



Scambiatori a fascio tubiero  
Shell & Tubes heat-exchangers



## APPLICAZIONE

### APPLICATION

La gamma MG Shell & Tubes comprende un'ampia scelta di modelli caratterizzati da un'elevata efficienza, e i materiali utilizzati consentono di ottenere un prodotto altamente affidabile e si prestano a essere la soluzione di raffreddamento ottimale per svariate applicazioni. Tutti gli scambiatori hanno il circuito acqua ispezionabile a 1, 2 o 4 passaggi, e possono essere predisposti per l'utilizzo di una valvola termostatica che consente un notevole risparmio sul consumo dell'acqua.

Shell & Tubes heat exchangers are used for the cooling of hydraulic circuits and are normally installed in return lines.

The range includes a vast choice of high-efficiency models.

The choice of top-quality materials, worked with precision machines, results in a highly reliable product.

All exchangers have a water circuit in 1, 2, 4 pass design, which can be inspected for maintenance and can be fitted with a thermostatic valve, allowing significant saving on water consumption.



Impiantistica oleodinamica.  
Macchine alimentari.  
Installazioni marine.  
Macchine industriali.  
Macchine utensili.  
Compressori.  
Generatori.

Hydraulic plants.  
Food machines.  
Marine installations.  
Industrial machines.  
Machine tools.  
Compressors.  
Generators.





## Introduzione

Gli scambiatori di calore a fascio tubiero EMMEGI S.p.A. sono utilizzati per il raffreddamento di circuiti oleodinamici e sono normalmente inseriti su linee di ritorno.

La gamma EMMEGI S.p.A. comprende una vasta scelta di modelli caratterizzati da un' elevata efficienza. La scelta di materiali di prima qualità, lavorati con macchine di precisione, consente d' ottenere un prodotto altamente affidabile.

Gli scambiatori EMMEGI S.p.A. hanno circuito acqua ispezionabile a 1,2,4 passaggi, e possono essere forniti con valvola termostatica che consente un notevole risparmio sul consumo dell' acqua.

## Fluidi compatibili

Oli minerali, HL, HLP.

Emulsioni acqua/olio

Acqua/glicole

Acqua/acqua industriale

Per altri fluidi consultare EMMEGI S.p.A.

## Specifiche tecniche

Versioni: standards-acqua marina AISI-

Pressione di esercizio: 12 bar.

Pressione di collaudo: 18 bar.

Temperatura max di esercizio: 120°C

Pressione di esercizio acqua: 5 bar.

Pressione di collaudo acqua: 8 bar.

Temperatura MAX di esercizio: 70°C

## Installazione

In fig. 1 è indicata la corretta posizione d' entrata dei due fluidi, che devono circolare in controcorrente per ottenere il massimo scambio termico.

Il posizionamento dello scambiatore sulla macchina deve essere eseguito utilizzando appositi supporti elastici, e quindi collegato all' impianto idraulico e alla rete idrica mediante tubi flessibili. E' consigliabile prevedere, su impianti che lavorano in ambienti con forti escursioni termiche, una valvola di by-pass (fig.2) tra ingresso e uscita olio. Con temperature molto basse e impianto fermo è opportuno mantenere l' acqua in continua circolazione per evitare dannose rotture; oppure svuotare lo scambiatore avvalendosi del tappo di scarico.

E' suggerita la messa a terra per evitare rotture dovute a correnti vaganti.

## Introduction

EMMEGI S.p.A. shell & tubes heat-exchangers are normally used for the cooling of oil hydraulic systems and are installed on the return line of the system.

The EMMEGI S.p.A. range includes wide choice of applicable models, highly efficient. The range of high quality material manufactured with precision machinery, result in extremely reliable product.

The EMMEGI S.p.A. heat exchangers have a inspectable water circuit in 1,2 or 4 pass. They can be supplied with thermostatic valves which greatly assist in the reduction of water consumption.

Mineral oils; HL;HLP.

Mixture water/oil

Water-glycolic acid

Water/industrial water

For other fluids, contact EMMEGI S.p.A.

Version: fresh water - sea water - AISI

Operating pressure: 12 bar.

Test pressure : 18 bar.

Max operating temperature : 120°C

Operating pressure water : 5 bar.

Test pressure water : 8 bar.

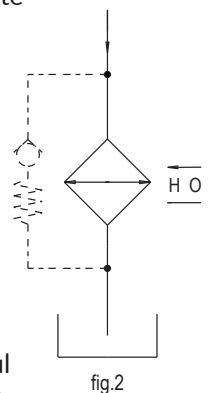
Max operantig temperature water : 70°C

The correct position of inlet of the two fluids is indicated in fig. 1. They should circulate in opposite direction, in order to obtain the maximum heat exchange.

The positioning of the heat exchanger on the machine should be carried out using appropriate flexible supports and all those in connection with hydraulic or power plant, through flexible tubing. It is advisable, to preserve the heat exchanger, that a by-pass valve is inserted (fig.2).

At very low temperatures, it is advisable to keep the water in constant circulation, to prevent harmful fractures otherwise emptyng the exchanger by use of the discharge valve.

EMMEGI suggest to connect electrical grounding in order to avoid leakage currents.





## Manutenzione

### Pulizia lato tubi

Per garantire il massimo rendimento dello scambiatore, è consigliabile una periodica ispezione del circuito acqua al fine d'eliminare eventuali tracce di calcare o altre impurità che si sono depositate all'interno dei tubi.

Quest'operazione si compie agevolmente togliendo solo il fondello e procedendo allo scivolamento dei tubi.

### Pulizia lato mantello

Su questo lato del circuito, la pulizia avviene mediante flussaggio con perclorilene fatto circolare in controcorrente per ca. 30 min. Procedere quindi all'eliminazione dei residui tramite flussaggio con acqua calda.

## Maintenance

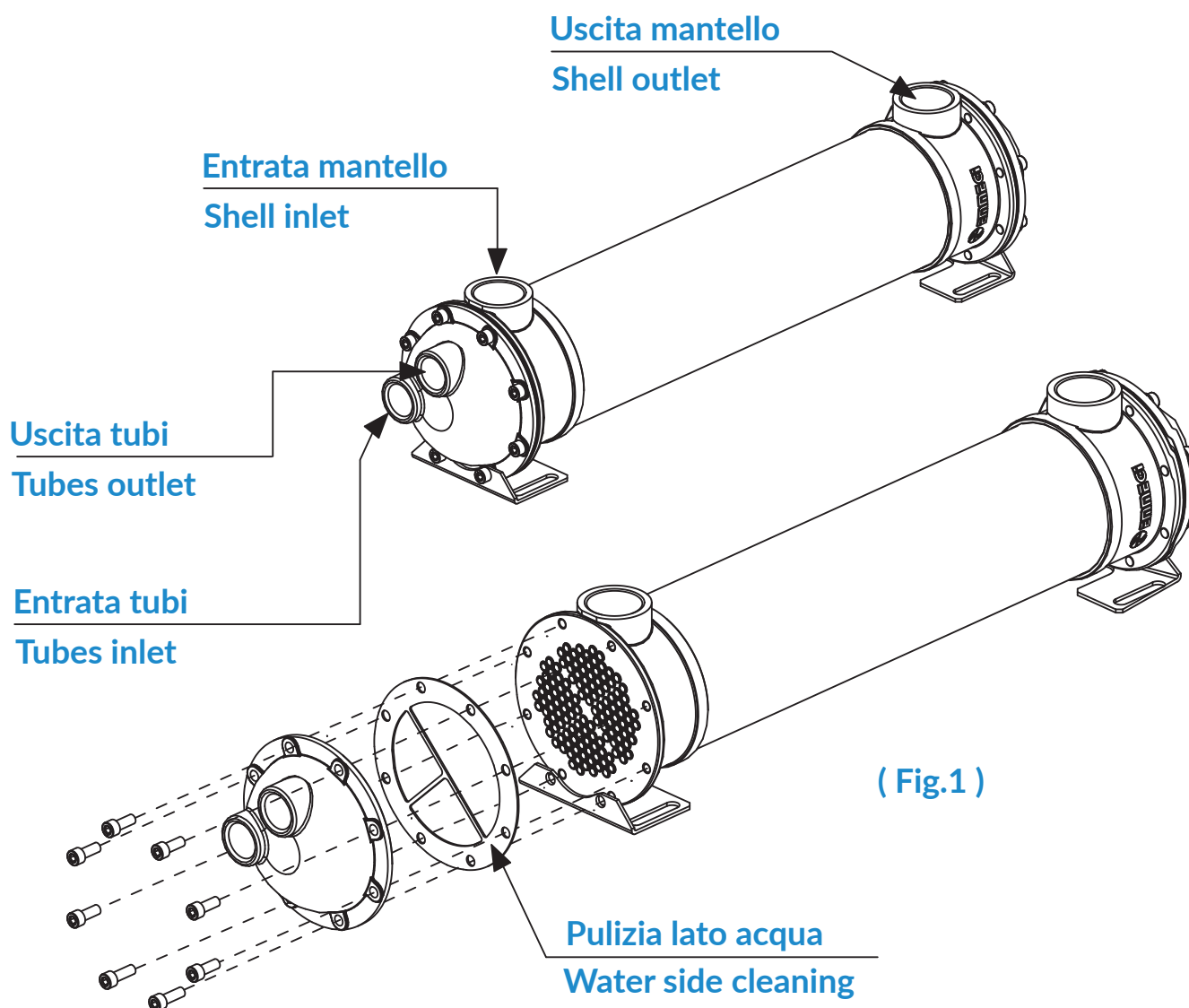
### Tubes side cleaning

To guarantee the maximum effectiveness in exchange, an inspection of the tubes circuit is advisable, to eliminate all trace of lime or any other impurities, which might be deposited inside the tubes.

This operation will be easily accomplished by removing the headers and flushing out the tubes.

### Shell side cleaning

In this part of the circuit, the cleaning will be carried out through the circulation of perchloride in the opposite direction of the normal flow, for about 30 minutes. This will help to eliminate any residue left by flushing out with hot water.





## Esempio di scelta dello scambiatore di calore

DATI :

Portata olio : 60 [lt/min.]  
 Peso specifico : 0,88 [Kg/dm<sup>3</sup>]  
 Calore specifico : 0,49 [Kcal/Kg °C]  
 Viscosità : 32 [cst]  
 Temperatura IN olio : 55 [°C]  
 Temperatura IN acqua : 20 [°C]  
 Potenza da dissipare : 15 [kW]

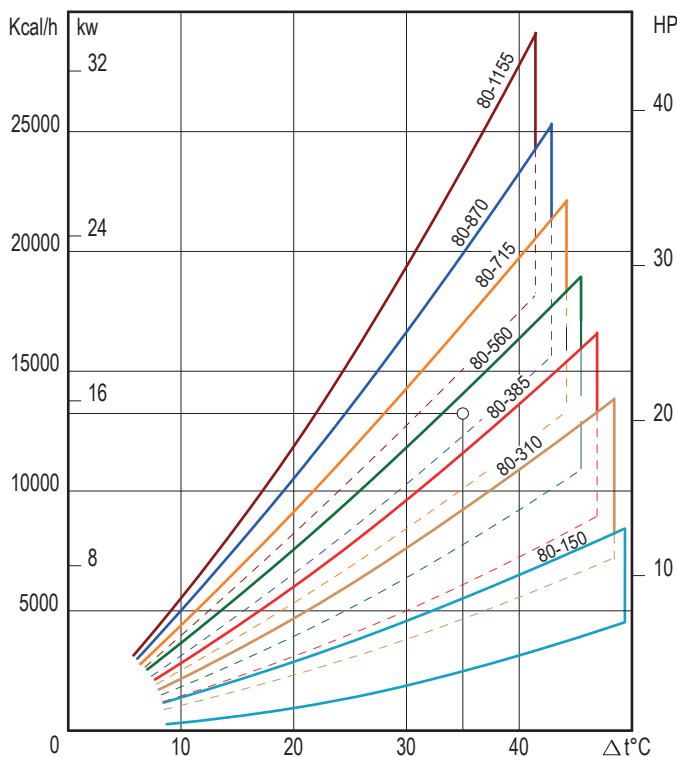
Conoscendo la portata dell'olio, la potenza da dissipare, e stabilito il  $\Delta T$ , ovvero la differenza tra la temperatura ingresso olio e la temperatura ingresso acqua, si può ricercare sui diagrammi riportati a catalogo lo scambiatore idoneo.

## Heat exchanger selection

DATA :

Oil flow : 60 [lt/min.]  
 Specific weight : 0,88 [Kg/dm<sup>3</sup>]  
 Specific heat : 0,49 [Kcal/Kg °C]  
 Viscosity : 32 [cst]  
 Oil temperature : 55 [°C]  
 Water temperature : 20 [°C]  
 Cooling power : 15 [kW]

Knowing the viscosity and flow rate of the oil, cooling power and stability of  $\Delta T$  (inlet temperature of oil - water) it is possible to obtain the suitable cooler from the performance diagram.



Lo scambiatore selezionato risulta il modello MG-80-870-4.

La dissipazione segnata nel diagramma di rendimento espressa in HP si ottiene con viscosità pari a 32 cst e portate acqua indicate nella seguente tabella A:

TIPO TYPE	PORTATA OLIO OIL FLOW (lt/min)	HP DISPERSI CON OLIO HP DISSIPATED WITH OIL @ 55°C H <sub>2</sub> O @ 20°C
MG 80-150-...	25 - 75	4 - 8
MG 80-310-...	25 - 80	7 - 14
MG 80-385-...	25 - 80	9 - 17
MG 80-560-...	25 - 80	12 - 20
MG 80-715-...	35 - 120	15 - 24
MG 80-870-...	40 - 130	18 - 29
MG 80-1155-...	40 - 130	22 - 36

Selected exchangers results in the model MG-80-870-4.

The cooling performance diagram expressed in HP is obtained, with a viscosity of 32 cst and water flow as indicated in the following table A:



# MG Water Series Selection



A)

n° passaggi lato acqua n° of water pass	lt/min x ogni HP da dissipare l/min per any HP to be dissipated
1	3
2	2
4	1

Nel caso si abbiano variazioni di temperatura e portata d' acqua, considerare i seguenti coefficienti:

In case there are different values of temperature and flow, the following coefficients Must be considered.

B)

### Fattore di correzione scambio termico Cooling power correction factor

Portata acqua <i>Water flow</i>	Portata indicata in tabelle "A" <i>Flow expressed in table "A"</i>	Due volte la portata indicata nella tabella "A" <i>Flow expressed in table "A" multiply x 2</i>	Tre volte la portata indicata nella tabella "A" <i>Flow expressed in table "A" multiply x 3</i>
Fattore di correzione <i>Correction factor</i>	1	1,2	1,4

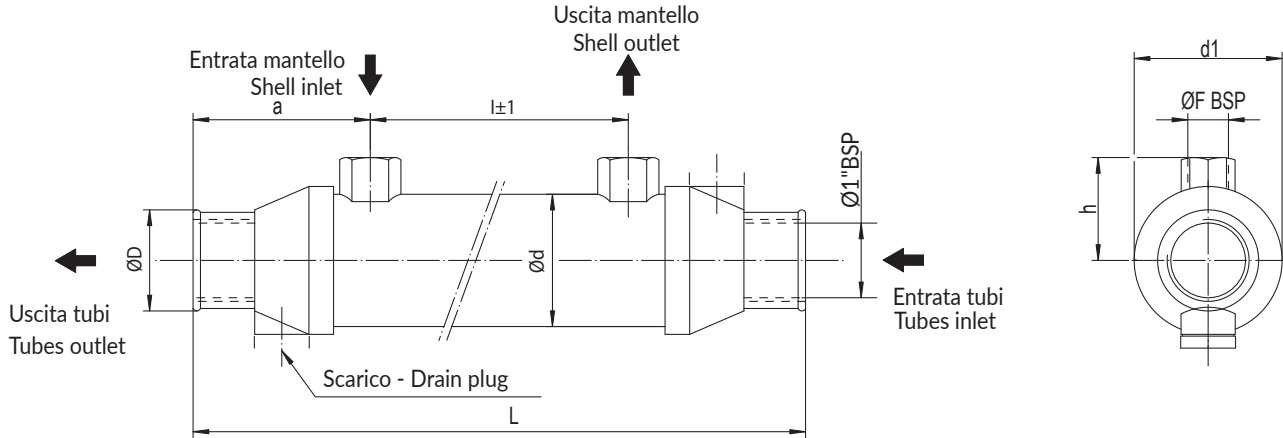
C)

### Fattore di correzione T °C acqua con olio a 55°C Temp °C water correction factor with oil at 55°C

Temperatura acqua <i>Water temp</i>	20°C	25°C	30°C	35°C
Fattore di correzione <i>Correction factor</i>	1	0.85	0.70	0.60

Se per la scelta, tutti i dati non sono conosciuti, contattare EMMEGI.

