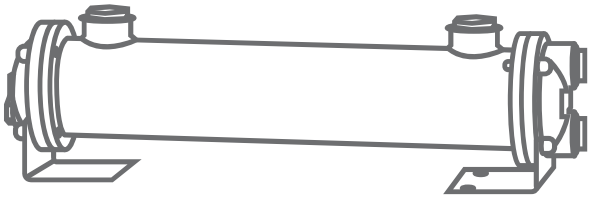
WATER-OIL HEAT EXCHANGERS WITH TUBE BUNDLE
SCAMBIATORI DI CALORE ACQUA-OLIO A FASCIO TUBIERO



WATER-OIL HEAT EXCHANGER WITH TUBE BUNDLE TYPE MS 84 P, MS 134 P, MS 134 CF, MS 84 CF, MS 134 B, MS 84/2 B

They consist of smooth tubes with little diameter; this allows the best compromise between high thermic performance and low pressure drops.

The flow rates shown in the tables are the ones recommended for the exchanger proper working. Going down the lowest flow rate indicated in the tables, the low oil speed causes a great loss in performance, whereas a flow rate that is superior to the maximum indicated causes great pressure drops and does not considerably increase the thermic performance.

The efficiency diagrams indicate the heat quantity (kW) each exchanger can disperse according to ΔT=25°C between oil and water depending on the oil flow of the exchanger.

The maximum work pressure allowed in the oil and water circuits is 12 bar

For the right calculation of tube bundle exchangers, we supply our customers with a CD-ROM calculation program; by filling in some data, it is possible to establish the right exchanger and to obtain all the working parameters on a data sheet.

The tube bundle heat exchangers can be used with other kind of fluids, which must be compatible with copper and its alloys. However, for each use, with the exception of oil cooling, we recommend to consult our Technical Department.

Exchange surface from 0,2 to 3,6 m^2

SCAMBIATORI DI CALORE ACQUA-OLIO A FASCIO TUBIERO MS 84 P, MS 134 P, MS 134 CF, MS 84 CF, MS 134 B, MS 84/2 B

Sono costruiti con tubi lisci di piccolo diametro, raggiungendo in questo modo il miglior compromesso tra elevata resa termica e basse perdite di carico.

Le portate olio indicate nelle tabelle sono quelle consigliate per il buon funzionamento dello scambiatore. Andando al di sotto della portata minima indicata, la bassa velocità dell'olio causa un forte calo di rendimento, mentre una portata superiore alla massima causa perdite di carico notevoli, senza peraltro aumentare la resa termica in maniera apprezzabile.

I diagrammi di rendimento forniscono la quantità di calore in kW che ogni scambiatore è in grado di disperdere con ΔT=25°C tra olio e acqua in funzione della portata olio circolante nello scambiatore.

La pressione di esercizio massima ammessa in entrambe i circuiti è 12 bar.

Per il calcolo esatto degli scambiatori a fascio tubiero possiamo fornire un programma di calcolo su CD-rom; mediante il semplice inserimento di alcuni dati è possibile stabilire lo scambiatore necessario e ottenere tutti i parametri di funzionamento su un data-sheet.

Gli scambiatori a fascio tubiero possono essere utilizzati con altri tipi di fluidi, a condizione che essi siano compatibili con il rame e le sue leghe. Consigliamo comunque, per qualsiasi impiego che non sia il raffreddamento dell'olio, di consultare il nostro Ufficio Tecnico.

Superficie di scambio da 0,2 a 3,6 m^2

Selection procedure

The curves are based on the following data:

1) Oil viscosity ISO VG 46
2) Arithmetic mean temperature difference between oil and water 25 [°C] (*ΔTm*)

If your application parameters are different, follow these steps:

1) Define the arithmetic mean temperature difference [see the technical example on page 7] and select the correction factor from the table

CORRECTION FACTOR							
ΔTm	10	15	20	25	30	35	40
f	2,5	1,67	1,25	1	0,83	0,71	0,63

2) Calculate the adjusted thermal power $\dot{Q}d = \dot{Q} \bullet f$

3) Select the model from the curve
Cross-check on the diagram the values of the oil flow, of the water flow and of the thermal adjusted power.

Procedura di selezione dello scambiatore

Le curve riportate sono basate sulle seguenti assunzioni:

1) Viscosità cinematica dell'olio pari a 46 [cSt]
2) Differenza di temperatura media aritmetica tra i due fluidi pari a 25 [°C] (ΔTm)

Se si ha una differenza di temperatura media aritmetica differente da 25 [°C], seguire la procedura sottostante:

1) Determinare la differenza di temperatura media aritmetica tra i due fluidi [vedere esempio a pagina 9 per effettuare il calcolo] e selezionare il fattore di correzione appropriato dalla tabella

CORRECTION FACTOR							
ΔTm	10	15	20	25	30	35	40
f	2,5	1,67	1,25	1	0,83	0,71	0,63

2) Determinare la potenza termica da smaltire opportunamente corretta $\dot{Q}d = \dot{Q} \bullet f$

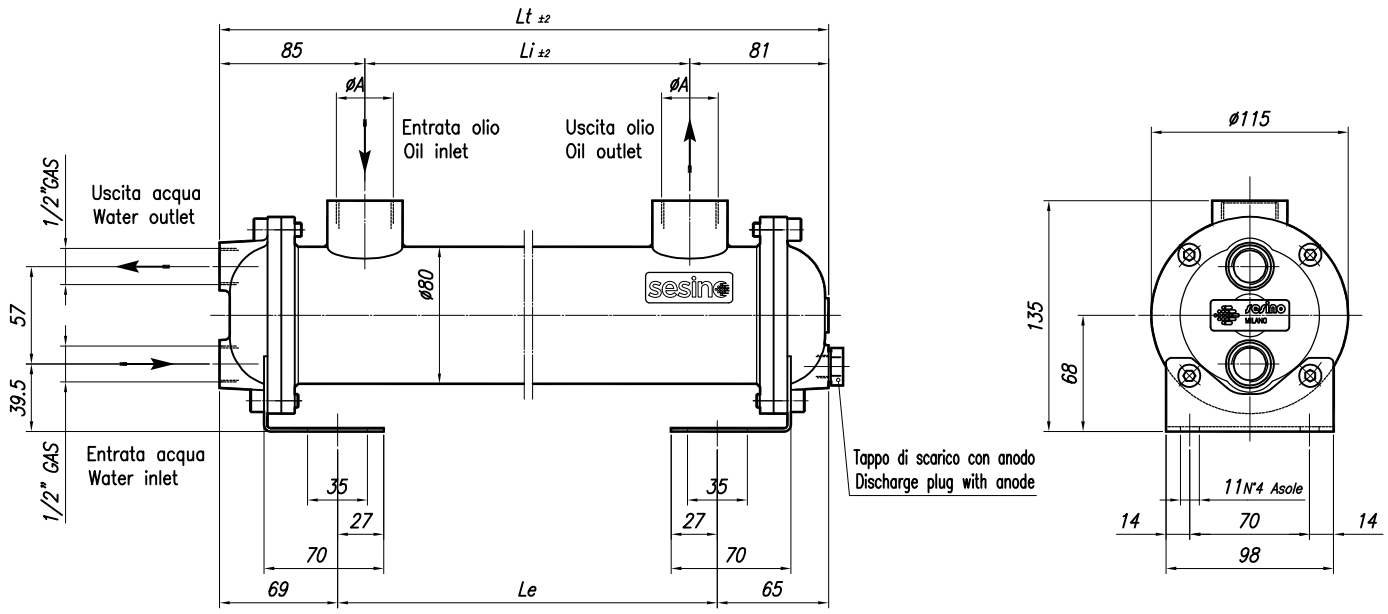
3) Selezionare il modello
Incrociare i valori di portata volumetrica d'olio, d'acqua e della potenza termica corretta sull'apposito grafico

MS 84 P

CONSTRUCTION MATERIALS		
SHELL	TUBES	END COVERS
CARBON STEEL*	COPPER*	CAST IRON*
STAINLESS STEEL	STAINLESS STEEL	STAINLESS STEEL

*standard

- Dimensions and technical characteristics are not binding



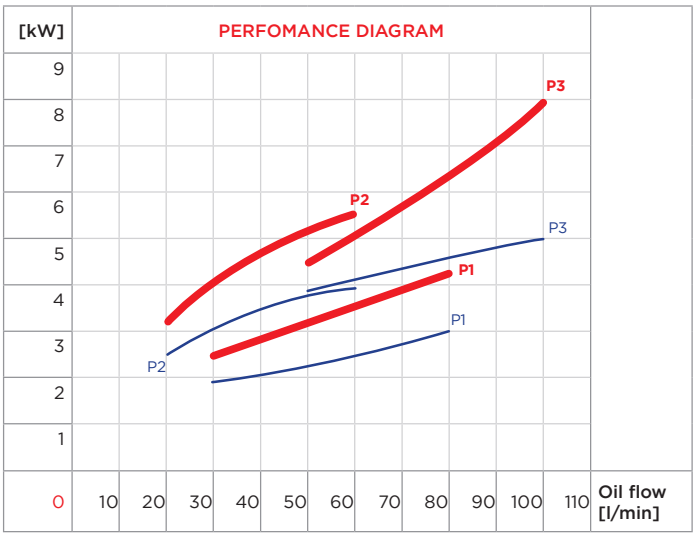
TYPE	CODE	WATER FLOW	OIL FLOW	kW MIN water flow		kW MAX water flow		WEIGHT	DIMENSIONS			
		l/min	l/min	ΔTm 25° C		ΔTm 25° C		kg	F	Li	Le	Lt
MS 84 P1	2SC84P1	7,5 - 30	30-80	2	3	2,6	4,2	4,5	1" gas	150	150	308
MS 84 P2	2SC84P2	7,5 - 30	20-60	2,6	4	3,25	5,6	6,3	1" gas	310	310	468
MS 84 P3	2SC84P3	7,5 - 30	50-100	3,6	4,4	4,6	8	6,5	1 1/2" gas	310	325	478
MS 84 P4	2SC84P4	7,5 - 30	30-80	4,8	7	6	10	9,0	1" gas	560	560	718
MS 84 P5	2SC84P5	7,5 - 30	80-130	6	7	7	9	9,0	1 1/2" gas	560	575	728
MS 84 P6	2SC84P6	7,5 - 30	40-90	9	12	12	18	10,8	1 1/2" gas	715	730	883
MS 84 P7	2SC84P7	7,5 - 30	100-160	11	14	15	21	10,8	1 1/2" gas	715	730	883
MS 84 P8	2SC84P8	7,5 - 30	60-110	12	16	16	24	12,3	1 1/2" gas	870	885	1038
MS 84 P9	2SC84P9	7,5 - 30	140-190	15	17	21	27	12,3	1 1/2" gas	870	885	1038

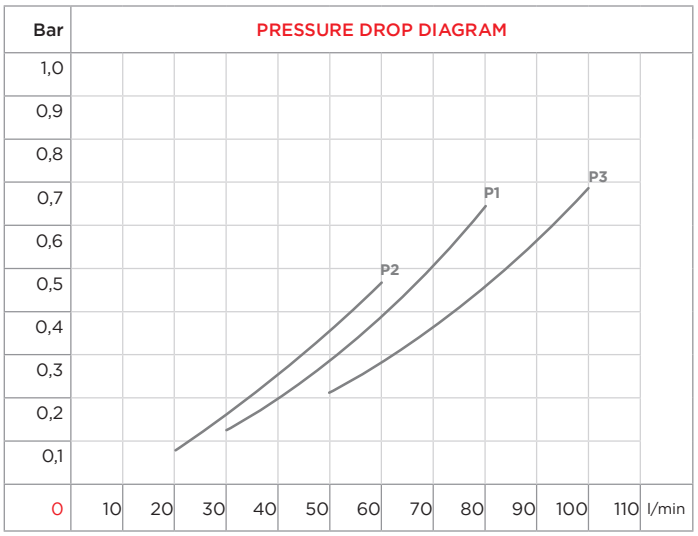
WATER FLOW RATE:

7,5 l/min

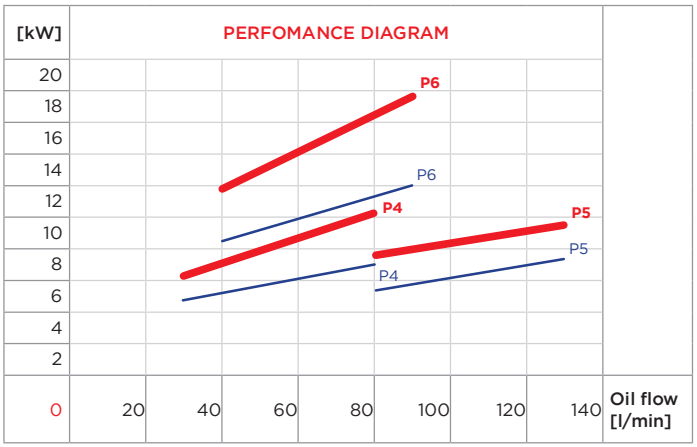
30 l/min

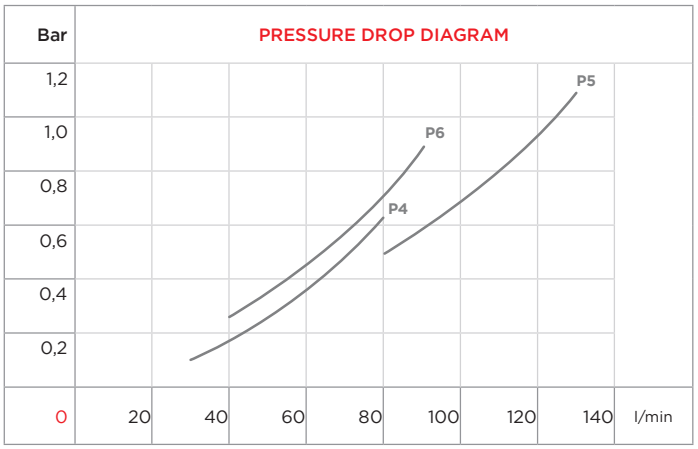
P1 P2 P3



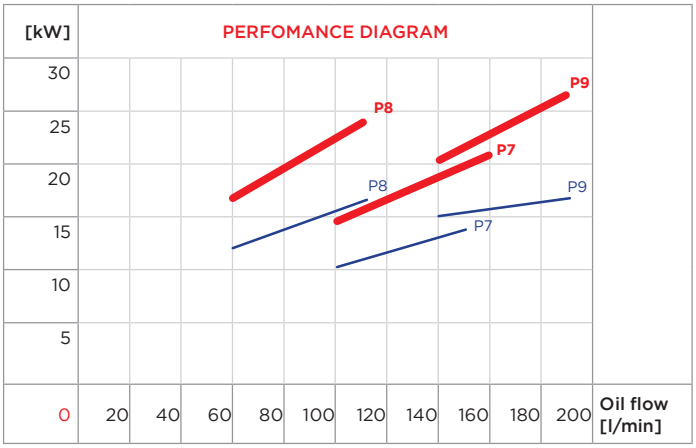


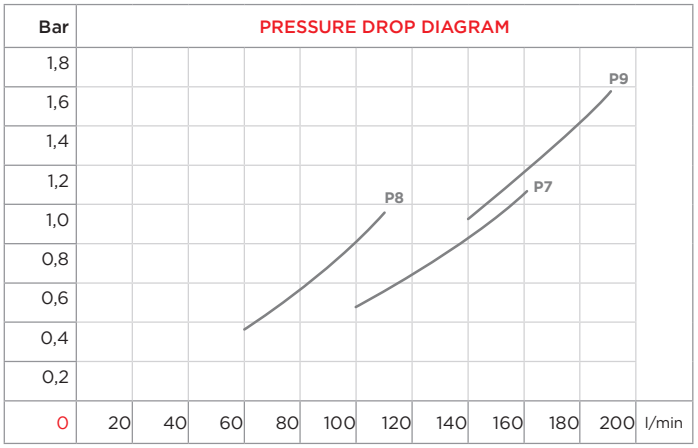
P4 P5 P6





P7 P8 P9

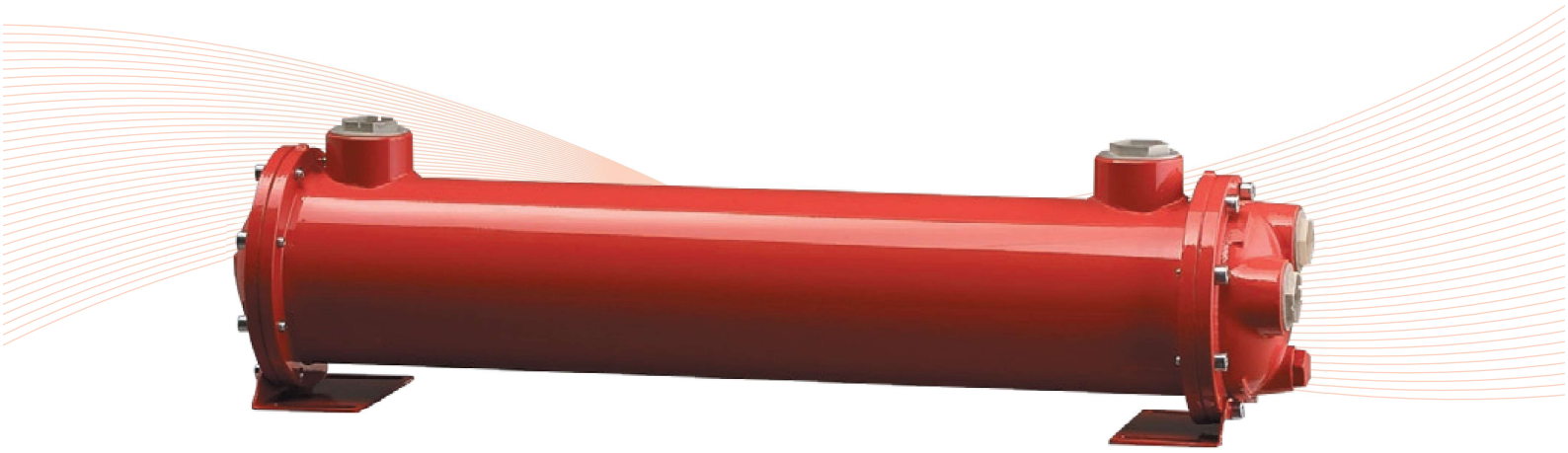




CORRECTION FACTOR							
ΔTm	10	15	20	25	30	35	40
f	2,5	1,67	1,25	1	0,83	0,71	0,63

CORRECTION FACTOR							
cSt	22	30	46	68	100	150	220
f	0,4	0,6	1	1,5	2,3	3,3	4,6

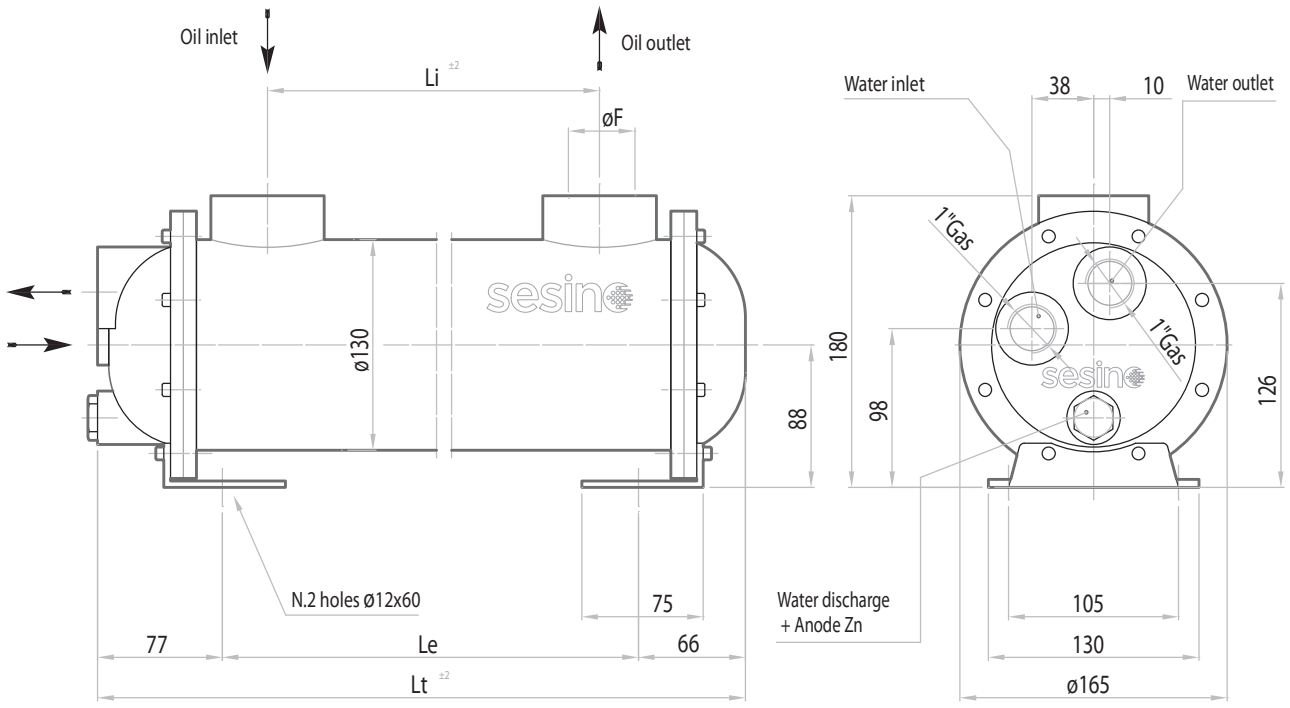
MS 134 P



CONSTRUCTION MATERIALS		
SHELL	TUBES	END COVERS
CARBON STEEL*	COPPER*	CAST IRON*
STAINLESS STEEL	STAINLESS STEEL	STAINLESS STEEL
BRASS	CuNi (marine use)	BRONZE

*standard

- Dimensions and technical characteristics are not binding



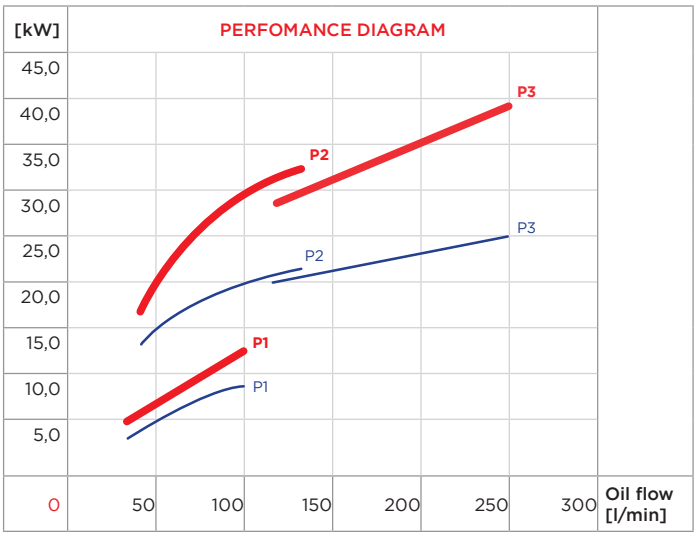
TYPE	CODE	OIL FLOW	WATERFLOW	kW MIN water flow		kW MAX water flow		WEIGHT	DIMENSIONS			
		l/min	l/min	ΔTm 25° C		ΔTm 25° C		kg	F	Li	Le	Lt
MS 134 P1	2SC134P1	30-100	15-60	4	9	4	12	16,4	1 1/2" gas	285	286-384	480
MS 134 P2	2SC134P2	40-130	15-60	13	22	17	33	22,6	1 1/2" gas	535	536-634	730
MS 134 P3	2SC134P3	120-250	15-60	20	25	29	39	23,0	2" gas	520	536-634	730
MS 134 P4	2SC134P4	80-250	15-60	8,5	21	9	29	30,7	1 1/2" gas	845	846-944	1040
MS 134 P5	2SC134P5	200-400	15-60	31	39	48	70	30,9	2" gas	830	846-944	1040
MS 134 P6	2SC134P6	30-170	15-60	11	26	12	36	40,0	1 1/2" gas	1145	1146-1244	1340
MS 134 P7	2SC134P7	200-500	15-60	32	64	41	95	39,5	2" gas	1130	1146-1244	1340

