

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.

September 2011

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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 to 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.

The products listed in this handbook are protected according to the law.

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 2.1.4 and 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		-	-	-				

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

TABLE 2: 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 [mm]	min.	max.		
3910/22	male - male	1/4"	-	-	-	-	-	-	-	-	-	-	Art. 3.3
3910/33		3/8"	-	-	-	-	-	-	-	-	-		
3910/44		1/2"	-	-	-	-	-	-	-	-	-		
3910/55		5/8"	-	-	-	-	-	-	-	-	-		
3910/66		3/4"	-	-	-	-	-	-	-	-	-		
3940/2	soldering	-	1/4"	-	-	-	-	-	-	-	-	45 (1)	
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"	-	-	-	-	-	-	-	-		
3950/22	male - female	1/4"	-	-	-	-	-	-	-	-30	+110	35 45 esclusi	
3950/33		3/8"	-	-	-	-	-	-	-	-	-		
3950/44		1/2"	-	-	-	-	-	-	-	-	-		
3950/55		5/8"	-	-	-	-	-	-	-	-	-		
3950/66		3/4"	-	-	-	-	-	-	-	-	-		
3770/M28	soldering	-	-	-	-	28	-	-	-	-	-		
3770/11		-	-	-	1.3/8"	35	-	-	-	-	-		
3770/13		-	-	-	1.5/8"	-	-	-	-	-	-		
3770/M42		-	-	-	-	42	-	-	-	-	-		
3771/11		-	1.3/8"	35	-	-	-	-	-	-	-		
3771/M42		-	-	42	-	-	-	-	-	-	-		
3771/17		-	2.1/8"	-	-	-	-	-	-	-	-		
3780/5	saddle tyoe	-	-	-	-	-	5/8"	16	-	-	-		
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

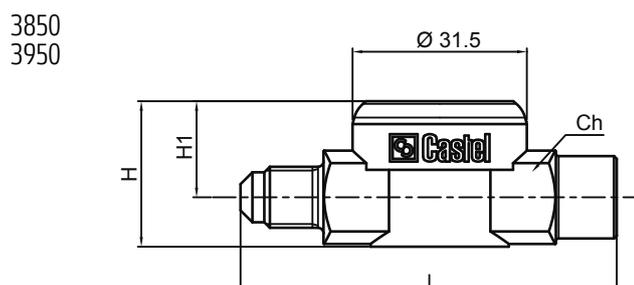
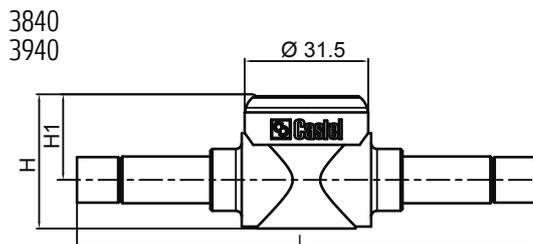
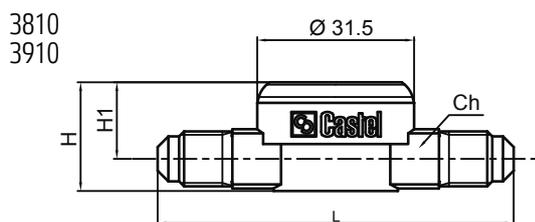
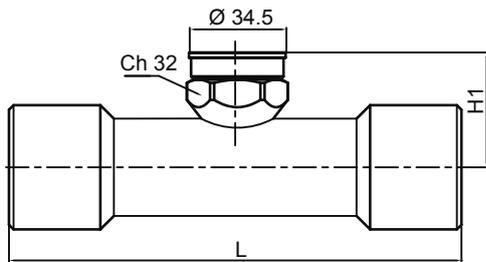


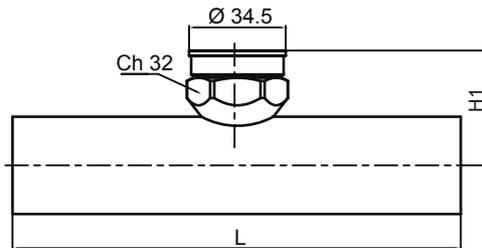
TABLE 4: Dimensions and Weights

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					225	
3840/M12	3940/M12					195	
3840/4	3940/4						
3840/5	3940/5	34	21.5	131		215	
3840/M18	3940/M18					310	
3840/6	3940/6	43.5	26	186		540	
3840/7	3940/7	37.5	23.5	151		-	300
3840/9	3940/9	43.5	26	186	540		
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		41.5	160		170	300
-	3771/11						480
-	3771/M42		45	170		300	
-	3771/17		30	-		-	480
-	3780/5		31				550
-	3780/M18		33				90
-	3780/7		36				
-	3780/9	39.5					

