

[INCH-POUND]
A-A-60005
March 2, 1998
SUPERSEDING
RR-F-621E
February 23, 1989

COMMERCIAL ITEM DESCRIPTION

FRAMES, COVERS, GRATINGS, STEPS, SUMP AND CATCH BASIN, MANHOLE

The General Services Administration has authorized the use of this commercial item description for all Federal agencies.

1. **SCOPE.** This commercial item description (CID) covers manhole and catch-basin frames, gratings, steps, sumps, and catch basins for access purposes.
2. **CLASSIFICATION.** The manhole frames, catch-basin frames, covers, and gratings shall be of the following types and styles, as specified (see 7.2).

Frames

- Type I - Straight traffic frame.
 - Style A - Round-base frame.
 - Style B - Square-base frame.

- Type II - Straight traffic frame for inner covers.
 - Style A - Round-base frame.
 - Style B - Square-base frame.

Beneficial comments, recommendations, additions, deletions, clarifications, etc. and any data which may improve this document should be sent to: Commanding Officer (Code 15E2), Naval Construction Battalion Center, 1000 23rd Avenue, Port Hueneme, CA 93043-4301, by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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- Type III - Flared traffic frame.
 - Style A - Round-base frame.
 - Style B - Square-base frame.
- Type IV - Nontraffic frame.
- Type V - Ring-type frame.
- Type VI - Catch-basin frame.
- Type VII - Sump frame.

Covers and gratings

- Type A - Manhole covers, traffic.
- Type B - Manhole covers, traffic.
- Type C - Manhole covers, traffic, with vent holes.
- Type D - Manhole covers, traffic.
- Type E - Manhole covers, nontraffic frame.
- Type F - Manhole gratings.
 - Style 1
 - Style 2
- Type G - Catch-basin gratings.
 - Style 1
 - Style 2
- Type H - Manhole grating, nontraffic.
- Type I - Sump grating.

3. SALIENT CHARACTERISTICS.

3.1 Description. The frames, covers, gratings, steps, sumps and catch basins covered by this commercial item description are intended for use in the construction of manholes for drainage, sanitation, and other underground utility applications.

3.2 Standard commercial product. The manhole and catch-basin frames, covers, gratings, steps, sumps, and catch basins shall, as a minimum, be in accordance with the requirements of this commercial item description and shall be the manufacturer's standard commercial product. Additional or better features which are not specifically prohibited by this commercial item description but which are a part of the manufacturer's standard commercial product, shall be included in the manhole and catch-basin frames, covers, gratings, steps, sumps, and catch basins being furnished. A standard commercial product is a product which has been sold or is being currently offered for sale on the commercial market through advertisements or manufacturer's catalogs, or brochures, and represents the latest production model.

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3.3 Performance.

3.3.1 Traffic loads. Unless otherwise specified (see 7.2), frames, covers, and gratings shall have a transverse proof-load strength of 25,000 pounds (lb) (11 340 kilograms (kg)). Tests shall cause no cracks or permanent deformations. Proof-load tests shall be in accordance with AASHTO Standard Specification for Highway Bridges.

3.3.2 Special load requirements. When frames, covers, and gratings are to be used in applications where the proof-load of not less than 25,000 lb (11 340 kg) is insufficient, special load requirements shall be specified (see 7.2). Test shall cause no cracks or permanent deformations. Proof-load tests shall be in accordance with AASHTO Standard Specification for Highway Bridges.

3.3.3 Nontraffic loads. Frames, covers, and grating loads for nontraffic applications shall be in accordance with the standard industry practice for nontraffic loads.

3.3.4 Test bars. In lieu of determining the proof-load strength for frames, covers, and gratings, an alternate load test shall be used to verify the material properties, when specified (see 7.2). The test bars submitted for the alternate load test shall be prepared and tested in accordance with the appropriate material specification. Iron casting shall be in accordance with ASTM A 48.

3.4 Design and construction.

3.4.1 Interchangeability. All units of the same classification furnished with similar options under a specific contract shall be identical to the extent necessary to ensure interchangeability of component parts, assemblies, accessories, and spare parts.

3.4.2 Frames. Frames shall be of the general configuration shown in figures 1 through 7. Frames shall meet the performance characteristics of 3.3. Frames shall be designed for stacking.

3.4.3 Covers. Covers shall be of the general configuration shown in figures 8 through 12 and figure 17 except for those variations permitted herein. Covers shall meet the performance characteristics of 3.3. Covers shall be designed for stacking.

3.4.4 Tread design. Safety-tread designs shall be provided in accordance with the manufacturer's standard practice.

3.4.5 Lifting holes. Lifting holes shall be provided on covers. When specified (see 7.2), special lifting holes shall be provided either at the edge of the cover or in the body of the cover.

3.4.6 Ventilating holes. When specified (see 7.2), ventilation holes, other than those shown in figure 10, shall be furnished.

3.4.7 Inner covers. Inner covers, for use with type II frames, shall be the manufacturer's standard type inner cover.

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3.4.8 Gratings. Gratings shall be of the general configurations shown in figures 13 through 16.

3.4.9 Accessory items. When an inner cover shown in figure 17 is specified, a rubber gasket for making water-tight joints shall be furnished (see 7.2). The gasket shall conform to the type recommended by the manufacturer of the manhole frames and covers.

3.4.10 Alternate designs. Frames may be furnished with designs other than those indicated on the figures provided that such designs meet the load bearing requirements and do not adversely affect cover interchangeability. Frames shall have the same opening area and masonry contact area as specified.

3.4.11 Locking bars. Locking bars shall be the manufacturer's standard for use with type II frames and inner covers. General configurations shall be as shown in figure 18.

3.5 Identification marking. When specified (see 7.2), identification marking (WATER, SEWER, or ELECTRIC) shall be provided in the center of the cover or in accordance with the manufacturer's standard practice. All casting shall have country of origin identification in accordance with Intermodal Surface Transportation Act of 1991.

3.6 Steps.

3.6.1 Manhole steps. Manhole steps covered by this CID shall be either the conventional type or nonsparking type as specified.

3.6.1.1 Conventional manhole steps. Conventional manhole steps shall be of the manufacturer's standard design similar to the configuration of figure 19. Conventional manhole steps shall be of the width and depth specified (see 7.2).

3.6.1.2 Nonsparking steps. When nonsparking steps are required (see 7.2), they shall be the manufacturer's standard design in a nonsparking material.

3.7 Dimensions. The critical dimensions of the frames, covers, gratings, locking bars, and steps shall conform to the dimensions indicated on the figures contained herein and be within the tolerance limits specified herein. Critical dimensions are defined as those which affect the load bearing capacity, cover interchangeability, opening area, or masonry contact area of the unit.

4. REGULATORY REQUIREMENTS.

4.1 Materials. The offeror/contractor is encouraged to use recovered materials to the maximum extent practicable, in accordance with paragraph 23.403 of the Federal Acquisition Regulation (FAR). Unless otherwise specified herein, all equipment, material, and articles incorporated in the work covered by this commercial item description are to be new and fabricated using materials produced from recovered materials to the maximum extent possible without jeopardizing the intended use. The term "recovered materials" means materials which have been collected or recovered from solid waste and reprocessed to become a source of raw materials, as opposed to

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virgin raw materials. Unless otherwise specified, none of the above shall be interpreted to mean that the use of used or rebuilt products are allowed under this commercial item description.

4.2 Metric products. Products manufactured to metric dimensions will be considered on an equal basis with those manufactured using inch-pound units, provided they fall within specified tolerances using conversion tables contained in the latest version of ASTM SI-10 (IEEE/ASTM SI-10), and all other requirements of this commercial item description including form, fit and function are met. If a product is manufactured to metric dimensions and those dimensions exceed the tolerances specified in the inch-pound units, a request should be made to the contracting officer to determine if the product is acceptable. The contracting officer has the option of accepting or rejecting the product.

5. QUALITY ASSURANCE PROVISIONS.

5.1 Product conformance. The products provided shall meet the salient characteristics of this commercial item description, conform to the producer's own drawings, specifications, standards, and quality assurance practices, and be the same product offered for sale in the commercial market. The government reserves the right to require proof of such conformance.

6. PACKAGING. The preservation, packing, and marking shall be as specified in the contract or order.

7. NOTES.

7.1 Source of documents.

7.1.1 ASTM standards are available from the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

7.1.2 AASHTO standards are available from the American Association of State Highway and Transportation Officials, 444 North Capital Street, NW, Suite 249, Washington, DC 20001.

7.1.3 IEEE standards are available from the Institute of Electrical and Electronics Engineers, IEEE Service Center, 445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855-1331.

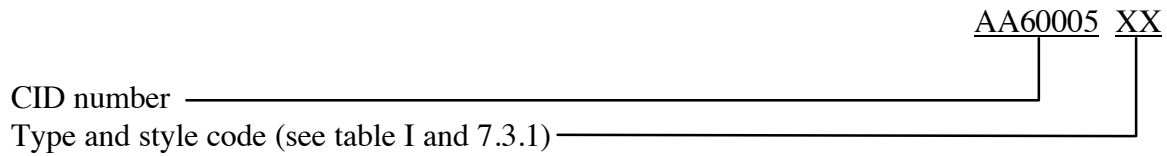
7.2 Ordering data. Acquisition documents should specify the following:

- a. Title, number, and date of this commercial item description.
- b. Type, style, and size (and applicable options) of frame, cover, grating, or step required (see 2., figures 1 through 17, and figure 19).
- c. When strength requirements are other than specified (see 3.3.1 and 3.3.2).
- d. When test bars for alternate load tests are required (see 3.3.4).
- e. When lifting holes and ventilation holes unlike those indicated are required (see 3.4.5 and 3.4.6).
- f. When accessory items are required, and type of gasket required (see 3.4.9).

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- g. Type of identification marking required (see 3.5).
- h. When width and depth of the conventional manhole steps are other than as specified (see 3.6.1.1).
- i. When nonsparking steps are required (see 3.6.1.2).
- j. Frame height required (see figures 1 and 5).
- k. Flange widths required (see figures 2 and 3).

7.3 Part Identification Number (PIN). The following part identification numbering procedure is for government purposes and does not constitute a requirement for the contractor. The PINs to be used for items acquired to this description are created as follows:



7.3.1 Type and style. The type and style of the frame, cover, or grating (see 2.) are converted to a numeric code (see table I).

TABLE I. Types and styles.

Frame, cover, or grating type	Code
Type I - style A	01
Type I - style B	02
Type II - style A	03
Type II - style B	04
Type III - style A	05
Type III - style B	06
Type IV	07
Type V	08
Type VI	09
Type VII	10
Type A	11
Type B	12
Type C	13
Type D	14
Type E	15
Type F - style 1	16
Type F - style 2	17
Type G - style 1	18
Type G - style 2	19
Type H	20
Type I	21

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7.4 National Stock Numbers (NSNs). The following is a list of NSNs assigned which correspond to this CID. The list may not be indicative of all possible NSNs associated with the CID.

NSN	TYPE	STYLE
5680-00-132-5616	Top assembly	Manhole

7.5 Classification cross reference. Classifications used in this commercial item description (see 2.) are identified to those found in the superseded Federal Specification RR-F-621E.

