

Specifications

Standard Technical Specification of Mother Meter Plan

| Steel Bend (22.5°) | |
|---|---|
| Material Type | Cast Iron/Ductile Iron |
| End Connection | FE x FE |
| Dimension | 4 sets 100mmØ X 22.5°, 1 set 200mmØ x 22.5° |
| Number of Holes | 8 holes for 100mmØ, 12 holes for 200mmØ |
|  | |

| Rubber Gasket | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----------------------|---|--------------|---------------------|-------------------------|-----------------------|--------------|---------------|-------------------------|-----------------------|--------------|---------------|--------------|----|--------------|----|----|-----|-----|----|---|----|----|----|----|----|-------|-----|-----|----|---|----|----|----|----|----|-----|-----|-----|----|---|----|----|----|----|----|-----|-----|-----|----|---|----|----|----|----|----|-----|-----|-----|----|----|----|----|----|----|----|-----|-----|-----|----|----|----|----|----|----|----|-----|-----|-----|----|----|----|----|----|----|----|-----|-----|-----|----|----|----|----|----|----|----|-----|-----|-----|------|----|----|----|----|----|----|-----|-----|-----|------|----|----|----|----|----|----|-----|-----|-----|------|----|----|----|----|----|----|-----|-----|-----|------|----|----|----|----|----|----|
| Material Type | Hard Rubber | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Thickness | 3mm thick with Bolt Holes | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Others | <ul style="list-style-type: none"> Shall conform to ISO 4633 and shall be suitable in contact with drinking or chlorinated water Shall conform to the Outside Diameter, Bolt Center Diameter, Bolt Hole Diameter and Number of Bolt Holes as shown below: <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2">NOMINAL SIZE</th> <th rowspan="2">OUTSIDE DIAMETER, A</th> <th rowspan="2">BOLT CENTER DIAMETER, B</th> <th rowspan="2">BOLT HOLE DIAMETER, C</th> <th rowspan="2">NO. OF BOLTS</th> <th rowspan="2">SIZE OF BOLTS</th> <th colspan="2">THICKNESS, D</th> <th colspan="2">THICKNESS, E</th> </tr> <tr> <th>STEEL</th> <th>CI</th> <th>STEEL</th> <th>CI</th> </tr> </thead> <tbody> <tr><td>50</td><td>165</td><td>125</td><td>18</td><td>4</td><td>16</td><td>20</td><td>20</td><td>20</td><td>20</td></tr> <tr><td>75/80</td><td>200</td><td>160</td><td>18</td><td>8</td><td>16</td><td>20</td><td>22</td><td>20</td><td>22</td></tr> <tr><td>100</td><td>220</td><td>180</td><td>18</td><td>8</td><td>16</td><td>22</td><td>24</td><td>22</td><td>24</td></tr> <tr><td>150</td><td>285</td><td>240</td><td>22</td><td>8</td><td>20</td><td>24</td><td>26</td><td>24</td><td>26</td></tr> <tr><td>200</td><td>340</td><td>295</td><td>22</td><td>12</td><td>20</td><td>26</td><td>30</td><td>24</td><td>30</td></tr> <tr><td>250</td><td>405</td><td>355</td><td>26</td><td>12</td><td>24</td><td>28</td><td>32</td><td>26</td><td>32</td></tr> <tr><td>300</td><td>460</td><td>410</td><td>26</td><td>12</td><td>24</td><td>32</td><td>32</td><td>28</td><td>32</td></tr> <tr><td>350</td><td>520</td><td>470</td><td>26</td><td>16</td><td>24</td><td>35</td><td>36</td><td>30</td><td>36</td></tr> <tr><td>400</td><td>580</td><td>525</td><td>29.5</td><td>16</td><td>27</td><td>38</td><td>38</td><td>32</td><td>38</td></tr> <tr><td>450</td><td>640</td><td>585</td><td>29.5</td><td>20</td><td>27</td><td>42</td><td>40</td><td>40</td><td>40</td></tr> <tr><td>500</td><td>715</td><td>650</td><td>32.5</td><td>20</td><td>30</td><td>46</td><td>42</td><td>44</td><td>42</td></tr> <tr><td>600</td><td>840</td><td>770</td><td>35.5</td><td>20</td><td>33</td><td>52</td><td>48</td><td>54</td><td>48</td></tr> </tbody> </table> <p style="font-size: small; text-align: center;">NOTE: All dimensions are in millimeters Flange detail per ISO 7005, PN 16</p> | NOMINAL SIZE | OUTSIDE DIAMETER, A | BOLT CENTER DIAMETER, B | BOLT HOLE DIAMETER, C | NO. OF BOLTS | SIZE OF BOLTS | THICKNESS, D | | THICKNESS, E | | STEEL | CI | STEEL | CI | 50 | 165 | 125 | 18 | 4 | 16 | 20 | 20 | 20 | 20 | 75/80 | 200 | 160 | 18 | 8 | 16 | 20 | 22 | 20 | 22 | 100 | 220 | 180 | 18 | 8 | 16 | 22 | 24 | 22 | 24 | 150 | 285 | 240 | 22 | 8 | 20 | 24 | 26 | 24 | 26 | 200 | 340 | 295 | 22 | 12 | 20 | 26 | 30 | 24 | 30 | 250 | 405 | 355 | 26 | 12 | 24 | 28 | 32 | 26 | 32 | 300 | 460 | 410 | 26 | 12 | 24 | 32 | 32 | 28 | 32 | 350 | 520 | 470 | 26 | 16 | 24 | 35 | 36 | 30 | 36 | 400 | 580 | 525 | 29.5 | 16 | 27 | 38 | 38 | 32 | 38 | 450 | 640 | 585 | 29.5 | 20 | 27 | 42 | 40 | 40 | 40 | 500 | 715 | 650 | 32.5 | 20 | 30 | 46 | 42 | 44 | 42 | 600 | 840 | 770 | 35.5 | 20 | 33 | 52 | 48 | 54 | 48 |
| NOMINAL SIZE | OUTSIDE DIAMETER, A | | | | | | | BOLT CENTER DIAMETER, B | BOLT HOLE DIAMETER, C | NO. OF BOLTS | SIZE OF BOLTS | THICKNESS, D | | THICKNESS, E | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | STEEL | CI | STEEL | CI | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50 | 165 | 125 | 18 | 4 | 16 | 20 | 20 | 20 | 20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 75/80 | 200 | 160 | 18 | 8 | 16 | 20 | 22 | 20 | 22 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 100 | 220 | 180 | 18 | 8 | 16 | 22 | 24 | 22 | 24 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 150 | 285 | 240 | 22 | 8 | 20 | 24 | 26 | 24 | 26 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 200 | 340 | 295 | 22 | 12 | 20 | 26 | 30 | 24 | 30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 250 | 405 | 355 | 26 | 12 | 24 | 28 | 32 | 26 | 32 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 300 | 460 | 410 | 26 | 12 | 24 | 32 | 32 | 28 | 32 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 350 | 520 | 470 | 26 | 16 | 24 | 35 | 36 | 30 | 36 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 400 | 580 | 525 | 29.5 | 16 | 27 | 38 | 38 | 32 | 38 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 450 | 640 | 585 | 29.5 | 20 | 27 | 42 | 40 | 40 | 40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 500 | 715 | 650 | 32.5 | 20 | 30 | 46 | 42 | 44 | 42 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 600 | 840 | 770 | 35.5 | 20 | 33 | 52 | 48 | 54 | 48 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



