



# ENAPART



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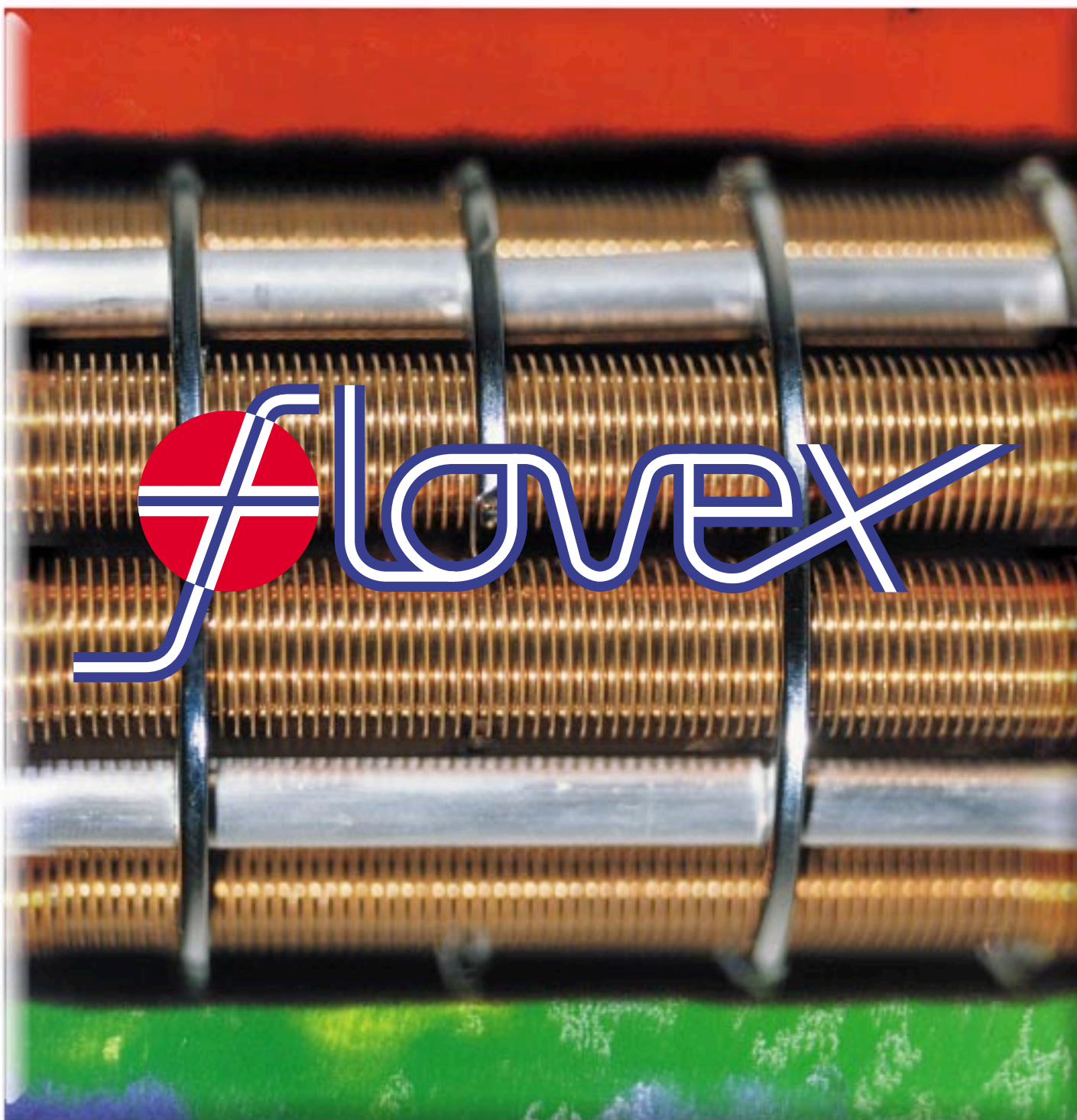


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**SCHEDE TECNICHE PRODOTTI**  
**PRODUCTS DATA SHEETS**



**FLOVEX**

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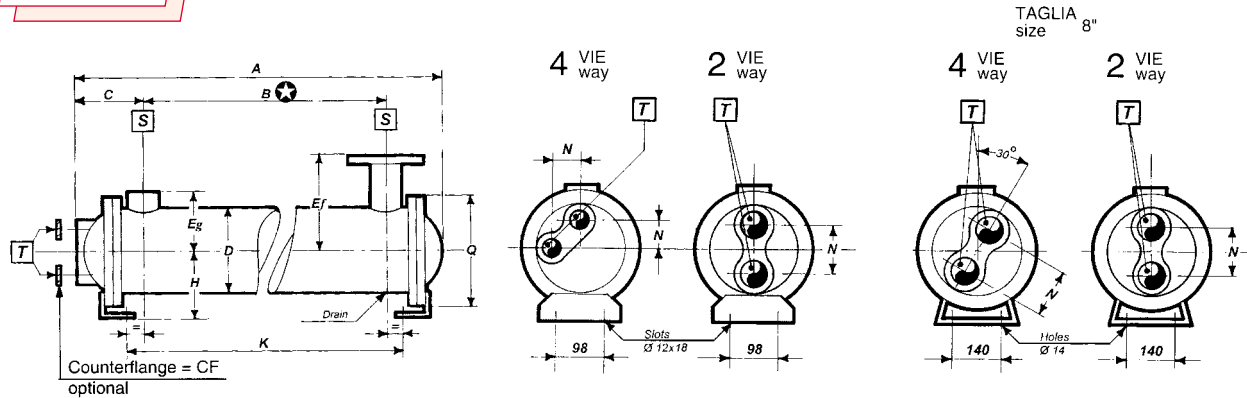


# FASCIO FISSO

Fixed tubesheet



SCAMBIATORI  
HEAT EXCHANGERS



ESEMPIO CODICE PRODOTTO	
example of product code	
VECCHIO - old	NUOVO - new
<b>BEM 302 - A - 4</b>	<b>EM1 . 3020 . A4G000</b>

VERNICIATO - Painting = RAL 5012

TEMP. PROGETTO	design temperatur.	°C	99	99
PRESS. PROGETTO	design pressure	Bar G	10	10
PRESSIONE PROVA	test pressure	Bar G	13	13
DATI DI PROGETTO	design data	U.M.	SHELL	TUBES

TAGLIA size	A	B	C	D	H	K ± 3		Q	Eg	CONNESSIONI LATO CORPO connections shell side			CONNESSIONI LATO TUBI connections tube side					
						4 vie / way	2 vie / way			Ø S (GAS) Type		Ef	Ø S (FL.) Type		4 vie / way		2 vie / way	
										A	B		A	B	N	Ø T GAS	N	Ø T GAS
3012	430	250	90	83	65	309	304	108	65	1"	1 1/2"	130	DN25	DN40	25	3/4"	50	1"
3020	685	500				564	559											
3030	990	805				869	864											
3040	1295	1110				1174	1169											
4012	435	250	95	108	90	309	333	145	85	1"	1 1/2"	140	DN25	DN40	35	3/4"	55	1"
4020	690	500				564	588											
4030	995	805				869	893											
4040	1300	1110				1174	1198											
5012	455	240	115	140	105	313	308	180	105	1 1/2"	2"	155	DN40	DN50	45	1"	76	1 1/2"
5020	710	490				568	563											
5030	1015	795				873	868											
5040	1320	1100				1178	1173											
6020	750	470	145	168	125	573	580	210	120	2"	2"	170	DN50	DN65	50	1 1/2"	86	2"
6030	1055	775				878	885											
6040	1360	1080				1183	1190											
6050	1665	1385				1488	1495											
8030	1090	740	175	219	180	600	600	265	150	3"	3"	200	DN65	DN80	140	2"	130	3"
8040	1395	1045				800	800											
8050	1700	1350				1000	1000											
8060	2005	1655				1200	1200											

★ Con connessione "Type B" - interasse bocche = B - 15 mm  
**LUNGHEZZA STANDARD** - Sono disponibili scambiatori in moduli di lunghezze intermedie (2.6 e 3.6) e superiori, non indicate a catalogo.

Dimensioni: sommare alle quote A-B-K del modello base le lunghezze:

mezzo piede = 152 (mm); 1 piede = 305 (mm). Es.:

3026 A = 685 + 152 = 837 (mm).

6060 A = 1665 + 305 = 1970 (mm).

**FLANGE STANDARD Ø F** - La quota Ef è valida per flange: Piane UNI - SO.ANSI - SAE 3000. Per flange Collare UNI W.N. - W.N.ANSI, aggiungere 20 mm alla quota Ef.

**DRENAGGIO** - Per la serie 8" è previsto sia il drenaggio che lo sfiato 1/2" GAS.

**ANODI** - Per le versioni marine (fascio Alumbrass B111 C687) sono previsti due anodi di zinco, ispezionabili, Ø 3/8" sul coperchio posteriore.

★ With shellside port "Type B" - dimension = B - 15 mm

**STANDARD TUBELENGTH** - In most cases we have exchangers with superior and intermediate lengths (2' 6", 3' 6", etc...) not indicated in our catalogue.

To be able to find the measures, please sum the measures A-B-K as follows:

6" = half ft. = 152 (mm); 1" = one ft. = 305 (mm). Ex.:

3026 A = 685 + 152 = 837 (mm).

6060 A = 1665 + 305 = 1970 (mm).

**FLANGES** - The measure of Ef is valid only for: flat UNI, SO.ANSI & SAE flanges. For Welding neck type flanges, add 20 (mm) to Ef.

**DRAIN** - For the 8" series drain & went of 1/2" GAS is used.

**ANODES** - For the marine exchangers we provide two zink anodes, diam. 3/8" GAS threaded, inspectionable for maintenance.

Per le curve di rendimento vedi tabella di selezione foglio 2001.134÷137

For heat transfer curves see selection tables sheet 2001.134÷137

Dimensioni e caratteristiche non impegnative. Tolleranze secondo norme. - Dimensions and characteristics of the catalogue are subject to change without notice. Clearances according to international standards.



## FASCIO ESTRAIBILE TUBI DIRITTI - TIPO BEW o AEW

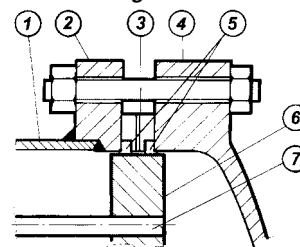
Removable bundle - Straight tube  
Type BEW or AEW



SCAMBIATORI  
HEAT EXCHANGERS



### TIPICA PIASTRA TUBIERA FLOTTANTE Floating tubesheet



- |                     |                |
|---------------------|----------------|
| 1 - Corpo           | shell          |
| 2 - Anello          | main flange    |
| 3 - Anello spia     | retaining ring |
| 4 - Coperchio       | cover          |
| 5 - Guarnizioni     | 2 gaskets      |
| 6 - Piastra tubiera | tubesheet      |
| 7 - Tubo scambio    | tube           |

#### CARATTERISTICHE GENERALI

Scambiatori completamente standard con le medesime caratteristiche di impiego, meccaniche e dei materiali, della serie **EM**. La codifica internazionale BEW indica uno scambiatore a fascio tubiero estraibile, con doppia guarnizione di tenuta sulla piastra flottante, ed anello spia, per assicurare la massima garanzia di completa separazione dei due fluidi, anche in caso di rottura di guarnizioni.

Come per la serie **EM**, di ciascun modello è prevista la versione tipo "A" (bassa portata) e tipo "B" (alta portata).

La gamma è articolata in molteplici varianti che consentono di risolvere qualsiasi problema di fluidi e di portata, anche con elevate potenzialità di scambio.

#### COSTRUZIONE TIPO BASE WE1

Vengono impiegati i medesimi componenti base della serie **EM**. Fascio tubiero, deflettori, piastre e coperchi hanno le medesime caratteristiche e le medesime alternative dei materiali. Vengono realizzate solo le versioni a 2 e 1 via d'acqua.

#### SFILAMENTO DEL FASCIO - MANUTENZIONE

Prima di compiere qualsiasi operazione occorre togliere pressione ad entrambi i lati, mantello e tubi mentre per lo scambiatore tipo **EM** a piastra fissa basta depressurizzare solo il lato acqua.

Due guarnizioni piane sono interposte, per la tenuta, fra il coperchio, la piastra tubiera fissa e il mantello. Due guarnizioni tipo OR, (BUNA o VITON secondo uso) sono poste a tenuta della piastra posteriore, flottante, e l'anello spia.

Togliendo i coperchi e queste guarnizioni, si ha accesso al lato tubi con possibilità di ispezione e pulizia meccanica mediante scovoli.

Lo sfilamento del fascio per un eventuale flussaggio, avviene dal lato anteriore, piastra fissa.

Occorre porre particolare cura nel manipolare il fascio per non danneggiare i tubi e prevedere adeguati sostegni per evitare la flessione dei fasci lunghi.

Sostituire sempre le guarnizioni dopo ogni smontaggio e controllare le sedi. Se necessario sostituire anche l'anello spia, serrare i bulloni dei coperchi diagonalmente e con un tiro uniforme.

#### GENERAL CHARACTERISTICS

Standard exchangers with same mechanical design, materials, and use as **EM** type exchangers.

According to international coding "BEW" means pull-out bundle with one fixed tubesheet, one floating tubesheet with two gaskets separated by a telltale ring to avoid mixing of the two fluids even with leaky or broken gaskets.

As for **EM** type exchangers the selection can be type "A" for low flowrate shellside, and type "B" for high flowrate shellside.

The wide range of shellsize and tubelength makes this type of exchangers able to solve most problems even for high dutyratings.

#### CONSTRUCTION BASE TYPE WE1

Materials are the same as **EM** type. Tube bundle, baffles, covers have same characteristics and alternatives as **EM**, while only two or one pass waterside can be made.

#### MAINTENANCE HINTS

Before unscrewing anything, pressure on both sides must be relieved, while in **EM** type shellside not need to be relieved.

**WE** type exchanger have: on fixed tubesheet side two flat gaskets on coverside and on shellside. On floating tubesheet side there are two O rings (in Buna or Viton according to service) with a metallic tell-tale ring.

After taking off all gaskets the exchanger can be cleaned on tubeside only or also shellside by pulling the bundle out.

Once pulled the bundle out (taking special care or long bundles: once bent, the bundle is nearly impossible to fit it into the shellpipe again!) must take care not to damage tubes, baffles, avoid to scratch the surface of the floating tubesheet, otherwise the O ring will then leak.

It is a good practice to change gaskets (O rings) each time the bundle is removed. To tighten bolts check parallelism inbetween rings and covers, tighten bolts diagonally!

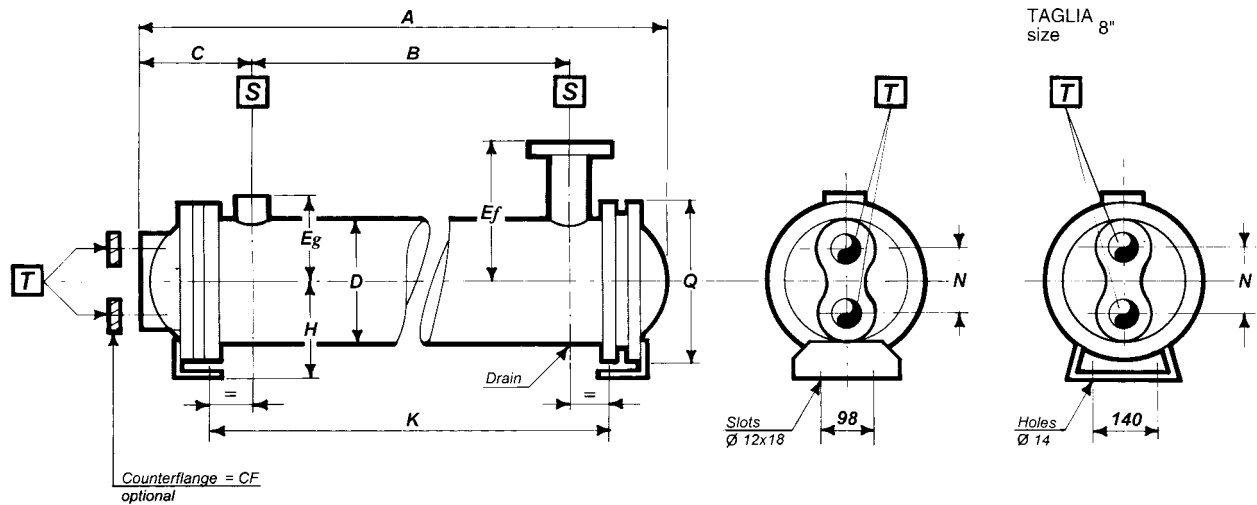


# FASCIO ESTRAIBILE

Removable bundle



SCAMBIATORI  
HEAT EXCHANGERS



ESEMPIO CODICE PRODOTTO	
example of product code	
VECCHIO - old	NUOVO - new
<b>BEW 502 - A - 2</b>	<b>WEA . 5020 . A2G000</b>

VERNICIATO - Painting = RAL 5012

TEMP. PROGETTO	design temperat.	°C	99	99
PRESS. PROGETTO	design pressure	Bar G	10	10
PRESSIONE PROVA	test pressure	Bar G	13	13
DATI DI PROGETTO	design data	U.M.	SHELL	TUBES

TAGLIA size	A	B	C	D	H	K ± 3	Q	CONNESSIONI LATO CORPO connections shell side				CONNESSIONI LATO TUBI connections tube side					
								Eg	Ø S (GAS) Type		Ef	Ø S (FL.) Type		N	Ø T		TUBE bundle
									A	B		A	B		GAS	CF	
5012	450	195	140	140	105	305	180	105	1 1/2"	★ 2"	155	DN40	DN50	76	1 1/2"	-	355
5020	705	445				560				610							
5030	1010	750				865				915							
5040	1315	1055				1170				1220							
6020	740	430	160	168	125	573	210	120	2"	2"	170	DN50	DN65	86	2"	1 1/2"	610
6030	1045	735				878											915
6040	1350	1040				1183											1220
6050	1655	1345				1488											1525
8030	1080	700	200	219	180	600	265	150	3"	3"	200	DN65	DN80	130	3"	2"	915
8040	1385	1005				800											1220
8050	1690	1310				1000											1525
8060	1995	1615				1200											1830

★ Con connessione "Type B" - interasse bocche = B - 15 mm

★ With shellside port "Type B" - dimension = B - 15 mm

**LUNGHEZZE STANDARD** - Sono disponibili scambiatori in moduli di lunghezze intermedie (2.6 e 3.6) e superiori, non indicate a catalogo.

Dimensioni: sommare alle quote A-B-K del modello base le lunghezze:

mezzo piede = 152 (mm); 1 piede = 305 (mm). Es.:

3026 A = 685 + 152 = 837 (mm).

6060 A = 1665 + 305 = 1970 (mm).

**FLANGE STANDARD Ø F** - La quota Ef è valida per flange: Piane UNI - SO.ANSI - SAE 3000. Per flange Collare UNI W.N.ANSI, aggiungere 20 mm alla quota Ef.

**DRENAGGIO** - Per la serie 8" è previsto sia il drenaggio che lo sfiato 1/2" GAS.

**SUPPORTI DI FISSAGGIO** - Per le taglie 5-6 i supporti sono fissati ai coperchi e variamente orientabili. Per la serie 8" sono saldati al mantello con le medesime quote della serie EM.

**ANODI** - Solamente per le versioni marine (fascio Alumbrass B111 - C687) sono previsti due anodi di zinco, ispezionabili, Ø 3/8" sul coperchio posteriore.

**STANDARD TUBELENGTH** - In most cases we have exchangers with superior and intermediate lengths (2'6", 3'6", etc...) not indicated in our catalogue.

To be able to find the measures, please sum to measures A-B-K as follows:

6" = half ft. 152 (mm); 1' one ft. = 305 (mm). Ex.:

3026 A = 685 + 152 = 837 (mm).

6060 A = 1665 + 305 = 1970 (mm).

**FLANGES** - The measure of Ef is valid only for: flat UNI, SO.ANSI & SAE flanges. For Welding neck type flanges, add 20 (mm) to Ef.

**DRAIN** - For the 8" series drain & went of 1/2" GAS is used.

**SUPPORTING FEET** - For size 5-6 inch, feet are fixed into the cover screws and they are orientable on site. For the 8" inch size, feet are welded to the shellpipe with the same dimension of EM type.

**ANODES** - Only for the marine exchangers we provide two zink anodes, diam. 3/8" GAS threaded, inspectionable for maintenance.

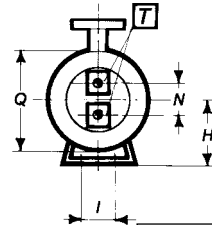
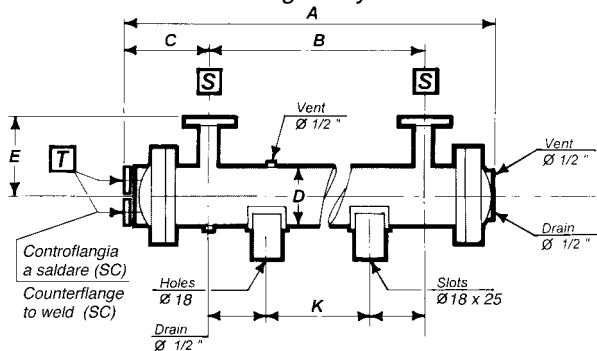
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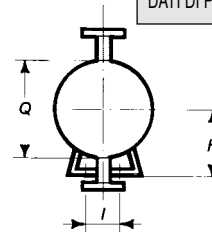
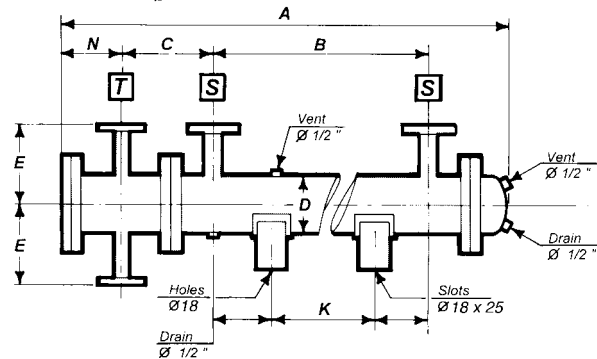
**FASCIO FISSO**  
**CONSTRUZIONE STANDARD FLOVEX**  
**ALTA POTENZIALITÀ da 10" a 17"**  
*Fixed tube sheet - Standard construction*  
*High duty from 10" to 17"*



SCAMBIATORI  
 HEAT EXCHANGERS



CONFIGURAZIONE - shape  
 COPERCHIO TIPO "B"  
 cover type



CONFIGURAZIONE - shape  
 COPERCHIO TIPO "A"  
 cover type

TEMP. PROGETTO	design temperat.	°C	99	99
PRESS. PROGETTO	design pressure	Bar G	10	10
PRESSIONE PROVA	test pressure	Bar G	13	13
DATI DI PROGETTO	design data	U.M.	SHELL	TUBES

VERNICIATO - Painting = RAL 7010

VECCHIA SIGLA Old size	TAGLIA size	B	D	K	I	Q	H	E	Ø S	COPERCHIO TIPO A cover type				COPERCHIO TIPO B cover type			
										A	C	N	Ø T	A	C	N	Ø T
1004	A040	955	273	700	150	365	220	265	DN100	1665	298	185	DN80	1410	240	138	DN80
1006	A060	1565		1200						2275				2020			
1008	A080	2175		1600						2885				2630			
1010	A100	2785		2000						3495				3240			
1204	B040	935	323	700	180	420	240	300	DN125	1715	323	205	DN100	1440	262	168	DN100
1206	B060	1545		1200						2325				2050			
1208	B080	2155		1600						2935				2660			
1210	B100	2765		2000						3545				3270			
1304	C040	935	355	700	200	470	250	320	DN125	1755	338	220	DN125	1435	260	182	DN125
1306	C060	1545		1200						2365				2045			
1308	C080	2155		1600						2975				2655			
1310	C100	2765		2000						3585				3265			
1504	D040	900	406	700	230	505	275	340	DN150	1775	355	225	DN125	1535	342	195	DN125
1506	D060	1510		1200						2385				2145			
1508	D080	2120		1600						2995				2755			
1510	D100	2730		2000						3605				3365			
1704	E040	900	457	700	250	575	300	370	DN150	1825	355	225	DN125	1630	390	225	DN125
1706	E060	1510		1200						2435				2240			
1708	E080	2120		1600						3045				2850			
1710	E100	2730		2000						3655				3460			

Il completamento della serie EM si estende oltre le taglie 8" con scambiatori pre-disegnati di grande potenzialità. Mantengono le medesime caratteristiche costruttive di affidabilità, efficienza e robustezza degli scambiatori di minor taglia. Realizzazione BASE con tubi di rame alettato Ø 5/8". Ampie possibilità di esecuzioni in differenti combinazioni di materiali. Per la definizione delle opzioni vedi foglio composizione CODICE PRODOTTO. Disponibili anche moduli di lunghezze intermedie non indicate a catalogo.

To complete the series of EM coolers over 8" inches of shell already in our catalogue, herewith our predesigned bigger sizes. Even being bigger and heavier, they have conserved perfectly the good characteristics of ruggedness, safety and excellent performances of the smaller coolers. Basic design with finned copper tubes of 5/8" = 16 (mm) size; also many optionals of different materials to suit most of customer's requirements. For orders please see sheet composition of the product code. Possibility to build intermediate lengths inbetween those shown on our catalogue.

