

# DEEPWATER

## I-ROD® STRIPS

### General

Half-round I-Rod is available in 5ft (1.5 m) or 10 ft (3 m) lengths or pre-cut-and-drilled for any standard pipe U-bolt. I-Rod is a durable extruded thermoplastic cut into a half-round shape. It is the key component in all of Deepwater's I-Rod brand pipe supports.

There are three different diameter sizes for I-Rod: (0.75 in, 1 in, and 1.5 in) as well as a high-temperature version (I-Rod HT) and PEEK (unfilled) for harsher conditions. I-Rod HT and PEEK have the same dimensions as standard I-Rod, but different specifications.

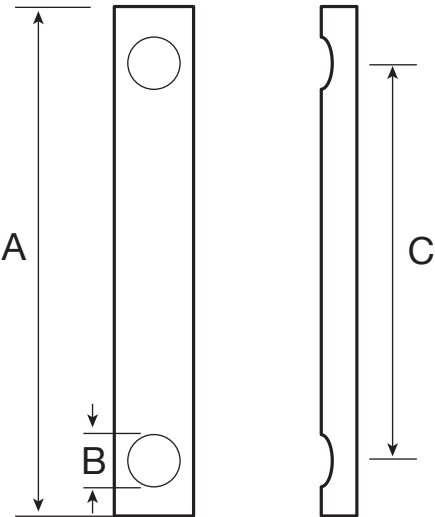
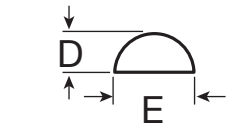


### I-Rod, I-Rod HT, and PEEK specifications

I-Rod thermoplastic is standard for most Nu-Bolt assemblies. In extreme conditions, I-Rod HT or Peek can be substituted.

| Property                     | I-Rod<br>Metric [Imperial]     | I-Rod HT<br>Metric [Imperial]  | PEEK unfilled<br>Metric [Imperial] |
|------------------------------|--------------------------------|--------------------------------|------------------------------------|
| Density (23°C)               | 1.41 g/cm³<br>[0.0509 lb/in³]  | 1.28 g/cm³<br>[0.0462 lb/in³]  | 1.31 g/cm³<br>[0.047 lb/in³]       |
| Tensile strength             | 64.8 MPa [9.4 ksi]             | 114 MPa [16.5 ksi]             | 110 MPa [16 ksi]                   |
| Tensile modulus              | 2.62 GPa [380 ksi]             | 3.45 GPa [500 ksi]             | 3.44 GPa [500 ksi]                 |
| Elongation @ break           | 30-60%                         | 30-60%                         | 20%                                |
| Flexural modulus             | 2.76 GPa [400 ksi]             | 3.45 GPa [500 ksi]             | 4.13 GPa [600 ksi]                 |
| Flexural strength            | 82.7 MPa [13 ksi]              | 138 MPa [20 ksi]               | 172 MPa [25 ksi]                   |
| Comp. strength               | 103 MPa [15 ksi]               | 152 MPa [22 ksi]               | 127 MPa [20 ksi]                   |
| Coefficient of friction      | 0.25                           | 0.42                           | -                                  |
| IZOD impact                  | 0.534 J/cm [1 ft-lb/in]        | 0.267 J/cm [0.5 ft-lb/in]      | 0.534 J/cm [1 ft-lb/in]            |
| Rock. hardness M/R           | 88/120                         | 112/125                        | 100/126                            |
| Min. service temp*           | -110°C [-166°F]                | -                              | -                                  |
| Max. service temp            | 83°C [181°F]                   | 171°C [340°F]                  | 249°C [480°F]                      |
| Melting point                | 168°C [329°F]                  | 210°C [410°F]                  | 340°C [644°F]                      |
| Coefficient of linear expan. | 97.2 µm/m/°C<br>[54 µin/in/°F] | 55.8 µm/m/°C<br>[31 µin/in/°F] | -                                  |
| Heat deflection              | 104°C [220°F]                  | 204°C [400°F]                  | 160°C [320°F]                      |
| Flammability rating          | HB                             | V/0                            | V/0                                |
| Dielectric strength          | 16.5 kV/mm                     | 32.7 kV/mm                     | 18.9 kV/mm                         |

