

SmartMode Manual Proteus 8.0 for DSC Instruments

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DOCUMENTATION

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General Information

In the design of your instrument, we endeavour to take individual solutions into account and to include these in the documentation.

However, in order to keep the scope of the technical documentation at a reasonable level, we must limit the description to a standard model.

We ask for your understanding, if additional information particular to your instrument is not included within the standard instructions. Additional information can always be found on the corresponding information sheets.

Any electronic or mechanical duplication and distribution of these instructions requires prior written authorization of NETZSCH-Gerätebau GmbH.

All technical data, instrument features and other information described in these operating instructions are presented to the best of our knowledge and in accordance with the technical standards of the instrument at the time of printing.

We welcome any comments, suggestions or new ideas concerning the instrument and its operating instructions. Please address them to:

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Software Manual – Smart Mode Measurement Proteus 8.0

The Smart Mode is designed for easily starting measurements based on predefined methods optionally with automatic evaluation. Moreover, Smart Mode offers wizards for typical operations. It is also possible to create new methods or to use analysis states based methods created in Proteus analysis.

'Smart Mode Measurement' is a standard feature of Proteus 8.0 for the DSC instruments Series 200 (DSC 214 Polyma, DSC 204 F1 Phoenix, DSC 3500 Sirius and DSC 200 F3 Maya).

The Smart Mode does not support special applications, e.g. instrument coupling with UV devices (e.g. Omnicure), mass spectrometer (Aeolos), FTIR or GC-MS. In those cases Expert mode has to be applied to perform measurements.

DSC-BeFlat, DSC-correction (TAU-R) are software extensions which are delivered free of charge for some instruments (DSC 214, DSC 204 F1) or as an extra price option for other DSC instruments (DSC 3500, DSC 200 F3). If available, the Smart Mode supports using these calibrations in methods as well as wizards, or allows to renewal and also create calibrations.

Start SmartMode Software



Open the NETZSCH-Proteus group on desktop.

NETZSCH-Proteus-80

SmartModeMeasurement Open the SmartMode Measurement.

SmartMode-Screen

Screen below appears when starting the SmartMode-software. It may vary depending on the connected instrument(s). It is possible to connect up to four instruments.

White tabs on toolbar are active, green tabs can be selected and grey tabs are not active right now.

name instrumer	it 1	name instrument 2 (if connected)	control buttons
VETZSCH SmartMode		Annual Clinic Inc. Inclinic	
NETZSCH SmartMode	DSC 214 Polyma IDLE 20,0 °C	TG 209F1 Libra	<mark>,《》</mark> ×
Favorites	General		
User Methods	Instruments Folders	Color themes Support E-mail Notifications	
Wizards		DSC 214 D-1	9 -2
Predefined Methods	Disconnect	DSC 214 Polyma (DSC21400A-0013-L)	Connected C
AutoCalibration	Disconnect	TG 209F1 Libra (TGA209F1D-0178-L)	Connected
Measurement	Î Î		Î Î I
Setup & Control			
Setpoint ULE 20 °C Switch OFF			
ASC Manager			
toolba	r conne	ct / disconnect instrument	
		custom	ize buttons
		ope	n expert-mode —

Control buttons:





Activate Setpoint



Enable setpoint to keep the instrument always under controlled conditions (protective/ purge gas flow, coolings). For DSC instruments with connected intracooler (IC) the setpoint prohibits a frozen cell when the IC is active, but heater is inactive. In auto sampler mode the sample is inserted/ removed during setpoints only.



For more details regarding the setpoint refer to page 30.



SmartMode Tab Favorites

NETZSCH SmartMode		Spring + Elling Source Starling		- 0	x
NETZSCH	DSC 214 Polyma DLE 20,0 °C		*	Ŷ	× 米
Favorites	0	PE-HD Polyethylen High density	-30,0 200,0 °C Number of segments: 7 1h : 36min	*	
Wizards	Θ	PTFE Polytetrafluorethylen	-70,0 380,0 °C Number of segments: 6 2h : 35min	*	
Predefined Methods		Oxidation Induction Time (static O.I.T.)		*	
AutoCalibration Measurement		Single Run		*	Í
Setup & Control					
Setpoint DLE 20 °C Switch OFF					
ASC Manager					
	A-Z	Search			

Favorites are shortcuts to methods, tests or calibrations, which are predefined and selected by the user.

To define a file as a favorite it must be marked with the symbol in the specific menu. The yellow star shows the marked state. Only marked methods are listed at Favorites tab.

SmartMode Tab User Methods



Methods can not be edited when created. Rename, open (start measurement) or delete methods is possible via methods manager.

Red highlighted headers must be completed, green highlighted headers are OK.

Instrument returns to Idle setpoint temperature after measurement.

All user methods up to now are listed here (independent of creation via expert mode or smart mode)



Created methods can not be copied or moved from one method to another method.

On the right hand side of the method you see the temperature range, number of segments and the required measurement time. To see more measurement settings of each method, click on the method.

NETZSCH

Create a new method



Click on $\sum_{i=1}^{\infty}$, a pop up window will start to create a new method.

0	Setup	Header Tempera	ature Program 🤤 Cal	ibration
Nr	Туре	°C	K/min	•
1	•	20,0		
2	-	350,0	10,000	
3	0	360,0		

Define setup, header, temperature program, calibrations and save the method. If calibrations are applied later on when using the method, suitable calibrations are precondition.

Section/Subfile	Contents	
Header	Description	Value
Gases	Description	Value
Detected Devices	Instrument:	DSC-type
Start criteria	Project:	ISM2014
Temp. Steps	Method used:	new method
Conditions	Laboratory:	NCD
	Caboratory:	NGB ASa
	Mode:	NSP DSC
	Measurement Ty	Samole
	Cnucible:	Concavus Pan Al nierced lid
	DSC DSC Paper	5000 w/
Type: Correction+Sample M Analysis method O Ngne Based on a AutoEvaluation type: mr	leasurement mode: DSC nalysis gtate	Evaluation Quality Control Quality Control
Type: Correction+Sample M Analysis method Ngne Based on a AutoEvaluation type: m	leasurement mode: DSC nalysis gtate	Evaluation Quality Control AutoEvaluation segment(s): last heating
Type: Correction+Sample M Analysis method Ngne Based on a AutoEvaluation type: m Analysis output files	leasurement mode: DSC nalysis gtate	Evaluation Quality Control utoEvaluation segment(s): last heating Analysis printouts
Type: Correction+Sample M Analysis method Ngne Based on a AutoEvaluation type: m Analysis output files	leasurement mode: DSC nalysis gtate	Evaluation Quality Control NutoEvaluation segment(s): last heating Analysis grintouts () Print analysis Print results Print to: PDF
Type: Correction+Sample M Analysis method Ngne Based on a AutoEvaluation type: m Analysis output files Analysis state Export graphic (EMF)	leasurement mode: DSC nalysis gtate AutoE tal melting peak A Export results (CSV Export data (CSV)	Evaluation Quality Control NutoEyaluation segment(s): last heating Image: Analysis grintouts Image: Analysis into the second
Type: Correction+Sample M Analysis method Ngne Based on a AutoEvaluation type: m Analysis output files Analysis state Export graphic (EMF) Method location & name	leasurement mode: DSC nalysis gtate	Evaluation Quality Control Quality Control Analysis grintouts Print analysis Print results Print to: PDF Print parameters Print data
Type: Correction+Sample M Analysis method Ngne Based on a AutoEvaluation type: m Analysis output files Analysis state Export graphic (EMF) Method location & name Folder: C:WETZSCH/Pr	leasurement mode: DSC nalysis gtate AutoE etal melting peak A Export results (CSV Export data (CSV) oteus70[Methods]	Evaluation Quality Control AutoEyaluation segment(s): last heating Analysis printuts Print analysis Print results Print to: PDF Print parameters Print data Method name:
Type: Correction+Sample M Analysis method Ngne Based on a AutoEvaluation type: m Analysis output files Analysis state Export graphic (EMF) Method location & name Folder: C:WETZSCH'Pr	leasurement mode: DSC nalysis gtate AutoE etal melting peak A Export results (CSV) Export data (CSV) oteus 70 [Methods]	Evaluation Quality Control Quality Control Quality Control Quality Control Analysis grintouts Print analysis Print results Print to: PDF Print parameters Print data Method game: Save Save As Cancel

The new created method will also be listed in the user methods tab.