7.6 Metric units. The values stated in either inch-pound units or SI units are to be regarded separately as standard. Within the text, the SI units are shown in brackets. The values stated in each system are not exact equivalents; therefore, each system should be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

7.7 Subject term (key word) listing.

Basin
Covers
Frames
Grating
Manhole

7.8 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

MILITARY INTERESTS:

Custodians:
Army - CE
Navy - YD1
Air Force - 99

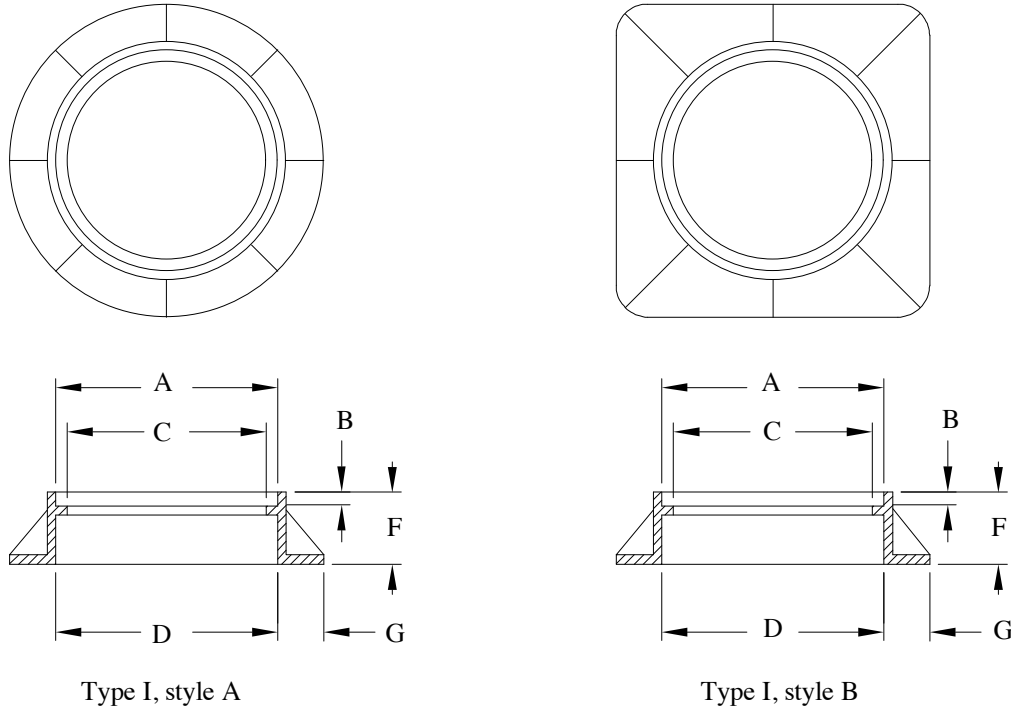
Review Activities:
Navy - MC
Air Force - 84

CIVIL AGENCY COORDINATING ACTIVITY:

GSA - FSS
Preparing Activity:
Navy - YD1

(Project 5680-0220)

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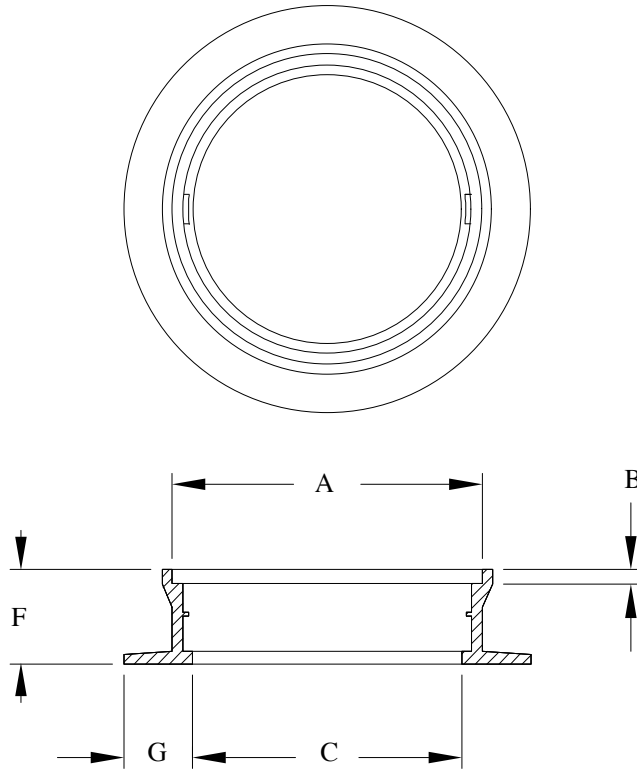
Dimensions for type I frame, style A and style B

Style	Size	A	B	C	D	F	G
A	22A	24 (609.6)	1.37 (34.9)	22 (558.8)	24.50 (622.3)	6 (152.4), 7 (177.8), or 8 (203.2)	4 (101.6)
	22B	24 (609.6)	1.50 (38.1)	22 (558.8)	24.50 (622.3)	6 (152.4), 7 (177.8), or 8 (203.2)	4 (101.6)
	22C	24 (609.6)	2.00 (50.8)	22 (558.8)	24.50 (622.3)	6 (152.4), 7 (177.8), or 8 (203.2)	4 (101.6)
A	24A	26 (660.4)	1.37 (34.9)	24 (609.6)	26.50 (673.1)	6 (152.4), 7 (177.8), or 8 (203.2)	4 (101.6)
	24B	26 (660.4)	1.50 (38.1)	24 (609.6)	26.50 (673.1)	6 (152.4), 7 (177.8), or 8 (203.2)	4 (101.6)
	24C	26 (660.4)	2.00 (50.8)	24 (609.6)	26.50 (673.1)	6 (152.4), 7 (177.8), or 8 (203.2)	4 (101.6)
A	27A	29 (736.6)	1.37 (34.9)	27 (685.8)	29.50 (749.3)	6 (152.4), 7 (177.8), or 8 (203.2)	4 (101.6)
	27B	29 (736.6)	1.50 (38.1)	27 (685.8)	29.50 (749.3)	6 (152.4), 7 (177.8), or 8 (203.2)	4 (101.6)
	27C	29 (736.6)	2.00 (50.8)	27 (685.8)	29.50 (749.3)	6 (152.4), 7 (177.8), or 8 (203.2)	4 (101.6)
A	30A	32 (812.8)	1.37 (34.9)	30 (762.0)	32.50 (825.5)	6 (152.4), 7 (177.8), or 8 (203.2)	4 (101.6)
	30B	32 (812.8)	1.50 (38.1)	30 (762.0)	32.50 (825.5)	6 (152.4), 7 (177.8), or 8 (203.2)	4 (101.6)
	30C	32 (812.8)	2.00 (50.8)	30 (762.0)	32.50 (825.5)	6 (152.4), 7 (177.8), or 8 (203.2)	4 (101.6)
B	36A	38 (965.5)	1.37 (34.9)	36 (914.4)	39.50 (1 003.3)	6 (152.4), 7 (177.8), or 8 (203.2)	4 (101.6)
	36B	38 (965.5)	1.50 (38.1)	36 (914.4)	39.50 (1 003.3)	6 (152.4), 7 (177.8), or 8 (203.2)	4 (101.6)
	36C	38 (965.5)	2.00 (50.8)	36 (914.4)	39.50 (1 003.3)	6 (152.4), 7 (177.8), or 8 (203.2)	4 (101.6)
B	42A	44 (1 117.6)	1.37 (34.9)	42 (1 066.8)	45.30 (1 143.7)	6 (152.4), 7 (177.8), or 8 (203.2)	4 (101.6)
	42B	44 (1 117.6)	1.50 (38.1)	42 (1 066.8)	45.30 (1 143.7)	6 (152.4), 7 (177.8), or 8 (203.2)	4 (101.6)
	42C	44 (1 117.6)	2.00 (50.8)	42 (1 066.8)	45.30 (1 143.7)	6 (152.4), 7 (177.8), or 8 (203.2)	4 (101.6)

- NOTE: 1. Values shown are in inches (millimetre (mm)).
 2. For appropriate covers, see figures 8, 9, 10, 11, and 13.
 3. Size of the frame refers to the actual clear opening.
 4. Dimensions for height "F" shall be one of the options listed, as specified (7.2).

FIGURE 1. Type I, straight traffic frame, style A and style B.

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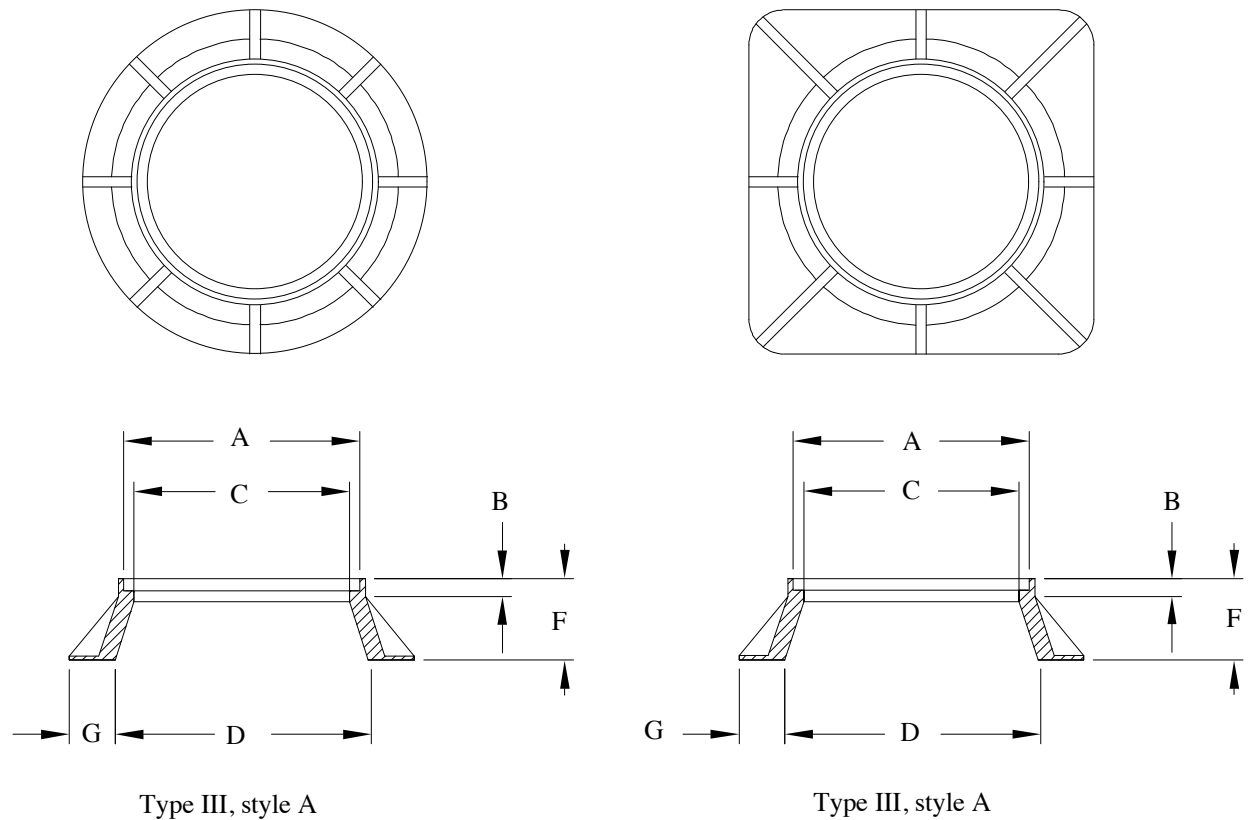
Dimensions for type II frame

Size	A	B	C	F	G
24	31.75 (806.4)	1.37 (44.4)	24 (609.6)	11 (279.4)	6 (152.4) or 8 (203.2)
27	33.50 (850.9)	1.37 (44.4)	27 (685.8)	11 (279.4)	6 (152.4) or 8 (203.2)

- NOTE:
1. Values shown are in inches (mm).
 2. Size refers to the actual clear opening.
 3. Dimensions for flanges "G" shall be one of the options listed, as specified (see 7.2).
 4. When specified (see 7.2), the height of the frame "F" may be 8 inches (203.2 mm).
 5. Covers: For appropriate outer covers, see figure 8.
For inner cover and locking bar, see figures 17 and 18.