In case of dubts contact EMMEGI.



Le dimensioni e le caratteristiche tecniche non sono impegnative. Over-all dimension and technical characteristics are not binding.

TIPO TYPE	TUBO	PIASTRA TUBIERA TUBES SHEET	DEFLETTORI BAFFLES	FONDI COVERS	MANTELLINO SHELL
SEA WATER	CuNi10Mn1Fe	CuZn37	CuZn37	CuZn40	CuZn37

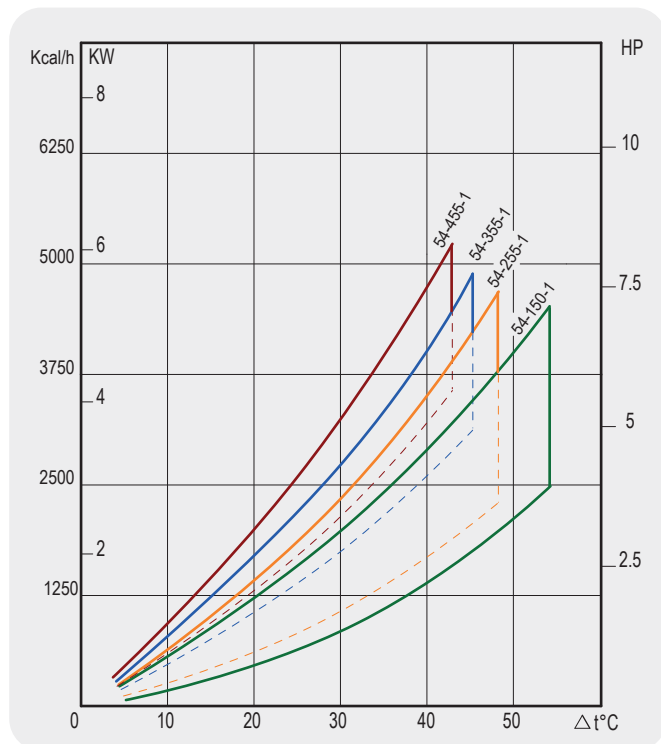
TIPO TYPE	PORTATA OLIO OIL FLOW (lt/min)	HP DISSIPATI CON OLIO HP DISSIPATED WITH OIL =55°C H2O=20°C	CAPACITA' CAPACITY (lt)	kg	Dimensioni - Over all dimension 1 Pass							
					ØD	ØF	l	L	a	Ød	d1	h
MG 54-150-1	10-40	1.5-4	0.26	1.3	39	3/8"	150	303	74	54	60	42
MG 54-255-1	10-50	2-4.5	0.4	1.8	39	3/8"	255	399	74	54	60	42
MG 54-355-1	10-50	3.5-5.5	0.5	2.3	39	3/8"	355	499	74	54	60	42
MG 54-455-1	10-50	4-6.5	0.6	2.7	39	3/8"	455	599	74	54	60	42

### DIAGRAMMA RENDIMENTO

Alla portata massima e minima indicata in tabella

### PERFORMANCE DIAGRAM

At the maximum and minimum flow stated in schedule

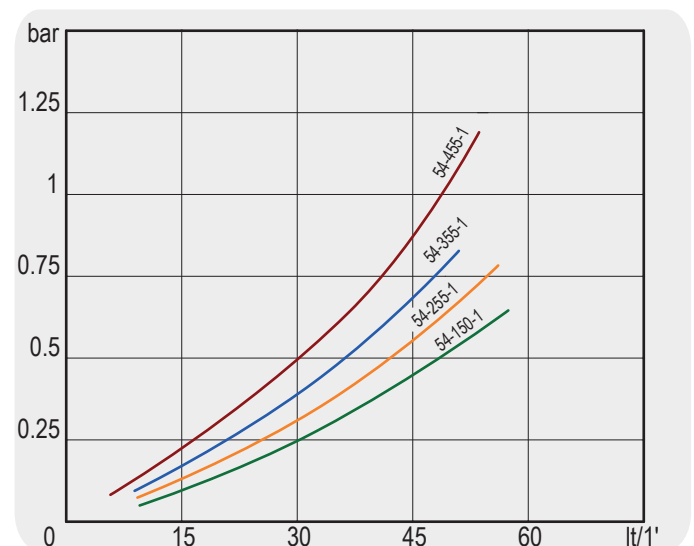


### FATTORE DI CORREZIONE (F)-PERDITE DI CARICO

### CORRECTION FACTOR (F)-PRESSURE DROP

cSt	10	15	20	30	40	50	60	80	100	200	300
F	0.5	0.65	0.77	1	1.2	1.4	1.6	1.9	2.1	3.3	4.3

### PERDITE DI CARICO (32 cst) PRESSURE DROP (32 cst)

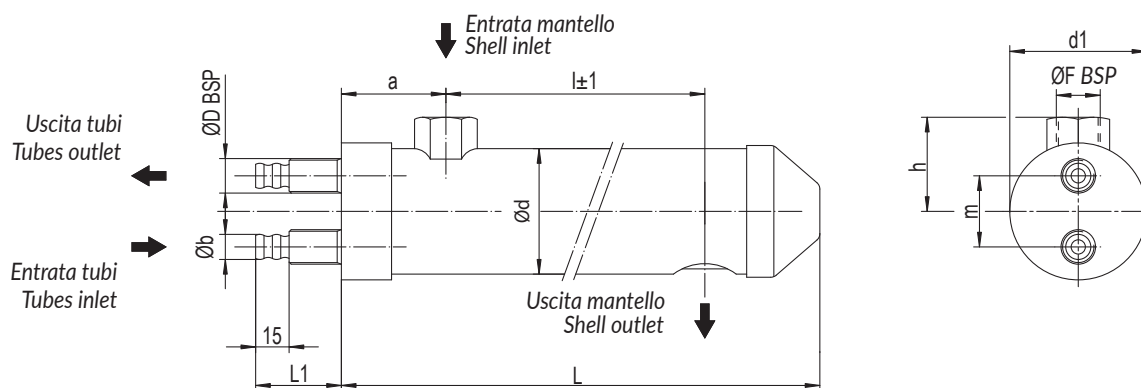




# MG Shell & Tubes

## MGC 60 - MGC 80

Con circuito acqua a due passaggi. Two ways water circuit



Le dimensioni e le caratteristiche tecniche non sono impegnative. Over-all dimension and technical characteristics are not binding.

TIPO TYPE	TUBI TUBES	PIASTRA TUBIERA TUBES SHEET	DEFLETTORI BAFFLES	FONDI COVERS	MANTELLO SHELL
STANDARD	CuDHP	CuZn40	CuZn37	CuZn40	CuZn37

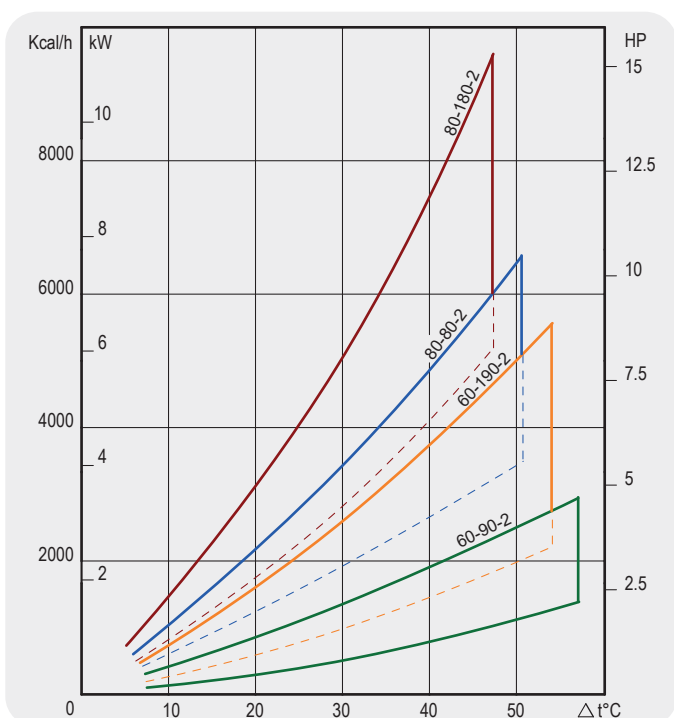
TIPO TYPE	PORTATA OLIO OIL FLOW (lt/min)	HP DISSIPATI CON OLIO HP DISSIPATED WITH OIL =55°C H2O=20°C	CAPACITA' CAPACITY (lt)	kg	Dimensioni - Over all dimension										
					2 Pass										
					$\text{ØD}$	$\text{ØF}$	$l$	$L$	$L1$	$a$	$\text{Ød}$	$h$	$\text{Øb}$	$m$	$d1$
MGC 60-90-2	5-30	1-2.5	0.3	1.5	3/8"	1/2"	90	190	40	48	60	45	13	38	65
MGC 60-190-2	7.5-40	2-5.5	0.4	2	3/8"	1/2"	190	290	40	48	60	45	13	38	65
MGC 80-80-2	25-60	3.5-6.5	0.5	2.3	3/8"	1/2"	80	190	40	50	60	65	16	45	85
MGC 80-180-2	30-80	5.5-10	0.7	3.5	3/8"	1/2"	180	290	40	50	60	65	16	45	85

### DIAGRAMMA RENDIMENTO

Alla portata massima e minima indicata in tabella

### PERFORMANCE DIAGRAM

At the maximum and minimum flow stated in schedule

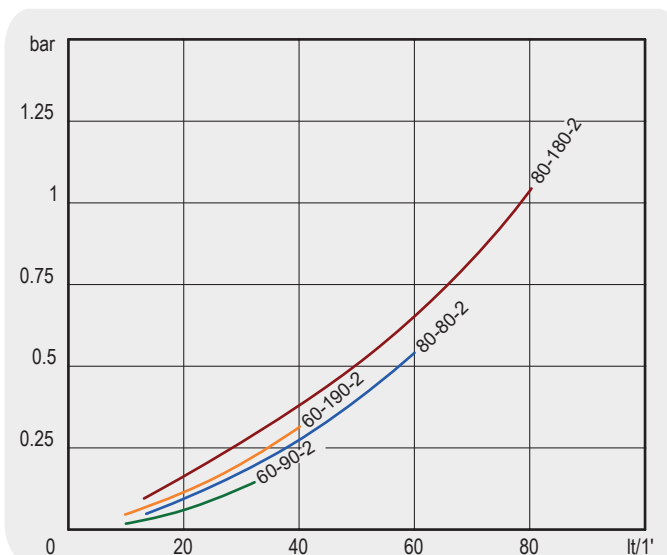


### FATTORE DI CORREZIONE (F)-PERDITE DI CARICO

### CORRECTION FACTOR (F)-PRESSURE DROP

cSt	10	15	20	30	40	50	60	80	100	200	300
F	0.5	0.65	0.77	1	1.2	1.4	1.6	1.9	2.1	3.3	4.3

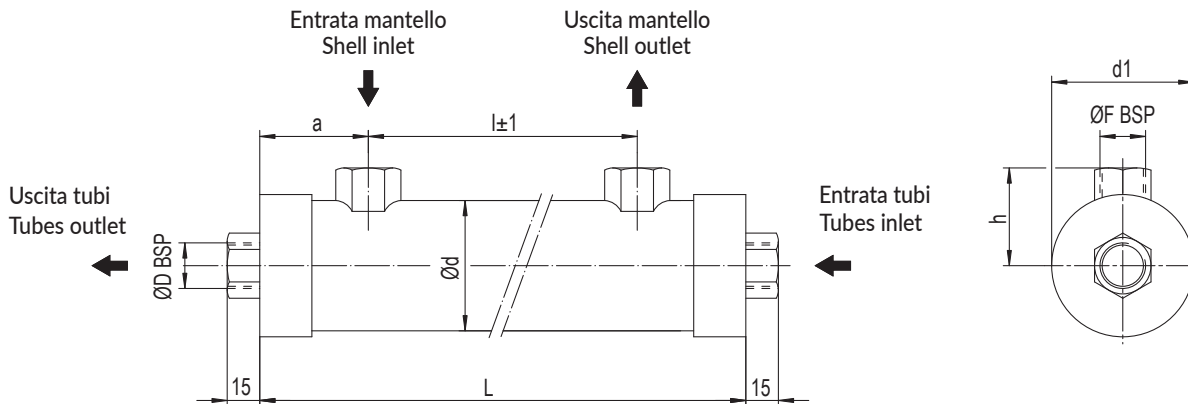
### PERDITE DI CARICO (32 cSt) PRESSURE DROP (32 cSt)







Con circuito acqua a un passaggio. One way water circuit



Le dimensioni e le caratteristiche tecniche non sono impegnative. Over-all dimension and technical characteristics are not binding.

TIPO TYPE	TUBI TUBES	PIASTRA TUBIERA TUBES SHEET	DEFLETTORI BAFFLES	FONDI COVERS	MANTELLO SHELL
STANDARD	CuDHP	CuZn40	CuZn37	CuZn40	CuZn37

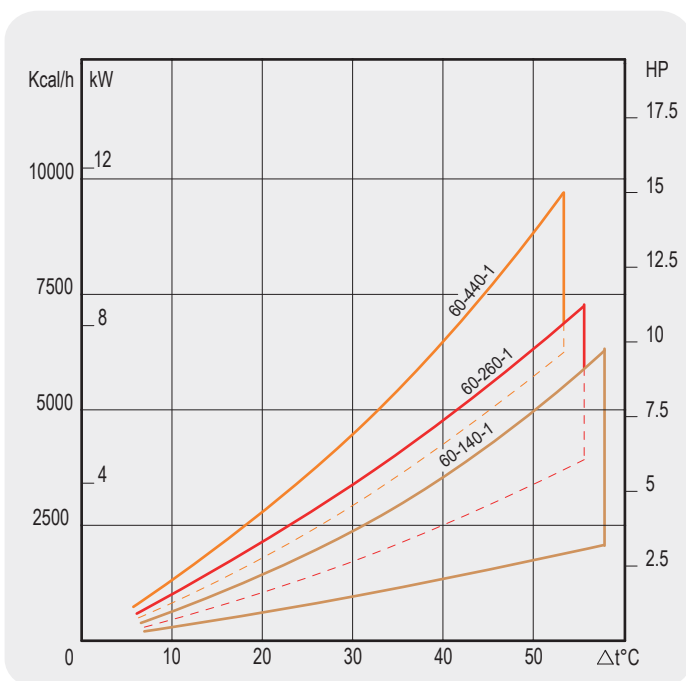
TIPO TYPE	PORTATA OLIO OIL FLOW (lt/min)	HP DISSIPATI CON OLIO HP DISSIPATED WITH OIL =55°C H2O=20°C	CAPACITA' CAPACITY (lt)	kg	Dimensioni - Over all dimension 1 Pass							
					ØD	ØF	l	L	a	Ød	d1	h
MGE 60-140-1	5-30	1.5-4.5	0.4	1.8	1/2"	1/2"	140	240	50	60	65	45
MGE 60-260-1	7.5-40	3.5-6.5	0.6	3	1/2"	1/2"	260	360	50	60	65	45
MGE 80-440-1	10-50	6-9	0.9	5	1/2"	1/2"	440	540	50	60	65	45

### DIAGRAMMA RENDIMENTO

Alla portata massima e minima indicata in tabella

### PERFORMANCE DIAGRAM

At the maximum and minimum flow stated in schedule

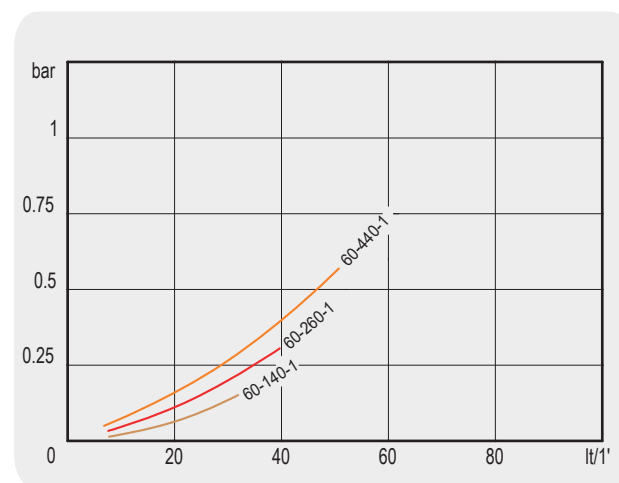


### FATTORE DI CORREZIONE (F)-PERDITE DI CARICO

### CORRECTION FACTOR (F)-PRESSURE DROP

cSt	10	15	20	30	40	50	60	80	100	200	300
F	0.5	0.65	0.77	1	1.2	1.4	1.6	1.9	2.1	3.3	4.3

### PERDITE DI CARICO (32 cSt) PRESSURE DROP (32 cSt)

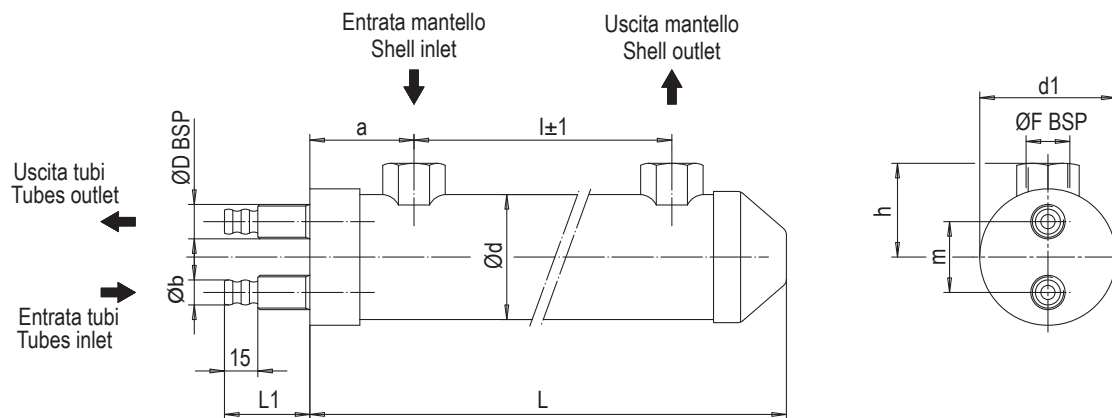




# MG Shell & Tubes

## MGE 60 2 PASS

Con circuito acqua a due passaggi. Two ways water circuit



Le dimensioni e le caratteristiche tecniche non sono impegnative. Over-all dimension and technical characteristics are not binding.

