Design criteria for refrigerant piping
[version 1.5]

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

1. reduction of the pressure drops for avoid to significant decreasing of the performances

2. ensure the correct oil return also at partial load when the refrigerant speed is reduced. Please note that pressure drop depends also to the surface friction between gas and pipe and surface friction is the "engine" for the oil drag. The oil drag is much critical in the suction line because the lower temperatures and consequent higher oil viscosity.

3. avoid the creation of "flash vapours" on the liquid line and consequents malfunction of the expansion valve. Avoid to have high liquid speeds to avoid pressure peaks when 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 %, so that no minimum speed is required.

INNOV@ DHA... CLOSE CONTROL UNITS

Refrigerant			R407C	R407C	R407C	R407C	R407C	R407C	R407C	R407C	R407C	R407C	R407C
Cooling capacity		[kW]	4-5	6-7	8-9	10-11.5	11.5-13	14-16	17-18	19-24	25-29	30-34	35-40
T ev. Dew Point		[°C]	0 / +10	0 / +10	0 / +10	0 / +10	0 / +10	0 / +10	0 / +10	0 / +10	0 / +10	0 / +10	0 / +10
0-10 m	Discharge gas line	[mm]	12	12	12	16	16	16	16	22	22	22	28
	Liquid line	[mm]	10	10	10	12	12	12	12	16	16	16	18
11-20 m	Discharge gas line	[mm]	12	12	16	16	16	18	18	22	22	28	28
	Liquid line	[mm]]	10	10	12	12	12	12	12	16	16	18	18
21-30 m	Discharge gas line	[mm]	12	12	16	16	16	18	18	22	22	28	28
	Liquid line	[mm]]	10	10	12	12	12	12	12	16	16	18	18

