BILL NO. 5.11.3

MECHANICAL INSTALLATIONS - AIR-CONDITIONING AND MECHANICAL VENTILATION INSTALLATION

CONDENSING WATER SYSTEM

Black mild steel pipes and fittings complying with ISO 65, medium grade with screwed joints

1	80 mm Pipe.	Run
2	100 mm Pipe.	Run
	Extra over pipework for the following fittings	
3	80 mm Bend.	No.
4	100 mm Bend.	No.
5	100 mm Tee.	No.
6	100 mm Reducing tee.	No.
	Flow and return header pipes blanked off at open ends	
7	100 mm Pipe 1500 mm long with junctions for connection of 3 No. 100 mm pipes.	No.
8	100 mm Pipe 9000 mm long with junctions for connection of 5 No. 80 mm and 4 No. 100 mm pipes.	No.

Ductile iron pipes and fittings complying with BS EN 545, with external coating and internal lining and welded joints

9	200 mm Pipe.	Run
10	250 mm Pipe.	Run
11	350 mm Pipe.	Run

Extra over pipework for the following fittings

12	200 mm Bend.	No.
13	250 mm Bend.	No.
14	350 mm Bend.	No.

Flow and return header pipes blanked off at open ends

15	250 mm Pipe 9000 mm long with junctions for connection of 2 No. 80 mm and 3 No. 200 mm pipes.	No.
16	400 mm Pipe 11000 mm long with junctions for connection of 1 No. 80 mm, 3 No. 200 mm and 1 No. 350 mm pipes.	No.
17	400 mm Pipe 11000 mm long with junctions for connection of 4 No. 200 mm and 1 No. 350 mm pipes.	No.
18	400 mm Pipe 11000 mm long with junctions for connection of 3 No. 250 mm and 1 No. 350 mm pipes.	No.
19	400 mm Pipe 11000 mm long with junctions for connection of 4 No. 250 mm and 1 No. 350 mm pipes.	No.

	uPVC pipes and fittings complying with ISO 3127, ISO 4422, * grade with solvent welded joints	
20	50 mm Pipe.	Run
21	80 mm Pipe.	Run
	Extra over pipework for the following fittings	
22	80 mm Bend.	No.
	Flow and return header pipes blanked off at open ends	
23	100 mm Pipe 9500 mm long with junctions for connection of 1 No. 50 mm and 4 No. 80 mm pipes.	No.
	Bronze body valves	
	Drain valves with plugs	
24	50 mm Diameter.	No.
	Gate valves	
25	50 mm Diameter.	No.
	Gate valves with plugs	
26	50 mm Diameter.	No.
	Cast iron body valves	
	Gate valves	
27	80 mm Diameter.	No.
28	100 mm Diameter.	No.

	Flow control valves	
29	250 mm Diameter.	No.
	Motorized on/off valves	
30	80 mm Diameter.	No.
	Check valves	
31	100 mm Diameter.	No.
32	250 mm Diameter.	No.
	Ductile iron body valves	
	Butterfly valves	
33	200 mm Diameter.	No.
34	250 mm Diameter.	No.
	Motorized on/off butterfly valves	
35	200 mm Diameter.	No.
36	250 mm Diameter.	No.
	Cast iron body strainers	
	Y-type pipeline strainers	
37	100 mm Diameter.	No.
38	250 mm Diameter.	No.
	Reinforced rubber flexible	
39	80 mm Diameter.	No.
40	100 mm Diameter.	No.
41	200 mm Diameter.	No.
42	250 mm Diameter.	No.

Gunmetal automatic air vents complete with non-ferrous floats and guides, and non-corrodible valves and seats including isolating valves

43 To suit 250 mm pipe. No.

Stainless steel thermometer wells complete with thermometers

44 To suit 250 mm pipe. No.

Pressure gauges complete with cocks, siphon pipework and connections

45 To suit 250 mm pipe. No.

Testing plugs complete with sealing caps

46 To suit 250 mm pipe. No.

Direct reading flow meters complete with flow sensors, integral signal converter/transmitter and digital display unit

47 Approved type. No.

Fresh water cooling towers comprising glass reinforced plastic (GRP) casings and removable covers, fan motors, self-extinguishing PVC fill, stainless steel grade 316 support structures, fan guards, gear boxes, bleed pipes, switches, adequate acoustic treatment and all necessary ancillary components, all as described

Centrifugal type cooling towers complete with forced draught fans and packaged silencers

48 Heat rejection capacity of * kW (ref. *). No.

Fresh water pump sets, direct driven by electric motors, complete with cast iron casings, stuffing box with mechanical seal, approved insulation and cladding, all as described

Centrifugal horizontal split casing type condenser water pump sets

49 Water flow rate at 63.11 l/s, against a head of 20 m cut-in and 30 m cut-out (ref. *). No.

In-line type make-up water booster pump sets

50 Water flow rate at 2.5 l/s, against a head of 20 m cut-in and 30 m cut-out (ref. *). No.

	Sand filters, packaged type complete with filter vessels, filtration media, pumps, control panels and motorized control valves, all as described		
51	Side stream filtration flow rate of 12 l/s.		No.
	Pneumatic tanks complete with interconnecting pipework and fittings, all necessary ancillary components, all as described		
52	Capacity of 300 l.		No.
	Fibreglass bleed-off tanks complete with all necessary tank connections, fixing and supports, all as described		
53	Capacity of 1500 l.		No.
	Water treatment system by water treatment specialist, comprising chemical treatment equipment and plant, metering pumps, panel box, chemical storage, interconnecting pipework and fittings, drilling and tapping into circulation system, all necessary ancillary components, all as described		
54	For condensing water.	1	Item

Water treatment service by water treatment specialist for commissioning and testing, pre-cleaning, day-to-day water treatment of the installed system, on-site water treatment service and water analysis, reports, including all labour, testing equipment, chemicals, instruments, interconnecting pipework, all necessary ancillary components and services, all as described

Water treatment service within Contract Period

55 For condensing water. 1 Item

Water treatment service during Defects Liability Period

56 For condensing water. 1 Item

Automatic condenser tube cleaning system, comprising rubber sponge balls, injectors, strainers, controllers, valves, interconnecting pipeworks, all necessary ancillary components, all as described

57 Automatic condenser tube cleaning system. 1 Item

CHILLED WATER SYSTEM

Pre-insulated black mild steel pipes and fittings complying with ISO 65, medium grade with welded joints, complete with CFC and HCFC free rigid polyurethane foam insulation, 0.6 mm thick galvanised steel cladding, black corrosion resistant paint, all as described

Pipework with 40 mm thick insulation and steel cladding

58	25 mm Pipe.	Run

Pipework with 50 mm thick insulation and steel cladding

59	32 mm Pipe.	Run
60	40 mm Pipe.	Run
61	50 mm Pipe.	Run
62	65 mm Pipe.	Run
63	80 mm Pipe.	Run

Extra over pipework with 50 mm thick insulation and steel cladding for the following fittings

64	65 mm Bend.	No.
65	80 mm Tee.	No.
66	80 mm Reducing tee.	No.

	Pipework with 65 mm thick insulation and steel cladding	
67	100 mm Pipe.	Run
68	125 mm Pipe.	Run
	Extra over pipework with 65 mm thick insulation and steel cladding for the following fittings	
69	100 mm Bend.	No.
70	125 mm Bend.	No.
71	100 mm Reducing tee.	No.
72	125 mm Reducing tee.	No.
	Flow and return header pipes blanked off at open ends with 65 mm thick insulation and steel cladding	
73	300 mm Pipe 8000 mm long with junctions for connection of 2 No. 100 mm and 4 No. 125 mm pipes.	No.

	Pre-insulated valves and pipework ancillaries, complete with CFC and HCFC free rigid polyurethane foam insulation, 0.8 mm thick hammered aluminium cladded hinged split boxes, all as described	
	Bronze body drain valves with plugs fixing with 50 mm thick insulation and split boxes	
74	40 mm Diameter.	No.
	Bronze body gate valves fixing with 50 mm thick insulation and split boxes	
75	40 mm Diameter.	No.
76	50 mm Diameter.	No.
	Cast iron body gate valves fixing with 50 mm thick insulation and split boxes	
77	65 mm Diameter.	No.
78	80 mm Diameter.	No.
	Black mild steel pipes and fittings complying with ISO 65, medium grade with welded joints	
79	25 mm Pipe.	Run
80	32 mm Pipe.	Run
81	40 mm Pipe.	Run
82	50 mm Pipe.	Run
83	65 mm Pipe.	Run
84	80 mm Pipe.	Run
85	100 mm Pipe.	Run
86	125 mm Pipe.	Run

Extra over pipework for the following fittings

87	65 mm Bend.	No.
88	80 mm Bend.	No.
89	100 mm Bend.	No.
90	125 mm Bend.	No.
91	65 mm Tee.	No.
92	65 mm Reducing tee.	No.
93	80 mm Reducing tee.	No.
94	100 mm Reducing tee.	No.
95	125 mm Reducing tee.	No.

Black mild steel pipes and fittings complying with ISO 9329, ISO 9330, with welded joints

96	150 mm Pipe.	Run
97	200 mm Pipe.	Run
98	250 mm Pipe.	Run

Extra over pipework for the following fittings

99	150 mm Bend.	No.
100	200 mm Bend.	No.
101	150 mm Reducing tee.	No.
102	200 mm Reducing tee.	No.
103	250 mm Reducing tee.	No.

Flow and return header pipes blanked off at open ends

104	300 mm Pipe 8500 mm long with junctions for connection of 2 No. 100 mm, 4 No. 200 mm and 1 No. 250 mm pipes.	No.
105	300 mm Pipe 8500 mm long with junctions for connection of 1 No. 150 mm, 4 No. 200 mm and 1 No. 250 mm pipes.	No.
106	350 mm Pipe 11000 mm long with junctions for connection of 1 No. 150 mm, 3 No. 200 mm and 1 No. 250 mm pipes.	No.

uPVC Pipes and fittings complying with ISO 3127, ISO 4422, * grade with solvent welded joints

107	25 mm Pipe.	Run

Bronze body valves

Drain valves with plugs

108	25 mm Diameter.	No.
109	40 mm Diameter.	No.
110	50 mm Diameter.	No.

Gate valves

111	25 mm Diameter.	No.
112	32 mm Diameter.	No.
113	40 mm Diameter.	No.
114	50 mm Diameter.	No.

Globe valves

115	25 mm Diameter.	No.

Double regulating balancing valves

116	25 mm Diameter.	No.
117	32 mm Diameter.	No.
118	40 mm Diameter.	No.
119	50 mm Diameter.	No.

Motorized on/off valves

120	25 mm Diameter.	No.

Motorized modulating valves

121	40 mm Diameter.	No.
122	50 mm Diameter.	No.

Cast iron body valves

Gate valves

123	65 mm Diameter.	No.
124	80 mm Diameter.	No.
125	100 mm Diameter.	No.
126	125 mm Diameter.	No.
127	150 mm Diameter.	No.
128	200 mm Diameter.	No.
129	250 mm Diameter.	No.

Double regulating balancing valves

130	65 mm Diameter.	No.
131	80 mm Diameter.	No.
132	100 mm Diameter.	No.
133	125 mm Diameter.	No.
134	150 mm Diameter.	No.
135	200 mm Diameter.	No.
136	250 mm Diameter.	No.

Flow control valves

137	200 mm Diameter.	No.

Motorized modulating valves

138	65 mm Diameter.	No.
139	80 mm Diameter.	No.
140	100 mm Diameter.	No.
141	125 mm Diameter.	No.
142	200 mm Diameter.	No.

Check valves

143	200 mm Diameter.	No.

Ductile iron body valves

Butterfly valves

144	200 mm Diameter.	No.

Motorized on/off butterfly valves

145	200 mm Diameter.	No.

Bronze body strainers

Y-type pipeline strainers

146	40 mm Diameter.	No.
147	50 mm Diameter.	No.

Cast iron body strainers

Y-type pipeline strainers

148	65 mm Diameter.	No.
149	80 mm Diameter.	No.
150	100 mm Diameter.	No.
151	125 mm Diameter.	No.
152	200 mm Diameter.	No.

Reinforced rubber flexible

153	25 mm Diameter.	No.
154	40 mm Diameter.	No.
155	50 mm Diameter.	No.
156	65 mm Diameter.	No.
157	80 mm Diameter.	No.
158	100 mm Diameter.	No.
159	125 mm Diameter.	No.
160	200 mm Diameter.	No.

