HENSALL

FINAL ISSUE, ALL INFORMATION RECEIVED

OPERATION & MAINTENANCE MANUAL

Elmwood Leisure Centre

Decarbonisation and refurbishment: air source heat pumps, LTHW plant, air handling units, air conditioning and domestic water services Mechanical Services

Volume 5 of 9: Manufacturers' literature and as-built drawings

Documents 8.104 to 8.107 and 11.1 to 11.22

Revision	Issue date	Practical completion	Job reference
A	**9th of October 2026**	**2nd of June 2026**	**HEN0203**

Prepared for Hensall Mechanical Services Ltd · Westgate Leisure Services Ltd (for the London Borough of Elmwood; operated by FitLife Active)

Compiled by OnTrack O&M

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SECTION 8

8

Manufacturers' literature

Documents 8.104 to 8.107 are in this volume, each exactly as received and checked.

8.104

siemens_VXF

The following 14 pages are the document exactly as received and checked. It is bookmarked in the PDF.

Reference	
Asset	General
Provided by	Not recorded
Source file	`siemens_VXF.pdf`
Pages	14



VVF42..
VVF42..K



VXF42..

ACVATIX™

2- and 3-port valves with flanged connections, PN 16

VVF42..
VVF42..K
VXF42..

From the large-stroke valve line

- **Performance valves for medium temperatures from -10…150 °C**
- **Valve body of grey cast iron EN-GJL-250**
- **DN 15…150**
- **k_{vs} 1.6…400 m^3/h**
- **Flange type 21, flange design B**
- **VVF42..K with pressure compensation to handle high differential pressure**
- **Equipable with electro-motoric actuators SAX.., SAV.. or electro-hydraulic actuators SKD.., SKB.., SKC..**

Use

In boiler, district heating and refrigeration plants, cooling towers, heating groups, in ventilation and air-handling units as control or shutoff valves.

For use in closed hydraulic circuits (observe cavitation).

Type summary

Valves				Actuators	SAX.. [1]		SKD..		SKB..		SAV.. [1]		SKC..	
				Stroke	20 mm						40 mm			
PN 16				Positioning force	800 N		1000 N		2800 N		1600 N		2800 N	
				Data sheet	N4501		N4561		N4564		N4503		N4566	
		DN	k_{vs}	S_V	Δp_s	Δp_{max}	Δp_s	Δp_{max}	Δp_s	Δp_{max}	Δp_s	Δp_{max}	Δp_s	Δp_{max}
-10…150 °C	Stock number		[m³/h]		[kPa]									
VVF42.15-1.6	S55204-V100	15	1.6	> 50	1600	400	1600	400	1600	400	-	-	-	-
VVF42.15-2.5	S55204-V101	15	2.5											
VVF42.15-4	S55204-V102	15	4											
VVF42.20-6.3	S55204-V103	20	6.3											
VVF42.25-6.3	S55204-V104	25	6.3											
VVF42.25-10	S55204-V105	25	10											
VVF42.32-16	S55204-V106	32	16	> 100	900		1200				1250	400		
VVF42.40-16	S55204-V107	40	16		550		750							
VVF42.40-25	S55204-V108	40	25											
VVF42.50-31.5	S55204-V109	50	31.5		350	300	450		1200		750			
VVF42.50-40	S55204-V110	50	40											
VVF42.65-50	S55204-V111	65	50		200	150	250	200	700		450			
VVF42.65-63	S55204-V112	65	63											
VVF42.80-80	S55204-V113	80	80		125	75	175	125	450		250	225		
VVF42.80-100	S55204-V114	80	100											
VVF42.100-125	S55204-V115	100	125		-	-	-	-	-	-	160	125	300	250
VVF42.100-160	S55204-V116	100	160											
VVF42.125-200	S55204-V117	125	200								125	90	190	160
VVF42.125-250	S55204-V118	125	250											
VVF42.150-315	S55204-V119	150	315								80	60	125	100
VVF42.150-400	S55204-V120	150	400											
-5…150 °C														
VVF42.50-40K	S55204-V121	50	40	> 100	1600	400	1600	400	1600	400	-	-	-	-
VVF42.65-63K	S55204-V122	65	63											
VVF42.80-100K	S55204-V123	80	100											
VVF42.100-160K	S55204-V124	100	160		-	-	-	-	-	-	1600	400	1600	400
VVF42.125-250K	S55204-V125	125	250											
VVF42.150-360K	S55204-V126	150	360								1400			

Valves			Actuators	SAX.. [1]		SKD..		SKB..		SAV.. [1]		SKC..	
			Stroke	20 mm						40 mm			
PN 16			Positioning force	800 N		1000 N		2800 N		1600 N		2800 N	
			Data sheet	N4501		N4561		N4564		N4503		N4566	
		DN	k_{vs}	S_V	Δp_{max} [kPa]								
-10…150 °C	Stock number		[m³/h]		A T AB B	AB A B	A T AB B	AB A B	A T AB B	AB A B	A T AB B	AB A B	A T AB B	AB A B
VXF42.15-1.6	S55204-V127	15	1.6	> 50	400	100	400	100	400	100	-	-	-	-
VXF42.15-2.5	S55204-V128	15	2.5											
VXF42.15-4	S55204-V129	15	4											
VXF42.20-6.3	S55204-V130	20	6.3											
VXF42.25-6.3	S55204-V131	25	6.3											
VXF42.25-10	S55204-V132	25	10											
VXF42.32-16	S55204-V133	32	16	> 100							400	100		
VXF42.40-16	S55204-V134	40	16											
VXF42.40-25	S55204-V135	40	25											
VXF42.50-31.5	S55204-V136	50	31.5		300									
VXF42.50-40	S55204-V137	50	40											
VXF42.65-50	S55204-V138	65	50		150	50	200	80						
VXF42.65-63	S55204-V139	65	63											
VXF42.80-80	S55204-V140	80	80		75		125	50			225	50		
VXF42.80-100	S55204-V141	80	100											
VXF42.100-125	S55204-V142	100	125		-	-	-	-	-	-	125		250	50
VXF42.100-160	S55204-V143	100	160											
VXF42.125-200	S55204-V144	125	200								90		160	
VXF42.125-250	S55204-V145	125	250											
VXF42.150-315	S55204-V146	150	315								60		100	
VXF42.150-400	S55204-V147	150	400											

DN = Nominal size
k_{vs} = Flow nominal value of cold water (5...30 °C) through the fully opened valve (H_{100}) at a differential pressure of 100 kPa (1 bar)
S_v = Rangeability
Δp_s = Maximum permissible differential pressure at which the motorized valve still closes securely against the pressure
Δp_{max} = Maximum permissible differential pressure across the valve's throughport for the entire positioning range of the motorized valve

Ordering

Example

Product number	Stock number	Description
VXF42.65-63	S55204-V139	3-port valve with flange, PN 16
SKD32.50	SKD32.50	Electro-hydraulic actuator

Delivery — Valves, actuators and accessories are packed and delivered as separate items.

Note — Counter-flanges, bolts and gaskets must be provided on site.

Spare parts, Rev.-No. — See page 13

Equipment combinations

Product number	Description	Stroke	Positioning force	Operating voltage	Positioning signal	Spring return time	Positioning time	LED	Manual adjuster	Auxiliary functions
SAX31.00	S55150-A105	20 mm	800 N	AC 230 V	3-position	-	120 s	-	Press and fix	[1]
SAX31.03	S55150-A106						30 s			
SAX61.03 **SAX61.03U**	S55150-A100 S55150-A100-A100			AC 24 V DC 24 V	0…10 V 4…20 mA 0…1000 Ω			✓		[2], [3]
SAX81.00	S55150-A102				3-position	-	120 s	-		[1]
SAX81.03 **SAX81.03U**	S55150-A103 S55150-A103-A100						30 s			
SKD32.21	SKD32.21	20 mm	1000 N	AC 230 V	3-position	8 s	Opening: 30 s Closing: 10 s	-	Turn, Position is maintained	[1]
SKD32.50	SKD32.50					-	120 s			
SKD32.51	SKD32.51					8 s				
SKD60	SKD60			AC 24 V	0…10 V 4…20 mA 0…1000 Ω	-	Opening: 30 s Closing: 15 s	✓		[2]
SKD62 **SKD62U**	SKD62 SKD62U					15 s				
SKD62UA	SKD62UA									[4]
SKD82.50 **SKD82.50U**	SKD82.50 SKD82.50U				3-position	-	120 s	-		[1]
SKD82.51 **SKD82.51U**	SKD82.51 SKD82.51U					8 s				
SKB32.50	SKB32.50	20 mm	2800 N	AC 230 V	3-position	-	120 s	-	Turn, Position is maintained	[1]
SKB32.51	SKB32.51					10 s				
SKB60	SKB60			AC 24 V	0…10 V 4…20 mA 0…1000 Ω	-	Opening: 120 s Closing:10 s	✓		[2]
SKB62 **SKB62U**	SKB62 SKB62U					10 s				
SKB62UA	SKB62UA									[4]
SKB82.50 **SKB82.50U**	SKB82.50 SKB82.50U				3-position	-	120 s	-		[1]
SKB82.51 **SKB82.51U**	SKB82.51 SKB82.51U					10 s				
SAV31.00	S55150-A112	40 mm	1600 N	AC 230 V	3-position	-	120 s	-	Press and fix	[1], [5]
SAV61.00 **SAV61.00U**	S55150-A110 S55150-A110-A100			AC 24 V DC 24 V	0…10 V 4…20 mA 0…1000 Ω			✓		[1], [2], [5], [6]
SAV81.00 **SAV81.00U**	S55150-A111 S55150-A111-A100				3-position			-		[1], [5]
SKC32.60	SKC32.60	40 mm	2800 N	AC 230 V	3-position	-	120 s	-	Turn, Position is maintained	[1]
SKC32.61	SKC32.61					18 s				
SKC60	SKC60			AC 24 V	0…10 V 4…20 mA 0…1000 Ω	-	Opening: 120 s Closing: 20 s	✓		[2]
SKC62 **SKC62U**	SKC62 SKC62U					20 s				
SKC62UA	SKC62UA									[4]
SKC82.60 **SKC82.60U**	SKC82.60 SKC82.60U				3-position	-	120 s	-		[1]
SKC82.61 **SKC82.61U**	SKC82.61 SKC82.61U					18 s				

[1] Auxiliary switch, potentiometer
[2] Position feedback, forced control, selection of valve characteristic
[3] Optional: sequence control, selection of acting direction
[4] Plus sequence control, stroke limitation, and selection of acting direction
[5] Stem heating element (optional)
[6] Function module (optional)

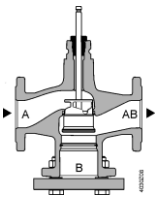
Product documentation

• Mounting Instructions	M4030	74 319 0749 0
• Basic documentation	P4030	Contains background information and technical basic knowledge of valves

Technical and mechanical design

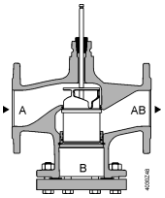
The illustrations below show the basic design of the valves. Constructional features, such as the shape of plugs, may differ.

2-port valves

Fluids
Closing against the pressure
 **A → AB** For use with all actuators

2-port valves pressure compensated

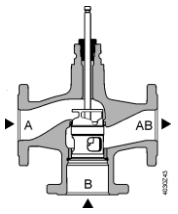
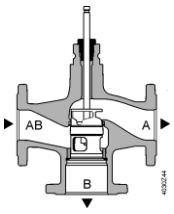
The VVF42..K valves use a pressure-compensated plug. This enables the same type of actuators to be used for the control of volumetric flow at higher differential pressures.

Fluids
Closing against the pressure
 **A → AB** For use with all actuators

Note

2-port valves do not become 3-port valves by removing the blank flange!

3-port valves

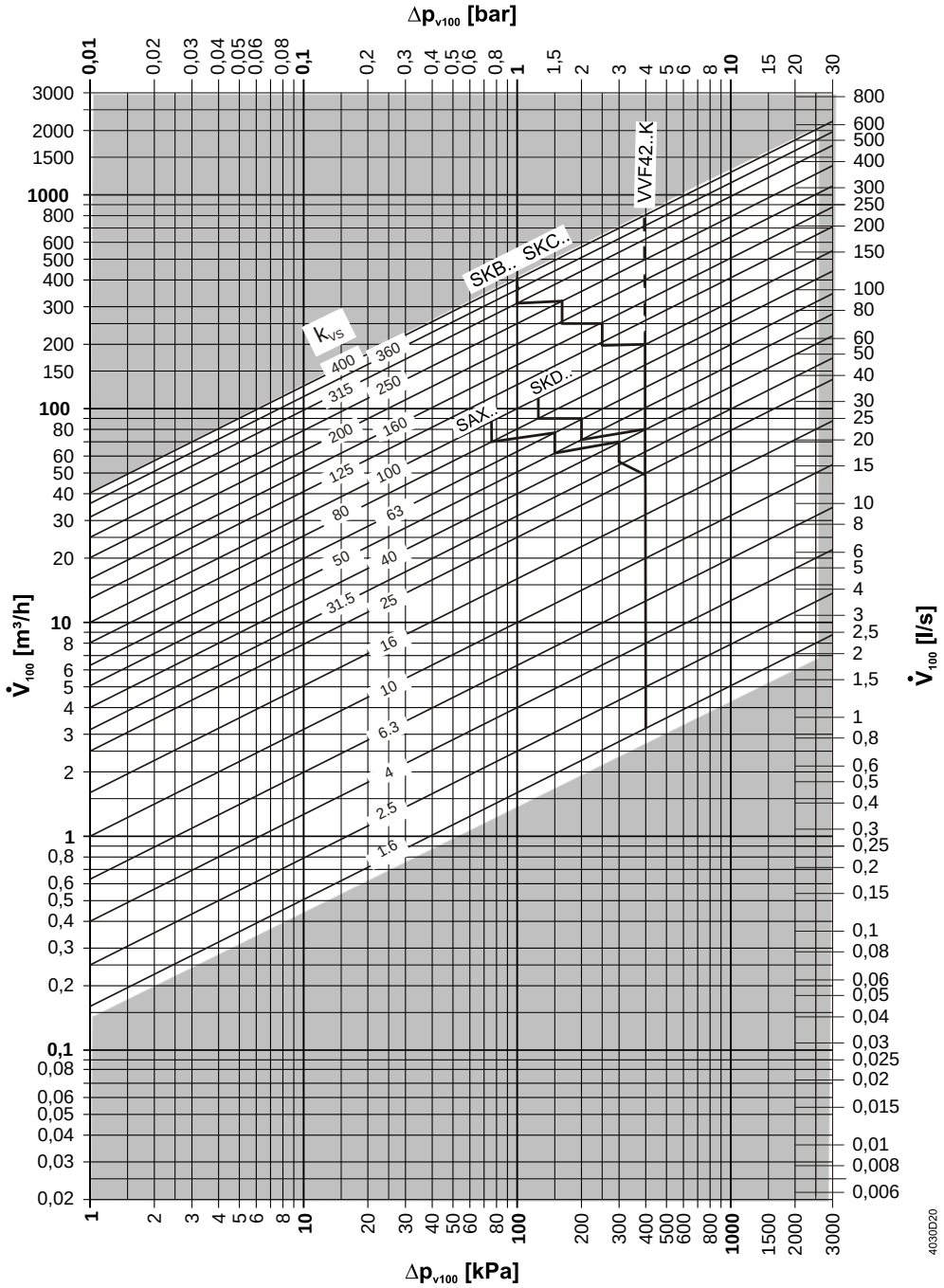
Fluids	
Mixing valve (preferred use)	Diverting valve
 **A → AB** **B**	 **AB → A** **B**

Accessories

Product number	Stock number	Description	Note	Example
ASZ6.6	S55845-Z108	Stem heating element	Required for medium temperatures < 0 °C	

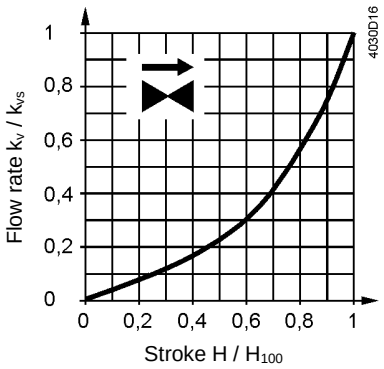
Sizing

Flow chart



Δp_{max} values apply for the mixing function. Δp_{max} values for the diverting function see table „Type summary“, page 2

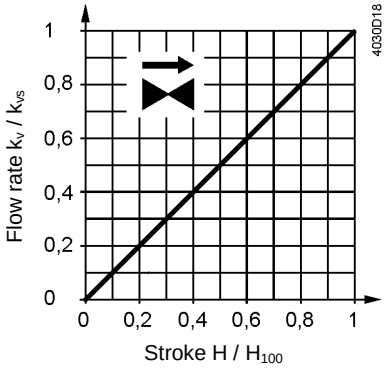
Valve characteristics
2-port valves



0…30%: Linear
30…100%: Equal percentage
n_{gl} = 3 to VDI / VDE 2173

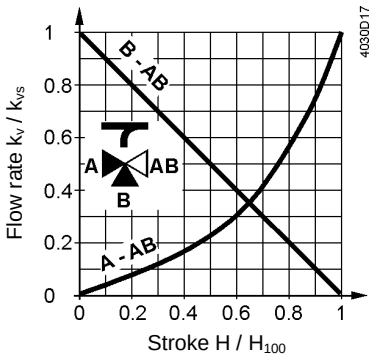
For high k_{VS} values the valve characteristic is optimized for maximum volumetric flow k_{V100}.

For product lines:
VVF42.125-250
VVF42.125-250K
VVF42.150-400
VVF42.150-360K



0…100%: Linear

3-port valves



Throughport A-AB
0...30%: Linear
30...100%: Equal percentage
n_{gl} = 3 to VDI / VDE 2173

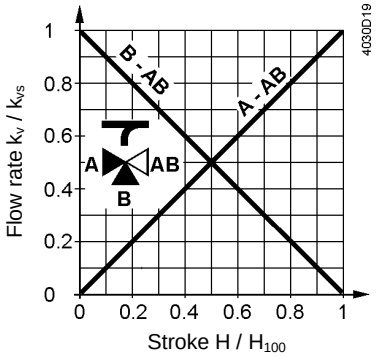
For high k_{VS} values the valve characteristic is optimized for maximum volumetric flow k_{V100}.

Bypass B-AB
0...100%: Linear

Tor AB = constant flow
Tor A = variable flow
Tor B = bypass (variable flow)

Mixing: Flow from port A and port B to port AB
Diverting: Flow from port AB to port A and port B

For product lines:
VXF42.125-250
VXF42.150-400

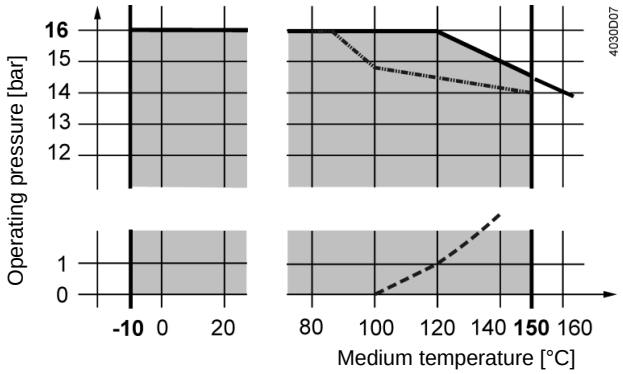


Throughport A-AB
0...100%: Linear

Bypass B-AB
0...100%: Linear

Operating pressure and medium temperature

Fluids, PN16
with V..F42..



--- Curve for saturated steam; steam forms below this line

—.. Operating pressure according to EN 1092-1, valid for 2-port valves with blank flange

Operating pressure and operating temperatures according to ISO 7005, EN 1092 and EN 12284

Notes

All relevant local directives must be observed

Medium compatibility and temperature ranges

Medium	Temperature range		Valve			Note
	T_{min} [°C]	T_{max} [°C]	VVF42..	VVF42..K	VXF42..	
Cold water	1	25	■	■	■	-
Low-temperature hot water	1	130	■	■	■	-
High-temperature hot water [1]	130	150	■	■	■	-
	150	180	-	-	-	-
Water with antifreeze	-5	150	■	■	■	For medium temperatures below 0 °C, the stem heating ASZ6.6 has to be installed.
	-10	150	■	-[3]	■	
	-20	150	-	-	-	
Cooling water [2]	1	25	-	-	-	-
Brines	-5	150	■	■	■	For medium temperatures below 0 °C, the stem heating ASZ6.6 has to be installed.
	-10	150	■	-[3]	■	
	-20	150	-	-	-	
Super-clean water (demineralized and deionized water)	1	150	-	-	-	
Demineralized water according to VDI2035 / SWKI_BT102-01	1	150	■	■	■	

[1] Differentiation due to saturated steam curve
[2] Open circuits
[3] VVF42..K can't be used with media below -5 °C due to the compensation sealing material

Fields of use

Fields of use		Valves		
		VVF42..	VVF42..K	VXF42..
Generation	Boiler plants	■	■	■
	District heating plants	■	■	-
	Refrigeration plants	■	■	■
Distribution	Heating groups	■	■	■
	Ventilation and air-handling units	■	■	■

Engineering notes

Mounting location

Preferably mount the valves at the return, as the temperature is lower there and the strain on the stem sealing gland is lower.

Dirt trap

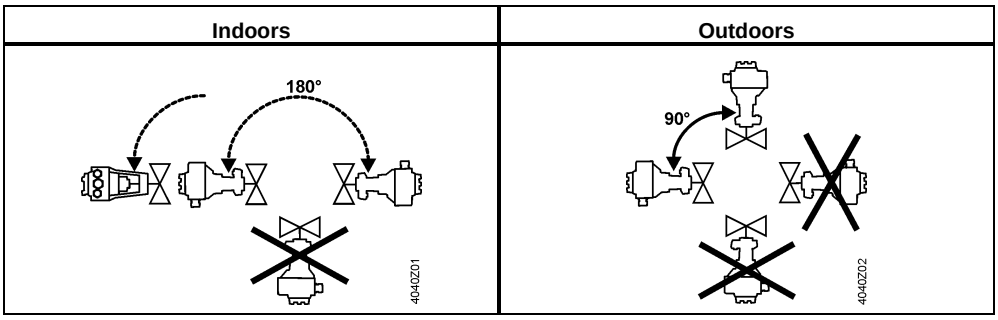
Mount a dirt filter or dirt trap before the valve to ensure proper functioning, and a long service life of the valve. Remove dirt, welding beads, etc. from the valves and pipes.

Cavitation

Cavitation can be avoided by limiting the pressure differential across the valve depending on the medium temperature and prepressure.

Mounting notes

Monting position



Mounting positions apply to both 2- and 3-port valves.

Commissioning notes

⚠ **The valve may be put into operation only if actuator and valve are correctly assembled.**

Note

Ensure that actuator stem and valve stem are rigidly connected in all positions.

Function check

Valve	Throughport A→AB	Bypass B→AB
Valve stem extends	Closes	Opens
Valve stem retracts	Opens	Closes

Maintenance notes

Valves are equipped with maintenance-free, continuously lubricated stem sealing glands. See page 13 for replacement stem sealing glands.

⚠ When servicing valves or actuators:

- Deactivate the pump and turn off the power supply
- Close the shutoff valves
- Fully reduce the pressure in the piping system and allow pipes to completely cool down

If necessary, disconnect the electrical wires.

Disposal

Do not dispose of the device as household waste.

- Special handling of individual components may be mandated by law or make ecological sense.
- Observe all local and currently applicable laws and regulations.

Warranty

Application-related technical data are guaranteed only when the valves are used in connection with the Siemens actuators listed under ”Equipment combinations”, page 4.
When used with actuators of other manufacture, any warranty by Siemens becomes void.

Technical data

Functional data	PN class		PN 16
	Connection		Flange
	Operating pressure		See Section "Operating pressure and medium temperatures", page 8
	Valve characteristics [1)]		See section "Valve characteristics", page 7
	Leakage rate	Throughport	0…0.02% of k_{vs} value
		Bypass	0.5…2% of k_{vs} value (k_{vs} ≥6.3)
			0.5…3% of k_{vs} value (k_{vs} 1.6; 2.5; 4)
	Permissible media		See table " Medium compatibility and temperature ranges", page 8
	Medium temperature		-10…150 °C
			VVF42..K: -5…150 °C
	Rangeability		To DN 25: > 50
			From DN 32: >100
	Nominal stroke		To DN 80: 20 mm
			From DN 100: 40 mm
Materials	Valve body		EN-GJL-250
	Blank flange	VVF.	S235JRG2
	Valve stem		Stainless steel
	Seat		Machined
	Plug		
	VVF.., VXF..:		Brass/ Bronze
	VVF..K..:		
	DN 65, DN 80		Brass/ Bronze
	DN 50, DN 100…150		Stainless steel
	Stem sealing gland		Brass EPDM O-rings PTFE sleeve silicon-free
	Compensation sealing		Stainless steel FEPM (silicone-free)

Standards, directives and approvals	Pressure Equipment Directive		PED 2014/68/EU
	Pressure-carrying accessories		Scope: Article 1, section 1 Definitions: Article 2, section 5
	Fluid group 2		PN 16
		≤DN 50	Without CE certification as per article 4, section 3 (sound engineering practice) [2]
		DN 65…125	Category I, Modul A, with CE-marking as per article 14, section 2
		DN 150	Category II, Modul A2, with CE-marking as per article 14, section 2, notified body number 0036
	EU conformity (CE)		
		DN 65…150	A5W00006523 [3]
	PN class		ISO 7268
	Operating pressure		ISO 7005, DIN EN 12284
	Flanges		ISO 7005
	Length of flanged valves		DIN EN 558-1, line 1
	Valve characteristic		VDI 2173
	Leakage rate		Throughport, bypass according to EN 60534-4 / EN 1349
	Water treatment		VDI 2035
	Environmental conditions		
		Storage: IEC 60721-3-1	Class: 1K3
			Temperature: -15…+55 °C
			Rel. humidity: 5…95% r.h.
		Transport: IEC 60721-3-2	Class: 2K3, 2M2
			Temperature: -30…+65 °C
			Rel. humidity: < 95% r.h.
		Operation: IEC 60721-3-3	Class: 3K5, 3Z11
			Temperature: -15…+55 °C
			Rel. humidity: 5…95% r.h.
Environmental compatibility	The product environmental declaration CE1E4403en01 [3], CE1E4403en02 [3] and CE1E4403en03 [3] contains data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit,disposal).		
Dimensions / Weight	Dimensions		See „Dimensions“, page 12/13
	Weight		See „Dimensions“, page 12/13

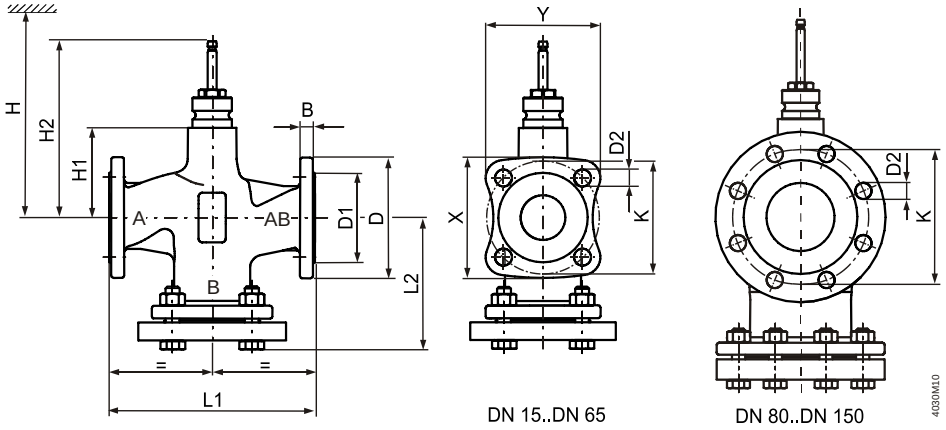
[1] For certain valve lines and high k_{vs} values, the valve characteristic is optimized for maximum volumetric flow k_{V100}.

[2] Valves where PS x DN < 1000, do not require special testing and cannot carry the CE label.

[3] The documents can be downloaded from http://siemens.com/bt/download

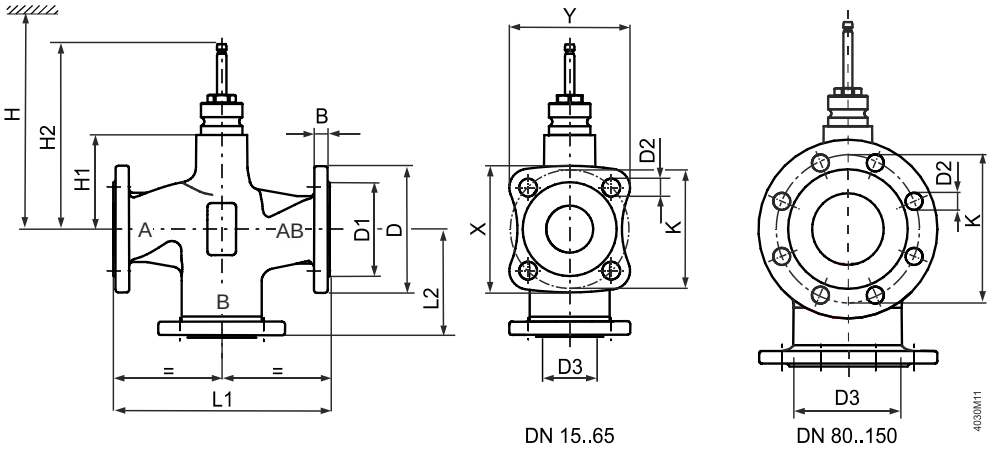
Dimensions

VVF42..
VVF42..K



Product number	DN	kg	B	Ø D	Ø D1	Ø D2	L1	L2	X	Y	Ø K	H1	H2	H				
														SAX..	SKD..	SKB..	SAV..	SKC..
VVF42..	15	3.7	14	95	46	14 (4x)	130	86	79	76	65	37	133.5	479	537	612	-	-
	20	4.7	16	105	56	14 (4x)	150	97	86.6	83	75	37	133.5	479	537	612	-	-
	25	5.4	15	115	65	14 (4x)	160	106.5	94.4	90.1	85	37	133.5	479	537	612	-	-
	32	8.4	17	140	76	19 (4x)	180	119	115.6	110.7	100	37	133.5	479	537	612	-	-
	40	9.3	16	150	84	19 (4x)	200	126	123.2	117.8	110	37	133.5	479	537	612	502	-
	50	12.2	16	165	99	19 (4x)	230	144	135.2	128.4	125	50	146.5	492	550	625	525	-
	65	17	17	185	118	19 (4x)	290	174	150	142.5	145	75	171.5	517	575	650	540	-
	80	25	17	200	132	19 (8x)	310	186	-	-	160	75	171.5	517	575	650	540	-
	100	35.9	17	220	156	19 (8x)	350	205	-	-	180	110	226.5	-	-	-	575	685
	125	52.5	17	250	184	19 (8x)	400	233	-	-	210	123	239.5	-	-	-	588	698
	150	74.9	17	284	211	23 (8x)	480	275.5	-	-	240	150.5	267	-	-	-	616	726
VVF42..K	50	12	16	165	99	19 (4x)	230	144	135.2	128.4	125	50	146.5	492	550	625	-	-
	65	17.7	17	185	118	19 (4x)	290	174	150	142.5	145	75	171.5	517	575	650	-	-
	80	26.8	17	200	132	19 (8x)	310	186	-	-	160	75	171.5	517	575	650	-	-
	100	35.3	17	220	156	19 (8x)	350	206	-	-	180	110	226.5	-	-	-	575	685
	125	51.6	17	250	184	19 (8x)	400	233	-	-	210	123 - 159	239.5 - 275.5	-	-	-	588 - 624	698 - 734
	150	74.8	17	284	211	23 (8x)	480	275.5	-	-	240	150.5 - 186.5	267 - 303	-	-	-	616 - 652	726 - 762

VXF42..



Product number	DN	kg	B	Ø D	Ø D1	Ø D2	Ø D3 [1]	L1	L2	X	Y	Ø K	H1	H2	H				
															SAX..	SKD..	SKB..	SAV..	SKC..
VXF42..	15	2.6	14	95	46	14 (4x)	23	130	65	79	76	65	37	133.5	479	537	612	-	-
	20	3.3	16	105	56	14 (4x)	29	150	75	86.6	83	75	37	133.5	479	537	612	-	-
	25	3.8	15	115	65	14 (4x)	36	160	80	94.4	90.1	85	37	133.5	479	537	612	-	-
	32	5.7	17	140	76	19 (4x)	46	180	90	115.6	110.7	100	37	133.5	479	537	612	-	-
	40	6.3	16	150	84	19 (4x)	56	200	100	123.2	117.8	110	37	133.5	479	537	612	502	-
	50	8.7	16	165	99	19 (4x)	69	230	115	135.2	128.4	125	50	146.5	492	550	625	525	-
	65	12.9	17	185	118	19 (4x)	85	290	145	150	142.5	145	75	171.5	517	575	650	540	-
	80	19.2	17	200	132	19 (8x)	102	310	155	-	-	160	75	171.5	517	575	650	540	-
	100	29	17	220	156	19 (8x)	124	350	175	-	-	180	110	226.5	-	-	-	575	685
	125	43.2	17	250	184	19 (8x)	149	400	200	-	-	210	123 - 159	239.5 - 275.5	-	-	-	588 - 624	698 - 734
	150	62.1	17	284	211	23 (8x)	174	480	240	-	-	240	150.5 - 186.5	267 - 303	-	-	-	616 - 652	726 - 762

[1] Interior opening of the bypass port

Spare parts

Stem sealing gland

Product number	DN	Stock number	Comments	Image
VVF42.. VXF42..	DN 15…80	4 284 8806 0	Series A	 4 284 8806 0
	DN 100…150	4 284 8806 0	Series A, B and C until October 2015	
	DN 100…150	4 679 5629 0	Series D as of October 2015	
VVF42..K	DN 50…80	4 284 8806 0	Series A, B	 4 679 5629 0
	DN 100…150	4 284 8806 0	Series A	
	DN 100…150	4 679 5629 0	Series B	

Revision numbers

VVF..
VXF..

Product number	Valid from rev. no.	Product number	Valid from rev. no.
VVF42.15-1.6	..A	**VXF42.15-1.6**	..A
VVF42.15-2.5	..A	**VXF42.15-2.5**	..A
VVF42.15-4	..A	**VXF42.15-4**	..A
VVF42.20-6.3	..A	**VXF42.20-6.3**	..A
VVF42.25-6.3	..A	**VXF42.25-6.3**	..A
VVF42.25-10	..A	**VXF42.25-10**	..A
VVF42.32-16	..A	**VXF42.32-16**	..A
VVF42.40-16	..A	**VXF42.40-16**	..A
VVF42.40-25	..A	**VXF42.40-25**	..A
VVF42.50-31.5	..A	**VXF42.50-31.5**	..A
VVF42.50-40	..A	**VXF42.50-40**	..A
VVF42.65-50	..A	**VXF42.65-50**	..A
VVF42.65-63	..A	**VXF42.65-63**	..A
VVF42.80-80	..A	**VXF42.80-80**	..A
VVF42.80-100	..A	**VXF42.80-100**	..A
VVF42.100-125	..D	**VXF42.100-125**	..D
VVF42.100-160	..D	**VXF42.100-160**	..D
VVF42.125-200	..D	**VXF42.125-200**	..D
VVF42.125-250	..D	**VXF42.125-250**	..D
VVF42.150-300	..D	**VXF42.150-300**	..D
VVF42.150-400	..D	**VXF42.150-400**	..D
VVF42.50-40K	..B		
VVF42.65-63K	..A		
VVF42.80-100K	..A		
VVF42.100-160K	..B		
VVF42.125-250K	..B		
VVF42.150-360K	..B		

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siemens_VXG

The following 5 pages are the document exactly as received and checked. It is bookmarked in the PDF.

Reference	
Asset	General
Provided by	Not recorded
Source file	`siemens_VXG.pdf`
Pages	5

SIEMENS

Technical Instructions
Document No. 155-113P25
August 17, 2018

VXG Series

Three-way Valves



Description

The VXG three-way valve controls the flow of water or glycol solutions. They have a 7/32-inch (5.5 mm) nominal stroke and are compatible with SAS series actuators.

Features

- External (male) metric, threaded connections.
- Reduced seat diameter produces reduced C_v (K_{vs}) in 1/2-inch valve bodies
- Double O-ring packing with Teflon® wiper

Application

The VXG valve can be used as a control and shut-off valve in small to medium HVAC installations for hot water and chilled water applications. Use only as a mixing valve. Use in closed circuits only.

NOTE: This valve is not designed for steam applications. See *Specifications* for details.

Product Numbers and Ordering Information

Order the valve and actuator separately.

Table 1. Product Information.

Nominal Valve Size Inches (mm)	Cv (Kvs)	Valve Product Number Body only with External Threads	Spring and Non-Spring Return		
			Range-Ability	Close-Off with SAS Actuators psig (kPa)	Max Δ P * psig (kPa)
0.5 (15)	0.47 (0.40)	VXG44.15-0.4	50	58 (400)	58 (400)
0.5 (15)	0.74 (0.63)	VXG44.15-0.63			
0.5 (15)	1.17 (1.0)	VXG44.15-1			
0.5 (15)	1.87 (1.6)	VXG44.15-1.6	100		
0.5 (15)	2.92 (2.5)	VXG44.15-2.5			
0.5 (15)	4.68 (4)	VXG44.15-4			
.75 (20)	7.37 (6.3)	VXG44.20-6.3			
1.0 (25)	11.7 (10)	VXG44.25-10		43.5 (300)	43.5 (300)
1.25 (32)	18.7 (16)	VXG44.32-16		29 (200)	29 (200)
1.5 (40)	29 (25)	VXG44.40-25		14.5 (100)	14.5 (100)

Max Δ P * = Maximum recommended differential pressure for modulating service.

Accessories

Table 2. NPT Union Kits (One Union per Kit)

698-047	1/2-inch Female NPT Union Kit
698-048	3/4-inch Female NPT Union Kit
698-049	1-inch Female NPT Union Kit
698-050	1-1/4-inch Female NPT Union Kit
698-051	1-1/2-inch Female NPT Union Kit

Specifications

Valve Composition	Body Style	Globe
	Body	Bronze
	Connections	External (male), metric-threaded (See *Dimensions*.)
	Trim	
	Upper Seat	
	1/2-inch and 3/4-inch	Stainless Steel
	1-inch to 1-1/2-inch	Bronze
	Lower Seat	Bronze
	PackingDouble O-ring	
	Body Rating	ANSI 125 (PN 16)
Operating Conditions	Line Size/Capacity	See Table 1 and Table 2.
	Medium	Water, glycol to 50%
	Rangeability	See Table 1.
	Flow Characteristics	Linear
	Leakage Rate	0.02% of Cv
	Medium Temperature	36 to 248°F (2 to 120°C)
	Maximum Inlet Pressure	232 psig (1600 kPa)
	Maximum Pressure Differential for Modulating Service	See Table 1.
	Close-Off Pressure	See Table 1.
Physical Characteristics	Weight	See Figure 3.
	Dimensions	See Figure 3.

Table 2. Maximum Water Capacity — US Gallons per Minute.

Valve	Pressure Differential (psi)												
	1 / Cv	Kvs	2	4	6	8	10	15	20	25	30	40	50
1/2 (15)	0.47	(0.40)	0.66	0.94	1.15	1.32	1.48	1.81	2.09	12.34	2.56	2.96	3.31
1/2 (15)	0.74	(0.63)	1.05	1.48	1.81	2.09	2.34	2.87	3.31	3.70	4.05	4.68	5.23
1/2 (15)	1.17	(1.0)	1.65	2.34	2.87	3.31	3.70	4.53	5.23	5.85	6.41	7.40	8.27
1/2 (15)	1.87	(1.6)	2.65	3.74	4.59	5.29	5.92	7.25	8.37	9.36	10.25	11.84	13.24
1/2 (15)	2.92	(2.5)	4.14	5.85	7.16	8.27	9.25	11.33	13.08	14.63	16.02	18.50	20.68
1/2 (15)	4.68	(4.0)	6.62	9.36	11.46	13.24	14.80	18.13	20.93	23.40	25.63	29.60	33.09
3/4 (20)	7.37	(6.3)	10.42	14.74	18.06	20.85	23.31	28.55	32.96	36.86	40.37	46.62	—
1 (25)	11.7	(10)	16.55	23.40	28.66	33.09	37.0	45.31	52.32	58.5	64.08	—	—
1-1/4 (32)	18.7	(16)	26.47	37.44	45.85	52.95	59.2	72.5	—	—	—	—	—
1-1/2 (40)	29	(25)	41	58	71	82	91	112	—	—	—	—	—

Warning/Caution Notations

WARNING:	⚠	Personal injury or loss of life may occur if you do perform a procedure as specified.
CAUTION:	⚠	Equipment damage may occur if you do not perform a procedure as specified.

Operation

The arrow on the valve indicates the direction of flow. As a mixing valve, the direction of flow is always from II (A) to I (AB). See Figure 1.

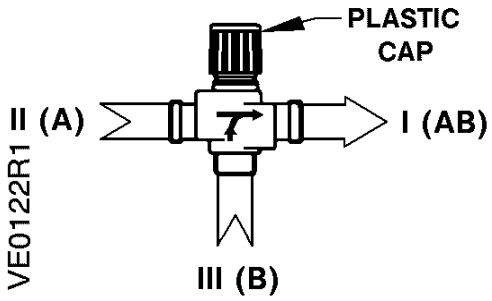


Figure 1. VXG Valve Direction of Flow.

With the valve stem down, the valve opens from II (A) to I (AB) and closes III (B) to I (AB). With the valve stem up, the valve closes from II (A) to I (AB) and opens III (B) to I (AB).

An electronic motor actuator positions the valve. A continuous 0 to 10 Vdc signal controls the actuator.

The valve provides a linear flow characteristic.

Installation

- The valve assembly can be installed in the supply or return line.

  NOTE: For hot water installations, it is recommended to place the valve in the return line because the temperature is lower.

- Match the direction of flow with the symbol cast on the valve body. See Figure 1.
- Allow 8 inches (200 mm) of clearance for installation and service.
- Mount the assembly in any position except with the actuator beneath the valve. See Figure 2 for allowable mounting positions.

CAUTION:

Dirt in the piping system can cause valve problems. Before starting-up and troubleshooting the valve, make certain that the piping system is free of dirt and foreign particles.

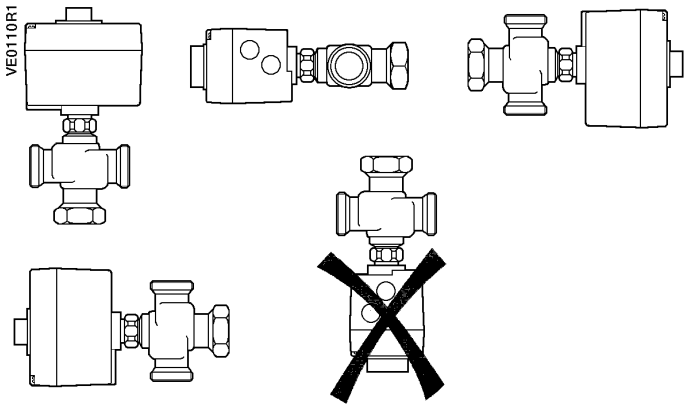


Figure 2. Mounting Positions.

- Before installing the actuator, use a protective plastic cap (Figure 1) to manually position the valve. The plastic cap opens up to 80% flow from II (A) to I (AB) and closes down to 20% flow from III (B) to I (AB). Port III (B) can not be completely closed using the plastic cap.

  NOTE: Do not discard the plastic cap. It may be needed during troubleshooting or for emergency valve operation.

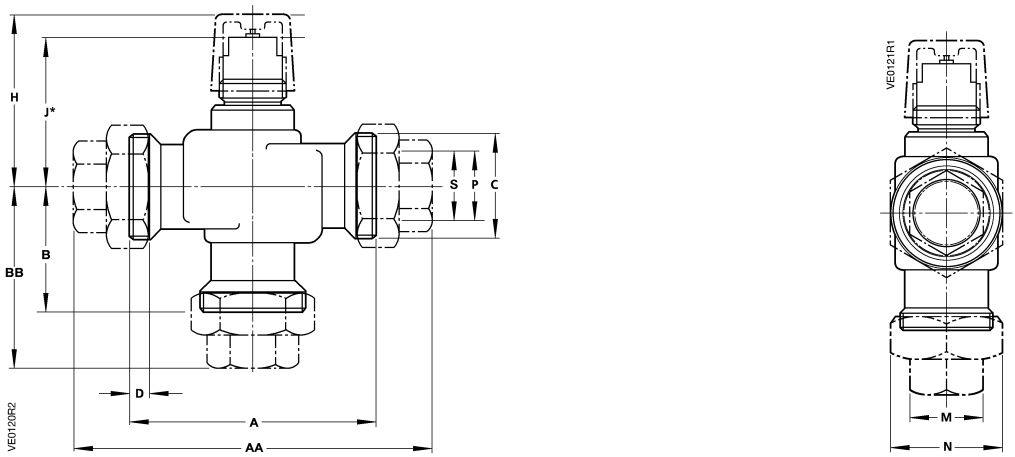
Service

If valve is inoperative, replace it.

WARNING:

To avoid personal injury, do *not* attempt to repair the valve.

Dimensions



Nominal Valve Size	A	AA	B	BB	C Metric Thread	D	H	J	M	N	P NPT for Union	Valve Weight lbs. (kg)
1/2 (15)	3-15/16 (100)	5-13/16 (148)	1-31/32 (50)	2-29/32 (74)	G 1"	11/32 (8.5)	2-1/2 (63)	2-3/32 (53)	1 (25)	1-5/8 (41)	1/2"	1.1 (0.50)
3/4 20)	3-15/16 (100)	5-29/32 (150)	1-31/32 (50)	2-15/16 (75)	G 1-1/4"	3/8 (9)	3-1/16 (78)	2-11/16 (68)	1-1/4 (32)	1-31/32 (50)	3/4"	1.9 (0.85)
1 (25)	4-5/32 (105)	6-5/16 (160)	2-1/16 (52.5)	3-5/32 (80)	G 1-1/2"	3/8 (9)	3-3/16 (81)	2-25/32 (71)	1-1/2 (38)	2-5/32 (55)	1"	2.6 (1.20)
1-1/4 (32)	4-5/32 (105)	6-11/16 (170)	2-1/16 (52.5)	3-3/8 (85)	G 2"	7/16 (11)	3-7/16 (87.5)	3-1/16 (77.5)	1-7/8 (47)	2-3/4 (70)	1-1/4"	3.5 (1.60)
1-1/2 (40)	5-1/8 (130)	7-13/16 (198)	2-9/16 (65)	3-29/32 (99)	G 2-1/4"	7/16 (11)	3-9/16 (90.5)	3-3/16 (80.5)	2-3/32 (53)	2-31/32 (75)	1-1/2"	5 2.30

Figure 3. Dimensions for VXG Series Valves.

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8.106

terrain_above_ground_jan19_0

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Reference	
Asset	General
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Source file	terrain_above_ground_jan19_0.pdf
Pages	51

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(52.3)

TSWTM4-PT January 2019

Terrain Above Ground



PVC-u above ground drainage systems

Polypipe
Building Services

Terrain Above Ground Drainage

Having pioneered the development of solvent-weld systems, Terrain soil & waste products represent the industry benchmark for quality, installation, flexibility and product innovation backed by the highest levels of customer service. Terrain systems include an extensive range of soil & waste drainage products for commercial, industrial, housing and public sector developments, all built on the strength of our Terrain brand. Systems include solvent-weld and Push-Fit options for both soil & waste drainage; overflow, WC pan and trap connectors along with a comprehensive range of adaptors and accessories. Products are available in a range of colours.

