# GROUP 1100
# ACCESORIES
# MOD.1100/96

DAVINCI VALVES™

# TECHNICAL
# DATA SHEET

## WATER Series

**DUCTILE IRON PIPES**

DAVINCI VALVES™ QUALITY ASSUREMENT

DAVINCI VALVES™ PRODUCT QT ASSUREMENT

DAVINCI VALVES™ COMPANY QT ASSUREMENT

www.davincivalves.com

18 Dongyu Street, Square One,
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10F/Tower A, Billion Center,
1 Wang Kwong Road, Kowloon Bay
Kowloon HONG KONG

# DUCTILE IRON PIPES
## Ref.1100



## INTRODUCTION TO PRODUCTS

SOLID products strictly meet the below standards:

ISO 2531 Ductile iron pipes, fittings and accessories for pressure pipelines.

BSEN545 Ductile iron pipes, fittings and accessories and their joints for water pipelines. Requirements and test methods.

BSEN598 Ductile iron pipes, fittings, accessories and their joints for sewage application-requirements and test methods.

ISO7186 Ductile iron pipes, fittings, accessories and their joints for the construction of drains and sewers outside buildings.

ISO4179 Ductile iron pipes for pressure and non pressure pipelines-Centrifugal cement mortar lining-general requirements.

ISO8179 Ductile iron pipes-External zinc coating.

ISO4633 Rubber Seals - joint rings for water supply, drainage and sewerage pipelines-specs for materials.

ISO 8180 Ductile iron pipes - Polyethylene Sleeve.

*All the components can be substituted with equivalent or higher-class materials.*



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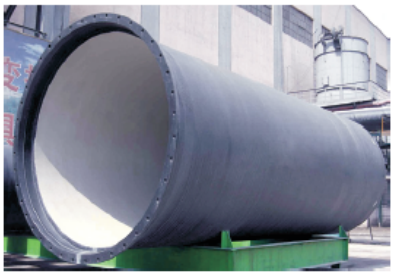
# DUCTILE IRON PIPES
## Ref.1100

The T-type Joint Pipes (Push-on) produced by our company range from DN80 to DN2600mm are flexibly jointed with sockets and spigots; they are the first choice in urban water pipe networks due to their convenient installation, strong seismic performances, seal ability and corrosion resistance.

T-type Joint

The K-type Joint Pipes produced by our company ranging from DN1200 to DN2600mm are mechanically jointed, and they play an irreplaceable role in urban water pipe networks due to their firm installation and excellent seismic performances.



K-type Joint

The Self-Restrained Joint Pipes produced by our company ranging from DN80 to DN1600mm are jointed self-restrainedly and are used mainly for carrying water with pipelines projects that are submerged in water, harsh environment.

Self-Restrained Joint

TECHNICAL DATA SHEET

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### External Protection

Zinc with finishing layer of bituminous paint. Coating of epoxy, zinc-Aluminum alloy, or polyurethane etc, can be supplied also as per requirement.

### Internal Protection

Portland cement mortar lining, Sulphate Resistant cement mortar lining, High-Aluminum cement mortar lining, linings of epoxy powder, ceramic epoxy, polyurethane etc. can be supplied also as per requirement.

Inside cement mortar lining

Inside ceramic epoxy lining

Red epoxy painting inside





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# DUCTILE IRON PIPES
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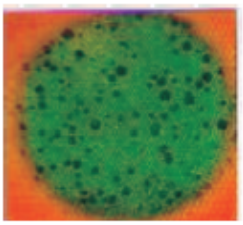
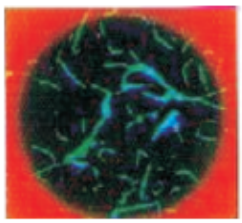
## Advantages of Ductile Iron Pipes

### Better Mechanical Properties

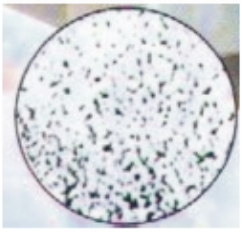
| | Ductile iron pipe | Grey Cast Iron Pipe | Steel Pipe |
|---|---|---|---|
| Tensile strength($N/mm^2$) | ≥420 | 150-260 | ≥400 |
| Yield strength($N/mm^2$) | 300 | ——— | ——— |
| Bending strength($N/mm^2$) | Min.590 | 200-360 | Min.400 |
| Elongation(%) | DN80-1000≥10<br>DN1200-2200≥7 | Negligible | Min.18 |
| Module of Elasticity($N/mm^3$) | Approx. $16 \times 10^4$ | Approx. $11 \times 10^4$ | Approx. $16 \times 10^4$ |
| Hardness (HB) | ≤230 | ≤230 | Approx.140 |



Ductile iron metallography



Grey iron metallography



Steel pipe metallography

Tensile test

Ring pressed test

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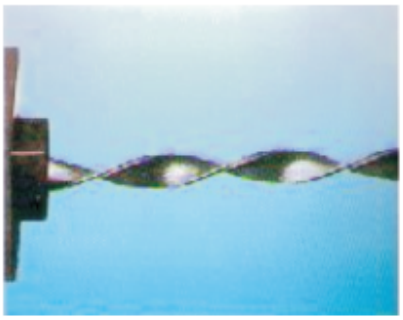
Flat-pressing test



Twist test

Elongation test


Damage test

Document relevant to earthquakes shows that the damage rate per kilometer for ductile iron pipe mains is one quarter of that for grey iron and one thirtieth of some other materials of pipes.

| Pipe material | Damage rate per km of main pipeline in earthquake |
|---|---|
| Ductile iron pipe | 0.04 |
| Grey cast pipe | 0.17 |
| PVC pipe | 0.14 |
| Steel pipe | 1.24 |

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# DUCTILE IRON PIPES
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## High corrosion resistance

| | Corrosion in running water at 90 days(G/cm²) | Corrosion in sea water (Mm/a) | Corrosion in 72h5% hydrochoric Acid Liquor (G/cm²) | 100℃ 33% Corrosion in Vitriol Liquor (mg/cm² .h) |
|---|---|---|---|---|
| Ductile iron pipe | 0.009 | 0.066 | 0.0821 | 620 |
| Grey Cast Iron Pipe | 0.0103 | 0.073 | 0.6899 | 470 |
| Steel Pipe | 0.0396 | 0.13 | ≥10 | 250 |

## Chemical composition

| Chemical composition | Ductile Iron Pipe(%) | Steel Pipe(%) | Grey Iron Pipe(%) |
|---|---|---|---|
| C | 3.5-4.0 | 0.1-0.2 | 3.2-3.8 |
| Si | 1.9-2.6 | 0.15-0.4 | 1.4-2.2 |
| Mn | 0.15-0.45 | 0.3-0.6 | 0.4-0.6 |
| P | ≤0.06 | 0.02-0.03 | ≤0.3 |
| S | ≤0.02 | 0.02-0.03 | ≤0.1 |
| Mg | 0.03-0.06 | | |

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# DUCTILE IRON PIPES
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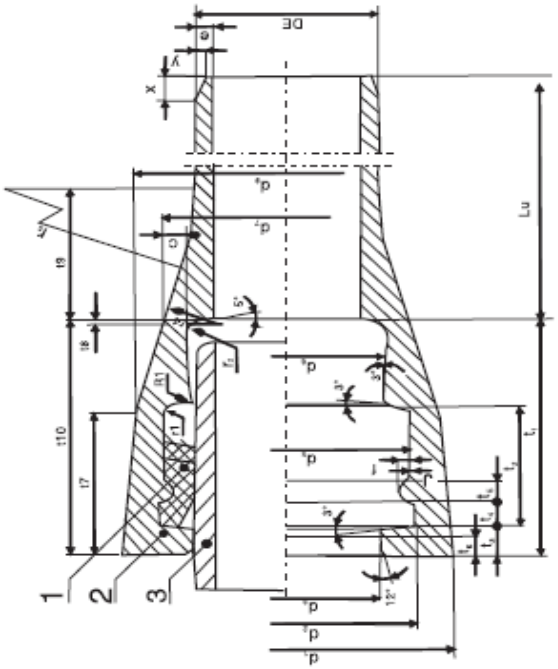
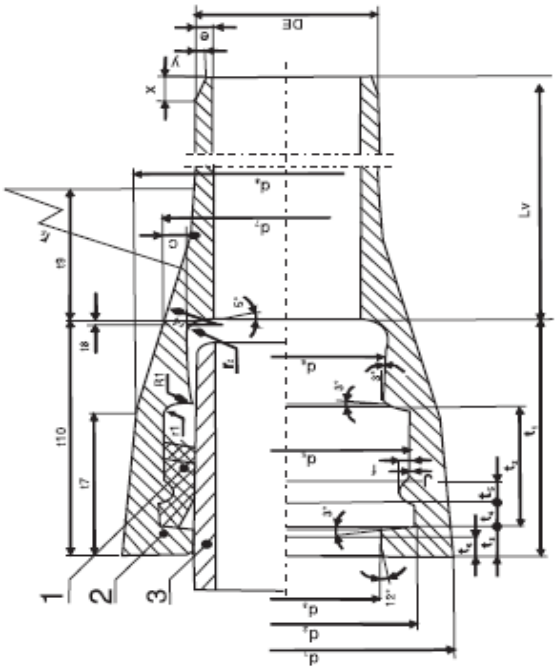


