



CONTRACTOR SUBMITTAL FORM

| | | |
|--|---|----------------------|
| Project Name: Navajo Gallup Water Supply Project Reach 26.3 | <input checked="" type="checkbox"/> M (Materials) <input type="checkbox"/> T (Testing) <input type="checkbox"/> A (Administrative) | Submittal No. |
| SMA Project No: 6921307 | | M003 |
| Date: 06/27/2019 | | |
| Contractor: Navajo Engineering and Construction Authority | No. of Copies: 1 | |

| | |
|---|--------------------------------------|
| Supplier: Core & Main | Manufacturer: Star Pipe |
| Specification No.: 33 11 13 – B. 3. a-d. and f 1)a) | Drawing No.: C-29, DT-7, DT-8 |
| Bid Item No(s): 9, 11, 13, 33, 34, 39, 42 | |
| Submittal Checklist No(s): M206 | |
| Product Description: 4", 6", 10" Mechanical Joint Fittings with Fusion Bonded Epoxy. | |
| Are there any deviations from the Contract Documents? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes Explain: | |
| Contractor's certification that product meets requirements of Contract Documents: <input checked="" type="checkbox"/> Certified <input type="checkbox"/> Certified with variations as noted on shop drawings and/or attached sheets. | |
| Signed:  Quentin Benally | Date: 06/27/2019 |

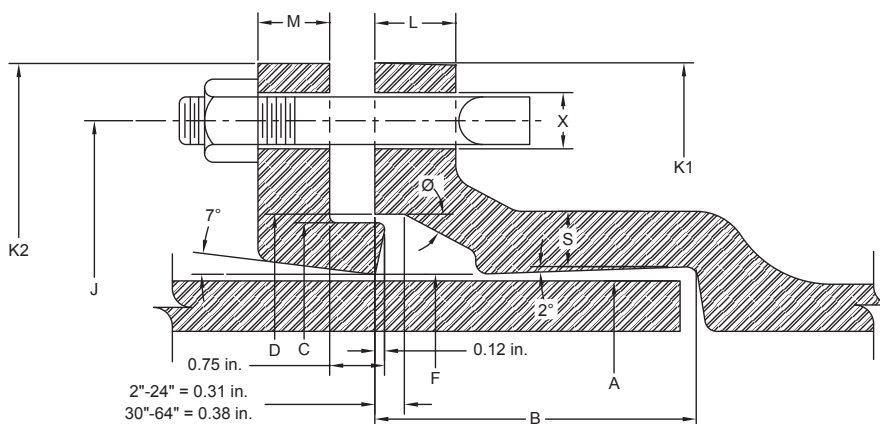
| | |
|--|--|
| Engineer's Comments: <input type="checkbox"/> No Exception Taken <input checked="" type="checkbox"/> Approved as Corrected <input type="checkbox"/> Exceptions as Noted <input type="checkbox"/> Submittal Rejected <input type="checkbox"/> Revise and Resubmit to Engineer <input type="checkbox"/> Contractor to Submit Specified Information - 10" 90°, not called out, but may be used - Contractor responsible to verify type & qty of fittings | Review is limited to check for compliance with design concept. No changes from provisions of Contract Documents are intended and Contractor remains responsible for compliance with revisions therein. The Contractor is solely responsible for quantities; correctness of dimensions; verification of physical interrelation of elements of the work as required by the drawings and specifications and by field determination; fabrication procedures, construction methods, techniques and sequences. This review does not relieve the Contractor from these responsibilities. Non-conformities and errors detected have been noted but such markings, or lack thereof, shall not relieve the Contractor from compliance with all requirements of the contract drawings and specifications. |
| Signed:  | Date: 7/9/19 |



Ductile Iron MJ Compact Fittings with Fusion Bonded Epoxy Coating

ANSI/AWWA C153/A21.53**GENERAL SPECIFICATIONS**

| | |
|------------------------|--|
| MATERIAL: | Ductile Iron per ASTM A536 |
| PRESSURE: | 350 PSI rating for 2" - 24" sizes, 250 PSI rating for 30" - 48" sizes and 150 PSI rating for 54" - 64" sizes |
| TESTING: | In accordance with ANSI/AWWA C153/A21.53 and UL requirements |
| LAYING LENGTH: | In accordance with ANSI/AWWA C153/A21.53 (fittings not listed in ANSI/AWWA have dimensions per Star design as noted in the catalog) |
| DEFLECTION: | 2"- 4"=8° 6"=7° 8"-12"=5° 14"-16"=3 1/2° 18"-24"=3° 30"-48"=2° |
| WEIGHTS: | Are in pounds, unless noted otherwise and do not include accessories, cement lining and coating |
| FLANGES: | Flanged ends on fittings match ANSI/AWWA C115/A21.15 and ANSI B16.1 class 125 flanges |
| COATING/LINING: | Fusion Bonded Epoxy per ANSI/AWWA C116/A21.16 - Dry Film Thickness of 6-10 mils, UL/NSF 61 |
| GASKETS: | SBR in accordance with ANSI/AWWA C111/A21.11 (see pg. 16) |
| T-BOLTS/NUTS: | Low alloy steel in accordance with ANSI/AWWA C111/A21.11 (see pg. 18) |
| APPROVALS: | 3" - 12" UL/ULC Listed 3" and greater are UL/NSF-61 3" - 16" FM APPROVED. Please consult factory for detail listing and approvals. |
| DIMENSIONS: | All dimensions are in inches unless noted otherwise. |

**MECHANICAL JOINT DIMENSIONS**

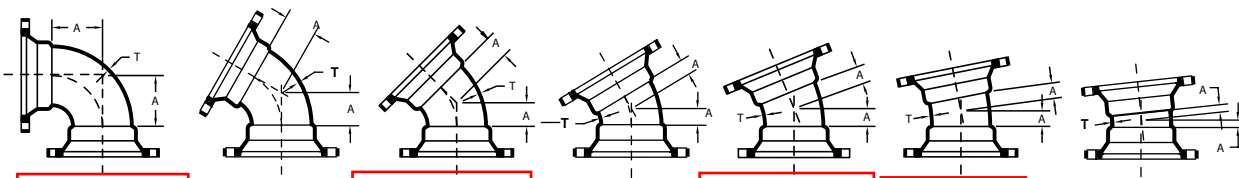
| NOM. SIZE | A DIA. | B | C DIA. | D DIA. | F DIA. | J DIA. | K1 DIA. | K2 DIA. | L | M | S | Ø | X DIA. | BOLTS | |
|-----------|---|------|--------|--------|--------|--------|---------|---------|------|------|------|-----|--------|-------------|-----|
| | | | | | | | | | | | | | | SIZE | NO. |
| 2 | 2.50 | 2.50 | 3.39 | 3.50 | 2.61 | 4.75 | 6.19 | 6.25 | 0.58 | 0.62 | 0.36 | 28° | 3/4 | 5/8 x 3 | 2 |
| 3 | 3.96 | 2.50 | 4.84 | 4.94 | 4.06 | 6.19 | 7.62 | 7.69 | 0.58 | 0.62 | 0.39 | 28° | 3/4 | 5/8 x 3 | 4 |
| 4 | 4.80 | 2.50 | 5.92 | 6.02 | 4.90 | 7.50 | 9.06 | 9.12 | 0.60 | 0.75 | 0.39 | 28° | 7/8 | 3/4 x 3 1/2 | 4 |
| 6 | 6.90 | 2.50 | 8.02 | 8.12 | 7.00 | 9.50 | 11.06 | 11.12 | 0.63 | 0.88 | 0.43 | 28° | 7/8 | 3/4 x 3 1/2 | 6 |
| 8 | 9.05 | 2.50 | 10.17 | 10.27 | 9.15 | 11.75 | 13.31 | 13.37 | 0.66 | 1.00 | 0.45 | 28° | 7/8 | 3/4 x 3 1/2 | 6 |
| 10 | 11.10 | 2.50 | 12.22 | 12.34 | 11.20 | 14.00 | 15.62 | 15.62 | 0.70 | 1.00 | 0.47 | 28° | 7/8 | 3/4 x 3 1/2 | 8 |
| 12 | 13.20 | 2.50 | 14.32 | 14.44 | 13.30 | 16.25 | 17.88 | 17.88 | 0.73 | 1.00 | 0.49 | 28° | 7/8 | 3/4 x 3 1/2 | 8 |
| 14 | 15.30 | 3.50 | 16.40 | 16.54 | 15.44 | 18.75 | 20.25 | 20.25 | 0.79 | 1.25 | 0.55 | 28° | 7/8 | 3/4 x 4 | 10 |
| 16 | 17.40 | 3.50 | 18.50 | 18.64 | 17.54 | 21.00 | 22.50 | 22.50 | 0.85 | 1.31 | 0.58 | 28° | 7/8 | 3/4 x 4 | 12 |
| 18 | 19.50 | 3.50 | 20.60 | 20.74 | 19.64 | 23.25 | 24.83 | 24.75 | 1.00 | 1.38 | 0.68 | 28° | 7/8 | 3/4 x 4 | 12 |
| 20 | 21.60 | 3.50 | 22.70 | 22.84 | 21.74 | 25.50 | 27.08 | 27.00 | 1.02 | 1.44 | 0.69 | 28° | 7/8 | 3/4 x 4 | 14 |
| 24 | 25.80 | 3.50 | 26.90 | 27.04 | 25.94 | 30.00 | 31.58 | 31.50 | 1.02 | 1.56 | 0.75 | 28° | 7/8 | 3/4 x 4 1/2 | 16 |
| 30 | 32.00 | 4.00 | 33.29 | 33.46 | 32.17 | 36.88 | 39.12 | 39.12 | 1.31 | 2.00 | 0.82 | 20° | 1 1/8 | 1 x 5 1/2 | 20 |
| 36 | 38.30 | 4.00 | 39.59 | 39.76 | 38.47 | 43.75 | 46.00 | 46.00 | 1.45 | 2.00 | 1.00 | 20° | 1 1/8 | 1 x 5 1/2 | 24 |
| 42 | 44.50 | 4.00 | 45.79 | 45.96 | 44.67 | 50.62 | 53.12 | 53.12 | 1.45 | 2.00 | 1.25 | 20° | 1 3/8 | 1 1/4 x 6 | 28 |
| 48 | 50.80 | 4.00 | 52.09 | 52.26 | 50.97 | 57.50 | 60.00 | 60.00 | 1.45 | 2.00 | 1.35 | 20° | 1 3/8 | 1 1/4 x 6 | 32 |
| 54 | {Fittings & Dimensions Available On Request } | | | | | | | | | | | | | | |
| 60 | | | | | | | | | | | | | | | |
| 64 | | | | | | | | | | | | | | | |



