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Operating Instructions

AUSTROMAT® *664*

*i*SiC®

DEKEMA

DENTAL-KERAMIKÖFEN

Version 05/2014

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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.
- Section 3 Design and functionality provides a short description of the firing furnace.
- How to set up and start the firing furnace is described in section 4 Start-up. Here you will find how to connect the firing furnace to a network or an individual computer.
- The menu control of the firing furnace is described in detail in section 5 User interface.
- The operation of the firing furnace is explained in section 6 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 7 Maintenance and Service.
- Finally, the index enables you to quickly find specific functions or commands.



Fig. 1-1 AUSTROMAT® 664 iSiC

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1.2. Proper use

The AUSTROMAT® firing furnace was designed for firing dental ceramic objects. 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 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 or hazardous or flammable gases.

Proper use also includes the following:

- Read and following these instructions for use,
- Observe the technical data (see section 1.5),
- Perform service tasks in a timely manner. (see section 7).

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1.3. Scope of delivery

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

- AUSTROMAT® *664* firing furnace with power cable,
- Insulation table and furnace tweezers,
- Instructions for use,
- Packaging material:
  - Cardboard boxes,
  - Foam material for protecting against impacts,
- Calibration set for calibrating the temperature.

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. Name plate

The information on the rating plate describes the firing furnace and also offers potential customer-specific adaptations. In all correspondence with DEKEMA, please indicate all of the data that is on the rating plate.

The rating plate is on the back of the firing furnace.



Fig. 1-2 Example of rating plate Rating plate

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1.5. 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.

Dimensions and weight

- Dimensions: 383 x 780 x 343 mm (width x height x depth) see Fig. 1-3
- Firing chamber useful dimensions: Firing function: 60 mm x 50 mm (diameter x height)
- Weight: 21 kg

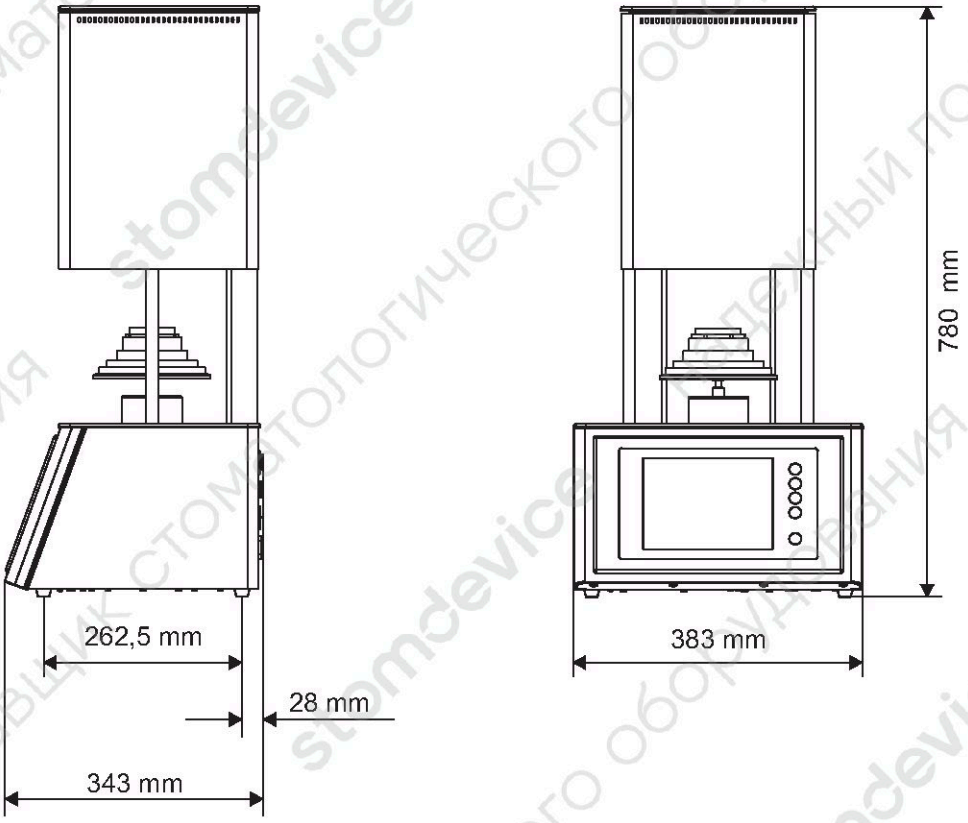


Fig. 1-3 Dimensions

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Electrical supply data

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

- Supply voltage: See rating plate on the rear:
  - ~ 230 VAC / 50…60 Hz
- Fuses: See rating plate on the rear:
  - ~230 V: 2 x 16 A T 250 V

Service data

- Power consumption: max. 2000 W for 230 V
- Firing temperature: max. 1530°C

Interfaces

- USB interface
- Network interface (optional)

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1.6. 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
- 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.

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2.2. Organization of the safety instructions

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



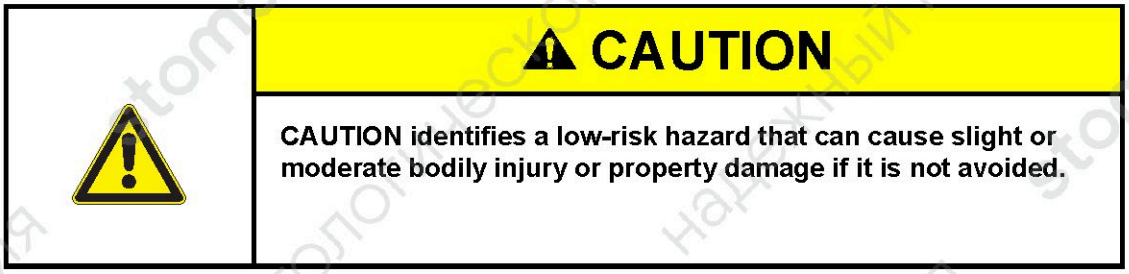
⚠ DANGER

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. 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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2.3.2. 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. Due to increasing surface temperatures the furnace shall not operate for more than one hour with an open lift above 800 °C.

Condition
The firing furnace may only be operated when it is functioning properly. Observe the technical data in section 1.5.
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 1.6).

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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2.3.3. Maintenance and Service

Spare parts



⚠ WARNING

Non-original replacement 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 7.7).

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

2.3.4. 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 8.2).

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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 1,500°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 1,500°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.**



⚠ WARNING

The firing furnace is heavy.

When the firing furnace is transported, there exists the danger of crushing, and the device may become damaged.

At least two persons must transport the firing furnace. Wear safety gloves.

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⚠ 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 9.

2.5. Access rights

Three levels are defined for accessing the user interface of the AUSTROMAT® firing furnace. Access levels 1 and 2 (see following table) are password-protected. The passwords are defined in the "Service" menu using the "Password" function.

The access rights should be issued to the users of the firing furnace based on their knowledge, experience and responsibility.

The firing furnace normally starts in the "Operation" menu. When "General Code" is used, it starts one level higher (level 0).

Access levels	Description
General code (level 0)	• Restricted access to the "Setup" menu • Selecting blocked programs and starting them • Edit and create unblocked programs • Unlocking the General Codes
Operation (level 1)	• Select all programs and start them • Edit and create all programs • Access to the "Setup" menu
Service (level 2)	• Access to the "Service" menu

Tab. 2-1 Access levels

2.6. Stop function

Press the [ON/OFF] key on the graphical user terminal. All the commands that the firing oven is executing in standby mode, i.e. no program is running, are immediately interrupted without a query.

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3. Design and functionality

3.1. Front of system

The following figure shows the front of the AUSTROMAT® firing furnace and identifies the most important components.



Fig. 3-1 *Front view of the firing furnace*

1	*Firing chamber cover*	*5*	*Lift seat with sealing ring*
2	*Top of furnace with firing chamber*	*6*	*Bottom cover plate*
3	*Back column*	*7*	*Bottom oven part with electronics*
4	*Insulation table*	*8*	*User interface with touchscreen*

The top of the firing furnace contains the firing chamber. The firing chamber cover contains ventilation slots for cooling the firing furnace. The area in the bottom of the housing contains the electronic and mechanical furnace components. used to move the lift system comprising the lift rod, lift seat with sealing ring (O-ring), and the insulation table on which the objects to be fired are placed. The firing furnace is operated using a touchscreen and function keys.

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3.2. Touchscreen and function keys



Fig. 3-2 Touchscreen and function keys

1 Touchscreen *2 Function keys*

3.2.1. Touchscreen

NOTE:
Never use hard or sharp objects (such as screwdrivers, tweezers, etc.) to operate the touchscreen. This will scratch and damage the screen.

The touchscreen allows you to operate the firing furnace. The buttons on the touchscreen are touch-sensitive. Lightly touch the desired button with your fingertip to execute the associated function.

Please note: After the firing furnace is turned on, the control starts. This can take approximately 1 minute. Only then does the touchscreen appear.

The description of the user interface is found in section 5.

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3.2.2. Function keys

You can use the function keys next to the touchscreen to move the lift up or down, scroll through the program memory, terminate the current program or go to standby mode. When the firing furnace is connected to a network or an individual computer and is correspondingly set up (see section 4.4), you can execute these functions using the computer keyboard.

Key	Name	Computer keyboard*)	Description
	[LIFT Up]	[F1]	• Press once to move the lift upward. • Press again to stop the lift.
	[MEMORY +]	[F2]	• Advances one position forward in the program memory.
	[MEMORY -]	[F3]	• Goes back one position in the program memory.
	[LIFT Down]	[F4]	• Press once to move the lift downward. • Press again to stop the lift.
	[ON/OFF]	[F9]	• Stop function: Press this to end all current commands. • On/off switch in standby mode: Press the key and hold it for about 5 seconds. • For the first startup (see section 4.3) without any function.

Tab. 3-1 Function keys
**) The function keys on the computer keyboard must be released to be used; see section 5.7.4.4*

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3.3. Rear of device

The following figure shows the back of the bottom part of the AUSTROMAT® firing furnace and identifies the most important components.



Fig. 3-3 Rear view of the firing furnace (example)

1	*Rating plate with serial number*	*4*	*Connection socket for the power cable*
2	*Main switch*	*5*	*USB interface*
3	*Fuse holder with fuses*	*6*	*Network interface (optional)*

The standard equipment on the back of the device comprises:

- The main switch for turning the device on and off,
- Two fuse holders with integrated fuses (see section 1.5),
- Connection socket for the power cable,
- Two interfaces:
  - USB interface for connecting a USB device such as a USB stick, USB keyboard or USB mouse,
  - Optional network interface for connecting an Ethernet cable (connecting the firing furnace to a network), or a crossed network cable (connecting the firing furnace to an individual computer).

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4. Start-up

4.1. Unpacking and setting up



⚠ WARNING

The firing furnace is heavy.

When the firing furnace is transported, there exists the danger of crushing, and the device may become damaged.

Two persons must transport the firing furnace. Wear safety gloves.

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

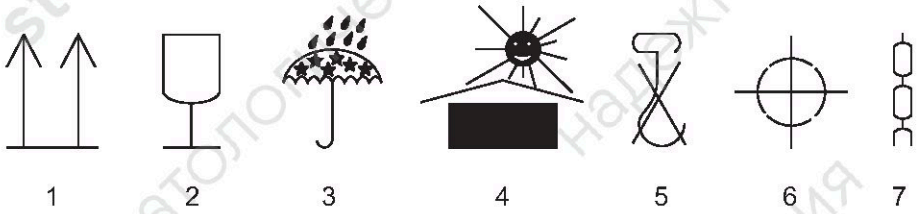


Fig. 4-1 *Packaging symbols*

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

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 4.2).

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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4.2. 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 surface.
- The surface must be able to bear the weight of the firing furnace (see section 1.5).
- 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 1.6.

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4.3. First Startup

4.3.1. Procedure

NOTE:
When connecting the firing furnace:

- **The firing furnace is operated using mains voltage.**
- **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.**

1. Make sure that the firing furnace is turned off. The ON/OFF switch is on the back of the furnace (see section 3.3).

2. If you want to operate the firing furnace through a network (Ethernet): Connect a network cable to the interface on the back of the furnace (see section 3.3).

3. If you want to operate the firing furnace with a computer (Ethernet): Connect a crossover network cable to the interface on the back of the furnace (see section 3.3).

4. Plug in the power cable of the firing furnace into a power socket with a ground contact.

5. Turn on 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.

6. Make sure that the insulating table is mounted on the lift seat. If not: Turn the firing furnace off, and mount the insulating table.

7. 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.

8. Approximately 3 minutes after the Program Manager appears, the firing furnace automatically heats up to the starting temperature for the preheating program.

9. The following ways exist to operate the firing furnace (control software):
   - Operation using the touchscreen and function keys, see section 3.2,
   - Operation using the touchscreen with the USB mouse and USB keyboard (via a USB hub), see section 3.2,
   - Optional operation using a network computer: Connect the firing furnace to the network (see section 4.4).
   - Optional operation using an individual computer: Connect the firing furnace to the computer (see section 4.5).

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4.3.2. Installation assistant (optional)

The (optional) Installation Assistant program is also activated in the factory before the delivery.

The installation assistant asks you to mount the insulation table, and runs an installation routine after you confirm by pressing the [CONTINUE] key: The firing chamber is dried, and the firing furnace is checked. The installation routine takes approximately 45 minutes, and can be terminated at any time with the [ABORT] key. The installation assistant is started each time the furnace is turned on until the entire installation routine has run once.

NOTE:
After the installation routine is finished, a message appears on the USB terminal and asks you to close the firing chamber to prevent wear. This message always appears when the firing chamber is opened for more than 15 minutes and the chamber temperature is above 200°C.

- **Acknowledge the message.**
- **Close the firing chamber.**

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4.4. Connect the firing oven to the network (optional)

NOTE:
This functionality is available as an option.

- **The options that are enabled for your firing furnace can be found in the menu *Setup* > *Furnace ID* > *Options* (see section 5.7.2.1).**
- **You can find information on enabling options in section 7.6.**
- **The unit shall not be connected directly to TNV networks.**

Overview of the procedure

1. Determine the IP address of the firing furnace (see section 4.4.1).

2. Set up remote access to the firing furnace (operation):
   - Access through a browser. To do this, Java must be installed on a computer and the browser must be a Java-enabled (see section 4.4.2).
   - Access via a VNC program. A VNC program must be installed on your computer (see section 4.4.3).

3. Set up a permanent IP address for the firing furnace (see section 4.4.4).

4. Establish access rights for users of the firing furnace (see section 4.4.5).

5. If desired: establish the type of remote access (through a browser or VNC program) (see section 4.4.6).

4.4.1. Determine the IP address

NOTE:
Consult your network administrator if you are uncertain.

1. Make sure that the firing furnace is connected to the Ethernet (interface for the network cable on the back of the unit),

2. Turn on the firing furnace and confirm any error messages. After the furnace is turned on, the Program Manager automatically appears.

3. Click on [Setup] > [Network] in the Program Manager. The window “Network settings” opens.

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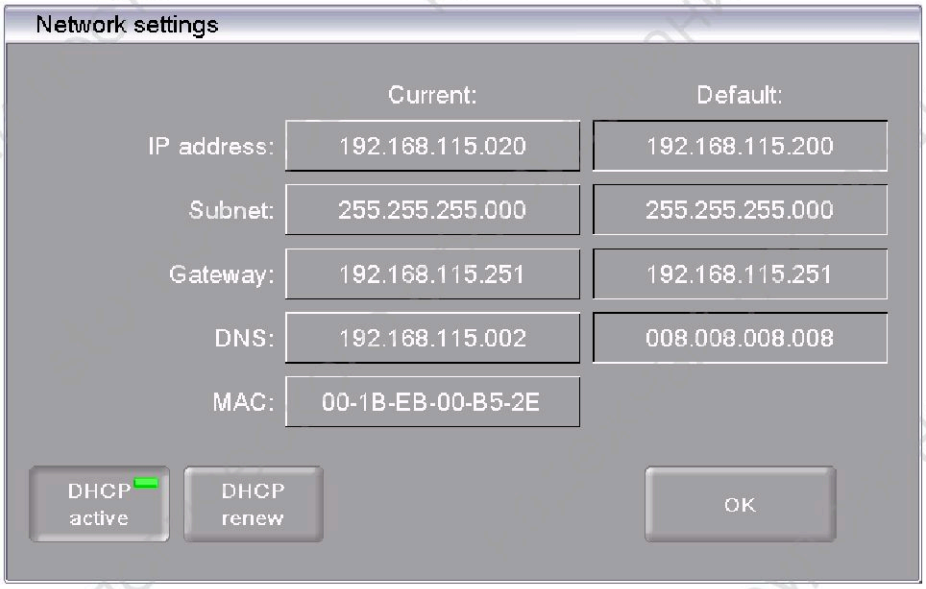


Fig. 4-2 *Setup > Network*

4. Click the button [DHCP]. Use the button to assign an IP address to the firing furnace from you network server. An LED within the button indicates that the DHCP function is active.

5. Click on [OK]. A warning appears: "Changes active after restart". Confirm the message by pressing [OK]. The message and "Network settings" window close.

6. Turn the furnace off and on. The control accepts the changed network settings, and the firing furnace automatically searches an IP address in the Ethernet network.

7. After restarting, open the "Network settings" menu.

8. Write down the current IP address.

4.4.2. Setting up the operation of the firing furnace using a browser

NOTE:
To operate the firing furnace using the web interface, your browser must be Java-capable, and the Java application must be activated.

1. Open a Java-capable browser on a computer network (such as Internet Explorer or Mozilla Firefox).

2. In the address line of the browser, enter the recorded IP address ("http://192.168.002.109" in the following example), and press the Enter key.

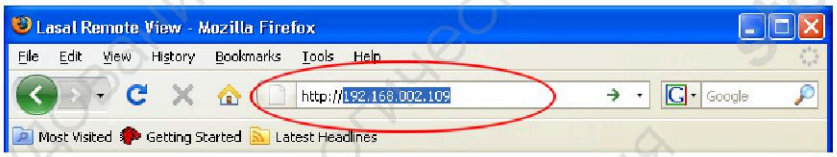


Fig. 4-3 *Enter the IP address in the browser (example)*

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3. The login window appears.

   a. Enter the password in the “Password” entry line.

   b. Select the desired data compression for transmitting data between the firing oven and the computer. We recommend using the default setting, "RL encoding".

   c. Click on [OK].



Fig. 4-4 *Login window*

4. The Program Manager appears in the browser (see section 5.3).

Set up a permanent IP address for the firing furnace (see section 4.4.4).

Recommendation: Define bookmarks in the browser
You can define a bookmark in the browser for easily opening the firing furnace control: In the browser, enter the permanent IP address, and start the Java application. Wait until the Program Manager is displayed. Define the bookmark.

4.4.3. Setting up the operation of the firing furnace using a VNC program

NOTE:
To use the firing furnace via a VNC, a suitable VNC program needs to be installed on the computer.

1. Open a VNC program on a computer network (such as RealVNC or UltraVNC).

2. The start window appears.

   a. Enter the noted IP address in the "Server" entry line ("192.168.115.200" in the following example).

   b. Click on [OK].



Fig. 4-5 *Enter the IP address in the VNC start window (example)*

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3. The logon window appears.

   a. Enter the password in the “Password” entry line. The standard password is "DEKEMA".

   b. Click on [OK].

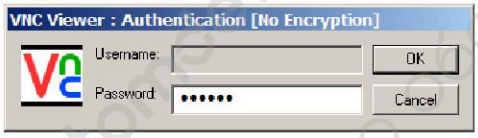


Fig. 4-6 *Login window*

4. The Program Manager appears in the VNC window (see section 5.3).

Set up a permanent IP address for the firing furnace (see section 4.4.4).

4.4.4. Setting up a permanent IP address for the firing furnace

You can now operate the firing furnace using the VNC program. Depending on the network settings, a different IP address can be used each time the unit is started. So that you do not have to repeatedly find and enter the IP address, the firing furnace should be assigned a fixed IP address in the network.

1. Contact your network administrator, and have him assign an IP address and subnet mask and gateway address for the firing furnace.

2. In the "Setup" menu, open the "Network" function (> Setup > Network).

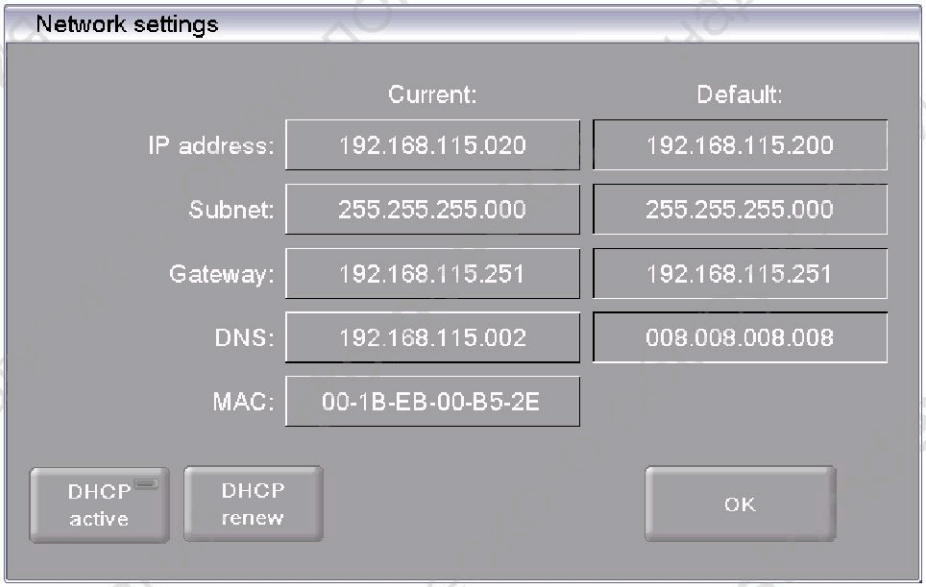


Fig. 4-7 *Assign permanent IP address*

3. Under "Default IP address", enter the IP address that was assigned to the firing furnace by the network administrator.

4. Under "Default Subnet mask", enter the subnet mask that was assigned to the firing furnace by the network administrator.