| Type | 1 | 2 | 3 |
|---|---|---|---|
| T | Gasket | Socket | Spigot |

DN1400~1600 T type joint



| Type | 1 | 2 | 3 |
|---|---|---|---|
| T | Gasket | Socket | Spigot |

DN80~1200 T type joint

**ISO2531,EN545,EN598,BS4772**

**TYTON PUSH-ON SOCKET SIZES**

Tyton Push-on Socket Sizes

TECHNICAL DATA SHEET

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# ISO2531,EN545,EN598,BS4772

## TYTON PUSH-ON SOCKET SIZES

### Tyton Push-on Socket Sizes

| DN mm | DE mm | | d1 mm | d2 mm | | d3 mm | | d5 mm | | d6 mm | | d7 mm | d8 mm | c mm | f mm | | t1 mm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 80 | 98 | +1 −2.8 | 140 | 123 | ± 1 | 100.5 | ± 1 | 119.1 | ± 1 | 103.2 | ± 2 | 122 | 135 | 8 | 3.5 | 0 −0.8 | 85 |
| 100 | 118 | | 190 | 169 | | 120.5 | | 138.9 | | 123.4 | | 142 | 155.7 | 8.4 | 3.5 | | 88 |
| 150 | 170 | +1 −2.9 | 217 | 195 | | 172.5 | | 190.6 | | 175.3 | | 195.6 | 209 | 9.1 | 3.5 | | 94 |
| 200 | 222 | +1 −3 | 278 | 250 | +1.5 −1 | 224.5 | +1.5 −1 | 245.2 | +1.5 −1 | 227.8 | | 251 | 265 | 9.8 | 4 | | 100 |
| 250 | 274 | +1 −3.1 | 336 | 301.5 | | 276.5 | | 296.9 | | 279.7 | | 305 | 323 | 10.5 | 4 | | 105 |
| 300 | 326 | +1 −3.3 | 393 | 356.5 | +1.8 −1 | 328.5 | +1.8 −1 | 351.7 | +1.8 −1 | 332.1 | | 368.5 | 384 | 11.2 | 4.5 | | 110 |
| 350 | 378 | +1 −3.4 | 448 | 408 | | 380.5 | | 403.4 | | 383.8 | | 410.3 | 433 | 11.9 | 4.5 | 0 −1 | 110 |
| 400 | 429 | +1 −3.5 | 500 | 462 | +2.1 −1 | 431.5 | +2.1 −1 | 457.2 | +2.1 −1 | 435.8 | ± 2.5 | 463 | 482.4 | 12.6 | 5 | | 110 |
| 450 | 480 | +1 −3.6 | 540 | 514 | +2.2 −1 | 482.5 | +2.2 −1 | 509 | +2.2 −1 | 487 | | 518.4 | 533 | 13.3 | 5 | | 120 |
| 500 | 532 | +1 −3.8 | 604 | 568 | +2.4 −1 | 534.5 | +2.4 −1 | 562.6 | +2.4 −1 | 539.4 | ± 3 | 569.7 | 590.6 | 14 | 5.5 | | 120 |
| 600 | 635 | +1 −4 | 713 | 673.4 | +2.7 −1 | 637.5 | +2.7 −1 | 668 | +2.7 −1 | 642.6 | | 676.7 | 698.8 | 15.4 | 6 | | 120 |
| 700 | 738 | +1 −4.2 | 824 | 788 | +3.5 −1 | 740.5 | +3.5 −1 | 779.3 | +3.5 −1 | 745.8 | ± 3.5 | 789 | 813 | 16.8 | 7 | 0 −1.2 | 150 |
| 800 | 842 | +1 −4.5 | 943 | 894 | +3.8 −1 | 844.5 | +3.8 −1 | 885.9 | +3.8 −1 | 850 | ± 3.8 | 892.2 | 922.3 | 18.2 | 8 | | 160 |
| 900 | 945 | +1 −4.8 | 1052 | 1000 | +4.1 −1 | 947.5 | +4.1 −1 | 991.3 | +4.1 −1 | 953.2 | ± 4.1 | 999.2 | 1030.5 | 19.6 | 9 | | 175 |
| 1000 | 1048 | +1 −5 | 1158 | 1105 | +4.4 −1 | 1050.5 | +4.4 −1 | 1097.1 | +4.4 −1 | 1056.4 | ± 4.4 | 1106 | 1139 | 21 | 9 | | 185 |
| 1100 | 1152 | +1 −5.2 | 1267 | 1211 | +4.7 −1 | 1155 | +4.7 −1 | 1202.5 | +4.7 −1 | 1160.2 | ± 4.7 | 1213.5 | 1247.3 | 22.4 | 10 | | 200 |
| 1200 | 1255 | +1 −5.5 | 1377 | 1317 | +5 −1 | 1258 | +5 −1 | 1308 | +5 −1 | 1264 | ± 5 | 1321 | 1355.6 | 23.8 | 10 | | 215 |
| 1400 | 1462 | +1 −6 | 1610 | 1529 | +5.6 −1 | 1465 | +5.6 −1 | 1509 | +5.6 −1 | 1471 | ± 5.6 | 1535 | 1584.5 | 26.6 | - | | 239 |
| 1600 | 1668 | +1 −6.5 | 1814 | 1740 | +6.2 −1 | 1673 | +6.2 −1 | 1717 | +6.2 −1 | 1678 | ± 6.2 | 1748 | - | - | - | | 262 |

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# ISO2531,EN545,EN598,BS4772

