

PLEASE ADDRESS ANY CORRESPONDENCE TO WATER SUPPLY (NETWORK) DEPARTMENT

Your Ref : \_

Our Ref : WSN 92413/90/202207/PTEMETER Tel : 65172925

Date : 1 Sep 2022

E-mail : noryati\_abdullah@pub.gov.sg

To water fitting suppliers, test laboratories, Singapore Sanitary Ware Importers & Exporters' Association (SSWIEA), Singapore Plumbing Society (SPS), Licensed Plumbers, Professional Engineers and relevant government agencies and associations.

Dear Sir/Madam

## STIPULATION OF STANDARDS AND REQUIREMENTS FOR WATER FITTING:

### -PRIVATE WATER METERS FOR USE IN WATER SERVICE INSTALLATIONS

We wish to inform you that **with effect from 1 Jun 2023 (based on date of certification)**, only private water meters which have been tested and certified in accordance with the standards & requirements stipulated in the attached **Appendix** shall be allowed to be offered, displayed or advertised for supply for water service installations in Singapore.

2. **Prior to 1 Jun 2023**, private water meters which have been tested for compliance with the stipulated standards in the **Appendix** are allowed to be supplied for use in water service installations in Singapore.

3. The above-mentioned water fitting are deemed to comply with the stipulated Standards if it is tested as complying with such Standards by a testing laboratory accredited by the Singapore Accreditation Council (SAC) or its Mutual Recognition Arrangement (MRA) partners. For more information, please visit SAC's website at [www.sac-accreditation.gov.sg](http://www.sac-accreditation.gov.sg). Test reports issued by a testing laboratory accredited by the SAC or its MRA partners must bear the SAC-SINGLAS mark or the mark of the International Laboratory Accreditation Cooperation Mutual Recognition Arrangement (ILAC-MRA) respectively. Test laboratories can approach Water Fittings Section, Inspectorate Branch if they have clarifications on acceptance of test reports.

4. Clear and colour photographs of the above water fittings and its associated parts, if any, should be clearly reflected in the test reports. The above water fittings must be supported with valid, complete and full test reports. Suppliers shall ensure that the test reports of the air valves which they offer-for-sale, advertise, display, sell or supply are properly kept and must be produced for verification upon request by PUB. PUB conducts compliance checks and will take action against any non-compliance.

5. A copy of this circular is also downloadable from PUB's website at [www.pub.gov.sg](http://www.pub.gov.sg). Please disseminate this circular to your relevant staff, members, distributors, retailers and other industry partners for their information and compliance.

6. Please contact me or email to [pub\\_waterfittings@pub.gov.sg](mailto:pub_waterfittings@pub.gov.sg) if you have any clarifications.

Yours faithfully

A handwritten signature in black ink, appearing to read 'Noriyati'.

NORYATI ABDULLAH  
SENIOR ENGINEER (INSPECTORATE)  
for DIRECTOR  
WATER SUPPLY (NETWORK) DEPARTMENT

Enclosed.

## Appendix

**PUB's Stipulation of Standards & Requirements for Private Water Meters for Use in Water Service Installations****(For sizes DN15, DN25, DN40, DN50, DN65, DN100, DN150, DN200 & DN300mm)**

