Pumping equipment for fire protection
The reliability of one brand for the most demanding requirements

KSB is the leading manufacturer of pumping equipment for fire protection (FP) in Spain. This leadership is not a coincidence but instead is based on an array of capabilities that make KSB an undisputed benchmark in the sector. Important contributing factors include the high technological standard of our designs and our more than sufficient material and human resources to ensure faithful compliance with contractual rules and also with the mandatory regulations in the country of destination.
KSB pumps:
- FM approved split case pumps.
- Pumps certified according to the following standards: VdS, APSAD/CNPP, LPC, BMOKE, ZUZ/Pavus, CNBOP and APCL.
- Pumps according to EN 733 and ISO 5199.
- Vertical submerged pumps.
- Multistage pumps.

KSB valves and actuators:
APSD/CNPP approved butterfly valves and actuators (up to 16 bar) and FM approved for higher pressures.

Complete KSB pumping equipment for FP with pumps, electric motors, diesel engines, valves, manifolds, pressure switches, and handling and control panels - according to the most demanding standards: FM, NFPA-20, UNE 23500:2012, EN 12845, Cepreven RT2-ABA and RT1-ROC, VdS, NC, etc.
Pumping equipment description

KSB manufactures pumping equipment for FP with two kinds of supply formats:

**UNIT**
Each UNIT consists of a main pump, with its electric motor or diesel engine and diesel tank and batteries, coupling, baseplate and control panel. Optionally, the pressure maintenance pump (jockey pump) and its control panel can be mounted on the same baseplate. In no case does the unit include valves or a general manifold.

**SET**
Each SET consists of one or various main pumps, with their electric motor or diesel engine and diesel tank and batteries, coupling, common baseplate, control panels, shut-off and check valves, concentric diffusing cones, pressure switches, pressure gauges, general discharge manifold, hydropneumatic accumulator and accessories. Optionally, the flowmeter can be supplied separately, as can the testing assembly made up of the manifold, the isolation valves for each main pump and the flow control valve.
Each fire pump must comply with very specific requirements. First, there are the different methods of fighting fires. These include sprinkler systems, fire hose reels (FHCs), outdoor hydrants, foam, water spray and water mist, etc. In addition to handling the differences in application, the pumps must also comply with different national and international approval regulations. KSB’s comprehensive programme can always provide the right solution for your needs.

With this in mind, our equipment is manufactured in accordance with the standard required for each case, either because of the official requirements of the country, or because of contractual requirements. The most common standards are:

KSB manufactures pumps and valves that are certified by the following organisations:

![FM Approvals](image)
![cepreven](image)
![VdS](image)

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<tr>
<th>KSB Fire Protection Series</th>
<th>UNIT SET</th>
<th>NFPA-20 Non listed</th>
<th>FM Global</th>
<th>UNE EN 12845</th>
<th>UNE 23500 2012</th>
<th>Cepreven RT2-ABA</th>
<th>Cepreven RT1-ROC CEA 4001</th>
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(1) Other standards on request.
(2) Annex C.
Daimler AG Mercedes-Benz production plant in Vitoria where the fire protection system uses KSB pumping equipment

**SET class FP equipment**

EDS UNV-12/65-JE equipment
In accordance with UNE 23500:2012 Annex C

EDS EC-320/90-JDD equipment
UNIT class FP equipment

Torre Agbar in Barcelona, at 142 metres in height, has 32 floors with a glass and aluminium exterior that make it resemble a giant water fountain. The tower houses a 39,000 m² office complex with KSB products for various services, including the fire protection systems. The French architect Jean Nouvel designed the Torre Agbar in homage to the famous Catalan architect Antonio Gaudí (1852-1956).
In terms of construction, the SET class of pumping equipment is the most complete since, in addition to the pumps with their motors and fully-wired control units, this class includes an individual bypass for testing, pressure switch and pressure gauge assemblies, general discharge manifold, common baseplate, hydropneumatic accumulator, valve systems and accessories.

1. Jockey pump
2. Main pump with diesel engine
3. Main pump with electric motor
4. Common baseplate
5. Pump-motor coupling
6. Battery set
7. Diesel emergency start-up panel
8. Complete motor wiring (control panel, sensors)
9. See detail on page 9
10. Diesel tank sensor
11. Diesel pump control panel
12. Diesel tank
13. Water-water heat exchanger
14. Diesel engine exhaust silencer
15. Jockey pump pressure switch and pressure gauge
16. Electric pump control panel
17. Hydropneumatic accumulator connection
18. General discharge manifold
19. Heat exchanger circuit
20. Pressure reducer valve for the heat exchanger
**Differentiating details**

KSB pumping equipment complies with the standards for which it has been designed down to the smallest detail.

Each main pump has a set of pressure switches at the discharge outlet.

There is also a pressure switch located before the check valve to confirm that there is pressure at the pump outlet when it is required, and two pressure switches with normally closed contacts connected in series, so that the opening of the contact of any of them or wire break causes the start up of the main pump.
Materials and testing complying with the standards

Materials for the main parts of the pump:

- Impeller cast in a single piece in bronze or stainless steel depending on pump size.
- Bronze or stainless steel wear ring.
- Shaft sealing by gland packing.
- Stainless steel shaft sleeve.

