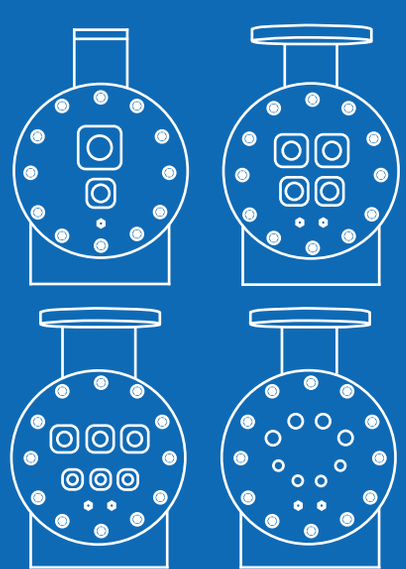
RF SERIES
EVAPORATOR



REFKAR
HEAT TRANSFER SOLUTIONS

Turkey
Discover
the potential

ABOUT US

Refkar is one of the preferred institutions in the Turkish market for heat transfer products related to freon systems. With its 15 years of experience, it aims to gain strength and become a global brand in the international market.

OUR FACTORY

It performs production in international standards with its 3.500 m^2 closed factory area established on 6.500 m^2 outdoor area, advanced technology production systems, and trained operator staff.

COMPETENT STAFF

Since its establishment, Refkar has worked with a highly skilled team. It has trained and developed its employees within the framework of their competencies.

FAIRS AND TRAVELS

Refkar has conducted business trips, partner visits, and participated in fairs to more than 50 countries. As a result, it has succeeded in becoming a recognized brand in the international market.

PERFORMANCE

RF series evaporators are standard-manufactured for R410A and designed for easy use with R407C and R454B fluid coolants. Areas of use include comfort and industrial chillers under high-evaporation temperatures (+2/+10).

RF range evaporators offer cooling gas circuit options based on the number of compressors:

- RFS for 1 independent compressor circuit,
- RFD for 2 independent compressor circuits,
- RFT for 3 independent compressor circuits,
- RFQ for 4 independent compressor circuits.

"Refkar SELECTOR Software" can be used to select evaporators for other operating temperatures.

RFS - 1

RFD - 2

RFT - 3

RFQ - 4

DESIGN AND MATERIALS

All materials used on Refkar shell&tube evaporators are selected and used in line with the EN norm. Materials with the following specifications are used on standard products.

Heat transfer pipes	Copper / internal threads
Tube sheet	Carbon steel
Chassis piping and water connections	Carbon steel
Guide screens	Plastic
Cover and coolant connections	Carbon steel

Evaporators can be manufactured with the materials and for the requirements listed below.

Heat transfer pipes	Copper-Nickel 90/10 alloy, AISI 316L and AISI 304L stainless steel, carbon steel
Tube sheet	AISI 316L or AISI 304L stainless steel
Chassis piping and water connections	AISI 316L and AISI 304L stainless steel
Guide screens	Carbon steel, AISI 316L and AISI 304L stainless steel

QUALITY AND TESTS

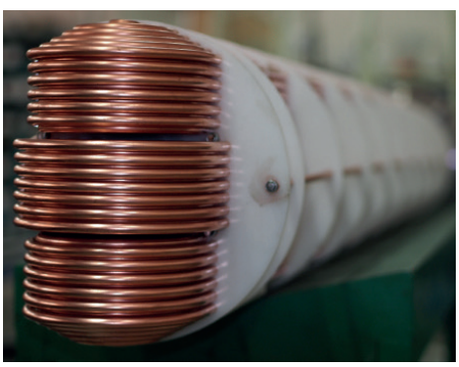
Mechanical calculations of Refkar RF range evaporators are in compliance with TS EN 13445-3 standards and ISO 9001:2008 quality management system and they have CE certification. Refkar Shell&Tube evaporators are tested with dry nitrogen at 33 bar at the gas side and 11 bar at the water side. Helium leak test is a standard test for all evaporators. Refkar offers fluid coolant non-leakage guarantee for its products for 2 gr/year. Tests are performed at different pressure levels on products with multiple circuits and no-leakage between circuits is guaranteed.

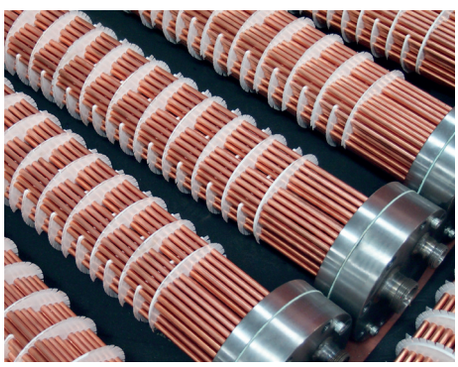
Approval	PS		Ts min	Ts max	Category
	Tube Side	Shell Side			
CE/EAC	30 bar	10 bar	-10 °C	90 °C	Up to Cat.IV, 2014/68/EU

POLLUTION FACTOR

The pollution factor (f.f.) is a major issue to be considered while choosing and evaporator. The pollution factors required under specific circumstances are listed below.

Closed loop mains water	f.f.= 0.000043 m²K/W
Open loop mains water	f.f.= 0.000086 m²K/W
Glycol solution < %40	f.f.= 0.000086 m²K/W
Glycol solution > %40	f.f.= 0.000172 m²K/W





ANTIFREEZE RECOMMENDATIONS

The table below lists the recommended glycol solution for low-temperature operating conditions.

Freezing Point [°C]	Ethilene Glyco [% Weight]	Propylene Glycol [% Weight]
-5	12	16
-10	22	26
-15	30	34
-20	36	40
-25	40	44
-30	44	48
-35	48	52

INSTALLATION AND OPERATION

Please ensure the following operating conditions for best use of your evaporator.

- The evaporator should be used in horizontal position.
- The air inside the product should be discharged before filling water.
- Ensure that the pressure drop and implementation conditions are in accordance with catalog values.
- Do not stop the water flow before the coolant in the evaporator is discharged.
- When not in use, fill the evaporator fully with anti-freeze fluid with no air in it and fully evacuate it, ensuring that it is dry.
- Regularly check the chemical properties of the water inside the evaporator. Incompliant water damages the evaporator.
- In case of a capacity decrease, you can reverse-operate the system for a short time for cleaning.
- Keep the evaporator away from sources of vibration.
- Prevent foreign particles in the water.
- Use anti-frees solution below 0°C.
- Prevent air in the pump cavitation and the system.
- Do not run the cooled fluids close to their freezing conditions.
- Do not exceed the allowed water flow.

