

# Thermoelectric refractories Refrattari termoelettrici



**KANTHAL**



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# Thermoelectric refractories

*One of the most widely used methods of supporting electrothermal components (electrical resistance and thermocouples) is the use of thermoelectric refractories.*

They belong to the extensive family of ceramics and are produced using a process similar to that used to manufacture household articles such as vases, plates and decorative objects.

However, for our product range, the best raw materials are chosen in order to meet the following requirements at high temperatures:

## **Good mechanical strength**

To improve mechanical strength we use alumina and refractory presintered clays which, when combined with basic clays, form a dense structure.

## **High electrical resistance**

To improve dielectric properties (high electrical resistance), we use clays with low iron oxide and alkaline content.

## **Good thermal shock resistance**

Thermal shock resistance is obtained by achieving the right level of porosity or, in certain cases, by the addition of magnesium oxide.

Thermoelectric refractories with alumina content can be divided into three groups:

### 1) *Aluminosilicates*

These are materials with an alumina content of less than 50%. They are used for temperatures up to 1100–1200°C (2010–2190°F). They have good thermal shock resistance.  
Kanthal® material code: **A42P**

### 2) *Aluminous*

These are materials with an alumina content of more than 50%. They are used for temperatures up to about 1300°C (2370°F). They have fairly good thermal shock resistance and excellent dielectric properties.  
Kanthal material codes: **A60P A50C A73E A80E**

### 3) *Cordierites*

These are materials with added magnesium oxide. They can be used for temperatures up to 1100°C (2010°F). They have excellent mechanical and thermal shock resistance.  
Kanthal material code: **A38E**

## **SPECIAL FEATURES**

- Good mechanical strength
- High electrical resistance
- Good thermal shock resistance

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# Refrattari termodielettrici

*Uno dei sistemi più comunemente impiegati per il supporto di elementi elettrotermici (resistenze elettriche e termocoppie) si ha con l'impiego di refrattari termodielettrici.*

Essi fanno parte della grande famiglia delle ceramiche e sono prodotti con un processo poco dissimile da quello impiegato per la fabbricazione di oggetti presenti anche nelle nostre case come vasi, piatti ed altri articoli artistici.

Per quanto concerne la nostra gamma di prodotti, è necessario però scegliere con molta cura le migliori materie prime che devono soddisfare i seguenti requisiti alle alte temperature:

## **Buona resistenza meccanica**

Per migliorare la resistenza meccanica vengono utilizzate allumine e chamottes refrattarie che, unite alle argille, formano una struttura densa.

## **Alta resistenza elettrica**

Per migliorare le caratteristiche dielettriche (alta resistenza elettrica) è necessario utilizzare argille con basse percentuali di ossido di ferro e di alcali.

## **Buona resistenza allo shock termico**

La resistenza allo shock termico si ottiene con un giusto grado di porosità o, in certi casi, con l'apporto di ossido di magnesio.

I refrattari termodielettrici contenenti allumina si possono dividere in tre gruppi:

### 1) *Allumino-Silicati*

Sono materiali con un contenuto di allumina inferiore al 50%. Vengono impiegati per temperature fino a 1100–1200°C. Hanno una buona resistenza allo shock termico. Materiale con contenuto di allumina medio 42% – *A42P*

### 2) *Alluminosi*

Sono materiali con un contenuto di allumina superiore al 50%. Vengono impiegati per temperature fino a circa 1300°C. Hanno una discreta resistenza allo shock termico ed ottime caratteristiche dielettriche. Materiale con contenuto di allumina medio 60% – *A60P*  
50% – *A50C* 73% – *A73E* 80% – *A80E*

### 3) *Cordierite*

Sono materiali contenenti anche ossido di magnesio. Possono essere impiegati con temperature fino a 1100°C. Hanno un'ottima resistenza meccanica ed allo shock termico. Materiale con contenuto di allumina medio 38% – *A38E*

## **CARATTERISTICHE SPECIALI**

- Buona resistenza meccanica
- Alta resistenza elettrica
- Buona resistenza allo shock termico

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# Choice of refractory materials

## Scelta dei materiali refrattari

Ceramic supports are usually manufactured with refractory earths containing oxides of silicon, aluminum and magnesium.

For electric furnaces, great care must be taken in choosing the supports due to the reduction in their dielectric properties at high temperatures. The  $\text{Al}_2\text{O}_3$  content must be at least 40%,  $\text{Fe}_2\text{O}_3$  less than 1%,  $\text{Na}_2\text{O}$  and  $\text{K}_2\text{O}$  as low as possible.  
(Kanthal® material A42P-A50C)

Where FeCrAl alloys are used in high temperature furnaces it is necessary to use supports with the lowest possible  $\text{SiO}_2$  content in order to prevent reaction between the silicon in the support and the aluminum layer which forms on the surface of the wire. In these cases, the  $\text{Al}_2\text{O}_3$  content of the support must be greater than 60%.  
(Kanthal material A60P-A73E-A80E)

In lower temperature applications or where excellent resistance to thermal shock is required, it is advisable to use cordieritic materials.  
(Kanthal material A38E)

The Kanthal material codes consist of a letter, a two-digit number and another letter, which show respectively the main ingredient, its percentage and the type of production process.

*A = Alumina*  
*E = Extrusion*  
*C = Casting*  
*P = Pressing*

Examples:

A73E Material with 73% alumina content, extruded  
A60P Material with 60% alumina content, pressed  
A50C Material with 50% alumina content, cast

I supporti ceramici sono solitamente prodotti con terre refrattarie contenenti in massima parte ossidi di silicio, alluminio e magnesio.

Per i forni elettrici, occorre porre molta attenzione nella scelta dei supporti a causa del decadimento delle loro proprietà dielettriche alle alte temperature. Il contenuto di  $\text{Al}_2\text{O}_3$  deve essere almeno del 40%,  $\text{Fe}_2\text{O}_3$  minore del 1%,  $\text{Na}_2\text{O}$  e  $\text{K}_2\text{O}$  il più basso possibile.  
(Kanthal® materiale A42P-A50C)

Nei forni elettrici ad alta temperatura dove vengono impiegate leghe FeCrAl è necessario usare supporti con il più basso possibile tenore di  $\text{SiO}_2$  onde evitare reazioni tra il silicio del supporto e lo strato di alluminio che si forma sulla superficie del filo. In questi casi il contenuto di  $\text{Al}_2\text{O}_3$  del supporto deve essere superiore al 60%.  
(Kanthal materiale A60P-A73E-A80E)

Per applicazioni con temperature più basse e dove è importante un'ottima resistenza agli sbalzi di temperatura è consigliabile usare materiali cordieritici.  
(Kanthal materiale A38E)

I codici di materiale Kanthal sono composti da una lettera, un numero di due cifre e da un'altra lettera che indicano rispettivamente il componente principale, la sua percentuale ed il tipo di processo produttivo.

*A = Allumina*  
*E = Estrusione*  
*C = Colaggio*  
*P = Pressatura*

Es.:

A73E Materiale al 73% di allumina estruso  
A60P Materiale al 60% di allumina pressato  
A50C Materiale al 50% di allumina colato

## Main features of Kanthal thermodielectric refractories

### Principali caratteristiche dei refrattari termodielettrici Kanthal

|   | A38E   | A73/80E            | A42P   | A60P               | A50C               |
|---|--|--------------------|--|--------------------|--------------------|
| Max. operating temperature<br>Temp. max di utilizzo   | 2190°F<br>1200°C   | 2370°F<br>1300°C   | 2190°F<br>1200°C   | 2370°F<br>1300°C   | 2370°F<br>1300°C   |
| H <sub>2</sub> O absorption as % volume<br>Assorbimento H <sub>2</sub> O in volume, %               | 12-18  | 12-18              | 12-18  | 12-18              | 12-18              |
| Bulk density, (lb/in <sup>3</sup> )<br>Densità apparente, g/cm <sup>3</sup>                         | 0.07<br>1.9  | 0.08<br>2.2        | 0.07<br>1.9  | 0.08<br>2.2        | 0.07<br>1.9        |
| Thermal conductivity, (W/mK 68-1830°F)<br>Conduitt. termica, Kcal/m h °C 20-1000°C                  | 460-585<br>1.1-1.4   | 627-836<br>1.5-2.0 | 460-627<br>1.1-1.5   | 627-836<br>1.5-2.0 | 460-627<br>1.1-1.5 |
| Cold compression strength, (lb/in <sup>2</sup> )<br>Resistenza compress. a freddo, MPa              | 4267<br>29.4   | 5689<br>39.2       | 4267<br>29.4   | 5689<br>39.2       | 4267<br>29.4       |
| Specific heat capacity, kcal/kg/°C (210-1830°F)<br>Calore specifico, kcal/kg/°C 100-1000°C          | 0.2  | 0.2                | 0.2  | 0.2                | 0.2                |
| Thermal shock resistance<br>Resistenza allo shock termico   | excellent<br>eccellente  | good<br>buona      | good<br>buona  | good<br>buona      | good<br>buona      |
| Thermal expansion coefficient × 10 <sup>-6</sup><br>Coeff. espansione di termica × 10 <sup>-6</sup> | 6.5  | 6.5                | 6.5  | 6.5                | 6.5                |
| Resistivity<br>Resistività  | 400°C (750°F)<br>600°C (1110°F)<br>800°C (1470°F)<br>1000°C (1830°F) |                    | 10-100 Mohm cm<br>1-10 Mohm cm<br>0.1-1 Mohm cm<br>10-100 k ohm cm |                    |                    |

## Average content of chemical ingredients

### Contenuto medio dei componenti chimici

|                                | A38E | A73E | A80E | A42P | A60P | A50C |
|--------------------------------|------|------|------|------|------|------|
| SiO <sub>2</sub>               | 53.2 | 21   | 12.4 | 47.2 | 30.5 | 37.8 |
| Al <sub>2</sub> O <sub>3</sub> | 38   | 73   | 82.2 | 43   | 60   | 53.5 |
| Fe <sub>2</sub> O <sub>3</sub> | 0.9  | 0.6  | 0.5  | 0.9  | 0.9  | 0.8  |
| MgO                            | 4    | 0.2  | 0.2  | 0.4  | 0.3  | <0.1 |
| TiO                            | 0.5  | 0.4  | 0.4  | 0.4  | 0.7  | 0.3  |
| CaO                            | 0.2  | <0.1 | <0.1 | 0.4  | 0.3  | <0.1 |
| K <sub>2</sub> O               | 1.2  | <0.1 | <0.1 | 0.3  | 0.9  | 3.2  |
| Na <sub>2</sub> O              | <0.1 | <0.1 | <0.1 | 0.2  | 0.1  | 0.1  |
| LiO                            | <0.1 | <0.1 | 0.3  | <0.1 | <0.1 | <0.1 |

**Health and safety**

Our ceramic materials do not contain substances dangerous to health, or create them during use. They are produced using inert natural raw materials, and any organic binders used are burned during firing.

During final processing such as cutting or drilling, inert dust may be created. Workers must therefore be provided with suitable protective equipment to prevent inhalation.

**Precauzioni per l'uso**

I nostri materiali ceramici non contengono o sviluppano, durante l'uso, sostanze pericolose alla salute, perché sono prodotti con materie prime naturali ed inerti e eventuali leganti organici sono eliminati durante la cottura.

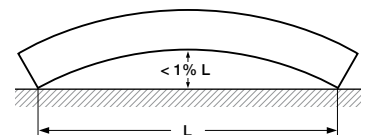
Durante ulteriori lavorazioni come taglio o foratura, è possibile lo sviluppo di polvere inerte. Perciò è necessario fornire agli operatori adeguati sistemi di protezione per evitarne l'inalazione.



