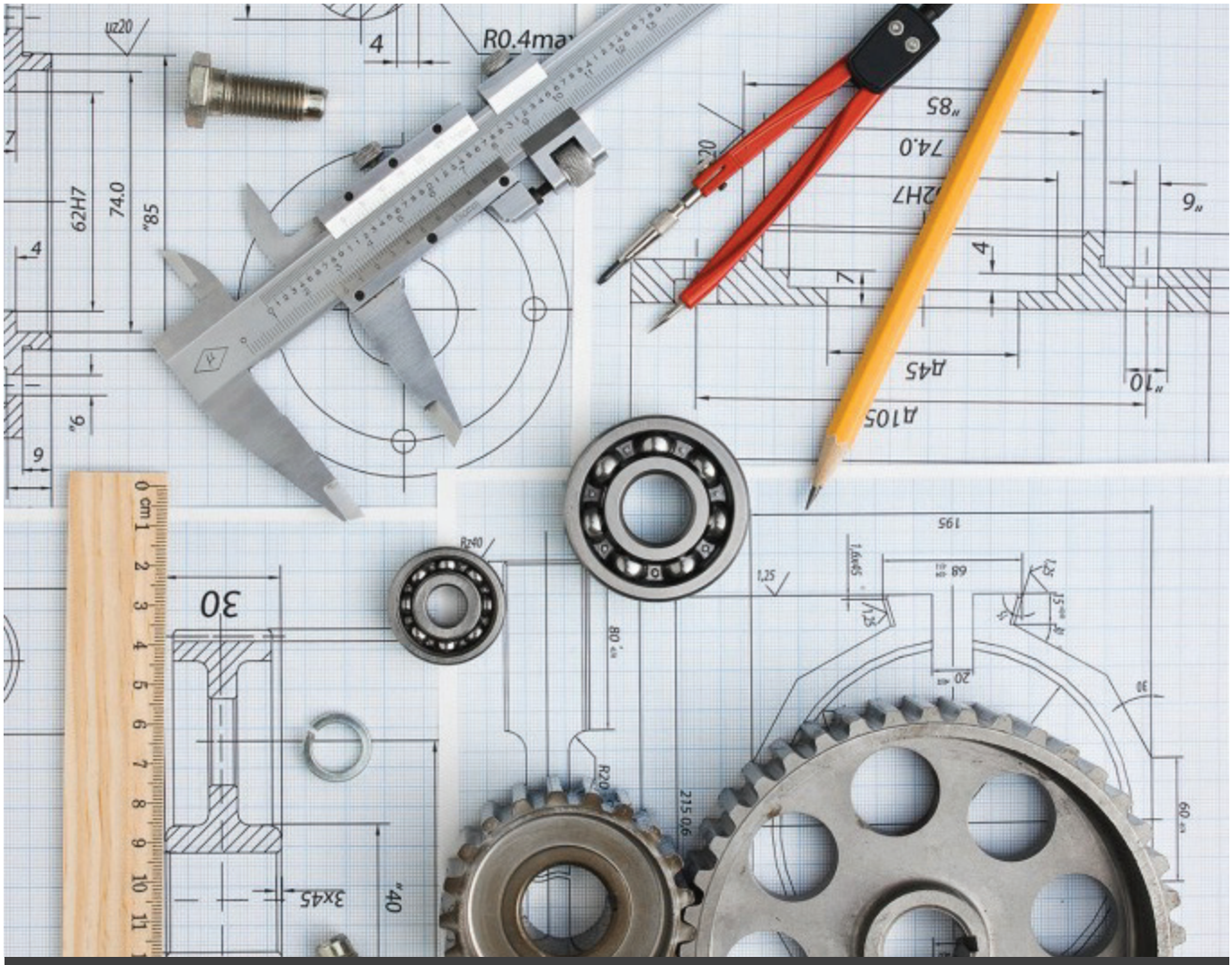
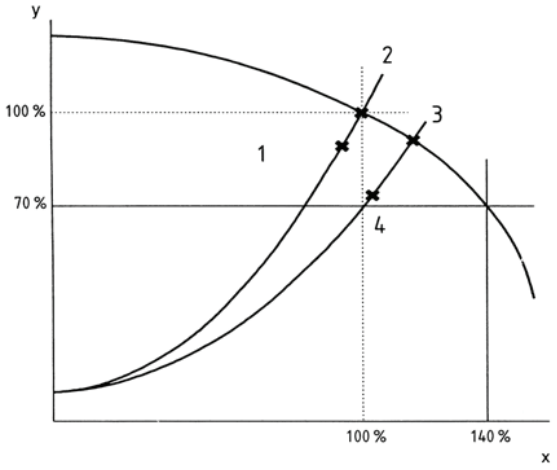
ETNA®