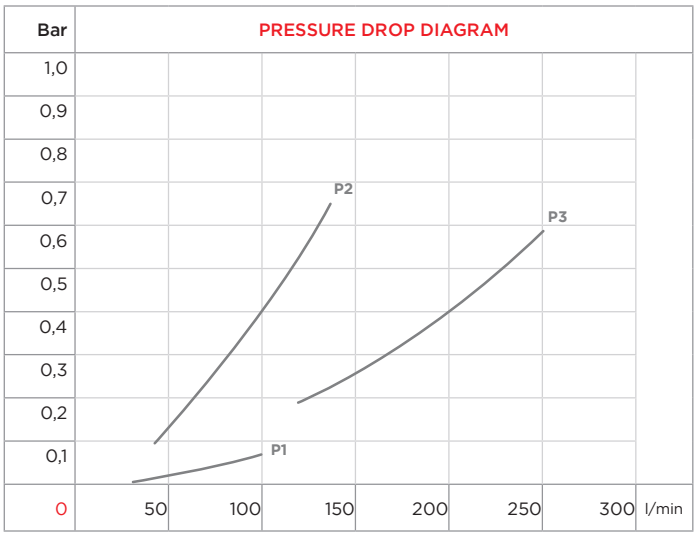
WATER FLOW RATE:

15 l/min

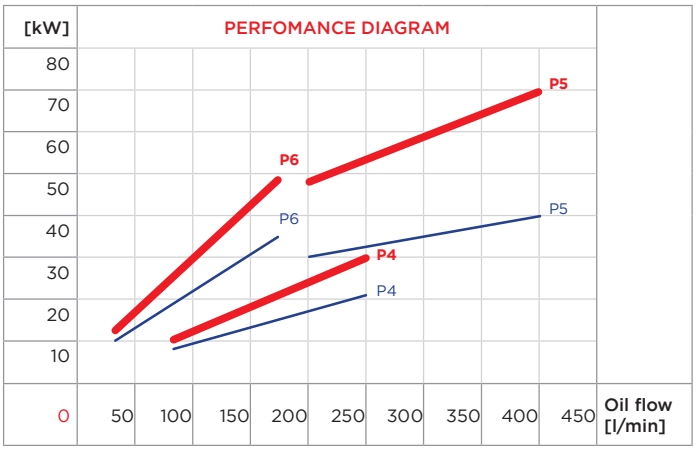
60 l/min

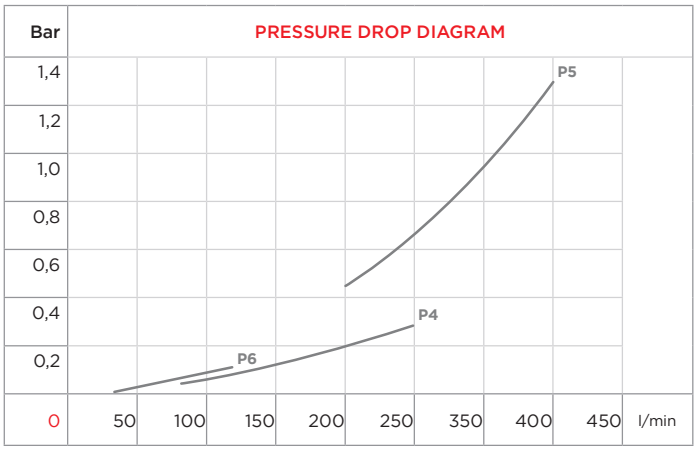
P1 P2 P3



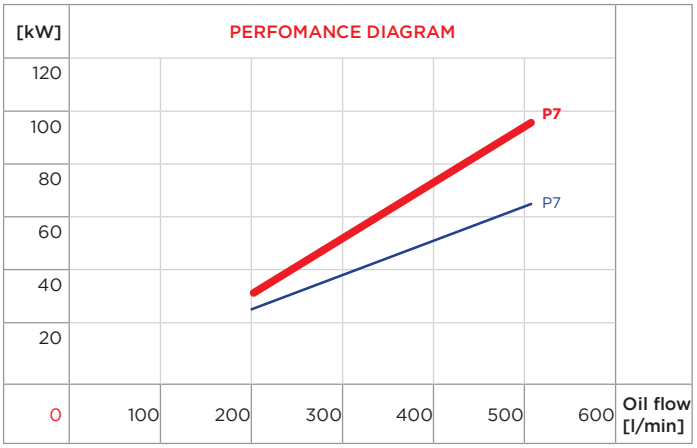


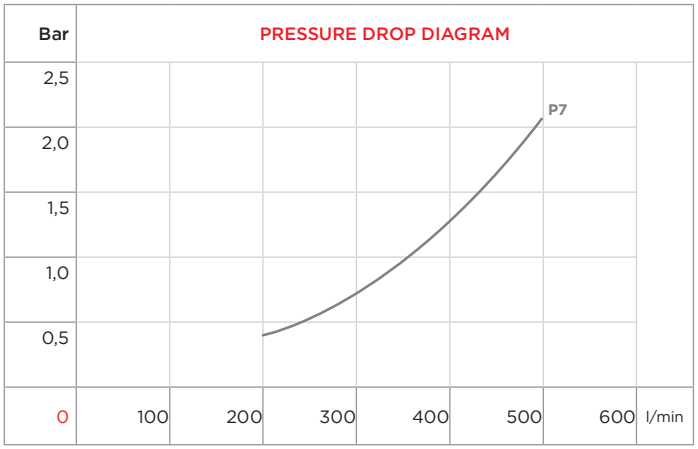
P4 P5 P6





P7

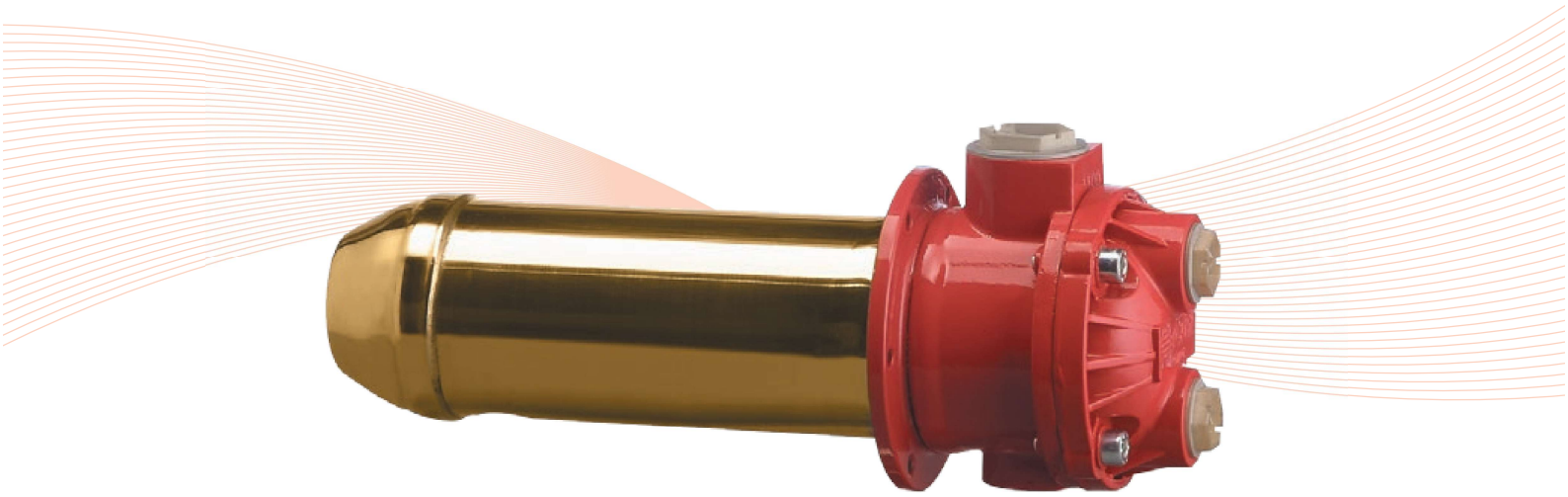




CORRECTION FACTOR							
ΔTm	10	15	20	25	30	35	40
f	2,5	1,67	1,25	1	0,83	0,71	0,63

CORRECTION FACTOR							
cSt	22	30	46	68	100	150	220
f	0,4	0,6	1	1,5	2,3	3,3	4,6

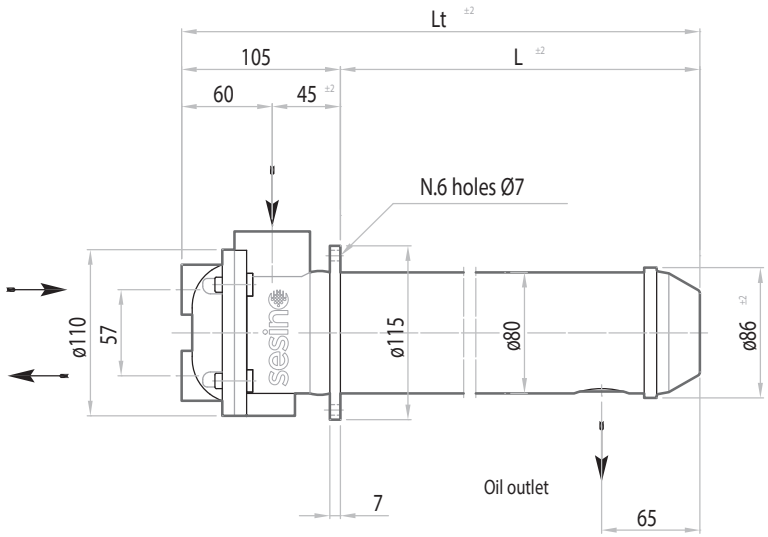
MS 84 CF

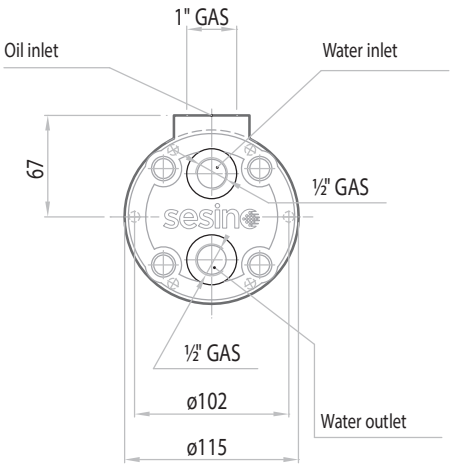


CONSTRUCTION MATERIALS		
SHELL	TUBES	END COVERS
BRASS*	COPPER*	CAST IRON*

*standard

- Dimensions and technical characteristics are not binding





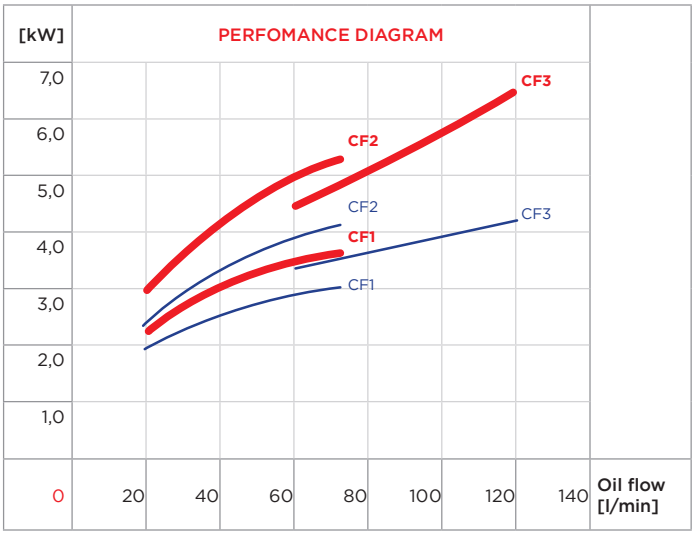
TYPE	CODE	OIL FLOW	WATER FLOW	kW MIN water flow		kW MAX water flow		WEIGHT	DIMENSIONS	
		l/min	l/min	ΔTm 25° C		ΔTm 25° C		kg	L	Lt
MS 84 CF1	2SC84CF1	25-70	7,5-30	2	3	2,5	4	3,5	145	250
MS 84 CF2	2SC84CF2	25-70	7,5-30	2	4	4	5	4,3	215	320
MS 84 CF3	2SC84CF3	60-120	7,5-30	3	4	5	7	5,2	290	395
MS 84 CF4	2SC84CF4	40-100	7,5-30	4,2	5,3	5	8	6,1	365	470
MS 84 CF5	2SC84CF5	80-200	7,5-30	6	9	8	17	7,3	465	570
MS 84 CF6	2SC84CF6	60-150	7,5-30	10	13	13	18	8,6	620	725

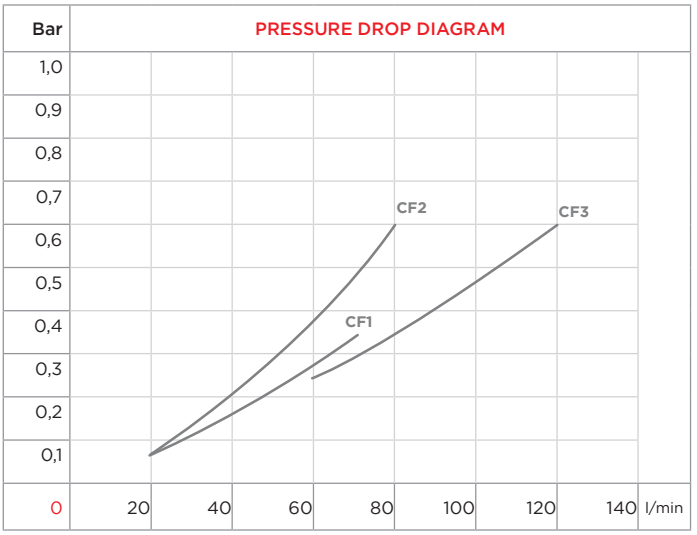
WATER FLOW RATE:

7,5 l/min

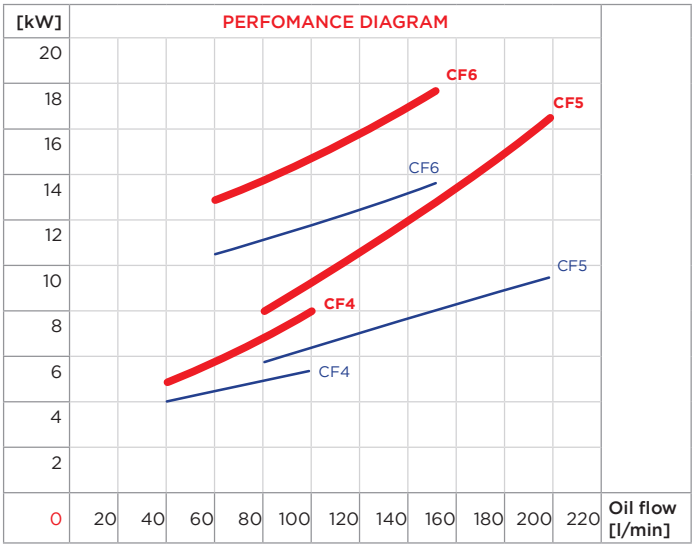
30 l/min

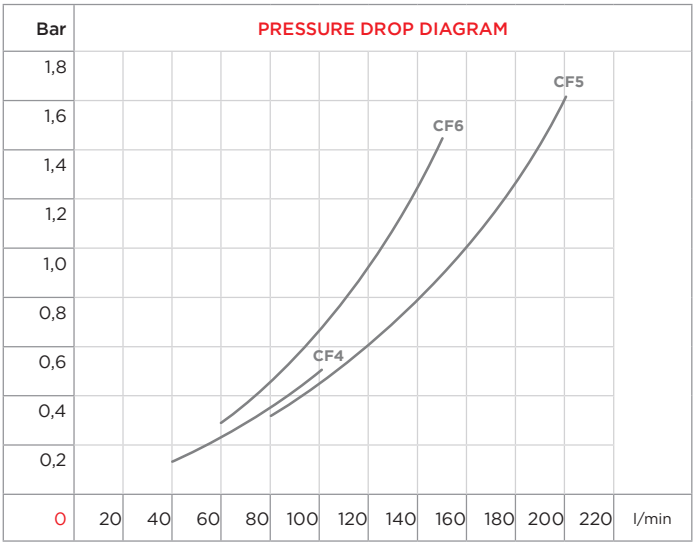
CF1 CF2 CF3





CF4 CF5 CF6

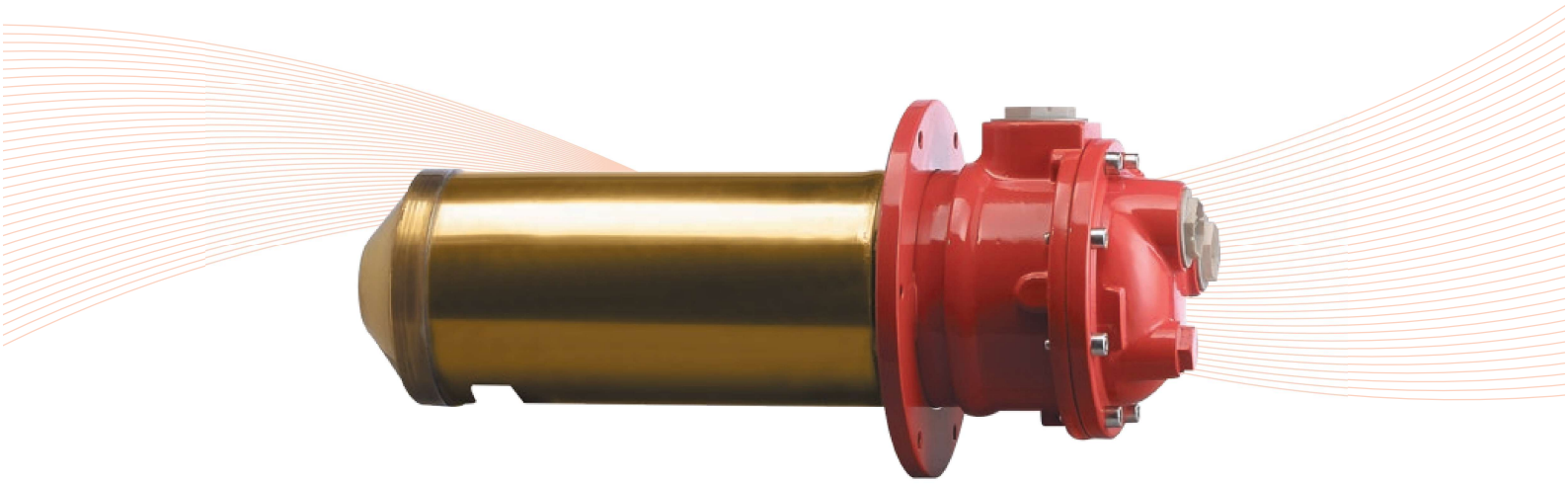




CORRECTION FACTOR							
ΔTm	10	15	20	25	30	35	40
f	2,5	1,67	1,25	1	0,83	0,71	0,63

CORRECTION FACTOR							
cSt	22	30	46	68	100	150	220
f	0,4	0,6	1	1,5	2,3	3,3	4,6

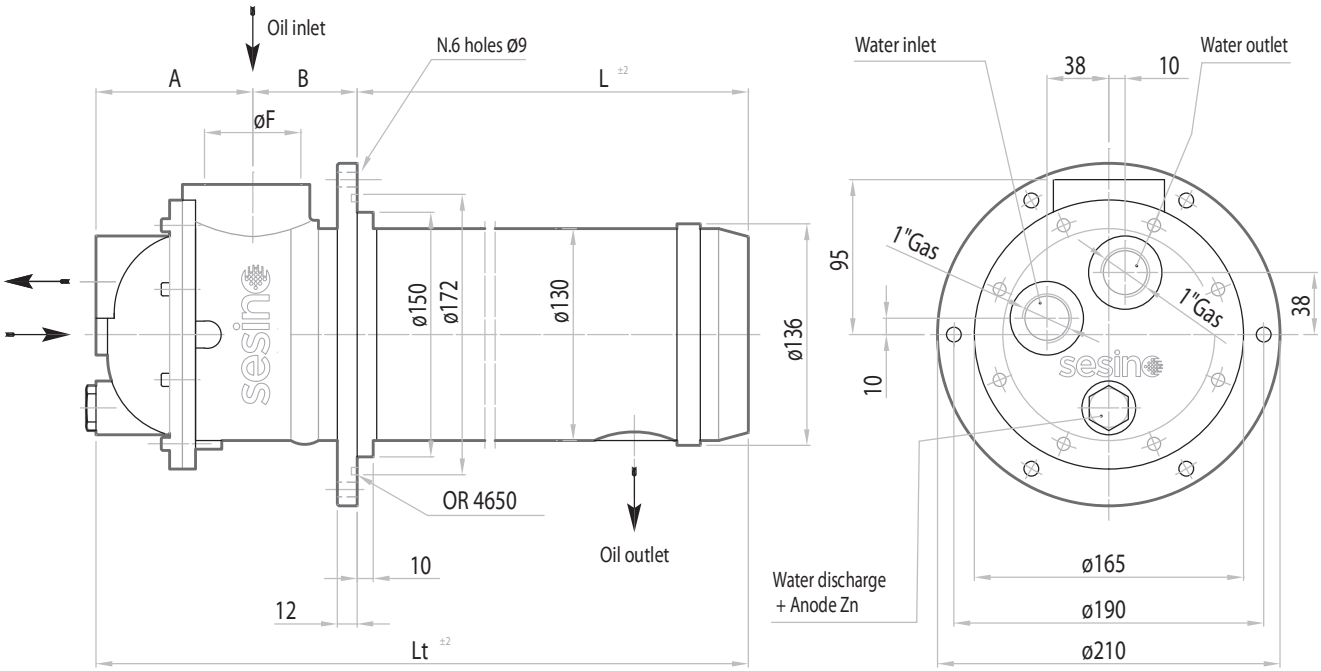
MS 134 CF



CONSTRUCTION MATERIALS		
SHELL	TUBES	END COVERS
BRASS*	COPPER*	CAST IRON*

*standard

- Dimensions and technical characteristics are not binding



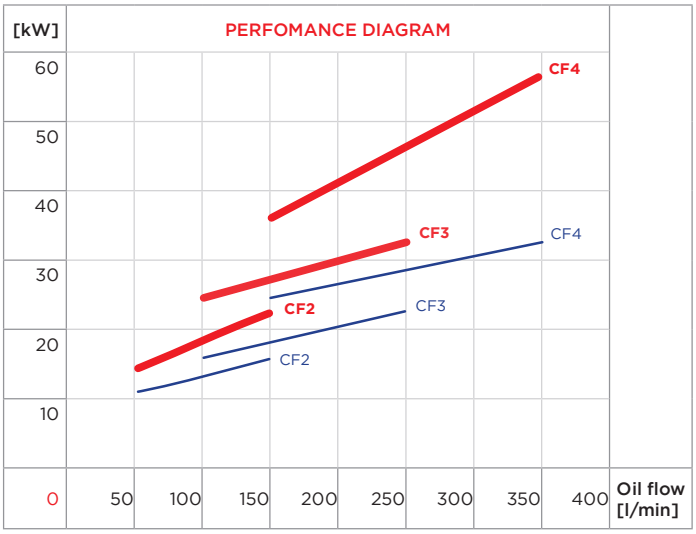
TYPE	CODE	OIL FLOW	WATER FLOW	kW MIN water flow		kW MAX water flow		WEIGHT	DIMENSIONS				
		l/min	l/min	ΔTm 25° C		ΔTm 25° C		kg	F	A	B	L	Lt
MS 134 CF2	2SC134CF2	50-150	15-60	11	16	14	23	16,7	1 1/2" gas	80	60	314	462
MS 134 CF3	2SC134CF3	100-250	15-60	18	24	25	34	20,8	2" gas	88	60	465	613
MS 134 CF4	2SC134CF4	150-350	15-60	25	33	37	56	24,8	2" gas	88	60	635	783
MS 134 CF5	2SC134CF5	80-250	15-60	25	34	37	59	29,3	2" gas	88	60	817	965
MS 134 CF7	2SC134CF7	200-400	15-60	35	47	54	78	41,6	2" gas	88	60	1135	1283

