

KNE
High-Pressure Boiler Feed Pumps

HIGH-PRESSURE BOILER FEED PUMPS KNE

PUMP APPLICATION

KNE pumps are intended for power generating units of 200 MW and 660 MW outputs.

PUMP TYPE DESIGNATION

Type	KNE
Design size	5.1
Discharge branch diameter	300
Number of stages	6
Design version	000

DESCRIPTION

Boiler feed water pumps KNE are designed as multistage, centrifugal, horizontal, barrel-type.

Pump can be dismantled into two sub-units:

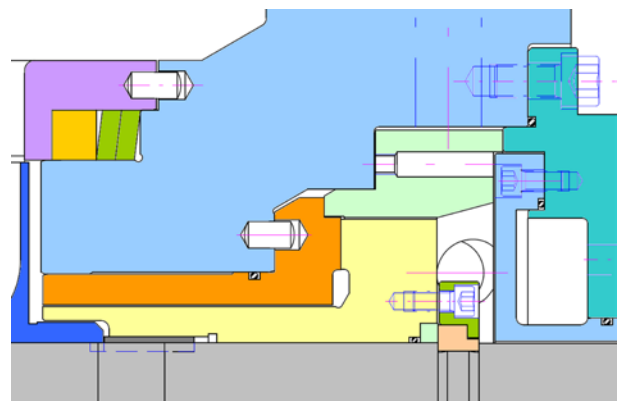
- High pressure pump barrel
- Internal pump stator (complete pumping unit)

This arrangement offers to the pump user a prompt pump repair by replacing of the pump's internal stator.

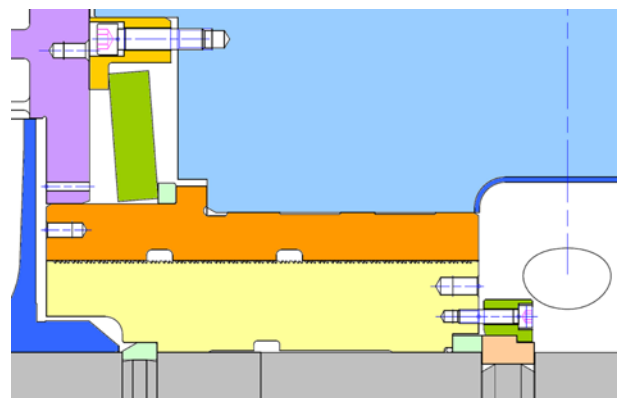
High-pressure pump barrel body is made of alloyed steel of high rigidity. Sealing and centring surfaces are furnished by weld deposits of austenitic stainless steel. Suction and discharge branches welded to the barrel body are of the same material. Branches of the high-pressure barrel can be flanged or of a "weld-in" execution. In case of the "weld-in" version the pump barrel is firmly welded into the piping system and contingent repairs are executed by replacement of the pump internal stator, fixed to the pump barrel by hydraulically stretched screws.

The internal pump stator itself consists of the pump rotor, internal stator part, balance device, mechanical seals, radial slide bearings and an axial bearing. Internal stator is assembled, checked and tested by the producer in such a way to be possibly built into any high- pressure pump barrel of the same pump size.

BALANCE DEVICE		BEARINGS
KNE-4.1	Balance disc, Counter balance disc	Radial bearings + subsidiary additional one-legged axial bearing are lubricated by pressurised oil
KNE-5.1	Balance drum, Balance drum bush	Radial bearings and two-sided axial bearing are lubricated by pressurised oil



Balance device "balance disc - counter balance disc"

