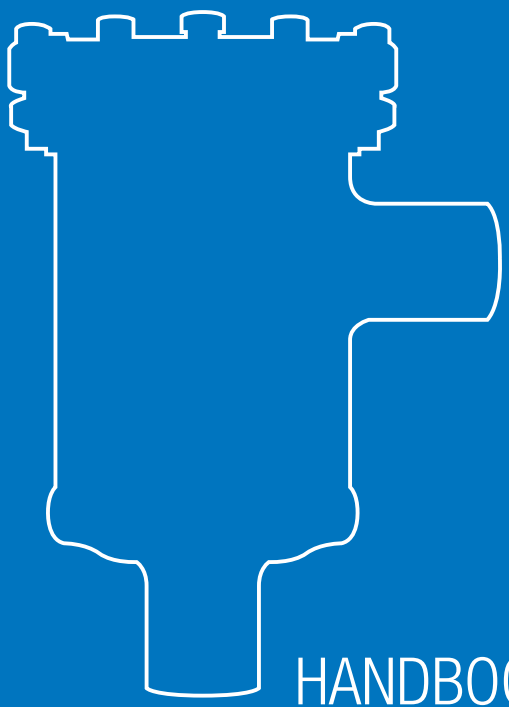

HANDBOOK
REFRIGERATING SYSTEMS PROTECTORS

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Castel®
Italian technology

INDICE

FROM QUALITY OUR NATURAL DEVELOPMENT

Achieved the goal of fifty years working in the industry of Refrigeration and Air Conditioning, Castel Quality Range of Products is well known and highly appreciated all over the world. Quality is the main issue of our Company and it has a special priority, in every step, all along the production cycle. UNI EN ISO 9001:2008, issued by ICIM, certifies the Quality System of the Factory. Moreover Castel Products count a number of certifications in conformity with EEC Directives and with European and American Quality Approval.
We produce on high tech machinery and updated automatic production lines, operating in conformity with the safety and environment standards currently enforced.
Castel offers to the Refrigeration and Air Conditioning Market and to the Manufacturers fully tested products suitable with HCFC and HFC Refrigerants currently used in the Refrigeration & Air Conditioning Industry.

REFRIGERATING SYSTEMS PROTECTORS

External leakage

All the products illustrated in this Handbook are submitted, one by one, to tightness tests besides to functional tests. Allowable external leakage, measurable during the test, agrees to the definition given in Par. 9.4 of EN 12284 : 2003 Standard:
"During the test, no bubbles shall form over a period of at least one minute when the specimen is immersed in water with low surface tension, …".

Pressure containment

All the products illustrated in this Handbook, if submitted to hydrostatic test, guarantee a pressure strength at least equal to 1,43 x PS in compliance with the Directive 97/23/EC.
All the products illustrated in this Handbook, if submitted to burst test, guarantee a pressure strength at least equal to 3 x PS according to EN 378-2 : 2008 Standard.
A great number of products illustrated in this Handbook can guarantee an higher pressure strength, equal to 5 x PS according the UL Standard 207: 2009.

Weights

The weights of the items listed in this Handbook include packaging.

Guarantee

All Castel products are covered by a 12 – months warranty. This warranty covers all products or parts thereof that turn out to be defective within the warranty period. In this case, at his own expenses, the customer shall return the defective item with a detailed description of the claimed defects. The warranty doesn't apply if the defect of Castel products are due to mistakes either by customer or by third parties such wrong installations, use contrary to Castel indications, tampering. In case of defects of its own products, Castel will only replace the defective goods and will not refund damages of any kind.
The technical data shown on this catalogue are indicative. Castel reserves the right to modify the same at any time without any previous notice.

DEHYDRATION OF REFRIGERANTS

Among contaminating agents causing serious damages to refrigerating systems, moisture plays a major role. Its presence, even possible in the refrigerating system, is due to many factors:

- inadequate or insufficiently prolonged vacuum before refrigerant charging
- oil used for topping up remained exposed to air humidity
- refrigerant used for subsequent additions contained in non dried vessels
- sealing defects especially in systems not designed for operation at low temperatures

High temperatures combined with humidity give rise to complex phenomena enhancing acid formation both in lubricating oil and refrigerant.

Oil organic acids react with metal and favor the formation of sludge, which are viscous clots consisting of insoluble metal salts and large molecules of polymerized oil.

Sludge affects the lubrication of the moving elements of the compressor, can clog valves and filters and cause serious damages.

Acids, especially hydrofluoric acid, produced by the hydrolysis of the fluorinated refrigerant (in compressors iron and aluminum act as catalysts) are particularly corrosive.

Acids etch metal surfaces with the consequent formation of crystal salts, which stick to surfaces and affect the total heat exchange coefficient in the condenser and in the evaporator.

In the sealed and semi-sealed groups, these salts damage the windings of electric motors as in these groups cold gas cools windings through direct contact.

On the other hand, water solubility in refrigerants in a liquid phase, is quite reduced, especially at low temperatures. As a consequence, when in the system water exceeds the very low limits of solubility admitted at low temperature, excess water turns into ice, and blocks expansion valves and capillaries either partially or totally.

Consequently, refrigerating plants must be equipped with a filter drier on the liquid line and types available on the market are essentially two: molecular sieve driers and solid core driers.

In molecular sieve driers, with a charge constituted by non-agglomerated products, the dehydrating mass is pressed in between two fine steel mesh disks, or two filtering disks of various materials, kept in place by a spring.

In solid core driers, dehydrating and deacidifying products with binders constitute the block. Water adsorption combines with the neutralization of acids that may be present in the refrigerant, and with a strong filtering action.

Castel have planned either its production lines of hermetic driers on this second solution that avoid any risk of abrasion of the charge and consequently the making of powder and permit to put the filter in any position inside the refrigerating system.

It is always advisable to install a moisture indicator downstream the filter, which will show the refrigerant moisture and, consequently, the degree of efficiency of the filter.

The dehydrating capacity of Castel drier is relative to the charge of refrigerant and not to the refrigeration potential of the plant. As a matter of fact, for the same refrigerant potential and for the same type of refrigerant fluid, there can be different refrigerant charges according to the type, design and working conditions of the plant as well as to the shutter degree.

The data shown in the following tables are deduced from the test results of the present Castel production.

It is important to note in the case of a high oil level in the circuit (> 5%) the data shown in the tables will be reduced considerably.

LIQUID INDICATORS & MOISTURE-LIQUID INDICATORS

Approved by Underwriters Laboratories Inc.

APPLICATIONS

The indicators, shown in this chapter, are classified "Pressure accessories" in the sense of the Pressure Equipment Directive 97/23/EC, Article 1, Section 2.1.4and are subject of Article 3, Section 1.3 of the same Directive. They are designed for installation on commercial refrigerating systems and on civil and industrial conditioning plants, which use the following refrigerant fluids: R22, R134a, R404A, R407C, R410A; R507 proper to the Group II (as defined in Article 9, Section 2.2 of Directive 97/23/EC and referred to in Directive 67/548/EEC). For specific applications with refrigerant fluids not listed above, always proper to the Group II, please contact Castel Technical Department.

The indicators series 3780 are excluded from the scope of Directive 97/23/EC, as specified in the Guidelines 1/8 and 1/9, because they are piping components.

Liquid indicators and moisture liquid indicators ensure a fast and safe inspection of the conditions of the refrigerant fluid in the circuit concerning regular flow and moisture. Liquid indicators also ensure inspection of the regular return of oil to the compressor crankcase.

Liquid indicators series 3810, 3840, 3850 and moisture/liquid indicators series 3910, 3940, 3950 are approved by Underwriters Laboratories Inc. of the United States according to UL 207 Standard.

OPERATION

The moisture/liquid indicators consist of a sensitive element as a ring, which changes color passing from green to yellow according to the percentage of moisture in the system.

The data of moisture content, shown in table 1 with the "green" color, can be considered admissible for the proper working of the system. When the sensitive element from green fade to yellow, "green Chartreuse", working conditions of the system could become difficult. When the sensitive element becomes "yellow", it's time to substitute the dehydrator filter.

If the charge and working condition are normal, the refrigerant fluid appears perfectly liquid underneath the "lens" of the indicator. The presence of bubbles indicates that the refrigerant fluid is partial evaporating along the liquid line.

CONSTRUCTION

New liquid indicators, series 38, and new liquid/moisture indicators, series 39, are manufactured in a total hermetic construction to avoid any possible refrigerant leaks. The glass "lens" , with its proper gasket, is housed into the brass body and is fixed in this seat with an edge calking operation.

The main parts of the indicators are made with the following materials:

- Hot forged brass EN 12420 – CW 617N for body
- Copper tube EN 12735-1 – Cu-DHP for solder connections
- Glass for lens
- PTFE for outlet seal gaskets

Liquid/moisture indicators series 3770 , 3771 , 3780 and 3781 are manufactured with the glass "lens" directly fused onto a steel metallic ring, with proper surface protection. This metallic ring, screwed on the indicator body, is equipped with a proper chloroprene gasket.

INSTALLATION

At the start-up the color of the sensitive element may be yellow, due to exposure to air humidity and to moisture in the circuit. When the moisture of the refrigerant is brought back to acceptable levels with the dehydrator, the indicator color is once again green. This is evidence that equilibrium has been re-established. In case of persisting yellow, measures have to be taken to eliminate moisture. Only when the sensitive element comes back to green, there is evidence that adopted measures were effective. About 12 hours of system operation are required to achieve equilibrium. However, the moisture indication is given normally when the plant is in function and the fluid is flowing.

The brazing of indicators with solder connections should be carried out with care, using a low melting point filler material. In any case, avoid direct contact between the torch flame and the indicator body or glass, which could be damaged and compromise the proper functioning of the indicator.

With indicators series 3780 and 3781 it's necessary to disassemble the ring before starting to braze.

NB: the PS declared on table 3 , for saddle type series 3780, is solely referred to the body plus the glass ring (with its O-Ring), assembled by the customer at the correct torque indicated on the product instruction leaflet. The aforesaid declaration doesn't cover any possible leakage or breakdown due to braze the body on the copper tube. The customer is totally responsible for the success of this operation.

TABLE 1: Moisture contained in the fluid [p.p.m.]

Colour	Refrigerant fluid					
	R22	R134a	R404A	R407C	R410A	R507
Green	<60	<75	<30	<30	<30	<30
Green "Chartreuse"	60	75	30	30	30	30
Yellow	>60	>75	>30	>30	>30	>30

TABLE 2: General Characteristics of liquid indicators

Catalogue Number	Connections				PED Directive			
	Type	SAE Flare	ODS		TS [°C]		PS [bar]	Risk Category
			Ø [in.]	Ø [mm]	min.	max.		
3810/22	male male	1/4"	–	–	– 30	+110	45 (1)	Art. 3.3
3810/33		3/8"	–	–				
3810/44		1/2"	–	–				
3810/55		5/8"	–	–				
3810/66		3/4"	–	–				
3840/2	soldering	–	1/4"	–				
3840/3		–	3/8"	–				
3840/M10		–	–	10				
3840/M12		–	–	12				
3840/4		–	1/2"	–				
3840/5		–	5/8"	16				
3840/M18		–	–	18				
3840/6		–	3/4"	–				
3840/7		–	7/8"	22				
3840/9		–	1.1/8"	–				
3850/22	male female	1/4"	–	–				
3850/33		3/8"	–	–				
3850/44		1/2"	–	–				
3850/55		5/8"	–	–				
3850/66		3/4"	–	–				

(1): MWP = 435 psi according to UL approval

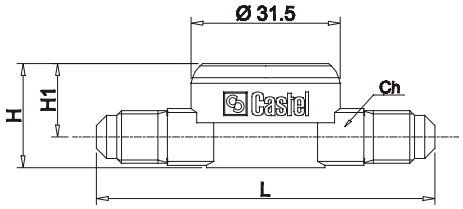
TABLE 3: General Characteristics of liquid / moisture indicators

Catalogue Number	Connections									PED Directive			
	Type	SAE Flare	ODS		ODM		for pipe			TS [°C]		PS [bar]	Risk Category
			Ø [in.]	Ø [mm]	Ø [in.]	Ø [mm]	Ø [in.]	Ø [mm]	Hole Ø	min.	max.		
[mm]"	male - male	max.			–	–	–	–	–	–30	+110	45 (1)	Art. 3.3
3910/33		3/8"	–	–	–	–							
3910/44		1/2"	–	–	–	–							
3910/55		5/8"	–	–	–	–							
3910/66		3/4"	–	–	–	–							
3940/2	soldering	–	1/4"	–	–	–							
3940/3		–	3/8"	–	–	–							
3940/M10		–	–	10	–	–							
3940/M12		–	–	12	–	–							
3940/4		–	1/2"	–	–	–							
3940/5		–	5/8"	16	–	–							
3940/M18		–	–	18	–	–							
3940/6		–	3/4"	–	–	–							
3940/7		–	7/8"	22	–	–							
3940/9		–	1.1/8"	–	–	–							
3940/X01		–	–	–	–	6							
3940/X02		–	–	–	–	6							
3950/22	male - female	1/4"	–	–	–	–							
3950/33		3/8"	–	–	–	–							
3950/44		1/2"	–	–	–	–							
3950/55		5/8"	–	–	–	–							
3950/66		3/4"	–	–	–	–							
3770/M28	soldering	–	–	–	–	28						35	1
3770/11		–	–	–	1.3/8"	35							Art. 3.3
3770/13		–	–	–	1.5/8"	–							1
3770/M42		–	–	–	–	42							
3771/11			1.3/8"	35	–	–							
3771/M42			–	42	–	–							
3771/17			2.1/8"	–	–	–							
3780/5	saddle type	–	–	–	–	–	5/8"	16				45	EXCLUDED
3780/M18							–	18					
3780/7							7/8"	22					
3780/9							1.1/8"	28					
3780/11							1.3/8"	35					
3781/M28	level glass						–	–	28				

(1) : MWP = 435 psi according to UL approval

TABLE 4: Dimensions and Weights						
Catalogue Number		Dimensions [mm]				Weight [g]
Liquid Indicators	Moisture Liquid Indicators	H	H1	L	Ch	
3810/22	3910/22	22	16,5	71,5	12	115
3810/33	3910/33	26,5	17,5	77,5	17	150
3810/44	3910/44	30	18,5	81,5	22	210
3810/55	3910/55	34	21,5	89,5	24	195
3810/66	3910/66	37,5	23,5	90	28	315
3840/2	3940/2	22	15,5	113	–	120
3840/3	3940/3	34	21,5	117	–	190
3840/M10	3940/M10					
3840/M12	3940/M12					225
3840/4	3940/4					
3840/5	3940/5			131		195
3840/M18	3940/M18	34	21,5			
3840/6	3940/6					215
3840/7	3940/7	37,5	23,5	151		310
3840/9	3940/9	43,5	26	186		540
–	3940/X01	22	15,5	242		135
	3940/X02	–	15,5	121		130
3850/22	3950/22	26,5	17,5	68	17	140
3850/33	3950/33	30	18,5	74	22	190
3850/44	3950/44	34	21,5	77	24	240
3850/55	3950/55	37,5	23,5	82	28	300
3850/66	3950/66	43,5	26	92	35	525
–	3770/M28	–	38	150	–	250
	3770/11		41,5	160		300
	3770/13		45	170		480
	3770/M42					
	3771/11		41,5	160		300
	3771/M42		45	170		480
	3771/17					550
	3780/5		30	–		90
	3780/M18		31			
	3780/7		33			
	3780/9		36			
	3780/11		39,5			

3810
3910



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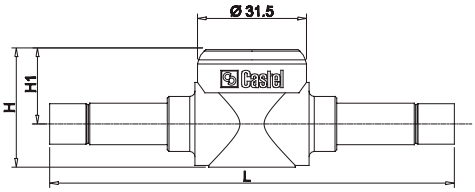

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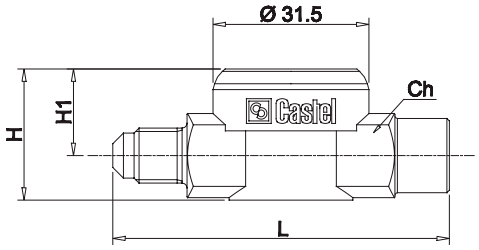

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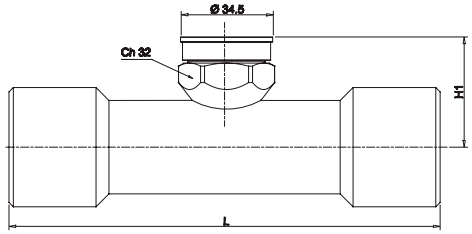