Dimensioni e caratteristiche non impegnative. Tolleranze secondo norme. - Dimensions and characteristics of the catalogue are subject to change without notice. Clearances according to international standards.



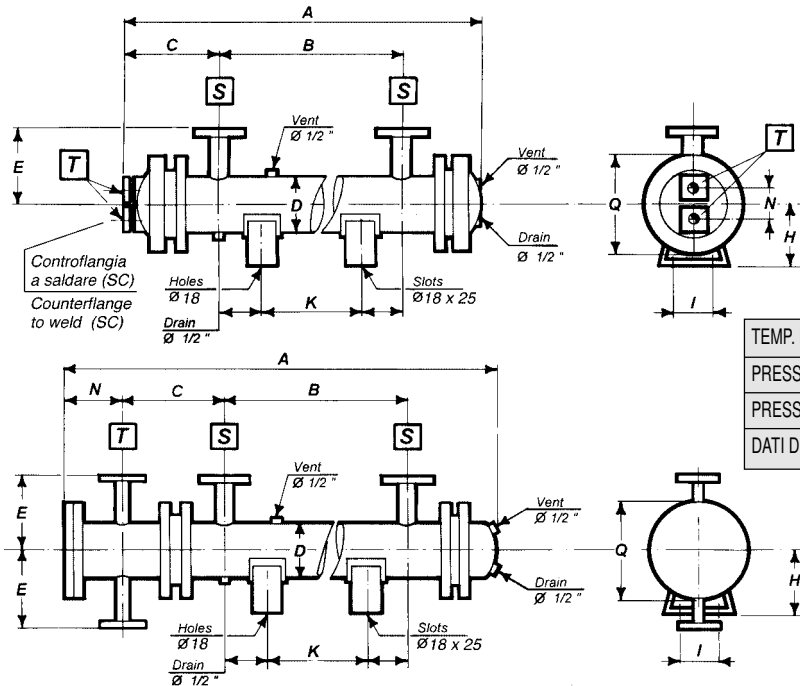
# WE

## FASCIO ESTRAIBILE COSTRUZIONE STANDARD FLOVEX ALTA POTENZIALITÀ da 10" a 17"

Removable bundle - Standard construction  
High duty from 10" to 17"



SCAMBIATORI  
HEAT EXCHANGERS



CONFIGURAZIONE - shape  
COPERCHIO TIPO "B"  
cover type

TEMP. PROGETTO	design temperat.	°C	99	99
PRESS. PROGETTO	design pressure	Bar G	10	10
PRESSIONE PROVA	test pressure	Bar G	13	13
DATI DI PROGETTO	design data	U.M.	SHELL	TUBES

CONFIGURAZIONE - shape  
COPERCHIO TIPO "A"  
cover type

VERNICIATO - Painting = RAL 7010

VECCHIA SIGLA Old size	TAGLIA size	B	D	K	I	Q	H	E	Ø S	COPERCHIO TIPO A cover type				COPERCHIO TIPO B cover type			
										A	C	N	Ø T	A	C	N	Ø T
1004	A040	905	273	700	150	365	220	265	DN100	1665	323	185	DN100	1400	265	138	DN80
1006	A060	1515		1200						2265				2010			
1008	A080	2125		1600						2875				2620			
1010	A100	2735		2000						3485				3230			
1204	B040	885	323	600	180	420	240	300	DN125	1710	347	205	DN100	1435	285	162	DN100
1206	B060	1495		1200						2320				2045			
1208	B080	2105		1600						2930				2655			
1210	B100	2715		2000						3540				3265			
1304	C040	885	355	600	200	470	250	320	DN125	1750	365	220	DN125	1425	282	182	DN125
1306	C060	1495		1200						2360				2035			
1308	C080	2105		1600						2970				2645			
1310	C100	2715		2000						3580				3255			
1504	D040	850	406	600	230	505	275	340	DN150	1765	380	225	DN125	1525	365	195	DN125
1506	D060	1460		1200						2375				2135			
1508	D080	2070		1600						2985				2745			
1510	D100	2680		2000						3595				3355			
1704	E040	850	457	600	250	575	300	370	DN150	1815	380	225	DN125	1620	410	225	DN125
1706	E060	1460		1200						2425				2230			
1708	E080	2070		1600						3035				2840			
1710	E100	2680		2000						3645				3450			

Il completamento della serie WE si estende oltre le taglie 8" con scambiatori pre-disegnati di grande potenzialità. Mantengono le medesime caratteristiche costruttive di affidabilità efficienza e robustezza degli scambiatori di minor taglia. Realizzazione base WE 1 con tubi di rame alettato Ø 5/8". Ampie possibilità di esecuzioni in differenti combinazioni di materiali. Per la definizione delle opzioni vedi foglio composizione CODICE PRODOTTO. Disponibili anche moduli di lunghezze intermedie non indicate a catalogo.

To complete the series of WE coolers over 8" inches of shell already in our catalogue, herewith our predesigned bigger sizes. Even being bigger and heavier; they have conserved perfectly the good characteristics of ruggedness, safety and excellent performances of the smaller coolers. Basic design WE 1 with finned copper tubes of 5/8" = 16 (mm) size; also many optionals of different materials to suit most of customer's requirements. For orders please see sheet composition of the product code. Possibility to build intermediate lengths inbetween those shown on our catalogue.

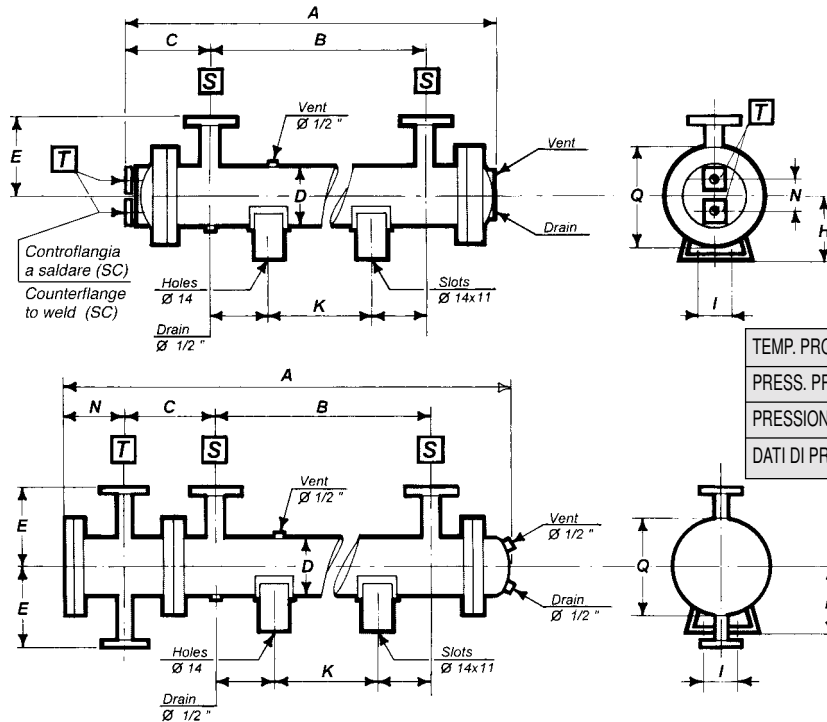
Dimensioni e caratteristiche non impegnative. Tolleranze secondo norme. - Dimensions and characteristics of the catalogue are subject to change without notice. Clearances according to international standards.



**ASME code TEMA "C"**  
**FASCIO FISSO**  
**TUBI DIRITTI - TIPO BEM o AEM**  
*Fixed tubesheet - Straight tube*  
*Type BEM or AEM*



SCAMBIATORI  
 HEAT EXCHANGERS



CONFIGURAZIONE - shape  
 COPERCHIO TIPO "B"  
 cover type

TEMP. PROGETTO	design temperatur.	°C	99	99
PRESS. PROGETTO	design pressure	Bar G	10	10
PRESSIONE PROVA	test pressure	Bar G	13	13
DATI DI PROGETTO	design data	U.M.	SHELL	TUBES

CONFIGURAZIONE - shape  
 COPERCHIO TIPO "A"  
 cover type

VERNICIATO - Painting = RAL 7010

VECCHIA SIGLA <i>Old size</i>	TAGLIA size	B	D	K	I	Q	H	E	Ø S	COPERCHIO TIPO A cover type				COPERCHIO TIPO B cover type				VENT DRAIN
										A	C	N	Ø T	A	C	N	Ø T	
402	4020	430	114	200	80	200	130	160	1"	910	190	120	3/4"	740	167	65	3/4"	3/8"
403	4030	735		400						1215				1045				
404	4040	1040		700						1520				1350				
405	4050	1345		1000						1825				1655				
602	6020	390	168	200	80	255	158	200	2"	990	236	148	1 1/2"	780	206	86	1 1/2"	3/8"
604	6040	1000		700						1600				1390				
606	6060	1610		1200						2210				2000				
608	6080	2220		1600						2820				2610				
804	8040	970	219	700	108	308	180	240	3"	1670	276	176	2"	1410	226	108	2"	3/8"
806	8060	1580		1200						2280				2020				
808	8080	2190		1600						2890				2630				
810	8100	2800		2000						3500				3240				
1004	A040	950	273	700	150	365	220	265	4"	1720	300	191	3"	1435	240	138	3"	1/2"
1006	A060	1560		1200						2330				2045				
1008	A080	2170		1600						2940				2655				
1010	A100	2780		2000						3550				3265				
1012	A120	3390		2400						4160				3875				

Le normative internazionali TEMA (Tubular Exchanger Manufacturers Association) e PED (Pressure Equipment Directive) impongono severi codici costruttivi a cui attenersi. La FLOVEX ha realizzato una serie di scambiatori PREDEGNATI in completo accordo a queste normative. Materiali, realizzazione e certificazione secondo ASME (American Society of Mechanical Engineers). Ampie opzioni in differenti configurazioni e materiali. Per la definizione delle varianti vedi CODICE PRODOTTO.

The international normatives T.E.M.A. (Tubular Exchangers Manufacturers Association) and PED (Pressure Equipment Directive) are giving severe codes for the construction of the coolers. FLOVEX has PRE-ENGINEERED a series of exchangers according to there codes. Materials, building and certification according to A.S.M.E. (American Society of Mechanical Engineers). Great choice of optional as configuration and materials; for the definition of such variables, see codification of the PRODUCT CODE.

Dimensioni e caratteristiche non impegnative. Tolleranze secondo norme. - Dimensions and characteristics of the catalogue are subject to change without notice. Clearances according to international standards.

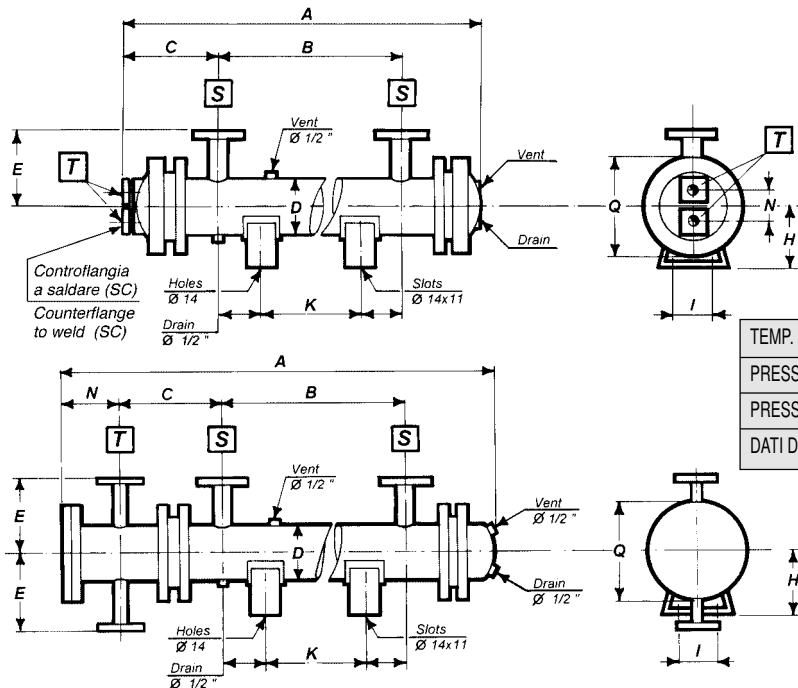


**ASME code TEMA "C"  
FASCIO ESTRAIBILE  
TIPO BEW o AEW**

*Removable bundle - Straight tube  
Type BEW or AEW*



SCAMBIATORI  
HEAT EXCHANGERS



CONFIGURAZIONE - shape  
COPERCHIO TIPO "B"  
cover type

TEMP. PROGETTO	design temperatur.	°C	99	99
PRESS. PROGETTO	design pressure	Bar G	10	10
PRESSIONE PROVA	test pressure	Bar G	13	13
DATI DI PROGETTO	design data	U.M.	SHELL	TUBES

CONFIGURAZIONE - shape  
COPERCHIO TIPO "A"  
cover type

VERNICIATO - Painting = RAL 7010

VECCHIA SIGLA Old size	TAGLIA size	B	D	K	I	Q	H	E	Ø S	COPERCHIO TIPO cover type <b>A</b>				COPERCHIO TIPO cover type <b>B</b>				
										A	C	N	Ø T	A	C	N	Ø T	VENT DRAIN
402	4020	385	114	200	80	200	130	160	1"	905	210	120	3/4"	735	188	65	3/4"	3/8"
403	4030	690		400						1210				1040				
404	4040	995		700						1515				1345				
405	4050	1300		1000						1820				1650				
602	6020	345	168	200	80	255	158	200	2"	980	256	148	1 1/2"	775	226	86	1 1/2"	3/8"
604	6040	955		700						1590				1385				
606	6060	1565		1200						2200				1995				
608	6080	2175		1600						2810				2605				
804	8040	925	219	700	108	308	180	240	3"	1660	296	176	2"	1400	246	108	2"	3/8"
806	8060	1535		1200						2270				2010				
808	8080	2145		1600						2880				2620				
810	8100	2755		2000						3490				3230				
1004	A040	905	273	700	150	365	220	265	4"	1710	323	191	3"	1425	263	138	3"	1/2"
1006	A060	1515		1200						2320				2035				
1008	A080	2125		1600						2930				2645				
1010	A100	2735		2000						3540				3255				
1012	A120	3345	2400	4155	3865													

Le normative internazionali TEMA (Tubular Exchanger Manufacturers Association) e PED (Pressure Equipment Directive) impongono severi codici costruttivi a cui attenersi. La FLOVEX ha realizzato una serie di scambiatori PREDISIGNATI in completo accordo a queste normative. Materiali, realizzazione e certificazione secondo ASME (American Society of Mechanical Engineers). Ampie opzioni in differenti configurazioni e materiali. Per la definizione delle varianti vedi CODICE PRODOTTO.

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Dimensioni e caratteristiche non impegnative. Tolleranze secondo norme. - Dimensions and characteristics of the catalogue are subject to change without notice. Clearances according to international standards.

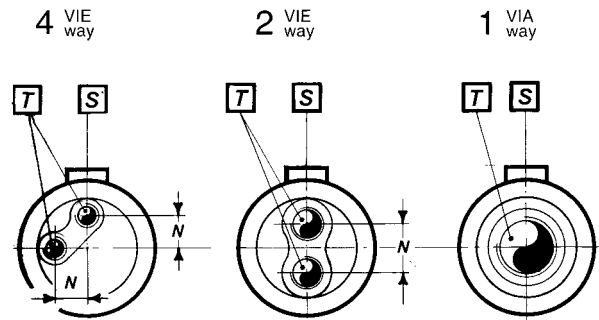
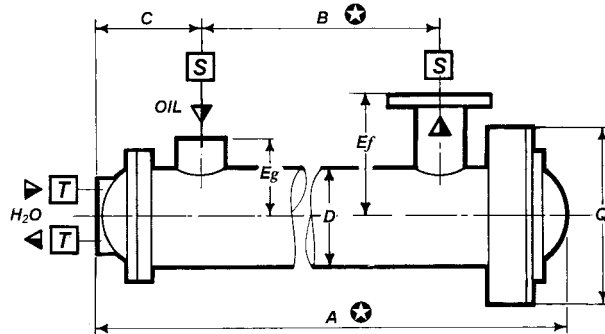
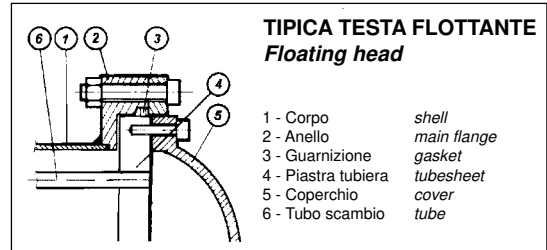


# TESTA FLOTTANTE - TUBI DIRITTI TENUTA PREMITRECCIA ESTERNO TIPO "P"

Straight tube  
Outside packed floating head "P" type



SCAMBIATORI  
HEAT EXCHANGERS



ESEMPIO CODICE PRODOTTO <i>example of product code</i>	
VECCHIO - old	NUOVO - new
<b>BP 301.2 - A - 4</b>	<b>BP1 . 3012 . A4G000</b>

TEMP. PROGETTO	<i>design temperatur.</i>	°C	99	220	320
PRESS. PROGETTO	<i>design pressure</i>	Bar G	10	10	10
PRESSIONE PROVA	<i>test pressure</i>	Bar G	13	13	13
DATI DI PROGETTO	<i>design data</i>	U.M.	TUBES	SHELL	SHELL

VERNICIATO - Painting = RAL 0950

TAGLIA size	A	B	C	D	Q	Eg	CONNESSIONI LATO CORPO <i>connections shell side</i>			CONNESSIONI LATO TUBI <i>connections tube side</i>						
							Ø S (GAS) Type		Ef	Ø S (FL.) Type		4 vie / way		2 vie / way		1via 1 way
							A	B		A	B	N	Ø T	N	Ø T	Ø T
3012	455	250	85	83	145	65	1"	1 1/2"	130	DN25	DN40	25	3/4"	50	1"	1 1/2"
3020	710	500	90													
3030	1015	805	90													
3040	1320	1110		140	230	105	1 1/2"	2"	155	DN40	DN50	45	1"	76	1 1/2"	2"
5012	502	240	110													
5020	757	490	115													
5030	1062	795	115													
5040	1367	1100														

Gli scambiatori della serie **BP** sono la soluzione più economica ed affidabile per chi debba condizionare fluidi ad alta temperatura.

La configurazione a TESTA FLOTTANTE permette di sopportare forti shock termici poiché il fascio è libero di dilatare indipendentemente dal corpo.

Data la particolare applicazione è stata scelta una costruzione con tubi DIRITTI, facilmente pulibili, in quanto i tradizionali fasci ad "U" risultano rapidamente inutilizzabili per i depositi di calcare. Sono realizzate differenti configurazioni per materiali e tipi di tubi impiegati; due sono le classi per temperatura: tipo O e tipo H.

Per la definizione delle varianti vedi foglio CODICE PRODOTTO.

**NOTA** - Lo scambiatore viene fornito privo di coibentazione. Provvedere all'atto della installazione ad adeguata protezione.

The **BP** type coolers are the cheapest solution to handle fluids with high operating temperatures, without hazard of thermal shock.

Designed with a FLOATING HEAD and straight tubes it will solve not only the problem of thermal shock, but also the lack that is the tubeside is easily cleaned from calcium deposits even without draining the shellside fluid.

Having no hairpin-like bend tubes, as the traditional "U" bundle, if necessary it can be inspected inside tubes for perfect mechanical cleaning.

**BP** coolers are made with different types of tubes; as size and materials; two types for temperature: design tipe O and type H. For orders please see detailed sheet PRODUCT CODE.

**NOTE** - The cooler is delivered without thermal insulation, for safety reasons it must be provided with protection on site!

★ L'alternativa realizzata con tubi in rame alettato necessita modifiche alle dimensioni: le misure "A" e "B" del catalogo vanno ridotte di 25 mm.

★ Alternative of finned copper tubes need different dimension: the measures "A" and "B" of the catalogue will get also reduced by 25 millimeters.

Dimensioni e caratteristiche non impegnative. Tolleranze secondo norme. - Dimensions and characteristics of the catalogue are subject to change without notice. Clearances according to international standards.

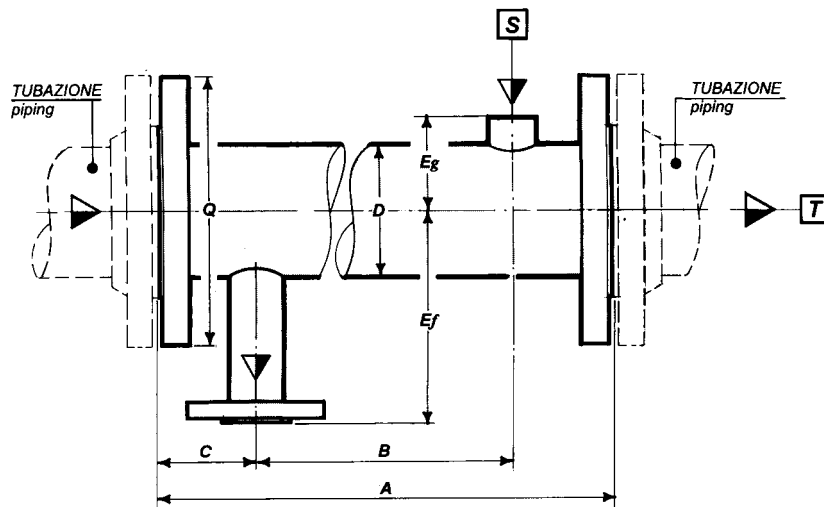


## MONTAGGIO IN LINEA TUBI DIRITTI - FASCIO FISSO

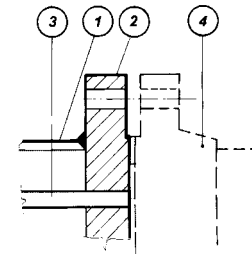
On line type  
Straight tube - Fixed tubesheet



SCAMBIATORI  
HEAT EXCHANGERS



TIPICA PIASTRA TUBIERA FISSA  
Fixed tubesheet device



- 1 - Corpo shell
- 2 - Piastra tubiera tubesheet
- 3 - Tubo scambio tube exchang
- 4 - Tubazione piping

ESEMPIO CODICE PRODOTTO example of product code	
VECCHIO - old	NUOVO - new
<b>OLC 502 - A - 1</b>	<b>OL1 . 3020 . A00000</b>

TEMP. PROGETTO	design temperatur.	°C	99	99
PRESS. PROGETTO	design pressure	Bar G	10	10
PRESSIONE PROVA	test pressure	Bar G	13	13
DATI DI PROGETTO	design data	U.M.	SHELL	TUBES

VERNICIATO - Painting = RAL 5012

TAGLIA size	A	B	C	D	CONNESSIONI connections					
					TUBI tubes		CORPO shell side			
					Q	Ø T	Eg	Ø S GAS	Ef	Ø S (FL.)
3012	358	235	61.5	83	185	DN65	65	1"	150	DN25
3020	613	480	66.5							
3030	918	785	66.5							
3040	1223	1090								
4020	613	480	66.5	108	220	DN100	85	1"	170	DN25
4030	918	785								
4040	1223	1090								
4050	1528	1395								
5020	613	465	74	140	250	DN125	105	1 1/2"	200	DN40
5030	918	770								
5040	1223	1075								
5050	1525	1380								
6020	613	445	84	168	285	DN150	120	2"	250	DN50
6030	918	750								
6040	1223	1055								
6050	1528	1360								
8030	918	710	104	219	340	DN200	142	2"	300	DN50
8040	1223	1015								
8050	1528	1320								
8060	1833	1625								

Scambiatori in esecuzione a fascio tubiero fisso. Particolarmente adatti per condensare e raffreddare fluidi e GAS in controcorrente perfetto. Facile installazione direttamente in linea sulle tubazioni con flange UNI - PN 10. Esecuzione base tipo **OL 9** con corpo in acciaio al carbonio e fascio con tubi 3/8" inox (Ø 9.5 mm).

A richiesta differenti opzioni di flange (ANSI - DIN) e di materiali corpo e fascio. Per la definizione delle varianti vedi foglio CODICE PRODOTTO.

Special fixed bundle "ON-LINE" coolers to cool air or other gases inside the tubes, with water on shellside, in what we can call: a "perfect counterflow". Easy connection with UNI PN 10 flanges.

Standard design with carbon steel shell, with stainless bare tubes of 3/8" (equivalent to 9,5 mm) = type **OL 9**.

Options: connections according to ANSI or DIN; different materials available for shell, tubesheets and inertubes.

For orders please see sheet PRODUCT CODE.

Dimensioni e caratteristiche non impegnative. Tolleranze secondo norme. - Dimensions and characteristics of the catalogue are subject to change without notice. Clearances according to international standards.



## FASCIO A SPIRALE ALETTATA INSTALLAZIONE INTERNA OD ESTERNA

*Finned coil tubebundle  
Inside or outside installation*



SCAMBIATORI  
HEAT EXCHANGERS



Negli scambiatori della serie **FC** il fascio tubiero è costituito da un tubo in rame ad alettatura integrale ad alta efficienza avvolto a spirale.

Questo particolare tipo di costruzione oltre ad avere consumi d'acqua estremamente bassi, consente l'impiego nei casi di forte "stress" termico, avendo il fascio liberamente dilatabile.