TIPO TYPE	TUBI TUBES	PIASTRA TUBIERA TUBES SHEET	DEFLETTORI BAFFLES	FONDI COVERS	MANTELLO SHELL
STANDARD	CuDHP	CuZn40	CuZn37	CuZn40	CuZn37

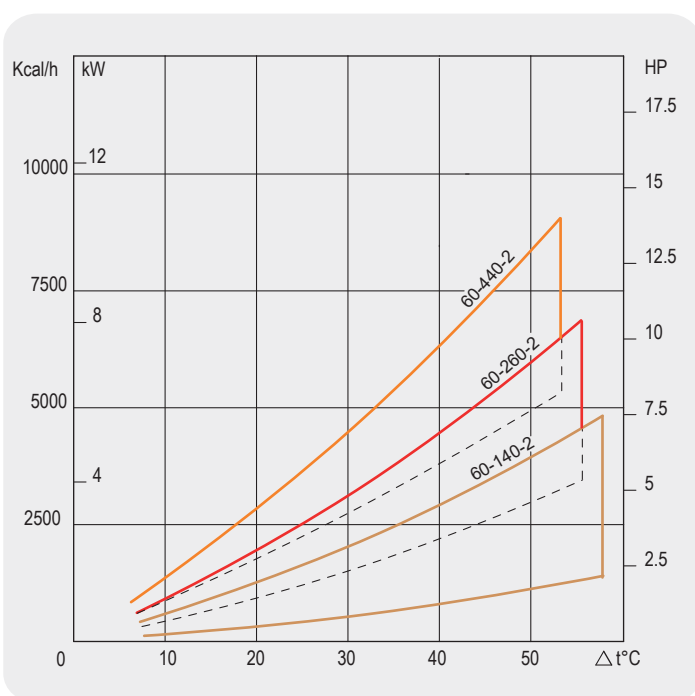
TIPO TYPE	PORTATA OLIO OIL FLOW (lt/min)	HP DISSIPATI CON HP DISSIPATED WITH OIL =55°C H2O=20°C	CAPACITA' CAPACITY (lt)	kg	Dimensioni - Over all dimension										
					2 Pass										
					$\text{ØD}$	$\text{ØF}$	$l$	$L$	$L1$	$a$	$\text{Ød}$	$h$	$\text{Øb}$	$m$	$d1$
MGE 60-140-2	5-30	1-4	0.4	1.8	3/8"	1/2"	140	245	40	50	60	45	13	38	65
MGE 60-260-2	7.5-40	3-6	0.6	3	3/8"	1/2"	260	365	40	50	60	45	13	38	65
MGE 60-440-2	10-50	5-8.5	0.9	5	3/8"	1/2"	440	545	40	50	60	45	16	38	65

### DIAGRAMMA RENDIMENTO

Alla portata massima e minima indicata in tabella

### PERFORMANCE DIAGRAM

At the maximum and minimum flow stated in schedule

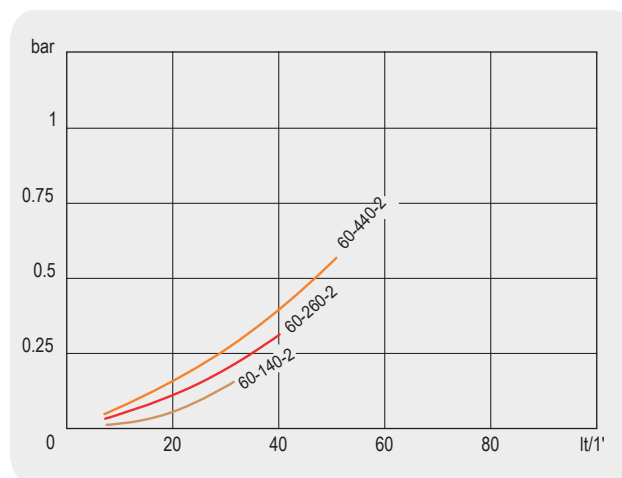


### FATTORE DI CORREZIONE (F)-PERDITE DI CARICO

### CORRECTION FACTOR (F)-PRESSURE DROP

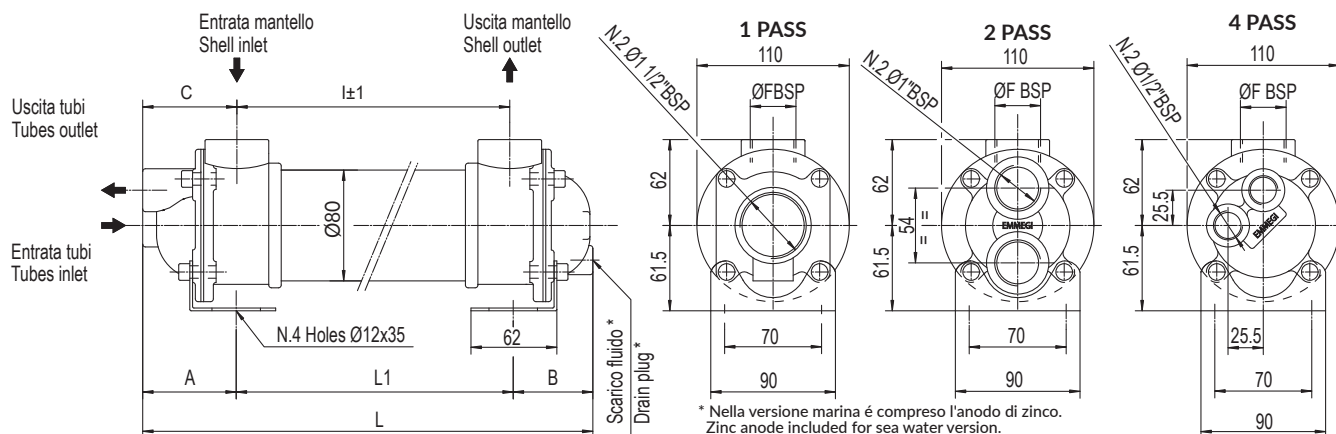
cSt	10	15	20	30	40	50	60	80	100	200	300
F	0.5	0.65	0.77	1	1.2	1.4	1.6	1.9	2.1	3.3	4.3

### PERDITE DI CARICO (32 cSt) PRESSURE DROP (32 cSt)





Con circuito acqua ispezionabile a uno-due-quattro passaggi. One-two-four ways inspectable water circuit



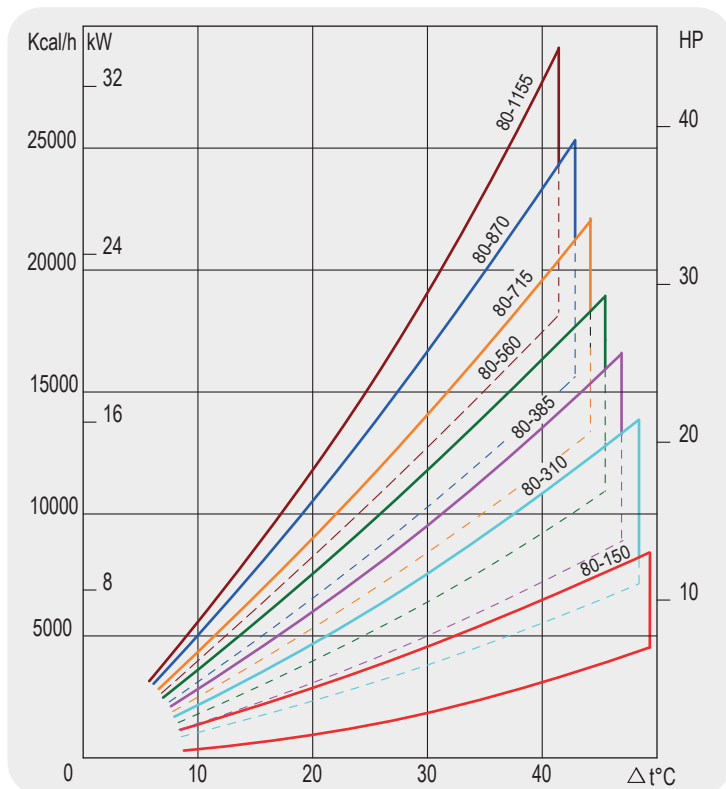
\* Nella versione marina è compreso l'anodo di zinco.  
Zinc anode included for sea water version.

Le dimensioni e le caratteristiche tecniche non sono impegnative. Over-all dimension and technical characteristics are not binding.

TIPO TYPE	TUBI TUBES	PIASTRA TUBIERA TUBES SHEET	DEFLETTORI BAFFLES	FONDI COVERS	MANTELLO SHELL	GUARNIZIONI SEALS
STANDARD	CuDHP	CuZn40	CuZn37	CuZn40	Fe510.2	Rubber-cork
SEA WATER	CuNi10Mn1Fe	CuZn40	CuZn37	CuZn40	Fe510.2	Rubber-cork

TIPO TYPE	PORTATA OLIO OIL FLOW (lt/min)	HP DISSIPACION OLIO HP DISSIPATED WTK OIL =55°C H2O=20°C	CAPACITÀ CAPACITY (lt)	kg	DIMENSIONI - Overall dimension												
					ØF	I	L	L1	1 Pass			2Pass			4Pass		
					A	B	C	A	B	C	A	B	C	A	B	C	
MG 80-150-..	25-70	4-8	0.65	4.5	1"	150	321	141	90	90	85.5	72	64	67	72	64	67.5
MG 80-310-..	25-80	7-14	1.1	5.7	1"	310	481	301	90	90	85.5	72	64	67	72	64	67.5
MG 80-385-..	25-80	9-17	1.3	6.0	1"	385	556	376	90	90	85.5	72	64	67	72	64	67.5
MG 80-560-..	25-80	12-20	1.9	7.5	1"	560	731	551	90	90	85.5	72	64	67	72	64	67.5
MG 80-715-..	35-120	15-24	2.3	8.0	1"	715	886	706	90	90	85.5	72	64	67	72	64	67.5
MG 80-870-..	40-130	18-29	2.8	10.0	1"	870	1041	861	90	90	85.5	72	64	67	72	64	67.5
MG 80-1155-..	40-130	22-36	3.7	13.5	1"	1155	1326	1146	90	90	85.5	72	64	67	72	64	67.5

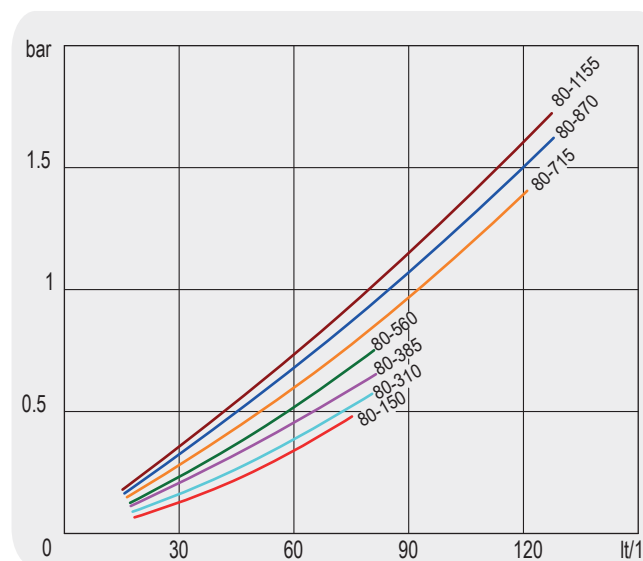
**DIAGRAMMA RENDIMENTO**  
Alla portata massima e minima indicata in tabella  
**PERFORMANCE DIAGRAM**  
At the maximum and minimum flow stated in schedule



### FATTORE DI CORREZIONE (F)-PERDITE DI CARICO CORRECTION FACTOR (F)-PRESSURE DROP

cSt	10	15	20	30	40	50	60	80	100	200	300
F	0.5	0.65	0.77	1	1.2	1.4	1.6	1.9	2.1	3.3	4.3

### PERDITE DI CARICO (32 cSt) PRESSURE DROP (32 cSt)

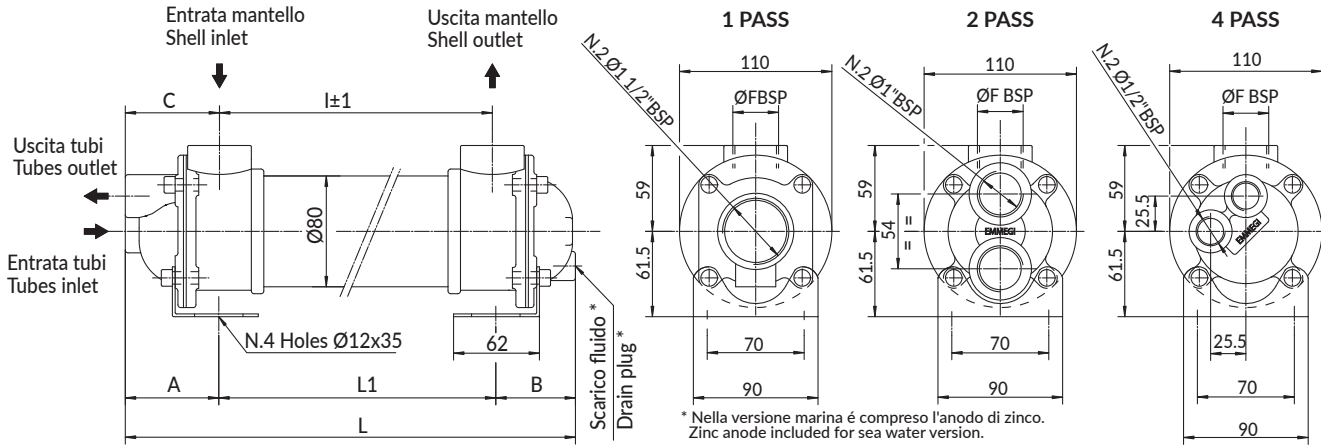




# MG Shell & Tubes

## MG 81

Con circuito acqua ispezionabile a uno-due-quattro passaggi. One-two-four ways controllable water circuit



\* Nella versione marina è compreso l'anodo di zinco.  
Zinc anode included for sea water version.

