

# USER´S MANUAL

Instructions for Operation, Maintenance  
and Installation

Flame arresters

**ADAST J 13x**

**ADAST J 34x**

**ADAST J 37x**

**ADAST J 47x**



CE 1026



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## 1. INTRODUCTION

The instructions for installation, service and maintenance provide the User with information on the product, its design, installation, proper service and maintenance.

It is equipment operating in the explosion-proof area. An authorised, properly trained person obliged to adhere to safety regulations shall carry out the installation in the process equipment (e.g. pumping stations).

The equipment can be put into operation after the inspection process of the filling station equipment completion and when a respective inspection body approves the operation.

**SAVE FOR FURTHER USE!**

## 2. APPLICATION

The flame arresters are used as a protection against the spreading of flame into the guarded part of the equipment. It is above all the safety protection of the process equipment applied for the storage, distribution, transport and processing of flammable gases and vapours of liquids of IIA explosion class and a part of IIB, IIB3 class assortment (bi-directional detonation flame arresters).

Their design results from the type of safety protection - against deflagration or detonation.

### **Deflagration flame arresters**

are fittings intended to block and extinguish deflagration i.e. subsonic spreading of flame without considerable pressure wave. As far as their application is concerned the flame arresters can be classified as follows:

- a) terminal deflagration ones - type J 373, J 374 series
- b) terminal deflagration valves (aerating piping of fuel tanks, etc.) - type J 341, J 344 series
- c) deflagration piping - type J 474 series

### **Detonation flame arresters**

are fittings installed in the piping and preventing flashback of flame during detonation burning and subsequent pressure wave propagating by supersonic speed. Type series:

- J 131, J 134 (bi-directional detonation ones)
- J 474 (unidirectional detonation ones, they work as deflagration ones in reverse direction)

## 3. TECHNICAL DATA, IDENTIFICATION

### 3.1 Technical description

The technical data are specified in technical sheets for single types of flame arresters.

The flame arresters of IIA explosion class are equipped with an all-stainless capillary flame arrester element provided with coils with capillary gap 0,7 mm or 0,4 mm.

The bi-directional detonation flame arresters of IIB explosion class, are equipped with an all-stainless capillary flame arrester element provided with discs of capillary gap 0,4 mm.

**Construction parts of the flame element are from stainless steel.**

The corner detonation flame arresters J 474 are equipped with a eliminator of detonation located in front of the flame arrester element. In case of the bi-directional flame arresters J 131 these eliminators of detonation are located at both sides. The design of the eliminator of detonation allows suppressing the shock wave in case of detonation and thus preventing the damage of the flame arrester element.



Some types of detonation flame arrester are not equipped with the eliminator of detonation.

Standard flame arrester housings and covers of deflagration flame arresters, incl. the J 474 type, are made of malleable cast iron. Only with valves ND 50 the cover with built-in safety valve and underpressure valve are made of aluminium alloy. The detonation flame arresters of type J 131 and J 134 series including the flame arrester housings are all-stainless.

The all-stainles flame arresters are made from corrosion-proof steel for casting 422931 and eliminators of detonation of J 131.25 flame arrester from 17347 steel.

The all-stainless flame arresters in aggressive atmosphere (in chemical industry) we recommend to consult with flame arresters producer.

**Surface preservation** - external surfaces of the flame arresters are coated with yellow chromium paint, 6400 hue.

**Design** of the flame arresters - shape, principal and connecting dimensions are specified in the Annex. No.1.

**The flame arresters of all type series comply within full range with the EN 12874 standard considering the design, function requirements, limits of application and testing.**

### 3.2 Identification

- each flame arrester is provided with a label made of stainless material and containing the following data:

1.	Name and address of the Producer	Adast Systems, a.s. CZ - 679 04 ADAMOV
2.	Type identification	see the table no. 3.2
3.	Serial number / year built	acc. to Producer's documents
4.	Explosion class	e.g. IIA
5.	EC Type certificate	see point 15
6.	Nominal diameter:	e.g. DN 50
7.	Nominal pressure:	e.g. PN 6
8.	EN number	EN 12874
9.	Spec. identification of explosion protection completed with the symbol of the group and category of the equipment, explosion class	II 1G IIA, ( II 1G IIB)
10.	Set gauge pressure - only with valves	see the table no. 3.2
	Set underpressure - only with valves	
11.	Ambient temperature Tamb.	-30 °C to +60 °C
12.	CE and the number of the notified authority that participates at the production inspection	



### 3.3 Technical parameters

Operating temperature of all flame arresters:

$T_{amb.} = -30 \text{ }^{\circ}\text{C}$  až  $+60 \text{ }^{\circ}\text{C}$ .

Operating pressure of products:

**0,08 - 0,11 MPa (absolutly) for types:**

J 131.25/P4AD2  
 J 131.25/P4BD2  
 J 371.50/1/P7AE/II  
 J 374.80/1/P7AE/II  
 J 374.100/1/P7AE  
 J 341.50/1/P7AE/II  
 J 344.100/1/P7AE

**0,08 - 0,13 MPa for types:**

J 134.50/P7AD2/II  
 J 134.80/P7AD2/II  
 J 474.50/1/P4AD/II  
 J 474.80/1/P4AD/II

**0,08 - 0,14 MPa for types:**

J 134.50/P4BD2/II  
 J 134.80/P4BD2/II

Flame arresters of line J 34x, J 37x and J 47x are constructed for name explosion pressure  $P_N = 0,6$  MPa.

### 3.4 Basic parameters

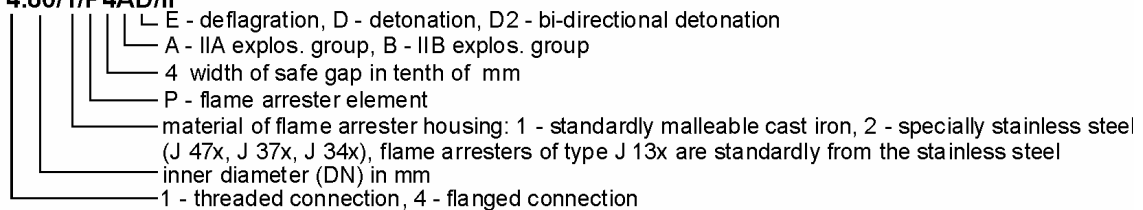
type	connection dimensions	mass	opening values underpress./gauge press.	material of the flame arrester housing
J 131.25/P4AD2	inside thread Rp1	2,2 kg	-	stainless steel
J 131.25/P4BD2	inside thread Rp1	2,5 kg	-	stainless steel
J 134.50/P7AD2/II	flange ND 50 / NP 10	12,2 kg	-	stainless steel
J 134.50/P4BD2/II	flange ND 50 / NP 10	14,5 kg	-	stainless steel
J 134.80/P7AD2/II	flange ND 80 / NP 10	27 kg	-	stainless steel
J 134.80/P4BD2/II	flange ND 80 / NP 10	31,2 kg	-	stainless steel
J 474.50/1/P4AD/II	flange ND 50, NP 65 / NP 6	12 kg	-	malleable cast iron
J 474.80/1/P4AD/II	flange ND 80 / NP 6	26 kg	-	malleable cast iron
J 371.50/1/P7AE/II	inside thread Rp2	5 kg	-	malleable cast iron
J 374.80/1/P7AE/II	flange ND 80 / NP 6	12 kg	-	malleable cast iron
J 374.100/1/P7AE	flange ND 100 / NP 6	21 kg	-	malleable cast iron
J 341.50/1/P7AE/II	inside thread Rp2	8,6 kg	0,003 / -0,0008 MPa $\pm 20$ %	mal. cast iron +Al cast iron
J 344.100/1/P7AE	flange ND 100 / NP 6	40,6 kg	0,0015 / -0,0002 MPa $\pm 20$ %	malleable cast iron

