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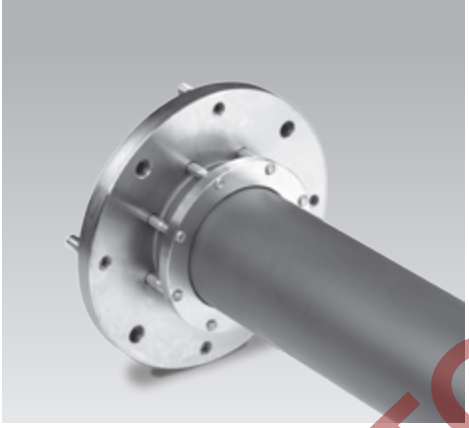
Operating instructions
Ceramic radiant tube SER-C



Contents

Safety

Please read and keep in a safe place

Please read through these instructions carefully before installing or operating. Following the installation, pass the instructions on to the operator. This unit must be installed and commissioned in accordance with the regulations and standards in force. These instructions can also be found at www.docuthek.com.

Explanation of symbols

•, **1**, **2**, **3**... = Action
▷ = Instruction

Liability

We will not be held liable for damage resulting from non-observance of the instructions and non-compliant use.

Safety instructions

Information that is relevant for safety is indicated in the instructions as follows:

⚠ DANGER
Indicates potentially fatal situations.

⚠ WARNING
Indicates possible danger to life and limb.

! CAUTION
Indicates possible material damage.

All interventions may only be carried out by qualified gas technicians. Electrical interventions may only be carried out by qualified electricians.

Conversion, spare parts

All technical changes are prohibited. Only use OEM spare parts.

Changes to edition 12.14

The following chapters have been changed:
– Checking the usage
– Installation
– Accessories

Checking the usage

Intended use

Ceramic radiant tube SER-C

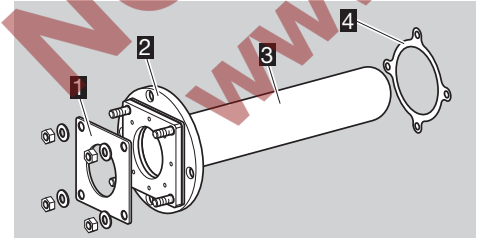
The ceramic radiant tube SER-C is used in conjunction with a self-recuperative burner for indirect heating in heat treatment processes where the combustion gases must be separated from the product.
This function is only guaranteed when used within the specified limits – see page 4 (Technical data).
Any other use is considered as non-compliant.

Type code

Code	Description
SER-C	Ceramic single ended radiant tube
	OD/ID [mm]
100/088	100/088
142/128	142/128
162/148	162/148
202/188	202/188
	Length W [mm]
W1000	1000
W1100	1100
W1200	1200
W1300	1300
...	...
W3000	3000
	Flange connection for
-Eco 0C	ECOMAX 0C
-Eco 1C	ECOMAX 1C
-Eco 2C	ECOMAX 2C
-Eco 3C	ECOMAX 3C
-FN	third-party product
–	
X	Connection dimensions different from standard
Y	For hydrogen
Z	Special version*

** Further information on request.*

Part designations



1 Burner seal
2 Flange connection
3 Radiant tube (SiSiC)
4 Mounting gasket

Type label

ID and order numbers: see type label.

Installation

! CAUTION

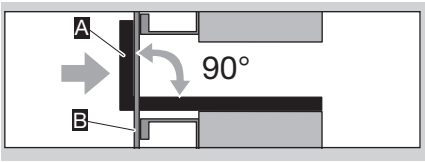
Please observe the following to ensure that the ceramic radiant tube SER-C is not damaged during installation and operation:
– Open packaging carefully and without using force.
– Install shock-free.