- Industry leading range of solvent and Push-Fit soil and waste solutions
- Unique products offer unrivalled installation options
- High quality finish, colour to match all systems
- Suitable for all types of commercial and domestic installations
- Extensive technical experience to support and advise on all aspects of design and installation
- Fully accredited product systems

As you would expect from a market leader our products come with all relevant standards including:

Manufacturing Standards

BS 5255:1989 Specification for Thermoplastics Waste Pipe and Fittings

BS 4514:2001 PVC Soil and Ventilation Pipes, Fittings and Accessories

BS EN 1329:2000 Plastic Piping Systems for Soil and Waste Discharge

BS EN 1566:2000 Plastic Piping Systems for Soil and Waste Discharge (Chlorinated)

BS EN 12380 A1 Air Admittance Valve

BS EN 12380 A1 Air Admittance Valve (Pleura System)

BS EN 1366-3 Terrain Firetrap Sleeves and Collars

Quality Management Systems Standards

EN ISO 9001:2008 Management System

EN ISO14001:2004 Management System

BS OHSAS 18001:2007 Management System

PASS 99:2006 Integrated Management Registration











Sustainable Materials

Plastics are among the most researched materials in the world and rapid technological and manufacturing developments made in recent years have allowed for continuous innovation.

Polypipe Terrain pioneered the development of PVC material for the manufacture of drainage pipes and fittings; we remain at the forefront of the industry across the globe with the use of ever-more environmentally friendly materials with no loss of mechanical characteristics.

Utilising a sustainable material composition contributes significantly to an environmentally friendly manufacturing process and gives a finished product that can be recycled in accordance with British Standards.

For further information, please refer to www.polypipe.com

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Products marked 💻 in the product listings are available in CAD form for ready incorporation into design drawings. If you would like a disk or CD ROM in the appropriate format, simply contact the Technical Advisory Service.

100 Soil System - PVC-u (solvent-weld)

82, 110 and 160mm PVC-u soil pipes and fittings:

- Wide range of bends, branches and access fittings to meet all application requirements



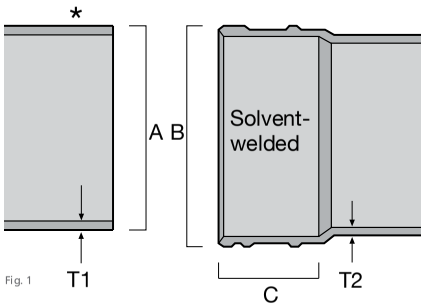


Fig. 1

82, 110 and 160mm pipe and fittings (Fig.1)				
A	B	C	T1	T2
82	95	51	3.2	3.2
110	122	51	3.2	3.2
160	175	76	3.3	3.5

The pipe and socket illustrated here are for solvent weld jointing. The conversion to seal ring expansion joint is made by adding a 109 seal ring adaptor to the socket.

* Some Terrain fittings feature a groove here, as shown on the underside.

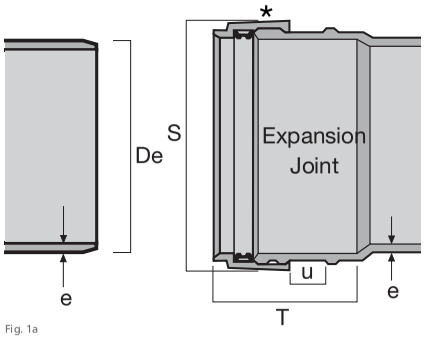


Fig. 1a

82, 110 and 160mm pipe and fittings (Fig.1a)					
De	S	e (min pipe)	e (min body of fitting)	U	T
82	102	3.2	3.2	18	72
110	127	3.2	3.2	19	72
160	184	3.3	3.5	25	101

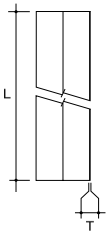
The 109 seal ring adaptor has been drawn in position on the socket of the 100 system fitting to illustrate its application and dimension S. The dimension U is to accommodate all Terrain holderbats.

* Some Terrain fittings feature a groove here, as shown on the underside.

All dimensions in mm unless otherwise stated

Terrain Soil System - 100 Solvent-Weld

Size (mm)	L	T (min)	Colour	Code
SOIL PIPE - PLAIN ENDED				
82	3m	3.2	GBW	100.3.30
82	4m	3.2	GBW	100.3.40
110	3m	3.2	GBW	100.4.30
110	4m	3.2	GBW	100.4.40
160	3m	3.3	G	100.6.30
160	4m	3.3	G	100.6.40



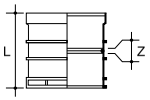


Size (mm)	A	Colour	Code
RING SEAL ADAPTOR - converts any Terrain solvent socket to a ring seal expan-			
82	21	GB	109.3
110	21	GBW	109.4
160	26	G	109.6



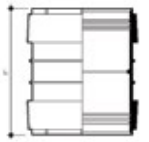


Size (mm)	L	Z	Colour	Code
STRAIGHT COUPLER DOUBLE SOCKET - double solvent socket				
82	92	3	GBW	110.3
110	102	3	GBW	110.4
160	126	6	G	110.6



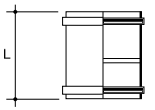


Size (mm)	L	Z	Colour	Code
EXPANSION COUPLER - to allow expansion in longer pipe runs				
82	113	3	GBW	111.3
110	123	3	GBW	111.4
160	152	6	G	111.6



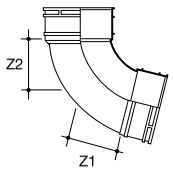


Size (mm)	L	Colour	Code
SLIP COUPLER DOUBLE SOCKET			
82	134	G	111.S.3
110	144	GB	111.S.4
160	175	G	111.S.6





Size (mm)	Angle°	Z1	Z2	Colour	Code
SWEPT BEND DOUBLE SOCKET					
82	92½	102	98	GBW	101.3.92
110	92½	75	83	GBW	101.4.92
160	92½	178	184	G	101.6.92
110	104	80	76	G	101.4.104
110	112½	65	63	GB	101.4.112
82	135	25	25	GBW	101.3.135
110	135	21	30	GBW	101.4.135
160	135	44	44	G	101.6.135



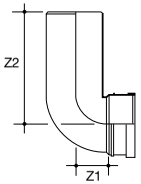


(82mm) 92½° and 135° as standard.
(110mm) 92½°, 104°, 112½° and 135° as standard.

G - Grey B - Black W - White

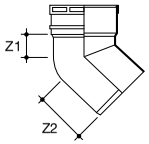
Terrain Soil System - 100 Solvent-Weld





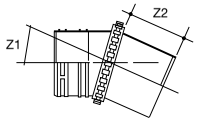
Size (mm)	Angle°	Z1	Z2 (max)	Z2 (min)	Colour	Code
SPIGOT SOCKET BENDS - long tail						
82	92½	41	152	97	G	107.3.92
110	92½	57	197	110	GBW	107.4.92





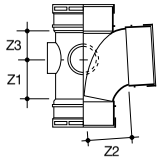
Size (mm)	Angle°	Z1	Z2 (max)	Z2 (min)	Colour	Code
SPIGOT SOCKET BENDS						
110	135	42	85		GBW	107.4.135
160	135	60	130		G	107P.6.135

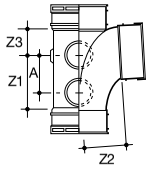




Size (mm)	Z1	Z2	Colour	Code
VARIABLE BEND SPIGOT/SOCKET - adjustable 0 - 25°				
110	0 - 25	45	G	107.4.025
Double spigot				
110	0 - 25	45	G	101.4.025

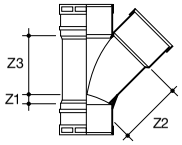






Size (mm)	Angle°	Z1	Z2	Z3	A	Colour	Code
SINGLE EQUAL BRANCH TRIPLE SOCKET - connect to boss horns using 117 boss adaptors (see page 21)							
82	92½	70	83	35		GBW	104.3.92
82	135	19	108	102		GB	104.3.135
110	92½	82	82	54		GBW	104.4.92
110	92½	101	96	50	74	GBW	104.4.924
160	92½	184	178	160		G	104.6.92
With boss connections							
						2 boss horns	104.3.92
						3 boss horns	104.4.92
						4 boss horns	104.4.924
						6 boss horns	104.6.92



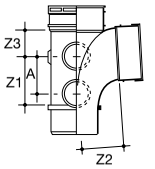


Size (mm)	Angle°	Z1	Z2	Z3	Colour	Code
SINGLE EQUAL BRANCH - no waste boss connections						
110	104	77	74	72	G	104.4.104
110	135	25	137	137	GBW	104.4.135
160	135	60	195	195	G	104AS.6.135†
160	135	53	198	198*	G	104.6.135

*Push-Fit only †Cannot be used with 109.6

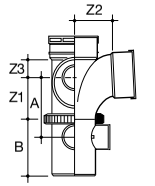
Terrain Soil System - 100 Solvent-Weld

Size (mm)	Angle°	A	Z1	Z2	Z3	Colour	Code
SINGLE BRANCH SPIGOT OUTLET - with boss connections - 4 boss horns							
110	92½	74	103	96	50	GB	104.104.92



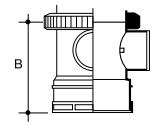


Size (mm)	Angle°	A	B	Z1	Z2	Z3	Colour	Code
SINGLE EQUAL BRANCH VARIABLE BOSS - Spigot outlet, 2 boss horns, 2 waste								
110	92½	142	140	91	83	59	G	104.412.92

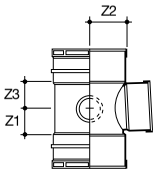




Size (mm)	Angle°	A	B	Z1	Z2	Z3	Colour	Code
SINGLE EQUAL BRANCH VARIABLE BOSS - Socket outlet								
110	92½	142	140	91	83	59	G	104.422.92

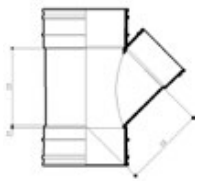


Size (mm)	Angle°	Z1	Z2	Z3	Colour	Code
SINGLE UNEQUAL BRANCH TRIPLE SOCKET - 2 boss horns						
	92½	59	87	62	G	104.64.92



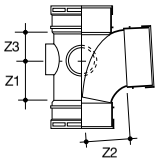


Size (mm)	Angle°	Z1	Z2	Z3	Colour	Code
SINGLE UNEQUAL BRANCH TRIPLE SOCKET - No waste boss connections						
	135	70	165	164	G	104.64.135





Size (mm)	Angle°	Z1	Z2	Z3	Colour	Code
CORNER BRANCH TRIPLE SOCKET - 1 boss horn						
110	92½	94	83	59	G	106.490.92

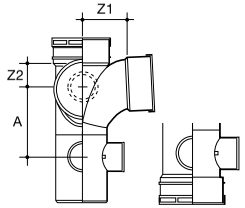




All dimensions in mm unless otherwise stated

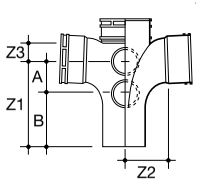
G - Grey B - Black W - White

Terrain Soil System - 100 Solvent-Weld

Size (mm)	Angle°	A	Z1	Z2	Colour	Code
CORNER BOSS BRANCH - spigot outlet - 1 boss horn, 2 waste sockets						
110	92½	120	83	59	G	106.490.12

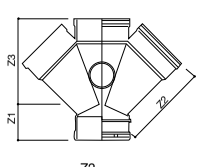
Size (mm)	Angle°	A	Z1	Z2	Colour	Code
CORNER BOSS BRANCH - socket outlet						
110	92½	120	83	59	G	106.490.22

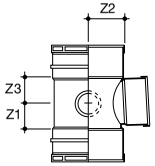
Size (mm)	Angle°	A	B	Z1	Z2	Z3	Colour	Code
DOUBLE BRANCH - spigot outlet, 4 boss horns								
110	92½	75	128	203	96	50	G	106.104.92

Size (mm)	Angle°	A	B	Z1	Z2	Z3	Colour	Code
DOUBLE BRANCH - socket outlet								
82	92½	-	-	70	83	35	G	106.3.92
110	92½	74	-	138	95	50	G	106.4.92

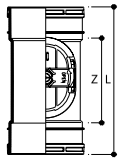
106.3.92 with 2 boss horns. 106.4.92 with 4 boss horns.

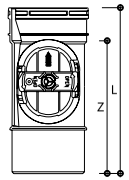
Size (mm)	Angle°	A	B	Z1	Z2	Z3	Colour	Code
DOUBLE BRANCH - no bosses								
110	135	-	-	25	137	137	G	106.4.135
160	135	-	-	196	172	135	G	106.6.135

Size (mm)	Angle°	Z1	Z2	Z3	Colour	Code
DOUBLE UNEQUAL BRANCH - 2 boss horns						
160/110	92½	59	87	62	G	106.64.92

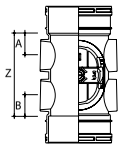
Size (mm)	L	Z	Colour	Code
ACCESS PIPE DOUBLE SOCKET				
110	216	115	GBW	138.4

Size (mm)	L	Z	Colour	Code
ACCESS PIPE SINGLE SOCKET				
110	216	166	GB	139.4
160	355	279	G	139.6

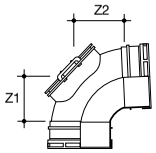
Terrain Soil System - 100 Solvent-Weld

Size (mm)	A	B	Z	Colour	Code
ACCESS PIPE CONNECTOR - 2 boss horns					
82	41	39	120	GBW	137.3
110	41	35	149	GBW	137.4



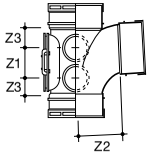


Size (mm)	Angle°	Z1	Z2	Colour	Code
ACCESS BEND DOUBLE SOCKET					
110	92½	102	98	GBW	103.4.92



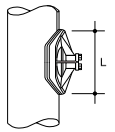


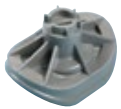
Size (mm)	Angle°	Z1	Z2	Z3	Colour	Code
SINGLE ACCESS BRANCH TRIPLE SOCKET - 4 boss horns						
110	92½	99	96	50	GBW	105.4.92



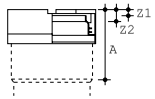


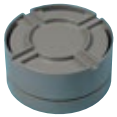
Size (mm)	L	Hole Saw Ø	Colour	Code
ACCESS DOOR				
82	114	48	G	135.3
110	152	73	GB	135.4
160	152	73	G	135.6



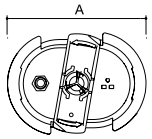


Size (mm)	A	Z1	Z2	Colour	Code
ACCESS CAP					
82	83	16	32	GW	136.3
110	97	21	46	GBW	136.4
160	122	22	42	G	136.6





A	Colour	Code
ACCESS DOOR WITH TEST NIPPLE		
127	GBW	6592/DW

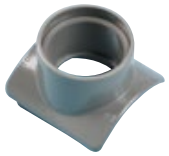


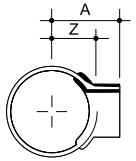


All dimensions in mm unless otherwise stated

G - Grey B - Black W - White

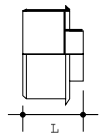
Terrain Soil System - 100 Solvent-Weld





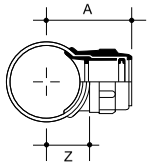
Size (mm)	A	Z	Hole Saw Ø	Colour	Code
TWO PART WASTE BOSS SOLVENT SOCKET					
110/32	79	53	48	G	112.4.125
82/40	69	39	57	G	112.3.15
110/40	82	53	57	G	112.4.15
110/50	86	53	70	G	112.4.2
160/50	110	77	70	G	112.6.2





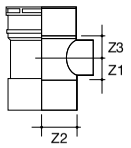
Size (mm)	L	Colour	Code
SOCKET PLUG			
110	69	GBW	130.4
160	92	G	130.6





Size (mm)	A	Z	Hole Saw Ø	Colour	Code
SELF LOCKING BOSS SEAL RING SOCKET					
110/32	111	60	60	G	122.4.125
110/40	111	60	64	GB	122.4.15
110/50	119	60	75	GBW	122.4.2

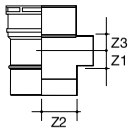




Size (mm)	Z1	Z2	Z3	Colour	Code
SINGLE BOSSED PIPE CONNECTOR DOUBLE SOCKET					
110/32	30	56	31	GBW	120.4.125
110/40	30	56	31	GBW	120.4.15
110/50	30	59	31	GBW	123.4[1]

[1]Requires a boss adaptor



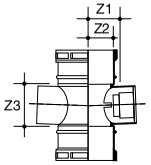


Size (mm)	Z1	Z2	Z3	Colour	Code
SINGLE BOSSED PIPE CONNECTOR SPIGOT - for 40mm waste pipe					
110/40	28	56	27	G	120.412.15

Terrain Soil System - 100 Solvent-Weld

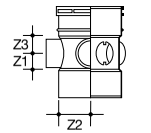
Size (mm)	Z1	Z2	Z3	Colour	Code
DOUBLE BOSSED PIPE CONNECTOR DOUBLE SOCKET - for 50mm waste pipes (40mm with adaptor)					
82/50	50	38	65	GB	120.3.2

2 x 50mm waste sockets, 2 blanking plugs.

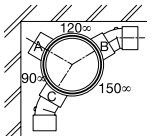


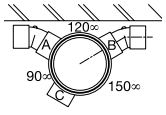


Size (mm)	Z1	Z2	Z3	Colour	Code
TRIPLE BOSSED PIPE CONNECTOR DOUBLE SOCKET					
110/40	30	56	30	GB	121.4.15



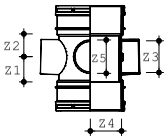






Size (mm)	Z1	Z2	Z3	Z4	Z5	Colour	Code
FOUR-WAY BOSS PIPE DOUBLE SOLVENT SOCKET							
110	44	40	56	55	59	GB	120.4.2

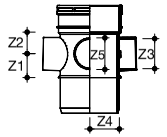
2 boss horns, 2 waste sockets.





Size (mm)	Z1	Z2	Z3	Z4	Z5	Colour	Code
FOUR-WAY BOSS PIPE DOUBLE SOLVENT SOCKET/SPIGOT							
110	44	40	56	55	59	G	120.412.2

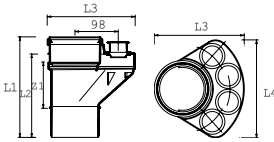
2 boss horns, 2 waste sockets.





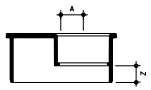
Size (mm)	L1	L2	L3	L4	Z1	Colour	Code
UNIVERSAL SOIL MANIFOLD - for solvent waste connections							
110	228	189	199	217	105	G	119.412.15

For connection of BS 5254/BS 5255 40mm waste pipes at floor level. Incorporates 4 inlets to accept 40mm waste pipes without need for adaptors. Use with Swivel Elbow or Swept Bend.
For Push-Fit waste connections see page 21.





Size (mm)	A	Z	Colour	Code
SOCKET REDUCER - for solvent connections				
82/50	11	3	GW	124.3.2
110/50	24	3	GBW	124.4.2
110/82	11	3	GBW	124.4.3
160/110	22	25	GW	124.6.4



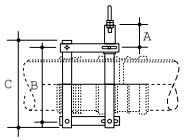


All dimensions in mm unless otherwise stated

G - Grey B - Black W - White

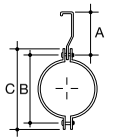
Terrain Soil System - 100 Solvent-Weld





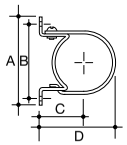
Size (mm)	A	B	C	Colour		Code
THERMAL MOVEMENT LIMITER						
82	100	129	154	Self		190.3
110	100	158	178	Self		190.4
160	100	232	260	Self		190.6





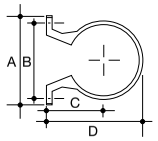
Size (mm)	A	B	C	Colour		Code
INTERMEDIATE SUPPORT BRACKET - to support horizontal pipework						
82	100	129	154	Self		191.3
110	100	158	178	Self		191.4
160	100	232	260	Self		191.6





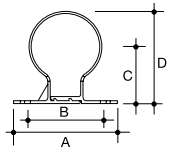
Size (mm)	A	B	C	D	Colour		Code
TWO-PIECE PIPE BRACKET - galvanised steel							
82	140	114	76	124	Self		140.3
110	175	147	89	152	Self		140.4
160	216	196	114	197	Self		140.6



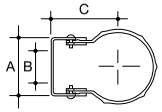


Size (mm)	A	B	C	D	Colour		Code
ONE-PIECE PIPE BRACKET							
82	132	110	76	117	GBW		143.3
110	164	141	90	155	GBW		143.4





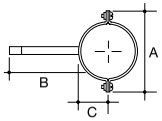




Size (mm)	A	B	C (max)	C (min)	Colour		Code
ADJUSTABLE PIPE BRACKET PLASTIC-COATED							
110	99	64	108	80	B		144.4

Both have self coloured backplates.

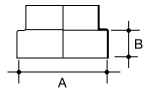


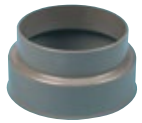


Size (mm)	A	B	C	Colour		Code
PIPE BRACKET GALVANISED DRIVE-IN						
110	178	152	59	Self		142.4

Terrain Soil System - 100 Solvent-Weld

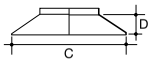
Size (mm)	A	B	Colour		Code
WEATHERING APRON - for lead slates					
82	102	38	GB		131.3
110	128	48	GBW		131.4
160	179	51	G		131.6





Size (mm)	C	D	Colour		Code
WEATHERING APRON - for asphalt upstand					
82	204	59	G		131.3.200
110	203	46	G		131.4.200

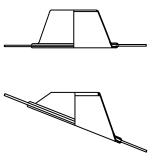
Makes weathertight cover between soil pipe and lead slate at roof level.

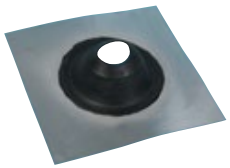




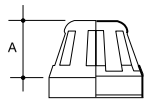
Size (mm)	Plate Size	Colour		Code
WEATHERING SLATES - for flat roof				
82 to 110	406 x 406	Alu/B		149.16.00
WEATHERING SLATES - for sloping roof (min30°)				
82 to 110	406 x 406	Alu/B		149.18.22
WEATHERING SLATES - for sloping roof (min 17°)				
82 to 110	406 x 406	Alu/B		149.24.22

Makes weathertight cover between soil pipe and lead slate at roof level.
Available for flat or pitched roof. Colours: Base - Aluminium, Cone - Black.



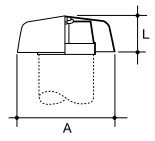


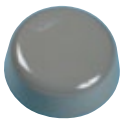
Size (mm)	A	Colour		Code
VENT COWL				
82	51	GB		150.3
110	64	GBW		150.4
160	83	G		150.6





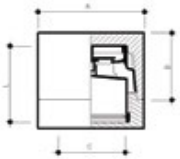
Size (mm)	A	L	Colour		Code
DUCT COWL - Stops rainwater from entering ventilation ducts					
110	205	80	GB		152.4
160	225	120	G		152.6





Size (mm)	A	B	L	C	Colour		Code
AUTOMATIC AIR ADMITTANCE VALVE							
110	171	107	121	110	W		153.4
82	171	107	121	110	W		153.3

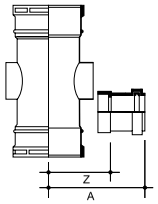
NOTE: Not to be used with Terrain Pleura alternative ventilation system.





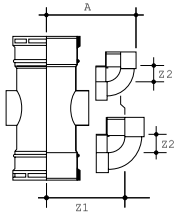
Terrain Soil System - 100 Solvent-Weld





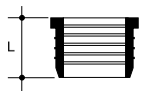
Use on Stack Size (mm)	A†	Z†	Hole Saw Ø	Colour	Code
STRAIGHT BOSS ADAPTOR RING SEAL SOCKET - for waste pipe					
82 - 160	107	61	51	GBW	117.125
82 - 160	107	61	51	GBW	117.15
82 - 160	107	61	51	GBW	117.2





Use on Stack Size (mm)	A	Z1	Z2	Hole Saw Ø	Colour	Code
BOSS ADAPTOR BEND SOLVENT SOCKET						
82 - 160	106	82	22	51	GBW	117.15.90
82 - 160	120	89	30	51	GBW	117.2.90
82 - 160	-	80	11	51	G	117.2.150

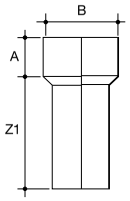




Size (mm)	L	Colour	Code
ADAPTOR TO UNDERGROUND DRAIN - Push-Fit into bore of underground			
82/110	54	B	4DW3

NOTE: As a Terrain Underground product different discount structure applies.

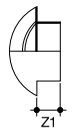




Size (mm)	A	B	Z1	Colour	Code
POST FORMED SOCKET					
82	60	98	240	G	126.3.12
110	64	127	236	G	126.4.12

NOTE: To be used with 9120 and 9119B.

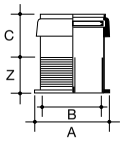




Size (mm)	Z1	Colour	Code
ADAPTOR SADDLES - for 40mm waste pipes (40mm with adaptor)			
110/40	29	G	115P.4

Used with 117 Waste Adaptors to enable direct connection of 32mm and 40mm waste pipe to soil pipe.





Size (mm)	A	B	C	Z	Colour	Code
PVC-U CAULKING BUSH						
110	133	124	63	67	G	132.4

To connect soil pipe to sockets of other material. Solid caulked into sockets.

All dimensions in mm unless otherwise stated

G - Grey B - Black W - White

Terrain Rainwater Systems

Terrain Rainwater System

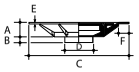


A comprehensive range of rainwater outlets designed to work in conjunction with the Terrain Soil & Waste pipes and fittings.

Note: Please refer to the Terrain Rainwater brochure for full details of guttering and downpipe ranges.

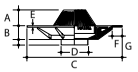
Terrain Roof Outlets

Size (mm)	A	B	C	D	E	F		Code
FLAT ROOF OUTLET (LARGE) Grey only -To drain surface water from flat roofs Suitable for most roof finishes								
82	67	25	406	89	6	43		2170.3
110	58	25	406	117	6	43		2170.4



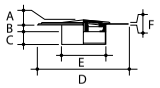


Size (mm)	A	B	C	D	E	F	G		Code
DOMED ROOF OUTLET (LARGE) Grey only -To drain surface water from flat roofs Suitable for most roof finishes									
82	67	25	406	89	6	43	76		2171.3
110	58	25	406	117	6	43	76		2171.4



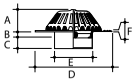


Size (mm)	A	B	C	D	E	F		Code
FLAT ROOF OUTLET (SMALL DIAMETER) Grey only -To drain surface water from porches, garages and small balconies. Suitable for mineral felt or single layer plastic roofs								
50	6	16	25	178	61	3		2180.2
82	6	16	25	178	87	3		2180.3



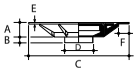


Size (mm)	A	B	C	D	E	F		Code
DOMED ROOF OUTLET (SMALL DIAMETER) Grey only -To drain surface water from porches, garages and small balconies. Suitable for mineral felt or single layer plastic roofs								
50	48	16	25	178	61	3		2181.2
82	48	16	25	178	87	3		2181.3



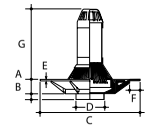


Size (mm)	A	B	C	D	E	F	G	Code
INVERTED ROOF OUTLET Grey only -To allow for drainage from two levels as required with inverted roof construction								
110	60	25	406	117	6	43	260	2171.4A





Size (mm)	A	B	C	D	E	F	G	Code
INVERTED ROOF OUTLET Grey only -Special vented type for combined systems Suitable for most roof finishes								
110	58	25	406	117	6	43	371	2174.44





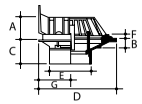
All dimensions in mm unless otherwise stated

G - Grey B - Black W - White

100P Push-Fit Large Diameter

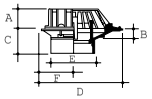
Balcony Outlets



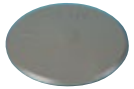


Size (mm)	A	B	C	D	E*	F	G		Code
BALCONY OUTLET Grey only -For screed-finished balconies Connects to 82mm round downpipe can be reduced via socket Adaptors – 2173.3.25 for 68mm round pipe When used induvidually or at top of multi-storey building, use 9995.3 Blanking Cap *Min size hole for roof slab									
	82	48	27	59	170	94	13	68	2172.3





Size (mm)	A	B	C	D	E*	F		Code
BALCONY OUTLET Grey only -For asphalt-finished balconies Details as 2172.3 *Min size hole for roof slab								
	82	48	27	59	170	94	68	2174.3



	Colour	Code
CAP FOR BALCONY OUTLET -For use with 2173.3.25 and 2273.23 when used singly or at top of multi-storey building		
	G	9995.3



	Colour	Code
SPARE GRID FOR BALCONY OUTLET -for 2172		
	G	9990



	Colour	Code
SPARE GRID FOR FLAT ROOF OUTLET -for 2170		
	G	9981



	Colour	Code
SPARE GRID FOR DOMED ROOF OUTLET -for 2171		
	G	9980

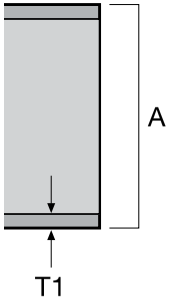
100P Push-Fit Large Diameter PVC-u



200 and 250mm PVC-u soil pipe and fittings:

- Wide range of bends, branches and access fittings
- Manufactured in accordance with BS EN 1329

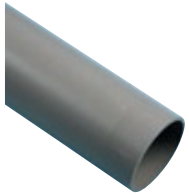
200 and 250mm PVC-u soil pipe and fittings	
A	T1
200mm	4.9mm
250mm	6.2mm

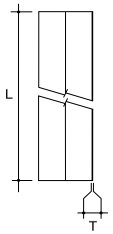


All dimensions in mm unless otherwise stated

G - Grey B - Black W - White

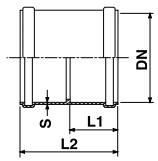
100P Push-Fit Large Diameter PVC-u





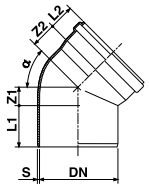
Size (mm)	L	T	Colour	Code
SOIL PIPE - Plain ended pipe				
200	4m	4.9	G	100.8.40
250	4m	6.2	G	100.10.40





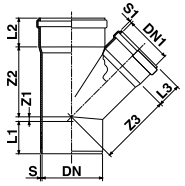
DN	S	L1	L2	Colour	Code
STRAIGHT COUPLER - All Socket					
200	4.4	106	217	G	110P.8
250	5.5	123	254	G	110P.10





DN	Angle°	S	Z1	Z2	L1	L2	Colour	Code
SPIGOT SOCKET BEND								
200	135	4.9	46	64	100	84	G	107P.8.135
250	135	6.2	58	79	125	96	G	107P.10.135

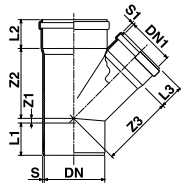




DN	DN1	S	S1	Z1	Z2	Z3	L1	L2	L3	Colour	Code
ALL SOCKET BRANCH EQUAL											
200	200	4.9	-	45	256	256	100	81	81	G	104P.8.135
250	250	6.2	-	57	311	311	134	101	101	G	104P.10.135

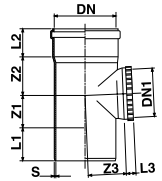
100P Push-Fit Large Diameter PVC-u

DN	DN1	S	S1	Z1	Z2	Z3	L1	L2	L3	Colour	Code
SINGLE BRANCH SPIGOT OUTLET UNEQUAL											
200	110	4.9	3.2	17	191	200	100	86	56	G	104P.84.135
200	160	4.9	4.0	18	228	232	100	86	74	G	104P.86.135
250	160	6.2	4.0	3	250	261	131	103	74	G	104P.106.135
250	200	6.2	4.9	24	275	280	134	103	86	G	104P.108.135



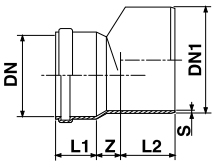


DN	DN1	S	Z1	Z2	Z3	L1	L2	L3	Colour	Code
ACESS PIPE AND COVER										
200	200	4.9	105	119	119	100	86	28	G	139P.8
250	250	6.2	120	152	152	135	101	70	G	139P.10





DN	S	Z	L1	L2	Colour	Code
REDUCERS						
200/110	4.6	40	60	59	G	124P.8.4
200/160	4.9	39	74	100	G	124P.8.6
250/110	6.1	7	56	90	G	124P.10.4
250/160	6.2	66	73	125	G	124P.10.6
250/200	6.2	39	96	134	G	124P.10.8





100P Soil System - PVC-u (Push-Fit)



82, 110 and 160mm PVC-u soil pipes and fittings for Push-Fit jointing:

82, 110 and 160mm pipe and fittings (Fig.2)				
A	D	E	T1	T2
82	100	50	3.2	3.2
110	132	58	3.4	3.4
160	189	70	4.1	4.1

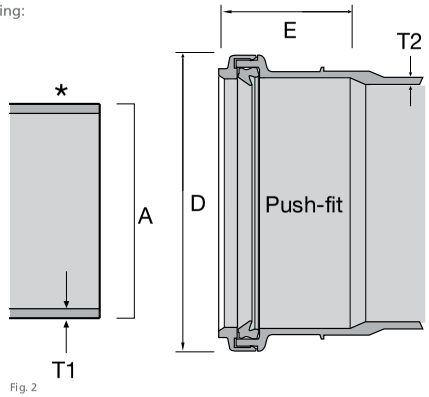
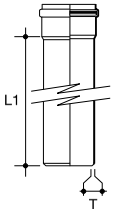


Fig. 2

* Some Terrain fittings feature a groove here, as shown on the underside.

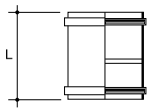
Terrain Soil System - 100P Push-Fit

	Size (mm)	L1	T (min)	Colour	Code
SOIL PIPE - single socket ended					
	82	3m	3.2	G	100P3.30
	82	4m	3.2	G	100P3.40
	110	3m	3.2	GB	100P4.30
	110	4m	3.2	GB	100P4.40
	160	3m	3.3	G	100P6.30
	160	3m	3.3	G	100P6.40



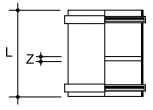


	Size (mm)	L	Colour	Code
SLIP COUPLER DOUBLE SOCKET				
	82	134	G	111.S.3
	110	144	GB	111.S.4
	160	210	G	111.S.6



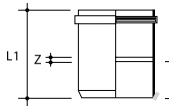


	Size (mm)	L	Z	Colour	Code
STRAIGHT COUPLER DOUBLE SOCKET - with central stop					
	82	103	6	G	110P.3
	110	129	6	GB	110P.4
	160	188	10	G	110P.6



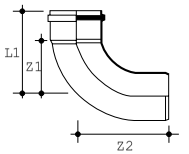


	Size (mm)	L1	L2	Z	Colour	Code
PIPE END SOCKET/SPIGOT						
	82	91	39	4	G	111P.3
	110	107	48	3	GB	111P.4



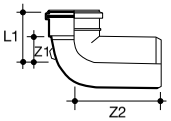


	Size (mm)	Angle°	L1	Z1	Z2	Colour	Code
SWEPT BEND SPIGOT/SOCKET							
	82	92½	149	109	161	G	101P.3.92
	110	92½	142	85	145	GB	101P.4.92
	160	92½	215	135	215	G	101P.6.92
	110	112½	152	104	184	G	101P.4.112
	82	135	76	36	89	G	107P.3.135
	110	135	89	42	119	GB	107P.4.135
	160	135	140	60	130	G	107P.6.135





	Size (mm)	Angle°	L1	Z1	Z2	Colour	Code
TIGHT RADIUS BEND SPIGOT/SOCKET							
	110	92½	113	65	197	G	107P.4.92



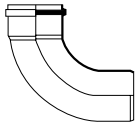


All dimensions in mm unless otherwise stated

G - Grey B - Black W - White

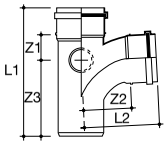
Terrain Soil System - 100P Push-Fit





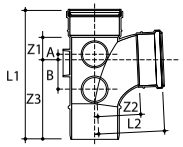
Size (mm)	Angle°	Colour	Code
2 PART VARIBLE BEND			
110	20-87½	G	107P.4.VAR





Size (mm)	Angle°	L1	L1	Z1	Z2	Z3	Colour	Code
SINGLE BRANCH SPIGOT OUTLET - with spigot bosses, 2 boss horns								
82	92½	225	125	54	85	131	G	104P.3.92

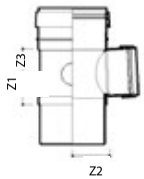




Size (mm)	Angle°	L1	L1	Z1	Z2	Z3	A	B	Colour	Code
SINGLE BRANCH SPIGOT OUTLET - with spigot bosses, 5 boss horns										
110	92½	278	152	58	96	164	19	57	GB	104P.4.92
160	92½	440	242	90	155	260			G	104P.6.92

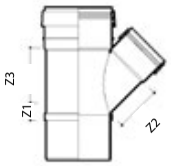
Size (mm)	Angle°	L1	L1	Z1	Z2	Z3	A	B	Colour	Code
SINGLE BRANCH SPIGOT OUTLET - with spigot bosses, 2 boss horns										
110	112½	349	165	95	95	184			G	104P.4.112





Size (mm)	Z1	Z2	Z3	Colour	Code
SINGLE BRANCH UNEQUAL SPIGOT OUTLET - 2 boss horns					
160	75	87	62	G	104P.64.92

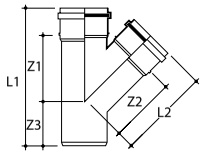




Size (mm)	Z1	Z2	Z3	Colour	Code
SINGLE BRANCH UNEQUAL SPIGOT OUTLET					
160	14	173	163	G	104P.64.135

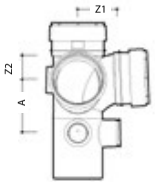
Terrain Soil System - 100P Push-Fit

Size (mm)	Angle°	L1	L2	Z1	Z2	Z3	Colour	Code
SINGLE EQUAL BRANCH PLAIN - no boss connections								
82	135	269	180	97	102	94	G	104P.3.135
110	135	328	215	168	168	113	G	104P.4.135
160	135	412	270	245	195	92	G	104P.6.135



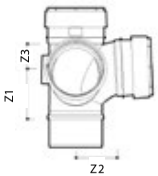


Size (mm)	A	Z1	Z2	Colour	Code
CORNER BOSS BRANCH					
110	157	119	55	G	106E.490.12



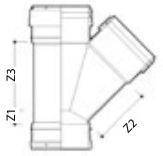


Size (mm)	Z1	Z2	Z3	Colour	Code
CORNER BRANCH SPIGOT OUTLET					
110	101	84	50	G	106P.490.92



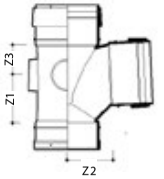


Size (mm)	Angle	Z1	Z2	Z3	Colour	Code
SINGLE BRANCH SOCKET OUTLET						
110	135	27	136	137	G	104E.4.135





Size (mm)	Angle	Z1	Z2	Z3	Colour	Code
BRANCH SOCKET OUTLET						
110	92	87	81	56	G	104E.4.92



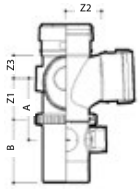


All dimensions in mm unless otherwise stated

G - Grey B - Black W - White

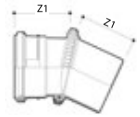
Terrain Soil System - 100P Push-Fit





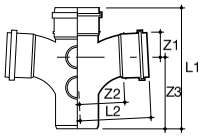
Size (mm)	A	B	Z1	Z2	Z3	Colour	Code
SINGLE EQUAL BRANCH VARIABLE BOSS							
110	146	149	96	86	57	G	104E.412.92





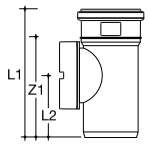
Size (mm)	Z1	Z2	Colour	Code
ADJUSTABLE BEND SPIGOT OUTLET				
110	106	87	G	107P4.025





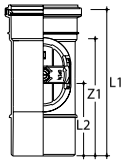
Size (mm)	Angle°	L1	L2	Z1	Z2	Z3	Colour	Code
DOUBLE EQUAL BRANCH SPIGOT OUTLET								
110	92.5	287	172	66	124	173	G	106P4.92





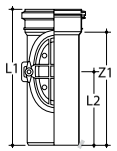
Size (mm)	L1	L2	Z1	Colour	Code
ACCESS PIPE AND COVER SINGLE SOCKET					
83	193	97	153	G	139P.3





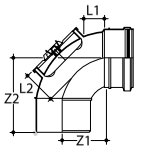
Size (mm)	L1	L2	Z1	Colour	Code
ACCESS PIPE AND COVER SINGLE SOCKET					
110	222	114	175	GB	139P.4





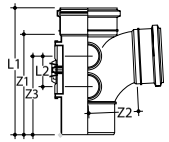
Size (mm)	L1	L2	Z1	Colour	Code
ACCESS PIPE AND COVER SINGLE SOCKET Access door aperture size: 172 x 130mm diameter - secured by 2 scews					
160	366	198	305	G	139P.6

Terrain Soil System - 100P Push-Fit



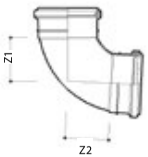


Size (mm)	Angle°	L1	L2	Z1	Z2	Colour	Code
ACCESS BEND SINGLE SOCKET Access door aperture size: 110 x 80mm diameter - secured by locking mechanism (use self tapping screw for anti-vandal							
110	92½	41	69	91	157	GB	103P.4.92



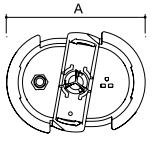


Size (mm)	L1	L2	Z1	Z2	Z3	Colour	Code
ACCESS BEND SINGLE EQUAL BRANCH SINGLE OUTLET - with waste bosses, 4 boss horns. Access door aperture size: 114 x 80mm diameter - secured by locking							
82	225	-	176	74	131	G	105P.3.92
110	136	74	87	105	172	G	105P.4.92



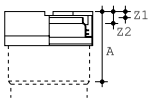


Size (mm)	Angle	Z1	Z2	Colour	Code
DOUBLE SOCKET BEND					
110	92.5	89	145	G	101D.4.92





A	Colour	Code
ACCESS DOOR WITH TEST NIPPLE - standard oval access door with test nipple for manometer connection		
127	GB	6592/DVW





Size (mm)	A	Z1	Z2	Colour	Code
ACCESS PIPE AND COVER SINGLE SOCKET Access door aperture size: 172 x 130mm diameter - secured by 2 scews					
82	81	26	13	G	136P.3
110	102	34	10	GB	136P.4
160	134	34	10	G	136P.6

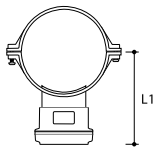
All dimensions in mm unless otherwise stated

G - Grey B - Black W - White

Terrain Soil System - 100P Push-Fit

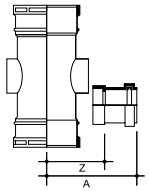
NEW - Now allows back-to-back dual connection of similar and/or dissimilar pipe diameters.





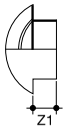
Size (mm)	L1	Hole Saw Ø	Colour	Code
STRAP-ON BOSS - for waste pipe				
110/32	116	60 (part no. 9105.237)	GB	112P.4.125
110/40	116	60 (part no. 9105.237)	GB	112P.4.15
110/50	120	60 (part no. 9105.237)	GB	112P.4.2





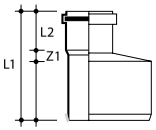
Use on Stack Size (mm)	A†	Z†	Hole Saw Ø	Colour	Code
BOSS ADAPTORS STRAIGHT - for waste pipe					
82 - 160	107	61	51	GB	117.125
82 - 160	107	61	51	GB	117.15
82 - 160	107	61	51	GB	117.2





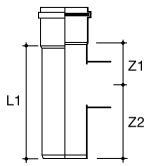
Size (mm)	Z1	Hole Saw Ø	Colour	Code
ADAPTOR SADDLES - for 40mm waste pipe				
110/40	29	51	G	115P.4





Size (mm)	L1	L2	Z1	Colour	Code
LEVEL INVERT TAPER					
82/50	117	44	15	G	124P3.2
110/50	136	45	16	GB	124P4.2
110/82	140	55	18	G	124P4.3
160/110	233	75	44	G	124P6.4

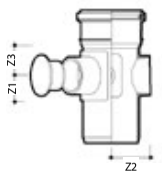




Size (mm)	Z1	Z2	Z3	Colour	Code
SHORT BOSSED PIPE					
82	145	48	97	G	123P.3
110	212	43	110	GB	123P.4

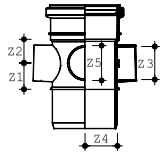
Terrain Soil System - 100P Push-Fit

Size (mm)	Z1	Z2	Z3	Colour	Code
82mm BOSS PIPE RING SEAL					
82	30	57	46	G	123P.312



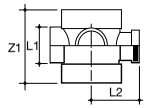


Size (mm)	Z1	Z2	Z3	Z4	Z5	Colour	Code
FOUR-WAY BOSS PIPE PUSH-FIT SOCKET/SPIGOT - 2 boss horns							
110	44	40	56	55	59	G	120P.412.2



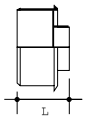


Size (mm)	L1	L2	Z1	Colour	Code
TRIPLE BOSS COLLAR					
110	44	40	56	GB	120P4.15





Size (mm)	L	Colour	Code
SOCKET PLUG			
110	69	GB	130.4
160	92	G	130.6

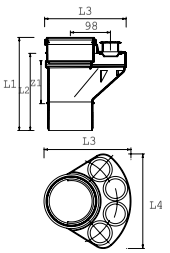




Size (mm)	L1	L2	L3	L4	Z1	Colour	Code
UNIVERSAL SOIL MANIFOLD - for Push-Fit waste connections, for solvent waste connections see page 11							
110	228	189	199	217	105	G	119P4.15

For connection of BS EN 1566/BS 5255 32mm and 40mm waste pipes at floor level. Incorporates 4 inlets to accept 32mm or 40mm waste pipes without need for adaptors. Use with Swivel Elbow or Swept Bend. Complete with 4 sealing gaskets and 3 removable plugs.
For solvent waste connections see page 11.

Refer to page 12 for bracketing options.
Bracketry available to both solvent weld and Push-Fit systems.





All dimensions in mm unless otherwise stated

G - Grey B - Black W - White

200 Waste System - MuPVC (Solvent-Weld)



Solvent-weld MuPVC system:

- 32, 40 and 50mm integrated systems
- Wide range of bends and adaptors
- Integrated floor gullies

All Terrain fittings and extrusions are manufactured to BS EN ISO 9001: 2000 certification.

32, 40 and 50mm pipe and fittings (Fig.3)					
Nom.	A	B	C	T1 (min)	T2 (min)
32mm	36	42	24	1.8	1.8
40mm	43	49	27	1.9	1.9
50mm	56	62	30	2.0	2.0

The pipe and socket illustrated here are for solvent weld jointing.

