

Range Point Monument Guidelines

All range points, as they relate to the City's Range Point Recovery Program, Site Development Plans, Capital Improvement Projects and Subdivisions, shall be set per these guidelines.

If in asphalt - #6 rebar, minimum 30" long, with a minimum 2" metallic cap marked "Range Point" or "RP" and bearing the PLS number of the Surveyor in responsible charge. Monument should be set in a range box with 3" riser per current City standards, with the top of the metallic cap a minimum of 0.5' below finish grade.

If in concrete – set monument and range box with 3" riser as described above. In some limited circumstances, a 2 1/2-inch metal rock cap drilled and recessed so that the top of the cap is flush or just below the concrete surface so as not to be destroyed by snowplows, marked as above may be allowed. Contact the City's Area Survey Reviewer for direction.

If in dirt median or landscaping- #6 rebar, minimum 30" long, with a minimum 2" metallic cap marked "Range Point" or "RP" and bearing the PLS number of the Surveyor in responsible charge. The "Range Point" monument should be set in a range box with 3" riser per current City standards, with the top of the metallic cap a minimum of 0.5' below finish grade.

If as part of the development or other known construction activities it is known that major work will be performed on the streets where the range points are to be set, then temporary range points (standard rebar and cap set flush with the finish grade) may be required to be set and are to be replaced (permanently set utilizing the required methods above) by the developer prior to a Temporary Certificate of Occupancy (TCO) or Certificate of Occupancy (CO) being approved or acceptance of the roadway for warranty purposes. The need for temporary range points will be determined at the sole discretion of the City's Area Survey Reviewer.

All range points will have a minimum of four (4) tie points set and a range point tie out sheet completed and submitted to the Area Survey Reviewer for review and approval.

In areas of a potential conflict between the location of the Range Point and underground utilities, it may be acceptable for monuments to be set to reference the true location of the Range Point. Reference monuments shall be of a substantial material such as a rebar and metallic cap, brass plug or rock cap bearing the PLS number of the Surveyor in responsible charge. In all cases, the contractor is required to contact the City's Area Survey Reviewer for direction on all location conflicts, prior to setting any monuments.

Range Point Monument Ties

Identifiable and durable ties are required so that the position of the range point may be re-established. Additionally, these ties are to be documented allowing their usage by the public.

Requirements:

1. A minimum of four (4) ties are to be set for each of the range points rehabilitated or set.
 - 1.1. A cut “X” is recommended to be set as a tie. Items such as PK or mag nails are not allowed.
 - The cut “X” should be approximately 2” x 2” long and a minimum of 1/16” deep.
 - 1.2. Berntsen BP2 copper survey marks are acceptable.
 - 1.3. Counter sunk PK or mag nails with a disc/washer may be set as long as the responsible PLS# is attached and it is not set in the curb.
2. Existing monuments (for example, chiseled “+”) should be used as ties if they meet the conditions set forth for a new tie.
3. A new tie must be identifiable as a cut “X” and not a “+”.
 - 3.1. This procedure will avoid confusing the tie with a property marker.
4. A new tie must not be set on a direct offset to the range point and should avoid aligning with property corners.
 - 4.1. This procedure will avoid confusing the tie as being a direct offset.
5. The geometry of the ties in relation to the range point should be taken into consideration.
 - 5.1. For example, in a typical intersection, ties placed on the sidewalk at each of the intersection’s four quadrants would be an ideal figure.
 - 5.2. Linear, or close to linear, configurations should be avoided.
 - 5.3. Ramp locations should be avoided for ties as they are frequently replaced.
6. It is recommended the new ties be cut with a diamond tipped blade.
 - 6.1. A 3.5” diameter circular blade on a battery powered saw is recommended.
7. Unless traffic safety is a concern, all tie distances are to be determined using a steel tape.
 - 7.1. At the discretion of the field crew, a total station may be used in areas where traffic is of concern.
 - 7.2. A fiberglass tape cannot be used.
8. All monument tie distances shall be measured directly and recorded to the nearest one-hundredth (0.01’) of a foot.
9. All ties should be identified as being found, cut, or set.
10. Each range point tie out sheet should show ties for only one range point.