CAPACITY, WATER FLOW AND VOLUME TABLE

The values listed in the table were calculated based on the following operating conditions.

Coolant	Water input	Water output	Condensation temperature	Evaporation temperature	Superheat value	Pollution factor f.f
R410A	12°C	7°C (temperature between RF141-144 is 8°C)	42°C	3°C	5 K	0,000043 m^2 K/W

MODEL	Q Nominal (kW)	ΔP Nominal (kPa)	W Nominal (m^3/h)	Volume Freon (L)	Volume Water (L)
RF141	12,3	3,1	2,1	2,9 L	6,6 L
RF142	20,1	6,6	3,4	3,5 L	7,9 L
RF143	32,4	15	5,5	4,1 L	9,6 L
RF144	43,8	27,3	7,5	4,8 L	11,1 L
RF161	49,5	21	8,5	5,7 L	13,9 L
RF162	61,4	29,2	10,5	6,4 L	15,4 L
RF163	70,3	25,3	12	7,4 L	17,8 L
RF164	78,3	27,9	13,4	7,8 L	18,6 L
RF191	93,1	26,6	15,9	10,6 L	25,2 L
RF192	114,9	35,3	19,7	11,7 L	27,8 L
RF193	136,4	46	23,4	12,8 L	30,3 L
RF194	166,5	57,3	28,5	14,2 L	33,5 L
RF195	189,9	67	32,6	15,5 L	36,6 L
RF211	222,2	46,3	38,1	18,4 L	41,5 L
RF212	273,4	53,6	46,9	22,1 L	49,4 L
RF213	287,5	56	49,3	23,2 L	51,6 L
RF271	296,5	29,4	50,8	26,4 L	85,3 L
RF272	346,2	38,9	59,4	29,4 L	81,8 L
RF273	429	60,8	73,6	35,0 L	75,3 L
RF321	448,4	39,9	76,9	39,2 L	122,1 L
RF322	548	56,9	94	46,1 L	114,0 L
RF323	595,6	32,7	102,2	53,4 L	105,4 L
RF401	718,8	61	123,3	60,1 L	220,0 L
RF402	822,6	34,3	141,2	70,8 L	207,5 L
RF403	898	40,2	154,1	75,5 L	202,1 L
RF404	1042,9	52,5	179	86,8 L	188,8 L
RF405	1207,7	51,3	207,3	101,8 L	219,9 L
RF451	1369,1	61,4	235	114,8 L	259,9 L
RF452	1414,4	63,3	242,7	118,1 L	255,9 L
RF501	1594	47,6	273,6	134,7 L	396,9 L
RF502	1849,7	98,3	317,5	153,4 L	375,0 L

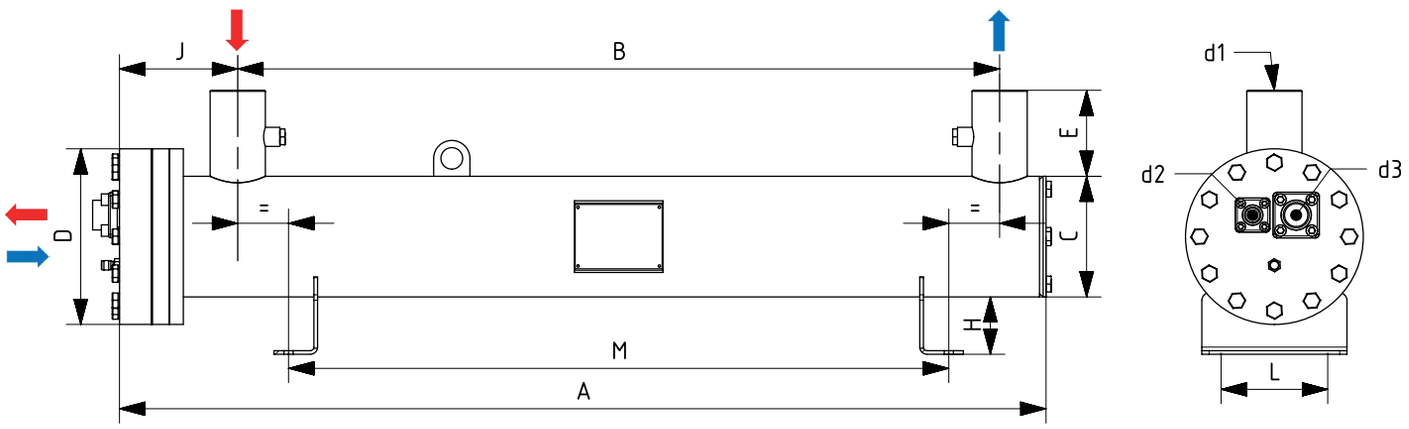
Q Nominal (kW)	Nominal cooling capacity
ΔP Nominal (kPa)	Nominal water circuit pressure loss
W Nominal (m^3/h)	Nominal water flow
Volume Freon (L)	Coolant circuit volume
Volume Water (L)	Water circuit volume

Note: Common capacity table for all RF models (RFS, RFD, RFT, RFQ).