Search toolbar

Search toolbar appears on different screens, e.g. on "User Methods" screen.

		NETZSCH SmartMode	- 0 -
NETZSCH	DSC 214 Pol 31.4 °C	ma	₩ 23
Favorites		PolymerPoster	
User Methods Wizards	Ner	Training	
Predefined Methods	•	140714 AS abc.ngb-s-dsc	200.111.0 °C Number of segments 1 So Labori
AutoCalibration	•	140714 AS abodingb-s-disc	Number of suggesting & Number of suggesting &
Measurement	•	140729 AS PLA 10K.ngb-s-dsc	0.0.201.0 °C Number of sugress 1 No. 2000.1
Setpoint	0	2014-07-24-05-Base.ngb-s-dsc	25.5 - 401.5 °C Number of suggesting 5 on 420ml
ASC Manager		1943-U-14-Off.ngb-s-dsc	-703.203.203.2
	•	LDPE - fast first, slow second heating -03.ngb-s-dsc	0.1 - 110.0 °C Number of segments 0 So 1 - 12000
		LDPE fast first, slow second 02.ngb-s-dsc	0.0 198.0 °C Number of arguments of the Section 2010 of the Sect
	•	PA6.ngb s-dac	-2021. 1980.5 X Number of Supremark S In 15.20ml
		PA66.ngb-s-dsc	-703-2003 ** Number of angus na 10
			0.303 C
	A-Z	Only suitable	ع م
		\mathbf{v}	
A-Z (] Only suita	ble	
A-Z (Only suita	ble	
A-Z	Only suita		
A-Z	Only suita	ble	
A-Z	Only suite	search input box only files which are suitable with co instrument will be displayed	onfiguration of
A-Z	Only suita	search input box only files which are suitable with co instrument will be displayed arrange files by name a-z	onfiguration of
A-Z	Only suita	search input box only files which are suitable with co instrument will be displayed arrange files by name a-z arrange files by name z-a	onfiguration of
A-Z	Only suita	search input box only files which are suitable with co instrument will be displayed arrange files by name a-z arrange files by name z-a arrange files by usage date/time (la	onfiguration of st used on top)

SmartMode Tab – Wizards

Structurally predefined measurement programs can be selected for typical operations like single run, multiple run, O.I.T., isothermal crystallization, TM-DSC (option). Moreover, crucible type and gas flow can be selected.

NETZSCH SmartMode				×
NETZSCH SmartMode	DSC 214 Polyma DLE 20,0 °C		*	× ¥
Favorites		Single Run	*	
User Methods New		Multiple Run	*	
Predefined Methods		Temperature Modulation Single Run	*	
AutoCalibration		Temperature Modulation Multiple Run	*	
Measurement		Oxidation Induction Time (static O.I.T.)	*	
Setpoint IDLE 20 °C Switch OFF		Oxidation Induction Temperature (dynamic O.I.T.)	*	
ASC Manager		Isothermal Crystallization	*	

After finishing a measurement the program switches to the setpoint mode, if activated before. In this mode all predefined gas settings are activated. If the setpoint mode is not activated the gas settings from the measurement are still active after finishing the measurement (except O.I.T. mode). According to the temperature program and measurement conditions (crucible type, gases, ...) the software select a suitable calibration file for the measurement. If no calibration file is found the measurement can also be carried out (without calibration).

NETZSCH

Single Run

For starting a single run press



It is possible to define one dynamic and one isothermal segment.

Bas	sic da	ata —									
Sar	mple	and R	eference	-							
Gas	ses s	etup -									
Ter	mper	rature r	anges -								
						ŀ	Heating Ra K/min	te			
DYI	NAM	1IC Fro	om ·	- 40 °(C To 450) °C	10	1			
ISO)	Du	iration () m	nin			-			
N	Nr	Туре	°C	K/min	Duration	pts/min	pts/K	STC	OXYGEN	NITROGEN	NITROGEN
0)	•	-40						0 ml/min	40 ml/min	60 ml/min
1	L,	×	450	10	00:49:00	300	30		0 ml/min	40 ml/min	60 ml/min
2	2	0	460						0 ml/min	40 ml/min	60 ml/min
_								Purge 1 I	MFC 📃 Purg	e 2 MFC 📃 P	Protective MFC
						Temper	rature Pro	ogram			
	450	1									
	-40										
						Time	00.40 hb	mm			

Example for temperature ranges



Multiple Run

For start of a multiple run press

Multiple Run	*
4	

Possibility to define two dynamic and two isothermal segments that can be repeated (cycle count).

🗲 Mu	ltiple F	Run								
 Temp Cycle DYN/ ISO DYN/ ISO Uso DYN/ ISO 	s count AMIC F AMIC F C AMIC F E se final s AMIC F	1 Trom Duration Puration Regment Trom	-50 0 180 5 -50 0	°C T min °C T min °C T min	o 180 o -50 o 200	Heatin K/r °C 10 °C 10 °C 10	g Rate nin			
Nr	Туре	°C	K/min	Duration	n pts/min	pts/K	STC	OXYGEN	NITROGEN	NITROGEN
0	•	-50						0 ml/min	40 ml/min	60 ml/min
1	1	180	10	00:23:00	300	30	\square	0 ml/min	40 ml/min	60 ml/min
2	N	-50	10	00:23:00	300	30	\checkmark	0 ml/min	40 ml/min	60 ml/min
3	-	-50		00:05:00	300			0 ml/min	40 ml/min	60 ml/min
4	× .	200	10	00:25:00	300	30		0 ml/min	40 ml/min	60 ml/min
5	0	210						0 ml/min	40 ml/min	60 ml/min
							Purge 1 N	MFC Purg	e 2 MFC 📃 P	rotective MFC
					Tempe	rature Pr	ogram			
20	00									
-5	50									
					Time	e 01:16 hh	mm			
	tional In	6								

Example for temperature ranges

NETZSCH

TM-DSC Single Run

This software feature is optional available.

Temperature Modulation Single Run	*
4	

Define one modulated dynamic and one modulated isothermal segment is possible.

