

1. Polybutylene (PB) Grey - Clamped Joint

All fittings and pipes shall be from the same manufacturer. The metal reinforced fitting shall be firmly joint via a forged clamp tool design to mechanically seal the joints all in accordance with the manufacturer's recommendation and specification.

2. Cold & Hot Water Pipes and Fittings

Item	Pipe Size (mm)	Materials	Standard	Remarks
<u>Above Ground</u>				
1. Cold Water	Above 28mm (1in) dia			
	28mm(1in)dia and below	Polybutylene (BUTE-PB)	ASNZS 2642 part 1 & 2	Pipes
		Polysulphone (PLS)	ASNZS 2642 part 3	Fittings Materials
2. Hot Water	Above 28mm (1in) dia			
	28mm(1in) dia and below	Polybutylene (BUTE-PB)	ASNZS 2642 part 1 & 2	Pipes
		Polysulphone (PLS)	ASNZS 2642 part 3	Fittings Materials

Item	Description
A	<p data-bbox="367 289 545 321"><u>PLUMBER</u></p> <p data-bbox="367 373 513 405"><u>Materials</u></p> <p data-bbox="367 457 488 489"><u>General</u></p> <p data-bbox="367 548 1219 667">All materials for use shall be new, free from any form of defects and of the best type with regards design, quality, manufacture and performance.</p>
B	<p data-bbox="367 726 899 758"><u>Polybutylene (PB) Pipes & Fittings</u></p> <p data-bbox="367 810 1276 930">Material of pipes for potable hot and cold water supply shall be Polybutylene (PB) manufactured in compliance with ASNZS2642 Parts 1 and 2.</p> <p data-bbox="367 982 1276 1102">Material for fittings shall be of Copolymer type of engineering resin manufactured in compliance with ASNZS2642 Parts 3.</p> <p data-bbox="367 1155 553 1186"><u>Pipe fittings</u></p> <p data-bbox="367 1245 1276 1581">All fittings shall be of those approved by the manufacturer. Properties of material shall be in accordance with the specifications in the above prescribed standards. Polybutylene (PB) pipes and copolymer metal reinforced fittings shall be firmly joined via a forged clamp tool designed to mechanically seal the joints in accordance with manufacturer's recommendation and practice for installation and commissioning.</p>
C	<p data-bbox="367 1640 675 1671"><u>Storage of Materials</u></p> <p data-bbox="367 1724 1268 1892">All materials shall be stored in a proper dry shed with adequate ventilation and be adequately protected from inclement weather, rising water, contamination with salts or impurities, growth of fungus, etc.</p>

Item	Description								
D	<p data-bbox="367 289 643 323"><u>Materials (cont'd)</u></p> <p data-bbox="367 375 857 409"><u>Hot and Cold Water Application</u></p> <p data-bbox="367 506 737 539"><u>Application - cold water</u></p> <p data-bbox="367 592 1268 625">For cold water application the following ratings shall apply:</p> <table data-bbox="367 678 1243 766"> <tr> <td data-bbox="367 678 776 716">Working Pressure</td> <td data-bbox="786 678 1243 716">1,600 kpa (230psi) @ 20°C</td> </tr> <tr> <td data-bbox="367 726 776 764">Hydrostatic Design Stress</td> <td data-bbox="786 726 1243 764">7.6 mpa (1100 psi) @ 20°C</td> </tr> </table> <p data-bbox="367 861 721 894"><u>Application - hot water</u></p> <p data-bbox="367 947 1252 980">For hot water application the following ratings shall apply:</p> <table data-bbox="367 1033 1243 1121"> <tr> <td data-bbox="367 1033 776 1071">Working Pressure</td> <td data-bbox="786 1033 1243 1071">740 kpa (107psi) @ 80°C</td> </tr> <tr> <td data-bbox="367 1081 776 1119">Hydrostatic Design Stress</td> <td data-bbox="786 1081 1243 1119">3.5 mpa (507 psi) @ 80°C</td> </tr> </table>	Working Pressure	1,600 kpa (230psi) @ 20°C	Hydrostatic Design Stress	7.6 mpa (1100 psi) @ 20°C	Working Pressure	740 kpa (107psi) @ 80°C	Hydrostatic Design Stress	3.5 mpa (507 psi) @ 80°C
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Item	Description
	<p data-bbox="367 289 581 323"><u>Workmanship</u></p> <p data-bbox="367 375 488 409"><u>General</u></p> <p data-bbox="237 464 1279 716">A The plumbing work shall be carried out by experienced and authorised license plumber registered with Surahanjaya Perkhidmatan Air Negara (SPAN). The name and registration of the plumber must be submitted to the Architect for approval before commencement of the plumbing works.</p> <p data-bbox="237 768 1279 890">B Notwithstanding the details and layout shown in the drawings, the Contractor shall be responsible to ensure the workability of the whole of the plumbing works.</p> <p data-bbox="237 942 1279 1194">C The Contractor shall be responsible for arranging with the Local Authority for the inspection of all underground pipeworks and to obtain approval form the Local Authority prior to the covering up of the underground pipeworks. <u>NO</u> underground pipeworks shall be covered up unless inspected and approved by the Local authority.</p> <p data-bbox="367 1247 651 1281"><u>Cutting to Lengths</u></p> <p data-bbox="237 1333 1279 1497">D Pipes shall be cut squarely and cleanly to lengths as required. All pipe ends shall be cut clean with a approved PB pipe cutter and all scrapings, oil, grease cleaned out from the bore.</p>

