

**I AM THE
CONTROLLER**



More information under: nabertherm.com/en/series500



PROCESS CONTROL AND DOCUMENTATION



Facts

- Production of Arts & Crafts furnaces, laboratory furnaces, dental furnaces and industrial furnaces since 1947
- Production site in Lilienthal/Bremen - Made in Germany
- 530 employees worldwide
- 150,000 customers in more than 100 countries
- Very wide product range of furnaces
- One of the biggest R&D departments in the furnace industry
- High vertical integration

Global Sales and Service Network

- Manufacturing only in Germany
- Decentralized sales and service close to the customer
- Own sales organization and long term sales partners in all important world markets
- Individual on-site customer service and consultation
- Fast remote maintenance options for complex furnaces
- Reference customers with similar furnaces or systems close to you
- Secured spare parts supply, many spare parts available from stock
- Further information see page 18

Setting Standards in Quality and Reliability

- Project planning and construction of tailor-made thermal process plants incl. material handling and charging systems
- Innovative controls and automation technology, adapted to customer needs
- Very reliable and durable furnace systems
- Customer test center for process assurance

Experience in Thermal Processing

- Thermal Process Technology
- Additive Manufacturing
- Advanced Materials
- Fiber Optics/Glass
- Foundry
- Laboratory
- Dental
- Arts & Crafts

Table of Contents



Standard-Controllers

Nabertherm controller series 500.....	4
MyNabertherm app	6
Functions of the standard controllers.....	8
Process data storage and data input via PC	9

PLC Controls

PLC controls	11
Process data storage	12
Nabertherm control center NCC.....	13

Temperature Uniformity and Industry-Specific Standards

Temperature uniformity and system accuracy.....	14
AMS2750F, NADCAP, CQI-9	15

The new MyNabertherm App for Mobile Monitoring of Process Progress



Everything on display in the new Nabertherm app for the new controller series 500. Get the most out of your furnace with our app for iOS and Android. Don't hesitate to download it now.



Nabertherm Controller Series 500

I AM THE CONTROLLER

I'm the big brother of analog buttons and turning switches. I am the new generation of control and intuitive operation. My skills are highly complex, my operation is simple. I can be touched and speak 24 languages. I'll show you exactly which program is currently running and when it ends.



The controller series 500 impresses with its unique scope of performance and intuitive operation. In combination with the free "MyNabertherm" smartphone app, the operation and monitoring of the furnace is even easier and more powerful than ever before. The operation and programming takes place via a high-contrast, large touch panel, which shows exactly the information that is relevant at the moment.



Standard Equipment

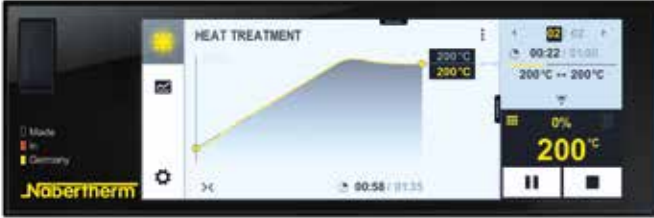
- Transparent, graphic display of the temperature curves
- Clear presentation of the process data
- 24 operating languages selectable
- Consistent, attractive design
- Easily understandable symbols for many functions
- Precise and accurate temperature control
- User levels
- Program status display with estimated end time and date
- Documentation of the process curves on USB storage medium in .csv file format
- Service information can be read out via USB stick
- Clear presentation
- Plain text display
- Configurable for all furnace families
- Can be parameterized for the different processes



Highlights

In addition to the well-known and matured controller functions, the new generation offers you some individual highlights. Here is an overview of the most important ones for you:

Modern Design



Colored display of temperature curves and process data

Easy Programming



Simple and intuitive program entry via touch panel

Integrated Help Function



Information on various commands in plain text

Program Management



Temperature programs can be saved as favorites and in categories

Segment Player



Detailed overview of process information including setpoint, actual value and switched functions

Wi-Fi-Capable



Connection with the MyNabertherm app



Intuitive touch screen



Easy program entry and control



Precise temperature control



User levels



Process documentation on USB

Further information on Nabertherm controllers, process documentation and tutorials on operation can be found on our website: <https://nabertherm.com/en/series-500>



MyNabertherm App for Mobile Monitoring of Process Progress

MyNabertherm App – the powerful and free digital accessory for Nabertherm 500 Series Controllers. Use the app for convenient online progress monitoring of your Nabertherm furnaces – from your office, while on the way or from wherever you wish. The app always keeps you in the picture. Just like the controller itself, the app is also available in 24 languages.



