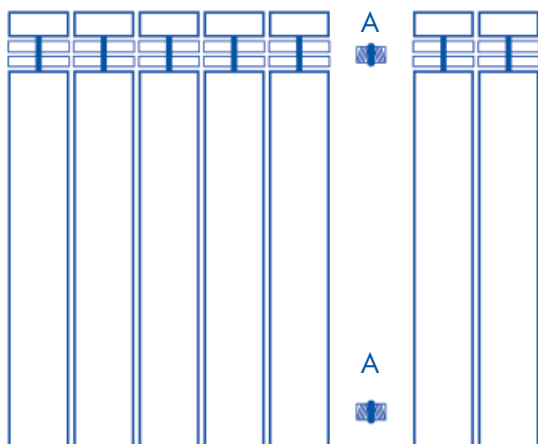


ISTRUZIONI PER LA CORRETTA INSTALLAZIONE, USO E MANUTENZIONE
INSTRUCTIONS FOR THE CORRECT INSTALLATION, USE AND MAINTENANCE
INSTRUCTIONS POUR UNE CORRECTE INSTALLATION, UTILISATION ET ENTRETIEN



Assemblaggio di elementi (quando necessario)

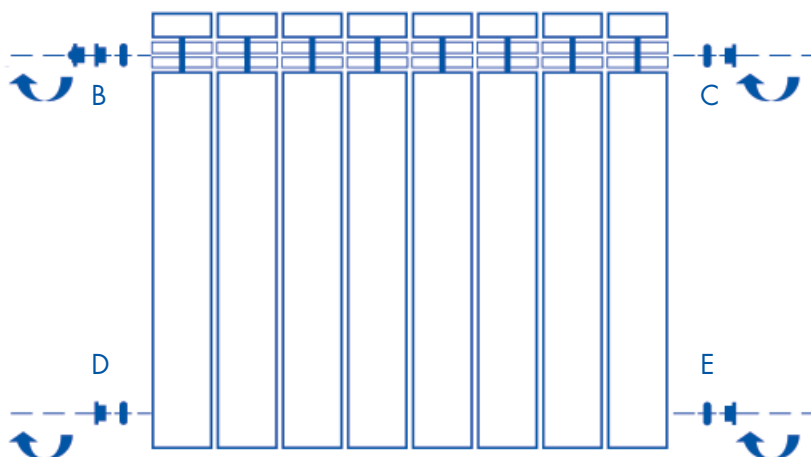
Assembly of elements (if necessary)

Assemblage des éléments (si nécessaire)

A: nipples + guarnizione

nipples + gasket

nipples + joint



Montaggio tappi e riduzioni

Fitting caps and reductions

Installation des bouchons et des réductions

B: tappo sx + guarnizione + valvola sfiato aria
left plug + gasket + air vent valve

bouchon gauche + joint + purgeur d'air

C: tappo dx + guarnizione
right plug + gasket

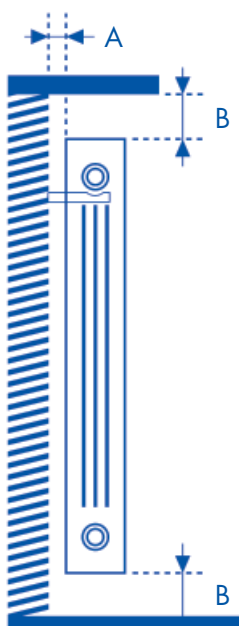
bouchon droite + joint

D: riduzione sx + guarnizione
left reduction + gasket

réduction gauche + joint

E: riduzione dx + guarnizione
right reduction + gasket

réduction droite + joint



Fissaggio al muro

Wall mounting

Fixation au mur

- Fissare al muro una coppia di mensole plastificate ogni 14 elementi max.
Mantenere le distanze dal muro come riportate sul disegno
- Fixed to the wall a couple of plastic shelves every 14 cells max.
Observing the distance as shown on drawing
- Installer les éléments sur des consoles plastifiées fixer au mur
max. 14 éléments.
Veuillez respecter les distances comme indiquées sur le croquis