### FC R e FC W

Spirale alettata con raccordi (FC R) o flangiata (FC W) da inserire direttamente nel serbatoio

Nota: i rendimenti sono legati ai moti turbolenti all'interno del serbatoio.

### FC X

Spirale alettata completa di corpo per montaggio esterno in esecuzione a fascio estraibile.

### FC T

Spirale alettata completa di corpo per montaggio in serbatoio.

*In the series of exchangers type **FC** the tube bundle is made of an integral highfined single coppertube made up in a coil. This particular construction has extremely low water-consumption and having the possibility of a free expansion this will allowe good resistance to thermal stress.*

### FC R and FC W

*Finned coil with threaded connections (FC R) or flange support (FC W) to fix directly into the tank.*

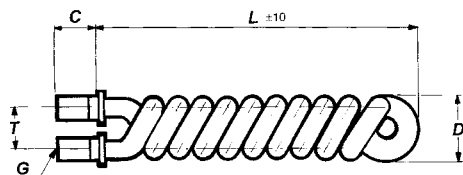
*Note: the efficiency is strictly connected with inside tank oil turbulence.*

### FC X

*Finned coil with shell, for forced circulation, pull out bundle, and service outside tank.*

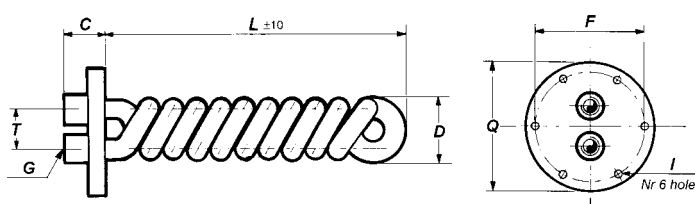
### FC T

*Finned coil with shell, for forced circulation to be fixed into the tank.*



ESEMPIO CODICE PRODOTTO <i>example of product code</i>	
VECCHIO - old	NUOVO - new
SPIRAX 301.6	FCR . 3016 . 000000

TAGLIA size	L	D	T	G	C
3016	365	75	50	1/2" M	40
3020	625				
4020	660	99		3/4" M	50



ESEMPIO CODICE PRODOTTO <i>example of product code</i>	
VECCHIO - old	NUOVO - new
SPIRAX - W 301.6	FCW . 3016 . 000000

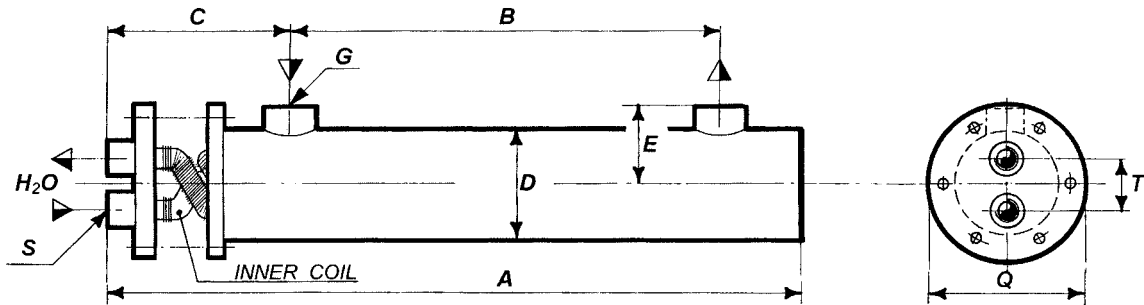
TAGLIA size	L	D	T	G	C	Q	F	I
3016	355	75	40	1/2" F	32	115	102	Ø 7
3020	640							
4020	650	99	45	3/4" F	40	145	130	Ø 9

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# FC X

ESEMPIO CODICE PRODOTTO example of product code	
VECCHIO - old	NUOVO - new
FCO - 301.6	FCX . 3016 . 000000

VERNICIATO - Painting = RAL 5012



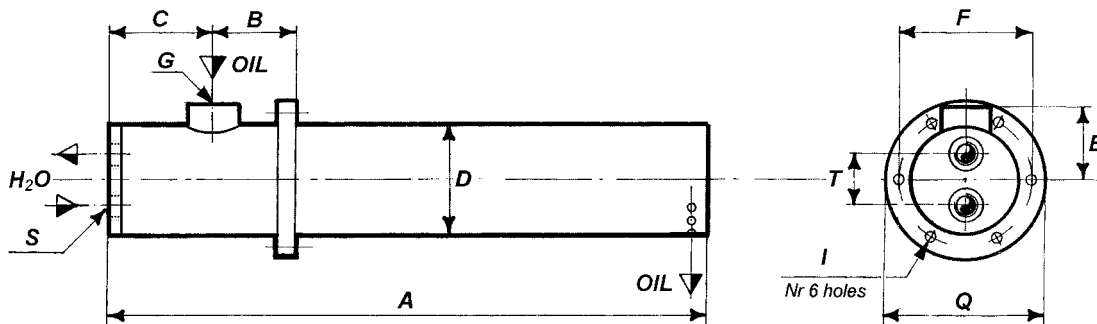
TAGLIA size	A	B	C	D	E	Ø G	Ø S	T	Q
3016	485	375	70	83	60	1"	1/2"	40	115
3020	675	565							
4020	710	580	85	108	80	1 1/2"	3/4"	45	145

TEMP. PROGETTO	design temperatur.	°C	99	99
PRESS. PROGETTO	design pressure	Bar G	10	10
PRESSIONE PROVA	test pressure	Bar G	13	13
DATI DI PROGETTO	design data	U.M.	SHELL	TUBES

# FC T

ESEMPIO CODICE PRODOTTO example of product code	
VECCHIO - old	NUOVO - new
FCI - 301.6	FCT . 3016 . 000000

VERNICIATO - Painting = RAL 5012



TAGLIA size	A	B	C	D	E	F	Ø G	Ø S	T	I	Q
3016	450	45	52	83	60	102	1"	1/2"	40	Ø 7	115
3020	675	80									
4020	690	70	65	108	80	130	1 1/2"	3/4"	45	Ø 9	145

TEMP. PROGETTO	design temperatur.	°C	99	99
PRESS. PROGETTO	design pressure	Bar G	10	10
PRESSIONE PROVA	test pressure	Bar G	13	13
DATI DI PROGETTO	design data	U.M.	SHELL	TUBES

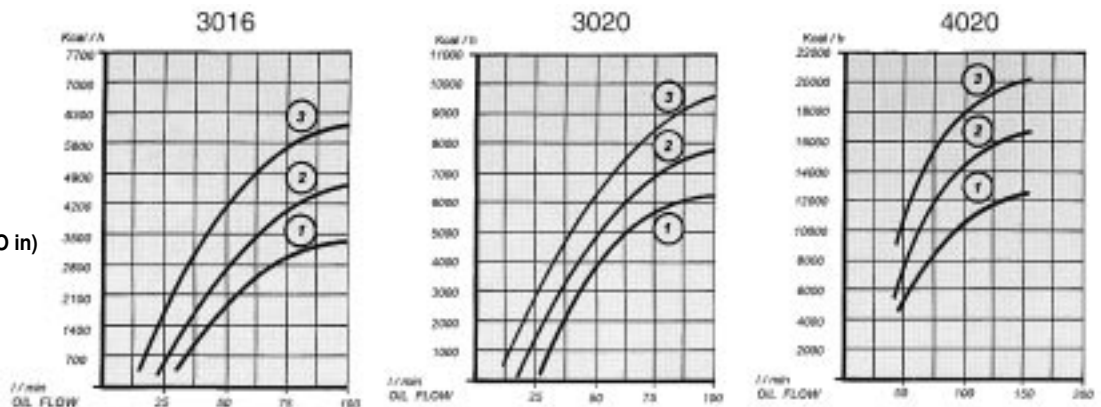
### DIAGRAMMI DI RENDIMENTO FC X - FC T

Diagrammi validi per olio idraulico 4°E a 50°C alla temperatura di 50°C.

### HEAT TRANSFER CURVES FC X - FC T

The curves are valides for hydraulic oil 4°E at 50°C at medium temperature of 50°C.

- ① = Δt 15°C
  - ② = Δt 20°C
  - ③ = Δt 25°C
- (ΔT OIL out - t H<sub>2</sub>O in)



Dimensioni e caratteristiche non impegnative. Tolleranze secondo norme. - Dimensions and characteristics of the catalogue are subject to change without notice. Clearances according to international standards.

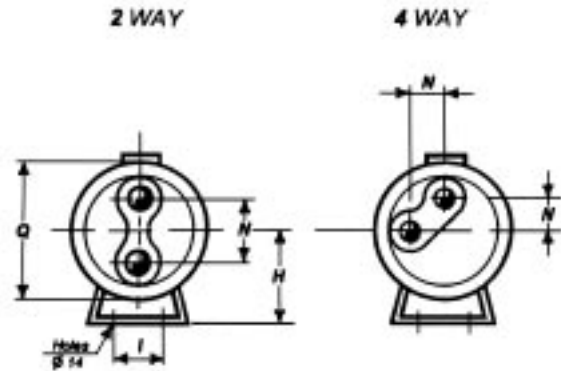
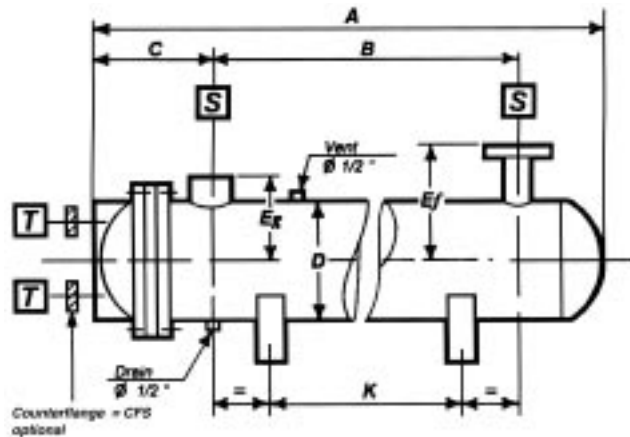


## FASCIO ESTRAIBILE TUBI AD "U" TIPO BEU

Removable bundle  
"U" bend tube - Type BEU



SCAMBIATORI  
HEAT EXCHANGERS



ESEMPIO CODICE PRODOTTO <i>example of product code</i>	
VECCHIO - old	NUOVO - new
<b>BEU 502 - A - 2</b>	<b>KEN . 5020 . A2G000</b>

TEMP. PROGETTO	<i>design temperat.</i>	°C	220	99
PRESS. PROGETTO	<i>design pressure</i>	Bar G	10	10
PRESSIONE PROVA	<i>test pressure</i>	Bar G	13	13
DATI DI PROGETTO	<i>design data</i>	U.M.	SHELL	TUBES

VERNICIATO - *Painting* = **RAL 0950**  
**ATTENZIONE ALTA TEMPERATURA!** Prevedere adeguata coibentazione  
**DANGER HIGH TEMPERATURE!** Insulation is necessary

TAGLIA size	A	B	C	D	H	K	I	Q	Eg	CONNESSIONI LATO CORPO <i>connections shell side</i>				CONNESSIONI LATO TUBI <i>connections tube side</i>					
										Ø S (GAS) Type		Ef	Ø S (FL.) Type		4 vie / way		2 vie / way		
										A	B		A	B	N	Ø T GAS	N	Ø T GAS   CFS	
<b>5020</b>	751	520	137	140	130	400	90	180	105	1 1/2"	2"	155	DN40	DN50	45	1"	76	1 1/2"	-
<b>5030</b>	1056	825				600													
<b>5040</b>	1361	1130				800													
<b>5050</b>	1666	1435				1000													
<b>6020</b>	780	515	160	168	150	400	90	210	120	2"	2"	170	DN50	DN65	50	1 1/2"	86	2"	1 1/2"
<b>6030</b>	1085	820				600													
<b>6040</b>	1390	1125				800													
<b>6050</b>	1695	1430				1000													
<b>8030</b>	1140	790	200	219	180	600	140	265	150	3"	3"	200	DN65	DN80	134	2"	130	3"	2"
<b>8040</b>	1445	1095				800													
<b>8050</b>	1750	1400				1000													
<b>8060</b>	2055	1705				1200													
<b>A040</b>	1535	1055	265	273	200	800	150	365	-	-	-	265	DN80	DN100	-	-	138	-	3"
<b>A050</b>	1840	1360				1000													
<b>A060</b>	2145	1665				1200													
<b>A070</b>	2450	1970				1400													
<b>A080</b>	2755	2275				1600													

### SCAMBIATORI DI CALORE SERIE KE (tipo BEU)

Gli scambiatori di calore serie **KE** sono forniti di fascio tubiero ad "U" che può dilatarsi liberamente. Sono quindi particolarmente indicati per il condizionamento di fluidi ad elevata temperatura (vapore, olio diatermico, acqua surriscaldata, ecc.). L'accurata progettazione meccanica, la perfetta lavorazione, ed i materiali di prima qualità che vengono impiegati, assicurano una resa termica specifica molto elevata ed un'ottima affidabilità nel tempo.

La serie **KE** è realizzata con componenti standardizzati costruiti in grande serie e sempre disponibili a magazzino; questo permette l'eventuale sostituzione dei pezzi in sede di futuri controlli ed una consegna molto rapida degli apparecchi finiti. Nella serie **KE** il fascio tubiero piegato ad "U" è estraibile. Ciò consente di intervenire con la massima facilità per le periodiche manutenzioni.

### HEAT EXCHANGERS KE SERIES (BEU type)

The "U" shaped tube bundle in **KE** series heat exchangers can freely dilate. These exchangers are therefore especially indicated for both heating and cooling of high temperature fluids (steam, diathermic oil, superheated water, etc.). Accurate engineering, perfect workmanship and top quality materials assure a long term reliability and high specific heat capacity.

The **KE** series is completely made of standardized components, always available by our warehouse. This assures an eventual, quick substitution of the components and allows fast efficient, maintenance and delivery time.

Dimensioni e caratteristiche non impegnative. Tolleranze secondo norme. - Dimensions and characteristics of the catalogue are subject to change without notice. Clearances according to international standards.

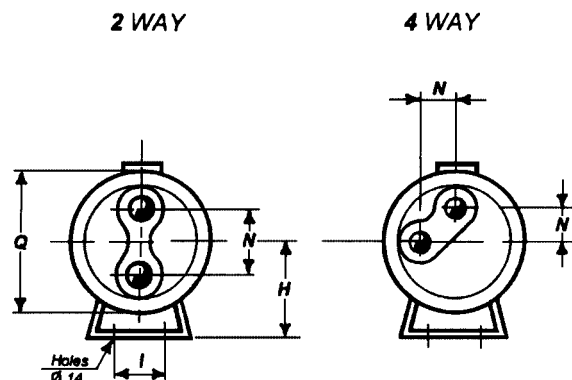
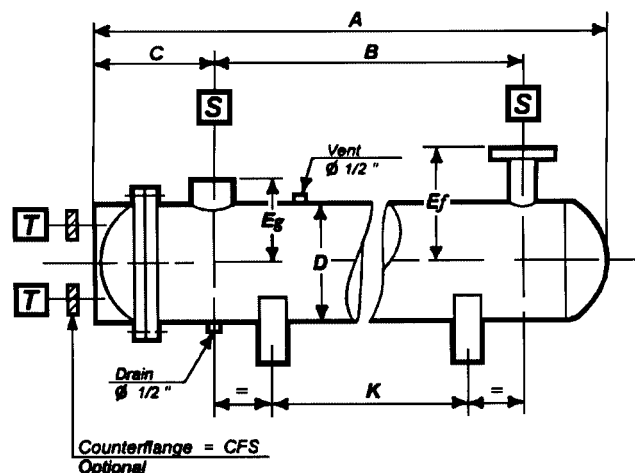




**FASCIO FISSO  
TUBI AD "U" TIPO BEU**  
Fixed tubesheet  
"U" bend tube - Type BEU



SCAMBIATORI  
HEAT EXCHANGERS



ESEMPIO CODICE PRODOTTO <i>example of product code</i>	
VECCHIO - old	NUOVO - new
BEU 502 - A - 4	KM5 . 5020 . A4G000

TEMP. PROGETTO	<i>design temperat.</i>	°C	220	99
PRESS. PROGETTO	<i>design pressure</i>	Bar G	10	10
PRESSIONE PROVA	<i>test pressure</i>	Bar G	13	13
DATI DI PROGETTO	<i>design data</i>	U.M.	SHELL	TUBES

VERNICIATO - *Painting* = **RAL 0950**  
ATTENZIONE ALTA TEMPERATURA! Prevedere adeguata coibentazione  
DANGER HIGH TEMPERATURE! Insulation is necessary

TAGLIA size	A	B	C	D	H	K	I	Q	CONNESSIONI LATO CORPO <i>connections shell side</i>				CONNESSIONI LATO TUBI <i>connections tube side</i>						
									Eg	Ø S (GAS) Type		Ef	Ø S (FL.) Type		4 vie / way		2 vie / way		
										A	B		A	B	N	Ø T GAS	N	Ø T GAS   CFS	
5020	751	520	129	140	130	400	90	180	105	1 1/2"	2"	155	DN40	DN50	45	1"	76	1 1/2"	-
5030	1056	825				600													
5040	1361	1130				800													
5050	1666	1435				1000													
6020	780	515	147	168	150	400	90	210	120	2"	2"	170	DN50	DN65	50	1 1/2"	86	2"	1 1/2"
6030	1085	820				600													
6040	1390	1125				800													
6050	1695	1430				1000													
8030	1140	790	185	219	180	600	140	265	150	3"	3"	200	DN65	DN80	134	2"	130	3"	2"
8040	1445	1095				800													
8050	1750	1400				1000													
8060	2055	1705				1200													
A040	1535	1055	245	273	200	800	150	365	-	-	-	265	DN80	DN100	-	-	138	-	3"
A050	1840	1360				1000													
A060	2145	1665				1200													
A070	2450	1970				1400													
A080	2755	2275				1600													

**SCAMBIATORI DI CALORE SERIE KM (tipo BEU)**

Gli scambiatori di calore serie **KM** sono forniti di fascio tubiero ad "U" che può dilatarsi liberamente. Sono quindi particolarmente indicati per il condizionamento di fluidi ad elevata temperatura (vapore, olio diatermico, acqua surriscaldata, ecc.). L'accurata progettazione meccanica, la perfetta lavorazione, ed i materiali di prima qualità che vengono impiegati, assicurano una resa termica specifica molto elevata ed un'ottima affidabilità nel tempo.

La serie **KM** è realizzata con componenti standardizzati costruiti in grande serie e sempre disponibili a magazzino; questo permette l'eventuale sostituzione dei pezzi in sede di futuri controlli ed una consegna molto rapida degli apparecchi finiti.

**HEAT EXCHANGERS KM SERIES (BEU type)**

The "U" shaped tube bundle in **KM** series heat exchangers can freely dilate. These exchangers are therefore especially indicated for both heating and cooling of high temperature fluids (steam, dowtherm oil, superheated water, etc.).

Accurate engineering, perfect workmanship and top quality materials assure a long term reliability and high specific heat capacity.

The **KM** series is completely made of standardized components, always available by our warehouse. This assures an eventual, quick substitution of the components and allows fast efficient, maintenance and delivery time.

Dimensioni e caratteristiche non impegnative. Tolleranze secondo norme. - Dimensions and characteristics of the catalogue are subject to change without notice. Clearances according to international standards.

# COPERCHI FLANGIATI e/o FILETTATI in carbon steel o inox in opzione ai coperchi in ghisa.

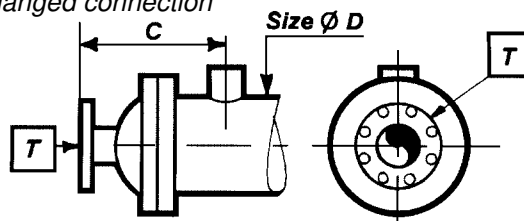
## Costruzione standard FLOVEX

Theraded and/or flanged covers  
in carbon steel or stainless steel.  
Optional to the cover in cast iron.



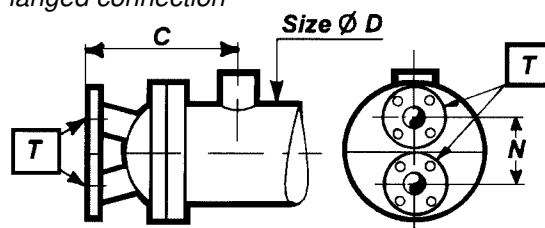
1 VIA FLANGIA	TAGLIA size Ø D	SCAMBIATORE TIPO exchanger type FASCIO (bundle)		CODICI PER ORDINAZIONE 8° E 9° Carattere del codice Code for order 8° - 9° character for code		
		FISSO fixed C	REMOVIBILE removable C	Ø T	FERRO c. steel	INOX stain. steel
	30XX	155	-	DN40	1F	1L
	40XX	155	-	DN40	1F	1L
	50XX	168	179	DN50	1F	1L
	60XX	221	237	DN80	1F	1L
	80XX	238	256	DN100	1F	1L

### CONNESSIONE FLANGIA PN16 UNI 2278/29 Flanged connection



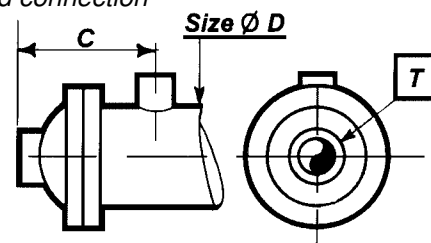
2 VIE FLANGIA	TAGLIA size Ø D	SCAMBIATORE TIPO exchanger type FASCIO (bundle)		CODICI PER ORDINAZIONE 8° E 9° Carattere del codice Code for order 8° - 9° character for code			
		FISSO fixed C	REMOVIBILE removable C	Ø T	N	FERRO c. steel	INOX stain. steel
	30XX	213	-	DN25	115	2F	2L
	40XX	213	-	DN25	115	2F	2L
	50XX	283	294	DN40	150	2F	2L
	60XX	296	312	DN50	165	2F	2L
	80XX	318	336	DN65	190	2F	2L

### CONNESSIONE FLANGIA PN16 UNI 2278/29 Flanged connection



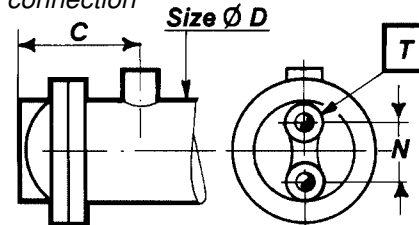
1 VIA GAS	TAGLIA size Ø D	SCAMBIATORE TIPO exchanger type FASCIO (bundle)		CODICI PER ORDINAZIONE 8° E 9° Carattere del codice Code for order 8° - 9° character for code		
		FISSO fixed C	REMOVIBILE removable C	Ø T	FERRO c. steel	INOX stain. steel
	30XX	113	-	1 1/2"	1T	1X
	40XX	113	-	1 1/2"	1T	1X
	50XX	135	159	2"	1T	1X
	60XX	151	167	3"	1T	1X
	80XX	208	224	3"	1T	1X

### CONNESSIONE FILETTATA GAS UNI 338 Threaded connection



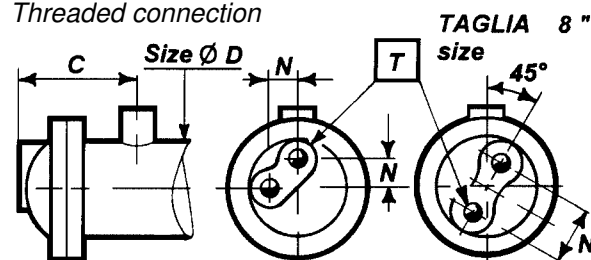
2 VIE GAS	TAGLIA size Ø D	SCAMBIATORE TIPO exchanger type FASCIO (bundle)		CODICI PER ORDINAZIONE 8° E 9° Carattere del codice Code for order 8° - 9° character for code			
		FISSO fixed C	REMOVIBILE removable C	Ø T	N	FERRO c. steel	INOX stain. steel
	30XX	80	-	1"	50	2T	2X
	40XX	80	-	1"	55	2T	2X
	50XX	115	138	1 1/2"	70	2T	2X
	60XX	150	168	2"	80	2T	2X
	80XX	198	216	2 1/2"	115	2T	2X

### CONNESSIONE FILETTATA GAS UNI 338 Threaded connection



4 VIE GAS	TAGLIA size Ø D	SCAMBIATORE TIPO exchanger type FASCIO (bundle)		CODICI PER ORDINAZIONE 8° E 9° Carattere del codice Code for order 8° - 9° character for code			
		FISSO fixed C	REMOVIBILE removable C	Ø T	N	FERRO c. steel	INOX stain. steel
	30XX	80	-	3/4"	25	4T	4X
	40XX	80	-	3/4"	35	4T	4X
	50XX	125	-	1"	40	4T	4X
	60XX	146	-	1 1/2"	45	4T	4X
	80XX	198	-	2"	136	4T	4X

### CONNESSIONE FILETTATA GAS UNI 338 Threaded connection



## MODULO RICHIESTA DATI (Sheet for thermal data)

CLIENTE (customer): \_\_\_\_\_

SIG. (Mr): \_\_\_\_\_

INDIRIZZO (address): \_\_\_\_\_

POTENZIALITÀ (duty) **1** \_\_\_\_\_  kcal  kW  HP

		Corpo <b>SHELL Side</b>		Tubi <b>TUBE Side</b>	
<b>Tipo fluido &amp; viscosità 40°C ISO</b> (Fluid type & viscosity) 40°C	<input type="checkbox"/> VG <input type="checkbox"/> cP	<b>2</b>		<b>5</b>	
<b>Portata fluido</b> (Flow)	<input type="checkbox"/> m³/h <input type="checkbox"/> l/min.	<b>3</b>			
<b>TEMPERATURA (temperature)</b>	°C	in	out	in	out
<b>PERDITA DI CARICO MAX.</b> (allowable pressure drop)	Bar G			<b>6</b>	
<b>DIMENSIONE MASSIMA LUNGHEZZA (max length):</b>					
<b>IMPORTANTE! 1 ÷ 6 DATI FONDAMENTALI (Fundamental datas)</b> NB.: densità, viscosità, calore specifico oppure diagramma relativi se il fluido non è conosciuto (density, viscosity, specific heat if the fluid is a special fluid)					

### PROGETTAZIONE (Project)

- |   |   |
|---|---|
| <input type="checkbox"/> Standard FLOVEX        | <input type="checkbox"/> FASCIO TUBIERO FISSO (Fixed bundle)          |
| <input type="checkbox"/> TEMA C ASME VIII Div 1 | <input type="checkbox"/> FASCIO TUBIERO ESTRAIBILE (Removable bundle) |
| <input type="checkbox"/> TEMA B ASME VIII Div 1 | <input type="checkbox"/> FASCIO TUBIERO U (U tube)                    |
| <input type="checkbox"/> TEMA R ASME VIII Div 1 | <input type="checkbox"/> ARIA CON ELETTROVENTILATORI (Fan)            |

### DATI DI PROGETTO (project data)

- |  |                        |       |       |
|--|------------------------|-------|-------|
| <input type="checkbox"/> Standard FLOVEX | Shell side pressure    | Bar G | _____ |
| <input type="checkbox"/> Non standard    | Tube side pressure     | Bar G | _____ |
|  | Shell side temperature | °C    | _____ |
|  | Tube side temperature  | °C    | _____ |

### COSTRUZIONI MATERIALI (Materials construction)

- |  |                               |                                  |
|--|-------------------------------|----------------------------------|
| <input type="checkbox"/> Standard FLOVEX | TUBI DI SCAMBIO (Tube bundle) | _____                            |
| <input type="checkbox"/> Non standard    | DIAMETRO (Diameter)           | _____ SPESSORE (Thickness) _____ |
|  | PIASTRA TUBIERA (Tubesheet)   | _____                            |
|  | CORPO (Shell)                 | _____                            |
|  | COPERCHI (Covers)             | _____                            |

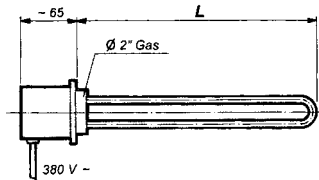
NOTE: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

# HR

## RISCALDATORI ELETTRICI Electric heaters



# HR E



### ELEMENTO RISCALDANTE

Resistenza in ferro con corpo in ottone per riscaldare olio con viscosità max ISO VG 68, da inserire direttamente nel serbatoio. Attacco filettato Ø 2" con guarnizione piana. Prevedere l'installazione in una zona di forte turbolenza per aumentare l'efficienza termica. Potenza resa ~ 2,5 watt/cm<sup>2</sup> a 230 - 400 V; altre tensioni a richiesta. Coperchio di protezione dei collegamenti in gomma con protezione IP 54. Esecuzione stagna antideflagrante a richiesta. Per applicazioni con differenti fluidi contattare nostro ufficio tecnico.