FIGURE 2. Type II, straight traffic frame for inner cover.

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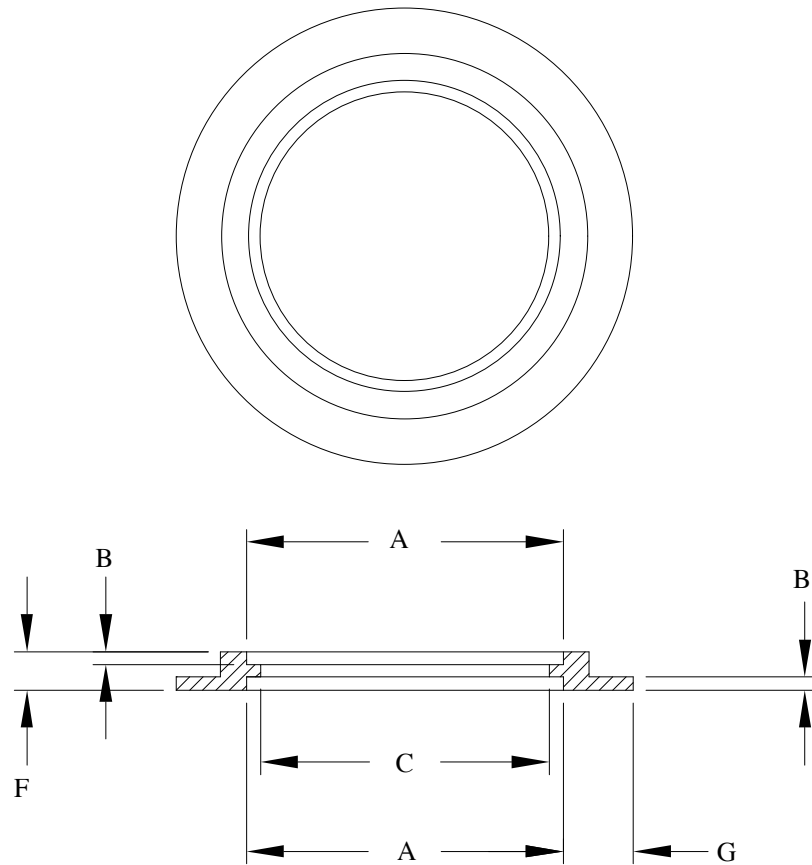
Dimensions for type III frame, style A and style B

Size	A	B	C	D	F	G
24A	26 (660.4)	1.37 (34.90)	24 (609.6)	35 (889.0)	10 (254.0)	4 (101.6), 5 (127.0), or 6 (152.4)
24B	26 (660.4)	1.50 (3.81)	24 (609.6)	35 (889.0)	10 (254.0)	4 (101.6), 5 (127.0), or 6 (152.4)
24C	26 (660.4)	2.00 (50.80)	24 (609.6)	35 (889.0)	10 (254.0)	4 (101.6), 5 (127.0), or 6 (152.4)
27A	29 (736.6)	1.37 (34.90)	27 (685.8)	38 (965.2)	10 (254.0)	4 (101.6), 5 (127.0), or 6 (152.4)
27B	29 (736.6)	1.50 (3.81)	27 (685.8)	38 (965.2)	10 (254.0)	4 (101.6), 5 (127.0), or 6 (152.4)
27C	29 (736.6)	2.00 (50.80)	27 (685.8)	38 (965.2)	10 (254.0)	4 (101.6), 5 (127.0), or 6 (152.4)
30A	32 (812.8)	1.37 (34.90)	30 (762.0)	41 (1041.4)	10 (254.0)	4 (101.6), 5 (127.0), or 6 (152.4)
30B	32 (812.8)	1.50 (3.81)	30 (762.0)	41 (1041.4)	10 (254.0)	4 (101.6), 5 (127.0), or 6 (152.4)
30C	32 (812.8)	2.00 (50.80)	30 (762.0)	41 (1041.4)	10 (254.0)	4 (101.6), 5 (127.0), or 6 (152.4)
36A	38 (965.2)	1.37 (34.90)	36 (914.4)	47 (1193.8)	10 (254.0)	4 (101.6), 5 (127.0), or 6 (152.4)
36B	38 (965.2)	1.50 (3.81)	36 (914.4)	47 (1193.8)	10 (254.0)	4 (101.6), 5 (127.0), or 6 (152.4)
36C	38 (965.2)	2.00 (50.80)	36 (914.4)	47 (1193.8)	10 (254.0)	4 (101.6), 5 (127.0), or 6 (152.4)
42A	44 (1117.6)	1.37 (34.90)	42 (1066.8)	53 (1346.2)	10 (254.0)	4 (101.6), 5 (127.0), or 6 (152.4)
42B	44 (1117.6)	1.50 (3.81)	42 (1066.8)	53 (1346.2)	10 (254.0)	4 (101.6), 5 (127.0), or 6 (152.4)
42C	44 (1117.6)	2.00 (50.80)	42 (1066.8)	53 (1346.2)	10 (254.0)	4 (101.6), 5 (127.0), or 6 (152.4)

- NOTE:
1. Values shown are in inches (mm).
 2. Dimensions for flanges "G" shall be one of the options listed, as specified (see 7.2).
 3. Covers: For appropriate covers, see figures 8, 9, 10, and 11.

FIGURE 3. Type III, flared traffic frame, style A and style B.

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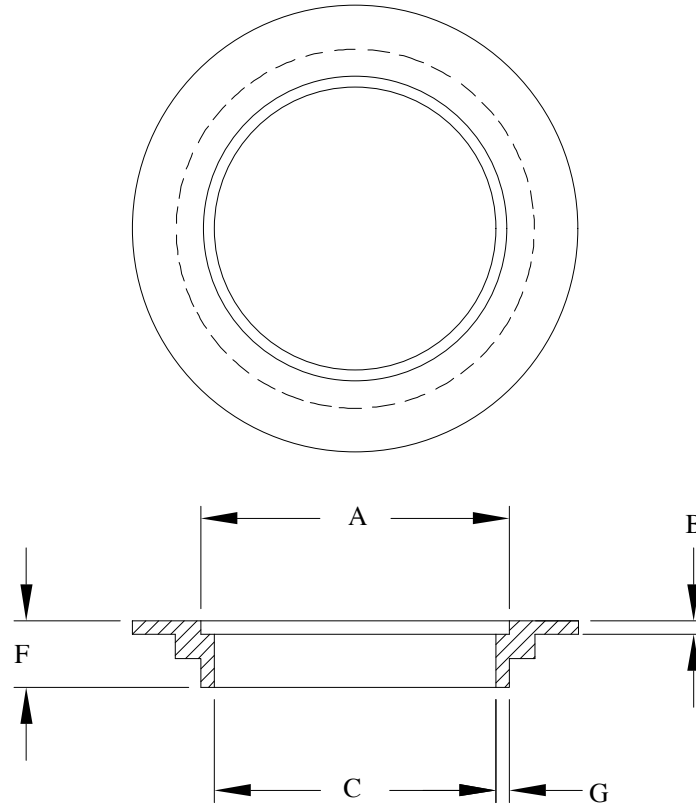
Dimensions for type IV, nontraffic frame

Size	A	B	C	F	G	H
10	12.5 (317.5)	1 (25.4)	10.5 (266.7)	3 (76.8)	2 (50.8)	0.43 (22.2)
12	14.5 (368.3)	1 (25.4)	12.5 (317.5)	3 (76.8)	2 (50.8)	0.43 (22.2)
14	16.5 (419.1)	1 (25.4)	14.5 (368.3)	3 (76.8)	2 (50.8)	0.43 (22.2)
16	18.5 (469.9)	1 (25.4)	16.5 (419.1)	3 (76.8)	2 (50.8)	0.43 (22.2)
18	22.5 (571.5)	1 (25.4)	18.5 (469.9)	3 (76.8)	2 (50.8)	0.43 (22.2)
22	25.5 (647.7)	1 (25.4)	22.5 (571.5)	3 (76.8)	2 (50.8)	0.43 (22.2)
25	28.5 (723.9)	1 (25.4)	25.5 (647.7)	3 (76.8)	2 (50.8)	0.43 (22.2)
28	30.5 (774.7)	1 (25.4)	28.5 (723.9)	3 (76.8)	2 (50.8)	0.43 (22.2)
30	32.5 (825.5)	1 (25.4)	30.5 (774.7)	3 (76.8)	2 (50.8)	0.43 (22.2)

- NOTE: 1. Values shown are in inches (mm).
 2. This frame can be used either side up and the appropriate cover will fit. Side to be up must be specified (see 7.2), to ensure machining of proper surface.
 3. Covers: For appropriate covers and grates, see figures 12 and 15.
 4. Size of frame refers to the actual clear opening.

FIGURE 4. Type IV, nontraffic frame.

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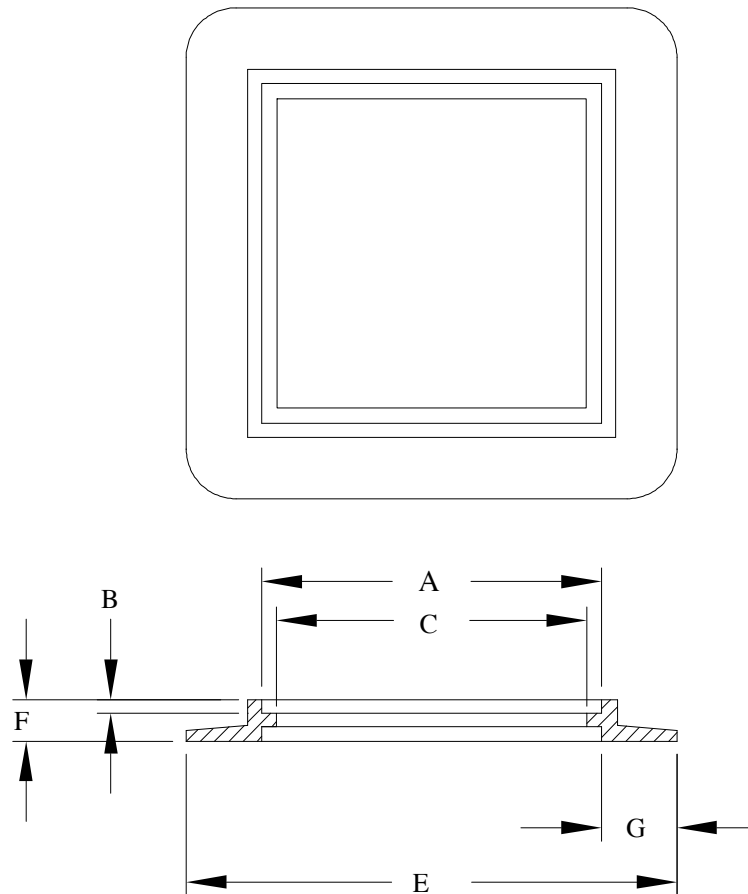
Dimensions for type V, ring type frame