Additional Notes:

Any deviation from the above-mentioned requirements must have the approval of the City’s Area Survey Reviewer.

Box/Riser Assembly

Box/riser assembly is required to protect and allow access to the range point.

Installation:

1. A new box and 3” riser are required for each monument.
2. The top of the box/riser assembly shall be set at a height that is no less than ¼” and no greater than ½” below the existing roadway grade.
3. Deep monuments may require an 8” diameter PVC pipe as a spacer. This PVC spacer is placed below the assembly, riser rings are not allowed as spacers below the box.
4. If necessary, lower the monument so that it is a minimum of 6” below the existing roadway grade.
 - 4.1. The monument shall be straddled prior to lowering the monument.
5. Depending upon the stability of the monument, it may be required to straddle the monument prior to excavation of the area.
6. The excavation area should be a minimum 2’ x 2’ hole and a minimum of 3’ deep.
7. The contractor is responsible for underground utility locates prior to excavation.
8. The contractor is responsible for obtaining a street occupancy permit before initiating any excavation work within the roadway.
9. A box/riser assembly shall be placed on Land Corners within project limits per state statutes.

Box/Riser Assembly – New Streets

Box/riser assembly is required to protect and allow access to the range point.

Specifications:

1. A new box and 3” riser are required for each monument.
2. Use a 12” core bit to remove the material.
3. The top of the box/riser assembly shall be set at a height that is no less than ¼” and no greater than ½” below the existing roadway surface.
4. Use a 50% mix of sand and 50% fast setting cement to pour around the range box casing, leaving at least 8” for asphalt.
5. Then use an asphalt bonding adhesive to coat the existing asphalt.
6. Then fill a minimum of 8” of hot mix asphalt, matching the existing asphalt, and pneumatically tamp the surface.
7. The contractor is responsible for underground utility locates prior to excavation.
8. The contractor is responsible for obtaining a street occupancy permit before initiating any excavation work within the roadway.
9. A box/riser assembly shall be placed on Land Corners within project limits per state statutes.

Failure to install per this method will result in reinstallation being required. Public Works inspectors will dictate the required repairs up to and including full lane width repaving 50’ either side of the point.

Example of an acceptable installation.



Monument Tie Out Sheet

The monument tie out sheet is used to document actions taken by the field crews during the setting of new range points or the rehabilitation process. The record will also show the locations and distances of the range point ties. The records are made available to the public.

Requirements:

1. All information pertaining to the date and crew should be completed.
2. Street names must be identified, with at least 1 east-west avenue and 1 north-south street included. If the range point is not located at an intersection, the nearest cross streets should be identified. All street labels must include the direction, (e.g., N or S and E or W).
3. Identify range lines on the tie out sheet (e.g., 20' RL, 30' RL, etc.), with the offset on the correct side of the range line.
4. Label all available platted range line dimensions that relate to the point. After the distance, identify how the distance was obtained (e.g., subdivision plat (or P), resurvey, tiebook, etc.).
5. If there are multiple range points at an intersection, the sheet should depict them all relative to each other.
6. Each range point tie out sheet should show ties for only one range point.
7. When appropriate, curve data should be included, with the inclusion of curve length, delta and radius being optimum, and 2 of the previous pieces of data being acceptable.
8. Land lines depicted should be labeled.
9. If the range point is found, then the tie out sheet should include descriptive notations of the found monument.
10. If the range point is not found, describe the methods used to search for the point and note if any excavation took place. Describe the extent of the search location, including how far down in depth the search was.
11. A diligent search shall be made for all called for stone monuments.
12. All City and County of Denver tie out sheets require a stamp and signature by the PLS in responsible charge.
13. A box/riser assembly shall be placed on Land Corners within project limits per state statutes.
14. A City and County of Denver tie out sheet shall be submitted describing such monument to the City Surveyor's Office if the monument and its accessories are not substantially described in an existing tie out sheet already available to the public.

