NETZSCH

Proven Excellence.

Accessories for Differential Scanning Calorimeters and Thermobalances

Crucibles, Sensors, Sample Carriers, Calibration Kits
for DSC, TGA and STA Systems

Analyzing & Testing

Introduction

Accessories for Thermal Analysis – DSC/DTA, TGA and STA

At NETZSCH, we always strive to be a step ahead. We place as much importance on the development and production of accessories as on that of new instruments. Accessories in contact with the sample or in close proximity to it require special attention. Potential reactions between the sample material and instrument parts must be prevented while ensuring that the test results remain reliable and accurate. For these reasons, one of our primary areas of focus is crucibles and sensors for DTA/DSC, TGA and STA instruments.

This catalogue provides an overview of all such crucibles and sensors for DTA, DSC, TGA and STA measurements. You will find many different crucible materials listed, and a variety of types and special shapes. From among these, we can help you find the right crucible size and material for any application, be it standard or special. In addition to standard aluminum crucibles, our portfolio includes autoclaves with low to medium or high pressure-tightness, as well as ones for determining the oxidative-induction time (OIT) and solid fat index (SFI). We offer crucibles made of ceramics or metals covering a wide temperature range. In the high-temperature range, special TGA and DTA crucibles, slip-on plates, meshes and baskets are available to accommodate specific sample dimensions and densities.

Lately, the demand for special crucibles has been increasing. Of course, measurements can only be carried out when the right sensor or sample carrier for these special crucibles is available. We have therefore listed these special cases here, often providing application examples to demonstrate their characteristic advantages.

Our accessories can open up a world of possibilities for your thermoanalytical needs. It is our hope that this catalogue will serve to acquaint you with these. If you have any questions, or if you require something specific which you cannot find in the following tables, please simply contact us – NETZSCH welcomes the challenge of working out a solution tailored to your application, and we are always happy to hear from you.

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Older Instruments

This catalogue lists current instrument models only. For older instruments not listed, suitable accessories are still available. Please use the table below to find your instrument and the corresponding current instrument model under which accessories for your older instrument can be found.

Older Instrument	Current Instrument
DSC 204 ***F1*** *Phoenix*®	DSC 300 *Caliris*®
DSC 204 ***F1*** *Nevio*	
DSC 200 ***F3*** *Maia*®	
DSC 3500 *Sirius*	
DSC 214 *Polyma*	
DSC 214 *Nevio*	
DSC 404 ***F1/F3*** *Pegasus*®	DSC 500 *Pegasus*®
TG 209 ***F1*** *Iris*®*/Libra*®	TG 309 *Libra*®
TG 209 ***F1/F3*** *Nevio*	
TG 209 ***F3*** *Tarsus*®	
STA 449 *Jupiter*®	STA 509 *Jupiter*®
STA 449 ***F3*** *Nevio*	

Crucibles

Crucibles for the DSC 300 *Caliris*®

The DSC 300 *Caliris*® covers a temperature range from -180°C up to 750°C dependung on selected module. Aluminium crucibles are most commonly used for these applications, however also other crucible materials expand the application range to higher temperatures and pressure tight crucibles are capable to withstanding a maximum of 100 bar of internal pressure.

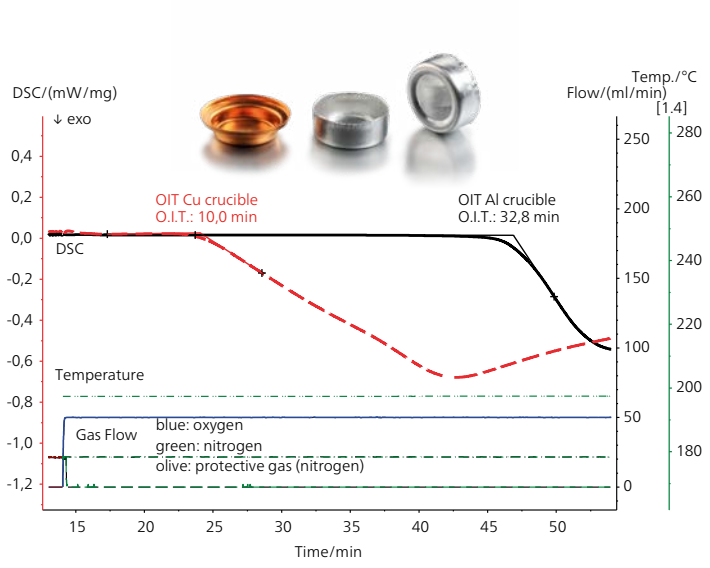
Standard Crucibles Made of Aluminum

Standard Crucibles Made of Aluminum (Purity: 99.5%) up to 600°C for the DSC 300 *Caliris*®			
Consisting of	Dimension/ Volume	Remarks	Order Number
Standard crucible + lid	ø 6 mm; 25/40 µl*	Set of 100 pcs., cold weldable**	**6.239.2-64.5.00**
Standard crucible + lid	ø 6 mm; 25/40 µl*	Set of 500 pcs., cold weldable**	**6.239.2-64.51.00**
Standard crucible	ø 6 mm; 25/40 µl*	100 pieces	**6.239.2-64.5.01**
Lid		Set of 100 pcs. for 6.239.2-64.5.01	**6.239.2-64.5.02**
Standard crucible + lid with punched hole (50 µm)	ø 6 mm; 40 µl	Set of 100 pcs., cold weldable**	**6.239.2-64.8.00**
Standard crucible + lid with punched hole (50 µm)	ø 6 mm; 40 µl	Set of 500 pcs., cold weldable**	**6.239.2-64.81.00**
Concavus pan + lid	ø 5 mm; 30/40 µl*	1 Set, 3in1 Box (archiving system)	**DSC21400A66.010.00**
Concavus pan + lid	ø 5 mm; 30/40 µl*	5 Sets of 96 pieces incl. 3in1 box	**DSC21400A66.020-00**
Concavus pan	ø 5 mm; 30/40 µl*	96 pieces including 3in1 box	**NGB814672**
Concavus pan + lid	ø 5 mm; 30/40 µl*	Set of *Concavus* pans and lids, 100 pieces each, without tray	**DSC21400A66.030-00**
Concavus pan + lid	ø 5 mm; 30/40 µl*	Set of *Concavus* pans and lids, 500 pieces each, without tray	**DSC21400A66.040-00**
Concavus pan + lid with punched hole (50 µm)	ø 5 mm; 30/40 µl*	Set of 100 *Concavus* pcs. + lid, cold weldable**	**DSC21400A66.050-00**
Lid with punched hole (50 µm)		Pierced lids for *Concavus* crucibles, 100 pcs.	**DSC21400A66.051-00**
Concavus pan	ø 5 mm; 30/40 µl	Set of 100 pcs.	**NGB817525**
Concavus lid		Set of 100 pcs.	**NGB817526**
Slide-in lid	For *Concavus* pans; allows sample to be pressed onto crucible bottom, set of 100 pcs., especially for foils and fibers; requires tool kit DSC21400A80.030-00 for sealing press 6.240.10-80.0.00A		**NGB815051**
Crucible (cylindrical)	ø 6.7mm; 85 µl	Set of 100 pieces	**NGB810405*** **
Set	2x 3in1 boxes, *Concavus* sealing tool, *Concavus* calibration set		**DSC21400A91.010-00**
Lid		100 pieces, for NGB810405	**NGB810406**