A: 3 cm

B: 10 cm

ISTRUZIONI PER LA CORRETTA INSTALLAZIONE, USO E MANUTENZIONE DEI RADIATORI GLOBAL

- I radiatori GLOBAL sono omologati secondo la normativa europea EN 442 e sono certificati a marchio NF 73/047 rilasciato da EUROVENT CERTITA CERTIFICATION.
- I radiatori GLOBAL trovano utile impiego in tutti gli impianti di riscaldamento ad acqua calda o vapore fino a 110°C
- 1600 K Pascal (16 bar) è la pressione massima di esercizio per tutti i modelli ad esclusione di *Gl 350/80/D*, *Gl 200/80/D*, *Ekos* ed *Ekos Plus* con pressione massima di esercizio 600 K Pascal (6 bar).
- Possono essere installati indifferentemente negli impianti con tubazioni in ferro, rame o materiali termoplastici.
- Si ottiene la resa termica prevista rispettando, nella posa in opera, le seguenti distanze minime:
 - a) dal pavimento e/o dalla mensola: $\geq$ cm 10
 - b) dalla parete: $\geq$ cm 3
- Al fine di preservare gli impianti da processi d'incrostazione o corrosione la normativa UNI-CTI 8065 prevede il controllo ed il trattamento dell'acqua di riempimento degli impianti: si consiglia un inibitore passivante tipo Cillit - HS 23 Combi, o similari, in quantità pari a 1 litro ogni 200 litri di acqua contenuta nell'impianto.
- Affinché l'azione protettiva del Cillit - HS 23 Combi sia efficace la velocità dell'acqua in circolo non deve superare i 2 m/s.
- Si consiglia in particolar modo di controllare il pH dell'acqua dell'impianto (deve essere preferibilmente tra 6,5 e 8).
- L'utilizzo di acqua con caratteristiche corrosive nei confronti dei metalli che compongono l'impianto di riscaldamento è vietato e comporta l'automatica decadenza della garanzia.
- Su ogni radiatore si deve installare una valvola di sfogo aria manuale o automatica per evitare il ristagno di aeriformi corrosivi.
- Si eviti di chiudere completamente le valvole di intercettazione dei radiatori allo scopo di permettere all'eventuale gas che potrebbe esserci all'interno degli stessi di fuoriuscire tramite la valvola automatica di sfogo aria obbligatoria in ogni impianto di riscaldamento, evitando così sovrappressioni che potrebbero danneggiare i radiatori.
- Qualora si voglia escludere una o più batterie dal circuito si deve montare su ciascuna batteria una valvola automatica di sfogo aria.
- Per evitare che le dilatazioni termiche dell'impianto provochino rumorosità in corrispondenza dei corpi scaldanti si consiglia l'impiego di mensole plastificate per il sostegno dei radiatori (artt. 4, 25, 27 o 29 del nostro catalogo).
- Per non compromettere la tenuta idraulica degli elementi in corrispondenza delle superfici di appoggio delle guarnizioni dei nipples o dei tappi si eviti di trattare tali superfici con materiali abrasivi o lime.
- Nell'assemblaggio di due o più radiatori vanno utilizzati nipples e guarnizioni originali (art. 9 e 8 del nostro catalogo).
- Il valore ottimale della pressione di chiusura nell'assemblaggio di due radiatori è di 150/160 Nm; mentre la pressione di chiusura dei tappi e/o riduzioni è di 60/70 Nm.
- Per una buona conservazione della verniciatura è necessario che i radiatori, prima e dopo l'installazione, non vengano tenuti in ambienti molto umidi, all'interno di docce, nelle saune, nei bagni turchi, in prossimità di piscine, etc... Un'eventuale distacco di vernice in un punto del radiatore potrebbe favorire la formazione dell'ossido di alluminio e far staccare completamente la vernice. Non utilizzare umidificatori in terracotta porosa.
- Per la pulizia esterna del radiatore è necessario evitare l'uso di prodotti abrasivi o chimicamente corrosivi/aggressivi di qualsiasi natura, essendo sufficiente l'uso di acqua e detergenti neutri e compiendo l'operazione a radiatore freddo per conservare nel tempo l'originaria brillantezza della vernice.
- Non posizionare sui radiatori pesi e/o oggetti. Non adibire i radiatori ad usi impropri che esulino dalla loro natura di corpi scaldanti (es: uso panca/appoggio, uso scala, per addossarvi mobili o oggetti)

ULTERIORI ISTRUZIONI PER LA CORRETTA INSTALLAZIONE DEI RADIATORI

MODELLI OSCAR, EKOS PLUS, JUNIORE E VETTA

- Nell'assemblaggio di due radiatori vanno accostati gli elementi con filetto destro e sinistro e vanno utilizzati esclusivamente nipples 1" mm 30 e guarnizioni *O-Ring* originali (art. 23 e 24 del nostro catalogo).
- Utilizzare i Kit riduzioni art. 44, 47, 49 già completi dell'apposita guarnizione al silicone.
- Qualora i radiatori *Oscar* o *Ekos Plus* vengano collegati idraulicamente con gli attacchi in basso sui lati opposti, è utile inserire un diaframma (art. 22 del catalogo) fra il primo ed il secondo elemento. Tale accorgimento evita la circolazione anomala del fluido termico garantendo così la massima resa termica del corpo scaldante.
- Per un buon funzionamento del radiatore VETTA noi consigliamo di utilizzare per l'installazione il kit mensole e tappi specifici forniti all'interno dell'imballaggio

GARANZIA DEI RADIATORI GLOBAL

GLOBAL garantisce i propri radiatori per 10 anni dalla data di produzione (stampigliata sulla parte laterale di ogni elemento). La garanzia convenzionale prestata consiste e dà diritto esclusivamente alla sostituzione gratuita del radiatore che, a causa di vizi originari consistenti in difetti del materiale o di fabbricazione, si riveli inservibile all'uso a cui ordinariamente è destinato. Il radiatore in sostituzione viene consegnato franco rivenditore che ha effettuato la vendita al cliente finale od al suo installatore. La garanzia è operante alla condizione che l'installazione e l'impianto a cui il prodotto è collegato siano eseguiti da personale abilitato/qualificato ed a regola d'arte e nel rispetto delle norme e prescrizioni di settore vigenti; nonché alla condizione che siano altresì rispettate le avvertenze ed istruzioni per la corretta installazione, uso e manutenzione del prodotto indicate nella documentazione tecnica al paragrafo "istruzioni per la corretta installazione, uso e manutenzione", consultabili e scaricabili anche nella sezione INFO TECNICHE dal sito globalradiatori.it. La garanzia è regolata dalle ulteriori condizioni riportate nel catalogo tecnico e nella sezione GARANZIA CONVENZIONALE del sito globalradiatori.it.

