

[Scientific and Research Centre for Fire Protection
National Research Institute]

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Series: NATIONAL TECHNICAL ASSESSMENTS

CNBOP-PIB NATIONAL TECHNICAL ASSESSMENT
CNBOP-PIB-KOT-2020/0207-1005 edition 2

Pursuant to the Regulation of the Minister of Infrastructure and Construction of 17 November 2016 on national technical assessments (Journal of Laws 2016, item 1968), upon the proceedings on the issuance of the National Technical Assessment conducted in the Centrum Naukowo-Badawcze Ochrony Przeciwpożarowej – Państwowy Instytut Badawczy [Scientific and Research Centre for Fire Protection – National Research Institute] in Józefów k/Otwocka, upon the request of:

Wilo Polska Sp. z o.o.
ul. Jedności 5, 05-506 Lesznowola

it is hereby certified that the construction product named below has successfully undergone the assessment of performance for its intended use:

SiFire EN firefighting pump set, models: E, EJ, EEJ, D, DJ, EDJ, sizes: 40-250; 50-160; 50-200; 50-250; 65-200; 65-200N; 65-250N; 65-315R; 80-200; 80-250; 80-315R; 100-200; 100-250; 100-315R; 125-250; 150-315.

manufactured by **Wilo SE**
Wilopark 1,
44263 Dortmund, Germany

of application, scope, conditions as well as under provisions set out in the appendix, which constitutes an integral part of this CNBOP-PIB National Technical Assessment.

Validity period

from 19 May, 2021
to 28 July, 2025

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Deputy Director
Certification and Approval
(-) [signature illegible]
st. bryg. dr inż. Jacek
Zboina

Appendix:

General and technical provisions

Józefów, 19 May, 2021

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GENERAL AND TECHNICAL PROVISIONS

1. TECHNICAL DESCRIPTION OF THE PRODUCT

1.1 General technical arrangements of the product

The subject of this National Technical Assessment is the firefighting pump set type SiFire EN, models: E, EJ, EEJ, D, DJ, EDJ, sizes: 40-250; 50-160; 50-200; 50-250; 65-200; 65-200N; 65-250N; 65-315R; 80-200; 80-250; 80-315R; 100-200; 100-250; 100-315R; 125-250; 150-315.

The firefighting pump sets, type SiFire EN, are pump sets equipped with one or two firefighting pumps. The pump set with two firefighting pumps is equipped with a main pump as well as a standby pump activated only in the event of the main firefighting pump having failed to start. The aforementioned pump sets are intended for pressure boosting of water in sprinkler systems compliant with PN-EN 12845, water spray systems, water mist systems. The aforementioned pump sets may also be utilised in firefighting water systems and grids¹.

1.1.1 Product design

The main components of the firefighting pump sets are as follows:

- Horizontal, centrifugal, axial-suction, single-stage firefighting pumps, type WNF-S, sizes: 40-250; 50-160; 50-200; 50-250; 65-200; 65-200N; 65-250N; 65-315R; 80-200; 80-250; 80-315R; 100-200; 100-250; 100-315R; 125-250; 150-315;
- Controller type SC-FIRE;
- Electric and Diesel motors;
- Mounting base frame;
- Pressure switches;
- Discharge manifold;
- Check and shut-off valves;
- Pressure gauges.

The pump sets with Diesel motors are equipped with the following auxiliary, integral components:

- Fuel tank;
- Fuel system;
- Batteries allowing the motor to start and the controller to operate in the event of mains power failure.

¹ Firefighting water systems and grids within the meaning of, respectively: the Regulation of the Minister of Interior and Administration of 7 June, 2010, on the fire protection of buildings, other construction buildings and areas (Journal of Laws 2010 No. 109 item 719) and the Regulation of the Minister of Interior and Administration of 24 July, 2009, on fire-fighting water supply and fire roads.

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- Motor water cooling system (if not cooled by air);
- Expansion (anti-vibration) joint, made of rubber, installed on the discharge side of the pump.

The firefighting pump sets with a Jockey pump are equipped with the following auxiliary, integral components:

- Jockey pump;
- Jockey pump controller;
- Jockey pump pressure switch;
- 20-litre pressure vessel.

Additional accessories being optional equipment of the firefighting pump set are as follows:

- Analogue flowmeter;
- Expansion (anti-vibration) joint, made of rubber, installed on the discharge side of the pump set;
- Eccentric reducing cone;
- Butterfly valve;
- Priming tank kit;
- Diesel motor silencer;
- Pump station synoptic table;
- Set of spare parts for Diesel motor;
- Densitometer for the battery.

The firefighting pump set is installed on a base frame made of galvanised steel, with transport holes for forklift and lifting hooks. The pump set is equipped with one or two horizontal, centrifugal, axial-suction, single-stage firefighting pumps, type WNF-S, sizes: 40-250; 50-160; 50-200; 50-250; 65-200; 65-200N; 65-250N; 65-315R; 80-200; 80-250; 80-315R; 100-200; 100-250; 100-315R; 125-250; 150-315, depending on the required performance parameters. The following are installed on the base frame: the firefighting pump or pumps, Jockey pump and the pump controller or controllers. The check valve, pressure switches, butterfly valve, and discharge manifold are connected to each firefighting pump.

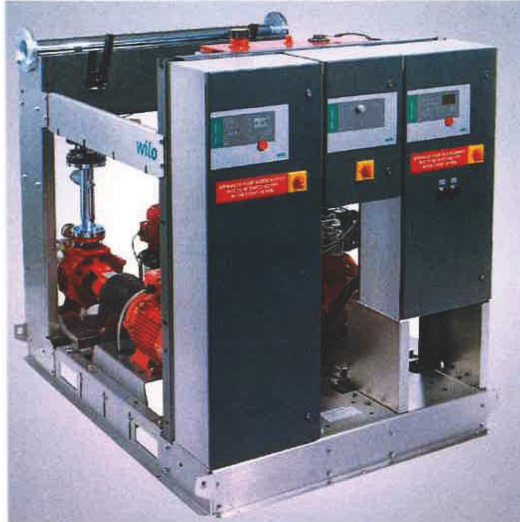
The design of the firefighting pump set allows for it to be installed on a concrete foundation. Amortisation of the pump set is ensured by means of the base frame for Diesel motor.

The firefighting pump set is equipped with flange connections DN 65 to DN 200 on the suction side and flange connections DN 65 to DN 250 on the manifold. The firefighting pump discharge pipes are equipped with a priming connection DN 50 at the bottom and a measuring connection DN 50 to DN 200 at the top as well as $\frac{3}{4}$ " connection for pump air-venting.

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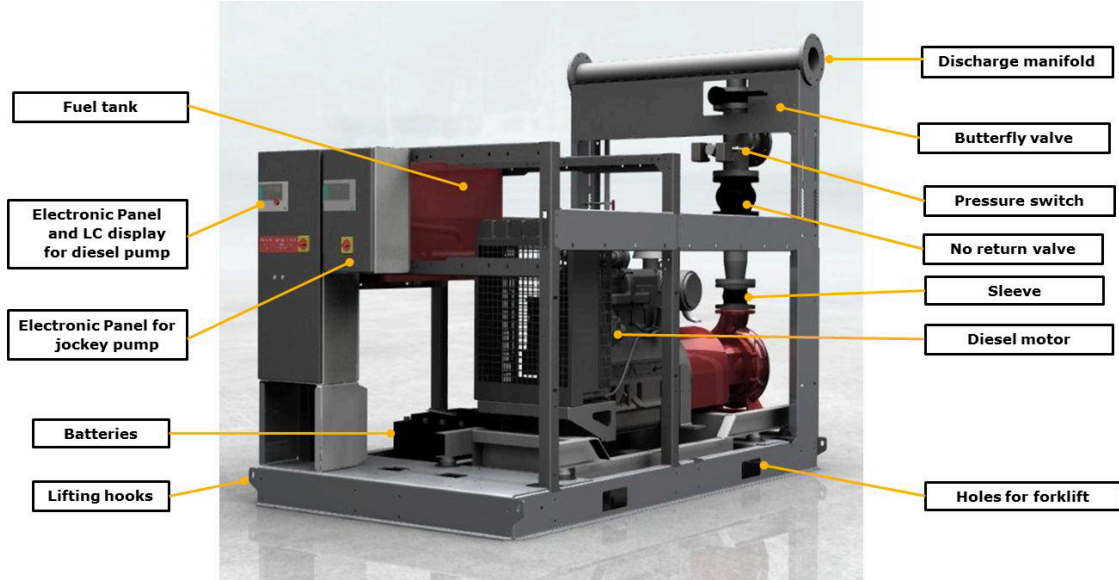
A sample firefighting pump set is illustrated in Photograph 1 and Photograph 2. The main components of the firefighting pump set with a description of their function are provided in Table 1.

[a photograph presenting a firefighting pump set]



Photograph 1. Illustration of the firefighting pump set type SiFire-EN-40/250-219-15/17.7/1.1EDJ
Source: Manufacturer's materials.

[a photograph presenting a firefighting pump set with a description of components]



Photograph 2. Illustration of the firefighting pump set type Wilo SiFire-EN-125/250-267-197/1.11DJ
Source: Manufacturer's materials.

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Table 1

No	Component	Function
1	Horizontal, centrifugal, axial-suction, single-stage firefighting pump* with Diesel or electric motor and with spacer coupling * or: firefighting pumps (in pump sets comprising 2 pumps)	Pressure boosting in firefighting systems.
2	Replenishing Jockey pump	Maintaining pressure and replenishing normal water losses in firefighting systems.
3	Controller	Processing signals from pressure switches, controlling firefighting pump operation, indicating operating status.
4	Replenishing Jockey pump controller	Controlling operation of the replenishing Jockey pump and indicating its operating status.
5	Pressure switches	Detecting pressure drop in the firefighting system below the set value and starting the firefighting pump* or the Jockey pump respectively. *or: firefighting pumps (in pump sets comprising 2 pumps).
6	Butterfly valve	Shutting off the firefighting system in order to conduct tests by means of a measuring system or to conduct maintenance works.
7	Check valve with inspection opening	Preventing the liquid from being pumped by one pump to the other through the common discharge manifold. The inspection opening allows check valve maintenance without removing the valve the from the pipeline.
8	Discharge manifold	Connecting discharge connections of the firefighting pump* and Jockey pump as well enabling connection of the pump set to the fire protection system. * or: firefighting pumps (in pump sets comprising 2 pumps).
9	Battery	Supplying power required to start Diesel motor in the event of mains power failure.
10	Base frame	Enabling all components to be installed in a compact manner as well as enabling transport of the pump set by a lift or a forklift using lifting hooks and transport holes.
11	Expansion (anti-vibration) joint	Reducing the transfer of vibrations generated by the operating pump set onto the fire protection system.
12	Priming set priming tank connection	Used in the event of the pump set operating in suction lift conditions; ensuring continuous, required level of water is maintained on the pump suction side.
13	Flow meter	Measuring the flow rate in a system measuring hydraulic performance of the firefighting pump set for the purpose of periodic inspection.

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Firefighting pumps

The main components of the WNF-S firefighting pumps include:

- Housing made of cast iron GJL or GS;
- Impeller made of stainless steel AISI 316;
- Shaft made of stainless steel AISI 431 or AISI 630;
- Mechanical seal.

The pump housing is equipped with an axial suction port and a radial discharge port. Due to the mechanical seal used, the pump does not require water lubrication and, therefore, is not equipped with a device collecting and disposing of leaking liquid. The pump is coupled with the motor shaft by means of a coupling which allows the pump-motor set to be disconnected. Figure 4 presents the design of the pump, while Table 2 provides a list of its components. Photograph 3 illustrates a sample firefighting pump utilised in the pump set.

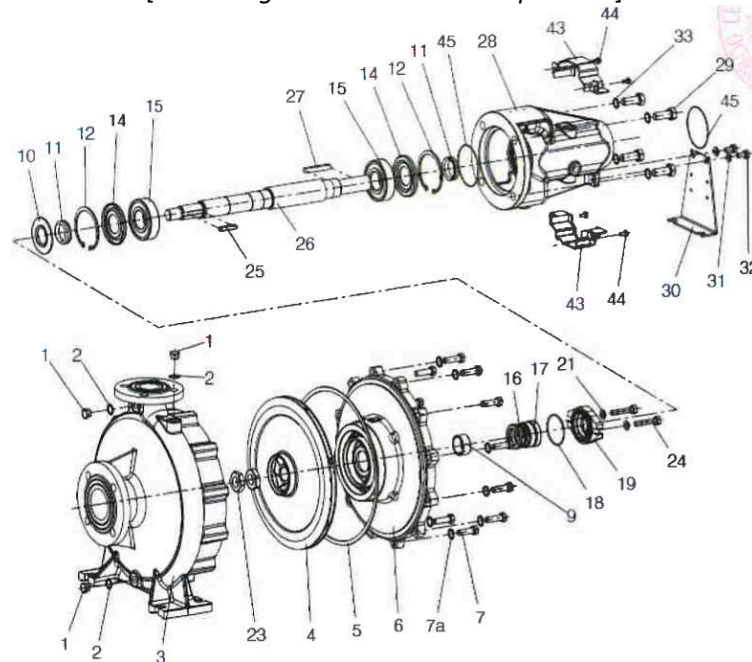
[a photograph illustrating a firefighting pump]



Photograph 3. The firefighting pump type WNF-S 32-250/210-15/2-L1.
Source: CNBOP-BIP

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[a drawing with numbered components]



Drawing 1. Design of the firefighting pump type WNF-S 40/250;

Source: Manufacturer's materials.

(a breakdown of pump components as well as materials for individual components is provided in Table 2).

Table 2

Item no in Figure 1	Component	Material
1	Plug	Brass
2	Washer	Black galvanized steel
3	Pump housing	Cast iron EN-GJL or EN-GJS
4	Impeller	Stainless steel
5	Gasket	EPDM
6	Back cover	Cast iron EN-GJL or EN-GJS
7	Screw	Alloy steel
7a	Washer	Black galvanized steel
9	Impeller spacer	Bronze
10	Dip tray	Alloy steel
11	Abutment ring	Alloy steel
12	Circlip	Stainless steel
14	Bearing cover	Cast iron
15	Bearing	Bearing alloy steel
16	Mechanical seal	Graphite silicon carbide
17	Seal	Silicon carbide
18	O-ring	EPDM
19	Seal holding	Cast iron
21	Washer	Black galvanized steel
23	Impeller locked nut	Brass
24	Screw	Alloy steel
25	Key impeller	Alloy steel

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26	Shaft	Alloy steel AISI 431/AISI 630
27	Key coupling	Alloy steel
28	Bearing bracket	Cast iron
29	Screw	Alloy steel
30	Support foot	Black steel
31	Washer	Alloy steel
32	Screw	Alloy steel
33	Washer	Alloy steel
43	Shaft guard	Alloy steel
44	Screw	Alloy steel
45	O-ring	EPDM

Replenishing Jockey pump

The firefighting pump set is equipped with a vertical multi-stager centrifugal replenishing Jockey pump, model MVI or MVIL. The pump housing, impeller and shaft of the MVI pump are made of stainless steel AISI 304, whereas the sealing is made of EPDM. A sample replenishing pump used in the pump set is illustrated in Photograph 4.

