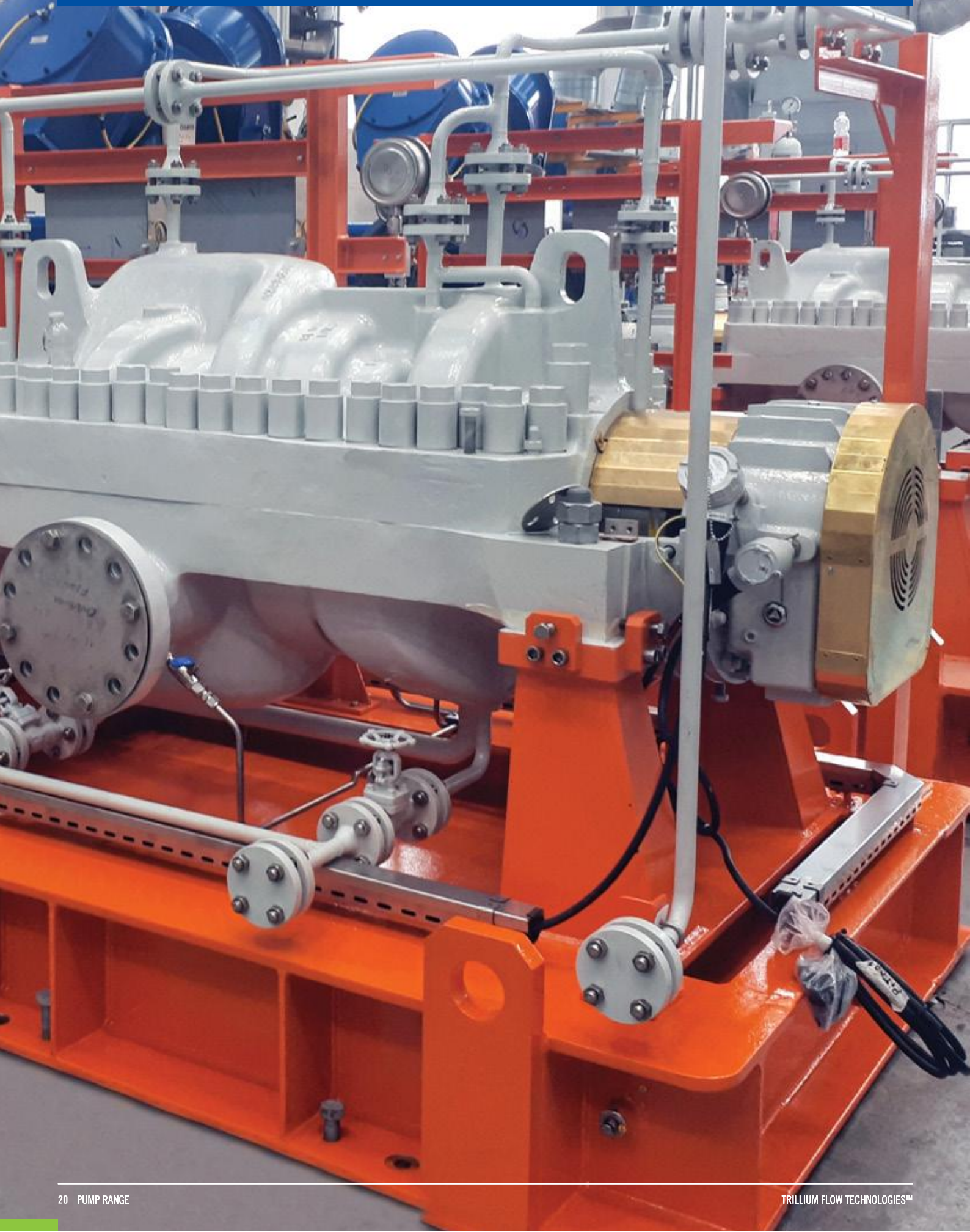


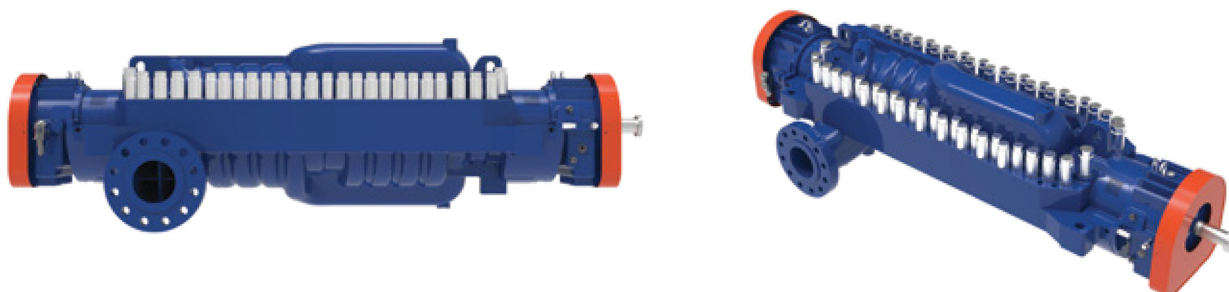
API 610 BB3-TYPE PUMPS • TMP PF PUMP MODEL
PHOTO: TMP PF PUMP MODEL FOR BOILER FEED WATER SERVICE AT OIL FIELD FACILITY