INSTRUCTIONS FOR THE CORRECT INSTALLATION, USE AND MAINTENANCE OF GLOBAL RADIATORS

- Radiators which have been produced by GLOBAL are approved by the European legislation EN 442 and are certified by the NF 73/047 mark issued by EUROVENT CERTITA CERTIFICATION.
- GLOBAL radiators can be used in all hot water or vapour heating installations up to 110° C.
- Working pressure up to 1600 K Pascal (16 bar) for all models except for the models *Gl 350/80/D*, *Gl 200/80/D*, *Ekos* and *Ekos Plus* with working pressure up to 600 K Pascal (6 bar).
- They can be installed in installations comprising iron, copper or thermoplastic pipes.
- The highest thermal output can be obtained by mounting the radiators observing the following minimum distances:
 - a) from the floor and/or the shelf: ≥ 10 cm
 - b) from the wall: ≥ 3 cm
- In order to avoid problems due to deposit and corrosion in the heating system UNI-CTI 8065 standard recommend that the water is checked and treated. It is advisable to use an inhibitive additive Cillit - HS 23 Combi or similar in a quantity equal to 1 litre to every 200 litres of circulating water or according to the manufacturer's instructions.
- To be sure that Cillit - HS Combi has a protective action, the circulating water velocity must not exceed 2 metres every second.
- It is recommended that the heating system water pH is checked (preferably between 6.5 and 8).
- The use of corrosive water (corrosive towards metals which form the heating installation) are forbidden and their use involves the loss of guarantee rights.
- A floating manual or automatic air vent valves must be installed on each radiator to avoid the stagnation of corrosive gases.
- Must be avoided to completely close the flow and return valves of the radiators to allow the possible gases that are formed to vent through the automatic vent valve mandatory in every heating system, thus avoiding overpressures that could damage the radiators.
- If it is necessary to exclude one or more blocks of radiators from the system it is recommended to install an automatic air vent valve on each block.
- To avoid noise caused by thermal expansion the use of plastic sleeves on the brackets is recommended (artt. 4, 25, 27 or 29 in our catalogue).
- To avoid weeping from joints, between sections, nipples, gaskets and bushes, it is advisable not to use abrasive products or file the joining surfaces. The assembling of two or more radiators requires the use of original nipples and gaskets (art. 9 and 8 in our catalogue).
- The optimal torque value in assembling two radiators is 150/160 Nm and for bushes and reductions is 60/70 Nm.
- For a good preservation of the painting it is necessary that the radiators, before and after installation, are not kept in environments of high humidity, inside showers, saunas, Turkish baths, near swimming pools, etc... Any detachment of paint in one point of the radiator could favor the formation of aluminum oxide and completely detach the paint. Do not use porous terracotta humidifiers.
- For external cleaning of the radiator it is necessary to avoid the use of abrasive or chemically corrosive / aggressive products of any nature, the use of water and neutral detergents being sufficient and performing the cold radiator operation to preserve the original gloss of the paint over time.
- Do not place weights and / or objects on the radiators. Do not use radiators for improper uses that go beyond their nature as heating bodies (such as: bench/support use, stairs use, to set against it furniture or objects)

MORE DETAILS FOR THE CORRECT INSTALLATION OF OSCAR, EKOS PLUS, JUNIOR AND VETTA RADIATORS

- In assembling two or more radiators, right and left thread must be pushed together and the use of original nipples 1" mm 30 and *O-Ring* gasket is required (art. 23 and 24 in our catalogue).
- Reduction kits art. 44, 47, 49 (silicon gasket included) must be used.
- *Oscar* or *Ekos Plus* radiators are installed with bottom opposite end connections it is advisable to insert a diverter (art. 22) between the first and the second element. The diverter enhances circulation, thereby guaranteeing maximum performance of the radiator.
- Given the particular function of the VETTA radiator, the foreseen thermal output is achieved by using the brackets and plugs included in the pack during the installation phase

RADIATOR WARRANTY

GLOBAL provides a ten year warranty for its radiators from the date of production (stamped on the side of each element).

The conventional warranty grants the sole right to free replacement of the radiator which, due to defects originating from defects in material or workmanship, is not fit for purpose or its ordinary intended use.

Replacement radiators shall be delivered free of charge to the retailer which sold the original version to the end user or to the its installers.

The warranty is valid on the condition that the installation and the system to which the product is connected are performed by qualified/eligible personnel to top workmanship standards and in compliance with the regulations and requirements of the sector in force; it is also valid on the condition that there has been full compliance with warnings and instructions for proper installation, use and maintenance of the product indicated in the technical documentation under the paragraph entitled *Instructions for correct installation, use and maintenance*, available and downloadable from the TECHNICAL INFO section on the globalradiatori.it website. The warranty is governed by the further conditions carried over the technical catalogue and in the CONVENTIONAL WARRANTY section of the globalradiatori.it website.

