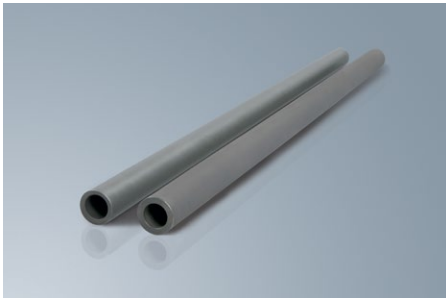


# 3M™ Silicon Carbide Thermocouple Protection Tubes

Formerly known as EKasic®

Thermocouple protection tubes made of 3M™ Silicon Carbide Grade F (SSiC) show an excellent performance under corrosive and abrasive conditions and very high temperatures. 3M™ Silicon Carbide Thermocouple Protection Tubes provides absolute gas impermeability and high purity of > 99% SiC at the same time.



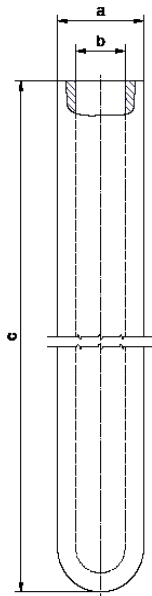
3M™ Silicon Carbide Thermocouple Protection Tubes for extreme environments

## Advantages

- Extreme temperature resistance up to 1,600 °C in oxidizing atmospheres and 2,000 °C under protective gas/vacuum
- Good thermal shock behaviour
- Excellent corrosion resistance against aggressive media
- Excellent oxidation resistance
- High abrasion and erosion resistance
- Fast response due to high thermal conductivity
- No gas permeability
- Pure  $\alpha$ -SiC matrix

## Applications

- Furnaces and combustion chambers under harsh conditions (corrosive and abrasive media, high gas velocities)
- Desulfurization units



## Standard sizes

Outside dia a (mm)	Inside dia b (mm)	Length c (mm-up to)
16 ( $\pm 1$ )	8 (+0.5)	550
22 (+1/-2)	12 (+1/-2)	1,050
28 ( $\pm 2$ )	16 ( $\pm 3$ )	1,200

## Specification

Typical material properties	Symbol / Unit	3M™ Silicon Carbide
Phase composition		$\alpha$ -SiC
Density	g/cm <sup>3</sup>	> 3.10
Porosity open	vol %	0
Porosity total	vol %	< 3
Flexural strength, 4-pt bending	MPa	400
Compressive strength	MPa	> 2,500
Vickers-hardness HV1	GPa	24.5
Young's modules	GPa	430
Coefficient of thermal expansion		
25 °C – 500 °C	[10 <sup>-6</sup> / K]	3.8
500 °C – 1,000 °C	[10 <sup>-6</sup> / K]	5.1
Thermal conductivity at 25 °C	[W/mK]	130

Product is manufactured and sold by 3M Technical Ceramics, Zweigniederlassung der 3M Deutschland GmbH.

**Warranty and Limitation of Liability:** Many factors beyond our control and uniquely within user's knowledge and control can affect the use and performance of the product in a particular application. User is solely responsible for evaluating the product and determining whether it is fit for a particular purpose and suitable for user's method of application. User is solely responsible for evaluating third party intellectual property rights and for ensuring that user's use of the product does not violate any third party intellectual property rights. Unless a different warranty is specifically stated in the applicable product literature or packaging insert, we warrant that each product meets the applicable product specification at the time we ship the product.

WE MAKE NO OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OR CONDITION OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY IMPLIED WARRANTY OF NON-INFRINGEMENT OR ANY IMPLIED WARRANTY OR CONDITION ARISING OUT OF A COURSE OF DEALING, CUSTOM OR USAGE OF TRADE.

The quality of our products is warranted under our General Terms and Conditions of Sale as now are or hereafter may be in force.

**Limitation of Liability:** Except where prohibited by law, we will not be liable for any loss or damages arising from the product, whether direct, indirect, special, incidental or consequential, regardless of the legal theory asserted, including warranty, contract, negligence or strict liability. We accept liability for intent and gross negligence. We are also liable for any culpable breach of major contractual obligations; however, if a breach of major contractual obligations is due to negligence, our liability is limited to the foreseeable damage associated with this type of contract. This does not affect our liability for culpable fatal or bodily injury or damage to health; this also applies to liability under the Product Liability Act (*Produkthaftungsgesetz*). Other claims for compensation are excluded.

**Technical Information:** Technical information, recommendations, and other statements contained in this document or provided by us are based on tests or experience that we believe are reliable, but the accuracy or completeness of such information is not guaranteed. Such information is intended for persons with knowledge and technical skills sufficient to assess and apply their own informed judgment to the information. No license under any of our or third party intellectual property rights is granted or implied with this information.



**3M Technical Ceramics**  
Zweigniederlassung der  
3M Deutschland GmbH  
Max-Schaidhauf-Straße 25  
87437 Kempten, Germany  
T +49 (0)831 5618-0  
F +49 (0)831 5618-345  
info.technical-ceramics@3M.com  
www.3M.de / Technical-Ceramics

The management system has been certified according to DIN EN ISO 9001, DIN EN ISO 50001, DIN EN ISO 14001.

Please recycle. Printed in Germany.  
© 3M 2015. All rights reserved.  
Issued: 04/17

**3M is a trademark of 3M.**  
**Used under license by**  
**3M subsidiaries and affiliates.**