[a photograph of a pump]



Photograph 4. The replenishing Jockey pump, model MVI.

Source: Manufacturer's materials.

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[a technical drawing with numbered components]

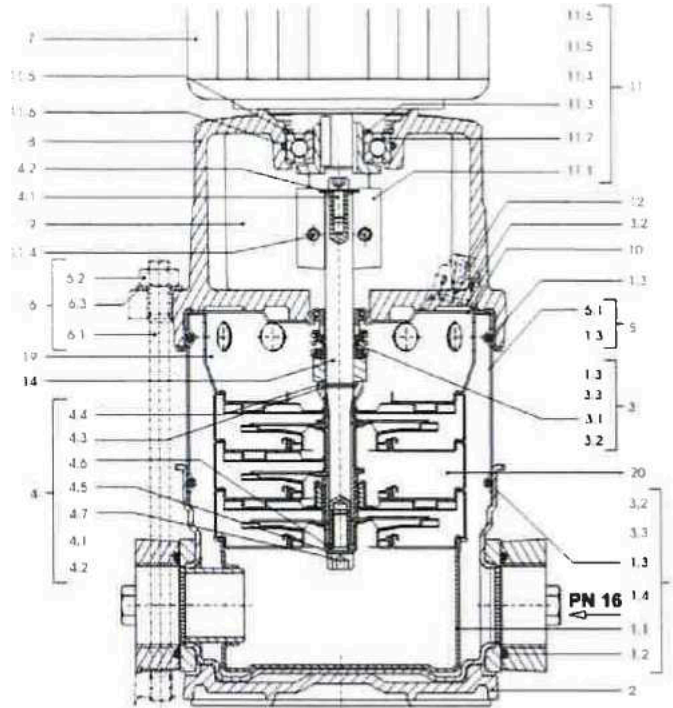


Figure 2. Design of the replenishing Jockey pump, model MVI
Source: Manufacturer's materials
(a breakdown of the pump components is provided in Table 3)

Table 3

Item no in Figure 2	Component
1	Pump housing with static sealing
2	Pump base plate
3	Mechanical sealing
4	Shaft equipment
5	Cooling jacket
6	Stud bolt
7	Electric motor
8	Lantern
9	Coupling guard
10	Stationary ring
11	Coupling
12	Plug
14	Shaft
19	Impellers

The housing of the replenishing Jockey pump, model MVIL, is made of cast iron EN-GJL-250 with a cathodic coating; the impeller and pump shaft are made of steel AISI 304. The sealing is made of EPDM. The design of the pump includes a common motor-pump shaft and a mechanical sealing independent of the direction of rotation.

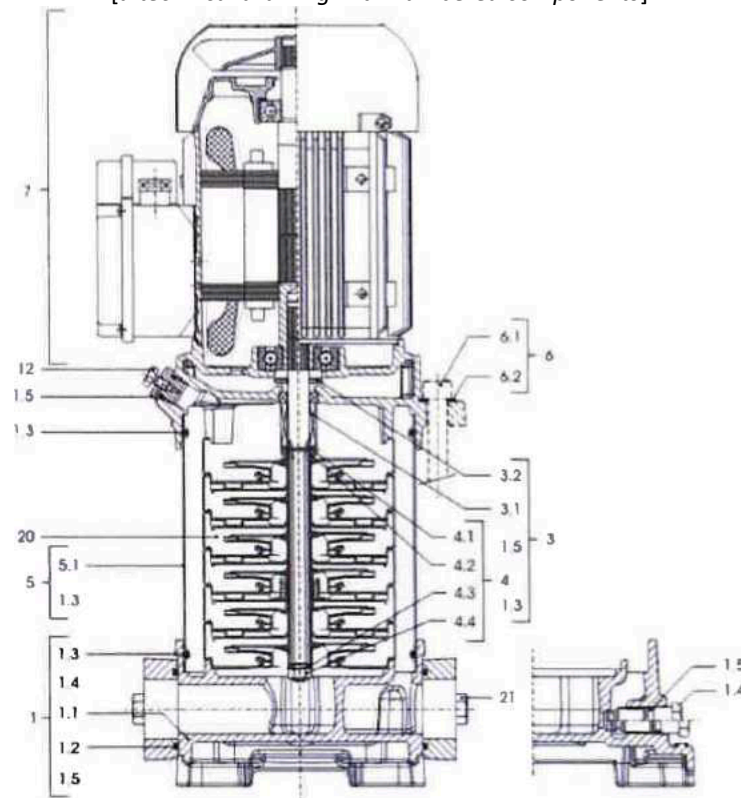
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[a photograph of a pump]



Photograph 5. The replenishing Jockey pump, model MVIL.
Source: Manufacturer's materials.

[a technical drawing with numbered components]



Drawing 3. Design of the replenishing Jockey pump, model MVIL
Source: Manufacturer's materials
(a breakdown of the pump components is provided in Table 4)

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Table 4

Item no in Figure 4	Component
1	Pump housing with static sealing
3	Mechanical sealing
4	Shaft equipment
5	Cooling jacket
6	Stud bolt
7	Electric motor
12	Plug
20	Impellers
21	Screw

Pump drive

The firefighting pumps are driven by:

- > Diesel motors with speed control, the manufacturer and basic parameters of which are provided in Table 5. The cooling system, selected and supplied by the motor manufacturer, forms an integral part of the aforementioned motors.
- > electric motors, the manufacturer and basic parameters of which are provided in Table 6. The replenishing Jockey pump is driven by an electric motor.

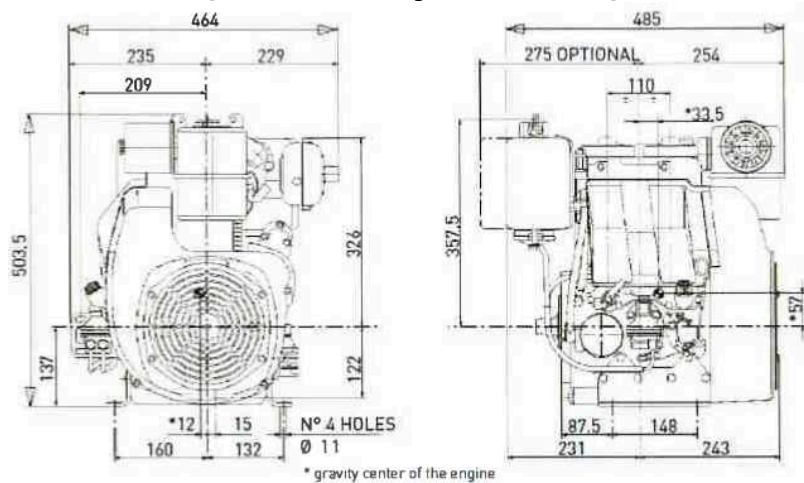
Table 5

Diesel motors							
Manufacturer	Type	Capacity	Number of cylinders	Power	Rotational speed ²	Fuel consumption	
-	-	[cm ³]	[pcs]	kW	rpm	g/kWh	[l/h]
Lombardini	15LD500	505	1	6,8	3000	240	1,9
Lombardini	25LD425-2	851	2	10,5	3000	245	3,0
Lombardini	12LD477-2	954	2	12,8	3000	250	3,8
Lombardini	9LD625-2	1248	2	17,5	3000	255	5,3
Lombardini	ULD626-3	1870	3	26,5	3000	250	7,8
VM Motori	D703	2082	3	31,5	3000	267	9,9
VM Motori	D703T	2082	3	47,7	3000	272	15,3
VM Motori	D754	2970	4	66	3000	272	21,1
VM Motori	D756	4455	6	100	3000	266	31,3
VM Motori	D703S	2082	3	31,5	3000	267	9,9
VM Motori	D703TS	2082	3	47,7	3000	272	15,3
VM Motori	D754S	2970	4	66	3000	272	21,1
VM Motori	D756S	4455	6	100	3000	266	31,3
Iveco FPT	N45MNSF40	4500	4	109	2940	228	29,2
Iveco FPT	N45MNTF41	4500	4	145	2940	220	37,5
Iveco FPT	N67MNTF42	6700	6	197	2940	230	53,3
Iveco FPT	N67MNTF41	6700	6	222	2940	235	61,4
Iveco FPT	N67MNTF40	6700	6	246	2940	230	66,6

² Maximum, reachable, rotational speed

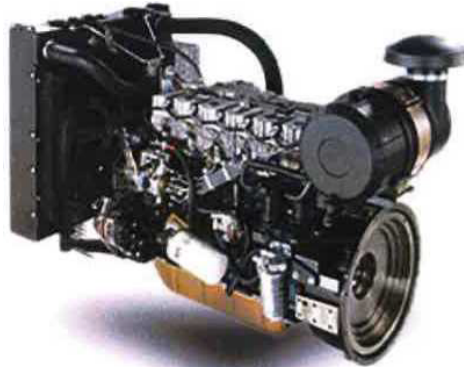
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[a technical drawing with dimensions]



Drawing 4. Basic dimensions of the air-cooled Diesel motor type 25LD425-2.
Source: Manufacturer's materials.

[a photograph illustrating a Diesel motor]



Photograph 6. Water-cooled Diesel motor with own water cooler type D756.
Source: Manufacturer's materials.

[a photograph illustrating a Diesel motor]



Photograph 7. Water-cooled Diesel motor type FTP N45 MNS F40.
Source: Manufacturer's materials.

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Table 6

Manufacturer	Type	Supply voltage	Current consumption	Power	Rotational speed	Efficiency ³
-	-	[V AC]	[A]	[kW]	[rpm]	[%]
FELM	F3 160M-2	400	20,0	11	2940	91,2
FELM	F3 160MX-2	400	27,1	15	2940	91,9
FELM	F3 160L-2	400	33,2	18,5	2940	92,4
FELM	F3 180M-2	400	38,9	22	2950	92,7
FELM	F3 200L-2	400	52,7	30	2955	93,3
FELM	F3 200LX-2	400	65,5	37	2955	93,7
FELM	F3 225M-2	400	77,6	45	2960	94,0
FELM	F3 250M-2	400	95,7	55	2965	94,3
FELM	F3 280S-2	400	129,9	75	2975	94,7
FELM	F3 280M-2	400	153,6	90	2975	94,7
FELM	F3 315S-2	400	183,3	110	2980	95,2
FELM	F3 315M-2	400	219,5	132	2980	95,4
FELM	F3 315L-2	400	265,5	160	2980	95,6
FELM	F3 315LX-2	400	331,1	200	2980	95,8
FELM	F3 355M-2	400	413,9	250	2980	95,8

Check valves

The check valves of the firefighting pump set are of DN 50 to DN 300 diameter. The housing, cover, clapper arm and disc are made of ductile iron. The sealing components are made of: bronze, EPDM and PTFE respectively. Maximum operating pressure of the check valves is 16 bar. The illustration and design of a sample check valve are provided in Figure 8.

[a photograph and a technical drawing of a check valve]

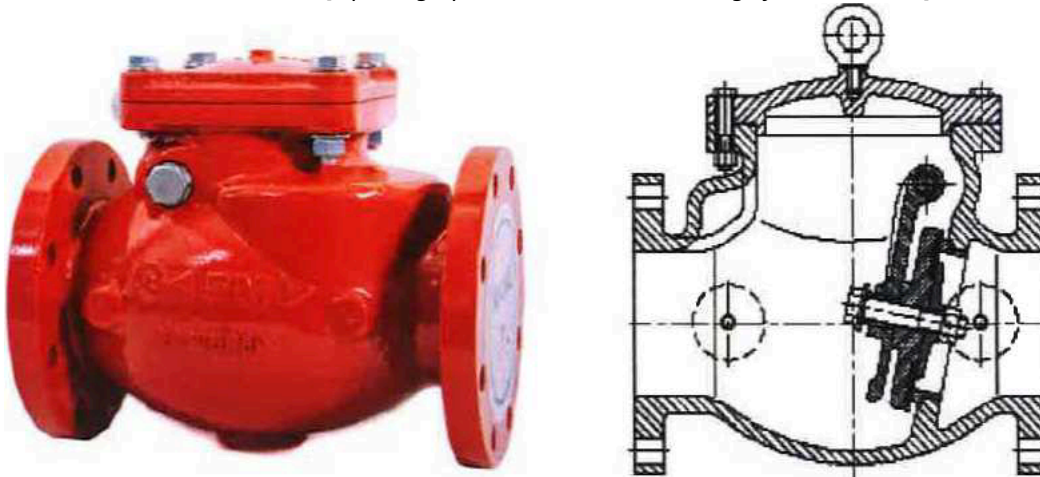


Figure 8. Illustration and design of the check valve type CVF.
Source: Manufacturer's materials.

³ Motor efficiency at rated pump performance

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Butterfly valves

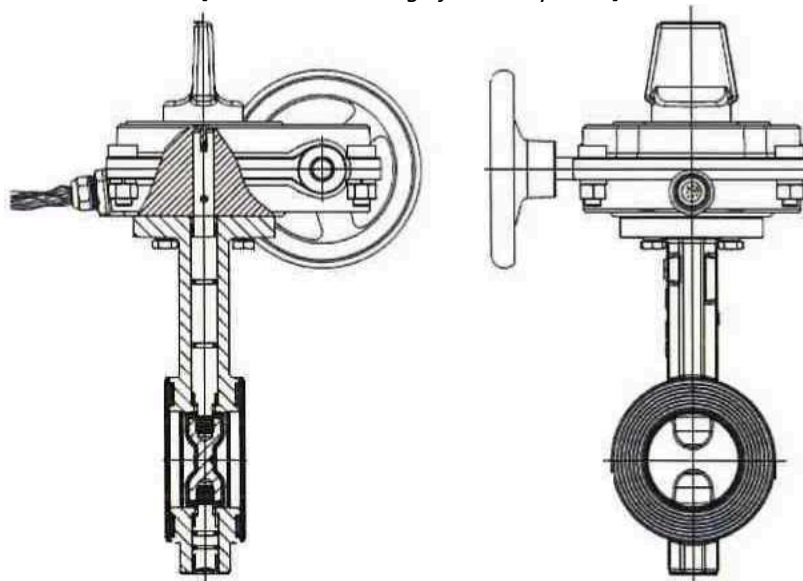
The butterfly valves of the firefighting pump set have the diameter of DN 50 to DN 300. The housing, disc, indicator, handwheel and gearbox made of ductile iron. The stem is made of stainless steel, whereas the seal is made of EPDM. Maximum operating pressure of the butterfly valves is 16 bar. The illustration and design of a sample butterfly valve is provided in Figure 13 and Figure 14.

