

Nexpand Row-based cooling Direct Expansion DX10 & DX20



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1. TECHNICAL SPECIFICATIONS

Nexpand Chilled Water units have been especially designed for smaller sites or use in server rooms without raised floors. Internal design and component selection are geared toward reliability and energy efficiency, for minimal running costs of the system. The Nexpand row-based Direct Expansion cooler is available in two sizes, a 10 kW and 20 kW. Both are configurable in two different configurations:

- the open loop configuration, in which cold air is released into the *cold aisle* towards each rack and the hot air is drawn in the *hot aisle*;
- the closed loop configuration, in which a closed circuit between rack cooler and rack is created.

	DX10	DX20
Capacity range	Up to 10kW	Up to 20kW
Height	42U / 47U	42U / 47U
Width	300mm	300mm
Depth	1200mm	1200mm
Weight	245kg	275kg
Color	Black / white	Black / white
Number of fans	3	5
Fan type	Plug EC series	
Type of fan motor	Brushless with integrated electronic	
Oil charge	0,5 dm ³	1,4 dm ³
Nominal airflow	2700 m ³ /h	4000 m ³ /h
Connection - In (liquid)	12mm	16mm
Connection - Out (gas)	12mm	22mm
Lp @ nominal rpm dist.= 2m, Q = 2	64 db(A)	66 db(A)
Power supply	230V/1ph/50Hz	400V/3+n ph/50Hz
Max. absorbed power	4,0 kW	11,3kW
Max. absorbed current	20,7 A	27,9 A
Maximum distance between indoor and outdoor unit	30m*	30m*

*The maximum distance between the indoor and the outdoor unit (condensor) is 30m. For a longer distance between the indoor and outdoor unit, please contact your sales representative for advice.



2. PERFORMANCE SPECIFICATIONS INDOOR UNIT

Piping connections of the refrigeration can be connect both high or low to the indoor unit. This choice should be made while configuring the indoor unit.

The operating limits ambient air temperature: +25°C ; +35°C

	DX10		DX20	
Return air conditions [°C; RH]	30 °C; 30%	35°C; 25%	30 °C; 30%	35°C; 25%
Outside air conditions [°C; RH]	35 °C; 50%	35°C; 50%	35 °C; 50%	35°C; 50%
Power supply	230V / 1ph / 50Hz		400V / 3+N ph / 50Hz	
Cooling capacity*	12,36kW	13,09kW	21,12kW	23,26kW
Net. Sensible cooling capacity	12,09kW	12,82kW	20,45kW	22,57kW
SHR	1	1	1	1
Cp absorbed power	3,17kW	3,24kW	7,51kW	7,68kW
Cp absorbed current	15,3A	15,7A	12A	12,3A
Fans absorbed power	0,27kW	0,27kW	0,69kW	0,69kW
Fans absorbed current	1,3A	1,3A	3,4A	3,4A
Total power input	3,4kW	3,5kW	8,2kW	8,4kW
Total absorbed current	16,6A	17A	15,4A	15,7A
EER	3,6	3,7	2,6	2,8

* A minimum thermal heat load of 25% of the maximum cooling capacity must be respected to ensure the lifetime of the unit. If the heat load is below the 25% threshold, the unit will restart too frequently, which significantly shortens to the compressor's lifespan.

