



OGDCL PAKISTAN:
OIL & GAS DEVELOPMENT
COMPANY LIMITED

KPD-TAY Compression Project (Phase-II)

ISSUED FOR TENDER

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ENAR Petrotech Services (Pvt.) Limited ,
7-B , Sector 7-A , Korangi Industrial Area ,
Karachi Pakistan

TITLE:

SPECIFICATION FOR PLUMBING WORKS

PROJECT NO.
14-0258

DOCUMENT NO:

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1.0 GENERAL

- 1.1 All the works for Potable Water and Sanitary / Sewerage Systems, complete in all respects, including connection of these internal systems with the external systems are included in the scope. All the materials and equipment shall be of the specifications mentioned herein and the samples, necessary catalogues, sketches, the name of manufacturer and guarantees if necessary, shall be submitted for approval by OGDCL / OGDCL's Representative.
- 1.2 It is specifically intended that any material or labor which is usually furnished as a part of supporting equipment and which is necessary for its proper completion and trouble free operation shall be furnished as a part of this Contract without any additional cost whether or not shown in detail on the drawings or described in this specifications.
- 1.3 All open ends of pipes shall be properly plugged to prevent any foreign material from entering the pipe during installation.
- 1.4 Misuse of plumbing fixtures to be installed under this Contract, is prohibited during execution of the project.
- 1.5 All metal fixture trimmings shall be thoroughly covered with non-corrosive grease, which shall be maintained until all work is completed.
- 1.6 Before erection, all pipes, valves, fittings, etc. shall be thoroughly cleaned of oil, grease or other foreign material.
- 1.7 Special Precautions shall be taken for the installation of concealed pipes as shown on the drawings and/or as required.
- 1.8 Unless specifically stated, the term "diameter" is the nominal diameter as designated commercially.
- 1.9 Wastewater outlet from each fixture or a battery of fixtures directly connected to the sewerage system shall be equipped with a water-seal trap.
- 1.10 Each vent terminal shall extend to the outer air and be so installed as to minimize the possibilities of clogging and the return of foul air to the building.



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- 1.11 When the roughing-in is completed, the plumbing system shall be subjected to test, prior to concealing the roughing-in in order to ascertain that all threads and connections are gas-tight and watertight.
 - 1.12 Appropriate fittings for change in direction shall be used.
 - 1.13 All fittings with hubs shall be aligned so that the hub faces upstream.
 - 1.14 No drainage or vent piping shall be drilled or tapped.
 - 1.15 Workmanship shall conform to generally accepted good practice.
 - 1.16 Each length of pipe and each pipe fitting, trap fixture, and device used in a plumbing system shall have cast, stamped, or indelible marked on it the maker's mark or name, the weight, type and classes of the product, when such marking is required by the approved standard that applies.
 - 1.17 Each fixture trap shall have a water seal of not less than 2" and not more than 4".
 - 1.18 No fixture shall be double trapped.
 - 1.19 All piping shall be grouped wherever practicable and shall be erected to present a neat appearance. Pipes shall be parallel to each other and parallel or at right angles to structural members of the building and shall give maximum possible headroom.
 - 1.20 Pipe work shall generally be set around all columns and shall follow the contour of the building. Piping shall not pass in front of doorways or windows, nor be installed passing through ductwork or directly under electric light outlets.
 - 1.21 Unless otherwise shown on the drawings, all pipes shall have a minimum clearance of 75mm from floors and ceilings and 25mm from the finished face of walls or other surfaces.
 - 1.22 All pipe drops shall be truly vertical, drain piping shall pitch down in direction of flow, and all pipe work shall be installed with a continuous gradient to allow natural circulation, air venting and drainage.
 - 1.23 Sufficient space is to be allowed for accessibility for servicing. No joints shall be formed in the thickness of walls, floors or ceilings.



