

Department Construction
Name REHAU Web Design New Zealand
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Date 10/10/2018

Plumbcraft
Todd Bowmast
5 Waimana Rd
Takanini 2244

REHAU Hydronic System detailed design - Heating
Project: 18-103 Service foods freezer

Dear Todd,

We have pleasure in submitting our detailed design documents for your above mentioned project. This design and the associated data have been prepared according to the information, diagrams and/or drawings provided. Please check and confirm all parameters and results prior to using them.

By utilising our design service and the results you recognise the current REHAU Terms and Conditions of Sale, which are available on request or at www.rehau.com/LZB.

In case this design requires amendments, please send an email with all required changes to FHDesign.ANZ@rehau.com

Additional charges may apply for design changes or required corrections not caused by us.

We thank you for your interest in the REHAU Hydronic System detailed design and look forward to the application of our products.

Please do not hesitate to contact us if you require any further clarification or assistance.

Kind regards

REHAU Web Design New Zealand
REHAU Pty Ltd

Attachments: Performance overview (proposed final)
 Hydraulic Balancing Data for each manifold
 Bill Of Material (proposed final)
 Circuit layout as CAD drawing

REHAU HYDRONIC SYSTEM DESIGN NOTES



V.7.9

PROJECT NO.	18-103
PROJECT NAME	Service foods freezer
INSTALLER	Plumbcraft
DATE	10/10/2018

These design notes shall provide guidance on obviously conflicting parameters. Please read them carefully.

	Parameter	Design Notes
System Details	Heat Source	Confirm if the supply temperature of 20°C for the floor circuits in heating mode suits to your energy source. Refer to page 'Performance Overview'.
System Details	Pipe Diameter	Pipe size 20mm chosen due to the design parameters, which have taken into consideration the flow and pressure loss of the system.
System Details	Anti Freeze	The calculation is based on a ratio of 30% anti-freeze in water. It has been assumed the anti-freeze will be Propylene Glycol with corrosion inhibitor.
System Details	Anti Freeze	When selecting anti-freeze make sure it includes corrosion inhibitors and is suitable for all metal materials used in the installation, ie. brass, steel etc. Anti-freeze with corrosion inhibitors must be maintained regularly in accordance with manufacturer's instruction.
Manifold Details	Flow Temperature Control Components	Assure the required design supply temperature and flow rate can be provided directly from the heat source as no Flow Temperature Mixer Unit was specified.
Manifold Details	Flow Temperature Control Components	A Flow Temperature Mixer Unit is recommended. Please advise if the REHAU Mixer Unit is required as this has not been included in the Bill of Materials.
Manifold Details	Flow Temperature Control Components	Further Control Components may be required for this application, check the Bill of Material and confirm the included control components suit your requirements.
Floor Structure	Floor Structure	The floor structure has been assumed since there was insufficient information provided. Refer to section "Floor Structure" on page "Performance Overview" for details.
Control Details	Zone Control	Further Control Components may be required for this application, check the Bill of Material and confirm the included control components suit your requirements.
Performance Details	Required Output	The target output (heat load/cooling load) reflects the information provided by the requesting party. REHAU has not verified if it covers the load requirements of the building or of particular areas of the building. We recommend to verify the load requirements by conducting a heat load / cooling load calculation.

REHAU HYDRONIC SYSTEM

PERFORMANCE OVERVIEW - PROPOSED FINAL*



PROJECT NO.	18-103
PROJECT NAME	Service foods freezer
INSTALLER	Plumbcraft
DATE	10/10/2018
DESIGN BY	REHAU Design Team

Ground Floor (R=6.51 m².K/W)		N/A	
Floor layer:	L (mm)	Floor layer	L (mm)
Wear slab	200	N/A	
Insulation	200		
Concrete Cover	38		
----- Pipe center -----	-----		
Concrete Cover	87		
Clay	2000		

HYDRAULICS

Pipe type	RAUTHERM S 20
Heating Flow temp	20 °C
Cooling Flow temp	NA °C

PERFORMANCE SUMMARY

No. of zones	2
No. of circuits	36
Conditioned Area	2406.0 m²

Room Parameters								Heating Performance									Cooling performance												
Room(s)	Zone	Area m²	Room Thermostat	Floor System	Floor type	Floor Covering	Pipe spacing mm	Temp above/ inside °C	Temp below/ outside °C	ΔT flow/ return °C	Area flow rate L/min	Floor Surface Temp °C	Target Heat Output W/m²	Heat output up W/m²	Heat output down W/m²	Percent Covered %	Total Slab Output W	Temp above/ inside °C	Temp below/ outside °C	ΔT flow/ return °C	Area flow rate L/min	Floor Surface Temp °C	Target Cooling Output W/m²	Cooling output up W/m²	Cooling output down W/m²	Percent Covered %	Total Slab Output W		
Freezer 1	1	1807.0	None	Ground Floor	Slab on ground	None	400	-22.0		6.0	78.7	-21	6	6	11	107	31110												
Chiller	1	539.0	None	Ground Floor	Slab on ground	None	400	-22.0		5.0	28.8	-21	6	6	11	108	9494												
Blast	2	60.0	None	Ground Floor	Slab on ground	None	400	-30.0		4.8	3.6	-29	8	8	11	97	1142												
2		2406.0															41746												

* This design and the associated data have been prepared in accordance with the information provided by the requesting party. Please check if the parameter suits to your project. For minimum insulation requirements for the floor refer to the Building Code of Australia / New Zealand Building Code. When considering to use Tacker sheet, please check that the thermal and physical properties (eg. compressive stress) suit to your project. The advice is based on experience and the most recent know how but does not represent any obligation on our part.

Explanatory Notes:

PIPE SPACING Proposed pipe laying distance. Laying the pipes in a different spacing will influence the performance of the system.
TEMPERATURE ABOVE/INSIDE Target temperature for the conditioned area above the slab (typically "Room Temperature").
TEMPERATURE BELOW/OUTSIDE Temperature of the area below the slab (ie. ground temperature or room below).
ΔT FLOW/RETURN Temperature difference between supply and return for the conditioned area.
NO. OF CIRCUITS Number of circuits required to cover the conditioned area.
FLOOR SURFACE TEMPERATURE Surface temperature of the finished floor.

TARGET HEAT/COOLING OUTPUT
HEAT/COOLING OUTPUT UP
HEAT/COOLING OUTPUT DOWN
PERCENT COVERED
TOTAL SLAB OUTPUT

Target Heat/Cooling output as per the information provided by the requesting party.
 Heating/Cooling performance upwards in Watts per square meter.
 Heating/Cooling performance downwards in Watts per square meter (in slab-on-ground constructions = "Downward losses")
 Coverage of Target Heating/Cooling output in %
 Output (upwards + downwards) of the conditioned slab in Watts.

REHAU HYDRONIC SYSTEM

MANIFOLD VALVE SETTINGS - HYDRAULIC BALANCING



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	
1	Project N°:	18-103					Project Name:	Service foods freezer				Installer:	Plumbcraft			
2	Manifold M1 - Ground Floor													Date	10/10/2018	
3	Circuit Fluid Properties				Circuit Pipe Details				Flow and Return Pipe				RESULTS - Manifold			
4	Heating Temperature	20.0	°C		Manifold Stainless HKV-D				Length	11 m			Number of circuits: 6			
5	Cooling Temperature	NA	°C		Pipe RAUTHERM S 20				Flow/Ret pipe	RAUTITAN Pink 32			Total Length of circuits: 1076 m			
6	Mean water temp	17.1	°C		Mixing Unit Details				Flow rate	1125 l/h			Total Flow: 1125 l/h			
7	% Propylene Glycol	30.0	%		Type None				v	0.7 m/s			Pressure Loss @ Manifold: 27.0 kPa			
8	viscosity	0.0033	Pa.s		Supply t 20.0 °C				ΔPf/r	5.9 kPa			Total pressure including F/R 33.0 kPa			
9								%Fitting losses	20% (estimate)							
10	INPUT - Manifold							RESULTS - Floor Circuits								
11	<i>Note: ** pressure drop when valves fully open!</i>		Circuit length Σ	Flow		Velocity	Head Loss	Head Losses			Balancing					
12				v	v			Pipe	Flow and Return Valves	Total Loss	Turn direction:					
13							ΔP _{pipe}	ΔP _{Flow/Return valves, full open}	ΔP _{total**}	Closed => Open						
14	Circuit Name	No.	m	l/min	l/s	m/s	Pa/m	Pa	Pa	Pa	Pa	Kv	Turns			
15												m ³ /h				
16	Circuit	M1.1	187	3.3	0.054	0.270	130	24,310	2,721	27,031	2,721	1.19	2 1/4			
17	Circuit	M1.2	187	3.2	0.054	0.269	129	24,065	2,700	26,765	2,966	1.13	2			
18	Circuit	M1.3	178	3.1	0.052	0.257	119	21,214	2,460	23,674	5,816	0.77	3/4			
19	Circuit	M1.4	177	3.1	0.051	0.256	118	20,894	2,432	23,326	6,137	0.75	3/4			
20	Circuit	M1.5	173	3.0	0.050	0.250	114	19,765	2,334	22,100	7,265	0.67	2/4			
21	Circuit	M1.6	174	3.0	0.051	0.251	115	19,951	2,350	22,301	7,080	0.68	3/4			
22	Circuit	M1.7														
23	Circuit	M1.8														
24	Circuit	M1.9														
25	Circuit	M1.10														
26	Circuit	M1.11														
27	Circuit	M1.12														
28	Circuit	M1.13														
29	Circuit	M1.14														
30	Circuit	M1.15														
31	Circuit	M1.16														
32	Circuit	M1.17														
33	18.7													CT ANZ / syd536		

