



# Czech Metrology Institute

Notified Body No. 1383, Okružní 31  
638 00 Brno

## EC-TYPE EXAMINATION CERTIFICATE

Number: TCM 311/10 – 4745

### Addition 2

This addition replaces all previous versions of this certificate in full wording.

Issued by: **Český metrologický institut  
Okružní 31  
638 00 Brno  
Czech Republic**

**Notified Body No. 1383**

In accordance with: point 3 of annex 2 to Government Order No. 464/2005 Coll. (annex B of the Directive 2004/22/EC) from 19 October 2005 that lays down technical requirements on measuring instruments and implements in Czech Republic Directive 2004/22/EC of the European Parliament and of the Council.

Manufacturer: **APATOR POWOGAZ S.A.  
K. Janickiego 23/25  
60-542 Poznań  
Poland**

In respect of: **heat meter - compact  
type: Elf 0,6; Elf 1,0; Elf 1,5 and Elf 2,5  
Accuracy class: 2 or 3**

Valid until: **3 May 2020**

Document number: **0115-CS-A020-10**

Description: Essential characteristics, approved conditions and special conditions, if any, are described in this certificate. This certificate contains 8 pages.



Date of issue: 17 May 2012

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Notified Body No.1383

**Addition 1 from January 3, 2011 – added plug-in interfaces M-BUS, outputs and inputs.****Addition 2 from May 11, 2012 – added plug-in interfaces RADIO.****1. Measuring device description**

The compact heat meters type Elf are designed to measure the heat which, in a heat exchange circuit, is given up by a liquid called the heat-conveying liquid in the sense of the Directive of the European Parliament and of the Council no. 2004/22/EC of measuring instruments, as amended.

The compact heat meters type Elf consist of a mechanical vane-wheel flow sensor, Temperature sensor pair and electronic calculator.

Water flows in the measuring section of flow sensor rotate and actuate vane wheel. The rotation is transmitting through half-moon metal plate and two coils to the transmitter unit inside of calculator. The flow sensor is connected to calculator by clamp on plastic ring. The adjustment of the flow sensor is executed by functions of electronic calculator.

Temperature sensor pair type TOPE 42 has EC – type examination certificate No. PL 08 010/MI-004 from Główny Urząd Miar, Warszawa, Poland. Temperature sensor pairs are soldered on the electronic board of the electronic calculator. Temperature sensor pairs are designated for symmetric direct mounted installation.

The electronic calculator consists of an electronic board with battery, and is equipped with LCD display and one button. There is a connector for quick testing and programming on the back side of the calculators cover. The electronic calculator is built in the plastic cover. Upper part of electronic calculator cover is connected with bottom part of this cover by two screws, which prevent access into the electronics and to connection of temperature sensor pair.

There are special jumper pins on the electronic board, which prevents access to calibration and configuration of the metrological parameters of the heat meter.

Heat meters Elf can be equipped with distance reading interfaces. They expand possibility of heat meter after connecting appropriate modules during production or using.

Heat meters Elf are manufactured according to the technical documentation of the company APATOR POWOGAZ S.A. Type Elf 0,6 - No. 30-3725-000000; type Elf 1,0 - No. 30-3726-000000, type Elf 1,5 - No. 30-3727-000000, type Elf 1,5-G1 - No. 30-3728-000000 and type Elf 2,5 - No. 30-3729-000000.