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5. Under "Gateway", enter the gateway address that was assigned to the firing furnace by the network administrator.

6. Deactivate the DHCP function.

7. Click on [OK].

The firing furnace now has a fixed IP address and can be accessed using a browser or the VNC program at this address.

NOTE:
The new IP address is only activated after the firing furnace is restarted.

Now set up the authorizations for accessing the firing furnace (see section 4.4.5).

4.4.5. Specify authorizations

After connecting the firing furnace to a network or individual computer, each network participant or computer user can access the firing furnace control. You can restrict the access the firing furnace to authorized persons by providing a user ID consisting of a user name and password.

1. In the "Setup" menu, open the "Login data" function (see section 5.7.4.4).

2. Define the password: In the "Password" field, enter the password,

3. Activate the functions "Start/stop functionality" and "Function keys via the Web server".

When opening the firing furnace control through a browser or VNC program, the password has to be entered to obtain access to the firing furnace, i.e., the firing furnace is password-protected. Communicate the password to the persons who are authorized to access the firing furnace.

NOTE:
If the password becomes lost, contact your service partner or directly contact DEKEMA (see page 2).

4.4.6. Specifying access through a browser or a VNC program

You can now operate the firing furnace using either a browser or the VNC program. In the "Setup" menu, open the "Network" function (> Setup > Network); see 5.7.1.5:

- Operation using a browser: Deactivate the VNC function,

- Operation using a VNC program: Activate the VNC function.

NOTE:
The change to the VNC function is only activated after the firing furnace is restarted.

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4.5. Connect the firing furnace to an individual PC (optional)

NOTE:
This functionality is available as an option.

- **The options that are enabled for your firing furnace can be found in the menu *Setup* > *Furnace ID* > *Options* (see section 5.7.2.1).**
- **You can find information on enabling options in section 7.6.**

NOTE:
Consult your network administrator if you are uncertain.

1. Make sure that the firing furnace is connected to a computer with a network cable (interface on the back of the device). Note that older computers may require a crossover network cable.

2. In the plant, the firing furnace was assigned the default IP address "192.168.115.200" by DEKEMA. If this IP address is no longer valid, you have to identify the present default IP address of the firing furnace: (see section 4.4.1).

3. If necessary, enter the correct IP address for your computer.

4.5.1. Setting up the operation of the firing furnace using a browser

NOTE:
To operate the firing furnace using the web interface, your browser must be Java-capable, and the Java application must be activated.

1. Open a Java-capable browser on your computer (such as Internet Explorer or Mozilla Firefox).

2. In the address line of the browser, enter the default IP address "http://192.168.115.200" provided by DEKEMA, and press the Enter key.

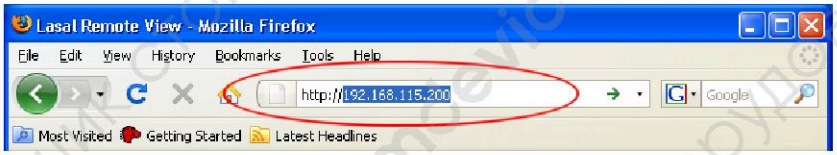


Fig. 4-8 *Enter the IP address in the browser (example)*

3. The login window appears.

   a. Enter the password in the “Password” entry line.

   b. Select the desired data compression for transmitting data between the firing oven and the computer. We recommend using the default setting, "RL encoding".

   c. Click on [OK].

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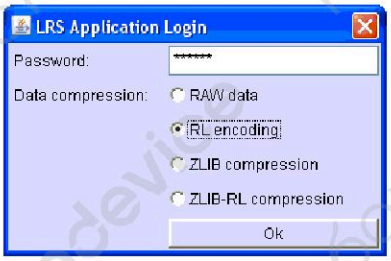


Fig. 4-9 *Login window*

4. The Program Manager appears in the browser (see section 5.3). You may have to release this IP address in the firewall of the computer (see the operating instructions of the operating system).

5. In the "Setup" menu, open the "Login data" function (> Setup > Network > Login data) (see section 5.7.4.4).

6. Activate the functions "Start/stop functionality" and "Function keys via the Web server" (see also section 5.7.4.4).

Recommendation: Define bookmarks in the browser
You can define a bookmark in the browser for easily opening the firing furnace control: In the browser, enter the permanent IP address, and start the Java application. Wait until the Program Manager is displayed. Define the bookmark.

You can now operate the firing furnace using the browser. Now set up the authorizations for accessing the firing furnace by the browser (see section 4.4.5).

4.5.2. Operating the firing furnace using a VNC program

NOTE:
To use the firing furnace via a VNC, a suitable VNC program needs to be installed on the computer.

1. Open a VNC program on a computer network (such as RealVNC or UltraVNC).

2. The start window appears.

   a. Enter the noted IP address in the "Server" entry line ("192.168.115.200" in the following example).

   b. Click on [OK].



Fig. 4-10 *Enter the IP address in the VNC start window (example)*

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3. The logon window appears.

   a. Enter the password in the “Password” entry line. The standard password is "DEKEMA".

   b. Click on [OK].

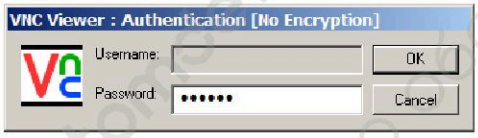


Fig. 4-11 *Login window*

4. The Program Manager appears in the VNC window (see section 5.3).

You can now operate the firing furnace using the VNC program. Now set up the authorizations for accessing the firing furnace (see section 4.4.5).

4.5.3. Selecting access through a browser or a VNC program

You can now operate the firing furnace using either a browser or the VNC program. In the "Setup" menu, open the "Network" function (> Setup > Network); see 5.7.1.5:

- Operation using a browser: Deactivate the VNC function,
- Operation using a VNC program: Activate the VNC function.

NOTE:
The change to the VNC function is only activated after the firing furnace is restarted.

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5. User interface

5.1. Basic information

5.1.1. Terms

The following table explains some of the basic terms that will make it easier to operate the AUSTROMAT®.

Term	Explanation
Program XE "Firing program"	Firing programs or other programs contain the individual control commands for the AUSTROMAT®. A typical example of a program is the preheating program that is the first program memory for most firing furnaces.
Program parameter XE "Firing parameters"	The individual values within a program are termed the program parameters or firing parameters. Program parameters are for example the starting temperature, drying time, and closing time.
Set	Compilation of all programs (program list) in the Program Manager.

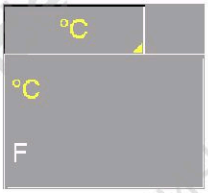
Tab. 5-1 Definition of terms

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5.1.2. Screen elements

The following table contains screen elements that are used in the user interface of the AUSTROMAT®.

Name	Example	Description
Button		A button is associated with a function. Run the function by clicking the button.
On/off button		An on/off button is associated with a function. Fields in the button show the status of the function: • Green field: The function is active • Gray field: The function is deactivated.
Option field		Option fields allow you a single distinct selection. Make a selection by clicking the desired option.
Drop-down list		Select the desired list entry as follows: • Click the entry to open the complete selection list, • Place the cursor on the desired entry, and click on it. The list closes, and the selected list entry is displayed.
Numeric keyboard window		(see section 5.1.3).
Alphanumeric keyboard window		(see section 5.1.4).
Keyboard window for the classic editor		(see section 5.1.5).

Tab. 5-2 Screen elements

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5.1.3. Numeric screen keyboard

The numeric screen keyboard is for entering text such as the firing programs. The keyboard automatically appears when the firing window control expects a number to be entered.



Fig. 5-1 *Numeric keyboard window*

Valid values
When entering parameters, the following values are automatically displayed in the numeric keyboard:

- "ActValue" shows the currently set value,
- "Min" shows the smallest permissible value (minimum),
- "Max" shows the highest permissible value (maximum),

Entering the value

- Enter the desired value.
- Click [Enter] to close your entry.
- The value is accepted when it lies within the valid range,
- The numeric keyboard window is closed.

Terminating an entry

- Click [ESC] to terminate the entry,
- An entered value is not accepted, the momentary value ("ActValue") is retained,
- The numeric keyboard window is closed.

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5.1.4. Alphanumeric keyboard window

The alphanumeric screen keyboard is for entering text such as the names of firing programs. The keyboard automatically appears when the firing window control expects text to be entered.



Fig. 5-2 Alphanumeric keyboard window

Entering text

- Enter the desired text.
- Click [Enter] to close your entry,
- The alphanumeric keyboard window is closed.

Terminating an entry

- Click [ESC] to terminate the entry,
- An entered text is not accepted
- The alphanumeric keyboard window is closed.

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5.1.5. Keyboard window for the classic editor

The keyboard window for the classic editor automatically appears when you click a command line of a classic program in the program editor.



Fig. 5-3 *Keyboard window for the classic editor*

Editing the command line

- Click [Edit] to edit the command line. The text appears blue,
- Use the cursor keys to edit the command line at the desired place,
- The existing commands are normally overwritten. Click [Insert] to insert commands,
- Click [Enter] to close your entry,
- The classic keyboard window is closed.

Terminating an entry

- Click [ESC] to terminate the entry,
- An entered command line is not accepted,
- The classic keyboard window is closed.

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5.2. Screen display

The screen display for operating the AUSTROMAT® is divided into different areas.



Fig. 5-4 Screen display (example of the Program Manager)

1 Information bar
2 Function bar
3 Display area

Information bar

Shows all of the important parameters:

- The Temperature in the firing chamber: "Tc",
- The firing number "#", that is, how many firings have been properly concluded,
- The time and date when the firing furnace was used, or if a program has been selected, the probable duration or remaining time of the program,
- The current menu (in this case, the "Program Manager"), A lock indicates that a program is protected by the general code,
- The status of the firing furnace:
  "Wait": The firing furnace is in wait mode,
  "Run": A program is being processed (program is running),
  "Edit": A program is being edited (program editor).

Function bar

The function bar contains the buttons for controlling and operating the firing furnace. The names of the buttons depend on the selected menu.

Display area

The display area shows the current menu of the firing furnace control such as the Program Manager in Fig. 5-4.

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5.3. Program Manager

Use the Program Manager menu to select the firing programs or sets and administer the assignment of the individual program memories (such as copy or delete firing programs).

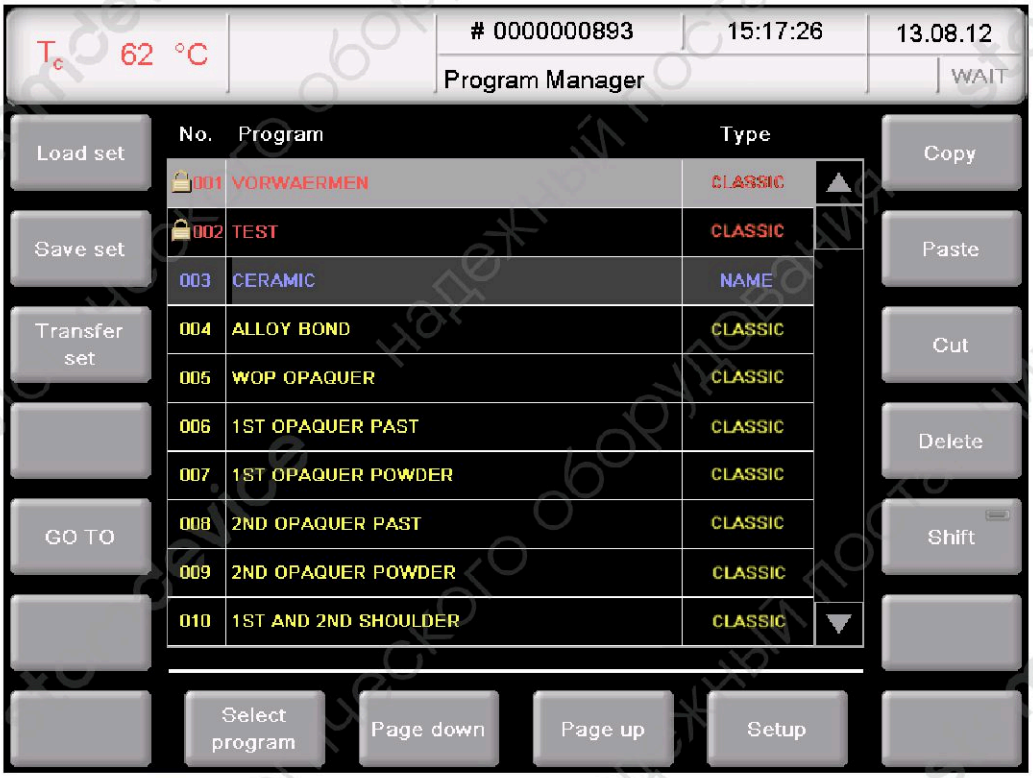


Fig. 5-5 Program Manager (example)

Display area
The display area of the Program Manager includes the following elements:

- The program list shows all of the firing programs in the loaded set.
  - The left column "No" shows the program number,
  - The middle column "Program" shows the program name. A lock indicates that a program is protected by the general code,
  - The right column "Type" shows the program type,
- Scroll bar. This allows you to scroll through the table (as with conventional Windows applications).

Select program

- Scroll through the program list until the desired program list is displayed. Click on a program to select it. The corresponding table line appears with a blue background. Or
- Click [GO TO]. The numeric keyboard window is opened. Enter the desired program number, and click [Enter].

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Left function bar
The buttons in the left function bar refer to sets of firing programs.

[Load set]:	Opens the window "Select manufacturer" to load the programs of the set into the Program Manager.
{Save set]:	Saves the loaded set. After it is saved, the message appears: "Successfully saved". Click [OK] to close the message.
[Transfer set]:	Transfers a set to the Program Manager. Note that existing programs are overwritten.
[GO TO]:	Opens the numeric keyboard window so that you can select a program by its number.

Right function bar
The buttons in the right function bar refer to individual firing programs.

NOTE:
Programs that are protected by the general code cannot be deleted or overwritten (see also the section 5.7.1.6).

[Copy] Copies the selected program. Procedure:

- Select the desired program (source).
- Click on [copy].
- Select the number of the program to which the program should be copied (target);
- Click on [Insert].

[Paste] Inserts a program. This function is only relevant along with the commands [Copy] or [Cut].

[Cut] Moves the selected program. Procedure:

- Select the desired program (source).
- Click on [Cut].
- Select the number of the program where the program should be moved (target);
- Click on [Insert].

[Delete] Deletes the selected program. Procedure:

- Select the desired program.
- Click on [Delete].
- A confirmation message is displayed. Click [OK] if you want to delete the program.

[Shift] For selecting several programs. Procedure:

- Select the first desired program.
- Click on [Shift].
- Select the last desired program.

The entire block between the first and last program is selected and can be copied, inserted or deleted.

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Bottom function bar
The buttons in the bottom function bar refer to individual firing programs.

[Program selection]	Opens the program display (see section 5.4) for the selected program.
[Page Down]	Scrolls one page down in the Program Manager. You can also use the scroll bar.
[Page Up]:	Scrolls one page up in the Program Manager. You can also use the scroll bar.
[Setup]	Opens the "Setup" menu (see section 5.7).

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5.4. Program display

The program display with the firing parameters appears when you select a program in the Program Manager and click on [Selected program].

5.4.1. Classic programs

The following illustration shows a typical program display for classic programs.

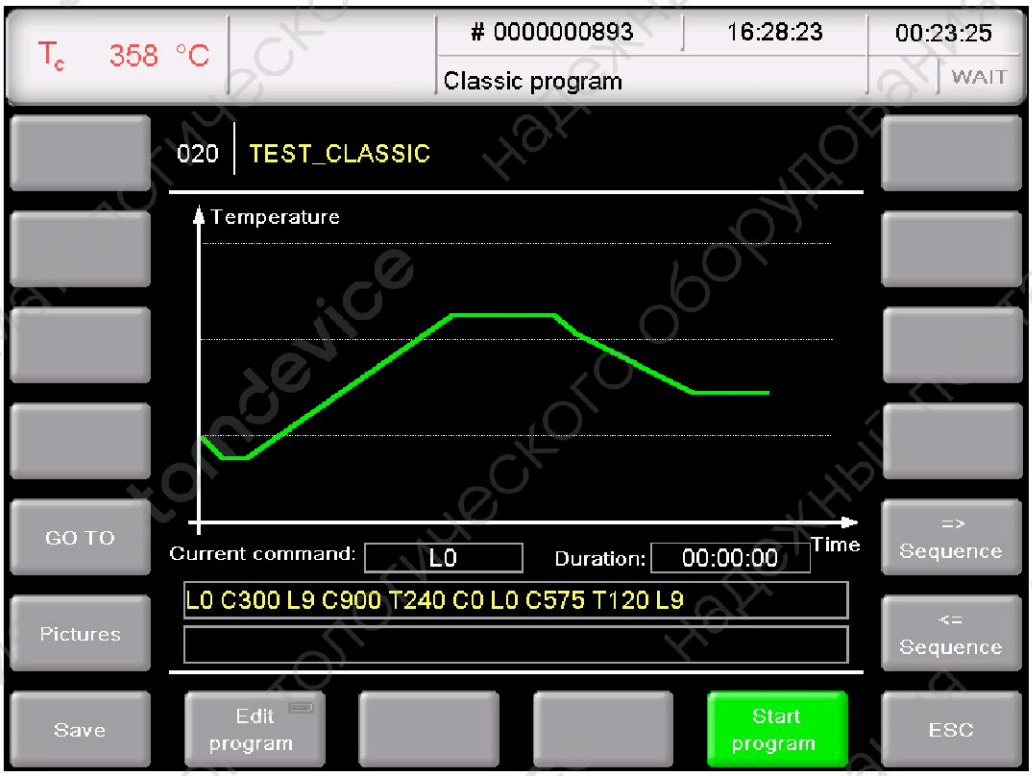


Fig. 5-6 *Program display for classic programs (example)*

The display is divided into four parts: The information line, the graphic display of the program progress, the command line with the firing parameters, and the function bar.

Information line — Displays the program number and name.

Graphic Representation — The graphic display shows the progress of the program and contains the following elements:

- The vertical axis shows the temperature.
- The horizontal axis shows the time.
- The cursor shows the momentary position (time) in the program.
- The diagram shows the progress of the program as a colored curve. The temperature over time at the fired object is displayed.

The firing parameters are displayed and edited in the command line.

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Command line	Shows the individual program steps with the firing program in "CVTL" syntax. Click on the command line to open the program editor to change the firing parameters (see section 5.6.1).
Buttons in the function bar:	
• [GO TO]	Opens the numeric keyboard window so that you can select a program by its number.
• [Pictures]	Opens a window for selecting a picture (see section 5.4.2).
• [Save]	Saves the program.
• [Edit program]	Opens the program editor to change the firing parameters. (see section 5.6).
• [Start Program]	Starts the program (see also the section 5.5). The [Start program] button is automatically replaced by the [Abort program] button after the program starts.
• [Cancel Program]	Prematurely terminates a running program. The [Cancel program] button is then automatically replaced by the [Start program] button. After a program is canceled, the heating system turns off, and the firing furnace cools down. The firing number is not increased during firing.
• [ESC]	Terminates the program display and opens the Program Manager (see section 5.3).
[=> Sequence] [=> Sequence]	The two sequence keys move the cursor through the individual program steps. The intervals have a colored background in the graphic.

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5.4.2. Pictures

NOTE:
The screen of your AUSTROMAT® firing furnace is not color calibrated. It is therefore not suitable for accepting color.

You can save pictures in the memory of the firing furnace electronics, for example to compare the firing results with photographs of sample firings. The screen page offers a simplified functionality for selecting and viewing a picture as in Windows Explorer. To overwrite the pictures, you can use the FTP functionality (see section 5.7.4.6) or a USB stick.

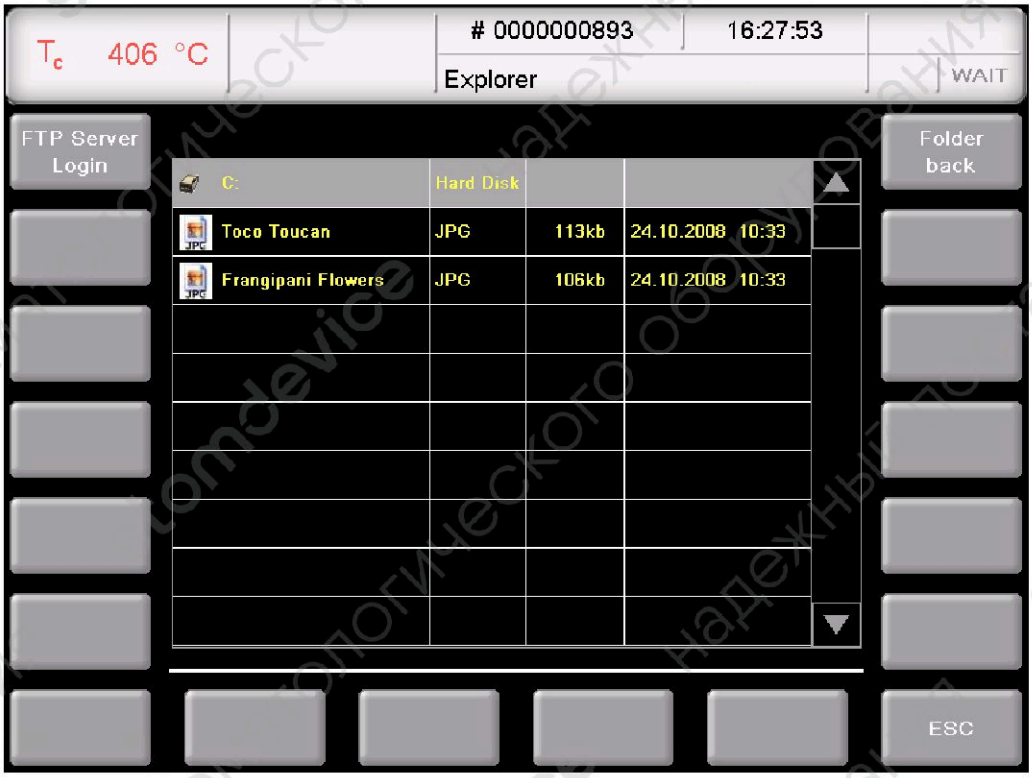


Fig. 5-7 *Program Manager > Pictures*

The Screen is divided into tables that list all the pictures in the selected directory, and the function bar.