### 3.5 Summary of flame arresters

	series	description	ND 25	ND 50	ND 80	ND 100
against detonation	J 13x	bi-directional detonat. in-line flame arrester	J 131.25/P4AD2 J 131.25/P4BD2	J 134.50/P7AD2/II J 134.50/P4BD2/II	J 134.80/P7AD2/II J 134.80/P4BD2/II	-
	J 47x	unidirectional detonat. angular ones	-	J 474.50/1/P4AD/II	J 474.80/1/P4AD/II	-
against deflagration	J 37x	deflag. end-of-line ones	-	J 371.50/1/P7AE/II	J 374.80/1/P7AE/II	J 374.100/1/P7AE
	J 34x	deflag. end-of-line valves (for recuperation)	-	J 341.50/1/P7AE/II	-	J 344.100/1/P7AE

Example of the flame arresters identification:

**J 474.80/1/P4AD/II**





## 4. INSTRUCTIONS FOR THE SAFETY OF WORK

The flame arresters are safety equipment and shall be always interconnected conductively in the process equipment and grounded in accordance with the CENELEC and R044-001 standards.

### 4.1 Safety of the equipment design

The Producer guarantees safety of the design.

The design of the flame arresters complies with the requirements of EN 12874 and has been approved for the operation in the area characterised by ,  symbols shown on the guard label. Considering safety of operation in the area with the danger of explosion the flame arrester has been EC type tested (certification) according to the Annex III. of the rule 94/9/EC - ATEX by notified authority No. 1026: AO 210 Fyzikálně technický zkušební ústav, s.p., Pikartská 7, 716 07 Ostrava - Radvanice.

The Producer can submit a copy of the EC Type Inspection Certificate on demand of authorised authorities.

### 4.2 Operation safety

The pumping station User or the process equipment User is responsible for the operation safety.

The User is obliged to mark the hazardous area with warning symbols (No smoking, No open fire, etc.).

The User is responsible for drawing up the regulations with terms of regular inspections. The Producer recommends carrying out inspections respectively according to operating conditions, but once a year at least. A serviceman trained by the Producer for service works and provided with valid certificate for this activity (Producer's Certificate for Service Authorisation) can only



carry out the service works. The serviceman must not break the operation and fire safety in the course of these repairs and other activities.

He confirms the performed inspection in the “Record of Inspection and Cleaning of Flame Arresters” which is filed with the User. After the inspection and reinstallation he shall secure the guard by an inspection seal with a serial number (identification sign) against unauthorised handling.

## 5. TRANSPORT

The Customer provides the transport from the Producer in the Contract. If the Producer provides the transport, he delivers the product to the contractual point of delivery. The Producer is sufficiently familiar with the method of handling and transportation. If the Customer provides the transport, the Producer provides professional loading. He is not responsible for the transportation method. The product shall be secured against damage, displacement and upsetting on the means of transport.

## 6. INSTALLATION

Only a worker trained by the Producer of the equipment for the installation and service who keeps valid certificate (Producer’s certificate for service authorisation) for this activity can carry out this installation.

The flame arresters are installed according to the method specified in the design. **Unidirectional detonation flame arresters (J 47x) are installed so that the socket with the eliminator of detonation is in the direction to presumed detonation.** The detonation flame arresters have eliminators of detonation on the outlet and the inlet and can be installed with any socket in the direction of the presumed detonation. These flame arresters can be installed either in vertical or horizontal position.

End-of-line deflagration flame arresters - type J 37x.xx and deflagration valve flame arresters - type J 34x.xx are always installed in vertical position.

They are either threaded or flanged with a gasket. Tightness test of the connection shall be always carried out after the installation of the flame arresters in the process equipment to prove the safety of the equipment. The tightness test is specified in the project design.

**The conditions for the application and operation of the flame arresters shall comply with the articles 6.4.1, 6.4.2 and 6.4.4 EN 12874.**

**Operating temperature and pressure of the flowing medium (gases, vapours) shall comply with the values on the flame arrester label, see the point 3.3 - TECHNICAL PARAMETERS.**

The flame arresters should not be located close to hot equipment.