HORIZONTAL BETWEEN-BEARINGS, AXIALLY SPLIT, MULTI-STAGE PUMPS

API-610 TYPE: BB3

TERMOMECCANICA PUMP MODEL: PF



KEY FEATURES:

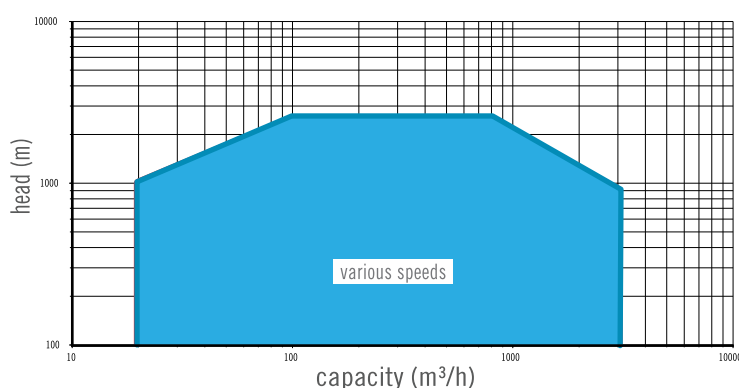
- Heavy duty, high pressure, double volute casing, multistage opposed impellers, near centerline mounted pumps
- First stage double entry impeller for low NPSH applications
- Opposed impellers arrangement for axial thrust balancing and minimum bearing loads
- Double volute design for radial thrust reduction to minimize the shaft deflection
- Suction and discharge nozzles are integrally cast with the bottom half casing, on opposite sides
- Ball/ball, sleeve/ball and sleeve/tilting pads solutions are available
- De-staging can be provided upon request
- Special features are used to compensate thermal expansion and ensure casing alignment

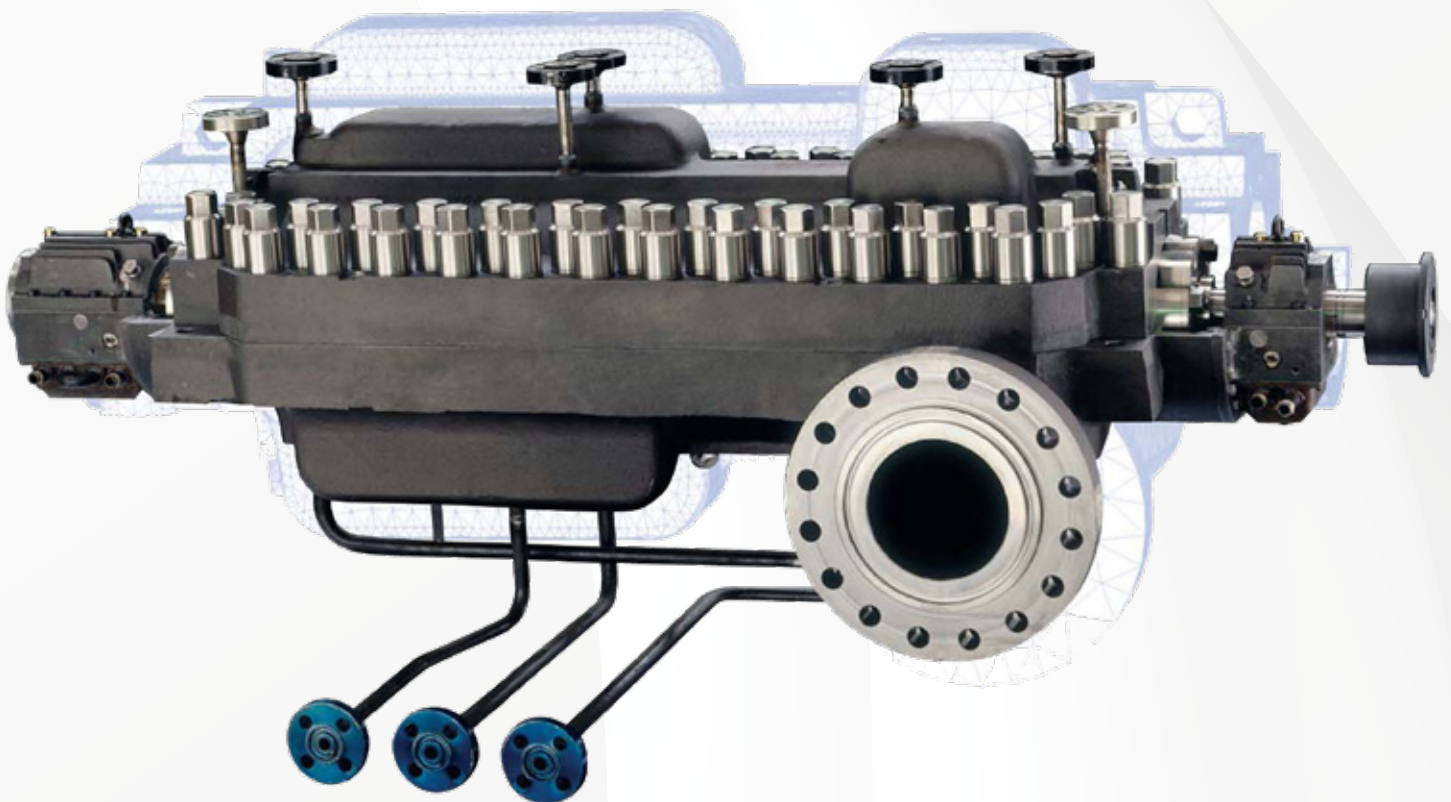
MAIN APPLICATIONS:

- Oil well water injection
- Hydrocarbon pipelines
- Liquefied gas industry
- Offshore installation
- Water transportation
- Reverse Osmosis HP service
- Boiler feed
- Nuclear auxiliary services
- Fire fighting

OPERATING RANGE

- | | | | |
|--------------------|-------|-------------------------|------------|
| • Capacity: | up to | 3,000 m ³ /h | 13,210 gpm |
| • Head: | up to | 2,500 m | 8,200 ft. |
| • Pressure: | up to | 300 bar | 4,350 psig |
| • Temperature: | up to | + 200 °C | 392 °F |
| • rotational speed | up to | 6,000 rpm | 6,000 rpm |





Gabbioneta Pumps®
Heavy Duty Process Pumps
AHP-AHP DS

General information

The AHP and AHPDS range heavy duty process multistage pumps are horizontal, between bearings with axial split casing, diffuser type with single or double entry 1st stage impeller designed for full compliance with latest edition of API 610 Standard.

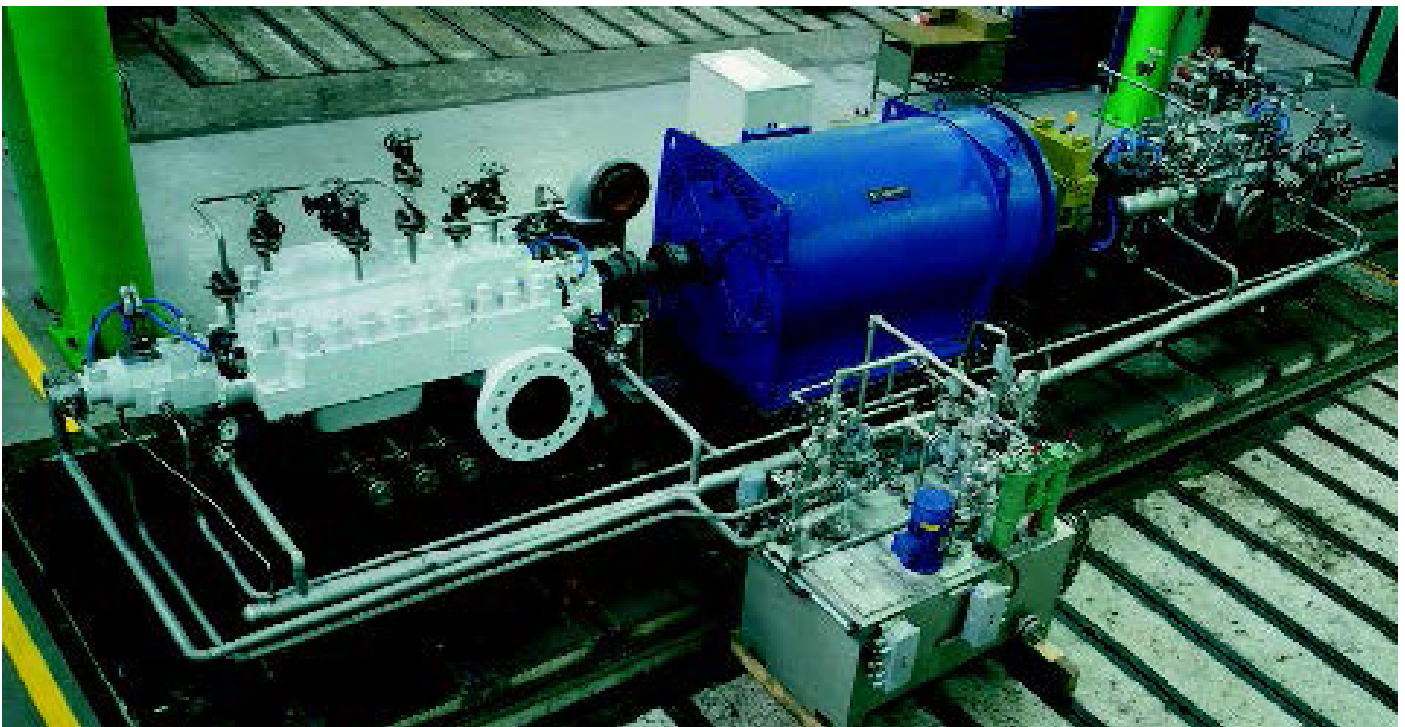
The “modular design” philosophy permits to cover a wide range of applications replacing the main hydraulic components i.e. only impeller/diffuser.