Table

The table provides the following information:

- Title line: Name of the current directory,
- Left column: Name of pictures:
- Second column: File extension,
- Third column: File size,
- Fourth column: Date and time of the pictures.

Note that only pictures and no other files are listed.

View picture

Double-click the line of the desired picture.

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Buttons in the function bar:

- [FTP Server Login] Optional functionality.
  Open the "FTP Server Login" to access an externally-linked FTP server (see section 5.7.4.6).
- [Folder up] Moves one level up in the directory structure.
- [ESC] Ends picture selection and switches to the normal program display (see section 5.4.15.4.2).

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5.5. Program sequence

A firing program is started from the Program Display by pressing [Program Start]. Please note:

- The program steps are executed in the specified sequence in the input mask (see section 5.4),
- Select [Cancel program] to prematurely terminate a running program. In this case, all the commands are stopped and the heat system is turned off. The firing furnace cools down. The firing number is not increased during firing.

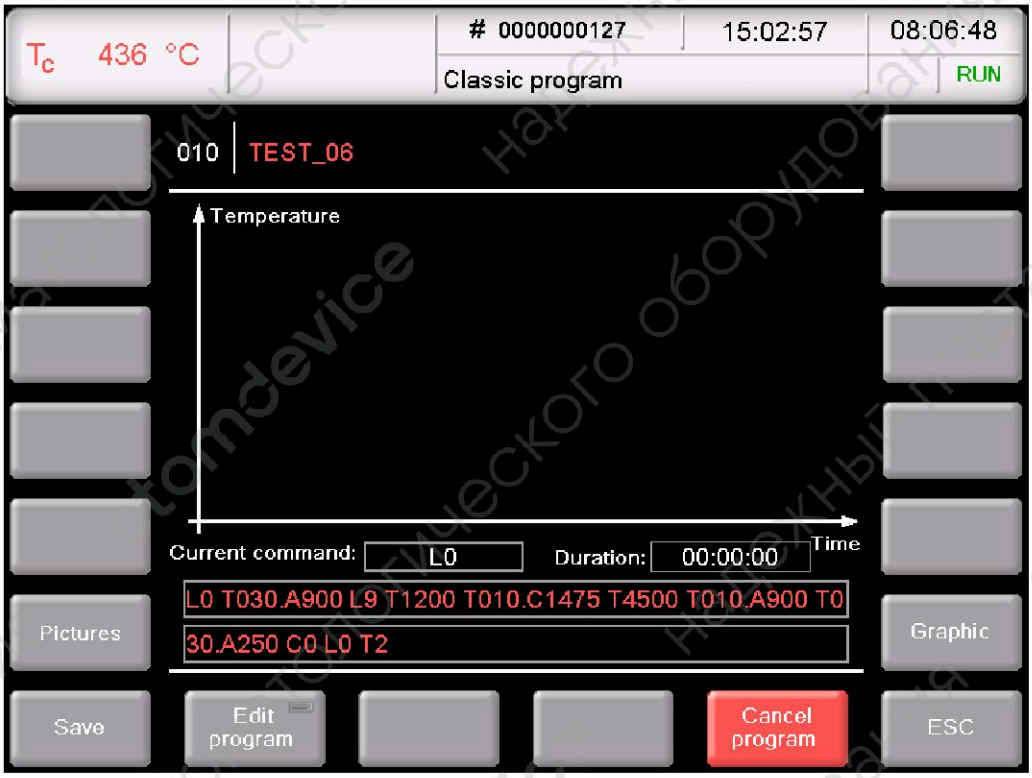


Fig. 5-8 *Example of the sequence of a firing program*

The example of Fig. 5-8 generates the following firing program:

Step 0: [Start Program]	"L0": The program starts when the firing chamber is open, i.e. the lift moves down if necessary. The firing program is normally processed after the correct temperature has been reached for starting the selected program. Otherwise the Tc display flashes, and a message is displayed indicating that the firing furnace is too hot or the firing furnace is still heating (message "Furnace not ready yet").
Step 1	"T030.A900": Set the object temperature (900 °C) with a rise of 30°C/min The lift travels partially upward while the firing chamber is being heated.
Step 2	"L9": Close (the lift moves upward).

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Step 3	"T1200": Wait time 1200 s.
Step 4	"T010.C1475": Set firing temperature (1475 °C) with a rate of 10°C/min (900 °C to 1475 °C)
Step 5	"T4500": Wait time 4500 s.
Step 6	"T010.A900": Set object temperature (900 °C) with a rate of 10°C/min (1475°C to 900°C) The lift travels downward somewhat while the firing chamber is being heated.
Step 7	"T030.A250": Set object temperature (250 °C) with a rate of 10°C/min (900 °C to 275 °C) The lift travels downward somewhat while the firing chamber is being heated.
Step 8	"C0": Turning off the heater
Step 9	"L0": The lift moves down all the way.
Step 10	"T2": The acoustic signal for the end of the program sounds. The firing number is automatically increased by one.

Classic programs
The individual program steps are displayed in the "CVTL" syntax and processed from left to right in the given sequence.

You can find a description of the "CVTL" syntax in section 5.6.1.

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5.6. Program editor

NOTE:
Programs that are protected by the general code cannot be edited (see also the section 5.7.1.6).

With the program editor, you can change existing programs or create new firing programs. Furthermore, it is possible to edit a firing program in progress.

When editing a firing program, note the following:

- The keyboard windows are described in sections 5.1.3, 5.1.4 and 5.1.5,
- An entered value must be confirmed by pressing [Enter]. Otherwise, the entry or changed value has no effect,
- Incorrect values cannot be entered. The original value is retained. The permissible value range is displayed in the keyboard window.

Editing while the program is running
Furthermore, you can edit parameters while a firing program is in progress. However, you can only edit the values of the program steps that have not been processed yet.

5.6.1. Editing classic programs

Classic programs are characterized by:

- variable and flexible programming,
- unrestricted firing control,
- all individual firing parameters can be changed as desired.

Opening the program editor

- In the Program Manager, select the desired firing program, and click [Selected program]. The program display appears (see section 5.4).
- Click on [Edit program]. An LED within the button indicates that the program editor is active. The command line is green. In addition, the "Edit" status is displayed in the information bar.
- Click on the command line below the parameter display to edit it. The keyboard window for the Classic editor appears.
- The command line is reentered by default.
- In the keyboard window, click on [Edit] when you want to change an existing command line. Note that the commands are normally overwritten. Click [Insert] to insert commands.

The command line shows the commands in the sequence in which they are processed. However, you will need a bit of practice as well as an understanding of ceramics and firing techniques to program with the CVTL commands.

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Closing the program editor

- Click [Save] to save the changes.
- Click on [Edit program]. A green field within the button goes dark to indicate that the program editor is inactive. In addition, the "Edit" status in the information bar disappears.

CVTL commands
In particular, the CVTL commands execute the following functions:

- "A" defines the temperature in °C on the insulation table (**A**utodry),
- "C" defines the temperature in °C in the firing chamber (degrees **C**elsius)
- "V" defines the vacuum (**V**acuum): Does not apply to the AUSTROMAT® *i*SiC®,
- "L" defines the lift position (**L**ift): L0 = Lift all the way down, L9 = Lift all the way up,
- "T" and at least a double-digit number define the time (**T**ime) in seconds.
- "T" and a single-digit number define the number of audible signals,
- "T0xx.Cxxxx" defines a temperature ramp with the temperature gradient, T defines the ramp in °C/min, C defines the end temperature in °C in the firing chamber,
- "T(x)xx.Cxxxx", (x) <> 0 defines a temperature ramp, T defines the time in s, C the end temperature in °C in the firing chamber,
- "T(x)xx.Lx" defines a lift ramp, T defines the time in s, L the lift end position,
- "T0xx.Axxxx" defines a temperature ramp with the temperature gradient, T defines the ramp in °C/min, A defines the end temperature in °C in the insulation table,
- "T(x)xx.Axxxx", (x) <> 0 defines a temperature ramp, T defines the time in s, A the end temperature in °C on the insulation table,
- Two sequential commands can be separated by a space for clarity.

The syntax is checked when you confirm your entry. If the entered command line contains an error, then a warning appears. In this case, correct for the command line.

Examples
Examples of programming are found in the download area of the DEKEMA website (http://www.dekema.com) or in the separate instructions for classic programming.

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5.6.2. Creating a new program

Follow the procedure below to create a new program:

1. Double-click an empty memory in the Program Manager.
2. The alphanumeric keyboard window opens. Enter a program name.
3. Edit the new program. You can find programming suggestions in section 5.6.3.
4. Subsequently change the program name: Click the field for the program name. The alphanumeric keyboard window opens.
5. In the program display, click [Save] to save the changes.

5.6.3. Programming Suggestions

You can find non-binding programming suggestions for conventional ceramic materials at http://www.dekema.com. The programs are firing programs converted according to manufacturer's instructions for DEKEMA dental ceramic furnaces of the AUSTROMAT® series. You can load these programs into your firing furnace (see section 6.8.4).

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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5.7. Setup menu

The "Setup" menu is used for system control, to change global settings of the firing furnace, to launch maintenance programs, and to record data. The "Setup" menu can be opened by clicking on the [Setup] function key in the Program Manager. It is accessible to laboratory users if not blocked by the supplier for a specific customer.



Fig. 5-9 *"Setup" menu*

Buttons

- [SERVICE]:
  Opens the “Service” menu. The "Service" menu is only available when you are authorized for level "2" (see section 2.5).
- [ESC]:
  Return to the Program Manager (see section 5.3).

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The following table lists the available functions in the "Setup" menu and provides a short description. A detailed explanation can be found in the indicated section in the column "See section".

Function	Description	See section
System control functions		
[Units]	Select the unit for the user temperature.	5.7.1.1
[Language]	Select a language for the user interface.	5.7.1.2
[Date/time]	Current date and time in the firing furnace control.	5.7.1.3
[Screen setting]	Determines how long to wait until the screensaver is activated after an entry is made.	5.7.1.4
[Network]	Network settings for the firing furnace.	5.7.1.5
[General code]	Access levels for the firing furnace.	5.7.1.6
Settings for the firing furnace		
[Furnace ID]	Enter the furnace ID.	5.7.2.1
[Acoustic signal]	Set the acoustic signal at the end of the program.	5.7.2.2
[Heating settings]	Defines the maximum temperature rise rates and power consumption.	5.7.2.3
[Lift settings]	Specifies if a warning is displayed before opening the lift when the firing chamber is hot.	5.7.2.4
Maintenance programs		
[Drying]	Runs a program for drying the firing furnace.	5.7.3.1
[Check program]	Executes the check program to check the function of the most important components.	5.7.3.2
[Oxidation]	Runs the oxidation program.	5.7.3.3
[Temperature calibration]	Calibrates the temperature and sets the CCF value (calibration factor).	5.7.3.4

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Function	Description	See section
Data recording and transfer		
[Printer]	Specifies a printer for the firing furnace.	5.7.4.1
[Quality management]	Option Determines if a QM report is displayed after a program.	5.7.4.2
[Diagnostic data]	Shows the diagnostic data that is created by the check program.	5.7.4.3
[Login data]	Option Defines the authorizations to use the firing furnace via the web interface.	5.7.4.4
[Backup / Recovery]	Backs up and restores the data in the firing furnace control.	5.7.4.5
[FTP Server Login]	Option Defines the access to the firing furnace on an FTP server.	5.7.4.6

Tab. 5-3 Functions in the "Setup" menu

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5.7.1. System control functions

5.7.1.1. Units

In the "Setup" menu, click the [Units] button. The following window for selecting the units for temperature appears. The set unit is marked.

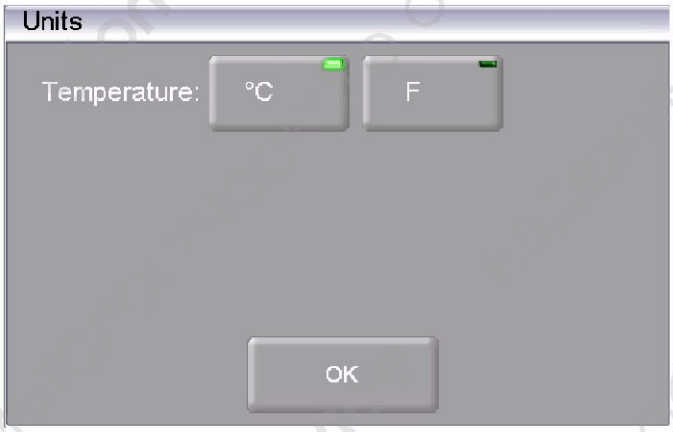


Fig. 5-10 Setup > Units

Buttons

- [OK]:
  Accepts the settings and switches back to the "Setup" menu.

Select unit

Click on the relevant unit. An LED within the button indicates that the related unit is selected:

- Temperature: Choose °C or °F (Fahrenheit);
  Conversion formula: $T_F = T_C \times 1.8 + 32$ or $T_F = 9/5\ T_C + 32$

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5.7.1.2. Language

In the "Setup" menu, click the [Language] button. The following window appears for selecting the language of the user interface. The option field identifies the currently set language.



Fig. 5-11 *Setup > Language*

Buttons
- [OK]:
  Accepts the settings and switches back to the "Setup" menu.
- [ESC]:
  Closes the window and switches back to the "Setup" menu. The changes will not be saved.

Select language
- Click on the option field for the desired language.

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5.7.1.3. Date/time

In the "Setup" menu, click the [Date/time] button. The following window opens for setting a date and time of the firing furnace control. The current date and time are displayed.

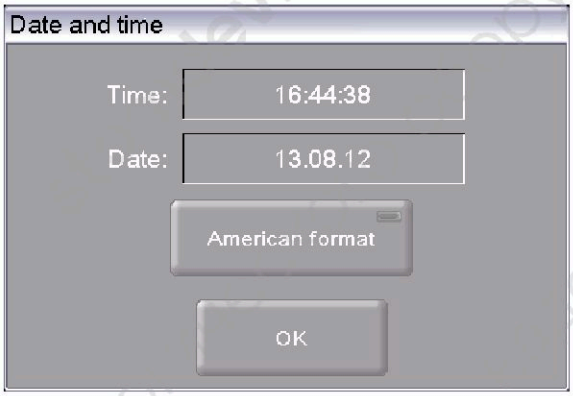


Fig. 5-12 *Setup > Date/time*

Buttons
- [OK]:
  Accepts the settings and switches back to the "Setup" menu.

Change date/time
You can change the date and time as follows:
- Click on the date or time. The numeric keyboard window appears.
- Enter the desired date or time.

Select the date format
With this button, you can choose the European or American format for the date and time. An LED within the button indicates that the American date format is active.
- European format, such as "14:29:12", and "15.5.2005" for May 15, 2005
- American format, such as "02:29:12 pm" and 5/15/2005 for May 15, 2005.

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5.7.1.4. Screen settings

In the "Setup" menu, click the [Screen settings] button. The following window appears for setting the screen saver.



Fig. 5-13 *Setup > Screensaver settings*

Buttons

- [Calibration]:
  Starts a process for calibrating the screen. Crosshairs are displayed on a black background. Click the white dot in the middle of the crosshairs. The crosshairs change position. Again click the white dot and continue until calibration is finished (a total of six crosshair positions).
- [Contrast setup]:
  Opens a window where you can set the screen contrast. See Fig. 5-14. Higher value = stronger contrast, lower value = weaker contrast. The standard setting is 180.
- [OK]:
  Accepts the settings and switches back to the "Setup" menu.

Screensaver after…min

The screen saver makes the screen go dark after the device has not been used for a while (less power consumption and longer screen life). When you press any key or touch the touchscreen, the original display appears. The screensaver starts after the indicated time without an entry (inactivity of the entry device). Change this time as follows:

- Click on the time. The numeric keyboard window appears.
- Enter the desired time.

Activate screen saver

You can activate and deactivate the screensaver with the button. An LED within the button indicates that the screensaver is active.

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Contrast setup



Fig. 5-14 *Setup > Screensaver settings > Contrast setup*

5.7.1.5. Network (optional)

NOTE:
This functionality is optional.
- **The options that are enabled for your firing furnace can be found in the menu *Setup > Furnace ID > Options* (see section 5.7.2.1).**
- **You can find information on enabling options in section 7.6.**

NOTE:
Consult section 4.4 about connecting the firing furnace with a network.

In the "Setup" menu, click the [Network] button. The following window appears with the network settings for the firing furnace. The current addresses in the network are displayed.

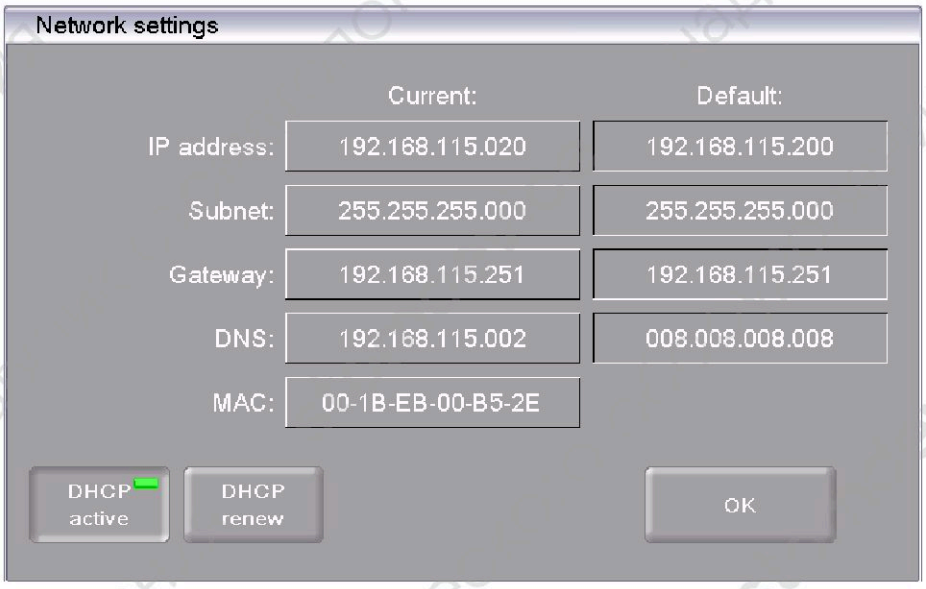


Fig. 5-15 *Setup > Network*

Buttons
- [OK]:
  Accepts the settings and switches back to the "Setup" menu.
- [ESC]:
  Closes the window and switches back to the "Setup" menu. The changes will not be saved.

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Change IP address	Change an address as follows: • Click on the corresponding address The alphanumeric keyboard window appears. Please note: The current IP address cannot be edited. • In the keyboard window, click on [Edit]. • Enter the desired program number.
DHCP active	Use the button to assign an IP address to the firing furnace from you network server. An LED within the button indicates that the DHCP function is active.
DHCP renew	Use the button to automatically assign a new IP address to the firing furnace from you network server.

5.7.1.6. General code

You can use this function to protect firing programs from changes (block) (see also section 2.5). Note the following usage restrictions before activating the general code.

- Programs protected by the general code cannot be edited or changed. The program editor cannot be opened for these programs,
- Programs protected by the general code cannot be deleted.
- Program numbers protected by the general code are not available as targets for copying (Program Manager),
- The functionality in the "Setup" menu is strongly restricted.

Activate general code

- In the "Setup" menu, click the [General code] button. The alphanumeric keyboard window appears.
- Enter the password for the general code. The following "General code" window appears.

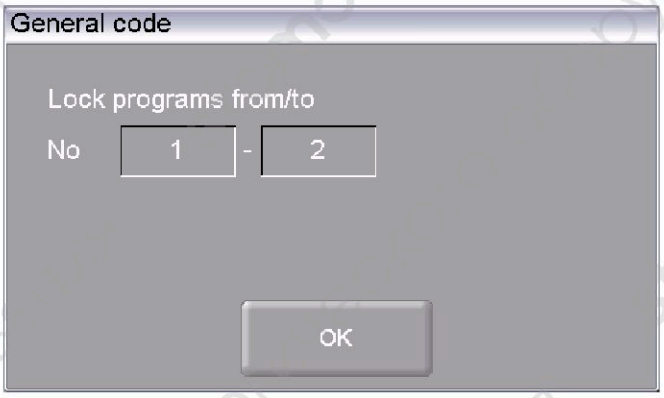


Fig. 5-16 " General code" window

Buttons	• [OK]: Accepts the settings and switches back to the "Setup" menu.

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Protect program memories

Select the protected program memories as follows:

- Click on the corresponding program numbers "from" and "to". The numeric keyboard window appears.
- Enter the desired program numbers.
- Click on [OK].

Programs protected by the general code are marked in the Program Manager with a lock and have a colored background. In the program display, a lock in the information bar indicates that a program is protected.



Fig. 5-17 *Lock symbol for protected programs*

Deactivate general code

- In the "Setup" menu, click the [General code] button. The alphanumeric keyboard window appears.
- Enter the password for the general code.

The general code is deactivated.

Change protected programs

Change the protected program memories when the general code is activated as follows.

- Deactivate the general code.
- Reactivate the general code, and change the protected program range as desired.

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5.7.2. System setting functions

5.7.2.1. Furnace ID

In the "Setup" menu, click the [Furnace ID] button. The following window appears for entering the furnace ID. The current furnace ID is displayed together with the current, furnace-specific hardware and software versions.

