TYLER UNION®
Quality Waterworks Products

**23U - ANSI/AWWA C153/A21.53**
**Mechanical Joint Compact**
**Ductile Iron Fittings**
**Revised 4/2018**

☐ **DOMESTIC** ☐ **NON-DOMESTIC**

# SUBMITTAL: C153 MECHANICAL JOINT PRODUCT

(Current revisions for the noted Standards apply)

**SIZES:** 2" - 64" (2" not included in ANSI/AWWA C153 standard)

**STANDARDS:** ANSI/AWWA C153/A21.53, NFPA13/24, 3"-16" UL and 3"-10" FM listed & approved (File - Tyler Union)

**MATERIAL:** Cast of ASTM A536 qualified ductile iron. Date code is cast on and required for traceability.

**PRESSURE RATING:** *Flanged fittings rated at 250 psi. Mechanical joints 2" – 24" rated at 350 psi and 30" – 48" at 250 psi.
*Note: With rubber annular ring flange gasket, 2" – 24" Flanged fittings can be rated at 350 psi.
Note: Wyes over 12" are not pressure rated. Contact Tyler Union for rating in your application.

**DEFLECTION:** Joint deflection 5° max for 2"– 12" and 3° max for 14"– 48". Reduces by 50% at nominal pipe & fitting diameters

**NSF-61 & NSF372:** Meets all requirements including Annex G, Tyler Union's Underwriters Laboratory listing MH16439.

**ASPHALT COATING:** Per ANSI/AWWA C104/A21.4 and ANSI/AWWA C153/A21.53.

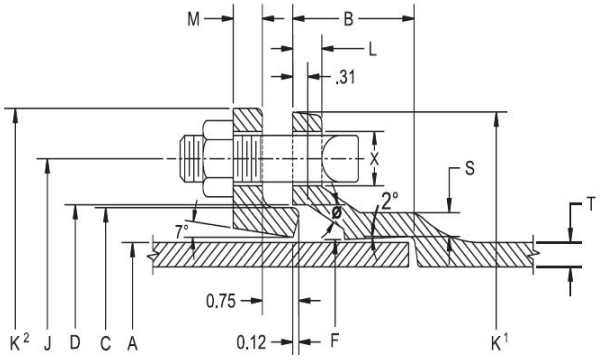
**CEMENT LINING:** Per ANSI/AWWA C104/A21.4, with double cement lining available upon request.