No	General requirements	Requirements and tests for private water meters for use in water service installations																																																												
1		<p>(a) Private water meter shall be tested to comply with the standards ISO 4064:2014 or OIML R49:2006 Standards or the respective latest edition of ISO Standards. The stipulated tests and requirements are as given in this document. The meters shall be tested by an SAC-accredited test laboratory or its Mutual Recognition Arrangement (MRA) partners.</p> <p>and</p> <p>(b) Private water meter shall also be supported with a Certificate of Conformity (CoC) issued by an SAC-accredited product certification or its Mutual Recognition Arrangement (MRA) partners.</p> <p>All documents such as test reports, certificates, etc. shall be in English version.</p>																																																												
2	<p>Meter accuracy</p> <p>Test methods : Clause 7.4 of ISO 4064-2:2014</p> <p>The maximum permissible error in the flow range from the transitional flow rate (Q2) to the maximum flow rate (Q4) shall be <math>\pm 2\%</math>. The maximum permissible error in the flow range from the minimum flow rate (Q1) up to but excluding the transitional flow rate (Q2) shall be <math>\pm 5\%</math>.</p> <p>The minimum, transitional, nominal and maximum flow rates are shown in Table 1. The calibration/re-adjustment mechanism of the meters (except for the by-pass meter of compound meter) shall be housed internally.</p> <p>Table 1</p> <table border="1" data-bbox="276 1361 1481 1749"> <thead> <tr> <th>Size of meter (mm)</th> <th>Measuring range R=Q3/Q1</th> <th>Maximum flow rate (Q4) (Lit/hr)</th> <th>Nominal flow rate (Q3) (Lit/hr)</th> <th>Transitional flow rate (Q2) (Lit/hr)</th> <th>Minimum flow rate (Q1) (Lit/hr)</th> </tr> </thead> <tbody> <tr> <td>15 Single</td> <td>R160</td> <td>3125</td> <td>2500</td> <td>25</td> <td>15.6</td> </tr> <tr> <td>25 Single</td> <td>R160</td> <td>7,875</td> <td>6,300</td> <td>63</td> <td>39.4</td> </tr> <tr> <td>40 Single</td> <td>R80</td> <td>20,000</td> <td>16,000</td> <td>320</td> <td>200</td> </tr> <tr> <td>50 Single</td> <td>R250</td> <td>31,000</td> <td>25,000</td> <td>160</td> <td>100</td> </tr> <tr> <td>65 Single</td> <td>R50</td> <td>50,000</td> <td>40,000</td> <td>1280</td> <td>800</td> </tr> <tr> <td>100 Single</td> <td>R250</td> <td>125,000</td> <td>100,000</td> <td>640</td> <td>400</td> </tr> <tr> <td>150 Single</td> <td>R50</td> <td>313,000</td> <td>250,000</td> <td>8000</td> <td>5,000</td> </tr> <tr> <td>200 Single</td> <td>R50</td> <td>500,000</td> <td>400,000</td> <td>12,800</td> <td>8,000</td> </tr> <tr> <td>300 Single</td> <td>R50</td> <td>1,250,000</td> <td>1,000,000</td> <td>32,000</td> <td>20,000</td> </tr> </tbody> </table>	Size of meter (mm)	Measuring range R=Q3/Q1	Maximum flow rate (Q4) (Lit/hr)	Nominal flow rate (Q3) (Lit/hr)	Transitional flow rate (Q2) (Lit/hr)	Minimum flow rate (Q1) (Lit/hr)	15 Single	R160	3125	2500	25	15.6	25 Single	R160	7,875	6,300	63	39.4	40 Single	R80	20,000	16,000	320	200	50 Single	R250	31,000	25,000	160	100	65 Single	R50	50,000	40,000	1280	800	100 Single	R250	125,000	100,000	640	400	150 Single	R50	313,000	250,000	8000	5,000	200 Single	R50	500,000	400,000	12,800	8,000	300 Single	R50	1,250,000	1,000,000	32,000	20,000	
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3	Pressure loss test	<p>Clause 6.5 of ISO 4064-1:2014 - Test methods : Clause 7.9 of ISO 4064-2:2014</p> <p>The pressure loss of water meters including its associated parts shall not be greater than 0.63 bar.</p>																																																												
4	Static pressure test	Clause 7.3 of ISO 4064-2:2014																																																												