* Crucible volumes of either 25 µl or 40 µl can be achieved by simply reversing the lid.
** One and the same sealing press is capable of sealing all standard Al crucibles; order no. 6.240.10-80.0.00A.
*** Stamping tool kit SFI, see page 21

Crucibles for General and Special Applications

Crucibles for General Applications – DSC 300 *Caliris*®				
Material (Purity/%)	Temp. Range	Dimension/Volume	Consisting of	Order Number [Order Number Lid]
Al_2O_3 (99.7)	Max. 1700°C	ø 6.8 mm/85 µl	Crucible [Lid]	**GB399972 [GB399973]**
Fused silica	Max. 1000°C	ø 6.7 mm/85 µl	Crucible [Lid]	**GB399974 [GB399975]**
Pt/Rh (90/10)	Max. 1700°C	ø 6.8 mm/85 µl	Crucible [Lid]	**NGB825767 [NGB825768]**
Pt/Rh (90/10)	Max. 1700°C	ø 6.8 mm/190 µl	Crucible [Lid]	**NGB827009 [NGB825768]**
Gold (99.9)	Max. 900°C	ø 6.7 mm/85 µl	Crucible + lid	**6.225.6-93.3.00**
Silver	Max. 750°C	ø 6.7 mm/85 µl	Crucible + lid	**6.225.6-93.4.00**



Comparison of the oxidative-induction time in open copper and aluminum crucibles

Influence of the Crucible on the Oxidative-Induction Time (OIT)

The oxidative-induction time (OIT) canbe determined in standard aluminum or in open copper crucibles in accordance with ASTM D3895.

This plot represents an OIT measure-mentm of HDPE carried out in open copper (red) and Al (black) crucible respectively. It can clearly be seen that, under isothermal conditions, oxidation of HDPE begins approximately 23 min earlier in the copper crucible than in the Al crucible.

Special Crucibles for Special Applications – DSC 300 *Caliris*®					
Material (Purity/%)	Temperature Range	Consisting of	Dimension/ Volume	Remarks	Order Number
Cu	Max. 600°C	Crucible	ø 6 mm/25/40 µl	For OIT measurements according to ASTM D3895 (Oxidative-Induction Time), Set of 25	**6.239.2-64.6.00**
Duran glass	Max. 600°C	Ampoule	80 µl	Set of 100, not available for DSC 214 *Polyma* and DSC 214 *Nevio* , after sealing ampoule length ≈ 14 mm	**6.240.1-93.2.00**
Fused silica	Max. 1000°C	Ampoule	80 µl	After sealing ampoule length ≈ 14 mm	**NGB815223**
For DSC 300 *Caliris*® *Select/Supreme* with S-Module, DSC 300 *Caliris*® *Classic:* Auxiliary kit for glass ampoules		▪ Seal-off support for glass ampoules ▪ Small welder with butane and oxygen gas bottles ▪ Inner lid for measuring cell for use with glass ampoules ▪ 100 ampoules			**6.240.20-93.1.00**

Pressure Crucibles

Low-Pressure Crucibles Made of Aluminum (Purity: 99.5%) up to 600°C			
Consisting of	Dimension / Volume / Pressure	Remarks	Order Number
Crucible + Lid	ø 6 mm / 40 µl / 3 bar	Set of 100 pieces, cold weldable	**DSC21400A65.030-00**
Crucible + Lid	ø 6 mm / 40 µl / 3 bar	Set of 500 pieces, cold weldable	**DSC21400A65.040-00**
Crucible + Lid	ø 6 mm / 100 µl / 3 bar	Set of 100 pieces, cold weldable	**DSC21400A65.050-00**
Crucible + Lid	ø 6 mm / 100 µl / 3 bar	Set of 500 pieces, cold weldable	**DSC21400A65.060-00**
Crucible	ø 6 mm / 40 µl / 3 bar	100 pieces	**DSC21400A65.030-01**
Crucible	ø 6 mm / 100 µl / 3 bar	100 pieces	**DSC21400A65.050-01**
Lid		for all crucibles above, 100 pieces	**6.239.2-64.5.02**