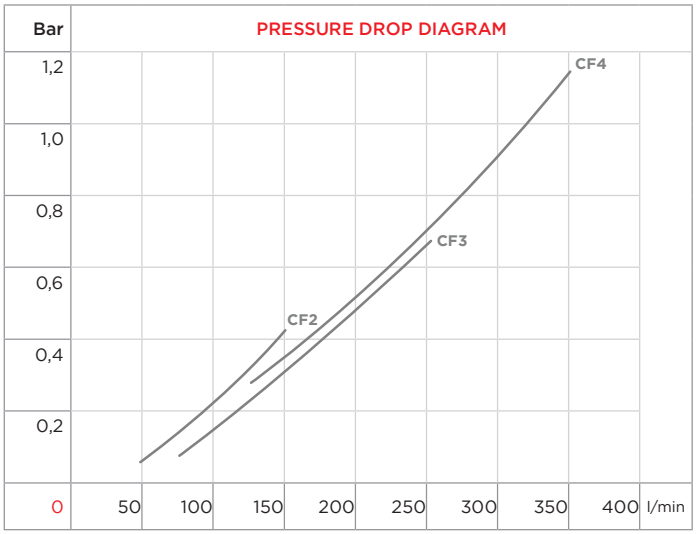
WATER FLOW RATE:

15 l/min

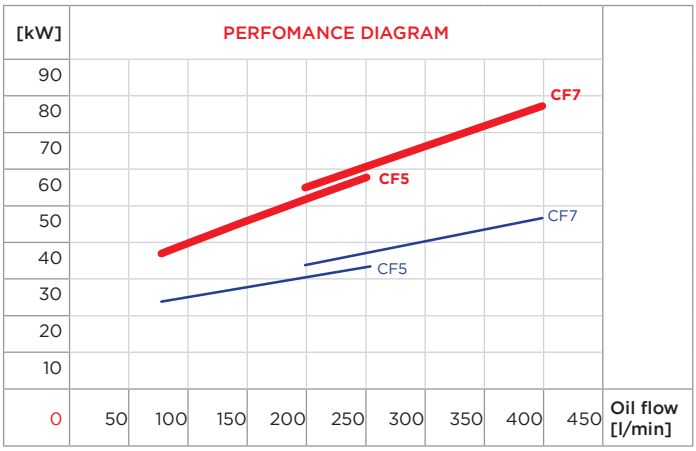
60 l/min

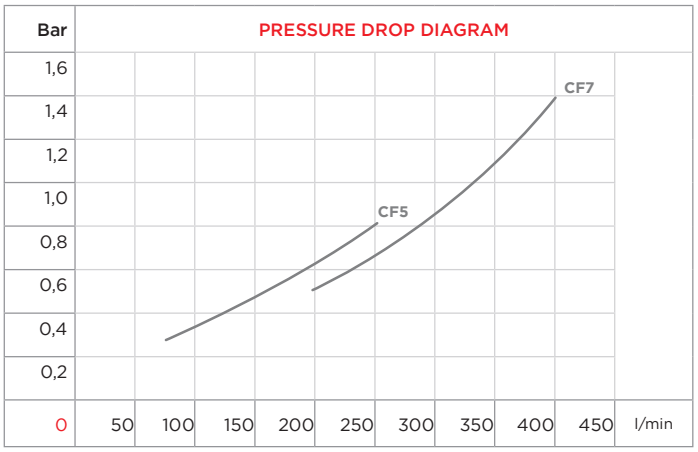
CF2 CF3 CF4





CF5 CF7





CORRECTION FACTOR							
ΔTm	10	15	20	25	30	35	40
f	2,5	1,67	1,25	1	0,83	0,71	0,63

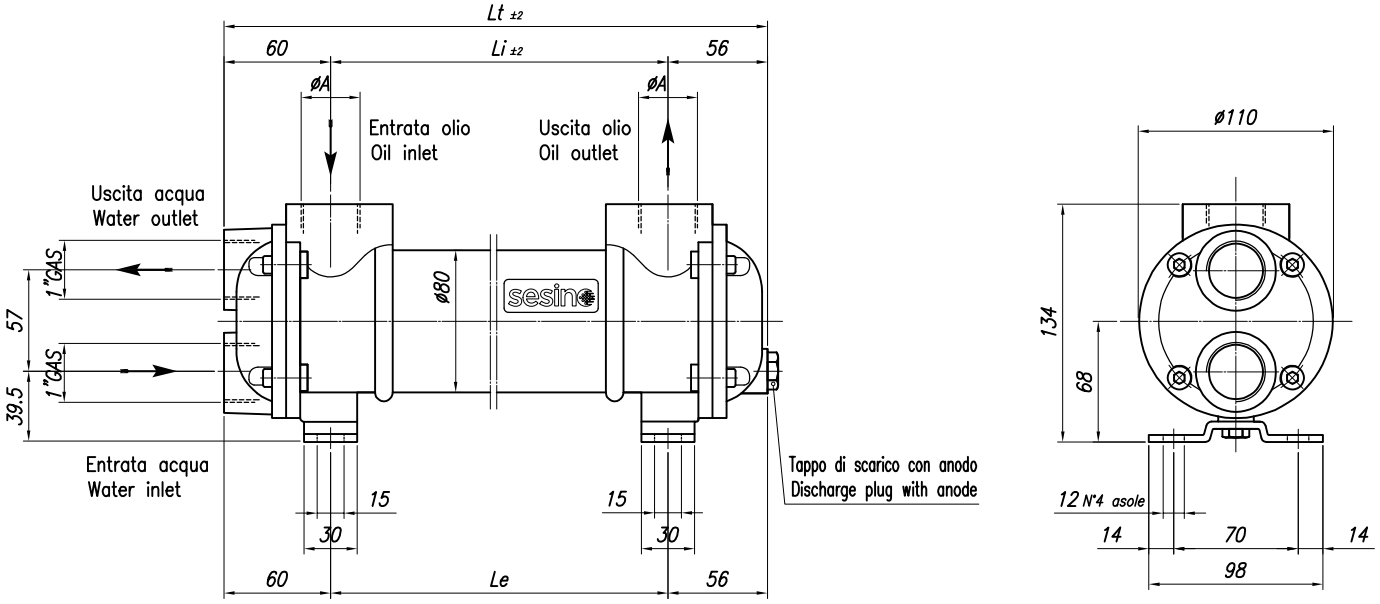
CORRECTION FACTOR							
cSt	22	30	46	68	100	150	220
f	0,4	0,6	1	1,5	2,3	3,3	4,6

MS 84/2B

CONSTRUCTION MATERIALS		
SHELL	TUBES	END COVERS
BRASS	CuNi (marine use)	BRONZE
CARBON STEEL	COPPER	CAST IRON
STAINLESS STEEL	STAINLESS STEEL	STAINLESS STEEL

*standard

- Dimensions and technical characteristics are not binding



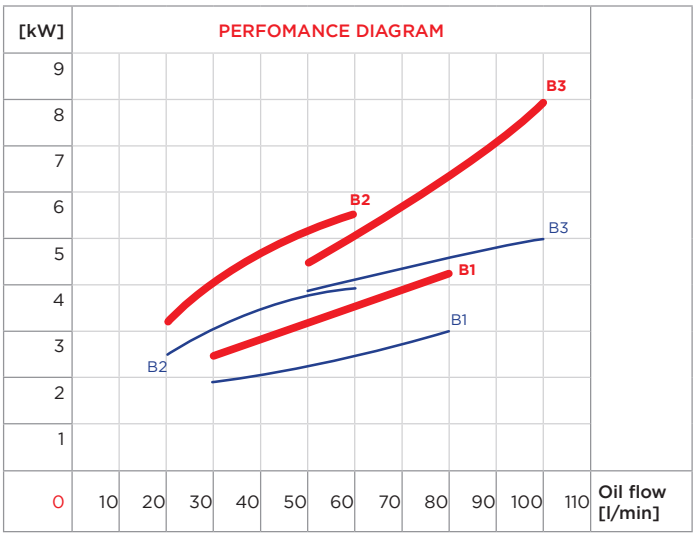
TYPE	CODE	OIL FLOW	WATER FLOW	kW MIN water flow		kW MAX water flow		WEIGHT	DIMENSIONS			
		l/min	l/min	ΔTm 25° C		ΔTm 25° C		kg	øA	Li	Le	Lt
MS 84/2 B1	2SC84/2B1CNA	30-80	7,5 - 30	2	3	2,6	4,2	4,5	1" gas	150	150	266
MS 84/2 B2	2SC84/2B2CNA	20-60	7,5 - 30	2,6	4	3,25	5,6	6,3	1" gas	310	310	426
MS 84/2 B3	2SC84/2B3CNA	50-100	7,5 - 30	3,6	4,4	4,6	8	6,5	1 1/2" gas	310	325	441
MS 84/2 B4	2SC84/2B4CNA	30-80	7,5 - 30	4,8	7	6	10	9,0	1" gas	560	560	676
MS 84/2 B5	2SC84/2B5CNA	80-130	7,5 - 30	6	7	7	9	9,0	1 1/2" gas	560	575	691
MS 84/2 B6	2SC84/2B6CNA	40-90	7,5 - 30	9	12	12	18	10,8	1 1/2" gas	715	730	846
MS 84/2 B7	2SC84/2B7CNA	100-160	7,5 - 30	11	14	15	21	10,8	1 1/2" gas	715	730	846
MS 84/2 B8	2SC84/2B8CNA	60-110	7,5 - 30	12	16	16	24	12,3	1 1/2" gas	870	885	1001
MS 84/2 B9	2SC84/2B9CNA	140-190	7,5 - 30	15	17	21	27	12,3	1 1/2" gas	870	885	1001

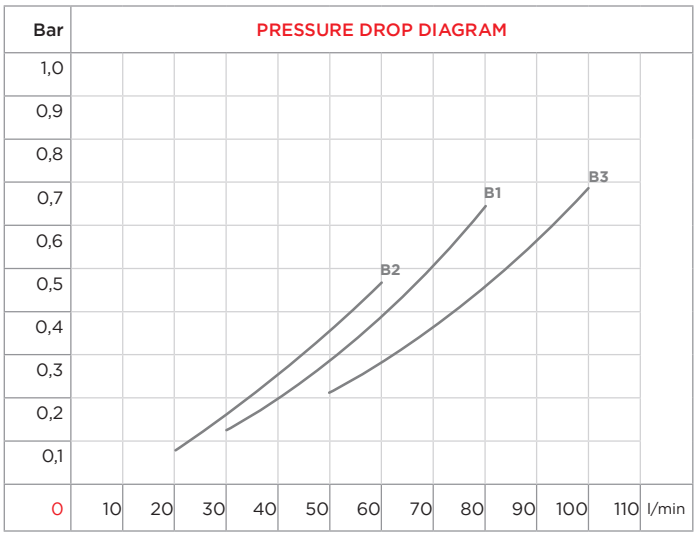
WATER FLOW RATE:

7,5 l/min

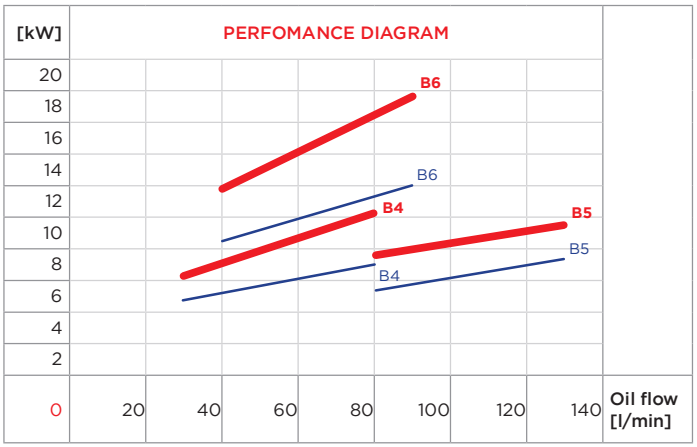
30 l/min

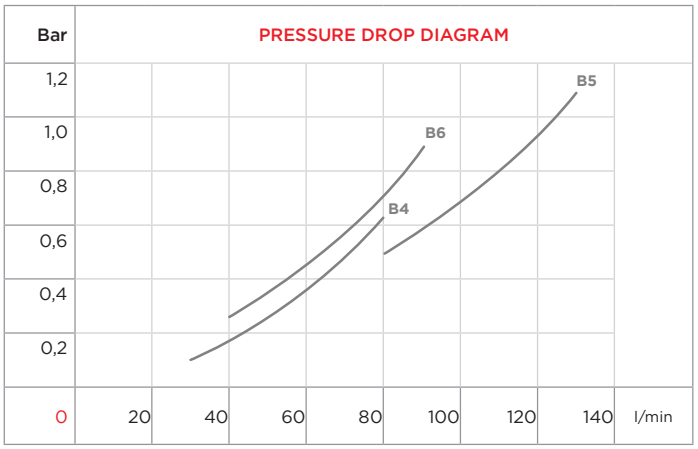
B1 B2 B3



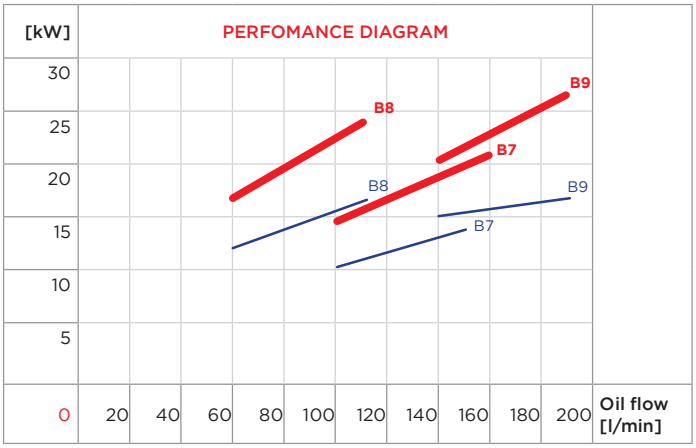


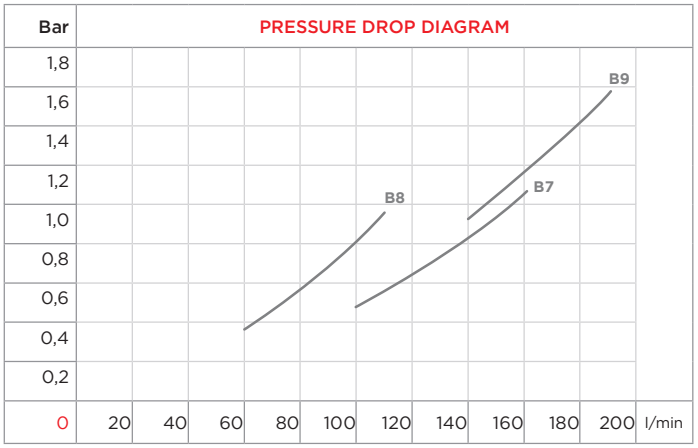
B4 B5 B6





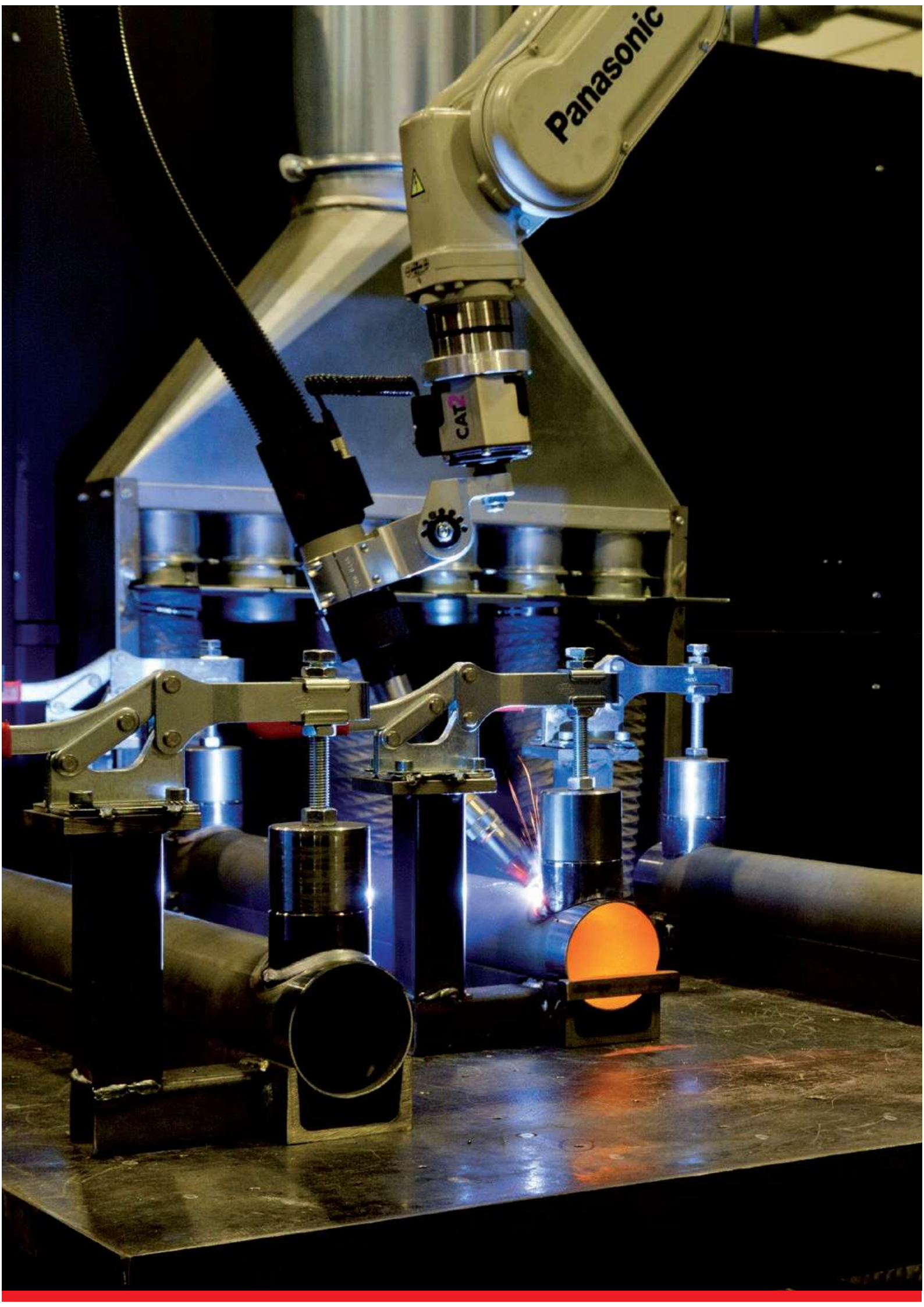
B7 B8 B9



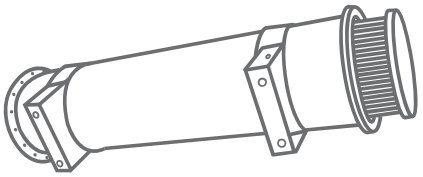


CORRECTION FACTOR							
ΔTm	10	15	20	25	30	35	40
f	2,5	1,67	1,25	1	0,83	0,71	0,63

CORRECTION FACTOR							
cSt	22	30	46	68	100	150	220
f	0,4	0,6	1	1,5	2,3	3,3	4,6


Panasonic
CAT2

WATER-OIL HEAT EXCHANGERS WITH REMOVABLE TUBE BUNDLE
SCAMBIATORI DI CALORE ACQUA-OLIO A FASCIO TUBIERO ESTRAIBILE



WATER-OIL HEAT EXCHANGERS WITH REMOVABLE TUBU BUNDLE MS 152, MS 172, MS 202, MS 272, MS 352

This type of exchangers have a dismountable tube bundle that is, for this reason, inspectable both oil and water side and is particularly fit for not filtered liquids.

The material of the tube bundle can be copper for soft water, copper nickel for seawater and stainless steel for other corrosive fluids or gas

They consist of smooth tubes with little diameter; this allows the best compromise between high thermic performance and low pressure drops.

The flow rates shown in the tables are the ones recommended for the exchanger proper working. Going down the lowest flow rate indicated in the tables, the low oil speed causes a great loss in performance, whereas a flow rate that is superior to the maximum indicated causes great pressure drops and does not considerably increase the thermic performance.

The maximum working pressure allowed in the oil and water circuits is 12 bar

For the right calculation of tube bundle exchangers, we supply our customers with a CD-ROM calculation program; by filling in some data, it is possible to establish the right exchanger and to obtain all the working parameters on a data sheet.

The tube bundle heat exchangers can be used with other kind of fluids, which must be compatible with copper and its alloys. However, for each use, with the exception of oil cooling, we recommend to consult our Technical Department.

Exchange surface from 1 to 30 m^2 approximately.

SCAMBIATORI ACQUA-OLIO A FASCIO TUBIERO ESTRAIBILE SERIE MS 152, MS 172, MS 202, MS 272 e MS 352

Queste serie di scambiatori hanno il fascio tubiero smontabile che è pertanto ispezionabile sia lato olio che lato acqua, ciò li rende idonei all'impiego anche con liquidi non filtrati.

Il materiale di costruzione del fascio tubiero può essere rame, per utilizzo con acqua dolce, cupronickel, per utilizzo con acqua di mare, acciaio inossidabile, per impieghi con fluidi corrosivi e gas.

Sono costruiti con tubi lisci di piccolo diametro, raggiungendo in questo modo il miglior compromesso tra elevata resa termica e basse perdite di carico.

Le portate olio indicate in tabella sono quelle consigliate per il buon funzionamento dello scambiatore. Andando al di sotto della portata minima indicata, la bassa velocità dell'olio causa un forte calo di rendimento, mentre una portata superiore alla massima causa perdite di carico notevoli, senza peraltro aumentare la resa termica in maniera apprezzabile.

La pressione di esercizio massima ammessa in entrambe i circuiti è 12 bar.

Per il calcolo esatto degli scambiatori a fascio tubiero possiamo fornire un programma di calcolo su CD-rom; mediante il semplice inserimento di alcuni dati è possibile stabilire lo scambiatore necessario e ottenere tutti i parametri di funzionamento su un data-sheet.

Gli scambiatori a fascio tubiero possono essere utilizzati con altri tipi di fluidi, a condizione che essi siano compatibili con il rame e le sue leghe. Consigliamo comunque, per qualsiasi impiego che non sia il raffreddamento dell'olio, di consultare il nostro Ufficio Tecnico.

Superfici di scambio da 1 a 30 m^2

Selection procedure

The curves are based on the following data:

1) Oil viscosity ISO VG 46
2) Arithmetic mean temperature difference between oil and water 25 [°C] (ΔTm)

If your application parameters are different, follow these steps:

1) Define the arithmetic mean difference temperature [see the technical example on page 7] and select the correction factor from the table

CORRECTION FACTOR							
ΔTm	10	15	20	25	30	35	40
f	2,5	1,67	1,25	1	0,83	0,71	0,63

2) Calculate the adjusted thermal power $\dot{Q}d = \dot{Q} \bullet f$

3) Select the model from the curve
Cross-check on the diagram the values of the oil flow, of the water flow and of the thermal adjusted power.