## TYTON PUSH-ON SOCKET SIZES

### Tyton Push-on Socket Sizes

| DN mm | t2 mm | t3 mm | t4 mm | | t5 mm | t6 mm | t7 mm | t8 mm | t9 mm | t10 mm | r1 mm | r2 mm | r4 mm | r5 mm | X | Y | Mass (kgs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 80 | 40 | 12 | 6 | | 5 | 8 | 48 | 5 | 39 | 80 | 4 | 5 | 22 | 62 | 6 | 2 | 3.4 |
| 100 | 40 | 12 | 6 | | 5 | 8 | 48 | 5 | 39 | 88 | 4 | 5 | 17 | 68 | 9 | 3 | 4.3 |
| 150 | 40 | 12 | 6 | | 5 | 8 | 48 | 5 | 43 | 94 | 4 | 5 | 18.5 | 74 | 9 | 3 | 7.1 |
| 200 | 45 | 15 | 7 | | 6 | 10 | 56 | 6.2 | 48 | 100 | 4 | 6 | 35 | 70 | 9 | 3 | 10.3 |
| 250 | 47 | 15 | 7 | | 6 | 10 | 58 | 6.8 | 48 | 105 | 4 | 6 | 36 | 72 | 9 | 3 | 14.2 |
| 300 | 50 | 17 | 8.5 | 0 −0.5 | 7 | 12 | 61 | 7.2 | 56 | 110 | 6 | 7 | 37 | 74 | 9 | 3 | 18.6 |
| 350 | 50 | 17 | 8.5 | | 7 | 12 | 61 | 5.1 | 55 | 113 | 6 | 7 | 24.5 | 98 | 9 | 3 | 23.7 |
| 400 | 55 | 19 | 9.5 | | 8 | 14 | 68 | 5.1 | 58 | 116 | 6 | 8 | 26 | 104 | 9 | 3 | 29.3 |
| 450 | 55 | 19 | 9.5 | | 8 | 15 | 68 | 6 | 66 | 120 | 6 | 8 | 28 | 105 | 9 | 3 | 38.3 |
| 500 | 60 | 21 | 11 | | 9 | 16 | 75 | 7 | 63 | 120 | 6 | 10 | 29 | 116 | 9 | 3 | 42.8 |
| 600 | 65 | 21 | 12 | | 10 | 16 | 80 | 9.2 | 62 | 120 | 6 | 10 | 32 | 128 | 9 | 3 | 59.3 |
| 700 | 80 | 21 | 18 | | 12 | 16 | 90 | 10.6 | 77 | 150 | 8 | 10 | 35 | 140 | 15 | 5 | 79.1 |
| 800 | 85 | 21 | 18 | | 14 | 16 | 96.5 | 12.4 | 86.5 | 160 | 8 | 10 | 38 | 160 | 15 | 5 | 102.6 |
| 900 | 90 | 21 | 20 | | 16 | 16 | 103 | 14.2 | 92.5 | 175 | 8 | 10 | 42 | 175 | 15 | 5 | 129.9 |
| 1000 | 95 | 22 | 20 | 0 −0.8 | 16 | 16 | 110 | 16 | 103 | 185 | 8 | 10 | 45 | 200 | 15 | 5 | 161.3 |
| 1100 | 100 | 24 | 23 | | 18 | 16 | 116 | 17 | 107.5 | 200 | 10 | 12 | 46.5 | 207.5 | 15 | 5 | 194.7 |
| 1200 | 105 | 25 | 23 | | 18 | 17 | 122 | 17.8 | 112 | 215 | 10 | 12 | 48 | 215 | 15 | 5 | 237.7 |
| 1400 | 115 | 27 | 25 | | – | 18 | 125 | 19 | 119 | 239 | 10 | 12 | 100 | 205 | 20 | 7 | 279.3 |
| 1600 | 125 | 30 | 27 | | | 20 | 125 | 19 | 165 | 262 | 10 | 10 | 380 | 210 | 21 | 7 | 375.4 |









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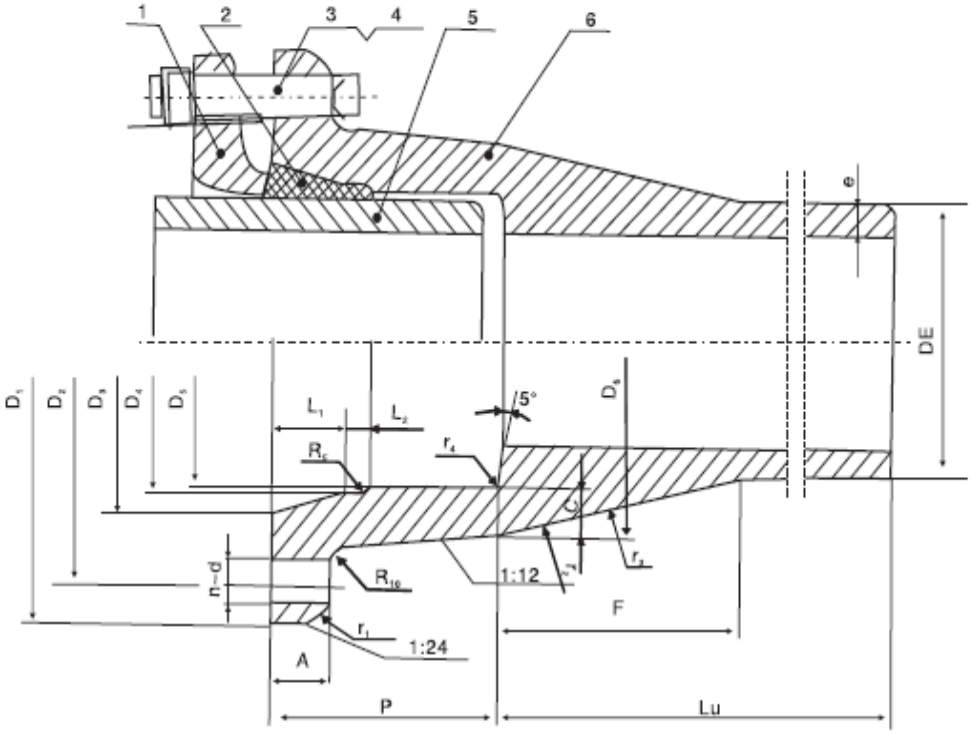
# DUCTILE IRON PIPES
## Ref.1100

TECHNICAL DATA SHEET

## ISO2531,EN545,EN598,BS4772

### MECHANICAL JOINT SOCKET SIZES

Mechanical Joint Socket Sizes




| Type | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| K | Gland | Gasket | Bolt | Nut | Spigot | Socket |

Mechanical type joint

*All the components can be substituted with equivalent or higher-class materials.*



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# ISO2531,EN545,EN598,BS4772

## MECHANICAL JOINT SOCKET SIZES

### Mechanical Joint Socket Sizes

| DN mm | DE mm | | D1 mm | D2 mm | D3 mm | D4 mm | | D5 mm | | D6 mm | A mm | c mm | P mm | F mm | r1 mm | r2 mm | r3 mm | L1 mm | L2 mm | d mm | n | Mass (kgs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 100 | 118 | | 234 | 188 | 148 | 130 | | 121 | | 140 | 19 | 8.4 | 80 | 50 | 8 | 28 | 100 | 33 | 9 | 23 | 4 | 5.9 |
| 150 | 170 | | 288 | 242 | 200 | 182 | | 173 | +2 −1 | 194 | 20 | 9.1 | 80 | 53 | 8 | 18 | 110 | 33 | 9 | 23 | 6 | 8.4 |
| 200 | 222 | | 341 | 295 | 252 | 234 | ±1 | 225 | | 247 | 20 | 9.8 | 80 | 57 | 8 | 32 | 115 | 33 | 9 | 23 | 6 | 11 |
| 250 | 274 | +1 −3 | 395 | 349 | 304 | 286 | | 277 | | 301 | 21 | 10.5 | 80 | 60 | 10 | 20 | 125 | 33 | 9 | 23 | 8 | 14.1 |
| 300 | 326 | | 455 | 409 | 360 | 342 | | 329 | | 358 | 22 | 11.2 | 110 | 68 | 10 | 35 | 135 | 33 | 13 | 23 | 8 | 22.4 |
| 350 | 378 | | 508 | 462 | 412 | 394 | | 382 | | 410 | 23 | 11.9 | 110 | 72 | 10 | 45 | 145 | 33 | 13 | 23 | 10 | 27.2 |
| 400 | 429 | | 561 | 515 | 463 | 445 | | 433 | +3 −1 | 462 | 23 | 12.6 | 110 | 75 | 10 | 40 | 150 | 33 | 13 | 23 | 12 | 31.5 |
| 450 | 480 | | 614 | 568 | 514 | 496 | ±1.5 | 484 | | 515 | 24 | 13.3 | 110 | 78 | 10 | 50 | 150 | 33 | 13 | 23 | 12 | 37.3 |
| 500 | 532 | | 667 | 621 | 566 | 548 | | 536 | | 568 | 25 | 14 | 110 | 82 | 10 | 55 | 160 | 33 | 13 | 23 | 14 | 42.8 |
| 600 | 635 | | 773 | 727 | 669 | 651 | | 639 | | 675 | 26 | 15.4 | 110 | 89 | 10 | 55 | 170 | 33 | 13 | 23 | 14 | 55.4 |
| 700 | 738 | | 892 | 838 | 780 | 758 | | 743 | | 781 | 28 | 16.8 | 120 | 96 | 10 | 50 | 190 | 43 | 14 | 27 | 16 | 73.9 |
| 800 | 842 | +1 −4 | 999 | 942 | 884 | 862 | | 847 | +3.5 −2 | 888 | 29 | 18.2 | 120 | 103 | 10 | 52 | 208 | 43 | 14 | 27 | 20 | 90.2 |
| 900 | 945 | | 1123 | 1057 | 987 | 965 | ±2 | 950 | | 994 | 31 | 19.6 | 120 | 110 | 10 | 50 | 225 | 43 | 14 | 33 | 20 | 115.6 |
| 1000 | 1048 | +1 −5 | 1231 | 1160 | 1090 | 1068 | | 1054 | | 1101 | 32 | 21 | 130 | 119 | 15 | 50 | 240 | 43 | 15 | 33 | 20 | 146.6 |
| 1100 | 1152 | +1 −5.2 | 1338 | 1272 | 1194 | 1172 | | 1158 | +3.5 −3 | 1208 | 33 | 22 | 130 | 126 | 15 | 80 | 245 | 43 | 15 | 33 | 24 | 172.4 |
| 1200 | 1255 | +1 −5.5 | 1444 | 1378 | 1297 | 1275 | | 1261 | | 1314 | 35 | 24 | 130 | 133 | 15 | 85 | 250 | 43 | 15 | 33 | 28 | 201 |
| 1400 | 1462 | +1 −6 | 1657 | 1591 | 1504 | 1482 | ±2.5 | 1469 | +4 −3 | 1527 | 38 | 27 | 130 | 147 | 15 | 70 | 280 | 43 | 15 | 33 | 28 | 265.8 |
| 1500 | 1565 | | 1766 | 1700 | 1608 | 1586 | | 1573 | | 1634 | 40 | 28 | 130 | 155 | 15 | 60 | 300 | 43 | 15 | 33 | 28 | 298.8 |
| 1600 | 1668 | +1 −6.5 | 1874 | 1808 | 1720 | 1690 | | 1678 | +4.5 −3 | 1740 | 41 | 29 | 160 | 163 | 15 | 50 | 354 | 59 | 17 | 33 | 30 | 375.4 |
| 1800 | 1875 | +1 −7 | 2089 | 2023 | 1927 | 1897 | | 1883 | +5 −4 | 1954 | 43 | 32 | 170 | 179 | 20 | 60 | 370 | 59 | 17 | 33 | 34 | 490.6 |
| 2000 | 2082 | | 2305 | 2239 | 2134 | 2104 | | 2091 | | 2168 | 46 | 35 | 180 | 195 | 20 | 120 | 380 | 59 | 17 | 33 | 36 | 626.4 |
| 2200 | 2288 | +1 −7.5 | 2519 | 2453 | 2340 | 2310 | ±2.8 | 2298 | +5.5 −4 | 2381 | 49 | 38 | 190 | 210 | 20 | 150 | 390 | 59 | 17 | 33 | 40 | 784.2 |
| 2400 | 2495 | | 2734 | 2668 | 2547 | 2517 | | 2505 | | 2595 | 52 | 41 | 200 | 226 | 20 | 170 | 402 | 59 | 17 | 33 | 44 | 966.2 |
| 2600 | 2702 | | 2949 | 2883 | 2754 | 2724 | | 2713 | | 2809 | 55 | 43 | 210 | 242 | 20 | 185 | 415 | 59 | 17 | 33 | 48 | 1173.7 |