**Table of tolerances in accordance with DIN 40680**

**Tabella delle tolleranze secondo DIN 40680**

| Dimensions |    | Dimensioni |   | Variations |      |      | Variazioni |  |  |
|------------|----|------------|---|------------|------|------|------------|--|--|
| From       | Da | To         | A | +/-        | +0   | -0   |            |  |  |
| 0          |    | 4          |   | 0.15       | 0.3  | 0.3  |            |  |  |
| 4.1        |    | 6          |   | 0.2        | 0.4  | 0.4  |            |  |  |
| 6.1        |    | 8          |   | 0.25       | 0.5  | 0.5  |            |  |  |
| 8.1        |    | 10         |   | 0.3        | 0.6  | 0.6  |            |  |  |
| 10.1       |    | 13         |   | 0.35       | 0.7  | 0.7  |            |  |  |
| 13.1       |    | 16         |   | 0.4        | 0.8  | 0.8  |            |  |  |
| 16.1       |    | 20         |   | 0.45       | 0.9  | 0.9  |            |  |  |
| 20.1       |    | 25         |   | 0.5        | 1    | 1    |            |  |  |
| 25.1       |    | 30         |   | 0.55       | 1.1  | 1.1  |            |  |  |
| 30.1       |    | 35         |   | 0.6        | 1.2  | 1.2  |            |  |  |
| 35.1       |    | 40         |   | 0.65       | 1.3  | 1.3  |            |  |  |
| 40.1       |    | 45         |   | 0.7        | 1.4  | 1.4  |            |  |  |
| 45.1       |    | 50         |   | 0.8        | 1.6  | 1.6  |            |  |  |
| 50.1       |    | 55         |   | 0.9        | 1.8  | 1.8  |            |  |  |
| 55.1       |    | 60         |   | 1          | 2    | 2    |            |  |  |
| 60.1       |    | 65         |   | 1.2        | 2.4  | 2.4  |            |  |  |
| 65.1       |    | 80         |   | 1.4        | 2.8  | 2.8  |            |  |  |
| 80.1       |    | 90         |   | 1.6        | 3.2  | 3.2  |            |  |  |
| 90.1       |    | 100        |   | 1.8        | 3.6  | 3.6  |            |  |  |
| 100.1      |    | 110        |   | 2          | 4    | 4    |            |  |  |
| 110.1      |    | 125        |   | 2.2        | 4.4  | 4.4  |            |  |  |
| 125.1      |    | 140        |   | 2.5        | 5    | 5    |            |  |  |
| 140.1      |    | 155        |   | 2.8        | 5.6  | 5.6  |            |  |  |
| 155.1      |    | 170        |   | 3          | 6    | 6    |            |  |  |
| 170.1      |    | 185        |   | 3.4        | 6.8  | 6.8  |            |  |  |
| 185.1      |    | 200        |   | 3.8        | 7.6  | 7.6  |            |  |  |
| 200.1      |    | 250        |   | 4.2        | 8.4  | 8.4  |            |  |  |
| 250.1      |    | 300        |   | 4.6        | 9.2  | 9.2  |            |  |  |
| 300.1      |    | 350        |   | 5          | 10   | 10   |            |  |  |
| 350.1      |    | 400        |   | 5.5        | 11   | 11   |            |  |  |
| 400.1      |    | 450        |   | 6.1        | 12.2 | 12.2 |            |  |  |
| 450.1      |    | 500        |   | 6.8        | 13.6 | 13.6 |            |  |  |
| 500.1      |    | 600        |   | 7.6        | 15.2 | 15.2 |            |  |  |
| 600.1      |    | 700        |   | 8.3        | 16.6 | 16.6 |            |  |  |
| 700.1      |    | 800        |   | 9          | 18   | 18   |            |  |  |
| 800.1      |    | 900        |   | 9.5        | 19   | 19   |            |  |  |
| 900.1      |    | 1000       |   | 10         | 20   | 20   |            |  |  |



Max camber.  
Freccia max sulla curvatura.

All dimensions in mm

Tutte le dimensioni in mm

# General information

Our products are manufactured using raw materials of the highest quality and do not contain conductive ingredients. However, substances such as alkalis, residual products generated by combustion or processing may be absorbed, reducing the dielectric properties of the final product.

As with all insulating materials, dielectric properties reduce as the temperature rises: at values close to 1000–1100°C (1830–2010°F), leakage currents may affect differential protection systems.

In this case, low supply voltages should be used to limit this effect.

## 1) *Product enquiries*

So that we can offer you the most suitable product for your application, your enquiry should include the following information:

Maximum operating temperature; type of heating element; ambient atmosphere; general operating conditions.

## 2) *Customized items*

If you require items not shown in our catalogue, your enquiry should include a detailed drawing.

## 3) *Moulds*

When it is necessary to build moulds to manufacture customized items, their cost will be charged to the customer but they will remain the industrial property of Sandvik.

Sandvik undertakes to use such moulds exclusively for that customers' products unless otherwise agreed.

Moulds cannot be transferred to the customer and after three years following the last order, Sandvik reserves the right to use or to dispose of them.

## 4) *Dimensional tolerances*

Our standard production is in accordance with the tolerances stated in DIN 40680.

## 5) *Quantity tolerance*

Quantities supplied are subject to a nominal tolerance of  $\pm 5\%$  and  $\pm 10\%$  for customized articles.

## Informazioni generali

I nostri prodotti sono fabbricati con composti di prima scelta e non contengono, di base, componenti conduttivi. Sostanze come alcali, residui di lavorazione o combustione presenti all'interno del forno possono però essere assorbite pregiudicando la loro caratteristica dielettrica.

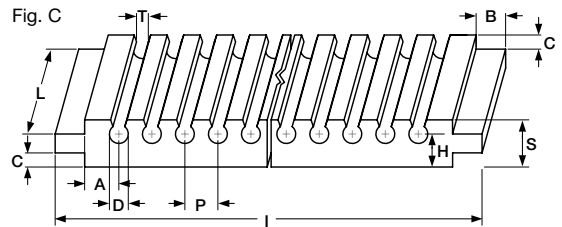
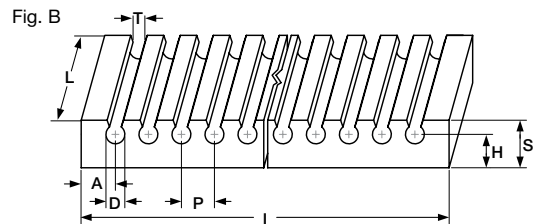
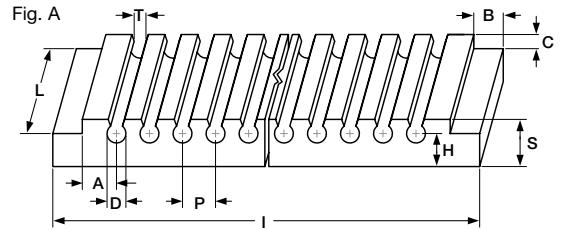
Come in ogni materiale isolante, la caratteristica dielettrica diminuisce con l'aumentare della temperatura; a temperature prossime ai 1000–1100°C le correnti di dispersione possono influenzare eventuali protezioni differenziali.

E' necessario, in questo caso, impiegare basse tensioni di alimentazione per contenere questo fenomeno.

- 1) *Richieste d'offerta*  
Per poter offrire l'elemento più adatto alla Vs. applicazione, è necessario che le richieste d'offerta vengano corredate dei seguenti dati:  
Temperatura massima di impiego; tipo di resistenza; atmosfera di lavoro; condizioni operative generali.
- 2) *Particolari a disegno*  
Nel caso abbiate necessità di particolari non presenti a catalogo, è necessario che la richiesta d'offerta sia completa di eventuale disegno particolareggiato.
- 3) *Stampi*  
Qualora la produzione dei particolari a disegno richieda la costruzione di stampi, questi saranno a carico del cliente ma di proprietà industriale di Sandvik.  
  
Sandvik si impegna altresì ad utilizzare questi stampi esclusivamente per la produzione del cliente se non diversamente approvato.  
  
Gli stampi non potranno essere richiesti in consegna totale o parziale e trascorsi tre anni dall'ultimo ordine, Sandvik si riserverà la libertà d'uso o distruzione degli stampi.
- 4) *Tolleranze dimensionali*  
La nostra produzione è regolamentata dalle tolleranze costruttive richiamate nelle norme DIN 40680 media.
- 5) *Tolleranza sulla quantità*  
Le quantità degli elementi in consegna sono assoggettate ad una tolleranza nominale del  $\pm 5\%$  con punte del  $\pm 10\%$  per i particolari a disegno.

# Supporting plates for electric furnaces – PIA

## Piastre portaresistenze per forni – PIA



The choice between the A42P material and the A60P material is determined by the wire alloy and by the working temperature.

La scelta tra il materiale A42P ad il materiale A60P è determinata dalla lega del filo e dalla temperatura di utilizzo.

### Supporting plates for laboratory furnaces

#### Piastre portaresistenze per forni da laboratorio

| Ref.             | Fig. | L   | I   | B  | C   | A    | H    | S  | D  | P    | T   | No. Can. |
|------------------|------|-----|-----|----|-----|------|------|----|----|------|-----|----------|
| PIA 03-26-20-14* | C    | 260 | 200 | 19 | 3.5 | 6    | 13.5 | 22 | 7  | 11.6 | 4.5 | 14       |
| PIA 03-26-12-10* | B    | 260 | 120 |    |     | 8    | 13.5 | 22 | 7  | 11.6 | 4.5 | 10       |
| PIA 03-26-14-12  | B    | 260 | 140 |    |     | 5    | 13.5 | 20 | 5  | 9.6  | 3.5 | 12       |
| PIA 03-26-8-8    | B    | 260 | 80  |    |     | 7    | 13.5 | 20 | 5  | 9.6  | 3.5 | 8        |
| PIA 03-26-11-10  | B    | 260 | 110 |    |     | 13   | 13.5 | 20 | 5  | 9.6  | 3.5 | 10       |
| PIA 03-30-19-8   | A    | 300 | 190 | 20 | 8   | 14   | 20.5 | 30 | 11 | 18.3 | 7   | 8        |
| PIA 03-30-19-10  | B    | 300 | 190 |    |     | 12.5 | 20.5 | 30 | 11 | 18.3 | 7   | 10       |

