



Zoppas Industries

Heating Element Technologies



COMMERCIAL & COMFORT



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LEGENDA:

Per le applicazioni evidenziate con le icone seguenti, viene fornita su richiesta documentazione specifica relativa ad assiemi funzionali completi da incasso (DROP-IN), da banco (PLUG-IN) e boiler.

For the applications depicted by the following icons, specific documentation is available on request.



KIT DROP-IN
Sistemi di cottura completi da incasso
Built-in integrated cooking systems



KIT PLUG-IN
Sistemi di cottura da banco/appoggio
Portable cooking machines



BOILER
Generatori di acqua calda e/o vapore
Hot water boilers and Steam generators



RISTORAZIONE COLLETTIVA

La Commercial Appliances "business unit" opera nella progettazione, produzione e commercializzazione di resistenze elettriche ed assiemi funzionali che trovano impiego nel mondo della Ristorazione Collettiva.

Gli elementi riscaldanti RICA sono apprezzati dai maggiori produttori del settore ed utilizzati per:

- sistemi di preparazione e conservazione dei cibi: armadi refrigerati, abbattitori rapidi di temperatura e congelatori;
- apparecchiature per la conservazione e l'esposizione degli alimenti: vetrine e tavoli refrigerati;
- apparecchiature di cottura: forni, friggitrici, grill, fry-top, brasiere, cuocipasta;
- apparecchiature di distribuzione: bagno-maria, tavoli caldi;
- macchine per il lavaggio professionale destinate alla Grande Collettività (ristoranti, mense, complessi alberghieri, ospedali): lavastoviglie e lavapentole;
- macchine per il lavaggio destinate alle Piccole Utenze (bar e caffetterie): lavatazzine e lavabicchieri.

FOOD SERVICE EQUIPMENT

The Commercial Appliances business unit operates in the design, production and sale of electric heating elements and functional assemblies for the catering sector.

RICA heating elements are preferred by the main manufacturers in the sector and used for:

- food preparation and conservation systems: refrigerated cupboards, blast chillers, and freezers;
- equipment for the conservation and display of food: showcases and chilled counters;
- cooking equipment: ovens, fryers, grills, fry-tops, bratt pans, pasta pans;
- distribution equipment: bain-marie, self-service;
- heavy-duty washing machines for caterers (restaurants, canteens, hotels, hospitals): dishwashers and panwashers;
- medium-duty washing machines (bars and coffee shops): cup and glass washers.

REFRIGERAZIONE

Nel settore della refrigerazione le resistenze sono generalmente impiegate nelle seguenti posizioni:

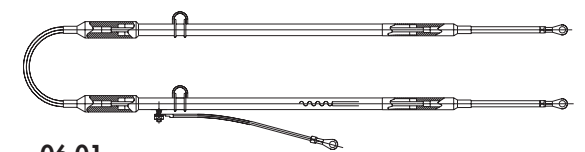
- pacco evaporatore: elementi riscaldanti tubolari con connessioni a tenuta stagna;
- vaschette di evaporazione: elementi tubolari, a cartuccia autoregolante o resistenze a foglio flessibile;
- porte dei frigoriferi: resistenze a cavo riscaldante.

REFRIGERATION

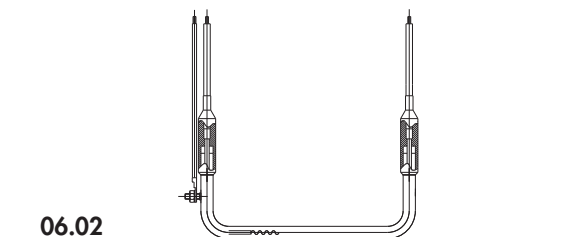
In the refrigeration sector the following elements are normally used:

- evaporation packs: tubular heating elements with watertight connections;
- evaporation trays: tubular elements, with self-regulating cartridges or flexible foil elements;
- refrigerator doors: heating cables.

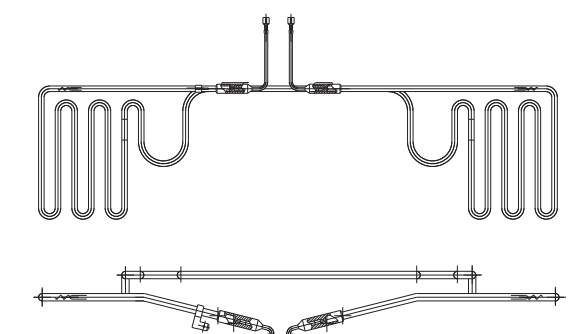
Refrigerazione / Refrigeration



06.01



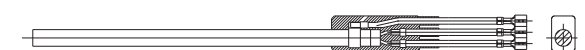
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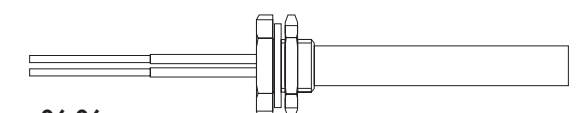
06.03



06.04



06.05



06.06

COTTURA



Molteplici sono i sistemi di cottura utilizzati e nelle corrispondenti attrezzature (cuocipasta, forni, friggitrici, fry-top, pentole, brasiera, piani di cottura) vengono normalmente inserite resistenze elettriche tubolari e radianti.

È inoltre disponibile la tecnologia del tubo piatto, principalmente adottata nelle friggitrici e nei cuocipasta, che assicura una maggiore compattezza del pacco riscaldante (minore ingombro in altezza) ed una migliore conducibilità termica. Grazie alla sua peculiare geometria, l'elemento tubolare piatto risulta particolarmente idoneo anche per il "riscaldamento a contatto" (grill).

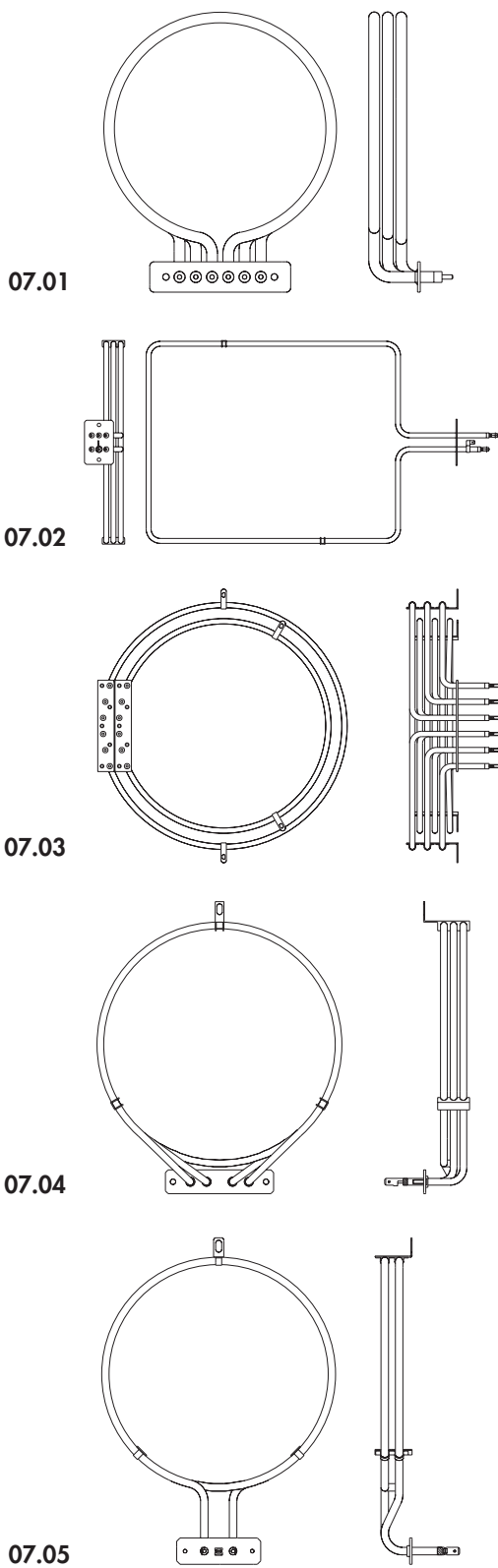
COOKING



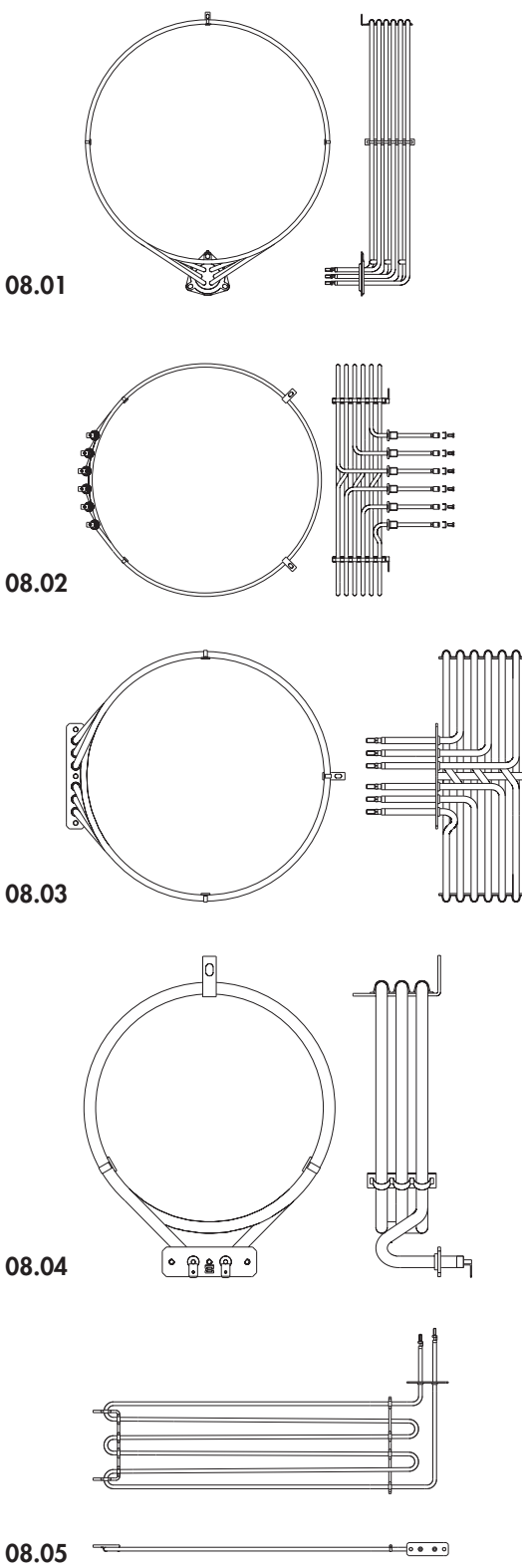
A great many cooking methods are in use today with the associated equipment normally using tubular and the radiant electric heating elements (pasta pans, ovens, fryers, fry-tops, pans, bratt pans, cooking hobs).

Flat tube technology is also available, mainly for use on fryers and pasta pans, ensuring a more compact heating pack (flatter) and better heat transmission. Together with the above, due to their special shape, flat tubular elements are particularly useful for contact heating (grills).

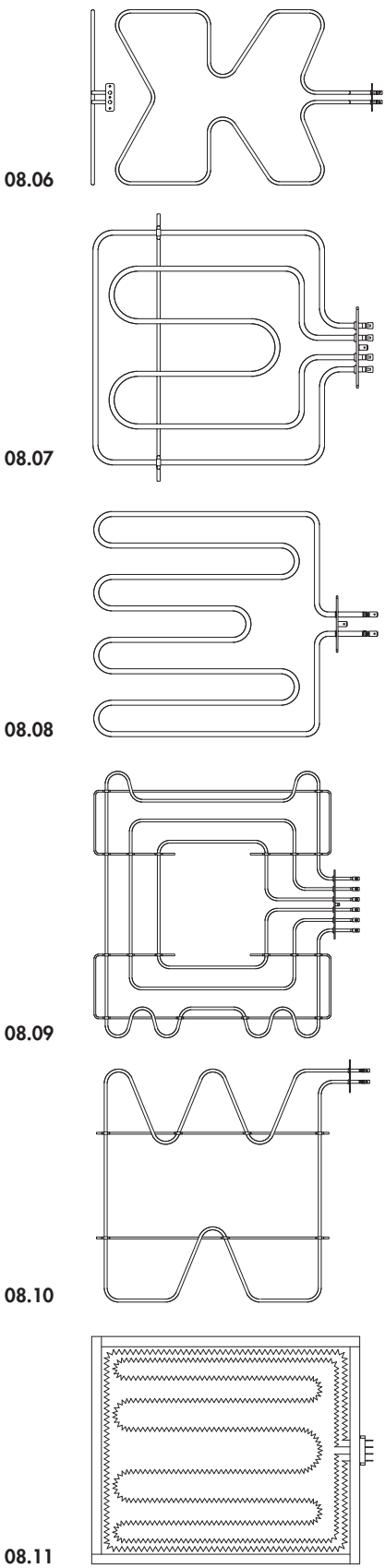
Forni ventilati / Convection ovens



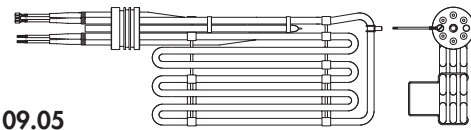
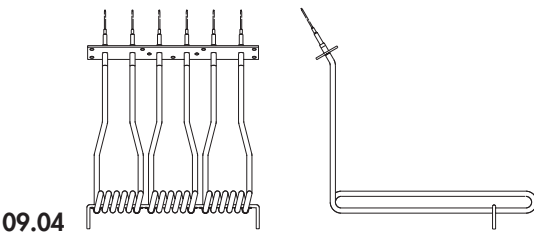
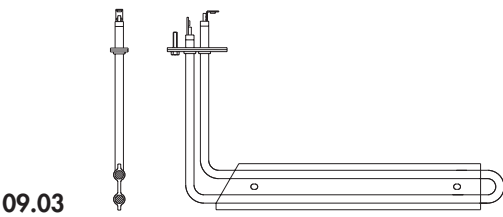
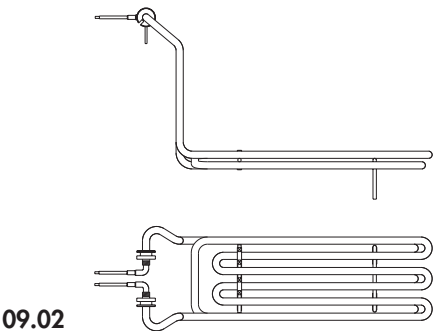
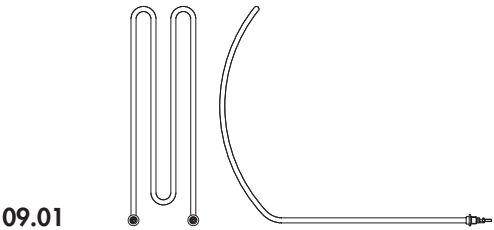
Forni ventilati / Convection ovens



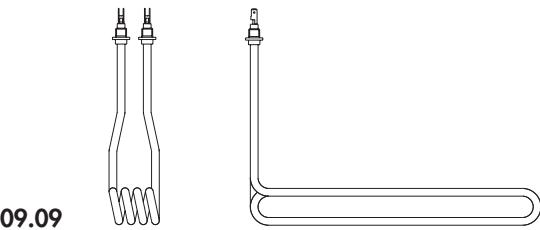
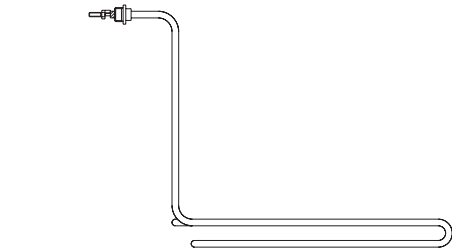
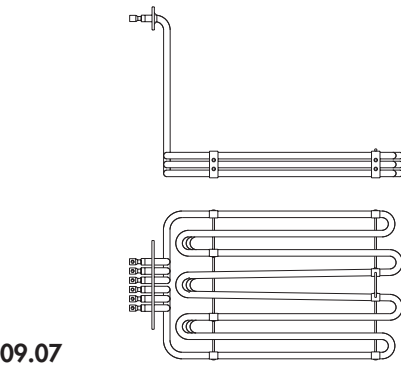
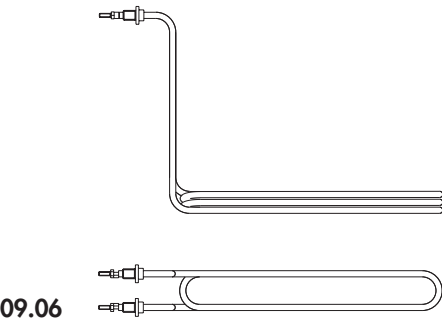
Forni statici / Static ovens



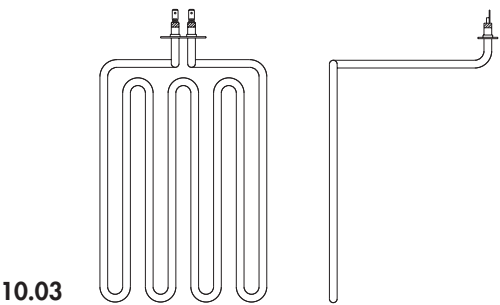
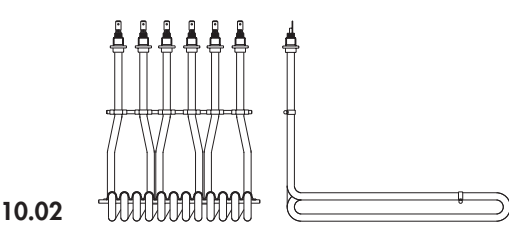
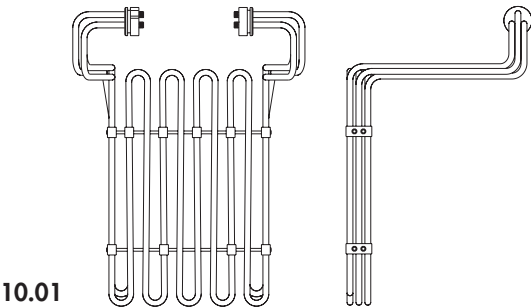
Friggitrici / Fryers



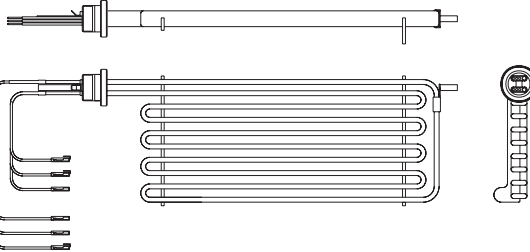
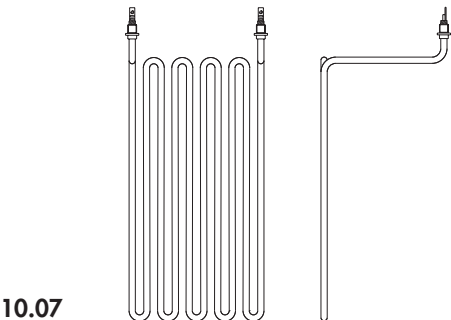
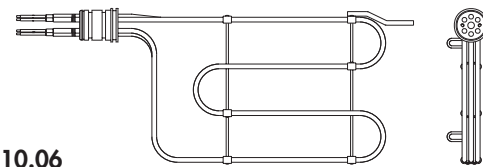
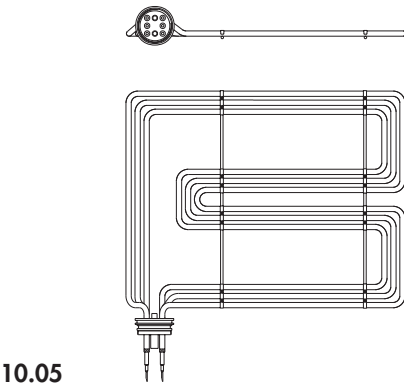
Friggitrici / Fryers



