aerospace
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VS/VS-HP Parker Sporlan K-LINE

Replaceable Filters Shells and Cores

Parker

SPORLAN

ENGINEERING YOUR SUCCESS.

VS/VS-HP Parker Sporlan K-LINE

Replaceable Filters Shells and Cores

Parker Sporlan K-line VS replaceable filter shells ensure protection, cleaning and decontamination after burn out of refrigeration and air-conditioning systems from moisture, acids, and solid particles.

VS replaceable filter shell is dedicated to all systems requiring a high degree of protection against moisture, particles and acids when the diameters of pipes are too big and needs to remove the filter drier without brazing or welding.

VS replaceable filter shells are suitable for filtration and dehydration in both liquid line and suction line, they can be delivered with steel or copper connection in both imperial and metric sizes.

The range of **VS replaceable filter shells** is very large, from 1 to 4 cores and with connections from 5/8" to 3-1/8", what allows of an easy selection for many installations as racks (packs) or chillers.

VS replaceable filter shells can be associated with a large range of cores and filters to offer an optimum solution to protect refrigeration and air conditioning systems.

This means that with **VS replaceable filter shells and cores** it's easy to find a solution regarding all problematic such as moisture inside refrigerant, presence of acid, presence of wax and sludge.

Due to the aggressiveness and detergents capacity of POE oils, particles like carbon deposit or shavings of metals have an increased opportunity to move from their home and cause damage to other components and particularly to expansion valves and compressors.

VS replaceable filter shells and filters protect the compressors during start up and commissioning period and also during all the life of the system. The special design of filter column and particularly conical filter for suction line ensure a maximum efficiency of filtration with smaller pressure drop than competitor's products.

VS-HP replaceable filter shells are a perfect choice with high pressure supprimer refrigerants such as R410A with their 45 bar maximum working pressure.

VS/VS-HP Filter Shells Advantages

- steel and copper connections with possibility to braze copper tubes or to weld steel or stainless steel tubes
- high filtering efficiency by using an innovative conical or cylindrical filters
- large range of cores and filters
- cores holders in column to minimize distance between **VS filter shells** and wall for cores replacement
- **VS-HP filter shells** are suitable for use with R410A with a steel shell of higher pressure rating
- **All VS filter shells and cores** are available to use with CFC, HCFC an HFC refrigerants.

Features and Benefits

- **Filtration:** VS filter shells use a stainless steel cylindrical or conical filter in column screwed with nylon threats, giving filtration of the particles sizes higher than 20 microns.
- **Desiccant:** VS filter shells can receive 100% molecular sieve or blend with activated alumina cores regarding to the application request.
- **Compatibility:** All materials are fully compatible with all CFC, HCFC, HFC and associated lubricants. Other refrigerants/ lubricants, contact us at **www.parker.com/RACE**.
- **Capacity:** All solid cores are moulded with an optimum proportion of binding agent to ensure a maximum efficiency and a great mechanical substantiality.
- **Connections:**
  - Steel solder connections (such as VS 487) are available in metric (16 mm to 54 mm) and imperial sizes from 5/8" to 3-1/8"
  - Copper solder connections (such as VS 487S) are available in metric (16 mm to 54 mm) and imperial sizes from 5/8" to 2-5/8". A brazing alloy with low silver content can be used to braze the component in line.

Features

Max Working Pressure	35bar (VS) / 45bar (VS-HP)
Temperature Range	-40°c to 80°C

Leak Testing

100% tested with helium and pressurized nitrogen.

VS Paint

Polyester grey coating (RAL 7037) giving protection to 500 hours salt spray.

Filtration

20 microns.

Approvals

PED 97/23/EC – Category I

Conformity certificates are delivered in accordance to PED 97/23/EC

VS

VS Series	MWP	Temperature (°C)		Net Volume	PED
	bar	Mini	Maxi	Liter	Category
VS48___	35	-45	65	2.69	I
VS96___	35	-45	65	4.21	I
VS144___	35	-45	65	5.69	I
VS192___	28	-45	65	6.8	I
VS48___HP	46	-45	65	2.08	I
VS96___HP	46	-45	65	3.58	I

VS Drying Capacity (Kg of Refrigerant)*

Part Number(1)	R22		R134a		R404A / R507		R407C		R410A	
	24°C	52°C	24°C	52°C	24°C	52°C	24°C	52°C	24°C	52°C
VS32H	12	9	16	12	10.5	10	12	9	10.8	8.1
VS48H	27.5	21	36.5	27.5	41.5	23.5	27.5	21	24.75	18.9
VS48XH	52	40	70	52	79	45	53	40	46.8	36
VS48SC	12.5	11	16.5	12	19.5	16.5	12.5	11	11.25	9.9
VS100H	46.5	33	62	44	80	45	46.5	33	41.85	29.7

(*) Drying capacity (for 1 core) is the results of standard tests before and after drying from 1050ppm to 50ppm.

(1) VS32H: 32 Inch^3 core with blend molecular sieve and activated alumina. Suction line use with ASKLS conical filter.

VS48H: 48 Inch^3 core with blend molecular sieve and activated alumina. Suction or liquid line use with ASK cylindrical filter.