INSTRUCTIONS POUR UNE CORRECTE INSTALLATION, UTILISATION ET ENTRETIEN DES RADIATEURS GLOBAL

- Les radiateurs fabriqués par GLOBAL sont homologués selon la norme européenne EN 442 et sont certifiés par la marque NF 73/047 attribué par Eurovent Certita Certification (visible en proximité du raccordement supérieur de chaque élément).
- Les radiateurs sont destinés à être utilisés dans les installations de chauffage central à eau chaude et vapeur jusqu'à 110° C.
- La pression maximale de service est de 1600 K Pascal (16 bar) pour tous les modèles sauf que pour les modèles *Gl 350/80/D*, *Gl 200/80/D*, *Ekos* et *Ekos Plus* qui ont une pression maximale de service de 600 K Pascal (6 bar).
- Peuvent être utilisés aussi bien avec des tubes en acier, en cuivre ou en matériel plastique.
- Pour un fonctionnement normal du radiateur, nous conseillons de respecter les distances suivantes:
 - a) distance du sol et/ou console: $\geq$ cm 10
 - b) distance du mur: $\geq$ cm 10
- Pour protéger les circuits d'incrustation ou des corrosions, on conseille selon la norme UNI-CTI 8065 de contrôler et de traiter l'eau de remplissage et d'introduire un inhibiteur passivant tel que Cillit - HS 23 Combi ou similaire, en quantité de 1 litre chaque 200 litres d'eau contenue dans l'installation.
- Pour que l'action protectrice de Cillit - HS 23 Combi soit efficace la vitesse de circulation de l'eau ne doit pas dépasser les 2m/s.
- On conseille de contrôler le pH de l'eau de l'installation (de préférence entre 6,5 et 8).
- L'utilisation d'eau avec des caractéristiques corrosives aux métaux présents dans l'installation est défendue, ce qui comporte la décadence de la garantie.
- Sur chaque radiateur doit être installée un purgeur d'air automatique ou manuel pour l'échappement du gaz.
- Éviter de fermer complètement les robinets des radiateurs pour faciliter la sortie du gaz qui pourrait être à l'intérieur, par l'aide d'un purgeur d'air automatique obligatoire dans tous les systèmes de chauffage, évitant ainsi les surpressions qui pourraient endommager le radiateur.
- Si l'on désire exclure une ou plusieurs batteries du fonctionnement de l'ensemble du circuit de chauffage on peut le faire, mais à condition que chacune de ces batteries soit munie d'un purgeur d'air: installer toujours des purgeurs automatiques.
- Pour éviter que les dilatations thermiques de l'installation provoquent des bruits, nous vous conseillons d'utiliser des consoles plastifiées comme support des radiateurs (art. 4, 25, 27 et 29 voir sur notre catalogue).
- Veuillez respecter les surfaces d'étanchéité en contact avec les joints, pour ne pas compromettre leur étanchéité.
- Pour assembler les éléments simples ou les batteries il faut toujours utiliser les nipples et les joints spécifiques (art. 9 et 8 voir sur notre catalogue).
- La pression de fermeture pour l'assemblage de deux radiateurs est de 150/160 Nm; tandis que la pression de fermeture des bouchons et/ou réductions est de 60/70 Nm.
- Pour un bon entretien des peintures il faut que les radiateurs, avant et après installation, ne soient pas stockés dans des ambiances très humides, à l'intérieur des douches, des saunas, des bains turcs, près des piscines, etc... une éventuelle blessure de la peinture dans un point du radiateur pourrait déclencher la formation d'oxyde d'aluminium et faire détacher complètement la peinture. Ne pas utiliser d'humidificateurs poreux en terre cuite.
- Pour le nettoyage externe du radiateur il faut éviter l'utilisation de produits abrasifs ou chimiquement corrosifs/agressifs de toute nature, l'utilisation d'eau et de détergents neutres étant suffisante et en effectuant l'opération à radiateur froid on préservera longtemps la brillance première de la peinture.
- Ne placez pas poids et/ou objets sur les radiateurs. Ne destiner pas les radiateurs à des utilisations impropres qui vont au-delà de leur nature de corps chauffants (par exemple: comme banc/support, comme échelle, pour y placer des meubles ou des objets).

INSTRUCTIONS SPECIALES POUR UNE CORRECTE INSTALLATION ET UTILISATION DES RADIATEURS OSCAR, EKOS PLUS, JUNIOR ET VETTA

- Pour assembler deux radiateurs il faut raccorder les éléments droits et gauches en utilisant les nipples spécifiques 1" mm 30 et les joints toriques spécifiques (art. 23 et 24 voir notre catalogue).
- Il faut utiliser les Kits de réduction art. 44, 47 et 49 complets des joints spécifiques en silicone.
- Si les radiateurs *Oscar* ou *EkosPlus* sont installés avec les deux raccords en bas, on conseille de mettre un diaphragme (obturateur) entre le premier et le deuxième élément (art. 22 voir notre catalogue) pour garantir une circulation impeccable et le maximum de puissance du radiateur.
- Pour un bon fonctionnement du VETTA nous conseillons d'utiliser pour la pose les kits consoles et bouchons spécifiques qui sont à l'intérieur du carton.

GARANTIE CONVENTIONNELLE

L'entreprise GLOBAL garantit ses radiateurs pendant 10 ans à compter de la date de production (apposée sur la partie latérale de chaque élément). La garantie conventionnelle prêtée consiste et donne droit exclusivement au remplacement gratuit du radiateur qui, à cause de vices originaires consistant en des défauts de matériel ou de fabrication, se révèle impropre à l'usage auquel il est destiné initialement. Le radiateur en remplacement est livré franco revendeur qui a effectué la vente au client final ou à son installateur. La garantie est opérationnelle à condition que l'installation et l'équipement auquel le produit est lié aient été réalisés par du personnel habilité/qualifié et conformément aux règles de l'art et dans le respect des règles et prescriptions du secteur en vigueur; ainsi qu'à condition qu'aient été respectées les mises en garde et instructions pour une installation correcte, utilisation et maintenance du produit indiquées dans la documentation technique au paragraphe *instructions pour l'installation correcte, utilisation et maintenance*, consultables et téléchargeables également dans la section INFOS TECHNIQUES du site globalradiatori.it. La garantie est régie par autres renseignements indiquées dans le Catalogue Technique et au paragraphe *Garantie Conventionnelle* du site globalradiatori.it.

Change in the heat output according to the pipe connection

The standard output of a radiator, corresponding to the emission in room test with $\Delta t = 50^\circ \text{C}$ is subject to reduction when the pipe connection differs from the traditional one or from the new Modul System with patent n. 1231113 UNIVER valve. Obviously the radiator output varies according to its position and to Δt different from 50°C .