EN 12845 FIRE-FIGHTING BOOSTER INFORMATION BROCHURE

PUMPS

- As per EN 12845, a fire pump should have a stable H(Q) curve.
- Shut off pressure: The shut off pressure of the pump (maximum pump pressure at zero flow rate) should not exceed 125% of the nominal value.
- Nominal Value: Junction point of a requested flow rate-pressure value on the pump hydraulic curve.
- Maximum load: The pump should be able to operate with a capacity of 140% of the nominal flow rate, if required. When the fire pump operates with a capacity of 140% of the nominal value, the pressure should drop down to maximum 70% of the nominal value.



- 2 Designed pump flow
- 3 Desired highest flow
- 4 Most desired area
- x Flow rate
- y Pressure

- Under positive pressure suction head conditions, the suction kit's suction tube diameter may not be less than ND 65. Furthermore, the tube's diameter should not exceed 1.8m/s water flow rate when the pump is run at the maximum desired flow rate.
- Under negative pressure suction head conditions, the suction kit's suction tube diameter may not be less than ND 80. Furthermore, the tube's diameter should not exceed 1.5m/s water flow rate when the pump is run at the maximum desired flow rate.
- The manifolds may not be connected to each other, where multiple pump sets are installed.
- The pumps must be run with an electric or diesel engine, which supplies the minimum power according to the following data.
- Pumps may be vertical or horizontal, however they should always allow inspection or replacement work inside the pump without needing to remove the water suction and discharge manifolds.
- Horizontal pumps should be back pull out type pumps, and their connection to the drive unit (electric motor or diesel engine) should be made with sleeve couplings enabling independent connection.
- The pumps should be in line with EN 12723.

MULTI-PUMP BOOSTERS

- Pumps should have an applicable typical pressure-flow rate curve and be able to operate with all possible flow rates.
- In two-pump booster systems, each pump should be able to fulfill the required pressure and flow rate.
- In three-pump booster systems, each pump should be able to fulfill at least 50% of the required pressure and flow rate.

TEMPERATURE

- The pumps should be ready to run at 4°C ambient temperature or higher with electric motor and at 10°C ambient temperature or higher with diesel engines.

SUCTION KIT

- The suction part of each pump at the booster set should extend as a line for at least two diameters long and the horizontal cap part should connect to an eccentric suction kit featuring a maximum immersion angle of 15 degrees. The valves at the suction side of the pump should not be connected directly to the inlet of the pump, but rather to the larger diameter side of the suction kit.+

OPERATING PUMPS

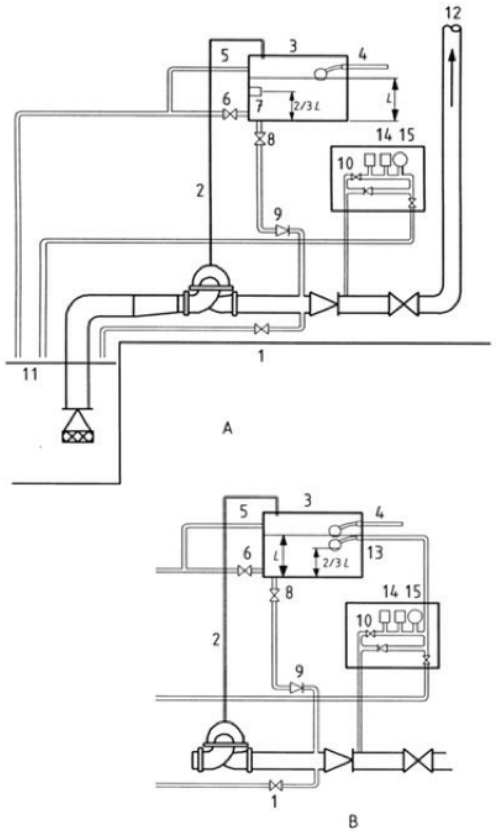
- When the system pressure drops to a value that is not lower than 0.8xP (P: Shut Off Pressure Condition), the first pump set will start-up automatically.
- When a two-pump set is mounted, the second pump should start-up before the pressure drops to a value not lower than 0.6xP.

ELECTRIC PUMP

- It should be able to automatically run the pump when a signal is received from the pressure switch,
- The motor should run when manually operated. It should only be stopped manually after being started.
- The main starter should be a 3-position switch (0 - AUTO. - MAN.), and it should be key-locked; the key should only be removable in AUTO position.