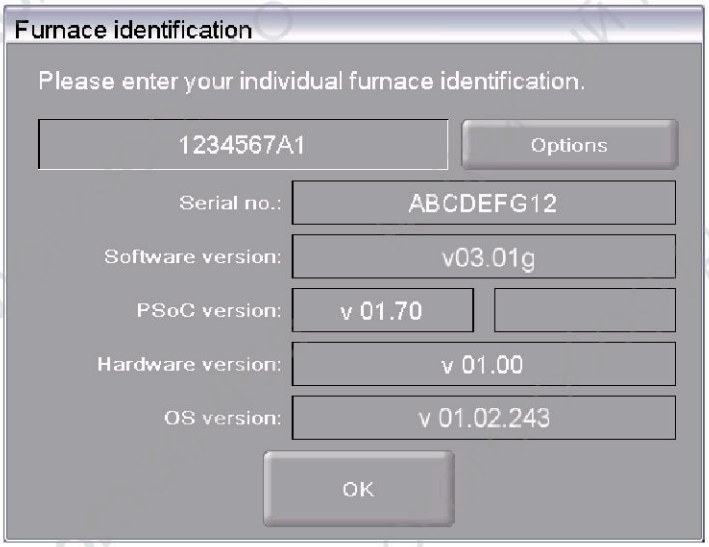


Fig. 5-18 *Setup > Furnace ID*

Buttons

- [OK]:
  Accepts the settings and switches back to the "Setup" menu.
- [Options]:
  Opens a window and displays the options that are activated/deactivated for your firing furnace. Refer to Fig. 5-19.

Change furnace ID

To prevent confusing firing furnaces from each other (for example when printing records), an individual ID can be entered for each firing furnace.

- Click the entry field for the furnace ID. The alphanumeric keyboard window appears.
- Enter your individual furnace ID.
- Click on [OK].

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Options
An LED within the button indicates that the option is active.



Fig. 5-19 Setup > Furnace ID

- DB — Internet interface for connecting to networks and the Internet. Direct access via the Internet to firing programs in the online database of DEKEMA. (see also the section 6.8.4).
- QM — Quality management All of the relevant parameters are recorded in ASCII format (text file) and can be printed and saved (on a thumb drive or a network). See also sections 5.7.4.2 and 6.10.

  Requirement: The "DB" option is activated.
- JAVA — Remote access to the firing furnace using a Java-enabled browser. See also sections 5.7.1.5 and 4.4.

  Requirement: The "DB" option is activated.
- VNC — Remote access to the firing furnace using a a VNC program (virtual network client). See also sections 5.7.1.5 and 4.4.

  Requirement: The "DB" option is activated.
- FTP-S — FTP server. Data transfer via an IP network to the firing furnace such as *.dfl files (see also the section 6.8).

  Requirement: The "DB" option is activated.
- FTP-C — FTP client Data transfer via an IP network from the firing furnace to an FTP server such as pictures.

  Requirement: The "DB" option is activated.

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- X-Dream

  Accessing QM data. Using the computer to request the status of the firing furnace and to automatically indicated by e-mail (see section 6.10).

  Requirement: The options "DB" and "FTP-S" are activated.

5.7.2.2. Acoustic signal

In the "Setup" menu, click the [Acoustic signal] button. The following window appears for selecting and testing the acoustic signal at the end of the program. The current signal is displayed.

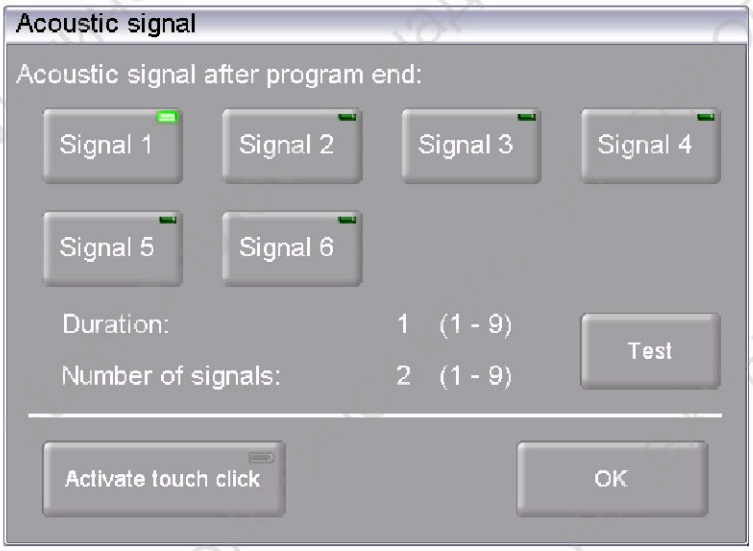


Fig. 5-20 *Setup > Acoustic signal*

Buttons

- [OK]:
  Accepts the settings and switches back to the "Setup" menu.
- [Test]:
  The selected signal sounds for a test.

Select acoustic signal

There are six default acoustic signals you can select that each consist of individual tones. The duration (in seconds) and number of tones varies from 1 to 9.

Click on the appropriate button to select the desired signal. An LED within the button indicates that the function is active

Activate Touchclick

When touchclick is activated, the firing furnace emits a confirmation signal each time a key is pressed. An LED within the button indicates that the function is active

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5.7.2.3. Heating settings

In the "Setup" menu, click the [Heating settings] button. The following window is displayed for setting customer-specific maximum levels for the start temperature [°C], power consumption [A] and rise rate [°C/min].

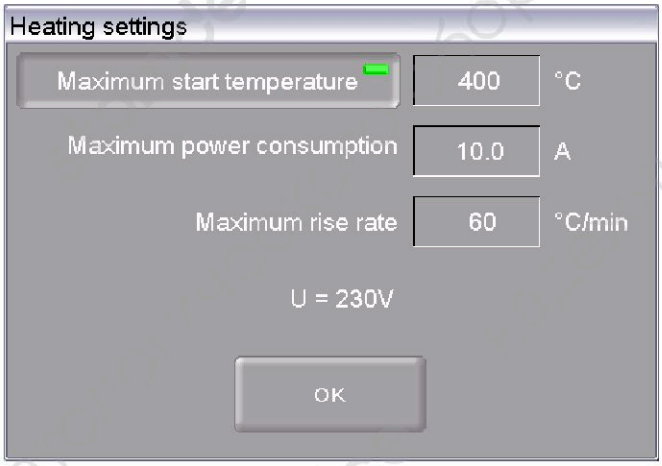


Fig. 5-21 Setup > Heating settings

Buttons	• [OK]: Accepts the settings and switches back to the "Setup" menu. • [Maximum start temperature]: Click on the button to activate and deactivate the "Maximum start temperature" function. A green field within the button indicates that the function is active
Maximum start temperature	The maximum start temperature limits the start temperature of the firing furnace. Change the maximum start temperature as follows: • Click on the corresponding entry field. The numeric keyboard window appears. • Enter the desired value.
Maximum power consumption	The maximum power consumption limits the power consumption of the firing furnace. Change the maximum power consumption as follows: • Click on the corresponding entry field. The numeric keyboard window appears. • Enter the desired value.
Maximum rise rate	The maximum rise rate limits the temperature ramp of the firing furnace. Change the maximum rise rate as follows: • Click on the corresponding entry field. The numeric keyboard window appears. • Enter the desired value.
U = ...	Displays the supply voltage level.

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5.7.2.4. Lift settings

NOTE:
For safety reasons, DEKEMA recommends not deactivating the warning.

When the "Warning" function is turned on, a warning appears before you open a hot firing chamber (temperature higher than 200°C). You are asked, "OPEN LIFT?". Confirm the query when you want to move the lift down and open the hot firing chamber.

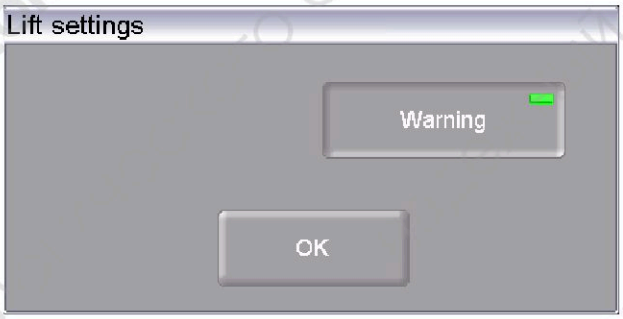


Fig. 5-22 *Setup > Lift settings*

Buttons
- [OK]:
  Accepts the settings and switches back to the "Setup" menu.

Warning
Click the button to activate the warning display. A green field within the button indicates that the function is active

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5.7.3. Maintenance programs

5.7.3.1. Drying

Use the drying program to dry the firing chamber, for example when the firing furnace has been exposed to a high-level of humidity for a long time.

In the "Setup" menu, click the [Drying] button. The following window appears for starting the drying program.

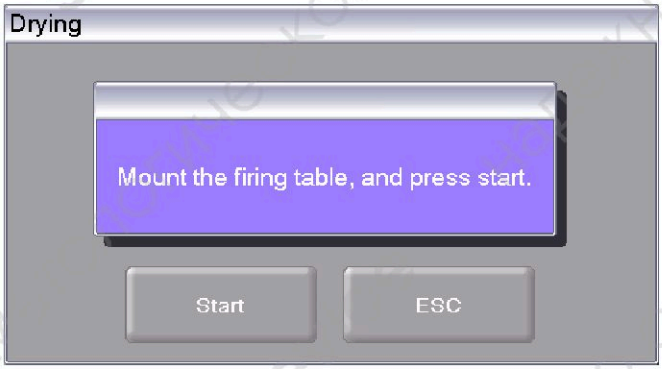


Fig. 5-23 *Setup > Drying*

Buttons

- [Start]:
  Starts the drying program (duration: approximately 90 minutes).
- [ESC]:
  Closes the window and switches back to the "Setup" menu.

Start the program

Mount the firing table and click [Start]. The "Dry" window is displayed as long as the program is running. You can terminate the program at any time when you click the [Stop] button. A safety query opens and asks you whether you really want to end the program:

- [OK]: Confirm your decision and in the program,
- [ESC]: Change your decision and continue the program.

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5.7.3.2. Check program

The AUSTROMAT® *664* has an internal program, the check program, that checks the function of the major components. Regularly using this non-editable program makes it easier for you and the responsible service personnel to identify aged components (such as heating element wear) and troubleshoot malfunctions. After approximately 500 firings, the firing oven displays a recommendation on the screen to start the self check program.

In the "Setup" menu, click the [Check program] button. The following window appears for starting the check program.

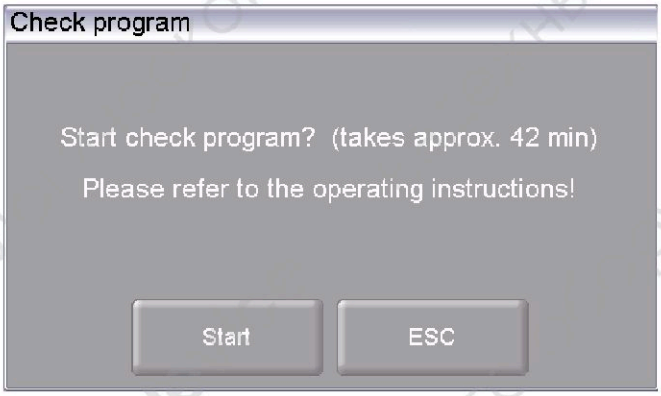


Fig. 5-24 *Setup > Check program*

Buttons
- [Start]:
  Starts the check program; duration: approx. 180 min.
  (depending on the set maximum rise rate; see section 5.7.2.3).
- [ESC]:
  Closes the window and switches back to the "Setup" menu.

Start the program
Click on [Start]. The "Check program" window is displayed as long as the program is running. You can terminate the program at any time when you click the [Stop] button. A safety query appears and asks if you really want to end the program:
- [OK]: Confirm your decision and in the program,
- [ESC]: Change your decision and continue the program.

Check program
You can find instructions on the check program in section 7.3.

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5.7.3.3. Oxidation

Use the oxidation program to clean the heating elements, the firing chamber and the thermocouples.

In the "Setup" menu, click the [Oxidation] button. The following window appears to start the oxidation firing. The set end temperature is displayed.

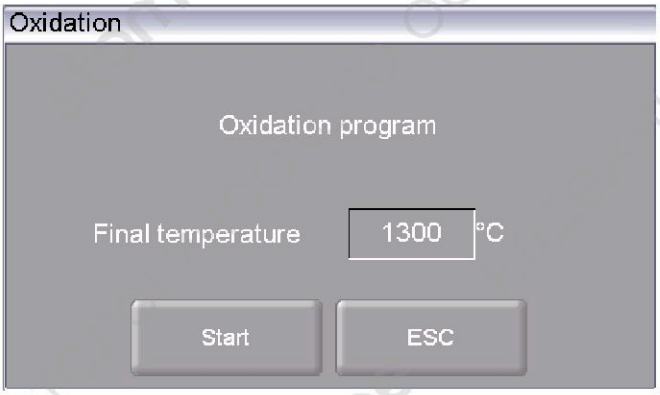


Fig. 5-25 Setup > Oxidation firing

Buttons
- [Start]:
  Starts the cleaning firing (duration: approximately 200 minutes depending on the end temperature).
- [ESC]:
  Closes the window and switches back to the "Setup" menu.

Change end temperature
- Click on the end temperature. The numeric keyboard window appears.
- Enter the desired temperature.

Start the program

Click on [Start]. The "Oxidation" window is displayed as long as the program is running. You can terminate the program at any time when you click the [Stop] button. A safety query appears and asks if you really want to end the program:

- [OK]: Confirm your decision and in the program,
- [ESC]: Change your decision and continue the program.

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5.7.3.4. Temperature calibration

NOTE:
DEKEMA recommends that the AUSTROMAT® *664* temperature is calibrated annually.

In the "Setup" menu, click the [Temperature calibration] button. The following temperature calibration window appears. The set CCF value is shown.

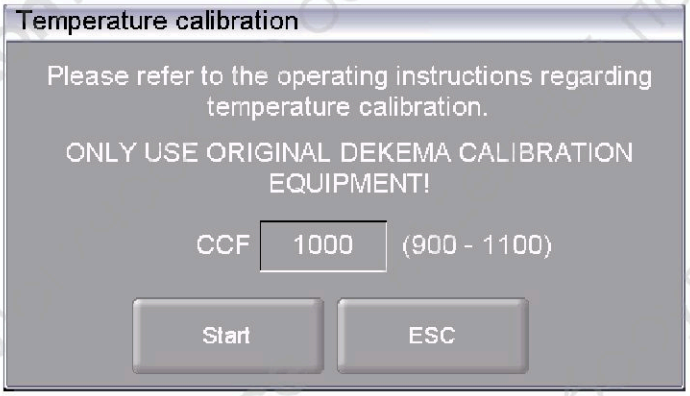


Fig. 5-26 *Setup > Temperature calibration*

Buttons
- [Start]:
  Starts temperature calibration.
- [ESC]:
  Closes the window and switches back to the "Setup" menu. The changes will not be saved.

Calibrate temperature
The procedure for calibrating the temperature is in section 7.2. You can terminate the program at any time when you click the [Stop] button. A safety query appears and asks if you really want to end the program:
- [OK]: Confirm your decision and end the program.
- [ESC]: Change your decision and continue the program.

Change CCF value
- Click on the CCF value. The numeric keyboard window appears.
- Enter the desired CCF value.

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5.7.4. Data recording and transfer

5.7.4.1. Printer

In the "Setup" menu, click the [Printer] button. The following printer settings window appears.

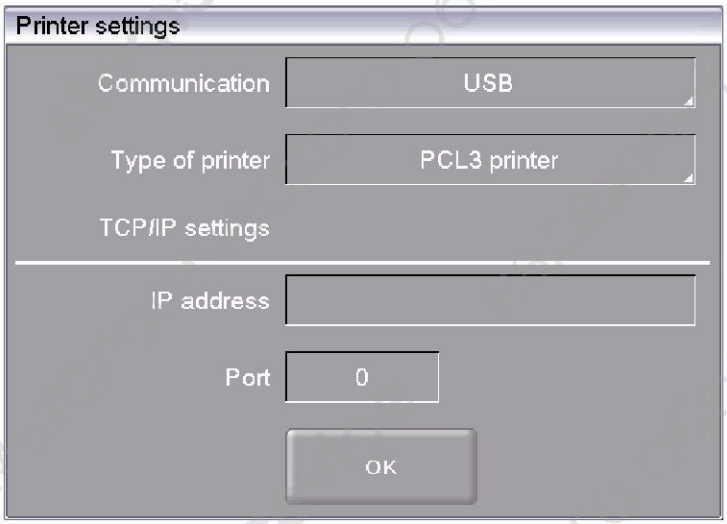


Fig. 5-27 Setup > Printer

Buttons
- [OK]:
  Closes the window and switches back to the "Setup" menu.

Communication
Specifies the interface for the printer (drop-down list).

Printer type
In the printer type fields, you can specify the printer (drop-down list) for example to print out record data.

TCP/IP settings
Settings for a network printer.

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5.7.4.2. Quality management (optional)

NOTE:
This functionality is available as an option.

- **The options that are enabled for your firing furnace can be found in the menu *Setup > Furnace ID > Options* (see section 5.7.2.1).**
- **You can find information on enabling options in section 7.6.**

In the "Setup" menu, click the [Quality management] button. The following quality management window appears.

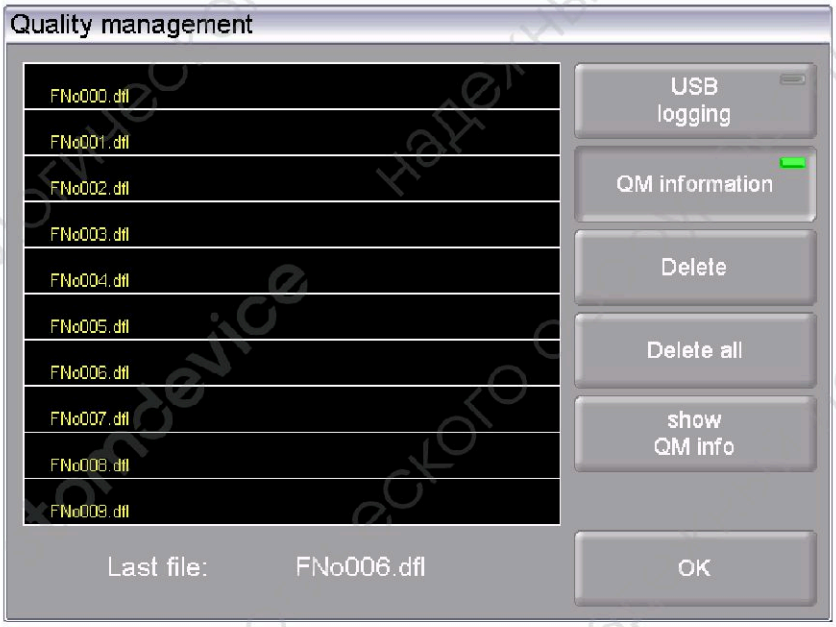


Fig. 5-28 *Setup > Quality management*

The firing furnace logs the ten last firing programs that have run. If more than ten firing programs have run, these QM files are overwritten starting with the last one.

Last file	The name of the QM file of the last run firing program.
USB record	Click this button to activate or deactivate the recording of data to an external USB stick. An LED within the button indicates that the function is active The QM files are additionally updated on the USB stick (USB record).
QM information	Click on the button to display the QM information after each firing program is over. An LED within the button indicates that the function is active • Not active: QM information is logged but not displayed. • Active: After a firing program is over, the related detailed firing information appears on the display.
Buttons	• [Delete]: Deletes the selected QM file. • [Delete all]: Deletes all QM files. • [Display QM info]: Displays the selected QM file. • [OK]: Accepts the settings and switches back to the "Setup" menu.

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5.7.4.3. Diagnostic data

In the "Setup" menu, click the [Diagnosis data] button. The following diagnostic data window appears.

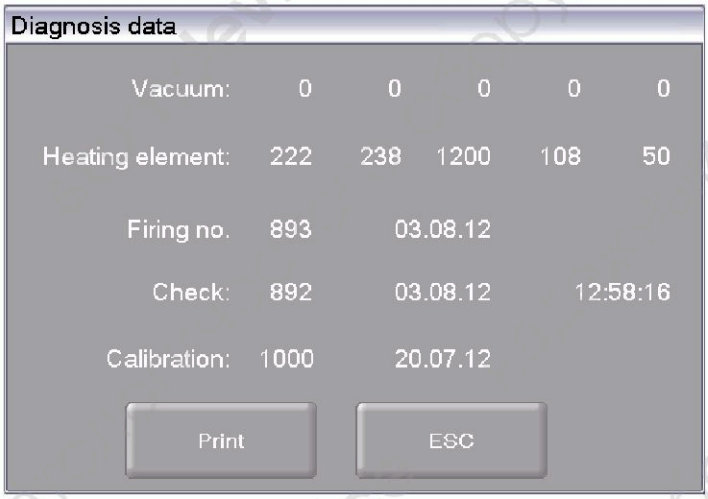


Fig. 5-29 Setup > Diagnosis data

Buttons

- [Print]:
  Prints the diagnostic data. Note that a printer must be connected and set up (see section 5.7.4.1).
- [ESC]:
  Closes the window and switches back to the "Setup" menu.

The diagnostic data are created by the check program and saved in a diagnostic file (see section 5.7.3.2). The values and interpretation of the diagnosis data are important for the service personnel. For remote diagnosis, you can output the diagnostic file on the screen or send it by e-mail (see page 2). The data have little significance for the user. They are therefore not detailed here.check program

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5.7.4.4. Login data (optional)

NOTE:
This functionality is available as an option.

- **The options that are enabled for your firing furnace can be found in the menu *Setup* > *Furnace ID* > *Options* (see section 5.7.2.1).**
- **You can find information on enabling options in section 7.6.**

NOTE:
As long as no HTML access is defined (that is, the fields "Username" and "Password" are empty, each user of the computer can access the firing furnace.

NOTE:
If the username or password becomes lost, contact your service partner or directly contact DEKEMA (see page 2).

HTML access authorizes you to remotely access (through a web interface or a VNC program) the control of the firing furnace. The password is defined in the "HTML access" window. This password must be entered in the browser on the computer to obtain access to the firing furnace (see also the section 4.4).

In the "Setup" menu, click the [Login data] button. The following HTML access window appears.