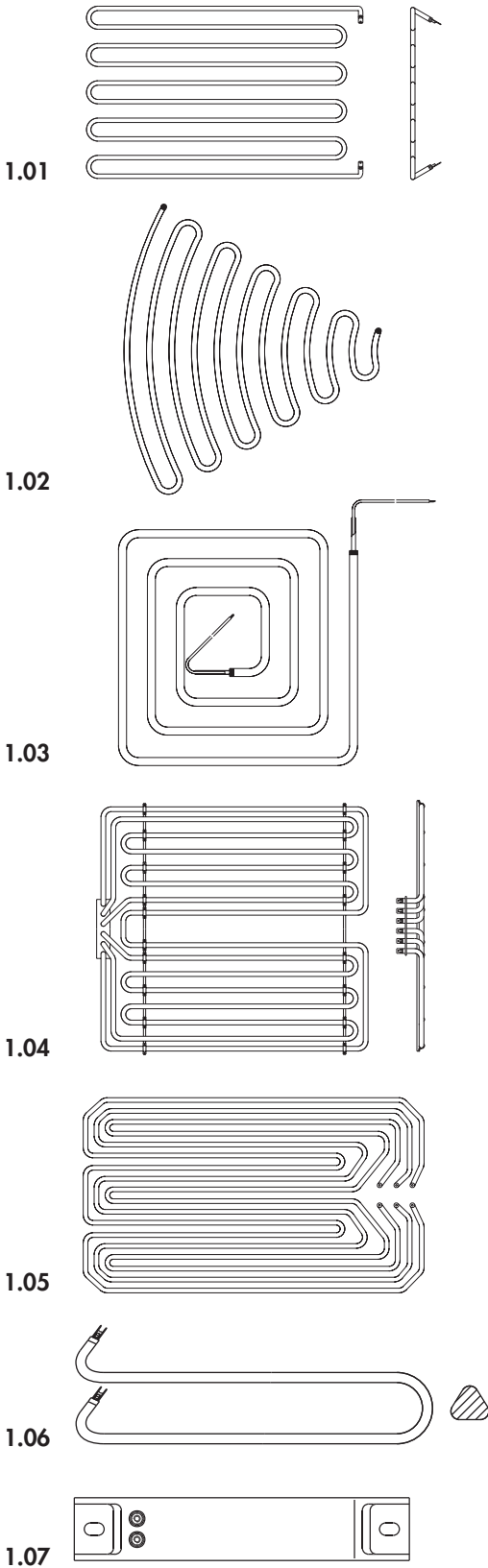
Friggitrici / Fryers



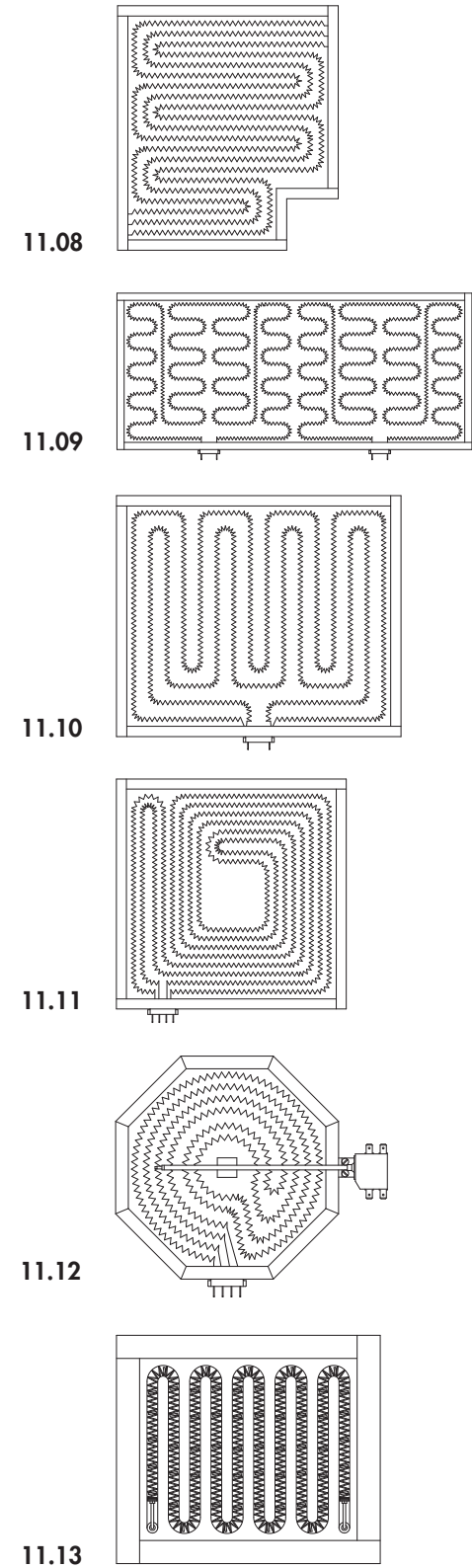
Friggitrici / Fryers



Brasiere - Frytop - Tutta piastra - Piani di cottura
Bratt-pans - Frytop - Solid top - Cooking hobs



Brasiere - Frytop - Tutta piastra - Piani di cottura
Bratt-pans - Frytop - Solid top - Cooking hobs



DISTRIBUZIONE



Nei Grandi Impianti la distribuzione del cibo, dalla cucina al tavolo del Cliente, avviene per mezzo di carrelli caldi o freddi o di isole self-service. Le resistenze installate possono essere del tipo tubolare corazzato, resistenze a cartuccia autoregolante e non, a foglio flessibile (figura 12.05: bagno maria, tavoli caldi) o immerse in fusioni di alluminio da applicare direttamente sulla superficie da riscaldare per bagno maria (figura 12.01).

Il mantenimento in temperatura degli alimenti può essere ottenuto anche con un riscaldamento per irraggiamento impiegando piastre a filo nudo (figura 12.11 e 12.12) e coppelle in ceramica di potenze e geometrie diverse (figura 12.04).

Sono disponibili, inoltre, piani completi per il mantenimento di cibi e stoviglie in vetro temprato, vetroceramico, inox e kit riscaldanti plug and play che permettono di trasformare il semplice armadio neutro in armadio caldo sia per il mantenimento in temperatura di stoviglie che di alimenti. Per ulteriori informazioni si rimanda a documentazione specifica.

DISTRIBUTION

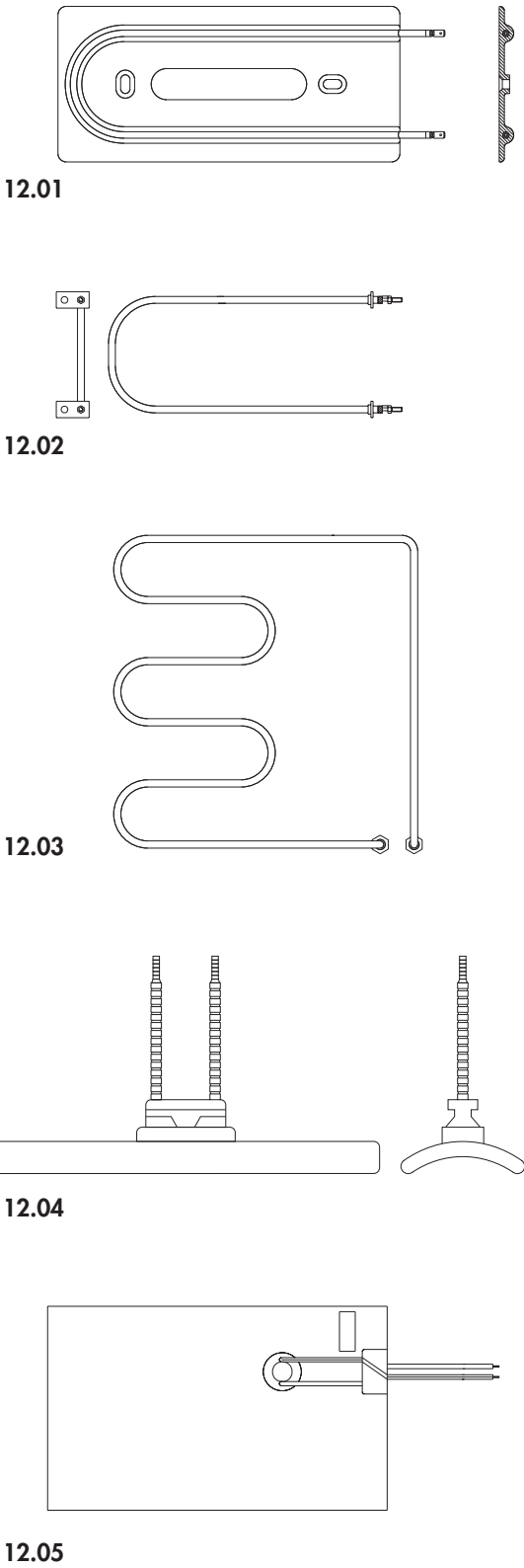


In the Food Service Equipment sector, food distribution from the point of cooking can take place using hot or cold trolleys or even self-service islands. The heating elements installed can be sheathed tubular, cartridges with or without self-regulation, flexible foil (dwg. 12.05: bain-marie, heated counters) or heaters immersed in aluminium casting to apply directly on the surface to be heated for bain-marie (dwg 12.01).

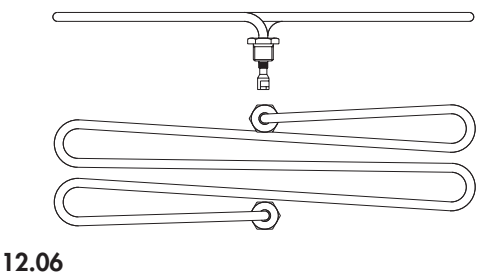
Food can also be kept warm with radiant heat, using Infrared (dwg.12.11 and 12.12) and ceramic heaters of different power ratings and shapes (dwg. 12.04).

Tempered glass, Glassceramic, Stainless steel warming tops and plug and play warming cabinets kits to transform plain cupboards into heated cupboards to keep utensils and food warm are also available. For further information please ask for specific documentation.

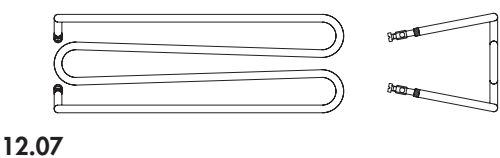
Distribuzione / Distribution



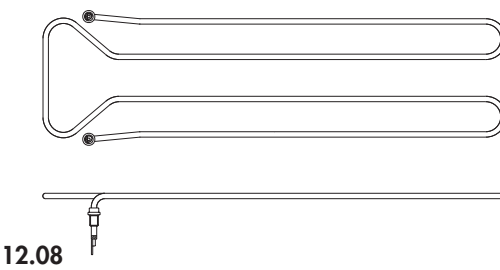
Distribuzione / Distribution



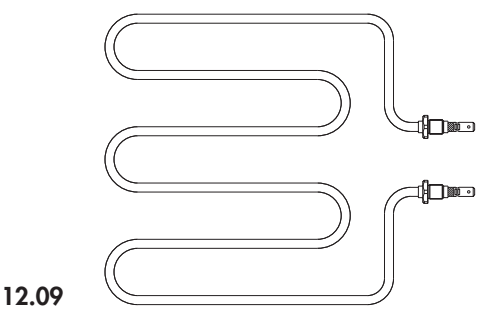
12.06



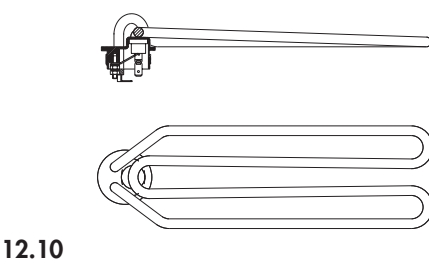
12.07



12.08

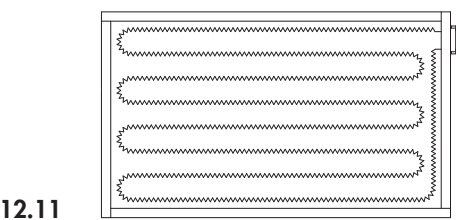


12.09

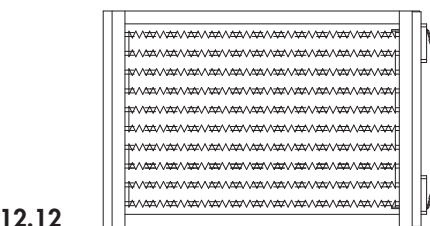


12.10

Distribuzione / Distribution



12.11



12.12

LAVAGGIO / ASCIUGATURA



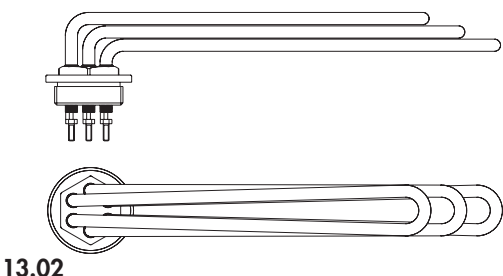
I due principali punti di installazione delle resistenze tubolari corazzate sono il boiler e la vasca. Nel primo la resistenza è normalmente di tipo trifase con flangia in acciaio inox, nella vasca invece l'elemento, completo di flangia o raccordi per il fissaggio, è generalmente monofase con sviluppo parallelo al fondo. La resistenza boiler può essere dotata di un dispositivo di sicurezza integrato (termofusibile): maggiori dettagli sono illustrati nella sezione "Informazioni Tecniche". La vasca è riscaldata anche indirettamente utilizzando le resistenze a foglio flessibile (figura 14.8). Nei tunnel d'asciugatura vengono principalmente utilizzate le resistenze tubolari corazzate sia nella versione "liscia" che con alettatura circolare o rettangolare.

WASHING / DRYING

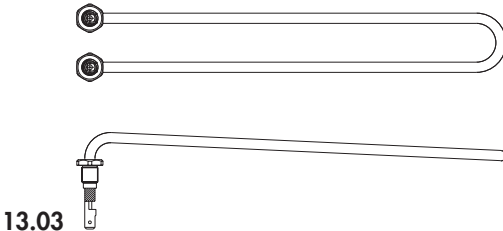


The two main installation points for sheathed tubular heating elements are in the boiler and tank. For the former the element is normally of the three-phase type with stainless steel flange, whereas in the tank a single phase element contoured parallel to the bottom is normally used, complete with flange or joints for fixing. The boiler element can be provided with an integrated safety device (thermal fuse): further details are given in the section "Technical Information". Tanks can also be heated indirectly using flexible foil elements (dwg. 14.8). Sheathed tubular elements are mainly used for drying tunnels, both 'smooth' versions and with circular or rectangular fins.

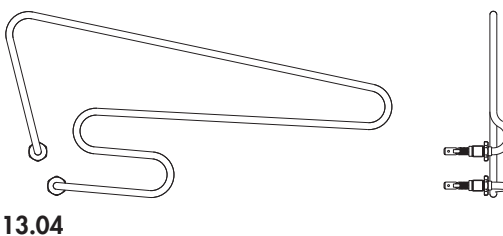
Lavaggio: vasca / Washing: tank



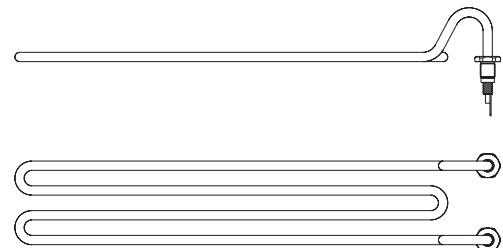
13.02



13.03

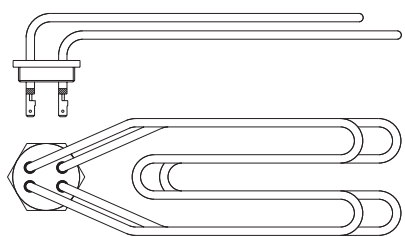


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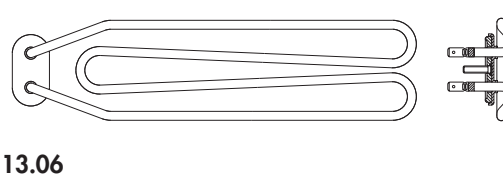