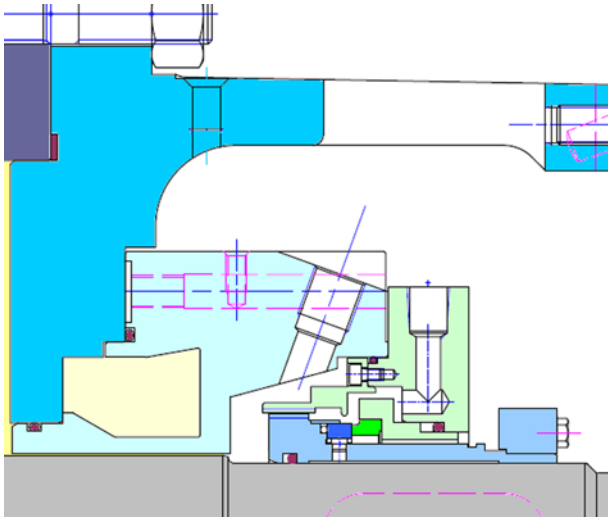


Balance device "balance drum - balance drum bush"

BASIC INFORMATION

MECHANICAL SEAL

Pumps are equipped by single mechanical seals with cooling chambers installed in accordance with API plan 23.



PUMPING SET ARRANGEMENT

Pump is supplied on a separate base plate. Pump can be driven by a steam turbine or by an electric motor, through a gearbox and/or hydraulic coupling.

TECHNICAL DATA

Pumped liquid	Feedwater		
Pump Flow	Q	max. 320	l/s
Delivery head	H	max. 5000	m
Operational temperature	t	max. 200	°C
Pump speed	n	max. 5100	1/min

MATERIAL EXECUTION

Position	Part designation	Material	
108	Stage body	GX4CrNi13-4	1.4317 + QT2
130	Suction body	GX4CrNi13-4	1.4317 + QT2
151	Pump barrel	23CrNiMo747V	1.6749.95
160.1	Barrel cover	23CrNiMo747V	1.6749.95
160.2	Cover – suction side	S235J2G3	1.0116
170	Diffuser	GX4CrNi13-4	1.4317 + QT2
210	Shaft	X3CrNiMo13-4	1.4313+QT900
230.1	Impeller	GX4CrNi13-4	1.4317 + QT2
441	Mechanical seal body	GX4CrNi13-4	1.4317 + QT2
502	Wear ring	X120Cr19Mo3	3346.9
603	Balance drum	X120Cr19Mo3	3347.9
605	Balance drum bush	X120Cr16Mo2	3346.9
905	Cover screw	30CrNiMo8	1.6580+QT
920	Nut	34CrNiMo6	1.6582+QT

SECTION DRAWING OF THE KNE 5.1 PUMP

5.1

Barrel design of the pump:

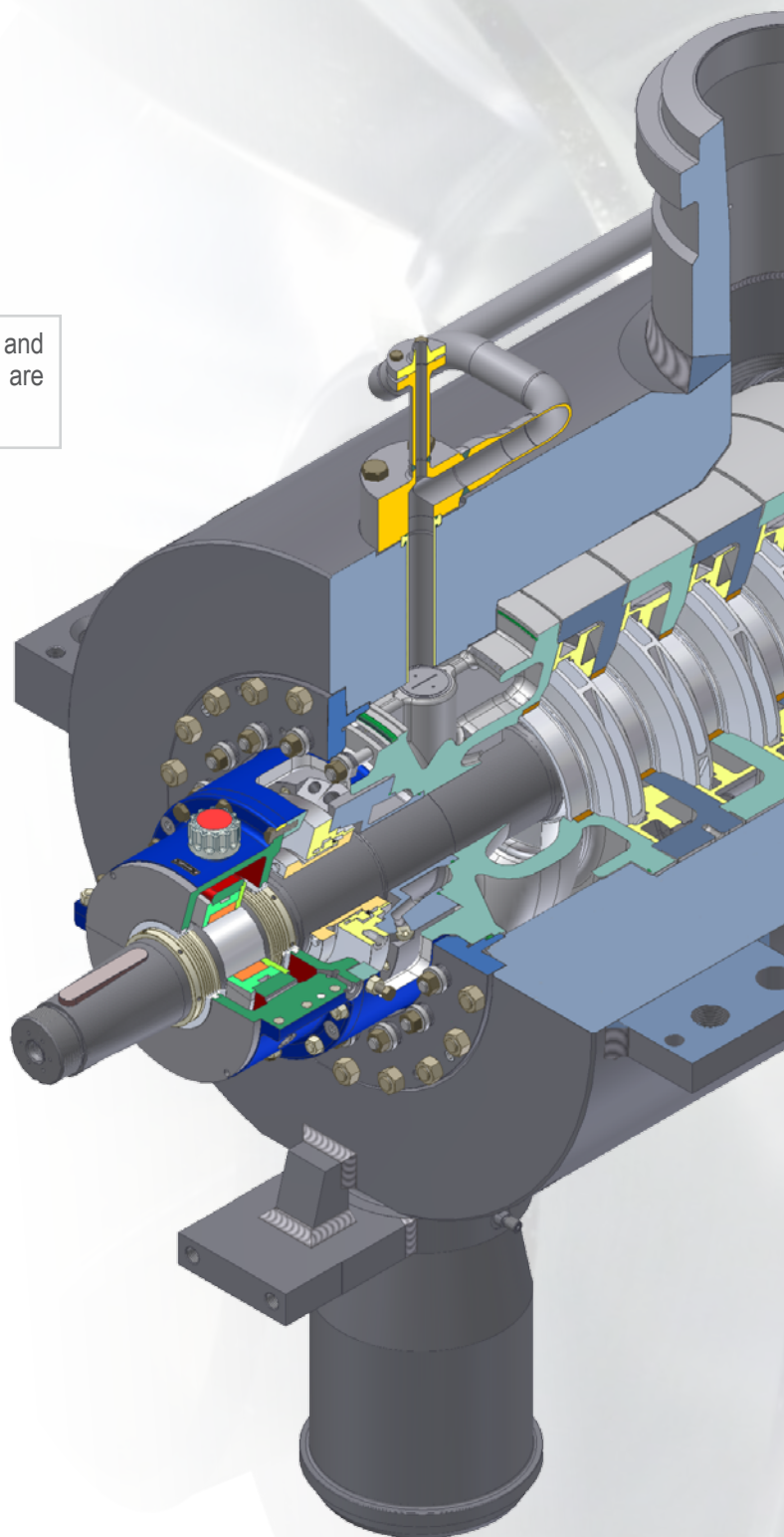
- High performance safety level – double pump casing, minimum number of sealing surfaces
- Durable connection of the pump branches to piping during the pump disassembly
- High structure rigidity with the possibility of a higher loading of the pump branches by external forces

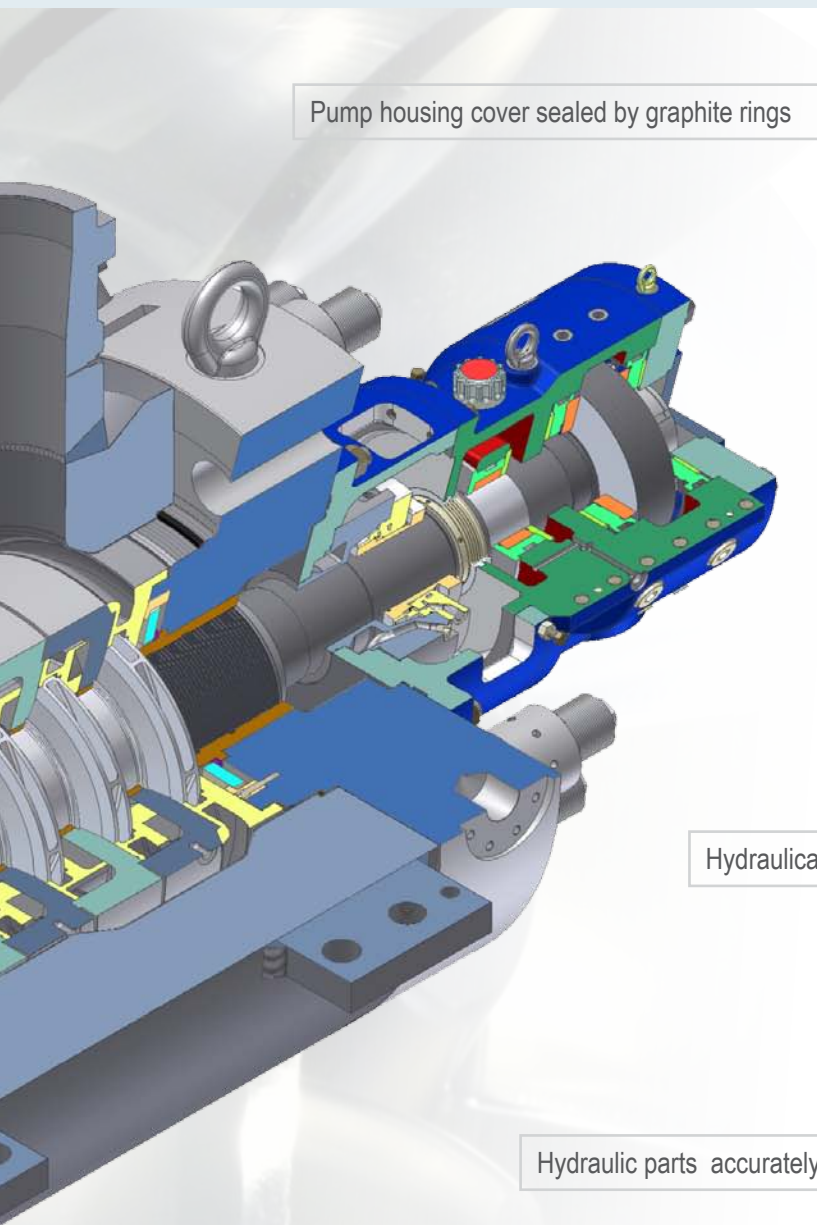
For sealing of the inter-stage tapping and internal connecting piping shaped seals are applied