Please contact the technical office before the order of the units

@DNOVA THS Split units for Telecom

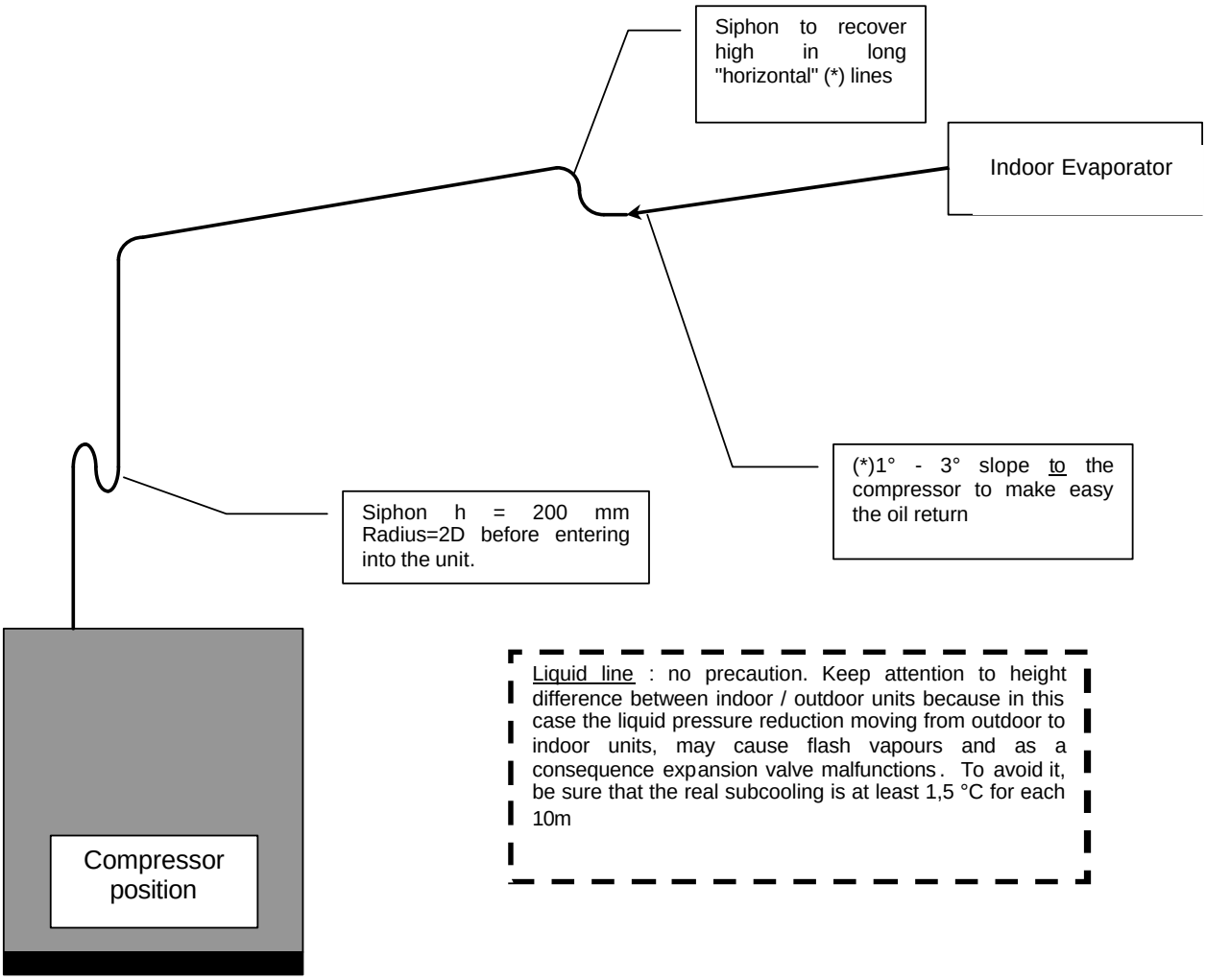
Refrigerant			R407C	R407C	R407C	R407C	R407C	R407C	R407C	R407C	R407C
Model THS		[-]	025	035	045	056	073	090	105	120	145
T ev. Dew Point		[°C]	0 / +10	0 / +10	0 / +10	0 / +10	0 / +10	0 / +10	0 / +10	0 / +10	0 / +10
0-10 m	Suction line	[mm-in]	10-3/8	10-3/8	16-5/8	16-5/8	16-5/8	16-5/8	16-5/8	22-7/8	22 -7/8
	Liquid line	[mm]	10-3/8	10-3/8	10-3/8	10-3/8	10-3/8	10-3/8	10-3/8	12-1/2	12-1/2
11-20 m	Suction line	[mm]	12-1/2	12-1/2	16-5/8	16-5/8	16-5/8	18-3/4	18-3/4	22-7/8	22-7/8
	Liquid line	[mm]]	10-3/8	10-3/8	10-3/8	10-3/8	10-3/8	10-3/8	10-3/8	12-1/2	12-1/2
21-30 m	Suction line	[mm]	12-1/2	16-5/8	16-5/8	16-5/8	18-3/4	18-3/4	22-7/8	22-7/8	22-7/8
	Liquid line	[mm]]	10-3/8	10-3/8	10-3/8	10-3/8	10-3/8	10-3/8	10-3/8	12-1/2	12-1/2

