

SECTION 8  
BUILDINGS AND STRUCTURES

8.1 SITE PREPARATION

A. Clearing

Clearing and removing obstructions within building sites shall be limited to only those items necessary to provide adequate work space. The removal of trees and/or permanent structures shall not be commenced unless prior approval has been granted by the Department of Lee County Utilities. Trees and shrubs scheduled for removal should be replanted if at all possible. Remaining vegetation in and around the work site shall be protected.

B. Grubbing

Grubbing shall be performed in areas including but not limited to areas where fill will be placed, structures erected or where other installations are required. Grubbing shall include the complete removal of all obstructions resting on or protruding through the surface of the existing ground to a depth of one foot below finished grade. Where excavation is done, all exposed stumps, roots and deleterious material shall be removed to a depth of one foot minimum below the excavated surface.

C. Disposal Of Cleared And Grubbed Material

All refuse from clearing and grubbing operations shall be disposed of either by burning or removal to a dump area approved by Lee County. Burning, if approved by the County, will be done at a location and at times as directed in a manner that will avoid all hazards. Permits shall be obtained from all applicable authorities for burning, and burning shall be kept under constant attendance until the fires have burned out or have been extinguished. Burning operations shall be done in compliance with all applicable regulations.

D. Unsuitable Material

All muck or other unsuitable material within the limits of building sites or other designated areas shall be excavated and removed. Depth of removal shall be that required to reach an approved suitable material. Removal and subsequent backfilling shall be maintained within the limits of the designated construction area unless specifically approved otherwise by the Department of Lee County Utilities. Sheeting, as specified under Section 4, shall be installed and left in place along the site boundary where required to preclude infringement of adjacent property and prevent damage by future demucking. Dewatering, if required, shall be accomplished as specified under Section 4. Muck or other unsuitable material shall be disposed of by the Contractor at a site approved by the Department of Lee County Utilities.

E. Fill

Suitable fill material shall be placed and compacted where muck or other unsuitable material have been removed and as required to elevate the site to finish grade. Fill material shall conform to U.S. Bureau of Public Roads, Classification A-3, or as may be approved by a testing laboratory and the Department of Lee County Utilities. Fill shall be placed in successive layers of not more than 12" loose measure and suitably compacted to a minimum of 98% of maximum density as determined by AASHTO Specification T-180, unless higher percentage is necessary in specific locations. Side slopes shall not exceed 2.5 (horizontal) to 1.0 (vertical) unless specifically approved otherwise and shall be protected from erosion by staggered solid grass sodding or other approved methods. Density tests for determination of the specified compaction shall be made by an approved testing laboratory as directed by the Department of Lee County Utilities.

F. Grading

All building sites shall be properly graded, including all cutting and filling necessary for the construction. Finish building site elevations shall be required to preclude flooding and shall receive prior approval from the County. Finish surface grades shall eliminate potholes, abrupt changes in grade and bring the ground to an even surface and shall provide adequate drainage for the complete site with special consideration for the following:

1. The grade shall be sloped evenly to provide drainage away from the building walls in all directions at 1/4-inch per foot minimum for at least 10-feet from the building walls.
2. Drainage swales shall have a minimum flow-line grade of not less than 1/8-inch per foot.
3. Rounding shall be provided at top and bottom of banks and at other breaks in grade.

8.2 SURFACING

A. Asphaltic Concrete Pavement, Non-Roadway

Driveways, parking locations and other vehicular traffic areas at building sites shall be paved with an asphaltic concrete surface course. All materials, installations and testing shall be in accordance with the Lee County Department of Transportation and Engineering.

1. Subgrade stabilization shall be 6" minimum below the base course and shall be compacted to 98% of maximum density as determined by AASHTO Specification T-180.
2. Base course shall be limerock or soil-cement, placed and compacted to 98% of maximum density per AASHTO T-180, 6" lifts.

3. Prime coat shall be rapid-curing cutback asphalt RC-70, applied at the rate of 0.10 gallon per square yard.
4. Asphaltic concrete surface course shall be 1" minimum thickness, compacted, Type III.
5. Field testing shall be performed in accordance with Lee County Department of Transportation and Engineering requirements.