Casing, shaft, mechanical seals, bearing frames result therefore fully interchangeable and reusable.

A wide range of sizes, number of stages and material combinations complete the variety of the offered product.

Main design features

- Geometry of pump components optimised through hydraulic, structural, thermal and dynamic F.E.M. analysis to guarantee high product reliability
- Opposed impeller and diffuser configuration to minimise axial and radial hydraulic thrusts
- Large eye single suction or double suction 1st stage impeller to meet low NPSH requirements
- Hydraulic performances checked on a Single Stage Test Equipment. This is particularly useful to verify the effective 1st stage NPSH
- Easy internal inspectability and maintenance in Central and lateral balancing drums adequately shaped to optimise pump rotordynamic behaviour and minimise axial thrusts
- Shrink fitted impellers for higher operational speeds (over 4500 rpm)
- Near centreline casing mounting for high temperature stability
- Deep stuffing boxes, designed in accordance with API 682 Std., suitable to accept any type of mechanical or packing seals
- Axial split bearing housing for easy inspection and maintenance procedure
- Labyrinths and deflectors at both bearing housing to maximise protection against dirt
- Number of stages rangeable from 4 to 13
- “Stiff shaft design”. Rotor operates below its 1st wet critical speed
- Side-Side suction and discharge nozzles integrally cast on lower casing half
- Contoured grafoil or glassfiber gasket to assure joint between casing halves and eliminate interstage leakages
- Casing guide keys for high temperature application over 120°C (250°F)
- Three bearings arrangements available:
 - Ball Radial / Ball Thrust
 - Sleeve Radial / Ball Thrust
 - Sleeve Radial / Tilting Pads Thrust (Kingsbury Type)



Options

The following pump designs can be provided:

- De-staged construction
- Replaceable stuffing box cooling or heating jackets
- Double shaft extension
- Cylindrical fit at coupling shaft end
- Special bearing isolators at both bearing housing ends
- 'CARB' or hydrodynamic line bearing for high temperature application
- Oil mist lubrication system (pure or purge)
- Forced feed lubrication system
- Temperature and/or vibration detection and monitoring equipment
- Baseplate available with three point gimbil mounting (FPSO services)

Main pumps applications refer to heavy duties on

- Oil & Gas
- Fluid transportation
- Refineries
- Petrochemical plants
- Boiler feedwater and
- Power plant auxiliaries
- Water injection
- Reverse osmosis

Operating data

Capacity

up to 2000 m³/h (8800 USgpm)

Head

up to 2800 m (9200 feet)

Temperature

from — 30°C (-20°F) to 200°C (400°F)