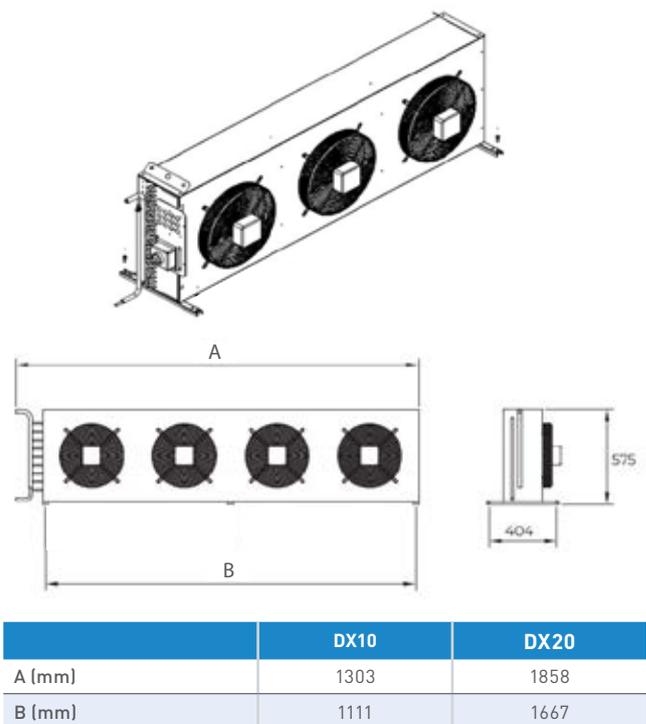
3. SPECIFICATIONS OUTDOOR UNIT

Remote condenser with high-efficiency axial fans with induction motor and built-in thermal protection. The finned pack consists of internally ribbed copper tubing and wavy aluminium fins. They are made with an all-aluminium alloy frame, providing an excellent compromise between corrosion resistance, copper pipe protection and solidity. The casing is also made of galvanized sheet metal finished with corrosion- and UV-resistant polyester paint.

The operating limits of the condensor units are: -20°C ; +45°C

	DX10	DX20
Refrigerant	R410A	R410A
T ev. Dew Point	0 /+15 °C	0 /+15 °C
Base refrigerant charge (only internal unit)	1,30 kg	2,71 kg
Base refrigerant charge (with external unit)	2,73 kg	4,99 kg
Number of Fans	2	3
Fan diameter	350mm	350mm
Connection - in	18mm	22mm
Connection - out	16mm	16mm
Air Flow	4800 m³/h	7200 m³/h
Max capacity	19,5 kW	29,4 kW
Lp Sound pressure level*	42 dB(A)	44 dB(A)
Dimensions (L x D x H)	1338 x 430 x 610	1893 x 430 x 609
Power Supply	230V / 1ph / 50Hz	
Fans absorbed power	360 W	540 W
Fans absorbed current	1,53 A	2,3 A
Weight	33 kg	55 kg