B. Concrete Walks

Concrete walks shall be provided between points of frequent travel to provide an all-weather surface for foot traffic ways. Walks shall be minimum 4-feet wide by 4" thick with concrete construction in accordance with the standards specified in this section. The base material shall be thoroughly compacted to 95% of maximum density. Walks shall be provided with expansion joints at structures and/or intervals not exceeding 18 feet with a minimum 1-1/2" deep contraction joints at 5-foot intervals. A broom finish shall be provided.

8.3 FENCING

A. General

All building sites shall be totally enclosed by protective fencing, unless specifically excluded from this requirement by the Department of Lee County Utilities. Other sites, as determined by the Department of Lee County Utilities, shall also be fully enclosed by protective fencing.

Said fence shall consist of 6-foot high chain-link fabric, surmounted with three (3) strands of barbed wire for a total height of 7 feet. Fence shall be fabricated and installed complete including top rail, stretcher bars and clips, end, corner, pull and gate posts, post braces, ornamental post tops, barbed wire and support arms and other

necessary items. The fence shall include a minimum of one gate opening 12-feet in width, consisting of two (2) 6-foot wide locking, 180 degree swing gates, or one (1) roll-open sliding gate, with total height equal to fence (7 feet).

B. Materials

Fencing shall be fabricated in compliance with the following minimum material standards:

1. Chain Link fabric shall be 2" mesh woven from 9-gauge steel wire.
2. End, corner and pull posts shall be a minimum of 2-1/2 inch Schedule 40 steel pipe.

3. Gate posts up to 6-foot in width shall have a minimum of a 2-1/2 inch Schedule 40 steel pipe; and, gate posts between 6-feet to 12-feet width shall have a minimum of a 3-1/2 inch Schedule 40 steel pipe.
4. Gate frames and intermediate posts shall be a minimum of 1-7/8-inch outside diameter, 2.71 pounds per foot steel tube.
5. Post braces and top rails shall be a minimum of 1-5/8-inch outside diameter, 2.27 pounds per foot.
6. Barbed wire shall have two twisted strands of 12-gauge steel wire with 14-gauge, 4-point barbs spaced on 5" centers.
7. Accessories shall be all steel.
8. Coatings shall be hot-dip galvanized with 1.2 ounces of zinc per square foot applied after weaving of fabric and following fabrication for all other ferrous metal items.
9. Concrete shall be 2,500 psi compressive strength.

C. Installation

The fencing shall be installed to proper grade, alignment and plumb with corner posts and bracing provided at all angles in alignment. Posts shall be set a minimum of 3-feet deep in concrete footings that are 1 foot 4 inches diameter for line posts and a minimum of 2-foot 0-inches diameter for gate and corner posts.

#### 8.4 LANDSCAPING AND GRASSING

A. General

Building sites shall be landscaped to be harmonious with the existing or projected adjacent development, provide screening plants and present a pleasing appearance. Plants shall equal or exceed Standards for Florida #1, as given in "Grades and Standards for Nursery Plants", Part I (1963) and Part II, State of Florida Department of Agriculture. The landscapes shall install the approved planting (grass, trees, and shrubbery) in accordance with standard practice and maintain said items until hardy growth has been established.

B. Landscaping

The Contractor shall provide the County with landscaping plans for approval prior to installation. Said plan shall be prepared by an experienced landscaping company and shall

include only such plants which are established for the area of construction and which require minimal maintenance. Such plan shall comply with the Lee County Landscaping Ordinance as a minimum standard.

C. Grassing

The Contractor shall place solid sod, where not covered by structures surfacing, over the total area of small facility sites and over the prime area of large sites such as treatment facilities, with additional placement for erosion control. Where not solid-sodded, the balance of the site area shall be totally grassed by sprigging. Unless otherwise approved by the County, the grass shall be Argentine Bahia. Sod and sprigs shall be fresh and uninjured at time of installation and sod shall be clean, have a well-matted root system and a minimum thickness of 2". Sod and sprigs shall be at least 80% green three (3) months after application.