VS48XH: 48 Inch^3 core with 100% 3Å molecular sieve. Very high capacity of dehydration. Suction and liquid line use with ASK cylindrical filter.

VS48SC: 48 Inch^3 core with blend molecular sieve, activated alumina and activated charcoal. Suction and liquid line use with ASK cylindrical filter. Temporary use only after compressor burn out or for cleaning refrigerant and lubricant.

VS100H: 100 Inch^3 core with blend molecular sieve and activated alumina. Suction or liquid line use with 100 series filter shells.

VS48F/VS100F: 48 Inch3/100 Inch^3 felt filters for commissioning period. Temporary use only.

Technical Data
VS Liquid Line (Steel Connections in Inch)

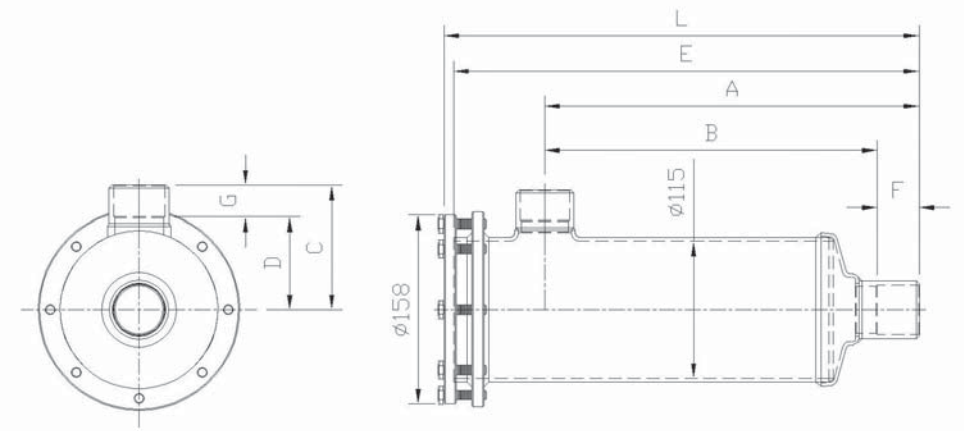
Part Number	Connect-ions	Cooling Capacity (kW)[1]					Dimensions (mm)							
	ODF	R134A	R404A R507	R407C	R410A	R22	A	B	C	D	E	F	G	L
VS485	5/8"	68	48	71	73	74	151.8	124.8	87.5	72.5	227.8	27.0	15.0	235.8
VS487	7/8"	119	84	124	127	129	162.8	132.8	95.5	73.5	238.8	30.0	22.0	246.8
VS489	1-1/8"	166	117	173	178	180	161.8	131.8	97.5	72.5	237.8	30.0	25.0	245.8
VS4811	1-3/8"	207	147	216	223	225	161.8	131.8	97.5	72.5	237.8	30.0	25.0	245.8
VS4813	1-5/8"	224	158	234	241	244	168.8	133.8	99.5	74.5	244.8	35.0	25.0	252.8
VS4817	2-1/8"	234	166	245	252	255	166.8	141.8	99.5	74.5	242.8	25.0	25.0	250.8
VS4821	2-5/8"	245	173	256	264	267	172.5	147.5	127.5	102.5	258.5	25.0	25.0	266.5
VS4825	3-1/8"	262	185	274	282	285	182.9	138.9	133.0	88.0	268.9	45.0	45.0	276.9
VS967	7/8"	126	89	132	135	137	306.8	276.8	95.5	73.5	382.8	30.0	22.0	390.8
VS969	1-1/8"	206	145	215	221	224	305.8	275.8	97.5	72.5	381.8	30.0	25.0	389.8
VS9611	1-3/8"	210	148	219	225	228	305.8	275.8	97.5	72.5	381.8	30.0	25.0	389.8
VS9613	1-5/8"	234	166	245	252	255	312.8	277.8	99.5	74.5	388.8	35.0	25.0	396.8
VS9617	2-1/8"	246	174	257	265	268	310.8	285.8	99.5	74.5	386.8	25.0	25.0	394.8
VS9621	2-5/8"	251	177	262	270	273	316.5	291.5	127.5	102.5	402.5	25.0	25.0	410.5
VS9625	3-1/8"	282	198	293	300	314	326.9	282.9	133.0	88.0	412.9	44.0	45.0	420.9
VS1449	1-1/8"	212	150	222	228	231	446.8	416.8	97.5	72.5	522.8	30.0	25.0	530.8
VS14411	1-3/8"	234	165	244	251	254	446.8	416.8	97.5	72.5	522.8	30.0	25.0	530.8
VS14413	1-5/8"	245	173	255	263	266	453.8	418.8	99.5	74.5	529.8	35.0	25.0	537.8
VS14417	2-1/8"	271	191	283	291	294	451.8	426.8	99.5	74.5	527.8	25.0	25.0	535.8
VS14421	2-5/8"	281	198	293	301	305	457.5	432.5	127.5	102.5	543.5	25.0	25.0	551.5
VS14425	3-1/8"	309	217	321	330	334	467.9	423.9	133.0	88.0	553.9	44.0	45.0	561.9
VS1929	1-1/8"	220	156	233	237	240	590.8	560.8	97.5	72.5	666.8	30.0	25.0	674.8
VS19211	1-3/8"	242	171	253	260	263	590.8	560.8	97.5	72.5	666.8	30.0	25.0	674.8
VS19213	1-5/8"	253	179	264	272	275	597.8	562.8	99.5	74.5	673.8	35.0	25.0	681.8
VS19217	2-1/8"	284	200	296	305	308	595.8	570.8	99.5	74.5	671.8	25.0	25.0	679.8
VS19221	2-5/8"	293	207	306	315	319	601.5	576.5	127.5	102.5	687.5	25.0	25.0	695.5