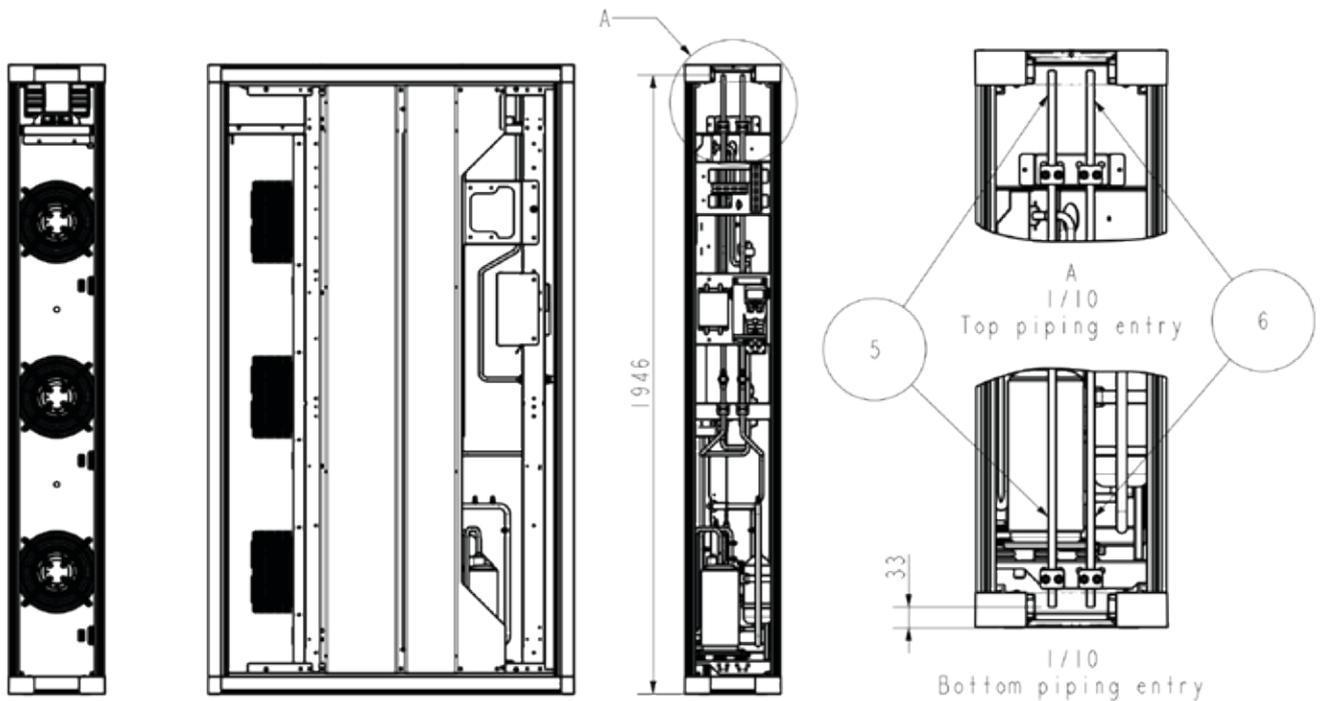
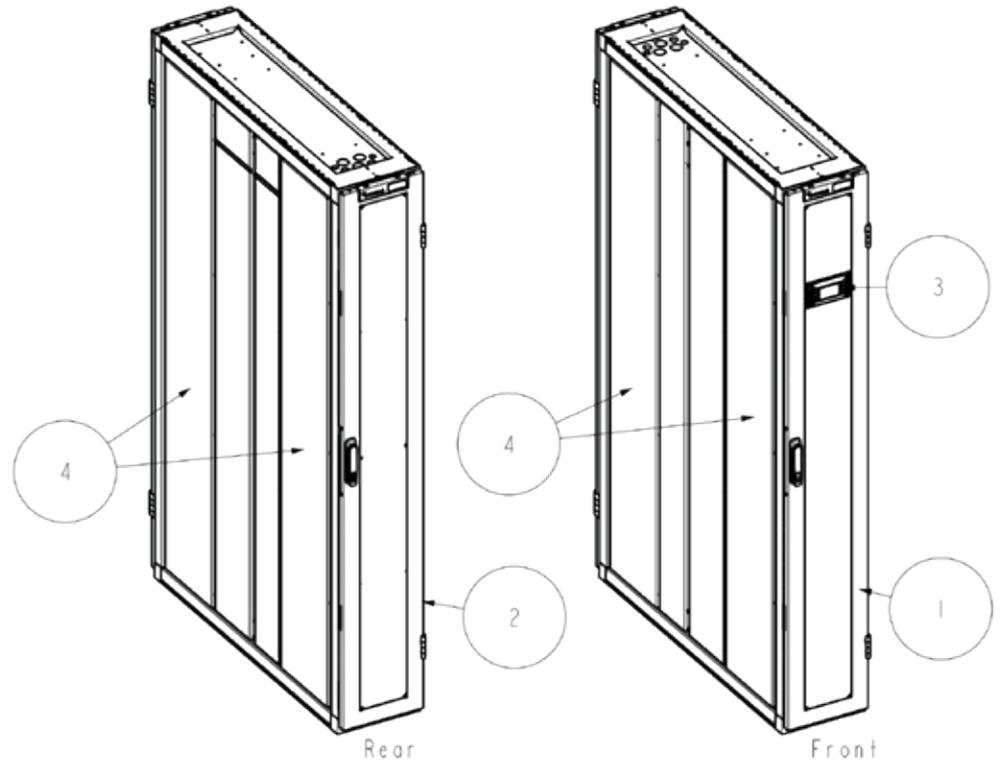
* At 10m free field