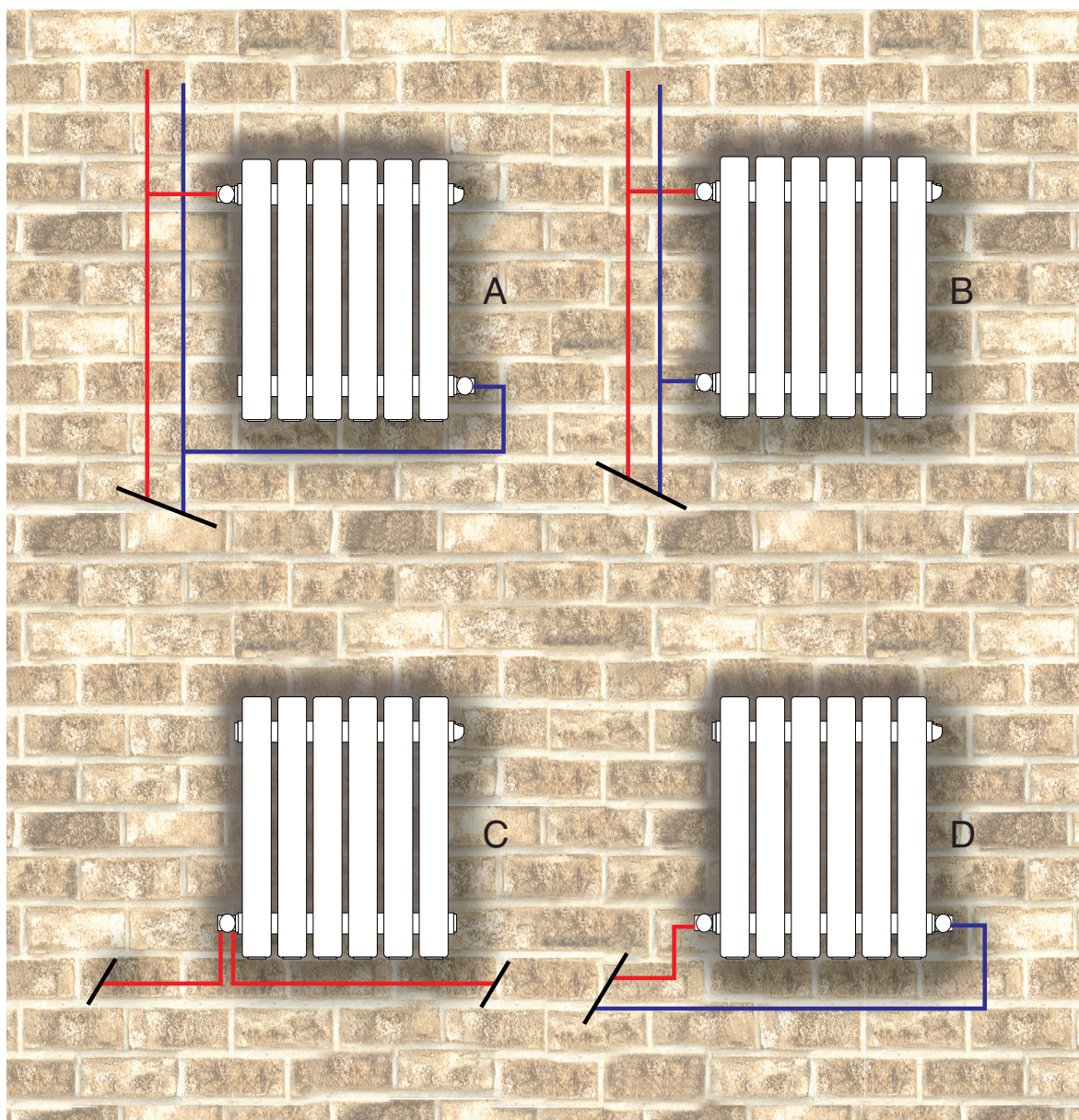
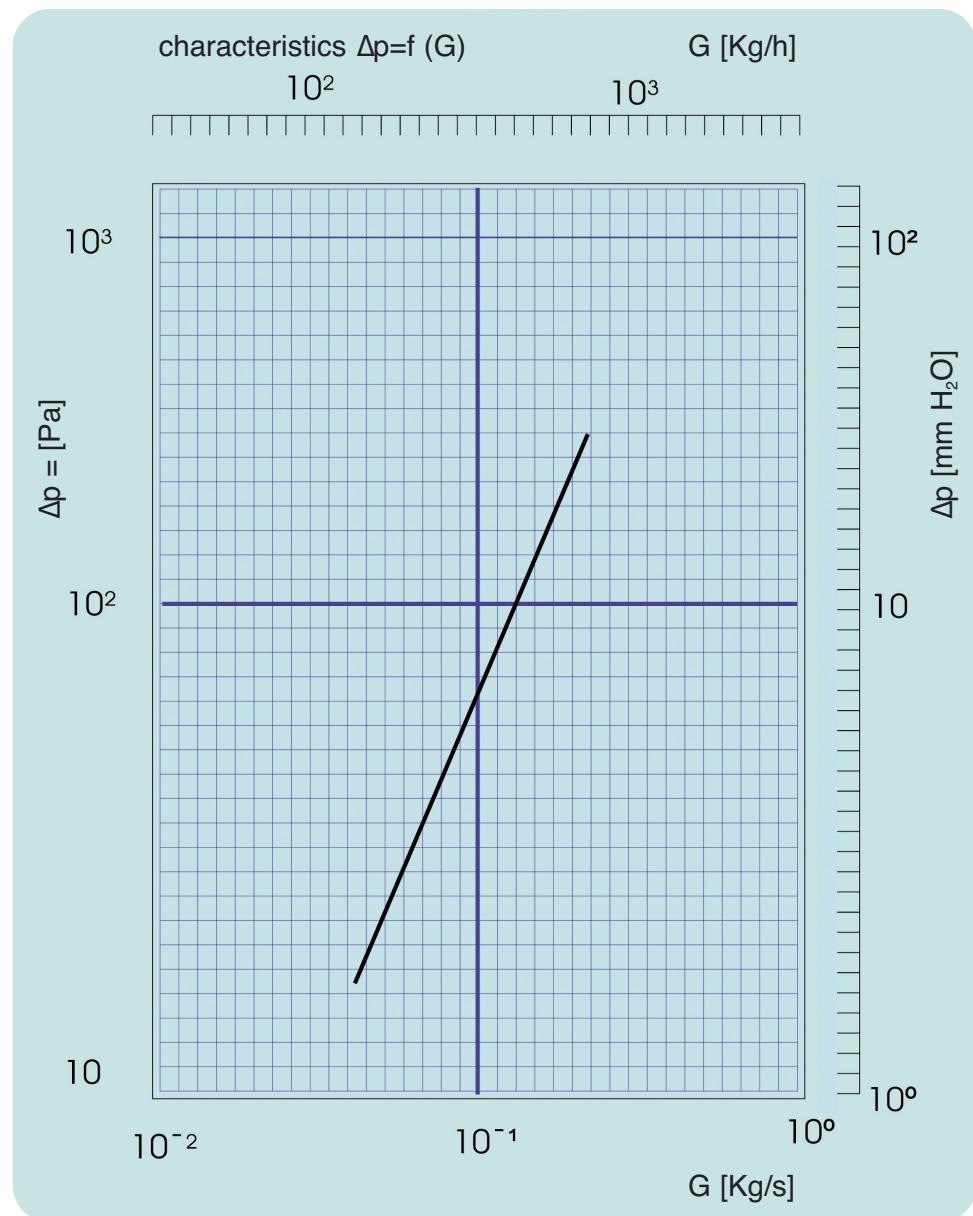