8.5 BUILDINGS AND STRUCTURES

A. Excavation And Fill

1. Excavation shall not proceed until building lines have been surveyed and staked by a Florida Registered, Professional Land Surveyor. The Contractor shall remove and dispose of all unwanted material, supply all fill material and install dewatering facilities, shoring and/or bracing.
2. Bearing capacity of surfaces in excavations or on compacted fill shall be adequate to support the building or structure to be placed thereon. In the event such bearing capacity is uncertain or suspected of being inadequate, the County may require testing by an independent testing laboratory to verify adequacy of the foundation design or to require special foundation features, such as larger footings, piles and increased compaction.
3. Fill and backfill shall be compacted to 98% of maximum density at optimum moisture as determined by or ASSHTO Method T-180.
4. Building site shall be kept clear of rubble and any material which may be hazardous to persons or impede construction progress.

B. Soil Treatment - Termite Control

1. When structures are to be constructed of, or are to contain any wood or wood products, soil treatment shall be required for termite control.
2. Chemicals shall be EPA approved termiticides containing a dye which will be readily

seen after application to the soil.

3. Application of chemical selected shall be made to all areas along foundation walls, around piers and under all concrete slabs at the maximum rate allowed by the EPA.

## C. Concrete Work

### 1. General

Design, materials, workmanship and practices shall conform to ACI Manual of Standard Practice (ACI 315) and the Code of Standard Practice of the CRSI.

### 2. Testing

Field and laboratory tests shall be conducted by independent testing laboratory on structural concrete pours for buildings to ascertain that concrete design slumps and strengths are attained.

### 3. Standards

Applicable standards shall include latest editions of the following publications and guidelines:

- a. Southern Standard Building Code.
- b. Building Code Requirements for Reinforced Concrete (ACI 318).
- c. Concrete Proportions and Placing (ACI 211.1 and 301).
- d. Concrete Design For Sanitary Engineering Structures (ACI Committee 350 Report 68-50).
- e. Form work (ACI 347).
- f. Reinforcing Bars (ASTM A-615, Grade 60).
- g. Stirrups and Ties (ASTM A-185).
- h. Welded Wire Fabric (ASTM A-185).
- i. Cement for Concrete NOT Exposed to Sewage (ASTM C-150, Type I).
- j. Cement for Concrete Exposed to Sewage (ASTM C-150, Type II, or ASTM C-150, Type I with sulfide resistant properties equal to Type II).
- k. Watertight and Chemical Resistant Concrete (ACI 614).
- l. Aggregate (ASTM C-33, Salt-Free).
- m. Ready-Mix Concrete (ASTM C-94).
- n. Slump Test (ASTM C-143).
- o. Test Cylinders (ASTM C-31, Minimum of 3 per 50 CY of Pour or Fraction Thereof).
- p. Compression Test (ASTM C-39 at cylinder ages of 7 days, 28 days and if

indicated and directed by Design Engineer, at extended time period, not to exceed 45 days).

4. Water Stops and Vapor Barriers

- a. Water Stops shall be installed at all construction joints in concrete structures retaining liquid and at all construction joints at or below ground level in concrete structures required to remain dry.
- b. Dampcheck or waterproof membranes shall be installed under and around all concrete slabs to be placed against soil with joints lapped a minimum of 6".
- c. Inspection by the County is required on Form work, reinforcing steel, Water Stops, vapor barriers, construction and expansion joints before placement of concrete.

D. Masonry Work

1. Concrete masonry units shall be of modular dimension and conform to ASTM C-90, Grade U-1.
2. Brick masonry units shall be clay and conform to ASTM C-216, Grade SW for below-ground work and Grade MW for above-ground work.
3. Reinforcement of all masonry unit walls shall be provided at alternate courses with "Dur-O-Wall", "Wal-Lock", "Block-Lok" or approved equal.
4. Anchors and ties shall be of ferrous metal with zinc coating conforming to ASTM A-153, Class B-1 or B-3 as appropriate and as follows:
  - a. Rigid Steel: 1" X 1/4" X 24" with ends turned down 3".
  - b. Wire Mesh: 16 gauge, 1/2-inch mesh, 3" X 16" .
  - c. Veneer Ties: #6 W & M gauge wire bent 90° to form 2" hook for mortar embedment, or 22 U.S. gauge corrugated sheet metal.
  - d. Ties: Spacing of ties shall be such that each tie shall not support more than 3 square feet of wall area with vertical spacing not more than 24" and with additional ties at wall openings.
5. Mortar shall conform to ASTM C-270 (except that slag cements shall not be used), Type M or S. Type N may be used for non-bearing interior walls and partitions above grade.