Stainless steel expansion joints of angular movement pattern bellow type

161	To suit 200 mm pipe.	No.

Energy meters complete with temperature sensors, flow meters, flow transmitter/converter units, calculator units, integrate with CCMS

162	To suit 250 mm pipe.	No.

Gunmetal automatic air vents complete with non-ferrous floats and guides, and non-corrodible valves and seats including isolating valves

163	To suit 32 mm pipe.	No.
164	To suit 40 mm pipe.	No.
165	To suit 50 mm pipe.	No.
166	To suit 65 mm pipe.	No.
167	To suit 80 mm pipe.	No.
168	To suit 100 mm pipe.	No.
169	To suit 125 mm pipe.	No.
170	To suit 150 mm pipe.	No.
171	To suit 250 mm pipe.	No.

Stainless steel thermometer wells complete with thermometers

172	To suit 40 mm pipe.	No.
173	To suit 50 mm pipe.	No.
174	To suit 65 mm pipe.	No.
175	To suit 80 mm pipe.	No.
176	To suit 100 mm pipe.	No.
177	To suit 125 mm pipe.	No.

Pressure gauges complete with cocks, siphon pipework and connections

178	To suit 40 mm pipe.	No.
179	To suit 50 mm pipe.	No.
180	To suit 65 mm pipe.	No.
181	To suit 80 mm pipe.	No.
182	To suit 100 mm pipe.	No.
183	To suit 125 mm pipe.	No.
184	To suit 200 mm pipe.	No.

Testing plugs complete with sealing caps

185	To suit 40 mm pipe.	No.
186	To suit 50 mm pipe.	No.
187	To suit 65 mm pipe.	No.
188	To suit 80 mm pipe.	No.
189	To suit 100 mm pipe.	No.
190	To suit 125 mm pipe.	No.

CFC and HCFC free phenolic foam insulation in rigid preformed section to mild steel pipes, * kg/m3 density with Class "0" fire rating, complete with factory applied double sided reinforced foil vapour barrier, fixing with approved adhesive

40 mm Thick fixing externally to pipework and fittings

191	25 mm Pipe.	Run

50 mm Thick fixing externally to pipework and fittings

192	32 mm Pipe.	Run
193	40 mm Pipe.	Run
194	50 mm Pipe.	Run
195	65 mm Pipe.	Run
196	80 mm Pipe.	Run

	Extra over 50 mm thick insulation for the following fittings	
197	65 mm Bend.	No.
198	80 mm Bend.	No.
199	65 mm Tee.	No.
200	65 mm Reducing tee.	No.
201	80 mm Reducing tee.	No.
	65 mm Thick fixing externally to pipework and fittings	
202	100 mm Pipe.	Run
203	125 mm Pipe.	Run
204	150 mm Pipe.	Run
205	200 mm Pipe.	Run
206	250 mm Pipe.	Run
	Extra over 65 mm thick insulation for the following fittings	
207	100 mm Bend.	No.
208	125 mm Bend.	No.
209	150 mm Bend.	No.
210	200 mm Bend.	No.
211	100 mm Reducing tee.	No.
212	125 mm Reducing tee.	No.
213	150 mm Reducing tee.	No.
214	200 mm Reducing tee.	No.
215	250 mm Reducing tee.	No.

65 mm Thick fixing externally to flow and return header pipes

216	300 mm Pipe 8500 mm long with junctions for connection of 2 No. 100 mm, 4 No. 200 mm and 1 No. 250 mm pipes.	No.
217	300 mm Pipe 8500 mm long with junctions for connection of 1 No. 150 mm, 4 No. 200 mm and 1 No. 250 mm pipes.	No.
218	350 mm Pipe 11000 mm long with junctions for connection of 1 No. 150 mm, 3 No. 200 mm and 1 No. 250 mm pipes.	No.

CFC and HCFC free phenolic foam insulation in rigid preformed 'oversize' section, * kg/m3 density with Class "0" fire rating, complete with factory applied double sided reinforced foil vapour barrier, fixing with approved adhesive

40 mm Thick to drain valves with plugs

219	25 mm Diameter.	No.

50 mm Thick to drain valves with plugs

220	40 mm Diameter.	No.
221	50 mm Diameter.	No.

40 mm Thick to gate valves

222	25 mm Diameter.	No.

	50 mm Thick to gate valves	
223	32 mm Diameter.	No.
224	40 mm Diameter.	No.
225	50 mm Diameter.	No.
226	65 mm Diameter.	No.
227	80 mm Diameter.	No.
	65 mm Thick to gate valves	
228	100 mm Diameter.	No.
229	125 mm Diameter.	No.
230	150 mm Diameter.	No.
231	200 mm Diameter.	No.
232	250 mm Diameter.	No.
	40 mm Thick to globe valves	
233	25 mm Diameter.	No.
	50 mm Thick to double regulating balancing valves	
234	25 mm Diameter.	No.
235	32 mm Diameter.	No.
236	40 mm Diameter.	No.
237	50 mm Diameter.	No.
238	65 mm Diameter.	No.
239	80 mm Diameter.	No.

	65 mm Thick to double regulating balancing valves	
240	100 mm Diameter.	No.
241	125 mm Diameter.	No.
242	150 mm Diameter.	No.
243	200 mm Diameter.	No.
244	250 mm Diameter.	No.
	65 mm Thick to flow control valves	
245	200 mm Diameter.	No.
	40 mm Thick to motorized on/off valves	
246	25 mm Diameter.	No.
	50 mm Thick to motorized modulating valves	
247	40 mm Diameter.	No.
248	50 mm Diameter.	No.
249	65 mm Diameter.	No.
250	80 mm Diameter.	No.
	65 mm Thick to motorized modulating valves	
251	100 mm Diameter.	No.
252	125 mm Diameter.	No.
253	200 mm Diameter.	No.

	65 mm Thick to check valves	
254	200 mm Diameter.	No.
	65 mm Thick to butterfly valves	
255	200 mm Diameter.	No.
	65 mm Thick to motorized on/off butterfly valves	
256	200 mm Diameter.	No.
	50 mm Thick to Y-type pipeline strainers	
257	40 mm Diameter.	No.
258	50 mm Diameter.	No.
259	65 mm Diameter.	No.
260	80 mm Diameter.	No.
	65 mm Thick to Y-type pipeline strainers	
261	100 mm Diameter.	No.
262	125 mm Diameter.	No.
263	200 mm Diameter.	No.
	40 mm Thick to flexible connectors	
264	25 mm Diameter.	No.

	50 mm Thick to flexible connectors	
265	40 mm Diameter.	No.
266	50 mm Diameter.	No.
267	65 mm Diameter.	No.
268	80 mm Diameter.	No.
	65 mm Thick to flexible connectors	
269	100 mm Diameter.	No.
270	125 mm Diameter.	No.
271	200 mm Diameter.	No.
	65 mm Thick to expansion joints	
272	To suit 200 mm pipe.	No.
	50 mm Thick to air vents	
273	To suit 32 mm pipe.	No.
274	To suit 40 mm pipe.	No.
275	To suit 50 mm pipe.	No.
276	To suit 65 mm pipe.	No.
277	To suit 80 mm pipe.	No.
	65 mm Thick to air vents	
278	To suit 100 mm pipe.	No.
279	To suit 125 mm pipe.	No.
280	To suit 150 mm pipe.	No.
281	To suit 250 mm pipe.	No.

Protective coverings and finishings complete with 0.8 mm thick hammered aluminium cladding to CFC and HCFC free phenolic foam insulation

Fixing to 50 mm thick insulation for

282	80 mm Pipe.	Run

Extra over protective coverings and finishings for the following

283	80 mm Bend.	No.
284	80 mm Reducing tee.	No.

Protective coverings and finishings complete with 0.8 mm thick hammered aluminium cladded hinged split boxes to CFC and HCFC free phenolic foam insulation

Fixing to 50 mm thick insulation to gate valves

285	80 mm Diameter.	No.

Protective coverings and finishings complete with 0.8 mm thick galvanized iron wire netting, cement plastering and painting to CFC and HCFC free phenolic foam insulation

Fixing to 40 mm thick insulation for

286	25 mm Pipe.	Run

	Fixing to 50 mm thick insulation for	
287	32 mm Pipe.	Run
288	40 mm Pipe.	Run
289	50 mm Pipe.	Run
290	65 mm Pipe.	Run
291	80 mm Pipe.	Run
	Extra over protective coverings and finishings for the following	
292	65 mm Bend.	No.
293	80 mm Bend.	No.
294	65 mm Tee.	No.
295	65 mm Reducing tee.	No.
296	80 mm Reducing tee.	No.
	Fixing to 65 mm thick insulation for	
297	100 mm Pipe.	Run
298	125 mm Pipe.	Run
299	150 mm Pipe.	Run
300	200 mm Pipe.	Run
301	250 mm Pipe.	Run

Extra over protective coverings and finishings for the following

302	100 mm Bend.	No.
303	125 mm Bend.	No.
304	150 mm Bend.	No.
305	200 mm Bend.	No.
306	100 mm Reducing tee.	No.
307	125 mm Reducing tee.	No.
308	150 mm Reducing tee.	No.
309	200 mm Reducing tee.	No.
310	250 mm Reducing tee.	No.

Fixing to 65 mm thick insulation for flow and return header pipes

311	300 mm Pipe 8500 mm long with junctions for connection of 2 No. 100 mm, 4 No. 200 mm and 1 No. 250 mm pipes.	No.
312	300 mm Pipe 8500 mm long with junctions for connection of 1 No. 150 mm, 4 No. 200 mm and 1 No. 250 mm pipes.	No.
313	350 mm Pipe 11000 mm long with junctions for connection of 1 No. 150 mm, 3 No. 200 mm and 1 No. 250 mm pipes.	No.

Protective coverings and finishings complete with 0.8 mm thick galvanized steel cladded hinged split boxes and painting, to CFC and HCFC free phenolic foam insulation

Fixing to 40 mm thick insulation to drain valves with plugs

314	25 mm Diameter.	No.

Fixing to 50 mm thick insulation to drain valves with plugs

315	40 mm Diameter.	
316	50 mm Diameter.	No.

Fixing to 40 mm thick insulation to gate valves

317	25 mm Diameter.	No.

Fixing to 50 mm thick insulation to gate valves

318	32 mm Diameter.	No.
319	40 mm Diameter.	No.
320	50 mm Diameter.	No.
321	65 mm Diameter.	No.
322	80 mm Diameter.	No.

Fixing to 65 mm thick insulation to gate valves

323 100 mm Diameter. No.

324 125 mm Diameter. No.

325 150 mm Diameter. No.

326 200 mm Diameter. No.

327 250 mm Diameter. No.

Fixing to 40 mm thick insulation to globe valves

328 25 mm Diameter. No.

Fixing to 50 mm thick insulation to double regulating balancing valves

329 25 mm Diameter. No.

330 32 mm Diameter. No.

331 40 mm Diameter. No.

332 50 mm Diameter. No.

333 65 mm Diameter. No.

334 80 mm Diameter. No.

	Fixing to 65 mm thick insulation to double regulating balancing valves	
335	100 mm Diameter.	No.
336	125 mm Diameter.	No.
337	150 mm Diameter.	No.
338	200 mm Diameter.	No.
339	250 mm Diameter.	No.
	Fixing to 65 mm thick insulation to flow control valves	
340	200 mm Diameter.	No.
	Fixing to 40 mm thick insulation to motorized on/off valves	
341	25 mm Diameter.	No.
	Fixing to 50 mm thick insulation to motorized modulating valves	
342	40 mm Diameter.	No.
343	50 mm Diameter.	No.
344	65 mm Diameter.	No.
345	80 mm Diameter.	No.

	Fixing to 65 mm thick insulation to motorized modulating valves	
346	100 mm Diameter.	No.
347	125 mm Diameter.	No.
348	200 mm Diameter.	No.
	Fixing to 65 mm thick insulation to check valves	
349	200 mm Diameter.	No.
	Fixing to 65 mm thick insulation to butterfly valves	
350	200 mm Diameter.	No.
	Fixing to 65 mm thick insulation to motorized on/off butterfly valves	
351	200 mm Diameter.	No.
	Fixing to 50 mm thick insulation to Y-type pipeline strainers	
352	40 mm Diameter.	No.
353	50 mm Diameter.	No.
354	65 mm Diameter.	No.
355	80 mm Diameter.	No.

Fixing to 65 mm thick insulation to Y-type pipeline strainers

356	100 mm Diameter.	No.
357	125 mm Diameter.	No.
358	200 mm Diameter.	No.

Fixing to 50 mm thick insulation to air vents

359	To suit 32 mm pipe.	No.
360	To suit 40 mm pipe.	No.
361	To suit 50 mm pipe.	No.
362	To suit 65 mm pipe.	No.
363	To suit 80 mm pipe.	No.