13.05

Lavaggio: vasca / Washing: tank

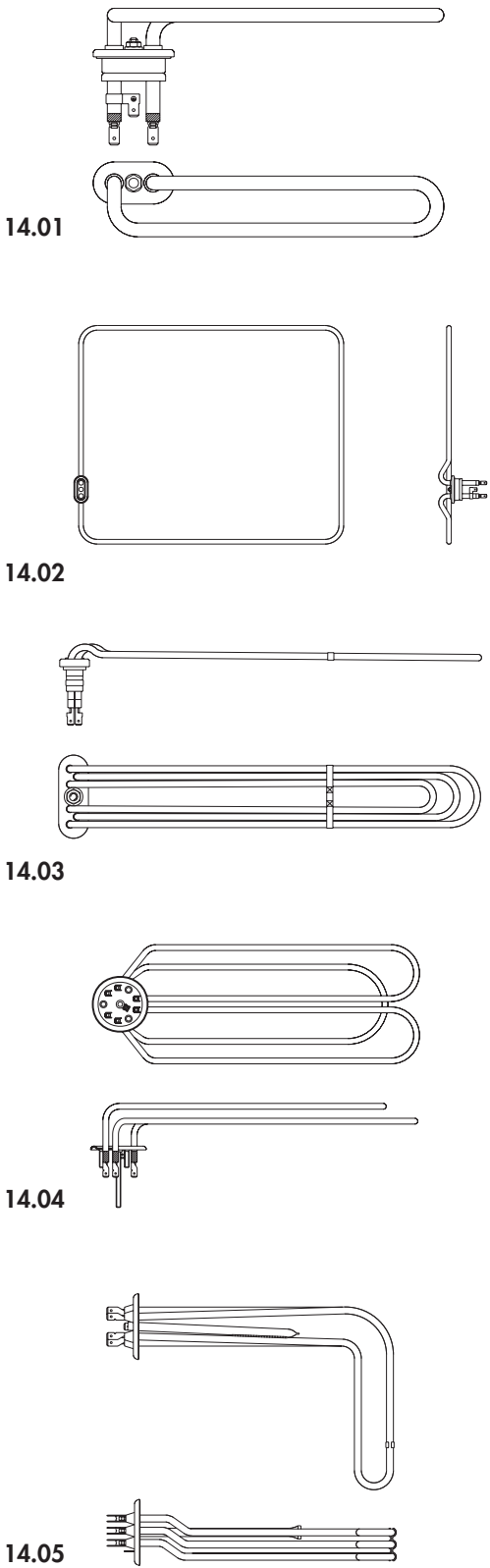


13.01

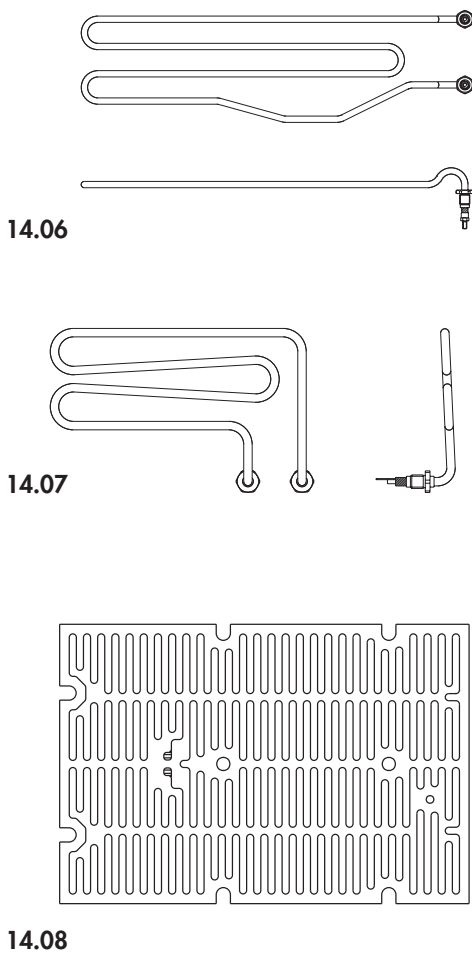


13.06

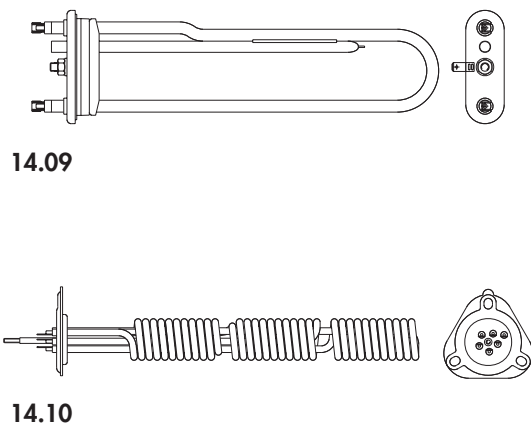
Lavaggio: vasca / Washing: tank



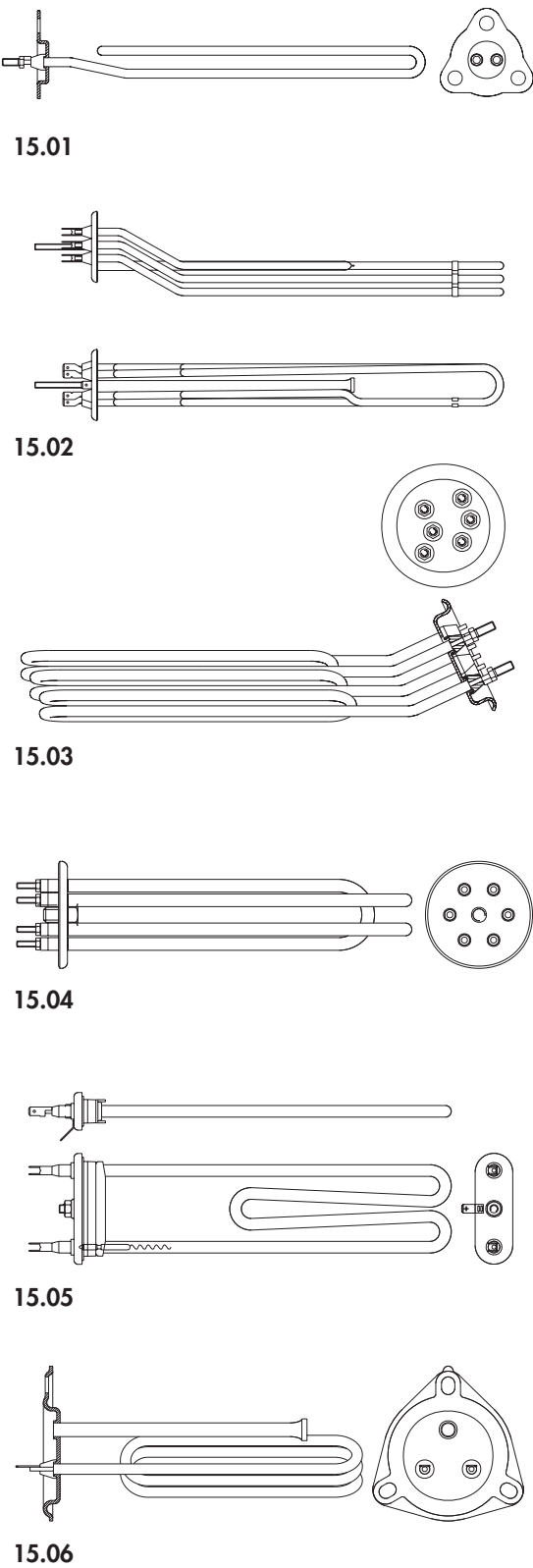
Lavaggio: vasca / Washing: tank



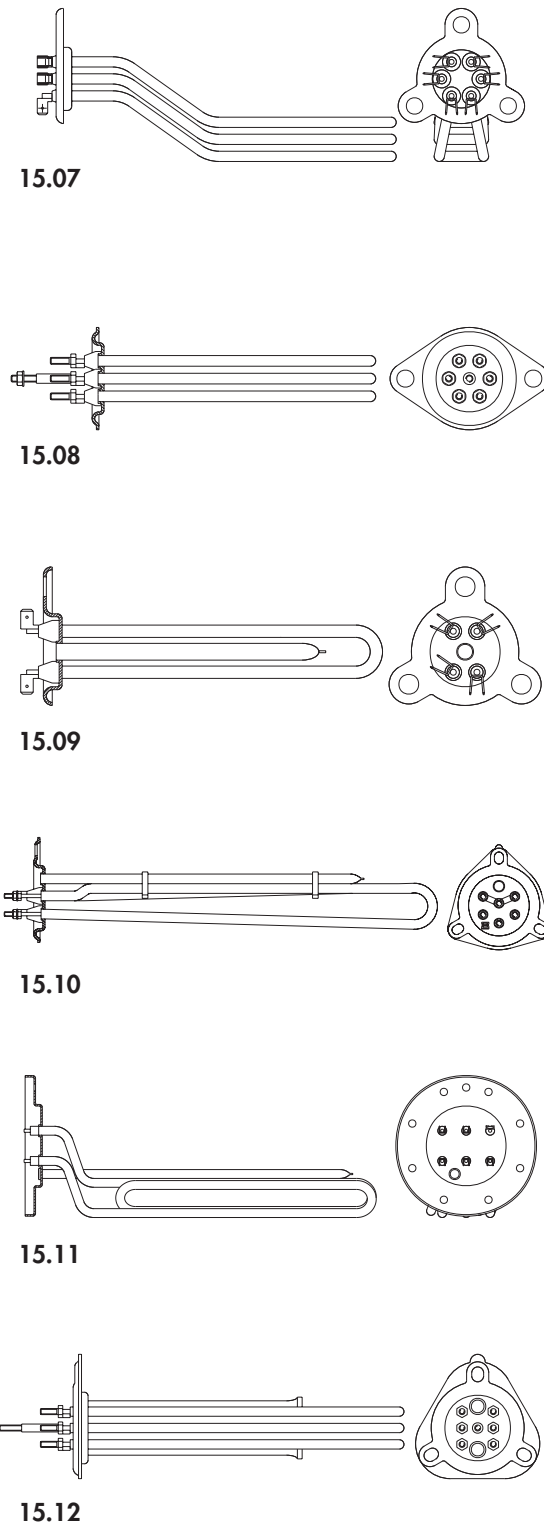
Lavaggio: boiler / Washing: boiler



Lavaggio: boiler / Washing: boiler



Lavaggio: boiler / Washing: boiler



PANIFICAZIONE & PASTICCERIA

Per un miglior servizio al mercato, RICA rivolge una particolare attenzione anche ai settori della panificazione, pasticceria e pizza. Gli elementi riscaldanti trovano il loro principale utilizzo in:

- camere e celle di lievitazione;
- forni di panificazione e pasticceria;
- forni pizza.

Nei forni è prevalente l'impiego delle resistenze tubolari corazzate che hanno quasi completamente soppiantato l'utilizzo del filo nudo. RICA è inoltre in grado di offrire soluzioni di riscaldamento e mantenimento in temperatura utilizzando resistenze a foglio flessibile su supporto autoadesivo in silicone (schiaccia pizza e vetrine calde).

BREAD-MAKING & CONFECTIONERY

In order to provide the best possible service and products, RICA pays particular attention to the areas of bread-making, confectionery and pizza-making. Heating elements are mainly used in:

- proving cells and chambers;
- bread and confectionery ovens;
- pizza ovens.

For ovens sheathed tubular elements are mainly used, almost completely replacing stitched wire type heaters.

RICA also provides complete solutions for the application and then maintaining a given temperature, using flexible foil elements with a silicon self-adhesive backing (pizza flattening and heated showcases).

CAMERE DI LIEVITAZIONE



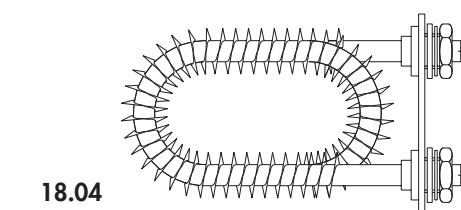
In queste apparecchiature gli elementi riscaldanti affrontano un impegno gravoso in quanto l'umidità che si concentra all'interno della camera può pregiudicarne il buon funzionamento e la durata di vita.

Nell'ampia gamma di soluzioni offerte, quella ottimale è rappresentata dalle resistenze con "sigillatura ermetica" completata da terminazioni a cavo e zone di connessione protette da una gomma vulcanizzata.

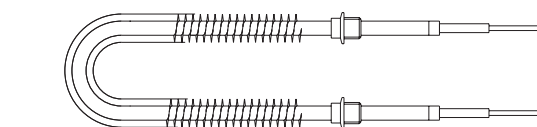
Camere di lievitazione / Proving chambers



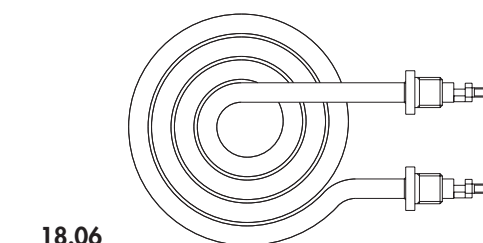
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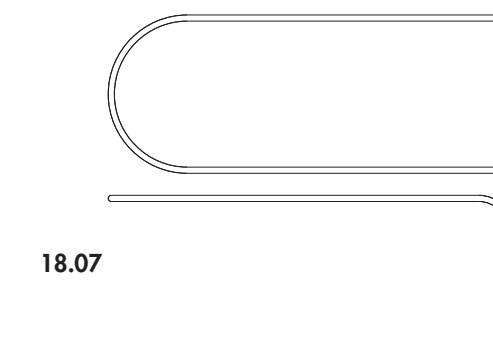
18.04



18.05



18.06



18.07

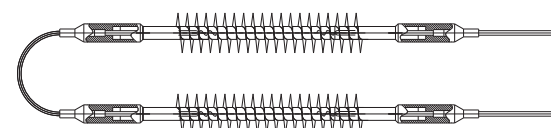
PROVING CHAMBERS



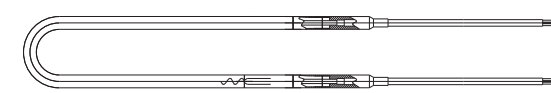
Within these environments, the heating elements must withstand the humidity in the chamber which can affect its working life.

From the wide range of solutions available, the ideal solution is an element with "hermetically sealed" connections. Both tails of the element are protected by vulcanized rubber connections.

Camere di lievitazione / Proving chambers



18.01



18.02

FORNI PANE



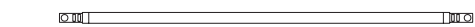
Per questa applicazione le resistenze tubolari sono progettate con carichi specifici ridotti (W/cm2) in quanto il calore emesso deve portare a cottura l'alimento senza rischio di bruciarlo. Inoltre, l'elemento subisce un trattamento termico detto di "ricottura in nero" che, migliorandone l'emissività superficiale, ne aumenta notevolmente la performance in termini di durata di vita.

BREAD OVENS



For this application, tubular elements are designed with reduced surface load (W/cm2), as the heat produced must cook the bread without burning. The element also undergoes heat treatment known as 'black annealing', which improves surface emission and performance in terms of element life.

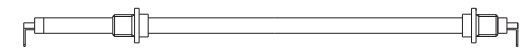
Forni pane / Bread ovens



19.01



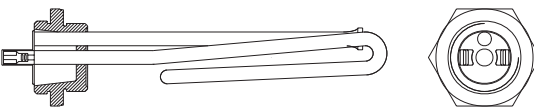
19.02



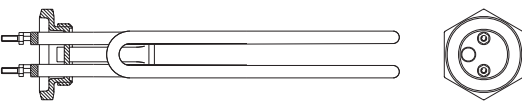
19.03



19.04



19.05



19.06

FORNI PIZZA



Lo stesso concetto progettuale/ costruttivo dei forni pane vale anche per il settore dei forni pizza con la sola differenza che, considerati i volumi di camera e le potenze richieste (ingombro e capienza inferiore rispetto ai forni pane), i diametri di guaina utilizzati possono essere sensibilmente ridotti.

Anche gli "schiaccia pizza" necessitano di una fonte di calore, seppur ridotta, per non far attaccare la pasta durante l'operazione di "schiacciata".

In queste apparecchiature si possono utilizzare resistenze tubolari o a foglio autoadesivo, che risulta particolarmente adatto per la facilità di montaggio e l'uniformità di riscaldamento che lo contraddistinguono (figura 21.05).

PIZZA OVENS

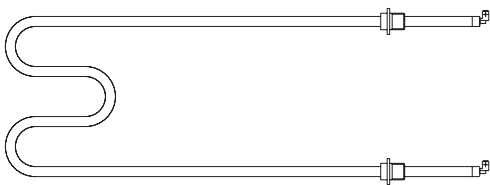


The same design and manufacturing concept as that used for bread ovens is also valid for the pizza sector, the only difference being that, considering the size of the chamber and the power rating required (size and capacity smaller than a bread oven), the sheath diameters that can be used are considerably smaller.

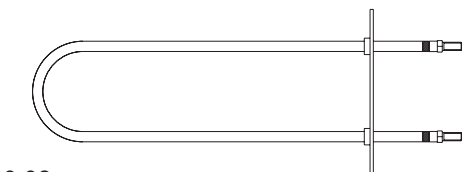
Pizza flatteners also require a heat source, albeit reduced, so that the dough does not stick during the flattening operation.

These appliances may use tubular or self-adhesive foil elements, which are particularly suitable as they are easy to fit and provide uniform heat (dwg. 21.05).

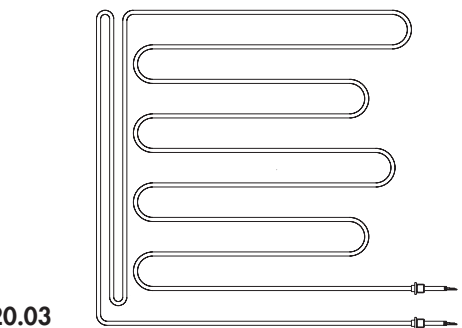
Forni pizza / Pizza ovens



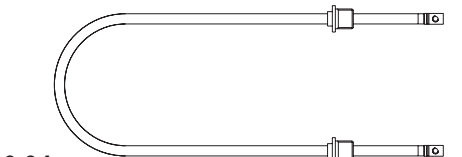
20.01



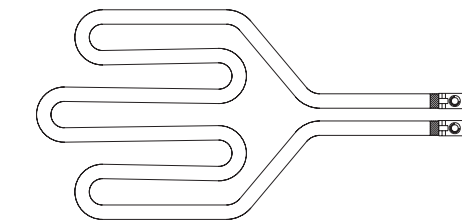
20.02



20.03

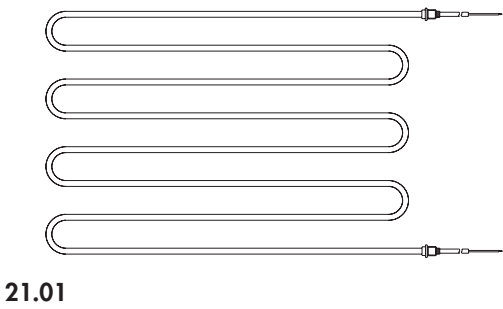


20.04

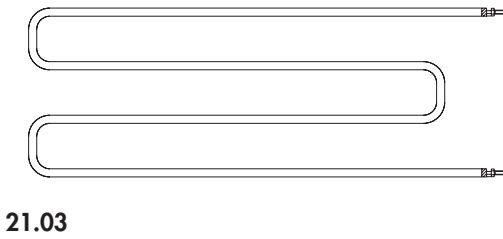


20.05

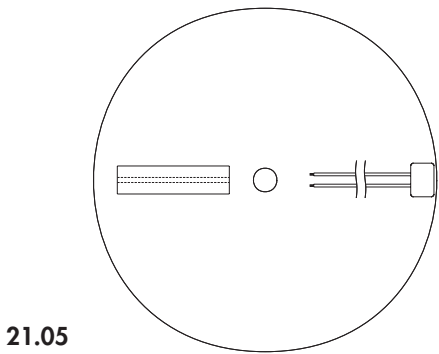
Forni pizza / Pizza ovens



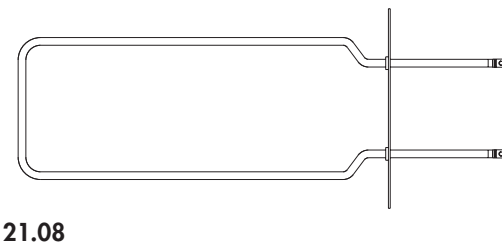
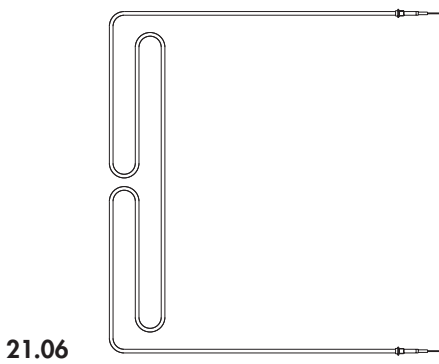
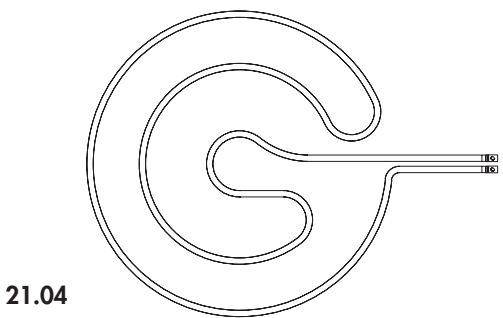
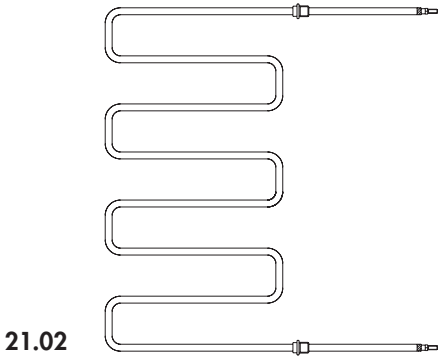
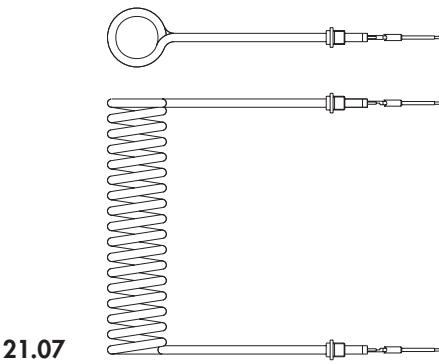
Forni pizza / Pizza ovens



Forni pizza / Pizza ovens



Forni pizza / Pizza ovens



CAFFETTERIA, SNACK, VENDING

Anche nel settore della “Ristorazione Rapida” RICA conferma la sua fama di fornitore “globale” con una gamma di soluzioni tecnologiche per le seguenti applicazioni:

- caffetteria: macchine per caffè;
- lavaggio: lavabicchieri, lavatazzine;
- snack: piccole friggitrici, tostiere;
- vending: distributori automatici di bevande calde e fredde;
- apparecchiature per la produzione automatica del gelato.