RFS

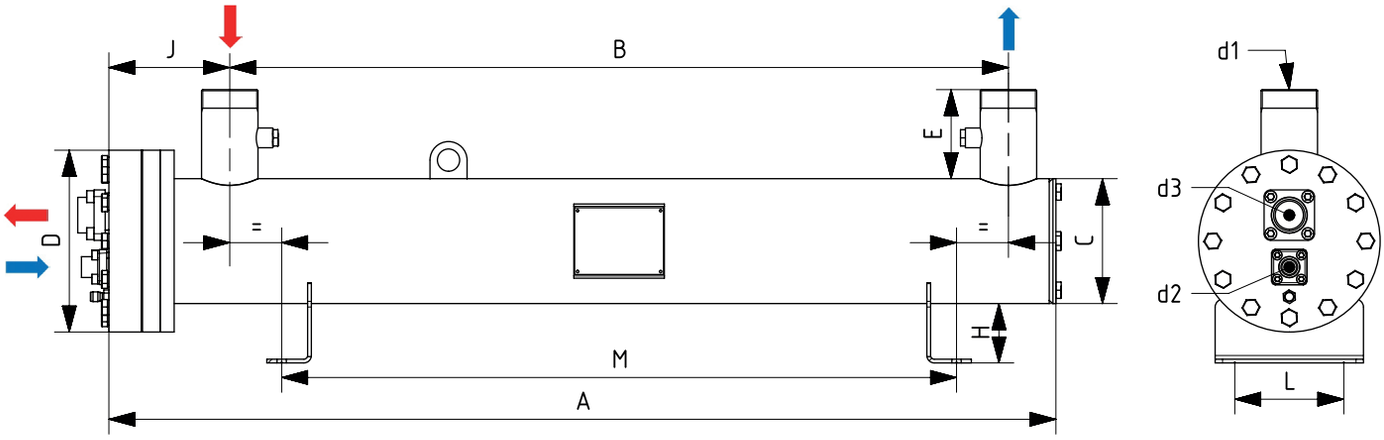
MEASURING TABLES

RF141S - RF164S / 1 Independent Compressor Circuit



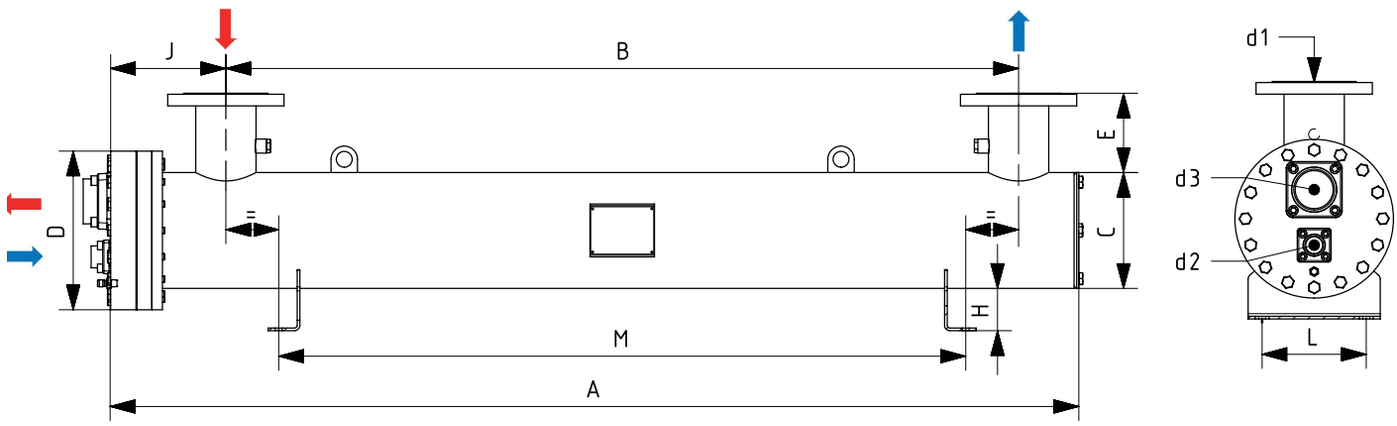
MODEL	A(mm)	B(mm)	C (mm)	D(mm)	E(mm)	H(mm)	L(mm)	J(mm)	M(mm)	d1	d2	d3	P (kg)
RF141S-4P	768	542	139,7	195	120	80	120	157	472	G1.5"	FL22	FL35	36 kg
RF142S-4P	908	682	139,7	195	120	80	120	157	612	G1.5"	FL22	FL35	39 kg
RF143S-4P	1078	840	139,7	195	120	80	120	163	764	G2"	FL22	FL35	42 kg
RF144S-4P	1238	1000	139,7	195	120	80	120	163	924	G2"	FL22	FL35	45 kg
RF161S-4P	1037	783	168,3	245	120	80	150	171	699	G2.5"	FL22	FL42	58 kg
RF162S-4P	1147	893	168,3	245	120	80	150	171	809	G2.5"	FL22	FL42	61 kg
RF163S-4P	1327	1073	168,3	245	120	80	150	171	989	G2.5"	FL22	FL42	69 kg
RF164S-4P	1392	1138	168,3	245	120	80	150	171	1054	G2.5"	FL22	FL42	70 kg

RF191S - RF195S / 1 Independent Compressor Circuit



MODEL	A(mm)	B(mm)	C (mm)	D(mm)	E(mm)	H(mm)	L(mm)	J(mm)	M(mm)	d1	d2	d3	P (kg)
RF191S	1401	1134	193,7	260	120	80	180	177	1044	G3"	FL35	FL54	80 kg
RF192S	1546	1279	193,7	260	120	80	180	177	1189	G3"	FL35	FL54	84 kg
RF193S	1686	1419	193,7	260	120	80	180	177	1329	G3"	FL35	FL54	89 kg
RF194S	1866	1599	193,7	260	120	80	180	177	1509	G3"	FL35	FL54	95 kg
RF195S	2036	1769	193,7	260	120	80	180	177	1679	G3"	FL35	FL54	100 kg

