

CT
Stage pumps

STAGE PUMPS CT

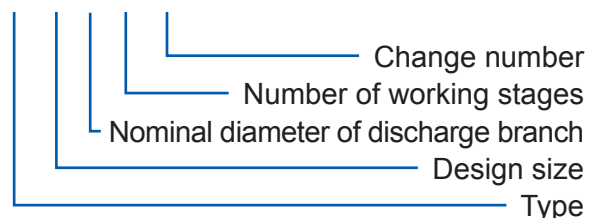
APPLICATION

CT pumps are supplemental alternative to feedwater multistage pumps of lower parameters. The pumps are designed for heating industry, power generation and chemical industry. The pumped water has to be clean without any abrasive particles.

DESIGNATION

Example of designation:

CTD-3-65-6-000



DESCRIPTION

Horizontal multistage centrifugal pump. The pump impeller is of radial design, the first stage is equipped with a special impeller for NPSH value increase. CT pumps are divided into two groups. The first group is called CTA featuring axial inlet, the latter group is called CTD featuring radial inlet. Pump pressure parts are manufactured from cast steel and sealed with „O“ wearing rings. Due to different surfaces of rear and front impellers disc, an axial force occurs, effecting the rotor towards pump suction. To absorb this force, the rotor is equipped with a balancing disc.

TECHNICAL DATA

Pump size	DN 40 - DN 150
Flow (Q)	max. 58 l.s ⁻¹
Head (H)	max. 1220 m
Media temperature	max. 180°C
Speed	max. 3600 min ⁻¹

MATERIAL VERSIONS

Pozice	Název	Material
106	Suction casing	1.4008 + QT
107	Discharge casing	1.4008 + QT
108	Stage casing	1.4008 + QT
210	Shaft	1.4313 + QT
230	Impeller	1.4008 + QT
231	Suction impeller	1.4008 + QT
350	Bearing casing	EN-GJL-250
441	Sealing casing	1.4008 + QT
502	Wearing ring	3346.9
601	Balancing disc	3347.9
602	Seating desk	3346.9
905	Connecting screw	1.8159+QT
920	Nut of connecting screw	1.0501

PUMP UNIT

The pump may be driven by electric motor, steam turbine or diesel engine directly, or via gearbox. The pump unit may be placed on a common base frame (designation FE) or the pump and the drive may be placed on separate base frames (designation F/2). The delivery may include base frame bolts (chemical anchors), couplings with covers connecting the pump with the drive (gearbox, turbine). The pump may be as well delivered separately without base frame (transport frame only), for example as a spare pump.

PUMP TECHNICAL SERVICE LIFE

The designed pump service life is 120 000 operation hours including 3-4 general overhauls. The actual service life depends on many operational factors that may extend or shorten it. An important factor for achieving long service life is correct operation and maintenance of the pump following manufacturer's instructi-

ons. Within the pump warranty period, any interventions into the pump shall be made only upon written permission of the manufacturer or under presence of manufacturer's representatives.

DIAGNOSTICS

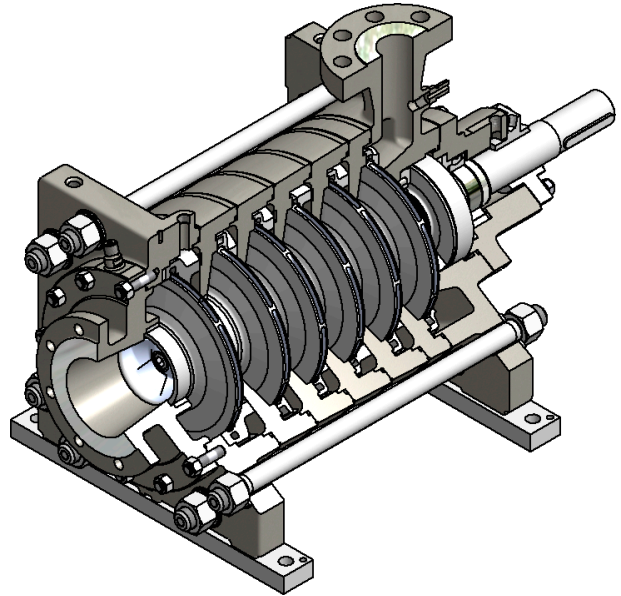
For pumps pressure measuring on suction and discharge, default equipment consists of indicating manometers. As an option, upon customer's request, the pumps may be delivered with transmitter pressure sensors with the possibility of remote reading of unified current signal. More, it is possible to add pressure measuring device behind the balancing disc.

For temperature measuring, CTD pumps are in default equipped with thermocouples on bearing console in order to measure journal bearing temperature. More, the thermocouples enable measuring of pumped media temperature on discharge, respectively other measurements as well.