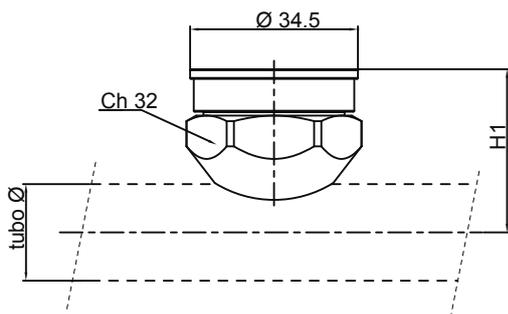
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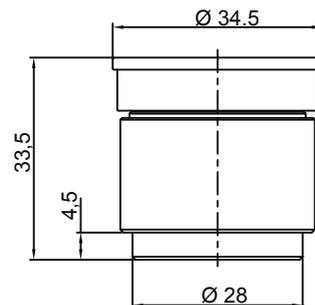
3770



3780



3781



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 – SERIES 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 to 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.

$$Q = Q_{ref} \times L_1$$

with:

Q = required refrigeration flow capacity [kW]

Q_{ref} = reference refrigeration flow capacity [kW] (see Tables 3 or 4)

L₁ = correction factor in presence of operative temperatures different from reference conditions (see Table 5)

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:

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

$$Q = Q_{ref} \times L_1 \quad 15 = Q_{ref} \times 0,86 \quad Q_{ref} = 15/0,86 = 17,44 \text{ [kW]}$$

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			3/8"				
4330/4	304	310	500	1/2"				
4330/5	305			5/8"				
4332/4	304			255				
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)

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.

FILTER SELECTION BASED ON WATER CAPACITY

System data:
 Refrigerant: R407C
 Liquid temperature: + 50 [°C]
 Evaporating temperature: - 10 [°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:

$$(1.050 - 50) \times 34 / 1.000 = 34 \text{ g of H}_2\text{O}$$

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 3, drier mod.4341 should be selected, 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:

$$1\text{g H}_2\text{O} = 20 \text{ water drops}$$

In this case and when a molecular sieve drier is selected, the following result is obtained:

$$34 \times 20 = 680 \text{ water drops.}$$

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 [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.		
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	-			-	10	-	12				
4308/2S	082S	103	130	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	255	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				
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 antiacid core (80% molecular sieves + 20% activated alumina)
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.		
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

	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.		
4203/2S	032S	47	50	1/4"	-	3/8"	-	- 40	+ 80	45 (1)	Art. 3.3
4205/2S	052S			1/4"	-	3/8"	-				
4205/3S	053S	70	80	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	155	250	1/2"	-	5/8"	16				
4216/3S	163S			3/8"	-	1/2"	-				
4216/M10S	-			-	10	-	12				
4216/M12S	-			-	12	-	14				
4216/4S	164S	310	500	1/2"	-	5/8"	16				
4216/5S	165S			5/8"	16	3/4"	-				
4230/3S	303S			3/8"	-	1/2"	-				
4230/4S	304S			1/2"	-	5/8"	16				
4230/5S	305S	255	500	5/8"	16	3/4"	-				
4232/4S	304S			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				
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

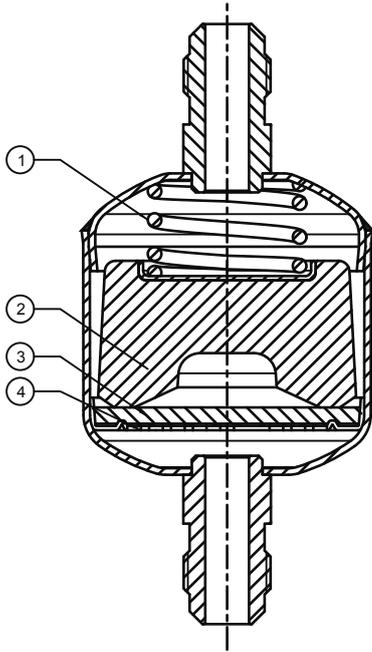
LIQUID LINE

TABLE 4- Correction factors - L₁ 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
10	R507							1.46	1.43	1.40	1.37	1.34
	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
20	R410A							1.24	1.22	1.21	1.19	1.18
	R507							1.30	1.27	1.24	1.22	1.19
	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
30	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
	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
40	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
	R134a	0.98	0.96	0.95	0.93	0.91	0.89	0.87	0.84	0.82	0.80	0.78
50	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
60	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
60	R507	0.77	0.75	0.73	0.71	0.68	0.66	0.64	0.61	0.59	0.56	0.54
	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
60	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 5: Dimensions and Weights