		. a. i goo				Heating Rate K/min	Per	iod Am 5 K	pl.	
YNA	MIC F	om 2	25 °(To 200	°C	5	30	0,5	>	
SO	D	uration () m	iin			0	0	-	
Nr	Туре	°C	K/min	Duration	pts/min	pts/K	STC	OXYGEN	NITROGEN	NITROGEN
0	•	25						0 ml/min	40 ml/min	60 ml/min
1	2	200	5	00:35:00	300	60	\square	0 ml/min	40 ml/min	60 ml/min
2	•	210					\square	0 ml/min	40 ml/min	60 ml/min
						Pu	urge 1 N	/IFC Purg	e 2 MFC 📃 F	Protective MF
200	5				Tempe	rature Prog	ram			
					Time	00:35 hh:m	m			
\dditi	onal Inf	o ——								



Temperature-modulated DSC is the method of the thermal analysis similar to the usual DSC, but the temperature program has harmonic oscillations which superposes the constant underlying dynamic or isothermal temperature program. Typical temperature amplitudes are 0.2 to 1K, period 10s to 60s.

In Proteus analysis software TM-DSC method allows to make fourier analysis and to find underlying (total) signal DSC₀, amplitude A_{DSC} , phase shift ϕ between oscillating heating rate and measured DSC, reversing and nonreversing DSC.

During temperature modulated DSC measurement all predefined gases are the same for all segments. Purge 1 and/or purge 2 and protective must be activated. A connected cooling device is absolutely required.



A suitable heat flow calibration is always necessary!

NETZSCH

TM-DSC Mutiple Run

This software feature is optional available.

Temperature Modulation Multiple Run	*
4	

It is possible to define two modulated dynamic and two modulated isothermal segments that can repeated (cycle count).

Tem	perat	ure r	anges –					Heating	Rate	Period	Ampl.		
Cycl	es co	unt 1	1					K/m	in	S	К		
DYN	IAMIC	Fro	om	20	°C 1	To 200	°C	5		30	0,5	-	
ISO		Du	iration	10	min					30	0,5	->	
DYN	IAMIC	Fro	om	200	°C 1	To 20	°C	5				×	
ISO		Du	iration	20	min					30	0,5	-	
7 11	lse fin	عا دە	ament										
DYN	IAMIC	Fro	om	20	°C 1	To 400	°C	5		30	0,5		
ISO		Du	iration	20	min					30	0.5		
150		20	lacion	20						[10300] and: 0	0,0	-	
N	r Ty	/pe	°C	K/min	Duratio	n pts/mi	n j	ots/K	STC	OXYGEN	NITR	OGEN	NITROGEN
0	•		20							40 ml/mir	n 40 n	nl/min	60 ml/min
1	1		200	5	00:36:00	300	6	0		40 ml/mir	n 40 n	nl/min	60 ml/min
2	~		200		00:10:00	300			\square	40 ml/mir	n 40 n	nl/min	60 ml/min
3	- 5		20	5	00:36:00	300	6	0		40 ml/mir	n 40 n	nl/min	60 ml/min
4	~		20		00:20:00) 300				40 ml/mir	n 40 n	nl/min	60 ml/min
5	- 2		400	5	01:16:00) 300	6	0		40 ml/mir	n 40 n	nl/min	60 ml/min
6	~		400		00:20:00) 300			$\mathbf{\underline{V}}$	40 ml/mir	n 40 n	nl/min	60 ml/min
7	•		410							40 ml/mir	n 40 n	nl/min	60 ml/min
								P	urge 1	MFC Pu	rge 2 MF	C 📃 I	Protective MF
						Temp	perat	ure Prog	gram				
4	00											_	
	20	_											
						Tin	ne 03	:18 hh:m	nm				

Temperature-modulated DSC is the method of the Thermal analysis similar to the usual DSC, but the temperature program has harmonic oscillations which superposes the constant underlying dynamic or isothermal temperature program. Typical temperature amplitudes are 0.2 to 1K, period 10s to 60s.

In Proteus analysis software TM-DSC method allows to make Fourier analysis and to find underlying (total) signal DSC₀, amplitude A_{DSC} and phase shift ϕ between oscillating heating rate and measured DSC, reversing and nonreversing DSC.

During temperature modulated DSC measurements all predefined gases are switched on for all segments. The use of purge 1 is optional, purge 2 and protective must be activated. A connected cooling device is absolutely required.

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Temperature modulation cannot be applied for cooling segments! A suitable heat flow calibration file is always necessary!



Static Oxidation Induction Time (O.I.T.)

			Oxic	lation Induct	ion Time (s	tatic O.I.T.)	N		*
							4		
define	d dialo	g for s	tarting	0.I.T.	meas	ureme	ents.		
Oxidatio	on Inducti	ion Time	(static O.I.	Т.)					
Gases setu									
Purge 1 M	FC OXY	'GEN	▼ Flo	ow Rate 50) m	l/min <mark>Oxi</mark>	idizing gas		
Purge 2 M	FC NIT	ROGEN	The Flo	ow Rate 50) m	l/min Ine	rt gas		
Protective	MFC NIT	ROGEN	▼ Flo	ow Rate 60) m	l/min			
Temperatu	ure settings								
Start Temp	perature 25	s °C	Iso Tem	perature	200	°C H	eating Rate	20 K/	min
Inert Time	0 :	03 :	00 +	- hh:mr	n:ss		-		
Please enter value	e between 00:01:00	and 99:59:00		_					
Oxidation	Time 12	20 min	1						
Nr Ty	rpe °C	K/min	Duration	pts/min	pts/K	STC	OXYGEN	NITROGEN	NITROGEN
0 🕒	25						0 ml/min	50 ml/min	60 ml/min
	200	20	00:08:45	150	7,50		0 ml/min	50 ml/min	60 ml/min
2 -	200		00:03:00	150			0 mi/min	50 ml/min	60 ml/min
4 0	200		02.00.00	150		ň	0 ml/min	50 ml/min	60 ml/min
						Purge 1 M	MEC Pura	e 2 MFC	Protective MF
				Tempe	rature Pr	ogram	inc ing		
						- 9			
200	/								
25									
				Τ	02.12 FF				
				Lime	02:12 nn	:mm			
Additional	Info ——								
Temper	15 ature calibr	ation: <-70	°C 571 °C		Concava	ic Pap Al i	nierced lid. Gas		
Sensitivi	ity: <-70 °C.	571 °C>,	Crucible: Co	oncavus Par	n Al, piero	ed lid, Ga	s: NITROGEN		
Tau-R ca	alibration: <	-70 °C 57	71 °C>, Cruc	ible: Conca	vus Pan A	Al, pierced	l lid, Gas: NITRO	DGEN	
Sample ter	mperature s	stability thr	reshold 5	к					
Sample ter	mperature s	stability rat	e 0,1	K/m	in				
Start delay	after stabi	lity	00:0	00:30 hh:n	nm:ss				
OIT setting	gs								
OII detection	on settings:								
OII start	delay ue between 00:01:0	00 and 01:59:45.	0 :	01 :	00	h	in:mm:ss		
End Delay	y Time		0 :	05 :	00	+ - h	h:mm:ss		
Pelase enter val	shold 05	00 and 01:58:45.	na						
	5,5								
boc mic									
Start	Insert S	ample	Start criteria						

The wizard O.I.T. static enables the definition of a program in which you can define a gas switch from inert to oxidizing in an isothermal segment after a dynamic heating.

- The colours in the figure show the active purge gases. The protective gas remains permanently on.
- The O.I.T. start and end delays refer to the oxidation segment.