Please contact the technical office before the order of the units

Reference for on site installed pipes

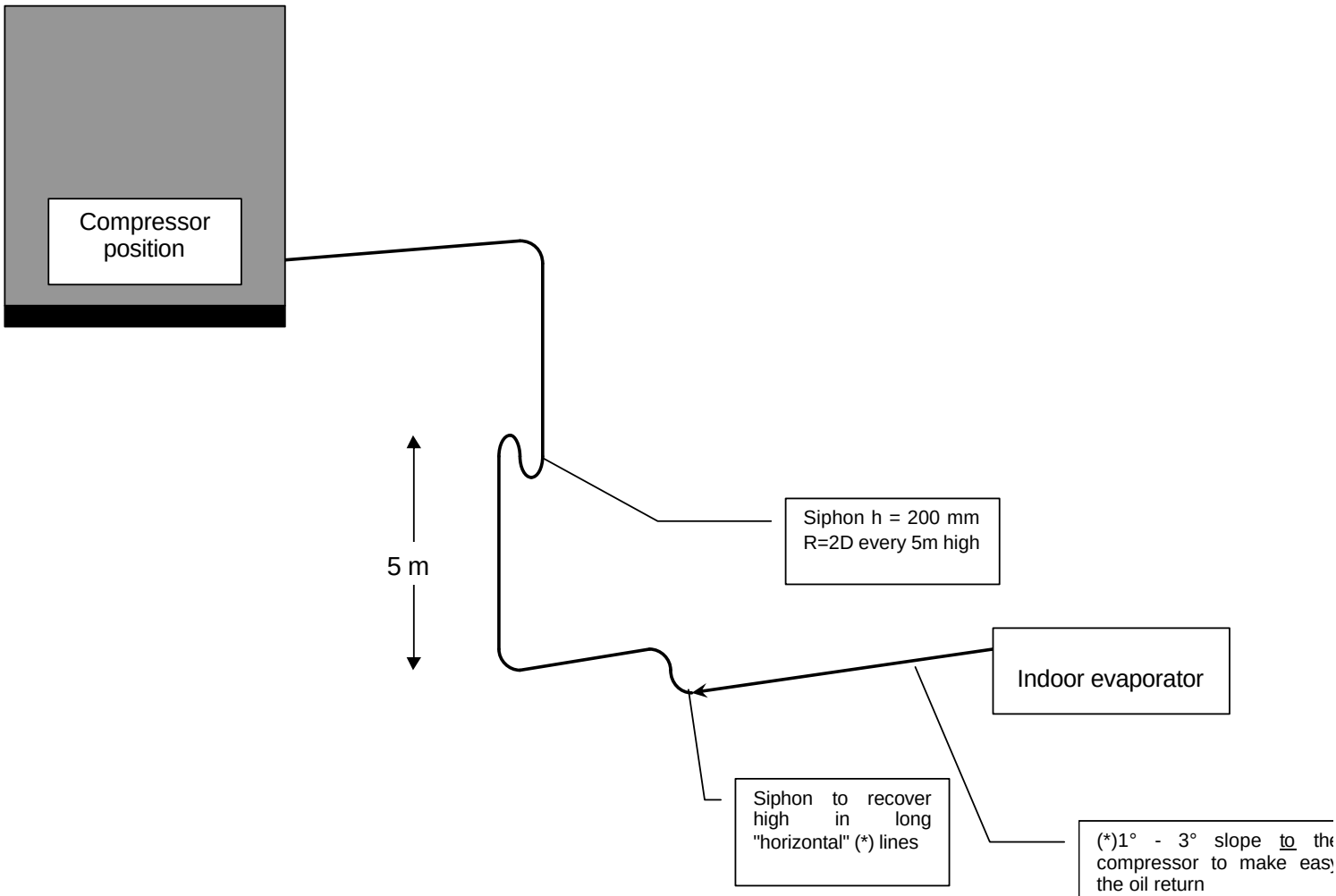
External Diameters [mm]	Thickness [mm]	Bending Radius [mm]	Design pressure [bar]	Pipes PED Category	ss copper strength [N/mm2]	s real stress [N/mm2]	Safety Coefficient.
10	1	36	28	A3 P3	227	11.2	20.3
12	1	36	28	A3 P3	227	14	16.2
16	1	46	28	A3 P3	227	19.6	11.6
18	1	56	28	A3 P3	227	21	10.8
22	1,5	67	28	A3 P3	227	17.3	13.1
28	1,5	96	28	A3 P3	227	23.3	9.8
35	1.5	70	28	A3P3	227	29.8	7.6
42	1.5	84	28	A3P3	227	36.4	6.2
54	2.0	108	28	A3P3	227	35	6.4

Installation of the suction line (Evaporator above condenser / compressor)



