



FIRE - FIGHTING PUMPS & PACKAGES



UNI EN 12845 & UNI EN 12259-12



AUDOLI & BERTOLA
a brand of

Gruppo Aturia

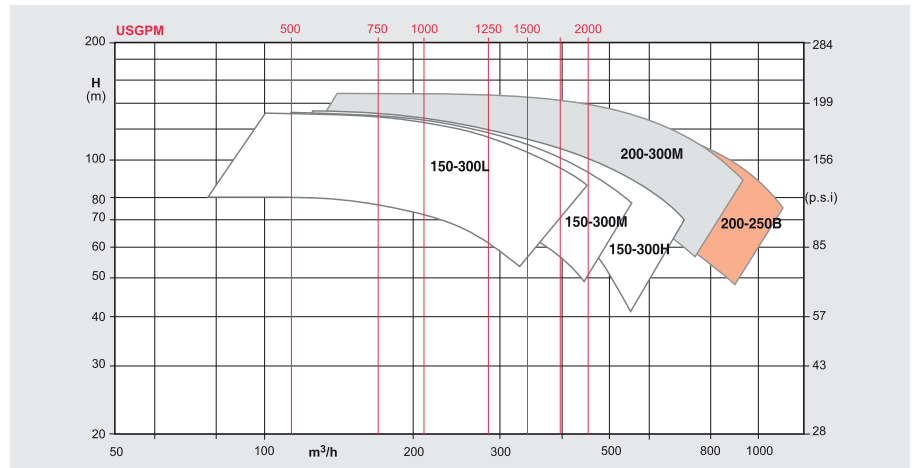


HORIZONTAL Split-Case Type PDN-PD

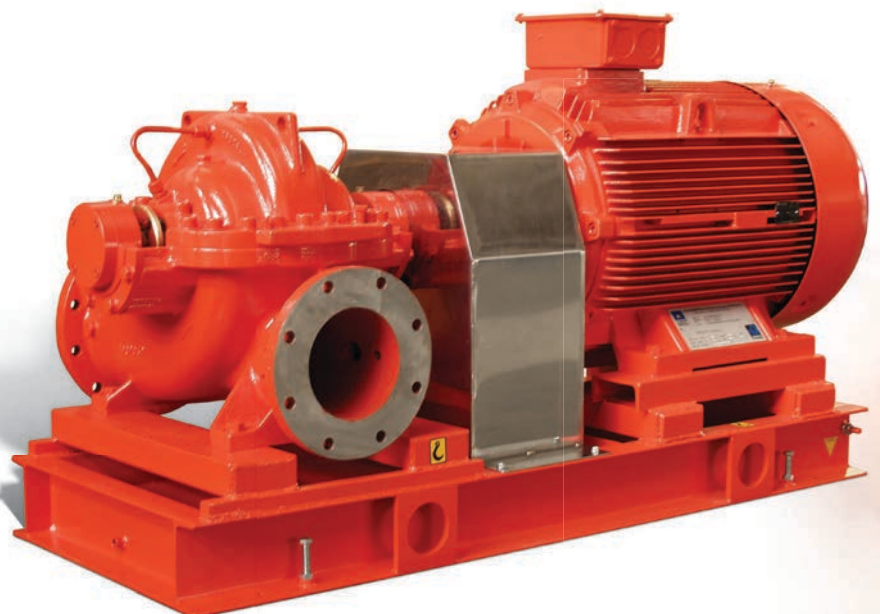


FM Approved horizontal split-case type centrifugal fire pumps are relatively simple to operate and repair. These pumps have a two-part casing divided in a horizontal plane through the shaft center line. They are well suited to fire protection service where a water supply is obtainable under a positive head.

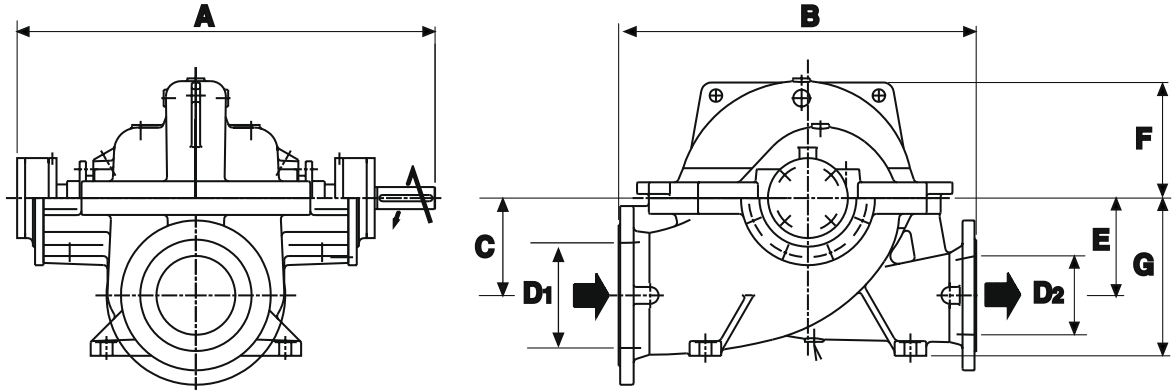
CHARACTERISTIC PERFORMANCE RANGE



Type	Speed (R.P.M.)	Capacity (US G.P.M.)
PDN 150-300 L	2100 ÷ 3550	750 ÷ 1000
PDN 150-300 M	2100 ÷ 3550	1000 ÷ 1250
PDN 150-300 H	2100 ÷ 3550	1250 ÷ 1500
PDN 200-300 M	2350 ÷ 2970	2000
PD 200-250 B	1460 ÷ 1900	1250 ÷ 2000