Item	Description
	<u>Workmanship (cont'd)</u>
	<u>Core-Holes, Ducts, Chases and Recesses for Pipes and Fittings</u>
E	<p>Before commencement of the works under this work sections and notwithstanding the schematic layout shown in the Drawings, the Contractor shall provide details of the plumbing layout to the Architect for his approval. The details of the plumbing layout shall also show the location of all core-holes, ducts, chases and recesses and also pipes and fittings which the Contractor intends to cast in concrete members. Where the Architect does not permit the location of the core-holes, ducts and recesses and casting of pipes and fittings at specific places, the Contractor shall seek an alternative layout and position which meet the approval of the Architect at the Contractor's own cost.</p>
F	<p>The Contractor shall not cut or hack any core-holes, ducts, chases and recesses through any structural member without obtaining the prior written permission of the Architect.</p>
G	<p>All core-holes, ducts, chases and recesses and the adjoining works shall be filled up and made good to the satisfaction of the Architect especially with regards finishes against water penetration and/or leakage and sound transmission.</p>
	<u>Fixing of Pipes</u>
H	<p>Polybutylene pipes should be installed ensuring any bending radius is at least 10 times the outside diameter of the pipe. Sharp bends should be made with appropriate fittings.</p>
I	<p>PB installations should have a minimum of 1 meter of copper tube from the hot water cylinder. When using a tempering valve use Buteline PB pipe direct from mixing outlet.</p>

Item	Description
	<p data-bbox="365 289 711 321"><u>Workmanship (cont'd)</u></p>
	<p data-bbox="365 378 727 409"><u>Fixing of Pipes (cont'd)</u></p>
J	<p data-bbox="365 462 1271 583">PB pipe should not be installed closer than 150mm to gas or central heating vents, nor located in any confined space containing appliance vents.</p>
K	<p data-bbox="365 640 1271 714">“Pipe Sleeves” and bored holes should be large enough to allow free movement of PB pipe.</p>
L	<p data-bbox="365 766 1271 934">PB pipes should be supported with approved pipe clips that allow free movement of the pipes at a centre distance of not more than 600mm. Pipes unsupported by clips are unsightly and can be damaged.</p>
M	<p data-bbox="365 976 1201 1018">PB pipe should not be fixed rigidly between two points.</p>
N	<p data-bbox="365 1071 1271 1186">PB pipe which penetrates fire resistant construction must be installed to ensure the fire resistant integrity of the building is retained.</p>
O	<p data-bbox="365 1249 1271 1365">Notwithstanding the above, no pipe shall be left unsupported. At least one support shall be provided for any length of pipe.</p>
P	<p data-bbox="365 1417 1271 1533">All pipes, other than those chased or cast in walls, floors, etc., shall be fixed projecting off the walls, floors, etc., by at least 1/4” with distance pieces.</p>

