NA

From: NA
Sent: Monday, January 19, 2009 5:37 PM
To: Engineer; Director; Admin
Subject: Master Specs - ACMV & FFAI

Attachments: MS ACMV Section 2 (112).pdf; MS ACMV Section 2 (113).pdf; MS ACMV Section 3 (114).pdf; MS ACMV Section 5 (115).pdf; MS FFAI Section 3 (116).pdf

OM-SC/003

Please note that the following Master Specifications have been updated as highlighted:

Air Conditioning & Mechanical Ventilation Installation

1. Section 2 - Air Handling and Cooling Equipment
2. Section 3 - Chillers, Cooling Tower & Pumps
3. Section 5 - Piping, Valves & Fittings


MS ACMV Section 2 (112).pdf (...


MS ACMV Section 2 (113).pdf (5...


MS ACMV Section 3 (114).pdf (4...


MS ACMV Section 5 (115).pdf (6...

Fire Fighting & Alarm Installation

1. Section 3 - Piping, Valves & Fittings


MS FFAI Section 3 (116).pdf (5...

Regards
NA

Alpha
Consulting Engineers Pte Ltd

FEEDBACK REPORT FORM

Ref No: 115-090109 (S)

To: LCT/ CCG From: Clm 9/1/09

Job No./Project: Master Spec. (ACMV)

(where applicable)

Source of feedback: _____

Scope of Feedback: * ☐ Quality ☐ Environmental ☐ Administrative ☐ Contractual ☐ Technical ☒ Specification ☐ Others

Section A : Problem & Cause

Updating of BS standards (current BS nos. are out of date)

Section B : Mitigating Action Taken, if any

Section C : Suggested Corrective Action

Section D : Approved Corrective Action

Document Affected * : ☑ Yes ☐ No Affected Document : A/5-5, 5-6, 5-8 & 5-9

Approved By : _____ Date : 16 Jan 09

Section E : Action

Action By : NA

Targeted Completion : end Jan 09

Actual Completion : 19 Jan 09 Verified By : _____

** Mark [X] where appropriate*

Distribution:

09/01/09

5.10 Type of Pipework

The types and quality of all pipework used shall comply with the following schedule:

(a) Refrigerant pipework shall be of copper to BS EN 1057.

(b) Chilled water pipework - up to and including 150mm bore pipes shall be black mild steel to BS EN 10255 medium gauge. Sizes above 150mm shall be of black mild steel to API 5L (Standard Weight).

(c) Condenser water pipework shall be as described in sub-paragraph (ii) hereof, but shall be galvanised. The galvanising of pipes shall be carried out by the pipe manufacturer.

(d) Condensate drain pipes up to and including 32mm bore shall be of copper to BS EN 1057 for installation above false ceiling, in plant rooms & cooling tower decks. All drain pipes shall not be less than 25mm diameter. For condensate drain droppers installed in pipe shaft, AHU Room, etc. hubless cast iron pipes shall be used.

(e) Air vent pipework shall be of galvanised steel to BS EN 10255 medium gauge.

For all pipe connections to valves, strainers and equipment, flanged or screwed joints shall be used. All screwed joints shall be made with Teflon thread sealing tape; hemp or similar organic substance shall not be used.

30/11/95

5.11 Steel Pipe Jointing

For black steel pipework, all joints up to and including 65mm diameter shall be made by means of screwed connections. Pipes 80mm diameter and above shall be joined by means of welding.

For galvanising steel pipework, joints up to and including 65mm diameter shall be made by means of screwed or flanged connections. Pipes 80mm diameter and above shall be joined by means of flanged connections.

In all cases where pipes are joined to flanged equipment, the appropriate mating flanges shall be used.

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5.12 Flanges For Steel Pipes

Flanges in accordance with BS EN 1092-1 shall be mild steel. All flanged joints shall be flushed and aligned, and shall be made with corrugated jointing rings, coated on both sides with the recommended jointing compound. All bolts shall be hexagonal-headed steel in accordance with BS 916 with washer and nuts.