### HEATING ELEMENT

Heating element for oil with max viscosity ISO VG 68. Body and thread in yellow brass alloy, resistance of carbon steel U bend shaped to be inserted directly into the tank. Threaded 2" B.S.P. connection to install near the part of the tank with turbulence to raise the thermal efficiency. Thermal rating about 2,5 (watt/cmsq). Standard Voltage 230/400 (other Voltages on request). Protection of cables in rubber cap, protection IP 54. Special executions as "waterproof" and "flameproof" on request. For applications with different fluid please contact our technical office.

ESEMPIO CODICE PRODOTTO example of product code	
VECCHIO - old	NUOVO - new
RE 1013	HRE . 1013 . 000000

TAGLIA size							
HRE	1013	1015	1020	1030	1040	1050	1060
Pot. W	1300	1500	2000	3000	4000	5000	6000
L (mm)	315	415	515	615	735	615	715

# HR X

### RISCALDATORI ELETTRICI IN LINEA

Elemento riscaldante **HR E** inserito in un corpo. Maggiore efficienza termica senza possibilità di surriscaldamento. Ampia gamma di versioni con una o più resistenze smontabili e sostituibili. Robusto corpo in acciaio al carbonio. Potenza resa ~ 2,5 watt/cm<sup>2</sup> - 230 - 400 V; altre tensioni a richiesta. Coperchio di protezione dei collegamenti in gomma con protezione IP 54. Esecuzione stagna antideflagrante a richiesta.

### ELECTRIC HEATERS ON LINE

Heating element **HR E** type fitted into a shell. For oil, gasoil, cherosene, other types, made for high efficiency, heat dynamically in full stream of flow avoiding over heating. Modular construction with one, three or four candles fitted into rugged carbon steel housing. Easy substitution of the heating elements. Thermal rating about 2.5 (watt/cmsq). Standard Voltage 230/400 (other Voltages on request). Protection of cables in rubber cap. Protection IP 54. Special executions as "waterproof" and "flameproof" on request.

# HR T

### RISCALDATORI ELETTRICI IMMERSI

Elemento riscaldante **HR E** inserito in un corpo. Facile montaggio a flangia con guarnizione piana direttamente al serbatoio. Ampia gamma di versioni con una e più resistenze smontabili e sostituibili. Robusto corpo in acciaio al carbonio. Potenza resa ~ 2,5 watt/cm<sup>2</sup> a 230 - 400 V; altre tensioni a richiesta. Coperchio di protezione dei collegamenti in gomma con protezione IP 54. Esecuzione stagna antideflagrante a richiesta.

### ELECTRIC IMMERSION HEATERS

Heating element **HR E** type fitted into a shell. For oil our types, with flange and plain gasket to be fitted into the tank, but using the dynamic way of heating "one line" pouring the oil tank. Modular construction with one, three or four candles, rugged carbon steel housing with most part hidden in tank will solve many problems of space. Thermal rating about 2,5 (watt/cmsq). Standard Voltage 230/400 (other Voltages on request). Protection of cables in dielectric rubber cap. Protection IP 54. Special executions as "waterproof" and "flameproof" on request.

**ATTENZIONE - Per evitare eventuali danni di sovratemperatura prevedere sempre nell'impianto un elemento termostatico di sicurezza per il controllo dei vari tipi di resistenza di riscaldamento.**

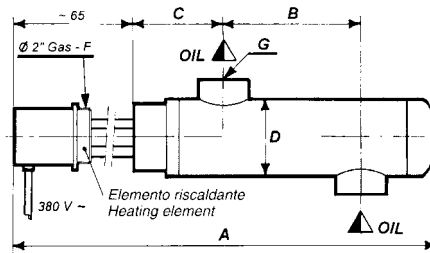
**ATTENTION - To avoid damages as burning or cracking of the fluids due to overheting, the system must be provided with thermostatic control!**

Dimensioni e caratteristiche non impegnative. Tolleranze secondo norme. - Dimensions and characteristics of the catalogue are subject to change without notice. Clearances according to international standards.

# HR X

ESEMPIO CODICE PRODOTTO example of product code	
VECCHIO - old	NUOVO - new
HT 1013	HRX . 1013 . 000000

TEMP. PROGETTO	design temp.	°C	220
PRESS. PROGET.	design press.	Bar G	10
PRESS. PROVA	test pressure	Bar G	13
DATI DI PROGET.	design data	U.M.	SHELL



**TYPE HRX 1**

Portata min	Flow min	2	m <sup>3</sup> /h
Portata max	Flow max	18	m <sup>3</sup> /h

**Nr. 1** Elemento riscaldante  
Heating element

Taglia size	kW	A	B	C	D	Ø G
1013	1.3	390	180			
1015	1.5	490	280			
1020	2	590	380			
1030	3	690	480	75	83	1 1/2"
1040	4	810	600			
1050	5	690	480			
1060	6	790	580			

**TYPE HRX 3**

Portata min	Flow min	6	m <sup>3</sup> /h
Portata max	Flow max	36	m <sup>3</sup> /h

**Nr. 3** Elementi riscaldanti  
Heating elements

Taglia size	kW	A	B	C	D	Ø G
3039	3.9	420	150			
3045	4.5	520	250			
3060	6	620	350			
3090	9	720	450	95	168	2"
3120	12	840	570			
3150	15	720	450			
3180	18	820	550			

**TYPE HRX 4**

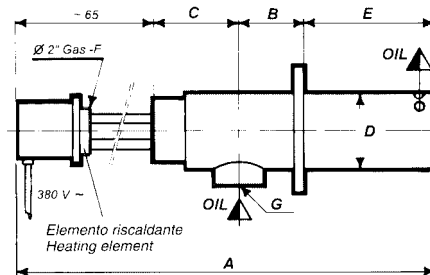
Portata min	Flow min	9	m <sup>3</sup> /h
Portata max	Flow max	60	m <sup>3</sup> /h

**Nr. 3** Elementi riscaldanti  
Heating elements

Taglia size	kW	A	B	C	D	Ø G
4052	5.2	460	150			
4060	6	560	250			
4080	8	660	350			
4120	12	760	450	105	219	2"
4160	16	880	570			
4200	20	760	450			
4240	24	860	550			

# HR T

ESEMPIO CODICE PRODOTTO example of product code	
VECCHIO - old	NUOVO - new
HS 1013	HRT . 1013 . 000000



**TYPE HRT 1**

Portata min	Flow min	2	m <sup>3</sup> /h
Portata max	Flow max	18	m <sup>3</sup> /h

**Nr. 1** Elemento riscaldante  
Heating element

Taglia size	kW	A	B	C	D	E
1013	1.3	380				170
1015	1.5	480				270
1020	2	580				370
1030	3	680	70	75	83	470
1040	4	800				590
1050	5	680				470
1060	6	780				570

**TYPE HRT 3**

Portata min	Flow min	6	m <sup>3</sup> /h
Portata max	Flow max	36	m <sup>3</sup> /h

**Nr. 3** Elementi riscaldanti  
Heating elements

Taglia size	kW	A	B	C	D	E
3039	3.9	385				145
3045	4.5	485				245
3060	6	585				345
3090	9	685	80	95	168	445
3120	12	805				565
3150	15	685				445
3180	18	785				545

**TYPE HRT 4**

Portata min	Flow min	9	m <sup>3</sup> /h
Portata max	Flow max	60	m <sup>3</sup> /h

**Nr. 3** Elementi riscaldanti  
Heating elements

Taglia size	kW	A	B	C	D	E
4052	5.2	380				130
4060	6	480				230
4080	8	580				330
4120	12	680	80	115	219	430
4160	16	800				550
4200	20	680				430
4240	24	780				530

Dimensioni e caratteristiche non impegnative. Tolleranze secondo norme. - Dimensions and characteristics of the catalogue are subject to change without notice. Clearances according to international standards.

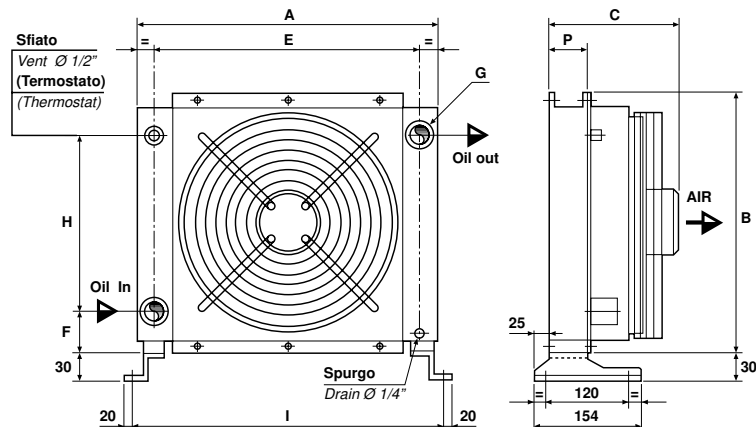


## SCAMBIATORI AD ARIA IN ALLUMINIO

*Air coolers aluminium block*



SCAMBIATORI  
HEAT EXCHANGERS



Model	A	B	C 12Vcc	C 24Vcc	C 220Vac	C 400Vac	E	H	G Ø Gas F	F	I	P
<b>RSA.2404</b>	315	275	147	147	170	133	275	185	3/4"	45	340	45
<b>RSA.2406</b>	335	275	162	162	190	148	285	185	1"	60	340	60
<b>RSA.3406</b>	440	375	172	172	200	201	390	255	1"	60	465	60
<b>RSA.4706</b>	610	510	206	206	200	216	540	390	1 1/2"	60	595	60
<b>RSA.4709</b>	610	510	236	236	230	246	540	390	1 1/2"	60	595	90

### Materiale

Massa radiante : Alluminio  
Ventola : Alluminio o plastica rinforzata  
Convogliatore, griglia di protezione : Acciaio al carbonio

### Termostati disponibili (Contatti N.A.)

**TA** : Protezione IP 54 48°C  
**TB** : Protezione IP 65 48°C  
**TBR** : Protezione IP 65 40°C ÷ 85°C

Gli scambiatori ARIA/OLIO serie **RSA** sono realizzati mediante l'impiego di una robusta massa radiante in alluminio con canali di passaggio muniti di turbolatori per aumentare l'efficienza termica.

Il profilo laterale, senza le connessioni, consente un più facile montaggio e necessita di un minore ingombro frontale.

La rumorosità è contenuta in un valore max di 76 dB(A) / 1m.

I piedi di fissaggio sono smontabili ed orientabili in diverse posizioni con l'interposizione di elementi antivibranti in gomma.

Un'attenta scelta della forma del convogliatore d'aspirazione consente di sfruttare al meglio il flusso d'aria.

Sono previste esecuzioni speciali con motori antideflagranti.

### Material

Main cooler Body : Aluminium  
Fan : Aluminium or Hard plastic  
Fan protection : Carbon steel

### Thermostat optional (Contact N. O.)

**TA** : Protection IP 54 48°C  
**TB** : Protection IP 65 48°C  
**TBR** : Protection IP 65 40°C ÷ 85°C

*Air-oil coolers of **RSA series** are realized by a strong aluminium radiant mass with passing canals equipped with turbulence device in order to increase the thermic efficiency*

*The overall side profile allows an easy assemble of the cooler since there isn't the hindrance caused by the connections and consequently it needs a smaller room.*

*The noise factor is 76 dB(A) at 1 mt maximum.*

*The support saddles can be desmantled and oriented in different positions. The saddles are equipped with anti-vibrations rubber device.*

*A correct choice of extractor plenum frame let to exploit completely the air-flow.*

*Special executions with EEXD motor are available.*

Dimensioni e caratteristiche non impegnative. Tolleranze secondo norme. - Dimensions and characteristics of the catalogue are subject to change without notice. Clearances according to international standards.



# SCAMBIATORI AD ARIA IN ALLUMINIO

Air coolers aluminium block



SCAMBIATORI  
HEAT EXCHANGERS

## Diagrammi di rendimento e selezione dello scambiatore ideale

Consentono di selezionare il modello sulla base della potenzialità termica da smaltire, della temperatura di ingresso dell'olio, della temperatura massima dell'aria e della portata dell'olio.

Sull'asse delle ascisse viene indicata la portata dell'olio in litri per minuto, sulle ordinate viene indicato il rendimento  $\eta$ , come rapporto tra la potenzialità termica (espressa in kcal/h) e la differenza tra la temperatura massima di ingresso olio e la temperatura massima dell'aria (entrambe in °C o °K).

## Efficiency Diagrams and selection of ideal cooler size

Ideal cooler size selection from the diagram is based on the duty, inlet oil temperature, maximum air temperature, and oil flow.

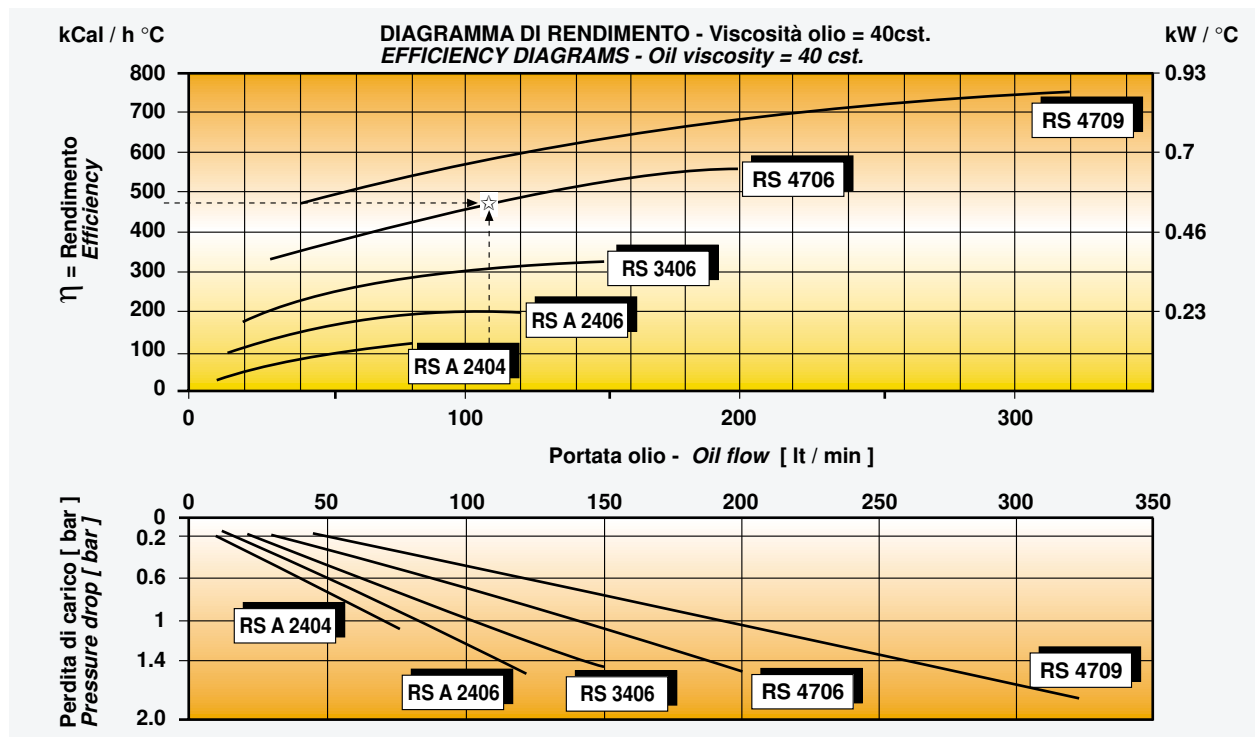
Oil flow (lt per min) is indicated on X-axis. On Y axis the efficiency,  $\eta$ , is reported as ratio between maximum oil inlet temperature and maximum air temperature (°C or °K).

$$\eta = \text{Rendimento} = \frac{Q, \text{ potenzialità, kcal / h}}{DT_o}$$

$DT_o = \text{Ingresso olio} - T \text{ massima aria } ^\circ\text{C oppure } ^\circ\text{K}$

$$\eta = \text{Efficiency} = \frac{Q, \text{ duty, kcal / h}}{DT_o}$$

$DT_o = \text{Inlet oil} - T \text{ max air } ^\circ\text{C or } ^\circ\text{K}$



## Calcolo della potenzialità termica

Nel caso non sia conosciuto il valore della potenzialità termica, questi può essere calcolato con la seguente formula:

$$Q = C_p \times \gamma \times G \times DT$$

dove:

**Q** = potenzialità termica = kcal / h  
**C<sub>p</sub>** = calore specifico = kcal / kg°C  
 **$\gamma$**  = peso specifico = kg / m<sup>3</sup>  
**G** = portata olio = lt / h  
**DT** = ingresso olio - T uscita olio = °C oppure °K

## Calculation of the duty

If the duty is unknown, it can be calculated by the following formula:

$$Q = C_p \times \gamma \times G \times DT$$

where:

**Q** = duty = kcal / h  
**C<sub>p</sub>** = specific heat = kcal / kg°C  
 **$\gamma$**  = specific weight = kg / m<sup>3</sup>  
**G** = oil flow = lt / h  
**DT** = inlet oil - T outlet oil = °C or °K

Nel caso di un olio minerale di cui non si conoscano calore specifico e/o la densità, si può considerare con buona approssimazione il valore:

$$C_p \times \gamma = 0.4 \quad [\text{kcal / lt } ^\circ\text{C h}]$$

**Esempio:** T olio ingresso = 70°C, T olio uscita = 63°C,  
 Portata = 100 (lt / min) x 60 = 6.000 lt / h  
**Q = 0.4 x 6.000 x 7 = 16.800 kcal / h**

For a mineral oil typical values of specific Heat and specific weight are the following:

$$C_p \times \gamma = 0.4 \quad [\text{kcal / lt } ^\circ\text{C h}]$$

**Example:** T inlet oil = 70°C, T outlet oil = 63°C,  
 Flow = 100 (lt / min) x 60 = 6.000 lt / h  
**Q = 0.4 x 6.000 x 7 = 16.800 kcal / h**

Dimensioni e caratteristiche non impegnative. Tolleranze secondo norme. - Dimensions and characteristics of the catalogue are subject to change without notice. Clearances according to international standards.



## SCAMBIATORI AD ARIA

Aircoolers



SCAMBIATORI  
HEAT EXCHANGERS



### CARATTERISTICHE GENERALI

Gli scambiatori serie **LT**, con raffreddamento forzato ad aria, si pongono quale valida alternativa all'impiego dei tradizionali scambiatori a fascio tubiero, qualora non si disponga di acqua o se ne voglia evitare il consumo.

Particolare cura è stata posta allo studio dei vari componenti per raggiungere elevata efficienza termica e robustezza.

Per una totale affidabilità ogni apparecchio viene collaudato a 30 Bar.

### PERDITE DI CARICO

Al fine di ottimizzare i rendimenti con un giusto valore di caduta di pressione, vengono proposte due versioni di apparecchi

- tipo A per portate medio-basse
- tipo B per portate più alte.

Le perdite di carico indicate nei diagrammi di rendimento sono calcolate per olio con viscosità 4°E a 50°C. Con olio più viscoso o con temperature di funzionamento più basse si hanno variazioni sostanziali dei valori. Per evitare danni all'impianto in particolare durante l'avviamento a freddo, si consiglia di escludere lo scambiatore dal circuito mediante l'inserimento di un by-pass tarato alla pressione di 4-5 Bar.

### APPLICAZIONI SPECIALI

Gli scambiatori serie **LT** possono essere utilizzati, oltre che per il raffreddamento dell'olio, per i più svariati fluidi e gas in pressione, compatibilmente coi materiali impiegati.

È prevista la realizzazione, su richiesta, di unità speciali, multipli dei modelli base, di cui si mantengono le caratteristiche costruttive, raggiungendo anche potenzialità di scambio molto elevate. Il ns. ufficio tecnico dispone di un collaudato sistema di calcolo computerizzato in grado di simulare le reali condizioni di lavoro per ottimizzare le scelte e ne fornisce una specifica termica completa di tutti i dati di funzionamento.

### CARATTERISTICHE COSTRUTTIVE

Per garantire elevate pressioni di esercizio resistenza alle vibrazioni ed elevato scambio termico si utilizza un pacco radiante composto da alette continue di alluminio, fissate ai tubi di rame mediante espansione meccanica.

I collettori sono dimensionati per consentire il passaggio dell'olio alla portata prevista.

Ogni apparecchio è corredato da un termostato a taratura fissa, da collegare al motore, per l'inserimento della ventola alla temperatura di 40-48°C.

Motore elettrico e ventola sono previsti per funzionamento al 100% e con livello di rumorosità particolarmente basso.

### GARANZIA

Ogni apparecchio è garantito contro i difetti di fabbricazione o dei materiali per la durata di mesi 12. Nessuna garanzia contro la corrosione, vibrazioni eccessive, colpi di ariete, incrostazioni ed errato montaggio.

### GENERAL CHARACTERISTICS

The fan exchangers, cooling with forced airdraft, are an extremely valid alternative to tube & shell exchangers, where no cooling water is available.

Particular care has been taken to select all components able to give good thermal efficiency together with rugged construction. To reach complete affidability all our fancoolers are tested at 30 (Bar).

### FLOWRATE & PRESSURE DROP

To optimise efficiency against allowable pressure drop, coolers are of two types: low flowrate = type "A"; high flowrate = type "B".

Pressure drop indicated on the performance curves are intended with oil viscosity of 4°E-50°C. With other oils than the mentioned, proper calculation should be made. Specially with cold start of the machine at low temperatures a by-pass should be used, with pressure setting of 4-5 (Bar).

### SPECIAL APPLICATIONS

Fan-type exchangers could also be used for compressed air, other gas, water, depending on fan materials.

The versatility of our design allows us to make multiple of our basic models, two or more standard or special fans & motors, more rows of tubes with tubelength according to proper computerised calculation.