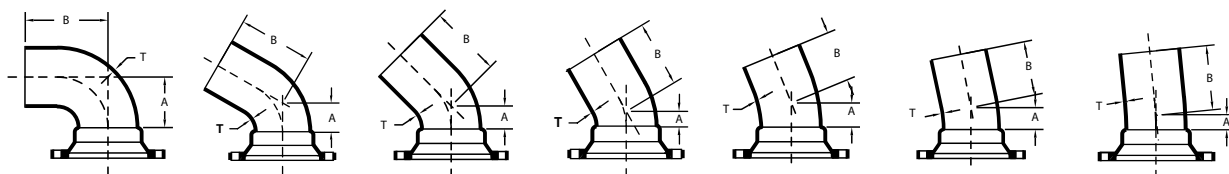


Compact MJ Fittings

ANSI/AWWA C153/A21.53



| MJ x MJ BENDS | | 90° MJ x MJ BENDS (1/4) | | 60° MJ x MJ BENDS (1/6) | | 45° MJ x MJ BENDS (1/8) | | 30° MJ x MJ BENDS (1/12) | | 22 1/2° MJ x MJ BENDS (1/16) | | 11 1/4° MJ x MJ BENDS (1/32) | | 5 5/8° MJ x MJ BENDS (1/64) | |
|---------------|------|-------------------------|-----------|-------------------------|-----------|-------------------------|-----------|--------------------------|-----------|------------------------------|-----------|------------------------------|-----------|-----------------------------|-----------|
| NOM. SIZE | T | A | WT (LBS.) | A | WT (LBS.) | A | WT (LBS.) | A | WT (LBS.) | A | WT (LBS.) | A | WT (LBS.) | A | WT (LBS.) |
| 2 | 0.30 | 3.25 | 14 | - | - | 1.80 | 13 | - | - | 1.00 | 9 | 1.00 | 8 | - | - |
| 3 | 0.33 | 3.50 | 23 | - | - | 1.50 | 21 | - | - | 1.00 | 16 | 1.00 | 14 | - | - |
| 4 | 0.34 | 4.00 | 27 | - | - | 2.00 | 23 | - | - | 1.50 | 18 | 1.25 | 16 | - | - |
| 6 | 0.36 | 5.00 | 39 | - | - | 3.00 | 32 | - | - | 2.00 | 32 | 1.50 | 30 | - | - |
| 8 | 0.38 | 6.50 | 57 | - | - | 3.50 | 46 | - | - | 2.50 | 46 | 1.75 | 42 | - | - |
| 10 | 0.40 | 7.50 | 89 | - | - | 4.50 | 70 | - | - | 3.00 | 64 | 2.00 | 58 | - | - |
| 12 | 0.42 | 9.00 | 108 | - | - | 5.50 | 86 | - | - | 3.50 | 84 | 2.25 | 74 | - | - |
| 14 | 0.47 | 11.50 | 180 | - | - | 5.00 | 145 | - | - | 3.75 | 140 | 2.50 | 128 | - | - |
| 16 | 0.50 | 12.50 | 264 | - | - | 5.50 | 202 | - | - | 3.75 | 178 | 2.50 | 148 | - | - |
| 18 | 0.54 | 14.00 | 335 | - | - | 6.00 | 250 | - | - | 4.50 | 255 | 3.00 | 205 | - | - |
| 20 | 0.57 | 15.00 | 400 | - | - | 7.00 | 305 | - | - | 4.50 | 262 | 3.00 | 245 | - | - |
| 24 | 0.61 | 17.00 | 565 | - | - | 7.50 | 405 | - | - | 4.50 | 412 | 3.00 | 315 | - | - |
| 30 | 0.66 | 21.50 | 1005 | 13.50 | 843 | 11.50 | 798 | 9.75 | 692 | 6.75 | 665 | 4.75 | 568 | - | - |
| 36 | 0.74 | 24.50 | 1562 | 17.00 | 1350 | 11.50 | 1164 | 11.00 | 1080 | 7.75 | 960 | 5.00 | 840 | 5.00 | 825 |
| 42 | 0.82 | 29.25 | 2506 | 19.00 | 2150 | 14.00 | 1792 | 12.00 | 1465 | 9.00 | 1350 | 6.00 | 1319 | 6.00 | 1125 |
| 48 | 0.90 | 33.25 | 3045 | 21.00 | 2650 | 15.00 | 2390 | 13.25 | 2075 | 10.00 | 1886 | 6.50 | 1700 | 6.50 | 1600 |