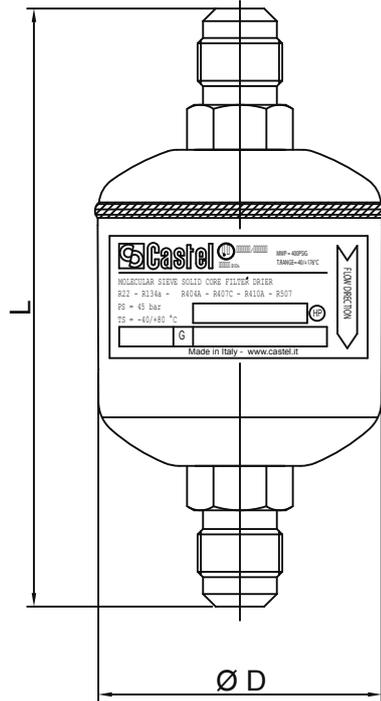
Catalogue Number		Connections			Dimensions [mm]		Weight [g]
		SAE Flare	ODS		Ø D	L	
			Ø [in.]	Ø [mm]			
4303/2	4203/2	1/4"	-	-	52	103	240
4303/2F	-	1/4"	-	-		92	230
4303/2S	4203/2S	-	1/4"	-		94	220
4303/3	4203/3	3/8"	-	-		111	235
4303/3S	-	-	3/8"	-		96	220
4305/2	4205/2	1/4"	-	-		119	275
4305/2F	-	1/4"	-	-		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"	-	-		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"	-	-	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	
4341/5	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	



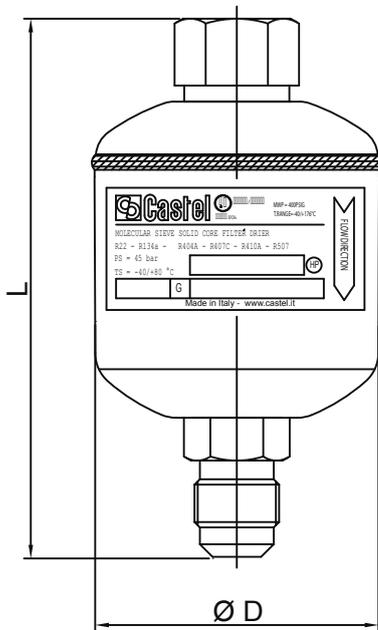
Flow direction

Solid core dehydrator

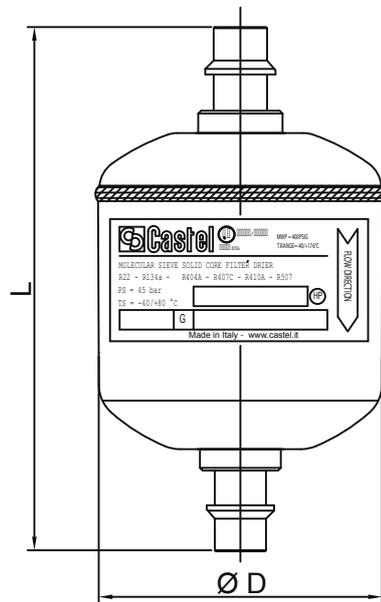
- 1 - Spring
- 2 - Bock
- 3 - Felt
- 4 - Stainless steel mesh



Male - male connections



Male - female connections



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.

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

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.

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

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

TABLE 3: Refrigerant Flow Capacity and Water 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]						Water Capacity at + 24 °C (2) [g H ₂ O]					Dehydratable Charge at + 24 °C [kg refrigerant]					Water Capacity at + 52 °C (2) [g H ₂ O]					Dehydratable Charge at + 52 °C [kg refrigerant]									
	R134a	R22	R404A	R407C	R410A	R404A R507	R134a	R22	R404A R507	R407C	R410A	R507	R134a	R22	R404A R507	R407C	R410A	R134a	R22	R404A R507	R407C	R410A	R134a	R22	R404A R507	R407C	R410A	R134a	R22	R404A R507	R407C	R410A	R134a	R22	R404A R507	R407C	R410A
	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	12.9	11.8	13.2	10.6	11.5	13.9	12.7	14.2	11.4	12.4	11.1	9.3	12.2	8.5	9.3	11.9	10.0	13.1	9.1	10.0				
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																									
4108/4	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	25.3	27.7	18.2	27.8	26.8	17.6	25.2	23.0	25.7	20.6	22.5	27.1	24.7	27.6	22.2	24.2	21.7	18.4	23.9	16.6	18.1	23.3	19.8	25.7	17.8	19.5					
4116/3S	24.3	26.6	17.5	26.7	25.8	16.9	31.6	34.6	22.8	34.7	33.5	21.9																									
4116/M10S	24.3	26.6	17.5	26.7	25.8	16.9	31.6	34.6	22.8	34.7	33.5	21.9																									
4116/4	27.9	30.5	20.1	30.6	29.6	19.3	36.3	39.7	26.1	39.8	38.4	25.1																									
4116/M12S	33.8	36.9	24.3	37.0	35.8	23.4	43.9	48.0	31.6	48.2	46.5	30.4																									
4116/4S	33.8	36.9	24.3	37.0	35.8	23.4	43.9	48.0	31.6	48.2	46.5	30.4																									
4116/5	37.1	40.6	26.8	40.8	39.3	25.7	48.3	52.8	34.8	53.0	51.1	33.5																									
4116/5S	44.6	48.7	32.1	48.9	47.2	30.9	57.9	63.3	41.7	63.6	61.3	40.1																									