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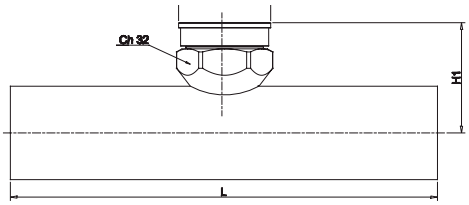

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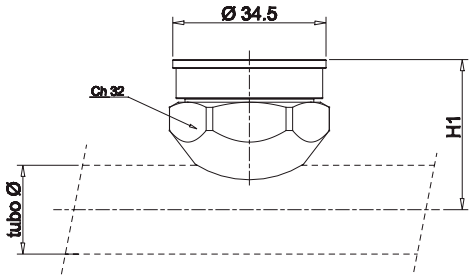

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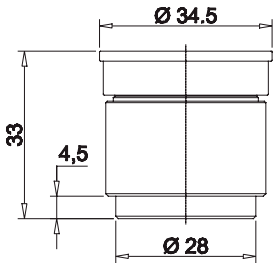

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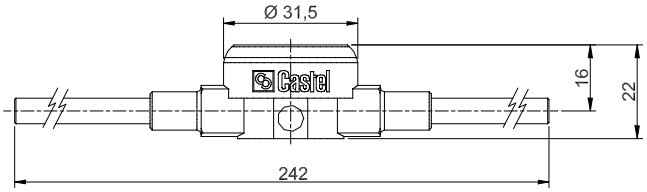
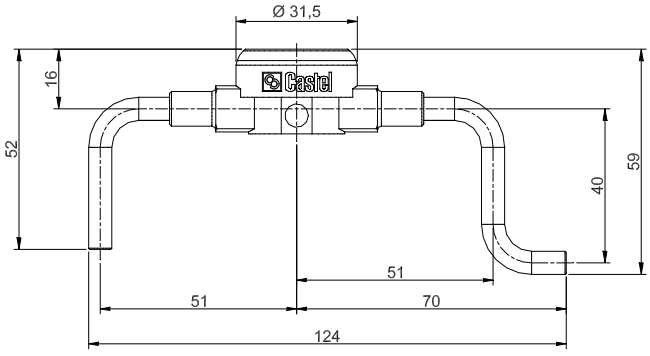


3940/X02



ANTI-ACID SOLID CORE FILTER DRIERS WITH MOLECULAR SIEVES AND ACTIVATED ALUMINA – SERIES 42

Approved by Underwriters Laboratories Inc.

SOLID CORE FILTER DRIERS WITH 100% MOLECULAR SIEVES – SERIE 43

Approved by Underwriters Laboratories Inc.

APPLICATIONS

The filters, shown in this chapter, are classified "Pressure vessels" in the sense of the Pressure Equipment Directive 94/23/EC, Article 1, Section 2.1.1 and are subject of Article 3, Section 1.1 of the same Directive.

They are designed for installation on commercial refrigerating systems and on civil and industrial conditioning plants, which use refrigerant fluids proper to the Group II (as defined in Article 9, Section 2.2 of Directive 97/23/EC and referred to in Directive 67/548/EEC).

Filters series 42 and series 43 have been developed for specific installations on refrigerating systems using HFC refrigerant fluids, particularly R134a , R404A , R407C , R410A and R507 mixed with polyolester lubricants. In spite of this, the new block may be successfully used also in refrigerating systems using the old CFC or HCFC refrigerant fluids, mixed with mineral lubricants

CONSTRUCTION

The filter is completely manufactured in steel, either with nickel-plated Flare threaded connections. The product range also includes types with copper plated solder connections, offering the possibility to solder the copper pipe inside the connections (ODS) or outside the connections, using a copper sleeve (ODM).

On specific customers' request, Castel is also able the supply them filters series 42 and series 43 with:

- solder connections made of copper tube EN 12735-1 – Cu-DHP
- ORFS (O-Ring Face Seal) threaded connections according to SAE J 1453 Standard

The blocks in the filters series 42 are molded from a blend of dehydrating charge, 80% of 3 Å molecular sieves and 20 % of activated alumina, and a special binding agent in appropriate proportions. The choice of blend, molecular sieves – activated alumina, gives to the block a very high capacity of acid adsorption also maintaining very good dehydrating characteristics. The presence of a controlled and defined percentage of activated alumina, lower than the maximum value recommended by ASERCOM, keeps unchanged the original concentration of additives in the polyolester lubricant.

The blocks in the filters series 43 are molded from a blend of dehydrating charge, totally made of 3 Å molecular sieves, and a special binding agent in appropriate proportions. The choice of the 3 Å molecular sieves, as sole dehydrating material, gives to the block a superlative capacity of water adsorption also maintaining quite good deacidifying characteristics.

The manufacturing process gives a considerable compacted ness and stoutness to both the products so that they are resistant to shocks and abrasions.

The shape of the block is designed in order to offer the maximum possible surface area to the incoming fluid. The internal cavity is also positioned in such a way as to have a uniform wall thickness. As a result, the fluid encounters a constant strength at all points, flows linearly through the block, and ensures efficient dehydration and minimum charge loss.

The block is chemically inert, not deliquescent, does not react with refrigerating fluids, and is capable of blocking oil by-products dragged into the circuit. Impurities accumulate in the ring between the metal shell and the block; this prevents filter clogging.

FILTER SELECTION BASED ON REFRIGERANT FLOW CAPACITY

Refrigerant flow capacities shown on Table 3 and 4 are referred to the following operating conditions according to ARI STANDARD 710-2004 :

- Liquid temperature + 30 °C
- Evaporating temperature - 15 °C

total pressure drop , inlet and outlet connections included, 0,07 bar / 0,14 bar

For different operating conditions apply the following formula:

$Q = Q_{ref} \times L_1$

with:

Q = required refrigeration flow capacity [kW]

Q_{ref} = reference refrigeration flow capacity [kW] (see Tables 3 or 5)

L_1 = correction factor in presence of operative temperatures different from reference conditions (see Table 7)

EXAMPLE

Refrigerant: R404A

Required refrigeration flow capacity: 15 [kW]

Liquid temperature: + 40 [°C]

Evaporating temperature: - 10 [°C}

Set pressure drop: 0,14 [bar]

Filter with 100% molecular sieve core and ODF solder connections

$Q = Q_{ref} \times L1 \quad 15 = Q_{ref} \times 0{,}86 \quad Q_{ref} = 15/0{,}86 = 17{,}44$ [kW]

Comparing this calculated reference flow capacity with the values shown on table 3, the result involves the selection of filter 4305/3S with a flow capacity of 17,8 kW., at a pressure drop of 0,14 bar.

TABLE 1A: General Characteristics of filters with high water capacity core (100% molecular sieves). SAE Flare connections

Catalogue Number	International Reference	Block Filtering Surface [cm^2]	Nominal Volume [cm^3]	Connections	PED Directive			
					TS [°C]		PS [bar]	Risk Category
					min.	max.		
4303/2	032	47	50	1/4"	-40	+80	45 (1)	Art. 3.3
4303/3	033			3/8"				
4305/2	052	70	80	1/4"				
4305/3	053			3/8"				
4308/2	082	103	130	1/4"				
4308/3	083			3/8"				
4308/4	084			1/2"				
4316/2	162	155	250	1/4"				
4316/3	163			3/8"				
4316/4	164			1/2"				
4316/5	165			5/8"				
4330/3	303	310	500	3/8"				
4330/4	304			1/2"				
4330/5	305			5/8"				
4332/4	304	255	500	1/2"				
4332/5	305			5/8"				
4341/4	414	330	670	1/2"				
4341/5	415			5/8"				
4341/6	416			3/4"				
4303/2F (2)	–	47	50	1/4"	-40	+80	45 (1)	Art. 3.3
4305/2F (2)	–	70	80	1/4"				
4308/2F (2)	–	103	130	1/4"				
4308/3F (2)	–			3/8"				
4316/3F (2)	–	155	250	3/8"				

(1) : MWP = 435 psi according to UL approval for filters series 4303, 4305, 4316, 4332
MWP = 400 psi according to UL approval for filters series 4308, 4330, 4341

(2) : Male-female connections (Inlet female)

FILTER SELECTION
BASED ON WATER CAPACITY

System data:
Refrigerant: R407C
Liquid temperature: + 50 [°C]
Weight of refrigerant: 34 [kg]]

According to ARI STANDARD 710-2004 and DIN 8949:2000, the adsorption capacity of the drier is given by:

(1.050 – 50) x 34 / 1.000 = 34 g di H_2O

where:
1.050 ppm. = moisture in the refrigerant entering the filter according to ARI STANDARD 710-2004 and DIN 8949:2000
50 ppm. = moisture in the refrigerant flowing out the filter according to ARI STANDARD 710-2004 and DIN 8949:2000

Comparing the absorption capacity required with the values shown in table 4A and 4B, drier mod.4341 should be select-ed, with a water absorption capacity of 40,5 g at 50 °C.
If the dehydrating capacity of products is expressed in water drops, it must be remembered that:

1 g H_2O = 20 water drops

In this case and when a molecular sieve drier is selected, the following result is obtained:
34 x 20 = 680 water drops.

If moisture exceeds the values specified in ARI STANDARD 710-2004 and DIN 8949:2000, a drier with a higher adsorption capacity shall be selected.

TABLE 1B: General Characteristics of filters with high water capacity core (100% molecular sieves). Solder connections

Catalogue Number	International Reference	Block Filtering Surface [cm²]	Nominal Volume [cm³]	Connections				PED Directive			
				ODS		ODM		TS [°C]		PS [bar]	Risk Category
				Ø [in.]	Ø [mm]	Ø [in.]	Ø [mm]	min.	max.		
4303/2S	032S	47	50	1/4"	–	3/8"	–	-40	+80	45 (1)	Art. 3.3
4303/3S	033S			3/8"	–	1/2"	–				
4305/2S	052S	70	80	1/4"	–	3/8"	–				
4305/3S	053S			3/8"	–	1/2"	–				
4305/M10S	–	103	130	–	10	–	12				
4308/2S	082S			1/4"	–	3/8"	–				
4308/3S	083S			3/8"	–	1/2"	–				
4308/M10S	–			–	10	–	12				
4308/M12S	–			–	12	–	14				
4308/4S	084S			1/2"	–	5/8"	16				
4316/3S	163S	155	250	3/8"	–	1/2"	–				
4316/M10S	–			–	10	–	12				
4316/M12S	–			–	12	–	14				
4316/4S	164S			1/2"	–	5/8"	16				
4316/5S	165S			5/8"	16	3/4"	–				
4316/7S	167S			7/8"	–	1.1/8"	–				
4330/3S	303S	310	500	3/8"	–	1/2"	–				
4330/4S	304S			1/2"	–	5/8"	16				
4330/5S	305S			5/8"	16	3/4"	–				
4330/7S	307S			7/8"	–	1.1/8"	–				
4330/9S	309S			1.1/8"	–	1.3/8"	35				
4332/4S	304S	225	500	1/2"	–	5/8"	16				
4332/5S	305S			5/8"	16	3/4"	–				
4341/4S	414S	330	670	1/2"	–	5/8"	16				
4341/5S	415S			5/8"	16	3/4"	–				
4341/6S	416S			3/4"	–	7/8"	–				
4341/7S	417S			7/8"	–	1.1/8"	–				
4375/4S	754S	660	1340	1/2"	–	5/8"	16				1
4375/5S	755S			5/8"	16	3/4"	–				
4375/6S	756S			3/4"	–	7/8"	–				
4375/7S	757S			7/8"	–	1.1/8"	–				
4375/9S	759S			1.1/8"	–	1.3/8"	35				

(1) : MWP = 435 psi according to UL approval for filters series 4303, 4305, 4316, 4332, 4375
MWP = 400 psi according to UL approval for filters series 4308, 4330, 4341

TABLE 2A: General Characteristics of filters with with antiacid core (80% molecular sieves + 20% activated alumina). SAE Flare connections

Catalogue Number	International Reference	Block Filtering Surface [cm²]	Nominal Volume [cm³]	Connections	PED Directive			
					TS [°C]		PS [bar]	Risk Category
					min.	max.		
4203/2	032	47	50	1/4"	-40	+80	45 (1)	Art. 3.3
4203/3	033			3/8"				
4205/2	052	70	80	1/4"				
4205/3	053			3/8"				
4208/2	082	103	130	1/4"				
4208/3	083			3/8"				
4208/4	084			1/2"				
4216/2	162	155	250	1/4"				
4216/3	163			3/8"				
4216/4	164			1/2"				
4216/5	165			5/8"				
4230/3	303	310	500	3/8"				
4230/4	304			1/2"				
4230/5	305			5/8"				
4232/4	304	255	500	1/2"				
4232/5	305			5/8"				
4241/5	415	330	670	5/8"				
4241/6	416			3/4"				

(1) : MWP = 435 psi according to UL approval for filters series 4203, 4205, 4216, 4232
MWP = 400 psi according to UL approval for filters series 4208, 4230, 4241

TABLE 2B: General Characteristics of filters with antiacid core (80% molecular sieves + 20% activated alumina). Solder connections

Catalogue Number	International Reference	Block Filtering Surface [cm²]	Nominal Volume [cm³]	Connections				PED Directive			
				ODS		ODM		TS [°C]		PS [bar]	Risk Category
				Ø [in.]	Ø [mm]	Ø [in.]	Ø [mm]	min.	max.		
4203/2S	032S	47	50	1/4"	–	3/8"	–	-40	+80	45 (1)	Art. 3.3
4205/2S	052S	70	70	1/4"	–	3/8"	–				
4205/3S	053S			3/8"	–	1/2"	–				
4205/M10S	–			–	10	–	12				
4208/2S	082S	103	130	1/4"	–	3/8"	–				
4208/3S	083S			3/8"	–	1/2"	–				
4208/M10S	–			–	10	–	12				
4208/M12S	–			–	12	–	14				
4208/4S	084S			1/2"	–	5/8"	16				
4216/3S	163S	155	250	3/8"	–	1/2"	–				
4216/M10S	–			–	10	–	12				
4216/M12S	–			–	12	–	14				
4216/4S	164S			1/2"	–	5/8"	16				
4216/5S	165S			5/8"	16	3/4"	–				
4230/3S	303S	310	500	3/8"	–	1/2"	–				
4230/4S	304S			1/2"	–	5/8"	16				
4230/5S	305S			5/8"	16	3/4"	–				
4232/4S	304S	255	500	1/2"	–	5/8"	16				
4232/5S	305S			5/8"	16	3/4"	–				
4241/5S	415S	330	670	5/8"	16	3/4"	–				
4241/6S	416S			3/4"	–	7/8"	–				
4241/7S	417S			7/8"	–	1.1/8"	–				
4275/4S	754S	660	1340	1/2"	–	5/8"	16				I
4275/5S	755S			5/8"	16	3/4"	–				
4275/6S	756S			3/4"	–	7/8"	–				
4275/7S	757S			7/8"	–	1.1/8"	–				
4275/9S	759S			1.1/8"	–	1.3/8"	35				

(1) : MWP = 435 psi according to UL approval for filters series 4203, 4205, 4216, 4232, 4275
MWP = 400 psi according to UL approval for filters series 4208, 4230, 4241

