OPERATING INSTRUCTIONS

AUSTROMAT™ 220

FIRING FURNACE
FOR DENTAL LABORATORIES

DEKEMA
DENTAL-KERAMIKÖFEN

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Dental Servis
Serdar Ayısıt
0555 274 05 51

DEKEMA Dental-Keramiköfen GmbH
Industriestrasse 22
D-83395 Freilassing

+49 (0) 8654-4639-0

+49 (0) 8654-66195

info@dekema.com

www.dekema.com

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Although we have reviewed the contents of this document to determine its correspondence with the described hardware and software, some differences may exist. We assume no liability for complete agreement. The information in this document is regularly reviewed. The necessary corrections appear in subsequent editions.

We reserve the right to make changes

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Serdar Ayısıt
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1. Usage, data

1.1. Introduction

Dear customer,

You are in possession of a new, exceptional AUSTROMAT™ firing furnace.

DEKEMA's many years of experience in the field of firing furnace construction have gone into this equipment ensuring a very high level of quality, and exceptional performance and reliability. In order to take full advantage of the possibilities that your firing furnace offers and obtain superior results, we would like to ask you to spend a little time studying these operating instructions.

- The technical data and description of the usage of the firing oven can be found in section 1 Usage, data.
- Before you start using the firing furnace, it is essential that you read 2 Safety to prevent personal injury and property damage.
- How to set up and start the firing furnace is described in section 3 Start-up. Here you will find how to connect the firing furnace to a network or an individual computer.
- The operation of the firing furnace is explained in section 4 Operation, from the first steps in to the creation of firing programs. Practical examples and tips will help you identify the sources of troubles and assist you in eliminating them.
- Follow the suggestions for the service and maintenance of the device in section 5 Maintenance and Service.

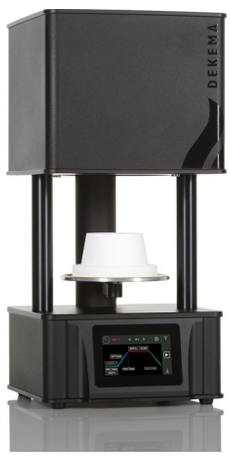


Fig. 1-1 AUSTROMAT™ 220

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1.2. Proper use

The AUSTROMAT™ firing furnace was designed for firing dental ceramic objects with and without a vacuum. In every task that you perform with the firing furnace, observe the safety instructions in the section Safety.

Every use that goes beyond these instructions is held to be improper and can cause serious personal injury or property damage. We assume no guarantee when the device is improperly used handled or not used according to instructions. DEKEMA assumes no liability for damages that are thereby incurred.

In particular, materials may not be heated that may trigger explosions, implosions and hazardous to health (toxic) or flammable gases.

Proper use also includes the following:

- Read and following these instructions for use,
- Observe the technical data. See section 1.4,
- Perform service tasks in a timely manner. See section 1.

1.3. Scope of delivery

The following components are included in the delivery of the firing furnace:

- AUSTROMAT™ 220 firing furnace with power cable,
- Optional: Vacuum pump with a vacuum hose, connecting cable, and ventilation unit,
- Insulation table,
- Operating instructions,
- Packaging material:
  - Cardboard boxes,
  - Foam material for protecting against impacts,

Ensure that delivery is complete, and that the components have not suffered any visible damage in transport. If this is not the case, please immediately contact your service partner. Please store the packaging in case you need to ship the equipment at a later date.

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1.4. Technical data

The technical data of the firing furnace are summarized in the following table. The cited connection values and tolerances must be maintained for the firing furnace to operate properly and for the warranty to take effect.

NOTE:
Only use tested third-party vacuum pumps that meet the specified technical data.

Dimensions and weight

- Dimensions: 266 x 531 x 258 mm (width x height x depth)
- Weight:
  - AUSTROMAT™ 220: 13 kg
  - Optional pump incl. ventilation unit: 7.8 kg

Electrical supply data

NOTE:
Only use fuses with the indicated lag and nominal current.

- Supply voltage: depending on the type (rating plate on the rear):
  - ~ 230 V, 50…60 Hz
  - ~ 120 V, 50…60 Hz
  - ~ 100 V, 50…60 Hz
- Fuses: depending on the type (rating plate on the rear):
  - ~ 230 V: 2 x 6,3 A T 250 V
  - ~ 120 V: 2 x 16 A T 250 V
  - ~ 100 V: 2 x 16 A T 250 V
- Delivered vacuum pump: depending on the type (rating plate on the rear):
  - ~ 230 V, 50…60 Hz
  - ~ 120 V, 50…60 Hz
  - ~ 100 V, 50…60 Hz
- Ventilation unit: ~ 100 V / ~ 120 V / ~ 230 V

Service data

- Power consumption: including delivered vacuum pump:
  - max. 1500 W for 230 V
    max. 1400 W for 120 V
    max. 1450 W for 100 V
- Firing temperature:
  - max. 1100 °C

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- Third-party vacuum pump:
  - Power consumption 120 W
  - max. leakage current 0.75 mA
  - Final pressure < 40 mbar

Measurement category and pollution degree (electro technics)

- Overvoltage category: OVCAT 2 — The firing furnace is classified in overvoltage category OVCAT 2 according to EN 61800-5-1. The equipment is not permanently connected to the fixed installation.
- Pollution degree: 2 — The firing furnace is classified in pollution degree 2 II according to EN 60664-1. Non-conductive pollution occurs. Occasionally a temporary conductivity caused by condensation or hand perspiration is to be expected.

1.5. Ambient conditions

NOTE:
The firing furnace should not be operated for some time after sudden change of ambient temperature as otherwise condensation may occur in the electronic components, thus causing damage.

The data for the ambient temperature and humidity are designed for conditions at sea level.

- During operation:
  - Temperature: +15 °C…+35 °C
  - Humidity: max. 60 %, non-condensing
  - Height above sea level max. 2000 m
- When not operating and during storage:
  - Temperature: +10 °C…+50 °C
  - Humidity: max. 80 %, non-condensing
- During Transport:
  - Temperature: -10 °C…+55 °C
  - Humidity: max. 80 %, non-condensing

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2. Safety

2.1. This section must be read!

Read this entire section before you start working with the firing furnace! It contains important instructions for your personal safety. This section must be read and understood by all persons who work with this firing furnace in any phase of the product life of the AUSTROMAT™ to prevent damage to persons and/or material.

2.2. Organization of the safety instructions

The following safety instructions Safety instructions refer to various hazard levels.



⚠ DANGER

DANGER identifies a direct, high risk hazard that can cause death or serious bodily injury if it is not avoided.



⚠ WARNING

WARNING identifies a potential, medium-level hazard that can cause death or serious bodily injury if it is not avoided.



⚠ CAUTION

CAUTION identifies a low-risk hazard that can cause slight or moderate bodily injury or property damage if it is not avoided.

NOTE:
A note such as this refers to particularly important information that, however, does not concern safety.

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2.3. General safety regulations

2.3.1. Personnel

All personnel who work with the AUSTROMAT™ must have the required technical qualifications and have received appropriate instruction and training. They must be informed about all dangers and risks in conjunction with this system.

2.3.2. Operating instructions

Read and learn
Anyone who works on or with the AUSTROMAT™ firing furnace in any phase of the product life must read these operating instructions and understand them. This concerns in particular chapter 2 Safety.

Retention
The operating instructions are delivered along with the firing furnace and are considered an essential component of the product. They must be stored with the firing furnace in a highly visible location and be directly accessible. You can order of additional copies of the operating instructions from DEKEMA, see page 2.

Completeness
Always use the complete original version of these operating instructions. The instructions in the operating instructions contain cross-references to other sections containing important information. Incomplete copies or copies of individual pages can not provide all the necessary information of the operating instructions.



⚠ WARNING

Incomplete operating instructions.

A lack of safety instructions due to incomplete operating instructions can cause serious injury and property damage.

Always perform work with a complete copy of the operating instructions. Do not copy individual pages.

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2.3.3. Operation

Use
The AUSTROMAT™ firing furnace may only be used for its intended purpose. See section 1.2. All instructions and procedures that can affect the safety of persons or the firing furnace are forbidden. The branch-specific and local regulations concerning accident prevention must be observed.

Please keep the lift closed when not in use. Due to increasing surface temperatures the furnace shall not operate for more than one hour with an open lift above 550 °C.

Condition
The firing furnace may only be operated when it is functioning properly, and with supervision. Observe the technical data in section 1.4.
If the firing furnace can no longer be operated safely, immediately unplug it and prevent it from being unintentionally operated. Reasons for assuming that the equipment cannot be used safely:

- An alarm message appears,
- Visible damage to the housing or power cable,
- Malfunctions,
- Frequently required fuse changes,
- Long storage in a problematic environment (moisture, see section 1.5).

Safety stickers
Safety stickers are affixed to the firing furnace and provide notification of residual danger. The safety stickers may not be removed. They must be replaced if they are lost or are no longer clearly legible.

Workplace
The operator must provide corresponding instructions and inspections to ensure order and cleanliness of the workplace and the surroundings of the AUSTROMAT™ firing furnace.