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REHAU HYDRONIC SYSTEM

MANIFOLD VALVE SETTINGS - HYDRAULIC BALANCING



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	
1	Project N°:	18-103					Project Name:	Service foods freezer				Installer:	Plumbcraft			
2	Manifold M2 - Ground Floor													Date	10/10/2018	
3	Circuit Fluid Properties				Circuit Pipe Details				Flow and Return Pipe				RESULTS - Manifold			
4	Heating Temperature	20.0	°C	Manifold Stainless HKV-D				Length	3.5 m			Number of circuits: 6				
5	Cooling Temperature	NA	°C	Pipe RAUTHERM S 20				Flow/Ret pipe	RAUTITAN Pink 32			Total Length of circuits: 1076 m				
6	Mean water temp	17.1	°C	Mixing Unit Details				Flow rate	1124 l/h			Total Flow: 1124 l/h				
7	% Propylene Glycol	30.0	%	Type None				v	0.7 m/s			Pressure Loss @ Manifold: 26.1 kPa				
8	viscosity	0.0033	Pa.s	Supply t 20.0 °C				ΔPf/r	1.9 kPa			Total pressure including F/L 28.0 kPa				
9									%Fitting losses 20% (estimate)							
10	INPUT - Manifold							RESULTS - Floor Circuits								
11			Circuit length	Flow				Head Losses			Balancing					
12	<i>Note: ** pressure drop when valves fully open!</i>		Σ	v	v	Velocity	Head Loss	Pipe	Flow and Return Valves	Total Loss	Turn direction:					
13								Δp _{pipe}	Δp _{Flow/Return valves, full open}	Δp _{total} **	Closed => Open					
14	Circuit Name	No.	m	l/min	l/s	m/s	Pa/m	Pa	Pa	Pa	Pa	Kv	Turns			
15												m ³ /h				
16	Circuit	M2.1	185	3.2	0.054	0.267	127	23,442	2,648	26,091	2,648	1.19	2 1/4			
17	Circuit	M2.2	184	3.2	0.053	0.266	126	23,203	2,628	25,831	2,888	1.13	2			
18	Circuit	M2.3	175	3.1	0.051	0.253	116	20,356	2,386	22,742	5,735	0.77	3/4			
19	Circuit	M2.4	175	3.0	0.051	0.252	115	20,168	2,369	22,538	5,923	0.75	3/4			
20	Circuit	M2.5	178	3.1	0.052	0.257	119	21,279	2,465	23,744	4,812	0.85	1			
21	Circuit	M2.6	179	3.1	0.052	0.258	120	21,538	2,488	24,025	4,553	0.88	1			
22	Circuit	M2.7														
23	Circuit	M2.8														
24	Circuit	M2.9														
25	Circuit	M2.10														
26	Circuit	M2.11														
27	Circuit	M2.12														
28	Circuit	M2.13														
29	Circuit	M2.14														
30	Circuit	M2.15														
31	Circuit	M2.16														
32	Circuit	M2.17														
33	18.7												CT ANZ / syd536			

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REHAU HYDRONIC SYSTEM

MANIFOLD VALVE SETTINGS - HYDRAULIC BALANCING



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	
1	Project N°:	18-103					Project Name:	Service foods freezer			Installer:	Plumbcraft				
2	Manifold M3 - Ground Floor													Date	10/10/2018	
3	Circuit Fluid Properties				Circuit Pipe Details			Flow and Return Pipe			RESULTS - Manifold					
4	Heating Temperature	20.0	°C	Manifold Stainless HKV-D			Length	8.5 m		Number of circuits:		6				
5	Cooling Temperature	NA	°C	Pipe RAUTHERM S 20			Flow/Ret pipe	RAUTITAN Pink 32		Total Length of circuits:		1076 m				
6	Mean water temp	17.1	°C	Mixing Unit Details			Flow rate	1124 l/h		Total Flow:		1124 l/h				
7	% Propylene Glycol	30.0	%	Type None			v	0.7 m/s		Pressure Loss @ Manifold:		25.2 kPa				
8	viscosity	0.0033	Pa.s	Supply t 20.0 °C			ΔPf/r	4.6 kPa		Total pressure including F/L		29.8 kPa				
9							%Fitting losses	20% (estimate)								
10	INPUT - Manifold							RESULTS - Floor Circuits								
11			Circuit length	Flow				Head Losses		Balancing						
12	<i>Note: ** pressure drop when valves fully open!</i>		Σ	v	v	Velocity	Head Loss	Pipe	Flow and Return Valves	Total Loss	Turn direction:					
13								Δp _{pipe}	Δp _{Flow/Return valves, full open}	Δp _{total**}	Closed => Open					
14	Circuit Name	No.	m	l/min	l/s	m/s	Pa/m	Pa	Pa	Pa	Pa	Kv	Turns			
15												m ³ /h				
16	Circuit	M3.1	182	3.2	0.053	0.262	123	22,427	2,563	24,990	2,781	1.14	2			
17	Circuit	M3.2	181	3.2	0.053	0.261	123	22,195	2,543	24,738	3,014	1.09	1 3/4			
18	Circuit	M3.3	175	3.0	0.051	0.252	115	20,106	2,364	22,470	5,102	0.81	1			
19	Circuit	M3.4	175	3.0	0.051	0.252	115	20,106	2,364	22,470	5,102	0.81	1			
20	Circuit	M3.5	182	3.2	0.053	0.262	123	22,394	2,560	24,954	2,814	1.13	2			
21	Circuit	M3.6	182	3.2	0.053	0.263	124	22,628	2,580	25,208	2,580	1.19	2 1/4			
22	Circuit	M3.7														
23	Circuit	M3.8														
24	Circuit	M3.9														
25	Circuit	M3.10														
26	Circuit	M3.11														
27	Circuit	M3.12														
28	Circuit	M3.13														
29	Circuit	M3.14														
30	Circuit	M3.15														
31	Circuit	M3.16														
32	Circuit	M3.17														
33	18.7													CT ANZ / syd536		

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REHAU HYDRONIC SYSTEM

MANIFOLD VALVE SETTINGS - HYDRAULIC BALANCING



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	
1	Project N°:	18-103					Project Name:	Service foods freezer			Installer:	Plumbcraft				
2	Manifold M4 - Ground Floor													Date	10/10/2018	
3	Circuit Fluid Properties				Circuit Pipe Details			Flow and Return Pipe			RESULTS - Manifold				V.7.9	
4	Heating Temperature	20.0	°C		Manifold Stainless HKV-D			Length	2.5 m		Number of circuits: 7					
5	Cooling Temperature	NA	°C		Pipe RAUTHERM S 20			Flow/Ret pipe	RAUTITAN Pink 32		Total Length of circuits: 1263 m					
6	Mean water temp	17.1	°C		Mixing Unit Details			Flow rate	1320 l/h		Total Flow: 1320 l/h					
7	% Propylene Glycol	30.0	%					Type	None		v	0.9 m/s		Pressure Loss @ Manifold: 28.5 kPa		
8	viscosity	0.0033	Pa.s		Supply t	20.0 °C		ΔPf/r	1.8 kPa		Total pressure including F/L 30.3 kPa					
9								%Fitting losses	20% (estimate)							
10	INPUT - Manifold							RESULTS - Floor Circuits								
11	<i>Note: ** pressure drop when valves fully open!</i>		Circuit length Σ	Flow		Velocity	Head Loss	Head Losses			Balancing					
12				Pipe	Flow and Return Valves			Total Loss	Turn direction:							
13			v	v			ΔP _{pipe}	ΔP _{Flow/Return valves, full open}	ΔP _{total**}	Closed => Open						
14	Circuit Name	No.	m	l/min	l/s	m/s	Pa/m	Pa	Pa	Pa	Pa	Kv	Turns			
15												m ³ /h				
16	Circuit	M4.1	173	3.0	0.050	0.250	114	19,642	2,324	21,966	8,857	0.61	2/4			
17	Circuit	M4.2	172	3.0	0.050	0.249	113	19,459	2,307	21,766	9,041	0.60	2/4			
18	Circuit	M4.3	176	3.1	0.051	0.254	117	20,482	2,397	22,878	8,018	0.65	2/4			
19	Circuit	M4.4	176	3.1	0.051	0.255	117	20,703	2,416	23,119	7,796	0.66	2/4			
20	Circuit	M4.5	186	3.2	0.054	0.269	129	23,995	2,695	26,690	4,504	0.92	1 1/4			
21	Circuit	M4.6	188	3.3	0.055	0.272	131	24,663	2,750	27,412	3,837	1.00	1 2/4			
22	Circuit	M4.7	191	3.3	0.055	0.276	134	25,667	2,832	28,499	2,832	1.19	2 1/4			
23	Circuit	M4.8														
24	Circuit	M4.9														
25	Circuit	M4.10														
26	Circuit	M4.11														
27	Circuit	M4.12														
28	Circuit	M4.13														
29	Circuit	M4.14														
30	Circuit	M4.15														
31	Circuit	M4.16														
32	Circuit	M4.17														
33	22.0													CT ANZ / syd536		

