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RCRA PART B PERMIT APPLICATION

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SECTION D: PROCESS INFORMATION

(Volume 4 of 13)

Fernald Environmental Management Project

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SECTION D:
PROCESS INFORMATION

SECTION D - PROCESS INFORMATION

RCRA Part B Permit Application
Fernald Environmental Management Project
Fernald, Ohio

The information provided in this section is submitted in accordance with the requirements of the Ohio Administrative Code (OAC) 3745-50-44 (C), and as otherwise provided in (OAC) 3745-55-70 through 78. This information is also in accordance with Title 40 of the Code of Federal Regulations (CFR) 270.15-21. Other federal hazardous waste regulations addressed in this section include 40 CFR 264.171-175.

D-1 CONTAINERS

This section discusses the specific process information for hazardous waste container storage at the Fernald Environmental Management Project (FEMP), formerly the Feed Materials Production Center (FMPC). The units to be permitted for storage of hazardous waste for more than 90 days are:

- CP Storage Warehouse - Building 56 (Butler Building)
- Plant 1 Pad
- Plant 8 Warehouse - Building 80
- Pilot Plant Warehouse - Building 68
- KC-2 Warehouse - Building 63
- Plant 9 Warehouse - Building 81
- Plant 6 Warehouse - Building 79

Figure D-1 shows the location of each of the above storage units at the facility. The container process information is discussed for each storage unit separately in the order shown above.

CP Storage Warehouse - Building 56 (Butler Building)

The CP Storage Warehouse is currently operated as a container storage building for the FEMP. Figure D-1 shows the location of the CP Storage Warehouse. The storage unit is a pre-engineered, ribbed, unheated building covered by metal roofing as shown in Figure D-2. The base of the unit is constructed of 6-inch thick concrete with 6-6-6/6 wire mesh fabric reinforcement as shown in Figure D-3. The maximum storage capacity is 127,435 gallons (2,317 55-gallon drum equivalents).

D-1a Containers with Free Liquids (CP Storage Warehouse)

This warehouse is presently constructed for storage of containers without free liquids. Secondary containment will be constructed before hazardous waste with free liquids is stored at the CP Storage Warehouse.

D-1b Containers Without Free Liquids (CP Storage Warehouse)

The CP Warehouse is designed for the storage of hazardous wastes without free liquids.

D-1b(1) Test for Free Liquids (CP Storage Warehouse)

The chemical and physical characteristics of the hazardous waste placed in the storage units are determined by visual inspection, specific material data, documented criteria, and/or process knowledge. The waste characterization process is described further in Section C, Waste Characteristics.

D-1b(2) Description of Containers (CP Storage Warehouse)

The CP Storage Warehouse will accept and store containerized hazardous waste in containers which meet RCRA specifications as delineated in OAC 3745-55-71 and 3745-55-72 and 40 CFR 264.171

and 264.172. Containers meeting DOT specifications or the equivalent are used as required to meet the RCRA storage container specifications.

The primary containers used at the facility include but are not limited to 55-gallon and 85-gallon drums. When overpacking of 55-gallon drums is required, 85-gallon drums are typically used. Other containers used at the facility are shown in Table D-1 with the container specifications.

Containers of hazardous waste are inspected for corrosion and other defects at the time they are first used and are inspected a minimum of once a week after they are filled and placed in the storage unit. The inspection schedule and procedures are described in Section F, Procedures to Prevent Hazards.

Hazardous waste container labelling includes the facility name and address, the EPA Identification Number, EPA Waste Number, the container fill date, and/or hazardous waste determination date. The facility lot number, inventory number, drum number, and the gross, net and tare weight are attached to the drum. A storage compatibility Reactivity Group Code (RGC) is marked and applied to each container.

D-1b(3) Container Management Practices (CP Storage Warehouse)

Various equipment is used to transport containers throughout the facility. The integrity of the containers is inspected prior to transport. Containers are inspected to ensure they are closed, non-leaking, and adequately secured for transport. Containers moved by truck or trailer are loaded and unloaded by fork-lift. The containers are strapped down and transported to the storage unit, once the safe conditions for movement are verified. Containers are elevated (for example, placed on pallets) during storage, to provide drainage within the

container storage area. The containers are stored with markings and labels visible and legible from the aisle.

A minimum aisle spacing of 22 inches will be maintained at the storage unit. The maximum number of containers and hazardous waste volume for each storage unit will vary depending on the type of container used and the applicable aisle spacing and stacking height.

Containers delivered to the hazardous waste storage unit are inspected according to the FEMP Hazardous Waste Container Prestorage Checklist (Figure D-4) to document the containers are acceptable for storage. This checklist is included as an example of the type of checklist used by the facility and is subject to change. Once the container is acceptable, the container is logged into the FEMP Hazardous Waste Log. This log records the container number, contents, Reactivity Group Code, and date of storage. A typical log sheet is shown in Figure D-5. This log sheet is included as an example of the type of log sheet used by the facility and is subject to change.

Hazardous waste types are grouped together and stored according to compatibility in accordance with Reactivity Group Codes and other appropriate information. Incompatible hazardous wastes are not simultaneously stored in the same area. Section F, Procedures to Prevent Hazards provides more information on the procedures used to ensure that incompatible hazardous wastes are not stored in the same area.

Individual drums shipped from the storage unit are logged out of the Hazardous Waste Log. Containers remain closed except when a sample must be obtained, for visual inspections as a part of the waste characterization, or during addition or removal of hazardous waste. Some containers are equipped with filters to prevent the build-up of pressure within the container.

D-1b(4) Container Storage Area Drainage (CP Storage Warehouse)

The CP Warehouse is a completely enclosed structure. Therefore, precipitation is not a factor. The topography around the storage unit slopes away from the building to prevent run-on. Containers stored in the CP Storage Warehouse are elevated to prevent contact with any accumulated liquids. The containers are also stored within a temporary Herculite containment system for the control of spills of hazardous waste without free liquids. This system consists of Herculite sheeting laid on the floor. A frame is constructed of four-inch PVC piping with slip fitted joints. The Herculite sheeting is rolled over the pipe frame to form the containment dike. The seams are heat sealed.

Plant 1 Pad

The location of the Plant 1 Pad is shown in Figure D-1. The pad was designed to function as a storage area for incoming processing materials. The materials were sampled to assay the contents, and then used in the production process. Process residues and waste materials were returned to the Plant 1 Pad to await further processing, or final disposal. A current photograph of the Plant 1 Pad is provided as Figure D-6.

The original pad was constructed on an eight-inch sub-base of crushed stone. The sub-base was topped with eight inches of class "E" concrete and reinforced with steel bars. Joints were sealed with a bituminous compound. In 1953 a large area of concrete had settled, creating several large cracks. These cracks were repaired using high, early strength concrete and hot bitumen to fill joints between the old and new concrete. Many areas of the pad have deteriorated since this time and have been repaired using asphalt.

The Plant 1 Pad will be renovated in accordance with the Work Plan approved by the Ohio EPA on April 3, 1991 and approved by the U.S. EPA on August 19, 1991. The existing pad and catch basins will be upgraded in the following manner:

- The existing pad will be coated with a polyethylene barrier prior to installing a new layer of concrete;
- A six inch concrete curb will be installed as shown in Figure D-7 to provide run-on and run-off control;
- New wearing surfaces will be covered with 86 mils of chemically resistant polyurethane, and;
- The trenches and sumps in the controlled areas will be coated with epoxy.

The design drawings for the Plant 1 Pad renovation are provided as Figures D-8 through D-16.

The total storage capacity of the Plant 1 Pad will be 10,892,200 gallons

based upon storing 198,040 55-gallon drums. Of this total capacity, 825,000 gallons of storage capacity, based upon storing 15,000 55-gallon drums, will be provided by three covered structures within the Plant 1 Pad. These structures are designed for storage of hazardous waste with and without free liquids.

D-1a Containers with Free Liquids (Plant 1 Pad)

Containers with free liquids may be stored in the Plant 1 Pad covered structures which will be constructed with secondary containment systems. The remaining portions of the Plant 1 Pad will be used for storage of containers without free liquids. This portion of the Plant 1 Pad is discussed in Section D-1b(2).

D-1a(1) Description of Containers (Plant 1 Pad)

The Plant 1 Pad will accept and store containerized hazardous waste in containers meeting RCRA specifications as delineated in OAC 3745-55-71 and 3745-55-72 and 40 CFR 264.171 and 264.172. Containers meeting DOT specifications or the equivalent will be used as required to meet the RCRA storage container specifications.

The primary containers used at the facility include but are not limited to 55-gallon and 85-gallon drums. When overpacking of 55-gallon drums is required, 85-gallon drums are typically used. Other containers used at the facility are shown in Table D-1 with the container specifications.

Containers are inspected for corrosion and other defects at the time they are first used and are inspected a minimum of once a week after they are filled and placed in the storage unit. The inspection schedule and procedures are described in Section F, Procedures to Prevent Hazards.

Hazardous waste container labelling includes the facility name and address, the EPA Identification Number, EPA Waste Number, the container fill date, and/or hazardous waste determination date. The facility lot number, inventory number, drum number, and the gross, net and tare weight are attached to the drum. A storage compatibility Reactivity Group Code (RGC) is marked and applied to each container.

D-1a(2) Container Management Practices (Plant 1 Pad)

Various equipment is used to transport containers throughout the facility. The integrity of the containers is inspected prior to transport. Containers are inspected to ensure they are closed, non-leaking, and adequately secured for transport. Containers moved by truck or trailer are loaded and unloaded by fork-lift. The containers are strapped down and transported to the storage unit, once the safe conditions for movement are verified. Containers are elevated (for example, placed on pallets) during storage, to provide drainage within the container storage area. The containers are stored with markings and labels visible and legible from the aisle.

Aisle spacing for the Plant 1 Pad will be maintained in accordance with the Consent Decree and its proposed amendments. The maximum number of containers and hazardous waste volume for each storage unit will vary depending on the type of container used and the applicable aisle spacing and stacking height.

Containers delivered to the hazardous waste storage unit are inspected according to the FEMP Hazardous Waste Container Prestorage Checklist (Figure D-4) to document the containers are acceptable for storage. This checklist is included as an example of the type of checklist used by the facility and is subject to change. Once the container is acceptable, the container is logged into the FEMP Hazardous Waste Log. This log

records the container number, contents, Reactivity Group Code, and date of storage. A typical log sheet is shown in Figure D-5. This log sheet is included as an example of the type of log sheet used by the facility and is subject to change.

Hazardous waste types are grouped together and stored according to compatibility in accordance with Reactivity group Codes and other appropriate information. Incompatible hazardous wastes are not simultaneously stored in the same area. Section F, Procedures to Prevent Hazards provides more information on the procedures used to ensure incompatible hazardous wastes are not stored in the same area.

Individual drums shipped from the storage unit are logged out of the Hazardous Waste Log. Containers remain closed except when a sample must be obtained, for visual inspections as a part of the waste characterization, or during adding or removal of hazardous waste. Some containers are equipped with filters to prevent the build-up of pressure in the container.

D-1a(3) Secondary Containment System Design and Operation (Plant 1 Pad)

Three tension support structures will be used to provide covered storage on the Plant 1 Pad, in addition to upgrading of the waste storage areas which are not covered. The proposed locations of the structures are shown in Figure D-7. Two of the structures will provide 70,000 square feet of storage area and a third will provide 22,500 square feet of storage. These structures will be erected with concrete curbs for containment. The containment for each structure will include a centrally located trench drain which will lead to a head end sump. These drains and sumps have no connection to site drainage systems and are intended to collect accumulated liquid from a leak or spill. The trench drains and sumps will be sealed with a chemically

resistant epoxy coating. The new concrete base will also be sealed with an 86 mil chemically resistant polyurethane wear surface. Figure D-9 shows the engineering details for the covered storage structures. The secondary containment system will be operated and maintained according to applicable regulations.

D-1a(3)(a) Requirement for the Base to Contain Liquids (Plant 1 Pad)

The concrete floor of the covered structures will be inspected for cracks and gaps. Any cracks or gaps identified will be repaired as necessary. The base, catch basins, and sumps in the covered structures of the Plant 1 Pad will be covered with a chemically resistant coating. Attachment D-1 provides examples of potential coating systems including chemical resistance data. The systems to be considered include polyurethane systems, epoxy systems, and miscellaneous systems. The coating used will be compatible with and impervious to the hazardous wastes stored at the Plant 1 Pad. A 12 inch concrete curb will be constructed around the perimeter of each secondary containment area.

D-1a(3)(b) Containment System Drainage (Plant 1 Pad)

Precipitation will not be a factor due the covered structures. The covered storage area floors will be sloped toward dedicated sumps which are not part of the site drainage systems and are intended to collect any released hazardous waste and rinseate in the event of a leak or spill. Containers stored at the Plant 1 Pad are elevated (for example, placed on pallets) during storage to eliminate the potential of spilled liquids coming into contact with the containers.

D-1a(3)(c) Containment System Capacity (Plant 1 Pad)

The design drawings for the Plant 1 Pad renovation are provided as Figures D-8 through D-16. The location of the three covered storage areas is shown in Figure D-7. The construction drawing for the Plant 1 Pad covered structures is provided as Figure D-9. Structures 1 and 2 will be divided into containment areas as shown in Figure D-9. Each containment area will be 220 ft x 80 ft with a 12-inch concrete dike constructed around the perimeter. The maximum storage capacity for each containment area is 275,000 gallons (5,000 55-gallon drum equivalents). The containment system capacity will be capable of holding at least 10 percent (or 27,500 gallons) of the maximum hazardous waste storage capacity for the area. The capacity of each of the secondary containment areas in Structures 1 and 2 is 120,600 gallons. The containment capacity calculations are provided in Attachment D-2.

Structure 3 will be constructed as structures 1 and 2 but with a single containment area. The containment area will be 22,500 square feet with a 12-inch concrete dike constructed around the perimeter. The maximum storage capacity is 275,000 gallons (5,000 55-gallon drum equivalent). The containment system capacity must be capable of holding at least 10 percent (or 27,500 gallons) of the maximum hazardous waste storage capacity of the area. The capacity of the secondary containment area in Structure 3 is 154,500 gallons. The containment capacity calculations are provided in Attachment D-2.

D-1a(3)(d) Control of Run-On (Plant 1 Pad)

The covered structures will provide run-on control for the storage of containers with free liquids. The covered

structures will be constructed upon a 12-inch concrete dike to prevent run-on from entering the storage areas.

D-1a(3)(e) Removal of Liquids From Containment System (Plant 1 Pad)

Liquids within the covered structures of the Plant 1 Pad will be collected by the catch basins and removed by pumps. The sumps will be inspected routinely for the presence of liquids and collected liquids will be removed from the sumps in a timely manner.

Vermiculite, diatomaceous earth, sand, sorbent pigs, or equivalent, will be used to contain and/or adsorb the spilled material within the immediate area. The characteristics of the spilled material will be established from the container identification if possible. The spill may then be cleaned up by absorption. A pumping system may be used to remove larger spills. A neutralizing agent will be used as necessary to reduce or eliminate the hazardous properties of the spill before absorption. Saturated sorbent material will be placed in a compatible container.

Samples will be analyzed for hazardous characteristics, if spilled material is not identifiable, in accordance with the FEMP Waste Analysis Plan and the Waste Determination Plan. The container will be properly labelled. Storage and disposal will be performed in accordance with applicable regulatory requirements. Equipment and materials used will be decontaminated or disposed of properly.

D-1b Containers Without Free Liquids (Plant 1 Pad)

The Plant 1 Pad will be used primarily for storage of containers without free liquids after completion of the upgrade activities. The covered structures will meet requirements for storage of containers with and without free liquids.

D-1b(1) Test for Free Liquids (Plant 1 Pad)

The chemical and physical characteristics of the hazardous waste placed in the storage units are determined by visual inspection, specific material data, documented criteria, and/or process knowledge. The waste characterization process is described further in Section C, Waste Characteristics.

D-1b(2) Description of Containers (Plant 1 Pad)

The primary containers used at the facility include but are not limited to 55-gallon and 85-gallon drums. A detailed description of the containers used at the FEMP is provided in Section D-1a(1). A list of containers used at the FEMP is provided in Table D-1.

D-1b(3) Container Management Practices (Plant 1 Pad)

The container management practices for containers without free liquids are the same as the containers with free liquids described in Section D-1a(2). The result is a single operating procedure that ensures hazardous waste containers at the FEMP are handled in a safe and cautious manner.

D-1b(4) Container Storage Area Drainage (Plant 1 Pad)

The base of the Plant 1 Pad is sloped toward catch basins to remove precipitation. The Plant 1 Pad drainage is shown in Figure D-7. The catch basins in the uncovered areas of Plant

1 Pad are connected with the stormwater management system. The covered structures will be equipped with dedicated sumps. Containers stored in these areas are elevated (for example, placed on pallets) during storage, to eliminating the potential of spilled liquids coming into contact with the containers.

Plant 8 Warehouse - Building 80

The Plant 8 Warehouse is a pre-engineered, ribbed, unheated building covered by metal roofing. This storage unit is designed and operated as a RCRA storage unit for storage of containers without free liquids. Figure D-1 shows the location of the Plant 8 Warehouse. A photograph of the Plant 8 Warehouse is provided as Figure D-17. Figure D-18 shows the plan view of the Plant 8 Warehouse with construction details. The base of the unit is constructed of eight inch thick concrete with number 4 reinforcement rods at 12 inch intervals as shown in Figure D-18.

The warehouse is presently constructed and being used for storage of containers without free liquids. Maximum capacity is 139,260 gallons (2,532 55-gallon drum equivalents). The Plant 8 Warehouse may be renovated to include a secondary containment system should future needs require increased capacity of hazardous waste with free liquids storage.

D-1a Containers with Free Liquids (Plant 8 Warehouse)

The Plant 8 Warehouse is presently designed for the storage of containers without free liquids. The Plant 8 Warehouse may be renovated for storage of containers with free liquids should future storage needs require increased capacities for containers with free liquids.

D-1b Containers Without Free Liquids (Plant 8 Warehouse)

The Plant 8 Warehouse is presently being used for the storage of wastes without free liquids.

D-1b(1) Test for Free Liquids (Plant 8 Warehouse)

The chemical and physical characteristics of the hazardous waste placed in the storage units are determined by visual inspection, by specific material data, documented criteria, and/or process

knowledge. The waste characterization process is described further in Section C, Waste Characteristics.

D-1b(2) Description of Containers (Plant 8 Warehouse)

The Plant 8 Warehouse accepts and stores containerized hazardous waste in containers meeting RCRA specifications as delineated in OAC 3745-55-71 and 3745-55-72 and 40 CFR 264.171 and 264.172. Containers meeting DOT specifications or the equivalent are used as required to meet the RCRA storage container specifications.

The primary containers used at the facility include but are not limited to 55-gallon and 85-gallon drums. When overpacking of 55-gallon drums is required, 85-gallon drums are typically used. Other containers used at the facility are shown in Table D-1 with the container specifications.

Containers are inspected for corrosion and other defects at the time they are first used and are inspected a minimum of once a week after they are filled and placed in the storage unit. The inspection schedule and procedures are described in Section F, Procedures to Prevent Hazards.

Hazardous waste container labelling includes the facility name and address, the EPA Identification Number, EPA Waste Number, the container fill date, and/or hazardous waste determination date. The facility lot number, inventory number, drum number, and the gross, net and tare weight are attached to the drum. A storage compatibility Reactivity Group Code (RGC) is marked and applied to each container.

D-1b(3) Container Management Practices (Plant 8 Warehouse)

Various equipment may be used to transport containers throughout the facility. The integrity of the containers is inspected

prior to transport. Containers are inspected to ensure they are closed, non-leaking, and adequately secured for transport. Containers moved by truck or trailer are loaded and unloaded by fork-lift. The containers are strapped down and transported to the storage unit, once the safe conditions for movement are verified. Containers are elevated (for example, placed on pallets) during storage, to provide drainage within the container storage area. The containers are stored with markings and labels visible and legible from the aisle.

A minimum aisle spacing of 22 inches is maintained at the storage unit. The maximum number of containers and hazardous waste volume for the storage unit varies depending on the type of container used and the applicable aisle spacing and stacking height.

Containers delivered to the hazardous waste storage unit are inspected according to the FEMP Hazardous Waste Container Prestorage Checklist (Figure D-4) to document the containers are acceptable for storage. This checklist is included as an example of the type of checklist used by the facility and it subject to change. Once the container is acceptable, the container is logged into the FEMP Hazardous Waste Log. This log records the container number, contents, Reactivity Group Code, and date of storage. A typical log sheet is shown in Figure D-5. This log sheet is included as an example of the type of log sheet used by the facility and is subject to change.

Hazardous waste types are grouped together and stored according to compatibility in accordance with Reactivity Group Codes and other appropriate information. Incompatible hazardous wastes are not simultaneously stored in the same area. Section F, Procedures to Prevent Hazards, provides more information on the procedures used to ensure incompatible hazardous wastes are not stored in the same area.

Individual drums shipped from the storage unit are logged out of the Hazardous Waste Log. Containers remain closed except when a sample must be obtained, for visual inspections as a part of waste characterization, or during addition or removal of waste. Some containers are equipped with filters to prevent the build-up of pressure in the container.

D-1b(4) Container Storage Area Drainage (Plant 8 Warehouse)

The Plant 8 Warehouse is a completely enclosed structure, therefore, precipitation is not a factor. Containers stored in the Plant 8 Warehouse are elevated (for example, placed on pallets) during storage, to eliminate the potential of spilled liquids coming into contact with the containers.

Pilot Plant Warehouse - Building 68

The Pilot Plant Warehouse is a pre-engineered metal fabricated building which is totally enclosed and covered by metal roofing. Figure D-1 shows the location of the Pilot Plant Warehouse. A photograph of the Pilot Plant Warehouse is provided in Figure D-19. The base of the warehouse is constructed of eight inch thick concrete with wire mesh fabric reinforcement as indicated in Figure D-20.

The major portion of the building is used for storage of thorium materials. Dry earthen material removed during relocation of the Gantry Crane is also stored in the Pilot Plant Warehouse. This material is hazardous waste. The hazardous wastes have been segregated to a separate area of the warehouse. This area of the warehouse is to be permitted as a RCRA storage area.

A layout drawing of the Pilot Plant Warehouse is provided as Figure D-21. The RCRA storage area is 62 ft by 7 ft located in the center of the building. The area is contained by four inch by four inch wooden beams with Herculite sheeting to form an impermeable barrier to contain spills of hazardous waste without free liquids. The maximum storage capacity of the RCRA storage area is 9,900 gallons (180 55-gallon drum equivalents).

D-1a Containers with Free Liquids (Pilot Plant Warehouse)

The Pilot Plant Warehouse is presently designed and operated for storage of containers without free liquids.

D-1b Containers Without Free Liquids (Pilot Plant Warehouse)

The Pilot Plant Warehouse is presently being used for the storage of hazardous wastes without free liquids.

D-1b(1) Test for Free Liquids (Pilot Plant Warehouse)

The chemical and physical characteristics of the hazardous waste placed in the storage units are determined by visual inspection, specific material data, documented criteria, and/or process knowledge. The waste characterization process is described further in Section C, Waste Characteristics.

D-1b(2) Description of Containers (Pilot Plant Warehouse)

The Pilot Plant Warehouse accepts and stores containerized hazardous waste in containers meeting RCRA specifications as delineated in OAC 3745-55-71 and 3745-55-72 and 40 CFR 264.171 and 264.172. Containers meeting DOT specifications or the equivalent are used as required to meet the RCRA storage container specifications.

The primary containers used at the facility include but are not limited to 55-gallon and 85-gallon drums. When overpacking of 55-gallon drums is required, 85-gallon drums are typically used. Other containers used at the facility are shown in Table D-1 with the container specifications.

Containers are inspected for corrosion and other defects at the time they are first used. The containers are inspected a minimum of once a week after they are filled and placed in the storage unit. The inspection schedule and procedures are described in Section F, Procedures to Prevent Hazards.

Hazardous waste container labelling includes the facility name and address, the EPA Identification Number, EPA Waste Number, the container fill date, and/or hazardous waste determination date. The facility lot number, inventory number, drum number, and the gross, net and tare weight are attached to the drum. A storage compatibility Reactivity Group Code (RGC) is marked and applied to each container.

D-1b(3) Container Management Practices (Pilot Plant Warehouse)

Various equipment may be used to transport containers throughout the facility. The integrity of the containers is inspected prior to transport. Containers are inspected to ensure the containers are closed, non-leaking, and adequately secured for transport and are strapped down during transport. Containers moved by truck or trailer are loaded and unloaded by fork-lift. The containers are strapped down and transported to the storage unit, once the safe conditions for movement are verified. Containers are elevated (for example, placed on pallets) during storage to provide drainage within the container storage area. The containers are stored with markings and labels visible and legible from the aisle.

A minimum aisle spacing of 22 inches is maintained at the storage unit. The maximum number of containers and hazardous waste volume for the storage unit varies depending on the type of container used and the applicable aisle spacing and stacking height.

Containers delivered to the hazardous waste storage unit are inspected according to the FEMP Hazardous Waste Container Prestorage Checklist (Figure D-4) to document the containers are acceptable for storage. This checklist is included as an example of the type of checklist used by the facility and is subject to change. Once the container is acceptable, the container is logged into the FEMP Hazardous Waste Log. This log records the container number, contents, Reactivity Group Code, and date of storage. A typical log sheet is shown in Figure D-5. This log sheet is included as an example of the type of log sheet used by the facility and is subject to change.

Hazardous waste types are grouped together and stored according

to compatibility in accordance with Reactivity Group Codes and other appropriate information. Incompatible hazardous wastes are not simultaneously stored in the same area. Section F, Procedures to Prevent Hazards provides more information on the procedures used to ensure that incompatible hazardous wastes are not stored in the same area.

Individual drums shipped from the storage unit are logged out of the Hazardous Waste Log. Containers remain closed except when a sample must be obtained, for visual inspections as a part of waste characterization, or during addition or removal of hazardous waste. Some containers are equipped with filters to prevent the build-up of pressure in the container.

D-1b(4) Container Storage Area Drainage (Pilot Plant Warehouse)

The Pilot Plant Warehouse is a completely enclosed structure, therefore, precipitation is not a factor. Containers stored in the Pilot Plant Warehouse are elevated (for example, placed on pallets) during storage to eliminate the potential of spilled liquids coming into contact with the containers.

KC-2 Warehouse (Bldg 63)

The KC-2 Warehouse can store containers with and without free liquids. Figure D-1 shows the location of the KC-2 Warehouse. A photograph of the KC-2 Warehouse is provided as Figure D-22. The detailed design drawings for the base of the storage unit is provided in Figures D-23 and D-24. The KC-2 Warehouse is subdivided into eight containment areas (Bays 1 through 8) by eight inch bearing walls (the east and west walls of each containment area). The north and south walls consist of fencing with attached corrugated sheet metal siding. The concrete slab comprising the floor of the bays is approximately eight inches thick.

Currently Bays 5, 6, and 7 have six inch by six inch concrete containment dikes overlain with an eight foot wide access ramp for storage of containers with free liquids. The bays are equipped with sprinkler systems and meet the standards for storage of flammable liquids. Construction details for the ramps is provided in Figure D-25. The maximum storage capacity of the KC-2 Warehouse is 234,520 gallons (4,264 55-gallon drum equivalents).

Bays 1, 2, 3, 4, and 8 currently have no concrete containment curbing and will therefore be used for non-liquid hazardous waste storage. Detailed design drawings for these bays are provided in Figures D-23 and D-24. The above-referenced bays are equipped with sprinkler systems. Bays 1, 2, 3, 4, and 8 may be renovated to include secondary containment in order to provide additional capacity for storage of hazardous waste with free liquids.

D-1a Containers with Free Liquids (KC-2 Warehouse)

The KC-2 Warehouse bays 5, 6, and 7 are presently designed for containers with and without free liquid.

D-1a(1) Description of Containers (KC-2 Warehouse)

The KC-2 Warehouse accepts and stores containerized hazardous waste in containers meeting RCRA specifications as delineated in OAC 3745-55-71 and 3745-55-72 and 40 CFR 264.171 and 264.172. Containers meeting DOT specifications or the equivalent are used as required to meet the RCRA storage container specifications.

The primary containers used at the facility include but are not limited to 55-gallon and 85-gallon drums. When overpacking of 55-gallon drums is required, 85-gallon drums are typically used. Other containers used at the facility are shown in Table D-1 with the container specifications.

Containers are inspected for corrosion and other defects at the time they are first used and are inspected a minimum of once a week after they are filled and placed in the storage unit. The inspection schedule and procedures are described in Section F, Procedures to Prevent Hazards.

Hazardous waste container labelling includes the facility name and address, the EPA Identification Number, EPA Waste Number, the container fill date, and/or hazardous waste determination date. The facility lot number, inventory number, drum number, and the gross, net and tare weight are attached to the drum. A storage compatibility Reactivity Group Code (RGC) is marked and applied to each container.

D-1a(2) Container Management Practices (KC-2 Warehouse)

Various equipment is used to transport containers throughout the facility. The integrity of the containers is inspected prior to transport. Containers are inspected to ensure they are closed, non-leaking, and adequately secured for transport. Containers moved by truck or trailer are loaded and unloaded by fork-lift. The containers are strapped down and transported to the storage unit, once the safe conditions for movement are verified. Containers are elevated (for example, placed on pallets) during storage, to provide drainage within the container storage area. The containers are stored with markings and labels visible and legible from the aisle.

A minimum aisle spacing of 22 inches is maintained at the storage unit. The maximum number of containers and hazardous waste volume for each storage unit varies depending on the type of container used and the applicable aisle spacing and stacking height.

Containers delivered to the hazardous waste storage unit are inspected according to the FEMP Hazardous Waste Container Prestorage Checklist (Figure D-4) to document the containers are acceptable for storage. This checklist is included as an example of the type of checklist used by the facility and is subject to change. Once the container is acceptable, the container is logged into the FEMP Hazardous Waste Log. This log records the container number, contents, Reactivity Group Code, and date of storage. A typical log sheet is shown in Figure D-5. This log sheet is included as an example of the type of log sheet used by the facility and is subject to change.

Hazardous waste types are grouped together and stored according to compatibility in accordance with Reactivity Group Codes and other appropriate information. Incompatible hazardous wastes

are not simultaneously stored in the same area. Section F, Procedures to Prevent Hazards provides more information on the procedures used to ensure that incompatible hazardous wastes are not stored in the same area.

Individual drums shipped from the storage unit are logged out of the Hazardous Waste Log. Containers remain closed except when a sample must be obtained, for visual inspections as a part of the waste characterization, or during addition or removal of hazardous waste. Some containers are equipped with filters to prevent the build-up of pressure in the container.

D-1a(3) Secondary Containment System Design and Operation (KC-2 Warehouse)

A plan view of the KC-2 Warehouse bays 5, 6, and 7 is provided in Figure D-24. Bays 5, 6, and 7 currently have six inch by six inch concrete containment dikes with a eight foot wide ramp to allow a forklift into each diked area. The concrete floor and dikes are coated with a durable epoxy to create an impermeable surface.

D-1a(3)(a) Requirement for the Base to Contain Liquids (KC-2 Warehouse)

The concrete floor of the warehouse is inspected for cracks and gaps. Any cracks or gaps identified are repaired as necessary. The floor and curbs are coated with a chemically resistant coating to create an impermeable surface. The base of the KC-2 Warehouse is scheduled to be recoated. Attachment D-1 provides examples of potential coating systems including chemical resistance data. The systems to be considered include polyurethane systems, epoxy systems, and miscellaneous systems. The coating used will be compatible with and

impervious to the hazardous wastes stored at the KC-2 Storage Warehouse. The secondary containment systems are designed to contain a minimum of 10 percent of the maximum storage capacity within the secondary containment system.

D-1a(3)(b) Containment System Drainage (KC-2 Warehouse)

Containers stored in the KC-2 Warehouse are elevated (for example, placed on pallets) during storage to eliminate the potential of spilled liquids coming into contact with the containers. The accumulated liquid is contained within the secondary containment system until the material is removed as described in Section D-1a(3)(e).

D-1a(3)(c) Containment System Capacity (KC-2 Warehouse)

Hazardous waste containers stored in the KC-2 Warehouse storage bays are elevated during storage. The storage and containment system capacities for bays 5, 6, and 7 of the KC-2 Warehouse storage unit are discussed separately below.

- Bay 5 - The maximum storage capacity is 25,080 gallons (456 55-gallon drum equivalents). The minimum containment capacity must equal or exceed ten percent of the maximum storage volume or 2,508 gallons. The secondary containment capacity is 7,682 gallons. The containment capacity calculations are provided in Attachment D-2.

- Bay 6 - The maximum storage capacity is 25,520 gallons (464 55-gallon drum equivalents). A minimum containment capacity must equal or exceed 10 percent

of the maximum storage volume or 2,552 gallons. The secondary containment capacity is 7,659 gallons. The containment capacity calculations are provided in Attachment D-2.

- Bay 7 - The maximum storage capacity is 13,200 gallons (240 55-gallon drum equivalents). A minimum containment capacity must equal or exceed 10 percent of the maximum storage volume or 1,320 gallons. The secondary containment capacity is 4,233 gallons. The containment capacity calculations are provided in Attachment D-2.

D-1a(3)(d) Control of Run-On (KC-2 Warehouse)

The KC-2 Warehouse bays are completely covered preventing precipitation from entering the storage areas. The area around the warehouse is sloped away from the building to prevent run-on. Bays 5, 6, and 7 are also constructed with diking to further prevent run-on.

D-1a(3)(e) Removal of Liquids from Containment System (KC-2 Warehouse)

Spills and leaks are contained within the diked containment area. Spills and leaks are remediated as follows in a timely manner.

Vermiculite, diatomaceous earth, sand, sorbent pigs, or equivalent, are used to contain and/or adsorb the spilled material within the immediate area. The characteristics of the spilled material are established from the container identification if possible. The spill may then be cleaned up by absorption. A pumping system may be used to remove

larger spills. A neutralizing agent is used as necessary to reduce or eliminate the hazardous properties of the spill before absorption. Saturated sorbent material is placed in a compatible container.

Samples are analyzed for hazardous characteristics, if spilled material is not identifiable, in accordance with the FEMP Waste Analysis Plan and the Waste Determination Plan. The container is properly labelled. Storage and disposal is performed in accordance with applicable regulatory requirements. Equipment and materials used is decontaminated or disposed of properly.

D-1b Containers Without Free Liquids (KC-2 Warehouse)

The KC-2 Warehouse bays 1, 2, 3, 4, and 8 may be used for the storage of hazardous wastes without free liquids. Bays 5, 6, and 7 may also be used for storage of containers without free liquids. The maximum storage capacities for the non-liquid bays are:

- Bay 1 49,280 gallons (896 55-gallon drum equivalents)
- Bay 2 49,280 gallons (896 55-gallon drum equivalents)
- Bay 3 39,600 gallons (720 55-gallon drum equivalents)
- Bay 4 25,520 gallons (464 55-gallon drum equivalents)
- Bay 8 7,040 gallons (128 55-gallon drum equivalents)

The storage capacities for Bays 5, 6, and 7 are discussed in Section D-1a(3)(c).

D-1b(1) Test for Free Liquids (KC-2 Warehouse)

The chemical and physical characteristics of the hazardous waste placed in the storage units are determined by visual

inspection specific material data, documented criteria, and/or process knowledge. The waste characterization process is described further in Section C, Waste Characteristics.

D-1b(2) Description of Containers (KC-2 Warehouse)

The primary containers used at the facility include but are not limited to 55-gallon and 85-gallon drums. A detailed description of containers used at the FEMP is provided in the Section D-1a(1). A list of containers used at the FEMP is provided in Table D-1.

D-1b(3) Container Management Practices (KC-2 Warehouse)

The container management practices for containers without free liquids are the same as the containers with free liquids described in Section D-1a(2). The result is a single operating procedure that ensures containers at the FEMP are handled in a safe and cautious manner.

D-1b(4) Container Storage Area Drainage (KC-2 Warehouse)

The KC-2 Warehouse is a completely enclosed structure, therefore, precipitation is not a factor. Containers stored in the warehouse bays are elevated (for example, placed on pallets) during storage, to eliminate the potential of spilled liquids coming into contact with the containers.

Plant 9 Warehouse - Building 81

The Plant 9 Warehouse is an 80 foot by 100 foot single story, pre-engineered, ribbed, metal building covered with metal roofing. Concrete dikes and curbs were installed in 1990. The original stormwater drains and sumps were sealed. Figure D-1 provides the location of the Plant 9 Warehouse. Figure D-26 provides a photograph of the Plant 9 Warehouse.

A detailed construction drawing of the Plant 9 Warehouse base is shown in Figure D-27. The base is constructed of six inch concrete with number 3 reinforcement rods at 12 inch intervals. The interior is subdivided into three containment areas (Bays A, B, and C). Concrete six inch by six inch dikes have been constructed around the perimeter of each containment area. Ramps have been constructed providing access to the containment areas. The maximum storage capacity of the Plant 9 Warehouse is 83,160 gallons (1,512 55-gallon drum equivalents).

D-1a Containers with Free Liquids (Plant 9 Warehouse)

The Plant 9 Warehouse is being used for the storage of containers with and without free liquids.

D-1a(1) Description of Container (Plant 9 Warehouse)

The Plant 9 Warehouse accepts and stores hazardous waste in containers meeting RCRA specifications as delineated in OAC 3745-55-71 and 3745-55-72 and 40 CFR 264.171.

The primary containers used at the facility include but are not limited to 55-gallon and 85-gallon drums. When overpacking of 55-gallon drums is required, 85-gallon drums are typically used. Other containers used at the facility are shown in Table D-1 with the container specifications.

Containers of hazardous waste are inspected for corrosion and

other defects at the time they are first used. The containers are inspected a minimum of once a week after they are filled and placed in the storage unit. The inspection schedule and procedures are described in Section F, Procedures to Prevent Hazards.

Hazardous waste container labelling includes the facility name and address, the EPA Identification Number, EPA Waste Number, and initial date of storage. The facility lot number, inventory number, drum number, and the gross, net and tare weight are attached to the drum. A storage compatibility Reactivity Group Code (RGC) is marked and applied to each container.

D-1a(2) Container Management Practices (Plant 9 Warehouse)

Various equipment is used to transport containers throughout the facility. The integrity of the containers is inspected prior to transport. Containers are inspected to ensure they are closed, non-leaking, and adequately secured for transport. Containers moved by truck or trailer are loaded and unloaded by forklift. The containers are strapped down and transported to the storage unit, once the safe conditions for movement are verified. Containers are elevated (for example, placed on pallets) during storage to eliminate the potential of spilled liquids coming into contact with the containers. The containers are stored with markings and labels visible and legible from the aisle.

A minimum aisle spacing of 22 inches is maintained at the storage unit. The maximum number of containers and hazardous waste volume for each storage unit varies depending on the type of container used and the applicable aisle spacing and stacking height.

Containers delivered to the hazardous waste storage unit are

inspected according to the FEMP Hazardous Waste Container Prestorage Checklist (Figure D-4) to document the containers are acceptable for storage. This checklist is included as an example of the type of checklist used by the facility and is subject to change. Once the container is acceptable, the container is logged into the FEMP Hazardous Waste Log. This log records the container number, contents, Reactivity Group Code, and date of storage. A typical log sheet is shown in Figure D-5. This log sheet is included as an example of the type of log sheet used by the facility and is subject to change.

Hazardous waste types are grouped together and stored according to compatibility in accordance with Reactivity Group Codes and other appropriate information. Incompatible hazardous wastes are not simultaneously stored in the same area. Section F, Procedures to Prevent Hazards provides more information on the procedures used to ensure incompatible hazardous wastes are not stored in the same area.

Individual drums shipped from the storage unit are logged out of the Hazardous Waste Log. Containers remain closed except when a sample must be obtained, for visual inspections as a part of the waste characterization, or during addition or removal of hazardous waste. Some containers are equipped with filters to prevent the build-up of pressure in the container.

D-1a(3) Secondary Containment System Design and Operation (Plant 9 Warehouse)

Detailed design parameters, dimensions and materials of construction for the Plant 9 Warehouse is provided in Figure D-27. The warehouse is completely under roof and enclosed. Each of the three bays of the warehouse have a secondary containment system constructed with a six inch by six inch concrete dike. Ramps are used at the entrances allowing access to the

completely enclosed perimeter. The secondary containment system is operated and maintained according to applicable regulations.

D-1a(3)(a) Requirement for the Base to Contain Liquids (Plant 9 Warehouse)

The concrete floor of the warehouse is inspected for cracks and gaps. Any cracks or gaps identified are repaired as necessary. The floor and curbs are coated with a chemically resistant coating to create an impermeable surface. The base of the Plant 9 Warehouse is scheduled to be recoated. Attachment D-1 provides examples of potential coating systems including chemical resistance data. The systems to be considered include polyurethane systems, epoxy systems, and miscellaneous systems. The coating used are compatible with and impervious to the hazardous wastes stored at the Plant 9 Warehouse. The secondary containment system is designed to contain a minimum of 10 percent of the maximum storage capacity of free liquids in each bay of the Plant 9 Warehouse. Precipitation is not a factor of influence since the storage unit is completely enclosed.

D-1a(3)(b) Containment System Drainage (Plant 9 Warehouse)

Containers stored in the Plant 9 Warehouse are (for example, placed on pallets) during storage to eliminate the potential of spilled liquids coming into contact with the containers. The accumulated liquid is contained within the secondary containment system until the material is removed as described in Section D-1a(3)(e).

D-1a(3)(c) Containment System Capacity (Plant 9 Warehouse)

Hazardous waste containers stored in the Plant 9 Warehouse storage bays are elevated during storage. The storage and containment system capacities for each bay of the Plant 9 Warehouse storage unit is discussed separately below.

- Bay A - The maximum storage capacity for Bay A is 30,360 gallons (552 55-gallon drum equivalents). A minimum containment capacity must equal or exceed 10 percent of the maximum storage volume or 3,036 gallons. The secondary containment capacity is 7,327 gallons. The containment capacity calculations are provided in Attachment D-2.

- Bay B - The maximum storage capacity for Bay B is 49,500 gallons (900 55-gallon drum equivalents). A minimum containment capacity must equal or exceed 10 percent of the maximum storage volume or 4,950 gallons. The secondary containment capacity is 10,495 gallons. The containment capacity calculations are provided in Attachment D-2.

- Bay C - The maximum storage capacity for Bay C is 3,300 gallons (60 55-gallon drum equivalents). A minimum containment capacity must equal or exceed 10 percent of the maximum storage volume or 330 gallons. The secondary containment capacity is 1,046 gallons. The containment capacity calculations are provided in Attachment D-2.

D-1a(3)(d) Control of Run-On (Plant 9 Warehouse)

Precipitation is prevented from entering the Plant 9 Warehouse since this area is completely covered and enclosed on all sides. The area around the warehouse is sloped away from the building to further prevent run-on.

D-1a(3)(e) Removal of Liquids from Containment System (Plant 9 Warehouse)

Spills and leaks are contained with the diked containment area. Spills and leaks are remediated in a timely manner.

Vermiculite, diatomaceous earth, sand, sorbent pigs, or equivalent, are used to contain and/or adsorb the spilled material within the immediate area. The characteristics of the spilled material are established from the container identification if possible. The spill may then be cleaned up by absorption. A pumping system may be used to remove larger spills. A neutralizing agent is used as necessary to reduce or eliminate the hazardous properties of the spill before absorption. Saturated sorbent material is placed in a compatible container.

Samples is analyzed for hazardous characteristics, if spilled material is not identifiable, in accordance with the FEMP Waste Analysis Plan and the Waste Determination Plan. The container is properly labelled. Storage and disposal is performed in accordance with applicable regulatory requirements. Equipment and materials used are decontaminated or disposed of properly.

D-1b Containers without free liquids (Plant 9 Warehouse)

The Plant 9 Warehouse may be used for the storage of hazardous waste with and without free liquids.

D-1b(1) Test for Free Liquids (Plant 9 Warehouse)

The chemical and physical characteristics of the hazardous waste placed in the storage units are determined by visual inspection, specific material data, documented criteria, and/or process knowledge. The waste characterization process is described further in Section C, Waste Characteristics.

D-1b(2) Description of Containers (Plant 9 Warehouse)

The primary containers used at the facility include but are not limited to 55-gallon and 85-gallon drums. A detailed description of containers used at the facility is provided in Section D-1a(1). A list of containers used at the FEMP is provided in Table D-1.

D-1b(3) Container Management Practices (Plant 9 Warehouse)

The container management practices for containers without free liquids are the same as the containers with free liquids described in Section D-1a(2). The result is a single operating procedure that ensures containers at the FEMP are handled in a safe and cautious manner.

D-1b(4) Container Storage Area Drainage (Plant 9 Warehouse)

The Plant 9 Warehouse is a completely enclosed structure, therefore, precipitation is not a factor. Containers stored in the warehouse bays are elevated (for example, placed on pallets) during storage, to eliminate the potential of spilled liquids coming into contact with the containers.

Plant 6 Warehouse - Building 79

The Plant 6 Warehouse is a pre-engineered, ribbed, unheated building covered by metal roofing. Figure D-1 shows the location of the Plant 6 Warehouse. The warehouse can store containers with and without free liquids. A photograph of the Plant 6 Warehouse is provided as Figure D-28. The storage unit is divided into three diked bays with access ramps provided for access to the enclosed areas as shown in Figure D-29. As indicated, the base is constructed of eight inch concrete with number 4 reinforcement rods at 12 inch intervals. The maximum storage capacity is 202,620 gallons (3,684 55-gallon drum equivalents).

D-1a Containers with Free Liquids (Plant 6 Warehouse)

The Plant 6 Warehouse is designed for the storage of containers with and without free liquids.

D-1a(1) Description of Containers (Plant 6 Warehouse)

The Plant 6 Warehouse accepts and stores hazardous waste in containers meeting RCRA specifications as delineated in OAC 3745-55-71 and 3745-55-72 and 40 CFR 264.171 and 264.172. Containers meeting DOT specifications or the equivalent are used as required to meet the RCRA storage container specifications.

The primary containers used at the facility include but are not limited to 55-gallon and 85-gallon drums. When overpacking of 55-gallon drums is required, 85-gallon drums are typically used. Other containers used at the facility are shown in Table D-1 with the container specifications.

Containers are inspected for corrosion and other defects at the time they are first used. The containers are inspected a minimum of once a week after they are filled and placed in the storage unit. The inspection schedule and procedures are described in Section F, Procedures to Prevent Hazards.

Hazardous waste container labelling includes the facility name and address, the EPA Identification Number, EPA Waste Number, the container fill date, and/or hazardous waste determination date. The facility lot number, inventory number, drum number, and the gross, net and tare weight are attached to the drum. A storage compatibility Reactivity Group Code (RGC) is marked and applied to each container.

D-1a(2) Container Management Practices (Plant 6 Warehouse)

Various equipment is used to transport containers throughout the facility. The integrity of the containers is inspected prior to transport. Containers are inspected to ensure they are closed, non-leaking, and adequately secured for transport. Containers moved by truck or trailer are loaded and unloaded by fork-lift. The containers are strapped down and transported to the storage unit, once the safe conditions for movement are verified. Containers are elevated (for example, placed on pallets) during storage, to provide drainage within the container storage area. The containers are stored with markings and labels visible and legible from the aisle.

A minimum aisle spacing of 22 inches is maintained at the storage unit. The maximum number of containers and hazardous waste volume for the storage unit varies depending on the type of container used and the applicable aisle spacing and stacking height.

Containers delivered to the hazardous waste storage unit are

inspected according to the FEMP Hazardous Waste Container Prestorage Checklist (Figure D-4) to document the containers are acceptable for storage. This checklist is included as an example of the type of checklist used by the facility and is subject to change. Once the container is acceptable, the container is logged into the FEMP Hazardous Waste Log. This log records the container number, contents, Reactivity Group Code, and date of storage. A typical log sheet is shown in Figure D-5. This log sheet is included as an example of the type of log sheet used by the facility and is subject to change.

Hazardous waste types are grouped together and stored according to compatibility in accordance with Reactivity Group Codes and other appropriate information. Incompatible hazardous wastes are not simultaneously stored in the same area. Section F - Procedures to Prevent Hazards provides more information on the procedures used to ensure incompatible hazardous wastes are not stored in the same area.

Individual drums shipped from the storage unit are logged out of the Hazardous Waste Log. Containers remain closed except when a sample must be obtained, for visual inspections as a part of the waste characterization, or during addition or removal of hazardous waste. Some containers are equipped with filters to prevent the build-up of pressure in the container.

D-1a(3) Secondary Containment System Design and Operation (Plant 6 Warehouse)

The warehouse is completely under roof and enclosed and is equipped with a secondary containment system. This containment system includes six inch by six inch concrete dikes around the perimeter of the three storage units (Bays A, B, and C) as shown in Figure D-29. Ramps are used to allow access to the containment area. The secondary containment system is operated

and maintained according to applicable regulations.

D-1a(3)(a) Requirement for the Base to Contain Liquids (Plant 6 Warehouse)

The concrete floor of the warehouse is inspected for cracks and gaps. Any cracks or gaps identified are repaired as necessary. The floor and curbs are coated with a chemically resistant coating to create an impermeable surface. The base of the Plant 6 Warehouse is scheduled to be recoated. Attachment D-1 provides information on potential coating systems, including chemical resistance data. The systems to be considered include polyurethane systems, epoxy systems, and miscellaneous systems. The coating used will be compatible with and impervious to the hazardous wastes stored at the Plant 6 Warehouse. The containment system is designed to contain a minimum 10 percent of the maximum capacity of the Plant 6 Warehouse.

D-1a(3)(b) Containment System Drainage (Plant 6 Warehouse)

Containers stored in the Plant 6 Warehouse are elevated (for example, placed on pallets) during storage to eliminate the potential of spilled liquids coming into contact with the containers. The accumulated liquid is contained within the secondary containment system until the material is removed as described in Section D-1a(3)(e). Precipitation is not a factor of influence since the storage unit is completely enclosed.

D-1a(3)(c) Containment System Capacity (Plant 6 Warehouse)

Hazardous waste containers stored in the Plant 6 Warehouse storage bays are elevated during storage. The storage and containment system capacities for each bay of the Plant 6 Warehouse storage unit are discussed separately below.

- Bay A - The maximum storage capacity for Bay A is 84,480 gallons (1,536 55-gallon drum equivalents). A minimum containment capacity must equal or exceed 10 percent of the maximum storage volume or 8,448 gallons. The secondary containment capacity is 11,553 gallons. The containment capacity calculations are provided in Attachment D-2.

- Bay B - The maximum storage capacity for Bay B is 60,720 gallons (1,104 55-gallon drum equivalents). A minimum containment capacity must equal or exceed 10 percent of the maximum storage volume or 6,072 gallons. The secondary containment capacity is 12,791 gallons. The containment capacity calculations are provided in Attachment D-2.

- Bay C - The maximum storage capacity for Bay C is 57,420 gallons (1,044 55-gallon drum equivalents). A minimum containment capacity must equal or exceed 10 percent of the maximum storage volume or 5,742 gallons. The secondary containment capacity is 16,131 gallons. The containment capacity calculations are provided in Attachment D-2.

D-1a(3)(d) Control of Run-On (Plant 6 Warehouse)

Precipitation is prevented from entering the storage unit since this area is completely covered and enclosed on all sides. To further prevent run-on, the topography around the warehouse is sloped away from the building.

D-1a(3)(e) Removal of Liquids from Containment System (Plant 6 Warehouse)

Spills and leaks are contained within the diked containment area. Spills and leaks are remediated in a timely manner.

Vermiculite, diatomaceous earth, sand, sorbent pigs, or equivalent, are used to contain and/or adsorb the spilled material within the immediate area. The characteristics of the spilled material are established from the container identification if possible. The spill may then be cleaned up by absorption. A pumping system may be used to remove larger spills. A neutralizing agent is used as necessary to reduce or eliminate the hazardous properties of the spill before absorption. Saturated sorbent material is placed in a compatible container.

Samples are analyzed for hazardous characteristics, if spilled material is not identifiable, in accordance with the FEMP Waste Analysis Plan and the Waste Determination Plan. The container is properly labelled. Storage and disposal is performed in accordance with applicable regulatory requirements. Equipment and materials used is decontaminated or disposed of properly.

D-1b Containers Without Free Liquids (Plant 6 Warehouse)

The Plant 6 Warehouse may be used for the storage of hazardous waste with and without free liquids.

D-1b(1) Test for Free liquids (Plant 6 Warehouse)

The chemical and physical characteristics of the hazardous waste placed in the storage units are determined by visual inspection specific material data, documented criteria, and/or process knowledge. The waste characterization process is described further in Section C, Waste Characteristics.

D-1b(2) Description of Containers (Plant 6 Warehouse)

The primary containers used at the facility include but are not limited to 55-gallon and 85-gallon drums. A detailed description of containers used at the FEMP is provided in Section D-1a(1). A list of containers used at the FEMP is provided in Table D-1.

D-1b(3) Container Management Practices (Plant 6 Warehouse)

The container management practices for containers without free liquids are the same as the containers with free liquids described in Section D-1a(2). The result is a single operating procedure that ensures containers at the FEMP are handled in a safe and cautious manner.

D-1b(4) Container Storage Area Drainage (Plant 6 Warehouse)

The Plant 6 Warehouse is a completely enclosed structure, therefore, precipitation is not a factor. Containers stored in the Plant 6 Warehouse are elevated (for example, placed on pallets) during storage to eliminate the potential of spilled liquids coming into contact with the containers.

D-2 TANK SYSTEMS

The FEMP is not seeking a permit for tank systems, therefore, this section is not applicable.

D-3 WASTE PILES

The FEMP is not seeking a permit for waste piles, therefore, this section is not applicable.

D-4 SURFACE IMPOUNDMENTS

The FEMP is not seeking a permit for surface impoundments, therefore, this section is not applicable.

D-5 TRIAL BURN

The FEMP is not seeking a permit for trial burns, therefore, this section is not applicable.

D-6 LANDFILLS

The FEMP is not seeking a permit for landfills, therefore, this section is not applicable.

D-7 LAND TREATMENT

The FEMP is not seeking a permit for land treatment, therefore, this section is not applicable.

D-8 MISCELLANEOUS UNITS

The FEMP is not seeking a permit for miscellaneous units, therefore, this section is not applicable.

D-9 SUBPART AA

The facility has no process vents associated with distillation, fractionation, thin-film evaporation, solvent extraction or air or steam stripping managing hazardous wastes with organic concentrations at least 10 parts per million (ppm). Therefore the facility is not subject to this rule at this time.

D-10 SUBPART BB

The facility has no equipment that contains or contacts hazardous waste with organic concentrations of at least 10 percent by weight that are managed in:

- Units that are subject to the permitting requirements of 40 CFR Part 270, or
- Hazardous waste recycling units that are located at hazardous waste management facilities otherwise subject to the permitting requirements of 40 CFR Part 270.

Therefore, the facility is not subject to this rule at this time.

SECTION D:
TABLES

Table D-1

CONTAINER SPECIFICATIONS

CONTAINER TYPE	APPROXIMATE NUMBER	DOT SPECIFICATIONS	VOLUME	WASTE TYPE
Single Trip, Bung Type	1,182	17E	55-gallon	liquids
Single Trip, Open Head	11,841	17H	55-gallon	liquids and solids
Sealed Head	10	5	5-gallon	liquids
Metal Drum	400	17C	10-gallon	liquids
Metal Drum	500	17C	30-gallon	liquids and solids
Metal Drum	4,069	16 gauge	85-gallon	liquids
Metal Drum	4	16 gauge	110-gallon	liquids
Steel	2	Type 7-A	330-gallon	solids
Steel (Sea/Land)	-0-	Strong Tight Packaging	40 cu. yd.	solids

Containers meeting DOT specifications or equivalent will be used as required to meet the RCRA storage container specifications.

SECTION D:
FIGURES

N

N 492,784.678
E 1,376,578.563

S.R. 126

NORTH ACCESS ROAD

CONSTRUCTION ACCESS ROAD

PADDY'S RUN

BUTLER CO.
HAMILTON CO.

KC-2 WAREHOUSE (BLDG.63)

CP STORAGE WAREHOUSE (BLDG.56 BUTLER BLDG.)

PIT #5

PIT #6

PIT #4

PIT #3

PIT #2

PIT #1

CLEAR WELL

SURGE LAGOON

PLANT 1 STORAGE AREA

PLANT 9 WAREHOUSE (BLDG.81)

PLANT 6 WHSE. (BLDG.79)

PADDY'S RUN ROAD

PLANT 8 WHSE. (BLDG.80)

PILOT PLANT WHSE. (BLDG.68) STORAGE AREA

STORM WATER RETENTION BASIN

STORM WATER RETENTION BASIN EXPANSION

S.W.R.B. OUTFALL E.P.A. NUMBER 002

TRIBUTARIES FEEDING PADDY'S RUN CREEK

SOUTH ACCESS ROAD

WILLEY ROAD

WIND DIRECTION AND SPEED OCCURRENCES

DATE: 7/25/9
REVISION NO.

BASED ON 10 METER WIND OBSERVATIONS FOR 1987-1990 AT THE FEED MATERIALS PRODUCTION CENTER

N

4.0% 2.7 MPH
4.1% 2.7 MPH
4.6% 2.5 MPH
7.4% 2.3 MPH
4.2% 1.5 MPH
1.3% 2.4 MPH
1.9% 1.4 MPH
2.6% 1.8 MPH
4.3% 2.3 MPH
9.1% 2.6 MPH
12.4% 2.3 MPH
1.13% 2.0 MPH
10.9% 2.1 MPH
9.1% 2.1 MPH
6.8% 2.1 MPH
4.8% 2.1 MPH

W E

FMPC

S

GRID NORTH
(U.S.G.S. & O.S.P.) TRUE NORTH
MAGNETIC NORTH
1°28' 26 MILS
1° 18 MILS

300' 0' 300' 600' 900'
SCALE

2478

U.S. DEPARTMENT OF ENERGY

FIGURE D-1

FERNALD, OHIO

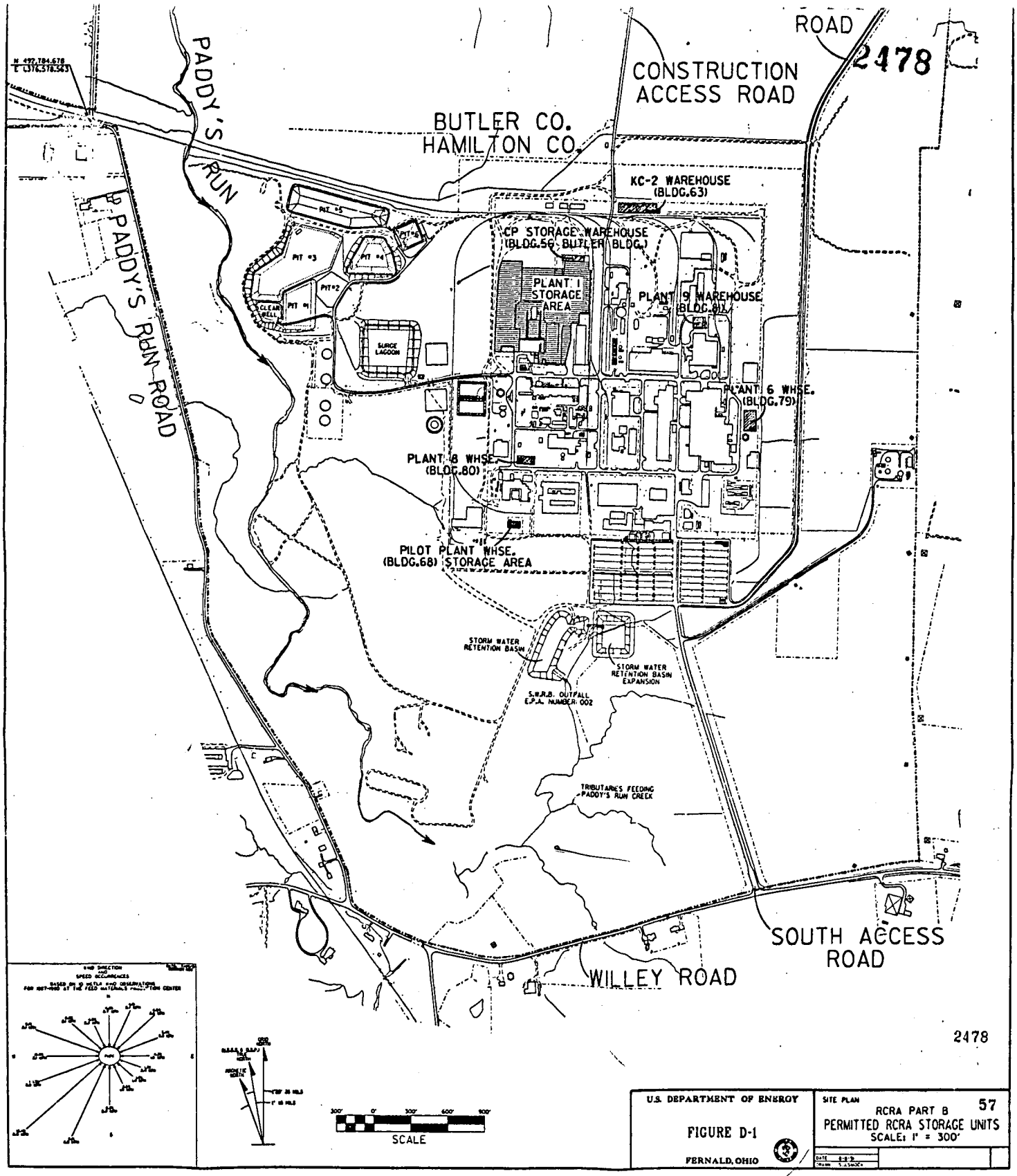
SITE PLAN

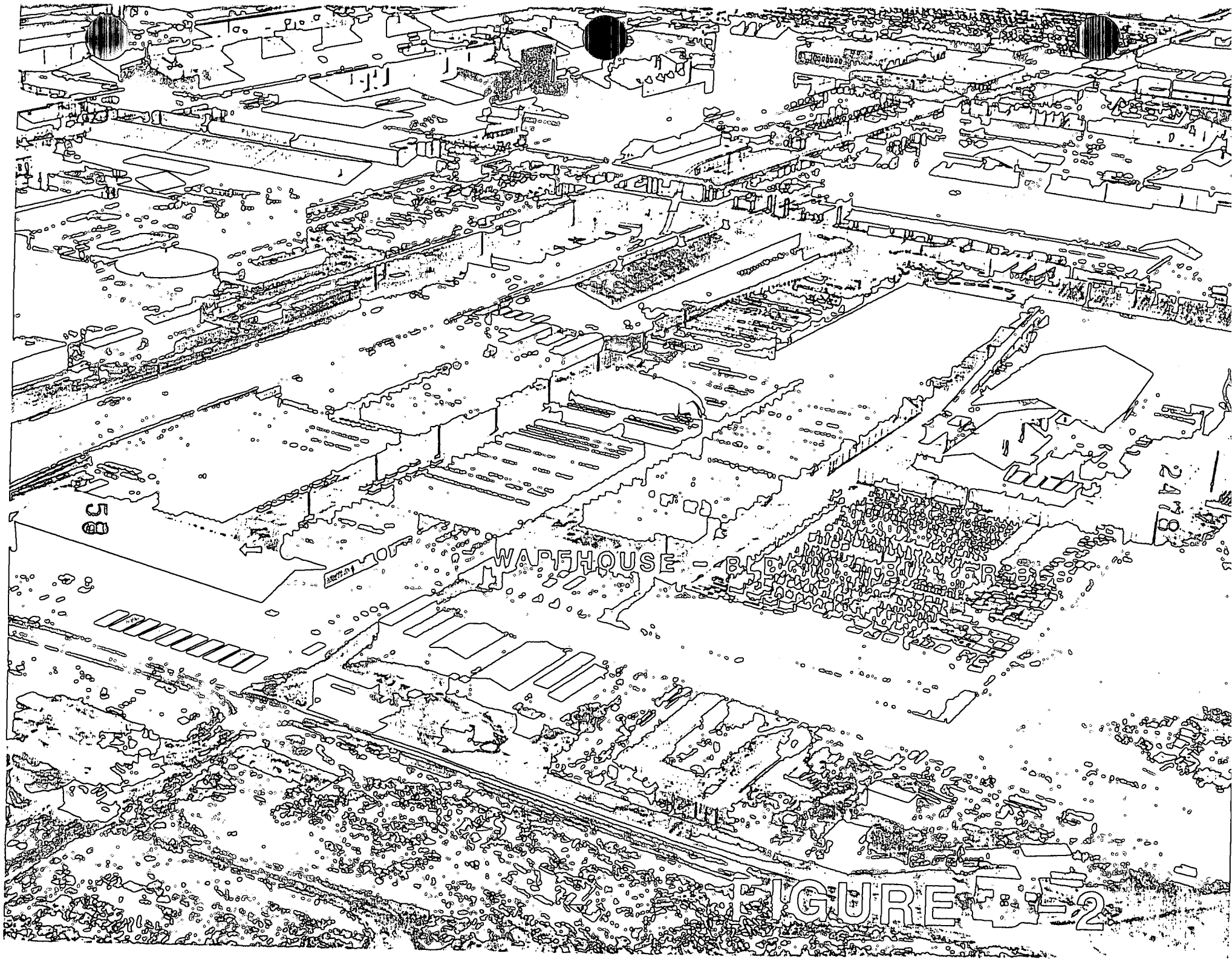
57

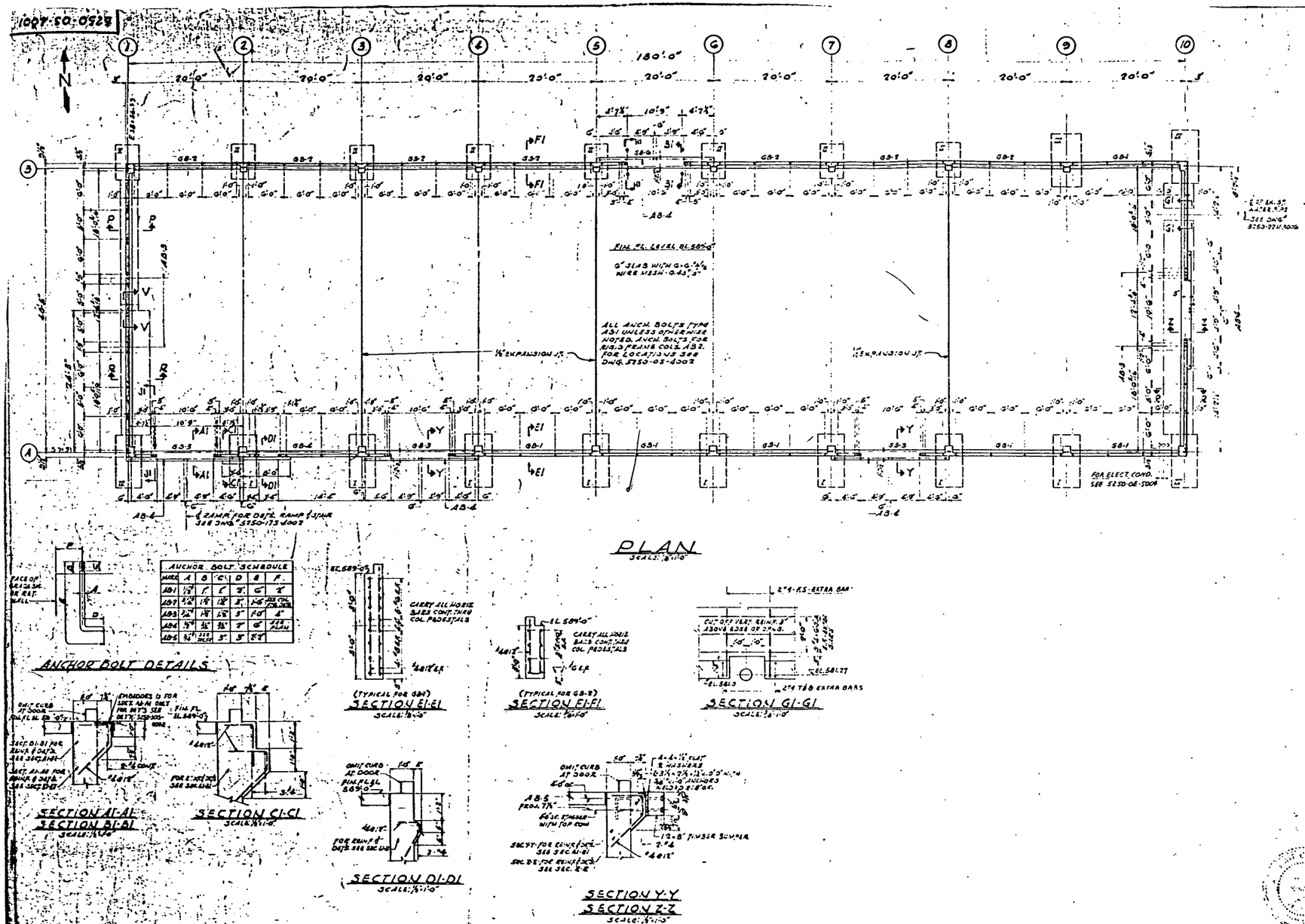
RCRA PART B
PERMITTED RCRA STORAGE UNITS
SCALE: 1" = 300'

DATE 8-8-91
DRAWN S.J.SMOCK

FILE NAME: ZFA2:[200,6]9IRCRAAL.DCN


ROAD
2478
CONSTRUCTION ACCESS ROAD
BUTLER CO.
HAMILTON CO.
PADDY'S RUN
PADDY'S RUN ROAD
KC-2 WAREHOUSE (BLDG.63)
CP STORAGE WAREHOUSE (BLDG.56, BUTLER BLDG.)
PLANT 1 STORAGE AREA
PLANT 9 WAREHOUSE (BLDG.81)
PLANT 6 WHSE. (BLDG.79)
PLANT 8 WHSE. (BLDG.80)
PILOT PLANT WHSE. (BLDG.68) STORAGE AREA
PIT #5
PIT #6
PIT #3
PIT #4
PIT #2
PIT #1
CLEAR WELL
SURGE LAGOON
STORM WATER RETENTION BASIN
STORM WATER RETENTION BASIN EXPANSION
S.W.R.B. OUTFALL E.P.A. NUMBER 002
TRIBUTARIES FEEDING PADDY'S RUN CREEK
SOUTH ACCESS ROAD
WILLEY ROAD
2478
SCALE
U.S. DEPARTMENT OF ENERGY
FIGURE D-1
FERNALD, OHIO
SITE PLAN
RCRA PART B
57
PERMITTED RCRA STORAGE UNITS
SCALE: 1" = 300'


WAREHOUSE - BUILDING
FIGURE 2



ANCHOR BOLT SCHEDULE						
MARK	A	B	C	D	E	F
AB-1	1 1/2"	1"	1"	3"	6"	2"
AB-2	2 1/2"	1 1/2"	1 1/2"	3"	1'-6"	SEE COL. FDN. DWGS.
AB-3	3"	1 1/2"	1 1/2"	3"	1'-0"	4"
AB-4	3 1/2"	2 1/2"	2 1/2"	3"	6"	SEE PLAN
AB-5	4 1/2"	SEE DWG.	3"	3"	2'-6"	

GENERAL NOTES

1. ALL FOOTINGS SHALL BE CARRIED TO UNDISTURBED VIRGIN SOIL AT MINIMUM ELEVATIONS INDICATED ON PLAN. WHERE DEPTH OF FOOTINGS IS INCREASED, DESIGN SHALL BE REVISED AS DIRECTED BY THE ARCHITECT-ENGINEER. BEARING SOIL PRESSURE 3000 LBS. PER SQ. FT.
2. THE CONTRACTOR SHALL VERIFY THE LOCATIONS AND DIMENSIONS OF EXISTING STRUCTURES, UTILITIES, ETC. BEFORE PROCEEDING WITH EXCAVATIONS AND DETAILING.
3. CONCRETE SHALL BE TYPE A- f'_c = 3000 PSI
4. REINFORCEMENT SHALL BE DEFORMED BARS OF RAIL STEEL OR INTERMEDIATE GRADE BILLET STEEL SECURELY HELD IN POSITION DURING POURING.
5. SPLICES, WHERE REQUIRED, SHALL LAP 30 DIA'S. WHERE POSSIBLE ADJACENT SPLICE SHALL BE STAGGERED. AVOID LOCATING SPLICES AT POINTS OF MAXIMUM STRESS.
6. THE CONTRACTOR SHALL INSTALL ALL PIPE SLEEVES, ANCHOR BOLTS AND OTHER INSERTS REQUIRED FOR THE VARIOUS TRADES.
7. FLOOR TO BE LEVEL AND TO HAVE A STEEL TROWELED FINISH.
8. THE CONTRACTOR SHALL VERIFY LOCATIONS OF ALL ANCHOR BOLTS FROM CERTIFIED VENDOR'S PRINTS OF BUILDINGS, DOORS, ETC.
9. VERTICAL CONSTRUCTION JOINTS IN WALLS SHALL BE USED ONLY WHEN UNAVOIDABLE, AND SHALL BE LOCATED AT LEAST 4'-0" FROM ANY SUPPORTING COLUMN OR WALL OPENING.
10. BACKFILL AROUND ALL WALLS AND GRADE BEAMS SHALL BE PLACED ALTERNATELY ON EACH SIDE, SO THAT THE DIFFERENCE IN GRADE OF INSIDE AND OUTSIDE FILLS SHALL AT NO TIME EXCEED 2'-0" UNTIL LOWEST FINISHED GRADE IS REACHED. DURING CONSTRUCTION, TEMPORARY BRACING SHALL BE USED IF DIRECTED BY THE ARCHITECT-ENGINEER.
11. CONCRETE HAS BEEN DESIGNED IN ACCORDANCE WITH ACI BUILDING CODE 318-51.
12. SEE SPECIFICATIONS FOR PROJECT 5250-30
13. FLOOR SLAB TO BE POURED IN ALTERNATE SECTIONS.
14. FOR SECTIONS & DETAILS NOT SHOWN SEE DWG. 5250-05-4002

DO NOT SCALE REDUCED DRAWING

REVISION 0 - APPROVED FOR CONSTRUCTION - 1-25-55

REVISIONS	DATE	BY	CHK.	NO.
4				
3	AS BUILT	3-15-56	JHZ	—
2	ADDED DIM. JJ PLAN	3-18-55	J.M.V.	16-3JR
1	REVISED SHEET IN ACCORDANCE WITH REVISED PLAN: DETS. 1 & 2 ADD NOTE 6. ADDED CONC. FILL DETS. AND BUILDER. THERE SEE NOTE 3	2-16-55	A.R.M.	TYP.