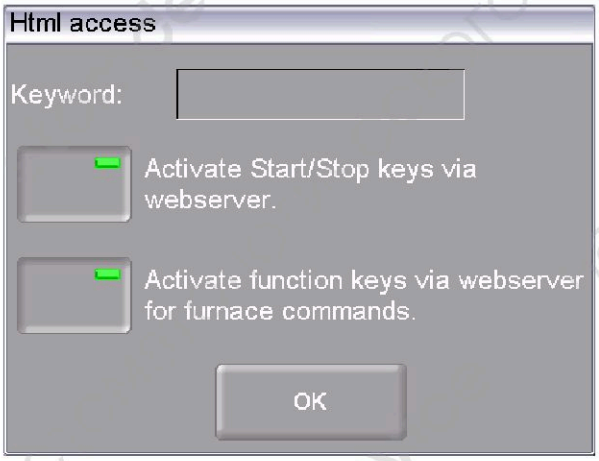


Fig. 5-30 *Setup > Login data*

Buttons	• [OK]: Accepts the settings and switches back to the "Setup" menu.
Password	Specify the password as follows: • Click on the “Password” entry field. The alphanumeric keyboard window appears. • Enter the password.
Release the start/stop function via the Web server	In order for you to use the firing furnace via the user interface on the computer (start firing programs, move lift, etc.), the start/stop function must be released. Click the button to release or block the start/stop function via the Webserver. An LED within the button indicates that the function is active

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Release the function keys for furnace commands via the Webserver	In order for you to execute touchscreen functions (see section 3.2) via the Webserver, the function keys of the computer keyboard must be released. Click the button to release or block the function keys for the furnace commands. An LED within the button indicates that the function is active

5.7.4.5. Backup / Recovery

NOTE:
For reasons of data safety and to prevent the loss of firing oven data, it is recommendable to regularly back up all your data.

In the "Setup" menu, click the [Backup/Recovery] button. The following window for backing up and recovering data appears.



Fig. 5-31 *Setup > Backup / Recovery*

Buttons

- [Backup Start]:
  Starts backing up the data.
- [ESC]:
  Closes the window and switches back to the "Setup" menu.
- [Recovery Start]:
  Starts recovering the data.

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Backup data
Follow the instructions under "Backup" in the "Backup / Recovery" window.

NOTE:
All data on the thumb drive are deleted at the start of the backup.

1. Insert a USB stick (make sure there is enough free memory) into the USB port in the back of the firing furnace.
2. Click on [Backup Start]. All the data of the firing furnace (operating system, software, set parameters and firing programs) are written to the USB stick. A progress bar indicates the remaining time until the backup is completed.
3. Wait until an acknowledgment beep sounds. It signals the conclusion of the backup process.
4. Remove the USB stick.

You have successfully backed up the firing furnace data. If data is lost, you can restore the data with the USB stick. Be sure to carefully store the USB stick and do not accidentally overwrite the backed up data.

Restoring data
Follow the instructions under "Recover" in the "Backup / Recovery" window:

1. Insert the USB stick with the backed up data into the USB port in the back of the firing furnace.
2. Click on [Recovery Start]. All the data of the firing furnace (operating system, software, set parameters and firing programs) are restored.
3. Wait until an acknowledgment beep sounds. It signals the conclusion of the recovery process.
4. Remove the USB stick.

You have successfully restored up the firing furnace data.

NOTE:
You can restore the data in the same manner as when updating a program (see section 7.5).

Observe the following procedure:

1. Turn off the firing furnace,
2. Plug the thumb drive with the backup data into the USB port.
3. Turn on the firing furnace. While booting up, the firing furnace restores the backup.
4. Withdraw the thumb drive once a corresponding message appears on the screen.

The firing furnace then reboots and is ready to use.

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5.7.4.6. FTP Server Login (optional)

NOTE:
This functionality is available as an option.

- **The options that are enabled for your firing furnace can be found in the menu *Setup > Furnace ID > Options* (see section 5.7.2.1).**
- **You can find information on enabling options in section 7.6.**

NOTE:
There are many DEKEMA-independent programs available to set up an external FTP server. For further information, please contact your network administrator.

With the FTP functionality, you can access an externally-linked FTP server. You can for example link picture folders and files to the firing furnace and view them while the program is running.

In the "Setup" menu, click the [FTP Server Login] button. The following window for accessing an FTP server appears.

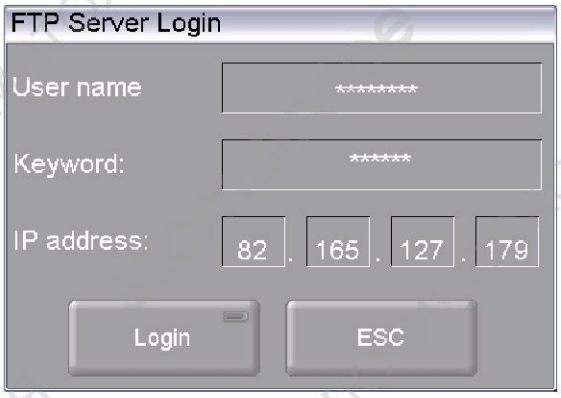


Fig. 5-32 Setup > FTP Server Login

Buttons	• [ESC]: Closes the window and switches back to the "Setup" menu.
User name	User name for your access the FTP server. • Click on the “User name” entry field. The alphanumeric keyboard window appears. • Enter your user name.
Password	Password with which you have access to the FTP server. • Click on the “Password” entry field. The alphanumeric keyboard window appears. • Enter your password.
IP address	IP address of the FTP server. • Click on the corresponding "IP address" entry field. The numeric keyboard window appears. • Enter the IP address of the FTP server.
Login	Click the button to connect the firing furnace to the indicated FTP server. An LED within the button indicates that the connection is active.

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Establish a connection to the FTP server

The connection with an FTP server is only established if all access data (user name, password, IP address) are correct. Proceed as follows to connect the firing furnace to an FTP server.

1. Enter the user name for your FTP access.
2. Enter the password for your FTP access.
3. Enter the associated IP address of the FTP server.
4. Click [Login] to establish the connection between the firing furnace and FTP server.

When you want to terminate the connection, reclick [Login].

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6. Operation

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

6.1. 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 4.3),
- the firing furnace is connected via a Web interface to an individual computer or network (see section 4.4).

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. Or
  - On/off switch in standby mode next to the touchscreen if the firing furnace is already in standby mode. The firing furnace is ready for use.
- 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, or
  - On/off switch in standby mode next to the touchscreen.

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6.2. Mounting and removing a firing object



⚠ WARNING

Hot surfaces.

The firing chamber can reach temperatures above 1,500°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 insulation table base plates and insulation table rings on the insulation table:
  - Mount the wave-shaped insulation table ring and optionally cover it with an insulation table base plate. This unit forms one level.
  - Create up to three levels as needed.
  - Cover the top level with another insulation table base plate if desired.



Fig. 6-1 Stacking the levels (example of two levels)

1 Insulation table
2 Insulation table ring
3 Insulation table base plate

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NOTE:
Stack the levels as precisely as possible. The levels may not tilt. Given the dimensional tolerances, the installation table base plates and insulation table rings may tilt when stacked. Make sure that this does not happen since the insulation may be contacted while the left is being closed causing undesirable wear.

- 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. 6-2 *Mounting the firing object*

- The height of the firing tray including the firing object may not exceed 50 mm.

Removing the firing object

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

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6.3. Select programs and start them

6.3.1. With the touchscreen

1. After turning on the firing furnace, the Program Manager automatically appears on the touchscreen. Select the desired program (see section 5.3).
2. Click on [Selected program] in the Program Manager. The firing of the selected program is displayed (program display, see section 5.4).
3. Click the program display [Program start]. The program is processed automatically (see section 5.5).
4. While the program is running, the lift automatically moves up and down. Make sure that no objects are in the way that could hinder the lift movement. Also do not attempt to manually stop or accelerate the lift.
5. While the program is running, you can stop the program by clicking [Cancel program].

6.3.2. With web interface (optional)

NOTE:
This functionality is available as an option.

- **The options that are enabled for your firing furnace can be found in the menu *Setup* > *Furnace ID* > *Options* (see section 5.7.2.1).**
- **You can find information on enabling options in section 7.6.**

NOTE:
To operate the firing furnace using the web interface, your browser must be Java-capable, and the Java application must be activated.

Start Web interface

1. Start the browser on the computer.
2. Click on the bookmark for the firing furnace (if available), or enter the IP address for the firing furnace in the address line of the browser (see section 4.4).
3. Enter your login data, that is, the password. The Program Manager opens (see section 5.3).

The remaining procedure is the same as that in section 6.3.1.

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6.3.3. With VNC program (optional)

NOTE:
This functionality is available as an option.

- **The options that are enabled for your firing furnace can be found in the menu *Setup > Furnace ID > Options* (see section 5.7.2.1).**
- **You can find information on enabling options in section 7.6.**

NOTE:
To use the firing furnace via a VNC, a suitable VNC program needs to be installed on the computer. The VNC function of the firing furnace must be activated (section 5.7.1.5).

Start the VNC program

1. Start the VNC program on the computer.

2. Enter the IP address for the firing furnace and the password (see section 4.4.3). The Program Manager opens (see section 5.3).

The remaining procedure is the same as that in section 6.3.1.

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6.3.4. Operating layout for the menu control

The basic operating layout for the menu control is shown in the following illustration. It can help you become familiar with the operation of the firing furnace. The arrows in the diagram indicate how to get from one menu item to another. The individual menus are described in section 5.

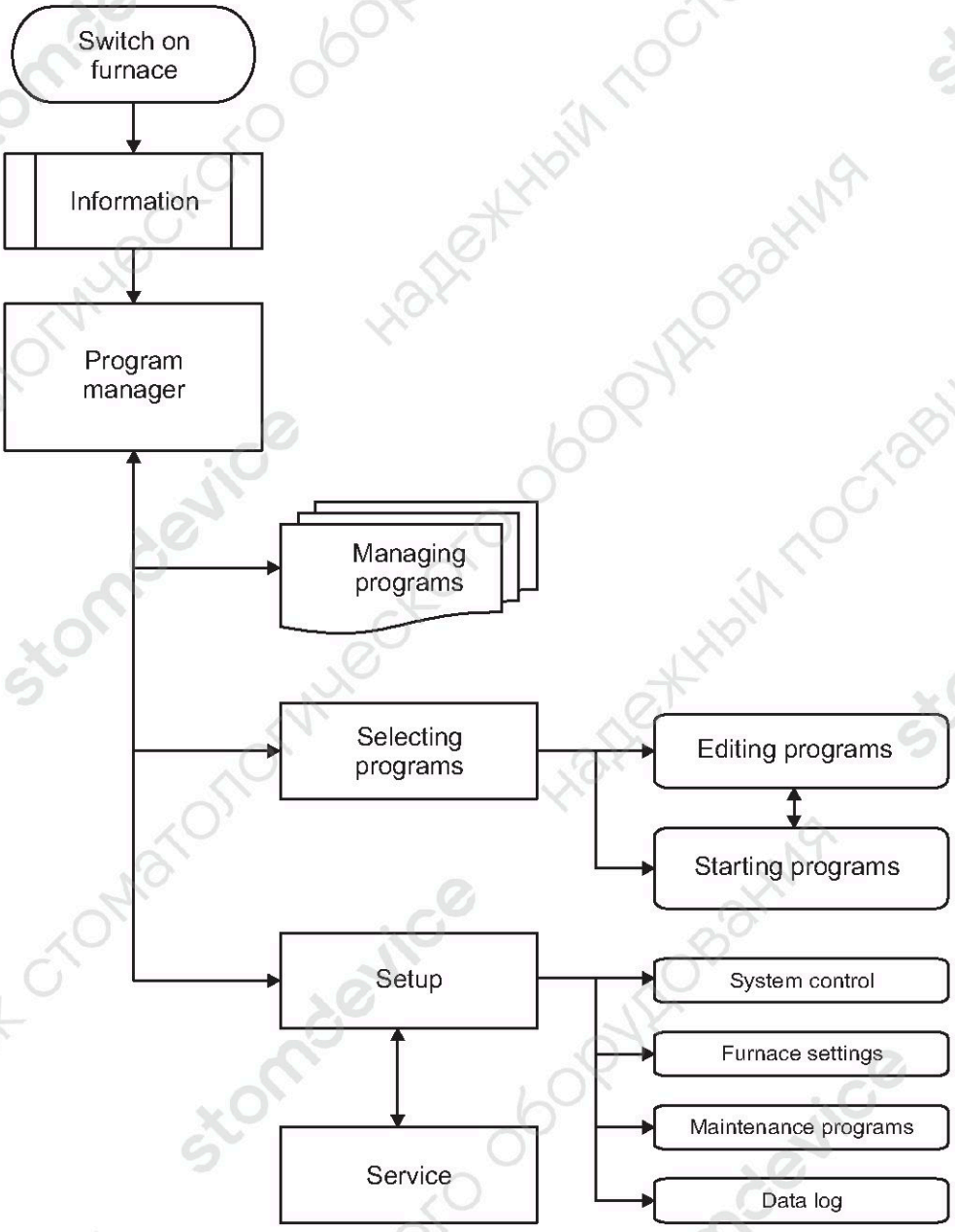


Fig. 6-3 Operating layout for the menu control

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6.4. Program end

- While the program is running, you can stop the program by clicking [Cancel program]. In this case, all the commands are stopped and the heat system is turned off. The firing furnace cools down. The firing number is not increased during firing.

- An acoustic signal sounds after a regular program end.
  - The lift moves down,
  - The firing number is automatically increased,
  - A log file for the firing is created and printed (if a printer is configured).

- You can remove the fired object (see section 6.2).

NOTE:
If, after the firing program is over, the firing chamber is opened longer than 15 minutes while the chamber temperature is above 200°C, a message appears and asks you to close the firing chamber to prevent wear.
- **Acknowledge the message.**
- **Close the firing chamber.**

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6.5. Some practical tips

6.5.1. 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.

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.

6.5.2. 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.

6.5.3. Thermocouple temperature calibration

Visually inspect the thermocouple 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. The thermocouples are attached to the middle of the back within the firing chamber and jut out horizontally into the firing chamber. Ensure that they are not bent since this influences temperature measurement and hence the firing results.

6.5.4. Programming and program steps

Drying the firing object
The insulation table is still very hot immediately after firing. The temperature near the firing object may thus be too high for drying. Wait a few minutes until the insulation table has cooled down before placing the new firing object on the insulation table for drying.

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6.5.5. Firing programs

Firing tray and kiln furniture
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. Ensure the quality of the firing tray and kiln furniture. Deformation at high temperatures, minimum shrinkage and thermal shock resistance are parameters affecting quality.

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.

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6.6. Backing up and restoring firing programs

For reasons of data security and to prevent the loss of firing programs, it is recommendable to regularly back up your firing programs:

- With a conventional USB stick (USB interface on the back of the firing furnace):
  - Backup (see section 6.6.1),
  - Restoring data (see section 6.6.2),
- You should at least note down your firing program parameters on paper or print it out.

6.6.1. Backup with a USB stick

Use the following procedure to back up the current program list ("set") on a USB stick.

1. Insert a USB stick into the USB port in the back of the firing furnace.
2. Open the Program Manager.
3. Click the button [Transfer set]. The “Select type of transmission” window opens.

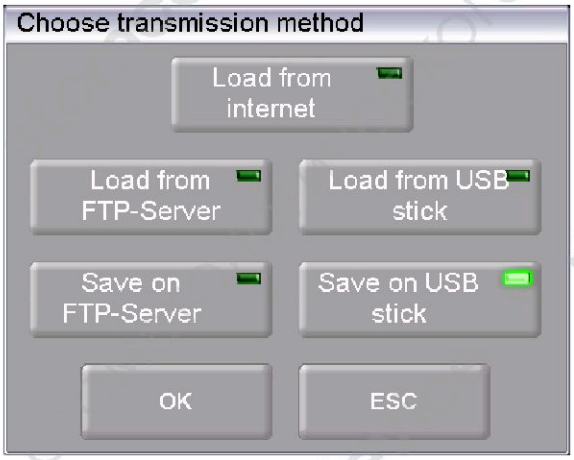


Fig. 6-4 *Program Manager > Transfer set*

4. To back up the data, select the transmission type “Save to USB stick”.
   - “Load from the Internet” downloads a set from the Dekema website,
   - Only available when connected to the FTP server:
     "Load from FTP server" downloads a set from the FTP server,
   - Only available when connected to the FTP server:
     "Load to FTP server" saves a set on the FTP server,
   - “Load from USB stick” uploads a set from the inserted USB stick,
   - “Save to USB stick” saves a set on the inserted USB stick.

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5. Click on [OK]. The window “Save as” appears.
   (Press [ESC] to return to the Program Manager.)

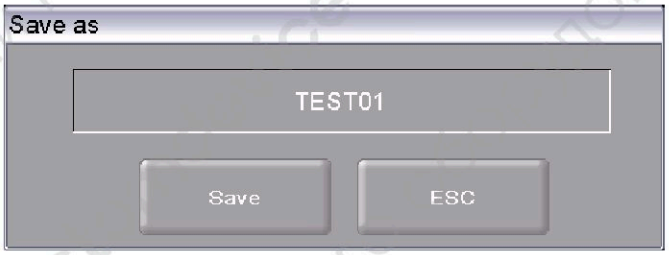


Fig. 6-5 *"Save as" window*

6. Click in the entry line. The alphanumeric keyboard window appears.

7. Enter the name for the set, and confirm with [Enter].

8. Click the button [Save].
   (Press [ESC] to return to the Program Manager without saving the set.)

The message "Successfully saved" appears after the set has been saved. Click [OK] to return to the Program Manager.

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6.6.2. Restore data with a USB stick

Use the following procedure to restore a set on a USB stick.

1. Insert the USB stick with the sets into the USB port in the back of the firing furnace.
2. Open the Program Manager.
3. Click the button [Transfer set]. The “Select type of transmission” window opens.

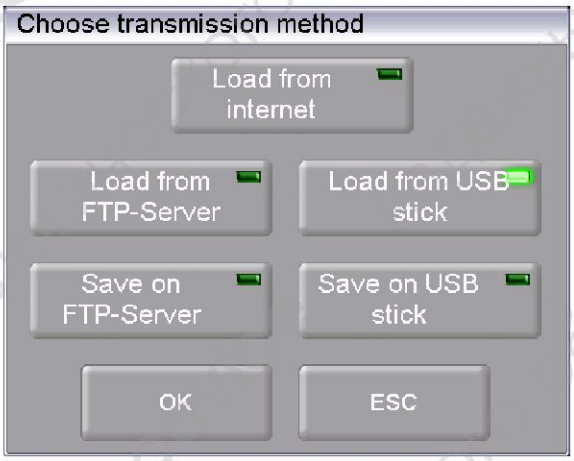


Fig. 6-6 *Program Manager > Transfer set*

4. To restore the data, select the transmission type “Load from USB stick”.
   - “Load from the Internet” downloads a set from the Dekema website,
   - Only available when connected to the FTP server:
     "Load from FTP server" downloads a set from the FTP server,
   - Only available when connected to the FTP server:
     "Load to FTP server" saves a set on the FTP server,
   - “Load from USB stick” uploads a set from the inserted USB stick,
   - “Save to USB stick” saves a set on the inserted USB stick.
5. Click on [OK]. The “Set Manager” window appears.
   (Press [ESC] to return to the Program Manager.)



Fig. 6-7 *"Set Manager" window*

6. Select the desired set.

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7. Click on [Load].
   (Press [ESC] to return to the Program Manager without loading the set.)

8. The Program Manager displays the "Load set" window.
   - The left table “External sets” shows the firing programs of the selected sets,
   - The right table (“Current set”) shows the firing programs of the set that is being loaded to the control of the firing furnace (active).
   - Double-click on a firing program in the current set to go directly to the firing program input window.

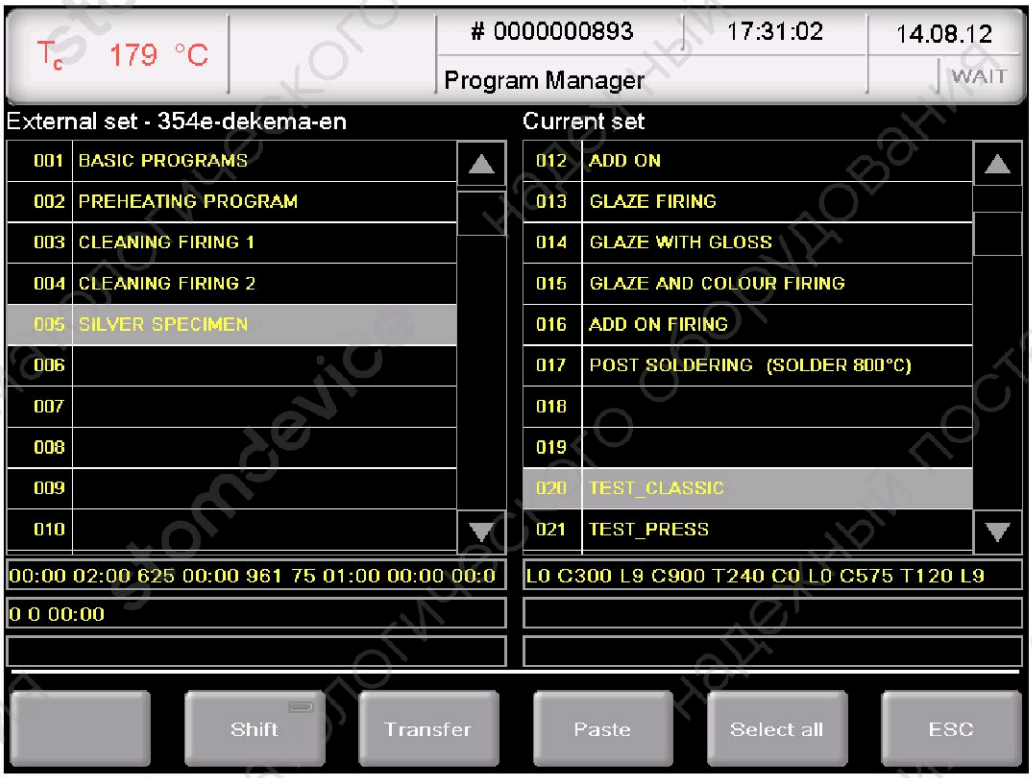


Fig. 6-8 *Program Manager > Compile firing programs*

9. Select the desired firing program in the external set and click one of the following buttons:

[Shift] Corresponds to the Shift key on a keyboard. This allows you to select associated blocks in the external set:

- Click the first desired program (beginning of the block),
- Press [Shift],
- Click the last desired program (end of the block).