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5.13 Steel Pipe Fittings

In all cases, galvanised pipe fittings shall be used on galvanised pipework and black pipe fittings on black steel pipework.

In general, all fittings shall be of the malleable iron type, but in all cases entirely suited to the working and test pressures of the circuit concerned.

On all changes of directions, proprietary made elbows and tees shall be used. Bends, offsets and other pipe fittings formed by welding together segmented pieces will be rejected. Short fill-in sections of piping less than 150mm long shall not be welded in to any pipe run.

Reduction in diameter for through-flow pipes shall be made by means of reducing sockets for vertical pipes only; for horizontal connections to pump suction, eccentric reducing sockets shall be used.

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5.14 Copper Pipe Jointing and Fittings

All copper pipework up to and including 40mm diameter shall be joined by means of brazing or compression fittings. Copper pipework 50mm diameter and above shall be jointed by means of brazing connections. At terminal joints to equipment flanged joints shall be used to facilitate maintenance, dismantling and repair.

All brazed joints shall be made using silver brazing alloy filler metal in accordance with BS EN 1044. Under no circumstances will the use of an acid based flux or fluid be permitted. After brazed joints are made, they shall be thoroughly cleaned and washed to remove all traces of residues before installation.

Flanges in accordance with BS EN 1092-1 shall be of gunmetal. Flanged joints shall be flush and aligned and shall utilise corrugated jointing rings, coated on both sides with the recommended jointing compound. Flanges shall be brazed to the pipes.

All copper fittings shall be of the capillary or compression type. In all cases the type of fittings used shall be entirely suited for their application. Where capillary fittings are used they shall have built-in solder rings, thereby requiring only flux and heat to make a truly clean joint. Bends may be pulled as necessary, but in all cases, a proper bending machine with formers for the varying pipe diameters shall be used to produce bends entirely free from buckling. Reduction tees may be brazed into the larger pipes if agreed by the Architect. In these cases great care must be taken to ensure the hole cut in the larger pipe has the required matching contour curve. Oversized holes filled in with filler metal by brazing will not be permitted.

If called upon to do so, the Sub-Contractor shall submit to the Architect, samples of copper fittings and specimens of brazed joints for review before any work is carried out.

09/01/09

5.15 Valves, Cocks etc. General

All valves, cocks, etc. shall be suitable for the working and test pressure of the system concerned. Valve flanges shall be in accordance with BS EN 1092-1 as specified for their respective service pipework. The nominal bore of any valve shall not be less than the bore of the pipe to which it is fitted.

Valves shall be fitted in accessible positions for operation and repair. The connection between each valve and the adjacent equipment shall be made with a union or a flange for ease of dismantling.

Valve spindles shall be adequately lubricated with graphite, and all glands shall be freshly packed before installation. All valves in main plant rooms shall be of the external spindle type. All valves shall be fitted with hand-wheels.

Where possible, all valves supplied and fitted shall be of the same manufacture. Control valves shall be supplied only by manufacturer of control equipment.

All valves, cocks, etc. for water supply or other services shall comply with the requirements of the P.U.B. Where valves are located more than 2 m above floor level or in an inaccessible location, they shall be operated by chain mechanism.

Valves used for working pressure more than 19 bar shall be of the flanged cast steel type. The materials with which valves and valves bodies, used for lower working pressure, are manufactured shall be as specified in the following clauses.

09/01/09

5.24 Pressure Gauges

Pressure gauges shall be of the 100mm diameter brass cased type. They shall be designed for pipe mounting and be calibrated in mbar. All pressure gauges shall be of the Bourbon tube type and selected for normal operating point to be at mid-point of the scale. All pressure gauges shall be provided with suitable gauge cocks and snubbers to prevent vibration of its needle. Pressure gauges shall conform to BS EN 837-1.