\* Standard stock

## Supporting plates for electric furnaces

### Piastre portaresistenze per forni elettrici

| Ref.              | Fig. | L   | I   | B  | C  | A  | H  | S  | D  | P    | T   | No. Can. |
|-------------------|------|-----|-----|----|----|----|----|----|----|------|-----|----------|
| PIA 04-50-21-6/17 | A    | 500 | 210 | 10 | 15 | 30 | 18 | 30 | 17 | 30   | 10  | 6        |
| PIA 04-50-33-12*  | A    | 500 | 330 | 15 | 5  | 33 | 23 | 33 | 17 | 22   | 12  | 12       |
| PIA 04-38-28-10   | A    | 380 | 280 | 15 | 12 | 28 | 21 | 30 | 14 | 22   | 8   | 10       |
| PIA 04-38-20-8    | A    | 380 | 200 | 15 | 12 | 15 | 21 | 30 | 14 | 20   | 8   | 8        |
| PIA 04-60-35-16*  | A    | 600 | 350 | 20 | 8  | 16 | 21 | 30 | 12 | 18.5 | 8   | 16       |
| PIA 04-60-20-10   | A    | 600 | 200 |    |    | 15 | 21 | 30 | 12 | 18.5 | 8   | 10       |
| PIA 04-50-35-21   | A    | 500 | 350 | 21 | 5  | 8  | 25 | 30 | 8  | 14.6 | 5.5 | 21       |
| PIA 04-50-22-15   | B    | 500 | 220 |    |    | 8  | 25 | 30 | 8  | 14.6 | 5.5 | 15       |
| PIA 04-50-12-06*  | B    | 500 | 120 |    |    | 15 | 21 | 30 | 12 | 18.5 | 8   | 6        |
| PIA 04-50-20-10*  | B    | 500 | 200 |    |    | 15 | 21 | 30 | 12 | 18.5 | 8   | 10       |
| PIA 04-50-35-16*  | A    | 500 | 350 | 20 | 8  | 16 | 21 | 30 | 12 | 18.5 | 8   | 16       |
| PIA 04-50-35-10*  | A    | 500 | 350 | 25 | 12 | 22 | 28 | 40 | 17 | 28.4 | 11  | 10       |
| PIA 04-50-25-08*  | B    | 500 | 250 |    |    | 26 | 28 | 40 | 17 | 28.4 | 11  | 8        |
| PIA 04-50-20-06*  | B    | 500 | 200 |    |    | 29 | 28 | 40 | 17 | 28.4 | 11  | 6        |
| PIA 04-50-35-08   | A    | 500 | 350 | 24 | 10 | 26 | 30 | 45 | 24 | 35.7 | 16  | 8        |
| PIA 04-50-25-06   | B    | 500 | 250 |    |    | 36 | 30 | 45 | 24 | 35.7 | 16  | 6        |
| PIA 04-50-35-09   | B    | 500 | 350 |    |    | 27 | 30 | 45 | 24 | 35.7 | 16  | 9        |
| PIA 04-50-28-08   | B    | 500 | 280 |    |    | 25 | 33 | 50 | 20 | 33   | 14  | 8        |
| PIA 04-50-21-06   | B    | 500 | 210 |    |    | 23 | 33 | 50 | 20 | 33   | 14  | 6        |
| PIA 04-50-35-15   | A    | 350 | 500 | 25 | 12 | 29 | 28 | 40 | 17 | 28   | 11  | 15       |
| PIA 04-60-35-15   | A    | 350 | 600 | 25 | 12 | 79 | 28 | 40 | 17 | 28   | 11  | 15       |

\* Standard stock

All dimensions in mm

Tutte le dimensioni in mm

## Supporting plates for bottom of industrial furnaces

### Piastre per suoli di forni industriali

| Ref.              | Fig. | L   | I   | B  | C  | A  | H  | S  | D  | P  | T  | No. Can. |
|-------------------|------|-----|-----|----|----|----|----|----|----|----|----|----------|
| PIA 05-55-20-12/S | A    | 200 | 550 | 20 | 27 | 33 | 40 | 67 | 30 | 40 | 20 | 12       |
| PIA 05-47-20-10/S | A    | 200 | 470 | 20 | 27 | 33 | 40 | 67 | 30 | 40 | 20 | 10       |
| PIA 05-39-20-8/S  | A    | 200 | 390 | 20 | 27 | 33 | 40 | 67 | 30 | 40 | 20 | 8        |
| PIA 05-31-20-6/S  | A    | 200 | 310 | 20 | 27 | 33 | 40 | 67 | 30 | 40 | 20 | 6        |
| PIA 05-51-20-12/S | B    | 200 | 510 |    |    | 33 | 40 | 67 | 30 | 40 | 20 | 12       |
| PIA 05-43-20-10/S | B    | 200 | 430 |    |    | 33 | 40 | 67 | 30 | 40 | 20 | 10       |
| PIA 05-35-20-8/S  | B    | 200 | 350 |    |    | 33 | 40 | 67 | 30 | 40 | 20 | 8        |
| PIA 05-27-20-6/S  | B    | 200 | 270 |    |    | 33 | 40 | 67 | 30 | 40 | 20 | 6        |

All dimensions in mm

Tutte le dimensioni in mm

**Supporting plates for industrial furnaces**  
**Piastre portaresistenze per forni industriali**

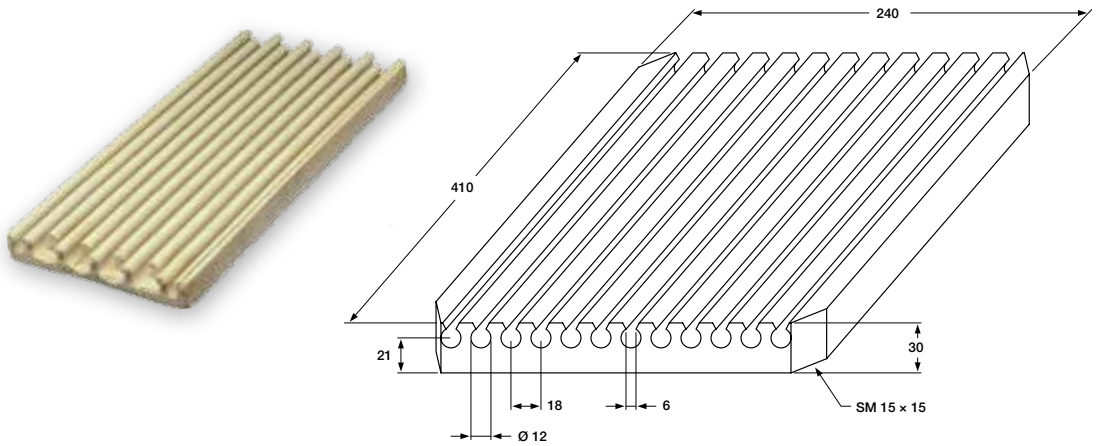
| Ref.              | Fig. | L   | I   | B    | C  | A    | H  | S  | D  | P  | T  | No. Can. |
|-------------------|------|-----|-----|------|----|------|----|----|----|----|----|----------|
| PIA 05-55-18-12 * | A    | 180 | 550 | 20   | 25 | 36   | 37 | 55 | 28 | 40 | 16 | 12       |
| PIA 05-47-18-10   | A    | 180 | 470 | 20   | 25 | 36   | 37 | 55 | 28 | 40 | 16 | 10       |
| PIA 05-43-18-09   | A    | 180 | 430 | 20   | 25 | 36   | 37 | 55 | 28 | 40 | 16 | 9        |
| PIA 05-39-18-08*  | A    | 180 | 390 | 20   | 25 | 36   | 37 | 55 | 28 | 40 | 16 | 8        |
| PIA 05-31-18-06*  | A    | 180 | 310 | 20   | 25 | 36   | 37 | 55 | 28 | 40 | 16 | 6        |
| PIA 05-23-18-04   | A    | 180 | 230 | 20   | 25 | 36   | 37 | 55 | 28 | 40 | 16 | 4        |
| PIA 05-51-18-12   | B    | 180 | 510 |      |    | 36   | 37 | 55 | 28 | 40 | 16 | 12       |
| PIA 05-43-18-10   | B    | 180 | 430 |      |    | 36   | 37 | 55 | 28 | 40 | 16 | 10       |
| PIA 05-39-18-09   | B    | 180 | 390 |      |    | 36   | 37 | 55 | 28 | 40 | 16 | 9        |
| PIA 05-35-18-08   | B    | 180 | 350 |      |    | 36   | 37 | 55 | 28 | 40 | 16 | 8        |
| PIA 05-27-18-06   | B    | 180 | 270 |      |    | 36   | 37 | 55 | 28 | 40 | 16 | 6        |
| PIA 05-19-18-04   | B    | 180 | 190 |      |    | 36   | 37 | 55 | 28 | 40 | 16 | 4        |
| PIA 05-55-20-12*  | A    | 200 | 550 | 20   | 17 | 31.5 | 33 | 50 | 30 | 40 | 20 | 12       |
| PIA 05-47-20-10*  | A    | 200 | 470 | 20   | 17 | 31.5 | 33 | 50 | 30 | 40 | 20 | 10       |
| PIA 05-43-20-09   | A    | 200 | 430 | 20   | 17 | 31.5 | 33 | 50 | 30 | 40 | 20 | 9        |
| PIA 05-39-20-08*  | A    | 200 | 390 | 20   | 17 | 31.5 | 33 | 50 | 30 | 40 | 20 | 8        |
| PIA 05-31-20-06   | A    | 200 | 310 | 20   | 17 | 31.5 | 33 | 50 | 30 | 40 | 20 | 6        |
| PIA 05-51-20-12   | B    | 200 | 510 |      |    | 31.5 | 33 | 50 | 30 | 40 | 20 | 12       |
| PIA 05-43-20-10   | B    | 200 | 430 |      |    | 31.5 | 33 | 50 | 30 | 40 | 20 | 10       |
| PIA 05-39-20-09   | B    | 200 | 390 |      |    | 31.5 | 33 | 50 | 30 | 40 | 20 | 9        |
| PIA 05-35-20-08*  | B    | 200 | 350 |      |    | 31.5 | 33 | 50 | 30 | 40 | 20 | 8        |
| PIA 05-27-20-06   | B    | 200 | 270 |      |    | 31.5 | 33 | 50 | 30 | 40 | 20 | 6        |
| PIA 05-17-18-03   | A    | 180 | 170 | 20   | 25 | 25   | 30 | 50 | 30 | 40 | 20 | 3        |
| PIA 05-13-18-03   | B    | 180 | 130 |      |    | 25   | 30 | 50 | 30 | 40 | 20 | 3        |
| PIA 05-28-50-04   | A    | 500 | 280 | 20   | 35 | 40   | 43 | 65 | 30 | 53 | 20 | 4        |
| PIA 05-20-50-03   | A    | 500 | 200 | 15   | 45 | 32   | 43 | 65 | 30 | 53 | 20 | 3        |
| PIA 05-35-20-6/34 | A    | 200 | 350 | 17.5 | 32 | 35   | 37 | 62 | 34 | 49 | 19 | 6        |
| PIA 05-39-41-10   | B    | 390 | 410 |      |    | 61   | 30 | 45 | 20 | 32 | 10 | 10       |
| PIA 05-39-41-08   | B    | 390 | 410 |      |    | 65   | 35 | 54 | 30 | 40 | 17 | 8        |
| PIA 05-23-25-06   | A    | 250 | 238 | 19   | 24 | 30   | 32 | 48 | 18 | 28 | 10 | 6        |
| PIA 05-35-25-10   | A    | 250 | 350 | 19   | 24 | 30   | 32 | 48 | 18 | 28 | 10 | 10       |

\* Standard stock

All dimensions in mm

Tutte le dimensioni in mm

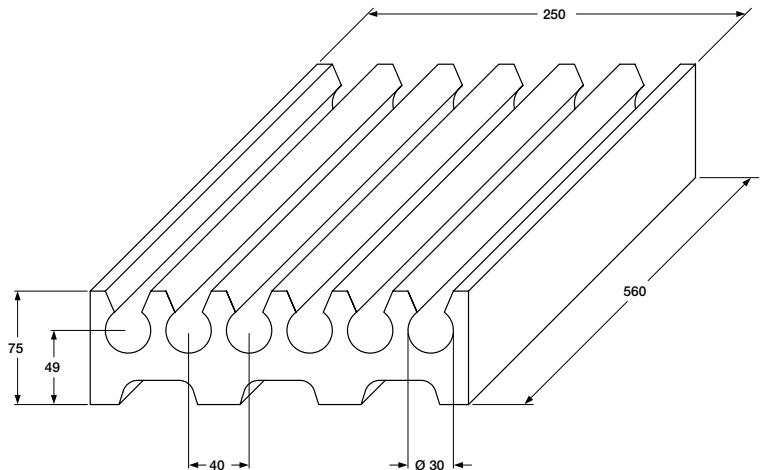
**Supporting plates for electric furnaces PIA 05-24-41-12**  
**Piastre portaresistenze per forni PIA 05-24-41-12**



The choice between the A42P material and the A60P material is determined by the wire alloy and by the working temperature.

La scelta tra il materiale A42P ad il materiale A60P è determinata dalla lega del filo e dalla temperatura di utilizzo.

