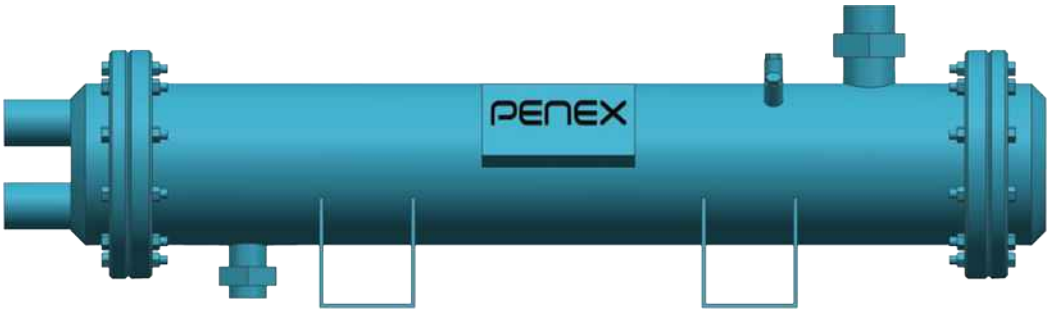
PENEX®
expert cooling

WATER COOLED
SHELL & TUBE
CONDENSERS



FUTURE OF ENERGY

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One product series, many applications

The water cooled shell and tube condensers from PENEX have been a standard in refrigeration and air conditioning technology for 15 years due to their well- known reliability and performance. The PHCD series consists of two designs and thus meets the requirements of a wide variety of applications. The unique brazing process between tubes and tube sheets ensures excellent vibration stability and high safety in terms of tight-ness.

Standard design for normal water

The heat exchanger tubes are characterised by high material thickness; This series is suitable for all types of coolants that do not attack copper.

Discharge gas desuperheaters

Construction sizes are also avail-able in the standard design for normal water as discharge gas desuperheaters. All that is required is to order the optional second refrigerant outlet.

Denomination

PHCD	1	-	32
Product line	**Number of circuits**		**Cooling Capacity In TR**
	1=1 Circuit 2=2 Circuit		05=5 TR 10=10 TR

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CONSTRUCTION FEATURES

For all common refrigerants and coolants

Refrigerant side

- Finned high performance tubes
- Refrigerant connections: pipe thread or flange
- inlet
- outlet Shut-off valve(optional)
- various adaptor and valve combinations optional
- Discharge gas desuperheater special version:
- Connection for second refrigerant outlet
- Connection for pressure relief valve
- internal thread : 3/8 NPT
- external thread ¼ NPT
- various adaptors optional

Materials

- Heat exchanger tubes
- standard design: Copper
- seawater resistant design: copper-nickel 90/10 (optional)
- Shells: carbon steel seamless
- Tube sheets : mild steel & s s (3 0 4) ss (3 1 6 L) o p t i o n a l
- Coolant reversing covers: mild steel

Protective charge

- 0,2 .. 0,5 bar nitrogen(optional)

Strong construction for easy maintenance

- High safety in terms of tightness:
- Heat exchanger tubes are expanded into tube sheets.
- Easy to clean: Both coolant reversing covers can be removed.
- Flexible: Coolant reversing covers of connection and
- reversing end are exchangeable.
- Fixing brackets
- Fixing brackets at the bottom for stable installation
- Fitting fixing plates and fixing rails optionally available.