Convenient monitoring of one or multiple Nabertherm furnaces simultaneously

App-Functions

- Convenient monitoring of one or multiple Nabertherm furnaces simultaneously
- Clear presentation as a dashboard
- Individual overview of a furnace
- Display of active/inactive furnaces
- Operating status
- Current process data

Display of Program Progress for Each Furnace

- Graphical representation of the program progress
- Display of furnace name, program name, segment information
- Display of start time, program run time, remaining run time
- Display of additional functions such as fresh-air fan, exhaust air flap, gassing, etc.
- Operating modes as symbol



Display of program progress for each furnace

Push Notifications in Case of Malfunctions and at Program End

- Push notification on the lock screen
- Display of malfunctions with an associated description in the individual overview and in a message list

Contact with Service Possible

- Stored furnace data facilitate rapid support for you

Requirements

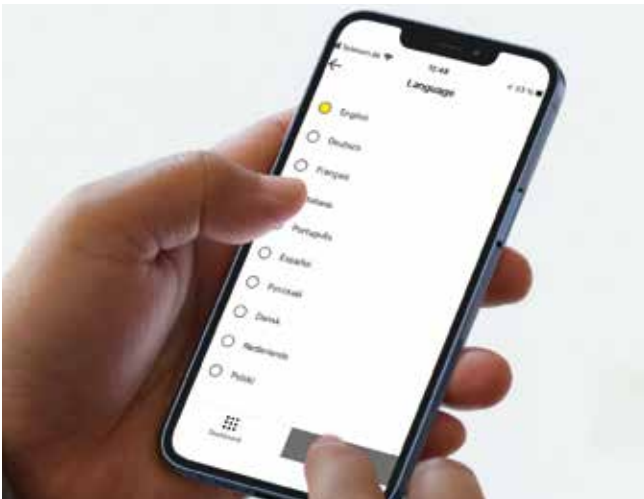
- Connection of the furnace to the Internet via the customer's Wi-Fi
- For mobile devices with Android (from version 9) or IOS (from version 13)



Easy to contact



Monitoring of Nabertherm furnaces with 500 series touch panel controller for Arts & Crafts, laboratory, dental, thermal process technology, advanced materials and foundry applications.



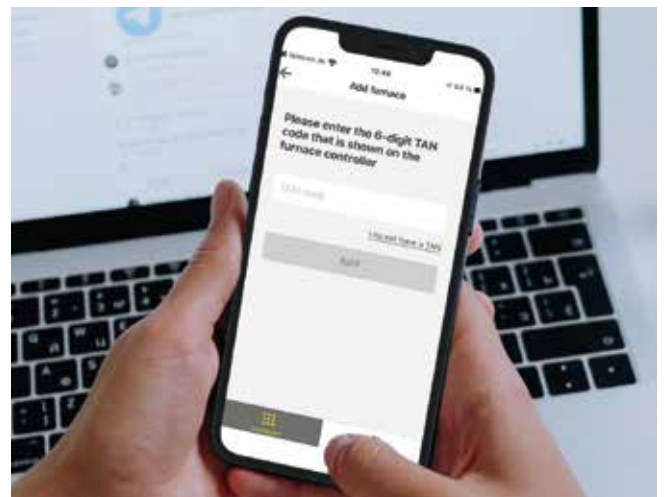
Available in 24 languages



Push notifications in case of malfunctions



Clear contextual menu



Any addition of Nabertherm furnaces

Functions of the Standard Controllers

	R7	3216	3208	B500/ B510	C540/ C550	P570/ P580	3504	H500	H1700	H3700	NCC
Number of programs	1	1		5	10	50	25	20	20	20	100
Segments	1	8		4	20	40	500 ³	20	20	20	20
Extra functions (e. g. fan or autom. flaps) maximum				2	2	2-6	2-8 ³	3 ³	6/2 ³	8/2 ³	16/4 ³
Maximum number of control zones	1	1	1	1	1	3	2 ^{1,2}	1-3 ³	8	8	8
Drive of manual zone regulation				●	●	●					
Charge control/bath control							○	○	○	○	○
Auto tune		●	●	●	●	●	●				
Real-time clock				●	●	●		●	●	●	●
Graphic color display				●	●	●		4" 7"	7"	12"	22"
Graphic display of temperature curves (program sequence)				●	●	●					
Status messages in clear text			●	●	●	●	●	●	●	●	●
Data entry via touchpanel				●	●	●		●	●	●	●
Entering program names (i.e. "Sintering")				●	●	●			●	●	●
Keypad lock				●	●	●	●				
User levels				●	●	●		○	○	○	●
Skip-button for segment jump				●	●	●		●	●	●	●
Program entry in steps of 1 °C or 1 min.	●	●	●	●	●	●	●	●	●	●	●
Start time configurable (e. g. to use night power rates)				●	●	●		●	●	●	●
Switch-over °C/°F	○	○	○	●	●	●	○	●	● ³	● ³	● ³
kWh meter				●	●	●					
Operating hour counter				●	●	●		●	●	●	●
Set point output			○	●	●	●	○		○	○	○
NTLog Comfort for HiProSystems: recording of process data on an external storage medium								○	○	○	
NTLog Basic for Nabertherm controller: recording of process data with USB-flash drive				●	●	●					
Interface for VCD software				○	○	○					
Malfunction memory				●	●	●		●	●	●	●
Number of selectable languages				24	24	24					
Wi-Fi-capable („MyNabertherm“ App)				●	●	●					

¹ Not for melt bath control

² Control of additional separate slave regulators possible

³ Depending on the design

● Standard

○ Option



Mains Voltages for Nabertherm Furnaces

1-phase: all furnaces are available for mains voltages from 110 V - 240 V at 50 or 60 Hz.

3-phase: all furnaces are available for mains voltages from 200 V - 240 V or 380 V - 480 V, at 50 or 60 Hz.

The connecting rates in the catalog refer to the standard furnace with 400 V (3/N/PE) respectively 230 V (1/N/PE).