Packaging

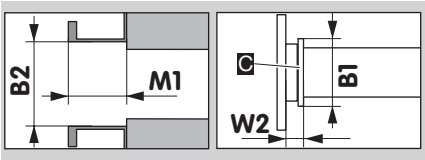
Check the shock indicator installed on the packaging on delivery of the ceramic radiant tube SER-C by the forwarding agent. A liquid in a glass tube turns irreversibly red upon heavy impact during transportation. Inform the forwarding agent and the manufacturer immediately if this is the case.

Checking the furnace flange

1 Check that the furnace flange is at right angles to the opening in the furnace wall.
▷ If the furnace flange is not mounted at right angles, this can lead to subsequent damage to the radiant tube caused by mechanical effects.
▷ Use a try-square (A) and a ruler (B) to assist you in checking this right angle.



2 Check the diameter (B2 - B1 > 16 mm) and length (M1 - W2 > 1 cm) of the furnace extension.
▷ After assembly, the radiant tube clamping ring (C) will be positioned in the furnace extension but without touching it.



Preparation for installation

Insulate the ceramic radiant tube SER-C with heat-resistant fibre blanket along the entire furnace wall opening and in the area of the furnace adapter.
Select the thickness of the fibre blanket depending on the annular void between the radiant tube and the furnace wall lining.
Force must not be applied to the radiant tube by the furnace lining.

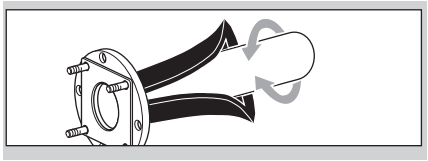
! CAUTION

Personal protective equipment should be worn when handling the fibre blanket.

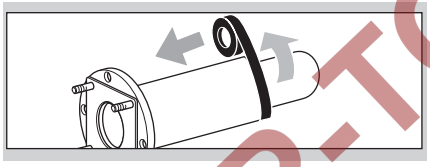
3 Cut the fibre blanket to the dimensions of the radiant tube circumference and the furnace wall thickness.

4 Wrap the fibre blanket which has been cut to size around the radiant tube.

▷ It must not be wrapped around the clamping ring.



5 Starting from the top, wrap conventional adhesive tape tightly around the entire length of the radiant tube up to the clamping ring to secure the fibre blanket.

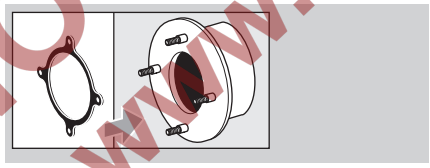


6 Remove any remaining fibre so that the blanket is flush with the clamping ring. When doing so, do not damage or cut into the ceramic surface.

▷ After commissioning, the tape combusts and the fibre blanket expands until it is equally distributed in the annular void around the radiant tube.

7 Fit the mounting gasket over the threaded bolts.

▷ Place the gasket so that it fits exactly with no visible defects or soiling.



Installation on the furnace

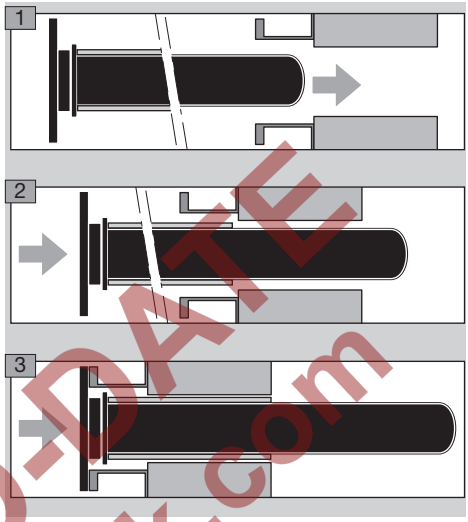
! CAUTION

Please observe the following to ensure that the ceramic radiant tube SER-C is not damaged during installation on the furnace:

– At least two people are required to install the tube in the furnace wall.

– Insert into the furnace chamber shock-free and scratch-free to avoid damage and breakage. Depending on the furnace atmosphere during operation, damage to the protective oxide layer on the surface of the radiant tube can cause corrosion and thus reduce the service life.