**EPOXY COATING:** Fusion bonded epoxy per ANSI/AWWA C116/A21.16. Additional coatings available upon request.

**BARE FITTINGS:** Available upon request.

**FASTNERS:** High strength low alloy weathering steel per ANSI/AWWA C111/A21.11 and ASTM A242

**INSTALLATION:** Install per AWWA C600/C651 using pipe conforming to ANSI/AWWA C151/A21.51 or AWWA C900/905.




| | NOMINAL JOINT DIMENSIONS IN INCHES | | | | | | | | | | | | | BOLTS | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Size Inches | A Dia. DI Pipe | B Hub Depth | C Dia. GLAND | D Dia. | F Dia. | J Dia. GLAND | K¹ Dia. | K² Dia. GLAND | L | M GLAND | S | T | X | Size | Qty. |
| **2** | 2.51 | 2.50 | 3.50 | 3.60 | 2.61 | 4.75 | 6.19 | 6.89 | 0.58 | 0.62 | 0.36 | 0.30 | 3/4 | 5/8x3 | 2 |
| **3** | 3.96 | 2.50 | 4.84 | 4.94 | 4.06 | 6.19 | 7.62 | 7.69 | 0.58 | 0.62 | 0.39 | 0.33 | 3/4 | 5/8x3 | 4 |
| **4** | 4.80 | 2.50 | 5.92 | 6.02 | 4.90 | 7.50 | 9.06 | 9.12 | 0.60 | 0.75 | 0.39 | 0.34 | 7/8 | 3/4x3-1/2 | 4 |
| **6** | 6.90 | 2.50 | 8.02 | 8.12 | 7.00 | 9.50 | 11.06 | 11.12 | 0.63 | 0.88 | 0.43 | 0.36 | 7/8 | 3/4x3-1/2 | 6 |
| **8** | 9.05 | 2.50 | 10.17 | 10.27 | 9.15 | 11.75 | 13.31 | 13.37 | 0.66 | 1.00 | 0.45 | 0.38 | 7/8 | 3/4x4 | 6 |
| **10** | 11.10 | 2.50 | 12.22 | 12.34 | 11.20 | 14.00 | 15.62 | 15.62 | 0.70 | 1.00 | 0.47 | 0.40 | 7/8 | 3/4x4 | 8 |
| **12** | 13.20 | 2.50 | 14.32 | 14.44 | 13.30 | 16.25 | 17.88 | 17.88 | 0.73 | 1.00 | 0.49 | 0.42 | 7/8 | 3/4x4 | 8 |
| **14** | 15.30 | 3.50 | 16.40 | 16.54 | 15.44 | 18.75 | 20.31 | 20.25 | 0.79 | 1.25 | 0.55 | 0.47 | 7/8 | 3/4x4-1/2 | 10 |
| **16** | 17.40 | 3.50 | 18.50 | 18.64 | 17.54 | 21.00 | 22.56 | 22.50 | 0.85 | 1.31 | 0.58 | 0.50 | 7/8 | 3/4x4-1/2 | 12 |
| **18** | 19.50 | 3.50 | 20.60 | 20.74 | 19.64 | 23.25 | 24.83 | 24.75 | 1.00 | 1.38 | 0.68 | 0.54 | 7/8 | 3/4x4-1/2 | 12 |
| **20** | 21.60 | 3.50 | 22.70 | 22.84 | 21.74 | 25.50 | 27.08 | 27.00 | 1.02 | 1.44 | 0.69 | 0.57 | 7/8 | 3/4x4-1/2 | 14 |
| **24** | 25.80 | 3.50 | 26.90 | 27.04 | 25.94 | 30.00 | 31.58 | 31.50 | 1.02 | 1.56 | 0.75 | 0.61 | 7/8 | 3/4x5 | 16 |
| **30** | 32.00 | 4.50 | 33.29 | 33.46 | 32.17 | 36.88 | 39.12 | 39.12 | 1.31 | 2.00 | 0.82 | 0.66 | 1-1/8 | 1x6 | 20 |
| **36** | 38.30 | 4.50 | 39.59 | 39.76 | 38.47 | 43.75 | 46.00 | 46.00 | 1.45 | 2.00 | 1.00 | 0.74 | 1-1/8 | 1x6 | 24 |
| **42** | 44.50 | 4.50 | 45.79 | 45.96 | 44.67 | 50.62 | 53.12 | 53.12 | 1.45 | 2.00 | 1.25 | 0.82 | 1-3/8 | 1-1/4x6-1/2 | 28 |
| **48** | 50.80 | 4.50 | 52.09 | 52.26 | 50.97 | 57.50 | 60.00 | 60.00 | 1.45 | 2.00 | 1.35 | 0.90 | 1-3/8 | 1-1/4x6-1/2 | 32 |
| **54** | Available on Request | | | | | | | | | | | | | | |
| **60** | Available on Request | | | | | | | | | | | | | | |
| **64** | Available on Request | | | | | | | | | | | | | | |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**Portland:** 15670 N. Lombard St. ● Portland, OR 97203
**Oxford:** 1800 Greenbrier Dear Road ●Anniston, AL 36207

☐ DOMESTIC ☐ NON-DOMESTIC

# SUBMITTAL: PROTECTIVE FUSION BONDED EPOXY (FBE)

(Current revisions for all noted Standards apply)

Tyler Union Waterworks standard applied coating thickness for protective fusion bonded epoxy (FBE) is 6 to 8 mil and our FBE is NSF61, NSF-372 and Annex G approved. Tyler Union Waterworks FBE water works fittings are coated internally and externally in accordance with the applicable requirements of ANSI/AWWA C116/A21.16. Section 4.3.2 of the ANSI/AWWA C116 standard provides that FBE mil thickness in the joint area shall not have a coating of less than 4 mil. Additionally, the standard advises it may be necessary to establish a limit for the maximum applied thickness in the joint areas.

Tyler Union Waterworks upon request at time of order placement, can provide FBE fittings with increased mil thickness. However, FBE thickness greater than 6 to 8 mil may interfere with the pipe to fitting fit and inhibit the sealing for a leakproof joint. For these reasons, Tyler Union Waterworks does not provide warranty for FBE lined and coated fittings with greater than 8 mil thickness in the joint area.