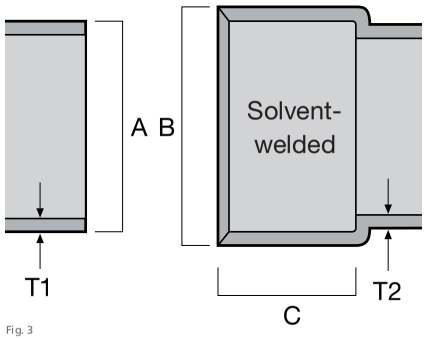
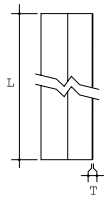


Fig. 3

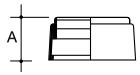
Terrain Waste System - 200 Solvent-Weld

	Size (mm)	L1	T (min)	Colour	Code
WASTE PIPE - plain-ended					
	32	3m	1.8	GW	200.125.30
	32	4m	1.8	GBW	200.125.40
	40	3m	1.9	GW	200.15.30
	40	4m	1.9	GBW	200.15.40
	50	3m	2.0	GW	200.2.30
	50	4m	2.0	GBW	200.2.40



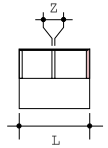


	Size (mm)	A	Colour	Code
SEAL RING ADAPTOR - to convert 50mm 207.2 spigot socket bends to expan-				
	50	65	GW	209.2



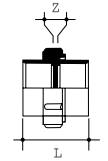


	Size (mm)	L	Z	Colour	Code
STRAIGHT COUPLER DOUBLE SOCKET					
	32	52	2	GBW	210.125
	40	58	2	GBW	210.15
	50	65	2	GBW	210.2



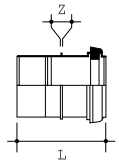


	Size (mm)	L	Z	Colour	Code
UNION DOUBLE SOCKET - threaded union for easy disconnection if required					
	32	59	8	G	211.125
	40	65	8	G	211.15
	50	73	8	G	211.2



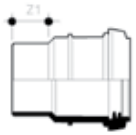


	Size (mm)	L	Z	Colour	Code
EXPANSION COUPLER SEAL RING AND SOLVENT SOCKET					
	32	67	4	GW	225.125
	40	70	4	GW	225.15
	50	77	4	GW	225.2



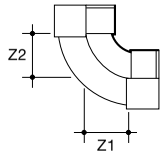


	Size (mm)	Z	Colour	Code
SPIGOT SOCKET COUPLER				
	32	27	GW	227.125
	40	30	GW	227.15
	50	35	G	227.2

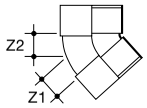




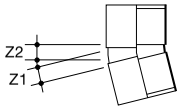
Terrain Waste System - 200 Solvent-Weld

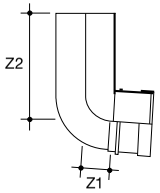



	Size (mm)	Angle°	Z2	Z2	Colour	Code
SWEPT BEND DOUBLE SOCKET - for 91¼° swept bend, 91¼°, 135° and 165° as						
♀	32	91¼	34	34	GBW	201.125.91
♀	40	91¼	38	38	GBW	201.15.91
♀	50	91¼	45	45	GBW	201.2.91

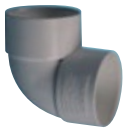
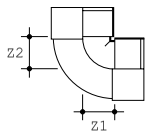



	Size (mm)	Angle°	Z2	Z2	Colour	Code
SWEPT BEND DOUBLE SOCKET - for 135° swept bend						
♀	32	135	10	10	GBW	201.125.135
♀	40	135	11	11	GBW	201.15.135
♀	50	135	14	14	GBW	201.2.135
♀	32	165	5	5	G	201.125.165
♀	40	165	5	5	G	201.15.165
♀	50	165	6	6	G	201.2.165

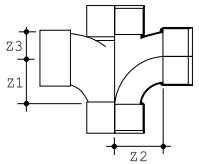


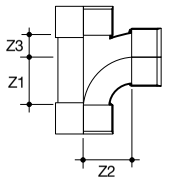
	Size (mm)	Angle°	Z2	Z2(max)	Z2(min)	Colour	Code
SPIGOT/SOCKET BENDS - to change pipe direction in limited-space situations, 91½°, 130° and 150° as standard							
	32	91½	19	92	46	GBW	207.125.92
♀	40	92½	21	95	52	GBW	207.15.92
	50	92½	29	102	64	GW	207.2.92
	32	135	8	30	-	GBW	207.125.135
	40	135	11	38	-	GBW	207.15.135
	50	135	13	46	-	GW	207.2.135
	32	150	8	52	29	GB	207.125.150
♀	40	150	9	49	33	GB	207.15.150

	Size (mm)	Angle°	Z2	Z2	Colour	Code
KNUCKLE BEND DOUBLE SOCKET						
♀	32	91¼	19	19	GBW	202.125.91
♀	40	91¼	22	22	GBW	202.15.91

	Size (mm)	Angle°	Z1	Z2	Z3	Colour	Code
SWEPT CROSS ALL SOCKET							
♀	40	91¼	44	44	20	GW	206.15.91
♀	50	91¼	51	51	25	GW	206.2.91
♀	50	135	13	71	71	G	206.2.135

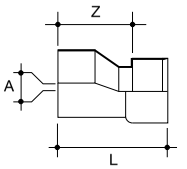



	Size (mm)	Angle°	Z1	Z2	Z3	Colour	Code
SWEPT TEE ALL SOCKET - 91¼°, 135° and 165° as standard							
♀	32	91¼	30	30	19	GBW	204.125.91
♀	40	91¼	32	35	22	GBW	204.15.91
♀	50	91¼	43	43	29	GBW	204.2.91
♀	32	135	8	48	48	GW	204.125.135
♀	40	135	10	57	57	GW	204.15.135
♀	50	135	13	71	71	GBW	204.2.135

All dimensions in mm unless otherwise stated

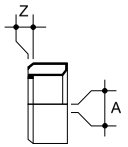
Terrain Waste System - 200 Solvent-Weld

	Size (mm)	A	L	Z	Colour	Code
LEVEL INVERT TAPER - to reduce socket of any standard fitting to accept a smaller size pipe. Larger end spigot and smaller end socket						
	40/32	4	73	47	GW	223.15.125
♀	50/32	10	98	73	GW	223.2.125
♀	50/40	7	62	62	GW	223.2.15



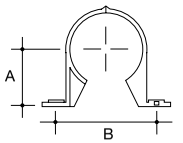


	Size (mm)	A	Z	Colour	Code
SOCKET REDUCER					
♀	40/32	0	3	GBW	224.15.125
♀	50/32	7	6	GBW	224.2.125
♀	50/40	4	3	GBW	224.2.15



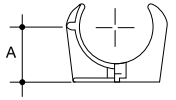


	Size (mm)	A	B	Colour	Code
PIPE FIXING CLIP					
	32	33	54	GBW	240.125
	40	37	60	GBW	240.15
	50	43	76	GBW	240.2



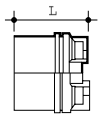


	Size (mm)	A	B	Colour	Code
EXPANSION FITTING FIXING CLIP - to secure control thermal expansion at regular points along pipework					
	32	33	54	GW	242.125
	40	37	60	W	242.15
	50	43	76	GW	242.2



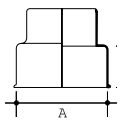


	Size (mm)	L	Colour	Code
ACCESS PLUG				
	32	47	GBW	237.125
♀	40	54	GBW	237.15
	50	56	GBW	237.2





	Size (mm)	A	B	Colour	Code
WEATHERING APRON					
	50	76	38	G	231.2

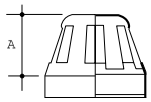




G - Grey B - Black W - White

Terrain Waste System - 200 Solvent-Weld





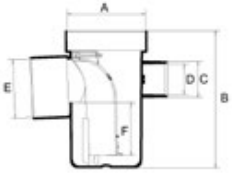
Size (mm)	A	Colour	Code
VENT COWL			
50	34	GW	250.2





Size (mm)	A	B	L	L1	C	D	Colour	Code
AUTOMATIC AIR ADMITTANCE VALVE - allows air into waste system when negative pressure occurs, helps prevent syphonage of traps								
50	56	26	74	55	25	25	W	253.2

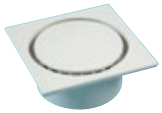


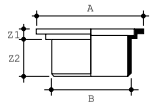


Size (mm)	A	B	C	D	E	F	Colour	Code
TRAPPED FLOOR GULLY - under-floor trap (e.g. for shower areas) with 3 sockets to accept 40mm or 50mm waste pipe e.g. for shower and wash down								
110/82	110	169	51	43	82	50	GT	281.43
160/110	160	169	51	43	110	50	GT	281.64
110/82	110	194	64	56	82	75	GT	279.432*

*2" Inlets only. Refer to page 33 for socket reducers if required

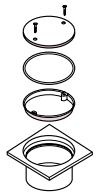
Seal depth: 50-75mm. Cleaning access via removable baffle with integral gasket to maintain airtight seal.





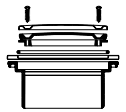
Size (mm)	A	B	Z1	Z2	Colour	Code
FLOOR GULLY INLETS - two part fitting to be set in standard-tiled floor (e.g. in shower areas). Comprises of raising piece with 50mm top and snap-in cover						
110 PVC	50 x 150	110	14	48	GW	282.6
110 SS	50 x 150	110	14	48	Self	283.6





Size (mm)	Colour	Code
SEALED GULLY RAISING PIECE		
110	GW	284.6



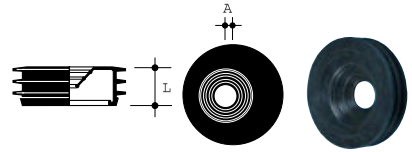


Size (mm)	Colour	Code
SEALED GULLY RAISING PIECE		
110	Self	285.6

Terrain Waste System - 200 Solvent-Weld

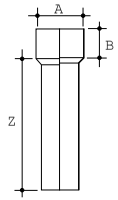
Size (mm)	A	L	Colour	Code
ADAPTOR TO UNDERGROUND DRAIN - push-fit connection into pipes with nominal 100mm bore, external use only				
32/40/50	8	40	B	4DW200

Note: As a Terrain Underground product different discount structure applies.



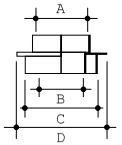
Size (mm)	A	B	Z	Colour	Code
POST FORMED STOCKET - supplied with seal ring					
50	70	42	358	G	226.2

Note: Use with 9132.2



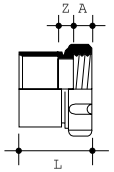


Size (mm)	A	B	C	D	Colour	Code
CAULKING BUSH - for connecting MuPVC waste pipe to 50mm socket of other material.						
32/42/50	43	36	56	70	G	232



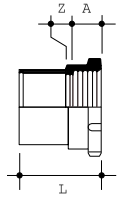


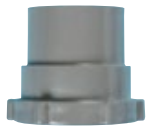
Size (mm)	A	L	Z	Colour	Code
REVERSE NUT ADAPTOR - for solvent-weld connection of MuPVC waste pipe (or waste fitting) to BSP male threaded fitting or pipe					
32/32	15	50	11	W	218.125
40/40	15	53	11	W	218.15





Size (mm)	A	L	Z	Colour	Code
200 WASTE TO MALE IRON - socket and threaded socket - for solvent-weld connection of MuPVC waste pipe or fitting to BSP threaded male pipe or fitting					
32/32	23	51	3	G	212.125
40/40	23	54	3	G	212.15
50/50	23	57	3	G	212.2

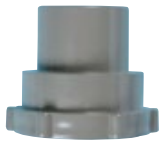


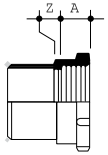


All dimensions in mm unless otherwise stated

G - Grey B - Black W - White

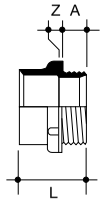
Terrain Waste System - 200 Solvent-Weld





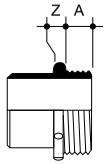
Size (mm)	A	Z	Colour	Code
200 WASTE TO MALE IRON - spigot and threaded socket - for solvent-weld connection of MuPVC waste pipe or fitting to BSP threaded male pipe or fitting				
32/32	23	3	G	216.125
40/40	23	3	G	216.15
50/50	23	3	G	216.2





Size (mm)	A	L	Z	Colour	Code
200 WASTE TO FEMALE IRON - socket and threaded socket - for solvent-weld connection of MuPVC waste pipe or fitting to BSP threaded female pipe or fitting					
32/32	19	48	3	G	213.125
40/40	19	51	3	GW	213.15
50/50	19	54	3	GW	213.2





Size (mm)	A	Z	Colour	Code
200 WASTE TO FEMALE IRON - spigot and threaded socket - for solvent-weld connection of MuPVC waste pipe or fitting to BSP threaded female pipe or fitting				
32/32	19	6	G	217.125
40/40	19	6	G	217.15
50/50	19	6	GW	217.2

All dimensions in mm unless otherwise stated

G - Grey B - Black W - White

300 Waste System - Polypropylene (Push-Fit)



Push-fit polypropylene system:

- 32, 40 and 50mm integrated systems
- Quick and easy to install
- Saves time and labour costs
- Resistant to most oils, bleaches and detergents
- Wide range of bends and fittings

32, 40 and 50mm pipe and fittings (Fig.4)					
Nom.	A	D	E	T1 (min)	T2 (min)
32mm	35	41	20	1.8	1.8
40mm	41	47	23	1.9	1.9
50mm	54	61	29	2.0	2.0

* Some Terrain fittings feature a groove here, as shown on the underside.

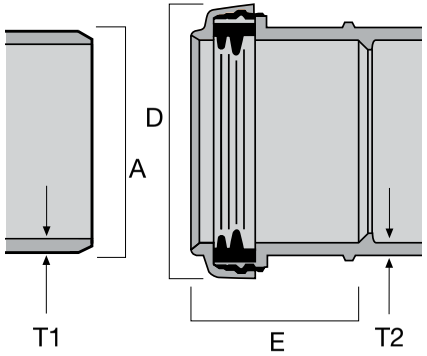
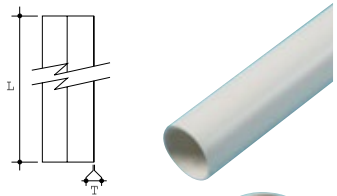


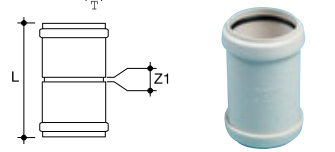
Fig. 4 Seal ring jointing

Terrain Waste System - 300 Push-Fit

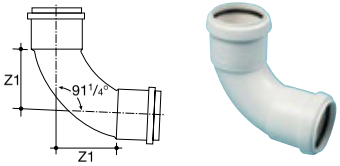
Size (mm)	L	T (min)	Colour	Code
WASTE PIPE - plain-ended				
32	3m	1.8	GBW	300.125.30
40	3m	1.9	GBW	300.15.30
50	3m	2	G	300.2.30



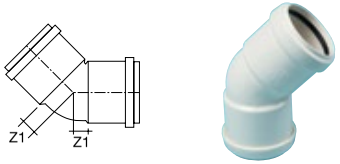
Size (mm)	L	Z1	Colour	Code
STRAIGHT COUPLER DOUBLE SOCKET				
32	80	2	GBW	310.125
40	80	2	GBW	310.15
50	70	2	G	310.2



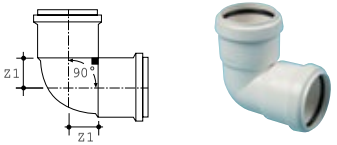
Size (mm)	Angle°	Z1	Colour	Code
SWEPT BEND DOUBLE SOCKET - for 91¼° swept bend, 91¼° and 135° as				
32	91¼	55	GBW	301.125.91
40	91¼	55	GBW	301.15.91
50	91¼	65	G	301.2.91



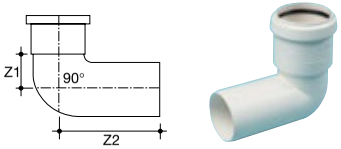
Size (mm)	Angle°	Z1	Colour	Code
SWEPT BEND DOUBLE SOCKET - for 135° swept bend, 91¼° and 135° as				
32	135	10	GBW	301.125.135
40	135	11	GBW	301.15.135
50	135	14	G	301.2.135



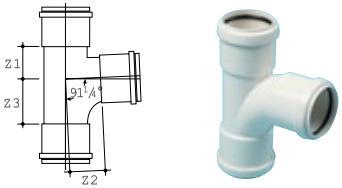
Size (mm)	Angle°	Z1	Colour	Code
KNUCKLE BEND 90° DOUBLE SOCKET				
32	90	20	GBW	302.125.90
40	90	23	GBW	302.15.90
50	90	28	G	302.2.90



Size (mm)	Angle°	Z1	Z2	Colour	Code
SWIVEL ELBOW BEND 90° SINGLE SOCKET/SPIGOT					
32	90	30	60	GW	307.125.90
40	90	25	60	GW	307.15.90



Size (mm)	Angle°	Z1	Z2	Z3	Colour	Code
SWEPT TEE 91¼°						
32	91¼	25	30	35	GBW	304.125.91
40	91¼	30	33	40	GBW	304.15.91
50	91¼	35	40	46	G	304.2.91

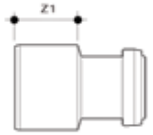


All dimensions in mm unless otherwise stated

G - Grey B - Black W - White

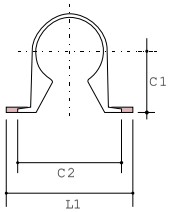
Terrain Waste System - 300 Push-Fit





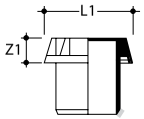
Size (mm)	Z1	Colour	Code
LEVEL INVERT TAPER - to reduce waste socket to accept smaller diameter waste			
40/32	35	GBW	323.15.125
50/32	35	G	323.2.125
50/40	35	G	323.2.15





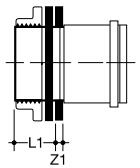
Size (mm)	L1	C1	C2	Colour	Code
PIPE AND FITTING CLIP					
32	70	34	54	GBW	340.125
40	77	37	61	GBW	340.15
50	60	51	22	G	340.2





Size (mm)	L1	Z1	Colour	Code
ACCESS PLUG				
32	55	17	GW	337.125
40	49	17	GBW	337.15
50	59	10	G	337.2





Size (mm)	L1	Z1	Colour	Code
TANK CONNECTOR - for connecting push-fit polypropylene pipe to water tank, supplied with 2 sealing washers				
32	24	7	GW	311.125
40	24	7	GW	311.15
50	25	7	G	311.2

All dimensions in mm unless otherwise stated

G - Grey B - Black W - White

400 Traps System

As part of Terrain All Round Drainage Solutions, a comprehensive new range of traps and pan connectors has been introduced. All products are manufactured in the UK and carry the kitemark.



Polypropylene traps

- Range of 40 traps
- 32mm & 40mm polypropylene traps
- Premium quality
- Kitemarked
- Manufactured to BS 3943
- Manufactured in the UK
- Pipe stiffener with every trap
- Range includes telescopic and anti siphon traps

Pan connectors

- Wide range of 30 pan connectors
- Push-Fit and solvent weld
- Premium quality
- Kitemarked
- Manufactured to BS 3943
- Manufactured in the UK
- Range includes variable degree and offset connectors

32, and 40mm sockets (Fig.5)		
Size	A	B (min)
32mm	55	42
40mm	65	49

Tubular 'S' traps limits (Fig.5a) (trap folded)		
Part no.	C (max)	C (min)
432.125	136	50
432.15	150	60

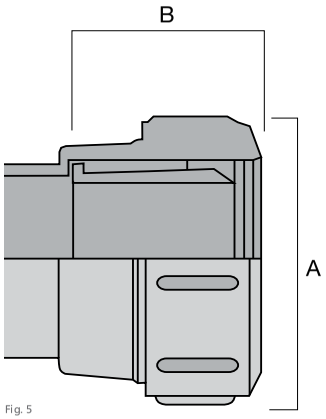


Fig. 5

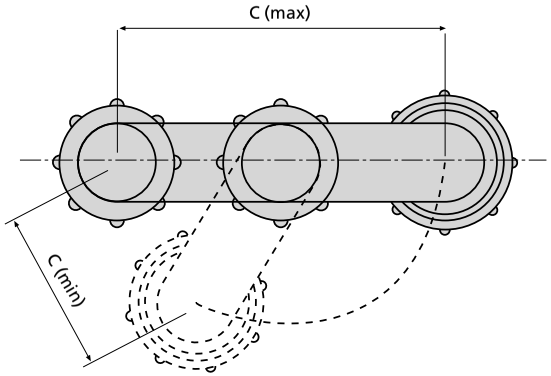
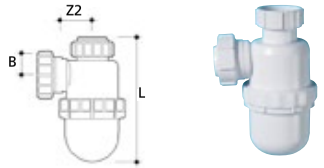


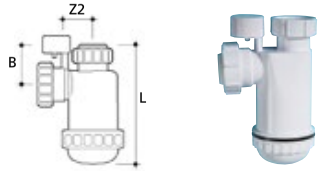
Fig. 5a

Terrain Traps System - Waste Traps 400

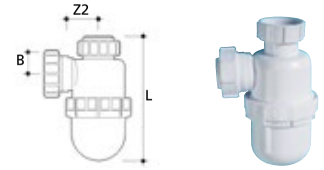
	Size (mm)	Z2	B	L	Colour	Code
BOTTLE TRAP - 75mm water seal						
	32	39	26	152	W	411.125
	40	40	33	160	W	411.15



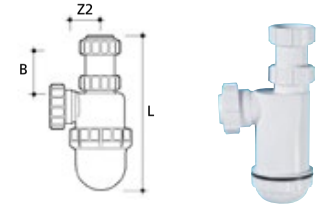
	Size (mm)	Z2	B	L	Colour	Code
BOTTLE TRAP ANTI-SYPHON - 75mm water seal						
	32	39	26	155	W	411AS.125
	40	40	33	163	W	411AS.15



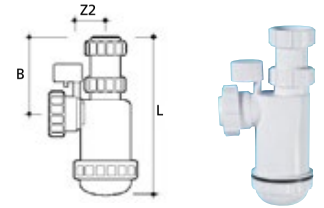
	Size (mm)	Z2	B	L	Colour	Code
RESEALING BOTTLE TRAP - 75mm water seal						
	32	39	26	151	W	415.125
	40	40	33	163	W	415.15



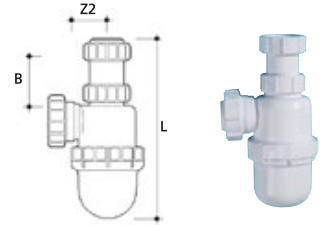
	Size (mm)	Z2	B	L	Colour	Code
BOTTLE TRAP - ADJUSTABLE TELESCOPIC - 75mm water seal						
	32	39	26	168 - 268	W	411T.125
	40	40	33	173 - 272	W	411T.15



	Size (mm)	Z2	B	L	Colour	Code
BOTTLE TRAP ANTI-SYPHON - ADJUSTABLE TELESCOPIC - 75mm water seal						
	32	39	26	168 - 268	W	421AS.125
	40	40	33	173 - 272	W	421AS.15



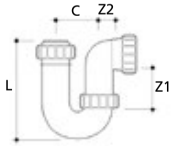
	Size (mm)	Z2	B	L	Colour	Code
RESEALING BOTTLE TRAP - ADJUSTABLE TELESCOPIC - 75mm water seal						
	32	39	26	168 - 268	W	421.125
	40	40	33	173 - 272	W	421.15



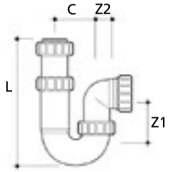
All dimensions in mm unless otherwise stated

G - Grey B - Black W - White

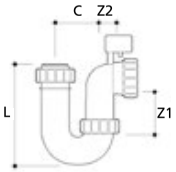
Terrain Traps System - Waste Traps 400

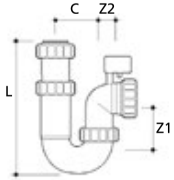
Size (mm)	L	C	Z1	Z2	Colour	Code
TUBULAR SWIVEL P TRAP - 75mm water seal						
32	135	57	57	24	W	431.125
40	140	64	64	30	W	431.15

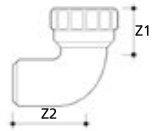
Size (mm)	L	C	Z1	Z2	Colour	Code
TUBULAR SWIVEL P TRAP - ADJUSTABLE TELESCOPIC - 75mm water seal						
32	142 - 242	57	57	24	W	431T.125
40	150 - 250	64	64	30	W	431T.15

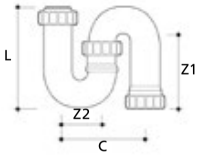
Size (mm)	L	C	Z1	Z2	Colour	Code
TUBULAR SWIVEL P TRAP ANTI-SYPHON - 75mm water seal						
32	135	57	57	24	W	431AS.125
40	140	64	64	30	W	431AS.15

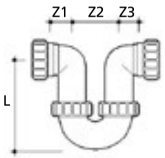
Size (mm)	L	C	Z1	Z2	Colour	Code
TUBULAR SWIVEL P TRAP ANTI-SYPHON - ADJUSTABLE TELESCOPIC 75mm water seal						
32	142 - 242	57	57	24	W	431TAS.125
40	150 - 250	64	64	30	W	431TAS.15

Size (mm)	Z1	Z2	Colour	Code
P TO S TRAP CONVERSION BEND - to convert tubular P traps to S traps				
32	54	86	W	407.125.90
40	60	90	W	407.15.90

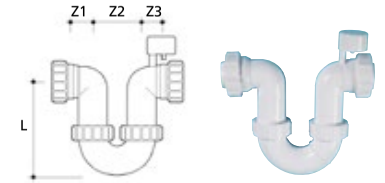
Size (mm)	L	C	Z1	Z2	Colour	Code
TUBULAR SWIVEL S TRAP - 75mm water seal						
32	135	111	54	57	W	432.125
40	142	127	61	64	W	432.15

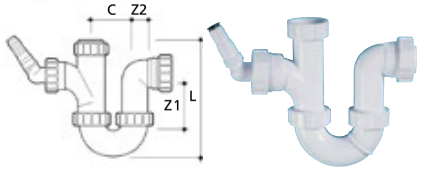
Size (mm)	L	Z1	Z2	Z3	Colour	Code
RUNNING TRAP - 75mm water seal						
32	118	28	60	28	W	445.125
40	124	30	64	30	W	445.15

All dimensions in mm unless otherwise stated

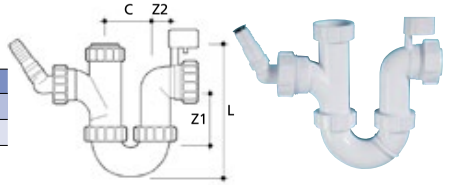
Terrain Traps System - Waste Traps 400



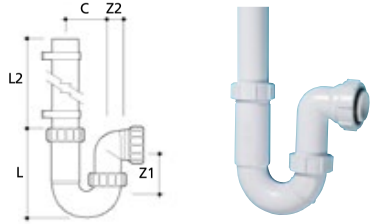
Size (mm)	L	Z1	Z2	Z3	Colour	Code
RUNNING TRAP ANTI-SYPHON - 75mm water seal						
32	118	28	60	28	W	445AS.125
40	124	30	64	30	W	445AS.15



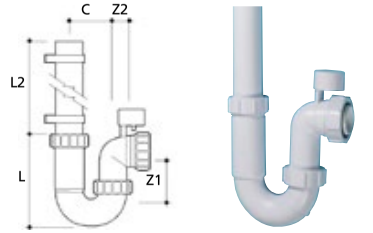
Size (mm)	L	C	Z1	Z2	Colour	Code
WASHING MACHINE HALF TRAP - 75mm water seal with adaptor						
40	164	57	64	24	W	433.15



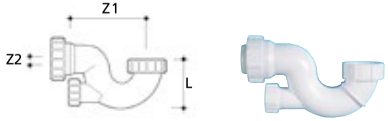
Size (mm)	L	C	Z1	Z2	Colour	Code
WASHING MACHINE HALF TRAP ANTI-SYPHON - 75mm water seal with						
40	164	57	64	24	W	433AS.15



Size (mm)	L	L2	C	Z1	Z2	Colour	Code
WASHING MACHINE TRAP WITH UPSTAND - 75mm water seal with 0.6m upstand							
40	600	126	57	64	24	W	434.15



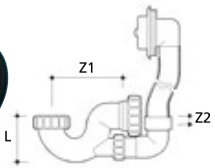
Size (mm)	L	L2	C	Z1	Z2	Colour	Code
WASHING MACHINE TRAP ANTI-SYPHON WITH UPSTAND - 75mm water seal with 0.6m upstand and 2 clips							
40	600	126	57	64	24	W	434AS.15



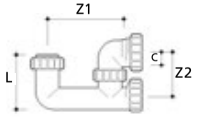
Size (mm)	L	Z1	Z2	Colour	Code
BATH TRAP WITH CLEANING EYE - 20mm water seal					
40	65	102	12	W	455.15

G - Grey B - Black W - White

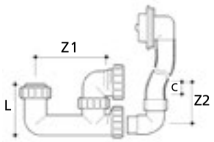
Terrain Traps System - Waste Traps 400

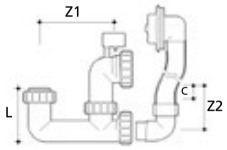
Size (mm)	L	Z1	Z2	Colour	Code
BATH TRAP C/W OVERFLOW HOSE AND CP ROSE - 20mm water seal					
40	65	102	12	W	456.15

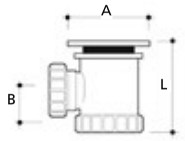
Size (mm)	L	C	Z1	Z2	Colour	Code
LOW LEVEL BATH TRAP - 38mm water seal						
40	85	21	120	70	W	457.15

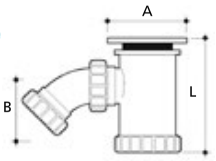
Size (mm)	L	C	Z1	Z2	Colour	Code
LOW LEVEL BATH TRAP C/W OVERFLOW HOSE AND CP ROSE - 38mm water						
40	85	21	120	70	W	459.15

Size (mm)	L	C	Z1	Z2	Colour	Code
LOW LEVEL BATH TRAP ANTI-SYPHON C/W OVERFLOW HOSE AND CP ROSE - 75mm water seal						
40	85	58	120	102	W	451.15

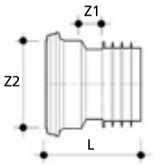
Size (mm)	A	B	L	Colour	Code
SHOWER TRAP - 19mm water seal, 70mm grid					
40	88	40	99	W	482.15
40	88	40	99	C/P	483.15

Size (mm)	A	B	L	Colour	Code
SHOWER TRAP WITH 45° ADJUSTABLE WASTE - 50mm water seal, 70mm					
40	88	64	129	W	484.15
40	88	64	129	C/P	486.15

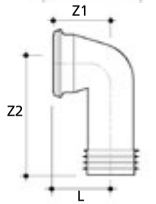
Terrain Traps System - WC Pan Connectors 490

Size (mm)	L	Z1	Z2	Colour	Code
STRAIGHT WC CONNECTOR FIN SEAL					
110	127	30	114	W	499P4.00



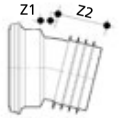


Size (mm)	Angle°	L	Z1	Z2	Colour	Code
90° WC CONNECTOR FIN SEAL BEND						
110	90	118	116	250	W	499P4.90



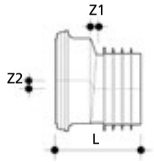


Size (mm)	Angle°	Z1	Z2	Colour	Code
14° WC CONNECTOR FIN SEAL SPIGOTS					
110	14	15	81	W	499P4.104



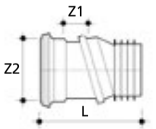


Size (mm)	L	Z1	Z2	Colour	Code
40MM OFFSET WC CONNECTOR FIN SEAL					
110	131	33	40	W	494P1.4.00
12MM OFFSET WC CONNECTOR FIN SEAL					
110	117	11	12	W	494P2.4.00



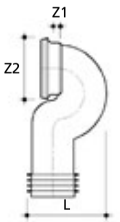


Size (mm)	Angle°	Colour	Code
SWIVEL CONNECTOR 0-30° FIN SEAL			
110	0-30	W	498P4.030



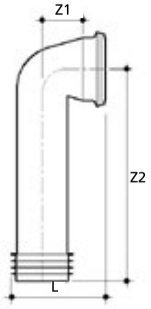


Size (mm)	Angle°	L	Z1	Z2	Colour	Code
SWAN NECK WC CONNECTOR 90° FIN SEAL						
110	90	175	16	139	W	496P4.90

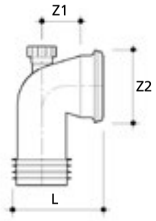




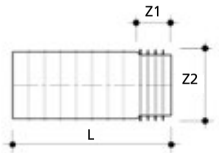
Terrain Traps System-WC Pan Connectors 490

Size (mm)	Angle°	L	Z1	Z2	Colour	Code
LONG 90° WC CONNECTOR FIN SEAL - 225mm leg						
110	90	172	74	390	W	491P.4.90

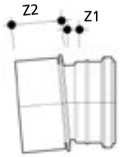
Size (mm)	Angle°	L	Z1	Z2	Colour	Code
90° WC CONNECTOR WITH BOSS FIN SEAL						
110	90	171	73	138	W	495P.4.90

Size (mm)	L	Z1	Z2	Colour	Code
EXTENSION 200MM					
110	250	54	114	W	493P.00



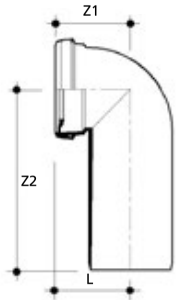

Size (mm)	Angle°	Z1	Z2	Colour	Code
WC MANIFOLD CONNECTORS FIN SEAL SPIGOT - when used in conjunction with					
110	5	14	58	W	499.4.05
110	14	19	58	W	499.4.14
110	24	24	58	W	499.4.24
110	34	26	70	W	499.4.34

Size (mm)	Angle°	Z1	Z2	Colour	Code
WC FRAME MANIFOLD BEND CONNECTORS FIN SEAL SPIGOT					
110	5	7	65	B	497.35.05
110	14	11	65	B	497.35.14
110	24	14	70	B	497.35.24
110	34	18	77	B	497.35.34
110	9	9	63	B	F497.35.09
110	18	11	67	B	F497.35.18
110	29	18	77	B	F497.35.29

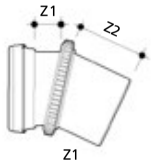
Terrain Traps System - WC Pan Connectors 490

Size (mm)	Angle°	L	Z1	Z2	Colour	Code
WC CONNECTOR 90° SPIGOT OUTLET - for connection of WC pans to existing soil or waste pipework previously connected to traditional 'S' mode pan						
110	90	150	63	240	W	499.4.90





Size (mm)	Angle°	Z1	Z2	Colour	Code
WC VARIABLE CONNECTOR VARIABLE BEND - adjustable 0-25°					
110	0-25	45	86	W	498.4.025



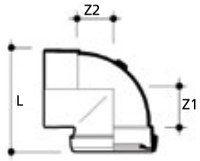


Size (mm)	Angle°	Z1	Z2	Colour	Code
WC CONNECTORS SOCKET OUTLET					
110	2½	12	101	W	498.4.02



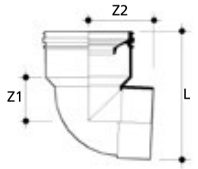


Size (mm)	Angle°	L	Z1	Z2	Colour	Code
WC CONNECTORS SOCKET OUTLET						
110	90	209	123	53	W	498.4.90



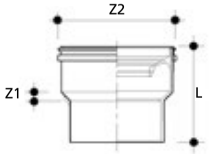


Size (mm)	Angle°	L	Z1	Z2	Colour	Code
90° WC TURNED CONNECTOR SOCKET OUTLET - for connecting non BS 5503 WC pans to soil pipes						
110	90	208	72	106	W	492.4.5





Size (mm)	L	Z1	Z2	Colour	Code
WC STRAIGHT CONNECTOR SOCKET OUTLET - for connecting non BS 5503 WC pans to soil pipes					
110	120	12	133	W	495.4.5

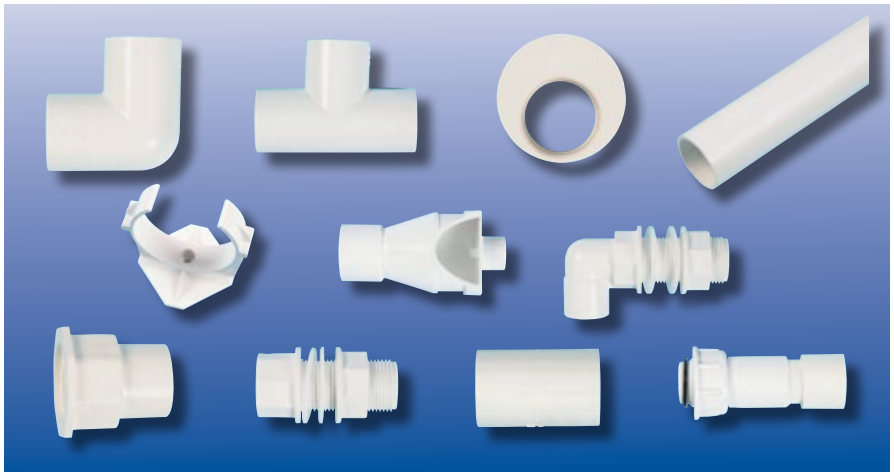




All dimensions in mm unless otherwise stated

G - Grey B - Black W - White

500 Overflow System - for Cold, Non-Pressure Water. Sockets are for Solvent-Weld Jointing



Solvent-weld PVC-u system for cold, non-pressure water:

- 19mm PVC-u pipe and fittings
- Range of tank connectors

19mm pipe and fittings (Fig.5)			
A	B	T1 (min)	T1 (max)
21	19	1.1	2.0

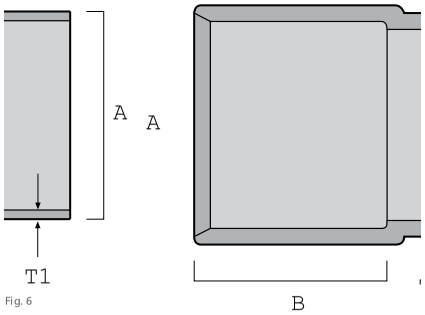
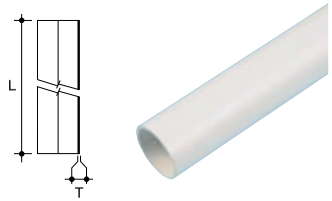


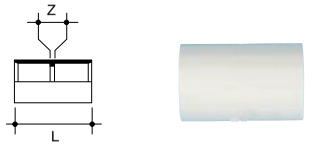
Fig. 6

Terrain Waste System - 500 Overflow

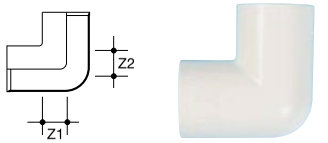
Size (mm)	L	T (min)	Colour	Code
OVERFLOW PIPE - plain-ended				
19	4m	1.1	W	500.75.40



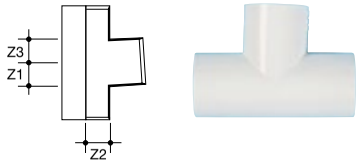
Size (mm)	L	Z	Colour	Code
STRAIGHT COUPLER DOUBLE SOCKET				
19	40	2	W	510.125



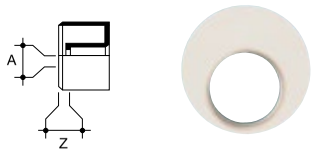
Size (mm)	Angle°	Z1	Z2	Colour	Code
BEND DOUBLE SOCKET - 91¼° and 135° as standard					
19	91¼	12	12	W	501.75.91
19	135	6	6	W	501.75.135



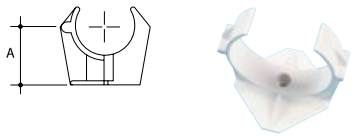
Size (mm)	Angle°	Z1	Z2	Z3	Colour	Code
BRANCH - 91¼° as standard						
19	91¼	13	13	13	W	504.75.91



Size (mm)	A	Z	Colour	Code
SOCKET REDUCER				
19/32	5	5	W	524.75

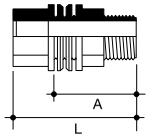


Size (mm)	A	Colour	Code
PIPE FIXING CLIP (PLASTIC)			
19/32	20	W	540.75



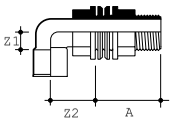
Terrain Waste System - 500 Overflow





Size (mm)	A	L	Colour	Code
STRAIGHT TANK CONNECTOR - to connect cistern/tank to overflow pipe				
19	48	69	W	511.75

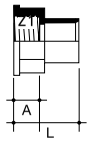




Size (mm)	Angle°	A	Z1	Z2	Colour	Code
BENT TANK CONNECTOR 90°						
19	90	48	13	32	W	502.75.90

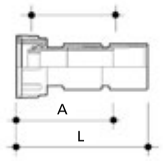
Solvent-weld socket to receive overflow pipe. Threaded socket to receive ¾"BSP male threaded pipe end.





Size (mm)	A	L	Colour	Code
BSP ADAPTOR SOLVENT-WELD SOCKET AND ¾"BSP SOCKET - to connect PVC-u overflow pipe to threaded components				
19	14	39	W	512.75

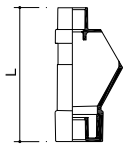




Size (mm)	A	L	Z1	Colour	Code
REVERSE NUT CONNECTOR - to connect PVC-u overflow pipe to threaded					
19	35	54	25	W	519.75

Threaded loose nut to receive ¾"BSP male threaded pipe end.





Size (mm)	L	Colour	Code
TUNDISH			
19	117	W	590.75

Accessories/Ancillaries

Size (mm)	Colour	Code
WC PAN SEAL (SOIL) - replacement seal for pan outlet diameter 95¼ - 121mm. Material: EPDM		
110	B	9124

Note: Use with 495.45 / 492.45



Size (mm)	For Fittings	Colour	Code
SPARE SEAL RINGS (SOIL) - suitable for soil system expansion sockets and soil pipe,			
110	Push-Fit Soil (P) range	B	9116.4
160	Push-Fit Soil (P) range	B	9116.6
82	109/111/111.S/126/132	B	9120
110	103/105/109/111/111.S/126/1	B	9119.B



Size (mm)	Colour	Code
SPARE SEAL RINGS (SOIL) - allows soil fittings to accept metric copper pipe to BS 2871.		
110	Red	9149



Size (mm)	Colour	Code
SPARE SEAL RING (WASTE) - 200 Waste System Fittings to accept pipe manufactured to BS 5255 and BS 5254, acceptable for copper pipe to BS 659 and BS		
32	B	9132.125
40	B	9132.15
50	B	9132.2

Note: Use with 226.2



Size (mm)	Colour	Code
MANIFOLD SEALING INSERT - Material: EPDM		
40	B	9113

Note: Use with 119.4.115



Size (mm)	Colour	Code
MANIFOLD PLUG (SPARE) - Material: Polypropylene		
40	G	9114

Note: Use with 119.4.115

Accessories/Ancillaries



Size (ml)		Colour	Code
TERRAIN ACCESSORIES - LIQUID WELD - for solvent jointing of PVC-u pipes and fittings cap, incorporates integral brush			
250	Tub	S/Steel	9100.250SW
500	Tub	S/Steel	9100.500SW



Size (ml)		Colour	Code
TERRAIN ACCESSORIES - LUBRICANT - for lubricating seal rings on expansion			
250	Tub (silicone)		9136.250L
500	Tub (Soluble)		9136.500L

Material: Silicone grease or Soluble lubricant.



Size (ml)		Colour	Code
TERRAIN ACCESSORIES - CLEANING FLUID - for cleaning PVC-u pipe and fittings before applying Liquid Weld			
250	Tub		9101.250CF

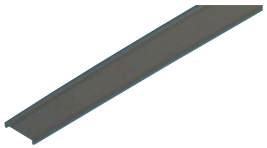
Material: Acetone. Screw top cans.



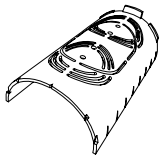
Size (ml)		Colour	Code
INTUMESCENT PIPE COLLAR			
55	To be used with 50mm pipe	Red	1625.55R
82		Red	1625.82R
110		Red	1625.110R
160		Red	1625.160R
200		Red	1625.200R
250		Red	1625.250R



	Colour	Code
TOGGLE BOLT - to clamp 112 and 115 Boss Connectors while solvent-welding		
	Self	9115



Size (mm)	Colour	Code
PACKING PIECE - for use with 140 and 142 Pipe Brackets and 191 Intermediate		
82	G	9104.3
110	GB	9104.4
160	G	9104.6

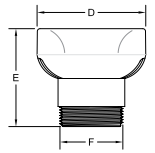


Size (mm)	Colour	Code
HOLE MARKING TEMPLATE - to clamp 112 and 115 Boss Connectors while solvent-welding		
110	Blue	9105.500

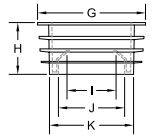
All dimensions in mm unless otherwise stated

Alternative Ventilation System

Size (mm)	D	E	F	G	H	I	J	K	Colour	Code
TERRAIN PLEURA 50										
	81	73	DN40	67	32	30	40	51	W	9301.253

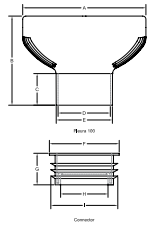


Pleura 50



Global Connector

Size (mm)	A	B	C	D	E	F	G	H	I	Colour	Code
TERRAIN PLEURA 100											
	195	141	50	83	89	111	50	75	106	W	9301.34





Size (mm)	A	B	C	D	E	F	G	H	I	Colour	Code
TERRAIN P.A.P.A. - Postitve Air Pressure Attenuator											
	200	652	104	83	89	111	50	75	106	W	9300.4

NOTE: Please request design advice prior to using these products. P.A.P.A must be used in conjuction with Terrain Pleura valves.



P.A.P.A.



Refer to Terrain Pleura System brochure for further details

Terrain Fire Trap

Terrain Firetrap Sleeves

- Compatible with all Terrain systems.
- Comprehensively tested to BS EN 1366-3, BS 476P+20.
- Suitable for vertical and horizontal fire compartmentalisation.
- Quick and easy to install.
- For new installations and retrofit.

See Terrain Firetrap brochure for further details.

Product Code	Di	Ø	Pipe size suitable for
1925.60	60mm	110mm	56mm 50mm PVC
1925.89	89mm	139mm	82mm
1925.114	114mm	164mm	110mm
1925.169	169mm	219mm	160mm



Terrain Firetrap Collars - for Terrain PVC Soil and Waste

- Seals against smoke, toxic gases, flames and heat
- Can be surface mounted or built in
- Intumescent material is totally unaffected by water, is robust, 'non-flaking' and difficult to tear
- Powder coated steel outer casing

See Terrain Firetrap brochure for further details.

Product Code	Ø	Fire Rating
1625.55R	50mm	2 Hour
1625.82R	82mm	2 Hour
1625.110R	110mm	2 Hour
1625.160R	160mm	2 Hour
1625.200R	200mm	2 Hour
1625.250R	250mm	2 Hour



General Principles

Good Site Practice

- Take all reasonable care when handling PVC-u particularly in very cold conditions when the impact strength of the material is reduced.
- Do not throw or drop pipes, or drag them along hard surfaces.
- In case of mechanical handling, use protective slings and padded supports. Metal chains and hooks should not make contact with the pipe.

On-site storage

- Stack pipe lengths
  - either on a flat base
  - or on level ground
  - or on 75mm x 75mm timber at 1 meter centres (Fig. 1)
- Provide side support with 75mm wide battens at 1m centres (Fig. 1).
- Maximum stack (normal conditions): seven layers high.
- Ideally, stacks should contain one diameter pipe size only. Where this is not possible, stack largest diameter pipes at base of stack. Small pipes may be nested inside larger pipes.
- If stored in the open for long periods or exposed to strong sunlight, cover the stack with opaque sheeting.
- Store fittings under cover. Do not remove from cartons or packaging until required.
- Store solvent cement and cleaning fluid in a cool place out of direct sunlight and away from any heat source.

Storage in hot climates

- Ultra-violet light can affect pipes and fittings: pipe colour may change and rubber seals may be degraded.
- Accordingly:
  - store all materials in well-ventilated, shady conditions
  - do NOT expose to direct sunlight
  - keep fittings in original packaging until required for use
- Maximum stack (hot conditions): six layers high.

Site safety

- The relevant regulations detailed in the Health & Safety at Work Act 1974, and Construction (Design & Management) Regulations 1995, must be adhered to on site.
- COSHH data sheets are available on request.

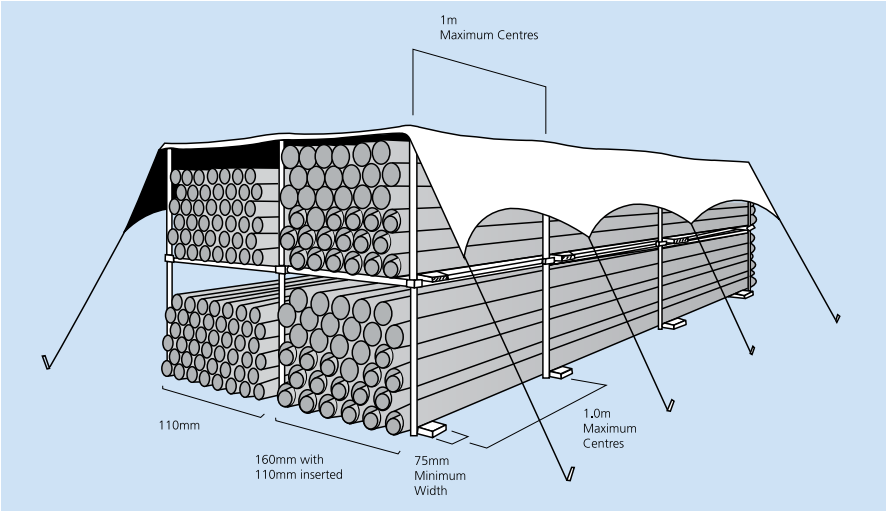


Fig. 1 Pipe stacking

Sitework Instructions

Solvent cement jointing

This technique applies to 100, 200, 400 and 500 pipes when used with 100, 200 and 500 system fittings.