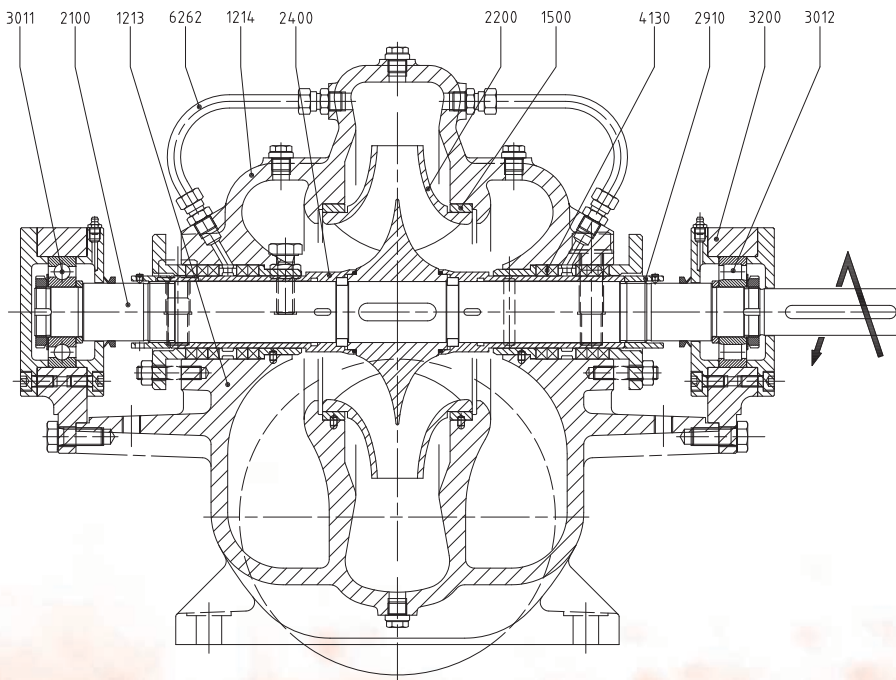


PUMP DIMENSIONS

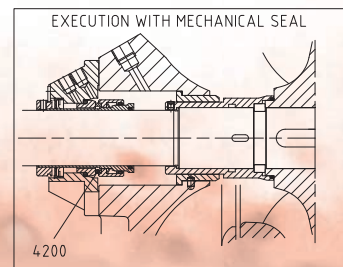


Pump	Dimension (mm)								Weight
	D ₁	D ₂	A	B	C	E	F	G	(kg)
PDN 150-300L	8"	6"	795	680	185	185	220	300	280
PDN 150-300M	8"	6"	795	680	185	185	220	300	280
PDN 150-300H	8"	6"	795	680	185	185	220	300	280
PDN 200-300M	10"	8"	795	760	200	200	237	350	330
PD 200-250B	10"	8"	1280	1030	285	335	460	470	900

SECTIONAL DRAWINGS



ref	DESCRIPTION	MATERIAL
1213	Casing half lower	Cast Iron - G30
1214	Casing half upper	Cast Iron - G30
1500	Casing wear ring	Bronze
2100	Shaft	Stainless Steel
2200	Impeller	Bronze
2400	Sleeve	Bronze
2910	Shaft nut	Bronze
3011	Radial ball bearing	-
3012	Radial roller bearing	-
3200	Bearing housing	Cast Iron - G30
4100	Staffing box	Bronze
4130	Gland packing	PTFE
4200	Mechanical seal	On requested
6262	Pipe	Stainless Steel





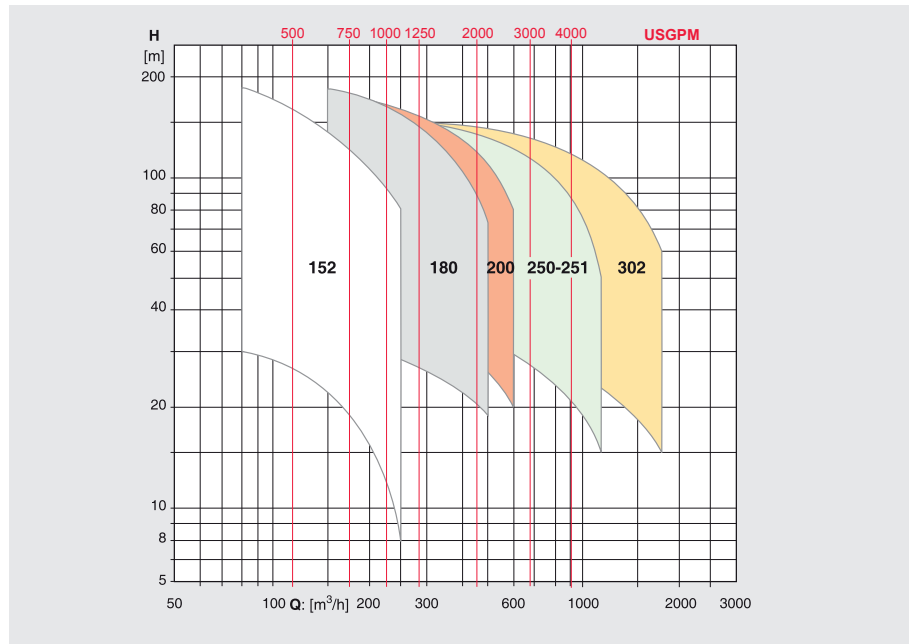
VERTICAL Shaft, Turbine Type VAB



Vertical shaft, turbine type centrifugal fire pumps have submerged impellers contained in a series-bowl assembly at the bottom of a vertical shaft. The design is similar to pumps used extensively for industrial and municipal service. These pumps are FM Approved for discharging water from lakes, streams, open sumps, drilled wells and other equivalent subsurface sources. Each pump consists of a discharge head, motor stand, column pipe, line shaft, bowl assembly and suction strainer. For electric drive, FM Approved pumps must be used with a vertical, electric motor. For internal-combustion-engine drive, FM Approved pumps must be connected to the FM Approved engine through an FM Approved right-angle gear drive.