E. Waterproofing

1. Waterproofing shall be provided in two coats on all exterior surfaces of subgrade concrete or masonry walls with outside lap of vapor barriers, dampchecks or waterproof membranes thoroughly sealed into the sidewall waterproofing material.
2. Waterproofing material shall be an asphalt base coating applied in accordance with manufacturer's recommendations for Tnemec Co. #461, "Foundation Coating" (black) or approved equal.
3. Minimum film thickness (dry) after application shall be 8.0 mils for first coat, 6.0 mils for second coat.

F. Architecture and Wall Finishes

1. Complete architectural plans and specifications for buildings shall be submitted for approval by the County prior to construction. In no case shall a structure be planned without regard for aesthetic appearance, or maintenance and construction costs.
2. Exterior wall finishes for permanent above-grade buildings or structures shall comply with one or more of the following selection of materials:
  - a. Stucco/Stucco Brick.
  - b. Rubbed Concrete.
  - c. Brick (Over Masonry or Sturdy Wood Frame).
  - d. Stone Aggregate on Masonry.
  - e. Stone.

G. Metal Fabrications

1. Steel and Ferrous Materials

Steel or other ferrous materials shall conform to the following requirements:

- a. Structural shapes and plates (ASTM A-36).
- b. Pipe ASTM A-53).
- c. Bolts, machine (ASTM A-307).
- d. Bolts, high tensile (ASTM A-325).
- e. Galvanizing (ASTM A-123 or A-153, as applicable).
- f. Iron castings (ASTM A-48, Class 25).
- g. Abrasive cast iron (nosing), American Abrasive Metals Co. "Feralun" or equal.
- h. Cast steel (ASTM A-27, Grade N2).

- i. Stainless Steel (Type 304, unless otherwise required or specified).
- j. Fabrication and erection (AISC Manual of Steel Construction).

2. Aluminum

Aluminum materials shall conform to the following requirements:

- a. Rolled shapes, smooth or checkered plates and extruded pipe (ALCOA 6061-T6).
- b. Other extruded shapes (ALCOA 6063-T5).
- c. Sheets (ALCOA 3003).
- d. Pipe hand railing (ASTM B-429).

H. Metal Doors and Frames

- 1. Door frames shall be combination buck and frame type with adjustable anchors for masonry applications. Frames shall be filled with sand-cement grout when installed.
- 2. Doors shall be constructed of honeycomb material with metal laminated facing. Minimum door thickness shall be 1-3/4 inches with a height of 6-feet 8-inches.
- 3. All doors and frames shall be mortised and reinforced to receive hardware. Non-ferrous metal should be used at all areas exposed to corrosive atmosphere.
- 4. All door frames shall be sealed with a non-shrink silicone-base caulk.

I. Finish Hardware

- 1. Hardware shall be heavy duty type with non-magnetic accessories and compatible with door and frame materials.
- 2. Emergency exit devices shall be provided in all areas of corrosive or hazardous atmosphere which may be encountered by occupants.
- 3. Finish hardware shall include:
  - a. Lock sets: Cylinder type with dead latch, suitable for master keying.
  - b. Butt hinges: 1-1/2 pairs per door, ball bearing type preferred.
  - c. Door closer, holders and silencers.
  - d. Thresholds shall be aluminum.
  - e. Flush bolts.

- f. Emergency Exit devices.