- For O.I.T. it is strongly recommended to have a valid heat flow calibration file available. The O.I.T. experiment will be controlled using the DSC threshold value in mW/mg. If no valid sensitivity file is found a threshold in μV/mg will be checked.
- During the O.I.T. measurement the actual DSC signal is monitored and compared to the DSC signal after the O.I.T. start delay. The termination of the measurement occurs as soon as an oxidation reaction reaches the predefined DSC threshold and the end delay time is finished.
- After finishing the measurement the program switches automatically to the setpoint mode, if activated before. In this mode all predefined gas settings are activated. If the setpoint mode is not activated the oxidation gas is switched off and the inert gas is activated.



Dynamic Oxidation Induction Time (O.I.T.)

[acco	idation I ording to ASTN	nductio	on Temp	erature (d	ynamic C).I.T.)				
Gase	es setup -	OXVG	EN	T Flo	w Rate 50) ml/	min Ovic	lizing gas		
Purg		NITRO		TIO		ml/	min Eina	I Conditionin	9	
Prote	e z IVIEC		OGEN	TIO		(1)/	min	Conditionin	9	
T			JULIN		W Mate Ot					
Start	Tempera	settings -	°C	End Tem	perature	300 °	C He	ating Pate	20 K/	min
Start	rempera		C	Life rem	perature	500	C He	ating Nate	20 17	
Nr	. Туре	°C	K/min	Duration	pts/min	pts/K	STC	OXYGEN	NITROGEN	NITROGEN
0	•	25						0 ml/min	0 ml/min	0 ml/min
1	`	300	20	00:13:45	150	7,50		0 ml/min 0 ml/min	0 ml/min 0 ml/min	0 ml/min 0 ml/min
2	-	510								
					Tempe	rature Pro	gram			Totective Inite
3	00									
	25									
					Time	00:14 hh:r	nm			
e TIO	settings -	ettings:								
e TIO b TIO	settings - etection s	ettings:		0.	00 ·	00	h h		۰ <i>۲</i>	
OIT s OIT de OIT Pelase	settings - etection s start dela enter value bet	ettings: ly ween 00:00:00	and 00:13:30.	0:	00 :	00	+ - hł	n:mm:ss 25	°C	

Example for O.I.T. dynamic settings

The wizard O.I.T. dynamic enables the definition of a program in which you can define an oxidizing gas in a dynamic heating segment.

- A single measurement is carried out. During the measurement the oxidation gas (purge 1) and protective gas are permanently switched on.
- The O.I.T. monitoring of the DSC signal starts after finishing the start O.I.T. start delay.
- For O.I.T. it is strongly recommended to have a valid sensitivity calibration file available. The O.I.T. experiment will be controlled using the DSC threshold value in mW/mg. If no valid sensitivity file is found a threshold in μV/mg will be checked.
- During the O.I.T. measurement the actual DSC signal is monitored and compared to the DSC signal after the O.I.T. start delay. The termination of the measurement occurs as soon as an oxidation reaction reaches the predefined DSC threshold and the end delay time is finished.
- After finishing the measurement the program switches automatically to the setpoint mode, if activated before. In this mode all predefined gas settings are activated. If the setpoint mode is not activated the oxidation gas is switched off and the inert gas is activated.



Isothermal Crystallization

Isothermal Crystallization
4

Predefined dialog for isothermal crystallization measurements.

	emperat	ture 2!	5 °C	Heating	a Rate	10	K/min			
Innor	Tompor	aturo 20	• •	Stabiliz	ation Time	2	min			
opper	remper			Stabiliz		5				
Lryst. I	empera	iture 14	15 °C	Cooling	J Rate	250	K/min			
				Crystali	zation Time	e 30	min			
Nr	Туре	°C	K/min	Duration	pts/min	pts/K	STC	OXYGEN	NITROGEN	NITROGEN
0	•	25						0 ml/min	0 ml/min	0 ml/min
1	/	200	10	00:17:30	600	60	\checkmark	0 ml/min	0 ml/min	0 ml/min
2	-	200		00:03:00	600		\checkmark	0 ml/min	0 ml/min	0 ml/min
3	N	145	250	00:00:13	600	2,40		0 ml/min	0 ml/min	0 ml/min
4	⇒	145		00:30:00	600		\checkmark	0 ml/min	0 ml/min	0 ml/min
5	•	210					\checkmark	0 ml/min	0 ml/min	0 ml/min
							Purge 1 N	IFC 📃 Purg	e 2 MFC 📃 F	Protective MF
					Temper	ature Pro	gram			
200	1									
200										
25										

Example for isothermal crystallization

This wizard helps for defining experiments for the investigation of crystallization of semicrystalline polymers. The method includes a very fast cooling segment from an upper temperature (molten polymer) to a crystallization temperature followed by an isothermal segment in which crystallization occurs.

Additional Information:

During the isothermal crystallization all predefined gases are switched on for all segments. The use of purge 1 is optional, purge 2 and protective must be activated. During the cooling segment the STC (Sample Temperature Controller) is switched off.

SmartMode Tab – Predefined Methods

In this tab you can find a list with predefined measurement methods for the 66 most commonly used neat polymers. No additional methods for blends or special compounds are included but the standard methods are also applicable.

INTERSCH NETZSCH SmartMode 8.0	DSC 214 E	TG 209 F1 OFF		× *
Favorites User Methods Wizards	ABS Acrylonitrile-butadiene-styrene eopolymer 2h: 23min - 150.8200,0 °C	SAN Styrene-scrylonitrile copolymer 1k: 22min 0.0.: 160.0 °C	ASA Acryloottrik-styrere-scrytate coppiner Ih: Stenin -1300 - 1800 °C	Sg Syrene/Polybutsdlene copolymer 2h: 17min -110,02000 °C
Predefined Methods AutoCalibration Measurement	PS Polystyrene Th: 4min d.01700.1°C	Pet-LD Polyethylene low density Ih.: 34min -30.0 - 20.0 ℃	PE-LLD Polyctylene linear low density In: 36min -30.0 - 200.0 *C	Pelyethylene high density th: 36min -300 - 200,0 °C
Setup & Control Setup of Control UL 23 % ASC Manager	PE-UHMW Pulyetellytene ultra high molecular weight Th 126min -300 - 4000 °C	EVA Polyetingkine co vingi actate 2h 15mn -120.0 - 200.0 °C	PP (Isostatic) Pułypropówa 2012/2min 1708 - 2200 °C	▶ PB Polybutone 11n S6min 1700 - 1803 °C
	PIB Polytosbutylene 16, 55min -150.0 50.0 ℃.	Polyvinycholic (with plasticizer) 26. Gm/m -130.0 , 200,0 °C	PVC-U Polyvinylchloride (without plasticize) N+1 Imin Q0_1100 °C	Polysing/dene chloide 20:115min -500.170,010
🛓 Max 🔨	Suitable Commo	od ty Thermoplestics	Engineering Thermoplastics	High-Temperature Resistant Thermoplastics Thermounds

Click on the method to see measurement settings.

The predefined methods include a temperature range to investigate all typical effects of the selected polymer (glass transition, melting, recrystallization or curing). A method contains two heating and one cooling segment with typical heating rates of 10 K/min or 20 K/min. Moreover, the gas flow is also predefined. User can select crucible type and has to enter basic sample data. Predefined methods can only be started if the customer DSC fulfils the predefined cooling requirements.