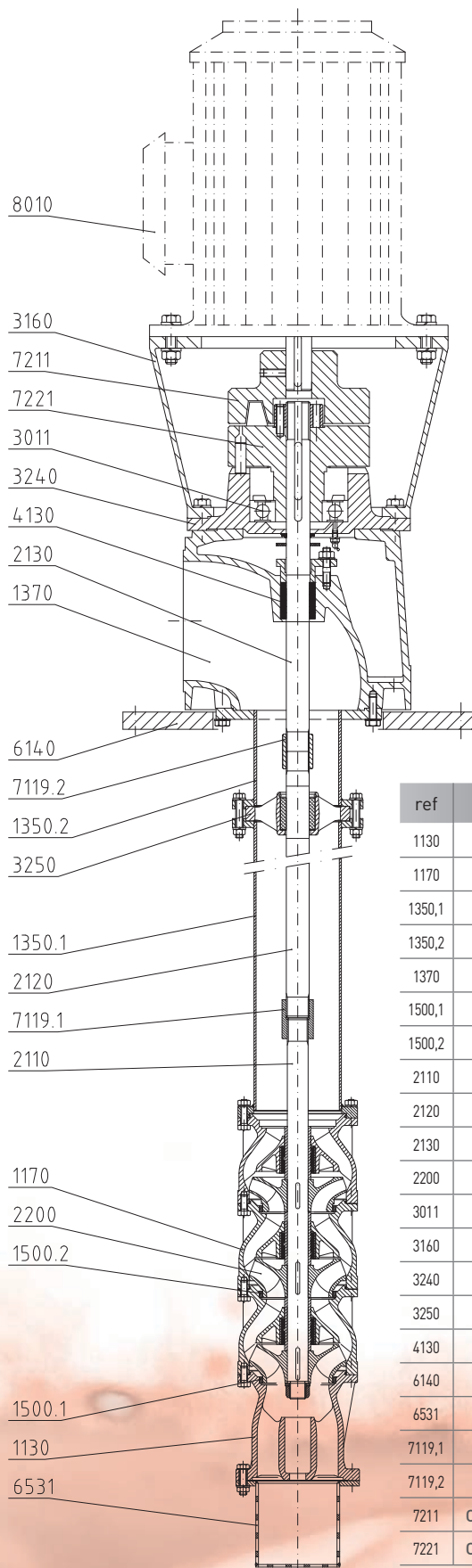
CHARACTERISTIC PERFORMANCE RANGE



Type	Speed (R.P.M.)	Capacity (US G.P.M.)
VAB 152	1480 ÷ 1770	500 ÷ 750
VAB 180	1480 ÷ 1770	500 ÷ 1250
VAB 200	1480 ÷ 1770	1000 ÷ 1500
VAB 250	1480 ÷ 1770	1500 ÷ 2500
VAB 251	1480 ÷ 1770	2250 ÷ 3000
VAB 302	1480 ÷ 1770	2500 ÷ 4000

SECTIONAL DRAWINGS

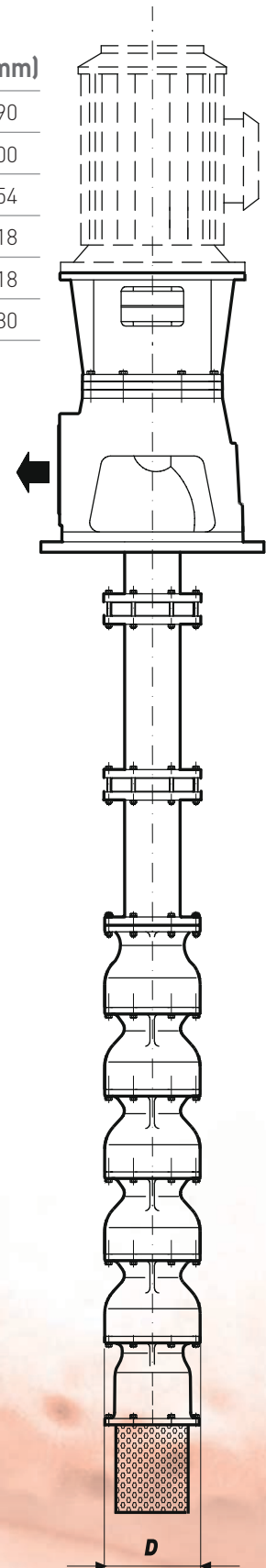
PUMP DIMENSIONS



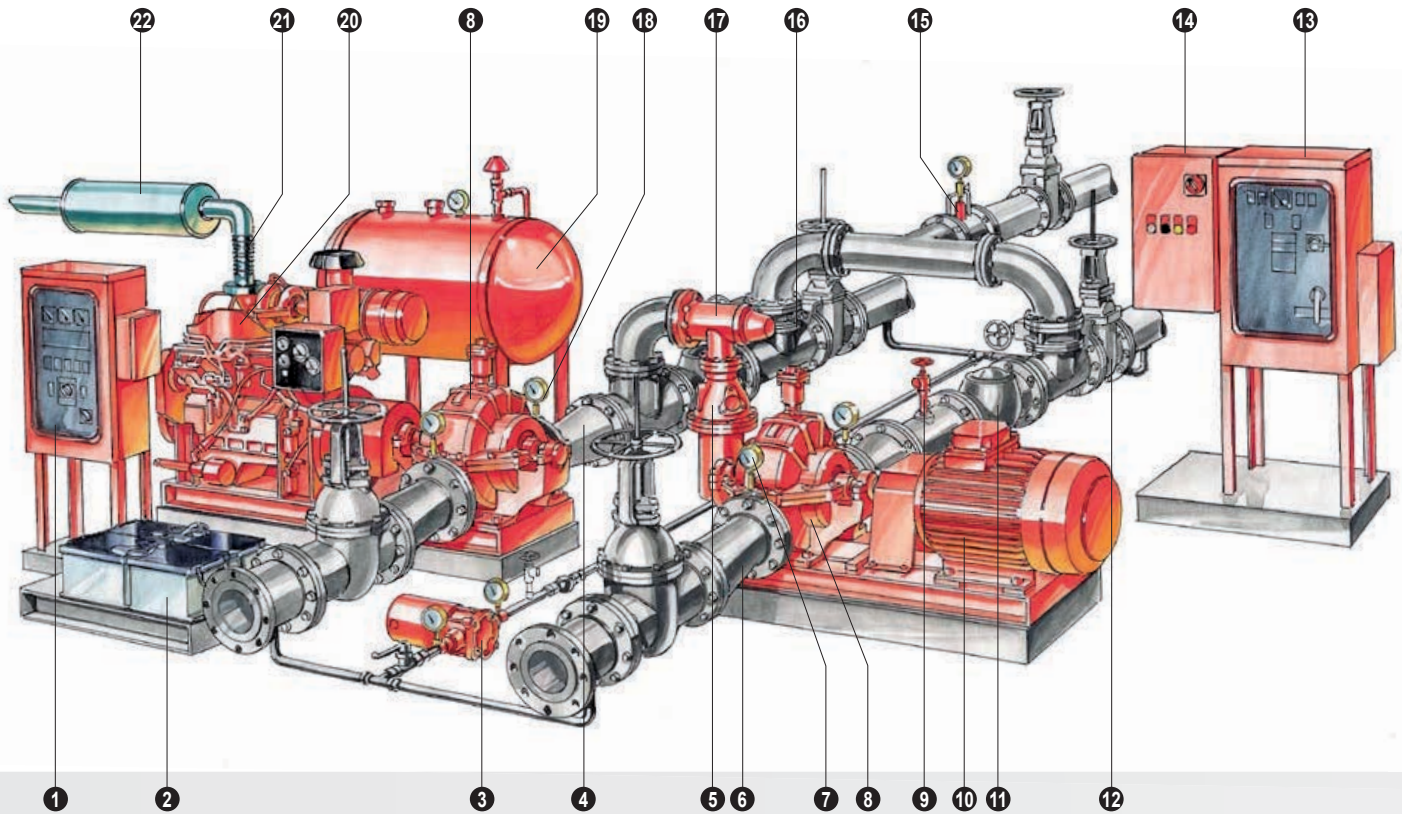
ref	DESCRIPTION	MATERIAL
1130	Bellmouth	Cast Iron - G25
1170	Pump Bowl	Cast Iron - G25
1350,1	Column Pipe	Stainless Steel
1350,2	Column Pipe	Stainless Steel
1370	Delivey Casing	Cast Iron - G25
1500,1	Wear Ring	Bronze
1500,2	Wear Ring	Bronze
2110	Pump Shaft	Stainless Steel
2120	Intermediate Shaft	Stainless Steel
2130	Top Shaft	Stainless Steel
2200	Impeller	Cast Iron - G25
3011	Ball Bearing	Stainless Steel
3160	Motor Stool	Cast Iron - G25
3240	Bearing Housing	Cast Iron - G25
3250	Bearing Bracket	Cast Iron - G25
4130	Gland Packing	Teflon - Carbon
6140	Foundation Plate	Steel Fe 430
6531	Suction Strainer	Steel Fe 510
7119,1	Screwed Coupling	AISI 420
7119,2	Screwed Coupling	AISI 420
7211	Coupling Half Side Motor	Cast Iron - G25
7221	Coupling Half Side Pump	Cast Iron - G25