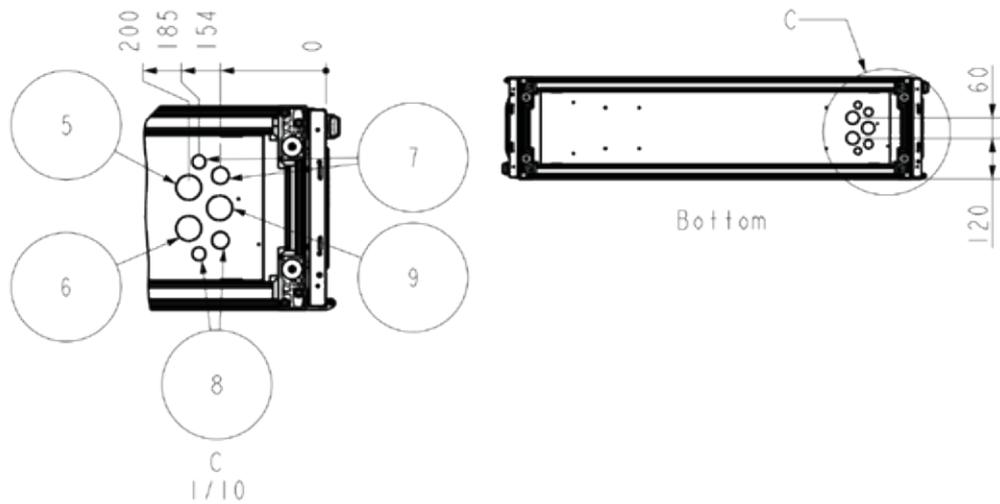
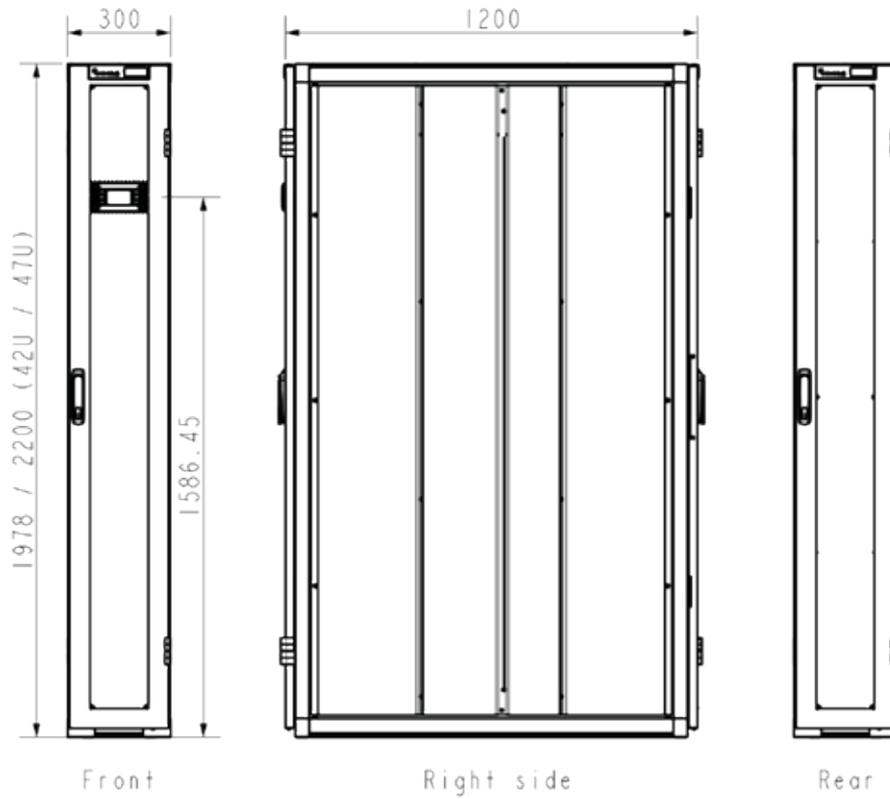


4. PRODUCT DIMENSIONS

The general dimensions of the Nexpand DX10 and DX20 coolers.

#	Description
1	Removable front door
2	Removable rear door
3	Display
4	Removable side panel
5	Liquid line inlet (rotalock 1" - Ø12)
6	Gas line outlet (rotalock 1" - Ø12)
7	Power supply
8	Data cables
9	Condensate drain





5. PIPING DESIGN CRITERIA

5.1 Refrigerant specifications

Piping for refrigerating systems should be designed according to 3 main principles:

1. Reduction of the pressure drops to avoid significant decrease of the performances
2. Ensure correct oil return also at partial load, when the refrigerant speed is reduced. Please note that the pressure drop depends also on the surface friction between gas and pipe. Surface friction is the *engine* for the oil drag. The oil drag is much critical in the suction line because of the lower temperatures and of the consequent higher oil viscosity.
3. Avoid the making of *flash vapours* on the liquid line and consequent dysfunction of the expansion valve. Avoid having high liquid speeds to avoid pressure peaks when the solenoid valve is closing.

General Parameters

- minimum gas speed to ensure oil drag even in vertical piping, for discharge lines is 4 m/s
- minimum gas speed to ensure oil drag even in vertical piping, for suction lines is 5 m/s
- for liquid line, the miscibility between oil and refrigerant is 100 % (in our T field) so that no minimum speed is required.