J. Carpentry

1. All carpentry components shall be of high quality with galvanized fasteners and treated wood where in contact with all masonry, metal or exposed to weather.
2. Rough carpentry of construction grade lumber shall conform to standards as follows:
  - a. NLA: Specifications for stress grade lumber and its fasteners.
  - b. AITC: Uniform specifications.
  - c. TPI: Specifications.
3. Finish carpentry or millwork shall be of "B" or better yard grade seasoned lumber, conforming to applicable requirements of the AWI. Shelving, cabinet doors, tops and ends shall be a minimum of 3/4-inch plywood with all exposed edges trimmed with hardwood. Joints shall be tight and formed to conceal shrinkage.

K. Roofing

1. Moisture control methods and materials for roofing shall be similar and equal to Johns-Mannville or Bird specifications for built-up shingle roofs.
2. Flat roofs shall have a minimum slope of 1/16-inch per foot with a 5-ply built-up roofing meeting the requirements for a 20-year bond. All built-up roofs on concrete slabs or metal decking shall be applied to 1" rigid insulation board.
3. Pitched shingle roofs shall have a minimum pitch of 3-1/2 vertical to 12 horizontal with seal-down type asphalt or Fiberglass shingles at 300 lb. per square on two layers of 15 lb. underlayment, meeting requirements for a minimum of five (5) years warranty.
4. Facial, gravel stops and soffits shall be of low maintenance materials of which architectural metal or masonry are preferred.
5. Flashing and trim shall be either galvanized steel, 24 gauge minimum thickness and conform to Federal Specification QQ-S775, Type I, Class C or aluminum, 0.019-inch minimum thickness.
6. Gutters and down spouts shall be provided on all permanent buildings. Screen protection from debris and concrete splash blocks are required for all down spouts. Materials shall be:

- a. Gutters: 24 gauge galvanized steel or 0.032-inch anodized aluminum.
- b. Down spouts: 26 gauge galvanized steel or 0.025-inch anodized aluminum.
- c. Hanger straps: Shall be the same material as gutters at 3-foot centers with blocking behind down spouts.

L. Accessories

1. Stairs shall be of reinforced concrete or all-welded structural aluminum. Nosing and treads shall be non-skid and tread widths and riser heights shall conform to applicable codes. The use of ship ladders or vertical ladders is discouraged.
2. Handrails shall be of all-welded 1-1/2-inch O.D. aluminum pipe, 42" high with intermediate rail. Rail post spacing shall not exceed 8-feet.
3. Gratings and checkered plate shall be of aluminum (preferred) or galvanized steel and designed to carry a uniform live load of 200 pounds per square foot with a safety factor of five (5), based on ultimate strength. Reinforcing shall be utilized to preclude deflections greater than 1/1160 of span. All grating and plates shall have a non-skid surface.
4. Plumbing fixtures shall include, but are not limited to, water closet and lavatory, shower, water heater; and, a drinking fountain(s) may be required by the County. Appropriate toilet partitions and stainless steel accessories shall be provided as indicated.
5. Fire extinguishers shall be 10 lb. Type ABC rechargeable units, provided and spaced as required by Code in all buildings and structures.
6. Other safety equipment shall be provided wherever hazardous materials or equipment are utilized, or as the County may require, such as eye-wash fountain, gas mask and emergency lighting.

8.6 PAINTING

A. General

1. Painting materials shall be delivered to the work site in the original and unbroken containers marked with the manufacturer's name, type of material and analysis of the product. All paint material shall be stored in one location and special care shall be exercised in the handling and maintenance of all painting materials.
2. A "Painting System Schedule" shall be included in the project specifications for specific

facility items and surfaces. Said schedule shall include, but not be limited to, the specific surface to be coated and specified painting system with minimum dry mil thickness per coat required.

B. Materials

1. All paints and painting materials shall be high grade products of manufacturers' established reputations and shall be approved by applicable codes for the intended uses.
2. To ensure a satisfactory product, it is essential that paint coats be mutually compatible and all paints applied to a given surface shall be the product of a single manufacturer.
3. The paint material shall not be less than the minimum acceptable type for the application indicated, unless specifically approved otherwise by the County.

C. Application

1. The Builder/Contractor shall do a complete painting job throughout the project in accordance with high quality work practices. Additionally, surface preparation and application shall be in strict compliance with the manufacturer's recommendations and paint shall not be extended or modified.
2. Factory finish coatings shall be inspected following installation and any mars or blemishes shall be touched up in the field with the original color and type of paint.