CITY AND COUNTY OF DENVER

MONUMENT TIE OUT SHEET



1) IF MONUMENT IS NOT AT AN INTERSECTION, INCLUDE NEAREST CROSS STREET(S)
 2) NEED AT LEAST ONE N-S STREET & ONE E-W STREET FOR DATABASE

4 TIES REQUIRED
 GOOD GEOMETRY TO RE-SET
 (NOT ALL ON SAME SIDE OF MONUMENT)

INCLUDE CURVE DATA
 CURVE LENGTH, DELTA & RADIUS PREFERRED
 BUT AT LEAST 2 PIECES OF INFO ACCEPTABLE

RANGE LINE INFO SHOULD BE ON CORRECT SIDE OF RANGE LINE

SHOW RELATIONSHIP OF ALL RANGE POINTS IN VICINITY
 SEPARATE RECORD FOR EACH POINT

20' R.L. 250' (TIEBOOK)

25.36'

22' (PL)

20' R.L. 60.6' (PL)

FOUND BRASS TAG
 LS 12345

RANGE LINE - OFFSET AND DISTANCE

1320' (PL)

1320.28' (PL)

L.L.

FOUND AXLE
 (MONUMENT DESCRIPTION)

TIE DISTANCES MEASURED TO NEAREST 0.01', BY STEEL CHAIN OR TOTAL STATION IF TRAFFIC IS AN ISSUE

E. 4TH AVE.

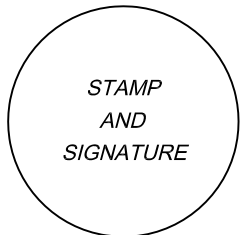
INCLUDE ORIGIN OF RANGELINE DISTANCE
 - SUB. PLAT
 - RESURVEY
 - TIEBOOK
 - MEASURED

33.33'

SET CUT "X"
 TOP OF CURB

TIES SHOULD BE SET SO THAT THEY CANNOT BE CONFUSED WITH PROPERTY OFFSET CROSSES
 1. NOT AT TYPICAL LOCATION OF CROSSES
 2. ROTATION SHOULD BE DIFFERENT
 3. SHOULD NOT BE CUT NEAR RADIUS OF CURVE IF IT APPEARS LIKELY CONCRETE WILL BE REMOVED TO ADD A RAMP

FOUND CUT "+"
 IN WALK



5' R.L. 420' (PL)

N. CLARKSON ST.

40' R.L. 685.3' (PL)

LABEL LAND LINE AND DISTANCE IF AVAILABLE

RANGE POINT OR LAND CORNER FOUND OR NOT FOUND
 IF FOUND, DESCRIPTION OF MONUMENT, IN BOX?
 IF NOT FOUND, DESCRIBE EXTENT OF SEARCH

INFORMATION TO BE SHOWN

1. Range Points (monument desc.) & Range Lines
2. Section Corners & Land Lines
3. Range Point Ties (found or set)
4. Street Names
5. Platted rangeline dimensions to identify Range Points not at an intersection
6. If monument is not found, describe the extent of the search

