



FIRE-FIGHTING IN COMPLIANCE WITH UNI EN 12845

INTRODUCTION TO THE EN 12845 STANDARD

Introduction

The new UNI EN 12845 system Standard, which replaces UNI 9490 and UNI 9489, concerns the design, installation and maintenance of fixed "sprinkler" fire-fighting systems. The pumping units indicated in paragraph 10 of the Standard are made up from: a supply pump that guarantees the system features (or several pumps functioning in parallel) and a jockey pump or small leaks in the system. The activation of the supply pump, which can be electrical or diesel, is governed by the Standard (UNI EN 12845 point 10.2) on the basis of the type of water supply. As requested by the Standard, the EBARA supply pumps used in the FFS-FFB range pumping units are equipped with motors that supply: the power requested in the power curve peak in the case of pumps with non-overloading curves; while, for pumps with power curve that increases with the capacity, supply the power requested up to the capacity corresponding to an NPSH requested by the pump not lower than 16 m. In the first case (Fig.1) the power peak can occur within the work field (curve A) or above (curve B).

In the second case (Fig.2) the power curve grows with the glow rate (curve C), the selection of the motor is made at the flow rate corresponding to NPSHr pump of 16 m or over.



Classes of danger

(UNI EN 12845 paragraph 6 and attachment A)

The choice of the class of danger and water supply (described below) is the competence of the fire extinguishing plant designer.

The Standard envisions that fire extinguishing systems, for protecting building, are designed and built according to classes of danger, divided into three types:

- Light Hazard LH (slight danger);
- Ordinary Hazard OH (ordinary danger), divided into OH1, OH2, OH3, OH4
- High Hazard HH (high danger), divided into:
 - > High Hazard, Process HHP, then divided into:
 - HHP1 High Hazard Process Unit 1
 - HHP2 High Hazard Process Unit 2
 - HHP3 High Hazard Process Unit 3
 - HHP4 High Hazard Process Unit 4
 - > High Hazard, Storage HHS then divided into:
 - HHS1 High Hazard Storage Category I
 - HHS2 High Hazard Storage Category II
 - HHS3 High Hazard Storage Category III
 - HHS4 High Hazard Storage Category IV

Type of water supply

The water supply networks must always supply the pressure and flow rate requested by the system and must guarantee continuity and reliability.

The Standard envisions four different types of water supply (UNI EN 12845 paragraph 9.6):

- Individual water supplies (9.6.1);
- Superior individual water supplies (9.6.2);
- Double water supplies (9.6.3);
- Combined water supplies (9.6.4).

In a fire-fighting pumping unit in compliance with UNI EN 12845, in the cases of "Superior or double water supplies" not more than one supply pump must be activated by an electric motor (point 10.2).

In practice, on these water supply systems, if a unit is supplied with several supply pumps, only one is activated by the electric motor, the others are activated by a diesel engine.



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Performance features – Pre/calculated systems

The performance features of the system for the choice of the pumps must be in agreement with that described in paragraph 10.7 of the UNI EN 12845 Standard. Statement 16 of the Standard establishes the minimum pressure and flow rate features, on the basis of pre-calculated systems for LH and OH classes of danger, with water withdrawn from accumulation reservoirs.

For pre-calculated systems in the HHP-HHS classes of danger, the features of the pump are defined on the basis of paragraph 7.3.2 of the UNI EN 12845 Standard. In these cases, the pump must be able to supply 140% of the flow rate at a pressure not lower than 70% of the pressure at the pump design flow rate. The selection of the performance features, of the number of pumps installed is entrusted to the system designer.

Functioning principle

The supply pump of the fire-fighting pumping unit in compliance with UNI EN 12845, in the case of intervention, is started by the activation of two pressure switches via the electric control panel (every pump has its own electric control panel), and must function continuously until stopping, which can only take place manually (UNI EN 12845 10.7.5.2). The start-up of the supply pump causes simultaneous activation of an acoustic signal via alarms remote control unit installed on manned place. The jockey pump, with small flow rate, intervenes in the case of small leaks from the system, (so as not to cause useless interventions of the supply pump) and is started automatically from its own electric control panel and relative pressure switch calibrated at a pressure value slightly higher than the value of the pressure switch of the supply pump. The stopping of the jockey pump takes place automatically on restoring system pressure.