TEMP. STORAGE BUILDING - POWER, SIGNAL & LIGHTING LAYOUT	5250-0E-5004
DRAWING NO. 5250-05-4001	REV. 3

REFERENCE DRAWING	NO.
TEMP. STOR. FAC. - FDNS. & 1st FL. DETS.	5250-05-4002
PLAN - TEMP. STOR. FAC.	5250-0A-4006
GEN. STOR. PAVED AREA PLOT PLAN	5250-17S-4002
YARD PIPING - TEMP. STOR. FAC. - SAN.	5250-77H-3006
CHEM. WISE ADDITION - FDN. PLAN	5250-70S-4006
BILL OF MATERIAL REF.	—
SPECIFICATION REF.	PROJ. 5250-30

U. S. ATOMIC ENERGY COMMISSION

U.S. DEPARTMENT OF ENERGY

FIGURE D-3

FERNALD, OHIO

TEMPORARY STORAGE FACILITIES

FOUNDATION PLAN

DEPT. CHECK	ARCH	CHECK	ELEC.	MECH.	STRUCT.
	JMC	RLS	JJV	HTP	

APPROVED		DATE
S&S		1-27-55
M.L.C.O.		1-31-55
A.E.C.		2-16-55
DRAWN J.M. MISSIMER	CHECKED W.K.	
DATE 1-21-55	DWG. NO. 5250-05-4001	REV. 3
SCALE AS SHOWN		

INDEX CODE

PL. & ELEC.	CIVIL	CLT	SER. NO.
56X	7000	A	00001

8/26/91

2478

HAZARDOUS WASTE CONTAINER PRE-STORAGE CHECK LIST

Storage Area: Bldg. 79 Date: 7-19-91 Time: 14:30

FMPC Lot Number: R050-755-P013-0355 DR. 1

ITEM NO.	INSPECTION ITEM	ACCEPTABLE YES	ACCEPTABLE NO	OBSERVATIONS & DATE CORRECTED
1	Verify information Card XX	✓		
2	Verify information on 68/69 Card	✓		
	VERIFY DRUM MARKINGS:			
3	FMPC Lot Marking Number	✓		
4	Reactivity Group Code (RGC)	✓		E, G
5	Gross and Tare Weight	✓		161 - 50 = 111
6	Drum No.	✓		1
7	Verify Marking Height (1½" to 2")	✓		
	VERIFY CONTAINER LABELS:			
8	Hazardous Waste Label	✓		
9	Pre-Transfer Check List	✓		
10	Check List Complete	✓		
11	D.O.T. Labels	✓		
12	Label Locations	✓		
	CHECK CONDITION OF CONTAINER AND SKID:			
	Loose Dirt, Rock or Rubble	✓		
14	Top and Bottom	✓		
15	Bolt-Type or Bung Type Lid	✓		Bung-Type
16	Rims	✓		
17	Bare Metal	✓		
18	Rain Cap	NA		
19	Hole	✓		
20	Dent	✓		
21	Bulge	✓		
22	Lid taped (if Liquid)	NA		
23	Other (list)	NA		

EXAMPLE

MC&A	[redacted]	BADGE NO.: 7178
WASTE MANAGEMENT	[redacted]	BADGE NO.: 181
INSPECTOR	[redacted]	BADGE NO.: 1781
INVENTORY NUMBER	6864	

COMMENTS:

ORM-E Label

60

FIGURE D-4

INV. NO.	MATERIAL DESCRIPTION	LOT NUMBER	DRUM NO.	GROSS WGT	TARE WGT	NET WGT	HBA	UN/NA NO.	ACCUMULATION DATE	LOCATION	ROW	STK	LEU	PHYS ST	VOL (GAL)	SAMPLED (Y/N)	RADIO ACTIV (Y/N)	AREA	HAND CODE	CODE	LAND BAN	LAND BAN DT.
IV00008	OILY SLUDGES	X095-853	0039-0001	000049	704.0	128.0	990	UN2912	11/29/88	79A	01	07	02	L	85 OP	Y	T	04	S01		T	
	EPAID #1: D001 EPAID #2: F001 EPAID #3: F005 EPAID #4: F003 EPAID #5: D019 EPAID #6: D039 EPAID #7: D040 EPAID #8: REACTIVE GROUP CODE(S): A K																					
	PROPER SHIPPING NAME: RQ WASTE RADIOACTIVE MATERIAL, LSA, N.O.S. (D001,F001,F005,F003,D019,D039,D040)(LIQUID)																					
	MAN. IN #: 0 MAN. IN DATE: / / MAN. OUT #: 0 MAN. OUT DATE: / / DESTINATION CD: COMMENTS:																					
IV00009	SOLVENT SLUDGE	R050-748	P043-0307	000001	215.0	128.0	87.0	930	UN1993	07/11/87	79C	04	01	03	L	85 OP	Y	T	04	S01		T
	EPAID #1: F001 EPAID #2: F003 EPAID #3: EPAID #4: EPAID #5: EPAID #6: EPAID #7: EPAID #8: REACTIVE GROUP CODE(S): A B																					
	PROPER SHIPPING NAME: SUSPECT WASTE COMBUSTIBLE LIQUID, N.O.S.																					
	MAN. IN #: 0 MAN. IN DATE: / / MAN. OUT #: 0 MAN. OUT DATE: / / DESTINATION CD: COMMENTS: XX																					
IV00010	NON-RECOVERABLE TRASH	R050-700	P003-0300	000001	101.0	50.0	51.0	930	NA9189	07/01/87	79C	01	02	01	S	55	Y	T	04	S01		F
	EPAID #1: F002 EPAID #2: EPAID #3: EPAID #4: EPAID #5: EPAID #6: EPAID #7: EPAID #8: REACTIVE GROUP CODE(S): A B																					
	PROPER SHIPPING NAME: OIL SAMPLE WASTE																					
	MAN. IN #: 0 MAN. IN DATE: / / MAN. OUT #: 0 MAN. OUT DATE: / / DESTINATION CD: COMMENTS:																					
IV00011	PAINT THINNER	R050-748	P013-0320	000001	328.0	93.0	235.0	[illegible]	NA1263	08/15/88	005	04	11	01	L	85 OP	Y	T	01	S01		T
	EPAID #1: F002 EPAID #2: D001 EPAID #3: EPAID #4: EPAID #5: EPAID #6: EPAID #7: EPAID #8: REACTIVE GROUP CODE(S): A B																					
	PROPER SHIPPING NAME: RQ WASTE PAINT RELATED MATERIAL (IGNITABILITY)																					
	MAN. IN #: 0 MAN. IN DATE: / / MAN. OUT #: 0 MAN. OUT DATE: / / DESTINATION CD: COMMENTS:																					
IV00012	USED OIL	R020-747	P015-0307	[illegible]	[illegible]	128.0	140.0	930	NA1993	07/11/87	79B	02	09	03	L	85 OP	Y	T	04	S01		F
	EPAID #1: D008 EPAID #2: F002 EPAID #3: EPAID #4: EPAID #5: EPAID #6: EPAID #7: EPAID #8: REACTIVE GROUP CODE(S): B																					
	PROPER SHIPPING NAME: WASTE COMBUSTIBLE LIQUID, N.O.S.																					
	MAN. IN #: 0 MAN. IN DATE: / / MAN. OUT #: 0 MAN. OUT DATE: / / DESTINATION CD: COMMENTS:																					
IV00013	TRIBUTYL PHOSPHATE/KEROSENE	S109-732	0022-0300	000001	191.0	80.0	111.0	990	UN1993	12/21/86	005	01	10	01	W	55 OP	Y	T	01	S01		F
	EPAID #1: D001 EPAID #2: D018 EPAID #3: EPAID #4: EPAID #5: EPAID #6: EPAID #7: EPAID #8: REACTIVE GROUP CODE(S): B C																					
	PROPER SHIPPING NAME: RQ WASTE FLAMMABLE LIQUID, N.O.S. (D018,D001) LIMITED QUANTITY, RADIOACTIVE MATERIAL																					
	MAN. IN #: 0 MAN. IN DATE: / / MAN. OUT #: 0 MAN. OUT DATE: / / DESTINATION CD: COMMENTS:																					
IV00014	FLOOR SWEEPINGS	R050-739	P003-6322	000001	251.0	50.0	201.0	930	NA9189	10/04/88	80B	01	02	01	S	55	Y	T	08	S01		F
	EPAID #1: D010 EPAID #2: F002 EPAID #3: F005 EPAID #4: EPAID #5: EPAID #6: EPAID #7: EPAID #8: REACTIVE GROUP CODE(S): A B E																					
	PROPER SHIPPING NAME: HAZARDOUS WASTE SOLID, N.O.S.																					
	MAN. IN #: 0 MAN. IN DATE: / / MAN. OUT #: 0 MAN. OUT DATE: / / DESTINATION CD: COMMENTS:																					
IV00015	USED OIL	R050-739	P015-0307	000001	85.0	45.0	40.0	930	NA1993	07/02/87	79C	03	09	03	L	30 OP	Y	T	04	S01		T
	EPAID #1: F002 EPAID #2: D010 EPAID #3: EPAID #4: EPAID #5: EPAID #6: EPAID #7: EPAID #8: REACTIVE GROUP CODE(S): A B E																					
	PROPER SHIPPING NAME: RQ WASTE COMBUSTIBLE LIQUID, N.O.S.																					
	MAN. IN #: 0 MAN. IN DATE: / / MAN. OUT #: 0 MAN. OUT DATE: / / DESTINATION CD: COMMENTS:																					

EXAMPLE

FIGURE D-5

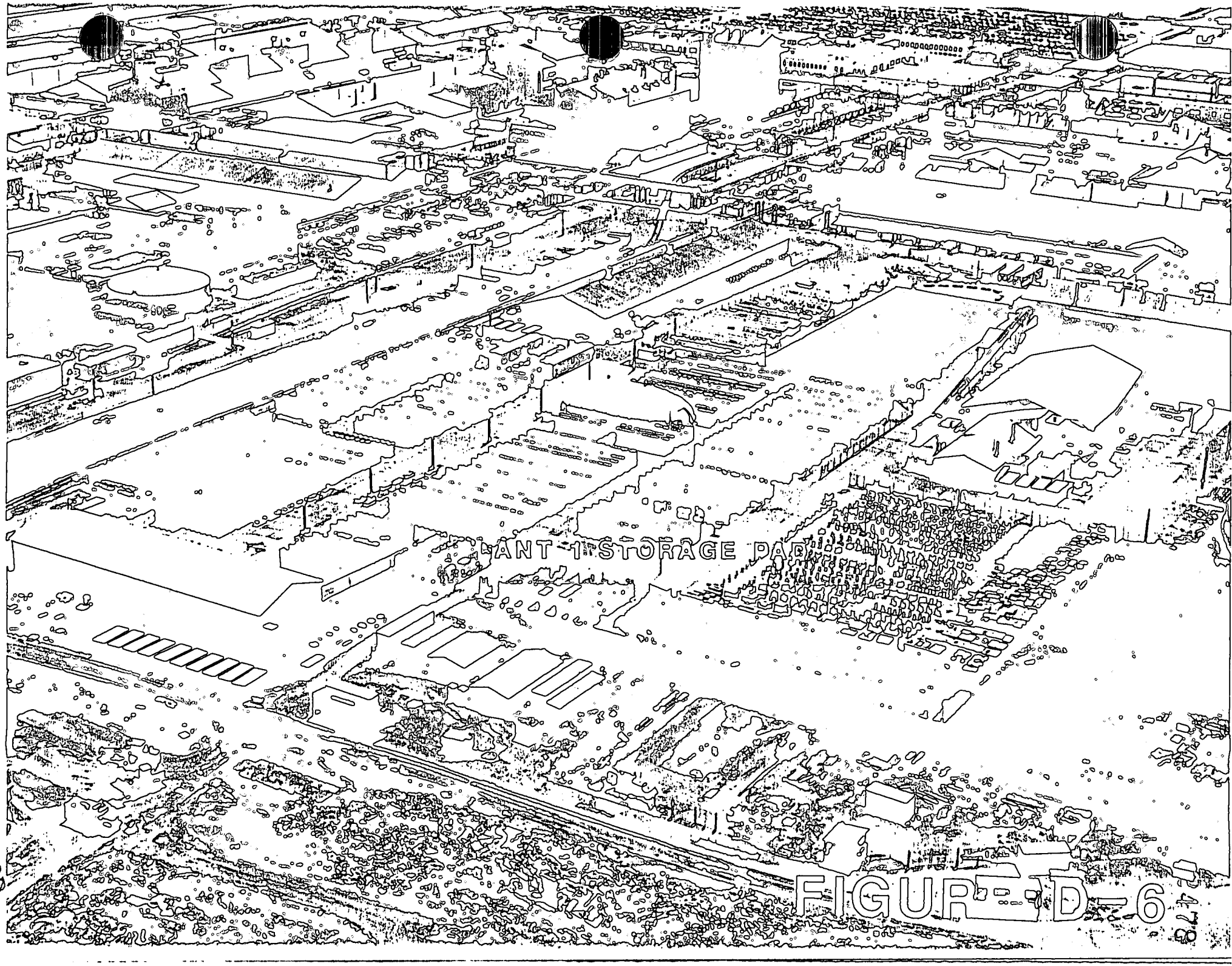
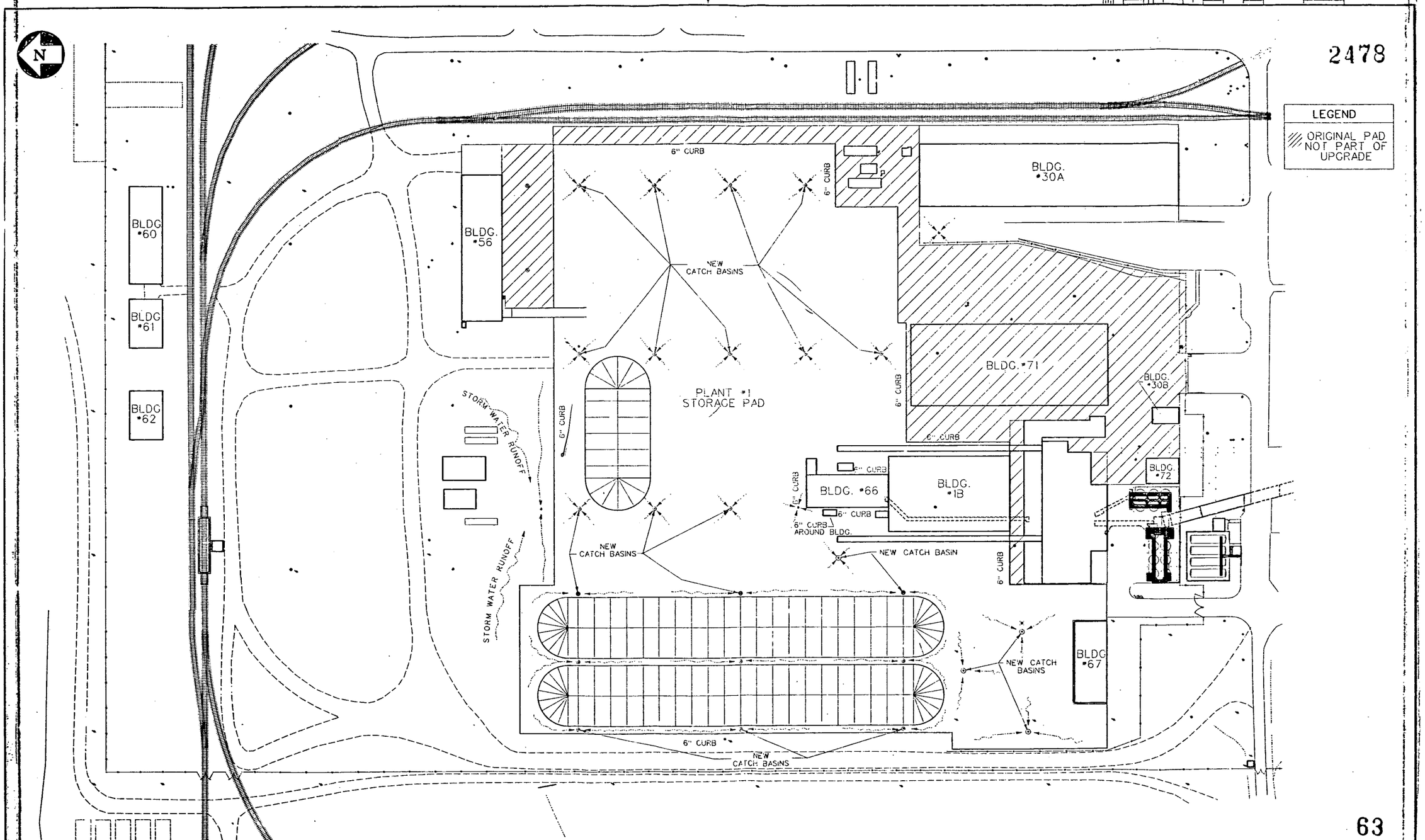


FIGURE D-6



U.S. DEPARTMENT OF ENERGY

FIGURE D-7

FERNALD, OHIO

PLANT #1 STORAGE AREA

PLANT 1 STORAGE PAD LAYOUT AFTER UPGRADE

SCALE - 1" = 50'-0"

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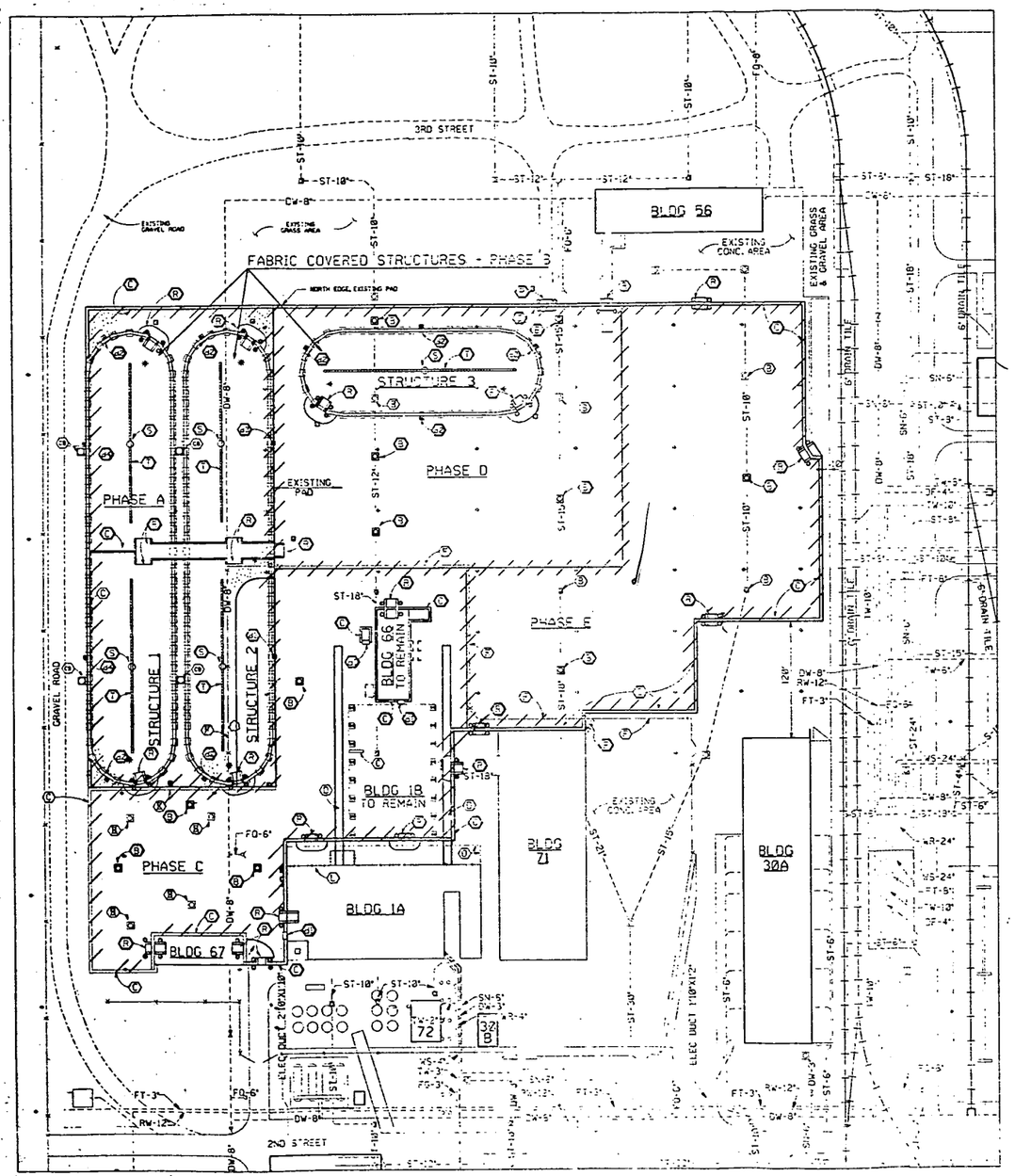


SITE PLAN

SCALE: 1"= 50'

NORTH

LEGEND

EXISTING

- (3) CATCH BASIN ADJUSTED TO GRADE
- (B) EXISTING CATCH BASIN - ABANDON & COVER W/ VAPOR BARRIER, CONCRETE, ETC.
- (C) RAISE CURB
- (R) REMOVE CURB
- (CB) CATCH BASIN
- (D) CONVEYOR GALLERY STRUCTURE TO BE DEMOLISHED AND REMOVED
- (F) FENCE TO REMAIN
- (F) REMOVE FENCE AND GATES
- (L) WALL LINE OF BLDG 1A
- (O) EXTENT OF BLDG 1A ROOF OVERHANG
- (R) EXIST. RAMP - ADD 4" CONC. ETC. BACK TO LINE OF NEW CURB & FEATHER TOWARDS PLANT 56. RAISE EXIST. RAMP CURB AS REQ'D.
- LIGHT POLE SEE E-2
- REMOVE TREE

NEW

- (CB) CATCH BASIN - SEE SHT. P-1
- (C) CURB
- (F) FENCE
- (R) RAMP
- (S) SUMP
- (T) TRENCH DRAIN
- (S1) ADD STEP @ EXIST. PEDESTRIAN DOORS. SEE DETAIL SHT. C-5
- (S2) ADD STEP @ PEDESTRIAN DOORS OF FABRIC STRUCTURES. SEE DETAIL SHT. C-5
- (S3) ADD STEP @ PEDESTRIAN DOORS OF FABRIC STRUCTURES. SEE DETAIL SHT. C-5
- (S4) ADD STEP @ PEDESTRIAN DOORS OF FABRIC STRUCTURES. SEE DETAIL SHT. C-2
- (T) PREFABRICATED TRENCH DRAIN SEE DWG. P1
- ✱ OVERHEAD DOOR CONTROL
- ■ BOLLARDS WITH DOOR CONTROL
- ○ STANDARD BOLLARDS

NOTES

1. ALL DIMENSIONS AND ELEVATIONS PERTAINING TO EXISTING CONSTRUCTION TO BE FIELD VERIFIED BEFORE STARTING ANY WORK OR FABRICATION.
2. CONTRACTOR SHALL VERIFY ALL DIMENSIONS OF THE FABRIC STRUCTURES WITH THE MANUFACTURER. OBTAIN CERTIFIED DRAWINGS BEFORE PROCEEDING WITH CONSTRUCTION.
3. ALL CONCRETE HAS BEEN DESIGNED AND THE DETAILING, FABRICATION AND CONSTRUCTION TO BE IN ACCORDANCE WITH THE ACI DETAILING MANUAL (ACI SP-66) AND "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE" (ACI 318), LATEST EDITION.
4. UNLESS OTHERWISE NOTED, ALL CONCRETE IS TO BE NORMAL WEIGHT CONCRETE WITH MINIMUM 28 DAY COMPRESSIVE STRENGTH AS FOLLOWS:

   FOOTINGS AND PIERS: 3000 PSI
   SLABS ON GRADE: 4000 PSI
5. ALL CONCRETE EXPOSED TO WEATHER SHALL BE AIR ENTRAINED.
6. CHAMFER ALL EXPOSED EDGES 3/4" UNLESS OTHERWISE SHOWN OR NOTED.
7. ALL REINFORCING STEEL TO BE ASTM A615 OR A616 (SIZE GRADE 60 UNLESS OTHERWISE NOTED.
8. WELDED WIRE FABRIC, WHERE SPECIFIED ON PROJECT SHALL BE ASTM A185 COLD DRAWN STEEL.
9. GRANULAR FILL UNDER SLABS SHALL BE 6 INCH THICK COMPACTED CRUSHED STONE OR BANK RUN GRAVEL AS DEFINED BY THE SPECIFICATIONS.
10. ALL STRUCTURAL STEEL, ANCHOR BOLTS, AND MISCELLANEOUS IRON TO BE ASTM A-36.
11. COLUMN ANCHOR BOLTS ARE TO BE FURNISHED BY THE STRUCTURAL FABRICATOR AND DELIVERED TO THE JOB SITE IN TIME FOR SCHEDULED INSTALLATION.
12. DESIGN SLAB LOAD = 1000 PSF
13. FOUNDATIONS TO BE DESIGNED FOR AN ALLOWABLE BEARING CAPACITY OF 3000 PSF.
14. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND SIZES OF EQUIPMENT FOUNDATIONS WITH THE EQUIPMENT MANUFACTURER PRIOR TO APPROVED DRAWINGS BEFORE PROCEEDING WITH CONSTRUCTION.
15. UNDERGROUND PIPING AND CONDUIT AFFECTED BY FOUNDATIONS SHALL BE IN PLACE BEFORE PLACING CONCRETE. ALL PLUGS, CAPS, ETC. SHALL BE IN PLACE BEFORE CONCRETE SLABS ARE PLACED. SEE ELECTRICAL & PIPING DWGS.

NOTES

2478

SCOPE OF PHASE A CONSTRUCTION

1. REMOVAL OF FENCE
2. EXCAVATION AND INSTALLATION OF APPROX 86,228 SQ. FT. OF NEW PAD WITH CURBS, RAMPS, MEMBRANE & WEARING SURFACE.
3. RELOCATION OF EXISTING ROAD
4. TRENCH DRAINS & SUMPS.
5. FOUNDATIONS FOR FRAME SUPPORTED FABRIC STRUCTURES. ERECTION OF 2 STRUCTURES.
6. INSTALLATION OF VAPOR BARRIER, 4" CONC. PAVEMENT, & WATERPROOFING MEMBRANE WITH NONSLIP SURFACE OVER EXISTING PAD.

SCOPE OF PHASE B CONSTRUCTION

1. FABRICATION & DELIVERY OF FRAME SUPPORTED FABRIC STRUCTURES.

SCOPE OF PHASE C CONSTRUCTION

1. DEMOLITION OF CONVEYOR GALLERIES
2. CURBS AND RAMPS
3. CATCH BASINS
4. INSTALLATION OF VAPOR BARRIER, 4" CONC. PAVEMENT, & WATERPROOFING MEMBRANE WITH NONSLIP SURFACE OVER EXISTING PAD.

SCOPE OF PHASE D CONSTRUCTION

1. REMOVAL OF FENCE
2. TRENCH DRAIN AND SUMP
3. FOUNDATIONS FOR FRAME SUPPORTED FABRIC STRUCTURE. ERECTION OF 1 STRUCTURE.
4. CURBS AND RAMPS
5. CATCH BASINS
6. INSTALLATION OF VAPOR BARRIER, 4" CONC. PAVEMENT, & WATERPROOFING MEMBRANE WITH NONSLIP SURFACE OVER EXISTING PAD.

SCOPE OF PHASE E CONSTRUCTION

1. REMOVAL OF FENCE
2. CURBS AND RAMPS
3. CATCH BASINS
4. INSTALLATION OF VAPOR BARRIER, 4" CONC. PAVEMENT, & WATERPROOFING MEMBRANE WITH NONSLIP SURFACE OVER EXISTING PAD.

TO CORRELATE REFERENCED "AMK SHEET" TO FMPC DRAWING NUMBERS, SEE FMPC DRAWING 749-4445-X-00063

U.S. DEPARTMENT OF ENERGY
FIGURE D-8
FERNALD, OHIO

REV.	REVISION NUMBER - DESCRIPTION	DATE	DRAWN BY	CHK'D BY
1	GENERAL REVISIONS	11-26-90	LMP	
0	CFC	3-14-89	CFC	

UNITED STATES
DEPARTMENT OF ENERGY
FEED MATERIALS PRODUCTION CENTER

PREPARED BY
A. M. KINNEY, INC.
CONSULTING ENGINEERS
CINCINNATI, OHIO

PROJECT TITLE
ENVIRONMENTAL, HEALTH & SAFETY IMPROVEMENTS

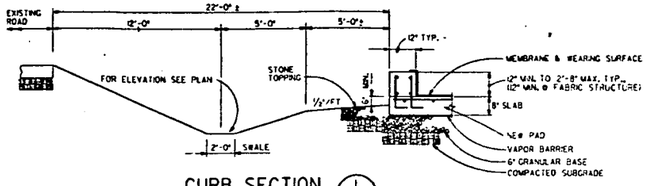
DRAWING TITLE
COVERED CONTROLLED STORAGE PAD - PLANT 1
CONSTRUCTION PHASING

DRAWN BY	DATE	DESIGNED BY	DATE	CHECKED BY	DATE
MEC	4-89	EBW	4-89	LMP	5-89

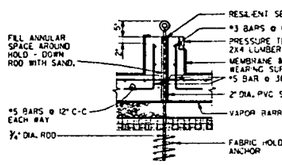
PLANT 1 | AS NOTED

64

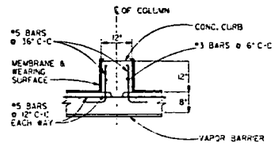
87-0-159 | 0087502 WSN.I.2.I.01 | 749-4445-22264 | C-1 | 1



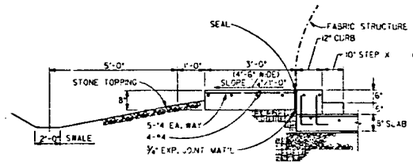
CURB SECTION 1 C-2-2
N.T.S.



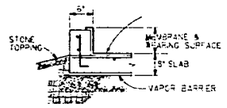
HOLD - DOWN ANCHOR DETAIL
N.T.S.
SEE NOTE 5



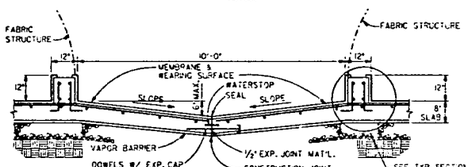
TYPICAL SECTION THRU BUILDING CURB
N.T.S.



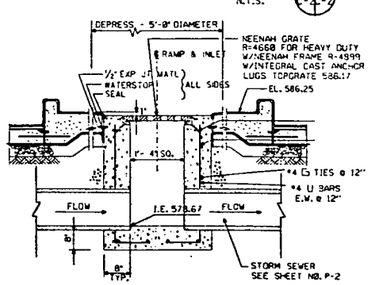
DOOR STEP d4
N.T.S.



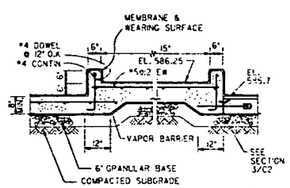
SECTION 2 C-2-2
N.T.S.



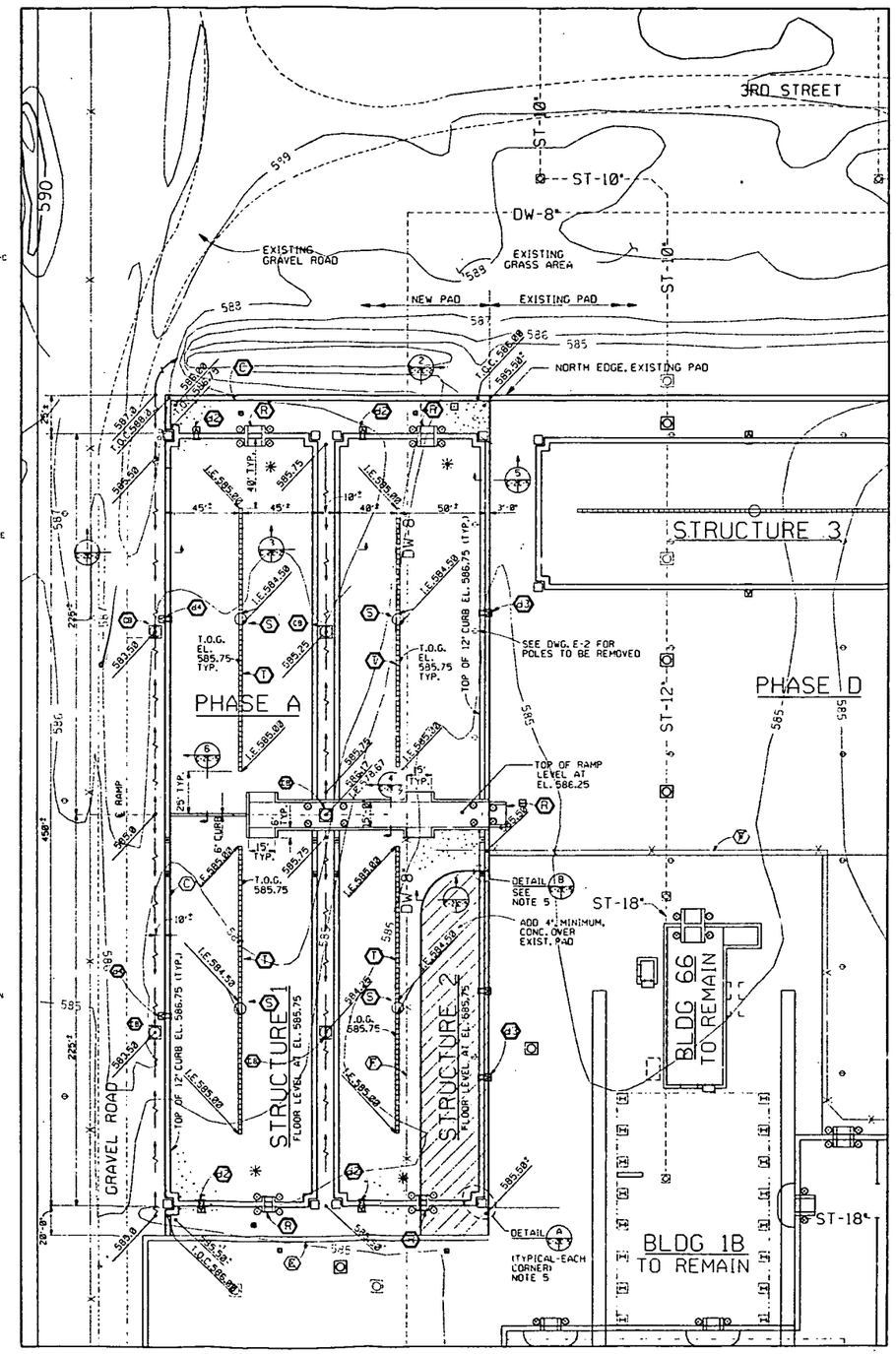
SECTION 3 C-2-2
N.T.S.



INLET: CENTER RAMP-SECTION 4A C2C5
SCALE: NTS
PARTS NOT SHOWN SAME AS SECTION 4/C-2



CENTER RAMP-SECTION 4 C2C2
SCALE: NTS



SITE PLAN
SCALE: 1" = 30'

SECTION & DETAIL KEY

NOTES

1. SEE SHEET C-1 FOR SCOPE OF PHASE A CONSTRUCTION.
2. SEE SHEET P-1 FOR STORM SEWER AND CATCH BASIN DETAILS.
3. SEE SHEET C-5 FOR DETAILS OF FOUNDATIONS, TRENCHES AND SUMPS.
4. LIGHT POLES TO BE REMOVED BY ELECTRICAL CONTRACTOR. SEE SHT. E-2.
5. SEE MANUFACTURER'S DWGS FOR LOCATION OF ANCHOR BOLTS AND HOLD-DOWN ANCHORS.
6. LOCATE SLAB JOINTS AS SHOWN ON DELTA STEEL DRAWING NUMBER 0045-1-1.

LEGEND

EXISTING

- REMOVE CURB
- REMOVE FENCE
- CONTOUR LINE
- ELECTRIC POLE

NEW

- CURB
- RAMP - SEE DETAIL SHEET C-5
- SUMP - SEE DETAIL SHEET C-5
- TRENCH DRAIN - SEE DETAIL SHEET C-5
- ADD STEP @ PEDESTRIAN DOORS OF FABRIC STRUCTURES - SEE DETAIL SHEET C-5
- ADD STEP @ PEDESTRIAN DOORS OF FABRIC STRUCTURES - SEE DETAIL SHEET C-5
- ADD STEP @ PEDESTRIAN DOORS OF FABRIC STRUCTURES - SEE DETAIL SHEET C-2
- CATCH BASIN - SEE DETAIL SHEET P-1
- NEW ELEVATION
- OVERHEAD DOOR CONTROL - WITHIN STRUCTURE
- STANDARD BOLLARDS
- BOLLARDS WITH DOOR CONTROL - OUTSIDE STRUCTURE

U.S. DEPARTMENT OF ENERGY
FIGURE D-9
FERNALD, OHIO

TO CORRELATE REFERENCED "AMK SHEET No's." TO FMPC DRAWING NUMBERS, SEE FMPC DRAWING No. 748-4445-X-00063

REV. NO.	REVISION PURPOSE - DESCRIPTION	DRAWN	CHECKED	APPR.
2	GENERAL REVISIONS	LMP 7-12-90		
1	GENERAL REVISIONS	LMP 11-28-90		
0	CFC	EBW 7-14-89		

UNITED STATES DEPARTMENT OF ENERGY
FEED MATERIALS PRODUCTION CENTER

A. M. KINNEY, INC.
CONSULTING ENGINEERS
CINCINNATI, OHIO

PROJECT NAME: ENVIRONMENTAL, HEALTH & SAFETY IMPROVEMENTS

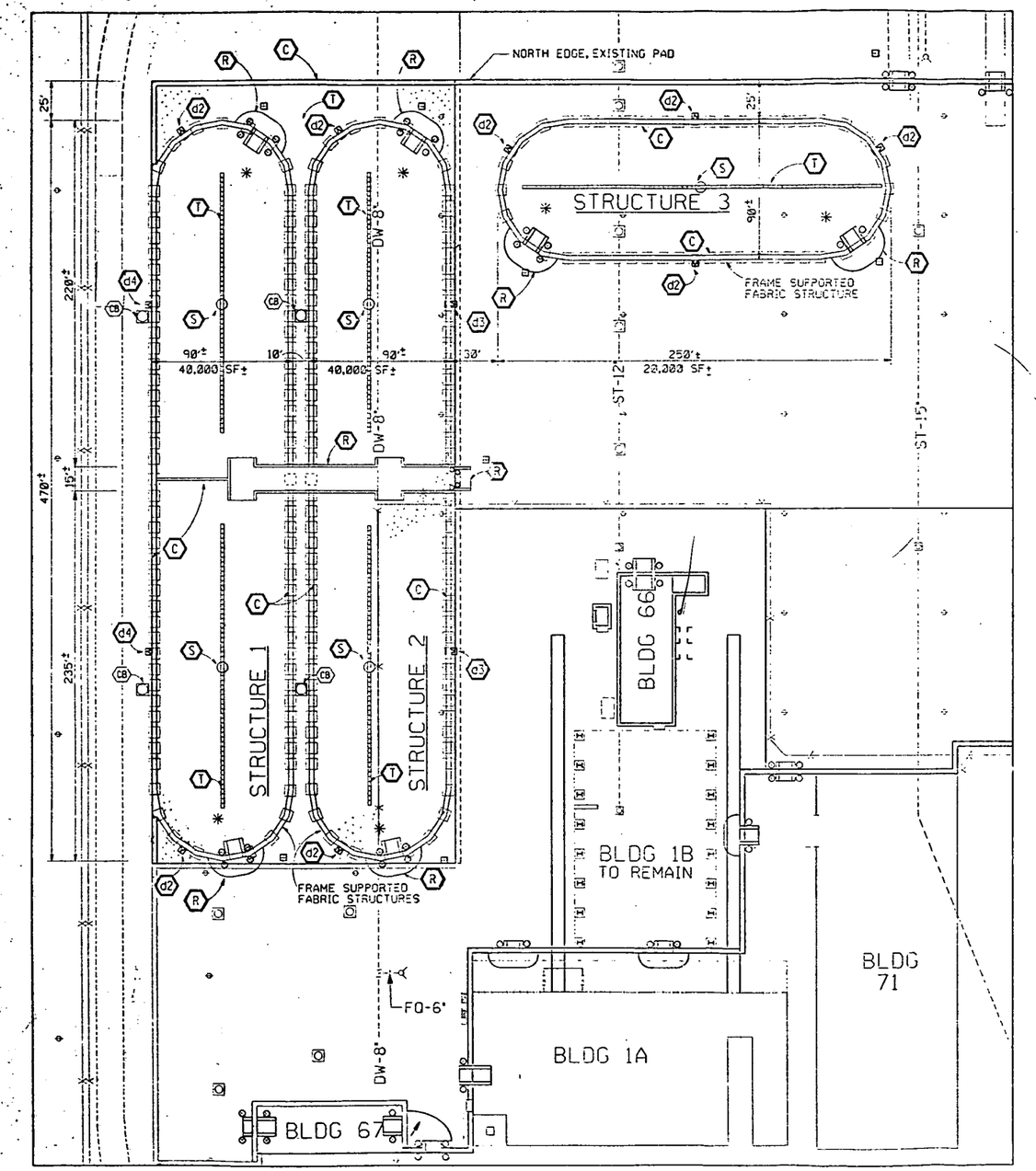
DRAWING TITLE: COVERED CONTROLLED STORAGE PAD - PLANT 1
PHASE A - PAD EXTENSION

DRAWN BY	DATE	CHECKED BY	DATE	CHECKED BY	DATE
MEC	5-89	EBW	5-89	LMP	6-89

PLANT 1 — SCALE: AS NOTED — STATUS: 65

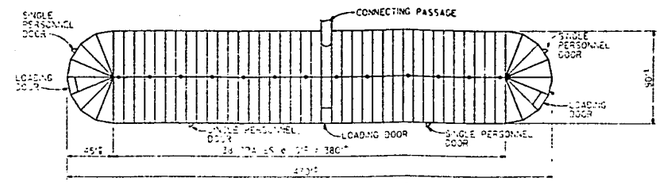
87-D-159 — WBS 1.1.2.1.01 — 0087502 — 748-4445-C-0000-65 — C-2 — REV. 2

2478

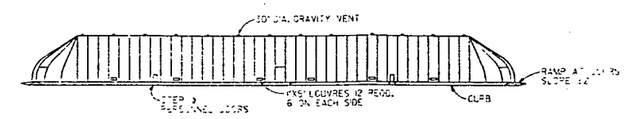


SITE PLAN

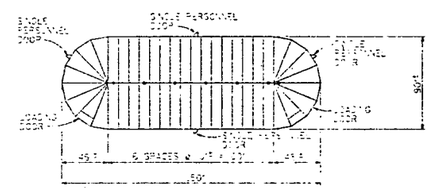
SCALE: 1" = 50'



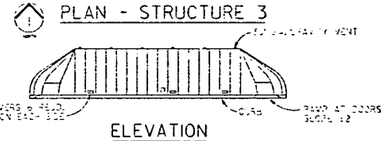
PLAN - STRUCTURE 2
STRUCTURE 1 SIMILAR



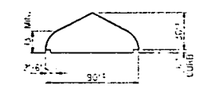
ELEVATION



PLAN - STRUCTURE 3



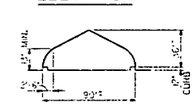
ELEVATION



SECTION

2 THUS

SCALE: 1" = 50'



SECTION

1 THUS

SCALE: 1" = 50'

FRAME SUPPORTED FABRIC STRUCTURE

LEGEND

EXISTING

- CATCH BASIN

NEW

- CATCH BASIN
- CURB
- RAMP
- SUMP
- TRENCH DRAIN
- PREFABRICATED TRENCH DRAIN SEE DWG. P1
- ADD STEP @ PEDESTRIAN DOORS OF FABRIC STRUCTURES SEE DETAIL SHEET G-5
- ADD STEP @ PEDESTRIAN DOORS OF FABRIC STRUCTURES SEE DETAIL SHEET G-5
- ADD STEP @ PEDESTRIAN DOORS OF FABRIC STRUCTURES SEE DETAIL SHEET G-2
- SLIDE-HEAT DOOR CONTROL
- BOLLARDS WITH DOOR CONTROL
- STANDARD BOLLARDS

SECTION & DETAIL KEY

NOTES

1. SEE DRAWING C-5 FOR DETAILS OF FOUNDATION, SLOPES AND TRENCH DRAINS.
2. PERSONNEL DOORS AND FRAMES TO BE HOLLOW METAL OUT TWANGING, NOMINAL [illegible] BY [illegible] FOOT 8 INCH SIZE AND TO INCLUDE [illegible] DOORS TO PROVIDE [illegible] 3 FOOT [illegible] INCH CLEAR OPENINGS, AND TO BE [illegible] HORIZONTAL SLIDING OR VERTICAL ROLLING [illegible] DOORS TO BE POWER OPERATED WITH PUSH-BUTTON CONTROLS POST MOUNTED OUTSIDE AND OVERHEAD DOOR CONTROLS INSIDE OF THE STRUCTURES.

TO CORRELATE REFERENCED A.M.K. SHEET NOS. TO FMPC DRAWING NUMBERS, SEE FMPC DRAWING No. 745-4445-X-00063

U.S. DEPARTMENT OF ENERGY
FIGURE D-10
FERNALD, OHIO

1	GENERAL REVISIONS		11-16-89
0	CFC	EBW	11-14-89

UNITED STATES
DEPARTMENT OF ENERGY
FEED MATERIALS PRODUCTION CENTER

THE A.M. KINNEY GROUP
A. M. KINNEY, INC.
CONSULTING ENGINEERS
CINCINNATI, OHIO

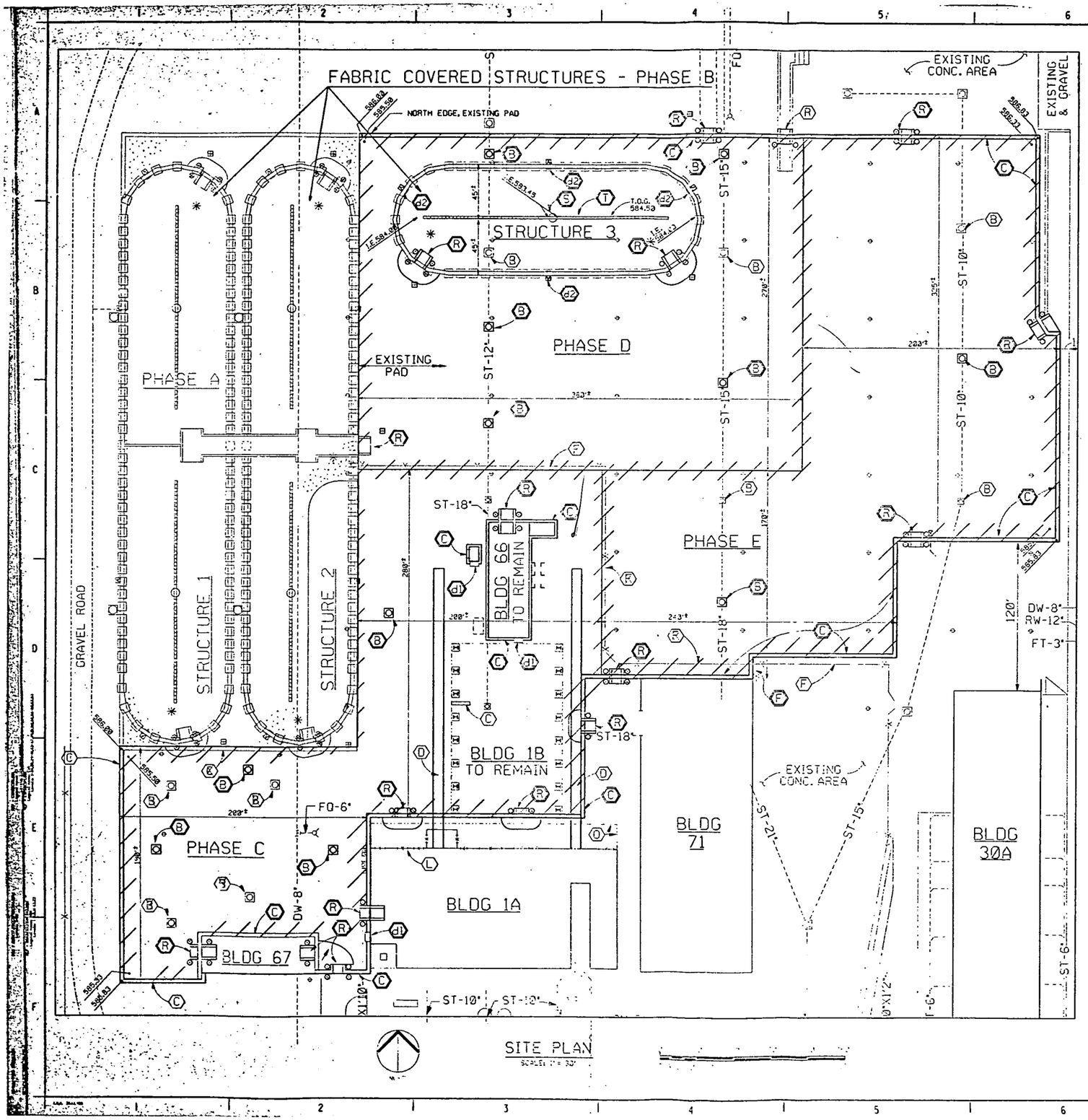
ENVIRONMENTAL, HEALTH & SAFETY IMPROVEMENTS

COVERED CONTROLLED STORAGE PAD - PLANT 1
PHASE B - FABRIC STRUCTURES

MEC	4-89	EBW	4-89	CMP	6-89
PLANT 1				AS NOTED	

87-D-159 | 0087502 WBS 1.1.2.1.01 | 745-4445-C-00235 | C-3 | 1

66



NOTES

1. SEE SHEET C-1 FOR SCOPE OF PHASE C, D & E CONSTRUCTION.
2. SEE SHEET P-1 FOR STORM SEWER DETAILS.
3. SEE SHEET C-5 FOR DETAILS OF FOUNDATIONS, TRENCHES AND SUMPS.
4. LIGHT POLES TO BE REMOVED BY ELECTRICAL CONTRACTOR. SEE SHT. E-2.

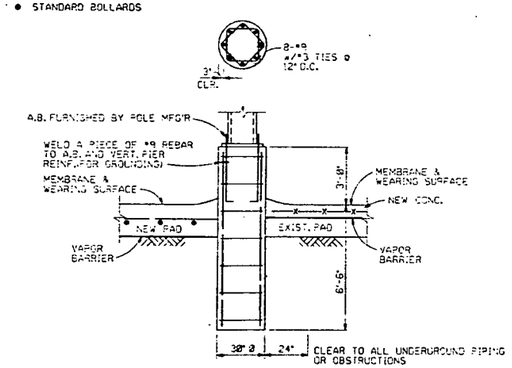
LEGEND

EXISTING

- (B) CATCH BASIN ADJUSTED TO GRADE - SEE SHT. P-1
- (B) EXISTING CATCH BASIN - ABANDON & COVER W/ VAPOR BARRIER, CONCRETE, ETC.
- (C) RAISE CURB
- (CB) CATCH BASIN
- (D) CONVEYOR GALLERY STRUCTURE TO BE DEMOLISHED AND REMOVED
- (F) FENCE TO REMAIN
- (F) REMOVE FENCE AND GATES
- (L) WALL LINE OF BLDG. 1A
- (O) EXTENT OF BLDG. 1A ROOF OVERHANG
- (R) EXIST. RAMP - ADD 4" CONC. ETC. BACK TO LINE OF NEW CURB & FEATHER TOWARDS PLANT 56. RAISE EXIST. RAMP CURB AS REQ'D.

NEW

- (B) CATCH BASIN - SEE SHT. P-1
- (C) CURB
- (F) NEW FENCE
- (R) RAMP
- (S) SUMP
- (T) TRENCH DRAIN
- (d1) ADD STEP @ EXIST. PEDESTRIAN DOORS. SEE DETAIL SHT. C-5
- (d2) ADD STEP @ PEDESTRIAN DOORS OF FABRIC STRUCTURES
- NEW ELEVATION
- OVERHEAD DOOR CONTROL
- BOLLARDS WITH DOOR CONTROL
- STANDARD BOLLARDS



PIER FOR LIGHT POLE

SEE ELECTRICAL DWG. FOR LOCATION

SCALE: ¼" = 1'-0"

TO CORRELATE REFERENCED AMK SHEET Nos. TO FMPC DRAWING NUMBERS, SEE FMPC DRAWING No. 749-4445-X-00063

REV. NO.	ISSUE OF REVISION PURPOSE - DESCRIPTION	DRAWN	CHECKED	APPROVED	DATE
1	GENERAL REVISIONS	LMP 11-26-90			
0	CFC	EBW 7-14-89			

UNITED STATES DEPARTMENT OF ENERGY
FEED MATERIALS PRODUCTION CENTER

THIS DRAWING WAS PREPARED BY
A. M. KINNEY, INC.
CONSULTING ENGINEERS
CINCINNATI, OHIO

PROJECT NAME
ENVIRONMENTAL, HEALTH & SAFETY IMPROVEMENTS

DRAWING TITLE
COVERED CONTROLLED STORAGE PAD - PLANT 1
PHASE C, D, & E

DRAWN BY	DATE	DESIGNED BY	DATE	PROJECT ENGR	DATE
MEC	4-89	EBW	4-89	LMP	6-89

PLANT 1 — SCALE: AS NOTED

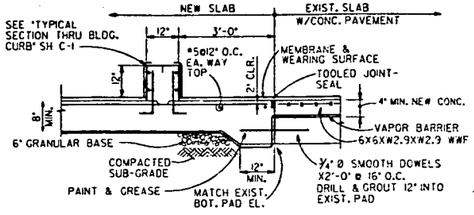
87-D-159 — WBS 1.2.1.01 — 0087502 — 749-4445-C-00267 — SHEET C-4 — REV. 1

U.S. DEPARTMENT OF ENERGY
FIGURE D-1 1
FERNALD, OHIO

SECTION & DETAIL KEY

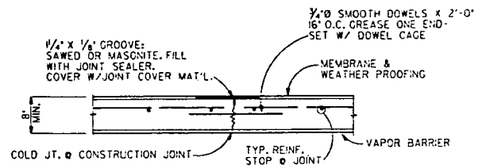
2478

67



TYP. PAD SECTION (5 / C2 C5)

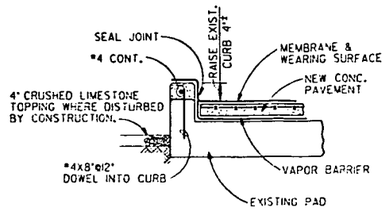
N.T.S.



CONSTRUCTION OR CONTROL JOINT (C.J.)

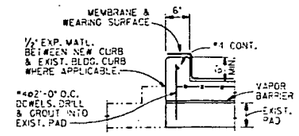
N.T.S.

JOINTS TO BE SPACED AT 20'-0" ± EA. WAY



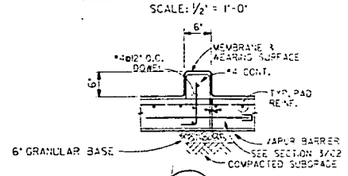
RAISED CURB DETAIL

SCALE: 1/2" = 1'-0"



CURB ON EXIST. PAD

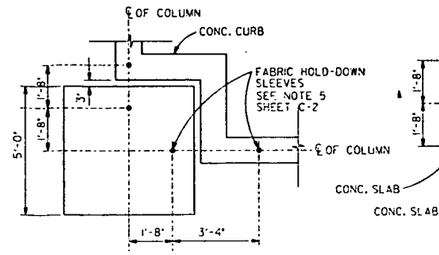
SCALE: 1/2" = 1'-0"



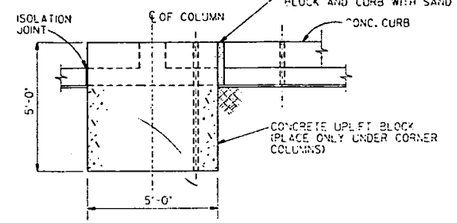
SECTION (6 / C2 C5)

CURB ON NEW PAD - INTERIOR

SCALE: 1" = 1'-0"



PLAN

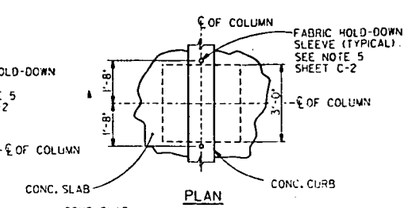


SECTION

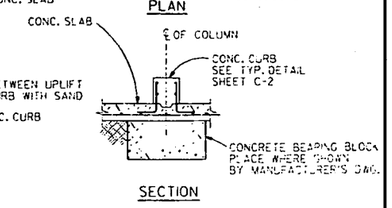
UPLIFT BLOCK DETAILS

DETAIL (A / C2 C5)

SCALE: 1/2" = 1'-0"



PLAN

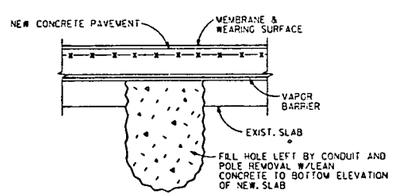


SECTION

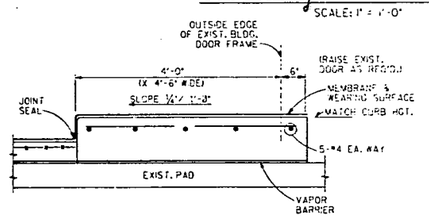
BEARING BLOCK DETAILS

DETAIL (B / C2 C5)

SCALE: 1/2" = 1'-0"

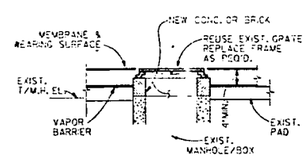


LIGHT POLE REMOVAL



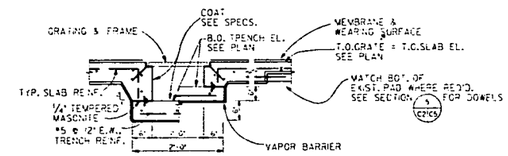
STEP @ EXIST. DOOR (d1)

SCALE: 1" = 1'-0"



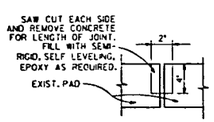
RAISED CATCH BASINS

NTS



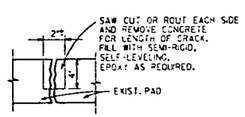
NEW TRENCH SECTION

SCALE: 1/4" = 1'-0"



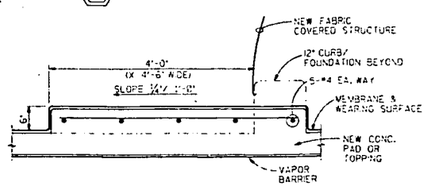
EXIST. JOINT TREATMENT

N.T.S.



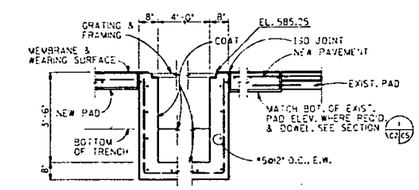
EXIST. CRACK TREATMENT

N.T.S.



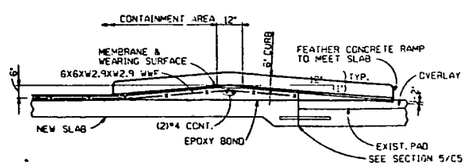
STEP @ NEW FABRIC STRUCTURE DOORS (d2)

SCALE: 1" = 1'-0"



SUMP DETAIL

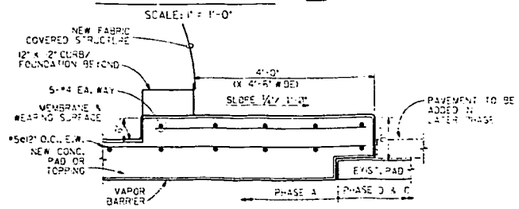
NTS



TYPICAL RAMP DETAIL AT FABRIC STRUCTURES

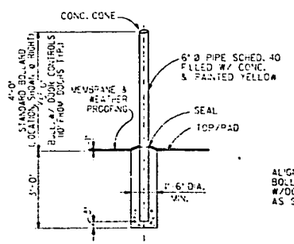
SCALE: 1/2" = 1'-0"

NOTE: ALL RAMPS 10' WIDE (INSIDE FACE TO INSIDE FACE OF CURBS) EXCEPT THOSE SPECIFICALLY NOTED.



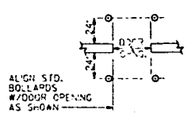
STEP @ NEW FABRIC STRUCTURE DOORS (d3)

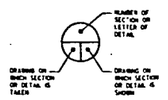
SCALE: 1" = 1'-0"



BOLLARD DETAIL

SCALE: 1/2" = 1'-0"

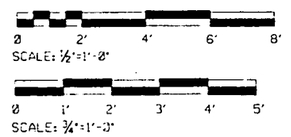




SECTION & DETAIL KEY

NOTES

2478



TO CORRELATE REFERENCED 'AMK SHEET No's' TO FMPC DRAWING NUMBERS, SEE FMPC DRAWING No.: 74B-4445-X-00063

REV. NO.	REVISIONS	BY	DATE	CHK'D
2	FOR CONSTRUCTION	LMP	7-11-89	
1	GENERAL REVISIONS	LMP	7-26-89	
0	CFC	EBW	7-14-89	

U.S. DEPARTMENT OF ENERGY

FIGURE D-12

FERNALD, OHIO

UNITED STATES DEPARTMENT OF ENERGY
FEED MATERIALS PRODUCTION CENTER

THIS DRAWING PREPARED BY
A. M. KINNEY, INC.
CONSULTING ENGINEERS
CINCINNATI, OHIO

A.K. PROJECT NO. 5249

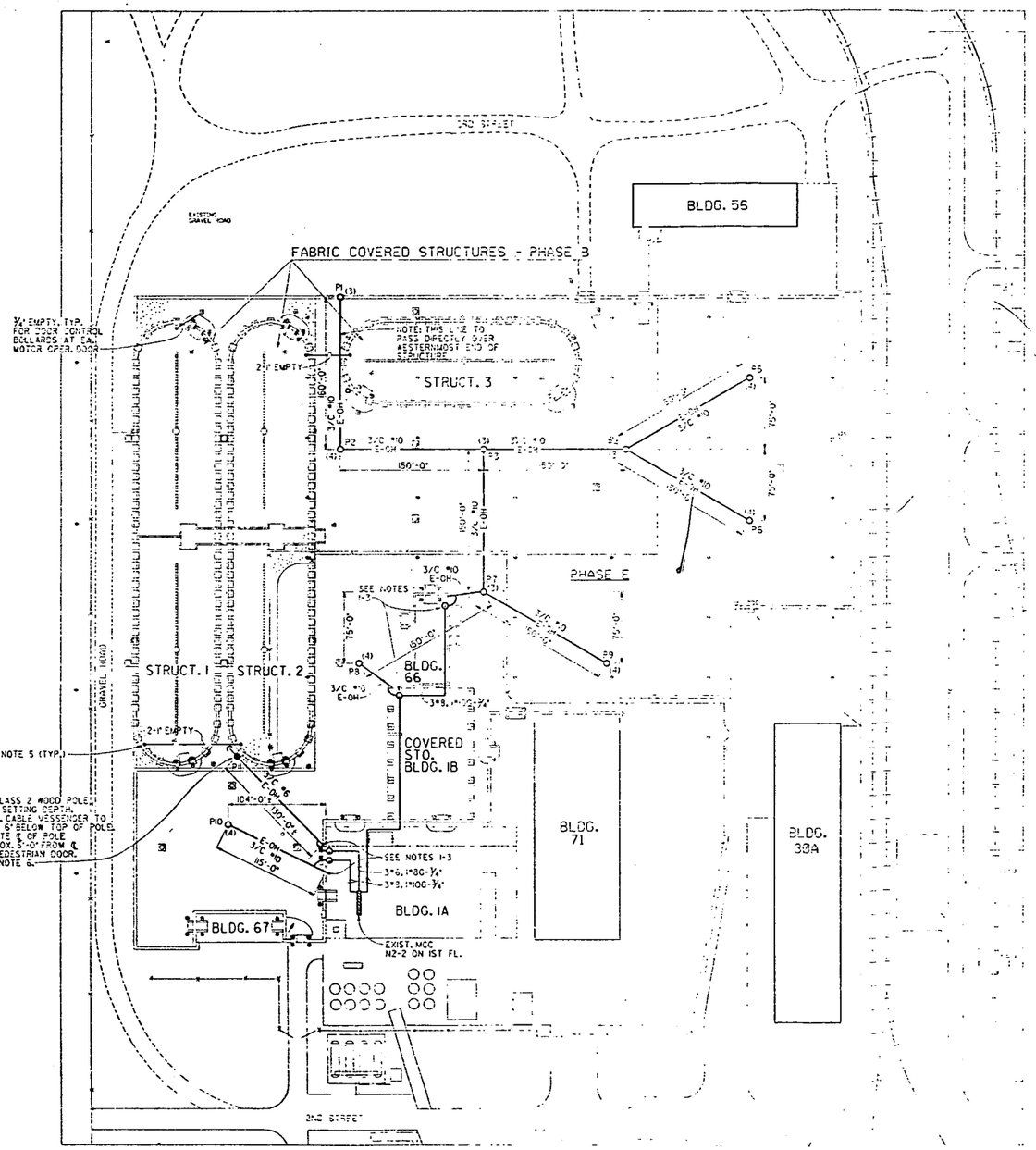
PROJECT NAME: ENVIRONMENTAL, HEALTH & SAFETY IMPROVEMENTS

DRAWING TITLE: COVERED CONTROLLED STORAGE PAD - PLANT 1 SITE DETAILS

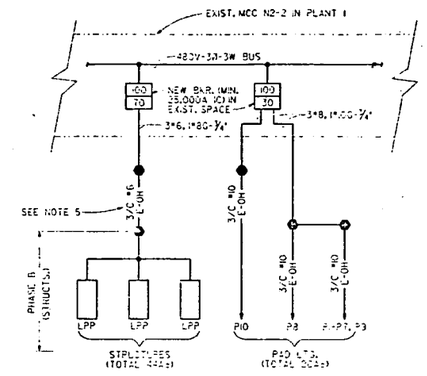
DRAWN BY	DATE	DESIGNED BY	DATE	CHECKED BY	DATE
HEC	5-89	EBW	5-89	LMP	6-89

FACILITY NO.: PLANT 1 | SCALE: AS NOTED | DRAWING NO.: 68

87-D-159 | WBS 0037502 | 74B-4445-C-00068 | SHEET NO. C-5 | REV. NO. 2



SITE PLAN
SCALE: 1"=50'-0"



SINGLE LINE DIAGRAM

POLE-MTD. LUMINAIRE CONNS.			
POLE NO.	QUAN. LUMINAIRES, PHASE		
	ØA-B	ØB-C	ØC-A
P1	1	1	1
P2	1	1	2
P3	1	1	1
P4	1	1	1
P5	1	2	1
P6	2	1	1
P7	1	1	1
P8	1	2	1
P9	1	1	2
P10	2	1	1

SECTION & DETAIL KEY

NOTES

1. ANCHOR OVERHEAD SPAN MESSENGERS TO BLDG. STEEL, AS FOLLOWS:
   a. APPROX. 40'-0" (MIN. 38'-0"), OR HIGHER, ABOVE GRADE ON BLDG. 1A.
   b. MIN. 17'-0" ABOVE GRADE ON BLDGS. 1B & 66. PROVIDE 3" GALV. STL. PIPE MAST IF NECESSARY.
2. BOND OVERHEAD SPAN MESSENGERS TO CONDUIT SYSTEM AT POINTS OF CONNECTION BETWEEN OVERHEAD CABLE & CONDUIT SYSTEM (MESSENGERS ARE EQUIP. GRDG. CONDUCTORS).
3. PROVIDE 1-HOLE WEATHERHEAD & CONDUIT FOR ENTRY OF 3/C OVERHEAD CABLE INTO BLDG. DO NOT STRIP JACKET FROM 3/C CABLE UNTIL CABLE IS EXTENDED INTO JCT. BOX IN BLDG.
4. BALANCE POLE-MTD. LUMINAIRES AS EQUALLY AS POSSIBLE ON ALL 3 PHASES OF SUPPLY IN ACCORDANCE W/CONN. SCHEDULE, THIS SHEET.
5. COORDINATE LOCATIONS & STUBUPS OF EMPTY CONDUITS IN/UNDER SLABS W/STRUCTURE SHOP DWGS. FOR OPTIMUM TERMINATIONS. CAP STUBOUTS UNTIL USED, INCLUDING CONDUITS FOR DOOR CONTROL BOLLARDS. STUB UP ALL SUCH CONDUITS 6" ABOVE SLAB & PROTECT FROM DAMAGE UNTIL EXTENDED FOR USE.
6. THE MESSENGER IN THE AERIAL SERVICE FROM BLDG. 1A TO TERMINAL POLE P4 AT STRUCT. 3 SHALL EQUIPMENT GRDG. CONDUCTOR, NOT A NEUTRAL, AND MAY NOT BE USED AS A NEUTRAL.
7. SEE SHEET E-3 FOR DETAILS, LUMINAIRE WIRING DATA & ON LINE STRINGING DATA.