OPERATION TANK

1. Discharge valve for the test
2. Air discharge of the pump, and the lowest flow line
3. Pump start-up tank
4. Inflow
5. Overflow channel
6. Discharge valve
7. Low level key to start-up the pump
8. Priming supply stop valve
9. Priming supply non-return valve
10. Pump start-up kit
11. Suction tank
12. Feed main assembly
13. Low level valve to start-up the pump
14. Pressure switches to start the pump
15. Pressure gauge



- The setup should include a tank positioned at a higher level than the pump, the pipe joint should be sloping towards the delivery side of the pump and a non-return valve (check valve) should be installed to this point.
- Tank, pump and suction pipe are kept completely full of water even if there is a leak from the foot valve (vertical flap) under negative pressure suction head conditions.
- If the pump is run against a shut off valve, arrangements should be made to allow constant sufficient water flow in order to prevent over-heating.
- Circulation should be clearly visible and provided individually for each pump.
- When the water level in the tank drops under 2/3 of the normal level, the pump runs automatically.
- Based on the size of the booster system, the operation tank will have a capacity ranging from 100L to 500L.
- Start up tank will be provided by the manufacturer upon request based on the above given conditions.

PRESSURE SWITCHES

- 2 pressure switches shall be available to operate each pump set. The pressure switches must be connected in series to operate the pump with normally closed connections after one of the switches is turned on.
- Both switches shall be adjusted to the same value.
- The connections of the pressure switches must be minimum 15mm.
- The required instruments to test each pump running with the pressure switch shall be provided.
- There will be a shut-off valve between the pressure manifold and pressure switch; but it shall be installed in parallel to a non-return valve separation valve, which would transfer the pressure loss to the pressure switch even when the valve is closed.

MONITORING PUMP OPERATION

- The following circumstances must be monitored; (See the Alarms Section)
  - Three-phase alternating current (AC) power supply for the engine
  - The pump desired to operate
  - Pump operation
  - Start error
- Each monitored circumstance should be separately and visibly defined in the pump room. Each monitored circumstance should be indicated visibly at a place continuously checked by the responsible personnel.
- Pump operation and failure alarms should also be displayed vocally at the same place.
- Visible failure notification should be in yellow color.
- Acoustic signals should be of at least 75 dB strength and able to be muted.

DIESEL ENGINE GROUP

- Diesel engine should be able to operate at full power continuously at a high place with a constant power output in line with ISO 3046.
- The pump must reach full capacity 15 seconds after it starts to operate.
- Horizontal pumps should be available for direct drive.
- Automatic start and operation of the pump set should not depend on any power sources other than the engine and the power supplies connected to the engine.

ENGINES

- They should be able to start in an engine room with 5°C temperature.
- They should be shipped with a regulator controlling the rated speed at nominal load with a 5% error rate; a mechanical device preventing the automatic activation of the engine should be mounted (key switch 0-MAN.-AUTO) and this device should enable the engine to return to its original position.

COOLING SYSTEM

- An air- or radiator-cooling system taking its power from the engine through a multi-frame setup.

AIR FILTERING

- There will be suitable filter at the air inlet.

EXHAUST SYSTEM

- A suitable silencer should be installed to the exhaust pipe.

FUEL, FUEL TANK AND SUPPLY PIPES

- The quality of the diesel fuel should be in line with the recommendations of the supplier. The fuel tank of the engine should contain enough fuel to run the engine at full load under the following conditions:
  - LH (light hazard) - 3 hours
  - OH (Ordinary Hazard) - 4 hours
  - HHP and HHS (high hazard process and high hazard storage) - 6 hours
- The fuel tank should be made of steel. In case of multiple engines, there should be an individual fuel tank and an individual fuel supply pipe for each engine.
- Fuel tank should be fixed to a level higher than the fuel pump of the engine so that it provides positive pressure, however, the engine should not be right above the pump group. The fuel tank should have a sound fuel level indicator.
- The valves in the fuel supply pipes between the tank and the engine should be placed adjacent to the tank; they should feature indicators and be kept open. Pipe connections should be welded, and metal pipes should be used for fuel pipe lines.
- Supply pipes should be at least 20mm above the base of the fuel tank. A discharge plug with minimum 20mm diameter should be mounted to the base of the tank.