Medium- and High-Pressure Crucibles					
Material	Temperature Range	Consisting of	Dimension / Volume / Pressure	Remarks	Order Number
CrNi steel (AISI 304)	Max. 250°C	Crucible + lid + elastomer seal	120 µl / 20 bar	Set of 25 pieces; seal made of FPM	6.240.1-68.1.00
O-ring seal	Max. 230°C	O-ring	Max. 20 bar	Seal made of PCTFE	NGB801765
CrNi steel (AISI 316L)	Max. 500°C	Crucible + lid, hexagonal, gold-plated surface, reusable	ø 6 mm / 27 µl / max. 100 bar	1 crucible + 5 Au sealing disks 10 crucibles + 50 Au sealing disks	6.239.2-92.3.00 6.239.2-92.31.00
CrNi steel (AISI 316L)	Max. 500°C	Crucible + lid, hexagonal, gold-plated surface, reusable	ø 6 mm / 100 µl / max. 100 bar	1 crucible + 5 Au sealing disks	6.239.2-92.8.00
CrNi steel (AISI 316L)	Max. 500°C	Crucible + lid, hexagonal, reusable	ø 6 mm / 27 µl / max. 100 bar	1 crucible + 5 Au sealing disks 10 crucibles + 50 Au sealing disks	6.239.2-93.3.00 6.239.2-93.31.00
CrNi steel (AISI 316L)	Max. 500°C	Crucible + lid, hexagonal, reusable	ø 6 mm /100 µl / max. 100 bar	1 crucible + 5 Au sealing disks 10 crucible + 50 Au sealing disks	6.239.2-93.4.00 6.239.2-93.41.00
Titanium (Grade 4)	Max. 500°C	Crucible + lid, hexagonal, reusable	ø 6 mm / 27 µl / max. 100 bar	1 crucible + 5 Au sealing disks	6.239.2-92.6.00
Titanium (Grade 4)	Max. 500°C	Crucible + lid, hexagonal, reusable	ø 6 mm / 100 µl / max. 100 bar	1 crucible + 5 Au sealing disks	6.239.2-92.9.00
Au seals (Au 585)	Max. 500°C	For all high-pressure autoclaves; 100 pieces; alloy: Au 58.5%, Ag 26%, Cu 15.5%			6.240.1-91.1.00
Sealing press		For crucibles: 6.239.2-92.3.00, -92.31.00, -92.6.00, -92.8.00, -92.9.00, -93.3.00, -93.31.00, -93.4.00, -93.41.00			6.239.2-92.4.00[1]

[1] Please see details on page 21

Medium-pressure crucible (right) and high-pressure crucible (left)

Crucibles for the TG 309 *Libra*® Series and STA 319 *Jupiter*®

The STA 319 *Jupiter*® offer sample carriers for regular and large sample masses, guaranteeing broad applications in the temperature range from room temperature to 1000°C and 1100°C, respectively.

A large variety of crucibles is available to cover the temperature range for different materials, including large crucibles required for substances with a high sample mass and low density (e.g., foams, aerogels, etc.).

Crucibles for General Applications

Crucibles for General Applications – TG 309 *Libra*® and STA 319 *Jupiter*®

Material (Purity/%)	Temperature Range	Dimension/ Volume	Remarks	Consisting of	Order Number [Order Number Lid]
Al_2O_3 (99.7)	Max. 1700°C	ø 6.8 mm/85 µl		Crucible [Lid]	GB399972 [GB399973]
Fused silica	Max. 1000°C	ø 6.8 mm/85 µl		Crucible [Lid]	GB399974 [GB399975]
Pt/Rh (90/10)	Max. 1700°C	ø 6.8 mm/85 µl		Crucible [Lid]	NGB825767 [NGB825768]
Pt/Rh (90/10)	Max. 1700°C	ø 6.8 mm/190 µl		Crucible [Lid]	NGB827009 [NGB825768]
Al (99.5) (cylindrical)	Max. 600°C	ø 6.7 mm/85 µl	Set of 100 pieces	Crucible [Lid]	NGB810405 [NGB810406]
Al (99.5) (*Concavus)*	Max. 600°C	ø 5 mm; 30/40 µl	Set of 100 pieces each	Crucible + lid	DSC21400 A66.030-00*
Gold (99.9)	Max. 900°C	ø 6.7 mm/85 µl		Crucible + lid	6.225.6-93.3.00
Silver	Max. 750°C	ø 6.7 mm/85 µl		Crucible + lid	6.225.6-93.4.00
ZrO_2	Max. 2000°C	85 µl	CaO-stabilized	Crucible [Lid]	GB397053 [GB397052]
Graphite	Max. 2200°C	85 µl		Crucible [Lid]	GB399956 [GB399957]
Al_2O_3 (99.8)	Max. 1700°C	ø 9 mm/350 µl	Sample holder for large samples required	Crucible [Lid]	NGB800453 [NGB800454]
Al_2O_3 (99.7)	Max. 1700°C	ø 8 mm/300 µl	Sample holder for large samples required, ASC-compatible	Crucible [Lid]	NGB803698 [NGB808209]

[1] Please see crucible packages on page 4

Large crucible made of Al_2O_3, volume 350 µl

Large crucible made of Al_2O_3, volume 300 µl

Crucibles made of Pt

Crucibles for Operation with the Automatic Sample Changer (ASC) for the DSC 300 *Caliris*®, TG 309 *Libra*®, STA 319 *Jupiter*®

Crucibles for DSC 300 *Caliris*®, TG 309 *Libra*®, STA 319 *Jupiter*® in ASC Operation				
Crucible Material (Purity/%), Specifications	20 Positons (Carousel Standard Crucibles)	20 Positons (Carousel Large Crucibles)	204 Positons[5]	Order Number [Order Number Lid]
Al (99.5), 30/40 µl (*Concavus* pan), with or without welded lid	x	x	x	NGB817525[1] [NGB817526[1]]
Al (99.5), 30/40 µl, slide-in lid for *Convacus* pan	x	x	x	[NGB815051]
Al (99.5), 30/40 µl, crucible and lid with punched-hole	x	x	x	DSC21400A66.050-00
Al (99.5), 25/40 µl, standard, with or without welded lid	x	x	x	6.239.2-64.5.00[1]
Al (99.5), 25/40 µl, standard, with or without punched-hole	x	x	x	6.239.2-64.8.00[1]
Al (99.5), cylindrical, ø 6.7 mm, 85 µl	x[7]	x[2,7]	x	NGB810405 [NGB810406]
Al_2O_3 (99.7), ø 6.8 mm, 85 µl	x	x[2]	x	GB399972 [GB399973]
Al_2O_3 (99.7), ø 8 x 8 mm, 300 µl	-	x	x[3]	NGB803698
Crucible with lid (note: lid order no.)	-	-	x[3]	[NGB808209]
Fused silica, ø 6.8 mm, 85 µl	x	x[2]	x	GB399974 [GB399975]
Fused silica, ø 8 mm, 300 µl	-	x	x[3]	NGB812506
Pt/Rh (90/10), ø 6.8 mm, 85 µl	x[7]	x[2,7]	x	NGB825767 [NGB825768]
Pt/Rh (90/10), ø 6.8 x 6 mm, 190 µl	x	x[2]	x	NGB827009 [NGB825768]
Pt/Rh/Al_2O_3 system with lid	x[7]	x[2,7]	x	6.225.6-93.5.00
Graphite, ø 6.8 mm, 85 µl	x	x[2]	x	GB399956 [GB399957]
Gold (99.9), ø 6.8 mm, 85 µl, with lid	x[7]	x[2,7]	x	6.225.6-93.3.00
Silver, ø 6.8 mm, 85 µl, with lid	x[7]	x[2,7]	x	6.225.6-93.4.00
ZrO_2, ø 6.8 mm, 85 µl	x[7]	x[2,7]	x	GB397053 [GB397052]
Y_2O_3[4], ø 6.8 mm, 85 µl	x	x[2]	x	NGB812636 [NGB812635]
MgO, ø 6.8 mm, 85 µl	x	x[2]	x	NGB812639 [NGB812637]