[a photo of a butterfly valve]



Photograph 9. Illustration of the butterfly valve type Figura 215.
Source: Manufacturer's materials

[a technical drawing of butterfly valve]



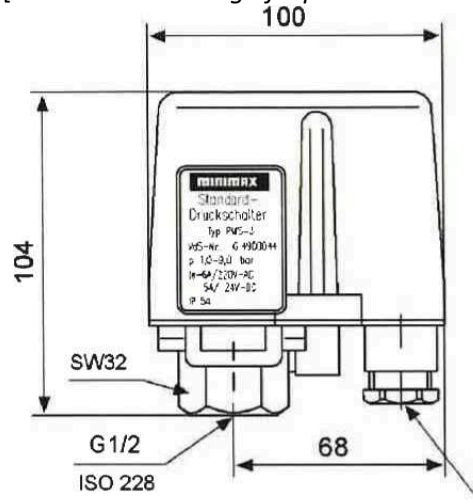
Drawing 5. Design of the butterfly valve type Figura 215.
Source: Manufacturer's materials.

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Pressure switches

The pressure switches utilised in the firefighting pump set are of IP54 protection class. The external cover of the pressure switches is made of transparent polyamide, while the housing is made of galvanised steel GD-Al Si12. The maximum operating pressure of the pressure switches is 16 bar. The actuation pressure of the pressure switches is adjustable within the range of 1-16 bar. The maximum water temperature is +80C. The design of a sample pressure switch is illustrated in Drawing 6.

[a technical drawing of a pressure switch]



Drawing 6. Design of the pressure switch type PMS-3.
Source: Manufacturer's materials.

Expansion (anti-vibration) joints

The expansion (anti-vibration) joints used in the firefighting pump set are predominantly made of forged steel, EPDM and polyamide.

[a photograph of an anti-vibration joint]



Photograph 10. Illustration of the anti-vibration joint DN 65, type 4015745.
Source: Manufacturer's materials.

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Controller (control and indicating device)

Each pump in the firefighting pump set is equipped with a separate control and indicating device. The elements supplying input signals to the controller are the pressure switches, two per each firefighting pump and one per Jockey pump.

In the event of normal system leakage (pressure drop to 80% of the nominal value), the replenishing Jockey pump (if applied) may compensate water and pressure losses, preventing activation of firefighting pumps. In the event of a pressure drop below 80% of the system pressure value in the fixed water fire-extinguishing system, a firefighting pump or pumps start automatically (a pump set with one or two firefighting pumps respectively), whereas for a pump set equipped with two pumps where one is a standby pump, automatic start of the standby pump is initiated in the event of a pressure drop below 60% of the system value.

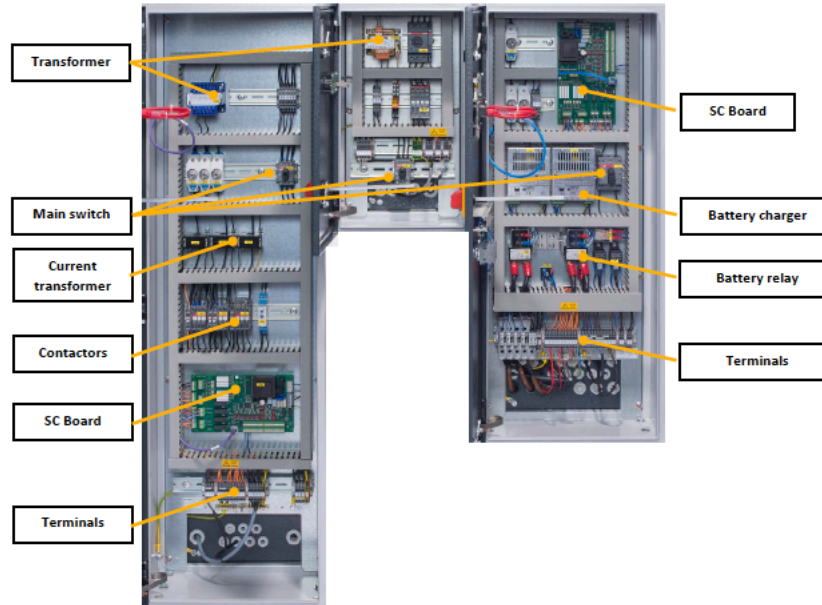
Depending on the firefighting pump motor type, a respective starting sequence is performed in accordance with the PN-EN 12845 standard.

The firefighting pumps can be stopped only manually.

Each controller is equipped with analogue visual signalling devices, analogue control buttons and a digital display whose functions are thoroughly described in the manufacturer's documentation. The controllers are illustrated in Photograph 11.

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[a photograph with component descriptions]



Photograph 11. Illustration of the firefighting pump set controllers.

Fragment A: SC-Fire Electric (controller for the firefighting pump with electric motor).

Fragment B: SC-Fire Jockey (controller for the replenishing Jockey pump with electric motor).

Fragment C: SC-Fire Diesel (controller for the firefighting pump with Diesel motor).

Source: Manufacturer's materials

1.1.2 Name and address of production plant

The SiFire EN firefighting pump sets, models: E, EJ, EEJ, D, DJ, EDJ, are manufactured by:
 WILO Italia Srl
 Viale Maestri del Lavoro 2A
 Bari Plant 70132 – Bari (BA), Italy.

1.2 Division

The firefighting pump sets are divided into models according to:

1. Number of pumps:

- > with one pump, of size indicated in section 1.1 of this National Technical Assessment, without Jockey pump;
- > with one pump, of size indicated in section 1.1 of this National Technical Assessment, with Jockey pump;
- > with two pumps, of size indicated in section 1.1 of this National Technical Assessment, with Jockey pump;

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2. Rated performance of the firefighting pump set

3. Pump configuration:

- > E: 1 pump with electric motor;
- > D: 1 pump with Diesel motor;
- > EJ: 1 pump with electric motor and 1 replenishing Jockey pump;
- > EEJ: 2 pumps with electric motors and 1 replenishing Jockey pump;
- > EDJ: 1 pump with electric motor, 1 pump with Diesel motor and 1 replenishing Jockey pump;
- > DJ: 1 pump with Diesel motor and 1 replenishing Jockey pump.

1.3 Designation

In the designation of the firefighting pump set models as per 1.1, a designation key⁴ including the product name as per division in 1.2 is applied.

A designation example of a firefighting pump set (SiFire) as per the aforementioned designation key, with SC-FIRE (EN) controller, with one main firefighting pump model 40/200, impeller diameter of 180 mm, electric motor (E) of 7,5kW as well as one standby firefighting pump, impeller diameter of 180mm, with Diesel motor (D) of 10,5kW and Jockey pump (J) of 0,55kW:

SiFire-EN- 40/200-180-7.5/10.5/0.55 EDJ

⁴ Designation key and its specifics are described in the instruction manual for the firefighting pump set "Wilo SiFire EN Instrukcja montażu i obsługi" [*Wilo SiFire EN Installation and Operating Manual*] no 4181658-ed. 01/2013-11-Wilo.

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2 INTENDED USE OF THE PRODUCT

2.1 Intended use

SiFire EN firefighting pump sets, models E, EJ, EEJ, D, DJ, EDJ, are intended for pressure boosting of water in fire-extinguishing sprinkler systems compliant with PN-EN 12845, water spray systems, water mist systems. The aforementioned pump sets may also be utilised in firefighting water systems and grids⁵.

2.2 Scope and conditions of use, limitations

The temperature of the water feeding the SiFire EN firefighting pump set shall be within the range of 4°C and 40°C. The firefighting pump set is designated for operation in the ambient temperature of 5°C to +40°C and humidity of up to 50%.

The sum of the pressure on suction side and the delivery head of the firefighting pump set shall not exceed the maximum operating pressure for the firefighting pump set indicated in Table 8, throughout its entire performance range.

The SiFire EN firefighting pump set shall be subject to technical inspections in accordance with the manufacturer's guidelines and legal regulations in force⁶. Technical inspections shall be conducted as per recommendations of Wilo Polska Sp. z o.o.

Table 7

Basic operating parameters	
Pumped liquid	Water of temperature within the range of 4°C to 40°C (10°C to 40°C for the pump sets with Diesel motor), free of solids and/or aggressive contaminants
Rated flow	633 l/min – 12600 l/min (depending on the firefighting pump set model)*
Delivery head at rated flow ⁷	10 m – 120 m* (depending on the firefighting pump set model)
Suction port diameter	DN 65 – DN 200 (depending on the firefighting pump set model)
Discharge port diameter	DN 65 – DN 250 (depending on the firefighting pump set model)
Max. operating pressure	10 bar or 16 bar*
Rated pump speed	2900
*Detailed values, depending on the firefighting pump set model, are provided in Table 8 of this National Technical Assessment.	

⁵ Firefighting water systems and grids within the meaning of, respectively: The Regulation of the Minister of Interior and Administration of 7 June, 2010, on the fire protection of buildings, other construction buildings and areas (Journal of Laws 2010 No. 109 item 719) and the Regulation of the Minister of Interior and Administration of 24 July, 2009, on fire-fighting water supply and fire roads (Journal of Laws 2009 No 124 item 1030).

⁶ A firefighting pump set, being a component supplying water to firefighting systems, is a fire protection device within the meaning of the Regulation of the Minister of Interior and Administration of 7 June, 2010, on the fire protection of buildings, other construction buildings and areas. Pursuant to par. 3.2 of the aforementioned regulation, fire protection devices shall be subject to technical inspections at least once a year.

⁷ Performance parameters of the pump set have been determined based on performance parameters of the pumps being the component elements of the firefighting pump set, calculated in accordance with prEN 12259-12:2004.

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2.3 Performance parameters

Nominal performance parameters of the firefighting pump sets are provided in Table 8. Detailed performance characteristics are presented in the reports issued by testing bodies⁸ as well as in the manufacturer's documentation.

Table 8

Firefighting pump set type	Max. operating pressure of firefighting pump set	Hmax of firefighting pump set	Rated flow of firefighting pump	Delivery head of firefighting pump set	Min. flow of firefighting pump set acc. to prEN 12259-12	Electric motor power of firefighting pump	Diesel motor power of firefighting pump
	[bar]	[m]	[l/min]	[m]	[l/min]	[kW]	[kW]
1	2	3	4	5	6	7	8
SiFire-EN-40/250-198-11	10	53	633	45	13	11	12,5
SiFire-EN-40/250-205-15	10	57	658	49	15	15	12,5
SiFire-EN-40/250-219-15	10	65	685	54	13	15	17,5
SiFire-EN-40/250-230-18,5	10	72	723	61	14	18,5	17,5
SiFire-EN-40/250-235-18,5	10	76	735	63	14	18,5	26,5
SiFire-EN-40/250-248-22	10	84	775	70	15	22	26,5
SiFire-EN-50/160-150-7,5	10	31	821	27	16	7,5	6,7
SiFire-EN-50/160-154-7,5	10	32	890	28	18	7,5	10,25
SiFire-EN-50/160-170-11	10	40	1162	32	23	11	12,5
SiFire-EN-50/200-175-11	10	40	975	31	20	11	12,5
SiFire-EN-50/200-185-15	10	45	1054	35	21	15	12,5
SiFire-EN-50/200-195-15	10	50	1138	40	22	15	17,5
SiFire-EN-50/200-204-18-5	10	56	1223	44	22	18,5	17,5
SiFire-EN-50/200-208-18,5	10	58	1256	46	24	18,5	26,5
SiFire-EN-50/200-215-22E	10	62	1315	49	26	22	25,5
SiFire-EN-50/250-230-22E	10	73	1167	60	23	22	26,5
SiFire-EN-50/250-243-30E	10	85	1218	73	24	30	26,5
SiFire-EN-50/250-257-30E	10	92	1248	80	25	30	31,5
SiFire-EN-65/200-185-18,5	10	43	1210	41	24	18,5	17,5
SiFire-EN-65/200-197-22	10	48	1302	47	26	22	26,5
SiFire-EN-65/200-209-30	10	61	1405	57	28	30	26,5
SiFire-EN-65/200-214-30	10	64	1784	56	33	30	31,5
SiFire-EN-65/250-223-30	10	69	1478	62	30	30	31,5
SiFire-EN-65/250-240-37	10	79	1570	72	34	37	47,7
SiFire-EN-65/250-252-45	10	87	1647	80	33	45	47,7
SiFire-EN-65/250-259-55	10	94	1703	86	34	55	66
SiFire-EN-65/315-292-75	16	113	1711	109	34	75	100
SiFire-EN-80/200-192R-30	10	48	3112	39	62	30	31,5
SiFire-EN-80/200-203-37	10	56	3184	45	70	37	47,7
SiFire-EN-00/200-215-5-45	10	61	3267	52	65	45	47,7
SiFire-EN-80/250-235-55	10	71	4582	48	92	55	66
SiFire-EN-80/250-243-75	10	77	4597	56	90	75	66
SiFire-EN-80/250-253-75	10	85	4616	66	90	75	100
SiFire-EN-80/250-266-90	10	95	4641	79	93	90	100
SiFire-EN-80/315-290-110	16	109	3470	100	69	110	109
SiFire-EN-80/315-311-132	16	128	3298	121	66	132	144,5
SiFire-EN-100/2D0-168R-22	10	32	5896	9	118	22	26,5
SiFire-EN-100/200-183-30	10	39	6000	14	120	30	31,5
SiFire-EN-100/200-194-37	10	46	6144	21	122	37	47,7
SiFire-EN-100/200-205-45	10	51	6241	26	126	45	47,7
SiFire-EN-100/200-219-55	10	59	6449	36	129	55	66
SiFire-EN-100/250-233-55	10	65	5794	38	116	55	66
SiFire-EN-100/250-247-75	10	76	6010	50	125	75	100
SiFire-EN-100/250-256-90	10	84	6154	58	128	90	100
SiFire-EN-100/250-269-110	10	93	6331	68	127	110	109
SiFire-EN-100/315-272-132	16	97	5786	83	116	132	144,5
SiHre-EN-100/315-294-160	16	113	6170	100	123	160	197
SiFire-EN-125/250-224-90	10	61	3709	58	74	90	100
SiFire-EN-125/250-237-110	10	70	4298	67	101	110	109
SiFire-EN-125/250-251-132	10	80	4947	76	111	132	144,5
SiFirn-FN-125/250-267-160	10	91	5721	88	114	160	197
SiFire-EN-125/315-290-160	16	104	5225	91	124	160	197
SiFire-EN-150/315-273-200	16	90	7183	85	144	200	221,5
SiFire-EN-150/315-279-250	16	94	9485	83	179	250	221,5
SiFire-EN-150/315-291-250	16	103	12598	80	252	250	245,5

⁸ The testing bodies, test results of which were utilised in the proceedings concerned with the issuance of this National Technical Assessment. A register of the test reports and names of respective testing bodies are provided in chapter 7 of this National Technical Assessment.

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2.4 Installing

The installation of the firefighting pump set shall be performed in accordance with the manufacturer's operating manual⁹ as well as relevant stipulations of this National Technical Assessment.