VS Liquid Line (Steel Connections in mm)

Part Number	Connect-ions	Cooling Capacity (kW)[1]					Dimensions (mm)							
	ODF	R134A	R404A R507	R407C	R410A	R22	A	B	C	D	E	F	G	L
VS485	16 mm	68	48	71	73	74	151.8	124.8	87.5	72.5	227.8	27.0	15.0	235.8
VS4828mm	28 mm	163	115	170	175	178	161.8	131.8	97.5	72.5	237.8	30.0	25.0	245.8
VS4811	35 mm	207	147	216	223	225	161.8	131.8	97.5	72.5	237.8	30.0	25.0	245.8
VS4842mm	42 mm	225	159	235	242	245	168.8	133.8	99.5	74.5	244.8	35.0	25.0	252.8
VS4817	54 mm	234	166	245	252	255	166.8	141.8	99.5	74.5	242.8	25.0	25.0	250.8
VS4864mm	64 mm	243	170	253	261	264	172.5	147.5	127.5	102.2	258.5	25.0	25.3	266.5
VS9628mm	28 mm	201	142	210	216	219	305.8	275.8	97.5	72.5	381.8	30.0	25.0	389.8
VS9611	35 mm	210	148	219	225	228	305.8	275.8	97.5	72.5	381.8	30.0	25.0	389.8
VS9642mm	42 mm	238	168	248	255	259	312.8	277.8	99.5	74.5	388.8	35.0	25.0	396.8
VS9617	54 mm	246	174	257	265	268	310.8	285.8	99.5	74.5	386.8	25.0	25.0	394.8
VS14428mm	28 mm	207	147	216	223	225	446.8	416.8	97.5	72.5	522.8	30.0	25.0	530.8
VS14411	35 mm	234	165	244	251	254	446.8	416.8	97.5	72.5	522.8	30.0	25.0	530.8
VS14442mm	42 mm	246	174	257	265	268	453.8	418.8	99.5	74.5	529.8	35.0	25.0	537.8
VS14417	54 mm	271	191	283	291	294	451.8	426.8	99.5	74.5	527.8	25.0	25.0	535.8
VS19211	35 mm	242	171	253	260	263	590.8	560.8	97.5	72.5	666.8	30.0	25.0	674.8
VS19242mm	42 mm	256	181	267	275	278	305.8	275.8	97.5	72.5	381.8	30.0	25.0	389.8
VS19217	54 mm	284	200	296	305	308	595.8	570.8	99.5	74.5	671.8	25.0	25.0	679.8

(1) Cooling capacities are published in accordance with ARI 710-86 standard Te = -15°C, Tc = 30°C, Δp = 0.07 bar.
Other working conditions see pages 12 and 13.

VS Shell with Steel Connectors

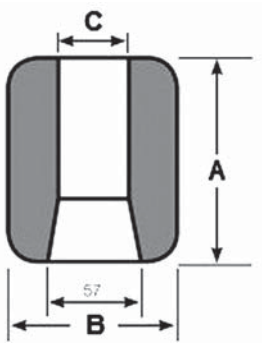


Cores used with VS Shell in Liquid Line

Part Number	Dimensions (mm)			Filtration Surface
	Height (A)	Ø External (B)	Ø Internal (C)	(cm^2)
VS48H	140	95	45	420
VS48XH	140	95	45	420
VS48SC	140	95	45	420

Cores Holders for VS Shell in Liquid and in Suction Lines

VS Series	Number of Core(s)	Core Holders	
		Cylindrical	Conical
VS48xx	1	ASK1	ASKLS
VS96xx	2	ASK2	ASKLS2
VS144xx	3	ASK3	
VS192xx	4	ASK4	



Technical Data
VS Liquid Line (Copper Connections in Inch)