LEGEND

1-LINE	PLAN	
	——	CONDUIT RUN EXPOSED
	— —	CONDUIT RUN IN OR UNDER CONC. SLAB
	3/C #10 —E-OH—	OVERHEAD PRE-ASSEMBLED AERIAL CABLE ON MESSENGER WIRE SIZE INDICATED
	(3) O P3	NEW STEEL LIGHT POLE (AS NUMBERED) ON CONC. BASE (SEE DWG. DATA FOR BASE NUMBER). PARENTHESES INDICATES QUAN. OF LUMINAIRES ON POLE.
	⟵●	NEW WOOD TERMINAL POLE, W/GUY
	⊗	JUNCTION BOX
	●	WEATHERHEAD & JCT. BOX
	100/70	MOLDED CASE BKR., FRAME/TRIP
	LPP	LTG. & PWR. PNLBD. (W/MAIN BKR.)
IC		INTERRUPTING CAPACITY
3/C	3/C	3-CONDUCTOR
	G	GROUND

TO CORRELATE REFERENCED "AMK SHEET No's" TO FMPC DRAWING NUMBERS, SEE FMPC DRAWING No. 74B-4445-K-00063

U.S. DEPARTMENT OF ENERGY
FIGURE D-13
FERNALD, OHIO

1	GENERAL REVISIONS	LMP 6-29-90	
0	CFC	SZ 7-17-89	

UNITED STATES DEPARTMENT OF ENERGY
FEED MATERIALS PRODUCTION CENTER

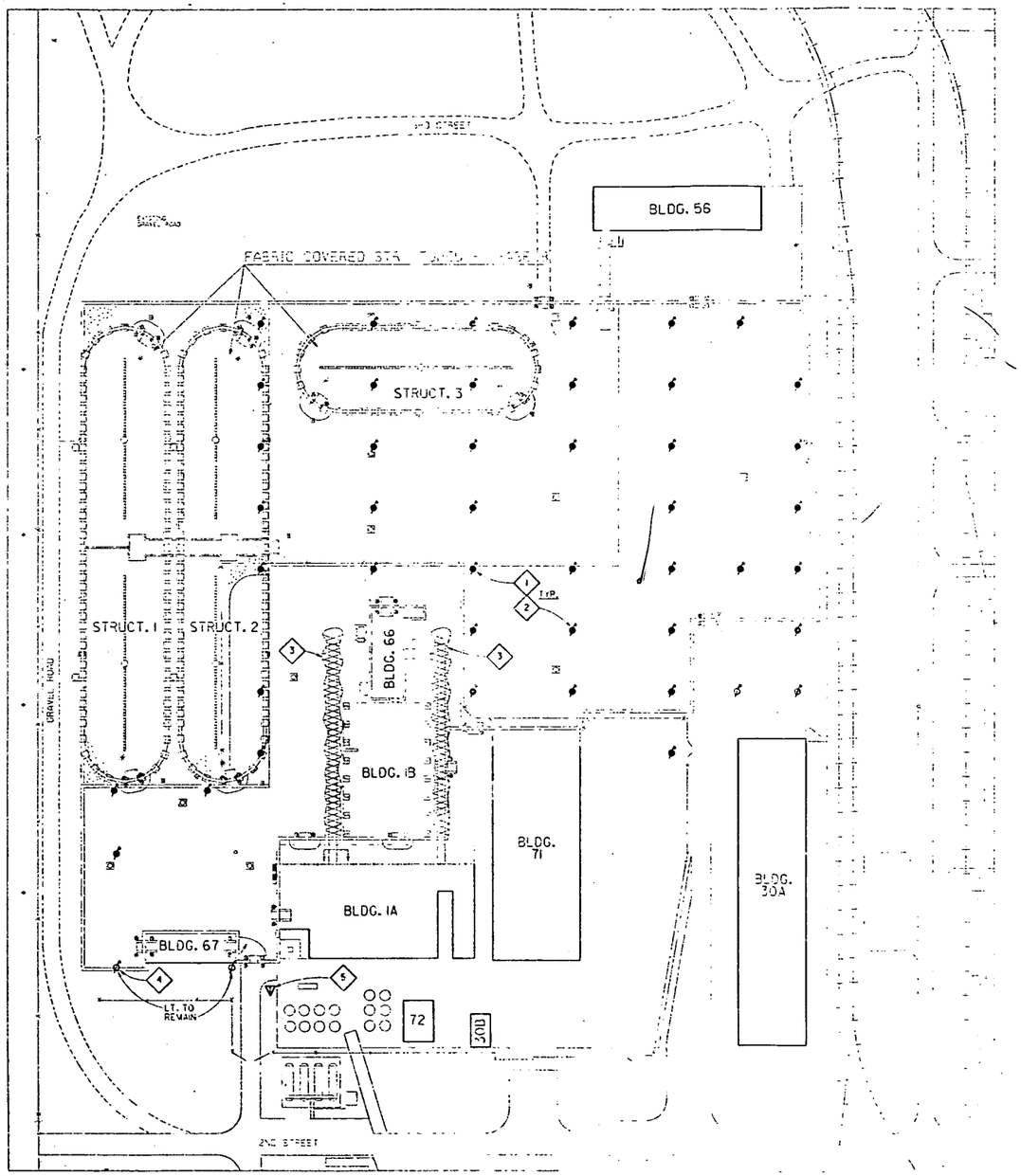
A. M. KINNEY, INC.
CONSULTING ENGINEERS
CINCINNATI, OHIO

ENVIRONMENTAL, HEALTH & SAFETY IMPROVEMENTS

COVERED CONTROLLED STORAGE PAD - PLANT 1
ELECTRICAL POWER AND LIGHTING

PSD	6/89	DJB/SZ	4/27/89	REB	5/2/89
PLANT 1				1"=50'-0"	

87-D-159 | 0087502 WBS 1.1.2.1.01 | 74B-4445-E-00069 | E-1 | 1



SITE PLAN
SCALE: 1"=50'-0"

SECTION & DETAIL KEY

ELECTRICAL DEMOLITION NOTES

2478

1. REMOVE WOOD POLE & LT.
2. CUT OFF EXIST. CONDUIT MIN. 1" BELOW TOP OF EXIST. PAD
3. REMOVE ELEC. WORK ON CONVEYOR GALLERIES (BEING REMOVED UNDER THIS SUBPROJECT)
4. DISCONN. BRANCH CKT. AT THIS LOC., FOR PHASE C AREA LTG. DEMOLITION
5. DISCONN. & INSULATE PRI. & SEC. WIRING AT EXIST. CONSTANT CURRENT TRANSF.

LEGEND

- EXIST. WOOD POLE & LT. TO BE REMOVED
- EXIST. WOOD POLE TO REMAIN, LT. TO BE REMOVED, EXCEPT AS NOTED.
- DEMOLITION AREA
- EXIST. CONSTANT CURRENT TRANSF. TO REMAIN

TO CORRELATE REFERENCED "BANK SHEET NOS." TO FMPC DRAWING NUMBERS, SEE FMPC DRAWING NO. 74B-4445-R-00063

U.S. DEPARTMENT OF ENERGY
FIGURE D-14
FERNALD, OHIO

1	GENERAL REVISIONS	LMP 6-28-90	
0	CFC	SZ 12-8-89	

UNITED STATES
DEPARTMENT OF ENERGY
FEED MATERIALS PRODUCTION CENTER

A. M. KINNEY, INC.
CONSULTING ENGINEERS
CINCINNATI, OHIO

ENVIRONMENTAL, HEALTH & SAFETY IMPROVEMENTS

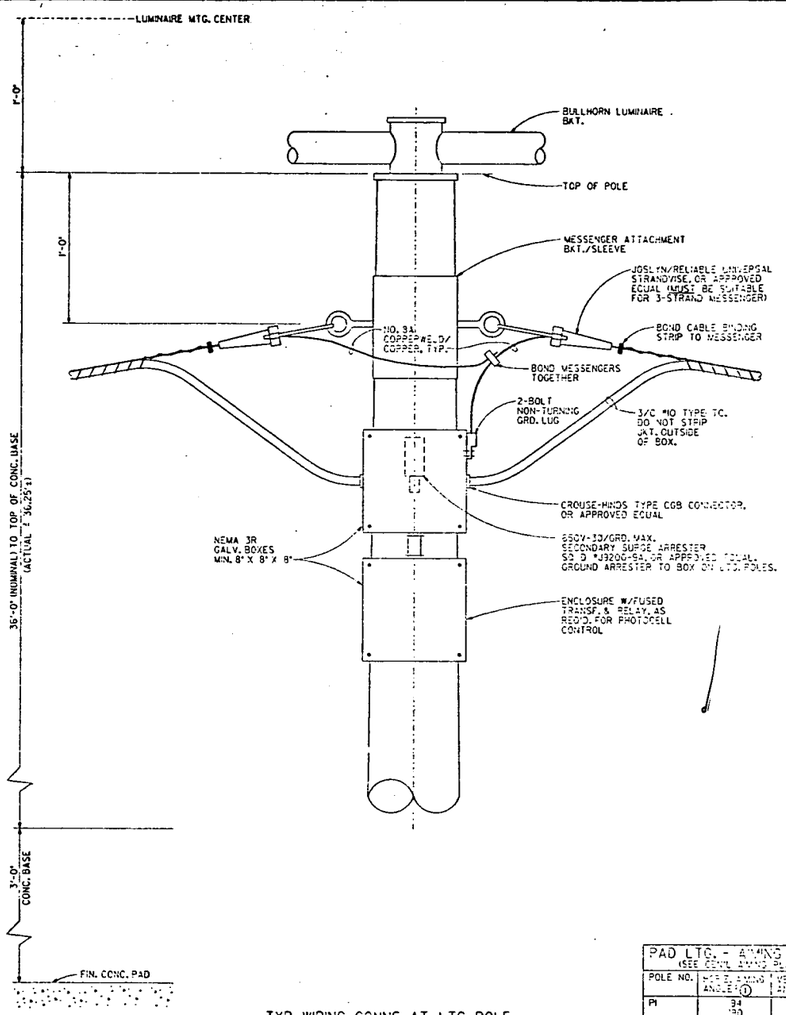
COVERED CONTROLLED STORAGE PAD - PLANT 1
ELECTRICAL DEMOLITION

PCD	6-89	SZ	6-89	REB	6-89
PLANT 1		1"=50'-0"	

70

87-D-159 | 0087502 WBS 1.1.2.1.01 | 74B-4445-E-00070 | E-2 | 1

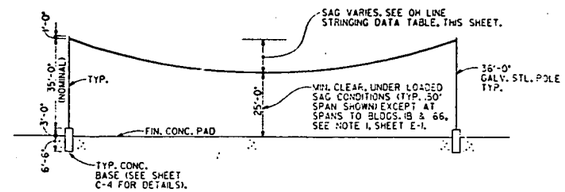
2478



TYP. WIRING CONNS. AT LTG. POLE

SCALE: 3"=1'-0"

(NOTE: TERMINATE AERIAL 480V SERVICE FROM PLANT I TO WOOD POLE AT STRUCT. 2 IN A JCT. BOX SIM. TO ABOVE)

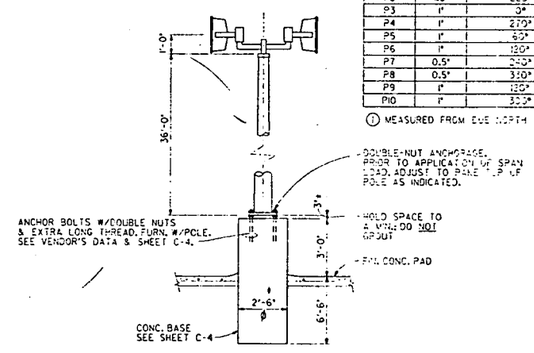


TYP. OVERHEAD SPAN WIRING

SCALE: 1"=20'-0"

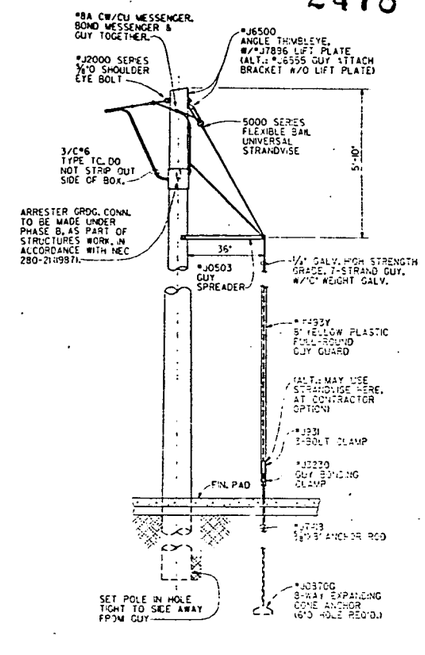
POLE	RAKE	RAKE DIRECTION ①
P1	1"	0°
P2	1.5"	225°
P3	1"	0°
P4	1"	270°
P5	1"	60°
P6	1"	120°
P7	0.5"	240°
P8	0.5"	300°
P9	1"	180°
P10	1"	300°

① MEASURED FROM DUE NORTH



TYP. LTG. POLE ARRANGEMENT & MTG.

SCALE: NONE



NOTE: ALL HDWE. (INCLUDING ANCHOR) GALV., JOSLYN OR APPROVED EQUAL

STRUCTURES SERVICE TERMINAL POLE P11 DETAIL

SCALE: 1/2"=1'-0"

PAD LTG. - AIMING TABLE (SEE CENTL AIMING PLAN)		
POLE NO.	HORIZ. AIMING ANGLE ①	VERT. AIMING ANGLE ②
P1	34 130 256	80 74 80
P2	76 141 231 349	67 75 71 71
P3	63 137 237	68 79 72
P4	27 130 242	76 60 75
P5	25 141 209 326	70 74 75 64
P6	23 115 197 335	74 70 58 75
P7	39 141 207	75 75 69
P8	24 141 32 325	77 78 75 46
P9	41 107 80 325	77 71 49 73
P10	43 123 231 309	71 71 70 70

① MEASURED CLOCKWISE FROM DUE NORTH

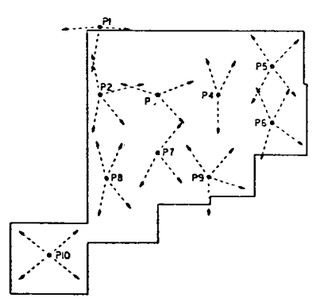
② MEASURED UP FROM VERTICAL (NADIR)

OH LINE STRINGING DATA

SPAN	LENGTH, FT. (NOTE 1)	STRINGING TEMPERATURE (WIRE TEMP.) 0°F d	0°F T	30°F d	30°F T	60°F d	60°F T	90°F d	90°F T	120°F d	120°F T	PRESTRESSING TENSION, LB.
P1-P2	160	12.06	74.9	12.15	74.4	12.25	73.9	12.34	73.4	12.44	72.9	550
P2-P3	150	12.08	66.2	12.17	65.8	12.25	65.4	12.33	65.0	12.44	64.7	500
P3-P4	150	12.08	66.2	12.17	65.8	12.25	65.4	12.33	65.0	12.44	64.7	500
P4-P5	150	13.01	62.1	13.09	61.7	13.18	61.4	13.26	61.0	13.34	60.7	450
P4-P6	190	13.01	62.1	13.09	61.7	13.18	61.4	13.26	61.0	13.34	60.7	450
P3-P7	150	12.08	66.2	12.17	65.8	12.25	65.4	12.33	65.0	12.44	64.7	500
P7-P9	150	12.08	66.2	12.17	65.8	12.25	65.4	12.33	65.0	12.44	64.7	500
P7-BLDG. 66	38±	(SLACK SPAN, d=1.25 FT.)										300
P8-BLDG. 66	40±	(SLACK SPAN, d=1.25 FT.)										350
P10-BLDG. 1A	85	6.05	75.3	6.15	74.1	6.25	72.9	6.35	71.8	6.44	70.9	550
P9-BLDG. 1A	130±	11.87	96.0	11.93	95.5	12.00	95.1	12.07	94.6	12.13	94.1	550

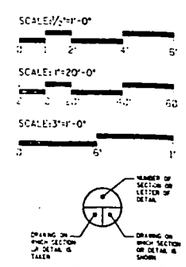
OH STRINGING DATA NOTES

1. "d" = SAG, FT.
   "T" = TENSION, LBS.
2. OH SPANS MAY BE STRUNG TO EITHER SAG OR TENSION FIGURES, BUT MUST BE PRE-STRESSED BRIEFLY TO INDICATED VALUES.
3. DATA IS SUITABLE FOR STRINGING UNDER WIND CONDITIONS OF 15 MPH OR LESS. DO NOT STRING WHEN WIND EXCEEDS 15 MPH.



PAD LTG. - GENERAL AIMING PLAN

SCALE: NONE



SECTION & DETAIL KEY

TO CORRELATE REFERENCED *AMK SHEET No's *TO FMPC DRAWING NUMBERS, SEE FMPC DRAWING No. 743-4445-X-00063

U.S. DEPARTMENT OF ENERGY

FIGURE D-15

FERNALD, OHIO

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	DATE	DRAWN	JOB
0	CFC	7-14-89	SZ	

UNITED STATES DEPARTMENT OF ENERGY
FEED MATERIALS PRODUCTION CENTER

A. M. KINNEY, INC.
CONSULTING ENGINEERS
CINCINNATI, OHIO

ENVIRONMENTAL, HEALTH & SAFETY IMPROVEMENTS

COVERED CONTROLLED STORAGE PAD - PLANT I ELECTRICAL DETAILS

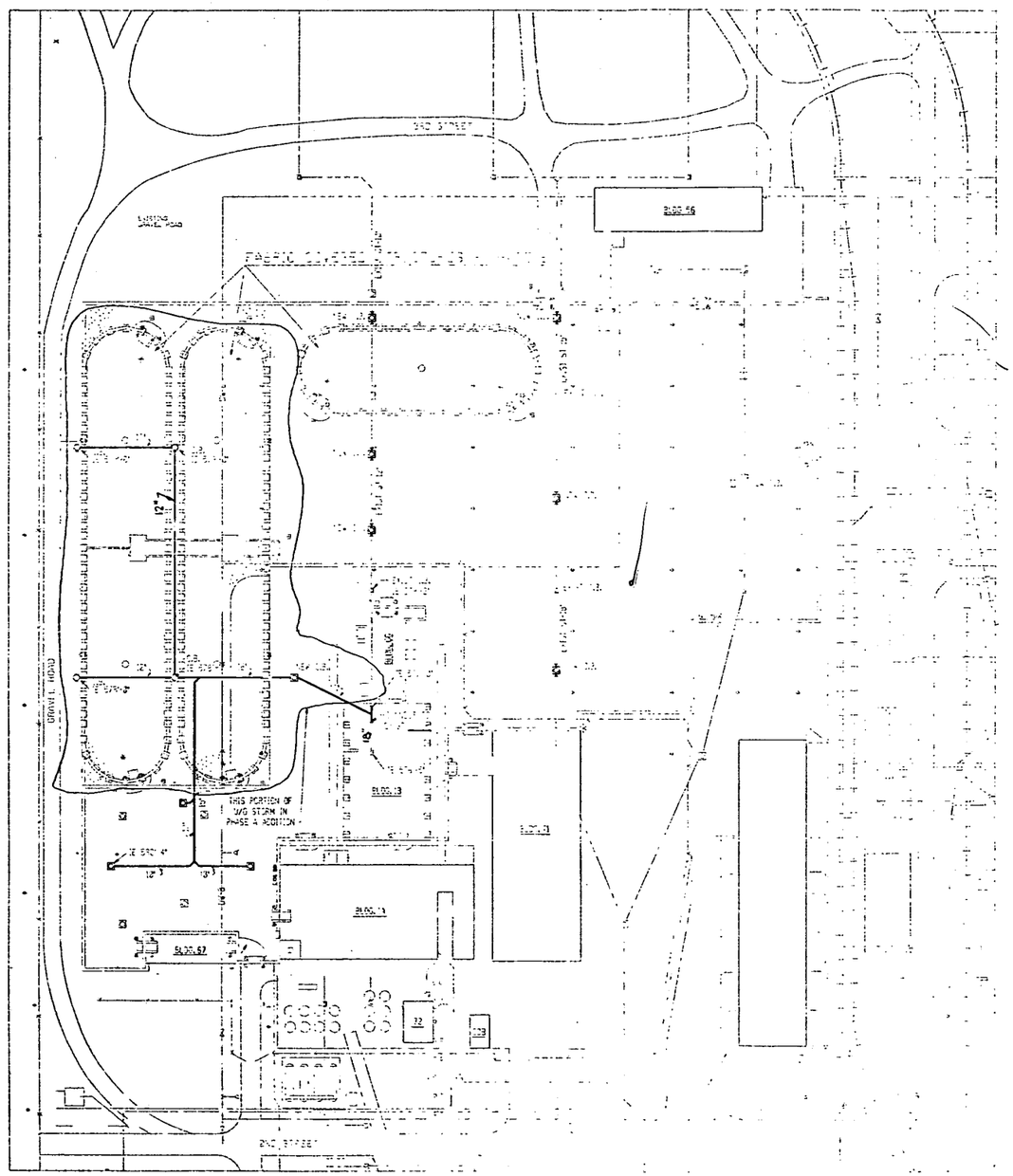
DESIGN BY	DATE	DRAWN BY	DATE	CHECKED BY	DATE	APPROVED BY	DATE
PGD, WRC	6-89	SZ	6-89			PEB	6-89

PLANT I — SCALE: AS NOTED

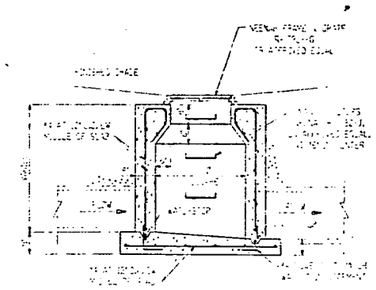
71

87-D-159 | 0087502 WBS 1.1.2.L01 | 743-4445-E-00071 | SHEET E-3 | REV. 0

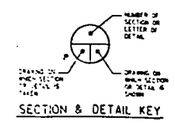
2478



SITE PLAN



TYPICAL CATCH BASIN



SECTION & DETAIL KEY

NOTES

TO CORRELATE REFERENCED DRAWING SHEET NOS. TO FMPC DRAWING NUMBERS, SEE FMPC DRAWING No. 74B-4445-A-00063

U.S. DEPARTMENT OF ENERGY

FIGURE D-16

FERNALD, OHIO

1	GENERAL REVISIONS		
0	CFC		

UNITED STATES DEPARTMENT OF ENERGY
FEED MATERIALS PRODUCTION CENTER

A. M. KINNEY, INC.
CONSULTING ENGINEERS
CINCINNATI, OHIO

ENVIRONMENTAL, HEALTH & SAFETY IMPROVEMENTS

COVERED CONTROLLED STORAGE PAD - PLANT 1
SITE DRAINAGE

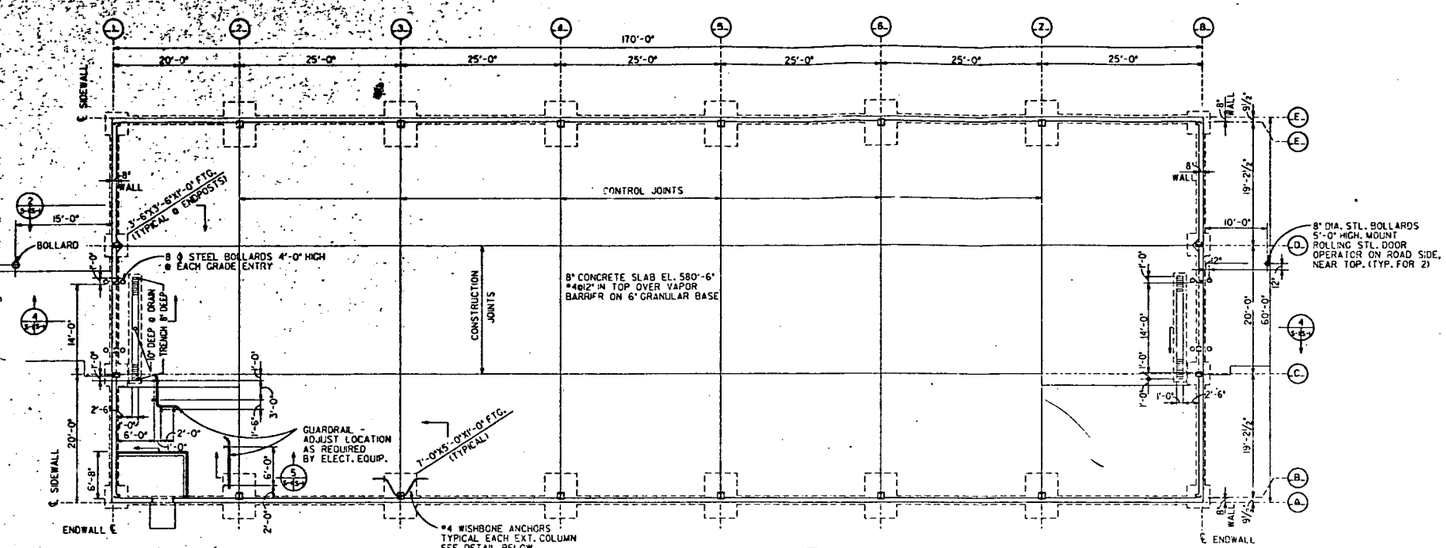
DWG/RAA	05-89	DWG	05-89	RCW	6-89
FMPC - PLANT 1				NOTED	

87-D-159	0087502 WBS U2.L01	74B-4445-P-00072	P-1 1

72

2478

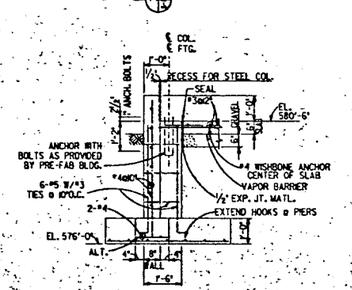
FIGURE D-17



FOUNDATION PLAN

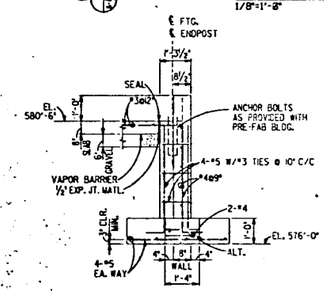
1/8"=1'-0"

NORTH



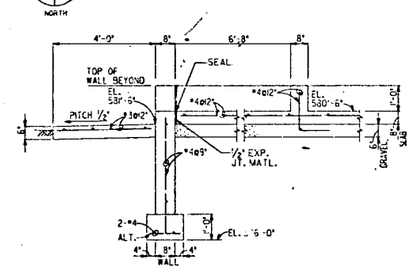
TYPICAL N. & S. WALLS (1 S1 S2)

SCALE: 1/2" = 1'-0"



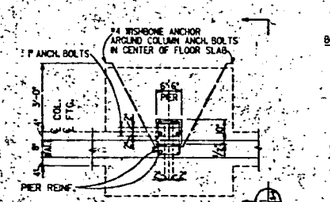
TYPICAL E. & W. WALLS (2 S1 S2)

SCALE: 1/2" = 1'-0"



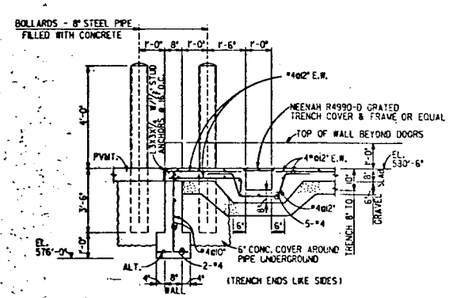
SECTION (3 S1 S2)

SCALE: 1/2" = 1'-0"



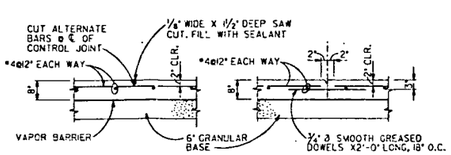
TYPICAL WALL, PIER & ANCHOR BOLT PLANS

SCALE: 1/2" = 1'-0"



SECTION (4 S1 S2)

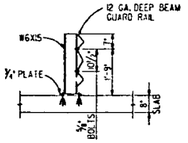
SCALE: 1/2" = 1'-0"

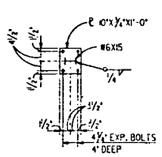


CONTROL JOINT

CONSTRUCTION JOINT IN LIEU OF ANY CONTROL JOINT

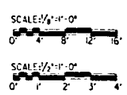
TYPICAL SLAB JOINT DETAILS

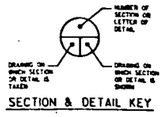




SECTION (5 S1 S2)

SCALE: 1/2" = 1'-0"





SECTION & DETAIL KEY

ELEVATION

DOOR JAMBS DETAIL

NOTES

ALL ANCHOR BOLTS ARE TO BE FURNISHED BY FOUNDATION CONTRACTOR.

PIERS AND ANCHOR BOLTS MUST ACCOMODATE COLUMN BASE PLATES PROVIDED BY THE MANUFACTURER OF THE BUILDING SYSTEM PURCHASED. THE CONTRACTOR IS TO VERIFY PIER AND ANCHOR BOLT SIZE & LOCATION FROM CERTIFIED DRAWINGS OF THE BUILDING SYSTEM PURCHASED BEFORE FABRICATING AND INSTALLING IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

FOOTINGS ARE DESIGNED FOR MAXIMUM SOIL BEARING OF 4000 P.S.F.

CONCRETE TO HAVE THE FOLLOWING 28 DAY COMPRESSIVE STRENGTHS: FC = 4000 P.S.I. FOR SLABS
FC = 3000 P.S.I. FOR OTHERS

ALL CONCRETE WHICH WILL BE EXPOSED TO WEATHER TO BE AIR ENTRAINED.

ALL REINFORCING STEEL TO BE ASTM A615 GRADE 60, EXCEPT GRADE 40 MAY BE USED FOR PIER TIES. ALL WALL CORNERS TO HAVE CORNER BARS IN OUTSIDE FACE TO MATCH GREATER HORIZONTAL WALL REINFORCEMENT. LAP SPLICES OR EMBEDMENT LENGTHS TO CONFORM TO TABLE 20.1 ACI MANUAL SP-17 CLASS B SPLICE.

STATE OF OHIO L. M. ROCKRAS 20092 PROFESSIONAL ENGINEER

TO CORRELATE REFERENCED "AWK SHEET NO." TO FMPC DRAWING NO., SEE FMPC DRAWING NO. BOX-4445-X-00021

U.S. DEPARTMENT OF ENERGY

FIGURE D-18

FERNALD, OHIO

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	DRAWN	CHECKED	DATE
1	AS-BUILT	LMP		3-12-89
a	CFC	LMP		3-25-88

UNITED STATES DEPARTMENT OF ENERGY
FEED MATERIALS PRODUCTION CENTER

A. M. KINNEY, INC.
CONSULTING ENGINEERS
CINCINNATI, OHIO

PROJECT NAME: ENVIRONMENTAL, HEALTH & SAFETY IMPROVEMENTS

DRAWING TITLE: WAREHOUSE PLANT 8 FOUNDATION PLAN & DETAILS

74

DRAWN BY	DATE	WORKED CHECKED BY	DATE	DESIGNED BY	DATE
MEC		RDS	1-19-88	LMP	3-25-88

SUBMITTED FOR APPROVAL: 8 | SCALE: AS NOTED | CLASS:

SUBMITTED FOR APPROVAL | APPROVAL RECOMMENDED | DRAWING APPROVED

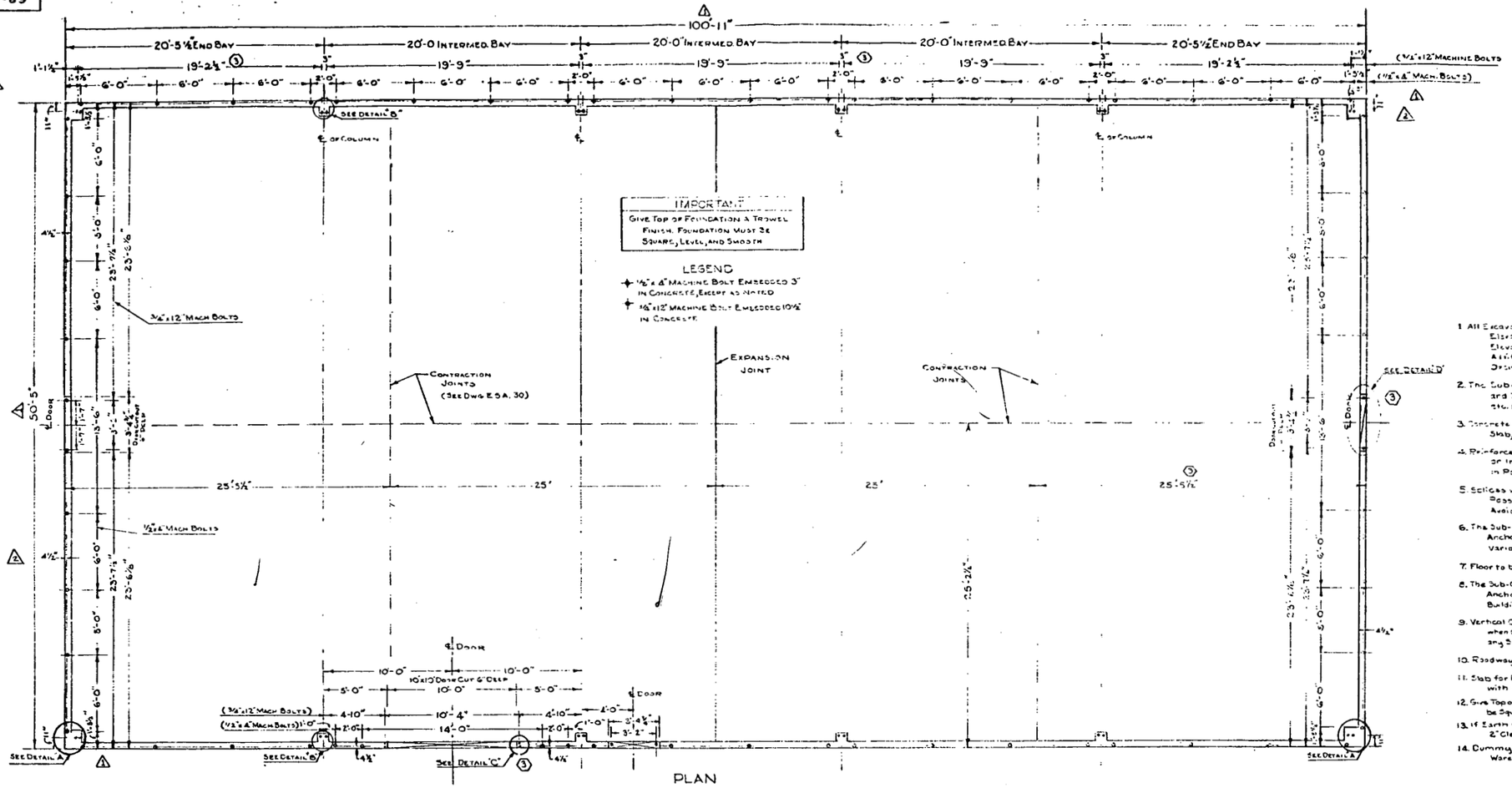
DOE PROJECT NO.	SPEC. CHAPTER NO.	PROJECT NO.	SHEET NO.	REV. NO.
87-D-159	0087502 WBS L1.3.2.02	80X-4445-A-00003	S-1	1

PILOT PLANT WAREHOUSE (BLDG-68)

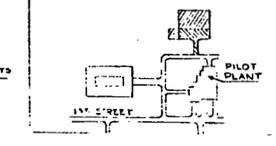
2478

FIGURE D-19

2478



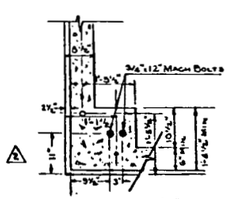
PLAN



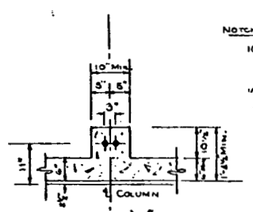
PLOT PLAN

GENERAL NOTES

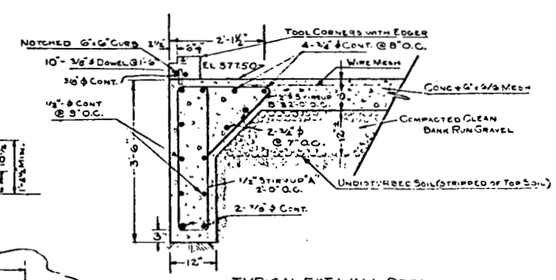
1. All Excavation for Footings shall be Carried to the Elevations Indicated on the Plan, if at these Elevations Undisturbed Soil does not Exist, Additional Excavation shall be Approved & Designated only by the Contractor's Engineer.
2. The Sub-Contractor shall Verify the Locations and Dimensions of Existing Structures, Utilities, etc. before Proceeding with Excavation & Detailing.
3. Concrete to be 3000 PSI @ 28 Day, Type C for Floor Slab, Foundation Walls & Footings.
4. Reinforcement shall be Deformed Bars of Rail Steel or Intermediate Grade Billet Steel Securely Held in Position during Pouring.
5. Splices where Required, shall Lap 40 Dia's, where Possible Adjacent Splices shall be Staggered. Avoid Locating Splices at Points of Maximum Stress.
6. The Sub-Contractor shall Install all Pipe Sleeves, Anchor Bolts and other Inserts Required for the Various Trades.
7. Floor to be Level and to have a Steel Troweled Finish.
8. The Sub-Contractor shall Verify Size & Location of All Anchor Bolts from Certified Vendors Prints of Buildings, Doors, etc.
9. Vertical Construction Joints in Walls shall be used only when Unavoidable, and shall be Located at Least 4'-0" from any Supporting Column or Wall Opening.
10. Roadway Concrete to be 4000 PSI @ 28 Day, Type "E".
11. Slab for Bldg. & Roadway to be 8" Concrete, Reinforced with 6"x6" #2 Wire Mesh.
12. Give Top of Foundation a Trowel Finish. Foundation must be Square, Level, & Smooth.
13. If Earth is Used for Footing Forms, Allow an additional 2" Clearance Each Side.
14. Dummy Contraction Joints to form 25' Squares in Warehouse Floor (See Dwg. E.S.A. 30)



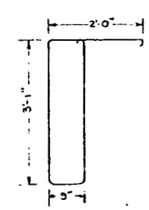
DETAIL "A"
Typical Corner Detail



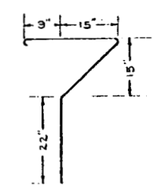
DETAIL "B"



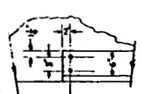
TYPICAL EXT. WALL DETAIL



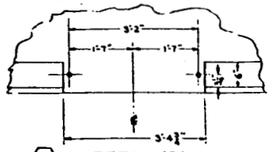
STIRRUP "A"
1/2" ϕ @ 2'-0" O.C.



STIRRUP "B"
1/2" ϕ @ 2'-0" O.C.



(3) DETAIL "C"
Bolt Layout @ 10'x10' Door



(3) DETAIL "D"
Typical Bolt Layout @ Door

INDEX CODE
68X5500S00007

DESIGN APPROVAL

DO NOT SCALE REDUCED DRAWING

REF. DWG. NO.	REF. DWG. TITLE
7-407GF-A	Foundation Plans Butler Mfg. Co.

NO.	REVISIONS	DATE	BY
3	Added Details C-D - Only Is Changed	7/8/55	J P D
2	Wall Dimensions Changed	11/15/55	J P D
1	Corner & Overall Dimensions Changed	7/26/55	J P D

Amuna 8/20/91

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NATIONAL LEAD COMPANY OF OHIO
FEED MATERIALS PRODUCTION CENTER
FERNALD, OHIO

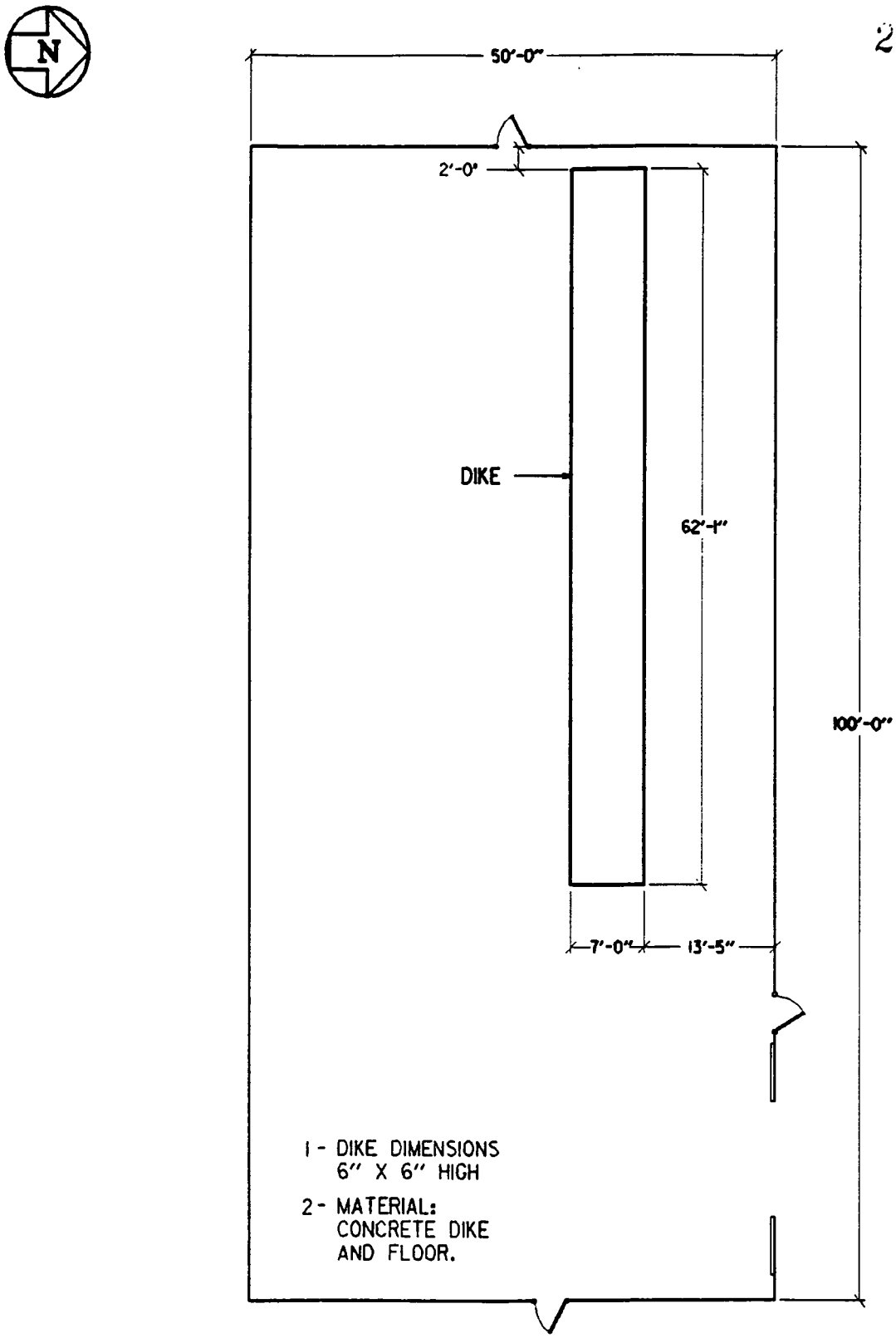
U.S. ATOMIC ENERGY COMMISSION

ENRICHED MATERIAL WAREHOUSE
LAYOUT AND DETAILS

Department Engineering
Project No. G-37 — CP-F-55-19
Drawn J. Price — Checked — Approved 7-13-55
Date July 6, 1955 — Dwg. No. — Rev. 3
Scale 1/4"=1'-0"

U.S. DEPARTMENT OF ENERGY
FIGURE D-20
FERNALD, OHIO

2478



PILOT PLANT WAREHOUSE
(BUILDING 68) RCRA STORAGE AREA

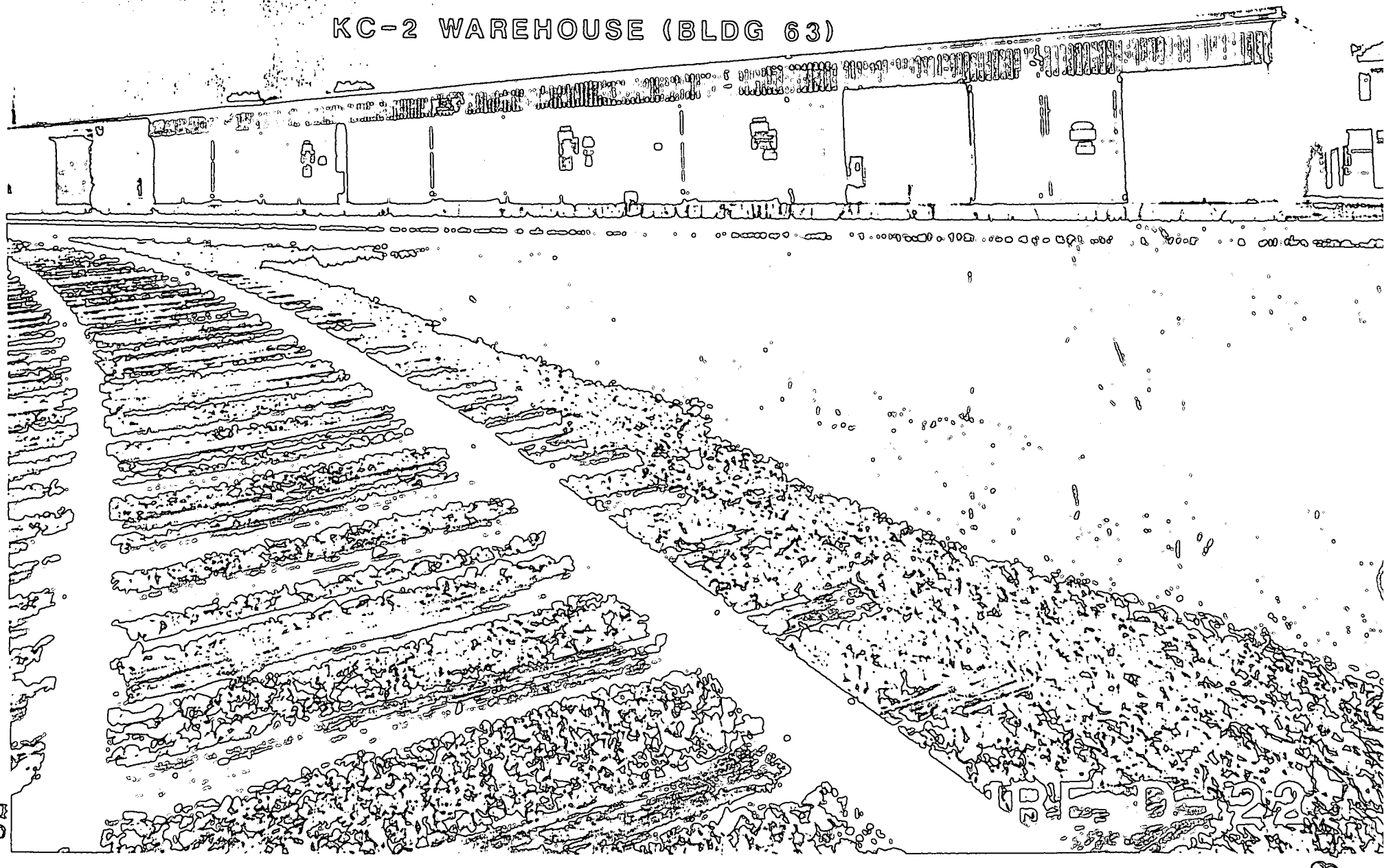
77

U.S. DEPARTMENT OF ENERGY

FIGURE D-21

FERNALD, OHIO

RCRA
D.J.HUFF 08-16-91
zfal:[200,4]flgd21.dgn


KC-2 WAREHOUSE (BLDG 63)

2478

REV.	
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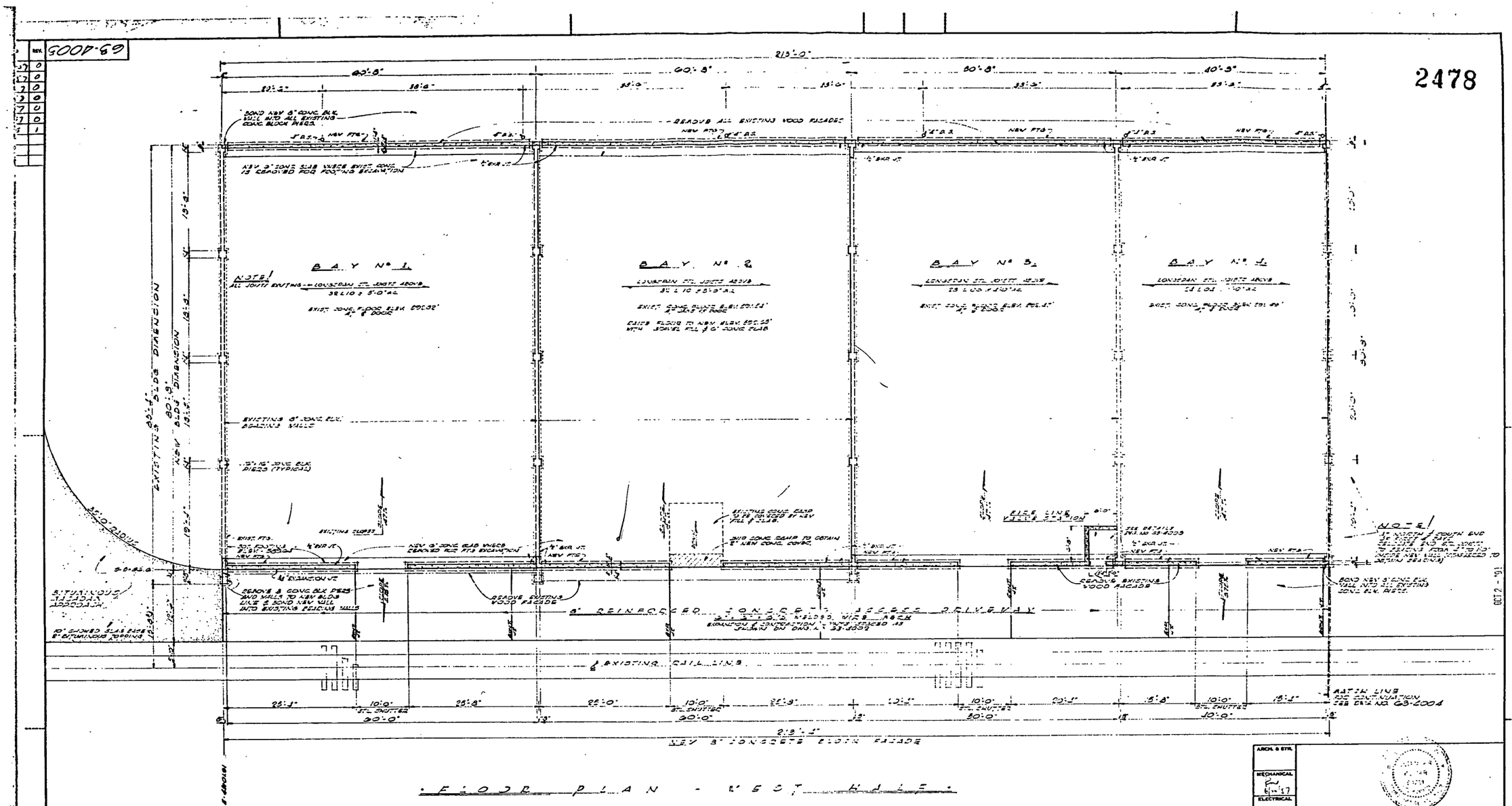


NOTE:
FOAM ROOFING HAS BEEN INSTALLED

INDEX CODE
69X 5500 A 00006

DESIGN APPROVAL

DIVISION	SIGNATURE	DATE
MECHANICAL		6/18
ELECTRICAL		
CHEMICAL		
MAINTENANCE		
PROCUREMENT		7/63

DO NOT SCALE REDUCED DRAWING

REF. DWG. NO.	REF. DWG. TITLE
63-2005	FACE LINE VARIES FOR DETAIL
63-2004	FLOOR PLAN - EAST HALF

NO.	REVISIONS	DATE	BY
1	ADDED NOTE	7/15/91	

ARCH. & STR.
MECHANICAL 6/18/67
ELECTRICAL
CHEMICAL
PROJ. ENGR. 7/14/67

STATE OF OHIO
JAMES M. ROBERTS
8/20/91

NATIONAL LEAD COMPANY OF OHIO
FEED MATERIALS PRODUCTION CENTER
FERNALD, OHIO

U.S. ATOMIC ENERGY COMMISSION

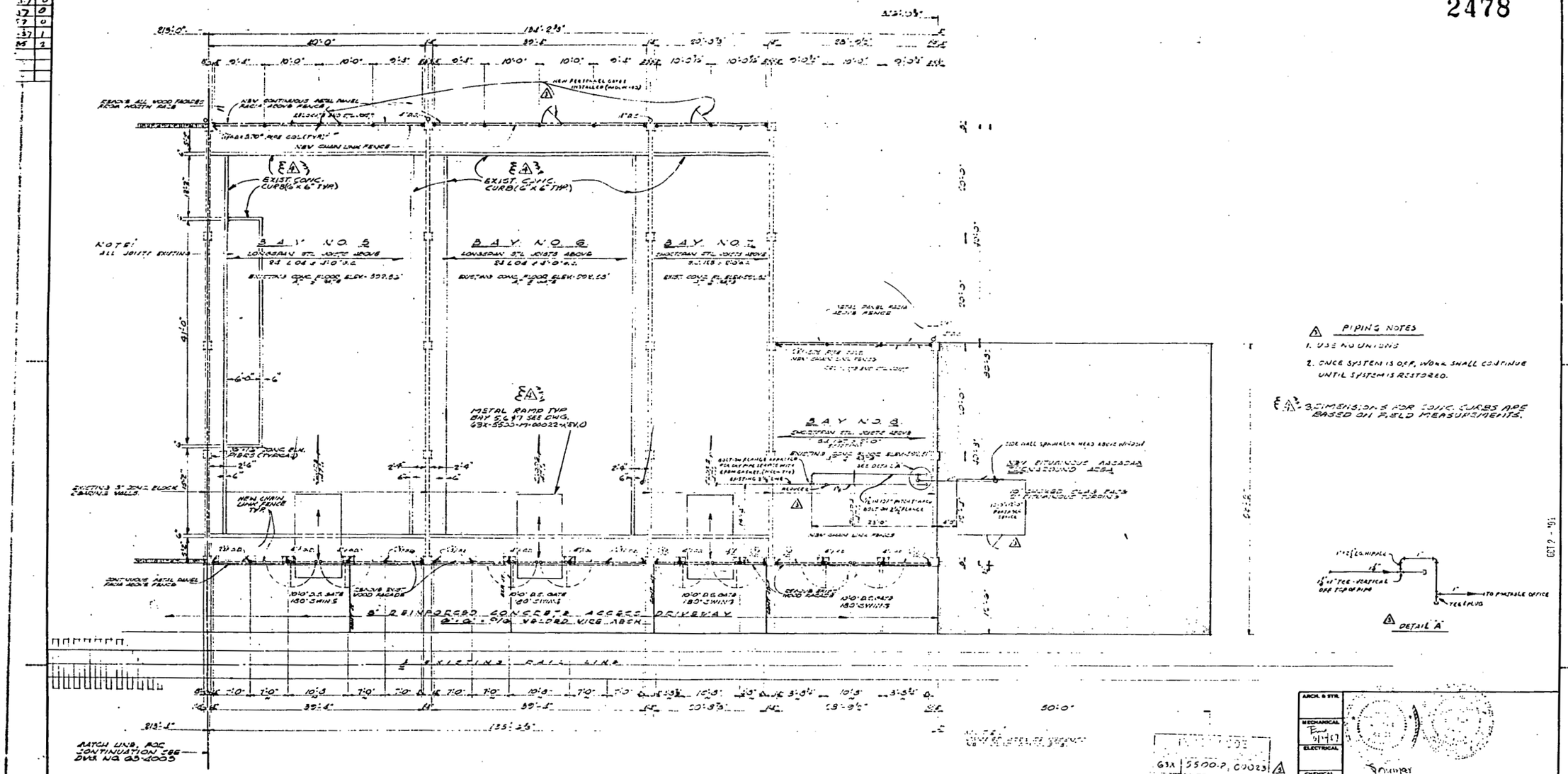
KC-2 WAREHOUSE
ARCHITECTURAL
FLOOR PLAN - WEST HALF

79

DEPARTMENT PROCUREMENT
PROJECT NO. 33-1 CP-F- 52-72
DRAWN TRACED HARDLEY CHECKED APPROVED
DATE 4-28-67
SCALE 1/4"=1'-0"
REV.

U.S. DEPARTMENT OF ENERGY
FIGURE D-23
FERNALD, OHIO

2478



PIPING NOTES

1. USE NO UNIONS
2. ONCE SYSTEM IS OFF, WORK SHALL CONTINUE UNTIL SYSTEM IS RESTORED.
3. DIMENSIONS FOR CONC. CURBS ARE BASED ON FIELD MEASUREMENTS.

DETAIL "A"

NOTE: FOAM FILLING NOT TO BE INSTALLED

INDEX CODE 63X 5500.2 00023

INDEX CODE 63X 5500.2 S 00007

DESIGN APPROVAL

DO NOT SCALE REDUCED DRAWING

REF. DWG. NO.	REF. DWG. TITLE	NO.	REVISIONS	DATE	BY
		1	REVISED FOR PERFECT AS BUILT		
		2	ADDED DIMS., PIPING & PARTIAL OFFICE - RES 1323		
		3	ALTED NOTE		
		4			

ARCH. & STR. / MECHANICAL / ELECTRICAL / CHEMICAL / PROJ. ENGR.

NATIONAL LEAD COMPANY OF OHIO
FEED MATERIALS PRODUCTION CENTER
FERNALD, OHIO

U.S. ATOMIC ENERGY COMMISSION

K-2 WAREHOUSE
ARCHITECTURAL
FLOOR PLAN - EAST HALF

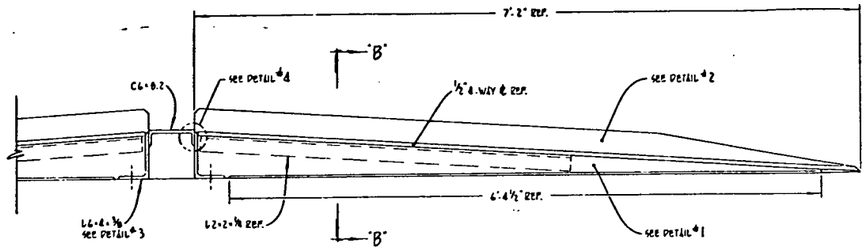
80

DEPARTMENT PROCUREMENT
PROJECT NO. 03-1 CP-F. 30-78
DRAWN TRACED CHECKED APPROVED REV. 4
DATE
SCALE 1/8"=1'-0"
DWG. NO.

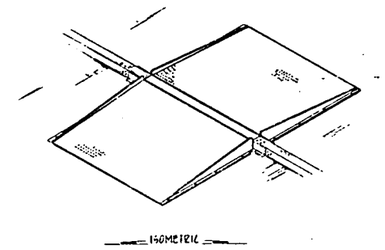
U.S. DEPARTMENT OF ENERGY

FIGURE D-24

FERNALD, OHIO

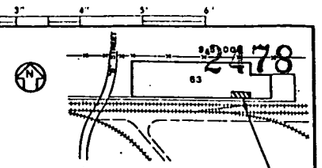


SECTION "B"-"B"
SCALE: 1 1/2" = 1'-0"

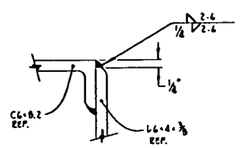


ISOMETRIC

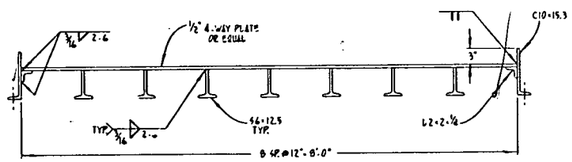
(3) RAMPS REQ'D



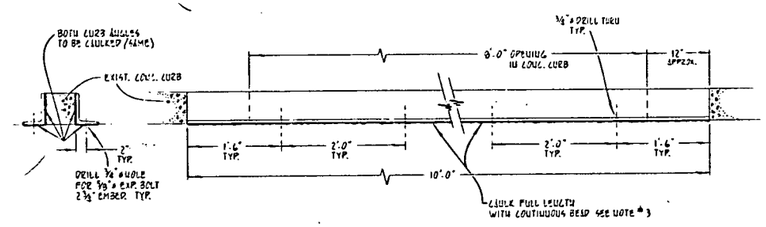
LOCATION PLAN
NEW WORK



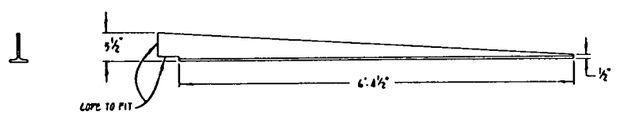
DETAIL #4



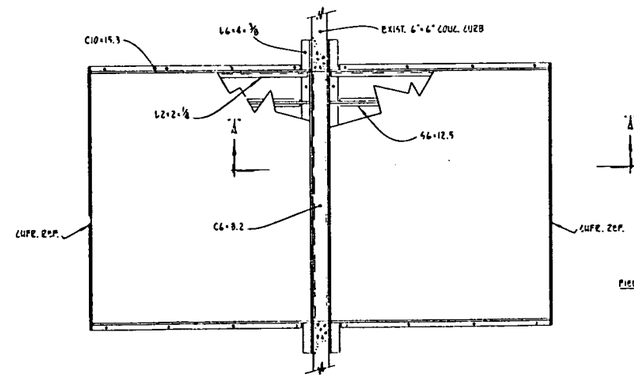
SECTION "B"-"B"
SCALE: 1" = 1'-0"



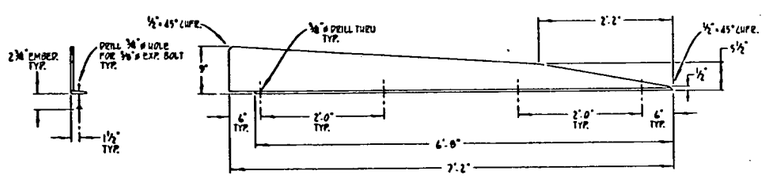
DETAIL #3 — L6×4×3/8
SCALE: 1" = 1'-0"



DETAIL #1 — S6×12.5
SCALE: 1" = 1'-0"



PLAN VIEW
SCALE: 1 1/2" = 1'-0"



DETAIL #2 — C10×15.3
SCALE: 1" = 1'-0"

DO NOT SCALE REDUCED DRAWING

NOTES:

1. ALL STRUCTURAL STEEL, UNLESS OTHERWISE SPECIFIED, SHALL CONFORM TO THE REQUIREMENTS OF ASTM A-36.
2. ALL STRUCTURAL WELDING TO CONFORM TO ANSI/AWS D1.1-86. VISUAL INSPECTION IS REQUIRED.
3. USE POLYURETHANE CAULKING COMPOUND (TREMCO, SONNEBORN) OR APPROVED EQUAL. CURB TO BE WATER-TIGHT ON BOTH SIDES.

FIELD NOTE:
MODIFY GATES TO CLEAR RAMPS AS REQ'D.

NO.	REVISIONS	DATE	DWN. BY	APPD.	NO.	REVISIONS	DATE	DWN. BY	APPD.	REF. DWG. NO.
										632.5500.4.00003

UNLESS OTHERWISE SPECIFIED DIM. LIMITS ARE IN INCHES
TOLERANCES ARE
FRACTIONS ± 1/16"
ANGLES ± 0° 30'
DECIMALS
.X ± .1
.XX ± .03
.XXX ± .005
.XXXX ± .0010
DWG. RELEASE DATE

APPROVALS

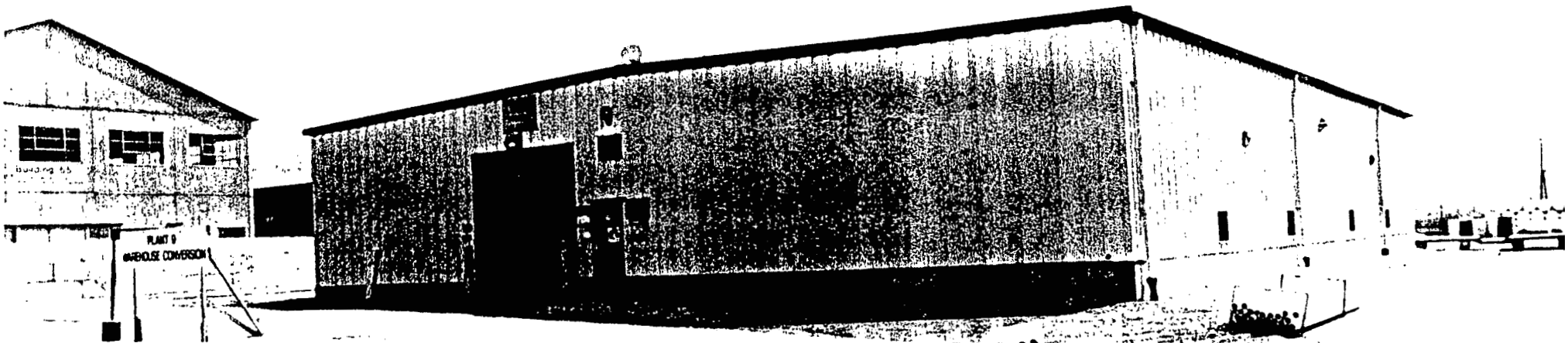
CHEMICAL			ES & H		
CIVIL & STR			MAINTENANCE		
ELECTRICAL			NU SAFETY		
ENGINEER			QA		
INSTRUMENT			PRODUCTION		
MECHANICAL			PROD. TECH		
			WASTE MANAGE.		
CHECKED					
APPROVED					

WESTINGHOUSE MAT'LS. CO. OF OHIO
FERNALD, OHIO
FEED MATERIALS PRODUCTION CENTER
U.S. DEPARTMENT OF ENERGY

K.C.-2 WAREHOUSE
BLDG. NO.'S 5, 6, 7
COUTAINMENT CURB RAMPS
81
PLAN DETAILS SECTIONS
PROJ. NO. RES 1070
DATE 11.3.88
DRAWN

U.S. DEPARTMENT OF ENERGY
FIGURE D-25
FERNALD, OHIO

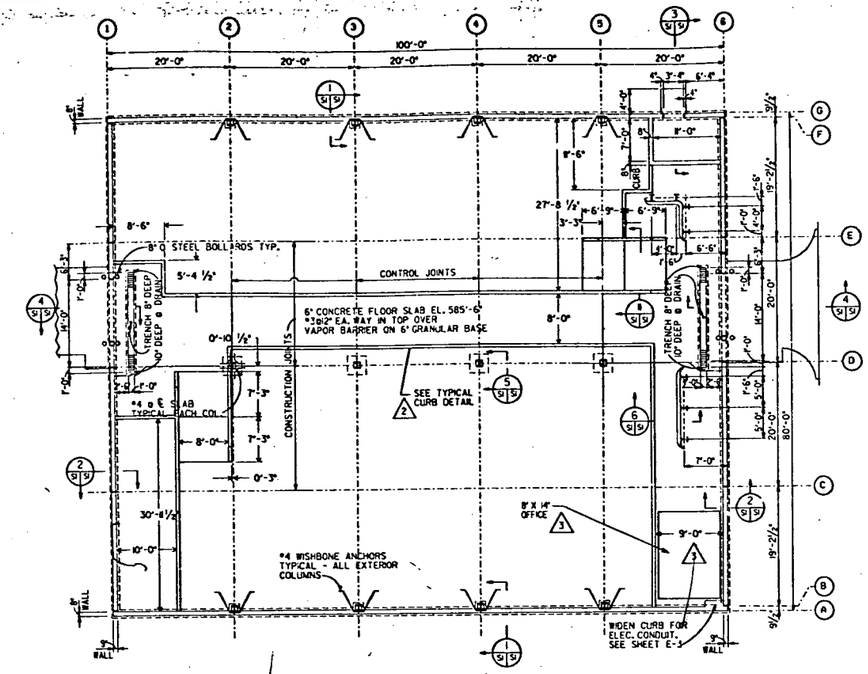
8/20/91



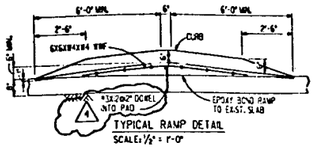
PLANT 9 WAREHOUSE (BLDG 81)

FIGURE D-26

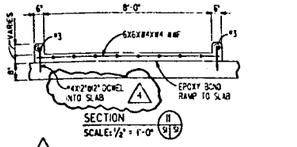
2478



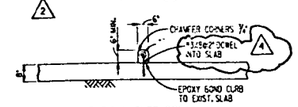
FOUNDATION PLAN
1/8"=1'-0"



TYPICAL RAMP DETAIL
SCALE: 1/2" = 1'-0"



SECTION
SCALE: 1/2" = 1'-0"



TYPICAL CURB DETAIL
SCALE: 1/2" = 1'-0"

NOTES

ALL ANCHOR BOLTS ARE TO BE FURNISHED BY PRE-ENGINEERED BUILDING CONTRACTOR.

PIERS AND ANCHOR BOLTS MUST ACCOMMODATE COLUMN BASE PLATES PROVIDED BY THE MANUFACTURER OF THE BUILDING SYSTEM PURCHASED. THE CONTRACTOR IS TO VERIFY PIER AND ANCHOR BOLT SIZE AND LOCATION FROM CERTIFIED DRAWINGS OF THE BUILDING SYSTEM PURCHASED BEFORE INSTALLING IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

FOOTINGS ARE DESIGNED FOR MAXIMUM SOIL BEARING OF 3500 P.S.F.

CONCRETE TO HAVE THE FOLLOWING 28 DAY COMPRESSIVE STRENGTHS: FC = 4000 P.S.I. FOR SLABS, CURBS, & RAMPS
FC = 3000 P.S.I. FOR OTHERS 2

CURBS AND RAMPS TO HAVE 3"-5" SLUMP AND 0%-3% ENTRAINED AIR.

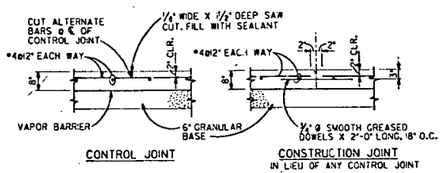
ALL CONCRETE WHICH WILL BE EXPOSED TO WEATHER TO BE AIR ENTRAINED.

ALL REINFORCING STEEL TO BE ASTM A615 GRADE 60, EXCEPT GRADE 40 MAY BE USED FOR PIER DIES. ALL WALL CORNERS TO HAVE CORNER BARS IN OUTSIDE FACE TO MATCH GREATER HORIZONTAL WALL REINFORCEMENT. LAP SPLICES OR EMBEDMENT LENGTHS TO CONFORM TO TABLE 202 ACI MANUAL SP-17, CLASS B SPLICE.

INSTALL CURB CONTROL JOINTS ON SLAB CONTROL JOINTS. SEAL JOINTS WITH A FLEXIBLE JOINT SEALER (URETHANE). DO NOT RUN REBAR THROUGH CONTROL JOINT.