Process Data Storage and Data Input via PC



There are various options for evaluation and data input the processes for optimal process documentation and data storage. The following options are suitable for data storage when using the standard controllers.

Data Storing of Nabertherm Controllers with NTLog Basic

NTLog Basic allows for recording of process data of the connected Nabertherm Controller (B500, B510, C540, C550, P570, P580) on a USB stick. The process documentation with NTLog Basic requires no additional thermocouples or sensors. Only data recorded which are available in the controller. The data stored on the USB stick (up to 130,000 data records, format CSV) can afterwards be evaluated on the PC either via NTGraph or a spreadsheet software used by the customer (e.g. Excel™ for MS Windows™). For protection against accidental data manipulation the generated data records contain checksums.

Visualization with NTGraph for MS Windows™ for Single-Zone Controlled Furnaces

The process data from NTLog can be visualized either using the customer's own spreadsheet program (e.g. Excel™ for MS Windows™) or NTGraph for MS Windows™ (Freeware). With NTGraph Nabertherm provides for an additional user-friendly tool free of charge for the visualization of the data generated by NTLog. Prerequisite for its use is the installation of the program Excel™ for MS Windows™ (from version 2003). After data import presentation as diagram, table or report can be chosen. The design (color, scaling, reference labels) can be adapted by using prepared sets. NTGraph is available in eight languages (DE/EN/FR/ES/IT/CN/RU/PT). In addition, selected texts can be generated in other languages.

Software NTEdit for MS Windows™ for Entering Programs on the PC

By using the software NTEdit for MS Windows™ (Freeware) the input of the programs becomes clearer and thus easier. The program can be entered on customers PC and then be imported into the controller (B500, B510, C540, C550, P570, P580) with a USB stick. The display of the set curve is tabular or graphical. The program import in NTEdit is also possible. With NTEdit Nabertherm provides a user-friendly free tool. A prerequisite for the use is the client installation of Excel™ for MS Windows™ (from version 2007). NTEdit is available in eight languages (DE/EN/FR/ES/IT/CN/RU/PT).



NTGraph, a freeware for the easy-to-read analysis of recorded data using MS Excel



Recording of process data of the connected controller via USB stick



Process input via the NTEdit software (freeware) for MS Windows™

Process Data Storage

VCD-software for visualization, control and documentation

Documentation and reproducibility are more and more important for quality assurance. The powerful VCD software represents an optimal solution for single multi furnace systems as well as charge documentation on the basis of Nabertherm controllers.

The VCD software is used to record process data of the series 500 and series 400 as well as various further Nabertherm controllers. Up to 400 different heat treatment programs can be stored. The controllers are started and stopped via the software at a PC. The process is documented and archived accordingly. The data display can be carried-out in a diagram or as data table. Even a transfer of process data to MS Excel (.csv format *) or the generation of reports in PDF format is possible.



Example lay-out with 3 furnaces

Features

- Available for controllers series 500 - B500/B510/C540/C550/P570/P580, series 400 - B400/B410/C440/C450/P470/P480, Eurotherm 3504 and various further Nabertherm controllers
- Suitable for operating systems Microsoft Windows 7/8/10/11
- Simple installation
- Setting, Archiving and print of programs and graphics
- Operation of controllers via PC
- Archiving of process curves from up to 16 furnaces (also multi-zone controlled)
- Redundant saving of archives on a server drive
- Higher security level due to binary data storage
- Free input of charge date with comfortable search function
- Possibility to evaluate data, files exportable to Excel
- Generation of a PDF-report
- 24 languages selectable

Extension Package 1 for display of an additional temperature measuring point, independant of the furnace controls

- Connection of an independent thermocouple, type S, N or K with temperature display on a supplied C6D display, e. g. for documentation of charge temperature
- Conversion and transmission of measured values to the VCD software
- For data evaluation, please see VCD-software features
- Display of measured temperature directly on the extension package

Extension Package 2 for the connection of up to three, six or nine measuring point, independant of the furnace controls

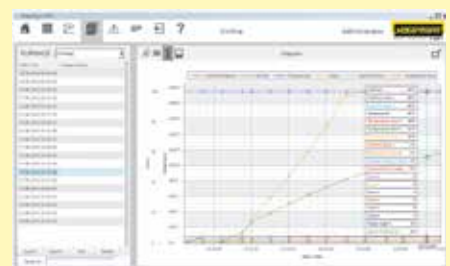
- Connection of three thermocouples, tpye K, S, N or B to the included connecting box
- Possible extension of up to two or three connecting boxes with up to nine measuring points
- Conversion and transmission of measured values to the VCD software
- Data evaluation, see VCD features



VCD Software for Control, Visualisation and Documentation



Graphic display of main overview (version with 4 furnaces)



Graphic display of process curve

PLC Controls HiProSystems



This professional process control with PLC controls for single and multi-zone furnaces is based on Siemens hardware and can be adapted and upgraded extensively. HiProSystems control is used when process-dependent functions, such as exhaust air flaps, cooling fans, automatic movements, etc., have to be handled during a cycle, when furnaces with more than one zone have to be controlled, when special documentation of each batch is required and when remote service is required. It is flexible and is easily tailored to your process or documentation needs.

Alternative User Interfaces for HiProSystems

Process Control H500

This basic panel accommodates most basic needs and is very easy to use. Firing cycle data and the extra functions activated are clearly displayed in a table. Messages appear as text. Data can be stored on a USB stick using the „NTLog Comfort“ option.