[1] Please see crucible packages on page 4
[2] Requires central positioning for smooth operation
[3] May be used in the row for calibration materials or in the 96 sample tray without a sample pan in direct neighborhood
[4] May not be used with Al_2O_3, e.g., sensor plate, sapphire disc, etc.
[5] Use of tray NGB817261 (depth 3.2 mm) is mandatory
[6] Using low pressure crucibles 100 µl, require specific adjustment of the ASC gripper
[7] Only without lid

Crucibles for DSC 300 *Caliris*®, TG 309 *Libra*®, STA 319 *Jupiter*® in ASC Operation (continuation)

Crucible Material (Purity/%), Specifications	20 Positons (Carousel Standard Crucibles)	20 Positons (Carousel Large Crucibles)	204 Positons[5]	Order Number [Order Number Lid]
Al (99.5), low pressure, 40 µl (100/pkg.), with or without welded lid	x	x	x	DSC21400A65.030-00[1]
Al (99.5), low pressure, 100 µl, (100/pkg.), with or without welded lid	x[6]	x[6]	x	DSC21400A65.050-00[1]
CrNi steel (AISI 304), medium-pressure, 120 µl, 20 bar, with lid	x	x[2]	x	6.240.1-68.1.00
Copper, 25 µl	x	x	x	6.239.2-64.6.00
CrNi steel (AISI 316L), high-pressure, 27 µl, gold-plated, 100 bar	x	x[2]	x	6.239.2-92.3.00
CrNi steel (AISI 316L), high-pressure, 27 µl, 100 bar	x	x[2]	x	6.239.2-93.3.00
CrNi (AISI 316L), high-pressure, 100 µl, gold-plated, 100 bar	x	x[2]	x	6.239.2-92.8.00
CrNi (AISI 316L), high-pressure, 100 µl, 100 bar	x	x[2]	x	6.239.2-93.4.00
Ti (Grade 4), high-pressure, 27 µl, 100 bar	x	x[2]	x	6.239.2-92.6.00
Ti (Grade 4), high-pressure, 100 µl, 100 bar	x	x[2]	x	6.239.2-92.9.00

1 Please see crucible packages on page 4
2 Requires central positioning for smooth operation
3 May be used in the row for calibration materials or in the 96 sample tray without a sample pan in direct neighborhood
4 May not be used with Al_2O_3, e.g., sensor plate, sapphire disc, etc.
5 Use of tray NGB817261 (depth 3.2 mm) is mandatory
6 Using low pressure crucibles 100 µl, require specific adjustment of the ASC gripper
7 Only without lid

Concavus pans with lids, 30 µl or 40 µl

Crucibles for the STA 2500 *Regulus*

Slip-on-plate

The STA 2500 *Regulus* is a standard simultaneous thermal analyzer with trendsetting technology. This top-loading unique differential balance arrangement is delivered with slip-on plates which allow for nearly all kinds of sample pans. A large slip-on plate is available for a large volume crucible.

Cap-type lid made of alumina
order no. JA000981

Crucibles, Lids/Caps and Slip-on Plates for the STA 2500 *Regulus*

Material (Purity/%)	Temperature Range	Consisting of	Dimension/ (ø x Height)/ Volume	Remarks	Order Number
Al (99.5)	600°C	Crucible	ø 5.2 x 2.6 mm/45 µl	Set of 100 pieces	J1560179
Al (99.5)	600°C	Crucible	ø 5.2 x 5.1 mm/95 µl	Large crucible, set of 100 pieces	J1560180
Al (99.5)	600°C	Lid, drop-in type	ø 4.8 mm	For Al crucibles, Set of 100 pieces	J1560184
Al_2O_3 (99.7)	1700°C	Crucible	ø 5.2 x 2.6 mm/40 µl	Set of 2 pieces	J1560181
Al_2O_3 (99.7)	1700°C	Crucible	ø 5.2 x 5.1 mm/80 µl	Large crucible, set of 2 pieces	J1560182
Al_2O_3 (99.7)	1700°C	Cap-type lid	ø 5.7 x 2.25 mm	For Al_2O_3 crucibles J1560181 and J1560182, set of 2 pieces	JA000981
Pt(Pt90/Rh10)	1600°C	Crucible	ø 5.2 x 2.6 mm/45 µl	Set of 2 pieces	J5900905
Pt(Pt90/Rh10)	1600°C	Crucible	ø 5.2 x 5.1 mm/95 µl	Large crucible, set of 2 pieces	J5900879
Pt(Pt90/Rh10)	1600°C	Cap-type lid	ø 5.5 x 2.1 mm	Set of 2 pieces	JA000982
Pt(Pt90/Rh10)	1600°C	Lid, drop-in type	ø 4.8 mm	For Pt crucibles, set of 2 pieces	J5900906
		Reshaping tool for Pt crucible			J7672306
Fused silica	1000°C	Crucible	ø 5.2 x 2.6 mm/25 µl	Set of 10 pieces	J5900881
Fused silica	1000°C	Crucible	ø 5.2 x 5.1 mm/55 µl	Large container, Set of 10 pieces	J1560183
Al_2O_3 (99.7)	1700°C	Slip-on-plate		Standard, set of 2 pieces	JA003598
Al_2O_3 (99.7)	1700°C	Flat slip-on plate	ø 6.8 mm	Set of 2 pieces, for crucibles with ø 6.8 mm	JA006844
Al_2O_3 (99.7)	1700°C	Crucible	ø 6.8 mm/85 µl	Only available with flat slip-on plate JA006844	GB399972
Pt/Rh (90/10)	1700°C	Crucible	ø 6.8 mm/85 µl	Only available with flat slip-on plate JA006844	NGB825767
Al_2O_3 (99.7)	1700°C	Corrosive slip-on-plate		Set of 2 pieces, for ø 5.2 mm crucibles	J1670612
Al_2O_3 (99.7)	1700°C	Large volume slip-on-plate		For sample position	JA004734
Al_2O_3 (99.7)	1700°C			For reference position	JA004735
Al_2O_3 (99.7)	1700°C	Crucible	ø 8.0 x 10.0 mm/400 µl	Only available for large slip-on plate JA004734	JA004738