Waste
If polluting waste arises from use, the operator is responsible for the proper disposal.

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2.3.4. Maintenance and Service

Spare parts



⚠ WARNING

Non-original spare parts.

Malfunctions can arise if third-party parts are used. In certain circumstances, this can cause serious injury and substantial property damage.

Always use original replacement parts from DEKEMA. See section 5.4

Retrofitting
Independent retrofitting and changes that affect the safety of the firing furnace are forbidden.

2.3.5. Disposal

The operator must carefully dispose of the firing furnace in accordance with regulations. He can give it to a licensed, private or public collection facility, or recycle it or dispose of it himself. See section 6.2.

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2.4. Risks

Observe the following hazard instructions in all of your jobs with the firing furnace.



⚠ DANGER

Electrical shock from voltage-conducting parts.

The firing furnace is operated using mains voltage. Death may result due to electrical shock from touching voltage-conducting parts.

Observe the following instructions:

- **Never contact voltage-conducting parts,**
- **Do not use your hands or any objects to grasp things in the firing chamber,**
- **Maintenance and service jobs may only be performed when a device is not powered. Turn off the firing furnace, and pull the power plug,**
- **The protective conductor (inside and outside of the unit) must always be safe for operation and may never be disabled. The connection may never be intentionally severed.**

NOTE:
Only personnel with electrotechnical training and experience with handling devices that operate on mains voltage may perform work on the electrical components.

Protection of personnel against electric shock
The equipment has to be connected with a supply source, which incorporates a circuit-breaker that interrupts the supply at a differential current of 30 mA or less.

The operator has to be protected against electric shock, including electric shock resulting from the possibility of simultaneous contact with hazardous live parts and parts connected to the protective conductor terminal. The following protective means are recommended:

- using insulated tools,
- wearing insulating clothing,
- standing on an insulating surface,
- shrouding of parts connected to the protective conductor terminal with which the operator might come into contact in normal use.

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⚠ WARNING

Fire hazard.

The firing chamber can reach temperatures above 1,000 °C during operation. Heat-sensitive materials close to the firing furnace can easily ignite and cause a fire.

Observe the following instructions:

- **Never operate the firing furnace without the insulation table being mounted,**
- **The vent holes in the cover of the firing chamber must be unobstructed,**
- **Make sure that flammable materials (such as cleaning alcohol, wiping cloths, etc.) or objects that can be damaged by heat are sufficiently distance from the firing furnace,**
- **Never operate the firing furnace without supervision.**





⚠ WARNING

Hot surfaces.

The firing chamber can reach temperatures above 1,000 °C during operation. There is an extreme burning hazard from touching hot surfaces after the firing chamber is opened.

Never directly contact hot parts of the firing furnace. The firing furnace requires several hours to cool after it is turned off. Observe the following instructions:

- **Do not use your hands or any objects to grasp things in the firing chamber,**
- **Do not grasp the lift seat, insulation table or firing objects with your bare hands,**
- **Use suitable tools (tweezers) to remove the firing objects, or wear safety gloves.**



⚠ CAUTION

Ceramic dust from insulation materials.

The firing chamber and insulation table consist of ceramic insulating material. Inhaling ceramic dust can be hazardous to your health.

Do not inhale the dust. To remove ceramic dust, use a suitable vacuum cleaner. Read the safety data sheets for the insulation materials in section 7.

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3. Start-up

3.1. Unpacking and setting up

Packaging symbols
The packaging can be labeled with the packaging symbols shown below. The symbols must be followed.

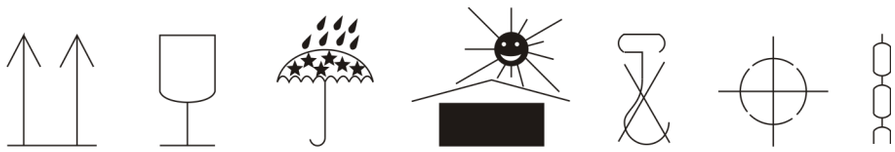


Fig. 3-1 *Packaging symbols*

1 *Top*
2 *Fragile*
3 *Protect from moisture*
4 *Keep away from heat*
5 *Do not use hooks*
6 *Center of gravity*
7 *Lifting point*

Unpacking
The following links provide videos that show the unpacking and installation procedure. You may also contact DEKEMA to request the videos (address see page 2).

	QR code	Link for PC
• Standard version (unpacking and setting up)		https://youtu.be/LyDaI6NuYoA
• with accessories (unpacking and setting up incl. vacuum pump)		https://youtu.be/0AVuCZlAdVg

NOTE:
It is possible that the firing furnace may not be safe to use when there is visible damage to the housing or power cable.

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1. Remove the packaging, and keep the packaging material for storing the firing furnace or for later transport.

2. Make sure that all of the parts listed in the scope of delivery are in the delivered package; see section 1.3.

3. Check the delivery for transportation damage. Notify immediately of any complaints.

4. Transport the firing furnace to the provided setup site. See section 3.2.

3.2. Requirements at the setup site

NOTE:
The following instructions must be followed each time the firing furnace is moved and repaired.

NOTE:
Set up the firing furnace on a place where you can easily remove the power cable.

Firing furnace
The setup site of the firing furnace must meet the following requirements:

- Set up the furnace on a dry, flat, solid, and fire-proof surface.
- The surface must be able to bear the weight of the firing furnace. See section 1.4.
- Materials and objects that can be damaged by heat must be sufficiently distant from the firing furnace.
- The vents in the firing furnace must not be obstructed to enable the circulation of cooling air.
- A power socket must be close to the device and easily accessible.
- The conditions in the environment at the setup site must meet the requirements in section 1.5.

Vacuum pump
The setup site of the vacuum pump must meet the following requirements:

- Set up the vacuum pump at a well-ventilated site protected from dust and dirt.
- Easily flammable and temperature-sensitive materials and objects must be sufficiently distant from the vacuum pump.
- The vents in the firing furnace must not be obstructed to enable the circulation of cooling air.

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3.3. Startup

NOTE:
When connecting the firing furnace and vacuum pump:

- **The firing furnace is operated using mains voltage.**
- **Ensure that the connected loads of the vacuum pump (name plate) correspond to supply data for the firing furnace.**
- **Use only suitable power sockets with ground contacts, and never use adapter plugs.**
- **Do not run the connection lines past places of the firing furnace that are hot, and especially avoid direct contact.**
- **Install the ventilation unit for the firing furnace in the vacuum line between vacuum pump and firing furnace.**

NOTE:
The ventilation unit is required to vent the evacuated firing chamber. When using a third-party vacuum pump you have to install an appropriate ventilation unit. See also chapter 5.3.

The following links provide videos that show the unpacking and installation procedure. You may also contact DEKEMA to request the videos (address see page 2).

	QR code	Link for PC
• Standard version (unpacking and setting up)		https://youtu.be/LyDaI6NuYoA
• with accessories (unpacking and setting up incl. vacuum pump)		https://youtu.be/0AVuCZlAdVg

If necessary: Remove any ceramic dust from the lift seat and the sealing ring. Brush the dust into a receptacle. Do not blow away the dust, and do not inhale it.

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4. Operation

NOTE:
When using the firing furnace, observe section 2, Safety.

4.1. Turning on and off

NOTE:
Never operate the firing furnace without supervision.

Preparations
Check if:

- the AUSTROMAT™ is connected by a power cable to a socket with a protected contact. See section 3.3,
- the optional vacuum pump is correctly connected to the firing furnace. See section 3.3.

Switching on

- Turn on the firing furnace:
  Main switch on the back of the firing furnace: The control of the firing furnace starts up over a period of about 1 minute. The firing furnace performs an internal software and hardware check, and the lift moves down automatically.
- Make sure that the insulating table is mounted on the lift seat. If not turn the firing furnace off, and mount the insulating table. Then turn on the firing furnace again.

Switching off

- Close the firing chamber before switching off the firing furnace to avoid any condensation in the ceramic furnace.
- Turn off the firing furnace:
  Main switch on the back of the firing furnace.

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4.2. Mounting and removing a firing object



⚠ WARNING

Hot surfaces.

The firing chamber can reach temperatures above 1,000 °C during operation. There is an extreme burning hazard from touching hot surfaces after the firing chamber is opened.

Never directly contact hot parts of the firing furnace. The firing furnace requires several hours to cool after it is turned off. Observe the following instructions:

- **Do not use your hands or any objects to grasp things in the firing chamber,**
- **Do not grasp the lift seat, insulation table or firing objects with your bare hands,**
- **Use suitable tools (tweezers) to remove the firing objects, or wear safety gloves.**

Mounting the firing object

- Place the firing object on the firing tray, and place the firing tray in the middle of the insulation table.
- When positioning the firing object and firing tray, ensure that no parts jut out over the edge of the insulation table. There is a danger of damaging the firing object and thermal insulation material when closing the firing furnace.



Fig. 4-1 *Mounting the firing object*

- The height of the firing tray including the firing object may not exceed 36 mm. Otherwise, the thermocouple would be damaged in the firing chamber when the chamber is closed.