Method with green ball fit to your hardware. Method with red ball cannot be used (e.g. missing cooling device).

It is absolutely necessary that temperature and sensitivity calibration in the temperature range of the selected polymer method is available!

€ PF	
Method Validation F	Failed!
Temperature calibration	Calibration file is required but no suitable calibration for the current instrument is found. Required calibration: Temperature range <-50,0 °C 285,0 °C>, Crucible: High pressure, steel, Gas: NITROGEN
e Heat flow calibration	Calibration file is required but no suitable calibration for the current instrument is found. Required calibration: Temperature range <-50,0 °C 285,0 °C>, Crucible: High pressure, steel, Gas: NITROGEN

SmartMode Tab – AutoCalibration

AutoCalibration offers a complete new calibration routine which includes defined temperature programs and an autonomous curve analysis for the melting standard materials.

2		NETZSCH SmartMode	- • ×
NETZSCH SmartMode	DSC 214 Polyma IDE 29,4 °C		☆ × ※
Favorites		Standard Calibrations Run	*
Wizards		Advanced BeFlat [®] Calibration	*
Predefined Methods			
AutoCalibration Measurement			
Setup & Control			
Setpoint OFF IDLE 25 °C Switch OFF ASC Manager			
Switch ON			

To perform a calibration use of AutoCalibration function is necessary.

Standard Calibrations Run:

The 'Standard Calibrations Run' includes calibrations for temperature, enthalpy, Tau-R (optional) and automatic evaluation of onset and area of DSC melting peaks.

Advanced DSC-BeFlat[®] Calibration:

User can perform a calibration to ensure flat baselines for DSC instruments.

Prior to the measurement, the calibrations of the instrument are managed with the module Standard Calibrations Run. It reminds when a calibration is necessary and carefully guides through the calibration procedure.



Being interested in more details we recommend to operate "Set point", "Advanced DSC BeFlat Calibration" and "Autocalibration" in the Expert modus of the Proteus software and read the description in the help system which is context sensitive linked to it.



Standard Calibrations Run

The 'Standard Calibrations Run' includes calibrations for temperature, enthalpy, Tau-R (optional) and automatic evaluation of onset and area of DSC melting peaks.

Standard Calibrations Run	*
4	

Autosampler settings

Standard Calibrations Run								
Autosampler settings Calibrations Standards Results								
Activate autosampler mode	🖌 Activate autosampler mode							
Max removal temperature:	150	°C						
Final removal:	Remove sample	-						
Reference crucible:	19 - Concavus Pan Al	pierced 💌						
Reference crucibles								
Position Name This reference is used in Standard Calibrations.	Mass [mg]	Crucible Mass [mg]	Crucible	Add				
19	50	22,2	Concavus Pan Al, pierced lid 610 °C	Remove				

With ,active autosampler mode' the selected reference crucible type is taken as a preselection for the 'calibration set' to be defined on 'calibrations' folder. \rightarrow Only calibration sets which fit to reference crucible type can be selected in ASC mode.

SmartMode Manual DSC Instruments

Calibrations

 Standard Calibrations Run 			
Autosampler settings Calibrations Standards Results			
 Full calibration Fast recalibration Verification run Select calibrations: Temperature Done Heat Flow Done Heat Flow Done Tau-R Not yet performed Autosampler mode is active. Available calibration sets and crucibles are limited by the configuration of the reference crucible. 	0	Calibration set: Crucible: Purge1: Purge2: Protective: Temp. range: Heating Rate: MFC flow:	*** All Standards *** 20 standard(g) available. Concavus Al, pierced lid Temperature limit: 600 °C Confirm NITROGEN Virge2 flow: 40 ml/min Protective flow: 60 ml/min -800 °C Ranger: -80 °C 600 °C 10 K/min Active Change

Later on, only calibrations which fit the selected "crucible", can be used for the corresponding methods.

- Full calibration: Execute a complete calibration of the instrument using a standard set.
- Fast calibration: Edit an existing calibration by re-measuring one calibration standard.
- Verification run: Check an existing calibration by re-measuring one or more calibration standard(s). An already existing calibration will be used. The results can be compared with literature values.

SmartMode 8.0

Standards

Aut	osamp	ler settings Calib	rations St	andards	Results								
		Name			ASC Po	sition	T. Melt. °C	Enthalpy J/g	Sample Mass mg				$\hat{\boldsymbol{\tau}}$
		Adamantane					-64.5	22.000					
•	Ø	Indium Temperature program for In start at 80 °C, heating to 18 isothermal for 5 minutes an min.	clium : 0 °C, cooling to 10 d heating to 180 °	0 °C, C with 10 K/	1	¥	156.6	28.600	11,53	0			
		Tin			2	•	231.9	60.500	12,91	\bigcirc			
		Bismuth			3	v	271.4	53.100	8,96	\bigcirc			
		Zinc			4	•	419.5	107.500	9,33	\bigcirc			
	Ø	Cesium Chloride			5	-	476.0	17.200	11,74 [0,00150000]	0			
-	rement					Evaluation	0						
8	Impos Succes	sible 🔵 Ready eded 🤶 Oblig	/ etory	Failed		X R	leeds verification ailed	్త	Succeeded Not used	č	Thres Reset	hold excee	eded

The calibration standards are listed with increasing temperature and predefined temperature programs. Adamantane can only be measured with connected LN2 cooling device. The measurement of Indium is absolutely required!





Ensure that the correct sample is inserted.

NETZSCH takes no warranty for overheating of wrong standard materials!

Results



Visual check of the calibration curves: Measuring points marked with yellow checkmarks, which indicate exceed specified threshold values, can be excluded from the curve calculation at standards tab (indicated as a red point in graph at results tab).

Note: If a single result has to be excluded from the calculation, it may be "reset" in tab "Standards" by clicking it's green checkmark.

Set "Accept" checkmarks if the calibration curves are valid to be used later.

Finally press "Save & Finish" button to finish and close the calibration process.

If necessary adaptions may be applied opening the saved calibration files in the separate tools temperature, sensitivity or TAU-R calibration.

Advanced DSC-BeFlat Calibration

The user can perform a calibration to ensure flat baselines for DSC instruments here.

Advanced BeFlat® Calibration			*
<u> </u>			_
C Advanced BeFlat® Calibration			
X Advanced BeFlat calibration missing		Cooling device	No cooling
Ket performed.	0	Temp. range:	50 - 600 °C
 Empty crucible on sample position 			range: 5 °C 605 °C except 25 °C
	0	Crucible:	Concavus Pan Al, pierced lid Confirm
	0	Reference crucible mass:	20 mg
			range: 5 mg 50000 mg
		Sample crucible mass:	0 mg range: 5 mg 50000 mg
	0	O Purge1:	HELIUM Confirm
	0	Purge2:	NITROGEN Confirm
	0	Protective:	NITROGEN Confirm
			Purge2 flow: 40 ml/min Protective flow: 60 ml/min
	0	MFC flow:	Active
Temperature program: start at 25 °C, heating to 50 °C, isothermal for 15 minutes, heating to 600 °C, isothermal for 10 minutes and cooling to 50 °C.			
Temperature Program			
600			
25			
Time 02:16 hh:mm			

The DSC-BeFlat calibration allows a program controlled creation of a DSC baseline in 2 steps.