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- 1.24 Liberal allowance shall be made for expansion and contraction joints in pipes by means of changes in direction or by the inclusion of expansion joints/bellows in the piping system.
- 1.25 Where pipes are to pass through reinforced concrete this must be ascertained before the concrete is cast and approval must be obtained for size of hole to be formed.
- 1.26 Where tubes pass through walls, floors or ceilings, sleeves shall be provided.
- 1.27 All branches from mains shall be taken from the top of the main wherever practicable and shall be made in such a manner as to allow for expansion and contraction in both main and branch.
- 1.28 Where piping is buried underground it shall be provided with protective coating and wrapping.
- 1.29 Any pipe work, which does not conform as to material and workmanship with this specification shall be removed and refixed.
- 1.30 **Pipe Sleeves**
- 1.30.1 All pipes passing through walls or floors or under-roads shall pass through a sleeve cut from a length of mild steel pipe.
- 1.30.2 The sleeves are to have an internal diameter of at least 25mm larger than the outside diameter of the pipe or of the insulation passing through the sleeve.
- 1.30.3 The sleeves are to project 2mm from the finished face of wall and ceiling plaster and 25mm out of finished floors.
- 1.30.4 The annular space between the pipes and sleeves shall be adequately caulked to reduce noise penetration.
- 1.30.5 To every exposed pipe passing through walls or rising through floors, a rolled steel hinged over plate shall be provided. Where pipes pass through trench covers, special flanged sleeves shall be provided to form a watertight seal bedded in mastic.
- 1.31 **Strainers**



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1.31.1 Approved strainers shall be fitted in the suction line of each pump and at the inlet connections for each feeder and make-up connections, and each automatic control valve of all apparatus of an automatic character, whose proper functioning would be interfered with by dirt on the seat, or by scoring of the seat. All strainers shall be suitably pressure tested at works.

1.31.2 All strainers shall be of ample strength for the pressure to which they will be subjected and with suitable flanges or tapings to connect with the piping they serve. Each water strainer shall be provided with an approved valved dirt blowout connection suitably piped to the nearest floor drain.

2.0 WATER SUPPLY PIPES AND FITTINGS

2.1 Material

- The galvanized pipes shall conform to British Standard 1387 Specifications for "Steel Pipes" suitable for screwing to BS 21 pipe threads".

All screwed pipes and sockets shall have BS PIPE thread in accordance with BS 12. In order to prevent damage to the leading thread.

A complete and uniform adherent coating of zinc will be provided for galvanized pipes.

The threads of all pipes shall be effectively covered with a good quality grease or other suitable compound, and each pipe above 2" nominal bore shall have a protecting ring affixed to the unsocketed screwed end.

All pipe fittings shall conform to BS 21.

- The Polypropylene Random PPR shall conform to DIN 8077-8078, PN 10, PN 20 for pipes & DIN 16962, PN 25 for fittings
- The uPVC pressure pipe shall conform to BS 3505 – 1968, PS 3051, solvent cement & Z joint rubber will be provided for uPVC pipe.
- The Polyethylene (P.E.) pipe & fittings shall conform International Standard ISO 4427, DIN 8074/8075, Ps – 3580 : & BS 5114.



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All pipes and pipe fittings shall be approved by OGDCL / OGDCL's Representative to installation.

2.2 Installation

The run and arrangement of all pipes shall be as shown on the drawings. All vertical pipes shall be erected plumb and shall be parallel to wall and other pipes. All horizontal runs of piping shall be kept close to walls.

Screwed joints in G.I. Pipes shall be made perfectly tight, without the use of any filler except by approved jointing compound. Wherever required to make flanged joints, they shall conform to BS 10 Table D.

Suitable and substantial number of hangers, supports and clamps of approved type make and spacing shall be provided for all horizontal and vertical piping.

Hangers shall be supported from approved concrete inserts in concrete slab. No piping shall be hung from the piping of other systems. Long radius bends shall be used wherever possible.

All M.S. hangers, brackets, etc. shall be given one coat of red oxide primer and two coats of synthetic enamel paint. All exposed G.I. piping shall be given two coats of synthetic enamel paint. Materials for painting shall be high quality products of a well-known manufacturer and shall be approved by OGDCL / OGDCL's Representative. The piping shall be painted according to a colour code approved by OGDCL / OGDCL's Representative.