Fixing to 65 mm thick insulation to air vents

364	To suit 100 mm pipe.	No.
365	To suit 125 mm pipe.	No.
366	To suit 150 mm pipe.	No.
367	To suit 250 mm pipe.	No.

Packaged refrigeration chillers, * refrigerant, factory assembled and tested unit, comprising centrifugal type compressors, condensers, motors, variable speed drives, evaporators, electronic / microcomputer control panel, acoustic treatment, insulation, all interconnecting pipework and fittings, all sensing devices, all necessary ancillary components, all as described

Fresh water cooling water chillers

368	Cooling capacity of 1055 kW (ref.	No.

Chilled water pump sets, direct driven by electric motors, complete with cast iron casings, stuffing boxes with mechanical seal, approved insulation and cladding, all as described

Centrifugal horizontal split casing type chilled water pump sets

369	Water flow rate at 38.7 l/s, against a head of 20 m cut-in and 30 m cut-out (ref. *).	No.

Pressurization units complete with all necessary ancillary components, all as described

370	Pressurization unit.	No.

Pneumatic tanks complete with interconnecting pipework and fittings, all necessary ancillary components, all as described

371 Capacity of 300 l. No.

Air dirt separators comprising cast steel housing with spiro tube bundles, insulation with protective coverings and finishings, air vents and drain facilities, all as described

372 Air dirt separator connected to 250 mm pipe. No.

Water treatment system by water treatment specialist, comprising chemical treatment equipment and plant, metering pumps, panel box, chemical storage, interconnecting pipework and fittings, drilling and tapping into circulation system, all necessary ancillary components, all as described

373 For chilled water. 1 Item

Water treatment service by water treatment specialist for commissioning and testing, pre-cleaning, day-to-day water treatment of the installed system, on-site water treatment service and water analysis, reports, including all labour, testing equipment, chemicals, instruments, interconnecting pipework, all necessary ancillary components and services, all as described

Water treatment service within Contract Period

374 For chilled water. 1 Item

Water treatment service during Defects Liability Period

375 For chilled water. 1 Item

HOT WATER SYSTEM

Pre-insulated black mild steel pipes and fittings complying with ISO 65, medium grade with welded joints, complete with CFC and HCFC free rigid polyurethane foam insulation, 0.6 mm thick galvanised steel cladding, black corrosion resistant paint, all as described

Pipework with 40 mm thick insulation and steel cladding

376	25 mm Pipe.	Run

Pipework with 50 mm thick insulation and steel cladding

377	32 mm Pipe.	Run
378	40 mm Pipe.	Run
379	50 mm Pipe.	Run
380	65 mm Pipe.	Run
381	80 mm Pipe.	Run

Extra over pipework with 50 mm thick insulation and steel cladding for the following fittings

382	65 mm Bend.	No.
383	80 mm Bend.	No.
384	80 mm Reducing tee.	No.

Pipework with 65 mm thick insulation and steel cladding

385	100 mm Pipe.	Run
386	125 mm Pipe.	Run

Extra over pipework with 65 mm thick insulation and steel cladding for the following fittings

387	100 mm Bend.	No.
388	125 mm Bend.	No.
389	100 mm Reducing tee.	No.
390	125 mm Reducing tee.	No.

Flow and return header pipes blanked off at open ends with 65 mm thick insulation and steel cladding

391	300 mm Pipe 8000 mm long with junctions for connection of 2 No. 100 mm and 4 No. 125 mm pipes.	No.

Pre-insulated valves and pipework ancillaries, complete with CFC and HCFC free rigid polyurethane foam insulation, 0.8 mm thick hammered aluminium cladded hinged split boxes, all as described

Bronze body drain valves with plugs fixing with 50 mm thick insulation and split boxes

392	40 mm Diameter.	No.

Bronze body gate valves fixing with 50 mm thick insulation and split boxes

393 40 mm Diameter. No.

394 50 mm Diameter. No.

Cast iron body gate valves fixing with 50 mm thick insulation and split boxes

395 65 mm Diameter. No.

396 80 mm Diameter. No.

Black mild steel pipes and fittings complying with ISO 65, medium grade with welded joints

397 65 mm Pipe. Run

398 100 mm Pipe. Run

399 125 mm Pipe. Run

Extra over pipework for the following fittings

400 65 mm Bend. No.

401 100 mm Bend. No.

402 125 mm Bend. No.

Black mild steel pipes and fittings complying with ISO 9329, ISO 9330, with welded joints

403 150 mm Pipe. Run

404 200 mm Pipe. Run

Extra over pipework for the following fittings

405	150 mm Bend.	No.
406	200 mm Bend.	No.

Flow and return header pipes blanked off at open ends

407	150 mm Pipe 5500 mm long with junctions for connection of 3 No. 100 mm pipes.	No.
408	150 mm Pipe 6000 mm long with junctions for connection of 4 No. 100 mm pipes.	No.
409	200 mm Pipe 8000 mm long with junctions for connection of 1 No. 65 mm, 2 No. 150 mm and 1 No. 200 mm pipes.	No.
410	250 mm Pipe 5000 mm long with junctions for connection of 4 No. 125 mm and 1 No. 200 mm pipes.	No.
411	250 mm Pipe 8000 mm long with junctions for connection of 1 No. 100 mm, 4 No. 125 mm and 1 No. 200 mm pipes.	No.
412	250 mm Pipe 8000 mm long with junctions for connection of 4 No. 125 mm and 1 No. 200 mm pipes.	No.

uPVC Pipes and fittings complying with ISO 3127, ISO 4422, * grade with solvent welded joints

413	25 mm Pipe.	Run

Bronze body valves

Drain valves with plugs

414	25 mm Diameter.	No.

Gate valves

415	25 mm Diameter.	No.

Gate valves with plugs

416	25 mm Diameter.	No.

Cast iron body valves

Gate valves

417	65 mm Diameter.	No.
418	100 mm Diameter.	No.
419	150 mm Diameter.	No.
420	200 mm Diameter.	No.

Flow control valves

421	100 mm Diameter.	No.
422	125 mm Diameter.	No.

Check valves

423	100 mm Diameter.	No.
424	125 mm Diameter.	No.

Ductile iron body valves

Butterfly valves

425	100 mm Diameter.	No.
426	125 mm Diameter.	No.

Motorized on/off butterfly valves

427	100 mm Diameter.	No.
428	125 mm Diameter.	No.

Cast iron body strainers

Y-type pipeline strainers

429	100 mm Diameter.	No.
430	125 mm Diameter.	No.

Reinforced rubber flexible

431	100 mm Diameter.	No.
432	125 mm Diameter.	No.

Gunmetal automatic air vents with non-ferrous floats and guides, and non-corrodible valves and seats including isolating valves

433 To suit 150 mm pipe. No.

434 To suit 200 mm pipe. No.

Stainless steel thermometer wells complete with thermometers

435 To suit 100 mm pipe. No.

436 To suit 125 mm pipe. No.

Pressure gauges complete with cocks and siphon pipework and connections

437 To suit 100 mm pipe. No.

438 To suit 125 mm pipe. No.

Testing plugs complete with sealing caps

439 To suit 100 mm pipe. No.

440 To suit 125 mm pipe. No.

CFC and HCFC free phenolic foam insulation in rigid preformed section to mild steel pipes, * kg/m3 density with Class "0" fire rating, complete with factory applied double sided reinforced foil vapour barrier, fixing with approved adhesive

50 mm Thick fixing externally to pipework and fittings

441	65 mm Pipe.	Run

Extra over 50 mm thick insulation for the following fittings

442	65 mm Bend.	No.

65 mm Thick fixing externally to pipework and fittings

443	100 mm Pipe.	Run
444	125 mm Pipe.	Run
445	150 mm Pipe.	Run
446	200 mm Pipe.	Run

Extra over 65 mm thick insulation for the following fittings

447	100 mm Bend.	No.
448	125 mm Bend.	No.
449	150 mm Bend.	No.
450	200 mm Bend.	No.

65 mm Thick fixing externally to flow and return header pipes

451 150 mm Pipe 5500 mm long with junctions for connection of 3 No. 100 mm pipes. No.

452 150 mm Pipe 6000 mm long with junctions for connection of 4 No. 100 mm pipes. No.

453 200 mm Pipe 8000 mm long with junctions for connection of 1 No. 65 mm, 2 No. 150 mm and 1 No. 200 mm pipes. No.

454 250 mm Pipe 5000 mm long with junctions for connection of 4 No. 125 mm and 1 No. 200 mm pipes. No.

455 250 mm Pipe 8000 mm long with junctions for connection of 1 No. 100 mm, 4 No. 125 mm and 1 No. 200 mm pipes. No.

456 250 mm Pipe 8000 mm long with junctions for connection of 4 No. 125 mm and 1 No. 200 mm pipes. No.

CFC and HCFC free phenolic foam insulation in rigid preformed 'oversize' section, * kg/m3 density with Class "0" fire rating, complete with factory applied double sided reinforced foil vapour barrier, fixing with approved adhesive

40 mm Thick to drain valves with plugs

457 25 mm Diameter. No.

	40 mm Thick to gate valves	
458	25 mm Diameter.	No.
	40 mm Thick to gate valves with	
459	25 mm Diameter.	No.
	50 mm Thick to gate valves	
460	65 mm Diameter.	No.
	65 mm Thick to gate valves	
461	100 mm Diameter.	No.
462	150 mm Diameter.	No.
463	200 mm Diameter.	No.
	65 mm Thick to flow control valves	
464	100 mm Diameter.	No.
465	125 mm Diameter.	No.
	65 mm Thick to check valves	
466	100 mm Diameter.	No.
467	125 mm Diameter.	No.
	65 mm Thick to butterfly valves	
468	100 mm Diameter.	No.
469	125 mm Diameter.	No.

	65 mm Thick to motorized on/off butterfly valves	
470	100 mm Diameter.	No.
471	125 mm Diameter.	No.
	65 mm Thick to Y-type pipeline strainers	
472	100 mm Diameter.	No.
473	125 mm Diameter.	No.
	65 mm Thick to flexible connectors	
474	100 mm Diameter.	No.
475	125 mm Diameter.	No.
	65 mm Thick to air vents	
476	To suit 150 mm pipe.	No.
477	To suit 200 mm pipe.	No.
	Protective coverings and finishings complete with 0.8 mm thick hammered aluminium cladding to CFC and HCFC free phenolic foam insulation	
	Fixing to 50 mm thick insulation for	
478	65 mm Pipe.	Run
	Extra over protective coverings and finishings for the following	
479	65 mm Bend.	No.

	Protective coverings and finishings complete with 0.8 mm thick hammered aluminium cladded hinged split boxes to CFC and HCFC free phenolic foam insulation	
	Fixing to 50 mm thick insulation to gate valves	
480	65 mm Diameter.	No.
	Protective coverings and finishings complete with 0.8 mm thick galvanized iron wire netting, cement plastering and painting to CFC and HCFC free phenolic foam insulation	
	Fixing to 50 mm thick insulation for	
481	65 mm Pipe.	Run
	Extra over protective coverings and finishings for the following	
482	65 mm Bend.	No.
	Fixing to 65 mm thick insulation for	
483	100 mm Pipe.	Run
484	125 mm Pipe.	Run
485	150 mm Pipe.	Run
486	200 mm Pipe.	Run

Extra over protective coverings and finishings for the following

487	100 mm Bend.	No.
488	125 mm Bend.	No.
489	150 mm Bend.	No.
490	200 mm Bend.	No.

Fixing to 65 mm thick insulation for flow and return header pipes

491	150 mm Pipe 5500 mm long with junctions for connection of 3 No. 100 mm pipes.	No.
492	150 mm Pipe 6000 mm long with junctions for connection of 4 No. 100 mm pipes.	No.
493	200 mm Pipe 8000 mm long with junctions for connection of 1 No. 65 mm, 2 No. 150 mm and 1 No. 200 mm pipes.	No.
494	250 mm Pipe 5000 mm long with junctions for connection of 4 No. 125 mm and 1 No. 200 mm pipes.	No.
495	250 mm Pipe 8000 mm long with junctions for connection of 1 No. 100 mm, 4 No. 125 mm and 1 No. 200 mm pipes.	No.
496	250 mm Pipe 8000 mm long with junctions for connection of 4 No. 125 mm and 1 No. 200 mm pipes.	No.

Protective coverings and finishings complete with 0.8 mm thick galvanized steel cladded hinged split boxes and painting, to CFC and HCFC free phenolic foam insulation

Fixing to 40 mm thick insulation to drain valves with plugs

497 25 mm Diameter. No.

Fixing to 40 mm thick insulation to gate valves

498 25 mm Diameter. No.

Fixing to 40 mm thick insulation to gate valves with plugs

499 25 mm Diameter. No.

Fixing to 50 mm thick insulation to gate valves

500 65 mm Diameter. No.

Fixing to 65 mm thick insulation to gate valves

501 100 mm Diameter. No.

502 150 mm Diameter. No.

503 200 mm Diameter. No.