Step 1

Cut pipe square, deburr and clean mating surfaces with Terrain cleaning fluid 9101 (Fig.1).

Step 2

Coat mating surfaces with solvent cement using a clean brush, assemble joint immediately, removing any excess cement with a clean rag. Initial set 3-minutes. Note 24 hours is required for the joint to fully set before testing. (Fig. 2).

Brush supplied with tin is suitable only for sizes up to 50mm for larger sizes use at least 12mm brush. Directions for use of solvent cement are printed on the container label and must be followed closely.

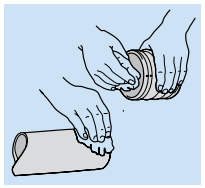


Fig. 1

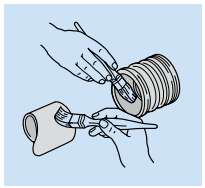


Fig. 2

Conversion of solvent weld socket to seal ring joint (using 109 adaptor)

Under normal use only fit 109 to upstream socket.

Step 1

Clean mating surfaces with Terrain cleaning fluid 9101 (Fig.3).

Step 2

Fit seal ring into 109 collar (Fig. 4)

Step 3

Carefully apply solvent cement to mating surfaces (Fig. 5)

Step 4

Assemble immediately applying firm even pressure until collar is in correct position (Fig. 6)

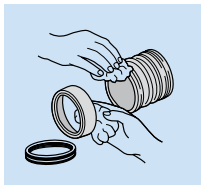


Fig. 3

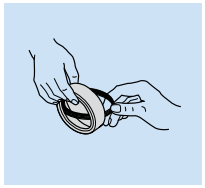


Fig. 4

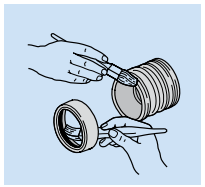


Fig. 5

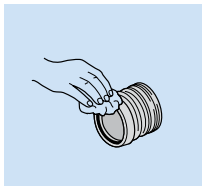


Fig. 6

Estimating guide: Terrain cleaning fluid, liquid weld, lubricants

Contents		Pipe sizes & number of joints achievable*					
		32mm	40mm	50mm	82mm	110mm	160mm
9101 Cleaning Fluid	125ml	80	80	80	30	20	10
	250ml	160	160	160	60	40	20
9100 Liquid Weld solvent cement	125ml	27	27	27	10	7	3
	250ml	55	55	55	20	15	7
9136 Lubricant	250gm	400	300	250	200	150	100

* For guidance only: approximate number allowing for wastage.

Sitework Instructions

Seal ring jointing - 109

Step 1

File a 45° chamfer onto end of square cut pipe. Lubricate rubber seal with Terrain lubricant 9136 (Fig.7).

Step 2

Enter pipe fully into socket, mark pipe as shown (Fig. 8).

Step 3

Withdraw pipe until the mark is 12mm away from socket. This means a 12mm gap exists between the end of the pipe and the socket register. This gap will allow the pipe to expand without distorting the pipework. Anchor the expansion joint with a holderbat or if not practical anchor a fitting within 1 metre of the joint (Fig 9 & 10).

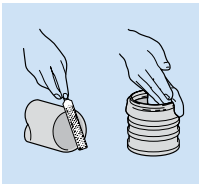


Fig. 7

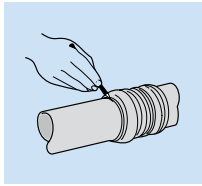


Fig. 8

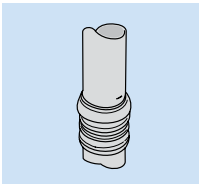


Fig. 9

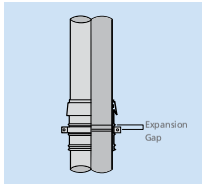


Fig. 10

Slip coupling - 111.S

Slip couplings are used for inserting additional fittings such as branch or for remedial work in existing soil pipework. To insert fitting:

Step 1

Assemble the fitting with a short length of pipe in the appropriate sockets. Cut out a section of the assembly, allowing for an expansion gap. Clean and chamfer pipe ends. Lubricate seals of the slip couplings.

Step 2

Slide the couplings completely over the spigot ends of the existing pipe.

Step 3

Insert and line up the new assembly, slide back the couplings to cover over the joints. Secure slip couplings with holderbats. (See Fig. 11).

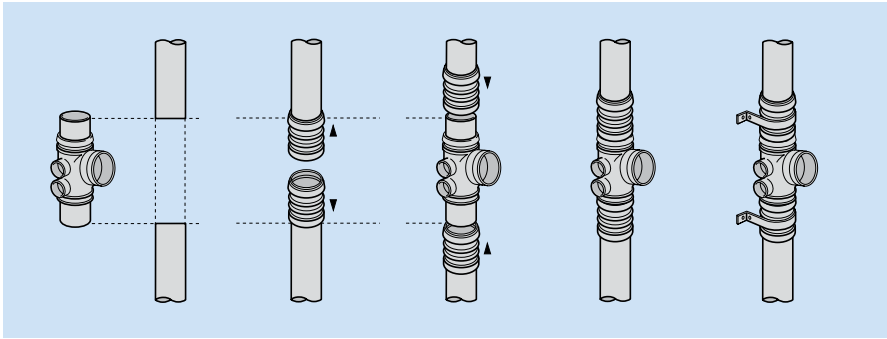


Fig. 11

Sitework Instructions

Control of Thermal Movement - Expansion and Contraction

Support and expansion

Plastic pipes expand and contract with changes in temperature. It is therefore essential that expansion joints be provided for the relief of such thermal movement. Any point where a pipe is made good, or fire stopped when passing through a floor or wall, must be treated as a fixed point when arranging the position of expansion joints, but should not be relied on to anchor the pipe unless the socket of a fitting is firmly concreted in. An expansion joint must be fitted between any two fixed points one metre or more apart.

(See Fig. 12) Vertical stacks are generally suported by holderbats anchoring expansion joints. Intermediate holderbats are necessary to steady the pipes.
More frequent support is required in horizontal runs. Maximum distances between expansion joints and holderbats are given in the tables below.

Support and Expansion Distances

Unless there is an alternative provision for thermal movement, pipework should be fitted with expansion joints in the following locations:

	Maximum Distance between expansion joint
Pipe Size - Soil	
82mm	4m
110mm	4m
160mm	4m
Pipe Size - Waste	
32mm	2m
40mm	2m
50mm	2m

a) At spacing's no greater than 4m for pipework 82mm and above.

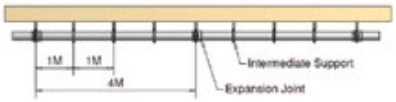


fig 1

c) Where the maximum distance between fixed points exceeds 1m

d) Any point where pipework passes through a floor or wall and is made good or fire stopped must be treated as a fixed point when determining positions of expansion joints.

e) Low level WC manifolds incorporate ring seal adaptors at each branch connection to compensate for expansion and also allow the branch to be 'turned' to the correct angle to allow connection to the WC

b) At spacing's no greater than 2m for pipework 50mm and below.

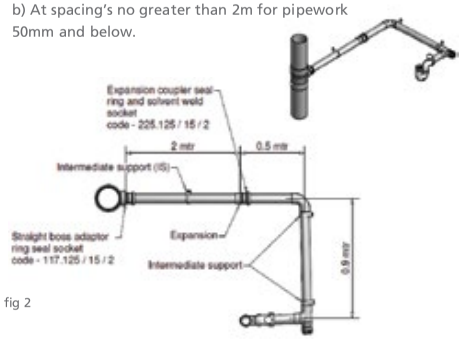


fig 2

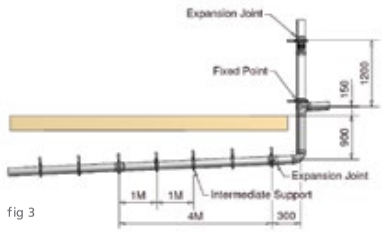
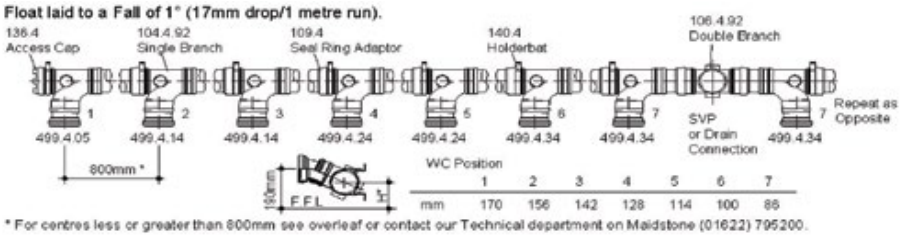


fig 3



* For centres less or greater than 800mm see overleaf or contact our Technical department on Maidstone (01622) 795200.

Expansion Joints

Pipe brackets must be used to anchor expansion joints. The anchor point can be made directly in the bracket grooves provided on pipework fittings or alternatively directly onto the pipe.

When anchoring the pipework using a solvent weld fitting a ring seal adaptor (code 109) needs to be solvent welded to the fitting to accommodate expansion. It is important to lubricate the ring seal adaptor with silicone grease (9136.250)

fig 6 fig 7 fig 8



The pipe connecting into the ring seal adaptor should be inserted fully into the socket and marked. To create the expansion gap withdraw the pipe 12mm from the socket. This gap will allow the pipe to expand sufficiently without distorting the pipework. (figs 6,7&8)

Anchor points directly onto the pipe can be made using a solvent welded piece (code 9104). The anchor point must be within one metre of the proposed point of anchorage.


fig 9

Note: On internal pipework systems subject to fire requirements it is recommended that only steel support brackets (code 140) are installed. Intermediate support must also be provided.

Pipework supports shall be provided in accordance with the following tables and either side of bends.

Multiple pipe supports for pipes of differing sizes shall be spaced at intervals required for the smallest pipe.

The Thermal Movement Limiter (TML - code 190) prevents the pipe from pulling out of the ring seal adaptor and causing a flood. It will also be necessary to install intermediate support bracket (code 191).

Pipe Material	Pipe SIZE (MM)	Vetical Pipes (m)	Low Gradient Pipes
MuPVC	32-40	1.2	0.5
	50	1.2	0.9

Pipe Material	Pipe SIZE (MM)	Vetical Pipes (m)	Low Gradient Pipes
PVC-u	32-40	1.2	0.5
	50	1.2	0.9
	75-100	2.0	1.0
	150	2.0	1.0

Multiple pipe supports for pipes of differing sizes shall be spaced at intervals required for the smallest pipe.

The Thermal Movement Limiter (TML - code 190) prevents the pipe from pulling out of the ring seal adaptor and causing a flood. It will also be necessary to install intermediate support bracket (code 191).

Alternative Provision for Thermal Movement

Expansion joints may be omitted if alternative provision is created in one of the following ways.

a) Above the highest branch connection to a foul and/or waste stack is free to move through a weather proof roof sleeve. (fig 13)

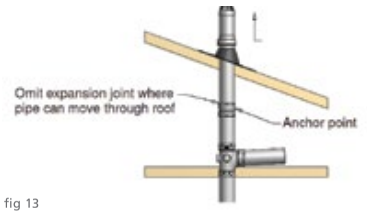


fig 13

b) At the base of an external drainage stack that is connected to a drainage connection that allows movement through an EPDM sleeve. (fig 14)

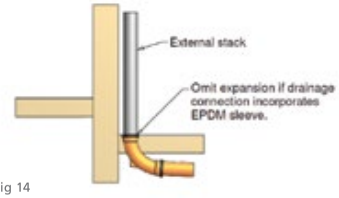


fig 14

Sitework Instructions

Steel holderbat 140

These are designed to clamp fittings, creating a fixed point and to control thermal movement of pipework.

To use holderbats for fittings the strap must fit snugly around the fitting. locate tongue in front of square hole and position strap to suit curvature of fitting. Insert bolt in circular hole and tighten nut (Fig. 14).

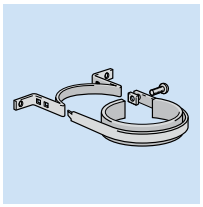
For pipe, locate tongue in back square hole and bolt in circular hole and tighten nut. The pipe must be free to move through the holderbat to allow expansion and contraction (Fig. 15). (Alternatively a packing piece 9104 can be used for pipe with the tongue located in the front square hole, as for fittings (Fig. 16).

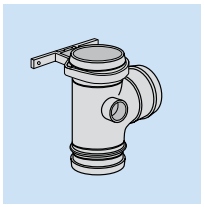
Plastic holderbat 143

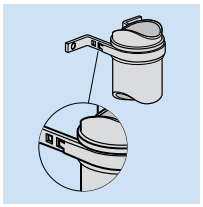
This is designed to perform the same two functions as the steel holderbats, i.e. to support pipework and allow thermal movement. When clampled around the socket of a fitting it creates a fixed point (Fig. 17).

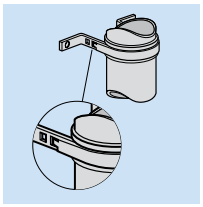
Adjustable holderbat 144

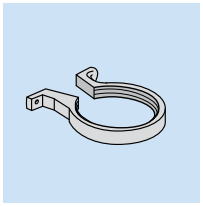
This is designed to perform the same functions as the other holderbats except it provides up to 28mm of adjustment on the 110mm system. When clamped around the socket of a fitting it creates a fixed point. When used to support pipe it is necessary to locate strap onto inside of back plate (Fig. 18).

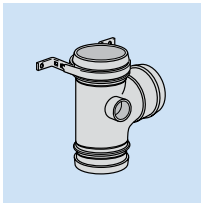

Fig. 13

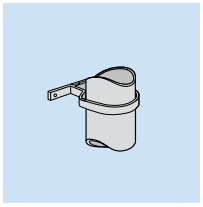

Fig. 14

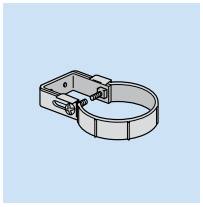

Fig. 15

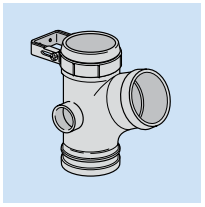

Fig. 16

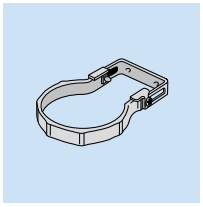

Fig. 17

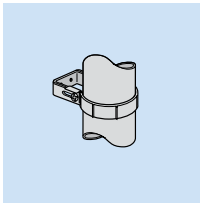

Fig. 17(1)


Fig. 17(2)


Fig. 18


Fig. 18(1)


Fig. 18(2)


Fig. 18(3)

Boss pipes 120 & 123

Only top socket can be converted to seal ring using seal ring adaptor 109.

Lugs permit holderbat anchorage.

120.4 - Accepts 200.125 and 200.15 pipe. (Fig. 22).

Sockets can be converted for expansion using a seal ring adaptor 109.

120.3.2 - Accepts 200.2 pipe and is suplied with blanking plugs that can have the centres removed to accept 200.15. (Fig. 23).

Must be used with engraved arrow pointing downstream to accommodate built in fall of 1¼°.

123.4 - Must be used with branch boss adaptors 117 or 117.90. Waste pipe then connects into fitting. (Fig.24)

Boss pipe 121

Only the top socket can be converted to seal ring using seal ring adaptor 109.

This boss pipe is for use with bends 207.15.150 allowing the waste pipe to approach at clip distance without the use of offsets. It can be used in both flat (Fig. 26) and corner (Fig.27) situations where pipes approach at 180° and 90° respectively. Solvent weld blanking plug into unused socket.

All bosses will accept 1½" waste pipe, solvent welded direct into the boss pipe.

For 1¼" connection a socket reducer 224.15.125 is required. Then use 207.125.150.

NOTE: The letters A, B, and C will be found engraved above each socket on the fitting.

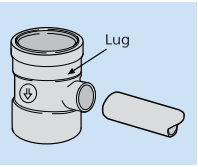


Fig. 22

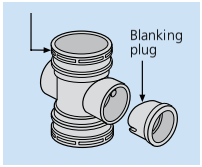
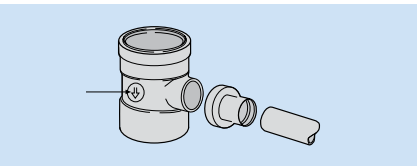


Fig. 22


Fig. 24

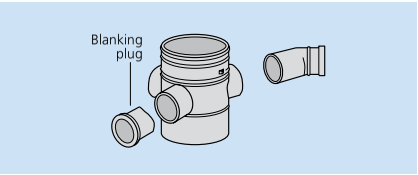


Fig. 25

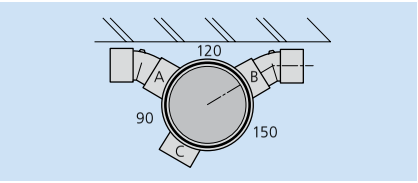


Fig. 26

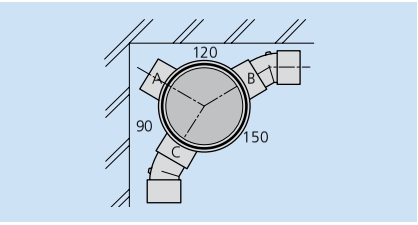


Fig. 27

Sitework Instructions

System Connections

Connection via universal manifold

Applicable to:
119P Universal Soil Manifold (Fig. 79).
119 (solvent connections) and 119P (Push-Fit connections)
For 32mm and 40mm waste connection

- For up to four connections of BS EN 1566/ BS EN 1451-1 waste pipe at floor level (e.g. in bathroom) without need for adaptors.
- May be positioned neatly in corner of room for connection to internal soil stack.
- Supplied with four inlets and with removeable plugs.
- A sealing gasket is supplied for each inlet (Push-Fit only). Install as follows:
  - Mark selected position the manifold will occupy on the floor and cut out shape.
  - Push-Fit soil connections to top socket, spigot connection to bottom socket.
  - Remove plug (if present) from selected waste inlet(s).
  - Push-Fit as necessary waste pipe into the manifold until the stop is reached.
  - Check that any waste inlet which is not required has plug in place.

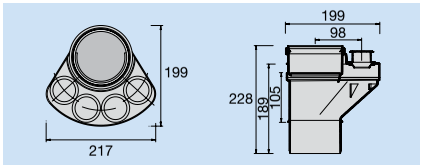
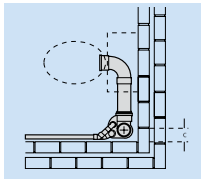
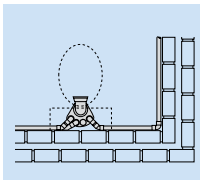


Fig. 79 419.4.15 Universal soil manifold

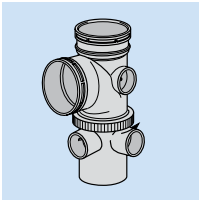

Fig. 80 Internal soil stack connection

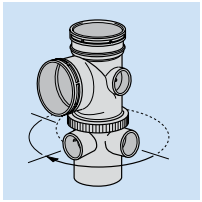

Fig. 80 Internal soil stack connection

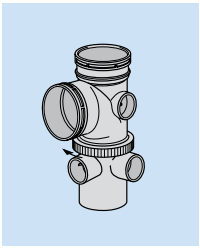
Sitework Instructions

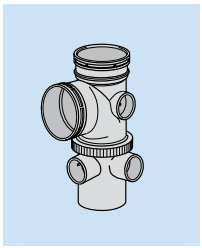
Variable boss branch

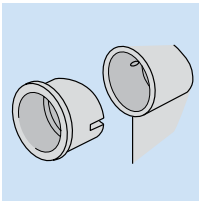
- Slacken locking ring (Fig. 28).
- Rotate lower unit so that waste connections are in required position (Fig. 29).
- Tighten locking ring (Fig. 30).
- If at ground floor use spigot version push into buried drain lipseal (Fig. 31).
- If at first floor and above use socket version and solvent weld to stack (Fig. 31).
- If only one waste connection is required solvent weld blanking plug into unused socket (Fig.32).
- If 1½" connections are required cut off socket plug at cut guide and use as a reducer (Fig.33).

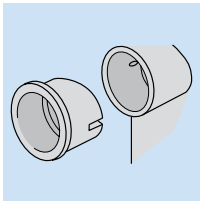

Fig. 28

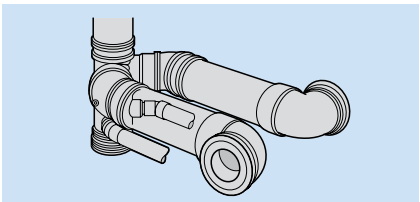

Fig. 29


Fig. 30


Fig. 31


Fig. 32


Fig. 33


Fig. 34

Sitework Instructions

Boss adaptors

These accept pipe via a boss ring adaptor, 117 straight or bent.

- Cut out centre of boss. For correct size hole cutter refer to (Fig. 35).
- Remove swarf and clean mating surfaces with Terrain cleaner 9101 (Fig. 36).
- Apply solvent cement 9100 to all mating surfaces (Fig. 37).
- Position boss adaptor, twist to ensure contact then hold under pressure for a few moments (Fig. 38).
- Remove excess cement (Fig. 39).

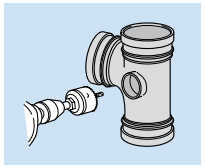
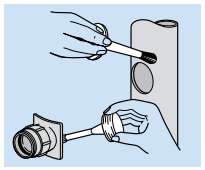
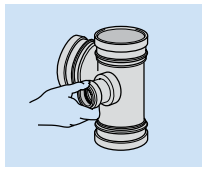
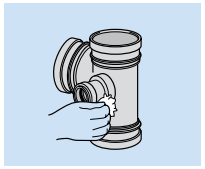

Fig. 35


Fig. 36

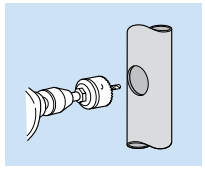

Fig. 37

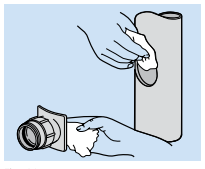

Fig. 38

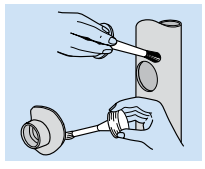

Fig. 39

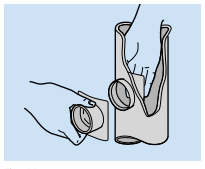
Connecting waste pipes to soil stacks via two part boss 112 and adaptor saddle 115P

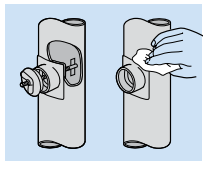
- Cut correct hole size and deburr (Fig. 40).
  For correct size hole cutter refer to table below.
- Remove swarf and clean mating surfaces with Terrain cleaner 9101 (Fig. 41).
- Apply solvent cement 9100 to all mating surfaces (Fig. 42).
- Pass inner component outward through hole from the inside of the pipe and push the outer component firmly on to it ensuring that the key and keyway are lined up. Ensure engraving reads: top 91¼ for waste top 88¾ for vent (Fig. 43).
- Insert toggle bolt and screw up until boss is fully closed with flanges in contact with the pipe both inside and outside. (Fig. 44).
  NOTE: Leave toggle bolt in position for approximately 15 minutes.


Fig. 40


Fig. 41


Fig. 42


Fig. 43


Fig. 44

Hole saw sizes	
Aperture diameter (mm)	To suit fitting ref.
33	281.43
48	112.4.125 - 135.3 - 112P.4.125
51	117* - 112P.4.15
57	112.X.15 - 115P.4
60	122.4.125 - 112P.4.2
64	122.4.15
70	112.X.2
73	135.4 - 135.6
75	122.4.2

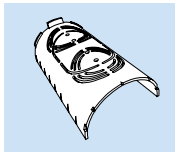
* All sizes.

All dimensions in mm unless otherwise stated

Sitework Instructions

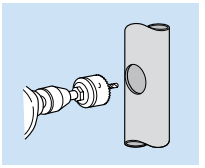
Self locking boss 122

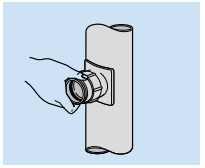
- Cut correct hole size and deburr. For correct size hole cutter refer to table on page 59 (Fig. 45).
- Slacken nut on boss to full extent. Enter boss into hole keeping the keyway to the last piece to enter the hole. Tighten outer locking nut (Fig. 46).
- Once satisfied that the boss fits neatly into the pipe remove and clean all mating surfaces with Terrain cleaner 9101 (Fig. 47).
- Apply solvent cement 9100 to all mating surfaces (Fig. 48).
- Re-enter boss into the pipe. Screw up until hand tight and remove excess cement (Fig. 49).
- Template available ref: 9105.500.

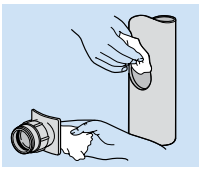

9105.500

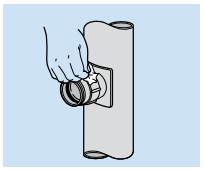
Access door 135 (110mm & 160mm)

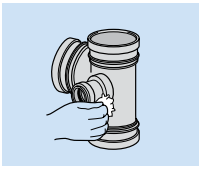
- Set out centre lines as described on inside of access door. Check aperture will be parallel with axis of pipe (Fig. 50).
- Drill two overlapping holes of correct size at 45mm centres (Fig. 51).
- Remove sides of aperture using a medium file (Fig. 52).
- Slacken door to its fullest extent. Push the inner part of the door into the hole at a slight angle turning at the same time. When it is fully entered, turn it parallel to the axix of the pipe ensuring that the inner part locates into the hole. (Fig. 53).
- Ensure seal ring is lubricated prior to fitting.
  Tighten the screw whilst pulling the door outwards.
  Do not over tighten (Fig. 54)

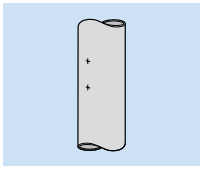

Fig. 45

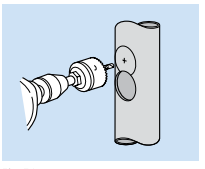

Fig. 46

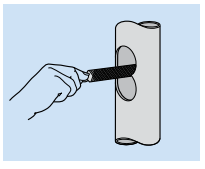

Fig. 47

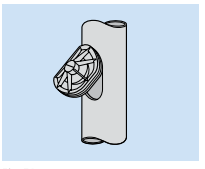

Fig. 48

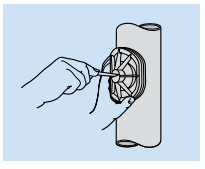

Fig. 49


Fig. 50


Fig. 51


Fig. 52


Fig. 53


Fig. 54

Sitework Instructions

Weathering slates for pitched roofs 149

- Place 150 Vent Cowl on open end of soil stack (do NOT solvent-weld at this stage) (Fig. 55).
- Slide 149 Weathering Slate over stack (Fig. 56).
- Dress the base plate to fit the lower tiles. Lay the side and upper tiles over the base plate (Fig. 57).
- Remove the vent cowl. Solvent-weld 131 Weathering Apron to pipe above rubber cone to prevent water ingress. Place 150 Vent Cowl onto stack and solvent-weld into position (Fig. 58).

NOTE: On low pitched roofs, optimum weathering may be achieved by making a single weld to the lower edge of the base plate.

In areas subject to high winds, or in difficult tiling situations, use tingles to prevent lower edge lifting away from tiles.

If installing on roof with interlocking tiles, boards or additional battens may be required underneath the weathering slate. The stack must pass through only ONE course (if necessary, the soil stack should be offset beneath the roof).

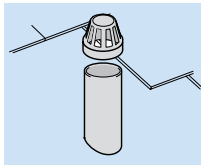


Fig. 55

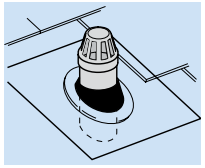


Fig. 56

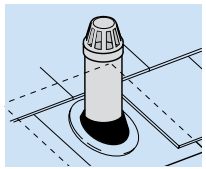


Fig. 57

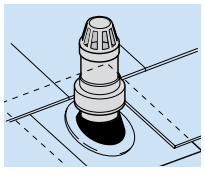


Fig. 58

Weathering slates for flat roof (three layers felt) 149

- Dress first layer of felt up to pipe (Fig. 59)
- Place 150 Vent Cowl on open end of soil stack (do NOT solvent-weld at this stage). Slide 149 Weathering Slate over stack. Push slate (and its rubber cone) down onto first layer of felt (Fig. 60)
- Coat the aluminium baseplate with bitumen. CAUTION: Keep hot material away from rubber cone Place second layer of felt over baseplate up to the cone. Trim accordingly. Repeat for third layer of felt (Fig. 61).
- Solvent weld weathering apron 131 for asphalt to pipe above cone to prevent ingress of water. Replace vent cowl (Fig. 62).

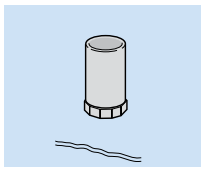


Fig. 59

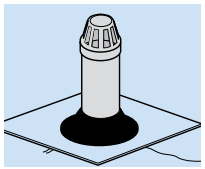


Fig. 60

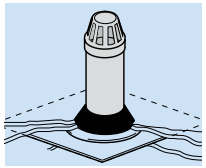


Fig. 61

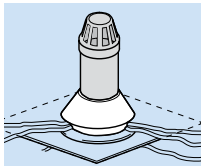


Fig. 48: Vent cowl 150
Weathering apron 131.3.200
or 131.4.200

Weathering to pitched roofs using purpose made slate e.g. lead

- Position purpose-made weathering slate on open end of soil stack (Fig. 63).
- Slide 131 Weathering Apron over stack and solvent-weld in position. Replace vent cowl and solvent-weld into position (Fig. 64).

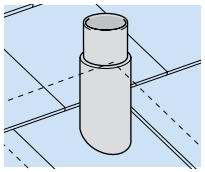


Fig. 63

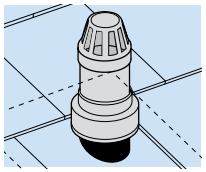


Fig. 64: Vent cowl 150
Weathering apron 131.3.200
or 131.4.200

Weathering to asphalt roofs using purpose made slate e.g. lead

- Position purpose-made weathering slate on open end of soil stack. Lay asphalt as normal, over baseplate and to upper rim of lead upstand around pipe. Feather this edge of the asphalt (Fig. 65).
- Slide 131 Weathering Apron over stack and solvent-weld in position. Place 150 Vent Cowl onto stack and solvent-weld into position (Fig. 66).

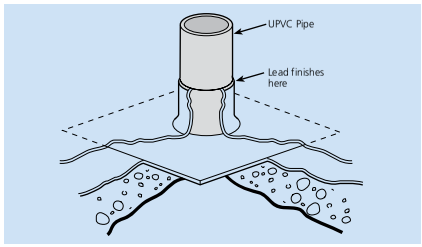


Fig. 65

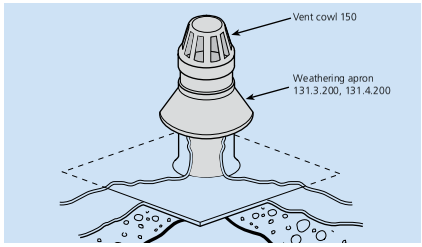


Fig. 66

System Connections

System Planning

System connections to below ground drainage

Connecting to soil system (soil pipe to BS EN 1329)

- 110mm Soil Pipe to 110mm Underground Pipe
  110mm Underground Pipe may be connected directly to 110mm Soil Pipe (Fig. 25)
- A 45° external chamfer should be filed onto the end of square cut soil pipe. The soil pipe is then push-fit into the underground drain ring seal socket, using 9136 Lubricant
- 82mm Soil Pipe to 110mm Underground Pipe (Fig. 26)

Connection should be made using the 4DW3 Socket Reducer. The socket reducer is inserted into the plain end of the underground pipe. The 82mm soil pipe is then pushed into top of reducer

Connecting to waste system (waste pipe to BS EN 1566)

Connection is made using the 124 Socket Reducer. The socket reducer is pushed into the ring seal of the socket on the underground drain pipe. The waste pipe is solvent-welded into reducer. Additional reducers may be used as required.

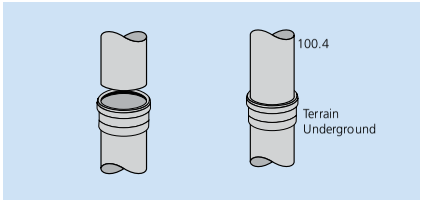


Fig. 25

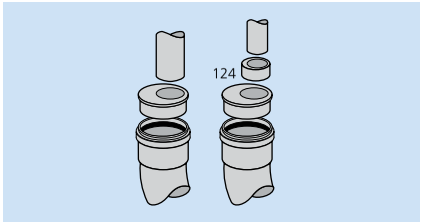


Fig. 26

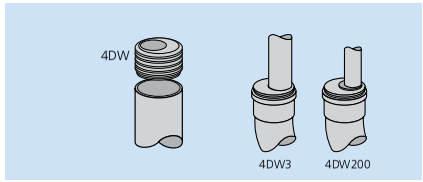


Fig. 27

Connecting to BS EN 5255/1566 waste pipe (Fig. 28) (also to copper waste pipe)

The centre of 130 Socket Plug should be drilled out, ready for solvent-weld connection of the appropriate size 4DW Boss Adaptor. Seal rings on 4DW and underground drain socket should be lubricated using 9136 Lubricant.
The socket plug is then inserted into the underground drain socket and 200 Waste Pipe (or copper waste pipe) into 4DW adaptor.

Waste	
32mm round	
40mm round	4DW200
50mm round	

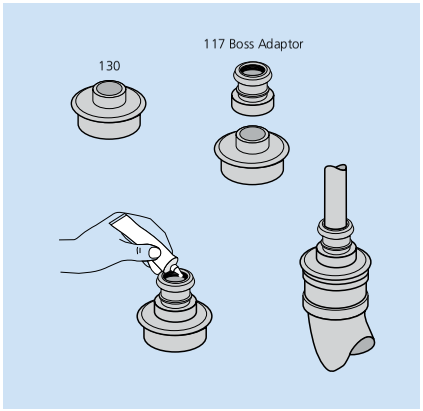


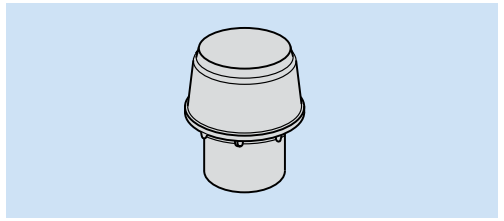
Fig. 28

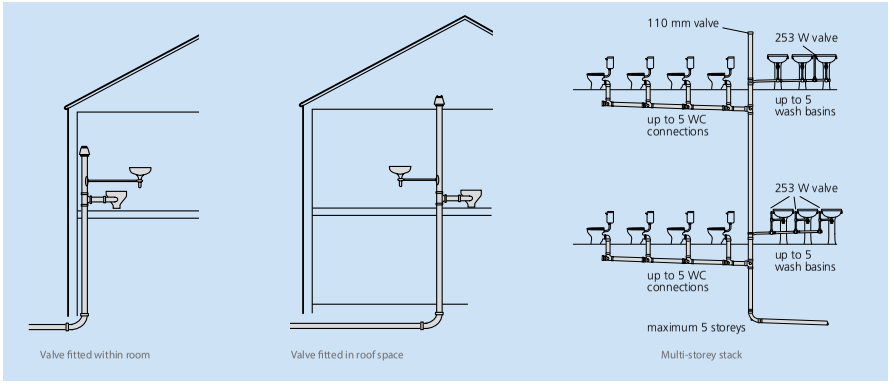
System Connections

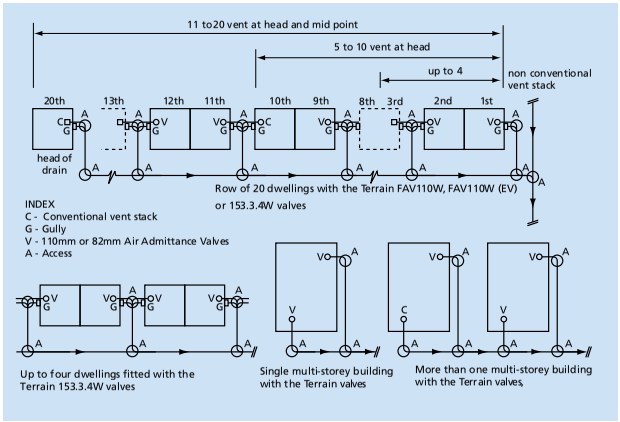
Automatic air admittance valves 153.3, 153.4 & 253.2

Installation

The valve should be fitted vertically and should normally be positioned in the roof space, but if fitted to a WC float or waste branch, must always be positioned above the spill-over level of appliances.


Fig. 67





Houses B,C and D may have automatic air admittance valve but house A must have normal S.V.P. to vent head of drain

A typical row of dwellings connected to a common drain, with automatic air admittance valves fitted to soil and vent stacks.

NOTE: providing that the head of drain (house A) is open vented, i.e. with S.V.P. then up to 9 houses downstream may be fitted with automatic air admittance valves.

System Connections

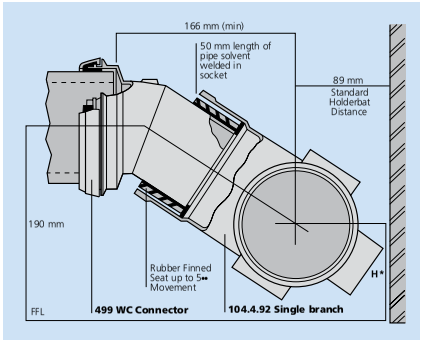
Multiple connection of BS 5503 WC pans

Applicable to: 499 WC manifold connectors

Connections to float laid to 1° fall of float (17mm drop per 1 metre run).

- For minimum dimensions solvent-weld 50mm pipe length into branch socket to provide sleeve.

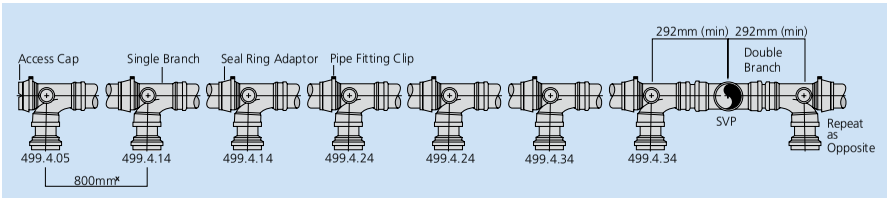
  NOTE: To extend distance between WC connector and branch, a longer length of pipe may be used.
- Position and fix branch to wall.
- Fit finned rubber seal onto spigot of connector.
- Push spigot of connector into sleeved branch socket (DO NOT LUBRICATE).
- Lubricate rubber seal with 9136 Lubricant to accept WC spigot.
- Align connector socket so that it is square with WC spigot (finned seal allows up to 5° adjustment).



Manifold connector connected to 104 branch

Alternatively float construction can be achieved using 498.4.02.

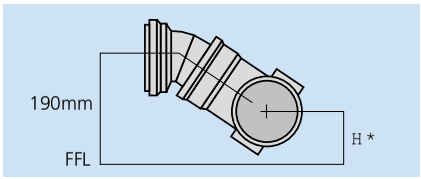
For centres less or greater than 800mm contact Technical Department.



Multiple WC pan connections layout

Distance from finished floor level (FFL) to centre of float		
Connector Type	H* mm (min)	H* mm (max)
499.4.05	166	176
499.4.14	142	162
499.4.24	114	132
499.4.34	80	100

* Variation achieved by flexing rubber finned seal joint.



Distance from finished floor level (FFL) to centre of float

Connecting to other materials

Connecting to iron, clay or cement fibre spigot

Applicable to: 126 and 226 Adaptors.
For soil and waste connections, use with:

9120 Seal Ring for 82mm
9119 Seal Ring for 110mm
9119B Seal Ring for 110mm

- Place rubber seal ring over spigot to half depth of socket (Fig.68).
- Position adaptor centrally over joint:
  - 126.3.12 Adaptor (for 82mm soil pipe)
  - 126.4.12 Adaptor (for 110mm soil pipe)
  - 226.2 Adaptor (for waste pipe)
- Heat gently with a gas torch/hot air gun, all round the socket starting at the base of the socket and working upwards (Fig. 69).
- When the socket has shrunk down to the adjoining spigot, and the captured seal ring has created a raised ridge, stop applying heat (Fig. 70).
- Leave to cool before moving or applying any pressure.

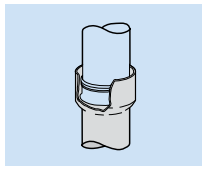


Fig. 68

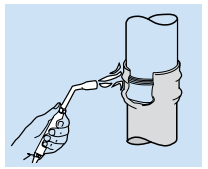


Fig. 69

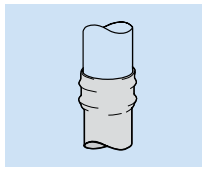


Fig. 70

Connecting to copper

- Clean pipe with 9101 Cleaning Fluid (Fig. 71).
- Replace black seal ring in PVC-u socket with appropriate red seal ring:
  - Seal ring ref. 9149 for 108mm metric copper to BS 2871
  - Seal ring ref. 9145 for 4" imperial copper to BS 659
- Lubricate seal ring with 9136 Lubricant and and insert copper spigot as for standard PVC/PVC seal ring joint (see page 50).

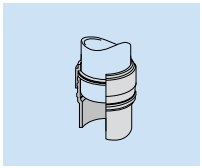


Fig. 71

Connecting to lead

- Clean pipe with 9101 Cleaning Fluid (Fig. 72).
- Wipe or lead weld short length of copper tube onto end of lead pipe.
- Follow procedure as for copper.

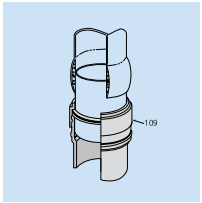
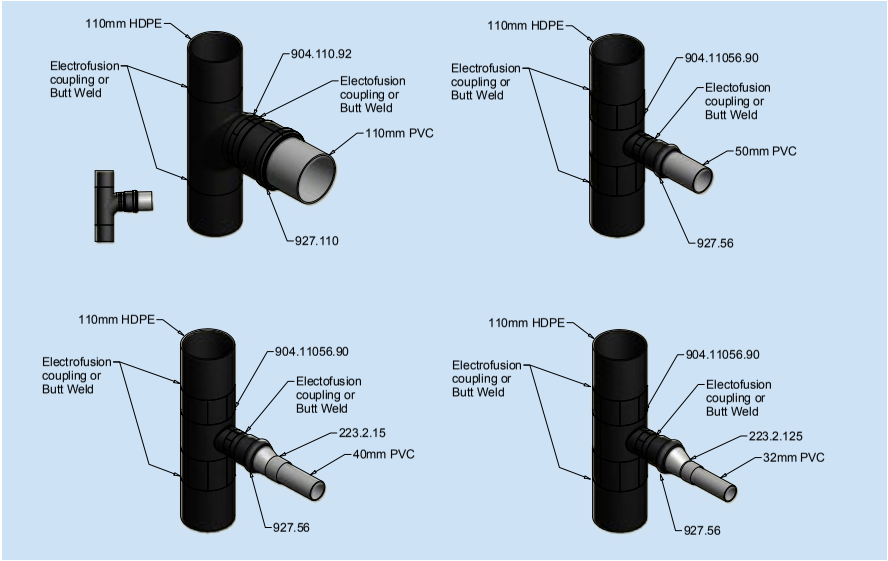


Fig. 72

System Connections

Connecting to other materials

Connecting PVC to HDPE



Trapped floor gullies

Installing trapped floor gullies

Applicable to:
279/281 Trapped Floor Gully, and 282 and 283 Floor Gully Inlets

- Check overall height of unit with inlet in position, and adjust to suit installation location. (Do NOT solvent weld inlet at this stage) (Fig. 74/75).
- Place gully into position.
- Solvent-weld waste pipe to outlet socket.
- Bring floor screed up to level with bottom of gully inlet.
- Allow screed to set, and remove gully inlet.
- Apply waterproof mastic to underside of square flange of gully inlet.
- Solvent cement gully inlet into position.
- Tile up to inlet, and grout using waterproof grout.

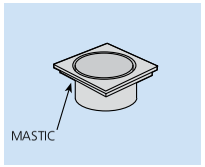


Fig. 74

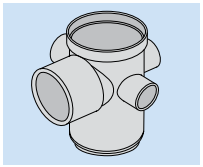


Fig. 75

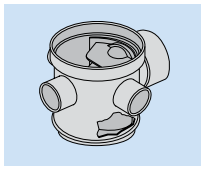


Fig. 76

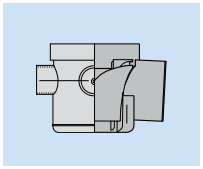


Fig. 77

Connecting waste to soil pipework

Back to back WC connections

Back-to-back WC's must NEVER be connected using a double branch laid horizontally because cross flow WILL occur .

EITHER

- Run two separate horizontal floats using a corner branch.

OR

- Stagger connections on a single float.

Using: 106.490.12, 106.490.22 Corner boss branches

- Use as Fig. 34 (page 55) with 135° bends. Can connect single or a range of WC's on each 110mm branch Lower bosses can connect two 50mm waste pipes directly to sockets or 40 and 32mm pipes using appropriate reducers.

Using standard single branches and 499 WC manifold connectors

See page 61 for details on angles.

- Alternatively, use staggered layout, as shown in Fig. 78.
- Use standard boss connection methods.