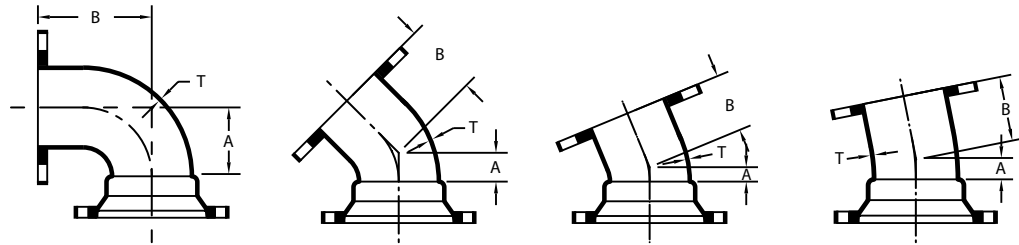
| MJ x PE BENDS | | 90° MJ x PE BENDS (¼) | | | 60° MJ x PE BENDS (⅙) | | | 45° MJ x PE BENDS (⅛) | | | 30° MJ x PE BENDS (¹⁄₁₂) | | | 22 ½° MJ x PE BENDS (¹⁄₁₆) | | | 11 ¼° MJ x PE BENDS (¹⁄₃₂) | | | 5 5⁄8° MJ x PE BENDS (¹⁄₆₄) | | |
|---------------|------|-----------------------|-------|-----------|-----------------------|-------|-----------|-----------------------|-------|-----------|--------------------------|-------|-----------|----------------------------|-------|-----------|----------------------------|-------|-----------|-----------------------------|-------|-----------|
| NOM. SIZE | T | A | B | WT (LBS.) | A | B | WT (LBS.) | A | B | WT (LBS.) | A | B | WT (LBS.) | A | B | WT (LBS.) | A | B | WT (LBS.) | A | B | WT (LBS.) |
| 3 | 0.33 | 3.50 | 8.50 | 16 | - | - | - | 1.50 | 7.00 | 13 | - | - | - | 1.00 | 6.50 | 12 | 1.00 | 6.50 | 12 | - | - | - |
| 4 | 0.34 | 4.00 | 9.50 | 22 | - | - | - | 2.00 | 7.50 | 19 | - | - | - | 1.50 | 7.00 | 18 | 1.25 | 6.25 | 17 | - | - | - |
| 6 | 0.36 | 5.00 | 12.00 | 40 | - | - | - | 3.00 | 8.50 | 31 | - | - | - | 2.00 | 7.50 | 29 | 1.50 | 7.00 | 27 | - | - | - |
| 8 | 0.38 | 6.50 | 12.50 | 61 | - | - | - | 3.50 | 9.00 | 46 | - | - | - | 2.50 | 8.00 | 43 | 1.75 | 7.25 | 39 | - | - | - |
| 10 | 0.40 | 7.50 | 13.00 | 83 | - | - | - | 4.50 | 10.00 | 68 | - | - | - | 3.00 | 8.50 | 61 | 2.00 | 7.50 | 52 | - | - | - |
| 12 | 0.42 | 9.00 | 14.50 | 114 | - | - | - | 5.50 | 11.00 | 95 | - | - | - | 3.50 | 9.00 | 81 | 2.25 | 7.75 | 70 | - | - | - |
| 14 | 0.47 | 11.50 | 19.50 | 197 | - | - | - | 5.00 | 13.00 | 148 | - | - | - | 3.75 | 11.25 | 133 | 2.50 | 10.50 | 122 | - | - | - |
| 16 | 0.50 | 12.50 | 20.50 | 248 | - | - | - | 5.50 | 13.50 | 184 | - | - | - | 3.75 | 11.75 | 166 | 2.50 | 10.50 | 148 | - | - | - |
| 18 | 0.54 | 14.00 | 21.00 | 325 | - | - | - | 6.00 | 13.00 | 235 | - | - | - | 6.00 | 13.00 | 235 | 6.00 | 13.00 | 235 | - | - | - |
| 20 | 0.57 | 15.00 | 22.50 | 390 | - | - | - | 7.00 | 14.00 | 300 | - | - | - | 7.00 | 14.00 | 300 | 7.00 | 14.00 | 300 | - | - | - |
| 24 | 0.61 | 17.00 | 25.00 | 575 | - | - | - | 7.50 | 14.50 | 390 | - | - | - | 7.50 | 14.50 | 395 | 7.50 | 14.50 | 400 | - | - | - |
| 30 | 0.66 | 22.75 | 31.75 | 865 | 13.50 | 22.50 | 846 | 10.50 | 19.50 | 715 | 9.75 | 18.75 | 762 | 6.75 | 15.75 | 600 | 4.75 | 13.75 | 535 | 4.75 | 13.75 | 505 |
| 36 | 0.74 | 24.50 | 33.50 | 1355 | - | - | - | 12.00 | 21.00 | 1040 | - | - | - | 7.75 | 16.75 | 865 | 5.00 | 14.00 | 725 | - | - | - |
| 42 | 0.82 | 29.25 | 38.25 | 2055 | - | - | - | 14.00 | 23.00 | 1460 | - | - | - | 9.00 | 18.00 | 1200 | 6.00 | 15.00 | 1030 | - | - | - |
| 48 | 0.90 | 33.25 | 42.25 | 2805 | - | - | - | 15.00 | 24.00 | 1905 | - | - | - | 10.00 | 19.00 | 1575 | 6.50 | 15.50 | 1290 | - | - | - |



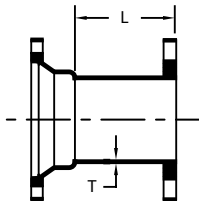


Compact MJ Fittings

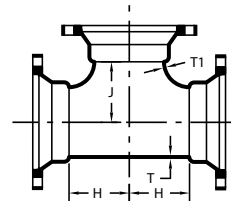
ANSI/AWWA C153/A21.53



| MJ x FE BENDS | | 90° MJ x FE BENDS (¼) | | | 45° MJ x FE BENDS (⅛) | | | 22 ½° MJ x FE BENDS (⅙) | | | 11 ¼° MJ x FE BENDS (⅓) | | |
|---------------|------|-----------------------|-------|-----------|-----------------------|-------|-----------|-------------------------|------|-----------|-------------------------|------|-----------|
| NOM. SIZE | T | A | B | WT (LBS.) | A | B | WT (LBS.) | A | B | WT (LBS.) | A | B | WT (LBS.) |
| 3 | 0.33 | 3.50 | 5.50 | 20 | 1.50 | 3.00 | 17 | 1.00 | 3.00 | 17 | 1.00 | 3.00 | 15 |
| 4 | 0.34 | 4.00 | 6.50 | 26 | 2.00 | 4.00 | 24 | 1.50 | 4.00 | 26 | 1.25 | 4.00 | 19 |
| 6 | 0.36 | 5.00 | 8.00 | 47 | 3.50 | 5.00 | 40 | 2.00 | 5.00 | 36 | 1.50 | 5.00 | 30 |
| 8 | 0.38 | 6.50 | 9.00 | 68 | 3.50 | 5.50 | 57 | 2.50 | 5.50 | 53 | 1.75 | 5.50 | 50 |
| 10 | 0.40 | 7.50 | 11.00 | 102 | 4.50 | 6.50 | 83 | 3.00 | 6.50 | 102 | 2.00 | 6.50 | 75 |
| 12 | 0.42 | 9.00 | 12.00 | 134 | 5.50 | 7.50 | 110 | 3.50 | 7.50 | 134 | 2.25 | 7.50 | 88 |
| 14 | 0.47 | 11.50 | 14.00 | 227 | 5.00 | 7.50 | 207 | --- | --- | --- | --- | --- | --- |
| 16 | 0.50 | 12.50 | 15.00 | 306 | 5.50 | 8.00 | 239 | 3.75 | 8.00 | 228 | --- | --- | --- |
| 30 | 0.66 | 21.50 | 25.00 | 1070 | 10.50 | 15.00 | 858 | --- | --- | --- | --- | --- | --- |
| 36 | 0.74 | 24.50 | 28.00 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |



| MJ x FLANGE ADAPTER | | | |
|---------------------|------|-------|-----------|
| NOM. SIZE | T | L | WT (LBS.) |
| 3 | 0.33 | 3.50 | 13 |
| 4 | 0.34 | 3.50 | 22 |
| 6 | 0.36 | 3.50 | 32 |
| 8 | 0.38 | 3.50 | 54 |
| 10 | 0.40 | 4.00 | 67 |
| 12 | 0.42 | 4.00 | 91 |
| 14 | 0.47 | 5.00 | 141 |
| 16 | 0.50 | 5.00 | 170 |
| 18 | 0.54 | 5.00 | 221 |
| 20 | 0.57 | 5.00 | 252 |
| 24 | 0.61 | 5.00 | 324 |
| 30 | 0.66 | 7.00 | 558 |
| 36 | 0.74 | 8.50 | 796 |
| 42 | 0.82 | 12.00 | 1190 |
| 48 | 0.90 | 12.00 | 1653 |