	Fixing to 65 mm thick insulation to flow control valves	
504	100 mm Diameter.	No.
505	125 mm Diameter .	No.
	Fixing to 65 mm thick insulation to check valves	
506	100 mm Diameter.	No.
507	125 mm Diameter.	No.
	Fixing to 65 mm thick insulation to butterfly valves	
508	100 mm Diameter.	No.
509	125 mm Diameter.	No.
	Fixing to 65 mm thick insulation to motorized on/off butterfly valves	
510	100 mm Diameter.	No.
511	125 mm Diameter.	No.
	Fixing to 65 mm thick insulation to Y-type pipeline strainers	
512	100 mm Diameter.	No.
513	125 mm Diameter.	No.
	Fixing to 65 mm thick insulation to air vents	
514	To suit 150 mm pipe.	No.
515	To suit 200 mm pipe.	No.

Packaged heat pumps, factory assembled and tested unit, comprising centrifugal / screw type compressors, condensers, motors, evaporators, electronic / microcomputer control panel, acoustic treatment, insulations, all interconnecting pipework and fittings, all sensing devices, all necessary ancillary components, all

Air source heat pumps

516 Heating capacity of 200 kW (ref. *). No.

Water source heat pumps

517 Heating capacity of 200 kW (ref. *). No.

Hot water pump sets, direct driven by electric motors, complete with cast iron casings, stuffing boxes with mechanical seal, approved insulation and cladding, all as described

In-line centrifugal type hot water pump sets

518 Water flow rate at 9.5 l/s, against a head of 20 m cut-in and 30 m cut-out (ref. *). No.

519 Water flow rate at 9.52 l/s, against a head of 20 m cut-in and 30 m cut-out (ref. *). No.

Air dirt separators comprising cast steel housing with spiro tube bundles, insulation with protective coverings and finishings, air vents and drain facilities, all as described

520 Air dirt separator connected to 200 mm pipe. No.

Fibreglass feed and expansion tanks complete with insulation, protective coverings and finishings, all necessary tank connections, fixing and supports

521 Capacity of 500 l. No.

Heat transfer compact units, factory assembled and tested unit, comprising duplex primary and secondary water pumps, plate type heat exchangers, ultrasonic energy meters, valves, gauges, sensors, acoustic treatment, insulation and cladding mountings, all interconnecting pipework and fittings, all necessary ancillary components, all as described

522	Heat transfer capacity of 120 kW with primary pump water flow rate at 6 l/s at static pressure head of 5 m, secondary pump water flow rate at 1 l/s at static pressure head of 5 m (ref. *).		No.
523	Heat transfer capacity of 300 kW with primary pump water flow rate at 15 l/s at static pressure head of 5 m, secondary pump water flow rate at 2.1 l/s at static pressure head of 5 m (ref. *).		No.
524	Heat transfer capacity of 400 kW with primary pump water flow rate at 20 l/s at static pressure head of 5 m, secondary pump water flow rate at 2.8 l/s at static pressure head of 5 m (ref. *).		No.

Water treatment system by water treatment specialist, comprising chemical treatment equipment and plant, metering pumps, panel box, chemical storage, interconnecting pipework and fittings, drilling and tapping into circulation system, all necessary ancillary components, all as described

525	For hot water.	1	Item

Water treatment service by water treatment specialist for commissioning and testing, pre-cleaning, day-to-day water treatment of the installed system, on-site water treatment service and water analysis, reports, including all labour, testing equipment, chemicals, instruments, interconnecting pipework, all necessary ancillary components and services, all as described

Water treatment service within Contract Period

526 For hot water. 1 Item

Water treatment service during Defects Liability Period

527 For hot water. 1 Item

CONDENSATE DRAIN SYSTEM

Pre-insulated mild steel pipes and fittings complying with ISO 65, medium grade with welded joints, complete with CFC and HCFC free rigid polyurethane foam insulation, 0.6 mm thick galvanised steel cladding, black corrosion resistant paint, all as described

Pipework with 40 mm thick insulation and steel cladding

528	25 mm Pipe.	Run

Pipework with 50 mm thick insulation and steel cladding

529	32 mm Pipe.	Run
530	40 mm Pipe.	Run
531	50 mm Pipe.	Run
532	65 mm Pipe.	Run
533	80 mm Pipe.	Run

Extra over pipework with 50 mm thick insulation and steel cladding for the following fittings

534	65 mm Bend.	No.
535	80 mm Bend.	No.
536	80 mm Reducing tee.	No.

Pipework with 65 mm thick insulation and steel cladding

537	100 mm Pipe.	Run
538	125 mm Pipe.	Run

Extra over pipework with 65 mm thick insulation and steel cladding for the following fittings

539	100 mm Bend.	No.
540	125 mm Bend.	No.
541	100 mm Reducing tee.	No.
542	125 mm Reducing tee.	No.

Flow and return header pipes blanked off at open ends with 65 mm thick insulation and steel cladding

543	300 mm Pipe 8000 mm long with junctions for connection of 2 No. 100 mm and 4 No. 125 mm pipes.	No.

Pre-insulated valves and pipework ancillaries, complete with CFC and HCFC free rigid polyurethane foam insulation, 0.8 mm thick hammered aluminium cladded hinged split boxes, all as described

Bronze body drain valves with plugs fixing with 50 mm thick insulation and split boxes

544	40 mm Diameter.	No.

Bronze body gate valves fixing with 50 mm thick insulation and split boxes

545	40 mm Diameter.	No.
546	50 mm Diameter.	No.

Cast iron body gate valves fixing with 50 mm thick insulation and split boxes

547 65 mm Diameter. No.

548 80 mm Diameter. No.

Mild steel pipes and fittings complying with ISO 65, medium grade with screw joints

549 25 mm Pipe. Run

550 32 mm Pipe. Run

551 40 mm Pipe. Run

552 50 mm Pipe. Run

Stainless steel expansion joints of angular movement pattern bellow type

553 To suit 50 mm pipe. No.

CFC and HCFC free phenolic foam insulation in rigid preformed section to mild steel pipes, * kg/m3 density with Class "1" fire rating, complete with factory applied double sided reinforced foil vapour barrier, fixing with approved adhesive

25 mm Thick fixing externally to pipework and fittings

554 25 mm Pipe. Run

555 32 mm Pipe. Run

556 40 mm Pipe. Run

557 50 mm Pipe. Run

MECHANICAL VENTILATION SYSTEM

Hot-dipped galvanised steel sheet ductwork and fittings complying with BS EN 10346, Grade DX51D+Z, DW/144, medium pressure, coating type Z275, off site prefabricated

Rectangular ducts

558	0.6 mm Thick.	Sup.
559	0.8 mm Thick.	Sup.
560	1.0 mm Thick.	Sup.
561	1.2 mm Thick.	Sup.

Galvanised mild steel dampers complying with DW/143

Volume control dampers of aerofoil, double skin, opposed blade low leakage type

562	150 x 100 mm.	No.
563	150 x 150 mm.	No.
564	200 x 150 mm.	No.
565	200 x 200 mm.	No.
566	250 x 150 mm.	No.
567	250 x 200 mm.	No.
568	250 x 250 mm.	No.
569	300 x 200 mm.	No.

570	300 x 300 mm.	No.
571	350 x 200 mm.	No.
572	350 x 250 mm.	No.
573	350 x 350 mm.	No.
574	400 x 200 mm.	No.
575	400 x 250 mm.	No.
576	450 x 200 mm.	No.
577	450 x 350 mm.	No.
578	450 x 450 mm.	No.
579	500 x 300 mm.	No.
580	600 x 200 mm.	No.
581	600 x 250 mm.	No.
582	600 x 300 mm.	No.
583	600 x 350 mm.	No.
584	800 x 300 mm.	No.
585	900 x 250 mm.	No.
586	1000 x 300 mm.	No.

Multi-bladed fire dampers, 2 hour fire rated with fusible link operated at temperature of 69°C

587	150 x 100 mm.	No.
588	150 x 150 mm.	No.
589	200 x 150 mm.	No.
590	200 x 200 mm.	No.
591	250 x 150 mm.	No.
592	250 x 200 mm.	No.
593	250 x 250 mm.	No.
594	300 x 150 mm.	No.
595	300 x 200 mm.	No.
596	300 x 250 mm.	No.
597	300 x 300 mm.	No.
598	350 x 200 mm.	No.
599	350 x 250 mm.	No.
600	350 x 300 mm.	No.
601	400 x 200 mm.	No.
602	400 x 250 mm.	No.
603	400 x 300 mm.	No.
604	450 x 250 mm.	No.
605	450 x 300 mm.	No.

606	500 x 250 mm.	No.
607	550 x 350 mm.	No.
608	600 x 150 mm.	No.
609	600 x 200 mm.	No.
610	600 x 250 mm.	No.
611	600 x 300 mm.	No.
612	600 x 350 mm.	No.
613	600 x 400 mm.	No.
614	600 x 500 mm.	No.
615	650 x 250 mm.	No.
616	700 x 300 mm.	No.
617	700 x 400 mm.	No.
618	750 x 300 mm.	No.
619	800 x 300 mm.	No.
620	800 x 400 mm.	No.
621	850 x 300 mm.	No.
622	900 x 250 mm.	No.
623	900 x 350 mm.	No.
624	1000 x 300 mm.	No.
625	1000 x 500 mm.	No.
626	1100 x 450 mm.	No.
627	1100 x 800 mm.	No.

Stainless steel dampers complying with DW/144

Combined fire and smoke stop dampers of aerofoil bladed type, 2 hour fire rated, temperature exposure tested, replaceable thermal actuator and fusible link

628	600 x 400 mm.	No.

Aluminium grilles

Fresh air grilles complete with volume control dampers

629	300 x 300 mm.	No.
630	600 x 600 mm.	No.
631	800 x 500 mm.	No.
632	1000 x 300 mm.	No.
633	1800 x 600 mm.	No.

Exhaust air grilles complete with volume control dampers

634	300 x 300 mm.	No.
635	400 x 400 mm.	No.
636	450 x 450 mm.	No.
637	500 x 300 mm.	No.
638	500 x 500 mm.	No.
639	600 x 300 mm.	No.
640	600 x 600 mm.	No.

641	800 x 800 mm.	No.
642	1200 x 600 mm.	No.
643	2000 x 600 mm.	No.
	Transfer air grilles complete with volume control dampers	
644	150 x 150 mm.	No.
645	200 x 200 mm.	No.
646	250 x 250 mm.	No.
647	300 x 150 mm.	No.
648	300 x 300 mm.	No.
649	500 x 300 mm.	No.
650	600 x 600 mm.	No.
	Egg crate grilles	
651	800 x 800 mm.	No.
	Air cleaning equipment	
	Synthetic fibre washable panel filters, heavy duty airtight factory assembled, complete with robust enclosure, holding frames and housing, all necessary ancillary components, all as described	
652	650 x 250 x 50 mm Thick.	No.
653	1500 x 1000 x 50 mm Thick.	No.

Washing facilities for washable filters complete with duplicate cleaning tanks for washing and rinsing, comprising 1 mm thick (minimum) grade 316 stainless steel tanks, drain cocks, external handles, all necessary ancillary components, all as described

654	Duplicate washing and rinsing tank set.		Set

Spare filter media, all as described

655	Allow for replacement and spare filter media and approved cleaning detergent during testing and commissioning stage and Defects Liability Period.	1	Item

Galvanised steel mesh bird wires to louvres, complete with all necessary framing

656	300 x 200 mm.		No.
657	350 x 200 mm.		No.
658	400 x 400 mm.		No.
659	500 x 500 mm.		No.
660	600 x 300 mm.		No.
661	600 x 600 mm.		No.

662	800 x 500 mm.	No.
663	800 x 800 mm.	No.
664	1000 x 300 mm.	No.
665	1200 x 600 mm.	No.
666	2000 x 600 mm.	No.

Galvanised steel ductwork silencers complete with inorganic mineral acoustic filler

Silencers to rectangular ducts

667	300 x 300 mm, 1200 mm Long.	No.
668	350 x 250 mm, 1200 mm Long.	No.
669	400 x 200 mm, 1200 mm Long.	No.
670	400 x 250 mm, 1200 mm Long.	No.
671	400 x 300 mm, 1200 mm Long.	No.
672	400 x 400 mm, 1200 mm Long.	No.
673	500 x 250 mm, 1200 mm Long.	No.
674	500 x 300 mm, 1200 mm Long.	No.
675	550 x 350 mm, 1200 mm Long.	No.
676	600 x 300 mm, 1200 mm Long.	No.

677	600 x 350 mm, 1200 mm Long.	No.
678	600 x 400 mm, 1200 mm Long.	No.
679	650 x 250 mm, 1200 mm Long.	No.
680	700 x 300 mm, 1200 mm Long.	No.
681	700 x 400 mm, 1200 mm Long.	No.
682	750 x 300 mm, 1200 mm Long.	No.
683	800 x 400 mm, 1200 mm Long.	No.
684	900 x 250 mm, 1200 mm Long.	No.
685	1000 x 300 mm; 1200 mm Long.	No.