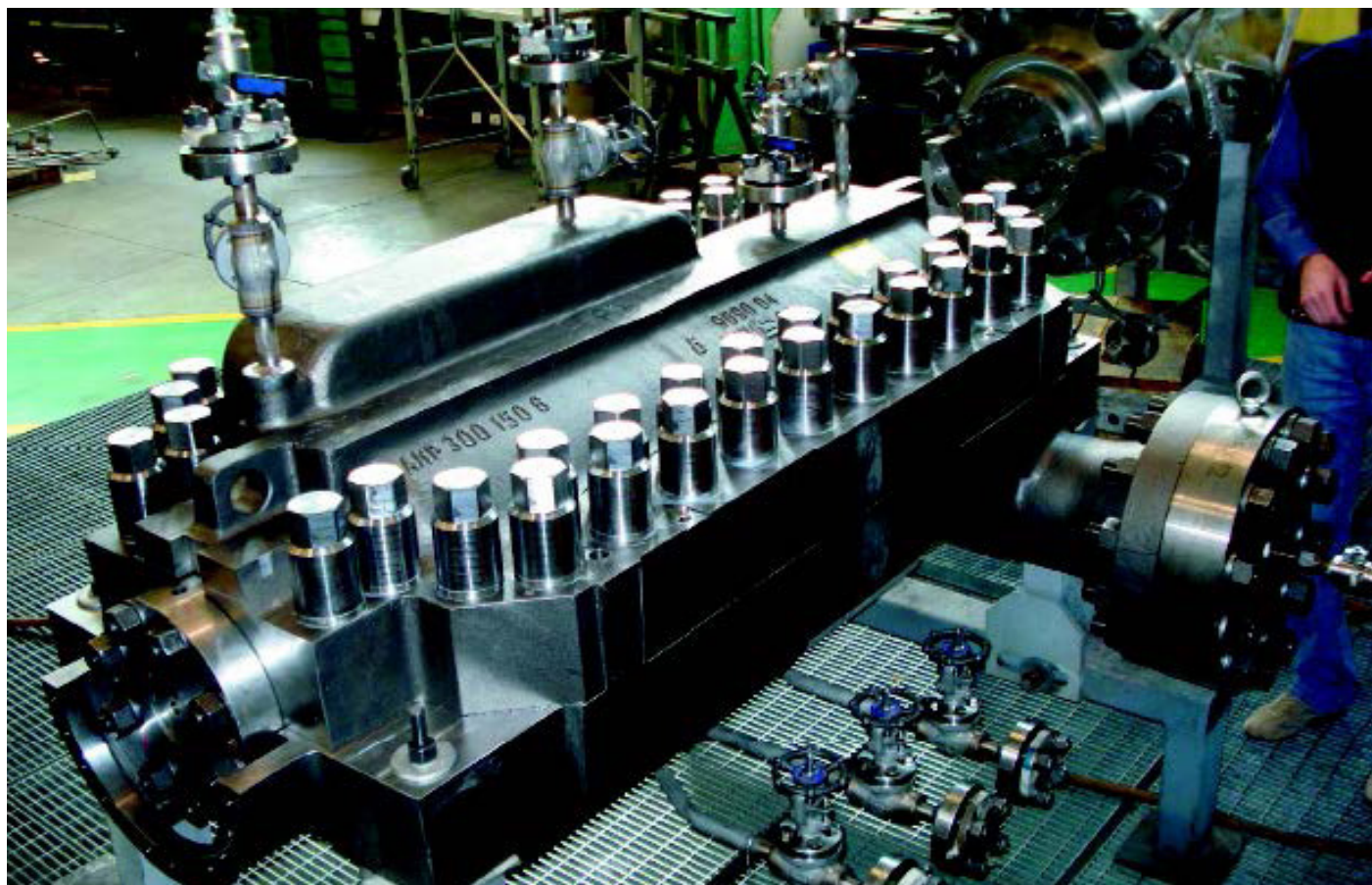
Design working pressure

up to 210 barg (3000 psig)