RANGE POINT NOT FOUND
 DUG 2'X2' HOLE 3' DEEP NO TONE

 DATE

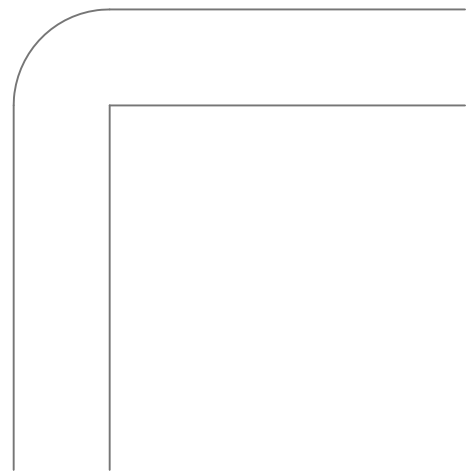
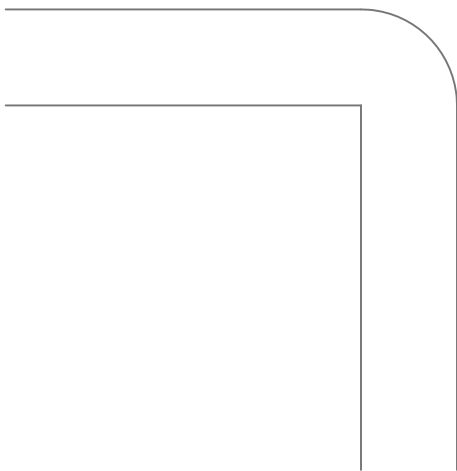
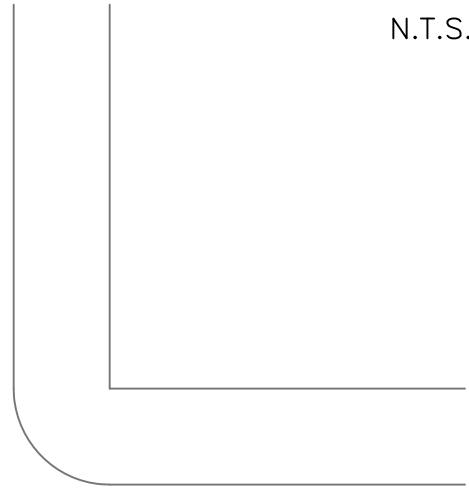
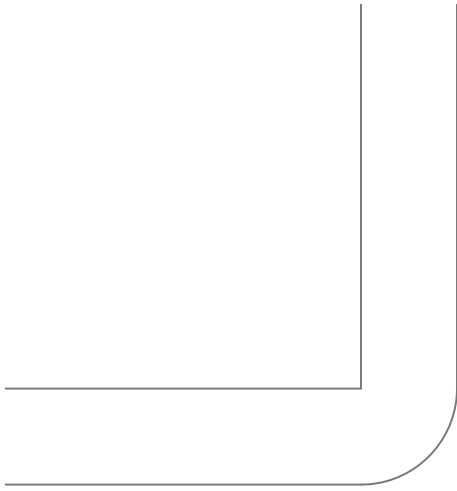
 FIRM/CREW

CITY AND COUNTY OF DENVER

MONUMENT TIE OUT SHEET



N.T.S.

