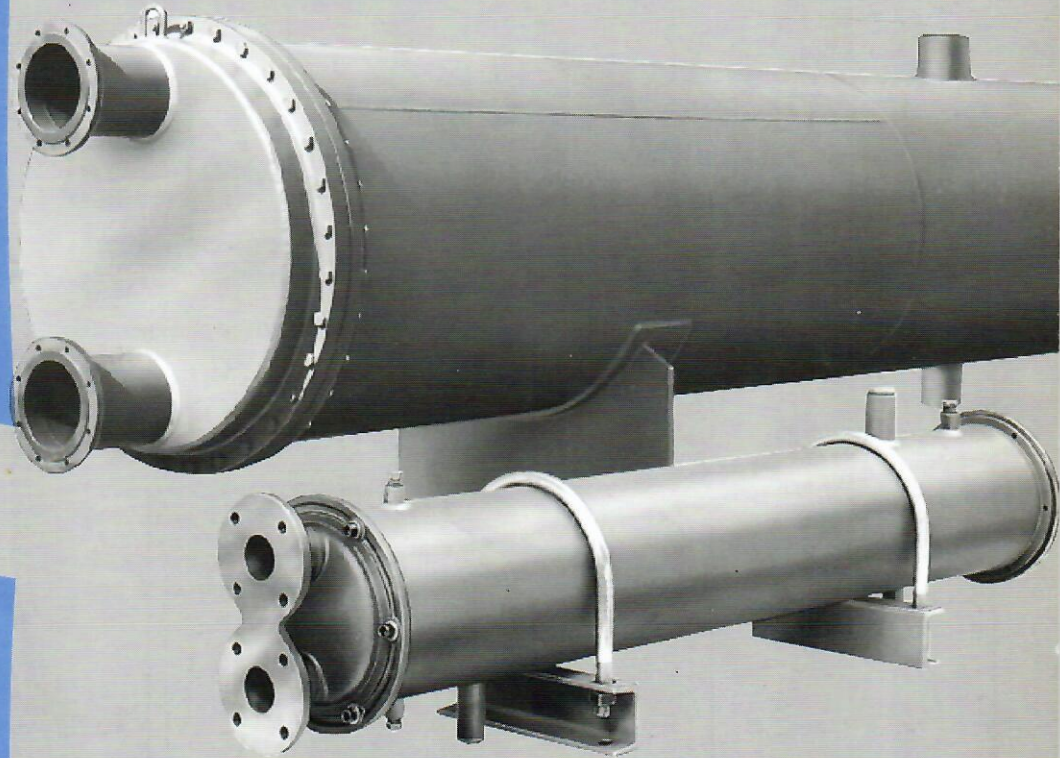


- H(C)FC models HBX, HBX-V, HC, HD and HE
- Ammonia condensers HBN and HN
- Selection programme available on request

# *Water Cooled* **Condensers**

*Models HBX, HBX-V, HC, HD, HE, HBN and HN*



**HELPMAN**



ISO-9001 CERTIFICATED FIRM

## Water Cooled Condensers

### Quality control

#### Strength

Strength calculations for the shell side do meet the requirements of AD Merkbblätter .

The condensers are pressure tested refrigerant side at 30 bar.

#### Control on dehydration

The shell side is blown through with dry compressed air and dehydrated by evacuation. The vacuum dryness test is based on a stable pressure of 10 mbar maintained for 30 minutes.

#### Quality assurance

Quality assurance is based on ISO 9001.

Dimensions of the condensers are in accordance with the tolerance class of DIN 2800 8-E .

Factory certificates and production reports are available on request at an extra cost.

#### Construction and testing authorities

Condensers can be supplied in accordance with the rules of :

- Stoomwezen
- TÜV
- DNV
- Germanischer Lloyd
- Lloyd's R.o.S.
- Bureau Veritas
- A.B.o.S.

The above rules may require modification of construction details, therefore delivery on request only.

### Operating Conditions

Unless otherwise indicated Helpman water cooled condensers are designed according to the following operating conditions.

	Operating temperature		Operating pressure	
	max. °C	min. °C	bar max. ≤14"	bar max. >14"
refr. side	+ 100	0	23	
water side	+ 50	1	4	2

Danger for freezing up (f.i. when blowing off refrigerant) to be avoided.

Application outside the above mentioned areas on request .