D. Painting Requirements

1. The paint schedule herein specifies the surfaces to be painted, service conditions of the indicated surfaces and examples of acceptable material. The total painting system (surface treatment, primer, finish coat and other necessary applications) and minimum dry mil thickness per coat required to achieve the specified finish for the specific surface and service condition, shall be in strict compliance with the paint manufacturer's recommendations.
2. For convenience of description and as a standard for quality comparative reference, the schedule indicates the finish coating by name and number for products manufactured by Koppers Co., Inc. of Pittsburgh, Pennsylvania. This does not imply preference for the subject manufacturer and approved equal products are acceptable.
3. In addition to the data contained herein, painting for water storage tanks shall comply with AWWA Standard D-102 (latest edition), "Painting and Repainting Steel Tanks, Standpipes, Reservoirs and Elevated Tanks for Water Storage".

4. Unless specifically indicated, the color for surfaces to be painted shall be as selected by the County and shall meet all nationally accepted safety codes.
5. Surfaces which shall not require painting (unless service color coding, or other specific coatings are required) are as follows:
  - a. Exterior Piping Below Ground
  - b. Factory Finished Equipment
  - c. Galvanized Fencing
  - d. Stainless Steel
  - e. Aluminum and Brass
  - f. Plastic or Rubber
  - g. Concrete Floors
  - h. Stair Treads
  - i. Interior of Concrete Below Grade Dry Pits
  - j. Exterior Concrete Services

PAINTING SYSTEM SCHEDULE

<u>General Areas</u>	<u>Service Conditions</u>	<u>Finish Paint Coating</u>
Masonry/Concrete (Walls/Ceilings):	Interior Above Grade, Normal Conditions, Non-Submerged:	Glamorglaze
Masonry/Concrete (Buildings/Tanks):	Exterior Above Grade, Normal Conditions, Non-Submerged:	Ramuc Exterior Masonry Paint
Wood:	Interior, Normal Conditions:	Ponkote 300 Enamel
Wood:	Exterior, Normal Conditions:	Rustarmor 500
Metal (Machinery, Piping Systems, etc.):	Interior, Normal Conditions Non-Submerged:	Ponkote 300 Enamel
	Exterior, Normal Conditions Non-Submerged:	Glamortex 501 Enamel
Metal (Machinery, Piping Systems, etc.):	Severe Moisture & Condensation Conditions, Non-Submerged:	Torex 800 Enamel
Metal (Large areas as Tank Surfaces,	Exterior, Moderate to Normal Conditions, Non-Submerged:	Rustarmor 500 Enamel

Structural Steel, etc.)

<u>Sewerage Facilities</u>	<u>Service Conditions</u>	<u>Finish Paint Coating</u>
Concrete (Wet Wells, Tanks, Channels, etc.):	Submerged or Severe Conditions:	Black-Bitumastic No. 300M
Metal (Equip., Tanks, Piping Systems, etc.):	Submerged or intermittently submerged or Extreme Conditions:	Black-Bitumastic Color-Rigortex 330
Metal (Moving Parts, Chains, Gates, etc.):	Submerged or intermittently submerged:	Inertol Grease Coat.
<u>Water Facilities</u>	<u>Service Conditions</u>	<u>Finish Paint Coating</u>
Concrete (Troughs, Tanks, Basins, etc.):	Submerged or intermittently submerged:	Black-Petropoxy Color-Torex 800 Enamel
Metal (Equip., Tanks, Piping Systems, etc.):	Submerged or intermittently submerged:	Black-Petropoxy Color-Torex 800 Enamel

#### Special Notes

1. All galvanized or other nonferrous surfaces requiring painting shall be pre-retreated with an approved conditioner or passivator, as recommended by the paint manufacturer prior to application of the painting system.
2. Bituminous coated pipe shall be coated with Inertol Tar Stop, as recommended, prior to application of the painting system.
3. Metal in contact with concrete or masonry shall be protected by coating the contact surface with Koppers Bitumastic No. 50, as recommended. This provision shall not apply to concrete reinforcement, piping and fittings or to conduits and accessories.
4. Unless specifically directed, painting and coatings shall generally conform to the minimum standards of the above-noted products.