Type D (") D (mm)

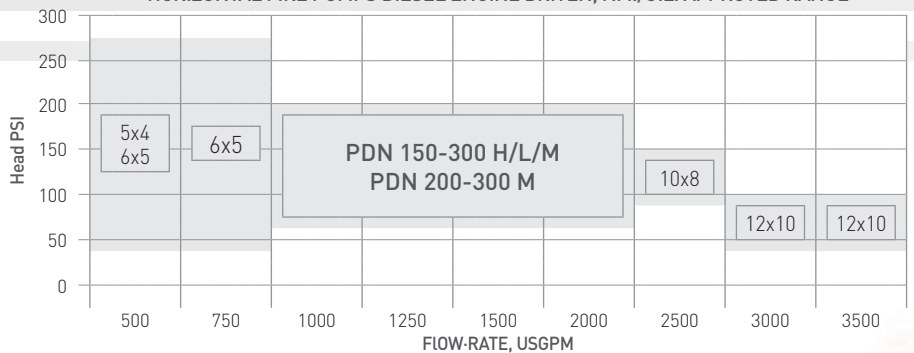
152	12"	290
180	12"	300
200	14"	354
250	17"	418
251	17"	418
302	19"	480



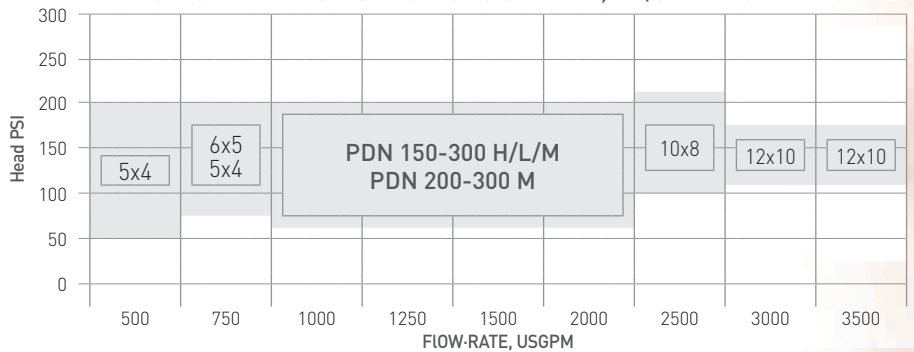
TYPICAL INSTALLATION OF FIRE-FIGHTING SETS WITH HORIZONTAL PUMPS



HORIZONTAL FIRE PUMPS DIESEL ENGINE DRIVEN, F.M./U.L. APPROVED RANGE



HORIZONTAL FIRE PUMPS ELECTRIC MOTOR DRIVEN, F.M./U.L. APPROVED RANGE



- 1_Diesel engine fire pump controller
- 2_Batteries
- 3_Jockey pump
- 4_Concentric discharge increaser
- 5_Enclosed discharge overflow cone
- 6_Eccentric suction reducer
- 7_Suction pressure gauge
- 8_Horizontal pump
- 9_Circulation relief valve
- 10_Electric motor
- 11_Check valve
- 12_OS&Y gate valve
- 13_Electric motor fire pump controller
- 14_Jockey pump controller
- 15_Flow estimator
- 16_Automatic air release valve
- 17_Main relief valve
- 18_Discharge pressure gauge
- 19_Fuel tank
- 20_Diesel engine
- 21_Flexible exhaust connector
- 22_Exhaust muffler

TECHNICAL SPECIFICATION FOR HORIZONTAL FIRE PUMPS COMPLY TO NFPA 20 AND/OR FACTORY MUTUAL STANDARDS

The set supplied by Audoli & Bertola for fire-fighting service shall include the Pump, driver, controller and fittings in the following technical specifications. The set shall be manufactured according to the standards of the "National Fire Protection Association", section 20.

The materials shall be:

- Factory Mutual Research Corporation (FM) approved
- Underwriters Laboratories (UL) (ULC) listed specifically for fire-fighting service.

All the materials supplied shall be installed as recommended in NFPA 20.

TEST PERFORMED BY THE MANUFACTURER

Each pump shall be subjected to a hydrostatic test of at least 5 minutes, at a pressure not less than 1.5 times the shut-off head plus maximum suction head and at any event, at a pressure not lower than 250 PSI.

The pump shall be able to deliver 150% of the nominal flow at no less than 65% of head at the working point, and the shut off head shall not exceed 140% of the rated head.

FIELD TESTS

A field test shall be performed by a suitable flow measuring device.

The test shall be conducted to NFPA 20, by:

- the installer
- the Audoli & Bertola engineer
- at the presence of authority responsible for acceptance release.

HORIZONTAL CENTRIFUGAL PUMP

The type _____ fire fighting pump, dimensioned according to NFPA 20 shall be

- Factory Mutual Research Corporation (FM) approved
- Underwriters Laboratories (UL) (ULC) listed for the following performance ratings:

Q _____ m³/h _____ USGPM _____
H _____ m _____ PSI _____ RPM _____
Suction pressure: _____ Bar _____ PSI _____

Suction pressure at the pump flange shall be not be less than "0 PSI" at 150% of flow conditions.