All of the programs in the block are selected.

[Transfer] Copies the selected firing program of the external set to the same program numbers of the current set. A query appears and asks if you want to overwrite the existing programs in the current set. Confirm the query to accept the firing programs.

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[Paste]	Copies the selected firing program of the external set to the current set. The firing programs are inserted into the current set starting at the selected program number. A query appears and asks if you want to overwrite the existing programs in the current set. Confirm the query to insert the firing programs.
[Select all]	Selects the firing programs of the external set.
[ESC]	Returns to the Program Manager.

The message "Successfully loaded" appears after the set has been loaded. Click [OK] to return to the Program Manager.

6.7. Backing up and restoring data

You can back up or restore all the data for the firing furnace control (saved operating systems, software, set parameters and firing programs) with the backup/recovery function the "Setup" menu" (see section 5.7.4.5).

NOTE:
For reasons of data safety and to prevent the loss of firing oven data, it is recommendable to regularly back up all your data.

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6.8. Loading and saving sets

A “set” is a group of all manufacturer-related firing programs (program list).

6.8.1. Download set from the internal memory

Use the following procedure to load individual firing programs or a complete set from the internal memory of the firing furnace.

1. Open the Program Manager.
2. Click the button [Load set]. The “Set Manager” window appears.



Fig. 6-9 *"Set Manager" window*

3. Select the desired set.
4. Click on [Load].
   (Press [ESC] to return to the Program Manager without loading the set.)
5. The Program Manager displays the "Load set" window. Continue as described in section 6.6.2.

The message "Successfully loaded" appears after the set has been loaded. Click [OK] to return to the Program Manager.

6.8.2. Load set from a USB stick

The procedure for loading a set from a USB stick is described in section 6.6.2.

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6.8.3. Load a set from an FTP server (optional)

NOTE:
This functionality is available as an option.
- **The options that are enabled for your firing furnace can be found in the menu *Setup* > *Furnace ID* > *Options* (see section 5.7.2.1).**
- **You can find information on enabling options in section 7.6.**

NOTE:
To load a set from an FTP server, the firing furnace must be connected to the FTP server (see section 5.7.4.6).

The procedure for loading a set from an FTP server is basically the same as loading a set from a USB stick (see section 6.6.2).

Difference:
In the "Choose transmission method" window, select the option "Load from FTP server".

6.8.4. Download set from the Internet (optional)

NOTE:
This functionality is available as an option.
- **The options that are enabled for your firing furnace can be found in the menu *Setup* > *Furnace ID* > *Options* (see section 5.7.2.1).**
- **You can find information on enabling options in section 7.6.**

Use the following procedure to download a set from the DEKEMA website.

1. Make sure that your internet connection is active.

2. Open the Program Manager.

3. Click the button [Transfer set]. The “Select type of transmission” window opens.

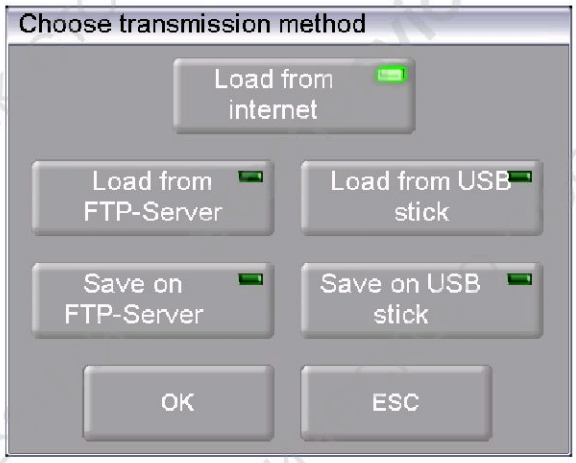


Fig. 6-10 *Program Manager > Transfer set*

4. Select the transmission type “Download from Internet”.

5. Click [OK] (press [ESC] to return to the Program Manager). You are automatically connected to the DEKEMA website. The “Select set” window appears.

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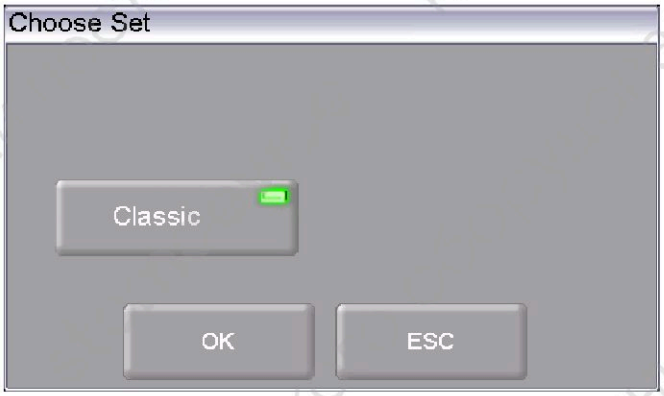


Fig. 6-11 Program Manager > Select set

6. Select the desired program type Click [OK] (press [ESC] to return to the Program Manager).

7. The "Set Manager" window appears and shows you the manufacturer-specific sets for you firing furnace.



Fig. 6-12 "Set Manager" window

8. Select the desired set.

9. Click on [Load].
(Press [ESC] to return to the Program Manager without loading the set.)

10. The Program Manager displays the "Load set" window. Continue as described in section 6.6.2.

The message "Successfully loaded" appears after the set has been loaded. Click [OK] to return to the Program Manager.

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6.8.5. Internally save set

Use the following procedure to save a set to the internal firing furnace database.

1. Open the Program Manager.
2. Click the button [Save set]. The window “Save as” opens.

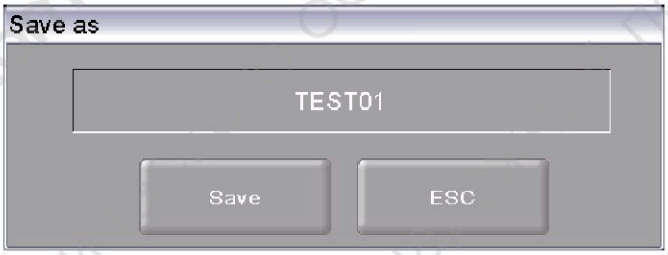


Fig. 6-13 "Save as" window

3. Click in the entry line. The alphanumeric keyboard window appears.
4. Enter the name for the set.
5. Click the button [Save].
   (Press [ESC] to return to the Program Manager without saving the set.)

The message "Successfully saved" appears after the set has been saved. Click [OK] to return to the Program Manager.

6.8.6. Saving a set on a USB stick

The procedure for saving a set on a USB stick is described in section 6.6.1.

6.8.7. Save a set on an FTP server (optional)

NOTE:
This functionality is available as an option.

- **The options that are enabled for your firing furnace can be found in the menu *Setup* > *Furnace ID* > *Options* (see section 5.7.2.1).**
- **You can find information on enabling options in section 7.6.**

NOTE:
To save a set on an FTP server, the firing furnace must be connected to the FTP server (see section 5.7.4.6).

The procedure for saving a set on an FTP server is basically the same as saving a set on a USB stick (see section 6.6.1).

Difference:
In the "Choose transmission method" window, select the option "Save to FTP server".

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6.9. Access the firing furnace via FTP (optional)

NOTE:
This functionality is available as an option.
- **The options that are enabled for your firing furnace can be found in the menu *Setup* > *Furnace ID* > *Options* (see section 5.7.2.1).**
- **You can find information on enabling options in section 7.6.**

NOTE:
Consult your network administrator if you are uncertain.

NOTE:
Several programs can be used to access an FTP site including a web browser like Internet Explorer. The following procedure describes how to create an FTP link between a computer and the firing furnace.

The computer and firing furnace have to be connected via an Ethernet connection.

1. Start Windows Explorer on the computer.

2. In the address line of Windows Explorer, enter the IP address of the firing furnace ("http://192.168.2.109" in the following example), and press the Enter key.

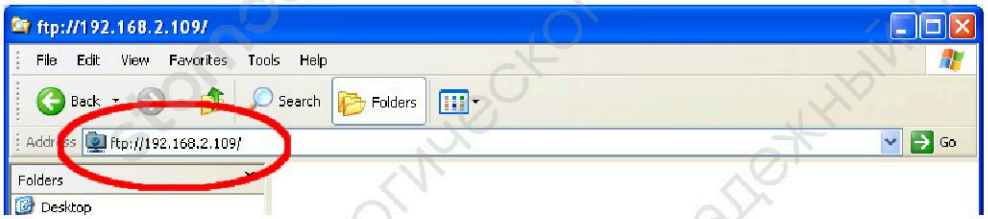


Fig. 6-14 Enter the IP address in Windows Explorer (example)

NOTE:
For immediate access, you can enter the complete FTP address for the firing furnace. An FTP address such as "ftp://ftp_username:ftp_PWD@IP_address" is composed of the following elements (observe the separators between the individual elements):
- **The network protocol "ftp",**
- **the username "ftp_username" and password "ftp_PWD" for FTP access to the firing furnace,**
- **the IP address "IP_address" of the firing furnace and the network (see section 4.4.1).**

3. An error message appears (FTP folder error) because the firing furnace is password-protected. Click [OK] to confirm the error message.

4. Open the context menu (right click) in the empty window of Windows Explorer. Select “Login as...”.

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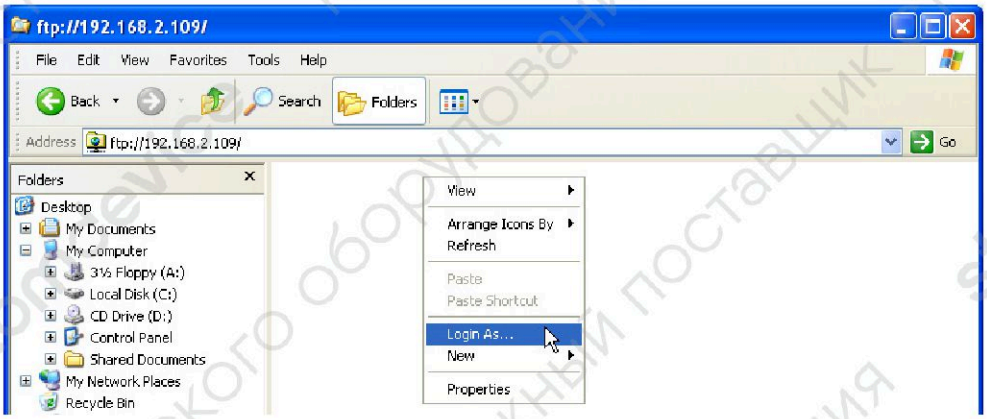


Fig. 6-15 *Logging into the firing oven*

5. The window “Login as” appears.
   - Enter your user name for FTP access TV firing furnace,
   - Enter the corresponding FTP password.

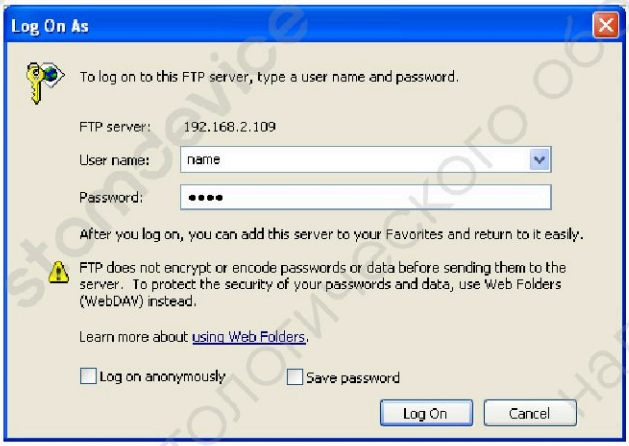


Fig. 6-16 *Enter username and password*

6. Click on [Login].

7. After you have logged in, Windows Explorer shows the memory of the firing furnace.

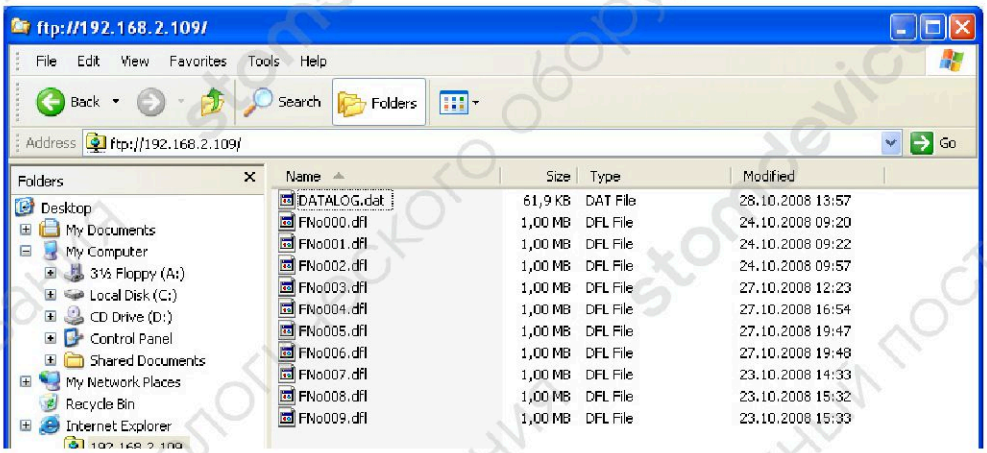


Fig. 6-17 *Memory of the firing furnace in Windows Explorer*

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8. You can move, delete, etc. files in Windows Explorer as usual.

Close Windows Explorer when you no longer need FTP access to the firing furnace.

6.10. Quality assurance (optional)

NOTE:
This functionality is available as an option.

- **The options that are enabled for your firing furnace can be found in the menu *Setup > Furnace ID > Options* (see section 5.7.2.1).**
- **You can find information on enabling options in section 7.6.**

6.10.1. QM logs

The AUSTROMAT® allows you to log a completed firing program for quality assurance documentation.

The log is internally fixed and cannot be changed by the user. The log monitors and documents the progress of the set program, especially the target and actual values of the Firing parameters , as well as fluctuations in temperature during the holding periods (only when the firing chamber is closed).

A precise description of quality management can be found in section 5.7.4.2.

Example of a log:

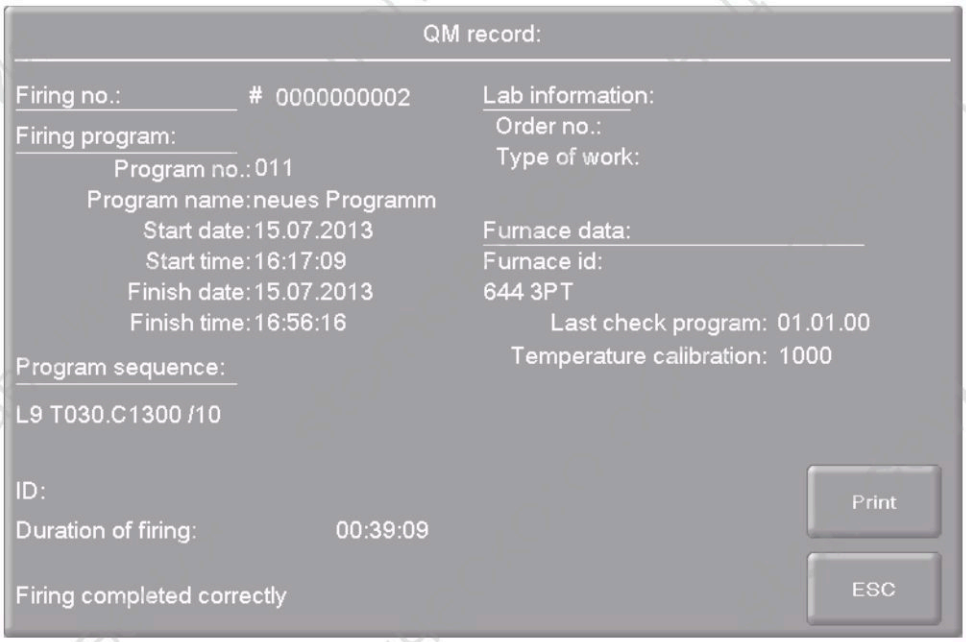


Fig. 6-18 QM log

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6.10.2. X-Dream (optional)

NOTE:
The requirements for using X-DREAM® are:
- **X-DREAM® is installed on the computer,**
- **the firing furnace is configured for a network connection,**
- **the firing furnace is configured for access via an FTP server.**

The optional X-DREAM® program ("Extended DEKEMA Remote Access Management") offers an additional level of quality management for firing furnaces:

- handling dfl files,
- querying the status of the firing furnace via a computer using QM information
- Automatically sending QM logs by e-mail:

Start X-DREAM® (for example by double-clicking the program name "X-DREAM_v20.exe"). The following window offers an example.

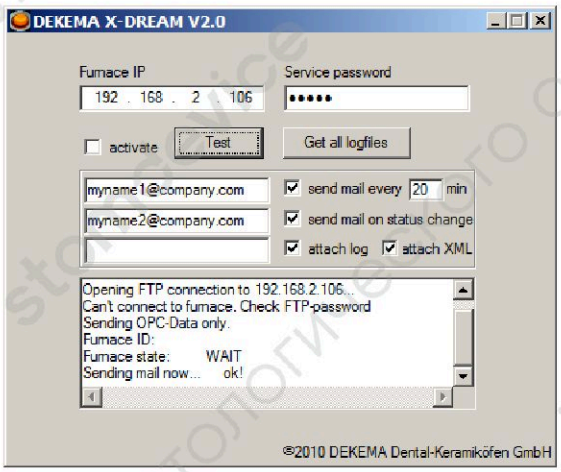


Fig. 6-19 *Example of X-DREAM*

For additional information, please contact DEKEMA (see section 7.7).

6.10.3. OPC (optional)

NOTE:
The requirements for using OPC are:
- **OPC is installed on the computer,**
- **the firing furnace is configured for a network connection,**
- **the firing furnace is configured for access via an FTP server.**

OPC ("OLE for Process Control") is a standardized software interface that allows you to exchange data between applications by different manufacturers.

By using the optional OPC program by DEKEMA, you can integrate quality management for the firing furnace into an ERP system ("enterprise resource planning").

For additional information, please contact DEKEMA (see section 7.7).

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6.11. After a power failure

NOTE:
If a running program is interrupted by a temporary power failure (less than 2 hours), the firing furnace attempts to properly terminate the program when the power comes back on. The quality of the firing results is not guaranteed in this case. Make sure to take particular care to inspect the firing results.

After a power failure, the control remembers the status of the firing furnace at the time of the interruption for up to two hours.

- If the power comes back on within two hours, the firing furnace returns to the status at the time of the power failure. A firing program is continued if the temperature drop in the firing chamber does not exceed 150°C.
- Otherwise, the AUSTROMAT® *664* asks you if you want to continue the program.

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7. Maintenance and Service



⚠ WARNING

Non-original replacement 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

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.**

7.1. 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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7.2. 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 (part of the scope of delivery). This consists of a PTC ring and a ring-specific calibration table.
- For calibration, always use the insulation table!
- Make sure 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:

1. The firing furnace must be thoroughly preheated before calibrating.
2. Place the PTC ring of the DEKEMA calibration set on the center of the insulation table.
3. Start the temperature calibration program:
   In the "Setup" menu, select the program "Temperature calibration", and press [Start] (see section 5.7.3.4).

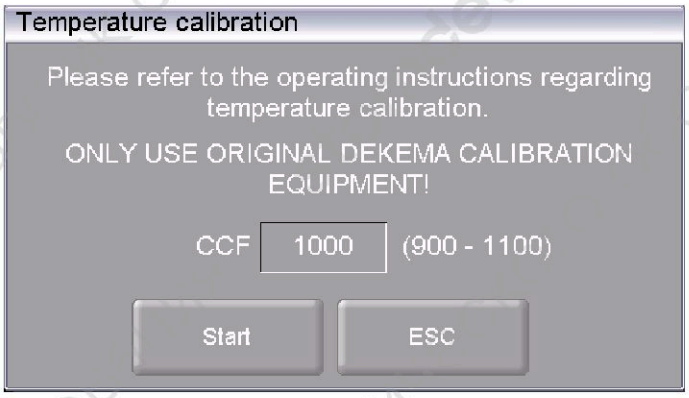


Fig. 7-1 Starting the temperature calibration

4. When the program is finished let the sintered PTC ring cool down on the insulation table.
5. Use an appropriate auxiliary tool, e.g. tweezers, or wear safety gloves when removing the PTC ring. Place the PTC ring (cooled down to room temperature) on a clean even surface.

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NOTE:
In order to exactly determine the diameter it is recommended to forward the sintered PTC ring to your service partner or to DEKEMA.

6. Use a caliper gauge in order to determine the diameter of the sintered PTC ring.
   - The measurement accuracy must be better than **± 0.01 mm** (= 10 µm). Otherwise, an exact evaluation and temperature calibration cannot be guaranteed.
   - Measure the diameter D between the two center digits of the three-digit batch number of the PTC ring (for example, the "2" digits in the following figure).

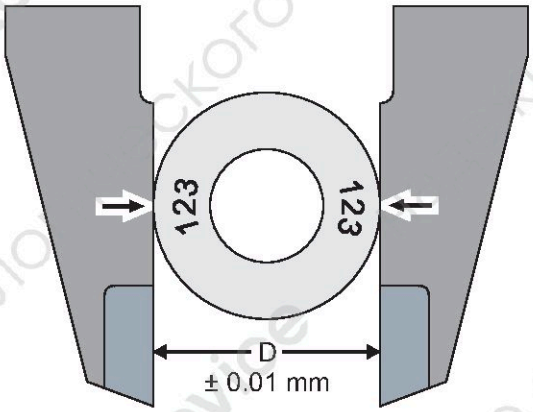


Fig. 7-2 *Measuring the diameter of the sintered PTC ring*

7. Compare the measured diameter D with the values given in the ring-specific calibration table: The corresponding table value shows the actual firing temperature.