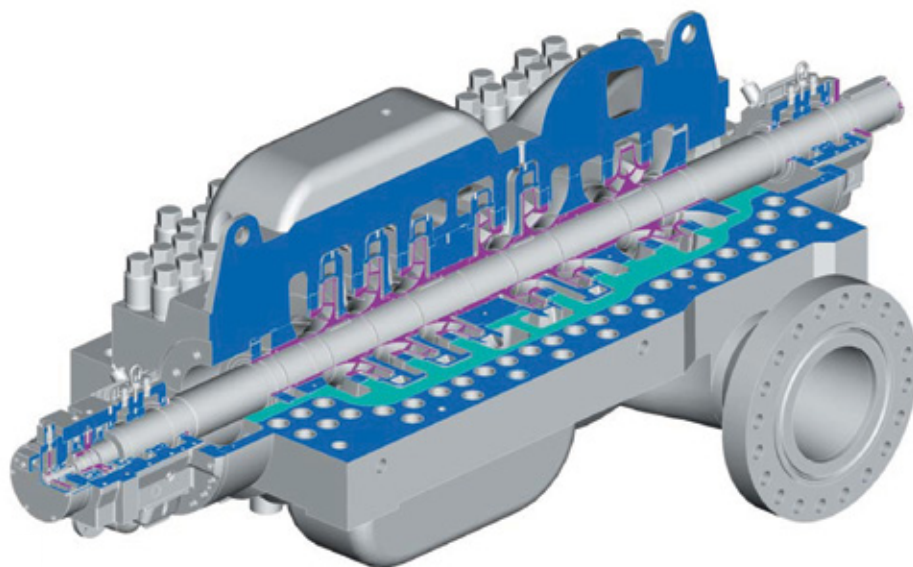
Rotational speed

up to 5000 rpm

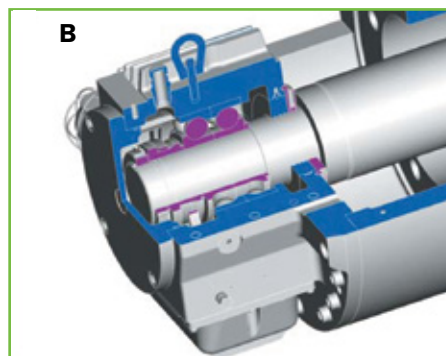
Hydrotest performed in test room



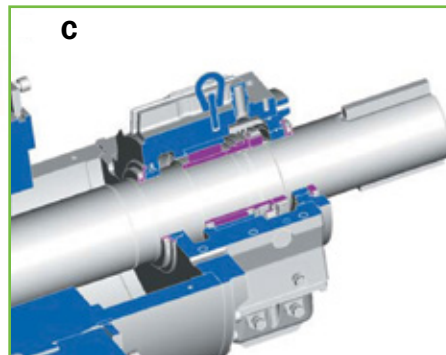
A



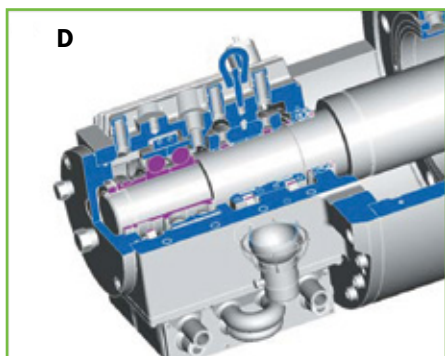
B



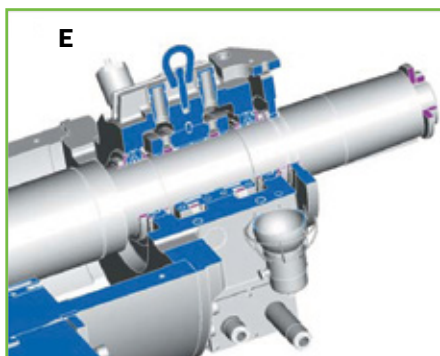
C



D



E



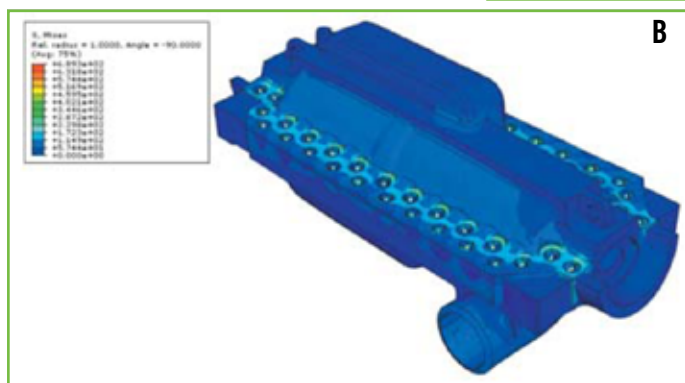
- A. Sleeve-Kingsbury
- B. Ball-Ball NDE
- C. Ball-Ball DE
- D. Sleeve-Ball NDE
- E. Sleeve-Ball DE

FEM analysis of hydrotest

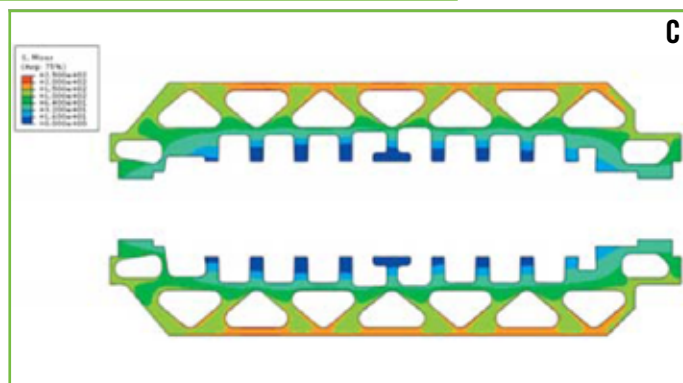
- A. 3D mesh generated for the upper and lower casing halves
- B. Stress results of a static analysis simulating the test
- C. Residual pressure on the gasket