*All the components can be substituted with equivalent or higher-class materials.*



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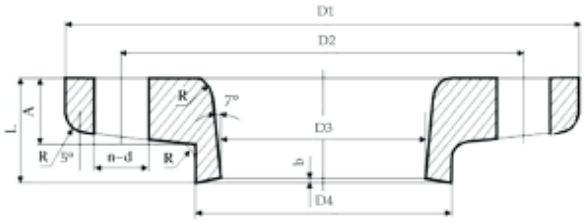
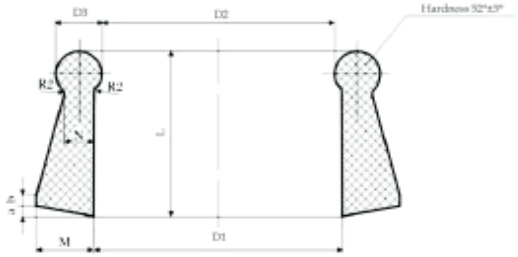
# DUCTILE IRON PIPES
## Ref.1100

## DIMENSION OF K-TYPE JOINT GLANDS




| DN | D1 | D2 | D3 | D4 | A | L | R | b | d-n/(mm-n) | Weight /kg |
|---|---|---|---|---|---|---|---|---|---|---|
| 1200 | 1444 | 1378 | 1262 | 1290 | 32 | 51 | 9 | 2.5 | 33-28 | 82.5 |
| 1400 | 1657 | 1591 | 1469 | 1497 | 34 | 53 | 9 | 3 | 33-28 | 104 |
| 1500 | 1766 | 1700 | 1573 | 1605 | 35 | 54 | 9 | 3 | 33-28 | 119 |
| 1600 | 1874 | 1808 | 1676 | 1711 | 36 | 55 | 9 | 3 | 33-30 | 123 |
| 1800 | 2089 | 2023 | 1883 | 1918 | 38 | 57 | 11 | 3 | 33-34 | 162 |
| 2000 | 2305 | 2239 | 2090 | 2125 | 40 | 59 | 11 | 3 | 33-36 | 196 |
| 2200 | 2519 | 2453 | 2296 | 2331 | 43 | 62 | 11 | 3 | 33-40 | 238 |
| 2400 | 2734 | 2668 | 2503 | 2538 | 46 | 65 | 11 | 3 | 33-44 | 318 |
| 2600 | 2949 | 2883 | 2710 | 2745 | 49 | 68 | 11 | 3 | 33-48 | 378 |

## DIMENSION OF K-TYPE JOINT GASKETS




Gasket of K-type joint pipe

| DN | D1 | D2 | D3 | L | M | N | a | b |
|---|---|---|---|---|---|---|---|---|
| 1200 | 1230 | 1223 | 20 | 62 | 21.5 | 13 | 4 | 5 |
| 1400 | 1430 | 1423 | 20 | 62 | 21.5 | 13 | 4 | 5 |
| 1500 | 1532 | 1525 | 20 | 62 | 21.5 | 13 | 4 | 5 |
| 1600 | 1635 | 1628 | 23 | 80 | 27 | 15 | 4 | 5 |
| 1800 | 1833 | 1825 | 23 | 80 | 27 | 15 | 4 | 5 |
| 2000 | 2035 | 2027 | 23 | 80 | 27 | 15 | 4 | 5 |
| 2200 | 2235 | 2227 | 23 | 80 | 27 | 15 | 4 | 5 |
| 2400 | 2440 | 2432 | 23 | 80 | 27 | 15 | 4 | 5 |
| 2600 | 2645 | 2637 | 23 | 80 | 27 | 15 | 4 | 5 |

TECHNICAL DATA SHEET

*All the components can be substituted with equivalent or higher-class materials.*



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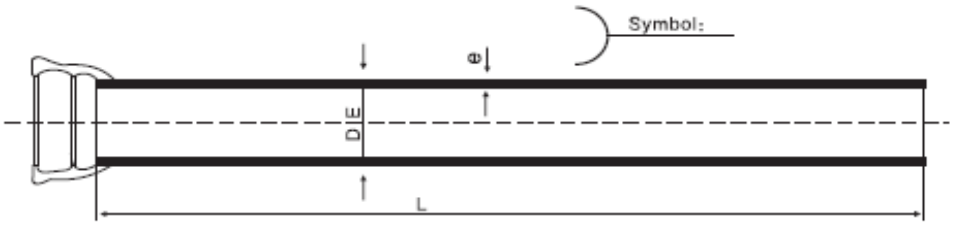
# DUCTILE IRON PIPES
## Ref.1100