Standards and Directives

- UNI EN 12845, fixed fire extinguisher systems automatic sprinkler systems.
- UNI 10779, fire extinguishing system Hydrant network
- UNI EN ISO 9906 Attachment A Rotodynamic pumps Hydraulic performance acceptance tests
- 2006/42 EEC Machinery Directive
- 2006/95/CE Low Voltage Directive
- Electromagnetic Compatibility Directive 2004/108

General conditions for use

Use:

- Fixed fire extinguisher systems, automatic sprinkler systems in compliance with the UNI EN 12845 Standard
- Fire extinguishing system, Hydrant networks in compliance with the UNI 10779 Standard

Room for installation and functioning:

- Especially for the pumping unit, closed and protected, with fire resistance no less than 60 minutes (UNI EN 12845 point 10.3)
- Protected via sprinkler (UNI EN 12845 point 10.3.2)
- The pumping unit must not be positioned in buildings or sections of constructions where dangerous processes or risk of explosion are present (UNI EN 12845, point 8.4)
- Protected from freezing (UNI EN 12845 point 8.4)
- Protected from tampering (UNI EN 12845 point 8.4)

Environment temperature:

- Environmental functioning area is 4° ÷ 40°C for electric pumps, at an altitude not exceeding 1000 m a.s.l.
- Max. relative humidity 50% at +40°C

Water power supply temperature:

- Temperature of the water conveyed is 0°÷40°C
- \bullet Temperature of the water conveyed is 0°+25°C, if submersed pumps are used

The water conveyed must not contain solid bodies and fibres in suspension or vegetation, which can cause deposits inside the piping (UNI EN 12845 point 8.1.2).

The pressure of the water must not exceed 12 bar, with exclusion of systems with high vertical development (height difference between the highest and lowest sprinkler > 45 metres) (UNI EN 12845 8 2 1 8 2 2)

(UNI EN 12845 8.2.1, 8.2.2).



FFS-FFB

FIRE-FIGHTING UNITS

FFS - FFB

FIRE-FIGHTING UNITS IN COMPLIANCE WITH UNI EN 12845

The EBARA FFS-FFB type pressure boosting units are applied in the automatic activation water supplies for the automatic fire fighting units in compliance with European Standard UNI EN 12845.

Functioning principle

As established by the UNI EN 12845 Standard, if the firefighting unit supply pumps intervene, they are started by a pair of pressure switches via an electric control panel supplied with each pump and they must function continuously until stopping, which only occurs with a manual control. The start-up of the supply pumps can cause simultaneous activation of an acoustic and luminous long distance indicator. The small flow rate jockey pump (pilot), intervenes in the case of small system leaks and is started and stopped automatically by its own electric control panel and relative pressure switch calibrated at a pressure value slightly higher than the pressure switch value of the supply pump. Stopping takes place when system pressure is resetd. The acoustic - luminous indicator also signals a missing phase, the voltage, lack of water and any incorrect position of the shut-off valves both in discharge and suction. The electric control panels are equipped with pump running signals.

Standards and regulations

The FFS-FFB firefighting pressure boosting units are designed and built in compliance with the following Regulations and Standards:

- UNI EN 12845 Standard, extinguisher appliances, water supplies for automatic systems
- UNI EN 12845/10779 Standard, extinguisher systems Hydrant networks
- 2006/42 EEC Machinery Directive
- 2006/95/CE Low Voltage Directive
- 2004/108 Electromagnetic Compatibility Directive
- European Standards:

EN60204-1; IEC EN60439-1; EN61000-6-4; EN61000-6-2

Conditions for use

The FFS-FFB firefighting pressure boosting units can be used exclusively as envisioned in the UNI EN 12845 LH, OH, HH Standard, in the automatic activation water supplies for the automatic fire fighting units in civil and industrial activities. The water conveyed must not contain solid bodies and fibres in suspension or vegetation and without aggressive and corrosive chemical substances (UNI EN 12845 8.6).

- Minimum temperature of the water conveyed is 0°C, max temperature 40°C (25°C for submersed multistage pumps)
- Environment functioning temperature is 4°÷40°C at a height not exceeding 1000 m a.s.l.
- Max. relative humidity 50% at +40°C

NB: possibly the pumping unit must be installed underhead (UNI EN 12845)

NB: each pump must have its own independent suction pipe (UNI EN 12845).