Le dimensioni e le caratteristiche tecniche non sono impegnative. Over-all dimension and technical characteristics are not binding.

TIPO TYPE	TUBI TUBES	PIASTRA TUBIERA TUBES SHEET	DEFLETTORI BAFFLES	FONDI COVERS	MANTELLO SHELL	GUARNIZIONI SEALS
STANDARD	CuDHP	CuZn40	CuZn37	CuZn40	Fe510.2	Rubber-cork
SEA WATER	CuNi10Mn1Fe	CuZn40	CuZn37	CuZn40	Fe510.2	Rubber-cork

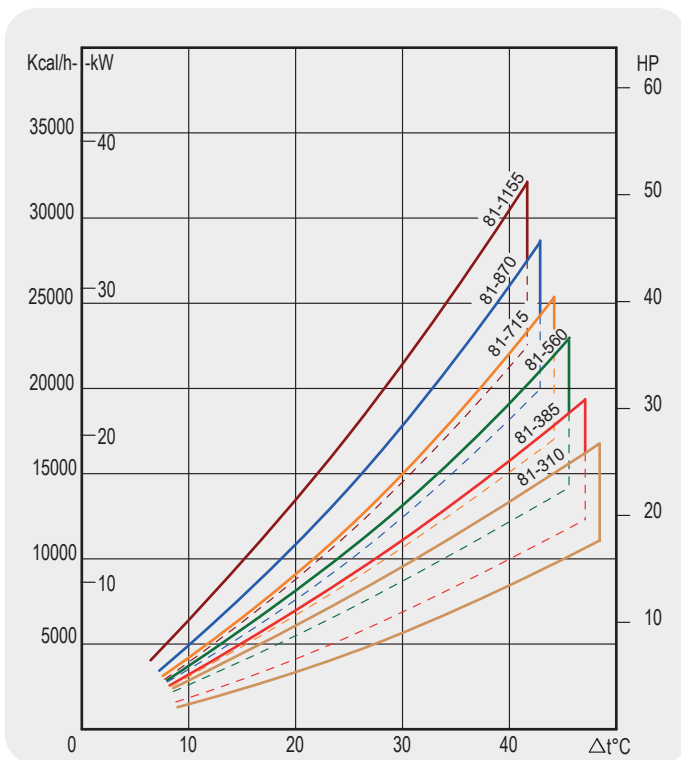
TIPO TYPE	PORTATA OLIO OIL FLOW (lt/min)	HP DISSIPATI CON OLIO HP DISSIPATED WITH OIL =55°C H2O=20°C	CAPACITÀ CAPACITY (lt)	kg	DIMENSIONI - Overall dimension															
					ØF	I	L1	1 Pass		2Pass				4Pass						
					A	B	C	L	A	B	C	L	A	B	C	L				
MG 81-310-..	50-120	11-18	1.2	5.7	1 1/2"	310	314	90	90	92	494	72	64	74	494	72	64	74	450	
MG 81-385-..	50-120	13-21	1.4	6.0	1 1/2"	385	389	90	90	92	569	72	64	74	569	72	64	74	525	
MG 81-560-..	60-150	16-25	2	7.5	1 1/2"	560	564	90	90	92	744	72	64	74	744	72	64	74	700	
MG 81-715-..	75-180	20-29	2.4	8.0	1 1/2"	715	719	90	90	92	899	72	64	74	899	72	64	74	855	
MG 81-870-..	75-180	24-34	2.9	10.0	1 1/2"	870	874	90	90	92	1054	72	64	74	1054	72	64	74	1010	
MG 81-1155-..	75-180	29-40	3.8	13.5	1 1/2"	1155	1159	90	90	92	1339	72	64	74	1339	72	64	74	1295	

### DIAGRAMMA RENDIMENTO

Alla portata massima e minima indicata in tabella

### PERFORMANCE DIAGRAM

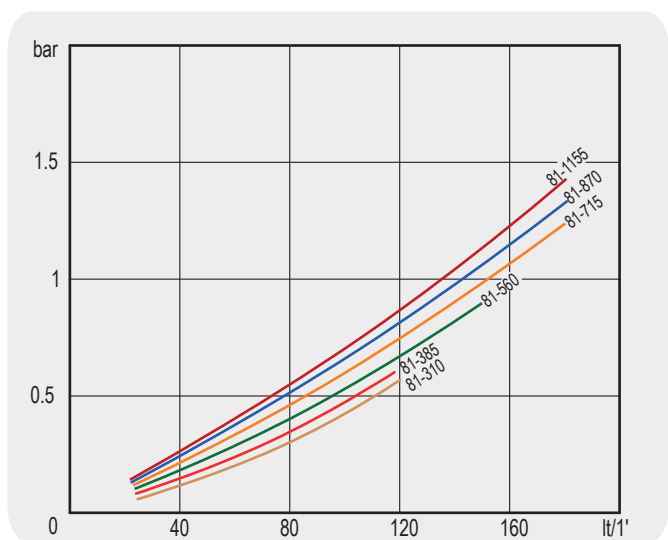
At the maximum and minimum flow stated in schedule



### FATTORE DI CORREZIONE (F)-PERDITE DI CARICO CORRECTION FACTOR (F)-PRESSURE DROP

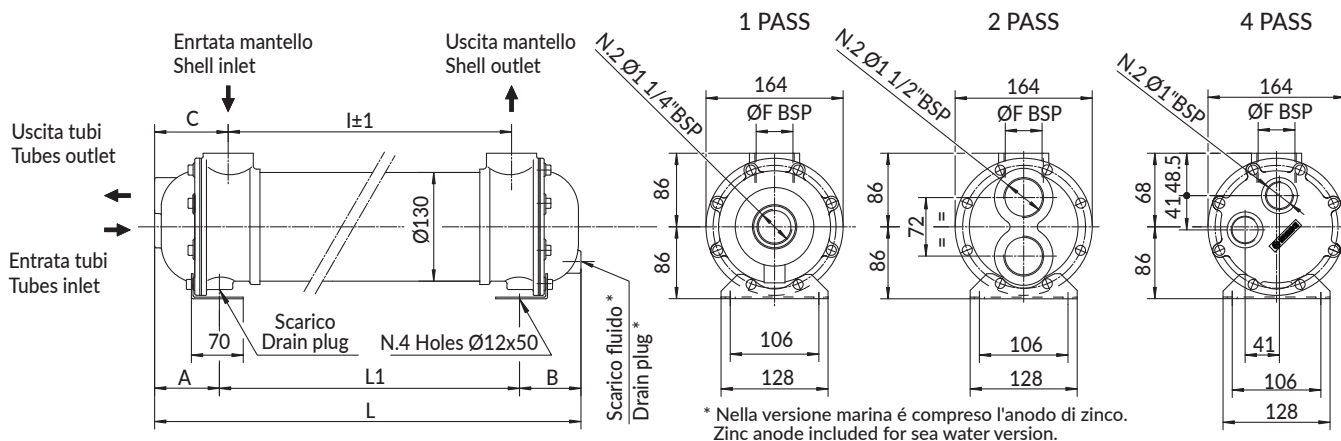
cSt	10	15	20	30	40	50	60	80	100	200	300
F	0.5	0.65	0.77	1	1.2	1.4	1.6	1.9	2.1	3.3	4.3

### PERDITE DI CARICO (32 cSt) PRESSURE DROP (32 cSt)





Con circuito acqua ispezionabile a uno-due-quattro passaggi. One-two-four ways inspectable water circuit



Le dimensioni e le caratteristiche tecniche non sono impegnative. Over-all dimension and technical characteristics are not binding.

TIPO TYPE	TUBI TUBES	PIASTRA TUBIERA TUBES SHEET	DEFLETTORI BAFFLES	FONDI COVERS	MANTELLO SHELL	GUARNIZIONI SEALS
STANDARD	CuDHP	CuZn40	CuZn37	CuZn40	Fe510.2	Rubber-cork
SEA WATER	CuNi10Mn1Fe	CuZn40	CuZn37	CuZn40	Fe510.2	Rubber-cork

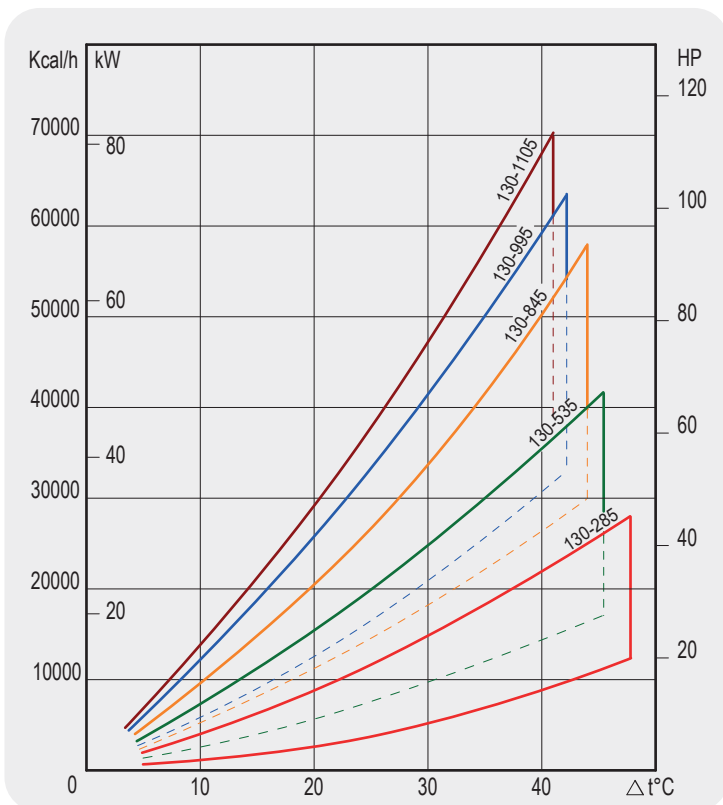
TIPO TYPE	PORTATA OLIO OIL FLOW (lt/min)	HP DISSIPATI CON OLIO HP DISSIPATED WITH OIL =55°C H2O=20°C	CAPACITÀ CAPACITY (lt)	kg	DIMENSIONI - Overall dimension														
					ØF	I	L1	1 Pass			2Pass			4Pass					
								A	B	C	A	B	C	L	A	B	C	L	
MG 130-285-..	60-160	12-30	3	16	1 1/2"	285	303	85	85	94	473	80	75	89	458	80	75	89	458
MG 130-535-..	80-200	18-48	5.2	22	1 1/2"	535	553	85	85	94	723	80	75	89	708	80	75	89	708
MG 130-845-..	120-280	35-68	7.9	28	1 1/2"	845	863	85	85	94	1033	80	75	89	1018	80	75	89	1018
MG 130-995-..	120-280	41-78	9.2	32	1 1/2"	995	1013	85	85	94	1183	80	75	89	1168	80	75	89	1168
MG 130-870-..	120-280	50-90	10	35	1 1/2"	1105	1293	85	85	94	1293	80	75	89	1278	80	75	89	1278

### DIAGRAMMA RENDIMENTO

Alla portata massima e minima indicata in tabella

### PERFORMANCE DIAGRAM

At the maximum and minimum flow stated in schedule

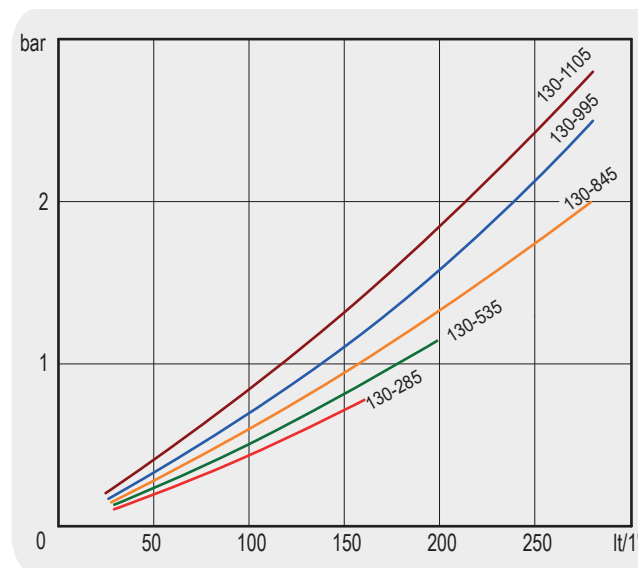


### FATTORE DI CORREZIONE (F)-PERDITE DI CARICO

### CORRECTION FACTOR (F)-PRESSURE DROP

cSt	10	15	20	30	40	50	60	80	100	200	300
F	0.5	0.65	0.77	1	1.2	1.4	1.6	1.9	2.1	3.3	4.3

### PERDITE DI CARICO (32 cSt) PRESSURE DROP (32 cSt)

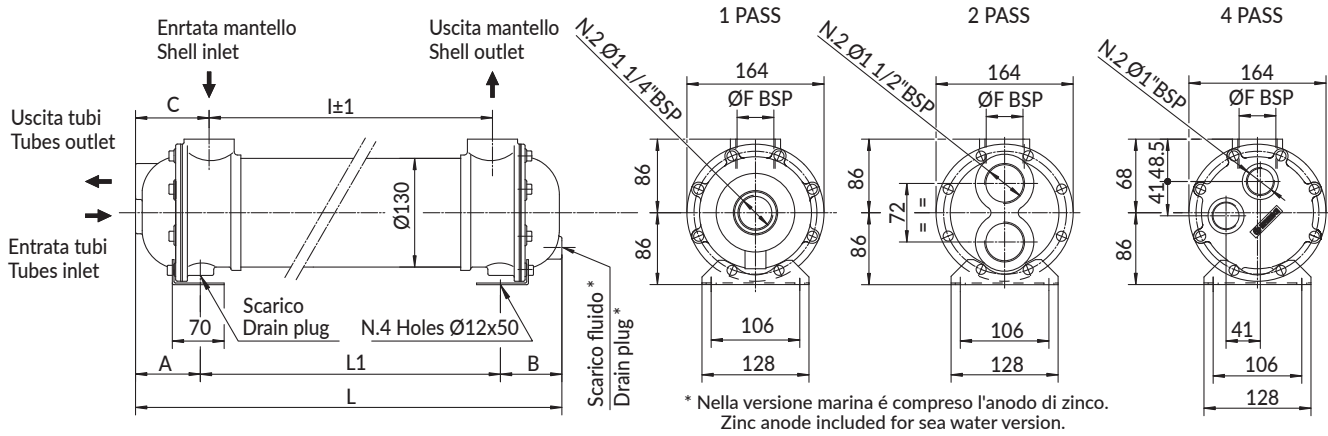




# MG Shell & Tubes

## MG 131

Con circuito acqua ispezionabile a uno-due-quattro passaggi. One-two-four ways inspectable water circuit



\* Nella versione marina è compreso l'anodo di zinco.  
Zinc anode included for sea water version.

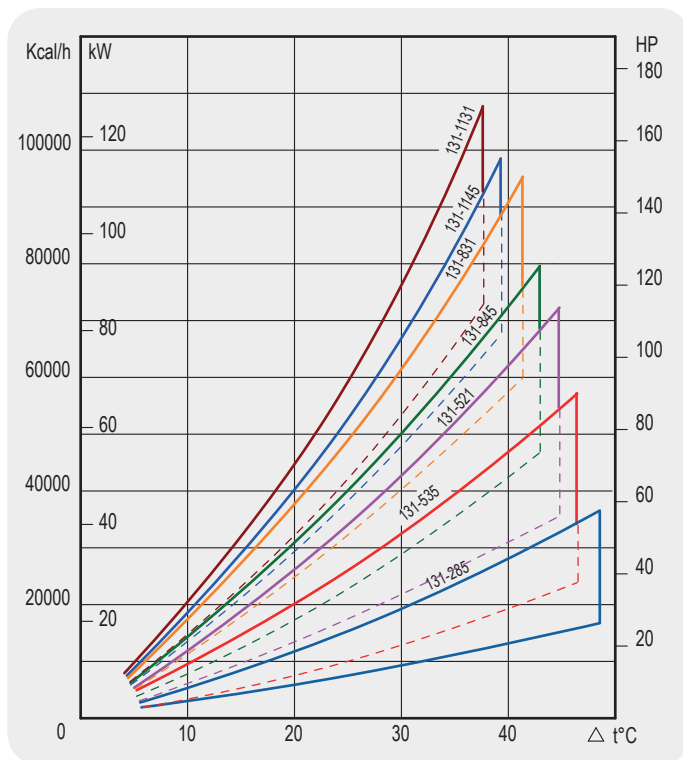
Le dimensioni e le caratteristiche tecniche non sono impegnative. Over-all dimension and technical characteristics are not binding.