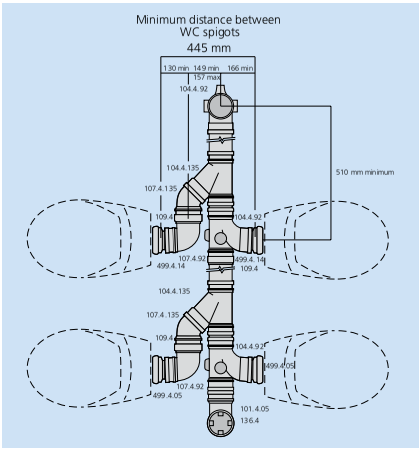


Fig. 78

Making offsets

Offsets on-site

Requirement: To offset soil pipe run

- Created on site with a length of 100 soil pipe and 101, 101P, 107 & 107P bends.
- Measure projection required.
- Determine length of pipe required
- Square-cut pipe length and de-burr cut ends. For ring-seal joints, pipe ends must be chamfered.
- Solvent-weld or Push-Fit into standard bend or offset bend sockets

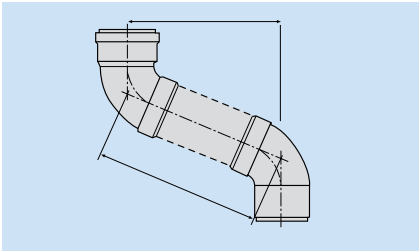


Fig. 82 Offset pipe

Balcony Outlets

Balcony Outlets

Installing screed finish balcony outlet

Applicable to: 2172 Balcony Outlet

- Remove grid
- Position spacer on locating pegs
- Replace screws temporarily to prevent ingress of concrete
- Lay screed to the level of the top edge of the spacer
- Remove screws and replace grid
- Dress flashing over the rear upstand
- Tuck flashing into brickwork, joint and point

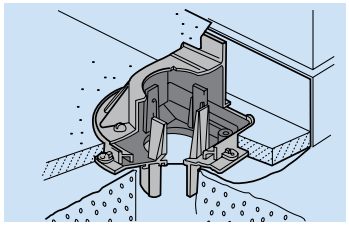


Fig.27

Installing asphalt finish balcony outlet

Applicable to: 2174 Balcony Outlet

- Remove grid
- Temporarily replace screws to prevent ingress of asphalt
- Apply a suitable primer or bonding agent up to engraved line on outlet body
- Apply asphalt layer: dress over outer rim and down to engraved line on outlet body
- Remove screws
- Offer up grid and check correct angle of dressing
- Fit washer and grid, and secure with screws

NOTE: The polypropylene washer allows the grid to be easily removed for maintenance/clearing

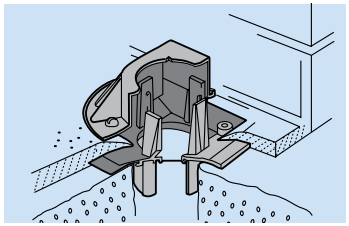


Fig.28

Connection to downpipes

Applicable to: 2172 and 2174 Balcony Outlets

- For 68mm round downpipe (2100): use 2173.3.25 Socket Adaptor
- For 82mm round downpipe (2100.3): connect direct to balcony outlet socket
- Solvent-weld all joints (see page 9)

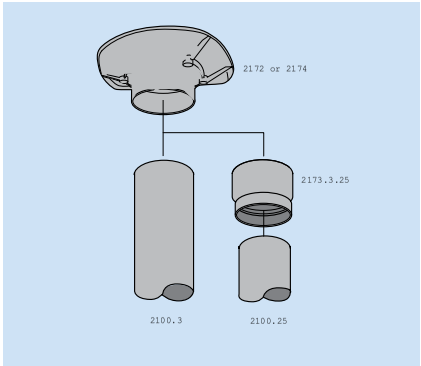


Fig.29

Small Roof Outlets

Small Roof Outlets

Fixing small roof outlet to proprietary plastic finish

Applicable to: all 2180 and 2181 Roof Outlets

- Apply recommended adhesive to flange of outlet body
- Dress plastic material over flange to the edge of opening
- Secure the flat or domed grid with brass screw supplied, lightly clamping the roof finish material in position

Fixing small roof outlet to mineral felt finish

Applicable to: all 2180 and 2181 Roof Outlets

- Apply suitable bitumastic primer to flange of outlet body
- Apply liquid bitumen or activator to roof and prepared area of flange
- Lay first layer of felt to edge of flange
- Dress second and third layers over the flange to the edge of the opening
- Secure the flat or domed grid with the brass screw supplied, lightly clamping the edge of the second and third layers of felt

NOTE: 2180 and 2181 outlets are not suitable for use with hot asphalt

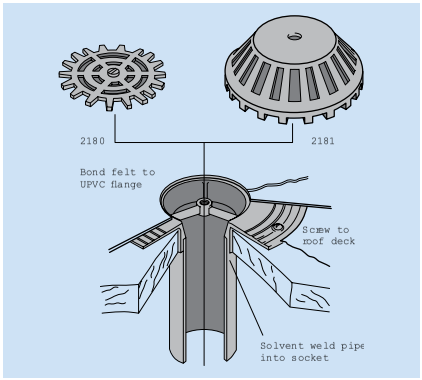


Fig.30

Connecting spigot/socket bends (small roof outlets)

Applicable to: all small diameter roof outlet

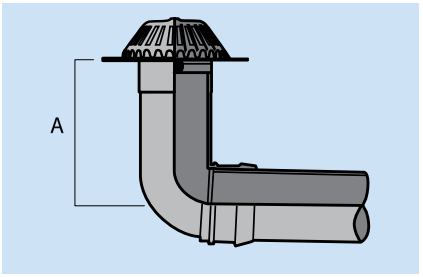


Fig.31 2181.2 Domed Outlet (small diameter)

Fittings	Outlet size (mm)	Dimension A (mm)	
		min	max
2180.2 + 207.2.92	55	73	118
2181.2 + 207.2.92	55	73	118
2180.3 + 107.3.92	82	89	168
2181.3 + 107.3.92	82	89	168

Large Roof Outlets

Grid Options

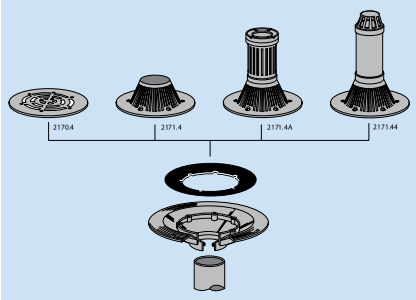


Fig.32

NOTE: 2170 flat roof outlet is not suitable for vehicular traffic

Fixing to asphalt finish

Applicable to: all 2170 and 2171 Roof Outlets

- Apply suitable bitumastic primer or bonding agent to bowl and flange of outlet body
- Dress a 19mm layer of asphalt over flange and bowl to level of upstand
- Offer up selected grid (see Fig.32 for alternative grids) check correct angle of dressing and engagement of screws
- Secure grid and washer in position with screws supplied

NOTE: The polypropylene washer allows the grid to be easily removed for maintenance/clearing

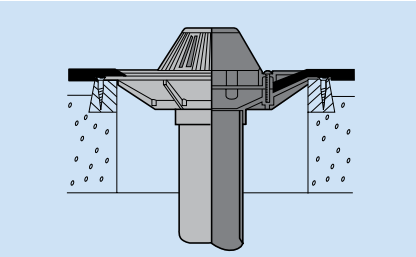


Fig.33 2171.4 Domed Outlet

Fixing to mineral felt finish

Applicable to: all 2170 and 2171 Roof Outlets

- Apply suitable bitumastic primer or bonding agent to bowl and flange of outlet body
- Apply liquid bitumen or activator to roof and prepared areas of outlet body
- Lay first layer of felt to edge of flange
- Lay second and third layers over roof outlet
- Dress down into bowl to the upstand
- Secure grid and washer in position with screws supplied

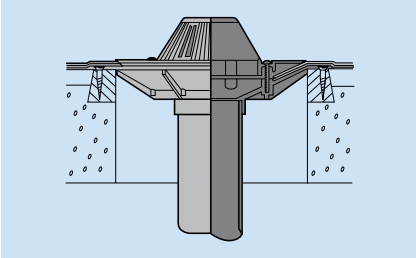


Fig.34 2171.4 Domed Outlet

Fixing to proprietary plastic finish

Applicable to: all 2170 and 2171 Roof Outlets

- Apply recommended adhesive to bowl and flange of outlet body
- Lay plastic material over roof outlet
- Dress over flange and bowl to the level of the upstand
- Secure grid and washer with screws supplied (see Fig.32 for alternative grids)

NOTE: The polypropylene washer allows the grid to be easily removed for maintenance/clearing

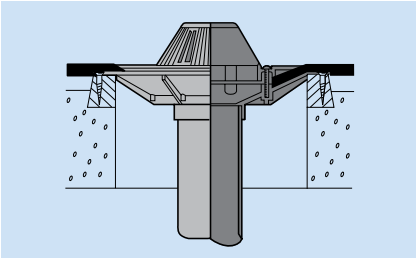
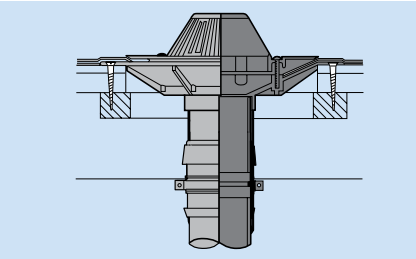


Fig.35 2171.4 Domed Outlet

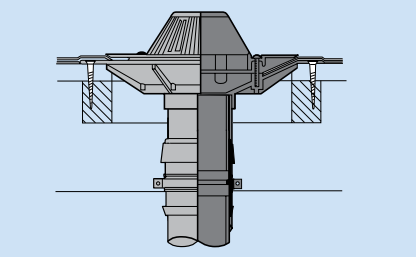
Large Roof Outlets

Anchoring on thin or uneven roof structures

Applicable to: all 2170 and 2171 Roof Outlets



Three-layer felt on insulation material over profiled metal decking



Three-layer felt on thin timber decking

Connecting spigot/socket bends (large roof outlets)

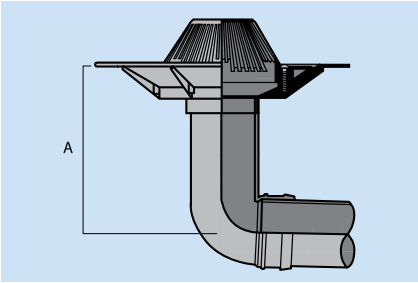


Fig.37 2171.4 Domed Outlet

Applicable to: all large roof outlets

Fittings	Outlet size (mm)	Dimension A (mm)	
		min	max
2170.3 + 107.3.92	82	140	219
2171.3 + 107.3.92	82	140	219
2170.4 + 107.4.92	110	146	257
2171.4 + 107.4.92	110	146	257

General fixing details

Applicable to: balcony and roof outlets

- Solvent weld pipe-end, or spigot of bend, to roof outlet (for jointing techniques, refer to sitework instructions)
- Locate outlet body in roof structure and check that a suitable rigid fixing can be made
- Screw down outlet firmly to roof structure
- Remove grid
- Apply selected roof finish

Design Considerations

Design Considerations - Above Ground Drainage

Building regulations requirements

All sanitary pipework and drainage installations must satisfy the relevant requirements of Part H of the approved documents to the England, Wales and Northern Ireland Building Regulations and the Building (Scotland) Regulations 2004.

Installations in accordance with BS EN 12056:2 Code of practice for sanitary pipework will also meet Building Regulations requirements.

Ventilation

The discharge stack must be ventilated in order to prevent pressure building up within the system and drawing the water seals in the traps. Separate ventilation of branch pipes is required only if the length and slope of the branch exceeds the following dimensions:

Maximum length:
(32mm) 1.7 metres
(40mm) 3 metres
(50mm) 4 metres
Slope: 18-90mm per metre

In such cases, the branch pipe should be ventilated by a branch ventilating pipe or an anti-syphon trap should be fitted. The Automatic Air Admittance Valve reduces the number of stack ventilating pipes required to penetrate the roof in multi-installations, without affecting performance of the drainage system.

Thermal expansion

Within a solvent-weld system it is important to make adequate allowance for thermal movement. This is most easily achieved by fitting an expansion ring seal joint between two fixed solvent-weld joints. The expansion gap should be created by pushing the spigot fully into the ring seal socket, and marking the position at the socket face. Then withdraw the spigot by 10mm. Check subsequently to ensure that the expansion gap is not lost during further installation work.

Branch connections

The distance between the centreline of the lowest branch connection to the discharge stack and the invert of the bend at the foot of the stack should be in accordance with the following:

- ≤3 storeys - 450mm min.
- ≤5 storeys - 750mm min.
- 5 storeys + - Ground floor connections should discharge direct to drain or into their own stack
- 20 storeys + - Ground floor and first floor connections should discharge into their own stack

A branch pipe should not discharge into a stack in a way which could cause crossflow into any other branch pipe.

Working temperatures

Terrain Soil and Waste systems may be used to convey liquids with a maximum temperature of 76°C when subjected to continuous flow. Intermittent discharges of up to 100°C may occur provided they are of less than 2 minutes duration.

Chemical discharges

Terrain Soil and Waste systems are generally resistant to most commonly used acids and those that may be discharged to the public sewer system. The rubber seals, however, are less resistant and it is advised that before any chemicals are conveyed through the systems, checks are made to establish their effects on the product. Refer to BS CP 312 Part 1 Code of Practice for Plastic Pipework for further information.

Access

Sufficient and suitable access must be provided to enable all pipework to be tested and maintained effectively. Access covers, plugs or caps should be installed in positions to facilitate use of testing equipment and removal of blockages.

Fire spread

In large commercial or housing developments, compartmentation may be required by the Building Regulations 2010 (Part B). In such cases, any penetrations by sanitary pipework must be suitably fire stopped. Suitable measures include the containment of pipes from floor to ceiling in a fire resistant enclosure (with appropriate fire rating).

Pipe support

Pipes must be adequately supported when installed vertically or horizontally (to falls).

Notes:

1. Gradients

Gradients should be between 1 and 5 degrees with a maximum distance of 3 metres. Distances over 3 metres are prone to blockage and should therefore be provided with access (Terrain Reference 204.15.135 & 237.15).

2. Venting

Maximum distance from stack for unvented system is 1.7 metres according to angle (see diagram A for details). Above 1.7 metres, venting is required, and if this is impractical then a suitable re-sealing trap (415.15) should be used.

3a. Air Admittance Valves

Air admittance valves (Terrain ref. 153.4.3) may be fitted as an alternative to an open vent, however an open vent must be allowed at the head of a drain. For further details see agreement Certificate No 06/4343.

3b. Terrain Pleura

Terrain Pleura may be fitted as an alternative ventilation system. The Pleura 50 protects the fixtures connected to the branch drain with the Pleura 100 and the PAPA together protecting the stack against positive and negative air pressures. An open vent must be allowed at the head of the drain. For further details see BBA Certificate 89/2139.

4. W.C. Connectors

W.C. connectors shown are to horizontal outlet pans (to BSEN997). For traditional P and S outlets a Terrain 495.4.5 or 492.4.5 connector should be used.

5. Stub Stacks

Stub stacks are used to connect one set of domestic appliances. A to be maximum of 2.0 metres and B (to crown of W.C. trap) to be maximum of 1.5 metres.

6. Connection Zones

Although four bosses have been provided on branches and access pipes certain connections are not allowed under BS5572. For permitted connections, see diagrams.

7. Distances

Distance must be a minimum of 450mm for single houses up to 3 storeys, or a minimum of 750mm up to 5 storeys, or one storey height for 5 storey buildings and over. Minimum radius of bend 200mm or alternative of 2 No. 45 degree bends.

8. Support and Expansion

Expansion should be allowed every 4.0 metres for 82mm, 110mm and 160mm and 2.0mtrs for 36mm, 43mm & 56mm respectively both vertically and horizontally.

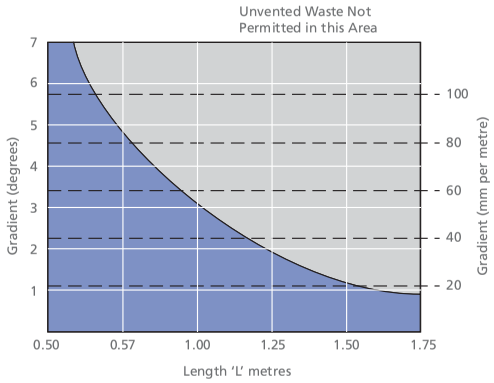
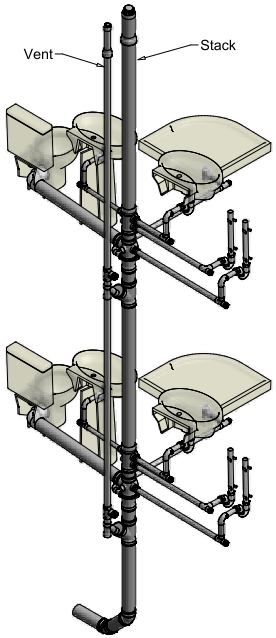


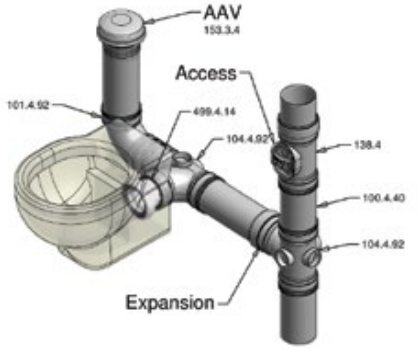
Diagram A

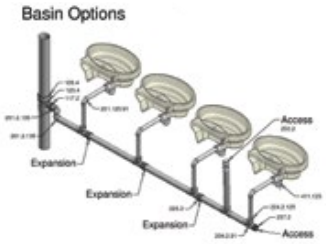
UK Design Principles

UK Principles of Stack Venting for Soil and Waste Drainage



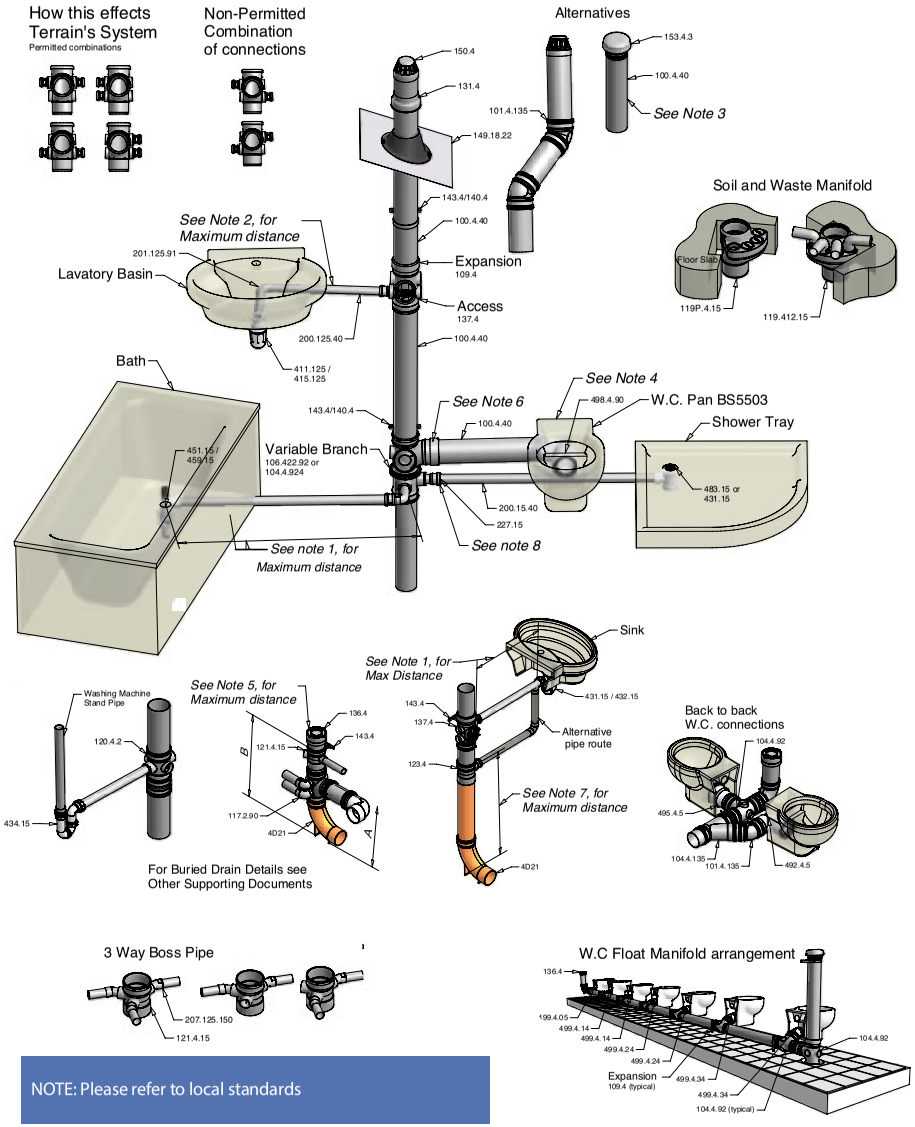
Traditional stack Vent







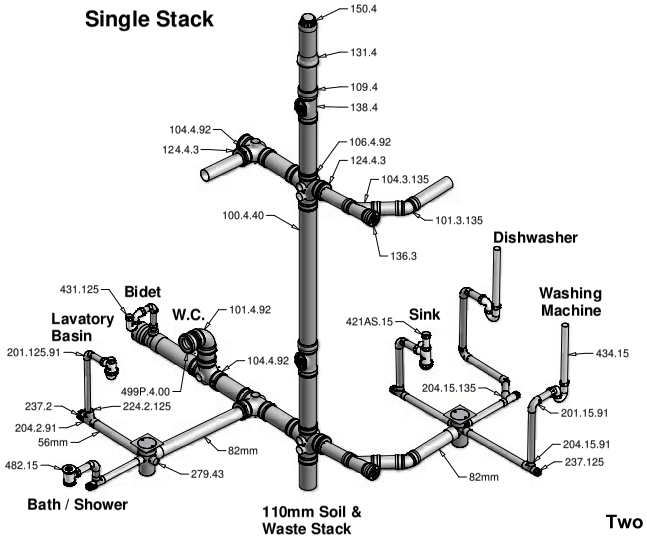
UK Principles of Stack Venting for Soil and Waste Drainage



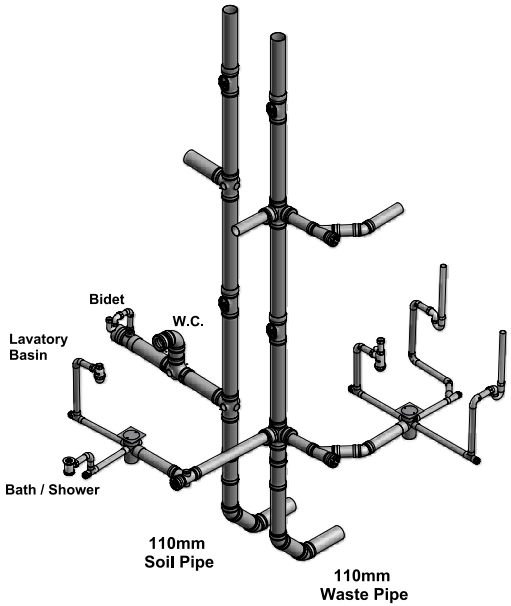
NOTE: Please refer to local standards

Middle East Design Principles

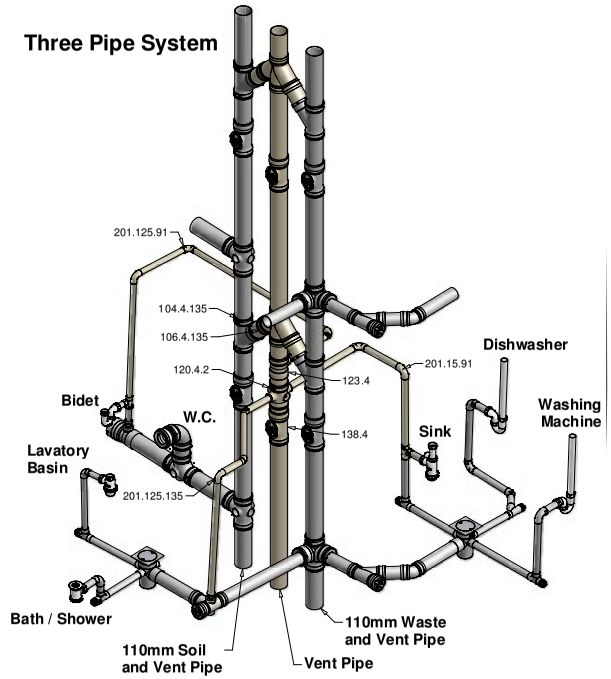
Single Stack



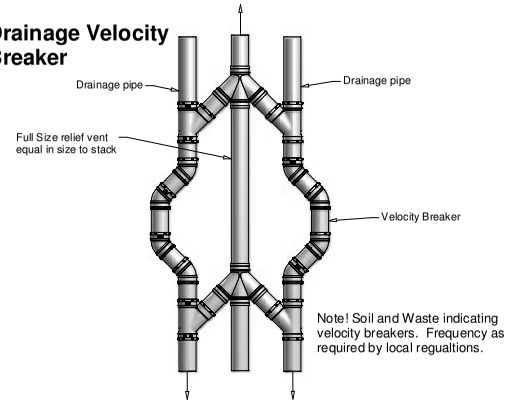
Two Pipe System



Three Pipe System



Drainage Velocity Breaker



Design Data - Soil & Waste

Table A: Discharge units (DU) Values

Appliance	System III DU l/s
Wash basin, bidet	0.3
Shower without plug	0.4
Shower with plug	1.3
Single urinal with cistern	0.4
Urinal with flushing valve	-
Slab urinal	0.2*
Bath	1.3
Kitchen sink	1.3
Dishwasher (household)	0.2
Washing machine up to 6kg	0.6
Washing machine up to 12Kg	1.2
WC with 4.0L cistern	**
WC with 6.0L cistern	1.2 to 1.7***
WC with 7.5L cistern	1.4 to 1.8***
WC with 9.0L cistern	1.6 to 2.0***
Floor gully DN 50	-
Floor gully DN 70	-
Floor gully DN 100	-

* Per person.
** Not permitted.
*** Depending upon type (valid for WC's with siphon flush cistern only).
\- Not used or no data.

Example:
10 storey building with

2 WC
4 WHB
2 Baths
2 Sinks
2 W/MC

} On each floor

2 x 1.5 = 3.0
4 x 0.3 = 1.2
2 x 1.3 = 2.6
2 x 1.3 = 2.6
2 x 0.6 = 1.2
10.6 x 9 = 95.4 DU

Domestic Building Use K = 0.7

$0.7 \sqrt{95.4} = 6.84$ l/s

See Table C and D for capacities of pipes.

Table B: Typical frequency factors (K)

Usage of appliances	K
Intermittent use, e.g. in dwelling, guest-house, office	0.5
Frequent use, e.g. in hospital, school, restaurant, hotel	0.7
Congestred use, e.g. in toilets and/or showers open to public	1.0
Special use, e.g. laboratory	1.2

Frequency factor (K)

Typical frequency factors associated with different usage of appliances Table B.

Calculation of flowrate
Waste water flowrate (Qww)

Qww is the expected flowrate of waste water in a part or in the whole drainage system where only domestic sanitary appliances are connected to the system

$Qww = K\sqrt{\sum DU}$

where:

Qww = Waste water flowrate (L/s)

K = Frequency factor

$\sum DU$ = Sum of discharge units.

NB: Under no circumstances should pipe of a larger diameter be connected to pipe of a smaller diameter in the direction of flow.

Table C: Stack with only Primary Vent

Stack & Stack Vent	System I, II, III, IV Q max (L/s)	
DN	Square # entries	Swept entries
60	0.5	0.7
70	1.5	2.0
80*	2.0	2.6
90*	2.7	3.5
100**	4.0	5.2
125	5.8	7.6
150	9.5	12.4
200	16.0	21.0

* Minimum size where WC's are connected in system II.
** Minimum size where WC's are connected in system I, III, IV. # Equal branch junctions that are more than 45°, or has a centre line radius less than the internal pipe diameter.

Table D: Stack with Secondary Venting

Stack & Stack Vent	Secondary Vent	System I, II, III, IV Q max (L/s)	
DN	DN	Square # entries	Swept entries
60	50	0.7	0.9
70	50	2.0	2.6
80*	50	2.6	3.4
90*	50	3.5	4.6
100**	50	5.6	7.3
125	70	7.6	10.0
150	80	12.4	18.3
200	100	21.0	27.3

* Minimum size where WC's are connected in system II.
** Minimum size where WC's are connected in system I, III, IV. # Equal branch junctions that are more than 45°, or has a centre line radius less than the internal pipe diameter.

For branch pipe sizing based on System III the following sizing charts should be used.

Appliance	Dia. DN	Min. trap seal depth (mm)	Max. length (L) of pipe from trap outlet to stack (m)	Pipe gradient	Max. no. of bends	Max. drop (H) (m)
Limitations for unventilated branch discharge pipes, system III						
Washbasin, bidet (30mm diameter	30	75	1.7	2.2[1]	0	0
Washbasin, bidet (30mm diameter	30	75	1.1	4.4[1]	0	0
Washbasin, bidet (30mm diameter	30	75	0.7	8.7[1]	0	0
Washbasin, bidet (30mm diameter	40	75	3.0	1.8 to 4.4	2	0
Shower, bath	40	50	No Limit[2]	1.8 to	No Limit	1.5
Bowl urinal	40	75	3.0[3]	1.8 to	No Limit[4]	1.5
Trough urinal	50	75	3.0[3]	1.8 to	No Limit[4]	1.5
Slab urinal[3]	60	50	3.0[3]	1.8 to	No Limit[4]	1.5
Kitchen sink (40mm diameter	40	75	No Limit[2]	1.8 to 9.0	No Limit	1.5
Household dish-washer or washing	40	75	3.0	1.8 to 4.4	No Limit	1.5
WC with outlet up to 80mm[6]	75	50	No Limit	1.8 min	No Limit[4]	1.5
WC with outlet greater than	100	50	No Limit	1.8 min	No Limit[4]	1.5
Food waste dis-posal[7]	40 min	75[8]	3.0[3]	13.5 min	No Limit[4]	1.5
Sanitary towel disposal unit	40 min	75[8]	3.0[3]	5.4 min	No Limit[4]	1.5
Floor drain	50	50	No Limit[3]	1.8 min	No Limit	1.5
Floor drain	50	50	No Limit[3]	1.8 min	No Limit	1.5
Floor drain	100	50	No Limit[3]	1.8 min	No Limit	1.5
4 basins	50	75	4.0	1.8 to	0	0
Bowl urinals[3]	50	75	No Limit[3]	1.8 to	No Limit[4]	1.5
Maximum of 8	100	50	15.0	0.9 to	2	1.5
Up to 5 spray tap basins[5]	30 max	50	4.5[3]	1.8 to 4.4	No Limit[4]	0

1) Steeper gradient permitted if pipe is less than maximum permitted length.
2) If length is greater than 3m noisy discharge may result with an increased risk of blockage.
3) Should be as short as possible to limit problems with deposition.
4) Sharp throated bends should be avoided.
5) For slab urinal for up to 7 persons. Longer slabs to have more than one outlet.
6) Swept-entry branches serving WC's.
7) Includes small potato-peeling machines.
8) Tubular not bottle or resealing traps.

Ventilated discharge branches: Sizes and limitations upon the use of ventilated discharge branches are given in the tables above. Limitations given in the second table are simplifications, for further information see national and local regulations and practice.

Appliance	Dia. DN	Min. trap seal depth mm	Max. length (L) of pipe from trap outlet to stack m	Pipe gradient	Max. no. of bends	Max. drop (H) m
Limitations for ventilated branch discharge pipes, system III						
Washbasin, bidet (30mm diameter	30	75	3.0	1.8 min	2	3.0
Washbasin, bidet (30mm diameter	40	75	3.0	1.8 min	No Limit	0
Shower, bath	40	50	No Limit[2]	1.8 min	No Limit	No
Bowl urinal	40	75	3.0[3]	1.8 min	No	3.0
Trough urinal	50	75	3.0[3]	1.8 min	No	3.0
Slab urinal[3]	60	50	3.0[3]	1.8 min	No	3.0
Kitchen sink (40mm diameter	40	75	No Limit[2]	1.8 min	No Limit	No Limit
Household dish-washer or washing	40	75	No Limit[3]	1.8 min	No Limit	No Limit
WC with outlet up to 80mm[6) & 14)]	75	50	No Limit	1.8 min	No Limit[4]	1.5
WC with outlet greater than	100	50	No Limit	1.8 min	No Limit[4]	1.5
Food waste dis-	40	75[8]	3.0[3]	13.5	No	3.0
Sanitary towel disposal unit	40 min	75[8]	3.0[3]	5.4 min	No Limit[4]	3.0
Bath drain, floor	50	50	No Limit[3]	1.8 min	No Limit	No
Floor drain	70	50	No Limit[3]	1.8 min	No Limit	No
Floor drain	100	50	No Limit[3]	1.8 min	No Limit	No
5 basins[9)]	50	75	7.0	1.8 to	2)	0
10 basins[9) & 10)]	50	75	10.0	1.8 to	No Limit	0
Bowl urinals[9) & 11)]	50	70	No Limit[3]	1.8 min	No	No
More than 8	100	50	No Limit	0.9 min	No Limit	No
Up to 5 spray tap basins[9)]	30 max	50	No Limit[3]	1.8 to 4.4	No Limit[4]	0

1) For maximum distances from trap to vent (see Figure 8 of BS EN 1205-2:2000).
2) If length is greater than 3m noisy discharge may result with an increased risk of blockage.
3) Should be as short as possible to limit problems with deposition.
4) Sharp throated bends should be avoided.
5) For slab urinal for up to 7 persons. Longer slabs to have more than one outlet.
6) Swept-entry branches serving WC's.
7) Includes small potato-peeling machines.
8) Tubular not bottle or resealing traps.
9) See Figure 9 of BS EN 12056-2:2000).
10) Every basin shall be individually ventilated.
11) Any number.
12) Spray tap basins shall have flush-grated wastes without plugs.
13) The size of ventilating pipes to branches from appliances can be DN 25

Design Data - Rainwater

Basic Principles for Rainwater Designs

Sizing of rainwater installations

The following general guidelines are based on BS EN 12056-3:2000 Gravity Drainage Systems Inside Buildings – Roof Drainage, Layout and Calculations.

There are two factors to consider when calculating the rainwater flow from a roof, firstly the design rainfall intensity to be used and the effective roof area to be drained.

Rainfall Intensity

It is important to confirm the design rainfall intensity with the client before carrying out any design work; this can be done by calculation (refer to BS EN 12056-3:2000) or based on local requirements.

Effective Roof Area

Before the effective roof area can be calculated it is necessary to determine if the calculation will be affected by:

a) Snow, (Section NB4, BS EN 12056-3:2000) details the design requirements for snow which should be taken into account.

b) Wind, there is no requirement to allow for the effect of wind when designing a rainwater system for flat roofs or roofs protected from the wind by adjacent buildings. However, the wind and the roof slope can have the effect of increasing the flow of rainwater from the roof of unprotected pitched roofs.

Note: Flat roofs should be designed to allow for structural deflection under dead and imposed loads, BS 6229:2003, table 6 details the minimum finished falls for a flat roof dependent upon the roof covering.

c) Tall Buildings, when draining onto a lower level roof the effective catchment area of a wall should be taken as 50% of its area up to a maximum exposed height of 10m

The effective roof area can be calculated using the following formulae,

Flat roof

$A(m^2) = L \times B$ where:

A = Effective roof area (square metres)
L = Length of roof (metres)
B = Width of roof (metres)

Pitched roof

$A(m^2) = L \times (B+H/2)$ where:

A = Effective roof area (square metres)
L = Length of roof (metres)
B = Width of roof (metres)
H = Height of rood between eaves and ridge (metres)

If an adjacent wall is to incorporated into the equation then the following needs to be added to the two formulae

$0.5 (l \times w)$ where:

L is up to maximum of 10m

Calculating design flow

Having determined the rainfall intensity (mm/hr) and effective roof area, A(m2), the following calculation is required to establish the actual design flow from the roof.

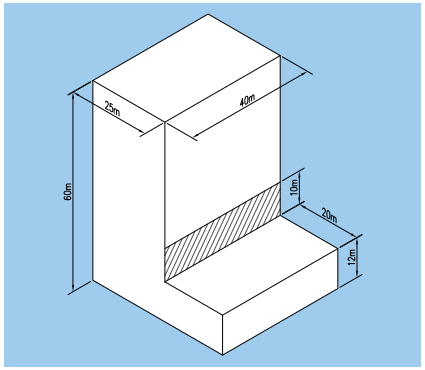
Flow rate, $Q (l/s) = \frac{A(m2) \times RI\ (mm/hr)}{3600}$

Example

A 20 storey residential block has a roof plan of 40m x 25m, there is also a podium level at level 3 with plan dimensions of 40m x 25m. The podium has been designed as a flat roof with a parapet around the perimeter. The roof will have a minimum slope towards the parapet, rainwater will discharge into a 50mm formed gutter

Local regulations have determined a design rainfall intensity of 75mm/hr.

Terrain domed PVCu outlets are to be installed on the main roof and flat grated outlets are to be installed at podium level. All outlets are to discharge into PVCu rainwater pipes.



Basic Principles for Rainwater Designs

Step 1, Determine roof area to be drained and flow rate.

Main Roof

Effective roof area
$A(m^2) = (L \times B)$
$A = (40 \times 25)$
$A = 1000\ m^2$

Flow rate
$Q (l/s) = \frac{A(m^2) \times RI\ (mm/hr)}{3600}$

$Q = \frac{1000 \times 75}{3600}$

$Q = 20.83\ l/s$

Podium Roof

Effective roof area
$A(m^2) = (L \times B) + 0.5 (l \times w)$
$A = (40 \times 20) + 0.5 (10 \times 40)$
$A = (800) + (200)$
$A = 1000\ m^2$

Flow rate
$Q (l/s) = \frac{A(m^2) \times RI\ (mm/hr)}{3600}$

$Q = \frac{1000 \times 75}{3600}$

$Q = 20.83\ l/s$

Step 2, Determine No of rainwater outlets required.

The table below details the flow rates achieved through terrain rainwater outlets for a given head of water over the outlet during a 75mm/hr rainfall intensity.

Roof Outlet	Size (mm)	Flow capacity litres/sec Head of water at Outlet		
Part No.		30mm	50mm	100mm
2180.2	50	0.88	1.18	1.78
2180.3	82	2.12	2.52	3.21
2181.2	50	2.00	2.27	2.69
2181.3	82	2.1	4.89	7.22
2170.3	82	9.18	11.08	13.67
2170.4	110	9.29	14.11	18.22
2171.3	82	4.94	9.24	16.64
2171.4	110	5.17	9.95	24.18

To suit the design of the main roof 5 No 2171.3 outlets will be installed based on a flow rate of 4.94 l/s, (head over outlet 30mm). This allows for a total of 24.7 l/s to be collected and discharged from the roof.

To suit the design of the podium roof 4 No 2170 .3 outlets will be installed based on a flow rate of 9.18 l/s, (head over outlet 30mm). This allows for a total of 36.72 l/s to be collected and discharged from the roof.

Step 3, Determine size of rainwater pipes required.

BS EN 12056-3:2000, Table 8 – capacities of vertical rainwater pipes, recommends the maximum design flow in vertical circular rainwater pipes.

Internal diameter of rainwater pipe (mm)	Capacity RWP (l/s)		Internal diameter of rainwater pipe (mm)	Capacity RWP (l/s)	
	Filling Degree f =0.20	Filling Degree f =0.33		Filling Degree f =0.20	Filling Degree f =0.33
55	0.9	2.2	150	13.7	31.6
60	1.2	2.7	160	16.3	37.5
65	1.5	3.4	170	19.1	44.1
70	1.8	4.1	180	22.3	51.4
75	2.2	5	190	25.7	59.3
80	2.6	5.9	200	29.5	68
85	3.0	6.9	220	38.1	87.7
90	3.5	8.1	240	48	110.6
95	4.0	9.3	260	59.4	137
100	4.6	10.7	280	72.4	166.9
110	6.0	13.8	300	87.1	200.6
120	7.6	17.4	> 300	Use wyly-Eaton equation	Use wyly-Eaton equation
130	9.4	21.6			

A filling degree of 0.33 shall be used unless national/local regulations and practice states that another filling factor should be used.

From our example, for the main roof we have chosen two number 110mm rainwater pipes collecting each collecting two rainwater outlets discharging a maximum of 4.94l/s. From The table above a 100mm internal rainwater pipe would be required (capacity 10.7l/s). Terrain 110mm PVCu pipework has an internal diameter of 103.6mm and is acceptable.

The podium roof will be collected and discharged through four number 110mm rainwater pipes each discharging a maximum of 9.18 l/s.

Note: where horizontal pipe runs are required, BS EN 12056-3:2000, table C.1 should be referred to, to ensure that the correct pipe size is chosen for the proposed gradient.

Fabrication Service

Fabrication Service

Pre-fabrication

Shortage of skilled labour is just one reason for the growth of pre-fabrication within construction. Moving significant elements of the process from site to factory provides improvements in quality, cost and time predictability, productivity and safety.

With unrivalled expertise in PVC fabrication systems, our Fabrication Service has been helping specifiers and contractors overcome problems, both at the design stage and on site.

Specialists in fabrication

The Terrain Fabrication team works closely with our Technical Services Department, employing the latest design and manufacturing technologies.

Together, they produce high quality Pre-fabricated Stacks and Specials, either by making modifications to existing products from the Terrain range, or by conceiving components from scratch to deal with particularly awkward problems.

Where fittings are designed specially, CAD technology is used to provide accurate drawings, along with indications of all relevant dimensions.

Our fabrication team provides services in two key areas.

Standard specials

- These are produced by making slight modifications to existing Terrain products to suit frequently occurring design problems.
- These products tend to be required regularly, but in small quantities.
- Delivery lead time is usually the same as for standard catalogue items.

Custom specials

- These are designed and fabricated specifically to meet the unique design requirements created by special architectural features. They can be made not only on a one-off or small batch basis, but also in their hundreds, subject to the demands of your particular project.
- They can be produced to your precise specification in virtually any size or shape.
- Custom Specials provide solutions to otherwise unsolvable design problems.
- Delivery time depends upon the complexity of the design and number required.

Pre fabricated stacks

Prefab Stacks consist of soil and waste pipes and fittings pre-assembled at the factory to pre-determined lengths to provide a modular soil and vent stack.

These offer a number of benefits:

- Time and labour costs on site are reduced by minimising the joints to be made.
- Highly efficient for commercial, leisure and housing projects where identical plumbing arrangements are repeated a number of times.
- Can be quickly installed, reducing the need to re-locate residents, making them ideal for refurbishment work.

Three easy steps for our special fabrication service

It couldn't be simpler to order Specials or have a Pre-fabricated Stack manufactured for you.

- Send a dimensioned sketch and specification by email, fax or post to our Technical Services Department.
- We will then advise you on design possibilities and send you back CAD diagrams, if necessary, complete with a part number and price for your approval.

If the special is being incorporated into the design stage of a drainage layout, be sure to include the unique part number with any plans to be passed to the contractor.

- You place the order through your local merchant, stating the unique product number and price.

Whether at the design stage or on site, should you come up against a problem related to plumbing and drainage, look no further than the Terrain Special Fabrication Service.



Certifications

Certifications

Certifications



Manufacturing Standards

BS 5255:1989 Specification for Thermoplastics Waste Pipe and Fittings

BS 4514:2001 PVC Soil and Ventilation Pipes, Fittings and Accessories

BS EN 1329:2000 Plastic Piping Systems for Soil and Waste Discharge

BS EN 1566:2000 Plastic Piping Systems for Soil and Waste Discharge (Chlorinated)

BS EN 12380 A1 Air Admittance Valve

BS EN 12380 A1 Air Admittance Valve (Pleura System)

BS EN 1366-3 Terrain Firetrap Sleeves and Collars

Quality Management Systems Standards

EN ISO 9001:2008 Management System

EN ISO14001:2004 Management System

BS OHSAS 18001:2007 Management System

PASS 99:2006 Integrated Management Registration

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Notes

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Terrain Above Ground



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8.107

tri-jace9000-datasheet-2025-0009

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Reference	
Asset	General
Provided by	Not recorded
Source file	`tri-jace9000-datasheet-2025-0009.pdf`
Pages	5

data sheet

JACE 9000 controller

PRODUCT DEFINITION

The JACE® 9000 is a compact, embedded IoT (Internet of Things) controller and server platform for connecting multiple and diverse devices and sub-systems. With internet connectivity and web-serving capability, the JACE 9000 controller provides integrated control, supervision, data logging, alarming, scheduling and network management. It streams data and rich graphical displays to a standard web browser via an Ethernet or wireless LAN, or remotely over the internet.

The licensing model for the JACE 9000 controller is simplified and features standard drivers, along with optional IO and field bus expansion modules for ultimate flexibility and expandability. The JACE 9000 controller operates with Niagara 4, the latest version of the Niagara Framework®, for optimum performance. In larger facilities, multi-building applications and large-scale control system integrations, Niagara 4 Supervisors can be used with JACE controllers to aggregate information, including alarms, and historical and real-time data, to create a single, unified application.



HARDWARE SPECIFICATIONS

1.6GHz NXP iMX8M+ Quad Core CPU
2GB LPDDR4 RAM
8GB onboard EMMC storage
8GB micro-SD card (backup media)
Wi-Fi (Client or WAP) • Wi-Fi 5 (802.11ac) • 1x1 802.11 a/b/g/n/ac • Configurable radio (Off, WAP, or Client) • WPAPSK/WPA2PSK supported • Only available for wireless model
USB type C connector • Debug port
(2) isolated RS-485 with selectable bias and termination
(2) 10/100/1000MB Ethernet ports
Secure boot
*Supply requirements: 24VAC rated at 24VA minimum, or 24VDC rated at 1A (24W) minimum
Non-Wi-Fi: Supports Niagara 4.13 and later Wi-Fi: Supports Niagara 4.15 and later
Real-time clock
Batteryless

Niagara Enterprise Security requires four hours of standby power

powered by niagara framework®

ORDERING INFORMATION: SOFTWARE & SOFTWARE MAINTENANCE

JACE 9000 non-Wi-Fi is available with a Niagara 4.13 or higher software license and Tridium's standard drivers. JACE 9000 Wi-Fi is available with a Niagara 4.15 or higher software license and Tridium's standard drivers. Purchase of a software maintenance agreement (SMA) is required with initial JACE licensing. The initial SMA is for 18 months, with extended agreements of 3 years and 5 years available for discounted rates.

Note: An active Software Maintenance Agreement (SMA) is required for a Niagara instance to run the latest version of Niagara. When SMA expires, the licensed version will remain at the version that's in effect at time of the expiration. To upgrade, the requisite maintenance terms (1-year, 3-year, 5-year) are required to bring the SMA expiration date to current or future date.