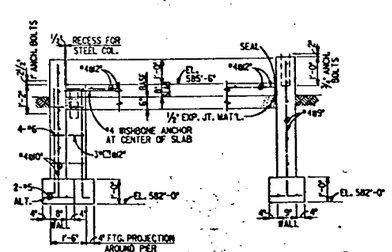
FOR EPOXY BOND USE (2) COMPONENT, 100% SOLIDS, EPOXY RESIN, ANSE CURED, EUCLID NO. 463, OR EQUAL. CONFORM TO ACI 503.2

ENTIRE FLOOR SLAB, INCLUDING SURFACE OF CURBS, SHALL BE TREATED WITH CONCRETE SEALANT, SURETREAT CORP., OR APPROVED EQUAL. 4

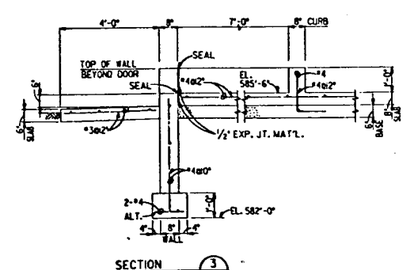


CONTROL JOINT
CONSTRUCTION JOINT
IN LIEU OF ANY CONTROL JOINT

TYPICAL SLAB JOINT DETAILS

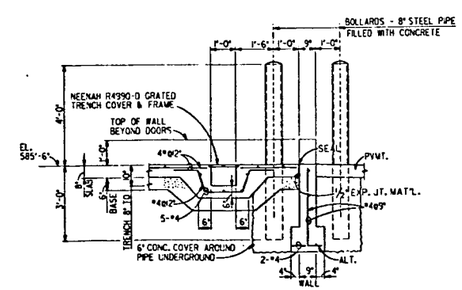


SIDEWALL & PIER
SCALE: 1/2" = 1'-0"

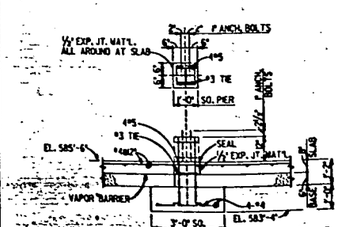


END WALLS
SCALE: 1/2" = 1'-0"

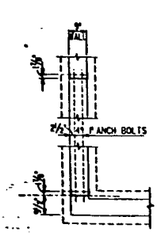
SECTION
SCALE: 1/2" = 1'-0"



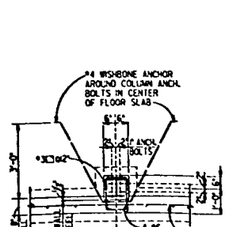
SECTION
SCALE: 1/2" = 1'-0"



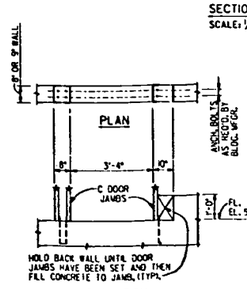
TYPICAL INTERIOR FOOTING
SCALE: 1/2" = 1'-0"



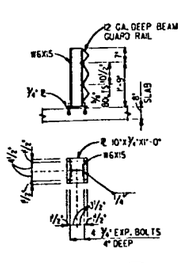
CORNER & END WALL
SCALE: 1/2" = 1'-0"



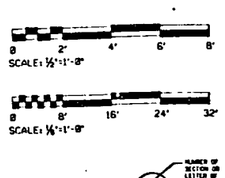
SIDE WALL PIERS
SCALE: 1/2" = 1'-0"

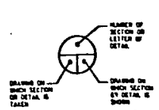


DOOR JAMBS DETAIL



SECTION
SCALE: 1/2" = 1'-0"





SECTION & DETAIL KEY

DO NOT SCALE REDUCED DRAWING

TO CORRELATE REFERENCED "AMK SHEET No's" TO FMPC DRAWING NUMBERS, SEE FMPC DRAWING No. 81X-4445-X-00021

4	REVISED DOWEL SPACING, & FLOOR SEALANT NOTE.	RWS 15/3	2-25-88		
3	REVISED DEMINSIONS PER FRANK BEAL	RWS 15/3	1-20-88		
2	ADDED CURBS, RAMPS, DETAILS, & NOTES.	15/3	12-15-87		
1	AS-BUILT	LMP	5-12-86		
0	CFC	LMP	5-23-86		
REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	A-E	DRAWN	SCR	
			DETAILS AND DATE		

UNITED STATES
DEPARTMENT OF ENERGY
FEED MATERIALS PRODUCTION CENTER

THIS DRAWING PREPARED BY
A. M. KINNEY, INC.
CONSULTING ENGINEERS
CINCINNATI, OHIO

AMKO SUBCONTRACT NO. 16-17267 A-E PROJECT NO. 07267

PROJECT NAME
ENVIRONMENTAL, HEALTH & SAFETY IMPROVEMENTS

DRAWING TITLE
WAREHOUSE - PLANT 9
FOUNDATION PLAN & DETAILS

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U.S. DEPARTMENT OF ENERGY

FIGURE D-27

FERNALD, OHIO

		2-5-88
	NOTED	
3	S-1	4

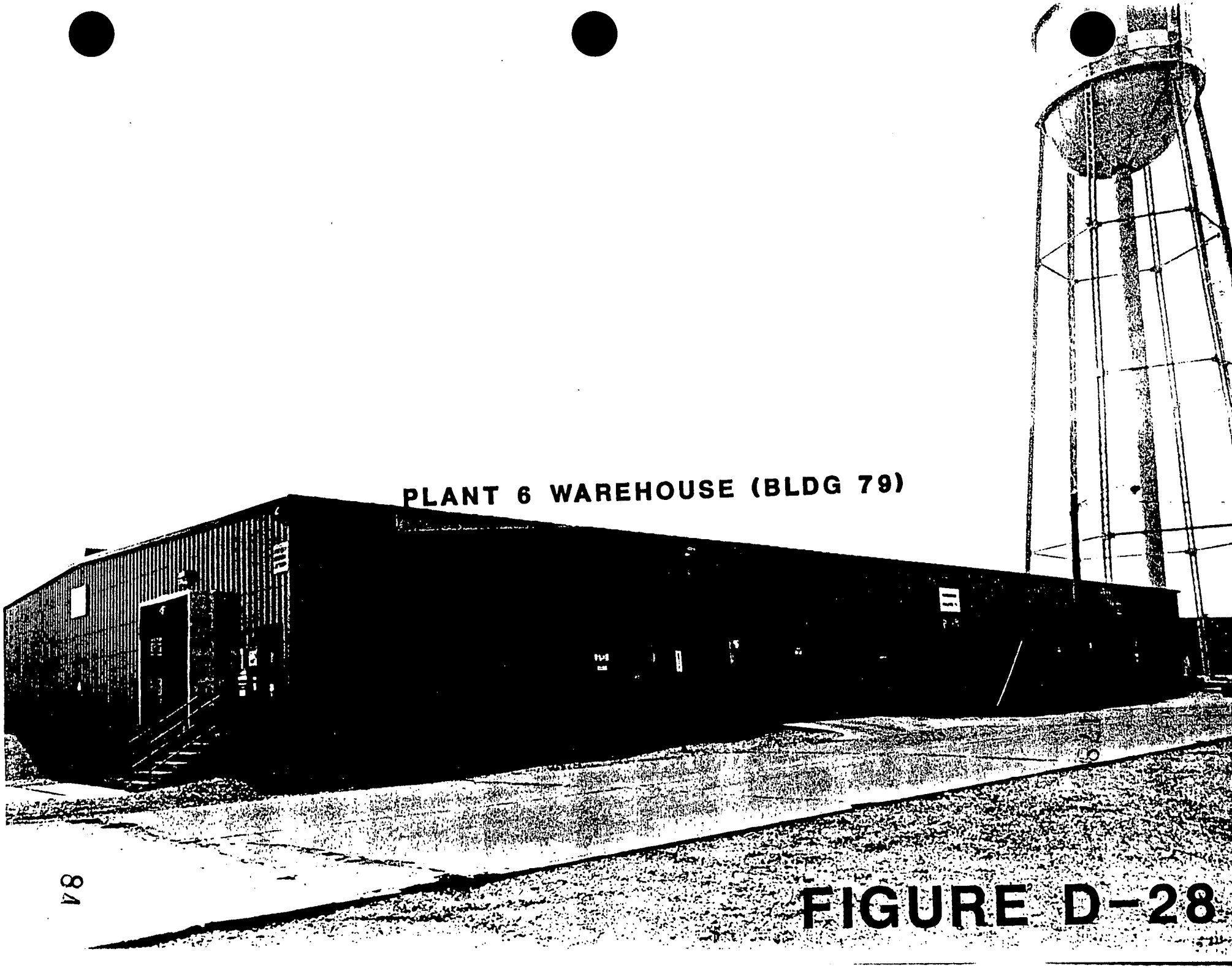
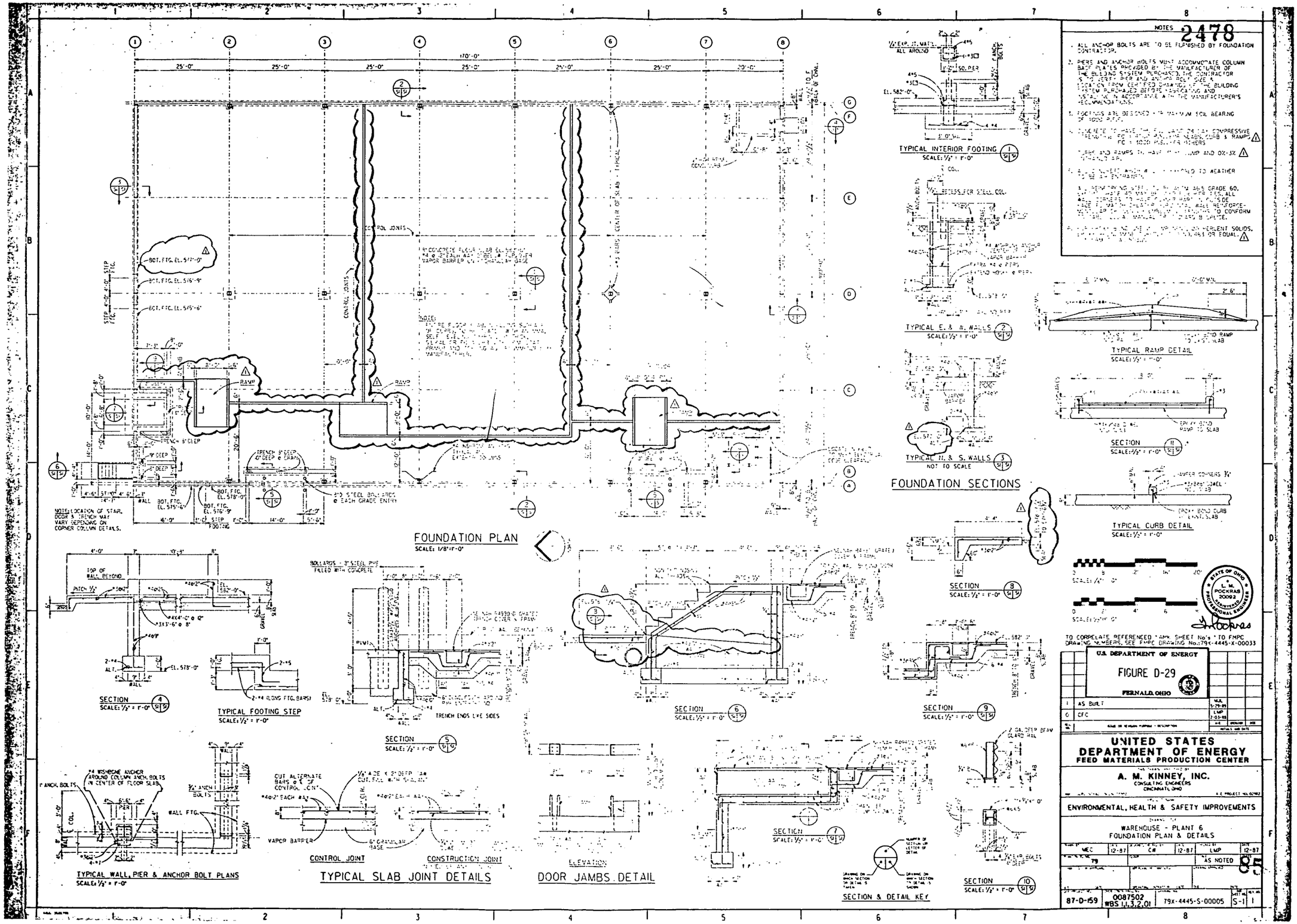


FIGURE D-28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NOTES
1. ALL ANCHOR BOLTS ARE TO BE FURNISHED BY FOUNDATION CONTRACTOR.
2. PIERS AND ANCHOR BOLTS MUST ACCOMMODATE COLUMN BASE PLATES PROVIDED BY THE MANUFACTURER OF THE BUILDING SYSTEM PURCHASED. THE CONTRACTOR SHALL SET PIER AND ANCHOR BOLTS BASED ON INFORMATION FROM CERTIFIED DRAWINGS OF THE BUILDING SYSTEM PURCHASED BEFORE FABRICATING AND INSTALLING IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
3. FOOTINGS ARE DESIGNED FOR MAXIMUM SOIL BEARING OF 3000 PSF.
4. CONCRETE TO HAVE THE FOLLOWING MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS: FOR WALLS, SLABS, CURB & RAMPS: f'c = 3000 PSI; FOOTINGS: f'c = 3000 PSI.
5. FOOTINGS AND RAMPS TO HAVE MAXIMUM SLOPE OF 2% AND 0%-3%.
6. ALL EXPOSED ANCHOR BOLTS TO BE GALVANIZED TO WEATHER TUBE BY EXTERIOR.
7. REINFORCING STEEL TO BE ASTM A615 GRADE 60, UNLESS NOTED OTHERWISE. ALL REINFORCING BARS TO HAVE MINIMUM 2" COVER OUTSIDE FACE OF CONCRETE. ALL REINFORCEMENT TO CONFORM TO ACI 318 AND ACI 315 & 318 CODE.
8. ALL EXPANSION JOINTS TO BE FILLED WITH NON-EXTENT SOLIDS. [illegible] OR EQUAL.
FOUNDATION PLAN
SCALE: 1/8" = 1'-0"
FOUNDATION SECTIONS
TYPICAL INTERIOR FOOTING
TYPICAL E. & W. WALLS
TYPICAL N. & S. WALLS
TYPICAL RAMP DETAIL
SECTION
TYPICAL CURB DETAIL
SECTION
TYPICAL FOOTING STEP
SECTION
SECTION
SECTION
SECTION
SECTION
SECTION
TYPICAL WALL, PIER & ANCHOR BOLT PLANS
CONTROL JOINT
CONSTRUCTION JOINT
TYPICAL SLAB JOINT DETAILS
ELEVATION
DOOR JAMBS DETAIL
SECTION & DETAIL KEY
TO CORRELATE REFERENCED "AMK SHEET No's" TO FMPC DRAWING NUMBERS, SEE FMPC DRAWING No.: 79X-4445-X-00033
U.S. DEPARTMENT OF ENERGY
FIGURE D-29
FERNALD, OHIO
AS BUILT
CFC
UNITED STATES
DEPARTMENT OF ENERGY
FEED MATERIALS PRODUCTION CENTER
A. M. KINNEY, INC.
CONSULTING ENGINEERS
CINCINNATI, OHIO
ENVIRONMENTAL, HEALTH & SAFETY IMPROVEMENTS
WAREHOUSE - PLANT 6
FOUNDATION PLAN & DETAILS
MEC 12-87
CH 12-87
LMP 12-87
79
AS NOTED
87-0-159
0087502
WBS 1.1.3.2.01
79X-4445-S-00005
S-1
1

FLOOR COATINGS

EPOXY	EPOXY\ PHENOLC	EPOXY/ AMINE	ACRYLIC	FLUOROPOLYMER	POLYURETHANE	SILICON	VINYL	FURAN	PHENOLIC
EPO Coat VA by Commercial Co.	7122 by Plasite	UltraPlex ESD by FlorLine Corp.	Degadur (Methyl-acrylate) by Degussa Corp.	Fluorolast by Lauren	Chemi-Cote UR-1000 (Aliphatic) UR-2000 (Aromatic) UR-4000 (Aliphatic Polyester) by Garland	Penncoat 401 by Pennwalt	4000 SERIES (Vinyl Ester) by Plasite	Furan Mortar by Pennwalt	Mod. Phenolic Mortar by Pennwalt
Chemi-Top Resurfacer by Garland		Series 66 by Tnemec	R71, R61sl, R7, & R8 (Acrylic) by Silikal		Chemglaze A-Line (Aliphatic) Z-Line (Aromatic) by Lord Co.	Silica\Silicate Mortar by Pennwalt	Mortar CE-239 (Vinyl Ester) by Pennwalt		Phenolic Mortar by Pennwalt
Penntrowel by Pennwalt		Series 104 by Tnemec	Spray-Cure & Seal by Murphy-Phoenix Company		Pennguard by Pennwalt	Surtreat (water soluble Alkaline Silicates) by	Series 35 (Vinyl-Copolymer) by Tnemec		
C-725 by Plasite					Auto-Gard II by Neogard, Division of Jones-Blair		Series 120 (Vinyl Ester) by Tnemec		
7133 by Plasite									
7156 by Plasite									
9060 by Plasite									
9080 by Plasite									
Stonkote GS4 & HT4 by Stonhard Inc.									
Series 61 by Tnemec Co.									
ICO-Super Guard by International Coatings Inc.									

CHEMICAL RESISTANCE CHART

Test Media	DEGADUR® 330, 410, 412, 510	DEGADUR® 520
Acids		
Acetic Acid, 10%	+	+
Acetic Acid, 30%	O	+
Chromic Acid, 20%	+	+
Chromic Acid, 40%	–	+
Citric Acid, 30%	+	+
Formic Acid, 10%	O	+
Hydrochloric Acid, conc.	+	+
Lactic Acid, 30%	+	+
Nitric Acid, 10%	+	+
Nitric Acid, 30%	O	O
Phosphoric Acid, 40%	+	+
Sulphuric Acid, 30%	+	+
Sulphuric Acid, 50%	O	+
Alkalies		
Ammonia, 10%	+	+
Caustic Soda, 50%	+	+
Potassium Hydroxide, 50%	+	+
Sodium Hypochlorite	+	+
Miscellaneous		
Acetone	–	–
Ammonium Chloride	+	+
Animal Fats	+	+
Antifreeze	+	+
Benzene	–	O
Butyl Acetate	–	–
Calcium Chloride	+	+
Carbon Tetrachloride	–	O
Castor Oil	+	+

	DEGADUR® 330, 410, 412, 510	DEGADUR® 520
Miscellaneous (cont.)		
Crude Oil	+	+
Diesel Fuel	+	+
Ethanol, 30%	+	+
Ethyl Acetate	–	–
Fruit Juices	+	+
Gasoline	O	+
Hydrogen Peroxide, 10%	+	+
Hydrogen Peroxide, 35%	+	+
Isopropyl Alcohol	–	O
Kerosene	+	+
Linseed Oil	+	+
Methyl Ethyl Ketone	–	–
Mineral Oil	+	+
Olive Oil	+	+
Paraffin Oil	+	+
Petroleum	+	+
Potassium Chloride	+	+
n-Propyl Alcohol	–	O
Salt Water	+	+
Sodium Carbonate	+	+
Sodium Sulphate	+	+
Styrene	O	+
Turpentine	+	+
Toluene	–	O
Trichloroethylene	–	–
Vegetable Juice	+	+
White Spirits	+	+
Wine	O	+
Xylene	–	O

+ Adequate Resistance O Resistant – Non-Resistant

For resistance to other chemicals, please contact Degussa.

PHYSICAL TESTS—SYSTEMS

TYPICAL PROPERTIES OF DEGADUR®-BASED RESURFACING SYSTEMS

U.S.

Property	Test Method	Units	330SL	412RO	412SL	412TO	510PC
USDA Approval	—	—	Yes	Yes	Yes	Yes	No
Compressive Strength	ASTM D695	psi	2500-3000	900-1400	5000-5500	4400-5200	2800-3500
Tensile Strength	ASTM D638	psi	500-700	1400-1600	1500-2000	400-600	600-1000
Flexural Strength	ASTM C580 mod	psi	1300-1500	—	2700-2800	2500-3000	1500-2200
Freeze/Thaw Resistance	ASTM C666	Pass/Fail	Pass	—	—	—	—
Bond Strength	ACI 503R	psi	Substrate Failure (250 psi minimum)				
Coeff. of Thermal Exp.	VDE 0304/1	10E-5/F	4.4	—	3.5	3.3	2.7
Vicat Temperature	DIN 53460	F	122	140	140	140	140

METRIC

Property	Test Method	Units	330SL	412RO	412SL	412TO	510PC
USDA Approval	—	—	Yes	Yes	Yes	Yes	No
Compressive Strength	ASTM D695	N/mm²	17-21	6-10	34-38	30-35	19-24
Tensile Strength	ASTM D638	N/mm²	3-5	9-11	10-14	2-5	4-7
Flexural Strength	ASTM C580 mod	N/mm²	9-10	—	18-19	17-2[illegible]	10-15
Freeze/Thaw Resistance	ASTM C666	Pass/Fail	Pass	—	—	—	—
Bond Strength	ACI 503R	N/mm²	Substrate Failure (1.5 N/mm² minimum)				
Coeff. of Thermal Exp.	VDE 0304/1	10E-5/K	7.9	—	6.3	5.0	4.0
Vicat Temperature	DIN 53460	C	50	60	60	60	60

Coating properties are dependent upon quality and size of fillers, as well as adherence to our recommended formulations. Measurements conducted at 68°F (20°C) and 24-hour cure where applicable.

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PRODUCT SELECTOR GUIDE

General Application by Area	330SL	412RO	412SL	412TO	510PC	520PD
Bridge Decks	●					
Chemical Storage		●	●			
Concrete Rehabilitation					●	
Coolers	●					
Dustproofing						●
Freezers	●					
Joint Repair	●				●	
Kitchens			●	●		
Laboratories		●	●	●		
Loading Docks	●					
Machine Shops	●		●			
Parking Garages	●				●	●
Ramps	●				●	
Restrooms			●	●		
Ship Decks	●					
Staircases					●	●
Walls		●				
Warehouses						
Light Traffic			●			
Heavy Traffic	●				●	
Wet Areas		●	●	●		●

General Application by Industry						
Automotive	●		●	●		
Bakeries	●	●	●	●		
Bottling	●		●	●		
Breweries	●		●	●		
Cheese Factories	●	●	●	●		
Chemical Process	—	●	●			
Civil Engineering	●				●	●
Dairies	●		●	●		
Electroplating	●		●	●		
Food Processing		●	●	●		
Fruit & Produce			●	●		
Hospitals		●	●	●		
Marine	●	●				
Meat Packing		●	●	●		
Photographic			●	●		
Poultry		●	●	●		
Printing			●	●		
Pulp & Paper	●		●	●		
Schools		●	●	●		
Supermarkets			●	●		
Textile	●		●	●		
Wineries			●	●		

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chemical resistance

FlorLine's UltraPlex

The purpose of this Table is to present a general outline for determining the suitability of using UltraPlex floor topping in specific applications. Recommendations are based on both laboratory and actual field use.

Laboratory method was to immerse a 1/4" x 4" x 4" specimen for 28 days. The sample was removed from the reagent at 7 day intervals, washed, weighed, and examined. This method has proven to be more severe than continuous immersion for longer periods. Values were assigned at the end of the test.

Value assignments are keyed as follows:

R-1 ..... Continuous use.
R-2 ..... Intermittant use.
R-3 ..... Occasional spillage.
NR ..... Not Recommended.
* ..... Surface may discolor.

Acetic Acid, 25%	R-3*
Acetic Acid, Glacial	NR
Acetone	NR
Alum (saturated)	R-1*
Aluminum chloride, 50%	R-1
Ammonium hydroxide, 50%	R-1
Ammonium nitrate, 50%	R-1
Ammonium sulfate (saturated)	R-1
Aniline	R-2
Barium hydroxide (saturated)	R-1
Beer	R-1
Benzene	R-1
Benzoic Acid, 3%, (saturated)	R-2
Benzoyl chloride	R-1*
Boric Acid, (saturated), 30%	R-1
Butyric Acid	R-1
Butyl acetate	R-1
Butyl lactate	R-2
Bromine	NR
Carbon disulfide	NR
Calcium Chloride, 50%	R-1
Calcium hydroxide (saturated)	R-1
Calcium nitrate, 50%	R-1
Calcium sulfate (saturated)	R-1*
Carbon tetrachloride, 75°F	R-1
Chlorobenzene	R-1
Chloroform	NR
Chromic acid, 15%	R-3*
Citric Acid, 50%	R-1*
Cola Syrup, 75°F	R-1
Copper sulfate, 50%	R-1*
Cresylic Acid	R-2
Cutting Oils	R-1
Diacetone alcohol	R-1
Dichloroethylene	NR
Diethyl phthalate	R-1
Dimethyl phthalate	R-1
Ethyl Acetate	R-3
Ethyl Alcohol, 75°F	R-1
Ethylene chloride	NR
Ethylene glycol	R-1*
Fatty Acids	R-2
Ferric chloride	R-2
Formaldehyde, 40%	R-1
Formic Acid	NR
Fruit Juices	R-1
Glycolic Acid, 75°F	R-1*
Glyoxal	R-1
Hydrobromic Acid, 47%, 75°F	R-2*
Hydrochloric Acid, 15%	R-1
Hydrochloric Acid, 37%	R-1
Hydrogen Peroxide, 10%, 120°F	R-1
Hydrogen Peroxide, 30%, 75°F	R-2
Isopropyl alcohol, 75°F	R-1
Jet Fuel	R-1
Kerosene	R-2
Lactic Acid, 20%	R-1*
Lactic Acid, 85%	R-2*
Lanolin	R-1
Lard	R-2
Lead chloride (saturated)	R-1*
Linseed Oil	R-1
Magnesium chloride	R-1
Mayonnaise	R-2
Methylene chloride	NR
Methyl ethyl ketone	NR
Methyl isobutyl ketone, 75°F	R-1
Milk, 85°F	R-1
Mineral Oil	R-1
Nickel Nitrate, 50%	R-1*
Nickel Sulfate, 50%	R-1*
Nitric Acid, 30%, 75°F	R-2*
Nitric Acid, 10%	R-1
Nitric Acid, 20%	R-3*
Nitric Acid, 40%	NR
Oleic Acid	R-1
Peanut Butter	R-1
Perchloroethylene	R-2
Phenol, 5%, 75°F	R-3
Potassium Hydroxide, 50%	R-1
Potassium Nitrate, 50%	R-1
Pyridine	NR
Salicylic Acid, 3%, 75°F	R-2
Skydrol	R-1
Sodium Bicarbonate, 3%	R-1
Sodium Bichromate, 50%	R-1*
Sodium Bisulfate, 30%	R-1
Sodium Carbonate, 30%	R-1
Sodium Chloride, 40%	R-1
Sodium Chromate, 50%	R-1
Sodium Hydroxide, 50%	R-1
Sodium Nitrate, 50%	R-1*
Sodium Sulfate, 50%	R-1*
Sodium Thiosulfate, 50%	R-1
Steric Acid (saturated)	R-1*
Succinic Acid (saturated)	R-1
Sugar Solution	R-1
Sulfuric Acid, 25%	R-2*
Sulfuric Acid, 50%	R-2*
Sulfuric Acid, 98%	R-3*
Tannic Acid, 50%	R-1
Tartaric Acid (saturated)	R-1
Tetrachloroethane	R-1
Toluene, 75°F	R-1
Trichloroethylene, 75°F	R-3*
Trisodium Phosphate (saturated)	R-1
Urea, 50%	R-1
Vegetable Juices	R-1
Vegetable Oil	R-2
Vinegar, household	R-1
Water	R-1
Wine	R-1
Xylene, 75°F	R-1
Zinc Chloride (saturated)	R-1*

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fluid resistance of VITON fluoroelastomer

LAUREN "FLUOROLAST" COATINGS FORMULATED FROM VITON* FLUOROPOLYMERS PERFORM SIMILARLY TO VITON* IN FLUID ENVIRONMENTS. DATA HERE IS REPRINTED BY PERMISSION OF THE DUPONT CO.

Products made from VITON* fluoroelastomer are successfully used in contact with a great variety of fluids, in many instances at temperatures far higher than are practical with other elastomers. The choice of premium-priced VITON is justified by its trouble-free service which saves far more expensive maintenance and downtime costs.

To assist design engineers concerned with specifying rubber components exposed to severe chemical environments, the accompanying tabulation has been prepared. It includes evaluations of the fluid resistance of VITON versus a selection of materials whose influences, at various temperatures and for certain exposure times, range from virtually no effect on, to complete solution of, products made from properly compounded VITON.

We emphasize that it should be used as a *guide only*. The tabulation is based on laboratory tests and records of actual service performance. But an elastomer's degree of compatibility with a particular fluid also depends on such variables as temperature, time, velocity of flow, aeration, stability of the fluid, degree of contact, nature of suspended solids, etc.

It is always advisable to test the product under actual service conditions before specification. If this is impractical, then tests should be devised which simulate actual service conditions as closely as possible. Obviously, your rubber supplier should be provided with complete details on the conditions involved, since correct compounding and processing are important to the success of any resilient part where chemical resistance is one of the service requirements.

Rating Key

- A—Little or no effect
- B—Minor to moderate effect
- C—Severe effect, ranging to complete destruction
- T—No data—likely to be compatible
- X—No data—not likely to be compatible

Chemical	F
Acetaldehyde	
Acetic acid, 20%	
Acetic acid, 30%	
Acetic acid, glacial	
Acetic anhydride	
Acetone	
Acetylene	
Aluminum chloride solutions	
Aluminum sulfate solutions	
Ammonia, anhydrous	
Ammonium chloride solutions	
Ammonium hydroxide solutions	
Ammonium sulfate solutions	
Amyl acetate	
Amyl alcohol	A(2
Aniline	
Aniline	B(1
Aniline	C(3
ASTM oil #1	A(3
ASTM oil #3	A(3
ASTM reference fuel A	
ASTM reference fuel B	
ASTM reference fuel C	
Asphalt	A(4
Barium hydroxide solutions	
Beer	
Benzaldehyde	
Benzene	B(1
Benzoyl chloride	
Borax solutions	
Boric acid solutions	
Bromine, anhydrous liquid	A(2
Butane	
Butyl acetate	
Butyraldehyde	
Butyric acid	
Calcium bisulfite solutions	
Calcium chloride solutions	
Calcium hydroxide solutions	
Calcium hypochlorite, 5%	
Calcium hypochlorite, 20%	B(1
Carbon bisulfide	
Carbon dioxide	
Carbon monoxide	
Carbon tetrachloride	A(1
Castor oil	
Chlorine gas, dry	A(2
Chlorine gas, wet	
Chloroacetic acid	
Chlorobenzene	
Chloroform	
Chlorosulfonic acid	
Chromic acid, 10-50%	
Citric acid solutions	
Copper chloride solutions	

*Reg. U.S. Pat. & Tm. Off.

Chemical	Rating
Copper sulfate solutions	A
Cottonseed oil	A(300°F.)
Creosote oil	A(212°F.)
Cyclohexane	A
Dibutyl phthalate	B
Diethyl sebacate	B
Dioctyl phthalate	B
DOWTHERM A	A(212°F.)
DOWTHERM A	B(400°F.)
Epichlorohydrin	C(122°F.)
Ethyl acetate	C
Ethyl alcohol	A
Ethyl chloride	A
Ethyl ether	B
Ethylene dichloride	A-B(120°F.)
Ethylene glycol	A(250°F.)
Ethylene oxide	C(158°F.)
Exxon 2380 turbo oil (lubricant)	A(392°F.)
Ferric chloride solutions	A
Fluosilicic acid	T
Formaldehyde, 40%	A
Formic acid	C(158°F.)
FREON†-11	B
FREON-11	T(130°F.)
FREON-12	A-B
FREON-12	B(130°F.)
FREON-22	C
FREON-22	X(130°F.)
FREON-113	A
FREON-113	T(130°F.)
FREON-114	A
FREON-114	T(130°F.)
Furfural	C(158°F.)
Fyrquel 220 (hydraulic fluid)	A(212°F.)
Gasoline	A
Glue	A
Glycerin	A(250°F.)
n-Hexane	A
Hydrazine	C
Hydrochloric acid, 20%	A
Hydrochloric acid, 20%	A(230°F.)
Hydrochloric acid, 37%	A(158°F.)
Hydrochloric acid, 37%	B(230°F.)
Hydrocyanic acid	A
Hydrofluoric acid, 48%	A(212°F.)
Hydrofluoric acid, 75%	B(158°F.)
Hydrofluoric acid, anhydrous	A
Hydrogen	A
Hydrogen peroxide, 90%	A
Hydrogen peroxide, 90%	C(270°F.)
Hydrogen sulfide	B(270°F.)
Isooctane	A
Isopropyl alcohol	A
Isopropyl ether	C
JP-4	A(400°F.)

Chemical	Rating
JP-5	A(400°F.)
JP-6	A(100°F.)
JP-6	B(550°F.)
Kerosene	A(158°F.)
Kerosene	B(400°F.)
Lacquer solvents	C
Lactic acid	A
Linseed oil	A
Lubricating oils	A(158°F.)
Magnesium chloride solutions	A
Magnesium hydroxide solutions	A
Mercuric chloride solutions	A
Mercury	A
Methyl alcohol	A-B
Methyl ethyl ketone	C
Methylene chloride	B(100°F.)
Mineral oil	A
Mobil XRM 206A (aircraft eng. lube)	A(350°F.)
Naphtha	A(158°F.)
Naphthalene	A(176°F.)
Nitric acid, 10%	A
Nitric acid, 30%	A
Nitric acid, 60%	A
Nitric acid, 70%	A
Nitric acid, 70%	B(100°F.)
Nitric acid, red fuming	B
Nitric acid, red fuming	C(158°F.)
Nitrobenzene	B
Oleic acid	B
Oleum, 20-25%	A
Palmitic acid	A
Perchloroethylene	A(212°F.)
Phenol	A(212°F.)
Phenol	B(300°F.)
Phosphoric acid, 20%	A
Phosphoric acid, 60%	A(212°F.)
Phosphoric acid, 70%	A
Phosphoric acid, 85%	A
Pickling solution (20% nitric acid, 4% HF)	A
Pickling solution (17% nitric acid, 4% HF)	A
Pickling solution (17% nitric acid, 4% HF)	C(225°F.)
Picric acid	A
Potassium dichromate solutions	A
Potassium hydroxide solutions	A
Pydraul 312C	A
Pyridine	C
QEI-2023 (silicone brake fluid)	A(392°F.)
SAE #10 oil	A
Sea water	A
Shell turbine oil 307	B(392°F.)

Chemical	Rating
Silicone grease	A
SKYDROL 500	C
SKYLUBE 450	C(392°F.)
Soap solutions	A
Sodium chloride solutions	A
Sodium dichromate, 20%	A
Sodium hydroxide, 20%	A
Sodium hydroxide, 46½%	A
Sodium hydroxide, 46½%	C(100°F.)
Sodium hydroxide, 50%	C
Sodium hydroxide, 73%	C
Sodium hypochlorite, 5%	A
Sodium hypochlorite, 20%	B(158°F.)
Sodium peroxide solutions	A
Soybean oil	A(250°F.)
Stannic chloride	A
Stannous chloride, 15%	A
Steam (see water)	B(300°F.)
Stearic acid	T
Styrene	A
Sulfur, molten	A(250°F.)
Sulfur dioxide, liquid	A
Sulfur dioxide, gas	A
Sulfur trioxide	A
Sulfuric acid, up to 5%	A
Sulfuric acid, 5-10%	A
Sulfuric acid, 10-50%	A
Sulfuric acid, 50-80%	A
Sulfuric acid, 60%	A(250°F.)
Sulfuric acid, 90%	A(158°F.)
Sulfuric acid, 95%	A
Sulfuric acid, 95%	A(158°F.)
Sulfuric acid, fuming (20% oleum)	A
Sulfurous acid	A
Sunoco XS-820 (EP lubricant)	A(300°F.)
Tannic acid, 10%	A
Tartaric acid	A
Tetrahydrofuran	C
Toluene	B(100°F.)
Tributyl phosphate	C(212°F.)
Trichlorethylene	A
Trichloroethylene	B(158°F.)
Tricresyl phosphate	A(300°F.)
Triethanolamine	C
Trisodium phosphate solutions	A
Tung oil	A
Turpentine	A(158°F.)
Water	A(158°F.)
Water	A(212°F.)
Xylene	A
Xylene	B(158°F.)
Zinc chloride solutions	A

†Freon is a registered trademark of E. I. du Pont de Nemours & Co. (Inc.)

CONVERSIONS FOR EXPOSURE TEMPERATURES INDICATED IN TABLE

°F.	°C.	°F.	°C.	°F.	°C.	°F.	°C.
100	38	158	70	230	110	350	176
120	49	176	80	250	121	392	200
122	50	212	100	270	132	400	204
130	54	225	107	300	149	550	288

Ford Co.

Table II
Impact Resistance

Z-line coatings are designed to have outstanding impact resistance and flexibility. As these properties are inherent in the basic urethane polymers, the films are not subject to embrittlement with age.

Impact tests are run by striking the direct (coated) side and reverse (uncoated) side of the metal panel and observing the blister formed for cracking or crazing.

The test panels were coated with Chemglaze Wash Primer and one coat of Chemglaze Z451 Gray Coating.

Test	Substrate	Coating Thickness	Results
Gardner Labs Impact (Direct) Range 0-160 in. lbs.	Steel	1.5 mils	Pass 160 in. lbs.
General Electric Elongation Range 0.5 - 60 per cent	Aluminum	1.5 mils	Pass 60% elongation

Table III
Chemical and Solvent Resistance

Chemglaze Z-Line coatings show excellent chemical and solvent resistance when used with the correct primer.

These coatings have excellent salt spray resistance when the metal is primed with Chemglaze Epoxy Metal Primer 9965, Wash Primer 9924, or Urethane Primer 9420.

Chemicals which attack urethane coatings are strong oxidizing acids like nitric and chromic as well as some organic acids such as acetic at concentrations of 10 per cent or higher. Also, acids will attack certain pigments in the green, yellow, orange and brown coatings.

Chemglaze coatings are softened on immersion in certain oxygenated solvents but recover when the solvent evaporates, making them suitable for intermittent exposure to these materials. Test panels were 1/4" thick sandblasted cold rolled steel. Panels were primed and spray coated with multiple coats of Chemglaze Z252 White to a total film thickness of 6 ± 1/2 mil.

The tests were run by partially immersing coated steel panels in the various test fluids for a period of 30 days. Resistance for 24 hours was considered adequate for splash or spillage exposure. Fume or vapor resistance was measured by observing the panel above the test fluid during the 30 days immersion.

All data are at room temperature 77°F (25°C) unless otherwise indicated.

Code: x — suggested o — not suggested

Reagent		Immersion	Splash or Spillage	Fumes or Vapors
Acids, Inorganic — with Wash or Epoxy Primer[2]				
Hydrochloric	10%	x	x	x
	35%	o	o	x
Sulfuric	10%	x	x	x
	35%	x	x	x
Phosphoric	10%	x	x	x
	50%	x	x	x
Chromic	2%	x	x	x
	10%	o	o	x
Nitric	2%	x	x	x
	10%	o	o	x

Continued on next page

Table III (Continued)

Reagent		Immersion	Splash or Spillage	Fumes or Vapors
Acids, Organic — with Wash or Epoxy Primer				
Lactic	10%	x	x	x
Acetic	5%	o	x	x
	10%	o	x	x
	Glacial	o	o	x
Citric	10%	x	x	x
Oleic		x	x	x
Maleic		x	x	x
Alkalies — with Wash or Epoxy Primer				
Ammonium Hydroxide	10%	o	x	x
	50%	o	x	x
Ammonia		o	x	x
Sodium Hydroxide	10%	x	x	x
	50%	x	x	x
Salts — with Wash or Epoxy Primer				
Sodium Chloride	20%	x	x	x
Calcium Chloride	20%	x	x	x
Ferric Chloride	20%	x	x	x
Trisodium Phosphate	10%	x	x	x
Miscellaneous Chemicals — with Wash Primer				
Tide Solution (160°F)	1%	o	x	x
Sodium Hypochlorite	1%	x	x	x
Sea Water (synthetic)		x	x	x
Sugar Solution	10%	x	x	x
Water (160°F)		o	x	x
Miscellaneous Chemicals — with Epoxy Primer				
Freon[&3]	100%	x	x	x
Sour Crude Oil		x	x	x
Chlorine Gas (Wet or Dry)		o	x	x
Solvents — with Epoxy Primer				
Aliphatic Hydrocarbons				
Gasoline		x	x	x
Hexane		x	x	x
JP-4		x	x	x
Brake Fluid		x	x	x
Aromatic				
Xylol		x	x	x
Toluol		x	x	x
Chlorinated				
Trichloroethylene		o	x	x
Carbon Tetrachloride		x	x	x
Alcohols				
Methyl Alcohol		o	x	x
Ethyl Alcohol		o	x	x
Ethylene Glycol		x	x	x
Glycerol		x	x	x
Ketones and Esters				
Acetone		o	x	x
Methyl Ethyl Ketone		o	x	x
Ethyl Acetate		o	x	x
Miscellaneous				
Nitropropane		o	x	x
Turpentine		x	x	x

[2]Request Bulletin No. DS10-7043 for additional information on primers.

[3]Freon® is a registered trademark of E.I. duPont de Nemours & Co. Inc.

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Table II
Chemglaze® A-Line Coatings over 9922 Epoxy Primer Exposed 3 Years at 45°'s in South Florida

Chemglaze II	Initial	60° GLOSS Uncleaned	Cleaned
A276 White	93	18	82
A382 Black	93	53	87
A471 Light Gray	92	8	76
A571 Aviation Red	92	10	86
A672 Dark Green	93	22	88
A771 Blue	94	42	87
A872 Omaha Orange	94	74	89
A971 Yellow	94	72	90

Flatting

A-Line coatings may be reduced in gloss by adding A170 flatting agent. For example, a 1:1 blend of A170 with an A-Line product will result in a very low gloss coating. Additional 9986 catalyst must be added when A170 is used (approx. 1-3% of weight of A170). Refer to Bulletin No. DS10-7066, "Flatting Agents for Gloss Control."

Baking Conditions

The cure time in certain applications may be accelerated by baking. Some typical conditions are shown below.

150°F (65°C) - 30 min.
200°F (93°C) - 20 min.

Clean Up and Stripping

Chemglaze Thinners, 9951 and 9954, xylene and ketones, may be used for clean up. Paint strippers which will facilitate removal of cured urethanes are available from the following vendors.

Shelly Andrews Co. — "Krano 95"
3540 North Southport Ave.
Chicago, IL 60657
(312) 871-5100

Penetone Corp. — "Pen-Strip" 5061 or NPX
Subsidiary of
West Chemical Products, Inc.
74 Hudson Ave.
Tenafly, NJ 07670

Chemical & Solvent Resistance of Chemglaze® Coatings

The following data shown in Table III illustrate the excellent chemical and solvent resistance of Chemglaze A-Line coatings when used with the appropriate primer. Steel panels, sandblasted, primed and spray coated with A276 White to a total film thickness of 5 ± 1/2 mils were immersed for 30 days in the test fluids. Tests were run at 77°F (25°C).

Chemicals which will attack urethane coatings are strong oxidizing acids like nitric and chromic as well as some organic acids such as acetic at concentrations of 5% or higher. Also, some acids will cause color changes in certain green, yellow, orange, brown, red and tan coatings.

Table III
Chemical & Solvent Resistance of Chemglaze® A-Line Coatings (Aliphatic Polyurethane)

Reagent	Solution (Percent)	Immersion	Splash or Spillage
Acids, Inorganic			
Hydrochloric	10	Pass	Pass
Sulfuric & Phosphoric			
Acids, Organic			
Acetic	5 & 10	Not Rec.	Pass
Citric/Lactic	10	Pass	Pass
Alkalies			
Sodium Hydroxide	10, 50	Pass	Pass
Ammonium Hydroxide	10, 50	Not Rec.	Pass
Salts			
Sodium & Calcium Chloride	20	Pass	Pass
Solvents			
Aliphatic[1]	—	Pass	Pass
Aromatic[2]	—	Pass	Pass
Alcohols[3]	—	Pass	Pass
Ketones & Esters[4]	—	Pass	Pass
Miscellaneous			
Sea Water (Synthetic)	—	Pass	Pass
Water at 160°F	—	Pass	Pass

1 - Aliphatic Solvents - Gasoline, hexane, JP-4, brake fluid
2 - Aromatic Solvents - Xylene, toluene
3 - Alcohols - Ethyl, ethylene glycol, glycerol
NOTE: fail in methyl alcohol immersion
4 - Ketones & esters - Acetone, methyl ethyl ketone, ethyl acetate

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Commercial Chemical Company

1. PRODUCT NAME

EPO COAT VA

Multi-purpose epoxy coating.

HI-SOLIDS EPOXY COATING

2. MANUFACTURER

Commercial Chemical Company
1021 Summer St.
Cincinnati, Ohio 45204
Phone: 513-921-8600

3. PRODUCT DESCRIPTION

BASIC USES: EPO Coat VA is an extremely versatile epoxy coating that exhibits outstanding durability, adhesion, chemical resistance, wear resistance and weatherability. This coating performs excellently on concrete, wood, metal, masonry surfaces and as a seal coat for troweled-on epoxy toppings.

EPO Coat VA is used as the base color coat in our Uni-Floor line of seamless epoxy floor systems, as it provides excellent adhesion to concrete. It also provides tough, long wearing non-skid coatings when aggregates such as silica sand are broadcast into the surface.

EPO Coat VA is used to coat floors, walls, machinery and equipment in meat packing and beverage plants, paper processing facilities, hospitals, food processing facilities, loading docks, swimming pools and to provide extremely long wear factory safety lines. EPO Coat cures overnight in most conditions. Treated floors may be opened for light foot traffic in approximately 24 hours, and two to three days should be allowed for heavy duty traffic. Seven days should be allowed for maximum chemical resistance.

LIMITATIONS: Surfaces which are to be coated must a) be at least 50°F, b) be clean and dry, c) be structurally sound and d) adequate ventilation must be provided.

COLOR: White, tile red, brown, light and dark grey, light and dark blue, tan, safety yellow and clear, are standard, many other colors are available upon request.

GLOSS: High gloss unless otherwise specified.

APPLICABLE STANDARDS: Accepted for the coating and sealing of floors and other structural surfaces in establishments operating under the Federal Meat and Poultry Products Inspection Program.

COVERAGE:

Steel (4 mils)	350 - 450 sq. ft. per gallon.
Concrete (2 coats)	one thin, penetrating coat, one heavy build coat. 100 - 150 sq. ft. per gallon total for both coats.
Concrete block (Sealed or previously painted)	150-200 sq. ft. per gallon.

4. TECHNICAL DATA

COATING PROPERTIES

Viscosity	70 - 100 KU
Pot Life	24 - 48 hrs.
Tack-free Dry Time	3 - 5 hrs.
Pencil Hardness 3 days	#2

1021 SUMMER STREET • CINCINNATI, OHIO 45204 • PHONE (513)921-8600

Solids	68% ± 1
Gloss (60° meter)	100+
Impact Resistance Direct	190 + in. lbs.

CHEMICAL RESISTANCE: EPO Coat VA resists corrosion due to spillage of most generally used acids, alkalies, salts and organic compounds.

Alkalies:	Caustic, pot ash, ammonia, lime, soda ash and others.
Mineral Acids:	Sulphuric acid, phosphoric acid, hydrochloric acid.
Organic Solvents:	Petroleum, coal tar thinners, turpentine and others.
Salts:	Alkalines, acid and neutral.
Oxidizing Acids and Salts:	Up to 15% nitric, chromic peroxide and bleach.
Water:	Tap, distilled, di-ionized.
Foods and Organic Compounds:	Sugar, mineral oils and greases, vegetable and animal fats and oils. Cheese. Detergent, soap.
Beverages:	Milk, fruit and vegetable juices.

5. INSTALLATION

PREPARATORY WORK: No primer is required for applying EPO Coat VA to most surfaces except metal where extreme corrosive resistance is required. Metal in extremely corrosive conditions should be primed with EPO Coat Zinc Rich Primer. Surfaces must be free from paint, grease, oil, laitance, and other contaminates prior to application. This may be done by shotblasting, acid cleaning, sandblasting, scarifying, detergent cleaning or grinding as applicable. New concrete must be free from laitance, sealers, curing compounds, etc. New concrete may be cleaned in the same manner as old concrete where required.

METHODS: EPO Coat VA may be applied by brush, roller or spray. Concrete and wood surfaces should receive a thin, penetrating first coat for maximum adhesion.

APPLICATION: Two coats of EPO Coat VA are recommended for most surfaces. When concrete or wood are to be coated, the first coat should be thinned one part mixed coating to one part thinner by volume. Thinner may be EPO Thinner or Methyl Ethyl Ketone (MEK).

MIXING: EPO Coat VA is mixed one part component A to one part component B by volume. The mixed coating should be allowed to stand (sweat-in) for approximately 30-60 minutes. It may then be reduced as required for application. Material that is to be brushed or roller coated will require little or no thinning.

EQUIPMENT CLEAN UP: Clean tools and equipment immediately with commercial grade lacquer thinner or EPO Thinner.

PRECAUTIONS: Flammable. Keep away from heat, open flame and pilot lights. Avoid prolonged contact with skin and breathing of vapor or spray mist. Use with adequate ventilation. Keep out of reach of children.

6. AVAILABILITY

EPO Coat VA is available from:

Commercial Chemical Company
1021 Summer St.
Cincinnati, OH 45204
513-921-8600

Ohio — 800-522-5866
Outside Ohio — 800-522-5867

7. GUARANTEE

The manufacturer warrants that the material meets the specifications listed.

8. TECHNICAL SERVICE

Installation crews are available directly from factory when desired, or trained technical representatives are available to assist and advise interested personnel in application procedures and specifications.

GARLAND FLOOR CO.
Epoxy Floors for Industry since 1959

Chemi-Cote UR-4000 series Polyurethane Coatings

Chemical Resistance Guide

The information presented in the chemical resistance guide is based on judgements derived from laboratory testing and field service performance at room temperature. The guide has been prepared as an aid to determine the potential value of Chemi-Cote UR-4000 series coatings in applications having chemical exposures. No guarantee of results is made or implied and no liability in connection with this information is assumed. In actual service, floors protected with Chemi-Cote UR-4000 series coatings are subjected to splash and spillage, as well as dilution effects of wash water, mixing with other solutions, wetting and drying cycles, temperature cycling and cleaning procedures.

The information presented herein should be supplemented by in-service testing. Further information regarding exposures to these chemicals or to chemicals not listed in this guide may be obtained by contacting Garland Floor Co.

Rating Code

E - (Excellent) - Continuous exposure for several weeks without adverse effects.
G - (Good) - Continuous exposure for several days.
F - (Fair) - Occasional repeated exposure, but floor washed at least once a day.
S/S - (Splash and Spillage) - Accidental spillage and floor is washed shortly afterwards.

FOOD CHEMICALS

Beer	E	Mayonaise	G
Caesin	E	Milk	E
Cheese, all	E	Molasses	E
Butter, Margarine	G	Mustard	E
Coffee, Tea	E	Olive Oil	E
Corn Syrup, Oil	G	Peanut Butter	E
Egg Yolk	E	Pectin	E
Fruit Juices	E	Salad Dressings	G
Glucose	E	Shortening	G
Glycerine	E	Soft Drinks	E
Horseradish	E	Sucrose (Sugar)	E
Jams and Jellies	E	Vegetable Oil	G
Ketchup	E	Vegetable Juices	E
Lard	F	Vinegar (Household)	E
Lecithin	E	Wine	E
Malt	E	Yeast	E

ACIDS

Acetic - 10%.....E
20%.....G
50%.....F

Benzoic - saturated.....E
Boric - saturated.....E

Chromic - 10%.....G
15%.....F
Citric - 50%.....E

Fatty.....E
Fluoboric.....G
Formic - 10%.....F

Hydrochloric - 10%.....E
37%.....F

Lactic - 20%.....G

Maleic - 30%.....G
40%.....F

Malic - 50%.....G
Monochloroacetic - 5%....G

Nitric - 10%.....E
20%.....G

Oleic.....E
Oxalic.....E

Perchloric - 30%.....F
Phosphoric - 50%.....G
85%.....S/S

Salicylic.....G
Stearic.....G
Sulfamic - 25%.....G
Sulfuric - 20%.....E
50%.....G
70%.....S/S

Tannic Acid.....E
Tartaric Acid.....E

ALKALIES & SALTS

Aluminum Chloride.....E
Ammonium Chloride.....E
Ammonium Hydroxide - 20%.E
Ammonium Nitrate.....E
Ammonium Persulfate.....E
Ammonium Sulfate.....E
Calcium Chloride.....E
Calcium Hydroxide.....E
Calcium Hypochlorite-15%.G
Copper Plating Cyanide...G
Copper Fluoroborate.....E
Ferric Chloride.....G
Ferric Sulfate.....G
Nickel Chloride.....E
Potassium Hydroxide
(up to 40 %)...E

Silver Nitrate.....G
Sodium Benzoate.....E
Sodium Bicarbonate.....E
Sodium Carbonate.....E
Sodium Chloride.....E
Sodium Glutamate.....E
Sodium Hydroxide
(up to 50%).....E
Sodium Hypochlorite
(up to 10 %).....G
Sodium Sulfate.....E
Sodium Sulfide.....E
Trisodium Phosphate.....E
Zinc Chloride.....E
Zinc Nitrate.....G

SOLVENTS & OTHER CHEMICALS

Acetone.....S/S
Acrylonitrile.....S/S
Amyl Acetate.....G

Benzene.....F
Brake Fluid (auto).....E
Butyl Acetate.....G
Butyl Alcohol.....G
Butyl Lactate.....G

Carbon Tetrachloride.....E
Chlorobenzene.....E
Cylcohexane.....E
Cyclohexanol.....E
Cyclohexanone.....G

Diacetone Alcohol.....E
Dibenzyl Phthalate.....E
Diethyl Phthalate.....E
Dimethyl Phthalate.....E
Dioctyl Phthlate.....E

Ethyl Acetate.....S/S
Ethyl Alcohol.....E
Ethylene Glycol.....E
Ether.....S/S

Formaldehyde.....E

Gasoline.....E
Glycol Ethers.....G
Glycol Ether Esters.....G
Glyoxyl.....E

Hydrogen Peroxide - 30%..G

Isopropyl Alcohol.....G

JP5 Jet Fuel.....E

Kerosene.....G

Lanolin.....E
Linseed Oil.....E
Methanol.....G
Methylene Chloride.....S/S
Methyl Ethyl Ketone....S/S
Methyl Isobutyl Ketone...F
Mineral Spirits.....E

Naptha.....G
Oils:
Cutting.....E
Sour Crude.....E

Perchloroethylene.....F
Petroleum.....E

Skydrol (500 A & B).....E

Tall Oil.....E
Tire Exudates.....E
Toluene.....G
Triacetin.....E
Trichloroethane.....G
Trichloroethylene.....S/S
Triethanolamine.....E
Triethylene Glycol.....E
Tung Oil.....E
Turpentine.....E

Urea.....E

Water.....E

Xylene.....G

Garland Floor Co.
4500 Willow Parkway Cleveland, Ohio 44125
Phone 216/883-4100 * WATTS 800-321-2395 * FAX 216/883-3079

Garland's heavy-duty epoxy industrial maintenance coatings have proven effective in providing protection to surfaces for a broad range of industrial users including:

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Appliance Manufacturers
Automotive Plants
Bakeries
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Dairies
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Food Processors
Heavy Equipment Manufacturers
Pharmaceutical Manufacturers
Pulp & Paper Mills
Textile Mills
Tobacco Manufacturers

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(CHEMI-TOP RESURFACER)

Typical Chemical Resistance Ratings

E (Excellent) – Continuous exposure for several weeks without adverse effects.
G (Good) – Continuous exposure for several days.
F (Fair) – Occasional repeated exposure, but floor washed at least once a day.
OS (Occasional Spillage) – Accidental spillage and floor is washed shortly afterwards.
NR (Not Recommended)

Acids

	Rating
Acetic – 5%	G
Acetic – 10%	F
Acetic – 20%	NR
Boric – Sat. 30%	F
Butyric – 10%	F
Chromic – 10%	G
Chromic – 15%	F
Chromic – 20%	OS
Citric – 50%	E
Cresylic	NR
Formic – up to 10%	OS
Formic – over 10%	NR
Fluoboric	F
Heptanoic	OS
Hydrochloric – 15%	G
Hydrochloric – 37%	F
Hydrofluoric – 5%	F
Hydrofluoric – 10%	OS
Hydrofluoric – 15%	NR
Hypochlorous – 5%	F
Lactic – up to 20%	F
Lactic – over 25%	OS
Maleic – 30%	F
Maleic – 40%	OS
Maleic – 60%	NR
Malic – 50%	E
Monochloroacetic – 5%	OS
Nitric – 10%	G
Nitric – 20%	OS
Nitric – over 30%	NR
Oleic	E
Oxalic – Sat.	E
Pelargonic	NR
Phosphoric – up to 50%	G
Phosphoric – Conc. 85%	NR
Picric – Sat.	E
Phthalic	F
Succinic – Sat.	E
Sulfuric – 20%	G
Sulfuric – 50%	F
Sulfuric – 70%	NR
Tannic – Sat.	G
Tartaric – Sat.	G

Caustics and Salts

	Rating
Aluminum Chloride – 50%	G
Ammonium Chloride – 50%	G
Ammonium Hydroxide – up to 20%	E
Ammonium Hydroxide – 40%	G
Ammonium Nitrate – Sat.	E
Ammonium Persulfate	E
Ammonium Sulfate – Sat.	G
Calcium Chloride – 50%	E
Calcium Hydroxide – Sat.	E
Calcium Hypochlorite – up to 15%	F
Copper Fluoroborate	E
Ferric Chloride	G
Ferrous Sulfate	G
Potassium Hydroxide – up to 40%	E
Sodium Benzoate	E
Sodium Carbonate (Soda Ash) – Sat.	E
Sodium Bicarbonate – Sat.	E
Sodium Bisulfate – Sat.	E
Sodium Bisulfite – Sat.	E
Sodium Chloride (salt)	E
Sodium Glutamate	E
Sodium Hydroxide – up to 30%	E
Sodium Hypochlorite – up to 10%	G
Sodium Propionate	E
Sodium Sulfate – 10%	E
Sodium Sulfide – 20%	E
Trisodium Phosphate – Sat.	E
Zinc Nitrate	G

Solvents and Other Agents

	Rating
Acetone	OS
Acrylonitrile	OS
Aniline	NR
Alcohol (Methyl)	OS
Alcohol (Ethyl, Propyl, Isopropyl, Butyl)	G
Amyl Acetate	G
Beer	E
Benzene	OS
Butyl Acetate	G
Butyl Lactate	G
Bromine	NR
Carbon Disulfide	NR
Carbon Tetrachloride	G
Chlorobenzene	G
Corn Oil	E
Cyclohexane	E
Cyclohexanol	E
Cyclohexanone	OS
Chloroform	NR
Diacetone Alcohol	E
Diethyl Phthalate	E
Dimethyl Phthalate	E
Ethyl Acetate	OS
Ethylene Glycol	G
Ether	OS
Ethylene Dichloride	NR
Formaldehyde	G
Gasoline	E
Glycerine	E
Glyoxal	E
Hydrogen Peroxide - 10%	E
JP5 Jet Fuel	E
Juices - Fruit	G
Juices - Vegetable	E

	Rating
Kerosene	OS
Lanoline	E
Lard	F
Linseed Oil	E
Mayonnaise	G
Methyl Ethyl Ketone	NR
Methyl Isobutyl Ketone	NR
Methylene Chloride	NR
Milk	E
Mineral Spirits	E
Muriatic Acid - 15%	G
Mustard	G
Naphtha	F
Naphthalene	G
Oils - Cutting	E
Oils - Mineral	E
Oils - Vegetable	G
Peanut Butter	E
Perchloroethylene	F
Phenol - 5%	NR
Pyridine	NR
Skydrol	G
Sucrose - Sat. (Sugar)	G
Toluene	F
Triacetin	E
Trichloroethane	G
Trichloroethylene	OS
Triethanolamine	G
Triethylene Glycol	E
Urea	E
Vinegar (Household)	G
Water	E
Wine	G
Xylene	G

This is a general guide of the chemical resistance to various agents of Chemi-Top industrial resurfacer. The information is based on published independent laboratory test results for the basic chemical structure of the product. While it is felt this information is reliable, many variables exist in actual field conditions which may present a greater attack on the product; whenever possible, a sample should be tested under actual or simulated conditions. Please contact the technical department when questionable conditions exist.

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Technical Information

Splash & Spill

2478

Dated: 2-88
Superceded: 3-84

CHEMICAL RESISTANCE OF PENNWALT EPOXY SYSTEMS

This table has been prepared as a guide to the serviceability of the following Pennwalt products

PENNTROWEL® EPOXY TOPPINGS(CE-140)
TUFCHEM® SPRAYABLE EPOXY(CE-224)
PENNTROWEL® EPOXY L/F SYSTEM(CE-245)
TUFCHEM® GROUT(CE-183)
PENNWALT® THIN SET ADHESIVE(CE-158)
PENNTROWEL® EPOXY BRICK MORTAR(CE-137)

This general information is offered as a helpful suggestion. The resistance table is believed to be reliable and is based on records of performance in the field and laboratory test data. However, it should be recognized that floors and walls are subject to various degrees of splash and spillage of the chemicals involved, as well as the effects of wash down water in combination with sanitizing chemicals and other solutions. Intermittent wetting and drying as well as temperature also affects the life expectancy of the epoxy system. Because the variable service conditions are beyond the control of Pennwalt, no guarantee of results is made and we assume no liability in connection therewith

160°F(71°C) in the KEY is established as the maximum temperature conditions for the below listed Pennwalt Epoxy Systems under intermittent splash and spill conditions

Exposures to 160°F(71°C) are acceptable continuously for 20 minutes. The service temperature for continuous thermal conditions is 140°F(60°C) or in accordance with the KEY rating

Where the resistance data is not listed or in the opinion of Pennwalt, it may be necessary to determine the suitability of the epoxy system by service testing. The chemical resistance chart may be revised on the basis of further testing

KEY	
R	Resistant to 160°F(71°C) Splash and Spill
LR	Resistant to 90°F(32°C) Splash and Spill
•	Resistant to 70°F(21°C) Splash and Spill
N	Not Resistant
C	Use Carbon Filled
••	Use "Nexus Veil" reinforcing cloth in L/F System

	TUFCHEM SPRAYABLE EPOXY (CE224)	P.T. EPOXY L/F SYSTEM (CE245)	TUFCHEM GROUT (CE183)	P.W. THIN SET ADHES. (CE158)	P.T. EPOXY BRICK MORTAR (CE137)	P.T. EPOXY TOPPINGS (CE140)
Acetaldehyde	R	R	R	R	R	R
Acetic Acid 5%	R	R	R	R	R	R
Acetic Acid 5-10%	LR	LR	LR	LR	LR	LR
Acetic Acid, glacial	NR	NR	NR	NR	NR	NR
Acetic anhydride	NR	NR	NR	NR	NR	NR
Acetone	LR	LR	LR	LR	LR	LR
Acetylene	LR	LR	LR	LR	LR	LR

	TUFCHEM SPRAYABLE EPOXY (CE224)	P.T. EPOXY L/F SYSTEM (CE245)	TUFCHEM GROUT (CE183)	P.W. THIN SET ADHES. (CE158)	P.T. EPOXY BRICK MORTAR (CE137)	P.T. EPOXY TOPPINGS (CE140)
Acrylic acid	NR	NR	NR	NR	NR	NR
Adipic Acid 25%	R	R	R	R	R	R
Alcohol ethyl	R	R	R	R	R	R
Allyl chloride	R	R	R	R	R	R
Aluminum chloride below 50%	R	R	R	R	R	R
Aluminum sulfate, saturated	R	R	R	R	R	R
Amidosulfonic acid	R	R	R	R	R	R

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	TUFCHEM SPRAYABLE EPOXY (CE224)	P.T. EPOXY L/F SYSTEM (CE245)	TUFCHEM GROUT (CE183)	P.W. THIN SET ADHES. (CE158)	P.T. EPOXY BRICK MORTAR (CE137)	P.T. EPOXY TOPPINGS (CE140)
Ammonia, aqueous 10%	R	R	R	R	R	R
Ammonia, aqueous 30%	LR	LR	LR	LR	LR	LR
Ammonia, annydrous.	R	R	R	R	R	R
Ammonium chloride, carbonate, sulfate 50%	R	R	R	R	R	R
Ammonium hydroxide 30%	LR	R	LR	LR	LR	LR
Ammonium nitrate 50%	R	R	R	R	R	R
Ammonium persulfate 50%	R	R	R	R	R	R
Ammonium phosphate	R	R	R	R	R	R
Ammonium sulfide solution	R	R	R	R	R	R
Amyl acetate	R	R	R	R	R	R
Aniline	N	N	N	N	N	N
Antifreeze	R	R	R	R	R	R
Aqua regia	N	N	N	N	N	N
Barium Chloride, Saturated	R	R	R	R	R	R
Beer	R	R	R	R	R	R
Benzaldehyde	N	N	N	N	N	N
Benzene	R	R	R	R	R	R
Benzenesulfonic acid	N	N	N	N	N	N
Benzoic acid	LR	LR	LR	LR	LR	LR
Benzole-alcohol mixture	R	R	R	R	R	R
Benzoyl chloride	R	R	R	R	R	R
Benzyl acetate	LR	LR	LR	LR	LR	LR
Benzyl alcohol	NR	NR	NR	NR	NR	NR
Benzyl chloride 150°C	R	R	R	R	R	R
Bleach (see Sodium hypochlorite)						
Blood	R	R	R	R	R	R
Boric acid, any	R	R	R	R	R	R
Bromine Water 4%	R	R	R	R	R	R
Butyl acetate	R	R	R	R	R	R
Butyl alcohol	R	R	R	R	R	R
Butyric acid	NR	NR	NR	NR	NR	NR
Calcium bisulfite liquor	R	R	R	R	R	R
Calcium chlorate	NR	NR	NR	NR	NR	NR
Calcium chloride 50%	R	R	R	R	R	R
Calcium hydroxide **	R	R	R	R	R	R
Calcium hypochlorite **	R	R	R	R	R	R

	TUFCHEM SPRAYABLE EPOXY (CE224)	P.T. EPOXY L/F SYSTEM (CE245)	TUFCHEM GROUT (CE183)	P.W. THIN SET ADHES. (CE158)	P.T. EPOXY BRICK MORTAR (CE137)	P.T. EPOXY TOPPINGS (CE140)
Calcium nitrate, saturated	R	R	R	R	R	R
Calcium sulfate	R	R	R	R	R	R
Carbon dioxide	R	R	R	R	R	R
Carbon disulfide	LR	LR	LR	LR	LR	LR
Carbon monoxide	R	R	R	R	R	R
Carbon tetrachloride	LR	LR	LR	LR	LR	LR
Caustic (see Sodium hydroxide)						
Chlorinated lime	R	R	R	R	R	R
Chlorine (dry)	R	R	R	R	R	R
Chlorine (wet) 600 ppm	R	R	R	R	R	R
Chlorine water	R	R	R	R	R	R
Chloroacetic acid 100%	NR	NR	NR	NR	NR	NR
Chloracetic acid 10%	LR	LR	LR	LR	LR	LR
Chloroform	R	R	R	R	R	R
Chloronaphthalene	LR	LR	LR	LR	LR	LR
Chloronitrobenzene	LR	LR	R	LR	LR	LR
Chromic acid 5%	R	R	R	R	R	R
Chromic acid 5-10%	LR	LR	LR	LR	LR	LR
Citric acid 40%	R	R	R	R	R	R
Coolant brines	LR	LR	LR	LR	LR	LR
Copper acetate, saturated	R	R	R	R	R	R
Copper chloride, nitrate, sulfate	R	R	R	R	R	R
Cottage cheese	R	R	R	R	R	R
Cottonseed oil	R	R	R	R	R	R
Cresols	NR	NR	NR	NR	NR	NR
Crude oil	R	R	R	R	R	R
Cyclohexane	LR	LR	LR	LR	LR	LR
Cyclohexanone	R	R	R	R	R	R
Dichloroethylene	NR	NR	NR	NR	NR	NR
Diesel fuel	R	R	R	R	R	R
Diethylene glycol	R	R	R	R	R	R
Diethylenetriamine	R	R	R	R	R	R
Dimethylaminoethanol	R	R	R	R	R	R
Dimethyl formamide	LR	LR	LR	LR	LR	LR
Dinitrobenzene	NR	NR	NR	NR	NR	NR

CHEMICAL RESISTANCE TABLE NO.2

Solutions Common to the Plating Industry Floor and Wall Service (Not for Immersion)

	TUFCHEM SPRAYABLE EPOXY (CE224)	P.T. EPOXY L/F SYSTEM (CE245)	TUFCHEM GROUT (CE183)	P.W. THIN SET ADHES. (CE158)	P.T. EPOXY BRICK MORTAR (CE137)	P.T. EPOXY TOPPINGS (CE140)
AcidCopper	R	R	R	R	R	R
Acid Zinc	R	R	R	R	R	R
Aluminum bright dip— # 41 Phosphoric acid heat Bath alumabrite Concentrate #41	R	R	R	R	R	R
Aluminum Pickle—Northwest Al A ume D S	R	R	R	R	R	R
Aluminum Pickling, Enthone— Nitric acid with Enthone actane # 70	NR	NR	NR	NR	NR	NR
Alkaline tin	R	R	R	R	R	R
Anodizing Electrolyte — 15-18% sulfuric acid	R	R	R	R	R	R
Brass bright-dip — 50% nitric, 50% sulfuric	NR	NR	NR	NR	NR	NR
Cadmium bright dip — with nitric acid with Kenvert conversion additive	R	R	R	R	R	R
Cadmium plating bath	R	R	R	R	R	R
Calolume L. Cadmium cyanide bath	R	R	R	R	R	R
Chrome plating bath - approx. 45oz CR to gallon 45oz sulfuric	R	R	R	R	R	R
Chromium	R	R	R	R	R	R
Copper Fluoroborate C	R	R	R	R	NR	R
Copper Lume, Copper cyanide	R	R	R	R	R	R
Copper plating bath - cyanide with # 625 Allied Research additive	R	R	R	R	R	R
Copper plating bath - straight cyanide	R	R	R	R	R	R
Enthone stripper-S18	NR	NR	NR	NR	NR	NR
Iron Chloride	R	R	R	R	R	R
Rochelle salt, Copper cyanide	R	R	R	R	R	R
Udylite bright nickel #425	R	R	R	R	R	R
Watt's nickel	R	R	R	R	R	R
Zincalume, Cyanide zinc	R	R	R	R	R	R
Delchem 946	•	•	•	•	•	•
Enthone Stripper	NR	NR	NR	NR	NR	NR
Nuvite Take-off Stripper	NR	NR	NR	NR	NR	NR
A-29-S Stripper	NR	NR	NR	NR	NR	NR

NOTE: Top service temperature for continuous service is 140°F (60°C). Exposures to 160°F (71°C) acceptable for not more than 20 minutes.

Use this reference information as a guide only. The information given in the specifications and drawings is believed to be reliable but no guarantee is made nor can we assume any liability in connection with its use. Please contact the Corrosion Engineering Department for specific recommendations.

PENNWALT

Corrosion Engineering Department • Three Parkway, Philadelphia, PA 19102 • (215) 587-7185

TECHNICAL DATA

2478

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ATOCHEM NORTH AMERICA, INC.,
THREE PARKWAY, PHILADELPHIA, PA 1910.

Pennwalt

CHEMICAL RESISTANCE TABLE FOR PENNCOAT(R) 401 CE 264
High Solids Silicon Polymer Lining

The following section contains a tabular listing of chemical reagents in which PENNCOAT(R) 401 was immersed at a temperature of 80°F (27°C) for a period of six months.

This guide is intended as an aid in determining the potential usefulness of PENNCOAT(R) 401 as a protective barrier against chemical exposure. Each application should be evaluated according to is particular circumstances and conditions.