figure	pipe connection	output
A	on opposite side (traditional)	100 %
B	on the same side	96 %
C	monopipe system	92 %
D	bottom opposite end	90 %

pressure drop through Global radiators
Certified by the "Politecnico di Milano"



relevant characteristics

FLUID DYNAMICS	Δp (Pa)	24,5	39,2	66,7	100,0	220,6	372,7
UNIT SI	G (Kg/s)	0,063	0,076	0,10	0,127	0,191	0,256
UNIT	Δp (mm H ₂ O)	2,5	4,0	6,8	10,2	22,5	38,0
PERFORMANCE	G (Kg/h)	225,45	273,10	358,89	458,19	688,58	922,10

ADDRESSED TO ARCHITECTS, CONSULTANTS, SPECIFIERS AND CONTRACTORS FOR CORRECT INSTALLATION

In the hope of assisting everybody involved in this business, GLOBAL is delighted to offer the following information, which is the result of studies and direct experiences of our engineers in the field of high-quality installations for more than 20 years.

GLOBAL radiators

Fundamental factors in the choice of [GL - VIP - MIX - VOX - KLASS - ISEO - EKOS, EKOS PLUS - OSCAR, OSCAR TONDO, JUNIOR and VETTA](#) models.

In order to satisfy the large demand of customers' needs including comfort and heat economy, GLOBAL has extended its radiator production creating various models such as [GL - VIP - MIX - VOX - KLASS - ISEO - EKOS, EKOS PLUS - OSCAR, OSCAR TONDO, JUNIOR and VETTA](#).

The choice of a model is often determined by aesthetic or space reasons.

[The GL model](#) design favours air convection towards the central part of the room.

[The VIP model](#) with its sober aesthetic and elegant line, adapts itself to every genre of environment.

[The MIX model](#) thanks to the refined line, can be easily installed in the most sophisticated places to ensure best comfort.

[The VOX model](#) gives avant-garde technology and exclusive design, guaranteeing the highest output without waste of energy.

[The KLASS model](#): the new concept in styling. Klass combines technology and aesthetics with longevity and high performance.

[The ISEO model](#): exceptional comfort, designed to maximise air convection and flow of heat towards the centre of the room. Energy saving: can be used in installations with heat pumps, condensing boilers and other low temperature systems.

[The EKOS, EKOS PLUS model](#) designed and patented, the first irresistibly rounded die-cast aluminium radiator.

[The OSCAR, OSCAR TONDO model](#), a vertical-developed radiator, can be seen as an optimal solution for space problems.

[The JUNIOR model](#) provides both the comfort of a warm bathroom and warm towels.

[The VETTA model](#) is made entirely of aluminium making it outstandingly lightweight and flexible to use.

Correct installation for aluminium radiators gl, vip, mix, vox, klass, iseo, ekos, ekos plus, oscar, oscar tondo, junior and vetta models

All these models can be used in all heating systems using warm water up to 100° C and with a working pressure up to 600 K Pascal, 6 bar. You can equally install iron, copper or plastic pipes.

The best heat output can be easily reached if during the installation a few rules are followed:

GL	wall	≥ cm. 3	- floor	≥ cm. 10
	under window or shelf	≥ cm. 5		
VIP	wall	≥ cm. 3	- floor	≥ cm. 10
	under window or shelf	≥ cm. 10		
MIX	wall	≥ cm. 3	- floor	≥ cm. 10
	under window or shelf	≥ cm. 10		
VOX	wall	≥ cm. 3	- floor	≥ cm. 10
	under window or shelf	≥ cm. 10		
KLASS	wall	≥ cm. 3	- floor	≥ cm. 10
	under window or shelf	≥ cm. 10		
ISEO	wall	≥ cm. 3	- floor	≥ cm. 10
	under window or shelf	≥ cm. 10		
EKOS	wall	≥ cm. 3	- floor	≥ cm. 10
	under window or shelf	≥ cm. 10		
EKOS PLUS	wall	≥ cm. 3	- floor	≥ cm. 10
OSCAR/OSCAR TONDO	wall	≥ cm. 3	- floor	≥ cm. 10
JUNIOR	wall	≥ cm. 6 (special bracket)		
	floor or bath-rim	≥ cm. 10		
VETTA	wall	≥ cm. 6 (special bracket)		

Placing the radiators underneath the windows or on external walls is very important in order to fully enjoy the comfort that warm environments can offer.