Mechanical seal in API plan 23 arrangement

Easy replacement of sealing on the pump suction side – no requirement for the internal stator disassembly

Horizontally split bearing bracket offers an easy access to the bearing





Pump housing cover sealed by graphite rings

Horizontally split bearing bracket

Two-sided axial bearing

Hydraulically stretched stator bolts

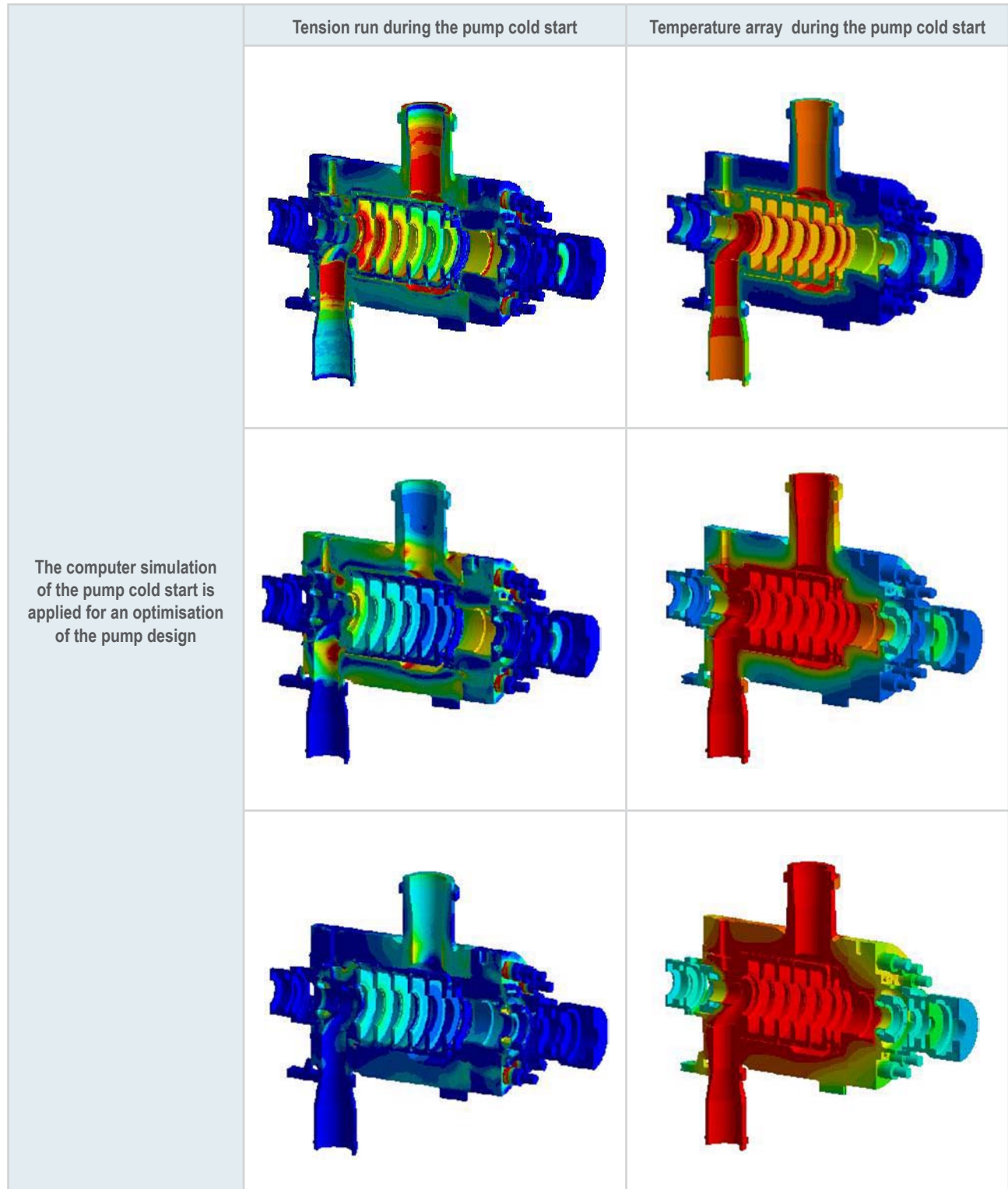
Hydraulic parts accurately cast from Cr-Ni steel