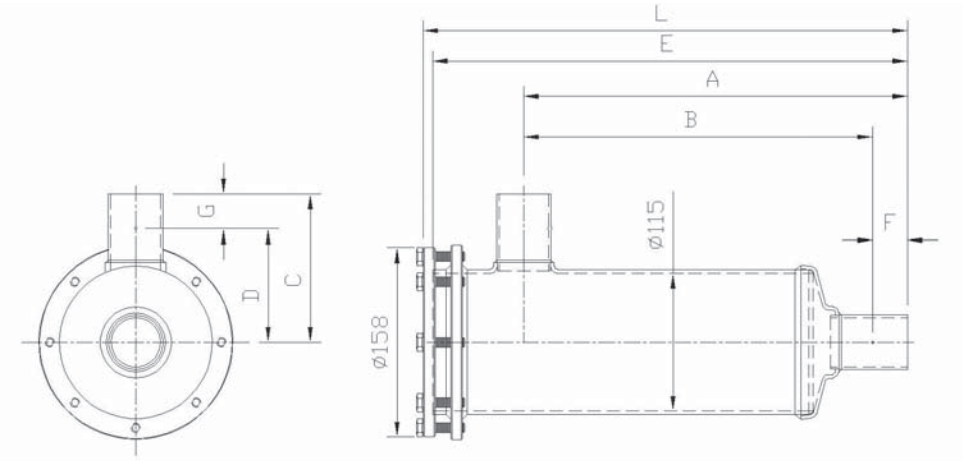
Part Number	Connect-ions	Cooling Capacity (kW)(1)					Dimensions (mm)							
	ODF	R134A	R404A R507	R407C	R410A	R22	A	B	C	D	E	F	G	L
VS485S	5/8"	68	48	71	73	74	167.8	157.8	113.5	103.5	243.8	10.0	10.0	251.8
VS487S	7/8"	119	84	124	127	129	167.8	152.8	113.5	98.5	243.8	15.0	15.0	251.8
VS489S	1-1/8"	166	117	173	178	180	170.8	152.8	116.5	98.5	246.8	18.0	18.0	254.8
VS4811S	1-3/8"	207	147	216	223	225	173.8	150.8	119.5	96.5	249.8	23.0	23.0	257.8
VS4813S	1-5/8"	224	158	234	241	244	175.8	148.8	123.5	96.5	251.8	27.0	27.0	259.8
VS4817S	2-1/8"	234	166	245	252	255	170.3	138.3	127.5	95.5	246.3	32.0	32.0	254.3
VS4821S	2-5/8"	245	173	256	264	267	161.8	129.8	131.5	99.5	247.8	32.0	32.0	255.8
VS967S	7/8"	126	89	132	135	137	311.8	296.8	113.5	98.5	387.8	15.0	15.0	395.8
VS969S	1-1/8"	206	145	215	221	224	314.8	296.8	116.5	98.5	390.8	18.0	18.0	398.8
VS9611S	1-3/8"	210	148	219	225	228	317.8	294.8	119.5	96.5	393.8	23.0	23.0	401.8
VS9613S	1-5/8"	234	166	245	252	255	319.8	292.8	123.5	96.5	395.8	27.0	27.0	403.8
VS9617S	2-1/8"	246	174	257	265	268	314.3	282.3	127.5	95.5	390.3	32.0	32.0	398.3
VS1449S	1-1/8"	212	150	222	228	231	455.8	437.8	116.5	98.5	531.8	18.0	18.0	539.8
VS14411S	1-3/8"	234	165	244	251	254	458.8	435.8	119.5	96.5	534.8	23.0	23.0	542.8
VS14413S	1-5/8"	245	173	255	263	266	460.8	433.8	123.5	96.5	536.8	27.0	27.0	544.8
VS14417S	2-1/8"	271	191	283	291	294	455.3	423.3	127.5	95.5	531.3	32.0	32.0	539.3
VS1929	1-1/8"	220	156	233	237	240	599.8	581.8	116.5	98.5	675.8	18.0	18.0	683.8
VS19211S	1-3/8"	242	171	253	260	263	602.8	579.8	119.5	96.5	678.8	23.0	23.0	686.8
VS19213S	1-5/8"	253	179	264	272	275	604.8	577.8	123.5	96.5	680.8	27.0	27.0	688.8
VS19217S	2-1/8"	284	200	296	305	308	599.3	567.3	127.5	95.5	675.3	32.0	32.0	683.3
VS19221S	2-5/8"	293	207	306	315	319	590.8	558.8	131.5	99.5	676.8	32.0	32.0	684.8

VS Liquid Line (Copper Connections in mm)

Part Number	Connect-ions	Cooling Capacity (kW)(1)					Dimensions (mm)							
	ODF	R134A	R404A R507	R407C	R410A	R22	A	B	C	D	E	F	G	L
VS485S	16 mm	68	48	71	73	74	167.8	157.8	113.5	103.5	243.8	10.0	10.0	251.8
VS4828mmS	28 mm	163	115	170	175	178	170.8	152.8	116.5	98.5	246.8	18.0	18.0	254.8
VS4811S	35 mm	207	147	216	223	225	173.8	150.8	119.5	96.5	249.8	23.0	23.0	257.8
VS4842mmS	42 mm	225	159	235	242	245	175.8	148.8	123.5	96.5	251.8	27.0	27.0	259.8
VS4817S	54 mm	234	166	245	252	255	170.3	138.3	127.5	95.5	246.3	32.0	32.0	254.3
VS9628mmS	28 mm	201	142	210	216	219	314.8	296.8	116.5	98.5	390.8	18.0	18.0	398.8
VS9611S	35 mm	210	148	219	225	228	317.8	294.8	119.5	96.5	393.8	23.0	23.0	401.8
VS9642mmS	42 mm	238	168	248	255	259	319.8	292.8	123.5	96.5	395.8	27.0	27.0	403.8
VS9617S	54 mm	246	174	257	265	268	314.3	282.3	127.5	95.5	390.3	32.0	32.0	398.3
VS14428mmS	28 mm	207	147	216	223	225	455.8	437.8	116.5	98.5	531.8	18.0	18.0	539.8
VS14411S	35 mm	234	165	244	251	254	458.8	435.8	119.5	96.5	534.8	23.0	23.0	542.8
VS14442mmS	42 mm	246	174	257	265	268	460.8	433.8	123.5	96.5	536.8	27.0	27.0	544.8
VS14417S	54 mm	271	191	283	291	294	455.3	423.3	127.5	95.5	531.3	32.0	32.0	539.3
VS19211S	35 mm	242	171	253	260	263	602.8	579.8	119.5	96.5	678.8	23.0	23.0	686.8
VS19242mmS	42 mm	256	181	267	275	278	604.8	577.8	123.5	96.5	680.8	27.0	27.0	688.8
VS19217S	54 mm	284	200	296	305	308	599.3	567.3	127.5	95.5	675.3	32.0	32.0	683.3