**2. Basic technical data****2.1 Flow sensor**

Meter type:	Elf 0,6	Elf 1,0	Elf 1,5	Elf 1,5-G1	Elf 2,5
Nominal diameter DN [mm]:	15	15	15	20	20
Lower limit of flowrate $q_i$ [ $\text{m}^3/\text{h}$ ] - horizontal orientation:	0.006	0.010	0.015	0.015	0.025
Lower limit of flowrate $q_i$ [ $\text{m}^3/\text{h}$ ] - vertical orientation:	0.012	0.020	0.030	0.030	0.050
Permanent flowrate $q_p$ [ $\text{m}^3/\text{h}$ ]:	0.6	1.0	1.5	1.5	2.5
Upper limit of flowrate $q_s$ [ $\text{m}^3/\text{h}$ ]:	1.2	2.0	3.0	3.0	5.0
Connection type: Screw thread	G $\frac{3}{4}$	G $\frac{3}{4}$	G $\frac{3}{4}$	G1	G1
Total length [mm]:	110	110	110	130	130
Orientation limitation:	Horizontal / Vertical				
Accuracy class:	2 or 3				
Maximum admissible working pressure PS [bar]:	16				
Maximum pressure loss: [bar]	0.25				
Limits of temperature range ( $\Theta_{mi} \div \Theta_{max}$ ) [ $^\circ\text{C}$ ]:	0.1 $\div$ 90				
Flow profile sensitivity classes:	U0, D0				
Liquid specification:	Water				
Direction of flow:	One direction				



## 2.2 Calculator with temperature sensor pair

Limits of temperature range [°C]:	1 ÷ 105
Limits of temperature difference [K]:	3 ÷ 104
Limits in ambient temperature [°C]:	5 ÷ 55
Type of temperature sensors:	Pt 500 / 2 wire
Place of the flow sensor installation:	Flow or return
Supply:	Lithium battery 3.6 V; minimum 2.1 Ah
Protection class:	IP54
Liquid specification:	Water
Thermal power $P_s$ [kW]:	850
Mechanical environments:	M1
Electromagnetic environments:	E1
Environmental class (EN 1434):	A (domestic use, indoor installations)
Displayed units of energy:	GJ or kWh
Type of display:	LCD – 7 signs
Output interface:	One interface for testing and programming
Version of software:	12.xx sign xx describe successive software subversions

## 2.3 Temperature sensor pair

Type of temperature sensors:	Pt 500 / 2 wire
Limits of temperature range [°C]:	0 ÷ 105
Limits of temperature difference [K]:	3 ÷ 105
Mounted:	Direct
Length of pocket [mm]:	28
Length of cables [m]:	2
Specifications wires [mm <sup>2</sup> ]:	2 × 0.25
Shield of cables:	No
Max. working pressure [MPa]:	1.6
Material of pocket:	Stainless Steel
Resistance of cables [ $\Omega$ ]:	0.30
Minimal immersion depth [mm]:	26
Response time [s]:	≤ 3.2

## 2.4 Parameters and type of heat meters Elf interfaces

<b>M-BUS</b>	Unit	Value
Max voltage	V	42
Max interface current	mA	2
Max cable length	m	<1200
Transmission speed	Baud	300,600,1200, 2400,4800,9600
Max diameter of cable connected	mm <sup>2</sup>	<1,5

<b>IN</b> <i>(potential free contact, active)</i>	Unit	Value
Max voltage	V	6
Max current	mA	0,05
Isolation voltage	V	>500
Max cable length	m	10
Max input number	-	4 (2)
Max diameter of cable connected	mm <sup>2</sup>	1,5
Impedance for potential free close input	k $\Omega$	<10
Impedance for potential free open input	M $\Omega$	>2



<b>OUT (opto-coupler)</b>	<b>Unit</b>	<b>Value</b>
Max voltage	V	24
Max current	mA	5
Isolation voltage	V	>500
Max cable length	m	10
Max frequency	Hz	64
Max diameter of cable connected	mm <sup>2</sup>	1,5

<b>RADIO</b>	<b>Unit</b>	<b>Value</b>
Frequency range	MHz	868,95
Neighboring channel interspace	kHz	±50
Frequency instability	kHz	<±2,5
Output power	mW	10
Sensitivity	dBm	105
Power	Lithium battery	3,6 V, size ½AA
Antenna	Internal	¼ λ
Temperature range during exploitation	°C	0-55
Conformity	Wireless-Mbus	EN 13757-4
Type of received frames	Wireless-Mbus	T1