Heat transfer calculation and fancooler size optimization made by simulation of real conditions with our computer, to minimise possible errors, giving specification sheet complete with constructional and heat transfer data available from our technical department for each project.

### CONSTRUCTION

Copper inertubes of small diameter expanded to integral aluminium fins, punched with small lips to extend contact surface, and to give protection against vibration.

Inlet/outlet connections in carbon steel pipe sized to take flow at nominal pressure.

Each cooler is supplied with thermostatic contact to insert the fan between 40-48 °C.

Electric motor & fan able to operate 100% of time, with low noise.

### WARRANTY

Each exchanger is guaranteed against defect of fabbricazione, or of the materials for 12 months.

No guarantee will be hold against corrosion, excessive vibrations, pressure hammering, calcium deposit and uncorrect installation.

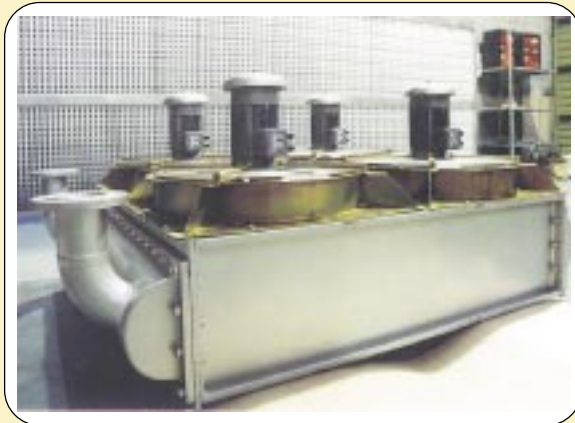
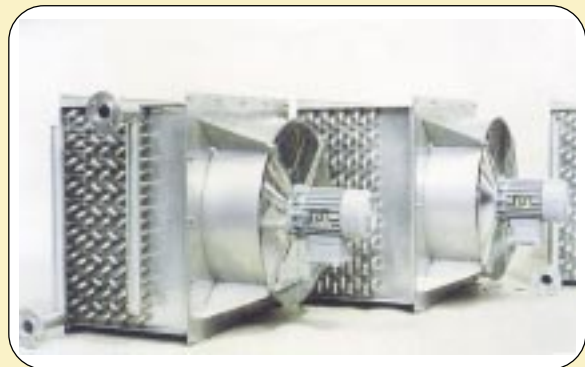




Scambiatore ad aria tipo **LTD** con doppio elettroventilatore.  
*Double fancooler type **LTD** with two motors ventilators.*

Scambiatore speciale completamente in inox AISI 316 con motore antideflagrante per impianto idraulico in ambiente geotermico altamente corrosivo.

*Special cooler completely in stainless steel AISI 316 with flameproof motor for hydraulic equipment working in geothermic highly corrosive site.*

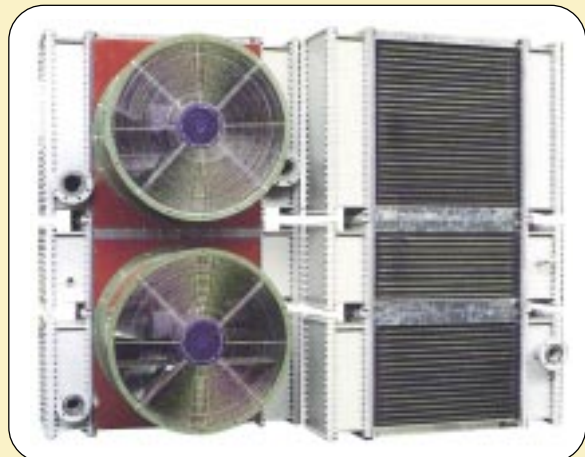


Scambiatore ad aria con grande potenzialità termica per impianto chimico.

*Aircooler for high dutyrating for chemical plant.*

Scambiatori con raffreddamento ad aria per ambienti pericolosi e in applicazioni gravose. Realizzazione secondo norme con tubi alettati in rame, alluminio, inox, titanio, ecc.

*Heavy duty aircooled exchangers to suite most codes, flameproof and hazardous applications. Made with bare or finned tubes. Materials as carbon steel, copper alloys, stainless or light alloy to suite most prescriptions.*



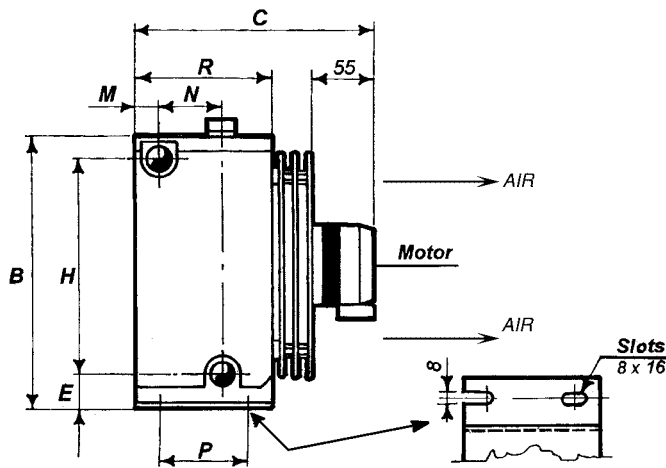
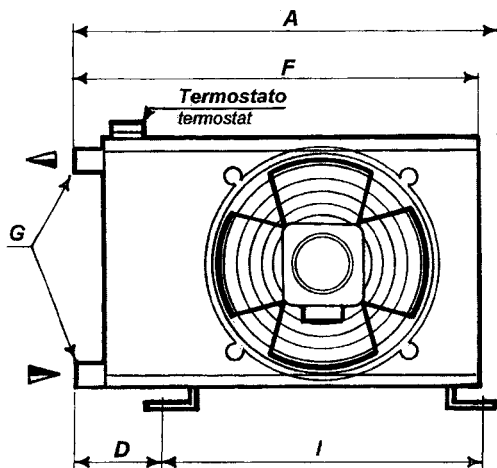


# SCAMBIATORI AD ARIA BASSA POTENZIALITÀ

Aircoolers  
Low duty



SCAMBIATORI  
HEAT EXCHANGERS



ESEMPIO CODICE PRODOTTO <i>example of product code</i>	
VECCHIO - old	NUOVO - new
<b>LT - 1.3 - A - 12V</b>	<b>LTO . 0103 . AD0000</b>

TEMP. PROGETTO	<i>design temperat.</i>	°C	99
PRESS. PROGETTO	<i>design pressure</i>	Bar G	10
PRESSIONE PROVA	<i>test pressure</i>	Bar G	13
DATI DI PROGETTO	<i>design data</i>	U.M.	TUBES

VERNICIATO - Painting = RAL 7381

VECCHIA SIGLA <i>Old size</i>	TAGLIA <i>size</i>	A	B	C	D	E	F	H	I	M	N	P	R	Ø G	MOTORE ELETTRICO <i>electric motor</i>
LT 1.3	<b>0103</b>	335	230	205	75	40	320	175	250	15	50	75	108	1/2"	48W - 230V~ 1 Phase
LT 2.3	<b>0203</b>	415	285	205	100	45	400	220	300	15	40	75	108	3/4"	65W - 230V~ 1 Phase
LT 3.4	<b>0304</b>	530	385	270	115	50	515	315	400	35	55	120	150	1"	50W - 400V~ 3 Phase

Nota: tutti i modelli sono disponibili anche con motore elettrico in corrente continua 12 V o 24 V

Note: all the models are available with electrical motors 12 V (dc) or 24 V (dc)

### TERMOSTATI DISPONIBILI: (CONTATTI N.A.)

TA: standard, protezione IP 44 taratura fissa 48°C +/- 12°C  
TB: opzionale, protezione IP 65 taratura fissa 48°C +/- 8°C

### THERMOSTAT OPTIONAL: (CONTACT N.O.)

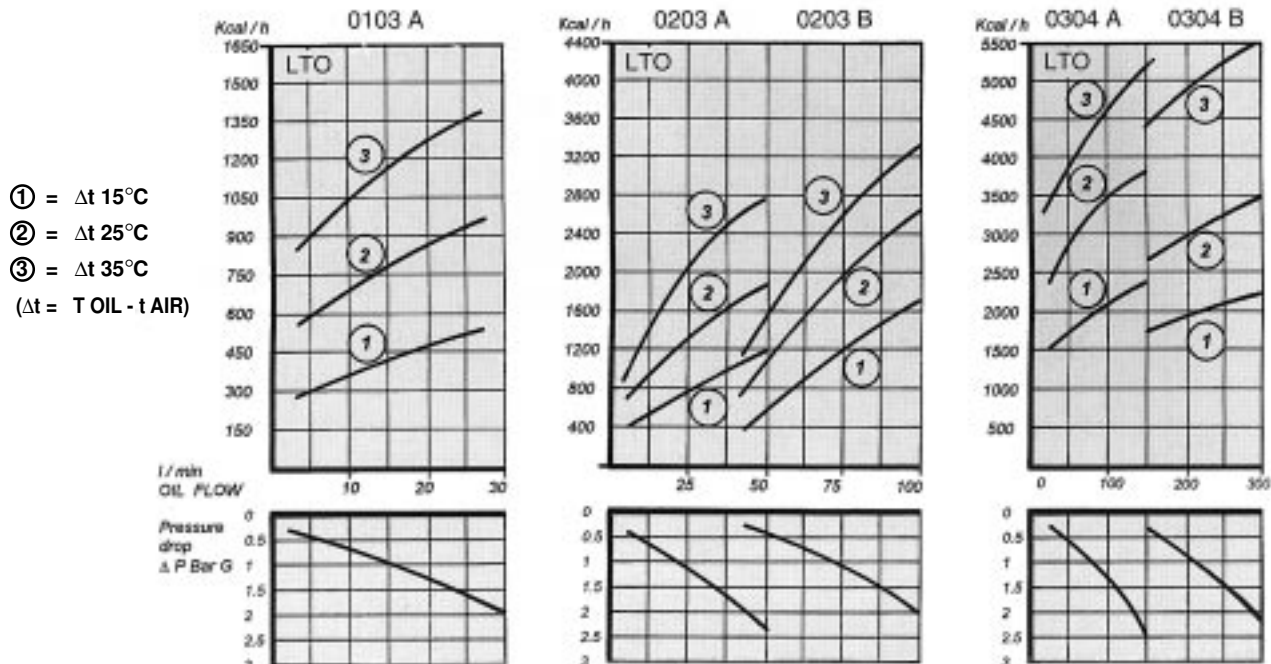
TA: standard type, protection IP 44 fixed range 48°C +/- 12°C  
TB: optional type, protection IP 65 fixed range 48°C +/- 8°C

### DIAGRAMMI DI RENDIMENTO

Diagrammi validi per olio idraulico 4°E a 40°C alla temperatura di 50°C.

### HEAT TRANSFER CURVES

The curves are valides for hydraulic oil 4°E at 40°C at medium temperature of 50°C.



Dimensioni e caratteristiche non impegnative. Tolleranze secondo norme. - Dimensions and characteristics of the catalogue are subject to change without notice. Clearances according to international standards.

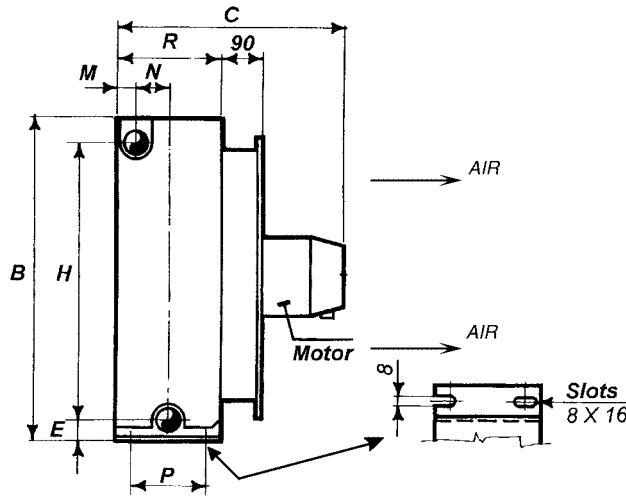
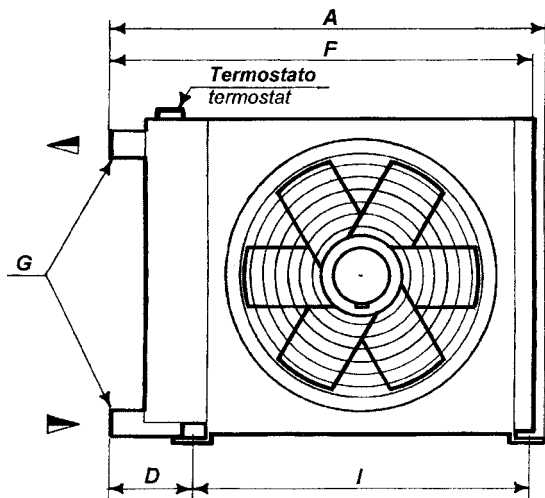


# SCAMBIATORI AD ARIA MEDIA POTENZIALITÀ

Aircoolers  
Medium duty



SCAMBIATORI  
HEAT EXCHANGERS



ESEMPIO CODICE PRODOTTO <i>example of product code</i>	
VECCHIO - <i>old</i>	NUOVO - <i>new</i>
LT - 5.4 - A - 220	LTO . 0504 . A20000

TEMP. PROGETTO	<i>design temperat.</i>	°C	99
PRESS. PROGETTO	<i>design pressure</i>	Bar G	10
PRESSIONE PROVA	<i>test pressure</i>	Bar G	13
DATI DI PROGETTO	<i>design data</i>	U.M.	TUBES

VERNICIATO - *Painting* = RAL 7381

VECCHIA SIGLA <i>Old size</i>	TAGLIA <i>size</i>	A	B	C	D	E	F	H	I	M	N	P	R	Ø G	MOTORE ELETTRICO <i>electric motor</i>
LT 5.4	0504	710	510	300	130	30	700	455	550	30	50	120	170	1 1/4"	80W - 400V~ 3 Phase
LT 7.4	0704	965	735	420	155	30	955	680	780	30	50	140	190	1 1/2"	250W - 400V~ 3 Phase
LT 7.8	0708	965	735	510	155	30	955	680	780	30	140	230	280	1 1/2"	730W - 400V~ 3 Phase

### TERMOSTATI DISPONIBILI: (CONTATTI N.A.)

TA: standard, protezione IP 44 taratura fissa 48°C +/- 12°C  
TB: opzionale, protezione IP 65 taratura fissa 48°C +/- 8°C

### THERMOSTAT OPTIONAL: (CONTACT N.O.)

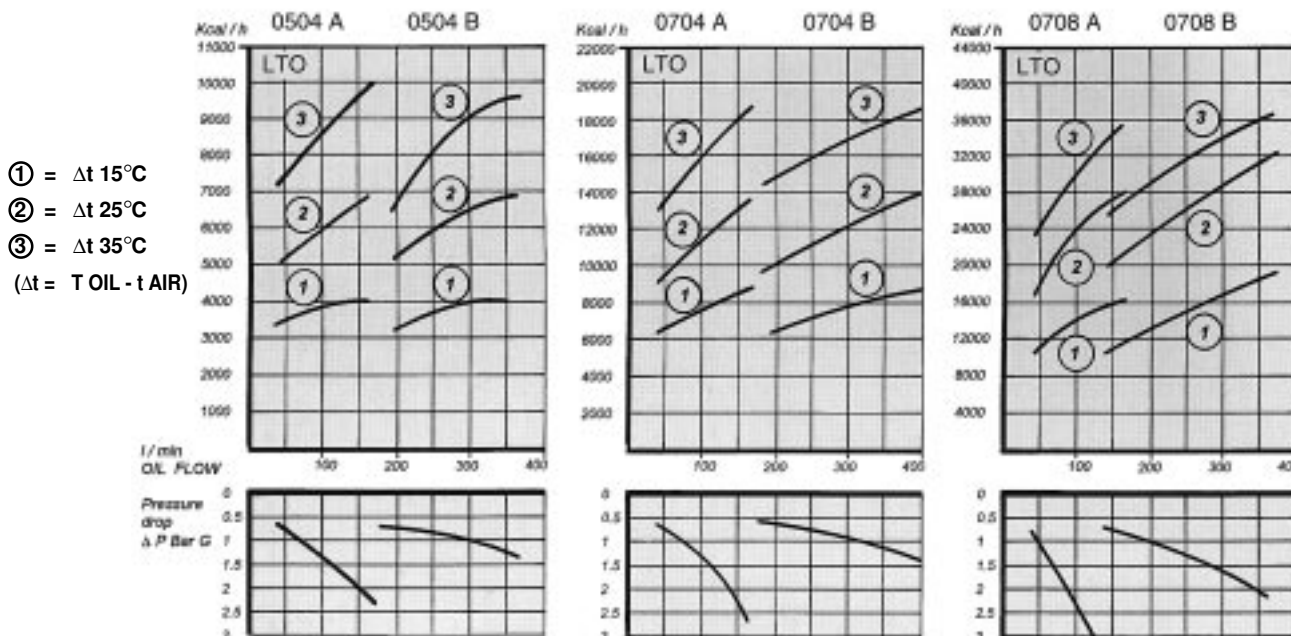
TA: standard type, protection IP 44 fixed range 48°C +/- 12°C  
TB: optional type, protection IP 65 fixed range 48°C +/- 8°C

### DIAGRAMMI DI RENDIMENTO

Diagrammi validi per olio idraulico 4°E a 40°C alla temperatura di 50°C.

### HEAT TRANSFER CURVES

The curves are valides for hydraulic oil 4°E at 40°C at medium temperature of 50°C.



Dimensioni e caratteristiche non impegnative. Tolleranze secondo norme. - Dimensions and characteristics of the catalogue are subject to change without notice. Clearances according to international standards.

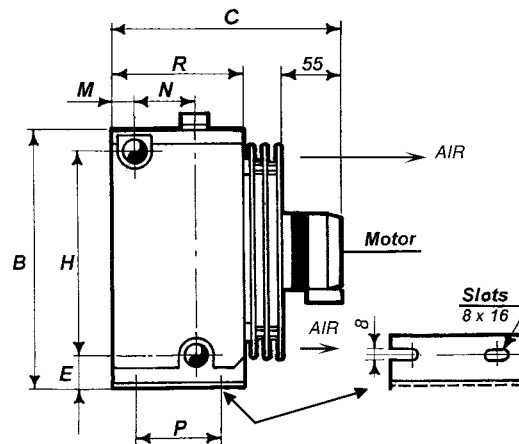
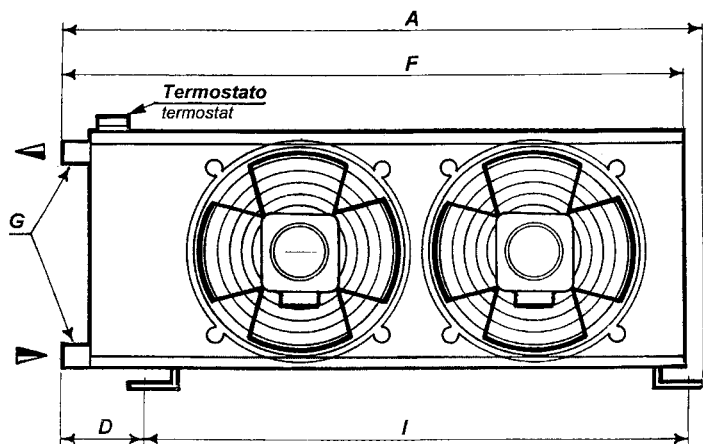


# SCAMBIATORI AD ARIA DOPPIO MOTORE

Aircoolers  
Double motors



SCAMBIATORI  
HEAT EXCHANGERS



ESEMPIO CODICE PRODOTTO <i>example of product code</i>	
VECCHIO - old	NUOVO - new
<b>LTD - 1.3 - A - 12V</b>	<b>LTD . 0103 . AD0000</b>

TEMP. PROGETTO	<i>design temperat.</i>	°C	99
PRESS. PROGETTO	<i>design pressure</i>	Bar G	10
PRESSIONE PROVA	<i>test pressure</i>	Bar G	13
DATI DI PROGETTO	<i>design data</i>	U.M.	TUBES

VERNICIATO - Painting = RAL 7381

VECCHIA SIGLA <i>Old size</i>	TAGLIA <i>size</i>	A	B	C	D	E	F	H	I	M	N	P	R	Ø G	MOTORE ELETTRICO <i>electric motor</i>
LT 1.3	<b>0103</b>	535	230	205	75	40	520	175	450	15	50	75	108	1/2"	2 x 48W - 230V~ 1 Phase
LT 2.3	<b>0203</b>	665	285	205	100	45	650	220	550	15	40	75	108	3/4"	2 x 65W - 230V~ 1 Phase
LT 3.4	<b>0304</b>	880	385	270	115	50	865	315	750	35	55	120	150	1"	2 x 50W - 400V~ 3 Phase

Nota: tutti i modelli sono disponibili anche con motore elettrico in corrente continua 12 V o 24 V

Note: all the models are available with electrical motors 12 V (dc) or 24 V (dc)

**TERMOSTATI DISPONIBILI:** (CONTATTI N.A.)

TA: standard, protezione IP 44 taratura fissa 48°C +/- 12°C  
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**THERMOSTAT OPTIONAL:** (CONTACT N.O.)

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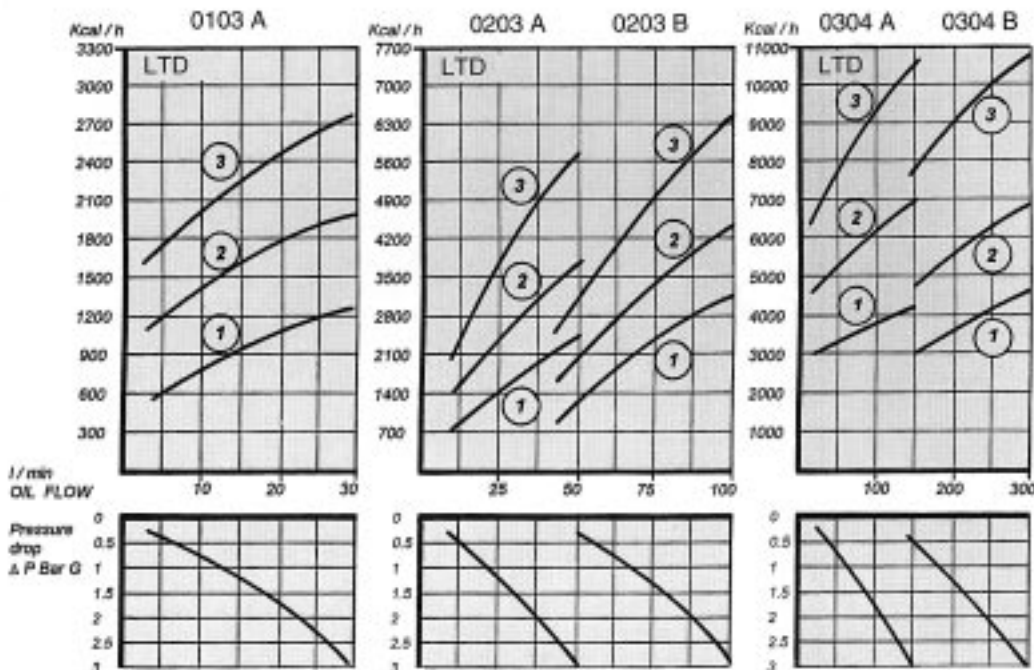
**DIAGRAMMI DI RENDIMENTO**

Diagrammi validi per olio idraulico 4°E a 40°C alla temperatura di 50°C.

**HEAT TRANSFER CURVES**

The curves are valides for hydraulic oil 4°E at 40°C at medium temperature of 50°C.

- ① = Δt 15°C
  - ② = Δt 25°C
  - ③ = Δt 35°C
- (Δt = T OIL - t AIR)



Dimensioni e caratteristiche non impegnative. Tolleranze secondo norme. - Dimensions and characteristics of the catalogue are subject to change without notice. Clearances according to international standards.