CFC and HCFC free phenolic foam board insulation, * kg/m3 density with Class "O" fire rating, factory applied double sided reinforced foil vapour barrier, fixing with approved adhesive

25 mm Thick fixing externally to ductwork

686	Rectangular ductwork.	Sup.

CFC free flexible closed cell elastomeric insulation, * kg/m3 density with Class "O" fire rating, factory applied talc coating on inner surface, vapour barrier with glass fibre mat to DIN 53122 Part 1, fixing with approved adhesive

25 mm Thick fixing externally to ductwork

687 Rectangular ductwork. Sup.

Protective coverings and finishings with 0.8 mm thick hammered aluminium cladding to CFC and HCFC free phenolic foam board insulation

Fixing to 25 mm thick insulation for

688 Rectangular ductwork. Sup.

Protective coverings and finishings complete with 0.8 mm thick hammered aluminium cladding to CFC free flexible closed cell elastomeric insulation

Fixing to 25 mm thick insulation for

689 Rectangular ductwork. Sup.

Protective coverings and finishings complete with 0.6 mm thick galvanised steel cladding to CFC free flexible closed cell elastomeric insulation

Fixing to 25 mm thick insulation for

690 Rectangular ductwork. Sup.

Fire-rated enclosure according to FSD and Building Ordinance, complete with all necessary framings

* Hour fire-resistant-period enclosure to BS 476 Part 20 - 22 for

691 Rectangular ductwork. Sup.

Ventilating fans complete with galvanised steel casings, all accessories and mountings as required, all as described

Propeller type ventilating fans

692 Air volume flow rate at * l/s, static pressure at * Pa (ref. *). No.

693 Air volume flow rate at * l/s, static pressure at * Pa (ref. *). No.

Propeller explosion proof type ventilating fans

694 Air volume flow rate at * l/s, static pressure at * Pa (ref. *). No.

In-line duct type ventilating fans with acoustic enclosure

695 Air volume flow rate at * l/s, static pressure at * Pa (ref. *). No.

696 Air volume flow rate at * l/s, static pressure at * Pa (ref. *). No.

697 Air volume flow rate at * l/s, static pressure at * Pa (ref. *). No.

698 Air volume flow rate at * l/s, static pressure at * Pa (ref. *). No.

In-line duct type ventilating fans with twin motors and acoustic enclosure

699 Air volume flow rate at * l/s, static pressure at * Pa (ref. *). No.

700 Air volume flow rate at * l/s, static pressure at * Pa (ref. *). No.

701 Air volume flow rate at * l/s, static pressure at * Pa (ref. *). No.

Centrifugal type ventilating fans

702 Air volume flow rate at * l/s, static pressure at * Pa (ref. *). No.

703 Air volume flow rate at * l/s, static pressure at * Pa (ref. *). No.

704 Air volume flow rate at * l/s, static pressure at * Pa (ref. *). No.

705 Air volume flow rate at * l/s, static pressure at * Pa (ref. *). No.

Centrifugal type ventilating fans with twin motors

706 Air volume flow rate at * l/s, static pressure at * Pa (ref. *). No.

707 Air volume flow rate at * l/s, static pressure at * Pa (ref. *). No.

708 Air volume flow rate at * l/s, static pressure at * Pa (ref. *). No.

Centrifugal and weather proof type ventilating fans

709 Air volume flow rate at * l/s, static pressure at * Pa (ref. *). No.

710 Air volume flow rate at * l/s, static pressure at * Pa (ref. *). No.

711 Air volume flow rate at * l/s, static pressure at * Pa (ref. *). No.

712 Air volume flow rate at * l/s, static pressure at * Pa (ref. *). No.

713 Air volume flow rate at * l/s, static pressure at * Pa (ref. *). No.

Cabinet type blower fans

714 Air volume flow rate at * l/s (ref. *). No.

Install Only axial type ventilating fans provided by CLP/HEC

715 Air volume flow rate at * l/s. No.

Air cleaning equipment

Activated oxygen air purifiers to UL 867, factory assembled, complete with screw-in electrode, power generators, control devices and units, switches, support brackets and stiffeners, terminal boxes, all necessary ancillary components, all as described

716 500 x 300 mm. No.

717 600 x 500 mm. No.

KITCHEN EXTRACTION SYSTEM

Stainless steel sheet ductwork and fittings complying with BS 1449 Part 2, grade 316, DW/144 low/medium pressure, off site prefabricated

Rectangular ducts

718	0.6 mm Thick.	Sup.
719	0.8 mm Thick.	Sup.
720	1.0 mm Thick.	Sup.
721	1.2 mm Thick.	Sup.

Stainless steel extract hoods grade 304, satin finish, comprising 1.2 mm thick sheet, make-up air grilles, vapour proof light fittings, grease filters, removable oil containers, terminal boxes, interconnecting wirings, all necessary ancillary components, fixed independent of ductwork, all as described

Wall mounted extract hoods

722	1400 x 900 x 660 mm Overall.	No.
723	2000 x 1200 x 660 mm Overall.	No.
724	4100 x 1200 x 660 mm Overall.	No.

Ceiling mounted extract hoods

725	1500 x 1200 x 660 mm Overall.	No.

Water scrubber comprising fibreglass reinforced polyester resin (FRP) casings, factory assembled unit, complete with scrubber section with knockdown baffles/packing, mist eliminator, scrubbing liquid distribution system, fans, chemical feed pumps, chemical tanks, silencers, instrumentation, flow switch, local and remote control panels, acoustic treatment, all interconnecting pipework and fittings, all sensing devices, all necessary ancillary components, connections to associated services, all as described

Horizontal draw-through non-clogging venturi type water scrubber, with connections to external control circuitry and pipework

726 Air flow rate at * 1/s (ref. *) No.

Stainless steel dampers of grade 316 complying with DW/143

Volume control dampers of aerofoil, double skin, opposed blade low leakage type

727 450 x 200 mm. No.

728 450 x 450 mm. No.

729 700 x 200 mm. No.

Multi-bladed fire dampers, 2 hour fire rated with fusible link operated at temperature of *°C

730 200 x 150 mm. No.

731 800 x 400 mm. No.

732 1200 x 750 mm. No.

Stainless steel dampers complying with DW/144

Combined fire and smoke stop dampers of aerofoil bladed type, 2 hour fire rated, temperature exposure tested, replaceable thermal actuator and fusible link

733 400 x 300 mm. No.

Stainless steel ductwork silencers of grade 316 complete with inorganic mineral acoustic filler

Silencers to rectangular ducts

734 400 x 200 mm, 1200 mm Long. No.

735 450 x 300 mm, 1200 mm Long. No.

736 800 x 300 mm, 1200 mm Long. No.

737 800 x 400 mm, 1200 mm Long. No.

738 1200 x 750 mm, 1200 mm Long. No.

CFC free flexible closed cell elastomeric insulation, * kg/m3 density, Class "O" fire rating, factory applied talc coating on inner surface, vapour barrier with glass fibre mat to DIN 53122 Part 1, fixing with approved adhesive

25 mm Thick fixing externally to ductwork

739 Rectangular ductwork. Sup.

Protective coverings and finishings complete with 0.8 mm thick hammered aluminium cladding to CFC free flexible closed cell elastomeric insulation

fixing to 25 mm thick insulation for

740 Rectangular ductwork. Sup.

Fire-rated enclosure according to FSD and Building Ordinance complete with all necessary framings

* Hour fire-resistant-period enclosure to BS 476 Part 20 - 22 for

741 Rectangular ductwork. Sup.

Ventilating fans complete with galvanised steel casings, access doors, plugged drain points, all accessories and mountings, all as described

Centrifugal bifurcated type ventilating fans

742 Air volume flow rate at * l/s, static pressure at * Pa (ref. *). No.

743 Air volume flow rate at * l/s, static pressure at * Pa (ref. *). No.

744 Air volume flow rate at * l/s, static pressure at * Pa (ref. *). No.

745 Air volume flow rate at * l/s, static pressure at * Pa (ref. *). No.

746 Air volume flow rate at * l/s, static pressure at * Pa (ref. *). No.

747 Air volume flow rate at * l/s, static pressure at * Pa (ref. *). No.

Proprietary electrostatic precipitators, two-stage type, complete with galvanised steel cabinets with epoxy enamel coated exterior, auto clean electrostatic filters, detergent pumps and tanks, nozzles, pipes and valves, pre-filters and after filters, all necessary ancillary components, all as described

748 Air volume flow rate at * l/s (ref. *). No.

749 Air volume flow rate at * l/s (ref. *). No.

AIR CONDITIONING SYSTEM

Hot-dipped galvanised steel sheet ductwork and fittings complying with BS EN 10346, Grade DX51D+Z, DW/144, medium pressure, coating type Z275, off site prefabricated

Rectangular ducts

750	0.6 mm Thick.	Sup.
751	0.8 mm Thick.	Sup.
752	1.0 mm Thick.	Sup.
753	1.2 mm Thick.	Sup.

Flexible ductwork complying with BS 476-12, Class P, BS 476-6, completed with tear-resistant fabric liner and cover, reinforced with approved wire helix, impregnated and coated with plastic

Flexible ducts fixed to rigid ductwork or equipment spigots

754	300 mm Diameter, 1000 - 1500 mm long.	No.
755	300 mm Diameter, 1500 - 2000 mm long.	No.
756	350 mm Diameter, 2000 - 2500 mm long.	No.
757	350 mm Diameter, 2500 - 3000 mm long.	No.

Galvanised mild steel plenum boxes, factory fabricated, complete with appropriate insulation

Air plenums

758	1000 x 250 x 200 mm.	No.
759	1000 x 300 x 200 mm.	No.
760	1200 x 250 x 200 mm.	No.
761	1200 x 300 x 200 mm.	No.
762	1200 x 400 x 200 mm.	No.
763	1700 x 250 x 200 mm.	No.
764	1800 x 800 x 200 mm.	No.
765	2000 x 250 x 200 mm.	No.
766	2000 x 250 x 250 mm.	No.
767	2000 x 300 x 200 mm.	No.
768	3500 x 300 x 300 mm.	No.

Galvanised mild steel dampers complying with DW/143

Volume control dampers of aerofoil, double skin, opposed blade low leakage type

769	100 x 100 mm.	No.
770	150 x 100 mm.	No.
771	150 x 150 mm.	No.
772	200 x 150 mm.	No.
773	200 x 200 mm.	No.
774	250 x 150 mm.	No.
775	250 x 200 mm.	No.
776	250 x 250 mm.	No.
777	300 x 200 mm.	No.
778	350 x 200 mm.	No.
779	350 x 250 mm.	No.
780	350 x 300 mm.	No.
781	400 x 150 mm.	No.
782	400 x 200 mm.	No.
783	400 x 250 mm.	No.
784	450 x 200 mm.	No.
785	450 x 450 mm.	No.
786	500 x 250 mm.	No.

787	600 x 250 mm.	No.
788	600 x 300 mm.	No.
789	600 x 400 mm.	No.
790	650 x 400 mm.	No.
791	700 x 300 mm.	No.
792	800 x 250 mm.	No.
793	800 x 400 mm.	No.
794	900 x 250 mm.	No.
795	900 x 400 mm.	No.
796	900 x 500 mm.	No.
797	1000 x 300 mm.	No.
798	1000 x 350 mm.	No.
799	1100 x 400 mm.	No.
800	1200 x 300 mm.	No.
801	1200 x 350 mm.	No.
802	200 mm Diameter.	No.
	Motorized on/off dampers	
803	350 x 250 mm.	No.
804	650 x 300 mm.	No.
805	700 x 300 mm.	No.
806	800 x 300 mm.	No.
807	800 x 400 mm.	No.
808	850 x 300 mm.	No.
809	900 x 500 mm.	No.

Multi-bladed fire dampers, 2 hour fire rated with fusible link operated at temperature of 69°C

810	100 x 100 mm.	No.
811	150 x 100 mm.	No.
812	150 x 150 mm.	No.
813	200 x 150 mm.	No.
814	200 x 200 mm.	No.
815	250 x 150 mm.	No.
816	250 x 200 mm.	No.
817	250 x 250 mm.	No.
818	300 x 200 mm.	No.
819	300 x 300 mm.	No.
820	350 x 200 mm.	No.
821	350 x 250 mm.	No.
822	350 x 300 mm.	No.
823	400 x 250 mm.	No.
824	400 x 300 mm.	No.
825	400 x 400 mm.	No.
826	450 x 200 mm.	No.
827	600 x 250 mm.	No.
828	650 x 300 mm.	No.

829	700 x 250 mm.	No.
830	700 x 300 mm.	No.
831	800 x 300 mm.	No.
832	800 x 350 mm.	No.
833	850 x 300 mm.	No.
834	900 x 250 mm.	No.
835	900 x 300 mm.	No.
836	900 x 500 mm.	No.
837	1000 x 300 mm.	No.
838	1000 x 350 mm.	No.
839	1000 x 400 mm.	No.
840	1100 x 400 mm.	No.
841	1100 x 600 mm.	No.
842	1100 x 800 mm.	No.
843	1200 x 350 mm.	No.
844	1200 x 450 mm.	No.
845	1200 x 500 mm.	No.
846	1400 x 400 mm.	No.
847	2200 x 1200 mm.	No.