(1) Cooling capacities are published in accordance with ARI 710-86 standard Te = -15°C, Tc = 30°C, Δp = 0.07 bar.
Other working conditions see pages 12 and 13.

VS Shell with Copper Connectors

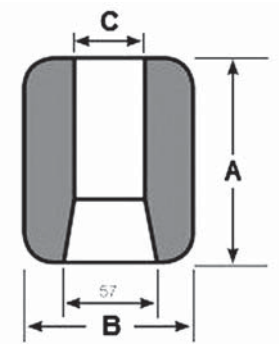


Cores used with VS Shell in Liquid Line

Part Number	Dimensions (mm)			Filtration Surface
	Height (A)	Ø External (B)	Ø Internal (C)	(cm^2)
VS48H	140	95	45	420
VS48XH	140	95	45	420
VS48SC	140	95	45	420

Cores Holders for VS Shell in Liquid and in Suction Lines

VS Series	Number of Core(s)	Core Holders	
		Cylindrical	Conical
VS48xx	1	ASK1	ASKLS
VS96xx	2	ASK2	ASKLS2
VS144xx	3	ASK3	
VS192xx	4	ASK4	



Technical Data

VS Suction Line Flow (Steel Connections and Conical Filter)

Part Number	Connect-ions	Cooling Capacity (kW)[2]					Dimensions (mm)							
	ODF	R134A	R404A R507	R407C	R410A	R22	A	B	C	D	E	F	G	L
VS489CF	1-1/8"	63	45	66	68	69	161.8	131.8	97.5	72.5	237.8	30.0	25.0	245.8
VS4811CF	1-3/8"	75	53	79	81	82	161.8	131.8	97.5	72.5	237.8	30.0	25.0	245.8
VS4813CF	1-5/8"	88	62	91	94	95	168.8	133.8	99.5	74.5	244.8	35.0	25.0	252.8
VS4817CF	2-1/8"	106	75	110	113	115	166.8	141.8	99.5	74.5	242.8	25.0	25.0	250.8
VS4821CF	2-5/8"	120	85	126	129	131	172.5	147.5	127.5	102.5	258.5	25.0	25.0	266.5
VS4825CF	3-1/8"	132	93	138	141	143	182.9	138.9	133.0	88.0	268.9	45.0	45.0	276.9
VS9613CF	1-5/8"	103	73	108	111	112	312.8	277.8	99.5	74.5	388.8	35.0	25.0	396.8
VS9617CF	2-1/8"	126	89	131	135	137	310.8	285.8	99.5	74.5	386.8	25.0	25.0	394.8
VS9621CF	2-5/8"	164	116	171	176	178	316.5	291.5	127.5	102.5	402.5	25.0	25.0	410.5
VS9625CF	3-1/8"	202	142	210	216	219	326.9	282.9	133.0	88.0	412.9	44.0	45.0	420.9
VS4811CF	35 mm	75	53	79	81	82	161.8	131.8	97.5	72.5	237.8	30.0	25.0	245.8
VS4842mmCF	42 mm	89	63	92	95	96	168.8	133.8	99.5	74.5	244.8	35.0	25.0	252.8
VS4817CF	54 mm	106	75	110	113	115	166.8	141.8	99.5	74.5	242.8	25.0	25.0	250.8
VS9642mmCF	42 mm	105	74	109	112	113	312.8	277.8	99.5	74.5	388.8	35.0	25.0	396.8
VS9617CF	54 mm	126	89	131	135	137	310.8	285.8	99.5	74.5	386.8	25.0	25.0	394.8

VS Suction Line Flow (Copper Connections and Conical Filter)