Process Control H1700

Customized versions can be realized in addition to the scope of services of the H500. Display of basic data as online trend on a color 7“ display with graphically structured interface.

Process Control H3700

Display of functions on a large 12“ display. Display of basic data as online trend or as a graphical system overview. Scope as H1700.

Remote Maintenance Router – Fast Support in Case of a Malfunction

For fast failure diagnosis in case of a malfunction, remote maintenance systems are used for HiProSystems-plants (depending on the model). The plants are equipped with a router, which will be connected to the internet by the customer. In case of a malfunction, Nabertherm is able to get access to the furnace controls via a secured connection (VPN tunnel) and to perform a malfunction diagnosis. In most cases, the problem can be directly solved by e technician on site according with supervision from Nabertherm.

If no Internet connection can be provided, we offer optionally the remote maintenance via LTE network as additional equipment.



H1700 with colored, tabular depiction



H3700 with colored graphic presentation



Router for remote maintenance

Process Data Storage



The following options are available for industrial process documentation and the recording of data from several furnaces. These can be used to document the process data for the PLC controls.



NTLog Comfort for data recording of a Siemens PLC via USB stick

Data Storing of HiProSystems with NTLog Comfort

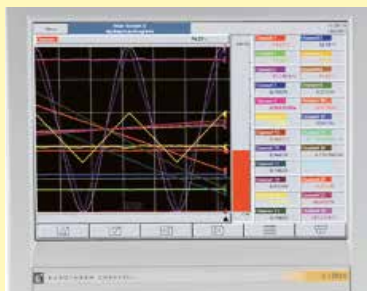
The extension module NTLog Comfort offers the same functionality of NTLog Basic module. Process data from a HiProSystems control are read out and stored in real time on a USB stick. The extension module NTLog Comfort can also be connected using an Ethernet connection to a computer in the same local network so that data can be written directly onto this computer.

Temperature Recorder

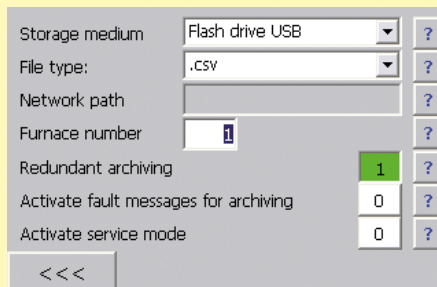
Besides the documentation via the software which is connected to the controls, Nabertherm offers different temperature recorders which can be used with respect to the application.

	Model 6100e	Model 6100a	Model 6180a
Data input using touch panel	x	x	x
Size of colour display in inch	5.5"	5.5"	12.1"
Number of thermocouple inputs	3	18	48
Data read-out via USB-stick	x	x	x
Input of charge data		x	x
Evaluation software included	x	x	x
Applicable for TUS-measurements acc. to AMS2750F			x

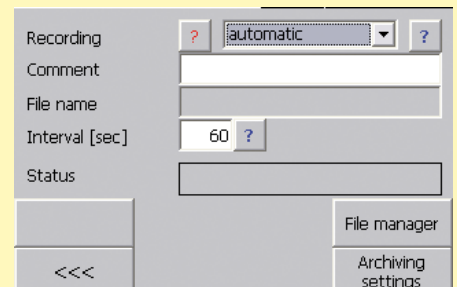
NTLog Comfort - Data recording online on the PC



Temperature recorder



NTLog Comfort - Data recording via USB stick



NTLog Comfort - Data recording online on the PC

Nabertherm Control Center NCC

PC-based control, process visualization and process documentation software

The Nabertherm Control Center as PC-supported furnace controls offers an ideal extension for furnaces with PLC based HiProSystem controls. The system has proven itself in many applications with increased demands on documentation and process reliability and also for convenient multi-furnace management. Many customers from the automotive, aviation, medical technology or technical ceramics sectors have been working successfully with this powerful software.



Retort furnace NR 300/08 for treatment in high vacuum

Standard Equipment

- Central furnace management
- Graphical furnace overview of up to 8 furnaces
- Tabular, clear program entry (100 program locations)
- Charge administration (article, quantity, additional information)
- Connection to the company network
- Adjustable access rights
- Online monitoring of the heat treatment
- Tamper-proof documentation
- Malfunction message list, adapted to the furnace model
- Archive function
- Delivery incl. PC and printer
- Measuring range calibration of up to 18 temperatures per measurement point. Multi-stage calibration is possible for applications with normative requirements.

Additional Equipment

- Reading in charge data via barcode
 - Simple data acquisition, ideal for frequently changing charges
 - Defined charge data ensures data quality
- Recipe storage with charge comparison
 - Comparison of charge and recipe to increase process reliability
- Adaptable access rights or access rights via employee cards
- Software extension to fulfill documentation requirements according to norms like AMS2750F (NADCAP), CQI9 or Food and Drug Administration (FDA), Part 11, EGV 1642/03
- Interface for connection to overriding systems
- SQL connection
- Redundant data storage
- Cellular connection or network connection for notification via SMS, e. g. in the event of malfunctions
- Control from different PC workstations
- Configuration as industrial PC or virtual machine
- PC cabinet
- UPS for PC
- Customization according to individual requirements



Retort furnace NR 80/11 with IDB safety concept for debinding under non-flammable protective gases



System overview



Furnace overview



Measurement range calibration

Temperature Uniformity and System Accuracy

Temperature uniformity is defined as the maximum temperature deviation in the work space of the furnace. There is a general difference between the furnace chamber and the work space. The furnace chamber is the total volume available in the furnace. The work space is smaller than the furnace chamber and describes the volume which can be used for charging.