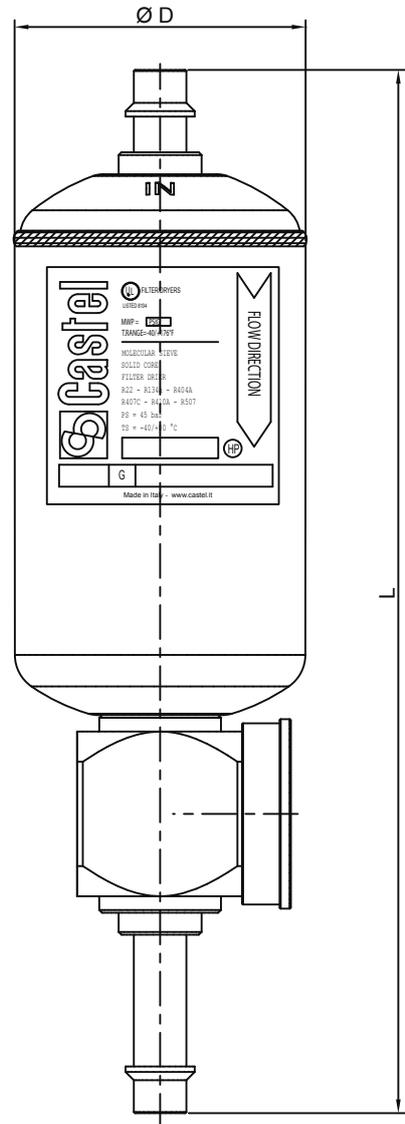
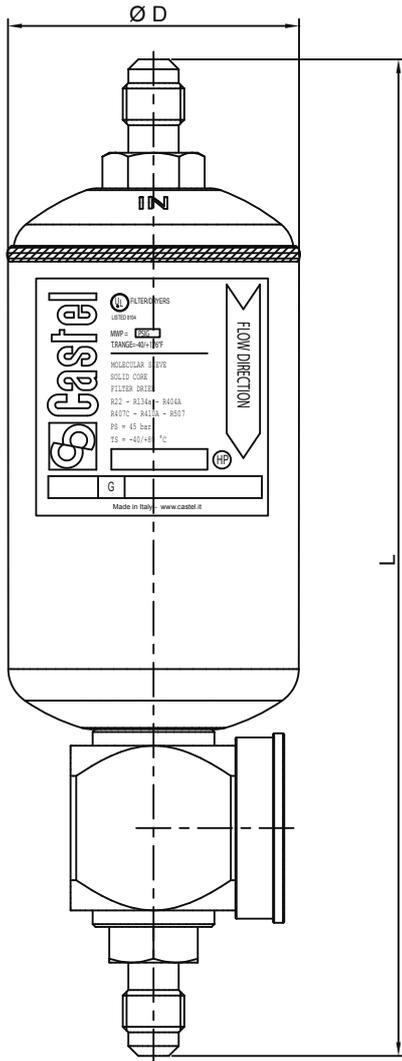
(1) : Maximum values of the refrigerant flow capacity at which the drier can be used when fluid dehydration is not the a major problem, provided that the original moisture is limited before the installation of the drier. The maximum refrigerant flow capacities are referred to a total pressure drop of 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)

(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	Connections			Dimensions [mm]		Weight [g]		
	SAE Flare	ODS		Ø D	L			
		Ø [in.]	Ø [mm]					
4108/2	1/4"	-	-	52	182	538		
4108/2S	-	1/4"	-		190	510		
4108/3	3/8"	-	-		191	553		
4108/3S	-	3/8"	-		193	515		
4108/4	1/2"	-	-		198	593		
4108/4S	-	1/2"	-		200	595		
4116/3	3/8"	-	-	73	202	795		
4116/3S	-	3/8"	-		204	780		
4116/M10S	-	-	10					
4116/4	1/2"	-	-		210	835		
4116/M12S	-	-	12		212	805		
4116/4S	-	1/2"	-					
4116/5	5/8"	-	-				219	895
4116/5S	-	5/8"	16				221	870