Tyler Union Waterworks FBE is tested and approved per Underwriters Laboratories UL262. Testing of FBE involves immersing coated parts in four aqueous solutions at 158°F and evaluate for blistering during 90 day continuous exposure period. The solutions are distilled water, 2% sodium chloride in distilled water, distilled water with a pH adjusted to 4.0 using potassium hydrogen phthalate, and distilled water with pH adjusted to 10.0 using sodium carbonate. Tyler Union Waterworks FBE is also tested for blister resistance when immersed in acid, alkali, alcohol, and hydrocarbons at room temperature over 90 days. Additional test data and recommended exposures for Tyler Union Waterworks FBE is as provided in Tables 1 thru 3.

The ANSI/AWWA C116/A21.16 standard describes the use of protective fusion bonded epoxy coatings as being utilized for the interior and exterior surfaces of ductile or gray iron fittings supplied for “water systems”. Section 1.1 of the standard specifically provides that the standard does not cover instances where coatings are agreed upon by purchaser and manufacturer for sewer or other special applications. Though not always recommended for use in **Sewer systems; FBE coated and lined fittings may be used in sewer applications conveying materials conforming to the properties as provided in Tables 2 and 3 on page 2.

**TABLE #1**

| TEST | METHOD | CONDITIONS | RESULT |
|---|---|---|---|
| **Abrasion Resistance** | ASTM D4060 | CS-17 wheels, 1000 cycles, 1 kg load | 32 mg loss |
| **Adhesion** | ASTM D3359 - Method A | X-cut and tape | 5A |
| **Adhesion** | ASTM D3359 - Method B | Crosshatch and tape | 5B |
| **Gloss, 60°** | ASTM D523 | N/A | 70-85 |
| **Humidity Resistance** | ASTM D2247 | 1000 hours at 100°F | No blisters or rusting |
| **Impact** | ASTM D2794 | N/A | Pass 40 inch-lbs. direct |
| **Pencil hardness** | ASTM D3363 | N/A | Pass 4H |
| **Salt Spray** | ASTM B117 | 1000 hours | No blisters or face rust, no scoreline creepage |
| **Water Resistance** | AWWA C550 | 90 days immersion at 70°C | Pass |
| **Weather Resistance** | ASTM G154 | UVA-340, cycle 4 hrs UV at 60°C, 4 hrs condensation at 50°C | Chalks after 200 hours exposure |

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# SUBMITTAL: PROTECTIVE FUSION BONDED EPOXY (FBE)

(Current revisions for noted Standards apply)

| TABLE #2 | |
|---|---|
| **Immersion Environments with the following chemicals (ambient temperature)** | |
| Aliphatic Hydrocarbons | Fresh water |
| Calcium Chloride (10% solution) | Fuel Oil |
| Calcium Hydroxide (10% solution) | Hexane |
| Calcium Sulfate (saturated solution) | Kerosine |
| Calcium Carbonate (saturated solution) | Motor oil |
| Distilled water | Magnesium Sulfate (saturated solution) |
| Gasoline (unleaded) | Potassium Acetate (saturated solution) |
| Diesel Fuel | Soap solutions |
| Sodium Chloride (5% solution) | Sodium Nitrate (10% solution) |
| Sodium Hydroxide (5% solution) | Trisodium Phosphate (5% solution) |

| TABLE #3 | |
|---|---|
| **Splash and Spillage Environments against the following chemicals** | |
| Aromatic Hydrocarbons | Butanol |
| Ethanol | Hydrochloric Acid (5% solution) |
| Isopropyl Alcohol | Methanol |
| Sulfuric Acid ( 5% solution) | Toluene |
| Xylene | |

*NOTE:

Due to the prescribed application methods of protective fusion bonded epoxy and the combination of varying fitting diameters, recesses, raised lettering, tapping bosses, and numerous radiused surfaces; the applied thickness of the FBE coating or lining may vary 1 to 2 mils over the coated surfaces of a fitting.

**NOTE:

Final determination of the suitability of this product for your application shall be determined by the end user .

Additional types of epoxy coatings are available upon request at time of order placement. Please contact a Tyler Union Waterworks Customer Service representative to discuss the additional coating and lining options that are available.

# SAMPLE SPECIFICATIONS

(Current ANSI/AWWA revisions apply)

Mechanical joint watermain fittings with accessories, 2" through 64" shall be manufactured from ductile iron in accordance with and meet all applicable terms and provisions of standards ANSI/AWWA C153/A21.53 and ANSI/AWWA C111/A21.11. Ductile iron mechanical joint fittings 2" through 24" shall be rated for 350 psi working pressure. Ductile iron 30" through 48" shall be rated for 250 psi working pressure. Flanged ductile iron fittings in 4" (610 mm) and smaller sizes may be rated for 350 psi (2,413 kPa) with the use of special (annular ring or comparable) gaskets. All coated and lined fittings meet requirements of NSF-61, NSF-372 and Annex G.