Removing the firing object

- Use suitable tools (tweezers) to remove the firing objects, or wear safety gloves.

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4.2.1. Firing programs

Firing tray
Every type of firing tray and kiln furniture has an effect on the temperature of the firing object due to its color and composition. Using a standardized firing tray can thus ensure constant firing results.

Firing parameters and test firings
Care in creating firing programs and editing firing parameters has a significant effect on the quality of firing results. The recommended firing parameters are thus to be seen only as guidelines. Perform test firings to identify your individual firing parameters based upon these guidelines.

4.2.2. Programming Suggestions

You can find non-binding programming suggestions at https://www.dekema.com/service-login/ . The programs are firing programs converted according to manufacturer's instructions for DEKEMA dental ceramic furnaces of the AUSTROMAT™ series.

The parameters such as heating rates, temperatures and hold times indicated by the respective manufacturer are transferred to the programs. These quantities depend on the conditions of use such as the size and material of the firing tray or soft firing cushion, the size and weight of the fired object, or the firing oven used when the ceramic manufacturer was determining the firing parameters.

To obtain the best firing results, DEKEMA recommends that you carry out a sample firing before the first ceramic firing. If different firing material is fired in your AUSTROMAT™ regular cleaning firings are recommended. This reduces contamination and foreign impurities on the fired material and thermocouple to an acceptable level. Never use additives during the cleaning firing!

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4.3. User interface

The following links provide a video that shows the operation and temperature calibration procedure. You may also contact DEKEMA to request the video (see page 2 for the address).

	QR code	Link for PC
• Operation and temperature calibration		https://youtu.be/-HE5FwLF90E

The firing furnace AUSTROMAT™ 220 is operated via the touchscreen at the front of the device. The screen display is divided into different areas.

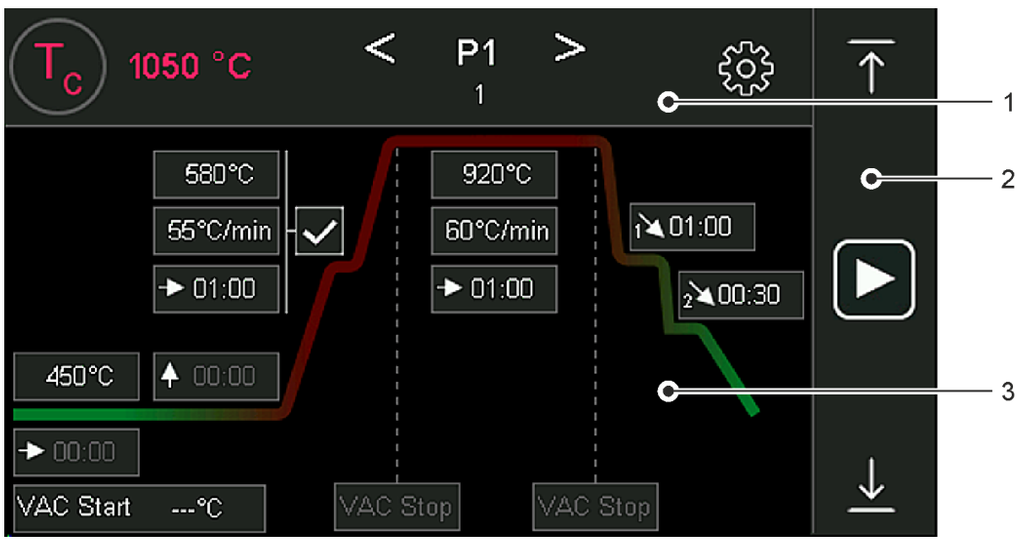


Fig. 4-2 Screen display, example of the program editor

1 Information bar
2 Function bar
3 Display area

Information bar
Shows all of the important parameters.

- The temperature in the firing chamber: "Tc".
  - Red text. The firing furnace is heating up,
  - Blue text: The firing furnace is cooling down,
  - Touch on the temperature "Tc" in order to switch on and off the heating.

- The program selection: "< P# >".
  - Touch the [<] or [>] button in order to display the previous and next program, respectively,
  - Touch the program symbol [P#] in order to display the program list,
  - A lock next to the program symbol indicates that the programs are locked, and cannot be modified.

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- Touch the cog-wheel symbol [⚙] in order to open the settings of the firing furnace.
  - Touching 1x:
    - Setting the CCF value (see chapter 5.2),
    - Setting the brightness of the screen,
  - Touching for 10 seconds:
    - Setting the screen saver,
    - Calibrating the screen,
    - Repeating a program.

Function bar
The function bar contains the following buttons :

- Moving the lift up [⤒] and down [⤓]. When the settings are selected (cog-wheel symbol in the information bar) an additional display indicates if the lift has reached the upper and lower limit switch, respectively.

- Starting [►] and stopping [■] a program,

Display area
The display area shows the current menu of the firing furnace control such as the settings, or the program display.

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4.3.1. Overview menu control

Fig. 4-3 shows the overview of the menu control and the functions of the firing furnace.

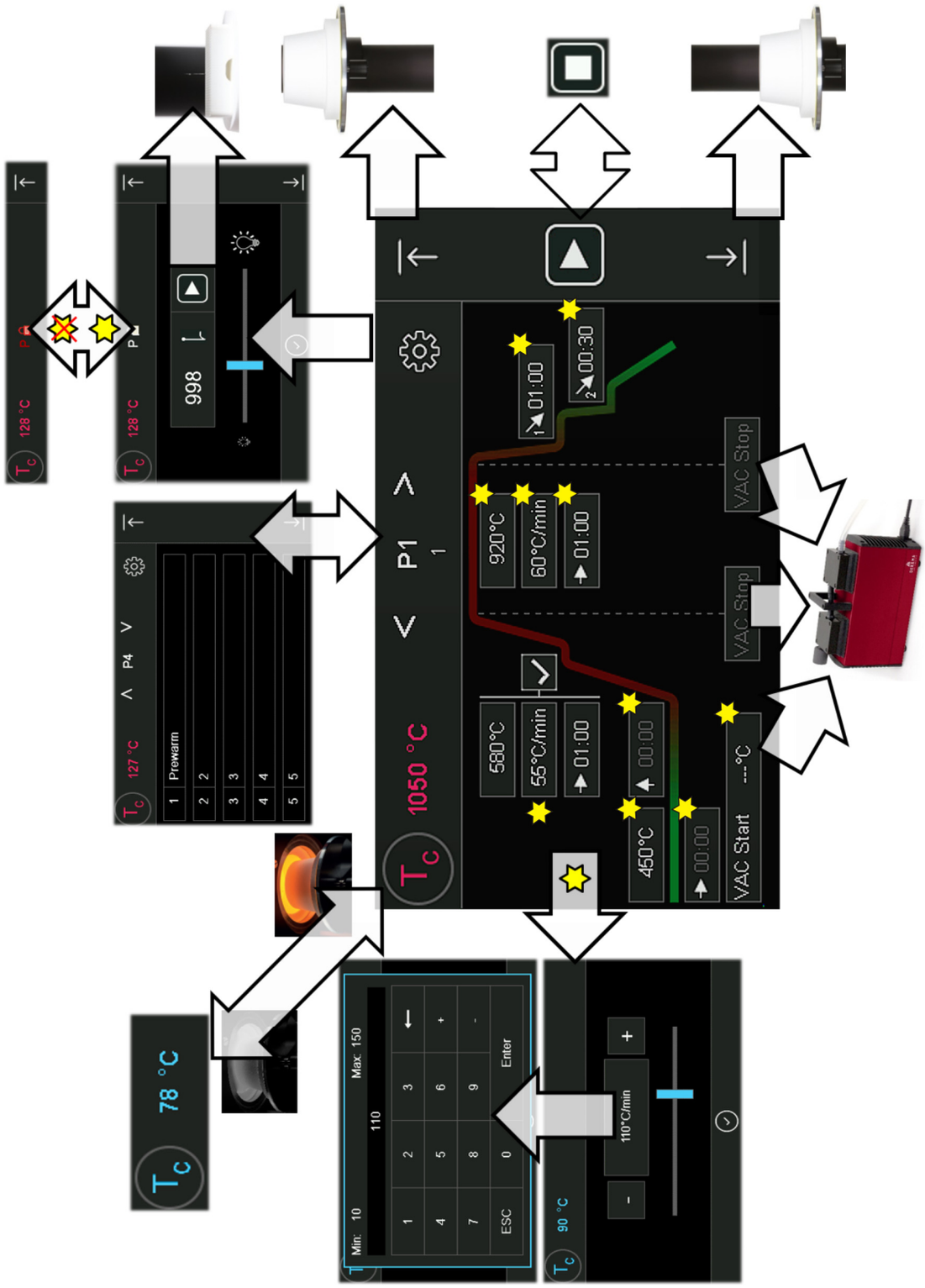


Fig. 4-3 Overview menu control

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4.3.2. Firing parameters

Fig. 4-4 shows a typical firing program and the available firing parameters, which are explained in the following table.