Holding frame for measurement of temperature uniformity

Specification of Temperature Uniformity in +/- K in the Standard Furnace

In the standard design the temperature uniformity is specified in +/- K at a defined set-temperature with the work space of the empty furnace during the dwell time. In order to make a temperature uniformity survey the furnace should be calibrated accordingly. As standard our furnaces are not calibrated upon delivery.

Calibration of the Temperature Uniformity in +/- K

If an absolute temperature uniformity at a reference temperature or at a defined reference temperature range is required, the furnace must be calibrated appropriately. If, for example, a temperature uniformity of +/- 5 K at a set temperature of 750 °C is required, it means that measured temperatures may range from a minimum of 745 °C to a maximum of 755 °C in the empty work space.

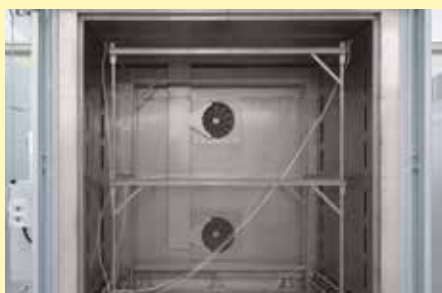
System Accuracy

Tolerances may occur not only in the work space, they also exist with respect to the thermocouple and in the controls. If an absolute temperature uniformity in +/- K at a defined set temperature or within a defined reference working temperature range is required, the following measures have to be taken:

- Measurement of total temperature deviation of the measurement line from the controls to the thermocouple
- Measurement of temperature uniformity within the work space at the reference temperature or within the reference temperature range
- If necessary, an offset is set at the controls to adjust the displayed temperature at the controller to the real temperature in the furnace
- Documentation of the measurement results in a protocol

Temperature Uniformity in the Work Space incl. Protocol

In standard furnaces, temperature uniformity is guaranteed as +/- K without measurement of temperature uniformity. However, as an additional feature, a temperature uniformity measurement at a target temperature in the work space compliant with DIN 17052-1 can be ordered. Depending on the furnace model, a holding frame which is equivalent in size to the work space is inserted into the furnace. This frame holds thermocouples at up to 11 defined measurement positions. The measurement of the temperature uniformity is performed at a target temperature specified by the customer after a static condition has been reached. If necessary, different target temperatures or a defined target working temperature range can also be calibrated.



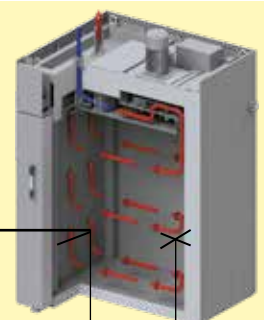
Pluggable frame for measurement for forced convection chamber furnace N 7920/45 HAS

The system accuracy is defined by adding the tolerances of the controls, the thermocouple and the work space



Precision of the controls, e. g. +/- 1 K

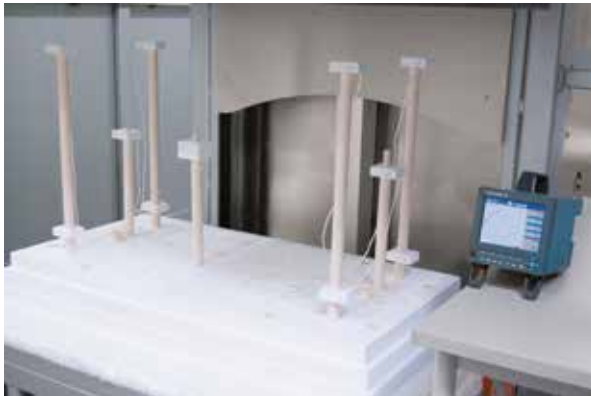
Deviation of thermocouple, e. g. +/- 1.5 K



Deviation from measuring point to the average temperature in the work space e. g. +/- 3 K

AMS2750F, NADCAP, CQI-9

Standards such as the AMS2750F (Aerospace Material Specifications) are applicable for the industrial processing of high-quality materials. They define industry-specific requirements for heat treatment. Today, the AMS2750F and derivative standards such as AMS2770 for the heat treatment of aluminum are the guidelines for the aerospace industry. After the introduction of the CQI-9, the automotive industry has also committed to submit heat treatment processes to stricter rules. These standards describe in detail the requirements applicable to thermal processing plants.



Measurement set-up in a high-temperature furnace

- Temperature uniformity in the work space (TUS)
- Instrumentation (definition of measurement and control systems)
- Calibration of the measurement system (IT) from the controller via the measurement line to the thermocouple
- Inspections of system accuracy (SAT)
- Documentation of the inspection cycles

Norm compliance is necessary to ensure that the required quality standard of the manufactured components can also be reproduced in series. For this reason, extensive and repeated inspections as well as controls of the instrumentation, including the relevant documentation, are required.