8. Change the CCF value if the actual firing temperature deviates from the nominal temperature of 1500 °C.

Change the CCF
Proceed as follows to change the CCF:

1. In the "Setup" menu, select the program "Temperature calibration", see section 5.7.3.4).

2. Click on the input field for the CCF. The numeric keyboard window "Calibration factor" appears, see following figure.

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Fig. 7-3 *Changing the CCF*

3. Enter the new value for the CCF.
   - Increasing the CCF by one point results in an increase of the firing temperature by 1 °C,
   - Reducing the CCF by one point results in a decrease of the firing temperature by 1 °C.

If there are very large or sudden deviations from the original CCF, check for technical faults, and inform your service partner.

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7.3. Check program

NOTE:
Start the check program only after running several firing programs, or after a cleaning firing so that the firing oven is warmed up.

The AUSTROMAT® has an internal program, the check program, that checks the function of the major components: the check program. Regularly running in this unchangeable program makes it easier on you and the responsible service personnel

- to identify old components such as heating element wear,
- and eliminates malfunctions.

Start check program
After approximately 500 firings, the device will display a recommendation on the screen to start the self-check program (this takes approximately 180 minutes depending on the set maximum rise rate; see section 5.7.2.3).
In the "Setup" menu, select the program "Check program", and press [Start] (see section 5.7.3.2).

Results of the check program
The results of the self-check are saved in a diagnosis file (see section 5.7.4.3). If the diagnostic data reveal that a firing program may not be able to be processed correctly, then the AUSTROMAT® automatically points this out when a firing program is started. This is the case for example when the heating element is too old, and you want to reach a firing temperature quickly.

Error messages after running the check program

Error messages	Measures
1. “NO ERRORS FOUND”	No errors were found.
2. ‘CHANGE HEATING ELEMENT”	Contact your service partner (see section 7.7).

Tab. 7-1 Overview of error messages

The error message "CHANGE HEATING ELEMENT" can also arise when the heating element is technically functional. However, the check program requires a nominal power supply to operate. When the power supply is below the nominal value, the error diagnosis of the heating element can be incorrect. This problem generally only occurs in Asian countries. Consult your local power company.

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7.4. Change the heating element

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

NOTE:
If technical servicing or repairs are necessary, they should only be performed by authorized professionals (see section 7.7).

Over time, the heating element wears out from use. This can have a negative influence on your firing results. For this reason, change the heating element at the proper time. If the self-check program is run regularly (see section 7.3), a recommendation will be displayed when the heating element wear exceeds the permissible limit. Follow the accompanying installation and safety instructions in section 2 to install the replacement heating element. Heating elements should only be replaced by trained professionals.

7.5. Software update

Contact DEKEMA to update the software program for your firing furnace. An update can be obtained in the following ways:

- by mail on a thumb drive,
- by e-mail.

Both means of delivery come with detailed step-by-step instructions to install the program update (on paper or in a PDF file).

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7.6. Enable software options

A description of the available software options is found in section 5.7.2.1. The "Options" window (the menu Setup > Furnace ID > [Options], see Fig. 5-19) shows the software options that are already released for the firing furnace.

Software options and functionalities of the firing furnace

The following table lists the possible functionalities of the AUSTROMAT® firing furnace and identifies the most required software options.

Functionality	Required software option					
	DB	QM	JAVA	VNC	FTP-S	FTP-C
Network connections (LAN, WLAN) • Section 4.4 • Section 4.5 • Section 5.7.1.5 • Section 5.7.4.4 • Section 6.8.4	✔					
Operating the firing furnace via a browser • Section 4.4.2 • Section 4.5.1 • Section 6.3.2	✔		✔			
Operating the firing furnace via a VNC program • Section 4.4.3 • Section 4.5.3 • Section 6.3.3	✔			✔		
FTP data transfer from the firing furnace • Section 6.8.7	✔					✔
FTP data transfer to the firing furnace • Section 5.7.4.6 • Section 6.8.3 • Section 6.9	✔				✔	
First level quality management internally in the firing furnace • Section 5.7.4.2 • Section 6.10.1	✔	✔				
Second level quality management (X-DREAM) via an external computer [1)] • Section 6.10.2	✔				✔	
Third level quality management, incorporation in an external ERP system [2)] • Section 6.10.3	✔				✔	

Tab. 7-2 Functionalities of the firing furnace and the required software options

1) Also requires "X-DREAM" by DEKEMA
2) Also requires OPC by DEKEMA

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Questions regarding software options
Contact your service partner, or contact DEKEMA directly. You will need the serial number of your firing furnace: Menu path: Setup > Furnace ID (see section 5.7.2.1).

Enable a software option
Requirement: The enabling code for the software option.

To enable the software functions, proceed as follows:

1. Open the Setup menu.
2. Click the [Furnace ID] button. The "Furnace ID" window opens.

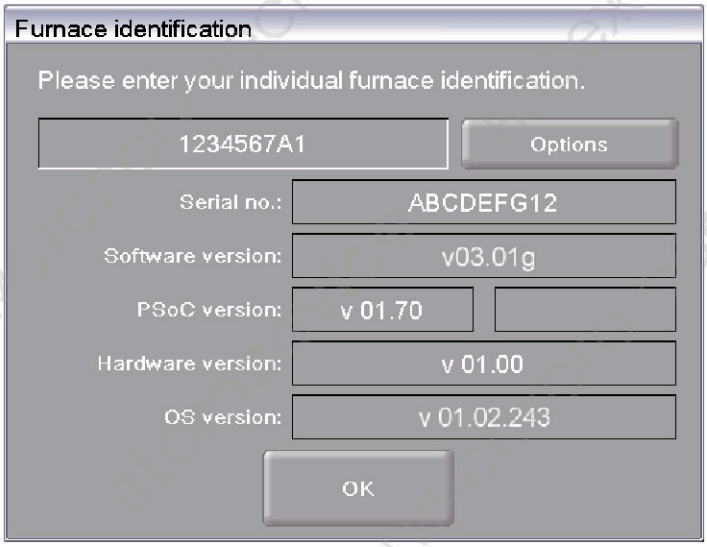


Fig. 7-4 "Furnace ID" window

3. Click on [Options]. The "Options" window opens.



Fig. 7-5 "Options" menu

4. Click on the button for the software option (not activated) for which you have received the enabling code. This opens the input window for the enabling code.

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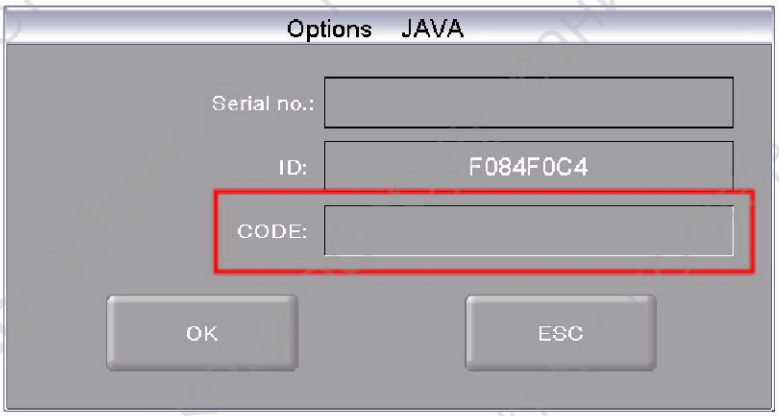


Fig. 7-6 *Input window for the enabling code (example)*

5. Enter the correct enabling code in the "CODE" field, and click [OK].

The button for the option is activated in the "Options" window. The corresponding function is available for the firing furnace.

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7.7. 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
Tel. +49-8654-4639-0
Fax +49-8654-66195
E-mail: info@dekema.com
Website: www.dekema.com

Transport

- Turn off to the firing furnace as described in section 8.1.
- To transport the firing furnace, only use the original box and the supplied packaging material.

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8. Storage and disposal

8.1. 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. 4-1), and maintain the storage conditions in section 1.6.

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8.2. Disposal

8.2.1. 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.

8.2.2. Legal guidelines

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

NOTE:
If the operator 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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8.2.3. 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.

8.2.4. 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, predator)
- Packaging
  - Styrofoam (cushion material)
  - Plastic (films)

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9. Safety data sheets

The relevant safety data sheets for the AUSTROMAT® *664* firing oven are on the following pages.

- For "Altraform" material, see section 9.1,
- For "Kerform" material, see section 9.2.
- For "Kerform" material, see section 9.3.

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9.1. "Altraform" safety data sheet

Material Safety Data Sheet

According to 91/155/EC

Document-No: 0012E Reviewed: 04. 01. 2005

1. IDENTIFICATION OF THE SUBSTANCE / PREPARATION AND OF THE COMPANY

Identification of the product

Altraform, Kerasetter - Vacuum formed material based on alumina fibre

Identification of the company

Aug. Rath jun. GmbH Hafnerstrasse 1 – 3 A-3375 Krummnussbaum Tel: +43/(0)2757/2400 Fax: +43/(0)2757/2400-50	Rath GmbH Ossietzkystrasse 37 - 38 D-01662 Meissen Tel: +49/(0)3521/4645-0 Fax: +49/(0)3521/4645-86	Rath Hungaria RT Porcelan utca 1 H-1106 Budapest Tel: +36/(0)1/262-2552 Fax: +36/(0)1/261-9052

Emergency call: *+ 43 (0)2757 2400 0*

2. COMPOSITION / INFORMATION ON INGREDIENTS

All vacuum formed Altraform and Kerasetter products covered by this material safety data sheet are produced on basis of Alumina Fibre (polycrystalline). They are used as boards or shapes. The fibre is voluntarily classified as carcinogenic substance to category 3 and as irritant according to the Directive 91/155/EG (refer also section 15).

Chemical characterisation

CAS-No.	CHEMICAL NAME	HAZARD SYMBOLS	R-PHRASES	Content
134 428-1	Alumina Fibre	Xn	R 20, R 38	30-95%
Composition				
Al2O3	70 – 98 %			
SiO2	2 – 30 %			

CAS-No.	CHEMICAL NAME	HAZARD SYMBOLS	R-PHRASES	Content
7631-86-9	Amorphous Silica			<25%
1344-28-1	Alumina			0-50%
56780-58-6	Starch			<10%

For further information see also the technical data sheet of the product.

3. HAZARD IDENTIFICATION

Irritant effects

May cause temporary mechanical irritation to eyes, skin, and upper respiratory tract (nose, throat). Pre-existing medical conditions, including dermatitis, asthma or chronic lung disease might be aggravated by exposure.

Concerns about chronic respiratory health effects

The manufacturer classified alumina fibres in category 3 by himself. Inhalation tests of animals haven't caused any lung damage (Toxicology Letters, 8, (1981) 153-163; Br. J. exp. Path. (1981) 62, 323; Ann. Occup. Hyg. Vol.26., 1982, 371-380).

4. FIRST-AID MEASURES

- After inhalation: If nose and throat become irritated move to a dust free area, drink water and blow nose.

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- **After skin contact:** In case of skin irritation rinse affected areas with cold water and wash gently with soap. Do not rub or scratch exposed skin. Using a skin cream or lotion after washing may be helpful. Change into clean clothing.
- **After eye contact:** In case of eye contact flush abundantly with lukewarm water. Lifting lids occasionally to ensure thorough rinsing. Have eye bath available. Do not rub eyes.
- **After swallowing:** If gastrointestinal tract irritation develops, move to a dust free environment and drink plenty of water.

Further instructions
If symptoms persist, seek medical advice.

5. FIRE-FIGHTING MEASURES

The materials related to this MSDS are not combustible. However, unfired products may contain up to 5% organic and inorganic additives, respectively, which are thermally unstable and develop gases and fumes.
Packaging and surrounding materials may be combustible. Therefore use extinguishing agent suitable for surrounding combustible materials. Wear self-contained breathing apparatus when entering oxygen deficient area.

6. ACCIDENTAL RELEASE MEASURES

Personal-related safety precautions
An accidental release or spillage of the material may lead to an abnormally high dust concentration. Provide the workers with protective equipment as detailed in section 8.
Restrict access to the area to a minimum number of workers. Restore the situation to normal as quickly as possible. Prevent further dust dispersion for example by damping the materials.

Environmental protection
Clean up spilled material to the extent possible. Package spilled material properly for disposal (see section 13). Do not allow to be wind blown. Do not flush spilled material into drains. Prevent spilled materials from entering natural water courses. Check with your employer to identify all regulations which may apply.

Measures for cleaning / collecting
Dust suppressing cleaning methods such as wet sweeping or vacuuming (equipped with a HEPA filter) should be used to clean the work area. Compressed air or dry sweeping should not be used for cleaning.

7. HANDLING AND STORAGE

Techniques to reduce dust emissions during handling
Handling can be a source of dust emission. Process should be designed to limit the amount of handling. Wherever possible handling should be carried out under ventilation. Limit use of power tools unless in conjunction with local exhaust. Using specially treated or packaged products will minimise dust emission. Regular good housekeeping will minimise secondary dust dispersal (see section 6).
Personal protection see section 8.

Storage
Always use visibly labelled containers, keep container closed when not in use.
Avoid damaging containers.
Reduce dust emission during packing out.
Store in a dry area.

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Empty containers
Product packaging may contain residue. Do not reuse.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Techniques to reduce dust exposure to a minimum:
Access situations with the potential for dust release. Where practical enclose dust sources and provide dust extraction at source. Use down draft tables, emission controlling tools and materials handling equipment designed to minimise airborne fiber emissions additionally.
Keep the workplace clean. Use a vacuum cleaner fitted with a HEPA filter. Avoid using brooms and compressed air.
Operating procedures might be useful to limit dust production and exposure of workers.
If necessary consult an industrial hygienist to design proper workplace controls.
Using products specially tailored to your application(s) will help controlling dust. Some products can be delivered ready for use without further cutting or machining.
Some could be treated or packaged to minimise or avoid dust emission during handling.
Consult your supplier for further details.

Hygiene standards and exposure limits
Hygiene standards and exposure limits may differ from country to country. Check those currently applying in your country and comply with regulations.

Examples of exposure limits applying (in January 1998) are given below:

Chemical name	CAS-Nr.	National exposure limits *	
amorphous silica	7631-86-9	Germany: TRGS 900 UK: HSE EH40	4 mg/m³ 6 mg/m³ inhalable dust
alumina fibre	134 428-1	Germany: TRGS 900 France: DRT No 95-4 UK: HSE EH40	0,5 f/ml 0,6 f/ml 2,0 f/ml

** Time weighted average concentrations of airborne respirable particles measured over 8 hours by the conventional membrane filter method.*

Personal protection equipment
Use skin and eye protection during mean working process (e.g. dismantling). Use protective cream and lotion for sensible skin. After completing work wash polluted skin with water. Wash work clothing separately.

Respiratory protection	- FFP2 particulate respirator (complying with EN 149) recommended; for short term operations where excursions above the exposure limit value are less than a factor of ten, use FFP3 respirators
Hand protection	- wear suitable gloves (e.g. PVC or Nitril according to EN 388 and EN 420)
Eye protection	- wear goggles or safety glasses with side shields
Skin protection	- suitable work clothes recommended (loose fitting, closed overalls).

Information and training of workers:
Workers should be informed on:
- the applications involving fibre-containing products;
- the potential risks to health resulting from exposure to fibrous dust;
- the requirements regarding smoking, eating and drinking at the workplace;
- the requirements for protective equipment and clothing.

Workers shall be trained on:
- the good working practices to limit dust emissions;
- the proper use of protective equipment.

9. PHYSICAL AND CHEMICAL PROPERTIES

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Appearance

Form:	solid, fibrous material
Colour:	white
Odour:	*odourless*

Safety relevant data

Melting point:	>2000°C
Flash point:	*non-flammable*
Flammability:	*non-flammable*
Ignition temperature:	*non-flammable*
Autoflammability:	*non-flammable*
Oxidising properties:	*none*
Vapour pressure:	*not applicable*
Raw density:	*200 -1500 kg/m³*
Solubility in water:	not soluble in water
pH value (1000g/H_2O, at 25°C):	*7 – 8*
Viscosity (at 25°C):	not applicable
Other data -	*see technical data sheet*

10. STABILITY AND REACTIVITY

Conditions or materials to avoid
None

Hazardous reaction products
No hazardous decomposition products when stored and handled correctly.

The first heat up of unfired material leads to the thermal decomposition of organic and/or volatile inorganic components in the temperature range between about 100 and 600°C. The amount of organic and/or volatile inorganic components present in the material can reach up to 5 wt.-%. The decomposition products are mainly carbon monoxide and carbon dioxide. Additionally trace gasses (e.g. hydrogen chloride, sulphur dioxide, nitrogen oxides) may released.
Emission occurs only during the first heating. It is advisable to ensure good ventilation when such appliances are first put into service. Please avoid exposures at high concentrations.
Continuous use of the products at temperatures above 900°C may lead to the formation of several crystalline phases. If crystalline silica (cristobalite) is present, follow corresponding hygienic standards and national regulations.

11. TOXICOLOGICAL INFORMATION

Irritant properties
Coarse fibres can cause itching of the skin, foreign body reaction in the upper respiratory system (mucous membranes), and in the eyes. The itching and possible inflammation are a mechanical reaction to the coarse fibres (of more than about 5 µm in diameter) and are not damaging in the way chemical irritants may be. They generally abate within a short time after the end of exposure.
Appropriate work clothes prevent irritation (see section 8).

Human data on chronic respiratory health effects
No known disease associated with exposure to alumina fibre even though these fibres have been used for over 20 years.

Inhalation toxicology data in animals
Polycrystalline fibre was administered to rats in intraperitoneal, intratracheal and intrapleural studies and all showed negative results. This comprehensive group of toxicological studies indicates that polycrystalline fibres showed no fibrogenic, neither carcinogenic nor other

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significant toxicological effects when exposure occurs by relevant routes (i.e. by inhalation or oral ingestion) or when introduced artificially into the lung in large quantities by injection. Despite the evidence, the IARC has placed polycrystalline alumina fibre into a broad group of so called ceramic fibres.

12. ECOLOGICAL INFORMATION

The Altraform and Kerasetter products are inert materials and remain stable over time.
No adverse effects of this material on the environment have been identified.

13. DISPOSAL CONSIDERATIONS

EWC-Code for mineral fibre waste: 101 103

Waste from the Altraform and Kerasetter materials is not classified as hazardous waste and may generally be disposed at a normal tipping site which has been licensed for the disposal of industrial waste. Unless wetted, such a waste is normally dusty and thus, should be properly sealed in clearly and visibly labelled containers for disposal. At some tip sites dusty waste may be treated differently in order to ensure they are dealt with promptly to avoid them being wind blown.
In case of contamination by products classified as hazardous waste, expert guidance should be sought.
Check for local regulations which may apply.

14. TRANSPORT INFORMATION

Not classified as dangerous goods according to international transport regulations (ADR, RID, IATA, IMDG).

Ensure that dust is not wind blown during transportation.

15. REGULATORY INFORMATION

EC Classification
The Altraform and Kerasetter products covered by this MSDS contain polycrystalline alumina fibres which are voluntarily classified as category 3 carcinogen.
According to Directive 97/69/EC these fibres belong to the group of "man-made vitreous (silicate) fibres with random orientation with alkaline oxide and alkaline-earth oxide ($Na_2O+K_2O+CaO+MgO+BaO$) content less or equal to 18% by weight".

Danger Symbol:	Xn - Harmful
Risk Phrases:	R 20 Harmful by inhalation, R 38 Irritating to skin
Safety Phrases:	S 24/25 Avoid contact with eyes and skin, S 36/37/38 Wear suitable loose fitting, long-sleeved clothes, gloves and eye protection

Water protection
National laws may apply.

Protection of workers
Shall be in accordance with several European directives as amended and their implementations by the Member States:
- Council Directive 90/394/EC "on the protection of workers from the risks related to exposure to carcinogens at work".
- Council Directive 89/391/EEC dated 12 June 1989 "on the introduction of measures to encourage improvements in the safety and health of workers at work" (Official Journal of the European Community - OJEC) L 183 of 29 June 1989, p.1).

General hygienic standards (e.g. TRGS 521) and all applicable regulations have to be observed.

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Other possible regulations
Member States are in charge of implementing European directives into their own national regulation within a period of time normally given in the directives. Member States may impose more stringent requirements.
Please always refer to any national regulation.

16. OTHER INFORMATION

Precautionary measures to be taken after service upon removal
As produced, the used 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 "hotface" 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 notes "in making the overall evaluation, the Working Group noted that carcinogenicity in humans was not detected in all industrial circumstances studied..." In most jurisdictions there are specific occupational exposure limits for crystalline silica (quartz, cristobalite) which may vary between countries and local jurisdictions. Check which exposure levels apply to your facility and comply with local regulation.

Labelling
Substances are labelled in accordance with the above classification (see section 15). In addition, manufacturers have decided that all other alumina fibre containing products will also be labelled on the basis of their estimated potential to release dust.

Useful references
- Hazards from the use of Refractory Ceramic Fibre. Health and Safety Executive; Information document, HSE 267 / (1998)
- Working with Refractory Ceramic Fibres; ECFIA; Code of practice (February 1998)
- TRGS 521: Faserstäube
- Commission Directive 97/69/EC of 5 December 1997 adapting to technical progress for the 23rd time 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. Official Journal of the European Communities, 13 December 1997, and its national adaptions
- Maxim LD et al (1998); CARE – A European programme for monitoring and reducing refractory ceramic fiber dust at the workplace - initital results: "Gefahrstoffe – Reinhaltung der Luft", 58 : 3, pp. 97-103

CARE Programm
The European Ceramic Fibres Industry Association (ECFIA) has undertaken an extensive hygiene Programme for refractory ceramic fibres (RCF).
The objectives are twofold:
(i) to monitor workplace dust concentrations at both manufacturers' and customers' premises, and
(ii) to document manufacturing and use of RCF products from an industrial hygiene perspective in order to establish appropriate recommendations to reduce exposures.
The initial results of the programme have been published; (see Maxim et al. ref. above).
If you wish to participate in the CARE programme, contact ECFIA or your supplier.

The data given here are based on current knowledge and experience. The purpose of this safety Data Sheet is to describe the products in terms of their safety requirements. The above details do not imply any guarantee concerning composition, properties or performance.
Relevant laws and regulations have to be observed in direct responsibility of our customers.