The firefighting pump set shall be installed in a room that complies with the requirements of PN-EN 12845:2015-10, chapter 10.3. The room shall be of appropriate size, so as to ensure sufficient space for installing the pump set as well as conducting inspections and maintenance. The surface which the pump set is to be installed shall be horizontal and flat. In order to reduce noise and ensure strain-free connections with pipelines, manufacturer's guidelines ought to be observed. Start-up of the firefighting pump set shall be conducted by Wilo Polska Sp. zo.o.

Should the parameters or the type of the fire protection system necessitate the firefighting pump set to be provided with two independent power supply sources, the controller shall be supplied with guaranteed power supply from the electrical switchboard, ensuring automatic switching between the main and the backup power source in order to ensure correct operation of the firefighting pump set in the event of failure of the main power supply.

3. PERFORMANCE CHARACTERISTICS OF THE PRODUCT AND ASSESSMENT METHODS APPLIED

3.1 Technical / environmental requirements

3.1.1 Firefighting pump set documentation

3.1.1.1 Requirements

The documentation of the firefighting pump set shall include:

- a. Assembly drawings accompanied by a list of components and material specification for all components present. Manufacturer's dimensional specification and/or dimensional drawings shall provide a full description of the product. All critical dimensions shall be provided with the permissible upper and lower limits of deviation. All documents concerning materials, dimensions, machining, and type designation shall be specified in manufacturer's quality assurance procedures and shall bear manufacturer's name, document number or other reference, title, as well as date and level of the most recent revision.
- b. Technical documentation of the firefighting pump set components that form part of the main flow line for fire extinguishing water, original operating manuals, installation manuals, pump datasheets.
- c. Operating and maintenance documentation (may constitute part of an operating manual).
- d. Documentation providing dimensions, curves as well as information on spare parts for the supplied pump set.

⁹ Document "Wilo SiFire EN Instrukcja montażu i obsługi" [Wilo SiFire EN Installation and Operating Manual] no 4181658-ed. 01/2013-11-Wilo.

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- e. User manual for the firefighting pump set including at least the following information:
- > Intended use of the product;
 - > Recommended maintenance and its intervals;
 - > Requirements concerning qualifications of the personnel performing device installation, with explicit indication of the required qualifications.

The technical documentation of pumps shall include at least:

- > General drawings with a list of components and material specification concerning at least the following components (if applicable): pump housing with pressure jacket, pump shaft, shaft protecting sleeves, impeller/impellers, impeller mounting components (impeller nut, locking plate or washer and key), wear rings (if present);
- > Charts of pump curves;
- > Image / drawing of the name plate
- > Operating manual.

Pump documentation shall include at least the following information:

- > Pump type;
- > Maximum operating pressure in bar;
- > Material of housing;
- > Material of components;
- > Standard for pump connections;
- > Minimum flow in [l/s] or [m³/h];
- > Maximum starting torque and torque at maximum power consumption (as graphic presentation or as table of values).

The following data shall be provided in the charts of the pump curves:

- > Pump type designation;
- > Rated delivery flow in [l/min] or [m³/h] (for the specified impeller diameter range and pump speed);
- > Delivery head [m] at rated delivery flow and guaranteed tolerance for the entire delivery flow range;
- > Power consumption [kW];
- > Maximum current load (if applicable);
- > NPSHR [m];
- > Rated speed [1/min];
- > Impeller diameter [mm];
- > Minimum flow [l/min], [m³/h] or a percentage value of the rated delivery flow;
- > Nominal diameter of the pump suction port;
- > Nominal diameter of the pump discharge port.

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Note 1:

Maximum permitted tolerance for the range of 50% to 100% of the rated delivery flow is $\pm 5\%$ for double-sided tolerance and $+6\%$ for single-sided positive tolerance. Outside this range, tolerances of up to $\pm 6\%$ and $+7\%$ respectively are permitted.

Note 2:

Delivery flow, delivery head, power consumption and NPSHR are guaranteed values according to PN-EN ISO 9906, at least grade 2, which means that for all pumps produced the delivery head is within the guaranteed tolerance in the entire delivery flow range; power consumption does not exceed the guaranteed required power; NPSHR does not exceed the guaranteed NPSHR.

The documentation of shut off valves and check valves shall include the following:

- > Nominal diameter;
- > Maximum operating pressure;
- > Maximum permissible flow velocity in relation to the nominal cross-section;
- > Pressure loss in bar at flow velocity 5 m/s (table or diagram) or Kv;
- > Application range.

The following documents are required for valves and check valves:

- > Assembly drawing;
- > Manufacturing drawings of individual elements.

All documents shall be supplied with translation into Polish or English.

The product shall be compliant with the supplied documentation.

3.1.1.2 Testing method

Documentation analysis, compliance with documentation, visual inspection of the product.

3.1.2 Design requirements for firefighting pump sets**3.1.2.1 Requirements**

All subassemblies of the firefighting pump set shall meet the requirements set. The operation of the interconnected subassemblies shall ensure that the pump set may reach the required operating parameters and provide the performance declared by the manufacturer. The pump set shall be equipped with connections for fire protection system, dimensions of which shall comply with PN-EN 805. Connections shall be made in accordance with the PN-EN 1092, PN-EN 12627 or PN-EN ISO 228 standard.

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The pipework design of a firefighting pump set shall ensure:

1. Possibility of disassembling the pipework in the event of repairs, unless welded piping is used;
2. Proper support in order to prevent damage caused by vibration during operation and maintenance;
3. Studious piping layout, fitting within the perimeter of the pump set, not hindering access to openings.

Pipelines shall be fastened independently of the pump fixing.

A check valve and a shut-off valve shall be installed on the discharge pipeline of each pump. Any reducer connected to the pump outlet shall expand in the direction of the flow by an angle no greater than 20 degrees.

A pump air-venting device shall be ensured, unless the pumps are made self-venting by arrangements of its branches.

Arrangements shall be made to ensure constant flow of water through the pump (minimum flow), preventing the pump from overheating in the event of its operation against a closed valve on the discharge side.

The discharge of water through the minimum flow discharge pipe shall be clearly visible; and where there is more than one pump, the minimum flow discharge pipes shall be separate.

Tappings for connecting pressure gauges on the pump suction side (inflow side) and discharge side shall be easily accessible. If the pump set comprises more than one pump, pump suction ports can be connected with each other only in the event of positive suction, using shut-off valves so that continuous operation of the pump set is ensured in the event of one pump having been dismantled (e.g. for repair). Valves and pipelines connecting pump suction ports shall have internal diameter appropriate for the required flow rate. In the event of suction lift condition, suction ports of the pumps may not be interconnected.

In the event of operation in suction lift condition, each pump in the pump set shall be equipped with a separate, automatic priming arrangement. The arrangement shall comprise a priming tank located above the pump, with a pipe descending towards the discharge side of the pump. The priming pipe shall be equipped with a check valve. Other requirements concerning the priming tank – as per PN-EN 12845.

3.1.2.2 Testing method

Documentation analysis, compliance with documentation, visual inspection of the product.

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3.1.3 Marking

3.1.3.1 Requirement

The pump set shall bear permanent, non-flammable and legible marking made on corrosion-resistant name plate attached to the pump base frame in a manner not allowing its removal (without the use of tools). The name plate shall indicate at least the following:

- a) Manufacturer's name or trademark;
- b) Type designation;
- c) Serial number / year of manufacture;
- d) Rated delivery flow of the firefighting pump set [l/min];
- e) Delivery head at rated delivery flow of the firefighting pump set [m];
- f) Maximum operating pressure;

The product shall also bear marking indicating the following information¹⁰:

- > Weight of the pump set [kg]
- > Information on the required power supply: power [kW], voltage [V], current [A]¹¹;

The information specified in point g) shall not be placed on the pump name plate.

All components of the firefighting pump set shall bear permanent, non-detachable and legible marking enabling their identification by means of a serial number or other designation specified by the manufacturer, clearly indicating component type, batch or date of manufacture.

Valves shall bear marking that includes at least the following information:

- > Manufacturer's name or trademark;
- > Nominal diameter;
- > Designation allowing clear identification;
- > Direction of flow (for directional valves);
- > Maximum operating pressure.

3.1.3.2 Testing method

Visual inspection of the product in order to confirm correct marking.

¹⁰ This information shall not be placed on the name plate of the firefighting pump set.

¹¹ Not applicable to firefighting pumps with Diesel motor only.

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3.1.4 Corrosion resistance

3.1.4.1 Requirement

All hydraulic and load-bearing components of the pump set shall be made of corrosion-resistant materials¹².

3.1.4.1.1 Testing method

Documentation analysis, visual inspection of the product or the NSS testing procedure as per PN-EN ISO 9227:2017-06. Testing shall be conducted on samples of component materials for which corrosion resistance cannot be conclusively evaluated based on documentation analysis and visual inspection of the product.

3.1.5 Hydrostatic resistance of the firefighting pump set

3.1.5.1 Requirement

The testing procedure as per 3.1.5.2 may not reveal any visible signs of leakage¹³.

3.1.5.2 Testing method

A hydrostatic test shall be conducted for the entire pump set. The test pressure shall equal the test pressure for pumps as per PN-EN 12162.

$$P_{\text{test}} = K_1 * K_2 * P_{\text{allw}}$$

where

P_{test} - is the hydrostatic test pressure

$K_1, K_2, P_{\text{allw}}$ - factors determined in accordance with PN-EN 12162.

The hydrostatic test duration shall be 60 minutes. Testing procedure as per PN-EN 12162.

3.1.6 Pumps, design requirements

3.1.6.1 Requirements

The design of the pump shall be in accordance with chapter 4 of prEN 12259-12:2004.

3.1.6.2 Testing method

Analysis of documentation and manufacturer's calculations, visual inspection and measurements.

¹² These requirements and the testing procedure do not apply to the components for which individual requirements are hereinafter specified.

¹³ Leakage from the pump is acceptable as per the guidelines of PN-EN 12162:2001.

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3.1.7 Marking of pumps

3.1.7.1 Requirement

Pumps shall be marked by means of a permanently affixed, legible, non-detachable, non-flammable, permanent name plate. Marking with the use of self-adhesive film or alike is not permissible.

The name plate shall bear at least the following information:

- a) Manufacturer's name or trademark;
- b) Type designation;
- c) Serial number / year of manufacture;
- d) Rated delivery flow [l/min];
- e) Delivery head at rated delivery flow [m];
- f) Pump speed [1/min];
- g) Required motor power [kW];
- h) Impeller diameter [mm]; in the case of angled blade ends, the largest and smallest impeller diameters are to be indicated.

The pump housing shall bear marking with the following information:

- > Direction of rotation;
- > Maximum operating pressure in [bar];
- > At least abbreviated designation of the pump housing material.

3.1.7.2 Testing method

Visual inspection in order to confirm correct marking.

3.1.8 Minimum flow

3.1.8.1 Requirement

The manufacturer shall specify the minimum bypass flow in order to reduce a possible pump breakdown in the event of operation against a closed valve on the discharge side. The sufficiency of the bypass flow for ensuring pump cooling shall be proved by testing.

3.1.8.2 Testing method

The testing procedure shall be performed for one pump only. The test shall be performed upon obtaining the pump delivery flow characteristics. A pump with an impeller of maximum diameter shall be run for a minimum of 2 hours at maximum speed and minimum bypass flow specified by the manufacturer. The maximum water temperature rise between the suction side and discharge side shall not exceed 10C for the duration of the test. The delivery head, flow rate and power consumed by the pump throughout the test shall be measured at intervals not exceeding 15 minutes.

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Throughout the test, the power consumption rise shall not exceed 2% in relation to the condition at the beginning of the test, and the delivery head shall not decrease by more than 1,5%. Upon completion of the testing procedure, hydraulic characteristics shall be obtained again. The hydraulic characteristics obtained prior to and after the test shall be in agreement within the measurement error tolerance limits.

3.1.9 Pump drive and operation

3.1.9.1 Requirement

The power provided by the drive motor shall be sufficient in the entire range of the H(Q) curve; however:

- > in the case of pumps exhibiting a power consumption curve which continues to rise when operating in the overload range, the pump motor power shall be such that it is equivalent to not less than the delivery flow corresponding to NPSH value of 16 m.
- > in the case of pumps exhibiting a non-overloading curve, having a demonstrable peak along the power consumption curve, a value of 1,05 times this peak value shall be used for the determination of the motor power.

Overload values or values for short-time operation which are allowed in the standards for electric or Diesel motors shall not be applied when selecting motor power.

The torque of the drive motors shall be greater than the countertorque exerted by the pump, all the way from standstill to rated speed. Maximum power consumed by the pump shall be taken as the basis for determining the countertorque.

3.1.9.2 Testing method

Motors shall be able to operate at full load with constant power, as per PN-ISO 3046:2009. The firefighting pump set shall reach the rated delivery flow within 15 s of initiating the start.

Automatic starting and operation of the pump set shall not depend on power supply sources other than the motor and its battery.

The motor shall be capable of starting at minimum ambient temperature of 5C.

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The motor shall be equipped with a governor to control the speed with the accuracy of up to 5% in relation to the rated speed at rated load conditions, and be constructed so that any mechanical device connected to the motor, potentially hindering its automatic start, would return to the starting position.

The exhaust system shall be equipped with a silencer. The exhaust system shall not allow the total back pressure to exceed the manufacturer's recommendation.

If the exhaust pipe is higher than the motor, means shall be provided to prevent condensate flowing back to the motor. The exhaust pipe shall be insulated so that it does not cause a fire ignition risk.

One of the following cooling systems shall be applied:

- a. Cooling by water pumped by the firefighting pump directly into the motor-cylinder jackets, via a pressure reducing device if necessary, in accordance with the manufacturer's guidelines. The outlet pipe shall be open so that the discharge water is visible;
- b. A heat exchanger, where the water is taken from the firefighting pump - via a pressure reducing device if necessary - in accordance with the manufacturer's guidelines. The outlet pipe shall be open so that the discharge water is visible. An auxiliary pump driven by the Diesel motor shall circulate the water in the closed circuit. If the auxiliary pump is belt driven, there shall be multiple belts so that even if half the belts are broken, the remaining belts are able to drive the pump. The capacity of the closed circuit shall conform to the value specified by the motor manufacturer;
- c. An air-cooled radiator with a fan driven by Diesel motor, with the use of multiple belts. Should half of the belts break, the remaining belts shall be capable of driving the fan. An auxiliary pump driven by the Diesel motor shall circulate the water in a closed circuit. If the auxiliary pump is belt driven, there shall be multiple belts so that even if half of the belts are broken, the remaining belts are able to drive the pump. The capacity of the closed circuit shall conform to the value specified by the motor manufacturer;
- d. Direct air cooling of the motor by means of a multiple belt driven fan. Should half of the belts break, the remaining belts shall be capable of driving the fan.

