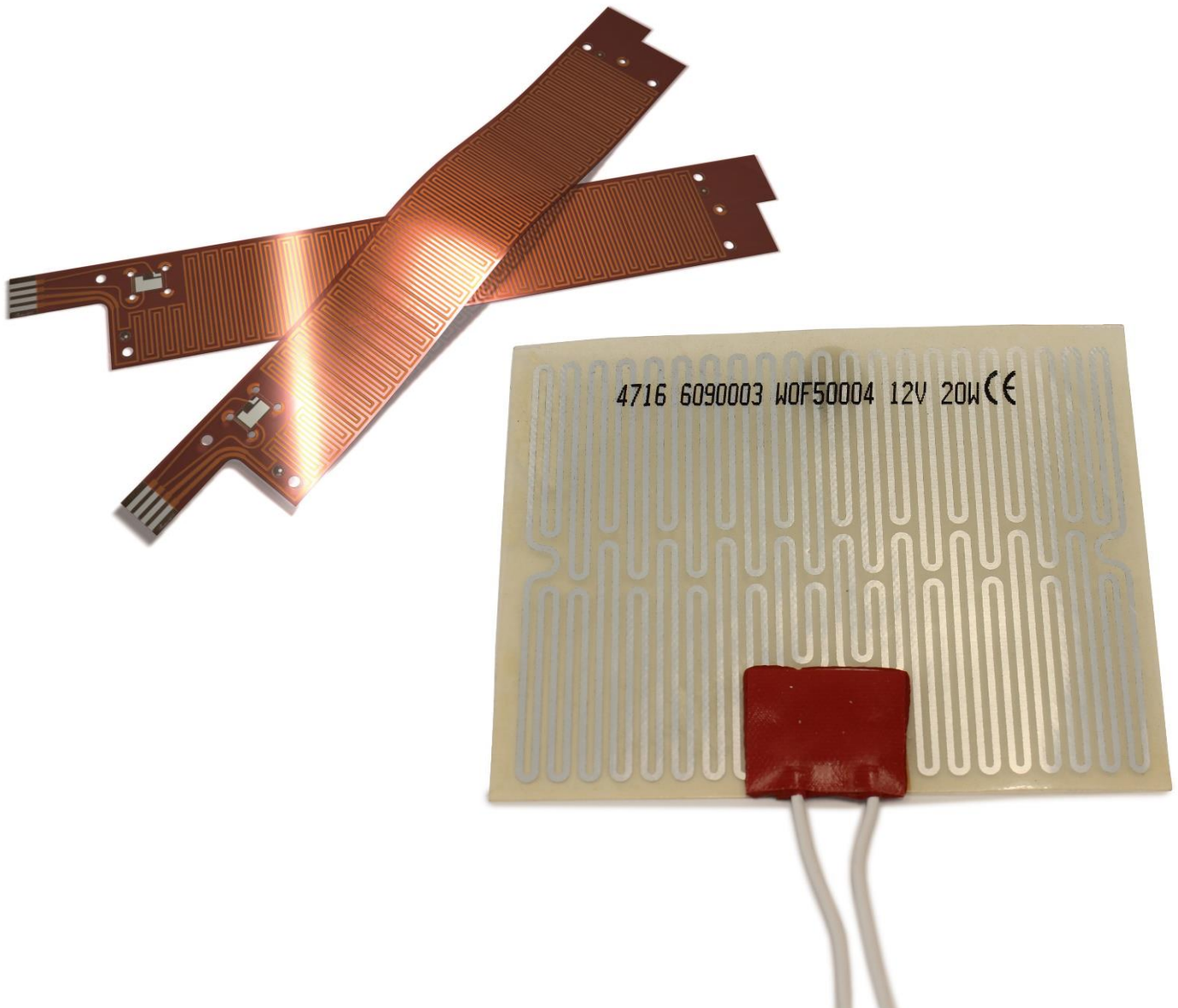




winkler

# Instructions for installation and operation

Heating Foils **Series WOF...**





### Important safety instructions for using heating foils

Please read the assembly instructions / operating instructions very carefully before using the heating foils. Observe the information on the nameplate and any warnings on the product. The assembly instructions / operating instructions are an important part of the product. It must be available to every user during use / operation. Keep the assembly instructions / operating instructions in a safe place for later use of the product. The persons commissioned with the installation and operation should have the appropriate professional competence.

