

Changes shown by ↗

SCOPE

- I 1.1 This practice covers the materials, design and erection of buildings and shelters for processing plants, including but not limited to buildings housing process or manufacturing equipment, control or service rooms, in-plant sample laboratories, in-plant sanitary facilities, power station equipment, material receiving, handling and storage facilities.
- I * 1.2 This practice applies to buildings located within or used directly for plant process, maintenance, or storage facilities. When specified by the Owner, it may apply to other buildings not located within the plant.
- I 1.3 **An asterisk (*) indicates that additional information from the Owner, or approval by the Owner is required.**

SUMMARY OF ADDITIONAL REQUIREMENTS

- I ↗ 2.1 **Table 1** lists the practices, code and standards which shall be used with this practice as specified.

TABLE 1

PRACTICES	
IP 4-1-3	Design Loads for Structures
IP 16-5-1	Lighting
API Recommended Practice	
RP 500	Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Division 1 and Division 2
CODE AND STANDARDS	
ICBO	
Uniform Building Code	
ANSI Standard	
Z97.1	Safety Glazing Material Used in Buildings
ANSI / NFPA Standard	
70	National Electric Code
496	Purged and Pressurized Enclosures for Electrical Equipment

- I 2.2 **Table 2** lists the practices and standards which shall be used with this practice **as appropriate**.

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TABLE 2

PRACTICES	
IP 2-1-1	Plant Noise Design Criteria
IP 4-1-1	Concrete Design and Construction
IP 4-2-1	Auxiliary Structures for Operation and Maintenance
IP 4-3-2	Blast Resistant Buildings
IP 4-3-4	Special Category 3 Blast Resistant Buildings
IP 4-7-1	Piles and Sheet Piling
IP 16-6-1	Substation Layout
STANDARDS	
ASTM Standards	
A 74 / A 74M	Cast Iron Soil Pipe and Fittings
A 525 / A 525M	General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process
B 209 / B 209M	Aluminum and Aluminum-Alloy Sheet and Plate
C 12	Installing Vitrified Clay Pipe Lines
C 443 / C 443M	Joints for Circular Concrete Sewer Culvert Pipe, Using Rubber Gaskets
E 84	Surface Burning Characteristics of Building Materials

- I 2.3 **ICBO (Uniform Building Code)** shall be used for building design and materials not covered by referenced practices, publications and standards listed in **Tables 1 and 2**.
- I ↗ * 2.4 **Local codes and standards** may be substituted for the ones referenced herein provide the following provisions are met:

IP 4-3-1		Plant Buildings for Operation and Storage	
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- a. The resultant design meets the safety and serviceability criteria attained through this practice.
- b. Substitution is accepted by the authorities where the facility is to be located and by the Owner's Engineer.

MATERIALS

- R 3.1 **Structural materials** shall be steel, reinforced concrete, masonry, or other materials approved by the Owner's Engineer.
- S 3.2 **Wood or other material which will support combustion** shall not be used.
- R 3.3 **Corrugated galvanized carbon steel sheets** for roofing and siding shall be per **ASTM A 525**, with a minimum weight of coating of 2 oz/ft² (610 g/m²) of sheet.
 - * For "temporary buildings," coating weight shall be approved by the Owner's Engineer.
- S 3.4 **Materials containing asbestos** shall not be used.
- S 3.5 **Asphalt covered corrugated steel roofing and siding** shall not be used.
- O 3.6 **Roof ventilators and louvers** shall be of corrosion resistant metal.
- S 3.7 **Plastic material for translucent panels** including reinforced plastic fiberglass shall have a flame spread classification of not more than 25 per **ASTM E 84**.
- S 3.8 **Windows, Doors, and Glazing materials** shall be as follows:
 - a. **Sash and frames** for windows and skylights shall be metal.
 - b. Doors and frames in walls and interior firestop partitions shall be metal.
 - c. **Glass for exterior and interior use** (doors, windows, skylights, and partitions) shall be "fully-tempered" per **ANSI Z97.1**.
- S,R 3.9 **Finish Materials and paint** shall comply with the following:
 - * a. **Finish materials and painting**, including colors, both interior and exterior, shall be approved by the Owner's Engineer.
 - b. **Wood or other materials which will support combustion** shall not be used for interior or exterior finish materials or trim.
 - c. **Highly polished, slippery materials** shall not be used for finished **floor surfaces**.
 - d. **Stairways shall have non-slip treads**.
 - e. **Concrete floors not subjected to heavy traffic or abrasion** shall have a smooth float finish treated with a non-dusting agent.
 - f. **Concrete floors subjected to heavy traffic or abrasion** shall have a metallic surface hardener.
- I * 3.10 **Materials for buildings subject to extremely corrosive conditions** such as the handling or storage of fertilizers or corrosive chemicals will be specified.