The fire-fighting pump shall be:

- split case type
- end suction type (DIN 24255)

construction: cast-iron casing and bronze impeller.

packing seal with sleeves (s) of bronze stainless steel

Suction flange Dn _____ PN _____/_____ " ANSI _____ #

Discharge flange Dn _____ PN _____/_____ " ANSI _____ #

ELECTRIC MOTOR

The electric motor shall be horizontal foot mounted B3 type, powered at _____ V, 3-phase, 50 hz, with rated power of _____ kW, with IP 55 protection and F insulation class.

The electric motor shall be mounted on a steel base common to the pump and shall coupled to the pump by means of an elastic coupling equipped with a suitable coupling guard.

The pump and the motor shall be carefully aligned in the workshop.

Correct alignment shall be verified in the field, before the tests, by skilled technicians.

ELECTRIC MOTOR FIRE PUMP CONTROLLER

The automatic start control panel shall conform to NFPA 20 stds. and shall be

- Factory Mutual Research Corporation (FM) approved.
- Underwriters Laboratories (UL) (ULC) listed for fire-fighting service.

The controller shall be:

- D.O.L. starting type
- Star delta starting type

The controller, of suitable size for the power installed, shall be dimensioned for an interrupting capacity rating of at least 30 kA RMS sym.

It shall be designed for:

- wall (standard) mounted
- floor mounted
- mounted on a common base plate with pump and the motor, with anti-vibration blocks and electric wiring.

DIESEL ENGINE

The diesel engine shall be horizontal type, comply to NFPA 20 and

Factory Mutual Research Corporation (FM) approved.

Underwriters Laboratories (UL) (ULC) listed

Manufacturer _____ Model _____

power rated kW _____ RPM _____

clockwise rotation view from flywheel opposite side.

- water cooled with radiator and fan.
- water cooled with heat exchanger of water cooling circuit in accordance with NFPA 20, consisting of: 4 shut-off valves, 1 pressure regulator valve, 1 pressure gauge, 1 on-off solenoid valve, 2 "Y" strainers, 1 by-pass circuit.

Fitting available:

- Silencer with flexible connection industrial residential
 - Set of dual batteries lead acid NiCd type
- complete with rack and cables and electrolyte, shipped in separate containers.
- Fuel tank, of _____ litre capacity, dimensioned to contain 1 gallon of fuel for each maximum engine power HP, plus 10% for sump and expansion area, complete with the following accessories: filler plug, drain valve, feed valve and filter, flame arrest, flexible hoses connection to the engine, visual level indicator, low fuel level switch and supports for floor mounting.
 - Engine jacket water heater
 - Instrument panel aboard the engine
 - Overspeed device
 - Emergency contactors.

DIESEL ENGINE PUMP CONTROLLER

The Automatic controller shall conform to NFPA 20 and shall be

Factory Mutual Research Corporation (FM) approved.

Underwriters Laboratories (UL) (ULC) listed

specifically for fire-fighting service.

The controller shall be 220 operating volts, single phase, 50hz, and shall be

equipped with following minimum accessories:

double battery charger, timer for weekly test and discharge solenoid valve, starting pressure switch, pressure recorder, low fuel level alarm.

It shall be designed to be positioned:

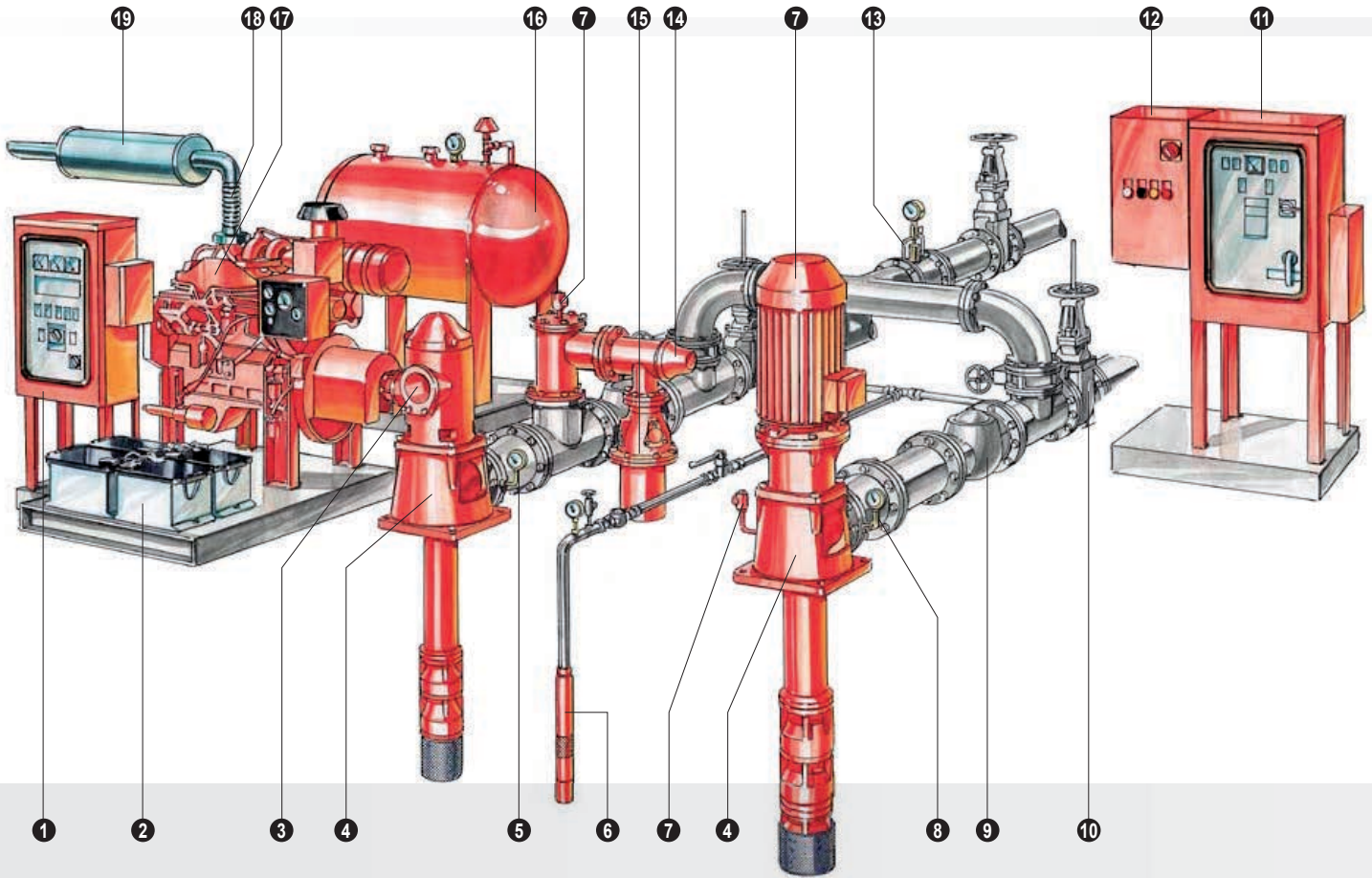
- wall (standard) mounted
- floor mounted
- mounted on a common base plate and the motor, with anti-vibration blocks and electric wiring,

