



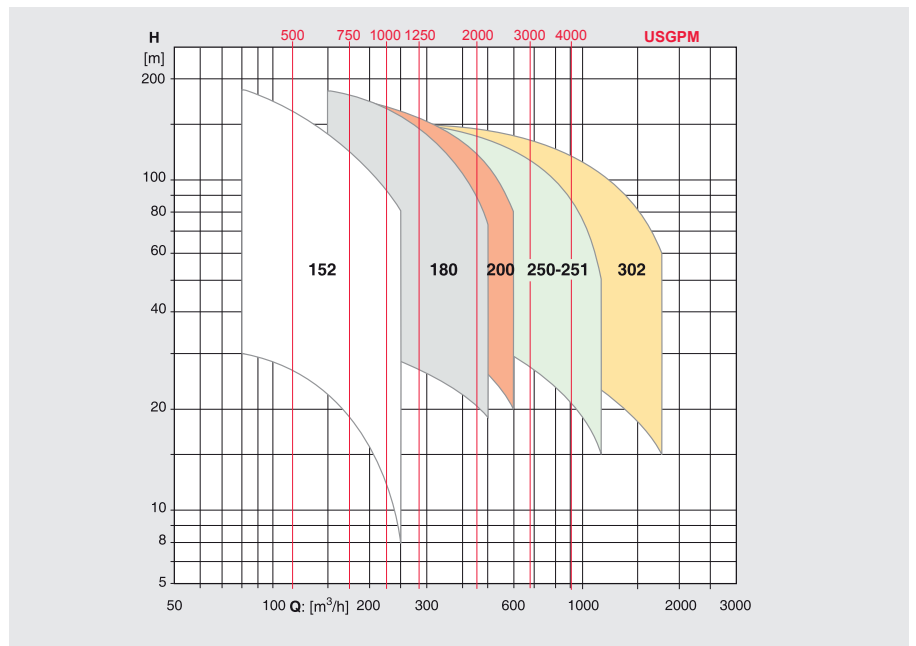
## VERTICAL Shaft, Turbine Type VAB



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.