Large crucible made of Al, order no. J1560180

Cucible and lid made of Al, order no. J1560179 and J1560184

Large Al_2O_3 crucible, order no. J1560182

Cap-type lids made of Al_2O_3, order no. JA000981

Crucible made of Al_2O_3, order no. J1560181

Crucible made of fused silica, order no. J5900881

Spare Parts for the STA 2500 *Regulus*		
Spare parts	Remark	Order Number
Radiation shield	Standard version	JA003597
Radiation shield	Special version	JA004827
Sample carrier receiver		JA003596
TGA-DTA sample holder rod	Type P, 1100°C; set of 2 pieces	J1670610
TGA-DTA sample holder rod	Type S, 1600°C; set of 2 pieces	JA004768

Large crucible made of Pt, order no. J5900879

Reshaping tool for crucible made of Pt, order no. J7672306

Standard radition shield, order no. JA003597

Special raditon shield, order no. JA004827

Slip-on plates for measurements in corrosive atmospheres, order no. J1670612

Sample carrier receiver, order no. JA003596

Slip-on plates made of Al_2O_3, order no. JA003598

Slip-on plates made of Al_2O_3, for sample and reference position, order no. JA004734 and JA004735

Large crucible made of Al_2O_3, order no. JA004738

Crucibles for the STA 509 *Jupiter*® and DSC 500 *Pegasus*®

Standard TGA-DSC Crucibles

Crucibles for all DSC and TGA-DSC Sensors of the STA 509 *Jupiter*® and DSC 500 *Pegasus*®

Material (Purity/%)	Temperature Range	Dimension/ Volume	Remarks	Consisting of	Order Number [Order Number Lid]
Al (99.5)	Max. 600°C	ø 5 mm/ 30 or 40 µl	Set of 100 pcs.[1]	*Concavus* pan [Lid]	NGB817525 [NGB817526]
Al (99.5)	Max. 600°C	ø 6 mm/ 25 or 40 µl	Set of 100, cold weldable[1,2]	Standard crucible [Lid]	6.239.2-64.5.01 [6.239.2-64.5.02]
Al (99.5)	Max. 600°C	ø 6 mm/40 µl	Set of 100, cold weldable[1,2]	Standard crucible + punched lid (50 µm)	6.239.2-64.8.00
Al (99.5)	Max. 600°C	ø 6.7 mm/85 µl	Set of 100 pieces, non-weldable	Crucible (cylindrical) [Lid]	NGB810405 [NGB810406]
Pt/Rh (90/10)[3]	Max. 1700°C	ø 6.8 mm/85 µl		Crucible [Lid]	NGB825767 [NGB825768]
Pt/Rh (90/10)[3]	Max. 1700°C	ø 6.8 mm/190 µl	Height 6 mm	Crucible [Lid]	NGB827009 [NGB825768]
PtRh/Al_2O_3[3]	Max. 1700°C	For metal melts and other reactive materials		Crucible + liner + lid	6.225.6-93.5.00
Al_2O_3	Max. 1700°C			Crucible liner (spare for 6.225.6-93.5.00, NGB825767)	6.225.6-93.1.00
MgO	Max. 1500°C		Minimum sale 10 pieces	Crucible liner (spare for NGB825767)	NGB812638
BN[4]	Max. 1600°C			Crucible liner (spare for NGB825767)	NGB809833
Y_2O_3[5]	Max. 1700°C			Crucible liner (spare for NGB825767)	NGB812634
Al_2O_3	Max. 1700°C	ø 6.8 mm, thick 0.2 mm	Inhibits sticking of Pt onto sensor type S and B	Washer	NGB811071
Tool			For reshaping of Pt crucibles		GB397964
Al_2O_3 (99.7)	Max. 1700°C	ø 6.8 mm/85 µl		Crucible [Lid]	GB399972 [GB399973]
Fused silica	Max. 1000°C	ø 6.7 mm/85 µl		Crucible [Lid]	GB399974 [GB399975]
Gold (99.9)	Max. 900°C	ø 6.7 mm/85 µl		Crucible + lid	6.225.6-93.3.00
Ag	Max. 750°C	ø 6.7 mm/85 µl		Crucible + lid	6.225.6-93.4.00

[1] Please see crucible packages on page 4
[2] Please see sealing press on page 21
[3] Direct contact between the crucible and sensor parts containing platinum should be avoided. Above 800°C, a washer from Al_2O_3 (NGB811071) must be used for TGA-DSC sample carriers.
[4] Special handling see page 44
[5] May not be used with Al_2O_3, e.g., sensor plate, sapphire disc, etc.

DSC and TGA-DSC crucible variety

Crucibles for all DSC and TGA-DSC Sensors of the STA 509 *Jupiter*® and DSC 500 *Pegasus*® (continuation)

Material (Purity/%)	Temperature Range	Dimension/ Volume	Remarks	Consisting of	Order Number [Order Number Lid]
ZrO_2	Max. 2000°C	ø 6.7 mm/85 µl	CaO-stabilized	Crucible [Lid]	GB397053 [GB397052]
Graphite[1]	Max. 2400°C	ø 6.7 mm/85 µl	>2200°C evaporation may occur	Crucible [Lid]	GB399956 [GB399957]
Glassy carbon[1]	Max. 2400°C	ø 6 mm/50 µl	Up to 500°C stable in oxidizing atmosphere	Crucible [Lid]	NGB811386 [NGB812613]
MgO	Max. 1500°C	ø 6.7 mm/85 µl		Crucible [Lid]	NGB812639 [NGB812637]
Y_2O_3[3]	Max. 1700°C	ø 6.7 mm/85 µl		Crucible [Lid]	NGB812636 [NGB812635]
BN[2]	Max. 1600°C	ø 6.7 mm/85 µl	Inert gas required	Crucible [Lid]	NGB808836 [NGB808835]
Mo	Max. 2000°C	ø 6.4 mm/85 µl		Crucible [Lid]	NGB808165 [NGB820241]
Duran glass	Max. 600°C		Length after sealing ≈14 mm	Ampoule	6.240.1-93.2.00
Fused silica	Max. 1000°C		Length after sealing ≈14 mm	Ampoule	NGB815223

[1] Direct contact between the crucible and sensor parts containing platinum should be avoided. Above 800°C, a washer from Al_2O_3 (NGB811071) must be used for TGA-DSC sample carriers.
[2] Special handling see page 44
[3] May not be used with Al_2O_3, e.g., sensor plate, sapphire disc, etc.