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REHAU HYDRONIC SYSTEM

MANIFOLD VALVE SETTINGS - HYDRAULIC BALANCING



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	
1	Project N°:	18-103					Project Name:	Service foods freezer				Installer:	Plumbcraft			
2	Manifold M5 - Ground Floor													Date	10/10/2018	
3	Circuit Fluid Properties					Circuit Pipe Details			Flow and Return Pipe			RESULTS - Manifold				
4	Heating Temperature	20.0	°C				Manifold	Stainless HKV-D		Length	6.5 m		Number of circuits:			1
5	Cooling Temperature	NA	°C				Pipe	RAUTHERM S 20		Flow/Ret pipe	RAUTITAN PINK 25		Total Length of circuits:			128 m
6	Mean water temp	17.1	°C				Mixing Unit Details			Flow rate	185 l/h		Total Flow:			185 l/h
7	% Propylene Glycol	30.0	%				Type	None		v	0.2 m/s		Pressure Loss @ Manifold:			17.5 kPa
8	viscosity	0.0033	Pa.s				Supply t	20.0 °C		ΔPf/r	0.5 kPa		Total pressure including F/L			18.0 kPa
9									%Fitting losses	20% (estimate)						
10	INPUT - Manifold							RESULTS - Floor Circuits								
11	<i>Note: ** pressure drop when valves fully open!</i>		Circuit length Σ	Flow		Velocity m/s	Head Loss Pa/m	Head Losses			Balancing					
12				v l/min	v l/s			Pipe	Flow and Return Valves	Total Loss	Turn direction:					
13	ΔP _{pipe}	ΔP _{Flow/Return valves, full open}	ΔP _{total**}			Closed => Open										
14	Circuit Name	No.	m	l/min	l/s	m/s	Pa/m	Pa	Pa	Pa	Pa	Kv	Turns			
15												m ³ /h				
16	Circuit	M5.1	128	3.1	0.051	0.255	118	15,085	2,428	17,513	2,428	1.19	2 1/4			
17	Circuit	M5.2														
18	Circuit	M5.3														
19	Circuit	M5.4														
20	Circuit	M5.5														
21	Circuit	M5.6														
22	Circuit	M5.7														
23	Circuit	M5.8														
24	Circuit	M5.9														
25	Circuit	M5.10														
26	Circuit	M5.11														
27	Circuit	M5.12														
28	Circuit	M5.13														
29	Circuit	M5.14														
30	Circuit	M5.15														
31	Circuit	M5.16														
32	Circuit	M5.17														
33	3.1													CT ANZ / syd536		

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REHAU HYDRONIC SYSTEM

MANIFOLD VALVE SETTINGS - HYDRAULIC BALANCING



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	
1	Project N°:	18-103					Project Name:	Service foods freezer			Installer:	Plumbcraft				
2	Manifold M6 - Ground Floor													Date	10/10/2018	
3	Circuit Fluid Properties				Circuit Pipe Details			Flow and Return Pipe			RESULTS - Manifold				V.7.9	
4	Heating Temperature	20.0	°C	Manifold IM 32 S			Length	8 m		Number of circuits:		10				
5	Cooling Temperature	NA	°C	Pipe RAUTHERM S 20			Flow/Ret pipe	RAUTITAN Pink 40		Total Length of circuits:		1336 m				
6	Mean water temp	17.1	°C	Mixing Unit Details			Flow rate	1714 l/h		Total Flow:		1714 l/h				
7	% Propylene Glycol	30.0	%	Type None			v	0.7 m/s		Pressure Loss @ Manifold:		20.1 kPa				
8	viscosity	0.0033	Pa.s	Supply t 20.0 °C			ΔP/r	3.1 kPa		Total pressure including F/L		23.2 kPa				
9							%Fitting losses	20% (estimate)								
10	INPUT - Manifold							RESULTS - Floor Circuits								
11			Circuit length	Flow		Velocity	Head Loss	Pipe	Head Losses		Total Loss	Balancing				
12	<i>Note: ** pressure drop when valves fully open!</i>		Σ	v	v			ΔP _{pipe}	Flow and Return Valves			Turn direction:				
13	Circuit Name	No.	m	l/min	l/s	m/s	Pa/m	Pa	Pa	Pa	Pa	Kv	Turns			
14																
15												m³/h				
16	Circuit	M6.1	144	3.1	0.051	0.256	118	17,093	3,012	20,105	3,012	1.07				
17	Circuit	M6.2	144	3.1	0.051	0.255	117	16,870	2,983	19,853	3,235	1.03				
18	Circuit	M6.3	135	2.9	0.048	0.239	105	14,165	2,621	16,786	5,940	0.71				
19	Circuit	M6.4	134	2.9	0.048	0.238	104	13,967	2,594	16,561	6,138	0.69				
20	Circuit	M6.5	126	2.7	0.045	0.223	94	11,827	2,294	14,121	8,278	0.56				
21	Circuit	M6.6	125	2.7	0.045	0.222	93	11,576	2,257	13,833	8,530	0.55				
22	Circuit	M6.7	127	2.7	0.045	0.225	95	12,083	2,330	14,413	8,023	0.58				
23	Circuit	M6.8	128	2.7	0.045	0.226	96	12,212	2,349	14,560	7,894	0.58				
24	Circuit	M6.9	136	2.9	0.049	0.242	107	14,653	2,688	17,341	5,452	0.75				
25	Circuit	M6.10	137	2.9	0.049	0.243	108	14,828	2,712	17,540	5,277	0.77				
26	Circuit	M6.11														
27	Circuit	M6.12														
28	Circuit	M6.13														
29	Circuit	M6.14														
30	Circuit	M6.15														
31	Circuit	M6.16														
32	Circuit	M6.17														
33	28.6													CT ANZ / syd536		

This design and the associated data have been prepared in accordance with the information provided by the requesting party.

The advice is based on experience and the most recent know how but does not represent any obligation on our part.

REHAU HYDRONIC SYSTEM

BILL OF MATERIAL - PROPOSED FINAL *



V.7.9

PROJECT NO. 18-103
 PROJECT NAME Service foods freezer
 INSTALLER Plumbcraft

Date 10/10/2018
 Department Construction

PROJECT OVERVIEW:

Project Type Commercial
 System in-slab
 Pipe RAUTHERM S 20
 Heat Source Condensing boiler
 Total output Heating 41.7 kW
 Cooling Source None
 Total output Cooling 0 kW
 Covered Floor Area 2406 m²
 Number of Zones 2
 Number of manifolds 6
 Number of circuits 36
 Manifold type Stainless HKV-D Industrial Manifold IM 32 S
 Flow Temp. system None

Further details see page "Performance Overview"

Category	Sub Category	Product Description	Availability	Article Number	Units	Est. Qty	Order Quantity
Floor Systems	RAUTHERM S	Pipe 20 x 2.0 mm - 400m coil	Standard	139800-400	m	5954	6400
Floor Systems	Stainless Manifold	Stainless Steel Manifold 2-port	Standard	208021-003	ea	1	1
Floor Systems	Stainless Manifold	Stainless Steel Manifold 6-port	Standard	208061-003	ea	3	3
Floor Systems	Stainless Manifold	Stainless Steel Manifold 7-port	Standard	208071-003	ea	1	1
Floor Systems	Stainless Manifold	Ball valve set 1"	Standard	208122-001	ea	5	5
Floor Systems	Industrial Manifold	IM 32 S 1 1/4" 10-port	Lead Time	470090-001	ea	1	1
Floor Systems	Industrial Manifold	Ball valve set 1 1/4"	Standard	470001-001	ea	1	1
Controls	Zone Controls	Actuator 24V for polymer manifold / NEA control	Standard	240131 or 217916	ea	36	Optional
Controls	Zone Controls	Actuator 230V for polymer manifold / ADR-UFH control	Standard	240011 or 217915	ea	36	Optional
Accessories	Manifold	Manifold Union for RAUTHERM S 20 x 2.0 mm	Standard	250617-001	ea	72	72
Accessories	Conduit	Conduit for RAUTITAN Pipe 20 mm (yellow)	Standard	180262-050	m	144	150
Accessories	RAUTITAN Fittings	Polymer Profile Bend Bkt 90 Deg 20 mm	Standard	297892-001	ea	72	72
Accessories	RAUTHERM S Fittings	No. 1 Straight Coupler 20 x 2.0 mm	Standard	250317-002	ea	16	16
Accessories	RAUTHERM S Fittings	Compression Sleeve 20 x 2.0 mm	Standard	250307-002	ea	32	32

Further Hydronic Components that may be required*:

- Suitably sized energy source(s)
- Suitably sized supply and return pipe work from the energy source to the manifold(s)
- An external pump (check the internal energy source pump curve)
- Suitably sized expansion vessel
- Safety Valves and Isolating Valves
- Air Bleeding Valve
- Other

The above are only suggestions from REHAU and a proper design considering the whole hydraulic system is required to determine if the above material estimation will be sufficient to condition the space adequately.