ORDERING INFORMATION: NIAGARA ANALYTICS

Niagara Analytics is a data analytics extension to the Niagara Framework available on JACE 9000 controllers. 25 Niagara Analytic points are included with every JACE 9000 license. Niagara Analytics licenses are conveniently and cost-effectively based on the number of analytical points and do not expire. Your Software Maintenance Agreement covers all Niagara Analytics enhancements, adding to the value of the SMA.

key features

- Data analysis at the onsite JACE controller level
- Real-time on-premise analytic control

Part number	Description
NA-EC-N4-100	Niagara Analytics Framework (on Niagara 4) license for 100 analytic points for an Embedded Controller (JACE)
NA-EC-N4-250	Niagara Analytics Framework (on Niagara 4) license for 250 analytic points for an Embedded Controller (JACE)
NA-EC-N4-500	Niagara Analytics Framework (on Niagara 4) license for 500 analytic points for an Embedded Controller (JACE)
NA-EC-N4-1000	Niagara Analytics Framework (on Niagara 4) license for 1,000 analytic points for an Embedded Controller (JACE)

Find additional data sheets for Niagara Analytics and Niagara Drivers on Tridium's website

EXPANSION MODULE AND IO CONFIGURATIONS

MAXIMUM EXPANSION (MODULES SUPPORTED)

- NPB-8000-LON (4)
- NPB-8000-232 (4)
- NPB-8000-2X-485 (2)

MAXIMUM IO (MODULES SUPPORTED)*

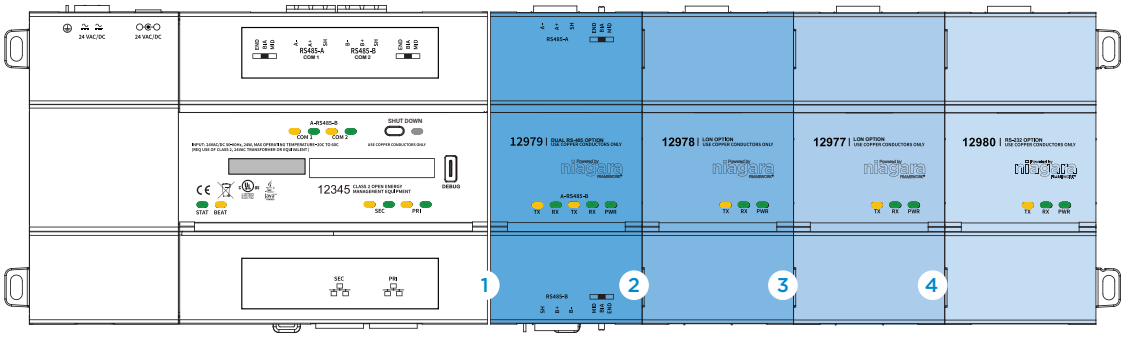
- IO-R-16 (16)*
- IO-R-34 (8)*

**See JACE IO R data sheet for configuration details*

MAXIMUM NIAGARA ENTERPRISE SECURITY (MODULES SUPPORTED)*

- T-SEC-R2R*
- T-SEC-RIO*

**16 total each or combined*



MAXIMUM COMBINATIONS

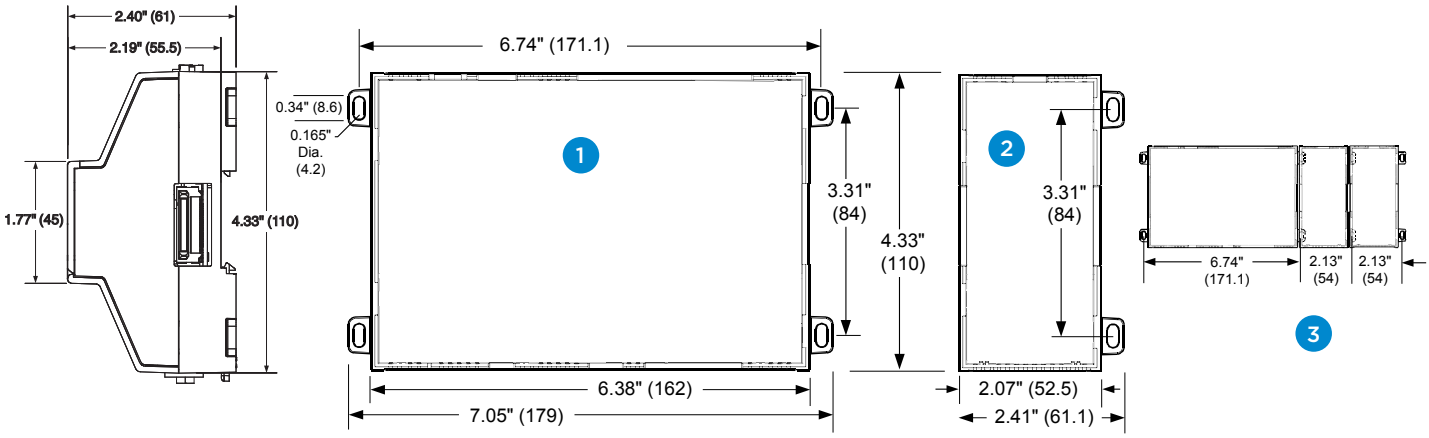
EXPANSION 1	EXPANSION 2	EXPANSION 3	EXPANSION 4
232 or LON	232 or LON	232 or LON	232 or LON
485 485	232 or LON	232 or LON	232 or LON
485 485	485 485	232 or LON	
485 485	485 485		

Expandability is dependent on the type of expansion module used



JACE® 9000 CONTROLLER MOUNTING & DIMENSIONS

1. JACE 9000 controller. Allow at least 1.5″ (38mm) clearance around all sides and minimum 3″ (76mm) at bottom for optional Wi-Fi antenna
2. Expansion module. Up to four (4) may be used. See "Expansion Module and IO Configurations"
3. Distances between center of tabs from one unit to another unit



Compatible with (DIN43880) enclosures
Suitable for mounting to a panel or to an EN50022 standard 35mm rail

Vizio stencils available upon request

AGENCY CERTIFICATIONS

- UL 916
- CE EN 61326-1
- RCM
- FCC Part 15 Subpart B, Class B
- FCC Part 15 Subpart C
- C-UL listed to Canadian Standards Association (CSA) C22.2 No. 205-M1983 "Signal Equipment"
- 1999/5/EC R&TTE Directive
- SRRC
- RSS
- RoHS

ENVIRONMENTAL SPECIFICATIONS

- **Operating temperature:** -20–60°C
- **Storage temperature:** -40–85°C
- **Humidity:** 5%–95% — Non condensing
- **Shipping & vibration:** ASTM D4169, Assurance Level II
- **MTTF:** 10 years+

Contact **support@tridium.com** for the latest agency certifications or global shipping guide

JACE® 9000 ORDERING INFORMATION

Part number	Description
JACE-9000-CSE-001, 002, 005	Base unit includes two isolated RS485 ports, two 10/100/1000MB Ethernet ports and Wi-Fi connectivity. Refer to the Global Shipping Guide for more country specific SKU.
JACE-9000-CSE-003	Identical in form and function to standard JACE 9000 model without the Wi-Fi module and peripherals.
JACE-9000-DEMO	Base unit includes two isolated RS485 ports, two 10/100/1000MB Ethernet ports, Wi-Fi connectivity, all available Tridium drivers and a 500 device license. Hardware Accessories purchased separately. Available with Niagara Analytics (non-production only).
NC-9XXX-DEMO	JACE 9000 Demo with 500 Device Core. Includes all available Tridium Drivers. Requires Niagara 4.13 or higher. Available with Niagara Analytics (non-production only). License will renew annually with the receipt of the annual support fee.
NC-9005	Up to 5 devices/250 point core
NC-9010	Up to 10 devices/500 point core
NC-9025	Up to 25 devices/1,250 point core
NC-9100	Up to 100 devices/5,000 point core
NC-9200	Up to 200 devices/10,000 point core
DEVICE-10	Up to 10 devices/500 point upgrade (can be purchased during initial licensing)
DEVICE-25	Up to 25 devices/1,250 point upgrade (can be purchased during initial licensing)
DEVICE-50	Up to 50 devices/2,500 point upgrade (can be purchased during initial licensing)
NPB-8000-2X-485	JACE 8000 & 9000 controllers — add on dual port RS-485 module
NPB-8000-LON	JACE 8000 & 9000 controllers — add on single port LON FTT10A module
NPB-8000-232	JACE 8000 & 9000 controllers — add on single port RS-232 module
WPM-8000	Universal power supply for JACE 8000 & 9000 controllers
IO-R-16	Optional 16 point IO RS485 module designed for use with the JACE 8000 & 9000 — Includes 8 Universal Inputs, 4 Form A Relay Outputs and 4 0-10 VDC Analog Outputs
IO-R-34	Optional 34 point IO RS485 module designed for use with the JACE 8000 & 9000 — Includes 16 Universal Inputs, 10 Form A Relay Outputs and 8 0-10 VDC Analog Outputs

The JACE 9000 controller is available through a wide variety of original equipment manufacturers. Our open distribution business model and open protocol support allow a vendor-neutral application compatible with devices and systems throughout the world.

TRIDIUM

tridium.com

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Support
North America & Latin America
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Europe, Middle East & Africa
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86 400 818 6088

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2025-0009

SECTION 11

11

As-built drawings

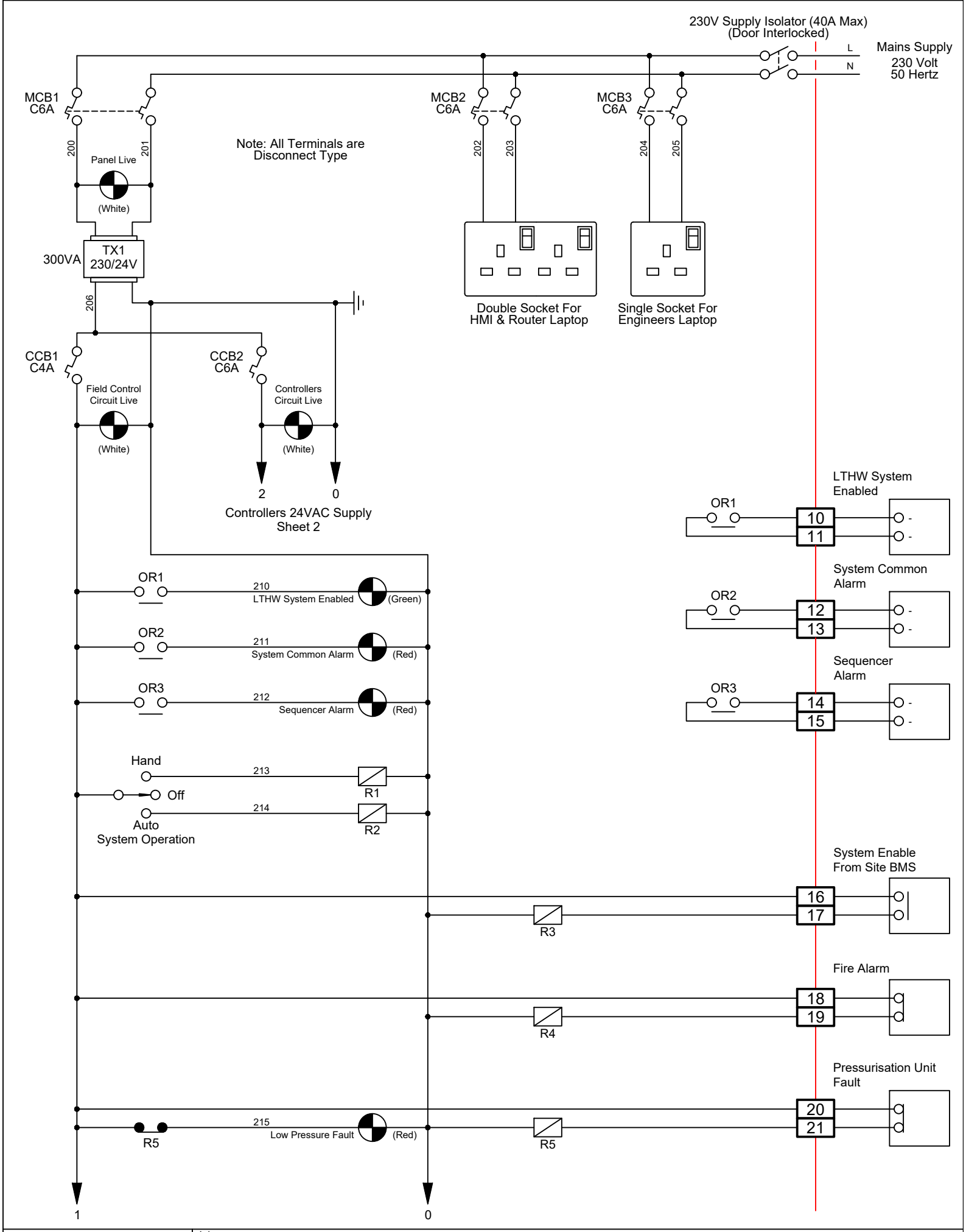
Documents 11.1 to 11.22 are in this volume, each exactly as received and checked.

11.1

Trane heat pump sequencer panel drawings, as manufactured

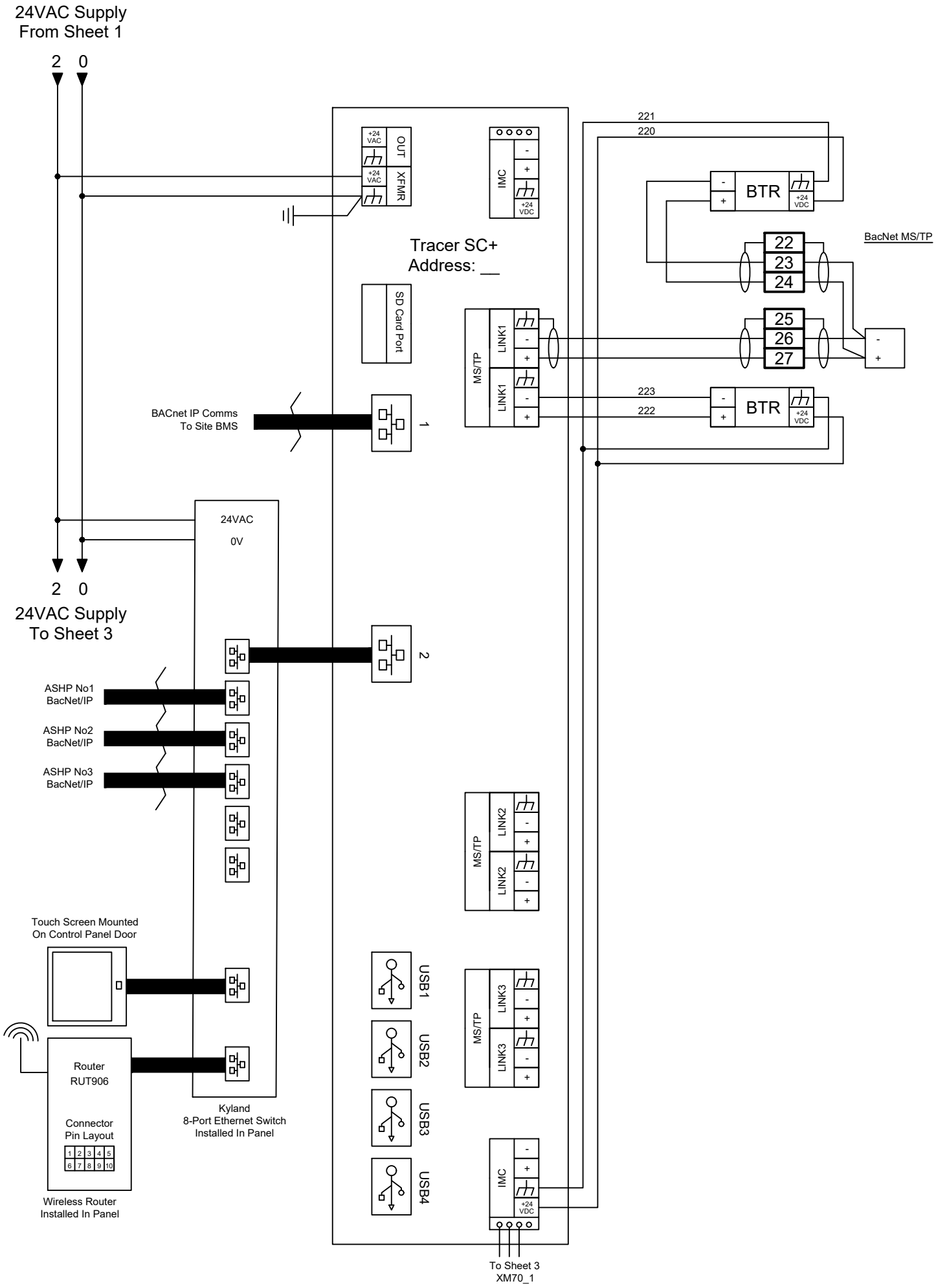
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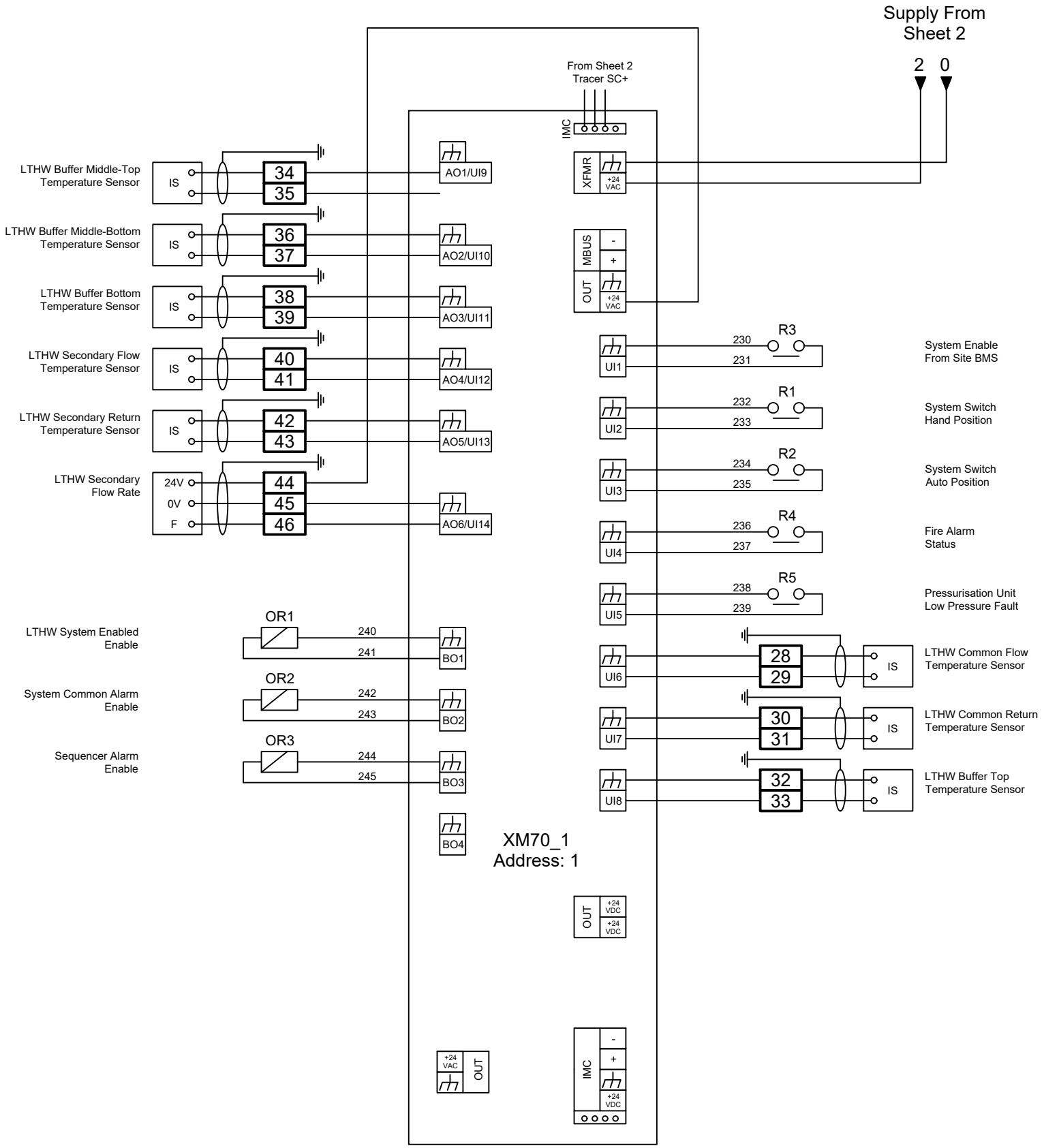
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Job: Elmwood Leisure Centre					
Title: Heat Pump Sequencer Panel					
Issue Type: As Manufactured					
Design: N. Sponer	CAD: N. Sponer	Checked: -	Scale: N.T.S	Sheet No.: 1	No. of Sheets: 6
Date: 05/08/2025	Date: 13/09/2025	Date: -	Drawing/Job No.: 43NA875		



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Title	Heat Pump Sequencer Panel				
Issue Type	As Manufactured				
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Job	Elmwood Leisure Centre					
Title	Heat Pump Sequencer Panel					
Issue Type	As Manufactured					
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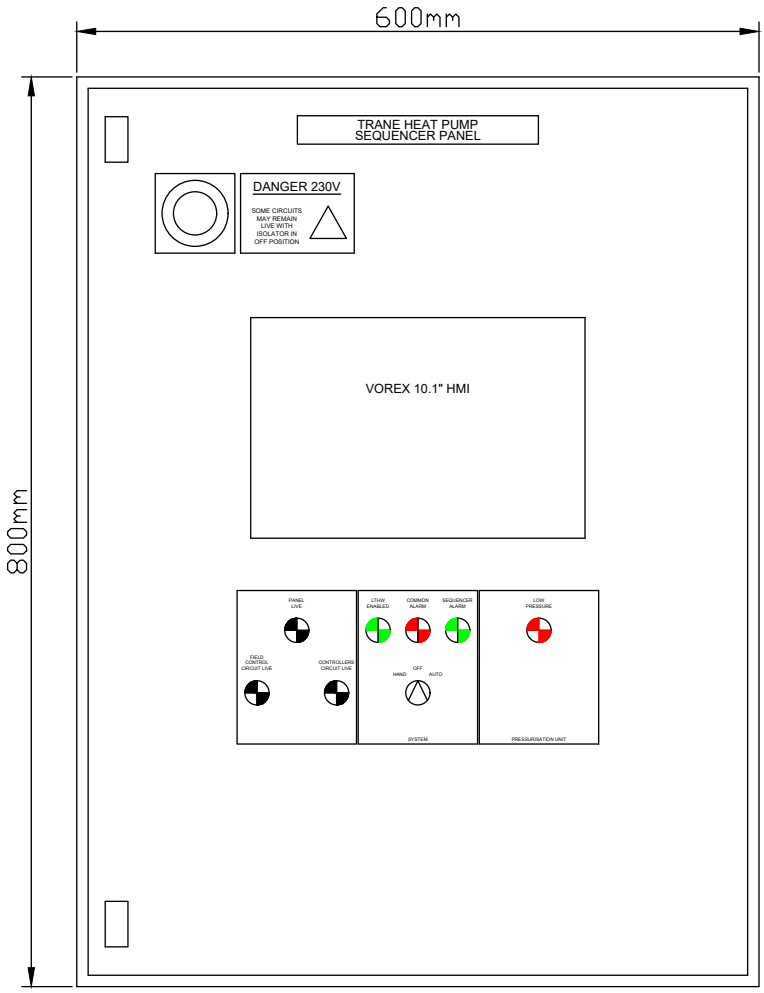
NTS

Panel Dimensions 800mm High x 600mm Wide x 300mm Deep

Note: Top Entry, Single Door, Right Hinge

ETA EC060830 - RAL7035 - IP66 - Cam lock with 3 mm double-bit insert

Door Layout



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Job	Elmwood Leisure Centre				
Title	Heat Pump Sequencer Panel				
Issue Type	As Manufactured				
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NTS

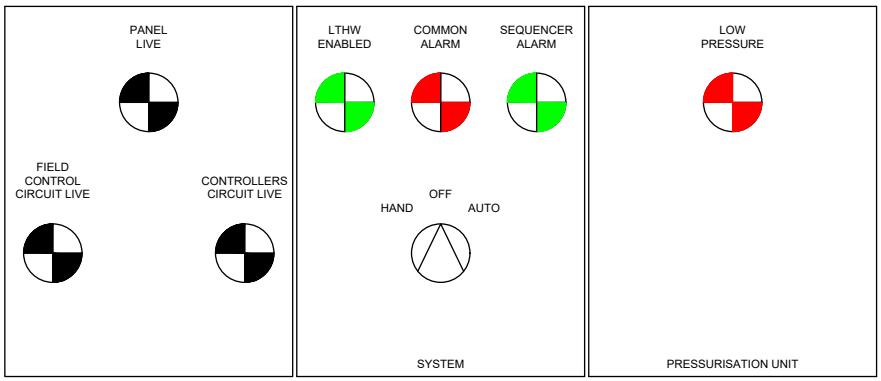
Labels - White Background/Black Text

Label Details

TRANE HEAT PUMP
SEQUENCER PANEL

DANGER 230V

SOME CIRCUITS
MAY REMAIN
LIVE WITH
ISOLATOR IN
OFF POSITION



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Job: Elmwood Leisure Centre					
Title: Heat Pump Sequencer Panel					
Issue Type: As Manufactured					
Design: N. Sponer	CAD: N. Sponer	Checked: -	Scale: N.T.S	Sheet No.: 5	No. of Sheets: 6
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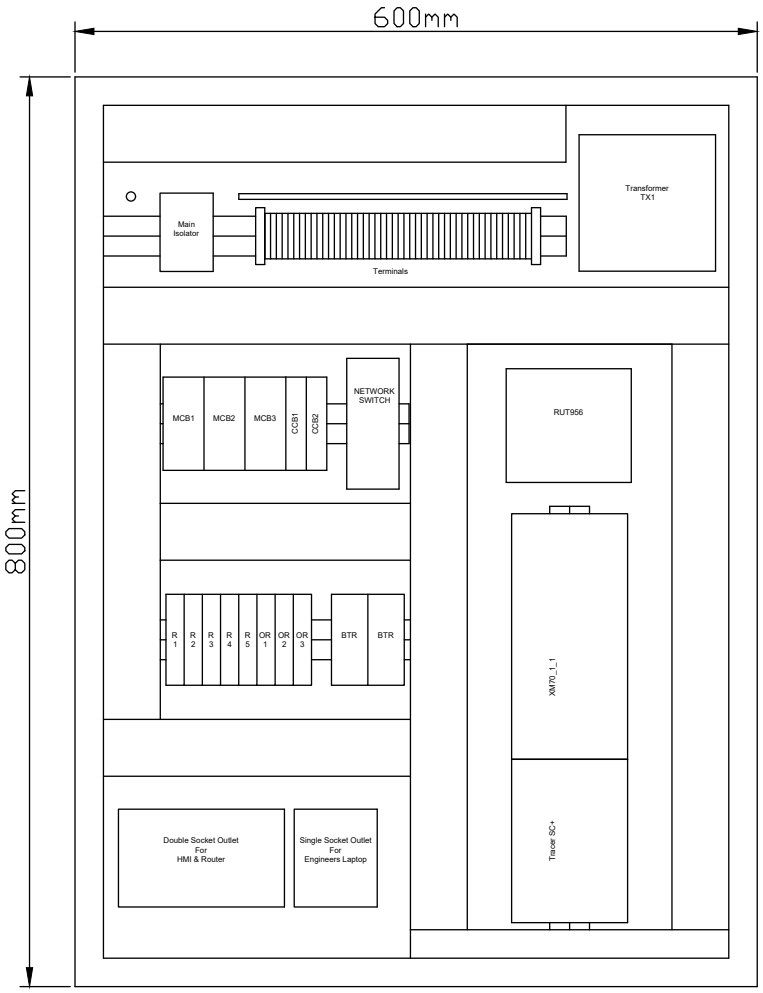
NTS

Panel Dimensions 800mm High x 600mm Wide x 300mm Deep

Note: Top Entry, Single Door

ETA EC060830 - RAL7035 - IP66 - Cam lock with 3 mm double-bit insert

Backplate Layout



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Title	Heat Pump Sequencer Panel				
Issue Type	As Manufactured				
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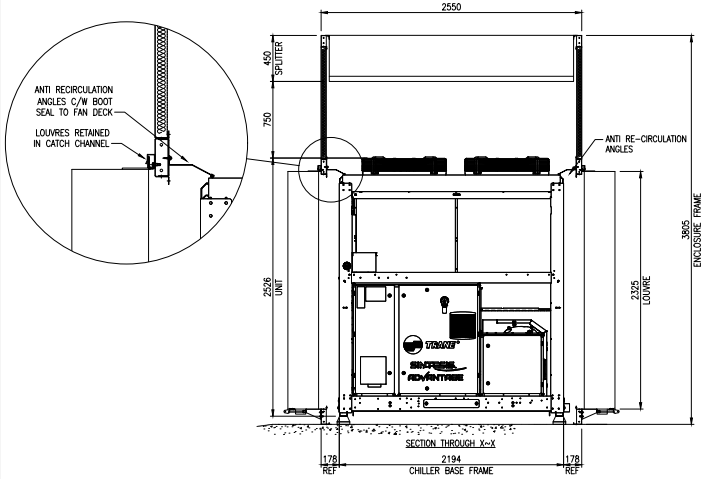
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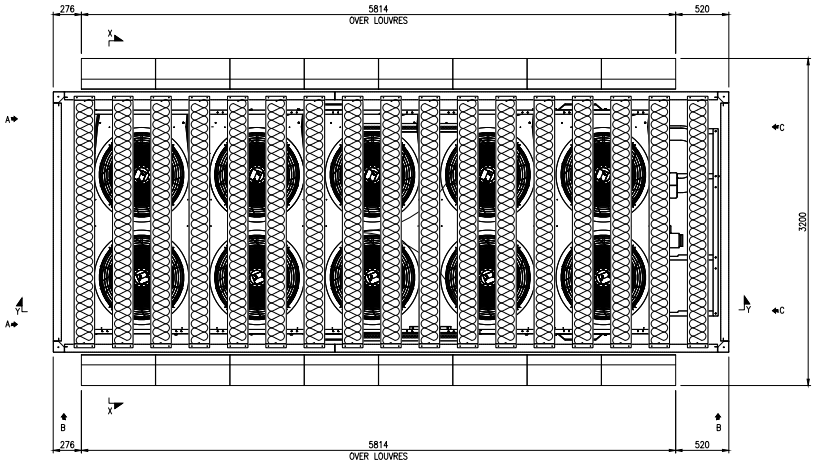
Quinway acoustic enclosure drawing 99307D 001 rev ZA

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Reference	
Asset	General
Provided by	Not recorded
Source file	`Quinway acoustic enclosure drawing 99307D 001 rev ZA.pdf`
Pages	1

IF IN DOUBT ASK
3rd ANGLE PROJECTION





GENERAL NOTES & SPECIFICATION:

1. ENCLOSURE FRAME:
   MANUFACTURED FROM PRE GALVANSED SHEET STEEL

2. FIXED ACOUSTIC ENCLOSURE PANELS:
   50mm THICK ACOUSTIC PANELS MANUFACTURED FROM STANDARD GAUGE PRE GALVANISED SHEET OUTER PRE GALVANISED PERFORATED SHEET INNER C/W ACOUSTIC INFILL & TISSUE SCRIM. PANELS FIXED TO FRAME WITH M8 SET SCREWS INTO PRE FIXED RIVNUTS WITHIN ENCLOSURE FRAME.

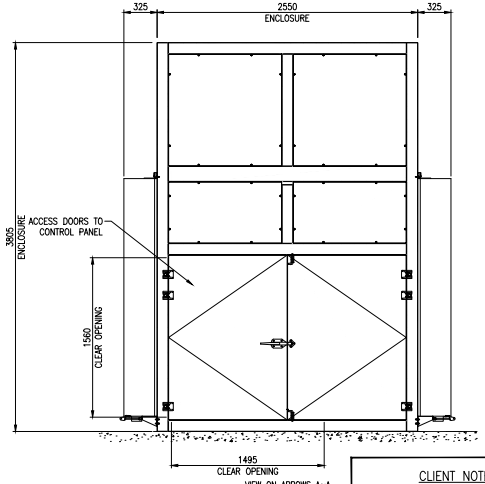
3. ENCLOSURE ACCESS DOOR:
   45mm THICK ACOUSTIC DOOR MANUFACTURED FROM STANDARD GAUGE PRE GALVANISED SHEET OUTER & SHEET INNER C/W SLAM HANDLE AND INTERNAL SHOOT BOLTS

4. AL3030 LOUVRES
   300mm DEEP LOUVRES MANUFACTURED FROM 5251 ALUMINIUM ALLOY.

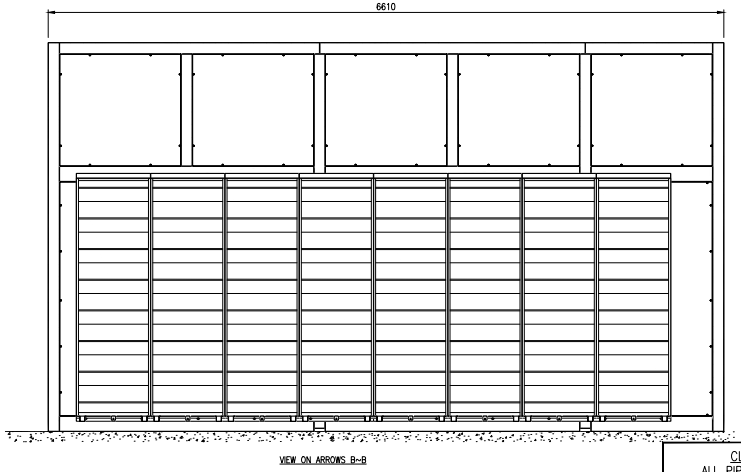
5. FINISH:
   ENCLOSURE FRAME, PANELS & SUPPORT ANGLES TO BE POLYESTER POWDER COATED TO TO RAL 7035 (MATT).
   SPLITTERS SELF FINISH PRE GALVANISED
   LOUVRES SELF FINISH 5251 ALUMINIUM

TOTAL WEIGHT OF ENCLOSURE APPROX. 2473kg

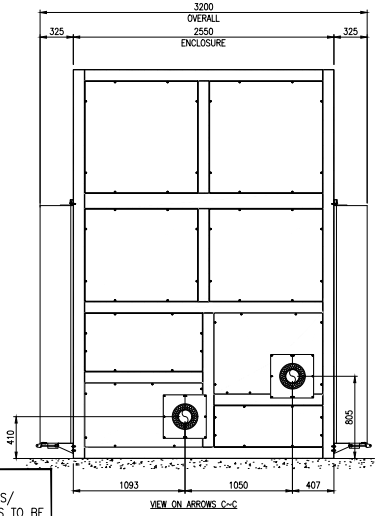
TOTAL 2 OFF ENCLOSURES REQD.



CLIENT NOTE:
CABLE ENTRY POINT & SIZE TO BE CONFIRMED PRIOR TO PACKAGE MANUFACTURE

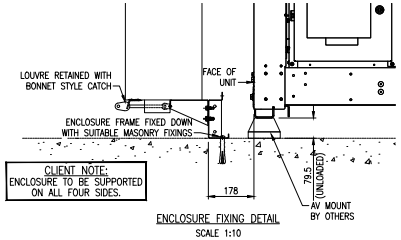


CLIENT NOTE:
ALL PIPE CONNECTIONS/ FLANGES/VALVES/COUPLINGS TO BE SITED CLEAR OF ACOUSTIC PACKAGE



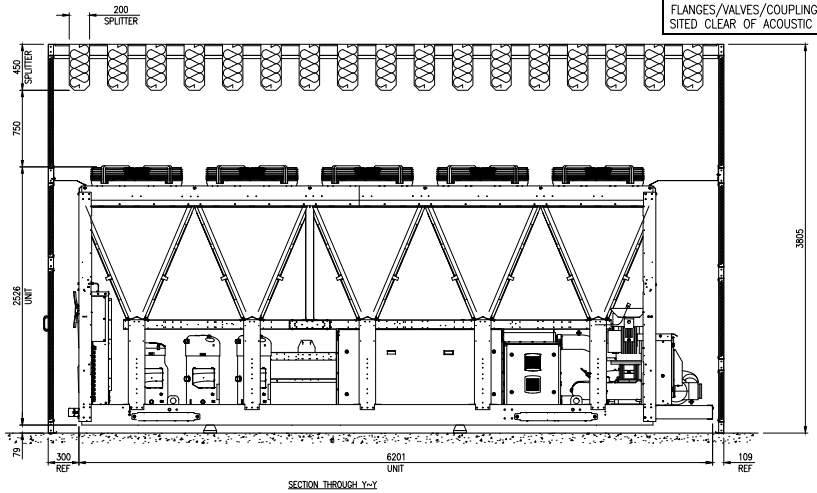
CLIENT NOTE:
END PANELS NOTCHED TO SUIT ø139.7 PIPEWORK C/W 40mm THICK LAGGING.

AS BUILT



CLIENT NOTE:
ENCLOSURE TO BE SUPPORTED ON ALL FOUR SIDES.

ENCLOSURE FIXING DETAIL
SCALE 1:10



SECTION THROUGH Y-Y

ISSUE	DESCRIPTION	ENG	DRN	CHKD	DATE
ZA	AS BUILT	MS	MF	MS2	20.10.25
B	CONSTRUCTION ISSUE	MS	MF	MS2	07.08.25
A	FIRST ISSUE	MS	MF	MS	30.06.25

CLIENT:- HENSALL MECHANICAL SERVICES LTD

CONTRACT No 99307C

SCALE 1:25 @ A1

PROJECT:- ELMWOOD LEISURE CENTRE

DRAWING No 99307D 001ZA

TITLE GENERAL ARRANGEMENT OF AN AA306S ACOUSTIC PACKAGE TO A TRANE CXAF150 UNIT

STATUS AS BUILT

quinway acoustics
1 QUEENS ROAD,
HERTFORD,
HERTFORDSHIRE. SG14 1EN
Tel: 01992-550825
FAX: 08000988744
E-MAIL: enquiries@quinwayacoustics.co.uk

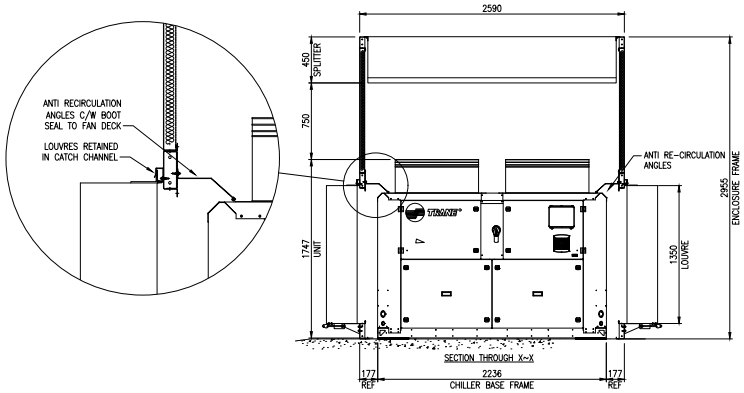
11.3

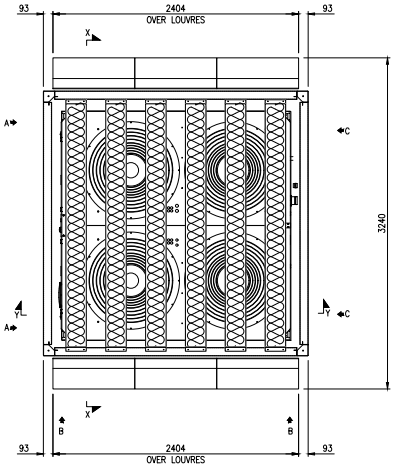
Quinway acoustic enclosure drawing 99307D 002 rev ZA

The following page is the document exactly as received and checked. It is bookmarked in the PDF.

Reference	
Asset	General
Provided by	Not recorded
Source file	`Quinway acoustic enclosure drawing 99307D 002 rev ZA.pdf`
Pages	1

IF IN DOUBT ASK
3rd ANGLE PROJECTION





GENERAL NOTES & SPECIFICATION:

1. ENCLOSURE FRAME:
MANUFACTURED FROM PRE GALVANSED SHEET STEEL

2. FIXED ACOUSTIC ENCLOSURE PANELS:
50mm THICK ACOUSTIC PANELS MANUFACTURED FROM STANDARD GAUGE PRE GALVANISED SHEET OUTER PRE GALVANISED PERFORATED SHEET INNER C/W ACOUSTIC INFILL & TISSUE SCRIM. PANELS FIXED TO FRAME WITH M8 SET SCREWS INTO PRE FIXED RIVNUTS WITHIN ENCLOSURE FRAME.

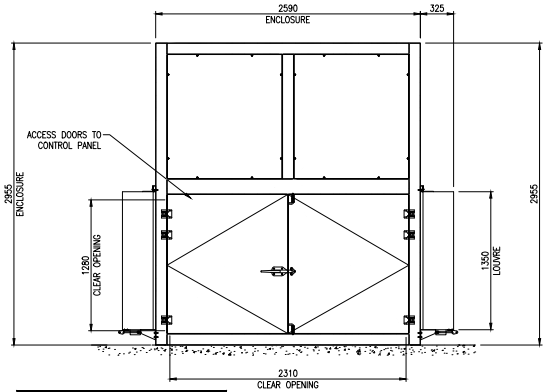
3. ENCLOSURE ACCESS DOOR:
45mm THICK ACOUSTIC DOOR MANUFACTURED FROM STANDARD GAUGE PRE GALVANISED SHEET OUTER & SHEET INNER C/W SLAM HANDLE AND INTERNAL SHOOT BOLTS

4. AL3030 LOUVRES
300mm DEEP LOUVRES MANUFACTURED FROM 5251 ALUMINIUM ALLOY.

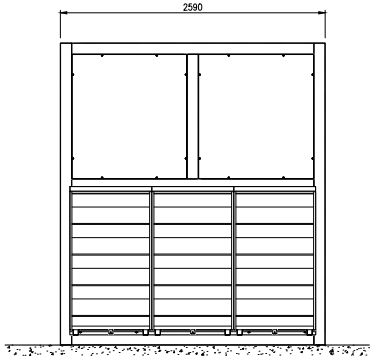
5. FINISH:
ENCLOSURE FRAME, PANELS & SUPPORT ANGLES TO BE POLYESTER POWDER COATED TO TO RAL 7035 (MATT).
SPLITTERS SELF FINISH PRE GALVANISED
LOUVRES SELF FINISH 5251 ALUMINIUM

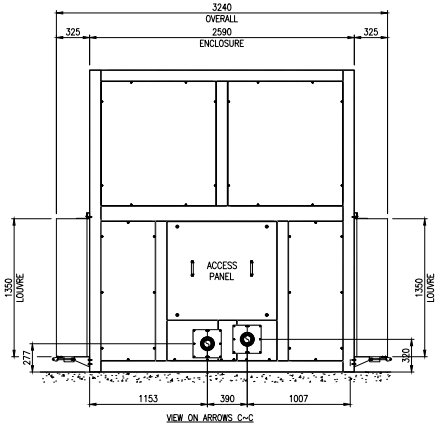
TOTAL WEIGHT OF ENCLOSURE APPROX. 1171kg

TOTAL 1 OFF ENCLOSURES REQD.

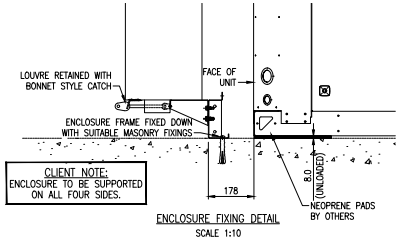


CLIENT NOTE:
CABLE ENTRY POINT & SIZE TO BE CONFIRMED PRIOR TO PACKAGE MANUFACTURE

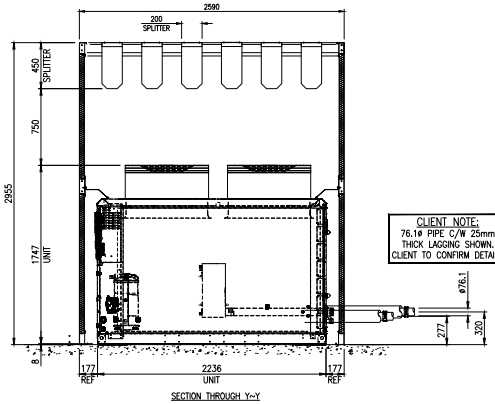




CLIENT NOTE:
END PANELS NOTCHED TO SUIT 76.1ø PIPE C/W 40mm THICK LAGGING.



CLIENT NOTE:
ENCLOSURE TO BE SUPPORTED ON ALL FOUR SIDES.



CLIENT NOTE:
76.1ø PIPE C/W 25mm THICK LAGGING SHOWN. CLIENT TO CONFIRM DETAILS

CLIENT NOTE:
ALL PIPE CONNECTIONS/ FLANGES/VALVES/COUPLINGS TO BE SITED CLEAR OF ACOUSTIC PACKAGE

AS BUILT

ZA	AS BUILT	MS	MF	MS2	20.10.25
B	CONSTRUCTION ISSUE	MS	MF	MS2	11.08.25
A	FIRST ISSUE	MS	MF	MS	14.07.25
ISSUE	DESCRIPTION	ENG	DRN	CHKD	DATE

CLIENT:- HENSALL MECHANICAL SERVICES LTD

CONTRACT No 99307C

SCALE 1:25 @ A1

PROJECT:- ELMWOOD LEISURE CENTRE

DRAWING No 99307D 002ZA

TITLE GENERAL ARRANGEMENT OF AN AA306S ACOUSTIC PACKAGE TO A TRANE CXAX035 UNIT

STATUS AS BUILT

quinway acoustics
1 QUEENS ROAD,
HERTFORD,
HERTFORDSHIRE. SG14 1EN
Tel: 01992-550825
FAX: 08000988744
E-MAIL: enquiries@quinwayacoustics.co.uk

11.4

Trane heat pump wiring architecture Rev A

The following 2 pages are the document exactly as received and checked. It is bookmarked in the PDF.

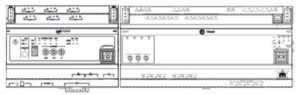
Reference	
Asset	General
Provided by	Not recorded
Source file	`Trane heat pump wiring architecture Rev A.pdf`
Pages	2



Fire Alarm Interface

SITE BMS BACnet Interface

Control Panel



Tracer SC+ Tracer UC600/1

User Interface

Note: *Sequencer panel requires a 230V single phase supply*

Remote Signals To Site BMS (Max 24VAC)

- VFC To Indicate LTHW Enabled
- VFC To Indicate System Common Alarm
- VFC To Indicate ASHP Common Alarm

Remote Signals From Site BMS

- VFC From Site BMS To Enable LTHW (24VAC from Trane Control Panel)



Trane CXAX035 Air Sourced Heat Pump 1



Trane CXAF150 Air Sourced Heat Pump 2



Trane CXAF150 Air Sourced Heat Pump 3



Pressurisation Unit Low Pressure Alarm



Flow Sensor Flow After Buffer

Temperature Sensor Secondary Return

Temperature Sensor Secondary Flow

Temperature Sensor Primary Flow

Temperature Sensor Primary Return

Temperature Sensor Buffer Top

Temperature Sensor Buffer Top Middle

Temperature Sensor Buffer Middle Bottom

Temperature Sensor Buffer Bottom

Note: *Trane to supply temperature and flow sensors only.*
All wiring and containment is the responsibility of the onsite contractors.

Recommended Cables:

- BACnet MSTP Cable - 18AWG, Screened & Shielded (Belden 8760)
- Sensor Cable - 18AWG, Screened & Shielded (Belden 8760)
- Sensor Cable - 18AWG, Screened & Shielded 2 pair (Belden 8723)
- VSD Pump Set Enable/Fault/Run – 6 + Earth Core YY cable Per VSD
- BMS Interface – 2 Cores for each signal required (Max Voltage 24Vac)
- BACnet-IP Cat5 Cable – UTP Cat5
- Fire Alarm – FP Rated Cable
- Valve Actuator Power Cable – 2 + Earth Core YY Cable

Rev:	Date :	Description :
A	13/05/2025	First Issue

TRANE

Project: **Elmwood LC**
Heat Pump Plant Management System

Title: Sequencer Panel Wiring Architecture Diagram

File: Elmwood LC_Wiring Architecture_REVA | **Page:** 1/2 | **Rev:** A | **Date:** 13/05/25

Supersedes:



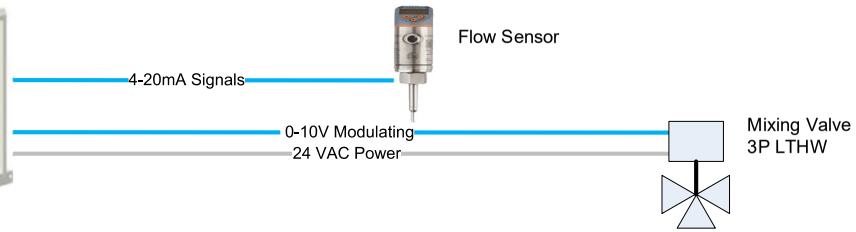
Trane CXAX035 Air Sourced Heat Pump 1

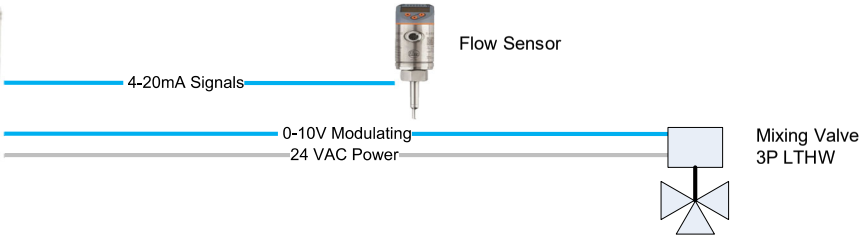


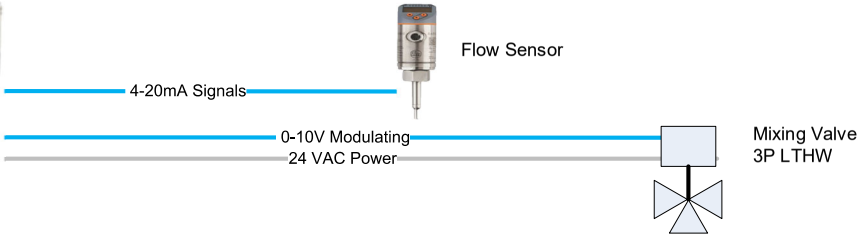
Trane CXAF150 Air Sourced Heat Pump 2



Trane CXAF150 Air Sourced Heat Pump 3







Note: *Trane to supply temperature and flow sensors only.*
All wiring and containment is the responsibility of the onsite contractors.

Recommended Cables:

- BACnet MSTP Cable - 18AWG, Screened & Shielded (Belden 8760)
- Sensor Cable - 18AWG, Screened & Shielded (Belden 8760)
- Sensor Cable - 18AWG, Screened & Shielded 2 pair (Belden 8723)
- VSD Pump Set Enable/Fault/Run – 6 + Earth Core YY cable Per VSD
- BMS Interface – 2 Cores for each signal required (Max Voltage 24Vac)
- BACnet-IP Cat5 Cable – UTP Cat5
- Fire Alarm – FP Rated Cable
- Valve Actuator Power Cable – 2 + Earth Core YY Cable

Rev:	Date :	Description :
A	13/05/2025	First Issue

TRANE

Project: **Elmwood LC**
Heat Pump Plant Management System

Title: ASHPs Wiring Architecture Diagram

File: Elmwood LC_Wiring Architecture_REVA | **Page:** 2/2 | **Rev:** A | **Date:** 13/05/2025

Supersedes:

11.5

HEN0203-HEN-00-00-DR-M-5201 rev AF01 Ground Floor Above Ground Drainage Layout Sheet 1 of 4

The following page is the document exactly as received and checked. It is bookmarked in the PDF.