Furnace Class and Instrumentation Requirements of the AMS2750F

Depending on the quality requirements of heat treatment job the customer specifies instrumentation type and the temperature uniformity class. The instrumentation type describes the necessary combination of the applied control, recording media as well as thermocouples. The temperature uniformity of the furnace and the class of the selected instrumentation are defined based on the required furnace class. The higher the requirements are set for the furnace class the more precise the instrumentation must be.

Regular Inspections

The furnace or the heat treatment plant must be designed so that the requirements of the AMS2750F can be met and be reproduced. The standard also requires the inspection intervals for the instrumentation (SAT = System Accuracy Test) and the temperature uniformity of the furnace (TUS = Temperature Uniformity Survey). The SAT/TUS tests must be performed by the customer with measuring devices and sensors which operate independently of the furnace instrumentation.

Instrumentation	Type						Furnace class	Temperature uniformity	
	A	B	C	D+	D	E		°C	°F
Each control zone has a thermocouple connected to the controller	x	x	x	x	x	x	1	+/- 3	+/- 5
Recording of the temperature measured by the control thermocouple	x	x	x	x	x		2	+/- 6	+/- 10
Sensors for recording the coldest and hottest spots			x				3	+/- 8	+/- 15
Each control zone has a charge thermocouple with recording system	x	x					4	+/- 10	+/- 20
One additional recording sensor, distance ≥ 76 mm to control sensor, of a different sensor type				x			5	+/- 14	+/- 25
Each control zone has an over-temperature protection unit	x	x	x	x	x		6	+/- 28	+/- 50



Measurement set-up in an annealing furnace



Measuring protocol



Measurement range calibration

AMS2750F, NADCAP, CQI-9

The suitable furnace model for the corresponding heat treatment can be designed based on the process, the charge, the required furnace class and the type of instrumentation. Depending on the required specs, alternative solutions can be offered.



N 12012/26 HAS1 according to AMS2750F

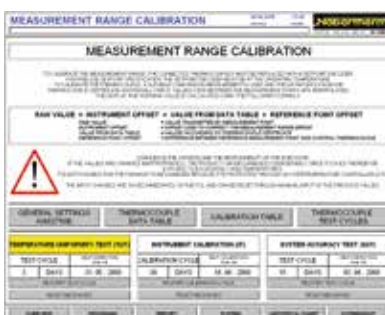
- Furnace designs, which meet standards, following customer specifications regarding furnace class and instrumentation, incl. gauge connections for repeated customer inspections at regular intervals. No consideration of requirements with respect to documentation
- Data recording devices (e.g., temperature recorder) for TUS and/or SAT measurements see page 12
- Data recording, visualization, time management via the Nabertherm Control Center (NCC), based on Siemens WinCC software see page 13
- Commissioning at site, incl. the first TUS and SAT inspection
- Connection of existing furnace plant to meet norm requirements
- Documentation of the complete process chain in line with the corresponding norm

Implementation of AMS2750F

Basically, two different systems are available for control and documentation, a proven Nabertherm system solution or instrumentation using Eurotherm controllers/temperature recorders. The Nabertherm AMS package is a convenient solution that includes the Nabertherm Control Center for control, visualization, and documentation of the processes and test requirements based on PLC control.

Instrumentation with Nabertherm Control Center (NCC)

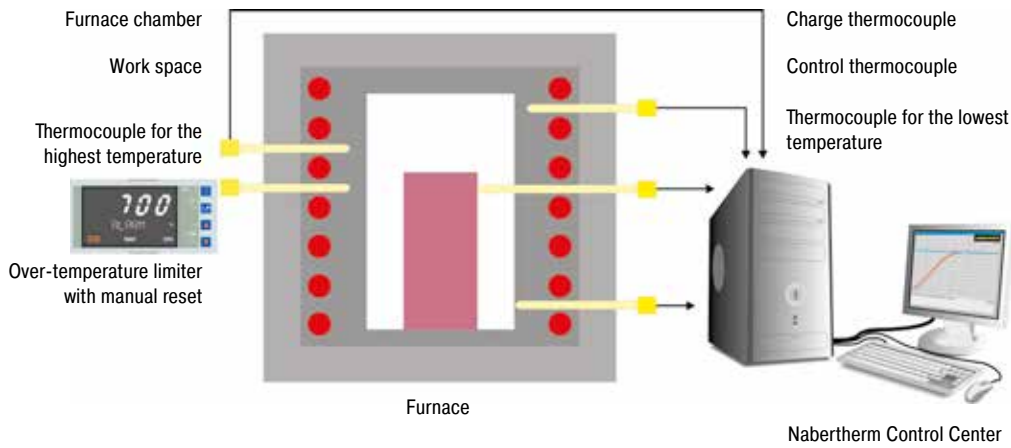
The attractive feature of the instrumentation with Nabertherm Control Center in combination with PLC controls of the furnace is the convenient data input and visualization. The software programming is structured in a way that both the user and the auditor can navigate it without difficulty.