| MJ x MJ TEES | | | | | |
|--------------|------|------|------|------|-----------|
| NOM. SIZE | T | T1 | H | J | WT (LBS.) |
| 2 x 2 | 0.39 | 0.39 | 3.25 | 3.25 | 20 |
| 3 x 2 | 0.48 | 0.39 | 3.50 | 3.50 | 43 |
| 3 x 3 | 0.33 | 0.33 | 3.00 | 3.00 | 28 |
| 4 x 2 | 0.34 | 0.30 | 3.00 | 4.00 | 29 |
| 4 x 3 | 0.34 | 0.33 | 3.50 | 4.00 | 30 |
| 4 x 4 | 0.34 | 0.34 | 4.00 | 4.00 | 32 |
| 6 x 3 | 0.36 | 0.33 | 3.50 | 5.00 | 42 |
| 6 x 4 | 0.36 | 0.34 | 4.00 | 5.00 | 46 |
| 6 x 4 x 6 | 0.36 | 0.36 | 5.00 | 5.00 | 45 |
| 6 x 6 | 0.36 | 0.36 | 5.00 | 5.00 | 56 |
| 6 x 6 x 8 | 0.36 | 0.38 | 6.50 | 6.50 | 62 |
| 8 x 3 | 0.38 | 0.33 | 4.00 | 6.50 | 52 |
| 8 x 4 | 0.38 | 0.34 | 4.00 | 6.50 | 60 |
| 8 x 6 | 0.38 | 0.36 | 5.00 | 6.50 | 72 |
| 8 x 6 x 6 | 0.38 | 0.38 | 5.00 | 6.50 | 62 |
| 8 x 6 x 8 | 0.38 | 0.38 | 6.00 | 6.50 | 85 |
| 8 x 8 | 0.38 | 0.38 | 6.50 | 6.50 | 86 |
| 10 x 3 | 0.40 | 0.33 | 4.00 | 7.50 | 75 |
| 10 x 4 | 0.40 | 0.34 | 4.00 | 7.50 | 78 |
| 10 x 6 | 0.40 | 0.36 | 5.00 | 7.50 | 90 |
| 10 x 8 | 0.40 | 0.38 | 6.50 | 7.50 | 105 |
| 10 x 10 | 0.40 | 0.40 | 7.50 | 7.50 | 120 |
| 12 x 3 | 0.42 | 0.33 | 4.00 | 8.75 | 90 |
| 12 x 4 | 0.42 | 0.34 | 4.00 | 8.75 | 94 |

(Con't)

UCAT.12.01

* REGISTERED TRADEMARK OF STAR PIPE PRODUCTS



STAR® PIPE PRODUCTS



Compact MJ Fittings

ANSI/AWWA C153/A21.53

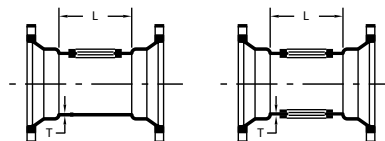
MJ x MJ TEES (Con't)

| NOM. SIZE | T | T1 | H | J | WT (LBS.) |
|-----------|------|------|-------|-------|-----------|
| 12 x 6 | 0.42 | 0.36 | 5.00 | 8.75 | 110 |
| 12 x 8 | 0.42 | 0.38 | 6.50 | 8.75 | 125 |
| 12 x 10 | 0.42 | 0.40 | 7.50 | 8.75 | 140 |
| 12 x 12 | 0.42 | 0.42 | 8.75 | 8.75 | 160 |
| 14 x 6 | 0.47 | 0.36 | 6.50 | 10.50 | 182 |
| 14 x 8 | 0.47 | 0.38 | 7.50 | 10.50 | 190 |
| 14 x 10 | 0.47 | 0.40 | 8.50 | 10.50 | 206 |
| 14 x 12 | 0.47 | 0.42 | 9.50 | 10.50 | 221 |
| 14 x 14 | 0.47 | 0.47 | 10.50 | 10.50 | 251 |
| 16 x 6 | 0.50 | 0.36 | 6.50 | 11.50 | 218 |
| 16 x 8 | 0.50 | 0.38 | 7.50 | 11.50 | 223 |
| 16 x 10 | 0.50 | 0.40 | 8.50 | 11.50 | 264 |
| 16 x 12 | 0.50 | 0.42 | 9.50 | 11.50 | 280 |
| 16 x 14 | 0.50 | 0.47 | 10.50 | 11.50 | 316 |
| 16 x 16 | 0.50 | 0.50 | 11.50 | 11.50 | 322 |
| 18 x 6 | 0.54 | 0.36 | 6.50 | 12.50 | 275 |
| 18 x 8 | 0.54 | 0.38 | 7.50 | 12.50 | 295 |
| 18 x 10 | 0.54 | 0.40 | 8.50 | 12.50 | 315 |
| 18 x 12 | 0.54 | 0.42 | 9.50 | 12.50 | 335 |
| 18 x 14 | 0.54 | 0.47 | 10.50 | 12.50 | 380 |
| 18 x 16 | 0.54 | 0.50 | 11.50 | 12.50 | 405 |
| 18 x 18 | 0.54 | 0.54 | 12.50 | 12.50 | 435 |
| 20 x 6 | 0.57 | 0.36 | 6.50 | 14.00 | 315 |
| 20 x 8 | 0.57 | 0.38 | 8.00 | 14.00 | 345 |
| 20 x 10 | 0.57 | 0.40 | 9.00 | 14.00 | 370 |
| 20 x 12 | 0.57 | 0.42 | 10.00 | 14.00 | 395 |
| 20 x 14 | 0.57 | 0.47 | 11.00 | 14.00 | 440 |
| 20 x 16 | 0.57 | 0.50 | 12.00 | 14.00 | 465 |
| 20 x 18 | 0.57 | 0.54 | 13.00 | 14.00 | 505 |
| 20 x 20 | 0.57 | 0.57 | 14.00 | 14.00 | 535 |
| 24 x 6 | 0.61 | 0.36 | 7.00 | 16.00 | 415 |
| 24 x 8 | 0.61 | 0.38 | 8.00 | 16.00 | 445 |
| 24 x 10 | 0.61 | 0.40 | 9.00 | 16.00 | 470 |
| 24 x 12 | 0.61 | 0.42 | 10.00 | 16.00 | 500 |
| 24 x 14 | 0.61 | 0.47 | 11.00 | 16.00 | 550 |
| 24 x 16 | 0.61 | 0.50 | 12.00 | 16.00 | 580 |
| 24 x 18 | 0.61 | 0.54 | 13.00 | 16.00 | 625 |
| 24 x 20 | 0.61 | 0.57 | 14.00 | 16.00 | 660 |
| 24 x 24 | 0.61 | 0.61 | 16.00 | 16.00 | 720 |
| 30 x 6 | 0.66 | 0.36 | 8.00 | 20.00 | 970 |
| 30 x 8 | 0.66 | 0.38 | 8.50 | 20.00 | 739 |
| 30 x 12 | 0.66 | 0.42 | 10.00 | 20.00 | 830 |
| 30 x 14 | 0.66 | 0.47 | 11.00 | 20.00 | 880 |
| 30 x 16 | 0.66 | 0.50 | 12.50 | 20.00 | 878 |
| 30 x 18 | 0.66 | 0.54 | 14.00 | 20.00 | 1039 |
| 30 x 20 | 0.66 | 0.57 | 15.00 | 20.00 | 1000 |
| 30 x 24 | 0.66 | 0.61 | 21.00 | 22.00 | 1389 |
| 30 x 30 | 0.66 | 0.66 | 20.00 | 20.00 | 1323 |
| 36 x 4 | 0.74 | 0.34 | 7.00 | 23.50 | 924 |
| 36 x 6 | 0.74 | 0.36 | 8.00 | 23.50 | 1045 |
| 36 x 8 | 0.74 | 0.38 | 9.00 | 23.50 | 1095 |
| 36 x 10 | 0.74 | 0.40 | 9.00 | 23.50 | 1024 |
| 36 x 12 | 0.74 | 0.42 | 10.00 | 23.50 | 1072 |