ACCESSORIES

The following shall be supplied in accordance with NFPA 20:

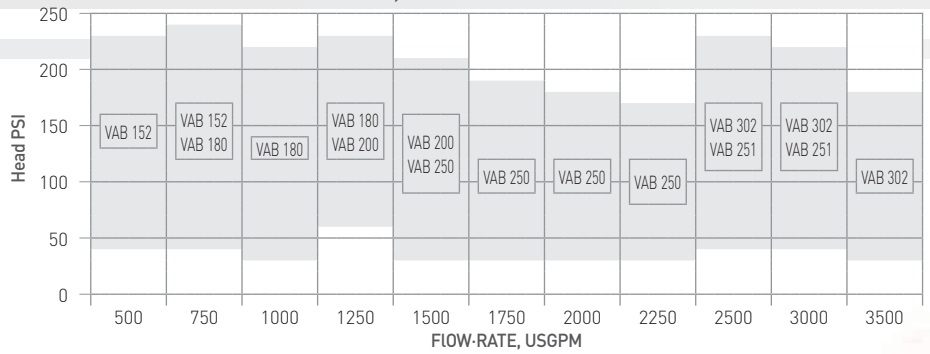
- 1/2" automatic air release valve
 - (Ø3 1/2 - 16 bar) suction and discharge pressure gauge
 - circulation relief valve (electric pump) 3/4" 1"
 - main relief valve 3" 4" 6" 8"
 - enclosed waste cone with glass 3"x5" 4"x8" 6"x10" 8"x12"
 - hose valve test header 4" 6" 8" 10"
- complete with 2 3 4 6 8
- 2 1/2" hose valves with caps and chain 4" 5" 6" 8" 10"
- flow test meter

TYPICAL INSTALLATION OF FIRE-FIGHTING SETS WITH VERTICAL

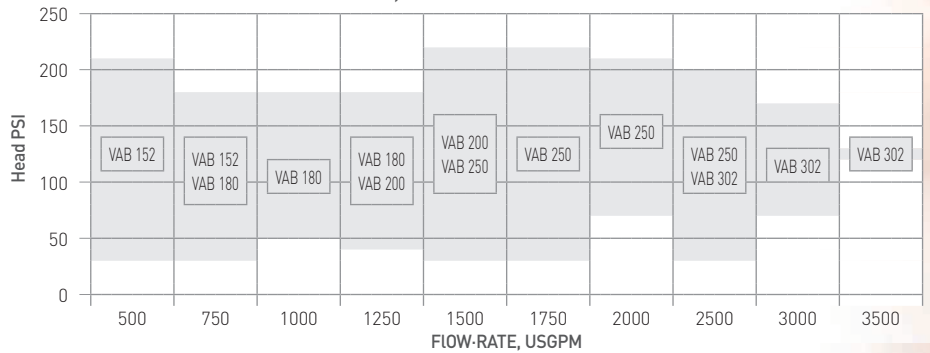


- 1_Diesel engine fire pump controller
- 2_Batteries
- 3_Right angle gear
- 4_Verticle turbine pump
- 5_Discharge pressure gauge
- 6_Jockey pump
- 7_Automatic air release valve
- 8_Concentric discharge increaser
- 9_Check valve
- 10_OS & Y gate valve
- 11_Electric motor controller
- 12_Jockey pump controller
- 13_Test flow meter
- 14_Main relief valve
- 15_Open discharge overflow cone
- 16_Fuel tank
- 17_Diesel engine
- 18_Flexible exhaust connection
- 19_Exhaust muffler

VERTICAL PUMPS AT 1700 RPM, F. M. APPROVED RANGE HEAD. PSI FLOW-RATE USGPM



VERTICAL PUMPS AT 1700 RPM, F. M. APPROVED RANGE HEAD. PSI FLOW-RATE USGPM



TECHNICAL SPECIFICATION FOR VERTICAL FIRE PUMPS COMPLY TO NFPA 20 AND/OR FACTORY MUTUAL STANDARDS

The set supplied by Audoli & Bertola for fire-fighting service shall include the Pump, driver, controller and fittings in the following technical specifications. The set shall be manufactured according to the standards of the "National Fire Protection Association", section 20.

The materials shall be:

- Factory Mutual Research Corporation (FM) approved
- Underwriters Laboratories (UL) (ULC) listed specifically for fire-fighting service.

All the materials supplied shall be installed as recommended in NFPA 20.

TEST PERFORMED BY THE MANUFACTURER

Each pump shall be subjected to a hydrostatic test of at least 5 minutes, at a pressure not less than 1.5 times the shut-off head plus maximum suction head and at any event, at a pressure not lower than 250 PSI.

The pump shall be able to deliver 150% of the nominal flow at no less than 65% of head at the working point, and the shut off head shall not exceed 140% of the rated head.

FIELD TESTS

A field test shall be performed by a suitable flow measuring device.

The test shall be conducted to NFPA 20, by:

- the installer
- the Audoli & Bertola engineer
- at the presence of authority responsible for acceptance release.

VERTICAL TURBINE PUMP

The type _____ fire fighting pump, dimensioned according to NFPA 20 shall be

- Factory Mutual Research Corporation (FM) approved
- Underwriters Laboratories (UL) (ULC) listed for the following performance ratings:

Q _____ m³/h _____ USGPM _____

H _____ m _____ PSI _____ RPM _____

Length of pump from base plate/ strainer _____ mm

Minimum submergence _____ m at 150% of nominal flow.

The fire-fighting pump shall be made casing and discharge head head of cast-iron, bronze impellers, stainless steel strainer and gland packing with hard chromed shaft sleeve.

