Process-Temperature Control-Rings
from 850°C up to 1,750°C

The PTCR ring is a highly accurate ceramic temperature indicator which records the true heat treatment receives by the fired product. PTCR rings take account of both radiated and transferred heat, as well as the effects of temperature over time.
It conveniently allows this recorded heat exposure to be expressed as a single number - ring temperature (RT) - which is practical and easy to work with. PTCR rings can be used in both batch and continuous kilns & furnaces; they are used in a range of atmospheres, including oxygen, nitrogen, air and vacuum.
Five different PTCR types are available - standard height is 7.0 mm (3,5 mm also available) - covering a range from 850 to 1,750°C. Ring types are identified by colour coding and batch and type numbers pressed into the ring.
When exposed to heat in the furnace, the PTCR ring contracts - and continues contracting as the top temperature is maintained over the time. The degree of contraction is almost linear over the complete operating range of the PTCR, providing a practical measure of the accumulated heat to which the ring - and the fired products - have been subjected. The amount of contraction - the amount by which the ring diameter has shrunk - is measured with a numerical or digital micrometer. This measurement can be converted to 'ring temperature' for ease of comparison and correlation to the firing process (temperature tables are supplied with the rings).

Temperature range	Type	Colour
850 - 1,100°C	**PTCR - ETH**	**pale green**
970 - 1,250°C	**PTCR - LTH**	**pink**
1,130 - 1,400°C	**PTCR - STH**	**green**
1,340 - 1,520°C	**PTCR - MTH**	**yellow**
1,450 - 1,750°C	**PTCR - HTH**	**white**
PTCR ring dimensions: outer diameter 20 mm, inner diameter 10 mm, height 7.0 mm		

PTCR is recognized for is accuracy and reliability, and is recently improved technology now offers an unsurpassed accuracy guarantee - a maximum variation of no more than 3°C ring temperature (RT) (in some cases 1.5°C).

Positioning

PTCR rings can be placed at almost any location in the kiln, on kiln furniture, trolleys or transports. The use of both multi-location and multi-level positioning is recommended, as this provides the most insight into the treatment distribution within the kiln.

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Converting to ring temperature

The measured ring diameter is converted to ring temperature using the conversion table enclosed in each packing unit. Each table is specific to the particular batch of rings, for accuracy and convenience. The ring temperature is a practical single number which is useful for comparison purposes – for instance to relate the recorded heat treatment to the firing process and defined standards – so that any required adjustments can be made. It does not necessarily reflect the actual kiln temperature; the PTCR acts as an accumulator, measuring the total heat treatment over time, rather than the maximum temperature attained.

Firing process optimisation

In the process of establishing a standard, the firing process is characterized by mapping the ring temperatures of PTCR rings distributed throughout the kiln. This allows the “hot” and “cold spots” to be detected and defined.
Using the heat treatment mapping, the firing process can than be optimised by offsetting heat sources or thermocouples as indicated by the variations in ring temperatures. As a rule of thumb, one degree of ring temperature corresponds to one degree Celsius. The exact relationship between ring temperature and degrees Celsius is of course dependent upon the specific firing cycle of the kiln.

Firing process control

In the course of time – as a result of aging of the heating elements or frequently alternating firing cycles – “hot” and “cold spots” may gradually return to the kiln.
The PTCR can help here, too. Once the firing process has been optimised, PTCR rings can be used regularly to monitor the monitor the firing process and to detect these deviations as they gradually arise, before they affect product quality.
By comparing the current ring temperatures against the defined standard, the number of degrees of ring temperature by which the firing process must be adjusted can be determined. Using several rings at critical locations in the kiln ensures that an even heat distribution is maintained.

Quality control at lower cost

Besides the benefits of yield improvement trough optimisation of firing process, the PTCR can also help reduce production costs. Simple comparison of ring temperature against a quality standard indicates whether the products are sintered to specification. Expensive, time-consuming conventional quality checks – destruction testing, geometry, density and porosity tests – can be reduced or eliminated.

Establishing a standard ring temperature

In order to make ring temperature comparisons between different firings, a standard ring temperature must be defined. This is done by including PTCR rings in a series of firings, and relating their ring temperatures to the quality of the products Produced.
The ring temperature which corresponds to products fired to the correct specifications can be used as the standard.

Packing

15 pc. / small paper boxes.

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Pricelist for PTCR-Rings 2008
(Process Temperature Control Rings)

Important: 1)
For orders of more than 300 pieces its possible to take various types (min. 150 pcs/Type).
For quantities of more than 4.800 pieces, please ask for prices.
(MTH & HTH are sintered and does not contain binders)

Application-Temperature	Type- No.	75 pcs. min	75 pcs. min
850°C - 1100°C	ETH	SEK 11,90	EUR 1,25
970°C - 1250°C	LTH	SEK 11,90	EUR 1,25
1130°C - 1400°C	STH	SEK 11,90	EUR 1,25
1340°C - 1520°C	MTH	SEK 15,50	EUR 1,65
1450°C - 1750°C	HTH	SEK 15,50	EUR 1,65

Test Pack of PTCR: 15 pcs. / box SEK 300,00 – EUR 33,00 / box

Pricing: Prices are to be understood EXW Ängelholm Sweden incl. Packing costs.
Delivery: On short notice
Validity: from May 1. 2008

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