RF211S - RF502S / 1 Independent Compressor Circuit

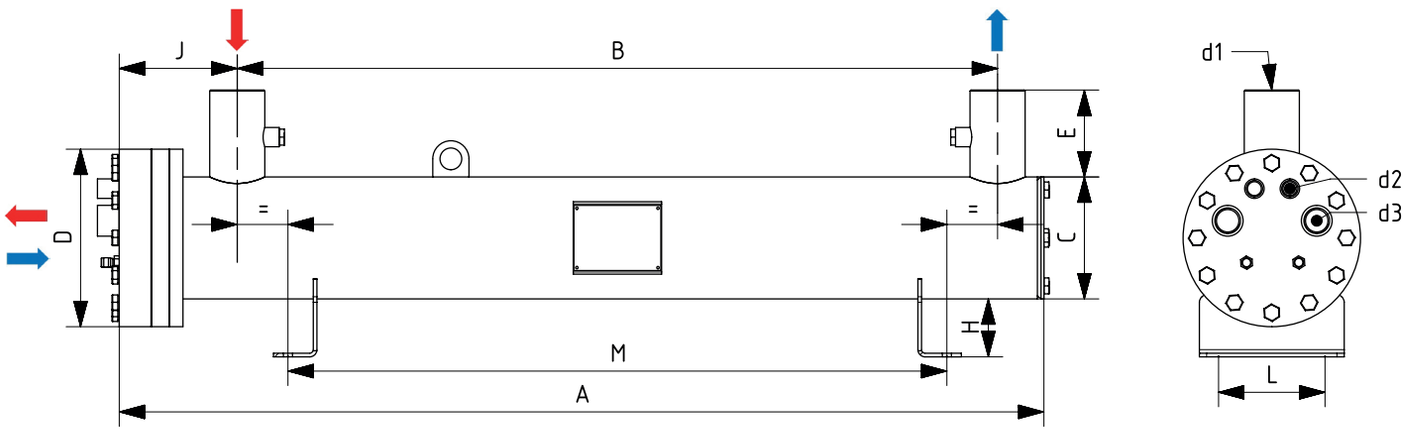


MODEL	A(mm)	B(mm)	C (mm)	D(mm)	E(mm)	H(mm)	L(mm)	J(mm)	M(mm)	d1	d2	d3	P (kg)
RF211S	1789	1471	219,1	300	150	80	200	208	1361	DN100	FL35	FL80	133 kg
RF212S	2139	1821	219,1	300	150	80	200	208	1711	DN100	FL35	FL80	148 kg
RF213S	2239	1921	219,1	300	150	80	200	208	1811	DN100	FL35	FL80	152 kg
RF271S	2102	1749	273	350	150	100	240	228	1624	DN125	FL42	FL80	185 kg
RF272S	2102	1749	273	350	150	100	240	228	1624	DN125	FL42	FL80	191 kg
RF273S	2102	1749	273	350	150	100	240	228	1624	DN125	FL42	FL80	201 kg
RF321S	2135	1747	323,9	420	150	100	280	246	1604	DN150	FL42	FL80	251 kg
RF322S	2135	1747	323,9	420	150	100	280	246	1604	DN150	FL42	FL80	263 kg
RF323S	2135	1747	323,9	420	150	100	280	246	1604	DN150	FL42	FL80	277 kg
RF401S	2370	1903	406,4	510	150	100	370	297	1732	DN200	FL54	FL105	403 kg
RF402S	2370	1903	406,4	510	150	100	370	297	1732	DN200	FL54	FL105	422 kg
RF403S	2370	1903	406,4	510	150	100	370	297	1732	DN200	FL54	FL105	431 kg
RF404S	2370	1903	406,4	510	150	100	370	297	1732	DN200	FL54	FL105	451 kg
RF405S	2770	2303	406,4	510	150	100	370	297	2132	DN200	FL54	FL105	497 kg
RF451S	2563	2071	457	570	150	100	420	322	1900	DN200	FL67	FL140	635 kg
RF452S	2563	2071	457	570	150	100	420	322	1900	DN200	FL67	FL140	642 kg
RF501S	2913	2416	508	620	150	100	470	327	2245	DN200	FL67	FL140	733 kg
RF502S	2913	2416	508	620	150	100	470	327	2245	DN200	FL67	FL140	767 kg