Part Number	Connect-ions	Cooling Capacity (kW)[2]					Dimensions (mm)							
	ODF	R134A	R404A R507	R407C	R410A	R22	A	B	C	D	E	F	G	L
VS489SCF	1-1/8"	63	45	66	68	69	170.8	152.8	116.5	98.5	246.8	18.0	18.0	254.8
VS4811SCF	1-3/8"	75	53	79	81	82	173.8	150.8	119.5	96.5	249.8	23.0	23.0	257.8
VS4813SCF	1-5/8"	88	62	91	94	95	175.8	148.8	123.5	96.5	251.8	27.0	27.0	259.8
VS4817SCF	2-1/8"	106	75	110	113	115	170.3	138.3	127.5	95.5	246.3	32.0	32.0	254.3
VS4821SCF	2-5/8"	120	85	126	129	131	161.8	129.8	131.5	99.5	247.8	32.0	32.0	255.8
VS9613SCF	1-5/8"	103	73	108	111	112	319.8	292.8	123.5	96.5	395.8	27.0	27.0	403.8
VS9617SCF	2-1/8"	126	89	131	135	137	314.3	282.3	127.5	95.5	390.3	32.0	32.0	398.3
VS4811SCF	35 mm	75	53	79	81	82	173.8	150.8	119.5	96.5	249.8	23.0	23.0	257.8
VS4842mmSCF	42 mm	89	63	92	95	96	175.8	148.8	123.5	96.5	251.8	27.0	27.0	259.8
VS4817SCF	54 mm	106	75	110	113	115	170.3	138.3	127.5	95.5	246.3	32.0	32.0	254.3
VS9642mmSCF	42 mm	105	74	109	112	113	319.8	292.8	123.5	96.5	395.8	27.0	27.0	403.8
VS9617SCF	54 mm	126	89	131	135	137	314.3	282.3	127.5	95.5	390.3	32.0	32.0	398.3

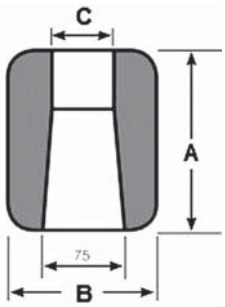
(2) Cooling capacities are published in accordance with ARI 730-2001 standard Te = -4.4°C, Tc = 32°C, Δp = 0.07 bar.
Other working conditions see pages 12 and 13.

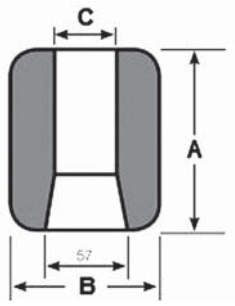
VS Shell with Steel and Copper Connections

Cores used with VS Shell in Suction Line

Part Number	Dimensions (mm)			Filtration Surface
	Height (A)	Ø External (B)	Ø Internal (C)	(cm^2)
VS32H	140	95	75	420
VS48H	140	95	45	420
VS48XH	140	95	45	420
VS48F	140	95	75	420
VS48SC	140	95	45	420

Conical filter
for suction use





Cooling Capacity Correction Factors

Condensing Temperature Tc (°C)	Evaporating Temperature Te (°C)										
	20	15	10	5	0	-5	-10	-15	-20	-25	-30
	R134a										
60	1.25	1.28	1.31	1.35	1.38	1.42	1.46	1.50	1.55	1.60	1.65
55	1.17	1.19	1.22	1.25	1.28	1.31	1.35	1.38	1.42	1.46	1.51
50	1.09	1.12	1.14	1.17	1.19	1.22	1.25	1.28	1.32	1.35	1.39
45	1.03	1.05	1.08	1.10	1.12	1.14	1.17	1.20	1.23	1.26	1.29
40	0.98	1.99	1.01	1.03	1.05	1.07	1.10	1.12	1.15	1.18	1.20
35	0.93	0.94	0.96	0.98	1.00	1.02	1.04	1.06	1.08	1.12	1.14
30	0.88	0.90	0.91	0.93	0.94	0.96	0.98	1.00	1.02	1.04	1.07
25	0.85	0.86	0.87	0.89	0.90	0.92	0.94	0.95	0.97	0.99	1.01
20		0.82	0.83	0.85	0.86	0.88	0.89	0.91	0.93	0.94	0.96
15			0.80	0.81	0.82	0.84	0.85	0.86	0.88	0.90	0.91
10				0.77	0.79	0.80	0.81	0.83	0.84	0.86	0.87
5					0.76	0.77	0.78	0.80	0.81	0.82	0.84
0						0.74	0.76	0.77	0.78	0.79	0.81
-5							0.73	0.74	0.75	0.76	0.77
-10								0.71	0.72	0.73	0.74

Condensing Temperature Tc (°C)	Evaporating Temperature Te (°C)												
	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40
	R404A / R507												
60	1.73	1.78	1.84	1.90	2.00	2.10	2.20	2.30	2.40	2.55	2.70	2.90	3.15
55	1.46	1.49	1.53	1.58	1.63	1.69	1.76	1.84	1.92	2.03	2.12	2.22	2.39
50	1.27	1.30	1.33	1.36	1.41	1.45	1.50	1.56	1.61	1.68	1.76	1.84	1.93
45	1.12	1.15	1.17	1.20	1.24	1.28	1.32	1.36	**1.41**	1.45	1.51	1.57	1.64
40	1.02	1.04	1.06	1.08	1.11	1.14	1.17	1.21	1.25	1.29	1.33	1.38	1.43
35	0.94	0.95	0.97	0.99	1.01	1.04	1.06	1.09	1.12	1.16	1.19	1.24	1.28
30	0.86	0.87	0.89	0.91	0.93	0.95	0.97	1.00	1.02	1.05	1.08	1.11	1.15
25	0.80	0.81	0.83	0.84	0.86	0.88	0.90	0.92	0.94	0.97	1.00	1.02	1.05
20		0.78	0.79	0.81	0.82	0.84	0.85	0.87	0.89	0.91	0.94	0.96	0.98
15			0.74	0.76	0.77	0.79	0.80	0.82	0.84	0.86	0.87	0.90	0.92
10				0.72	0.74	0.75	0.76	0.77	0.79	0.81	0.82	0.84	0.86
5					0.70	0.71	0.72	0.74	0.75	0.77	0.78	0.80	0.82
0						0.68	0.69	0.70	0.72	0.73	0.74	0.76	0.77
-5							0.66	0.67	0.68	0.69	0.70	0.72	0.73
-10								0.64	0.65	0.66	0.67	0.68	0.70
-15									0.59	0.60	0.61	0.62	0.64
-20										0.57	0.58	0.59	0.60