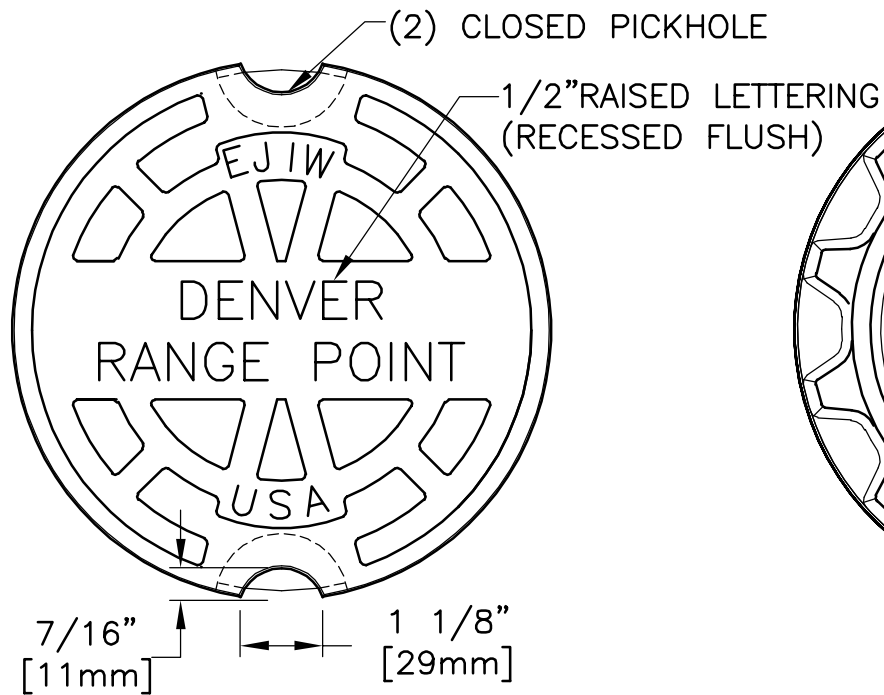


INFORMATION TO BE SHOWN

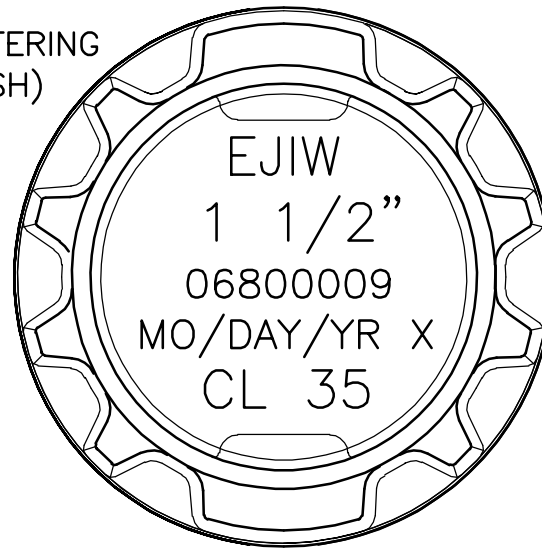
1. Range Points (monument desc.) & Range Lines
2. Section Corners & Land Lines
3. Range Point Ties (found or set)
4. Street Names
5. Platted rangeline dimensions to identify Range Points not at an intersection
6. If monument is not found, describe the extent of the search

DATE

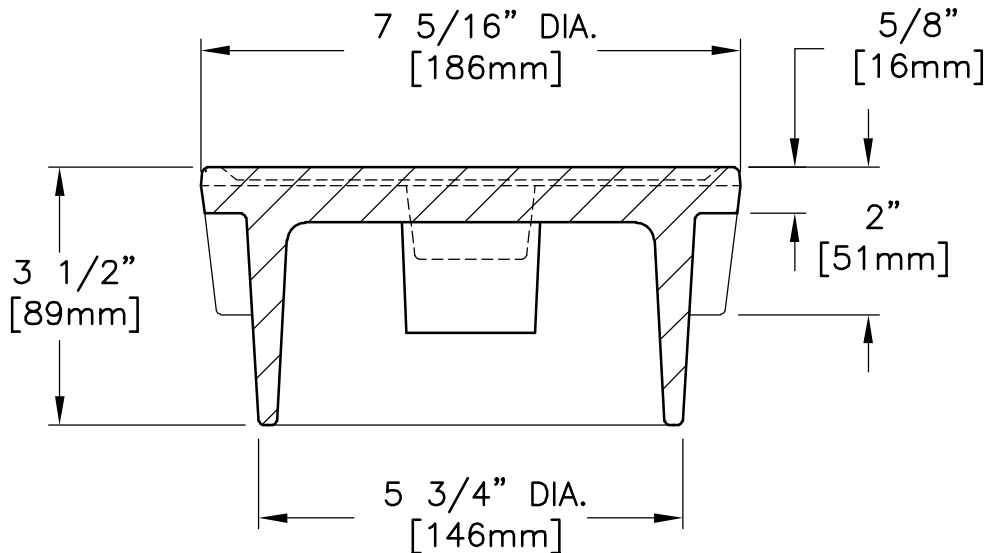
FIRM/CREW



PLAN VIEW



BOTTOM VIEW



SECTION VIEW

EAST JORDAN
IRON WORKS, INC.
P.O. BOX 439
EAST JORDAN, MI. 49727
1-800-874-4100
FAX 231-536-4458

DRAWN TCL	DATE 02/25/05
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APPROVED	DATE
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5 1/4" DROP LID
1 1/2" SKIRT
(DENVER RANGE POINT)

PRODUCT NO.

06800009

CATALOG NO.

6800

REF. PRODUCT DRAWING

06800001

EST. WT.