Being interested in more details we recommend to operate "Set point", "Advanced DSC BeFlat Calibration" and "Autocalibration" in the Expert modus of the Proteus software and read the description in the help system which is context sensitive linked to it.

How calibrations are applied in Smart Mode measurements

When performing Smart Mode measurements the Proteus software mostly requires calibration files which will later be applied to correct the measurement data and the instrument control.

A calibration created for this instrument and sensor type is suitable if the temperature range of the prepared measurement is covered by the calibration file and gas types and crucible material are adequate.

- When operating with Wizards or Predefined Methods Proteus always searches for the most suitable calibration files and auto selects the respective calibration files.
- When operating with User Methods Proteus will use the calibrations defined inside the user method (if available in the directory ...\calibrations...). If no calibration file is found in this directory then measurement can be executed without calibration.

Found calibrations file are indicated as below:

Additional Info

Calibrations

Temperature calibration: <-100 °C... 500 °C>, Crucible: Concavus Pan Al, pierced lid, Gas: NITROGEN Sensitivity: <-30 °C... 605 °C>, Crucible: Concavus Pan Al, pierced lid, Gas: NITROGEN Tau-R calibration: <-30 °C... 605 °C>, Crucible: Concavus Pan Al, pierced lid, Gas: NITROGEN

The Auto Selection of the calibration files in the Smart Mode is always active and can never be deactivated. For the individual selection of calibration files you have to use the Expert Mode.

If more than one calibration file is available in (...\calibrations ...) and the 'most suitable' calibration file Proteus selects automatically is not 'the best one', such (historical calibration files) may be 'moved to archive'. To perform this operation access the 'File open' dialog in the calibration tools (Temperature Calibration, Sensitivity Calibration or TAU-R calibration) mark this file and press button 'Move to archive'. If such calibrations are moved to archive they will be not used and found automatically. If necessary these archived files may be restored any day.



SmartMode Tab – Measurement

General

NETZSCH SmartMode				- 6 2
NETZSCH SmartMode 8.0	DSC 214 ASC R0 / Sti Sogned: C 01 19min 12s			* ⊠
Favorites User Methods	`````	Š		
Wizards	- Full calibration measurement for Indium running			
Predefined Methods	0.8 - DSC / (µV/mg) exo- 🗹 P2042) ml/min 📝 PG(N2) ml/min 🗐 Temperature /*C	- 250	180	
AutoCalibration Measurement	0,6	200	160	Q ⁺
Setup & Control	§ 0.4 -	160 -	-140 2	
Setpoint G#	(Building)	Gas ml/mi	- 120 antradu	135,8 °C
ASC Manager Estimated time: 02:21 bhown	×	100	80	هر
	-02	- 50	-60	<u></u>
	-0.4 0 5 10 15 20	0	40	<u>M</u>
	time /min, all segments			
🛓 Max 🔨	Snapshot Stop Measurement Measurement Info			

The tab Measurement shows a graphical chart of the recent running measurement. If no measurement is running, the tab is grey and cannot be activated.

An active measurement shows DSC signal, actual temperature and gas flow as well as the required time to finish measurements. If the AutoEvaluation was activated for a method or a wizard, an evaluated curve will be shown at the end of the measurement.

From this tab the user can switch over into the NETZSCH Analysis software to perform advanced evaluation or already perform a snapshot during the run.

If a method (User or Predefined) or a wizard includes an AutoEvaluation then the measurement analysis will be carried out directly at the end of the measurement. The data will be analyzed in a hidden form and shown in the Smart Mode Measurement window as a result. Not in ASC runs!



SmartMode Tab - Setup & Control

D		NETZSCH SmartMode	- 5	×
NETZSCH SmartMode	DSC 214 Polyma IDLE 81,4 'C		¢	× ¥
Favorites	Control		ġļġ	Ē
User Methods	Control			
Wizards		Signals		
Predefined Methods		Switches	8	
AutoCalibration		Gas Manager	ഫ്	
Measurement		ASC Manual Control	₹ ≎	
Setpoint UDE 25 °C		Cooling	**	
ASC Manager	Setup		Ø	
		Gases definition	1	
		Wizards Start Criteria	183	
		Calibrations Watchdogs	.	
		Miscellaneous Options	-	
		Xp/Tn/Tv Parameters	எ	
	?	Event log		

Control

Here you can see and check all instrument functions (e.g. gases, switches, signals...). You can also manage samples if an ASC (Autosampler) is installed.

Setup

Select type of gas, which is connected to purge 1, purge 2 and protective at "Gases definition".

Under "Wizards Start Criteria" you can define the conditions which are applied for the automatic start of measurements even if the actual sample temperature differs from the defined new start temperature.

Here it is also possible to check the "Calibrations Watchdogs" which are reminders for necessary recalibrations.

Xp/Tn/Tv Parameters are predefined by NETZSCH (factory settings) and applied to all Wizards and Predefined Methods.

By means of the dialog Xp/Tn/Tv Parameters the predefined settings can be changed before or during a measurement (if necessary). These parameter changes are stored for Predefined Methods in a common parameter set. For any Wizard (e.g. Single Run, Multiple Run...) an individual parameter set is stored. The stored parameters will be applied when carrying out a Wizard or Predefined Method later.

For creation of User Methods you can use predefined parameters from NETZSCH (factory settings) or you can define Xp/Tn/Tv Parameters individually for each separate method. When performing a measurement the respective parameters will be applied.

Incidents (leak of gases, external resets,...) during Smart Mode Measurements are registered in "Event log" tab.



SmartMode Tab – Setpoint

General

<u> </u>			NETZSCH	SmartMode	×
NETZSCH	DSC 214 Polyma				2 ⁰ ×
SmartMode	22,9 °C				※
Favorites	Setpoint				
User Methods	General Schedule				
Wizards	▲ General	le after measurement 6 0	0 min		
Predefined Methods	▲ Idle mode				
AutoCalibration	Cooling device Co	oling (Intracooler 40)			
Measurement	Heating Rate 20	K/min			
Setup & Control	Purge 1 MFC NITI	ROGEN Flow Rate 0	ml/min		
Setpoint	Purge 2 MFC NITI	ROGEN Flow Rate 40	0 ml/min		
OFF	Protective MFC NIT	ROGEN Flow Rate 60	0 ml/min		
ASC Manager Switch ON	Cooling device No	cooling			
	Temperature 25	°C			
	Heating Rate 20	K/min			
	Purge 1 MFC NITI	ROGEN Flow Rate 0	ml/min		
	Purge 2 MFC NITI	ROGEN Flow Rate 20	0 ml/min		
	Protective MFC NIT	ROGEN Flow Rate 20	0 ml/min		
	Apply U	ndo Defaults			

The Setpoint functionality is a new feature in the Proteus software. If no measurement program is active, the software controls the status of the DSC cell regarding its temperature and gas flow. Setpoint has the aim that the DSC cell is always under controlled conditions, offering two subsequent modes.

The Idle mode becomes active when starting the software and is in charge before and after the measurement to keep the DSC cell at default values, e.g. 25 °C and a gas flow of 40 ml/min purge and 60 ml/min protective.

The Economy mode can be scheduled for nights or weekends when the DSC is not in use for a longer time, to save energy and gas consumption.

