

# WESTERN UNDERGROUND COMMITTEE

## GUIDE 3.3 (3.3/01/0867)

### PRECAST CONCRETE BOXES, HANDHOLES, MANHOLES AND VAULTS

NOTE: This "Guide" summarizes the opinions, recommendations, and practices of the Western Underground Committee members and is issued only to assist these members in preparing their own specifications, or in making recommendations to specification agencies. Thus, this "Guide" may not reflect the complete requirements of each individual utility and is not binding upon them.

#### **1.0 SCOPE**

1.1 This recommended standard establish a list of sizes of precast concrete substructures and minimum design load requirements for manholes and vaults.

1.2 Classification – These boxes, handholes, manholes and vaults are for use by electrical and communication utilities.

1.3 Purpose – This recommendation is intended to standardize sizes of precast concrete substructures and establish minimum standards for their construction.

1.4 Limitations – These standards are not intended to intrude into the field of manufacturing processes.

1.5 In order to retain maximum value to the utilities and the manufacturers, these standards and the attached list of substructure sizes requires periodic revision in order that they remain consistent with new developments and requirements.

#### **2.0 GENERAL DESIGN CHARACTERISTICS**

2.1 The attached list (TABLE 1, page 5) of substructure sizes, in its latest issue, is a part of this standard.

2.2 All vaults and manholes shall conform to applicable American Association of State Highway Officials (A.A.S.H.O.) Standard Specifications H20-S16-44 for Highway Bridges, latest revision, relating to dead loads, live loads, and impact loads. Additionally, loads due to a ground water table of three (3) feet from finished

grade and a surcharge of two (2) feet shall be applied in calculating design loads.

2.3 All vaults and manholes shall be designed by a registered structural or civil engineer. The drawings, specifications and calculations shall bear this stamp.

2.4 The manufacturer shall obtain approval for used of the specific vault or manhole under consideration from the State Division of Highways and any other authorities that have control over permit procedures.

2.5 The embedded pulling loop, pulling-in iron, pick-up inset or equivalent will be capable of holding safely without noticeable cracking or deformation of the concrete or steel, a pull of 20,000 lbs. (working load) with a safety factor of 2.

2.6 The panel thickness of any vault with rib and beam type construction shall be not less than 5-1/2 inches.

2.7 All manholes and vaults will be so designed and so manufactured as to provide a dry and water tight installation. There will be no through cracks from any outside surface to any inside surface and all surfaces will be sound and free of honeycomb. Interior walls and ceilings of manholes and vaults shall be smooth.

### **3.0 FITTINGS**

Fittings such as inserts, pulling in attachments, conduit or duct entrances, recesses, sumps, openings and neck (materials and methods) are as required separately by the utilities and are not a part of this standard.

### **4.0 MATERIALS**

4.1 Material used in precast structures referred to in this standard shall meet the requirements of all governmental agencies and the individual utility having jurisdiction over their use.

4.2 The standards of governmental agencies and specifications of many utilities are available to the precast manufacturers. Assurance of compliance with the material requirements can be obtained by purchaser's inspection or by manufacturers certification that the products meet the standard or specifications.

## **5.0 PUBLICATIONS**

Reference is made to American Association of State Highway Officials (A.A.S.H.O.) Standard Specifications for Highway Bridges.

## **6.0 REQUIREMENTS**

6.1 Precast concrete structures under this recommended standard shall be manufactured in a plant affording conditions and controller supervision to assure compliance with this standard and the standards of the agencies and utilities having jurisdiction over their use.

6.2 Forms used in the manufacture of precast concrete structures under this standard shall be of sufficient strength to maintain the dimensions indicated in the attached list.

6.3 Finished surfaces shall meet the specifications and requirements of the purchasing utility.

## **7.0 INSPECTION**

Manufacturers shall provide inspection and/or permit inspection by agencies or utilities having jurisdiction over the use of their products.

## **8.0 MARKING IDENTIFICATION**

8.1 Precast structures manufactured for use under this recommended standard shall have marking indicating the manufacturer's name and identification number.