Selection example:

System capacity Q_{e1} = 100kW
With 200kg of R404A
Condensing temperature = 45°C
Evaporating temperature = -20°C

Correction factor = 1.41
Capacity calculated according to ARI-710-86
Q_e = 10 × 1.41 = 141kW
Select the capacity from table page 4
(Steel connection), page 6 (Copper connection)
Selection:
VS 19213/VS 19242mm + 4 VS 48XH
VS 19213S/VS 19242mmS + 4 VS 48XH
+ 4 VS 48XH

Cooling Capacity Correction Factors

Condensing Temperature Tc (°C)	Evaporating Temperature Te (°C)										
	20	15	10	5	0	-5	-10	-15	-20	-25	-30
	R407C										
60	1.34	1.36	1.39	1.42	1.45	1.49	1.53	1.56	1.61	1.66	1.71
55	1.23	1.25	1.27	1.30	1.33	1.36	1.38	1.42	1.46	1.50	1.54
50	1.14	1.16	1.18	1.20	1.23	1.25	1.27	1.31	1.34	1.37	1.41
45	1.07	1.08	1.10	1.12	1.14	1.16	1.19	1.21	1.23	1.27	1.30
40	1.00	1.01	1.03	1.05	1.07	1.09	1.11	1.13	1.15	1.18	1.20
35	0.95	0.96	0.97	0.99	1.00	1.02	1.04	1.06	1.08	1.10	1.13
30	0.90	0.91	0.92	0.93	0.95	0.97	0.98	1.00	1.02	1.04	1.06
25	0.86	0.87	0.88	0.89	0.90	0.92	0.93	0.95	0.97	0.98	1.00
20		0.83	0.84	0.85	0.86	0.88	0.89	0.90	0.92	0.93	0.95
15			0.81	0.82	0.83	0.84	0.85	0.87	0.88	0.89	0.91
10				0.78	0.79	0.80	0.81	0.83	0.84	0.85	0.87
5					0.76	0.77	0.78	0.79	0.80	0.81	0.83
0						0.74	0.75	0.76	0.77	0.78	0.80
-5							0.73	0.74	0.75	0.76	0.77
-10								0.71	0.72	0.73	0.74

Condensing Temperature Tc (°C)	Evaporating Temperature Te (°C)												
	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40
	R410A												
60	1.55	1.56	1.58	1.60	1.62	1.65	1.68	1.71	1.75	1.78	1.83	1.87	1.92
55	1.37	1.38	1.39	1.41	1.43	1.45	1.47	1.50	1.52	1.55	1.58	1.62	1.66
50	1.24	1.25	1.26	1.28	1.29	1.31	1.32	1.34	1.37	1.39	1.41	1.44	1.47
45	1.14	1.15	1.16	1.17	1.18	1.20	1.22	1.23	1.25	1.27	1.29	1.31	1.34
40	1.06	1.07	1.08	1.09	1.10	1.11	1.13	1.14	1.16	1.17	1.19	1.21	1.23
35	0.99	1.00	1.01	1.02	1.03	1.04	1.05	1.06	1.08	1.09	1.11	1.12	1.15
30	0.94	0.94	0.95	0.96	0.97	0.98	0.99	1.00	1.01	1.03	1.04	1.06	1.07
25	0.89	0.90	0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.00	1.01
20		0.85	0.86	0.87	0.87	0.88	0.89	0.90	0.91	0.92	0.93	0.95	0.96
15			0.82	0.83	0.84	0.84	0.85	0.86	0.87	0.88	0.89	0.90	0.92
10				0.79	0.80	0.80	0.81	0.82	0.83	0.84	0.85	0.86	0.87
5					0.77	0.77	0.78	0.79	0.79	0.80	0.81	0.82	0.83
0						0.75	0.75	0.76	0.77	0.78	0.78	0.79	0.80
-5							0.73	0.73	0.74	0.75	0.75	0.76	0.77
-10								0.70	0.70	0.71	0.72	0.73	0.74
	R22												
60	1.24	1.25	1.26	1.28	1.30	1.32	1.34	1.36	1.38	1.40	1.42	1.43	1.49
55	1.17	1.18	1.20	1.21	1.22	1.24	1.26	1.28	1.30	1.32	1.35	1.37	1.40
50	1.11	1.12	1.14	1.15	1.16	1.18	1.20	1.21	1.23	1.25	1.27	1.30	1.32
45	1.06	1.07	1.08	1.09	1.10	1.12	1.14	1.16	1.18	1.20	1.21	1.23	1.24
40	1.01	1.02	1.03	1.04	1.05	1.07	1.08	1.09	1.11	1.13	1.14	1.16	1.18
35	0.97	0.98	0.99	1.00	1.01	1.02	1.03	1.04	1.05	1.07	1.08	1.10	1.12
30	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.00	1.01	1.03	1.04	1.06	1.07
25	0.89	0.90	0.91	0.92	0.93	0.94	0.95	0.96	0.98	0.99	1.00	1.01	1.02
20		0.87	0.88	0.89	0.90	0.91	0.92	0.93	0.94	0.95	0.97	0.98	0.99
15			0.84	0.85	0.86	0.87	0.88	0.89	0.90	0.91	0.92	0.93	0.95
10				0.82	0.83	0.84	0.85	0.86	0.87	0.88	0.89	0.90	0.91
5					0.80	0.81	0.82	0.83	0.84	0.85	0.86	0.87	0.88
0						0.78	0.79	0.80	0.81	0.82	0.82	0.84	0.85
-5							0.76	0.77	0.78	0.79	0.80	0.81	0.80
-10								0.74	0.75	0.76	0.77	0.78	0.79
-15									0.72	0.73	0.74	0.75	0.76
-20										0.68	0.69	0.72	0.73