▷ We recommend that someone be inside the furnace chamber to receive the radiant tube.



4 Secure the radiant tube by placing 4 nuts on the respective threaded bolts and hand tightening them.

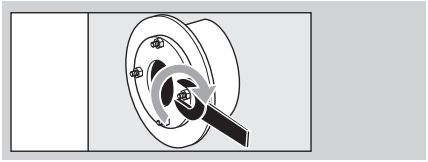
▷ This prevents the tube from shifting unintentionally.

! CAUTION

The maximum tightening torque for the nuts is 80 Nm and should be applied using a torque wrench.

▷ Tighten the nuts in a crosswise fashion, each time with a maximum of ¼ of a turn per nut.

▷ Avoid subjecting the radiant tube to mechanical stress.



5 Cut off any remaining fibre blanket so that the blanket is flush with the interior furnace wall.

▷ Once the radiant tube SER-C has been installed, the segmented flame tubes SICAFLEX® and the burner ECOMAX® can be fitted.

Commissioning

▷ Once the tubes have been installed (and, where necessary, once the furnace has been tempered), we recommend annealing the radiant tubes for at least 72 hours in a moist air atmosphere at maximum furnace temperature.

▷ The optimal water vapour content for this is 50 to 70%.

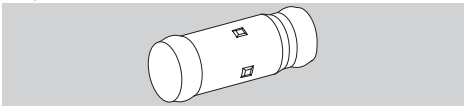
▷ The furnace should only be purged and operated with a protective atmosphere once annealing has been completed.

Maintenance

Check the radiant tube SER-C for damage (visual inspection) when carrying out maintenance work on the burner or in the furnace.
In the event of damage, remove the radiant tube and replace it. The radiant tube should only be removed and replaced when the furnace has cooled down.

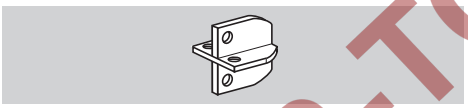
Accessories

Segmented flame tubes SICAFLEX®



Segmented ceramic flame tubes to guide hot flue gases in radiant tubes.
Material: SiSiC.
Available on request in different sizes and lengths suitable for the SER-C radiant tube sizes.

Cruciform spacer



For installation of segmented flame tubes SICAFLEX® in vertical radiant tubes.
Material: refractory clay.
Available in different sizes and heights.

Flue gas guide tube

To guide the flue gases if smaller burners are used than those normally intended.
Material: vacuum molded pulp.
Available in different sizes and versions suitable for the SER-C radiant tube and ECOMAX burner sizes.

Technical data

Material:
Radiant tube: SiSiC,
max. application temperature: 1350°C.
Flange connection: heat-resistant steel, 1.0425 (HII).
Storage temperature: -20°C to +40°C.

Designed lifetime

By avoiding chemical attacks on the radiant tube, a long service life will be ensured for the ceramic radiant tube.
Note the dew point temperature of the protective atmosphere.
Avoid the presence of impurities such as fluorine, chlorine or any alkaline compounds, e.g. sodium or sulfur compounds, in the furnace atmosphere.

Logistics

Transport

Protect the unit from external forces (blows, shocks, vibration). On receipt of the product, check that the delivery is complete, see page 2 (Part designations). Report any transport damage immediately.

Storage

Store the product in a dry and clean place.
Storage temperature: see page 4 (Technical data).
Storage time: 2 years before using for the first time.
If stored for longer than this, the overall service life will be reduced by the corresponding amount of extra storage time.

Packaging

The packaging material is to be disposed of in accordance with local regulations.

Disposal

Components are to be disposed of separately in accordance with local regulations.

Contact

If you have any technical questions, please contact your local branch office/agent. The addresses are available on the Internet or from Elster GmbH.

We reserve the right to make technical modifications in the interests of progress.

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