The heating foils are used in areas where special operating regulations apply and requirements must be met. Please note these and inform yourself in advance about the regulations so that you can guarantee perfect, intended operation.

If you have any questions, you can contact us at any time using the contact details (Chapter 9. Who we are / contact details). We would be happy to advise you and provide assistance for the safe and proper operation of our heating foils.

### Silicone heating elements are electrical equipment

The operation and maintenance of the heating foils may only be carried out by a qualified electrician or by persons trained in electrical engineering.

In order to prevent dangers from the electric current, a regular inspection or maintenance of the heating foils according to the current rules of technology (VDE / DGUV V3 / ...) is necessary and documented.



**A residual current device of 30 mA must be provided for safe operation.  
Its function must be checked before commissioning and at regular intervals**

### Additional safety information

In the event of obvious damage, the heating foils must be taken out of operation immediately and may no longer be used.

The cause of the damage must be determined and eliminated.

- for example, mechanical damage to the outer material due to external forces / excess temperature.

Avoid overheating the silicone heating mat. Observe the minimum and maximum operating temperatures and never fall below or exceed them. The resulting overheating can occur in a variety of ways. Please convince yourself in advance of the operating and environmental conditions and monitor the first heating processes.

Monitored operation with suitable temperature controllers and / or temperature limiters (e.g. WRW510SW / WRT560SW / WRT570SW / WRW00220-UNIXW00K / WRWB0220UNIWW00K) is a prerequisite for the intended operation of the heating foils.

### Guidelines and regulations

The following guidelines and provisions were taken into account in the design, manufacture and testing of the silicone heating mats:

Low Voltage Directive 2014/35/EU from 26.02.2014

Electromagnetic Compatibility Directive 2014/30/EU from 26.02.2014

EU Directive 2011/65/EU RoHS Directive

**EN 60519-1 / -2 (VDE0721-1)** Safety in Electro Heat Installations

**EN 60335-1:2012 (VDE0700-1)** Household and similar electrical appliances - Safety - Part 1"

**EN 60398 (VDE0721-50)** Industrial Electro Heat Installations

DIN VDE 0100-600 Testing

DIN VDE 0701-0702 Recurrent Tests

With your WINKLER heater you have purchased a high-quality product that can be used successfully in your application, taking into account relevant standards and regulations. We constantly strive to manufacture our products so that they work to your satisfaction and meet the desired requirements. In principle, installation and intended operation must be carried out in accordance with the applicable regulations for electrical heating (VDE) and the recognized rules of technology (DIN, accident prevention regulations UVV).



The heating foils may only be installed by trained specialist personnel in compliance with the following installation instructions and used in accordance with the operating instructions.

Improper operation of the heating system can cause a damage and the warranty will expire. If you have any questions, please contact us in good time (Chapter 11 Who we are / contact details). We're here to help.

The heating foils are called heater in the following.

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## 1. General information/checking the heater

The heater must comply with its intended use. Before installing the heater, check that the information on the type plate matches your order details.

- Are the details on the type plate identical to your order data (mains voltage, power, type max. Operating temperature etc.)?
- Does the heater fit properly on the object to be heated?
- Have measures been taken to prevent excess temperatures?
- Is the temperature sensor placed at the hottest position?
- Make sure that the heater can be disconnected from the power supply quickly?
- Basically, the heater is suitable for a variety of applications. Application change over time, the user must obtain information about the other areas of application and application from the manufacturer. The heater should be protected from chemical, mechanical and aggressive environmental conditions, as this can cause a damage and thus endanger safe and proper operation.