Stainless steel dampers complying with DW/144

Combined fire and smoke stop dampers of aerofoil bladed type, 2 hour fire rated, temperature exposure tested, replaceable thermal actuator and fusible link

848	500 x 300 mm.	No.

Aluminium grilles

Supply air grilles complete with volume control dampers

849	600 x 600 mm.	No.

Linear supply air grilles complete with volume control dampers

850	600 x 250 mm.	No.
851	800 x 250 mm.	No.
852	1000 x 200 mm.	No.
853	1000 x 250 mm.	No.
854	1200 x 200 mm.	No.
855	200 mm Width.	Run
856	250 mm Width.	Run
857	300 mm Width.	Run

 Carried to Collection $

	Dummy linear supply air grilles complete with painted blanking	
858	200 mm Width.	Run
859	250 mm Width.	Run
860	300 mm Width.	Run
861	400 mm Width.	Run
862	800 mm Width.	Run
	Return air grilles complete with volume control dampers	
863	600 x 600 mm.	No.
	Linear return air grilles complete with volume control dampers	
864	1000 x 300 mm.	No.
865	1200 x 200 mm.	No.
866	3500 x 300 mm.	No.
867	300 mm Width.	Run
868	400 mm Width.	Run
869	800 mm Width.	Run
	Return air louvres complete with filters	
870	1200 x 600 mm.	No.

Fresh air grilles complete with volume control dampers

871	750 x 600 mm.	No.

Transfer air grilles

872	200 x 200 mm.	No.
873	300 x 300 mm.	No.
874	600 x 600 mm.	No.

Galvanised steel mesh bird wires to louvres, complete with all necessary framings

875	1200 x 500 mm.	No.
876	2200 x 1200 mm.	No.

Galvanised steel ductwork silencers complete with inorganic mineral acoustic filler

Silencers to rectangular ducts

877	300 x 300 mm, 1200 mm Long.	No.
878	800 x 300 mm, 1200 mm Long.	No.
879	800 x 350 mm, 1200 mm Long.	No.
880	900 x 250 mm, 1200 mm Long.	No.
881	900 x 300 mm, 1200 mm Long.	No.
882	900 x 500 mm, 1200 mm Long.	No.
883	1000 x 300 mm, 1200 mm Long.	No.

884	1000 x 350 mm, 1200 mm Long.	No.
885	1000 x 400 mm, 1200 mm Long.	No.
886	1100 x 400 mm, 1200 mm Long.	No.
887	1100 x 600 mm, 1200 mm Long.	No.
888	1200 x 350 mm, 1200 mm Long.	No.
889	1200 x 450 mm, 1200 mm Long.	No.
890	1200 x 500 mm, 1200 mm Long.	No.
891	1400 x 400 mm, 1200 mm Long.	No.
892	2200 x 1200 mm, 1200 mm Long.	No.

CFC and HCFC free phenolic foam board insulation, * kg/m3 density with Class "O" fire rating, factory applied double sided reinforced foil vapour barrier, fixing with approved adhesive

25 mm Thick fixing externally to ductwork

893	Rectangular ductwork.	Sup.

CFC free flexible closed cell elastomeric insulation, * kg/m3 density with Class "O" fire rating, factory applied talc coating on inner surface, vapour barrier with glass fibre mat to DIN 53122 Part 1, fixing with approved adhesive

25 mm Thick fixing externally to ductwork

894 Rectangular ductwork. Sup.

Protective coverings and finishings complete with 0.8 mm thick hammered aluminium cladding to CFC and HCFC free phenolic foam insulation

Fixing to 25 mm thick insulation for

895 Rectangular ductwork. Sup.

Protective coverings and finishings complete with 0.8 mm thick hammered aluminium cladding to CFC free flexible closed cell elastomeric insulation

Fixing to 25 mm thick insulation for

896 Rectangular ductwork. Sup.

Protective coverings and finishings complete with 0.6 mm thick stainless steel grade 316 cladding to CFC free flexible closed cell elastomeric insulation

Fixing to 25 mm thick insulation for

897 Rectangular ductwork. Sup.

Fire-rated enclosure according to FSD and Building Ordinance, complete with all necessary framings

* Hour fire-resistant-period enclosure to BS 476 Part 20 - 22 for

898 Rectangular ductwork. Sup.

Air handling units (AHU), complete with galvanised steel casings and mountings, fans, coils, access doors, air filters, thermal and acoustic insulation, finishings and painting, all necessary ancillary components, all as described

Air handling units (AHU) in rigid double skin modular construction, floor mounted

899 Supply air volume flow rate at * l/s, external static pressure at * Pa, total cooling capacity of * kW (ref. *). No.

900 Supply air volume flow rate at * l/s, external static pressure at * Pa, total cooling capacity of * kW (ref. *). No.

901 Supply air volume flow rate at * l/s, external static pressure at * Pa, total cooling capacity of * kW (ref. *). No.

Air handling units (AHU) in rigid double skin modular construction, complete with UV filters and ionized air filters, floor mounted

902 Supply air volume flow rate at * l/s, external static pressure at * Pa, total cooling capacity of * kW (ref. *). No.

Primary air handling units (PAU), complete with galvanised steel casings and mountings, fans, coils, access doors, air filters, thermal and acoustic insulation, finishings and painting, all necessary ancillary components, all as described

Primary air handling units (PAU), floor mounted

903	Supply air volume flow rate at * l/s, external static pressure at * Pa, total cooling capacity of * kW (ref. *).	No.
904	Supply air volume flow rate at * l/s, external static pressure at * Pa, total cooling capacity of * kW (ref. *).	No.
905	Supply air volume flow rate at * l/s, external static pressure at * Pa, total cooling capacity of * kW (ref. *).	No.
906	Supply air volume flow rate at * l/s, external static pressure at * Pa, total cooling capacity of * kW (ref. *).	No.
907	Supply air volume flow rate at * l/s, external static pressure at * Pa, total cooling capacity of * kW (ref. *).	No.
908	Supply air volume flow rate at * l/s, external static pressure at * Pa, total cooling capacity of * kW (ref. *).	No.
909	Supply air volume flow rate at * l/s, external static pressure at * Pa, total cooling capacity of * kW (ref. *).	No.

Primary air handling units (PAU) of heat recovery type, floor mounted

910 Supply air volume flow rate at * l/s, exhaust air volume flow rate at * l/s, external static pressure at * Pa, total cooling capacity of * kW (ref. *). No.

911 Supply air volume flow rate at * l/s, exhaust air volume flow rate at * l/s, external static pressure at * Pa, total cooling capacity of * kW (ref. *). No.

912 Supply air volume flow rate at * l/s, exhaust air volume flow rate at * l/s, external static pressure at * Pa, total cooling capacity of * kW (ref. *). No.

913 Supply air volume flow rate at * l/s, exhaust air volume flow rate at * l/s, external static pressure at * Pa, total cooling capacity of * kW (ref. *). No.

914 Supply air volume flow rate at * l/s, exhaust air volume flow rate at * l/s, external static pressure at * Pa, total cooling capacity of * kW (ref. *). No.

Primary air handling units (PAU), ceiling mounted

915 Supply air volume flow rate at * l/s, external static pressure at * Pa, total cooling capacity of * kW (ref. *). No.

Fan coil units (FCU), complete with galvanised steel casings and mountings, fans, air filters, coils, motors, galvanised steel drain pans, thermal and acoustic insulation, finishings and painting, all necessary ancillary components, all as described

Fan coil units (FCU) of cooling only concealed type, ceiling mounted

916 Supply air volume flow rate at * l/s, external static pressure at * Pa, total cooling capacity of * kW (ref. *). No.

917 Supply air volume flow rate at * l/s, external static pressure at * Pa, total cooling capacity of * kW (ref. *). No.

918 Supply air volume flow rate at * l/s, external static pressure at * Pa, total cooling capacity of * kW (ref. *). No.

919 Supply air volume flow rate at * l/s, external static pressure at * Pa, total cooling capacity of * kW (ref. *). No.

Fan coil units (FCU) of cooling only cassette type, ceiling mounted

920 Supply air volume flow rate at * l/s, external static pressure at * Pa, total cooling capacity of * kW (ref. *). No.

Electric duct heaters, sheathed heating elements mounted in removable sheet steel casing with accessible terminal box, each element fused, complete with all necessary ancillary components, all as described

921	Capacity of 1.5 kW.	No.

UNITARY AIR CONDITIONING SYSTEM

Copper pipes and fittings complying with BS EN 1057 with union or screwed joints

Pipework and fittings between condensing unit (ref. *) and 1 No. direct expansion unit (ref. *)

922	* mm Liquid refrigerant pipe.	Run
923	* mm Suction pipe.	Run

Pipework and fittings, between condensing unit (ref. *) and 2 No. direct expansion units (ref. *)

924	* mm Liquid refrigerant pipe.	Run
925	* mm Suction pipe.	Run

Pipework and fittings between condensing unit (ref. *) and * No. direct expansion units (ref. *)

926	* mm Liquid refrigerant pipe.	Run
927	* mm Suction pipe.	Run

Pipework and fittings between condensing unit (ref. *) and * No. direct expansion units (ref. *)

928 * mm Liquid refrigerant pipe. Run

929 * mm Suction pipe. Run

CFC free flexible closed cell elastomeric insulation, * kg/m3 density with Class "O" fire rating, factory applied talc coating on inner surface, vapour barrier sealed, fixing with approved adhesive

19 mm Minimum thick fixing externally to pipework and fittings between condensing unit (ref. *) and 1 No. direct expansion unit (ref. *)

930 * mm Liquid refrigerant pipe. Run

631 * mm Suction pipe. Run

19 mm Minimum thick fixing externally to pipework and fittings between condensing unit (ref. *) and 2 No. direct expansion units (ref. *)

932 * mm Liquid refrigerant pipe. Run

933 * mm Suction pipe. Run

19 mm Minimum thick fixed externally to pipework and fittings between condensing unit (ref. *) and * No. direct expansion units (ref. *)

934 * mm Liquid refrigerant pipe. Run

935 * mm Suction pipe. Run

19 mm Minimum thick fixed externally to pipework and fittings between condensing unit (ref. *) and * No. direct expansion units (ref. *)

936 * mm Liquid refrigerant pipe. Run

937 * mm Suction pipe. Run

Protective coverings and finishings complete with 0.8 mm thick hammered aluminium cladding to CFC free flexible closed cell elastomeric insulation

Fixing to 19 mm minimum thick insulated pipework and fittings between condensing unit (ref. *) and 1 No. direct expansion unit (ref. *)

938 * mm Liquid refrigerant pipe. Run

939 * mm Suction pipe. Run

Fixing to 19 mm minimum thick insulated pipework and fittings between condensing unit (ref. *) and 2 No. direct expansion units (ref. *)

940 * mm Liquid refrigerant pipe. Run

941 * mm Suction pipe. Run

Fixing to 19 mm minimum thick insulated pipework and fittings between condensing unit (ref. *) and * No. direct expansion units (ref. *)

942 * mm Liquid refrigerant pipe. Run

943 * mm Suction pipe. Run

Fixing to 19 mm minimum thick insulated pipework and fittings between condensing unit (ref. *) and * No. direct expansion units (ref. *)

944	* mm Liquid refrigerant pipe.	Run
945	* mm Suction pipe.	Run

Packaged single split type air conditioners with air-cooled outdoor condensing unit and indoor direct expansion unit, remote controllers, insulation, all necessary ancillary components, all as described

Packaged single split unit with wall-mounted indoor unit

946	Total cooling capacity of 2.5 kW.	No.
947	Total cooling capacity of 3.5 kW.	No.
948	Total cooling capacity of 6 kW.	No.

Variable refrigerant volume (VRV) system of multi-zone modular split type, each zone with one air-cooled outdoor condensing unit and a group of direct expansion units complete with remote controllers, all necessary ancillary components, all as described

Direct expansion units, wall mounted type

949	Total cooling capacity of 2.5 kW.	No.
950	Total cooling capacity of 3.5 kW.	No.

Air cooled multi-split condensing units, outdoor type

951	Total cooling capacity of 5 kW (ref. *).	No.
952	Total cooling capacity of 7 kW (ref. *).	No.

Air cooled VRV condensing units, outdoor type

953	Total cooling capacity of 28 kW (ref. *).	No.

ELECTRICITY SUPPLY

Electrical power circuits comprising approved power supply cables, drawing into and including conduits and fittings and/or flexible conduits and fittings and any cable installing facilities, with earthing, all as described

From power supply to

954	Motor control centre (ref. *).	No.
955	Local control panel (ref. *).	No.
956	Local control panel (ref. *).	No.
957	Local control panel (ref. *).	No.
958	Local control panel (ref. *).	No.
959	Local control panel (ref. *).	No.
960	Local control panel (ref. *).	No.
961	Local control panel (ref. *).	No.
962	Local control panel (ref. *).	No.
963	Local control panel (ref. *).	No.
964	Local control panel (ref. *).	No.
965	Local control panel (ref. *).	No.