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		<p>The maximum admissible pressure (MAP) for the Meters shall be 16 bar. The water meter shall be capable of withstanding the following test pressures without leakage or damage:</p> <p>a) 1.6 times the maximum admissible pressure (MAP) applied for 15 min;</p> <p>and</p> <p>b) Twice the maximum admissible pressure (MAP) applied for 1 min.</p>																																										
5	Water pressure test	Clause 7.7 of ISO 4064-2:2014																																										
6	Static magnetic field test	<p>Clause 7.2.8 of ISO 4064-1:2014.</p> <p>The totalizer shall be housed in a shockproof synthetic polymer container and it shall be rotatable on site to all positions. The totalizer shall be incorporated with pulse output in the form of inductive type to facilitate accurate remote meter reading and communication. This feature shall be immune to magnetic interference or tampering. The encapsulated totalizer of the water meter shall comply with protection class IP68.</p>																																										
7	Size, length and connection type	<p>The size of meter shall be determined by the internal diameter of inlet pipe to and outlet pipe from the meter.</p> <p>The total length of the meter body from flange to flange/connector-faces shall be as shown in Table 2.</p> <p>Table 2</p> <table border="1" data-bbox="719 1205 1331 1711"> <thead> <tr> <th data-bbox="726 1214 863 1323">Nominal Diameter</th> <th data-bbox="863 1214 1062 1323">Meter Length (mm)</th> <th data-bbox="1062 1214 1324 1323">End Connection Type</th> </tr> <tr> <th data-bbox="726 1323 863 1357">mm</th> <th data-bbox="863 1323 1062 1357">( ± 1 mm)</th> <th data-bbox="1062 1323 1324 1357"></th> </tr> </thead> <tbody> <tr><td data-bbox="726 1357 863 1391">15</td><td data-bbox="863 1357 1062 1391">110</td><td data-bbox="1062 1357 1324 1391">BSP threads</td></tr> <tr><td data-bbox="726 1391 863 1424">20</td><td data-bbox="863 1391 1062 1424">110</td><td data-bbox="1062 1391 1324 1424">BSP threads</td></tr> <tr><td data-bbox="726 1424 863 1458">25</td><td data-bbox="863 1424 1062 1458">260</td><td data-bbox="1062 1424 1324 1458">BSP threads</td></tr> <tr><td data-bbox="726 1458 863 1491">32</td><td data-bbox="863 1458 1062 1491">260</td><td data-bbox="1062 1458 1324 1491">BSP threads</td></tr> <tr><td data-bbox="726 1491 863 1525">40</td><td data-bbox="863 1491 1062 1525">300</td><td data-bbox="1062 1491 1324 1525">BSP threads</td></tr> <tr><td data-bbox="726 1525 863 1559">50</td><td data-bbox="863 1525 1062 1559">200</td><td data-bbox="1062 1525 1324 1559">Flange type</td></tr> <tr><td data-bbox="726 1559 863 1592">65</td><td data-bbox="863 1559 1062 1592">200</td><td data-bbox="1062 1559 1324 1592">Flange type</td></tr> <tr><td data-bbox="726 1592 863 1626">80</td><td data-bbox="863 1592 1062 1626">200</td><td data-bbox="1062 1592 1324 1626">Flange type</td></tr> <tr><td data-bbox="726 1626 863 1659">100</td><td data-bbox="863 1626 1062 1659">250</td><td data-bbox="1062 1626 1324 1659">Flange type</td></tr> <tr><td data-bbox="726 1659 863 1693">125</td><td data-bbox="863 1659 1062 1693">250</td><td data-bbox="1062 1659 1324 1693">Flange type</td></tr> <tr><td data-bbox="726 1693 863 1727">150</td><td data-bbox="863 1693 1062 1727">300</td><td data-bbox="1062 1693 1324 1727">Flange type</td></tr> <tr><td data-bbox="726 1727 863 1760">200</td><td data-bbox="863 1727 1062 1760">350</td><td data-bbox="1062 1727 1324 1760">Flange type</td></tr> </tbody> </table>	Nominal Diameter	Meter Length (mm)	End Connection Type	mm	( ± 1 mm)		15	110	BSP threads	20	110	BSP threads	25	260	BSP threads	32	260	BSP threads	40	300	BSP threads	50	200	Flange type	65	200	Flange type	80	200	Flange type	100	250	Flange type	125	250	Flange type	150	300	Flange type	200	350	Flange type
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8	Main casings	<p>For small water meters (DN15/20/25/32/40), the main casing shall be made of non-corrodible or corrosion-resistant material.</p> <p>For Dezincification-Resistant Brass (DZR) material, the DZR brass grades shall be those which are stipulated in Clause 4 of the PUB S&amp;R.</p> <p>For DN50 and larger water meters, preferred materials of main casing would be copper alloy or ductile iron. Ductile iron body shall be internally lined with fusion-bonded epoxy.</p>																																										

