

1. Polyethylene (PE) Black - Clamped Joint

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

2. Cold Water Pipes and Fittings

Item	Pipe Size (mm)	Materials	Standard	Remarks
<u>Above Ground</u>				
1. Cold Water	32mm(1in)dia and below	Polyethylene (BUTE-PE)	MS1058	Pipes
		Co-polymer (Duracon M25)	ISO14236	Fittings Materials
<u>Below Ground</u>				
1. Cold Water	Above 32mm (1in) dia	Polyethylene (BUTE-PE)	MS1058	Pipes
	32mm(1in)dia and below	Co-polymer (Duracon M25)	ISO14236	Fittings Materials.

Item	Description
A	<p><u>PLUMBER</u></p> <p><u>Materials</u></p> <p><u>General</u></p> <p>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>
	<p><u>Polyethylene (PE) Pipes & Fittings</u></p> <p>Material of pipes for potable cold water supply shall be Polyethylene (PE) manufactured in compliance with MS1058.</p> <p>Material for fittings shall be of Copolymer type of engineering resin in compliance to ISO14236.</p> <p><u>Pipe fittings</u></p> <p>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. Polyethylene (PE) 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>
	<p><u>Storage of Materials</u></p> <p>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="370 286 647 324"><u>Materials (cont'd)</u></p> <p data-bbox="370 376 737 414"><u>Cold Water Application</u></p> <p data-bbox="370 510 1278 548">For cold water application the following ratings shall apply:</p> <p data-bbox="370 595 644 633">Working Pressure</p> <ul style="list-style-type: none"> <li data-bbox="400 640 1238 678">: 20mm pipes (PN 16) - 1600 kpa (230psi) @ 20°C <li data-bbox="400 685 1246 723">: 25mm pipes (PN 12.5) - 1250 kpa (180psi) @ 20°C <li data-bbox="400 730 1246 768">: 32mm pipes (PN 12.5) - 1250 kpa (180psi) @ 20°C <p data-bbox="370 869 1238 907">Hydrostatic Design Stress 5.5 mpa (800 psi) @ 20°C</p>

Item	Description
	<p data-bbox="371 286 587 331"><u>Workmanship</u></p> <p data-bbox="371 376 496 421"><u>General</u></p> <p data-bbox="236 465 1292 723">A The plumbing work shall be carried out by experienced and authorized 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="236 768 1292 902">B Notwithstanding the details and layout shown in the drawings, the Contractor shall be responsible to ensure the workability of the whole plumbing works.</p> <p data-bbox="236 947 1292 1205">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="371 1249 659 1294"><u>Cutting to Lengths</u></p> <p data-bbox="236 1339 1292 1507">D Pipes shall be cut squarely and cleanly to lengths as required. All pipe ends shall be cut clean with a approved PE or PB pipe cutter and all scrapings, oil, grease cleaned out from the bore.</p>

Item	Description
	<p><u>Workmanship (cont'd)</u></p>
	<p><u>Core-Holes, Ducts, Chases and Recesses for Pipes and Fittings</u></p>
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 to finishes against water penetration and/or leakage and sound transmission.</p>
	<p><u>Fixing of Pipes</u></p>
H	<p>Polyethylene (PE) pipes should be installed ensuring any bending radius is at least 12.5 times the outside diameter of the pipe. Sharp bends should be made with appropriate fittings.</p>

Item	Description
	<p><u>Workmanship (cont'd)</u></p>
	<p><u>Fixing of Pipes (cont'd)</u></p>
I	<p>PE pipe should not be installed closer than 150mm to gas or central heating vents, nor located in any confined space containing appliance vents.</p>
J	<p>“Pipe Sleeves” and bored holes should be large enough to allow free movement of PE pipe.</p>
K	<p>PE 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>
L	<p>PE pipe should not be fixed rigidly between two points.</p>
M	<p>PE pipe which penetrates fire resistant construction must be installed to ensure the fire resistant integrity of the building is retained.</p>
N	<p>Notwithstanding the above, no pipe shall be left unsupported. At least one support shall be provided for any length of pipe.</p>
O	<p>All pipes, other than those chased or cast in walls, floors, etc., shall be fixed projecting off the walls, floors, etc., by at least ¼” with distance pieces.</p>

Item	Description
A	<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>
B	<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>
C	<p>When burying Buteline fittings underground, or behind a wall, wrap the aluminum rings with tape to prevent corrosion.</p>
Item	Description
D	<p><u>Pipe Works</u></p> <p>Unless stated or shown otherwise, water supply pipeworks in distribution pipes above ground shall be executed in compliance to the relevant installations of such nature for PE pipes and fittings</p>
E	<p>All PE cold water distribution shall be pipes and fittings complying to MS1058 and ISO14236 respectively.</p>
F	<p>The socket and spigot joints of polyethylene (PE) pipes shall be firmly joined via a forged clamp tool which allows pipe material to “flow” into insert tail grooves.</p>

Item	Description
G	Pipe ends are inserted fully into fittings where built-in pipe end stop shoulder ensures pipe is correctly fitted prior to forge clamping.
H	<p>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.</p> <p><u>Joining of Stainless Steel pipes, copper pipes and other approved pipe materials to Polyethylene (PE) fittings.</u></p>
I	<p>The joints of the approved pipe material shall be made with threaded fittings complying with British Standard Pipe Thread Specifications.</p> <p><u>Lump sum tender and schedule of rates for Plumber</u></p>
J	<p>The rates for plumber shall also be held to include for:-</p> <ul style="list-style-type: none"> (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.

Buteline Polyethylene (PE) Pipe Specifications for Potable Cold Water Supply.

Material of pipes for cold water supply shall be Polyethylene (PE) manufactured in compliance with MS1058.

Material for fittings shall be of Copolymer type of engineering resin manufactured in compliance with ISO14236.

Pipe fittings.

All fittings shall be of those approved by the manufacturer. Properties of material shall be in accordance without the specifications in the above prescribed standards. Polyethylene (PE) 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 - 20mm (PN16)	1,600 kpa (235psi) @ 20°C
- 25mm (PN12.5)	1,250 kpa (180psi) @ 20°C
- 32mm (PN12.5)	1,250 kpa (180psi) @ 20°C
Hydrostatic Design Stress	5.5mpa (800 psi) @ 20°C

Classification/Headings

1. Pipe Works

Unless stated or shown otherwise, water supply pipeworks in distribution pipes above ground shall be executed in compliance to MS1058 for polyethylene (PE) pipes.

Alternatively,

2. Polyethylene (PE) Pipes & Fittings

All polyethylene (PE) cold water distribution shall be at minimum PN12.5 pipes complying MS1058 with PE pipe fittings complying to ISO14236

3. Workmanship

The socket and spigot joints of polyethylene (PE) 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 Polyethylene (PE) System shall be made with threaded fittings complying with British Standard Pipe Thread Specifications.