| Short Pipe (Flanged Adaptor/Flanged Nipple) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|------|--------------------|------|--------|-----------------|------------------------------|----------------------|--|--------------------|--|-----|-----------------|------|------|------|------|------|------|------|-----|-----|--------|------|------|------|------|-----|-----|-------|------|
| Material Type | Cast Iron/Ductile Iron | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| End Connection | FE x FE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dimension | 3 sets 100mmØ, 3 sets 200mmØ, 1 set 150mmØ – Flange Adaptors 1 set 100mmØ, 1 set 200mmØ – Steel Nipples | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Number of Holes | 8 holes for 100mmØ, 12 holes for 200mmØ, 8 holes for 150mmØ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Others | <ul style="list-style-type: none"> • Shall be suitable in contact with potable water and shall comply with the requirements of ANSI/NSF 61 • Shall be manufactured and tested in accordance with ISO 4427 • Base compound material designation shall be PE 100 as listed in ISO 4427, with corresponding minimum required strength (MRS) at 50 years and 20oC of 10 MPa and maximum allowable hydrostatic design stress of 8 MPa • Pipe density shall be 0.941 g/ml minimum • Carbon Black Content of the pipe shall be 2.0% minimum • Pipe Tensile Strength at Break shall be 20.0 MPa minimum • Pipe Elongation at Break shall be 350% minimum • Dimensional requirements shall be as specified in the table below when tested in accordance with ISO 3126: <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="2">Nominal Outside Diameter, mm</th> <th colspan="2">Outside Diameter, mm</th> <th colspan="2">Wall Thickness, mm</th> <th rowspan="2">SDR</th> <th rowspan="2">Pressure Rating</th> </tr> <tr> <th>Min.</th> <th>Max.</th> <th>Min.</th> <th>Max.</th> </tr> </thead> <tbody> <tr> <td>25mm</td> <td>25.0</td> <td>25.3</td> <td>2.3</td> <td>2.7</td> <td>SDR 11</td> <td>PN16</td> </tr> <tr> <td>63mm</td> <td>63.0</td> <td>63.6</td> <td>7.1</td> <td>8.5</td> <td>SDR 9</td> <td>PN20</td> </tr> </tbody> </table> <p style="text-align: center; font-size: small;">Dimensional Requirements for PE pipes</p> <ul style="list-style-type: none"> • Shall conform to the hydrostatic strength indicated in the table below under the specified conditions when tested in accordance with ISO1167: | | | | | | Nominal Outside Diameter, mm | Outside Diameter, mm | | Wall Thickness, mm | | SDR | Pressure Rating | Min. | Max. | Min. | Max. | 25mm | 25.0 | 25.3 | 2.3 | 2.7 | SDR 11 | PN16 | 63mm | 63.0 | 63.6 | 7.1 | 8.5 | SDR 9 | PN20 |
| Nominal Outside Diameter, mm | Outside Diameter, mm | | Wall Thickness, mm | | SDR | Pressure Rating | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Min. | Max. | Min. | Max. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25mm | 25.0 | 25.3 | 2.3 | 2.7 | SDR 11 | PN16 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 63mm | 63.0 | 63.6 | 7.1 | 8.5 | SDR 9 | PN20 | | | | | | | | | | | | | | | | | | | | | | | | | |