### Cut and drilled I-Rod / I-Rod UV+ / I-Rod HT / PEEK dimensions



| Nominal<br>pipe size<br>mm [in] | U-Bolt<br>stock Ø<br>mm [in] | (A)<br>I-Rod<br>length<br>mm [in] | (B)<br>Hole Ø<br>diameter<br>mm [in] | (C)<br>Holes<br>C-to C<br>mm [in] | (D)<br>I-Rod<br>height<br>mm [in] | (E)<br>I-Rod<br>width<br>mm [in] |
|---------------------------------|------------------------------|-----------------------------------|--------------------------------------|-----------------------------------|-----------------------------------|----------------------------------|
| 15 [1/2]                        | 6 [1/4]                      | 64 [2 1/2]                        | 10 [3/8]                             | 31 [1 3/16]                       | 8 [5/16]                          | 19 [3/4]                         |
| 20 [3/4]                        | 6 [1/4]                      | 76 [3]                            | 10 [3/8]                             | 35 [1 3/8]                        | 8 [5/16]                          | 19 [3/4]                         |
| 25 [1]                          | 6 [1/4]                      | 76 [3]                            | 10 [3/8]                             | 41 [1 5/8]                        | 8 [5/16]                          | 19 [3/4]                         |
| 25 [1]                          | 10 [3/8]                     | 76 [3]                            | 13 [1/2]                             | 44 [1 3/4]                        | 11 [7/16]                         | 25 [1]                           |
| 32 [1 1/4]                      | 10 [3/8]                     | 89 [3 1/2]                        | 13 [1/2]                             | 54 [2 1/8]                        | 11 [7/16]                         | 25 [1]                           |
| 40 [1 1/2]                      | 10 [3/8]                     | 102 [4]                           | 13 [1/2]                             | 60 [2 3/8]                        | 11 [7/16]                         | 25 [1]                           |
| 50 [2]                          | 10 [3/8]                     | 114 [4 1/2]                       | 13 [1/2]                             | 71 [2 13/16]                      | 11 [7/16]                         | 25 [1]                           |
| 65 [2 1/2]                      | 13 [1/2]                     | 127 [5]                           | 16 [5/8]                             | 87 [3 7/16]                       | 11 [7/16]                         | 25 [1]                           |
| 80 [3]                          | 13 [1/2]                     | 152 [6]                           | 16 [5/8]                             | 103 [4 1/16]                      | 11 [7/16]                         | 25 [1]                           |
| 100 [4]                         | 13 [1/2]                     | 178 [7]                           | 16 [5/8]                             | 129 [5 1/16]                      | 11 [7/16]                         | 25 [1]                           |
| 120 [5]                         | 13 [1/2]                     | 203 [8]                           | 16 [5/8]                             | 156 [6 1/8]                       | 11 [7/16]                         | 25 [1]                           |
| 150 [6]                         | 16 [5/8]                     | 229 [9]                           | 18 [11/16]                           | 187 [7 3/8]                       | 11 [7/16]                         | 25 [1]                           |
| 200 [8]                         | 16 [5/8]                     | 279 [11]                          | 18 [11/16]                           | 238 [9 3/8]                       | 11 [7/16]                         | 25 [1]                           |
| 250 [10]                        | 19 [3/4]                     | 343 [13 1/2]                      | 22 [7/8]                             | 295 [11 5/8]                      | 18 [11/16]                        | 38 [1 1/2]                       |
| 300 [12]                        | 22 [7/8]                     | 406 [16]                          | 25 [1]                               | 349 [13 3/4]                      | 18 [11/16]                        | 38 [1 1/2]                       |
| 350 [14]                        | 22 [7/8]                     | 432 [17]                          | 25 [1]                               | 381 [15]                          | 18 [11/16]                        | 38 [1 1/2]                       |
| 400 [16]                        | 22 [7/8]                     | 483 [19]                          | 25 [1]                               | 432 [17]                          | 18 [11/16]                        | 38 [1 1/2]                       |
| 450 [18]                        | 25 [1]                       | 546 [21 1/2]                      | 28 [1 1/8]                           | 486 [19 1/8]                      | 18 [11/16]                        | 38 [1 1/2]                       |
| 500 [20]                        | 25 [1]                       | 597 [23 1/2]                      | 28 [1 1/8]                           | 537 [21 1/8]                      | 18 [11/16]                        | 38 [1 1/2]                       |
| 600 [24]                        | 25 [1]                       | 699 [27 1/2]                      | 28 [1 1/8]                           | 638 [25 1/8]                      | 18 [11/16]                        | 38 [1 1/2]                       |
| 700 [28]                        | 25 [1]                       | 800 [31 1/2]                      | 28 [1 1/8]                           | 740 [29 1/8]                      | 18 [11/16]                        | 38 [1 1/2]                       |
| 750 [30]                        | 25 [1]                       | 851 [33 1/2]                      | 28 [1 1/8]                           | 791 [31 1/8]                      | 18 [11/16]                        | 38 [1 1/2]                       |
| 900 [36]                        | 25 [1]                       | 1003 [39 1/2]                     | 28 [1 1/8]                           | 943 [37 1/8]                      | 18 [11/16]                        | 38 [1 1/2]                       |