## Ductile Iron Pipes with Tyton joint ISO2531-1998 Class K9




| Nominal size DN | Barrel | | | Socket mass (approxi-mate) | Total mass(approximate)for one working length L of | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | DE | e | Mass per-metre (approxi-mate) | | 2m | 3m | 4m | 5m | 5.5m | 6m | 7m | 8m | 9m |
| 40 | 56 | 6 | 6.6 | 1.7 | 15 | 21.5 | 28 | 34.5 | 38 | 41.5 | – | – | – |
| 50 | 66 | 6 | 8 | 2.1 | 18 | 26 | 34 | 42 | 46 | 50 | – | – | – |
| (60) | 77 | 6 | 9.4 | 2.5 | 21.5 | 30.5 | 40 | 49.5 | 54 | 59 | – | – | – |
| 65 | 82 | 6 | 10.1 | 2.7 | 23 | 33 | 43 | 53 | 58.5 | 63.5 | – | – | – |
| 80 | 98 | 6 | 12.2 | 3.4 | – | – | 52 | 64.5 | 70.5 | 76.5 | – | – | – |
| 100 | 118 | 6.1 | 15.1 | 4.3 | – | – | 64.5 | 80 | 87.5 | 95 | – | – | – |
| 125 | 144 | 6.2 | 18.9 | 5.7 | – | – | 81.5 | 100 | 110 | 119 | – | – | – |
| 150 | 170 | 6.3 | 22.8 | 7.1 | – | – | 98.5 | 121 | 133 | 144 | – | – | – |
| 200 | 222 | 6.4 | 30.6 | 10.3 | – | – | 133 | 163 | 179 | 194 | – | – | – |
| 250 | 274 | 6.8 | 40.2 | 14.2 | – | – | 175 | 215 | 235 | 255 | – | – | – |
| 300 | 326 | 7.2 | 50.8 | 18.6 | – | – | 222 | 273 | 298 | 323 | – | – | – |
| 350 | 378 | 7.7 | 63.2 | 23.7 | – | – | 277 | 340 | 371 | 403 | – | – | – |
| 400 | 429 | 8.1 | 75.5 | 29.3 | – | – | 331 | 407 | 445 | 482 | – | – | – |
| 500 | 532 | 9 | 104.3 | 42.8 | – | – | 460 | 564 | 616 | 669 | – | – | – |
| 600 | 635 | 9.9 | 137.3 | 59.3 | – | – | 608 | 745 | 813 | 882 | 1019 | 1156 | 1293 |
| 700 | 738 | 10.8 | 173.9 | 79.1 | – | – | 775 | 949 | 1036 | 1123 | 1298 | 1470 | 1644 |
| 800 | 842 | 11.7 | 215.2 | 102.6 | – | – | 963 | 1179 | 1286 | 1394 | 1609 | 1824 | 2039 |
| 900 | 945 | 12.6 | 260.2 | 129.9 | – | – | 1171 | 1431 | 1561 | 1691 | 1951 | 2212 | 2472 |
| 1000 | 1048 | 13.5 | 309.3 | 161.3 | – | – | 1399 | 1708 | 1862 | 2017 | 2326 | 2636 | 2945 |
| 1200 | 1255 | 15.3 | 420.1 | 237.7 | – | – | 1918 | 2338 | 2548 | 2758 | 3178 | 3599 | 4019 |
| 1400 | 1462 | 17.1 | 547.2 | 279.3 | – | – | 2468 | 3015 | 3289 | 3563 | 4110 | 4657 | 5204 |
| 1600 | 1668 | 18.9 | 690.3 | 375.4 | – | – | 3137 | 3827 | 4172 | 4517 | 5208 | 5898 | 6588 |
| 1800 | 1875 | 20.7 | 850.1 | 490.6 | – | – | 3891 | 4741 | 5166 | 5591 | 6441 | 7291 | 8142 |
| 2000 | 2082 | 22.5 | 1026.3 | 626.4 | – | – | 4732 | 5758 | 6271 | 6784 | 7811 | 8837 | 9863 |
| 2200 | 2288 | 24.3 | 1218.3 | 784.2 | – | – | 5657 | 6876 | 7485 | 8094 | 9312 | 10531 | 11749 |
| 2400 | 2495 | 26.1 | 1427.2 | 966.2 | – | – | 6675 | 8102 | 8816 | 9529 | 10957 | 12384 | 13811 |
| 2600 | 2702 | 27.9 | 1652.4 | 1173.7 | – | – | 7783 | 9436 | 10262 | 11088 | 12741 | 14393 | 16045 |

The nominal iron wall thickness of pipe is in accordance with ISO2531/EN 545 and calculated as a function of the nominal size, DN, by the following formula,with a minimum of 6 mm for pipes.

$$e = K(0.5 + 0.001\,DN)$$

Where :

e is the nominal wall thickness, in millimeters;

DN is the nominal size in millimeters;

K is a coefficient used for thickness class designation. It is selected from a series of whole numbers :

.....8, 9, 10, 11, 12.....

TECHNICAL DATA SHEET

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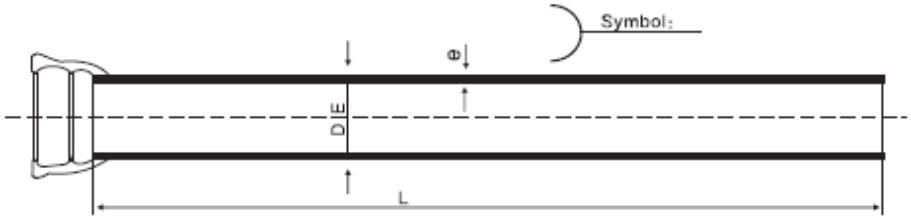
# DUCTILE IRON PIPES
## Ref.1100

## Ductile Iron Pipes with Tyton joint ISO2531-2009




**Wall Thickness Of Preferred Pressure Class And Other Pressure Classes**

| DN(mm) | DN(mm) | Nominal Thickness (mm) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | C20 | C25 | C30 | C40 | C50 | C64 | C100 |
| 80 | 98 | | | | 4.4 | 4.4 | 4 | 4.8 |
| 100 | 118 | | | | 4.4 | 4.4 | 4.4 | 5.5 |
| 125 | 144 | | | | 4.5 | 4.5 | 4.8 | 6.5 |
| 150 | 170 | | | | 4.5 | 4.5 | 5.3 | 7.4 |
| 200 | 222 | | | | 4.7 | 5.4 | 6.5 | 9.2 |
| 250 | 274 | | | | 5.5 | 6.4 | 7.8 | 11.1 |
| 300 | 326 | | | 5.1 | 6.2 | 7.4 | 8.9 | 12.9 |
| 350 | 378 | | 5.1 | 6.3 | 7.1 | 8.4 | 10.2 | 14.8 |
| 400 | 429 | | 5.5 | 6.5 | 7.8 | 9.3 | 11.3 | 16.5 |
| 450 | 480 | | 6.1 | 6.9 | 8.6 | 10.3 | 12.6 | 18.4 |
| 500 | 532 | | 6.5 | 7.5 | 9.3 | 11.2 | 13.7 | 20.2 |
| 600 | 635 | | 7.6 | 8.7 | 10.9 | 13.1 | 16.1 | 23.8 |
| 700 | 738 | 7.3 | 8.6 | 9.9 | 12.4 | 15 | 18.5 | 27.5 |
| 800 | 842 | 8.1 | 9.6 | 11.1 | 14 | 16.9 | 21 | |
| 900 | 945 | 8.9 | 10.6 | 12.3 | 15.5 | 18.8 | 23.4 | |
| 1000 | 1048 | 9.8 | 11.6 | 13.4 | 17.1 | 20.7 | | |
| 1100 | 1152 | 10.6 | 12.6 | 14.7 | 18.7 | 22.7 | | |
| 1200 | 1255 | 11.4 | 13.6 | 15.8 | 20.2 | | | |
| 1400 | 1462 | 13.1 | 15.7 | 18.2 | | | | |
| 1500 | 1565 | 13.9 | 16.7 | 19.4 | | | | |
| 1600 | 1668 | 14.8 | 17.7 | 20.6 | | | | |
| 1800 | 1875 | 16.4 | 19.7 | 23 | | | | |
| 2000 | 2082 | 18.1 | 21.8 | 25.4 | | | | |
| 2200 | 2288 | 19.8 | 23.8 | | | | | |
| 2400 | 2495 | 21.4 | 25.8 | | | | | |
| 2600 | 2702 | 23.1 | 27.9 | | | | | |

Minimal Allowable diameter of lower pressure class pipes are C20 DN700;C25 DN350;C30 DN300
Gray parts mean preferred pressure class
Tolerance of wall thickness-(1.3+0.001DN)

TECHNICAL DATA SHEET

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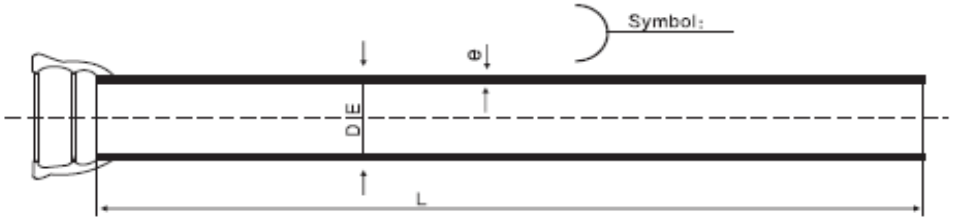
# DUCTILE IRON PIPES
## Ref.1100