TABLE 3: Refrigerant Flow Capacity of filters with high water capacity core

Catalogue Number	Refrigerant Flow Capacity, pressure drop 0,07 bar (1) [kW]						Refrigerant Flow Capacity, pressure drop 0,14 bar (1) [kW]					
	R134a	R22	R404A R507	R407C	R410A	R507	R134a	R22	R404A R507	R407C	R410A	R507
4303/2	6,4	7,0	4,6	7,0	6,8	4,4	7,7	8,4	5,5	8,4	8,1	5,3
4303/2F												
4303/2S	7,9	8,6	5,7	8,6	8,3	5,5	9,4	10,3	6,8	10,4	10,0	6,5
4303/3	14,7	16,1	10,6	16,2	15,6	10,2	17,7	19,3	12,7	19,4	18,7	12,2
4303/3S	18,6	20,3	13,4	20,4	19,7	12,9	22,3	24,4	16,1	24,5	23,6	15,4
4305/2	6,6	7,2	4,7	7,2	7,0	4,6	8,6	9,4	6,2	9,4	9,1	5,9
4305/2F												
4305/2S	8,1	8,9	5,9	8,9	8,6	5,6	10,6	11,6	7,6	11,6	11,2	7,3
4305/3	15,2	16,6	10,9	16,7	16,1	10,5	19,7	21,6	14,2	21,7	20,9	13,7
4305/3S	19,2	21,0	13,8	21,1	20,3	13,3	25,0	27,3	18,0	27,4	26,5	17,3
4305/M10S												
4308/2	6,9	7,5	4,9	7,5	7,3	4,8	8,9	9,8	6,4	9,8	9,4	6,2
4308/2F												
4308/2S	8,4	9,2	6,1	9,2	8,9	5,8	10,9	12,0	7,9	12,0	11,6	7,6
4308/3	17,8	19,5	12,9	19,6	18,9	12,4	23,2	25,4	16,7	25,5	24,6	16,1
4308/3F												
4308/3S	22,6	24,7	16,3	24,8	23,9	15,7	29,4	32,1	21,2	32,2	31,1	20,4
4308/M10S												
4308/M12S	28,6	31,3	20,6	31,4	30,3	19,8	37,2	40,7	26,8	40,9	39,4	25,8
4308/4	23,7	25,9	17,1	26,0	25,1	16,4	30,8	33,7	22,2	33,8	32,6	21,3
4308/4S	28,6	31,3	20,6	31,4	30,3	19,8	37,2	40,7	26,8	40,9	39,4	25,8
4316/2	6,9	7,5	4,9	7,5	7,3	4,8	9,3	10,1	6,7	10,2	9,8	6,4
4316/3	19,5	21,3	14,0	21,4	20,6	13,5	26,3	28,8	18,9	28,9	27,9	18,2
4316/3F												
4316/3S	24,3	26,6	17,5	26,7	25,8	16,9	32,9	35,9	23,7	36,1	34,8	22,8
4316/M10S												
4316/M12S	33,8	36,9	24,3	37,0	35,8	23,4	45,6	49,8	32,8	50,0	48,3	31,6
4316/4	27,9	30,5	20,1	30,6	29,6	19,3	37,7	41,2	27,1	41,3	39,9	26,1
4316/4S	33,8	36,9	24,3	37,0	35,8	23,4	45,6	49,8	32,8	50,0	48,3	31,6
4316/5	37,1	40,6	26,8	40,8	39,3	25,7	50,2	54,8	36,1	55,0	53,1	34,7
4316/5S	44,6	48,7	32,1	48,9	47,2	30,9	60,2	65,7	43,3	66,0	63,7	41,7
4316/7S	47,2	51,6	34,0	51,8	50,0	32,7	63,7	69,7	45,9	69,9	67,5	44,2
4330/3	21,4	23,4	15,4	23,5	22,7	14,8	28,9	31,6	20,8	31,7	30,6	20,0
4330/3S	26,8	29,3	19,3	29,4	28,4	18,6	36,2	39,6	26,1	39,7	38,3	25,1
4330/4	30,6	33,4	22,0	33,5	32,4	21,2	41,3	45,1	29,7	45,3	43,7	28,6
4330/4S	37,0	40,4	26,6	40,6	39,1	25,6	49,9	54,5	35,9	54,8	52,8	34,6
4330/5	38,3	41,9	27,6	42,1	40,6	26,6	51,8	56,6	37,3	56,8	54,8	35,9
4330/5S	46,1	50,4	33,2	50,6	48,8	32,0	62,3	68,0	44,8	68,3	65,9	43,1
4330/7S	48,7	53,2	35,1	53,4	51,6	33,7	65,7	71,8	47,3	72,1	69,6	45,5
4330/9S												
4332/4	33,2	36,3	23,9	36,4	35,2	23,0	46,5	50,8	33,5	51,0	49,2	32,2
4332/4S	40,1	43,8	28,9	44,0	42,4	27,8	56,1	61,3	40,4	61,6	59,4	38,9
4332/5	39,4	43,1	28,4	43,3	41,8	27,3	55,2	60,3	39,8	60,6	58,5	38,3
4332/5S	47,7	52,1	34,3	52,3	50,5	33,0	66,7	72,9	48,1	73,2	70,7	46,2
4341/4	34,2	37,4	24,6	37,5	36,2	23,7	51,3	56,1	37,0	56,3	54,4	35,6
4341/4S	40,8	44,6	29,4	44,8	43,2	28,3	61,2	66,9	44,1	67,2	64,8	42,4
4341/5	40,4	44,2	29,1	44,4	42,8	28,0	60,7	66,3	43,7	66,6	64,2	42,0
4341/5S	49,0	53,5	35,3	53,7	51,8	33,9	73,4	80,3	52,9	80,6	77,8	50,9
4341/6	66,4	72,6	47,8	72,9	70,3	46,0	99,6	108,9	71,8	109,3	105,5	69,0
4341/6S												
4341/7S	73,4	80,2	52,9	80,5	77,7	50,8	110,1	120,3	79,3	120,8	116,6	76,3
4375/4S	52,8	57,7	38,0	57,9	55,9	36,6	79,2	86,6	57,0	86,9	83,9	54,9
4375/5S	53,9	58,9	38,8	59,1	57,1	37,3	80,8	88,4	58,2	88,7	85,6	56,0
4375/6S	79,7	87,1	57,4	87,4	84,4	55,2	119,5	130,7	86,1	131,2	126,6	82,8
4375/7S	91,8	100,3	66,1	100,7	97,2	63,6	137,7	150,5	99,1	151,1	145,8	95,4
4375/9S	95,4	104,3	68,7	104,7	101,1	66,1	143,2	156,5	103,1	157,1	151,6	99,2

(1) : Maximum values of the refrigerant flow capacity at which the drier can be used when fluid dehydration is not the a major problem, provided that the original moisture is limited before the installation of the drier. The maximum refrigerant flow capacities are referred to a total pressure drop of 0,07 bar / 0,14 bar , inlet and outlet connections included, (according to ARI STANDARD 710-2004 - with liquid temperature at + 30 °C and evaporating temperature at - 15 °C)

TABLE 4A: Refrigerant Water Capacity of filters with high water capacity core

Catalogue Number	Water Capacity at + 24 °C (1) [g H_2O]					Dehydratable Charge at + 24 °C [kg refrigerant]				
	R134a	R22	R404A R507	R407C	R410A	R134a	R22	R404A R507	R407C	R410A
4303/2	4,9	4,4	5,0	4,0	4,3	5,3	4,7	5,4	4,3	4,6
4303/2F										
4303/2S										
4303/3										
4303/3S										
4305/2	7,7	7,1	7,9	6,3	6,9	8,3	7,6	8,5	6,8	7,4
4305/2F										
4305/2S										
4305/3										
4305/3S										
4305/M10S										
4308/2	12,9	11,8	13,2	10,6	11,5	13,9	12,7	14,2	11,4	12,4
4308/2F										
4308/2S										
4308/3										
4308/3F										
4308/3S										
4308/M10S										
4308/M12S										
4308/4										
4308/4S										
4316/2	25,2	23,0	25,7	20,6	22,5	27,1	24,7	27,6	22,2	24,2
4316/3										
4316/3F										
4316/3S										
4316/M10S										
4316/M12S										
4316/4										
4316/4S										
4316/5										
4316/5S										
4316/7S										
4330/3	50,4	46,0	51,5	41,3	44,9	54,2	49,5	55,3	44,3	48,4
4330/3S										
4330/4										
4330/4S										
4330/5										
4330/5S										
4330/7S										
4330/9S										
4332/4	46,6	42,6	47,6	38,2	41,5	50,1	45,8	51,2	41,1	44,6
4332/4S										
4332/5										
4332/5S										
4341/4	63,3	57,8	64,7	51,8	56,4	68,1	62,2	69,6	55,7	60,6
4341/4S										
4341/5										
4341/5S										
4341/6										
4341/6S										
4341/7S										
4375/4S	126,6	115,6	129,4	103,7	112,8	136,1	124,3	139,1	111,4	121,3
4375/5S										
4375/6S										
4375/7S										
4375/9S										

(1) : Water capacity values are referred to the following conditions, fixed in ARI STANDARD 710-2004 and DIN 8949:2000:
- Liquid temperatures: 24 °C and 52 °C
- Equilibrium point dryness, EPD: 60 ppm for R22
- Equilibrium point dryness, EPD: 50 ppm for R134a, R404A, R407C, R410A e R507

TABLE 4B: Refrigerant Water Capacity of filters with high water capacity core

Catalogue Number	Water Capacity at + 52 °C (1) [g H_2O]					Dehydratable Charge at + 52 °C [kg refrigerant]				
	R134a	R22	R404A R507	R407C	R410A	R134a	R22	R404A R507	R407C	R410A
4303/2	4,2	3,6	4,6	3,2	3,5	4,5	3,9	4,9	3,4	3,8
4303/2F										
4303/2S										
4303/3										
4303/3S										
4305/2	6,7	5,7	7,3	5,1	5,6	7,2	6,1	7,8	5,5	6,0
4305/2F										
4305/2S										
4305/3										
4305/3S										
4305/M10S										
4308/2	11,1	9,3	12,2	8,5	9,3	11,9	10,0	13,1	9,1	10,0
4308/2F										
4308/2S										
4308/3										
4308/3F										
4308/3S										
4308/M10S										
4308/M12S										
4308/4										
4308/4S										
4316/2	21,7	18,4	23,9	16,6	18,1	23,3	19,8	25,7	17,8	19,5
4316/3										
4316/3F										
4316/3S										
4316/M10S										
4316/M12S										
4316/4										
4316/4S										
4316/5										
4316/5S										
4316/7S										
4330/3	43,5	36,9	47,8	33,2	36,2	46,7	39,6	51,4	35,7	38,9
4330/3S										
4330/4										
4330/4S										
4330/5										
4330/5S										
4330/7S										
4330/9S										
4332/4	40,2	34,1	44,2	30,7	33,4	43,2	36,7	47,5	33,0	35,9
4332/4S										
4332/5										
4332/5S										
4341/4	54,6	46,3	60,1	41,7	45,4	58,7	49,8	64,6	44,8	48,8
4341/4S										
4341/5										
4341/5S										
4341/6										
4341/6S										
4341/7S										
4375/4S	109,2	92,7	120,2	83,5	90,8	117,4	99,6	129,2	89,7	97,6
4375/5S										
4375/6S										
4375/7S										
4375/9S										

(1) : Water capacity values are referred to the following conditions, fixed in ARI STANDARD 710-2004 and DIN 8949:2000:
- Liquid temperatures: 24 °C and 52 °C
- Equilibrium point dryness, EPD: 60 ppm for R22
- Equilibrium point dryness, EPD: 50 ppm for R134a, R404A, R407C, R410A e R507

TABLE 5: Refrigerant Flow Capacity of filters with antiacid core

Catalogue Number	Refrigerant Flow Capacity, pressure drop 0,07 bar (1) [kW]						Refrigerant Flow Capacity, pressure drop 0,14 bar (1) [kW]					
	R134a	R22	R404A	R407C	R410A	R404A R507	R134a	R22	R404A R507	R407C	R410A	R507
4203/2	6,4	7,0	4,6	7,0	6,8	4,4	7,7	8,4	5,5	8,4	8,1	5,3
4203/2S	7,9	8,6	5,7	8,6	8,3	5,5	9,4	10,3	6,8	10,4	10,0	6,5
4203/3	14,7	16,1	10,6	16,2	15,6	10,2	17,7	19,3	12,7	19,4	18,7	12,2
4205/2	6,6	7,2	4,7	7,2	7,0	4,6	8,6	9,4	6,2	9,4	9,1	5,9
4205/2S	8,1	8,9	5,9	8,9	8,6	5,6	10,6	11,6	7,6	11,6	11,2	7,3
4205/3	15,2	16,6	10,9	16,7	16,1	10,5	19,7	21,6	14,2	21,7	20,9	13,7
4205/3S	19,2	21,0	13,8	21,1	20,3	13,3	25,0	27,3	18,0	27,4	26,5	17,3
4208/2	6,9	7,5	4,9	7,5	7,3	4,8	8,9	9,8	6,4	9,8	9,4	6,2
4208/2S	8,4	9,2	6,1	9,2	8,9	5,8	10,9	12,0	7,9	12,0	11,6	7,6
4208/3	17,8	19,5	12,9	19,6	18,9	12,4	23,2	25,4	16,7	25,5	24,6	16,1
4208/3S	22,6	24,7	16,3	24,8	23,9	15,7	29,4	32,1	21,2	32,2	31,1	20,4
4208/4	23,7	25,9	17,1	26,0	25,1	16,4	30,8	33,7	22,2	33,8	32,6	21,3
4208/4S	28,6	31,3	20,6	31,4	30,3	19,8	37,2	40,7	26,8	40,9	39,4	25,8
4216/2	6,9	7,5	4,9	7,5	7,3	4,8	9,3	10,1	6,7	10,2	9,8	6,4
4216/3	19,5	21,3	14,0	21,4	20,6	13,5	26,3	28,8	18,9	28,9	27,9	18,2
4216/3S	24,3	26,6	17,5	26,7	25,8	16,9	32,9	35,9	23,7	36,1	34,8	22,8
4216/4	27,9	30,5	20,1	30,6	29,6	19,3	37,7	41,2	27,1	41,3	39,9	26,1
4216/4S	33,8	36,9	24,3	37,0	35,8	23,4	45,6	49,8	32,8	50,0	48,3	31,6
4216/5	37,1	40,6	26,8	40,8	39,3	25,7	50,2	54,8	36,1	55,0	53,1	34,7
4216/5S	44,6	48,7	32,1	48,9	47,2	30,9	60,2	65,7	43,3	66,0	63,7	41,7
4230/3	21,4	23,4	15,4	23,5	22,7	14,8	28,9	31,6	20,8	31,7	30,6	20,0
4230/3S	26,8	29,3	19,3	29,4	28,4	18,6	36,2	39,6	26,1	39,7	38,3	25,1
4230/4	30,6	33,4	22,0	33,5	32,4	21,2	41,3	45,1	29,7	45,3	43,7	28,6
4230/4S	37,0	40,4	26,6	40,6	39,1	25,6	49,9	54,5	35,9	54,8	52,8	34,6
4230/5	38,3	41,9	27,6	42,1	40,6	26,6	51,8	56,6	37,3	56,8	54,8	35,9
4230/5S	46,1	50,4	33,2	50,6	48,8	32,0	62,3	68,0	44,8	68,3	65,9	43,1
4232/4	33,2	36,3	23,9	36,4	35,2	23,0	46,5	50,8	33,5	51,0	49,2	32,2
4232/4S	40,1	43,8	28,9	44,0	42,4	27,8	56,1	61,3	40,4	61,6	59,4	38,9
4232/5	39,4	43,1	28,4	43,3	41,8	27,3	55,2	60,3	39,8	60,6	58,5	38,3
4232/5S	47,7	52,1	34,3	52,3	50,5	33,0	66,7	72,9	48,1	73,2	70,7	46,2
4241/5	40,4	44,2	29,1	44,4	42,8	28,0	60,7	66,3	43,7	66,6	64,2	42,0
4241/5S	49,0	53,5	35,3	53,7	51,8	33,9	73,4	80,3	52,9	80,6	77,8	50,9
4241/6	66,4	72,6	47,8	72,9	70,3	46,0	99,6	108,9	71,8	109,3	105,5	69,0
4241/6S												
4241/7S	73,4	80,2	52,9	80,5	77,7	50,8	110,1	120,3	79,3	120,8	116,6	76,3
4275/4S	52,8	57,7	38,0	57,9	55,9	36,6	79,2	86,6	57,0	86,9	83,9	54,9
4275/5S	53,9	58,9	38,8	59,1	57,1	37,3	80,8	88,4	58,2	88,7	85,6	56,0
4275/6S	79,7	87,1	57,4	87,4	84,4	55,2	119,5	130,7	86,1	131,2	126,6	82,8
4275/7S	91,8	100,3	66,1	100,7	97,2	63,6	137,7	150,5	99,1	151,1	145,8	95,4
4275/9S	95,4	104,3	68,7	104,7	101,1	66,1	143,2	156,5	103,1	157,1	151,6	99,2

(1) : Maximum values of the refrigerant flow capacity at which the drier can be used when fluid dehydration is not the a major problem, provided that the original moisture is limited before the installation of the drier. The maximum refrigerant flow capacities are referred to a total pressure drop of 0,07 bar / 0,14 bar , inlet and outlet connections included, (according to ARI STANDARD 710-2004 - with liquid temperature at + 30 °C and evaporating temperature at - 15 °C)