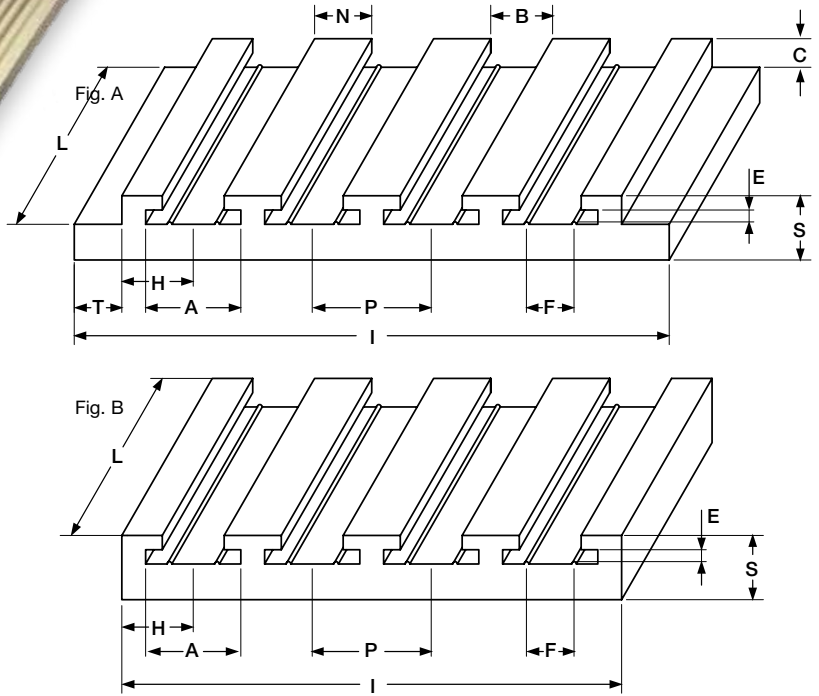
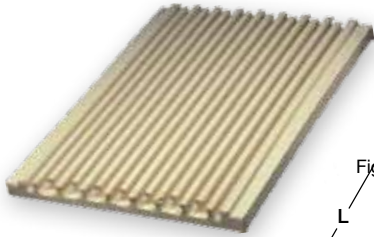
**Supporting plates for electric furnaces PIA 05-56-25-6**  
**Piastre portaresistenze per forni PIA 05-56-25-6**



The choice between the A42P material and the A60P material is determined by the wire alloy and by the working temperature.

La scelta tra il materiale A42P ad il materiale A60P è determinata dalla lega del filo e dalla temperatura di utilizzo.

**Supporting plates for furnaces with resistance wire or ribbon**  
**Piastre portaresistenze per forni con resistenze a piattina e a filo**



| Ref.           | Fig. | I   | L   | A  | E  | P   | B  | F  | N  | H  | T  | C  | S  | No. Can. |
|----------------|------|-----|-----|----|----|-----|----|----|----|----|----|----|----|----------|
| PIA 06-25-21-4 | A    | 250 | 210 | 40 | 5  | 50  | 30 | -  | 20 | 30 | 20 | 12 | 23 | 4        |
| PIA 06-21-25-4 | B    | 210 | 250 | 40 | 15 | 50  | 30 | 20 | 20 | 30 | -  | -  | 40 | 4        |
| PIA 06-38-25-6 | A    | 380 | 250 | 40 | 15 | 50  | 30 | 20 | 20 | 30 | 35 | 20 | 40 | 6        |
| PIA 06-38-25-4 | A    | 380 | 250 | 60 | 14 | 72  | 18 | 30 | 24 | 44 | 36 | 20 | 40 | 4        |
| PIA 06-49-20-4 | A    | 490 | 200 | 90 | 25 | 108 | 68 | 46 | 40 | 60 | 23 | 43 | 70 | 4        |
| PIA 06-28-50-2 | A    | 280 | 500 | 90 | 25 | 110 | 60 | 45 | 50 | 65 | 20 | 40 | 70 | 2        |
| PIA 06-25-50-2 | B    | 250 | 500 | 90 | 25 | 110 | 60 | 45 | 50 | 70 | -  | 40 | 70 | 2        |

All dimensions in mm

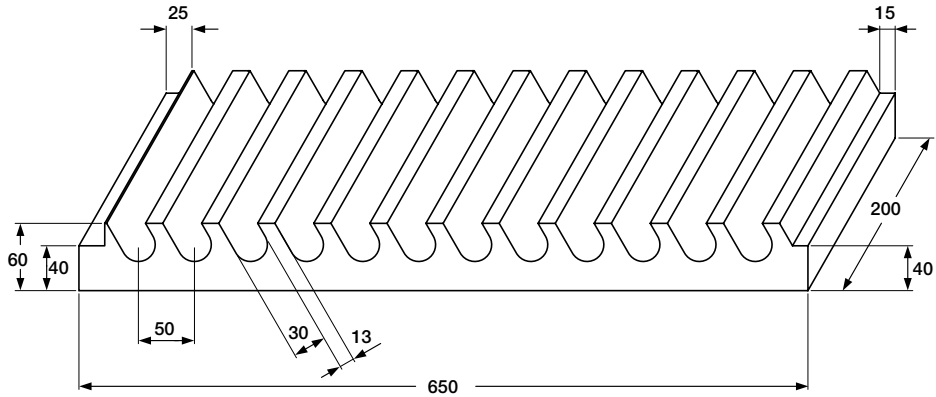
Tutte le dimensioni in mm

The choice between the A42P material and the A60P material is determined by the wire alloy and by the working temperature.

La scelta tra il materiale A42P ad il materiale A60P è determinata dalla lega del filo e dalla temperatura di utilizzo.



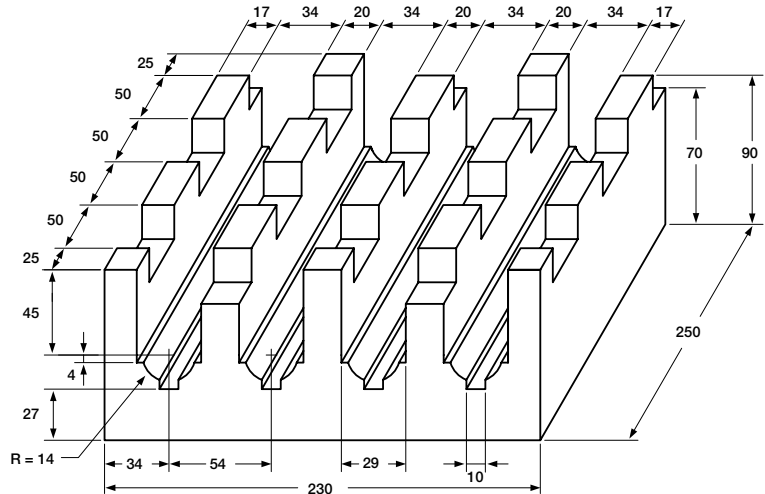
**Supporting plates for electric furnaces PIA 07-20-60-12**  
**Piastre portaresistenze per forni PIA 07-20-60-12**



The choice between the A42P material and the A60P material is determined by the wire alloy and by the working temperature.

La scelta tra il materiale A42P ad il materiale A60P è determinata dalla lega del filo e dalla temperatura di utilizzo.

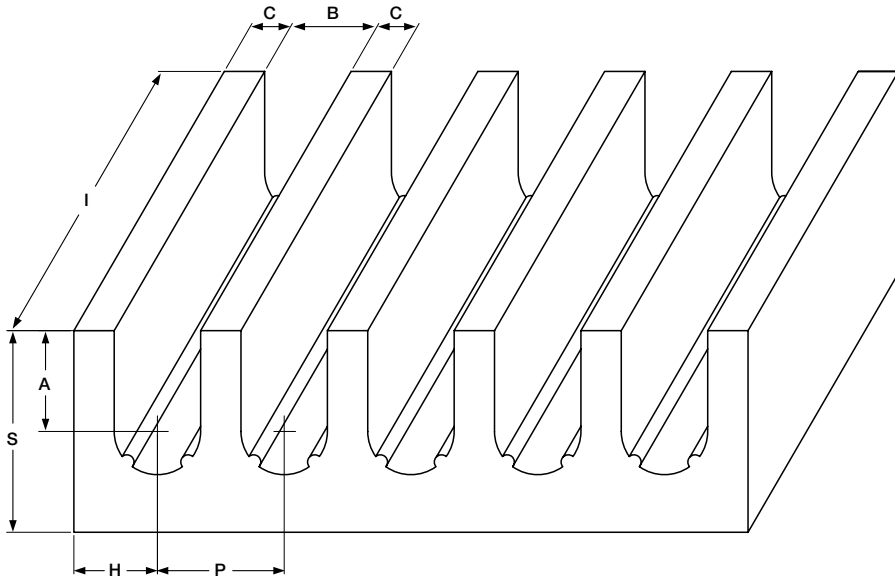
**Supporting plates for electric furnaces PIA 07-23-25-4**  
**Piastre portaresistenze per forni PIA 07-23-25-4**



The choice between the A42P material and the A60P material is determined by the wire alloy and by the working temperature.

La scelta tra il materiale A42P ad il materiale A60P è determinata dalla lega del filo e dalla temperatura di utilizzo.

**Supporting plates for electric furnaces with open grooves**  
**Piastre portaresistenze per forni a canali aperti**



| Ref.           | L   | I   | S  | A  | B  | P  | C  | H  | T |
|----------------|-----|-----|----|----|----|----|----|----|---|
| PIA 07-25-19-4 | 190 | 250 | 70 | 35 | 30 | 44 | 15 | 30 | 4 |
| PIA 07-25-22-4 | 220 | 250 | 76 | 39 | 34 | 50 | 18 | 35 | 4 |
| PIA 07-25-32-6 | 320 | 250 | 76 | 39 | 34 | 50 | 16 | 35 | 6 |

All dimensions in mm

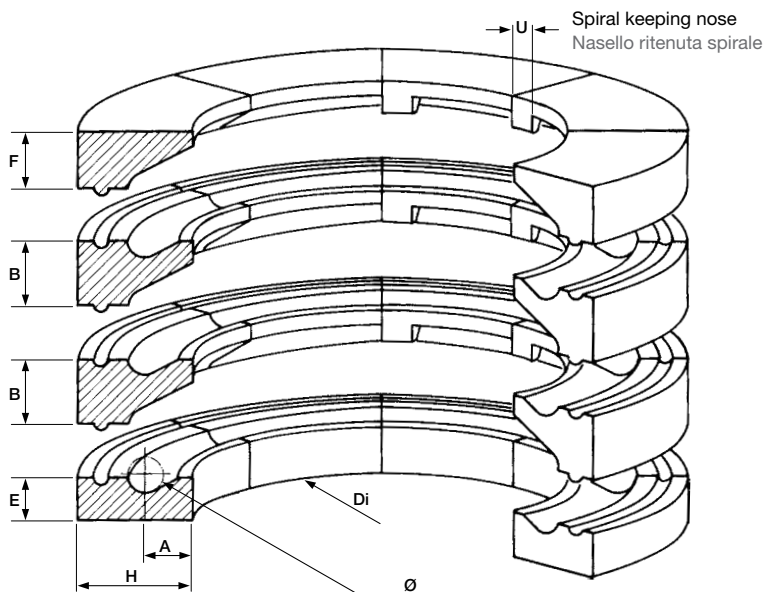
Tutte le dimensioni in mm

The choice between the A42P material and the A60P material is determined by the wire alloy and by the working temperature.

La scelta tra il materiale A42P ad il materiale A60P è determinata dalla lega del filo e dalla temperatura di utilizzo.