### Enquiries

It is essential that the following details are given when ordering or making enquiries

- Type of refrigerant
- Duty kW
- Condensing temperature °C
- Water inlet temperature °C
- Water outlet temperature °C or waterflow m<sup>3</sup>/h
- Fouling factor or type of water (sea water, river water etc.)
- Size of refrigerant connections and dimensions (if required).

### Finish

Condensers are dehydrated on refrigerant side and provided with a charge of protection gas.

Outside of condenser is blasted (quality SA 2½) and finished with primer.

### More information

For more information on the use of water cooled condensers we refer to our leaflet Nr. T-06-30-001 (General guidelines for the use of water cooled condensers).

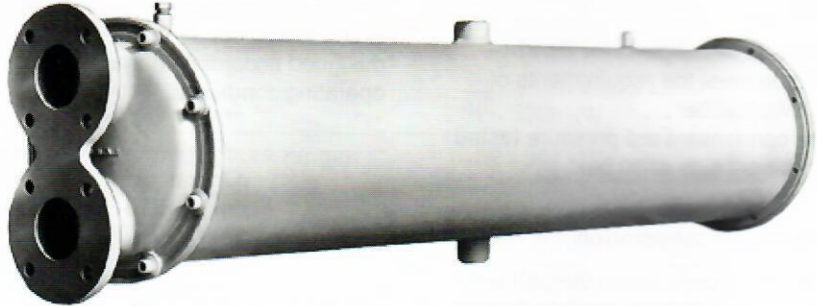
## Water Cooled Condensers

# HBX

### Model indication

**Example :** HBX 10 - 185 - 2 ASG

- HBX** : Water cooled condenser with HP-tubes  $\varnothing$ 18.9 mm
- 10** : Shell diameter code
- 185** : Effective length of tubes in cm (Nom. length)
- 2** : Number of passes
- A** : Tube material code
- S** : Tube plate material code
- G** : End cover material code



### General information

Water cooled condensers type HBX form an extensive standard series for both land and marine installations.

There are 13 shell diameters available in 9 standard lengths. The condensers are suitable for all halocarbon refrigerants.

Due to application of High Performance finned tubes (HP-tubes) a high duty can be reached within small dimensions.

Duty range : 32 - 5266 kW (10 K lmtd).

For construction and testing authorities see page 3.

### Design

#### Shell

Seamless steel tube for smaller condensers (up to HBX 22).

For HBX 24 and HBX 28 welded shell, material P265 GH acc. to EN 10028-2

#### Tube plates

Two different types of tube plates are standard available:

- S** P265 GH acc. to EN 10028-2 for land installations and non-corrosive cooling water.
- I** Cupro-Aluminium for sea water, brackish water and corrosive cooling water.

Cupro-Alum. is an Cu-Al-Ni-Mn-Fe alloy. It contains no Zinc. This alloy offers, for above application, an excellent protection against corrosion and cavitation.

The holes in the tube plates are double grooved to give a better resistance against thermal tension.

#### Tubes

For the tubes there are 3 different standard options :

- A** Aluminium-Brass HP finned tubes
- C** Cupro-Nickel 90/10 HP finned tubes
- K** SF Copper HP finned tubes

Outside diameter of tubes  $\varnothing$ 18.9 mm. The tubes have plain ends  $\varnothing$ 19 mm. Tube wall according to TEMA (1988). The tubes are rolled into the tube plate.

# Water Cooled Condensers

# HBX

## End covers

Flanges according to :

DIN 2631 - for HBX 6 - HBX 22,  
DIN 2632 - for HBX 24 and HBX 28.

Waterflow and return connections are always on one cover with drain and purge connections on the opposite end cover.

Covers for 2 and 4 passes can be supplied in 3 types :

- G** - Cast iron,
- P** - Plastified cast iron,
- B** - Bronze.  
HBX 24 and 28 in bronze only and only 2-pass.

Covers fixed to flanges on tube plate, (see detail drawing page 7), with high grade steel socket head bolts and sealed with O-rings.

## Support plates

Intermediate supporting plates are mounted in the shell if necessary to prevent tube vibration.

## Refrigerant connections

Combined soldering / welding stubs, blanked off.

## Accessories

Standard with 2 refrigerant connections without valves.  
Valves, level glasses, counter flanges can be supplied as an extra.

Supports also can be mounted as an extra.

## Other material combinations

On request other materials than the above mentioned can be selected for end covers, shell, tube plates and tubes.