TABLE 6A: Refrigerant Water Capacity of filters with antiacid core

Catalogue Number	Water Capacity at + 24 °C (1) [g H_2O]					Dehydratable Charge at + 24 °C [kg refrigerant]				
	R134a	R22	R404A R507	R407C	R410A	R134a	R22	R404A R507	R407C	R410A
4203/2	4,2	3,7	4,3	3,4	3,7	4,5	4,0	4,6	3,7	3,9
4203/2S										
4203/3										
4205/2	6,5	6,0	6,7	5,4	5,9	7,0	6,5	7,2	5,8	6,3
4205/2S										
4205/3										
4205/3S										
4208/2	11,0	10,0	11,2	9,0	9,8	11,8	10,8	12,1	9,7	10,5
4208/2S										
4208/3										
4208/3S										
4208/4										
4208/4S										
4216/2	21,4	19,6	21,8	17,5	19,1	23,0	21,0	23,5	18,8	20,6
4216/3										
4216/3S										
4216/4										
4216/4S										
4216/5										
4216/5S										
4230/3	42,8	39,1	43,8	35,1	38,2	46,1	42,0	47,0	37,7	41,1
4230/3S										
4230/4										
4230/4S										
4230/5										
4230/5S										
4232/4	39,6	36,2	40,5	32,5	35,3	42,6	38,9	43,5	34,9	37,9
4232/4S										
4232/5										
4232/5S										
4241/5	53,8	49,1	55,0	44,0	47,9	57,9	52,8	59,1	47,3	51,5
4241/5S										
4241/6										
4241/6S										
4241/7S										
4275/4S	107,6	98,3	110,0	88,1	95,9	115,7	105,7	118,3	94,8	103,1
4275/5S										
4275/6S										
4275/7S										
4275/9S										

(1) : Water capacity values are referred to the following conditions, fixed in ARI STANDARD 710-2004 and DIN 8949:2000:
- Liquid temperatures: 24 °C and 52 °C
- Equilibrium point dryness, EPD: 60 ppm for R22
- Equilibrium point dryness, EPD: 50 ppm for R134a, R404A, R407C, R410A e R507

TABLE 6B: Refrigerant Water Capacity of filters with antiacid core

Catalogue Number	Water Capacity at + 52 °C (1) [g H_2O]					Dehydratable Charge at + 52 °C [kg refrigerant]				
	R134a	R22	R404A R507	R407C	R410A	R134a	R22	R404A R507	R407C	R410A
4203/2	3,6	3,1	3,9	2,7	3,0	3,8	3,3	4,2	2,9	3,2
4203/2S										
4203/3										
4205/2	5,7	4,8	6,2	4,3	4,8	6,1	5,2	6,7	4,7	5,1
4205/2S										
4205/3										
4205/3S										
4208/2	9,4	7,9	10,4	7,2	7,9	10,1	8,5	11,2	7,8	8,5
4208/2S										
4208/3										
4208/3S										
4208/4										
4208/4S										
4216/2	18,4	15,6	20,3	14,1	15,4	19,8	16,8	21,8	15,2	16,5
4216/3										
4216/3S										
4216/4										
4216/4S										
4216/5										
4216/5S										
4230/3	37,0	31,4	40,6	28,2	30,8	39,7	33,6	43,7	30,3	33,1
4230/3S										
4230/4										
4230/4S										
4230/5										
4230/5S										
4232/4	34,2	29,0	37,6	26,1	28,4	36,7	31,2	40,4	28,1	30,5
4232/4S										
4232/5										
4232/5S										
4241/5	46,4	39,4	51,1	35,4	38,6	49,9	42,3	54,9	38,1	41,5
4241/5S										
4241/6										
4241/6S										
4241/7S										
4275/4S	92,8	78,8	102,2	71,0	77,2	99,8	84,7	109,9	76,3	83,0
4275/5S										
4275/6S										
4275/7S										
4275/9S										

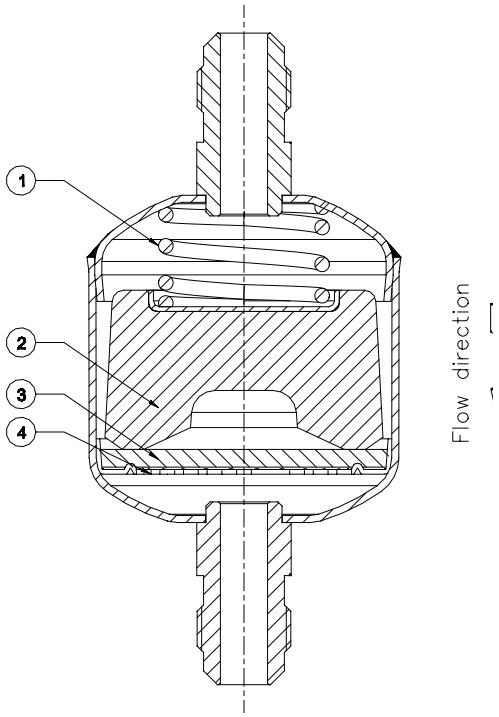
(1) : Water capacity values are referred to the following conditions, fixed in ARI STANDARD 710-2004 and DIN 8949:2000:
- Liquid temperatures: 24 °C and 52 °C
- Equilibrium point dryness, EPD: 60 ppm for R22
- Equilibrium point dryness, EPD: 50 ppm for R134a, R404A, R407C, R410A e R507

TABLE 7: Correction factors - L_1 of the refrigeration capacity for temperatures different from standard values

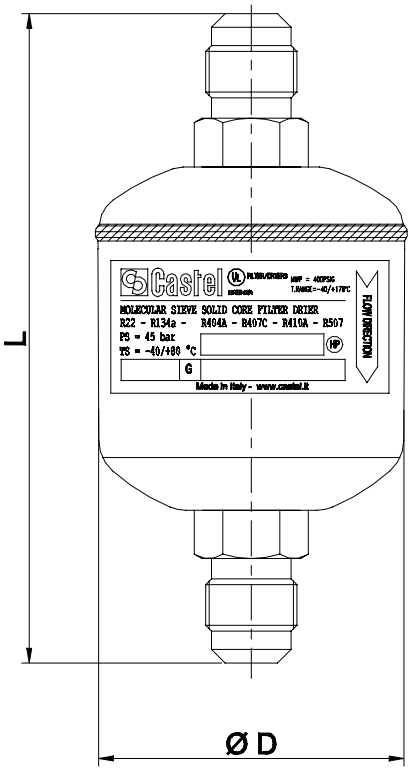
Liquid temperature [°C]	Refrigerant	Evaporating temperature [°C]										
		+10	+5	0	-5	-10	-15	-20	-25	-30	-35	-40
0	R134a							1,32	1,29	1,27	1,25	1,23
	R22							1,27	1,25	1,24	1,23	1,21
	R404A							1,44	1,42	1,39	1,36	1,33
	R407C							1,33	1,31	1,29	1,27	1,25
	R410A							1,36	1,34	1,33	1,31	1,30
	R507							1,46	1,43	1,40	1,37	1,34
10	R134a							1,20	1,18	1,16	1,14	1,12
	R22							1,18	1,16	1,15	1,13	1,12
	R404A							1,29	1,26	1,24	1,21	1,18
	R407C							1,22	1,20	1,18	1,16	1,14
	R410A							1,24	1,22	1,21	1,19	1,18
	R507							1,30	1,27	1,24	1,22	1,19
20	R134a	1,21	1,19	1,18	1,15	1,13	1,11	1,09	1,07	1,05	1,03	1,01
	R22	1,15	1,14	1,13	1,12	1,11	1,09	1,08	1,07	1,05	1,04	1,03
	R404A	1,27	1,25	1,23	1,21	1,18	1,16	1,13	1,11	1,08	1,06	1,03
	R407C	1,20	1,18	1,17	1,15	1,13	1,12	1,10	1,08	1,06	1,05	1,03
	R410A	1,17	1,17	1,16	1,15	1,14	1,13	1,11	1,10	1,09	1,07	1,06
	R507	1,28	1,26	1,24	1,21	1,19	1,16	1,14	1,11	1,09	1,06	1,03
30	R134a	1,10	1,08	1,06	1,04	1,02	1,00	0,98	0,96	0,94	0,92	0,89
	R22	1,06	1,05	1,04	1,02	1,01	1,00	0,99	0,97	0,96	0,95	0,93
	R404A	1,11	1,09	1,07	1,05	1,02	1,00	0,98	0,95	0,93	0,90	0,87
	R407C	1,08	1,06	1,05	1,03	1,02	1,00	0,98	0,97	0,95	0,93	0,91
	R410A	1,05	1,04	1,03	1,02	1,01	1,00	0,99	0,98	0,96	0,95	0,93
	R507	1,11	1,09	1,07	1,05	1,02	1,00	0,98	0,95	0,92	0,90	0,87
40	R134a	0,98	0,96	0,95	0,93	0,91	0,89	0,87	0,84	0,82	0,80	0,78
	R22	0,96	0,95	0,94	0,93	0,92	0,90	0,89	0,88	0,86	0,85	0,84
	R404A	0,95	0,93	0,90	0,88	0,86	0,84	0,81	0,79	0,76	0,74	0,71
	R407C	0,96	0,94	0,93	0,91	0,90	0,88	0,86	0,85	0,83	0,81	0,79
	R410A	0,92	0,91	0,90	0,89	0,88	0,87	0,86	0,85	0,83	0,82	0,81
	R507	0,94	0,92	0,90	0,88	0,86	0,83	0,81	0,78	0,76	0,73	0,71
50	R134a	0,87	0,85	0,83	0,81	0,79	0,77	0,75	0,73	0,71	0,69	0,67
	R22	0,86	0,85	0,84	0,83	0,82	0,81	0,79	0,78	0,77	0,75	0,74
	R404A	0,77	0,76	0,74	0,71	0,69	0,67	0,65	0,62	0,60	0,58	0,55
	R407C	0,83	0,82	0,80	0,79	0,77	0,76	0,74	0,72	0,71	0,69	0,67
	R410A	0,78	0,77	0,77	0,76	0,75	0,74	0,72	0,71	0,70	0,69	0,67
	R507	0,77	0,75	0,73	0,71	0,68	0,66	0,64	0,61	0,59	0,56	0,54
60	R134a	0,75	0,73	0,71	0,69	0,67	0,65	0,63	0,61	0,59	0,57	0,55
	R22	0,76	0,75	0,74	0,73	0,72	0,70	0,69	0,68	0,67	0,65	0,64
	R404A	0,60	0,58	0,56	0,54	0,52	0,50	0,47	0,45	0,43	0,41	0,38
	R407C	0,70	0,69	0,68	0,66	0,65	0,63	0,62	0,60	0,58	0,57	0,55
	R410A	0,64	0,63	0,62	0,61	0,60	0,59	0,58	0,57	0,56	0,55	0,53
	R507	0,58	0,57	0,55	0,53	0,50	0,48	0,46	0,44	0,41	0,39	0,37

TABLE 8: Dimensions and Weights

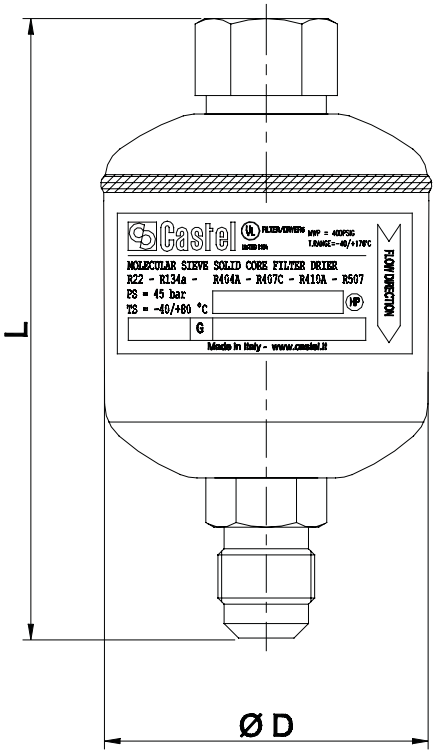
Catalogue Number		Connections			Dimensions [mm]		Weight [g]
		SAE Flare	ODS				
			Ø [in.]	Ø [mm]	Ø D	L	
4303/2	4203/2	1/4"	–	–	52	103	240
4303/2F	–	1/4"	–	–		92	230
4303/2S	4203/2S	–	1/4"	–		94	220
4303/3	4203/3	3/8"	–	–		111	235
4303/3S	–	–	3/8"	–		96	220
4305/2	4205/2	1/4"	–	–		119	275
4305/2F	–	1/4"	–	–		109	
4305/2S	4205/2S	–	1/4"	–		110	260
4305/3	4205/3	3/8"	–	–		127	295
4305/3S	4205/3S	–	3/8"	–		112	260
4305/M10S	–	–	–	10			
4308/2	4208/2	1/4"	–	–		146	380
4308/2F	–	1/4"	–	–		135	
4308/2S	4208/2S	–	1/4"	–		137	345
4308/3	4208/3	3/8"	–	–		154	395
4308/3F	–	3/8"	–	–		142	380
4308/3S	4208/3S	–	3/8"	–		139	345
4308/M10S	–	–	–	10			
4308/M12S	–	–	–	12		146	380
4308/4	4208/4	1/2"	–	–		162	430
4308/4S	4208/4S	–	1/2"	–		146	380
4316/2	4216/2	1/4"	–	–	73	158	635
4316/3	4216/3	3/8"	–	–		166	690
4316/3F	–	3/8"	–	–		154	680
4316/3S	4216/3S	–	3/8"	–		151	620
4316/M10S	–	–	–	10			630
4316/M12S	–	–	–	12		158	640
4316/4	4216/4	1/2"	–	–		174	680
4316/4S	4216/4S	–	1/2"	–		158	640
4316/5	4216/5	5/8"	–	–		183	740
4316/5S	4216/5S	–	5/8"	16		166	640
4316/7S	–	–	7/8"	–		171	650
4330/3	4230/3	3/8"	–	–		245	1380
4330/3S	4230/3S	–	3/8"	–		230	1240
4330/4	4230/4	1/2"	–	–		253	1360
4330/4S	4230/4S	–	1/2"	–		237	1280
4330/5	4230/5	5/8"	–	–		262	1480
4330/5S	4230/5S	–	5/8"	16		245	1370
4330/7S	–	–	7/8"	–		250	1420
4330/9S	–	–	1.1/8"	–		250	1450
4332/4	4232/4	1/2"	–	–	91	187	1300
4332/4S	4232/4S	–	1/2"	–		173	1200
4332/5	4232/5	5/8"	–	–		196	1320
4332/5S	4232/5S	–	5/8"	16		179	1250
4341/4	–	1/2"	–	–		222	1560
4341/4S	–	–	1/2"	–		208	1450
4341/5	4241/5	5/8"	–	–		231	1580
4341/5S	4241/5S	–	5/8"	16		214	1470
4341/6	4241/6	3/4"	–	–		232	1640
4341/6S	4241/6S	–	3/4"	–		219	1560
4341/7S	4241/7S	–	7/8"	–			1600
4375/4S	4275/4S	–	1/2"	–		387	2540
4375/5S	4275/5S	–	5/8"	16		393	2640
4375/6S	4275/6S	–	3/4"	–		398	2820
4375/7S	4275/7S	–	7/8"	–		398	2900
4375/9S	4275/9S	–	1.1/8"	–		398	3050



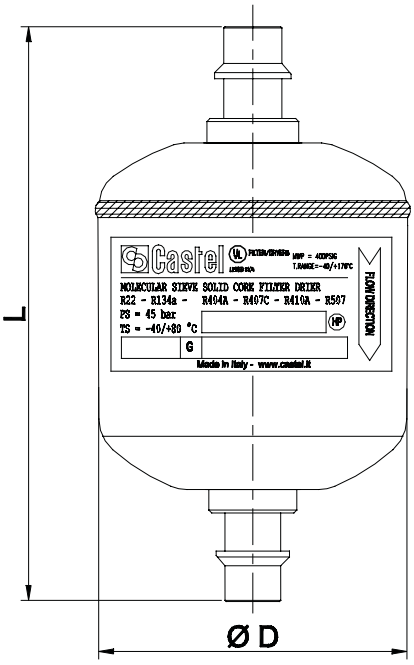
Solid core dehydrator
1 – Spring
2 – Bock
3 – Felt
4 – Stainless steel mesh



Male connections



Male - female connections
(female - in)



Solder connections

SOLID CORE FILTER DRIERS WITH SIGHT GLASS SERIES 41

Approved by Underwriters Laboratories Inc.