Size	A	B	C	F	G
18	21.50 (546.1)	2.50 (63.5)	18 (457.2)	4 (101.6), 6 (154.4), or 8 (203.2)	1 (24.4)
22A	24.00 (609.6)	1.37 (34.9)	22 (558.8)	4 (101.6), 6 (154.4), or 8 (203.2)	1 (24.4)
22B	24.00 (609.6)	1.50 (38.1)	22 (558.8)	4 (101.6), 6 (154.4), or 8 (203.2)	1 (24.4)
22C	24.00 (609.6)	2.00 (50.8)	22 (558.8)	4 (101.6), 6 (154.4), or 8 (203.2)	1 (24.4)
24A	26.00 (660.4)	1.37 (34.9)	24 (609.6)	4 (101.6), 6 (154.4), or 8 (203.2)	1 (24.4)
24B	26.00 (660.4)	1.50 (38.1)	24 (609.6)	4 (101.6), 6 (154.4), or 8 (203.2)	1 (24.4)
24C	26.00 (660.4)	2.00 (50.8)	24 (609.6)	4 (101.6), 6 (154.4), or 8 (203.2)	1 (24.4)
24D	26.00 (660.4)	2.50 (63.5)	24 (609.6)	4 (101.6), 6 (154.4), or 8 (203.2)	1 (24.4)
30A	32.37 (822.3)	2.00 (50.8)	30 (762.0)	4 (101.6), 6 (154.4), or 8 (203.2)	1 (24.4)
30B	32.37 (822.3)	2.00 (50.8)	30 (762.0)	4 (101.6), 6 (154.4), or 8 (203.2)	1 (24.4)
36A	38.00 (965.2)	2.00 (50.8)	36 (914.4)	4 (101.6), 6 (154.4), or 8 (203.2)	1 (24.4)
36B	38.00 (965.2)	2.00 (50.8)	36 (914.4)	4 (101.6), 6 (154.4), or 8 (203.2)	1 (24.4)

- NOTE: 1. Values shown are in inches (mm).
 2. Covers: For appropriate covers, see figures 8, 9, 10, 11, and 13.
 3. Size of frame refers to the actual clear opening.
 4. Dimensions for height "F" shall be one of the options listed, as specified (see 7.2).

FIGURE 5. Type V, ring type frame.

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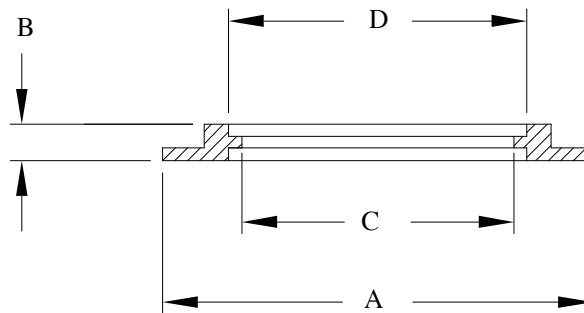
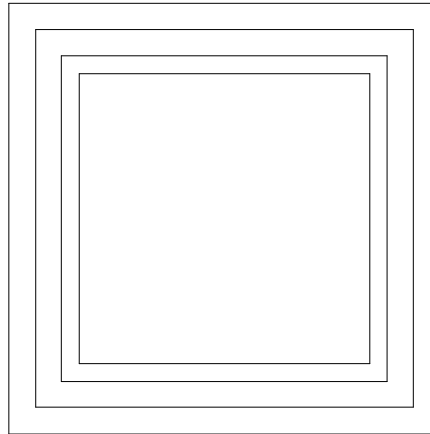
Dimensions for type VI, catch basin frame

Size	A	B	C	E	F	G
22A	24 (609.6)	1.37 (34.9)	22 (558.8)	32.5 (825.5)	7 (177.8)	4 (101.6)
22B	24 (609.6)	2.00 (50.8)	22 (558.8)	32.5 (825.5)	7 (177.8)	4 (101.6)

- NOTE: 1. Values shown are in inches (mm).
 2. Covers: For appropriate covers, see figure 14.
 3. Size of frame refers to the actual clear opening.
 4. Frame can be used either side up and the appropriate cover will fit.

FIGURE 6. Type VI, catch basin frame, traffic.

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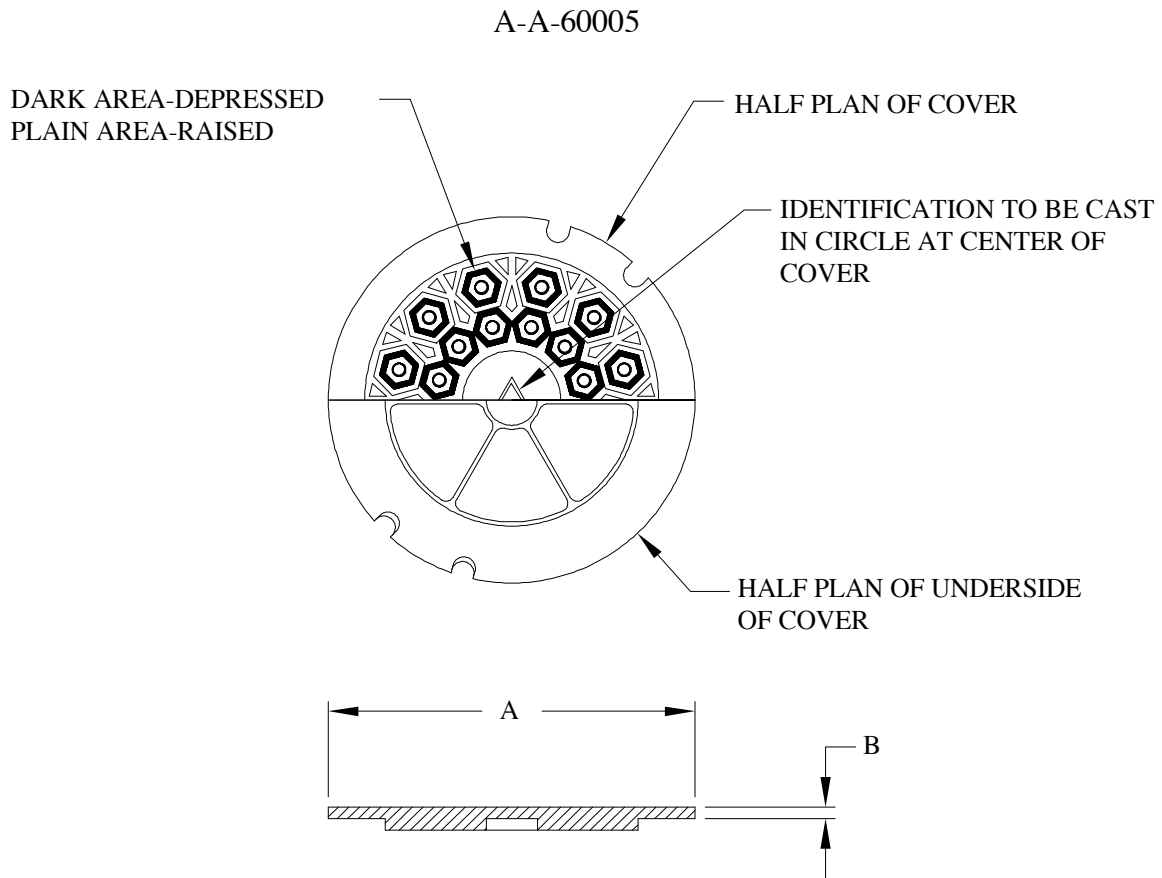


Dimensions for type VII style A and Style B, sump frame

Size	A	B	C	D
12	19.62 (498.3)	4 (101.6)	12 (304.8)	13 (330.2)

- NOTE:
1. Values shown are in inches (mm).
 2. Covers: For appropriate covers, see figure 16.
 3. Size of frame refers to the actual clear opening.
 4. Frame can be used either side up and the appropriate cover will fit.

FIGURE 7. Type VII, sump frame.



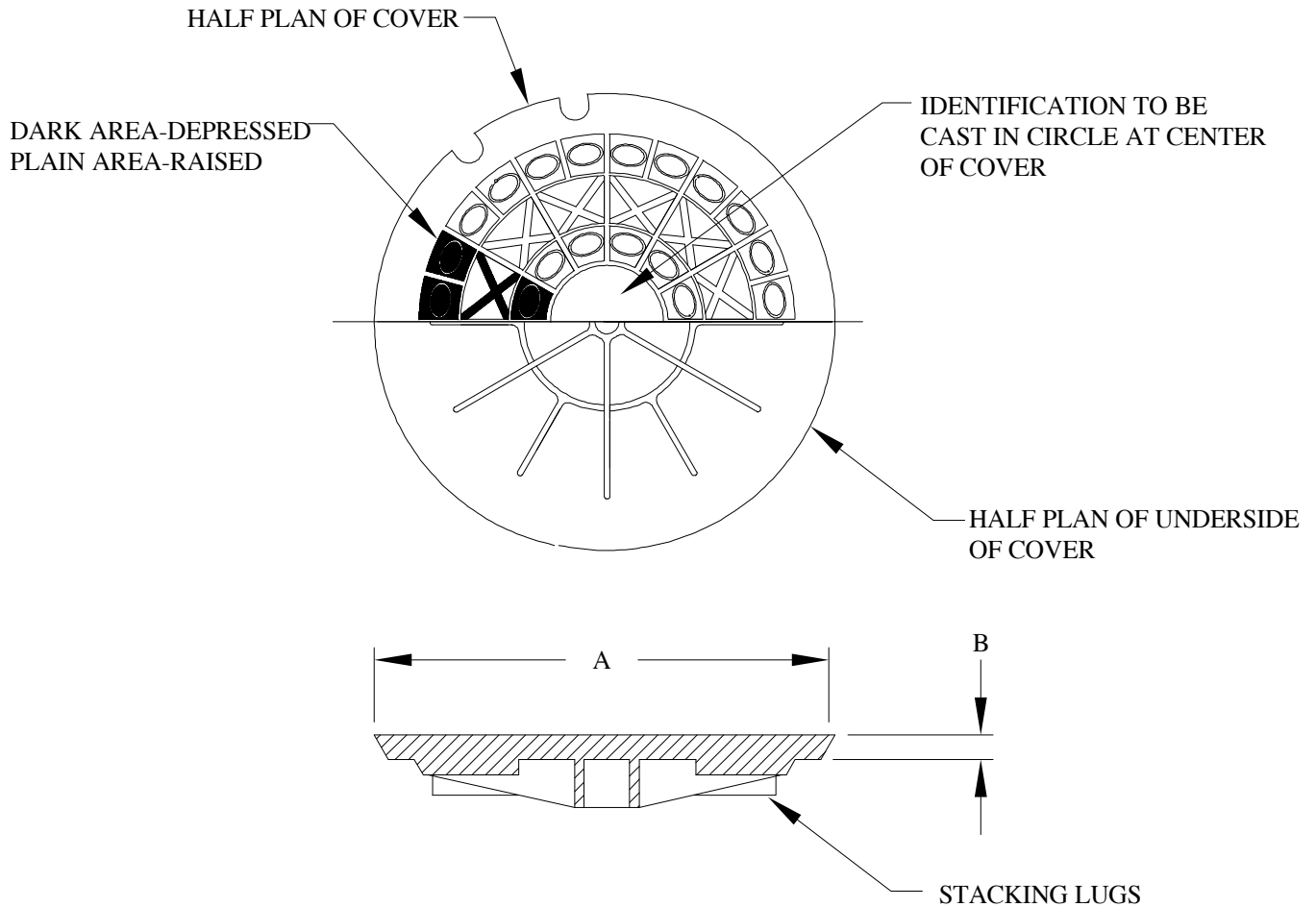
Dimensions for type A, manhole cover, traffic

Style	Size	A	B
Straight, nonlocking frame, flared frame, or ring frame	22A	23.93 (608.0)	1.37 (34.9)
	22B	23.93 (608.0)	1.50 (38.1)
	22C	23.93 (608.0)	2.00 (50.8)
	24A	25.93 (658.8)	1.37 (34.9)
	24B	25.93 (658.8)	1.50 (38.1)
	24C	25.93 (658.8)	2.00 (50.8)
	27A	28.93 (735.0)	1.37 (34.9)
	27B	28.93 (735.0)	1.50 (38.1)
	27C	28.93 (735.0)	2.00 (50.8)
Straight locking frame	30A	31.93 (811.2)	1.37 (34.9)
	30B	31.93 (811.2)	1.50 (38.1)
	30C	31.93 (811.2)	2.00 (50.8)
	24A	31.68 (804.8)	1.37 (34.9)
	24B	31.68 (804.8)	1.50 (38.1)
	27A	33.43 (849.3)	1.37 (34.9)
	27B	33.43 (849.3)	1.50 (38.1)
	30A	36.43 (925.5)	1.37 (34.9)
	30B	36.43 (925.5)	1.50 (38.1)

- NOTE: 1. Values shown are in inches (mm).
 2. Frames: For appropriate frames, see figures 1, 2, 3, and 5.
 3. Size of frame refers to the actual clear opening.