## Ductile Iron Pipes with Tyton joint ISO2531-2009




**Weight Of Preferred Pressure Class And Other Pressure Classes**

| DN(mm) | DN(mm) | Standard Weight (Kg) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | C20 | C25 | C30 | C40 | C50 | C64 | C100 |
| 80 | 98 | | | | 58 | 58 | 58 | 58 |
| 100 | 118 | | | | 71 | 71 | 71 | 87 |
| 125 | 144 | | | | 89 | 89 | 95 | 125 |
| 150 | 170 | | | | 106 | 106 | 123 | 167 |
| 200 | 222 | | | | 146 | 166 | 196 | 271 |
| 250 | 274 | | | | 210 | 242 | 290 | 402 |
| 300 | 326 | | | 236 | 282 | 332 | 394 | 555 |
| 350 | 378 | | 276 | 335 | 374 | 436 | 522 | 738 |
| 400 | 429 | | 339 | 394 | 466 | 548 | 657 | 934 |
| 450 | 480 | | 423 | 472 | 577 | 681 | 821 | 1167 |
| 500 | 532 | | 479 | 566 | 689 | 818 | 986 | 1417 |
| 600 | 635 | | 693 | 783 | 963 | 1142 | 1383 | 1992 |
| 700 | 738 | 788 | 932 | 1037 | 1275 | 1520 | 1848 | 2676 |
| 800 | 842 | 1000 | 1165 | 1328 | 1643 | 1956 | 2394 | |
| 900 | 945 | 1237 | 1446 | 1654 | 2045 | 2444 | 2996 | |
| 1000 | 1048 | 1513 | 1759 | 2004 | 2504 | 2987 | | |
| 1100 | 1152 | 1803 | 2103 | 2416 | 3011 | 3601 | | |
| 1200 | 1255 | 2122 | 2481 | 2840 | 3552 | | | |
| 1400 | 1462 | 2908 | 3403 | 3877 | | | | |
| 1500 | 1565 | 3340 | 3911 | 4459 | | | | |
| 1600 | 1668 | 3778 | 4408 | 5036 | | | | |
| 1800 | 1875 | 4753 | 5559 | 6363 | | | | |
| 2000K | 2082 | 5591 | 6595 | 7568 | | | | |
| 2200K | 2288 | 6752 | 7945 | | | | | |
| 2400K | 2495 | 8149 | 9580 | | | | | |
| 2600K | 2702 | 9520 | 11209 | | | | | |

Weight of T-Type Joint 6m length pipes according to ISO2531-2009
Gray parts mean preferred wall thickness class

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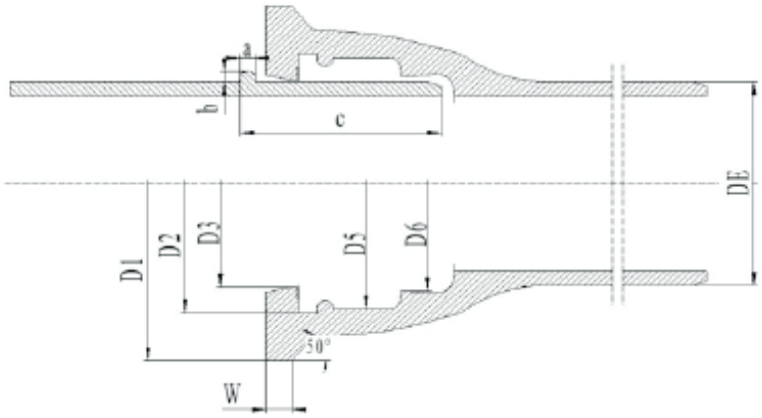
# DUCTILE IRON PIPES
## Ref.1100

TECHNICAL DATA SHEET

## Ductile Iron Pipes with Self-restrained joint Class K9




| | K9 Weight | D1 | W | Spigot size | | | | Socket size | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | D4 | a | b | c | D2 | D3 | D5 | D6 |
| DN80 | 78 | 167±1 | 13±1 | $98^{+1}_{-2.7}$ | $5^{+1}_{0}$ | $4^{+1}_{0}$ | $85^{+1}_{0}$ | 123±1 | $100.5^{+1}_{-1}$ | $119.1^{+1}_{-1}$ | 103.2±2 |
| DN100 | 96 | 188±1 | 13±1 | $118^{+1}_{-2.8}$ | $5^{+1}_{0}$ | $4^{+1}_{0}$ | $88^{+1}_{0}$ | 143±1 | $120.5^{+1}_{-1}$ | $138.9^{+1}_{-1}$ | 123.4±2 |
| DN150 | 146 | 242±1 | 13±1 | $170^{+1}_{-2.9}$ | $5^{+1}_{0}$ | $4^{+1}_{0}$ | $94^{+1}_{0}$ | 192±1 | $172.5^{+1}_{-1}$ | $190.6^{+1}_{-1}$ | 175.3±2 |
| DN200 | 196 | 294±1 | 13±1 | $222^{+1}_{-3}$ | $5^{+1}_{0}$ | $4^{+1}_{0}$ | $105^{+1}_{0}$ | $250^{+1.5}_{-1}$ | $224.5^{+1.5}_{-1}$ | $245.2^{+1.5}_{-1}$ | 227.8±2 |
| DN250 | 258 | 351±1 | 13±1 | $274^{+1}_{-3.1}$ | $5^{+1}_{0}$ | $4^{+1}_{0}$ | $105^{+1}_{0}$ | $301.5^{+1.5}_{-1}$ | $276.5^{+1.5}_{-1}$ | $296.9^{+1.5}_{-1}$ | 279.7±2 |
| DN300 | 327 | $408.2^{+1.3}_{-1.2}$ | 13±1 | $326^{+1}_{-3.3}$ | $5^{+1}_{0}$ | $4^{+1}_{0}$ | $110^{+1}_{0}$ | $356.5^{+1.8}_{-1}$ | $328.5^{+1.8}_{-1}$ | $351.7^{+1.8}_{-1}$ | 332.1±2 |
| DN350 | 408 | $464.2^{+1.3}_{-1.2}$ | 13±1 | $378^{+1}_{-3.4}$ | $5^{+1}_{0}$ | $4^{+1}_{0}$ | $110^{+1}_{0}$ | $408^{+1.8}_{-1}$ | $380.5^{+1.8}_{-1}$ | $403.4^{+1.8}_{-1}$ | 383.8±2 |
| DN400 | 488 | $516.2^{+1.3}_{-1.2}$ | 13±1 | $429^{+1}_{-3.5}$ | $5^{+1}_{0}$ | $4^{+1}_{0}$ | $110^{+1}_{0}$ | $462^{+2.1}_{-1}$ | $431.5^{+2.1}_{-1}$ | $457.2^{+2.1}_{-1}$ | 435.8±2.5 |
| DN450 | 582 | $576.5^{+1.3}_{-1.2}$ | 13±1 | $480^{+1}_{-3.6}$ | $7^{+1}_{0}$ | $7^{+1}_{0}$ | $120^{+1}_{0}$ | $514^{+2.2}_{-1}$ | $482.5^{+2.2}_{-1}$ | $509^{+2.2}_{-1}$ | 487±2.5 |
| DN500 | 676 | $629.5^{+1.3}_{-1.2}$ | 19±1 | $532^{+1}_{-3.8}$ | $7^{+1}_{0}$ | $7^{+1}_{0}$ | $120^{+1}_{0}$ | $568^{+2.4}_{-1}$ | $534.5^{+2.4}_{-1}$ | $562.6^{+2.4}_{-1}$ | 539.4±3 |
| DN600 | 888 | 738.5±1 | 19±1 | $635^{+1}_{-4}$ | $7^{+1}_{0}$ | $7^{+1}_{0}$ | $120^{+1}_{0}$ | $673.4^{+2.7}_{-1}$ | $637.5^{+2.7}_{-1}$ | $668^{+2.7}_{-1}$ | 642.6±3 |
| DN700 | 1132 | 863±2 | 19±1 | $738^{+1}_{-4.2}$ | $7^{+1}_{0}$ | $7^{+1}_{0}$ | $150^{+1}_{0}$ | $788^{+3.5}_{-1}$ | $740.5^{+3.5}_{-1}$ | $779.3^{+3.5}_{-1}$ | 745.8±3.5 |
| DN800 | 1416 | 970±2 | 19±1 | $842^{+1}_{-4.5}$ | $7^{+1}_{0}$ | $7^{+1}_{0}$ | $160^{+1}_{0}$ | $894^{+3.8}_{-1}$ | $844.5^{+3.8}_{-1}$ | $885.9^{+3.8}_{-1}$ | 850±3.8 |
| DN900 | 1722 | 1080±2 | 19±1 | $945^{+1}_{-4.8}$ | $8^{+1}_{0}$ | $8^{+1}_{0}$ | $175^{+1}_{0}$ | $1000^{+4.1}_{-1}$ | $947.5^{+4.1}_{-1}$ | $991.3^{+4.1}_{-1}$ | 953.2±4.1 |
| DN1000 | 2050 | 1189±2 | 19±1 | $1048^{+1}_{-5}$ | $8^{+1}_{0}$ | $8^{+1}_{0}$ | $185^{+1}_{0}$ | $1105^{+4.4}_{-1}$ | $1050.5^{+4.4}_{-1}$ | $1097.1^{+4.4}_{-1}$ | 1056.4±4.4 |
| DN1100 | 2415 | 1298±2 | 19±1 | $1152^{+1}_{-5.2}$ | $8^{+1}_{0}$ | $8^{+1}_{0}$ | $200^{+1}_{0}$ | $1211^{+4.7}_{-1}$ | $1155^{+4.7}_{-1}$ | $1202.5^{+4.7}_{-1}$ | 1160.2±4.7 |
| DN1200 | 2806 | 1408±2 | 19±1 | $1255^{+1}_{-5.5}$ | $9^{+1}_{0}$ | $9^{+1}_{0}$ | $215^{+1}_{0}$ | $1317^{+5}_{-1}$ | $1258^{+5}_{-1}$ | $1308^{+5}_{-1}$ | 1264±5 |
| DN1400 | 3741 | 1646±2 | 24±1 | $1462^{+1}_{-6}$ | $9^{+1}_{0}$ | $9^{+1}_{0}$ | $239^{+2}_{0}$ | $1529^{+5.6}_{-1}$ | $1465^{+5.6}_{-1}$ | $1509^{+5.6}_{-1}$ | 1471±5.6 |
| DN1500 | 4272 | 1735±2 | 26±1 | $1565^{+1}_{-6}$ | $9^{+1}_{0}$ | $9^{+1}_{0}$ | $240^{+2}_{0}$ | $1635^{+6}_{-1}$ | $1568.5^{+6}_{-1}$ | $1615^{+6}_{-1}$ | 1575±6 |
| DN1600 | 4788 | 1844±2 | 30±1 | $1668^{+1}_{-8}$ | $10^{+1}_{0}$ | $10^{+1}_{0}$ | $240^{+2}_{0}$ | $1743^{+6}_{-1}$ | $1672^{+6}_{-1}$ | $1719^{+6}_{-1}$ | 1682±6 |
| DN1800 | 5925 | 2062±2 | 40±1 | $1875^{+1}_{-7}$ | $10^{+1}_{0}$ | $10^{+1}_{0}$ | $300^{+2}_{0}$ | $1954^{+6.8}_{-1}$ | $1880^{+6.8}_{-1}$ | $1926^{+6.8}_{-1}$ | 1885±6.8 |