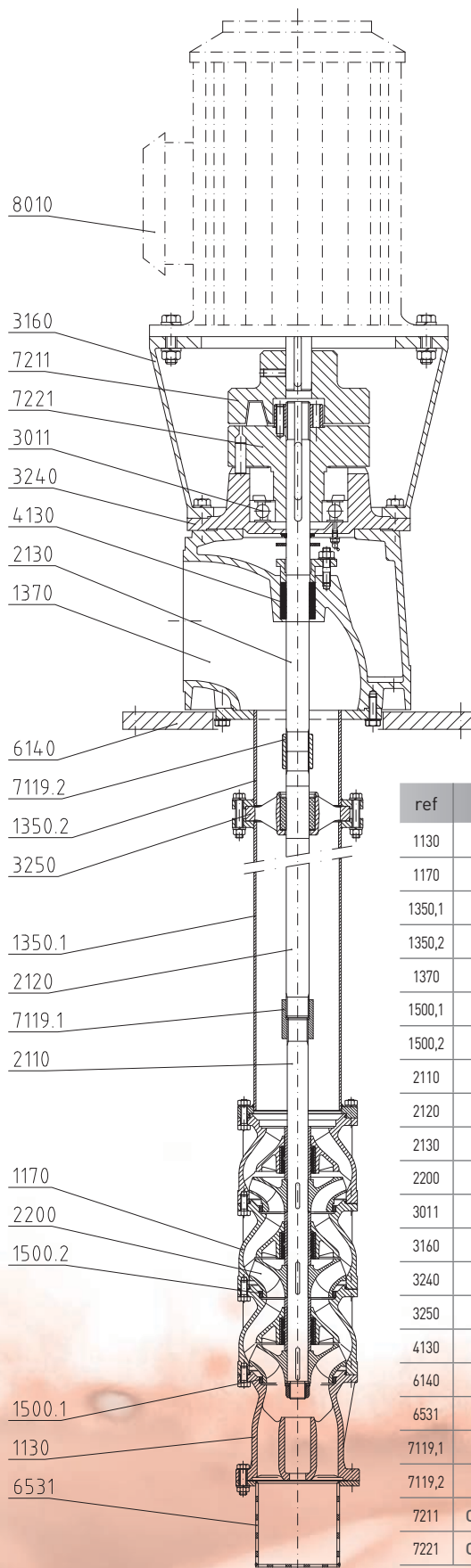
### CHARACTERISTIC PERFORMANCE RANGE



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

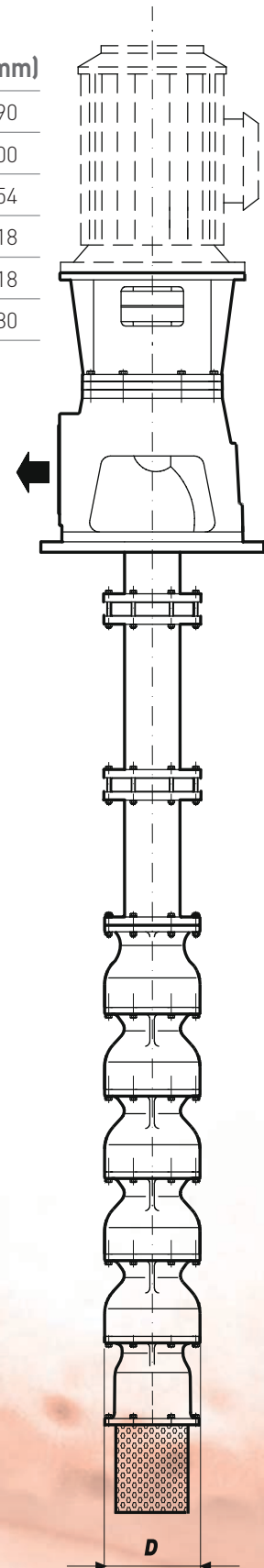
## PUMP DIMENSIONS



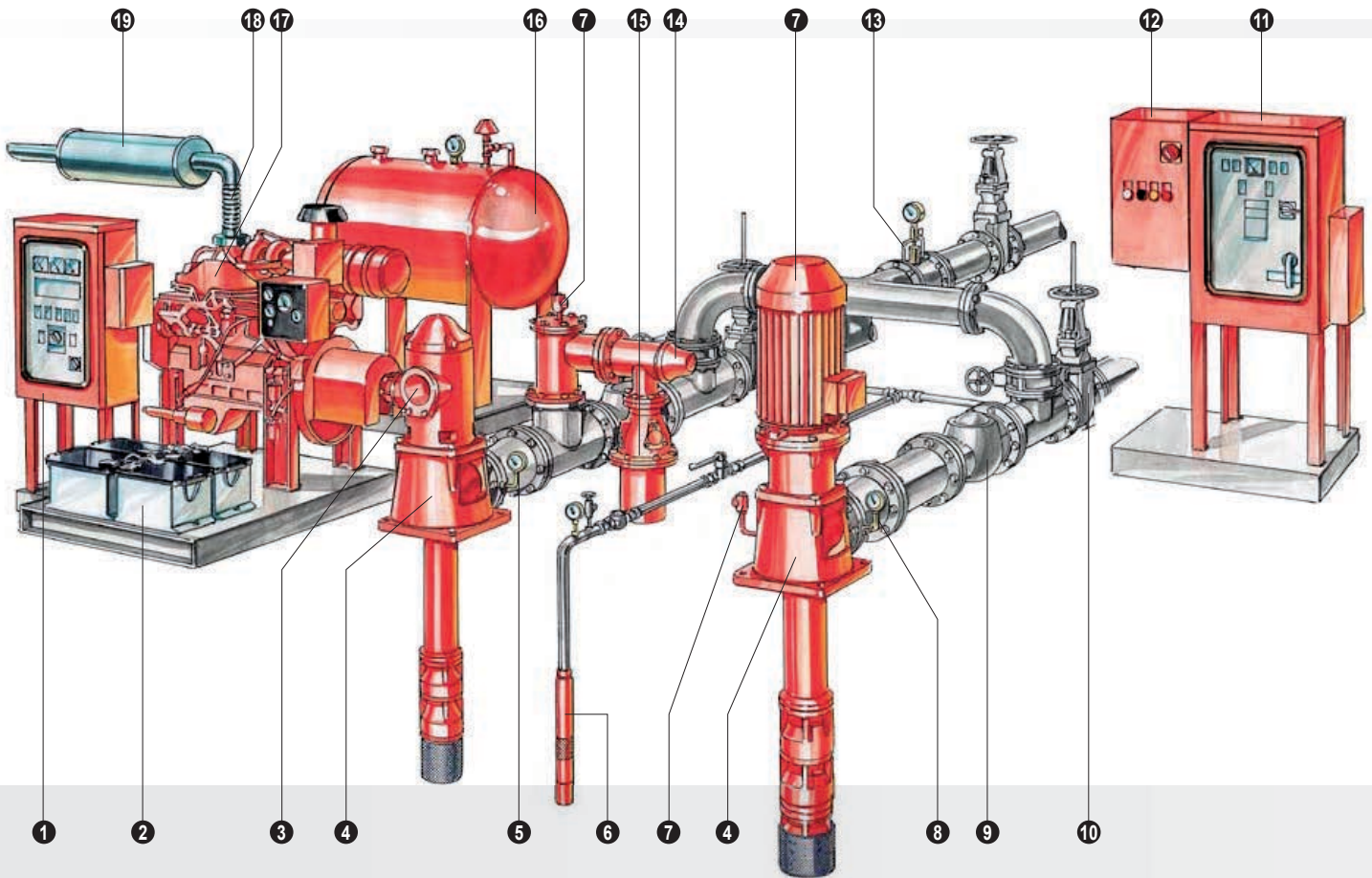
ref	DESCRIPTION	MATERIAL
1130	Bellmouth	Cast Iron - G25
1170	Pump Bowl	Cast Iron - G25
1350,1	Column Pipe	Stainless Steel
1350,2	Column Pipe	Stainless Steel
1370	Delivey Casing	Cast Iron - G25
1500,1	Wear Ring	Bronze
1500,2	Wear Ring	Bronze
2110	Pump Shaft	Stainless Steel
2120	Intermediate Shaft	Stainless 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