**KSB model BOAX-B valves for the main pumps.** These are butterfly valves with a reducer and flywheel, clearly identifiable position indicator, chain with a padlock to fix the position and 2 contacts for electrical supervision: “fully open” and “fully closed”.

The pump start-up and control panels faithfully meet the specifications of the standards for which they are designed. They are all wired and numbered according to the attached diagram and are tested at KSB. Jockey pump control includes delayed pump stop after order reception.

In the control circuit of the electric main pump, which is protected by fuses, the starters are fed at the nominal voltage between mains phases (400 V), and not at the reduced voltage taken between phase and neutral.
European standards (EN 12845, UNE 23500:2012, CEA 4001, Cepreven RT1-ROC, etc.) require that motor power must be greater than or equal to the maximum power consumed by the pump at any point on its characteristic Q-H curve. To determine how the maximum power consumption has to be calculated, the standards distinguish between two types of pump according to their power consumption curve:

A. The power consumption increases as the flow increases, until it reaches a maximum value, and then decreases as the flow continues to increase. This is typical of pumps with semi-axial impellers.

B. Power consumption continuously increases as the flow increases. Typical of pumps with a radial impeller.

In accordance with European standards, KSB guarantees correct selection of the motor’s useful power, in kW, by showing the entire curve for pump operation up to an NPSHr of 16 m.

Is maximum power consumption 45 kW?

NO. This only appears to be the case if the coloured area with the complete curve for the pump is not shown until it reaches a positive suction threshold of 16 m.

In fact, the maximum power consumption is 55 kW. We will therefore require a motor, control panel, cables, transformer, etc., for 55 kW.
Test benches

Reliable proof

KSB test benches are equipped with state-of-the-art measurement and control technologies.

KSB Spain has modern test benches to test pumps from 0.5 to 710 kW at different speeds, having a frequency converter for all the power ratings.

With the test benches that KSB has in Europe, pumps with a power of up to 20 megawatts (MW) can be tested.

By means of large stainless steel tanks that can be subjected to a vacuum or pressurized up to 4 bar, measurement of required NPSH (between 0.3 m and 49.0) m can be carried out in the KSB test bench in Zarautz.

The test bench is fully automated. All valves are piloted and operated from the control room or even from Germany or another KSB Group test bench via the Internet. The results are produced automatically.

The test bench that KSB has in its factory in Zarautz (Spain) has the following facilities:

- Surface area: 1,000 m²
- No. of benches: 9
- Installed power: 1,600 KVA
- Speed: variable using frequency converter
- Q per pump: up to 4,500 m³/h
- H per pump: up to 400 m (40 bar)
- DN max: DN 600
- Minimum NPSH: 0.3 m
- Maximum NPSH: 49 m
- Inspection with complete protocol: up to 75 b/day
The certificates issued with each set of KSB pumping equipment are a faithful reflection of:

- a) The construction characteristics of the materials.
- b) The tests carried out in our factory’s test bench.
- c) The standards or regulations with which the contracted equipment complies.

Certificate type 3.1 sample from the testing of an electric pump and a diesel pump in our test benches.

Pumping equipment compliant with standard UNE 23500:2012 includes the following documentation:

- Theoretical curve for each main pump showing the total power consumed according to the standard.
- In horizontal pumps, 2.1 certificate for materials: body, impeller, shaft, sleeve, rings, sealing.
- In vertical pumps, 2.1 certificate for materials: body, cells, impeller, shafts, sleeve, bearing.
- The 2.1 certificate for materials clearly states that the impeller is cast in a single piece.
- Instruction and operating manuals for pumps and motors.
- Dimensional drawings of the assembly.
- Sectional plan of the pump with parts list.
- List of recommended spare parts for 2 years of operation.
- Diagram of each pump start-up and control panel, including jockey pump.
- Certificate type 3.1 for the values required by the standard for the manufacturer’s bench tests.
- CE certificate for the unit or equipment.
- Certificate of compliance with the standard or standards that the unit satisfies.
Ideas: Technology and innovative products

KSB’s exceptional products are the result of great ideas. Behind this success is the work of many research experts - from Engineering to Development - who provide pioneering technological solutions.

KSB adapts its products to the most demanding technical requirements, addresses all aspects of the concept of safety, and offers fire protection in all its formats, guaranteeing reliable and durable products.
KSB’s commitment continues beyond supply of the product. The Service department offers a wide range of services:

- Commissioning of the equipment carried out by professional technicians with checking guidelines to guarantee correct operation from the moment of the initial start-up.
- Preventive maintenance of the equipment, with monitoring of the fundamental operating parameters.
- Corrective maintenance with guaranteed repairs carried out by specialists.

The experience and technical know-how of KSB are available to all customers through the Zarautz Training Centre, which has two classrooms, one theoretical and one practical, and a test bench exclusively for training that is in no way connected to the test bench used for production.

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