Category	Sub Category	Product Description	Availability	Article Number	Units	Est. Qty	Order Quantity
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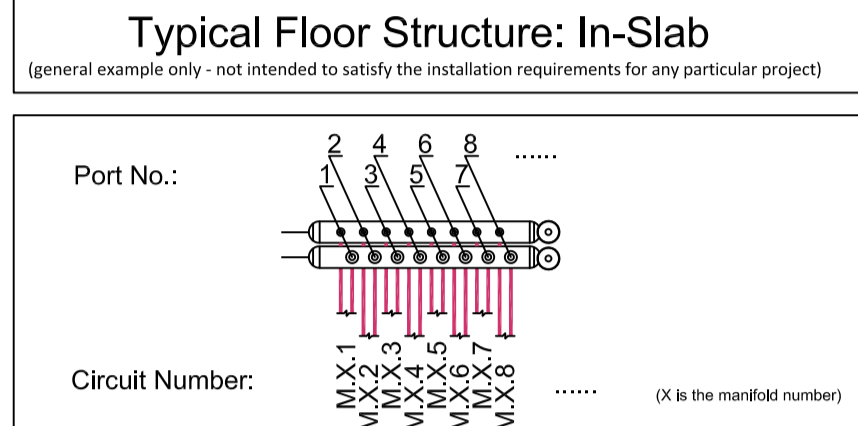
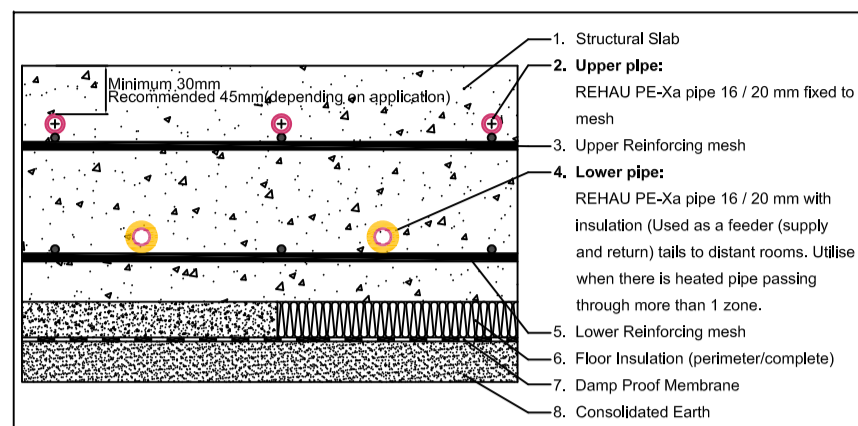
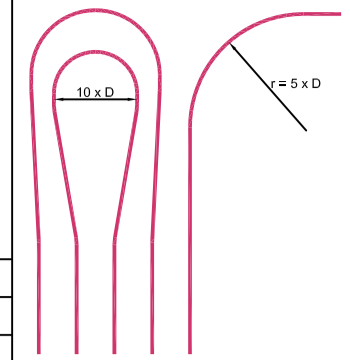
**This is an estimate only based on the information provided to us at the time of completing this proposal. The estimate assumes the building has sufficient thermal insulation to meet local building requirements, e.g. NZBC, BCA or BASIX, prior to the installation of the REHAU components. REHAU does not accept any liability for omissions of hydronic components, installation tools and accessories, or for any discrepancy in terms of quantity of materials (overestimate or underestimate) compared to the actual requirements. This material list terminates at the UFH manifold and may not include all components required to condition the space adequately. The amount and sizes for each article may change during the final design.*

Our verbal and written advice relating to technical applications and this quote is based on experience and is to the best of our knowledge correct but is given without obligation.

LAYING INSTRUCTIONS

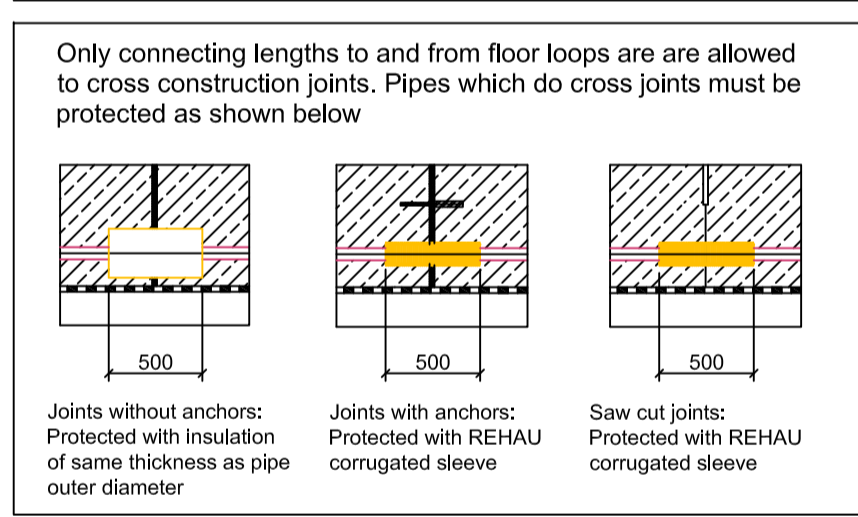
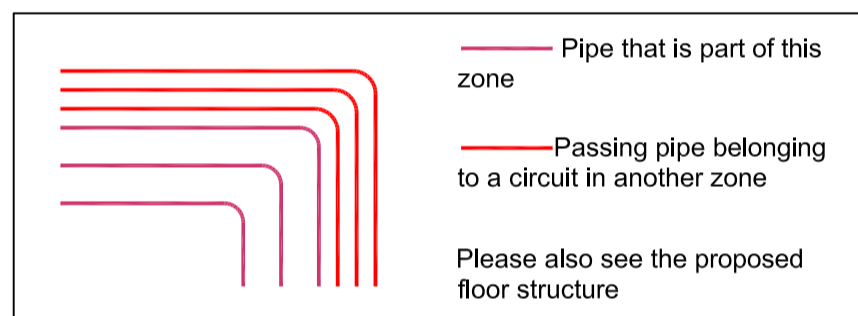
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Ø 16 mm	min. 80 mm
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In installation areas with dense pipe work, we recommend to insulate part of the pipe work with corrugated conduit until the pipes reach the design pipe spacing.

Note: Depending on the structural load a minimum distance between the pipes needs to be considered, refer to a structural engineer for further advice.



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- Contact REHAU for further advice on pressure testing with air.

On completion of the pressure test the pipe circuits can be covered with concrete/screed. Keep the system under operating pressure during pouring of the screed to detect any leaks straight away.

Warning:
Don't leave any water in the system when there is a risk of sub-zero conditions!