| Duration | Temperature, °C | Test Stress, MPa |
|-----------|-----------------|------------------|
| 100 hrs. | 20 | 12.4 |
| 165 hrs. | 80 | 5.5 |
| 1000 hrs. | 80 | 5.0 |

Hydrostatic Pressure Test for PE Pipe

- The value for the longitudinal reversion shall not be greater than 3% when tested in accordance with ISO 2505-1, method A or B, at 110 ± 2 °C for the duration specified in the table below:

| | Method A (Using Liquid Bath) | Method B (Using Air Oven) |
|--------------------|---------------------------------|--|
| Duration (min.) | 30 | 60 for $e \leq 8$ 120 for $8 < e \leq 16$ 240 for $e > 16$ |

Exposure Duration for Longitudinal Reversion for PE pipes



Gate Valve with Operating Nut

| | |
|------------------------|---|
| Material Type | Cast Iron/Ductile Iron |
| End Connection | FE x FE |
| Dimension | 2 sets 100mmØ, 1 set 200mmØ, 1 set 150mmØ |
| Number of Holes | 8 holes for 100mmØ, 8 holes for 150mmØ, 12 holes for 200mmØ |
| Others | <ul style="list-style-type: none"> Shall be designed to provide a clear bore through the valve when fully open Shall be equipped with a nut and shall open by turning the nut in a counterclockwise direction when viewed from the top after installation Shall be in accordance with ISO 7259 |

| | |
|--|---|
| | <ul style="list-style-type: none"> • Shall be designed to withstand a minimum working pressure of 16bars • Shall be resilient seated, non-rising stem, straight through bore unobstructed waterway design and with integrally cast double-flanged bodies • Shall have a face to face dimensions in accordance with ISO 5752, series 14 / EN 558-1 series 14 and 15 • Body and bonnet shall be made of ductile iron in compliance with ISO 1083 or ASTM A536 or cast iron in accordance with ASTM A126 Class B • Wedge shall be made of ductile iron in compliance with ISO 1083 or ASTM A536 and shall be fully encapsulated inside and outside with a vulcanized SBR or EPDM rubber • Body and bonnet shall be assembled with countersunk sealed bolts • Valve stem with rolled-on thread shall be stainless steel conforming to ASTM A276, Type 316 • Wedge and stem coupling nut shall be made of brass or bronze in accordance with AWWA C509, Grade A, D or E • Valves bigger than DN 200 shall have additional axial roller bearings to reduce friction and operating torques to enable an easy manual operation of the valves by one person • Gate valves shall be equipped with a 50-mm square-operating nuts with arrow for opening direction and shall open by turning in a counterclockwise direction when viewed from the top |
| |  |

| Mechanical Flange Tee | |
|------------------------------|--|
| Material Type | Cast Iron/Ductile Iron |
| End Connection | FE x FE x FE |
| Dimension | 1 set 100mmØ X 100mmØ 1 set 150mmØ x 150mmØ |



| Reducer | |
|-----------------------|--|
| Material Type | Cast Iron |
| End Connection | FE x FE |
| Dimension | 200mmØ x 150mmØ |
| |  |

| Surface Box Cover for Gate Valve/Valve Box Cover | |
|---|-----------|
| Material Type | Cast Iron |
| Dimension | 150mmØ |