APPLICATIONS

The filters, shown in this chapter, are classified “Pressure vessels” in the sense of the Pressure Equipment Directive 94/23/EC, Article 1, Section 2.1.1 and are subject of Article 3, Section 1.1 of the same Directive.

They are designed for installation on commercial refrigerating systems and on civil and industrial conditioning plants, which use refrigerant fluids proper to the Group II (as defined in Article 9, Section 2.2 of Directive 97/23/EC and referred to in Directive 67/548/EEC).

Filters series 41 have been developed for specific installations on refrigerating systems using HFC refrigerant fluids, particularly R134a , R404A , R407C , R410A and R507 mixed with polyolester lubricants. In spite of this, the new block may be successfully used also in refrigerating systems using the old CFC or HCFC refrigerant fluids, mixed with mineral lubricants

CONSTRUCTION

The filter series 41 is a liquid line filter drier with a sight glass directly brazed on its outlet side. This group reduces the amount of field brazing required and the potential risk for leaks. Moisture/liquid indicators ensure a fast and safe inspection of the conditions of the refrigerant fluid in the circuit concerning regular flow and moisture

The filter is completely manufactured in steel, either with nickel-plated Flare threaded connections or with copper plated solder connections. Liquid/moisture indicator is manufactured with the glass “lens” directly fused onto a steel metallic ring, with proper surface protection.

The block is molded from a blend of dehydrating charge, totally made of 3 Å molecular sieves, and a special binding agent in appropriate proportions. The choice of the 3 Å molecular sieves, as sole dehydrating material, gives to the block a superlative capacity of water adsorption also maintaining quite good deacidifying characteristics. The manufacturing process gives a considerable compactness and stoutness to both the products so that they are resistant to shocks and abrasions.

OPERATION

The moisture/liquid indicators consist of a sensitive element as a ring, which changes color passing from green to yellow according to the percentage of moisture in the system.

The data of moisture content, shown in table 1 with the “green” colour, can be considered admissible for the proper working of the system. When the sensitive element from green fade to yellow, “green Chartreuse”, working conditions of the system could become difficult. When the sensitive element becomes “yellow”, it’s time to substitute the dehydrator filter.

If the charge and working condition are normal, the refrigerant fluid appears perfectly liquid underneath the “lens” of the indicator. The presence of bubbles indicates that the refrigerant fluid is partial evaporating along the liquid line.

INSTALLATION

At the start-up the color of the sensitive element may be yellow, due to exposure to air humidity and to moisture in the circuit. When the moisture of the refrigerant is brought back to acceptable levels with the dehydrator, the indicator color is once again green. This is evidence that equilibrium has been re-established. In case of persisting yellow, measures have to be taken to eliminate moisture. Only when the sensitive element comes back to green, there is evidence that adopted measures were effective.
About 12 hours of system operation are required to achieve equilibrium. However, the moisture indication is given normally when the plant is in function and the fluid is flowing

The brazing of filter/indicator with solder connections should be carried out with care, using a low melting point filler material. In any case, avoid direct contact between the torch flame and the indicator body or glass, which could be damaged and compromise the proper functioning of the indicator

TABLE 1: Moisture contained in the fluid [p.p.m.]

Colour	Refrigerant fluid					
	R22	R134a	R404A	R407C	R410A	R507
Green	<60	<75	<30	<30	<30	<30
Green "Chartreuse"	60	75	30	30	30	30
Yellow	>60	>75	>30	>30	>30	>30

TABLE 2: General Characteristics of filter driers with sight glass - high water capacity core (100% molecular sieves)

Catalogue Number		International Reference	Block Filtering Surface [cm^2]	Nominal Volume [cm^3]	Connections					PED Directive			
					SAE Flare	ODS		ODM		TS [°C]		PS [bar]	Risk Category
SAE Flare	ODS					Ø [in.]	Ø [mm]	Ø [in.]	Ø [mm]	min.	max.		
4105/2	–	052	70	80	1/4"	–				-40	+80	45 (1)	Art. 3.3
–	4105/2S	052S			–	1/4"	–	3/8"	–				
4105/3	–	053			3/8"	–							
–	4105/3S	053S			–	3/8"	–	1/2"	–				
4108/2	–	082	103	130	1/4"	–							
–	4108/2S	082S			–	1/4"	–	3/8"	–				
4108/3	–	083			3/8"	–							
–	4108/3S	083S			–	3/8"	–	1/2"	–				
–	4108/M10S	–			–	–	10	–	12				
–	4108/M12S	–			–	–	12	–	14				
4108/4	–	084			1/2"	–							
–	4108/4S	084S			–	1/2"	–	5/8"	16				
4116/3	–	163	155	250	3/8"	–							
–	4116/3S	163S			–	3/8"	–	1/2"	–				
–	4116/M10S	–			–	–	10	–	12				
–	4116/M12S	–			–	–	12	–	14				
4116/4	–	164			1/2"	–							
–	4116/4S	164S			–	–	–	–	–				
4116/5	–	165			5/8"	–							
–	4116/5S	165S			–	5/8"	16	3/4"	–				
41326/6	–	306	255	500	3/4"	–							
–	4132/6S	306S			–	3/4"		7/8"	–				
–	4132/7S	307S			–	7/8"		1.1/8"	–				

(1) : MWP = 435 psi according to UL approval for filters series 4105 , 4132
MWP = 400 psi according to UL approval for filters series 4108 , 4116

TABLE 3: Refrigerant Flow Capacity of filter driers with sight glass

Catalogue Number	Refrigerant Flow Capacity, pressure drop 0,07 bar (1) [kW]						Refrigerant Flow Capacity, pressure drop 0,14 bar (1) [kW]					
	R134a	R22	R404A	R407C	R410A	R404A R507	R134a	R22	R404A R507	R407C	R410A	R507
4105/2	6,6	7,2	4,7	7,2	7,0	4,6	8,6	9,4	6,2	9,4	9,1	5,9
4105/2S	8,1	8,9	5,9	8,9	8,6	5,6	10,6	11,6	7,6	11,6	11,2	7,3
4105/3	15,2	16,6	10,9	16,7	16,1	10,5	19,7	21,6	14,2	21,7	20,9	13,7
4105/3S	19,2	21,0	13,8	21,1	20,3	13,3	25,0	27,3	18,0	27,4	26,5	17,3
4108/2	6,9	7,5	4,9	7,5	7,3	4,8	8,9	9,8	6,4	9,8	9,4	6,2
4108/2S	8,4	9,2	6,1	9,2	8,9	5,8	10,9	12,0	7,9	12,0	11,6	7,6
4108/3	17,8	19,5	12,9	19,6	18,9	12,4	23,2	25,4	16,7	25,5	24,6	16,1
4108/3S	22,6	24,7	16,3	24,8	23,9	15,7	29,4	32,1	21,2	32,2	31,1	20,4
4108/M10S												
4108/M12S	28,6	31,3	20,6	31,4	30,3	19,8	37,2	40,7	26,8	40,9	39,4	25,8
4108/4	23,7	25,9	17,1	26,0	25,1	16,4	30,8	33,7	22,2	33,8	32,6	21,3
4108/4S	28,6	31,3	20,6	31,4	30,3	19,8	37,2	40,7	26,8	40,9	39,4	25,8
4116/3	19,5	21,3	14,0	21,4	20,6	13,5	26,3	28,8	18,9	28,9	27,9	18,2
4116/3S	24,3	26,6	17,5	26,7	25,8	16,9	32,9	35,9	23,7	36,1	34,8	22,8
4116/M10S												
4116/M12S	33,8	36,9	24,3	37,0	35,8	23,4	45,6	49,8	32,8	50,0	48,3	31,6
4116/4	27,9	30,5	20,1	30,6	29,6	19,3	37,7	41,2	27,1	41,3	39,9	26,1
4116/4S	33,8	36,9	24,3	37,0	35,8	23,4	45,6	49,8	32,8	50,0	48,3	31,6
4116/5	37,1	40,6	26,8	40,8	39,3	25,7	50,2	54,8	36,1	55,0	53,1	34,7
4116/5S	44,6	48,7	32,1	48,9	47,2	30,9	60,2	65,7	43,3	66,0	63,7	41,7
4132/6	51,2	56,0	36,9	56,2	54,3	35,5	71,7	78,4	51,7	78,7	76,0	49,7
4132/6S	61,9	67,7	44,6	68,0	65,6	42,9	86,7	94,8	62,5	95,2	91,8	60,1
4132/7S												

(1) : Maximum values of the refrigerant flow capacity at which the drier can be used when fluid dehydration is not the a major problem, provided that the original moisture is limited before the installation of the drier. The maximum refrigerant flow capacities are referred to a total pressure drop of 0,07 bar / 0,14 bar , inlet and outlet connections included, (according to ARI STANDARD 710-2004 - with liquid temperature at + 30 °C and evaporating temperature at - 15 °C)

TABLE 4A: Refrigerant Water Capacity of filter driers with sight glass

Catalogue Number	Water Capacity at + 24 °C (1) [g H_2O]					Dehydratable Charge at + 24 °C [kg refrigerant]				
	R134a	R22	R404A R507	R407C	R410A	R134a	R22	R404A R507	R407C	R410A
4105/2	7,7	7,1	7,9	6,3	6,9	8,3	7,6	8,5	6,8	7,4
4105/2S										
4105/3										
4105/3S										
4108/2	12,9	11,8	13,2	10,6	11,5	13,9	12,7	14,2	11,4	12,4
4108/2S										
4108/3										
4108/3S										
4108/M10S										
4108/M12S										
4108/4										
4108/4S										
4116/3	25,2	23,0	25,7	20,6	22,5	27,1	24,7	27,6	22,2	24,2
4116/3S										
4116/M10S										
4116/M12S										
4116/4										
4116/4S										
4116/5										
4116/5S										
4132/6	46,6	42,6	47,6	38,2	41,5	50,1	45,8	51,2	41,1	44,6
4132/6S										
4132/7S										

(1) : Water capacity values are referred to the following conditions, fixed in ARI STANDARD 710-2004 and DIN 8949:2000:
- Liquid temperatures: 24 °C and 52 °C
- Equilibrium point dryness, EPD: 60 ppm for R22
- Equilibrium point dryness, EPD: 50 ppm for R134a , R404A , R407C , R410A e R507

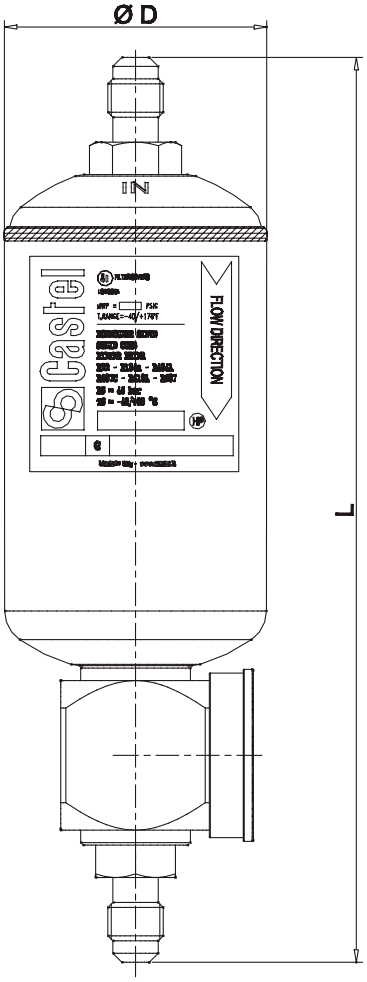
TABLE 4B: Refrigerant Water Capacity of filter driers with sight glass

Catalogue Number	Water Capacity at + 52 °C (1) [g H_2O]					Dehydratable Charge at + 52 °C [kg refrigerant]				
	R134a	R22	R404A R507	R407C	R410A	R134a	R22	R404A R507	R407C	R410A
4105/2	6,7	5,7	7,3	5,1	5,6	7,2	6,1	7,8	5,5	6,0
4105/2S										
4105/3										
4105/3S										
4108/2	11,1	9,3	12,2	8,5	9,3	11,9	10,0	13,1	9,1	10,0
4108/2S										
4108/3										
4108/3S										
4108/M10S										
4108/M12S										
4108/4										
4108/4S										
4116/3	21,7	18,4	23,9	16,6	18,1	23,3	19,8	25,7	17,8	19,5
4116/3S										
4116/M10S										
4116/M12S										
4116/4										
4116/4S										
4116/5										
4116/5S										
4132/6	40,2	34,1	44,2	30,7	33,4	43,2	36,7	47,5	33,0	35,9
4132/6S										
4132/7S										

(1) : Water capacity values are referred to the following conditions, fixed in ARI STANDARD 710-2004 and DIN 8949:2000:
- Liquid temperatures: 24 °C and 52 °C
- Equilibrium point dryness, EPD: 60 ppm for R22
- Equilibrium point dryness, EPD: 50 ppm for R134a , R404A , R407C , R410A e R507

TABLE 5: Dimensions and Weights

Catalogue Number	Connections			Dimension [mm]		Weight [g]
	SAE Flare	ODS				
		Ø [in.]	Ø [mm]	Ø D	L	
4105/2	1/4"	–	–	52	155	520
4105/2S	–	1/4"	–		163	520
4105/3	3/8"	–	–		163	550
4105/3S	–	3/8"	–		165	550
4108/2	1/4"	–	–		182	530
4108/2S	–	1/4"	–		190	530
4108/3	3/8"	–	–		192	550
4108/3S	–	3/8"	–		192	530
4108/M10S	–	–	10			
4108/M12S	–	–	12		200	540
4108/4	1/2"	–	–		198	580
4108/4S	–	1/2"	–		200	540
4116/3	3/8"	–	–	73	202	795
4116/3S	–	3/8"	–		204	835
4116/M10S	–	–	10			
4116/M12S	–	–	12		212	850
4116/4	1/2"	–	–		210	880
4116/4S	–	1/2"	–		212	850
4116/5	5/8"	–	–		219	940
4116/5S	–	5/8"	16		221	870
4132/6	3/4"	–	–	91	233	1400
4132/6S	–	3/4"	–		238	1380
4132/7S	–	7/8"	–		238	1400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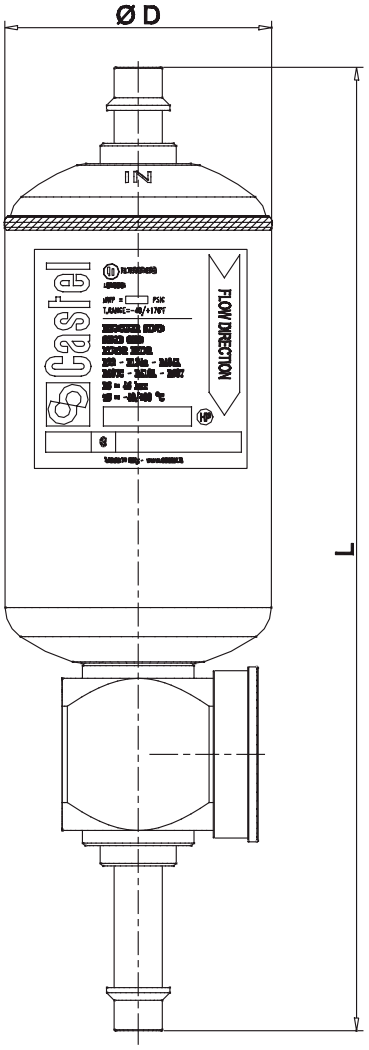
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SOLID CORE BI-FLOW FILTER DRIERS SERIES 46

Approved by Underwriters Laboratories Inc.

APPLICATIONS

The filters, shown in this chapter, are classified “Pressure vessels” in the sense of the Pressure Equipment Directive 94/23/EC, Article 1, Section 2.1.1 and are subject of Article 3, Section 1.1 of the same Directive.

They are designed for installation in liquid lines on conditioning plants with reverse-cycle, on heat pumps and on refrigerating systems which use refrigerant fluids proper to the Group II (as defined in Article 9, Section 2.2 of Directive 97/23/EC and referred to in Directive 67/548/EEC).

Filters series 46 have been developed for specific installations on refrigerating systems using HFC refrigerant fluids, particularly R134a , R404A , R407C , R410A and R507 mixed with polyolester lubricants. In spite of this, the new block may be successfully used also in refrigerating systems using the old CFC or HCFC refrigerant fluids, mixed with mineral lubricants.

CONSTRUCTION

The filter is completely manufactured in steel, either with copper plated solder connections, offering the possibility to solder the copper pipe inside the connections (ODS) or outside the connections, using a copper sleeve (ODM).