(Con't)➔

MJ x MJ TEES (Con't)

| NOM. SIZE | T | T1 | H | J | WT (LBS.) |
|--|--|------|-------|-------|-----------|
| 36 x 14 | 0.74 | 0.47 | 11.00 | 23.50 | 1135 |
| 36 x 16 | 0.74 | 0.50 | 12.50 | 23.50 | 1385 |
| 36 x 18 | 0.74 | 0.54 | 13.00 | 23.50 | 1455 |
| 36 x 20 | 0.74 | 0.57 | 15.00 | 23.50 | 1631 |
| 36 x 24 | 0.74 | 0.61 | 16.00 | 23.50 | 1550 |
| 36 x 30 | 0.74 | 0.66 | 20.00 | 23.50 | 1986 |
| 36 x 36 | 0.74 | 0.74 | 23.50 | 23.50 | 2072 |
| 42 x 6 | 0.82 | 0.36 | 9.00 | 27.50 | 1534 |
| 42 x 12 | 0.82 | 0.42 | 14.00 | 27.50 | 1885 |
| 42 x 16 | 0.82 | 0.50 | 13.00 | 27.50 | 1929 |
| 42 x 18 | 0.82 | 0.54 | 16.00 | 27.50 | 2072 |
| 42 x 20 | 0.82 | 0.57 | 18.00 | 27.50 | 1947 |
| 42 x 24 | 0.82 | 0.61 | 20.00 | 27.50 | 2270 |
| 42 x 30 | 0.82 | 0.66 | 22.00 | 29.50 | 2608 |
| 42 x 36 | 0.82 | 0.74 | 30.00 | 30.00 | 3000 |
| 42 x 42 | 0.82 | 0.82 | 30.00 | 30.00 | 3175 |
| 48 x 6 | 0.90 | 0.36 | 10.00 | 32.00 | 1949 |
| 48 x 12 | 0.90 | 0.42 | 14.00 | 32.00 | 2535 |
| 48 x 16 | 0.90 | 0.50 | 13.00 | 32.00 | 2657 |
| 48 x 18 | 0.90 | 0.54 | 16.00 | 32.00 | 2293 |
| 48 x 24 | 0.90 | 0.61 | 23.00 | 32.00 | 2870 |
| 48 x 30 | 0.90 | 0.66 | 23.00 | 32.00 | 3050 |
| 48 x 36 | 0.90 | 0.74 | 33.50 | 32.25 | 3900 |
| 48 x 42 | 0.90 | 0.82 | 33.50 | 33.50 | 4100 |
| 48 x 48 | 0.90 | 0.90 | 33.50 | 33.50 | 4250 |
| 54 x 20 54 x 24 54 x 30 54 x 54 60 x 30 64 x 64 | { Dimensions Available On Request... } | | | | |



MJ x MJ TAPPED TEES / CROSSES (2" TAP)

| NOM. SIZE | T | L | MAX TAP | WT (LBS.) |
|-----------|------|------|---------|-----------|
| 3 | 0.33 | 6.00 | 2 1/2 | 18 |
| 4 | 0.34 | 6.00 | 3 | 25 |
| 6 | 0.36 | 6.00 | 3 | 42 |
| 8 | 0.38 | 6.00 | 3 | 55 |
| 10 | 0.40 | 6.00 | 3 | 70 |
| 12 | 0.42 | 6.00 | 3 | 85 |
| 16 | 0.50 | 6.00 | 3 | 164 |
| 24 | 0.61 | 8.00 | 3 | 325 |

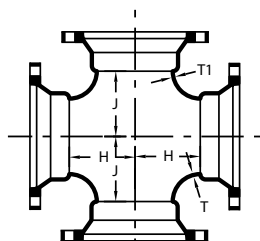
Threads in Accordance with ANSI/ASME B1.20.1





Compact MJ Fittings

ANSI/AWWA C153/A21.53



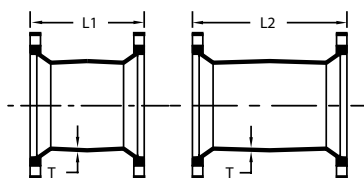
MJ CROSSES

| NOM. SIZE | T | T1 | H | J | WT (LBS.) |
|-----------|------|------|-------|-------|-----------|
| 3 x 3 | 0.33 | 0.33 | 3.00 | 3.00 | 35 |
| 4 x 3 | 0.34 | 0.33 | 3.50 | 4.00 | 38 |
| 4 x 4 | 0.34 | 0.34 | 4.00 | 4.00 | 40 |
| 6 x 4 | 0.36 | 0.34 | 4.00 | 5.00 | 57 |
| 6 x 6 | 0.36 | 0.36 | 5.00 | 5.00 | 80 |
| 8 x 4 | 0.38 | 0.34 | 4.00 | 6.00 | 68 |
| 8 x 6 | 0.38 | 0.36 | 5.00 | 6.00 | 74 |
| 8 x 8 | 0.38 | 0.38 | 6.00 | 6.00 | 105 |
| 10 x 4 | 0.40 | 0.34 | 4.00 | 7.00 | 112 |
| 10 x 6 | 0.40 | 0.36 | 5.00 | 7.00 | 119 |
| 10 x 8 | 0.40 | 0.38 | 6.50 | 7.00 | 124 |
| 10 x 10 | 0.40 | 0.40 | 7.00 | 7.00 | 145 |
| 12 x 4 | 0.42 | 0.34 | 4.00 | 8.50 | 119 |
| 12 x 6 | 0.42 | 0.36 | 5.00 | 8.50 | 126 |
| 12 x 8 | 0.42 | 0.38 | 6.00 | 8.50 | 149 |
| 12 x 10 | 0.42 | 0.40 | 7.50 | 8.50 | 179 |
| 12 x 12 | 0.42 | 0.42 | 8.50 | 8.50 | 200 |
| 14 x 6 | 0.47 | 0.36 | 6.50 | 10.50 | 200 |
| 14 x 8 | 0.47 | 0.38 | 7.50 | 10.50 | 228 |
| 14 x 10 | 0.47 | 0.40 | 8.50 | 10.50 | 255 |
| 14 x 12 | 0.47 | 0.42 | 9.50 | 10.50 | 269 |
| 14 x 14 | 0.47 | 0.47 | 10.50 | 10.50 | 335 |
| 16 x 6 | 0.50 | 0.36 | 6.50 | 11.50 | 240 |
| 16 x 8 | 0.50 | 0.38 | 7.50 | 11.50 | 260 |
| 16 x 10 | 0.50 | 0.40 | 8.50 | 11.50 | 317 |
| 16 x 12 | 0.50 | 0.42 | 9.50 | 11.50 | 320 |
| 16 x 16 | 0.50 | 0.50 | 11.50 | 11.50 | 385 |
| 18 x 12 | 0.54 | 0.42 | 9.50 | 12.50 | 348 |
| 18 x 18 | 0.54 | 0.54 | 12.50 | 12.50 | 478 |
| 20 x 8 | 0.57 | 0.38 | 8.00 | 14.00 | 379 |
| 20 x 12 | 0.57 | 0.42 | 10.00 | 14.00 | 413 |
| 20 x 18 | 0.57 | 0.54 | 13.00 | 14.00 | 554 |
| 20 x 20 | 0.57 | 0.57 | 14.00 | 14.00 | 590 |
| 24 x 6 | 0.61 | 0.36 | 7.00 | 16.00 | 481 |
| 24 x 8 | 0.61 | 0.38 | 8.00 | 16.00 | 500 |
| 24 x 12 | 0.61 | 0.42 | 10.00 | 16.00 | 529 |
| 24 x 16 | 0.61 | 0.50 | 12.00 | 16.00 | 576 |
| 24 x 18 | 0.61 | 0.54 | 13.00 | 16.00 | 868 |
| 24 x 20 | 0.61 | 0.57 | 14.00 | 16.00 | 757 |
| 24 x 24 | 0.61 | 0.61 | 16.00 | 16.00 | 881 |
| 30 x 12 | 0.66 | 0.42 | 10.00 | 20.00 | 882 |
| 30 x 24 | 0.66 | 0.61 | 16.00 | 20.00 | 1246 |
| 30 x 30 | 0.66 | 0.66 | 22.00 | 22.00 | 1691 |
| 36 x 24 | 0.74 | 0.61 | 16.00 | 23.50 | 1785 |

(Con't)➔

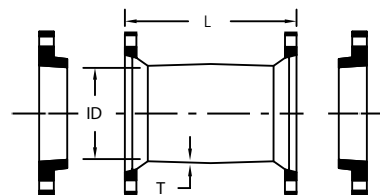
MJ CROSSES (Con't)

| NOM. SIZE | T | T1 | H | J | WT (LBS.) |
|-----------|------|------|-------|-------|-----------|
| 36 x 36 | 0.74 | 0.74 | 26.00 | 26.00 | 2811 |
| 42 x 24 | 0.82 | 0.61 | 20.00 | 27.50 | 2668 |
| 42 x 30 | 0.82 | 0.66 | 22.00 | 29.50 | 2950 |
| 42 x 36 | 0.82 | 0.74 | 30.00 | 30.00 | 3607 |
| 42 x 42 | 0.82 | 0.82 | 30.00 | 30.00 | 3725 |
| 48 x 24 | 0.90 | 0.61 | 23.00 | 32.00 | 3670 |
| 48 x 30 | 0.90 | 0.66 | 23.00 | 32.00 | 4505 |
| 48 x 36 | 0.90 | 0.74 | 33.50 | 32.25 | 4700 |
| 48 x 48 | 0.90 | 0.90 | 33.50 | 33.50 | 5827 |