COFFEE SHOPS, SNACK BARS, VENDING

In the fast food sector RICA again underlines its reputation as a major global supplier with a full range of technological solutions for the following applications:

- *coffee shops: coffee machines;*
- *washing: glasswashers, cupwashers;*
- *snack bars: small fryers, toasters;*
- *vending: automatic distributors of hot and cold drinks;*
- *appliances for the automatic production of ice cream.*

MACCHINE PER CAFFÈ ESPRESSO



In funzione del materiale della caldaia la maggioranza delle resistenze utilizzate in queste apparecchiature è costruita con flangia di montaggio in ottone e guaina in RAME. Quest'ultimo risulta sufficientemente malleabile da poter essere piegato nelle geometrie più complesse ed è caratterizzato da un buon coefficiente di scambio termico. In alternativa è disponibile una gamma completa di riscaldatori con guaina in “incoloy” e flangia in acciaio inossidabile.

Nelle macchine da caffè tipo famiglia sono installate sia resistenze tubolari di forma compatta e dimensioni contenute che resistenze a cartuccia inserite nei masselli in ottone.

Per gli scaldi tazze vengono impiegate sia resistenze tubolari (anche con connessioni vulcanizzate) che a foglio flessibile con supporto in Poliestere o Silicone (figura 25.5); le peculiarità degli elementi flessibili (ingombri ridotti, flessibilità geometrica, facilità di montaggi, uniformità di riscaldamento) ne rendono particolarmente idonea l'applicazione anche negli “scaldi cioccolato” (figura 25.4).

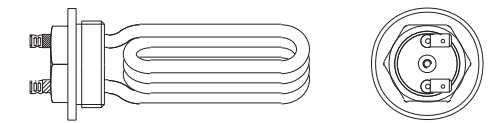
“ESPRESSO” COFFEE MACHINES



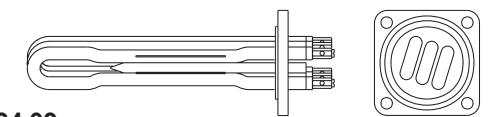
On the basis of the material from which the boiler is made, most of the heating elements used on these machines are manufactured with a brass fitting flange and COPPER sheath. The latter is ductile enough to be bent into varied complex shapes, and features a good heat exchange coefficient. Alternatively, there is a complete range of heaters with 'incoloy' sheathed and stainless steel flanges. Household coffee machines have small compact tubular elements or cartridge elements fitted into brass blocks.

Cup warmers use either tubular elements (also with vulcanized connections) or flexible foil with polyester or silicon backing (dwg. 25.5). The features of flexible elements (compact, geometrically flexible, easy to fit, uniform heat) make them especially suitable for application for 'chocolate warmers' (dwg. 25.4).

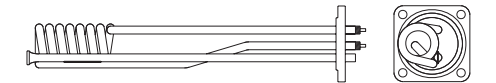
Macchine per caffè / Coffee machines



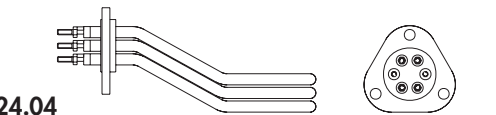
24.01



24.02

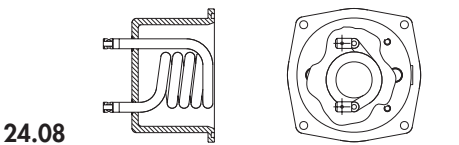
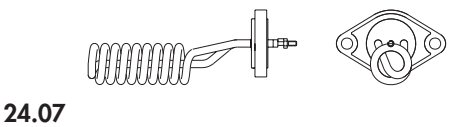
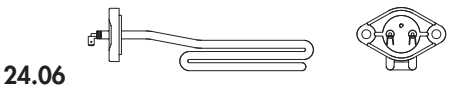
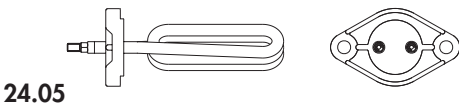


24.03

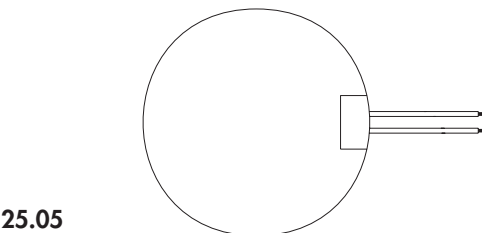
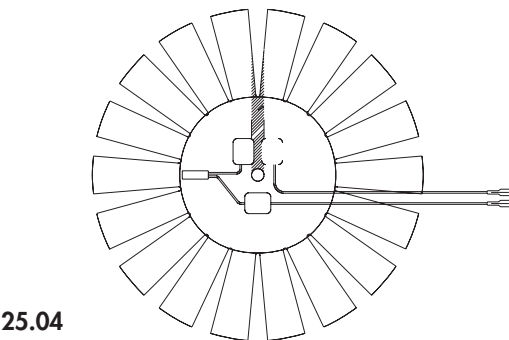
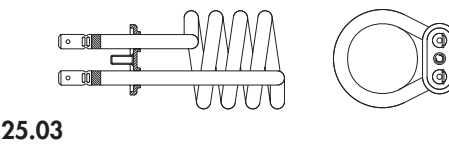
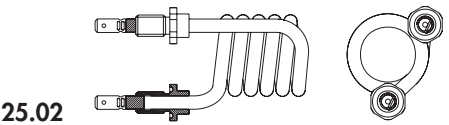
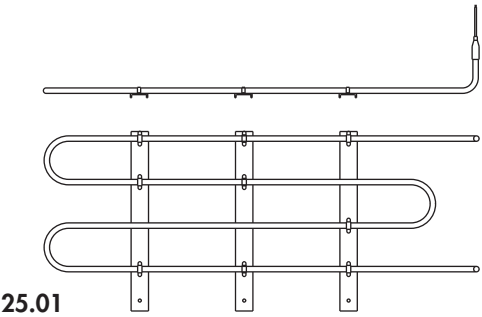


24.04

Macchine per caffè / Coffee machines



Macchine per caffè / Coffee machines



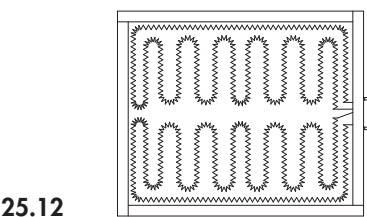
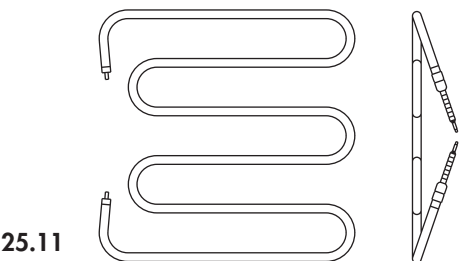
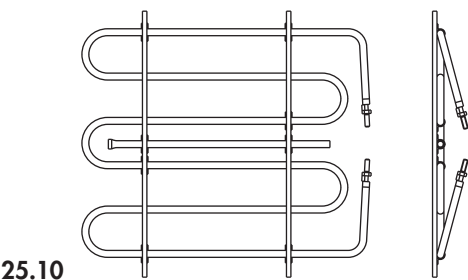
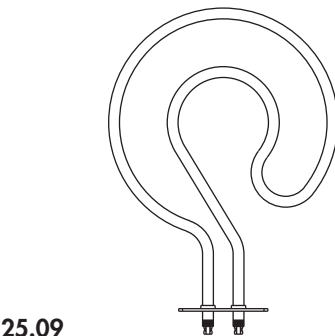
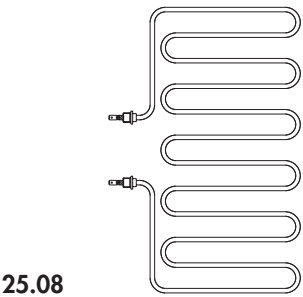
TOSTIERE

In queste attrezzature, solitamente legate al mondo dello snack, le resistenze tubolari o radianti sono applicate nella parte superiore ed inferiore della griglia, della piastra in ghisa o del vetro. Nelle versioni in vetroceramico sono personalizzabili piastre ad irraggiamento.

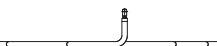
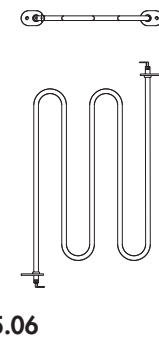
TOASTERS

These appliances, usually found in the snack sector, have tubular elements applied to the top and bottom parts of the grill or cast iron plate. For machines with glassceramic, radiant heaters are also available.

Tostiere / Toasters



Tostiere / Toasters



PICCOLE FRIGGITRICI



SMALL FRYERS



Le resistenze corazzate utilizzate nel settore della caffetteria/snack differiscono da quelle impiegate nel settore dei grandi impianti per le loro dimensioni e per essere generalmente di tipo monofase. Gli elementi riscaldanti che trovano utilizzo nelle piccole friggitrice vanno opportunamente dimensionati dal punto di vista della potenza specifica (W/cm²) in modo da evitare la carbonizzazione dell'olio. Per la visualizzazione delle geometrie più rappresentative delle resistenze per piccole friggitrice si rimanda al dettaglio FRIGGITRICI della sezione "Ristorazione collettiva".

The difference between the sheathed elements used in the coffee shop/snack bar sector and the catering sector lies both in their dimensions and the fact that they are usually single phase. The heating elements used in small fryers must have suitable surface loads (W/cm²) to prevent oil cracking. To see the most typical shapes for small fryer heating elements, consult the "FRYERS" chapter in the "Food Service equipment" section.

LAVATAZZINE - LAVABICCHIERI



CUPWASHERS - GLASSWASHERS



Come per le apparecchiature destinate al lavaggio professionale i due principali punti di installazione sono per questa applicazione il boiler e la vasca. Nel primo il riscaldatore può essere sia monofase che trifase con resistenze montate su flangia in acciaio inox, mentre nella vasca l'elemento è generalmente monofase con raccordi saldati o del tipo a foglio flessibile nel caso di riscaldamento indiretto.

As for heavy-duty washing appliances, the two main installation points for these applications are the boiler and tank. For the former the element can be either single phase or three phase, with the elements fitted to stainless steel flanges. For the tank the element is usually single phase with welded connections, or the flexible foil type if heating is indirect.

MACCHINE PER GELATO

La tipologia di resistenze applicate in questo settore è la più varia. Per la pastorizzazione del latte ad esempio, vengono utilizzate normali resistenze tubolari per immersione come pure riscaldatori in fusione di alluminio ed elementi a foglio flessibile in silicone applicati sulla parete esterna della vasca.

ICE CREAM MAKERS

This is the sector where the most different types of heating elements are used. For milk pasteurization, for example, normal tubular elements are used in immersion, as well as heating elements in aluminium casting or silicon flexible foil elements applied to the external wall of the tank.

MACCHINE VENDING



VENDING MACHINES

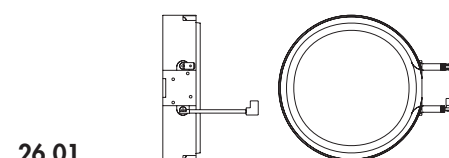


Resistenze tubolari con guaina in acciaio inox, complete di accessori per il fissaggio (raccordi o flange), vengono normalmente montate nel boiler del distributore per la produzione di acqua calda. Anche in questa applicazione, soprattutto nel caso in cui il materiale del boiler sia plastico, si va diffondendo l'impiego di resistenze con termofusibile interno.

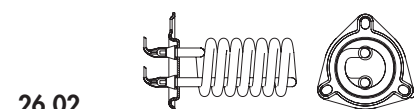
Elementi riscaldanti a foglio flessibile su supporto in Poliestere e/o cavi scaldanti sono applicati sui tubi di collegamento boiler/erogatore per evitare la perdita di calore dell'acqua. Il foglio flessibile è inoltre utilizzato, per il riscaldamento dell'acqua, nella zona di mescolamento del caffè liofilizzato e, come anticondensa, nelle tastiere/display di selezione con componentistica elettrica.

Tubular heating elements in a stainless steel sheath, complete with the accessories for fixing (nipples or flanges) are normally used in distributor boilers for the production of hot water. Also for this application, especially in the case of plastic boilers, the use of elements with an integrated thermal fuse is becoming popular. Flexible foil heating elements on polyester backing and/or with heating cables are applied to the boiler/dispenser connecting pipes in order to avoid loss of heat. Flexible foil elements are also used for heating the water in the area where the instant coffee is mixed and as an anticondensation device for the selection keypad/display and its electrical components.

Gelato / Ice

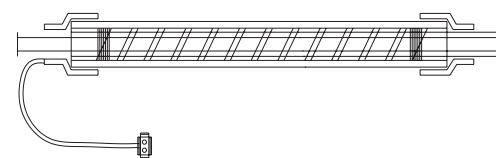


26.01

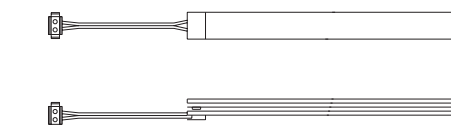


26.02

Lavatazzine / Cupwashers

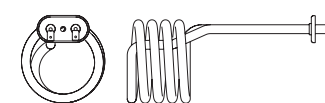


26.03

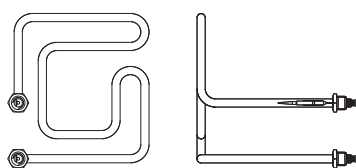


26.04

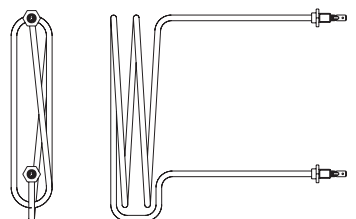
Vending / Vending



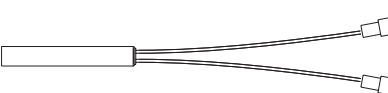
27.01



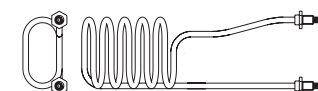
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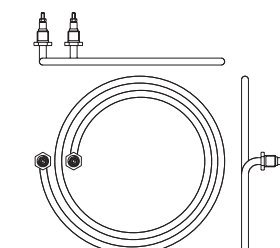
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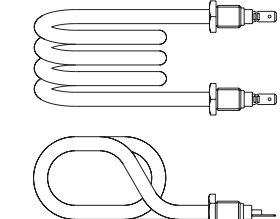
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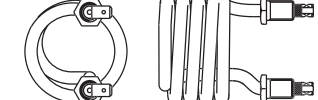
27.05



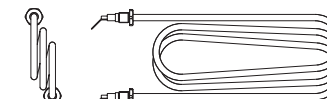
27.06



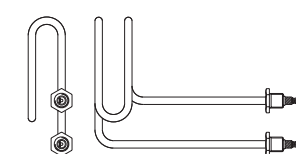
27.07



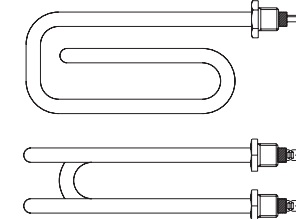
27.08



27.09



27.10



27.11



27.12

LAVANDERIA, LAVAPAVIMENTI

Le elevate prestazioni tecniche e qualitative delle resistenze RICA soddisfano le particolari condizioni di utilizzo richieste nell'equipaggiamento di:

- apparecchiature di lavanderia per comunità;
- apparecchiature per il lavasecco;
- apparecchiature per la stiratura professionale & mangani;
- apparecchiature per la stiratura domestica;
- apparecchiature per lavapavimenti.

LAUNDRY, FLOOR WASHERS

The quality and high technical performance of RICA heating systems make them ideal for the special operating conditions required by:

- heavy duty laundry appliances;
- dry cleaning equipment;
- equipment for industrial pressing and ironers;
- household ironing equipment;
- floor washing equipment.

LAVATRICI PER COMUNITÀ



Le resistenze sono generalmente di tipo tubolare con flangia ovale. Elementi riscaldanti con sicurezze termiche inserite al loro interno sono utilizzati nei boiler e nelle vasche di lavaggio. RICA sviluppa e fornisce assiemi boiler in acciaio completi personalizzabili in potenze e ingombri.

Per la fase di asciugatura del bucato vengono impiegati riscaldatori completi di alettatura circolare o rettangolare che favorisce un migliore scambio termico tra l'aria e la resistenza.

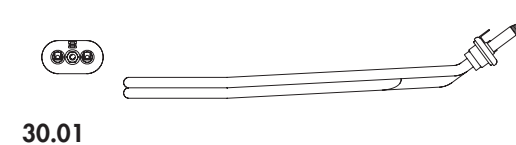
HEAVY-DUTY WASHING MACHINES



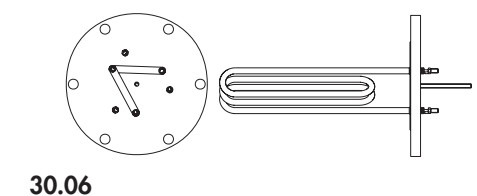
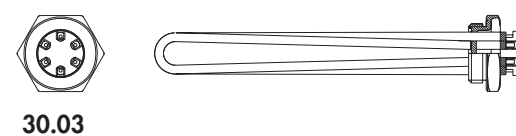
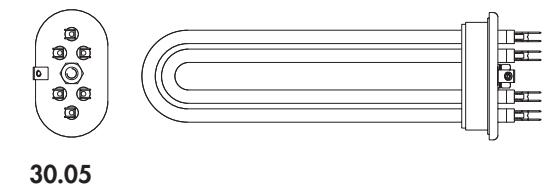
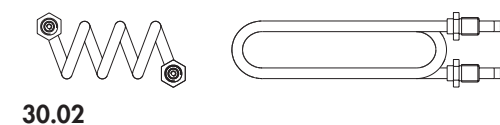
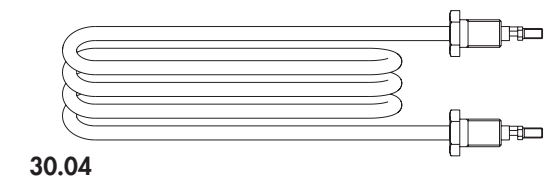
The heating elements are usually tubular with oval flanges. Heating elements with an integrated safety thermal fuse are used in the boilers and washing tubs.