The installation jointing / welding of PPR, UPVC, PE pipes & fittings shall be carried out by skilled personnel and recommendation of manufacturers.

2.3 Tests At Site

Pipes shall be tested at the manufacturer's works to a hydraulic test pressure of 483 N/cm² (700 lbs/sq.in) and shall be maintained at the test pressure sufficiently long for proof and inspection.

Pressure tests shall be applied to piping only before connection of equipment and appliances. In no case shall piping, equipment or appliances be subject to pressure exceeding their rating. Tests shall be completed and approved before any insulation is



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applied on pipes, valves and fittings have been concealed. Any leaks or defects uncovered by the tests shall be repaired and the system re-tested.

When the installation has been completed, it shall be tested in the following manner:

- The entire system shall be slowly filled with water, allowing any trapped air to escape.
- When all outlets are closed the system shall be checked for water tightness. The specified pressure for potable water pipeline system shall be 50 psi.

2.4 Hot Water System

All hot water supply piping shall be insulated as specified herein. Prior to insulation the pipes shall be thoroughly cleaned of all rust, scales and other contaminants by wire-brushing, sand blasting etc. and by using aromatic solvents to remove oil grease etc.

Subsequent to the cleaning operation the pipe shall be coated with two coats of approved, temperature resistant, anti-corrosion paint.

Insulation shall be applied to the painted pipe only after the hydraulic testing as specified has been carried out.

The installation for PPR, uPVC, PE pipes & fittings is per manufacturer's recommendation.

The material and thickness of insulation shall be as approved by OGDCL // OGDCL Representative.

3.0 WASTE AND VENT PIPES AND FITTINGS

3.1 Material

- The cast iron pipe shall conform to British Standard Specifications spun No. 416/1973 for "Cast Iron spigot and socket soil, waste and ventilating pipes and fittings". The quality of material shall be according to B.S. No.1453.
- The uPVC pipe & fitting shall conform to ISO 3633 : 1991, PS 3214 / 1992, solvent cement for jointing will be provided for uPVC.



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- All pipes and fittings shall be coated or as recommended by the manufacturer. The coatings shall be smooth, tenacious, sufficiently hard not to flow when exposed to a temperature of 63°C and not so brittle at zero degree centigrade that it chips soft when scribed lightly with the point of pen knife.

3.2 Installation

The soil and waste system shall be installed in accordance with CP 304 and previous and subsequent relevant clauses in this specification.

All cast iron spun soil pipes and fittings shall be installed to the lines and grades shown on the drawings.

Where required to be installed above ground/floor level, suitable and substantial number of hangers and supports of approved type and make shall be provided.

No piping shall be hung from the piping of other systems. Clamps shall be provided on not more than 5'-0" centres. Where excessive numbers of fittings are installed, additional clamps will be provided.

All steel clamps, hangers and support, etc. shall be given one coat of red oxide primer and two coats of synthetic enamel paint. All exposed C.I. soil/vent pipes shall be given two coats of synthetic enamel paint. Materials for painting shall be high quality product of well-known manufacturer and will be approved by OGDCL / OGDCL's Representative. The instruction of the manufacturer regarding all painting work shall be strictly adhered to.

Caulked joints for cast iron bell-and-spigot soil pipe shall be firmly packed with approved jointing material. No paint, varnish or other coatings shall be permitted on the jointing material until after the joint has been tested and approved.

The installations of uPVC shall be carried out by skilled personnel in strict accordance with recommendations of the manufacturer.

3.3 Testing

Pipes shall be tested at the manufacturer's works to a hydraulic test pressure of 6.9 N/cm² (approx.: 10 lbs/sq.in). Pipe and fitting shall ring clearly and test for soundness.



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The entire system of drains, waste, and vent piping inside the building shall be tested under a water test. Every portion of the system shall be tested to a hydrostatic pressure equivalent to at least 10 feet head of water. After filling this, water supply shall be shut off, and shall allow to stand two hours, under test during which time there shall be no loss or leakage.

Defects disclosed by the tests shall be repaired. Defective work shall be replaced with new work.

All fixtures shall be tested for soundness, stability or support and satisfactory operation.