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The fuel tank of the firefighting pump set shall ensure that the pump set may run, depending on its intended use, for:

- > 3hrs, for pump sets intended for the protection of areas qualified as light hazard (LH);
- > 4hrs, for pump sets intended for the protection of areas qualified as ordinary hazard (OH);
- > 6hrs, for pump sets intended for the protection of areas qualified as high hazard storage or high hazard processing (HHS or HHP),

in accordance with PN-EN 12845:2015.

Where there is more than one Diesel motor, separate fuel tanks and separate fuel systems shall be provided.

The fuel tank shall be fixed above the pump to ensure a positive head, but shall not be located directly above the motor. The fuel tank shall be equipped with a sturdy fuel level gauge.

The fuel system shall be equipped with a fuel filter. Any valves in the fuel feed pipes between the fuel tank and the motor shall be installed adjacent to the tank, be fitted with an operating status indicator and locked in the open position. Pipe joints shall not be soldered. Metallic pipes shall be used for fuel pipes.

The fuel feed pipe shall be situated at least 20 mm above the bottom of the fuel tank. A drain valve of at least 20 mm diameter shall be fitted to the base of the tank.

The fuel tank vent should be located outside the building.

3.1.10.2 Testing method

Analysis of documentation and power consumption curves obtained in hydraulic performance testing.

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3.1.11 Hydraulic characteristic curve

3.1.11.1 Requirement

The characteristic curve of the firefighting pump set shall equal the characteristic curve of the pump set declared by the manufacturer, with a permissible 5% tolerance.

In the case of pump sets comprising two firefighting pumps, the tests shall be conducted for each pump separately.

3.1.11.2 Testing method

Testing of firefighting pump H(Q) characteristic curve shall be conducted at 25°C +/- 10°C, unless PN-EN ISO 9906:2012 specifies otherwise for a particular test. The tolerance in all parameter testing is +/- 5%.

The testing procedures shall be performed in accordance with PN-EN ISO 9906:2012, at least grade 2. Testing shall be performed on pumps with motor power as per PN-EN 12845:2015. The measurements required for the purpose of evaluation in accordance with ISO 9906:2012 shall be performed at 7 points uniformly distributed throughout the pump delivery flow range.

NPSHR shall be determined at 5 appropriately distributed points between the pump delivery flow corresponding to 0,3 of the rated delivery flow and the maximum delivery flow to be measured.

All values shall be measured in accordance with PN-EN ISO 9906:2012, at least grade 2.

The maximum water temperature rise shall not exceed 10C for the duration of the test. The temperature shall be measured on the pump suction side and the discharge side, at a distance which equals twice the nominal diameter of the connection piece (measured from the edge of each connection piece), with a measuring device of +/- 2C accuracy.

3.1.12 Pressure switches

3.1.12.1 Requirement

The PN nominal pressure of a pressure switch shall be at least 10 bar. For pressure switches with an adjustable actuation pressure setting, the maximum actuation pressure shall not exceed 10 bar. The pressure switch shall be of IP 54 protection class. The pressure switch connection for water supply shall have a thread min. R 3/8". The pressure-carrying elements of the pressure switch shall have a minimum passage diameter of 5 mm, whereas for elements made of copper alloys min. 2,5 mm. The pressure switch shall be capable of operating within the temperature range of 5°C to 50°C. The pressure switch shall be vibration-resistant and designed to operate under constant load. The pressure switch shall be corrosion-resistant.

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3.1.12.2 Testing method

Technical documentation analysis, measurements or laboratory tests.

Environmental tests:

Vibration resistance:

- > The test sample shall first be conditioned in the temperature of -20°C for 24 hours, then in the temperature of 50°C for 24 hours, and subsequently subjected to vibrations at a frequency crossing the test curve from 5 to 60 Hz with 30 octaves / min, continuously;
- > After the aforementioned test, the actuation pressure (switchover pressure) of the pressure switch shall be set at a middle value of the actuation pressure range and it shall be confirmed whether, with the pressure being decreased at the pressure switch inlet, the deviation does not exceed +/- 0,25 bar compared to the set actuation (switchover) pressure.

Salt spray – corrosion test

The pressure switch shall remain open, i.e. with the cover off, with cables connected, in a salt-spray chamber. The physiological saline solution shall consist of 20% pure salt (NaCl) and a larger amount of distilled water. The pH value shall be within the range of 6.5 to 7.5, and the specific gravity within the range of 1.126 kg/dm³ to 1.157 kg/dm³. Atmosphere in the chamber shall be strictly controlled. The test sample shall be in its standard installation position, exposed to the salt spray in the chamber of 200-litre capacity, with the zone temperature of 35°C (+/- 2°C). The salt solution shall be fed from a recirculation tank at a pressure of 0,7 to 1,7 bar through a mixing nozzle. The salt solution dripping from the pressure switch shall not be discharged to a container. At least two sampling points in the spraying zone are required for the purpose of the salt spray control. The salt spray shall be such that a solution of 1 cm³ to 2 cm³ can be taken from the testing surface of 80cm² within one hour. The solution taken within 16 hours shall have a salt content of 20% (+/- 1%) by weight. The pressure switch shall be exposed to the salt spray for 10 days. The pressure switch shall subsequently be dried for 7 days at the temperature of 20°C (+/- 5°C) and maximum humidity of 70%.

After the aforementioned test, the actuation pressure (switchover pressure) of the pressure switch shall be set at a middle value of the range and it shall be confirmed whether the deviation does not exceed +/- 0,25 bar compared to the set actuation pressure.

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3.1.13 Isolating valves (shut-off valves, butterfly valves) – design requirements, resistance to environmental impact

3.1.13.1 Requirement

Closing of the valves shall be performed clockwise, from the top perspective. MOT and mST operating torques shall comply with the requirements of PN-EN 1074-1:2002. Isolating valves shall be designed in such a way that the maximum flow velocity of water passing through the valve is in accordance with PN-EN 593:2008+A1:2011. Valves shall be selected in such a way that the flow does not exceed the maximum velocity specified in the aforementioned standard. Isolating valves shall be resistant to corrosion and ageing. There shall be sufficient clearance between all moving and stationary parts to ensure proper operation, even if corrosion or dirt deposits have formed. All elements that move against each other shall be made of corrosion-resistant metal. All sealing elements shall be made of corrosion-resistant materials. The housing of isolating valves shall be made of metal with a melting point of >800 °C. For valves of a maximum operating pressure of > 12.5 bar, the housing shall be made of malleable material, e.g. ductile iron or at least equivalent.

3.1.13.2 Testing method

3.1.13.2.1 Analysis of technical documentation or laboratory tests, should it prove unfeasible to confirm the requirements based on the documentation data.

3.1.13.2.2 Environmental tests

Resistance to corrosion and ageing

Based on drawings, lists of components and the test sample being tested, it shall be verified whether corrosion and ageing may have a detrimental effect on the performance characteristics of the isolating valves. In the event of doubt, corresponding laboratory tests shall be conducted, within the scope described below.

Valves with internal coating shall be tested against corrosion in salt solution.

Laboratory tests

The test sample shall be subjected to a salt-spray test in a mist chamber. The inlet and outlet of the valve shall be open. The essential reagent components and properties as well as the test conditions are as follows:

- > NaCl dissolved in distilled water;
- > pH value: 6.5 – 7.2;
- > solutions concentration: (50 +/- 5) g/l;
- > spray pressure: 0,7 bar to 1,7 bar;
- > spray volume: 1 ml/h to 2 ml/h over the surface of 80cm²;
- > test chamber temperature: (35 +/- 2) °C;

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- > spray time: (240 + 6) h;
- > drying time: (168 +/- 5) h at a relative humidity of max. 70%.

The coating shall not show signs of damage after the test. There shall be no signs of delamination or sub-surface corrosion.

Note:

Where the isolating valves are declared to be made of corrosion-resistant materials, it is permissible to omit conducting the aforementioned corrosion tests, provided that the specification of such valves explicitly confirms the use of corrosion-resistant materials.

3.1.14 Check valves – design requirements, resistance to environmental impact

3.1.14.1 Requirement

Check valves shall be resistant to corrosion and ageing.

There shall be sufficient clearance between all moving and stationary parts to ensure proper operation, even if corrosion or dirt deposits have formed. The closing member shall be capable of moving into and from the closed position, despite the presence of deposits.

There shall be sufficient clearance of at least 3 mm between the valve seat rings and the metal components of the closing member (e.g. the seal supporting ring). There shall be a clearance of at least 12 mm between the housing, the edge of the closing member and the level hub and at least 6 mm for components made of corrosion-resistant materials.

Corrosion and ageing shall not adversely affect the functioning of the check valve.

All elements that move against each other shall be made of corrosion-resistant metal. Sealing elements shall not have the tendency to stick together.

Valve seat rings shall be made of corrosion-resistant metal, and when used in ferrous metal housings, they shall protrude at least 3 mm from the housing surface.

The housing of check valves shall be made of metal with a melting point of >800 °C. For valves of a maximum operating pressure of > 12.5 bar, the housing shall be made of malleable material, e.g. ductile iron or at least equivalent.

The aforementioned requirements apply to all check valves contained in this section, installed on the main firewater flow line.

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3.1.14.2 Testing method

Resistance to corrosion and ageing

Based on drawings, lists of components and the test sample being tested, it shall be verified whether corrosion and ageing may have a detrimental effect on the performance characteristics of the check valves. In the event of doubt, corresponding laboratory tests shall be conducted, within the scope described below.

Valves with internal coating shall be tested against corrosion in salt solution.

Laboratory tests

The test sample shall be subjected to a salt-spray test in a mist chamber. The inlet and outlet of the valve shall be open. The essential reagent components and properties as well as the test conditions are as follows:

- > NaCl dissolved in distilled water;
- > pH value: 6.5 – 7.2;
- > solutions concentration: (50 +/- 5) g/l;
- > spray pressure: 0,7 bar to 1,7 bar;
- > spray volume: 1 ml/h to 2 ml/h over the surface of 80cm²;
- > test chamber temperature: (35 +/- 2) °C;
- > spray time: (240 + 6) h;
- > drying time: (168 +/- 5) h at a relative humidity of max. 70%.

The coating shall not show signs of damage after the test. There shall be no signs of delamination or sub-surface corrosion.

Note:

Where the check valves are declared to be made of corrosion-resistant materials, it is permissible to omit conducting the aforementioned corrosion tests provided that the specification of such valves explicitly confirms the use of corrosion-resistant materials.

3.1.15 Isolating check valves utilised in a firefighting pump set, including water butterfly valves, check valves, shut-off valves – requirements and other tests

3.1.15.1 Requirement

The isolating and check valves shall be consistent with the documentation provided and have the appropriate characteristics of:

> mechanical strength (valves, subjected to hydrostatic pressure of a value corresponding to 3-times the maximum operating pressure declared for the component, shall not show cracks or permanent deformations; the requirement applies to valves in fully open and fully closed position);

Water tightness (valves, subjected to hydrostatic pressure of a value corresponding 1,5- times the maximum working pressure declared for the component, shall not show visible leakage);

> resistance to low and high temperatures (valves shall operate correctly within the temperature range of +4°C to +54°C).

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3.1.15.2 Testing method

Documentation analysis, visual inspection, measurements and laboratory tests in order to verify whether the requirements as per 16.1 are met. Laboratory tests shall be conducted in accordance with the principles set out in the PN-EN 12259 standard series or other relevant standards for tests of hydraulic fittings.

3.1.16 Pressure gauges

3.1.16.1 Requirement

- 1) Pressure gauge scale divisions shall not exceed the following values:
 - a) 0,2 bar for a scale of 10 bar or lower;
 - b) 0,5 bar for a scale higher than 10 bar;

The maximum pressure value on the scale shall be 50% higher than the maximum pressure that may occur in the pump set, at a point in which the pressure gauge is to take the measurement.

- 2) Pressure gauges shall be vibration resistant.
- 3) Pressure gauges shall allow a correct reading under uniform lighting conditions of 500-550 lux by an observer whose vision has been corrected to 20/20 and who is 1.8 m away from the pressure gauge.
- 4) A new pressure gauge shall be installed vertically, on a vibrating table, by means of an adapter plate or other suitable device. Using air, the pressure in the gauge shall be increased to the value of approximately 50% of the full pressure gauge scale; however, not more than 690 kPa. The test sample shall be subjected to a 25-hour vibration test as per Table 9. Leakage, sticking or binding the needle or any other damage that renders taking a measurement impossible is not permissible.

Table 9

Total interval [mm]	Frequency T_{Hz} [<i>illegible</i>]	Time T_{hour 1}
0.51	28	5
1.04	28	5
3.81	28	5
1.04	18 to 37 (variable)*	5
1.78	18 to 37 (variable)*	5

- 5) *in a continuous or variable manner, in a frequency range of 18 to 37 Hz at approximately one full cycle every 25 + 5 seconds;
- 6) After completing the test, the pressure gauge ought to function properly in within the entire measuring range.

3.1.17 Spare parts of firefighting pump set

3.1.17.1 Requirement

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The manufacturer shall ensure the supply of the following spare parts:

A pump set comprising a firefighting pump / firefighting pumps with electric motor only:

- Complete mechanical sealing,
- Fuses,
- Pressure switch (pump starting)

A pump set comprising a firefighting pump / pumps with Diesel motor only:

- Complete mechanical sealing,
- Fuses,
- Pressure switch (pump starting),
- Two sets of fuel filters, including the sealing and installation equipment necessary for the replacement,
- Two sets of drive belts,
- One complete set of bolts, nuts, washers for the motor,
- Two fuel injection nozzles,

Replenishing Jockey pump:

- Complete mechanical sealing,
- Fuses,
- Pressure switch (pump starting).

3.1.17.2 Testing method

Compliance with documentation, verification whether the product supplied includes the required spare parts.

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3.1.18 Controllers

3.1.18.1 Product design

The execution of individual components of the firefighting pump set controller shall be meticulous, and its assembly in accordance with the technical documentation and technological instructions for the controller assembly. Controller components made of metal shall be protected against corrosion by means of protective coating.

The controller shall have a sturdy housing, suitable for the installation recommended in the documentation and the declared operating conditions.

3.1.18.1.1 Marking

- Controller marking shall include the following:
- Manufacturer's name or trademark;
- Type or other designation;
- Power supply parameters;
- Type of the pump supported;
- Code or number identifying the production period
- Permissible operating conditions (temperature, humidity).

3.1.18.2 Functional requirements

3.1.18.2.1 General requirements

Should the controller perform a facultative function, it shall meet all the requirements corresponding to this function.

3.1.18.2.2 Response time

3.1.18.2.2.1 Receiving and processing signals of low pressure (pump operation)

The controller shall be capable of receiving and processing signals from a pressure switch. Signals of pressure drop below the value set on the pressure switch shall have the highest priority.

The time of receiving and processing signals shall not cause a delay in pump starting of more than 10 s.

3.1.18.2.2.2 Resetting the pump operation status

Resetting of the pump operation status shall be performed after the pump has been stopped manually. The resetting button shall be located on the controller housing.