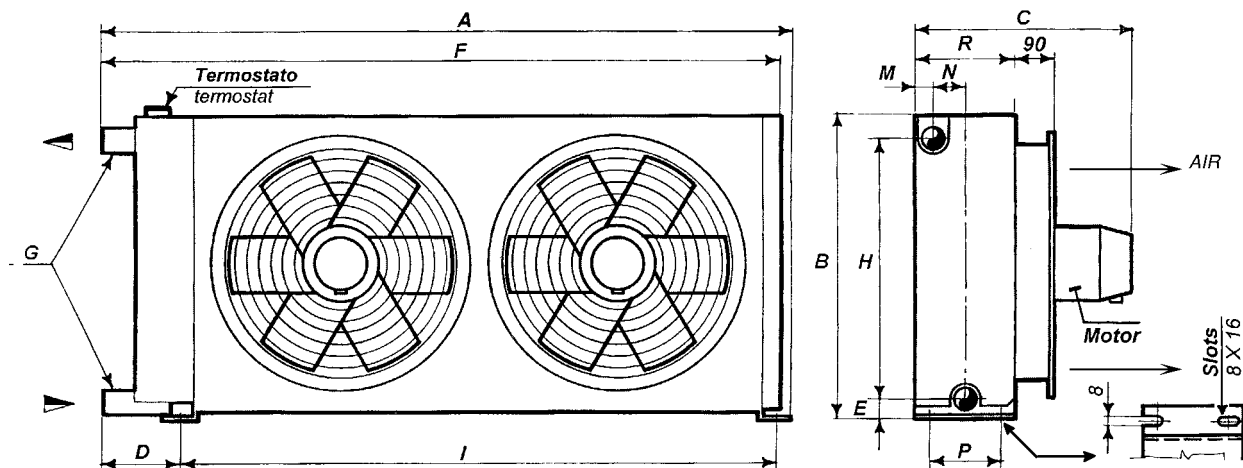
# LT D

## SCAMBIATORI AD ARIA DOPPIO MOTORE

Aircoolers  
Double motors



SCAMBIATORI  
HEAT EXCHANGERS



ESEMPIO CODICE PRODOTTO <i>example of product code</i>	
VECCHIO - old	NUOVO - new
<b>LTD - 5.4 - A - 220</b>	<b>LTD . 0504 . A20000</b>

TEMP. PROGETTO	<i>design temperat.</i>	°C	99
PRESS. PROGETTO	<i>design pressure</i>	Bar G	10
PRESSIONE PROVA	<i>test pressure</i>	Bar G	13
DATI DI PROGETTO	<i>design data</i>	U.M.	TUBES

VERNICIATO - Painting = RAL 7381

VECCHIA SIGLA <i>Old size</i>	TAGLIA size	A	B	C	D	E	F	H	I	M	N	P	R	Ø G	MOTORE ELETTRICO <i>electric motor</i>
LT 5.4	<b>0504</b>	1210	510	300	130	30	1200	455	1050	30	50	120	170	1 1/4"	2 x 80W - 400V~ 3 Phase
LT 7.4	<b>0704</b>	1695	735	420	155	30	1685	680	1510	30	50	140	190	1 1/2"	2 x 250W - 400V~ 3 Phase
LT 7.8	<b>0708</b>	1695	735	510	155	30	1685	680	1510	30	140	230	280	1 1/2"	2 x 730W - 400V~ 3 Phase

### TERMOSTATI DISPONIBILI: (CONTATTI N.A.)

TA: standard, protezione IP 44 taratura fissa 48°C +/- 12°C  
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### THERMOSTAT OPTIONAL: (CONTACT N.O.)

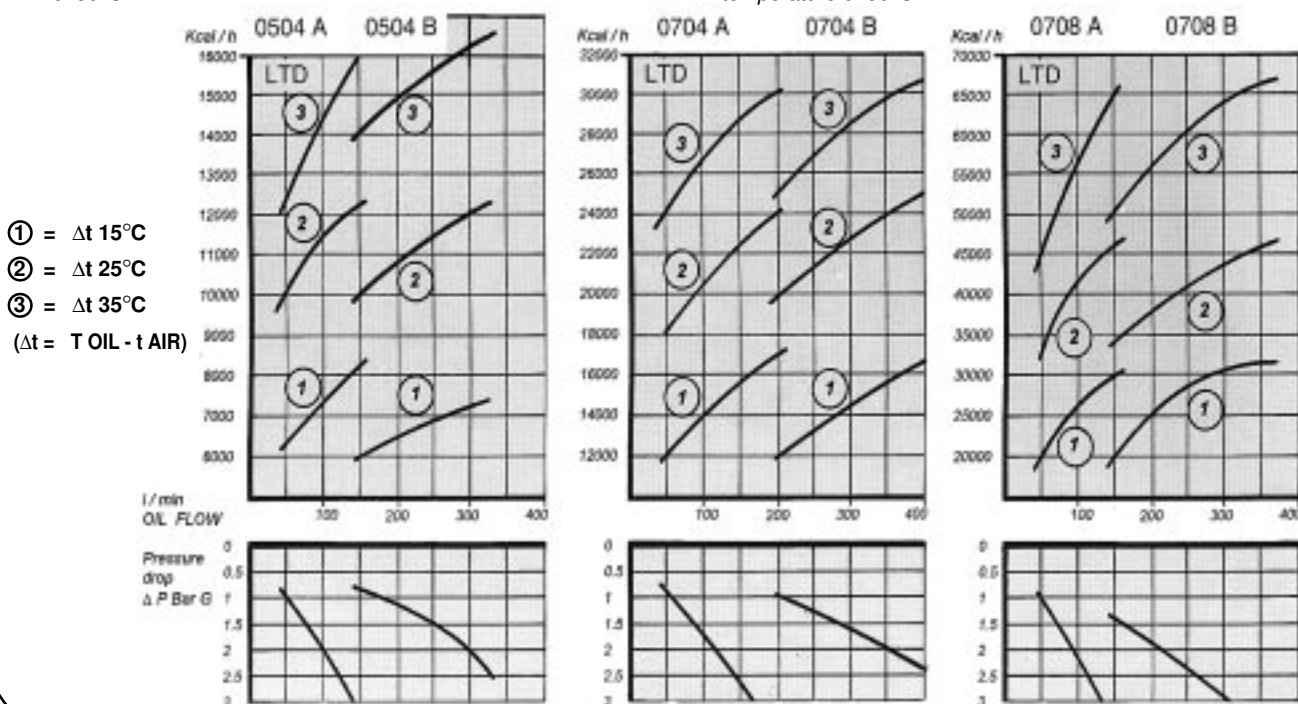
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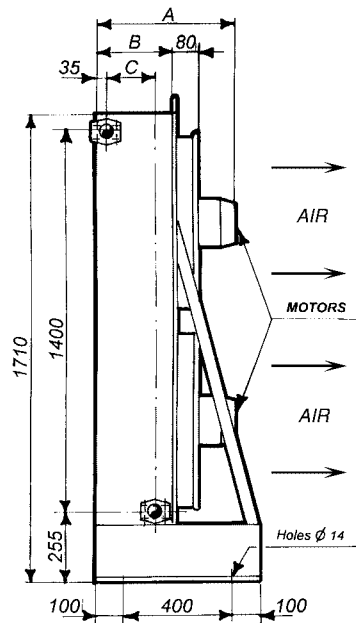
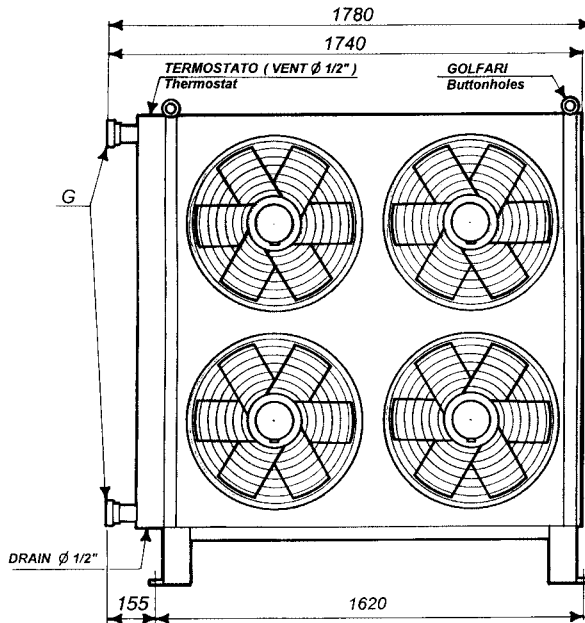
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**SCAMBIATORI AD ARIA  
ALTA POTENZIALITÀ**  
Aircoolers  
High duty



SCAMBIATORI  
HEAT EXCHANGERS



VERNICIATO -  
Painting = RAL 7381

VECCHIA SIGLA Old size	TAGLIA size	A	B	C	Ø G	MOTORE ELETTRICO electric motor
14.4	1404	400	190	65	2" SAE 3000 #	2 x 250W - 400V~ 3 Phase
14.8	1408	490	280	185	2" SAE 3000 #	2 x 730W - 400V~ 3 Phase

TEMP. PROGETTO	design temperatur.	°C	99
PRESS. PROGETTO	design pressure	Bar G	10
PRESSIONE PROVA	test pressure	Bar G	13
DATI DI PROGETTO	design data	U.M.	TUBES

**FLANGE OPZIONALI:** ANSI - UNI - GAS/F - GAS/M - NPT/F

**FLANGE OPTIONAL:** ANSI - UNI - GAS/F - GAS/M - NPT/F

**TERMOSTATI DISPONIBILI:** (CONTATTI N.A.)

TA: standard, protezione IP 44 taratura fissa 48°C +/- 12°C  
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**THERMOSTAT OPTIONAL:** (CONTACT N.O.)

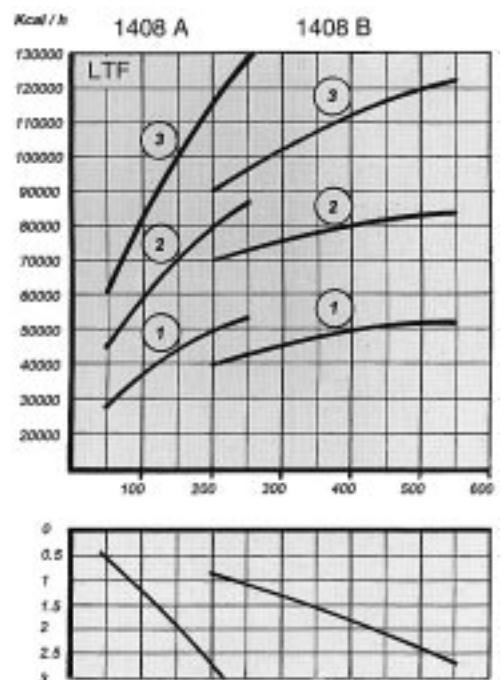
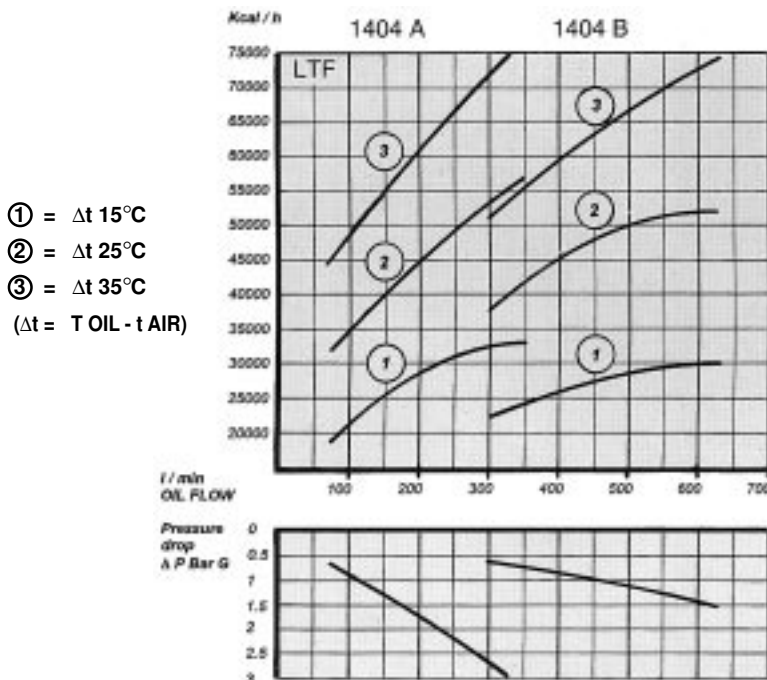
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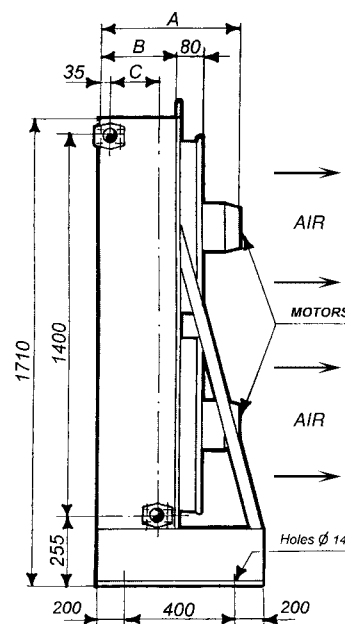
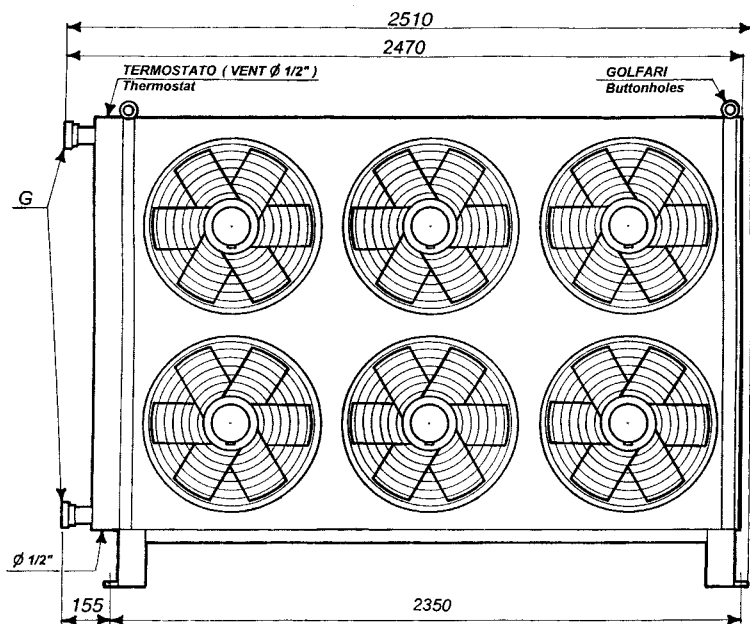


# SCAMBIATORI AD ARIA ALTA POTENZIALITÀ

Aircoolers  
High duty



SCAMBIATORI  
HEAT EXCHANGERS



VERNICIATO - Painting = RAL 7381

VECCHIA SIGLA Old size	TAGLIA size	A	B	C	Ø G	MOTORE ELETTRICO electric motor
14/21.4	2104	400	190	65	2" SAE 3000 #	6 x 250W - 400V~ 3 Phase
14/21.8	2108	490	280	185	2" SAE 3000 #	6 x 730W - 400V~ 3 Phase

TEMP. PROGETTO	design temperat.	°C	99
PRESS. PROGETTO	design pressure	Bar G	10
PRESSIONE PROVA	test pressure	Bar G	13
DATI DI PROGETTO	design data	U.M.	TUBES

**FLANGE OPZIONALI:** ANSI - UNI - GAS/F - GAS/M - NPT/F

**FLANGE OPTIONAL:** ANSI - UNI - GAS/F - GAS/M - NPT/F

**TERMOSTATI DISPONIBILI:** (CONTATTI N.A.)

TA: standard, protezione IP 44 taratura fissa 48°C +/- 12°C  
TB: opzionale, protezione IP 65 taratura fissa 48°C +/- 8°C

**THERMOSTAT OPTIONAL:** (CONTACT N.O.)

TA: standard type, protection IP 44 fixed range 48°C +/- 12°C  
TB: opzionale type, protection IP 65 fixed range 48°C +/- 8°C

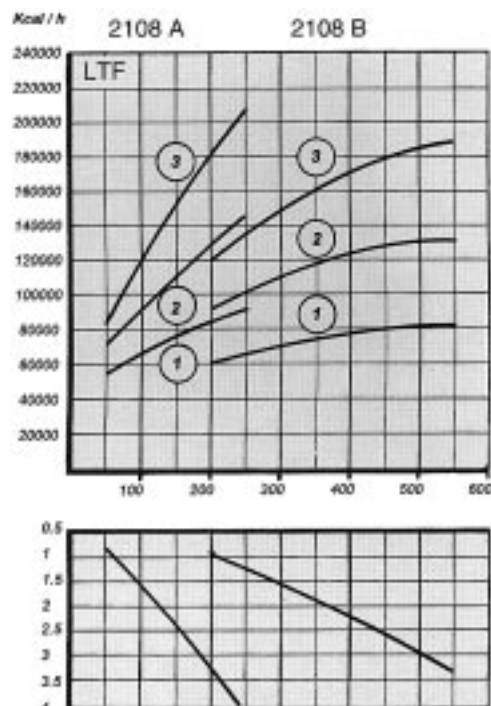
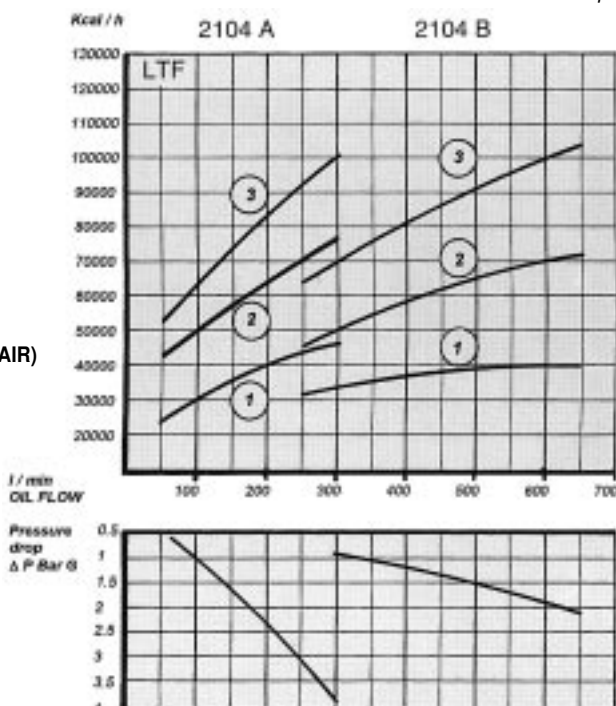
## DIAGRAMMI DI RENDIMENTO

Diagrammi validi per olio idraulico 4°E a 40°C alla temperatura di 50°C.

## HEAT TRANSFER CURVES

The curves are valides for hydraulic oil 4°E at 40°C at medium temperature of 50°C.

- ① = Δt 15°C
- ② = Δt 25°C
- ③ = Δt 35°C
- (Δt = T OIL - t AIR)



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# EM 1 E ST 1



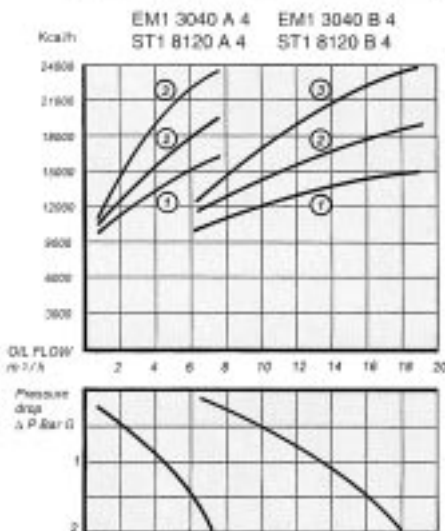
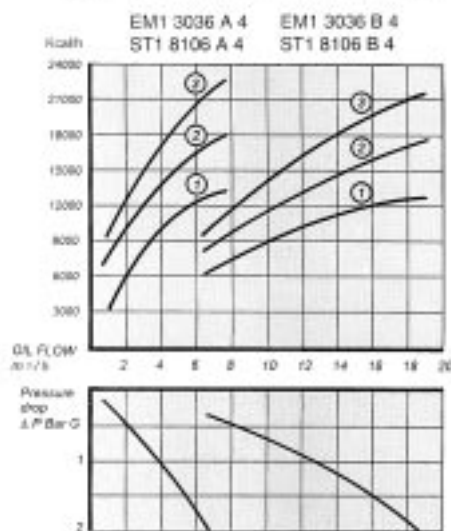
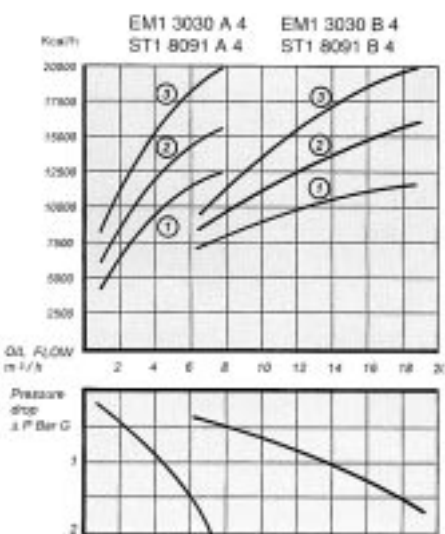
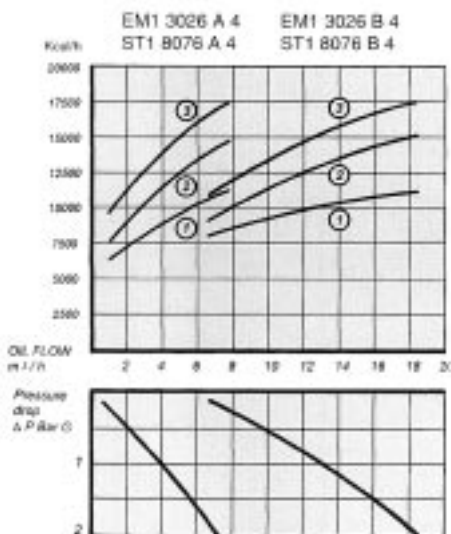
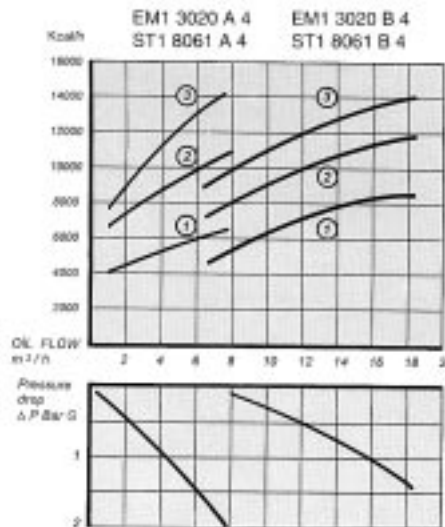
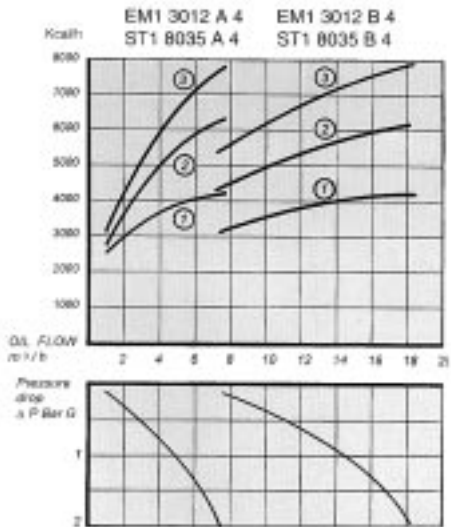
SCAMBIATORI  
HEAT EXCHANGERS

## PRESTAZIONI DEGLI SCAMBIATORI

tipo STANDARD tubi alettati

## PERFORMANCE HEAT EXCHANGER

STANDARD type finned tubes



### DIAGRAMMI DI RENDIMENTO

Diagrammi validi per olio idraulico ISO VG 46

Differenza di temperatura olio/acqua 25°C

### CONSUMO D'ACQUA

① = 0.5 m³/h    ② = 1.25 m³/h

③ = 2 m³/h

### FATTORE DI CORREZIONE

Per differenze di temperatura olio/acqua diverse da 25°C prima di leggere le curve occorre moltiplicare le kcal/h che si vogliono dissipare per il coefficiente in tabella.

TABELLA table	
Δt oil/water	Coefficient
15	1.4
20	1.2
25	1
30	0.8
35	0.6

### HEAT TRANSFER CURVES

The curves are valides for hydraulic oil ISO VG 46

Temperature difference oil/water 25°C

### WATER CONSUMPTION

① = 0.5 m³/h    ② = 1.25 m³/h

③ = 2 m³/h

### TEMPERATURE CORRECTION

For difference of temperature inbetween oil/water other then 25°C before see the curves multiply kcal/h with coefficient of correction table.

Dimensioni e caratteristiche non impegnative. Tolleranze secondo norme. - Dimensions and characteristics of the catalogue are subject to change without notice. Clearances according to international standards.



## PRESTAZIONI DEGLI SCAMBIATORI

tipo STANDARD tubi alettati

### DIAGRAMMI DI RENDIMENTO

Diagrammi validi per olio idraulico ISO VG 46  
Differenza di temperatura olio/acqua 25°C

### CONSUMO D'ACQUA

① = 2 m³/h    ② = 3 m³/h    ③ = 4 m³/h

### FATTORE DI CORREZIONE

Per differenze di temperatura olio/acqua diverse da 25°C prima di leggere le curve occorre moltiplicare le kcal/h che si vogliono dissipare per il coefficiente in tabella.