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5.25 Thermometers

Thermometers shall be of glass stem industrial heavy duty type fitted in metal case. Thermometers shall be designed for pipe mounting and complete with pipe well. Calibration shall be in Celsius. Measuring range shall be suitable for the particular service. Thermometers used in conjunction with chilled water pipework shall be rejected if condensation should occur at the glass face plate.

03/10/03

5.26 Anti-Vibration Coupling

Piping connections to all pumps, chillers, fan coil units, air handling units etc. shall be by means of stainless steel flexible connections and/or victaulic flexible coupling unless otherwise shown in the Specification Drawings. Suitable devices shall be provided to limit elongation of the fitting.

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5.27 uPVC Pipe

Unplasticised PVC (uPVC) pipework shall be to BS EN 1452 (Part 1 to 5) and installed complete with standard moulded fittings. Sample of pipes and fittings shall be submitted to the Architect for review.

uPVC pipes shall be odourless type and shall not taint and shall be suitable for the service and duty specified. uPVC pipes shall be resistant to all external and internal corrosion and shall not attack or be subject to attack by insects and rodents. Pipe material shall be suitable for use with thermal insulating materials and vapour sealing compounds specified elsewhere in the Specification.

Pipe runs shall be fabricated using cemented sockets, bushes, bends, elbows and tees but flanged or screwed joints shall be used at connections to plant items and valves. Sufficient additional flanged joints shall be provided to facilitate maintenance and dismantling as directed by the Architect.

Generally pipe fixing shall be in accordance with the clause on “Pipe Fixings” and particular care and attention shall be paid to the greater degree of expansion and contraction of uPVC pipes in comparison with that of metal pipes. Hangers or supports spacing shall comply with the manufacturer’s recommendations but in any case shall not exceed the following:

Up to and including 40mm bore	....	1m apart
50mm bore to 80mm bore	....	1.5m apart
100mm bore to 150mm bore	....	2m apart

Valves, cocks, etc. for uPVC piping systems shall be (as specified in the appropriate clauses of these Specifications) applicable to uPVC pipes. uPVC pipes shall be flange connected to metal valves and metal systems. Screwed connections will not be accepted but composite unions or special adaptors may be used.

09/01/09

5.28 Orifice Plates

Orifice plates shall be of stainless steel and complete with orifice carriers, matching flanges, gaskets, flange bolts, etc. Tapping points shall be provided at both upstream and downstream of the orifice plates and shall be made in strict accordance with PD ISO/TR 9464 and associated amendments.

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5.29 Flow Meter

The flow meter shall be of the direct reading type and shall consist basically of an accurately calibrated resistor which converts the orifice pressure drop into flow rate directly proportional to the main flow. The indicator float shall also be of the stainless steel. Isolating valves shall be provided at inlets and outlets of the flow meter. Flow meter for cooling tower make-up water lines shall be PUB approved cumulative water meter.

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5.30 Earthing of Riser Pipes

Earthing bosses shall be provided at the top and bottom of each condenser water pipe risers and earthed to the respective pumpset electrical earthing system.

Earthing bosses shall be of the same material as the pipe to which they are connected, and shall be welded to the pipes in an accessible and approved locations suitable for connection to the earthing system. Bosses shall be 50mm diameter with 10mm diameter clear hole and 7mm deep.

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5.31 Labelling

Directional arrows and symbols - 25mm black lettering on yellow background or as approved by the Architect, shall be used on all pipework throughout the installations. All arrows shall indicate the direction of flow of water in the pipe. Such arrows and symbols shall be located on each pipe between each floor level and throughout plant rooms in positions to the approval of the Architect.

Symbols shall be as follows unless otherwise approved:

Description	Symbol
Chilled Water Flow	CHWF
Chilled Water Return	CHWR
Condenser Water Flow	CWF
Condenser Water Return	CWR
Condensate Water	CW
Suction Line	SL
Liquid Line	LL

All valves larger than 100mm diameter shall be fitted with engraved brass labels indicating the valve duty. The label shall be mounted on top of the valve and screwed onto the handwheel or level nut.

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5.32 Expansion Tanks