A

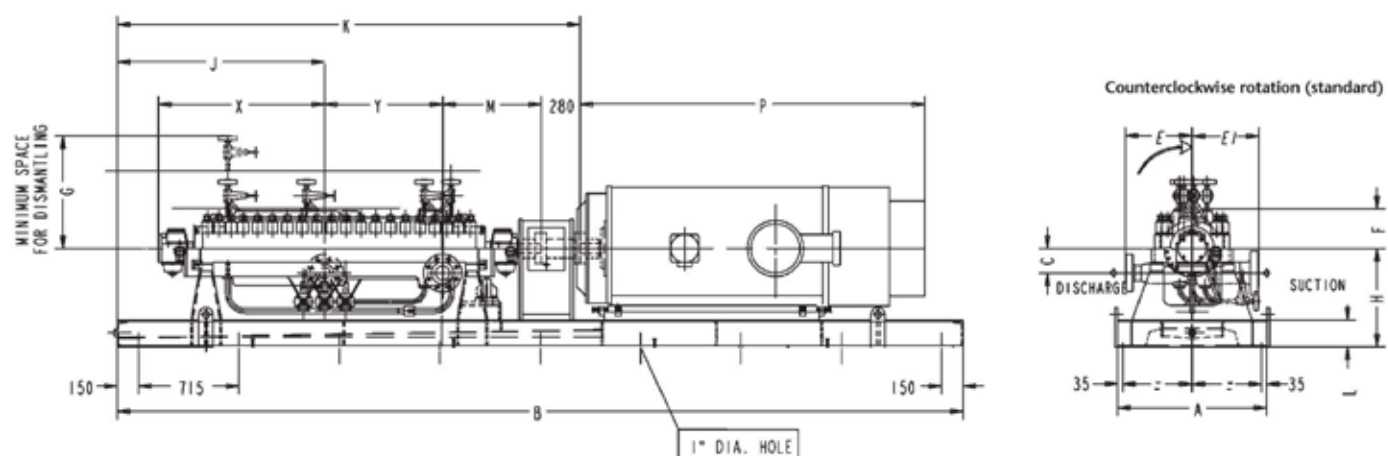


B



C

AHP-AHP DS overall dimensions



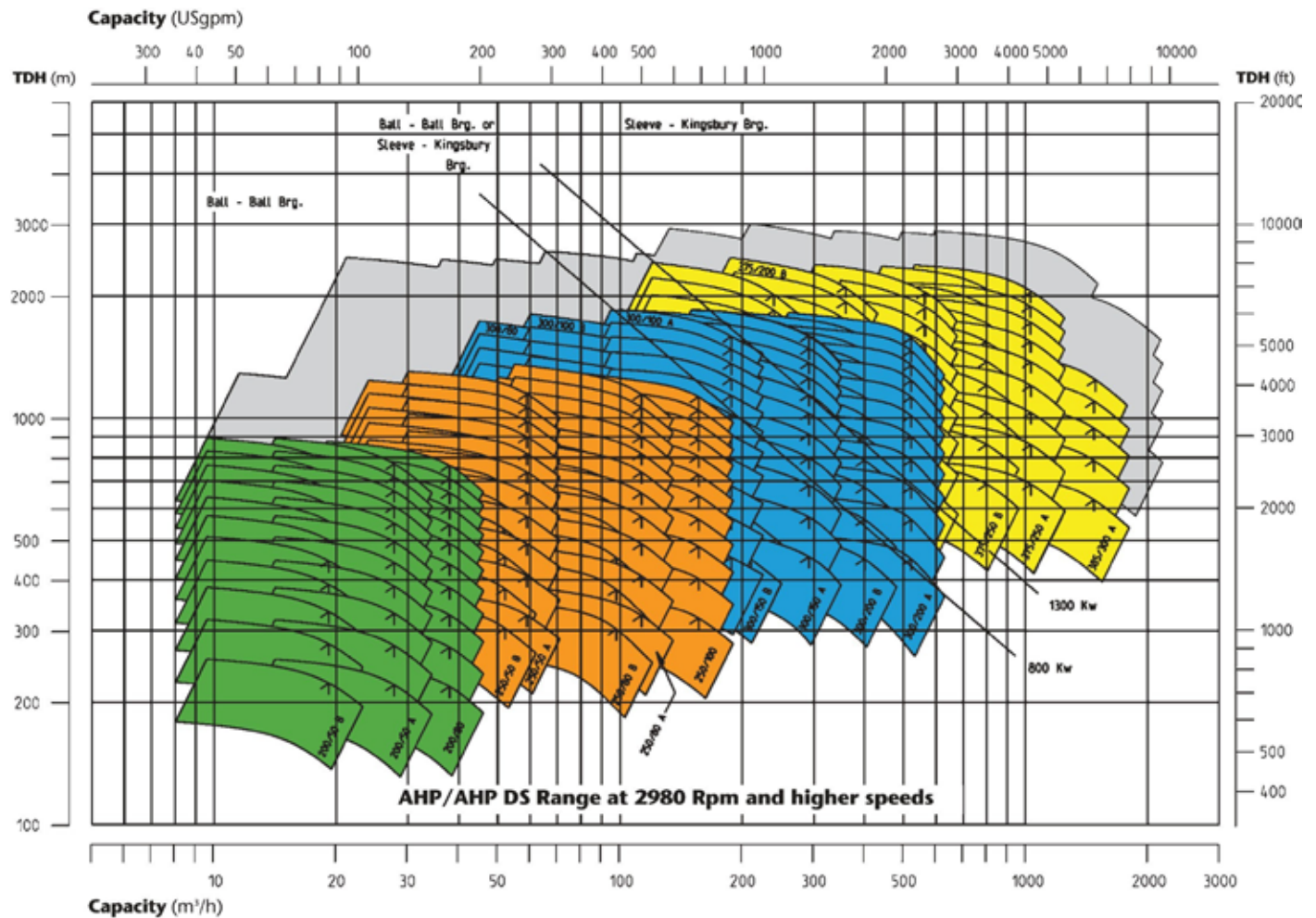
Pump type	No. of Stages	A	C	D	E	E1	F	G	H	X			Y	M	J	K
										B/B	S/B	S/K				
AHP 200 / 50 - 80 (4'X2') (4'X2') Single suction first stage	4	1060	150	200	475	475	250	750	700	706	630	947	280	580	1240	2380
	5									796	920	1037	280		1330	2470
	6									796	920	1037	370		1330	2560
	7									886	1010	1127	370		1420	2650
	8									886	1010	1127	480		1420	2740
	9									976	1100	1217	460		1510	2830
	10									976	1100	1217	550		1510	2920
	11									1066	1190	1307	550		1600	3010
	12									1066	1190	1307	640		1600	3100
	13									1156	1280	1397	640		1690	3190
	14									1156	1280	1397	730		1690	3280
AHP 250 / 50 - 80 - 100 (4'X2') (4'X3') (6'X4') Single suction first stage	4	1060	175	200	475	475	280	800	700	760	884	904	305	625	1175	2385
	5									865	989	1009	305		1280	2490
	6									865	989	1009	410		1280	2595
	7									970	1094	1114	410		1385	2700
	8									970	1094	1114	515		1385	2805
	9									1075	1199	1219	515		1490	2910
	10									1075	1199	1219	620		1490	3015
	11									1180	1304	1324	620		1595	3120
	12									1180	1304	1324	725		1595	3225
	13									1285	1409	1429	725		1700	3330
	14									1285	1409	1429	830		1700	3435
AHP DS 250 / 50 - 80 - 100 (4'X2') (4'X3') (6'X4') Double suction first stage	5	1060	175	200	475	475	280	800	700	760	884	904	420	700	1175	2575
	6									865	989	1009	420		1280	2680
	7									865	989	1009	525		1280	2785
	8									970	1094	1114	525		1385	2890
	9									970	1094	1114	630		1385	2995
	10									1075	1199	1219	630		1490	3100
	11									1075	1199	1219	735		1490	3205
	12									1180	1304	1324	735		1595	3310
	13									1180	1304	1324	840		1595	3415
	14									1180	1304	1324	945		1595	3520
	15									1285	1409	1429	945		1700	3625