By-flow filter driers have two built-in check valves, one on both sides, which ensure that the refrigerant liquid always flows through the drier from the outer side of the solid core towards the center, regardless of the flow direction. Thus all dirt particles are retained irrespective of flow direction.

The blocks are molded from a blend of dehydrating charge, totally made of 3 Å molecular sieves, and a special binding agent in appropriate proportions. The choice of the 3 Å molecular sieves, as sole dehydrating material, gives to the block a superlative capacity of water adsorption also maintaining quite good deacidifying characteristics. The manufacturing process gives a considerable compactness and stoutness to both the products so that they are resistant to shocks and abrasions.

The blocks are symmetrical and are designed to offer the maximum possible surface area to the incoming fluid, while the internal hole guaranties a uniform wall thickness. As a result, the fluid encounters a constant strength at all points, flows linearly through the block, and ensures efficient dehydration and minimum charge loss.

The block is chemically inert, not deliquescent, does not react with refrigerating fluids, and is capable of blocking oil by-products dragged into the circuit.

When building heat pump systems or conditioning plants with reverse-cycle, the use of by-flow filter driers eliminates the need for external check valves and reduces external piping and brazing.

TABLE 1: General Characteristics of bi-flow filters - high water capacity core (100% molecular sieves)

Catalogue Number	International Reference	Block Filtering Surface [cm^2]	Nominal Volume [cm^3]	Connections				PED Directive			
				ODS		ODM		TS [°C]		PS [bar]	Risk Category
				Ø [in.]	Ø [mm]	Ø [in.]	Ø [mm]	min.	max.		
4608/3S	083S	70	95	3/8"	–	1/2"	–	-40	+80	45 (1)	Art. 3.3
4608/4S	084S			1/2"	–	5/8"	16				
4616/3S	163S	105	150	3/8"	–	1/2"	–				
4616/4S	164S			1/2"	–	5/8"	16				
4616/5S	165S			5/8"	16	3/4"	–				
4616/7S	167S			7/8"	–	1.1/8"	–				

(1) : MWP = 400 psi according to UL approval

TABLE 2: Refrigerant Flow Capacity of bi-flow filters

Catalogue number	Refrigerant Flow Capacity, pressure drop 0,07 bar (1) [kW]						Refrigerant Flow Capacity, pressure drop 0,14 bar (1) [kW]					
	R134a	R22	R404A	R407C	R410A	R404A R507	R134a	R22	R404A R507	R407C	R410A	R507
4608/3S	11,4	12,5	8,2	12,6	12,1	7,9	14,9	16,3	10,7	16,3	15,7	10,3
4608/4S	15,8	17,3	11,4	17,4	16,8	11,0	20,6	22,5	14,8	22,6	21,8	14,3
4616/3S	16,7	18,2	12,0	18,3	17,6	11,5	22,5	24,6	16,2	24,7	23,8	15,6
4616/4S	27,8	30,4	20,0	30,5	29,5	19,3	37,6	41,0	27,0	41,2	39,8	26,0
4616/5S	36,2	39,6	26,1	39,8	38,4	25,1	48,9	53,5	35,2	53,7	51,8	33,9
4616/7S	43,5	47,5	31,3	47,7	46,0	30,1	58,7	64,1	42,3	64,4	62,1	40,7

(1) : Maximum values of the refrigerant flow capacity at which the drier can be used when fluid dehydration is not the a major problem, provided that the original moisture is limited before the installation of the drier. The maximum refrigerant flow capacities are referred to a total pressure drop of 0,07 bar / 0,14 bar , inlet and outlet connections included, (according to ARI STANDARD 710-2004 - with liquid temperature at + 30 °C and evaporating temperature at - 15 °C)

TABLE 3A: Refrigerant Water Capacity of bi-flow filters

Catalogue number	Water Capacity at + 24 °C (1) [g H_2O]					Dehydratable Charge at + 24 °C [kg refrigerant]				
	R134a	R22	R404A R507	R407C	R410A	R134a	R22	R404A R507	R407C	R410A
4608/3S	14,0	12,8	14,3	11,4	12,4	15,1	13,8	15,4	12,3	13,3
4608/4S										
4616/3S	22,8	20,8	23,3	18,6	20,3	24,5	22,4	25,1	20,0	21,8
4616/4S										
4616/5S										
4616/7S										

(2) : Water capacity values are referred to the following conditions, fixed in ARI STANDARD 710-2004 and DIN 8949:2000:
- Liquid temperatures: 24 °C and 52 °C
- Equilibrium point dryness, EPD: 60 ppm for R22
- Equilibrium point dryness, EPD: 50 ppm for R134a , R404A , R407C , R410A e R507

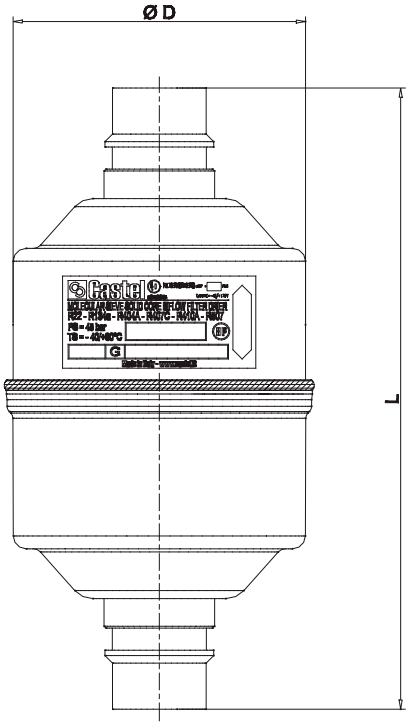
TABLE 3B: Refrigerant Water Capacity of bi-flow filters

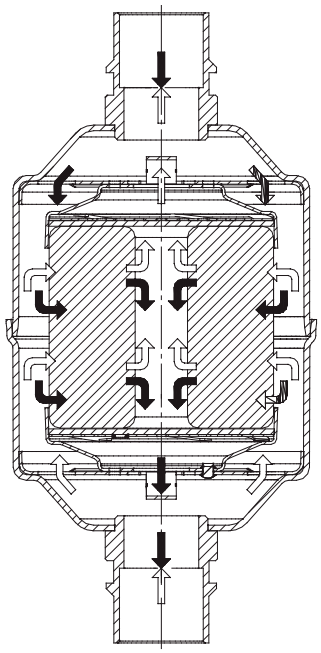
Catalogue Number	Water Capacity at + 52 °C (1) [g H_2O]					Dehydratable Charge at + 52 °C [kg refrigerant]				
	R134a	R22	R404A R507	R407C	R410A	R134a	R22	R404A R507	R407C	R410A
4608/3S	12,0	10,2	13,3	9,2	10,0	12,9	11,0	14,3	9,9	10,0
4608/4S										
4616/3S	19,6	16,7	21,6	15,0	16,3	21,1	18,0	23,2	16,1	17,5
4616/4S										
4616/5S										
4616/7S										

(2) : Water capacity values are referred to the following conditions, fixed in ARI STANDARD 710-2004 and DIN 8949:2000:
- Liquid temperatures: 24 °C and 52 °C
- Equilibrium point dryness, EPD: 60 ppm for R22
- Equilibrium point dryness, EPD: 50 ppm for R134a , R404A , R407C , R410A e R507

TABLE 4: Dimensions and Weights

Catalogue Number	ODS Connections		Dimensions [mm]		Weight [g]
	Ø [in.]	Ø [mm]	Ø D	L	
4608/3S	3/8"	–	73	140	345
4608/4S	1/2"	–		146	380
4616/3S	3/8"	–	83	149	620
4616/4S	1/2"	–		156	640
4616/5S	5/8"	16		164	640
4616/7S	7/8"	–		168,5	650





FILTER DRIERS WITH REPLACEABLE ANTI-ACID SOLID CORE

Approved by Underwriters Laboratories Inc.

APPLICATIONS

The filters, shown in this chapter, are classified “Pressure vessels” in the sense of the Pressure Equipment Directive 94/23/EC, Article 1, Section 2.1.1 and are subject of Article 3, Section 1.1 of the same Directive.
They are designed for installation on commercial refrigerating systems and on civil and industrial conditioning plants, which use refrigerant fluids proper to the Group II (as defined in Article 9, Section 2.2 of Directive 97/23/EC and referred to in Directive 67/548/EEC).
The dehydrating blocks for filters 44 has been developed for specific installations on refrigerating systems using HFC refrigerant fluids, particularly R134a , R404A , R407C , R410A and R507 mixed with polyolester lubricants. In spite of this, the new block may be successfully used also in refrigerating systems using the old CFC or HCFC refrigerant fluids, mixed with mineral lubricants.

OPERATION

In the case of filters with more than one block, the passage of the fluid takes place in parallel; as a result, the pressure drop does not increase proportionately to the number of blocks. A large ring between the block and the inner surface of the filter permits the accumulation of solid particles, and prevents clogging. Before leaving the filter, the refrigerant fluid must pass through the mesh sieve on which blocks are mounted. The danger that small particles of dehydrating material being introduced into the system is thus avoided. Furthermore, at filter outlet, a plastic cup, the edge of which closely adheres to the inner surface of the filter, prevents dirt from reaching the outlet connection during normal operation and block change.

CONSTRUCTION

The filters type 4410 are manufactured with steel body and solder connections:
- manufactured with EN 12735-1 – Cu-DHP copper tube (no suffix after connection code)
- machined with a steel bar EN 10025 S355JR. (“F” suffix after connection code)

The filters type 4420 are completely manufactured in steel and solder connection are machined with a steel bar EN 10025 S355JR.
Liquid line filter driers series 4411, 4412, 4413 e 4414 are supplied in these two solutions:
- Codes with “A” suffix , equipped with 1/4” NPT threaded cover for mounting an access fitting with valve core (for example G9150/R05)
- Codes with “B” suffix, equipped with blind cover

Liquid line filter driers series 4423 e 4424 are supplied solely in codes with “A” suffix, equipped with 1/4” NPT threaded cover for mounting an access fitting with valve core (for example G9150/R05).

The blocks 4490, type A and type B, and the block 4491, type A, are molded from a blend of dehydrating charge, totally made of 3 Å molecular sieves, and a special binding agent in appropriate proportions. The choice of the 3 Å molecular sieves, as sole dehydrating material, gives to the block a superlative capacity of water adsorption also maintaining quite good deacidifying characteristics.

The blocks 4490, type AA and type AB, and the block 4491, type AA, are molded from a blend of dehydrating charge, 80% of 3 Å molecular sieves and 20 % of activated alumina, and a special binding agent in appropriate proportions. The choice of blend, molecular sieves – activated alumina, gives to the block a very high capacity of acid adsorption also maintaining very good dehydrating characteristics. The presence of a controlled and defined percentage of activated alumina, lower than the maximum value recommended by ASERCOM, keeps unchanged the original concentration of additives in the polyolester lubricant.

The manufacturing process of blocks series 4490 and 4491 gives a considerable compacted ness and stoutness to both the products so that they are resistant to shocks and abrasions.
The blocks series 4490 have a volume of 48 cu.in., equivalent to approx. 800 cm3 , and it is used with type 4411, 4412, 4413 and 4414 filters.
The block series 4491 has a volume of 100 cu.in., equivalent to approx. 1600 cm3. and it is used with type 4421, 4423 and 4424 filters.
The two blocks are shaped as a hollow cylinder and their overall dimensions correspond to those of other international brands. Consequently they are interchangeable. The hollow cylinder shape offers a large surface area to the inflowing fluid, which crosses the block in radial sense. As a result, dehydration is highly efficient with a minimum loss of charge.

TABLE 1: General Characteristics of solid core filter driers

Catalogue Number			Core Cat. Number	Number of Cores	Core Filtering Surface [cm²]	Nominal Volume		Connections			PED Directive			
								ODS		W (2)	TS [°C]		PS [bar]	Risk Category
Copper connections		Steel connections				[cu.in]	[cm³]	Ø [in.]	Ø [mm]	Ø [mm]	min.	max.		
Theaded cover	Blind cover	Theaded cover												
4411/5A	4411/5B	4411/5AF	4490/A - 4490/B ; 4490/AA - 4490/AB	1	420	48	800	5/8"	16	21,3	-40	+80	45 (1)	I
4411/7A	4411/7B	4411/7AF						7/8"	22	26,9				
4411/9A	4411/9B	4411/9AF						1.1/8"	–	33,7				
4411/M28A	4411/M28B	–												
4411/11A	4411/11B	4411/11AF						1.3/8"	35	42,4				
4411/13A	4411/13B	4411/13AF						1.5/8"	–	48,3				
4411/M42A	4411/M42B	4411/M42AF						–	42	48,3				
4411/17A	4411/17B	4411/17AF						2.1/8"	54	60,3				
4411/21A	4411/21B	4411/21AF		2	840	96	1600	2.5/8"	–	76,1				
4412/7A	4412/7B	4412/7AF						7/8"	22	26,9				
4412/M28A	4412/M28B	–												
4412/9A	4412/9B	4412/9AF						1.1/8"	–	33,7				
4412/11A	4412/11B	4412/11AF						1.3/8"	35	42,4				
4412/M42A	4412/M42B	4412/M42AF						–	42	48,3				
4412/17A	4412/17B	4412/17AF						2.1/8"	54	60,3				
4413/7A	4413/7B	4413/7AF	4491/A ; 4491/AA	3	1260	144	2400	7/8"	22	26,9				
4413/9A	4413/9B	4413/9AF						1.1/8"	–	33,7				
4413/11A	4413/11B	4413/11AF						1.3/8"	35	42,4				
4413/13A	4413/13B	4413/13AF						1.5/8"	–	48,3				
4413/M42A	4413/M42B	4413/M42AF						–	42	48,3				
4414/11A	4414/11B	4414/11AF		4	1680	192	3200	1.3/8"	35	42,4			35 (1)	
4414/13A	4414/13B	4414/13AF						1.5/8"	–	48,3				
4414/M42A	4414/M42B	4414/M42AF						–	42	48,3				
4414/17A	4414/17B	4414/17AF						2.1/8"	54	60,3				
–	–	4423/17A	4491/A ; 4491/AA	3	1890	300	4800	2.1/8"	54	60,3			32 (1)	II
		4423/21A						2.5/8"	67	76,1				
		4423/25A						3.1/8"	80	88,9				
		4424/25A		4	2520	400	6400	3.1/8"	80	88,9				
		4424/34A						4.1/4"	108	114,3				

(1) : MWP = 470 psi according to UL approval
(2) : only for shells with steel connections

BLOCKS REPLACEMENT

Blocks must be ordered separately from the filter. They are supplied in individual packages, which are hermetically sealed in suitable wrappings (type 4490), and in special bags (type 4491) for safe storage over long periods of time. Every cartridge is equipped of two seals in synthetic material to use like seal between the two cartridges and between the cartridge and its covers.

If the filter is installed in a system without any by-pass, the block replacement has to be done following these instructions:

1. Close the valve on the departing line
2. Start the compressor and its auxiliaries in order to transfer the refrigerant charge into the high pressure side of the plant (liquid receiver);
3. Stop the compressor at a suction pressure sufficiently higher than the atmospheric pressure;
4. Shut off the service valve at the suction side of the compressor.

NOTE: if during the transfer of the refrigerant to the high-pressure side of the plant, the discharge pressures reach too high values (the condenser is flooded due to insufficient capacity of the liquid receiver), shut off the valve on the compressor suction side and stop immediately the compressor.

5. Replace quickly the filter block. During the preparation of the new block, close the filter with a clean cloth. The slight over-pressure inside the filter and the ability of the technician will prevent air from getting into the plant.
6. The internal cleanliness of the body is guaranteed by the cleaning effect of the cup, which is characteristic of Castel filters.

If air is supposed to have entered the plant during filter block replacement, produce a vacuum in the low-pressure side of the plant, and always in the sector of the circuit involved.

7. Open the valve on the departure of liquid line
8. Slowly open the suction valve of the compressor and start the compressor and its auxiliaries.
9. Top the charge up, if necessary.