TIPO TYPE	TUBI TUBES	PIASTRA TUBIERA TUBES SHEET	DEFLETTORI BAFFLES	FONDI COVERS	MANTELLI SHELL	GUARNIZIONI SEALS
STANDARD	CuDHP	CuZn40	CuZn37	CuZn40	Fe510.2	Rubber-cork
SEA WATER	CuNi10Mn1Fe	CuZn40	CuZn37	CuZn40	Fe510.2	Rubber-cork

TIPO TYPE	PORTATA OLIO OIL FLOW (t/min)	HP DISSIPATI CON OLIO HP DISSIPATED W/TK OIL =55°C H2O=20°C	CAPACITÀ CAPACITY (lt)	kg	DIMENSIONI - Overall dimension														
					ØF	I	L1	1 Pass				2Pass				4Pass			
					A	B	C	L	A	B	C	L	A	B	C	L			
MG 131-285..	50-140	17-38	2.7	17	1 1/2"	285	303	85	85	94	473	80	75	89	458	80	75	89	458
MG 131-535..	80-200	24-63	4.5	23	1 1/2"	535	553	85	85	94	723	80	75	89	708	80	75	89	708
MG 131-521..	120-280	40-82	4.6	23	2"	521	555	85	85	94	725	80	75	97	710	80	75	97	710
MG 131-845..	100-250	56-96	6.9	29	1 1/2"	845	863	85	85	94	1033	80	75	89	1018	80	75	89	1018
MG 131-831..	160-400	77-120	7	29	2"	831	866	85	85	94	1036	80	75	97	1020	80	75	97	1020
MG 131-1145..	120-280	85-132	8	36	1 1/2"	1145	1163	85	85	94	1333	80	75	89	1318	80	75	89	1318
MG 131-1131..	160-420	102-153	8.1	36	2"	1131	1165	85	85	94	1335	80	75	97	1320	80	75	97	1320

DIAGRAMMA RENDIMENTO  
Alla portata massima e minima indicata in tabella

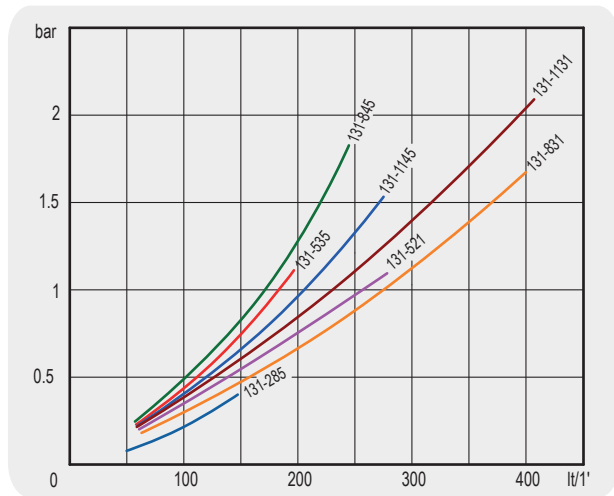
PERFORMANCE DIAGRAM  
At the maximum and minimum flow stated in schedule



FATTORE DI CORREZIONE (F)-PERDITE DI CARICO  
CORRECTION FACTOR (F)-PRESSURE DROP

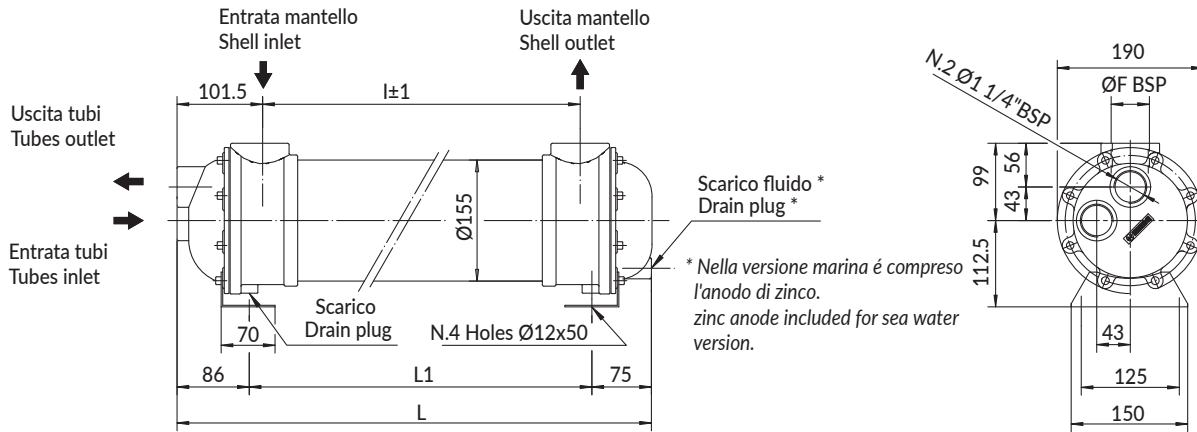
cSt	10	15	20	30	40	50	60	80	100	200	300
F	0.5	0.65	0.77	1	1.2	1.4	1.6	1.9	2.1	3.3	4.3

PERDITE DI CARICO (32 cSt) PRESSURE DROP (32 cSt)





Con circuito acqua ispezionabile a quattro passaggi. Four ways inspectable water circuit



Le dimensioni e le caratteristiche tecniche non sono impegnative. Over-all dimension and technical characteristics are not binding.

TIPO TYPE	TUBI TUBES	PIASTRA TUBIERA TUBES SHEET	DEFLETTORI BAFFLES	FONDI COVERS	MANTELLO SHELL	GUARNIZIONI SEALS
STANDARD	CuDHP	CuZn40	CuZn37	CuZn40	Fe510.2	Rubber-cork
SEA WATER	CuNi10Mn1Fe	CuZn40	CuZn37	CuZn40	Fe510.2	Rubber-cork

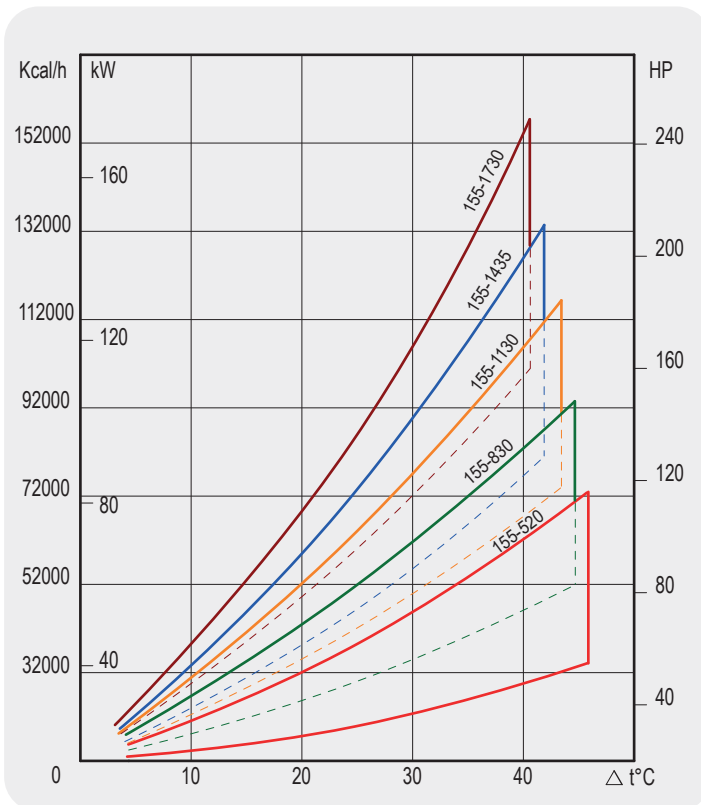
TIPO TYPE	PORTATA OLIO OIL FLOW (lt/min)	HP DISSIPATI CON OLIO HP DISSIPATED WITH OIL =55°C H2O=20°C	CAPACITÀ CAPACITY (lt)	kg	DIMENSIONI - Overall dimension			
					ØF	l	L	L1
MG 155-520-4	120-300	55-120	6.4	35	2"	520	712	551
MG 155-830-4	140-380	95-155	9.6	43	2"	830	1022	861
MG 155-1130-4	160-420	115-185	12.8	51	2"	1130	1322	1161
MG 155-1435-4	180-450	135-235	16	58	2"	1435	1627	1466
MG 155-1730-4	180-450	160-250	19	66	2"	1730	1922	1761

### DIAGRAMMA RENDIMENTO

Alla portata massima e minima indicata in tabella

### PERFORMANCE DIAGRAM

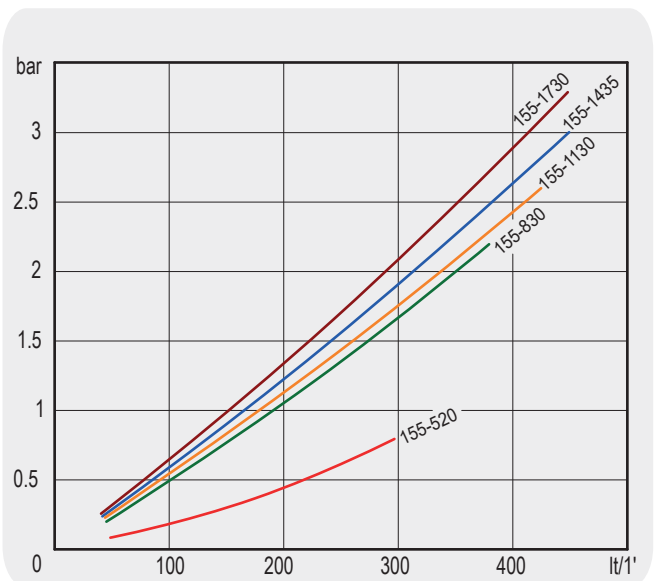
At the maximum and minimum flow stated in schedule



### FATTORE DI CORREZIONE (F)-PERDITE DI CARICO CORRECTION FACTOR (F)-PRESSURE DROP

cSt	10	15	20	30	40	50	60	80	100	200	300
F	0.5	0.65	0.77	1	1.2	1.4	1.6	1.9	2.1	3.3	4.3

### PERDITE DI CARICO (32 cSt) PRESSURE DROP (32 cSt)

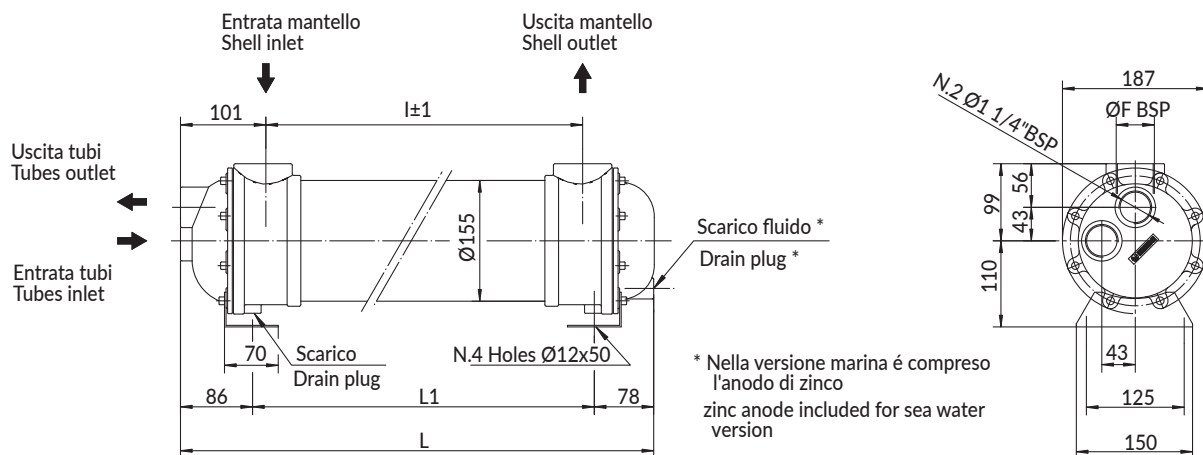




# MG Shell & Tubes

## MG 157

Con circuito acqua ispezionabile a quattro passaggi. Four ways inspectable water circuit



Le dimensioni e le caratteristiche non sono impegnative. Over-all dimension and technical characteristics are not binding.

TIPO TYPE	TUBI TUBES	PIASTRA TUBIERA TUBES SHEET	DEFLETTORI BAFFLES	FONDI COVERS	MANTELLO SHELL	GUARNIZIONI SEALS
STANDARD	CuDHP	CuZn40	CuZn37	CuZn40	Fe510.2	Rubber-cork
SEA WATER	CuNi10Mn1Fe	CuZn40	CuZn37	CuZn40	Fe510.2	Rubber-cork

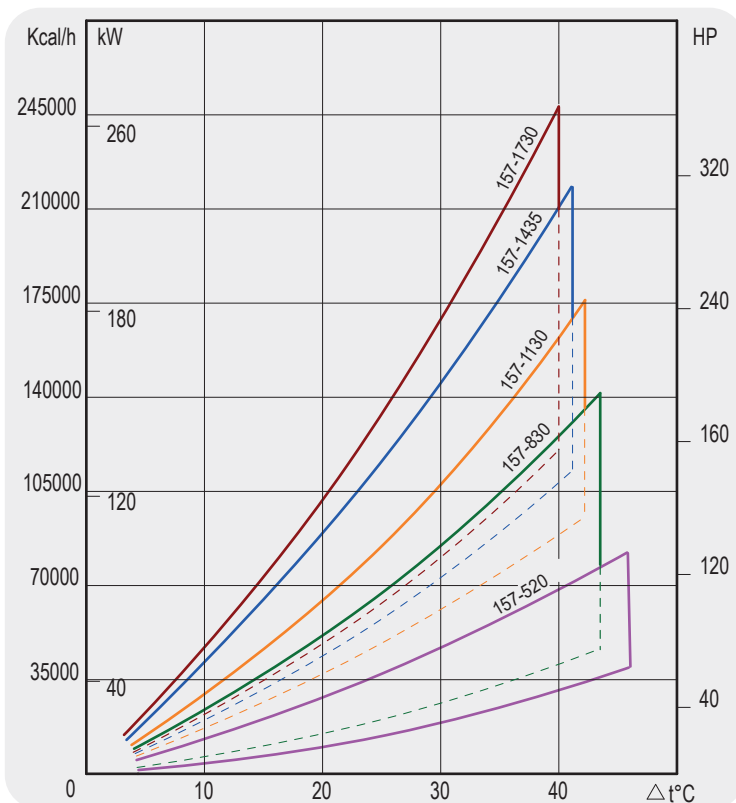
TIPO TYPE	PORTATA OLIO OIL FLOW (lt/min)	HP DISSIPACION OLIO HP DISSIPATED WTK OIL =55°C H2O=20°C	CAPACITÀ CAPACITY (lt)	kg	DIMENSIONI - Overall dimension			
					ØF	I	L	L1
MG 157-520-4..	120-300	35-92	5.5	40	2"	520	711	547
MG 157-830-4..	140-380	54-166	8.4	50	2"	830	1021	857
MG 157-1130-4..	160-420	110-215	11.3	59	2"	1130	1321	1157
MG 157-1435-4..	180-450	140-280	14.1	66	2"	1435	1626	1462
MG 157-1730-4..	180-450	155-315	17	76	2"	1730	1921	1757

### DIAGRAMMA RENDIMENTO

Alla portata massima e minima indicata in tabella

### PERFORMANCE DIAGRAM

At the maximum and minimum flow stated in schedule



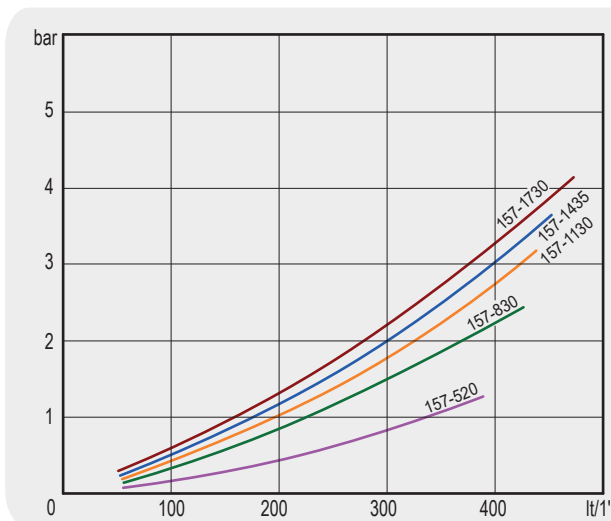
### FATTORE DI CORREZIONE (F)-PERDITE DI CARICO