Shaping Tool

Ampoules made of Duran glass or fused silica are available.

Crucibles for Operation with the Automatic Sample Changer (ASC) for the STA 509 *Jupiter*® and DSC 500 *Pegasus*®

Crucibles for STA 509 *Jupiter*® and DSC 500 *Pegasus*® in ASC Operation					
Crucible Material (Purity/%), Volume	20 Positons (Carousel Standard Crucibles)	20 Positons (Carousel Large Crucibles)	TGA-DSC Sensor[1], DSC Sensor[1]	TGA/ TGA-DTA Sensor[1,2]	Order Number [Order Number Lid]
Al (99.5), 30/40 µl (*Concavus* pan)	x[3]	x[3]	x	x	NGB817525[4] [NGB817526]
Al (99.5), 30/40 µl, slide-in lid for *Concavus* pan	x[3]	x[3]	x	x	[NGB815051]
Al (99.5), 25/40 µl, standard, with or without welded lid	x[5]	x[5]	x	x	6.239.2-64.5.00[4]
Al (99.5), 25/40 µl, standard, with or without punched-hole (50 µm)	x[5]	x[5]	x	x	6.239.2-64.8.00[4]
Al (99.5), low pressure, 40 µl (100/pkg.), with lid	x[5]	x[5]	x	x	DSC21400A65.030-00[4]
Al (99.5), low pressure, 100 µl (100/pkg.), with lid	x[5]	x[5]	x	x	DSC21400A65.050-00[4]
CrNi steel (AISI 302), medium-pressure, 120 µl, with lid	x	x[8]	x	x	6.240.1-68.1.00
Copper, 25 µl	x[5]	x	x	x	6.239.2-64.6.00
CrNi steel (AISI 316L), high-pressure, 27 µl, gold-plated, 100 bar, with lid	x	x[6]	x	x	6.239.2-92.3.00
CrNi steel (AISI 316L), high-pressure, 27 µl, 100 bar, with lid	x	x[6]	x	x	6.239.2-93.3.00
CrNi (AISI 316L), high-pressure, 100 µl, gold-plated, 100 bar, with lid	x	x[6]	x	x	6.239.2-92.8.00
CrNi (AISI 316L), high-pressure, 100 µl, 100 bar, with lid	x	x[6]	x	x	6.239.2-93.4.00
Ti (Grade 4), high-pressure, 27 µl, 100 bar, with lid	x	x[6]	x	x	6.239.2-92.6.00
Ti (Grade 4), high-pressure, 100 µl, 100 bar, with lid	x	x[6]	x	x	6.239.2-92.9.00
Al_2O_3 (99.7), ø 6.8 mm, 85 µl, with or without lid	x	x[6]	x	x	GB399972 [GB399973]
Fused silica, ø 6.8 mm, 85 µl, with or without lid	x	x[6]	x	x	GB399974 [GB399975]

1 Sensors see page 30 (STA 509 *Jupiter*®) and page 24 (DSC 500 *Pegasus*®)
2 For the listed crucibles, the sensors require the slip-on plate made of Al_2O_3, order no. NGB809010
3 Using *Concavus* pans or 40 µl low-pressure crucibles with ASC require re-adjustment of ASC gripper.
4 Please see crucible details on page 4
5 Special gripper for Al crucibles on request
6 Requires central positioning for smooth operation
7 Direct contact between the crucible and sensor parts containing platinum should be avoided. > 800°C, a washer from Al_2O_3 (NGB811071) must be used for TGA-DSC sample carriers.
8 May not be used with Al_2O_3, e.g., sensor plate, sapphire disc, etc.

Crucibles for STA 509 *Jupiter*® and DSC 500 *Pegasus*® in ASC Operation (continuation)

Crucible Material (Purity/%), Volume	20 Positons (Carousel Standard Crucibles)	20 Positons (Carousel Large Crucibles)	TGA-DSC Sensor[1], DSC Sensor[1]	TGA/ TGA-DTA Sensor[1,2]	Order Number [Order Number Lid]
Pt/Rh[7] (90/10), ø 6.8 mm, 85 µl, with or without lid	x	x[6]	x	x	NGB825767 [NGB825768]
Pt/Rh[7] (90/10), ø 6.8 x 6 mm, 190 µl, with or without lid	x	x[6]	x	x	NGB827009 [NGB825768]
Pt/Rh[7]/Al_2O_3 system with lid	x	x[6]	x	x	6.225.6-93.5.00
Al (99.5), ø 6.7 mm, 85 µl, with or without lid	x	x[6]	x	x	NGB810405 [NGB810406]
Graphite[7], ø 6.8 mm, 85 µl, with or without lid	x	x[6]	x	x	GB399956 [GB399957]
Gold (99.9), ø 6.8 mm, 85 µl, with or without lid	x	x[6]	x	x	NGB813359
Silver, ø 6.8 mm, 85 µl, with or without lid	x	x[6]	x	x	NGB813358
ZrO_2, ø 6.8 mm, 85 µl, with or without lid	x	x[6]	x	x	GB397053 [GB397052]
Y_2O_3[8] ø 6.8 mm, 85 µl, with or without lid	x	x[6]	x	x	NGB812636 [NGB812635]
MgO, ø 6.8 mm, 85 µl, with or without lid	x	x[6]	x	x	NGB812639 [NGB812637]
Mo, ø 6.4 mm, 85 µl, with or without lid	x	x[6]	x	-	NGB808165 [NGB820241]
Fused silica, ø 8 mm, 300 µl, open	-	x	-	x	NGB812506
Al_2O_3 (99.7), ø 8 x 8 mm, 300 µl, with or without lid	-	x	-	x	NGB803698 [NGB808209]

1 Sensors see page 30 (STA 509 *Jupiter*®) and page 24 (DSC 500 *Pegasus*®)
2 For the listed crucibles, the sensors require the slip-on plate made of Al_2O_3, order no. NGB809010
3 Using *Concavus* pans or 40 µl low-pressure crucibles with ASC require re-adjustment of ASC gripper.
4 Please see crucible details on page 4
5 Special gripper for Al crucibles on request
6 Requires central positioning for smooth operation
7 Direct contact between the crucible and sensor parts containing platinum should be avoided. > 800°C, a washer from Al_2O_3 (NGB811071) must be used for TGA-DSC sample carriers.
8 May not be used with Al_2O_3, e.g., sensor plate, sapphire disc, etc.