**NOTE: EXCEPTIONS:** Mechanical joint fittings with flanged branches are rated for water pressure of 250 psi.

**NOTE:** Wyes over 12" are not pressure rated. Contact manufacturer for rating in your application.

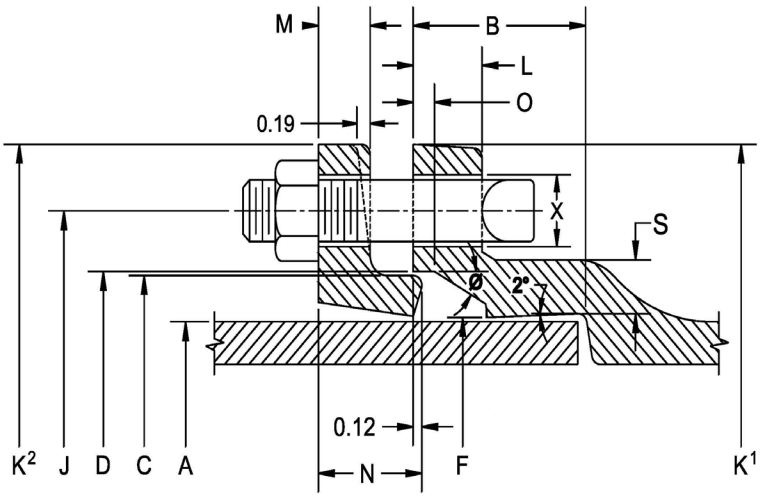
**NOTE:** Fittings are cement lined and seal coated in accordance with ANSI/AWWA C104/A21.4. Fittings are available double cement-lined, bare, or epoxy coated upon request. Epoxy coating per ANSI/AWWA C116.