Heating elements complete with circular or rectangular fins are used for the drying stage, giving better heat exchange between air and element.

Lavatrici / Washing machines



Lavatrici / Washing machines



LAVASECCO



In questa applicazione le resistenze tubolari corazzate affrontano un compito molto gravoso in quanto i solventi impiegati per il “lavaggio chimico” dei tessuti risultano particolarmente aggressivi e possono danneggiare l’elemento riscaldante in tempi molto brevi. Diventano quindi indispensabili: il corretto dimensionamento termico dell’elemento (potenza e carico specifico superficiale) e la ponderata scelta dei materiali di guaina che ne garantiscano affidabilità e durata. Una particolare attenzione è posta alle diverse fasi del processo produttivo per evitare tutti quei punti critici che, “indebolendo” la resistenza, permetterebbero agli agenti chimici una più facile aggressione del materiale con conseguenti effetti corrosivi.

STIRATRICI “PROFESSIONALI”
E MANGANI

Queste attrezzature sono normalmente equipaggiate con resistenze tubolari che riscaldano la superficie dove viene appoggiato l’indumento da stirare. Una particolare attenzione viene prestata nella definizione e realizzazione della forma/piegatura dell’elemento per ottenere la migliore distribuzione ed omogeneità termica sul piano di stiro; maggiore flessibilità e autonomia è consentita nella scelta dei materiali in quanto le potenze specifiche richieste non sono elevate. Nei mangani gli elementi tubolari rettilinei vengono normalmente fissati alla piastra che avvolge il rullo di asciugatura e stiratura e sono progettati in modo da garantire la migliore distribuzione ed omogeneità termica sul rullo stesso.

DRY CLEANING MACHINES

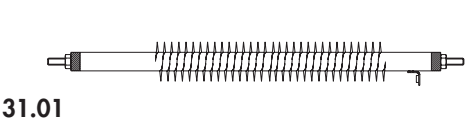


In this application sheathed tubular heaters are exposed to severe operating conditions due to the solvents normally used for the ‘chemical washing’ of fabrics being particularly aggressive and harmful in a very short time. It is therefore essential to have: the right technical specifications (power and surface load) and a careful choice of material for the sheath that will ensure reliability and duration. Special attention is paid to the different stages of the production process in order to avoid those critical points which can ‘weaken’ the element and therefore permit the chemicals to attack the material easily, resulting in corrosion.

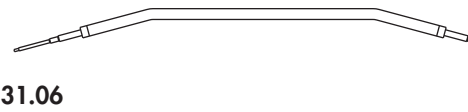
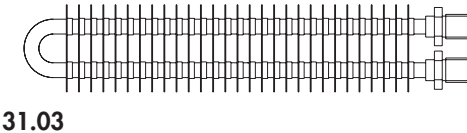
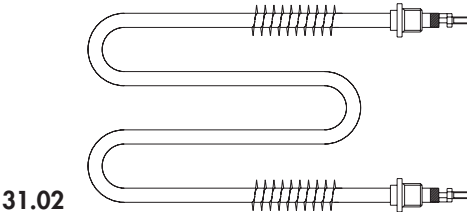
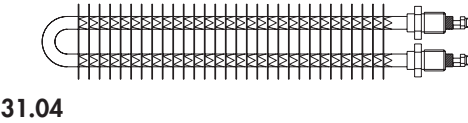
“PROFESSIONAL” IRONS
AND IRONERS

These appliances are normally manufactured with tubular elements that heat the surface on which the item to be ironed is placed. Careful attention is paid when establishing and producing the shape/bend of the element in order to achieve the best and most uniform heat distribution on the ironing board; more flexibility is possible in selecting the materials as the specific power rating required is not high. On ironers straight tubular elements are usually fixed to the plate covering the drying and ironing roller. Such elements are designed to ensure the best heat distribution on the roller.

Lavasecco - Stiro industriale
Dry cleaning machines - Professional irons



Lavasecco - Stiro industriale
Dry cleaning machines - Professional irons



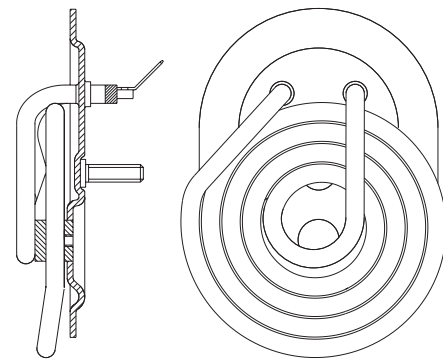
STIRATURA DOMESTICA

In questo settore le resistenze vengono installate nelle caldaie per la generazione di vapore e sono di tipo tubolare con materiali di guaina "speciali" in grado di sopportare temperature elevate; molto spesso infatti, questi elementi lavorano scoperti dall'acqua subendo stressanti shock termici.

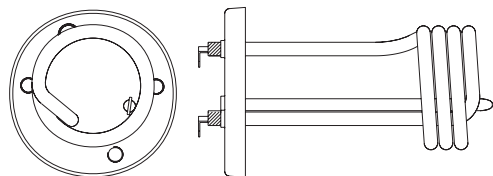
Le resistenze tubolari sono utilizzate anche per il riscaldamento dei piani da stiro e dei braccioli e possono essere dotate di connessioni di tipo ermetico.

Vengono inoltre proposte resistenze a foglio flessibile che consentono una distribuzione di calore più omogenea, una minore dispersione termica e migliori performance (es. stiracalzoni).

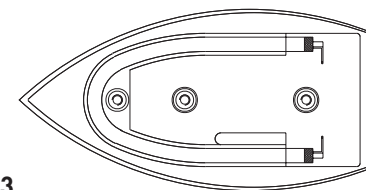
Stiratura domestica / Household ironing



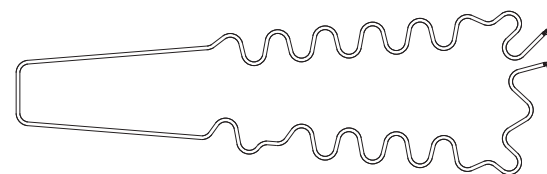
32.01



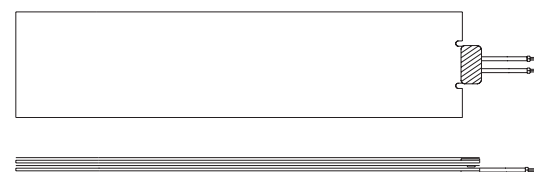
32.02



32.03



32.04



33.01

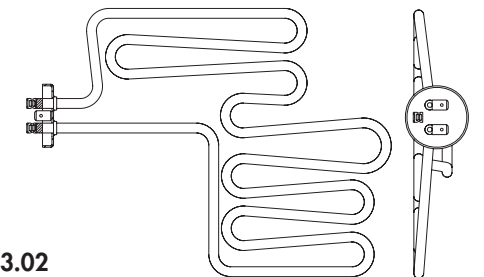
LAVAPAVIMENTI



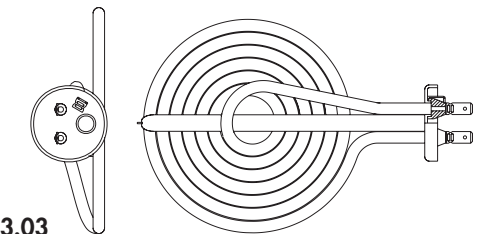
Per questa applicazione sono state sviluppate resistenze con elevate potenze specifiche adatte a funzionare in ambienti con pressioni elevate e volumi contenuti.

RICA sviluppa e fornisce assiemi boiler "resistenza caldaia" completi e personalizzabili in potenze e ingombri.

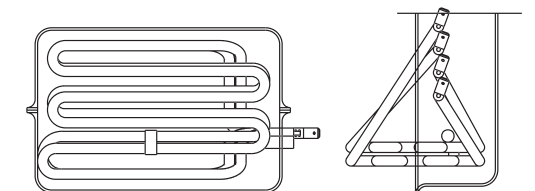
Lavapavimenti / Floor washers



33.02



33.03



33.04

FLOOR WASHERS



For this application heating elements have been developed with high specific power ratings, suitable for operation in environments with high pressure and low volumes.

RICA is able to develop and supply complete water boiler systems, meeting unique customer designs for power and dimensions etc.

HOUSEHOLD IRONING

In this sector the elements are installed in steam generating boilers and they are of the tubular type with 'special' sheaths that can withstand high temperatures; these elements often operate uncovered by water, subjecting them to stressful thermic shocks.

Tubular elements are also used to heat ironing boards and sleeve boards and in this case the heaters can be provided with hermetic connections.

Flexible foil elements are also used, as these give more uniform heat distribution, less heat loss and better performance (e.g. trouser presses).

ESTETICA & BENESSERE

Le tecnologie e la gamma dei prodotti RICA trovano normale utilizzo in diverse apparecchiature destinate al settore dell'estetica e del benessere.

I sistemi idromassaggio, le saune domestiche e professionali e le apparecchiature elettriche per la cosmetica del viso e del corpo (caschi, visage, aerosol) sono equipaggiabili in funzione delle particolari condizioni di utilizzo con resistenze tubolari e riscaldatori a foglio flessibile in poliestere o in gomma silicone.

AESTHETICS & HEALTHCARE

The range of RICA products is normally used in the equipment employed for beauty and body care.

Whirlpool systems, household, professional saunas and electrical utensils for face and body treatment (hair dryers, visage, aerosol treatment) are fitted with tubular or flexible foil heating elements in polyester or silicon rubber, according to the special conditions of use.

COSMETICA DEL CORPO E DEL VISO

Nel visage vengono normalmente installate resistenze corazzate in contenitori metallici o plastici per produrre vapore. Le forme e i materiali di guaina devono essere correttamente definiti in funzione delle soluzioni da riscaldare: acqua o soluzioni miste (combinazione di acqua ed essenze) che ne aumentano il potere corrosivo. Nel riscaldamento della paraffina per la pulizia della pelle sono inoltre utilizzate resistenze flessibili in poliestere (figura 36.09).

Per gli aereosol si adottano riscaldatori immersi nel liquido da evaporare e resistenze per uso esterno su foglio adesivo o su supporto in mica.

Per i caschi asciugacapelli le resistenze corazzate avvolgono la circonferenza del casco stesso con potenze specifiche molto ridotte. In fase di funzionamento sono investite dal flusso d'aria che, riscaldato, viene indirizzato sulla capigliatura.



FACE AND BODY TREATMENT

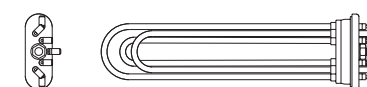


Sheathed heating elements are fitted in metal or plastic vessels to produce steam. Shapes and materials must be carefully established according to the solutions to be heated, for example water or mixed solutions (combination of water and perfumes) which increase the risk of corrosion. Flexible polyester elements are employed for heating the paraffin used in cleaning the skin (dwg. 36.09).

In aerosol treatments, immersed heaters are used to vaporize liquids and heating element for external use on adhesive foil or mica backing.

Hair dryers are normally warmed up by tubular elements with very low surface power installed around the circumference of the air dryer. During operation the air is heated and blown onto the hair.

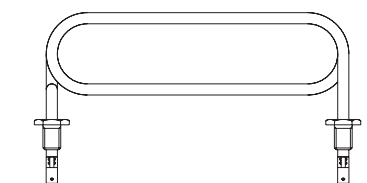
Caschi - Visage & body care - Aerosol / Hair dryer - Visage & body care - Aerosol treatment



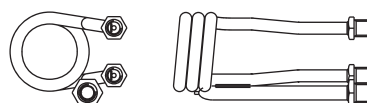
36.01



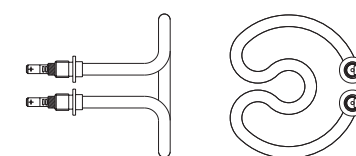
36.02



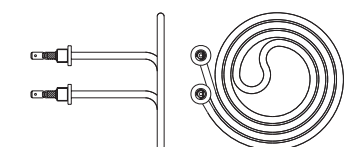
36.03



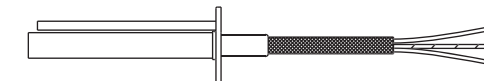
36.04



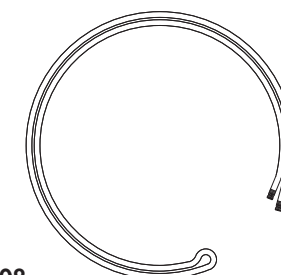
36.05



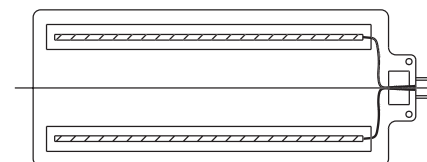
36.06



36.07



36.08



36.09

SAUNE



Le resistenze per sauna finlandese sono di tipo tubolare e, date le condizioni di lavoro particolarmente gravose, sono progettate per resistere a shock termici elevati. Per saune a infrarossi si propongono sia resistenze tubolari che a tecnologia a foglio flessibile.

RICA sviluppa e fornisce in co-partnership con i propri clienti assieme stufe complete di temporizzatori e termostati.

SAUNAS



The heating elements for a Finnish sauna are tubular and given the severe working conditions, are designed to withstand high thermic shocks. For infrared saunas RICA suggests both tubular and etched foil heaters.

RICA can supply complete sauna stoves with timers and thermostats.

VASCHE IDROMASSAGGIO SPA



Rica fornisce resistenze tubolari e/o tubi in acciaio o di alluminio teflonato riscaldanti completi di termostatazione al fine di mantenere la temperatura voluta di comfort in vasca.

WHIRLPOOL TUBS SPA



Rica can supplies tubular heaters or stainless steels or Teflon-coated aluminium flow true heaters to keep the water at a constant temperature in the whirlpool tub.

BOX DOCCIA



Le resistenze corazzate vengono normalmente adoperate per la generazione di vapore. Oltre alla resistenza, RICA sviluppa e fornisce generatori di vapore dei box doccia chiusi o ispezionabili, completi di sicurezze termiche e sonde di livello.

SHOWER CABINS

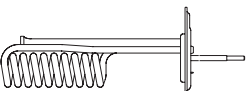


Electric heaters are normally used to create steam in the cabin. RICA - using tubular - can supply close or inspectional steam generators, with safety devices and water level probes. RICA is able to develop steam generators complete with safety devices and water level sensors.

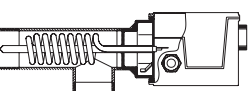
Saune - Vasche idromassaggio - Box doccia / Saunas - Whirlpool tubs - Shower cabins



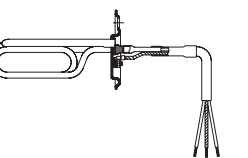
37.01



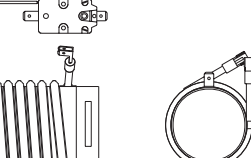
37.06



37.02



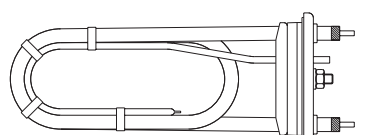
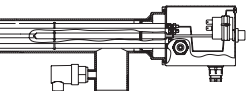
37.07



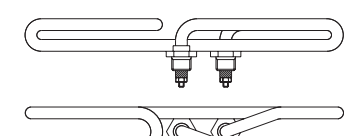
37.03



37.08



37.05



37.09

INFORMAZIONI TECNICHE / TECHNICAL DATA

CURVE CARATTERISTICHE / TEMPERATURE PROFILES

PROFILI DI TEMPERATURA IN ARIA STATICA

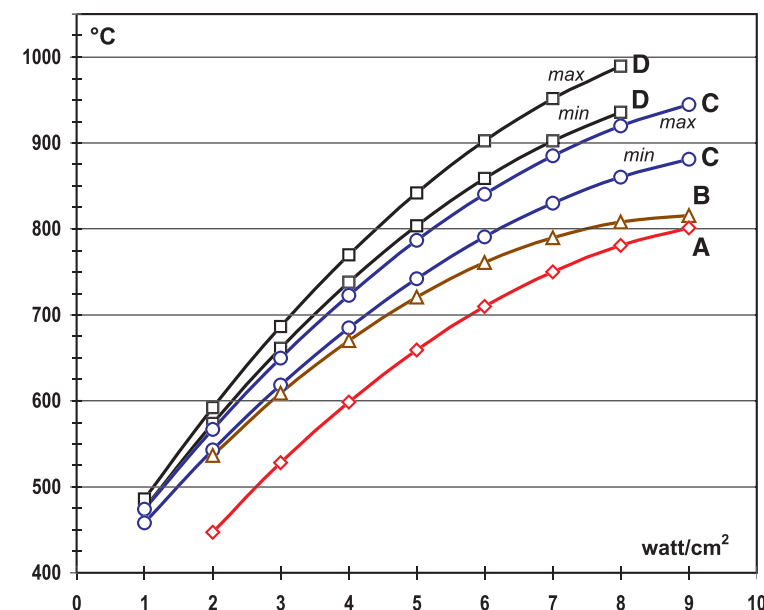
Temperatura di guaina in funzione del carico specifico applicato:

- D elemento inferiore, temperatura centro forno pari a 250°C
- C elemento superiore, temperatura centro forno pari a 250°C
- B elemento in aria libera (20°C) con guaina brillante
- A elemento in aria libera (20°C) con guaina scura, ossidata

TEMPERATURE PROFILES IN STILL AIR

Sheath temperature as a function of specific surface load:

- D bottom heater, middle oven temperature equal to 250°C
- C top heater, middle oven temperature equal to 250°C
- B element in free air (20°C), bright sheath
- A element in free air (20°C), dark, fully oxidized sheath

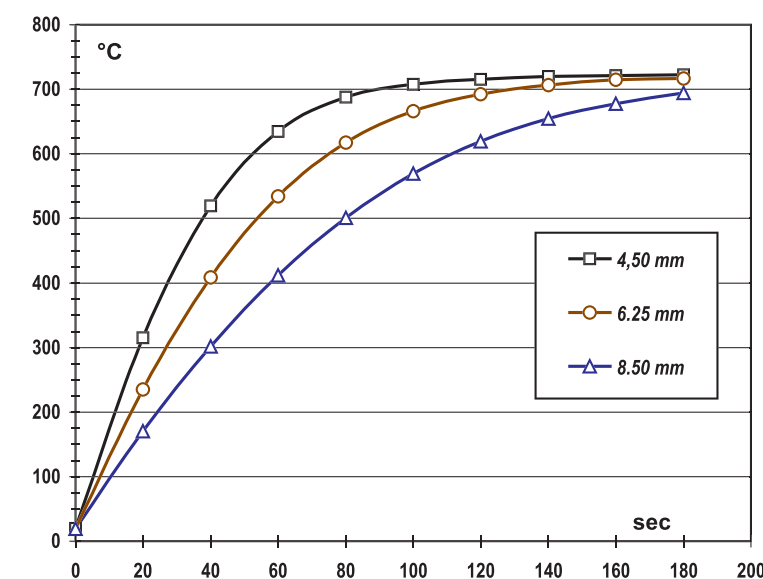
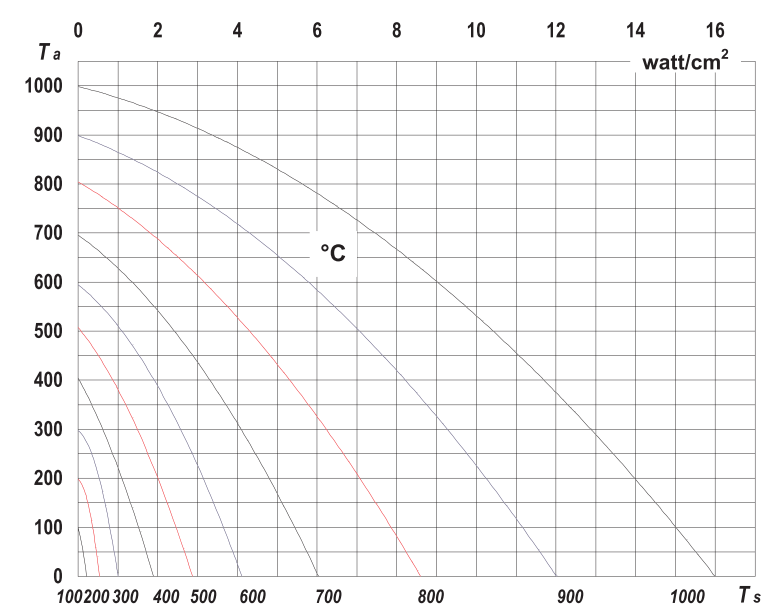


MAPPA TERMICA

Temperatura di guaina (T_s) in funzione del carico specifico applicato al variare della temperatura ambientale (T_a).