While designing, this rule should not be under valued.

To ensure lasting protection of the finished paint surface radiators must not be installed in a permanently wet or damp environment. Small paint imperfections or damage can allow aluminium oxydisation that will stain or destroy the finished surface.

In any case the Global radiators can be repainted with enamel paint baking at 60° C about, or with catalytic paint.

It is advisable not to use abrasive products when cleaning the radiator surface.

GAS FORMATION AND NOISE IN HEAT INSTALLATIONS

Even if a heating installation has been planned following the best techniques and professionally installed, it can happen that during use, especially at the beginning, minor problems can emerge, such as the forming of gases inside the components or noise in appliances.

The causes for these are various. Here is all the necessary information to solve these problems (the following practical advice will assist in overcoming these problems).

GAS FORMATION

There are three main causes for the gas formation in the heating installations.

- The first one is due to air introduced during the operation of water filling or re-filling. During heating the dissolved gases split in the boiler, relocating as gas pockets in the top of the radiators because of the different specific weight. This phenomenon is temporary, in fact it ceases in a short time and it can only reappear if the system is partially or completely emptied of water. For this reason we suggest not emptying or removing any of the filling water, unless really necessary.

- The second cause is the presence in the installation of organic materials such as working residual or hemp for hydraulic use, that while decomposing develop natural gas in the upper side of the radiator.

Even this trouble is temporary and stops when the material completes its decomposition.

- The third cause with a more persistent development of gases is the water quality and its varying hardness due to regional differences. In fact the water on the way from the atmosphere to the sea absorbs carbon dioxide and mineral substances from rocks and soils in different quantities, without mentioning the various pollutants produced by humans.

When particularly hard water is introduced into the heating installation, it begins to react with its metallic components, producing chemical and electrochemical processes (corrosion), with varied gas production, especially of hydrogen.

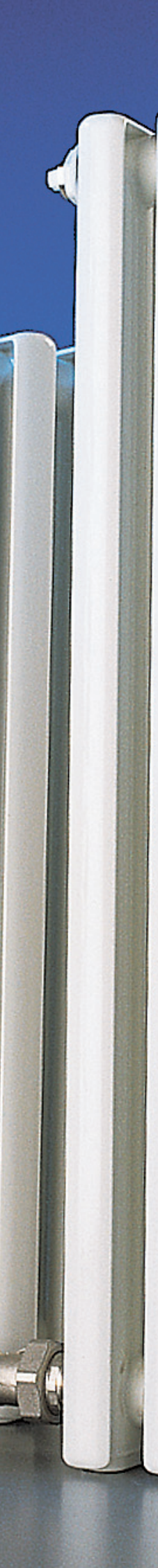
This phenomenon can continue for a long time thus damaging the installation, unless the UNI-CTI 8065 rule, which foresees the treatment of filling waters, is observed.

If the previously-mentioned causes are present, the gas mixture vented from radiators is quantitatively composed of:

carbon dioxide CO₂
nitrogen N₂
hydrogen H₂
methane CH₄
oxygen O₂

We can summarise the main gas problems as follows:

- ◆ noise in the system fluid
- ◆ reduction or interruption of the water circulation in the heating elements
- ◆ insufficient warmth in the environment due to lower output from the radiators
- ◆ corrosion of various installation components



Cure

When the causes which produce the gas in the installation are known, the under-mentioned operations must be followed.

first of all a thorough washing of the installation before the final filling is necessary. Circulation flushing contributes to remove the residue responsible for gas production. After a few hours the water must be drained by opening the draincock.

refill the installation possibly using water with hardness between 12 and 14 French degrees and a pH between 6,5 and 8 (do not use softened water). When the filling water operation ends, the temperature of the working fluid has to reach 85-90° C, to facilitate the division of the air in solution.

The produced air pockets can be eliminated by venting the radiators and circulating pipes with bottle vents and/or automatic air bleed valves.

If the filling water has degrees of hardness and pH which are different from those recommended, the phenomenon of gas production can cause corrosive processes in the installation and is therefore difficult to eliminate.

Considering impracticable the solution making follow every establishment by a laboratory specialized in the treatment of the water, for evident reasons of practicality and cost, we propose as remedies the following simple interventions that the experience has confirmed valid as much:

as a remedy we suggest installing a floating automatic air vent valve; add to the filling water the Cillit-HS 23 Combi, or similar inhibitor which prevents corrosion and gas production;

as a precaution do not completely close the flow and return valves in order to prevent an excessive build-up of pressure.

NOISE

Radiators are involved when noise in heating appliances occurs. Accurate tests have demonstrated that radiators do not cause the trouble but are simply the vehicle of noise produced somewhere else. The following list indicates the main causes for poor functioning of the installation and for a badly compensated thermal expansion:

- ✓ excessive speed of the water producing a noise similar to an open stopcock
- ✓ air presence in the upper side of the radiator with the particular noise of flowing water, due to the incomplete filling of the radiator.
These problems do not appear if the delivery pipe connection lies below as used in 'mono pipe installation' or Modul system with UNIVER valve
- ✓ the circulation pump of the fluid working outside recommended limits causing resonance especially in the radiators
- ✓ wall brackets out of alignment causing noises similar to metallic blows during the heating or cooling phase due to badly compensated thermal expansion. The noise is transferred from the pipes onto the heating appliances with the typical 'ticking' reappearing at every thermal variation. The copper pipes with insulation are noise free.