From motor control centre (ref. *)

966	Motor control centre (ref. *).	No.
967	Local control panel (ref. *).	No.
968	Chiller (ref. *).	No.
969	Chiller (ref. *).	No.
970	Chiller (ref. *).	No.
971	Cooling tower (ref. *).	No.
972	Cooling tower (ref. *).	No.
973	Cooling tower (ref. *).	No.
974	Water source heat pump (ref. *).	No.
975	Water source heat pump (ref. *).	No.
976	Air source heat pump (ref. *).	No.
977	Air source heat pump (ref. *).	No.
978	Condensing water pump (ref. *).	No.
979	Condensing water pump (ref. *).	No.
980	Condensing water pump (ref. *).	No.
981	Condensing water booster pump (ref. *).	No.

982	Chilled water pump (ref. *).	No.
983	Chilled water pump (ref. *).	No.
984	Chilled water pump (ref. *).	No.
985	Chilled water pump (ref. *).	No.
986	Hot water pump (ref. *).	No.
987	Hot water pump (ref. *).	No.
988	Hot water pump (ref. *).	No.
989	Hot water pump (ref. *).	No.
990	Hot water pump (ref. *).	No.
991	Hot water pump (ref. *).	No.
992	Hot water pump (ref. *).	No.
993	Chemical dosing pump for chilled water treatment system.	No.
994	Chemical dosing pump for condensing water treatment system.	No.
995	Chemical dosing pump for hot water treatment system.	No.
996	Equipment for automatic condenser tube cleaning system.	No.

From motor control centre (ref. *)

997 Exhaust air ventilating fan (ref. *). No.

998 Exhaust air ventilating fan (ref. *). No.

999 Exhaust air ventilating fan (ref. *). No.

1000 Exhaust air ventilating fan (ref. *). No.

From local control panel (ref. *) to

1001 Exhaust air ventilating fan (ref. *). No.

From local control panel (ref. *) to

1002 Exhaust air ventilating fan (ref. *). No.

From local control panel (ref. *) to

1003 Exhaust air ventilating fan (ref. *). No.

From local control panel (ref. *) to

1004 Exhaust air ventilating fan (ref. *). No.

1005 Exhaust air ventilating fan (ref. *). No.

	From local control panel (ref. *) to	
1006	Exhaust air ventilating fan (ref. *).	No.
1007	Exhaust air ventilating fan (ref. *).	No.
1008	Air purifier.	No.
	From local control panel (ref. *) to	
1009	Exhaust air ventilating fan (ref. *).	No.
	From local control panel (ref. *) to	
1010	Exhaust air ventilating fan (ref. *).	No.
	From local control panel (ref. *) to	
1011	Exhaust air ventilating fan (ref. *).	No.
	From local control panel (ref. *) to	
1012	Exhaust air ventilating fan (ref. *).	No.
1013	Fresh air ventilating fan (ref. *).	No.
	From local control panel (ref. *) to	
1014	Exhaust air ventilating fan (ref. *).	No.
	From local control panel (ref. *) to	
1015	Air handling unit (ref. *).	No.
1016	Air handling unit (ref. *).	No.
1017	Primary air handling unit (ref. *).	No.

	From local control panel (ref. *) to	
1018	Exhaust air ventilating fan (ref. *).	No.
	From local control panel (ref. *) to	
1019	Exhaust air ventilating fan (ref. *).	No.
	From local control panel (ref. *) to	
1020	Exhaust air ventilating fan (ref. *).	No.
	From local control panel (ref. *) to	
1021	Exhaust air ventilating fan (ref. *).	No.
	From local control panel (ref. *) to	
1022	Exhaust air ventilating fan (ref. *).	No.
1023	Exhaust air ventilating fan (ref. *).	No.
1024	Primary air handling unit (ref. *).	No.
	From local control panel (ref. *) to	
1025	Primary circulation pumps of heat transfer compact unit (ref. *).	No.
1026	Secondary circulation pumps of heat transfer compact unit (ref. *).	No.
	From local control panel (ref. *) to	
1027	Primary circulation pumps of heat transfer compact unit (ref. *).	No.
1028	Secondary circulation pumps of heat transfer compact unit (ref. *).	No.

	From local control panel (ref. *) to	
1029	Primary circulation pumps of heat transfer compact unit (ref. *).	No.
1030	Secondary circulation pumps of heat transfer compact unit (ref. *).	No.
	From local control panel (ref. *) to	
1031	Primary air handling unit (ref. *).	No.
	From local control panel (ref. *) to	
1032	Exhaust air ventilating fan (ref. *).	No.
	From local control panel (ref. *) to	
1033	Fresh air ventilating fan (ref. *).	No.
	From local control panel (ref. *) to	
1034	Exhaust air ventilating fan (ref. *).	No.
1035	Air handling unit (ref. *).	No.
	From local control panel (ref. *) to	
1036	Primary air handling unit (ref. *).	No.
1037	Exhaust air ventilating fan (ref. *).	No.
1038	Exhaust air ventilating fan (ref. *).	No.
1039	Exhaust air ventilating fan (ref. *).	No.

Carried to Collection $

	From local control panel (ref. *) to	
1040	Exhaust air ventilating fan (ref. *).	No.
1041	Kitchen exhaust air fan (ref. *).	No.
1042	Kitchen exhaust air fan (ref. *).	No.
1043	Kitchen exhaust air fan (ref. *).	No.
1044	Water scrubber (ref. *).	No.
	From local control panel (ref. *) to	
1045	Kitchen exhaust air fan (ref. *).	No.
1046	Kitchen exhaust air fan (ref. *).	No.
1047	Kitchen exhaust air fan (ref. *).	No.
1048	Exhaust air ventilating fan (ref. *).	No.
1049	Electrostatic precipitator (ref. *).	No.
1050	Electrostatic precipitator (ref. *).	No.
1051	Electrostatic precipitator (ref. *).	No.
	From local control panel (ref. *) to	
1052	Primary air handling unit (ref. *).	No.
	From local control panel (ref. *) to	
1053	Exhaust air ventilating fan (ref. *).	No.
1054	Exhaust air ventilating fan (ref. *).	No.
1055	Exhaust air ventilating fan (ref. *).	No.

Carried to Collection $

	From local control panel (ref. *) to	
1056	Fresh air ventilating fan (ref. *).	No.
1057	Air handling unit (ref. *).	No.
	From local control panel (ref. *) to	
1058	Motorized on/off valves.	No.
1059	Motorized on/off butterfly valves.	No.
1060	Sand filter with motorized control valves.	No.
	From local control panel (ref. *) to	
1061	Motorized on/off valves.	No.
1062	Motorized modulating valves.	No.
1063	Motorized on/off butterfly valves.	No.
	From local control panel (ref. *) to	
1064	Primary air handling unit (supply) (ref. *).	No.
1065	Primary air handling unit (exhaust) (ref. *).	No.
	From local control panel (ref. *) to	
1066	Primary air handling unit (ref. *).	No.
1067	Primary air handling unit (ref. *).	No.
	From local control panel (ref. *) to	
1068	Exhaust air ventilating fan (ref. *).	No.
1069	Exhaust air ventilating fan (ref. *).	No.

	From local control panel (ref. *) to	
1070	Exhaust air ventilating fan (ref. *).	No.
1071	Primary air handling unit (ref. *).	No.
	From local control panel (ref. *) to	
1072	Exhaust air ventilating fan (ref. *).	No.
1073	Primary air handling unit (supply) (ref. *).	No.
1074	Primary air handling unit (exhaust) (ref. *).	No.
1075	motorized on/off dampers.	No.
	From local control panel (ref. *) to	
1076	Exhaust air ventilating fan (ref. *).	No.
	From local control panel (ref. *) to	
1077	Exhaust air ventilating fan (ref. *).	No.
	From local control panel (ref. *) to	
1078	Energy meters.	No.
	From local control panel (ref. *) to	
1079	Primary air handling unit (supply) (ref. *).	No.
1080	Primary air handling unit (exhaust) (ref. *).	No.

	From local control panel (ref. *) to	
1081	Exhaust air ventilating fan (ref.	No.
1082	Exhaust air ventilating fan (ref.	No.
1083	Primary air handling unit (supply) (ref. *).	No.
1084	Primary air handling unit (exhaust) (ref. *).	No.
	From local control panel (ref. *) to	
1085	Exhaust air ventilating fan (ref. *).	No.
1086	Exhaust air ventilating fan (ref. *).	No.
1087	Exhaust air ventilating fan (ref. *).	No.
1088	Exhaust air ventilating fan (ref. *).	No.
1089	Primary air handling unit (supply) (ref. *).	No.
1090	Primary air handling unit (exhaust) (ref. *).	No.
	From isolators (isolators measured separately) to	
1091	Condensing unit (ref. *).	No.
1092	Condensing unit (ref. *).	No.
1093	Condensing unit (ref. *).	No.
1094	Condensing unit (ref. *).	No.

1095	Condensing unit (ref. *).	No.
1096	Condensing unit (ref. *).	No.
1097	Condensing unit (ref. *).	No.
1098	Condensing unit (ref. *).	No.
1099	Condensing unit (ref. *).	No.
1100	Condensing unit (ref. *).	No.
1101	Condensing unit (ref. *).	No.
	From fused spur units (fused spur units measured separately) to	
1102	Direct expansion units.	No.
1103	Fan coil units.	No.
1104	Electric duct heaters.	No.
1105	Blower fans.	No.
1106	Extract hoods.	No.

CONTROL SYSTEM - AUTOMATIC CONTROL SYSTEM (ACS)

Variable speed drives (VSDs) complying with IEC 61000-4-2, IEC 61000-4-3 and IEC 61000-4-4, IEC 61000-4-5, BS EN 61800-3, ISO 9001, with integral control panel, manual by-pass arrangement, and all sensing instrument and necessary accessories, all as described

For chilled water pumps

1107 Capacity of * kW. No.

For cooling towers

1108 Capacity of * kW. No.

For primary air handling units

1109 Capacity of * kW. No.

Low voltage motor control switchboard, multi-cubicle type, complying with IEC 60439-1, IP31, floor mounted, complete with circuit breakers, motor starters, relays, busbars, current transformers, fuses, neutral link, copper earth bars, ammeters, voltmeters, hour run meters, indicating lamps, selectors, control switches, emergency stop buttons, battery chargers and batteries system, hydraulic operated handling devices, portable earthing equipment, operating handles and jigs, insulation mats, operation diagrams, control wiring, all necessary ancillary components, all as described

1110 Motor control switchboard (ref. *). No.

Low voltage motor control panels, type tested cubicle, complying with BS EN 60439-1, complete with indicating lamps, ammeters, voltmeters, relays, timers, selectors, control switches, motor starters, contactors, control wiring and other necessary equipment to enable remote operation and monitoring of all ACMV equipment, all necessary ancillary components, all as described

Wall mounted type motor control panels

1111 Motor control panel for smoke extraction system (ref. *). No.

Local control panels, factory assembled, self supporting and framing, IP44 protection, complete with indicating lamps, ammeters, voltmeters, relays, timers, selectors, control switches, motor starters, contactors, control wiring and other necessary equipment to enable remote operation and monitoring of all ACMV equipment, all necessary ancillary components, all as described

Wall mounted type local control panels

1112 Local control panel for exhaust air ventilating fan ref. * to * (ref. *). No.

1113 Local control panel for exhaust air ventilating fan ref. * to * (ref. *). No.

1114	Local control panel for exhaust air ventilating fan ref. * to * (ref. *).	No.
1115	Local control panel for exhaust air ventilating fan ref. * to * (ref. *).	No.
1116	Local control panel for exhaust air ventilating fan ref. * to * (ref. *).	No.
1117	Local control panel for exhaust air ventilating fan ref. *, fresh air ventilating fan ref. * and air purifier (ref. *).	No.
1118	Local control panel for exhaust air ventilating fan ref. * to * (ref. *).	No.
1119	Local control panel for exhaust air ventilating fan ref. * to * (ref. *).	No.
1120	Local control panel for exhaust air ventilating fan ref. * to * (ref. *).	No.
1121	Local control panel for exhaust air ventilating fan ref. * and fresh air ventilating fan ref. * (ref. *).	No.
1122	Local control panel for exhaust air ventilating fan ref. * (ref. *).	No.
1123	Local control panel for air handling unit ref. * and primary air handling unit ref. * (ref. *).	No.
1124	Local control panel for exhaust air ventilating fan ref. * (ref. *).	No.