Upon customer's request it is possible to install vibration sensors.

CTA VERSION

Multi-stage, axial inlet design pump, equipped with ceramic bearings and one mechanic seal. The pumped media temperature shall not exceed 120°C.



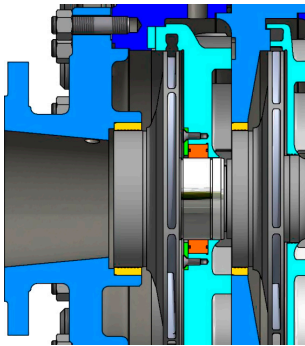
MECHANICAL SEAL

Inside CTA pump there is only one mechanical seal used on the drive (discharge) side. For the sealing itself a seal following API plan 02 is used.

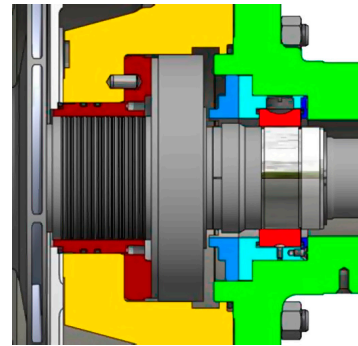
BEARINGS (JOURNAL)

The CTA pump rotor is laid in two plain journal bearings of segment design made from SiC material. The bearing is lubricated by pumped media, which makes it environmentally friendly with no risk of oil pollution. Five bearing segments made together solid plain bearing. In order to keep necessary pressure conditions for appropriate bearing operation function on hot water, the front bearing is located behind the first impeller. Sufficient pressure in rear bearing, located behind the balancing drum, is ensured through connection of conversion piping into first pressure stage.

BEARINGS, DIMENSIONS

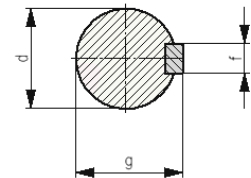
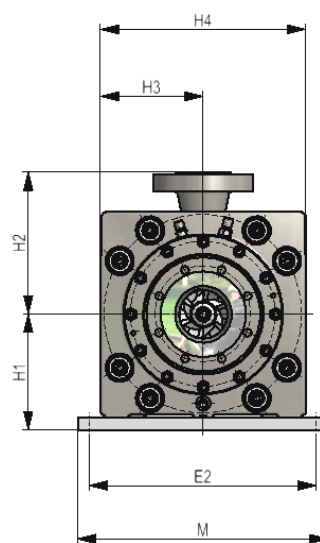
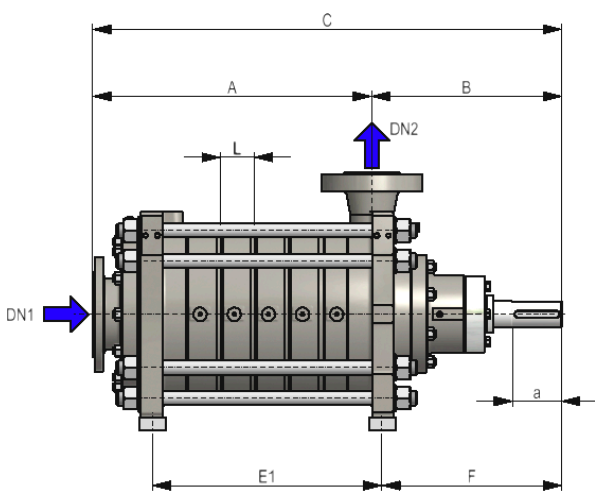


Segment journal bearing – pump suction side



Balancing device (disc-plate), segment journal bearing – pump discharge side

	St max.		DN 1	DN 2	A*	B	C*	E1	E2	F	H1	H2	H3	H4	M	L	a	d	f	g	m1 (kg)	m (kg)**
	50Hz	60Hz																				
CTA 1.1	16	14	80	40	338	340	678	420	420	320	215	260	190	380	460	63	80	40	12	43,1	25	268
CTA 2.1	15	11	125	40	354	375	729	290	500	350	255	310	225	450	550	70	110	45	14	48,5	36	296
CTA 3.1	11	8	125	65	380	412	792	287	500	390	255	310	225	450	550	75	110	50	18	53,5	50	330
CTA 4.1	10	7	125	65	372	412	784	200	590	390	255	310	225	450	550	70	110	55	16	58,5	82	413
CTA 5.1	8	6	150	80	475	510	985	540	600	500	380	420	310	620	840	95	120	60	18	64,2	95	1000
CTA 6.1	7	5	150	100	490	510	1000	535	595	500	380	420	310	620	840	95	120	65	18	69,2	98	1100