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3.1.18.2.2.3 Receiving and processing fault signals

The controller shall indicate a fault state within 100 s upon receiving a signal interpreted as a fault.

The controller shall be capable of simultaneous reading of the following faults / abnormal conditions:

- Tripping of the motor protection by means of a thermal and electromagnetic trigger (only applies to the Jockey pump motor);
- Power failure, battery charging failure;
- Improper operation of components;
- Short-circuit or interruption in the transmission path;
- Overload current consumption of the firefighting pump motor;
- Motor start fault.

3.1.18.2.2.4 Resetting fault signals

Resetting fault signals shall be possible:

- a) automatically when faults are no longer recognised and/or
- b) manually, at access level 2, which may be the same as the one used for resetting the pump operating status signal.

After a fault signal has been reset, indication of the proper operating state, according to the signals being received, shall resume or establish within max. 120 s.

3.1.18.2.2.5 Control of component failed starts (option with requirements)

Since there is a real risk of the controlled pumps failing to start, the controller shall be capable of actuating the output designated to their start more than once.

3.1.18.2.2.6 Pump operation state outputs (option with requirements)

At least one output shall be provided to indicate the pump operation state, actuation of which shall occur within 10 seconds of receiving the signal. Absence of the signal on the signaling circuit or on the receiving device shall not prevent fault indication.

3.1.18.2.3. Performance in fire conditions

3.1.18.2.3.1 Inputs and outputs related to pump operation

The signals related to the pump operation state shall have the highest priority. Each signal of a pressure drop below the set-point value shall cause the controller to enter the pump operation state, regardless of the current operating status.

All pump outputs related to pump operation shall have priority over other outputs.

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3.1.18.2.3.2 Optical indicators

Optical indicators shall be provided by means of separate indicators for:

- pump operation state
- failed start
- standby
- motor stopped

The indicator of the pump operation state may blink to indicate that the pump set has not entered the operation state.

3.1.18.2.3 Internal delay (option with requirements)

The controller shall offer the possibility to set a time delay on activation of some or all outputs after the response time has lapsed in order to meet the design requirements of the system. The maximum delay time shall be specified in the technical documentation of the controller.

3.1.18.2.5 Pump operation state outputs (option with requirements)

At least one output shall be provided to indicate the pump operation state, actuation of which shall occur within 10 seconds of the controller having entered the pump operation state.

Damage to the signaling circuit or signal receiver shall not affect the controller operation.

Note: For this purpose, elements ensuring galvanic separation of systems may be used, e.g. potential-free relay outputs or optocouplers.

3.1.18.2.6 Durability

Durability of the controller in terms of its response time, reliable operation and performance in fire conditions shall be confirmed by means of durability tests conducted under the conditions specified in Table 10, as appropriate for the intended operating environment.

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Table 10

Durability in terms of response time, operational reliability and performance under fire conditions		
Test	Exposure levels	Testing method
Cold, operational	Temperature - 5 ± 3°C Time 16 h	PN-EN 60068-2-1:2009
Damp heat, steady state, operational	Temperature 40 ± 2°C Relative humidity 93% (+2, -3%) Time 4 days	PN-EN 60068-2-78:2013
Damp heat, cyclic, operational	Temperature min 25 ± 3°C Temperature max 40 ± 2°C Relative humidity at min temp. >95% Max, temp 93% (±3%) Number of cycles 2	PN-EN 60068-2-30:2008
Mechanical impact, operational	Impact energy 0,5 ± 0,04 J Number of impacts 3	PN-EN 60068-2-75:2015
Vibration, sinusoidal, operational	Frequency range 10 - 150 Hz Acceleration amplitude 4,905 m/s ² (0,5 g) Number of axes 3 Number of frequency change cycles per axis 1 Sweep rate 1 octave/min	PN-EN 60068-2-6:2008
Damp heat, steady state, endurance	Temperature 40 ± 2°C Relative humidity 93% (±3%) Time 21 days	PN-EN 60068-2-78:2013
Vibration, sinusoidal, endurance	Frequency range 10 - 150 Hz Acceleration amplitude 9,81 m/s ² (1 g) Number of axes 3 Number of frequency change cycles per axis 20 Sweep rate 1 octave/min	PN-EN 60068-2-6:2008
Dry heat, operational	Temperature +40 ± 2°C Time 16 h	PN-EN 60068-2-2:2009
Moisture protection (IP protection class)	IP X4	PN-EN 60529:2003 + A2:2014
Protection against foreign bodies (IP protection class)	IP 5X	PN-EN 60529:2003 + A2:2014
Variation in supply voltage	PN-EN 50130-4:2012 + A1:2015	PN-EN 50130-4:2012 + A1:2015
Electrostatic discharge	PN-EN 50130-4:2012 + A1:2015	PN-EN 61000-4-2:2011
Electromagnetic field impact	PN-EN 50130-4:2012 + A1:2015	PN-EN 61000-4-3:2007 + A1:2008 + A2:20U
Interference by electrical fast transient/bursts (EFT/B)	PN-EN 50130-4:2012 + A1:2015	PN-EN 61000-4-4:2013
High-energy voltage surges	PN-EN 50130-4:2012 + A1:2015	PN-EN 61000-4-5:2014 + A1:2018
Conducted disturbances induced by radio-frequency fields	PN-EN 50130-4:2012 + A1:2015	PN-EN 61000-4-6:2014

In order to verify the correct operation of the controller both before and after the exposure, functional tests as per 3.1.18.6 shall be conducted.

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3.1.18.2.7 General requirements

The controller shall be capable of any combination of the following conditions simultaneously:

- > quiescent state
- > pump operation
- > fault

A single short circuit or interruption in any transmission path to and from the controller shall not affect the functioning of the controller in terms of more than one of the following functions, as per manufacturer's declaration:

- > transmission and reception of signals to/from input/output devices;
- > activation of auxiliary devices / sub-assemblies

3.1.18.2.8 Requirements for indications

3.1.18.2.8.1 General requirements

The controller shall be capable of simultaneously indicating the following states:

- > quiescent state
- > pump operation
- > fault

3.1.18.2.8.2 Display of indications

All mandatory indications shall be clearly identifiable.

Indications may be repeated in other system elements, e.g. in a control panel for the fire brigade.

3.1.18.2.8.3 Additional indications

Where indications are used in addition to mandatory indications, these shall not result in contradictions or confusion.

3.1.18.2.8.4 Light indications

The mandatory indications by means of lights shall be legible at an ambient light intensity up to 500lx, at an angle of up to 22,5 measured from a line through the centre of the active indicator and perpendicular to its mounting surface, at a distance:

- > 3 m for general indications of operating states,
- > 3 m for indications of power supply,
- > 0,8 m for other indications.

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Where the same indicator lights are used for indicating faults and blockages, then faults shall be indicated by means of steady light, whereas faults by means of pulsing light (other than for both states, as per manufacturer's documentation).

3.1.18.2.8.5 Indication testing

Any mandatory optical indicators shall offer the possibility of manual testing at access level 1 or 2.

3.1.18.2.9 The quiescent state

Presence of power supply at the controller shall be indicated by means of a separate, green light indicator.

Any information concerning the firefighting pump set may be displayed in the quiescent state; however, no indications shall be given which could be confused with the indications used in the:

- > pump operation state
- > fault state

3.1.18.2.10 The fault state

3.1.18.2.10.1 Optical indication of fault state

a) Faults shall be indicated with no prior manual intervention. A fault state takes place when it is indicated optically by means of at least a separate yellow light indicator (general fault indicator) and/or

b) optically, by means of a separate yellow light indicator for each fault, and

c) acoustically (if applicable).

Optical indication may be provided by:

d) dedicated light indicators

or

e) a common light indicator for testing and/or fault state, provided that indication can be distinguished (steady light, slow pulsing, fast pulsing).

3.1.18.2.10.2 Output for fault indication (option with requirements)

The controller shall be equipped with means of transferring fault signals to other devices. The output signal shall also be transferred when the controller receives no power supply. Damage to these devices shall not affect controller operation.

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3.1.18.3 Requirements for power supply and motor starting procedures

3.1.18.3.1 Controllers for electric motor pumps

3.1.18.3.1.1 Mains power supply

The main AC power supply switch shall be integrated into the controller cabinet door. It shall be possible to lock the switch in the switched-on position.

The switch shall be clearly labelled:

“FIREFIGHTING PUMP MOTOR SUPPLY – NOT TO BE SWITCHED OFF IN THE EVENT OF FIRE”.

The letters on the notice shall be at least 10 mm high and shall be white on a red background.

The metal cabinet of the controller shall be connected directly to the terminal that enables earthing. The terminal shall be properly marked with the earthing symbol.

3.1.18.3.1.2 Protective equipment for electric circuit

The controller shall be equipped with appropriate sensors indicating firefighting pump overload. The controller shall indicate a fault of a pump / pump set, but shall not disable pump operation.

Fuses in the controller shall be designed such that they can resist the current of a blocked motor for at least 75% of the time until the coils fail. Fuse values shall be clearly indicated near the fuses.

Every volt-free switch shall have the possibility to automatically switch on again after mains voltage is resumed so that the motor may be started automatically after a pressure drop on pump discharge side.

3.1.18.3.2 Controllers for Diesel motor pumps

The main AC power supply switch shall be integrated into the controller cabinet door. In the event of mains power supply failure, the controller shall be powered by the batteries. A switch for disconnecting batteries for maintenance shall be fitted inside the controller casing.

Classes of fuses or switches shall be clearly indicated near the device.

The metal cabinet of the controller shall be connected directly to the terminal that enables earthing. The terminal shall be properly marked with the earthing symbol.

3.1.18.3.2.1 Batteries / back-up power supply

For the purpose of starting the Diesel motor and maintaining controlling functions, two separate batteries shall be provided: 12 V or 24 V. The batteries shall not be used for any other purpose and shall be charged by two chargers connected to the mains power supply.

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The batteries shall be:

- > nickel-cadmium batteries, in accordance with PN-EN 60623;
- > lead-acid batteries, in accordance with PN-EN 50342-1 or PN-EN 50342-2 confirmed by manufacturer's declaration.

3.1.18.3.2.2 Battery chargers

The controller shall be equipped with two independent constant potential battery chargers with current limiter.

The battery chargers shall be powered independently by means of fuses or circuit breakers. It shall be possible to remove either charger while leaving the other operational.

In standby mode, each charger shall remain powered and permanently connected to a battery. Under normal operating conditions, the charger output shall be set in accordance with manufacturer's recommendations so that AC current flow through the battery is ensured to maintain the battery fully charged. Battery loads and electromagnetic interference shall be compensated automatically. Chargers shall enable the batteries to be charged from a fully discharged state to 90% of their capacity within a period of time not exceeding 24 hours.

The functioning of chargers shall be monitored, and in the event of charger failure or damage or disconnection, "charger fault" shall be indicated. Charger alarms shall be disabled during firefighting pump starting.

3.1.18.3.2.3 Battery charging

An option of boosted charging shall be ensured for charging to a higher voltage as recommended by the battery manufacturer. A controller for boosted charging (if required by the control panel design) shall be accessible only from the inside of the motor controller.

3.1.18.3.2.4 Automatic starting

Automatic firefighting pump starting shall be initiated by the controller after a pressure drop in the fire protection system and after receiving a signal from the pressure switch. The started pump shall remain in operation until stopped manually.

Where the pump is equipped with a priming tank and the water level drops below 2/3 of the normal water level, the firefighting pump shall start.

The automatic starting sequence shall include maximum 6 motor start attempts. After each attempt, the controller shall perform an automatic switchover to the other battery. Each attempt shall last from 5 s to 10 s, with a maximum pause of 10 s between the attempts.

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In the event of 6 failed attempts to start the motor, the controller shall:

- generate an acoustic and visual signal indicating that the motor failed to start;
- initiate an output signal “cannot start”;
- disable the automatic starting system.

In the event of the battery being insufficiently powered, there shall be an automatic switchover to the other battery at any time during the starting attempt so that it is possible to perform a starting sequence of maximum 6 attempts.

The mechanism of automatic starting remains fully functional at a pressure drop in the fire protection system or firefighting water grid as well as when a signal from the pressure switch is received, except when:

- the pump starts (after the pump motor starts, the motor speed sensor shall provide the controller with the information on current speed in order to terminate the starting sequence, and the controller shall return to default settings);
- after a “failed starting sequence”.

The started pump shall remain in operation until stopped manually by means of the manual switch located on the door of the controller cabinet.

The control voltage shall be drawn from both batteries simultaneously.

Pressure sensors or pressure switches, e.g. on the motor lubrication system or on pump discharge, shall not be used as a means of determining the moment of de-energising the starter motor during the starting sequence.

The controller shall provide an output signal to the Diesel motor speed governor in order to maintain constant motor speed.

3.1.18.3.3 Emergency manual starting system

Manual start shall be easily accessible and active in any operating condition. Facilities shall be provided to prevent accidental manual starting of the pumps. There shall be no delay in firefighting pump set operation after the manual start button is pressed.

3.1.18.3.4 Pump stopping

Pursuant to PN-EN 12845, section 10.7.5.2, pump operation can be stopped only manually.

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4. PACKING, STORAGE, TRANSPORT AND MARKING

4.1 Packing

The products shall be supplied in manufacturer's packaging. The packaging shall bear the data specified in 4.4.3.

4.2 Storage

The products shall be stored in manufacturer's packaging, in dry and cool rooms, protected against exposure to mechanical factors and other conditions that may cause damage, in accordance with manufacturer's guidelines.

4.3 Transport

Transport of the products packaged as set out in 4.1. shall be conducted in a manner ensuring protection against any damage.

4.4 Marking

The marking of the construction product as well as its packaging, prior to the product being placed on the market, shall bear the information required by this National Technical Assessment.

4.4.1 Construction product marking

Marking a product with a construction mark shall be conducted in accordance with the guidelines set out in the Regulation of the Minister of Infrastructure and Construction of 17 November, 2016 on the methods of declaring conformity of construction products and their marking with a construction mark (Journal of Laws, item 1966, as amended): § 10

1. The manufacturer shall mark the construction product with a construction mark prior to placing it on the market or making it available on the domestic market.

2. The construction mark shall be affixed visibly, legibly and permanently, directly to the construction product or to a label attached to the product.

3. Should marking the product with a construction mark as set out in point 2 render not feasible due to the size or nature of the construction product, the construction mark shall be placed on unit packaging or collective packaging of the product or on accompanying documents.

§ 11 1. The marking of the construction product shall be accompanied by the following information:

- 1) The last two digits of the year in which the construction mark was first placed on the construction product;
- 2) Manufacturer's name and address of its headquarters or an identification mark that explicitly identifies the manufacturer's name and its address;
- 3) Name and type designation of the construction product;

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- 4) Number and year of issuance of the National Technical Assessment, according to which the performance characteristics are declared;
- 5) Number of the national declaration of performance;
- 6) Level or class of the performance characteristics declared;
- 7) Name of the certification body, provided that the aforementioned participated in the assessment and verification of constancy of performance of the construction product;
- 8) Manufacturer's website address if the national declaration is available thereon.