A cooling device may be switched on to precool and stabilize the instrument. It is recommended to use it in Idle mode if the DSC instrument is equipped with an Intracooler. This avoids a possible freezing of the cell.



Being interested in more details we recommend to operate "Set point", "Advanced DSC BeFlat Calibration" and "Autocalibration" in the Expert modus of the Proteus software and read the description in the help system which is context sensitive linked to it.

NETZSCH

Schedule

Setpoin	nt						
Genera	Schee	lule					
	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
00:00		ECO	ECO	ECO	ECO	ECO	ECO
01:00	ECO	ECO	ECO	ECO	ECO	ECO	ECO
02:00	ECO	ECO	ECO	ECO	ECO	ECO	ECO
03:00	ECO	ECO	ECO	ECO	ECO	ECO	ECO
04:00	ECO	ECO	ECO	ECO	ECO	ECO	ECO
05:00	ECO	ECO	ECO	ECO	ECO	ECO	ECO
06:00	IDLE	IDLE	IDLE	IDLE	IDLE	ECO	ECO
07:00	IDLE	IDLE	IDLE	IDLE	IDLE	ECO	ECO
08:00	IDLE	IDLE	IDLE	IDLE	IDLE	ECO	ECO
09:00	IDLE	IDLE	IDLE	IDLE	IDLE	ECO	ECO
10:00	IDLE	IDLE	IDLE	IDLE	IDLE		ECO
11:00	IDLE	IDLE	IDLE	IDLE	IDLE	ECO	ECO
12:00	IDLE	IDLE	IDLE	IDLE	IDLE	ECO	ECO
13:00	IDLE	IDLE	IDLE	IDLE	IDLE	ECO	ECO
14:00	IDLE	IDLE	IDLE	IDLE	IDLE	ECO	ECO
15:00	IDLE	IDLE	IDLE	IDLE	IDLE	ECO	ECO
16:00	IDLE	IDLE	IDLE	IDLE	IDLE	ECO	ECO
17:00	IDLE	IDLE	IDLE	IDLE	IDLE	ECO	ECO
18:00	ECO	ECO	ECO	ECO	ECO	ECO	ECO
19:00	ECO	ECO	ECO	ECO	ECO	ECO	ECO
20:00	ECO	ECO	ECO	ECO	ECO	ECO	ECO
21:00	ECO	ECO	ECO	ECO	ECO	ECO	ECO
22:00	ECO	ECO	ECO	ECO	ECO	ECO	ECO
23:00	ECO	ECO	ECO	ECO	ECO	ECO	ECO
Eco mo	de	Idle mode					
Арр	pl y	Undo	Defaults				

The Eco mode starts according the above "Schedule" but will be started earliest when the defined "Switch time" has elapsed after the end of a measurement. Customizing the time schedule is possible at anytime.

ASC Manager (programming the ASC) (option)

The ASC (Automatic Sample Changer) must be programmed in the respective tab when selecting a method (User Methods or Predefined Methods) or defining a measurement (Wizards). In the tab ASC manager you can see the single programmed ASC measurements. Here you can define the measurement sequence and it is also possible to edit or change the single measurement parameters.

The following screenshots shows the ASC 200 which is assembled on a DSC 214 Polyma, DSC 200 F3 Maya and DSC 3500 Sirius. The screens of the ASC 400 (DSC 204 F1 Phoenix) are quite similar.

Color mode for ASC measurement status

\bigcirc	defined
	done
	done (analysis failed or results are out of the predefined boundaries, e.g. for quality control)
	failed
	measurement active
	reference

Some screens will also contain a toolbar at the lower right corner. The function of each icon is described below the specific icon.

Click "Switch ON" to activate the ASC.

Favorites
User Methods
Wizards
Predefined Methods
AutoCalibration
Measurement
Setup & Control
Setpoint OFF Switch ON
ASC Manager
4

It is also possible activate the ASC by clicking "Restore", see page 39.



DSC Instruments with ASC

8		N	IETZSCH SmartMode		- 0 ×
NETZSCH SmartMode	DSC 214 Polyma IDLE -4.3 °C				🗳 🗡 🕅
Favorites	🔄 Single Run				
User Methods	🕭 Basic data				
Wizards	Laboratory NETZSCH Project ISM	Sample ID Sample Name	#01 Test		
Predefined Methods	Operator Name RS	Directory	C:\NETZSCH\Proteus70\data		
AutoCalibration	Material PA6	File Name	Test_1-7	.ngb-sdg	
Measurement	A Sample and Peference	Nethark	Test		
Setup & Control	Autosampler Position		•		
Setpoint UIE 25 °C	Reference position No	D suitable reference crucible found! see go to "ASC manager" page and modify references or select "M	Manual control". References		
ASC Manager	Crucible	oncavus Pan Al, pierced lid 610 °C	•		
Restore	Sample Mass	10	mg		1
	Sample Crucible Mass	51,9	mg		
	Reference Crucible Mass	51,9	mg		
	🛓 🗌 Remove lid				
	👔 🔲 Remove to trash after	r measurement end			
	▲ Gases setup			•	
	Purge 1 MFC <no gas=""></no>	Flow Rate 0 ml/min			
	Purge 2 MFC NITROGEN	Flow Rate 40 ml/min			
	Protective MFC NITROGEN	Flow Rate 60 ml/min			
	Add to ASC				

Select a method (User Methods, Predefined Methods) or create a new measurement (Wizards) and define the settings of sample and reference crucibles (position and mass). The ASC manager will be switched on automatically. In this way you can define all sample tray positions. With click on the button References you can also define the reference position.



Configuration

NETZSCH SmartMode		
NETZSCH SmartMode 8.0	DSC 214 TG 209 F1 OFF	≁
Favorites User Methods	Configuration Sample Tray Execution list Sample Tray State	
Wizards		
Predefined Methods	Copen Save As Restore	
AutoCalibration	(X) General	
Management	Crucible insertion temperature threshold: 5 °C	
measurement	Max removal temperature: 150 °C	
Setup & Control	Activate alternative delay	
Setpoint 🖒	Alternative equilibration delay: 20 min	
IDLE 25 °C Switch OFF ASC Manager Estimated time: 02/21 hhzmm	If alternative equilibration delay is activated then measurement in autosampler mode will start whatever comes first: - start criteria defined in method or - alternative equilibration delay defined above. Final removal: Remove sample	
	Reference crucibles	
	Position Name Mass [mg] Crucible Mass [mg] Crucible	Add
	This reference is used in one of defined measurements.	Remove
	Cooling (Intracooler 70) MECs	
💄 Max 🔨	Start Cancel	

In the Configuration list of the ASC manager define the general ASC settings and the reference crucible (position, mass, crucible mass, crucible type).