TEMPERATURE MAP

Sheath temperature (T_s) as a function of specific surface load with different environment temperature (T_a).



TRANSITORI TERMICI

Andamento nel tempo della temperatura di guaina al variare del diametro dell'elemento, a parità di carico specifico (6.5 watt/cm²) e condizioni ambientali (aria libera, 20°C.).

THERMAL TRANSIENTS

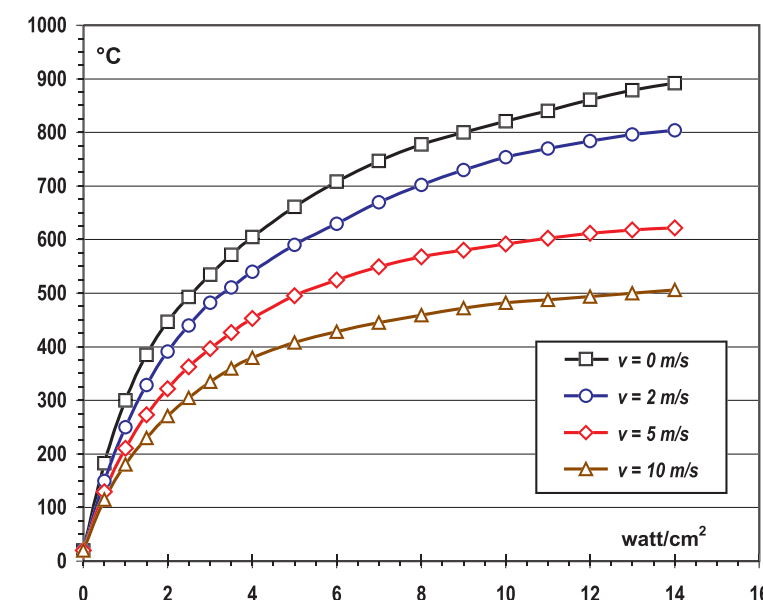
Sheath temperature vs. time plots by changing tube diameter at the same surface load (6.5 watt/cm²) and room conditions (free air, 20°C.).

PROFILI DI TEMPERATURA CON VENTILAZIONE FORZATA

Temperatura di guaina in funzione del carico specifico al variare della velocità di flusso dell'aria (v) e con temperatura ambiente di 20°C.

TEMPERATURE PROFILES IN FORCED AIR

Sheath temperature as a function of specific surface load by changing the air flow rate (v) at ambient temperature of 20°C.

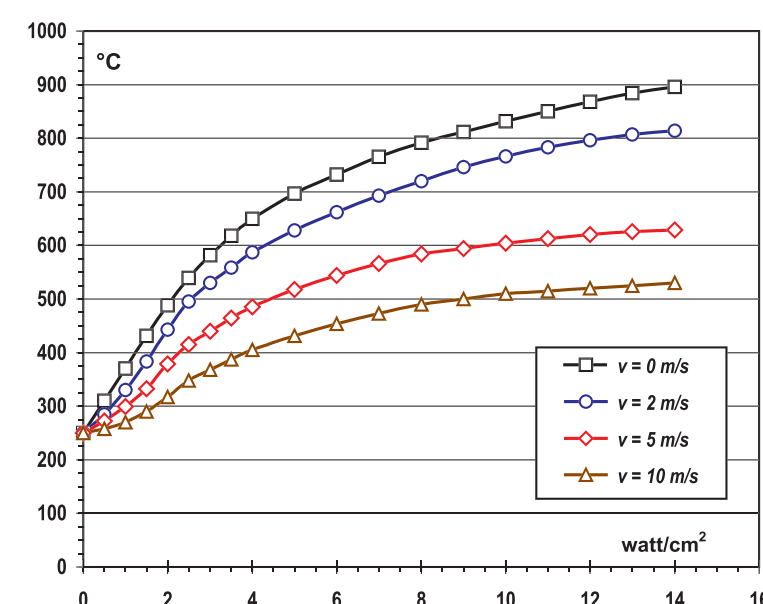


PROFILI DI TEMPERATURA CON VENTILAZIONE FORZATA

Temperatura di guaina in funzione del carico specifico al variare della velocità di flusso dell'aria (v) e con temperatura ambiente di 250°C.

TEMPERATURE PROFILES IN FORCED AIR

Sheath temperature as a function of specific surface load by changing the air flow rate (v) at ambient temperature of 250°C.



RESISTENZE TUBOLARI / SHEATHED HEATING ELEMENTS

TIPOLOGIE DI GUAINA / SHEATH TIPOLOGIES

Din	% Ni	Materiale Material	Ø 6.25	Ø 8.50	Ø 10.00	Ø 12.50	Ø 16.00	Max temp. senza eccessiva scaglia °C Max. temp. without excessive ossidation °C
1.4301	8 ÷ 12	AISI 304		●		●	●	760
1.4307	8 ÷ 12	AISI 304L	●					760
1.4828	12 ÷ 15	AISI 309	●	●				816
1.4404	10 ÷ 14	AISI 316L	●			●	●	760
1.4571	10 ÷ 14	AISI 316Ti		●				760
1.4541	9 ÷ 12	AISI 321	●	●	●	●	●	760
1.4876	30 ÷ 35	INCOLOY 800	●	●	●	●	●	927
2.4858	38 ÷ 46	INCOLOY 825	●	●	●			593
1.4847	18 ÷ 22	INCOLOY 840	●	●				927
2.4816	≥ 72	INCONEL 600		●	●	●	●	982
1.4529	25	CRONIFER	●	●				927
1.4547	18	254 SMO		●				760
ST 35		ACCIAIO al CARB.	●	●	●	●	●	400
DHP 99.9%		RAME	●	●	●	●	●	177
BT1-0 GOST		TITANIO		●			●	320

PROPRIETÀ MATERIALI / MATERIALS PROPERTIES

	Materiali/ Materials					
	AISI 304	INCOLOY 800	ACC. CARB. MILD STEEL	RAME COPPER	ALLUMINIO	TITANIO
Massa volumica/ Volume mass [Kg/dm³]	7.9	8.1	7.9	8.9	2.7	4.5
Temperatura di fusione/ Melting temperature [°C]	1450	1400	1530	1083	658	1660
Max. temp. di lavoro/ Max. working temperature [°C]	750	900	400	180	250	550
Temp. di ricottura/ Annealing temperature [°C]	1050	1100	850	600	350	-
Coeff. Medio di Dilatazione termica lineare Average coeff. for linear heat expansion [10 ⁻⁶ /°K]	19.8	17.3	12.3	16.9	23.8	8.5
Conducibilità termica a 20°C [W/m K] Conductivity at 20°C [W/m K]	15.2	14	57	387	229	16.1
Calore Specifico/ Surface load [J/g °K]	0.5	0.5	0.47	0.39	0.89	0.52
Resistività/ Thermal resistivity [Ω mm²/m]	0.75	0.95	0.1	0.02	0.03	0.42
Carico di rottura/ Aggregate breaking load [N/mm²]	65	65	22	21	7	-
Coefficiente di emissività - Stato superficiale: Emission coefficient - Surface condition:						
- Lucidato/ Polished	0.15÷0.22	0.20	-	-	0.04	-
- Parzialmente ossidato/ Partially oxidised	0.57	0.60	-	-	0.11	-
- Molto ossidato/ Highly oxidised	0.85	0.92	-	-	0.25	-
Capacità Termica per unità di volume [cm³] (calore specifico x massa volumica x volume) Heat capacity per unit of volume [cm³] (specific heat for volume mass by volume)	3.95	4.05	3.71	3.47	2.40	2.34

CARATTERISTICHE DIMENS. ED ELETTRICHE / DIMENS. AND ELECTRICAL FEATURES

Diametro di guaina [mm] Sheath diameter [mm]	Ø 6.25	Ø 8.50	Ø 10.00	Ø 12.5	Ø 16.00
Lunghezza finale tot. di guaina [mm] Sheath total length [mm] (Min./ Max)	220 / 8000	220 / 8000	220 / 8000	220 / 8000	220 / 8000
Ø terminale [mm] Terminal pins diameter [mm]	2.3	3 - 4	4	6	6
Ohm per metro/ Ohm per meter (Min./ Max.)	5.8 / 780	2.5 / 996	1.8 / 700	1.8 / 361	2.1 / 356

PERNI TERMINALI
TERMINAL PINS

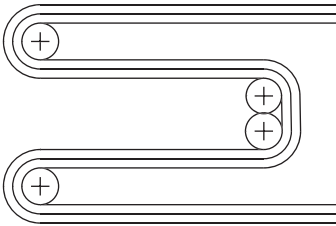
Corrente Max applicabile sui terminali (con connessioni compatibili) Max. current applicable to terminals (with compatible connections)		
Dimensione Dimension [mm]	Acciaio al carbonio Carbon Steel [A]	Acciaio inox Stainless steel [A]
Ø 2.3	14	8
Ø 3.0	18	10
Ø 4.0	28	17
Ø 6.0	50	22
M3	10	5
M4	16	8
M6	34	17

SIGILLANTI / SEALS

Tipo sigillante Sealing Material	Caratteristiche sigillatura Sealing features	Max. temp. continuativa nella zona di sigillatura Max. continuous temp. in sealing zone	Limite Max. temp. nella zona di sigillatura Max. temp. limit in sealing zone
Pasta siliconica Silicone compound	Non ermetica Non hermetic	260 °C	310 °C
Resina epossidica Epoxy compound	Ermetica Hermetic	155 °C	155 °C
Resina poliuretanica Polyurethane resin	Ermetica Hermetic	120 °C	125 °C

RAGGI DI PIEGATURA / BENDING RADIUS

Ø di guaina Sheath diameter [mm]	Raggio min. standard asse centrale tubo Standard min. radius over central axis of tube [mm]	Raggio min. speciale consentito* Special min. radius allowed*	
	AISI	INCOLOY	
6.25	13	13.5	6.5
8.50	14.5	18.5	6
10.00	18	22	9
12.50	20	25	8.75
16.00	23	25	10



* Per semplificare le operazioni di piegatura è preferibile mantenere i raggi di curvatura uniformi (vedi figura).
Raggi speciali sono ottenibili con costi aggiuntivi.

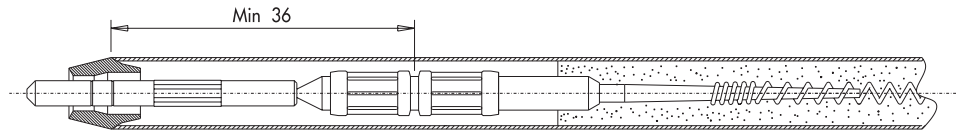
* To facilitate bending it is advisable to keep the bending radius uniform (see illustration).
Special radius are available at extra cost.

TERMOFUSIBILI / THERMAL FUSES

Temperatura di intervento [°C]/ Working temperature [°C]			
128	152	167	184
Portata amperometrica massima [A]/ Max. amperometric output [A]			
16			

Il corretto dimensionamento del termofusibile
va opportunamente concordato con l'Ufficio
tecnico.

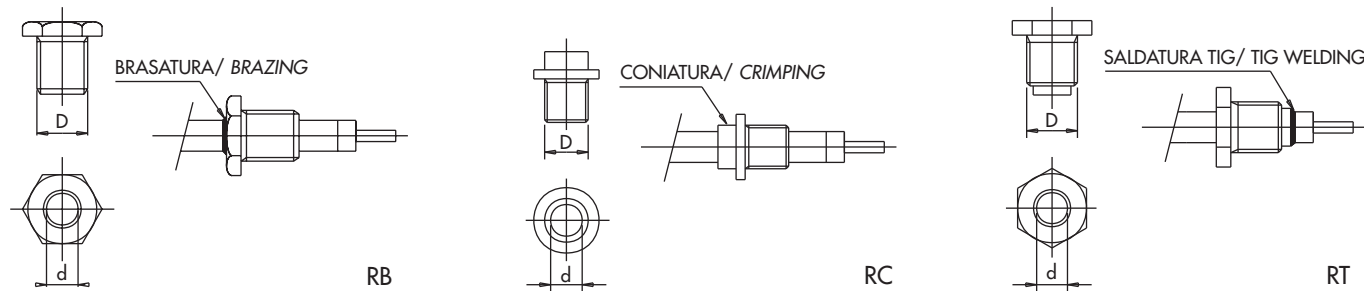
The specifications of the thermal fuse must
be agreed with the Technical Department.



RACCORDI / NIPPLES

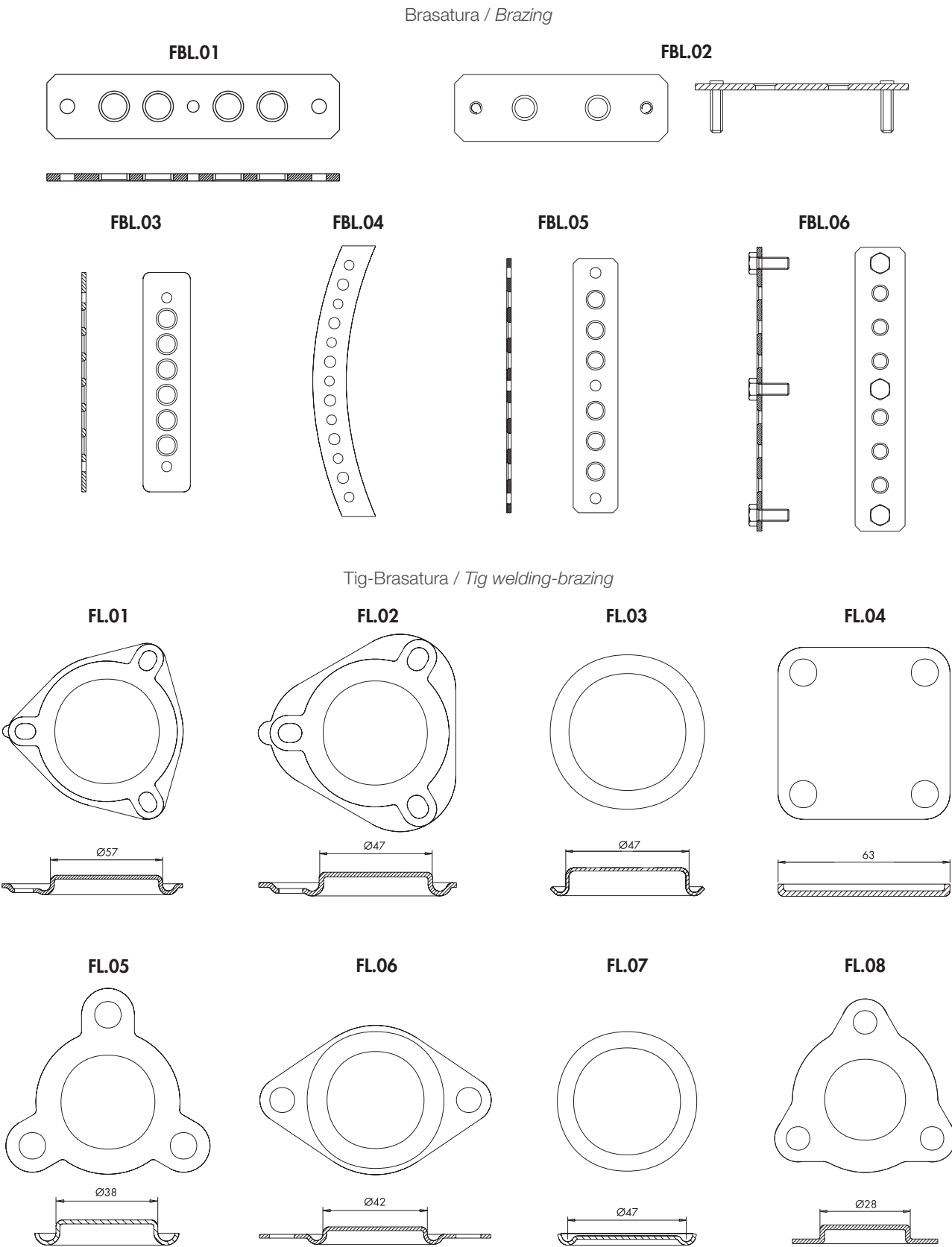
Diametro guaina d Sheath diameter d [mm]	Sistema di fissaggio Fixing System	Filettatura D Thread D	Materiale Material
6.25	Brasatura/ Brazing Coniatura/ Crimping Saldatura tig/ TIG Welding	M10	Ottone/ Brass
		M11	Ottone nichelato
		M12	Nickel-plated brass
		M14	Acciaio zincato
		M24	Zinc-plated steel
8.5	Brasatura/ Brazing Coniatura/ Crimping Saldatura tig/ TIG Welding	1/4" GAS	AISI-3XX
		3/8" GAS	
		M12	Ottone/ Brass
		M14	Ottone nichelato
		M16	Nickel-plated brass
10	Brasatura/ Brazing Coniatura/ Crimping Saldatura tig/ TIG Welding	1/4" GAS	Acciaio zincato
		3/8" GAS	Zinc-plated steel
		1/2" GAS	Acciaio nichelato
		M14	Nickel-plated steel
		M15	AISI-3XX
12.5	Brasatura/ Brazing Coniatura/ Crimping Saldatura tig/ TIG Welding	M16	Ottone/ Brass
		M18	Acciaio zincato
		M20	Zinc-plated steel
		M24	AISI-3XX
		3/8" GAS	
		1/2" GAS	