General notes

1. All dimensions are in mm.
Do not use for construction unless certified.
2. Minimum flange rating on nozzle - ANSI 600#.
3. Dimensions B and P vary with driver selection.
4. Dimension X relative to Sleeve-Kingsbury configuration does not include the coaxial lube oil pump

Pump type	No. of Stages	A	C	D	E	E1	F	G	H	X			Y	M	J	K
										B/B	S/B	S/K				
AHP 300 / 100 - 150 - 200 (5'X4') (8'X6') (10'X8') Single suction first stage	4	1390	225	200	575	675	360	950	800	827	951	971	405	698	1240	2623
	5									957	1081	1101	405		1370	2753
	6									957	1081	1101	535		1370	2883
	7									1067	1211	1231	535		1500	3013
	8									1087	1211	1231	665		1500	3143
	9									1217	1341	1361	665		1630	3273
	10									1217	1341	1361	795		1630	3403
	11									1347	1471	1491	795		1780	3533
	12									1347	1471	1491	925		1760	3663
	13									1477	1601	1621	925		1890	3793
	5									827	951	971	565		1240	2865
	6									957	1081	1101	565	780	1370	2995
AHP DS 300 / 100 - 150 - 200 (5'X4') (8'X6') (10'X8') Double suction first stage	7									957	1081	1101	695		1370	3125
	8									1087	1211	1231	695		1500	3255
	9									1087	1211	1231	825		1500	3385
	10									1217	1341	1361	825		1630	3515
	11									1217	1341	1361	955		1630	3645
	12									1347	1471	1491	955		1760	3775
	13									1347	1471	1491	1085		1760	3905
	4									991	1233	1220	510		1700	3250
	5									1151	1393	1380	510		1860	3410
	6									1151	1393	1380	670	910	1860	3570
AHP 370 / 150 - 200 - 250 (8'X6') (10'X8') (12'X10') Single suction first stage	7									1311	1553	1540	670		2020	3730
	8									1311	1553	1540	665		2020	3690
	9									1471	1713	1700	830		2180	4050
	10									1471	1713	1700	990		2180	4210
	11									1631	1873	1860	990		2340	4370
	12									1631	1873	1880	1150		2340	4530
	5									991	1233	1220	705		1700	3620
	6									1151	1393	1380	705		1860	3780
	7									1151	1393	1380	865	935	1860	3940
AHP DS 370 / 150 - 200 - 250 (8'X6') (10'X8') (12'X10') Double suction first stage	8									1311	1553	1540	865		2020	4100
	9									1311	1553	1540	1025		2020	4260
	10									1471	1713	1700	1025		2180	4420
	11									1471	1713	1700	1185		2180	4580
	12									1631	1873	1860	1185		2340	4530
	4									1139	1381	1367	680	910	1700	3570
AHP 385/300 (16'X12') Single suction first stage	5									1389	1631	1617	680		1950	3820
	6									1389	1631	1617	930		1950	4070
	7									1639	1881	1867	930		2200	4320
	8									1639	1881	1867	1180		2200	4570
AHP DS 385/300 (16'X12') Double suction first stage	5	1800	280	280	800	800	515	1300	1100	1139	1381	1367	930	950	1700	3680
	6									1389	1631	1617	930		1950	4110
	7									1389	1631	1617	1180		1950	4360
	8									1639	1881	1867	1180		2200	4610

Coverage Chart



Pump identification

Pump type	AHP	250	50	10
Nominal impeller diameter (mm)				
Nominal discharge nozzle diameter (mm)				
Number of stages				

A century of experience

Since the foundation of the company in 1897, Gabbioneta Pumps® has been engaged in design and manufacture of high quality centrifugal pumps.

The products and the markets served progressively changed from water to chemical industry and finally, in the last thirty years, to API 610 heavy duty pumps for refinery and petrochemical industries.

Product development is based on a thorough interchange of marketing and operating experience within the company and in close cooperation with project and plant engineers.

Manufacturing is carried out in a factory equipped with several modern CNC machines and machine tools. Special note has to be given to the machining centers where pump casings can be machined completely with only two settings.

In-house facilities are designed to meet the performance and NPSH testing requirements of all pumps manufactured in the company in full compliance with API 610 Standards.

A quality assurance system certified in accordance with ISO 9001 ensures Gabbioneta Pumps® are of the highest quality.



Trillium Pumps Italy S.p.A.
Società Unipersonale

Gaetana Agnesi 1, 20834 Nova Milanese (MB), Italy
T: +39 0362 17331; Fax: +39 0362 1733209; E: gabbioneta.sales@trilliumflow.com

www.trilliumflow.com Certified: ISO 9001:2015, ISO 14001:2015, OHSAS 18001:2007