3. INITIAL WARM-UP

- In case of cement based screeds the initial warm-up must only be carried out after 21 days after laying (or as per manufacturer advice) to ensure the screed is correctly cured.
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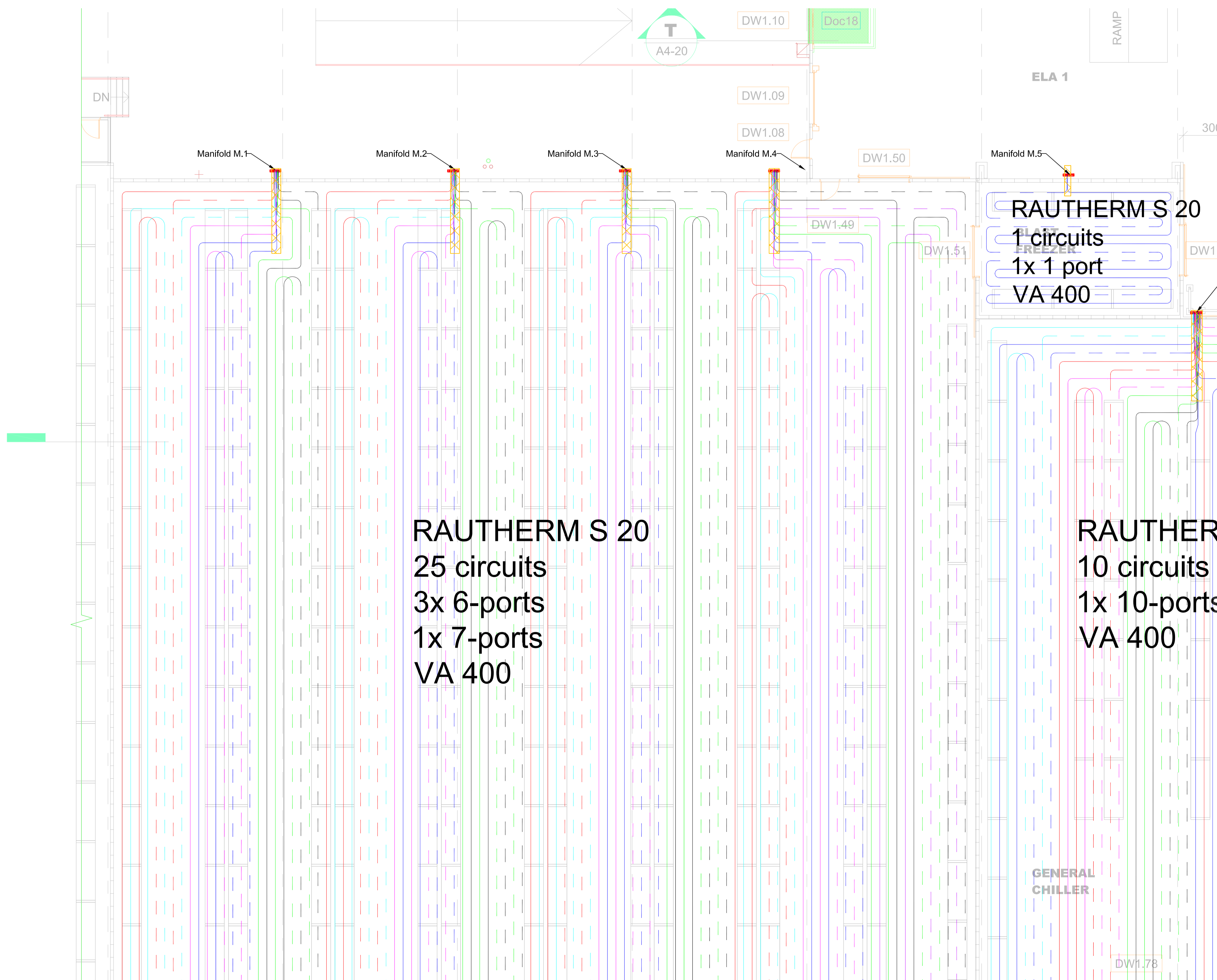
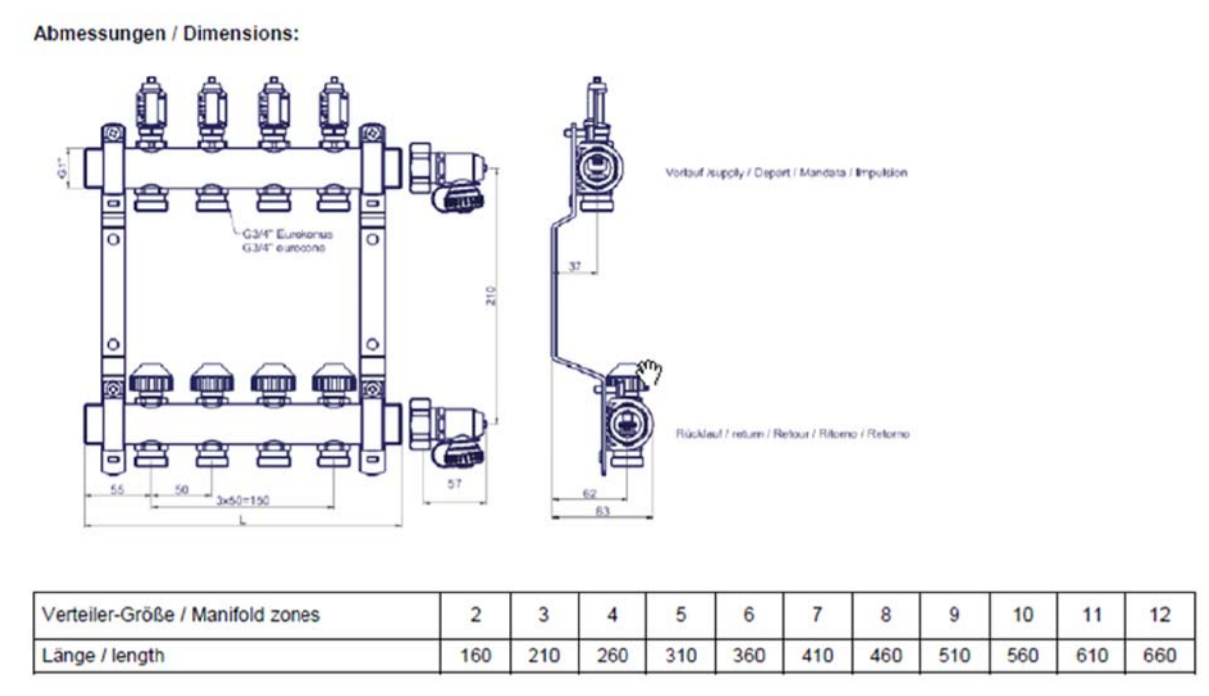
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- Perform the hydraulic balancing of the circuits.
- Start-up and operate the plant.

Manifold No.: M.1					Manifold No.: M.2				
Manifold type:	Circuits pipe:	Total Flow Rate:	Pressure Loss:		Manifold type:	Circuits pipe:	Total Flow Rate:	Pressure Loss:	
Stainless	RAUTHERM S 20x2.0	18.7 L/min	27 KPa		Stainless	RAUTHERM S 20x2.0	18.7 L/min	26.1 KPa	
Circuit No.:	Pipe Spacing: (mm)	Total Length: (m)	Flow Rate: (L/min)	Turns open:	Circuit No.:	Pipe Spacing: (mm)	Total Length: (m)	Flow Rate: (L/min)	Turns open:
M.1.1	400 mm	187	3.3	2-1/4	M.2.1	400 mm	185	3.2	2-1/4
M.1.2	400 mm	187	3.2	2	M.2.2	400 mm	184	3.2	2
M.1.3	400 mm	178	3.1	3/4	M.2.3	400 mm	175	3.1	3/4
M.1.4	400 mm	177	3.1	3/4	M.2.4	400 mm	175	3.0	3/4
M.1.5	400 mm	173	3.0	1/2	M.2.5	400 mm	178	3.1	1
M.1.6	400 mm	174	3.0	3/4	M.2.6	400 mm	179	3.1	1

Manifold No.: M.3					Manifold No.: M.4				
Manifold type:	Circuits pipe:	Total Flow Rate:	Pressure Loss:		Manifold type:	Circuits pipe:	Total Flow Rate:	Pressure Loss:	
Stainless	RAUTHERM S 20x2.0	18.7 L/min	25.2 KPa		Stainless	RAUTHERM S 20x2.0	22.0 L/min	28.5 KPa	
Circuit No.:	Pipe Spacing: (mm)	Total Length: (m)	Flow Rate: (L/min)	Turns open:	Circuit No.:	Pipe Spacing: (mm)	Total Length: (m)	Flow Rate: (L/min)	Turns open:
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REHAU
Unlimited Polymer Solutions

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Legend

- Heating Pipe Flow (Solid)
- Heating Pipe Return (Dashed)
- Expansion Joint Profile
- Manifold