Raccordi / Nipples

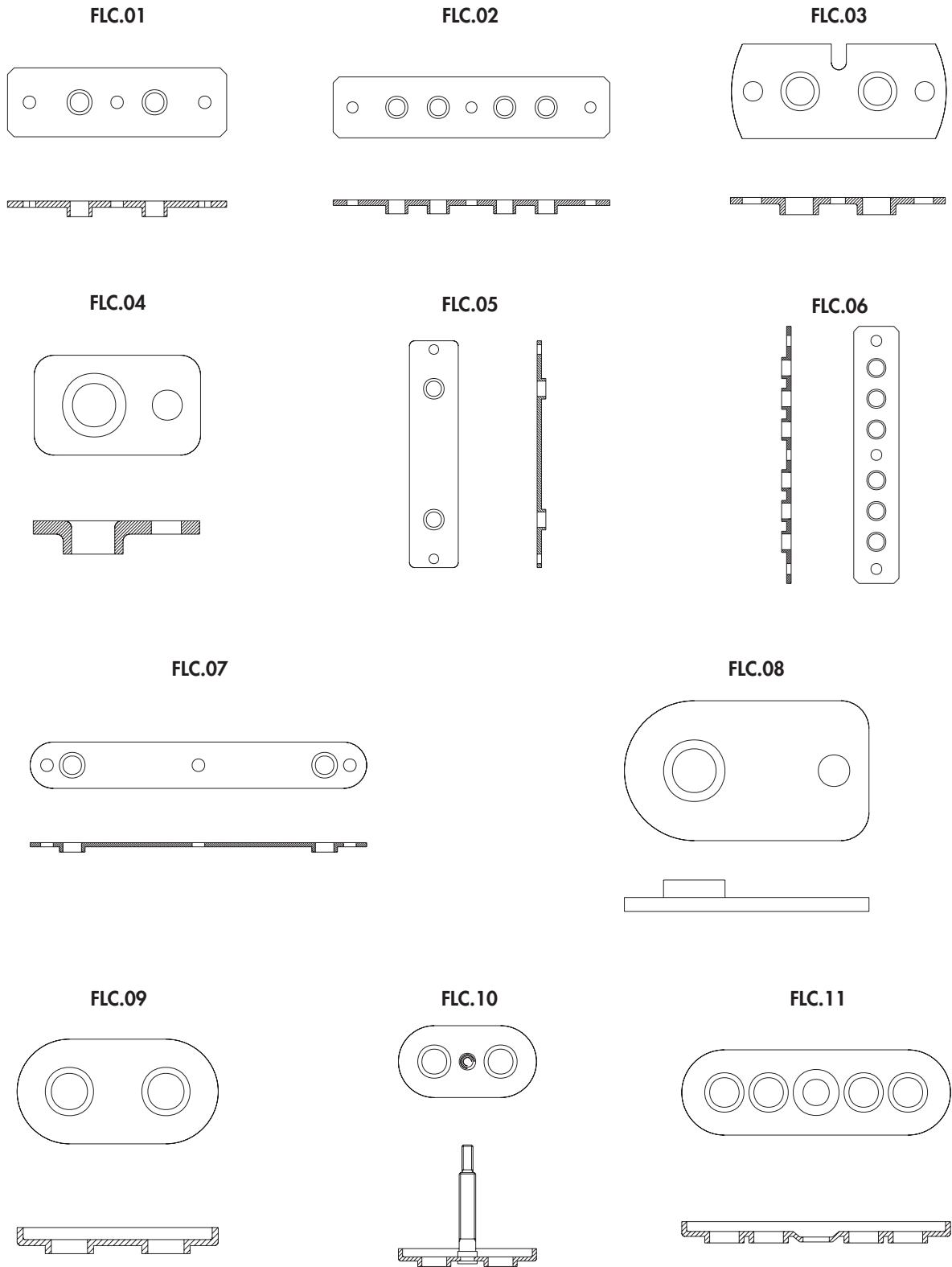


FLANGE / FLANGES

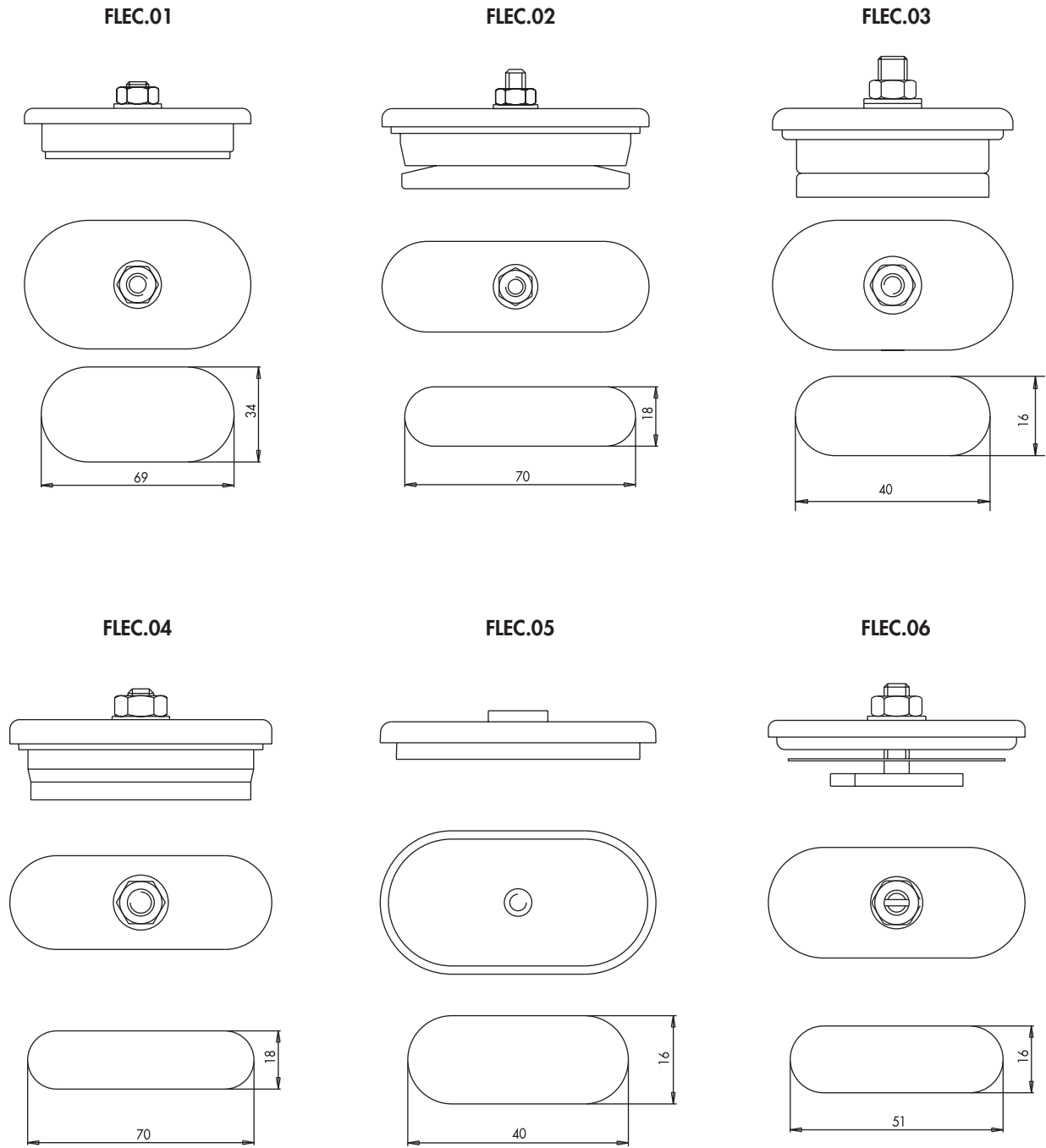
I modelli raffigurati rappresentano alcuni esempi della più ampia gamma di flange disponibili:
The models shown are some examples of a wider range of flanges available:



Coniatura / Crimping



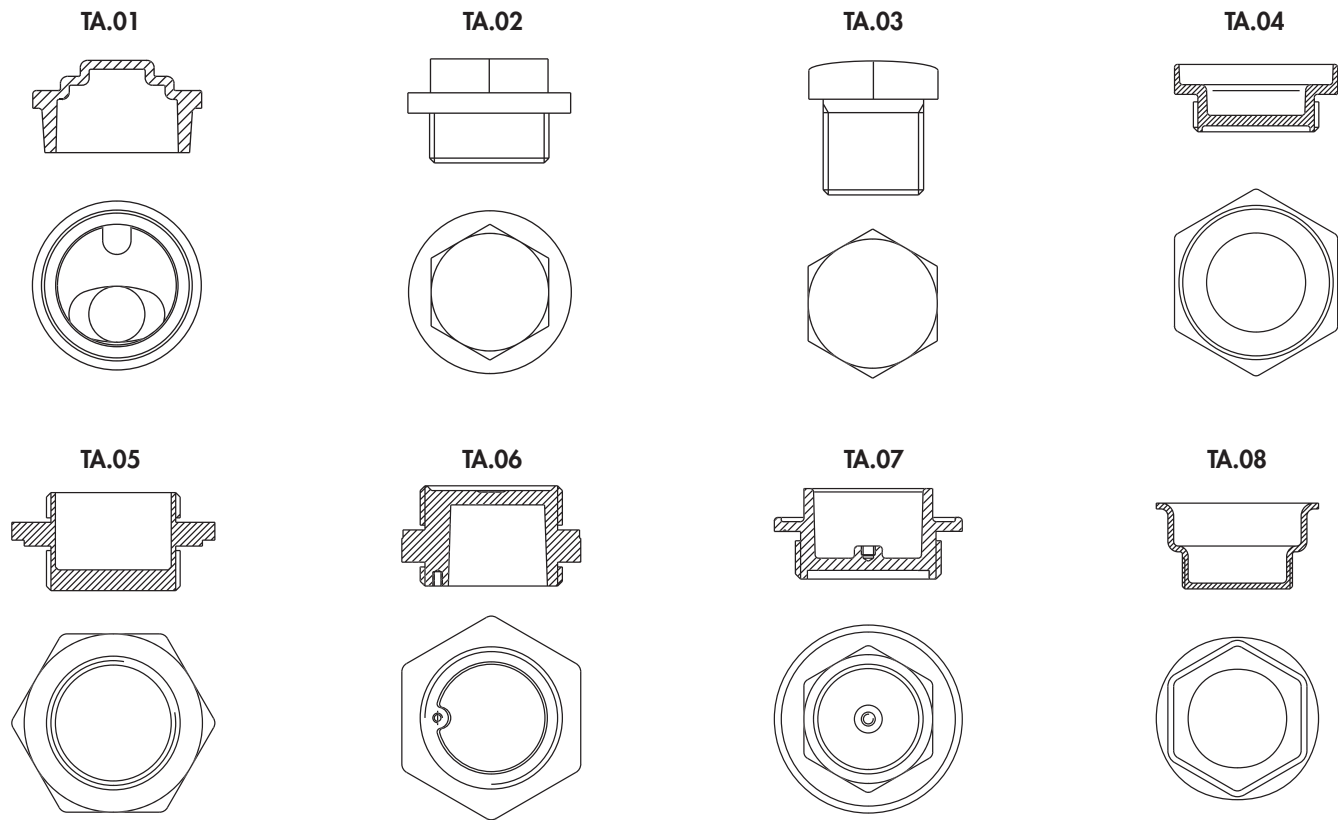
Flange ad espansione e compressione / Expanding and compression flanges



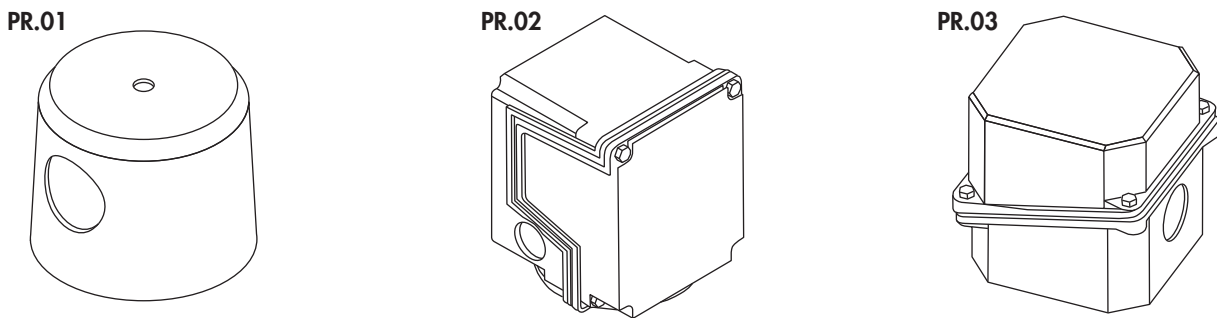
Foro fissaggio
Per ulteriori dettagli contattare l'Ufficio Tecnico

Mounting slot
For further details contact our Technical Department

TAPPI / HEADS



PROTEZIONI / PROTECTIONS

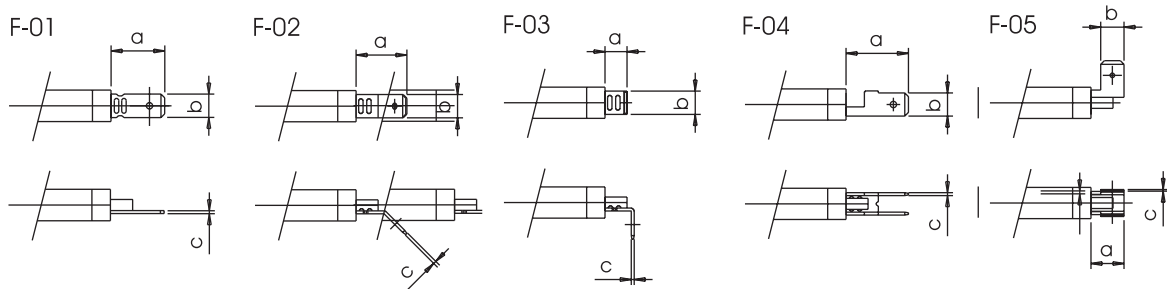


Per dimensioni e specifiche tecniche
contattare l'Ufficio Commerciale.

For more information about dimensions
and technical data contact our Sales Office.

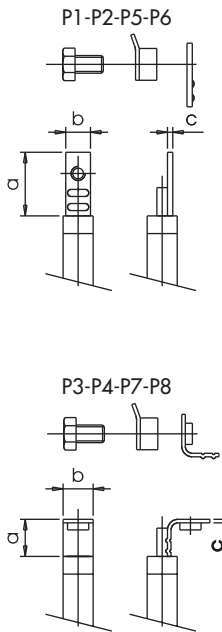
FASTON / FASTON

Tipo Type	Ø Guaina Sheath Diameter	Lunghezza Length a [mm]	Larghezza Width b [mm]	Spessore Thickness c [mm]	Materiale/ Material				Corrente max. esercizio Max. operating current [A]
					FePO2 nic.	AISI 304	AISI 430	P CuZn30	
Faston F01 semplice dritto straight simple	6.25	17	6.3	0.8	●	●			15
	8.5								
	10								
Faston F02 semplice a 45° simple at 45°	6.25	14.5	6.3	0.8	●		●		15
	8.5								
	10								
Faston F03 semplice a 90° simple at 90°	6.25	10	6.3	0.8	●		●		15
	8.5								
	10								
Faston F04 doppio dritto straight double	6.25	17	6.3	0.8	●			●	15
	8.5								
	10								
Faston F05 doppio a 90° double at 90°	6.25	9	6.3	0.8	●	●		●	15
	8.5								
	10								



PIASTRINE DI CONNESSIONE / CONNECTION TABS

Tipo	Ø Guaina Sheath Diameter	Lunghezza Length a [mm]	Larghezza width b [mm]	Spessore Thickness c [mm]	Materiale				Max esercizio Max. operating [A]
					FePO2 nic.	AISI 302	AISI 304	AISI 430	
Piastr. P1 dritta P1 straight tab M4	6.25	18	7	1.5		●	●		22 (14*)
	8.50								22
	10.00								22
Piastr. P2 dritta P2 straight tab M5	6.25	16	9	1.5	●				32 (14*)
	8.50								32 (22*)
	10.00								32
Piastr. P3 a 90° P3 at 90° M4	6.25	10.5	8	1				●	22 (14*)
	8.50								22 (22*)
	10.00								22
Piastr. P4 a 90° P4 at 90° M5	6.25	10.5	8.5	1				●	32 (14*)
	8.50								32 (22*)
	10.00								32
Piastr. P5 dritta P5 straight tab 8/32	6.25	16	8	1.5	●				22 (14*)
	8.50								22
	10.00								22
Piastr. P6 dritta P6 straight tab 10/32	6.25	14.5	9	1.5	●				32 (14*)
	8.50								32 (22*)
	10.00								32
Piastr. P7 a 90° P7 at 90° 8/32	6.25	12.7	8.7	1.5	●				32 (14*)
	8.50								32 (22*)
	10.00								32
Piastr. P8 a 90° P8 at 90° 10/32	6.25	12.7	8.7	1.5	●				32 (14*)
	8.50								32 (22*)
	10.00								32

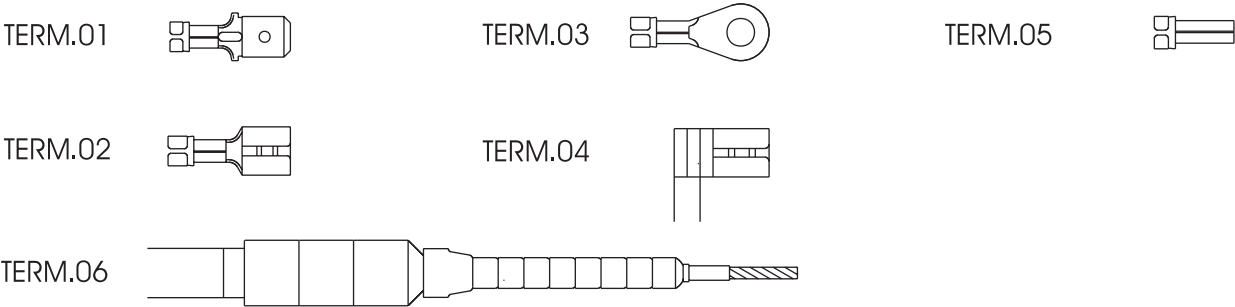


(*) Portata amperometrica massima consentita dal terminale/ Max. amperometric output allowed by the terminal.