KEY: A = Suitable for constant immersion
B = Suitable for shorter term containment and continual spillage
C = Suitable for intermittent spills when followed promptly with water flushing
NR = Not Recommended

A	
Acetic Acid, 10%	A
Acetic Acid, 30%	A
Acetic Acid, Glacial	A
Acetone	A
Acrylic Acid, up to 25%	A
Acrylonitrile	A
Alum (Aluminum Potassium Sulfate)	A
Aluminum Chloride	A
Aluminum Fluoride	A
Aluminum Hydroxide	A
Aluminum Nitrate	A
Aluminum Sulfate	A
Ammonia	A
Ammonium Bisulfite	A
Ammonium Chloride	A
Ammonium Hydroxide	A
Ammonium Nitrate	A
Ammonium Sulfate	A
n-Amyl Alcohol	A
Aniline	C

B	
Barium Chloride	A
Barium Hydroxide	A
Barium Sulfate	A
Barium Sulfide	A
Benzene	A
Benzene Sulfonic Acid	A
Benzoic Acid	A
Black Liquor, Pulp Mill	A
Bleach Liquor, Pulp Mill	A
Boric Acid	A
Brine	A
Bromine, Liquid	C
Bromine Gas (Dry & Wet)	C
n-Butyl Alcohol	A
Butyl Cellosolve Solvent	A
n-Butyric Acid	B
Butyl Acetate	A

C

Cadmium Chloride	A
Calcium Chloride	A
Calcium Hypochlorite	A
Calcium Nitrate	A
Calcium Sulfate	A
Calcium Sulfite	A
Carbon Dioxide Gas	A
Carbon Dissulfide	B
Carbon Tetrachloride	A
Chlorine Dioxide	B
Chlorine Gas (Dry and Wet)	B
Chlorine Water	A
Chloroacetic Acid, 50%	C
Chlorobenzene	A
Chloroform	A
Chromic Acid, 15%	A
Chromic Acid, 50%	B
Citric Acid	A
Copper Chloride	A
Copper Cyanide	A
Copper Nitrate	A
Copper Sulfate	A
Corn Oil	A
Crude Oil, Sour	A
Crude Oil, Sweet	A
Cyclohexane	A
Cyclohexanol	A
Cyclohexanone	A

D

Dichlorobenzene	A
Dichloroethane	A
Diesel Fuel	A
Diethyl Benzene	B
Dimethyl Formamide (DMF)	A

E

Ethyl Acetate	A
Ethyl Alcohol	A
Ethyl Benzene	B
Ethyl Chloride	A
Ethylene Chloride	A
Ethylene Glycol	A

F

Fatty Acids	A
Ferric Chloride	A
Ferric Nitrate	A
Ferric Sulfate	A
Ferrous Chloride	A
Fluosilicic Acid	B
Formaldehyde	A
Formic Acid	B
Fuel Oil	A

G

Gasoline	A
Glycerine	A

H

Heptane	A
Hexane	A
Hydrobromic Acid	A
Hydrochloric Acid, 15%	A
Hydrochloric Acid, 37%	A
Hydrofluoric Acid	C
Hydrogen Peroxide	A
Hydrogen Sulfide	A

I

Isopropyl Alcohol	A

J

Jet Fuel	A

K

Kerosene	A

L

Lactic Acid	A
Lauryl Chloride	A
Lead Acetate	A
Linseed Oil	A
Lithium Bromide	A
Lithium Chloride	A
Lithium Hypochlorite	A

Page Three

L

Lithium Hydroxide	A

M

Magnesium Bisulfite	A
Magnesium Carbonate	A
Magnesium Chloride	A
Magnesium Sulfate	A
Maleic Acid	A
Mercuric Chloride	A
Mercurous Chloride	A
Methyl Alcohol	A
Methyl Ethyl Ketone	A
Methylene Chloride	A
Mineral Spirits	A
Monochloroacetic Acid	A
Muriatic Acid	A

N

Naphtha	A
Naphthalene	A
Nitric Acid, 5%	A
Nitric Acid, 30%	B
Nitric Acid, 50%	C
Nitric Acid/Sulfuric Acid	C
Nitrobenzene	B
n-Octyl Alcohol	A

O

Oils	A
Oleum	B
Oleic Acid	A
Oxalic Acid	A

P

Perchloroethylene	A
Perchloric Acid	B
Phenol	B
Phosphoric Acid, 50%	A
Phosphoric Acid, 85%	A
Phosphorous Acid	B
Potassium Carbonate	A
Potassium Chloride	A
Potassium Dichromate	A
Potassium Hydroxide	A
Potassium Nitrate	A
Propionic Acid	A

S

Seawater	A
Silver Nitrate	A
Sodium Acetate	A
Sodium Bicarbonate	A
Sodium Bisulfate	A
Sodium Bisulfite	A
Sodium Carbonate	A
Sodium Chloride	A
Sodium Chlorite	A
Sodium Hydroxide, 10%	A
Sodium Hydroxide, 50%	A
Sodium Hypochlorite	A
Sodium Sulfate	A
Sodium Sulfide	A
Stannic Chloride	A
Stannous Chloride	A
Stearic Acid	A
Styrene	A
Sugar/Sucrose	A
Sulfur Dioxide	A
Sulfuric Acid, 10%	A
Sulfuric Acid, 50%	A
Sulfuric Acid, 98%	A

T

Tall Oil	A
Tannic Acid	A
Tartaric Acid	A
Tetrahdrofuran	A
Toluene	A
Toluene Sulfonic Acid	A
Trichloroethylene	A
Trisodium Phosphate	A

U

Urea	A

W

Water, Deionized	A
Water, Demineralized	A
Water, Distilled	A

X

Xylene	A

Z

Zinc Chloride	A
Zinc Sulfate	A

When significant amounts of trace impurities or combination of chemicals are to be resisted, we encourage our customers to test a sample under actual or simulated use conditions before a final decision is made on the suitability.

ATOCHEM North America can provide corrosion test coupons for customers to expose under actual service conditions or in the laboratory.

Use this reference information as a guide only. The information given is believed to be reliable, but no guarantee is made nor do we assume liability to connection with their use. Please contact the Corrosion Engineering Department for specific recommendations.

TECHNICAL DATA

PENNWALT
CHEMICALS ■ EQUIPMENT
HEALTH PRODUCTS
PENNWALT BUILDING, THREE PARKWAY, PHILADELPHIA, PA. 19102

2478

Immersion

Dated: 2-88
Superceded: 3-84

CHEMICAL RESISTANCE OF PENNWALT EPOXY SYSTEMS

This table has been prepared as a guide to the serviceability of the following Pennwalt products:

PENNTROWEL® EPOXY TOPPINGS (CE-140)
TUFCHEM® SPRAYABLE EPOXY (CE-224)
PENNTROWEL® EPOXY L/F SYSTEM (CE-245)
TUFCHEM® GROUT (CE-183)
PENNWALT® THIN SET ADHESIVE (CE-158)
PENNTROWEL® EPOXY BRICK MORTAR (CE-137)

This general information is offered as a helpful suggestion. The resistance table is believed to be reliable and is based on records of performance in the field and laboratory test data. However, it should be recognized that floors and walls are subject to various degrees of splash and spillage of the chemicals involved, as well as the effects of wash down water in combination with sanitizing chemicals and other solutions. Intermittent wetting and drying as well as temperature also affects the life expectancy of the epoxy system. Because the variable service conditions are beyond the control of Pennwalt, no guarantee of results is made and we assume no liability in connection therewith.

160°(71°C) in the KEY is established as the maximum temperature conditions for the below listed Pennwalt Epoxy systems under *intermittent* splash and spill conditions.

Unless otherwise rated for Immersion(I), exposures to 160°F(71°C) are acceptable continuously for 20 minutes. Top service temperature for *continuous* thermal condition is 150°F(60°C) or in accordance with the KEY rating.

Where the resistance data is not listed, or if in the opinion of Pennwalt, it may be necessary to determine the suitability of the epoxy system by in-service testing. The chemical resistance chart may be revised on the basis of further testing.

KEY

- I Immersion or continually wet service
- R Resistant to Intermittent Splash & Spill service
- N Not Recommended for Splash & Spill service.
- F Fumes only service
- T Tests required for Splash & Spill service
- * Where not so indicated (I) tests are required for Immersion service
- C Use Carbon Grade
- ** Use Nexus Veil reinforcing in L/F System

1. 160°F(71°C) on concrete or steel
2. 160°F(71°C)
3. 140°F(60°C)
4. 90°F(32°C)
5. 70°F(21°C)

EXAMPLES

- I2 Can be used for immersion or continually wet services to 160°F(71°C).
- R2 Can be used for intermittent Splash & Spill service to 160°F(71°C).

	TUFCHEM SPRAYABLE EPOXY (CE224)	*P.T. EPOXY L/F SYSTEM (CE245)	TUFCHEM GROUT (CE183)	P.W. THIN SET ADHES. (CE158)	*P.T. EPOXY BRICK MORTAR (CE137)	P.T. EPOXY TOPPINGS (CE140)
Acetaldehyde	R2	R2	R2	R2	R2	R2
Acetic Acid 5%	R2	R2	R2	R2	R2	R2
Acetic Acid 5-10%	R4	R4	R4	R4	R4	R4
Acetic Acid, glacial	N	N	N	N	N	N

	TUFCHEM SPRAYABLE EPOXY (CE224)	*P.T. EPOXY L/F SYSTEM (CE245)	TUFCHEM GROUT (CE183)	P.W. THIN SET ADHES. (CE158)	*P.T. EPOXY BRICK MORTAR (CE137)	P.T. EPOXY TOPPINGS (CE140)
Acetic anhydride	N	N	N	N	N	N
Acetone	R4	R4	R4	R4	R4	R4
Acetylene	R4	R4	R4	R4	R4	R4
Acrylic acid	N	T	N	N	N	N

	TUFCHEM SPRAYABLE EPOXY (CE224)	*P.T. EPOXY L/F SYSTEM (CE245)	TUFCHEM GROUT (CE183)	P.W. THIN SET ADHES. (CE158)	*P.T. EPOXY BRICK MORTAR (CE137)	P.T. EPOXY TOPPINGS (CE140)
Adipic Acid 25%	R2	I4	R2	R2	R2	R2
Alcohol, ethyl	R2	I3	R2	R2	I3	R2
Allyl chloride	R2	R2	R2	R2	R2	R2
Aluminum chloride, below 50%	R2	I4	R2	R2	I4	R2
Aluminum sulfate, saturated	R2	I3	R2	R2	I3	R2
Aminosulfonic acid	R2	R2	R2	R2	R2	R2
Ammonia, aqueous 10%	R2	R2	R2	R2	R2	R2
Ammonia, aqueous 30%	R4	R4	R4	R4	R4	R4
Ammonia, anhydrous	R2	I1	R2	R2	I3	R2
Ammonium chloride, carbonate, or sulfate 50%	R2	I1	R2	R2	I3	R2
Ammonium hydroxide 30%	R4	I2	R4	R4	I3	R4
Ammonium nitrate 50%	R2	I1	R2	R2	I3	R2
Ammonium persulfate 50%	R2	I4	R2	R2	I3	R2
Ammonium phosphate	R2	R2	R2	R2	R2	R2
Ammonium sulfide solution	R2	I1	R2	R2	I3	R2
Amyl acetate	R2	T	R2	R2	R2	R2
Aniline	N	N	N	N	N	N
Antifreeze	R2	R2	R2	R2	R2	R2
Aqua regia	N	N	N	N	N	N
Barium chloride, saturated	R2	I3	R2	R2	I3	R2
Beer	R2	R2	R2	R2	R2	R2
Benzaldehyde	N	N	N	N	N	N
Benzene	R2	I4	R2	R2	I4	R2
Benzenesulfonic acid	N	N	N	N	N	N
Benzoic acid	R4	I3	R4	R4	I3	R4
Benzoic alcohol mixture	R2	R2	R2	R2	R2	R2
Benzoyl chloride	R2	I4	R2	R2	I4	R2
Benzyl acetate	R4	R4	R4	R4	R4	R4
Benzyl alcohol	N	N	N	N	N	N
Benzyl chloride	R2	I4	R2	R2	I4	R2
Bleach (see Sodium hypochlorite)						
Blood	R2	R2	R2	R2	R2	R2
Boric acid	R2	I3	R2	R2	I4	R2
Bromine water 4%	R2	R2	R2	R2	R2	R2
Butyl acetate	R2	R2	R2	R2	R2	R2
Butyl alcohol	R2	R2	R2	R2	R2	R2
Butyric acid	N	N	N	N	N	N

	TUFCHEM SPRAYABLE EPOXY (CE224)	*P.T. EPOXY L/F SYSTEM (CE245)	TUFCHEM GROUT (CE183)	P.W. THIN SET ADHES. (CE158)	*P.T. EPOXY BRICK MORTAR (CE137)	P.T. EPOXY TOPPINGS (CE140)
Calcium bisulfite liquor	R2	I3	R2	R2	I3	R2
Calcium chlorate	N	N	N	N	N	N
Calcium chloride 50%	R2	I1	R2	R2	I3	R2
Calcium hydroxide **	R2	I1	R2	R2	I3	R2
Calcium hypochlorite **	R2	R2	R2	R2	R2	R2
Calcium nitrate, saturated	R2	I3	R2	R2	I3	R2
Calcium sulfate	R2	R2	R2	R2	R2	R2
Carbon dioxide	R2	R2	R2	R2	R2	R2
Carbon disulfide	R4	R4	R4	R4	R4	R4
Carbon monoxide	R2	R2	R2	R2	R2	R2
Carbon tetrachloride	R4	I4	R4	R4	I4	R4
Caustic (see Sodium hydroxide)						
Chlorinated lime	R2	R2	R2	R2	R2	R2
Chlorine (dry)	R2	R2	R2	R2	R2	R2
Chlorine (wet) 500 ppm	R2	R2	R2	R2	R2	R2
Chlorine water	R2	R2	R2	R2	R2	R2
Chloroacetic acid 100%	N	N	N	N	N	N
Chloracetic acid 10%	R4	R4	R4	R4	R4	R4
Chloroform	R2	R2	R2	R2	R2	R2
Chloronaphthalene	R4	R4	R4	R4	R4	R4
Chloronitrobenzene	R4	R4	R4	R4	R4	R4
Chromic acid 5%	R2	R2	R2	R2	R2	R2
Chromic acid 5-10%	R4	R4	R4	R4	R4	R4
Citric acid 40%	R2	I4	R2	R2	R2	R2
Coolant brines	R4	R4	R4	R4	R4	R4
Copper acetate, saturated	R2	R2	R2	R2	R2	R2
Copper chloride, nitrate, sulfate	R2	I1	R2	R2	I3	R2
Cottage cheese	R2	R2	R2	R2	R2	R2
Cottonseed oil	R2	I4	R2	R2	I4	R2
Cresols	N	N	N	N	N	N
Crude oil	R2	R2	R2	R2	R2	R2
Cyclohexane	R4	I3	R4	R4	I4	R4
Cyclohexanone	R2	I4	R2	R2	I4	R2
Dichloroethylene	N	N	N	N	N	N
Diesel fuel	R2	R2	R2	R2	R2	R2
Diethylene glycol	R2	R2	R2	R2	R2	R2
Diethylenetriamine	R2	R2	R2	R2	R2	R2

	TUFCHEM SPRAYABLE EPOXY (CE224)	*P.T. EPOXY L/F SYSTEM (CE245)	TUFCHEM GROUT (CE183)	P.W. THIN SET ADHES. (CE158)	*P.T. EPOXY BRICK MORTAR (CE137)	P.T. EPOXY TOPPINGS (CE140)
Dimethylaminoethanol	R2	R2	R2	R2	R2	R2
Dimethyl formamide	R4	R4	R4	R4	R4	R4
Dinitrobenzene	N	N	N	N	N	N
Diphenyl or diphenyl oxide	R2	R2	R2	R2	R2	R2
Ether	R2	R2	R2	R2	R2	R2
Ethyl acetate	R2	R2	R2	R2	R2	R2
Ethyl alcohol	R2	I3	R2	R2	I4	R2
Ethylamine, 40% aq. sol	R4	R4	R4	R4	R4	R4
Ethyl chloride	N	N	N	N	N	N
Ethylene dichloride	N	N	N	N	N	N
Ethylene glycol	R2	I3	R2	R2	I3	R2
Fatty acids	R4	R4	R4	R4	R4	R4
Ferric chloride, below 50%	R2	I3	R2	R2	I3	R2
Ferric chloride, anhydrous	R2	R2	R2	R2	R2	R2
Ferric nitrate or sulfate	R2	I3	R2	R2	I3	R2
Fluosilicic acid 30% C	R2	R2	R2	R2	N	R2
Formaldehyde, below 37%	R2	I3	R2	R2	I4	R2
Formic acid 90%	N	N	N	N	N	N
Furmaric acid	R4	R4	R4	R4	R4	R4
Furfural	R2	R2	R2	R2	R2	R2
Furfuryl alcohol	R4	I4	R4	R4	I4	R4
Gallic acid	R2	R2	R2	R2	R2	R2
Gasoline	R4	I4	R4	R4	I3	R4
Glycerine	R2	I3	R2	R2	I3	R2
Glycol	R4	R4	R4	R4	R4	R4
Glycol acetate	R4	R4	R4	R4	R4	R4
Glycolic acid	N	N	N	N	N	N
Heptanoic acid	R4	R4	R4	R4	R4	R4
Hexachlorocyclopentadiene	N	N	N	N	N	N
Household ammonia (see ammonium hydroxide)						
Hydrochloric acid, below 16%	R2	I4	R2	R2	I3	R2
Hydrochloric acid, 16-25%	R2	R2	R2	R2	R2	R2
Hydrochloric acid, 26-34%	R3	R2	R3	R3	R3	R3
Hydrochloric acid, conc	R4	R3	R4	R4	R4	R4
Hydrofluobric acid C	R2	R2	R2	R2	N	R2
Hydrofluoric acid 10-20% C	R2	R2	R2	R2	N	R2
Hydrofluoric acid 20-70% C	R4	R4	R4	R4	N	R4

	TUFCHEM SPRAYABLE EPOXY (CE224)	*P.T. EPOXY L/F SYSTEM (CE245)	TUFCHEM GROUT (CE183)	P.W. THIN SET ADHES. (CE158)	*P.T. EPOXY BRICK MORTAR (CE137)	P.T. EPOXY TOPPINGS (CE140)
Hydrogen peroxide 50%	R4	R4	R4	R4	R4	R4
Hydrogen sulfide	F3	F3	F3	F3	F3	F3
Hydroquinone	R2	R2	R2	R2	R2	R2
Hypochlorous acid	R4	R4	R4	R4	R4	R4
Iron sulfate, saturated	R2	I3	R2	R2	I3	R2
Jet fuel	R2	I3	R2	R2	I3	R2
Kerosene	R2	I3	R2	R2	I3	R2
Lactic acid 85%	R2	R2	R2	R2	R2	R2
Lard	R2	R2	R2	R2	R2	R2
Magnesium bisulfite	R2	R2	R2	R2	R2	R2
Magnesium chloride, saturated	R2	R2	R2	R2	R2	R2
Magnesium sulfate, saturated	R2	R2	R2	R2	R2	R2
Maleic acid, below 40%	R2	R2	R2	R2	R2	R2
Maleic acid 40%	R4	R4	R4	R4	R4	R4
Maleic anhydride	R2	R2	R2	R2	R2	R2
Mercuric chloride, saturated	R4	R4	R4	R4	R4	R4
Mercury	R2	I3	R2	R2	I3	R2
Methacrylic acid	N	N	N	N	N	N
Methyl acetate	R4	R4	R4	R4	R4	R4
Methyl alcohol	R2	I4	R2	R2	I4	R2
Methyl amine 40%	R2	R2	R2	R2	R2	R2
Methyl "Cellosolve"	R2	R2	R2	R2	R2	R2
Methyl chloride	N	N	N	N	N	N
Methy cyclohexanol	R2	R2	R2	R2	R2	R2
Methyl ethyl ketone	R4	R4	R4	R4	R4	R4
Methyl naphthalene	R2	R2	R2	R2	R2	R2
Methylene chloride	N	N	N	N	N	N
Milk	R2	I1	R2	R2	I3	R2
Mineral oil	R2	I1	R2	R2	I3	R2
Monochlorobenzene	R4	R4	R4	R4	R4	R4
Motor oil	R2	R2	R2	R2	R2	R2
Muriatic acid	R3	R2	R3	R3	R3	R3
Naphthalene	R2	R2	R2	R2	R2	R2
Nickel chlorate, nitrate or sulfate	R2	R2	R2	R2	R2	R2
Nitric acid 5%	R3	R3	R3	R3	R3	R3
Nitric acid (above 10%)	N	N	N	N	N	N
Nitric oxide gases	N	N	N	N	N	N
Nitrobenzene	N	N	N	N	N	N

	TUFCHEM SPRAYABLE EPOXY (CE224)	*P.T. EPOXY L/F SYSTEM (CE245)	TUFCHEM GROUT (CE183)	P.W. THIN SET ADHES. (CE158)	*P.T. EPOXY BRICK MORTAR (CE137)	P.T. EPOXY TOPPINGS (CE140)
Nitrosylsulfuric acid	N	N	N	N	N	N
Nitropropaone	R4	R4	R4	R4	R4	R4
Oils (saponifiable)	R2	R2	R2	R2	R2	R2
Oleic acid	R2	R2	R2	R2	R2	R2
Oleum	N	N	N	N	N	N
Oxalic acid	R2	R2	R2	R2	R2	R2
Oxygen	R2	R2	R2	R2	R2	R2
Paradimethylaminobenzophenone	R4	R4	R4	R4	R4	R4
Paraffin	R2	R2	R2	R2	R2	R2
Perchloric acid	N	N	N	N	N	N
Perchloroethylene	R2	I4	R2	R2	I4	R2
Pelargonic acid	R2	R2	R2	R2	R2	R2
Petroleum	R2	R2	R2	R2	R2	R2
Phenol, below 5%	R5	R5	R5	R5	R5	R5
Phosgene	R4	R4	R4	R4	R4	R4
Phosphoric acid 85%	R2	R2	R2	R2	R2	R2
Phosphorous chlorides	R2	I3	R2	R2	I4	R2
Phthalic anhydride	R2	R2	R2	R2	R2	R2
Picric acid 5%	R4	R4	R4	R4	R4	R4
Picric acid 50%	N	N	N	N	N	N
Potassium bromide, saturated	R2	R2	R2	R2	R2	R2
Potassium carbonate, 25%	R2	I1	R2	R2	I3	R2
Potassium chlorate, 50%	R4	I3	R4	R4	I4	R4
Potassium chloride, nitrate or sulfate	R2	I1	R2	R2	R2	R2
Potassium cyanide, saturated	R2	I1	R2	R2	I3	R2
Potassium ferricyanide, saturated	R2	R2	R2	R2	R2	R2
Potassium hydroxide 50% **	R2	I1	R2	R2	I3	R2
Potassium nitrate, saturated	R2	I1	R2	R2	I3	R2
Potassium permanganate, below 5%	R2	R2	R2	R2	R2	R2
Potassium peroxide 5%	R2	R2	R2	R2	R2	R2
Potassium persulfate, saturated	R2	R2	R2	R2	R2	R2
Potassium sulfate saturated	R2	I1	R2	R2	I3	R2
Potassium sulfide	R2	R2	R2	R2	R2	R2
Prussic acid	R2	R2	R2	R2	R2	R2
Pyridine	R4	R4	R4	R4	R4	R4
Quinoline sulfate	R2	R2	R2	R2	R2	R2
Saccharin solutions	R2	R2	R2	R2	R2	R2
Salicylic acid	R4	R4	R4	R4	R4	R4
Salt, saturated	R2	I1	R2	R2	I3	R2

	TUFCHEM SPRAYABLE EPOXY (CE224)	*P.T. EPOXY L/F SYSTEM (CE245)	TUFCHEM GROUT (CE183)	P.W. THIN SET ADHES. (CE158)	*P.T. EPOXY BRICK MORTAR (CE137)	P.T. EPOXY TOPPINGS (CE140)
Sodium acetate, saturated	R2	I1	R2	R2	I3	R2
Sodium bichromate (acidified)	N	T	N	N	N	N
Sodium chlorate	R2	I4	R2	R2	I3	R2
Sodium chloride, carbonate, bicarbonate, phosphate, nitrate, sulfate	R2	I1	R2	R2	I3	R2
Sodium hydroxide 50% **	R2	I1	R2	R2	I3	R2
Sodium hypochlorite, below 5% Cl **	R2	R2	R2	R2	R2	R2
Sodium hypochlorite 27% **	R4	R4	R4	R4	R4	R4
Sodium peroxide 5%	R4	R4	R4	R4	R4	R4
Stannic chloride	R4	R4	R4	R4	R4	R4
Stearic acid, any	R2	R2	R2	R2	R2	R2
Sugar, saturated	R2	I1	R2	R2	I3	R2
Sulfur chloride	N	N	N	N	N	N
Sulfur dioxide	R2	R2	R2	R2	R2	R2
Sulfuric acid 80%	R4	R4	R4	R4	R4	R4
Sulfuric acid 98%	N	N	N	N	N	N
Sulfurous acid, below 10%	R2	I4	R2	R2	I4	R2
Sulfur monochloride	R4	R4	R4	R4	R4	R4
Sulfuryl chloride	R4	R4	R4	R4	R4	R4
Tannin	R2	R2	R2	R2	R2	R2
Tar, tar oils	R4	R4	R4	R4	R4	R4
Tartaric acid, cold saturated	R2	I4	R2	R2	I4	R2
Tetrachloroethane	N	I4	N	N	N	N
Tetrachloromethane	N	N	N	N	N	N
Tetrahydrofuran	R4	R4	R4	R4	R4	R4
Toluene	R2	R2	R2	R2	R2	R2
Toluenesulfonic acid	R2	R2	R2	R2	R2	R2
Trichloroacetic acid	N	N	N	N	N	N
Trichloroethylene	R4	I4	R4	R4	I4	R4
Triethanolamine	R2	R2	R2	R2	R2	R2
Trisodium phosphate	R2	I1	R2	R2	I3	R2
Turpentine	R2	I4	R2	R2	I4	R2
Urea 20%	R2	I1	R2	R2	R2	R2
Urine	R2	R2	R2	R2	R2	R2
Vegetable oil	R2	R2	R2	R2	I3	R2
Vinegar	R2	I3	R2	R2	I4	R2
Water, fresh	R2	I3	R2	R2	I3	R2
Water, distilled	R2	I3	R2	R2	I3	R2
Xylene	R2	I4	R2	R2	I4	R2
Zinc chloride 50%	R2	R2	R2	R2	R2	R2

CHEMICAL RESISTANCE TABLE NO. 2

Solutions Common to the Plating Industry Floor and Wall Service

	TUFCHEM SPRAYABLE EPOXY (CE224)	*P.T. EPOXY L/F SYSTEM (CE245)	TUFCHEM GROUT (CE183)	P.W. THIN SET ADHES. (CE158)	*P.T. EPOXY BRICK MORTAR (CE137)	P.T. EPOXY TOPPINGS (CE140)
Acid Copper	R2	R2	R2	R2	R2	R2
Acid Zinc	R2	R2	R2	R2	R2	R2
Aluminum bright dip— #41 Phosphoric acid heat Bath alumabrite Concentrate #41	R2	R2	R2	R2	R2	R2
Aluminum Pickle - Northwest Al. Alume D.S.	R2	R2	R2	R2	R2	R2
Aluminum Pickling, Enthone— Nitric acid with Enthone actane #70	N	N	N	N	N	N
Alkaline tin	R2	R2	R2	R2	R2	R2
Anodizing Electrolyte — 15-18% sulfuric acid	R2	R2	R2	R2	R2	R2
Brass bright dip — 50% nitric, 50% sulfuric	R5	R5	R5	R5	R5	R5
Cadmium bright dip — with nitric acid with Kenvert conversion additive	R2	R2	R2	R2	R2	R2
Cadmium plating bath	R2	R2	R2	R2	R2	R2
Calolume L Cadmium cyanide bath	R2	R2	R2	R2	R2	R2
Chrome plating bath — approx. 45 oz. CR to gallon 45 oz. sulfuric	R2	R2	R2	R2	R2	R2
Chromium	R2	R2	R2	R2	R2	R2
Copper Fluoroborate C	R2	R2	R2	R2	NR	R2
Copper Lume, Copper cyanide	R2	R2	R2	R2	R2	R2
Copper plating bath — cyanide with #625 Allied Research additive	R2	R2	R2	R2	R2	R2
Copper plating bath — straight cyanide	R2	R2	R2	R2	R2	R2
Enthone stripper — S18	N	N	N	N	N	N
Iron Chloride	R2	R2	R2	R2	R2	R2
Rochelle salt, Copper cyanide	R2	R2	R2	R2	R2	R2
Udylite bright nickel #425	R2	R2	R2	R2	R2	R2
Watt's nickel	R2	R2	R2	R2	R2	R2
Zincalume, Cyanide zinc	R2	R2	R2	R2	R2	R2
Oelchem 946	R5	R5	R5	R5	R5	R5
Enthone Stripper	N	N	N	N	N	N
Nuvite Take-off Stripper	N	N	N	N	N	N
A-29-S Stripper	N	N	N	N	N	N

NOTE: Top service temperature for continuous service is 140°F (60°C). Exposures to 160°F (71°C) acceptable for not more than 20 minutes.

Use this reference information as a guide only. The information given in the specifications and drawings is believed to be reliable but no guarantee is made nor can we assume any liability in connection with its use. Please contact the Corrosion Engineering Department for specific recommendations.

PENNWALT

Corrosion Engineering Department • Three Parkway, Philadelphia, PA 19102 • (215) 587-7185

TECHNICAL DATA

PENNWALT

2478

PENNWALT BUILDING, THREE PARKWAY, PHILADELPHIA, PA. 19102

CE-233
4/87

CHEMICAL RESISTANCE OF URETHANE ASPHALT MEMBRANES

PENNGUARD (R) Adhesive/Membrane
TUFCHEM (R) II Membrane

Key: R - Resistant
NR - Not Resistant
C - Conditional

Acetic Acid	0 to 25%	R
Chromic Acid	0 to 35%	R
Citric Acid	0 to 35%	R
Hydrochloric Acid	0 to 35%	R
Nitric Acid	0 to 35%	R
Oleic Acid		NR
Phosphoric Acid	0 to 35%	R
Sulfuric Acid	0 to 35%	R
Acetone		NR
Benzene		NR
Carbon Tetrachloride		NR
Ethyl Acetate		NR
Ethylene Glycol		R
Methyl Chloride		NR
Methanol		R
Propanol		R
Toluene		NR
Xylene		NR
Water		R

Aluminum Hydroxide		NR
Calcium Hydroxide	Saturated	R
Sodium Hydroxide	0 to 35%	R
Aluminum Chloride	Up to 35%	C
Calcium Chloride	Up to 35%	R
Calcium Sulfate	Saturated	R
Magnesium Chloride	0 to 35%	R
Potassium Chromate	0 to 35%	R
Sodium Carbonate	0 to 35%	R
Sodium Chloride	Saturated	R
Sodium Phosphate	Saturated	R
Sodium Sulfate	Saturated	R
Ammonium Nitrate		R

Chemical resistance was determined by immersion in a solution of the listed chemicals for one year at 132 deg.F (55.5 deg. C). If the urethane asphalt membrane samples which were immersed in solution did not have significant weight gain or not physically affected by the solutions, they were deemed recommended for immersion in that particular environment.

TECHNICAL DATA

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PENNWALT BUILDING, THREE PARKWAY, PHILADELPHIA, PA. 19102

CORROSION ENGINEERING DEPARTMENT
TELEX: 831-415
(215) 587-7185

CE-239
1/85

CHEMICAL RESISTANCE OF PENNWALT VINYL ESTER MORTAR AND PENNTROWEL VINYL ESTER L/F SYSTEM-SILICA

The general information is offered as a helpful suggestion and is based on tests believed to be reliable. No guarantee of results is made and we assume no liability in connection therewith. If you have a specific problem not covered in this chart, or wish more detailed information regarding effects of temperature, concentration or mixed chemical environments, please get in touch with us.

CHEMICAL	MAX CONTINUOUS SERVICE Temperature (°F)
Acetic Acid	210
Acetone	Not recommended
Adipic Acid	180
Aluminum Chloride, below 50%	210
Ammonia, aqueous 10%	210
Ammonia, aqueous 30%	100
Ammonia, anhydrous	210
Ammonium Chloride, Carbonate, Sulfate 50%	210
Ammonium Hydroxide 20%	100
Ammonium Nitrate, up to 50%	210
Aniline	70
Antifreeze	90
Beer	120
Benzene	100
Benzoyl Chloride	90
Bleach (see Sodium Hypochlorite)	
Blood	210
Brine (see Sodium Chloride)	
Boric Acid	210
Butyl Acetate	80
Calcium Chloride, up to 50%	210
Calcium Hypochlorite	100
Caustic (see Sodium Hydroxide)	
Carbon Disulfide	Not recommended
Carbon Tetrachloride	180
Chloroform	Not recommended
Chlorine (Dry)	210
Chlorine (Wet) 5000 ppm	210
Chlorine Water	210
Chromic Acid, up to 25%	150
Citric Acid, up to 40%	210
Copper Chloride, Nitrate or Sulfate	210
Cottage Cheese	210
Cottonseed Oil	210
Crude Oil	210
Cyclohexane	150
Cyclohexanone	90
Diesel Fuel	210
Diethylene Glycol	210
Diethylenetriamine	90

CHEMICAL	MAX CONTINUOUS SERVICE Temperature (°F)
Dimethylaminoethanol	90
Dimethyl Formamide	Not recommended
Ether	90
Ethyl Acetate	70
Ethyl Alcohol	100
Ethylene Dichloride	80
Ethylene Glycol	210
Ferric Chloride, below 50%	210
Ferric Chloride, anhydrous	160
Ferric Nitrate or Sulfate	210
Fluosilicic Acid	Not recommended
Formaldehyde, below 37%	150
Formic Acid, 90%	100
Fumaric Acid	210
Furfural	Not recommended
Gasoline	180
Glycerine	210
Glycolic Acid	100
Heptanoic Acid	210
Household Ammonia (see Ammonium Hydroxide	
Hydrochloric Acid, below 10%	250
Hydrochloric Acid, 10 to 32%	210
Hydrofluoric Acid	Not recommended
Hydrogen Peroxide, 50%	160
Hypochlorous Acid	100
Jet Fuel	180
Kerosene	180
Lactic Acid, up to 85%	210
Lard	210
Maleic Acid, up to 40%	250
Maleic Anhydride	150
Methyl Alcohol	70
Methyl "Cellosolve"	90
Methyl Ethyl Ketone	70
Milk	210
Mineral Oil	250
Motor Oil (see Crude Oil)	
Muriatic Acid, see Hydrochloric Acid)	
Nickel Chloride, Nitrate or Sulfate	210
Nitric Acid, below 5%	180
Nitric Acid, 5 to 40%	80
Nitropropane	70
Oleic Acid	210
Oleum	Not recommended
Oxalic Acid	210
Perchloric Acid, up to 30%	100
Perchloroethylene	120
Pelargonic Acid, any	210
Phenol, below 5%	70
Phosphoric Acid, up to 85%	210
Phthalic Anhydride	100
Potassium Chloride, Nitrate or Sulfate	210
Potassium Hydroxide, below 25%	150
Potassium Hydroxide, 25 to 50%	180
	210

CHEMICAL	MAX CONTINUOUS SERVICE Temperature (°F)
Salt, Saturated Solution	210
Sodium Bicarbonate	180
Sodium Carbonate	180
Sodium Chloride	210
Sodium Nitrate	210
Sodium Sulfate	210
Sodium Sulfide	210
Sodium Hydroxide, below 25%	180
Sodium Hydroxide, 25 to 50%	150
Sodium Hypochlorite, up to 6% Cl_2	180
Sodium Hypochlorite, 6 to 27%	160
Stearic Acid	210
Sulfur Dioxide	210
Sulfuric Acid, below 40%	210
Sulfuric Acid, 40 to 50%	180
Sulfuric Acid, 50 to 70%	160
Sulfuric Acid, 93%	Not recommended
Sulfurous Acid, below 10%	120
Sugar, Saturated Solution	210
Tetrahydrofuran	Not recommended
Toluene	100
Toluenesulfonic Acid	120
Trichloroethylene	Not recommended
Trichloroacetic Acid	210
Triethanolamine	120
Trisodium Phosphate, any	210
Urine	210
Vegetable Oil	210
Vinegar	210
Water, Fresh	210
Water, Distilled	210
Xylene	120

TECHNICAL DATA

PENNWALT

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PENNWALT BUILDING, THREE PARKWAY, PHILADELPHIA, PA. 19102

CORROSION ENGINEERING DEPARTMENT
(215) 587-7185

CHEMICAL RESISTANCE OF PENNWALT MORTARS

CE-122

Supercedes 4/76 6/86

R – Resistant
NR – Not Recommended
– – Not Tested
C – Conditional, Test Required

This general information is offered as a helpful suggestion and is based on tests believ to be reliable. No guarantee of results is made and we assume no liability in connecti therewith. If you have a specific problem not covered in this chart, or wish more detail information regarding effects of temperature, concentration or mixed chemic environments, please get in touch with us.

TYPE MORTAR	SILICA & SILICATE	RESIN**						SULFUR	
		FURAN		MODIFIED PHENOLIC		PHENOLIC			
Pennwalt Name & Maximum Service Temp.	K-14® 2500°F.*** / H.E.S.® 1650°F. / MB® 1850°F. / Corkot® 1650°F.	Furalac Standard 330°F.	FN® 428°F. Furalac Green Panel 350°F.	Aspite® CV 300°F.	Aspite® CN 350°F.	Silica Filled Regular 375°F.	Carbon Filled Regular 375°F.	Sulfur 200°F.	Carbon & Sulfur 200°F.
CHEMICALS									
Acetaldehyde	R	R	R	R	R	R	R	R	R
Acetic Acid, under 10%	R	R	R	R	R	R	R	R	R
Acetic Acid, Glacial	R	R	R	R	R	R	R	NR	NR
Acetic Anhydride	R	NR	NR	R	R	R	R	NR	NR
Acetone	R	R	R	R	R	NR	NR	NR	NR
Acetone Oil	R	R	R	R	R	NR	NR	NR	NR
Acetyl-Bromide	R	R	R	R	R	R	R	R	R
Acetyl-Chloride	R	R	R	R	R	R	R	R	R
Acetylene-Dichloride	R	R	R	R	R	R	R	NR	NR
Acetyl Salicylic Acid	R	R	R	R	R	R	R	R	R
Aluminum Bromide	R	R	R	–	–	NR	NR	R	R
Aluminum Chloride, Sulfate & Alums	R	R	R	R	R	R	R	R	R
Aluminum Fluoride	NR	NR	R	NR	R	NR	R	NR	R
Ammonium Bromide	R	R	R	R	R	NR	NR	NR	NR
Ammonium Carbonate	R	R	R	R	R	R	R	NR	NR
Ammonium Chloride, Sulfate	R	R	R	R	R	R	R	R	R
Ammonium Fluoride	NR	NR	R	NR	R	NR	R	NR	R
Ammonium Hydroxide	NR	R	R	R	R	NR	NR	NR	NR
Ammonium Nitrate (Neutral Solutions)	R	R	R	R	R	R	R	R	R
Ammonium Persulfate	R	R	R	R	R	R	R	R	R
Ammonium Phosphates	R	R	R	R	R	R	R	R	R
Ammonium Sulfide	R	R	R	R	R	R	R	NR	NR
Ammonium Tungstate	R	R	R	R	R	R	R	R	R
Amyl Acetate, Alcohol	R	R	R	R	R	R	R	NR	NR
Aniline	R	NR	NR	R	R	NR	NR	NR	NR
Aniline Hydrochloride	R	R	R	R	R	R	R	R	R
Antimony Chloride	R	R	R	R	R	R	R	R	R
Antimony Oxychloride	R	R	R	R	R	R	R	R	R
Antimony Potassium Tartrate	R	R	R	R	R	R	R	R	R
Aqua Regia	R	NR	NR	NR	NR	NR	NR	NR	NR

TYPE MORTAR	SILICA & SILICATE	RESIN**						SULFU
		FURAN		MODIFIED PHENOLIC		PHENOLIC		
Pennwalt Name & Maximum Service Temp.	K-14® 2500°F.*** / H.E.S.® 1650°F. / Corbel® 1650°F. / Hi-B® 1650°F.	Furalac Standard 330°F.	FN® 478°F. Furalac Green Panel 350°F.	Aeplite® CV 300°F.	Aeplite® CN 356°F.	Silica Filled Regular 375°F.	Carbon Filled Regular 375°F.	Sulfur 200°F. / 200°F.
CHEMICALS								
Arsenic Compounds, Neutral or Acid	R	R	R	R	R	R	R	R
Barium Chloride	R	R	R	R	R	R	R	R
Barium Hydroxide	NR	R	R	R	R	NR	NR	NR
Barium Sulfide	R	R	R	R	R	NR	NR	NR
Benzaldehyde—Neutral or Acid	R	R	R	R	R	NR	NR	R
Benzene (Benzol)	R	R	R	R	R	R	R	NR
Benzene Sulfonic Acid (or Chloride)	R	R	R	R	R	R	R	NR
Benzoic Acid	R	R	R	R	R	R	R	R
Benzyl Acetate	R	R	R	R	R	NR	R	R
Benzyl Alcohol	R	R	R	R	R	NR	NR	R
Benzyl Chloride	R	R	R	R	R	R	R	NR
Boric Acid 5%	R	R	R	R	R	R	R	R
Bromine	R	NR	NR	NR	NR	NR	NR	R
Bromine Water, Saturated	R	R	R	R	R	R	R	R
Butanol	R	R	R	R	R	R	R	NR
Butyl Acetate	R	R	R	R	R	R	R	NR
Butyl Carbitol	R	R	R	R	R	NR	NR	NR
Butyric Acid	R	R	R	R	R	R	R	NR
Calcium Chloride	R	R	R	R	R	R	R	R
Calcium Hydroxide	NR	R	R	R	R	NR	NR	NR
Calcium Hypochlorite	R	NR	NR	NR	NR	NR	NR	NR
Calcium Nitrate (Neutral Solutions)	R	R	R	R	R	R	R	R
Calcium Sulfate	R	R	R	R	R	R	R	R
Carbon Bisulfide	R	R	R	R	R	R	R	NR
Carbon Dioxide	R	R	R	R	R	R	R	R
Carbon Oxychloride (Phosgene)	R	R	R	R	R	R	R	R
Carbon Tetrachloride	R	R	R	R	R	R	R	NR
Caustic Soda & Potash 25%	NR	R	R	NR	R	NR	NR	NR
Chloroacetic Acid 10%	R	R	R	R	R	R	R	NR
Chloral (Trichloroacetic aldehyde)	R	R	R	NR	NR	NR	NR	NR
Chlorbenzene	R	R	R	R	R	R	R	NR
Chlorine Dioxide, Water Solution	R	NR	NR	NR	NR	NR	NR	NR
Chlorine, Liquid	R	NR	NR	NR	NR	NR	NR	NR
Chlorine, Gas	R	NR	NR	R	R	NR	NR	NR
Chlorine Water, Saturated	R	R	R	R	R	R	R	NR
Chloroform	R	R	R	R	R	R	R	NR
Chloronaphthalene	R	R	R	R	R	NR	NR	NR
Chlorosulfonic Acid	R	NR	NR	R	R	NR	NR	R
Chromic Acid 10%	R	NR	NR	NR	NR	NR	NR	NR
Chromic Chloride	R	R	R	R	R	R	R	R
Chromium Potassium Sulfate	R	R	R	R	R	R	R	R
Citric Acid	R	R	R	R	R	R	R	R
Copper Acetate, Chlorides & Sulfate	R	R	R	R	R	R	R	NR
Copper Nitrate (Neutral Solutions)	R	R	R	R	R	R	R	NR
Cresol	R	R	R	R	R	NR	NR	NR

CHEMICALS	TYPE MORTAR	SILICA & SILICATE	RESIN**						SULFUR	
			FURAN		MODIFIED PHENOLIC		PHENOLIC			
	Pennwalt Name & Maximum Service Temp.	K-14® 2500°F.*** / Corbek® 1650°F. / H.E.S.® 1650°F. / HBI® 1650°F.	Furalac Standard 330°F.	FN® 428°F. Furalac Green Panel 350°F.	Aplin® CV 300°F.	Aplin® CN 356°F.	Silica Filled Regular 375°F.	Carbon Filled Regular 375°F.	Sulfur 200°F.	Carbon Sulfur 200°F.
Ether		R	R	R	R	R	R	R	NR	NR
Ethyl Acetate		R	R	R	R	R	R	R	NR	NR
Ethyl Alcohol		R	R	R	R	R	NR	NR	R	R
Ethylamine 40%		R	R	R	R	R	NR	NR	R	R
Ethyl Bromide		R	R	R	R	R	NR	NR	NR	NR
Ethyl Chloride & Ethylene Dichloride		R	R	R	R	R	R	R	NR	NR
Ethylene Disulfonic Acid		R	R	R	R	R	R	R	R	R
Ethylene Oxide		R	R	R	R	R	R	R	R	R
Ethyl Ether		R	R	R	R	R	R	R	NR	NR
Ethyl Sulfate		R	R	R	R	R	R	R	R	R
Ethyl Sulfuric Acid		R	R	R	R	R	R	R	R	R
Fatty Acids		R	R	R	R	R	R	R	NR	NR
Ferric Chloride, Nitrate, Sulfate		R	R	R	R	R	R	R	R	R
Ferri- & Ferrocyanides		R	R	R	R	R	R	R	R	R
Fluoboric Acid		NR	NR	R	NR	R	NR	R	NR	R
Fluorine Gas, Anhydrous		R	NR	NR	NR	NR	NR	NR	NR	NR
Fluosilicic Acid		NR	NR	R	NR	R	NR	R	NR	R
Formaldehyde		R	R	R	R	R	R	R	R	R
Formic Acid & Compounds		R	R	R	R	R	R	R	NR	NR
Gallic Acid		R	R	R	R	R	R	R	R	R
Glycol Monoacetate		R	R	R	R	R	R	R	NR	NR
Hydrazine Sulfate		R	R	R	R	R	NR	NR	NR	NR
Hydriodic Acid		R	NR	NR	NR	NR	NR	NR	NR	NR
Hydrobromic Acid		R	R	R	R	R	R	R	R	R
Hydrochloric Acid		R	R	R	R	R	R	R	R	R
Hydrocyanic Acid		R	R	R	R	R	R	R	R	R
Hydrofluoric Acid 50%		NR	NR	NR	NR	R	NR	R	NR	R
Hydrogen Peroxide 1%		R*****	NR	R	R	R	R	R	R	R
Hydrogen Peroxide 10%		R	NR	NR	NR	NR	NR	NR	NR	NR
Hydrogen Peroxide 25%		R	NR	NR	NR	NR	NR	NR	NR	NR
Hydrogen Sulfide		R	R	R	R	R	R	R	R	R
Hypochlorous Acid		R	NR	NR	NR	NR	NR	NR	NR	NR
Iodine		R	NR	NR	NR	NR	NR	NR	NR	NR
Iodoform		R	R	R	R	R	NR	NR	R	R
Lactic Acid & Compounds		R	R	R	R	R	R	R	R	R
Lead Chloride		R	R	R	R	R	R	R	R	R
Lead Nitrate (Neutral Solutions)		R	R	R	R	R	R	R	R	R
Magnesium Chloride, Nitrate, Sulfate		R	R	R	R	R	R	R	R	R
Maleic Acid & Compounds		R	R	R	R	R	R	R	R	R
Manganese Chloride, Oxides & Sulfates		R	R	R	R	R	R	R	R	R
Mercuric Chloride		R	R	R	R	R	R	R	R	R
Methanol (Methyl Alcohol)		R	R	R	R	R	NR	NR	R	R
Methyl Acetate		R	R	R	R	R	R	R	NR	NR
Methylbutyleneglycol Acetate		R	R	R	R	R	NR	NR	NR	NR
Methyl Cyclohexanol		R	R	R	NR	R	NR	NR	NR	NR
Methylene Chloride		R	R	R	R	R	R	R	NR	NR
Methyl Sulfate		R	R	R	R	R	R	R	NR	NR
Methyl Sulfonic Acid		R	R	R	R	R	R	R	R	R

TYPE MORTAR	SILICA & SILICATE		RESIN**						SULFUR	
			FURAN		MODIFIED PHENOLIC		PHENOLIC			
Pennwalt Name & Maximum Service Temp.	K-14® 2500°F.***	H.E.S.® 1650°F. HB® 1650°F. Corhok® 1650°F.	Furane Standard 330°F.	FN® 428°F. Furane Green Panel 350°F.	Aspir® CV 300°F.	Aspir® CN 356°F.	Silica Filled Regular 375°F.	Carbon Filled Regular 375°F.	Sulfer 200°F.	Carbon Sulfur 200°F.
CHEMICALS										
Molybdenum Acids & Oxides	R	R	R	R	R	R	R	R	R	R
Naphthalene (Sulfonated)	R	R	R	R	R	R	R	R	R	R
Naphthalenesulfonic Acid	R	R	R	R	R	R	R	R	R	R
Naphtholsulfonic Acid	R	R	R	R	R	R	R	R	R	R
Nickel Chloride & Sulfate	R	R	R	R	R	R	R	R	R	R
Nitric Acid 5%	R	NR	NR	NR	C	C	NR	NR	R	R
Nitrobenzene	R	R	R	R	R	R	R	R	NR	NR
Nitrogen Oxides	R	NR	NR	NR	NR	NR	NR	NR	R	R
Nitroglycerine	R	NR	NR	NR	NR	NR	NR	NR	NR	NR
Nitrophenol	R	R	R	R	NR	R	NR	NR	R	R
Nitrotoluene	R	NR	NR	NR	NR	R	NR	NR	NR	NR
Oils — Vegetable, Mineral, Animal	R	R	R	R	R	R	R	R	NR	NR
Oleic Acids & Compounds (Esters)	R	R	R	R	R	R	R	R	R	R
Oxalic Acids & Compounds	R	R	R	R	R	R	R	R	R	R
Paradimethylaminobenzophenone	R	R	R	R	R	R	R	R	NR	NR
Paraffin Wax	R	R	R	R	R	R	R	R	NR	NR
Perchloric Acid 25%	R	NR	NR	NR	NR	NR	NR	NR	NR	NR
Phenol (20% Solution)	R	R	R	R	R	R	NR	NR	NR	NR
Phenol Sulfoacids	R	R	R	R	R	R	R	R	R	R
Phosphoric Acid	R	R	R	R	R	R	R	R	R	R
Phosphorous Bromide	R	NR	NR	NR	NR	NR	NR	NR	R	R
Phosphorous Chloride & Oxychloride	R	R	R	R	R	R	R	R	R	R
Phthalic Acid	R	R	R	R	R	R	R	R	R	R
Picric Acid 50% in Water	R	R	R	R	R	R	R	R	R	R
Potassium Bichromate	R	R	R	R	R	R	R	R	□R	□R
Potassium Bromide 40%	R	R	R	R	R	R	R	R	R	R
Potassium Carbonate	NR	R	R	R	R	R	R	R	NR	NR
Potassium Chlorate 6.5%	R	R	R	R	R	R	R	R	R	R
Potassium Chloride, Nitrate, Sulfate	R	R	R	R	R	R	R	R	R	R
Potassium Cyanide	NR	R	R	R	R	R	R	R	□R	□R
Potassium Ferri & Ferro Cyanide	R	R	R	R	R	R	R	R	R	R
Potassium Hydroxide 50%	NR	R	R	R	R	R	NR	NR	NR	NR
Potassium Oxalate	R	R	R	R	R	R	R	R	R	R
Potassium Permanganate 10%	R	R	R	R	R	R	R	R	R	R
Potassium Persulfate & Sulfate	†R	R	R	R	R	R	R	R	R	R
Potassium Peroxide 5%	NR	NR	NR	NR	R	R	NR	NR	NR	NR
Pyridine	R	R	R	R	R	R	R	R	NR	NR
Salicylic Acid	R	R	R	R	R	R	R	R	R	R
Selenium Compounds—Acid or Neutral	R	R	R	R	R	R	R	R	R	R
Silicon Tetrachloride	R	R	R	R	R	R	R	R	R	R
Sodium Acetate	R	R	R	R	R	R	R	R	R	R
Sodium Bicarbonate	R	R	R	R	R	R	R	R	R	R
Sodium Bichromate 50%	R	R	R	R	R	R	R	R	R	R
Sodium Bisulfate, Bisulfite	R	R	R	R	R	R	R	R	R	R
Sodium Carbonate 18%	NR	R	R	R	R	R	NR	NR	NR	NR

*OK up to 40% at 160°F. Test higher concentrations and temperatures. □OK cold, test hot.

TYPE MORTAR	SILICA & SILICATE	RESIN**						SULFU
		FURAN		MODIFIED PHENOLIC		PHENOLIC		
Pennwalt Name & Maximum Service Temp.	K-14® 2500°F.*** / H.E.S.® 1650°F. / HBI® 1650°F. / Corbel® 1650°F.	Furalac Standard 330°F.	FN® 428°F. Furalac Graphite Panel 350°F.	Aspirit® CV 300°F.	Aspirit® CN 356°F.	Silica Filled Regular 375°F.	Carbon Filled Regular 375°F.	Sulfur 200°F.
CHEMICALS								
Sodium Chloride, Nitrate	R	R	R	R	R	R	R	R
Sodium Chromate	R	R	R	R	R	R	R	R
Sodium Chlorosulfonate	R	R	R	R	R	R	R	R
Sodium Hydroxide 25%	NR	R	R	NR	R	NR	NR	NR
Sodium Hypochlorite	NR	NR	NR	#NR	#NR	NR	NR	NR
Sodium Oxalate	R	R	R	R	R	R	R	R
Sodium Peroxide 5%	NR	NR	NR	NR	NR	NR	NR	NR
Sodium Sulfate	R	R	R	R	R	R	R	R
Sodium Sulfide	†NR	R	R	NR	R	NR	NR	NR
Sodium Tartrate	R	R	R	R	R	R	R	R
Sodium Thiosulfate	R	R	R	R	R	R	R	R
Stearic Acid	R	R	R	R	R	R	R	•R
Sulfuric Acid 70% @ 100°C	R	R	R	R	R	R	R	≈R
Sulfur Chloride	R	NR	NR	R	R	R	R	R
Sulfur Molten	R	R	R	R	R	R	R	NR
Sulfurous Acid	R	R	R	R	R	R	R	R
Sulfur Oxides	R	R	R	R	R	R	R	R
Sulfuryl Chloride (Sulfur Oxychloride)	R	NR	NR	NR	NR	NR	NR	R
Tartaric Acid & Compounds	R	R	R	R	R	R	R	R
Tetrachloroethane	R	R	R	R	R	R	R	NR
Tin Chlorides	R	R	R	R	R	R	R	R
Tin Sulfates	R	R	R	R	R	R	R	R
Titanium Chlorides, Sulfate	R	R	R	R	R	R	R	R
Toluene (Toluol)	R	R	R	R	R	R	R	NR
Toluenesulfonic Acid	R	R	R	R	R	R	R	R
Trichloroacetic Acid	R	R	R	R	R	NR	NR	‡NR
Trichloroethylene	R	R	R	R	R	R	R	NR
Trisodium Phosphate	†NR	R	R	R	R	NR	NR	NR
Urea	R	R	R	R	R	R	R	R
Uric Acid	R	R	R	R	R	R	R	R
Xylene (Xylol)	R	R	R	R	R	R	R	NR
Zinc Chloride, Nitrate, Sulfate	R	R	R	R	R	R	R	R

- • Same chemical resistance with reduced physical strength above 750°F. (399°C)
- •• See separate tables for polyester and epoxy mortars
- ••• Pennwalt K14® Mortar has similar chemical resistances to CORLOK® B Mortar and HB® Mortar with some exceptions. Check with your Pennwalt representative for specific chemical resistances.
- •••• CORLOK B Mortars should be tested for resistance in 1% range. All Mortars resistant in 10% and 25% range.
- @ Resistant up to 40% at 160°F (71°C). Test higher concentrations and temperatures.
- $ Up to 2% concentration.
- ¢ Limited resistance at 48% concentration.
- ◆ Resistant to 100°F (38°C). Test for higher temperatures.
- Δ Strong oxidizers must not be added because elemental bromine would be freed that would make the rating of all resin mortars Not Resistant.
- ■ Polyester Mortar probably resistant to boiling point in all three concentrations. Epoxy toppings may be considered up to 10% but verify by test.
- + H.E.S.® and HB® Mortars will resist some concentrations. See Addenda.
- # Attack is slow at 1% or less.
- ‡ Resistant to 20% at 100°F. (38°C)
- ✚
- & Resistant intermittent to 100°F. (38°C)
- ☐ Resistant intermittent to 160°F. (71°C)
- ≈ Up to 302°F. (150°C)

ADDENDA

H.E.S. and HB Mortars differ from other siliceous, silicate, or silica mortars in resisting exposures between pH 0.0 and pH8.0 with the exception of acid fluorides and HF acid. In addition, they can be used in glycol acetate, potassium sulfate or persulfate, sodium sulfide and trisodium phosphate, all of which will damage other siliceous mortars.

"Use this reference information as a guide only. The information given in the resistance chart is believed to be reliable, but no guarantee is made nor can we assume liability in connection with their use. Please contact the Corrosion Engineering Department for specific recommendations."

SECTION D:
ATTACHMENT D-2

PLASITE ®

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Epoxies

BULLETIN TD-2

CORROSION RESISTANCE TEST DATA

JANUARY, 1990
(Replaces Jan. 1988)

TD 2 CORROSION RESISTANCE TEST DATA

The proper selection of coatings for specific exposures requires the best combination of science, art, experience and certain engineering fundamentals. Protective coatings for immersion and severe service are selected much in the same manner as other materials of construction involved in a chemical environment.

EFFECTIVE LIFE OF COATINGS depends on many factors, a few of which are listed below as a check-list to consider in the process of selecting the proper coating:

A. Chemical resistance of coating film.
B. Surface preparation and accessibility.
C. Film thickness — continuity and quality depending on skilled application.
D. Design of tankage and equipment.
E. Physical abuse — abrasion — impingement — liquid velocities — impact
F. Electro-chemical, cathodic protection.
G. Thermal shock-cyclical heating and cooling.
H. Temperature limits and operating characteristics
I. Impurities and combinations of reagents.

The foregoing information, plus guidelines from Field Histories (both successful and failures), narrows the field to one or more generic types of linings.

The coatings listed are classified in the "thin film" range and are not to be used in total and continuous immersion in the chemicals that produce an extreme corrosion rate on mild steel. The following data denotes an extreme corrosion rate "in excess of 50 mils per year" by a + symbol (refer to National Association of Corrosion Engineers, Corrosion Data Survey, Metals Section). Another rough guide is to ascertain from previous severe service whether or not this tank would have a foreshortened life without any protective lining — this range could be from a matter of weeks where heavy pitting might occur to five years. Thin film linings in the range of 5 mils to 35 mils would normally not be used where aggressive organic and inorganic acids are to be involved. In general, weak acids with less than a pH of 4 are considered corrosive and thin films are normally not recommended.

INSTRUCTIONS FOR USE OF TD 2

The test data published in this bulletin was derived by conducting immersion tests in closed containers. 1" x 5" x 1/8" mild steel panels were coated with a specific coating at the nominal mil thickness recommended for immersion service. The panels were immersed in one-half of their length in the liquid. The holes in the test coupons are not patched and there is a void in the coating from the hanging hook.

At the beginning of the test, panels were inspected at 24 hours. Thereafter, inspection of the panels was at the following intervals: 1 week; 2 weeks; 1 month; 2 months; 4 months; 6 months; 8 months; 10 months; and 1 year.

Prior to 1972, all tests were discontinued at 6 months. Commencing January 1972 all test data is accumulated for a 1 year period. 6 month tests are indicated by a < symbol

By using coded symbols, the following data (in chart form) allows the user to determine the effect of the environment on the specific coating. The chart is based on immersion exposure (space does not allow reporting the effect of vapor and interface stage). Although a failure may be indicated and, if not too rapid, a judgment may be made if the coating is useful in protection against fumes, splash and spills. Each page shows the symbols and description of exposure and effect. The following notes will aid in interpretation of results:

1 = SLIGHT SOFTENING

This is not considered a true failure as in most cases it is only a surface softening, the coating is not readily removable from the surface and, when removed from the environment, it generally comes back to its original hardness. The chart indicates that it should not be used for total and continuous immersion service. It is possible that the coatings showing this degree of softening might be used at the discretion of the user.

2 = SEVERE SOFTENING

The guidelines are that it may be easily removed from the surface and would not be recommended for continuous service even though the coating might appear to harden after being removed from the environment.

3 = BLISTERED 5 = DISSOLVED 6 = CRACKED
8 = SEVERE ETCHING 9 = SWELLING 10 = PERMEATION

Would be interpreted as not being suitable for immersion service and would be considered a failure when immersion service is contemplated.

4 = DISCOLORATION

Not considered a failure.

7 = SLIGHT ETCHING

This is a noted effect to the coating film and would normally not be considered a failure. This effect is limited to slight surface etching only, with no measurable loss of film thickness. Coatings showing this degree of etching might be used at the discretion of the user.

The information presented is to be used as a guide to preliminary selection and an indication of the chemical resistance range of the coatings. Evaluation under actual conditions and field service is the next step in the process of proper selection. Consult our Home Office or PLASITE representative in your area for information on further tests and field history.

All data, statements and recommendations made herein are based upon information we believe to be reliable of all patent rights. Our products are sold on the condition that the user form all will evaluate them regarding the use of our products or process are not to be construed as recommendations for their use

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CHEMICAL EXPOSURE	TEMP	C-725 (Epoxy)	1246	3066	3070	6001	7100	7111	7122 (Epoxy Phenolic)	7133 (Epoxy)	7155HHB	7156 (Epoxy)	9060 (Epoxy)	9080 (Epoxy)	9500	9570
Acetaldehyde	70 F	F 3 1 Da		OK**			F 3 1 Da	F 3 1 Da	F 3 1 Da	F 3 1 Da						
Acetic Acid (Glacial)	100 F			<OK+	OK+										OK+4	
Acetic Acid (Glacial)	150 F														F 6 1 Mo	
Acetic Acid 0.5%	100 F	F 3 6 Mo							F 3 8 Mo				OK+4	OK+4		
Acetic Acid 1%	100 F								F 3 2 Mo							
Acetic Acid 5%	100 F	F 3 1 Wk		<OK+	OK+		F 3 1 Wk		F 3 1 Wk				F 3,4 2 Wk	F 3 1 Mo	OK+4	
Acetic Acid 10%	100 F	F 3 1 Da		<OK+	OK+		F 3 1 Wk		F 3 1 Wk	F 3 3 Wk					F 3 8 Mo	
Acetic Anhydride	70 F			OK**	OK		F 3 1 Wk	F 3 2 Wk	F 1,3 1 Wk	F 5 9 Da						
Acetone	100 F		F 2 6 Mo	OK**	OK	F 3 8 Mo					F 3 40 H	F 3 40 H	OK4		OK	OK
Acetophenone	100 F			<OK	OK	<OK	F 5 1 Wk	F 3 1 Wk	F 3 1 Wk	F 2 2 Mo			OK 4	F 5 1 Da	OK	OK
Acrylic Acid (Glacial)	100 F			OK+	OK+											
Acrylic Acid 20%	100 F			OK+	OK+										F 3 2 Mo	OK4
Acrylic Acid 20%	150 F			OK+	OK+										F 3 1 Wk	F 3 1 Yr
Acrylic Acid 50%	150 F				OK+4											
Acrylic Acid 60%	100 F			OK+	OK+										F 3 1 Mo	OK 4
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

Mo = Month
Wk = Week
Da = Day
Hr = Hours
F = Failed

FC = Force Cured.
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5 = Dissolved Coating
6 = Cracked
7 = Slight Etching
8 = Severe Etching
9 = Swelling
10 = Permeation

NOTE: All solutions are in water unless otherwise indicated

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TD-2 CORROSION RESISTANCE TEST DATA

CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570
Acrylic Acid 60%	150 F			OK+	OK+										F 3 72 H	F 3 1 Wk
Acrylic Acid 80%	100 F			OK+	OK+										F 3 1 Mo	OK4
Acrylic Acid 80%	150 F			OK+	OK+										F 3,6 72 H	F 3,6 72 H
Acrylic Syrup	70 F			OK**					OK**							
Acrylonitrile	70 F			<OK			F 2 1 Wk	F 2 1 Wk	F 5 1 Wk	F 5 1 Wk						
Acrylonitrile	100 F				OK								F 3 1 Da		OK	
Activated Carbon	70 F			<OK			<OK		<OK	<OK						
Activated Carbon	100 F				OK							OK	OK	OK	OK	OK
Adipic Acid (Dry)	70 F			<OK					OK**					OK		
Adipic Acid 60% in Ethyl Alcohol	70 F			<OK			F 3 6 Wk	F 1,3 10 Da	F 1,3 3 Wk	F 1,3 3 Wk						
Alkyl Glycidyl Ether	150 F	OK	OK	OK	OK	OK		F 3 1 Yr	OK	F 3 4 Mo	F 3 1 Yr	OK 4	OK 4	OK 4	OK	OK
Alkyl Glycidyl Ether Sulfonate 58%; Sodium Chloride 2%; Water 40%	150 F	F 5,9 2 Wk	F 3 10 Mo	OK	OK	OK		F 2,9 24 H	F 1,3,5 1 Mo	F 2,3,5 1 Mo	F 3 1 Wk	F 2 1 Yr	OK 4	F 5 1 Yr	OK 5	OK 4
Allyl Chloride	100 F			OK+	OK+								F 3,4 1 Wk	F 3 1 Da	OK+ 4	F 3,4 1 Yr
Allyl Glycidyl Ether	70 F			<OK			F 5 1 Mo	F 5 1 Mo	F 5 1 Mo	F 5 1 Mo						
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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TD-2 CORROSION RESISTANCE TEST DATA

CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570
Almond Oil	70 F									F 3 3 Da						
Aluminum Acetate 25%	70 F						F 3 1 Mo	F 3 2 Wk	F 3 1 Mo	F 3 1 Mo						
Aluminum Ammonium Sulfate 50%	70 F						<OK+	F 3 2 Mo	<OK+	<OK+						
Aluminum Ammonium Sulfate 50%	150 F														OK	OK
Aluminum Chloride 13%; Benzol 2%	70 F			<OK+			OK+ 4 Mo		F 3,4 4 Mo	F 3,4 4 Mo						
Aluminum Chloride 29%	70 F			<OK+			<OK+	<OK+	<OK+	OK+ 7 Mo	<OK+	<OK+				
Aluminum Chloride 29%	100 F												OK+	OK+ 4		
Aluminum Chloride 29%	150 F														OK+	OK+
Aluminum Fluoride 1%	100 F								OK				OK		OK	OK
Aluminum Fluoride 5%	100 F								OK				OK		OK	OK
Aluminum Fluoride 5%	150 F														OK	OK
Aluminum Fluoride 10%	100 F								F 3 1 Yr				OK		OK	OK
Aluminum Fluoride 20%	100 F								F 3 1 Yr				OK		OK	OK
Aluminum Nitrate 50%	70 F						OK+ 8 Mo	OK+4 8 Mo	OK+ 8 Mo	OK+4 8 Mo						
Aluminum Nitrate 50%	100 F												OK 1,4	OK 1,4		
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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ID-2 CORROSION RESISTANCE TEST DATA

CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570
Aluminum Nitrate 50%	150 F														OK	
Aluminum Potassium Sulfate	70 F						OK+ 7 Mo	F 3 2 Mo	OK+ 7 Mo	OK+ 7 Mo						
Aluminum Sulfate 8.3% pH3	100 F		OK+	OK+	OK+	OK+			OK+	OK+	F 3 2 Wk					
Aluminum Sulfate 8.3% pH 3	150 F		OK+	OK+		OK+			F 3 6 Mo	F 3 4 Mo	F 3 2 Wk					
Aluminum Sulfate 48.5% pH 2.5	150 F		OK+	OK+	OK+	OK+			OK+	OK+	OK+					
Aluminum Sulfate 49%	100 F			OK+		OK+			OK+	OK+			OK+4	OK+4		
Aluminum Sulfate 49%	150 F			OK+		OK+			OK+	OK+			F 3,4 2 Mo	OK+4		
Ammonium Carbonate 25%	70 F			OK			F 1,3 5 Mo	<OK	<OK	F 3 6 Wk						
Ammonium Chloride (Dry)	250 F			<OK 4		<OK 4			<OK 4							
Ammonium Chloride 30%	100 F														OK	
Ammonium Chloride 50%	70 F						<OK+		<OK+	<OK+						
Ammonium Dichromate 50%	70 F						OK 7 Mo	OK 1 7 Mo	OK 1 7 Mo	OK 4 7 Mo						
Ammonium Hydroxide 2%	150 F															F 3,4 8 Mo
Ammonium Hydroxide 5%	70 F			<OK			F 3 2 Wk		F 3 2 Mo	F 3 1 Mo						
Ammonium Hydroxide 5%	100 F					F 3 3 Mo			F 3 1 Wk				F 3 2 Wk	F 3 2 Mo	OK	OK
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570
Ammonium Hydroxide 10%	100 F			OK	OK										OK	OK
Ammonium Hydroxide 29%	100 F			OK 4	OK4		F 3 1 Wk	F 3 5 Da	F 3 1 Wk	F 3 1 Wk			F 3 2 Wk		F 3 1 Yr	F 3 1 Mo
Ammonium Hydroxide 29%	150 F			F 3 1 Mo	OK 4					F 3 24 H						
Ammonium Nitrate 5%	100 F								OK							
Ammonium Nitrate 50%	70 F			<OK			OK 7 Mo	OK 9 Mo	OK 7 Mo	OK 9 Mo						
Ammonium Nitrate 50%	100 F												OK	OK		
Ammonium Nitrate 65%	150 F	OK	OK	OK 4	OK 4	OK 4		OK 4	OK	OK 4	OK 4	OK 4	OK 4	OK 4	OK	OK 4
Ammonium Nitrate 83%	100 F			OK**	OK				OK**	OK 7 Mo					OK	OK
Ammonium Nitrate 83%	180 F		OK	OK 4	OK 4	OK 4			OK 4	OK 4	OK 4	OK 4			OK 4	OK 4
Ammonium Nitrate 83%	200 F		OK	OK 4	OK 4	OK 4			OK 4		OK 4	OK 4			OK 4	OK 4
Ammonium Nitrate 83%	220 F		OK 4	OK 4	OK 4	OK 4					F 3,4 1 Yr	F 3,4 1 Yr			OK 4	OK 4
Ammonium Perchlorate 10%	100 F												OK	OK	OK	OK
Ammonium Persulfate 10%	100 F								F 3,9 6 Mo	F 3,9 6 Mo			F 3 1 Mo	OK 1,4		
Ammonium Persulfate 10%	150 F								F 3 3 Mo	F 1,3 1 Wk			F 3 2 Wk	F 3 6 Mo		
Ammonium Persulfate 50%	70 F						OK+4 7 Mo	F 5 1 Mo	F 3 2 Mo	OK+4 7 Mo						
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570
Ammonium Persulfate 50%	150 F															OK
Ammonium Phosphate 40%	150 F		OK	OK	OK			OK 4	F 3 1 Yr	F 4,5 8 Mo	OK	OK 4	F 3 2 Wk	OK 4		OK
Ammonium Phosphate, Monobasic 50%	70 F			OK 8 Mo			OK 8 Mo	OK 8 Mo	OK 8 Mo	OK 8 Mo						
Ammonium Sulfamate 46%	100 F		<OK					<OK		<OK	<OK					
Ammonium Sulfate Dry	70 F							OK**4 7 Mo								
Ammonium Sulfate 6%; Sodium Sulfate 6%	150 F	<OK	<OK	<OK			<OK	<OK 4	<OK	<OK 4						
Ammonium Sulfate 8%	150 F														OK	OK
Ammonium Sulfate 8.3% pH 3.5	100 F			OK+		OK+			OK+	OK•	OK+		OK+	OK+		
Ammonium Sulfate 8.3% pH 3.5	150 F			OK+		OK+			F 3 6 Mo	F 3 6 Mo	OK•		OK+4	OK+4		
Ammonium Sulfate 65%	100 F	OK 4	OK	OK		OK		OK 4	OK 4	OK 4	OK 4	OK 4	OK 4	OK 4	OK 4	OK
Ammonium Sulfate 65%	150 F	OK+4	OK+4	OK+4		OK+4		F 5 10 Mo	OK+4	OK+4	OK+4	OK+4	OK+4	OK+4	OK+4	OK+4
Ammonium Sulfide 40-45%	100 F		OK	OK	OK			OK 4	OK 4	OK 4,7			OK 4	OK 4	OK 4	OK 4
Ammonium Sulfite 50%	70 F						OK 8 Mo	OK 8 Mo	OK 8 Mo	OK 8 Mo						
Ammonium Sulfite 50%	100 F												OK	OK		
Ammonium Thiocyanate 50%	100 F								OK	OK 4			OK 4	OK		
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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TD-2 CORROSION RESISTANCE TEST DATA

CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570
Ammonium Thiocyanate 55%	100 F		OK	OK	OK	OK		F 3 11 Mo	OK 4	OK 4	OK 4	OK 4			OK	OK
Ammonium Thiosulfate 60%	100 F	OK+		OK+		OK+		OK+4	OK+	OK+4	OK+				OK+	OK+
Ammonyx Cetac (Stepan Co.)	180 F	F 3,9 1 Mo	F 2 4 Mo	OK	OK	OK 4		F 1,3,9 24 H	F 1,3 3 Mo	F 3 2 Mo	F 3 2 Mo	F 3,8 3 Mo	F 3 10 Mo	F 3 10 Mo	OK 4	OK 4
Amyl Acetate	70 F			<OK			<OK	<OK	<OK	<OK					OK	OK
Aniline	205 F			OK 4	OK 4										F 5 1 Wk	F 5 1 Da
Animal Fat Solution 45%	180 F								OK	OK 4			OK 4	F 3 1 Yr		
Apple Butter	70 F									<OK						
Apple Concentrate	100 F	OK		OK	OK				OK	F 3 6 Mo			F 3 4 Mo	OK		
Apple Juice (MOTT'S)	150 F			OK	OK				OK 4	F 3 4 Mo		F 3 4 Mo				
Aqua Regia	70 F			F 5 6 Mo		F 5 2 Mo	F 5 1 Mo	F 5 1 Wk	F 5 3 Wk	F 5 3 Wk						
Arsenic Acid 50%	70 F						F 3 6 Mo	F 3,4 2 Wk	OK+1,7 6 Mo	OK+7 6 Mo						
Barium Chloride 50%	70 F						<OK	<OK	<OK	<OK						
Barium Hydroxide 50%	70 F						<OK	F 3 3 Wk	<OK	<OK						
Barium Nitrate 50%	70 F						OK 2 Wk	F 3 3 Wk	OK 2 Wk	OK 2 Wk					OK	
Barium Nitrate 50%	150 F														OK	
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570
Barium Sulfide 20%	150 F														OK	OK
Benzaldehyde	100 F			F 6 4 Mo				F 5 1 Da	F 5 1 Da				F 4.5 2 Wk	F 5 1 Da	OK 4	F 3.4 2 Wk
Benzene	100 F		OK	OK	OK	OK		OK 4	OK 4	F 3 1 Yr	OK 4	OK 4	OK 4	F 3 72 H	OK	OK
Benzene	150 F								F 1.3 2 Mo				OK 4	F 3 72 H	OK	OK
Benzene Sulfonyl Chloride 98.5%; Methanol 1.5%	100 F	F 3.9 24 H		OK 4	OK 4	OK 4		F 2.9 24 H	F 2.9 1 Wk	F 3 24 H	F 2.5 1 Wk	F 3 24 H	F 5 1 Yr	F 3.9 24 H	F 5 1 Yr	F 2 2 Wk
Benzoyl Chloride	100 F	F 1.3 4 Mo	F 5 2 Wk	OK+4		F 4.5 2 Mo	F 5 1 Mo	F 5 2 Wk	F 5 1 Mo	F 5 2 Wk						
Benzyl Chloride	100 F			OK+ 9 Mo		F 6 4 Mo			F 3 1 Wk	OK+4 9 Mo	F 3 2 Mo					
Benzyl Dichloride (Benzal Chloride)	100 F			OK 4 9 Mo		F 3 4 Mo			F 3 2 Mo	OK 4 9 Mo						
Borax Solution	70 F						<OK	<OK	<OK	<OK						
Boric Acid 1%	150 F	<OK	<OK	<OK	OK	<OK	<OK		<OK	<OK 4						
Boric Acid 3%	100 F					<OK			<OK	<OK						
Boric Acid 3%	150 F					<OK			<OK	<OK						
Boric Acid 25%	70 F					<OK+	<OK+	<OK•	<OK+	<OK•						
Boric Acid 25%	100 F												OK+	OK+	OK•	OK+
Brake Fluid (Gold Bond Heavy Duty)	100 F															OK
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570
Brake Fluid (DOT 3)	100 F												OK 4			
Brake Fluid HD557	100 F			<OK	OK	<OK		F 3 1 Wk	F 3 1 Wk							
Brake Fluid HD557	150 F			<OK	OK	<OK		F 3 1 Wk	F 3 1 Wk							
Brake Fluid Silicone SBF-1001	100 F		OK	OK	OK	OK		OK 4	OK	OK	OK	OK		OK 4	OK	OK
Brake Fluid Silicone SBF-1001	150 F		OK	OK	OK	OK		F 3,4 6 Mo	OK	F 3,4 6 Mo	F 3,6 1 Yr	OK 1,4		OK 4	OK	OK
Brewer's Yeast	40 F									<OK						
Brine Solution (SEE: Sodium Chloride)																
Bromochloromethane (Methylene Chlorobromide)	70 F			<OK			F 5 1/2 H	F 2,3 2 Wk	F 2,3 1 Da	F 5 1/2H						
Burgundy Wine (SEE: Wine Fortified)																
1,3-Butadiene Gas	100 F								OK**							
1,4 Butanediol (SEE: 1,4 Butylene Glycol)																
Butterscotch Topping	70 F			<OK		<OK				<OK						
n-Butyl Acetate	70 F			<OK			<OK	<OK 1,4	<OK 1,4	<OK 1						
n-Butyl Acetate	100 F				OK								OK		OK	OK
n-Butyl Acrylate	100 F	<OK 1		<OK	OK			<OK 1	<OK 1	<OK 1			OK	F 3 1 Wk	OK	OK
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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1.0.2 CORROSION RESISTANCE TEST DATA

CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570
n-Butyl Alcohol	70 F			<OK			<OK 1	<OK 1	<OK 1	<OK 1						
n-Butyl Alcohol	100 F				OK			OK 1					OK	OK	OK*	OK
Butyl Alcohol 10%; Ammonium Hydroxide 5%	180 F			F 3 2 Mo				FC/F 3 4 Da								
Butyl CARBITOL® (SEE: Diethylene Glycol Monobutyl Ether) (Union Carbide)																
Butyl CELLOSOLVE® (SEE: Ethylene Glycol Monobutyl Ether) (Union Carbide)																
Butyl FORMCEL® (Celanese)	70 F			<OK			F 1.3 4 Mo	<OK 1	F 1.3 4 Mo	F 1.3 1 Mo						
Butyl Oxitol (Shell)	100 F	F 1.3 1 Wk	F 3 4 Mo	OK	OK	F 6 1 Yr		F 2 24 H	F 2.3 6 Mo	F 2.3 6 Mo	F 3 24 H	OK 1	OK 4	F 3 1 Wk	OK	OK
Butylamine	100 F	F 5 1 Da		F 3 1 Yr		F 5 2 Mo		F 5 1 Da	F 5 1 Da	F 5 1 Da	F 5 1 Da	F 5 1 Da	F 5 1 Da	F 5 1 Da	F 5 1 Mo	F 5 1 Da
Butylamine 50%	100 F	F 3 1 Da		F 3 8 Mo		F 3 4 Mo		F 3 1 Da	F 3 1 Da	F 3 1 Da	F 3 1 Da	F 3 1 Da	F 3 1 Da	F 3 1 Da	F 3 4 Mo	F 3 1 Wk
1,3-Butylene Glycol	100 F	<OK		<OK	OK			<OK	<OK	<OK						
1,4-Butylene Glycol (1,4-Butanediol)	100 F	OK		OK	OK			F 3 8 Mo	OK	OK	OK	OK	OK	OK	OK	OK
1,4-Butylene Glycol (1,4-Butanediol)	150 F	OK		OK	OK				OK	OK	OK	OK	OK	OK	OK	OK
Butyraldehyde	100 F			OK	OK	F 3 6 Mo		F 3.5 2 Da	F 3.5 2 Da	F 3.5 2 Da	F 3.5 2 Da	F 3.5 1 Wk	F 3 2 Wk	F 3 2 Wk	OK 4	F 3 2 Mo
Butyraldehyde	150 F			<OK	OK				F 3 1 Da							
Butyric Acid	70 F			<OK+			F 5 2 Da	F 5 2 Da	F 5 2 Da	F 5 1 Wk						
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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TD-2 CORROSION RESISTANCE TEST DATA

CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570
Butyric Acid	100 F			OK	OK										OK	OK
Butyric Acid	150 F														F 3,4 8 Mo	F 3,4 2 Wk
Butyric Acid 5%	100 F	F 3 1 Da							F 3 1 Wk	F 1,3 1 Da			F 3 1 Da	F 3 1 Wk	OK	OK
Butyric Acid 50%	100 F	F 5,6 1 Da							F 3,6 1 Da	F 5 1 Da			F 5 1 Da	F 3,6 1 Da		F 3 1 Mo
Butyrolactone	100 F			OK	OK			F2,3,9 1 Da	F2,3,9 1 Da				F 5 1 Mo		OK	F 5 6 Mo
Calcium Carbonate (Dry)	100 F	OK							OK**					OK		
Calcium Carbonate (Saturated)	100 F													OK**		
Calcium Bromide 10%	100 F	OK						OK	OK	OK 4						
Calcium Chloride 40%	212 F			<OK			OK 2 Mo	OK 2 Mo	OK 2 Mo	OK 2 Mo						
Calcium Chloride 50%	70 F			<OK		<OK	<OK	<OK	<OK**	<OK						
Calcium Chloride 50%	100 F												OK	OK		OK
Calcium Hydroxide 5%	100 F								F 3 10 Mo							
Calcium Hydroxide 10%	100 F	F 3 9 Mo		<OK	OK 4	<OK	F 3 6 Mo	F 3 5 Mo	F 3 2 Da	<OK	F 3 2 Da	<OK	F 3 2 Mo	OK	OK	OK
Calcium Hydroxide 10%	150 F	F 3 4 Mo		OK 4	OK 4	<OK	F 3 3 Mo		F 3 2 Da	F 3 4 Mo	F 3 2 Da	<OK	F 3 1 Da	F 3 10 Mo	OK	OK
Calcium Hydroxide 25%	100 F	F 3 6 Mo		<OK		<OK	F 3 3 Mo	<OK	F 3 2 Da	F 3 1 Mo	F 3 2 Da	<OK	F 3 1 Mo	OK	OK	OK
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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Calcium Hydroxide 25%	150 F	F 3 2 Mo		<OK		<OK	F 3 2 Wk	<OK	F 3 2 Da	F 3 4 Mo	F 3 2 Da	<OK	F 3 1 Yr	F 3,4 10 Mo	OK	OK
Calcium Hydroxide 50%	100 F	F 3 1 Yr		<OK		<OK	F 3 3 Mo	F 3 5 Mo	F 3 2 Da	F 3 1 Mo	F 3 2 Da	<OK	F 3 1 Mo	OK	OK	OK
Calcium Hydroxide 50%	150 F	F 3 5 Mo		OK		OK	F 3 3 Mo	OK	F 3 2 Da	F 3 4 Mo	F 3 2 Da	OK	F 3 1 Mo	F 3,4 10 Mo	OK	OK
Calcium Hypochlorite 1%	70 F	F 3 4 Mo							F 3 2 Mo	F 3 2 Mo		OK				
Calcium Hypochlorite 5%	70 F						F 5 2 Wk	F 5 4 Da	F 5 2 Wk	F 5 1 Wk						
Calcium Hypochlorite 15%	100 F	OK+4							F 3,4 1 Yr	F 3,4 6 Mo		F 3,4 4 Mo	F 3,4 4 Mo			OK+4
Calcium Lignosulfonate	100 F		OK	OK		OK	OK 4		F 3 6 Mo	F 3,4 8 Mo	F 3 6 Mo	F 3,4 8 Mo	OK	OK	OK	OK
Calcium Lignosulfonate	150 F		F 2 6 Mo	OK		OK 4	F 3,4 2 Wk		F 3,4 2 Wk	F 3,4 2 Wk	F 3,4 2 Wk	F 3,4 2 Wk	F 3,4 4 Mo	F 3,4 4 Mo	F 3,4 8 Mo	OK 4
Canola Oil (Canbra Foods)	100 F			OK	OK				OK	OK 4		OK	OK 4	OK	OK	OK
Canola Oil, Crude (Canbra Foods)	100 F			OK	OK				OK	OK 4		OK	OK 4	OK 4	OK	OK
Caprolactam, Molten - BASF (2-oxohexamethyleneimine)	200 F			OK	OK	F 5 1 Wk		F 3,5 24 H	F 5 24 H	F 5 24 H	F 3,5 24 H	F 3,5 24 H	F 5 24 H	F 5 24 H	F 5 1 Mo	F 5 1 Wk
Caproic Acid	100 F														OK	OK
Caproic Acid	150 F														OK 4	OK 4
Caramel Coloring, pH 2.5 to 3.5 (Sethness)	120 F			OK	OK				F 3 6 Mo	F 3,4 6 Mo		F 3,4 10 Mo	F 3,4 1 Yr	OK	OK	
Caramel Coloring, pH 2.8 to 3.2	150 F	F 3 6 Mo		OK	OK					F 3 1 Yr						
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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TD-2 CORROSION RESISTANCE TEST DATA

CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570
Carbon Disulfide	100 F		OK	OK	OK	OK	F 3 18 H	F 1,3 3 Wk	F 3 18 H	F 3,4 4 Mo	F 3,4 5 Mo	F 3 2 Mo	F 3 1 Wk	F 3 72 H	OK	OK
Carbon Tetrachloride	100 F		F 6 6 Mo	OK**	OK	<OK	F 3 6 Mo	<OK	<OK				OK		OK	OK
Carbon Tetrachloride	130 F					OK			OK	F 3 1 Mo					OK	OK
Castor Oil	70 F			<OK		<OK				<OK			OK	OK	OK	OK
Cation Exchange Water (SEE: Water, Demineralized)																
Caustic Liquor	100 F	F 3 2 Mo	<OK	F 5 1 Wk			F 2 6 Mo	F 3 1 Da	F 3 1 Mo	<OK 4						
Cell Liquor (SEE: Sodium Chloride 14%; Sodium Hydroxide 10%)																
CELLOSOLVE® (SEE: Ethylene Glycol Monoethyl Ether)																
CELLOSOLVE® Acetate (SEE: Ethylene Glycol Monoethyl Ether Acetate)																
Cherry Soda Concentrate 70%	70 F			<OK		<OK				<OK						
Chlorine 500 ppm in water	100 F								F 3 6 Mo							
Chlorine Water 0.4%	70 F						F 1,3 2 Wk	F 3 2 Da	F 3 6 Mo	F 5 1 Mo						
2-Chloro, 4-Nitrotoluene	212 F		F 3 2 Da	OK	OK	OK 4						F 1,3,9 2 Mo			OK 4	
Chloroaniline	70 F						F 5 4 Da	F 3 4 Da	F 5 18 H	F 3 1 Wk						
Chlorobenzene	70 F			OK	OK								OK	F 3 2 Mo	OK	OK
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570
Chloroform	70 F			<OK**			F 3 12 H	F 2 10 Mo	F 3 12 H	F 3 12 H					[illegible]	
Chloroform	100 F			OK	OK				F 5 1 Da				F 5 1 Da		OK[illegible]	
Chlorosulfonic Acid	70 F						F 5 5 Min	F 5 7 Min	F 5 5 Min	F 5 5 Min						
CHLOROTHENE ® (SEE: 1,1,1-Trichloroethane)																
CHLORWAX 40 ®	100 F	OK 10 Mo		OK 10 Mo		OK 10 Mo		OK 10 Mo	OK 10 Mo	OK 10 Mo						
Chocolate Syrup	70 F			<OK		<OK										
Choline Chloride 70%	100 F			<OK					<OK	<OK						
Chromic Acid 10%	70 F			<OK+			F 5 3 Da	F 5 3 Da	F 5 3 Da	F 5 3 Da						
Chromic Acid 10%	100 F			OK+4	OK+4								F 4.8 2 Da	F 4.8 2 Da	OK+	
Chromic Acid 20%	100 F														OK+4.7	
Chromic Acid 25%	180 F														F 5 1 Da	
Chromic Acid 30%	70 F			<OK+			F 5 3 Da	F 5 3 Da	F 5 3 Da	F 5 3 Da						
Chromic Acid 50%	70 F			<OK+			F 5 3 Da	F 5 3 Da	F 5 3 Da	F 5 3 Da						
Chromic Acid 75%	180 F			F 8 1 Da	F 8 1 Da										F 5 1 Da	
Chromium Trioxide (Dry)	180 F			F 2 1 Da	F 2 1 Da										F 2 1 Da	
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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10-2 CORROSION RESISTANCE TEST DATA

CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570
Citric Acid 10%	100 F												F 3 2 Mo		OK+	
Citric Acid 25%	100 F														OK+	
Citric Acid 50%	70 F						<OK+	<OK+	<OK+	<OK+						
Citric Acid 50%	100 F												OK 4	OK 4	OK	OK
Clay (Saturated)	100 F								OK**					OK**		
Cobalt Acetate 40%	150 F														F 3 1 Yr	OK
Coconut Oil Refined Edible (COBEE 76®)	150 F	<OK		<OK	OK	<OK	<OK	<OK	<OK	<OK						
Cod Liver Oil	70 F			<OK		<OK				<OK						
Coffee, Instant Freeze Dried 26% (Gen. Foods)	100 F			<OK		<OK			<OK	<OK						
Cola Concentrate (COKE®)	70 F			OK**		<OK				<OK						
Cola Concentrate (RC®)	70 F			<OK		<OK				<OK						
Condensed Milk	70 F			<OK		<OK				<OK						
Copper Acetate 50%	70 F			<OK			OK 8 Mo	F 1.3 1 Mo	F 3 2 Mo	F 3 2 Mo						
Copper Chloride 50%	70 F						OK 4 8 Mo	OK 4 8 Mo	OK 4 8 Mo	OK 4 8 Mo						
Copper Liquor	180 F	<OK		<OK		<OK	<OK	<OK	<OK	<OK						
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570
Copper Sulfate 10%	100 F			<OK+		<OK+	<OK+	<OK+	<OK+	<OK+						
Copper Sulfate 10%	150 F			<OK+		<OK+	<OK+	<OK+	<OK+	<OK+						
Copper Sulfate 20%	100 F	<OK+	<OK+	<OK+		<OK+	<OK+	<OK+4	<OK+	<OK+						
Copper Sulfate 50%	100 F		<OK+	<OK+		<OK+	<OK+	<OK+	<OK+	<OK+			OK 4	F 3 1 Yr		
Copper Sulfate 50%	150 F		<OK+	<OK+		<OK+	<OK+	<OK+	<OK+	<OK+						
Corn Oil	100 F	OK	OK	OK	OK	OK			OK	OK		OK	OK	OK	OK	OK
Corn Oil	180 F	OK	OK	OK	OK	OK			OK	OK		OK	OK	OK	OK	OK
Corn Oil (MAZOLA®)	70 F			<OK		<OK				<OK					OK	OK
Corn Oil (MAZOLA®)	150 F	OK		OK	OK	OK		OK	OK 4	OK	OK	OK	OK	OK	OK	OK
Corn Oil (MAZOLA®)	210 F			OK	OK				F 1,3 1 Yr						OK	OK
Corn Steep Liquor	100 F									<OK						
Corn Steep Liquor	150 F									F 3 4 Mo						
Corn Syrup	150 F			<OK		<OK				OK**			OK 4	OK 4	OK	
Corn Syrup, Fructose Corn Syrup, Hi Fructose	100 F									OK**					OK	
(ISOMEROSE 100®) Clinton Corn Products	100 F									OK**4			OK 4	OK		
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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TD-2 CORROSION RESISTANCE TEST DATA

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Corn Syrup, High Fructose (ISOMEROSE 100®) Clinton Corn Products	150 F									OK			OK 4		OK	OK
Corn Syrup, High Fructose (ISOMEROSE 550®) Clinton Corn Products	100 F	OK		OK	OK					OK**4		OK	OK 4	OK		
Corn Syrup, High Fructose (ISOMEROSE 550®) Clinton Corn Products	150 F									OK			OK 4		OK	OK
Cough Syrup (VICKS®)	70 F			<OK			<OK	<OK	<OK	<OK						
Cransweets	70 F									<OK						
Creosote Oil 97%	100 F			OK					OK 4				OK 4		OK	OK
Creosote Oil 97%	150 F			OK					F 2,9 1 Mo				OK 4		OK	OK
Mono-butyl-meta-Cresol	150 F			OK	OK										OK	OK 4
Mono-butyl-meta-Cresol	180 F			OK 4	OK 4										F 7 1 Yr	F 7 1 Yr
Cresylic Acid	100 F	F 3 1 Da	F 3,5 2 Mo	OK	OK	OK		F 5 1 Da	F 5 1 Wk	F 5 1 Wk	F 3,5 1 Da	F 5 1 Da	F 8 2 Wk	F 3,5 1 Da	OK	OK 4
Cresylic Acid	150 F	F 5 1 Da	F 5 1 Wk	OK	OK	F 3,5 1 Mo		F 5 1 Da	F 5 1 Da	F 5 1 Da	F 5 1 Da	F 5 1 Da	F 5 1 Wk	F 5 1 Da	F 5 2 Mo	F 5 2 Wk
Cumene (Witco)	100 F			OK		OK						OK	OK	OK	OK	OK
Cutting Oil	140 F			<OK		<OK	<OK	<OK	<OK	<OK						
Cyclohexane	70 F			<OK												
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570
Cyclohexanone	100 F	F 5 2 Wk		<OK	OK			F 5 1 Wk	F 5 4 Mo							
Cyclohexene	70 F			<OK				<OK 1								
Cyclohexene	100 F			OK	OK								OK 4 8 Mo	F 1.3 1 Mo	OK	OK 8 Mo
Cyclohexylamine	100 F												F 2 1 Da	F 5 1 Da		F 5 2 Mo
Decyl Alcohol (1-Decanol)	70 F			<OK	OK	<OK	<OK	<OK	<OK	<OK			OK		OK	OK
DESMOPHEN 670-90® Mobay Chemical	150 F			OK				F 3 1 Yr	OK	F 2.4 1 Yr	OK 4	F 4.5 1 Yr	OK	OK 4	OK	OK
DESMOPHEN 800® Mobay Chemical	150 F			OK				OK 4	OK	OK 4	OK 4	F 2.9 1 Yr	OK 4	OK 4	OK	OK
Detergent (CHIFFON®)	150 F	<OK					<OK		<OK	<OK					OK	OK
Detergent (JOY®)	100 F	OK		OK		OK		OK	OK	OK						
Detergent (JOY®)	150 F	F 3 1 Yr		OK 4		OK		F 3 2 Wk	OK	F 3 1 Mo	F 3 1 Yr					
Detergent (PALMOLIVE®)	100 F	OK		OK		OK		OK 4	OK	OK 4	OK					
Detergent (PALMOLIVE®)	150 F	OK		OK		OK		OK 4	OK	F 3 1 Yr	F 3 1 Yr					
Detergent 10% (FAB®)	180 F			F 3 7 Mo			<OK		<OK						OK	OK
Detergent Paste (TIDE®)	70 F			<OK		<OK	<OK	F 3 3 Wk	F 3 2 Wk	<OK					OK	OK
Detergent 1% (TIDE®)	180 F		<OK						<OK	<OK					OK	OK
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Deacetone Alcohol	70 F			<OK		<OK		<OK	<OK	<OK			OK		OK	OK
1,2-Diaminopropane	70 F			OK 8 Mo			F 5 1 Da	F 5 1 Da	F 5 1 Da							
1,2-Dibromo 1,1-Dichloroethane	100 F												OK		OK	OK 4
1,2-Dibromoethane	100 F												OK 4		OK	OK 4
Dibutyl Phthalate	70 F			<OK		<OK	<OK	<OK	<OK				OK		OK	OK
Dichlorobutane	100 F							OK**								
Dichlorodintene	100 F			OK**	OK											
1,2-Dichloroethane	100 F												OK		OK	OK
Diesel Fuel	100 F							OK**	OK**				OK 4	OK 4	[illegible]	OK
Diethanolamine	100 F	OK	OK	OK	OK		OK	F 3 2 Wk	OK	OK			OK	OK 4	OK	OK
Diethanolamine	150 F	F 3 6 Mo	OK	OK 4	OK4	OK	F 3 1 Mo	F 3 5 Da	F 3 1 Mo	OK						
Diethyl Ether	70 F												OK		OK	OK
Diethyl Sulfate	100 F		F 2 6 Mo	<OK	OK			F 2 6 Mo	F 2 6 Mo	F 2 4 Mo						
Diethylene Glycol (Shell)	100 F	F1,3,9 2 Wk	OK	OK	OK	OK		F 1,9 24 H	F 3 6 Mo	OK	F 1,3 1 Wk	OK	OK 4	OK	OK	OK
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CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570
Diethylene Glycol	150 F		F 3 1 Yr	OK	OK			F 3,4 72 H	F 2,3 2 Mo		F 3 72 H	F 3,4 2 Mo	F 3,4 10 Mo	F 3,4 2 Mo	OK 4	OK 4
Diethylene Glycol	270 F			<OK 4			F 3,5 1 Wk	F 1,3 1 Wk	F 3,5 1 Wk				F 3,4 2 Mo	F 3,4 2 Wk		
Diethylene Glycol 50%	70 F						<OK	<OK	<OK	<OK						
Diethylene Glycol 50%	100 F												OK	OK		
Diethylene Glycol Mono-butyl Ether (Butyl CARBITOL®)	100 F	F 1,3 1 Mo		<OK	OK			F 1,3 1 Wk	F 2 4 Mo	F 2,4 4 Mo						
Diethylenetriamine	70 F						F 5 3 Da	F 5 3 Da	F 5 3 Da	F 5 3 Da			F 5 2 Wk	F 5 4 Da	F 5 3 Mo	F 5 12 Da
Diethylenetriamine	100 F	F 5 1 Da		OK	OK			F 5 1 Da	F 5 1 Da	F 5 1 Da	F 5 1 Da	F 5 1 Da	F 3 1 Da	F 3 1 Da	F 5 4 Mo	F 3 1 Wk
Diethylenetriamine	150 F	F 5 1 Da		F 3 10 Mo		F 3 10 Mo		F 5 1 Da	F 5 1 Da	F 5 1 Da	F 5 1 Da	F 5 1 Da	F 5 1 Da	F 5 1 Da		F 5 1 Da
Difluorophosphoric Acid	70 F						F 3 1 Da	F 3 1 Da	F 3 1 Da	F 3 1 Da						
Diisopropanolamine	100 F							F 1,3 4 Mo								
Dimethylacetamide	Amb.							F 2,3 1 H	F 2,3 1 H				F 5 2 Wk			
Dimethylacetamide	212 F			F 5 2 Wk	F 5 2 Wk								F 5 4 H			
Dimethylamine 1%	100 F		F 3 1 Yr	OK 4					F 3 4 Mo	F 3 1 Mo		OK	F 3 4 Mo	OK	OK 4	OK
Dimethylamine 25%	100 F												F 3 1 Mo		OK	F 3 1 Mo
Dimethylethanolamine (Dimethylaminoethanol)	70 F			<OK			F 3 2 Wk	F 1,3 18 H	F 3,5 3 Da	<OK 1						
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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Dimethylformamide (Tech.)	70 F			<OK			F 5 12 H	F 5 12 H	F 5 12 H	F 5 12 H					F 5 2 Wk	F 5 72 H
Dimethylformamide	100 F			OK 4	OK 4								F 5 1 Da		F 5 2 Wk	F 5 1 Da
2-6 Dimethyl Phenol	150 F			OK	OK 4										F 2 1 Yr	F 5 1 Wk
Dimethyl Sulfoxide	100 F			OK 4	OK 4								F 5 1 Da		F 5 1 Mo	F 5 1 Da
Dioctyl Phthalate	140 F			<OK	OK		OK 7 Mo	OK 4 7 Mo	OK 7 Mo	OK 7 Mo			OK 4	OK	OK	OK
Dipropylene Glycol	100 F	<OK		<OK	OK	<OK		<OK 1	<OK 1	<OK 1,4			OK 4	OK	OK	OK
Dipropylene Glycol	150 F	F 2,4 4 Mo		<OK	OK	<OK				F 3,4 2 Mo			F 3,4 1 Yr	F 3 2 Mo		
Dipropylene Glycol Monomethyl Ether (DPM)	100 F	F 3 3 Wk		OK	OK	OK		F 2 72 H	OK 1			F 2 72 H	OK	F 3 3 Wk	OK	OK
Disodium Phosphate 5% (SEE: Sodium Phosphate, Di-Basic)																
Effluent Glycol	100 F			<OK				<OK 4								
EMERY 3004	150 F	OK		OK	OK				OK	OK	OK	OK	OK	OK	OK	OK
EMERY 3004	210 F			OK	OK										OK	OK
Epichlorohydrin	100 F			<OK	OK			FC/F 3 2 Da					F 3,4 2 Mo		F 3 6 Mo	F 5 5 Mo
Epichlorohydrin	150 F			<OK	OK			FC/F 3 2 Da					F 5 1 Da		F 5 1 Wk	F 5 1 Da
Ethanol (SEE: Ethyl Alcohol)																
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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Ethanolamine (Monoethanolamine)	100 F		F 3 2 Wk	F 5 6 Mo	F 3 1 Yr		F 3 5 Da	F 3 5 Da	F 3 2 Mo	F 3 2 Mo				F 3 4 Da	OK 1,4	F 5 2 Wk
Ethanolamine (Monoethanolamine)	150 F	F 3 5 Da	F 5 5 Da	F 5 1 Wk			F 3 5 Da	F 3 5 Da	F 3 5 Da	F 3 5 Da						F 5 1 Mo
Ethyl Acetate	70 F			<OK		<OK	<OK 1	<OK 1	<OK 1	<OK 1						<OK
Ethyl Acetate	100 F				OK								OK 4	F 3 2 Da	OK	
Ethyl Acrylate	70 F			<OK			<OK 1	<OK 1	<OK 1	<OK 1					OK	OK
Ethyl Alcohol	100 F		<OK	<OK	OK	<OK	F 3 6 Mo	<OK	OK 1	<OK 1	F 3 1 Wk	F 3,4 10 Mo	OK	F 3 1 Wk	OK	OK
Ethyl Alcohol	150 F		<OK	<OK	OK	<OK	F 3 6 Mo	<OK	F 3 1 Da	<OK 1			F 3,4 8 Mo	F 3 2 Da	OK	OK
Ethyl Alcohol 5%	100 F			<OK	OK										OK	OK
Ethyl Alcohol 5%	150 F			<OK	OK										OK	OK
Ethyl Alcohol 10%	100 F			<OK	OK								OK	OK	OK	OK
Ethyl Alcohol 10%	150 F			<OK	OK								F 3,4 4 Mo	F 3,4 4 Mo	OK	OK
Ethyl Alcohol 20%	100 F			<OK	OK								<OK		OK	OK
Ethyl Alcohol 20%	150 F			<OK	OK								<OK		OK	OK
Ethyl Alcohol 50%	212 F			OK	OK											
Ethyl Chloroformate	100 F														F 9 8 Mo	F 6 2 Wk
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Ethyl Silicate	100 F			OK**	OK	<OK		<OK	<OK						OK	OK
Ethyl Thiochloroformate	100 F			OK 4	OK			F 5 1 Wk	F 5 1 Wk	F 4.5 1 Wk	F 3.4 1 Wk	F 3.4 1 Wk	OK 4	F 3.4 1 Wk	OK 4	F 3 1 Wk
Ethylamine 70%	70 F						F 1.3 1 Mo	F 3 18 H	F 1.3 2 Da	F 3 18 H						
Ethylamine 70%	100 F														F 5 1 Wk	F 6 1 Da
Ethylene Dibromide	100 F	OK 1							OK 1	OK 4	OK					
Ethylene Dichloride	100 F			<OK	OK		F 1.3 2 Mo	<OK 1	F 1.3 1 Da	F 5 1 Da	F 2.3 1 Da		FC OK 4	F 3 2 Da	OK	OK
Ethylene Glycol	100 F	F 3.4 1 Yr	OK	OK**	OK	OK		F 3 8 Mo	OK**	OK	F 3 1 Yr	OK	OK	OK	OK	OK
Ethylene Glycol	150 F	F 3 1 Mo	OK	OK	OK	OK		F 3 2 Wk	F 3 1 Yr	F 3 4 Mo	F 3 2 Wk	F 3 2 Wk	OK 4	OK 4		OK
Ethylene Glycol	200 F			OK 4	OK 4										OK	F 3 10 Mo
Ethylene Glycol	210 F														OK 4	
Ethylene Glycol	250 F		F 2.3 2 Mo	F 3 9 Mo		F 3 9 Mo		F 3 48 H	F 3 1 Wk	F 3 48 H	F 3.4 1 Wk					
Ethylene Glycol 30%	210 F			OK	OK			F 3 1 Yr				F 3 1 Yr	OK 4	F 3 1 Yr	OK	OK
Ethylene Glycol 50%	70 F			<OK		<OK	<OK	<OK	<OK	<OK						
Ethylene Glycol 50%	100 F												OK 4	OK 4	OK	OK
Ethylene Glycol 50%	150 F			OK	OK						OK**				OK	OK
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Ethylene Glycol Mono-butyl Ether (Butyl CELLOSOLVE®)	70 F			<OK	OK		F 1,3 2 Wk	OK 1	F 1,3 5 Mo	<OK 1					OK	
Ethylene Glycol Mono-butyl Ether (Butyl CELLOSOLVE®)	100 F	F 3 1 Wk	F 3 1 Wk	OK	OK	F 6 1 Yr		F 2,3 2 Mo	F 2,3 2 Mo	F1,3,4 2 Mo	F 3 72 H	F 5 72 H	F 2 8 Mo	F 3 1 Wk	OK	OK
Ethylene Glycol Mono-ethyl Ether (CELLOSOLVE®)	100 F	F 3 72 H	F 1,3 1 Mo	OK	OK	F 3 1 Yr		F 3 72 H	F 3 72 H	F 2,3 2 Mo	F 3 72 H	F 5 72 H	F 3 4 Mo	F 3 72 H	OK	F 5 1 Yr
Ethylene Glycol Mono-ethyl Ether Acetate (CELLOSOLVE® Acetate)	100 F	<OK 1		<OK	OK	<OK		<OK 1	<OK 1	<OK 1						
Ethylene Glycol Mono-methyl Ether (Methyl CELLOSOLVE®)	100 F	F 3 72 H	F 3 1 Wk	OK	OK	F 3 6 Mo		F 3 72 H	F 2,3 2 Mo	F2,3,4 2 Mo	F 3 72 H	F 3 72 H	F 3 4 Mo	F 3 72 H		F 5 4 Mo
Ethylene Glycol Mono-propyl Ether (EP) (Propyl CELLOSOLVE®)	100 F	F 3 72 H		OK	OK	OK		F 2 72 H	F 2 3 Wk			F 2,4 72 H	OK 4	F 3,4 72 H	OK	OK
Ethylenediamine	70 F						F 5 3 Da	F 5 3 Da	F 5 3 Da	F 5 3 Da						
Ethylenediamine	100 F				F 3 4 Mo								F 5 1 Da	F 5 1 Da	OK 4	F 5 2 Wk
Ethylenediamine-tetraacetic acid (VERSENE 100®)	100 F	<OK		<OK 7		<OK			<OK	<OK		<OK			OK	OK
Ethylenediamine-tetraacetic acid (VERSENE 100®)	150 F		F 3 6 Mo					<OK1,4	F 1,3 6 Mo	<OK 1					OK	OK
2-Ethylhexanol	100 F	<OK		<OK	OK			<OK	<OK	<OK					OK	OK
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2-Ethylhexyl Acrylate	100 F	<OK		<OK	OK			<OK	<OK	<OK						
2-Ethylhexyl Chloro-formate	100 F			OK**	OK											
Fatty ester (Septan C-65) BASF	Amb.	OK 4	OK	OK	OK	OK		OK	OK	OK	OK	OK	OK	OK	OK	OK
Ferric Ammonium Citrate Solution	100 F			OK+	OK			OK+	OK+	OK+4						
Ferric Chloride 40%	150 F			<OK+4					<OK+4	F 3,4 4 Mo			F 3,4 6 Mo	F 3,4 1 Mo	OK+	OK+
Ferric Chloride 50%	70 F			<OK+			<OK+	F 3 3 Mo	<OK+	<OK+						
Ferric Chloride 50%	100 F												F 3,4 10 Mo			
Ferrous Sulfate 50%; Hydrochloric Acid 2%	100 F	<OK+	<OK+	<OK+			<OK+	<OK+4	<OK+	<OK+						
Fertilizer (Dry)	100 F	OK**							OK**							
Fertilizer (Liquid)	100 F								OK**							
Fish Oil	180 F	OK 4		OK	OK	OK		OK	OK 4	OK 4	OK 4					
Fluoboric Acid 10%	100 F								F 3 3 Mo	F 1,3,5 1 Mo			F 3 6 Mo	F 3,9 3 Mo		
Fluoboric Acid 10%	150 F								F 3 1 Wk	F 3,5 24 H			F 3 1 Wk	F 3,9 1 Wk		
Formaldehyde 37%	100 F			OK**	OK	OK	F 3 1 Mo	F 3 4 Mo	F 3 2 Mo				F 3 3 Mo	F 3 6 Mo	OK	OK
Formaldehyde 37%	150 F			OK 4	OK		F 1,3 2 Da		F 1,3 1 Da	F 1,3 1 Da			F 3 2 Wk		F 3,4 1 Yr	F 4,10 1 Yr
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Formaldehyde 40% Sol. In Isobutyl Alcohol	100 F	F 3 2 Wk		<OK	OK			F 2,3 1 Mo	F 3 2 Mo	F 2,5 2 Wk						
Formaldehyde 50%	100 F			OK	OK											
Formaldehyde 50%	150 F			OK	OK										F 3 8 Mo	
Formaldehyde Uninhibited 50%	170 F			OK	OK											OK 8 Mo
Formaldehyde 50%; Methanol 1%	100 F			OK	OK											
Formic Acid 10%	70 F			OK+			F 2,3 3 Da	F 2,3 3 Da	F 2,3 1 Wk	F 2 3 Da						
FREON MF® (DuPont)	70 F			<OK				<OK	<OK							
FREON TF® (DuPont)	70 F			<OK				<OK	<OK							
Fuel Oil	100 F			<OK	OK	<OK		OK**	OK**				OK	OK	OK	OK
Furfural	70 F			<OK			F 1,3 2 Wk	F 1,3 2 Wk	F 1,3 2 Wk	F 2,5 3 Mo						
Furfuryl Alcohol	70 F			<OK			F 3 1 Wk	F 1,3 1 Mo	F 3 1 Wk	F 1,3 1 Mo						
Furfuryl Alcohol	100 F				OK								F 5 2 Wk		OK	
Furfuryl Amine	70 F			<OK			F 5 1 Wk	F 5 1 Wk	F 5 1 Wk	F 5 1 Wk						
Gasoline (Leaded)	100 F	<OK		<OK	OK	<OK	<OK	OK**	OK**	<OK			OK 4		OK	<OK
Gasoline (Leaded)	150 F	<OK		<OK	OK	<OK	<OK		<OK						<OK	OK
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Gasoline (Premium-No Lead)	100 F	OK	OK	OK	OK	OK	OK	OK	OK	OK		OK 1,4	OK 4	OK	OK 4	OK
Gasoline (Unleaded) 80% Methanol 20%	100 F	F 2 2 Wk	F 2,3 2 Wk	OK	OK	OK		F 2 72 H	F 3 72 H	F 5 72 H	F 3 72 H	F 2,3 72 H	OK 1	F 3 72 H	OK	OK
Gasoline (Unleaded) 90% Ethanol 10%	100 F	OK 1	F 1,3 72 H	OK	OK	OK		OK 1	OK 1	F 3 72 H		F 2 72 H	OK 4	F 3 72 H	OK	OK
Gasoline (Unleaded) 90% Methanol 10%	100 F	F 2 72 H	F 1,3 2 Wk	OK	OK	F 3 8 Mo		F 2 72 H	F 2 72 H	F 5 72 H	F 3 72 H	F 2 72 H	OK 1,4	F 3 24 H	OK	OK
Gasoline (Unleaded) 95% Methanol 5%	100 F	F 2 72 H	F 2 72 H	OK	OK	OK		F 2 72 H	F 2 72 H	F 5 72 H	OK 4	F 2 72 H	OK 4	F 3 72 H	OK	OK
Gasoline (White)	70 F			<OK		<OK	<OK	<OK	<OK	<OK					OK	OK
Gin, 80 Proof	100 F			OK	OK					F 3 1 Wk			OK 4	F 3 6 Mo	OK	OK
Gluconic Acid 50%	70 F									<OK 4						
Gluconic Acid 50%	140 F									<OK 4						
Glucose	70 F			<OK	OK	<OK				<OK						
Glycerine (Glycerol)	70 F			OK**		<OK	OK 9 Mo	OK 9 Mo	OK 9 Mo	OK 9 Mo						
Glycerine (Glycerol)	100 F				OK								OK	OK		
Glycerine (Glycerol)	200 F			<OK	OK	<OK	<OK	<OK 4		<OK 4						
Glycidyl Phenyl Ether	70 F			<OK			F 2,5 2 Mo	F 2,5 1 Mo	F 2,5 2 Mo	F 2,5 1 Mo						
Glycolic Acid 70% (SEE: Hydroxyacetic Acid)																
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Glyoxal Resin (SUNKEM #183®)	100 F			<OK			<OK	<OK	<OK	<OK						
Glyoxal 30%	70 F		OK	OK	OK		OK 4	OK 4	OK	OK 4						
Grape Juice	100 F								OK**	OK						
Grape Pop Conc.	70 F									<OK						
Grapefruit Juice (Fresh)	40 F									<OK						
Grapefruit Juice (Fresh)	100 F									F 3 1 Yr			F 3,4 1 Yr	OK		
Grapefruit Juice (Fresh Concentrate	150 F									F 3 6 Mo			F 3,4 8 Mo	F 3,4 8 Mo		
Grapefruit Juice (MINUTE MAID®)	40 F									<OK						
Grapefruit Juice (MINUTE MAID®)	100 F								OK 4	F 3 1 Yr						
Grapefruit Juice (MINUTE MAID®)	150 F									F 3 6 Mo						
Halogenated Polyester Resin (Co-Rezyn 1664®) Inter-plastic Corp.	Amb.			OK					F 1,3 1 Yr				OK			OK
Heptane	70 F			OK	OK			OK					OK		OK	OK
Heptanoic (Heptoic) Acid	120 F	F 3 2 Wk	F 3 2 Wk	<OK		<OK	F 3 2 Wk	F 2 1 Wk	F 3 2 Wk	F 3 2 Wk						
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Heptanoic (Heptoic) Acid 10%	100 F												F 3 2 Wk	F 3 6 Mo	OK	OK
Heptanoic (Heptoic) Acid 10%	150 F														OK	OK
Herbicide (BASAGRAM®) BASF	100 F			OK 4	OK 4				OK			OK 4	OK 4	OK 4	OK	OK
Herbicide (Blazer®) BASF	Amb.	OK	OK	OK	OK	OK		OK	OK	OK 4	OK	OK	OK	OK	OK	OK
Hexane	100 F			OK	OK			OK	OK						OK	OK
Hexane Sulfonic Acid	150 F			OK 4	OK	OK		F 2,4 4 Mo	F 2 2 Mo	F 2,5 2 Mo						
Hexylene Glycol	100 F	<OK		<OK	OK			<OK	<OK	<OK					OK	OK
Honey	70 F									<OK						
Horseradish	70 F									F 3 2 Mo						
Hydraulic Fluid - Emulsion Fluid (HOUGHTO-SAFE 5406®) Stauffer	140 F			<OK	OK	<OK	F 3 4 Da	F 3 4 Da	<OK 1	F 3 4 Mo						
Hydraulic Fluid - Fire Resistant Jet Aircraft Type (SKYDROL 500B®) Stauffer Chemical	100 F	F 3 1 Mo		<OK	OK	<OK	F 3 1 Mo	F 3 6 Mo	F 3 6 Mo	<OK						
Hydraulic Fluid - Fire Resistant Jet Aircraft Type (SKYDROL 500B®) Stauffer Chemical	150 F	F 3 1 Wk		<OK	OK	<OK	F 2 1 Wk	F 3 2 Wk	F 2 6 Mo	F 2 6 Mo						
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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Hydraulic Fluid (FYRQUEL EHC®) Stauffer Chemical	100 F												OK		OK	OK
Hydraulic Fluid (FYRQUEL 220®) Stauffer Chemical	150 F		OK	OK	OK	OK		F 5 4 Mo	F 5 1 Yr	F 5 6 Mo	F 5 1 Yr	F 5 6 Mo	F 3 4 Mo	F 6 1 Yr	OK	OK 4
Hydraulic Fluid-Phosphate Ester Type (HOUGHTO-SAFE 1120®) Stauffer	140 F			<OK	OK	<OK	F 2 6 Mo	F 2 6 Mo	F 2 6 Mo	F 3 4 Mo						
Hydraulic Fluid - Water Glycol Type (HOUGHTO-SAFE 620®) Stauffer	140 F			<OK	OK	<OK	F 3 1 Mo	OK 4	F 3 2 Mo	F 3 1 Mo						
Hydraulic Oil {SEE: Oil, Hydraulic}																
Hydrochloric Acid 5%	100 F												F 3 1 Mo			F 3,4 6 Mo
Hydrochloric Acid 10%	100 F	F 3,4 2 Mo	<OK+	<OK+	OK+	<OK+	F 3,4 1 Mo		F 3,4 2 Wk				F 3 2 Mo	F 3,4 2 Mo	OK+	
Hydrochloric Acid 10%	150 F	F 3,4 2 Wk	F 3 2 Mo	<OK+		<OK+	F 3 1 Wk		F 3 1 Wk							
Hydrochloric Acid 20%	100 F	F 3 2 Mo	F 3 4 Mo	<OK+	OK+	<OK+	F 3 1 Mo		F 3 1 Mo					F 3,4 4 Mo		
Hydrochloric Acid 20%	150 F	F 3,4 1 Wk	F 3 1 Mo	<OK+		F 3 1 Mo	F 3 1 Wk		F 3,4 1 Wk							
Hydrochloric Acid 30%	100 F		F 3,4 1 Mo	<OK+	OK+	F 5 2 Mo	F 3 1 Wk		F 3 1 Mo						F 3 1 Wk	F 4,5 2 Mo
Hydrochloric Acid 30%	150 F		F 3 1 Wk	<OK+		F 3 1 Mo	F 3 1 Da		F 3 1 Da						F 3 1 Wk	F 3,6 1 Wk
Hydrochloric Acid 36-37%	70 F			<OK+			F 3 2 Wk	F 3 5 Da		F 3 6 Mo						
Hydrochloric Acid 37%	100 F				OK+											
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Hydrochloric Vapors 1%	100 F								F 3 1 Yr							
Hydrofluoric Acid 10%	70 F						F 3 5 Da	F 3 20 H	F 3 5 Da	F 3 1 Da						
Hydrofluosilicic Acid (Conc.)	100 F	F 3,4 1 Mo		<OK+	OK+		<OK+	<OK+4	<OK+	<OK+1,4						
Hydrofluosilicic Acid 25%	70 F		OK+ 4 Mo	OK+ 4 Mo	OK+ 4 Mo	OK+		F 2,3 4 Mo	OK+4	OK+4	F 3 4 Mo	F 3,6 8 Mo	OK+	OK+4	OK+4	OK+4
Hydrofluosilicic Acid Solution 25%	100 F	OK+7 11 Mo	OK+ 11 Mo	OK+ 11 Mo		OK+ 11 Mo		OK+7 11 Mo	OK+7 11 Mo	OK+4 11 Mo						
Hydrogen Peroxide 3%	100 F		F 3 6 Mo	F 8 6 Mo		F 3 1 Mo	F 3 1 Mo	F 2 1 Wk	F 3 2 Mo				F 3 2 Wk			
Hydrogen Peroxide 3%	150 F		F 3 2 Mo			F 3 1 Mo	F 3 1 Mo		F 3 2 Mo							
Hydrogen Peroxide 70%	100 F				F 8 2 Wk										F 3 1 Da	F 5 1 Da
Hydrogen Peroxide 70% (FMC Corp.)	100 F				F 5 2 Wk										F 3 24 H	F 5 24 H
Hydroquinone	70 F			<OK			<OK 4	<OK 4	<OK 4	<OK 4						
Hydroxyacetic Acid (Glycolic Acid)	100 F			OK**	OK											
Hydroxyacetic Acid 70% (Glycolic Acid)	140 F			<OK+			F 1,3 18 H	F 1,3 18 H	F 1,3 18 H	F 1,3 2 Da						
Hydroxylamine Sulfate 24% (BASF)	150 F			OK+4	OK+4				F 3 4 Mo		F 3 3 Mo	F 3 3 Mo	F 3 3 Mo	F 3 3 Mo	OK 4	OK 4
Hydroxylamine Sulfate 30% (BASF #547254)	150 F			OK+4	OK+4 9 Mo				F 3 4 Mo		F 3 3 Mo	F 3 3 Mo	F 3 3 Mo	F 3 3 Mo	OK 4	F 3 1 Yr
Hydroxylamine Sulfate 30% (BASF #584900)	150 F			OK+4	OK+4 10 Mo				F 3 4 Mo		F 3 3 Mo	F 3 3 Mo	F 3 3 Mo	F 3 3 Mo	OK 4	OK 4
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Iodine 5% ; Water 95%	100 F	F 3,4 1 Wk	F 3 10 Mo			F 3 10 Mo		F 3,4 1 Wk	F 3,4 2 Wk	F 3,4 1 Da		F 3,4 4 Da	F 3,4 1 Mo	F 3,4 6 Mo	OK 4	OK 4
Iridate 10%	140 F			<OK	OK		F 5 2 Wk	F 3,4 2 Da	F 5 2 Wk	F 1,4 1 Wk						
Iron Arsenic Sludge (Oak Mitsui)	70 F								OK			OK	OK 4	OK		OK
Iron Arsenic Sludge (Oak Mitsui)	150 F								F 3 2 Mo			F 3 10 Mo	F 3 2 Wk	F 3 2 Mo		OK
Isobutyl Alcohol	70 F			<OK		<OK	<OK	<OK	<OK	<OK					OK	OK
Isobutyraldehyde (Isobutyl Aldehyde)	70 F			<OK		<OK			F 3 1 Da							
Isooctyl Alcohol	70 F			<OK		<OK	<OK	<OK	<OK						OK	OK
Isophorone	70 F			<OK		<OK	<OK 1	<OK 1	<OK 1	<OK 1					OK	OK
Isophorone	100 F			OK	OK				F 2,5 2 Mo				OK	F 3 1 Mo	OK 4	OK
Isopropyl Acetate	70 F			<OK		<OK	<OK	<OK	<OK	<OK					OK	OK
Isopropyl Alcohol	70 F			<OK		<OK	<OK	<OK	<OK	<OK	OK					OK
Isopropyl Alcohol	100 F				OK							OK	OK	F 3 2 Mo	OK	OK
Isopropyl Alcohol	150 F			OK	OK			OK 1,4					F 3 6 Mo		OK	OK
Jet Fuel (#4 and #7)	100 F	OK						OK**	OK	OK 4	OK 4		OK 4	OK	OK	OK
Kaolin (Saturated) (China Clay)	100 F								OK**					OK	OK	OK
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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KARO® Syrup	70 F			<OK		<OK				<OK						
Kerosene	70 F	<OK		<OK		<OK	<OK	<OK	OK**	<OK						
Kerosene	100 F				OK								OK	OK	OK	OK
KEVLAR®	140 F			<OK			<OK 4	<OK 4	<OK 4	<OK 4						
KYMENE 367® (Hercules)	100 F			OK	OK				OK 4		F 3,4 2 Mo	F 3,4 8 Mo	OK	OK	OK	OK
KYMENE 525® (Hercules)	100 F			OK+	OK+				F 1,3 2 Mo		F 3,4 1 Wk	F 1,3 1 Mo	F 3 2 Wk	F 3 2 Wk	OK+	OK+
KYMENE 557® (Hercules)	100			OK	OK		F 3 8 Mo	OK 1	F 3 8 Mo	OK 4						
KYMENE 557-H® (Hercules)	100 F			OK	OK				OK		F 3 3 Mo	F 3 1 Yr	OK	OK	OK	OK
KYMENE 709® (Hercules)	100 F		<OK 1	<OK	OK		F 1,3 2 Wk	F 1,3 2 Wk	F 1,3 1 Mo	F 1,3 2 Wk						
KYMENE 760-35® (Hercules)	100 F			OK	OK				OK		OK	OK	OK	OK	OK	OK
KYMENE 917® (Hercules)	100 F			OK	OK		OK	OK	OK	OK						
KYMENE S-2064® (Hercules)	150 F					F 3 10 Mo									F 3 10 Mo	F 3 10 Mo
KYMENE 2399® (Hercules)	100 F			OK	OK				OK		F 3 2 Wk	OK	OK	OK	OK	OK
Lactic Acid (Conc.)	70 F			<OK+			<OK+1	F 2,3 6 Mo	<OK+1	F 2,3 6 Mo						
Lactic Acid 2%	100 F			OK+					OK+	OK+4			OK+	OK+		
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(Isobutyl Aldehyde)																
Isoc Alcohol	70 F			<OK			<OK	<OK	<OK						OK	OK
Isophorone	70 F			<OK		<OK	<OK 1	<OK 1	<OK 1	<OK 1					OK	OK
Isophorone	100 F			OK	OK				F 2.5 2 Mo				OK	F 3 1 Mo	OK 4	OK
Isopropyl Acetate	70 F			<OK		<OK	<OK	<OK	<OK	<OK					OK	OK
Isopropyl Alcohol	70 F			<OK		<OK	<OK	<OK	<OK	<OK	OK					OK
Isopropyl Alcohol	100 F				OK							OK	OK	F 3 2 Mo	OK	OK
Isopropyl Alcohol	150 F			OK	OK			OK 1,4					F 3 6 Mo		OK	OK
Jet Fuel (#4 and #7)	100 F	OK						OK**	OK	OK 4	OK 4		OK 4	OK	OK	OK
Kaolin (Saturated) (China Clay)	100 F								OK**					OK	OK	OK

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Lactic Acid 10%	140 F			<OK+			F 3 1 Wk	F 3 1 Da	F 3 2 Mo	F 3 1 Da						
Lard	70 F			<OK		<OK				<OK						
Lard	150 F	OK	OK	OK	OK	OK			OK	F 2 1 Yr		F 3 1 Yr	OK 4	OK 4	OK	OK
Latex (Gentac 118®) Diversitech General	100 F			OK					OK	OK		OK	OK	OK	OK	OK
Latex (Gentac 118®) Diversitech General	150 F			OK					F 3	F 2						