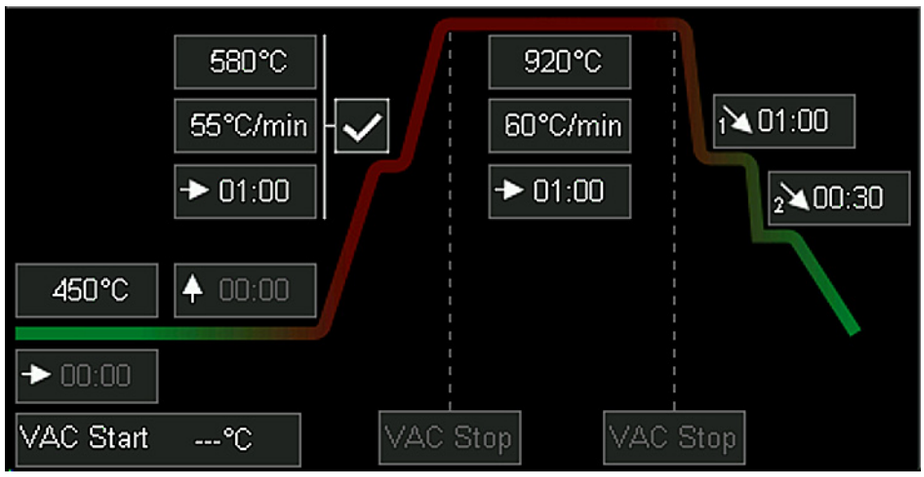
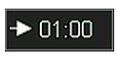
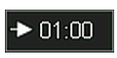


Fig. 4-4 *Program with firing parameters (example)*

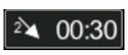
A colored curve visualizes the temperature as a function of time in the firing program. Red parts of the curve indicate that the firing process is executed.

Firing parameter	Description	Range
Start temperature 450°C	This temperature is first set in the firing chamber. It is used as a basic temperature for the drying and preheating process.	100…600 °C
Drying time 00:00	The firing object is exposed to the heat radiated from the firing chamber for the entered time and is thereby dried. The lift does not move during the drying time. Usually, the lift should be in the bottom position when the program is started. If the start temperature is very low, i.e. for low-melting ceramics, it may be necessary to raise the lift manually.	0…59 min 59 s
Closing time 00:00	During the entered closing time, the lift closes from bottom to top position (firing chamber closed). The firing object is slowly preheated up to the start temperature.	0…59 min 59 s
Vacuum start VAC Start ---°C	The firing chamber is evacuated at vacuum start temperature. The vacuum pump starts working.	-
Vacuum stop VAC Stop	The vacuum pump keeps running until vacuum stop. The firing chamber maintains evacuated until the final temperature has been reached or until the holding time has been finished.	-

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Firing parameter	Description	Range
Stage 1 of the temperature ramp 	Stage 1 of the temperature ramp can be activated or deactivated by clicking on the checkbox. When stage 1 is activated you can set the following firing parameters.	activated deactivated
Final temperature 	• The final temperature of stage 1. The allowed maximum value T_{max} is the firing temperature entered for stage 2.	100…T_{max} °C
Temperature rising rate 	• The temperature increases from the start temperature to the final temperature of stage 1.	0…99 °C/min
Holding time 	• The final temperature of stage 1 is maintained for this period.	0…59 min 59 s
Stage 2 of the temperature ramp 	This stage of the temperature ramp is always executed from the firing program. The temperature increases up to the firing temperature. • Stage 1 of the temperature ramp activated: Start temperature stage 2 = Final temperature stage 1 • Stage 1 of the temperature ramp deactivated: Start temperature stage 2 = Start temperature You can set the following firing parameters.	-
Final temperature 	• The final temperature or firing temperature.	100…1100 °C
Temperature rising rate 	• The temperature increases from the start temperature of stage 2 to the firing temperature.	0…99 °C/min
Haltezeit 	• The firing temperature is maintained for this period.	0…59 min 59 s

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Firing parameter	Description	Range
1st cooling stage 	Slow cooling in the **upper** temperature range. The firing chamber is closed again after being briefly opened, and the temperature in the firing chamber slowly drops. The firing object is exposed to this temperature range for the entered time.	0…59 min 59 s
2nd cooling stage 	Slow cooling in the **lower** temperature range - relaxation cooling. The lift moves to half-height and remains there for the entered time. The heating is switched off, and the firing chamber temperature drops down.	0…59 min 59 s

Tab. 4-1 Overview firing parameters

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4.4. Some practical tips

4.4.1. General operation of the furnace

Lift noise
After switching on the firing furnace, the lift moves down and performs automatic lift calibration. The brief buzzing noise is due to technical reasons and is completely normal. Please note that the firing furnace does not react to any commands during this calibration time.

Automatic heating
The firing furnace automatically heats to the temperature required to start the next program when programs are selected. In general, it occurs when the firing chamber is open.

Save energy
Close the firing chamber in the event of prolonged breaks between firings. This will save energy and avoid unnecessary wear on the heating element and unnecessary warming of the lid.

Condensation
Close the firing chamber before switching off the furnace to avoid unnecessary condensation in the firing furnace.

4.4.2. Heating element

The heating elements are wear-sensitive parts, whose service life depends on how much it is used. Running the check program regularly makes it easier to identify the correct time to replace a heating element. Another way of identifying heating element wear is visual inspection. Look into the open firing chamber from below while the firing furnace is switched off and cold. If the heating strips are deformed or there is strong glass formation, the heating element should be replaced.

4.4.3. Thermocouple - temperature calibration

The thermocouples are wear-sensitive parts, whose service life depends on how much they are used. Visually inspect the thermocouples regularly - particularly before temperature calibration - while the firing furnace is cold and switched off and the firing chamber is open. A mirror held at an angle under the firing chamber can be very helpful. Ensure that they the thermocouples are not bent since this influences temperature measurement and hence the firing results.

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5. Maintenance and Service



⚠ WARNING

Non-original spare parts.

Malfunctions can arise if third-party parts are used. In certain circumstances, this can cause serious injury and substantial property damage.

Always use original spare parts from DEKEMA.

NOTE:
When performing all maintenance and service tasks, maintenance and service tasks observe section 2, Safety.

If technical servicing or repairs are necessary, they should only be performed by authorized professionals.

NOTE:
After the ceramic furnace has been restored to operation, check for safety:
- **Federal Republic of Germany:VDE 0701,**
- **International: According to the legal requirements of your own country.**

5.1. Care

NOTE:
Before each maintenance and service task: Read section 2 Safety. In particular, be aware of the hazards listed in section 2.4.

- Clean the housing and control elements with a soft cloth moistened with a mild cleanser. Do not use scouring agents, scouring pads or solvents such as alcohol, gasoline or acetone.

- Always keep the sealing ring of the lift seat free of dust to ensure a reliable seal. Use a brush with a receptacle (for ceramic dust), or a moist cloth.

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5.2. Calibrate temperature

NOTE:
Before each maintenance and service task: Read section 2 Safety. In particular, be aware of the hazards listed in section 2.4.

A number of factors influence the temperature of the firing object. These can include: The color and shape of the firing tray, or the number and type of firing objects. Other major influences can be age-related effects such as heating element wear and changes to the thermoelectric properties of the temperature sensor. We therefore recommend calibrating the temperature of the firing furnace to adapt these factors and achieve the desired firing results. Calibrate the temperature whenever the firing results are inconsistent and at least once annually. Calibration is carried out by means of the calibration factor (CCF). Observe the following instructions:

- For new furnaces, we recommend that you calibrate the temperature for the first time after approximately six months.
- Make sure that the heating element and thermocouples are not damaged.
- Only use the DEKEMA calibration set that is for the specific furnace. This consists of a curved silver wire and a white ceramic firing tray.
- Always use the insulation table for calibration.
- Note that the temperatures of all the firing programs are adjusted when the CCF value changes. The firing temperatures of individual programs may have to be corrected.

Calibrating the temperature with the calibration set:
The following links provide a video that shows the operation and temperature calibration procedure. You may also contact DEKEMA to request the video (see page 2 for the address).

	QR code	Link for PC
• Bedienung und Temperaturkalibrierung		https://youtu.be/-HE5FwLF90E

1. The firing furnace must be thoroughly preheated before calibrating. The thermocouple must be preconditioned. Therefore perform a sample firing before calibrating the temperature.
   - Rule of thumb: The side walls of the top furnace housing must be warm to the touch.
2. Insert the bent silver wire (silver sample) from the calibration set in the middle of the firing tray (see the following illustration). Place the firing tray on the insulation table.