COVER: 14 LBS 6kg

OPEN AREA

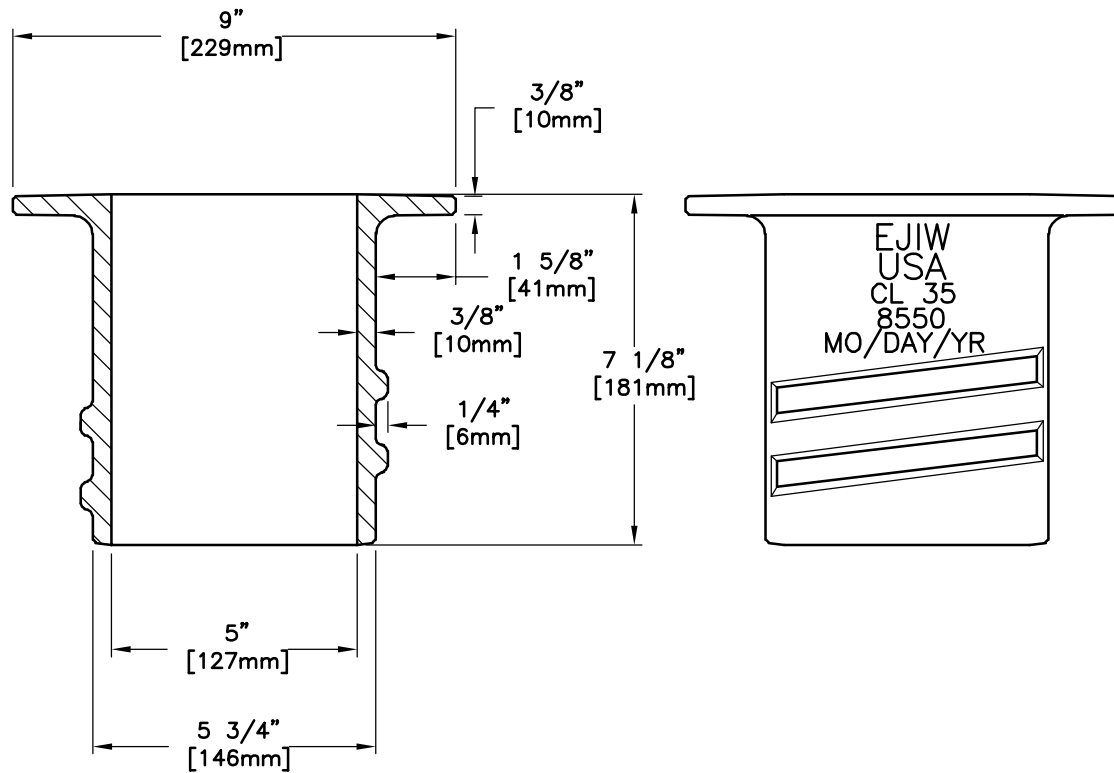
N/A

MAT'L SPEC.

COVER - GRAY IRON
ASTM A48 CL35B

LOAD RATING

HEAVY DUTY



EAST JORDAN
IRON WORKS, INC.
P.O. BOX 439
EAST JORDAN, MI. 49727
1-800-874-4100
FAX 231-536-4458

DRAWN TCL	DATE 05/04/01
--------------	------------------

APPROVED	DATE
----------	------

8550 BOTTOM SCREW BASE

PRODUCT NO.

85506007

CATALOG NO.

8550

REF. PRODUCT DRAWING

85506007

EST. WT.

BASE: 17 LBS 8 kg

OPEN AREA

N/A

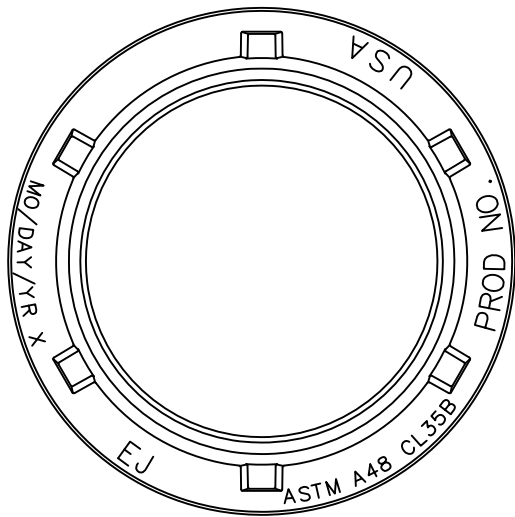
MAT'L SPEC.