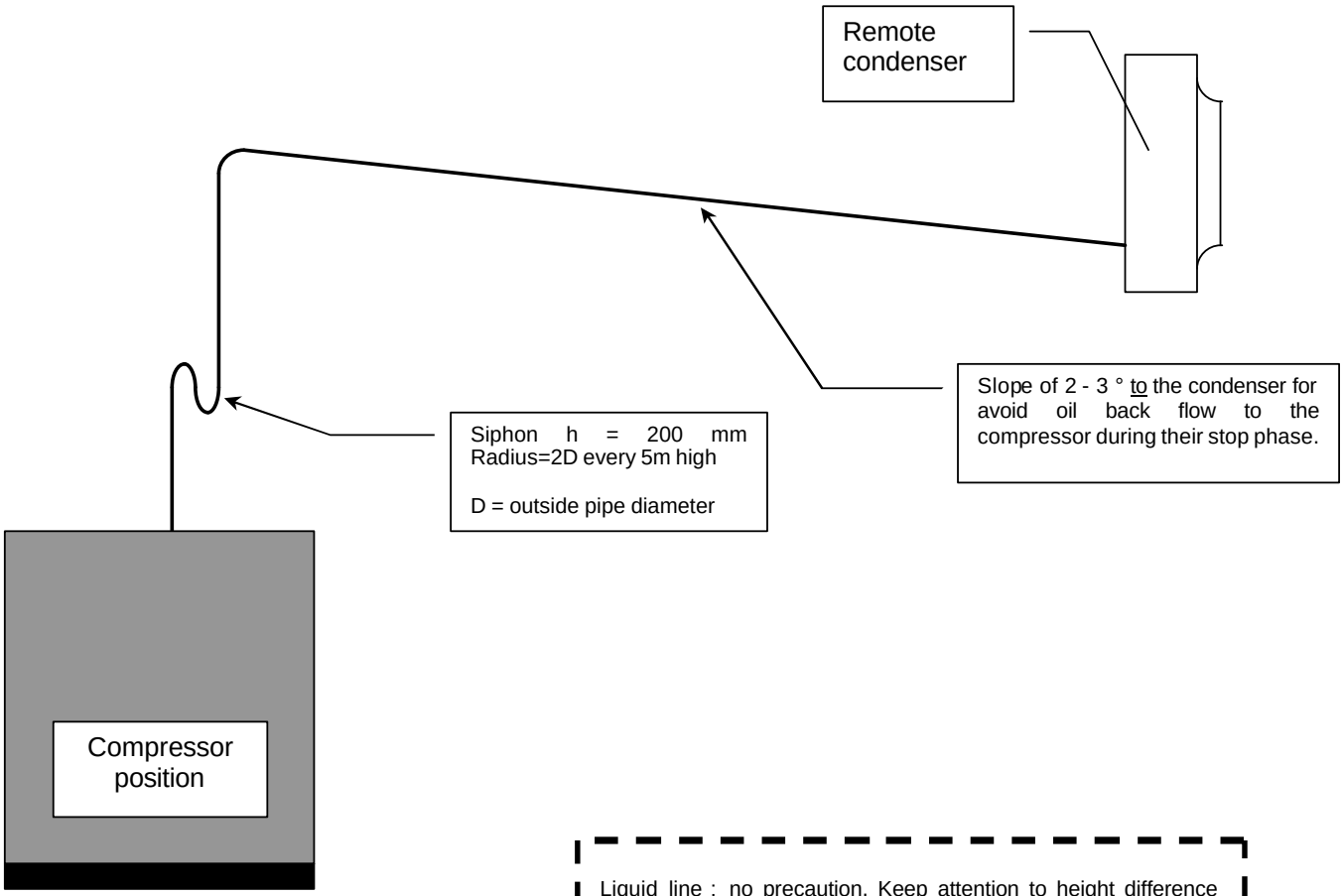
Liquid line : no precaution. Keep attention to height difference between indoor / outdoor units because in this case the liquid pressure reduction moving from outdoor to indoor units, may cause flash vapours and as a consequence expansion valve malfunctions. To avoid it, be sure that the real subcooling is at least 1,5 °C for each 10m

Installation of the suction line (Evaporator below condenser / compressor)