8.2 In manholes and vaults, the manufacturer's name, identification number, and date of pour shall be placed on the inside wall near the roof opening. In other precast structures recognized under this standard, the marking of name and identification number shall be placed inside so that they can be easily seen after installation.

## **9.0 ORDERING AND INSTALLATION DATA**

9.1 In ordering, the purchaser shall specify the sizes and/or other requirements or options needed.

9.2 Installation instructions and recommendations shall be provided to the installing contractor if the manufacturer does not erect the structure.

9.3 The manufacturer, upon request, shall furnish the purchaser or contractor with the maximum allowable depth of cover over the manhole roof and the maximum inside depth of the specific manhole or vault under consideration. Maximum dimensions shall be given for the manhole or vault in fluid soil (3' water table) and in hard compact ground. These dimensions shall be certified as being within the design calculations of the registered engineer as approved by authorities having control over permit procedures.

**10.0 NOTES/REVISIONS**

10.1 Suggestions for revision and correspondence concerning this specification should be addressed to the:

Chairman,  
Western Underground Committee.  
(For address, see any member of the committee)

10.2 This specification may be reproduced in whole provided proper credit is given the Western Underground Committee.

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**TABLE 1  
PRECAST BOXES, HANDHOLES, MANHOLES AND VAULTS**

| <u>WUC<br/>NUMBER</u> | <u>INSIDE SIZE</u><br>W x L x H |                    | <u>SHAPE</u>     | <u>VARIATIONS</u>  |
|-----------------------|---------------------------------|--------------------|------------------|--------------------|
| 100                   | 10" x 15" x 16"                 |                    | R                |                    |
| 120                   | 12" x 22" x 12"                 |                    | R                | H only             |
| 170                   | 17" x 30" x 18"                 |                    | RS               | H (30")            |
| 201                   | 2' x 3' x 3'                    | R                  | H (3'0" to 4'0") | (deep duct recess) |
| 251                   | 2'6" x 4' x 3'0"                | R                  | H (3'0" to 4'6") |                    |
| 252                   | 2'6" x 4' x 2'6"                | R                  | H (2'6" to 4'6") | 2 covers           |
|                       |                                 | (deep duct recess) |                  |                    |

|        |                       |                  |                    |                         |
|--------|-----------------------|------------------|--------------------|-------------------------|
|        |                       |                  |                    | 2 lower sections        |
| 300    | 3' x 5' x 2'6"        | R                | H inserts          |                         |
|        | (deep duct recess)    |                  | (2'6" to 4'6")     | 400 4' x 4' x           |
| 5'6"   | RS                    | H (5'6" to 6'0") |                    |                         |
| 450    | 4' x 6' x 5'6"        | RS               | H (5'6" to 7'0")   |                         |
|        | (deep duct recess)    |                  |                    | 3 variations of inserts |
| 451    | 4'6" x 10'6" x 5'6"   | OSR              | H (5'6" to 8'0")   |                         |
|        |                       | 2 variations     |                    |                         |
|        | ducts, inserts        |                  |                    |                         |
| 470    | 4' x 7'9" x 5'6"      | OSR              | H (5'6" to 8'0")   |                         |
|        |                       | 2 variations     |                    |                         |
|        | ducts, inserts        |                  |                    |                         |
| 471    | 4'6" x 7'9" x 5'6"    | OSR              | H (5'6" to 8'0")   | 551 5'0" x 10'6"        |
| x 5'6" | OSR                   | H (5'6" to 8'0") | 600 6' x 10' x 7'  | OS                      |
|        | H (7'0" to 9'4")      |                  |                    |                         |
| 800    | 8' x 14' x 7' to 9'4" | RS               | H (7'0" to 9'4")   |                         |
| 850    | 8' x 17' x 9'4"       | S                | L (17'0" to 36'0") |                         |

Sectional

R = Rectangular  
W = Width

Legend  
O = Octagonal  
S =  
L = Length  
H = Height