STARTING MECHANISM

- Besides the drive engine and batteries to be used in both systems, there should also be manual and automatic starting systems and these systems should be independent from each other.
- It should be possible to start the diesel engine automatically with the signal received from the pressure switch, and also manually by pressing the respective button on the pump control panel.
- One should be able to turn off the diesel engine only manually and the engine monitoring devices should never cause the engine to stop.
- The nominal voltage of the batteries and the engine operating mechanism should not be below 12V DC.

AUTOMATIC STARTING SYSTEM

- Automatic starting series should be composed of 6 operation attempts for 5 to 10 seconds with maximum 10 seconds in between. The operating device should be able to rerun itself automatically, independently from the power supply line.
- The system should switch to the other battery after each operation attempt. The control voltage should be drawn from both batteries simultaneously. To prevent any adverse effect of one battery on another, the required systems should be provided.

EMERGENCY MANUAL STARTING SYSTEM

- The emergency manual starter systems that are operated with the power supplied from both batteries should be provided with breakable covers. To prevent any adverse effect of one battery on another, the required systems should be provided.

BATTERIES

- The power should be supplied through two individual batteries and these should not be used for any other purpose. The batteries can be lead-acid batteries in line with EN 50342 as they can be rechargeable, light nickel-cadmium cells in line with EN 60623.

BATTERY CHARGERS

- Each starter battery should be provided individually with an independent fully automatic charger with constant connection and fixed potential. It should be possible to separate the charger from one battery while the other is running.

MONITORING ENGINE OPERATION

- Each of the below given conditions should be displayed in the pump set's location and in another reliable location. (See Alarms Section).
  - Not using a key switch that prevents the engine from running automatically.
  - Not being able to operate the engine after six attempts.
  - Pump operation
  - Diesel engine control mechanism failure

  Warning lights should operate as required.

ON-SITE ACTIVATION TEST

- When an installation is subjected to a test, the first automatic action system of the diesel engine should be able to be activated with a separate supply for waiting not shorter than 15 seconds or not shorter than 10 seconds and 6 cycles of operation where each is not shorter than 15 seconds. After 6 operation cycles are completed, the error alarm should start. The fuel should be resupplied, and the engine should start when the manual test start button is pressed.

MONITORING SPRINKLER SYSTEM

- The pump suction valves controlling the flow of water to the sprinkler group should trigger an alarm when they are less opened than their fully opened state. (Like Valve Open, Valve Closed).
- The closed status of all stop valves connected to the sprinkler group and closed status of the pump outlet valves prevent the correct operation of alarm valves such as pressure switch, hydraulic alarm flow switch, or the signaling device. Valve that is less open than its fully opened state should trigger an alarm. (Like Valve Open, Valve Closed).

ALARMS AND ALARM TRANSMISSION

- For the alarms described in EN 12845 standard, an alarm panel should be mounted in the control room or the pump (booster) room and these alarms should be transmitted based on their significance.
- Alarms should be transmitted to the constant control location inside or outside the facility, or to the responsible officer for immediate response.

ALARM LEVELS

- Signals that can be indications of fire like water flow signal should be displayed as fire alarm.
  Alarm Level A - Red Alarm (Visual - Acoustic)
- In case of fire, the technical failures like power failure that prevent the system to work correctly are displayed as failure alarms.
  Alarm Level B - Yellow Alarm (Visual - Acoustic)

ALARM TYPE FOR TRANSMISSION

Low Pressure	Alarm Type B
Water Flow	Alarm Type A

ALARMS FOR ELECTRIC PUMP SET

1 - Optional (pressure drop)
YELLOW (visual and acoustic alarm)

2 - Operation failure	YELLOW	(	‘’	‘’)
3 - Operating (water flow)	RED	(	‘’	‘’)
4 - No power	YELLOW	(	‘’	‘’)

ALARMS FOR DIESEL PUMP SET

1 - When automatic mode is closed
YELLOW (visual and acoustic alarm)

2 - Operation failure	YELLOW	(	‘’	‘’)
3 - Operating (water flow)	RED	(	‘’	‘’)
4 - Failure in controllers	YELLOW	(	‘’	‘’)

PILOT PUMPS

- The pilot pump will optionally run as an independent booster by being turned on and off via the pressure switch to compensate the pressure loss arising from the small leaks in the system, preventing the main pump to be activated needlessly.

Dudullu Organize Sanayi Bölgesi 2. Cad. No: 14
34775 Ümraniye - Istanbul / Turkey
Tel. +90 216 561 47 74 (Pbx) • Fax. +90 216 561 47 50
www.etna.com.tr • info@etna.com.tr

ETNA®

0850 455 38 62
müşteri hizmetleri