MJ SLEEVES

| NOM. SIZE | T | SHORT SLEEVES | | LONG SLEEVES | |
|-----------|------|---------------|-----------|--------------|-----------|
| | | L1 | WT (LBS.) | L2 | WT (LBS.) |
| 2 | 0.30 | 7.50 | 8 | 12.00 | 13 |
| 3 | 0.33 | 7.50 | 12 | 12.00 | 17 |
| 4 | 0.34 | 7.50 | 15 | 12.00 | 22 |
| 6 | 0.36 | 7.50 | 23 | 12.00 | 29 |
| 8 | 0.38 | 7.50 | 31 | 12.00 | 45 |
| 10 | 0.40 | 7.50 | 45 | 12.00 | 61 |
| 12 | 0.42 | 7.50 | 57 | 12.00 | 79 |
| 14 | 0.47 | 9.50 | 94 | 15.00 | 128 |
| 16 | 0.50 | 9.50 | 118 | 15.00 | 159 |
| 18 | 0.54 | 9.00 | 145 | 15.00 | 200 |
| 20 | 0.57 | 9.00 | 173 | 15.00 | 236 |
| 24 | 0.61 | 9.00 | 226 | 15.00 | 306 |
| 30 | 0.66 | 15.00 | 472 | 24.00 | 634 |
| 36 | 0.74 | 15.00 | 673 | 24.00 | 889 |
| 42 | 0.82 | 15.00 | 887 | 24.00 | 1120 |
| 48 | 0.90 | 15.00 | 1067 | 24.00 | 1414 |



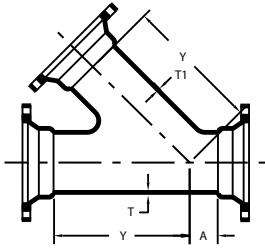
MJ DUAL PURPOSE SLEEVES W/ OVERSIZE GLANDS

| NOM. SIZE | PIPE SIZE | T | L | (I.D.) | WT (LBS.) |
|-----------|---------------|------|-------|--------|-----------|
| 4 | 4.80 - 5.00 | 0.34 | 12.00 | 5.10 | 20 |
| 6 | 6.90 - 7.10 | 0.36 | 12.00 | 7.20 | 36 |
| 8 | 9.05 - 9.30 | 0.38 | 12.00 | 9.40 | 46 |
| 10 | 11.10 - 11.40 | 0.40 | 12.00 | 11.50 | 62 |
| 12 | 13.20 - 13.50 | 0.42 | 12.00 | 13.60 | 76 |
| 16 | 17.40 - 17.80 | 0.50 | 15.00 | 17.94 | 172 |



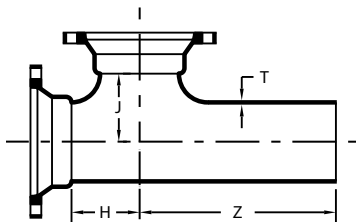
Compact MJ Fittings

ANSI/AWWA C153/A21.53



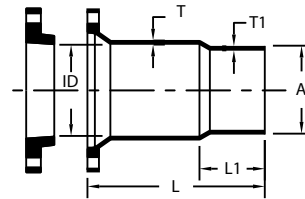
45° MJ LATERALS

| NOM. SIZE | T | T1 | A | Y | WT (LBS.) |
|-----------|------|------|------|-------|-----------|
| 3 x 3 | 0.33 | 0.33 | 2.50 | 8.50 | 36 |
| 4 x 3 | 0.34 | 0.33 | 2.50 | 8.50 | 40 |
| 4 x 4 | 0.34 | 0.34 | 2.50 | 8.50 | 41 |
| 6 x 4 | 0.36 | 0.34 | 1.50 | 11.00 | 53 |
| 6 x 6 | 0.36 | 0.36 | 3.00 | 12.50 | 85 |
| 8 x 4 | 0.38 | 0.34 | 0.50 | 13.00 | 73 |
| 8 x 6 | 0.38 | 0.36 | 2.00 | 14.50 | 90 |
| 8 x 8 | 0.38 | 0.38 | 3.50 | 16.00 | 102 |
| 10 x 4 | 0.40 | 0.34 | 0.00 | 15.00 | 150 |
| 10 x 6 | 0.40 | 0.36 | 1.00 | 16.00 | 158 |
| 10 x 8 | 0.40 | 0.38 | 2.50 | 17.00 | 172 |
| 10 x 10 | 0.40 | 0.40 | 3.50 | 19.00 | 210 |
| 12 x 4 | 0.42 | 0.34 | 0.00 | 16.50 | 150 |
| 12 x 6 | 0.42 | 0.36 | 1.50 | 18.50 | 186 |
| 12 x 8 | 0.42 | 0.38 | 1.50 | 18.50 | 188 |
| 12 x 10 | 0.42 | 0.40 | 3.00 | 20.00 | 250 |
| 12 x 12 | 0.42 | 0.42 | 4.50 | 22.50 | 272 |
| 14 x 6 | 0.47 | 0.36 | 0 | 19.50 | 245 |
| 14 x 8 | 0.47 | 0.38 | 1.50 | 21.00 | 279 |
| 14 x 10 | 0.47 | 0.40 | 3.00 | 22.50 | 316 |
| 14 x 14 | 0.47 | 0.47 | 6.00 | 25.00 | 474 |
| 16 x 6 | 0.50 | 0.36 | 0.00 | 21.00 | 300 |
| 16 x 8 | 0.50 | 0.38 | 0.50 | 22.50 | 349 |
| 16 x 10 | 0.50 | 0.40 | 2.00 | 24.00 | 370 |
| 16 x 12 | 0.50 | 0.42 | 3.50 | 25.00 | 453 |
| 16 x 14 | 0.50 | 0.47 | 5.00 | 26.50 | 500 |
| 16 x 16 | 0.50 | 0.50 | 6.50 | 28.00 | 575 |



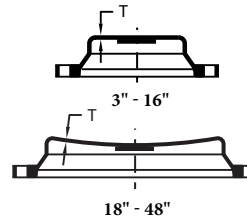
MJ x PE x MJ TEES

| NOM. SIZE | T | H | J | Z | WT (LBS.) |
|-----------|------|------|------|-------|-----------|
| 6 x 6 | 0.36 | 5.00 | 5.00 | 12.00 | 57 |
| 8 x 6 | 0.38 | 5.50 | 6.50 | 11.50 | 69 |
| 8 x 8 | 0.38 | 6.50 | 6.50 | 12.50 | 77 |
| 10 x 10 | 0.40 | 7.50 | 7.50 | 13.00 | 120 |

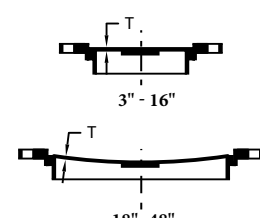


MJ x PE CUTTING IN SLEEVE W/ OVER SIZE GLAND

| NOM. SIZE | ID | T | T1 | A | L | L1 | WT (LBS.) |
|-----------|-------|------|------|-------|-------|------|-----------|
| 4 | 5.10 | 0.36 | 0.34 | 4.80 | 20.00 | 9.00 | 50 |
| 6 | 7.20 | 0.38 | 0.36 | 6.90 | 20.00 | 9.00 | 62 |
| 8 | 9.40 | 0.40 | 0.38 | 9.05 | 20.00 | 9.00 | 70 |
| 10 | 11.50 | 0.42 | 0.40 | 11.10 | 20.00 | 9.00 | 105 |
| 12 | 13.60 | 0.47 | 0.42 | 13.20 | 20.00 | 9.00 | 128 |
| 16 | 17.94 | 0.54 | 0.50 | 17.40 | 20.00 | 9.00 | 275 |