\*This was lowest temperature possible at testing facility; actual minimum service temperature is probably lower.

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3M Double-sided tape

When used as a beam dressing, place the I-Rod material in continuous lengths across the upper flange of a pipe support beam so the curved surface contacts the pipe. The rod may be secured to the beam with special double-sided tape, by bolting or by the stabilizing U-Bolts used on the piping.

|                            |                                                  |
|----------------------------|--------------------------------------------------|
| Adhesive type              |                                                  |
| Adhesive carrier           | 745 (rubber adhesive)                            |
|                            | Closed cell, crosslinked, polyethylene foam      |
| Thickness (nominal)        | 1.6 mm [ 1/16 in ]                               |
| Tolerance                  | 1.4 - 2.0 mm [ 0.053 - 0.080 in ]                |
| Approximate density        | 65 kg/m <sup>3</sup> [ 4 lb. /ft. <sup>3</sup> ] |
| Peel adhesion (ASTM D3330) | 140 N/100 mm width [ 8 lb./in. ]                 |
| Static shear (ASTM D3654)  | @22 °C [ 72 °F ] - 1000 g                        |
|                            | @49 °C [ 120 °F ] - 250 g                        |
| Normal tensile (ASTM D897) | 275 kPa [ 40 lb./in. <sup>2</sup> ]              |
| Dynamic shear (ASTM D1002) | 240 kPa [ 35 lb./in. <sup>2</sup> ]              |
| Temperature resistance     | 240 kPa                                          |
| Short term (hours)         | 70 °C [ 158 °F ]                                 |
| Long term (weeks)          | 49 °C [ 120 °F ]                                 |
| Cold flex ( at -30°C )     | No cracking at 6.4 mm [ 1/4 in ]                 |
| Shelf life                 | 18 months*                                       |
| Slitting tolerance         | +/- 0.8 mm [ 1/32 in. ]                          |

\* when stored in original cartons at 70 °F (21 °C) and 50% relative humidity

I-Rod compressive strength testing

From an independent lab test conducted in 1996, I-Rod was subjected to compressive loading with a fixture simulating a 12 inch OD pipeline and crosshead extension was measured.