## 2.5 Interfaces of heat meters Elf

Interface type:	M-BUS	IN	OUT
M-BUS + 4 pulse inputs	+	+	
M-BUS + 2 pulse inputs + pulse output	+	+	+
M-BUS + 2 pulse inputs	+	+	
M-BUS + pulse inputs	+		+
4 pulse inputs		+	
2 pulse inputs + pulse output		+	+
2 pulse inputs		+	
Pulse output			+
Radio output			

## 3. Test

Technical tests of the heat meters Elf were performed in compliance with the International Recommendation OIML R 75 Edition 2006 (E) with conformity to EN 1434:2007, Test Report No. 6015-PT-P027-10 from April 27. 2010 and 8551-PT-E0009-09 from April 9. 2010.

Technical tests of the interface module for heat meters Elf were performed in compliance with the International Recommendation OIML R 75 Edition 2006 (E) with conformity to EN 1434:2007, Test Report No. 6015-PT-P027-10 from April 27. 2010, 8551-PT-E0009-09 from April 9. 2010 and No. 8551-PT-0145-10 from November 5. 2010 and Test Report No. 8551-PT-E0067-12 from April 10. 2012.

## 4. The measuring device data

There are following data on the measurement device:

- The “CE” marking and supplementary metrology marking
- Number of EC-type examination certificate
- Manufacturer’s mark or name
- Year of manufacture (last two digits)
- Measuring device type
- The serial number
- Unit of measurement (GJ or kWh)



- Accuracy class 2 or 3
- The maximum admissible pressure PS (xx bar)
- Limits of temperature range
- Limits of temperature difference
- Place of the flow sensor installation (flow or return)
- Direction of flow arrow on both sides of the meter body

## 5. Sealing

The connection of the electronic calculator with flow sensor body is protected by clamp on plastic ring with seal. Opening plastic cover of the calculator is protecting by sealed screw.

The location of the seal is described in Figure 1, 2 and 3.

Figure 1: The sealing of compact heat meters type Elf:

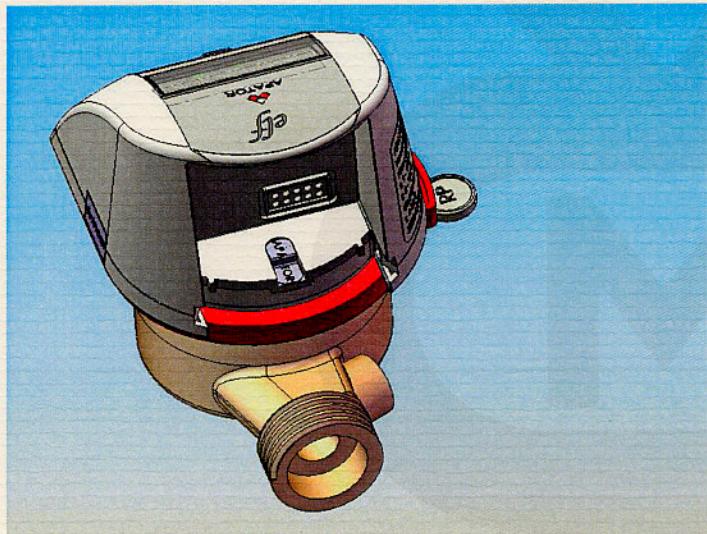


Figure 2: The sealing of compact heat meters type Elf:

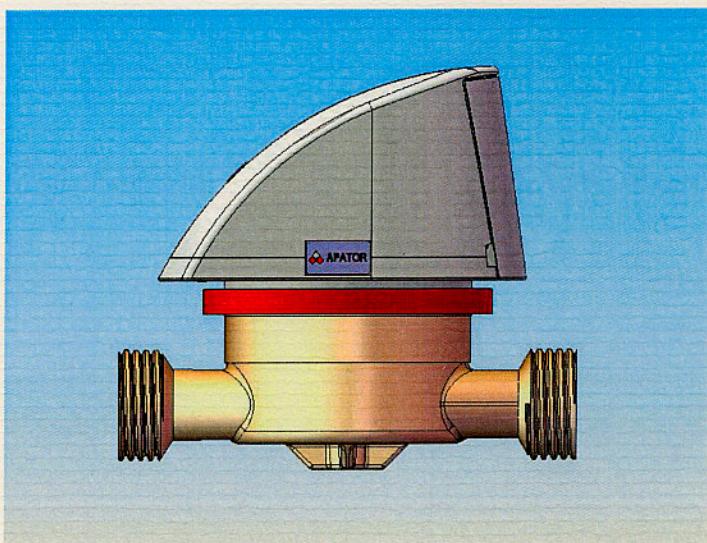


Figure 3: The sealing of compact heat meters type Elf:

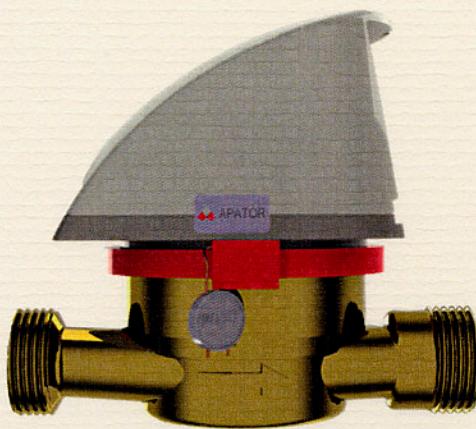


Figure 4: Montage sealing of compact heat meters type Elf after installing  
(recommendation of producer):

