

INTRODUCTION FOR CHOOSING A PRESSURE-BOOSTING PLANT WITH INVERTER PANEL

The public water-supply system is normally capable of supplying water at an adequate pressure and capacity level to the various outlets connected to it.

In those cases where a water-supply system is not-existent or insufficient for correct operation of the various facilities, a pressure-boosting system has to be installed to ensure an acceptable level of pressure and capacity also at the outlets in the most unfavourable positions. These are indispensable in all those cases where constant pressure is required.

All the various working phases are managed and controlled by electronic card. All the various calibration parameters appear as display on the display of the electronic card.

If there are any faults or defects a code appears on the display giving details of the problem. All the pumps can work with the same pressure value (set point), or, for systems with high head losses, the pressure can be increased depending on the number of pumps operating. Motors working at reduced speed and check valves that close gradually mean that operation is particularly quiet. All the mechanical components of the pumps and motors are stressed to a minimum, due to the variable speed operation. The motors consume only the power level of power necessary moment to moment, in order to supply the quantity of water required by the system. The use of inverters means that high capacity pressure vessels and membrane vessels are no longer necessary. Even units with high flow rate pumps only require a small number of 20 litre membrane vessels. Depending on water consumption, one or more pumps are activated, all at variable speed, in order to guarantee the quantity of water required at the set pressure. The size of the water-supply unit is determined according to the quantity of water and pressure required.

Residential buildings

The main data needed for calculation of the quantity of water required is given in the following list:

- the number of outlets;
- consumption per each type of outlets (Table 2);
- the contemporaneity factor.

The maximum theoretical requirement is given by the sum of the quantities of water delivered to the various outlets of a flat multiplied by the number of flats.

In practice, it is generally found that the only some if the outlets are used simultaneously.

The contemporaneity factor allows for definition of the real maximum delivery that may be required by the outlets.

CHOOSING THE PRESSURE-BOOSTING PLANT Delivery head

The outlets pressure required for proper operation of electrical appliances must be lower than 1,5 bar and not greater than 4-5 bar. When the pressure level is insufficient and to such a degree that it impedes operation of domestic appliances, a pressure-boosting system must be installed to ensure adequate pressure also at the more unfavourably-located points of demand.

The values to particularly consideration are the following:

- the geodetic head between the pressure-boosting unit and the highest outlet;
- the initial pressure (or positive suction head);
- the minimum residual pressure at the highest outlet (normally 1,5 bar);
- the system head loss.

The pumps are installed with a positive suction head when they are connected to a raised tank or a pressurized primary collection tank. The pumps therefore have an initial pressure at the suction port which can vary from 0,1 bar (suction with collection tank) to 2-3

bar (with suction from a pressurized primary collection tank). When choosing a pressure-boosting system, the positive value of the initial pressure must be considered as a value to be subtracted from the height. The system head loss are given by the sum of the losses of the pipes (including the suction pipe) added to the losses due to the gate valves, non-return valves, water purifiers, counters, filters, elbows etc. Head loss in the tube, caused by the friction of the water against the inner surface of the pipelines, may be quantified as 1 floor in the case of new systems and 2 floor in the case of old systems. To avoid pressure levels greater than 4-5 bar arriving at outlets on the lower floors of apartment block and other buildings with a height greater than 30 m (about 10 floors), pressure reducers must be installed at the offtake point of the lower floors or otherwise two pressure-boosting units can be installed: one for the lower and one for the upper floors.

Surge tanks

The purpose of surge tanks is to retain a quantity of water, under pressure, thus avoiding continuous pump starts, as water is demanded. The selection of the vessel must be made in-line with the pump flow and pressure and number of starts allowed by the motor. For water pressure units with more than one pump, the selection of the vessel should refer to the data for one pump only. The surge vessel may be air cushion and membrane vessels.