§ 12 Other markings, marks and inscriptions may be placed on the construction product marked with a construction mark on the condition that they do not restrict the visibility and legibility of the construction mark or the information referred to in § 11, and their meaning as well as graphic form shall not be misleading.

4.4.2 Marking of the type, characteristics and intended use of the product

Notwithstanding the requirements set out in 4.4.1, the pump housing shall bear legible and permanent marking indicating at least the following:

- Manufacturer's name or trademark;
- Type designation or other marking;
- Code of number identifying the time of manufacture;
- Permissible delivery flow (in l/min);
- Environmental class designation.

4.4.3 Marking of product packaging

The packaging of the product being subject of this National Technical Assessment shall bear at least the following information:

1. The construction mark, conditionally, as per the guidelines specified in 4.4.1,
2. Manufacturer's name and trademark;
3. Product name and type.

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5. ASSESSMENT AND VERIFICATION OF CONSTANCY OF PERFORMANCE

5.1 General provisions

Pursuant to Article 4, Article 5 paragraph 2 and Article 8 paragraph 1 of the Act of 16 April 2004 on construction products (Journal of Laws No 92/2004, Item 881, as amended) the product referred to in this National Technical Assessment may be placed on the market and used in construction works to the extent of their performance characteristics and intended use, provided that the manufacturer has conducted the assessment and verification of constancy of performance, and by issuing a national declaration of performance has declared, in sole responsibility, that the performance of product conforms to the National Technical Assessment CNBOP-PIB No CNBOP-PIB-KOT-2020/0207-1005 edition 2, and has marked the product with the construction mark.

Pursuant to the Regulation of the Minister of Infrastructure and Construction of 17 November 2016 on the methods of declaring conformity of construction products and their marking with a construction mark (Journal of Laws 2016, item 1966, as amended), the assessment and verification of constancy of performance of **the SiFire EN firefighting pump set, models: E, EJ, EEJ, D, DJ, EDJ, in sizes 40-250; 50-160; 50-200; 50-250; 65-200; 65-200N; 65-250N; 65-315R; 80-200; 80-250; 80-315R; 100-200; 100-250; 100-315R; 125-250; 150-315** shall be conducted by the manufacturer by applying **System 1 of the assessment and verification of constancy of performance**, which indicates certification of conformity of the product performance characteristics by an accredited certifying body based on:

- 1) Tasks of the manufacturer which include type specification of the construction product as well as:
 - a) factory production control (FPC),
 - b) testing of samples taken by the manufacturer at the factory, conducted in accordance with the test plan established by the manufacturer;
- 2) Assessment and verification conducted by an accredited certifying body:
 - a) initial inspection of the factory and factory production control,
 - b) issuance of the national certificate of constancy of performance,
 - c) continuous supervision, assessment and evaluation of factory production control

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5.2 Factory production control (FPC)

5.2.1 General provisions

The manufacturer shall establish, document and maintain a factory production control system in order to ensure that the products placed on the market comply with the declared performance characteristics.

The factory production control system shall entail written procedures, regular inspections and tests and/or assessments as well as utilisation of their results to control raw materials and other incoming materials or components, equipment, production process, and the product itself.

All elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner, in the form of written policies and procedures. Documentation of the factory production control system shall ensure general understanding of the conformity assessment and shall allow to obtain the required performance characteristics of the product as well as verify the effectiveness of the factory production control system under inspection.

The factory production control shall adopt both operating techniques and any measures allowing to maintain and control conformity of the product performance with this National Technical Assessment.

5.2.2 Requirements

The construction product being subject of this National Technical Assessment shall be produced in accordance with the factory production control system.

The manufacturer shall establish, document, implement and maintain the factory production control system in order to maintain constancy of the performance characteristics specified in this National Technical Assessment.

The documentation of factory production control shall include:

- a) organizational structure,
- b) requirements for personnel (required qualifications, specification of authorisations, specification of responsibility for individual elements of factory production control, training),
- c) management review conducted by managerial staff,
- d) supervision over documentation and records,
- e) test and control plans for raw materials, requirements,
- f) test and control plans for finished product,
- g) supervision over production equipment,
- h) supervision over monitoring and measuring equipment, maintaining consistency of measurements,
- i) supervision over production process, including ongoing inspections and in-process tests
- j) description of subcontracted processes and procedure of supervision
- k) handling a non-compliant product and complaints, corrective actions
- l) description of packing, transport, storage and marking

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The documentation of factory production control shall be accompanied by technical documentation, technical specifications (product standards, testing standards, European or national technical assessments, etc.), legal regulations.

A quality management system applied in accordance with the requirements of ISO 9001 may be deemed as a factory production control system, provided that the requirements of this National Technical Assessment are also conformed with.

5.3 Initial type testing

Initial type testing attests to the required performance characteristics and is conducted prior to placing the product on the market and upon any change of raw materials or components and production technology, as well as changes in the FPC system if they affect the performance characteristics of the product.

Based on **System 1 of the assessment and verification of constancy of performance** adopted for the product being subject of this National Technical Assessment as well as pursuant to § 5 of the Regulation of the Minister of Infrastructure and Construction of 17 November, 2016, on national technical assessments (Journal of Laws 2016, item 1968), initial type testing shall be conducted by:

- 1) an accredited testing laboratory, in accordance with the Act of 13 April 2016 on compliance assessment systems and market surveillance or;
- 2) a foreign laboratory, should this derive from international agreements or;
- 3) a notified laboratory, in accordance with the Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011 laying down harmonized conditions for the marketing of construction products and repealing Council Directive 89/106 / EEC or;
- 4) other laboratory which the assessment body concluded an agreement with on the recognition of test and calculation results.

The assessment body may recognise test and calculation results submitted by the applicant and produced by national and foreign laboratories other than listed above.

The scope of initial type testing includes all tests specified in section 3.

Positive results of the tests, conducted by accredited laboratories, on the basis of which performance characteristics were established in the course of the **National Technical Assessment CNBOP-PIB-KOT-2020/0207-1005 edition 2 proceedings**, are deemed as initial type testing in the assessment and verification of constancy of performance of the product.

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5.4 Finished product testing

The plan for finished product testing includes ongoing product testing and periodic testing.

5.4.1 Periodic testing

Periodic testing shall be conducted for the purpose of periodic product quality control as well as confirmation of production stability, at least once per 3 years. The scope of periodic testing includes at least the tests specified in Table 10.

Table 10

No.	Performance characteristic	Requirement / requirement description	Test / test description	Sample size
1	2	3	4	5
1	Documentation; compliance with documentation	The documentation, as to the scope and content, shall contain sufficient data concerning the product, in accordance with section 3.1 of this National Technical Assessment. The product shall be compliant with the documentation.	Analysis of documentation, measurements and (if necessary) laboratory tests in order to determine compliance with requirements according to column 3 of this table.	According to arrangements with the CNBOP-PIB laboratory
2	Marking	Section 3.1 and section 4.4 of this National Technical Assessment	Analysis of documentation and visual inspection of the product	
3	Hydrostatic resistance	Section 3.1.5.1 of this National Technical Assessment	Section 3.1.5.2 of this National Technical Assessment	
4	Hydraulic performance	Section 3.1.11.1 of this National Technical Assessment	Section 3.1.11.2 of this National Technical Assessment	

5.4.2 Ongoing product testing

Ongoing product testing is a procedure of internal production control, as a result of which the manufacturer ensures conformity of the product technical characteristics with the provisions of the National Technical Assessment. The scope of ongoing product testing is specified in Table 11.

Table 11

No.	Performance characteristic	Requirement	Test	Sample size
1	2	3	4	5
1	Compliance with documentation (for defects / damage)	The product shall not show any defects or damage that may worsen its performance in accordance with the manufacturer's FPC procedure.	According to the relevant manufacturer's procedure	Each specimen of the firefighting pump set
2	Hydrostatic resistance	Section 3.1.5.1 of this National Technical Assessment or in accordance with the relevant manufacturer's FPC procedure.	Section 3.1.5.1 of this National Technical Assessment or in accordance with the relevant manufacturer's FPC procedure.	Each specimen of the firefighting pump set
3	Hydraulic performance	Section 3.1.11.1 of this National Technical Assessment or in accordance with the relevant manufacturer's FPC procedure.	Section 3.1.11.2 of this National Technical Assessment or in accordance with the relevant manufacturer's FPC procedure.	

The results of the ongoing product testing shall be recorded systematically, and the records shall attest that the product meets the criteria of conformity assessment. Each batch shall be unequivocally identifiable in the test register.

The manufacturer shall indicate the percentage of product samples (no less than 1%) to be used for ongoing product testing. Should one product batch include different product models (versions), then the tests shall be conducted for each of the models.

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5.5 Testing methods

Product testing shall be conducted by means of the methods specified in sections 3 and 5.4 of this National Technical Assessment. The results obtained shall be compared to the requirements set out therein. Environmental requirements set out in the normative documents specified in sections 3 and 5.4 herein shall be ensured during sample taking and preparation as well as during tests.

5.6 Sampling for testing

Test samples shall be taken at random, in accordance with the relevant standard.

5.7 Assessment of test results

The manufactured products shall be deemed compliant with this National Technical Assessment if all test results attest to the conformity with the requirements provided in section 3 herein. The assessment of test results shall also include the results of previous tests conducted in accredited laboratories, provided that the testing methods and exposure conditions are in line with the requirements of this National Technical Standard.

6. NOTICE

- 6.1 The National Technical Assessment **CNBOP-PIB-KOT-2020/0207-1005 edition 2** is a document certifying that the following products have successfully undergone the assessment of performance for their intended use: SiFire EN firefighting pump set, models E, EJ, EEJ, D, DJ, EDJ, in sizes 40-250; 50-160; 50-200; 50-250; 65-200; 65-200N; 65-250N; 65-315R; 80-200; 80250; 80-315R; 100-200; 100-250; 100-315R; 125-250; 150-315, to the extent resulting from the provisions of this National Technical Assessment.
- 6.2 The set of performance characteristics specified in the National Technical Assessment as well as their required level constitute the reference basis for the manufacturer to conduct the assessment and verification of constancy of performance, as well as issue, under his sole responsibility, the national declaration of conformity.
- 6.3 The National Technical Assessment **CNBOP-PIB-KOT-2020/0207-1005 edition 2** certifies positive assessment of the product manufactured and submitted by the manufacturer for the purpose of assessment proceedings concerned with the issuance of the National Technical Assessment. The assessment proceedings neither change nor improve the product by assigning other requirements than those declared by the manufacturer, nor do they introduce other methods of testing performance characteristics than those that are actually applied in the course of production in type testing and internal production control.
- 6.4 The National Technical Assessment is not a document authorising construction product marking prior to placing it on the market.

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- 6.5 The product shall be delivered to a recipient in accordance with the provisions concerning packing, storage and transport, set out in section 4 of this National Technical Assessment. This condition applies to the Supplier at all stages of product distribution, from the manufacturer to the end-customer.
- 6.6 The National Technical Assessment does not release the manufacturer from liability for the quality of the construction product, any batch of this product as well as its single units, and does not release contractors of construction works from liability for their correct application.
- 6.7 Warranty for the construction product referred to in this National Technical Assessment shall be issued by the Supplier in accordance with separate regulations.
- 6.8 The content of brochures, advertisements as well as other documents issued in relation to placing the product referred to in this National Technical Assessment on the market and its use in construction shall contain a note on the **National Technical Assessment CNBOP-PIB-KOT-2020/0207-1005 edition 2** issued for this product.
- 6.9 The CNBOP-PIB National Technical Assessment does not infringe the rights arising from the provisions on the protection of industrial property, in particular the Act of 30 June, 2000 Industrial Property Law (Journal of Laws 2001, no 49, item 508, as amended). The responsibility for ensuring these rights lies with the user of this National Technical Assessment.
- 6.10 The manufacturer shall determine whether the product being the subject of this National Technical Assessment does not infringe the rights of third parties.
- 6.11 Liability for any damage caused to anyone as a result of product defect lies with the manufacturer.
- 6.12 By issuing this National Technical Assessment, CNBOP-PIB shall not be liable for any possible infringement of exclusive and acquired rights.
- 6.13 CNBOP-PIB may introduce changes to the performance characteristics specified in this National Technical Assessment. This requires a written application, with reasons, submitted by the manufacturer as well as assessment proceedings to be conducted in scope commensurate with the changes. No changes shall be introduced to the content of this National Technical Assessment in other manner than stated above.
- 6.14 The CNBOP-PIB National Technical Assessment may be repealed by CNBOP-PIB in the event of changes in separate regulations, standards and provisions laid down by international organisations if it stems from existing contracts, significant changes in scientific basis and practical knowledge as well as in the event of no evidence present for the positive assessment of performance of the construction product for its intended use, while in use. The National Technical Assessment may be repealed on the initiative of CNBOP-PIB or at the request of the General Inspector of Construction Supervision upon conducting an investigative procedure with participation of the applicant.