Firmly bolted stage bodies creating an integrated unit

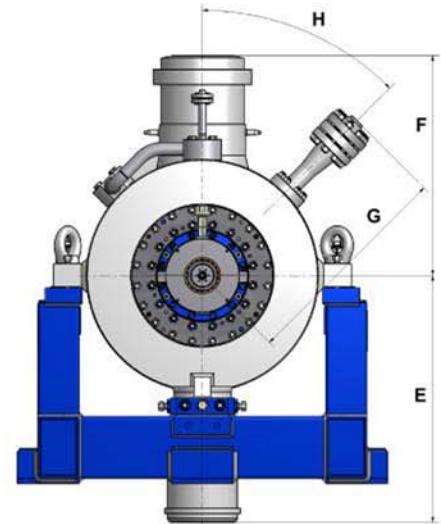
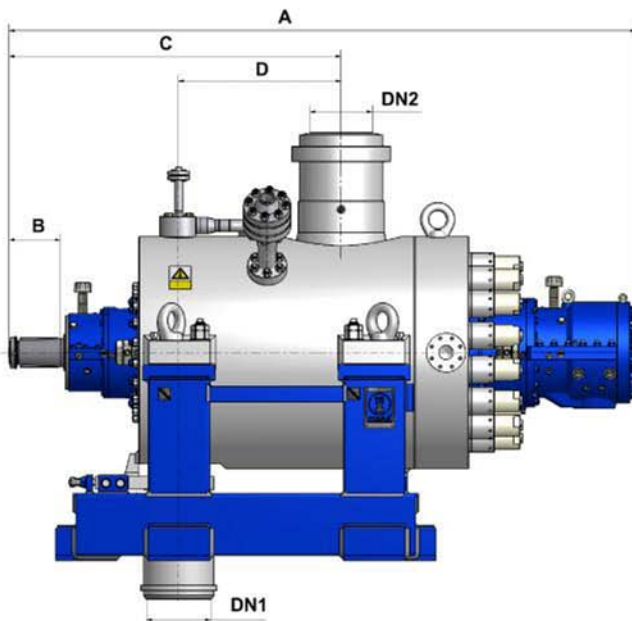
Feet in the pump axle

PUMP DESIGN VERIFICATION

The pump design is verified by computational methods and optimised from the point of view of the material tension, parts deformations, dynamic carriage of the pump rotor as well as of the complete pump incl. its base frame.