Item	Description
<p>A</p> <p>B</p> <p>C</p>	<p><u>Workmanship (cont'd)</u></p> <p><u>Installation of Pipes And Fittings</u></p> <p>All plumbing work shall generally be located and installed so that the plumbing is accessible for inspection, replacement and/or repair. All stop valves, taps, etc., shall be placed in positions which allow for convenient operation and maintenance.</p> <p>Pipework in branch connection shall always be arranged to allow free drainage of the system. Connection to main or branch pipes shall be so arranged as to prevent cross flow from one appliance to another. Connections shall be made with an easy sweep in the direction of flow.</p> <p>When burying Buteline fittings underground, or behind a wall, wrap the aluminum rings with tape to prevent corrosion.</p>
Item	Description
<p>E</p>	<p><u>Workmanship (cont'd)</u></p> <p><u>Pipe Works</u></p> <p>Unless stated or shown otherwise, water supply pipeworks in distribution pipes above ground shall be executed in approved classifications of AS/NZS2642 Parts 1, 2 and 3, Polybutylene pipes and fittings</p>

F	All PB hot and cold distribution shall be pipes and fittings complying to AS/NZS2642 Parts 1, 2 and 3.
G	The socket and spigot joints of Polybutylene (PB) pipes shall be firmly joined via a forged clamp tool which allows pipe material to “flow” into insert tail grooves.
Item	Description
	<u>Workmanship (cont'd)</u>
L	Pipe ends are inserted fully into fittings where built-in pipe end stop shoulder ensures pipe is correctly fitted prior to forge clamping.
M	During clamping process, a 2mm wide spacing/flare is maintained at end of metal reinforcing sleeve. This process ensures no stress from clamping is transmitted to insert tail or pipe at end of fitting which is crucial to ensure metal sleeve cannot impinge into pipe even in bending.
	<u>Joining of Stainless Steel pipes, copper pipes and other approved pipe materials to Buteline Polybutylene fittings.</u>
N	The joints of the approved pipe material shall be made with threaded fittings complying with British Standard Pipe Thread Specifications.
	<u>Lump sum tender and schedule of rates for Plumber</u>
O	The rates for plumber shall also be held to include for:- (i) all short lengths, sockets, connectors, backnuts: (ii)holderbats, supports, hangers and the like and distance pieces, and;

	(iii)cutting and pinning end of holderbats, supports, hangers and the like to brick or blockwork or casting in concrete work.
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Buteline Polybutylene (PB) Pipe Specifications for Potable Hot & Cold Water Supply.

Material of pipes for potable hot and cold water supply shall be Polybutylene (PB) manufactured in compliance with ASNZS2642 Parts 1 and 2.

Material for fittings shall be of Copolymer type of engineering resin manufactured in compliance with ASNZS2642 Part 3.

Pipe fittings.

All fittings shall be of those approved by the manufacturer. Properties of material shall be in accordance with the specifications in the above prescribed standards. Polybutylene (PB) fittings shall be firmly joined via a 8mm forged clamp tool designed to mechanically seal the joints all in accordance with manufacturer’s recommendation and practice for installation & commissioning.

Application - cold water.

For cold water application the following ratings shall apply:

Working Pressure	1,600 kpa (230psi) @ 20°C
Hydrostatic Design Stress	7.6mpa (1100 psi) @ 20°C

Application - hot water.

For hot water application the following ratings shall apply:

Working Pressure	740 kpa (107psi) @ 80°C
Hydrostatic Design Stress	3.5mpa (507 psi) @ 80°C

Classification/Headings

1. Pipe Works

Unless stated or shown otherwise, water supply pipeworks in distribution pipes above ground shall be executed in approved classifications of ASNZS2642 Parts 1,2 and 3 Polybutylene pipes and fittings.

Alternatively,

2. Polybutylene (PB) Pipes & Fittings

All PB hot and cold distribution shall be Class 16 pipes complying to ASNZS2642 Parts 1 & 2 and fittings shall comply to ASNZS2642 part 3.

3. Workmanship

The socket and spigot joints of Polybutylene (PB) pipes shall be firmly joined via a 8mm forged clamp tool which allows pipe material to “flow” into insert tail grooves.

Pipe ends are inserted fully into fittings where built-in pipe end stop shoulder ensures pipe is correctly fitted prior to forge clamping.

During clamping process, a 2mm wide spacing/flare is maintained at end of metal reinforcing sleeve. This process ensures no stress from clamping is transmitted to insert tail or pipe at end of fitting which is crucial to ensure metal sleeve commit impinge into pipe even in bending.

When burying Buteline fittings underground, or behind a wall, wrap the aluminum rings with tape to prevent corrosion.

Joining of Stainless Steel pipes, copper pipes and other approved pipe materials to Buteline Polybutylene (PB) System shall be made with fittings complying with British Standard Pipe Thread Specifications.