Reference	HEN0203-0000M5201-DWG
Asset	0000M5201
Provided by	Hensall Mechanical Services Ltd
Source file	HEN0203-HEN-00-00-DR-M-5201 AF01.pdf
Pages	1

KEY PLAN



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4. ALL FINAL CONNECTIONS SHALL BE MADE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

ABOVE GROUND DRAINAGE

1. ALL PIPEWORK SHALL BE INSTALLED IN PVC-U EXCEPT HOT WATER DISCHARGE WHICH SHALL BE IN COPPER.
2. ALL HORIZONTAL PIPEWORK SHALL BE INSTALLED WITH A MINIMUM OF 1:40 GRADIENT.
3. ALL HORIZONTAL VENT PIPEWORK SHALL BE INSTALLED WITH A MINIMUM OF 1 : 15 GRADIENT.
4. RODDING EYES SHALL BE PROVIDED AT THE END OF EACH RUN AND AT EACH CHANGE OF DIRECTION.
5. RODDING EYES SHALL BE LOCATED IN EASILY ACCESSIBLE LOCATIONS.
6. CONNECTIONS TO BELOW GROUND DRAINAGE POP-UPS SHALL BE COMPLETE WITH 110mm RODDING ACCESS AT 1000mm AFFL.
7. HEPVO TRAP TO BE INSTALLED BY PLUMBING CONTRACTOR.
8. ALL BELOW GROUND DRAINAGE TO BE INSTALLED BY OTHERS.
9. ALL WEATHERING TO BE DONE BY OTHERS.

LEGEND

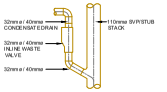
- SOIL AND VENT PIPEWORK
- PIPEWORK IN CEILING VOID
- PIPEWORK AT HIGH LEVEL
- PIPEWORK AT LOW LEVEL
- FLOOR DRAIN
- RE — RODDING EYE
- DRAINAGE CONNECTION TO SVP
- DRAINAGE CONNECTION TO APPLIANCE
- DRAINAGE CONNECTION TO SVP
- DRAINAGE CONNECTION
- SVP SCHEDULE NUMBER
- DRAWING MATCH LINE

DRAINAGE CONNECTION SIZES

SVP	-	110mmø
WC	-	110mmø
WHB	-	32mmø
SINK	-	40mmø
DW	-	40mmø
M	-	40mmø
FG	-	110mmø
DW	-	40mmø
UR	-	40mmø

ABBREVIATIONS

SVP	-	SOIL AND VENT PIPE
SS	-	SUBSTACK
VP	-	VENT PIPE
WP	-	WASTE PIPE
SINK	-	SINK
WHB	-	WASH HAND BASIN
WC	-	TOILET
SS	-	SLOP HOPPER SINK
RE	-	RODDING EYE
FG	-	FLOOR GULLY
AAV	-	AUTOMATIC AIR VENT
DW	-	DISHWASHER
M	-	ICE MACHINE
UR	-	URINAL



TYPICAL CONDENSATE REMOVAL DETAIL

REV	DESCRIPTION	DATE	DRAWN	CHECK
AF01	AS FITTED	29.04.25	MP'O	DB
C01	CONSTRUCTION ISSUE	29.09.25	MW	DB
P01	PRELIMINARY ISSUE	26.03.25	MW	DB

AS FITTED

CLIENT

HENSALL

PROJECT

ELMWOOD LEISURE CENTRE

DRAWING TITLE

MECHANICAL SERVICES
GROUND FLOOR
ABOVE GROUND DRAINAGE LAYOUT
SHEET 1 OF 4

SCALE @ A0	DATE	DRAWN	CHECKED
1:50	FEB '24	IJS	DDP

DRAWING NO

HEN0203-HEN-00-00-DR-M-5201

REV

AF01

11.6

HEN0203-HEN-00-00-DR-M-5202 rev AF01 Ground Floor Above Ground Drainage Layout Sheet 2 of 4

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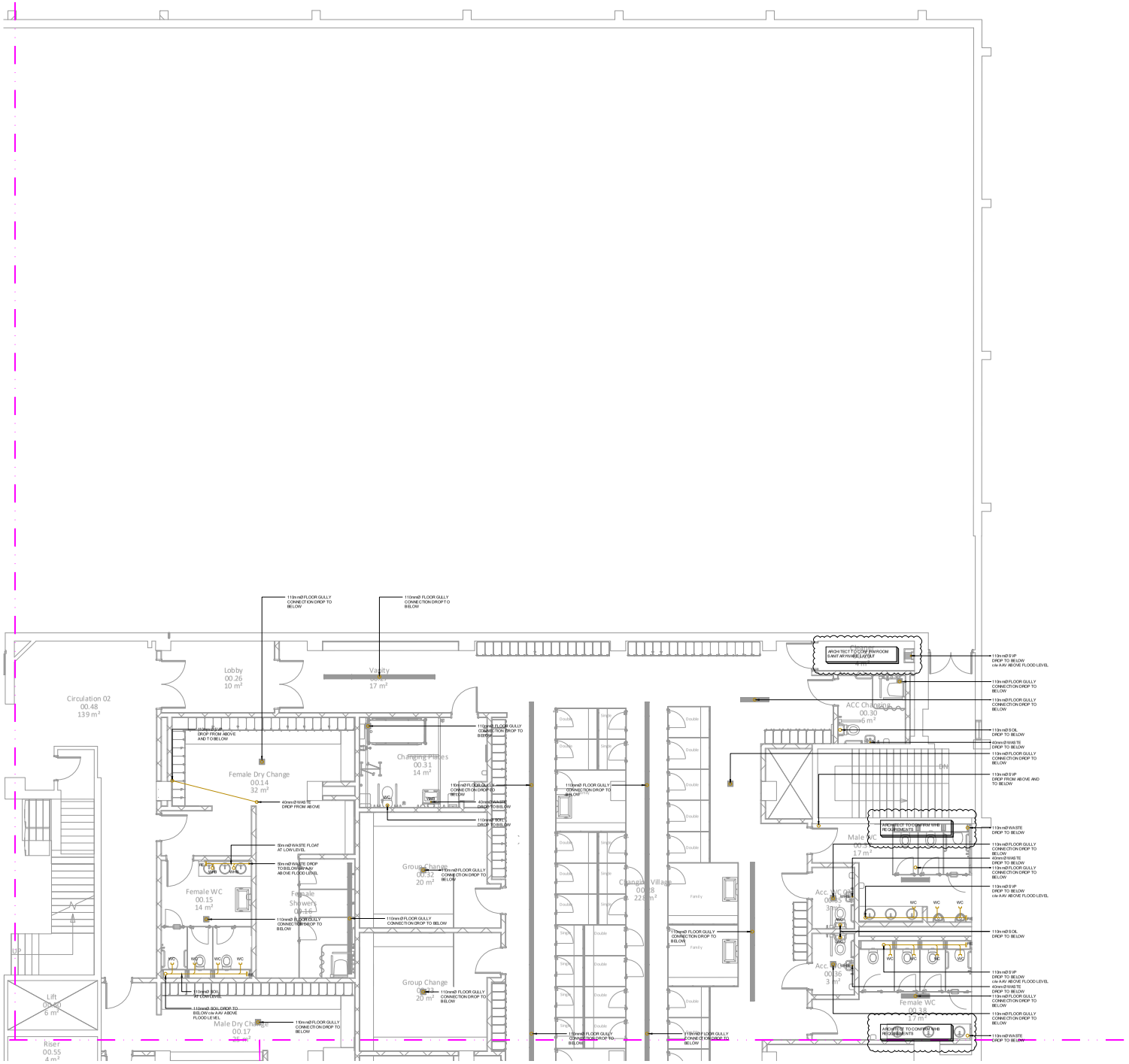
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Asset	0000M5202
Provided by	Hensall Mechanical Services Ltd
Source file	HEN0203-HEN-00-00-DR-M-5202 AF01.pdf
Pages	1

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4. ALL FINAL CONNECTIONS SHALL BE MADE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

ABOVE GROUND DRAINAGE :

1. ALL PIPEWORK SHALL BE INSTALLED IN PVC-U EXCEPT HOT WATER DISCHARGE WHICH SHALL BE IN COPPER.
2. ALL HORIZONTAL PIPEWORK SHALL BE INSTALLED WITH A MINIMUM OF 1:40 GRADIENT.
3. ALL HORIZONTAL VENT PIPEWORK SHALL BE INSTALLED WITH A MINIMUM OF 1:110 GRADIENT.
4. RODDING EYES SHALL BE PROVIDED AT THE END OF EACH RUN AND AT EACH CHANGE OF DIRECTION.
5. RODDING EYES SHALL BE LOCATED IN EASILY ACCESSIBLE LOCATIONS.
6. CONNECTIONS TO BELOW GROUND DRAINAGE POP-UPS SHALL BE COMPLETE WITH 110mm RODDING ACCESS AT 1200mm A.F.L.
7. HEPVO TRAP TO BE INSTALLED BY PLUMBING CONTRACTOR.
8. ALL BELOW GROUND DRAINAGE TO BE INSTALLED BY OTHERS.
9. ALL WEATHERING TO BE DONE BY OTHERS.

LEGEND

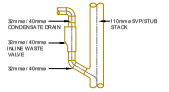
- SOIL AND VENT PIPEWORK
- PIPEWORK IN CEILING VOID
- PIPEWORK AT HIGH LEVEL
- PIPEWORK AT LOW LEVEL
- FLOOR DRAIN
- RE — RODDING EYE
- DRAINAGE CONNECTION TO SVP
- DRAINAGE CONNECTION TO APPLIANCE
- DRAINAGE CONNECTION TO SVP
- DRAINAGE CONNECTION
- SVP SCHEDULE NUMBER
- DRAWING MATCH LINE

DRAINAGE CONNECTION SIZES

SVP	-	110mma
WC	-	110mma
WHB	-	32mma
SINK	-	40mma
CL	-	40mma
IM	-	40mma
AAV	-	40mma
DW	-	40mma
UR	-	40mma

ABBREVIATIONS

SVP	-	SOIL AND VENT PIPE
SS	-	SUB STACK
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SINK	-	SINK
WHB	-	WASH HAND BASIN
WC	-	TOILET
CL	-	CLEANERS SINK
RE	-	RODDING EYE
FD	-	FLOOR DRAIN
AAV	-	AUTOMATIC AIR VENT
DW	-	DISHWASHER
IM	-	ICE MACHINE
UR	-	URINAL



TYPICAL CONDENSATE STACK CONNECTION

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AF01	AS FITTED	2504.26	MPO	DB
C01	CONSTRUCTION ISSUE	26.03.25	MW	DB
P01	PRELIMINARY ISSUE	26.03.25	MW	DB

AS FITTED

CLIENT

HENSALL

PROJECT

ELMWOOD LEISURE CENTRE

DRAWING TITLE

MECHANICAL SERVICES
GROUND FLOOR
ABOVE GROUND DRAINAGE LAYOUT
SHEET 2 OF 4

SCALE @ A0	DATE	DRAWN	CHECKED
1:50	FEB '24	IJS	DDP

DRAWING NO

HEN0203-HEN-00-00-DR-M-5202

REV

AF01

11.7

HEN0203-HEN-00-00-DR-M-5203 rev AF01 Ground Floor Above Ground Drainage Layout Sheet 3 of 4

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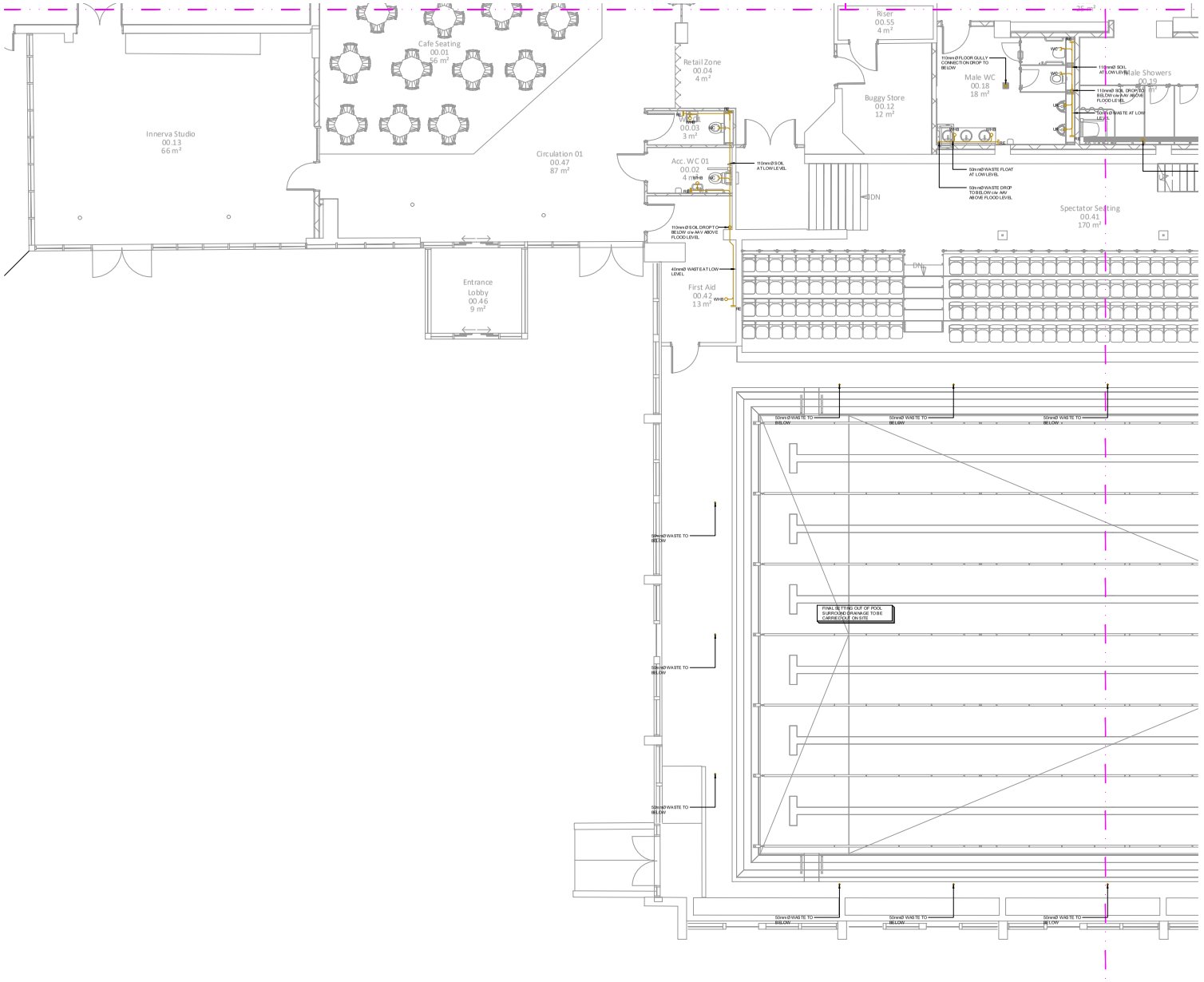
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Provided by	Hensall Mechanical Services Ltd
Source file	HEN0203-HEN-00-00-DR-M-5203 AF01.pdf
Pages	1

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ABOVE GROUND DRAINAGE :

1. ALL PIPEWORK SHALL BE INSTALLED IN PVC-U EXCEPT HOT WATER DISCHARGE WHICH SHALL BE IN COPPER.
2. ALL HORIZONTAL PIPEWORK SHALL BE INSTALLED WITH A MINIMUM OF 1:40 GRADIENT.
3. ALL HORIZONTAL VENT PIPEWORK SHALL BE INSTALLED WITH A MINIMUM OF 1:110 GRADIENT.
4. RODDING EYES SHALL BE PROVIDED AT THE END OF EACH RUN AND AT EACH CHANGE OF DIRECTION.
5. RODDING EYES SHALL BE LOCATED IN EASILY ACCESSIBLE LOCATIONS.
6. CONNECTIONS TO BELOW GROUND DRAINAGE POP-UPS SHALL BE COMPLETE WITH 110mm RODDING ACCESS AT 1200mm A.F.L.
7. HEPVO TRAP TO BE INSTALLED BY PLUMBING CONTRACTOR.
8. ALL BELOW GROUND DRAINAGE TO BE INSTALLED BY OTHERS.
9. ALL WEATHERING TO BE DONE BY OTHERS.

LEGEND

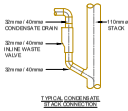
- SOIL AND VENT PIPEWORK
- PIPEWORK IN CEILING VOID
- PIPEWORK AT HIGH LEVEL
- PIPEWORK AT LOW LEVEL
- FLOOR DRAIN
- RE — RODDING EYE
- DRAINAGE CONNECTION TO SVP
- DRAINAGE CONNECTION TO APPLIANCE
- DRAINAGE CONNECTION TO SVP
- DRAINAGE CONNECTION
- SVP SCHEDULE NUMBER
- DRAWING MATCH LINE

DRAINAGE CONNECTION SIZES :

SVP	- 110mm ø
WC	- 110mm ø
WHB	- 32m ø
SINK	- 40m ø
CL	- 40m ø
IM	- 40m ø
FG	- 110mm ø
DW	- 40m ø
UR	- 40m ø

ABBREVIATIONS :

SVP	- SOIL AND VENT PIPE
SS	- SUB STACK
VP	- VENT PIPE
WP	- WASTE PIPE
SINK	- SINK
WHB	- WASH HAND BASIN
WC	- TOILET
CL	- CLEANERS SINK
RE	- RODDING EYE
FG	- FLOOR GULLY
AAV	- AUTOMATIC AIR VENT
DW	- DISHWASHER
IM	- ICE MACHINE
UR	- URINAL



TYPICAL CONDENSATE ST ACK CONNECTION

REV	DESCRIPTION	DATE	DRAWN	CHECK
AF01	AS FITTED	25.04.25	MPO	DB
C01	CONSTRUCTION ISSUE	25.03.25	MW	DB
P02	POOL AREA DRAINAGE CLARIFIED	05.06.25	MPO	DB
P01	PRELIMINARY ISSUE	25.03.25	MW	DB

AS FITTED

CLIENT

HENSALL

PROJECT

ELMWOOD LEISURE CENTRE

DRAWING TITLE

MECHANICAL SERVICES
GROUND FLOOR
ABOVE GROUND DRAINAGE LAYOUT
SHEET 3 OF 4

SCALE @ A0	DATE	DRAWN	CHECKED
1:50	FEB '24	IJS	DDP

DRAWING NO

HEN0203-HEN-00-00-DR-M-5203

REV

AF01

11.8

HEN0203-HEN-00-00-DR-M-5204 rev AF01 Ground Floor Above Ground Drainage Layout Sheet 4 of 4

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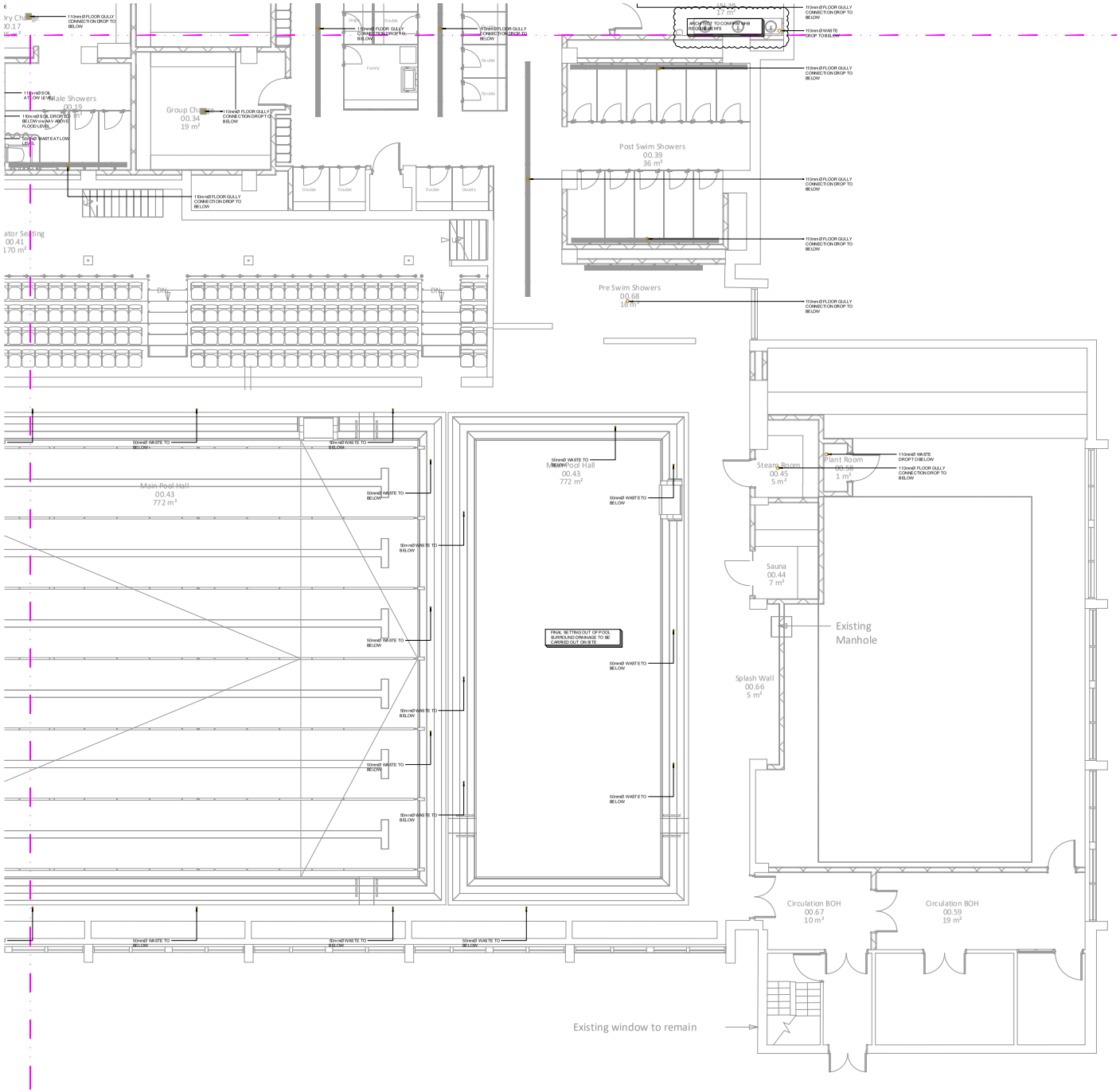
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Asset	0000M5204
Provided by	Hensall Mechanical Services Ltd
Source file	HEN0203-HEN-00-00-DR-M-5204 AF01.pdf
Pages	1

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4. ALL FINAL CONNECTIONS SHALL BE MADE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

ABOVE GROUND DRAINAGE :

1. ALL PIPEWORK SHALL BE INSTALLED IN PVC-U EXCEPT HOT WATER DISCHARGE WHICH SHALL BE IN COPPER.
2. ALL HORIZONTAL PIPEWORK SHALL BE INSTALLED WITH A MINIMUM OF 1:40 GRADIENT.
3. ALL HORIZONTAL VENT PIPEWORK SHALL BE INSTALLED WITH A MINIMUM OF 1:110 GRADIENT.
4. RODDING EYES SHALL BE PROVIDED AT THE END OF EACH RUN AND AT EACH CHANGE OF DIRECTION.
5. RODDING EYES SHALL BE LOCATED IN EASILY ACCESSIBLE LOCATIONS.
6. CONNECTIONS TO BELOW GROUND DRAINAGE POP-UPS SHALL BE COMPLETE WITH 110mm RODDING ACCESS AT 1200mm A.F.L.
7. HEPVO TRAP TO BE INSTALLED BY PLUMBING CONTRACTOR.
8. ALL BELOW GROUND DRAINAGE TO BE INSTALLED BY OTHERS.
9. ALL WEATHERING TO BE DONE BY OTHERS.

LEGEND

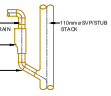
- SOIL AND VENT PIPEWORK
- PIPEWORK IN CEILING VOID
- PIPEWORK AT HIGH LEVEL
- PIPEWORK AT LOW LEVEL
- FLOOR DRAIN
- RE — RODDING EYE
- DRAINAGE CONNECTION TO SVP
- DRAINAGE CONNECTION TO APPLIANCE
- DRAINAGE CONNECTION TO SVP
- DRAINAGE CONNECTION
- SVP SCHEDULE NUMBER
- DRAWING MATCH LINE

DRAINAGE CONNECTION SIZES :

SVP	-	110mmø
WC	-	110mmø
WHB	-	32mmø
SINK	-	40mmø
CL	-	40mmø
BF	-	40mmø
FG	-	110mmø
DW	-	40mmø
UR	-	40mmø

ABBREVIATIONS :

SVP	-	SOIL AND VENT PIPE
SS	-	SLAB STACK
VP	-	VENT PIPE
WP	-	WASTE PIPE
SINK	-	SINK
WHB	-	WASH HAND BASIN
WC	-	TOILET
CL	-	CLEANERS SINK
RE	-	RODDING EYE
FG	-	FLOOR GULLY
AAV	-	AUTOMATIC AIR VENT
DW	-	DISHWASHER
WM	-	WASHING MACHINE
UR	-	URINAL



TYPICAL CONDENSATE STACK CONNECTION

REV	DESCRIPTION	DATE	DRAWN	CHECK
AF01	AS FITTED	2504.26	MPO	DB
C01	CONSTRUCTION ISSUE	25.09.25	MW	DB
P02	POOL AREA DRAINAGE CLARIFIED	05.08.25	MPO	DB
P01	PRELIMINARY ISSUE	25.03.25	MW	DB

AS FITTED

CLIENT

HENSALL

PROJECT

ELMWOOD LEISURE CENTRE

DRAWING TITLE

MECHANICAL SERVICES
GROUND FLOOR
ABOVE GROUND DRAINAGE LAYOUT
SHEET 4 OF 4

SCALE @ A0	DATE	DRAWN	CHECKED
1:50	FEB '24	IJS	DDP

DRAWING NO

HEN0203-HEN-00-00-DR-M-5204

REV

AF01

11.9

HEN0203-HEN-00-00-DR-M-5301 rev AF01 Ground Floor Domestic Water Services Layout Sheet 1 of 4

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Reference	HEN0203-0000M5301-DWG
Asset	0000M5301
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Pages	1

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4. ALL FINAL CONNECTIONS SHALL BE MADE IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS.

DOMESTIC SERVICES NOTES

1. ANY EXPOSED PIPEWORK SHALL BE CHROME EXCEPT IN CLEANERS STORES.
2. ALL FINAL CONNECTIONS SHALL BE 15mm Ø UNLESS OTHERWISE NOTED.
3. ALL PIPEWORK SHALL BE INSULATED THROUGHOUT EXCEPT WHERE EXPOSED.
4. DRAIN COCKS TO BE INSTALLED AT THE END OF ALL LOW LEVEL RUNS.
5. ALL FINAL CONNECTIONS SHALL BE COMPLETE WITH BALL-O-FIX ISOLATING VALVES.
6. FLEXIBLE CONNECTIONS TO OUTLETS SHALL NOT EXCEED 500mm.
7. ALL THERMOSTATIC MIXING VALVES SHALL BE INSTALLED IN EASILY ACCESSIBLE LOCATIONS.
8. ALL OUTLETS SHALL BE SET TO WORK WITH MATCHING HOT AND COLD WATER OUTLET PRESSURES.
9. MIXED FLOW PIPEWORK FROM THE THERMOSTATIC MIXING VALVES SHALL NOT EXCEED 1500mm.
10. ALL TMV's SHALL BE TMV3.

LEGEND

- BCWS PIPEWORK
- DHWS FLOW PIPEWORK
- DHWS RETURN PIPEWORK
- TCWS PIPEWORK
- CATS PIPEWORK
- PIPEWORK IN CEILING VOID
- PIPEWORK AT HIGH LEVEL
- PIPEWORK AT LOW LEVEL
- SHOWER MIXING VALVE
- EXISTING RISER LOCATION
- DRAWING MATCH LINE

REV	DESCRIPTION	DATE	DRAWN	CHECK
AP01	AS FITTED	19.03.26	MPO	DB
C01	CONSTRUCTION ISSUE	28.03.25	MW	DB
P01	PRELIMINARY ISSUE	19.03.25	MW	DB

AS FITTED

CLIENT

HENSALL

PROJECT

ELMWOOD LEISURE CENTRE

DRAWING TITLE

MECHANICAL SERVICES
GROUND FLOOR
DOMESTIC WATER SERVICES LAYOUT
SHEET 1 OF 4

SCALE @ A0	DATE	DRAWN	CHECKED
1:50	FEB '24	IJS	DDP

DRAWING Nº	REV
HEN0203-HEN-00-00-DR-M-5301	AF01

11.10

HEN0203-HEN-00-00-DR-M-5302 rev AF01 Ground Floor Domestic Water Services Layout Sheet 2 of 4

The following page is the document exactly as received and checked. It is bookmarked in the PDF.

Reference	HEN0203-0000M5302-DWG
Asset	0000M5302
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Source file	HEN0203-HEN-00-00-DR-M-5302 AF01.pdf
Pages	1

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4. ALL FINAL CONNECTIONS SHALL BE MADE IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS.

DOMESTIC SERVICES NOTES

1. ANY EXPOSED PIPEWORK SHALL BE CHROME EXCEPT IN CLEANERS STORES.
2. ALL FINAL CONNECTIONS SHALL BE 15mmØ UNLESS OTHERWISE NOTED.
3. ALL PIPEWORK SHALL BE INSULATED THROUGHOUT EXCEPT WHERE EXPOSED.
4. DRAIN COCKS TO BE INSTALLED AT THE END OF ALL LOW LEVEL RUNS.
5. ALL FINAL CONNECTIONS SHALL BE COMPLETE WITH BALL-O-FIX ISOLATING VALVES.
6. FLEXIBLE CONNECTIONS TO OUTLETS SHALL NOT EXCEED 500mm.
7. ALL THERMOSTATIC MIXING VALVES SHALL BE INSTALLED IN EASILY ACCESSIBLE LOCATIONS.
8. ALL OUTLETS SHALL BE SET TO WORK WITH MATCHING HOT AND COLD WATER OUTLET PRESSURES.
9. MIXED FLOW PIPEWORK FROM THE THERMOSTATIC MIXING VALVE SHALL NOT EXCEED 1000mm.
10. ALL TMVs SHALL BE TMV3.

LEGEND

- BCWS PIPEWORK
- DHWS FLOW PIPEWORK
- DHWS RETURN PIPEWORK
- TCWS PIPEWORK
- CAT 5 PIPEWORK
- PIPEWORK IN CEILING VOID
- PIPEWORK AT HIGH LEVEL
- PIPEWORK AT LOW LEVEL
- SHOWER MIXING VALVE
- EXISTING RISER LOCATION
- DRAWING MATCH LINE

REV	DESCRIPTION	DATE	DRAWN	CHECK
AP01	AS FITTED	19.03.26	MPO	DB
C01	CONSTRUCTION ISSUE	28.03.25	MW	DB
P01	PRELIMINARY ISSUE	19.03.25	MW	DB

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CLIENT

HENSALL

PROJECT

ELMWOOD LEISURE CENTRE

DRAWING TITLE

MECHANICAL SERVICES
GROUND FLOOR
DOMESTIC WATER SERVICES LAYOUT
SHEET 2 OF 4

SCALE @ A0	DATE	DRAWN	CHECKED
1:50	FEB '24	IJS	DDP

DRAWING Nº	REV
HEN0203-HEN-00-00-DR-M-5302	AF01

11.11

HEN0203-HEN-00-00-DR-M-5303 rev AF01 Ground Floor Domestic Water Services Layout Sheet 3 of 4

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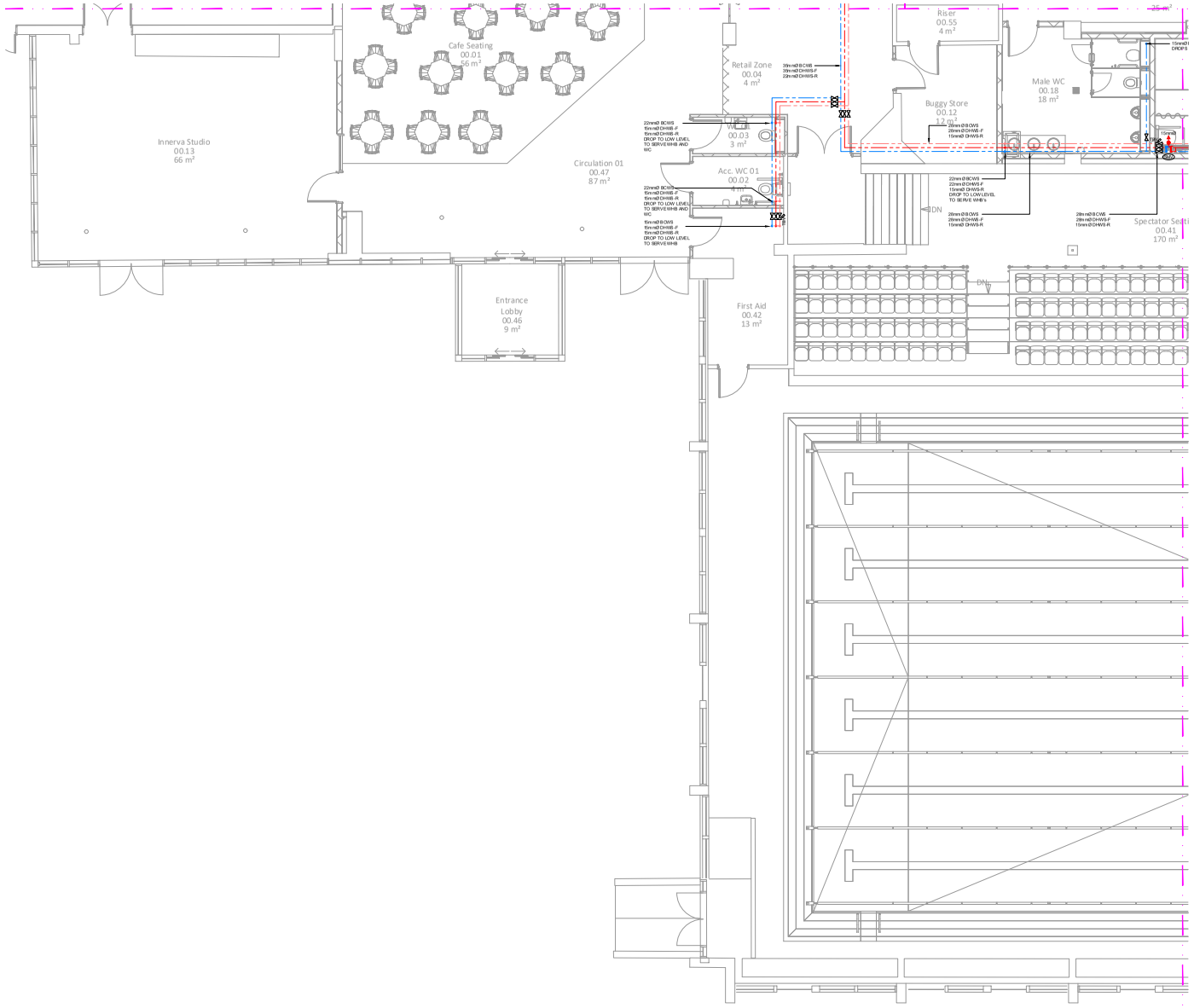
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Asset	0000M5303
Provided by	Hensall Mechanical Services Ltd
Source file	HEN0203-HEN-00-00-DR-M-5303 AF01.pdf
Pages	1

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4. ALL FINAL CONNECTIONS SHALL BE MADE IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS.

DOMESTIC SERVICES NOTES

1. ANY EXPOSED PIPEWORK SHALL BE CHROME EXCEPT IN CLEANERS STORES.
2. ALL FINAL CONNECTIONS SHALL BE 15mm Ø UNLESS OTHERWISE NOTED.
3. ALL PIPEWORK SHALL BE INSULATED THROUGHOUT EXCEPT WHERE EXPOSED.
4. DRAIN COCKS TO BE INSTALLED AT THE END OF ALL LOW LEVEL RUNS.
5. ALL FINAL CONNECTIONS SHALL BE COMPLETE WITH BALL-O-FIX ISOLATING VALVES.
6. FLEXIBLE CONNECTIONS TO OUTLETS SHALL NOT EXCEED 300mm.
7. ALL THERMOSTATIC MIXING VALVES SHALL BE INSTALLED IN EASILY ACCESSIBLE LOCATIONS.
8. ALL OUTLETS SHALL BE SET TO WORK WITH MATCHING HOT AND COLD WATER OUTLET PRESSURES.
9. MIXED FLOW PIPEWORK FROM THE THERMOSTATIC MIXING VALVES SHALL NOT EXCEED 1000m/s.
10. ALL TMV's SHALL BE TMV3.

LEGEND

- BCWS PIPEWORK
- DHWS FLOW PIPEWORK
- DHWS RETURN PIPEWORK
- TCWS PIPEWORK
- CATS PIPEWORK
- PIPEWORK IN CEILING VOID
- PIPEWORK AT HIGH LEVEL
- PIPEWORK AT LOW LEVEL
- SHOWER MIXING VALVE
- EXISTING RISER LOCATION
- DRAWING MATCH LINE

REV	DESCRIPTION	DATE	DRAWN	CHECK
AP01	AS FITTED	19.03.26	MPO	DB
C01	CONSTRUCTION ISSUE	28.03.25	MW	DB
P01	PRELIMINARY ISSUE	19.03.25	MW	DB

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HENSALL

PROJECT

ELMWOOD LEISURE CENTRE

DRAWING TITLE

MECHANICAL SERVICES
GROUND FLOOR
DOMESTIC WATER SERVICES LAYOUT
SHEET 3 OF 4

SCALE @ A0	DATE	DRAWN	CHECKED
1:50	FEB '24	IJS	DDP

DRAWING N°	REV
HEN0203-HEN-00-00-DR-M-5303	AF01

11.12

HEN0203-HEN-00-00-DR-M-5304 rev AF01 Ground Floor Domestic Water Services Layout Sheet 4 of 4

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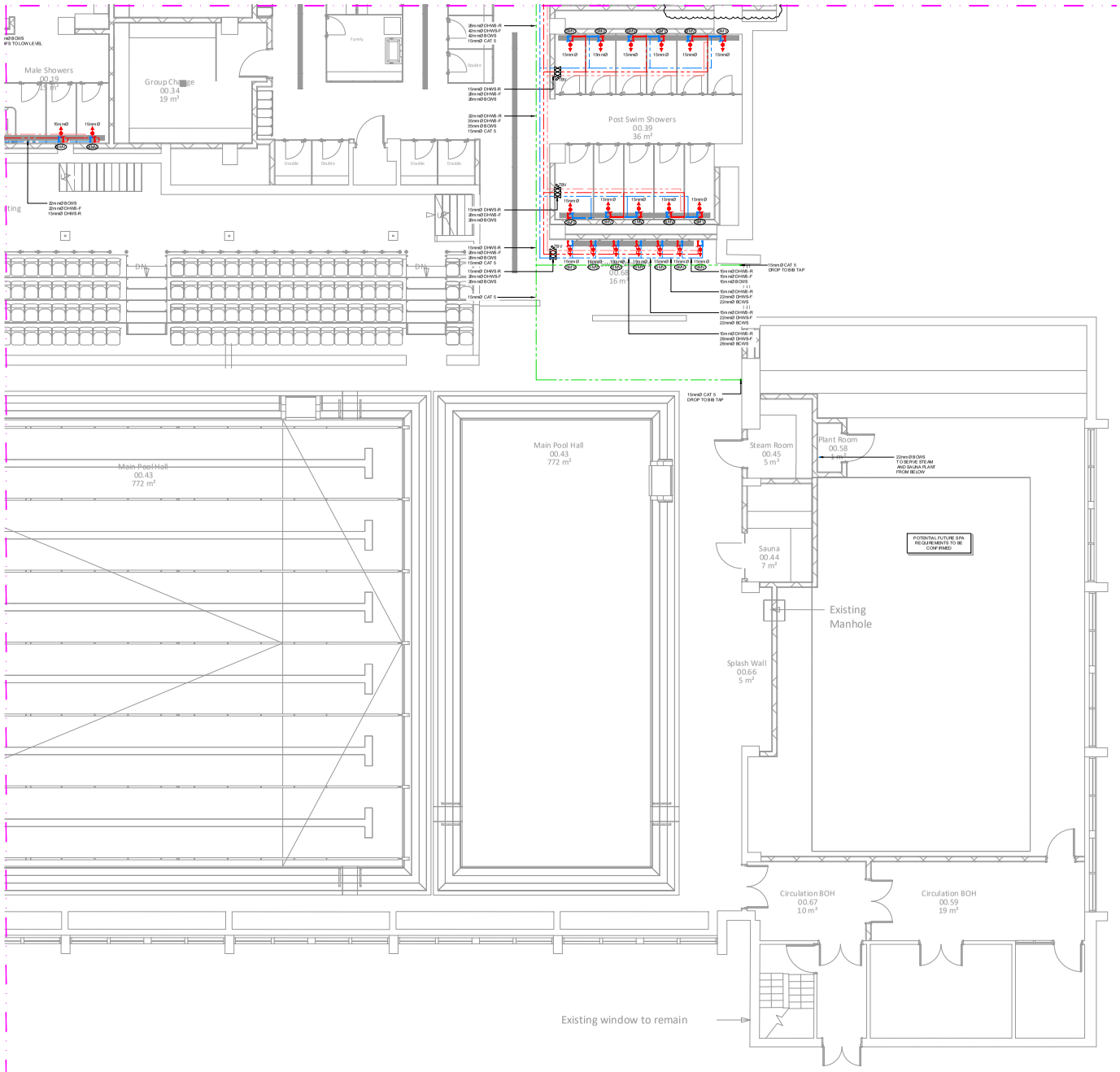
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Source file	HEN0203-HEN-00-00-DR-M-5304 AF01.pdf
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4. ALL FINAL CONNECTIONS SHALL BE MADE IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS.

DOMESTIC SERVICES NOTES

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3. ALL PIPEWORK SHALL BE INSULATED THROUGHOUT EXCEPT WHERE EXPOSED.
4. DRAIN COCKS TO BE INSTALLED AT THE END OF ALL LOW LEVEL RUNS.
5. ALL FINAL CONNECTIONS SHALL BE COMPLETE WITH BALL-O-FIX ISOLATING VALVES.
6. FLEXIBLE CONNECTIONS TO OUTLETS SHALL NOT EXCEED 500mm.
7. ALL THERMOSTATIC MIXING VALVES SHALL BE INSTALLED IN EASILY ACCESSIBLE LOCATIONS.
8. ALL OUTLETS SHALL BE SET TO WORK WITH MATCHING HOT AND COLD WATER OUTLET PRESSURES.
9. MIXED FLOW PIPEWORK FROM THE THERMOSTATIC MIXING VALVE SHALL NOT EXCEED 1500mm.
10. ALL TMVs SHALL BE TMV3.

LEGEND

- BCWS PIPEWORK
- DHWS FLOW PIPEWORK
- DHWS RETURN PIPEWORK
- TCWS PIPEWORK
- CAT 5 PIPEWORK
- PIPEWORK IN CEILING VOID
- PIPEWORK AT HIGH LEVEL
- PIPEWORK AT LOW LEVEL
- SHOWER MIXING VALVE
- EXISTING RISER LOCATION
- DRAWING MATCH LINE

REV	DESCRIPTION	DATE	DRAWN	CHECK
AP01	AS FITTED	19.03.26	MPO	DB
C01	CONSTRUCTION ISSUE	28.03.25	MW	DB
P01	PRELIMINARY ISSUE	19.03.25	MW	DB

AS FITTED

CLIENT

HENSALL

PROJECT

ELMWOOD LEISURE CENTRE

DRAWING TITLE

MECHANICAL SERVICES
GROUND FLOOR
DOMESTIC WATER SERVICES LAYOUT
SHEET 4 OF 4

SCALE @ A0	DATE	DRAWN	CHECKED
1:50	FEB '24	IJS	DDP

DRAWING N°	REV
HEN0203-HEN-00-00-DR-M-5304	AF01

11.13

HEN0203-HEN-00-00-DR-M-5601 rev AF01 Ground Floor Heating and Cooling Services Layout Sheet 1 of 4

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Reference	HEN0203-0000M5601-DWG
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4. ALL FINAL CONNECTIONS SHALL BE MADE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

HEATING SERVICES NOTES

1. PRIOR TO INSTALLATION, THE CONTRACTOR SHALL ENSURE FINAL COORDINATION OF EMITTERS, PIPEWORK AND VALVES WITH THE FINAL FURNITURE LAYOUT.
2. ALL LOW POINTS TO BE PROVIDED WITH DRAIN COCKS AND HIGH POINTS WITH AUTOMATIC AIR VENTS.
3. ALL PIPEWORK TO BE INSULATED AND IDENTIFIED IN ACCORDANCE WITH BS 1710:2014. INSULATION WITHIN SWIMMING POOL TO BE ISOGENOPAK FINISH, ELSEWHERE FOIL FACED FINISH.
4. ALL FINAL CONNECTIONS SHALL BE 15mm FLOW AND RETURN UNLESS STATED OTHERWISE.
5. SPECIFIC REFERENCE SHALL BE MADE TO THE SCHEMATIC DRAWINGS FOR VALVE ARRANGEMENTS.

COOLING SERVICES NOTES

1. REFRIGERANT PIPEWORK SIZES AND SYSTEM REFRIGERANT VOLUME ARE SPECIALIST DESIGN.
2. ALL PIPEWORK SHALL BE INSULATED AND VAPOUR SEALED THROUGHOUT.

LEGEND

- AIR CONDITIONING WALL MOUNTED INSIDE UNIT
- AIR CONDITIONING CASSETTE UNIT
- WALL MOUNTED AIR CONDITIONING OUTSIDE UNIT
- AIR CONDITIONING OUTSIDE UNIT
- LOCAL WALL MOUNTED CONTROLLER
- CENTRAL WALL MOUNTED CONTROLLER
- ELECTRIC PANEL HEATER
- CEILING MOUNTED ELECTRIC PANEL HEATER
- REFRIGERANT TRAY
- LTHW FLOW PIPEWORK
- LTHW RETURN PIPEWORK

REV	DESCRIPTION	DATE	DRAWN	CHECK
AF01	AS FITTED	19.03.26	MFO	DB
C02	UPDATED TO NEW ARCHITECTURAL LAY OUT	17.07.25	MW	DB
C01	CONSTRUCTION ISSUE	@ 03.25	MW	DB
P01	PRELIMINARY ISSUE	19.03.25	MW	DB

AS FITTED

CLIENT

HENSALL

PROJECT

ELMWOOD LEISURE CENTRE

DRAWING TITLE

MECHANICAL SERVICES
GROUND FLOOR
HEATING AND COOLING SERVICES
SHEET 1 OF 4

SCALE @ A0	DATE	DRAWN	CHECKED
1:50	JAN '24	MW	DB

DRAWING N°	REV
HEN0203-HEN-00-00-DR-M-5601	AF01

11.14

HEN0203-HEN-00-00-DR-M-5602 rev AF01 Ground Floor Heating and Cooling Services Layout Sheet 2 of 4

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Reference	HEN0203-0000M5602-DWG
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Source file	HEN0203-HEN-00-00-DR-M-5602 AF01.pdf
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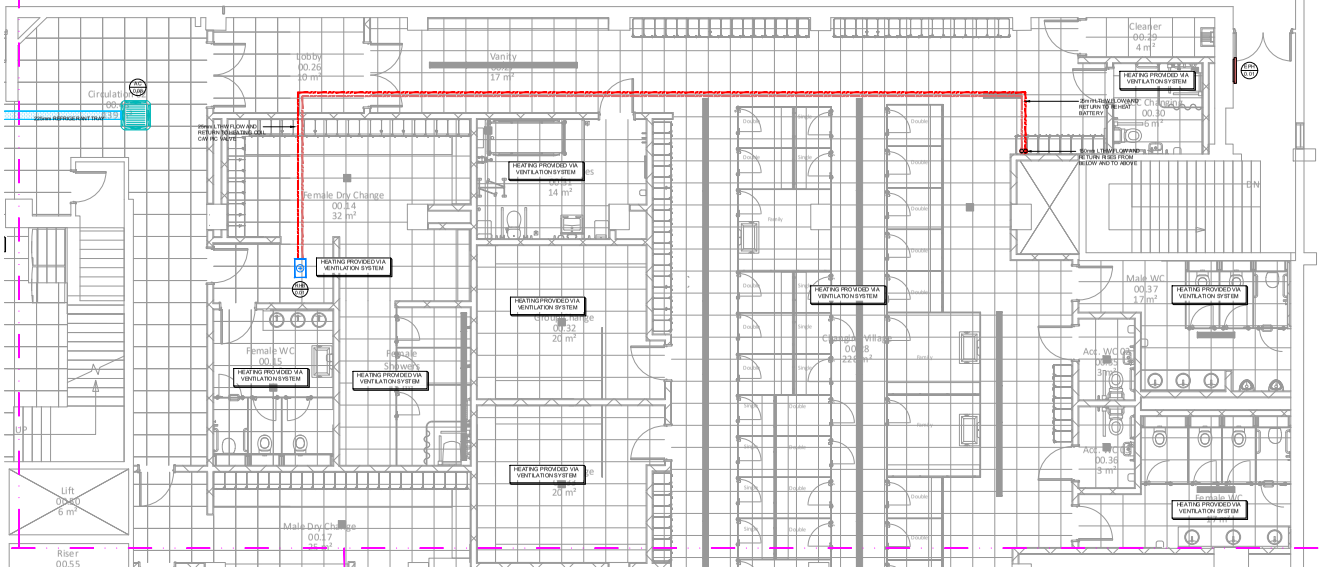
KEY PLAN



REFERENCED MODELS AND DRAWINGS

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HEATING PROVIDED VIA VENTILATION SYSTEM



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HEATING SERVICES NOTES

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4. ALL FINAL CONNECTIONS SHALL BE 15mm FLOW AND RETURN UNLESS STATED OTHERWISE.
5. SPECIFIC REFERENCE SHALL BE MADE TO THE SCHEMATIC DRAWINGS FOR VALVE ARRANGEMENTS.