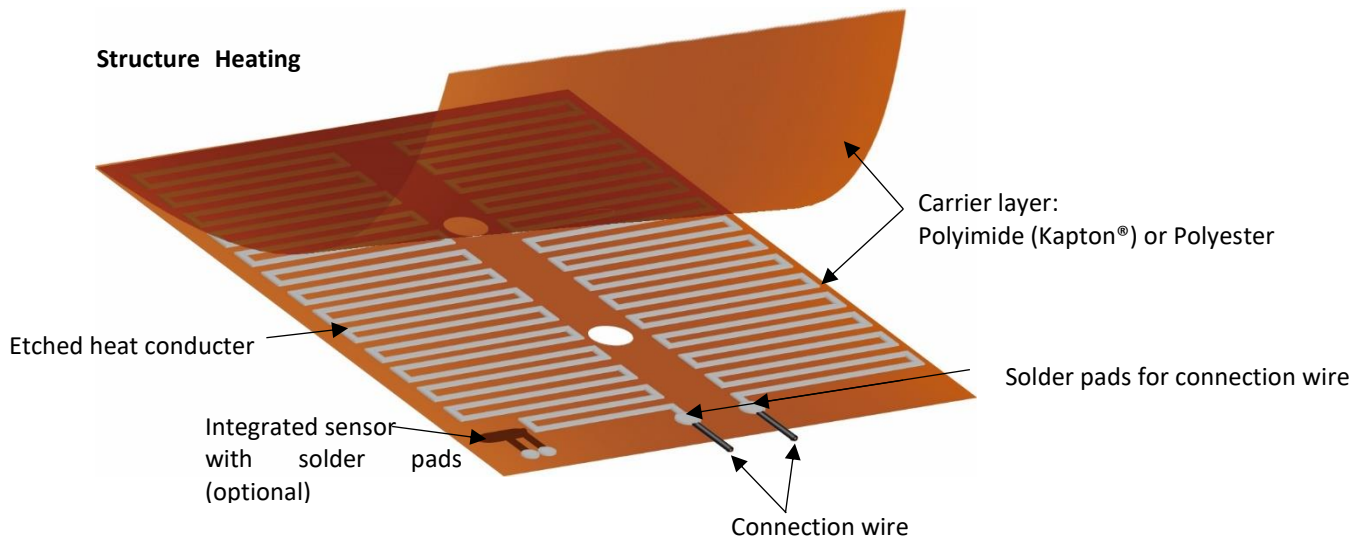


The maximum operating temperatures are specified on the type plate. These must not be exceeded at any point.

Use suitable temperature controllers (e.g. WRW510SW / WRT560SW / WRT570SW / WRW00220-UNIXW00K / WRWB0220UNIWW00K).

### 2. Structure of the heater

The heating foils consist of a thin heat-conductor layer etched along specific routes and embedded between two strong, temperature-resistant foils made of polyimide or polyester. The foil layers are bonded together homogeneously during constant temperature and pressure cycles. Subsequently, they are die-cut to the precise shape desired.



**Attention:** The heater may only be used in rooms / environments in which electrical safety measures were hit.



**A temperature controller is required due to the high output power. The heater is used in laboratories, pilot plants and industries in which objects with high performance or high temperatures (up to max. 250 ° C, depending on version) must be warmed up quickly.**



**Note:** The heater must be included in the protective measures available at the place of use.

### 3. Area of application / electrical connection

The standard supply voltage is 230 V (other voltages on request). The voltage specification on the type plate of the heater is decisive and must be observed. Electrical protective measures and protection against accidental contact must be carried out in accordance with DIN VDE 0100. The electrical wires (supply network) must be according to the fuse size and max. allowable voltage drop. The cross-section of the connecting cable must be dimensioned according to the current consumption according to VDE 0100. However, a minimum cross section of 0.75 mm<sup>2</sup> is required.

This requirement also applies to all connecting cables of temperature control devices.

If there is a protective conductor on the heater, this must be included in the protective measure (protective conductor must be placed on the PE conductor).



**The electrical connection of the heater must be protected by an RCD (FI) residual current device (IF <30mA). The supply is carried out that no dangerous contact voltage can be present on the heater in the event of a fault.**