Notes

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Power generation
Regional transports
Unmanned aerial vehicles

Key Products

Control systems & actuation products
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Fluid conveyance systems & components
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Fuel systems & components
Fuel tank inerting systems
Hydraulic systems & components
Thermal management
Wheels & brakes

Climate Control

Key Markets

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Air conditioning
Construction Machinery
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Process
Refrigeration
Transportation

Key Products

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Electronic controllers
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Heat exchangers
Hose & fittings
Pressure regulating valves
Refrigerant distributors
Safety relief valves
Smart pumps
Solenoid valves
Thermostatic expansion valves

Electromechanical

Key Markets

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Factory automation
Life science & medical
Machine tools
Packaging machinery
Paper machinery
Plastics machinery & converting
Primary metals
Semiconductor & electronics
Textile
Wire & cable

Key Products

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Electric actuators, gantry robots & slides
Electrohydrostatic actuation systems
Electromechanical actuation systems
Human machine interface
Linear motors
Stepper motors, servo motors, drives & controls
Structural extrusions

Filtration

Key Markets

Aerospace
Food & beverage
Industrial plant & equipment
Life sciences
Marine
Mobile equipment
Oil & gas
Power generation & renewable energy
Process
Transportation
Water Purification

Key Products

Analytical gas generators
Compressed air filters & dryers
Engine air, coolant, fuel & oil filtration systems
Fluid condition monitoring systems
Hydraulic & lubrication filters
Hydrogen, nitrogen & zero air generators
Instrumentation filters
Membrane & fiber filters
Microfiltration
Sterile air filtration
Water desalination & purification filters & system

Fluid & Gas Handling

Key Markets

Aerial lift
Agriculture
Bulk chemical handling
Construction machinery
Food & beverage
Fuel & gas delivery
Industrial machinery
Life sciences
Marine
Mining
Mobile
Oil & gas
Renewable energy
Transportation

Key Products

Check valves
Connectors for low pressure fluid conveyance
Deep sea umbilicals
Diagnostic equipment
Hose couplings
Industrial hose
Mooring systems & power cables
PTFE hose & tubing
Quick couplings
Rubber & thermoplastic hose
Tube fittings & adapters
Tubing & plastic fittings

Hydraulics

Key Markets

Aerial lift
Agriculture
Alternative energy
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Forestry
Industrial machinery
Machine tools
Marine
Material handling
Mining
Oil & gas
Power generation
Refuse vehicles
Renewable energy
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Turf equipment

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Hydraulic cylinders
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Integrated hydraulic circuits
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Power units
Rotary actuators
Sensors

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Key Products

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Pneumatic actuators & grippers
Pneumatic valves & controls
Quick disconnects
Rotary actuators
Rubber & thermoplastic hose & couplings
Structural extrusions
Thermoplastic tubing & fittings
Vacuum generators, cups & sensors

Process Control

Key Markets

Alternative fuels
Biopharmaceuticals
Chemical & refining
Food & beverage
Marine & shipbuilding
Medical & dental
Microelectronics
Nuclear Power
Offshore oil exploration
Oil & gas
Pharmaceuticals
Power generation
Pulp & paper
Steel
Water/wastewater

Key Products

Analytical Instruments
Analytical sample conditioning products & systems
Chemical injection fittings & valves
Fluoropolymer chemical delivery fittings, valves & pumps
High purity gas delivery fittings, valves, regulators & digital flow controllers
Industrial mass flow meters/ controllers
Permanent no-weld tube fittings
Precision industrial regulators & flow controllers
Process control double block & bleeds
Process control fittings, valves, regulators & manifold valves

Sealing & Shielding

Key Markets

Aerospace
Chemical processing
Consumer
Fluid power
General industrial
Information technology
Life sciences
Microelectronics
Military
Oil & gas
Power generation
Renewable energy
Telecommunications
Transportation

Key Products

Dynamic seals
Elastomeric o-rings
Electro-medical instrument design & assembly
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Extruded & precision-cut, fabricated elastomeric seals
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