Versions available

The EBARA fire fighting units are produced in six versions:

- FFS 11/21 3PS: unit made up from 1 or 2 main surface electric pumps, base-joint monobloc and an electric jockey pump;
- FFBE 11/21 ENR: unit made up from 1 or 2 main surface electric pumps, base-joint monobloc and an electric jockey pump;
- FFS 11/21 EVMG: unit made up from 1 or 2 main surface electric pumps, vertical multistage and an electric jockey pump;
- KIT FFS 11/21 S: unit made up from 1 or 2 main submersed electric pumps, vertical multistage and an electric jockey pump;
- FFBD 11/21: unit made up from 1 or 2 main surface pumps, base-joint monobloc and an electric jockey pump;
- FFBD 111: unit made up from 1 pump and 1 main surface electric pumps, base-joint monobloc and an electric jockey pump.









1 2

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5 6

8 9



FIRE-FIGHTING UNITS

REPRESENTATIVE HYDRAULIC LAYOUT WITH OVERHEAD SURFACE PUMPS - VERSION A



REPRESENTATIVE HYDRAULIC LAYOUT WITH OVERHEAD SURFACE PUMPS - VERSION B

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REPRESENTATIVE HYDRAULIC LAYOUT WITH UNDERHEAD SURFACE PUMPS



REPRESENTATIVE HYDRAULIC LAYOUT WITH SUBMERSED PUMPS

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- Supply pump
- 2
- Jockey pump Butterfly shut-off valve 3
- 4 Supply pumps tank
- 5 Ball shut-off valve
- 6 7 Recirculation circuit connection
- 8 Pressure gauge
- 9 Automatic vent valve 10 Non-return valve
- 11 Blind flange/closing cap 12 Pump control pressure switch
- 13 Expansion vessel with membrane
- 14 T-shaped fitting, measuring device connection 15 Extension stub pipe upstream from measuring device
- 16 Flow rate measuring device
- 17 Safety valve
- 18 Pump start-up minimum level switch 19 Filling valve with float
- NB: the accessories and tracts of piping from the pumps outlet to the fittings upstream from the check valves, electric connections included, are the
- NB: the components numbered with the asterisk are supplied on request and separately (*3, *14, *15, *16, flow rate measuring device kit) (*13 expansion vessel), assembly and inspection are the competence of the system manufacturer.
- NB: the components numbered in brackets and the relative hydraulic networks marked are not part of the fire-fighting pressure booster unit, but are competence of the fire-fighting system manufacturer.





Data

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FFS FIRE-FIGHTING UNIT LAYOUT WITH BASE-JOINT ELECTRIC PUMPS

KEY

- Fitting upstream from non-return valve Non-return valve with check valves that can be inspected
- 2
- Connection stub pipe
- 4 Butterfly shut-off valve with no opening electric signal
- 5 6 Discharge manifold
- Jockey pump connection pipes Cross fitting with closing cap, jockey pump line
- Non-return valve with check valves that can be inspected, jockey pump line Ball shut-off valve, jockey pump line
- 8 9
- 10 Ball shut-off valve 11 Automatic vent valve
- 12 T-shaped fitting, recirculation circuit 13 Test and unload ball valve

- 14 Angle valve/diaphragm, recirculation circuit 15/15A closing cap/Priming kit 16/16A closing cap/Pumps local sprinkler supply connection set-up
- 17 T-shaped fitting, pressure switch test circuit 18 Ball shut-off valve, pressure switch circuit test and discharge
- 19 Electric supply pumps starting pressure switches 20 Cross fitting with closing cap, pressure switch test circuit 23 Ball shut-off valve, pressure switch test circuit

- 24 Pressure gauge, pressure switch test circuit 25 Pressure gauge, jockey pump line
- 26 Ball shut-off valve, jockey pump pressure switch circuit 27 Jockey pump start-up pressure switch 28 Blind flange

- 29 Counter-flange 30 Electric supply pump electric control panel
- 31 Electric supply pump electric control panel 32 (*) Manned place alarms control unit
- 33 (*) Acoustic alarm control unit 34 (*) Expansion vessel 35 Three-way stub pipe