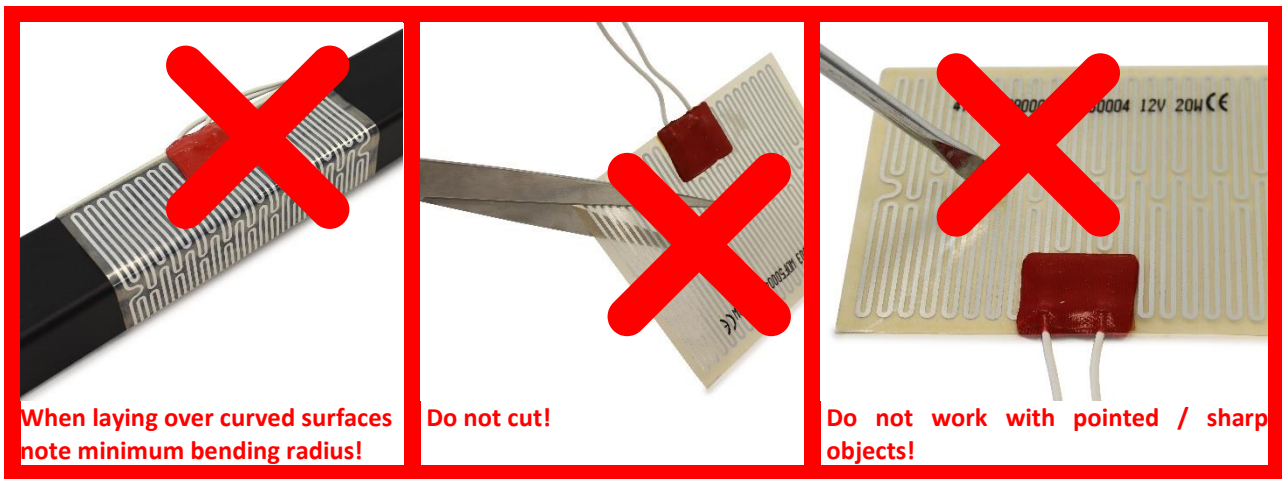


**Different ambient temperatures in the area of heater cause different internal temperatures. The decisive factor for the control is the ambient temperature at the sensor location it must be in the area of the highest ambient temperature to avoid overheating. It has to be determined in advance and taken into account during project planning. As standard, the sensor for the limitation is mounted directly on the heater. The sensor place for the operating temperature can be specified customer or application specified.**

#### 4. Installation / commissioning

The heater is ready-made and can be installed observing the following instructions:

1. The heater connecting lead (stranded wire with PTFE, silicone, PVC, etc.) must not be twisted or laid over edges where it can kink.
2. When installing make sure that the minimum permissible bending radius is not less than 10 mm and that the heater is not kinked.
3. The insulation of the heater must not be damaged.
4. Several heaters must not be laid on top of each other, otherwise an overtemperature may occur.
5. Be careful when using pointed or sharp-edged tools and objects.
6. Covers and thermal insulation must be installed in such a way that they do not cause heat build-up which leads to the nominal temperature being exceeded. The measured temperature must not exceed 105 °C (Polyester) / 180°C / 200°C (Polyimid) (depending on the version) at any point.
7. Up to an area power of 0.2 W / cm<sup>2</sup> and a max. Operating temperature of 105 °C for polyester and 0.8 W / cm<sup>2</sup> and a max. Operating temperature of 180 °C for polyimide, the heating can be equipped with a self-adhesive film.



#### Instructions for gluing the heater with self-adhesive film (up to max. 180 °C):

- Thoroughly clean and degrease the metal surface (acetone or isopropanol) and let it dry for approx. 30 min.
- Remove the protective paper from the self-adhesive film.
- Apply the heating element to the metal body and massage from the center of the silicone heating mat.
- Vigorous massaging by stroking to the edges is absolutely necessary to drive out air pockets.



**Note: The best adhesion is achieved if the heating element is pressed on the first time it is heated.**

It is also important to ensure good heat transfer to the heated object. A heating which doesn't fit cannot transfer the heat. Because of overtemperature avoid that heaters placed on each other. In places where the heat is not dissipated the excess temperature caused destroy the heating. Fastening tapes can also damage the heating by cutting. If metal parts are heated, they must be included in the protective measures (e.g. protective earthing). When using outdoors corresponding additional measures are required in accordance with the relevant regulations.

#### 5. Operation / disassembly

1. **Always monitor the first heating-up phase** in order to identify any errors early and to be able to carry out change measures if necessary.
2. Extreme vibrations or movements should be avoided during operation of the heating (shaking, vibrating, etc.) or appropriate measures should be taken to avoid any damage.