### CORRECTION FACTOR (F)-PRESSURE DROP

cSt	10	15	20	30	40	50	60	80	100	200	300
F	0.5	0.65	0.77	1	1.2	1.4	1.6	1.9	2.1	3.3	4.3

### PERDITE DI CARICO (32 cSt)

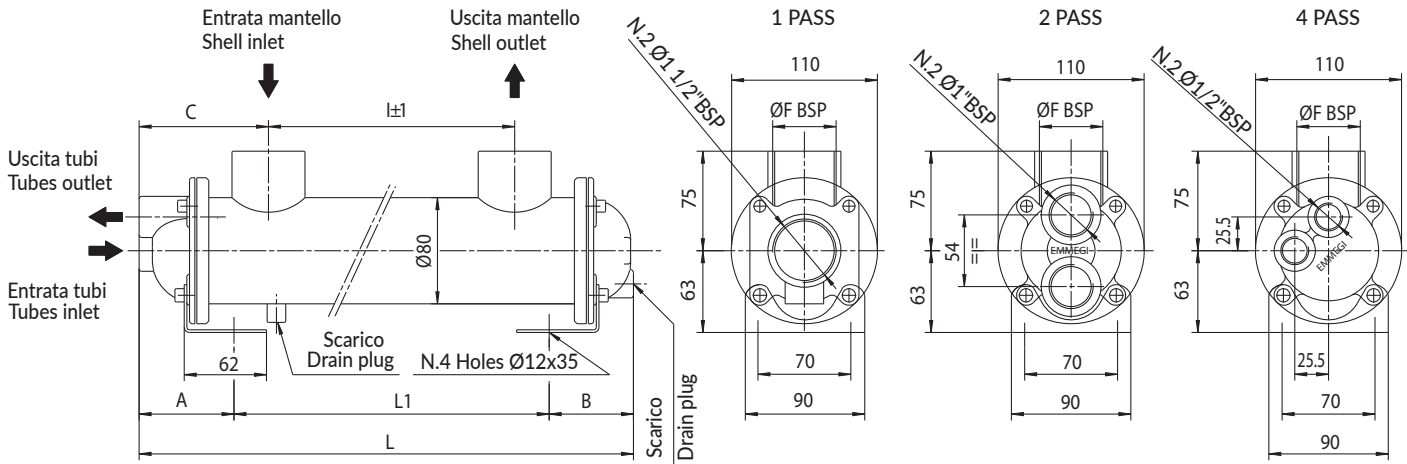
### PRESSURE DROP (32 cSt)







Con circuito acqua ispezionabile a uno-due-quattro passaggi. One-two-four ways inspectable water circuit



Le dimensioni e le caratteristiche tecniche non sono impegnative. Over-all dimension and technical characteristics are not binding.

TIPO TYPE	TUBI TUBES	PIASTRA TUBIERA TUBES SHEET	DEFLETTORI BAFFLES	FONDI COVERS	MANTELLO SHELL	GUARNIZIONI SEALS
AISI 304	AISI 304	AISI 304	AISI 304	CuZn40	AISI 304	Graphite-kevlar

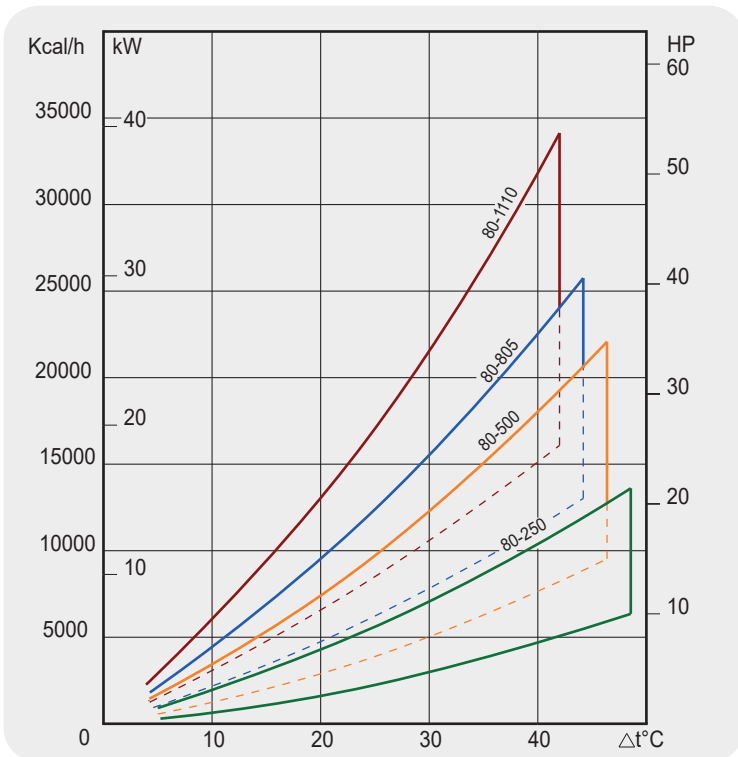
TIPO TYPE	PORTATA OLIO OIL FLOW (l/min)	HP DISSIPATI CON OLIO HP DISSIPATED WITH OIL =55°C H2O=20°C	CAPACITÀ CAPACITY (lt)	kg	DIMENSIONI - Overall dimension															
					ØF	I	L1	1 Pass				2 Pass				4 Pass				
								A	B	C	L	A	B	C	L	A	B	C	L	
MGB 80-250-..	30-160	6-4	1.1	6	1 1/2"	250	325	90	90	127.5	505	72	64	127.5	461	72	64	127.5	461	
MGB 80-500-..	40-180	10-24	2	9	1 1/2"	500	575	90	90	127.5	755	72	64	127.5	711	72	64	127.5	711	
MGB 80-805-..	40-180	15-30	3	12	1 1/2"	805	880	90	90	127.5	1060	72	64	127.5	1016	72	64	127.5	1016	
MGB 80-1110-..	50-200	20-42	4	15	1 1/2"	1110	1185	90	90	127.5	1365	72	64	127.5	1321	72	64	127.5	1185	

### DIAGRAMMA RENDIMENTO

Alla portata massima e minima indicata in tabella

### PERFORMANCE DIAGRAM

At the maximum and minimum flow stated in schedule

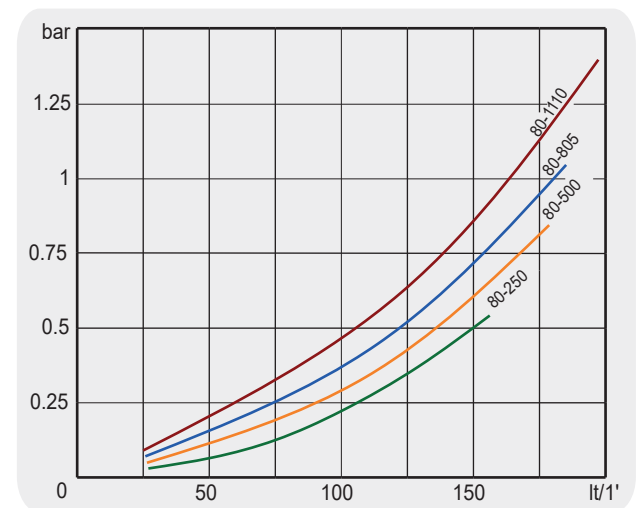


### FATTORE DI CORREZIONE (F)-PERDITE DI CARICO

#### CORRECTION FACTOR (F)-PRESSURE DROP

cSt	10	15	20	30	40	50	60	80	100	200	300
F	0.5	0.65	0.77	1	1.2	1.4	1.6	1.9	2.1	3.3	4.3

#### PERDITE DI CARICO (32 cSt) PRESSURE DROP (32 cSt)

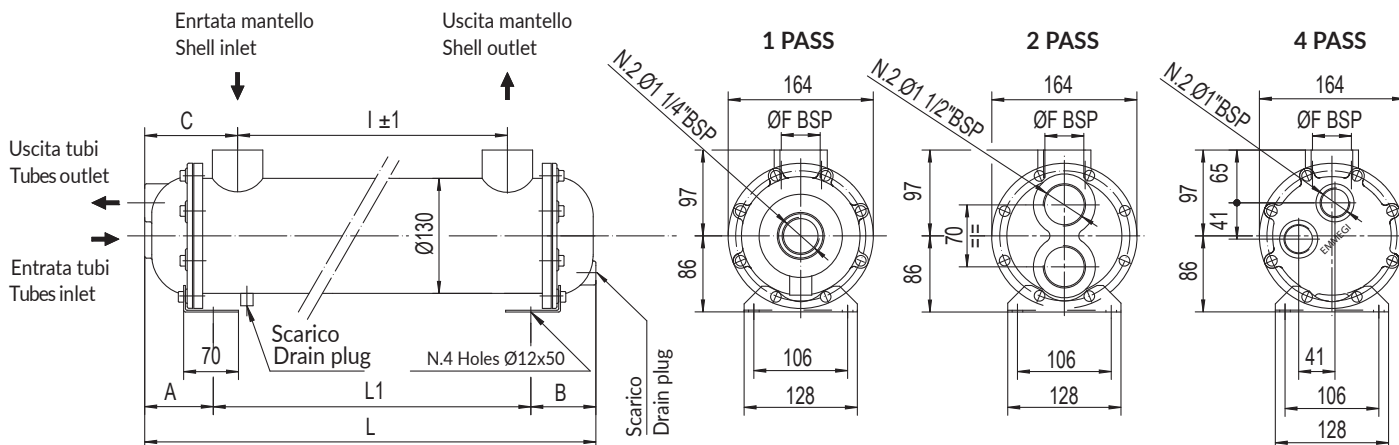




# MG Shell & Tubes

## MGB 130 - AISI 304

Con circuito acqua ispezionabile a uno-due-quattro passaggi. One-two-four ways inspectable water circuit



Le dimensioni e le caratteristiche tecniche non sono impegnative. Over-all dimension and technical characteristics are not binding.

TIPO TYPE	TUBI TUBES	PIASTRA TUBIERA TUBES SHEET	DEFLETTORI BAFFLES	FONDI COVERS	MANTELLINO SHELL	GUARNIZIONI SEALS
AISI 304	AISI 304	AISI 304	AISI 304	CuZn40	AISI 304	Graphite-kevlar

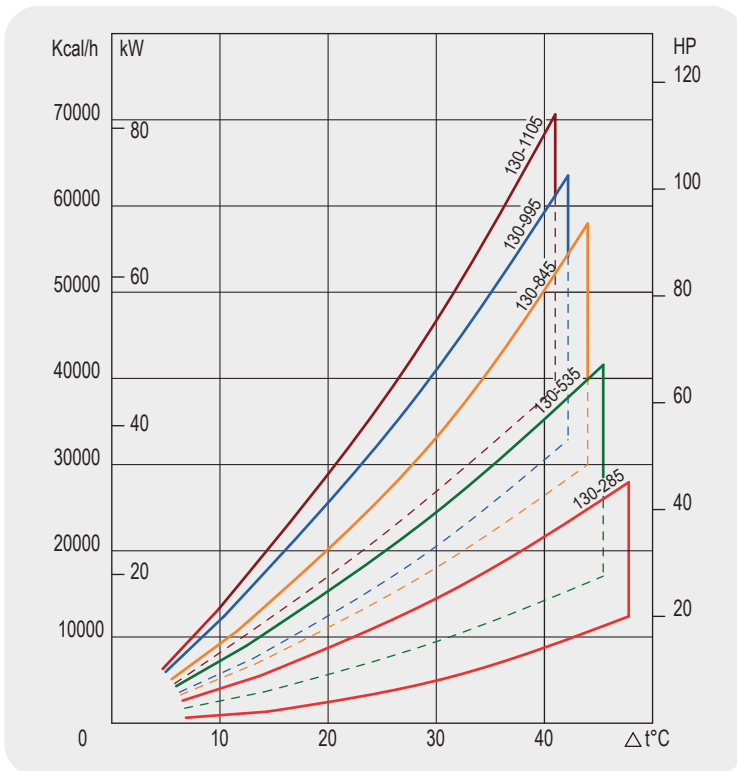
TIPO TYPE	PORTATA OLIO OIL FLOW (lt/min)	HP DISSIPATI CON OLIO HP DISSIPATED WITH OIL =55°C H2O=20°C	CAPACITÀ CAPACITY (lt)	kg	DIMENSIONI - Overall dimension																
					ØF	I	1 Pass					2 Pass					4 Pass				
							A	B	C	L1	L	A	B	C	L1	L	A	B	C	L1	L
MGB 130-285...	60-160	12-30	3	16	1 1/2"	285	85	85	132	379	549	80	75	127	379	534	80	75	127	381	536
MGB 130-535...	80-200	18-48	5.2	22	1 1/2"	535	85	85	129.5	624	794	80	75	124.5	624	779	80	75	124.5	626	781
MGB 130-845...	120-280	35-68	7.9	28	1 1/2"	845	85	85	124.5	924	1094	80	75	119.5	924	1079	80	75	119.5	926	1081
MGB 130-995...	120-280	41-78	9.2	32	1 1/2"	995	85	85	132	1089	1259	80	75	127	1089	1244	80	75	127	1091	1246
MGB 130-1105...	120-280	50-90	10	35	1 1/2"	1105	85	85	129.5	1194	1364	80	75	124.5	1194	1349	80	75	124.5	1196	1351

### DIAGRAMMA RENDIMENTO

Alla portata massima e minima indicata in tabella

### PERFORMANCE DIAGRAM

At the maximum and minimum flow stated in schedule

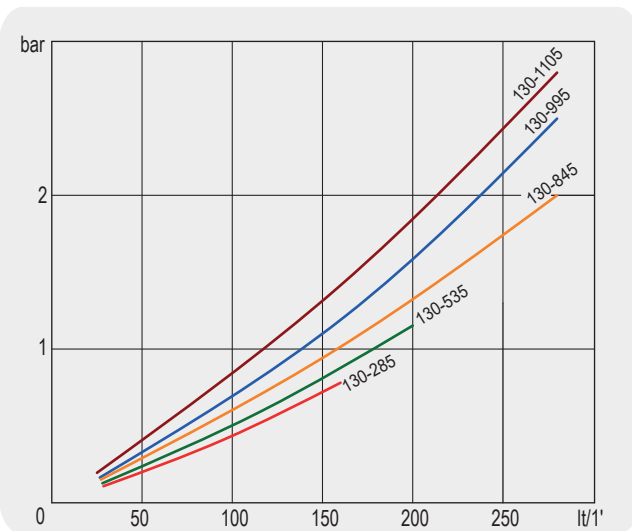


### FATTORE DI CORREZIONE (F)-PERDITE DI CARICO

### CORRECTION FACTOR (F)-PRESSURE DROP

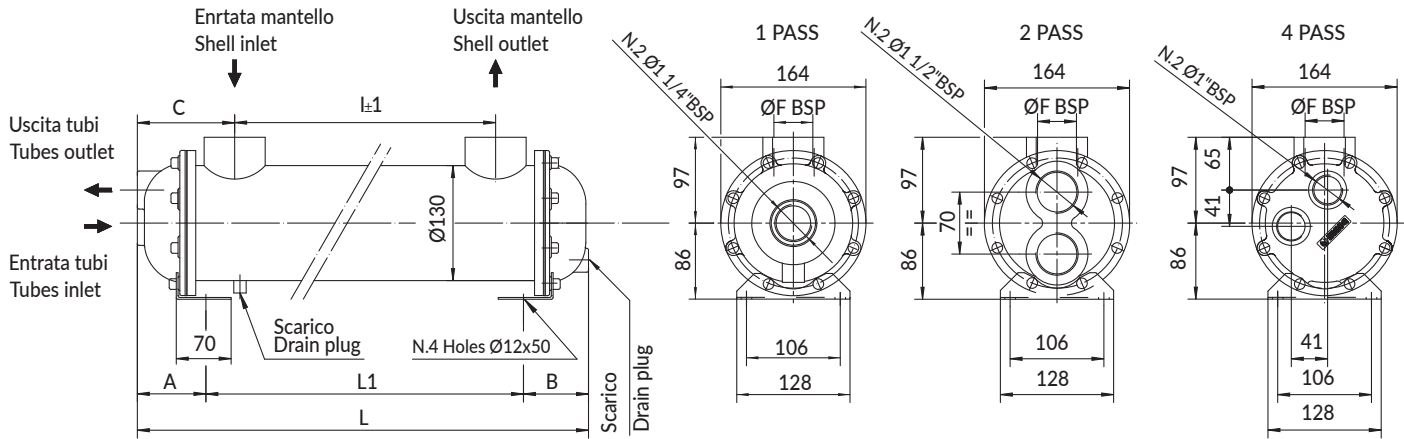
cSt	10	15	20	30	40	50	60	80	100	200	300
F	0.5	0.65	0.77	1	1.2	1.4	1.6	1.9	2.1	3.3	4.3

### PERDITE DI CARICO (32 cSt) PRESSURE DROP (32 cSt)





Con circuito acqua ispezionabile a uno-due-quattro passaggi. One-two-four ways inspectable water circuit



Le dimensioni e le caratteristiche tecniche non sono impegnative. Over-all dimension and technical characteristics are not binding.