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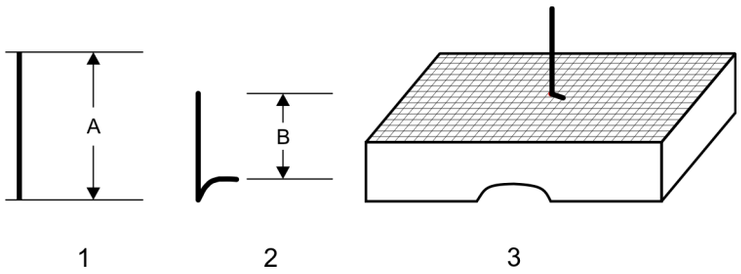


Fig. 5-1 *Placing the silver sample*

1 Silver wire A=25 mm
2 Silver sample(bent silver wire) B=15 mm
3 Silver wire inserted into the middle of a honey comb tray

3. Start the temperature calibration program:
   Touch the icon "Settings" > [►].

4. Evaluate the silver wire after the program using the illustration in Fig. 5-2.

5. Approach the correct setting of the CCF in small steps of approximately two to three points (such as 1004 to 1006).
   - By increasing the CCF, you increase the firing temperature,
   - By reducing the CCF, you lower the firing temperature.

Changing the CCF
Touch the CCF value, and enter the new CCF value.

Minor corrections of the CCF can be made instinctively. If there are very large or sudden deviations from the original CCF, check for technical faults, and inform your service partner.

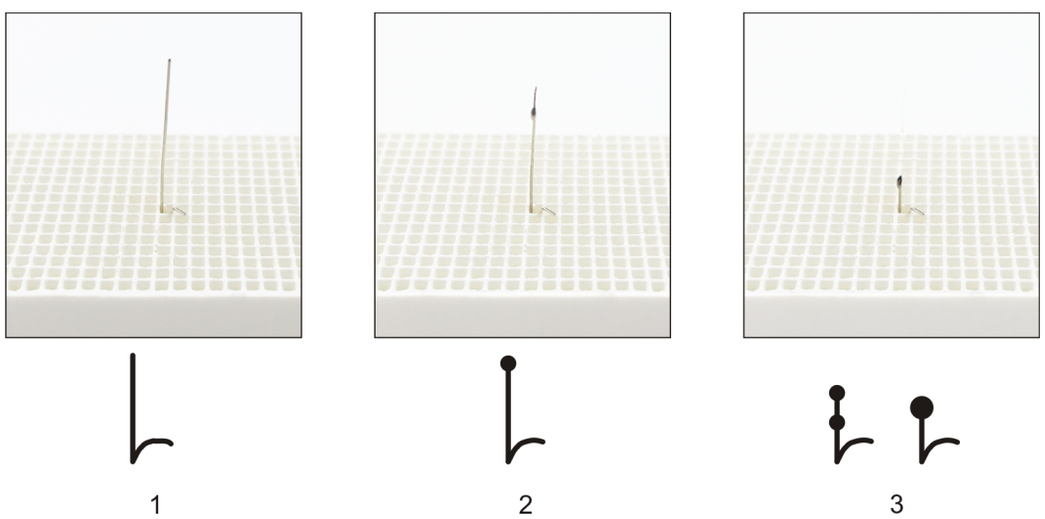


Fig. 5-2 *Evaluating the silver wire*

1 Effective temperature too low: Increase CCF by approximately 5
2 Effective temperature okay
3 Effective temperature a bit too high: Lower CCF by approximately 3

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5.3. Ventilation unit

The ventilation unit for the firing chamber is integrated in the vacuum line before the vacuum pump. The DEKEMA specific turbulence technique minimizes thermal influences when the firing chamber is being vented.

In the course of time, the ventilation unit becomes soiled by moisture and deposits. You have to replace the ventilation unit when heavily soiled, but after two years at the latest.

Component	Work to be done	Interval	Info
Ventilation unit	• Replace	2 years	Chapter 3.3, QR-Code / Link

Tab. 5-1 Maintenance schedule

Order numbers

Description	Article No.
Ventilation unit AUSTROMAT™ 220, 100 V	106498
Ventilation unit AUSTROMAT™ 220, 120 V	106499
Ventilation unit AUSTROMAT™ 220, 230 V	106500

Tab. 5-2 Order numbers

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5.4. Service and Transport

NOTE:
Before each maintenance and service task: Read section 2 Safety. In particular, be aware of the hazards listed in section 2.4.

NOTE:
These operating instructions are part of the documentation for the AUSTROMAT™ firing furnace. Read the service instructions before servicing.

Service partners
We recommend regular maintenance of the firing furnace by your service partner. This will ensure superior firing results. Contact the responsible service partner if you need to replace wearing parts or if the firing furnace needs to further repairs.

Spare parts
Only use original DEKEMA parts for servicing and maintaining the firing furnace. Contact your service partner, or contact DEKEMA directly.

Manufacturer address
Please direct any questions for the manufacturer to the following address:

DEKEMA Dental-Keramiköfen GmbH
Industriestrasse 22
D-83395 Freilassing

+49 (0) 8654-4639-0

+49 (0) 8654-66195

info@dekema.com

www.dekema.com

Transport

- Turn off to the firing furnace as described in section 6.1.
- To transport the firing furnace, only use the original box and the supplied packaging material.

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6. Storage and disposal

6.1. Storage

Turn off the firing furnace



⚠ WARNING

Fire hazard.

A fire hazard exists when the firing furnace is hot when packaged.

Let the firing furnace cool for several hours to room temperature with the firing chamber open after turning it off.

Proceed as follows:

1. Turn the firing furnace off, and let it cool to room temperature. Note that the device needs several hours to cool down.
2. Turn the firing furnace on, and move the insulation table up to close the firing chamber.
3. Turn the device off, and fold the power cable from the plug.

Storage Requirements
The firing furnace may only be stored in the original packaging. Observe the packaging symbols (see Fig. 3-1), and maintain the storage conditions in section 1.5.

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6.2. Disposal

6.2.1. Personnel qualifications

The operator can recycle or dispose the AUSTROMAT™ in accordance with legal provisions. A good knowledge of mechanics and how to differentiate between waste materials is required to properly disassemble the AUSTROMAT™ and separate the materials.

6.2.2. Legal guidelines

Responsibilities
The owner is responsible for proper disposal of the AUSTROMAT™. The owner can give the firing furnace to a licensed private or public collection facility, or the owner can recycle or dispose of the firing furnace himself.

NOTE:
If the owner gives the AUSTROMAT™ to a recycling facility, he must also provide the instructions for use. The operating instructions contain all the important instructions for disposal of the firing furnace.

Obligation to report
Companies that dispose of or recycle their own waste are subject to official approval and inspection. Under certain circumstances, they can be freed from the approval requirement if they take the requirements of environment protection into account. These companies are subjected to a reporting requirement. You can find out more information at the responsible office for environmental protection.

Environmental protection requirements
Wastes must be recycled or disposed of in such a manner that it does not pose a hazard to human health. Only those procedures or methods may be used that do not harm the environment. In particular, care must be taken that:

- The air, water and earth are not contaminated,
- Animals and vegetable life are not endangered,
- No excessive noise or odor arises,
- The surroundings and the landscape are not impaired.

Sort
After the firing furnace has been disassembled, the individual parts must be sorted into waste groups. This is done according to the list in the current European Waste Catalog (EWC) or comparable documents. The EWC catalog applies for waste independent of whether it is disposed or recycled.

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6.2.3. Disposal: Electrical and electronic materials

WEEE
The European Commission has issued a directive on the disposal of electrical and electronic materials (WEEE; 2002/96/EC). According to this directive, manufacturers have been responsible since August 2005 for returning and recycling electronic and electrical devices if no exception has been granted. As a manufacturer of laboratory equipment, DEKEMA Dental-Keramiköfen GmbH is freed from this requirement. Dental ceramic furnaces do not have to be returned to DEKEMA Dental-Keramiköfen GmbH.



⚠ CAUTION

Electrical and electronic materials

Electrical and electronic materials can negatively influence the environment.

Do not treat electrical and electronic trails as unsorted garbage. Collect old electrical and electronic devices separately.

6.2.4. Disposal: Other assemblies and components

The components of the AUSTROMAT™ are composed of the following materials:

- Metals and alloys
  - Aluminum (housing, cover panels, etc.)
  - Copper (cooling plates, electrical lines)
  - Steel (sections, fastening materials such as screws, etc.)
  - High-grade steel
- Glass and ceramic materials
  - Glass (screens and displays)
  - Ceramic insulation material (insulation table, firing chamber)
- Plastics and rubber
  - Plastics (hoses, covers, wheels, etc.)
  - Rubber (seals, silicone hoses)
- Composites
  - Electrical materials (cables, motors, components)
  - Electronic materials (printed circuit boards, computer, printer)
- Packaging
  - Styrofoam (cushion material)
  - Plastic (films)

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7. Safety data sheets

The relevant safety data sheets for the AUSTROMAT™ 220 firing furnace are on the following pages.

- Material "Kerform".