| Bolt and Nuts | |
|----------------------|---|
| Material Type | Galvanized Steel |
| Others | <ul style="list-style-type: none"> • Bolts, anchor bolts, nuts and washers shall be of low carbon steel, Grade B of ASTM A307. • Threads and tapping for all bolts and nuts respectively shall conform to ISO 261 • Bolt head and nut shapes shall be hexagonal and shall conform to ISO 272. • Washers shall be provided under nuts and under the heads of bolts. • Bolts, anchor bolts, nuts and similar threaded fasteners, after being properly cleaned, shall be galvanized in accordance with the requirements of ASTM A153. |
| | |

| uPVC Pipe | |
|----------------------|--|
| Material Type | uPVC |
| Dimension | 100mmØ, 6 meters / length 200mmØ, 6 meters / length |

| | |
|-----------------------|---------|
| End Connection | PO x PE |
|-----------------------|---------|

- Others**
- With Rubber Gasket
 - Pipes and fittings, unless otherwise specified, shall conform with PNS 65 and/or ISO 4422.
 - Base compound material shall conform to the applicable requirements of ISO 4422; with minimum required strength (MRS) at 50 years and at 20oC of at least 25 MPa (3625 psi), and with maximum allowable hydrostatic design stress of 10MPa (1450 psi).
 - The extracted quantities of lead or tin measured as metals in accordance with ISO 3114 shall not exceed the limits specified in the table below. Likewise, cadmium and mercury shall not be more than the limits indicated in ISO 6992.

| Toxic Substances | Maximum Limits (mg/L) |
|---|-----------------------|
| Lead, mg/L | 0.05 |
| Di-alkyl Tin, C4, and other higher monologues measured as tin, mg/L | 0.02 |
| Cadmium, mg/L | 0.01 |
| Mercury, mg/L | 0.001 |

Limits of Extractable Toxic Substances for uPVC

- Pipes and fittings shall be classified as Series 8 of ISO 4422, with nominal working pressure of 1.25 MPa (181 psi).
- Pipe dimensional requirements shall be as specified in table below when tested in accordance with ISO 3126.

| Nominal Pipe Size, mm | Nominal Outside Diameter, mm | Outside Diameter, mm | | Wall Thickness, mm | | Tolerance on Ovality, mm | Minimum Depth of Engagement, mm |
|-----------------------|------------------------------|----------------------|-------|--------------------|------|--------------------------|---------------------------------|
| | | Min. | Max. | Min. | Max. | | |
| 50 | 63 | 63 | 63.3 | 3.8 | 4.4 | 1.5 | 64 |
| 75 | 90 | 90 | 90.3 | 5.4 | 6.2 | 1.8 | 70 |
| 100 | 110 | 110 | 110.4 | 6.6 | 7.6 | 2.2 | 75 |
| 150 | 160 | 160 | 160.5 | 9.5 | 10.9 | 3.2 | 86 |
| 200 | 225 | 225 | 225.7 | 13.4 | 15.4 | 4.5 | 100 |
| 250 | 280 | 280 | 280.9 | 16.6 | 19.1 | 9.8 | 112 |
| 300 | 355 | 355 | 356.1 | 21.1 | 24.3 | 12.4 | 124 |

Dimensional Requirements for uPVC pipe

- Pipes shall be 6m in length with tolerance of +20mm
- No Negative tolerance is allowed
- Pipes spigot ends shall be chamfered in accordance with PNS 65
- Pipe color shall be extruded blue, nearest to RAL 5012, and shall be uniformly dispersed throughout the entire surface.
- Pipes shall not show signs of delamination or disintegration when immersed in acetone
- The value for the longitudinal reversion shall not be greater than 5% when tested in accordance with ISO 2505-1, method A or B, at 150 ± 2oC for the duration specified in the table below.

| | Method A (Using Liquid Bath) | Method B (Using Air Oven) |
|-----------------|---------------------------------|--|
| Duration (min.) | 15 for e ≤ 8 30 for e > 8 | 60 for e ≤ 8 120 for 8 < e ≤ 16 240 for e > 16 |

Exposure Duration for Longitudinal Reversion for uPVC pipe

- Pipes shall withstand the test pressures indicated in the table below under the specified conditions when tested in accordance with ISO 1167.

| Test | Minimum Duration | Temp., °C | Test Pressure MPa (psi) |
|--------------------------|------------------|-----------|-------------------------|
| Burst Pressure Test | 60 sec. | 28 | 5.0 (725) |
| Short Term Pressure Test | 1 hr. | 28 | 4.9 (710) |
| Long Term Pressure Test | 100 hrs. | 28 | 4.0 (580) |
| Sustained Pressure Test | 1000 hrs. | 60 | 1.5 (218) |

Hydrostatic Pressure Test for uPVC pipe