Discharge flange Dn _____ PN _____ / _____ " ANSI _____ #

Pump head construction:

- 90° right angle gear drive
- vertical hollow shaft motor (NEMA)
- solid shaft electric motor (IEC-UNELL-MEC)

The column line shall be:

- open line shaft water lubricated by the pumped liquid
- enclosed line oil lubricated (static water level > 15 m).

ELECTRIC MOTOR

The electric motor shall be vertical V1 type or horizontal foot mounted B3 type, powered at _____ V, 3-phase, 50 hz, with rated power of _____ kW, with IP 55 protection and F insulation class.

Starting current shall not exceed the values specified in NFPA 20.

The electric motor shall be installed:

- directly mounted on discharge head complete with bearings and anti-rotation device.
- on a separate steel base, and connected to the pump by means an elastic coupling or cardan shaft, protected by a suitable joint cover. Correct alignment shall be verified in the field, before the tests, by skilled technicians.

RIGHT ANGLE GEAR

The hollow shaft angle gear shall be fitted directly to the pump head and shall contain both the thrust bearings and the anti-rotation device. It shall be comply to the NFPA 20 standards with 1.5 AGMA service factor, and shall be

- Factory Mutual Corporation (FM) approved.

ELECTRIC MOTOR FIRE PUMP CONTROLLER

The automatic start control panel shall conform to NFPA 20 stds. and shall be

- Factory Mutual Research Corporation (FM) approved.
- Underwriters Laboratories (IL) (ULC) listed for fire-fighting service.

The controller shall be:

- D.O.L. starting type
- Star delta starting type

The controller, of suitable size for the power installed, shall be dimensioned for an interrupting capacity rating of at least 30 kA RMS sym.

It shall be designed for:

- wall (standard) mounted
- floor mouted
- mounted on a common base plate with pump and the motor, with anti-vibration blocks and electric wiring.

DIESEL ENGINE

The diesel engine shall be horizontal type, comply to NFPA 20 and

- Factory Mutual Research Corporation (FM) approved.
- Underwriters Laboratories (IL) (ULC) listed

Manufacturer _____ Model _____

power rated kW _____ RPM _____

clockwise rotation view from flywheel opposite side.

- water cooled with radiator and fan.
- water cooled with heat exchanger of water cooling circuit in accordance with NFPA 20, consisting of: 4 shut-off valves, 1 pressure regulator valve, 1 pressure gauge, 1 on-off solenoid valve, 2 "Y" strainers, 1 by-pass circuit.

Fitting available:

- Silencer with flexible connection industrial residential
- Set of dual batteries lead acid NiCd type
- complete with rack and cables and electrolyte, shipped in separate containers.
- Fuel tank, of _____ litre capacity, dimensioned to contain 1 gallon of fuel for each maximum engine power HP, plus 10% for sump and expansion area, complete with the following accessories: filler plug, drain valve, feed valve and filter, flame arrest, flexible hoses connection to the engine, visual level indicator, low fuel level switch and supports for floor mounting.
- Engine jacket water heater
- Instrument panel aboard the engine
- Overspeed device
- Emergency contactors.

DIESEL ENGINE PUMP CONTROLLER

The Automatic controller shall conform to NFPA 20 and shall be

- Factory Mutual Research Corporation (FM) approved.
- Underwriters Laboratories (IL) (ULC) listed

specifically for fire-fighting service.

The controller shall be 220 operating volts, single phase, 50hz, and shall be equipped with following minimum accessories:

double battery charger, timer for weekly test and discharge solenoid valve, starting pressure switch, pressure recorder, low fuel level alarm.

It shall be designed to be positioned:

- wall (standard) mounted
- floor mounted
- mounted on a common base plate and the motor, with anti-vibration blocks and electric wiring,

ACCESSORIES

The following shall be supplied in accordance with NFPA 20:

- 1/2" automatic air release valve
- (Ø3 1/2 - 16 bar) suction and discharge pressure gauge
- circulation relief valve (electric pump) 3/4" 1"
- main relief valve 3" 4" 6" 8"
- enclosed waste cone with glass 3"x5" 4"x8" 6"x10" 8"x12"
- hose valve test header 4" 6" 8" 10"
- complete with 2 3 4 6 8
- 2 1/2" hose valves with caps and chain
- flow test meter 4" 5" 6" 8" 10"



FIRE- FIGHTING Pumping Systems



With "Audoli&Bertola" Division, Gruppo Aturia operates in the firefighting field as supplier of water fire fighting packages fully in compliance with the European Standards (EN 12845 e EN 12259-12) and the American Standards (NFPA 20). Audoli&Bertola technical skill allows to easily operate in building and industrial fields and to meet the hardest specifications required by refineries, petrochemical industries and off-shore. Gruppo Aturia offers a wide range of centrifugal pumps for fire fighting application, both in vertical and in horizontal construction. Audoli&Bertola is the only Italian pumps manufacturer to have obtained from "Factory Mutual" the approval for its vertical turbine pumps and split case pumps for a range of capacities from 500 USGPM to 3500 USGPM, at 50 ÷ 60 Hz and Diesel Driven.

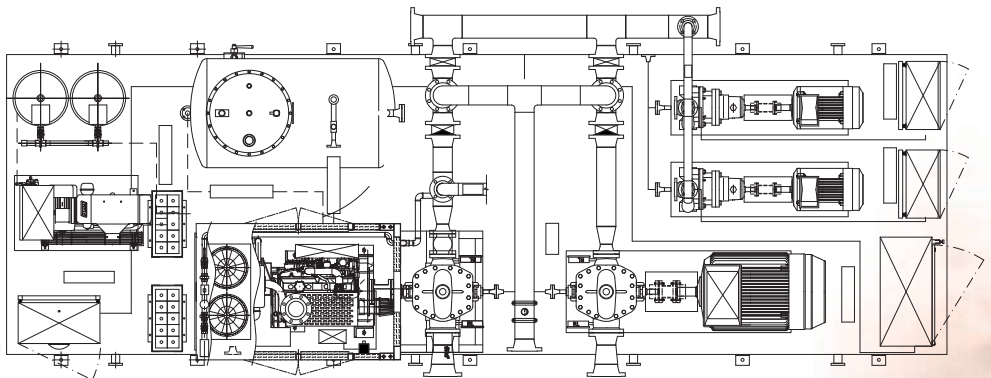
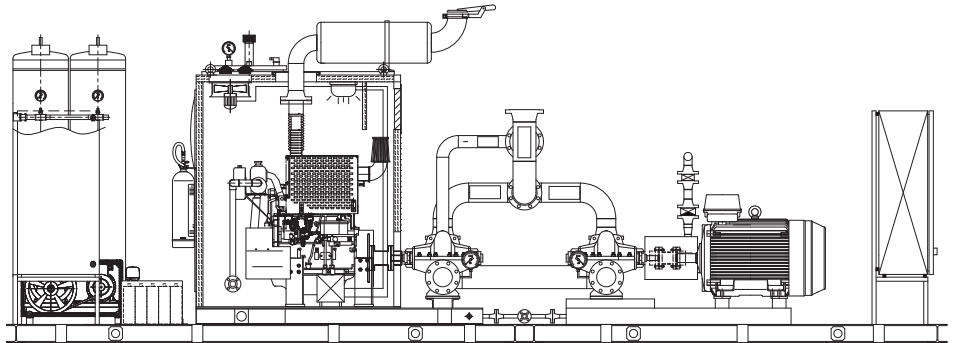
ATEX: Packages and Pumps for ATEX Classified area are available for Electrical Pump and Diesel Engine Driven Pump Fire-Fighting services.