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RATH

Safety Data Sheet

based on Regulation (EC) No 1907/2006

Kerform, Kerasetter, Kerheat

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SECTION 1: Identification of the substance/mixture and of the company/undertaking

Product identifier

Kerform, Kerasetter, Kerheat

Relevant identified uses of the substance or mixture and uses advised against

Use of the substance/mixture

Use of the products is restricted to “professional users” for application as thermal insulation, heat shields, heat containment, gaskets and expansion joints at temperatures up to 1400°C in industrial furnaces, ovens, kilns, boilers and other process equipment and in the aerospace and automotive industries. Products are not intended for direct sale to the general public.
• Primary Use: Manufacture of fibre (refers to the initial production of the fibre and is therefore not relevant to the downstream user, secondary and tertiary use are relevant to users)
• Secondary Use: Conversion into wet and dry mixtures and articles (refer to section 8)
• Tertiary Use: Installation, removal (industrial and professional) / Maintenance and service life (industrial and professional) (refer to section 8)

Uses advised against

Do not use for injecting or spraying.

Details of the supplier of the safety data sheet

Company name:	Rath GmbH Mönchengladbach	
Street:	Krefelderstrasse 680-682	
Place:	D-41066 Mönchengladbach	
Telephone:	+49 (2161) 9692 - 0	Telefax: +49 (2161) 9692 - 61
Contact person:	Heinz Wimmer	
e-mail:	heinz.wimmer@rath-group.com	
Internet:	www.rath-group.com	

Emergency telephone: +49 (2161) 9692 - 12
This number is serviced during office hours.

SECTION 2: Hazards identification

Classification of the substance or mixture

Indications of danger : Toxic
R-phrases:
May cause cancer by inhalation.

GHS classification

Hazard categories:
Carcinogenicity: Carc. 1B
Hazard Statements:
May cause cancer by inhalation.

Label elements

Signal word:	Danger
Pictograms:	GHS08



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Hazard statements

H350i May cause cancer by inhalation.

Precautionary statements

P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P281 Use personal protective equipment as required.
P308+P313 IF exposed or concerned: Get medical advice/attention.
P405 Store locked up.

Special labelling of certain mixtures

Restricted to professional users.

Other hazards

The International Agency for Research on Cancer (IARC) reaffirmed in 2001 that group 2B ("possibly carcinogenic to humans") remains the appropriate classification for RCF/ASW. In accordance with 31st adaptation to Technical Progress of Directive 67/548/ECC as published 15th January 2009 the classification as "irritant" has been removed for all types of man made vitreous fibres (MMVFs). Mild mechanical irritation to skin, eyes and upper respiratory system may result from exposure. These effects are usually temporary.

SECTION 3: Composition/information on ingredients

Mixtures

Chemical characterization

Refractory shape based on alumino-silicate wool.
None of the components are radioactive under the terms of European Directive Euratom 96/29.

Hazardous components

EC No	Chemical name	Quantity
CAS No	Classification	
Index No	GHS classification	
REACH No		
266-046-0	Alumino-silicate wools	> 10 %
142844-00-6	Carc. Cat. 2 R49	
	Carc. 1B; H350i	
01-2119458050-50		
231-668-3	sodium hypochlorite, solution ... % Cl active	< 0,2 %
7681-52-9	C, N R34-31-50	
017-011-00-1	Skin Corr. 1B, Aquatic Acute 1; H314 H400	

Full text of R- and H-phrases: see section 16.

SECTION 4: First aid measures

Description of first aid measures

After inhalation

If nose or throat becomes irritated move to a dust free area, drink water and blow nose. If symptoms persist, seek medical advice.

After contact with skin

After contact with skin, wash immediately with plenty of water and soap.

After contact with eyes

Rinse immediately carefully and thoroughly with eye-bath or water. Do not subject to friction.

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SECTION 5: Firefighting measures

Extinguishing media

Suitable extinguishing media

Extinguishing materials should be selected according to the surrounding area.

Additional information

The product itself is not combustible. Packaging and surrounding materials may be combustible. Fire class: 0

SECTION 6: Accidental release measures

Personal precautions, protective equipment and emergency procedures

Avoid generation of dust. Wear personal protection equipment. Restrict access to the area to a minimum number of workers required.

Environmental precautions

Beat down dust with water spray. Do not empty into drains or the aquatic environment. Moreover, national legislation has to be observed!

Methods and material for containment and cleaning up

Use approved industrial vacuum cleaner for removal. High efficiency particulate air filter (HEPA filter). Absorb wet solids or soak them up. Don't use a brush or compressed air for cleaning surfaces or clothing.
Do not allow to be wind blown.

SECTION 7: Handling and storage

Precautions for safe handling

Advice on safe handling

Avoid exposure - obtain special instructions before use.
In case of open handling equipment with built-in suction must be used. If suction of the immediate vicinity is impossible or insufficient, the entire working place must be sufficiently ventilated using appropriate machines.
Conditions to avoid: dust deposits

Conditions for safe storage, including any incompatibilities

Requirements for storage rooms and vessels

Keep/Store only in original container. Keep container tightly closed. Protect containers against damage.
Contaminated packing must be completely emptied and can be re-used following appropriate cleaning.
Packaging materials: Recyclable Cardboard and/or plastic films

Specific end use(s)

Specific use(s):
The product is intended for professional use.

SECTION 8: Exposure controls/personal protection

Control parameters

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Exposure limits (EH40)

CAS No	Chemical name	ml/m³	mg/m³	F/ml	Category	Origin
675106-31-7	Polycrystalline alumina wool			500000	TWA (8 h)	
					STEL (15 min)	
1344-28-1	Aluminium oxides, respirable dust	-	4		TWA (8 h)	WEL
		-	-		STEL (15 min)	WEL
-	Refractory Ceramic Fibres and Special Purpose Fibres	-	5	1	TWA (8 h)	WEL
		-	-		STEL (15 min)	WEL
9005-25-8	Starch, respirable	-	4		TWA (8 h)	WEL
		-	-		STEL (15 min)	WEL

Additional advice on limit values

The Scientific Committee on Occupational Exposure Limit Values (SCOEL) as set up by a Commission Decision (95/320/EC) have proposed an OEL for RCF/ASW of 0.3 f/ml.

DNEL/DMEL (DERIVED NO-EFFECT LEVEL/DERIVED MINIMAL EFFECT LEVEL) The calculation of DMELs for fibres alone is not possible; a precautionary value is assigned based on fibrosis. An inhalation DMEL of 0.5 mg/m3 with an assessment factor of 25 can be calculated based on repeated dose toxicity, this value in the correct units would give a DMEL of 4 f/ml.

Exposure controls

Occupational exposure controls

United Kingdom: MDHS 59 specific for MMVF: “Man-made mineral fibre - Airborne number concentration by phase-contrast light microscopy” and MDHS 14/3 “General methods for sampling and gravimetric analysis of respirable and inhalable dust”. World Health Organisation Geneva 1997 ISBN 92 4 154496 1.

Protective and hygiene measures

Review your application(s) and assess situations with the potential for dust release. The use of products specially tailored to your application(s) will help to control dust. Some products can be delivered ready for use to avoid further cutting or machining. Some could be pre-treated or packaged to minimise or avoid dust release during handling. Consult your supplier for further details. Designate work areas and restrict access to informed and trained workers. Use operating procedures that will limit dust production and exposure of workers.

Avoid generation of dust. Beat down dust with water spray. Take up dust-free and set down dust-free. High efficiency particulate air filter (HEPA filter).

Respiratory protection

For dust concentrations below the exposure limit value, RPE is not required but FFP2 respirators may be used on a voluntary basis. For short term operations where excursions are less than ten times the limit value, use FFP3 respirators. In case of higher concentrations or where the concentration is not known, please seek advice from your company and/or your supplier. You may also refer to the ECFIA code of practice available on the ECFIA’s web site: www.ecfia.eu

Hand protection

Suitable gloves type: Chromate-free leather. Used working clothes should not be used outside the work area. Wash hands before breaks and at the end of work. Wash contaminated clothing prior to re-use. Street clothing should be stored seperately from work clothing.

Eye protection

Tightly sealed safety glasses. Dust protection goggles.

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Skin protection

INFORMATION AND TRAINING OF WORKERS: This should include: The applications involving RCF/ASW-containing products; The potential risk to health resulting from the exposure to fibrous dust; The requirements regarding smoking, eating and drinking at the workplace; The requirements for protective equipment and clothing; The good working practices to limit dust release; The proper use of protective equipment.

Environmental exposure controls

RCF/ASW is inorganic, inert and stable and it is not soluble in water (solubility <1mg/litre) and as such does not pose a detrimental effect on the environment.
Do not allow to be wind blown.