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7 REGISTER OF DOCUMENTS UTILISED IN THE PROCEEDINGS

Standards and related documents

- **PN-EN 54-2:2002 + A1:2007** Systemy sygnalizacji pożarowej - Część 2: Centrale sygnalizacji pożarowej [**Fire detection and fire alarm systems – Part 2: Control and indicating equipment**]
- **PN-EN 593:2018-02** Armatura przemysłowa - Przepustnice metalowe ogólnego przeznaczenia [**Industrial valves – Metallic butterfly valves for general purposes**]
- **PN-EN 1074-1:2002** Armatura wodociągowa - Wymagania użytkowe i badania sprawdzające - Część 1: Wymagania ogólne [**Valves for water supply – Fitness for purpose requirements and appropriate verification tests – Part 1: General Requirements**]
- **PN-EN 1092:2018-08** Kołnierze i ich połączenia - Kołnierze okrągłe do rur, armatury, kształtek, łączników i osprzętu z oznaczeniem PN - Część 1: Kołnierze stalowe [**Flanges and their joints - Circular flanges for pipes, valves, fittings and accessories, PN designated – Part1: Steel flanges**]
- **PN-EN 12162+A1:2009** Pompy do cieczy - Wymagania bezpieczeństwa - Procedura prób hydrostatycznych [**Liquid pumps – Safety Requirements – Procedure for hydrostatic testing**]
- **PN-EN 12259-5:2005** Stałe urządzenia gaśnicze - Podzespoły urządzeń tryskaczowych i zraszaczowych [**Fixed firefighting systems – Components for sprinkler and water spray systems**]
- **prPN-EN 12259-12:2004** Fixed firefighting Systems - components for sprinkler and water spray Systems. Part 12: Pumps
- **PN-EN 12627:2002** Armatura przemysłowa - Przyłącza armatury stalowej do przyspawania doczołowego [**Industrial valves – Butt welding ends for steel valves**]
- **PN-EN 12845:2015-10** Stałe urządzenia gaśnicze - Automatyczne urządzenia tryskaczowe - Projektowanie, instalowanie i konserwacja [**Fixed firefighting systems – Automatic sprinkler systems – Design, installation and maintenance**].
- **PN-EN 50130-4:2012 + A1:2015** Systemy alarmowe - Cz. 4: Kompatybilność elektromagnetyczna - Norma dla grupy wyrobów: Wymagania dotyczące odporności urządzeń systemów sygnalizacji pożarowej, sygnalizacji włamania, sygnalizacji napadu, CCTV, kontroli dostępu i osobistych [**Alarm systems – Part 4: Electromagnetic compatibility – Product family standard: Immunity Requirements for components of fire, intruder, hol dup, CCTV, access control and social alarm systems**]
- **PN-EN 60068-2-1:2009** Badania środowiskowe - Część 2-1: Próby - Próba A: Zimno [**Environmental testing – Part 2-1: Tests – Test A: Cold**]
- **PN-EN 60068-2-2:2009** Badania środowiskowe - Część 2-2: Próby - Próba B: Suche gorąco [**Environmental testing – Part 2-2: Tests – Test B: Dry heat**]
- **PN-EN 60068-2-6:2008** Badania środowiskowe - Część 2-6: Próby - Próba Fc: Wibracje (sinusoidalne) [**Environmental testing – Part 2-6: Tests – Test Fc: Vibration (sinusoidal)**]
- **PN-EN 60068-2-75:2015-01** Badania środowiskowe - Część 2-75: Próby - Próba Eh: Próby młotami [**Environmental testing – Part 2-75: Tests – Test Eh: Hammer tests**]
- **PN-EN 60068-2-78:2013-11** Badania środowiskowe - Część 2-78: Próby - Próba Cab: Wilgotne gorąco stałe [**Environmental testing – Part 2-78: Tests – Test CAB: Dam heat, steady state**]
- **PN-EN 60529:2003 + A2:2014** Stopnie ochrony zapewniane przez obudowy (Kod IP) [**Degrees of protection provided by enclosures (IP Code)**]

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- **PN-EN 61000-4-2:2011** Kompatybilność elektromagnetyczna (EMC) - Część 4-2: Metody badań i pomiarów - Badanie odporności na wyładowania elektrostatyczne

[*Electromagnetic compatibility*

(*EMC*) – *Part 4-2 Testing and measurement techniques – Electrostatic discharge immunity test*]

- **PN-EN 61000-4-3:2007+AI:2008+IS:2009+A2:2011** Kompatybilność elektromagnetyczna (EMC) - Część 4-3: Metody badań i pomiarów - Badanie odporności na promieniowane pole elektromagnetyczne o częstotliwości radiowej

[*Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test*]

- **PN-EN 61000-4-4:2013-05** Kompatybilność elektromagnetyczna (EMC) - Część 4-4: Metody badań i pomiarów - Badanie odporności na serie szybkich elektrycznych stanów przejściowych

[*Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test*]

- **PN-EN 61000-4-5:2014-10** Kompatybilność elektromagnetyczna (EMC) - Część 4-5: Metody badań i pomiarów - Badanie odporności na udary

[*Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test*]

- **PN-EN 61000-4-6:2014-04** Kompatybilność elektromagnetyczna (EMC) - Część 4-6: Metody badań i pomiarów - Badanie odporności na zaburzenia przewodzone, indukowane przez pola o częstotliwości radiowej

[*Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields*]

- **PN-EN ISO 228-1:2005** Gwinty rurowe połączeń ze szczelnością nie uzyskiwaną na gwincie - Część 1: Wymiary, tolerancje i oznaczenie

[*Pipe threads where pressure-tight joints are not made on the threads – Part 1: Dimensions, tolerances and designation*]

- **PN-EN ISO 9227:2017-06** Badania korozyjne w sztucznych atmosferach - Badania w rozpylonej solance

[*Corrosion tests in artificial atmospheres – Salt spray tests*]

- **PN-EN ISO 9906:2012** Pompy wirowe - Badania odbiorcze parametrów hydraulicznych - Klasy dokładności 1, 2 i 3

[*Rotodynamic pumps – Hydraulic performance acceptance tests – Grades 1, 2 and 3*]

- **IEC 60034-30:2014** Rotating electrical machines - Part 30-1: Efficiency classes of line operated AC motors (IE code)

Test reports, assessments, classifications used in the National Technical Assessment proceedings

Test reports:

> No 1296/BA/18 of 15 July, 2019

conducted in Zespół Laboratoriów Sygnalizacji Alarmu Pożaru i Automatyki Pożarniczej – BA, Centrum Naukowo-Badawcze Ochrony Przeciwpowodziarowej im. J. Tuliszkowskiego – Państwowy Instytut Badawczy [*Laboratory of Fire Alarm Signaling and Fire Automation; Research Centre for Fire Protection - National Research Institute*]

> No 1320/BU/18 of 21 May, 2020

conducted in Zespół Laboratoriów Sygnalizacji Alarmu Pożaru i Automatyki Pożarniczej – BA, Centrum Naukowo-Badawcze Ochrony Przeciwpowodziarowej im. J. Tuliszkowskiego – Państwowy Instytut Badawczy [*Laboratory of Fire Alarm Signaling and Fire Automation; Research Centre for Fire Protection - National Research Institute*]

> No EF13324 on the test of WNF-S 40-250 pump with the hydraulic performance curve

> No EF13326 on the test of WNF-S 50-160 pump with the hydraulic performance curve

> No EF13328 on the test of WNF-S 50-200 pump with the hydraulic performance curve

> No EF13330 on the test of WNF-S 50-250 pump with the hydraulic performance curve

> No EF13336 on the test of WNF-S 65-200 pump with the hydraulic performance curve

> No EF13342 on the test of WNF-S 65-250 pump with the hydraulic performance curve

> No EF13346 on the test of WNF-S 65-315 pump with the hydraulic performance curve

> No EF13350 on the test of WNF-S 80-200 pump with the hydraulic performance curve

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- > No EF13354 on the test of WNF-S 80-250 pump with the hydraulic performance curve
- > No EF13356 on the test of WNF-S 80-315 pump with the hydraulic performance curve
- > No EF13358 on the test of WNF-S 100-200 pump with the hydraulic performance curve
- > No EF13360 on the test of WNF-S 100-250 pump with the hydraulic performance curve
- > No EF13362 on the test of WNF-S 100-315 pump with the hydraulic performance curve
- > No EF13364 on the test of WNF-S 125-250 pump with the hydraulic performance curve
- > No EF13366 on the test of WNF-S 125-315 pump with the hydraulic performance curve
- > No EF13368 on the test of WNF-S 150-315 pump with the hydraulic performance curve issued by the Centre National de Prevention et de Protection.

Documentation

- > Operating and installation manual for WNF-S pumps „Instrukcja montażu i obsługi Wilo WNF-F" issue no: 2 145 709-Ed.O2 / 2014-04-Wilo
- > Pump set assembly drawings “FFS ASSEMBLY DRAWINGS” no: 4400734 edOI
- > Product brochure “Niezawodny system przeciwpożarowy Wilo-SiFire” issue: PL/2018/02
- > Operating and installation manual for pump sets “Instrukcja montażu i obsługi Wilo-SiFire EN” issue: 4 181 658-Ed.OI / 2013-11-Wilo
- > Wilo document “Diesel engine data collection.pdf” on Diesel motors utilized in Wilo SiFire firefighting pump sets no WILO/PL/2018/09/001
- > Manufacturer’s product information “Wilo-SiFire EN series 75/250 kW Pressure boosting systems for firefighting in accordance with EN 12845" no: 719en, edition 01, issued in March 2014.
- > Operating and installation manual for Jockey pump "Wilo-MultiVert-MVI 1../2../4../8../16.. -6, Instrukcja montażu i obsługi" no: 2 050 778-Ed.O7 / 2015-02-Wilo
- > Operating and installation manual for Jockey pump “Wilo-MVIL, Instrukcja montażu i obsługi" no: 4 086 201-Ed.03 / 2015-02-Wilo
- > Jockey pump data sheets: WILO/PL/2018/09/002 version of 27.08.2018
- > Brochure on air-cooled Lombardini motors “Air cooled Diesel engines 12.0-26.0 kW" no: ED0035584920 10/12 ENG”
- > Motor data sheet Lombardini 15LD500 no: mod. 51056/5
- > Motor data sheet Lombardini 9LD625 no: cod. 3558305-05-07
- > Motor data sheet Lombardini 11LD626/3 no: cod. 3558140-06/2007-mod.50971/2
- > Motor data sheet Lombardini 12LD477 no: mod. 51041/5
- > Motor data sheet Lombardini 25LD425 no: mod. 51036/5
- > Motor data sheet VM Motori D703E0.F3S „CARATTERISTICHE TECNICHE / Technical Features" issue: Mod. 102/DIT - Ed. 2-07/09
- > Motor data sheet VM Motori D703TE0.F3S „CARATTERISTICHE TECNICHE / Technical Features" issue: Mod. 102/DIT - Ed. 2-07/09

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- > Motor data sheet VM Motori D754TPE2.FRP „CARATTERISTICHE TECNICHE / Technical Features" issue: Mod. 102/DIT - Ed. 1-03/07
- > Motor data sheet VM Motori D756IPE2.FRP „CARATTERISTICHE TECNICHE / Technical Features" issue: Mod. 102/DIT - Ed. 1-03/07
- > Installation and operating manual for VM Motori D756 motor no: VM p/n 42432097F Ed.3 – 2012-04
- > Motor data sheet FELM „FELM s.r.l IE3 MOTORI ELETTRICI AD ALTO RENDIMENTO, ENERGY EFFICENCY"
- > Motor data sheet Iveco FPT N45 MNS F40 date of issue: 20.11.2008
- > Product brochure on motor Iveco FPT N45 MNS F40 no: P2F04N001E - 03.09
- > Motor data sheet FPT N45 MNT F41 date of issue: 20.11.2008
- > Product brochure on motor FPT N45 MNT F41 no: P2F04N002E - 03.09
- > Motor data sheet FPT N67 MNT F40 date of issue: 20.11.2008
- > Product brochure on motor FPT N67 MNT F40 no: P2F04N009E - 03.09
- > Motor data sheet FPT N67 MNT F41 date of issue: 20.11.2008
- > Product brochure on motor FPT N67 MNT F41 no: P2F04N010E - 03.09
- > Motor data sheet FPT N67 MNT F42 date of issue: 20.11.2008
- > Product brochure on motor FPT N67 MNT F42 no: P2F04N003E - 03.09
- > Data sheet of priming tank set Wilo, Salmson "FFS accessory: PRIMING SET" issue: Rev.O – March 2017
- > Data sheet of Rapidrop check valves „Data Sheet 1.23 Issue C, Resilient Seat Check Valve Fig. CVF 300" no: DS: 1.23, issue C; 31/03/17
- > Data sheet of heat exchanger system Wilo, Salmson "FFS accessory: HYDRAULIC HEAT EXCHANGER for Diesel motor" issue 0; March 2017
- > Data sheet of Rapidrop butterfly valves "Data Sheet 1.63 Issue C, Wafer Butterfly Valve Fig. 215" no: DS: 1.63, issue C 21/07/2017
- > Data sheet of flowmeters, OFFICINE OROBICHE S.p.A., „FBB Series Flowmeters" issue: SET. 11
- > Data sheet of pressure switches, MINIMAX "Produktblatt IWasser - Product Sheet IWater, M2-04-10 Teil 2, pressure switch type PMS-3, PMS-10 and PMS-16" issue: M2_0410_002 01/2012
- > Data sheet of anti-vibration joint, Wilo, Salmson, "FFS accessory: ANTIVIBRATION JOINT" issue 0, March 2017

Drawings

- > Technical drawing of MVI114 pump, no: MVI114-I/16/E/3-400-50-2 (4070478) issue: 29.08.2018
- > Technical drawing of MVIL112 pump, no: MVIL112-16/E/3-400-50-2 (4087737) issue: 29.08.2018
- > Assembly drawing of WNF-S with list of components

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- > Technical drawing of Iveco N45MNSF40 motor "ENGINE LAYOUT, FIGURINO MOTORE" no: 8043773 D A 54-9754"
- > Technical drawing of Iveco N45MNTF41 motor „ENGINE LAYOUT, FIGURINO MOTORE" no: 8043799 D A 54-9754"
- > Technical drawing of Iveco N67MNTF40 motor „Figurino Motore -Completo- Engine Layout" no: 8043837 D A 54-9756"
- > Technical drawing of Iveco N67MNTF41 motor „Figurino Motore -Completo- Engine Layout" no: 8043837 D A 54-9756"
- > Technical drawing of Iveco N67MNTF42 motor „Figurino Motore -Completo- Engine Layout" no: 8043838 D A 54-9800"

APPENDICES

No appendices

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END OF THE NATIONAL TECHNICAL ASSESSMENT

The National Technical Assessment has been drawn up by	mgr. inż. Natalia Michałowska Title or equivalent term, name and surname	19.05.2021 (-) [signature illegible] Date, signature
The National Technical Assessment has been authorized by	mgr. inż. Robert Śliwiński Title or equivalent term, name and surname	19.05.2021 (-) [signature illegible] Date, signature

ADDITIONAL INFORMATION

Legal regulations

- > The Act of 16 April, 2004, on construction products (Journal of Laws No 92, item 881, as amended)
- > The Regulation of Minister of Infrastructure od 12 April, 2002 on technical conditions which must be fulfilled by buildings and their location (Journal of Laws No 75, item 690, as amended)
- > The Regulation of the Minister of Infrastructure and Construction of 17 November, 2016, on national technical assessments (Journal of Laws 2016, Item 1968).
- > The Regulation of the Minister of Infrastructure and Construction of 17 November, 2016, on the methods of declaring conformity of construction products and their marking with a construction mark (Journal of Laws 2016, item 1966, as amended)
- > The Regulation of the Minister of Interior and Administration of 7 June, 2010, on the fire protection of buildings, other construction buildings and areas (Journal of Laws No. 109, item 719, as amended)
- > The Regulation of the Minister of Interior and Administration of 24 July, 2009, on fire-fighting water supply and fire roads (Journal of Laws 2009, No 124 item 1030).

Changes introduced to the National Technical Assessment

The following changes have been introduced to this National Technical Assessment No CNBOP-PIB-KOT-2020/0207-1005 edition 1:

1. The product manufacturer's address has been changed from *Wilo SE Nortkirchenstrasse 100, 44263 Dortmund, Germany* to *Wilo SE Wilopark 1 44263 Dortmund, Germany*.
2. The name of the production plant has been changed from *Wilo SE, Wilo Systems Italia S.r.l. Viale Maestri del Lavoro 2A70132 – Bari (BA), Italy* to *WILO Italia Srl Viale Maestri del Lavoro 2A Bari Plant 70132 – Bari (BA) Italy*.
3. Correction of editorial errors.