In daily use, the following product characteristics stand out:

- Very easy to navigate and straight-forward presentation of all the data in plain text on the PC
- Automatic saving of the charge documentation at the end of the program
- Administration of the calibration cycles in the NCC
- Results of the measurement distance calibration are entered in the NCC
- Schedule management of the required testing cycles including a reminder function. The testing cycles for TUS (Temperature Uniformity Survey) and SAT (System Accuracy Test) are entered in days and monitored by the system and the operator or tester is informed in time about up-coming tests. The measurements have to be done with separate calibrated measuring equipment.
- Option of transferring the measurement data to a customer's server

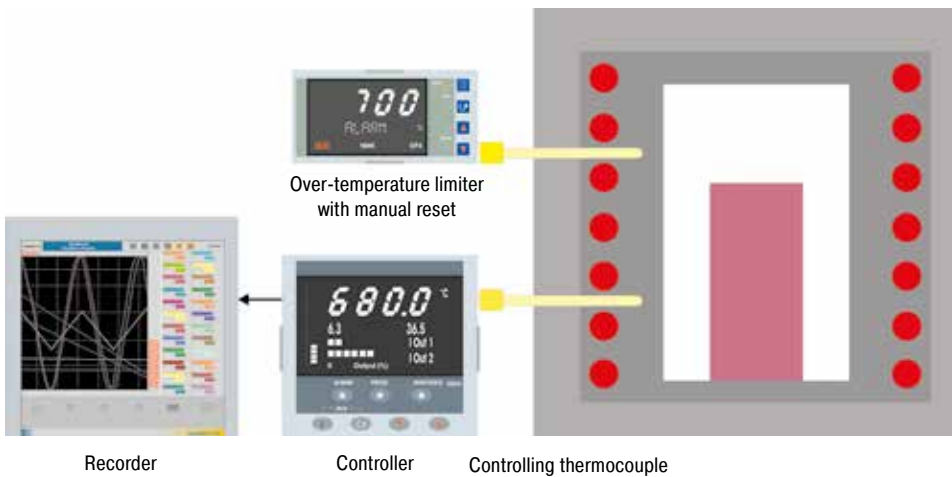
The Nabertherm Control Center can be extended to enable a complete documentation of the heat treatment process apart from just the furnace data. For example, when heat-treating aluminum, in addition to the furnace, the temperatures in the quenching basin or a separate cooling medium can also be documented.



Example of a design with Type A Nabertherm Control Center

Alternative Instrumentation with Temperature Controllers and Recorders from Eurotherm

As an alternative to instrumentation with the Nabertherm Control Center (NCC) and PLC controls, instrumentation with controllers and temperature recorders is also available. The temperature recorder has a log function that must be configured manually. The data can be saved to a USB stick and be evaluated, formatted, and printed on a separate PC. Besides the temperature recorder, which is integrated into the standard instrumentation, a separate recorder for the TUS measurements is needed (see page 12).



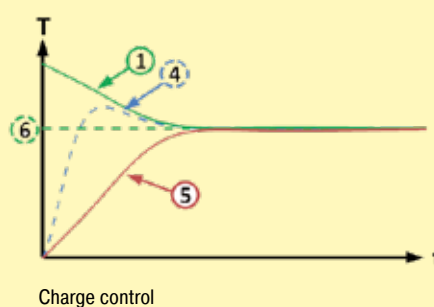
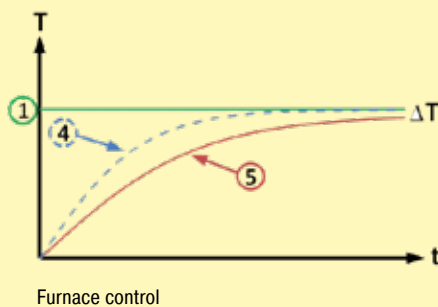
Example of a design containing Type D Eurotherm instrumentation

Furnace Chamber Control

Only the furnace chamber temperature is measured and controlled. Regulation is carried out slowly to avoid out-of-range values. As the charge temperature is not measured and controlled, it may vary a few degrees from the chamber temperature.

Charge Control

If the charge control is switched on, both the charge temperature and furnace chamber temperature are measured. By setting different parameters the heat-up and cooling processes can be individually adapted. This results in a more precise temperature control at the charge.



1. Furnace setpoint value
2. Actual value furnace chamber, 1-zone
3. Actual value furnace chamber, 3-zone
4. Actual value furnace chamber
5. Actual value load/bath/muffle/retort
6. Charge setpoint value



Spare Parts and Customer Service — Our Service Makes the Difference

For many years the name **Nabertherm** has been standing for top quality and durability in furnace manufacturing. To secure this position for the future as well, Nabertherm offers not only a first-class spare parts service, but also excellent customer service for our customers. Benefit from more than 70 years of experience in furnace construction.

In addition to our highly qualified service technicians on site, our service specialists in Lilienthal are also available to answer your questions about your furnace. We take care of your service needs to keep your furnace always up and running. In addition to spare parts and repairs, maintenance and safety checks as well as temperature uniformity measurements are part of our service portfolio. Our range of services also includes the modernization of older furnace systems or new linings.

The needs of our customers always have highest priority!