### 6.1 The application of the detonation flame arresters as piping deflagration ones

When the detonation piping flame arresters are used in the process equipment as a protection against deflagration, the following conditions shall be adhered to:

- At least 10 % of the piping cross section shall be free in the initiation source point
- The ratio of the piping length  $L_i$  (from possible initiation source to flame arrester) and the piping diameter on the unprotected end  $D_1$  shall not exceed the  $L_i/D_1$  ratio (the value at which the flame arrester was tested - certified) see the fig. 1 and table 1.
- The piping branches and contingent built-in valves in the unprotected end shall be installed as close to the flame arresters as possible.
- The piping diameter of the unprotected end  $D_1$  shall not exceed the connecting fitting size of the flame arrester.

- The piping diameter of the protected end D2 shall not exceed the piping diameter D1 of the unprotected end.

Fig. No. 1

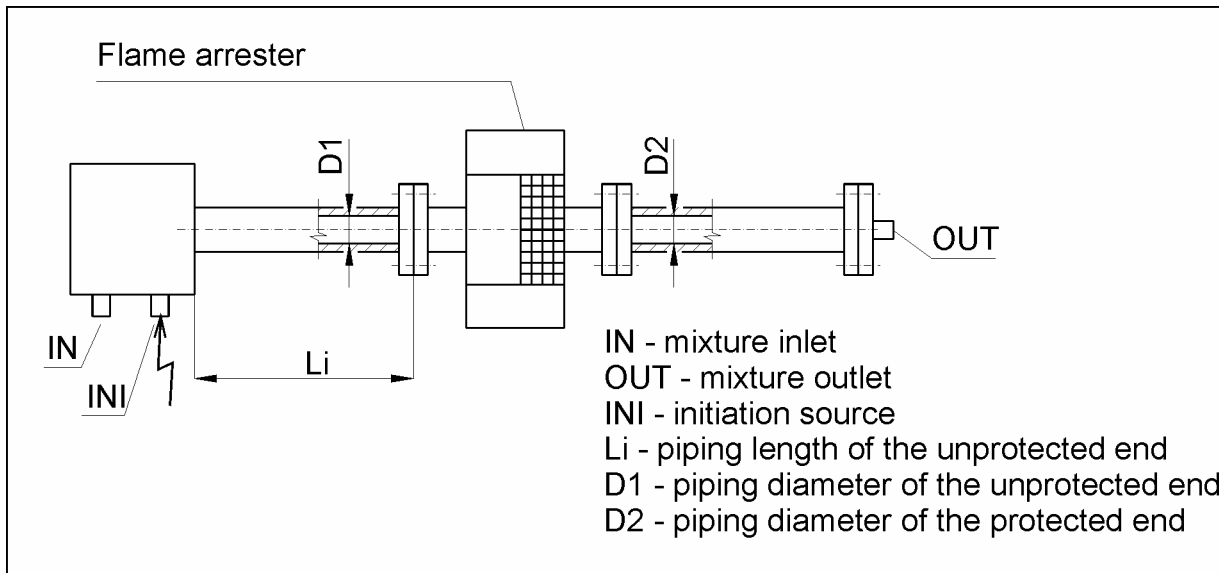


Table No. 1

Flame arrester type	Li/D1 ratio	Piping length Li (m)
J 131.25/P4AD2	40	1
J 131.25/P4BD2	40	1
J 134.50/P7AD2/II	80	4
J 134.50/P4BD2/II	60	3
J 134.80/P7AD2/II	62,5	5
J 134.80/P4BD2/II	37,5	3
J 474.50/1/P4AD/II	80	4
J 474.80/1/P4AD/II	62,5	5

## 6.2 Detonation piping flame arresters

They can be used for open and closed piping (vessels) at the unprotected end. The flame arresters have been approved as a safety element for stable detonation.

Nominal diameter D of the unprotected end and of the protected end shall coincide with the connecting flange diameter of the flame arrester.