4.0 PLUMBING FIXTURES

4.1 Scope of Work

4.1.1 The work included in this section of Specification consist of providing and installing complete system of plumbing fixtures, fittings and accessories as per drawings and specification, including all labor, equipment and materials required for the satisfactory operation and installation of plumbing fixtures. Complete in all respects.

4.1.2 All model numbers not indicated or approved equal implies that the Contractor shall submit for the approval of OGDCL / OGDCL's Representative

4.1.3 Summary of the plumbing fixtures proposed indicating type, manufacturer name, model number. If samples are required by the OGDCL / OGDCL's Representative, then they shall be provided at no additional cost. No materials shall be purchased, before such approval is obtained in writing from the OGDCL / OGDCL's Representative.

4.2 General Requirements

4.2.1 All fixtures shall be free from imperfections, true as to line, angles, curves and colors, smooth, water tight and complete in every respect.

4.2.2 All fixtures specified to be of vitreous ware, shall be fired vitreous Chinaware of the best quality nonabsorbent and burned so that the whole mass is thoroughly fused and vitrified producing a material white or colored, which when manufactured will show a homogeneous mass, close grained and free from pores. The glazing and vitreous China fixture shall be of color approved by the OGDCL / OGDCL's Representative



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thoroughly fused, and united to the body, without discoloration, chips, or flaws and shall be free from craze. Warped or other imperfect fixtures will not be accepted.

- 4.2.3 All plumbing fixtures and fittings shall be supplied by Contractor, all fixtures should be approved by the OGDCL / OGDCL's Representative prior to installation.
- 4.2.4 All fittings, cast brass set screws, escutcheons, faucets, traps, exposed piping etc., shall be brass chrome plated over nickel plate with polish finished. Any hanger nuts visible shall like wise be chrome plate over nickel plate.
- 4.2.5 After installation of plumbing accessories, the Contractor shall ensure their protection against damage, misuse and general deterioration. Fixture outlets shall be plugged with suitable material to prevent of external debris. All chrome plated and other metallic fittings shall be provided with a coat of crease to prevent their deterioration. All items prior to handing over must be in perfect condition in the visual and operational sense.

4.3 **Materials required**

4.3.1 **Lavatory**

- a. White vitreous china lavatory with pedestal/counter top, shall be KARAM CERA MODEL or equivalent with approved fittings.
- b. Lavatory shall be completed with the following accessories:
- Exquisite Line KARAM CERA Model.
 - Fixa 11, concealed 1/2" Ø basin mixer with hot and cold brilliant handles, cast spout with mousseur, pop up waste set.
 - Handles trecorn deluxe.
 - 1/2" Ø stop cocks with flexible/chrome plated pipe.
 - 1 1/2" Ø. CP Bottle Trap with removable sump, outlet with compression nut.
 - CP Towel rail of required length.
 - 1 1/2" Ø. Stainless steel waste pipe with chain west and plug.
 - Soap tray of KARAM CERA Model.

4.3.2 **Water Closet EWC-1**

- a. White Vitreous china siphon jet water closet with P or S trap shall be KARAM CERA Model or equivalent with approved fittings.



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b. Water closet shall be complete with the following accessories:

- 1½" Ø S/S flush pipe of required length
- Vacuum breaker
- Solid plastic closed front seat with cover and screws.
- ½" Ø. CP Inlet spout
- CP Toilet paper holder. Floor flange gasket rubber bumper
- 1" Ø. Flush valve

4.3.3 Water Closet AWC-1

a. White vitreous china siphon jet water closet orissa type, with P or S traps shall be KARAM CERA MODEL or equivalent with approved fittings.

b. Water closet shall be complete with the following accessories:

- 1½" Ø. S/S flush pipe of required length
- Vacuum breaker
- ½" Ø. CP Inlet spout
- Floor flange gasket rubber bumper
- 1" Ø. Flush valve

4.3.4 Shower

Shower accessories will consist of the following approved fittings.