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

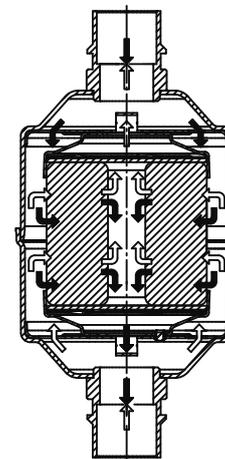
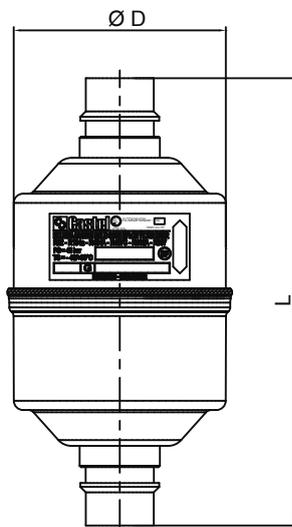
TABLE 2: Refrigerant Flow Capacity and Water Capacity of bi-flow filters																																	
Nr. Catalogo	Refrigerant Flow Capacity, pressure drop 0,07 bar (1) [kW]					Refrigerant Flow Capacity, pressure drop 0,14 bar (1) [kW]					Water Capacity at + 24 °C (2) [g H2O]				Dehydratable Charge at + 24 °C [kg refrigerant]				Water Capacity at + 52 °C (2) [g H2O]				Dehydratable Charge at + 52 °C [kg refrigerant]										
	R134a	R22	R404A	R407C	R410A	R404A	R507	R134a	R22	R404A	R507	R407C	R410A	R507	R134a	R22	R404A	R507	R407C	R410A	R134a	R22	R404A	R507	R407C	R410A	R134a	R22	R404A	R507	R407C	R410A	
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	14.0	12.8	14.3	11.4	12.4	15.1	13.8	15.4	12.3	13.3	12.0	10.2	13.3	9.2	10.0	12.9	11.0	14.3	9.9	10.0	
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	22.8	20.8	23.3	18.6	20.3	24.5	22.4	25.1	20.0	21.8	19.6	16.7	21.6	15.0	16.3	21.1	18.0	23.2	16.1	17.5	
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)

(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 3: 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 [cm ²]	Nominal Volume		Connections			PED Directive			
Copper connections		Steel connections				[cu.in]	[cm ³]	ODS		W (2)	TS [°C]		PS [bar]	Risk Category
Theaded cover	Blind cover	Theaded cover						Ø [in.]	Ø [mm]		Ø [mm]	min.		
4411/5A	4411/5B	4411/5AF	4490/A - 4490/B ; 4490/AA - 4490/AB ; 4490/BA - 4490/BB	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				
4411/11A	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						2.5/8"	-	76.1				
4412/7A	4412/7B	4412/7AF		2	840	96	1600	7/8"	22	26.9				
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		3	1260	144	2400	2.1/8"	54	60.3				
4413/7A	4413/7B	4413/7AF						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	4	1680	192	3200	1.5/8"	-	48.3					
4413/M42A	4413/M42B	4413/M42AF					-	42	48.3					
4414/11A	4414/11B	4414/11AF					1.3/8"	35	42.4					
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					2.1/8"	54	60.3					
		4423/21A					2.5/8"	-	76.1					
		4423/25A	-	-	88.9									
		4424/25A	-	-	88.9									
		4424/33A	-	-	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	R134a	R22	R404A	R407C	R410A	R507	R134a	R22	R404A	R407C	R410A	R507
Theaded cover	"Blind cover"	Theaded cover												
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
4411/9A	4411/9B	4411/9AF	198	216	142	217	209	137	346	378	249	380	366	240
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
4413/9A	4413/9B	4413/9AF	223	244	161	245	236	155	391	427	281	429	414	271
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
		4424/33A	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								
Catalogue Number	Batch characteristic	Filtering Surface [cm ²]	Nominal Volume		Dimensions [mm]			Weight [g]
			[cu.in]	[cm ³]	Ø D ₁	Ø D ₂	H	
4490/A (1)	High moisture adsorption (100% molecular sieve)	420	48	800	47	96	140	730
4490/B								
4490/AA (1)								
4490/AB	Moisture and acid adsorption (80% molecular sieve + 20% activated alumina)							
4491/A (2)	High moisture adsorption (100% molecular sieve)	630	100	1600	53	122	165	1560
4491/AA (2)								