| Load applied<br>kg [ lb ] | Extension<br>1 rod<br>mm [ in ] | Extension<br>2 rods<br>mm [ in ] | Extension<br>3 rods<br>mm [ in ] |
|---------------------------|---------------------------------|----------------------------------|----------------------------------|
| 227 [ 500 ]               | 0.254 [ 0.010 ]                 | 0.229 [ 0.009 ]                  | 0.381 [ 0.015 ]                  |
| 454 [ 1,000 ]             | 0.508 [ 0.020 ]                 | 0.356 [ 0.014 ]                  | 0.584 [ 0.023 ]                  |
| 681 [ 1,500 ]             | 0.711 [ 0.028 ]                 | 0.457 [ 0.018 ]                  | 0.686 [ 0.027 ]                  |
| 909 [ 2,000 ]             | 0.864 [ 0.034 ]                 | 0.508 [ 0.022 ]                  | 0.762 [ 0.030 ]                  |
| 1,363 [ 3,000 ]           | 1.143 [ 0.045 ]                 | 0.711 [ 0.028 ]                  | 0.889 [ 0.035 ]                  |
| 1,818 [ 4,000 ]           | 1.321 [ 0.052 ]                 | 0.864 [ 0.034 ]                  | 0.991 [ 0.039 ]                  |
| 2,272 [ 5,000 ]           | 1.473 [ 0.058 ]                 | 0.991 [ 0.039 ]                  | 1.092 [ 0.043 ]                  |
| 2,727 [ 6,000 ]           | 1.626 [ 0.064 ]                 | 1.118 [ 0.044 ]                  | 1.194 [ 0.047 ]                  |
| 3,181 [ 7,000 ]           | 1.753 [ 0.069 ]                 | 1.219 [ 0.048 ]                  | 1.270 [ 0.050 ]                  |
| 3,636 [ 8,000 ]           | 1.905 [ 0.075 ]                 | 1.346 [ 0.053 ]                  | 1.346 [ 0.053 ]                  |
| 4,090 [ 9,000 ]           | 2.057 [ 0.081 ]                 | 1.448 [ 0.057 ]                  | 1.422 [ 0.056 ]                  |
| 4,545 [ 10,000 ]          | 2.184 [ 0.086 ]                 | 1.549 [ 0.061 ]                  | 1.524 [ 0.060 ]                  |
| 5,000 [ 11,000 ]          | 2.337 [ 0.092 ]                 | 1.651 [ 0.065 ]                  | 1.600 [ 0.063 ]                  |
| 5,454 [ 12,000 ]          | 2.464 [ 0.097 ]                 | 1.753 [ 0.069 ]                  | 1.651 [ 0.065 ]                  |

Pipe weight guide (for a pipe filled with water)

The maximum loading for each one-inch (1 inch) rod is **8,000 lb (3636 kg)**.  
The maximum loading for each one-and-a-half inch (1 1/2 inch) rod is **10,000 lb (4545kg)**.

The table below conservatively estimates total weight/foot (or meter) of pipe filled with water. Multiply this number by support spacing to get total weight loading then select number of 1 inch I-Rods if pipe is less than 12 inches. 1 1/2 inch I-Rods are generally recommended for piping over 12 inches. Do not mix I-Rod sizes.