Procedura di selezione dello scambiatore

Le curve riportate sono basate sulle seguenti assunzioni:

1) Viscosità cinematica dell'olio pari a 46 [cSt]
2) Differenza di temperatura media aritmetica tra i due fluidi pari a 25 [°C] (ΔTm)

Se si ha una differenza di temperatura media aritmetica differente da 25 [°C], seguire la procedura sottostante:

1) Determinare la differenza di temperatura media aritmetica tra i due fluidi [vedere esempio a pagina 9 per effettuare il calcolo] e selezionare il fattore di correzione appropriato dalla tabella

CORRECTION FACTOR							
ΔTm	10	15	20	25	30	35	40
f	2,5	1,67	1,25	1	0,83	0,71	0,63

2) Determinare la potenza termica da smaltire opportunamente corretta $\dot{Q}d = \dot{Q} \bullet f$

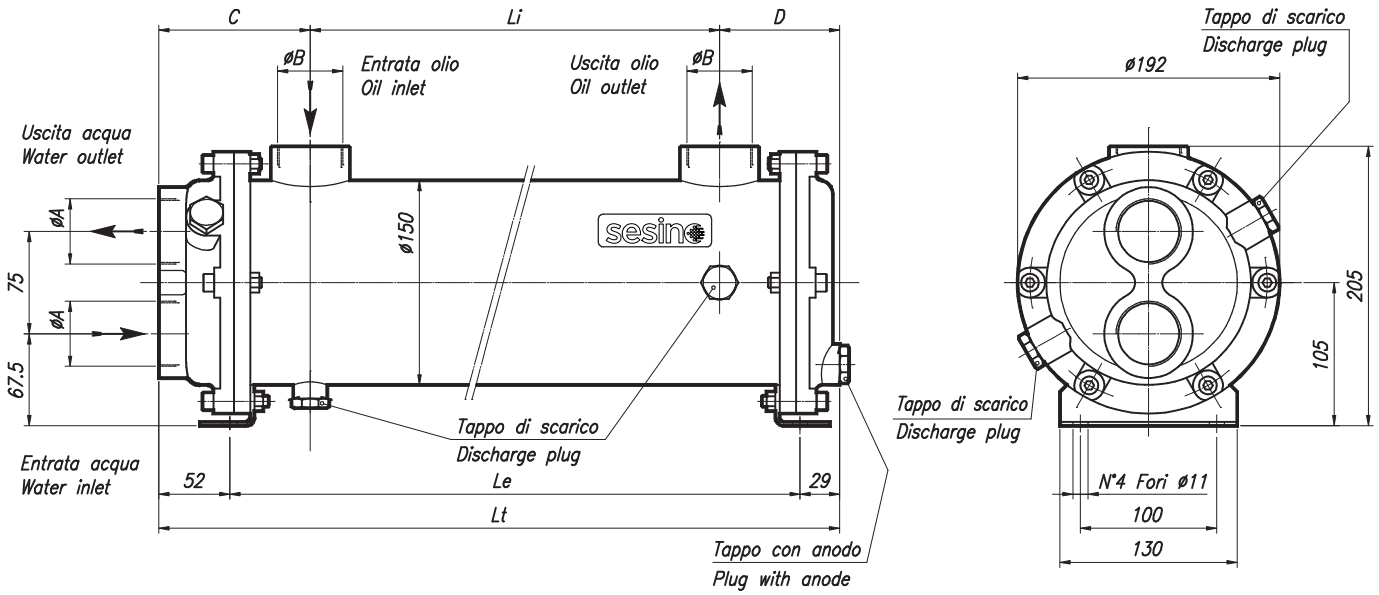
3) Selezionare il modello
Incrociare i valori di portata volumetrica d'olio, d'acqua e della potenza termica corretta sull'apposito grafico

MS 152/7 P

CONSTRUCTION MATERIALS		
SHELL	TUBES	END COVERS
CARBON STEEL*	COPPER*	CAST IRON*
STAINLESS STEEL	STAINLESS STEEL	STAINLESS STEEL
BRASS	CuNi (water sea)	BRONZE

*standard

- Dimensions and technical characteristics are not binding



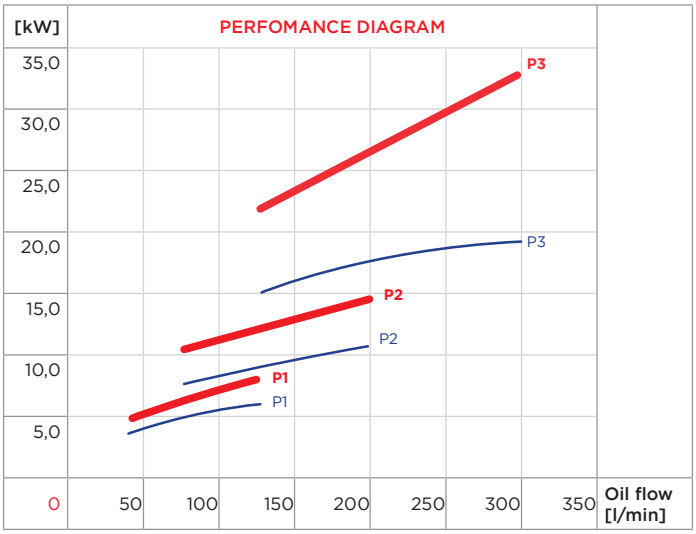
TYPE	CODE	OIL FLOW	WATER FLOW	kW MIN water flow		kW MAX water flow		WEIGHT	DIMENSIONS						
		l/min	l/min	ΔTm 25° C		ΔTm 25° C		kg	øA	øB	C	D	Li	Le	Lt
MS 152/7 P1	2SC152/7P1	40-120	40-160	4,5	6,9	5,1	8,3	17	1" gas	3/4" gas	101	78	80	178	259
MS 152/7 P2	2SC152/7P2	80-200	40-160	8	10	10	15	21	1" gas	1" gas	111	88	150	268	349
MS 152/7 P3	2SC152/7P3	130-300	40-160	15	19	23	33	26,5	1 1/2" gas	1 1/2" gas	111	88	300	418	499
MS 152/7 P4	2SC152/7P4	150-330	40-160	10	20	15	30	32	2" gas	2" gas	121	98	430	568	649
MS 152/7 P5	2SC152/7P5	200-400	40-160	30	42	45	65	38,5	2" gas	2" gas	121	98	590	728	809
MS 152/7 P6	2SC152/7P6	100-300	40-160	21	42	35	65	44	2" gas	2" gas	121	98	720	858	939
MS 152/7 P7	2SC152/7P7	250-500	40-160	39	47	69	98	54	2" gas	2" gas	121	98	970	1108	1189
MS 152/7 P8	2SC152/7P8	250-500	40-160	48	55	88	118	62	2" gas	2" gas	121	98	1170	1308	1389
MS 152/7 P9	2SC152/7P9	250-500	40-160	55	70	97	130	70	2" gas	2" gas	121	98	1370	1508	1589

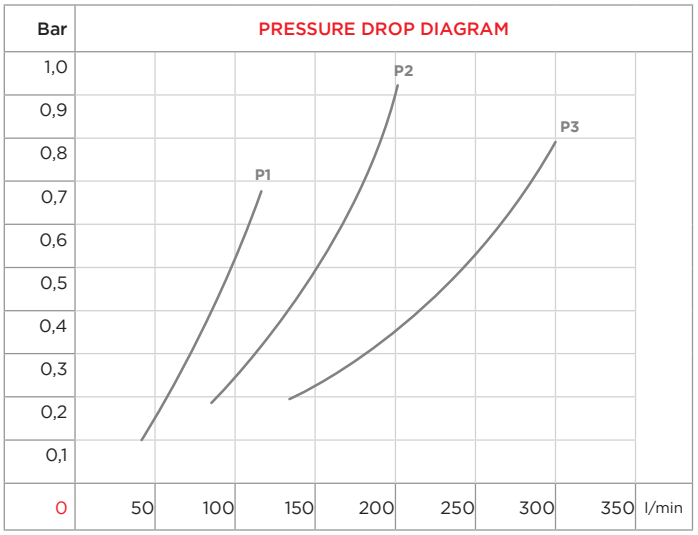
WATER FLOW RATE:

40 l/min

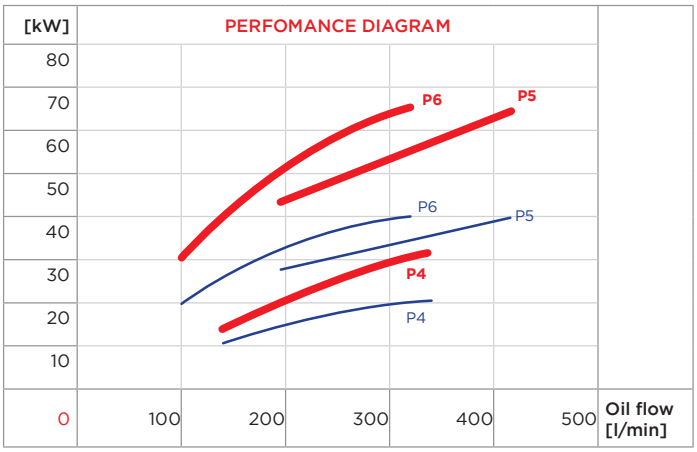
160 l/min

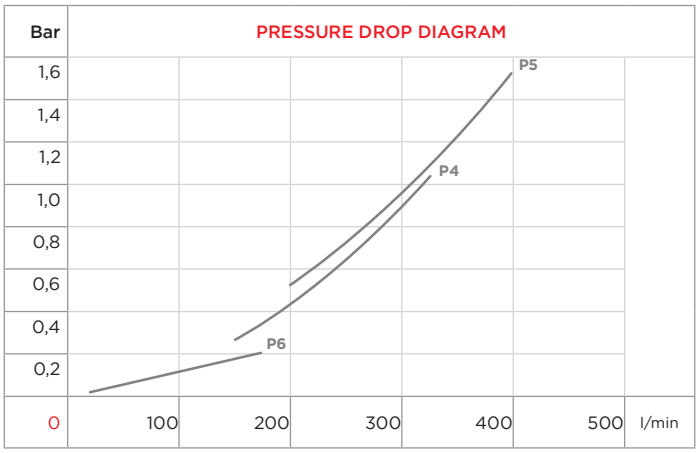
P1 P2 P3



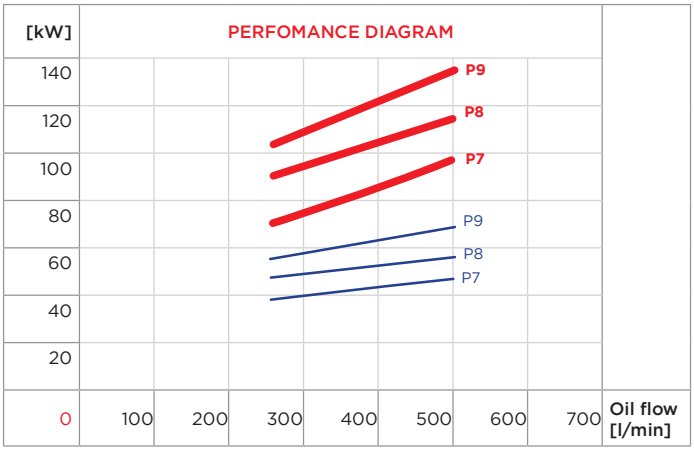


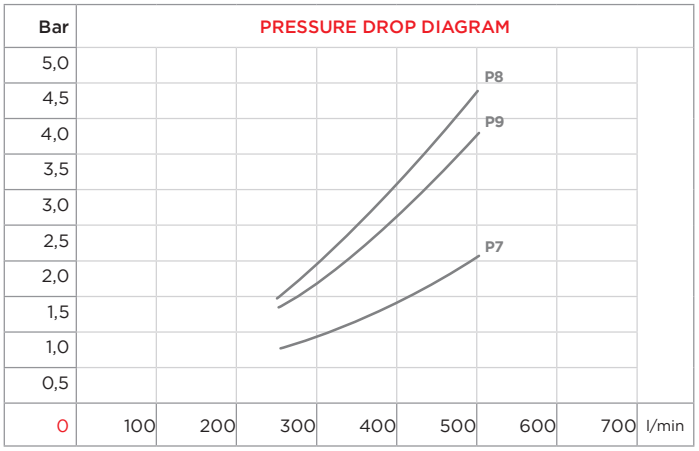
P4 P5 P6





P7 P8 P9

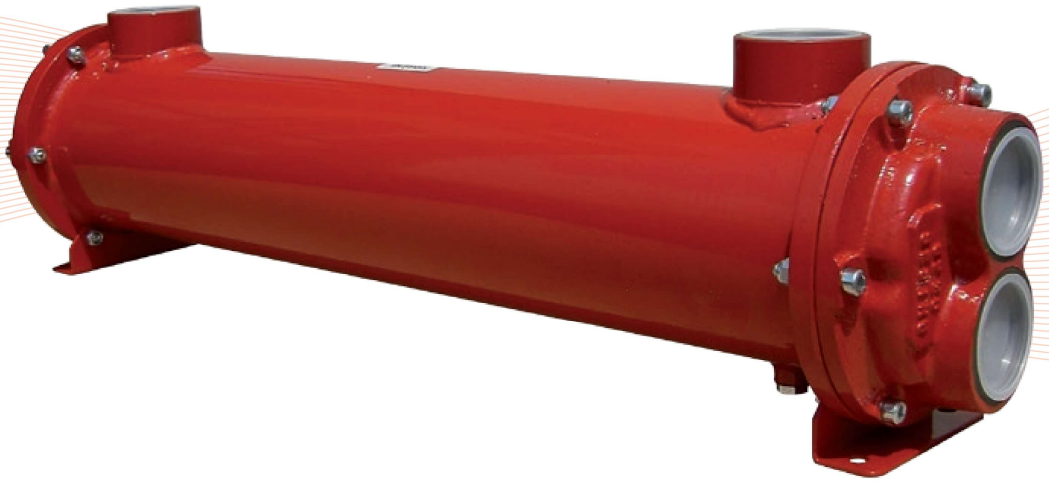




CORRECTION FACTOR							
ΔTm	10	15	20	25	30	35	40
f	2,5	1,67	1,25	1	0,83	0,71	0,63

CORRECTION FACTOR							
cSt	22	30	46	68	100	150	220
f	0,4	0,6	1	1,5	2,3	3,3	4,6

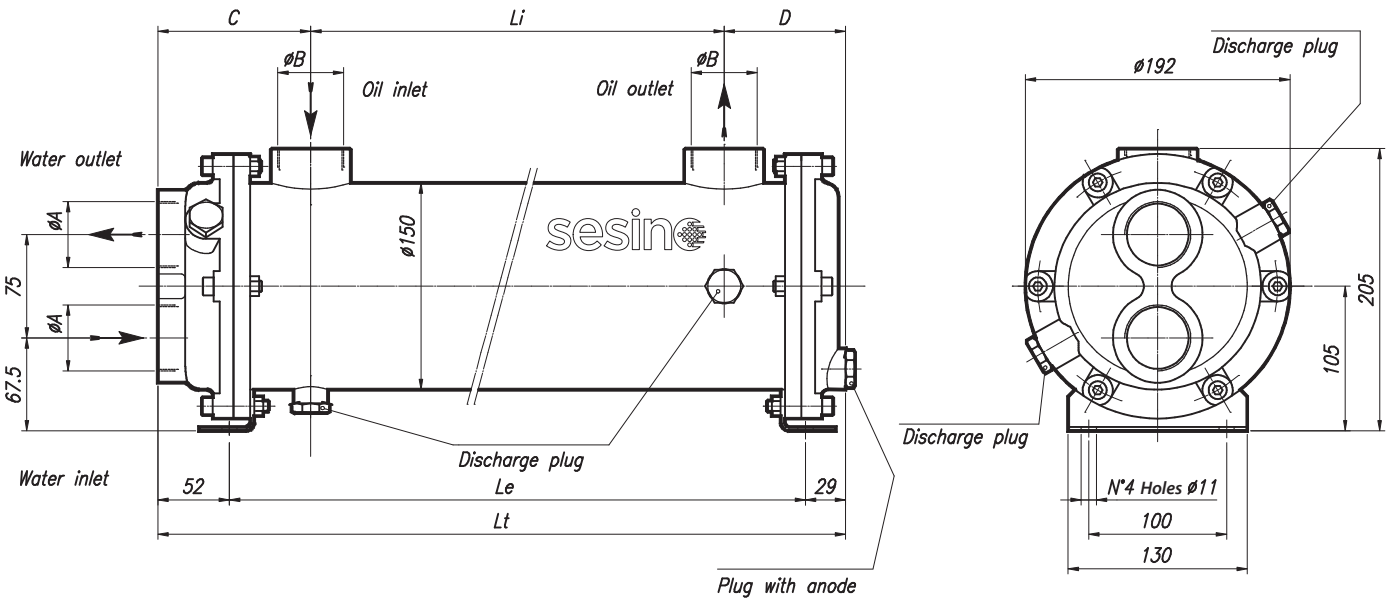
MS 152/10 P



CONSTRUCTION MATERIALS		
SHELL	TUBES	END COVERS
CARBON STEEL*	COPPER*	CAST IRON*
STAINLESS STEEL	STAINLESS STEEL	STAINLESS STEEL
BRASS	CuNi (water sea)	BRONZE

*standard

- Dimensions and technical characteristics are not binding



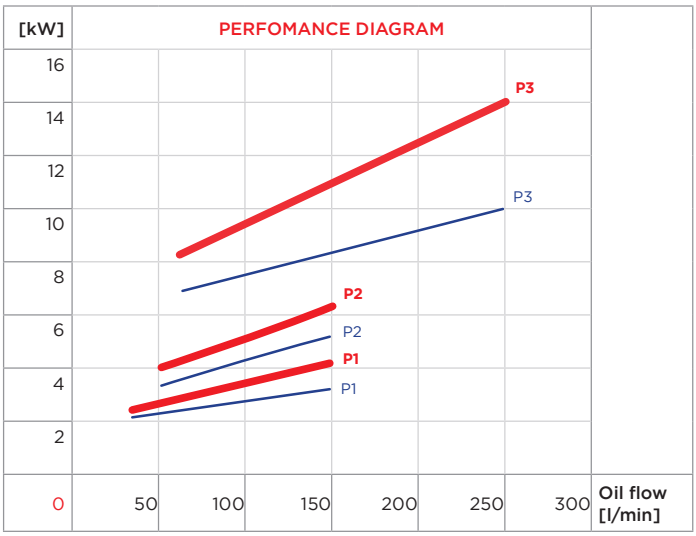
TYPE	CODE	OIL FLOW	WATER FLOW	kW MIN water flow		kW MAX water flow		WEIGHT	DIMENSIONS						
		l/min	l/min	ΔTm 25° C		ΔTm 25° C		kg	øA	øB	C	D	Li	Le	Lt
MS 152/10 P1	2SC152/10P1	30-150	40-160	2,1	3,5	2,5	4,5	16	1" gas	3/4" gas	101	78	80	178	259
MS 152/10 P2	2SC152/10P2	50-150	40-160	4	5	4,6	6	19	1" gas	1" gas	111	88	150	268	349
MS 152/10 P3	2SC152/10P3	60-250	40-160	7	10	8,5	14	24	1 1/2" gas	1 1/2" gas	111	88	300	418	499
MS 152/10 P4	2SC152/10P4	90-200	40-160	12	17	16	21	29	2" gas	2" gas	121	98	430	568	649
MS 152/10 P5	2SC152/10P5	140-260	40-160	15	20	21	30	34	2" gas	2" gas	121	98	590	728	809
MS 152/10 P6	2SC152/10P6	160-300	40-160	19	26	27	37	39	2" gas	2" gas	121	98	720	858	939
MS 152/10 P7	2SC152/10P7	100-300	40-160	15	19	31	42	47	2" gas	2" gas	121	98	858	1108	1189
MS 152/10 P8	2SC152/10P8	100-250	40-160	29	35	41	52	54	2" gas	2" gas	121	98	1108	1308	1389
MS 152/10 P9	2SC152/10P9	200-380	40-160	43	46	64	72	61	2" gas	2" gas	121	98	1308	1508	1589

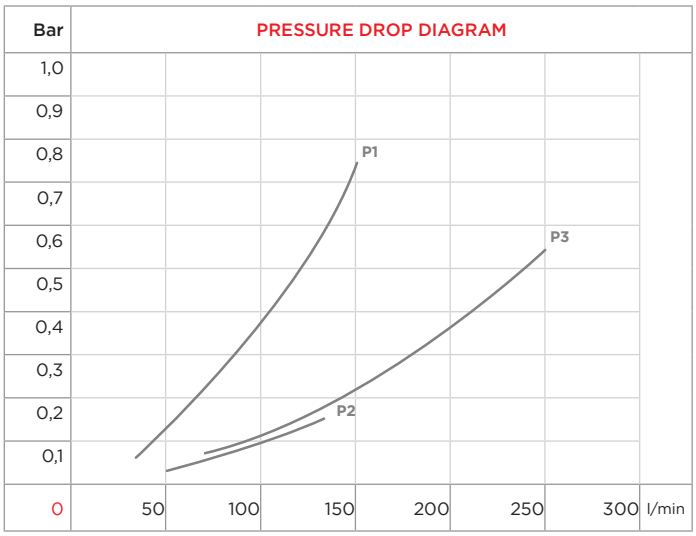
WATER FLOW RATE:

40 l/min

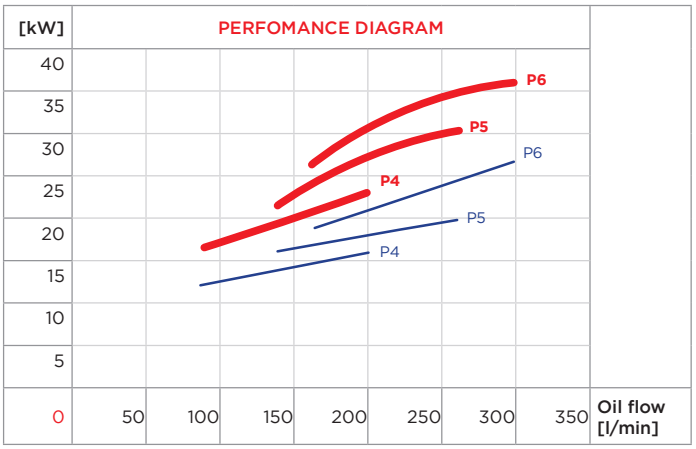
160 l/min

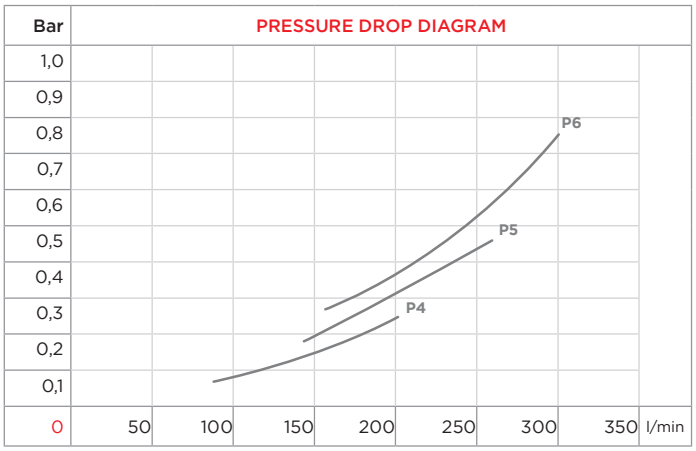
P1 P2 P3



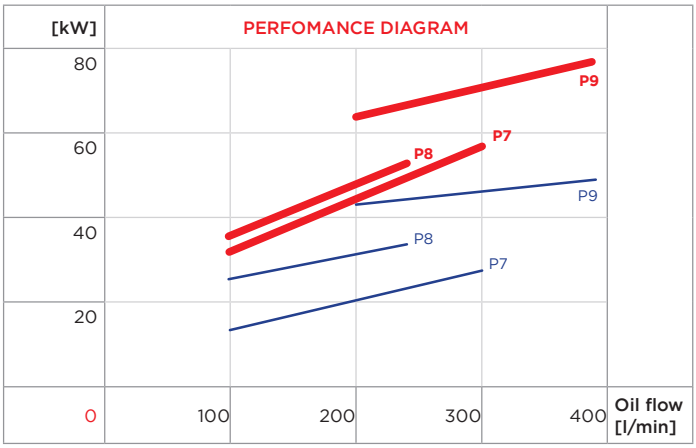


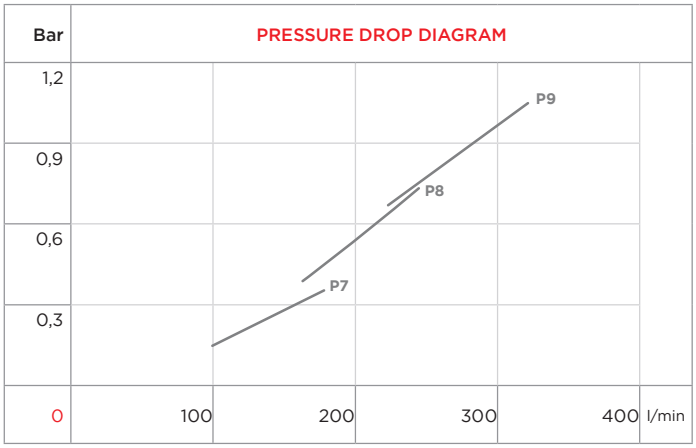
P4 P5 P6





P7 P8 P9

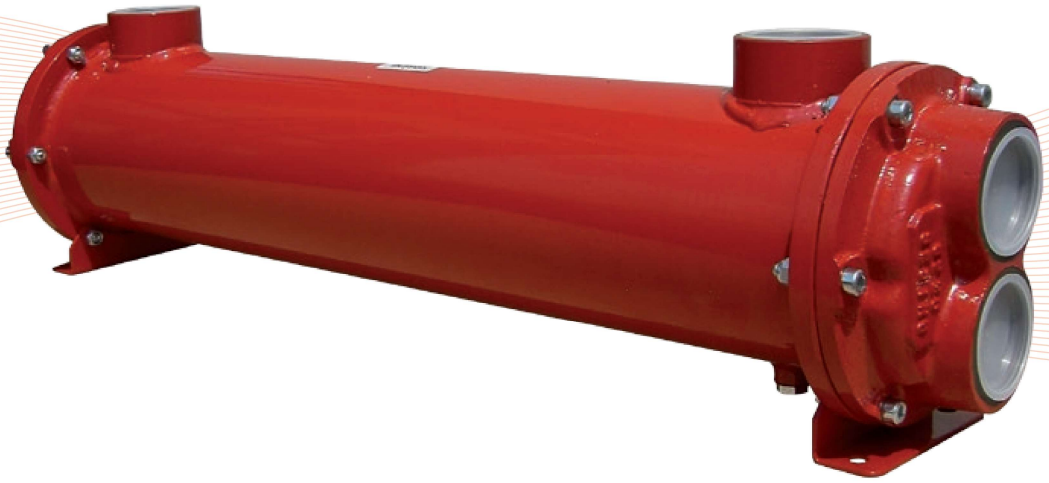




CORRECTION FACTOR							
ΔTm	10	15	20	25	30	35	40
f	2,5	1,67	1,25	1	0,83	0,71	0,63

CORRECTION FACTOR							
cSt	22	30	46	68	100	150	220
f	0,4	0,6	1	1,5	2,3	3,3	4,6

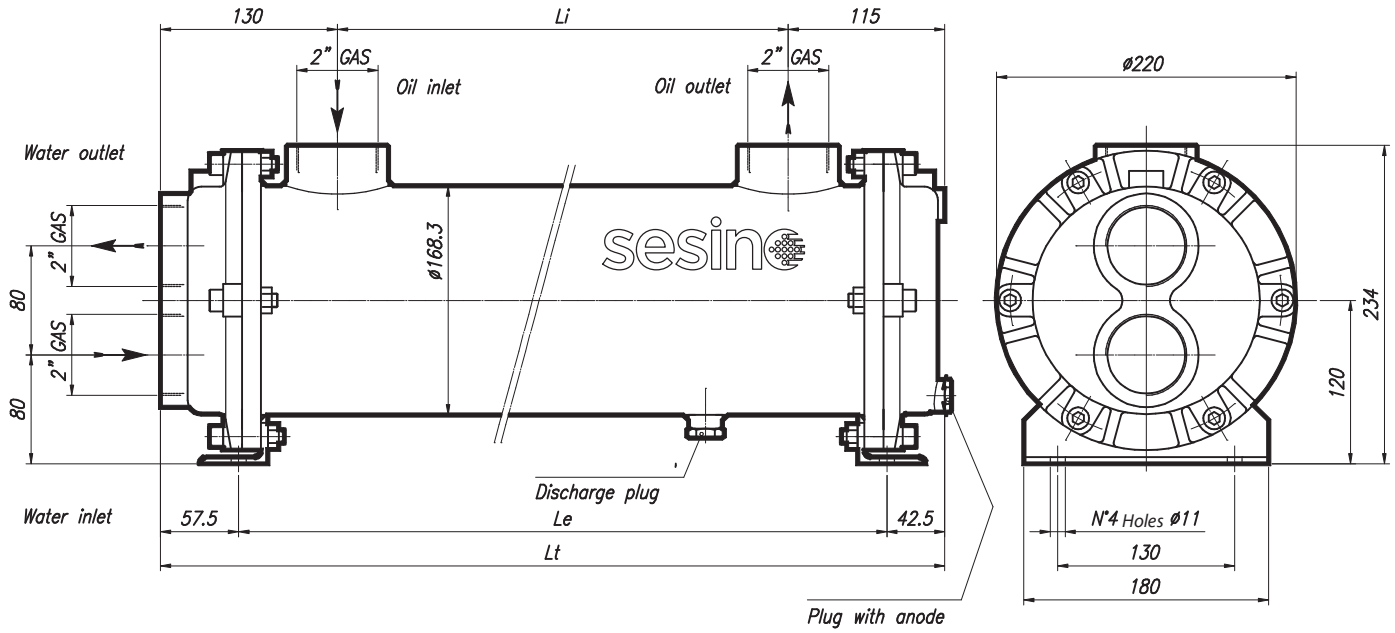
MS 172/7 P



CONSTRUCTION MATERIALS		
SHELL	TUBES	END COVERS
CARBON STEEL*	COPPER*	CAST IRON*
STAINLESS STEEL	STAINLESS STEEL	STAINLESS STEEL
BRASS	CuNi (water sea)	BRONZE

*standard

- Dimensions and technical characteristics are not binding



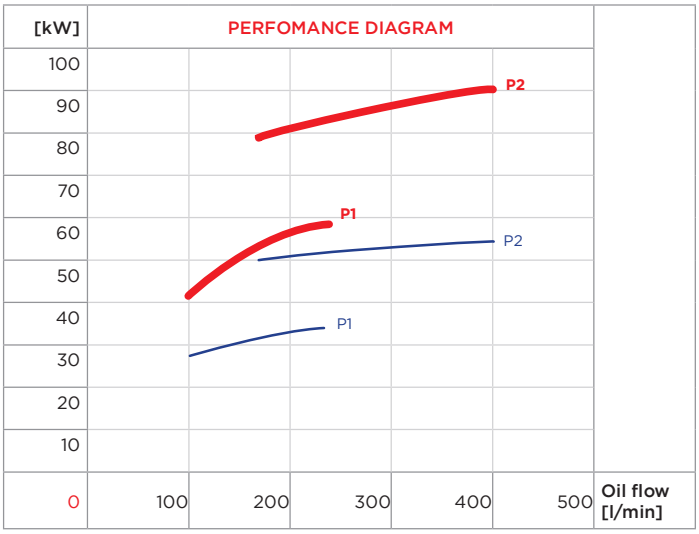
TYPE	CODE	OIL FLOW	WATER FLOW	kW MIN water flow		kW MAX water flow		WEIGHT	DIMENSIONS		
		l/min	l/min	ΔTm 25° C		ΔTm 25° C		kg	Li	Le	Lt
MS 172/7 P1	2SC172/7P1	100-240	67,5-270	28	34	42	60	42	355	500	600
MS 172/7 P2	2SC172/7P2	160-400	67,5-270	50	57	78	92	50,5	505	650	750
MS 172/7 P3	2SC172/7P3	260-420	67,5-270	63	71	110	136	59	655	800	900
MS 172/7 P4	2SC172/7P4	340-500	67,5-270	76	92	136	171	68,5	830	975	1075
MS 172/7 P5	2SC172/7P5	180-320	67,5-270	88	96	143	170	78	1005	1150	1250
MS 172/7 P6	2SC172/7P6	140-500	67,5-270	89	117	148	230	86	1155	1300	1400
MS 172/7 P7	2SC172/7P7	250-550	67,5-270	113	138	200	267	97	1355	1500	1600

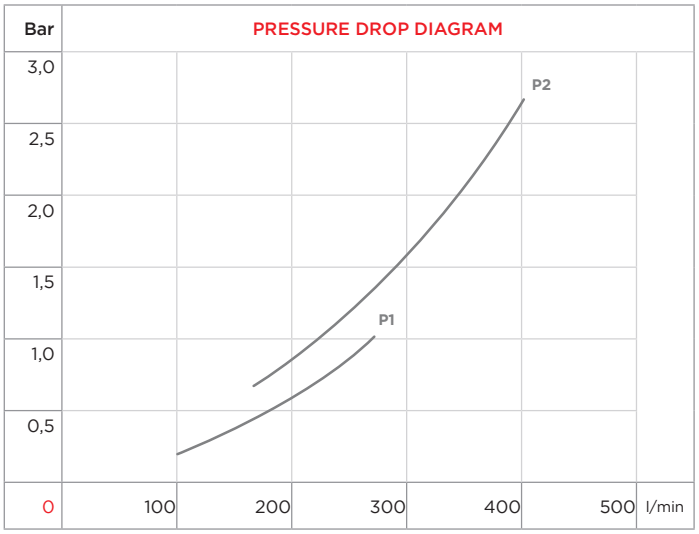
WATER FLOW RATE:

67,5 l/min

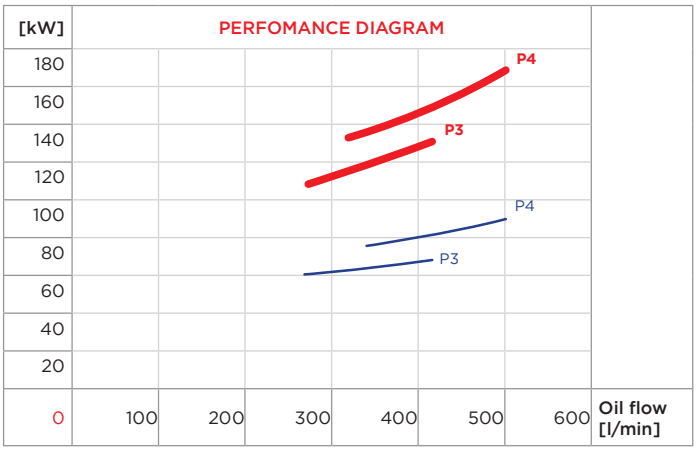
270 l/min

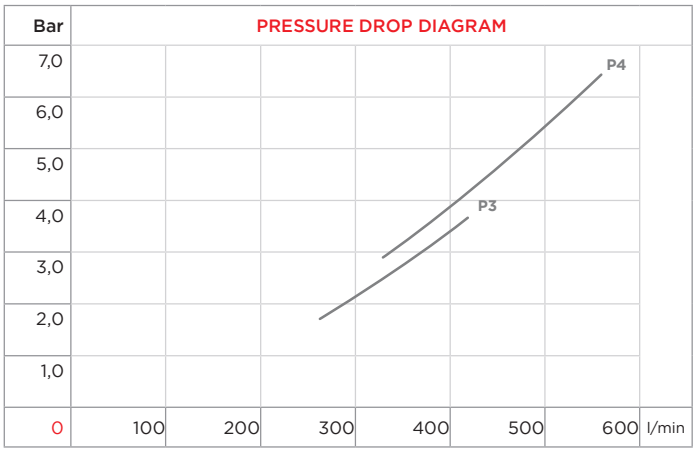
P1 P2



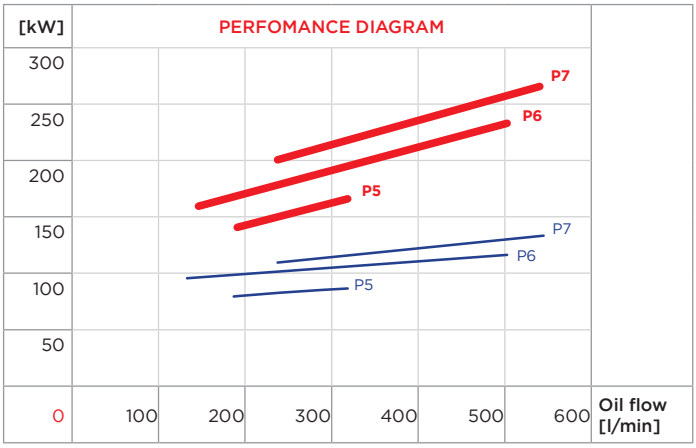


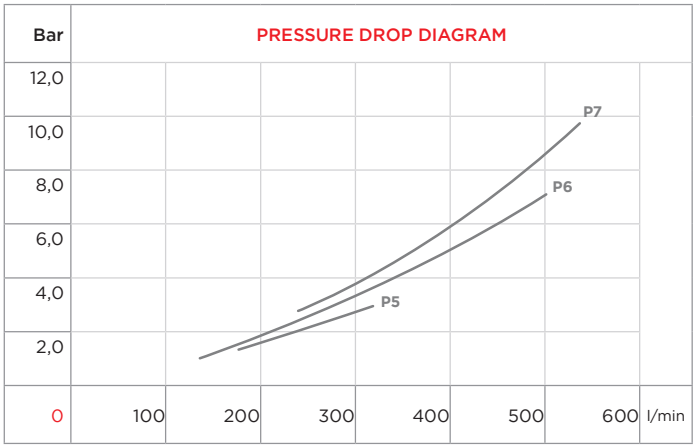
P3 P4





P5 P6 P7

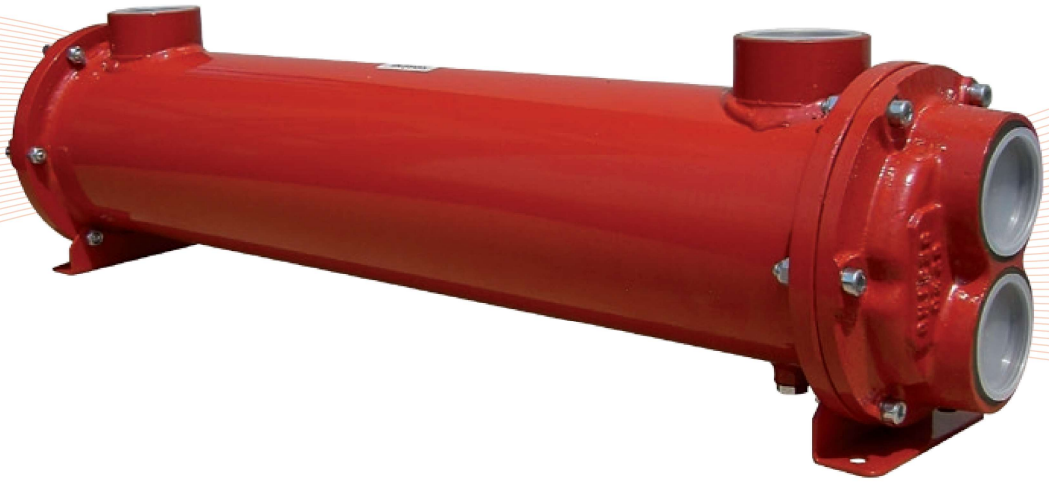




CORRECTION FACTOR							
ΔTm	10	15	20	25	30	35	40
f	2,5	1,67	1,25	1	0,83	0,71	0,63

CORRECTION FACTOR							
cSt	22	30	46	68	100	150	220
f	0,4	0,6	1	1,5	2,3	3,3	4,6

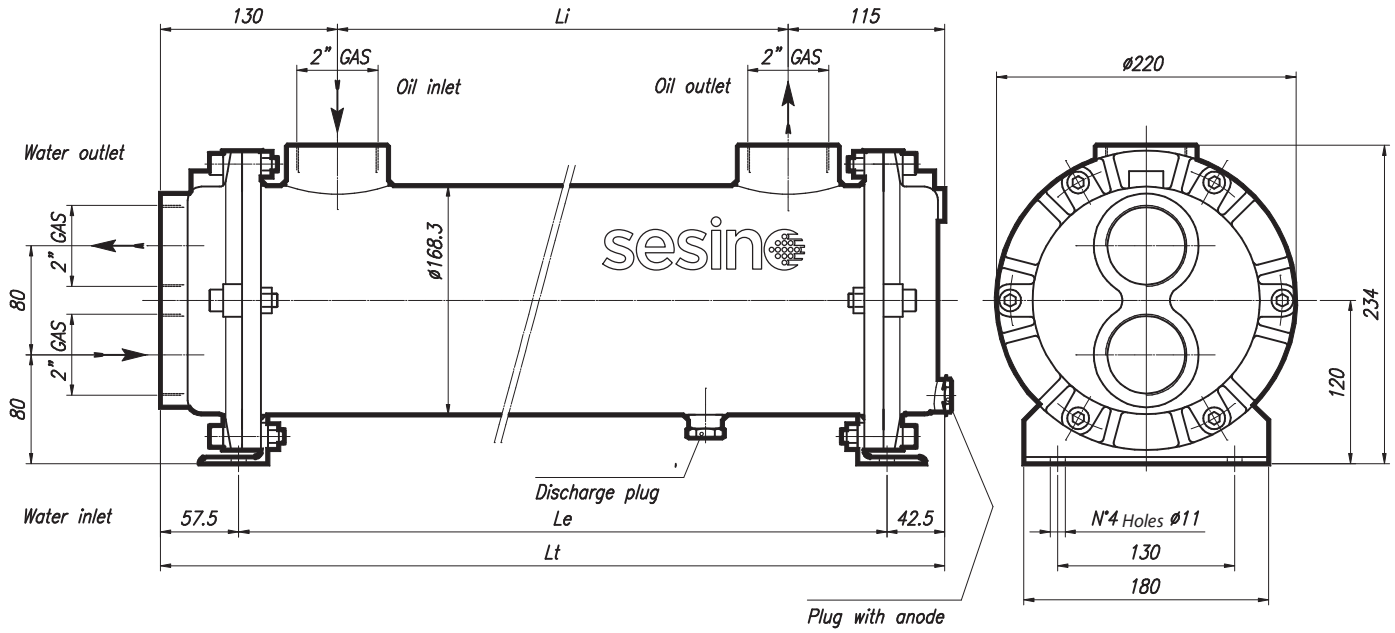
MS 172/10 P



CONSTRUCTION MATERIALS		
SHELL	TUBES	END COVERS
CARBON STEEL*	COPPER*	CAST IRON*
STAINLESS STEEL	STAINLESS STEEL	STAINLESS STEEL
BRASS	CuNi (water sea)	BRONZE

*standard

- Dimensions and technical characteristics are not binding



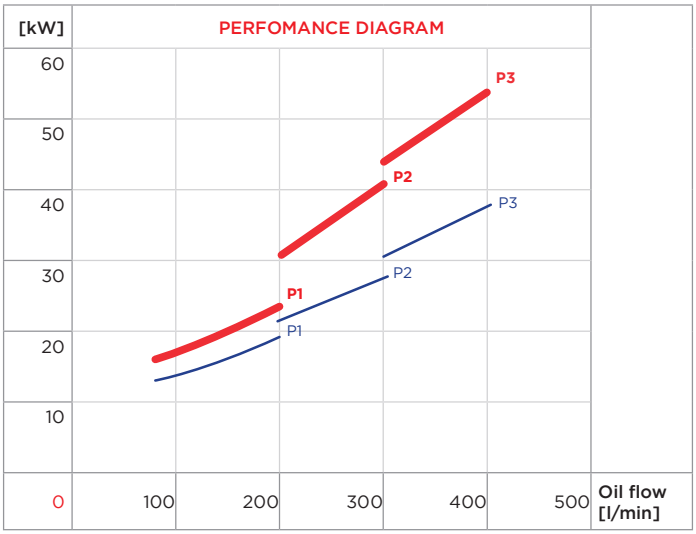
TYPE	CODE	OIL FLOW	WATER FLOW	kW MIN water flow		kW MAX water flow		WEIGHT	DIMENSIONS		
		l/min	l/min	ΔTm 25° C		ΔTm 25° C		kg	Li	Le	Lt
MS 172/10 P1	2SC172/10P1	80-200	67,5-270	13	18	16	24	36	355	500	600
MS 172/10 P2	2SC172/10P2	200-300	67,5-270	22	28	31	41	42,5	505	650	750
MS 172/10 P3	2SC172/10P3	300-400	67,5-270	31	38	44	55	54,5	655	800	900
MS 172/10 P4	2SC172/10P4	120-280	67,5-270	26	39	35	56	63	830	975	1075
MS 172/10 P5	2SC172/10P5	280-400	67,5-270	51	57	69	88	71,5	1005	1150	1250
MS 172/10 P6	2SC172/10P6	100-300	67,5-270	46	61	61	85	79	1155	1300	1400
MS 172/10 P7	2SC172/10P7	300-500	67,5-270	69	89	90	115	88,5	1355	1500	1600

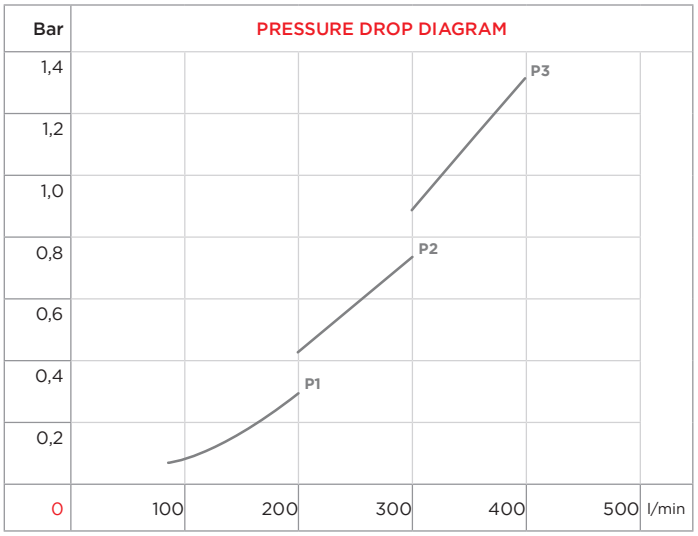
WATER FLOW RATE:

67,5 l/min

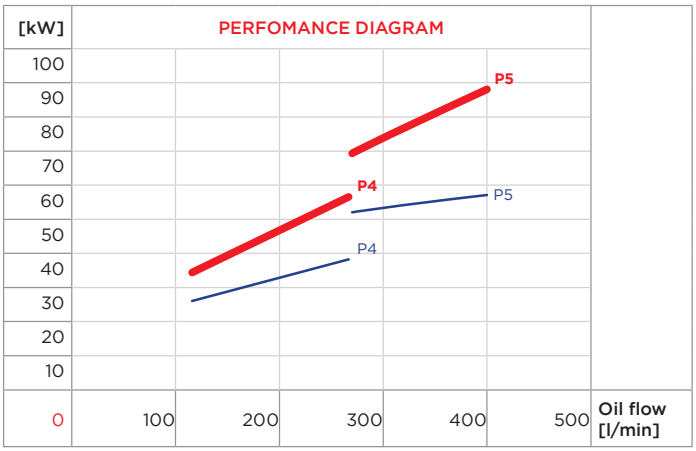
270 l/min

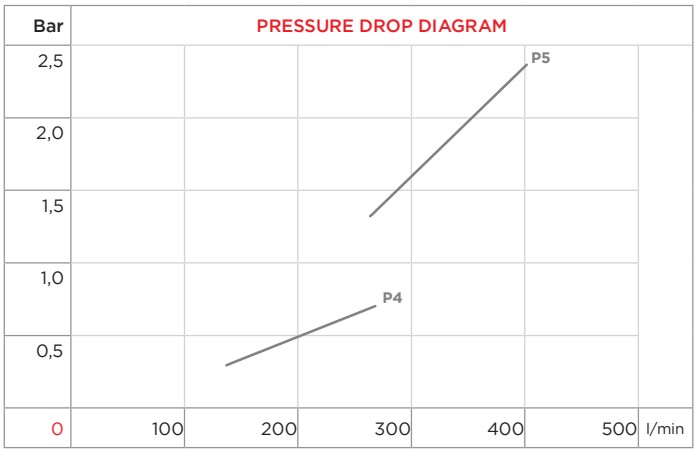
P1 P2 P3



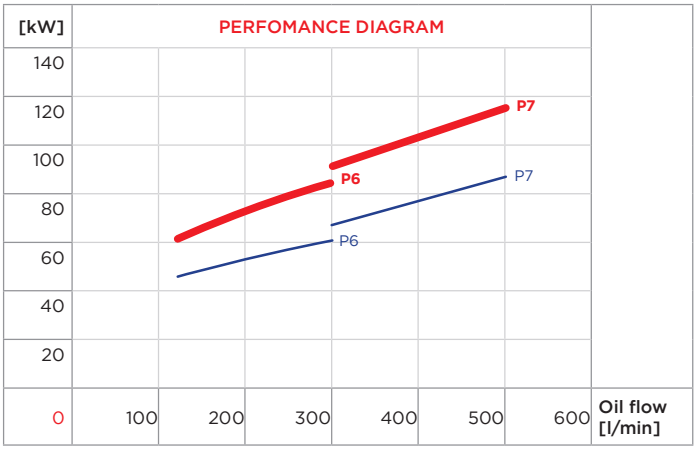


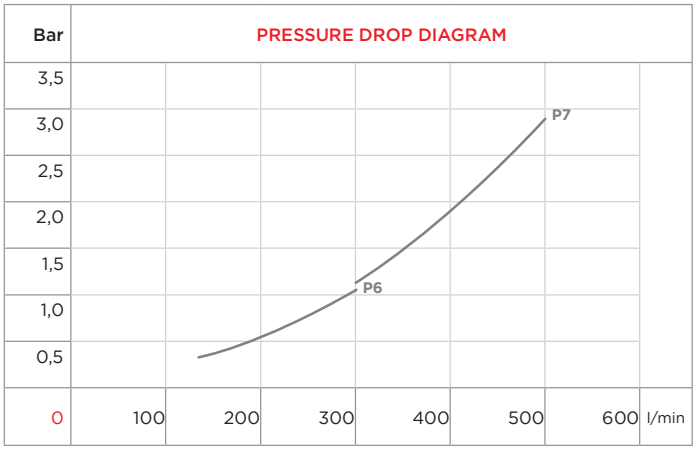
P4 P5





P6 P7





CORRECTION FACTOR							
ΔTm	10	15	20	25	30	35	40
f	2,5	1,67	1,25	1	0,83	0,71	0,63

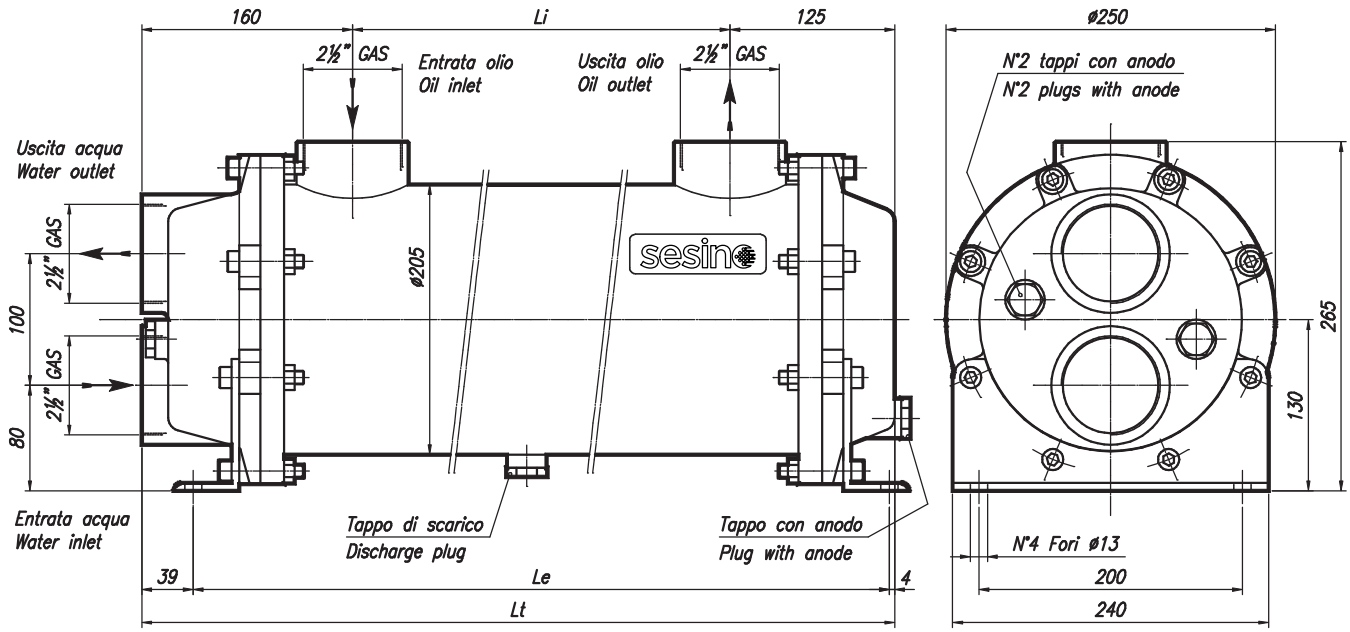
CORRECTION FACTOR							
cSt	22	30	46	68	100	150	220
f	0,4	0,6	1	1,5	2,3	3,3	4,6

MS 202 P

CONSTRUCTION MATERIALS		
SHELL	TUBES	END COVERS
CARBON STEEL*	COPPER*	CAST IRON*
STAINLESS STEEL	STAINLESS STEEL	STAINLESS STEEL
BRASS	CuNi (water sea)	BRONZE

*standard

- Dimensions and technical characteristics are not binding



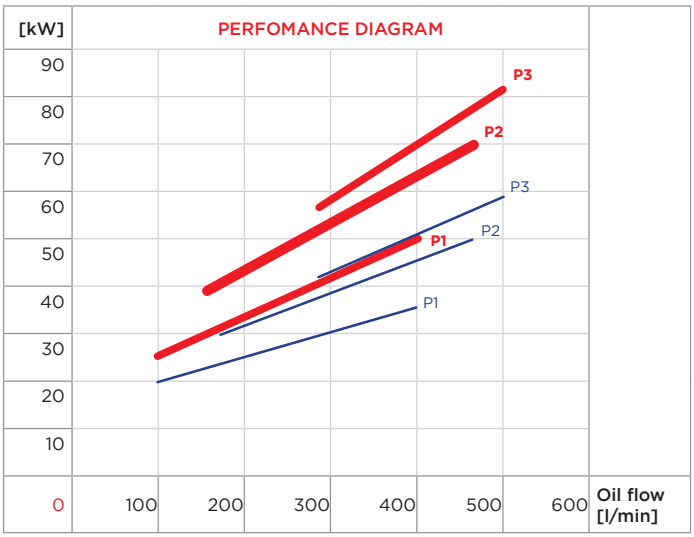
TYPE	CODE	OIL FLOW	WATER FLOW	kW MIN water flow		kW MAX water flow		WEIGHT	DIMENSIONS		
		l/min	l/min	ΔTm 25° C		ΔTm 25° C		kg	Li	Le	Lt
MS 202 P1	2SC202P1	100-400	105-420	20	35	24	51	47	340	582	630
MS 202 P2	2SC202P2	160-460	105-420	29	50	39	69	56	500	742	790
MS 202 P3	2SC202P3	280-500	105-420	42	57	56	82	72,5	660	902	950
MS 202 P4	2SC202P4	260-560	105-420	46	76	67	109	84	820	1062	1110
MS 202 P5	2SC202P5	300-600	105-420	56	78	79	125	94	980	1222	1270
MS 202 P6	2SC202P6	340-600	105-420	73	98	98	148	104	1140	1382	1430
MS 202 P7	2SC202P7	280-600	105-420	68	90	92	123	114	1300	1542	1590
MS 202 P8	2SC202P8	200-600	105-420	102	134	141	177	124,5	1460	1702	1750
MS 202 P9	2SC202P9	460-800	105-420	132	168	176	221	135	1620	1862	1910
MS 202 P10	2SC202P10	520-800	105-420	145	197	191	260	145,5	1780	2022	2070

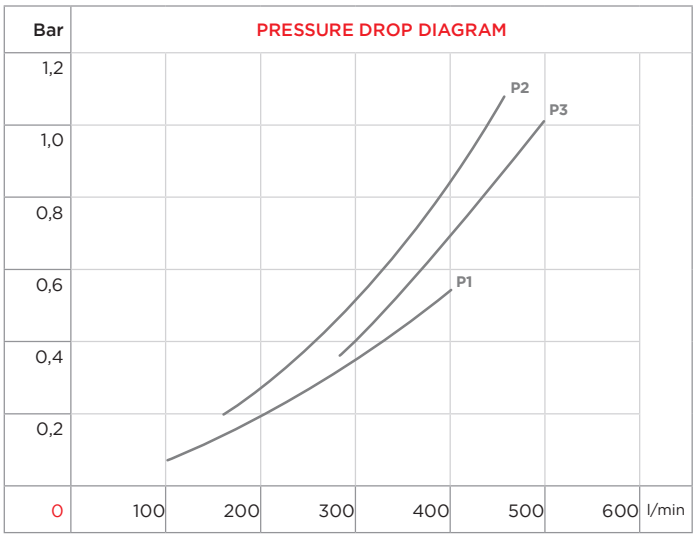
WATER FLOW RATE:

105 l/min

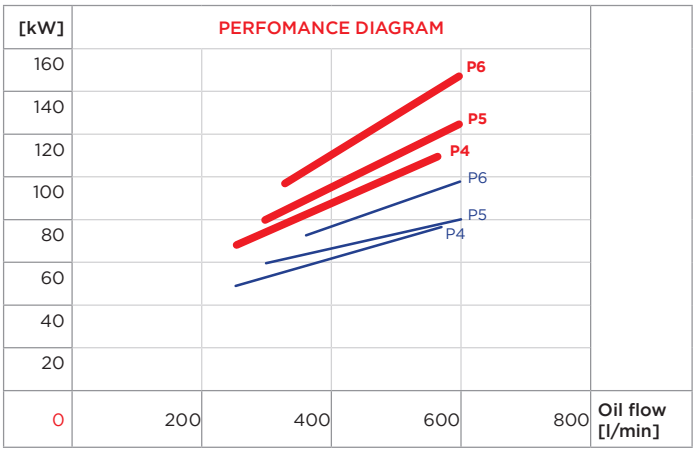
420 l/min

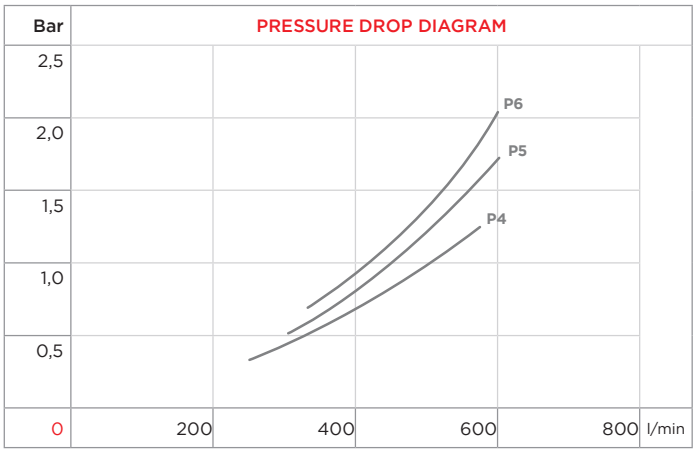
P1 P2 P3



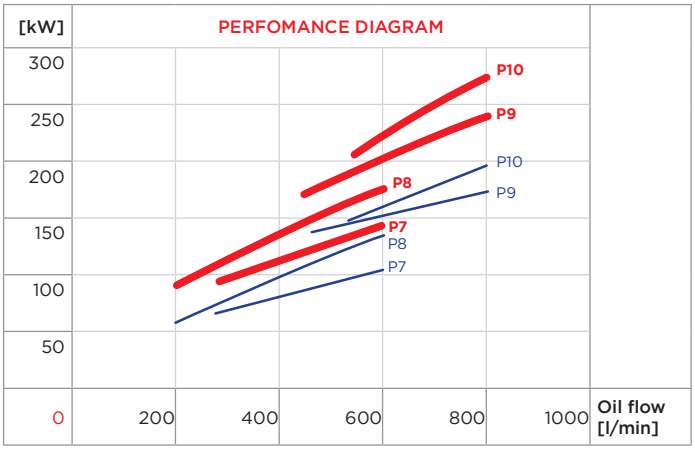


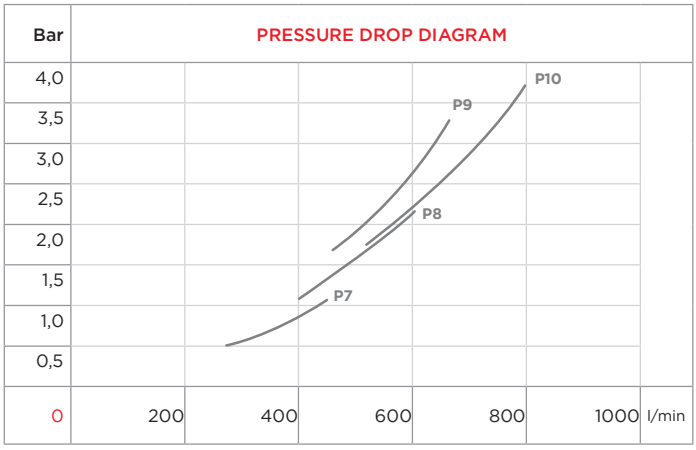
P4 P5 P6





P7 P8 P9 P10





CORRECTION FACTOR							
ΔTm	10	15	20	25	30	35	40
f	2,5	1,67	1,25	1	0,83	0,71	0,63

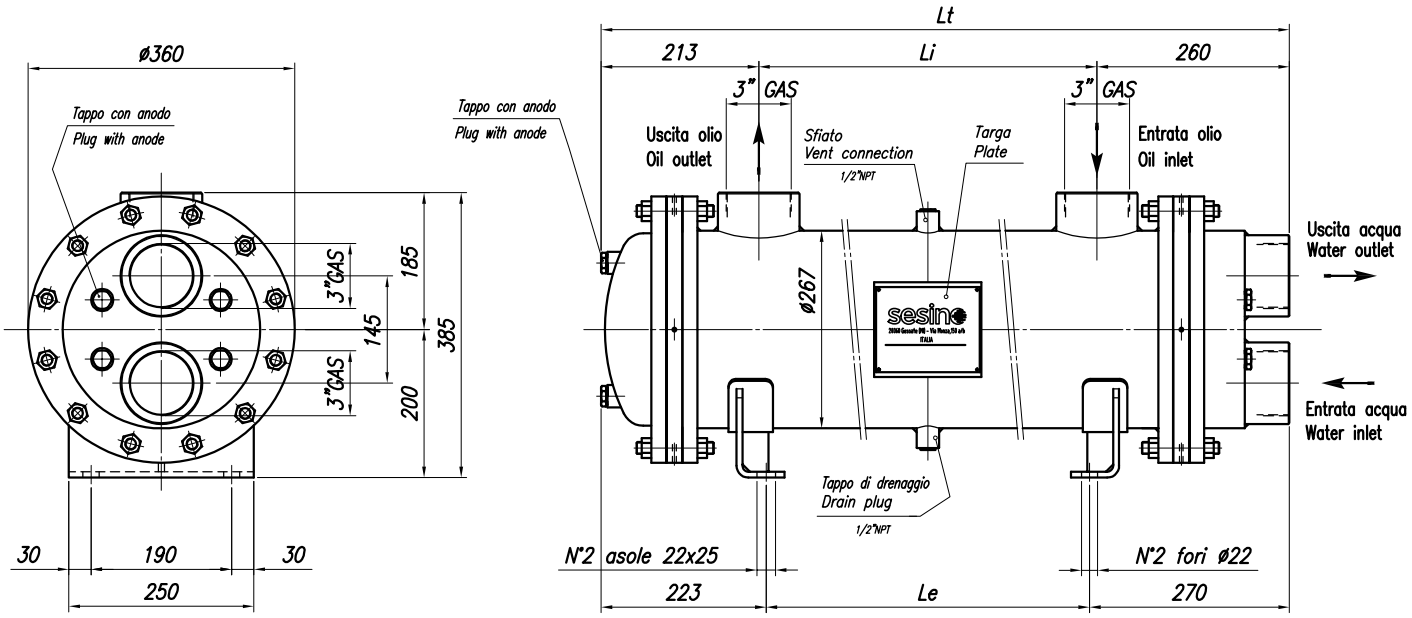
CORRECTION FACTOR							
cSt	22	30	46	68	100	150	220
f	0,4	0,6	1	1,5	2,3	3,3	4,6

MS 272 P

CONSTRUCTION MATERIALS		
SHELL	TUBES	END COVERS
CARBON STEEL*	COPPER*	CAST IRON*
STAINLESS STEEL	STAINLESS STEEL	STAINLESS STEEL
BRASS	CuNi (water sea)	BRONZE

*standard

- Dimensions and technical characteristics are not binding



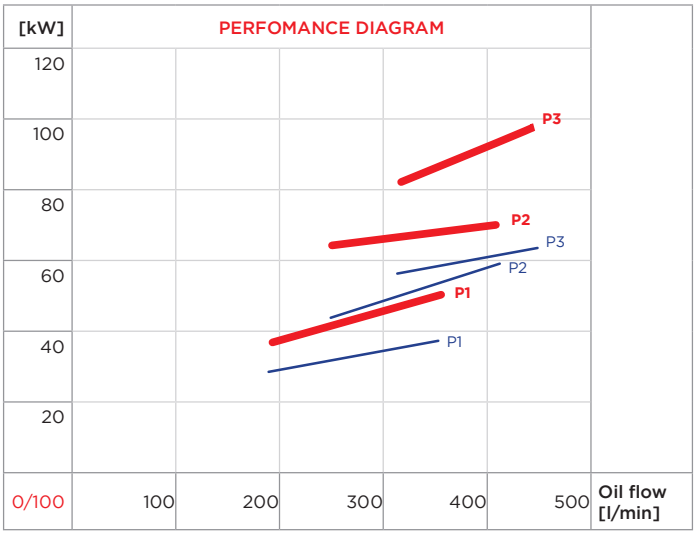
TYPE	CODE	OIL FLOW	WATER FLOW	kW MIN water flow		kW MAX water flow		WEIGHT	DIMENSIONS		
		l/min	l/min	ΔTm 25° C		ΔTm 25° C		kg	Li	Le	Lt
MS 272 P1	2SC272P1	190-350	146-583	28	36	37	51	142	255	235	728
MS 272 P2	2SC272P2	250-410	146-583	48	60	64	78	160	385	365	858
MS 272 P3	2SC272P3	310-450	146-583	56	66	81	97	172	505	485	978
MS 272 P4	2SC272P4	250-500	146-583	93	114	135	166	214	850	830	1323
MS 272 P5	2SC272P5	300-560	146-583	124	146	181	204	236	1040	1020	1513
MS 272 P6	2SC272P6	300-600	146-583	158	182	239	277	273	1360	1340	1833
MS 272 P7	2SC272P7	460-740	146-583	214	242	335	376	327	1825	1805	2298

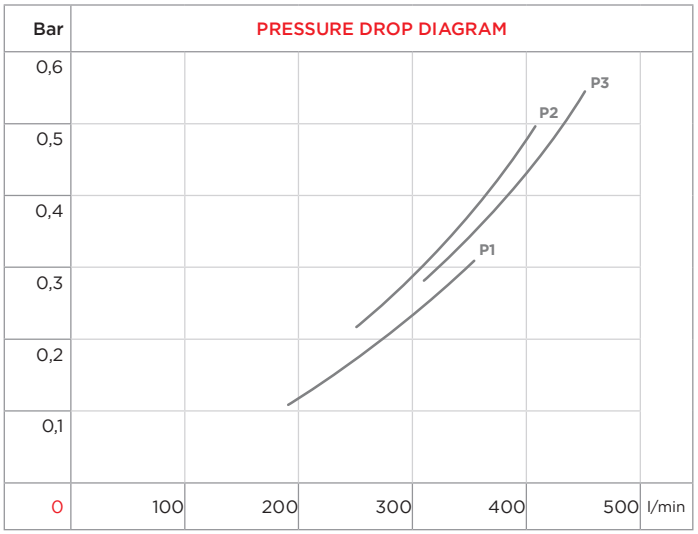
WATER FLOW RATE:

146 l/min

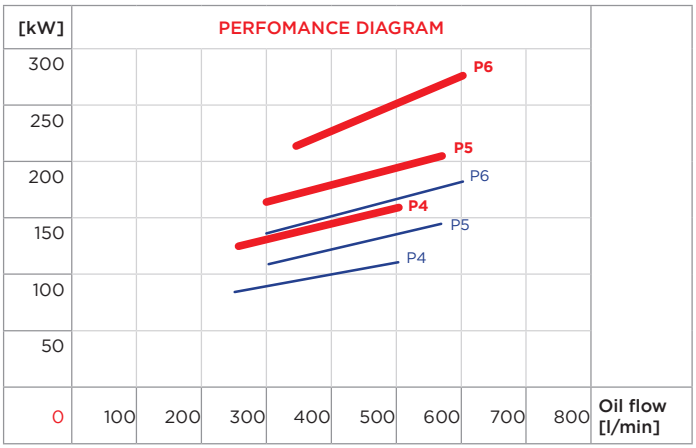
583 l/min

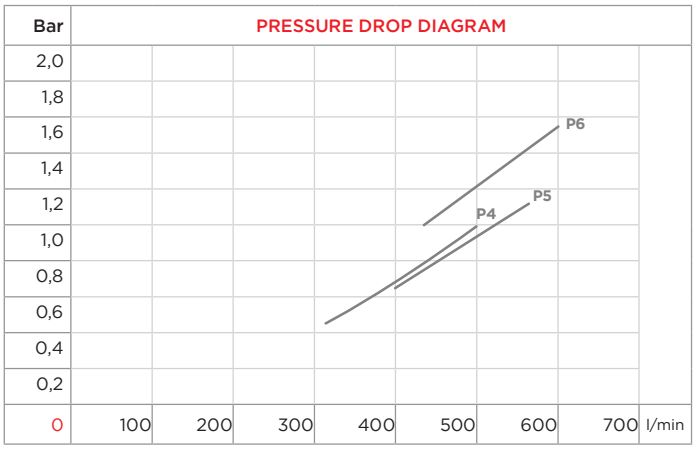
P1 P2 P3



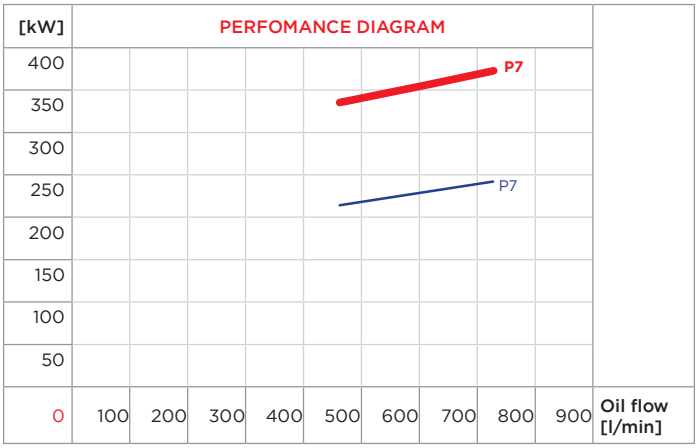


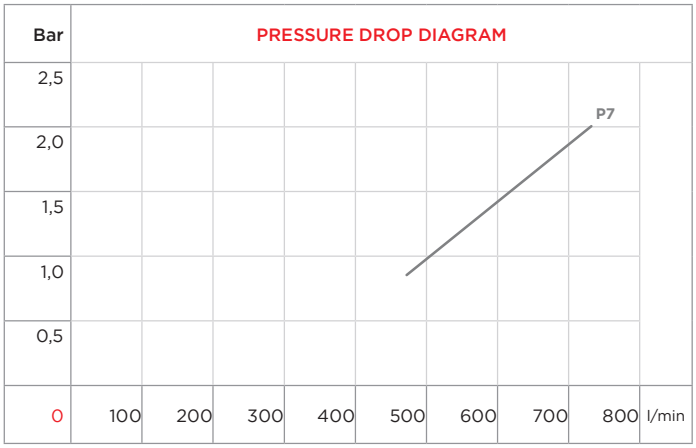
P4 P5 P6





P7





CORRECTION FACTOR							
ΔTm	10	15	20	25	30	35	40
f	2,5	1,67	1,25	1	0,83	0,71	0,63

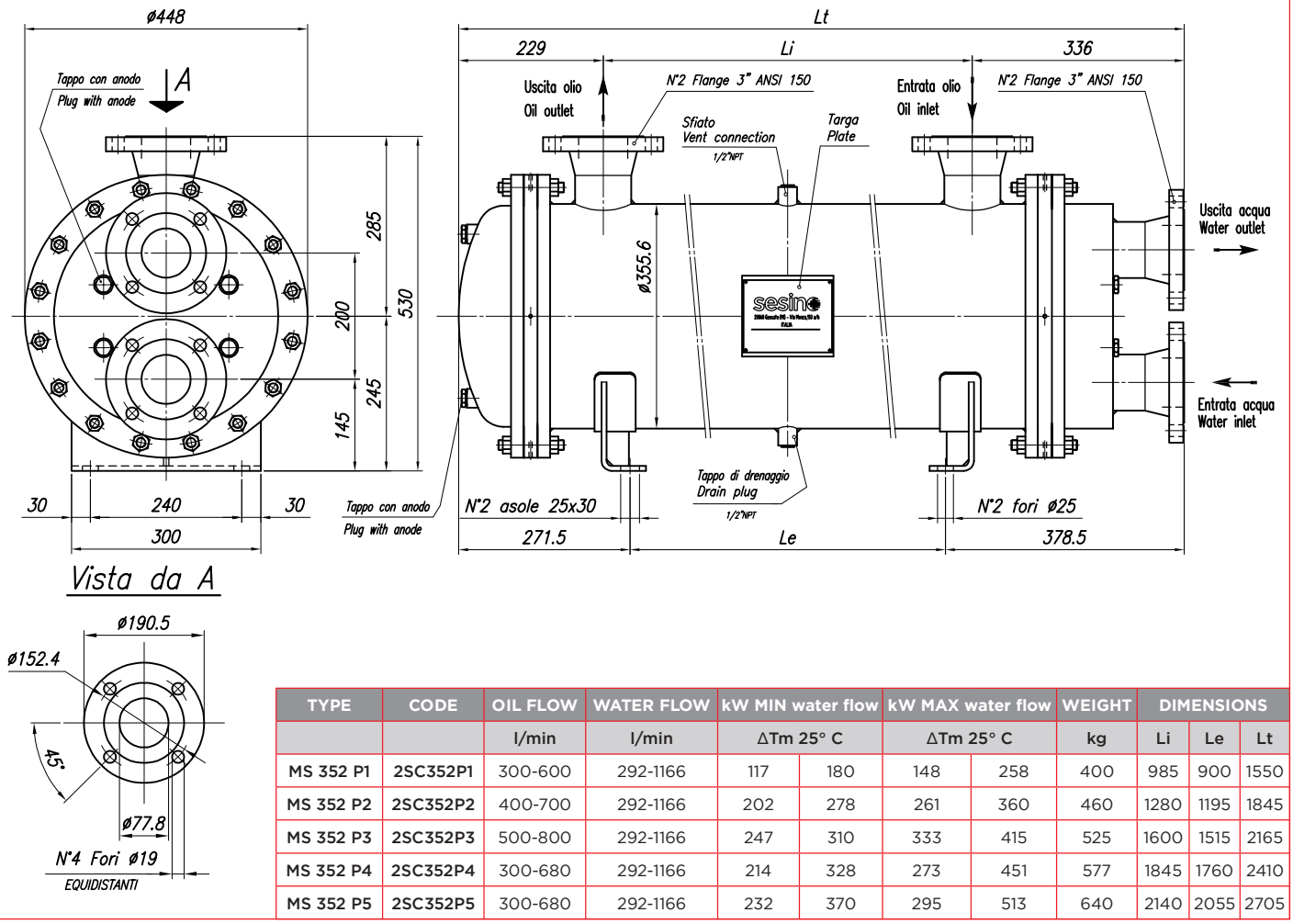
CORRECTION FACTOR							
cSt	22	30	46	68	100	150	220
f	0,4	0,6	1	1,5	2,3	3,3	4,6

MS 352 P

CONSTRUCTION MATERIALS		
SHELL	TUBES	END COVERS
CARBON STEEL*	COPPER*	CAST IRON*
STAINLESS STEEL	STAINLESS STEEL	STAINLESS STEEL
BRASS	CuNi (water sea)	BRONZE

*standard

- Dimensions and technical characteristics are not binding



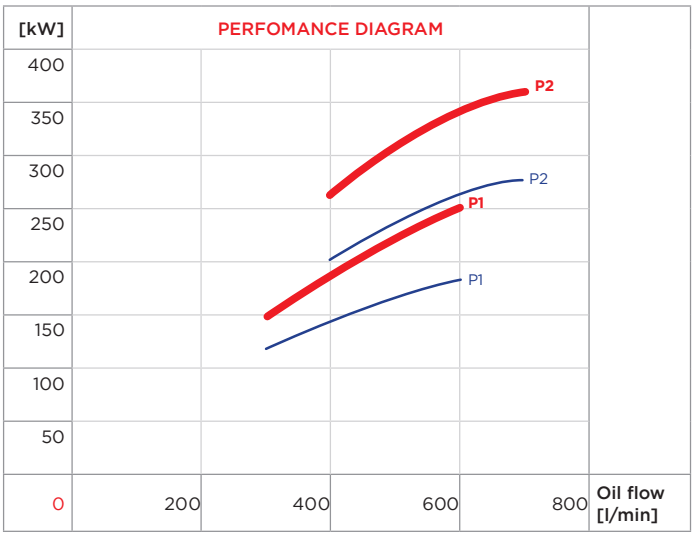
TYPE	CODE	OIL FLOW	WATER FLOW	kW MIN water flow		kW MAX water flow		WEIGHT	DIMENSIONS		
		l/min	l/min	ΔTm 25° C		ΔTm 25° C		kg	Li	Le	Lt
MS 352 P1	2SC352P1	300-600	292-1166	117	180	148	258	400	985	900	1550
MS 352 P2	2SC352P2	400-700	292-1166	202	278	261	360	460	1280	1195	1845
MS 352 P3	2SC352P3	500-800	292-1166	247	310	333	415	525	1600	1515	2165
MS 352 P4	2SC352P4	300-680	292-1166	214	328	273	451	577	1845	1760	2410
MS 352 P5	2SC352P5	300-680	292-1166	232	370	295	513	640	2140	2055	2705

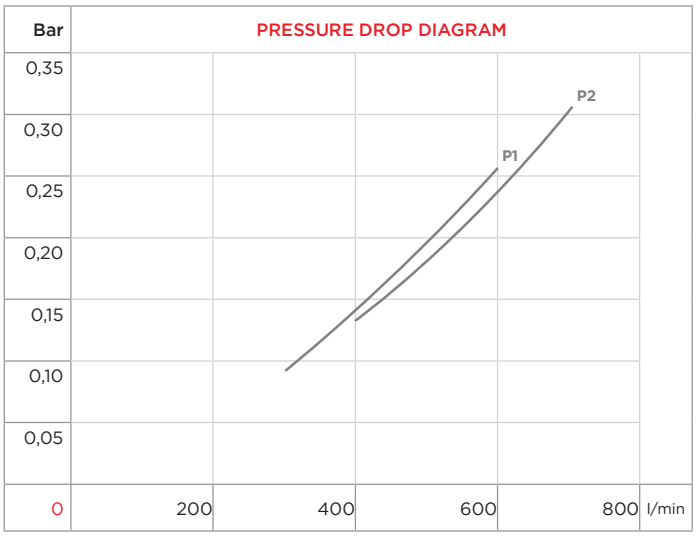
WATER FLOW RATE:

292 l/min

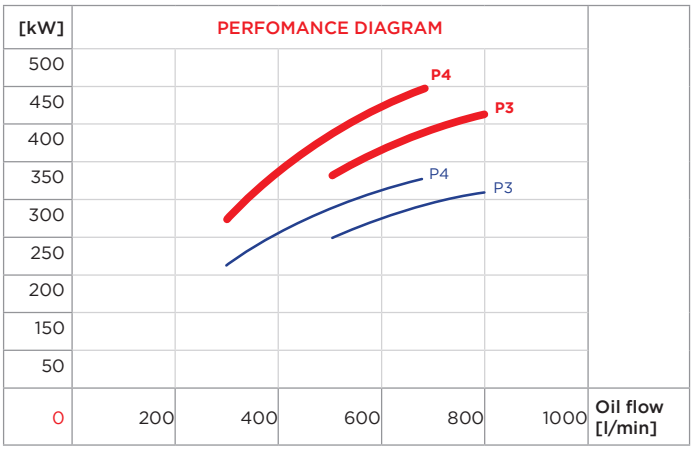
1166 l/min

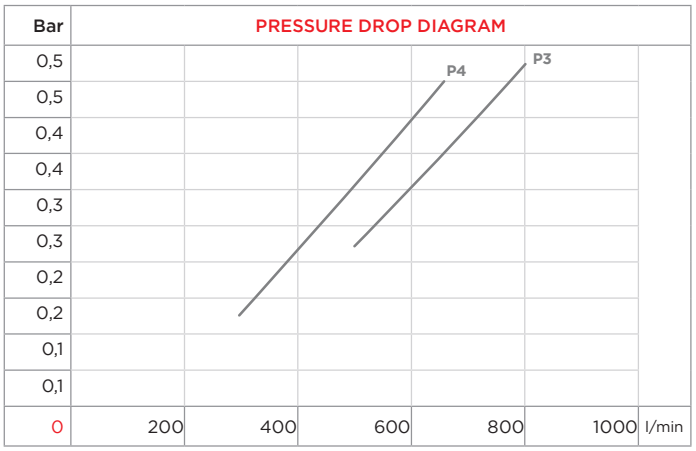
P1 P2



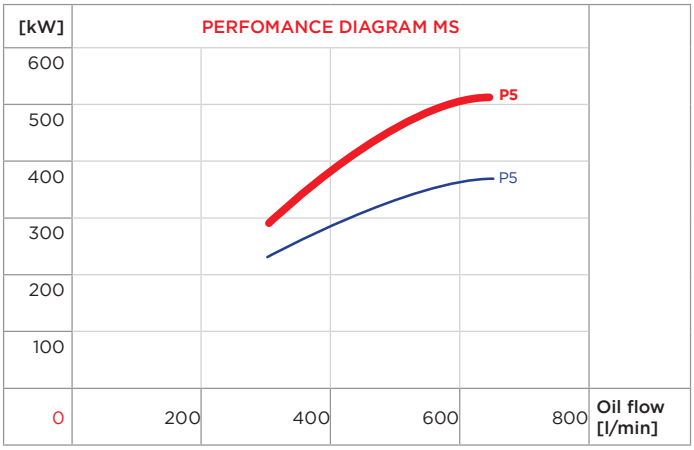


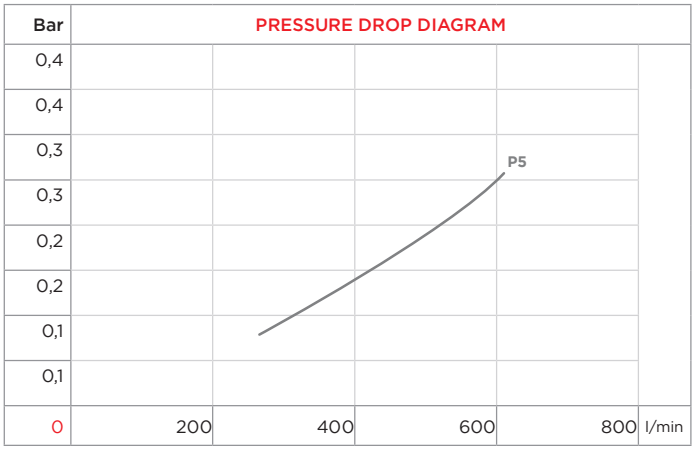
P3 P4





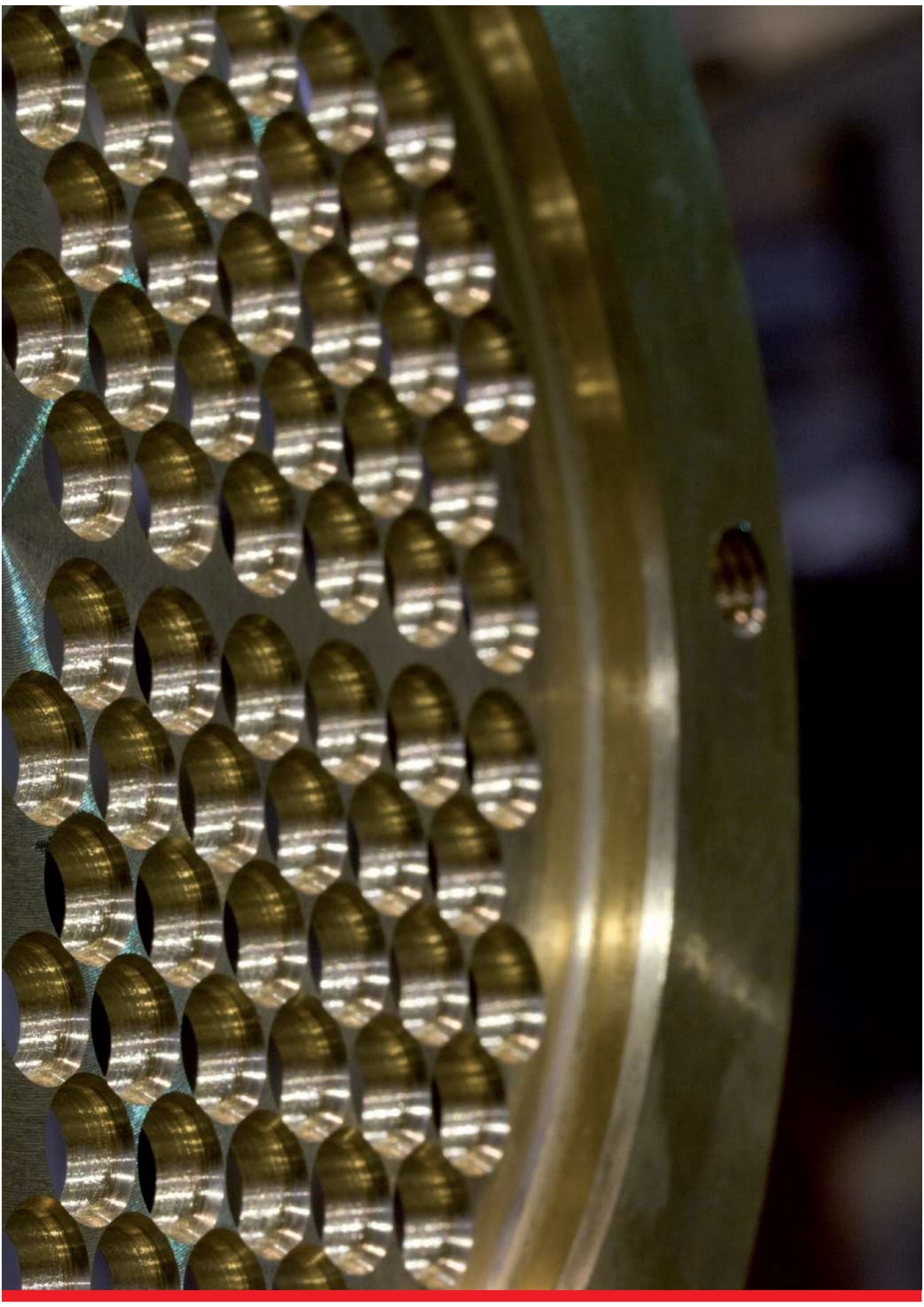
P5





CORRECTION FACTOR							
ΔTm	10	15	20	25	30	35	40
f	2,5	1,67	1,25	1	0,83	0,71	0,63

CORRECTION FACTOR							
cSt	22	30	46	68	100	150	220
f	0,4	0,6	1	1,5	2,3	3,3	4,6



NOT INSPECTABLE WATER SIDE OUTSIDE/INSIDE THE TANK
NON ISPEZIONABILI LATO ACQUA ESTERNI/INTERNI AL SERBATOIO

HEAT EXCHANGERS WITH NOT INSPECTABLE WATER SIDE TUBE BUNDLE, OUTSIDE/INSIDE THE TANK

They are exchangers with a maximum exchange surfaces of 0,7 m^2, fit to cool little powerful plants.

The fixing of this kind of exchanger, can be carried out through tubes for oil inlet and outlet, if rigid; or, upon request, through clamps of our production.

They cannot be checked neither from the water side nor from the oil side and therefore cannot be used with dirty or not filtered fluids.

Thanks to their simple structure, their price is very competitive. They are chosen when the cheapness of the plant is very important.

SCAMBIATORI DI CALORE A FASCIO TUBIERO NON ISPEZIONABILI LATO ACQUA ESTERNI/ INTERNI AL SERBATOIO

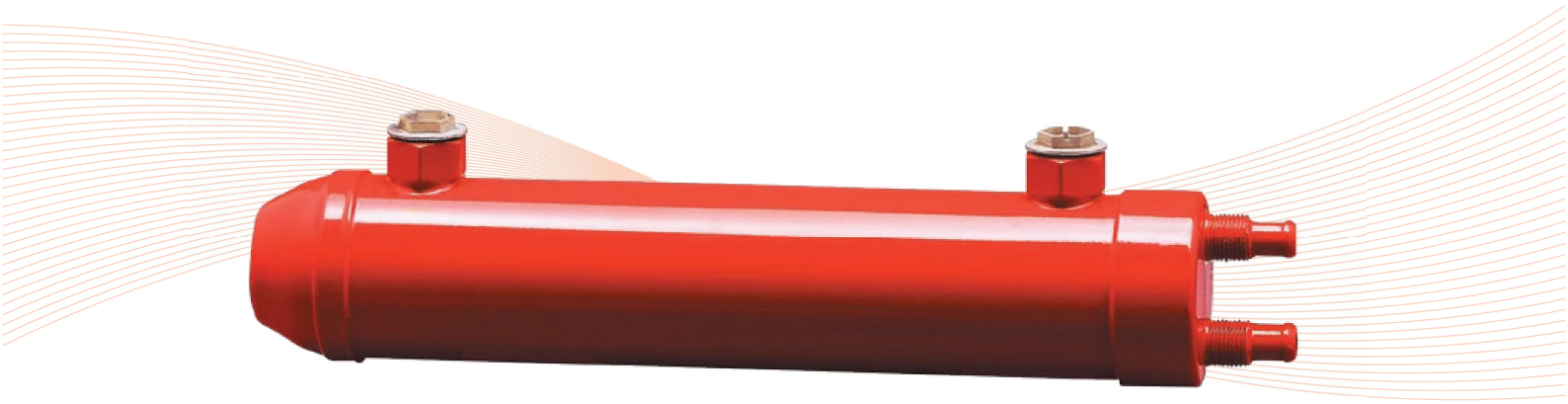
Sono apparecchi con una superficie massima di 0,7 m^2, adatti quindi a raffreddare impianti di piccola potenza.

Il fissaggio di questi scambiatori alla centralina può essere effettuato per mezzo dei tubi di entrata e uscita olio, se rigidi, oppure per mezzo di fascette di nostra fornitura, su richiesta.

Non sono ispezionabili né lato acqua né lato olio e pertanto non possono essere impiegati con fluidi sporchi, o comunque non filtrati.

Data la loro semplicità costruttiva, il prezzo di questi scambiatori è estremamente competitivo e ciò li fa preferire nei casi in cui è preminente l'economicità dell'impianto.

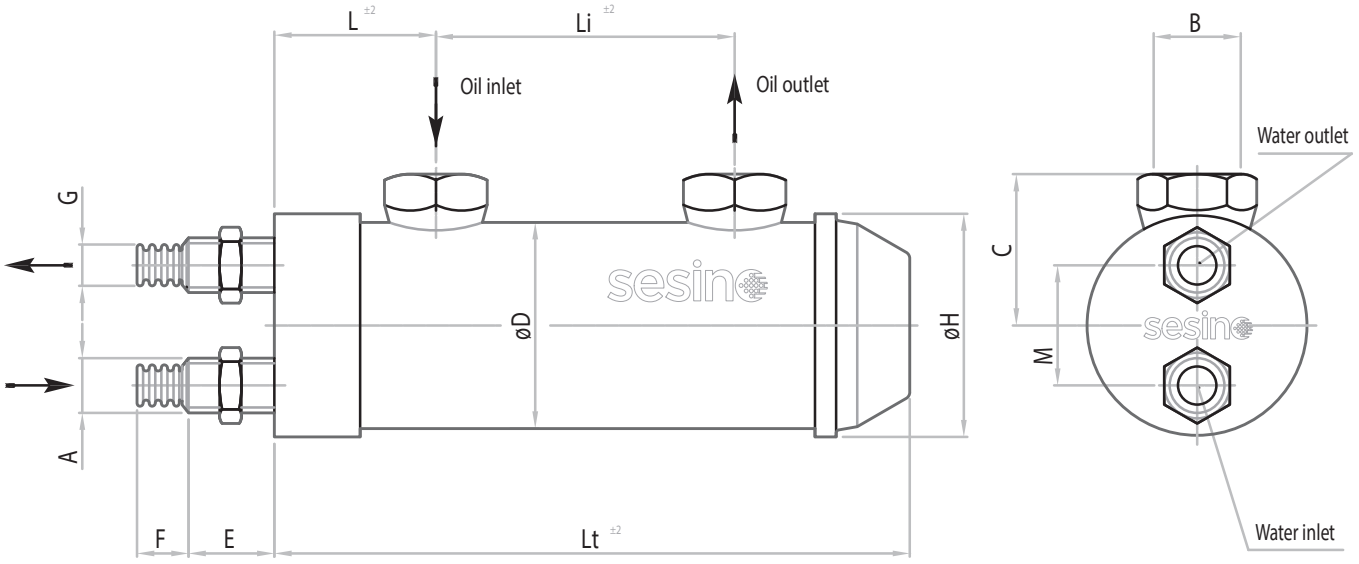
T60-80 CB



CONSTRUCTION MATERIALS		
SHELL	TUBES	END COVERS
BRASS*	COPPER*	/

*standard

- Dimensions and technical characteristics are not binding



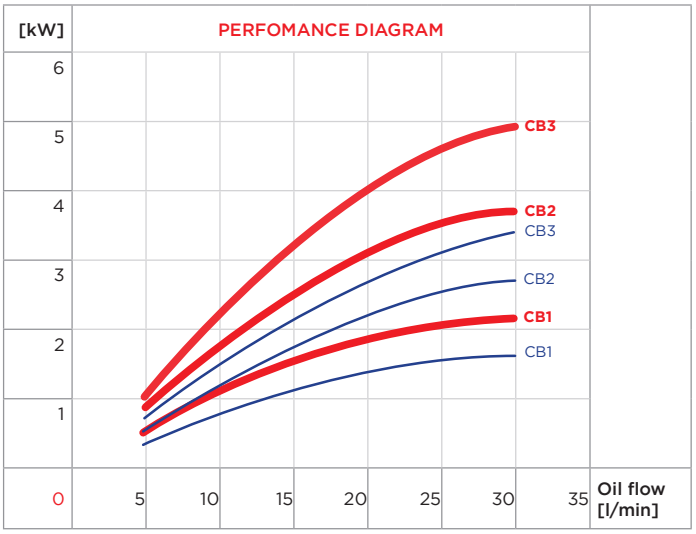
TYPE	CODE	OIL FLOW	WATER FLOW	kW MIN water flow		kW MAX water flow		WEIGHT	DIMENSIONS											
		l/min	l/min	ΔTm 25° C		ΔTm 25° C		kg	Lt	D	A	B	H	Li	G	M	C	L	F	E
T60 CB1	2SC60CB1	5-30	7,5 - 30	0,3	1,57	0,3	2,24	1,9	235	60	3/8" gas	1/2" gas	65	140	12	35	47	47	17	20
T60 CB2	2SC60CB2	5-30	7,5 - 30	0,4	2,44	0,61	3,48	2,6	355	60	3/8" gas	1/2" gas	65	260	12	35	47	47	17	20
T60 CB3	2SC60CB3	5-30	7,5 - 30	0,7	3,4	1	5,3	3,8	535	60	3/8" gas	1 1/2" gas	65	440	12	35	47	47	17	20
T80 CB1	2SC80CB1	25-50	7,5 - 30	2,33	2,94	2,9	3,89	3,2	255	80	1/2" gas	3/4" gas	85	120	17	45	65	60	20	20
T80 CB2	2SC80CB2	25-60	7,5 - 30	3,4	4,49	4,43	6,12	5,1	415	80	1/2" gas	3/4" gas	85	280	17	45	65	60	20	20
T80 CB3	2SC80CB3	30-80	7,5 - 30	5,95	7,3	8,13	10,5	8,0	665	80	1/2" gas	3/4" gas	85	530	17	45	65	60	20	20