1125	Local control panel for exhaust air ventilating fan ref. * (ref. *).	No.
1126	Local control panel for exhaust air ventilating fan ref. * (ref. *).	No.
1127	Local control panel for exhaust air ventilating fan ref. * (ref. *).	No.
1128	Local control panel for exhaust air ventilating fan ref. * and primary air handling unit ref. * (ref. *).	No.
1129	Local control panel for heat transfer compact unit ref. * (ref. *)	No.
1130	Local control panel for heat transfer compact unit ref. * (ref. *)	No.
1131	Local control panel for heat transfer compact unit ref. * (ref. *)	No.
1132	Local control panel for primary air handling unit ref. * (ref. *).	No.
1133	Local control panel for exhaust air ventilating fan ref. * (ref. *).	No.
1134	Local control panel for fresh air ventilating fan ref. * (ref. *).	No.
1135	Local control panel for exhaust air ventilating fan ref. * and air handling unit ref. * (ref. *).	No.
1136	Local control panel for primary air handling unit ref. * and exhaust air ventilating fan ref. * to * (ref. *).	No.

1137	Local control panel for exhaust air ventilating fan ref. * and kitchen exhaust air fan ref. * to * (ref. *).	No.
1138	Local control panel for kitchen exhaust air fan ref. * to *, exhaust air ventilating fan ref. *, electronic filter ref. * to * (ref. *).	No.
1139	Local control panel for primary air handling unit ref. * (ref. *).	No.
1140	Local control panel for exhaust air ventilating fan ref. * to * (ref. *).	No.
1141	Local control panel for fresh air ventilating fan ref. * and air handling unit ref. * (ref. *).	No.
1142	Local control panel for primary air handling unit ref. * (ref. *).	No.
1143	Local control panel for primary air handling unit ref. * and * (ref. *).	No.
1144	Local control panel for exhaust air ventilating fan ref. * and * (ref. *).	No.
1145	Local control panel for exhaust air ventilating fan ref. * and primary air handling unit ref. * (ref. *).	No.
1146	Local control panel for exhaust air ventilating fan ref. * and primary air handling unit ref. * (ref. *).	No.
1147	Local control panel for exhaust air ventilating fan ref. * (ref. *).	No.

1148	Local control panel for exhaust air ventilating fan ref. * (ref. *).	No.
1149	Local control panel for primary air handling unit ref. * (ref. *).	No.
1150	Local control panel for exhaust air ventilating fan ref. * and primary air handling unit ref. * (ref. *).	No.
1151	Local control panel for exhaust air ventilating fan ref. * to * and primary air handling unit ref. * (ref. *).	No.

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1152	Manual override control panel complete with contact devices, switches, VAC control interface and control wirings, located at fire services control room, all as described.	No.
1153	Power and control accessories for fan coil units complete with 1.6 mm thick minimum galvanised steel metal box, control wirings, switches and relays, all as described.	No.
1154	Room control units for fan coil units, all as described.	No.
1155	Emergency stop push button, all as described.	No.

Electrical control circuits, associated with ACMV equipment, connections to control panels, emergency stop push buttons and fire services control modules (control panels, emergency stop push buttons and control modules measured separately), interconnecting wiring, cables, conduits, cabling facilities; relays, contactors, sensors and control devices, all necessary accessories, all as described

From motor control centre (ref. *)

1156	Motor control centre (ref. *).	No.
1157	Local control panel (ref. *).	No.
1158	Chiller (ref. *).	No.
1159	Chiller (ref. *).	No.
1160	Chiller (ref. *).	No.
1161	Cooling tower (ref. *).	No.
1162	Cooling tower (ref. *).	No.
1163	Cooling tower (ref. *).	No.
1164	Water source heat pump (ref. *).	No.
1165	Water source heat pump (ref. *).	No.
1166	Air source heat pump (ref. *).	No.
1167	Air source heat pump (ref. *).	No.

1168	Condensing water pump (ref. *).	No.
1169	Condensing water pump (ref. *).	No.
1170	Condensing water pump (ref. *).	No.
1171	Condensing water booster pump (ref. *).	No.
1172	Chilled water pump (ref. *).	No.
1173	Chilled water pump (ref. *).	No.
1174	Chilled water pump (ref. *).	No.
1175	Chilled water pump (ref. *).	No.
1176	Hot water pump (ref. *).	No.
1177	Hot water pump (ref. *).	No.
1178	Hot water pump (ref. *).	No.
1179	Hot water pump (ref. *).	No.
1180	Hot water pump (ref. *).	No.
1181	Hot water pump (ref. *).	No.
1182	Hot water pump (ref. *).	No.
1183	Chemical dosing pump for chilled water treatment system.	No.
1184	Chemical dosing pump for condensing water treatment system.	No.
1185	Chemical dosing pump for hot water treatment system.	No.
1186	Equipment for automatic condenser tube cleaning system.	No.

From motor control centre (ref. *)

1187 Exhaust air ventilating fan (ref. *). No.

1188 Exhaust air ventilating fan (ref. *). No.

1189 Exhaust air ventilating fan (ref. *). No.

1190 Exhaust air ventilating fan (ref. *). No.

From local control panel (ref. *) to

1191 Exhaust air ventilating fan (ref. *). No.

From local control panel (ref. *) to

1192 Exhaust air ventilating fan (ref. *). No.

From local control panel (ref. *) to

1193 Exhaust air ventilating fan (ref. *). No.

From local control panel (ref. *) to

1194 Exhaust air ventilating fan (ref. *). No.

1195 Exhaust air ventilating fan (ref. *). No.

From local control panel (ref. *) to

1196 Exhaust air ventilating fan (ref. *). No.

1197 Exhaust air ventilating fan (ref. *). No.

1198 Air purifier. No.

	From local control panel (ref. *) to	
1199	Exhaust air ventilating fan (ref. *).	No.
	From local control panel (ref. *) to	
1200	Motorized on/off valves.	No.
1201	Motorized on/off butterfly valves.	No.
1202	Sand filter with motorized control valves.	No.
	From local control panel (ref. *) to	
1203	Motorized on/off valves.	No.
1204	Motorized modulating valves.	No.
1205	Motorized on/off butterfly valves.	No.
	From local control panel (ref. *) to	
1206	Exhaust air ventilating fan (ref. *).	No.
	From local control panel (ref. *) to	
1207	Exhaust air ventilating fan (ref. *).	No.
	From local control panel (ref. *) to	
1208	Exhaust air ventilating fan (ref. *).	No.
1209	Fresh air ventilating fan (ref. *).	No.
	From local control panel (ref. *) to	
1210	Exhaust air ventilating fan (ref. *).	No.

	From local control panel (ref. *) to	
1211	Air handling unit (ref. *).	No.
1212	Air handling unit (ref. *).	No.
1213	Primary air handling unit (ref. *).	No.
	From local control panel (ref. *) to	
1214	Primary circulation pumps of heat transfer compact unit (ref. *).	No.
1215	Secondary circulation pumps of heat transfer compact unit (ref. *).	No.
	From local control panel (ref. *) to	
1216	Kitchen exhaust air fan (ref. *).	No.
1217	Kitchen exhaust air fan (ref. *).	No.
1218	Kitchen exhaust air fan (ref. *).	No.
1219	Water scrubber (ref. *).	No.
	From local control panel (ref. *) to	
1220	Kitchen exhaust air fan (ref. *).	No.
1221	Exhaust air ventilating fan (ref. *).	No.
1222	Electrostatic precipitators (ref. *).	No.
1223	Electrostatic precipitators (ref. *).	No.
1224	Electrostatic precipitators (ref. *).	No.

Carried to Collection $

	From local control panel (ref. *) to	
1225	Primary air handling unit (supply) (ref. *).	No.
1226	Primary air handling unit (exhaust) (ref. *).	No.
1227	Motorized on/off dampers.	No.
	From condensing unit (ref. *) to	
1228	Energy meters.	No.
	From condensing unit (ref. *) to	
1229	Direct expansion unit (ref. *).	No.
	From condensing unit (ref. *) to	
1230	Direct expansion unit (ref. *).	No.
	From condensing unit (ref. *) to	
1231	Direct expansion unit (ref. *).	No.
	From VRV condensing unit (*) to	
1232	Direct expansion unit (ref. *).	No.
1233	Direct expansion unit (ref. *).	No.
1234	Direct expansion unit (ref. *).	No.
1235	Direct expansion unit (ref. *).	No.
1236	Direct expansion unit (ref. *).	No.
	From condensing unit (ref. *) to	
1237	Direct expansion unit (ref. *).	No.

	From condensing unit (ref. *) to	
1238	Direct expansion unit (ref. *).	No.
	From multi-split condensing unit (ref. *) to	
1239	Direct expansion unit (ref. *).	No.
1240	Direct expansion unit (ref. *).	No.
	From condensing unit (ref. *) to	
1241	Direct expansion unit (ref. *).	No.
	From remote controllers to	
1242	Direct expansion units.	No.
	From local lighting control interlock (lighting control measured separately) to	
1243	Blower fans.	No.
	From double pole switches (double pole switches measured separately)	
1244	Exhaust air ventilating fan (ref. *).	No.
1245	Exhaust air ventilating fan (ref. *).	No.
1246	Exhaust air ventilating fan (ref. *).	No.

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1247	From power supply and control accessories boxes to fan coil units.	No.
1248	From power supply and control accessories boxes to fan coil units.	No.
1249	From power supply and control accessories boxes to fan coil unit electric duct heaters.	No.
1250	From room control units to fan coil units.	No.
1251	From room control units to fan coil unit electric duct heaters.	No.
	From manual override control panel	
1252	Air handling units.	No.
1253	Ventilating fans.	No.

CONTROL SYSTEM - CENTRAL CONTROL AND MONITORING SYSTEM (CCMS)

AIR CONDITIONING AND MECHANICAL VENTILATION SUNDRIES

The following items are in respect of the whole Air Conditioning and Mechanical Ventilation Installation

1254	Allow for marking the positions of holes, mortices, chases and the like in the structure.	1	Item
1255	Allow for inspection, testing and commissioning of the complete Air Conditioning and Mechanical Ventilation Installation, all as described.	1	Item
1256	Allow for inspection, attendance, operation and maintenance during the Defects Liability Period, all as described.	1	Item
1257	Allow for providing all necessary power and water, diesel, gas and fuels in connection with testing, commissioning and maintenance.	1	Item
1258	Allow for providing installation drawings including detailed design, working and builder's work drawings, all as described.	1	Item
1259	Allow for providing as-built drawings, all as described.	1	Item
1260	Allow for providing Operation and Maintenance (O&M) Manuals and User Manuals, all as described.	1	Item
1261	Allow for providing earthing up to the nearest earthing terminals, all as described.	1	Item

1262	Allow for providing training of the Employer's staff, all as described.	1	Item
1263	Allow for providing sample boards, all as described.	1	Item
1264	Allow for priming and painting to all pipework, ductworks, cable trays and conduits for associated electrical work.	1	Item
1265	Allow for providing mock-ups and prototypes.	1	Item
1266	Allow for supplying and fixing non fire rated sleeves and the like and fixing fire rated sleeves and the like provided by Nominated Sub-Contractors.	1	Item
1267	Allow for cleaning and draining of all pipework before and after installation, including all necessary temporary pipework and equipment, all as described.	1	Item
1268	Allow for providing spare and tools, all as described.	1	Item
1269	Allow for disconnecting, setting aside and refixing for the convenience of other trades.	1	Item
1270	Allow for cleaning of water coils of air handling units after completion of fitting out, all as described.	1	Item
1271	Allow for replacement of pre-filters of all air handling units after completion of fitting out, all as described.	1	Item

1272	Allow for disinfection of the whole air duct installation before handover, all as described.	1	Item
1273	Allow for cleaning interior of all ductwork by rotary mechanical brush and removing contaminants by high efficiency vacuum pumps, all as described.	1	Item
1274	Allow for obtaining the Certificate of Fire Services Installation and Equipment (F.S. 251) for the VAC Control System, all as described.	1	Item
1275	Allow for providing defects rectification certificates for fire dampers including the associated testing and commissioning of the systems for the issue of the Defects Rectification Certificate for the Works, all as described.	1	Item
1276	Allow for providing galvanised mild steel blanking plates to all areas of external louvred area not required for fresh air intakes/exhausts to air handling units and fans, all as described.	1	Item
1277	Allow for all necessary provisions for compliance with the indoor air quality objective and measurements as described, unless measured elsewhere in this Bill of Quantities.	1	Item
1278	Allow for providing acoustical treatment to the internal walls and ceilings of the chiller plant room to meet the specified noise levels, all as described.	1	Item
1279	Allow for all necessary provisions for compliance with the noise and vibration requirements as described unless measured elsewhere in this Bill of Quantities.	1	Item