BASE - GRAY IRON
ASTM A48 CL35

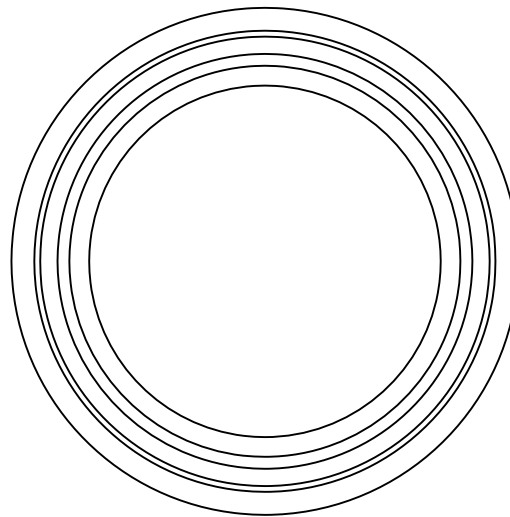
LOAD RATING

NON-TRAFFIC

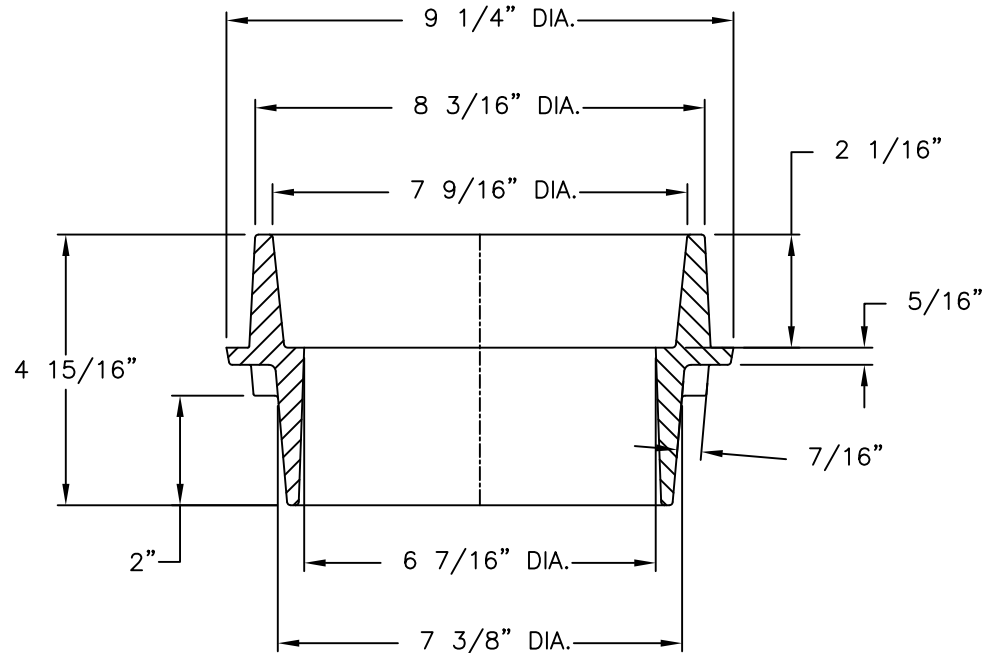
8500 Riser



BOTTOM VIEW



TOP VIEW



SECTION VIEW

Product Number

85008030

Design Features

- Materials
Gray Iron (CL35B)
- Design Load
Heavy Duty
- Open Area
n/a
- Coating
Undipped
- √ Designates Machined Surface

Certification

- ASTM A48
-
-
- Country of Origin: USA

3" RISER

Drawing Revision

03/08/2006 Designer: TCL
11/10/2014 Revised By: DAE

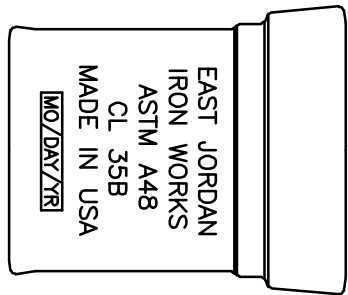
Disclaimer

Weights (lbs./kg) dimensions (inches/mm) and drawings provided for your guidance. We reserve the right to modify specifications without prior notice.

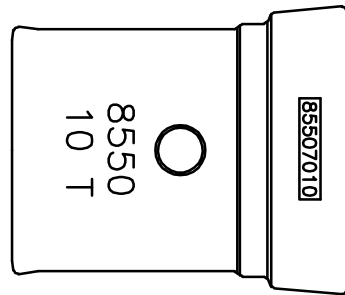
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Contact

