



## Eurotherm and NADCAP

### Expert Control

- The best PID control algorithm available
- Flexible Control Strategies
- Setpoint Programming
- Zirconia Probe

### Secure Recording

- Complete Audit Trails
- Unlimited Unique User accounts
- Batch Software
- Ethernet connectivity

The National Aerospace and Defense Contractors Accreditation Program (NADCAP) establishes requirements for Heat Treating Accreditation for manufacturers throughout the world. The following documentation is an extract from Aerospace Standard ASE AS7102, and provides information on how Eurotherm Data Management and Control Products can be used to aid compliance in the Heat Treat Industry.

Featuring the best PID control algorithm available Eurotherm's range of Controllers offers flexible single or multi loop control strategies including set-point programming.

Amongst many of its features the 5000 Series offers a complete secure Audit trail and unlimited unique user accounts. The introduction of Modbus Master support allows the 5000 Series to act as a master to any device supporting Modbus and record/trend process variables.

The Eurotherm product range is extensive, offering many flexible and scalable solutions, ranging from sensors to combined control and recording to local panel SCADA up to small systems.

NADCAP Ref	Requirement	Example procedural solution	
1	<b>Scope</b>		
2	<b>References</b>		
3	<b>General Quality System</b>		
4	<b>Process Planning and Control</b>		
4.1	<b>Process Planning</b>		
4.2	<b>Quality Planning</b>		
4.3	<b>Job Documentation</b>		
4.3.1	Procedures shall require that documentation/travelers detailing each operation accompany each job	Manual tracking of job number against manually recorded log sheets or chart recorder prints.	
4.3.1.1	Procedures shall require traceability from the documentation to the parts	Manual tracking of part numbers against job number	
4.3.1.2	In-process documentation shall include process status, inspection status, engineering change notices, and all other relevant information	Manual tracking of inspection status, engineering change notices, etc to the job number.	
4.4	<b>Change Control</b>		
4.5	<b>Specification Changes</b>		
4.5.1	Procedures shall require that new, revised and amended specifications be integrated into the production system promptly upon receipt	(procedural)	
4.5.2	Records shall indicate that the procedure is followed and that old specifications are used only when specified	Manual records of the specifications used	
4.6	<b>Process Control</b>		
4.6.1	Procedures shall assure that parts are processed in conformance with the process instructions on the traveler	Manual recording of setpoints or programs used.	
4.6.2	Procedures shall require a method of recording actual process data for comparison to instructions on the traveler	Manual or chart recorder logging of actual process data	
4.6.3	Records shall indicate that the procedures are followed	Manual comparison of log/chart against job instructions trends or spreadsheets from Eurotherm Review	
4.7	<b>Automated Processes and Recordings</b>		
4.7.1	Where automated heat treating processes and/or record keeping are used, there shall be a system in effect to assure the integrity of the process and records		
4.7.2	Procedures shall include a method of ensuring that electronic /magnetic programs can not be altered without authorization		
4.7.3	Procedures shall include a method of ensuring that electronic /magnetic records can not be altered		
4.7.4	When required by customer, back-ups of electronic / magnetic programs shall be stored at a separate location		
4.8	<b>Furnace Malfunctions / Cycle Interruptions</b>		
4.8.1	Procedures shall specify the actions to be taken when furnace malfunctions occur and/or when furnace cycles are interrupted	Manual identification of malfunction / interruption and manual procedure to ensure correct action taken.	
4.8.2	These procedures shall meet customer requirements	(procedural)	
4.8.3	Records shall indicate that the procedure is followed	Manual records of malfunction / interruption	
5	<b>Personnel</b>		
6	<b>Material Handling and Protection</b>		
7	<b>Test and Inspection</b>		
8	<b>Furnace Control and Maintenance</b>		
8.1	Furnace Document Control		
8.1.1	Operating Instructions		
8.1.2	Heating Times		
8.1.2.1	Procedures shall specify the method for determining heat-up time or start of soaking time and cooling rate.	Manual identification of start conditions. Manual set-up of times / rates.	
8.1.2.2	Records on the furnace chart or log shall indicate that the procedure is followed.	Manual note onto log or chart.	
8.1.2.3	When metal temperature is specified, records shall demonstrate that the metal was at temperature for the specified time.	Temperatures and times can be read from chart or log	
8.1.3	Maintenance		
8.2	Furnace Conditions		
8.3	Control of Heating Environment		
8.3.1	Procedures shall specify how atmosphere from each generator / blender is to be controlled		

	Example solution with Eurotherm 5000 series 'add on'	Example solution with Eurotherm 5000 series + control
	5000 series 'batch' functionality can be used to associate a job reference with the recorded data	5000 series 'batch' functionality can be used to associate a job reference with the recorded data
	5000 series is capable of connection to barcode readers in order to 'swipe' parts and include identification in the batch data	5000 series is capable of connection to barcode readers in order to 'swipe' parts and include identification in the batch data
	5000 series can display process status. Inspection status can be entered as part of batch data. Current engineering change notices and other relevant information can be entered as operator notes.	5000 series can display process status. Inspection status can be entered as part of batch data. Current engineering change notices and other relevant information can be entered as operator notes.
	(procedural)	(procedural)
	5000 series is capable of acting as a Modbus master in order to audit trail setpoint changes resulting from a specification change.	Setpoint or program changes resulting from a specification change can be made and audit trailed via 5000 series
	5000 series can act as Modbus master to allow selection of appropriate programs in 3rd party controllers	Controllers can be configured with setpoint programs corresponding to particular process instructions.
	5000 series can collect actual process data and audit trail messages into tamperproof files. Where 5000 series acts as a Modbus master, setpoint values can also be collected for ease of comparison.	5000 series can collect actual process data, setpoints and audit trail messages into tamperproof files.
	Process data, setpoints and audit trail messages can then viewed as trends or spreadsheets from Eurotherm Review	Process data, setpoints and audit trail messages can then viewed
	Tamperproof process records are stored locally in 5000 series flash memory. Data can also be stored to PC card and/or archived automatically across an Ethernet network	Tamperproof process records are stored locally in 5000 series flash memory. Data can also be stored to PC card and/or archived automatically across an Ethernet network
	Password based security system prevents unauthorised access to 5000 series programs and allows changes to be audit trailed. If 5000 series acts as Modbus master then parameter changes made from the 5000 series screens can also be restricted and audit trailed.	Password based security system prevents unauthorised access to 5000 series programs and allows changes to both 5000 series parameters and controller parameters to be restricted and audit trailed
	5000 series stores data and audit trail messages to tamperproof (binary checksummed) files which can be automatically archived across an Ethernet network	5000 series stores data and audit trail messages to tamperproof (binary checksummed) files which can be automatically archived across an Ethernet network
	(procedural)	(procedural)
	(dependent on 3rd party controller)	Actions on malfunction / interruption can be built into the controller
	(procedural)	(procedural)
	5000 series allows explanatory notes to be added to batch record. when a malfunction / interruption is detected. Explanatory notes	5000 series can automatically include messages in batch record can also be added to the batch record.
	(dependent on 3rd party controller)	Start conditions, times and rates can be built into controller program.
	5000 series allows explanatory notes to be added to batch record.	5000 series can automatically include messages in batch record when start condition is detected. Explanatory notes can also be added to the batch record.
	Timer can be set up within 5000 series to demonstrate compliance. Times / temperatures can be read from tamperproof records by using Eurotherm Review.	Time / temperature condition can be built into program. Timer can be set up within 5000 series to demonstrate compliance. Times / temperatures can be read from tamperproof Eurotherm Review.

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