3. Make sure that the object to be heated is not hotter than the max. operating temperature of the heating device otherwise the heating can be damaged.
4. Before disassembling the heating cool it down and all electrical poles disconnected from the means.
5. Never pull the heaters at the connection leads as they are not suitable for this.
6. If there is any damage or irregularity to the heating function during operation switch it off as soon as possible and disconnect it from the mains at all poles. For this purpose a main switch with min. 3 mm contact opening and a fuse of 16 A or 20 A corresponding to the cable cross section must be installed. A precise cause of failure analysis has to be carried out. Our specialist advisors are at your disposal for this (Chapter 9. Who we are/ contact details).
7. Check the information on the type plate to ensure that the type, design, mains voltage, power and operating temperature match your requirements.
8. Check visually whether the version matches the version you ordered. If in doubt, check that your documents are correct.
9. Appropriate temperature control devices must be used. The switching capacity the sensor type and the temperature range must match. Is the heating also connected to the correct controller? A wrong sensor type will cause the heating to heat up until it is destroyed.
10. Are there special provisions at the place of use and have these been observed during assembly (hazardous area; fire hazardous area, etc.)?
11. The user must check whether the materials that come into contact with the medium are resistant or resistant (Chapter 8. Technical data). If you have any questions please contact us directly for advice (Chapter 9 Contact).
12. Check whether surrounding objects, system parts or other can lead to damage or impairment of the heating function and remove or eliminate them.
13. Conductive, touchable parts must be included in the equipotential bonding.
14. The use of a RCD (FI) residual current device ( $I_f < 30\text{mA}$ ) is mandatory.



**Please note the following: The heating mainly consists of polyimide (Kapton®) or polyester. This becomes brittle at correspondingly high operating temperatures above 105 ° C for polyester and 180 ° C / 200 ° C for polyimide (depending on the version). If the heating is then moved excessively, insulation defects can occur. A heater that has been exposed to high operating temperatures (over 105 ° C / 200 ° C), depending on the version, should not be constantly dismantled or removed. After dismantling, the insulation resistance to the object to be heated must be measured and documented before restarting.**

## 6. Tests according to DIN VDE 0100-600 / repeat tests according to DIN VDE 0701-0702

**DIN VDE 0100-600** "Installation of low-voltage systems - tests" obliges the installer of an electrical system to determine before commissioning whether the required protective measures have been applied to the individual system parts in accordance with the intended use and whether the proper functioning of the protective measures is ensured. This test includes an in-depth inspection of all system parts important for the safety of the protective measures, as well as measurements and tests that demonstrate the effectiveness of the protective measures.

**DIN VDE 0701-0702** "Tests after repair, modification of electrical devices - repeat tests of electrical devices" obliges the operator of electrical systems to check them at regular intervals and to provide proof of the correct and safe operation of the electrical system.

## 7. Thermal insulation / temperature influence

The heating is not provided with thermal insulation. The required thickness of the thermal insulation depends on the respective type of heating and application or can vary according to customer specifications. If heating without thermal insulation is used, the customer must install thermal insulation according to the specifications before commissioning the heating, otherwise the calculated heating output of the heating cannot be transferred to the object accordingly.

It must be ensured that burns to parts of the body or other types of damage are prevented. Appropriate measures must be taken in accordance with DIN VDE 0100-420, e.g. Mineral wool, foam insulation, spacer grille.

To label heated electrical system parts, labeling stickers (WZX00531) with the inscription "**ELECTRICALLY HEATED**" must be affixed to the thermal insulation.

In order to protect the heating from overheating and to ensure an exact process temperature, the heating must be operated with a control and / or limitation. The temperature sensor must always be attached to the hottest point. (Please note our "Installation and application instructions for temperature sensors" when using with external temperature sensors).

The operating temperatures specified on the nameplate are the max. permissible temperatures on the heating conductor. The user must take appropriate measures to ensure that the max. Operating temperature is exceeded.



**When operating without temperature control, there is a risk of the object to be heated, the medium and the overheating**

**Heating. However, the max. Operating temperature of the heating is exceeded:**

- Heat build-up when the heating is not or only partially applied to heated the body.
- changing fill level of the medium
- Excess temperature that build up through exothermic chemical processesAs well as changing environmental conditions

**Important information:**



**Electric heaters must be installed and operated in such a way that they do not cause any danger, even if they are not monitored or switched on accidentally. Appropriate security measures must be taken, e.g. B. Operation with a Regulator and / or limiter. The use of a residual current device RCD (FI) ( $I_f < 30\text{mA}$ ) is recommended.**

**It should also be noted that the heating heats up when operating with incorrectly adjusted temperature controllers and also temperature sensors, which means that the max. permissible operating temperature can be exceeded.**



**When using the heater for the first time, depending on the application, there may be an odor. This is a normal process with the material used and will stop shortly.**