PUMP DIMENSIONS



TYPE	DN1	DN2	A	B	C	D	E	F	G	H	Weight (kg)
KNE-4.1 7st	300	300	2715	200	1805	1010	1100	900	650	0	9 870
KNE-4.1 8st	300	300	2840	200	1930	770	1100	850	650	0	10 750
KNE-5.1 6st	300	300	3050	250	1615	790	1200	1070	1065	45°	14 600

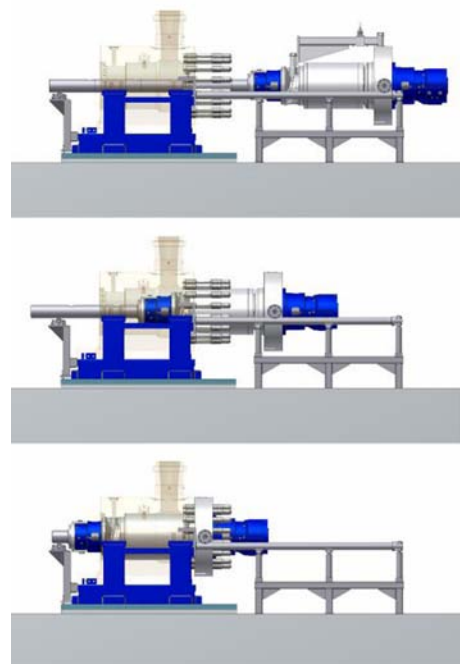
INTERNAL STATOR

Advantages:

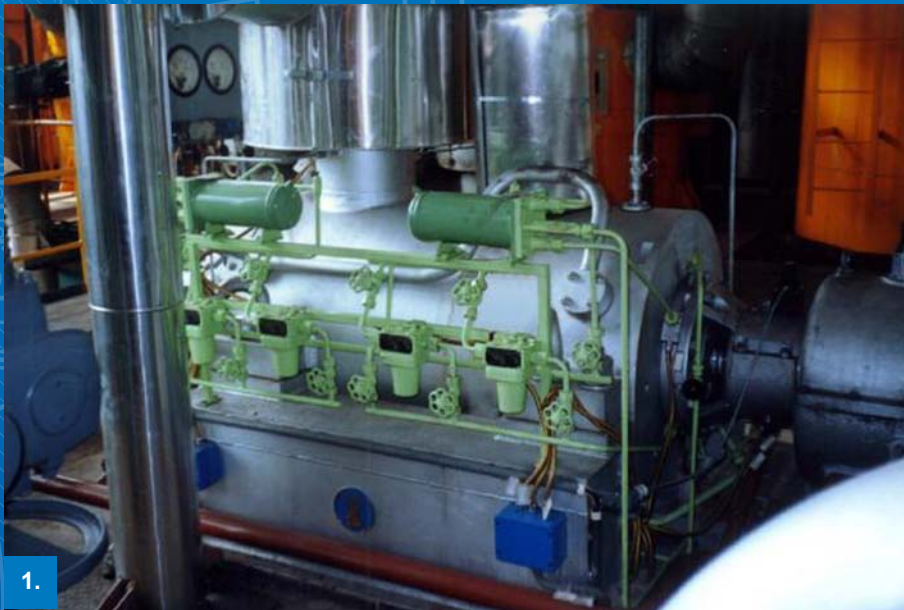
- The internal stator is assembled out of the pump barrel.
- Before the internal stator installation mechanical seals are adjusted and the pump rotor is in the correct working position.
- Easy pump internal stator replacement by means of special assembly tool delivered together with the pump.



The pump internal stator is supplied as spare part.



Sample of assembly of the pump internal stator into the pump housing.



1.

- 1. Power Plant Tušimice (CZ), KNE 4.1
- 2. Power Plant Ledvice (CZ), KNE 5.1



2.



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