SPLIT CASE PUMPS TYPICAL INSTALLATIONS

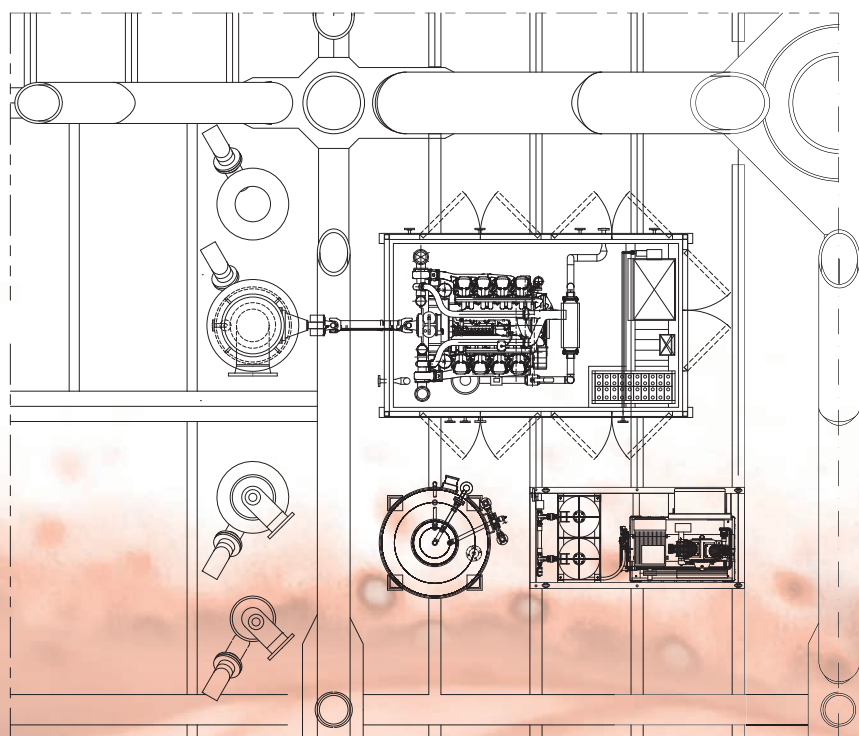
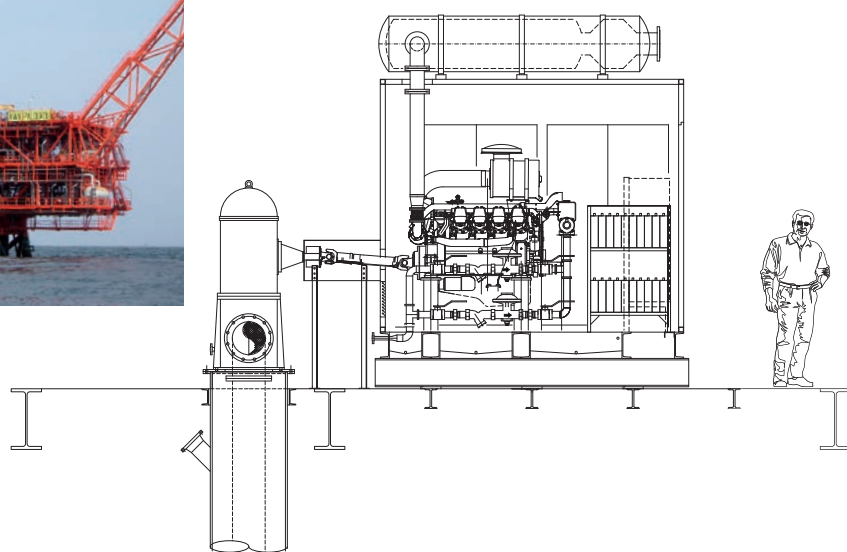
IMPROVING WORKFORCE EFFICIENCY:

Standard factory certifications improve worksite safety

- Class I Division 2 (NEC 500)
- Class I Zone 2 (NEC 505)
- ATEX Directive (94/9/EC) Group II
- 3G Environments (Zone 2) with Gas Group T3
- Electrical IIC and Temperature Class T3



VERTICAL PUMPS TYPICAL INSTALLATIONS





SOME REFERENCES

Ansaldo Energia
Saipem
Snamprogetti
Edison
Danieli
Holzhauer
Abb
Eni
Mondadori
Techint
Silvani
Antibioticos

Sonatrach
Petrofac
Saint-Gobain
Nuovo Pignone (Generale
Electric)
Tecnimont
Rigel
Nuovo Pignone
Rosetti Marino
Comau
Polibrasil
Seda

Technip
Ecis Group
Wormald Ltaliana
Foster Wheeler
Fiat
Johnson Controls
Siemens
Sud Progetti
Riccardi
Samir Refinery
Irasco
Piping Engineering Constr

Progetti Europa & Global
Berger
Danway
Siraga
Fisia Italimpianti
British Gas Tunisia
Shell
Murphy
A.m.general Contractor
Rahmat Dagangan
Enka Teknik

liberati@v.com



A highly efficient servicing organizations, a periodical maintenance service and prompt availability of spare parts are the means adopted by "Audoli & Bertola" to offer its customers a fully satisfactory after-sales service.

Thanks to the "Periodical Technical Servicing Facility - S.A.T.P.", all "Audoli & Bertola" customers may rest secured that the high degree of safety and efficiency of the components will remain unchanged through time.

The periodical checks performed by the "S.A.T.P.", in fact, make it possible to identify and remedy possible anomaly, thereby preventing repair costs from soaring and ensuring long-term service efficiency, necessary to guarantee safety against fires.



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