Coolant side

- Tubes with low-fouling profile inside
- Coolant connections: pipe thread or flange
- Coolant drain
- Additional vent plug(optional)

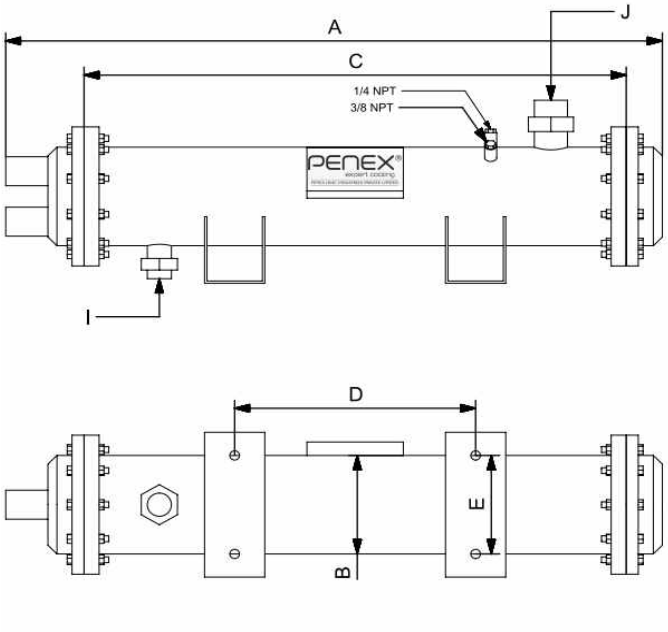
PERFORMANCE DATA / TECHNICAL DATA

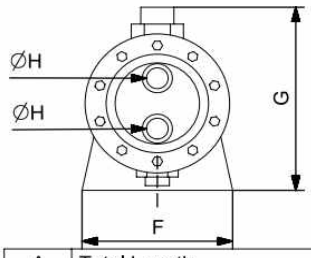
Model No.	Condenser Capacity kW	Condenser Capacity TR	Normal Coolant Flow Rate m^3/Hr	Design Pressur (Shell Side) PSI	Pressure Drop (Approx.) Kg 0.5-1.5	Gas	Weight (Approx.) Kg
PHCD 1-05	17.55	5	3.75	400		R407c	65
PHCD 1-08	28.08	8	6	400		R407c	68
PHCD 1-10	35.1	10	7.5	400		R407c	76
PHCD 1-12	42.12	12	9	400		R407c	115
PHCD 1-15	52.65	15	11.25	400		R407c	127
PHCD 1-20	70.2	20	15	400		R407c	163
PHCD 1-25	87.75	25	18.75	400		R407c	170
PHCD 1-30	105.3	30	22.5	400		R407c	216
PHCD 1-35	122.85	35	24.5	400		R407c	223
PHCD 1-40	140.4	40	30	400		R407c	230
PHCD 1-50	175.5	50	37.5	400		R407c	317
PHCD 1-60	210.6	60	45	400		R407c	330
PHCD 1-70	245.7	70	52.5	400		R407c	360
PHCD 1-80	280.8	80	60	400		R407c	460
PHCD 1-100	351	100	75	400		R407c	490

- **1** The performance data are based on: Refrigerant: R407c
- **2** Pass
- Refrigerant inlet temperature: 90°C
- Fouling factor on the refrigerant side: 0.00004 m^2K/W
- **Standard design**
- Condensing temperature: 40°C
- Coolant inlet temperature: 29°C
- **Seawater resistant design**
- Condensing temperature: 35°C
- Coolant inlet temperature: 25°C
- The condenser capacity is strongly influenced by system operating conditions.
- These specifications take into account a maximum flow velocity of 2.0 m/s for the seawater resistant design.
- This is necessary for this design to protect the tube profile from wear.

GENERAL DIMENSIONS

Water Cooled Condenser Approx. Dimensions





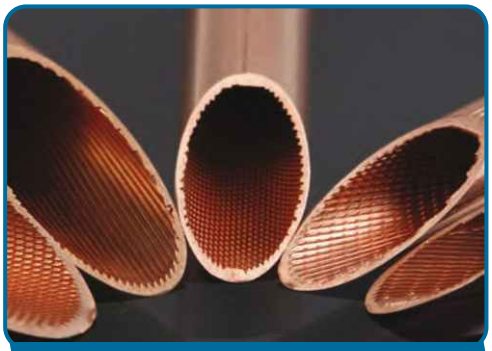
A	Total Length
B	Shell Diameter
C	Tube Sheet To Tube sheet
D	Stand Hole To Hole Distance
E	Single Stand hole To Hole Distance
F	Stand Total Length
G	Total Height
H	Water Connection
I	Refrigerant Outlet
J	Refrigerant Inlate