(1): Supplied with gasket as spare part of cover in Castel drier 4411 / 4414

(2): Supplied with gasket as spare part of cover in Castel drier 4421 / 4424

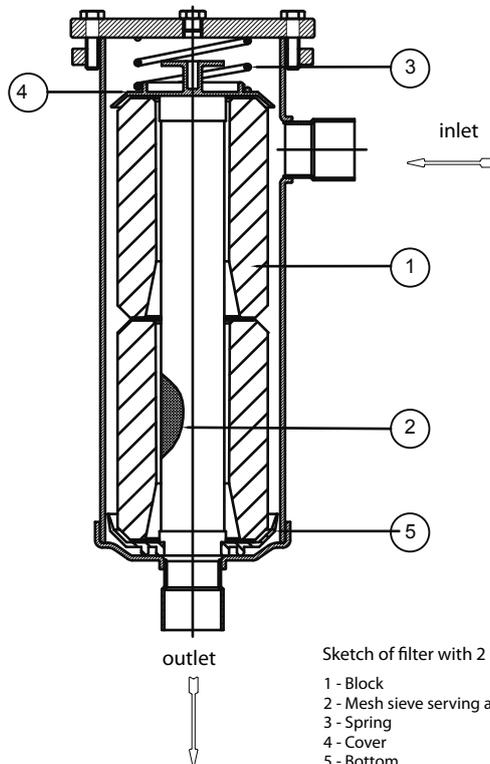
TABLE 4: Water Capacity, dehydratable charge and acid capacity of single block																						
Catalogue Number	Nominal Volume		Water Capacity at + 24 °C (1) [g H ₂ O]					Dehydratable Charge at + 24 °C [kg refrigerant]					Water Capacity at + 52 °C (1) [g H ₂ O]					Dehydratable Charge at + 52 °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	48	800	82	75	84	67	73	88	81	90	72	79	71	60	78	54	59	76	65
4490/B	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



Sketch of filter with 2 blocks

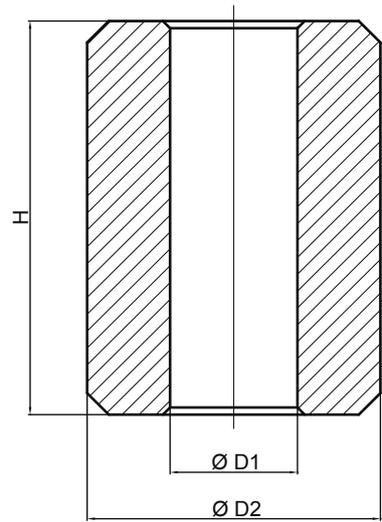
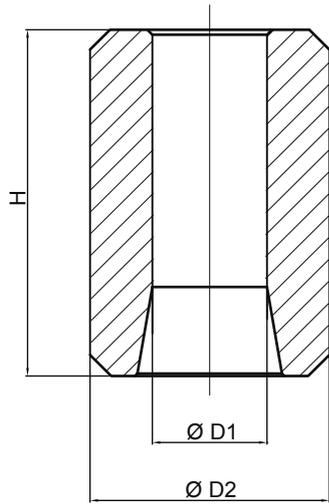
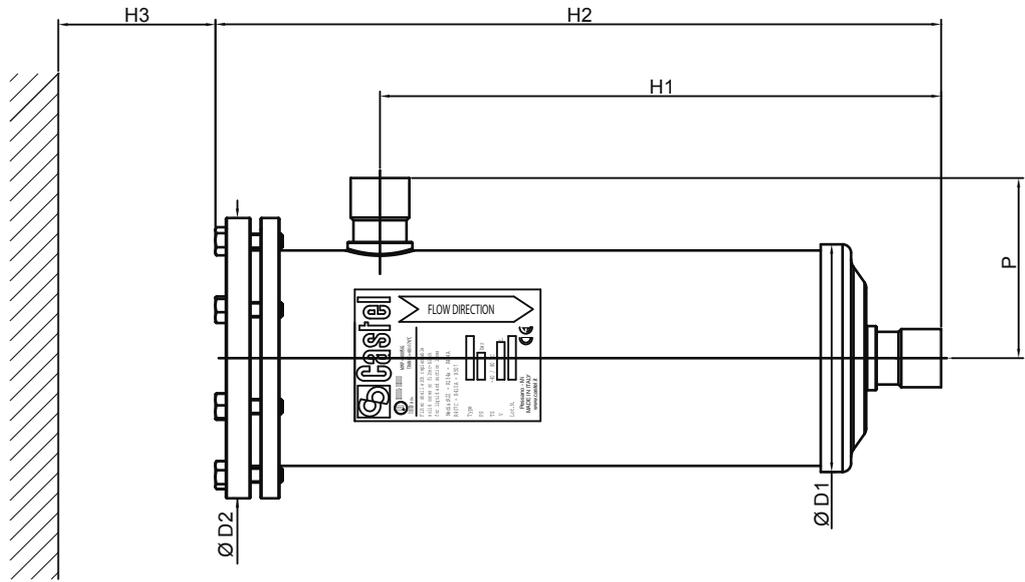
- 1 - Block
- 2 - Mesh sieve serving as block support
- 3 - Spring
- 4 - Cover
- 5 - Bottom