## 7. OPERATING INFORMATION

The flame arresters need higher checking of the operability only in case they are installed for the safety protection of the equipment where vapours of combustible liquids or gases can reduce the capillary permeability of flame arrester element. In such case it is necessary to determine the checking intervals and inspections separately by operating rules in accordance with the level of danger of putting the flame arrester out of operation.



The danger of putting out of service with fuel pumping stations results only from cases of water entering the flame arresters and subsequent freezing. Such cases do not happen in normal operation. The reduction of capillary permeability of piping flame arresters can result from the fouling of the piping systems.

The Producer recommends carrying out the inspection of the flame arrester element and internal space of the flame arrester housing yearly.

## 8. MAINTENANCE AND REPAIRS

Only a person trained and authorised by the Producer for repairs of safety equipment can perform service works.

The maintenance of the flame arresters consists of the disassembly, removal and cleaning (washing) of the capillary flame arrester element by proper ecological cleaning and degreasing agent (e.g. ALFER + ALPASIV, UPEX trend alpha etc.), its drying and reassembly. Internal machined surface in the bodies shall be protected against corrosion by preservation with plastic grease (LITOL 24) to secure easy removal of the flame arrester element.

If explosion (deflagration or detonation) occurs in the course of operation in the circuit of the installed flame arrester, inspection (professional inspection of the condition) of the installed flame arrester and professional measuring of operational parts shall be carried out immediately. The Producer recommends carrying out the measurement in Producer's workshop. The decision if the flame arrester must be replaced fully or if only replacement of the flame arrester element will be sufficient depends upon the measurement results.

The flame arrester element shall be replaced always after explosion (deflagration or detonation)!

## 9. STORAGE

The flame arresters shall be stored in sheltered rooms. It is always necessary to blind the inlet and outlet sockets to prevent the entering of mechanical impurities into internal space of flame arresters. The sockets are blinded when delivered from the Producer.

## 10. LIST OF SPARE PARTS

The Producer shall supply service parts on the basis of an order. The Producer also supplies relevant commercial and technical documentation, if requested. The list of parts recommended as spare parts for individual types of the flame arresters is the Annex No. 2 and 3 to the present instructions.

## 11. ACCESSORIES

The delivery includes:

- Instructions for installation, service and maintenance
- EC Declaration of Conformity

## 12. DISASSEMBLY AND DISPOSAL

The product does not contain materials detrimental to ecology. It is necessary to avoid the contact with oil or other combustible residual matters in the course of disposal. The worker shall be equipped with protective safety aids. In case of the pollution of hands e.g., they shall be washed with hot water and soap and greased with protective cream.



### **13. GUARANTEE AND RECLAMATION**

The guarantee and the method of reclamation are given in the Contract. When setting up a claim the following shall be specified:

- serial number and the type of the flame arrester
- description of the defect or failure
- description of the defect or failure occurrence

The defects due to incorrect checking and maintenance are not an object of reclamation and they shall not be accepted. Reclamation shall not be also accepted due to incorrect design or wrong installation in the equipment.

If not specified otherwise in the Contract, the guarantee period is six months since the date of taxable supplies specified in the relevant invoice.

### **14. ENCLOSURE**

Enclosure No. 1 - Dimensions of flame arresters

Enclosure No. 2 - 3 - List of spare parts

## 15. LIST OF CERTIFICATES

Type of the flame arrester	Certificate
J 131.25/P4AD2	FTZÚ 02 ATEX 0356
J 131.25/P4BD2	FTZÚ 02 ATEX 0124
J 134.50/P7AD2/II	FTZÚ 05 ATEX 0085
J 134.50/P4BD2/II	FTZÚ 05 ATEX 0086
J 134.80/P7AD2/II	FTZÚ 05 ATEX 0087
J 134.80/P4BD2/II	FTZÚ 05 ATEX 0088
J 474.50/1/P4AD/II	FTZÚ 05 ATEX 0089
J 474.80/1/P4AD/II	FTZÚ 05 ATEX 0090
J 371.50/1/P7AE/II	FTZÚ 05 ATEX 0091
J 374.80/1/P7AE/II	FTZÚ 05 ATEX 0092
J 374.100/1/P7AE	FTZÚ 02 ATEX 0134
J 341.50/1/P7AE/II	FTZÚ 05 ATEX 0093
J 344.100/1/P7AE	FTZÚ 02 ATEX 0136