800 626 4653
ejco.com

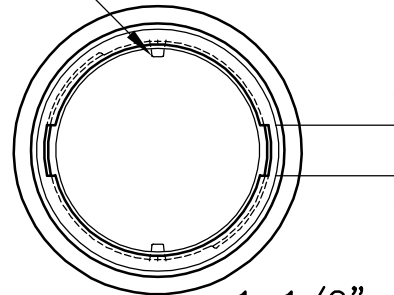


VIEW OF BACK SIDE LETTERING

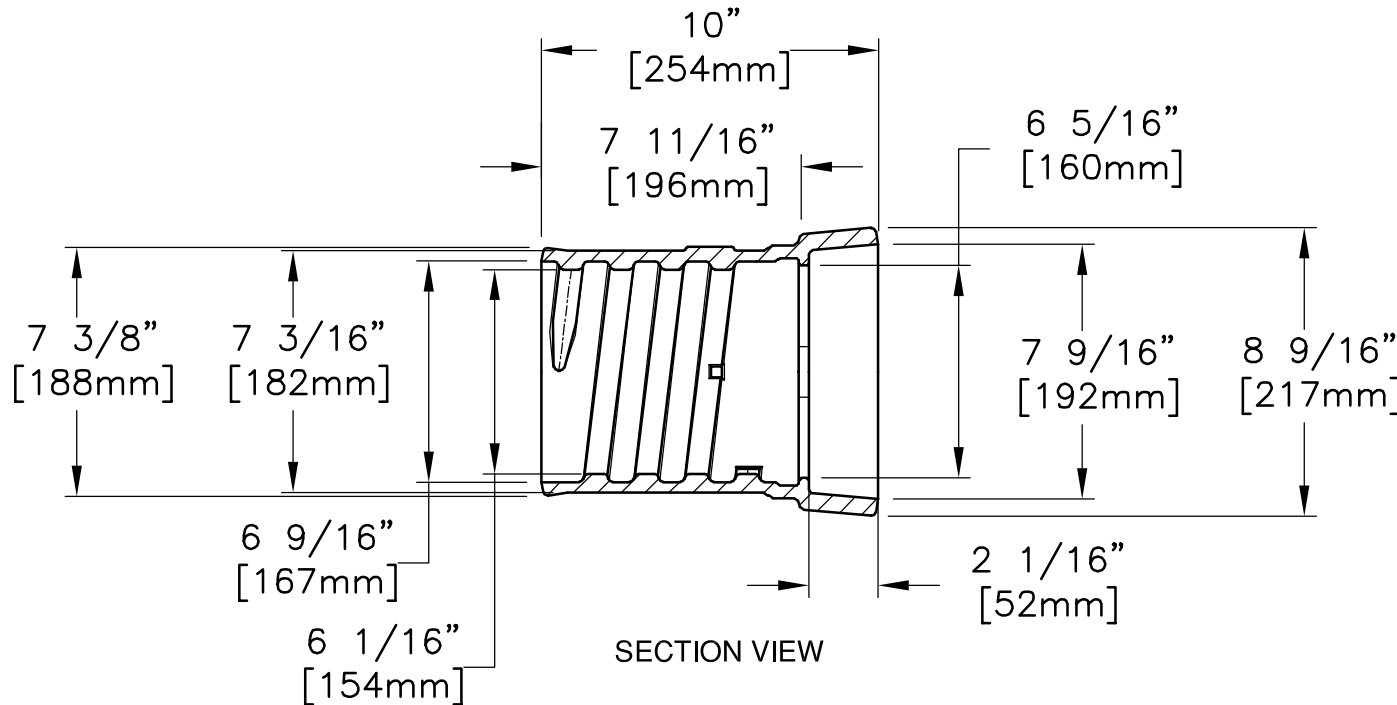


PLAN VIEW

(2) STOP LUGS



TOP VIEW



SECTION VIEW

EAST JORDAN
IRON WORKS, INC.
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EAST JORDAN, MI. 49727
1-800-874-4100
FAX 231-536-4458

DRAWN TCL	DATE 09/29/05
--------------	------------------

APPROVED	DATE
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**8550 10T
VALVE BOX TOP**

PRODUCT NO.

85507010

CATALOG NO.

8550

REF. PRODUCT DRAWING

85507010

EST. WT.

VALVE T: 25 LBS 11kg

OPEN AREA

N/A

MAT'L SPEC.
VALVET - GRAY IRON
ASTM A48 CL35

LOAD RATING

HEAVY DUTY