FIGURE 8. Type A, manhole cover, traffic.

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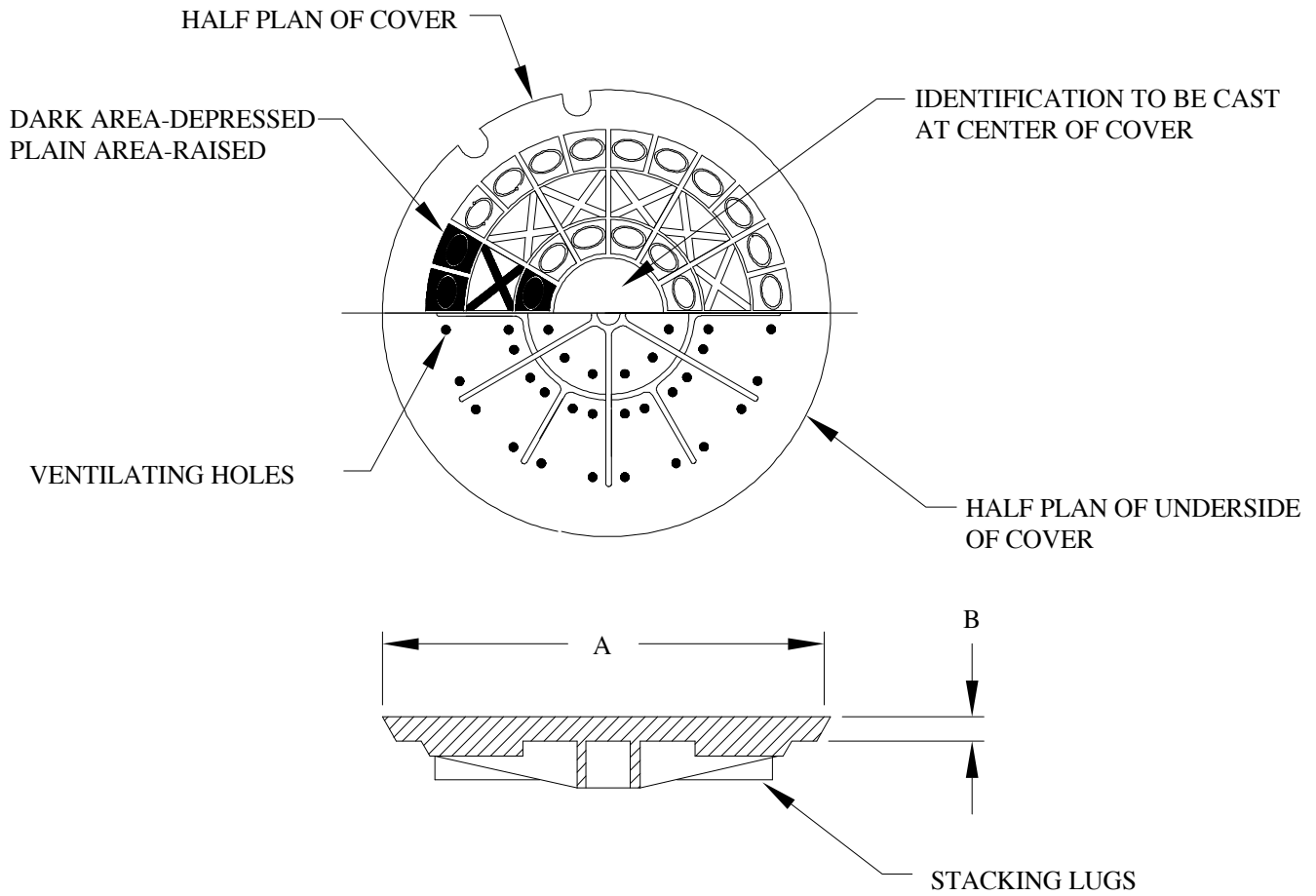
Dimensions for type B cover

Size	A	B
36A	37.87 (962.0)	1.37 (34.9)
36B	37.87 (962.0)	1.50 (38.1)
36C	37.87 (962.0)	2.00 (50.8)
42A	43.87 (1 114.4)	1.37 (34.9)
42B	43.87 (1 114.4)	1.50 (38.1)
42C	43.87 (1 114.4)	2.00 (50.8)

- NOTE:
1. Values shown are in inches (mm).
 2. Frames: For appropriate frames, see figures 1, 3, and 5.
 3. Size of frame refers to the actual clear opening.

FIGURE 9. Type B, cover, traffic.

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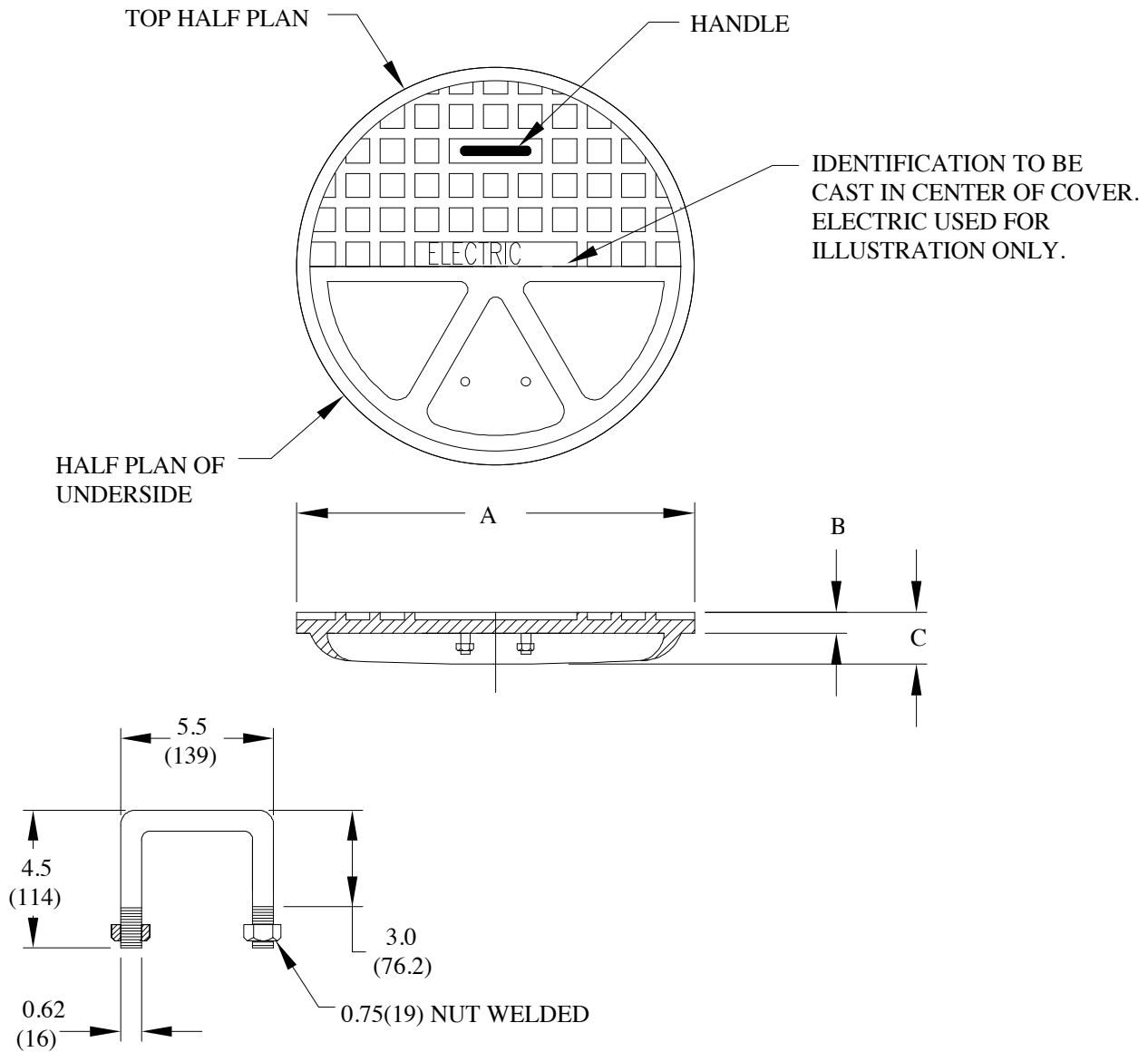
Dimensions for type B cover

Size	A	B
27A	28.93 (735.6)	1.37 (34.9)
27B	28.93 (735.6)	2.00 (50.8)
30A	31.93 (811.2)	1.37 (34.9)
30B	31.93 (811.2)	2.00 (50.8)

- NOTE: 1. Values shown are in inches (mm).
 2. For appropriate frames, see figures 1, 3, and 5.
 3. Size of the cover refers to the frame clear opening.

FIGURE 10. Type C, manhole cover, with vent holes, traffic.