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OK

CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570
Latex (AC-61®) Rohm & Haas	100 F									OK						
Latex (E-206®) Rohm & Haas	100 F	<OK					<OK	<OK	F 3 4 Da	<OK						
Latex (AC-388®) Rohm & Haas	100 F			<OK												
Latex (AC-388®) Rohm & Haas	150 F			<OK												
Latex (S-2000®) Shell	100 F	<OK		<OK		<OK	<OK		<OK	<OK						
Latex (S-2105®) Shell	100 F	<OK	<OK	<OK		<OK	<OK		<OK	<OK						
Latex (S-7852®) Shell	100 F	<OK	<OK	<OK		<OK	<OK		<OK	<OK						
Latex (1R-700®) Shell	100 F	<OK	<OK	<OK		<OK	<OK		<OK	<OK						
Latex (1R-700®) Shell	150 F	F 3 1 Wk	<OK	<OK		<OK	<OK		<OK	<OK						
Latex (UCAR WC-130®) Union Carbide	100 F			<OK			F 3 6 Mo		F 3 4 Mo	<OK 4						
Latex (UCAR 131®) Union Carbide	100 F			<OK			F 3 6 Mo		F 3 4 Mo	<OK						
Latex (UCAR 180®) Union Carbide	100 F			<OK			F 3 6 Mo		F 3 6 Mo	<OK						
Latex (UCAR 360®) Union Carbide	100 F			<OK			F 3 2 Mo		<OK	<OK						
Latex (UCAR 680®) Union Carbide	100 F			<OK			<OK		<OK	<OK						
Latex (UCAR 891®) Union Carbide	100 F			<OK			<OK		<OK 1	<OK						
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Latex (UCAR 893®) Union Carbide	100 F			<OK			<OK 1		<OK	<OK						
Latex (UCAR® Paper Coating Binder) Union Carbide	100 F			<OK			<OK		<OK	<OK						
Latex (Butadiene Styrene B-2146®) Batex	70 F						<OK	F 3 6 Mo	<OK	<OK						
Latex (Butadiene Styrene #176®) Firestone	70 F								<OK	<OK						
Latex Natural Rubber	70 F		<OK				<OK	<OK	<OK	OK**						
Lauric Acid 100%	150 F	F 2,9 2 Wk		OK	OK			F 2 1 Da	F 2 2 Wk	F 5 1 Wk	F 2,3 2 Wk	F 5 1 Wk	F 5 1 Wk	F 1 1 Yr	OK	OK
Lauric Acid 20%	150 F	F 9 1 Da		OK	OK			F 9 1 Da	F 9 1 Da	F 5 1 Da	F 9 1 Da	F 5 1 Da	F 5 1 Da	F 9 1 Da	OK	F 3 1 Yr
Lauryldimethylamine	100 F							<OK 1								
Leachate (landfill) (NOTE: Chemical composition of leachates varies!)	100 F								OK			OK 4	OK 4	OK 4		OK
Light Water (FC-196®) 3M Company	100 F			OK	OK	OK	F 3 3 Wk	F 3 3 Wk	F 3 3 Wk	F 3 3 Wk						
Light Water (FC-200®) 3M Company	100 F			OK	OK	OK	F 3 1 Mo	F 3 3 Wk	F 3 1 Yr	F 3 4 Mo						
Light Water (FC-203®) 3M Company	100 F	F 3 6 Mo		OK	OK	<OK		F 3 2 Wk	F 3 6 Mo	F 3 6 Mo	F 3 2 Mo	F 3 1 Wk	OK 4	F 3,4 6 Mo	OK	OK
Light Water (FC-203A®) 3M Company	100 F	F 3 2 Mo	OK	OK	OK			F 1,3,4 1 Wk	F 1,3,4 2 Mo	F 3,4 3 Wk	F 3,4 3 Wk	F 3,4 3 Wk	OK 4	OK 4	OK	OK
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Light Water (FC-203CE®) 3M Company	100 F	F 2 2 Wk		OK	OK			F 3 1 Da	F 3 2 Mo	F 1,3,4 1 Mo	F 3 1 Da	F 3,4 1 Da	F 3,4 6 Mo	F 3,4 6 Mo	OK	OK
Light Water (FC-206®) 3M Company	100 F	<OK		<OK	OK	<OK		F 3 1 Mo	F 3 6 Mo	F 3 4 Mo	F 3 4 Mo					
Light Water (FC-600®) 3M Company	100 F	F 3,4 2 Mo	OK	OK	OK			F 1,3 1 Wk	F 3,4 1 Yr	F 3,4 3 Wk	F 3,4 3 Wk	F 3,4 3 Wk	OK 4	OK 4	OK	OK
Light Water - Fluoroprotein 3% National Foam Systems	100 F	OK 4		OK	OK			OK 4	OK 4		OK 4	OK 4	OK 4	OK 4	OK	OK
Light Water - Fluoroprotein 3% Nat'l Foam Systems	150 F	OK 4		OK	OK			OK 4	F 3,4 9 Mo		F 3,4 9 Mo	F 3,4 9 Mo	OK 4	OK 4	OK	OK
Light Water - Fluoroprotein 6% Nat'l Foam Systems	100 F	OK 4		OK	OK			OK 4	OK		OK 4	OK 4	OK 4	OK 4	OK	OK
Light Water - Fluoroprotein 6% Nat'l Foam Systems	150 F	OK 4		OK	OK			F 3,4 8 Mo	F 4,10 10 Mo		F 3,4 8 Mo	F 3,4 8 Mo	OK 4	OK 4	OK	OK
Light Water - Fluoro-protein 3% (LORCON®) Wormald Con, Inc.	100 F	OK 4		OK	OK			OK 4	OK 4		F 3,4 1 Yr	F 3,4 1 Yr	OK 4	OK	OK	OK
Light Water - Fluoro-protein 3% (LORCON®) Wormald Con, Inc.	150 F	OK 4		OK	OK			F 3,4 3 Wk	OK 4		F 3,4 4 Mo	F 3,4 3 Wk	OK 4	OK 4	OK	OK
Lime (Chopped)	100 F			OK		<OK				OK 4						
Limestone (Saturated)	100 F								OK**							
Linseed Oil	70 F			<OK		<OK	<OK	<OK	<OK	<OK						
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Liquor, Black Sulfite Process	150 F			F 3.5 9 Mo	F 3.5 9 Mo											
Liquor, Black Modified (Dresser Megabar) Sulfite Process	170 F			F 3 1 Yr				F 3.4 1 Yr	F 3.4 1 Wk		F 3.4 1 Wk	F 3.4 2 Wk	F 3.4 1 Wk	F 3.4 1 Wk	F 3 3 Mo	F 3 6 Mo
Liquor, Black (Thilmany) Sulfate Process	185 F														OK 4	OK 4
Liquor, Weak Black (P&G)	150 F				F 3.4 8 Mo											
Liquor, Weak Black (P&G)	200 F				F 3.6 3 Mo											
Liquor, Weak Black (P&G) Sulfite Process	205 F														F 3 2 Mo	F 3 1 Mo
Liquor, Strong Black (P&G) Sulfite Process	205 F														F 3.4 4 Mo	F 3.4 4 Mo
Liquor, Green (Thilmany)	185 F														OK 4	OK 4
Liquor, Green	190 F			F 5 1 Da		<OK 4										
Liquor, White (Thilmany)	185 F														OK 4	OK 4
Liquor, White	200 F											F 3 1 Mo				OK
Lithium Chloride 40%	150 F														OK	OK
LP Gas	70 F								OK**							
Lubricant (TURBO 15®) MIL-L-7808B Shell	70 F			<OK			<OK	<OK	<OK	<OK						
Lubricating Oil (SEE: oil, lubricating)																
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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LUDOX LS®	100 F							F 3 2 Mo	F 3 2 Mo	F 3 2 Mo	OK					
LUDOX LS®	150 F							F 3 2 Mo	F 3 2 Mo	F 3 2 Mo	OK					
LUSOL®	70 F						OK 1,4 8 Mo	OK 1,4 8 Mo	OK 1,4 8 Mo	OK 1,4 8 Mo						
Magnesium Chloride 40%	212 F			OK 2 Mo			OK 2 Mo	OK 2 Mo	OK 2 Mo	OK 2 Mo						
Magnesium Chloride 50%	70 F			<OK		<OK	<OK	<OK	<OK	<OK					OK	OK
Magnesium Hydroxide 10%	150 F		OK	OK	OK 4	OK		OK 4	F 3 6 Mo	F 3 2 Mo	F 3 8 Mo	OK	F 3 1 Wk	F 3 10 Mo	OK	OK 4
Magnesium Hydroxide 10%	200 F		F 3 1 Yr	OK	OK 4	OK 4		F 3 8 Mo	F 3 8 Mo	F 3 1 Mo	F 3 1 Mo	OK	F 3 1 Wk	F 3 1 Mo	OK 4	OK 4
Magnesium Hydroxide 20%	70 F						F 3 6 Mo	F 3 3 Mo	OK 8 Mo	F 3 3 Mo						
Magnesium Hydroxide 50%	100 F	F 3 1 Yr		<OK				<OK	<OK	<OK	<OK	<OK	OK	OK	OK	OK
Maleic Acid 50%	70 F			<OK			F 3 1 Da	F 3 4 Da	F 3 2 Wk	F 3 1 Mo						
Maleic Acid 50%	150 F			OK	OK										F 3 1 Da	F 3 1 Da
Maleic Anhydride	150 F			OK	OK							F 3 2 Wk			OK	OK
Maleic Anhydride	150 F	F 2 10 Da	F 1,3 2 Mo	<OK		<OK		F 2 2 Mo	F 2 10 Da	F 2 1 Mo						
Maleic Anhydride	250 F		F 1,3 4 Mo	OK	OK										F 3 2 Mo	F 3 6 Mo
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Manganese Ammonium Sulfate	150 F						<OK	<OK	<OK	<OK 4						
Melamine	100 F								OK**							
Methacrylic Acid (Tech.)	100 F			<OK+											OK+	
Methacrylic Acid Crude	100 F			OK**	OK											
Methacrylic Acid Glacial	Amb.								F 3 3 Wk				F 3.5 2 Mo	F 3 3 Wk		
Methacrylic Acid 50%	150 F			F 5 6 Mo	F 5 6 Mo											
Methanesulfonic Acid	100 F			OK 4	OK 4											
Methanesulfonic Acid 70%	Amb.								OK 4							
Methanesulfonic Acid 70%	100 F			OK					F 3.4 1 Yr						OK 4	F 4.5 2 Mo
Methanesulfonic Acid 70%	150 F			OK 4												
Methanesulfonic Acid Anhydrous	100 F		F 5 1 Da	OK 4		OK 4			F 5 1 Da			F 5 1 Da	F 5 1 Da	F 5 1 Da	F 8 1 Da	F 3.5 1 Da
Methanesulfonic Chloride	100 F		F 5 1 Wk	OK 4	OK 4	OK 4			F 5 1 Da			F 5 1 Da	F 5 1 Wk	F 5 1 Da	F 4.5 4 Mo	F 5 1 Mo
Methanesulfonyl Chloride	100 F		F 5 1 Wk	OK 4	OK 4	OK 4			F 5 1 Da			F 5 1 Da	F 5 1 Wk	F 5 1 Da	F 4.5 4 Mo	F 5 1 Mo
Methanesulfonyl Chloride	150 F			OK	OK											
Methanol	100 F	F 3 8 Mo	OK 1	OK	OK	OK		OK 1.4	OK 1	F 3 72 H	F 3 72 H	F 3 72 H	OK 4	F 3 1 Da	OK	OK
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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Methanol	150 F	F 3,4 1 Wk	F 3 8 Mo	OK	OK	OK		F 3,4 1 Wk	F 3,4 1 Mo	F 3,4 1 Mo	F 3 72 H	F 3 72 H	F 3,4 2 Mo	F 3 1 Mo	OK	F 3,4 8 Mo
Methanol 20%; Water 80%	100 F			OK	OK								OK		OK	OK
Methanol 20%; Water 80%	150 F			OK	OK								F 3 8 Mo		OK	OK
Methanol 38.1%; Chloroform 1.2%; Water 60.7%	120 F			OK	OK										OK	OK
Methanol 50%	100 F							<OK			OK			F 3 6 Mo	OK	OK
Methanol 50%; Hydrochloric Acid 5%; Water 45%	100 F												F 1,3 1 Da			F 3,4 2 Mo
Methanol 75; Hydrochloric Acid 5%; Water 20%	100 F												F 1,3 1 Wk			F 3,4 2 Mo
Methanol 86.5%; Hydrochloric Acid 5%; Water 8.5%	100 F												F 3,4 1 Wk			F 3,4 2 Mo
Methanol 93% Acetic Acid (DI Water 2%)	100 F								F 1,3 1 Da						F 3 10 Mo	F 3 6 Mo
Methanol 95%; Acetic Acid 5%	100 F								F 3 1 Da						F 3 1 Yr	
Methyl Acrylate	100 F	<OK 1		<OK	OK			<OK 1	<OK 1	<OK 1						
Methyl Amylketone	100 F			OK	OK			OK 1,4								
Methyl-bis-amino propylamine (Hercules)	100 F		F 3,5 1 Mo	OK 4	OK 4	OK			F 2,3 2 Wk			F 2,3 5 Mo	F 2,5 5 Mo	F 2,5 1 Wk	OK 4	OK 4
Methyl CELLOSOLVE® (SEE: Ethylene Glycol Monomethyl Ether)																
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Methyl Chloroformate	100 F			OK**	OK								F 2,4 1 Mo	F 3,4 1 Da	F 4,5 1 Mo	F 4,5 2 Wk
Methyl Ethyl Ketone	100 F	F 2 1 Da		<OK	OK	F 3 3 Mo	F 2 1 Da		F 2 1 Da				OK 1	F 5 1 Da	OK	OK
Methyl Ethyl Ketone	150 F	F 2 1 Da		<OK	OK		F 2 1 Da		F 2 1 Da				F 3 2 Mo	F 5 1 Da		
Methyl Ethyl Ketone 20%; Water 80%	100 F			OK	OK								F 1,3 1 Da		OK	OK
Methyl Ethyl Ketone 20%; Water 80%	150 F			OK	OK								F 1,3 1 Da			F 3,6 1 Da
Methyl FORMCEL® (55% Formaldehyde in Methanol) Celanese	100 F	F 3 2 Mo		<OK				<OK 1	<OK	<OK 1						
Methyl Isobutyl Ketone (MIBK)	70 F			<OK												
Methyl Isobutyl Ketone (MIBK)	100 F				OK				OK 1				OK 4	F 3,4 4 Da	OK	OK
Methyl Tert-Butyl Ether (MTBE)	100 F							OK 4	OK				OK			OK
Methyldiethanolamine 50%	100 F								OK				OK			
Methylene Chloride	100 F			OK**	OK	F 3 24 H	F 3 5 Da	F 3 1 Wk	F 3 5 Da	F 5 1 Da			F 3,5 72 H	F 5 72 H	OK	F 1,6 1 Yr
Methylene Chlorobromide (SEE: Bromochloromethane)																
N-methyl-2-pyrrolidone (M-PYROL®)	100 F			OK	OK			F 5 72 H	F 5 72 H				F 5 72 H		OK	F 3 1 Wk
Milk Whey	100 F	<OK	<OK	<OK			<OK	<OK 4	<OK	<OK 4						
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Milk Whey	150 F	<OK	<OK	<OK			<OK	<OK	<OK	F 3,4 6 Mo						
Mineral Oil	70 F			<OK		<OK	OK 8 Mo	OK 8 Mo	OK 8 Mo	OK 8 Mo			OK	OK	OK	OK
Mineral Oil	205 F		OK	OK	OK	OK		OK 4	OK 4	OK 4	OK 4	OK 4	OK 4	OK 4	OK	OK
Mineral Spirits	100 F	<OK		OK**	OK	<OK	<OK		<OK	<OK	<OK		OK	OK	OK	OK
Mineral Spirits	150 F	<OK		OK**	OK	<OK	<OK		<OK	<OK					OK	OK
Molasses	70 F			<OK		<OK				<OK						
Molasses	100 F			<OK	OK	<OK	<OK	<OK	<OK	<OK						
Molasses (Beet) A. E. Staley	100 F	OK 4	OK	OK	OK	OK		OK 4	OK 4	OK 4	OK 4	OK 4	OK 4	OK 4	OK	OK
Molasses (Beet) Upjohn	110 F			OK	OK				OK 4	OK 4			OK 4	OK 4	OK	OK
Molasses (Cane) A. E. Staley	100 F	OK 4	OK	OK	OK	OK		OK 4	OK 4	OK 4	OK 4	OK 4	OK 4	OK 4	OK	OK
Molasses (Table)	150 F			OK	OK				F 3,4 1 Mo	F 3,4 72 H			F 3,4 1 Mo	F 3,4 1 Mo	OK 4	
Monochloroacetic Acid 5%	100 F														OK+	
Monoethanolamine (SEE: Ethanolamine)																
Morpholine	100 F	F 5 5 Da	F 5 5 Da	OK	OK		F 5 5 Da	F 5 5 Da	F 5 5 Da	F 5 5 Da						
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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Morpholine	150 F	F 5 5 Da	F 5 5 Da	OK			F 5 5 Da	F 5 5 Da	F 5 5 Da	F 5 5 Da						
Mustard - Yellow FRENCH'S	100 F								F 3 2 Mo	F 3 2 Mo						OK+
Mustard - Yellow FRENCH'S	150 F			<OK+	OK+				F 3 1 Wk	F 3 1 Wk	F 3 1 Wk					
Naptha Sour	100 F								OK**				OK		OK	
Naphthenic Acid	100 F	OK		OK		OK		OK	OK	F 3 1 Mo	OK					
NEODENE 6® (Shell)	100 F		OK	OK	OK				OK	OK 4	OK	OK	OK	OK	OK	OK
NEODENE 8® (Shell)	100 F		OK	OK	OK				OK	OK	OK	OK	OK	OK	OK	OK
NEODENE 18® (Shell)	100 F		OK	OK	OK				OK	OK	OK	OK	OK	OK	OK	OK
NEODOL 23-12® (Shell)	100 F		OK	OK	OK				OK	OK	F 3 1 Yr	OK	OK 4	OK 4	OK	OK
NEODOL 25® (Shell)	100 F		OK	OK	OK				OK	OK	OK	OK	OK	OK	OK	OK
NEODOL 25® C2-C15 Alcohol (Shell)	150 F			<OK	OK	<OK					OK					
NEODOL 25-3® (Shell)	100 F		OK	OK	OK				OK	OK	OK	OK	OK	OK	OK	OK
NEODOL 25-3® - Alcohol Ethoxylate (Shell)	100 F			<OK	OK			F 2 10 Mo	OK	OK	OK	OK	OK	OK	OK	OK
NEODOL 25-3® - Alcohol Ethoxylate (Shell)	150 F			<OK	OK	<OK					F 3 9 Mo					
NEODOL 25-3A® (Shell)	100 F		OK	OK	OK				OK	F 1,3 8 Mo	F 3 3 Mo	OK 4	OK 4	OK	OK	OK
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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NEODOL 25-3A® (Shell)	150 F			<OK 4	OK	OK+	F 3 2 Wk	F 3 2 Wk	F 3 1 Mo	F 3 1 Mo						
NEODOL 25-3S® (Shell)	100 F		OK 4	OK 4	OK 4				OK	F 1,3 6 Mo	F 3 4 Mo	F 3 6 Mo	OK 4	OK	OK	OK 4
NEODOL 25-3S® (Shell)	150 F			<OK 4	OK	F 3 6 Mo	F 3 1 Mo	F 3 2 Wk	F 3 1 Mo		F 3 1 Mo					
NEODOL 25-9® - Nonionic Surfactant (Shell)	150			<OK	OK	<OK					F 3 9 Mo					
NEODOL 25-12® (Shell)	150 F	F 3 4 Mo	F 3 4 Mo	<OK	OK	<OK		<OK	<OK	<OK						
NEODOL 45-13® (Shell)	100 F		OK	OK	OK				OK	OK	F 3 4 Mo	OK	OK 4	OK	OK	OK
Nickel Acetate 50%	70 F			<OK			OK 8 Mo	F 3 2 Wk	OK 8 Mo	OK 8 Mo						
Nickel Chloride 50%	70 F			<OK			OK 8 Mo	OK 8 Mo	OK 8 Mo	OK 4 8 Mo						
NIPAR S30® (SEE: 1-Nitropropane 50%; 2-Nitropropane 50%)																
Nitric Acid 5%	70 F			<OK+			<OK+	F 3 1 Wk	F 3 4 Mo	F 3 4 Mo						
Nitric Acid 5%	100 F	F 3,4 2 Wk		<OK+	OK+		F 3,4 2 Wk		F 3,4 2 Wk				F 3,4 2 Wk	F 3,4 2 Wk		
Nitric Acid 5%	150 F	F 3,4 2 Wk		<OK+			F 3,4 2 Wk		F 3,4 2 Wk							
Nitric Acid 10%	100 F		<OK+4	<OK+	OK+	<OK+	F 3 2 Da		F 3 1 Da					OK+4	F 3,4 4 Mo	
Nitric Acid 10%	150 F		F 3 1 Mo	<OK+		F 2,6 2 Mo	F 3 1 Da		F 3 1 Da							
Nitric Acid 20%	100 F		F 3 4 Mo	<OK+		F 2,6 2 Mo	F 3 2 Da		F 3 2 Da							
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Nitric Acid 20%	150 F		F 2 4 Wk	F 5 72 H	F 5 72 H	F 3 2 Wk	F 3 2 Da		F 3 2 Da							
Nitric Acid 25%	70 F			<OK+			F 3 4 Mo	F 3 1 Da	F 3 2 Wk	F 3 2 Wk						
Nitric Acid 40%	100 F		F 3 1 Wk			F 5 1 Wk	F 5 2 Da		F 5 2 Da							
Nitric Acid 70% (conc.)	70 F						F 3 1 Da			F 3 1 Da						
p-Nitrochlorobenzene (Dupont)	212 F		F 3,6 2 Da	OK	OK	F 3 24 H						F 3 1 Wk			OK 4	
Nitrogen Fertilizer Solution (SEE: Urea Ammonium Nitrate)																
1-Nitropropane	70 F			<OK		<OK	<OK 1	<OK 1	F 2,3 2 Da						OK	OK
2-Nitropropane	100 F			OK	OK								F 2 1 Mo	F 3 1 Da	F 2 1 Yr	F 1,3 1 Yr
1-Nitropropane 50%; 2-Nitropropane 50% (NIPAR S-30®)	100 F	F 3,4 4 Mo		OK		OK		F 2 72 H	F 2,4 6 Mo			F 3,4 72 H	OK 4	F 3,4 72 H	OK 4	OK 4
Nonylphenol	100 F	<OK	<OK	<OK	OK	<OK		<OK	<OK		<OK	<OK	OK	OK	OK	OK
Nonylphenol	150 F	F 5 6 Mo	F 5 6 Mo	<OK	OK	<OK		F 5 6 Mo	F 5 6 Mo		F 5 6 Mo	F 5 6 Mo	F 5 6 Mo	F 4,5 4 Mo		
Nonylphenol	180 F			<OK	OK		F 5 1 Mo	F 2,4 2 Mo	F 5 1 Mo	F 5 1 Wk						
Nonylphenoxy Polyoxyethylene Ethanol	70 F						<OK	<OK	<OK	<OK						
Nylon Resin Pellets	100 F								OK**							
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OAKITE 62® Sol. (pH 10)	140 F						F 3,4 6 Mo	<OK 4	F 3,4 2 Wk	F 3,4 6 Mo						
OAKITE 84-A®	70 F						<OK 4	<OK 4	<OK 4	<OK 1,4						
OAKITE 84-A®	180 F						F 3,4 7 Mo	F 3,4 4 Mo	F 3,4 7 Mo	F 3 1 Mo						
OAKITE Compound 31® (Acid), 10%	70 F									OK+1,4 7 Mo						
OAKITE Compound 62® (Alkali)	70 F									OK 4 7 Mo						
OAKITE Compound 162® (Alkali)	70 F									OK 4 7 Mo						
n-Octadecanoic Acid 90% (SEE: stearic Acid)																
Octanoic Acid 100%	100 F	F 3 6 Mo							F 1,3 6 Mo	F 5 1 Da			OK	F 3 6 Mo	OK	OK
Octanoic Acid 100%	150 F	F2,3,4 6 Mo							F 2,5 1 Wk	F 3,5 1 Da			F 5 1 Mo	F 3 1 Wk	OK	OK
n-Octyl Alcohol	70 F			<OK		<OK	<OK	<OK	<OK	<OK						
n-Octyl Mercaptan	100 F	OK	OK	OK	OK	OK		OK	OK	F 3 6 Mo	F 3 6 Mo	OK 4	OK	F 3 1 Yr	OK	OK
n-Octyl Mercaptan	150 F	F 3 2 Wk	F 3 8 Mo	OK	OK	F 3,4 8 Mo		F 3 4 Mo	F 3 2 Wk	F 3 1 Wk	F 3 2 Wk	F 3 1 Wk	F 3,4 1 Yr	F 3 1 Wk	OK	OK
Oil, Sour Crude (Light Arabian)	100 F	<OK		<OK	OK	<OK		<OK	<OK	<OK	OK					
Oil, Sour Crude (Light Arabian)	150 F	<OK		<OK	OK	<OK		<OK 4	<OK	<OK 4	OK					
Oil, Sour Crude (Light Arabian)	180 F	OK		OK	OK	OK		OK 4	OK	OK 4	<OK				OK	OK
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Oil, Sour Crude (Prudhoe Bay)	100 F	<OK		<OK	OK	<OK		<OK 4	<OK	<OK	<OK					
Oil, Sour Crude (Prudhoe Bay)	150 F	<OK		<OK	OK	<OK		<OK 4	<OK	<OK 4	<OK					
Oil, Sour Crude (Prudhoe Bay)	180 F	OK		OK	OK	OK		OK 4	OK	OK 4	OK					
Oil, Sour Crude (Prudhoe Bay)	210 F	OK 4	OK	OK	OK	OK	OK	OK	OK		OK 4	OK	OK 4	OK 4	OK	OK
Oil, Sour Crude (West Texas)	100 F	<OK		<OK	OK			<OK	OK**	<OK	<OK		OK		OK	OK
Oil, Sour Crude (West Texas)	150 F	<OK		<OK	OK	<OK		<OK 4	<OK	<OK 4	OK		OK		OK	OK
Oil, Sour Crude (West Texas)	180 F	OK 4		OK 4	OK	OK		OK 4	OK	OK 4	OK		OK		OK	OK
Oil, Crude (Wyoming)	180 F												OK 4			
Oil, Crude (Wyoming)	210 F												OK 4	OK 4	OK	OK
Oil, Hydraulic	100 F	OK		OK	OK			OK	OK			OK	OK	OK	OK	OK
Oil, Hydraulic	150 F	OK		OK	OK			OK 4	OK			OK	OK	OK	OK	OK
Oil, Lubricating	70 F			<OK		<OK	<OK	<OK	<OK	<OK						
Oil, Lubricating	150 F			<OK	OK			<OK								
Oil, Lubricating	180 F			<OK	OK			<OK								
Oil, Turbine-Synthetic (JET 254®) Mobil	180 F	OK		OK	OK			OK 4	OK 4		F 3 2 Mo	OK 4	OK 4	OK 4	OK	OK
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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Oil (Water Soluble)	140 F			OK 7 Mo			OK 4 7 Mo	OK 4 7 Mo	F 3,4 5 Mo	F 3,4 5 Mo						
Oleic Acid	Amb.								OK				OK			
Oleic Acid	70 F			<OK			<OK	<OK	<OK	<OK						
Oleic Acid	100 F												OK		OK	
Oleic Acid	150 F			<OK					F 3 1 Mo	F 3 1 Mo						
Oleic Acid 74%; Corn Oil 26%	150 F		OK	OK		OK			F 5 4 Mo	F 5 1 Wk		F 5 1 Wk	OK 4	F 3,5 6 Mo	OK	
Oleic Acid 74%; Corn Oil 26%	130 F		OK	OK		OK			F 2,4 8 Mo	F 5 1 Wk		F 5 1 Wk	OK 4	OK 4	OK	
Oleomargarine	70 F			<OK		<OK				<OK						
Olive Oil	70 F			<OK		<OK				<OK						
Orange Conc. (SUNKIST®)	100 F			<OK		<OK				<OK 4			OK 4	OK 4	OK	OK
Orange Soda (Conc.)	70 F			<OK		<OK				<OK						
Ortho-chloronitrobenzene	180 F			OK				<OK 1	<OK 1							
Oxalic Acid	70 F			<OK+			<OK+	<OK+	<OK+	<OK+						
Oxalic Acid 10%	150 F	OK+4				OK 4		F 3 1 Mo	F 3 1 Yr	F 3 1 Mo	F 3 6 Mo					
2-oxohexamethyleneimine (SEE: Caprolactam, Molten)																
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Palm Oil (Canbra Foods Ltd)	150 F			OK	OK				OK	OK 4		OK	OK 4	OK 4	OK	OK
Palm Oil, Crude	250 F	F 3 7 Mo		OK	OK	OK				F 3 1 Mo						
Palm Oil of Foots	250 F	F 3 2 Mo		OK		OK				F 5 2 Wk						
Palmitic Acid	150 F												OK 6	OK 4	OK	OK
Palmitoleic Fatty Acid	200 F			OK		OK			F 3 2 Wk	F 5 48 H						
Paraffin Wax	150 F			OK	OK			OK	OK			OK	OK	OK		
Paraformaldehyde 50%	150 F			OK	OK		F 3 2 Wk	F 3 2 Wk	F 3 2 Wk	F 3 2 Wk						
Paraldehyde	70 F			<OK			<OK	<OK	<OK	<OK						
Peanut Butter	70 F			<OK		<OK				<OK						
Peanut Oil	70 F			<OK		<OK				<OK						
PENNSTOP #1866®	150 F			<OK		<OK										
2,4-Pentanedione	100 F				OK											
Pepper	70 F			<OK		<OK				<OK						
Perchloroethylene (SEE: Tetrachloroethylene)																
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PERMACOL #120®	70 F			<OK			<OK 4	F 3,4 1 Mo	F 3 2 Wk	F 3,4 1 Mo						
Permalastic Adhesive	100 F			<OK				F 1,3 4 Mo	<OK 1	<OK						
Petroleum Jelly (SONOJELL #4)	180 F	OK		OK	OK	OK		OK	OK	OK		OK	OK	OK	OK	OK
Phenol 0.5%	100 F			OK	OK								OK	OK	OK	OK
Phenol 2%	100 F			OK	OK										OK	
Phenol 3%	100 F			OK	OK								F 3,4 8 Mo		OK	
Phenol 5%	100 F			OK	OK			F 3 72 H					F 4,5 2 Wk	F 4,5 2 Wk	OK 4	OK 1,4
Phenol 10%	100 F			OK	OK								F 5 1 Da	F 5 1 Da	F 5 2 Mo	F 4,5 2 Wk
Phenol 15%	100 F			OK	OK										F 5 2 Mo	
Phenol 50%	100 F			OK	OK			F 5 72 H					F 5 1 Da	F 5 1 Da		F2,4,5 1 Wk
Phenol 50%	150 F			OK	OK											
Phenol 90%	70 F			OK**	OK		F 2,3 1 Da	F 3 2 H	F 2,3 1 Da							
Phenol 90%	100 F		F 5 48 H	OK**	OK	F 3 1 Wk							F 5 1 Da	F 5 1 Da	F 4,5 4 Mo	F 4,5 2 Wk
Phenol-formaldehyde	100 F			OK**	OK											
Phenylenediamine 50%	70 F			<OK			<OK 4	<OK 1,4	<OK 1,4	<OK 4						
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Phenylhydrazine	70 F			<OK+			F 5 1 Wk	F 5 1 Wk	F 5 1 Wk	F 5 1 Wk						
1-Phenyl-2-methyl-1,2-propane diamine	70 F			<OK			<OK	F 2 3 Mo	<OK	<OK 1						
Phosphoric Acid .5%	100 F						OK 7									
Phosphoric Acid 10%	100 F	<OK+4	<OK+	<OK+	OK+	<OK+	F 2,3 4 Mo		<OK+1				F 3 2 Wk	OK+4	OK+	OK+
Phosphoric Acid 10%	150 F	F 3 4 Mo	<OK+	<OK+		<OK+	F 1,3 2 Mo		F 3 2 Mo							
Phosphoric Acid 20%	100 F												F 3 1 Wk			
Phosphoric Acid 30%	70 F			<OK+		<OK+	<OK+	F 3 2 Mo	<OK+	F 3 4 Mo						
Phosphoric Acid 30%	150 F			<OK+		<OK+			F 3 1 Mo							
Phosphoric Acid 40%	100 F	F 3 1 Mo		<OK+	OK+	<OK+	F 3 1 Mo		F 3 1 Mo							
Phosphoric Acid 54%	100 F			<OK+4		OK+										
Phosphoric Acid 60%	100 F		<OK+	<OK+	OK+	<OK+	F 3 2 Wk		F 3 2 Wk							
Phosphoric Acid 60%	150 F		<OK+	<OK+		<OK+	F 3 2 Wk		F 3 2 Wk							
Phosphoric Acid 76%	100 F														F 3,4 4 Mo	
Phosphoric Acid 85%	70 F			<OK+				F 2,3 1 Wk	F 3 4 Da	F 3 4 Mo						
Phosphoric Acid 85%	100 F				OK+											
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Phosphoric Acid 85%	200 F			<OK+4												
Phosphoric Acid 86%	150 F			OK+4	OK+4											
Phosphorus Trichloride	100 F			OK**	OK											
Phthalic Acid 90%	70 F			<OK			<OK	<OK	<OK	<OK						
Phthalic Anhydride	350 F		F 5 1 Wk	<OK 4												
Phthalic Anhydride 80%	70 F			<OK			F 3 5 Da	F 3 1 Mo	F 3 3 Mo	F 3 3 Mo						
Pine Gum (Diluted)	70 F						<OK	F 3 6 Mo	<OK	<OK						
Pine Gum (Diluted)	140 F						F 3 4 Mo	F 3 4 Mo	F 3 1 Mo	F 3 4 Mo						
Plant Regulator (PIX®) BASF	150 F			OK 4	OK 4,7				F 3,4 10 Mo			OK 4	OK 4	OK 4	OK 4	OK 4
Polyamide, Aqueous Borne	180 F			OK 7 Mo			F 3 1 Wk	F 3 1 Wk	F 3 1 Wk	F 3. 1 Wk						
POLY-EM 10® Anionic	140 F			<OK 4			F 3,4 1 Mo	<OK 4	<OK	<OK						
POLY-EM 20®	100 F	<OK					F 3 3 Da	<OK 4	<OK	<OK						
Polyethylene Glycol	100 F			<OK	OK		F 2 4 Mo	F 3 1 Wk	F 3 1 Wk	F 3 6 Mo						
Polyethylene - Resin with PVA Traces	100 F	OK**							OK**							
Polyol (PERMAPOL P-820®)	150 F			OK				OK 4	OK 4	OK	OK 4	OK	OK	OK 4	OK	OK
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Polyol (NIAX 1025®) PPG	150 F			OK				OK	OK	OK	OK 4	OK	OK 4	OK 4	OK	OK
Polyol (NIAX L-112®) PPG	150 F			OK				OK	OK	OK 4	OK	OK	OK 4	OK 4	OK	OK
Polyolefin (Dry) Resin	100 F								OK**							
Polypropylene (Dry) Resin	100 F	OK**							OK**							
POLYTEX 669® (Celanese)	100 F			OK 11 Mo			F 3 9 Mo		F 3 9 Mo	F 3 9 Mo						
Polyvinyl Acetate Emulsion	70 F			<OK			F 2,3 3 Mo	F 2,3 1 Wk	F 3 6 Wk	F 3 6 Wk						
Polyvinyl Acetate with stabilizer	150 F			<OK			F 3 1 Wk	F 3 1 Wk	F 3 1 Wk	F 3 1 Wk						
Potassium Bromide	70 F			<OK 4			OK 7 Mo	OK 4 7 Mo	OK 7 Mo	OK 7 Mo						
Potassium Chloride (Dry)	100 F								OK**							
Potassium Chloride 50%	180 F	OK 4	F 3 1 Yr	OK 4		F 3 8 Mo	F 3 2 Mo	F 3 1 Yr	OK 4	F 3 8 Mo		F 3 8 Mo	OK 4	OK 4	OK	OK
Potassium Ferrocyanide 10%	100 F	OK 4	OK	OK 4		OK		OK 1	OK	OK 4		OK 4	OK 4	OK		OK
Potassium Ferrocyanide 10%	150 F	F 3 10 Mo	OK 4	OK 4		OK 4		F 3,4 1 Yr	F 3,6 1 Yr	F 3 10 Mo		F 3 1 Yr	OK	OK		OK
Potassium Ferrocyanide 25%	150 F														OK	
Potassium Fluoride	100 F	OK 1		OK 4		OK		OK 4	OK 4	OK 4						
Potassium Hydroxide 10%	100 F	F 3 1 Wk					F 3 6 Mo	F 3 1 Da	<OK	<OK	F 2,3,4 1 Yr		F 3 1 Yr	OK		OK
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Potassium Hydroxide 10%	140 F		<OK	F 5 1 Da				F 3 1 Da	<OK 4	<OK						OK
Potassium Hydroxide 44%; Acrylic Acid 21%; Water 35%	100 F								OK	OK			OK	OK 4	OK 4	OK
Potassium Hydroxide 45%	100 F									OK 1		F 2 2 Wk	OK 4	OK 9		
Potassium Hydroxide 45%	150 F	F 3 4 Mo	<OK	F 5 1 Da		F 5,8 1 Yr		F 3 1 Wk	F 3 2 Mo	F 3 4 Mo	F 3 1 Da	F 2 1 Da	OK 4	OK 4,9		OK
Potassium Hydroxide 50%	150 F	F 3 4 Mo	OK 4	F 5 1 Da		F 5,8 1 Yr		F 3 1 Mo	F 3 2 Mo	F 3 1 Yr	F 3 1 Wk	F 3 1 Yr	F 3 8 Mo		OK 4	OK**
Potassium Hydroxide 50%	180 F		F 3 2 Mo	F 3 1 Da	F 3 1 Da	F 3 1 Wk		F 3,4 1 Da	F 3,4 4 Mo	F 3,4 4 Mo	F 3,4 1 Da	F 3,4 1 Wk	F 3,4 4 Mo	F 3,4 4 Mo	F 3,5 1 Yr	OK 4,7
Potassium Nitrate 50%	70 F						OK 8 Mo	OK 4 8 Mo	OK 8 Mo	OK 8 Mo						
Potassium Permanganate 5%	150 F														OK	OK
Potassium Phosphate, Tri-basic (Tripotassium Phosphate)	150 F			<OK 4		<OK 4										
Potassium Phosphate 50%	100 F	OK	OK	OK 4		OK		OK 4	OK	OK 4	OK 4	OK	OK	OK		OK
PRESTONE®	200 F			<OK 4	OK			F 3 1 Wk	F 3 1 Wk						OK	OK
1,2-Propanediol (Propylene Glycol)	100 F	<OK		OK**	OK		<OK	<OK	<OK	<OK			OK	OK	OK	OK
Propionaldehyde	70 F			<OK					F 3 1 Da					F 3 3 H		
Propionaldehyde	100 F			OK 4	OK 4								F 5 1 Da	F 5 1 Da	F 3,4 1 Yr	F 3,6 2 Wk
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Propionic Acid	70 F			OK+ 8 Mo			F 3 2 Da	F 3 2 Da	F 3 2 Da	F 3 2 Da						
Propionic Acid	100 F			OK+	OK+										F 3,4 1 Yr	
n-Propyl Acetate	70 F			<OK			<OK 1	<OK 1	<OK 1	<OK 1					OK	OK
n-Propyl Alcohol	100 F	<OK 1		<OK	OK	<OK		<OK 1	<OK 1	<OK 1					OK	OK
Propyl CELLOSOLVE® (SEE: Ethylene Glycol Monopropyl Ether)																
Propylene Carbonate Crude	100 F			OK	OK	OK			F 2 2 Mo			OK 4	OK	F 2 1 Wk	OK	OK
Propylene Dichloride	100 F												<OK 4			<OK
Propylene Glycol Monomethyl Ether (PM)	100 F	F 3 1 Da		OK	OK			F 3,5 2 Mo	F 2 1 Wk	F 2,3 1 Da		F 2 1 Wk	OK 4	F 2,3 1 Da	OK	OK
Propylene Glycol Monomethyl Ether (PM)	150 F	F 3 1 Da		OK 4	OK4			F 2,3 1 Da	F 2 1 Wk	F 3 1 Da		F 2,3 1 Da	F 3,4 4 Mo	F 5 1 Da	F 5 10 Mo	F 5 2 Wk
Propylene Glycol Monomethyl Ether Acetate(PMA)	100 F	F 2 72 H		OK OK	OK	OK		F 2 72 H	OK 1			OK	OK	F 3 1 Yr	OK	OK
Propylene Oxide	70 F			OK**	OK		F 3 2 H	F 3 1 Mo	F 3 2 H	F 3 1 Mo						
Propylene Oxide	100 F				OK								F 2,3 1 Da		F 5 3 Mo	
Prune Juice	100 F	OK		OK		OK			OK	OK						
Pulp Slurry (Kraft Hi-Density Brown Stock)	120 F	F 2 2 Mo		OK				OK 4	OK 1,4	F 3 2 Mo	OK 4	OK 4	F 3 1 Wk	OK	OK	OK
PVC Powder	100 F	OK							OK**							
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PVC 2% (solution) in Sulfuric Acid 5%	100 F								OK						OK	OK
PVC Feed Tank Slurry (B. F. Goodrich)	100 F								OK						OK	OK 4
PYRANOL® 1481	150 F						OK 4 11 Mo	OK 4 11 Mo	OK 11 Mo	OK 11 Mo						
Raisin Feedstock Conc. (Sunmaid)	100 F				OK 4								OK 4	OK 4		OK
Raisin Feedstock Conc. (Sunmaid)	150 F				OK+4								F 3 10 Mo	F 3 10 Mo	OK 4	OK 4
Raisin Feedstock Conc. (Sunmaid)	180 F				OK+4								F 3 2 Mo	F 3 2 Mo	OK 4	OK 4
Rock Salt	100 F	OK					OK		OK**	OK				OK		
Rosin	100 F									OK**						
Rum, 80 Proof	100 F			OK	OK					F 3,4 1 Wk			OK 4	F 3 6 Mo	OK	OK
SC - Solvent #100	70 F			<OK		<OK		<OK		OK 7 Mo						
SC - Solvent #100	100 F				OK								OK	F 3 8 Mo	OK	OK
Sea Water {SEE: Water (Sea)}																
SERVAC® 5%	100 F	<OK	<OK	<OK			<OK	<OK 4	<OK	<OK 4						
SERVAC® 5%	150 F	<OK	<OK	<OK			<OK	<OK 4	<OK	<OK 4						
Soap (Conc.) Fatty Acid pH 8.0	160 F		<OK	<OK			<OK 4		<OK	F 3 2 Mo						
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CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570
Soap (Conc.) Fatty Acid pH 11.0	160 F		<OK	F 4,5 1 Mo			F 3 6 Mo		<OK	<OK						
Soap (Conc.) Oleic Acid pH 7.9	160 F		<OK	<OK			F 3 1 Mo		<OK	F 1,3 2 Mo						
Soap (Conc.) Oleic Acid pH 10.9	160 F		<OK	<OK 4			<OK		<OK	<OK						
Sodium Bisulfate 30%	100 F			<OK+		<OK+			<OK+		<OK+					
Sodium Bisulfite 40%	150 F													F 3 4 Mo	F 3 6 Mo	F 3 9 Mo
Sodium Bisulfite 50%	70 F						OK	OK	OK	OK						
Sodium Bromide 40%	100 F			OK		OK			OK	OK		OK 4	OK 4	OK 4		OK
Sodium Bromide 44%	150 F	OK 4	OK 4			OK+			OK 4	F 3 8 Mo		F 3 8 Mo	OK 4	OK 4		OK 4
Sodium Bromide 40%; Sodium Hydroxide 1%	100 F			F 3 6 Mo		OK			F 3 11 Mo	F 3 11 Mo						
Sodium Bromide 44%; Sodium Hydroxide 1%	100 F		OK			OK			OK	OK		F 3 6 Mo	OK	OK		OK
Sodium Bromide 44%; Sodium Hydroxide 1%	150 F		OK 4			OK 4			OK 4	OK 4		F1,3,4 6 Mo	OK 4	OK 4		OK
Sodium Bromide Waste	100 F		F 3 1 Yr			OK		F 3 1 Yr	F 3 1 Yr			F 3 1 Yr				OK
Sodium Carbonate Slurry	100 F													OK**		
Sodium Carbonate Slurry	150 F													OK**		
Sodium Carbonate 5%	100 F	OK	OK	OK 4		OK			OK	OK 4	OK 4	OK	OK	OK	OK	OK
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

Mo = Month
Wk = Week
Da = Day
H = Hours
F = Failed

FC = Force Cured.
< = 6 Month Test.
** = Minimum 1 year field service history.
+ = Corrosion rate extreme to steel substrate; NOT recommended for immersion service.

1 = Slight Softening: Normally NOT recommended for continuous immersion service. May be recommended for spillage.
2 = Severe Softening: NOT recommended for continuous immersion service. May be recommended for spillage
3 = Blistered
4 = Discoloration
5 = Dissolved Coating
6 = Cracked
7 = Slight Etching
8 = Severe Etching
9 = Swelling
10 = Permeation

NOTE: All solutions are in water unless otherwise indicated

CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570
Sodium Carbonate 5%	150 F	OK 4	OK	OK 4		OK			OK 4	OK 4	OK 4	OK 4	OK 4	OK 4	OK	OK
Sodium Carbonate 30%	100 F	OK	OK	OK 4		OK			OK	OK 4	OK 4	OK	OK	OK	OK	OK
Sodium Carbonate 30%	150 F	OK 4	OK	OK 4		OK 7			OK 4	F 3,4 1 Yr	OK 4	OK	OK 4	OK 4	OK	OK
Sodium Carbonate 50%	70 F						<OK	<OK	<OK	<OK						
Sodium Chlorate (Dry)	100 F								OK**							
Sodium Chlorate 50%	70 F						<OK	<OK	<OK	<OK						
Sodium Chlorate 50%	100 F											OK		OK	OK	OK
Sodium Chlorate 50%	150 F											OK	OK 4	OK	OK	OK
Sodium Chlorate 50%	180 F						OK 1 Mo	OK 1 Mo	OK 1 Mo	OK 1 Mo						
Sodium Chlorate 25%; Sodium Chloride 15%	100 F											<OK				
Sodium Chlorate 25%; Sodium Chloride 15%	150 F											<OK				
Sodium Chlorate 50%; Sodium Chloride 50% (Slurry)	100 F	<OK					<OK		<OK							
Sodium Chlorate 50%; Sodium Chloride 50% (Slurry)	180 F	F 3 4 Mo					<OK		<OK							
Sodium Chloride (Dry)	100 F	OK							OK**					OK	OK	
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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10.2 CORROSION RESISTANCE TEST DATA

CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570
Sodium Chloride 10% (Brine Solution)	100 F	OK	OK	OK		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Sodium Chloride 20% (Brine Solution)	100 F	OK	OK	OK		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	
Sodium Chloride 20% (Brine Solution)	180 F	OK		OK	OK	OK	OK		OK		OK	OK			OK	OK
Sodium Chloride 40%	212 F			OK		OK					OK	OK	F 4,10 1 Yr	F 4,10 1 Yr	OK	
Sodium Chloride 12% Sodium Hydrosulfite 3%	150 F			OK 4		F 5 1 Yr			OK 4		F 3 2 Mo	F 3 2 Mo				OK 4
Sodium Chloride 14%; Sodium Hydroxide 10% (Cell Liquor)	150 F								F 3 2 Wk	F 3 4 Mo						
Sodium Chloride 20% Methylene Chloride 2%	100 F			OK		OK										
Sodium Chlorite 50%	100 F			F 5 2 Wk					F 5 2 Wk							
Sodium Chromate 50%	70 F		<OK	OK			<OK	<OK	<OK	<OK						
Sodium Chromate 50%	150 F														OK	
Sodium Citrate 40%	100 F	<OK		<OK		<OK		<OK	<OK	<OK	<OK	<OK				OK
Sodium Cyanide 20%	100 F	F 3 6 Mo		F 3 6 Mo			F 3 6 Mo	F 3 6 Mo	<OK	<OK						OK
Sodium Fluorosilicate	100 F	OK							OK							
Sodium Formate 22%	100 F			OK		OK		OK	OK	OK	OK					
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570
Sodium Formate 22%	180 F			OK		OK		OK	OK 4	F 3 4 Mo	F 3 6 Mo					
Sodium Formate 50%	100 F			OK		OK		OK	OK	OK	OK		OK	OK		
Sodium Formate 50%	150 F												OK 4	OK		
Sodium Formate 50%	180 F			F 3 1 Yr		OK 4		OK 4	OK	F 5 1 Yr	F 3 6 Mo					
Sodium Hydrosulfide	180 F			F 5,6 Mo			F 3,4 2 Wk		F 3 1 Mo	<OK 4						
Sodium Hydrosulfide 40%	150 F								OK 4	OK 4		F 2,4 1 Mo	OK 4	OK 4	OK 4	OK 4
Sodium Hydrosulfide 50%	140 F			<OK 4			<OK 4	<OK 4	<OK	<OK 4						
Sodium Hydrosulfide 60%	230 F															OK
Sodium Hydrosulfide 72%	100 F			<OK 4	OK			<OK 4	<OK	<OK 4			OK 4	OK		
Sodium Hydrosulfide 72%	150 F			<OK 4				<OK 4	<OK	<OK 4			OK 4	OK		
Sodium Hydrosulfite 5%	100 F			OK		F 3 1 Yr	F 3 2 Mo		OK			OK				OK
Sodium Hydrosulfite 5%	150 F			OK	OK	F 3 1 Yr	F 3 2 Mo		OK			F 3 6 Mo	F 3 1 Wk	F 3 1 Wk		OK
Sodium Hydrosulfite 10%	100 F			OK		OK			OK		F 3 1 Yr	OK				OK
Sodium Hydrosulfite 10%	150 F			OK	OK	OK			F 3 2 Mo		F 3 2 Mo	F 3 2 Mo	F 3 1 Wk	F 3 1 Wk		OK
Sodium Hydrosulfite 25%	100 F			OK		F 3 1 Yr			F 3 4 Mo		F 3 2 Mo	OK				OK
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570
Sodium Hydrosulfite 25%	150 F			OK	OK	F 3 1 Yr			F 3 2 Mo		F 3 2 Mo	F 3 2 Mo	F 3 1 Wk	F 3 1 Wk		OK
Sodium Hydrosulfite 50%	100 F			OK	OK	OK			OK		OK					OK
Sodium Hydrosulfite 50%	150 F			OK	OK	OK			OK		OK		OK 4	OK 4		OK
Sodium Hydroxide 1%	100 F			F 5 4 Mo	F 5 4 Mo											
Sodium Hydroxide 1%	150 F								F 3 2 Wk	OK 8 Mo					OK	OK
Sodium Hydroxide 5%	100 F	F 3,4 1 Wk	OK		F 8 3 Wk		F 3 4 Mo		F 3 1 Wk	OK 8 Mo		<OK	F 3 1 Yr	OK	OK	OK
Sodium Hydroxide 5%	150 F	F 3 1 Da	OK			F 3 3 Mo	F 3,4 1 Wk		F 3 5 Da	F 3 16 Mo			F 3 1 Yr	F 3 1 Yr	OK	OK
Sodium Hydroxide 8%	100 F					F 4,7 1 Yr								OK	OK	OK
Sodium Hydroxide 8%	150 F											F 3 2 Mo			OK	OK
Sodium Hydroxide 8%	200 F		F 3 3 Mo			F 3 8 Mo				F 3 2 Mo						OK
Sodium Hydroxide 10%	100 F	F 3 6 Mo	OK			OK	<OK 1		F 1,3 4 Mo	<OK			OK	OK 4	OK	OK
Sodium Hydroxide 10%	150 F	F 3,4 2 Wk	F 3 1 Yr			F 1,3 8 Mo			F 3 2 Wk	F 3 4 Mo			F 3,4 1 Yr	F 3 6 Mo	OK	OK
Sodium Hydroxide 10%	200 F		F 3 6 Mo	F 5 3 Da		F 3,4 6 Mo	F 3 2 Mo	F 3 5 Da	F 3 3 Da	F 3 1 Mo				F 3 7 Mo	F 3,4 1 Yr	OK
Sodium Hydroxide 20%	100 F												OK 4			
Sodium Hydroxide 25%	100 F		<OK						F 3 6 Mo	OK			OK 4	OK	OK	OK
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570
Sodium Hydroxide 25%	150 F	F 3 1 Mo	OK	F 5 5 Da		F 1,3 8 Mo			F 3,4 2 Mo	OK			OK 4	F 3,4 1 Yr	OK	OK
Sodium Hydroxide 33%	100 F	F 3 8 Mo												OK 9		
Sodium Hydroxide 33%	150 F	F 3 1 Mo												OK 4		
Sodium Hydroxide 40%	100 F	OK	<OK			<OK	<OK		<OK	OK				OK 4	OK	OK
Sodium Hydroxide 40%	150 F	F 3 4 Mo	<OK			<OK 4	<OK 1		F 1,3 2 Mo					OK 4	OK	OK
Sodium Hydroxide 50%	100 F	OK 4	OK			OK 4	<OK 4		<OK 4	OK**		OK 15 Mo	OK	OK	OK	OK**
Sodium Hydroxide 50%	150 F	F 3 6 Mo	OK			OK 7			OK 4	OK		OK 15 Mo	OK 4	OK 4	OK	OK
Sodium Hydroxide 50%	180 F						F 2 8 Mo		F 2 8 Mo	F 1,8 10 Mo		F 1,8 1 Yr	OK 4	OK 4	OK	OK
Sodium Hydroxide 50%	200 F														OK 4	OK
Sodium Hydroxide 73%	200 F														OK 4	OK**4
Sodium Hydroxide 73%	265 F														OK 4,7	OK 4,7
Sodium Hypochlorite 5%	100 F						F 3 7 Da	F 5 1 Mo	F 3 3 Wk	F 5 4 Mo			F3,4,7 8 Mo	OK+4		OK+
Sodium Hypochlorite 50 ppm	100 F	F 1,3 2 Wk					OK+	F 3 1 Mo	OK+	F 3 2 Wk	OK+	OK+	F 3 1 Mo	OK+		
Sodium Hypochlorite 50 ppm	150 F	F 3 2 Wk					F 3 8 Mo	F 3 2 Wk	F 3 4 Mo	F 3 1 Wk	OK+	OK+	F 3 1 Wk	F 3 1 Mo		
Sodium Hypochlorite 50 ppm	180 F	F 3 1 Wk					F 3 2 Wk	F 3 2 Wk	F 3 6 Mo	F 3 1 Wk	F 3,4 4 Mo	F 3,10 6 Mo	F 3 1 Wk	F 3 1 Mo		
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570
Sodium Hypochlorite 100 ppm	100 F	F 3 2 Wk					OK+	OK+	OK+	F 3 2 Wk	OK+	OK+	F 3 6 Mo	OK+		
Sodium Hypochlorite 100 ppm	150 F	F 3 2 Wk					OK+	F 3 1 Mo	F 3 4 Mo	F 3 1 Wk	F 3 1 Yr	OK+	F 3 1 Wk	F 3 1 Mo		
Sodium Hypochlorite 100 ppm	180 F	F 3 1 Wk					F 3 1 Wk	F 3 1 Wk	F 1,9 8 Mo	F 3 1 Wk	F 3,4 4 Mo	F 3,4 6 Mo	F 3 6 Mo	F 3 1 Mo		
Sodium Hypochlorite 144 ppm	100 F	F 2 2 Wk	OK+	OK+4	OK+4	OK+	F 3 2 Mo	F 3 4 Mo	F 3 2 Mo	F 3 2 Wk	OK+		F 3 2 Mo	OK+	OK+	OK+
Sodium Hypochlorite 200 ppm	100 F	F 3 2 Wk					OK+	F 3 1 Mo	F 3 2 Wk	F 3 2 Wk	OK+	OK+	F 3 1 Mo	OK+		
Sodium Hypochlorite 200 ppm	150 F	F 3 1 Wk					F 3 1 Mo	F 3 2 Wk	F 3 4 Mo	F 3,4 1 Wk	F 3 6 Mo	F 3 6 Mo	F 3 1 Wk	F 3 1 Mo		
Sodium Hypochlorite 200 ppm	180 F	F 3 1 Wk					F 3 2 Wk	F 3 2 Wk	F 3 4 Mo	F 3 1 Wk	F 3,4 2 Wk	F 3,4 6 Mo	F 3 1 Wk	F 3,4 1 Mo		
Sodium Hypochlorite 288 ppm	100 F	F 3 1 Mo	OK+	OK+4	OK+4	OK+	F 3 2 Mo	F 3 6 Mo	F 3 1 Mo	F 3 2 Mo	OK+		F 3 6 Mo	OK+	OK+	OK+
Sodium Hypochlorite 300 ppm	100 F	F 3 1 Mo					F 3 4 Mo	F 3 1 Mo	F 3 1 Mo	F 3 2 Wk	OK+	OK+	F 3 4 Mo	OK+4		
Sodium Hypochlorite 300 ppm	150 F	F 3 2 Wk					F 3 2 Wk	F 3 2 Wk	F 3 2 Wk	F 3 2 Wk	F 3 1 Yr	OK+	F 3 1 Wk	F 3 1 Mo		
Sodium Hypochlorite 300 ppm	180 F	F 3 1 Wk	OK+	OK+	OK+	F 3 6 Mo	F 3 1 Wk	F 3 1 Wk	F 3 1 Wk	F 3,4 1 Wk	F 3 1 Wk	F 3 1 Mo	F 3 1 Wk	F 3,4 1 Mo	OK+	OK•
Sodium Hypophosphite 5%	70 F						OK 8 Mo	OK 8 Mo	OK 8 Mo	OK 8 Mo						
Sodium Lauryl Sulfate 30%	100 F	OK 8 Mo		OK 8 Mo		OK 8 Mo		OK 8 Mo	OK 8 Mo	OK 8 Mo		OK 8 Mo				
Sodium N-Methyldithio-carbamate 42%	100 F	OK		OK	OK	OK		OK	OK	OK	OK	OK	OK	OK	OK	OK
Sodium Nitrate 40%	100 F		OK	OK 4	OK	OK		OK	OK	OK	OK	OK	OK	OK		OK
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570
Sodium Nitrate 40%	150 F		OK	OK 4	OK	OK 4		F 3 8 Mo	OK 4	OK 4	OK 4	OK 4	OK 4	OK 4		OK 4
Sodium Perborate	100 F								OK**							
Sodium Phosphate, Di-Basic 5% (Disodium Phosphate)	100 F										<OK	<OK				
Sodium Phosphate 50%	70 F						OK+ 8 Mo	F 3 3 Mo	OK+ 8 Mo	OK+ 8 Mo						
Sodium Propionate 20%	70 F			OK			<OK	<OK	<OK	<OK						
Sodium Silicate	100 F	OK 7 Mo	OK 7 Mo			OK 7 Mo	OK 7 Mo		OK 7 Mo	OK 7 Mo						
Sodium Silicate	150 F	F 3 7 Mo	OK 7 Mo			OK 7 Mo	F 3 7 Mo		OK 7 Mo	OK 4 7 Mo						
Sodium Silicate 50%	100 F	OK 7 Mo	OK 7 Mo			OK 7 Mo	OK 7 Mo		OK 7 Mo	OK 7 Mo						
Sodium Silicate 50%	150 F	OK 8 Mo	OK 8 Mo			OK 8 Mo	OK 8 Mo		OK 8 Mo	OK 8 Mo						
Sodium Sulfate Dry	100 F	OK**							OK**					OK		
Sodium Sulfate 6%; Ammonium Sulfate 6%	150 F	<OK	<OK	<OK			<OK	<OK 4	<OK	<OK 4						
Sodium Sulfate 10%	150 F		<OK	OK 4 8 Mo		OK 8 Mo		OK 4 8 Mo	OK 8 Mo	OK 4 8 Mo						
Sodium Sulfate 30%	150 F		<OK	OK 4 8 Mo		OK 8 Mo		OK 8 Mo	F 3 1 Mo	OK 4 8 Mo			F 3 1 Wk	F 3 6 Wk		
Sodium Sulfide 10%	100 F		OK			OK			F 3 6 Mo	OK	F 3 1 Yr	OK	OK 4	OK	OK	OK
Sodium Sulfide 10%	150 F		OK			OK			F 3 6 Mo	F 3 1 Yr	F 3 1 Yr	F 3 2 Mo	OK 4	F 3 6 Mo	OK	OK
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570
Sodium Sulfide 50%	100 F		OK			OK			OK	OK 4	F 3 2 Mo	F 3 1 Yr		OK	OK	OK
Sodium Sulfide 50%	150 F		F 3 6 Mo			OK 4			F 3 4 Mo	OK	F 3 1 Mo	F 3 2 Mo	OK 4	OK 4	OK	OK
Sodium Sulfite 10%	180 F			<OK 4			<OK	<OK 4	<OK 4	<OK 4						
Sodium Sulfite 50%	150 F												OK	OK	OK	OK
Sodium Thiocyanate 10%	70 F			OK+4 9 Mo				OK+ 9 Mo	OK+ 9 Mo	OK+ 9 Mo						
Sodium Thiocyanate	180 F			OK+4 9 Mo				OK+4 9 Mo	F 3 4 Mo	OK+ 9 Mo						
Sodium Thiocyanate 50%	70 F			OK+ 9 Mo					OK+ 9 Mo	OK+ 9 Mo						
Sodium Thiocyanate 50%	100 F												OK+	OK+	OK+	OK+
Sodium Thiocyanate 50%	180 F			OK+4 9 Mo				OK+ 9 Mo	F 3 4 Mo	OK+4 9 Mo						
Sodium Thiosulfate 10% pH 6.5	100 F								<OK+1							
Sodium Thiosulfate 30%	100 F	<OK+	<OK+	<OK+4		OK	<OK+	<OK+	<OK+	<OK+			OK+	OK+	OK+	OK+
Sodium Xylenesulfonate	100 F			F 2,4 6 Mo			F 1 4 Mo	<OK 4	<OK	<OK 4						
Sorbitol	100 F	<OK		<OK	OK				<OK	<OK						
Soy Sauce (Kikkoman)	110 F			OK	OK 4				OK 4	OK 4		OK 4	OK 4	OK 4		OK
Soy Sauce (Kikkoman)	150 F			OK 4	OK 4				OK 4	F 3 10 Mo		OK 4	OK 4	OK 4		OK 4
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570
Soy Sauce (Kikkoman)	180 F			OK 4	OK 4				OK 4	F 3 3 Mo		F 3 6 Mo	F 3 6 Mo	F 3 6 Mo		OK 4
Soybean Foots	250 F	F 3 2 Wk		F 5 1 Wk		OK				F 3 2 Mo						
Soybean Oil	70 F			<OK	OK		<OK		<OK	<OK 4						
SR-10® 5% (Wyandotte Chemical)	100 F	<OK 4		<OK			<OK	<OK 4	<OK	<OK 4						
SR-10® 5% (Wyandotte Chemical)	150 F	<OK 4		<OK			<OK	<OK 4	<OK	<OK 4						
Stearic Acid	180 F												F 3 6 Mo	F 3 6 Mo	OK	OK
Stearic Acid	200 F			OK	OK											
Stearic Acid 50% in Ethyl Alcohol	70 F			<OK	OK		<OK	<OK	<OK	F 3 2 Mo						
Stearic Acid 90%	160 F	F 5 1 Yr	OK	OK	OK	OK	F 5 2 Mo	F 3 1 Yr	F 5 1 Mo	F 5 1 Da						
Stearic Acid 90% (n-Octadecanoic Acid)	180 F												F 2 6 Mo	F 3,6 6 Mo	OK	OK
STEROX AJ-85®	170 F			<OK			F 2,3 1 Wk	F 2,3 1 Mo	F 2,3 1 Wk	F 2,3 1 Mo						
Strawberry Preserve	70 F			<OK		<OK				<OK						
Styrene	100 F			OK	OK	OK	F 3 1 Wk	OK 1	F 3 1 Wk	F 1,3 2 Wk	F 2 1 Wk		OK	F 3 2 Da	OK	OK
Styrene	150 F				OK								F 5 2 Mo			F 3 2 Mo
Sugar Solution (Saturated)	70 F	<OK		<OK		<OK			<OK	<OK						
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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Sulfamic Acid 5%	100 F	OK+				OK+		F 3 48 H	OK+	OK+4	F 3 48 H					
Sulfamic Acid 5%	150 F														OK	OK
Sulfamic Acid 20%	70 F			<OK+			F 3,4 2 Wk	F 3 1 Wk	F 3 1 Wk	F 3 1 Mo						
Sulfamic Acid 50%	70 F			<OK+			F 3,4 2 Wk	F 3 1 Wk	<OK+	F 3 4 Mo						
Sulfamic Acid 50%	100 F								F 3 6 Mo				F 3 2 Da	F 3,4 4 Mo		
Sulfolane 60%	100 F			OK		OK							OK	OK 4		OK
Sulfur (Dry)	100 F								OK**							
Sulfur (Molten)	320 F			OK**	OK											
Sulfuric Acid 0.1%	140 F			<OK+4		<OK+4			F 3,4 5 Mo	F 3 2 Mo						
Sulfuric Acid 2%	150 F			<OK+4		<OK+4		F 1,3 1 Mo	F 3 1 Wk	F 3 1 Mo						
Sulfuric Acid 5%	100 F					OK							F 3 2 Wk		OK+4	
Sulfuric Acid 10%	100 F	F 3,4 6 Mo	<OK+	<OK+4	OK+4	<OK+4	F 3 2 Wk		F 3 1 Mo				F 3 1 Wk	F 3,4 4 Mo	OK+4	OK+4
Sulfuric Acid 10%	150 F	F 3,4 1 Mo	<OK+	<OK+4		OK+	F 3,4 1 Wk		F 3,4 1 Wk						F 3,4 4 Mo	F 3,4 2 Mo
Sulfuric Acid 20%	70 F			<OK+4			<OK+	F 3 1 Wk	<OK+	F 3 4 Mo						OK+
Sulfuric Acid 40%	100 F		<OK+	<OK+4		<OK+	F 3,4 4 Mo		F 3,4 4 Mo							
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Sulfuric Acid 40%	150 F		<OK+			<OK+	F 3,4 2 Wk		F 3,4 1 Mo							
Sulfuric Acid 50%	100 F	<OK+		<OK+4		OK+	<OK+4	<OK+	<OK+4	<OK+4						
Sulfuric Acid 50%	150 F	F 3,4 4 Mo	F 5 1 Yr	<OK+4			F 3,4 4 Mo		F 3,4 1 Mo							
Sulfuric Acid 75%	100 F			<OK+4		<OK+4	F 3 1 Mo		F 3 2 Mo	F 3,4 6 Mo						
Sulfuric Acid 75%	150 F			<OK+4		<OK+	F 5 1 Da		F 3 1 Da							
Sulfuric Acid 92-98%	70 F			OK**4			F 5 2 H	F 5 2 H	F 5 2 H	F 5 2 H					F 5 1 Da	
Sulfuric Acid 92-98%	100 F			OK**4	OK**4											
Sulfuric Acid 96%	150 F			OK 4												
Swift Glue	70 F			<OK			<OK 1	F 3,4 2 Wk	F 3 3 Wk	F 3,4 3 Wk						
Tall Oil	70 F			<OK		<OK	<OK		<OK	<OK						
Tall Oil	150 F								OK 4							
Tall Oil	180 F			OK 4	OK 4								F 1,8 10 Mo		OK	OK
Tall Oil	200 F	F 3 4 Mo		OK	OK	OK		F 3 1 Mo	F 3 4 Mo	F 3 2 Wk	F 3 1 Mo	F 3 2 Wk	F 3 1 Yr	F 3 1 Yr	OK	OK
Tall Oil	210 F			OK 4	OK 4											
Tall Oil (Crude) Reichhold	Amb.	OK 4	OK	OK	OK	OK		F 3,4 1 Yr	OK 4	F 3,4 10 Mo	OK 4	OK 4	OK 4	OK 4	OK	OK
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Tall Oil Fatty Acid	100 F			OK**	OK	OK		F 3 1 Yr	OK	F 3.5 2 Mo		F 2 4 Mo	OK 4		OK	
Tallow (Crude)	150 F			<OK	OK		F 5 6 Mo	<OK	F 3 4 Mo	F 5 2 Wk						
TAMUL F® (Rohm & Haas)	100 F			OK 7 Mo					<OK 1	OK 7 Mo						
Tanning Extract	100 F			OK**												
TELVAR®	70 F						<OK	F 3 2 Mo	<OK	<OK						
Terephthalic Acid (Dry)	100 F	OK														
Tetrachloroethylene (Perchloroethylene)	70 F			OK**		<OK	<OK	<OK	<OK	<OK						
Tetrachloroethylene (Perchloroethylene)	100 F		OK	OK	OK	OK	OK		OK	OK 4	OK	OK	OK 4	F 3 10 Mo	OK	OK
Tetrachloroethylene (Perchloroethylene)	200 F			<OK	OK			OK 4					OK 4	F 3 1 Wk	OK	OK 4
Tetraethylenepentamine	70 F			<OK			F 2.6 2 Mo	F 3 1 Wk	F 2.6 2 Mo	F 2.6 2 Mo						
Tetraethylenepentamine	100 F	F 2 1 Da		OK	OK	OK		F 2 1 Da	F 2 1 Da	F 2.3 1 Wk	F 2.3 1 Wk	F 2 1 Da	F 2 8 Mo	F 2 1 Da	OK	OK 4 1 Yr
Tetraethylenepentamine	150 F	F 5 1 Da		OK	OK	OK		F 5 1 Da	F 5 1 Da	F 5 1 Da	F 5 1 Da	F 5 1 Da	F 5 1 Wk	F 2.3 1 Da	OK	F 5 1 Mo
Tetraethyllead	100 F			OK**	OK			FC/OK**								
Tetrahydrofuran (THF)	100 F			OK**	OK		F 5 1 Da	F 5 1 Da	F 5 1 Da	F 5 1 Da			F 4.5 1 Wk		F 3 1 Wk	F 5 1 Wk
Tetrahydrofuran (THF)	120 F												F 3.5 1 Wk			
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Tetrahydrofuran (THF)	150 F												F 5 1 Da		F 5 1 Da	F 5 1 Da
Therminol #55® (Heat Transfer Agents) Monsanto	120 F			OK	OK				OK				OK	OK	OK	OK
Therminol #59® (Heat Transfer Agents) Monsanto	120 F			OK	OK				OK 4				OK	OK	OK	OK
Therminol F 60® (Heat Transfer Agents) Monsanto	120 F			OK	OK				F [illegible] 10 Mo				OK 4	OK [illegible]	OK	OK
Therminol #66® (Heat Transfer Agents) Monsanto	120 F			OK	OK				OK 4				OK 4	OK	OK	OK
Therminol VP-1® (Heat Transfer Agents) Monsanto	120 F			OK	OK				F 3 8 Mo				OK 4	F 3 6 Mo	OK	OK
Titanium Dioxide (Dry)	100 F	OK							OK**					OK		
Titanium Dioxide ~~(Slurry)~~	100 F			OK**	OK	OK**			OK**					OK	OK	OK
Toluene	70 F			OK		OK	OK	OK		OK				OK		OK
Toluene	100 F				OK				OK 1				OK	F 3 1 Wk	OK	OK
2,4-Toluene Diisocyanate	100 F								OK**				OK		OK	
2,4-Toluene Diisocyanate	150 F			OK** 4 Mo	OK	<OK	OK 4 Mo		OK 4 Mo	OK 4 Mo						
Toluenesulfonic Acid 70%; Methanol 30%	100 F							F 3 4 Mo								
p-Toluenesulfonic Acid 25%	100 F	F 1,3 4 Mo	OK	OK		OK		F 3,4 48 H	F 3 2 Mo	F 3 1 Mo	F 3 4 Mo	F 3,4 2 Wk	OK 4	OK 4	OK	OK
p-Toluenesulfonic Acid 25%	150 F	F 3,5 48 H	F 5 4 Mo	F 5 4 Mo		OK+		F 3,4 48 H	F 3 2 Mo	F 3 48 H	F 3 48 H	F 3,5 48 H	F 3,5 48 H	F 3 48 H		F 3,4 1 Yr
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p-Toluenesulfonic Acid 50%	100 F	F 3,4 4 Mo	OK	OK		OK		F 3,4 2 Mo	OK 4	F 4,5 1 Mo	F 3,4 1 Yr	F 4,5 2 Wk	OK 4	OK 4	OK	OK
p-Toluenesulfonic Acid 50%	150 F	F 5 48 H	F 4,5 4 Mo	OK 4		OK		F 3,4 48 H	F 3 2 Mo	F 5 48 H	F 3,4 2 Wk	F 5 48 H	F 3 48 H	F 3,4 48 H	F 3,9 10 Mo	F 3,4 1 Yr
p-Toluenesulfonic Acid 75%	100 F	F 2,4 4 Mo	OK	OK		OK		OK 1,4	OK 4	F 2 1 Mo	OK 4	F 3,4 1 Wk	OK 4	OK 4	OK	OK
p-Toluenesulfonic Acid 75%	150 F	F 3,4 1 Wk	F 4,5 1 Yr	OK 4		OK 4		F 3,4 48 H	F 3,4 2 Wk	F 2,5 48 H	F1,3,4 2 Wk	F 4,5 48 H	OK 4,7	F 3 48 H		F 4,5 6 Mo
Tomato Juice	100 F	OK	OK 4 Mo						OK 4	OK 4					OK	OK
Tomato Juice	150 F	OK 4							OK 4	F 3 1 Yr					OK	OK
Tomato Paste	100 F	OK 4							OK 4	OK 4		OK 4	OK 4	OK 4	OK	OK
Tomato Paste	150 F	OK 4							OK 4	F 3 1 Yr		F 3,4 1 Mo	F 3,4 2 Mo	F 3,4 4 Mo		
Transmission Fluid	130 F			OK	OK										OK	OK
Tributyl Phosphate	100 F			OK	OK			F 3,4 4 Da	F 1,3 4 Mo				OK		OK	OK
1,1,1-Trichloroethane (CHLOROTHENE®)	100 F		OK	OK**	OK	OK		OK 1,4	F 2 1 Da	F 3 2 Wk	F 3 2 Wk	F 3 2 Mo	OK 4	OK	OK	OK
1,1,1-Trichloroethane (CHLOROTHENE®) Vulcan Chem.	212 F	F 3 1 Mo		OK	OK			F 3 1 Mo	F 1,3 1 Mo	F 3 1 Wk	F 3 1 Wk	F 3 1 Wk	OK 4	F 3 24 H	OK	OK
Trichloroethylene	100 F		F 3 6 Mo	<OK	OK	F 3 2 Mo	F 2,3 1 Da	<OK	F 2,3 1 Da				F 2,3 4 Mo	F 5 72 H		OK 4
Trichloroethylene	180 F			<OK	OK			OK**4								
Trichloroethylene	190 F			OK 4	OK			F 3,4 1 Yr					F 3,4 1 Yr		F 3,4 8 Mo	F 3,4 1 Yr
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Tridecyl Alcohol	70 F			<OK			<OK	<OK	<OK	<OK						
Tri(dimethylaminomethyl) Phenol	100 F												OK	OK	OK	OK
Triethanolamine	100 F	OK	OK	OK	OK		OK	F 3 2 Wk	OK	OK			OK	OK	OK	OK
Triethanolamine	150 F		OK	OK	OK		OK	F 3 1 Wk	OK	OK						
TRI-ETHONE® (PPG)	165 F							<OK1,4								
TRI-ETHONE® (PPG)	165 F							FC <OK1,4								
Triethyl Benzene	70 F			OK 8 Mo			OK 8 Mo	OK 8 Mo	OK 8 Mo	OK 8 Mo						
Triethyl Benzene	150 F			<OK	OK		OK 8 Mo	OK 8 Mo	OK 8 Mo							
Triethylene Glycol	100 F	<OK	<OK	<OK	OK			F 3,4 2 Wk	F 2 2 Mo	F1,3,4 8 Mo	F 3 2 Wk	OK	OK	F 2 2 Mo	OK	OK
Triethylene Glycol	150 F		F 3 2 Mo	OK	OK			F 2,3 72 H	F 3 2 Mo		F 3 72 H	F 3 2 Mo	F 3,4 10 Mo	F 3 4 Mo	OK 4	OK 4
Triethylene Glycol 80%	100 F							F1,3,4 2 Wk								
Triethylenetetramine	100 F			OK	OK								F 5 2 Wk		OK 4,7	F 5 1 Wk
Trimethyl Phosphate	100 F	F 3 1 Da	F 3 1 Wk	OK	OK	OK		F 3 1 Da	F 3,5 1 Wk	F 2,3 6 Mo	F 2,3 1 Da	F 3 1 Da	OK	F 5 1 Da		OK
Triphenyl Phosphite	100 F			<OK	OK	<OK		<OK	<OK							
Tripotassium Phosphate {SEE: Potassium Phosphate, tribasic}																
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Tripropylene Glycol Monomethyl Ether (TPM)	100 F	F 1,3 10 Mo		OK	OK	OK		F 2 72 H	OK 1			OK 1	OK	OK 1	OK	OK
TRITON X100® (Rohm & Haas)	180 F			<OK			F 3 1 Wk	F 3 4 Mo	F 3 2 Wk	F 1,3 4 Mo						
Turbine Oil (Synthetic) {SEE: Oil, Turbine (Synthetic)}																
TURBO 15® {SEE: Lubricant}																
Turpentine	70 F			<OK			<OK	<OK	<OK	<OK					OK	OK
UCON ®Quenchants (Union Carbide)	150 F			OK 4				F 3 1 Mo			F 3 1 Mo	F 3 6 Mo	F 3 1 Wk	OK 4	OK	OK 4
UCON ®Quenchants 25% (Union Carbide)	150 F	F 3 2 Wk		OK 4				F 3 2 Wk	F 3 2 Wk	F 3 2 Wk	F 3 1 Mo	F 3 1 Mo	F 3 1 Wk	F 3 2 Mo	OK 4	OK 4
Urea (Dry)	100 F												OK		OK	
Urea 50%	100 F	OK		OK		OK		OK 4	OK	OK						
Urea Ammonium Nitrate (Nitrogen Fertilizer Solution)	100 F		OK	OK	OK	OK		OK 4	OK	OK	OK 4	OK	OK	OK	OK	OK
Urea Ammonium Nitrate (Nitrogen Fertilizer Solution)	150 F		OK	OK 4	OK 4	OK 4		OK 4	OK 4	OK 4	OK 4	OK 4	OK 4	OK	OK	OK 4
Urea Ammonium Nitrate (Nitrogen Fertilizer Solution)	200 F		OK 4	OK 4	OK 4	OK 4		OK 4	F 3 1 Yr	OK 4	OK 4	OK 4	OK 4	OK 4	OK 4	OK 4
Urea Ammonium Nitrate (Nitrogen Fertilizer Solution)	250 F		OK 4	OK 4	OK 4	OK 4		OK 4	F 3 6 Mo	F 3 6 Mo	F 3 6 Mo	F 3 6 Mo	F 5,6 6 Mo	OK 4	OK 4	OK 4
Urea Formaldehyde Resin	100 F			OK**	OK											
Uric Acid Solution	70 F			OK 8 Mo			OK 8 Mo	F 3 6 Mo	OK 8 Mo	F 3 8 Mo						
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Valeric Acid	100 F														OK	OK
Valeric Acid	150 F														OK 4	F1,3,4 8 Mo
Valeric Acid 5%	100 F	F 3,6 1 Da							F 3,6 1 Da	F 5 1 Da			F 3,5 1 Da	F 3,6 1 Da		OK 4
Vegetable Fat	150 F			OK	OK								OK	OK	OK	OK
Vegetable Fat	180 F			OK	OK								OK 4	OK 4	OK	OK
Vegetable Juice (V-8®)	70 F			<OK		<OK				OK 2 Mo						
Vegetable Oil	100 F			OK**	OK										OK	
Vegetable Shortening CRISCO®	70 F									<OK						
VERSENE 100® (SEE: Ethylenediaminetetraacetic acid)																
Vinegar (White)	70 F			<OK+			F 3 2 Mo		F 3 2 Mo							
Vinegar (White)	100 F												F 3 1 Da			
Vinyl Acetate Monomer (Union Carbide)	100 F		OK	OK**	OK	F 3 4 Mo	F 2 2 Mo	OK 1,4	F 3 1 Yr	F 2 2 Mo			F 5 6 Mo	F 3 48 H	OK	OK
Vinyl Acetate Monomer (Union Carbide)	120 F							F 2,3 1 Mo	F 3 1 Wk				F 5 1 Wk	F 3 1 Da	OK	OK
Vinyl Acetate Monomer (Union Carbide)	150 F		F 2 6 Mo	OK**	OK	F 3 4 Mo	F 2 2 Mo	F 2 2 Mo	F 3 2 Mo	F 2 2 Mo					F 3 1 Mo	F 5 2 Mo
Vitamin "D" Solution	70 F									<OK						
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Vodka, 190 Proof	100 F			OK	OK					F 1,3 6 Mo			OK 4	F 3 1 Wk	OK	OK
Waste Sulfide Liquid	180 F						F 3 1 Da	F 3 1 Da	F 3 1 Da							
Water (Demineralized)	100 F	F 3 6 Mo		<OK	OK	<OK		F 3 4 Mo	F 3 6 Mo	F 3 6 Mo	OK**	OK**			OK	OK
Water (Demineralized)	150 F						OK									
Water (Demineralized)	212 F			OK	OK							OK			OK	F 3 40 H
Water, Demineralized (Ion (Cation) Exchange) Approx. pH 4	120 F			OK		OK		F 3 3 Mo		F 3 1 Yr	F 3 1 Wk					
Water, Demineralized (Ion (Cation) Exchange(Approx. pH 4	180 F			OK		OK		F 3 1 Yr		F 3 2 Mo	F 3 1 Wk					
Water (Distilled)	100 F	<OK		<OK	OK	<OK	<OK		<OK		OK**	OK**			OK	OK
Water (Distilled)	200 F	F 3 4 Da		OK**	OK	OK	F 3 4 Da		F 3 4 Da		OK**	OK**			OK	
Water (Sea)	100 F	<OK		<OK	OK	<OK	<OK	<OK	<OK	<OK	<OK	<OK	OK	OK	OK	OK
Water (Sea)	150 F	<OK		<OK	OK	<OK	OK	<OK	<OK	<OK	<OK	<OK	OK	OK	OK	OK
Water (Tap)	100 F	OK**	<OK	<OK	OK	<OK	<OK	<OK	OK**	OK**	<OK	<OK	OK	OK	OK	OK
Water (Tap)	150 F		<OK	OK	OK	OK			OK	F 3 6 Mo	<OK	OK**	F 3 1 Wk	OK 10 Mo	OK	OK
Water (Tap)	200 F	F 3 9 Da	<OK	OK**	OK	<OK	F 3 1 Da	F 3 1 Wk	F 3 9 Da	F 3 1 Wk	OK**	OK**			OK	
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

Mo = Month
Wk = Week
Da = Day
H = Hours
F = Failed

FC = Force Cured.
< = 6 Month Test.
** = Minimum 1 year field service history.
+ = Corrosion rate extreme to steel substrate; NOT recommended for immersion service.

1 = Slight Softening: Normally NOT recommended for continuous immersion service. May be recommended for spillage
2 = Severe Softening: NOT recommended for continuous immersion service. May be recommended for spillage.
3 = Blistered
4 = Discoloration
5 = Dissolved Coating
6 = Cracked
7 = Slight Etching
8 = Severe Etching
9 = Swelling
10 = Permeation

NOTE: All solutions are in water unless otherwise indicated

CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570
Water (Tap)	212 F				OK										OK	F 3 4 Mo
2,4-D ESTER WEED-NO-MORE®	70 F			OK**			<OK	<OK	<OK	<OK			OK 4	OK 4		
Whiskey, 80 Proof	100 F			OK					F 3 10 Mo	F1,3,4 1 Wk			F 3,4 1 Yr	F1,3,4 1 Mo	OK**	OK
Whiskey, 90 Proof	100 F			OK						F 2,4 1 Da			F 3,4 1 Mo	F 3,4 6 Mo	OK	OK
Wine, 10% Alcohol by volume	70 F			<OK		<OK			<OK	OK**			OK	OK	OK	OK
Wine 14% Alcohol by volume	100 F			OK	OK				OK	F 3 10 Mo			OK 4	OK	OK	OK
Wine (Fortified) 20% Alcohol by volume	100 F			OK	OK				OK 1	F 3 2 Mo			OK 4	OK	OK	OK
Worchestershire Sauce	150 F			OK	OK					F 3,4 1 Wk					F 3 8 Mo	OK
Xylene	100 F	<OK		<OK	OK	<OK	<OK	<OK	<OK	<OK	OK		OK	F 3 1 Yr	OK	OK
Xylene	150 F				OK			OK 4	OK 1,4	OK 1,4			OK 4		OK	OK
para-Xylene	150 F			<OK	OK	<OK		<OK1,4								
Zinc Chloride 40%	70 F			OK+ 9 Mo			OK+ 9 Mo	OK+ 9 Mo	OK+ 9 Mo	OK+ 9 Mo						
Zinc Chloride 40%	150 F														OK	
CHEMICAL EXPOSURE	TEMP	C-725	1246	3066	3070	6001	7100	7111	7122	7133	7155HHB	7156	9060	9080	9500	9570

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6 = Cracked
7 = Slight Etching
8 = Severe Etching
9 = Swelling
10 = Permeation

NOTE: All solutions are in water unless otherwise indicated.

PLASITE (R)

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BULLETIN TD-3
CORROSION RESISTANCE
TEST DATA

AUGUST 1989
(Replaces July 1987)

FOR THICK FILM COATINGS

The proper selection of coatings for specific exposures requires the best combination of science, art, experience and certain engineering fundamentals. Protective coatings for immersion and severe service are selected much in the same manner as other materials of construction involved in a chemical environment.

EFFECTIVE LIFE OF COATINGS depends on many factors, a few of which are listed below as a check-list to consider in the process of selecting the proper coating:

A. Chemical resistance of coating film.
B. Surface preparation and accessibility.
C. Film thickness -- continuity and quality depending on skilled application.
D. Design of tankage and equipment.
E. Physical abuse — abrasion — impingement - liquid velocities impact.
F. Electro-chemical, cathodic protection.
G. Thermal shock — cyclical heating and cooling.
H. Temperature limits and operating characteristics.
I. Impurities and combinations of reagents.
J. Substrate over which coating is applied.

The test data published in this bulletin was derived by conducting immersion tests in closed containers. The 1" x 5" x 1/8" mild steel panels were coated with a specific coating at the nominal mil thickness recommended for immersion service. The panels were immersed in one-half of their length in the liquid.

Test panels were inspected and results recorded as follows:
24 hrs.; 1 week; 2 weeks; 1 month; 2 months; 4 months; 6 months; 8 months; 10 months; and 1 year.

INSTRUCTIONS FOR USE OF TD-3

By using coded symbols, the following data in chart form allows the user to determine the effect of the environment on the specific coating. The chart is based on immersion exposure (space does not allow reporting the effect of vapor and interface stage). Although a failure may be indicated, and if not too rapid, a judgment may be made if the coating is useful in protection against fumes, splash and spills. Each page shows the symbols and description of exposure and effect. The following notes will aid in interpretation of results.

1 = SLIGHT SOFTENING

This is not considered a true failure as in most cases it is only a surface softening, the coating is not readily removable from the surface and, when removed from the environment, it generally comes back to its original hardness. The chart indicates that it should not be used for total and continuous immersion service. It is possible that the coatings showing this degree of softening might be used at the discretion of the user.

2 = SEVERE SOFTENING

The guidelines are that it may be easily removed from the surface and would not be recommended for continuous service even though the coating might appear to harden after being removed from the environment.

3 BLISTERED	5 = DISSOLVED	6 = CRACKED
8 SEVERE ETCHING	9 = SWELLING	10 = PERMEATION

Would be interpreted as not being suitable for immersion service and would be considered a failure when immersion service is contemplated.

4 = DISCOLORATION

Not considered a failure.

7 = SLIGHT ETCHING

There is a noted effect to the coating film and would normally not be considered a failure. This effect is limited to light surface etching only, with no measurable loss of film thickness. Coatings showing this degree of etching might be used at the discretion of the user.

The information presented is to be used as a guide to preliminary selection and an indication of the chemical resistance range of the coatings. Evaluation under actual conditions and field service is the next step in the process of proper selection. Consult our Home Office or PLASITE representative in your area for information on further tests and field history.

PLASITE 4000 SERIES

These coatings are formulated with **vinyl ester resin**. For immersion service, the normal film thickness is 35 mils minimum, 45 mils maximum, and is the thickness that is used to develop the test data. For film thickness above 45 mils, consult with our technical service laboratory. For film thickness below 35 mils for non-immersion service, refer to specific coating bulletins. For lining concrete tanks, refer to specific coating bulletin and to PLASITE Bulletin PA-4000.

All data, statements, and recommendations made herein are based upon information we believe to be reliable but ... without any representation or guaranty or warranty of accuracy and are made with reservation ... product are the condition that the user himself will evaluate them, as we disclaim responsibility for loss or damage ... patent rights that ... be construed as recommendations for their use in violation of any patent rights or in violation of any applicable ... adoption. All statements regarding the use of our products are ... evaluation. ... uses are made ...

CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310
Allyl Chloride (3-Chloropropene)	100°F	F 2 1 Mo				F 4, 10 1 Yr	
Aluminum Ammonium Sulfate 50%	150°F	OK 4 1 Yr		OK 4 1 Yr		OK 4, 7 1 Yr	
Aluminum Chloride 29%	150°F	OK 4 1 Yr	OK 4, 7 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr
Aluminum Fluoride 5%	150°F	OK 4 1 Yr				OK 4 1 Yr	
Aluminum Nitrate 50%	150°F	OK 4 1 Yr	OK 4, 7 1 Yr		OK 4 1 Yr	OK 4,7 1 Yr	OK 4,7 1 Yr
Aluminum Sulfate 10%	100°F	OK 4 1 Yr	OK 1 Yr	OK 1 Yr	OK 4 1 Yr	OK 1 Yr	OK 1 Yr
Aluminum Sulfate 10%	150°F	OK 4 1 Yr	F 3 6 Mo	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr
Aluminum Sulfate 50%	100°F	OK 4 1 Yr	OK 4 1 Yr	OK 1 Yr	OK 1 Yr	OK 1 Yr	OK 1 Yr
Aluminum Sulfate 50%	150°F	OK 4 1 Yr	F 3 1 Yr	OK 1 Yr	OK 1 Yr	OK 4 1 Yr	OK 4 1 Yr
Ammonium Hydroxide 5%	100°F	F 3, 4 6 Mo			F 3, 4, 7 1 Mo		
Ammonium Hydroxide 10%	100°F	OK 4, 7 1 Yr	F 3, 4 9 Mo	OK 4, 7 1 Yr	F 3, 4, 7 2 Mo	F 3 1 Mo	F 3, 4 1 Mo
Ammonium Hydroxide 29%	100°F	F 3, 4 2 Mo				F 3, 4 1 Mo	F 3, 4 1 Mo
Ammonium Perchlorate 10%	150°F	OK 4 1 Yr	OK 4 1 Yr			OK 1 Yr	OK 4 1 Yr
Ammonium Sulfate 8%	150°F	OK 4 1 Yr		OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	
Ammonium Sulfide 100%	100°F	OK 4 1 Yr				OK 4, 7 1 Yr	
CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310

Mo = Month
Wk = Week
Da = Day
H = Hours

OK = Test in progress at times noted
F = Failed
Blank space indicates no test data
** = Minimum 1 year field service history

1 = Slight Softening
2 = Severe Softening
3 = Blistered
4 = Discoloration
5 = Dissolved Coating
6 = Cracked
7 = Slight Etching
8 = Severe Etching
9 = Swelling
10 = Permeation

CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310
Acetic Acid 5%	100°F	OK 4 1 Yr				OK 4 1 Yr	
Acetic Acid 5%	150°F	F 3, 4 1 Yr	F 3 2 Mo	F 3 2 Mo	F 3 1 Mo	F 3, 4 4 Mo	F 3, 4 4 Mo
Acetic Acid 10%	100°F	OK 4 1 Yr		F 3 4 4 Mo		F 3 10 Mo	
Acetic Acid 10%	150°F					F 3, 4 6 Mo	
Acetic Acid 20%	100°F	F 4, 9, 10 6 Mo	F 3 10 Mo			F 3, 4 6 Mo	F 3 10 Mo
Acetic Acid (Glacial) 100%	100°F	F 2, 4 24 H		F 4, 6, 9 2 Wk	F 4, 6, 9 2 Wk	F 4, 8, 9 4 Mo	
Acetone	100°F	F 3 24 H				F 3 1 Mo	
Acetophenone	100°F	F 2 24 H				OK 1, 4, 7 1 Yr	
Acrylamide	Ambient						OK**
Acrylic Acid (Glacial)	100°F	F 2 1 Wk	F 3 1 Wk	F 2 1 Wk	F 2 1 Wk	OK 4, 7 1 Yr	OK 1 Yr
Acrylic Acid (Glacial)	150°F	F 1, 3, 5 2 Wk	F 1, 5 2 Wk	F 5, 7 1 Mo	F 5, 7 1 Mo	F 3, 7 4 Mo	OK 4 8 Mo
Acrylic Acid	100°F	F 2 1 Wk	F 3 1 Mo	F 2 1 Wk	F 3 1 Mo	OK 1, 7 1 Yr	OK 7 1 Yr
Acrylic Acid 5%	100°F	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr
Acrylic Acid 5%	150°F	F 3 4 Mo	F 3 2 Mo	F 3 2 Mo	F 3, 4 2 Mo	OK 4 1 Yr	F 3, 4 4 Mo
Acrylic Acid 20%	100°F	OK 4 1 Yr	OK 4 1 Yr	F 3, 4 1 Mo	F 4, 5 1 Mo	OK 4 1 Yr	OK 4 1 Yr
Acrylic Acid 50%	100°F	F 3, 4, 7 1 Wk	F 4, 5, 7 1 Wk	F 2, 3, 7 1 Wk	F 3, 5, 6 1 Wk	F 2, 3, 5 1 Wk	F 2, 3 24 H
CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310

Mo = Month
Wk = Week
Da = Day
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OK = Test in progress at times noted
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Blank space indicates no test data
** = Minimum 1 year field service history

1 = Slight Softening
2 = Severe Softening
3 = Blistered
4 = Discoloration
5 = Dissolved Coating

6 = Cracked
7 = Slight Etching
8 = Severe Etching
9 = Swelling
10 = Permeation

CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310
Carbon Disulfide	Ambient	F 2 8 Mo				F 6, 7 1 Yr	
Carbon Tetrachloride	Ambient	OK 7 1 Yr				OK 7 1 Yr	
Chlorobenzene	Ambient	F 2 1 Da				OK 7 1 Yr	
3-Chloropropene (SEE: Allyl Chloride)							
Chromic Acid 10%	150°F					OK 4 1 Yr	OK 4 1 Yr
Chromic Acid 20%	100°F	F 2, 4 24 H		F 4, 8 4 Mo		OK 4, 7 1 Yr	OK 4, 7 1 Yr
Chromic Acid 20%	150°F					OK 7 1 Yr	OK 1,4,7 1 Yr
Citric Acid 50%	100°F	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr
Cobalt Acetate 40%	150°F	OK 1 Yr		F 6 9 Mo		F 3 1 Yr	
Cresylic Acid 100%	100°F	F 3, 8 24 H		F 3, 8 24 H		F 3, 8 24 H	
Cresylic Acid 100%	150°F	F 8 24 H		F 8 24 H		F 3, 5 1 Wk	
Cyclohexene	100°F	F 2 1 Da				OK 4, 7 8 Mo	
Cyclohexylamine	100°F	F 5 1 Da				F 4, 5, 7 2 Mo	
1,2 Dibromo-1,1 Dichloroethane	100°F	F 2 1 Da				OK 4 1 Yr	
1,2 Dibromoethane (SEE: Ethylene Dibromide)							
1,2 Dichloroethane	100°F	F 2 1 Da				F 3, 4, 7 10 Mo	
CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310

Mo = Month
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Blank space indicates no test data
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1 = Slight Softening
2 = Severe Softening
3 = Blistered
4 = Discoloration
5 = Dissolved Coating
6 = Cracked
7 = Slight Etching
8 = Severe Etching
9 = Swelling
10 = Permeation

CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310
Barium Nitrate 50%	150°F	OK 4 1 Yr				OK 4 1 Yr	
Barium Sulfide 20%	150°F	OK 4 1 Yr		F 4, 6 9 Mo		F 3 1 Yr	
Benzaldehyde	100°F	F 5 1 Wk				OK 1, 4 1 Yr	
1,4-Butanediol	150°F	OK 4 1 Yr				OK 4,7 1 Yr	
n-Butylacrylate	100°F	F 3, 4 1 Mo				OK 4, 7 1 Yr	
n-Butylamine	100°F	F 5 24 H				F 5 24 H	
Butyl Alcohol	Ambient					OK**	
Butyl Glycidyl Ether	100°F	F 2 1 Da				OK 4 1 Yr	
Butyraldehyde	100°F	OK 7 1 Yr				OK 7 1 Yr	
Butyric Acid 5%	100°F	OK 1 1 Yr		F 1, 3 6 Mo		OK 4 1 Yr	
Butyric Acid 50%	100°F	F 2, 3 1 Wk		F 2, 4, 7 1 Wk		F 3, 4, 7 1 Mo	
Butyric Acid 98%	100°F	F 2 24 H	F 2 24 H	F 6 6 Mo	F 6 6 Mo	OK 7 1 Yr	OK 1 Yr
Butyric Acid 98%	150°F	F 2 24 H	F 6 2 Wk	F 6 2 Wk		OK 7 1 Yr	OK 7 1 Yr
Calcium Hydroxide 50%	150°F	OK 4 1 Yr		OK 4 1 Yr		OK 4 1 Yr	
Caproic Acid 98%	100°F	F 2 24 H				OK 7 1 Yr	
Caproic Acid 98%	150°F	F 3, 6 4 Mo	F 1, 6 4 Mo	F 1, 6 4 Mo	F 6 6 Mo	OK 7 1 Yr	OK 1 Yr
CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310

Mo = Month
Wk = Week
Da = Day
H = Hours

OK = Test in progress at times noted
F = Failed
Blank space indicates no test data
** = Minimum 1 year field service history

1 = Slight Softening
2 = Severe Softening
3 = Blistered
4 = Discoloration
5 = Dissolved Coating
6 = Cracked
7 = Slight Etching
8 = Severe Etching
9 = Swelling
10 = Permeation

CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310
Ethylene Dibromide (1,2 Dibromoethane)	100°F	F 2 1 Da				F 4, 6, 7 1 Yr	
Ethylene Glycol	210°F					OK 1, 4, 7 1 Yr	OK 4, 7 1 Yr
Ethylene Glycol 50%	100°F	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 1 Yr	OK 1 Yr
Ethylene Glycol 50%	150°F	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr
Fatty Ester (SEPTAN C-65) BASF	Ambient	OK 1 Yr		OK 1 Yr		OK 1 Yr	
Ferric Chloride 40%	150°F	OK 4 1 Yr	OK 4, 7 1 Yr			OK 4, 7 1 Yr	OK 4, 7 1 Yr
Ferric Chloride 50%	150°F	F 4, 6 1 Mo	OK 4 1 Yr	OK 4 1 Yr		OK 4 1 Yr	OK 4 1 Yr
Formaldehyde 37%	100°F	OK 4 1 Yr	OK 4 1 Yr			OK 7 1 Yr	OK 4 1 Yr
Formaldehyde 37%	150°F	F 3 8 Mo				F 3 8 Mo	
Formaldehyde 50%	100°F					OK 1 1 Yr	
Formaldehyde 50%	150°F					OK 1, 4 1 Yr	
Formic Acid 2%	100°F	OK 4 1 Yr				OK 4 1 Yr	
Formic Acid 5%	100°F	F 6 9 Mo	F 6 9 Mo	F 4, 6 9 Mo	F 4, 6 9 Mo	F 3, 4, 6 6 Mo	OK 4 1 Yr
Formic Acid 10%	100°F	F 4, 6 4 Mo				F 4, 6 4 Mo	
Formic Acid 25%	100°F	F 6, 9 4 Mo	F 6, 9 4 Mo			F 4, 5 2 Mo	F 4, 5 2 Mo
CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310

Mo = Month
Wk = Week
Da = Day
H = Hours

OK = Test in progress at times noted
F = Failed
Blank space indicates no test data
** = Minimum 1 year field service history

1 = Slight Softening
2 = Severe Softening
3 = Blistered
4 = Discoloration
5 = Dissolved Coating
6 = Cracked
7 = Slight Etching
8 = Severe Etching
9 = Swelling
10 = Permeation

CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310
Diethanolamine	100°F	OK 4, 7 1 Yr				OK 4, 7 1 Yr	
Diethanolamine	150°F	F 2,3,4,6 2 Wk	F 2,3,4,6 2 Wk	F 2, 4 24 H		F 4, 5 2 Wk	F 4, 5 2 Wk
Diethyl Ether (SEE: Ethyl Ether)							
Diethylenetriamine	100°F	F 4, 5 1 Wk				F 4, 5 1 Wk	F 5 24 H
Dimethylamine 25%	100°F	F 3, 4, 7 1 Mo				F 3 2 Wk	
Dimethylaminomethyl Phenol	100°F	OK 7 1 Yr				OK 7 1 Yr	
Dimethylaminomethyl Phenol (DMP-30)	100°F	OK 7 1 Yr				OK 7 1 Yr	
Dimethylethanolamine	100°F	F 2 24 H				OK 4 1 Yr	
Dimethylformamide	100°F	F 5 1 Da				F 5 1 Da	
2,4-Dimethylphenol (Xylenol)	150°F					F 5 2 Wk	F 5 2 Wk
Dimethylsulfoxide	100°F	F 2 1 Da				F 2 1 Da	
Ethanol	100°F	F 2 24 H		F 2 24 H		OK 4 1 Yr	
Ethyl Ether (Diethylether)	Ambient	OK 7 1 Yr				OK 4 1 Yr	
Ethylamine 70%	100°F	F 5 24 H	F 5 24 H			F 5 24 H	F 5 24 H
Ethylene Diamine	100°F	F 5 2 Wk				F 4, 5 2 Wk	
CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310

Mo = Month
Wk = Week
Da = Day
H = Hours

OK = Test in progress at times noted
F = Failed
Blank space indicates no test data
** = Minimum 1 year field service history

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2 = Severe Softening
3 = Blistered
4 = Discoloration
5 = Dissolved Coating

6 = Cracked
7 = Slight Etching
8 = Severe Etching
9 = Swelling
10 = Delamination

CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310
Herbicide (BLAZER) BASF	Ambient	OK 4, 7 1 Yr		OK 4, 7 1 Yr		OK 4, 7 1 Yr	
Hydrobromic Acid 3%	100°F	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr
Hydrobromic Acid 3%	150°F	OK 4, 7 1 Yr	F 3, 7 4 Mo	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	F 3, 4 8 Mo
Hydrobromic Acid 10%	100°F	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4, 7 1 Yr	OK 4, 7 1 Yr
Hydrobromic Acid 10%	150°F	F 3, 4, 7 1 Yr	F 3, 4, 7 8 Mo	OK 4 1 Yr	OK 4 1 Yr	OK 4, 7 1 Yr	OK 4, 7 1 Yr
Hydrobromic Acid 20%	100°F	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4, 7 1 Yr	OK 4, 7 1 Yr
Hydrobromic Acid 20%	150°F	OK 4, 7 1 Yr	OK 4, 7 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4, 7 1 Yr	OK 4, 7 1 Yr
Hydrobromic Acid Condensate	122°F	OK 4 1 Yr	OK 4 1 Yr			OK 4 1 Yr	OK 4 1 Yr
Hydrochloric Acid 5%	150°F	OK 4 1 Yr		OK 4 1 Yr		OK 4 1 Yr	
Hydrochloric Acid 10%	100°F	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr
Hydrochloric Acid 10%	150°F	OK 4 1 Yr		OK 4 1 Yr	OK 4 1 Yr	OK 4, 7 1 Yr	
Hydrochloric Acid 20%	100°F	OK 4 1 Yr				OK 4 1 Yr	
Hydrochloric Acid 25%	100°F	F 6 8 Mo	F 6 8 Mo	OK 4 1 Yr	OK 4 1 Yr	OK 4, 7 1 Yr	F 6, 7 8 Mo
Hydrochloric Acid 30%	100°F	F 4,5 1 Mo	F 4,5 4 Mo			F 4, 5 1 Mo	F 4, 5 1 Mo
Hydrochloric Acid 30%	150°F					F 3, 4 1 Mo	
CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310

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8 = Severe Etching
9 = Swelling
10 = Permeation

CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310
Formic Acid 90%	100°F	F 4, 6 2 Wk				F 4, 6 2 Wk	
Furfural	100°F	F 2 24 H				F 2 2 Mo	
Furfuryl Alcohol	100°F					OK 1, 4 1 Yr	OK 1, 4 1 Yr
Gasoline 80% (unleaded) / Methanol 20%	100°F	F 2 24 H				OK 1 Yr	
Gasoline 90% / Ethanol 10%	100°F	F 2 1 Da		F 2 1 Da		OK 1 Yr	
Gasoline 90% / Methanol 10%	100°F	F 2 1 Da	F 2 1 Da			OK 7 1 Yr	OK 4 1 Yr
Gasoline 95% (unleaded) / Methanol 5%	100°F	F 2 72 H				OK 1 Yr	
Glycolic Acid 70%	150°F	OK 4 1 Yr				OK 4, 7 1 Yr	
Heat Transfer Agent (THERMINOL 55) Monsanto	120°F	OK 1 Yr				OK 1 Yr	
Heat Transfer Agent (THERMINOL 59) Monsanto	120°F	OK 1 Yr				OK 1 Yr	
Heat Transfer Agent (THERMINOL 66) Monsanto	120°F	OK 1 Yr				OK 1 Yr	
Heat Transfer Agent (THERMINOL T-60) Monsanto	120°F	OK 1 Yr				OK 1 Yr	
Heat Transfer Agent (THERMINOL VP-1) Monsanto	120°F	OK 1 1 Yr				OK 1 Yr	
Heptanoic Acid 95%	100°F	OK 1, 4 1 Yr				OK 4 1 Yr	
Heptanoic Acid 95%	150°F	F 3, 4, 7 6 Mo		F 6, 7 9 Mo		OK 7 1 Yr	
CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310

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Mo = Month
Wk = Week
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Blank space indicates no test data
** = Minimum 1 year field service history

1 = Slight Softening
2 = Severe Softening
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4 = Discoloration
5 = Dissolved Coating
6 = Cracked
7 = Slight Etching
8 = Severe Etching
9 = Swelling
10 = Permeation

CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310
Tall Oil	150°F	OK 4 1 Yr	OK 4 1 Yr			OK 4 1 Yr	OK 4 1 Yr
Tall Oil, Crude (Reichhold 4107)	Ambient	OK 1 Yr		OK 1 Yr		OK 1 Yr	
Tetrahydrofuran	100°F	F 5 24 H	F 5 24 H			F 4, 6 5 Mo	F 2 8 Mo
Toluene	100°F	F 2 24 H	F 2 24 H	OK 1 Yr		OK 4 1 Yr	OK 1 Yr
para-Toluenesulfonic Acid 10%	150°F	OK 4 1 Yr	F 3, 4 6 Mo	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	F 3, 4 10 Mo
para-Toluenesulfonic Acid 25%	100°F	OK 4 1 Yr				OK 4 1 Yr	
para-Toluenesulfonic Acid 25%	150°F	F 3, 4 1 Yr	F 3, 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	F 3, 4 1 Yr	F 4, 6 1 Yr
Tomato Paste	100°F	OK 4 1 Yr	OK 4 1 Yr				
Tributyl Phosphate	100°F	F 2, 7 1 Yr				OK 1, 7 1 Yr	
1,1,1-Trichloroethane	100°F	OK 1, 4 1 Yr		OK 1 Yr		OK 4 1 Yr	
Triethanolamine	100°F	OK 4, 7 1 Yr				OK 4, 7 1 Yr	
Triethylenetetramine	100°F	F 4, 5, 7 1 Wk				OK 4, 7 1 Yr	
Urea Ammonium Nitrate	100°F	OK 4 1 Yr		OK 4 1 Yr		OK 4 1 Yr	
Urea Ammonium Nitrate	150°F	OK 4 1 Yr		OK 4 1 Yr		OK 4 1 Yr	
Urea Ammonium Nitrate	200°F	OK 4 1 Yr		OK 4 1 Yr		OK 4 1 Yr	
CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310

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CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310
Urea Ammonium Nitrate	250°F	OK 4 1 Yr		OK 4 1 Yr		OK 4 1 Yr	
Valeric Acid 5%	100°F	F 2, 4 2 Wk		F 3, 4 1 Wk		OK 1, 7 1 Yr	
Vinegar	100°F	OK 4 1 Yr	OK 4 1 Yr			OK 4 1 Yr	
Vinyl Acetate	100°F	F 2 24 H	F 2 24 H			F 5 1 Yr	F 5 1 Yr
Water, demineralized	150°F					OK 4 1 Yr	
Water, tap	150°F	OK 4 1 Yr	F 3 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr
Xylene	100°F	OK 7 1 Yr				OK 1 Yr	
Xylenol (2-4 Dimethylphenol)	150°F					F 5 2 Wk	F 5 2 Wk
Zinc Bromide 77%	Ambient	OK**					
Zinc Chloride, 40%	150°F	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr
CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310

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Urea Ammonium Nitrate	250°F	OK 4 1 Yr		OK 4 1 Yr		OK 4 1 Yr	
Valeric Acid 5%	100°F	F 2, 4 2 Wk		F 3, 4 1 Wk		OK 1, 7 1 Yr	
Vinegar	100°F	OK 4 1 Yr	OK 4 1 Yr			OK 4 1 Yr	
Vinyl Acetate	100°F	F 2 24 H	F 2 24 H			F 5 1 Yr	F 5 1 Yr
Water, demineralized	150°F					OK 4 1 Yr	
Water, tap	150°F	OK 4 1 Yr	F 3 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr
Xylene	100°F	OK 7 1 Yr				OK 1 Yr	
Xylenol (2-4 Dimethylphenol)	150°F					F 5 2 Wk	F 5 2 Wk
Zinc Bromide 77%	Ambient	OK**					
Zinc Chloride, 40%	150°F	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr
CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310

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CHEMICAL EXPOSURE	TEMP.	4100	4110	4200	4210	4300	4310
Tall Oil	150°F	OK 4 1 Yr	OK 4 1 Yr			OK 4 1 Yr	OK 4 1 Yr
Tall Oil, Crude (Reichhold 4107)	Ambient	OK 1 Yr		OK 1 Yr		OK 1 Yr	
Tetrahydrofuran	100°F	F 5 24 H	F 5 24 H			F 4, 6 5 Mo	F 2 8 Mo
Toluene	100°F	F 2 24 H	F 2 24 H	OK 1 Yr		OK 4 1 Yr	OK 1 Yr
para-Toluenesulfonic Acid 10%	150°F	OK 4 1 Yr	F 3, 4 6 Mo	OK 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	F 3, 4 10 Mo
para-Toluenesulfonic Acid 25%	100°F	OK 4 1 Yr				OK 4 1 Yr	
para-Toluenesulfonic Acid 25%	150°F	F 3, 4 1 Yr	F 3, 4 1 Yr	OK 4 1 Yr	OK 4 1 Yr	F 3, 4 1 Yr	F 4, 6 1 Yr
Tomato Paste	100°F	OK 4 1 Yr	OK 4 1 Yr				
Tributyl Phosphate	100°F	F 2, 7 1 Yr				OK 1, 7 1 Yr	
1,1,1-Trichloroethane	100°F	OK 1, 4 1 Yr		OK 1 Yr		OK 4 1 Yr	
Triethanolamine	100°F	OK 4, 7 1 Yr				OK 4, 7 1 Yr	
Triethylenetetramine	100°F	F 4, 5, 7 1 Wk				OK 4, 7 1 Yr	
Urea Ammonium Nitrate	100°F	OK 4 1 Yr		OK 4 1 Yr		OK 4 1 Yr	
Urea Ammonium Nitrate	150°F	OK 4 1 Yr		OK 4 1 Yr		OK 4 1 Yr	
Urea Ammonium Nitrate	200°F	OK 4 1 Yr		OK 4 1 Yr		OK 4 1 Yr	
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Silikal®

SILIKAL NORTH AMERICA, INC.

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Chemical Resistance

of Silikal reactive resins at room temperature 73 °F (23 °C.)

Chemicals	Evaluation
Alkalis:	
Aluminium hydroxide	+
Amine	○
Ammonium hydroxide 10 %	+
Ammonium hydroxide 25 %	○
Ammonium hydroxide alcoholic	○
Potassium hydroxide 10 %	+
Potassium hydroxide 30 %	+
Potassium hydroxide 50 %	+
slaked Lime	+
Sodium hydroxide 10 %	+
Sodium hydroxide 30 %	+
Acids:	
Formic acid 10 %	○
Formic acid 40 %	–
Boric acid 3 %	+
Chromic acid 10 %	+
Chromic acid 20 %	+
Chromic acid 40 %	○
Acetic acid 10 %	+
Acetic acid 25 %	+
• Acetic acid 30 %	○
• Acetic acid 80 %	–
Fatty acid	○
Oxalic acid 10 %	+
Lactic acid 5 %	+
Lactic acid 10 %	+
Phosphoric acid 10 %	+
Phosphoric acid 20 %	+
Phosphoric acid 40 %	+
Phosphoric acid conc.	○

Chemicals	Evaluation
Acids:	
Nitric acid 10 %	+
Nitric acid 30 %	○
• Nitric acid conc.	–
Hydrochloric acid 10 %	+
Hydrochloric acid 30 %	+
Hydrochloric acid conc.	+
Sulphuric acid 10 %	+
Sulphuric acid 30 %	+
• Sulphuric acid 50 %	○
• Sulphuric acid 80 %	–
Citric acid 10 %	+
Citric acid 30 %	+
Certain acids may lead to discoloration without attacking the material	
Solvents:	
• Organic hydrocarbons	–
• Ethyl alcohol	–
Ethyl alcohol 10 %	○
Ethyl acetate	–
Gasoline regular	+
Gasoline super	○
• Benzene	–
Butyl alcohol	–
Butyl acetate	–
Chloroform	–
Cyclohexane	+
Dibutylphthalate	○
Diesel oil	+
Dioctylphthalate	○
Glycerol	○

Chemicals	Evaluation
Solvents:	
Heptane	+
Hexane	+
Isopropyl alcohol	–
Kerosene	+
White spirit	+
Methanol	–
Methylene chloride	–
Monochlorobenzene	○
n-Propylalcohol	–
n-Propylacetate	–
Ethylene perchlorate	○
Petroleum	+
Phenol	○
Styrene	○
• Carbon tetrachloride	–
• Trichlorethylene	–
• Toluene	–
• Xylene	–

Evaluation:

+ **excellent resistance** after months of contact

○ **fair resistance** after 4 hours of contact

– **poor resistance** after less than 4 hours of contact

Chemicals	Evaluation
Water and water solutions:	
Sewage	+
chlorine water	+
Formaldehyde 37 %	+
Antifreeze (contains glycol)	+
Tap water	+
Sea water	+
Sodium chloride 5 %	+
Sodium chloride conc.	+
Sodium hypochlorite 15 %	+
Sodium carbonate	+
Soap solution	+
Silicone solution	+
Water deionized	–
Water 90° C	O
hydrogen peroxide 3 %	+
hydrogen peroxide 10 %	+
hydrogen peroxide 30 %	+
hydrogen peroxide 80 %	O
Natural and manufactured beverages:	
Beer	+
Vegetable juice	+
Milk	+
Grape juice	+
Wine	+
Whisky	O

Chemicals	Evaluation
Oils and Fats:	
Blood	+
hydraulic fluids e.g. Skydrol B 500	O
Linseed oil	+
Mineral oil	+
Olive oil	+
Castor oil	+
Crude oil	+
Lard	+
Animal fats	+
Cleaning agents:	
Gasoline	+
Household bleach	+
Spot remover	–
Soaps	+
Petroleum	+
Ammonia solution	+
Soapy water	+
Soda water	+
Turpentine	+
Mineral spirits	O

Evaluation:

+ **excellent resistance** after months of contact

O **fair resistance** after 4 hours of contact

– **poor resistance** after less than 4 hours of contact

Chemical Resistance of Methyl Methacrylate Based Materials

This is a guide only. Chemical attack is in most cases caused by a combination of chemicals. This table shows resistance of cured acrylic resin (PMMA) to individual chemicals only.

Other resin systems, such as the RU-products, may have a substantially better chemical resistance rating.

Since various combinations of chemicals may cause different rates of attack, it is absolutely necessary to document job specifics by using the *Silikal* Questionnaire.

Neither seller nor manufacturer has any knowledge or control concerning the purchaser's use of our products. The buyer is responsible for the application and processing of our products and is also liable for observing any third party rights. Our technical advice on the use of our materials is given without obligation. Technical data concerning our products are representative values and to be used as general guidelines only.

Our technical advice and recommendations serve the aim of facilitating and furthering the work of our customers. No warranty follows from this information, because in every case the particular circumstances and proprietary rights must be considered.

INTERNATIONAL COATINGS INC.

Resilient Epoxy Flooring and Grouting Systems

PRODUCT DATA SHEET

ICO-SUPER GUARD COATING

Product Description

ICO-Super Guard Coating™ is a 100% solids, low odor epoxy coating that is our highest chemical resistant coating for use with concentrated acids, caustics and solvents. Its above-average resilience enables it to better withstand cracking from thermal shock, whether for inside or outside applications. **ICO-Super Guard Coating™** is available in our standard red, green, black or brown colors with a high gloss finish. A solvented satin finish, as well as a faster cure ("FC") version, is also available.

Applications

ICO-Super Guard Coating™ is particularly recommended as a floor and wall coating for secondary containment areas, sumps, trenches and other severely corrosive environments where maximum chemical protection is desired. It must be applied over a fresh coat of our **ICO-Primer™** epoxy primer. **ICO-Super Guard Coating™** can be used over both new and old concrete, wood and metal surfaces, both inside and outside and at temperatures down to 50°F. For higher wear applications, use our **ICO-Super Guard™ self-levelling** or **ICO-Super Guard™ trowelled** grades.

Chemical Resistance Guide

Code: HR: Recommended for constant exposure R: Recommended for moderate usage
OS: Recommended for areas where occasional spillage occurs NR: Not recommended
NMF: Not meaningful – Chemical boils below 200°F, or not run.

Chemical	Rating (21 Days @ 77°F)	Rating (8 Hours @ 200°F)
Acetic Acid - Glacial	HR	HR
Acetone	R	NMF
Ammonium Hydroxide - 26%	HR	NMF
Butanol	HR	NMF
Chlorine Water - 30%	HR	HR
Chloroform	OS	NMF
Citric Acid - 50%	HR	R
Ethanol	HR	NMF
Ethyl Acetate	HR	NMF
Freon TS	HR	NMF
HCL - 24%	HR	NR
36%	HR	HR
Hydrogen Peroxide - 30%	HR	NR
Hydrogen Sulfite	HR	NMF
Iso Propyl Alcohol	HR	NMF
Lactic Acid - 50%	HR	R
88%	HR	R
Methanol	HR	NMF
Methyl Acetate	HR	NMF
Methylene Chloride	R	NMF
MEK	R	NMF
Nitric Acid - 10%	HR	NMF
- 50%	R	NMF
- 69%	NR	NMF
Phosphoric Acid - 85%	HR	NMF
Picric Acid	HR	HR
Sodium Hydroxide - 50%	HR	HR
Sulfuric Acid - 50%	HR	R
- 80%	HR	NR
- 98%	OS	NR
Tetrachloroethylene	HR	NMF
Trichloroethylene	HR	NMF
I.I.I. Trichloroethylene	HR	NMF
Toluene	HR	NMF
Xylene	HR	NMF

NOTE: *The above test data was obtained from total immersion tests. The table should be used as a guideline, as no warranty can be expressed or implied regarding the accuracy of the information given as it would apply to actual plant use.*

Physical Characteristics

Solids by Weight:	100%
Density	
Part A:	10 lbs./gal
Part B:	9.5 lbs./gal
Mixed:	9.85 lbs./gal
Viscosity	
Part A:	11,400 cps
Part B:	840 cps
Mixed:	6,900 cps
Mixing Ratio	
By Volume (A:B):	3.5:1
By Weight (A:B):	3.8:1
Pot Life (at 75°F):	30 mins.
Curing Times (at 75°F)	
Tack-free Time:	3 hours
Lite Traffic:	6-8 hours
Heavy Traffic:	48 hours
Full Chemical Cure:	7 days
Shelf Life:	12 months
Hardness (Shore D):	75
60° Gloss:	108
Direct Impact:	ok at 70 in lbs
Cross Hatch Adhesion:	no loss
Tensile Elongation (D638):	10%
Conical Mandrel:	no loss on ½" bend

NOTE: Above properties are for **ICO-Super Guard Red Coating™**. Properties will vary slightly according to color

INTERNATIONAL COATINGS INC.

Resilient Epoxy Flooring and Grouting Systems

PRODUCT DATA SHEET

ICO-SUPERGUARD

Production Description

ICO-SuperGuard™ is our highest performing epoxy flooring, formulated to withstand attack not only from the most aggressive acids and bases used in industry, but also from such solvents as methylene chloride, MEK, acetone, and methanol. It is a solvent-free, low odor product that, when used with our blended ICO-Fill™ aggregate, can be trowelled down, applied as a self-levelling floor, or as a thin film coating. It is a resin-rich system that does not need to be coated and that has extremely good adherence. ICO-SuperGuard™ comes in our standard red, brown and green colors.

Applications

ICO-SuperGuard™, with its wide range of chemical resistance, along with its ability to withstand spalling from thermal and mechanical shock, is the ideal choice for containment areas in tank farm operations, chemical waste and solvent recycling treatment centers and other such operations that must comply with EPA regulations for containment of hazardous materials. Other recommended applications include water waste treatment facilities, acid etching and metal plating lines and other such operations where maximum chemical protection of floors is a must.

Chemical Resistance Guide

Code. HR: Recommended for constant exposure R: Recommended for moderate usage
OS: Recommended for areas where occasional spillage occurs NR: Not recommended
NMF: Not meaningful - Chemical boils below 200°F, or not run.

Chemical	Rating (21 Days @ 77°F)	Rating (6 hours @ 200°F)	Chemical	Rating (21 Days @ 77°F)	Rating (6 Hours @ 200°F)	Chemical	Rating (21 Days @ 77°F)	Rating (6 Hour @ 200°F)
Acetic Acid - Glacial	HR	HR	Hydrogen Sulfite	HR	NMF	Picric Acid	HR	HR
Acetone	R	NMF	Iso Propyl Alcohol	HR	NMF	Sodium Hydroxide - 50%	HR	HR
Ammonium Hydroxide - 26%	HR	NMF	Lactic Acid - 50%	HR	R	Sulfuric Acid - 50%	HR	R
Butanol	HR	NMF	- 88%	HR	R	- 80%	HR	NR
Chlorine Water - 30%	HR	HR	Methanol	HR	NMF	- 95%	OS	NR
Chloroform	OS	NMF	Methyl Acetate	HR	NMF	Tetrachloroethylene	HR	NMF
Citric Acid - 50%	HR	R	Methylene Chloride	R	NMF	Trichloroethylene	HR	NMF
Ethanol	HR	NMF	MEK	R	NMF	1.1.1. Trichloroethylene	HR	NMF
Ethyl Acetate	HR	NMF	Nitric Acid - 10%	HR	NMF	Toluene	HR	NMF
Freon TS	HR	NMF	- 50%	R	NMF	Xylene	HR	NMF
HCL - 24%	HR	HR	- 69%	NR	NMF			
- 36%	HR	HR	Phosphoric Acid - 85%	HR	NMF			
Hydrogen Peroxide - 30%	HR	NR						

NOTE: The above test data was obtained from total immersion tests. The table should be used as a guideline, as no warranty can be expressed or implied regarding the accuracy of the information given as it would apply to actual plant use.

Physical Characteristics

Density (lbs/gal)
- Part A: 9.7
- Part B: 9.3
- Parts A & B Mixed: 9.6

Viscosity (Liquid Mix): Pourable

Mixing Ratios

Kit:
Empty Contents of Container A. Container B, and 100 pounds of ICO-Fill

Mixing Ratios (approximate)

Bulk Packs Only:

By Volume
- Part A:Part B: 3.:1

By Weight
- Part A:Part B: 3.:1
- ICO-Fill: Liquid Mix: 4:1

NOTE: See reverse side for exact weights.

Coverage (theoretical):
- Filled System: 6.4 SF per gallon per 1/4" thickness

Shelf Life at 77 deg. F: 12 months
Pot Life of Liquid A & B Mixed at 77 deg. F: 1.5 hours
Working Time of Filled Mix at 77 deg. F: 2 hours

Curing Time at 77 deg. F
- Life Traffic: 18-24 hours
- Heavy Traffic: 48-72 hours
- Maximum Chemical Resistance: 7 days

Physical Test Data (Based on Trowellable Mix)

Tensile Strength (ASTM C307) 876 psi
Percent Elongation (untilled) (D638) 10.0%

Flexural Strength (C580) 1465 PSI
Compressive Yield (C579) 2584 PSI

CHEMICAL RESISTANCE

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This chart is to be used in conjunction with the Tnemec **Chemical Resistance Guide** which explains abbreviations and provides information on chemical resistance. Contact your Tnemec representative for further information and technical data.

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Tnemec Co.

CHEMICAL EXPOSURE	Series 35	46H413	Series 61	Series 66	Series 104	Series 120
Acetic Acid (10%)	OC	OC	FC	FC	FC	IS
Acetic Anhydride	NT	FC	FC	OC	FC	NT
Acetone	NR	OC	OC	OC	OC	NT
Activated Carbon	NT	NT	IS	FC	IS	IS
Adipic Acid (Dry)	FC	NT	FC	OC	FC	NT
Aluminum Chloride (25%)	NT	NT	FC	OC	FC	FC
Aluminum Nitrate (50%)	NT	NT	FC	FC	FC	IS
Aluminum Sulfate (49%)	NT	FC	FC	FC	FC	IS
Ammonium Chloride (50%)	NT	FC	FC	FC	FC	IS
Ammonium Hydroxide (10%)	OC	IS	IS	IS	IS	FC
Ammonium Hydroxide (28%)	OC	IS	IS	FC	FC	FC
Ammonium Nitrate (38%)	NT	IS	IS	FC	IS	NT
Ammonium Phosphate (50%)	NT	IS	IS	IS	IS	NA
Ammonium Sulfate (65%)	FC	IS	IS	IS	IS	IS
Amyl Acetate	NR	NR	FC	OC	FC	NT
Aviation Gas 100/130	NT	NT	IS	NT	NT	NA
Barium Chloride (50%)	NT	FC	FC	FC	FC	IS
Benzene	NR	OC	IS	FC	FC	NT
Boric Acid (5%)	FC	IS	IS	IS	IS	IS
n-Butyl Alcohol	NR	OC	IS	OC	FC	FC
n-Butyl Acetate	NR	NR	FC	OC	FC	NT

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Chemical resistance results were obtained in a controlled environment and Tnemec Company makes no claim that these tests accurately represent all environments.

CHEMICAL EXPOSURE	Series 35	46H413	Series 61	Series 66	Series 104	Series
Butyl Cellosolve ®	NR	NR	FC	OC	FC	FC
Calcium Chloride (50%)	FC	FC	IS	FC	IS	IS
Calcium Hypochlorite (5%)	FC	IS	IS	IS	IS	IS
Chromic Acid (10%)	FC	FC	FC	FC	FC	IS
Citric Acid (50%)	FC	FC	IS	IS	IS	IS
Coal Oil	NR	IS	IS	IS	IS	IS
Copper Sulfate (50%)	FC	FC	IS	NT	IS	IS
Corn Mash Solution	NR	FC	IS (120 F.)	FC	FC	NA
Cyclohexane	NR	IS	IS	IS	IS	NA
n-Decyl Alcohol	NR	OC	IS	OC	FC	NT
Diesel Oil HD #2	NR	IS	IS	IS	IS	
Diethanolamine	FC	FC	IS	FC	IS	NR
Ethyl Alcohol	NR	FC	IS	FC	IS	FC
Ethylene Glycol	FC	FC	IS	IS	IS	NA
Furfuryl Alcohol	NT	NR	OC	OC	OC	FC
Gasoline - Leaded	NR	NT	IS	NT	IS	NA
Gasoline - Unleaded	NR	NT	IS	NT	IS	NA
Gasoline - Gasohol	NR	NR	IS	OC	IS	NT
Grease	FC	FC	IS	FC	IS	NA
Glycerin	FC	IS	IS	IS	IS	NA
Heptane	FC	IS	IS	IS	IS	NA
Hexane	FC	IS	IS	IS	IS	
Hydraulic Fluid	NR	IS	IS	IS	IS	NA

Chemical resistance results were obtained in a controlled environment and Tnemec Company makes no claim that these tests accurately represent all environments.

CHEMICAL EXPOSURE	Series 35	46H413	Series 61	Series 66	Series 104	Series 120
Hydrochloric Acid (10%)	FC	FC	FC	FC	FC	IS (150 F.)
Hydrochloric Acid (30%)	FC	FC	FC	FC	FC	IS
Hydrochloric Acid (37%)	FC	FC	FC	FC	FC	FC
Hydrofluoric Acid (10%)	NR	NR	OC	NR	OC	FC
Hydrogen Peroxide (30%)	FC	FC	IS	FC	FC	NA
Isobutyl Alcohol	NR	OC	IS	OC	FC	FC
Isooctyl Alcohol	NR	OC	IS	OC	FC	FC
Isopropyl Alcohol	NR	FC	IS	FC	IS	FC
Isopropyl Acetate	NR	NR	FC	OC	FC	FC
JP-4 Aviation Fuel	NT	NT	IS	NT	NT	NA
JP-5 Aviation Fuel	NT	NT	IS	NT	NT	NA
Jet A Fuel	NT	NT	IS	NT	NT	NA
Kerosene	OC	NA	IS	IS	IS	NA
Lactic Acid (10%)	FC	FC	IS	FC	FC	IS
Lactic Acid (85%)	FC	OC	FC	FC	FC	IS
Lime Slurry	FC	IS	IS	IS	IS	NT
Linseed Oil	FC	IS	IS	IS	IS	NT
Magnesium Chloride (50%)	NT	FC	IS	FC	IS	IS
Magnesium Hydroxide (50%)	OC	IS	IS	IS	IS	FC
Methyl Alcohol	NR	NR	FC	OC	FC	FC
Methyl Ethyl Ketone	NR	NR	OC	OC	OC	FC
Methyl Propyl Ketone	NR	OC	FC	OC	FC	NA
N-Methyl-2-Pyrolidone	NR	NR	OC	NR	OC	NA

Chemical resistance results were obtained in a controlled environment and Tnemec Company makes no claim that these tests accurately represent all environments.

CHEMICAL EXPOSURE	Series 35	46H413	Series 61	Series 66	Series 104	Series
Mineral Spirits	FC	IS	IS	IS	IS	NA
Naptha	FC	FC	IS	IS	IS	NA
Nitric Acid (10%)	FC	OC	OC	OC	OC	IS
n-Octyl Alcohol	NR	OC	IS	OC	FC	FC
Oxalic Acid (10%)	FC	FC	FC	FC	FC	IS
Perchloroethylene	NR	FC	IS	FC	OC	NA
Phosphoric Acid (10%)	FC	FC	FC	FC	FC	IS (150 F)
Phthalic Acid (90%)	FC	FC	FC	FC	FC	IS
Potassium Hydroxide (10%)	FC	FC	IS	IS	IS	FC
n-Propyl Alcohol	NR	OC	IS	OC	FC	FC
Propylene Glycol	OC	FC	IS	FC	IS	
Sodium Bisulfate (30%)	FC	FC	FC	FC	FC	IS
Sodium Carbonate (30%)	FC	IS	IS	IS	IS	NA
Sodium Carbonate Slurry	FC	IS	IS	IS	IS	NT
Sodium Chloride (10%)	FC	IS	IS	IS	IS	NA
Sodium Chloride (20%)	FC	IS	IS	IS	IS	NA
Sodium Chromate (50%)	NT	NT	FC	NT	FC	IS
Sodium Formate	NT	NT	NT	NT	NT	IS
Sodium Hydrosulfide (72%)	NT	NT	FC	NT	NT	IS
Sodium Hydrosulfite (10%)	NT	NT	NT	NT	NT	IS
Sodium Hydroxide (10%)	FC	IS	IS (150 F.)	IS	IS	FC
Sodium Hydroxide (50%)	OC	IS	IS (150 F.)	IS	IS	
Sodium Hypochlorite (5%) (Bleach)	FC	FC	FC	FC	FC	IS

Chemical resistance results were obtained in a controlled environment and Thermec Company makes no claim that these tests accurately represent all environments.

CHEMICAL EXPOSURE	Series 35	46H413	Series 61	Series 66	Series 1041	Series 120
Sodium Silicate	NT	NT	NT	NT	NT	IS
Sodium Sulfate (6%)	FC	IS	IS	IS	IS	NA
Sodium Thiosulfate (30%)	NT	NT	FC	NT	FC	IS
Sodium Tripolyphosphate	FC	IS	IS	IS	IS	NA
Sour Crude	OC	IS	IS (150 F.)	IS	IS	IS
Sweet Crude	OC	IS	IS (150 F.)	IS	IS	IS
Soybean Oil	FC	IS	IS	IS	IS	NA
Sulfuric Acid (10%)	FC	FC	FC	FC	FC	IS
Sulfuric Acid (30%)	FC	FC	FC	FC	FC	IS
Sulfuric Acid (50%)	OC	OC	OC	OC	OC	IS
Styrene	NR	NR	FC	NR	OC	IS
Tannic Acid	FC	IS	IS	IS	IS	IS
Toluene	NR	FC	IS	FC	IS	NA
Transmission Fluid	NR	IS	IS	IS	IS	IS
1.1.1-trichloroethane	NR	FC	IS	OC	FC	FC
Trisodium Phosphate (20%)	FC	FC	IS	FC	IS	IS
Turpentine	OC	IS	IS	IS	IS	NA
Vinegar	FC	OC	FC	FC	FC	IS
Water, Distilled	FC	IS	IS (200 F.)	S	IS	NA
Water, Fresh	IS	IS	IS (200 F.)	IS	IS	NR
Water, Sea	IS	IS	IS	S	IS	NA
Water, Sewage	NR	IS	IS	IS	IS	IS
Xylene	NR	FC	IS	FC	IS	NA

Chemical resistance results were obtained in a controlled environment and Thermec Company makes no claim that these tests accurately represent all environments.

CHEMICAL EXPOSURE	Series 35	46H413	Series 61	Series 66	Series 104	
Zinc Chloride (40%)	NT	FC	IS	FC	FC	IS

Chemical resistance results were obtained in a controlled environment and Tnemec Company makes no claim that these tests accurately represent all environments.

T2M59

We live in a chemical world. Tens of thousands of chemicals are on the market and hundreds more are added every year. There is no universal coating that can tolerate all those chemicals. That's why choosing the correct coating or lining is so difficult. What's more, a company may have several micro-environments within its walls—each requiring a different type of coating.

Of course, the most important factor in coating selection is whether the coating can withstand attack by the chemical to which it is exposed. A pocket in the back of this guide includes a chart outlining resistance of specific Tnemec coatings to different chemicals.

Chemical resistance is not the only factor to consider in coating selection. Some others are: temperature resistance, flexibility, adhesion, toxicity, moisture vapor transmission, scrubbability, pot life, drying and curing time, method and ease of application, resistance to abrasion and impact. Flash point is also an important consideration as is solids-by-volume which gives an indication of coverage potential, volatile solvent content and value. Lastly, the life-cycle cost—not just initial cost—of the coating should be weighed.

Information to aid coating selection is available from:

- Tnemec Company, Inc. product data sheets
- National Association of Corrosion Engineers (NACE) publication Corrosion Prevention by Protective Coatings by Charles G. Munger

High-solids Epoxy.

Amine-cured epoxy coating offers excellent corrosion and chemical resistance to both acids and bases. Provides exceptional adhesion, and solvent and abrasion resistance. High-solids, two-component formula with over 80% solids-by-volume assures excellent coverage and value. Beige and gray high-gloss finish.

Vinyl-Copolymer Coating.

A proven, high performance, one-component coating that provides good corrosion resistance for long-term protection. Dries quickly, has good flexibility, repairs easily, and can be applied in low ambient temperatures (35 F. minimum). USDA approved for incidental contact. Available in select Tnemec CHROMACOLORS.

High-solids Amine-cured Epoxy.

High-solids (over 80%) formula with high-build characteristics (up to 10 mils) provides extraordinary protection, often with a single coat. Delivers strong chemical, corrosion, abrasion and stain resistance. Two-component formula is available in Tnemec CHROMACOLORS. Select colors meet USDA requirements for incidental contact.

Epoxy-Polyamide Coating.

Hi-build characteristic delivers excellent protection over properly primed steel and concrete surfaces. Two-component formula delivers exceptional corrosion, abrasion and moisture resistance. Select colors USDA approved for incidental contact. CHROMACOLORS available. Semi-gloss finish.

Vinyl-Ester Coating.

Premium high-solids coating (theoretical 92% solids-by-volume mixed) is especially formulated for lining tanks and vessels holding acid solutions. Two-component formula offers exceptional wet and dry temperature resistance. Available in beige (primer) and gray (finish coat).

High-build Coal Tar-Epoxy.

Provides exceptional adhesion and chemical resistance—especially to alkali and salt solutions. Good abrasion resistance. High-build, two-component formula permits dry film thickness up to 20 mils for one-coat coverage, one-coat savings. Black semi-gloss finish only.

62-1400 SEAM SEALER, 63-1500 FILLER/SURFACER.

Two-component, epoxy-polyamine products include solventless, non-shrinking seam sealer and filler/surfacer. Both develop high bond strength and outstanding resistance to water. Knife or trowel-grade products seal seams, rivet and bolt heads and faying surface edges. Also used to fill and patch voids and pits. For interior or exterior use.

120-5003 VINESTER F & S.

Vinyl-ester filler and surfacer offers outstanding bond strength for use in heavy service areas and wet or corrosive environments. Two-component, trowel-grade product patches, fills and surfaces concrete.

The Tnemec chart in the pocket at right will provide information for matching the performance of specific Tnemec coatings to expected chemical exposure. It is a compilation of Tnemec product testing to date and will be periodically revised as new data becomes available.

The chart is only a guide. Combinations of chemicals can have a completely different effect on coating performance than the chemicals separately. To be sure of a coating's performance, ask your Tnemec representative for a panel or coupon for testing.

IS

IS-IMMERSION SERVICE.
Suitable for continuous contact with chemical at 70-100 F. temperature. (Higher temperatures may be indicated for insulated tanks.) Coating will show no effect except slight softening or color change after six months continuous immersion.

FC

FC-FREQUENT CONTACT.
Suitable for frequent splash or prolonged exposure to concentrated vapors. The coating will show no effects except slight softening or color change after eight hours continuous immersion in the liquid chemical or 72 hours exposure to the vapor.

OC

OC-OCCASIONAL CONTACT.
Suitable for occasional splash and spillage or occasional exposure to concentrated vapors. The coating shows no effects, except slight softening or color changes, following short exposure to splash or spillage which evaporates, is hosed off, or dried overnight or, 24 hours exposure to vapor.

NA

NA—NOT APPLICABLE.
This designation makes no statements regarding chemical resistance. The coating may in fact do the job, but other systems are judged more applicable.

NR

NR—NOT RECOMMENDED.
Suitable for mild concentrations of vapors only.

NT

NT—NOT TESTED.

This guide is for reference only and is not intended to provide complete information concerning product application, preparation or safety. Tnemec Company, Inc. does not accept responsibility for any methods discussed in this publication. The use of materials and methods is solely at the risk of the user.

Chemical resistance results were obtained in a controlled environment and Tnemec Company makes no claim that these tests accurately represent all environments.

CHEMICAL RESISTANCE GUIDE

Stonitard

The purpose of this guide is to aid in determining the potential value of STONKOTE GS4 when exposed to the damaging effects of corrosive chemical environments.

RATING CODE

E—Excellent
G—Good
NR—Not Recommended
OS—Suitable for use where "occasional spillages" occur, when flushing with water immediately follows.

2478

ACIDS

	RATING
Acetic—5%	G
Acetic—20%	OS
Acetic—Glacial	NR
Benzoic—Sat. 3%	E
Boric—Sat. 30%	E
Butyric—10%	OS
Chromic—10%	G
Chromic—20%	OS
Citric—50%	E
Cresylic	OS
Diglycolic	G
Fatty	G
Formic—up to 10%	OS
Fluoboric	G
Heptanoic	OS
Hydrochloric—15%	G
Hydrochloric—37%	OS
Hydrofluoric—5%	G
Hydrofluoric—10%	OS
Hypochlorous—5%	E
Lactic—up to 20%	OS
Maleic—30%	G
Maleic—40%	OS
Malic—50%	G
Nitric—10%	G
Nitric—30%	OS
Oleic	G
Oxalic—Sat.	E
Perchloric—35%	G
Phosphoric—up to 50%	OS
Picric—Sat.	E
Phthalic	G
Succinic—Sat.	E
Sulfuric—20%	E
Sulfuric—50%	G
Sulfuric—70%	OS
Tannic—Sat.	G
Tartaric—Sat.	E

ALKALIES AND SALTS

STONKOTE GS4 is rated Good to Excellent when exposed to most alkalies and salts.

SOLVENTS AND OTHER CHEMICALS

	RATING
Acetone	NR
Alcohol (Methyl)	OS
Alcohol (Ethyl, Propyl, Isopropyl, Butyl)	E
Benzene	OS
Carbon Tetrachloride	OS
Corn Oil	E
Cyclohexane	G
Diacetone Alcohol	OS
Ethylene Glycol	G
Ether	OS
Formaldehyde	G
Gasoline	E
Glycerine	E
Hydrogen Peroxide—10%	OS
JP5 Jet Fuel	G
Juices—Fruit	E
Juices—Vegetable	E
Lard	G
Linseed Oil	G
Methyl Ethyl Ketone	NR
Methylene Chloride	NR
Milk	E
Mineral Spirits	G
Naphtha	OS
Oils—Cutting	G
Oils—Mineral	E
Oils—Vegetable	G
Perchloroethylene	OS
Skydrol	G
Sucrose—Sat. (Sugar)	E
Toluene	OS
Trichloroethylene	NR
Urea	G
Vinegar (Household)	G
Water	E
Xylene	OS

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***Note:** This data is based on laboratory tests performed under carefully controlled conditions. (All solutions are at ambient temperatures.) No warranty can be expressed nor implied regarding the accuracy of this information as it will apply to actual plant operation or jobsite use. Plant operations and jobsite uses vary widely, and the individual results obtained are affected by the specific conditions encountered, which are beyond our control.*

CHEMICAL RESISTANCE GUIDE

Stonhard

2478

The purpose of this guide is to aid in determining the potential value of STONKOTE HT4 when exposed to the damaging effects of corrosive chemical environments.

RATING CODE

E—Excellent
G—Good
NR—Not Recommended
OS—Suitable for use where "occasional spillages" occur, when flushing with water immediately follows.

ACIDS

	RATING
Acetic—15%	E
Acetic—50%	OS
Acetic—Glacial	NR
Benzoic—Sat. 3%	E
Boric—Sat. 30%	E
Butyric—10%	OS
Chromic—10%	E
Chromic—40%	OS
Citric—50%	E
Cresylic	OS
Diglycolic	G
Fatty	E
Formic—up to 10%	G
Fluoboric	G
Heptanoic	OS
Hydrochloric—Conc.	E
Hydrofluoric—15%	E
Hypochlorous—5%	E
Lactic—up to 20%	E
Maleic—30%	E
Maleic—40%	G
Malic—50%	E
Nitric—10%	G
Nitric—30%	OS
Oleic	G
Oxalic—Sat.	E
Perchloric—35%	G
Phosphoric—up to 50%	G
Picric—Sat.	E
Phthalic	G
Succinic—Sat.	E
Sulfuric—20%	E
Sulfuric—50%	G
Sulfuric—70%	OS
Tannic—Sat.	
Tartaric—Sat.	

ALKALIES AND SALTS

STONKOTE HT4 is rated Good to Excellent when exposed to most alkalies and salts.

SOLVENTS AND OTHER CHEMICALS

	RATING
Acetone	OS
Alcohol (Methyl)	G
Alcohol (Ethyl, Propyl, Isopropyl, Butyl)	G
Benzene	E
Carbon Tetrachloride	E
Corn Oil	E
Cyclohexane	E
Diacetone Alcohol	E
Ethylene Glycol	E
Ether	OS
Formaldehyde	E
Gasoline	E
Glycerine	E
Hydrogen Peroxide—10%	E
JP5 Jet Fuel	E
Juices—Fruit	E
Juices—Vegetable	E
Lard	G
Linseed Oil	E
Methyl Ethyl Ketone	G
Methylene Chloride	NR
Milk	E
Mineral Spirits	E
Naphtha	E
Oils—Cutting	E
Oils—Mineral	E
Oils—Vegetable	G
Perchloroethylene	E
Skydrol	G
Sucrose—Sat. (Sugar)	E
Toluene	E
Trichloroethylene	G
Urea	E
Vinegar (Household)	
Water	E
Xylene	E

Note: *This data is based on laboratory tests performed under carefully controlled conditions. (All solutions are at ambient temperatures.) No warranty can be expressed nor implied regarding the accuracy of this information as it will apply to actual plant operation or jobsite use. Plant operations and jobsite uses vary widely, and the individual results obtained are affected by the specific conditions encountered, which are beyond our control.*

SPEC-DATA®

This Spec-Data sheet conforms to editorial style prescribed by The Construction Specifications Institute. The manufacturer is responsible for technical accuracy.

1. PRODUCT NAME

AUTO-GARD II

Concrete wear surface coatings

2. MANUFACTURER

Neogard Div. of Jones-Blair
P.O. Box 35288
6900 Maple Avenue
Dallas, Texas 75235
Phone: (214) 353-1689

3. PRODUCT DESCRIPTION

AUTO-GARD II is a fluid surface applied elastomeric wearing surface waterproofing system which is applied in homogenous layers positively bonded to the substrate. The system's elastic qualities allow it to bridge shrinkage cracks in concrete.

Basic Use: Surface applied, skid resistant wearing surface waterproofing coating system for parking garages and ramps to protect occupied areas underneath against water damage and to keep concrete slabs from spalling and deteriorating due to deicing salts, chemicals and freeze-thaw damage.

Limitations: The substrate must be concrete, structurally sound with a minimum of 4000 psi compressive strength, clean and dry. AUTO-GARD II cannot be bonded to wax, oils, grease or tar. It cannot be applied to concrete cured with compounds of wax, chlorinated rubber or resin base. Minimum temperature for application is 40°F (4.4°C). Steel decking over which concrete is poured should be perforated to permit escape of trapped moisture on exterior exposed applications.

Composition and Materials: The AUTO-GARD II system is composed of polyurethane coating, quartz aggregate, and epoxy primer.

Sizes: The basic ingredients in AUTO-GARD II are shipped in liquid form, in metal containers, varving in size from 5 to 55 gallon capacity. All containers bear Underwriters' Laboratory, Inc. labels.

Colors: Gray and tan are the standard colors. Other top coat colors are available on special order. Price subject to inquiry.

4. TECHNICAL DATA

Physical properties of the liquid polyurethane coating are included in Table 1. Test results of the cured coating film are listed in Tables 2 and 3.

5. INSTALLATION

Licensed Applicator: AUTO-GARD II coating materials are installed bv licensed applicators of Neogard. These licensed applicators are trained for the application of Neogard coatings in complete accordance with application instructions provided by Neogard. Applicators are licensed on a non-exclusive basis.

Preparatory Work: Proper surface preparation is of the utmost importance. All surfaces to which AUTO-GARD II is to be applied must be uniform, clean, dry, free of ridges, sharp projections, or other defects.

Concrete decks shall be cured for a minimum of 28 davs. Water cured treatment of concrete is preferred. The use of concrete curing agents, if any, shall be of the sodium silicate base only. Others require prior written approval by Neogard. Prior to application of materials, deck must be acid etched with a 14% or 15% solution of muriatic acid.

It is recommended to finish the concrete with power or hand steel trowel followed bv a soft hair broom to obtain light texture or "sidewalk" finish.

Methods: The AUTO-GARD II system is applied by squeegee, power roller, hand roller, airless spray, or combination of all four.

Primer: Apply Neogard II Primer at the nominal rate of 1/1–1/2 gallon per 100 square feet over entire surface. When primer is tack-free apply base coat same day or re-prime.

Detail Work: Cracks less than 1/16" should be primed and coated with two or three coats of AUTO-GARD II coating material. Cracks in excess of 1/16" should be routed out, blown clean, and filled flush with urethane

TABLE 1. PHYSICAL PROPERTIES OF LIQUID POLYURETHANE COATING

PHYSICAL PROPERTY	RESULTS	ASTM TEST METHOD IF APPLICABLE
Flashpoint of Solvent	80-100°F	D1310
Solvent Odor	Ester	D1296
Specific Gravity	1.18	D1475
Viscosity	80-100 KU	D562
Volume Solids	75% ± 2%	Calculated
Weight Per Gallon	9.65 ± 2 lbs.	D1475
Weight Solids	80% ± 2%	D1353

TABLE 2. PERFORMANCE REQUIREMENTS OF CURED FILM

PHYSICAL PROPERTY	RESULTS	ASTM TEST METHOD IF APPLICABLE
Fire Resistance of System	U.L. 790 Class "A" over non-combustible deck	E108
Tensile Strength Min. at Break	2500 psi	D412
Elongation at Break at 75°F (23.8°C), % Min.	450%	D412
Permanent Set at Break % Min.	10%	D412
Hardness	78 to 87 Shore A	D2240
Tear Resistance	250 lbs. per linear inch	D1004
Abrasion	15 mg. loss	C501 Taber Abrasion 1000 Rev. with 1000 gm/wheel psig CS-17 Wheels
Adhesion to Substrate lbs/in. Min.	30 lbs/in.	D903
Weather Stability	Maintains Flexibility −40°F to +180°F	Heat/Cold
Thermal Shock	No loss of Adhesion	Alternate Heat/Cold cycle
Weathering Resistance	Slight Chalking Weatherometer 350 hours	D822
Moisture Vapor Transmission at 36 mil	1.08 Perms	E96 Procedure B

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TABLE 3. CHEMICAL RESISTANCE OF CURED COATING FILM

16 Hour Spot Test ASTM D1308*

CHEMICAL	RESULT
Automobile Brake Fluid	N
Animal Urine	N
Battery Acid	N
Bleach	S
Blood	N
Bunker Fuel #2	N
Carbon Tetrachloride	N
*Chloroform	N
Deicing Chemical	N
Ethylene Glycol (Anti-Freeze)	N
Gasoline	N
Hydrochloric Acid 20%	N
Hydrochloric Acid 35%	S
Isopropyl Alcohol	N
Lipstick	N
Methyl Alcohol	N
Methylethyl Keytone	O
Mineral Oil	N
Motor Oil	N
Naphtha	N
Nitric Acid 10%	S
Skydrol (Fire retardant, Aircraft Hydraulic Fluid)	B
Sodium Chloride 5%	N
Sodium Hydroxide 40%	N
Sulfuric Acid 25%	N
Treated Sewage	N
Xylene	O

*Contact Neogard for test results of film under constant immersion

Key: N -No Effect
S -Staining of Film
O -Slight Swell
B -Blistered

sealant. Apply detail coats to sealed cracks as detailed above. Extend coating a minimum distance of 2" on either side of all cracks, cold joints or control joints. Sheet flashings should be provided at locations of high movement.

Base Coat: Apply 1⅓ gallons per 100 square feet of AUTO-GARD II polyurethane coating material to all surfaces in two coats to yield an average 20 dry mils. Extend base coat over all cracks, and control joints which have received treatment. Install integral flashings after base coat has cured. Apply base coat same day as prime coat.

Wearing Surface Coat: Apply in one coat, ⅔ gallons per 100 square feet of AUTO-GARD II coating material to yield an average of 8 dry mils and immediately broadcast properly-graded, evenly distributed, hard (6.5+ Moh's Scale) #7992 aggregate at the rate of 15 lbs. per 100 square feet. When dry, sweep off excess aggregate and recoat surface with 1 gallon per 100 square feet of AUTO-GARD II material to yield an average of 12 dry mils. Total system coating thickness averages 40 dry mils exclusive of aggregate.

Note: For heavy traffic areas such as ticket booths, spiraled ramps, turn areas, or in other areas subjected to extreme high traffic abrasion: after aggregate coat and before finish coat—apply 1 gallon to yield an average of 12 dry mils per 100 square feet of AUTO-GARD II coating and immediately broadcast an additional 10 pounds per 100 square feet of aggregate. When dry, sweep off excess aggregate and coat surface with 1 gallon (12 mils) per 100 square feet of AUTO-GARD II coating material. This will yield an average 52 dry mil system, exclusive of aggregate.

Precautions: Although AUTO-GARD II is rated fire resistant in its cured state, it is a "red label" liquid and highly flammable during application. Extreme caution must be used when applying AUTO-GARD II in an interior situation where the solvents can contaminate the air conditioning or ventilation of occupied spaces. In confined areas, the best form of protection against organic solvents or other potentially sensitizing vapors is a fresh air supply. For maximum protection, it is recommended to use NIOSH/MESA approved self-contained breathing apparatus with a full face piece operated in a positive pressure mode. In unrestricted (open outdoor) areas, it is recommended to wear a suitable mask or respirator of a type approved by NIOSH/MESA. To prevent excessive skin contact with the material, it is recommended to use fabric coveralls and neoprene or other resistant gloves. To prevent eye contact, wear a full face mask or OSHA-approved protective goggles. Keep away from heat, sparks and open flames.

6. AVAILABILITY AND COST

Availability: AUTO-GARD II systems are available through licensed applicators nationally and internationally.

Cost: Costs vary due to variations in labor rates, job size and conditions. Budget quotations available upon request.

7. WARRANTY

AUTO-GARD II materials and workmanship are jointly and severally guaranteed, on a single document, by Neogard and the licensed applicator. The guarantee insures the waterproofing performance of the system, at no cost to the owner, for a period of three years. Provisions also guarantee the integrity of the system against cracking of the substrate up to 1/16" in width; otherwise, no liability is to be assumed for defects in the substrate. Liability for damage, in any respect to the building or contents thereof is specifically excluded from this guarantee.

8. MAINTENANCE

Good housekeeping procedures as generally practiced by the industry will assure years of satisfactory performance. However, should damage occur, repairs are simple, and the procedure for them can be followed by maintenance men. Areas to be repaired should be cleaned, all damaged materials removed, the area primed and the full mil thickness replaced. Where a regular maintenance and cleaning program is required, surfaces may be washed with commercial detergents or steam cleaned. All blades on snow removal equipment must be guarded with a ski device at each end of blade to protect surface from contact damage.

9. TECHNICAL SERVICES

Factory trained representatives are established in principal cities and markets throughout the continental United States and factory personnel are available for assistance at any time. Call area code (214) 353-1689 and ask for "Technical Service."

10. FILING SYSTEMS

SPEC-DATA® II
Sweet's Architectural File

NEOGARD
Div. of Jones-Blair
6900 Maple Avenue—P.O. Box 35288—Dallax, Texas 75235—Phone (214) 353-1689
Telex No: 73-2665 Cable: Neogard Dal

11-88-1789

SPRAY-CURE CONCRETE CONSTRUCT CHEMICALS

2478

SPRAY-CURE & SEAL (ACRYLIC TYPE)

DESCRIPTION: Clear liquid membrane-forming compound for use as an effective curing compound for new concrete and as an effective sealing compound for new or existing concrete. Has the advantage of providing a seal with the minimum effect on the color of the concrete. Yellowing with age is minimal.

COMPOSITION: A blend of acrylate copolymer with aliphatic and aromatic solvents.

FLASH POINT: 105 degrees F.

NON-VOLATILE %: 20% minimum.

WT. PER GALLON: 6.87 ppg.

USE: As a curing compound Spray-Cure & Seal effectively seals water inside the fresh concrete, allowing more complete curing and hardening. As a sealer this product forms a tough, long-lasting, flexible film on the surface of the concrete to keep out salt and freezing water, dirt, grease and oil. This makes for easier clean-up. Concrete treated with Spray-Cure & Seal resists spalling and dusting. Will not interfere with subsequently applied resilient flooring materials. Check with manufacturer for compatibility with other subsequent surface treatments. May be used outdoors or indoors. Provides a medium gloss clear finish. Yellowing with age is minimal.

APPLICATION: Spraying preferred. May also be applied with brush or roller.

COVERAGE: Depends upon condition of concrete surface. For use as a curing compound and/or sealer on new concrete, use at 200 sq. ft. per gallon. For use as a sealer on new or old concrete the rate will vary between 200 and 500 sq. ft. per gallon.

DRYING RATE: This depends upon temperature, humidity and coverage rate. Generally this product will be dry to touch in one hour at 70 degrees F. Open to light traffic in 8 hours. Allow 12 hours before opening to heavy traffic.

CLEAN-UP: Use Kleen-Sol equipment cleaning solvent.

PRECAUTIONS: CAUTION: Contains petroleum distillate. Harmful or fatal if swallowed. Combustible. Skin and eye irritant. Keep away from heat, sparks and open flame. Avoid contact with skin, eyes and clothing. If contacted: flush eyes with water for 15 minutes. Contact physician. Wash from skin with soap and water. If swallowed do not induce vomiting. Call a physician immediately.

SPECIFICATIONS: Meets or exceeds ASTM-C309 Type 1; TTC-800A Type 1, Class 1.

PACKAGING: One gallon can (6 per case), 5 gallon pail and 55 gallon drum.

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THE MURPHY-PHOENIX COMPANY
P.O. BOX 22930 • BEACHWOOD, OHIO 44122 • (216) 831-0404

216-423-2105

SURTREAT

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(412) 281-1202 FAX 281-1282

Research & Development
University of Pittsburgh • Applied Research Cen...
805 William Pitt Way • Pittsburgh, PA 15238
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Surtreat Concrete Surface Protection Properties

SURTREAT protects concrete surfaces from penetration and attack by inorganic and organic liquid via two mechanisms: surface penetration/chemical reaction and surface coating/sealing.

The primary **SURTREAT** concrete protection mode results from the liquid **SURTREAT** formulation penetrating the concrete and reacting with the portland cement to form an inorganic polymer which is chemically bonded to the cement. This seals the concrete pores and makes it resistant to attack by even strong mineral acids. The reduced porosity inhibits penetration of organic and inorganic liquids, but does not completely resist surface wetting of the concrete.

Further application of **SURTREAT** is made to build up a surface film which is resistant to penetration by and solubility in organic liquids. This surface film, though, is not totally resistant to reaction with strong mineral acids. The surface coating is not removed, but changes appearance from a clear to white film when contacted by strong acids.

When **SURTREAT** is applied to protect a RCRA warehouse concrete floor several applications are made to both seal the pores and protect the concrete, and to form a solvent resistant surface film. A floor so treated will resist reaction with and penetration by inorganic acids such as:

Hydorchloric	- 32%
Sulfuric	- 98%
Sulfuric	- 50%
Nitric	- Concentrated

and organic acids such as:

Acetic	- Glacial
Acetic	- 50%
Citric	- Aqueous Solution

and inorganic bases such as:

Sodium hydroxide	- 50% solution
Potassium hydroxide	- 50% solution

The **SURTREAT** sealed concrete surface with a top coat will resist solubility in and penetration by the most aggressive organic liquids such as:

Acetone
Chloroform
Trichloroethylene
Xylene
Benzene
Methanol
Acetic Acid
Dimethylsulfoxide
Tetrahydrofurane
Dimethyl Acetamide

SURTREAT coated concrete surfaces have not been exposed to every organic solvent or inorganic chemical. The exposure tests run (as summarized here) have demonstrated a high degree of resistance to chemical attack and penetration.

A condition under surface penetration which might occur could be a combined spill of strong mineral acids and aggressive organic solvents such as hydrochloric acid plus trichloroethylene, where the acid would attack the top coat and open the surface to wetting by the organic solvent. This combination was tested in the laboratory as a mixed spill and the concrete surface resisted both reaction and penetration by both chemicals.

All resistance tests were run on **SURTREAT** coated surfaces by applying a few drops of each chemical and observing its effect up to one hour versus a similar application to an uncoated surface.

Specific resistance tests can be run on any combination of chemicals which may be of concern.

If a spill does occur on a **SURTREAT** coated floor, it should be inspected for surface damage and if necessary **SURTREAT** will repair the surface coating.

For further information on **SURTREAT** chemical resistance please contact:

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Besides applying **SURTREAT** to a concrete floor, **SURTREAT** also seals all cracks and joints with a urethane elastomer which is then coated with **SURTREAT** to protect it from solvents. This insures a total resistance to migration of a chemical spill from the containment area.

SECTION D - PROCESS INFORMATION

ATTACHMENT D-2

SECONDARY CONTAINMENT CAPACITY CALCULATIONS

Conversion for Containment Capacities:

Ref: CRC Handbook, copyright 1964
Volume conversion: 7.48 gallons/cubic feet

Pallet Displacement Calculations:
Based upon design parameters
1-inch by 6-inch by 4-inch support boards - 12 each = 3,456 cubic inches
3-inch by 4-inch by 4-inch runner boards - 3 each = 1,728 cubic inches
Total Displacement = 3,456 + 1,728 = 5,184 cubic inches
5,184 cu. in. (divided by the conversion factor of 1,728 cu. in. per 1 cubic foot) = 3 cu. ft.
TOTAL DISPLACEMENT PER PALLET = 3 CUBIC FEET

NOTE: For the purpose of these calculations, pallets were selected as representative of displacement volume.