Approx. Dimensions

PHCD Model	A mm	B mm	C mm	D mm	E mm	F mm	G mm	H inch	I mm	J mm
PHCD 1-05	1045	141	890	441	180	228	290	1	19	19
PHCD 1-08	1350	168	1190	650	180	255	315	1.5	19	19
PHCD 1-10	1350	168	1190	650	180	255	315	1.5	19	23
PHCD 1-12	1700	168	1510	900	180	255	315	1.5	23	28
PHCD 1-15	1700	168	1510	900	180	255	315	1.5	23	28
PHCD 1-20	1700	220	1510	900	225	304	365	2	23	35
PHCD 1-25	1700	220	1510	900	225	304	365	2	23	35
PHCD 1-30	1700	273	1510	900	280	355	420	2.5	28	41
PHCD 1-35	2610	220	2420	1825	225	304	365	2.5	28	41
PHCD 1-40	2610	220	2420	1825	225	304	365	2.5	28	41
PHCD 1-50	2610	273	2420	1825	280	355	420	3	28	41
PHCD 1-60	2670	323	2420	1825	326	406	540	3	35	54
PHCD 1-70	2670	323	2420	1825	326	406	540	4	35	54
PHCD 1-80	3575	323	3034	1965	326	406	540	4	41	54
PHCD 1-100	3575	355	3034	1965	381	457	565	4	41	54

Seamless Shell Pipe
Thickness : 6 - 8 mm

Tube Sheet
Thickness : 35-50 mm



Copper Internally Finned Tubes with 75 internal ridges of 0.3 mm groove depth at helix angle of 18 degrees

Copper Condenser Fin Tubes outer fins of 42 FPI with cross knurling, plain ID

Copper Tube Standards

Phosphorus Deoxidized Copper (DLP)	**Standard**	SB - 75, 111, 359, 395	BS 2871	JIS H 3300	DIN 1787	IS: 1545
	Symbol	C - 12000	C 106	C 1201	SW-CU 25	Cu-DLP
Phosphorus Deoxidized Copper (DHP)	**Standard**	SB - 68, 75, 111, 280, 355, 395, 819	BS 2871	JIS H 3300	DIN 1787	IS:2501, 10773, 14810
	Symbol	C - 12000	C 106	C 1220	C 1220	Cu-DHP
Toudh Pithc Copper (ETP)	**Standard**	ASTM B-188	BS 2871	JIS H 3300	DIN 1787	IS: 2501
	Symbol	C - 11000	C 101	C 1100	ECU 58	Cu-ETP

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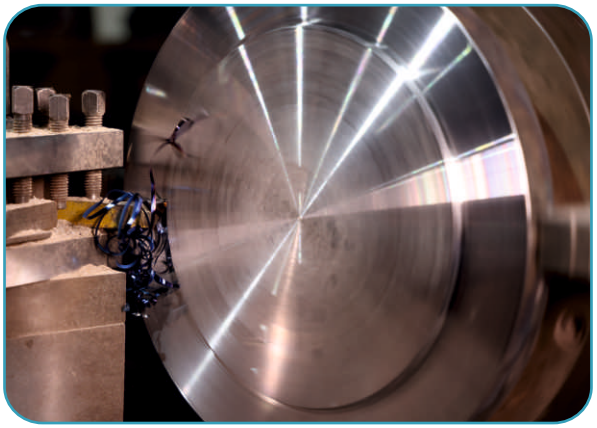
MANUFACTURING LINE TO FINISH GOODS





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