Pressure Crucibles

Low-Pressure Crucibles Made of Aluminum (Purity: 99.5%) up to 600°C for TGA-DSC Sensors of the STA 509 *Jupiter*® and DSC Sensors of the DSC 500 *Pegasus*®			
Consisting of	Dimension / Volume / Pressure	Remarks	Order Number
Crucible + Lid	ø 6 mm / 40 µl / 3 bar	Set of 100 pieces, cold weldable	**DSC21400A65.030-00**
Crucible + Lid	ø 6 mm / 40 µl / 3 bar	Set of 500 pieces, cold weldable	**DSC21400A65.040-00**
Crucible + Lid	ø 6 mm / 100 µl / 3 bar	Set of 100 pieces, cold weldable	**DSC21400A65.050-00**
Crucible + Lid	ø 6 mm / 100 µl / 3 bar	Set of 500 pieces, cold weldable	**DSC21400A65.060-00**
Crucible	ø 6 mm / 40 µl / 3 bar	100 pieces	**DSC21400A65.030-01**
Crucible	ø 6 mm / 100 µl / 3 bar	100 pieces	**DSC21400A65.050-01**
Lid		for all crucibles above, 100 pieces	**6.239.2-64.5.02**

Medium- and High-Pressure Crucibles for TGA-DSC Sensors (HTP 40000A69/70/71/72.000-00) of the STA 509 *Jupiter*® and DSC sensors of the DSC 500 *Pegasus*®					
Material (Purity/%)	Temperature Range	Consisting of	Dimension / Volume / Pressure	Remarks	Order Number
CrNi steel (AISI 304)	Max. 250°C	Crucible + lid + elastomer seal	120 µl / 20 bar	Set of 25 pieces; seal made of FPM	6.240.1-68.1.00
O-ring seal	Max. 230°C	O-ring	Max. 20 bar	Seal made of PCTFE	NGB801765
CrNi steel (AISI 316L)	Max. 500°C	Crucible + lid, hexagonal, gold-plated surface, reusable	ø 6 mm / 27 µl / max. 100 bar	1 crucible + 5 Au sealing disks 10 crucibles + 50 Au sealing disks	6.239.2-92.3.00 6.239.2-92.31.00
CrNi steel (AISI 316L)	Max. 500°C	Crucible + lid, hexagonal, gold-plated surface, reusable	ø 6 mm / 100 µl / max. 100 bar	1 crucible + 5 Au sealing disks	6.239.2-92.8.00
CrNi steel (AISI 316L)	Max. 500°C	Crucible + lid, hexagonal, reusable	ø 6 mm / 27 µl / max. 100 bar	1 crucible + 5 Au sealing disks 10 crucibles + 50 Au sealing disks	6.239.2-93.3.00 6.239.2-93.31.00
CrNi steel (AISI 316L)	Max. 500°C	Crucible + lid, hexagonal, reusable	ø 6 mm / 100 µl / max. 100 bar	1 crucible + 5 Au sealing disks 10 crucible + 50 Au sealing disks	6.239.2-93.4.00 6.239.2-93.41.00
Titanium (Grade 4)	Max. 500°C	Crucible + lid, hexagonal, reusable	ø 6 mm / 27 µl / max. 100 bar	1 crucible + 5 Au sealing disks	6.239.2-92.6.00
Titanium (Grade 4)	Max. 500°C	Crucible + lid, hexagonal, reusable	ø 6 mm / 100 µl / max. 100 bar	1 crucible + 5 Au sealing disks	6.239.2-92.9.00
Au seals (Au 585)	Max. 500°C	For all high-pressure autoclaves; 100 pieces; alloy: Au 58.5%, Ag 26%, Cu 15.5%			6.240.1-91.1.00
Sealing press		For crucibles: 6.239.2-92.3.00, -92.31.00, -92.6.00, -92.8.00, -92.9.00, -93.3.00, -93.31.00, -93.4.00, -93.41.00			6.239.2-92.4.00

Medium-pressure crucible (right) and high-pressure crucible (left)

Knudsen Cells (TGA)

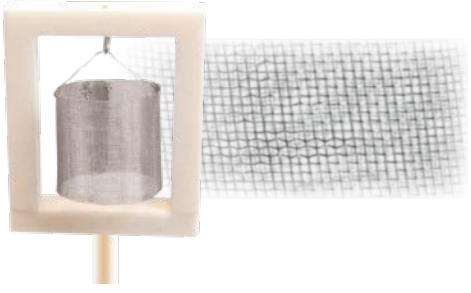
Crucibles for TGA Sample Carriers[1] of the STA 509 *Jupiter*® with Turbo Pump – Knudsen Cells				
Material	Temperature Range	Sample Chamber Dimension	Remarks	Order Number
ZrO_2	Max. 2000°C	ø 12 mm x 3.7 mm high; orifice ø 2.896 mm (optically dimensioned)	Crucible + lid	6.226.1-69.5.00
Al_2O_3 (99.7)	Max. 1700°C	ø 12 mm x 3.7 mm high; orifice ø 2.896 mm (optically dimensioned)	Crucible + lid	6.226.1-67.1.00
Al_2O_3 (99.7)	Max. 1700°C	Outlet ø 0.3 mm (optically dimensioned)	Crucible + lid; also for carrier: 6.226.1-58.0.00+S	6.226.1-69.1.00
Al_2O_3 (99.7)	Max. 1700°C	Outlet ø 0.1 mm (optically dimensioned)	Crucible + lid	6.226.1-69.2.00
Molybdenum	Max. 2000°C	ø 12 mm x 3.7 mm high; orifice ø 2.896 mm (optically dimensioned)	Crucible + lid	6.226.1-69.4.00
MgO	Max. 1500°C	Outlet ø 0.3 mm (optically dimensioned)	Crucible + lid[2]	6.226.1-68.1.00