RFD

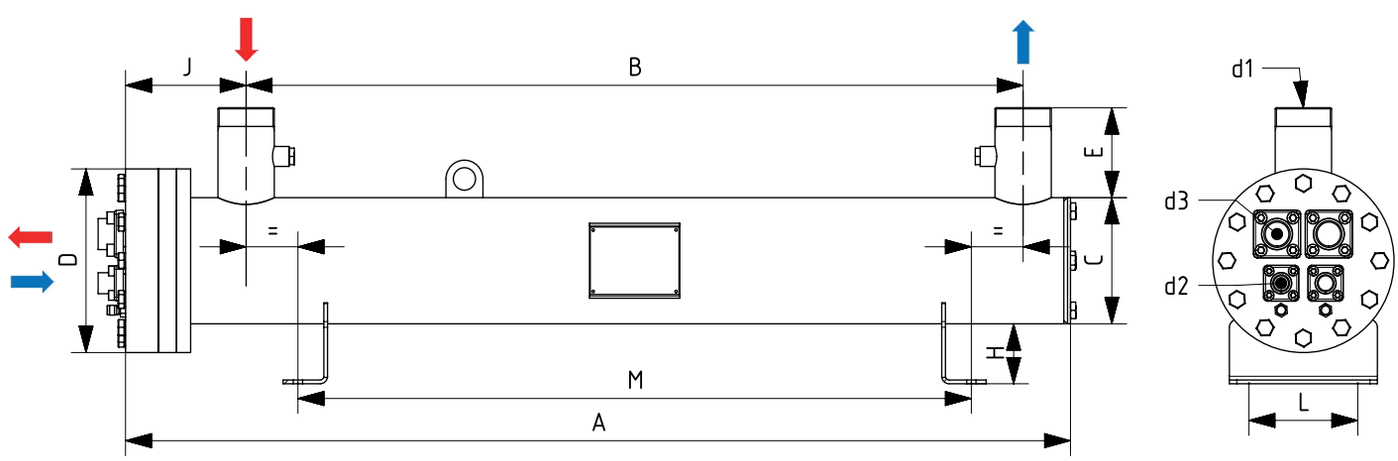
MEASURING TABLES

RF161D - RF164D / 2 Independent Compressor Circuits



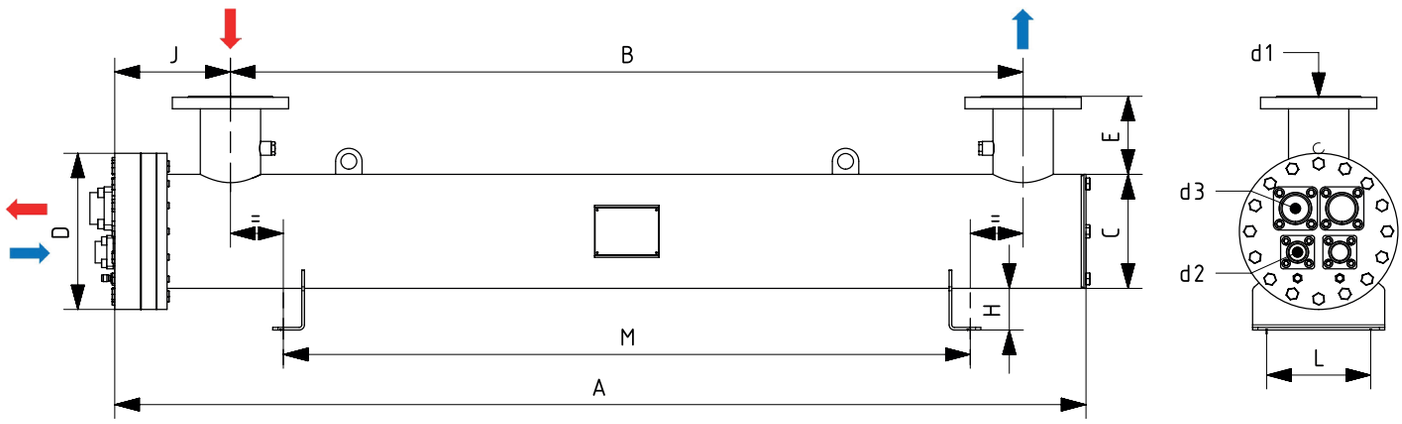
MODEL	A(mm)	B(mm)	C (mm)	D(mm)	E(mm)	H(mm)	L(mm)	J(mm)	M(mm)	d1	d2	d3	P (kg)
RF161D-4P	1037	783	168,3	245	120	80	150	171	699	G2.5"	FL22	FL42	58 kg
RF162D-4P	1147	893	168,3	245	120	80	150	171	809	G2.5"	FL22	FL42	61 kg
RF163D-4P	1327	1073	168,3	245	120	80	150	171	989	G2.5"	FL22	FL42	69 kg
RF164D-4P	1392	1138	168,3	245	120	80	150	171	1054	G2.5"	FL22	FL42	70 kg

RF191D - RF195D / 2 Independent Compressor Circuits



MODEL	A(mm)	B(mm)	C (mm)	D(mm)	E(mm)	H(mm)	L(mm)	J(mm)	M(mm)	d1	d2	d3	P (kg)
RF191D	1401	1134	193,7	260	120	80	180	177	1044	G3"	FL35	FL54	80 kg
RF192D	1546	1279	193,7	260	120	80	180	177	1189	G3"	FL35	FL54	84 kg
RF193D	1686	1419	193,7	260	120	80	180	177	1329	G3"	FL35	FL54	89 kg
RF194D	1866	1599	193,7	260	120	80	180	177	1509	G3"	FL35	FL54	95 kg
RF195D	2036	1769	193,7	260	120	80	180	177	1679	G3"	FL35	FL54	100 kg

RF211D - RF502D / 2 Independent Compressor Circuits

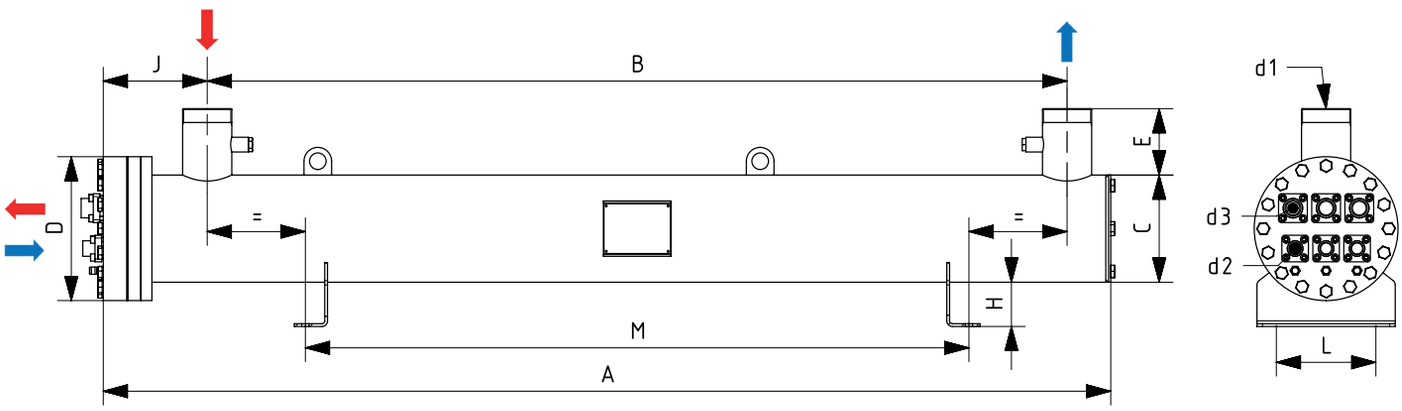


MODEL	A(mm)	B(mm)	C (mm)	D(mm)	E(mm)	H(mm)	L(mm)	J(mm)	M(mm)	d1	d2	d3	P (kg)
RF211D	1789	1471	219,1	300	150	80	200	208	1361	DN100	FL35	FL80	133 kg
RF212D	2139	1821	219,1	300	150	80	200	208	1711	DN100	FL35	FL80	148 kg
RF213D	2239	1921	219,1	300	150	80	200	208	1811	DN100	FL35	FL80	152 kg
RF271D	2102	1749	273	350	150	100	240	228	1624	DN125	FL42	FL80	185 kg
RF272D	2102	1749	273	350	150	100	240	228	1624	DN125	FL42	FL80	191 kg
RF273D	2102	1749	273	350	150	100	240	228	1624	DN125	FL42	FL80	201 kg
RF321D	2135	1747	323,9	420	150	100	280	246	1604	DN150	FL42	FL80	251 kg
RF322D	2135	1747	323,9	420	150	100	280	246	1604	DN150	FL42	FL80	263 kg
RF323D	2135	1747	323,9	420	150	100	280	246	1604	DN150	FL42	FL80	277 kg
RF401D	2370	1903	406,4	510	150	100	370	297	1732	DN200	FL54	FL105	403 kg
RF402D	2370	1903	406,4	510	150	100	370	297	1732	DN200	FL54	FL105	422 kg
RF403D	2370	1903	406,4	510	150	100	370	297	1732	DN200	FL54	FL105	431 kg
RF404D	2370	1903	406,4	510	150	100	370	297	1732	DN200	FL54	FL105	451 kg
RF405D	2770	2303	406,4	510	150	100	370	297	2132	DN200	FL54	FL105	497 kg
RF451D	2563	2071	457	570	150	100	420	322	1900	DN200	FL67	FL140	635 kg
RF452D	2563	2071	457	570	150	100	420	322	1900	DN200	FL67	FL140	642 kg
RF501D	2913	2416	508	620	150	100	470	327	2245	DN200	FL67	FL140	733 kg
RF502D	2913	2416	508	620	150	100	470	327	2245	DN200	FL67	FL140	767 kg