TABLE 2: Refrigerant Flow Capacity of solid core filter driers

Catalogue Number			Refrigerant Flow Capacity, pressure drop 0,07 bar (1) [kW]						Refrigerant Flow Capacity, pressure drop 0,14 bar (1) [kW]					
Copper connections		Steel connections												
Theaded cover	Blind cover	Theaded cover	R134a	R22	R404A	R407C	R410A	R507	R134a	R22	R404A	R407C	R410A	R507
4411/5A	4411/5B	4411/5AF	82	90	59	90	87	57	144	158	104	158	153	100
4411/7A	4411/7B	4411/7AF	145	158	104	159	153	100	253	277	182	278	268	175
4411/M28A	4411/M28B	–	198	216	142	217	209	137	346	378	249	380	366	240
4411/9A	4411/9B	4411/9AF												
4411/11A	4411/11B	4411/11AF	231	252	166	253	244	160	404	441	291	443	427	280
4411/13A	4411/13B	4411/13AF	247	270	178	271	262	171	432	473	311	474	458	300
4411/M42A	4411/M42B	4411/M42AF												
4411/17A	4411/17B	4411/17AF												
4411/21A	4411/21B	4411/21AF												
4412/7A	4412/7B	4412/7AF	145	158	104	159	153	100	253	277	182	278	268	175
4412/9A	4412/9B	4412/9AF	223	244	161	245	236	155	391	427	281	429	414	271
4412/11A	4412/11B	4412/11AF	303	331	218	332	321	210	530	579	382	582	561	367
4412/M42A	4412/M42B	4412/M42AF	330	361	238	362	350	229	578	632	416	634	612	401
4412/17A	4412/17B	4412/17AF												
4413/7A	4413/7B	4413/7AF	145	158	104	159	153	100	253	277	182	278	268	175
4412/M28A	4412/M28B	–	223	244	161	245	236	155	391	427	281	429	414	271
4413/9A	4413/9B	4413/9AF												
4413/11A	4413/11B	4413/11AF	324	354	233	355	343	224	567	620	408	622	600	393
4413/13A	4413/13B	4413/13AF	358	391	258	393	379	248	626	684	451	687	663	434
4413/M42A	4413/M42B	4413/M42AF												
4414/11A	4414/11B	4414/11AF	375	410	270	412	397	260	657	718	473	720	695	455
4414/13A	4414/13B	4414/13AF	421	460	303	462	446	292	737	805	530	808	780	510
4414/M42A	4414/M42B	4414/M42AF												
4414/17A	4414/17B	4414/17AF												
–	–	4423/17A	442	483	318	485	468	306	773	845	557	849	819	536
		4423/21A	487	532	351	534	516	337	852	931	614	935	902	590
		4423/25A	663	725	478	728	703	460	1161	1269	836	1274	1229	804
		4424/25A	729	797	525	800	772	505	1276	1395	919	1400	1352	884
		4424/34A	1168	1276	841	1281	1236	809	2043	2233	1472	2242	2164	1416

(1) : Maximum values of the refrigerant flow capacity at which the drier can be used when fluid dehydration is not the a major problem, provided that the original moisture is limited before the installation of the drier. The maximum refrigerant flow capacities are referred to a total pressure drop of 0,07 bar / 0,14 bar , inlet and outlet connections included, (according to ARI STANDARD 710-2004 - with liquid temperature at + 30 °C and evaporating temperature at - 15 °C)

TABLE 3: General Characteristics, Dimensions and Weights of solid cores

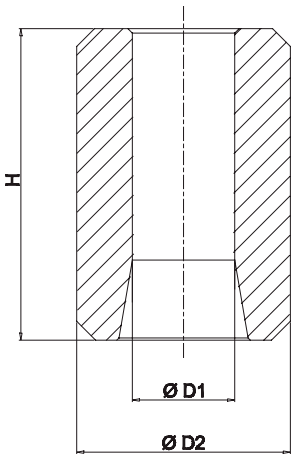
Catalogue Number	Batch characteristic	Filtering Surface [cm^2]	Nominal Volume		Dimensions [mm]			Weight [g]
			[cu.in]	[cm^3]	Ø D	Ø D_2	H	
4490/A (1)	High moisture adsorption (100% molecular sieve)	420	48	800	47	96	140	730
4490/B (2)								
4490/AA (1)	Moisture and acid adsorption (80% molecular sieve + 20% activated alumina)							
4490/AB (2)								
4491/A (3)	High moisture adsorption (100% molecular sieve)	630	100	1600	53	122	165	1560
4491/AA (3)	Moisture and acid adsorption (80% molecular sieve + 20% activated alumina)							

(1): Supplied with cover gaskets as spare part, either for Castel filters or for competitors ones
(2): Supplied without cover gasket as part part
(3): Supplied with cover gasket as spare part for Castel filters

TABLE 4: Water Capacity, dehydratable charge of single block

Catalogue Number	Nominal Volume		Water Capacity at + 24 °C (1) [g H_2O]					Dehydratable Charge at + 24 °C [kg refrigerant]					Water Capacity at + 52 °C (1) [g H_2O]					Dehydratable Charge at + 52 °C [kg refrigerant]				
	[cu.in]	[cm^3]	R134a	R22	R404A R507	R407C	R410A	R134a	R22	R404A R507	R407C	R410A	R134a	R22	R404A R507	R407C	R410A	R134a	R22	R404A R507	R407C	R410A
4490/A 4490/B	48	800	82	75	84	67	73	88	81	90	72	79	71	60	78	54	59	76	65	84	58	63
4490/AA 4490/AB			70	64	71	57	62	75	69	77	61	67	60	51	66	46	50	65	55	71	50	54
4491/A	100	1600	216	197	220	177	192	232	212	237	190	207	186	158	205	142	155	200	170	220	153	166
4491/AA			183	167	187	150	163	197	180	201	161	176	158	134	174	121	131	170	144	187	130	141

(1) : Water capacity values are referred to the following conditions, fixed in ARI STANDARD 710-2004 and DIN 8949:2000:
- Liquid temperatures: 24 °C and 52 °C
- Equilibrium point dryness, EPD: 60 ppm for R22
- Equilibrium point dryness, EPD: 50 ppm for R134a , R404A , R407C , R410A e R507



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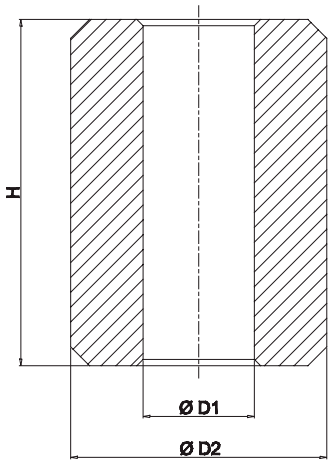

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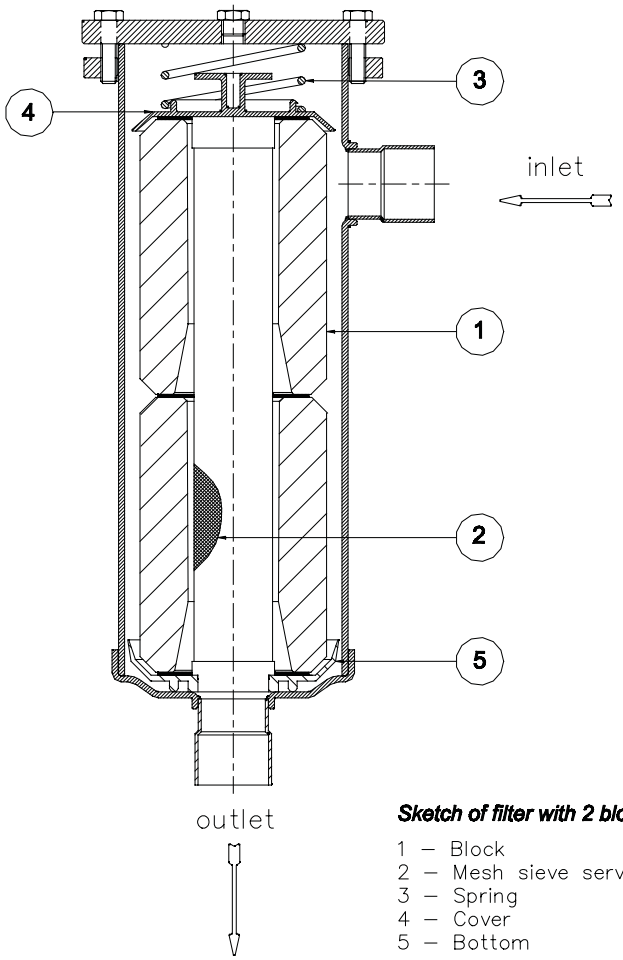
TABLE 5: Dimensions and weights of filters with copper connections

Catalogue Number	Connections		Dimensions [mm]						Weight [g]
	ODS		Ø D_1	Ø D_2	H_1	H_2	H_3	P	
	Ø [in.]	Ø [mm]							
4411/5 (A-B)	5/8"	16	121	149	144	231	185	89	5360
4411/7 (A-B)	7/8"	22			150	237		95	5405
4411/M28 (A-B)	–	28							5395
4411/9 (A-B)	1.1/8"								
4411/11 (A-B)	1.3/8"	35			155	242		100	5464
4411/13 (A-B)	1.5/8"	–			167	254		112	5435
4411/M42 (A-B)	–	42							5410
4411/17 (A-B)	2.1/8"	54			158	245		103	5585
4411/21 (A-B)	2.5/8"	–			182	269		127	6030
4412/7 (A-B)	7/8"	22			292	379	324	95	6880
4412/M28 (A-B)	–	28							
4412/9 (A-B)	1.1/8"	–							
4412/11 (A-B)	1.3/8"	35			297	384		100	7015
4412/M42 (A-B)	–	42			309	396		112	6985
4412/17 (A-B)	2.1/8"	54			300	387		103	7136
4413/7 (A-B)	7/8"	22			433	520		95	8375
4413/9 (A-B)	1.1/8"	–							
4413/11 (A-B)	1.3/8"	35			438	525		100	8510
4413/13 (A-B)	1.5/8"	–			450	537		112	8470
4413/M42 (A-B)	–	42							8445
4414/11 (A-B)	1.3/8"	35			580	667		100	9900
4414/13 (A-B)	1.5/8"	–			592	679		112	9940
4414/M42 (A-B)	–	42							10010
4414/17 (A-B)	2.1/8"	54			583	670		103	

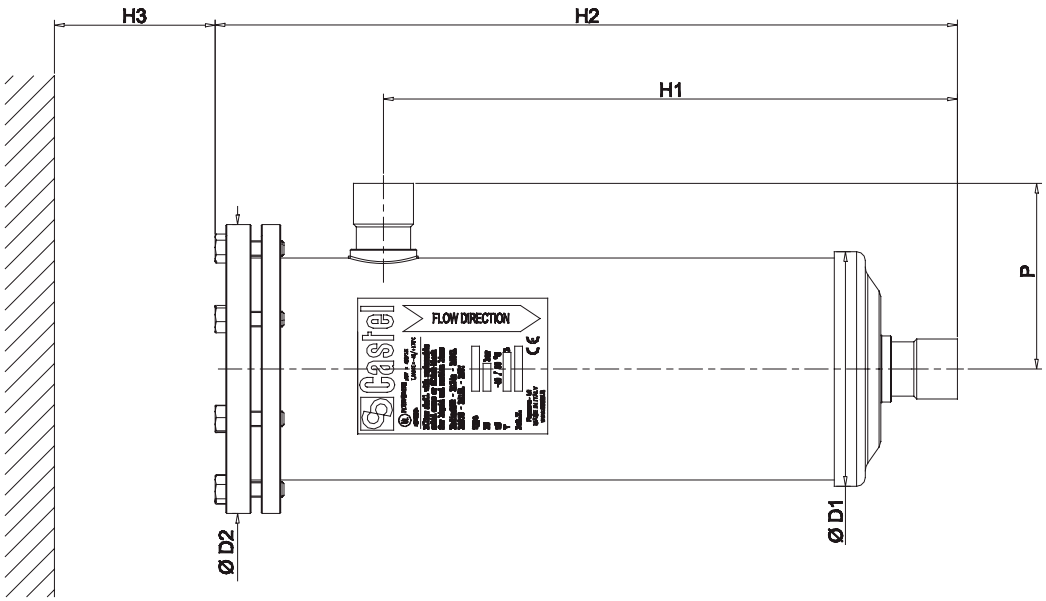
TABLE 6: Dimensions and weights of filters with steel connections

Catalogue Number	Connections			Dimensions [mm]						Weight [g]
	ODS		W	Ø D_1	Ø D_2	H_1	H_2	H_3	P	
	Ø [in.]	Ø [mm]	Ø [mm]							
4411/5AF	5/8"	16	21,3	121	149	144	231	185	90	5360
4411/7AF	7/8"	22	26,9			150	237		95	5405
4411/9AF	1.1/8"	–	33,7							5395
4411/11AF	1.3/8"	35	42,4			155	242		100	5464
4411/13AF	1.5/8"	–	48,3			167	254		112	5435
4411/M42AF	–	42	48,3							5410
4411/17AF	2.1/8"	54	60,3			158	245		103	5585
4411/21AF	2.5/8"	–	76,1			152	239		95	6030
4412/7AF	7/8"	22	26,9			292	379	324	95	6880
4412/9AF	1.1/8"	–	33,7							
4412/11AF	1.3/8"	35	42,4			297	384		100	7015
4412/M42AF	–	42	48,3			309	396		112	6985
4412/17AF	2.1/8"	54	60,3			300	387		103	7136
4413/7AF	7/8"	22	26,9			433	520		95	8375
4413/9AF	1.1/8"	–	33,7							
4413/11AF	1.3/8"	35	42,4			438	525		100	8510
4413/13AF	1.5/8"	–	48,3			450	537		112	8470
4413/M42AF	–	42	48,3							8445
4414/11AF	1.3/8"	35	42,4			580	667		100	9900
4414/13AF	1.5/8"	–	48,3			592	679		112	9940
4414/M42AF	–	42	48,3							10010
4414/17AF	2.1/8"	54	60,3			583	670		103	
4423/17A	2.1/8"	54	60,3	163	200	518	641	600	142	18000
4423/21A	2.5/8"	67	76,1							18200
4423/25A	3.1/8"	80	88,9			538	661		162	18400
4424/25A	3.1/8"	80	88,9			705	829	760		21600
4424/34A	4.1/4"	108	114,3			715	839		172	22000



Sketch of filter with 2 blocks

1 – Block
2 – Mesh sieve serving as block support
3 – Spring
4 – Cover
5 – Bottom



MECHANICAL FILTERS WITH REPLACEABLE FILTERING BLOCK

Approved by Underwriters Laboratories Inc.

APPLICATIONS

The filters, shown in this chapter, are classified “Pressure vessels” in the sense of the Pressure Equipment Directive 94/23/EC, Article 1, Section 2.1.1 and are subject of Article 3, Section 1.1 of the same Directive.
They are designed for installation on commercial refrigerating systems and on civil and industrial conditioning plants, which use the following refrigerant fluids: R22, R134a, R404A, R407C, R410A; R507 proper to the Group II (as defined in Article 9, Section 2.2 of Directive 97/23/EC and referred to in Directive 67/548/EEC). For specific applications with refrigerant fluids not listed above, always proper to the Group II, please contact Castel Technical Department.

OPERATION

Good filtering of the refrigerant on the low-pressure side of the system is a guarantee of protection for the compressor. System cleanliness is ensured by micro filtering cores, which filter out impurities derived from manufacture and assembly of the refrigerating system

CONSTRUCTION

The filters type 4410 are manufactured with steel body and solder connections:
- manufactured with EN 12735-1 – Cu-DHP copper tube (no suffix after connection code)
- machined with a steel bar EN 10025 S355JR. (“F” suffix after connection code)

The filters type 4420 are completely manufactured in steel and solder connection are machined with a steel bar EN 10025 S355JR.
Zinc plated wire cloths and a filtering baffle form the block, which features a large surface, with controlled porosity. The block can stop solid particles up to 20 micron. At the two ends, soft felt gaskets ensure perfect sealing with the plastic cups.
Filters 4411 and 4421 , with “C” suffix, are equipped with 1/4” NPT threaded cover and access fitting with valve core G9150/R05.