TABELLA table	
$\Delta t$ oil/water	Coefficient
15	1.4
20	1.2
25	1
30	0.8
35	0.6

## PERFORMANCE HEAT EXCHANGER

STANDARD type finned tubes

### HEAT TRANSFER CURVES

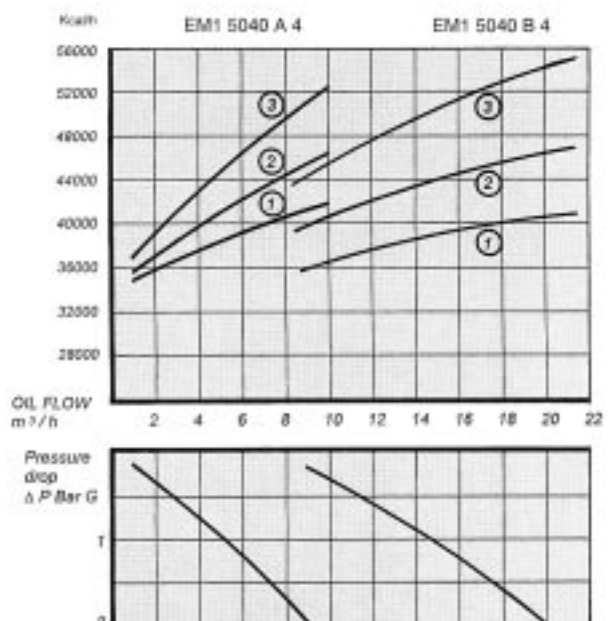
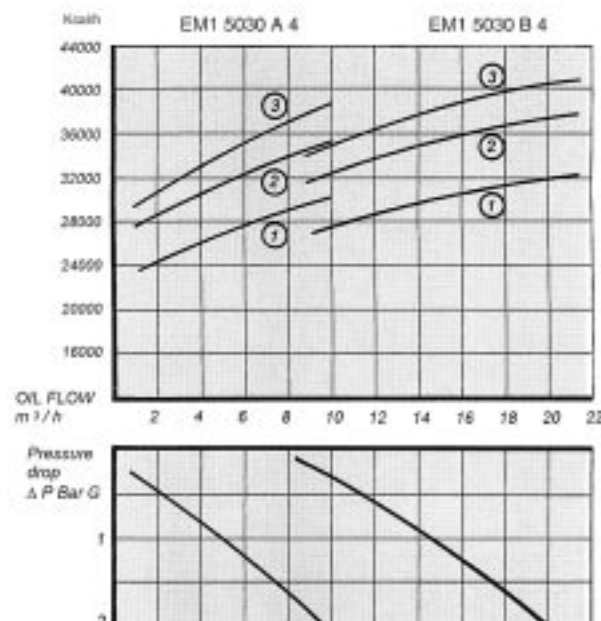
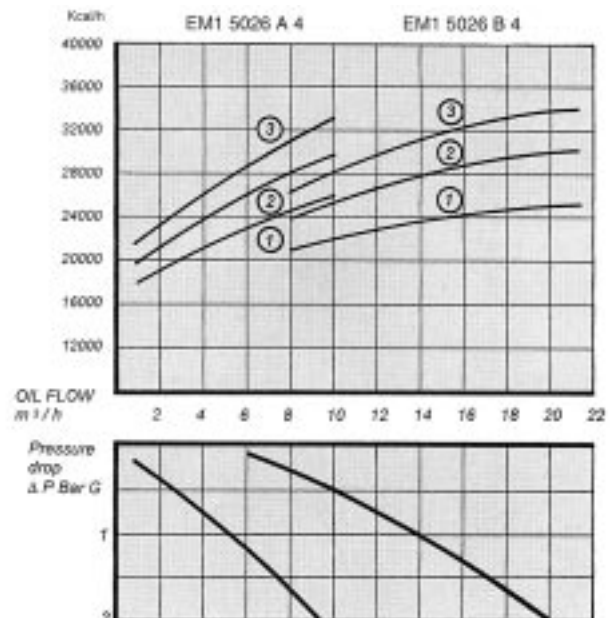
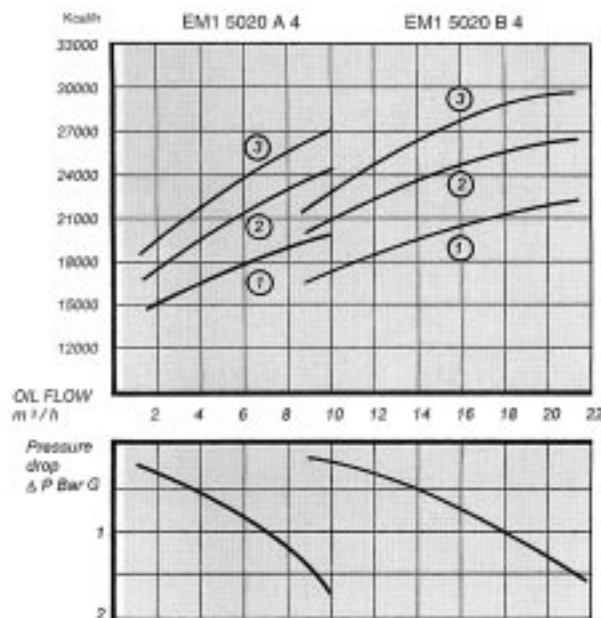
The curves are valides for hydraulic oil ISO VG 46  
Temperature difference oil/water 25°C

### WATER CONSUMPTION

① = 2 m³/h    ② = 3 m³/h    ③ = 4 m³/h

### TEMPERATURE CORRECTION

For difference of temperature inbetween oil/water other then 25°C before see the curves multiply kcal/h with coefficient of correction table.



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# EM 1



SCAMBIATORI  
HEAT EXCHANGERS

## PRESTAZIONI DEGLI SCAMBIATORI

tipo STANDARD tubi alettati

### DIAGRAMMI DI RENDIMENTO

Diagrammi validi per olio idraulico ISO VG 46  
Differenza di temperatura olio/acqua 25°C

### CONSUMO D'ACQUA

① = 2.5 m³/h    ② = 4 m³/h    ③ = 5.5 m³/h

### FATTORE DI CORREZIONE

Per differenze di temperatura olio/acqua diverse da 25°C prima di leggere le curve occorre moltiplicare le kcal/h che si vogliono dissipare per il coefficiente in tabella.

TABELLA table	
$\Delta t$ oil/water	Coefficient
15	1.4
20	1.2
25	1
30	0.8
35	0.6

## PERFORMANCE HEAT EXCHANGER

STANDARD type finned tubes

### HEAT TRANSFER CURVES

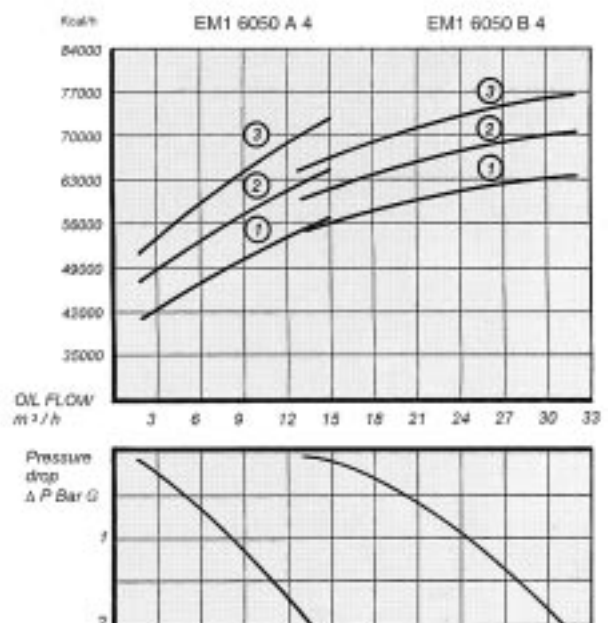
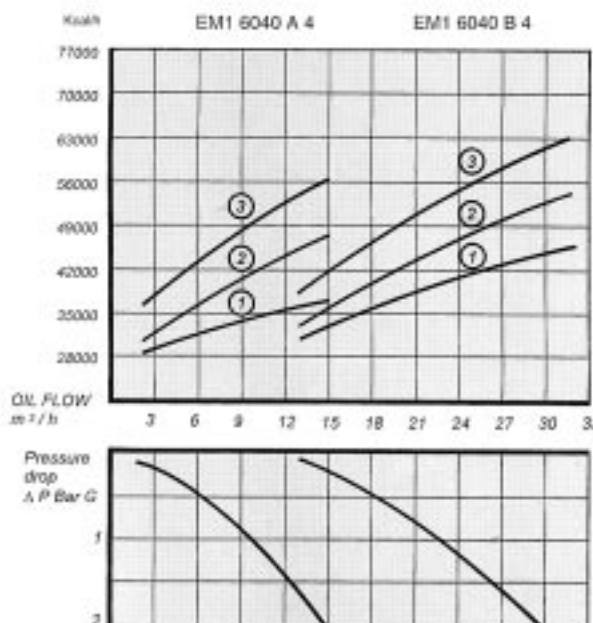
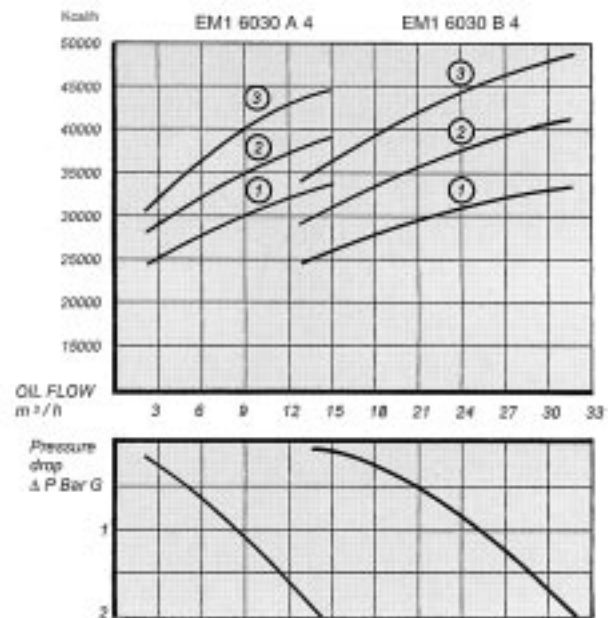
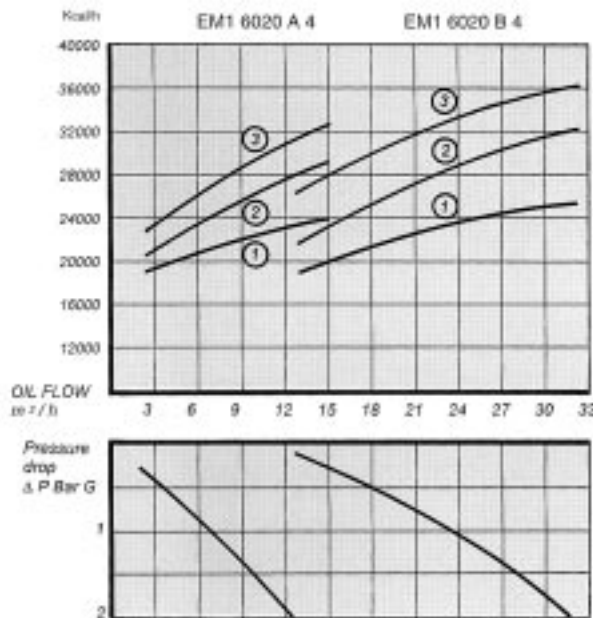
The curves are valides for hydraulic oil ISO VG 46  
Temperature difference oil/water 25°C

### WATER CONSUMPTION

① = 2.5 m³/h    ② = 4 m³/h    ③ = 5.5 m³/h

### TEMPERATURE CORRECTION

For difference of temperature inbetween oil/water other then 25°C before see the curves multiply kcal/h with coefficient of correction table.



Dimensioni e caratteristiche non impegnative. Tolleranze secondo norme. - Dimensions and characteristics of the catalogue are subject to change without notice. Clearances according to international standards.

## PRESTAZIONI DEGLI SCAMBIATORI

tipo STANDARD tubi alettati

### DIAGRAMMI DI RENDIMENTO

Diagrammi validi per olio idraulico ISO VG 46  
Differenza di temperatura olio/acqua 25°C

### CONSUMO D'ACQUA

- ① = 5 m³/h    ② = 6 m³/h    ③ = 7 m³/h  
④ = 8 m³/h    ⑤ = 9 m³/h    ⑥ = 10 m³/h  
⑦ = 11 m³/h    ⑧ = 12 m³/h

### FATTORE DI CORREZIONE

Per differenze di temperatura olio/acqua diverse da 25°C prima di leggere le curve occorre moltiplicare le kcal/h che si vogliono dissipare per il coefficiente in tabella.

TABELLA table	
$\Delta t$ oil/water	Coefficient
15	1.4
20	1.2
25	1
30	0.8
35	0.6

## PERFORMANCE HEAT EXCHANGER

STANDARD type finned tubes

### HEAT TRANSFER CURVES

The curves are valides for hydraulic oil ISO VG 46

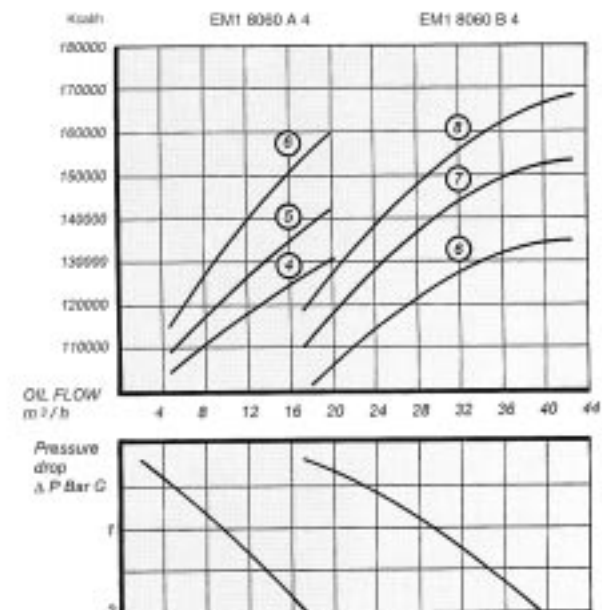
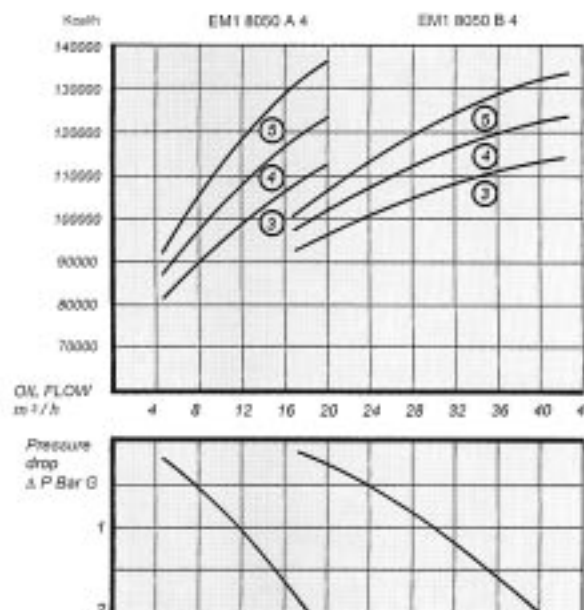
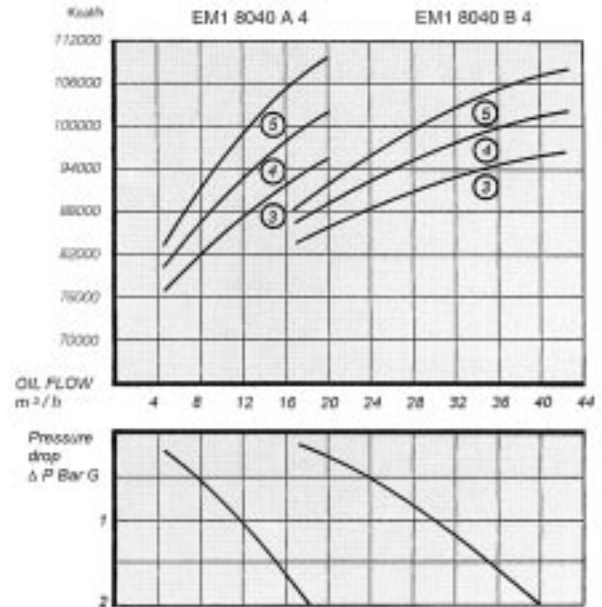
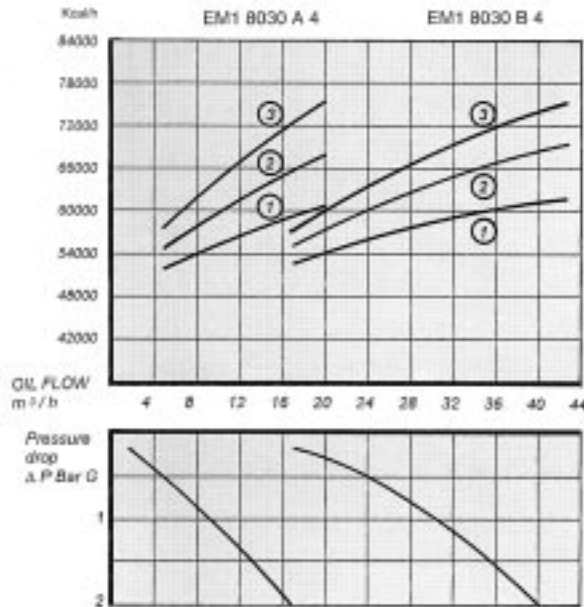
Temperature difference oil/water 25°C

### WATER CONSUMPTION

- ① = 5 m³/h    ② = 6 m³/h    ③ = 7 m³/h  
④ = 8 m³/h    ⑤ = 9 m³/h    ⑥ = 10 m³/h  
⑦ = 11 m³/h    ⑧ = 12 m³/h

### TEMPERATURE CORRECTION

For difference of temperature inbetween oil/water other then 25°C before see the curves multiply kcal/h with coefficient of correction table.



Dimensioni e caratteristiche non impegnative. Tolleranze secondo norme. - Dimensions and characteristics of the catalogue are subject to change without notice. Clearances according to international standards.

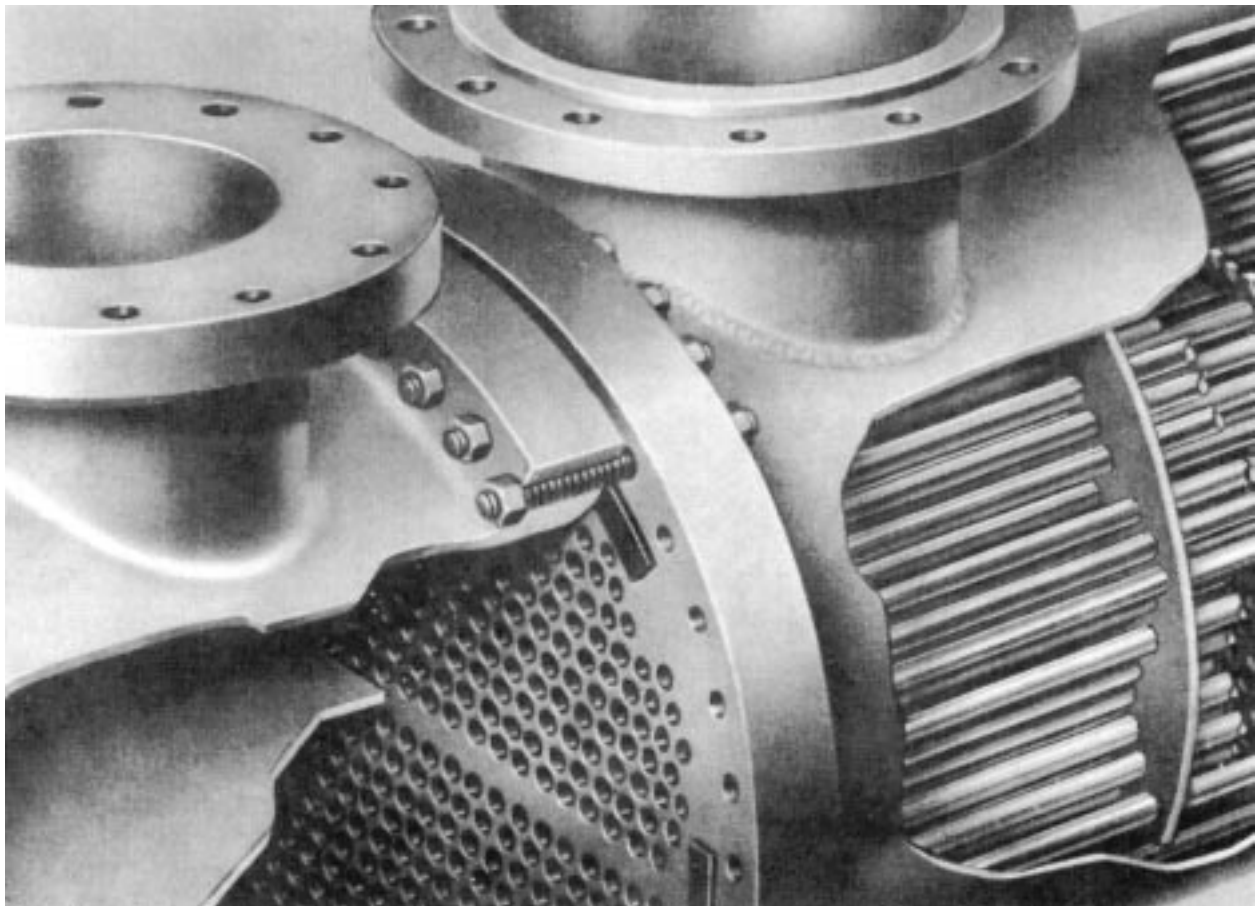
# **GENERAL INFORMATION OPERATING AND MAINTENANCE OF HEAT EXCHANGERS**

**SUCCESSFUL PERFORMANCE** of heat transfer equipment, length of service and freedom from operating difficulties are largely dependent upon:

1. Proper thermal design.
2. Proper physical design.
3. Manner of installation, including design of foundation and piping.
4. The method of operation.
5. The thoroughness and frequency of cleaning.
6. The materials, workmanship, and tools used in maintenance and making repairs and replacements.

**FAILURE TO PERFORM** properly may be due to one or more of the following:

1. Exchanger being dirty.
2. Operating conditions being different than design conditions.
3. Air or gas binding.
4. Incorrect piping connections.
5. Excessive clearance between baffles and shell due to corrosion.
6. Improper application.



### INSTALLATION PLANNING

1. On removable bundle heat exchangers provide sufficient clearance at the stationary end to permit the removal of the tube bundle from the shell. On the floating head end, provide space to permit removal of the shell cover and floating head cover.
2. On fixed bundle heat exchanger, provide sufficient clearance at one end to permit removal and replacement of tubes and at the other end sufficient clearance to permit tube rolling.
3. Provide valves and bypasses in the piping system so that both the shell side and tube side may be bypassed to permit isolation of the heat exchanger for inspection, cleaning and repairs.
4. Provide convenient means for frequent cleaning as suggested under maintenance.
5. Provide thermometer wells and pressure gauge Pipe taps in all piping to and from the heat exchanger located as close to the heat exchanger as possible.
6. Provide necessary air vent valves for the heat exchanger so that it can be purged to prevent or relieve vapor or gas binding on either the tube side or shell side.
7. Provide adequate supports for mounting the heat exchanger so that it will not settle and cause piping strains. Foundation bolts should be set accurately. In concrete footings, pipe sleeves at least one pipe size larger than the bolt diameter slipped over the bolt and cast in place are best for this purpose as they allow the bolt centers to be adjusted after the foundation has set.
8. Proper liquid level controls and relief valves and liquid level and temperature alarms, etc., should be installed.
9. Gauge glasses or liquid level alarms should be installed in all vapor or gas spaces to indicate any failure occurring in the condensate drain system and prevent flooding of the heat exchanger.
10. A surge drum should be installed upstream from the heat exchanger to guard against pulsation of fluids caused by pumps, compressors or other equipment.

11. Drain connections should not be piped to a common closed manifold so that it may be determined that the exchanger has been thoroughly drained.

### INSTALLATION AT JOBSITE

**CAUTION: Dress properly for the job. You may need any number of special items-safety hat, safety shoes, goggles, heavy gloves, ear protective devices, etc., for your own protection. Find out what items are required and wear them.**

1. On receipt of the heat exchanger at the jobsite, inspect for shipping damage to all protective covers. If damage is evident, inspect for possible contamination and replace protective covers as required. If damage is extensive, notify the carrier immediately.
2. Store under cover in a heated area, if possible.
3. If the heat exchanger must be stored for a period exceeding 30 days, precautions should be taken to prevent rusting or contamination. Following extended storage, it is suggested that the exchanger be thoroughly inspected prior to installation.
4. When installing, set heat exchanger level and square so that pipe connections can be made without forcing.
5. Before piping up, inspect all openings in the heat exchanger for foreign material. Remove all wooden Plugs, bags of desiccant and shipping covers immediately prior to installing. Do not expose internal passages at the heat exchanger to the atmosphere since moisture or harmful contaminants may enter the unit and cause severe damage to the system due to freezing and/or corrosion.
6. After piping is complete, if support cradles or feet are fixed to the heat exchanger, loosen foundation bolts at one end of the exchanger to allow free movement. Oversize holes in support cradles or feet are provided for this purpose.