- ½" Ø. Concealed valves threaded pipe connection with brilliant handles blue and red.
- ½" Ø. 4 way diverter.
- Bath combination ½".
- Adjustable ball joint shower head 3" Ø with ½" shower arm.
- ¾" Ø. Bath spout with mousseur.

4.3.5 Kitchen Sink

a. Kitchen sink shall be KARAM CERA Model or equivalent approved with Grohe approved fittings.

b. Kitchen sink shall consist of the following accessories:

- Double bowl 20 gauge nickel stainless steel sink with double drain board.



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- PVC waste coupling, and 1½” PVC bottle trap.
- CP ½” combination mixer (hot and cold) with pipe.
- Cabinet fitted, size 25”x22”x6½” deep and 33”x22”x6½” deep
- Stain finish, self rim, back ledge with holes
- ½” single hole mixer
- Brilliant handles
- Extractable rising spray with diverter
- Set/spray metal tube
- Chain support
- 1½” Ø. PVC flush pipe of required length.

4.3.6 Urinals

White vitreous china wall hung urinals shall be KARAM CERA MODEL or equivalent with approved fittings.

- 1½” Ø. CP bottle trap.
- CP washer, cup and screws
- 1” Ø. CP flushes valve and fittings
- CP ½” pipe open of required length.
- 1½” Ø. Straight CP pipe to wall and flange of required length

4.3.7 Shower Jet

- Shower Jet shall be KARAM CERA or equivalent approved.
- Shower jet will consist of the following accessories:
- Double hole mixer
- Hand spray with trigger control
- Pressure proof flexible hose of SFS of required length
- Jet/spray, tube socket
- ¾ " Ø extractable spout



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4.4 Fixture Supports/Settings

Provide all hangers, supports, brackets, etc. for the proper installation of water closet, urinals, lavatories, suits etc. requiring supports shall be in accordance with the manufacturers recommendation as approved and where necessary built into partitions or walls, and shall be set with the Construction progress.

4.5 Fixture Settings

- 4.5.1 Fixture shall be set in a neat, finished and uniform manner making the connections to all fixtures at right angle to the wall unless otherwise directed by the OGDCL / OGDCL's Representative. Roughing for this work must be accurately laid out so as to conform with finished wall materials. Fixtures are not to be set until as directed by the OGDCL / OGDCL's Representative.
- 4.5.2 Each fixture and piece of equipment including floor drain, requiring connections to drainage system shall be equipped with a trap. Traps are to be supplied with the fixtures. Each trap shall be placed as near to the fixtures as possible and no fixture shall be double trapped, except as otherwise indicated. Trap installed on bell and spigot pipe shall be cast iron or uPVC.
- 4.5.3 All fixtures and trimmings in so far as practicable shall be of one manufacturer.
- 4.5.4 All exposed chromium plated fittings such as pipes, valve etc. shall be protected immediately after installation. During installation s-trap or p-trap added wrenches shall be used on charge plated pipe and fittings etc.
- 4.5.5 All fixtures shall be set straight and true. The setting shall be level and flush with finished floors and partitions.
- 4.5.6 Plumbing fixtures shall be supplied complete with all required trimming, vitreous china fixtures shall be first class quality with smooth glazed surfaces, free from warp, cracks, discoloration or other imperfections.
- 4.5.7 Fixture mounting heights and spacing shall be as detailed on the Architectural drawings or as approved by the OGDCL / OGDCL's Representative.
- 4.5.8 Protect fixtures from damage before and after installation.



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- 4.5.9 Fasten fixture carriers securely to slab construction with power driven expansion shields and bolts.

4.6 Cleaning

Clean and adjust all fixtures and trim before acceptance.

5.0 MISCELLANEOUS ITEMS

5.1 Scope of Work

The work to be done under this section of the Specifications consists of providing all material and labor, equipment, appliances etc. for proper installation of miscellaneous plumbing items of valves, cocks, floor traps, rain water pipes, clean-outs, towel rails, service connections, water heaters as specified herein or as shown on the drawings and/or as directed by the OGDCL / OGDCL's Representative.