CAP



PLUG

MJ CAPS & PLUGS (SOLID OR TAPPED)

| NOM. SIZE | T | MAX. TAP | WT (LBS.) | |
|-----------|------|----------|-----------|------|
| | | | PLUGS | CAPS |
| 3 | 0.48 | 2 | 9 | 8 |
| 4 | 0.34 | 2 | 12 | 9 |
| 6 | 0.42 | 2 | 21 | 15 |
| 8 | 0.44 | 2 | 32 | 22 |
| 10 | 0.46 | 2 | 40 | 32 |
| 12 | 0.48 | 2 | 54 | 42 |
| 14 | 0.55 | 2 ½ | 77 | 86 |
| 16 | 0.56 | 2 ½ | 101 | 79 |
| 18 | 0.54 | 2 ½ | 136 | 120 |
| 20 | 0.57 | 2 ½ | 161 | 140 |
| 24 | 0.61 | 3 | 236 | 199 |
| 30 | 0.70 | 4 | 388 | 357 |
| 36 | 1.03 | 4 | 691 | 633 |
| 42 | 1.13 | 4 | 969 | 893 |
| 48 | 1.13 | 4 | 1296 | 1114 |

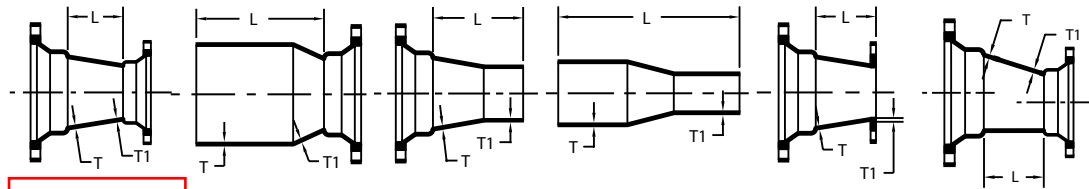
Threads in Accordance with ANSI/ASME B1.20.1





Compact MJ Fittings

ANSI/AWWA C153/A21.53



| REDUCERS | | | MJ x MJ | | SEB | | LEB | | PE x PE | | MJ x FE | | ECCENTRIC | |
|-----------|------|------|---------|-----------|-------|-----------|-------|-----------|---------|-----------|---------|-----------|-----------|-----------|
| NOM. SIZE | T | T1 | L | WT (LBS.) | L | WT (LBS.) | L | WT (LBS.) | L | WT (LBS.) | L | WT (LBS.) | L | WT (LBS.) |
| 4 x 3 | 0.34 | 0.33 | 3.00 | 16 | 8.50 | 17 | 8.50 | 16 | 14.00 | 14 | 5.00 | 19.00 | --- | --- |
| 6 x 3 | 0.36 | 0.33 | 5.00 | 22 | 10.62 | 24 | 10.50 | 19 | 16.00 | 19 | --- | --- | --- | --- |
| 6 x 4 | 0.36 | 0.34 | 4.00 | 24 | 9.50 | 23 | 9.50 | 23 | 15.00 | 22 | 5.00 | 30.00 | --- | --- |
| 8 x 4 | 0.38 | 0.34 | 5.00 | 32 | 10.50 | 30 | 10.50 | 34 | 16.00 | 30 | --- | --- | --- | --- |
| 8 x 6 | 0.38 | 0.36 | 4.00 | 36 | 9.50 | 35 | 9.50 | 32 | 15.00 | 33 | 6.00 | 41.00 | --- | --- |
| 10 x 4 | 0.40 | 0.34 | 7.00 | 46 | 12.50 | 44 | 12.50 | 43 | --- | --- | --- | --- | --- | --- |
| 10 x 6 | 0.40 | 0.36 | 5.00 | 47 | 10.50 | 46 | 10.50 | 46 | 16.00 | 46 | --- | --- | --- | --- |
| 10 x 8 | 0.40 | 0.38 | 4.00 | 50 | 9.50 | 49 | 9.50 | 50 | 15.00 | 47 | --- | --- | 4.00 | 50 |
| 12 x 4 | 0.42 | 0.34 | 9.00 | 58 | 14.50 | 60 | 14.50 | 57 | 20.00 | 58 | --- | --- | --- | --- |
| 12 x 6 | 0.42 | 0.36 | 7.00 | 60 | 12.50 | 53 | 12.50 | 57 | 18.00 | 57 | --- | --- | --- | --- |
| 12 x 8 | 0.42 | 0.38 | 5.00 | 60 | 10.50 | 61 | 10.50 | 59 | 16.00 | 54 | 7.00 | 82 | --- | --- |
| 12 x 10 | 0.42 | 0.40 | 4.00 | 64 | 9.50 | 53 | 9.50 | 58 | 15.00 | 54 | 7.00 | 85 | --- | --- |
| 14 x 6 | 0.47 | 0.36 | 9.00 | 110 | 16.90 | 100 | 14.50 | 105 | --- | --- | --- | --- | --- | --- |
| 14 x 8 | 0.47 | 0.38 | 7.00 | 122 | 14.90 | 99 | 12.40 | 98 | --- | --- | --- | --- | --- | --- |
| 14 x 10 | 0.47 | 0.40 | 5.00 | 120 | 12.90 | 96 | 10.40 | 92 | --- | --- | 8.00 | 112 | --- | --- |
| 14 x 12 | 0.47 | 0.42 | 4.00 | 132 | 11.90 | 90 | 9.40 | 92 | 17.30 | 88 | --- | --- | --- | --- |
| 16 x 6 | 0.50 | 0.36 | 11.00 | 148 | 21.00 | 125 | 16.50 | 144 | 24.30 | 93 | --- | --- | --- | --- |
| 16 x 8 | 0.50 | 0.38 | 9.00 | 155 | 18.00 | 124 | 14.50 | 136 | 22.30 | 119 | --- | --- | --- | --- |
| 16 x 10 | 0.50 | 0.40 | 7.00 | 160 | 15.00 | 124 | 12.50 | 125 | 20.50 | 119 | --- | --- | --- | --- |
| 16 x 12 | 0.50 | 0.42 | 5.00 | 161 | 12.90 | 122 | 10.50 | 116 | 18.30 | 99 | --- | --- | 5.00 | 115 |
| 16 x 14 | 0.50 | 0.47 | 4.00 | 131 | 12.00 | 133 | 12.00 | 135 | 19.70 | 129 | --- | --- | --- | --- |
| 18 x 8 | 0.54 | 0.38 | 13.00 | 201 | 20.00 | 170 | 19.50 | 195 | --- | --- | 16.00 | 190 | --- | --- |
| 18 x 10 | 0.54 | 0.40 | 10.00 | 196 | 18.00 | 165 | 17.40 | 185 | 25.50 | 160 | --- | --- | --- | --- |
| 18 x 12 | 0.54 | 0.42 | 7.00 | 180 | 15.50 | 150 | 14.00 | 150 | 19.50 | 150 | 12.00 | 198 | --- | --- |
| 18 x 14 | 0.54 | 0.47 | 6.00 | 200 | 15.00 | 175 | 15.00 | 200 | --- | --- | --- | --- | --- | --- |
| 18 x 16 | 0.54 | 0.50 | 5.00 | 196 | 12.50 | 170 | 12.50 | 192 | --- | --- | --- | --- | --- | --- |
| 20 x 8 | 0.57 | 0.38 | 16.00 | 227 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 20 x 10 | 0.57 | 0.40 | 16.00 | 220 | 22.12 | 200 | 19.00 | 210 | --- | --- | --- | --- | --- | --- |
| 20 x 12 | 0.57 | 0.42 | 12.00 | 227 | 17.50 | 170 | 16.00 | 205 | --- | --- | --- | --- | --- | --- |
| 20 x 14 | 0.57 | 0.47 | 10.00 | 200 | 18.00 | 190 | 17.90 | 205 | --- | --- | --- | --- | --- | --- |
| 20 x 16 | 0.57 | 0.50 | 7.00 | 231 | 13.50 | 185 | 13.50 | 200 | --- | --- | --- | --- | --- | --- |
| 20 x 18 | 0.57 | 0.54 | 4.00 | 225 | 12.00 | 200 | 12.00 | 215 | --- | --- | --- | --- | 8.00 | 235 |
| 24 x 8 | 0.61 | 0.38 | 20.00 | 263 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 24 x 10 | 0.61 | 0.40 | 18.00 | 286 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 24 x 12 | 0.61 | 0.42 | 16.00 | 263 | 21.50 | 275 | 21.00 | 290 | --- | --- | 18.00 | 318 | --- | --- |
| 24 x 14 | 0.61 | 0.47 | 14.00 | 310 | 22.00 | 310 | 21.90 | 315 | --- | --- | --- | --- | --- | --- |
| 24 x 16 | 0.61 | 0.50 | 13.00 | 279 | 21.00 | 285 | 17.50 | 285 | --- | --- | --- | --- | 12.00 | 320 |
| 24 x 18 | 0.61 | 0.54 | 10.00 | 284 | 18.00 | 300 | 18.00 | 310 | --- | --- | --- | --- | --- | --- |
| 24 x 20 | 0.61 | 0.57 | 7.00 | 328 | 15.00 | 276 | 13.50 | 275 | --- | --- | --- | --- | 7.00 | 370 |
| 30 x 12 | 0.66 | 0.42 | 30.00 | 702 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 30 x 16 | 0.66 | 0.50 | 30.00 | 633 | 39.00 | 565 | 39.00 | 623 | 48.00 | 690 | --- | --- | --- | --- |
| 30 x 18 | 0.66 | 0.54 | 28.00 | 658 | 37.00 | 654 | 37.00 | 635 | --- | --- | --- | --- | 28.00 | 800 |
| 30 x 20 | 0.66 | 0.57 | 24.00 | 628 | 33.00 | 590 | 33.00 | 603 | --- | --- | --- | --- | 24.00 | 630 |
| 30 x 24 | 0.66 | 0.61 | 10.00 | 478 | 24.50 | 536 | 24.50 | 526 | --- | --- | --- | --- | 10.00 | 570 |