## Max. Waterflow m<sup>3</sup>/h

Type	2 pass.	4 pass.
HBX 6	9.4	4.7
HBX 7	14.1	7.05
HBX 8	23.5	11.75
HBX 10	40.0	20.0
HBX 12	49.4	24.7
HBX 13	61.2	30.6
HBX 14	84.7	42.35
HBX 16	112.9	56.45
HBX 18	136.4	68.2
HBX 20	174.0	87.0
HBX 22	214.0	107.0
HBX 24	272.8	—
HBX 28	392.7	—

## Duty kW (Imtd = 10 K)

Type	Duty
HBX 6 - 100	32
HBX 7 - 150	70
HBX 8 - 150	118
HBX 10 - 185	251
HBX 12 - 225	380
HBX 13 - 225	471
HBX 14 - 260	761
HBX 16 - 260	1015
HBX 18 - 300	1424
HBX 20 - 335	2002
HBX 22 - 375	2870
HBX 24 - 375	3658
HBX 28 - 375	5266

## Nominal Duty

The nominal duty is based on following conditions:

Refrigerant: R 22

Maximum waterflow

Fouling factor:  $0.86 \times 10^{-4} \text{ m}^2\text{K/W}$

Imtd: 10 K

Water tubes: Aluminium-Brass

## Water Cooled Condensers

HBX

## Dimensions (mm)

## Cast iron end covers (G/P)

Type	2 passes						4 passes						tubes		kg	kg/m	dm <sup>3</sup> /m
	d	D	A	B	E	F	A	B	C	E	F	numb.	m <sup>2</sup> /m	M			
HBX- 6	159	204	30	85	123	32	30	75	32	103	25	16	2.7	15	30	5	
HBX- 7	168	223	35	90	133	40	35	90	32	123	32	24	4.1	20	38	7	
HBX- 8	219	266	40	100	143	50	40	100	40	133	40	40	6.8	30	62	12	
HBX-10	267	316	50	105	163	65	50	105	50	143	50	68	11.6	40	92	21	
HBX-12	298	353	55	125	193	80	50	115	60	163	65	84	14.3	50	115	26	
HBX-13	324	379	60	125	193	80	60	115	60	163	65	104	17.7	60	135	32	
HBX-14	368	423	65	135	213	100	65	135	70	193	80	144	24.5	75	180	44	
HBX-16	419	481	75	140	243	125	75	140	75	193	80	192	32.6	100	245	59	
HBX-18	457	521	80	150	243	125	80	150	85	213	100	232	39.4	125	285	71	
HBX-20	508	578	90	160	268	150	90	160	98	213	100	296	50.3	165	360	91	
HBX-22	559	631	180	255	268	150	100	170	110	243	125	364	61.9	270	450	112	

## Bronze end covers (B)

HBX- 6	159	202	45	95	123	32	45	90	25	103	25	16	2.7	16	30	5
HBX- 7	168	221	50	100	133	40	50	100	32	123	32	24	4.1	22	38	7
HBX- 8	219	262	60	100	143	50	40	100	40	133	40	40	6.8	32	62	12
HBX-10	267	312	80	125	163	65	50	105	50	143	50	68	11.6	48	92	21
HBX-12	298	350	90	140	193	80	55	115	60	163	65	84	14.3	63	115	26
HBX-13	324	376	100	160	193	80	60	115	60	163	65	104	17.7	72	135	32
HBX-14	368	420	115	175	213	100	65	135	70	193	80	144	24.5	93	180	44
HBX-16	419	476	130	195	243	125	75	140	75	193	80	192	32.6	125	245	59
HBX-18	457	516	150	215	243	125	80	150	85	213	100	232	39.4	160	285	71
HBX-20	508	574	175	250	268	150	90	160	98	213	100	296	50.3	220	360	91
HBX-22	559	624	180	255	268	150	100	170	110	243	125	364	61.9	270	450	112
HBX-24	610	682	205	280	318	175						464	78.9	340	500	130
HBX-28	720	800	240	325	344	200						668	113.6	450	685	170