St max. – max. number of pump stages at given frequencies

L – width of one pump stage

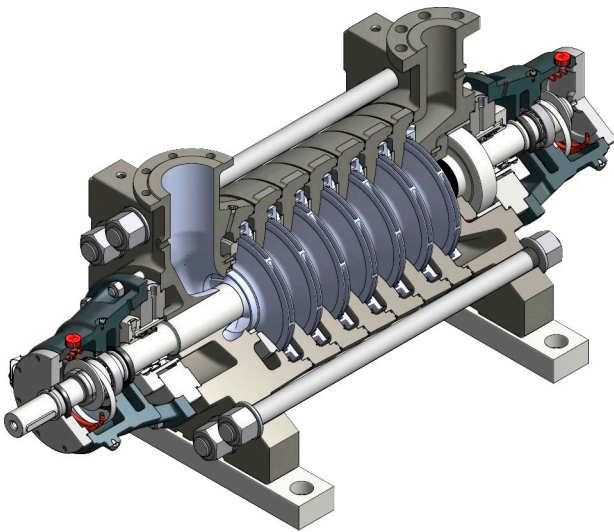
m1 – weight of one pump stage

* – length of three-stage pump

** – weight of three-stage pump

CTD VERSION

Horizontal, multistage, radial inlet design pump. Suction branch position 0°, 90°, 270°. If not cooled, it is possible to pump liquids with temperature up to 140°C. If cooled, the temperature limit is 180°C. The pump is equipped with two mechanical seals.



MECHANICAL SEAL

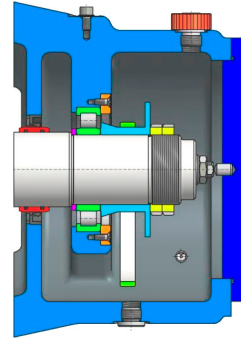
Seals following API plan 02 are used. When pumping liquids of higher temperature than 140°C, the seal is cooled by water from external source (cooling water temperature max. 30°C, pressure 0,3 MPa). Other types of seals may be used if required by operational conditions.

BEARINGS (JOURNAL)

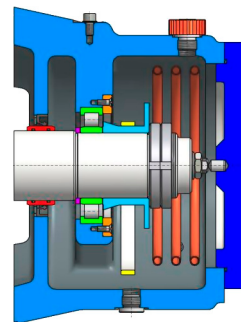
The pump rotor is laid in roller or plain bearings. In case of pumping liquids of higher temperatures, the bearings are cooled from an external source. The bearings are lubricated through stable oil fill with automatic refilling with the help of throw ring.

Types of used bearings:

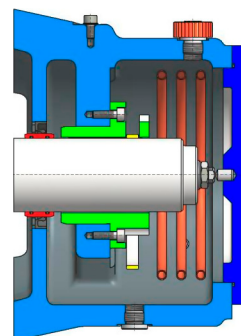
ROLLING NON-COOLED (lubricated with throw ring)



ROLLING COOLED (lubricated with throw ring)

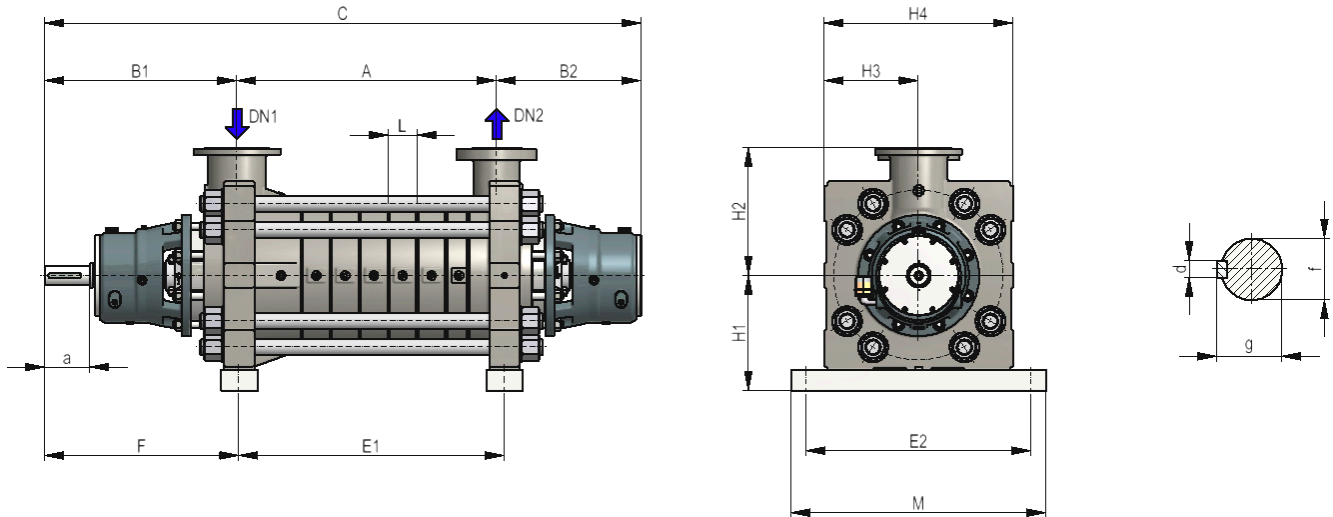


PLAIN COOLED (lubricated with throw ring)