COOLING SERVICES NOTES

1. REFRIGERANT PIPEWORK SIZES AND SYSTEM REFRIGERANT VOLUME ARE SPECIALIST DESIGN.
2. ALL PIPEWORK SHALL BE INSULATED AND VAPOUR SEALED THROUGHOUT.

LEGEND

- AIR CONDITIONING WALL MOUNTED INSIDE UNIT
- AIR CONDITIONING CASSETTE UNIT
- WALL MOUNTED AIR CONDITIONING OUTSIDE UNIT
- AIR CONDITIONING OUTSIDE UNIT
- LOCAL WALL MOUNTED CONTROLLER
- CENTRAL WALL MOUNTED CONTROLLER
- ELECTRIC PANEL HEATER
- CEILING MOUNTED ELECTRIC PANEL HEATER
- REFRIGERANT TRAY
- LTHW FLOW PIPEWORK
- LTHW RETURN PIPEWORK

REV	DESCRIPTION	DATE	DRAWN	CHECK
AF01	AS FITTED	19.03.26	MFO	DB
C01	CONSTRUCTION ISSUE	@ 03.25	MW	DB
P01	PRELIMINARY ISSUE	19.03.25	MW	DB

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CLIENT

HENSALL

PROJECT

ELMWOOD LEISURE CENTRE

DRAWING TITLE

MECHANICAL SERVICES
GROUND FLOOR
HEATING AND COOLING SERVICES
SHEET 2 OF 4

SCALE @ A0	DATE	DRAWN	CHECKED
1:50	JAN '24	MW	DB

DRAWING NO

HEN0203-HEN-00-00-DR-M-5602

REV

AF01

11.15

HEN0203-HEN-00-00-DR-M-5603 rev AF01 Ground Floor Heating and Cooling Services Layout Sheet 3 of 4

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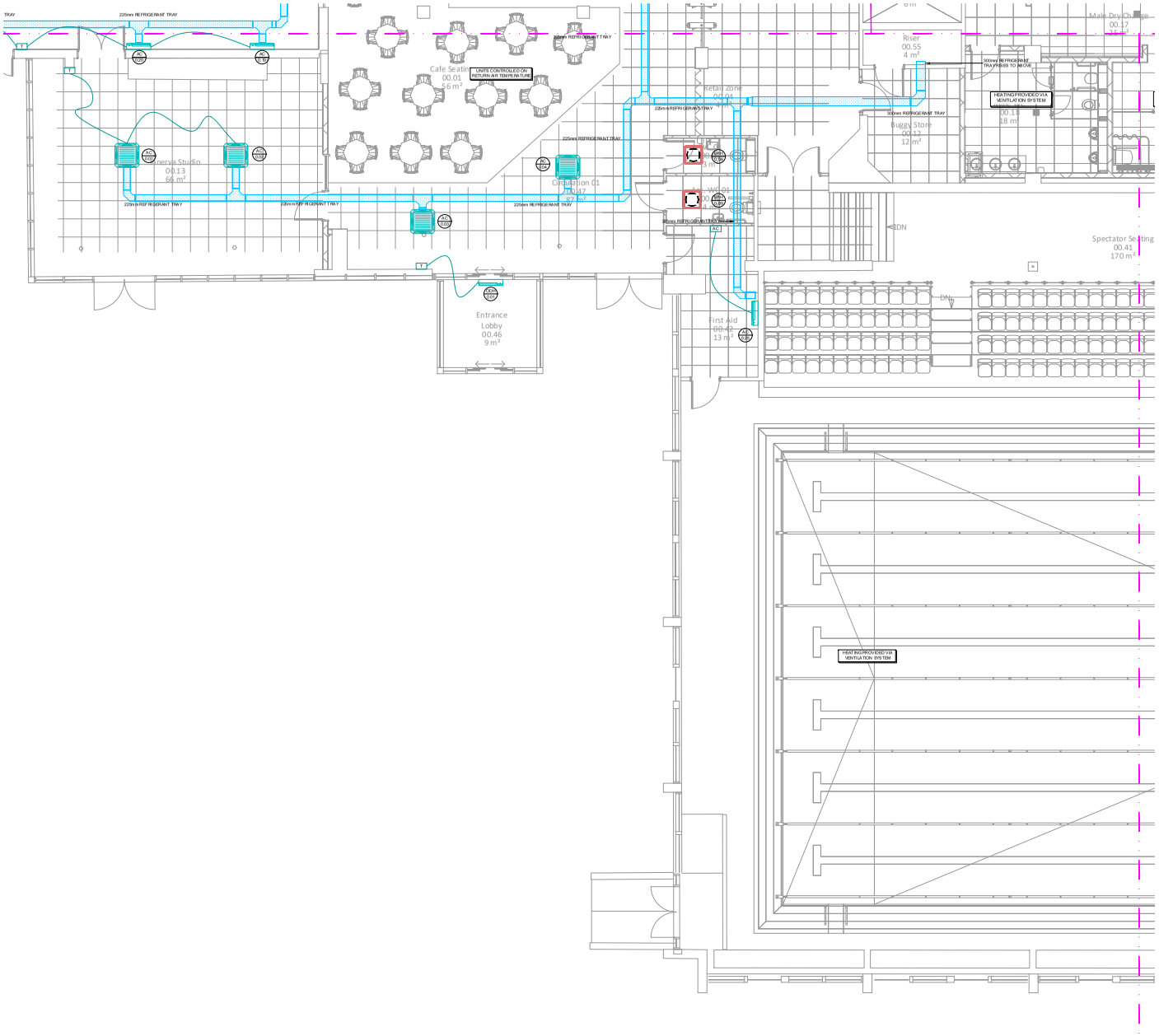
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Provided by	Hensall Mechanical Services Ltd
Source file	HEN0203-HEN-00-00-DR-M-5603 AF01.pdf
Pages	1

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REFERENCED MODELS AND DRAWINGS

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- ELECTRIC PANEL HEATER
- CEILING MOUNTED ELECTRIC PANEL HEATER
- REFRIGERANT TRAY
- LTHW FLOW PIPEWORK
- LTHW RETURN PIPEWORK

REV	DESCRIPTION	DATE	DRAWN	CHECK
AF01	AS FITTED	19.03.26	MP'O	DB
C01	CONSTRUCTION ISSUE	@ 03.25	MW	DB
P01	PRELIMINARY ISSUE	19.03.25	MW	DB

AS FITTED

CLIENT

HENSALL

PROJECT

ELMWOOD LEISURE CENTRE

DRAWING TITLE

MECHANICAL SERVICES
GROUND FLOOR
HEATING AND COOLING SERVICES
SHEET 3 OF 4

SCALE @ A0	DATE	DRAWN	CHECKED
1:50	JAN '24	MW	DB

DRAWING No	REV
HEN0203-HEN-00-00-DR-M-5603	AF01

11.16

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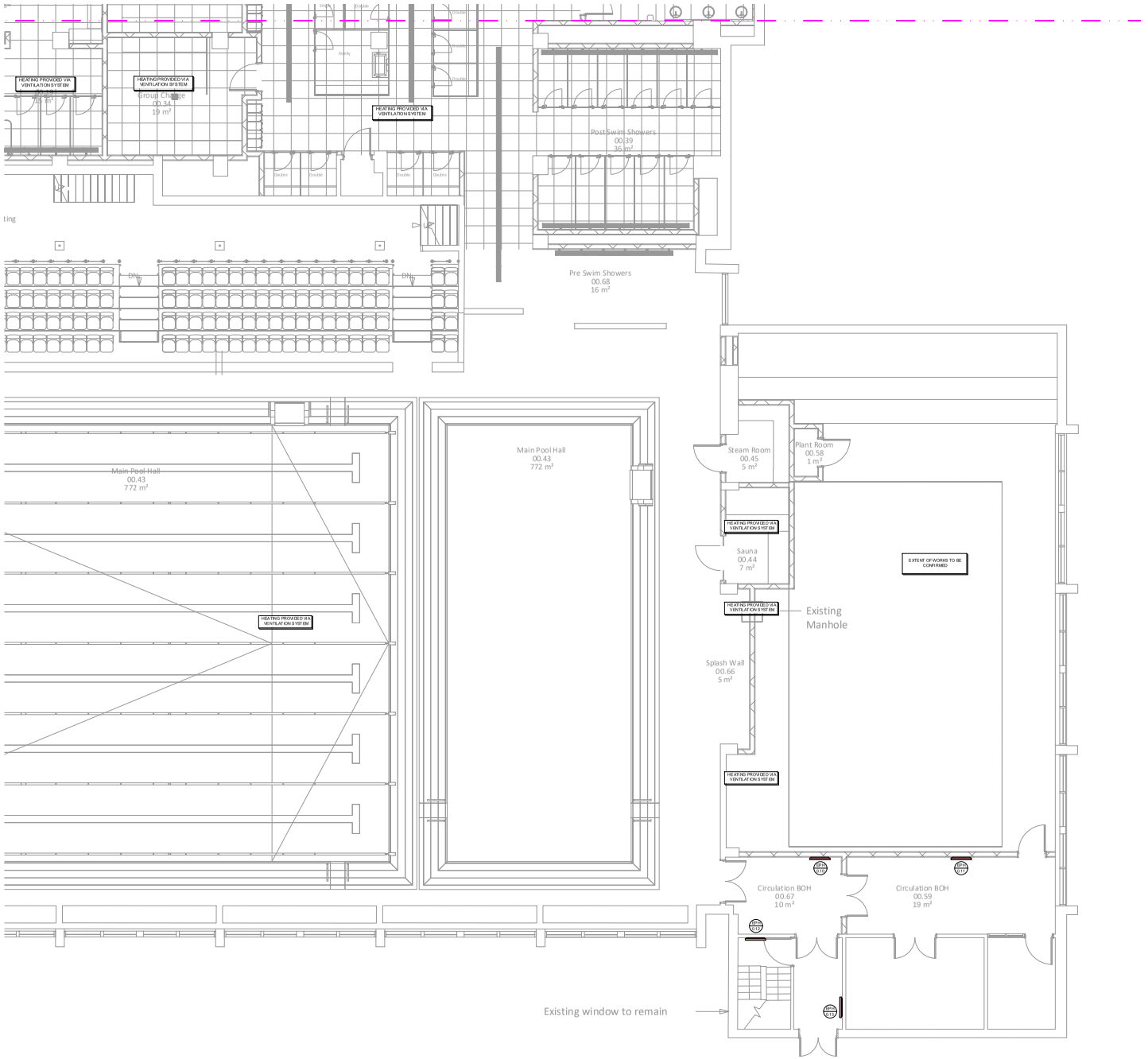
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- AIR CONDITIONING OUTSIDE UNIT
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- ELECTRIC PANEL HEATER
- CEILING MOUNTED ELECTRIC PANEL HEATER
- REFRIGERANT TRAY
- LTHW FLOW PIPEWORK
- LTHW RETURN PIPEWORK

REV	DESCRIPTION	DATE	DRAWN	CHECK
AF01	AS FITTED	19.03.26	MP/O	DB
C01	CONSTRUCTION ISSUE	@ 03.25	MW	DB
P01	PRELIMINARY ISSUE	19.03.25	NW	DB

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CLIENT

HENSALL

PROJECT

ELMWOOD LEISURE CENTRE

DRAWING TITLE

MECHANICAL SERVICES
GROUND FLOOR
HEATING AND COOLING SERVICES
SHEET 4 OF 4

SCALE @ A0	DATE	DRAWN	CHECKED
1:50	JAN '24	AP	DB

DRAWING NO	REV
HEN0203-HEN-00-00-DR-M-5604	AF01

11.17

HEN0203-HEN-00-00-DR-M-5701 rev AF01 Ground Floor Ventilation Services Layout Sheet 1 of 4

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Asset	0000M5701
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OVERVIEW
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4. ALL FINAL CONNECTIONS SHALL BE MADE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

VENTILATION NOTES

1. ALL EXPOSED DUCTWORK SHALL NOT BE INSULATED
2. ALL DUCTWORK WITHIN RISERS OR CEILING VOIDS SHALL BE INSULATED
3. ACCESS HATCHES SHALL BE PROVIDED IN ACCORDANCE WITH DW144 AND DW172.
4. ALL VCDs AND FIRE DAMPERS SHALL BE ACCESSIBLE VIA ACCESS HATCHES IN THE DUCTWORK.
5. FLEXIBLE DUCTWORK SHALL NOT EXCEED 500mm LONG.

LEGEND

- EXTRACT DUCTWORK
- SUPPLY DUCTWORK
- FRESH AIR INTAKE DUCTWORK
- EXHAUST DUCTWORK
- FLEXIBLE DUCTWORK
- ATTENUATOR
- CROSS TALK ATTENUATOR
- CEILING MOUNTED EXTRACT FAN
- WALL MOUNTED EXTRACT FAN
- COOKER CANOPY EXTRACT FAN
- INLINE EXTRACTOR FAN
- INLINE TWIN EXTRACTOR FAN
- PLENUM BOX
- EXTRACT LOUVRE
- DOOR TRANSFER GRILLE (DTG)
- FIRE DAMPER
- MOTORISED SMOKE AND FIRE DAMPER
- CIRCULAR DUCTWORK
- RECTANGULAR DUCTWORK
- BELLMOUTH
- EXTRACT GRILLE
- EXTRACT VALVE
- SUPPLY GRILLE
- SUPPLY VALVE
- VCD - VOLUME CONTROL DAMPER
- EQUIPMENT REFERENCE
- MATCHLINE

ABBREVIATIONS:

ATT - ATTENUATOR
CTA - CROSS TALK ATTENUATOR
EG - EXTRACT GRILLE
EV - EXTRACT VALVE
FD - FIRE DAMPER
HRU - HEAT RECOVERY UNIT
SG - SUPPLY GRILLE
SV - SUPPLY VALVE
VCD - VOLUME CONTROL DAMPER

REV	DESCRIPTION	DATE	DRAWN	CHECK
AF01	AS FITTED	13.05.25	MPO	DB
C02	UPDATED TO NEW ARCHITECTURAL LAYOUT	17.07.25	MW	DB
C01	CONSTRUCTION ISSUE	28.03.25	MW	DB
P01	PRELIMINARY ISSUE	17.03.25	MW	DB

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HENSALL

PROJECT

ELMWOOD LEISURE CENTRE

DRAWING TITLE

MECHANICAL SERVICES
GROUND FLOOR
VENTILATION SERVICES LAYOUT
SHEET 1 OF 4

SCALE @ A0	DATE	DRAWN	CHECKED
1:50	JAN '24	MW	DB

DRAWING N°	REV
HEN0203-HEN-00-00-DR-M-5701	AF01

11.18

HEN0203-HEN-00-00-DR-M-5702 rev AF01 Ground Floor Ventilation Services Layout Sheet 2 of 4

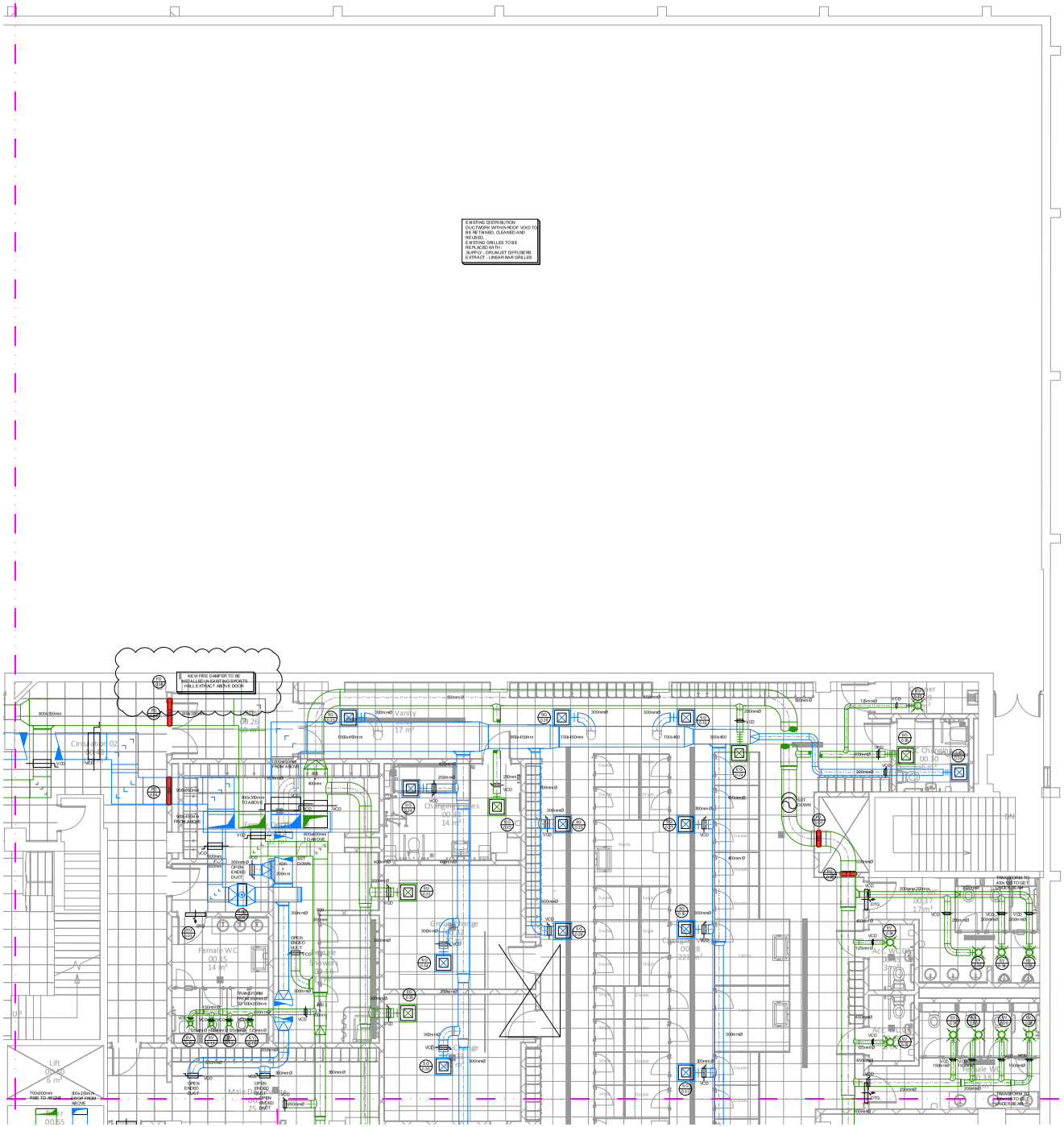
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4. ALL FINAL CONNECTIONS SHALL BE MADE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

VENTILATION NOTES

1. ALL EXPOSED DUCTWORK SHALL NOT BE INSULATED
2. ALL DUCT WORK WITHIN RISERS OR CEILING VOIDS SHALL BE INSULATED
3. ACCESS HATCHES SHALL BE PROVIDED IN ACCORDANCE WITH DW144 AND DW172.
4. ALL VCD'S AND FIRE DAMPERS SHALL BE ACCESSIBLE VIA ACCESS HATCHES THROUGH DUCTWORK.
5. FLEXIBLE DUCTWORK SHALL NOT EXCEED 500m LONG.

LEGEND

- EXTRACT DUCTWORK
- SUPPLY DUCTWORK
- FRESH AIR INTAKE DUCTWORK
- EXHAUST DUCTWORK
- FLEXIBLE DUCTWORK
- ATTENUATOR
- CROSS TALK ATTENUATOR
- CEILING MOUNTED EXTRACT FAN
- WALL MOUNTED EXTRACT FAN
- COOKER CANOPY EXTRACT FAN
- INLINE EXTRACTOR FAN
- INLINE TWIN EXTRACTOR FAN
- PLENUM BOX
- EXTRACT LOUVRE
- DOOR TRANSFER GRILLE (DTG)
- FIRE DAMPER
- MOTORISED SMOKE AND FIRE DAMPER
- CIRCULAR DUCTWORK
- RECTANGULAR DUCTWORK
- BELLMOUTH
- EXTRACT GRILLE
- EXTRACT VALVE
- SUPPLY GRILLE
- SUPPLY VALVE
- VOLUME CONTROL DAMPER (VCD)
- EQUIPMENT REFERENCE (AHU 1.01)
- MATCHLINE

ABBREVIATIONS

ATT	ATTENUATOR
CTA	CROSS TALK ATTENUATOR
EG	EXTRACT GRILLE
EV	EXTRACT VALVE
FD	FIRE DAMPER
HRU	HEAT RECOVERY UNIT
SG	SUPPLY GRILLE
SV	SUPPLY VALVE
VCD	VOLUME CONTROL DAMPER

REV	DESCRIPTION	DATE	DRAWN	CHECK
AF01	AS FITTED	15.05.25	MW	DB
C02	FD DOOR ADDED	15.05.25	MW	DB
C01	CONSTRUCTION ISSUE	01.04.25	MW	DB
P01	PRELIMINARY ISSUE	21.03.25	MW	DB

AS FITTED

CLIENT

HENSALL

PROJECT

ELMWOOD LEISURE CENTRE

DRAWING TITLE

MECHANICAL SERVICES
GROUND FLOOR
VENTILATION SERVICES LAYOUT
SHEET 2 OF 4

SCALE @ A0	DATE	DRAWN	CHECKED
1:50	JAN '24	MW	DB

DRAWING No | REV

HEN0203-HEN-00-00-DR-M-5702 | AF01

11.19

HEN0203-HEN-00-00-DR-M-5703 rev AF01 Ground Floor Ventilation Services Layout Sheet 3 of 4

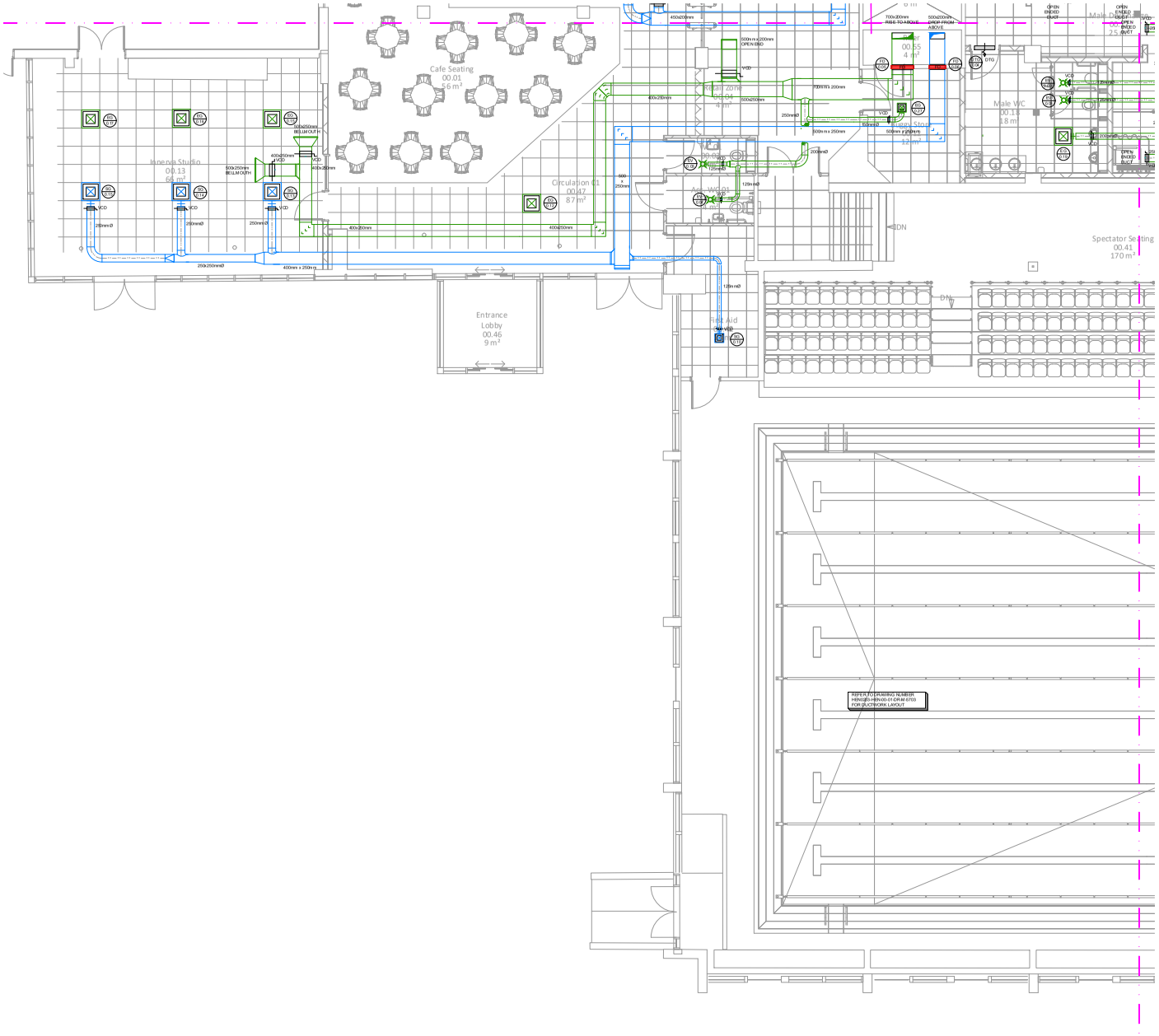
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4. ALL VCD's AND FIRE DAMPERS SHALL BE ACCESSIBLE VIA ACCESS HATCHES IN THE DUCTWORK.
5. FLEXIBLE DUCTWORK SHALL NOT EXCEED 500m m LONG.

LEGEND

- EXTRACT DUCTWORK
- SUPPLY DUCTWORK
- FRESH AIR INTAKE DUCTWORK
- EXHAUST DUCTWORK
- FLEXIBLE DUCTWORK
- ATTENUATOR
- CROSS TALK ATTENUATOR
- CEILING MOUNTED EXTRACT FAN
- WALL MOUNTED EXTRACT FAN
- COOKER CANOPY EXTRACT FAN
- INLINE EXTRACTOR FAN
- INLINE TWIN EXTRACTOR FAN
- PLENUM BOX
- EXTRACT LOUVRE
- DOOR TRANSFER GRILLE (DTG)
- FIRE DAMPER
- MOTORISED SMOKE AND FIRE DAMPER
- CIRCULAR DUCTWORK
- RECTANGULAR DUCTWORK
- BELLMOUTH
- EXTRACT GRILLE
- EXTRACT VALVE
- SUPPLY GRILLE
- SUPPLY VALVE
- VCD - VOLUME CONTROL DAMPER
- EQUIPMENT REFERENCE
- MATCHLINE

ABBREVIATIONS

ATT - ATTENUATOR
CTA - CROSS TALK ATTENUATOR
EG - EXTRACT GRILLE
EV - EXTRACT VALVE
FD - FIRE DAMPER
HRU - HEAT RECOVERY UNIT
SG - SUPPLY GRILLE
SV - SUPPLY VALVE
VCD - VOLUME CONTROL DAMPER

REV	DESCRIPTION	DATE	DRAWN	CHECK
AF01	AS FITTED	15.05.25	MP'O	DB
C01	CONSTRUCTION ISSUE	26.03.25	MW	DB
P01	PRELIMINARY ISSUE	17.03.25	MW	DB

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CLIENT

HENSALL

PROJECT

ELMWOOD LEISURE CENTRE

DRAWING TITLE

MECHANICAL SERVICES
GROUND FLOOR
VENTILATION SERVICES LAYOUT
SHEET 3 OF 4

SCALE @ A0	DATE	DRAWN	CHECKED
1:50	JAN '24	MW	DB

DRAWING N°	REV
HEN0203-HEN-00-00-DR-M-5703	AF01

11.20

HEN0203-HEN-00-00-DR-M-5704 rev AF01 Ground Floor Ventilation Services Layout Sheet 4 of 4

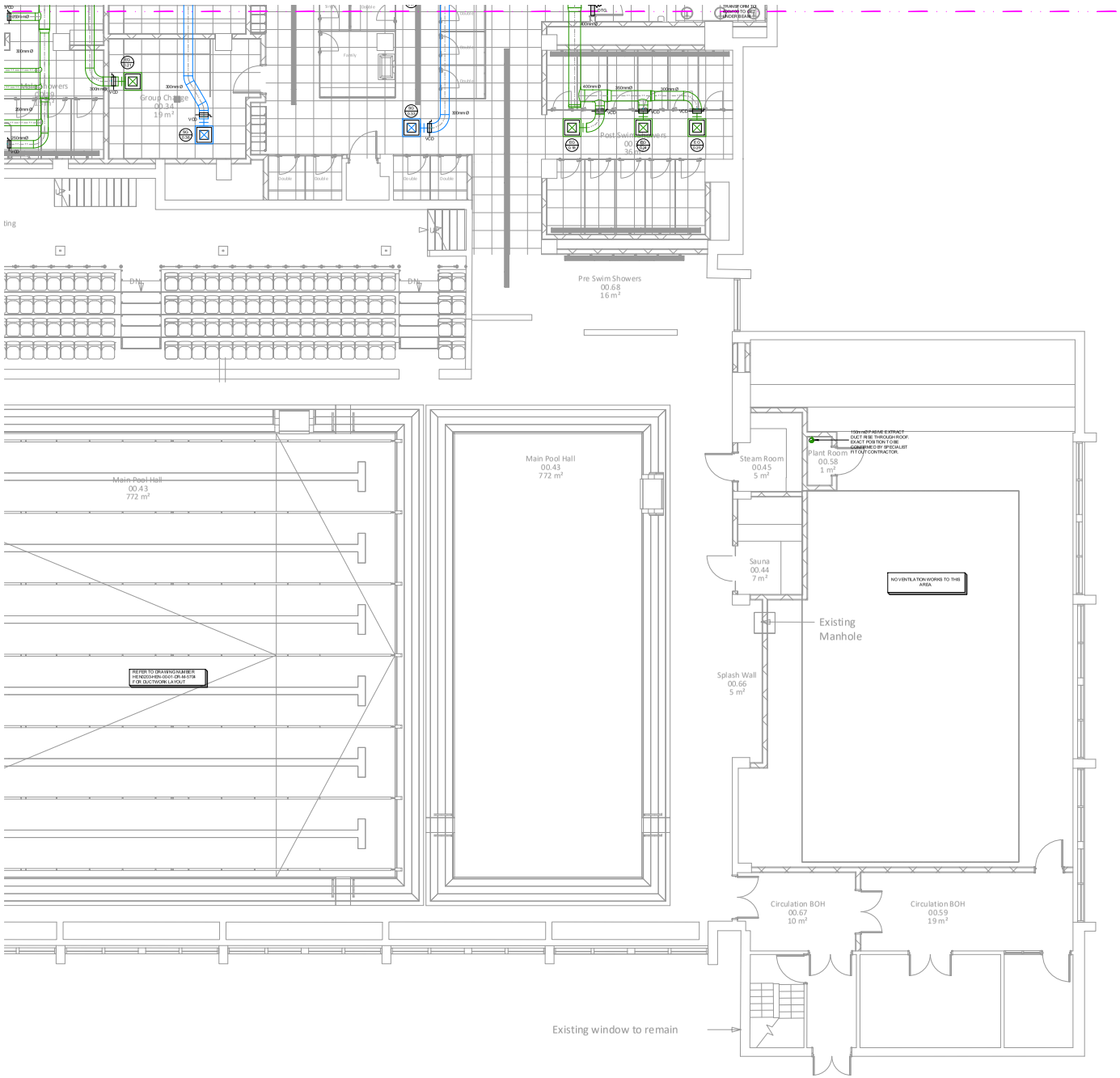
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Asset	0000M5704
Provided by	Hensall Mechanical Services Ltd
Source file	HEN0203-HEN-00-00-DR-M-5704 AF01.pdf
Pages	1

KEY PLAN

REFERENCED MODELS AND DRAWINGS

23031-GT3-00-00-DR-A-20-0003-P5



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4. ALL FINAL CONNECTIONS SHALL BE MADE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

VENTILATION NOTES

1. ALL EXPOSED DUCTWORK SHALL NOT BE INSULATED.
2. ALL DUCTWORK WITHIN RISERS OR CEILING VOIDS SHALL BE INSULATED.
3. ACCESS HATCHES SHALL BE PROVIDED IN ACCORDANCE WITH DWH44 AND DW172.
4. ALL VCD's AND FIRE DAMPERS SHALL BE ACCESSIBLE VIA ACCESS HATCHES IN THE DUCTWORK.
5. FLEXIBLE DUCTWORK SHALL NOT EXCEED 500mm LONG.

LEGEND

- EXTRACT DUCTWORK
- SUPPLY DUCT WORK
- FRESH AIR INTAKE DUCT WORK
- EXHAUST DUCT WORK
- FLEXIBLE DUCTWORK
- ATTENUATOR
- CROSS TALK ATTENUATOR
- CEILING MOUNTED EXTRACT FAN
- WALL MOUNTED EXTRACT FAN
- COOKER CANOPY EXTRACT FAN
- INLINE EXTRACTOR FAN
- INLINE TWIN EXTRACTOR FAN
- PLENUM BOX
- EXTRACT LOUVRE
- DOOR TRANSFER GRILLE (DTG)
- FIRE DAMPER
- MOTORISED SMOKE AND FIRE DAMPER
- CIRCULAR DUCTWORK
- RECTANGULAR DUCTWORK
- BELLMOUTH
- EXTRACT GRILLE
- EXTRACT VALVE
- SUPPLY GRILLE
- SUPPLY VALVE
- VCD — VOLUME CONTROL DAMPER
- EQUIPMENT REFERENCE (AHU 01 / MVHR 01)
- MATCHLINE

ABBREVIATIONS

ATT - ATTENUATOR
CT A - CROSS TALK ATTENUATOR
EG - EXTRACT GRILLE
EV - EXTRACT VALVE
FD - FIRE DAMPER
HRU - HEAT RECOVERY UNIT
SG - SUPPLY GRILLE
SV - SUPPLY VALVE
VCD - VOLUME CONTROL DAMPER

REV	DESCRIPTION	DATE	DRAWN	CHECK
AF01	AS FITTED	15.05.25	MP'O	DB
C01	CONSTRUCTION ISSUE	25.03.25	MW	DB
P01	PRELIMINARY ISSUE	21.03.25	MW	DB

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HENSALL

PROJECT

ELMWOOD LEISURE CENTRE

DRAWING TITLE

MECHANICAL SERVICES
GROUND FLOOR
VENTILATION SERVICES LAYOUT
SHEET 4 OF 4

SCALE @ A0	DATE	DRAWN	CHECKED
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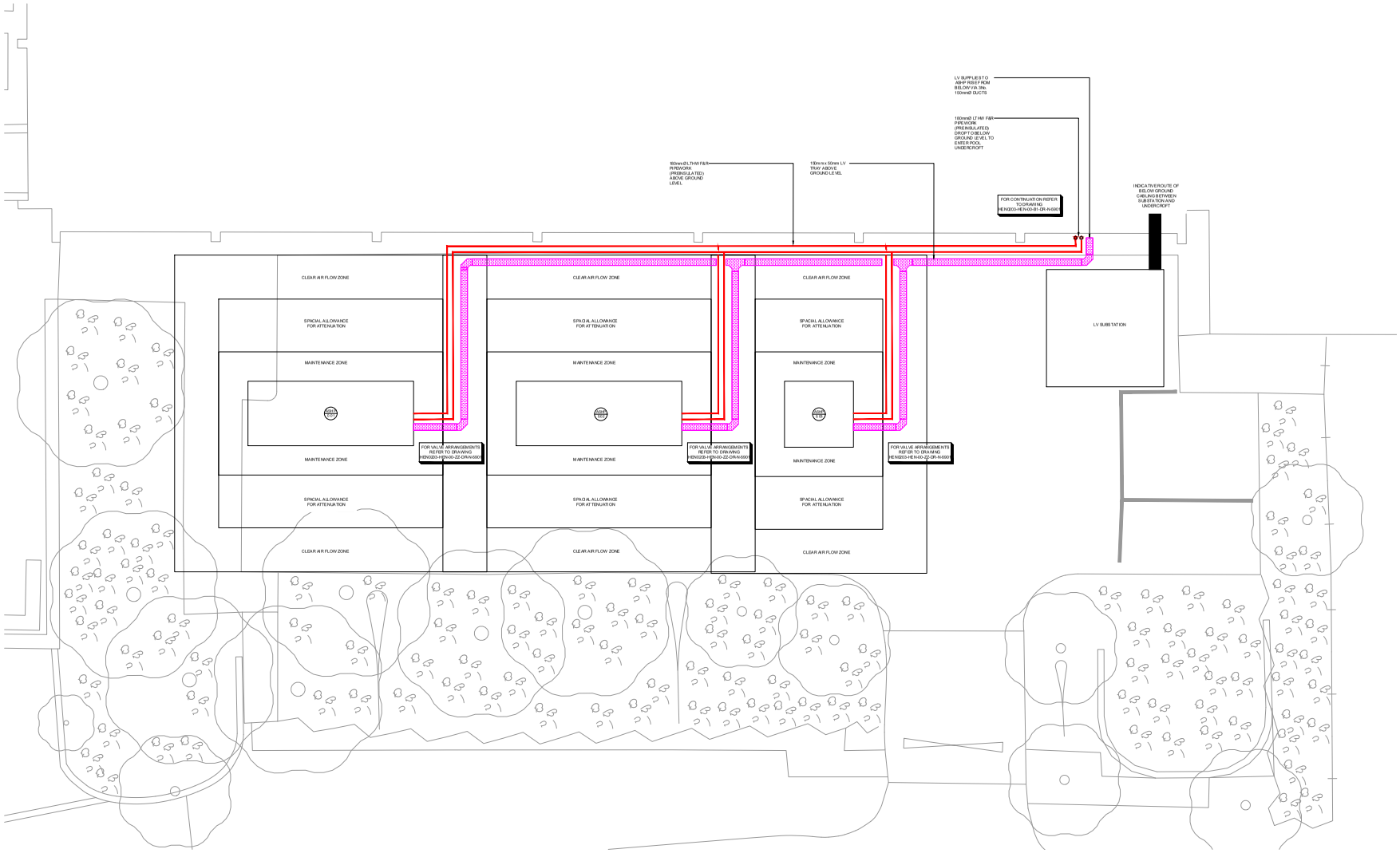
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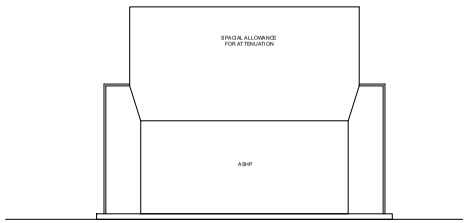
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HEN0203-HEN-00-00-DR-N-9001 rev AF01 Site Plan, External Services

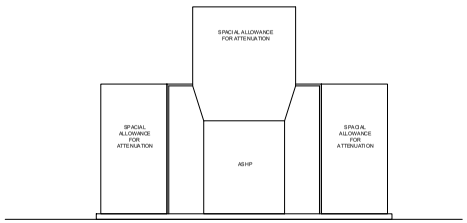
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Pages	1





INDICATIVE LONGITUDINAL ELEVATION OF ASHP



INDICATIVE CROSS SECTIONAL ELEVATION OF ASHP

THE DESIGN HAS BEEN DEVELOPED BASED ON INFORMATION AVAILABLE AT THE TIME OF DESIGN AND IS SUBJECT TO CHANGE FOLLOWING THE STRIPOUT AND EXPOSURE OF STRUCTURE WHICH IS CURRENTLY UNKNOWN

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AP01	AS FITTED	28.04.25	MPO	DB
P01	PRELIMINARY ISSUE	04.04.25	MPO	DB

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HENSALL

PROJECT
ELMWOOD LEISURE CENTRE

DRAWING TITLE
COMBINED SERVICES
SITE PLAN
EXTERNAL SERVICES

SCALE @ A0	DATE	DRAWN	CHECKED
1:50	OCT '24	MW	DB

DRAWING N°	REV
HEN0203-HEN-00-00-DR-N-9001	AF01

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HEN0203-HEN-00-01-DR-M-5201 rev AF01 First Floor Above Ground Drainage Layout Sheet 1 of 4

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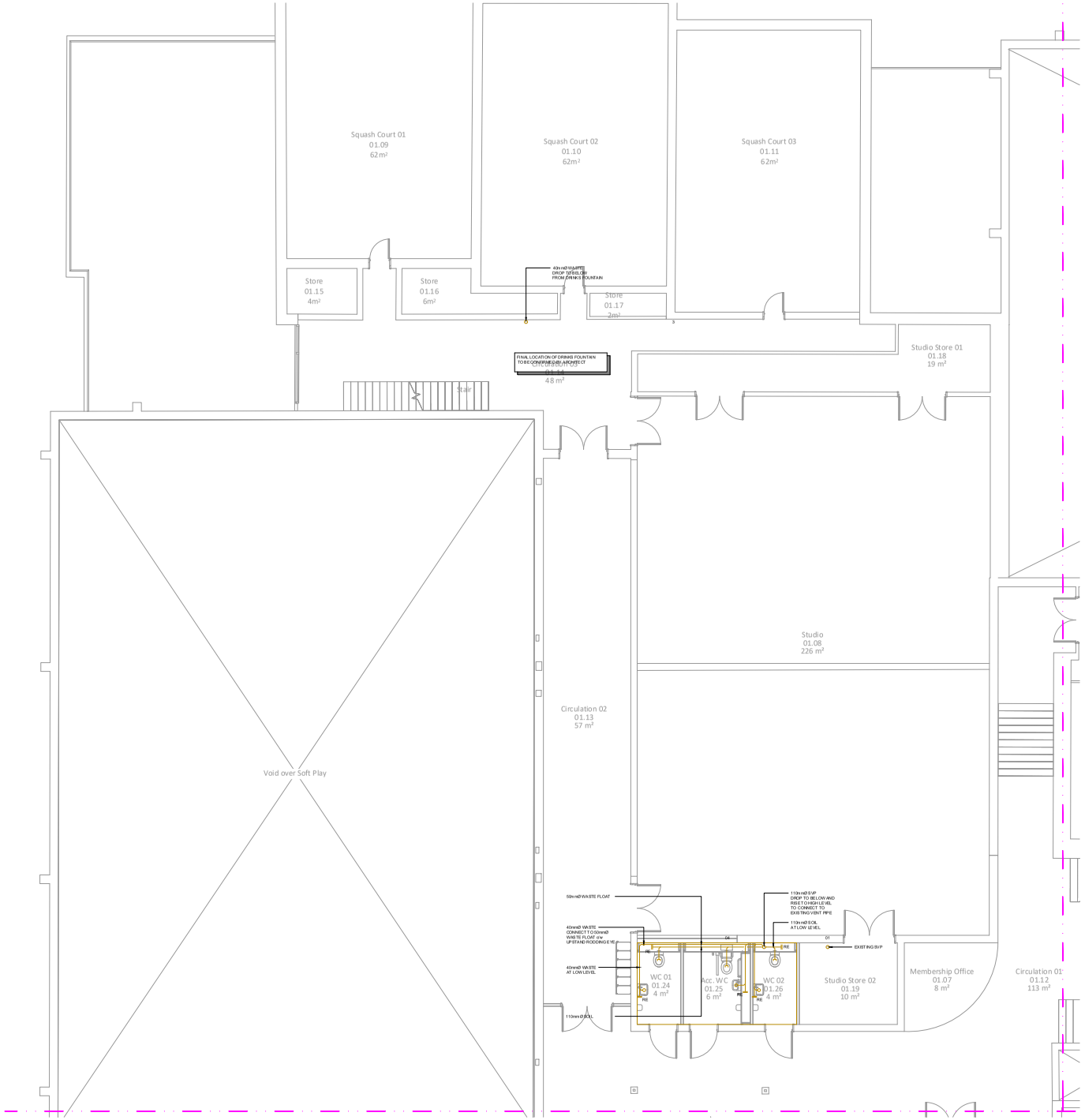
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Asset	0001M5201
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Source file	`HEN0203-HEN-00-01-DR-M-5201 AF01.pdf`
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KEY PLAN



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4. ALL FINAL CONNECTIONS SHALL BE MADE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

ABOVE GROUND DRAINAGE

1. ALL PIPEWORK SHALL BE INSTALLED IN PVC-U EXCEPT HOT WATER DISCHARGE WHICH SHALL BE IN COPPER.
2. ALL HORIZONTAL PIPEWORK SHALL BE INSTALLED WITH A MINIMUM OF 1:40 GRADIENT.
3. ALL HORIZONTAL VENT PIPEWORK SHALL BE INSTALLED WITH A MINIMUM OF 1:100 GRADIENT
4. RODDING EYES SHALL BE PROVIDED AT THE END OF EACH RUN AND AT EACH CHANGE OF DIRECTION.
5. RODDING EYES SHALL BE LOCATED IN EASILY ACCESSIBLE LOCATIONS.
6. CONNECTIONS TO BELOW GROUND DRAINAGE POP-UPS SHALL BE COMPLETE WITH 110mmø RODDING ACCESS AT 1200mm APPL.
7. HEPVO TRAP TO BE INSTALLED BY PLUMBING CONTRACTOR.
8. ALL BELOW GROUND DRAINAGE TO BE INSTALLED BY OTHERS.
9. ALL WEATHERING TO BE DONE BY OTHERS.

LEGEND

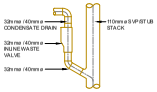
- SOIL AND VENT PIPEWORK
- PIPEWORK IN CEILING VOID
- PIPEWORK AT HIGH LEVEL
- PIPEWORK AT LOW LEVEL
- FLOOR DRAIN
- RE — RODDING EYE
- DRAINAGE CONNECTION TO SVP
- DRAINAGE CONNECTION TO APPLIANCE
- DRAINAGE CONNECTION TO SVP
- DRAINAGE CONNECTION
- SVP SCHEDULE NUMBER
- DRAWING MATCH LINE

DRAINAGE CONNECTION SIZES :

SVP	-	110mm ø
WC	-	110mm ø
WHB	-	32m ms
SINK	-	40mms
CL	-	40mms
FC	-	40mms
FG	-	110mm ø
DW	-	40mms

ABBREVIATIONS

SVP	-	SOIL AND VENT PIPE
SS	-	SUB STACK
VP	-	VENT PIPE
SP	-	SOIL PIPE
WHB	-	WASH HAND BASIN
WC	-	TOILET
CL	-	CLEANERS SINK
RE	-	RODDING EYE
FG	-	FLOOR GULLY
AAV	-	AUTOMATIC AIR VENT
DW	-	DISHWASHER
WM	-	WASHING MACHINE
GW	-	GLASS WASHER



TYPICAL CONDENSATE
STACK ARRANGEMENT

REV	DESCRIPTION	DATE	DRAWN	CHECK
AF01	AS FITTED	29.04.25	MP'O	DB
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P01	PRELIMINARY ISSUE	26.03.25	MW	DB

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PROJECT

ELMWOOD LEISURE CENTRE

DRAWING TITLE

MECHANICAL SERVICES
FIRST FLOOR
ABOVE GROUND DRAINAGE LAYOUT
SHEET 1 OF 4

SCALE @ A0	DATE	DRAWN	CHECKED
1:50	FEB '24	IJS	DDP

DRAWING N°	REV
HEN0203-HEN-00-01-DR-M-5201	AF01