**NOTE:** Installation per AWWA C600 and AWWA C651, current revision.

**Nominal Joint Dimensions in Inches**

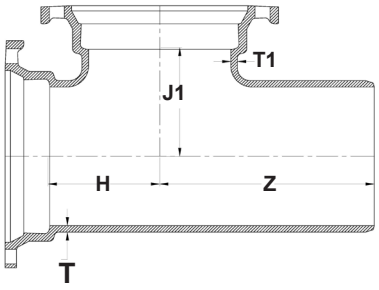
| Size | A | B | C | D | F | ø | X | J | K1 | K2 | L | M | O | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 2.51 | 2.50 | 3.50 | 3.60 | 2.61 | 28° | 3/4 | 4.75 | 6.19 | 6.89 | 0.58 | 0.62 | 0.31 | 0.36 |
| 3 | 3.96 | 2.50 | 4.84 | 4.94 | 4.06 | 28° | 3/4 | 6.19 | 7.62 | 7.69 | 0.58 | 0.62 | 0.31 | 0.39 |
| 4 | 4.80 | 2.50 | 5.92 | 6.02 | 4.90 | 28° | 7/8 | 7.50 | 9.06 | 9.12 | 0.60 | 0.75 | 0.31 | 0.39 |
| 6 | 6.90 | 2.50 | 8.02 | 8.12 | 7.00 | 28° | 7/8 | 9.50 | 11.06 | 11.12 | 0.63 | 0.88 | 0.31 | 0.43 |
| 8 | 9.05 | 2.50 | 10.17 | 10.27 | 9.15 | 28° | 7/8 | 11.75 | 13.31 | 13.37 | 0.66 | 1.00 | 0.31 | 0.45 |
| 10 | 11.10 | 2.50 | 12.22 | 12.34 | 11.20 | 28° | 7/8 | 14.00 | 15.62 | 15.62 | 0.70 | 1.00 | 0.31 | 0.47 |
| 12 | 13.20 | 2.50 | 14.32 | 14.44 | 13.30 | 28° | 7/8 | 16.25 | 17.88 | 17.88 | 0.73 | 1.00 | 0.31 | 0.49 |
| 14 | 15.30 | 3.50 | 16.40 | 16.54 | 15.44 | 28° | 7/8 | 18.75 | 20.25 | 20.25 | 0.79 | 1.25 | 0.31 | 0.55 |
| 16 | 17.40 | 3.50 | 18.50 | 18.64 | 17.54 | 28° | 7/8 | 21.00 | 22.50 | 22.50 | 0.85 | 1.31 | 0.31 | 0.58 |
| 18 | 19.50 | 3.50 | 20.60 | 20.74 | 19.64 | 28° | 7/8 | 23.25 | 24.75 | 24.75 | 1.00 | 1.38 | 0.31 | 0.68 |
| 20 | 21.60 | 3.50 | 22.70 | 22.84 | 21.74 | 28° | 7/8 | 25.50 | 27.00 | 27.00 | 1.02 | 1.44 | 0.31 | 0.69 |
| 24 | 25.80 | 3.50 | 26.90 | 27.04 | 25.94 | 28° | 7/8 | 30.00 | 31.50 | 31.50 | 1.02 | 1.56 | 0.31 | 0.75 |
| 30 | 32.00 | 4.00 | 33.29 | 33.46 | 32.17 | 20° | 1 1/8 | 36.88 | 39.12 | 39.12 | 1.31 | 2.00 | 0.38 | 0.82 |
| 36 | 38.30 | 4.00 | 39.59 | 39.76 | 38.47 | 20° | 1 1/8 | 43.75 | 46.00 | 46.00 | 1.45 | 2.00 | 0.38 | 1.00 |
| 42 | 44.50 | 4.00 | 45.79 | 45.96 | 44.67 | 20° | 1 3/8 | 50.62 | 53.12 | 53.12 | 1.45 | 2.00 | 0.38 | 1.35 |
| 48 | 50.80 | 4.00 | 52.09 | 52.26 | 50.97 | 20° | 1 3/8 | 57.50 | 60.00 | 60.00 | 1.45 | 2.00 | 0.38 | 1.35 |
| 54 | 57.56 | 4.00 | 58.82 | 59.02 | 57.73 | 20° | 1 3/8 | 63.20 | 65.70 | 65.70 | 1.55 | 2.00 | 0.38 | 1.45 |
| 60 | 61.61 | 4.00 | 62.87 | 63.07 | 61.78 | 20° | 1 3/8 | 67.72 | 70.22 | 70.22 | 1.75 | 2.00 | 0.38 | 1.50 |
| 64 | 65.67 | 4.00 | 66.96 | 67.13 | 65.84 | 20° | 1 3/8 | 71.86 | 74.36 | 74.36 | 1.75 | 2.00 | 0.38 | 1.50 |

**NOTE:** For projects where product weights, specifications or dimensions are critical, advise upon order placement



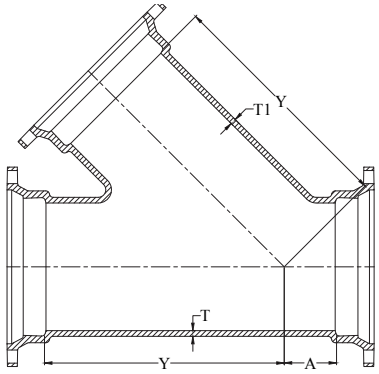

ANSI/AWWA
C153 Mechanical Joint Fittings

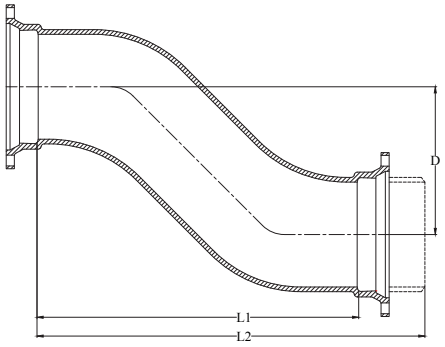
## C153 DUCTILE IRON COMPACT FITTINGS




| MJxPExMJ TEES | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Domestic | | | | | | | Import | | | | | |
| Size | T | T1 | *H | *J1 | *Z | Weight | T | T1 | *H | *J1 | *Z | Weight |
| 6 | 0.37 | 0.37 | 5.00 | 5.00 | 11.50 | 57 | 0.37 | 0.37 | 8.00 | 8.00 | 16.00 | 57 |
| 8x6 | 0.39 | 0.37 | 5.50 | 6.50 | 11.50 | 79 | 0.39 | 0.37 | 9.00 | 9.00 | 17.00 | 79 |
| 8 | 0.39 | 0.39 | 6.50 | 6.50 | 12.50 | 81 | 0.38 | 0.38 | 9.00 | 9.00 | 17.00 | 77 |
| 10 | 0.41 | 0.41 | 7.50 | 7.50 | 13.00 | 133 | 0.40 | 0.40 | 11.00 | 11.00 | 19.00 | 120 |