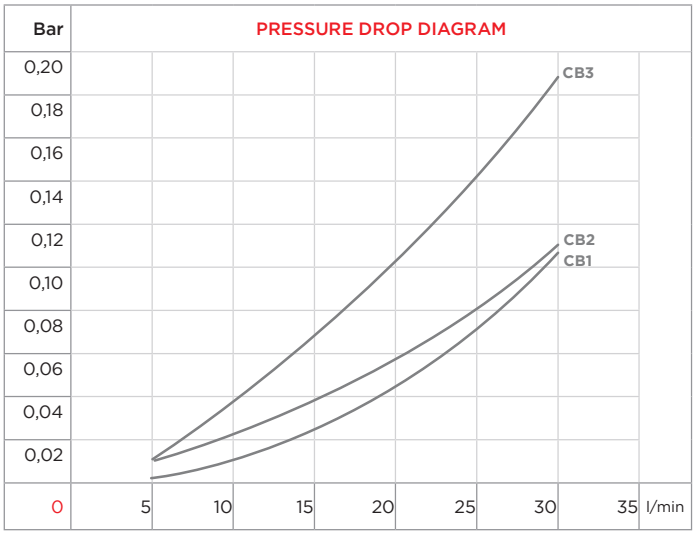
WATER FLOW RATE:

7,5 l/min

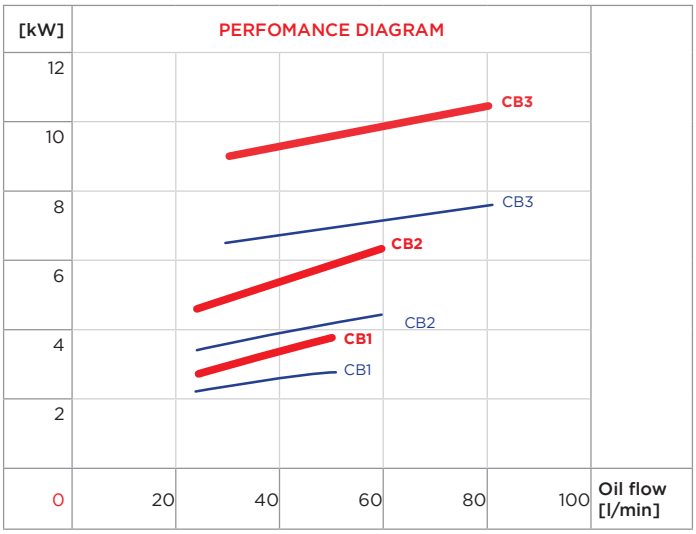
30 l/min

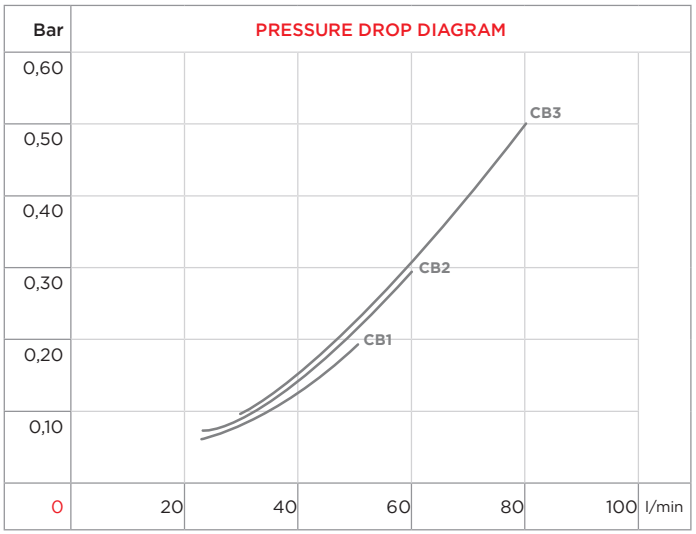
T60: CB1 CB2 CB3





T80: CB1 CB2 CB3

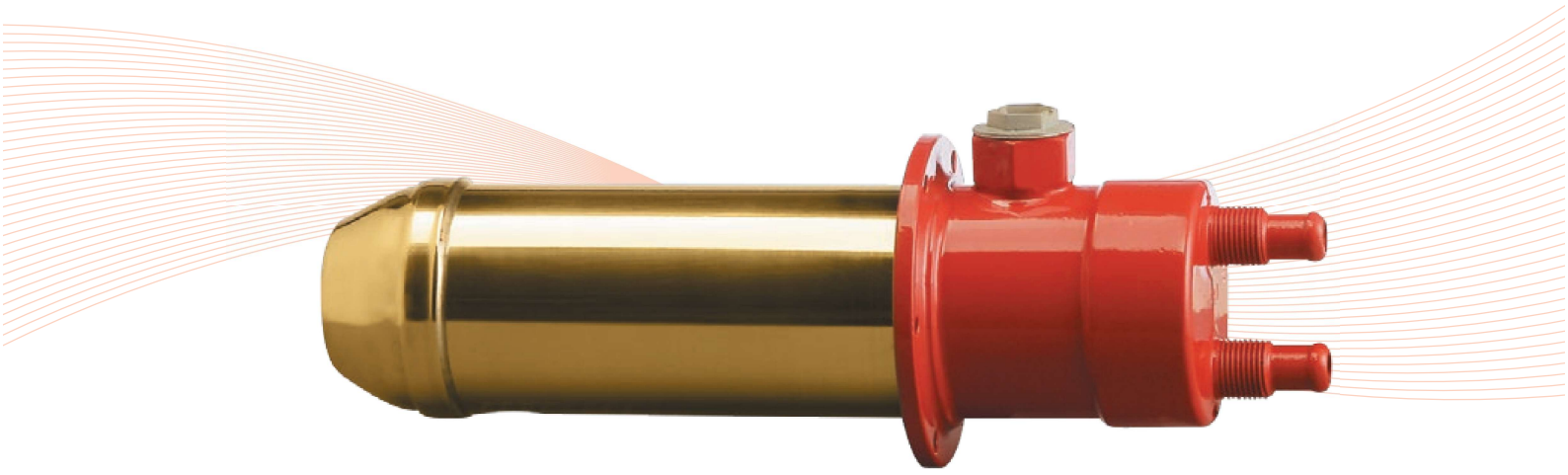




CORRECTION FACTOR							
ΔTm	10	15	20	25	30	35	40
f	2,5	1,67	1,25	1	0,83	0,71	0,63

CORRECTION FACTOR							
cSt	22	30	46	68	100	150	220
f	0,4	0,6	1	1,5	2,3	3,3	4,6

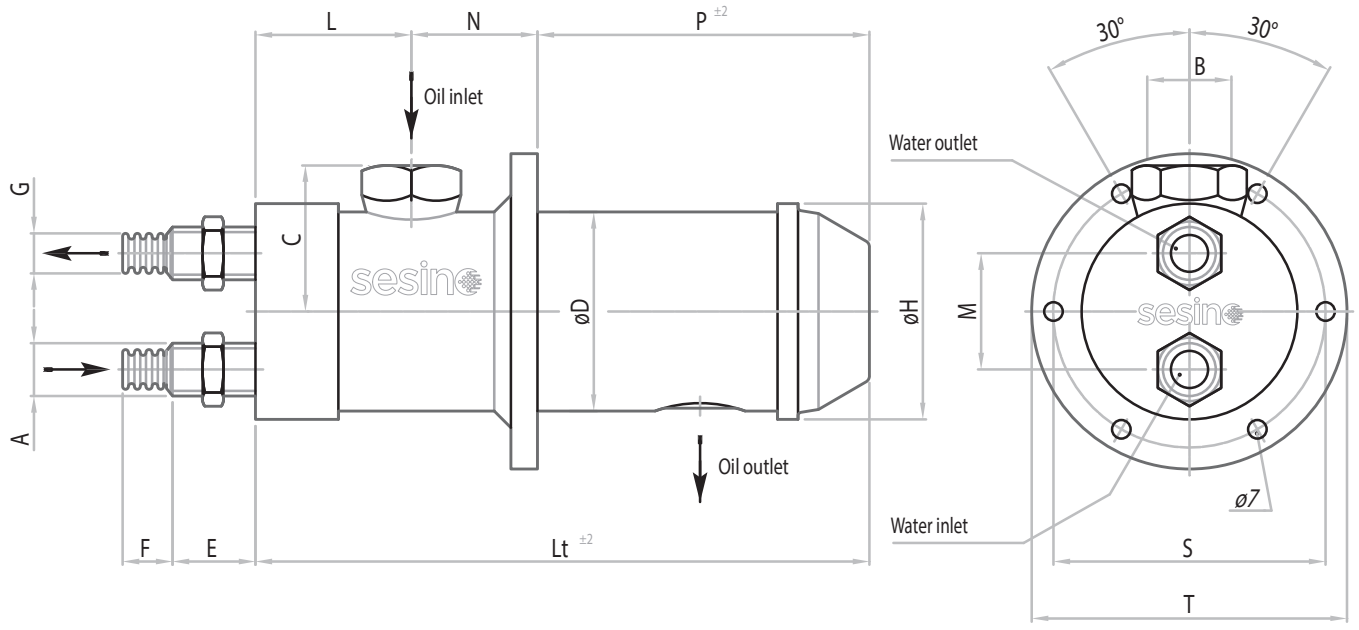
T60 CF2



CONSTRUCTION MATERIALS		
SHELL	TUBES	END COVERS
BRASS*	COPPER*	/

*standard

- Dimensions and technical characteristics are not binding



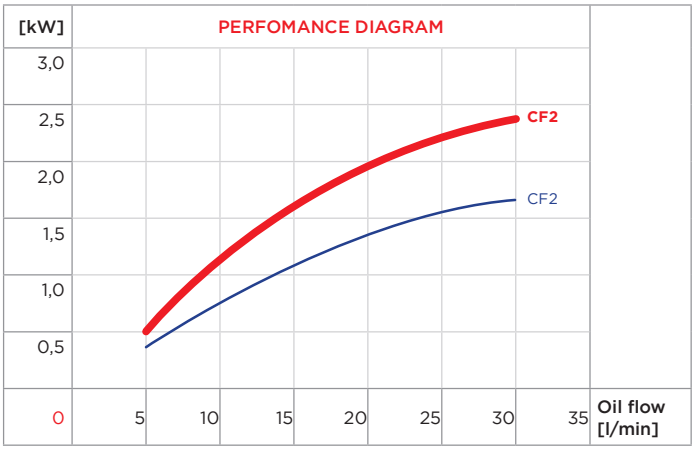
TYPE	CODE	OIL FLOW	WATER FLOW	kW MIN water flow		kW MAX water flow		WEIGHT	DIMENSIONS														
		l/min	l/min	ΔTm 25° C		ΔTm 25° C		kg	Lt	D	A	B	H	P	G	S	T	N	M	C	L	F	E
T60 CF2	2SC60CF2	5-30	7,5 - 30	0,35	1,6	0,5	2,4	2,1	285	60	3/8" gas	1/2" gas	65	100	12	82	95	38	35	47	47	17	20

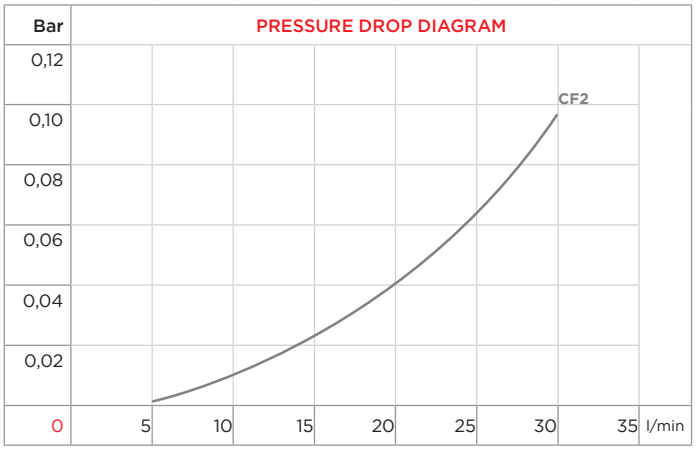
WATER FLOW RATE:

7,5 l/min

30 l/min

CF2





CORRECTION FACTOR							
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CORRECTION FACTOR							
cSt	22	30	46	68	100	150	220
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ASSEMBLING AND MAINTENANCE INSTRUCTIONS OF THE TUBE BUNDLE HEAT EXCHANGERS

Assembling

The water-oil heat exchangers are generally fixed in the return circuit. It is also possible to carry out a separate circuit through a self-contained pump. This is recommended when the outlet oil rates are variable. In this way, it is possible to obtain a better thermic performance.
In the hydraulic systems is probable to encounter some pressure peaks that could approach or exceed the maximum allowable pressure of the exchanger. In this case, it is recommended to supply it with a self-contained pump.

Note! These pulsations move inside the oil at the sound velocity, therefore they cannot be gauged with standard manometers, but only with a proper electronic instrumentation. The connection of the oil-water fittings must be carried out so that air can be easily blown out with the normal fluid circulation. This means that, if the exchanger is installed horizontal, water must flow in the lowest fitting and the oil fittings must be turned upwards; if otherwise it is vertical, the water fittings must be placed on the upper side and oil must flow in the lowest fitting.

MAINTENANCE OF NOT ISPECTABLE TUBE BUNDLE HEAT EXCHANGERS WATER SIDE

Oil side cleaning

The exchanger must be disassembled.
To remove the impurities it is necessary to let a detergent circulate for a time, which can vary from 10 to 30 minutes. Later proceed removing the detergent through the circulation of hot water.
During this operation, it is recommended to comply with the anti-pollution standards.

Water side cleaning

It is recommended to check the exchanger every 2 or 3 months to avoid that calcareous sediments completely close the little tubes inside which water flows. In this case the exchanger must be replaced.
If the exchanger is slightly obstructed, it is recommended to use a solution with water and 15% hydrochloric acid or similar fluids, and let it circulate into the water side of the exchanger, but in the opposite direction of the normal water flow.
Remove afterwards any trace of the corrosive product letting some hot water flow for some minutes.

MAINTENANCE OF INSPECTABLE TUBE BUNDLE HEAT EXCHANGERS WATER SIDE

Oil side cleaning

The exchanger must be disassembled.
To remove the impurities it is necessary to let a detergent circulate for a time, which can vary from 10 to 30 minutes. Later proceed removing the detergent through the circulation of hot water.
During this operation, it is recommended to comply with the anti-pollution standards.

Water side cleaning

It is recommended to check the exchanger every 2 or 3 months to avoid that calcareous sediments completely close the little tubes inside which water flows. In this case, the exchanger must be replaced.
To carry out the check it is necessary to disconnect the exchanger from the water inlet and outlet tubes and remove the two heads, which stop the water circuit. If the exchanger is slightly obstructed, it is recommended to assemble both the heads and to use a solution with water and 15% hydrochloric acid or similar fluids, and let it circulate in the opposite direction of the normal water flow.
Remove afterwards any trace of the corrosive product letting some hot water flow for some minutes.
Otherwise if the exchanger is obstructed not by calcareous sediments but by mud or by other solid sediments, it is enough to use a pig inside the tubes and then rinse with a water jet. In any case, before reassembling the two heads, it is necessary to check that the zinc anode is clean and not damaged; otherwise, it must be replaced.
If the zinc anode is worn out in a short time, it is recommended to check the efficiency of the earthing of the machine on which the exchanger is assembled; wandering currents could cause corrosion.

ISTRUZIONI MONTAGGIO E FUNZIONAMENTO SCAMBIATORI A FASCIO TUBIERO

Montaggio

Gli scambiatori acqua-olio sono generalmente installati nel circuito di ritorno. E' possibile anche realizzare un circuito separato con una pompa autonoma e ciò è consigliabile nel caso in cui le portate olio allo scarico siano molto variabili; ciò facendo si ottiene un miglioramento di resa termica. Nei sistemi idraulici possono verificarsi dei picchi di pressione che potrebbero avvicinarsi o superare la pressione massima ammissibile dello scambiatore; in questo caso è indispensabile alimentare lo stesso con una pompa autonoma.

Attenzione! Queste pulsazioni percorrono l'olio alla velocità del suono e non sono pertanto misurabili con normali manometri, ma solo con un'adatta strumentazione elettronica. Il collegamento dei raccordi acqua e olio deve essere eseguito in modo che l'aria possa essere agevolmente espulsa con la normale circolazione dei fluidi Ciò significa che, se lo scambiatore è installato in posizione orizzontale, l'acqua deve entrare nel raccordo posto più in basso ed i raccordi olio devono essere rivolti verso l'alto, mentre, se installati in posizione verticale, i raccordi acqua devono essere nella parte superiore e l'olio deve entrare nel raccordo posto più in basso.

MANUTENZIONE SCAMBIATORI A FASCIO TUBIERO NON ISPEZIONABILI LATO ACQUA

Pulizia lato olio

Per tale tipo di pulizia lo scambiatore deve essere smontato. Lo sporco può essere asportato con la circolazione di un prodotto detergente; la durata di questa operazione può variare dai 10 ai 30 minuti. Dopo questo procedimento il prodotto resta all'interno e bisognerà quindi procedere alla sua espulsione mediante circolazione di acqua calda. Durante questa operazione si raccomanda di rispettare le norme antinquinamento.

Pulizia lato acqua

E' sempre buona norma controllare lo scambiatore ogni 2 o 3 mesi di lavoro per evitare che il calcare otturi completamente i tubetti all'interno dei quali scorre l'acqua, nel qual caso lo scambiatore sarebbe da sostituire.
In caso di modesto intasamento è consigliabile far circolare nel lato acqua dello scambiatore, in senso opposto alla normale circolazione della stessa, una soluzione al 15% di acido cloridrico in acqua, oppure altri fluidi simili reperibili in commercio.
Terminata tale operazione è necessario espellere dallo scambiatore la benché minima traccia di prodotto corrosivo; per fare ciò è sufficiente far circolare acqua calda per qualche minuto.

MANUTENZIONE SCAMBIATORI A FASCIO TUBIERO ISPEZIONABILI LATO ACQUA

Pulizia lato olio

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Pulizia lato acqua

E' sempre buona norma controllare lo scambiatore ogni 2 o 3 mesi di lavoro per evitare che il calcare otturi completamente i tubetti all'interno dei quali scorre l'acqua, nel qual caso lo scambiatore sarebbe da sostituire.
Per l'ispezione è necessario scollegare lo scambiatore dai tubi di entrata ed uscita acqua e togliere le due testate che chiudono il circuito acqua.
Nel caso di modesto intasamento dovuto al calcare è consigliabile rimontare le due testate e far circolare, in senso opposto al normale flusso, una soluzione al 15% di acido cloridrico in acqua, oppure altri fluidi simili reperibili in commercio.
Terminata tale operazione, è necessario espellere dallo scambiatore ogni traccia di prodotto corrosivo; per fare ciò è sufficiente far circolare acqua calda per qualche minuto.
Nel caso invece dall'ispezione risultasse che lo scambiatore fosse intasato non da sedimenti calcarei, ma da fango o da altre particelle solide contenute nell'acqua, è sufficiente agire con uno scovolo all'interno dei tubi e sciacquare successivamente con un getto d'acqua.
In ogni caso, prima di rimontare le testate, bisogna controllare che l'anodo di zinco sia integro e pulito; in caso contrario, non potendo svolgere la sua funzione sacrificale, deve essere sostituito.
Nel caso il suddetto anodo si fosse consumato in breve tempo, è indispensabile controllare l'efficienza della messa a terra della macchina sulla quale è installato lo scambiatore, perché la presenza di correnti vaganti potrebbe provocare rapidi fenomeni corrosivi.

CONSTRUCTIVE AND WORKING PRINCIPLES

The heat exchanger with brazed plates consists of pressed stainless steel plates, which are brazed with copper alloy during a vacuum process.
During the brazing process, the plates are packed by turning them to 180° one to each other in order to create two separate flow chambers, where the fluids, which must exchange heat, flow in opposite directions.
The pressing on the plates causes a great turbulence in the fluids; this increases the thermic exchange coefficients even in case of little volumetric flows.

ADVANTAGES

- Compact and light unit
- High thermic exchange coefficient thanks to the particular structure of the plates
- High working temperature and pressure
- High corrosion strength (the plates are made of stainless steel)
- Simple installation and repair; it does not need maintenance
- Cheapness thanks to the possibility to automate the production

RESISTANCE TO INCRUSTATIONS

The brazed plate heat exchangers are much more resistant to the incrustations that occur on the water-side of the tube bundle heat exchangers.
This depends on the following factors:

- There is always a turbulent flow also in case of low water flows
- There are no areas with low speed, because water is distributed uniformly inside the exchanger
- The calcareous sediments cannot adhere on the plate surfaces, thanks to their accurate finishing.

PRINCIPI COSTRUTTIVI E DI FUNZIONAMENTO

Lo scambiatore di calore a piastre saldobrasate è costituito da piastre di acciaio inossidabile stampate che vengono brasate con lega di rame in un processo sottovuoto.
Nel processo di brasatura le piastre vengono impacchettate ruotandole di 180° l'una con l'altra in modo da produrre due camere di flusso separate nelle quali i fluidi che si devono scambiare il calore scorrono in direzioni opposte.
Le stampature presenti sulle piastre generano un intensa turbolenza nei fluidi che incrementa i coefficienti di scambio termico anche in presenza di scarsi flussi volumetrici.

VANTAGGI

- *Unità compatta e leggera*
- *Coefficiente di scambio termico elevato grazie al particolare disegno delle piastre*
- *Temperatura e pressione di esercizio elevate*
- *Essendo le piastre di acciaio inossidabile, alta resistenza alla corrosione*
- *Semplicità di installazione e di riparazione; non richiede praticamente manutenzione*
- *Economicità grazie alla possibilità di automatizzarne la produzione*

RESISTENZA ALLE INCROSTAZIONI

Gli scambiatori a piastre saldobrasati sono molto meno sensibili alle incrostazioni, che si verificano soprattutto nel lato acqua, degli scambiatori a fascio tubiero. Questo grazie ai seguenti fattori:

- *Si è sempre in presenza di flusso turbolento anche con portate d'acqua basse*
- *Non esistono aree di bassa velocità perché l'acqua viene distribuita uniformemente all'interno dello scambiatore*
- *Le particelle di calcare non possono aderire alla superficie delle piastre essendo la loro finitura superficiale molto accurata*