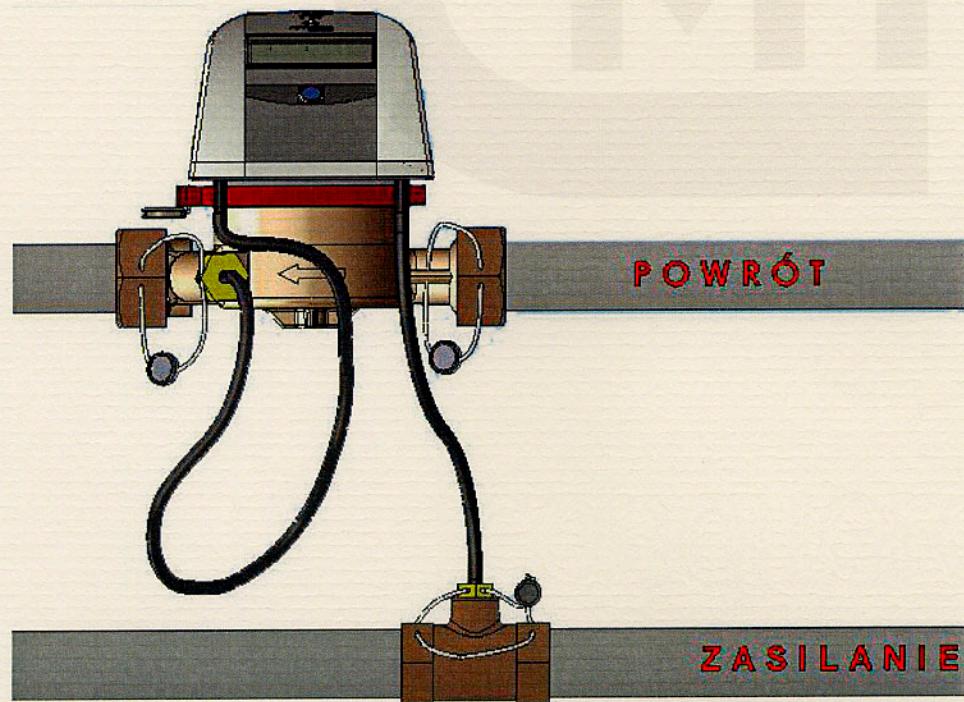
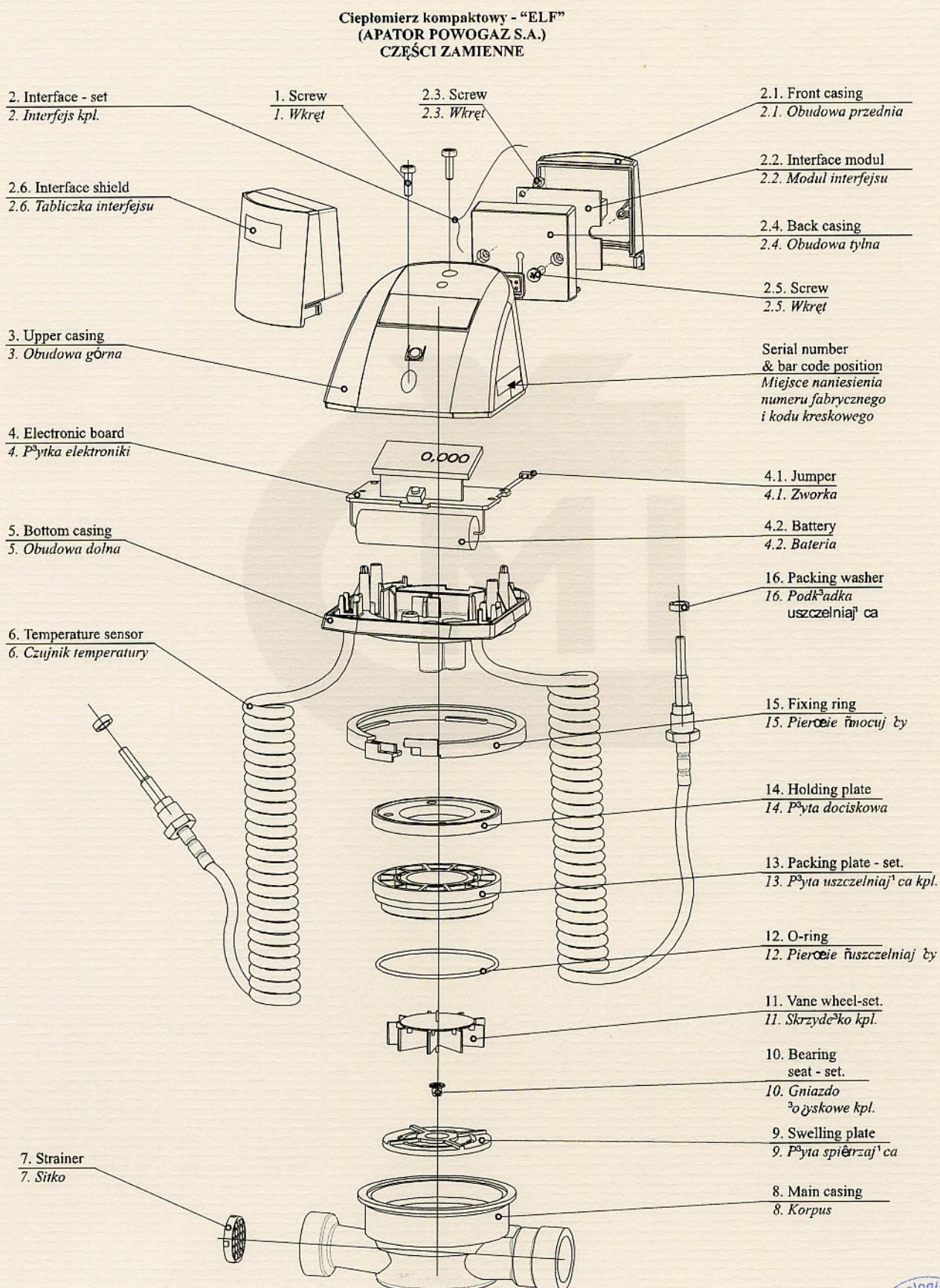