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HANDLE, HOT DIPPED GALVINIZED

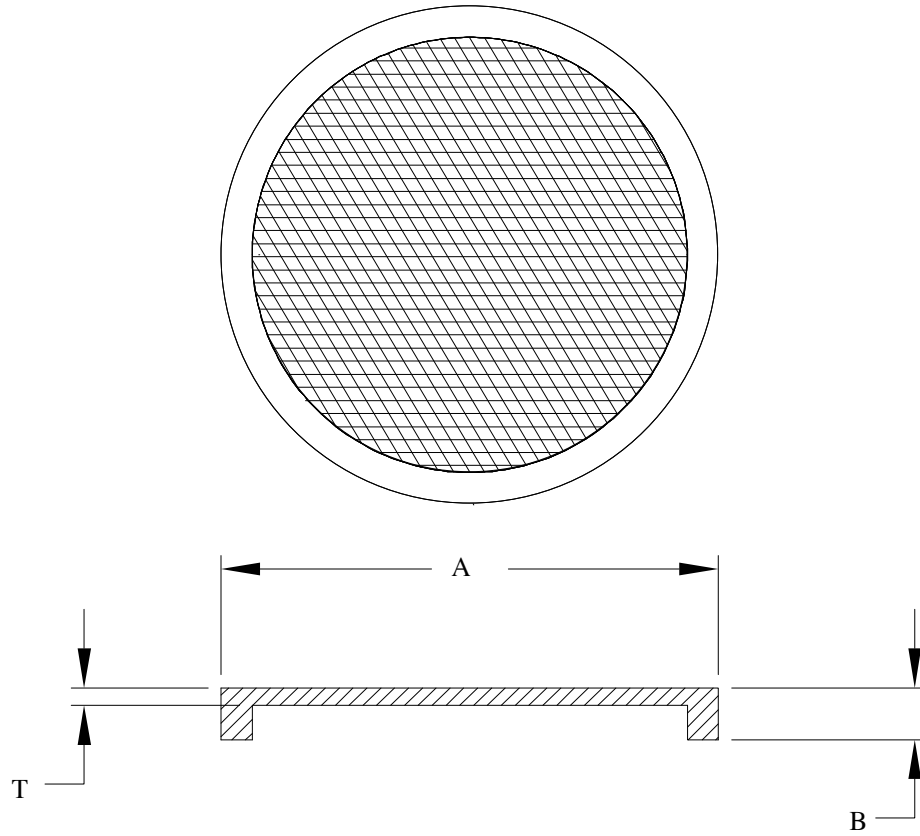
Dimensions for type D cover

Size	A	B	C
30A	31.87 (809.6)	1.37 (34.9)	2.62 (66.6)
30B	31.87 (809.6)	2.00 (50.8)	3.25 (82.5)

- NOTE: 1. Values shown are in inches (mm).
 2. For appropriate frames, see figures 1 and 3.
 3. Size of cover refers to frame clear opening.

FIGURE 11. Type D, manhole cover, traffic.

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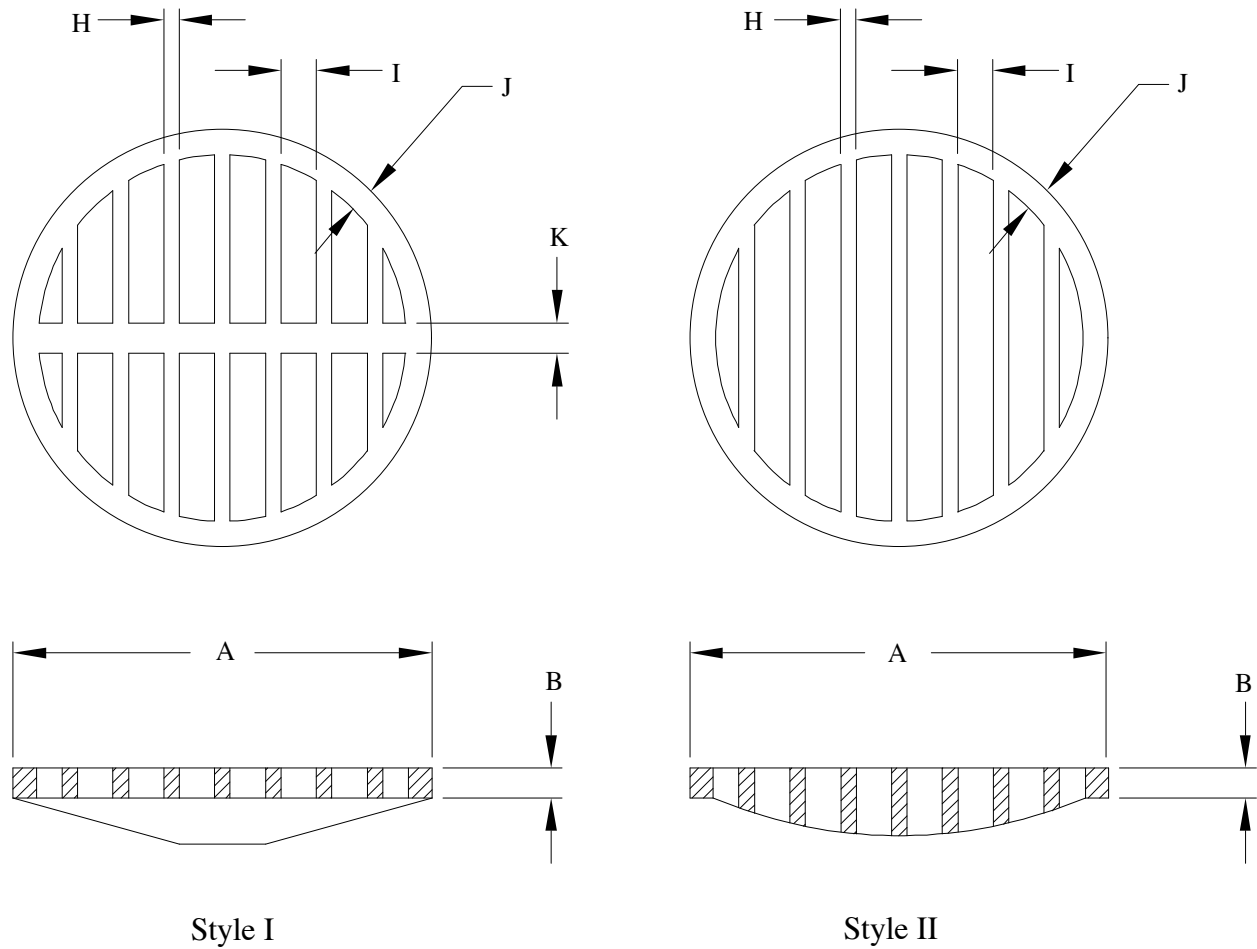
Dimensions for type E covers

Size	A	B	T
10	12 (304.8)	1 (25.4)	0.5 (12.7)
12	14 (355.6)	1 (25.4)	0.5 (12.7)
14	16 (406.4)	1 (25.4)	0.5 (12.7)
16	18 (457.2)	1 (25.4)	0.5 (12.7)
18	20 (508.0)	1 (25.4)	0.5 (12.7)
22	24 (609.6)	1 (25.4)	0.5 (12.7)
25	27 (685.8)	1 (25.4)	0.5 (12.7)
28	30 (762.0)	1 (25.4)	0.5 (12.7)
30	32 (812.8)	1 (25.4)	0.5 (12.7)

- NOTE: 1. Values shown are in inches (mm).
 2. Frames: For appropriate frames, see figure 4.
 3. Size of cover refers to the frame clear opening.

FIGURE 12. Type E manhole cover, nontraffic.

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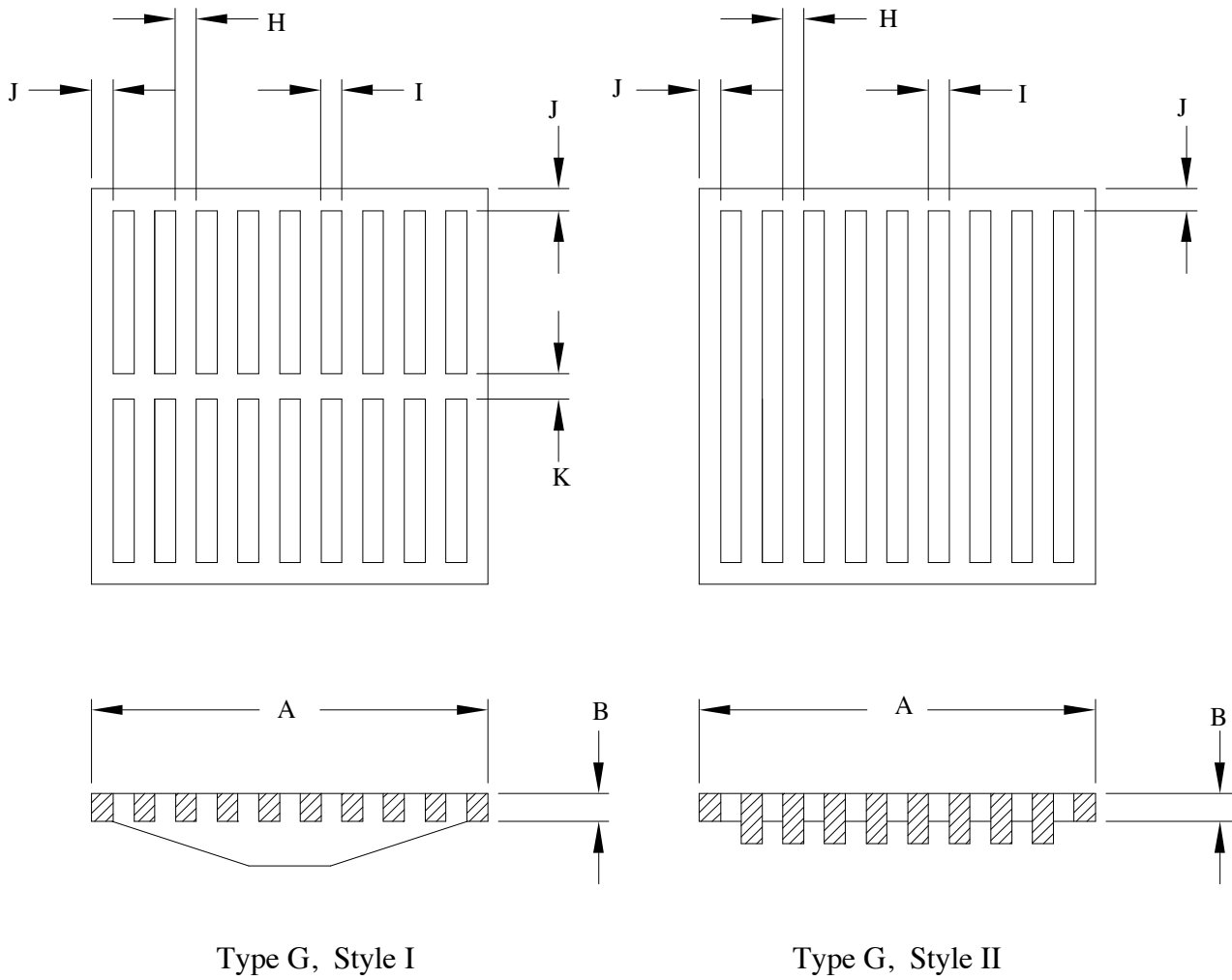
Dimensions for type F, manhole grating

Size	A	B	H	I	J	K	MIN OPEN AREA SQ/IN (SQ/CM)	
							Style I	Style II
18A	21.43 (544.5)	2.50 (63.5)	1 (25.4)	1.5 (38.1)	1.5 (38.1)	2.5 (63.5)	126 (813)	156 (1006)
22A	23.93 (608.0)	1.37 (34.9)	1 (25.4)	1.5 (38.1)	1.5 (38.1)	2.5 (63.5)	183 (813)	213 (1374)
22B	23.93 (608.0)	2.00 (50.8)	1 (25.4)	1.5 (38.1)	1.5 (38.1)	2.5 (63.5)	183 (813)	213 (1374)
22C	23.93 (608.0)	2.50 (63.5)	1 (25.4)	1.5 (38.1)	1.5 (38.1)	2.5 (63.5)	183 (813)	213 (1374)
24A	25.93 (658.8)	1.37 (34.9)	1 (25.4)	1.5 (38.1)	1.5 (38.1)	2.5 (63.5)	212 (1368)	242 (1561)
24B	25.93 (658.8)	2.00 (50.8)	1 (25.4)	1.5 (38.1)	1.5 (38.1)	2.5 (63.5)	212 (1368)	242 (1561)
24C	25.93 (658.8)	2.50 (63.5)	1 (25.4)	1.5 (38.1)	1.5 (38.1)	2.5 (63.5)	212 (1368)	242 (1561)

- NOTE: 1. Values shown are in inches (mm).
 2. Frames: For appropriate frames see figures 1, 3, and 5.
 3. Size of grating refers to frame clear opening.