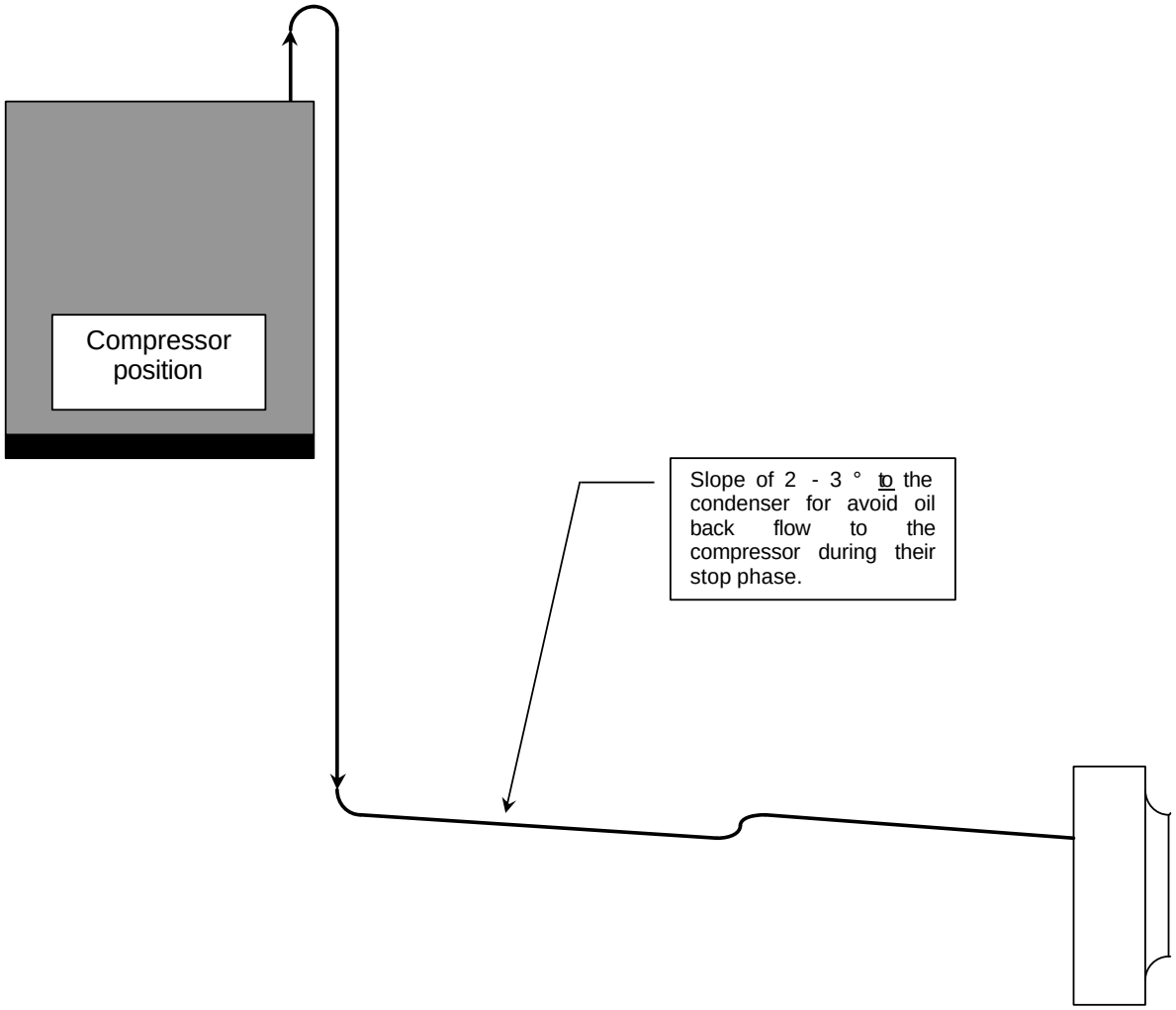
Liquid line : no precaution. Keep attention to height difference between indoor / outdoor units because in this case the liquid pressure increasing moving from condenser to evaporator/compressor, may cause opening in safety valve on the liquid receiver (if present - i.e. in DHA… unit). In case of height differences greater than 10m contact the Technical office for the right selection of High pressure switches and remote condensers.

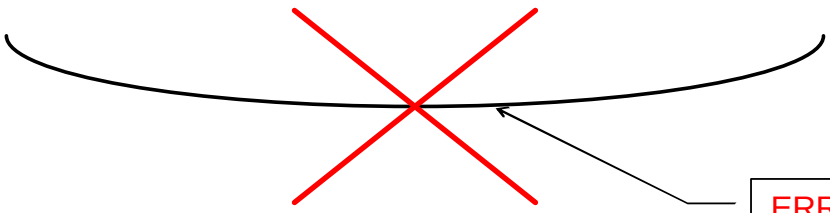
Installation of the discharge line (Condenser above evaporator / compressor)



Liquid line : no precaution. Keep attention to height difference between indoor / outdoor units because in this case the liquid pressure increasing moving from condenser to evaporator/compressor, may cause opening in safety valve on the liquid receiver (if present - i.e. in DHA… unit). In case of height differences greater than 10m contact the Technical office for the right selection of High pressure switches and remote condensers.

Installation of the discharge line (Condenser below evaporator / compressor)





ERROR: here a lot of oil will be accumulated

Liquid line : no precaution. Keep only attention to the height difference between indoor / outdoor units because in this case the liquid pressure decreasing , moving from condenser to evaporator/compressor, may cause flash vapour on the liquid receiver . To avoid this, make sure to have at least 2°C of real subcooling measured at condenser outlet for each 10m of hight increasing.