7. If heat exchanger shell is equipped with a bellows type expansion joint, remove shipping supports per instructions.

### OPERATION

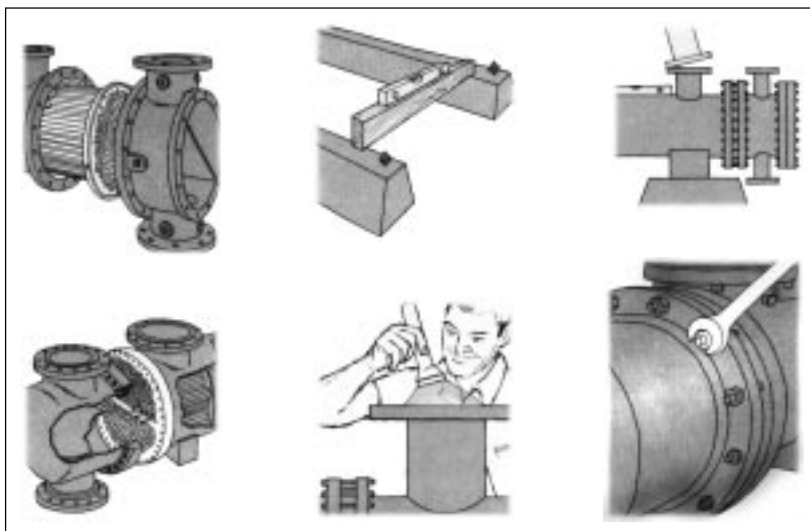
1. Be sure entire system is clean before starting operation to prevent plugging of tubes or shell side passages with refuse. The use of strainers or settling tanks in pipe lines leading to the heat exchanger is recommended.
2. Open vent connections before starting up.

**CAUTION: A heat exchanger is a pressure vessel designed for operation at certain specific limits of pressure and temperature. The cooling or process system, which includes the heat exchanger, must be safeguarded with safety valves and controls so that these heat exchanger design conditions are not exceeded. All operating personnel should be made aware of these specific design pressures and temperatures.**

3. Start operating gradually. See Table 1 for suggested startup and shutdown procedures for most applications. If in doubt, consult FLOVEX Technical office for specific instructions.
4. After the system is completely filled with the operating fluids and all air has been vented, close all manual vent connections.
5. Bolting on all gasketed or packed joints should be retightened after the heat exchanger has reached operating temperatures to prevent leaks and gasket failures.

**CAUTION: Many heat exchanger circulate fluids which are irritating or dangerous to the human system. These fluids could cause problems if bolted or threaded joints are not maintained in a leak-tight condition at operating pressures, temperatures and no-flow, ambient conditions. If fluids are not irritating or dangerous, a leak will at least cause a slippery situation on the floor below. Since one fluid the heat exchanger is at higher temperatures, any leaks might cause burns.**

6. Do not operate the heat exchanger under pressure and temperature conditions in excess at those specified on the name plate.
7. To guard against water hammer, condensate should be drained from steam heated exchangers and similar apparatus both when starting up and shutting down.
8. Drain all fluids when shutting down to eliminate possible freezing and corroding.
9. In all installations there should be no pulsation of fluids since this causes vibration and will result in reduced operating life.



**MAINTENANCE**

**CAUTION: Do not remove channel covers, shell covers, floating head covers or bonnets until all pressure in the heat exchanger has been relieved and both shell side and tube side are completely drained.**

1. Exchangers subject to fouling (scale, sludge deposits, etc.) should be cleaned periodically depending on specific conditions. A light sludge or scale coating on either side at the tube greatly reduces its effectiveness. A marked increase in pressure drop and/or reduction in performance usually indicates cleaning is necessary. Since the difficulty of cleaning increases rapidly as the scale thickens or deposits increase, the intervals between cleanings should not be excessive.
2. Neglecting to keep tubes clean may result in random tube plugging. Consequent overheating or cooling at the plugged tubes, as compared to surrounding tubes, will cause physical damage and leaking tubes due to differential thermal expansion of the metals.
3. To clean or inspect the inside at the tubes, remove only the necessary tube side channel covers or bonnets depending on type of exchanger construction.

**CAUTION: Since many of the removable components of the heat exchanger, particularly in the larger sizes, are too heavy for men to handle, care must be used to take this weight with proper rigging to avoid injury. Wear hard hats and safety shoes as required.**

4. If the heat exchanger is equipped with zinc wasting pencils or plates, replace these as required.
5. To clean or inspect the outside of the tubes, it may be necessary to remove the tube bundle. (Fixed tubesheet exchanger bundles are non-removable.)
6. Some suggested methods at cleaning either the shell side or tube side are listed below:
  - ...Circulating hot wash oil or light distillate through tube side or shell side will usually effectively remove sludge or similar soft deposits.
  - ...Soft salt deposits may be washed out by circulating hot fresh water.
  - ...Some commercial cleaning compounds such as "Oakite" or "Dowell" may be effective in removing the more stubborn deposits. Use in accordance with the manufacturer's instructions.

**CAUTION: When the heat exchanger is cleaned, it is important that full characteristics of the fouling material and care exercised in handling them according to instructions. Use eye protection to prevent damage to your eyes. Wear a respirator when required.**

7. If the heat exchanger has been in service for a considerable length at time without being removed, it may be necessary to use a jack on the floating tubesheet to break the bundle free.

...A good-sized steel bearing plate should be used with a filler board between the tubesheet face and bearing plate to protect the tube ends.

8. Tube bundles may be lifted horizontally by means of a cradle formed by bending a light-gauge plate or plates into a U shape. Attachments are made in the legs at the U for lifting.

9. Bundles should not be dragged since baffles or support plates may become easily bent. Any damage to baffles must be avoided so that the heat exchanger will function properly.

10. Following are safe loads for rods and eyebolts:

RODS			EYEBOLTS	
size tubes	size rods	safe load per rod	size	safe load
5/8"	3/8"	1,000 lbs	3/4"	4,000 lbs
3/4"	1/2"	2,000 lbs	1"	6,000 lbs
1" or larger	5/8"	3,000 lbs	1 1/4"	10,000 lbs
			1 1/2"	15,000 lbs

11. When removing tube bundles from heat exchangers for inspection or cleaning, care should be exercised to see that they are not damaged by improper handling.

...The weight of the tube bundle should not be supported on individual tubes but should be carried by the tubesheets, support or baffle plates or on blocks con-toured to the periphery of the tube bundles.

...Do not handle tube bundles with hooks or other tools which might damage tubes. Tube bundles should be moved about on cradles or skids.

...To withdraw tube bundles, it is recommended that rods be passed through two or more of the tubes and the load taken on the floating tubesheet.

...Rods should be threaded at both ends and provided with nuts and should pass through a steel bearing plate at each end of the bundle.

...A soft wood filler board should be inserted between the bearing plate and tubesheet face to prevent damage to the tube ends.

...Forged steel eyebolts should be screwed into both bearing plates for pulling and lifting.

...As an alternate to the rods, a steel cable can be threaded through one tube and returned through another tube.

...A hardwood spreader block must be inserted between the cable and the floating tubesheet to prevent damage to the tube ends.

12. Do not attempt to clean tubes by blowing steam through individual tubes. This overheats the individual tube and results in severe expansion strains and leaking tube to tubesheet joints.

**CAUTION: Do not blow out heat exchangers with air when the normal process fluids or the cleaning fluids being handled are inflammable.**

13. To locate ruptured or corroded tubes or leaking joints between tubes and tube sheets, the following procedure is recommended;

...Remove tube side channel covers or bonnets.

...Pressurize the shell side of the exchanger with a cold liquid, preferably water.

...Observe tube joints and tube ends for indication of test fluid leakage.

14. With certain styles of exchangers, it will be necessary to buy or make a test ring to seal off the space between the floating tubesheet and shell inside diameter to apply the test in paragraph 13. Consult your nearest sales representative for reference drawings showing installation of a test ring in your heat exchanger.

15. To tighten a leaking tube joint, use a suitable parallel roller tube expander.

...Do not roll tube beyond the back face of the tubesheet. Maximum rolling depth should be tubesheet thickness minus 1/8".

...Do not re-roll tubes which are not leaking since this needlessly thins the tube wall.

16. It is recommended that when a heat exchanger is dismantled, new gaskets be used in reassembly.

...Composition gaskets become brittle and dried out in service and do not provide an effective seal when reused.

...Metal or metal jacketed gaskets in initial compression match the contact surfaces and tend to work harden and cannot be recompressed on reuse.

17. Use of new bolting in conformance with dimensions and ASTM specifications of the original design is recommended where frequent dismantling is encountered.

# GENERAL INFORMATION OPERATING AND MAINTENANCE OF HEAT EXCHANGERS

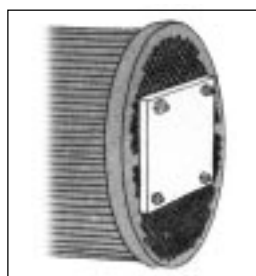
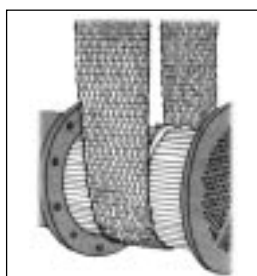
**TABLE 1**  
**RECOMMENDED START-UP AND SHUT-DOWN PROCEDURES**

Caution: Every effort should be made to avoid subjecting the unit to thermal shock, overpressure and/or hydraulic hammer, since these conditions may impose stresses that exceed the mechanical strength of the unit or the system in which it is installed which may result in leaks and/or other damage to the unit and/or system.

Heat Exchanger Type of Construction	Fluid Location & relative Temp.				Start-Up Procedure	Shut-Down Procedure		
	Shell side		Tube side					
	Type of Fluid	Rel. Temp.	Type of Fluid	Rel. Temp.				
<b>Fixed Tubesheet (Non removable) Bundle</b>	Liquid	Hot	Liquid	Cold	Start both fluids gradually at the same time	Shut down both fluids gradually at the same time		
	Condensing Gas (i.e. Steam)		Liquid or Gas				Start hot fluid first, then hot fluid	Shut down cold fluid first, then hot fluid
	Gas		Liquid					
	Liquid	Cold	Gas	Hot	Start both flows gradually at the same time	Shut down both fluids gradually at the same time		
<b>U-Tube Packed Floating Head Packed Floating Tubesheet Internal Floating Heat (All these types have Removable Bundles)</b>	Liquid	Hot	Liquid	Cold	Start cold fluid first, then start hot fluid gradually	Shut down hot fluid first, then cold fluid		
	Condensing Gas (i.e. Steam)		Liquid or Gas				Shut down cold fluid first, then shut down hot fluid gradually	
	Gas		Liquid					
	Liquid	Cold	Gas	Hot			Shut down hot fluid first, then cold fluid	

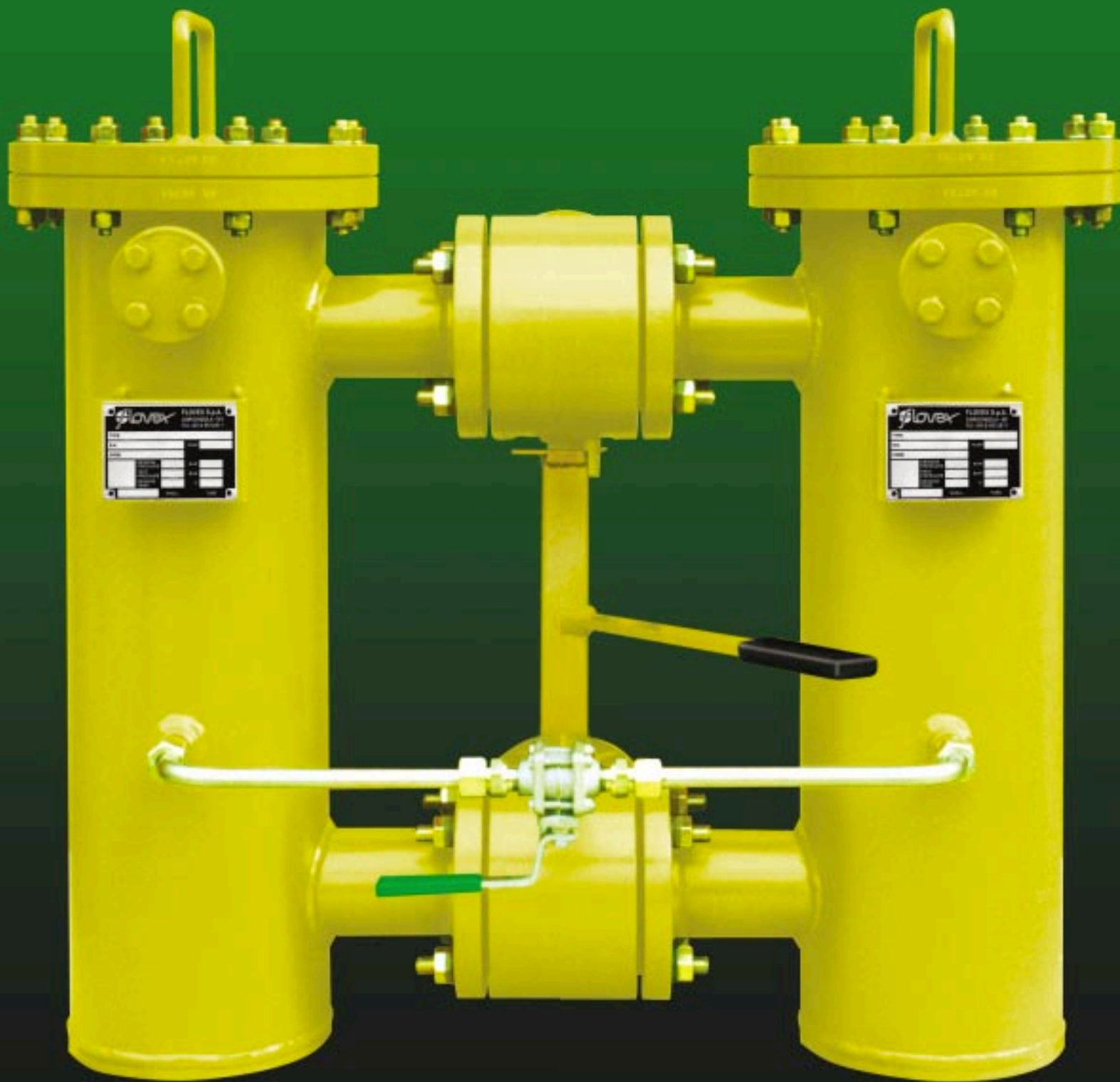
**General Comments:**

- 1) In all start-up and shut-down operations, fluid flows should be regulated so as to avoid thermal shocking the unit regardless of whether the unit is of either a removable or non-removable type construction.
- 2) For fixed tubesheet (non-removable bundle) type units where the tube side fluid cannot be shut down, it is recommended that (1) A bypass arrangement be incorporated in the system, and (2) The tube side fluid be bypassed before the shell side fluid is shut down.



*Filtri per olio*

*Lube oil filters*



**FLOVEX**

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E-mail: flo@flovex.it - www.flovex.it



**AZIENDA CON SISTEMA QUALITÀ  
CERTIFICATO DA DNV  
= UNI EN ISO 9001 =**



Fin dalla sua fondazione, 1977, la Flovex ha operato con professionalità nel campo degli scambiatori di calore per oleodinamica e lubrificazione.

Nel mondo stanno funzionando più di 100.000 impianti con scambiatori Flovex.

Una forte tendenza a seguire le richieste del mercato e dei clienti ha permesso a Flovex di espandersi durante gli anni sia in Italia che in numerosi Paesi europei distinguendosi per la sua alta qualità (ISO 9001) e la certificazione ASME (U-STAMP).

La medesima qualità è stata posta nella progettazione e costruzione della nuova linea FILTRI per olio DUPLEX e singoli.

Il nostro standard di costruzione è in accordo ad ASME VIII DIV. 1 ed API 614.

Vengono normalmente impiegati acciaio al carbonio ed acciaio inossidabile nei vari gradi richiesti.

Tutti gli apparecchi vengono collaudati secondo il nostro sistema di qualità ISO 9001. Secondo le normative e le esigenze necessarie si eseguono anche collaudi con Enti riconosciuti come LL.RR., B.V., DNV,... e la stampigliatura U-STAMP.

La Flovex utilizza cartucce filtro dei più qualificati costruttori per rispettare i valori di filtrazione richiesti.

*Since its foundation, 1977, Flovex has been operating with authority in the field of heat exchangers lubrication systems.*

*More than 100.000 implants are working in the world with our heat exchangers.*

*A strong orientation of the market and of the customer requirements has allowed Flovex to expand over the years both on the national territory and in many European countries with a continuous track record of high quality (ISO 9001) and certification ASME (U-STAMP).*

*The same quality was used in projecting and constructing the new family of DUPLEX or single FILTERS for oil.*

*Our standard of construction is according to ASME VIII Div. 1 and API 614 codes.*

*Carbon steel and stainless steel are the materials usually used.*

*All the manufactures are tested according to our quality system ISO 9001.*

*According to the codes and necessities even tests by LL.RR., B.V., DNV,... and U-STAMP are done.*

*Flovex uses cartridges of the most qualified factories to respect the values of filtration requested.*

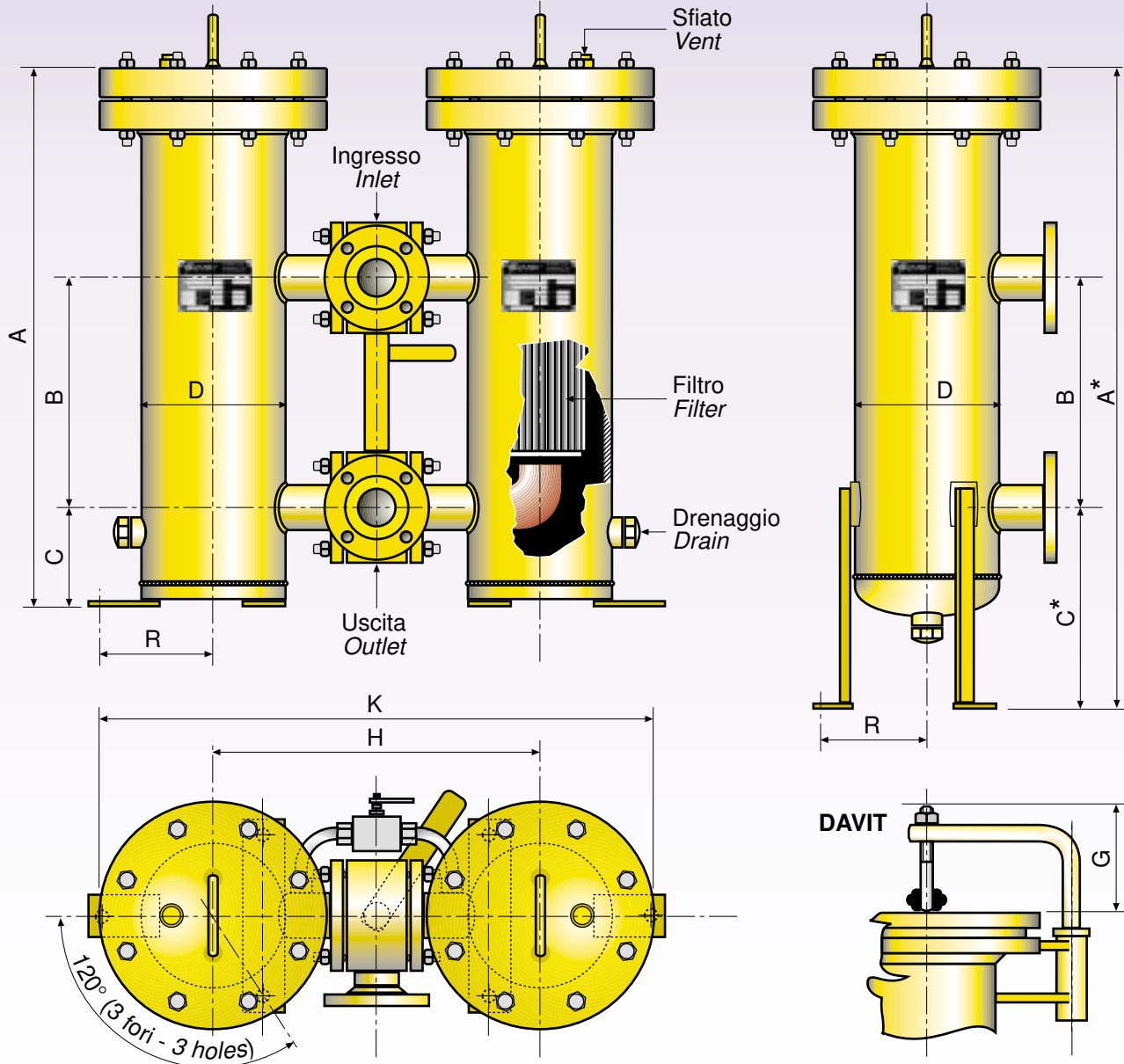


ASME



Corpo con basamento - Base type

Corpo con piede - Foot type



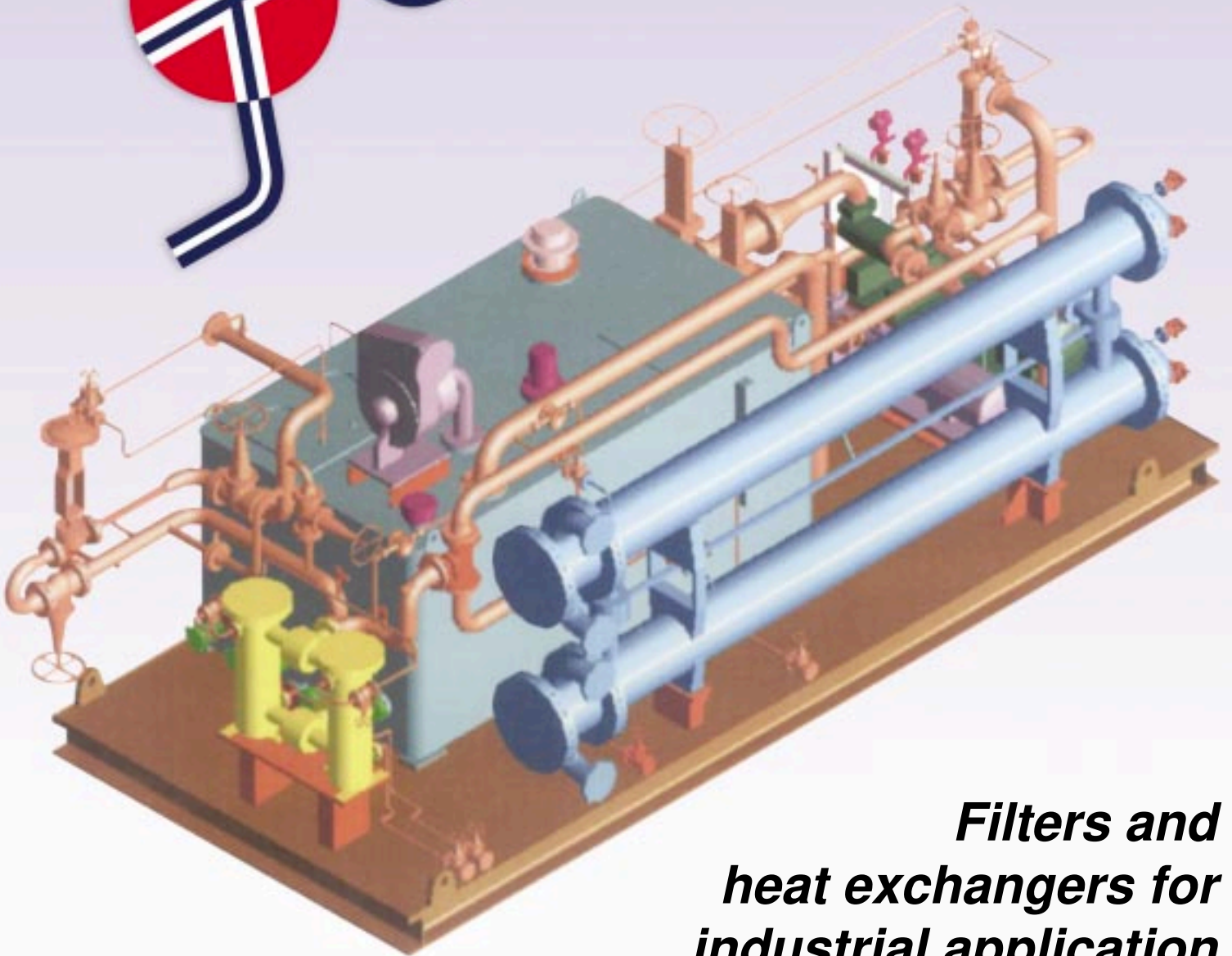
TAGLIA size	IN / OUT	Portata max Max flow lt/min	A	A*	B	C	C*	D	H	K	R	G
DFX 0410	1 1/2"	230	675	900	330	140	365	141	476	680	100	-
DFX 0820	2	380	770	1020	330	140	390	219	492	800	150	-
DFX 0830	3	840	995	1245	350	140	390	219	522	830	150	-
DFX 1240	4	1480	1105	1455	400	185	535	323	715	1135	230	50
DFX 1260	6	2700	1160	1510	600	185	535	323	827	1250	230	50
DFX 1680	8	4500	1175	1555	600	210	590	406	820	1330	260	50

- Portata max di olio tipo ISO VG32
- Codice di costruzione: ASME VIII Div. 1 - API 614
- Esecuzione flangiata a 3 vie con sfera in acciaio inox
- Sfiati e drenaggio: Ø 1/2" NPT-F
- Tubazione di by-pass Ø 1/2" con valvola
- Sistema DAVIT secondo codice

- Max flowrate of oil ISO VG32 type
- Construction code: ASME VIII Div. 1 - API 614
- 3 way flanged execution with int. boll 316 in stainl. steel
- Vent & drain: Ø 1/2" NPT-F
- By-pass tubing Ø 1/2" with bool valve
- DAVIT system according code



***Filtri e  
scambiatori di calore  
per impieghi industriali***



***Filters and  
heat exchangers for  
industrial application***

***FLOVEX***

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