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		All non-metallic materials in contact with water shall not have adverse effects on the quality of the water that it conveys.						
9	Material and quality	<p>a) The materials shall be tested for compliance with the stipulated standards and requirements in <b>Clause 4 of the PUB S&amp;R</b> which is downloadable from PUB website at <a href="https://www.pub.gov.sg/compliance/watersupplyservices/standards">https://www.pub.gov.sg/compliance/watersupplyservices/standards</a>.</p> <p>b) All parts of the water meter in contact with the water flowing through it shall be manufactured from materials that are conventionally known to be non-toxic, non-contaminating and biologically inert. It shall be fit for drinking water application.</p>						
10	Mechanism integrity	The water meters supplied shall be in-line which normally be worked in the direction indicated by an arrow on the meter body, that is, from inlet to outlet. However, the meters must be so designed to operate satisfactorily in the reverse direction, and all working parts liable to displacement or liable to be displaced for such reverse direction must be secured in such a manner that they will not become displaced. The meters must be able to register accurately when installed in all positions.						
11	Strainers	Removable or Integral Strainers are required. The strainers shall be made of suitable synthetic polymer, or stainless steel or other corrosion-resistant materials.						
12	Meter register holder	<p>The meter registers shall be properly secured to meter body by mechanical means to ensure proper registration such as screw on or holder with steadfast fastener type.</p> <p>Materials used should be of adequate strength and durability to keep the registers secured over the meter's useful life of 15 years. Metallic alloys are preferred.</p> <p>If plastic materials are used, they must not break, fade, chalk, become brittle, loses strength or dimensional stability even after prolonged outdoor exposure, for instance such as under solar radiation (heat and ultraviolet), water and accidental impact during transport or operation.</p>						
13	Registers	<p>a) The register shall read in cubic metres (m<sup>3</sup>) and litres and shall be suitably protected with strong covers of suitable materials. The cubic metres and its multiples shall be indicated in black and sub-multiples of the cubic metre (litres) in red.</p> <p>b) Register shall be one of the following types (all other types will not be acceptable).</p> <table border="1" data-bbox="639 1727 1487 1977"> <thead> <tr> <th data-bbox="639 1727 1166 1794">Type 1 - Straight reading roller counter type</th> <th data-bbox="1166 1727 1487 1794">Maximum Indication of Initial Dial/Roller Wheel</th> </tr> </thead> <tbody> <tr> <td data-bbox="639 1794 1166 1850">a 4 or 5 black roller wheels and at least 3 red roller wheels</td> <td data-bbox="1166 1794 1487 1850">1.0 litre</td> </tr> <tr> <td data-bbox="639 1850 1166 1977">4 or 5 black roller wheels and 4 red roller wheels 0.1litre (Counter unit shall be able to pick up 0.1 litre/Pulse)</td> <td data-bbox="1166 1850 1487 1977">0.1 litre</td> </tr> </tbody> </table> <p>c) The actual or apparent height of the digits on the roller wheel must not be less than 4 mm readable at a 30-degree angle from the vertical. Cover lid for register window is not required. However,</p>	Type 1 - Straight reading roller counter type	Maximum Indication of Initial Dial/Roller Wheel	a 4 or 5 black roller wheels and at least 3 red roller wheels	1.0 litre	4 or 5 black roller wheels and 4 red roller wheels 0.1litre (Counter unit shall be able to pick up 0.1 litre/Pulse)	0.1 litre
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		<p>provision is to be made on the meter for fixing of cover lid, when required. The meter dial shall be in upright position, i.e. to be read at 90 degrees to the direction of flow. Meter with inclined dial face is not acceptable.</p> <p>d) For hybrid volumetric water meter with brass body and electronic register display, the register shall read in cubic metres (m<sup>3</sup>) and litres and shall be suitably protected with strong covers of suitable materials. The LCD display digits shall not be less than 4 mm in height and shall minimally be indicated in cubic metres up to the 10,000th place with 4 decimal places (i.e. 00000.0000 m<sup>3</sup>). The protection class of the electronic register shall be IP68.</p>
14	Marking	<ul style="list-style-type: none"> <li>• Each water meter shall be marked or embossed on the casing with the direction(s) of flow of water on both sides of the meter.</li> <li>• Each water meter shall have a permanent and legible manufacturer's name or trademark on the body of the product.</li> </ul>