Cure

- II The ground noise due to water speed and turbulence on entering the radiator can be eliminated by working on the regulation valve to correct the water delivery as projected. However if the noise continues, it is possible to solve the problem with a diam. 18 mm diverter directly connected to the entrance valve of the radiator in order to convey the water to the next element of the radiator.
- II The noise caused by the air presence in the radiator can be eliminated by installing a floating automatic air vent valve.
- II The resonance of the circulation pump disappears by adjusting the pump head or revolutions (see instruction booklet). In some cases it is necessary to install an expansion joint between pump and pipes.
- II The noise of thermal expansion can be eliminated by covering the bracket with a rubber sheath.
- II To avoid noise in expanding pipes, it is necessary to use pipes fitted with insulating sleeves.

We hope that these brief notes will be of use in the solution of problems connected to modern systems, and will contribute to a wider knowledge and use of aluminium radiators.

HEAT OUTPUT IN CONFORMITY WITH EN 442

The heat output of GLOBAL elements, shown in this catalogue, is certified complying with EN 442 rule to standardize the heat emissions in the EU.

In accordance with this regulation, the nominal heat emission is determined in a room test with Δt 50° C.

The advantage of this regulation can be summarized as follows:

- ◇ lower fuel demand for the reduction of passive losses of heat energy from boiler, pipes and heating appliances.
- ◇ higher levels of hygiene in warm environments, since the low temperature installations permit reduction of the convective air flows that circulate dust, bacterium, pollen etc.
- ◇ reduction of the heat loss in an environment heated with low temperature radiators produces improved comfort.

HEAT EMISSION WITH ΔT DIFFERENT FROM 50° C

The variation of heat emission of a radiator with Δt different from 50° C is determined in the following way:

assuming the datum point as the nominal power according to EN 442 rule Δt 50° C the result, with the characteristic equation, will be:

$$P = K_m \cdot \Delta t^n$$

Example with Global MIX 600 a $\Delta t = 60^\circ\text{C}$:

$$P = 0,80314 \times 60^{1,32266} = 181 \text{ Watt}$$

where P = heat output

K_m = K_m coefficient

n = distinctive coefficient of the heating element

Δt = the resultant of this equation

$$\Delta t = t_m - t_a \text{ (ex. } \frac{85+75}{2} - 20 = 60^\circ\text{C)}$$

$$t_m = \frac{t_e + t_u}{2}$$

t_e = entry water temperature = 85°

t_u = exit water temperature = 75°

t_a = room temperature = 20°

t_m = mean water temperature = 80°

DEGREE OF COMFORT OFFERED BY A WARM ENVIRONMENT

As we have already seen, the installation of the radiators must follow particular rules, so as to obtain the maximum output. This can be reached if we connect it hydraulically following the classic hook-up or the new Modul System with the UNIVER valve.

However even if you follow the previously-mentioned rules, this may not be sufficient to reach maximum room comfort.

The well being feeling in a warm environment is the combination of various factors, such as the **inner air temperature**, heat loss and the **operating temperature**.

The heat loss, which is the difference of temperature at different levels between floor and ceiling, must be the lowest in order to avoid people having a kind of 'cold feet' feeling, due to the great difference of air temperature between floor and ceiling.

The following situations contribute to reduce the heat loss:

- * rational location of horizontal developed radiators, installed in recesses or on external walls to mitigate the negative effects of cold radiation of windows and boundary walls
- * low operating temperatures of the installation with medium Δt between the water in the radiator and the room air equal or little lower than 50° C.
Example:
Medium water temperature 70° C
Medium air temperature 20° C
Medium Δt 50° C
- * limited room height, not higher than 3 m, to avoid excessive air stratification, warmer under the ceiling, leading to an increase in loss of heat

The inner room temperature, which is the average of the inner air temperature and the radiant temperature of walls and windows, gives the degree of well-being for a person, taking into consideration exchanges, occurring between the person and the room air for convection and with the walls and windows for radiance.

There is interdependence between convection and radiance to maintain the same comfort. That is to say that if one increases the other must decrease and vice versa. Having room comfort means that when windows and walls are cold, the inner air temperature has to be higher to balance the heat exchanges between the person and the things surrounding him.

Conversely isolated walls and double glazed windows permit comfort to be reached even with a lower inner room temperature, reducing the body heat losses due to radiance.



INSTALLATION WATER

The quality of the filling water of a system is very important for the good functioning and preservation of the same.

Experience has shown that the value of the pH must be between 6,5 and 8 with optimization to 7,3.

In all cases purified water must not be used because of the serious damage caused to all systems. It is useful at this point to remember that, in order to preserve the thermal systems from corrosive or encrusting processes regarding radiators, piping and boilers, legislation body UNI-CTI 8065 foresees the treatment of the filling water of systems, without discrimination in aluminium, steel and cast iron. Among the various products to add to system water, under the cited rule UNI, there is a filmed aliphatic poliammina on market with the name Cillit-HS 23 Combi.

Important: the Cillit-HS 23 Combi does not leave the protective film on the inside of systems if the water in a ring exceeds the speed of 2 m/s.

The valves use to float for the automatic vent of gases in the radiators is recommended to avoid the stagnation in corrosive aeriform one in the inside of the system.

COMPATIBILITY BETWEEN DIFFERENT MATERIALS IN THE HOME INSTALLATION

Designers and installers have often stressed the problem of corrosion between the different materials, which can lead to 'micropile'.

This problem, also mentioned in the specific literature, has never been experienced by our engineers in more than 10.000 installations since 1965.

The installations are constituted nearly 90% of aluminium radiators, copper pipes and brass valves.

In fact the isolating power of gaskets and sealants installed between radiators gives reassurance for everybody who has already employed the previously-mentioned materials in the installation and for those who wish to adopt the same system in future.