- Very fast spare parts supply, many standard spare parts in stock
- Worldwide customer service on site with its own service points in the largest markets
- International service network with long-term partners
- Highly qualified customer service team for quick and reliable repair of your furnace
- Commissioning of complex furnace systems
- Customer training in function and operation of the system
- Temperature uniformity measurements, also according to standards like AMS2750F (NADCAP)
- Competent service team for fast help on the phone
- Safe teleservice for systems with PLC controls via modem, ISDN or a secured VPN line
- Preventive maintenance to ensure that your furnace is ready for use
- Modernization or relining of older furnace systems

Contact us:


Spare parts

 spares@nabertherm.de

 +49 (4298) 922-474

Customer service

 service@nabertherm.de

 +49 (4298) 922-333



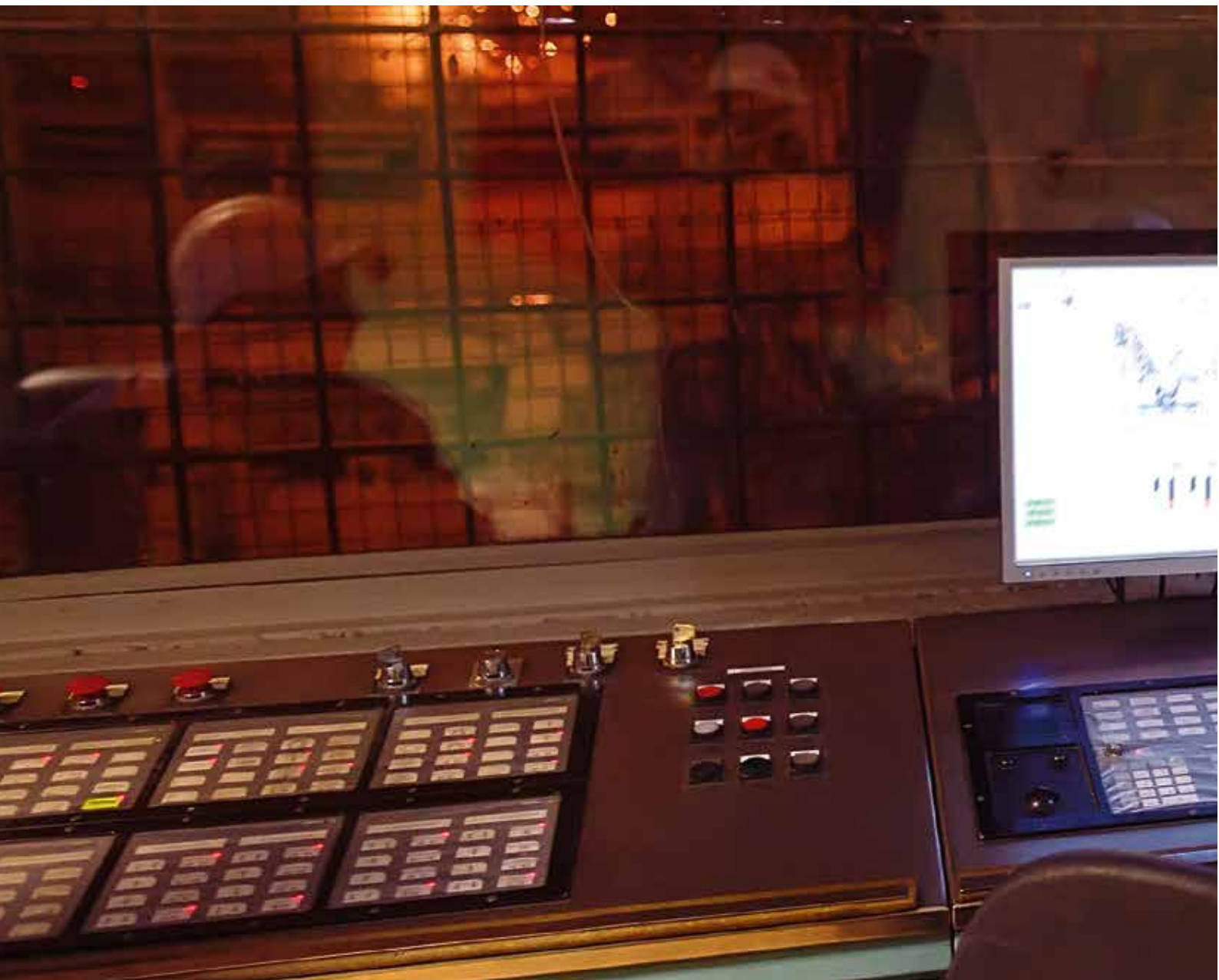
The whole World of Nabertherm: www.nabertherm.com

Please visit our website www.nabertherm.com and find out all you want to know about us - and especially about our products.

In addition to current information and exhibition dates, there is of course the possibility of direct contact or an authorized dealer from our worldwide dealer network.

Professional Solutions for:

- Thermal Process Technology
- Additive Manufacturing
- Advanced Materials
- Fiber Optics/Glass
- Foundry
- Laboratory
- Dental
- Arts & Crafts



Distributed by Fisher Scientific. Contact us today:

Austria: fishersci.at **Belgium:** fishersci.be **Denmark:** fishersci.dk
Germany: fishersci.de **Ireland:** fishersci.ie **Italy:** fishersci.it
Finland: fishersci.fi **France:** fishersci.fr **Netherlands:** fishersci.nl
Norway: fishersci.no **Portugal:** fishersci.pt **Spain:** fishersci.es
Sweden: fishersci.se **Switzerland:** fishersci.ch **UK:** fishersci.co.uk

© 2022 Thermo Fisher Scientific Inc. All rights reserved.

Trademarks used are owned as indicated at fishersci.com/trademarks.