RFT

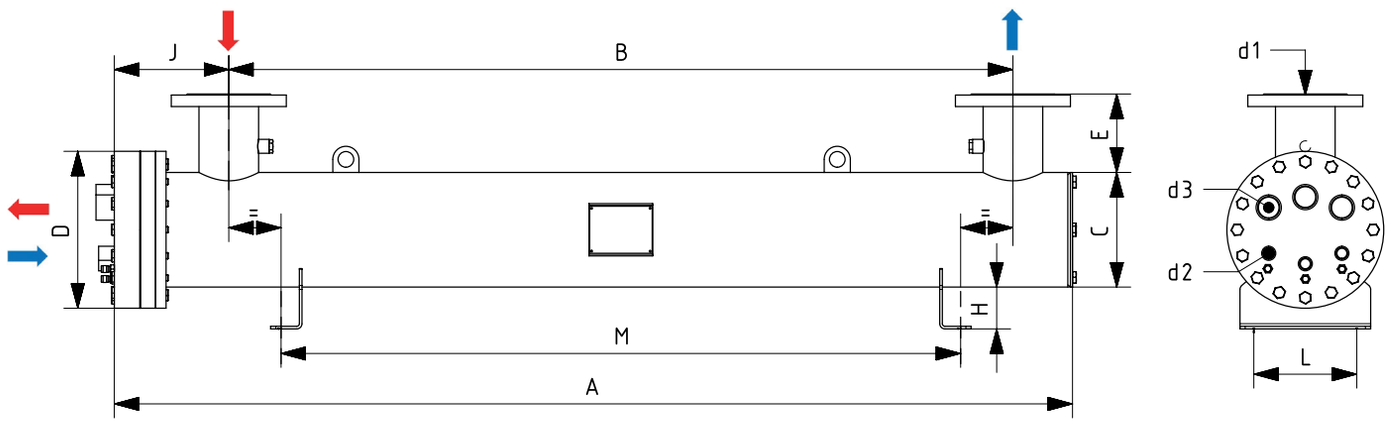
MEASURING TABLES

RF191T - RF195T / 3 Independent Compressor Circuits



MODEL	A(mm)	B(mm)	C (mm)	D(mm)	E(mm)	H(mm)	L(mm)	J(mm)	M(mm)	d1	d2	d3	P (kg)
RF191T	1401	1134	193,7	260	120	80	180	177	1044	G3"	W35	W54	80 kg
RF192T	1546	1279	193,7	260	120	80	180	177	1189	G3"	W35	W54	84 kg
RF193T	1686	1419	193,7	260	120	80	180	177	1329	G3"	W35	W54	89 kg
RF194T	1866	1599	193,7	260	120	80	180	177	1509	G3"	W35	W54	95 kg
RF195T	2036	1769	193,7	260	120	80	180	177	1679	G3"	W35	W54	100 kg