# Heating element supports for well kilns

## Settori portaresistenze per forni a pozzo



| Ref.            | D    | H  | E  | B  | F  | Ø  | A  | N  | U  |
|-----------------|------|----|----|----|----|----|----|----|----|
| SET 08-25-3.5-1 | 250  | 50 | 25 | 35 | 30 | 22 | 15 | 6  | 18 |
| SET 08-35-3.8-1 | 350  | 52 | 25 | 38 | 30 | 22 | 15 | 8  | 18 |
| SET 08-45-5-1*  | 450  | 70 | 40 | 50 | 40 | 30 | 25 | 10 | 25 |
| SET 08-60-5-1*  | 600  | 70 | 40 | 50 | 40 | 30 | 25 | 12 | 25 |
| SET 08-80-5-1*  | 800  | 70 | 40 | 50 | 40 | 30 | 25 | 12 | 25 |
| SET 08-100-5-1* | 1000 | 80 | 40 | 50 | 40 | 30 | 25 | 15 | 25 |
| SET 08-130-6-1  | 1300 | 90 | 45 | 60 | 50 | 35 | 30 | 20 | 25 |
| SET 08-170-6-1  | 1700 | 90 | 45 | 60 | 50 | 35 | 30 | 25 | 25 |
| SET 07-20-5-1** | -    | -  | 40 | 50 | 40 | 30 | 25 | -  | 25 |

\* Standard stock

All dimensions in mm

Tutte le dimensioni in mm

Ø Max spiral diameter.  
N No. sectors per turn.

Ø Diametro massimo della spirale.  
N Numero settori per giro.

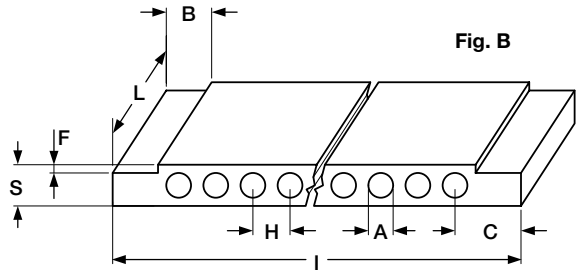
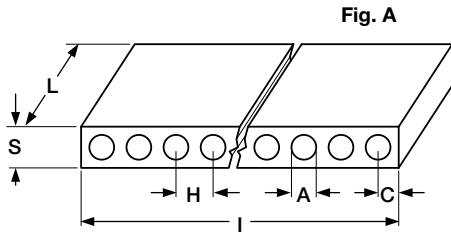
\*\* Straight element to couple with 08-45, 08-60, 08-80 to build oval kilns.

\*\* Elemento rettilineo L=200 da abbinare con 08-45, 08-60, 08-80 per formazione di forni ovali.

The element heads and intermediate can be manufactured with or without keeping nose (08-130 & 08-170 only with nose).

Gli elementi teste e intermedi possono essere forniti con o senza nasello di ritenuta resistenze (08-130 & 08-170 solo con nasello).

**Supporting plates for electric furnaces**  
**Piastre portaresistenze per forni**



**Supporting plates with closed grooves**  
**Piastre portaresistenze a canali chiusi**

| Ref.             | Fig. | I   | L   | S  | H    | A | B  | C  | D | E | F | Mat. | No. Can. |
|------------------|------|-----|-----|----|------|---|----|----|---|---|---|------|----------|
| PIA 09-26-12-10  | A    | 120 | 260 | 22 | 11.6 | 7 |    | 8  |   |   |   | A50C | 10       |
| PIA 09-26-20-14* | B    | 200 | 260 | 22 | 11.6 | 7 | 20 | 25 |   |   | 4 | A50C | 14       |

\*Standard stock

All dimensions in mm

Tutte le dimensioni in mm

# Hooks Ganci

Fig. A

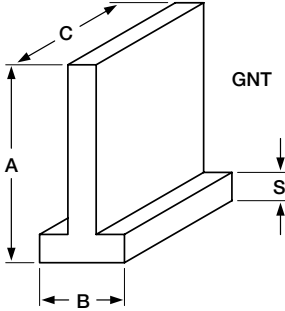


Fig. C

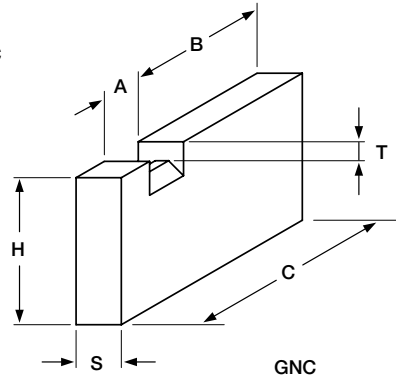


Fig. B

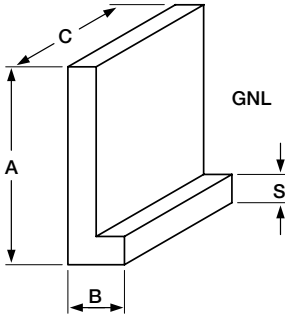
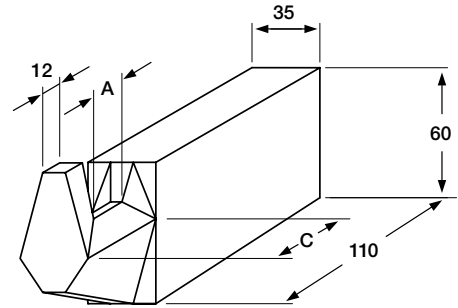


Fig. D



| Code | Ref.            | Fig. | A   | B   | C   | H  | S  | T  | Mat. |
|------|-----------------|------|-----|-----|-----|----|----|----|------|
| GNT  | 015-25-15-2 T*  | A    | 150 | 60  | 250 | -  | 20 | -  |      |
| GNL  | 015-25-15-2 L   | B    | 150 | 60  | 250 | -  | 20 | -  |      |
| GNT  | 015-20-17-3.5 T | A    | 175 | 75  | 200 | -  | 35 | -  |      |
| GNL  | 015-20-17-3.5 T | B    | 175 | 55  | 200 | -  | 35 | -  |      |
| GNC  | 016-143         | C    | 18  | 110 | 143 | 60 | 15 | 12 | A60P |
| GNC  | 016-150         | C    | 25  | 110 | 150 | 60 | 15 | 12 | A60P |
| GNC  | 016-157         | C    | 32  | 110 | 157 | 60 | 15 | 12 | A60P |
| GNC  | 016-175         | C    | 45  | 110 | 175 | 60 | 24 | 12 |      |
| GNC  | 016-165         | D    | 27  | -   | 55  | -  | -  | -  |      |
| GNC  | 016-180         | D    | 42  | -   | 70  | -  | -  | -  |      |

\* Standard stock

All dimensions in mm

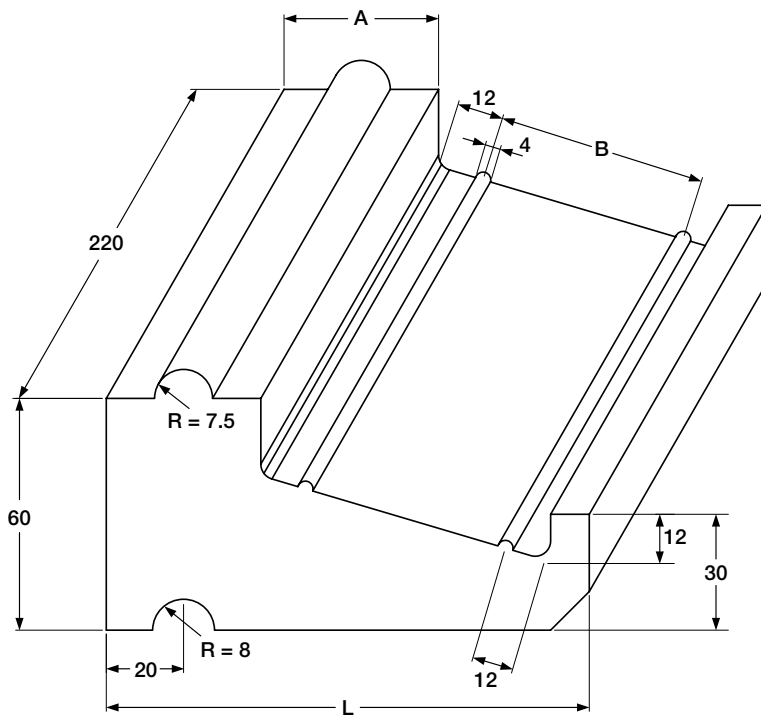
Tutte le dimensioni in mm

The choice between the A42P material and the A60P material is determined by the wire alloy and by the working temperature.

La scelta tra il materiale A42P ad il materiale A60P è determinata dalla lega del filo e dalla temperatura di utilizzo.

# Resistance supporting hooks

## Ganci portaresistenze



| Code | Ref.     | L   | A  | B  |
|------|----------|-----|----|----|
| GNC  | 016-65   | 110 | 40 | 39 |
| GNC  | 016-85   | 125 | 40 | 54 |
| GNC  | 016-85-6 | 145 | 60 | 54 |

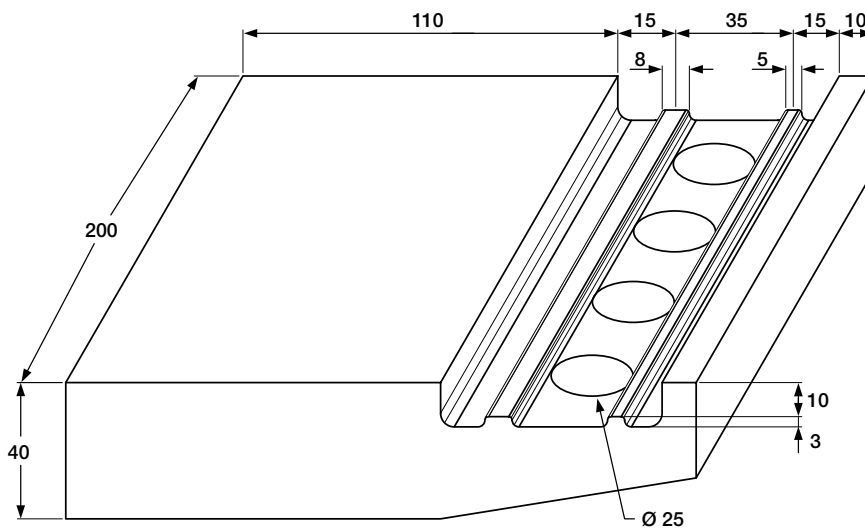
All dimensions in mm

Tutte le dimensioni in mm

The choice between the A42P material and the A60P material is determined by the wire alloy and by the working temperature.

La scelta tra il materiale A42P ad il materiale A60P è determinata dalla lega del filo e dalla temperatura di utilizzo.

**Resistance supporting hooks GNC 016-200**  
**Ganci portaresistenze GNC 016-200**

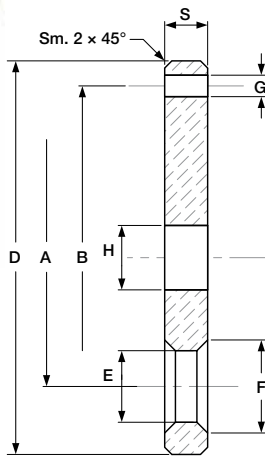


The choice between the A42P material and the A60P material is determined by the wire alloy and by the working temperature.

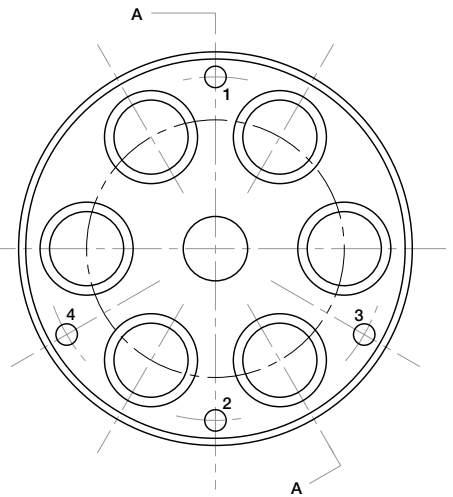
La scelta tra il materiale A42P ad il materiale A60P è determinata dalla lega del filo e dalla temperatura di utilizzo.