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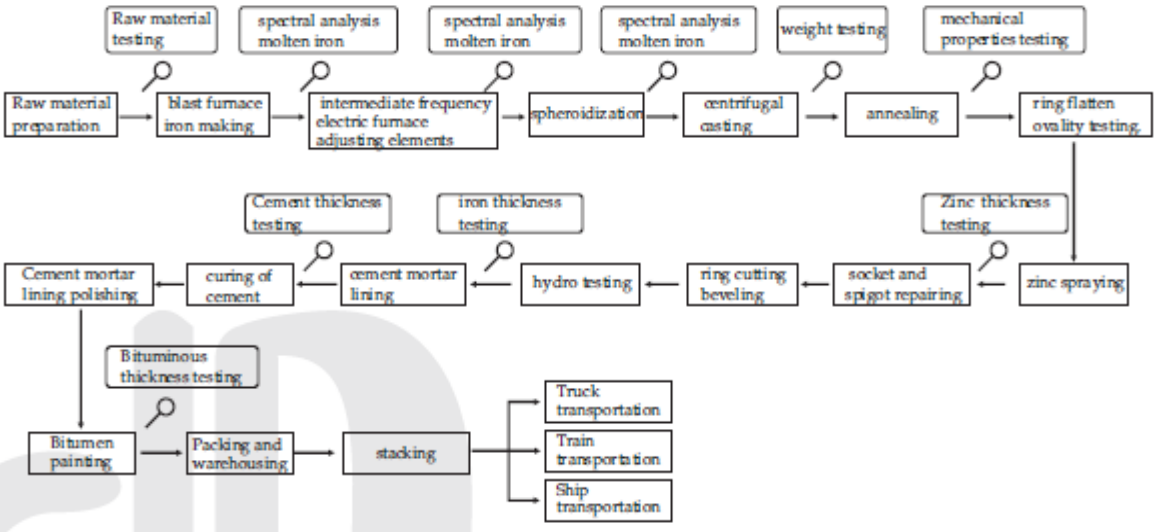
# DUCTILE IRON PIPES
## Ref.1100

| DN(mm) | Minimum work test pressure (Bar) | | |
|---|---|---|---|
| | ISO2531-1998 | | ISO2531-2009 |
| | K<9 | K≥9 | Preferred pressure Class |
| ≤300 | $0.5(K+1)^2$ | 50 | 40 |
| 350-600 | $0.5K^2$ | 40 | 30 |
| 700-1000 | $0.5(K-1)^2$ | 32 | 25 |
| 1200-2000 | $0.5(K-2)^2$ | 25 | 25 |
| 2200-2600 | $0.5(K-3)^2$ | 18 | 25 |

## Production process flow of ductile iron pipes and Advance Quality Testing System

### Process flow diagram




TECHNICAL DATA SHEET

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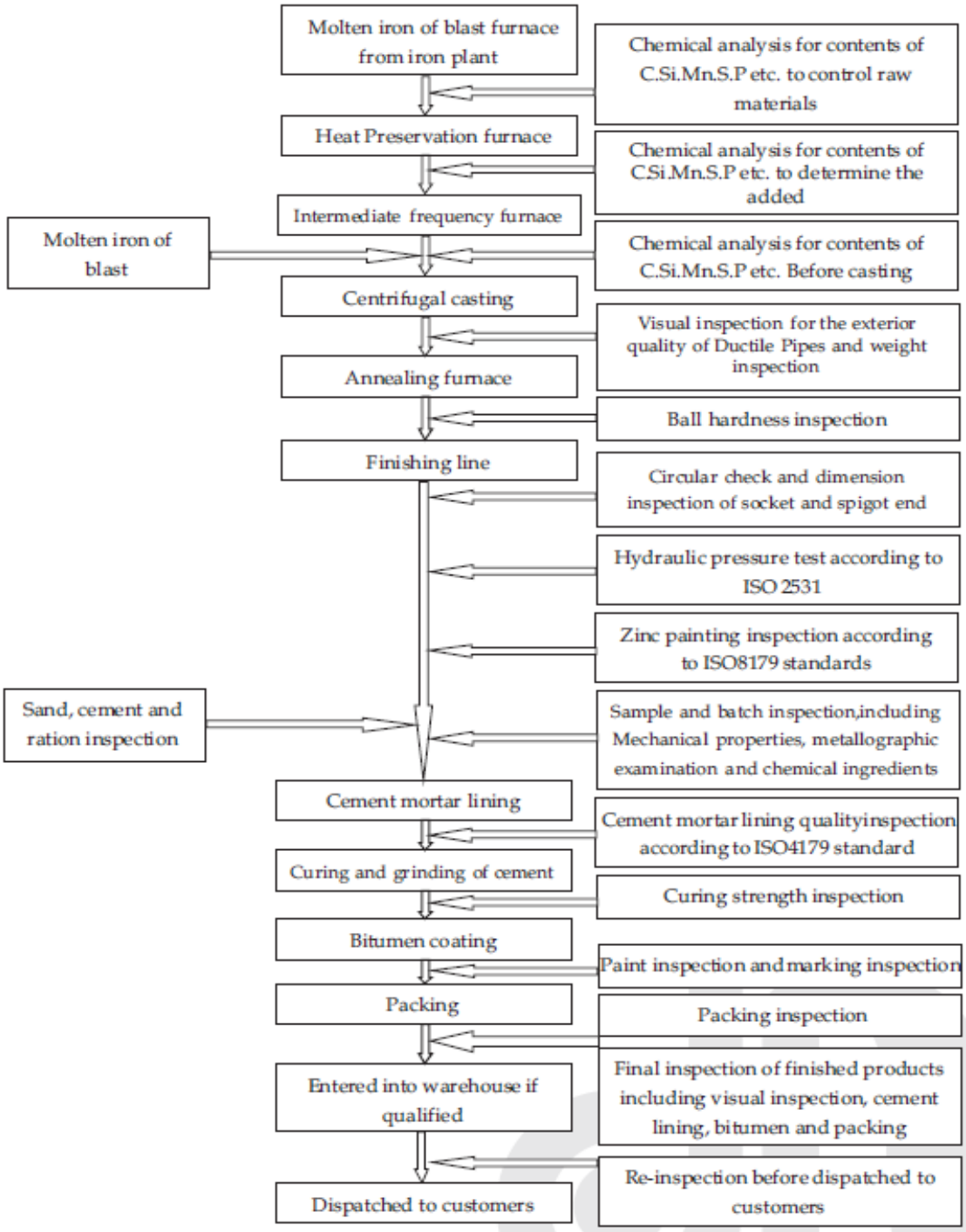
# DUCTILE IRON PIPES
## Ref.1100