FIGURE 13. Type F, manhole grating, traffic.

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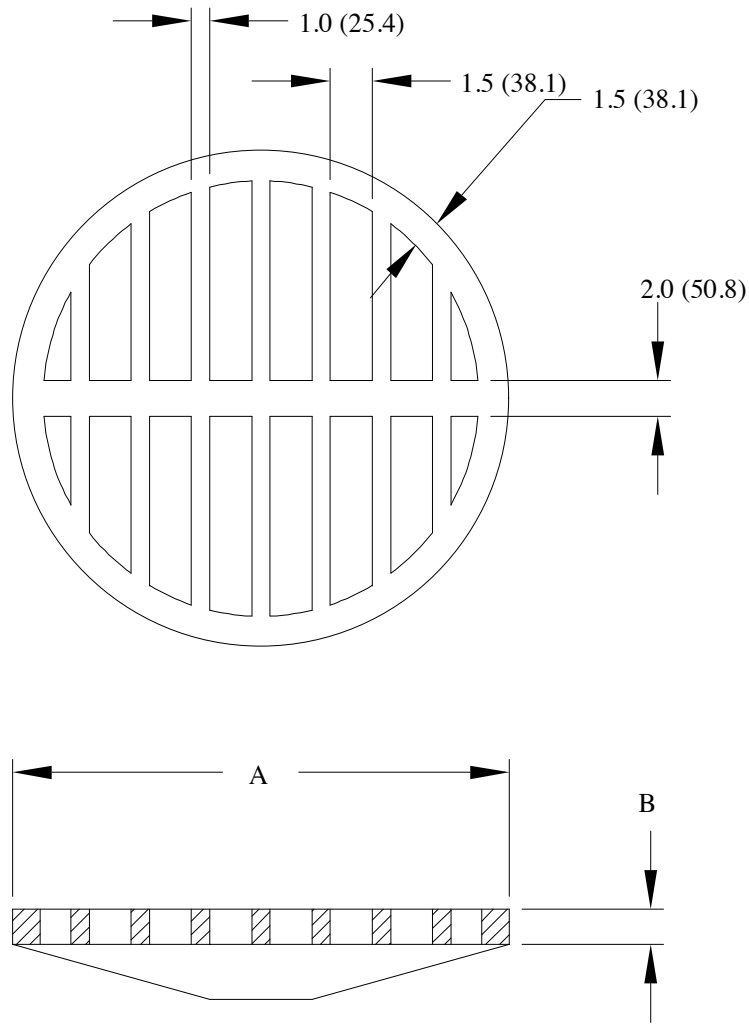
Dimensions for type G catch basin grating

Size	A	B	H	I	J	K	MIN OPEN AREA SQ/IN (SQ/CM)	
							Style I	Style II
22A	23.93 (608.0)	1.37 (34.9)	1 (25.4)	1.43 (11.1)	1.5 (38.1)	2 (50.8)	246 (1587)	271 (1748)
22B	23.93 (608.0)	2.00 (50.8)	1 (25.4)	1.43 (11.1)	1.5 (38.1)	2 (50.8)	246 (1587)	271 (1748)

- NOTE: 1. Values shown are in inches (mm).
 2. Frames: For appropriate frames, see figure 6.
 3. Size of grating refers to frame clear opening.
 4. Style 2 is unsafe for bicycle traffic.

FIGURE 14. Type G, catch basin grating.

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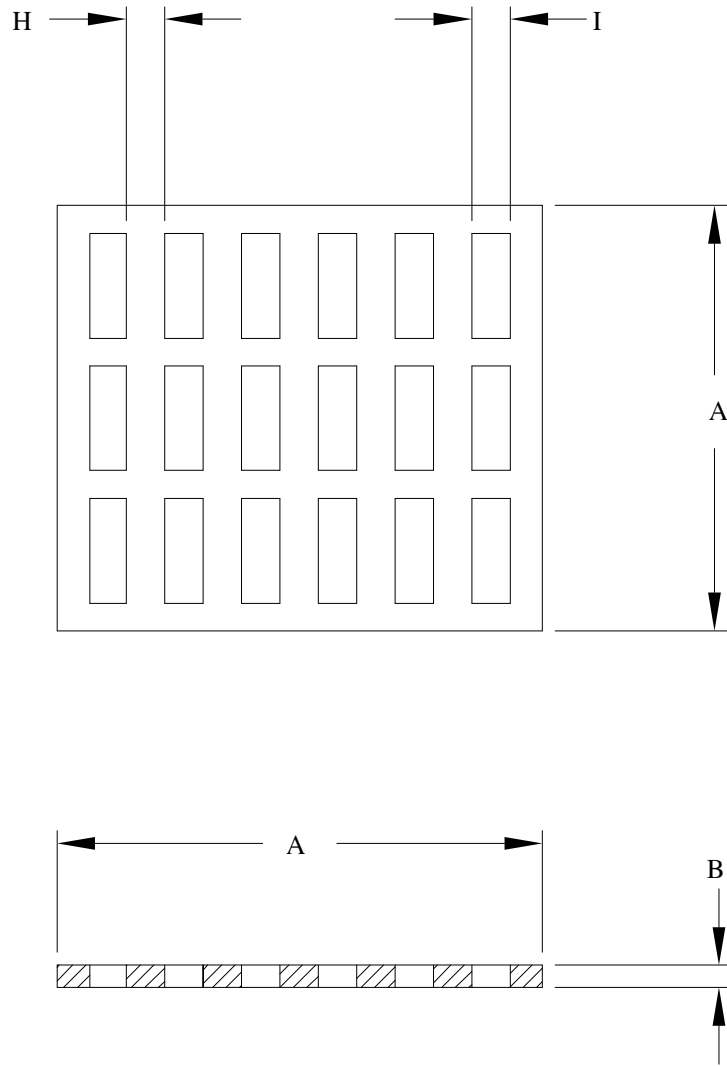
Dimensions for type H manhole grating

Size	A	B	MIN OPEN AREA SQ/IN (SQ/CM)
10	12 (304.8)	1 (25.4)	18 (116)
12	14 (355.6)	1 (25.4)	37 (239)
14	16 (406.4)	1 (25.4)	50 (323)
16	18 (457.2)	1 (25.4)	51 (329)
18	20 (508.0)	1 (25.4)	91 (587)
22	24 (609.6)	1 (25.4)	198 (1 277)
25	27 (685.8)	1 (25.4)	286 (1 845)
28	30 (762.0)	1 (25.4)	414 (2 671)
30	32 (812.8)	1 (25.4)	437 (2 819)

- NOTE: 1. Values shown are in inches (mm).
 2. Frames: For appropriate frames, see figure 4.
 3. Size of grating refers to frame clear opening.

FIGURE 15. Type H manhole cover, nontraffic.

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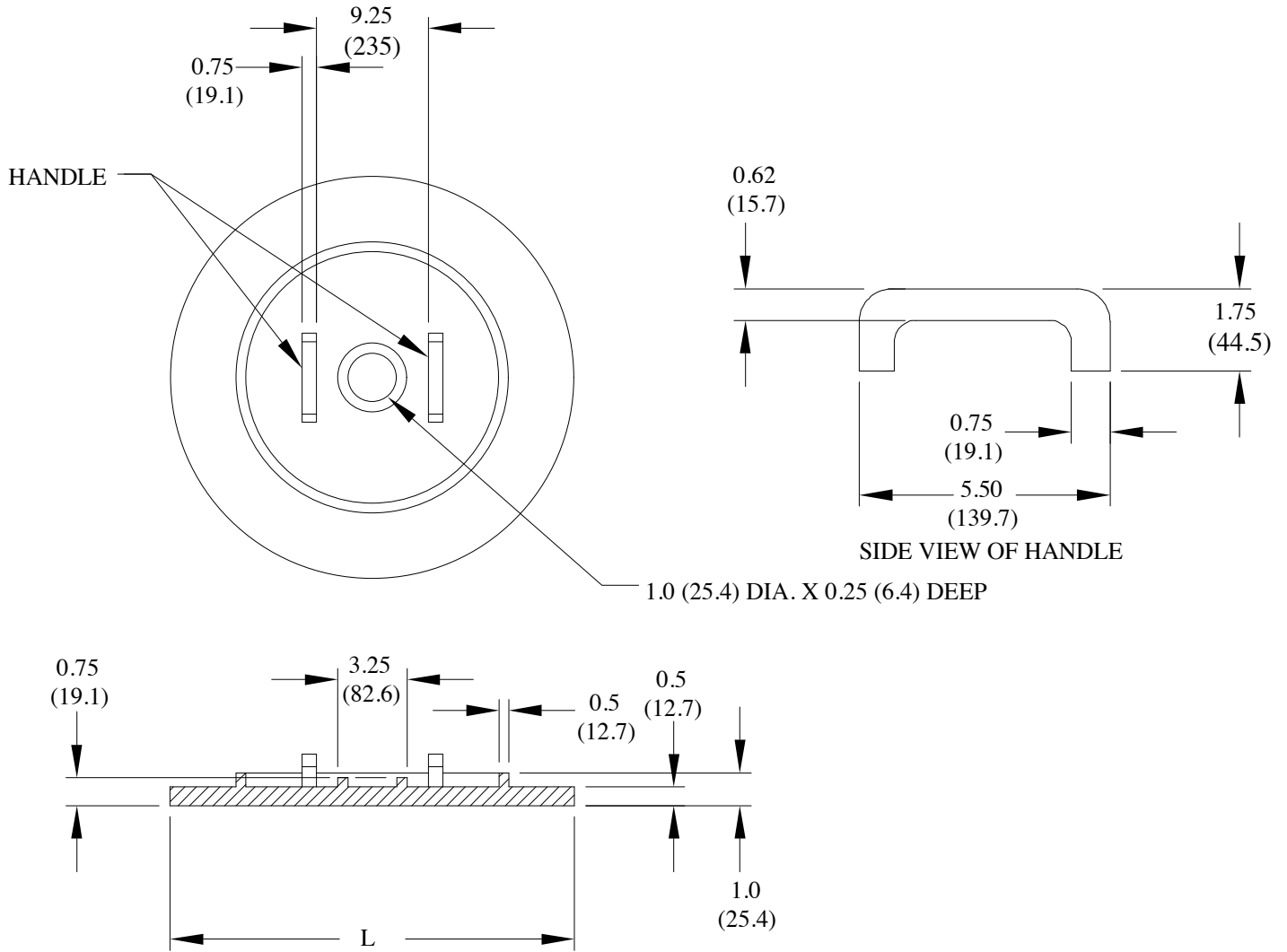
Dimensions for type I sump grating

Size	A	B	H	I	MIN OPEN AREA SQ/IN (SQ/CM)
12	13 (330.2)	0.5 (12.7)	1 (25.4)	1 (25.4)	54 (348)

- NOTE: 1. Values shown are in inches (mm).
 2. Frames: For appropriate frames, see figure 7.
 3. Size of grating refers to frame clear opening.

FIGURE 16. Type I sump grating.