RF211T - RF502T / 3 Independent Compressor Circuits

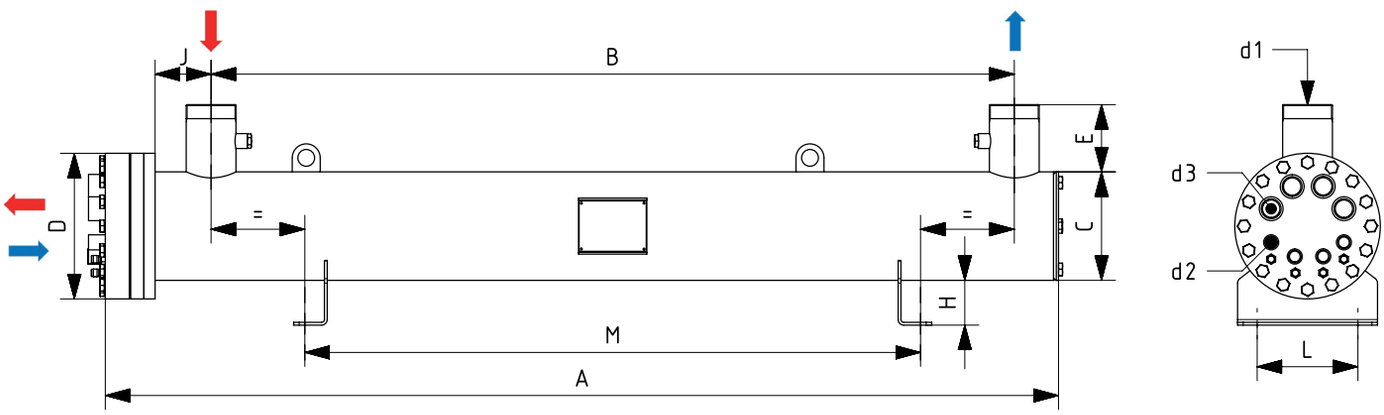


MODEL	A(mm)	B(mm)	C (mm)	D(mm)	E(mm)	H(mm)	L(mm)	J(mm)	M(mm)	d1	d2	d3	P (kg)
RF211T	1789	1471	219,1	300	150	80	200	208	1361	DN100	W35	W80	133 kg
RF212T	2139	1821	219,1	300	150	80	200	208	1711	DN100	W35	W80	148 kg
RF213T	2239	1921	219,1	300	150	80	200	208	1811	DN100	W35	W80	152 kg
RF271T	2102	1749	273	350	150	100	240	228	1624	DN125	W42	W80	185 kg
RF272T	2102	1749	273	350	150	100	240	228	1624	DN125	W42	W80	191 kg
RF273T	2102	1749	273	350	150	100	240	228	1624	DN125	W42	W80	201 kg
RF321T	2135	1747	323,9	420	150	100	280	246	1604	DN150	W42	W80	251 kg
RF322T	2135	1747	323,9	420	150	100	280	246	1604	DN150	W42	W80	263 kg
RF323T	2135	1747	323,9	420	150	100	280	246	1604	DN150	W42	W80	277 kg
RF401T	2370	1903	406,4	510	150	100	370	297	1732	DN200	W54	W05	403 kg
RF402T	2370	1903	406,4	510	150	100	370	297	1732	DN200	W54	W105	422 kg
RF403T	2370	1903	406,4	510	150	100	370	297	1732	DN200	W54	W105	431 kg
RF404T	2370	1903	406,4	510	150	100	370	297	1732	DN200	W54	W105	451 kg
RF405T	2770	2303	406,4	510	150	100	370	297	2132	DN200	W54	W105	497 kg
RF451T	2563	2071	457	570	150	100	420	322	1900	DN200	W67	W140	635 kg
RF452T	2563	2071	457	570	150	100	420	322	1900	DN200	W67	W140	642 kg
RF501T	2913	2416	508	620	150	100	470	327	2245	DN200	W67	W140	733 kg
RF502T	2913	2416	508	620	150	100	470	327	2245	DN200	W67	W140	767 kg

RFQ

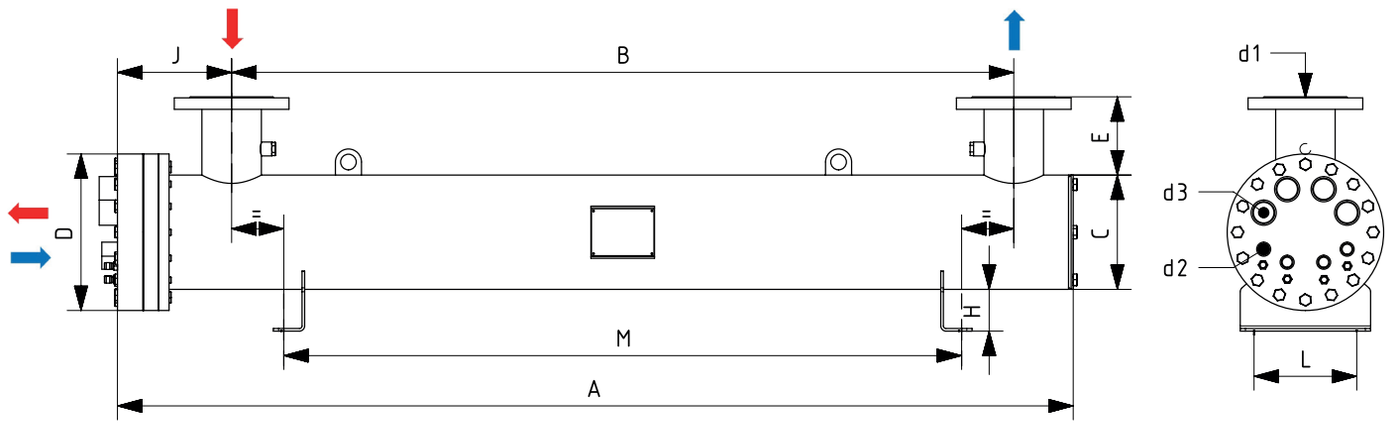
MEASURING TABLES

RF191Q - RF195Q / 4 Independent Compressor Circuits



MODEL	A(mm)	B(mm)	C (mm)	D(mm)	E(mm)	H(mm)	L(mm)	J(mm)	M(mm)	d1	d2	d3	P (kg)
RF191Q	1401	1134	193,7	260	120	80	180	177	1044	G3"	W35	W54	80 kg
RF192Q	1546	1279	193,7	260	120	80	180	177	1189	G3"	W35	W54	84 kg
RF193Q	1686	1419	193,7	260	120	80	180	177	1329	G3"	W35	W54	89 kg
RF194Q	1866	1599	193,7	260	120	80	180	177	1509	G3"	W35	W54	95 kg
RF195Q	2036	1769	193,7	260	120	80	180	177	1679	G3"	W35	W54	100 kg

RF211Q - RF502Q / 4 Independent Compressor Circuits

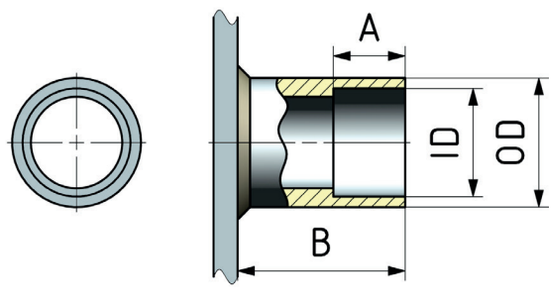


MODEL	A(mm)	B(mm)	C (mm)	D(mm)	E(mm)	H(mm)	L(mm)	J(mm)	M(mm)	d1	d2	d3	P (kg)
RF211Q	1789	1471	219,1	300	150	80	200	208	1361	DN100	W35	W80	133 kg
RF212Q	2139	1821	219,1	300	150	80	200	208	1711	DN100	W35	W80	148 kg
RF213Q	2239	1921	219,1	300	150	80	200	208	1811	DN100	W35	W80	152 kg
RF271Q	2102	1749	273	350	150	100	240	228	1624	DN125	W42	W80	185 kg
RF272Q	2102	1749	273	350	150	100	240	228	1624	DN125	W42	W80	191 kg
RF273Q	2102	1749	273	350	150	100	240	228	1624	DN125	W42	W80	201 kg
RF321Q	2135	1747	323,9	420	150	100	280	246	1604	DN150	W42	W80	251 kg
RF322Q	2135	1747	323,9	420	150	100	280	246	1604	DN150	W42	W80	263 kg
RF323Q	2135	1747	323,9	420	150	100	280	246	1604	DN150	W42	W80	277 kg
RF401Q	2370	1903	406,4	510	150	100	370	297	1732	DN200	W54	W05	403 kg
RF402Q	2370	1903	406,4	510	150	100	370	297	1732	DN200	W54	W105	422 kg
RF403Q	2370	1903	406,4	510	150	100	370	297	1732	DN200	W54	W105	431 kg
RF404Q	2370	1903	406,4	510	150	100	370	297	1732	DN200	W54	W105	451 kg
RF405Q	2770	2303	406,4	510	150	100	370	297	2132	DN200	W54	W105	497 kg
RF451Q	2563	2071	457	570	150	100	420	322	1900	DN200	W67	W140	635 kg
RF452Q	2563	2071	457	570	150	100	420	322	1900	DN200	W67	W140	642 kg
RF501Q	2913	2416	508	620	150	100	470	327	2245	DN200	W67	W140	733 kg
RF502Q	2913	2416	508	620	150	100	470	327	2245	DN200	W67	W140	767 kg