		DX10	DX20	
Refrigerant		R410A	R410A	
T ev. Dew Point		0 /+15 °C	0 /+15 °C	
Base refrigerant charge		1,30 kg	2,71 kg	
Base refrigerant charge with external unit:				
Standard		2,73 kg	4,99 kg	
Compact		2,17 kg	3,58 kg	
Oversized		3,57 kg	7,07 kg	
Low noise		2,73 kg	5,94 kg	
Low noise compact		2,73 kg	4,99 kg	
Low noise oversized		4,52 kg	7,68 kg	
Additional refrigerant charge:				
0-10m	Discharge gas line	Horizontal	1/2 in 12,7 mm	5/8 in 15,9 mm
		Vertical	3/8 in 9,5 mm	1/2 in 12,7 mm
	Liquid line		3/8 in 9,5 mm	1/2 in 12,7 mm
	Refrigerant addition x line meter		0,05 kg	0,10 kg
	Oil addition x single siphon***		4 kg	10 kg
11-20m	Discharge gas line	Horizontal	1/2 in 12,7 mm	5/8 in 15,9 mm
		Vertical	3/8 in 9,5 mm	5/8 in 15,9 mm
	Liquid line		3/8 in 9,5 mm	1/2 in 12,7 mm
	Refrigerant addition x line meter		0,05 kg	0,10 kg
	Oil addition x single siphon***		4 kg	20 kg
21-30m	Discharge gas line	Horizontal	1/2 in 12,7 mm	5/8 in 15,9 mm
		Vertical	3/8 in 9,5 mm	5/8 in 15,9 mm
	Liquid line		3/8 in 9,5 mm	1/2 in 12,7 mm
	Refrigerant addition x line meter		0,05 kg	0,10 kg
	Oil addition x single siphon***		4 kg	20 kg
Refrigerant compressor limit**		2,3 kg	9,3 kg	
Compressor brand		LG	Mitsubishi Siam	
Suggested oil type		FVC68D	FV50S	

Note:

If the total refrigerant charge (base charge + refrigerant addition due to line length) exceeds the refrigerant compressor limit (**), an oil charge of 50g, per exceeding refrigerant kg, must be added. (***) A siphon has to be installed on every 5m of vertical suction or discharge line.

5.2 Piping thickness

Follows the choice criteria in terms of diameter, material and thickness that is implemented in compliance with the indications provided in EN12735_1_2 and EN14276_2 on copper pipes for cooling and conditioning systems and machinery.

The table below indicates, for each diameter, the calculation of the minimum pipe thickness in the curved and straight sections according to EN14276_2:2011 at the minimum radius of curvature possible and pressure

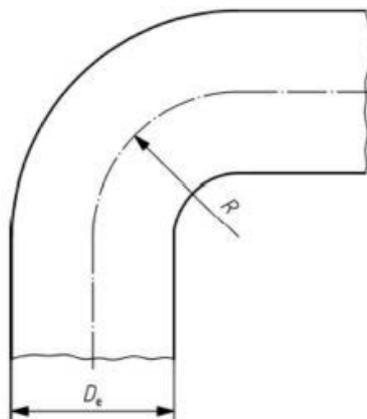
PT=50bar (take into account that the PS=45bar so PT=1,1XPS). The pipe is oxide-free.

Please consider the commercial thickness in the last column as minimum possible one

DN	External diameter (mm)	Radius curvature (mm)	PT (bar)	PED category	copper os (N/mm ²)	Z	Min. Straight Thick. (mm)	Min. Curve Thick. (mm)	Commercial Thickness
6	6	12	50	A3 P3	100	0,85	0,179	0,286	1
6	8	16	50	A3 P3	100	0,85	0,239	0,265	1
6	10	20	50	A3 P3	100	0,85	0,298	0,331	1
8	12	24	50	A3 P3	100	0,85	0,358	0,397	1
10	16	26	50	A3 P3	100	0,85	0,477	0,529	1
15	18	18	50	A3 P3	100	0,85	0,537	0,595	1
20	22	33	50	A3 P3	100	0,85	0,657	0,728	1,5
25	28	42	50	A3 P3	100	0,85	0,836	0,926	1,5
32	35	52.5	50	A3 P3	100	0,85	1,045	1,158	1,5
32	42	65	50	A3 P3	100	0,85	1,253	1,389	1,5
50	54	108	50	CAT I	100	1	1,375	1,504	1,5
65	64*	89	29	CAT I	100	1	0,95	1,052	2
80	76*	152	29	CAT I	100	1	1,250	1,250	2