DIMENSIONS

	St max.		DN 1	DN 2	A*	B1	B2	C*	E1	E2	F	H1	H2	H3	H4	M	L	a	d	f	g	m1 (kg)	m (kg)**
	50Hz	60Hz																					
CTD 1.1	16	14	65	40	270	450	375	1095	245	420	495	215	260	190	380	460	63	80	40	12	43,1	25	316
CTD 2.1	15	11	80	40	300	450	375	1125	290	500	538	255	310	225	450	550	70	80	45	14	48,5	36	350
CTD 3.1	11	8	80	65	313	490	386	1189	287	500	539	255	310	225	450	550	75	110	50	18	53,5	50	461
CTD 4.1	10	7	80	65	300	490	386	1176	275	500	539	255	310	225	450	550	70	110	50	18	53,5	82	422
CTD 5.1	8	6	125	80	450	610	475	1535	470	740	600	380	420	310	620	840	95	120	60	18	64,2	95	1250
CTD 6.1	7	5	150	100	475	635	491	1601	494	740	620	380	420	310	620	840	95	120	65	18	69,2	98	1403



St max. – max. number of pump stages at given frequencies

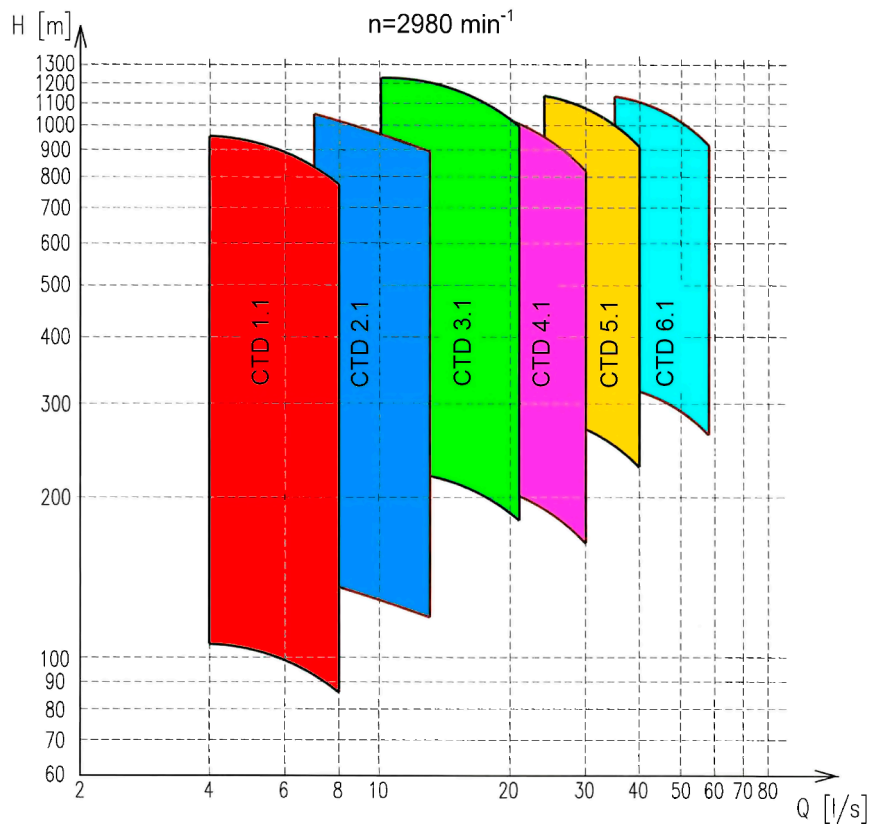
L – width of one pump stage

m1 – weight of one pump stage

*** – length of three-stage pump

**** – weight of three-stage pump

PUMP PERFORMANCE DIAGRAM



Performance diagrams for both CTA and CTD pumps are identical.



Auxiliary feed-water pump CTD 3.1, Coal-Fired Power Plant Nováky (Slovakia).
Unit consists of pump, gearbox and diesel engine.



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