TIPO TYPE	TUBI TUBES	PIASTRA TUBIERA TUBES SHEET	DEFLETTORI BAFFLES	FONDI COVERS	MANTELLI SHELL	GUARNIZIONI SEALS
AiSi	AiSi 304	AiSi 304	AiSi 304	CuZn40	AISI 304	Graphite-kevlar

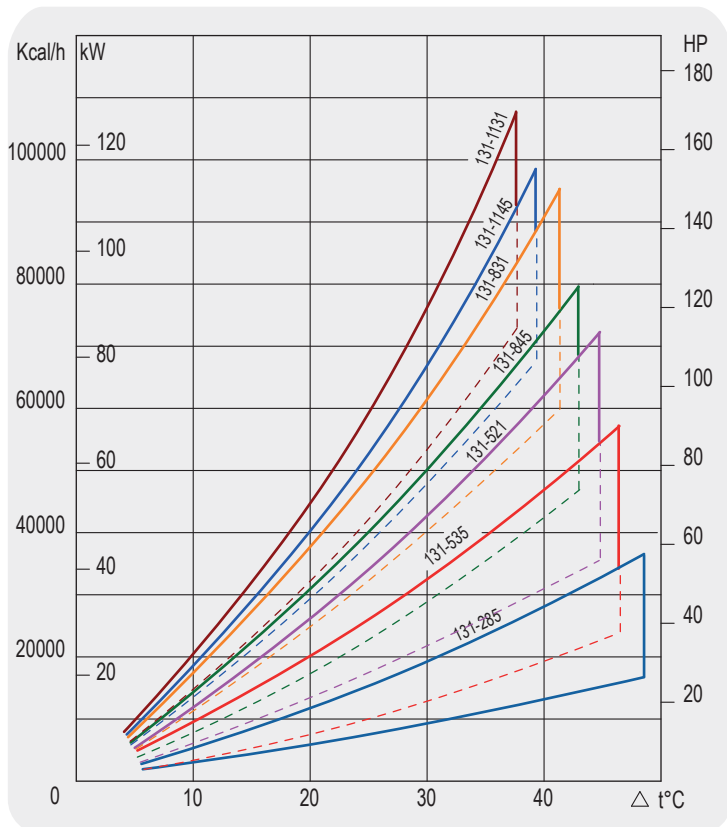
TIPO TYPE	PORTATA OLIO OIL FLOW (lt/min)	HP DISSIPATI CON OLIO HP DISSIPATED WITH OIL =55°C H2O=20°C	CAPACITÀ CAPACITY (lt)	kg	DIMENSIONI - Overall dimension															
					ØF	I	L1	1 Pass				2Pass				4Pass				
								A	B	C	L	A	B	C	L	A	B	C	L1	L
MGB 131-285-..	50-140	17-38	2.7	17	1 1/2"	285	379	85	85	132	549	72	64	67	534	72	64	67.5	381	536
MGB 131-535-..	80-200	24-63	4.5	23	1 1/2"	535	624	85	85	129.5	794	72	64	67	779	72	64	67.5	626	781
MGB 131-521-..	120-280	40-82	4.6	23	2"	521	624	85	85	136.5	794	72	64	67	779	72	64	67.5	626	781
MGB 131-845-..	100-250	56-96	6.9	29	1 1/2"	845	924	85	85	124.5	1094	72	64	67	1079	72	64	67.5	926	1081
MGB 131-831-..	160-400	77-120	7	29	2"	831	924	85	85	131.5	1094	72	64	67	1079	72	64	67.5	926	1081
MGB 131-1145-	120-280	85-132	8	36	1 1/2"	1145	1224	85	85	124.5	1394	72	64	67	1379	72	64	67.5	1224	1379
MGB 131-1131-	160-420	102-153	8.1	36	2"	1131	1224	85	85	131.5	1394	72	64	67	1379	72	64	67.5	1224	1379

### DIAGRAMMA RENDIMENTO

Alla portata massima e minima indicata in tabella

### PERFORMANCE DIAGRAM

At the maximum and minimum flow stated in schedule

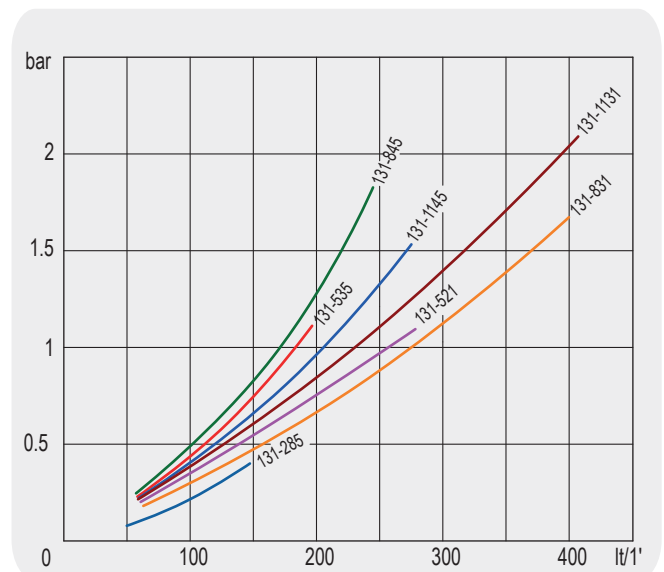


### FATTORE DI CORREZIONE (F)-PERDITE DI CARICO

### CORRECTION FACTOR (F)-PRESSURE DROP

cSt	10	15	20	30	40	50	60	80	100	200	300
F	0.5	0.65	0.77	1	1.2	1.4	1.6	1.9	2.1	3.3	4.3

### PERDITE DI CARICO (32 cSt) PRESSURE DROP (32 cSt)

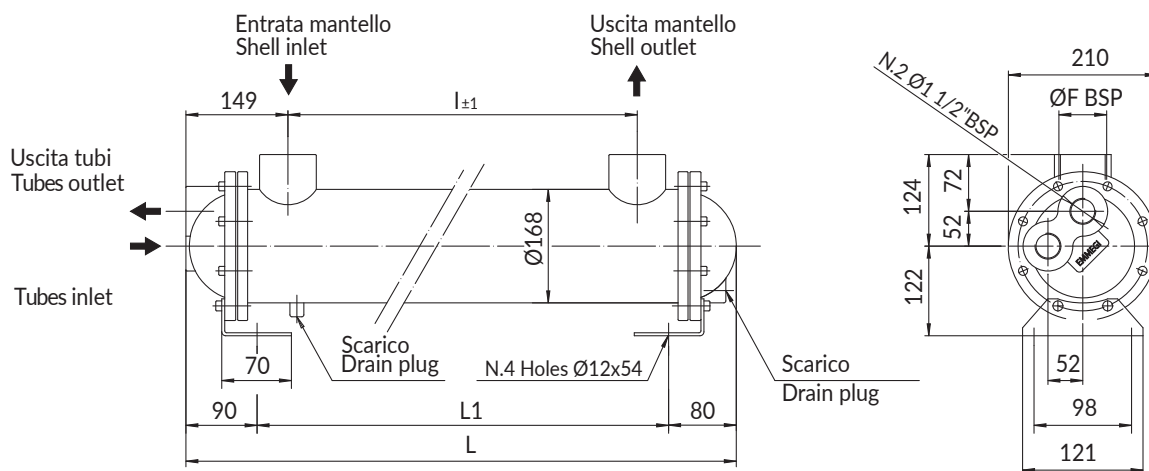




# MG Shell & Tubes

## MGB 168 - AISI 304

Con circuito acqua ispezionabile a quattro passaggi. Four ways inspectable water circuit



Le dimensioni e le caratteristiche tecniche non sono impegnative. Over-all dimension and technical characteristics are not binding.

TIPO TYPE	TUBI TUBES	PIASTRA TUBIERA TUBES SHEET	DEFLETTORI BAFFLES	FONDI COVERS	MANTELLO SHELL	GUARNIZIONI SEALS
AISI	AISI 304	AISI 304	AISI 304	G25	AISI 304	Graphite-kevlar

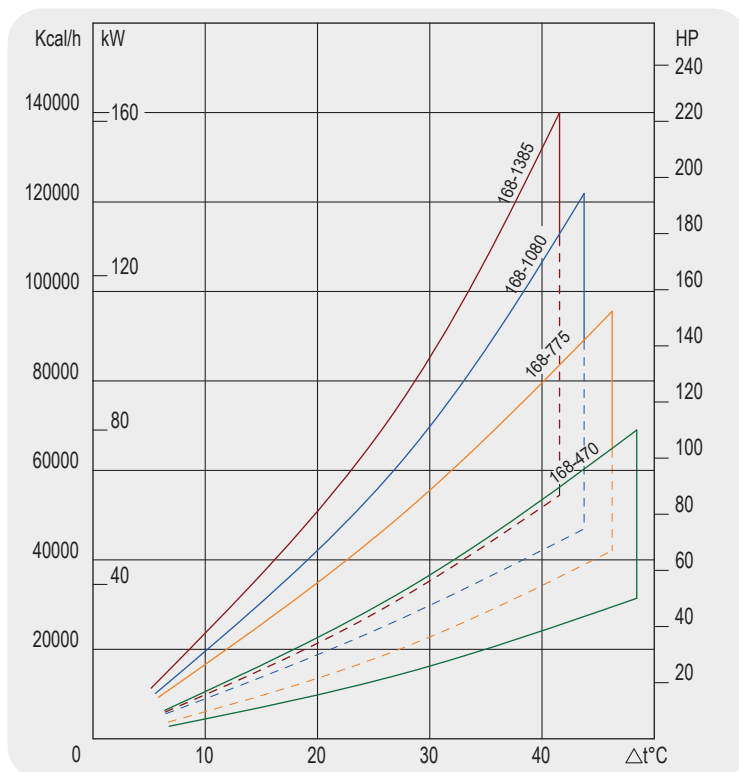
TIPO TYPE	PORTATA OLIO OIL FLOW (lt/min)	HP DISSIPATI CON OLIO HP DISSIPATED WITH OIL =55°C H2O=20°C	CAPACITÀ CAPACITY (lt)	kg	DIMENSIONI - Overall dimension 4 Pass			
					ØF	I	L	L1
MGB 168-470-4..	100-450	32-72	8.3	35	2"	470	756	586
MGB 168-775-4..	120-500	45-105	12.5	43	2"	775	1061	891
MGB 168-1080-4..	150-550	55-142	16.7	50	2"	1080	1366	1196
MGB 168-1385-4..	150-550	70-172	21	57	2"	1385	1671	1501

### DIAGRAMMA RENDIMENTO

Alla portata massima e minima indicata in tabella

#### PERFORMANCE DIAGRAM

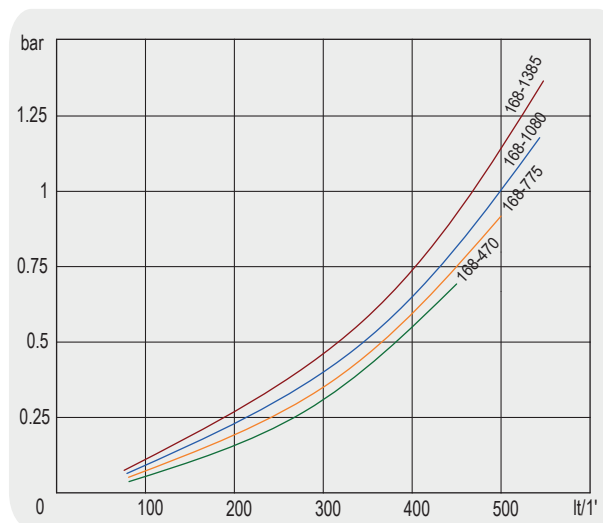
At the maximum and minimum flow stated in schedule



### FATTORE DI CORREZIONE (F)-PERDITE DI CARICO CORRECTION FACTOR (F)-PRESSURE DROP

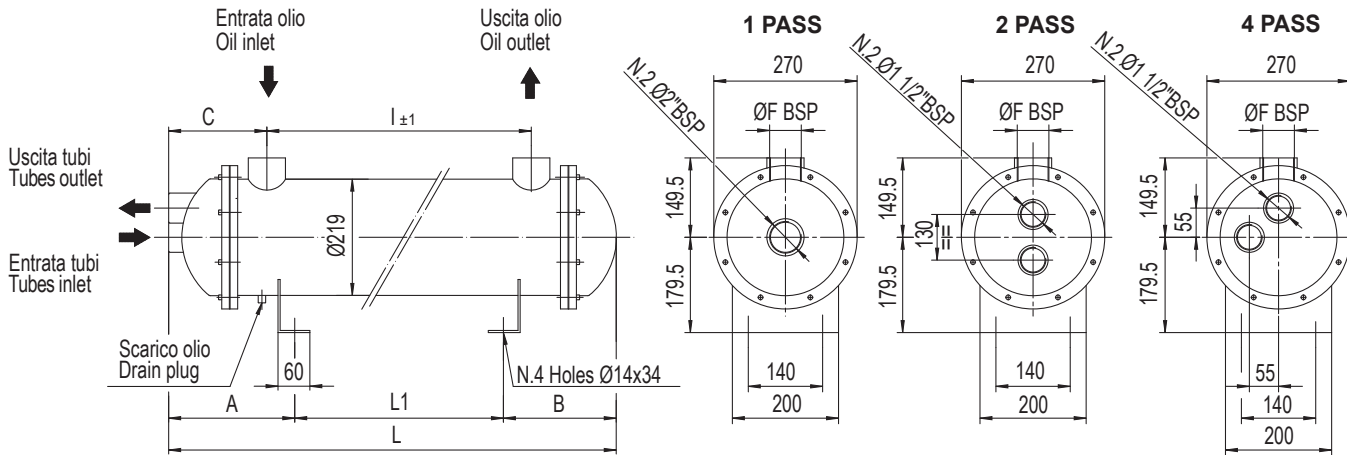
cSt	10	15	20	30	40	50	60	80	100	200	300
F	0.5	0.65	0.77	1	1.2	1.4	1.6	1.9	2.1	3.3	4.3

### PERDITE DI CARICO (32 cSt) PRESSURE DROP (32 cSt)





Con circuito acqua ispezionabile a uno-due-quattro passaggi. One-two-four ways inspectable water circuit



Le dimensioni e le caratteristiche tecniche non sono impegnative. Over-all dimension and technical characteristics are not binding.