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RATH **Material Safety Data Sheet**
According to 91/155/EC

Replaces version dated: November 4, 2002

Department issuing MSDS: **R&D**
Dr.-Ing. habil. S. Möhmel

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9.2. "Kerform" safety data sheet

RATH

Material Safety Data Sheet

According to 91/155/EC

Document-No: 0013E Reviewed: 04. 01. 2005

1. IDENTIFICATION OF THE SUBSTANCE / PREPARATION AND OF THE COMPANY

Identification of the product

Kerform, Kerasetter, Kerheat - Vacuum formed material based on aluminosilicate fibre

Identification of the company

Aug. Rath jun. GmbH Hafnerstrasse 1 – 3 A-3375 Krummnussbaum Tel: +43/(0)2757/2400 Fax: +43/(0)2757/2400-50	Rath GmbH Ossietzkystrasse 37 - 38 D-01662 Meissen Tel: +49/(0)3521/4645-0 Fax: +49/(0)3521/4645-86	Rath Hungaria RT Porcelan utca 1 H-1106 Budapest Tel: +36/(0)1/262-2552 Fax: +36/(0)1/261-9052

Emergency call: *+ 43 (0)2757 2400 0*

2. COMPOSITION / INFORMATION ON INGREDIENTS

All vacuum formed Kerform, Kerasetter and Kerheat products covered by this material safety data sheet are produced on basis of Ceramic Fibre (Aluminium Silicate Fibre). Some qualities may additionally contain mineral fibres and alumina fibres, respectively (see technical data sheets). They are used as boards or shapes. The ceramic fibre is classified as carcinogenic substance to category 2 and the alumina fibre is voluntarily classified as carcinogenic substance to category 3 and as irritant according to the Directive 91/155/EG (refer also section 15).
The mineral fibre is not classified as carcinogen.

Chemical characterisation

CAS-No.	CHEMICAL NAME	HAZARD SYMBOLS	R-PHRASES	Content
142 844-00-6	Aluminium Silicate Fibre	T, Xi	R 38 / R 49	30-90%
Composition				
Al2O3	35 – 55 %			
SiO2	45 – 60 %			
ZrO2	0 – 15 %			

CAS-No.	CHEMICAL NAME	HAZARD SYMBOLS	R-PHRASES	Content
134 428-1	Alumina Fibre	Xn	R 38	0-30%
Composition				
Al2O3	70 – 98 %			
SiO2	2 – 30 %			

CAS-No.	CHEMICAL NAME	HAZARD SYMBOLS	R-PHRASES	Content
287922-11-6	Mineral Fibre	Xi	R 38	0-30%
Composition				
Al2O3	18 - 23 %			
SiO2	38 – 43 %			
CaO+MgO	23 - 28 %			
Others	< 20 %			

CAS-No.	CHEMICAL NAME	HAZARD SYMBOLS	R-PHRASES	Content
7631-86-9	Amorphous Silica			<25%
1344-28-1	Alumina			0-50%
56780-58-6	Starch			<10%

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For further information see also the technical data sheet of the product.

3. HAZARD IDENTIFICATION

Irritant effects
May cause temporary mechanical irritation to eyes, skin, and upper respiratory tract (nose, throat). Pre-existing medical conditions, including dermatitis, asthma or chronic lung disease might be aggravated by exposure.

Concerns about chronic respiratory health effects
This fibre belongs to a group of fibres classified under Directive 97/69/CE as category 2 carcinogens ("substances which should be regarded as if they are carcinogenic to man"). Based on results of some animal studies there is a concern that excessive dust exposure may cause fibrosis and cancer of the lung or the pleura. This has not confirmed by human data. The manufacturer classified alumina fibres in category 3 by himself. Inhalation tests of animals haven't caused any lung damage.

4. FIRST-AID MEASURES

- **After inhalation:** If nose and throat become irritated move to a dust free area, drink water and blow nose.
- **After skin contact:** In case of skin irritation rinse affected areas with cold water and wash gently with soap. Do not rub or scratch exposed skin. Using a skin cream or lotion after washing may be helpful. Change into clean clothing.
- **After eye contact:** In case of eye contact flush abundantly with lukewarm water. Lifting lids occasionally to ensure thorough rinsing. Have eye bath available. Do not rub eyes.
- **After swallowing:** If gastrointestinal tract irritation develops, move to a dust free environment and drink plenty of water.

Further instructions
If symptoms persist, seek medical advice.

5. FIRE-FIGHTING MEASURES

The materials related to this MSDS are not combustible. However, unfired products may contain up to 5% organic and inorganic additives, respectively, which are thermally unstable and develop gases and fumes.
Packaging and surrounding materials may be combustible. Therefore use extinguishing agent suitable for surrounding combustible materials. Wear self-contained breathing apparatus when entering oxygen deficient area.

6. ACCIDENTAL RELEASE MEASURES

Personal-related safety precautions
An accidental release or spillage of the material may lead to an abnormally high dust concentration. Provide the workers with protective equipment as detailed in section 8.
Restrict access to the area to a minimum number of workers. Restore the situation to normal as quickly as possible. Prevent further dust dispersion for example by damping the materials.

Environmental protection
Clean up spilled material to the extent possible. Package spilled material properly for disposal (see section 13). Do not allow to be wind blown. Do not flush spilled material into drains. Prevent spilled materials from entering natural water courses. Check with your employer to identify all regulations which may apply.

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Measures for cleaning / collecting
Dust suppressing cleaning methods such as wet sweeping or vacuuming (equipped with a HEPA filter) should be used to clean the work area. Compressed air or dry sweeping should not be used for cleaning.

7. HANDLING AND STORAGE

Techniques to reduce dust emissions during handling
Handling can be a source of dust emission. Process should be designed to limit the amount of handling. Wherever possible handling should be carried out under ventilation. Limit use of power tools unless in conjunction with local exhaust. Using specially treated or packaged products will minimise dust emission. Regular good housekeeping will minimise secondary dust dispersal (see section 6).
Personal protection see section 8.

Storage
Always use visibly labelled containers, keep container closed when not in use.
Avoid damaging containers.
Reduce dust emission during packing out.
Store in a dry area.

Empty containers
Product packaging may contain residue. Do not reuse.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Techniques to reduce dust exposure to a minimum:
Access situations with the potential for dust release. Where practical enclose dust sources and provide dust extraction at source. Use down draft tables, emission controlling tools and materials handling equipment designed to minimise airborne fiber emissions additionally.
Keep the workplace clean. Use a vacuum cleaner fitted with a HEPA filter. Avoid using brooms and compressed air.
Operating procedures might be useful to limit dust production and exposure of workers.
If necessary consult an industrial hygienist to design proper workplace controls.
Using products specially tailored to your application(s) will help controlling dust. Some products can be delivered ready for use without further cutting or machining.
Some could be treated or packaged to minimise or avoid dust emission during handling.
Consult your supplier for further details.

Hygiene standards and exposure limits
Hygiene standards and exposure limits may differ from country to country. Check those currently applying in your country and comply with regulations.

Examples of exposure limits applying (in January 1998) are given below:

Chemical name	CAS-Nr.	National exposure limits *	
amorphous silica	7631-86-9	Germany: TRGS 900 UK: HSE EH40	4 mg/m³ 6 mg/m³ inhalable dust
aluminium silicate fibre	142 844-00-6	Germany: TRGS 900 France: DRT No 95-4 UK: HSE EH40	0,5 f/ml 0,6 f/ml 2,0 f/ml

** Time weighted average concentrations of airborne respirable particles measured over 8 hours by the conventional membrane filter method.*

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Personal protection equipment
Use skin and eye protection during mean working process (e.g. dismantling). Use protective cream and lotion for sensible skin. After completing work wash polluted skin with water. Wash work clothing separately.

Respiratory protection	- FFP2 particulate respirator (complying with EN 149) recommended; for short term operations where excursions above the exposure limit value are less than a factor of ten, use FFP3 respirators
Hand protection	- wear suitable gloves (e.g. PVC or Nitril according to EN 388 and EN 420)
Eye protection	- wear goggles or safety glasses with side shields
Skin protection	- suitable work clothes recommended (loose fitting, closed overalls).

Information and training of workers:
Workers should be informed on:
- the applications involving fibre-containing products;
- the potential risks to health resulting from exposure to fibrous dust;
- the requirements regarding smoking, eating and drinking at the workplace;
- the requirements for protective equipment and clothing.

Workers shall be trained on:
- the good working practices to limit dust emissions;
- the proper use of protective equipment.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form:	solid, fibrous material
Colour:	white - gray
Odour:	*odourless*

Safety relevant data

Melting point:	>1400°C
Flash point:	*non-flammable*
Flammability:	*non-flammable*
Ignition temperature:	*non-flammable*
Autoflammability:	*non-flammable*
Oxidising properties:	*none*
Vapour pressure:	*not applicable*
Raw density:	*200 -1500 kg/m³*
Solubility in water:	not soluble in water
pH value (1000g/H_2O, at 25°C):	7 – 8
Viscosity (at 25°C):	not applicable
Other data -	*see technical data sheet*

10. STABILITY AND REACTIVITY

Conditions or materials to avoid
None

Hazardous reaction products
No hazardous decomposition products when stored and handled correctly.

The first heat up of unfired material leads to the thermal decomposition of organic and/or volatile inorganic components in the temperature range between about 100 and 600°C. The amount of organic and/or volatile inorganic components present in the material can reach up to 5 wt.-%. The decomposition products are mainly carbon monoxide and carbon

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dioxide. Additionally trace gasses (e.g. hydrogen chloride, sulphur dioxide, nitrogen oxides) may released.
Emission occurs only during the first heating. It is advisable to ensure good ventilation when such appliances are first put into service. Please avoid exposures at high concentrations.
Continuous use of the products at temperatures above 900°C may lead to the formation of several crystalline phases. If crystalline silica (cristobalite) is present, follow corresponding hygienic standards and national regulations.

11. TOXICOLOGICAL INFORMATION

Irritant properties
Under Directive 67/548/EEC all types of man-made vitreous (silicate) fibres are classified as "irritant" despite the fact that testing by the appropriate EU method (B4 in annex 5 of Directive 67/548/EEC) is providing no response and would not result in irritant classification.
Coarse fibres can cause itching of the skin, foreign body reaction in the upper respiratory system (mucous membranes), and in the eyes. The itching and possible inflammation are a mechanical reaction to the coarse fibres (of more than about 5 µm in diameter) and are not damaging in the way chemical irritants may be. They generally abate within a short time after the end of exposure.
Appropriate work clothes prevent irritation (see section 8).

Human data on chronic respiratory health effects
No known disease associated with exposure to refractory ceramic even though these fibres have been used for nearly 40 years. Pulmonary morbidity studies were carried out among the production workers in Europe and USA. In the American study pleural plaques were reported in 2,9% of workers examined. Plaques do not cause any symptoms and do not develop into disease.

Inhalation toxicology data in animals
In earlier studies RCF together with other man-made mineral fibres were regarded as inert. In the 70's and 80's tumours were produced in animals after intrapleural or intraperitoneal injection but the several inhalation experiments conducted were inconclusive. In 1990 inhalation studies known as the "RCC experiments" were conducted with size selected fibres. Fibrosis, lung tumours and mesotheliomas were produced in animals exposed to very high concentrations. It was then discovered that the size selection process led to a serious contamination of the test samples by non-fibrous particles. The inhaled particles may have decreased the rate of fibre clearance leading to a condition sometimes referred to as pulmonary overload. Experts are still analysing the significance of the RCC results. In further tests, uncontaminated fibre samples have proved to be largely less biologically active.

12. ECOLOGICAL INFORMATION

The Kerform, Kerasetter and Kerheat products are inert materials, which remain stable over time.
No adverse effects of this material on the environment have been identified.

13. DISPOSAL CONSIDERATIONS

EWC-Code for mineral fibre waste: 101 103

Waste from the Kerform, Kerasetter and Kerheat materials is usually not classified as hazardous waste and may generally be disposed at a normal tipping site which has been licensed for the disposal of industrial waste. Unless wetted, such a waste is normally dusty and thus, should be properly sealed in clearly and visibly labelled containers for disposal. At some tip sites dusty waste may be treated differently in order to ensure they are dealt with promptly to avoid them being wind blown.
In case of contamination by products classified as hazardous waste, expert guidance should be sought.

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Check for national and/or regional regulations which may apply.

14. TRANSPORT INFORMATION

Not classified as dangerous goods according to international transport regulations (ADR, RID, IATA, IMDG).

Ensure that dust is not wind blown during transportation.

15. REGULATORY INFORMATION

EC Classification

The Kerform, Kerasetter and Kerheat products contain aluminum silicate fibres classified as category 2 carcinogen.
According to Directive 97/69/EC these fibres belong to the group of "man-made vitreous (silicate) fibres with random orientation with alkaline oxide and alkaline-earth oxide ($Na_2O+K_2O+CaO+MgO+BaO$) content less or equal to 18% by weight".

Danger Symbol:	T - Toxic, Xi - Irritant
Risk Phrases:	R 49 - May cause cancer by inhalation, R 38 - Irritating to skin
Safety Phrases:	S 24/25 Avoid contact with eyes and skin, S 36/37/38 Wear suitable loose fitting, long-sleeved clothes, gloves and eye protection

The polycrystalline alumina fibres used for some of the products are voluntarily classified as category 3 carcinogen.
According to Directive 97/69/EC also these fibres belong to the group of "man-made vitreous (silicate) fibres with random orientation with alkaline oxide and alkaline-earth oxide ($Na_2O+K_2O+CaO+MgO+BaO$) content less or equal to 18% by weight".

Danger Symbol:	Xn - Harmful
Risk Phrases:	R 20 Harmful by inhalation, R 38 Irritating to skin
Safety Phrases:	S 24/25 Avoid contact with eyes and skin, S 36/37/38 Wear suitable loose fitting, long-sleeved clothes, gloves and eye protection

Some products additionally contain non-classified mineral fibres.
According to Directive 97/69/EC these fibres belong to the group of "man-made vitreous (silicate) fibres with random orientation with alkaline oxide and alkaline earth oxide ($Na_2O+K_2O+CaO+MgO+BaO$) content >18% by weight".

Danger Symbol:	Xi, Irritant
Risk Phrases:	Irritating to skin (R 38)
Safety Phrases:	Wear suitable protective clothing and gloves (S 36, S 37)

Water protection

National laws may apply.

Protection of workers

Shall be in accordance with several European directives as amended and their implementations by the Member States:

- Council Directive 90/394/EC "on the protection of workers from the risks related to exposure to carcinogens at work".
- Council Directive 89/391/EEC dated 12 June 1989 "on the introduction of measures to encourage improvements in the safety and health of workers at work" (Official Journal of the European Community - OJEC) L 183 of 29 June 1989, p.1).

General hygienic standards (e.g. TRGS 521) and all applicable regulations have to be observed.

Other possible regulations

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Member States are in charge of implementing European directives into their own national regulation within a period of time normally given in the directives. Member States may impose more stringent requirements.
Please always refer to any national regulation.

16. OTHER INFORMATION

Precautionary measures to be taken after service upon removal
As produced, the used 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 "hotface" 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 notes "in making the overall evaluation, the Working Group noted that carcinogenicity in humans was not detected in all industrial circumstances studied..." In most jurisdictions there are specific occupational exposure limits for crystalline silica (quartz, cristobalite) which may vary between countries and local jurisdictions. Check which exposure levels apply to your facility and comply with local regulation.

Useful references
- Hazards from the use of Refractory Ceramic Fibre. Health and Safety Executive; Information document, HSE 267 / (1998)
- Working with Refractory Ceramic Fibres; ECFIA; Code of practice (February 1998)
- TRGS 521: Faserstäube
- Commission Directive 97/69/EC of 5 December 1997 adapting to technical progress for the 23rd time 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. Official Journal of the European Communities, 13 December 1997, and its national adaptions
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CARE Programm
The European Ceramic Fibres Industry Association (ECFIA) has undertaken an extensive hygiene Programme for refractory ceramic fibres (RCF).
The objectives are twofold:
(i) to monitor workplace dust concentrations at both manufacturers' and customers' premises, and
(ii) to document manufacturing and use of RCF products from an industrial hygiene perspective in order to establish appropriate recommendations to reduce exposures.
The initial results of the programme have been published; (see Maxim et al referenced above).
If you wish to participate in the CARE programme, contact ECFIA or your supplier.

The data given here are based on current knowledge and experience. The purpose of this safety Data Sheet is to describe the products in terms of their safety requirements. The above details do not imply any guarantee concerning composition, properties or performance.
Relevant laws and regulations have to be observed in direct responsibility of our customers.

Replaces version dated: November 4, 2002

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9.3. "Isolrath" (Super-Isol) safety data sheet

skamol

Safety data sheet

Super-Isol, Super-1100 E, Super-1100 E (WR)

1. Identification of the substance/preparation and of the company/undertaking

Prepared on: 28-11-2007/ ZBH
Replaces: 13-11-2006

Product use: Porous board insulation.

Supplier:
Skamol A/S
Østergade 58-60
DK-7900 Nykøbing M
Tel:+45 97721533 Fax:+45 97724975
Emergency telephone number: +45 97721533
Email: insulation@skamol.dk

2. Hazards identification

The product shall not be classified as hazardous according to the national classification and labelling rules.

Additional information
May cause slight irritation to the skin and eyes.

3. Composition/information on ingredients

Einecs no.	CAS No.	Substances	Classification	w/w%
215-710-8	1344-95-2	Calcium silicate	-	-

Please see section 16 for the full text of the R-phrases

4. First aid measures

Inhalation
Exposure to dust: Seek fresh air, wash out mouth with water and blow nose thoroughly. Seek medical advice in case of persistent discomfort.

Ingestion
Exposure to dust: Wash out mouth thoroughly and drink 1-2 glasses of water in small sips. Seek medical advice in case of persistent discomfort.

Skin
Exposure to dust: Remove contaminated clothing. Wash the skin thoroughly with water and continue washing for a long time. Seek medical advice in case of persistent discomfort.

Eyes
Exposure to dust: Flush with water (preferably using eye wash equipment) until irritation subsides. Seek medical advice if symptoms persist.

Other information
Symptoms: See section 11. When obtaining medical advice, show the safety data sheet or label.

5. Fire-fighting measures

The product is not directly flammable. Avoid inhalation of vapour and flue gases – seek fresh air.

6. Accidental release measures

Use the same personal protective equipment as stated in section 8. Sweep up/collect spills for possible reuse or transfer to suitable waste containers. See section 13 for instructions on disposal. Do not sweep – use vacuum cleaner to collect spillage.

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Prepared on: 28-11-2007/ZBH
Replaces: 13-11-2006

Super-Isol, Super-1100 E, Super-1100 E (WR)

7. Handling and storage

Handling
See section 8 for information about precautions for use and personal protective equipment.

Storage
No special storage requirements.

8. Exposure controls/ personal protection

Precautions for use
Work processes where generation of dust may occur must be performed under effective process ventilation (e.g. local exhaust ventilation). Running water and eye wash equipment must be available. Wash hands before breaks, before using restroom facilities, and at the end of work.

Respiratory protection
In case of insufficient ventilation, wear respiratory protective equipment with P2 filter.

Gloves and protective clothing
Not required.

Eye protection
Wear safety goggles if there is a risk of dust contact with eyes.

Occupational exposure limits
Contains no substances subject to reporting requirements.

9. Physical and chemical properties

State: Solid substance, Porous board
Odour: None
pH: 8
Melting point: 1345 °C
Density: 230 - 290 kg/m3
Solubility in water: Insoluble

10. Stability and reactivity

The product is stable when used in accordance with the supplier's directions.

11. Toxicological information

Acute
Inhalation
Inhalation of dust may cause irritation to the upper airways.

Ingestion
Exposure to dust: Irritates mucous membranes in mouth and gastrointestinal tract.

Skin contact
Exposure to dust: May cause slight irritation.

Eye contact
Exposure to dust: Temporary irritation.

Long-term effects
None known.

12. Ecological information

Do not discharge large quantities of concentrated spills and residue into drains.

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Prepared on: 28-11-2007/ZBH
Replaces: 13-11-2006

Super-Isol, Super-1100 E, Super-1100 E (WR)

13. Disposal considerations

Contact the local authorities.

EWC code: Depends on line of business and use, for instance 17 06 04 insulation materials other than those mentioned in 17 06 01 and 17 06 03

14. Transport information

The product is not covered by the rules for transport of dangerous goods by road and sea according to ADR and IMDG.

15. Regulatory information

Hazard designation: It has been assessed that the product shall not be classified as hazardous according to the national classification and labelling rules.

Other labelling
None.

Chemical safety assessment
Chemical safety assessment has not been performed.

Restrictions on use
None.

Training requirement
No special training is required, but a thorough knowledge of this safety data sheet should be a prerequisite condition.

16. Other information

Sources used
Commission Directive 2004/73/EC of 29 April 2004 adapting to technical progress for the twenty-ninth time 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.
Commission Directive 2000/39/EC of 8 June 2000 establishing a first list of indicative occupational exposure limit values in implementation of Council Directive 98/24/EC on the protection of the health and safety of workers from the risks related to chemical agents at work
2001/118/EC: Commission Decision of 16 January 2001 amending Decision 2000/532/EC as regards the list of wastes (Text with EEA relevance) (notified under document number
Commission Directive 2001/58/EC of 27 July 2001 amending for the second time Directive 91/155/EEC defining and laying down the detailed arrangements for the system of specific information relating to dangerous preparations in implementation of Article 14 of European Parliament and Council Directive 1999/45/EC and relating to dangerous substances in implementation of Article 27 of Council Directive 67/548/EEC (safety data sheets)
Directive 1999/45/EC of the European Parliament and of the Council 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 + Directive 2006/8/EC.
ADR 2007 edition and IMDG 2006 edition.

Other information
This safety data sheet was prepared from information provided by the supplier about the product at the time of preparation (e.g. data sheets and the like).

Full text of the R-phrases that are stated in section 3.
No R-phrases.

Amendments have been made in the following sections
1,2,3,4,11,13,15,16

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