(Con't)➔



STAR® PIPE PRODUCTS

Nap-Gard®

7-2500

Fusion Bonded Epoxy

Revised: 6 March 2014

DESCRIPTION

Nap-Gard® Product No. 7-2500 is a thermosetting epoxy powder designed as a coating for underground and subsea pipeline service. In buried service, the coating is capable of withstanding continuous operating temperatures of 107°C (225°F). This product has been certified to meet the requirements of CSA Z245.20-10, NACE RP-0394-02 and NSF 61 for Potable Water Services.

For NSF 61 applications the maximum recommended film thickness is 14 mils.

This product is also recommended for use as a primer on multi-layer systems at a film thickness of 8-12 mils.



TYPICAL POWDER PROPERTIES

| | | | |
|--------------------------|---------------|-----------------------------------|-----------------------------|
| Color: | Reddish Brown | Theoretical Coverage: | 134 Ft ² /lb/mil |
| Specific Gravity: | 1.44 ± .05 | Typical Gel Time: | 22 ± 4 seconds |
| Cured Film | 1.35 ± .05 | CSA Z245.20-10 @ 205°C (401°F) | |
| Density: | 1440 ± 50 g/L | Shelf Life*: | 12 months |
| CSA Z245.20-10 | | @ 25°C (77°F) @ 50% RH | |

* Transportation: The material is stable during transportation at temperatures below 25°C (77°F) and 50% RH.

TYPICAL PROPERTIES OF APPLIED FILM†

| | | | |
|-----------------------------------|-------------------------------|--|--|
| Recommended Film Thickness | | Average Minimum | 350µm (14 mils) 300µm (12 mils) |
| TEST / REQUIREMENT | METHOD | CRITERIA | RESULT |
| Impact Resistance | ASTM G14-72 CSA Z245.20-10 | 1/8"X5"X8" Steel Panels @25°C (77°F) @-30°C (-22°F) | 160 in.lbs |
| Bending | CSA Z245.20-10 API-RP-5L7 | 3.0°/PD @-30° (-22°F) | Pass Pass |
| Elongation | Modified ASTM G10-72 | @23°C (73°F) | 10.96% |
| Hardness | ASTM D2583 ASTM D2240-74 | Barcol Shore D | 61 Average 90 Average |
| Hot Water Resistance | CSA Z245.20-10 | 75°C, 24 hours | Rating 1-2, Pass |
| Cathodic Disbondment | CSA Z245.20-10, | 24 hours., 3.5 V _{dc} , 65°C 28 days, 1.5 V _{dc} , 23°C Strained C.D | 2-4 mm radius Pass 3-5 mm radius Pass Pass |
| Thermal Conductivity | ASTM C177 | | 0.19±0.02 BTU/hr./ft ² /ft./°F |



| | | | |
|----------------------------------|--|---|---------------|
| Chemical Resistance Test* | 90 Day Immersion per CSA Z245.20-98 | HCl in H ₂ O** | No Blistering |
| | | 10% NaCl, H ₂ SO ₄ in H ₂ O ** | No Blistering |
| | | 10% NaCl in H ₂ O ** | No Blistering |
| | | Distilled Water | No Blistering |
| | | 5% NaOH in H ₂ O ** | No Blistering |
| | | MgCO ₃ /CaCO ₃ in H ₂ O ** | No Blistering |

** Distilled Water

* For additional information refer to Nap-Gard® Products Catalog Chemical Resistance Chart.

† Performance depends on film thickness. Consult Nap-Gard® Specialist for specific recommendations.

TYPICAL ELECTRICAL PROPERTIES OF FILM

| | | | |
|--|-------------------------------------|--|--------------------------------|
| Dielectric Strength ASTM D149-97 | 1500 volts/mil @ 250µm (10 mils) | Breakdown Voltage ASTM D149-97 | volts @ 450µm (18 mils) 20K |
| Dielectric Constant ASTM D150 | 2.15 @ 1 MHz | Volume Resistivity ASTM D257 | 3.3 X 10 ¹⁵ ohm-cm. |

GENERAL APPLICATION PARAMETERS

- Grit blast to NACE Near-White specifications (Swedish Standard #Sa2½) and profile between 50µm (2 mils) and 112µm (4.5 mils).
- Use phosphoric acid/deionized water rinse if water soluble salt contamination is suspected.
- Preheat pipe to approximately 232°C (450°F) to 246°C (475°F)
- Apply Nap-Gard® 7-2500 powder to meet customer thickness specifications.
- Follow recommended cure schedule (see below).
- Cure should be verified by DSC or other methods.
- Electrically inspect for holidays. Repair with Nap-Gard® 7-1631 or 7-1861, NSF approved SP-7888
- If girth welds are being coated, refer to Axalta's "Nap-Gard® Field Girth Weld Application Procedure".

CURE† SCHEDULE GUIDELINES

The cure schedule for Nap-Gard® Product No. 7-2500 shows the minimum time at temperature required to achieve the typical performance properties of the coating. Because pipe cooling rates vary so widely with pipe wall thickness, no allowance has been made for heat loss from the pipe but this can be easily measured on the coating line and allowance made. Recommended powder application temperature range is listed below for single/dual layer FBE and post heating is not a normal requirement. The minimum post application curing temperature (as measured on the coated pipe) and the time to quench may conform to the following cure schedule.

| 7-2500 | |
|-------------------------|---------------------|
| Application Temperature | Min Time to Quench† |
| 232°C (450°F) | 90 seconds |
| 239°C (463°F) | 60 seconds |
| 246°C (475°F) | 60 seconds |

† Cure is by residual heat in the pipe, therefore very light wall pipe may require additional post heat to complete cure.

‡ Recommended time to quench is based on the assumption that the listed temperature is maintained without any cool down rate. Time to quench will vary with application parameters and pipe sizes. Therefore, the above information shall be used only as a guideline by the applicator to develop proper time to quench. Cure should be verified by DSC or other methods. For three layer, the optimum time for adhesive application is between 30-70% cure of the FBE. This has to be developed by the applicator based on the plant layout.

Always consult product Material Safety Data (MSDS) prior to handling.

WARRANTY POLICY: Axalta Powder Coating Systems USA, Inc. ("Seller") certifies that all coatings delivered to Customer in unopened factory filled containers meet all pertinent quality standards presented in Seller's current published literature. Since matters of surface preparation, application procedures, curing procedures and other local factors that affect coating performance are beyond Seller's control; Seller assumes no liability for coating failure other than to supply replacement material for coating material proven to be defective. Customer will determine suitability of this product for its use and thereby assumes all risks and liabilities in connection therewith. Seller will not be liable for any injuries, damages or other losses derived, directly or indirectly, from or as a consequence of Customer's use of the product. **SELLER DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, RELATING TO ITS PRODUCTS AND THEIR APPLICATION, INCLUDING BUT NOT LIMITED TO WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSES.**