TABLE 1: General Characteristics of mechanical block filters

Catalogue Number		Number of cores	Filtering block		Connections			PED Directive			
					ODS		W (2)	TS [°C]		PS [bar]	Risk Category
Copper connections	Steel connections		Cat. Number	Filtering Surface [cm²]	Ø [in.]	Ø [mm]	Ø [mm]	min.	max.		
4411/7C	4411/7CF	1	4495/C	820	7/8"	22	26,9	-40	+80	45 (1)	I
4411/9C	4411/9CF				1.1/8"	–	33,7				
4411/11C	4411/11CF				1.3/8"	35	42,4				
4411/13C	4411/13CF				1.5/8"	–	48,3				
4411/M42C	4411/M42CF				–	42	48,3				
4411/17C	4411/17CF				2.1/8"	54	60,3				
4411/21C	4411/21CF				2.5/8"	–	76,1				
–	4411/25CF				3.1/8"	80	88,9				
	4421/21C		4496/C	1850	2.5/8"	67	76,1			32 (1)	
	4421/25C				3.1/8"	80	88,9				
	4421/34C				4.1/4"	108	114,3				

(1) : MWP = 470 psi according to UL approval
(2) : only for shells with steel connections

TABLE 2A: Refrigerant Flow Capacity of filtering block [kW]

Catalogue Number		R134a				R22					R404A				
		Evaporating Temperature [°C]				Evaporating Temperature [°C]					Evaporating Temperature [°C]				
Copper connections	Steel connections	+4,4	-6,7	-18	-29	+4,4	-6,7	-18	-29	-40	+4,4	-6,7	-18	-29	-40
		Pressure drop [bar]				Pressure drop [bar]					Pressure drop [bar]				
		0,14	0,10	0,07	0,03	0,21	0,14	0,10	0,07	0,03	0,21	0,14	0,10	0,07	0,03
4411/7C	4411/7CF	23,6	15,3	9,7	4,7	37,0	24,1	16,0	10,3	5,1	32,6	20,7	13,4	8,4	4,0
4411/9C	4411/9CF	42,0	26,7	16,6	7,9	66,8	42,8	27,9	17,8	8,5	59,3	37	23,5	14,6	6,8
4411/11C	4411/11CF	56,1	35,7	22,2	10,5	89,2	57,2	37,2	23,7	11,4	79,2	49,5	31,4	19,5	9,1
4411/13C	4411/13CF	63,7	41,2	26,1	12,6	99,8	65,0	43,0	27,8	13,8	87,9	55,9	36,0	22,7	10,9
4411/M42C	4411/M42CF	63,7	41,2	26,1	12,6	99,8	65,0	43,0	27,8	13,8	87,9	55,9	36,0	22,7	10,9
4411/17C	4411/17CF	86,1	54,8	34,1	16,1	137,0	87,9	57,2	35,4	17,5	121,5	76,0	48,2	29,9	14,0
4411/21C	4411/21CF	86,1	54,8	34,1	16,1	137,0	87,9	57,2	35,4	17,5	121,5	76,0	48,2	29,9	14,0
–	4411/25CF	86,1	54,8	34,1	16,1	137,0	87,9	57,2	35,4	17,5	121,5	76,0	48,2	29,9	14,0
	4421/21C	160,7	98,4	58,8	25,9	285,8	163,8	102,7	62,8	28,2	240,0	144,1	88,0	52,4	22,8
	4421/25C	208,9	127,9	76,4	33,7	371,5	212,9	133,5	81,6	36,7	312,0	187,3	114,4	68,1	29,6
	4421/34C	208,9	127,9	76,4	33,7	371,5	212,9	133,5	81,6	36,7	312,0	187,3	114,4	68,1	29,6

Standard rating conditions according to AHRI Standard 730-2005

Condensing temperature	100 °F	(37,5 °C)
Liquid temperature	90 °F	(32 °C)
Subcooling	10 °R	(5,5 °K)
Evaporating temperature	40 °F	(4,4 °C)
Superheating	10 °R	(5,5 °K)
Suction temperature	65 °F	(18,3 °C)

TABLE 2B: Refrigerant Flow Capacity of filtering block [kW]																
Catalogue Number		R407C					R410A					R507				
		Evaporating Temperature [°C]					Evaporating Temperature [°C]					Evaporating Temperature [°C]				
Copper connections	Steel connections	+4,4	-6,7	-18	-29	-40	+4,4	-6,7	-18	-29	-40	+4,4	-6,7	-18	-29	-40
		Pressure drop [bar]					Pressure drop [bar]					Pressure drop [bar]				
		0,21	0,14	0,10	0,07	0,03	0,21	0,14	0,10	0,07	0,03	0,21	0,14	0,10	0,07	0,03
4411/7C	4411/7CF	35,2	22,4	14,4	9,1	4,3	42,8	27,8	18,4	11,9	5,9	30,0	19,0	12,2	7,7	3,7
4411/9C	4411/9CF	63,4	39,7	25,2	15,5	7,2	77,8	49,7	32,4	20,5	9,9	54,7	34,0	21,5	13,3	6,2
4411/11C	4411/11CF	84,7	53,0	33,6	20,8	9,7	103,9	56,4	43,2	27,5	13,2	73,0	45,5	28,7	17,7	8,3
4411/13C	4411/13CF	94,8	50,4	38,9	24,4	11,7	115,4	75,0	49,5	32,1	15,9	81,0	51,3	32,9	20,6	9,9
4411/M42C	4411/M42CF	94,8	50,4	38,9	24,4	11,7	115,4	75,0	49,5	32,1	15,9	81,0	51,3	32,9	20,6	9,9
4411/17C	4411/17CF	130,0	81,4	51,6	31,9	14,8	159,6	102,0	66,4	42,2	20,3	112,1	69,8	44,1	27,2	12,7
4411/21C	4411/21CF	130,0	81,4	51,6	31,9	14,8	159,6	102,0	66,4	42,2	20,3	112,1	69,8	44,1	27,2	12,7
–	4411/25CF	130,0	81,4	51,6	31,9	14,8	159,6	102,0	66,4	42,2	20,3	112,1	69,8	44,1	27,2	12,7
	4421/21C	251,5	150,9	91,9	54,5	23,8	315,1	193,4	121,1	74,0	33,3	222,0	132,7	80,8	47,9	20,9
	4421/25C	327,0	196,2	119,5	70,9	30,9	409,6	251,4	157,4	96,2	43,3	288,6	172,5	105,0	62,3	27,2
	4421/34C	327,0	196,2	119,5	70,9	30,9	409,6	251,4	157,4	96,2	43,3	288,6	172,5	105,0	62,3	27,2

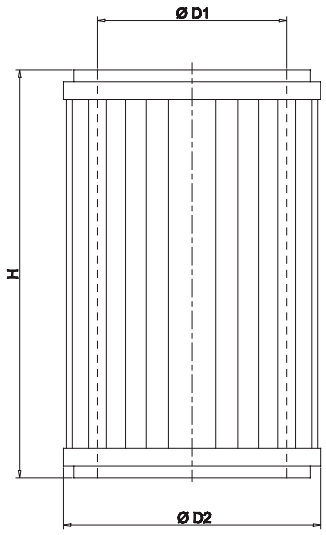
Standard rating conditions according to AHRI Standard 730-2005

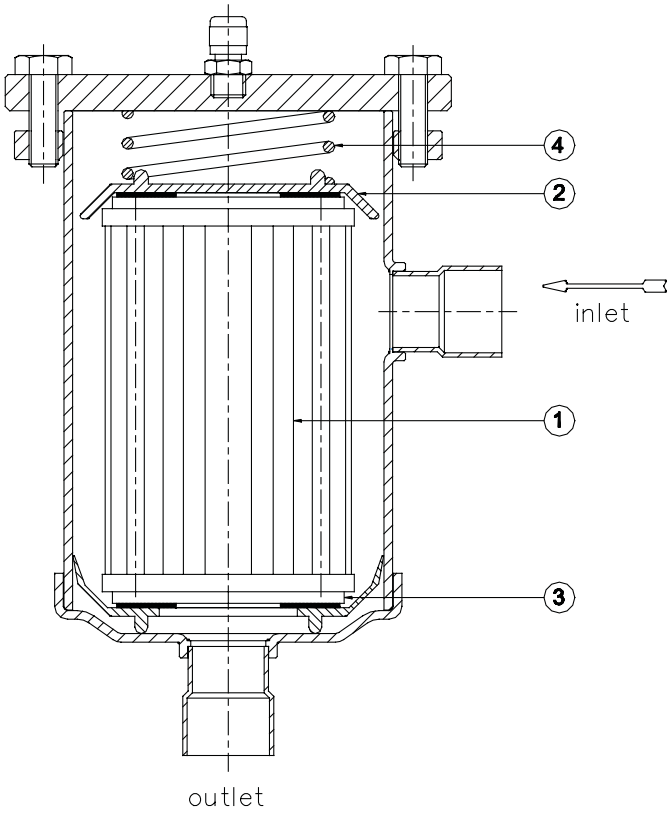
Condensing temperature	100 °F	(37,5 °C)
Liquid temperature	90 °F	(32 °C)
Subcooling	10 °R	(5,5 °K)
Evaporating temperature	40 °F	(4,4 °C)
Superheating	10 °R	(5,5 °K)
Suction temperature	65 °F	(18,3 °C)

TABLE 3: Dimensions and weights of filters with copper connections									
Catalogue Number	Connections		Dimensions [mm]						Weight [g]
	ODS		Ø D_1	Ø D_2	H_1	H_2	H_3	P	
	Ø [in.]	Ø [mm]							
4411/7C	7/8"	22	121	149	150	237	185	95	5450
4411/9C	1.1/8"	–							5375
4411/11C	1.3/8"	35			155	242		100	5435
4411/13C	1.5/8"	–			167	254		112	5410
4411/M42C	–	42							
4411/17C	2.1/8"	54			158	245		103	5585
4411/21C	2.5/8"	–			182	269		127	6030

TABLE 4: Dimensions and weights of filters with steel connections										
Catalogue Number	Connections			Dimensions [mm]						Weight [g]
	ODS		W	Ø D_1	Ø D_2	H_1	H_2	H_3	P	
	Ø [in.]	Ø [mm]	Ø [mm]							
4411/7CF	7/8"	22	26,9	121	149	150	237	185	95	5450
4411/9CF	1.1/8"	–	33,7							5375
4411/11CF	1.3/8"	35	42,4			155	242		100	5435
4411/13CF	1.5/8"	–	48,3			167	254		112	5410
4411/M42CF	–	42	48,3							
4411/17CF	2.1/8"	54	60,3			158	245		103	5585
4411/21CF	2.5/8"	–	76,1			152	239		95	6030
4411/25CF	3.1/8"	80	88,9			172	259		103	6100
4421/21C	2.5/8"	67	76,1	163	200	187	308	200	142	12000
4421/25C	3.1/8"	80	88,9			205	328		162	12200
4421/34C	4.1/4"	108	114,3			215	338		172	12500

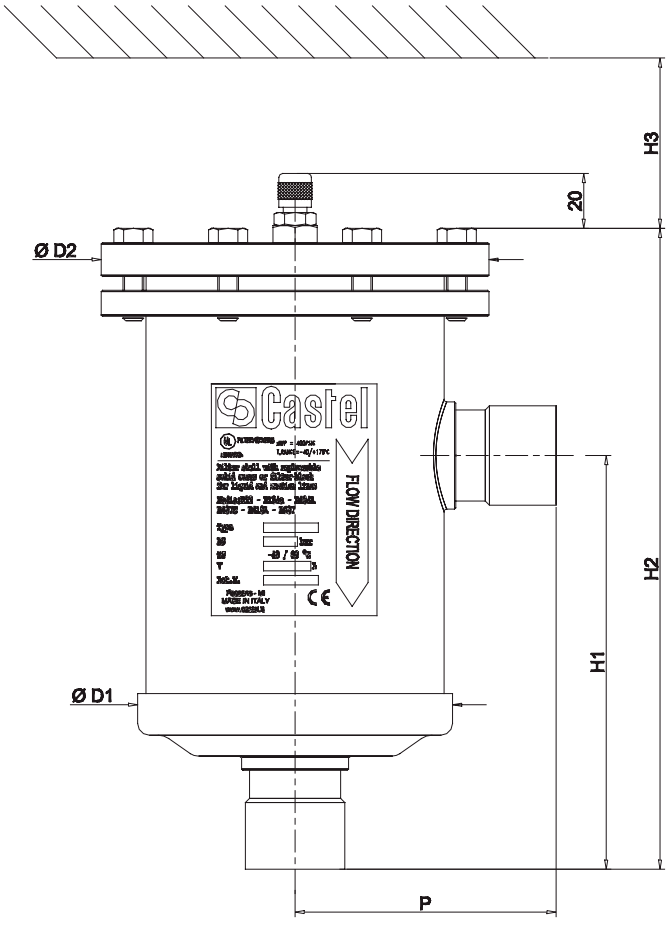
TABLE 5: General Characteristic, Dimensions and Weights of mechanical block						
Catalogue Number	Filtering Surface		Dimensioni [mm]			Weight [g]
	Ø [in.]	Ø [mm]	Ø D_1	Ø D_2	H_1	
4495/C	127	820	60	87	138	480
4496/C	287	1850	80	113	168	750





Sketch of filter with mechanical block

1 – Block
2 – Cover
3 – Botton
4 – Spring



APPLICATIONS

The filters, shown in this chapter, are classified “Pressure vessels” in the sense of the Pressure Equipment Directive 94/23/EC, Article 1, Section 2.1.1 and are subject of Article 3, Section 1.1 of the same Directive.
They are designed for installation on commercial refrigerating systems and on civil and industrial conditioning plants, which use refrigerant fluids proper to the Group II (as defined in Article 9, Section 2.2 of Directive 97/23/EC and referred to in Directive 67/548/EEC).

CONSTRUCTION

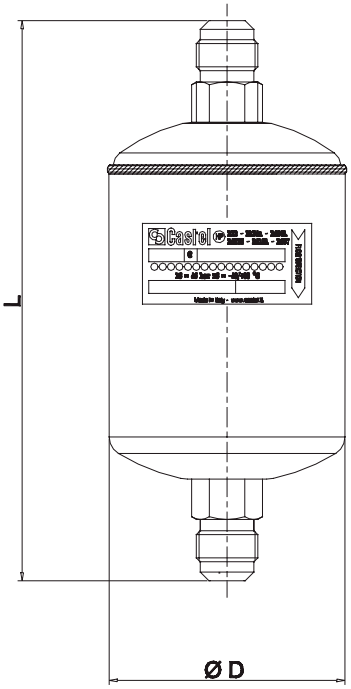
The filter is completely manufactured in steel, either with nickel-plated Flare threaded connections. The product range also includes types with copper plated solder connections, offering the possibility to solder the copper pipe inside the connections (ODS) or outside the connections, using a copper sleeve (ODM).
Inside the filters there is a screen basket, with wide filtering surface, made of austenitic stainless steel AISI 304.
These filters may not be cleaned.

TABLE 1: General Characteristics of strainers

Catalogue Number	Filtering Surface [cm^2]	Useful Passage Surface [%]	Mesh Opening [mm]	Connections					Kv Factor [m^3/h]	TS [°C]		PS [bar]	Risk Category according to PED
				SAE Flare	ODS		ODM			min.	max.		
					Ø [in.]	Ø [mm]	Ø [in.]	Ø [mm]					
4510/3	58	36,6	0,166	3/8"	–	–	–	–	2,4	– 40	+80	45	Art. 3.3
4510/4	142			1/2"	–	–	–	–	3,2				
4520/3	58			–	3/8"	–	1/2"	–	2,4				
4520/M10				–	–	10	–	12					
4520/M12				–	–	12	–	14	3,4				
4520/4				–	1/2"	–	5/8"	16					
4520/5				–	5/8"	16	3/4"	–					
4520/M18	142				–	18	–	22	8,0				

TABLE 2: Dimensions and Weights			
Catalogue Number	Dimensions [mm]		Weight [g]
	Ø D	L	
4510/3	52	110	195
4510/4	76	174	515
4520/3	52	109	195
4520/M10			
4520/M12		113	205
4520/4		122	215
4520/5		126	245
4520/M18	76	170	495

4510



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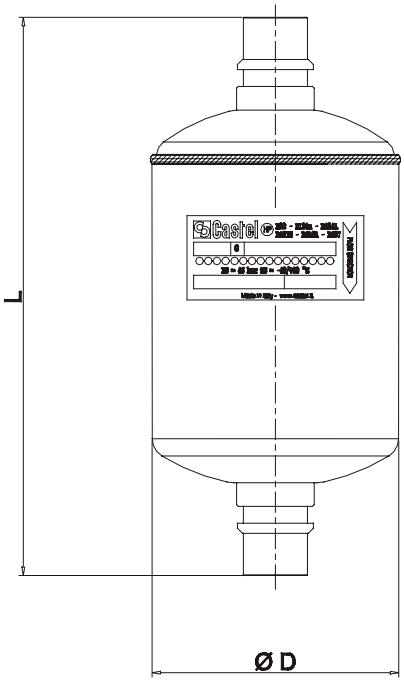

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