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
4411/9 (A-B)	1.1/8"	-			155	242		100	5464
4411/11 (A-B)	1.3/8"	35			167	254		112	5435
4411/13 (A-B)	1.5/8"	-			158	245		103	5410
4411/M42 (A-B)	-	42			182	269		127	5585
4411/17 (A-B)	2.1/8"	54			292	379		95	6030
4411/21 (A-B)	2.5/8"	-			297	384	100	6880	
4412/7 (A-B)	7/8"	22			309	396	112	7015	
4412/9 (A-B)	1.1/8"	-			300	387	103	6985	
4412/11 (A-B)	1.3/8"	35			433	520	95	7136	
4412/M42 (A-B)	-	42			438	525	100	8375	
4412/17 (A-B)	2.1/8"	54			450	537	112	8510	
4413/7 (A-B)	7/8"	22			580	667	100	8470	
4413/9 (A-B)	1.1/8"	-			592	679	112	8445	
4413/11 (A-B)	1.3/8"	35			583	670	100	9900	
4413/13 (A-B)	1.5/8"	-					112	9940	
4413/M42 (A-B)	-	42					103	10010	
4414/11 (A-B)	1.3/8"	35							
4414/13 (A-B)	1.5/8"	-							
4414/M42 (A-B)	-	42							
4414/17 (A-B)	2.1/8"	54							

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			155	242		100	5464
4411/11AF	1.3/8"	35	42.4			167	254		112	5435
4411/13AF	1.5/8"	-	48.3			158	245		103	5410
4411/M42AF	-	42	48.3			182	269		127	5585
4411/17AF	2.1/8"	54	60.3			152	239		95	6030
4411/21AF	2.5/8"	-	76.1			292	379	95	6880	
4412/7AF	7/8"	22	26.9			297	384	100	7015	
4412/9AF	1.1/8"	-	33.7			309	396	112	6985	
4412/11AF	1.3/8"	35	42.4			300	387	103	7136	
4412/M42AF	-	42	48.3			433	520	95	8375	
4412/17AF	2.1/8"	54	60.3			438	525	100	8510	
4413/7AF	7/8"	22	26.9			450	537	112	8470	
4413/9AF	1.1/8"	-	33.7			580	667	100	9900	
4413/11AF	1.3/8"	35	42.4			592	679	112	9940	
4413/13AF	1.5/8"	-	48.3			583	670	103	10010	
4413/M42AF	-	42	48.3							
4414/11AF	1.3/8"	35	42.4							
4414/13AF	1.5/8"	-	48.3							
4414/M42AF	-	42	48.3							
4414/17AF	2.1/8"	54	60.3							
4423/17A	2.1/8"	54	60.3	163	200	518	641	600	142	18000
4423/21A	2.5/8"	-	76.1			538	661		162	18200
4423/25A	-	-	88.9			705	829	760	172	18400
4424/25A	-	-	88.9			715	839		21600	
4424/33A	-	-	114.3						22000	



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				
Copper connections	Steel connections		Cat. Number	Filtering Surface [cm ²]	ODS		W (2)	TS [°C]		PS [bar]	Risk Category	
					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				2.5/8"	-	76.1					
	4421/25C				-	-	88.9					
	4421/33C	-	107	114.3								
	4421/34C	-	108	114.3					32 (1)			

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

TABLE 2: Refrigerant Flow Capacity of filtering block [kW]																																			
Catalogue Number		R134a				R22					R4040A					R407C					R410A					R507									
		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	+ 4,4	-6,7	-18	-29	-40	+ 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]																													
		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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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					
	4421/33C	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	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	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	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					

TABLE 3: Dimensions and weights of filters with copper connections

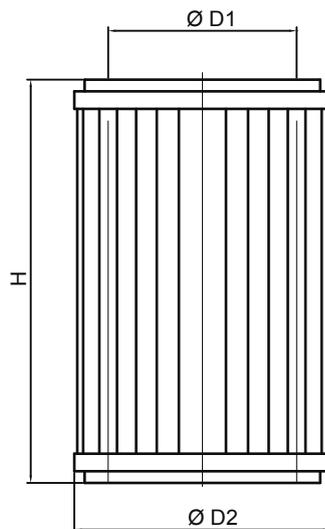
Catalogue Number	Connections		Dimensions [mm]					Weight [g]	
	ODS		Ø D ₁	Ø D ₂	H ₁	H ₂	H ₃		P
	Ø [in.]	Ø [mm]							
4411/7C	7/8"	22	121	149	150	237	185	95	5450
4411/9C	1.1/8"	-			155	242		100	5375
4411/11C	1.3/8"	35			167	254		112	5435
4411/13C	1.5/8"	-			158	245		103	5410
4411/M42C	-	42			182	269		127	5585
4411/17C	2.1/8"	54							6030
4411/21C	2.5/8"	-							