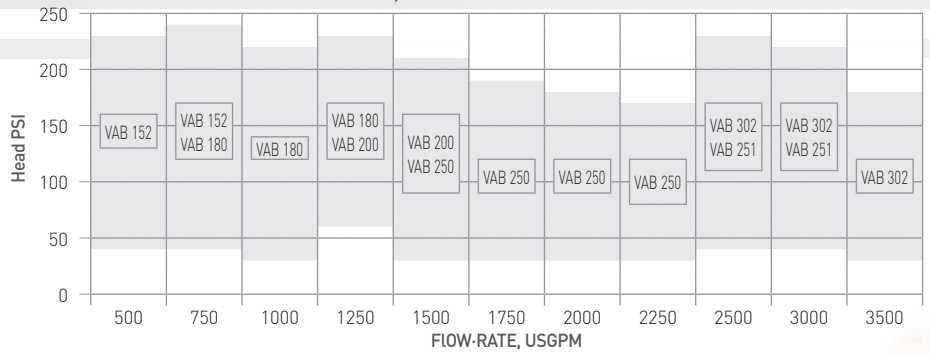


# TYPICAL INSTALLATION OF FIRE-FIGHTING SETS WITH VERTICAL

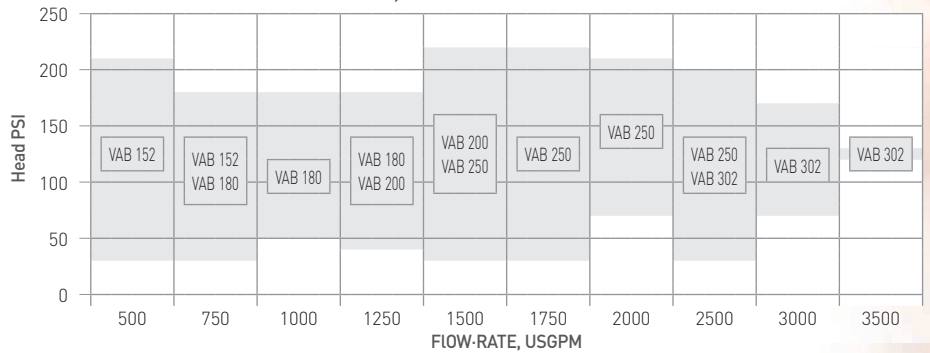


- 1\_Diesel engine fire pump controller
- 2\_Batteries
- 3\_Right angle gear
- 4\_Vertically turbine pump
- 5\_Discharge pressure gauge
- 6\_Jockey pump
- 7\_Automatic air release valve
- 8\_Concentric discharge increaser
- 9\_Check valve
- 10\_OS&Y gate valve
- 11\_Electric motor controller
- 12\_Jockey 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 \_\_\_\_\_ m<sup>3</sup>/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"