# Ceramic supports for electric elements in radiant tubes

## Supporti ceramici per resistenze in tubi radianti



Sez. A-A



| Code | Ref.     | E  | no. E | F  | G | pos. G | B   | A  | D   | S  | H  | Mat. |
|------|----------|----|-------|----|---|--------|-----|----|-----|----|----|------|
| DCR  | 018-96*  | 19 | 6     | 23 | 7 | 1-2    | 75  | 55 | 96  | 13 | 10 | A60P |
| DCR  | 018-113* | 22 | 6     | 28 | 6 | 1-2    | 84  | 68 | 113 | 12 | 20 | A60P |
| DCR  | 018-145* | 33 | 6     | 41 | 5 | 1-3-4  | 126 | 89 | 145 | 14 | 16 | A60P |

\* Standard stock

All dimensions in mm

Tutte le dimensioni in mm



## Steatite beads

### Perline in steatite



| Code | Ref.      | D    | d    | L    | No. × kg |
|------|-----------|------|------|------|----------|
| PRL  | 023-00*   | 3.3  | 1    | 4.2  | 17000    |
| PRL  | 023-01*   | 4.3  | 1.5  | 5.5  | 6250     |
| PRL  | 023-02*   | 5.3  | 2    | 6    | 4000     |
| PRL  | 023-02 B* | 5.3  | 2.5  | 6    | 4350     |
| PRL  | 023-03*   | 6.3  | 2.5  | 6.7  | 2650     |
| PRL  | 023-03 B* | 6.3  | 3    | 6.7  | 3050     |
| PRL  | 023-04*   | 7.3  | 3    | 7.5  | 1750     |
| PRL  | 023-04 B* | 7.3  | 3.5  | 7.5  | 1900     |
| PRL  | 023-05*   | 8.3  | 4    | 9    | 1200     |
| PRL  | 023-05 B* | 8.3  | 5    | 9    | 1400     |
| PRL  | 023-06*   | 9.3  | 4.5  | 10   | 980      |
| PRL  | 023-06 B* | 9.3  | 5.5  | 10   | 1000     |
| PRL  | 023-07*   | 10.3 | 5    | 11   | 700      |
| PRL  | 023-08*   | 11.3 | 5.5  | 11.8 | 500      |
| PRL  | 023-08 B* | 11.3 | 6.5  | 11.8 | 550      |
| PRL  | 023-09*   | 12.3 | 6    | 12.8 | 430      |
| PRL  | 023-10*   | 13.3 | 6.5  | 13.3 | 350      |
| PRL  | 023-10 B* | 13.3 | 8    | 13.3 | 370      |
| PRL  | 023-12*   | 19   | 10.7 | 19   | 130      |

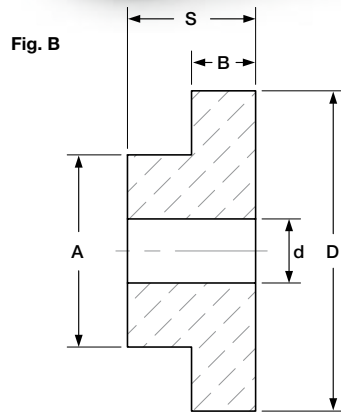
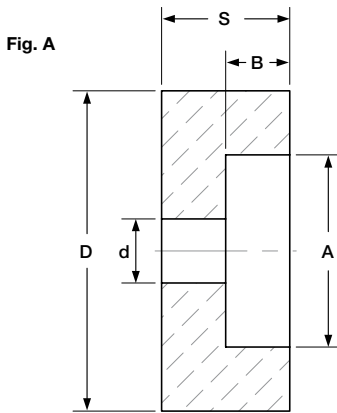
\* Standard stock

All dimensions in mm

Tutte le dimensioni in mm

# Insulators and plugs

## Isolatori e tappi



| Code | Ref.           | Fig. | D    | d    | A    | B   | S    | Mat.     |
|------|----------------|------|------|------|------|-----|------|----------|
| ISM  | 025-16.5-5 M*  | B    | 15.5 | 5    | 10   | 1.5 | 6    | Steatite |
| ISF  | 025-16.5-5 F*  | A    | 15.5 | 5    | 11   | 1.8 | 5    | Steatite |
| ISM  | 025-22-6.5 M*  | B    | 22.5 | 6.5  | 11.5 | 4   | 10.5 | Steatite |
| ISF  | 025-22-6.5 F*  | A    | 22.5 | 6.5  | 12.3 | 4.3 | 8    | Steatite |
| ISM  | 025-30-8 M*    | B    | 30   | 8.5  | 16   | 7.5 | 15   | Steatite |
| ISF  | 025-30-8 F*    | A    | 30   | 8.5  | 18   | 8.5 | 15   | Steatite |
| ISM  | 025-36-11.5 M* | B    | 36   | 11.5 | 22   | 11  | 20   | Steatite |
| ISF  | 025-36-11.5 F* | A    | 36   | 11.5 | 23.5 | 10  | 18   | Steatite |
| TAP  | 025-23-7*      | B    | 23   | 7    | 13   | 15  | 20   | A38E     |
| TAP  | 025-45-13      | B    | 45   | 13   | 26   | 18  | 30   | A42P     |
| TAP  | 025-60-15      | B    | 60   | 15   | 30   | 18  | 40   | A42P     |

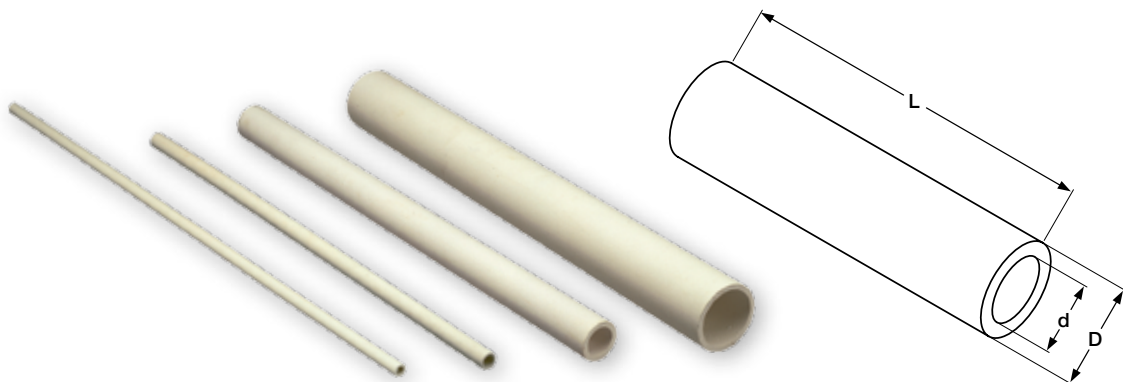
\* Standard stock

All dimensions in mm

Tutte le dimensioni in mm

# Tubes with one hole

## Tubi e tubetti semplici



| Ref. | D  | d   | Ref. | D  | d  |
|------|----|-----|------|----|----|
| TUS  | 6  | 3   | TUS  | 17 | 12 |
| TUS  | 6  | 4   | TUS  | 20 | 12 |
| TUS  | 7  | 4   | TUS  | 20 | 14 |
| TUS  | 7  | 5   | TUS* | 25 | 15 |
| TUS  | 8  | 4   | TUS  | 25 | 20 |
| TUS  | 8  | 5   | TUS  | 30 | 16 |
| TUS  | 8  | 6   | TUS* | 30 | 20 |
| TUS  | 9  | 6   | TUS  | 35 | 15 |
| TUS  | 10 | 5   | TUS  | 35 | 25 |
| TUS* | 10 | 6   | TUS  | 40 | 20 |
| TUS  | 10 | 7.5 | TUS  | 40 | 28 |
| TUS  | 11 | 7   | TUS* | 40 | 30 |
| TUS  | 11 | 8   | TUS  | 45 | 25 |
| TUS* | 12 | 8   | TUS  | 45 | 35 |
| TUS  | 13 | 7   | TUS  | 50 | 30 |
| TUS  | 14 | 10  | TUS  | 50 | 36 |
| TUS  | 15 | 10  | TUS* | 50 | 40 |
| TUS* | 15 | 11  | TUS  | 60 | 40 |
| TUS  | 16 | 12  | TUS* | 60 | 50 |

Other dimensions on request.

For temp. max 1100°C: **A38E**

For temp. max 1300°C: **A80E** for lengths < 500  
**A73E** for lengths > 500

Dimensional tolerances according DIN 40680 norms

D < 10 l max 200  
D = 10 < 19 l max 800  
D > 20 < 50 l max 1000  
D > 50 l max 800

*Only*  
25 × 15 30 × 20 35 × 25 l max 3000  
40 × 30 50 × 40 60 × 50

Altre dimensioni su richiesta.

Per temp. max 1100°C: **A38E**

Per temp. max 1300°C: **A80E** per lunghezze < 500  
**A73E** per lunghezze > 500

Tolleranze dimensionali secondo le norme DIN 40680

D < 10 l max 200  
D = 10 < 19 l max 800  
D > 20 < 50 l max 1000  
D > 50 l max 800

*Solo*  
25 × 15 30 × 20 35 × 25 l max 3000  
40 × 30 50 × 40 60 × 50

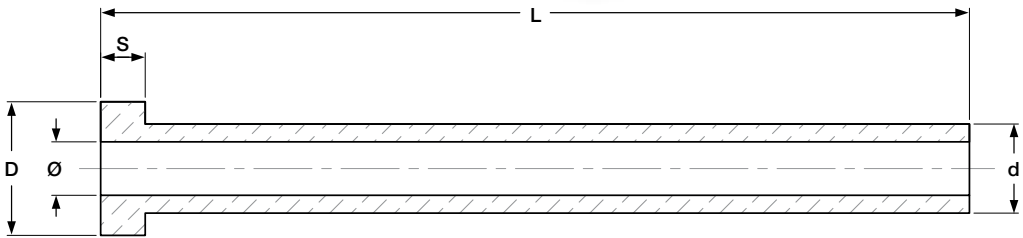
\* Standard stock

All dimensions in mm

Tutte le dimensioni in mm

# Tubes with flange

## Tubi con testata



| Ref.       | D  | d  | Ø  | S  | L stock         |
|------------|----|----|----|----|-----------------|
| TUT-20-10  | 20 | 10 | 6  | 6  | max 200         |
| TUT-25-15* | 25 | 15 | 9  | 10 | 100-150-200-300 |
| TUT-30-20* | 30 | 20 | 12 | 15 | 100-150-200-300 |
| TUT-35-25* | 35 | 25 | 15 | 20 | 150-200-300     |
| TUT-40-30* | 40 | 30 | 15 | 20 | 200-250-300     |
| TUT-45-35* | 45 | 35 | 20 | 20 | 150-200-300     |
| TUT-50-40* | 50 | 40 | 25 | 30 | 300             |

\* Standard stock

All dimensions in mm

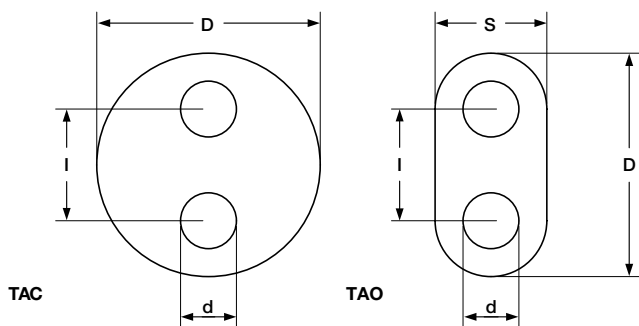
Tutte le dimensioni in mm

Usually manufactured in material A38E.

Solitamente prodotti in materiale A38E.