## 8.7 ELECTRICAL

### A. General

1. It shall be the responsibility of the Contractor to advise the appropriate electrical power company regarding the proposed facility prior to installation and to make the necessary provisions for service thereto.
2. In accordance with the provisions of the General Conditions, complete shop drawings and technical data shall be submitted to the County. The drawings shall include, but not limited to, motor control centers and control systems with wiring diagrams and components, switches, transformers, relays, lighting fixtures, panel-boards and other electrical system accessories.

### B. Materials, Equipment and Installation

Materials, equipment and workmanship shall conform to the codes, specifications, standards and statutes listed below:

§ National Fire Protection Association (NFPA) #70 National Electrical Code.

§ Local Codes - All applicable local codes, regulations and ordinances in effect at the place of the work.

§ National Electrical Manufacturers' Association (NEMA):

- AB 1 Circuit Breakers, Molded Case
- FB 1 Conduit Fittings, Cable Fittings
- IC 1 Industrial Control
- SGB 1 Connectors, Electric Power
- KS 1 Enclosed Switches
- PB 1 Panel-Boards
- TR 1 Transformers
- SG 8.1 Connectors for Copper Conductors
- SG 8.2 Connectors for Copper Conductors
- SG 14 Connectors for Copper Conductors
- IC 4 Industrial Enclosures
- WC 5 Thermoplastic, Insulated Wire & Cable

• American National Standards Institute (ANSI):

- C80.1 Rigid Steel Conduit
- C6.1 Terminal Markings for Electrical Apparatus

- Underwriters' Laboratories, Inc. (UL):
  - Standard for Cabinets and Boxes
  - Standard for Service Equipment
  - Standard for Industrial Control Equipment
  - Standard for Thermoplastic-Insulated Wire

\$ Illuminating Engineering Society:

- IES Lighting Handbook

\$ United States Federal Government:

- Williams-Steiger Occupational Safety & Health Act of 1970 (OSHA)

C. Special Requirements

1. Phase rotation of electrical service shall be L1, L2, L3 (A, B, C) left to right when facing equipment.
2. Generator receptacles for portable emergency power connection shall be provided for all electrically operated facilities and shall be as follows for the specified service:

Three Phase, 100 Amps, 120/240V, 4-Wire, Tapped Delta:  
 Pyle National, JRE-4100, 3W, 4P-100 Amp, 600 VAC Receptacle

Three Phase, 200 Amps, 120/240V, 4-Wire, Tapped Delta:  
 Crouse Hinds, AR-2042, 3W, 4P-200 Amp, 600 VAC Receptacle

Three Phase, 277/480V, 4-Wire, Y:  
 Russell & Stoll, FCB-3144, 3W, 4P-200 Amp, 480 Vac Receptacle

D. Electrical Motors

1. Environment: Motors shall have enclosure types which provide safe protection from exposure to unusual environments such as chemical fumes, high humidity, poorly ventilated rooms or places of restricted air circulation. In general, enclosures shall be NEMA standardized motor types.
2. Insulation: Motor insulation materials shall be Class F Systems.
3. Size: Motors for non-submersible service shall be sized such that the nameplate horsepower rating shall not be less than 1.2 times the required shaft brake horsepower

output. Appropriate NEMA design shall be used to provide torque and/or other load requirements.

4. Electrical Characteristics: Motor electrical rating shall be compatible with station electrical service.
5. Mountings: Motor Mountings shall be of standard NEMA design and shall be compatible with the driven apparatus.
6. Controls: Motors shall be controlled by NEMA standard controllers for all across-the-line or reduced voltage starting. Where variable speed pumping is required, the specifications of variable speed control equipment shall be coordinated with the County. Motors shall be equipped with all necessary controls and devices for complete and operable systems.
7. Electrical Service: Station electrical service shall be provided as 3-phase. In the event the electrical utility company is unable to provide 3-phase service due to motor size or other valid reasons, an approved converter shall be provided so that 3-phase pump motors may be utilized.