| Nominal<br>pipe size<br>mm [ in ] | STD<br>kg/m<br>[ lb / ft ] | Sch 40<br>kg/m<br>[ lb / ft ] | X-Strong<br>kg/m<br>[ lb / ft ] | Sch 80<br>kg/m<br>[ lb / ft ] | Sch 120<br>kg/m<br>[ lb / ft ] | Sch 140<br>kg/m<br>[ lb / ft ] | Sch 160<br>kg/m<br>[ lb / ft ] | XX Strong<br>kg/m<br>[ lb / ft ] |
|-----------------------------------|----------------------------|-------------------------------|---------------------------------|-------------------------------|--------------------------------|--------------------------------|--------------------------------|----------------------------------|
| 50 [ 2 ]                          | 9 [ 6 ]                    | 9 [ 6 ]                       | 11 [ 7 ]                        | 11 [ 7 ]                      |                                |                                | 14 [ 9 ]                       | 17 [ 11 ]                        |
| 80 [ 3 ]                          | 18 [ 12 ]                  | 18 [ 12 ]                     | 21 [ 14 ]                       | 21 [ 14 ]                     |                                |                                | 27 [ 18 ]                      | 35 [ 23 ]                        |
| 100 [ 4 ]                         | 27 [ 18 ]                  | 27 [ 18 ]                     | 33 [ 22 ]                       | 33 [ 22 ]                     | 39 [ 26 ]                      |                                | 44 [ 29 ]                      | 51 [ 34 ]                        |
| 150 [ 6 ]                         | 50 [ 33 ]                  | 51 [ 34 ]                     | 66 [ 44 ]                       | 66 [ 44 ]                     | 77 [ 51 ]                      |                                | 90 [ 60 ]                      | 102 [ 68 ]                       |
| 200 [ 8 ]                         | 77 [ 51 ]                  | 81 [ 54 ]                     | 103 [ 69 ]                      | 103 [ 69 ]                    | 129 [ 86 ]                     | 139 [ 93 ]                     | 150 [ 100 ]                    | 147 [ 98 ]                       |
| 250 [ 10 ]                        | 114 [ 76 ]                 | 120 [ 80 ]                    | 141 [ 94 ]                      | 156 [ 104 ]                   | 193 [ 129 ]                    | 214 [ 143 ]                    | 232 [ 155 ]                    | 214 [ 143 ]                      |
| 300 [ 12 ]                        | 156 [ 104 ]                | 165 [ 110 ]                   | 181 [ 121 ]                     | 215 [ 144 ]                   | 270 [ 181 ]                    | 291 [ 195 ]                    | 321 [ 215 ]                    | 270 [ 181 ]                      |
| 350 [ 14 ]                        | 182 [ 122 ]                | 196 [ 131 ]                   | 209 [ 140 ]                     | 258 [ 173 ]                   | 324 [ 217 ]                    | 354 [ 237 ]                    | 381 [ 255 ]                    |                                  |
| 400 [ 16 ]                        | 226 [ 151 ]                | 256 [ 171 ]                   | 256 [ 171 ]                     | 335 [ 224 ]                   | 418 [ 280 ]                    | 463 [ 310 ]                    | 496 [ 332 ]                    |                                  |
| 450 [ 18 ]                        | 273 [ 183 ]                | 323 [ 216 ]                   | 306 [ 205 ]                     | 421 [ 282 ]                   | 528 [ 354 ]                    | 573 [ 384 ]                    | 624 [ 418 ]                    |                                  |
| 500 [ 20 ]                        | 324 [ 217 ]                | 390 [ 261 ]                   | 361 [ 242 ]                     | 516 [ 346 ]                   | 645 [ 432 ]                    | 712 [ 477 ]                    | 767 [ 514 ]                    |                                  |
| 600 [ 24 ]                        | 439 [ 294 ]                | 552 [ 370 ]                   | 485 [ 325 ]                     | 737 [ 494 ]                   | 933 [ 625 ]                    | 1012 [ 678 ]                   | 1100 [ 737 ]                   |                                  |
| 650 [ 26 ]                        | 503 [ 337 ]                |                               | 552 [ 370 ]                     |                               |                                |                                |                                |                                  |
| 700 [ 28 ]                        | 572 [ 383 ]                |                               | 625 [ 419 ]                     |                               |                                |                                |                                |                                  |
| 750 [ 30 ]                        | 643 [ 431 ]                |                               | 701 [ 470 ]                     |                               |                                |                                |                                |                                  |
| 900 [ 36 ]                        | 885 [ 593 ]                | 1091 [ 731 ]                  | 953 [ 639 ]                     |                               |                                |                                |                                |                                  |
| 1050 [ 42 ]                       | 1164 [ 780 ]               |                               | 1244 [ 834 ]                    |                               |                                |                                |                                |                                  |