# Cylindrical and oval tubes with two holes

## Tubi abbinati cilindrici e ovali



| Ref. | D   | S | d   | l   |
|------|-----|---|-----|-----|
| TAC* | 6   | - | 2   | 2.8 |
| TAC  | 6.5 | - | 2   | 3.2 |
| TAC  | 7   | - | 2.5 | 3.2 |
| TAC  | 7.5 | - | 2   | 3.6 |
| TAC  | 7.5 | - | 2.5 | 3.6 |
| TAC  | 8   | - | 2.2 | 3.6 |
| TAC* | 8   | - | 3   | 3.6 |
| TAC  | 8.5 | - | 3   | 4.1 |
| TAC  | 9   | - | 3   | 4.1 |
| TAC* | 10  | - | 3   | 4.1 |
| TAC* | 12  | - | 4   | 5.4 |
| TAC  | 12  | - | 4.5 | 5.4 |
| TAC  | 14  | - | 4   | 5.4 |
| TAC  | 14  | - | 5   | 7.3 |
| TAC  | 16  | - | 5   | 7.3 |
| TAO* | 12  | 7 | 4   | 5.5 |
| TAO  | 15  | 9 | 4.5 | 7   |
| TAO  | 15  | 9 | 5   | 7   |

\* Standard stock

All dimensions in mm

Tutte le dimensioni in mm

Standard length 25-50-100.  
Usually manufactured in material A38E.

Lunghezze standard 25-50-100.  
Solitamente prodotti in materiale A38E.

# Tubes with multiple holes

## Tubi multiforo

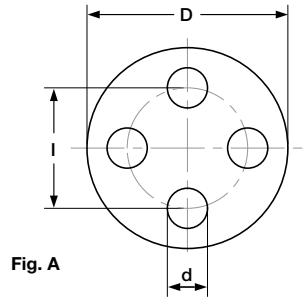


Fig. A

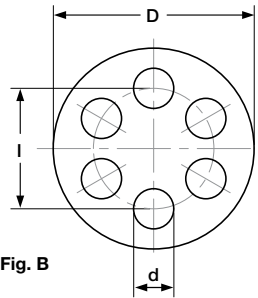


Fig. B

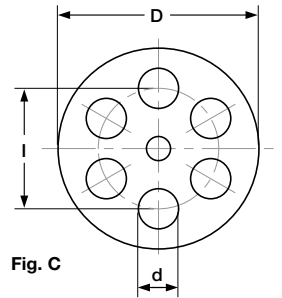


Fig. C

| Ref. | Fig. | D   | d   | l    | No.d |
|------|------|-----|-----|------|------|
| TMF  | A    | 8   | 2   | 4.25 | 4    |
| TMF  | A    | 8.5 | 1.5 | 4.8  | 4    |
| TMF  | A    | 8.5 | 2   | 4.8  | 4    |
| TMF  | A    | 8.5 | 2.5 | 4.8  | 4    |
| TMF  | A    | 9.5 | 2.8 | 5.2  | 4    |
| TMF  | A    | 10  | 3   | 5.4  | 4    |
| TMF  | A    | 12  | 3   | 6.5  | 4    |
| TMF  | A    | 12  | 3.5 | 6.8  | 4    |
| TMF  | A    | 13  | 4   | 7.15 | 4    |
| TMF  | A    | 14  | 4   | 7.7  | 4    |
| TMF  | A    | 14  | 4.5 | 8    | 4    |
| TMF  | A    | 16  | 4   | 9.3  | 4    |
| TMF  | A    | 16  | 4.5 | 9.3  | 4    |
| TMF  | A    | 16  | 5   | 9.3  | 4    |
| TMF  | A    | 17  | 5   | 10.2 | 4    |

| Ref. | Fig. | D    | d   | l    | No.d |
|------|------|------|-----|------|------|
| TMF  | B    | 8    | 1.6 | 5.1  | 6    |
| TMF  | B    | 10   | 2.2 | 6.5  | 6    |
| TMF  | B    | 14   | 3.5 | 9    | 6    |
| TMF  | B    | 15   | 3.5 | 9.5  | 6    |
| TMF  | C    | 11.5 | 2.7 | 8    | 7    |
| TMF  | C    | 12.4 | 2.7 | 8    | 7    |
| TMF  | C    | 13   | 3   | 8.5  | 7    |
| TMF  | C    | 14.5 | 2   | 9    | 7    |
| TMF  | C    | 16   | 4   | 10   | 7    |
| TMF  | C    | 18   | 4.5 | 11.5 | 7    |

All dimensions in mm

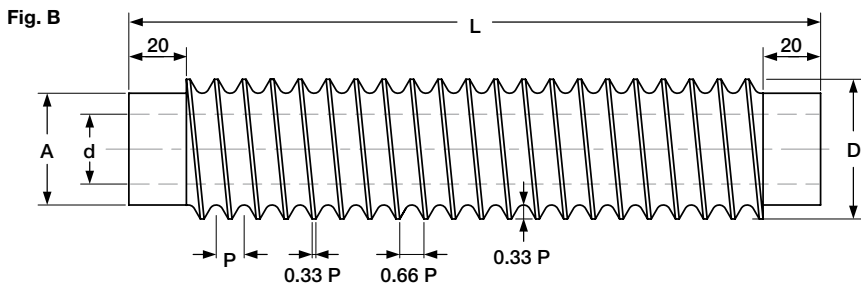
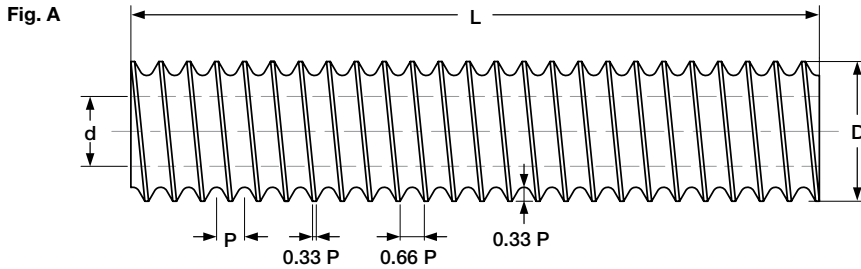
Tutte le dimensioni in mm

Standard length 25-50-100.  
Usually manufactured in material A38E.

Lunghezze standard 25-50-100.  
Solitamente prodotti in materiale A38E.

# Threaded candles

## Candele filettate



| Ref. | Fig. | D  | d  | P               | L max | No. P | A  | B  |
|------|------|----|----|-----------------|-------|-------|----|----|
| CND  | A    | 20 | 9  | 1.5-2-3-4-5     | 300   | 1     | -  | -  |
| CND  | A    | 30 | 16 | 1.5-2-3-4-5-6.5 | 300   | 1     | -  | -  |
| CND  | A    | 40 | 24 | 1.5-2-3-4-5-6.5 | 500   | 1     | -  | -  |
| CND  | A    | 50 | 32 | 1.5-2-3-4-5-6.5 | 500   | 1     | -  | -  |
| CND  | A    | 60 | 40 | 3-4-5-6.5       | 500   | 1     | -  | -  |
| CNT  | B    | 20 | 9  | 5               | 300   | 1     | 20 | 20 |
| CNT  | B    | 30 | 16 | 5               | 300   | 1     | 25 | 20 |
| CNT  | B    | 30 | 16 | 6.5             | 300   | 1     | 25 | 20 |
| CNT  | B    | 40 | 24 | 5               | 300   | 1     | 32 | 20 |
| CNT  | B    | 40 | 24 | 6.5             | 300   | 1     | 32 | 20 |
| CNT  | B    | 30 | 16 | 5               | 300   | 2     | 25 | 20 |
| CNT  | B    | 30 | 16 | 6.5             | 300   | 2     | 25 | 20 |
| CNT  | B    | 40 | 24 | 5               | 300   | 2     | 32 | 20 |
| CNT  | B    | 40 | 24 | 6.5             | 300   | 2     | 32 | 20 |

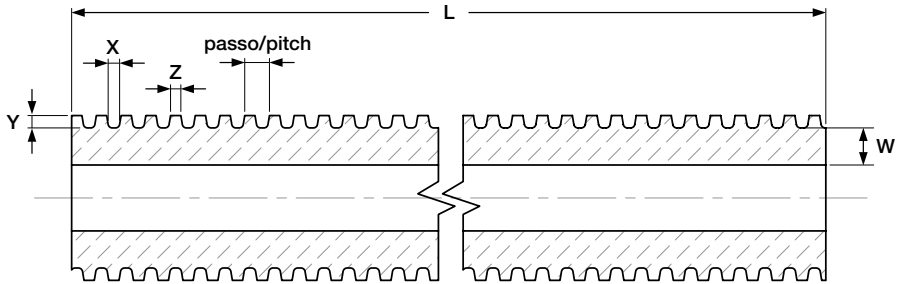
All dimensions in mm

Tutte le dimensioni in mm

Other dimensions on request.  
Usually manufactured in material A39E.

Altre dimensioni su richiesta.  
Solitamente prodotti in materiale A39E.

**Not standard threaded candles**  
**Candele filettate non standard**



$$Y_{\max} = X \times 1.2$$

$$X_{\min} = 2.5$$

$$Z > X \times 0.8 \text{ (min. 2.5)}$$

$$W > 8$$

For length up to 500 mm (19.7 in)  
 Pitches from 1.5 to 30 mm (0.059 to 1.18 in)  
 Also with double spiral

For length > 500 mm (19.7 in)  
 Pitches 3 - 4 - 5 - 6.5 - 8.5 - 9.5 - 10.7 - 11.5 - 15.5

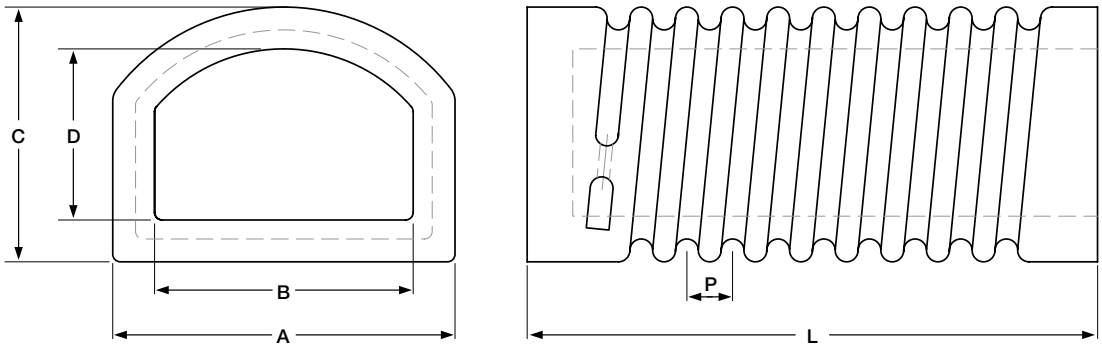
Per lunghezza fino a 500 mm  
 Passi da 1.5 a 30 mm  
 Anche con doppia spirale

Per lunghezza > 500 mm  
 Passi 3 - 4 - 5 - 6.5 - 8.5 - 9.5 - 10.7 - 11.5 - 15.5



# Muffles Muffole

## Muffles 034 Muffole 034



| Ref.             | A   | B   | C   | D   | L   | P  |
|------------------|-----|-----|-----|-----|-----|----|
| MUFO 230-180-115 | 190 | 170 | 125 | 105 | 240 | 13 |

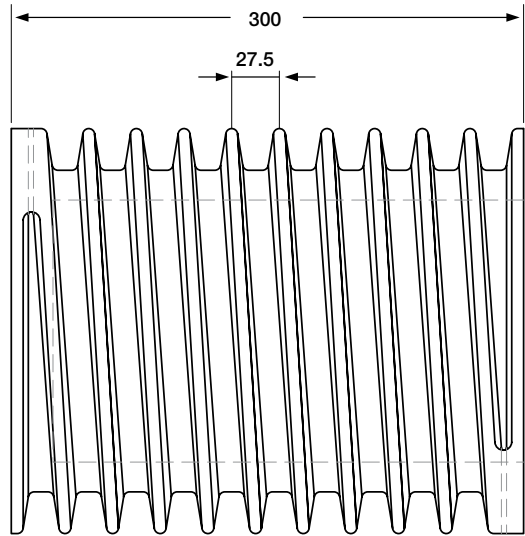
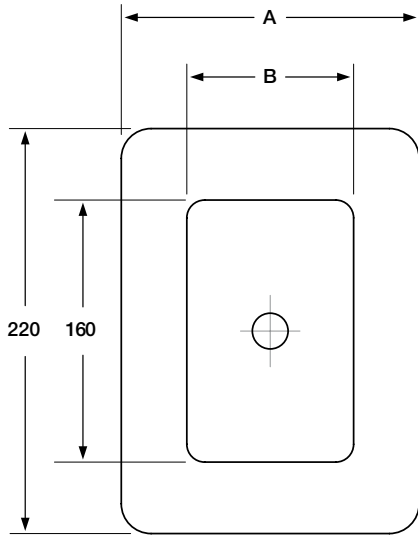
All dimensions in mm

Tutte le dimensioni in mm

Material A50C only.