PROJECT TITLE
Service foods freezer

DRAWING TITLE
UFH CIRCUIT LAYOUT

A	First Issue	10/10/18
No.	DESCRIPTION	DATE

ISSUES & REVISIONS

DRAWN BY D.P	SCALE A1 1:100 A3 1:200
CHECKED BY D.P	SHEET NO. P1
DATE 10/10/18	

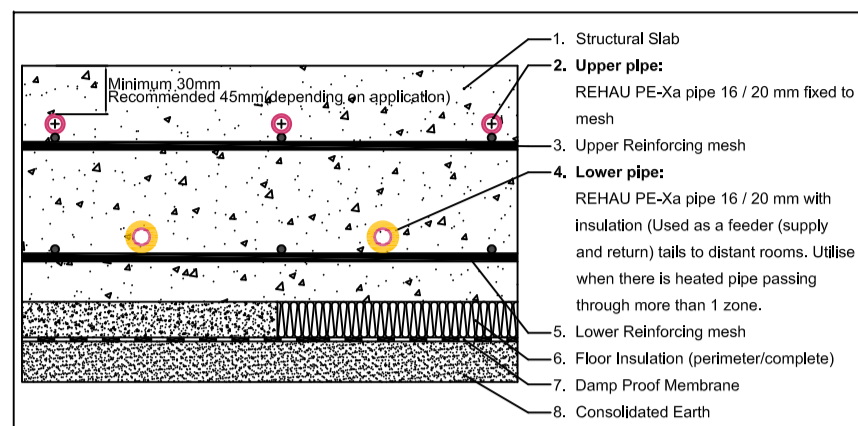
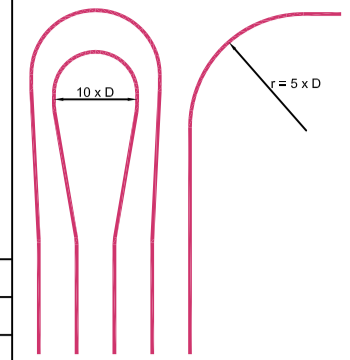
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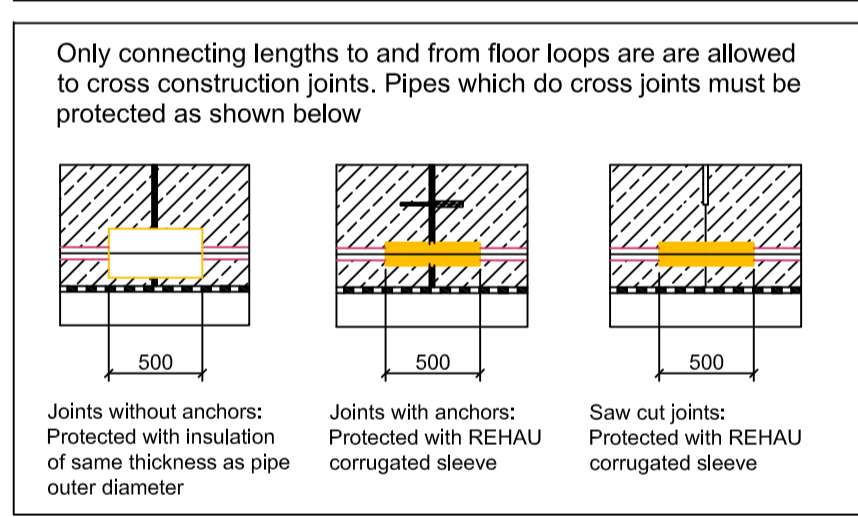
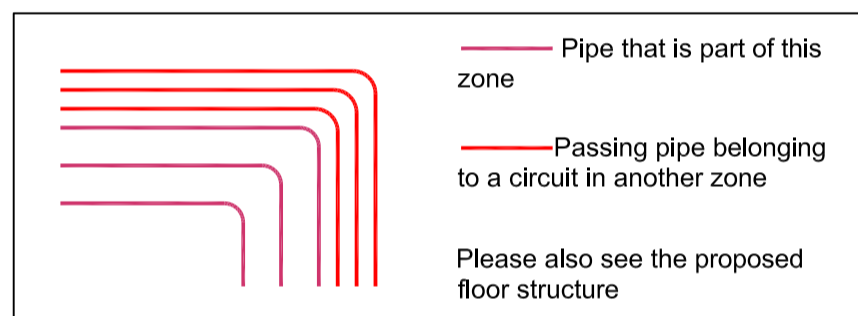
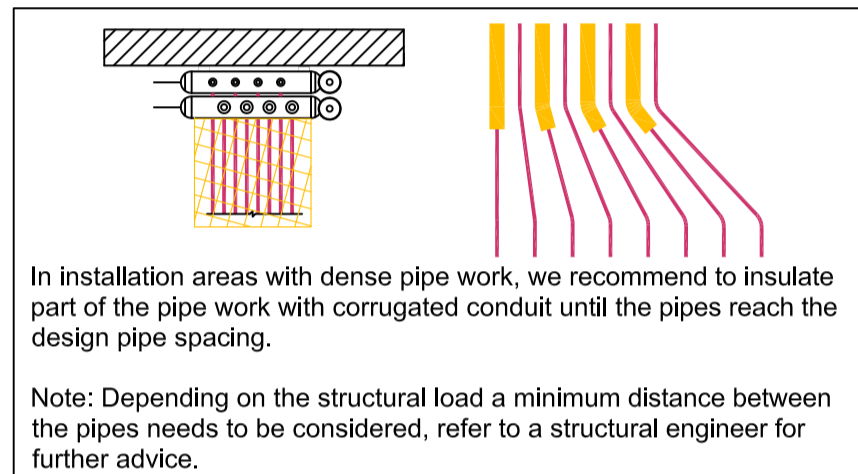
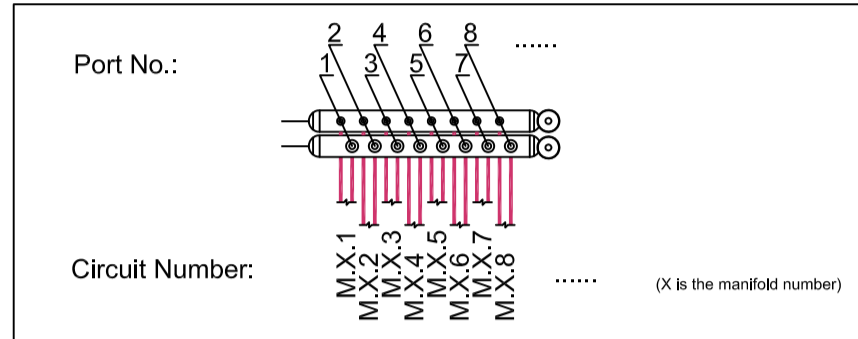
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Typical Floor Structure: In-Slab
(general example only - not intended to satisfy the installation requirements for any particular project)