When the instrument is equipped with an ASC400:

	24,9 °C 米
STL:	
sample tray left	CS STLAT
STR:	Configuration Sample Tray Left Sample Tray Right Calibration Strip Preview Execution list Sample Tray State
sample tray	Sample Tray Management
right	Restore
CS:	🔊 General
calibration strip	Crucible insertion temperature threshold: 5 °C
	Max removal temperature: 150 °C
	Activate alternative delay

NETZSCH SmartMode					
NETZSCH SmartMode 8.0	DSC 214 En To IDLE us 25,0 °C Awate direct (volume)	3 209 F1 OFF			∼ ⊠
Favorites User Methods	Configuration Sample Tray	xecution list Sample Tray State			
Wizards Predefined Methods	O Reference Concavus Al, pierced lid (600 °C)	1 Convenue Al, pierred liel (600 °C) Standard In Substance: Indium	2 🔮 Concernan Al, piercred Bid (600 %) Standard: Sin Substance: Tin	3 🔮 Concesson Al, pierced Ed (600 °C) Standard: Bi Substance: Bismuth	
Measurement Setup & Control	Crucble 0 mg Reference 0 mg 4 Concruits All, pierced lid (600 °C) Standard: Zin Substance: Zine	Chuchle 0 mg Sample 11.32 mg Concerns AL pierced lid (600 °C) Sundard CxC Substance Ceskam Chloride	Crucible 0 mg Sample 1291 mg	Crucible 0 mg Sample 8,96 mg	
Setpoint IDLE25 % ASC Manager Estimated time: 0221 Monvin	Crachele 0 mg Sample 0.18 mg 8 Fmpty	Cruchele D mg Sumple 11.74 mg 9 Empty	10 Empty	11 Emply	
	12 Empty	13 Empty	14 Empty	15 Empty	
💄 Max 🔨	Start Cancel				•

Sample Tray / Sample Tray Left - Sample Tray Right - Calibration Strip

In the ASC manager you find the sample tray list with all defined positions. By means of the toolbar in the right corner each sample tray position can edited and copied/pasted.

STL STR CS Configuration Sample Tray Left Sample Tray Right Calibration Strip Preview Execution list Sample Tray State Empty BR @ É Ō **N** \swarrow Al2O3 85 μl, open 1700 °C 🔽

Example screen when the instrument is equipped with an ASC400:

Screen is quite similar for sample tray right and calibration strip.



Preview



This screen is only visible when an ASC 400 is used and gives a quick overview of defined sample / calibration materials. For editing select the respective position under the header "Sample Tray Left", "Sample Tray Right" or "Calibration Strip".



Execution List

NETZSCH SmartMode				
NETZSCH SmartMode 8.0	DSC 214 IDLE teo. Furr 25,0 °C	TG 209 F1	F1 OFF	× ≮ ⊠
Favorites User Methods	Configuration S	3 4 5 6 ample Tray Execution lis	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	
Wizards Predefined Methods	Position Reference Sample Crucible	1 Sample name ce 0 Sample ID 11,53 mg Crucible 0 mg Step status	ame In D Indium Concevus AI, pierced lid (600 °C) us Not yet run	
AutoCalibration Measurement	Position Reference Sample Crucible	2 Sample name 0 Sample ID 12,91 mg Crucible 0 mg Step status	ame Sn D Tin Concavus Al, pierced lid (600 °C) us Not yet run	
Setup & Control	Position Reference Sample Crucible	3 Sample name ce 0 Sample ID 8,96 mg Crucible 0 mg Step status	ume Bi D Bismuth Concervus AL pierced Rid (600 °C) us Not yet run	
ASC Manager Estimated time: 02:21 hhumm	Position Reference Sample Crucible	4 Sample name 0 Sample ID 9,33 mg Crucible 0 mg Step status	ame Zn D Zinc Concavus Al, pierced lid (600 °C) vis Not yet run	
	Position Reference Sample Crucible	te 0 Sample name 11,74 mg Crucible 0 mg Step status	ume CKU CKU CKU Skiele (1600 °C) Concavus Al pierced lid (600 °C) us Not yet run	
		Remove Remove measurer	Arrement Move top Move up Move down Move bottom Edit Redefine Add pause Copy Raste Run a	N Inalysis
💄 Max 🔨	Start	Cancel		

In the Execution list of the ASC manager you see the actual sequence of measurement. By means of the toolbar in the right corner each single measurement can be copied, removed or modified. Here you can also define the desired sequence of measurement.



Sample tray state

NETZSCH SmartMode							
NETZSCH SmartMode 8.0	DSC 214 IDLE Iso. 25,0 °C	4 Furnace closed (lock	TG 209 F1	OFF			☆ × ⊠
Eavorites Image: Configuration Image: Configuration							
Wizards	Position	Sample ID	Sample Name	Measurement Source	File Name	Crucible	Crucible Mass [m
Predefined Methods	0			Reference		Concavus Al, pierced lid (600 °C)	Crucible
AutoCalibration	1	Indium	In	Indium	In	Concavus Al, pierced lid (600 °C)	
Measurement	2	Tin	Sn	Tin	Sn	Concavus Al, pierced lid (600 °C)	
Setup & Control	3	Bismuth	Ві	Bismuth	Ві	Concavus Al, pierced lid (600 °C)	
Setpoint UDLE 25 °C Switch OFF	4	Zinc	Zn	Zinc	Zn	Concavus Al, pierced lid (600 °C)	
ASC Manager Estimated time: 02:21 hh:mm	5	Cesium Chloride	CsCl	Cesium Chloride	CsCl	Concavus Al, pierced lid (600 °C)	
> 	1						×
💄 Max 🔨	Sta	ırt Can	cel				

All programmed positions are visible here which will gives an quick overview. For editing select the respective position under the header "Sample Tray Left", "Sample Tray Right" or "Calibration Strip".



Restore

After closing the Smart Mode, the latest sample tray status will be saved automatically. When opening the Smart Mode next time, Proteus will offer the possibility to restore the latest sample tray status and to continue where it was stopped.

The saved sample tray status will be lost if any run is performed in manual mode or another new sample tray is defined after having started the Smart Mode.

A saved sample tray status can only be restored if connected gases or cooling devices were not changed.

If measurements no longer exists in the working directories methods will be deleted from the sample tray definition.

Favorites	
User Methods	New
Wizards	
Predefined Methods	
AutoCalibration	
Measurement	
Setup & Control	
Setpoint IDLE 30 °C	Switch OFF
ASC Manager	Restore
	46

After click on restore, the last restored state screen appears.

Evaluation



Remember!

It is possible to save analysis states also as methods with evaluation. As evaluation you can select either "based on analysis state" (manual evaluation) or "Auto Evaluation"!



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AutoEvaluation

Evaluation Extras Ist Derivative Intervaluation AutoEvaluation Polymer Melting Peak Peak Automatic Peak Search	 Select AutoEvaluation in the Evaluation menu. DSC AutoEvaluation has subitems: Polymer: use this option especially for DSC AutoEvaluation of polymer materials. Melting Peak: use this option for DSC AutoEvaluation of other materials e.g. metals (for calibration)
DSC /(mW/mg) 1,4 1,2 1,0 0,6 0,6 0,6 0,6 0,6 0,6 Delta Cp*: 0,167 J/(g*K) Area: 43,46 J/g 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	 The results of the AutoEvaluation are shown in the window. With right mouse click on the presented results you can recalculate the values. DSC AutoEvaluation shows evaluation results for the current DSC data.



DSC AutoEvaluation is enabled only for heating DSC segments.

AutoEvaluation algorithm is optimized to get the best results for heating rates up to 20K/min.

AutoEvaluation and Identify are autonomous mathematical algorithms, which propose an evaluation and an interpretation of DSC data.

Please be aware that these information are only recommendations based on objective algorithms that might not be always correct. The user is always in charge of the final curve interpretation and NETZSCH does not guarantee correctness of the algorithms.

Identify



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