COOLANT CONNECTION OPTIONS

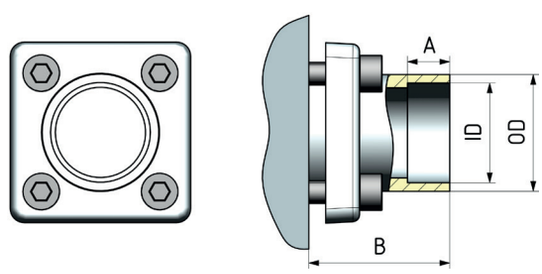
Welded connection (W)

Dimensions				
CODE	A	B	ID	OD
W 16	15	30	16,2	21,3
W 19	15	30	19,4	25
W 22	15	30	22,6	26,9
W 28	15	30	28,8	33,7
W 35	15	30	35,4	42,4
W 42	15	35	42,3	48,3
W 54	15	45	54,3	60,3
W 67	20	50	67	76
W 80	20	50	80,5	88,9
W 105	20	50	106	114



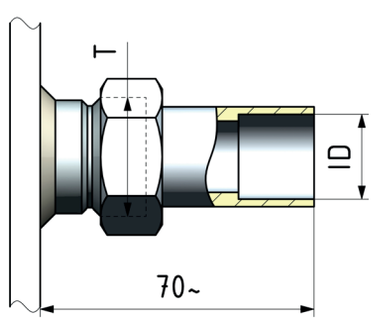
Flanged connection (FL)

Dimensions				
CODE	A	B	ID	OD
FL 16	15	40	16,1	20,5
FL 19	15	40	19,4	24
FL 22	15	40	22,6	28
FL 28	15	40	29	35
FL 35	15	40	35,4	41,4
FL 42	15	40	42	48
FL 54	15	50	54,8	61
FL 67	25	55	67	74
FL 80	25	55	80,5	85
FL 105	25	55	106	115



Rotalock connection (RLA)

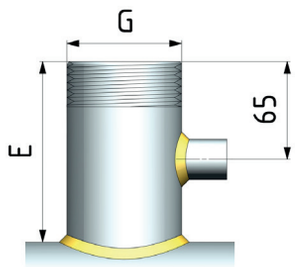
Dimensions		
CODE	ID	T
RLA 16	16,2	1"14-UNS
RLA 19	19,4	1"14-UNS
RLB 22	22,6	1 ⅛"12-UNF
RLB 28	28,8	1 ¼"12-UNF
RLC 28	28,8	1 ¾"12-UN
RLC 35	35,4	1 ¾"12-UN
RLC 42	42,3	1 ¾"12-UN



WATER CIRCUIT CONNECTION OPTIONS

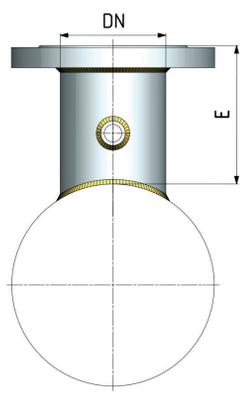
Threaded pipe connection (G)

Dimensions			
CODE	G	G(mm)	E(mm)
G1	G 1”	33,7	120
G11	G 1 ½”	48,3	120
G2	G 2”	60,4	120
G21	G 2 ½”	73,1	120
G3	G 3”	88,9	120



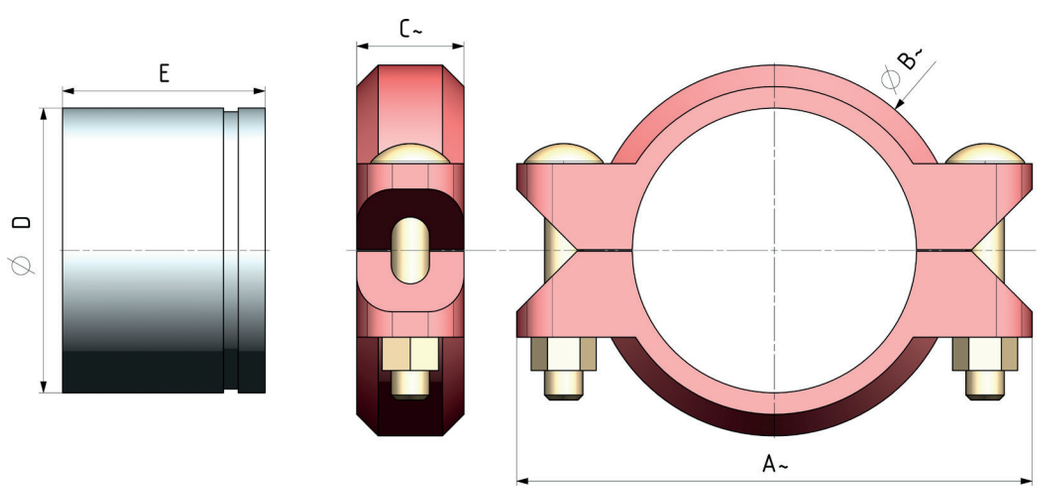
Flanged connection (DN)

Dimensions		
CODE	DN(mm)	E(mm)
DN 100	114	120
DN 125	140	120
DN 150	168	120
DN 200	220	120



Flexible coupling (FLC)

Dimensions					
CODE	A	B	C	D	E
J3 FLC089	165	115	50	88,9	80
J4 FLC114	200	145	50	114,3	100
J5 FLC140	245	175	50	139,7	100
J6 FLC168	275	205	55	168,3	150
J8 FLC220	345	265	60	219,1	150



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