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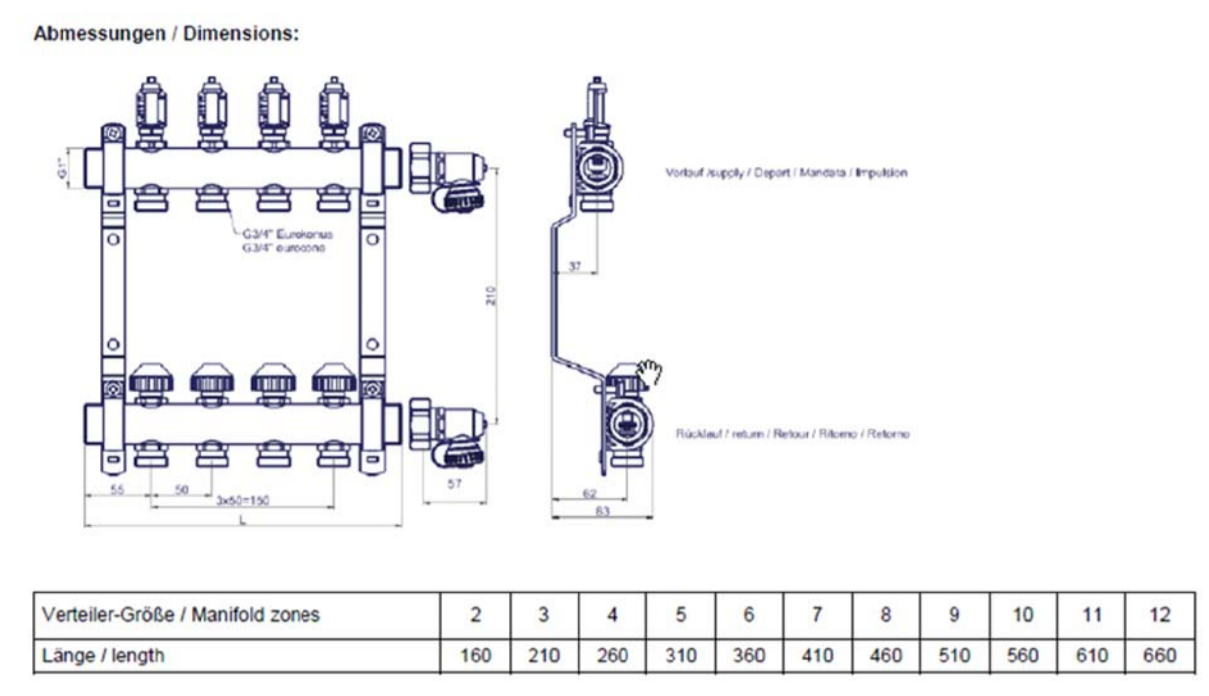
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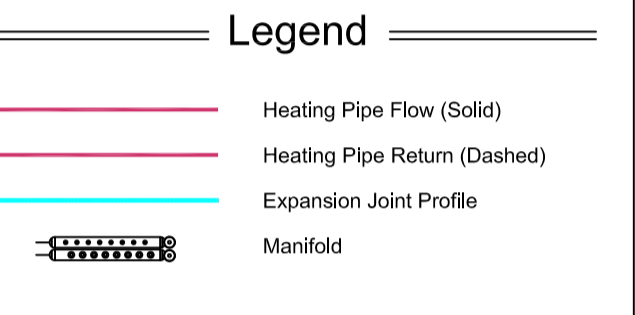
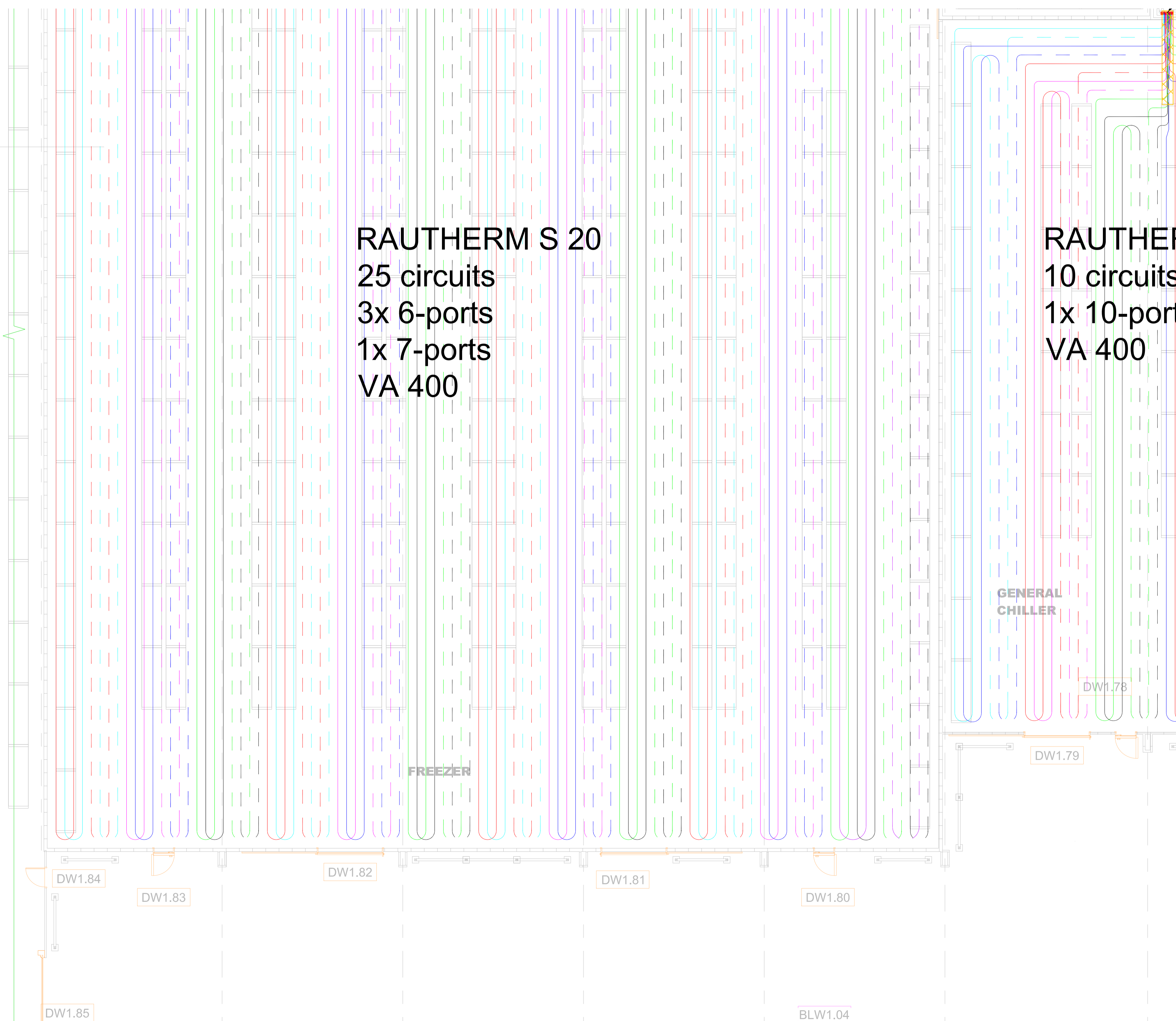


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DRAWING TITLE

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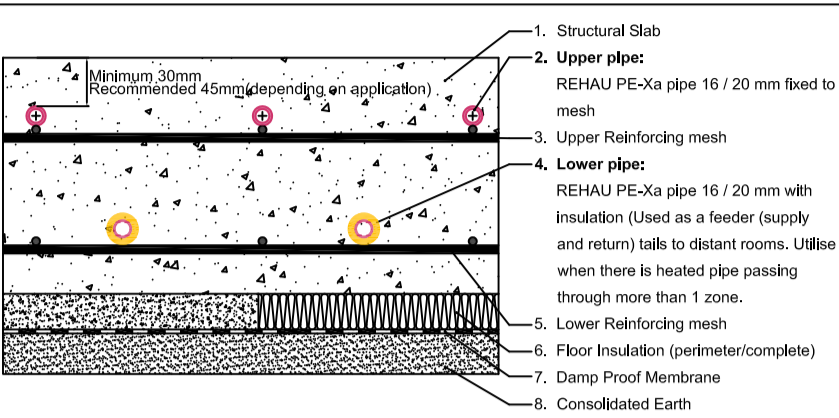
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APPROVED BY	D.P	DATE	10/10/18

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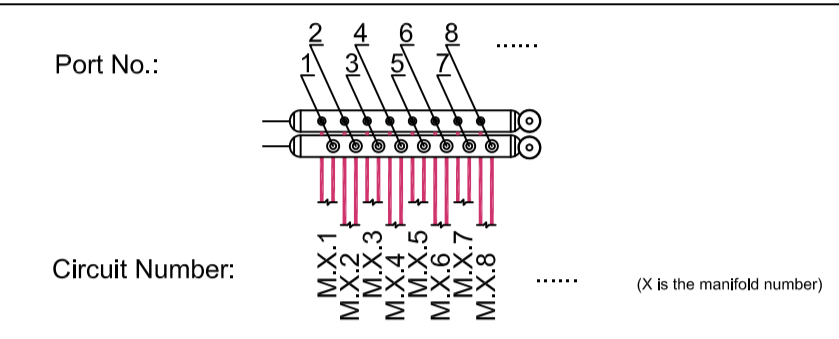
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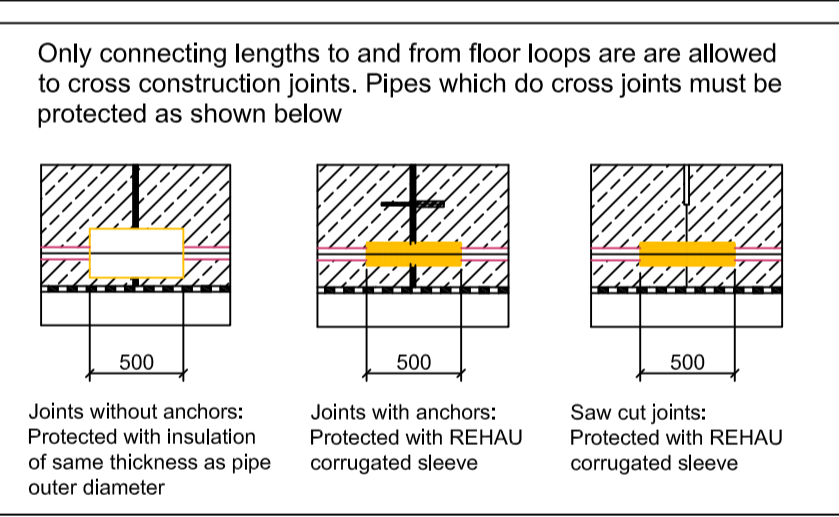
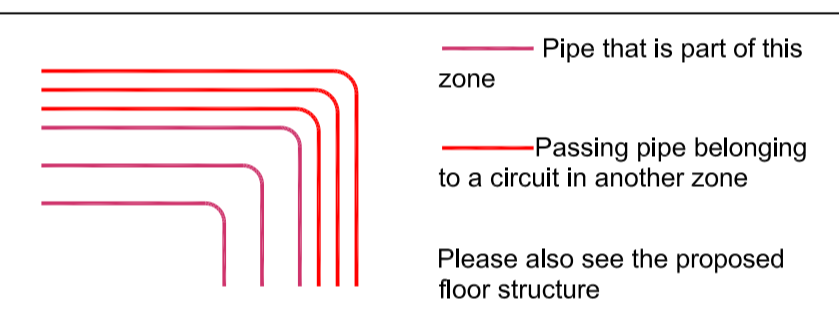