**Tyler Union does not recommend the use of wedge action restraints on plain end fittings**




| WYES/LATERAL | | | | | |
|---|---|---|---|---|---|
| Size | *A | *Y | T | T1 | Weights |
| 3 | 2.50 | 7.50 | 0.34 | 0.34 | 36 |
| 4x3 | 2.00 | 8.50 | 0.35 | 0.34 | 39 |
| 4 | 2.50 | 8.50 | 0.35 | 0.35 | 45 |
| 6x4 | 1.50 | 11.00 | 0.37 | 0.35 | 67 |
| 6 | 3.00 | 13.00 | 0.37 | 0.37 | 85 |
| 8x4 | 0.50 | 13.00 | 0.39 | 0.35 | 86 |
| 8x6 | 2.00 | 16.00 | 0.39 | 0.37 | 109 |
| 8 | 3.50 | 16.00 | 0.39 | 0.39 | 117 |
| 10x4 | 0.00 | 15.00 | 0.41 | 0.35 | 112 |
| 10x6 | 1.00 | 16.00 | 0.41 | 0.37 | 129 |
| 10x8 | 2.50 | 17.00 | 0.41 | 0.39 | 162 |
| 10 | 3.50 | 19.00 | 0.41 | 0.41 | 199 |
| 12x4 | 0.00 | 16.50 | 0.43 | 0.35 | 141 |
| 12x6 | 1.50 | 18.50 | 0.43 | 0.37 | 170 |
| 12x8 | 1.50 | 18.50 | 0.43 | 0.39 | 177 |
| 12x10 | 3.00 | 20.00 | 0.43 | 0.41 | 216 |
| 12 | 4.50 | 22.50 | 0.43 | 0.43 | 269 |
| 14 | 6.00 | 25.00 | 0.51 | 0.51 | 476 |
| 16x6 | 0.00 | 21.00 | 0.52 | 0.45 | 300 |
| 16x8 | 0.50 | 22.50 | 0.52 | 0.46 | 349 |
| 16x12 | 3.50 | 25.00 | 0.52 | 0.48 | 471 |
| 16 | 6.50 | 28.00 | 0.52 | 0.52 | 635 |

*Not in AWWA C153. "A" & "Y" are approximate dim.

| OFFSETS (MJ x MJ) or (MJxPE) | | | | | |
|---|---|---|---|---|---|
| Import | | | | Weights | |
| Size | D | L1 | L2 | MJ x MJ | MJ x PE |
| 3 | 6.00 | 9.00 | 14.50 | 23 | 29 |
| 3 | 12.00 | 15.00 | 20.50 | 34 | 39 |
| 3 | 18.00 | 21.00 | 26.50 | 40 | 48 |
| 3 | 24.00 | 27.00 | 32.50 | 47 | 53 |
| 4 | 6.00 | 10.00 | 15.50 | 32 | 44 |
| 4 | 12.00 | 6.00 | 21.50 | 42 | 54 |
| 4 | 18.00 | 22.00 | 27.50 | 56 | 65 |
| 4 | 24.00 | 28.00 | 33.50 | 65 | 72 |
| 6 | 6.00 | 12.00 | 17.50 | 55 | 54 |
| 6 | 12.00 | 18.00 | 23.50 | 72 | 68 |
| 6 | 18.00 | 24.00 | 29.50 | 88 | 96 |
| 6 | 24.00 | 30.00 | 35.50 | 111 | 117 |
| 8 | 6.00 | 13.00 | 18.50 | 79 | 78 |
| 8 | 12.00 | 19.00 | 24.50 | 103 | 110 |
| 8 | 18.00 | 25.00 | 30.50 | 128 | 124 |
| 10 | 6.00 | 15.00 | 20.50 | 112 | 130 |
| 10 | 12.00 | 21.00 | 26.50 | 148 | 172 |
| 10 | 18.00 | 27.00 | 32.50 | 176 | 189 |
| 12 | 6.00 | 17.00 | 22.50 | 157 | – |
| 12 | 12.00 | 23.00 | 28.50 | 174 | 198 |
| 12 | 18.00 | 29.00 | 34.50 | 210 | 270 |
| 12 | 24.00 | 35.00 | 40.50 | 298 | 334 |
| 12 | 30.00 | 41.00 | 46.50 | 283 | 205 |