- 36 Stabiliser stub pipe 37 Shut-off valve
- 38 Discharge meter
- 39 Power supply electric pump 40 Tapered nozzle for pump discharge speed reduction (for units with 3PS pumps)
- 41 Jockey pump 42 Ball shut-off valve
- 43 (*) Eccentric tapered nozzle 44 (*) Butterfly shut-off valve with no opening electric signal (suction) 45 Ball shut-off valve
- 46 Non-return valve with check valves that can be inspected
- 47 Base 48 Frame
- 49 Lifting eye-bolts 50 Jockey pump line 3 pieces fitting
- (*) Supplied separately on request





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FFB FIRE-FIGHTING UNIT LAYOUT WITH ELECTRIC PUMPS AND BASE-JOINT PUMPS

KEY

- Anti-vibration joint Non-return valve with check valves that can be inspected
- 3/3A Blind flange (cap)/ flow rate measuring device kitButterfly shut-off valve with no opening electric signal
- 5
- Discharge manifold 6
- Jockey pump connection pipes Fitting with closing cap, jockey pump line
- Non-return valve with check valves that can be inspected, jockey pump line Ball shut-off valve, jockey pump line 8
- 10 Ball shut-off valve for expansion vessels 11 Automatic vent valve
- 12 T-shaped fitting, recirculation circuit
- 13 Pressure switch test circuit non-return valve 14 Angle valve/diaphragm, recirculation circuit
- 15/15Å closing cap/Priming kit 16/16A closing cap/Pumps local sprinkler supply connection set-up
- 17 T-shaped fitting, pressure switch test circuit 18 Ball shut-off valve, pressure switch circuit test and discharge
- 19 Electric supply pumps starting pressure switches
- 20 Closing cap fitting, pressure switch test circuit
- 21 Fuel tank
- 22 Collection tank
- 23 Battery
- 24 Pressure gauge, pressure switch test circuit 25 Pressure gauge, jockey pump line
- 26 Ball shut-off valve, jockey pump pressure switch circuit

- 27 Jockey pump start-up pressure switch 28 Blind flange
- 29 Counter-flange 30 Supply pump electric control panel
- 30A Electric supply pump electric control panel (present in the FFBD111 versions)
- 31 Electric supply pump electric control panel
- 32 (*) Manned place alarms control unit
- 33 (*) Acoustic alarm control unit 34 (*) Expansion vessel
- 36 Stabiliser stub pipe 37 Shut-off valve
- 38 Discharge meter
- 39 Supply pump
- 39A Electric supply pump (present in the FFBD111 versions)
- 40 Tapered nozzle for pump discharge speed reduction 41 Jockey pump
- 42 Ball shut-off valve, in jockey pump suction line 43 (*) Eccentric tapered nozzle
- 44 (*) Butterfly shut-off valve with no opening electric signal (suction) 45 Ball shut-off valve
- 46 Non-return valve with check valves that can be inspected 47 Base
- 48 Manifold support thrust blocks
- 49 Jockey pump line 3 pieces fitting

(*) Supplied separately on request



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FFS FIRE-FIGHTING UNIT WITH VERTICAL MULTI-STAGE ELECTRIC PUMPS LAYOUT

KEY

- Fitting upstream from non-return valve Non-return valve with check valves that can be inspected 2
- Connection stub pipe
- Butterfly shut-off valve with no opening electric signal 4
- 5 6 Discharge manifold
- Jockey pump connection pipes Cross fitting with closing cap, jockey pump line
- Non-return valve with check valves that can be inspected, jockey pump line Ball shut-off valve, jockey pump line 8
- 9
- 10 Ball shut-off valve 11 Automatic vent valve
- 12 T-shaped fitting, recirculation circuit 13 Test and unload ball valve

- 14 Angle valve/diaphragm, recirculation circuit 15/15A closing cap/Priming kit 16/16A closing cap/Pumps local sprinkler supply connection set-up
- 17 T-shaped fitting, pressure switch test circuit 18 Ball shut-off valve, pressure switch circuit test and discharge

- 19 Electric supply pumps starting pressure switch electric starting discharge
 19 Electric supply pumps starting pressure switches
 20 Cross fitting with closing cap, pressure switch test circuit
 21 "L" -shaped support bracket (present only in units with EVMG pumps)
 22 Manifold support (present only in units with EVMG pumps)
 23 Ball shut-off valve, pressure switch test circuit