Figure 5: The assembling of compact heat meters



Cieplomierz kompaktowy - "ELF"  
 (APATOR POWOGAZ S.A.)  
 CZĘŚCI ZAMIENNE

MATERIALS  
 MATERIAŁY

CODE Nr części	DESCRIPTION <i>Opis</i>	MATERIALS <i>Materiały</i>
01	SCREW <i>Wkręt</i>	STEEL <i>Stal</i>
02	INTERFACE <i>Interfejs</i>	ELECTRONIC PART <i>Część elektroniczna</i>
02.1	FRONT CASING <i>Obudowa przednia</i>	POLYCARBONATE RESIN <i>Żywica poliwęglanowa</i>
02.2	INTERFACE MODUL <i>Moduł interfejsu</i>	ELECTRONIC PART <i>Część elektroniczna</i>
02.3	SCREW <i>Wkręt</i>	STEEL <i>Stal</i>
02.4	BACK CASING <i>Obudowa tylna</i>	POLYCARBONATE RESIN + STYRENE ETHYLENE BUTYLENE STYRENE BLOCK COPOLYMER <i>Żywica poliwęglanowa + SEBS</i>
02.5	SCREW <i>Wkręt</i>	STEEL <i>Stal</i>
02.6	INTERFACE SHIELD <i>Tabliczka interfejsu</i>	POLYPROPYLENE <i>Polipropylen</i>
03	UPPER CASING <i>Obudowa górnna</i>	POLYCARBONATE RESIN+ POLYCARBON TRANSPARENT <i>Żywica poliwęglanowa + poliwęglan przezroczysty</i>
04	ELECTRONIC BOARD <i>Płyta elektroniki</i>	ELECTRONIC PART <i>Część elektroniczna</i>
04.1	JUMPER <i>Zwórka</i>	ELECTRONIC PART <i>Część elektroniczna</i>
04.2	BATTERY <i>Bateria</i>	ELECTRONIC PART <i>Część elektroniczna</i>
05	BOTTOM CASING <i>Obudowa dolna</i>	POLYCARBONATE RESIN + STYRENE ETHYLENE BUTYLENE STYRENE BLOCK COPOLYMER <i>Żywica poliwęglanowa + SEBS</i>
06	TEMPERATURE SENSOR <i>Czujnik temperatury</i>	ELECTRONIC PART <i>Część elektroniczna</i>
07	STRAINER <i>Sitko</i>	POLIPROPYLENE <i>Polipropylen</i>
08	MAIN CASING <i>Korpus</i>	BRASS <i>Mosiądz</i>
09	SWELLING PLATE <i>Płyta spiętrzająca</i>	BLEND OF POLYPHENYLENE OXIDE (PPO) AND POLYSTYRENE (PS) <i>Polieter fenylenu i polistiren</i>
10	BEARING SEAT - SET. <i>Gniazdo lożyskowe kpl.</i>	AROMATIC POLYAMIDE + SAPPHIRE <i>Poliimid aromatyczny + szafir</i>
11	VANE WHEEL - SET. <i>Skrzydełko kpl.</i>	POLYPROPYLENE+Cu+STAINLESS STEEL+HARTMETAL <i>Polipropylen+Cu+stal nierdzewna+hartmetal</i>
12	O-RING <i>Pierścień uszczelniający</i>	EPDM <i>Guma EPDM</i>
13	PACKING PLATE - SET. <i>Płyta uszczelniająca kpl.</i>	AROMATIC POLYAMIDE + SAPPHIRE <i>Poliimid aromatyczny + szafir</i>
14	HOLDING PLATE <i>Płyta dociskowa</i>	BRASS OR STEEL <i>Mosiądz lub stal</i>
15	FIXING RING <i>Pierścień mocujący</i>	POLI(TEREFTALAN BUTYLENU) <i>PBT</i>
16	PACKING WASHER <i>Podkładka uszczelniająca</i>	FIBRE <i>Fibra</i>