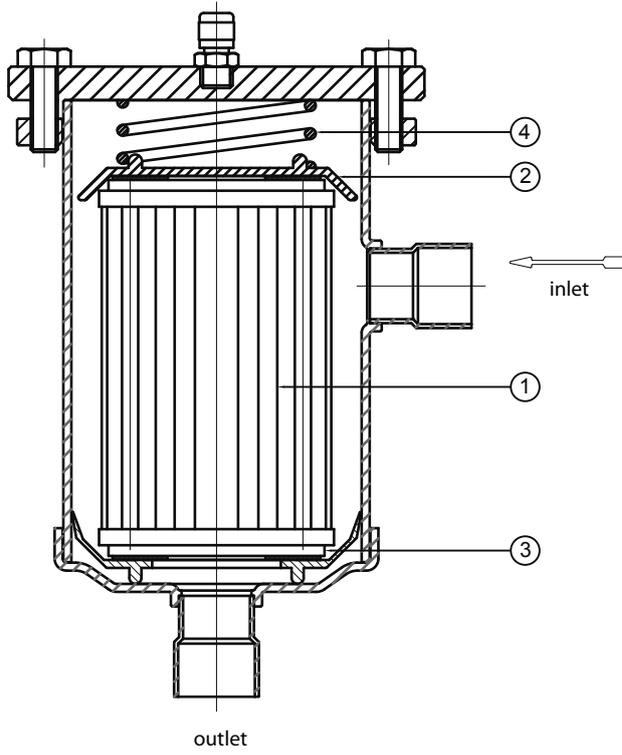
TABLE 4: Dimensions and weights of filters with steel connections

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]								
4411/7CF	7/8"	22	26.9	121	149	150	237	185	95	5450
4411/9CF	1.1/8"	-	33.7			155	242		100	5375
4411/11CF	1.3/8"	35	42.4			167	254		112	5435
4411/13CF	1.5/8"	-	48.3			158	245		103	5410
4411/M42CF	-	42	48.3			152	239		95	5585
4411/17CF	2.1/8"	54	60.3			172	259		103	6030
4411/21CF	2.5/8"	-	76.1			187	308		142	6100
4421/25CF	3.1/8"	80	88.9	163	200	205	328	200	162	12000
4421/21C	2.5/8"	-	76.1			215	338		172	12200
4421/25C	-	-	88.9			215	338		172	12500
4421/33C	-	107	114.3							12500
4421/34C	-	108	114.3					12500		

TABLE 5: General Characteristic, Dimensions and Weights of mechanical block

Catalogue Number	Filtering Surface		Dimensions [mm]			Weight [g]
	[sq.in]	[cm ²]	Ø D ₁	Ø D ₂	H	
4495/C	127	820	60	87	138	480
4496/C	287	1850	80	113	168	750



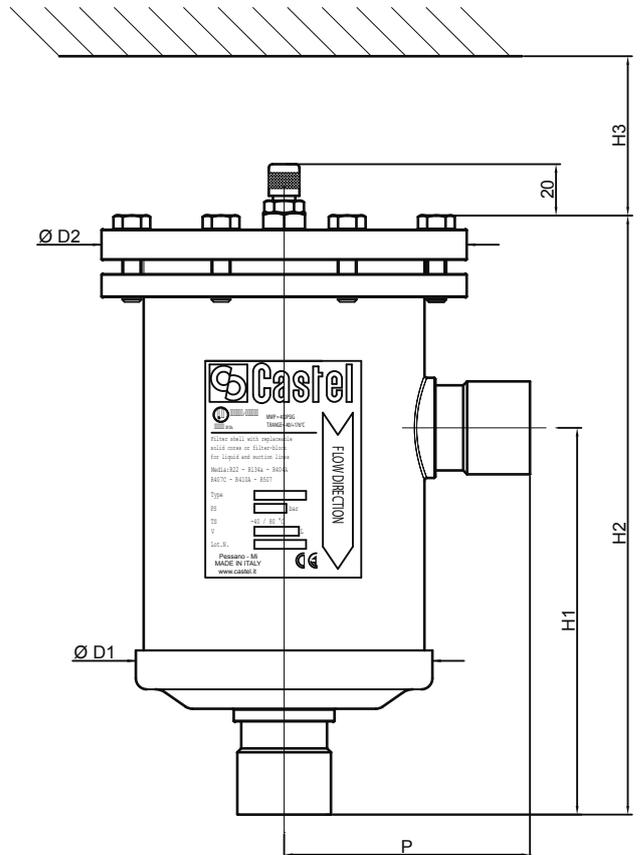


outlet



Sketch of filter with mechanical block

- 1 - Block
- 2 - Cover
- 3 - Bottom
- 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 [mm]	Ø [in.]							Ø [mm]
4510/3	58	36.6	0.17	3/8"	-	-	-	-	- 40	+80	45	Art. 3.3	
4510/4	142			1/2"	-	-	-	-					
4520/3	58			-	3/8"	-	1/2"	-					2.4
4520/M10				-	-	10	-	12					3.4
4520/M12				-	-	12	-	14					
4520/4				-	1/2"	-	5/8"	16					8.0
4520/5				-	5/8"	16	3/4"	-					
4520/M18	142			-	-	18	-	22					

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