## QUALITY CONTROL SYSTEM

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# DUCTILE IRON PIPES
## Ref.1100

## TEST AND INSPECTION PLAN (QAP)

| Item No. | Description | Objective | Quality Control Processing (By Mill) |
|---|---|---|---|
| 1 | Raw material used for Ductile pipes | Property or chemical composition for main elements | Review records as per ISO9001 quality operation file |
| 2 | Induction furnace and treated metal | Molten metal temperature | In manufactueing as per ISO9001 quality operation file |
| | | Chemical composition of molten metal | Analysis the samples per furnace as per the standards of manufacturer's |
| | | Spheroidizing & Nodularity | Analysis the samples per furnace as per the standards of manufacturer's |
| 3 | Casting | Check for surface defect finish & integrity | Visual check and weight check |
| 4 | DI pipes | Heat treatment (annealing) | Check Micro-structure of samples as per the samples as per ISO standard |
| | | Mechanical test | Check Micro-structure of samples as per the samples as per ISO standard |
| | | Hydrostatic test | 100% pressure test |
| | | Size and dimension | Checking dimension of length and joint, OD, wall thickness, appearance |
| 5 | Zinc spraying | Zinc coating | Checking the sample pipes' zinc spraying mass |
| 6 | Lining and coating | Cement lining | 100% surface defects visual check, check thickness of the lining randomly as per ISO standard |
| | | Bitumen coating | 100% surface defects visual check, check randomly for coating thickness |
| 7 | Making and packing | Identification | 100% visual check |

All the tests and inspections are according to ISO2531 and ISO9001. Other standards will be followed accordingly if requested.

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## DUCTILE IRON PIPES
Ref.1100

# Lifting, Transportation of ductile iron pipes

## Pipe Lifting

### 1.End lifting

Use appropriately shaped hooks, coated with a polyamide type protection.

### 2.Barrel lifting

Use wide flat slings maintained sufficiently widely apart to prevent accidental slippage. Prohibit wire ropes which may damage the coating.

A single sling may be used on site. In that case, lift the pipe at its centre of gravity, with the sling gripping the pipe to prevent slippage.

### 3.Bundle lifting

DN80 to 300 bundles are unloaded with flat textile slings.

Take precaution of handling with steel cable, hoisting belts and specialized rigging avoiding from pipe's rock. While using steel cable, single cable is not admitted, for the purpose of protecting outer anti-corrosion layer, steel cable should be packed by rubber or other similar material. While using hook, it also should be covered with rubber or other similar material for protecting cement lining layer. Especially for pipe with relative large diameter, hook should be mounted a gasket with same shape as internal diameter of pipes while handing. It is not available fixing hook on the steel belts or socket side and spigot side of pipe while handling pipes in bundle.

TECHNICAL DATA SHEET





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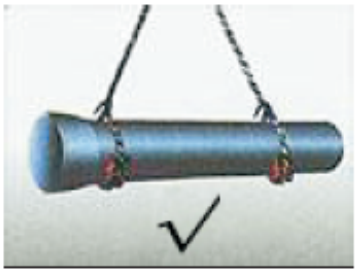
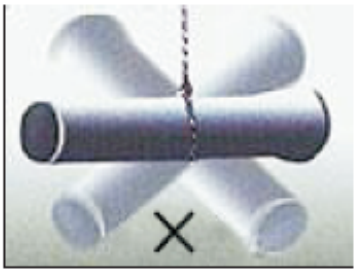
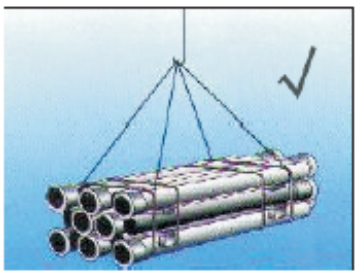
## Ref.1100







## Transportation

Vehicles must be suitable for transporting, loading and unloading ductile iron pipes. The following basic rules must be observed:

1. Prevent any contact between the pipeline components and metal surfaces (to avoid coating damage).

2. Prevent any direct pipe connecting with the bottom of the trailer (keep the pipes horizontal with two parallel rows of good quality timbers fastened to the floor).

3. Facilitate pipe loading and unloading under safe conditions (use textile slings or protected hooks; do not use wire ropes).

4. Ensure the load is in good order during transport.

5. Use vehicles and trailers equipped with side supports to stabilize the load (adequately sized stanchions on either side of the floor).

6. Secure the load with textile straps and a tautening device.

TECHNICAL DATA SHEET

*All the components can be substituted with equivalent or higher-class materials.*



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## DUCTILE IRON PIPES
**Ref.1100**

# Installation guide

1. Using a wire brush and a rag, carefully clear the inside of the socket particularly the gasket recesses. In particular, remove any deposits of earth, sand, etc. also clean the spigot of the pipe to be jointed and the gasket itself. Check the presence of the chamfer, as well as the absence of any damage on the spigot of the pipe. (See picture 1 & 2)

2. Check the condition of the gasket and insert it into its recess, with the lips pointing towards the bottom of the socket. Make sure that the gasket is correctly compressed all the way round. (See picture 3)

3. Lubricate interface of gasket and spigot end. Lubrication could be soap water or nonpoisonous alkaline lubrication. (See picture4&5)

4. Insert spigot into socket till touch gasket at the same axle. It must be straightened properly to make the central axle of pipes or fittings coincide. While connecting pipe, different pipe adopts different tools. Insert pipe carefully and continuously, if existing larger resistance force, pipe connection should be stopped immediately then draw out the pipe and check the position of rubber gasket and socket and spigot end. After removing troubles, insert again. The insert depth required should be between two white lines. (See picture 6)

5. Check that the gasket is correctly in position by inserting the end of a metal ruler through the annular spigot and socket gap until it touches the gasket. The ruler must penetrate to the same depth around the whole circumference.

6. After finish assembling joint, make sure that the curvature after assemble does not exceed the permissible angular deflection of particular joint. See the table.





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# DUCTILE IRON PIPES
## Ref.1100

| DN(mm) | Permissible angular deflection while laying |
|---|---|
| 80-150 | 5° 00' |
| 200-300 | 4° 00' |
| 350-600 | 3° 00' |
| 700-800 | 2° 00' |
| 900-1800 | 1° 30' |

Picture 1

Picture 2

Picture 3

Picture 4

Picture 5

Picture 6

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TECHNICAL DATA SHEET

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