DESIGN

- I * 4.1 **If the basic type of construction is not specified**, proposals employing the most economical type of construction suitable for the required service and environmental exposure shall be approved by the Owner's Engineer. Such proposals shall cover:
 - a. Layout.
 - b. Architectural appearance.
 - c. Material selection.
 - d. Structural System.
 - e. Deviations from practice requirements.

In addition to masonry, or metal sheet construction, proposals to use prefabricated construction, and materials such as foamed cement blocks in metal frames or laminated aluminum-foam-plastic-aluminum, may be submitted for consideration.
- S * 4.2 Buildings, and enclosures for electrical equipment, shall be appropriate for the **electrical area classification and environmental exposure**.
- S * 4.3 Steel or reinforced concrete frames shall be used to support the roof of the building. However, in small unoccupied buildings, walls may be used to support the vertical roof loads but shall not be of fragile materials such as unreinforced masonry.

- I * 4.4 When specified as blast resistant, building shall be designed according to IP 4-3-2 or IP 4-3-4, as appropriate.
- S 4.5 Unless otherwise specified, process equipment shall not be enclosed with walls or siding in areas where flammable or toxic materials could accumulate.

ACCESS AND EGRESS

- S,O 4.6 **Doors:**
- All exterior exit doors shall open outward.
 - Doors for access and egress of personnel shall be 3 ft (900 mm) x 7 ft (2100 mm) standard commercial design. Larger doors required for installation and removal of equipment shall not be used for personnel.
 - Heavy duty door closers shall be provided if the building is pressurized.
 - Revolving doors are not permitted unless there is an outward swinging emergency door adjacent to the revolving door.
 - Emergency exit doors shall be equipped with quick opening bars (panic bolts) on the inside, which must override exterior locks.
 - * Hardware for door locks and the master key system will be specified.
- S * 4.7 **All buildings shall have at least two means of egress** located at opposite ends of the building except that one means of egress may be provided on small buildings as approved by the Owner's Engineer.
- S 4.8 **Buildings with more than one story** shall have at least two means of egress from each upper story, one of which shall be by means of an open exterior fire escape or an enclosed fireproof stairway.
- S 4.9 All roofs in multistory buildings shall have a permanently installed means of access.

WINDOWS

- S 4.10 Windows for plant buildings shall be as follows:
- Use of exterior windows shall be minimized and they shall not be installed unless specified.
 - Glazing shall be at least ¼ in (6 mm) fully-tempered laminate with a 0.06 in (1.5 mm) interlayer or monolithic ¼ in (6 mm) fully-tempered with polyester safety film 0.004 in (0.1 mm). Where film is used, it shall be applied to the inside face of exterior windows, and both faces of interior windows.
 - Windows sash and frames shall be of standard industrial types and sizes.
 - The largest dimension of exterior panes shall be less than 3 ft (0.90 m).
 - Surface area of each exterior pane shall not exceed 7 ft² (0.65 m²).

FLOORS, AND SUBGRADE CONSTRUCTION

- O 4.11 **The finished ground floor level** of any building shall not be less than 8 in. (200 mm) above the adjoining grade.
- M 4.12 **A vapor barrier** shall be installed between all concrete floors and the subgrade for floors laid on the ground.
- S 4.13 **Cellars, pits or trenches** shall not be constructed under buildings located within 200 ft (60 m) of equipment handling flammable liquids.

FIRE DETECTION, FIRE FIGHTING, AND PERSONNEL SAFETY

- I * 4.14 Equipment for fire detection, fire fighting, and personnel safety shall be provided as specified.