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Table of Uses and Risk Management Measures (RMM)

Intended use	RMM - Hierarchy of Controls
Secondary use – Conversion into wet and dry mixtures and articles. Process would include: Mixing forming operations, handling of RCF/ASW products, assembly of RCF/ASW containing products, machine and hand finishing of RCF/ASW products. Reference ES 2	- Where it is practical to do so, automatically feed RCF/ASW in to the process - Where practical to do so, segregate dry and wet processing - Enclose the process where practically possible. - Where practical to do so, segregate machine areas and restrict access to operators involved in the process. - Enclose Machines as far as practically possible. - Install LEV where possible, when machine finishing, handling, compressing and hand cutting to remove dust at source - Employ experienced personnel – trained in the correct use of fibrous products - PPE and RPE used for all dusty tasks - Provide vacuum cleaner connection point to central system where practical or use a portable HEPA vacuum - Regular clean up – using a wet scrubbing unit where practically possible and in general a HEPA vacuum should be used. - Dry brushing and use of compressed air should be prohibited - Waste materials to be contained at source, labelled and stored separately for disposal or recycling.
Intended use	**RMM - Hierarchy of Controls**
Tertiary use - maintenance and service life (Industrial or professional use) Process: Small scale repairs involving removal and installation of RCF/ASW products. Use of the product in an enclosed system, where there is occasional control access or no access. Reference ES 3	- Use pre-cut, pre-sized pieces where practically possible. - Allow access only to trained (authorised) operators - Where practically possible, perform all hand cutting in a segregated area, on a down draft bench. - Clean up work area regularly during the shift using a HEPA equipped vacuum cleaner. - Prohibit use of dry brushing and compressed air cleaning. - Bag and seal waste immediately at source. - Use PPE and RPE appropriate to task. - Employ good hygiene practices.
Intended use	**RMM - Hierarchy of Controls**
Tertiary use- installation and removal (industrial or professional). Large scale removal and installation of RCF/ASW from Industrial processes. Large scale removal and installation by professionals. Reference ES 4	- Where practically possible enclose or segregate the work area. - Allow only authorised personnel. - Pre-wet insulation prior to removal where practically possible. - Where practically possible use a water lance for removal or vacuum-truck. - Use down draft bench for hand cutting products. - Cover pre-cut section during transport and storage to prevent secondary exposure. - Where practically possible provide multiple vacuum hoses for convenient cleanup of spillage or use portable HEPA filtered vacuums. - Bag waste materials immediately at source - Prohibit use of dry brushing and or compressed air cleaning. - Experienced personnel only - Use appropriate PPE and RPE appropriate to expected concentrations

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SECTION 9: Physical and chemical properties

Information on basic physical and chemical properties

Physical state:	solid	
Colour:	white	
Odour:	odourless	
pH-Value:		not applicable
Melting point:		> 1650 °C
Boiling point:		not applicable
Flash point:		not applicable

Flammability

Solid: not applicable

Explosive properties

not applicable

Auto-ignition temperature

Solid: not applicable

Vapour pressure:	not applicable
Density:	not applicable
Water solubility:	< 0.001 g/L
Partition coefficient:	not applicable

Other information

Length weighted geometric mean diameter of fibres contained in the product: 1.3 - 4 µm

These fibres are dense materials and so will settle rapidly from both air and liquid.

SECTION 10: Stability and reactivity

Possibility of hazardous reactions

Contact with acids liberates very toxic gas. Formation of: Chlorine (Cl2).

Conditions to avoid

Avoid generation of dust.

Incompatible materials

No risks worthy of mention.

Hazardous decomposition products

Upon heating above 900°C for sustained periods, this amorphous material can begin to transform to mixtures of crystalline phases. For further information please refer to Section 16.

SECTION 11: Toxicological information

Information on toxicological effects

Toxicocinetics, metabolism and distribution

Exposure is predominantly by inhalation or ingestion. Man made vitreous fibres of a similar size to RCF/ASW have not been shown to migrate from the lung and/or gut and do not become located in other parts of the body. When compared to many naturally occurring minerals, RCF/ASW has a low ability to persist and accumulate in the body (half-life of long fibres (> 20 µm) in 3 week rat inhalation test is approx. 60 days). Human Toxicological data: In order to determine possible human health effects following RCF exposure, the University of Cincinnati has been conducting medical surveillance studies on RCF workers in the U.S. The Institute of Occupational Medicine (IOM) has conducted

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medical surveillance studies on RCF workers in European manufacturing facilities.

Pulmonary morbidity studies among production workers in Europe and USA have demonstrated an absence of interstitial fibrosis and no decrement in lung function associated with current exposures, but have indicated a reduction of lung capacity among smokers. A statistically significant correlation between pleural plaques and cumulative RCF exposure was evidenced in the USA longitudinal study . The USA mortality study did not show evidence of increased lung tumour development either in the lung parenchyma or in the pleura.

Acute toxicity

Short term inhalation: No data available. Short term tests have been undertaken to determine fibre (bio) solubility rather than toxicity; repeat dose inhalation tests have been undertaken to determine chronic toxicity and carcinogenicity. - Oral: No data available. Repeated dose studies have been carried out using gavage. No effect was found.

Specific effects in experiment on an animal

Germ cell mutagenicity: Method: In vitro micronucleus test; Species: Hamster (CHO); Dose: 1-35 mg/ml; Routes of administration: In suspension; Results: Negative.

Carcinogenicity: Method: Inhalation. Multi-dose; Species: Rat; Dose: 3 mg/m3, 9 mg/m3 and 16 mg/m3; Routes of administration: Nose only inhalation; Results: Fibrosis just reached significant levels at 16 and 9 mg/m3 but not at 3 mg/m3. None of the parenchymal tumour incidences were higher than the historical control values for this strain of animal.

Method: Inhalation. Single dose; Species: Rat; Dose: 30 mg/m3; Routes of administration: Nose only inhalation; Results: Rats were exposed to a single concentration of 200 WHO fibres/ml specially prepared RCF for 24 months. High incidence of exposure-related pulmonary neoplasms (bronchoalveolar adenomas and carcinomas) were observed. A small number of mesotheliomas were observed in each of the fibre exposure groups (Mast et al 1995a).

Method: Inhalation. Single dose; Species: Hamster; Dose: 30 mg/m3; Routes of administration: Nose only inhalation; Results: Hamsters were exposed to a single concentration of 260 WHO fibres/ml specially prepared RCF for 18 months and developed lung fibrosis, a significant number of pleural mesotheliomas (42/102) but no primary lung tumours (McConnell et al 1995).

Method: Inhalation. Single dose; Species: Rat; Dose: RCF1: 130 F/ml and 50 mg/m3 (25% of non fibrous particles) RCF1a: 125 F/ml and 26 mg/m3 (2% of non fibrous particles); Routes of administration: Nose only inhalation Results: Rats were exposed to RCF1 and RCF1a for 3 weeks. The objective of the study was to compare lung retention and biological effects of the original RCF 1 compared to RCF1a. The main difference of these 2 samples was the non fibrous particle content of respectively 25% versus 2%. The post treatment observation was 12 months. Alveolar clearance was barely retarded after RCF1A exposure. After RCF1 exposure , however, a severe retardation of clearance was observed. (Bellmann et al 2001)

After intraperitoneal injection of ceramic fibres into rats in three experiments (Smith et al 1987, Pott et al 1987, Davis et al 1984), mesotheliomas were found in the abdominal cavity 6 in two studies, while the third report (Pott et al 1987) had incomplete histopathology. Only a few mesotheliomas were found in the abdominal cavity of hamsters after intraperitoneal injection in one experiment (Smith et al 1987). However, the ceramic fibres tested were of relatively large diameter. When rats and hamsters were exposed via intraperitoneal injection, tumour incidence was related to fibre length and dose (Smith et al 1987, Pott et al 1987, Miller et al 1999, Pott et al 1989). (From SCOEL publication (EU Scientific Committee on Occupational Exposure Limits) publication SCOEL/SUM/165, October 2010)

Reproductive toxicity: Method: Gavage; Species: Rat; Dose: 250mg/kg/day; Routes of administration: Oral; Results: No effects were seen in an OECD 421 screening study. There are no reports of any reproductive toxic effects of mineral fibres. Exposure to these fibres is via inhalation and effects seen

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are in the lung. Clearance of fibres is via the gut and the faeces, so exposure of the reproductive organs is extremely unlikely.

Irritation and corrosivity

Irritation and etching: Not an irritant. Evaluation: OECD 404

Irritant effect on the eye: Not an irritant.

Sensitising effects

After skin contact: no danger of sensitization.

Carcinogenic/mutagenic/toxic effects for reproduction

Specific symptoms in laboratory animals

Additional information on tests

STOT-Single exposure: Not applicable; STOT-Repeated exposure: Not applicable; Aspiration hazard: Not applicable.

Further information

IRRITANT PROPERTIES: Negative results have been obtained in animal studies (EU method B 4) for skin irritation. Inhalation exposures using the nose only route produce simultaneous heavy exposures to the eyes, but no reports of excess eye irritation exist. Animals exposed by inhalation similarly show no evidence of respiratory tract irritation. Human data confirm that only mechanical irritation, resulting in itching, occurs in humans, Screening at manufacturers' plants in the UK has failed to show any human cases of skin conditions related to fibre exposure.

SECTION 12: Ecological information

Toxicity

Experience so far shows this product to be inert and not degradable.
These products are insoluble in the natural environment and are chemically identical to inorganic compounds found in the soil and sediment.

Persistence and degradability

Inorganic product which is not eliminable from water through biological cleaning processes.

Bioaccumulative potential

Elimination from water is possible through precipitation or flocculation.