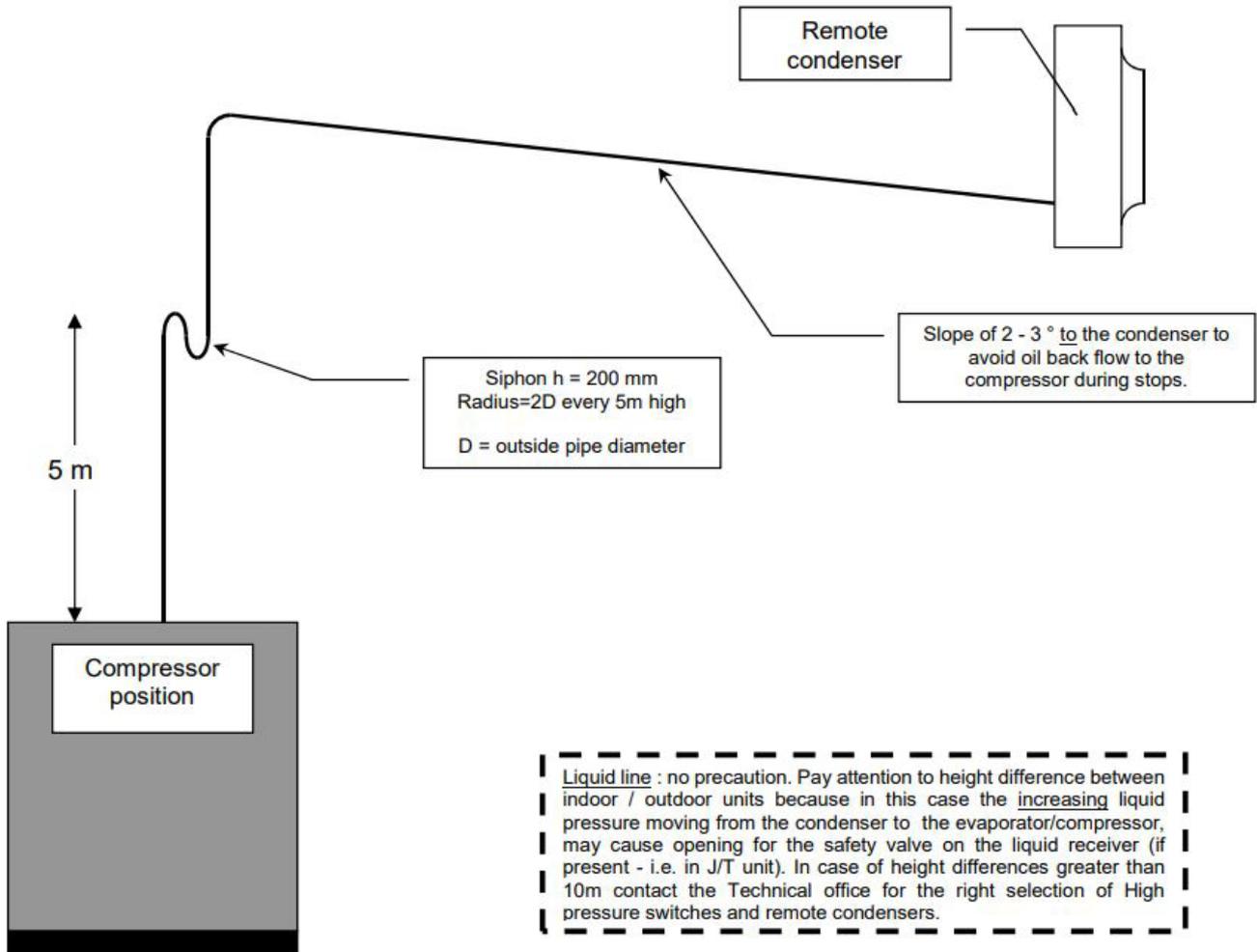
* Used only as suction pipes in low pressure (PS= 29 bar)

$$t = \frac{P \times D_e}{2 \times f \times z + 0,8 \times P} \left(1 + \frac{D_e}{4R} \right)$$



5.3 Installation of the discharge line

Piping design criteria when the condenser will be installed **above** the evaporator / compressor.



5.4 Installation of the discharge line

Piping design criteria when the condenser will be installed **below** the evaporator / compressor.