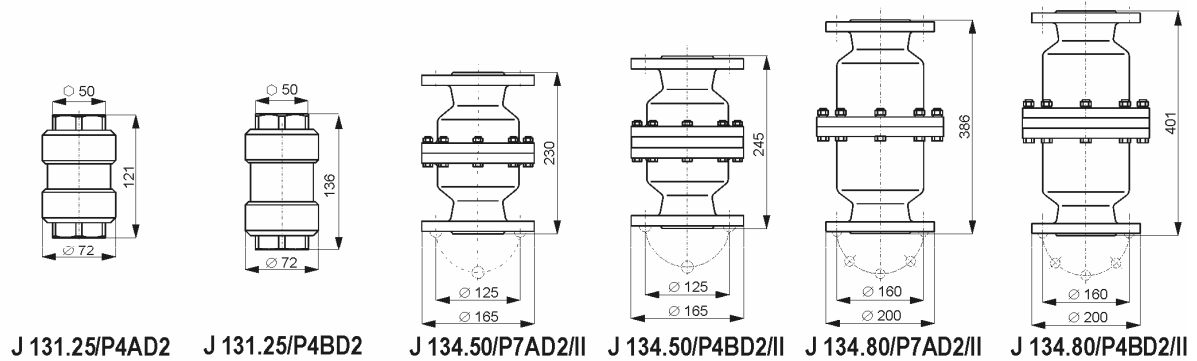
Adast Systems, a.s., Mírová 2, 679 04 ADAMOV, Czech Republic

**Considering continuous development the Producer reserves the right of design modifications!**

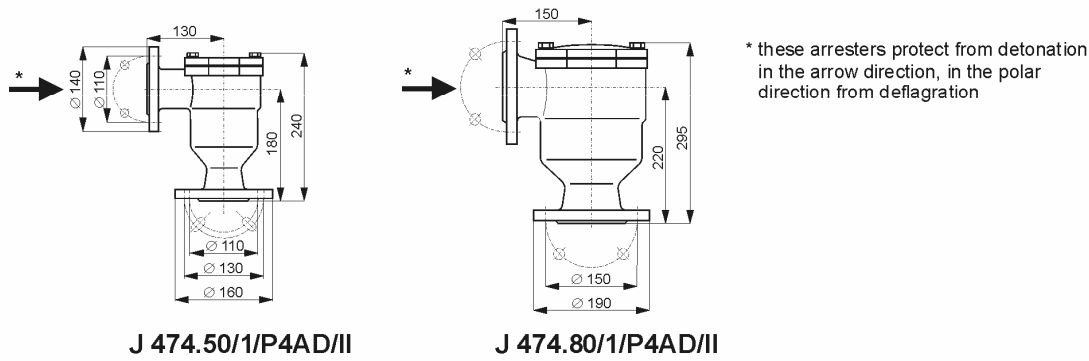


### Dimensions of the flame arresters

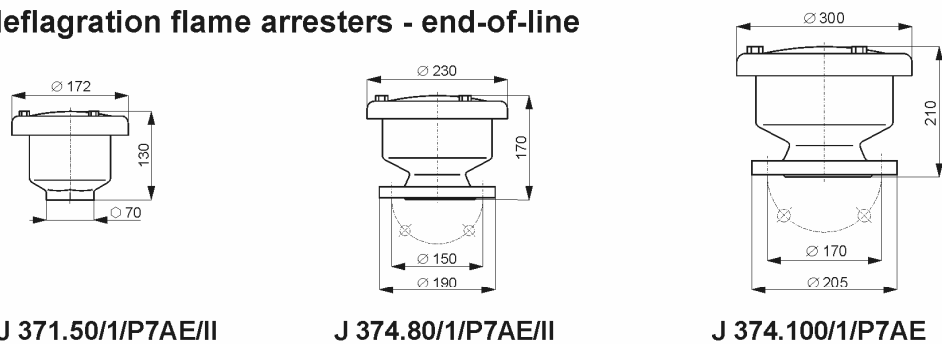
■ J 13x - bi-directional detonation flame arresters - in-line