Solo materiale A50C.

**Muffles 034-300**  
**Muffole 034-300**



| Ref.             | A   | B   |
|------------------|-----|-----|
| MUFO 300-170-220 | 170 | 110 |
| MUFO 300-270-220 | 270 | 210 |

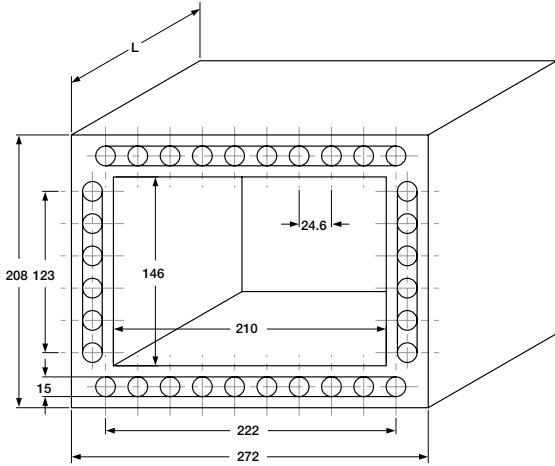
All dimensions in mm

Tutte le dimensioni in mm

Material A50C only.

Solo materiale A50C.

**Muffles 034-27**  
**Muffole 034-27**



| Ref.          | L   |
|---------------|-----|
| MUFO-27-28-32 | 280 |
| MUFO-27-32-32 | 320 |

Stock standard

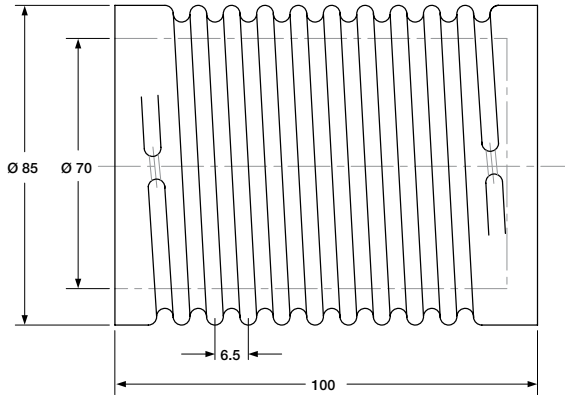
All dimensions in mm

Tutte le dimensioni in mm

Material **A50C** only.

Solo materiale **A50C**.

**Muffles 035**  
**Muffole 035**



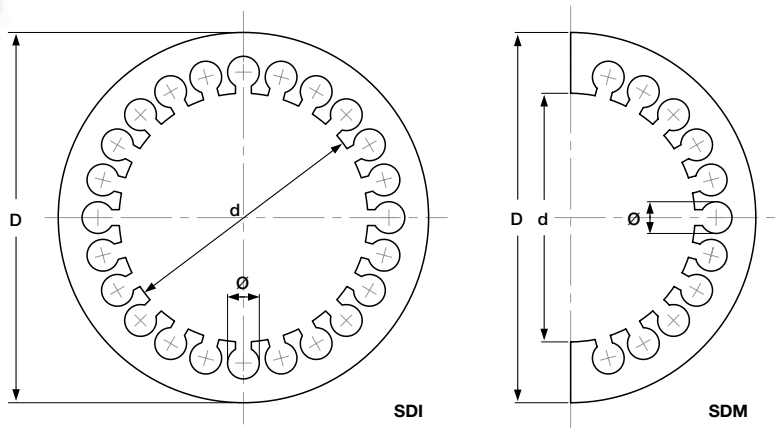
MUFO-80-100-65

Material **A50C** only.

Solo materiale **A50C**.

# Candles and half candles SAIDH with internal grooves

## Candele e mezze candele SAIDH a canali interni



| Ref. | D   | d   | Ø   | No. Ø | Mat. | L             |
|------|-----|-----|-----|-------|------|---------------|
| SDI  | 45  | 20  | 6   | 8     | A80E | 100-200-300   |
| SDI  | 55  | 30  | 5   | 10    | A80E | 100-200-300   |
| SDI  | 63  | 38  | 5   | 16    | A80E | 100-200-300   |
| SDI  | 65  | 30  | 9   | 10    | A80E | 100-200-300   |
| SDI  | 83  | 55  | 5   | 16    | A80E | 100-200-300   |
| SDI  | 105 | 70  | 7   | 16    | A80E | 100-200-300   |
| SDI  | 140 | 90  | 9   | 17    | A50C | only/solo 200 |
| SDI  | 210 | 150 | 15  | 24    | A50C | only/solo 300 |
| SDI  | 290 | 210 | 20  | 24    | A50C | only/solo 200 |
| SDI  | 450 | 350 | 20  | 36    | A50C | only/solo 350 |
| SDM  | 55  | 30  | 5   | 8     | A80E | 100-200-300   |
| SDM  | 63  | 40  | 5.5 | 8     | A80E | 100-200-300   |

All dimensions in mm

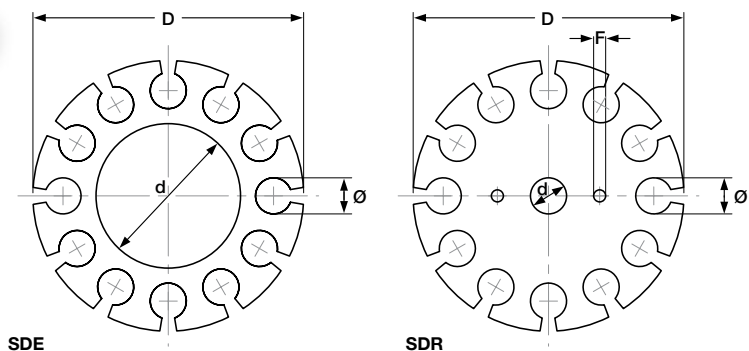
Tutte le dimensioni in mm

Other lengths on request.

Altre lunghezze su richiesta.

# Candles SAIDH with external grooves

## Candele SAIDH a canali esterni



| Ref. | D  | d  | Ø   | No. Ø | F | L max  |
|------|----|----|-----|-------|---|--------|
| SDE  | 20 | 4  | 4   | 6     | – | 300    |
| SDE  | 27 | 5  | 4   | 6     | – | 300    |
| SDE  | 30 | 7  | 5   | 8     | – | 300    |
| SDE  | 30 | 7  | 6.5 | 6     | – | 300    |
| SDE  | 35 | 7  | 6   | 8     | – | 300    |
| SDE  | 36 | 7  | 7   | 8     | – | 300    |
| SDE  | 37 | 12 | 6   | 8     | – | 300    |
| SDE  | 40 | 16 | 6   | 10    | – | 300    |
| SDE  | 43 | 8  | 8   | 8     | – | 300    |
| SDE  | 47 | 15 | 8   | 8     | – | 300    |
| SDE  | 50 | 20 | 6.5 | 12    | – | 300    |
| SDE  | 57 | 15 | 9   | 8     | – | 300    |
| SDE  | 60 | 25 | 7   | 12    | – | 300    |
| SDE  | 60 | 20 | 11  | 6     | – | 300    |
| SDE  | 75 | 40 | 7   | 16    | – | 300    |
| SDE  | 80 | 35 | 11  | 10    | – | 300    |
| SDR  | 27 | 4  | 4   | 6     | 2 | 50-100 |
| SDR  | 37 | 6  | 6   | 8     | 3 | 50-100 |
| SDR  | 47 | 8  | 8   | 8     | 3 | 50-100 |
| SDR  | 57 | 8  | 9   | 8     | 3 | 50-100 |
| SDR  | 57 | 8  | 7   | 12    | 3 | 50-100 |
| SDR  | 67 | 11 | 10  | 10    | 4 | 50-100 |
| SDR  | 77 | 12 | 10  | 12    | 4 | 50-100 |

All dimensions in mm

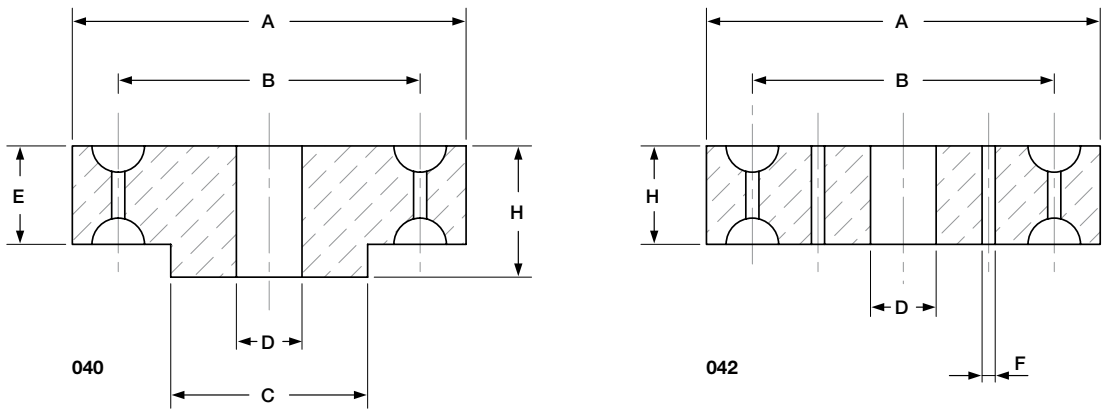
Tutte le dimensioni in mm

Material A38E only.

Solo materiale A38E.

# Plugs for SAIDH elements

## Tappi per candele SAIDH



| Ref.         | A  | B  | C  | D  | E  | F | H  |
|--------------|----|----|----|----|----|---|----|
| TAP040-20-8  | 20 | 15 | -  | 4  | 6  | - | 8  |
| TAP040-30-11 | 30 | 21 | 6  | 3  | 7  | - | 11 |
| TAP040-35-15 | 35 | 25 | 11 | 5  | 10 | - | 13 |
| TAP040-40-15 | 40 | 29 | 11 | 6  | 10 | - | 15 |
| TAP040-47-15 | 47 | 33 | 13 | 5  | 10 | - | 15 |
| TAP040-50-15 | 50 | 38 | 18 | 6  | 10 | - | 15 |
| TAP040-60-15 | 60 | 44 | 23 | 6  | 10 | - | 15 |
| TAP040-70-16 | 70 | 58 | 34 | 8  | 15 | - | 22 |
| TAP040-75-16 | 75 | 60 | 37 | 8  | 15 | - | 16 |
| TAP042-37-12 | 37 | 26 | -  | 6  | -  | 3 | 12 |
| TAP042-57-15 | 57 | 45 | -  | 8  | -  | 3 | 15 |
| TAP042-67-15 | 67 | 50 | -  | 12 | -  | 4 | 15 |
| TAP042-77-15 | 77 | 60 | -  | 12 | -  | 4 | 15 |

All dimensions in mm

Tutte le dimensioni in mm

Material A42P only.

Solo materiale A42P.

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