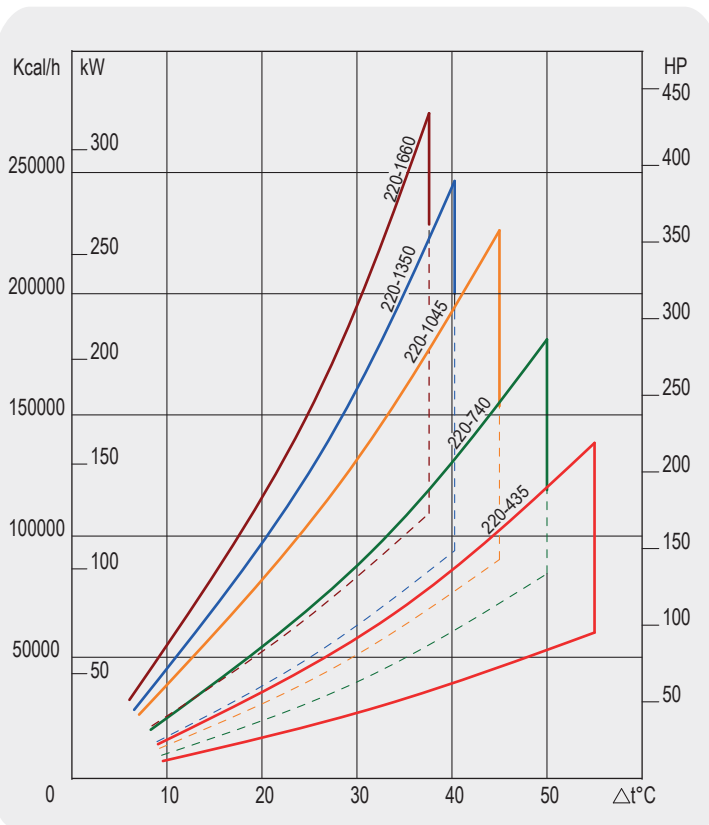
TIPO TYPE	TUBI TUBES	PIASTRA TUBIERA TUBES SHEET	DEFLETTORI BAFFLES	FONDI COVERS	MANTELLO SHELL	GUARNIZIONI SEALS
STANDARD	CuDHP	CuZN40	CuZN37	CuZN40	AISI 304	OR 4900
AISI	AISI 304	AISI 304	AISI 304	AISI 304	AISI 304	OR 4900

TIPO TYPE	PORTATA OLIO OIL FLOW (lt/min)	HP DISSIPATI CON OLIO HP DISSIPATED WTK OIL =55°C H20=20°C	CAPACITÀ CAPACITY (lt)	kg	DIMENSIONI - Overall dimension															
					ØF	I	L1	1 Pass				2Pass				4Pass				
								A	B	C	L	A	B	C	L	A	B	C	L	
MGB 220-435-..	80-800	50-120	11	48	2 1/2"	435	322	264	225	208	811	235	225	179	782	235	225	178.5	782	
MGB 220-740-..	100-800	75-180	16.8	82	2 1/2"	740	627	264	225	207.5	1116	235	225	179	1087	235	225	178.5	1087	
MGB 220-1045-..	100-800	100-250	22.2	110	2 1/2"	1045	932	264	225	207.5	1421	235	225	179	1392	235	225	178.5	1392	
MGB 220-1350-..	100-250	125-320	27.9	120	2 1/2"	1350	1237	264	225	207.5	1726	235	225	179	1697	235	225	178.5	1697	
MGB 220-1660-..	100-800	150-390	33.6	145	2 1/2"	1660	1547	264	225	207.5	2036	235	225	179	2007	235	225	178.5	2007	

### DIAGRAMMA RENDIMENTO

Alla portata massima e minima indicata in tabella  
PERFORMANCE DIAGRAM

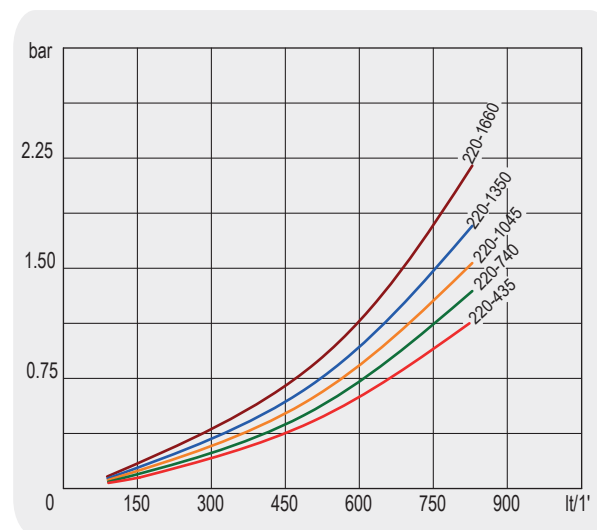
At the maximum and minimum flow stated in schedule



### FATTORE DI CORREZIONE (F)-PERDITE DI CARICO CORRECTION FACTOR (F)-PRESSURE DROP

cSt	10	15	20	30	40	50	60	80	100	200	300
F	0.5	0.65	0.77	1	1.2	1.4	1.6	1.9	2.1	3.3	4.3

### PERDITE DI CARICO (32 cSt) PRESSURE DROP (32 cSt)

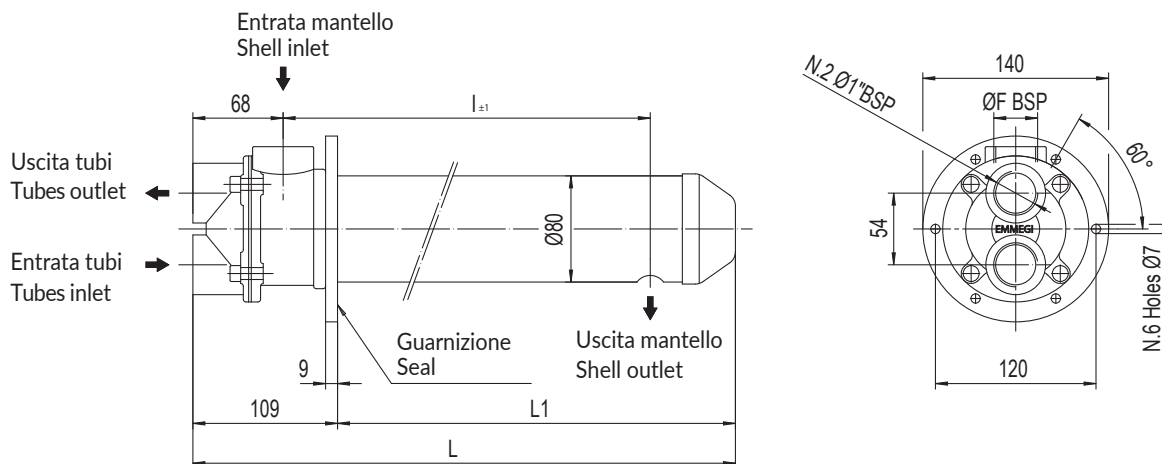




# MG Shell & Tubes

## MGF 80

Con circuito acqua ispezionabile a due passaggi. Two ways inspectable water circuit



Le dimensioni e le caratteristiche non sono impegnative. Over-all dimension and technical characteristics are not binding.

TIPO TYPE	TUBI TUBES	PIASTRA TUBIERA TUBES SHEET	DEFLETTORI BAFFLES	FONDI COVERS	MANTELLO SHELL	GUARNIZIONI SEALS
STANDARD	CuDHP	CuZn40	CuZn37	CuZn40	CuZn37	Rubber-cork

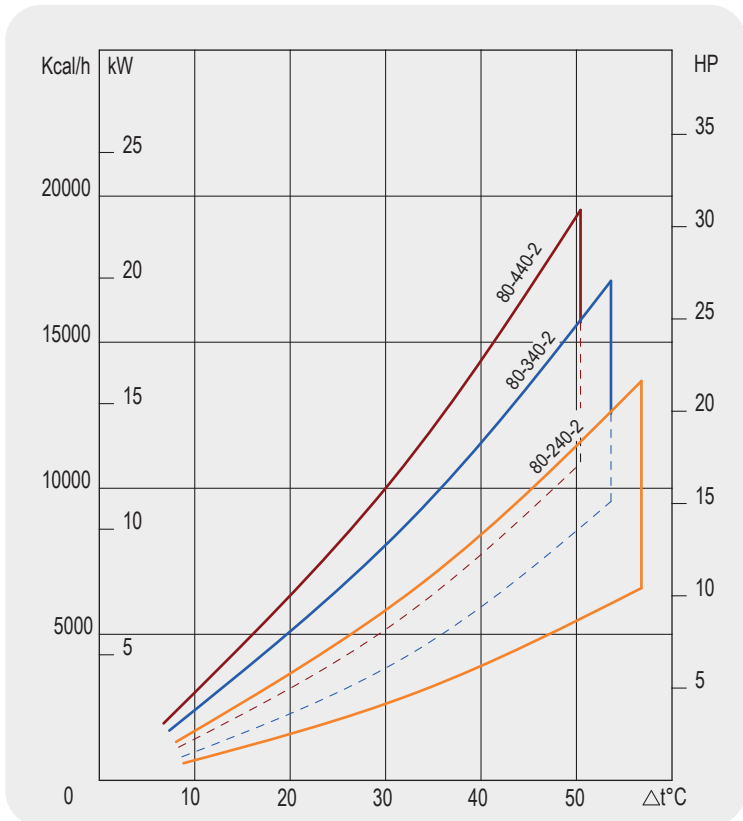
TIPO TYPE	PORTATA OLIO OIL FLOW (lt/min)	HP DISSIPATI CON OLIO HP DISSIPATED WITH OIL =55°C H2O=20°C	CAPACITÀ CAPACITY (lt)	kg	DIMENSIONI - Overall dimension 2 Pass			
					ØF	I	L	L1
MGF 80-240-2	20-60	3-6	0.9	5	1"	240	369	260
MGF 80-340-2	30-70	6-9	1.2	5.7	1"	340	469	360
MGF 80-440-2	40-80	9-12	1.5	6.4	1"	440	569	460

### DIAGRAMMA RENDIMENTO

Alla portata massima e minima indicata in tabella

### PERFORMANCE DIAGRAM

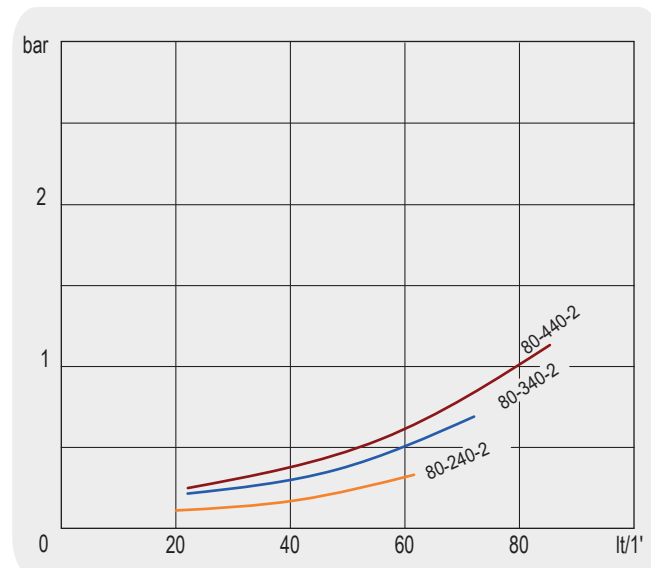
At the maximum and minimum flow stated in schedule



### FATTORE DI CORREZIONE (F)-PERDITE DI CARICO CORRECTION FACTOR (F)-PRESSURE DROP

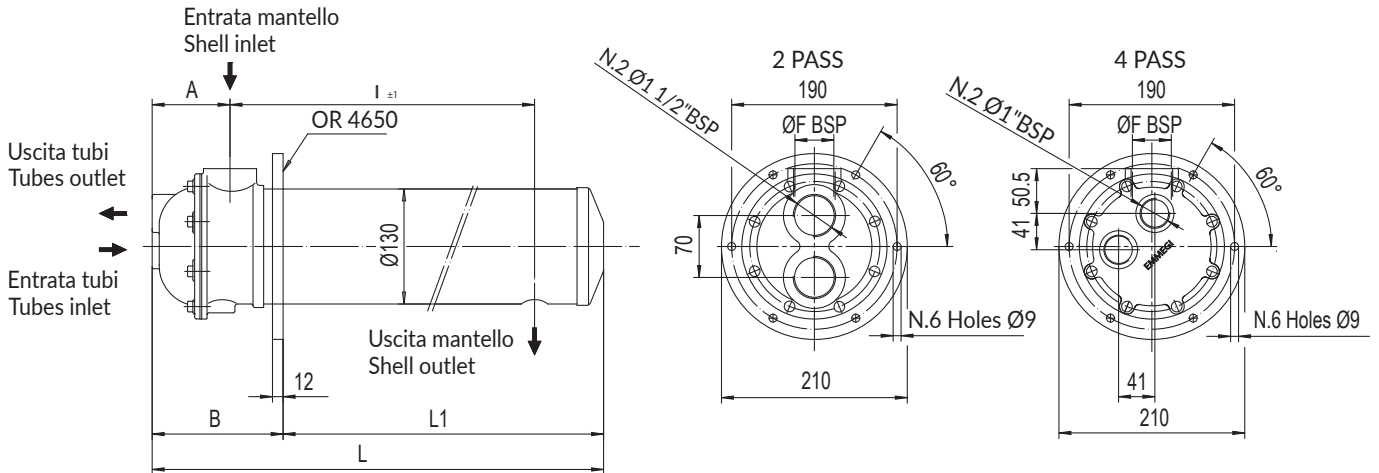
cSt	10	15	20	30	40	50	60	80	100	200	300
F	0.5	0.65	0.77	1	1.2	1.4	1.6	1.9	2.1	3.3	4.3

### PERDITE DI CARICO (32 cSt) PRESSURE DROP (32 cSt)





Con circuito acqua ispezionabile a due-quattro passaggi. Two-four ways inspectable water circuit.



Le dimensioni e le caratteristiche non sono impegnative. Over-all dimension and technical characteristics are not binding.

TIPO TYPE	TUBI TUBES	PIASTRA TUBIERA TUBES SHEET	DEFLETTORI BAFFLES	FONDI COVERS	MANTELLO SHELL	GUARNIZIONI SEALS
STANDARD	cuDHP	CUZn40	CUZn37	CUZn40	Fe 360 UNI EN 10305 - 03	Rubber-cork

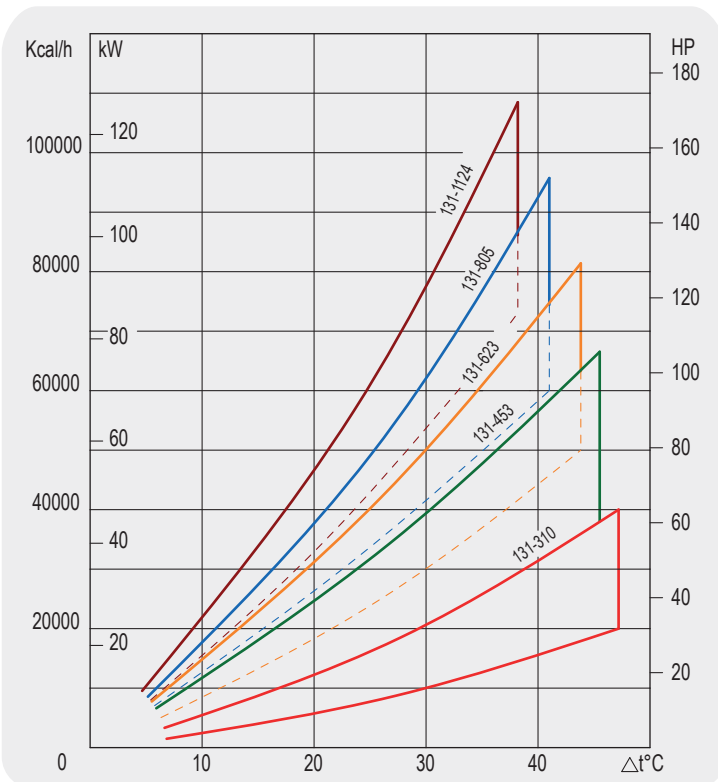
TIPO TYPE	PORTATA OLIO OIL FLOW (lt/min)	HP DISSIPATI CON OLIO HP DISSIPATED WITH OIL =55°C H2O=20°C	CAPACITÀ CAPACITY (lt)	kg	DIMENSIONI - Overall dimension							
					2 Pass				4 Pass			
					ØF	I	L1	L	ØF	I	L1	L
MGF 131-310-..	50-150	20-40	3.2	16	1 1/2"	310	314	462	1 1/2"	310	314	462
MGF 131-453-..	100-150	40-75	4.3	22	1 1/2"	453	465	613	1 1/2"	453	465	613
MGF 131-623-..	150-300	58-96	5.7	28	2"	623	635	795	2"	623	635	795
MGF 131-805-..	150-350	78-118	7.1	32	2"	805	817	977	2"	805	817	977
MGF 131-1124-..	200-400	105-150	9.6	35	2"	1124	1136	1296	2"	1124	1136	1296

### DIAGRAMMA RENDIMENTO

Alla portata massima e minima indicata in tabella

### PERFORMANCE DIAGRAM

At the maximum and minimum flow stated in schedule



### FATTORE DI CORREZIONE (F)-PERDITE DI CARICO

### CORRECTION FACTOR (F)-PRESSURE DROP

cSt	10	15	20	30	40	50	60	80	100	200	300
F	0.5	0.65	0.77	1	1.2	1.4	1.6	1.9	2.1	3.3	4.3

### PERDITE DI CARICO (32 cSt) PRESSURE DROP (32 cSt)