## 8. General technical data

	<b>Series WOF... Polyimide (Kapton®)</b>	<b>Series WOF... Polyester</b>
<b>Temperature range</b>	180° C (with self-adhesive film) / 200° C (higher temperatures on request)	105° C
<b>Tolerance power</b>	According to EN 60335 – 1:2012	According to EN 60335 – 1:2012
<b>Nominal power</b>	2 W/cm <sup>2</sup>	0,2 W/cm <sup>2</sup>
<b>Nominal voltage</b>	400 V	400 V
<b>Min. bending radius</b>	10 mm	10mm
<b>Foil thickness</b>	0,2mm	0,2 mm – 0,3 mm
<b>Foil size</b>	Max. 285 x 550 mm	Max. 590 x 2000 mm
<b>Connection system</b>	Soldering, crimp	Soldering, crimp
<b>Connecting lead</b>	Leads	Leads
<b>Protection standard</b>	IP 64 possible	IP 64 possible

## 9. Contact

**Winkler AG**  
Englerstrasse 24  
69126 Heidelberg  
Germany

**Tel:** +49-6221-3646-0  
**Fax:** +49-6221-3646-40  
sales@winkler.org  
www.winkler.org

## 10. Quality management certificate according to ISO 9001: 2015

M 3011-21/2015 ZERTIFIKAT ◆ CERTIFICATE ◆ CERTIFICADO ◆ CERTIFICAT ◆ CERTIFICADO ◆ CERTIFICAT ◆ CERTIFICADO ◆ CERTIFICAT ◆ CERTIFICADO ◆ CERTIFICAT ◆ CERTIFICADO ◆ CERTIFICAT ◆ CERTIFICADO ◆ CERTIFICAT ◆ CERTIFICADO ◆ CERTIFICAT ◆ CERTIFICADO ◆ CERTIFICAT ◆ CERTIFICADO ◆ CERTIFICAT ◆ CERTIFICADO ◆ CERTIFICAT ◆	 <p>Management Service</p>
	<h1>CERTIFICATE</h1>
	<p>The Certification Body of TÜV SÜD Management Service GmbH certifies that</p>
	<p><b>winkler.eu</b> <b>Winkler AG</b></p>
	<p><b>Englerstr. 24 • 69126 Heidelberg • Germany</b> for the scope of application Development, manufacture and sales of heat engineering products with control and monitoring systems</p>
	<p><b>Kleinfeldweg 38 • 69190 Walldorf • Germany</b> for the scope of application Manufacture of heat engineering products with control and monitoring systems</p>
	<p>has established and applies a Quality Management System. An audit was performed, Order No. 70002379. Proof has been furnished that the requirements according to</p>
	<h3>ISO 9001:2015</h3> <p>are fulfilled.</p>
	<p>The certificate is valid from 2021-04-20 until 2024-04-19. Certificate Registration No.: 12 100 28096 TMS.</p>
	<p> Head of Certification Body Munich, 2021-04-12</p> <p> </p>
<p>TÜV SÜD Management Service GmbH • Zertifizierungsstelle • Ridlerstrasse 57 • 80339 München • Germany <a href="http://www.tuev-sued.de/certificate-validity-check">www.tuev-sued.de/certificate-validity-check</a></p> <p></p>	



11. Declaration of EU conformity (CE marking)

EU-DECLARATION OF CONFORMITY

winkler.eu



Manufacturer : WINKLER AG  
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69126 Heidelberg

Contact : Tel.: ++ 49 (0) 6221-3646-0 Fax.: ++ 49 (0) 6221-3646-40  
sales@winkler.eu www.winkler.eu

Product group : Heating foils

Product : **WOF....**

Directives : **EU Directive 2014/35/EU**  
**Low Voltage Directive** from 26.02.2014  
"Electrical equipment for use within certain voltage limits"

**EU Directive 2014/30/EU**  
**Electromagnetic compatibility** from 26.02.2014

We hereby declare that the basic safety and health requirements of the above-mentioned EU directives and the currently applicable RoHS directive were complied with when planning and manufacturing this product.

Other national standards and technical specifications applied:

**EN 60519-1 / -2 (VDE 0721-1)**  
Safety in electro heat installations

**EN 60398 (VDE 0721-50)**  
Industrial electro heat installations

Any modification to the product without our consent will make this declaration invalid.

Heidelberg, May 27<sup>th</sup> 2020

Winkler AG

B. Häpkel  
General Manager