SECTION 13: Disposal considerations

Waste treatment methods

Advice on disposal

Waste containing > 0.1% RCF/ASW is categorised as a stable non-reactive hazardous waste, which can generally be disposed of at landfill sites licensed for this purpose Unless wetted, such a waste is normally dusty and so should be properly sealed in clearly labelled containers for disposal. At some authorised disposal sites, dusty wastes may be treated differently in order to ensure they are dealt with promptly to avoid them being wind blown. Please refer to the European list (Decision no 2000/532/CE as modified) to identify your appropriate European Waste Code (EWC) and ensure national and or regional regulation are complied with. When disposing of waste and assigning European Waste Code (EWC) any possible contamination during use will need to be considered and expert guidance sought as necessary.

When disposing of waste and assigning European Waste Code (EWC) any possible contamination during use will need to be considered and expert guidance sought as necessary.

Contaminated packaging

Cleaned containers may be recycled. Handle contaminated packaging in the same way as the substance itself.

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SECTION 14: Transport information

Land transport (ADR/RID)

UN proper shipping name: Not a hazardous material with respect to these transportation regulations.

Inland waterways transport

UN proper shipping name: Not a hazardous material with respect to these transportation regulations.

Marine transport

UN proper shipping name: Not a hazardous material with respect to these transportation regulations.

Air transport

UN proper shipping name: Not a hazardous material with respect to these transportation regulations.

Environmental hazards

Dangerous for the environment: no

Other applicable information

Ensure that dust is not windblown during transportation.

SECTION 15: Regulatory information

Safety, health and environmental regulations/legislation specific for the substance or mixture

EU regulatory information

Additional information

Product is classified and labelled in accordance with EC regulations or the corresponding national laws.

- Council Directive 67/548/EEC “on the approximation of the laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous substances as modified and adapted to the technical progress” (OJEC L 196 of 16 August 1967, p.1 and its modifications and adaptations to technical progress).
- Council Directive 1999/45/EC of 31 May 1999 concerning the approximation of the laws, regulations and administrative provisions of the Member States relating to the classification, packaging and labelling of dangerous preparations.
- Regulation (EC) No 1907/2006 dated 18th December 2006 on Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH).
- Regulation (EC) No 1272/2008 dated 16th December 2008 on classification, labeling and packaging of substances and mixtures (OJ L 353).
- Commission Directive 97/69/EC of 5 December 1997 adapting to technical progress for the 23rd time Council Directive 67/548/EEC (OJEC of 13 December 1997, L 343).
- Commission regulation (EC) No 790/2009 of 10 August 2009 amending, for the purposes of its adaptation to technical and scientific progress, Regulation (EC) No 1272/2008 of the European Parliament and of the Council on classification, labeling and packaging of substances and mixtures.
- The 1st Adaptation to Technical Progress (ATP) to Regulation (EC) No 1272/2008 enters into force on 25 September 2009. It transfers the 30th and 31st ATPs of Directive 67/548/EEC to the Regulation (EC) No 1272/2008.

INTEGRATION OF RCF/ASW IN TO ANNEXE XV OF THE REACH REGULATION: RCF are classified as a carcinogenic substance CLP 1B (See section 15 above). On the 13th of January 2010 ECHA updated the candidate list for authorisation (Annexe XV of the REACH regulation) and added 14 new substances in this list including aluminosilicate refractory ceramic fibres and zirconia aluminosilicate refractory ceramic fibres. As a consequence, EU (European Union) or EEA (European Economical Area) suppliers of articles which contain aluminosilicate refractory ceramic fibres and zirconia aluminosilicate refractory ceramic fibres in a concentration above 0.1% (w/w) have to provide sufficient

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information, available to them, to their customers or upon requests to a consumer within 45 days of the receipt of the request. This information must ensure safe use of the article and as minimum contains the name of the substance.

RESTRICTION ON MARKETING OF RCF/ASW: Marketing and use of RCF/ASW is controlled by Directive 76/769/EEC relating to restrictions on the marketing and use of certain dangerous substances and preparations as modified (21st amending, Directive 2001/41/EC, 19 June 2001) and is restricted to professional use only.

PROTECTION OF WORKERS: Shall be in accordance with several European Directives as amended and their implementations by the Member States:
- Council Directive 89/391/EEC dated 12 June 1989 “on the introduction of measures to encourage improvement in the safety and health of workers at work (OJEC (Official Journal of the European Community) L 183 of 29 June 1989, p.1).
- Council Directive 98/24/EC dated 7 April 1997 “on the protection of workers from the risks related to chemical agents at work” (OJEC L 131 of 5 May 1998, p.11).
- Council Directive 2004/37/EC of 29 April 2004 on the protection of workers from risks related to exposure to carcinogens mutagens and reprotoxics at work (OJEC L 158 of 30 April 2004).

OTHER EU REGULATIONS: Member states are in charge of implementing European directives into their own national regulation within a period of time normally given in the directive. Member States may impose more stringent requirements. Please always refer to national regulations.

SOURCE OF REFERENCE FOR OELs: UK: HSE EH40 Workplace Exposure Limit.

National regulatory information

Employment restrictions:	Observe employment restrictions for young people. Observe employment restrictions for child bearing mothers and nursing.
Water contaminating class (D):	- - not water contaminating

Chemical Safety Assessment

For this substance a chemical safety assessment has been carried out.

SECTION 16: Other information

Changes

Notice the directions for use on the label.

The above information describes exclusively the safety requirements of the product and is based on our present-day knowledge. The information is intended to give you advice about the safe handling of the product named in this safety data sheet, for storage, processing, transport and disposal. The information cannot be transferred to other products. In the case of mixing the product with other products or in the case of processing, the information on this safety data sheet is not necessarily valid for the new made-up material.

Abbreviations and acronyms

European Industry Association Representing HTIW (ECFIA): 3, Rue du Colonel Moll, 75017 Paris - Tel. +33 (0) 31 48 74 26 - www.ecfia.eu

Full text of R-phrases referred to under sections 2 and 3

31	Contact with acids liberates toxic gas.
34	Causes burns.
49	May cause cancer by inhalation.
50	Very toxic to aquatic organisms.

Full text of H-Statements referred to under sections 2 and 3

H314	Causes severe skin burns and eye damage.
H350i	May cause cancer by inhalation.

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H400 Very toxic to aquatic life.

Further Information

USEFUL REFERENCES (the directives which are cited must be considered in their amended version):
- Hazards from the use of Refractory Ceramic Fibre. Health and Safety Executive: Information document, HSE 267 (1998).
- Working with Refractory Ceramic Fibres 2006
- ECFIA; Code of Practice.
- Maxim LD et al (1998). CARE – A European programme for monitoring and reducing Refractory Ceramic Fibre dust at the workplace initial results; Gefahrstoffe – Reinhaltung der Luft, 58:3,97-103.
- Recognition and control of exposure to RCF, ECFIA, April 2009

ADDITIONAL INFORMATION AND PRECAUTIONS TO BE CONSIDERED UPON REMOVAL OF AFTER SERVICE MATERIAL:

As produced, all Refractory Ceramic Fibres are vitreous (glassy) materials which, upon continued exposure to elevated temperatures (above 900°C), may devitrify. The occurrence and extent of crystalline phase formation is dependent on the duration and temperature of exposure, fibre chemistry and/or the presence of fluxing agents. The presence of crystalline phases can be confirmed only through laboratory analysis of the “hot-face” fibre. IARC’s evaluation of crystalline silica states “Crystalline silica inhaled in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (Group 1)” and additionally mentioned “in making the overall evaluation, the Working Group noted that carcinogenicity in humans was not detected in all industrial circumstances studied...”.

As only a thin layer of the insulation (hot face side) is exposed to high temperatures, respirable dust generated during removal operations does not contain detectable levels of crystalline silica (CS). In applications where the material is heat soaked, duration of heat exposure is normally short and a significant devitrification allowing CS to build up does not occur. This is the case for waste mould casting for instance. Toxicological evaluation of the effect of the presence of CS in artificially heated RCF/ASW material has not shown any increased toxicity in vitro.

The lack of toxicological effects may be explained by the following factors ; Increased brittleness of fibres after service life, favours fast fibre translocation through macrophage. Microcrystals, including crystalline silica, are embedded in the glass structure of the fibre and are therefore not biologically available.

High concentrations of fibres and other dusts may be generated when after-service products are mechanically disturbed during operations such as wrecking. Therefore ECFIA recommends: a) control measures are taken to reduce dust emissions and b) all personnel directly involved wear an appropriate respirator to minimise exposure.

CARE PROGRAMME: ECFIA, representing the high temperature insulation wool (HTIW) industry, has undertaken an extensive industrial hygiene programme to provide assistance to the users of all products containing HTIW. The objectives are twofold: To monitor workplace dust concentrations at both manufacturers’ and customers’ premises and to document manufacturing and use of RCF products from an industrial hygiene perspective in order to establish appropriate recommendations to reduce exposures. If you wish to participate in the CARE programme, contact ECFIA or your supplier.

SPRAYING: ECFIA recommends that this fibre should not be used for spraying.

(The data for the hazardous ingredients were taken respectively from the last version of the sub-contractor's safety data sheet.)

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