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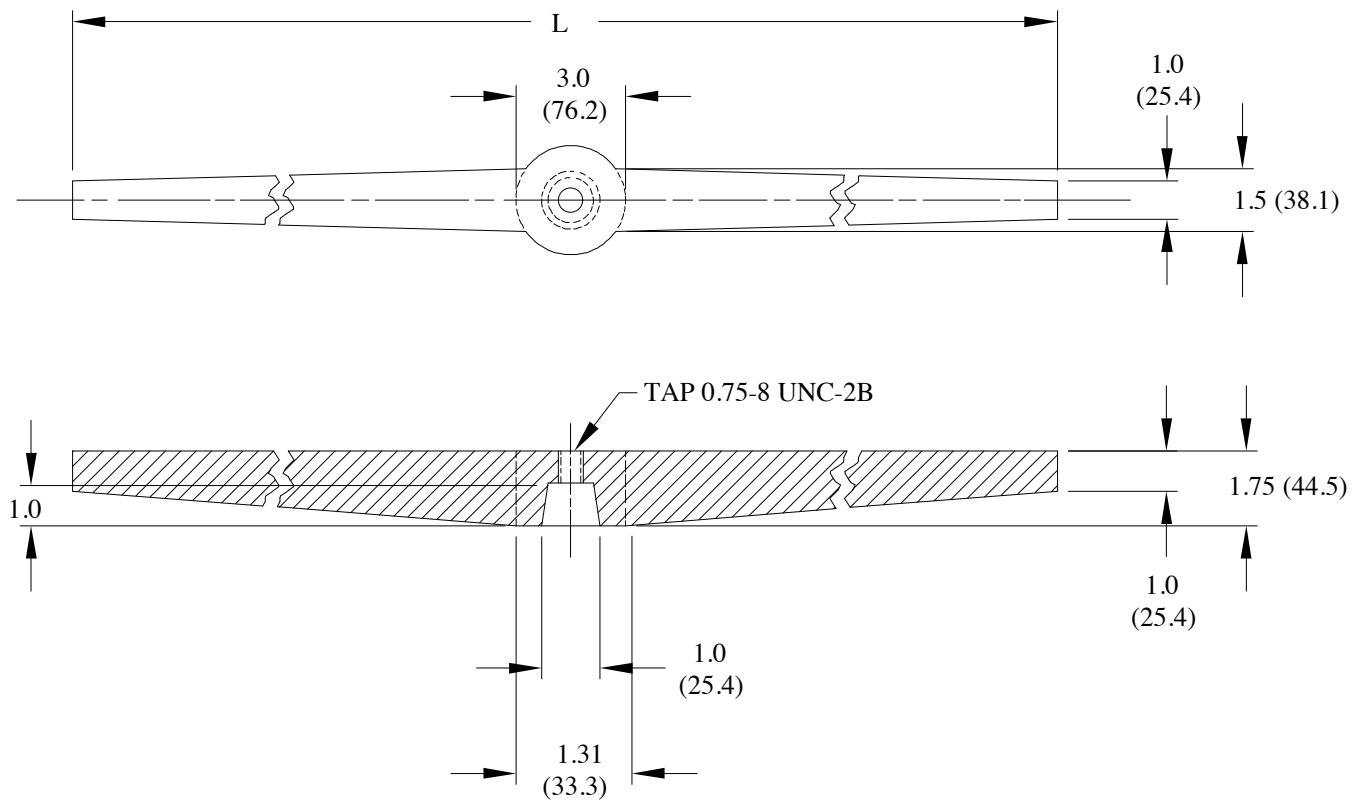
Dimensions for inner covers for locking type frames

Size	L
24	26.25 (666.8)
37	29.25 (742.9)
30	32.25 (819.1)

- NOTE:
1. Values shown are in inches (mm)
 2. For proper frames, see figure 7.
 3. Size of cover refers to frame clear opening.

FIGURE 17. Inner manhole cover.

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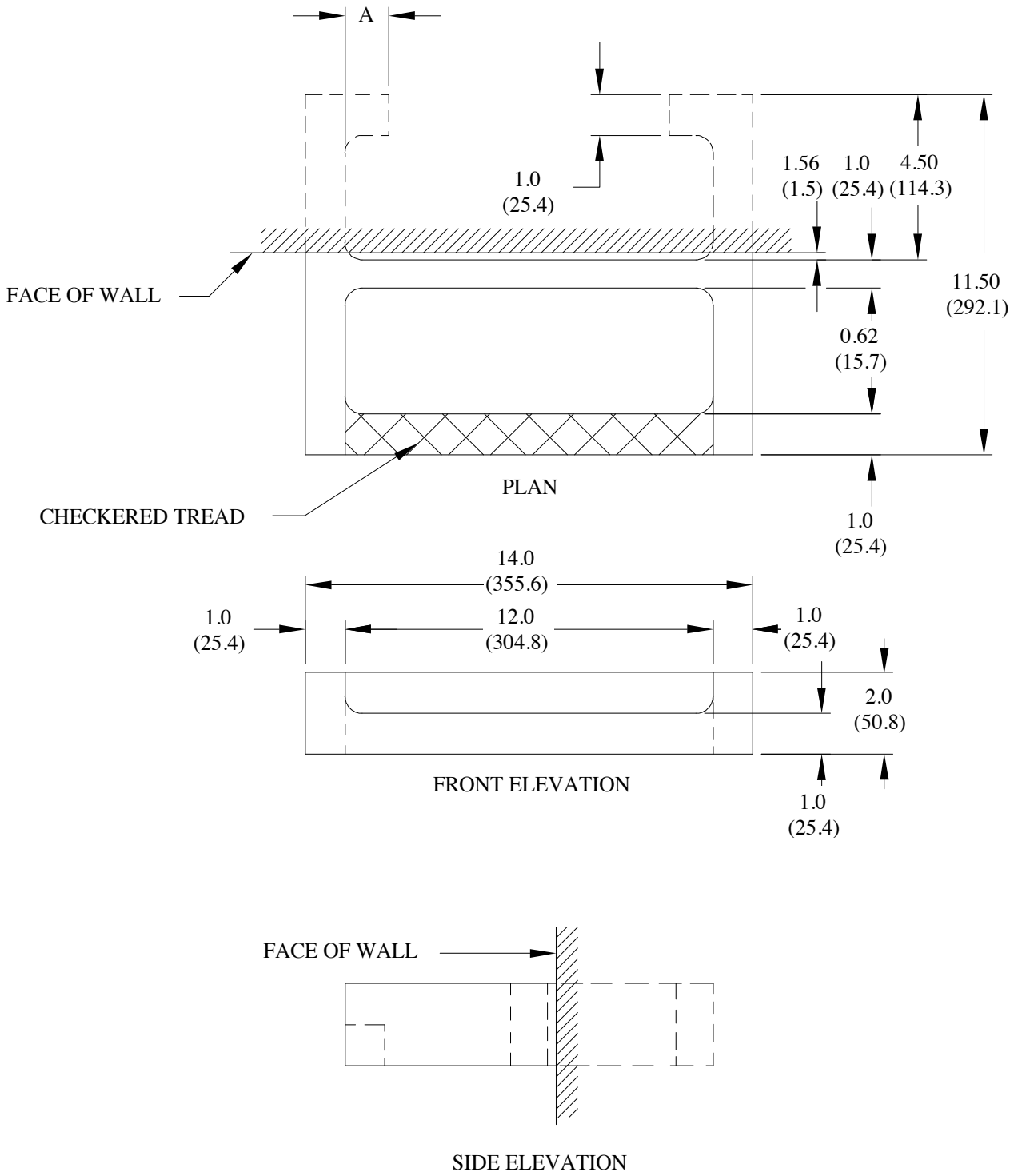
Dimensions for locking bar

Size	L
24	28 (711.2)
27	31 (787.4)
30	34 (863.6)

NOTE: 1. Values shown are in inches (mm).

FIGURE 18. Locking bar.

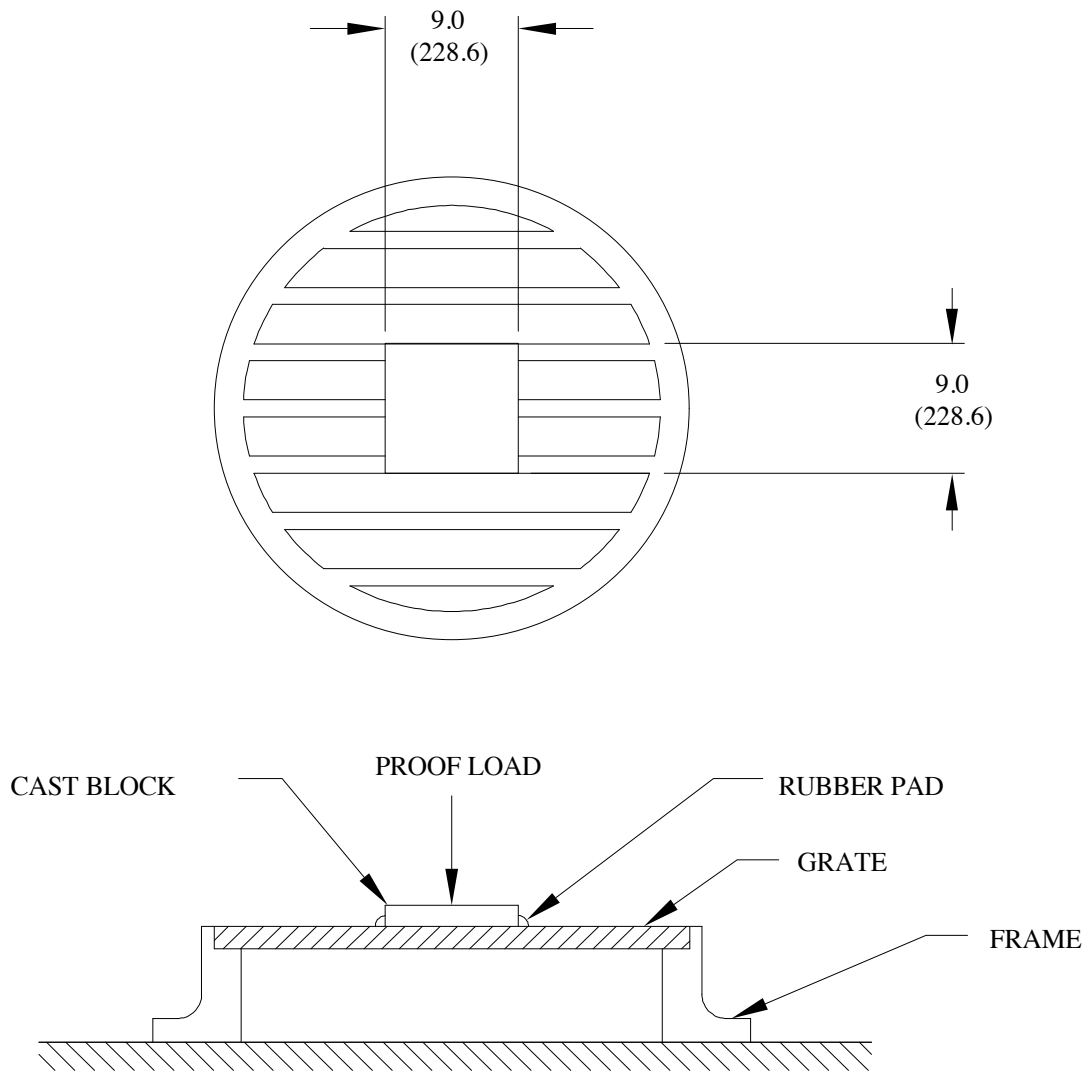
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NOTE: 1. Values shown are in inches (mm).

FIGURE 19. Standard manhole step.

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NOTE: 1. Values shown are in inches (mm).

FIGURE 20. Diagram for proof load position (for illustrative purposes only).

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4. NATURE OF CHANGE *(Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)*

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