CAVI / LEADS

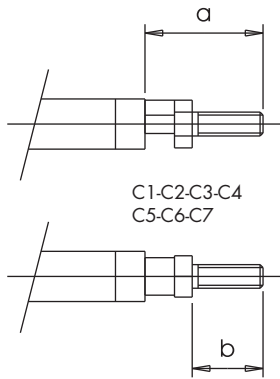
Tipo/ Type	Conduttore Conductor	Isolamento/ Insulation	Temp. di esercizio Working Temper.
TVT	Nichel Nickel	1 Nastro in PTFE/ PTFE tape 2 Calza in elettrovetro impregnata in teflon Teflon impregnated electroglass sleeve	+180°C ÷ -60°C
TSV (doppio isolamento) (double insulated)	Nichel Nickel	1 Nastro in PTFE/ PTFE tape 2 Spirale in elettrovetro impregnata in gomma silicone Silicon rubber impregnated electroglass coil 3 Calza in elettrovetro impregnata in gomma silicone Silicon rubber impregnated electroglass sleeve	+250°C ÷ -60°C
TS2V	Nichel Nickel	1. Nastro in PTFE/ PTFE tape 2 Spirale in elettrovetro impregnata in gomma silicone Silicon rubber impregnated electroglass coil 3 Spirale in elettrovetro impregnata in gomma silicone Silicon rubber impregnated electroglass coil 4 Calza in elettrovetro impregnata in gomma silicone Silicon rubber impregnated electroglass sleeve	+250°C ÷ -60°C (Punte a 280°C) (Pocks at 280°C)
TS2VT	Nichel Nickel	1 Nastro in PTFE/ PTFE tape 2 Spirale in elettrovetro/ Electroglass coil 3 Spirale in elettrovetro impregnata in teflon Teflon impregnated electroglass coil 4 Calza in elettrovetro impregnata in teflon Teflon impregnated electroglass sleeve	+300°C ÷ -60°C
PVC Simbol. armonizzata: H05V Harmonized symbol: H05V	Rame Copper	1 PVC 105	+90°C ÷ +105°C
SILICONE Simbol. armonizzata: H05S Harmonized symbol: H05S	Rame Copper	1 Gomma silicone Silicon rubber	+180°C ÷ -60°C
TRECCIA NICHEL NICKEL PLAIT	Nichel Nickel	Possibilità di ricoprire il cavo con perline in ceramica The cable can be clad with ceramic beads	600 C
NEOPRENE NEOPRENE	Rame stagnato Tinned copper	1 Neoprene Neoprene	+90°C ÷ -30°C
DOPPIO EVAPRENE DOUBLE EVAPRENE	Rame stagnato Tinned copper	1 Evaprene Evaprene	+120°C ÷ -40°C
HYPALON HYPALON	Rame stagnato Tinned copper	1 Hypalon Hypalon	110°C ÷ -30°C

TERMINAZIONI CAVI / LEAD TERMINATIONS

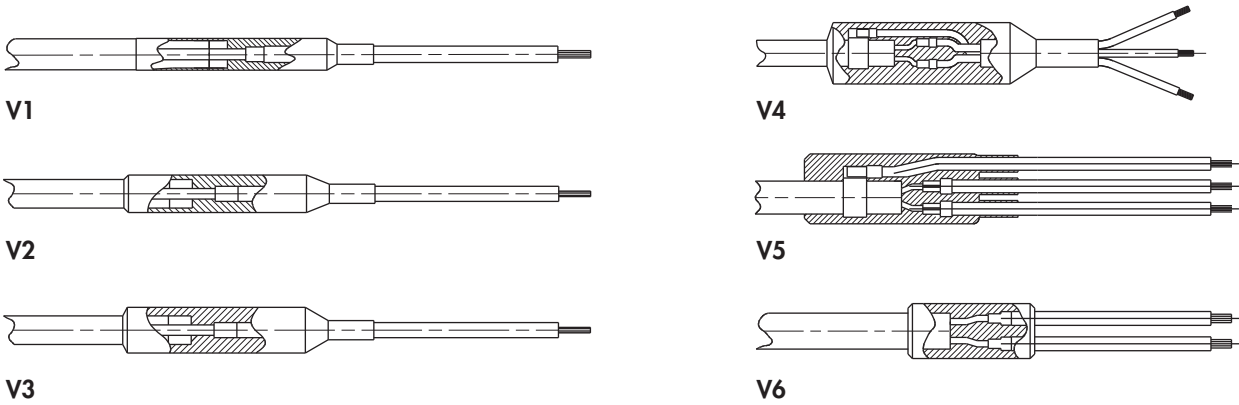


CONNETTORI A PUNTARE / SPOT WELDED TERMINAL STUDS

Tipo Type	Ø Guaina Sheath Diameter	Lunghezza totale Total length a [mm]	Larghezza filettata Threaded width b [mm]	Materiale/ Material			Corrente max. di esercizio Max. operating current [A]
				FeP02 nic.	AISI 303	AISI 304	
Connettore C1 Connector C1	6.25	12	4.5	●			12
M3	8.5			●			
	10			●			
Connettore C2 Connector C2	6.25	16	8	●	●		22
M4	8.5	20	12	●			
	10	25	17	●			
Connettore C3 Connector C3	6.25	20	12	●			32
M5	8.5			●			
	10			●			
Connettore C4 Connector C4	6.25	20	12	●	●		50
M6	8.5	30	22	●		●	
	10	33	24	●			
Connettore C5 Connector C5	6.25	33	25	●			60
M8	8.5			●			
	10			●			
Connettore C6 Connector C6	6.25	19	13.5	●			22
8/32	8.5			●			
	10			●			
Connettore C7 Connector C7	6.25	22	16	●			32
10/32	8.5			●			
	10			●			



VULCANIZZAZIONI / VULCANIZATION



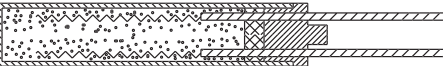
LIMITI DI TEMPERATURA DEI MATERIALI / MATERIALS TEMPERATURE LIMITS

Materiali/ Materials	Temperatura Min./ Minimum temperature		Temperatura Max./ Maximum temperature	
	in condizioni dinamiche operating	in condizioni statiche static	d'esercizio working	picco peak
Neoprene/ Neoprene	-30°C	-40°C	+90°C	+120°C
Hypalon/ Hypalon	-30°C	-40°C	+110°C	+140°C
Silicone/ Silicone	-40°C	-50°C	+180°C	+210°C

RESISTENZE TUBO PIATTO / FLAT TUBES

Applicazioni Applications	Carico specifico Surface load	Materiale di guaina Sheath material			
LIQUIDI LIQUIDS	[W/cm ²]	M Acciaio Steel	S Acciaio Steel	V AISI 304L	C Acciaio Cromo nichel Cr. Ni. Steel
Acqua statica/ Static water	8.0	●		●	●
Acqua dinamica/ Dynamic water	10.0	●		●	●
Soluzioni basiche di acqua Water Basic solutions	6.0	●		●	●
Acqua/ pericolo cavo parte a secco Water/ dry start hazard	5.0			●	●
Bagni alcalini/ Alkaline bath	6.0		●		
Acidi acquosi/ Acid solution	2.5				●
Bagni fosfatici/ Phosphatic bath	4.0			●	●
Glicerina/ Glycerine	2.3			●	
Difilene/ Diphylene	2.0		●		
Olio fluido fino a/ Fluid oil up to 50°	4.0		●		
Olio fluido fino a/ Fluid oil up to 100°	2.5		●		
Olio fluido fino a/ Fluid oil up to 250°	2.0		●		
Olio fluido fino a/ Fluid oil up to 350°	1.5		●		
Olio di lavaggio/ Oil for washing	4.0		●		
Olio per friggitori/ Oil for Fryers	5.0		●	●	●
Catrame/ Tar	1.0		●	●	●
Bagno di piombo/ Lead bath	4.0			●	●
GAS/ GAS					
20°C				1.4	5.0
Aria statica, temp. ambiente: 150°C				1.2	4.5
Static air, ambient temp: 250°C				0.8	4.0
350°C					3.5
Aria corrente/ Forced air					
SOLIDI/ SOLIDS					
Riscaldam. a contatto senza regolazione Contact heating - non regulated				2.0	3.0

● = Mater. preferibilmente adottato in funzione delle specifiche applicazioni/ Material preferably used for specific applications.



Profilo/ Profile	Materiale/ Material				
	S 1.0034	V 1.4307	C 1.4404	CR 1.4571	L (Rame/ Copper) 2.4360
S Perimetro Perimeter					
B Perimetro Perimeter					
E Perimetro Perimeter					

RESISTENZE A CARTUCCIA “ULTRAWATT”
ULTRAWATT CARTRIDGES

Diametro [mm]	Diameter [inch]	Tolleranza diametro Tolerance diameter [mm]	Tolleranza lunghezza Length tolerance [mm]	Temperatura massima Max temperature [°C]	Tolleranza potenza Wattage tolerance [W]
6.5 8 10 12.5 16 20	1/4" 3/8" 1/2" 5/8" 3/4"	-0.03 -0.08	±2%	750	+5 -10%

RESISTENZE “STRIP” / STRIP HEATERS

Sezione [mm] Section [mm]	Tolleranza sulla lungh. [mm] Length Tolerance [mm]	Temperatura massima [°C] Maximum Temperature [°C]	Tolleranza sulla potenza [W] Wattage Tolerance [W]
34 x 10	± 2	450	+5 -10 %
40 x 10	± 2	450	+5 -10 %

COPPELLE IN CERAMICA / CERAMIC HEATERS

Irraggiatori con lunghezza d’onda compresa fra i 3 e 6 micron/ Infrared heaters with wave-length between 3 and 6 micron.
Temperatura di lavoro/ Working Temperature: 300 - 700 °C

Modello/ Model	Dimensioni/ Dimensions [mm]	Potenza Max./ Max wattage [W]
FTE	245 x 60	1000
HTE	122 x 60	500
Possono essere dotate di termocoppia J o K/ Available with J or K thermocouple		

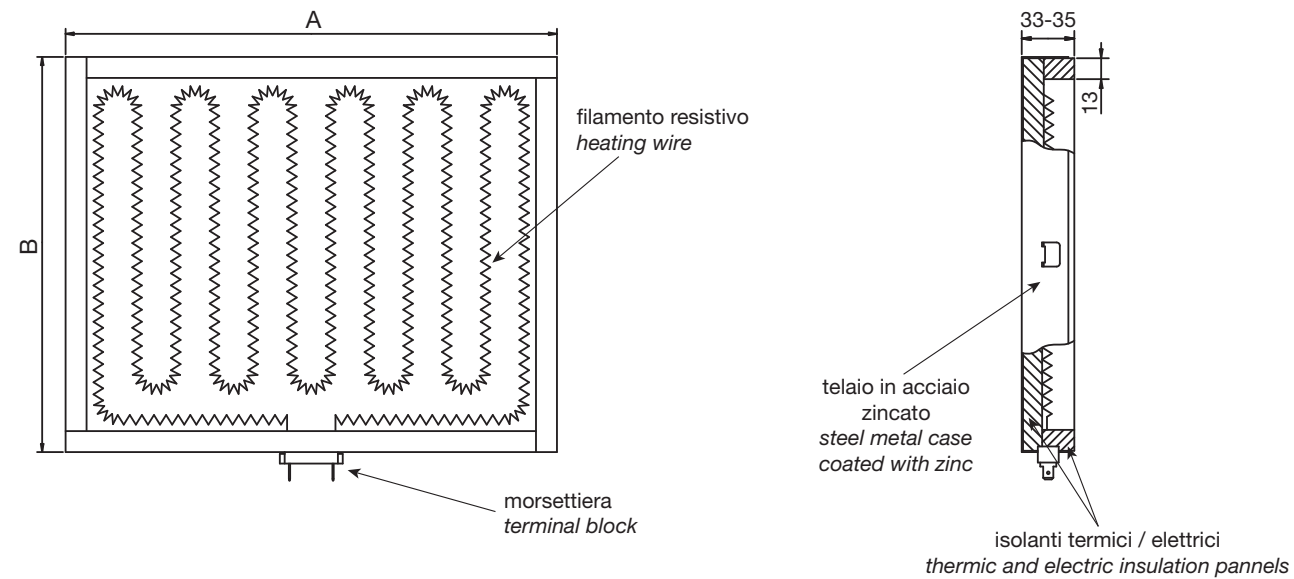
FOGLI FLESSIBILI / FLEXIBLE FOIL HEATERS

Applicazioni Applications	Materiali Materials	Spessore Thickness [mm]	Temperatura Max Max. Temperature	Potenza spec. tipica Typical Watt density [W/cm ²]
Ristorazione collettiva (bagnomaria) Foodservice Equipment (bain-marie)	Silicone Silicon	0.9	175°C	0.9 - 1.3
Ristorazione collettiva (piani caldi) Foodservice Equipment (hot plates)	Poliestere/ Silicone Polyester/ Silicon	0.5 / 0.9	Pol. 100°C/ Sil. 175°C	0.1 - 0.3
Refrigerazione (vaschetta evaporazione) Refrigeration (evaporation tray)	Poliestere/ Silicone Polyester/ Silicon	0.5 / 0.9	Pol. 100°C/ Sil. 175°C	0.08 - 0.3
Caffetteria (scaldatasse) Cafetteria (cup heaters)	Poliestere/ Silicone Polyester/ Silicon	0.5 / 0.9	Pol. 100°C/ Sil. 175°C	0.1 - 0.2
Caffetteria (erogatore caffè) Cafetteria (coffee dispenser)	Poliestere/ Silicone Polyester/ Silicon	0.5 / 0.9	Pol. 100°C/ Sil. 175°C	0.2 - 1
Vending Vending	Poliestere Polyester	0.5	100°C	0.05 - 0.15
Macchine per gelato Ice cream machinery	Silicone Silicon	0.9	175°C	0.25 - 0.35
Stiracalzoni Trouser presses	Poliestere Polyester	0.5	100°C	0.25
Estetica & Benessere (apparecch. scaldacera) Aesthetics and Healthcare (wax-heaters)	Poliestere/ Silicone Polyester/ Silicon	0.9	Pol. 100°C/ Sil. 175°C	0.1 - 0.3
Estetica e benessere (riscald. parti del corpo) Aesthetics and Healthcare (body heaters)	Silicone Silicon	3 - 4	175°C Max 40°C norm./ normal use	0.01 - 0.05

* Nell’Estetica e Benessere le potenze specifiche sono definite in funzione dell’applicazione (installazione sull’apparecchiatura o a contatto diretto).

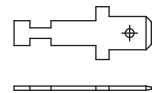
* In Aesthetics and Healthcare specific power is defined according to the application (installation on a machine or in direct contact).

ELEMENTI RISCALDANTI RADIANTI A FILO NUDO INFRARED RADIANT HEATERS

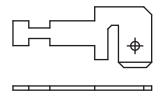


A - B: quote personalizzabili
customizable dimensions

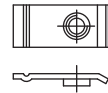
CONNESSIONI / CONNECTIONS



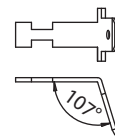
Faston semplice dritto
Straight faston



Faston semplice a 90°
Faston at 90°



Piastrina dritta M4
M4 straight tab



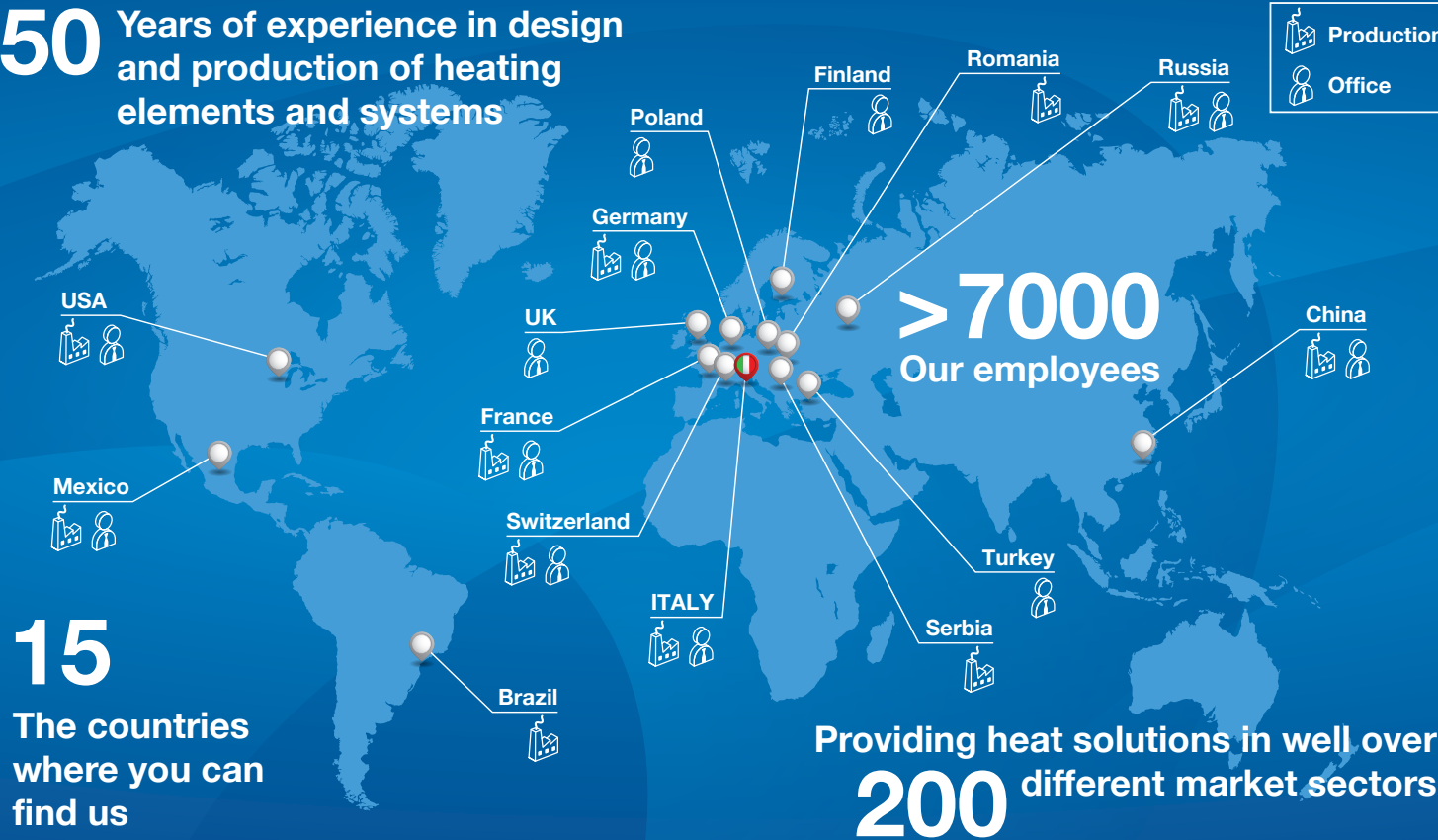
Faston semplice
a 107°
Faston at 107°



Cavo
Lead

NOTE

[illegible]



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PRODUCT TRADEMARKS



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Heating Element Technologies

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