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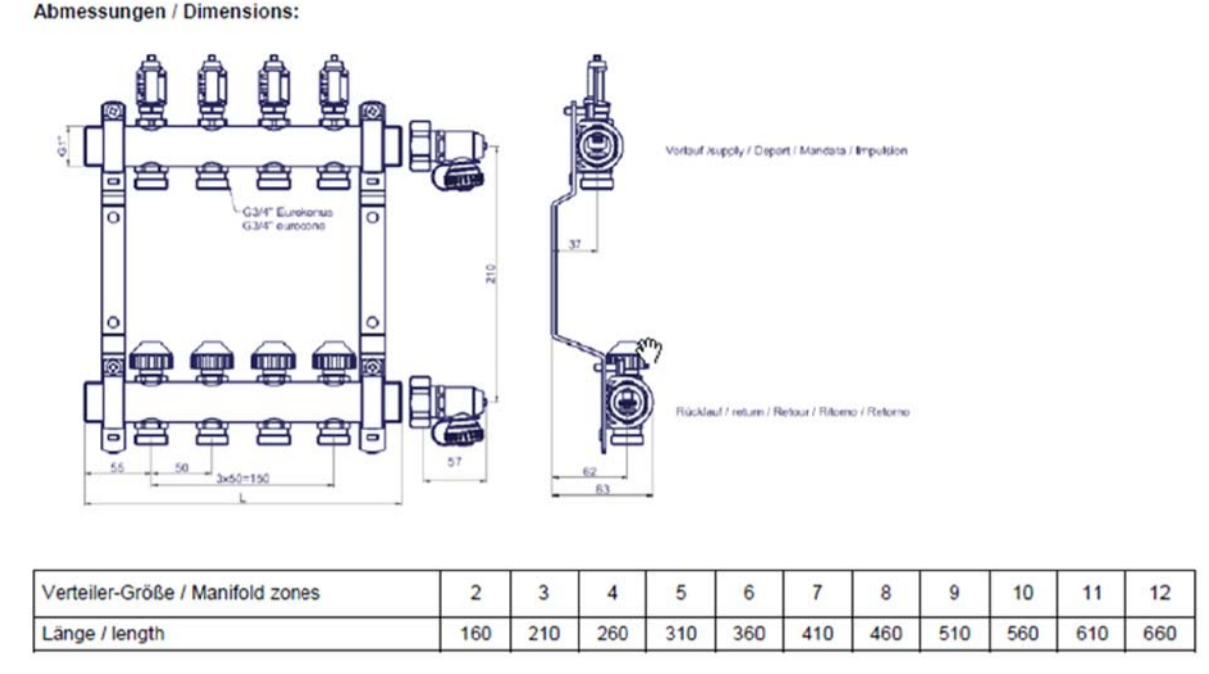
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- Start-up and operate the plant.

Manifold No.: M.5

Manifold type:	Circuits pipe:	Total Flow Rate:	Pressure Loss:	
Stainless	RAUTHERM S 20x2.0	3.1 L/min	17.5 KPa	
Circuit No.:	Pipe Spacing: (mm)	Total Length: (m)	Flow Rate: (L/min)	Turns open:
M.5.1	400 mm	128	3.1	2-1/4

Manifold No.: M.6

Manifold type:	Circuits pipe:	Total Flow Rate:	Pressure Loss:	
Stainless	RAUTHERM S 20x2.0	28.6 L/min	19.5 KPa	
Circuit No.:	Pipe Spacing: (mm)	Total Length: (m)	Flow Rate: (L/min)	Turns open:
M.6.1	400 mm	144	3.1	2-1/4
M.6.2	400 mm	144	3.1	2
M.6.3	400 mm	135	2.9	3/4
M.6.4	400 mm	134	2.9	3/4
M.6.5	400 mm	126	2.7	1/2
M.6.6	400 mm	125	2.7	1/2
M.6.7	400 mm	127	2.7	1/2
M.6.8	400 mm	128	2.7	1/2
M.6.9	400 mm	136	2.9	3/4
M.6.10	400 mm	137	2.9	1

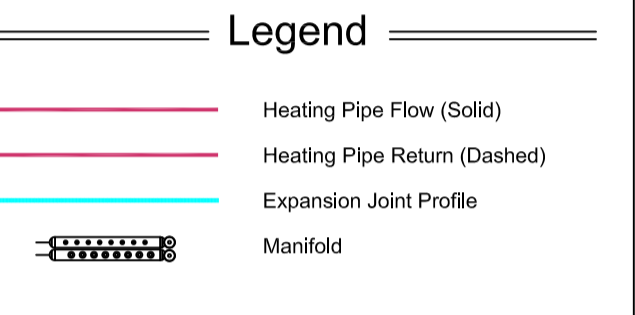
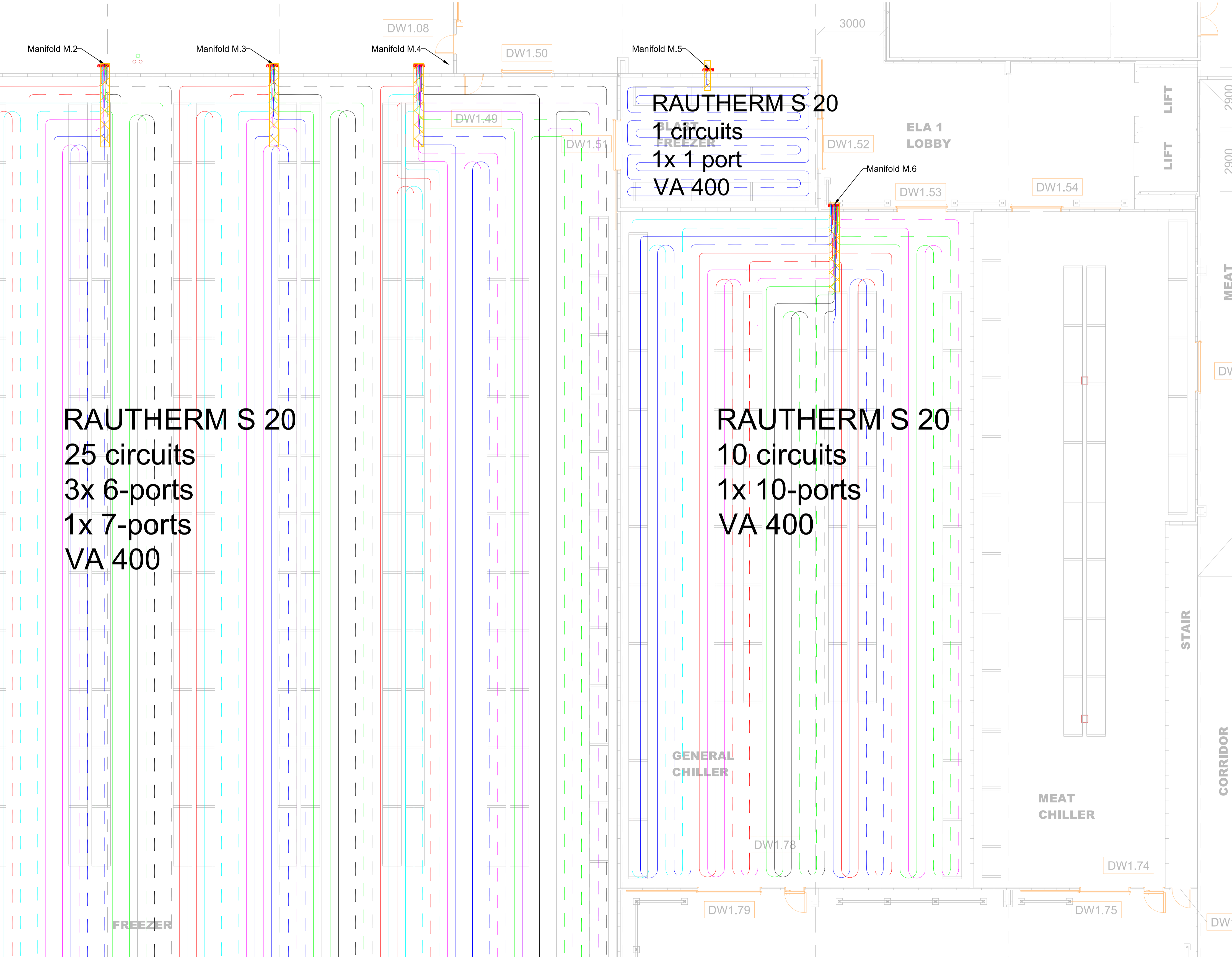


NOTE

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PROJECT TITLE

Service foods freezer

DRAWING TITLE

UFH CIRCUIT LAYOUT

A	First Issue	10/10/18
No.	DESCRIPTION	DATE

ISSUES & REVISIONS

DRAWN BY	D.P	SCALE	A1 1:100 A3 1:200
CHECKED BY	D.P	SHEET NO.	P3
APPROVED BY	D.P	DATE	10/10/18

DRAWING No

RDC-ANZ-18-103