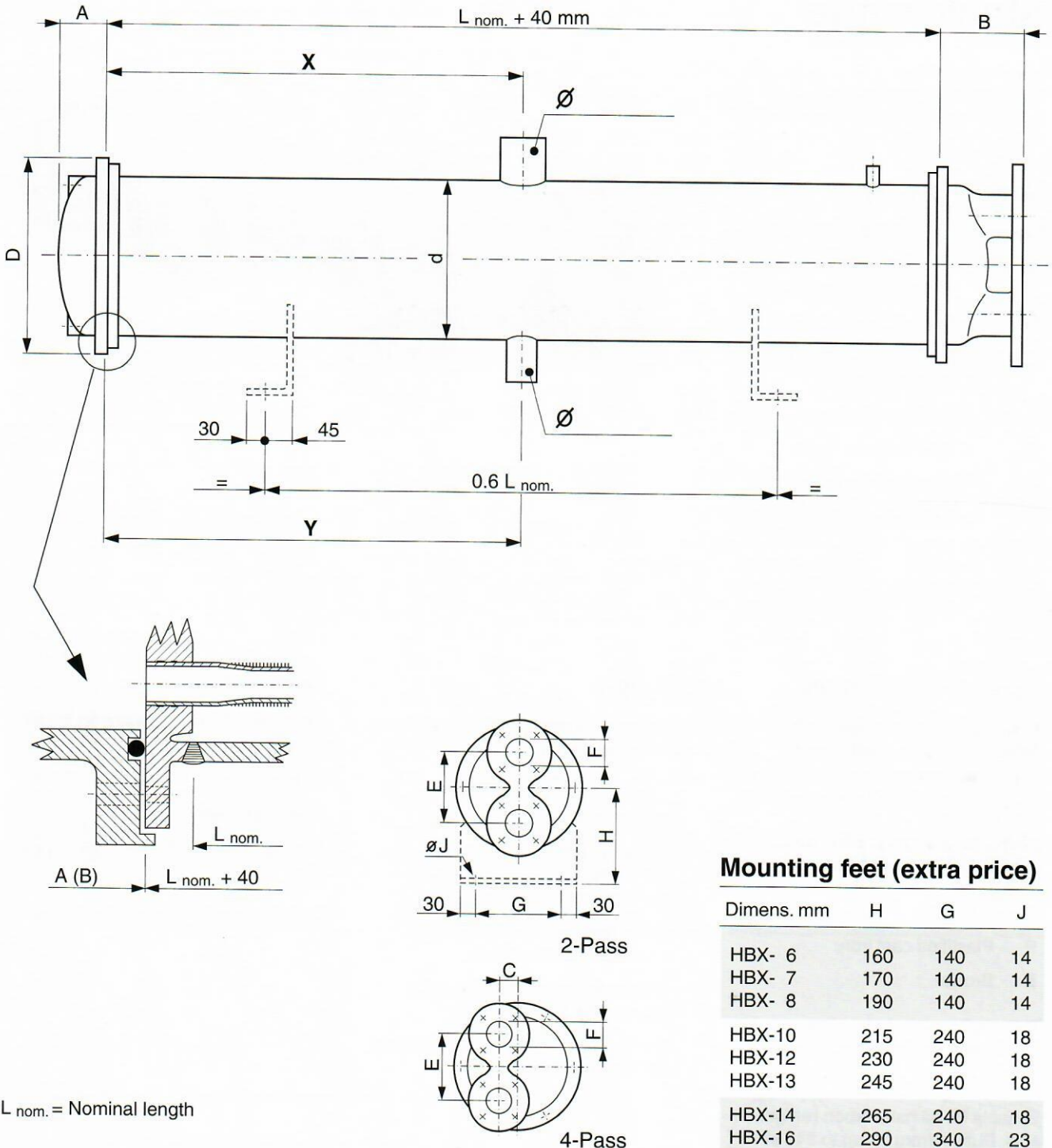
M Weight of both ends (kg)

N Weight of shell with tubes (kg/m)

V Pump down capacity (dm<sup>3</sup>/m)Pump down capacities are based on 70 %  
of the tubes below the liquid level.

Water Cooled Condensers

HBX



$L_{nom.}$  = Nominal length

The following details are to be given when ordering :

Dimensions  $X$  and  $Y$ , and the size of the refrigerant connections.

Mounting feet (extra price)

Dimens. mm	H	G	J
HBX- 6	160	140	14
HBX- 7	170	140	14
HBX- 8	190	140	14
HBX-10	215	240	18
HBX-12	230	240	18
HBX-13	245	240	18
HBX-14	265	240	18
HBX-16	290	340	23
HBX-18	310	340	23
HBX-20	335	340	23
HBX-22	360	340	23
HBX-24	385	340	23
HBX-28	440	390	27