5.2 Material and Installation

5.2.1 Bronze/Malleable/Ductile Valves

All valves of 4" Ø and below shall be of bronze/Malleable iron/Ductile iron conforming to BSS 1952 and shall be of appropriate class for the working pressure on which they are installed. Open and shut indicators shall be marked on the handle. The ends may be threaded or flanged. The valves are to be installed inclusive of all fittings and accessories.

5.2.2 Float Valves

Float valves shall be made of cast iron body, gunmetal leather faced valve and seating, forged Bronze spindle, gunmetal links and pins and gunmetal lined cylinder, wrought iron lever and copper ball, and capable for working pressure 300 psig.

5.2.3 Foot Valves

Foot valves shall be made of brass as per PN16 with strainer, and renewable discing.

5.2.4 Taps

All the fittings shall be of approved model and appropriate class for 125 psi working pressure on which they are installed.



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5.2.5 Floor Traps

Floor traps shall be of cast iron. They shall have minimum water seal of 3" and shall be provided with removable stainless steel grating.

The traps shall be of self-cleaning type. The open area of the grating shall be at least two thirds of the cross sectional area of the drain line to which it connects. Floor traps shall be well set in position so that there is no leakage at the joint between traps and the floor.

5.2.6 Rain Water Pipes

Rain water pipes shall be 3" Ø. PVC non pressure. The pipe and fittings such as wyes, tees, junctions, elbows shall be suitable for storm water bearing pressure.

5.2.7 Clean-outs

Clean-outs shall be of the same nominal size as that of the pipe on which it is installed. Clean-out shall consist of tapped heavy duty cast iron ferrule caulked into cast iron fitting and heavy duty brass tapered plug. Clean outs shall be turned up through floor by long sweep fittings, wherever the space so permits. Top finish of clean-out shall be flush with the floor when located in open area. They may not be flush with the floor when installed near wall levels and not deep enough to make them flush.

Clean-outs shall be so installed that there is a clearance of at least 1' –6". The access cover and frame shall be of cast iron and of at least 1' –6" x 1' – 6". Clean-outs near walls shall be embedded in concrete.

5.2.8 Towel Rail

Towel rail shall be of specified size, of chrome plated brass and shall be fixed to wall with screws and chrome plated brass brackets of size ¾" or as specified in drawings.

5.2.9 Service Connection

Service connection of water to building shall consist of cast iron saddle clip, gasket, bolts, polyethylene pipe up to plug stop cock with access pipe and cover etc. All material and equipment shall be suitable for pressure of potable water system.



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Complete work including excavations, back-filling, supply and installations of all material as shown in the Contract Documents shall be covered under this item.

5.2.10 Gas Water Heater

Gas water heater shall be of storage type, having a capacity of 30 gallons with adjustable thermostatic range. It shall be of approved locally manufactured and all controls shall be automatic. It shall automatically shut off when water temperature reaches the setting. It shall be installed at specified locations as directed by the OGDCL / OGDCL's Representative. Complete installation shall be considered as one item including connection of incoming and to outgoing system and ½" Ø venting pipe above the roof.

5.3 Electric Water Cooler

5.3.1 Cabinet

Electric water cooler shall be heavy gauge, vinyl-coated and electro-galvanized rust proof steel sheet with stainless steel tray. Back panel easily removable for cleaning and servicing. Top cover shall be scratch proof Formica.

5.3.2 Refrigerant System

The cooler shall be fitted with high starting torque, high back pressure compressor condenser and fan will be able to work in high ambient. Copper cooling coil metal banded to outside of water tank. The compressor shall be hermetically sealed with refrigerant – 12.

5.3.3 Insulation

The cooler shall be insulated with expanded polystyrene insulation.

5.3.4 Thermostat/Pilot Light

The cooler shall be filled with high quality water temperature control thermostat adjustable from 48 °F to 45 °F and twin pilot lights to indicate power supply and compressor operation.



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5.3.5 Water Filter

A ceramic cartridge or equivalent type 2-micron water filter shall be fitted.

5.3.6 Water Tank

The cooler storage tank shall be heavy stainless steel sheet. The tank shall be tested at 142 PSI with maximum working pressure of 71 PSI. Water tap shall be fitted of high quality chrome plated.