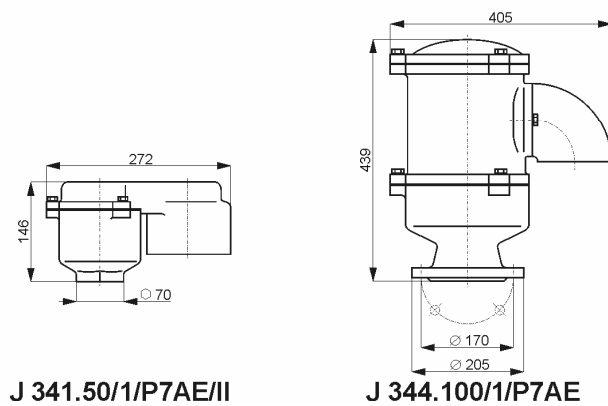
■ J 47x - unidirectional detonation flame arresters - angular\*



■ J 37x - deflagration flame arresters - end-of-line



■ J 34x - deflagration flame arresters - end-of-line with overpressure and underpressure valves





## List of spare parts

### J 131.25/P4AD2

Order number of the part	Name of the part
425401173	Flame arrester element I
425401174	Flame arrester element II
1383139165	Ring 60 x 52

### J 131.25/P4BD2

Order number of the part	Name of the part
425400925	Flame arrester element I
425400926	Flame arrester element II
1383139165	Ring 60 x 52

### J 134.50/P7AD2/II

Order number of the part	Name of the part
425401354	Flame arrester element I
425401355	Flame arrester element II
425401356	Flame arrester element III
1382811203	Ring 120 x 3

### J 134.50/P4BD2/II

Order number of the part	Name of the part
425401354	Flame arrester element I
425401355	Flame arrester element II
425401356	Flame arrester element III
1382811203	Ring 120 x 3

### J 134.80/P7AD2/II

Order number of the part	Name of the part
425401351	Flame arrester element I
425401352	Flame arrester element II
425401353	Flame arrester element III
1382811203	Ring 170 x 3

### J 134.80/P4BD2/II

Order number of the part	Name of the part
425401371	Flame arrester element I
425401372	Flame arrester element II
425401373	Flame arrester element III
1382811703	Ring 170 x 3

**J 474.50/1/P4AD/II**

Order number of the part	Name of the part
425401351	Flame arrester element I
425401352	Flame arrester element II
446223	Gasket

**J 474.80/1/P4AD/II**

Order number of the part	Name of the part
425401368	Flame arrester element I
425401369	Flame arrester element II
446230	Ring 120 x 3

**J 371.50/1/P7AE/II**

Order number of the part	Name of the part
425401354	Flame arrester element I
425401355	Flame arrester element II

**J 374.80/1/P7AE/II**

Order number of the part	Name of the part
425401371	Flame arrester element I
425401372	Flame arrester element II

**J 374.100/1/P7AE**

Order number of the part	Name of the part
425400752	Flame arrester element I
425400753	Flame arrester element II

**J 341.50/1/P7AE/II**

Order number of the part	Name of the part
425401354	Flame arrester element I
425401355	Flame arrester element II
446007	Valve
446010	Valve
420400964	Gasket

**J 344.100/1/P7AE**

Order number of the part	Name of the part
425400752	Flame arrester element I
425400753	Flame arrester element II
425400760	Safety valve
446264	Vacuum valve
446262	Guide
1382812102	Ring 210 x 2