- 24 Pressure gauge, pressure switch test circuit 25 Pressure gauge, jockey pump line
- 26 Ball shut-off valve, jockey pump pressure switch circuit

- 27 Jockey pump start-up pressure switch 28 Blind flange
- 29 Counter-flange
- 30 Electric supply pump electric control panel 31 Electric supply pump electric control panel
- 32 (*) Manned place alarms control unit
- 33 (*) Acoustic alarm control unit
- 34 (*) Expansion vessel 35 Three-way stub pipe
- 36 Stabiliser stub pipe 37 Shut-off valve
- 38 Discharge meter
- 39 Power supply electric pump 41 Jockey pump

- 42 Ball shut-off valve 43 (*) Eccentric tapered nozzle 44 (*) Butterfly shut-off valve with no opening electric signal (suction) 45 Ball shut-off valve
- 46 Non-return valve with check valves that can be inspected
- 47 Base 49 Lifting eye-bolts
- 50 Jockey pump line 3 pieces fitting
- (*) Supplied separately on request

ALARMS CONTROL UNIT (32)30 (33) .31 •• Œ ••• 18 17 19 24 23 20 39 11 28 22 15 47 16 12 13 5 10 15A 16A (34) 29 22 4 9 3 50 7 26 8 21 27 2 6 41 49 42 FLOW RATE MEASURING KIT (*) SELF-PRIMING KIT 46 35 37 36 38 SUCTION CONE SUCTION VALVE (43) CONTROL WITH HAND WHEEL REDUCER (44) DN 125-150-200-250

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FFS-S FIRE-FIGHTING UNIT KIT WITH SUBMERSED ELECTRIC PUMPS LAYOUT

KEY

- Fitting upstream from non-return valve Non-return valve with check valves that can be inspected 2
- 4
- Connection stub pipe Butterfly shut-off valve with no opening electric signal
- Discharge manifold Jockey pump collection pipes (not envisioned for submersed pumps) 5 6
- Cross fitting with closing cap, jockey pump line
- Non-return valve with check valves that can be inspected, jockey pump line Ball shut-off valve, jockey pump line 8 9
- 10 Ball shut-off valve 11 Automatic vent valve
- 12 T-shaped fitting, recirculation circuit 13 Test and unload ball valve

- 14 Angle valve/diaphragm, recirculation circuit 15/15A closing cap/Priming kit 16/16A closing cap/Pumps local sprinkler supply connection set-up
- 17 T-shaped fitting, pressure switch test circuit 18 Ball shut-off valve, pressure switch circuit test and discharge

- 19 Electric supply pumps starting pressure switches 20 Cross fitting with closing cap, pressure switch test circuit 23 Ball shut-off valve, pressure switch test circuit

- 24 Pressure gauge, pressure switch test circuit 25 Pressure gauge, jockey pump line
- 26 Ball shut-off valve, jockey pump pressure switch circuit 27 Jockey pump start-up pressure switch 28 Blind flange 29 Counter-flange

- 30 Electric supply pump electric control panel
- 31 Electric supply pump electric control panel 32 (*) Manned place alarms control unit
- 33 (*) Acoustic alarm control unit 34 (*) Expansion vessel
- 35 Three-way stub pipe 36 Stabiliser stub pipe 37 Shut-off valve

- 38 Discharge meter 40 Counter-flange (for unit kits with submersed pumps)
- 48 Frame
- 49 Lifting eye-bolts
- 50 Jockey pump line 3 pieces fitting

(*) Supplied separately on request



36 38

(*) FLOW RATE MEASURING KIT

35

37

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FFS-FFB

FIRE-FIGHTING UNITS

IDENTIFICATION CODE - UNITS WITH BASE-JOINT PUMPS



⁽¹⁾ Not indicated in absence of the specific pump ⁽²⁾ Quantity 0 not indicated

⁽³⁾ Not indicated in the units with 3PS pumps

IDENTIFICATION CODE - UNITS WITH VERTICAL MULTISTAGE ELECTRIC PUMPS



IDENTIFICATION CODE - UNITS WITH SUBMERSED ELECTRIC PUMPS



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