[1] Sample carriers see page 25
[2] Depending on the atmosphere, the cell can potentially withstand 1650°C for short periods

Knudsen cells with different dimensions and orifice diameters

Crucibles for Hanging Samples

Crucibles for TGA Sample Carrier (HTP40000A60.000-00) for Hanging Samples of the STA 509 *Jupiter*®				
Material	Temp. Range	Consisting of	Dimensions	Order Number
Pt	Max. 1650°C	Cage, net-shaped	Cage ø 12 mm, height 12 mm, wire ø 0.04 mm, mesh width 0.12 mm	NGB813037
Pt	Max. 1650°C	Cage, net-shaped	Cage ø 12 mm, height 12 mm, wire ø 0.06 mm, mesh width 0.25 mm	NGB813036



Standard Crucibles for TGA and TGA-DTA Sensors

Crucibles for DTA Sensors[1] of the DSC 500 *Pegasus*® and for TGA[2], TGA-DTA[3] Sensors of the STA 509 *Jupiter*®					
Material (Purity/%)	Temperature Range	Consisting of	Dimension/ Volume	Remarks [Remarks Lid]	Order Number [Order Number Lid]
Duran glass	Max. 600°C	Ampoule	Length after sealing ≈ 34 mm		GB461185
Fused silica	Max. 1000°C	Ampoule	Length after sealing ≈ 34 mm		GB461177
Al_2O_3	Max. 1700°C	Crucible	0.2 ml	[pierced, ø 0.5 mm hole]	GB445172 [GB445175]
Al_2O_3	Max. 1700°C	Crucible	0.3 ml	100 pieces [pierced, ø 0.5 mm hole]	NGB810411 [GB445175]
Al_2O_3	Max. 1750°C	Crucible	0.3 ml	100 pieces, highly sintered [pierced]	NGB820035 [NGB820036]
Al_2O_3 (99.7)	Max. 1700°C	Crucible	0.3 ml	sixfold pierced	NGB813974
Al_2O_3 (99.7)	Max. 1700°C	Crucible	0.9 ml		GB445215 [GB445216]
Al_2O_3 (99.7)	Max. 1750°C	Crucible	0.9 ml	Highly sintered	NGB820039 [NGB820040]
Pt	Max. 1600°C[4]	Crucible	0.3 ml		NGB826144 [NGB826145]
Graphite	Max. 2400°C	Crucible	0.3 ml	> 2200°C evaporation may occur	GB399222
Fine steel	Max. 600°C	Crucible	0.3 ml	Only in inert atmosphere	GB440112 [GB440113]

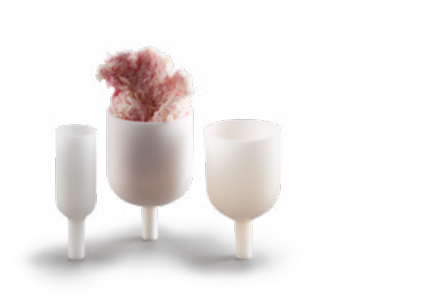
[1] DTA sample carrier of the DSC 500 *Pegasus*® see page 23
[2] TGA sample carrier of the STA 509 *Jupiter*® see page 24
[3] TGA-DTA sample carrier of the STA 509 *Jupiter*® see page 27
[4] Lift cruible after each measurement above 1200°C.

Ampoules for TGA
and TGA-DTA measurements

TGA-DTA crucibles
and slip-on plates

Large Crucibles and Slip-on Plates for TGA Sample Carrier

Crucibles for TGA Sample Carrier (HTP40000A58.000-00) of the STA 509 *Jupiter*®					
Material (Purity/%)	Temperature Range	Geometry	Dimension/ (ø x Height) / Volume	Remarks [Remarks Lid]	Order Number [Order Number Lid]
Al_2O_3 (99.7)	Max. 1700°C	Slip-on plate, flat	ø 10 mm		GB343550
Al_2O_3 (99.7)	Max. 1700°C	Slip-on plate	ø 17 mm		GB445240
Pt/Ir (90/10)	Max. 1600°C	Slip-on plate, net-shaped	ø 17 mm (100 meshes/cm²)		GB398029
Pt/Ir (90/10)	Max. 1600°C	Slip-on plate, net-shaped	ø 17 mm (225 meshes/cm²)		GB398030
Pt/Ir (90/10)	Max. 1600°C	Slip-on plate	ø 10 mm		GB348834
Pt/Ir (90/10)	Max. 1600°C	Slip-on plate	ø 17 mm		GB348835
Fused Silica	Max. 1100°C	Crucible	3.4 ml	Only for TGA-sample carrier HTP40000A64.000-00	NGB811507
Al_2O_3 (99.7)	Max. 1700°C	Crucible	3.4 ml	[Lid without hole]	GB445213 [GB445214]
Al_2O_3 (99.7)	Max. 1750°C	Crucible	3.4 ml	Highly sintered [Lid without hole]	NGB820041 [NGB820042]
Al_2O_3 (99.7)	Max. 1700°C	Crucible	5.0 ml	[Lid without hole]	NGB809163 [NGB814785]
Al_2O_3 (99.7)	Max. 1750°C	Crucible	5.0 ml	Highly sintered [Lid without hole]	NGB820037 [NGB820038]
Al_2O_3 (99.7)	Max. 1750°C	Crucible	10.0 ml	Crucible mass approx. 8 g	NGB820017
Al_2O_3 (99.7)	Max. 1700°C	Crucible	ø 15 mm; hight 25 mm; 4.5 ml		NGB811934
Al_2O_3 (99.7)	Max. 1700°C	Crucible	ø 18 mm; $ø_{inner}$ 14.5 mm; total height 14.5 mm; filling height 3 mm; 0.53 ml	For glove box applications	NGB811194
Repository	Crucible repository with handling tool, for glove box crucible NGB811194				HTP40000 A91.000-00



Al_2O_3 crucibles with different volumes (0.9 ml, 5 ml, 3.4 ml)

Al_2O_3 slip-on plates (ø 17 mm, 10 mm)

Al_2O_3 crucible for glove box applications

Crucible Fused Silica (3.4 ml)

Pt/Ir net-shaped slip-on plates (ø 17 mm, 225/100 meshes/cm²)

TGA-DTA Crucibles for Highest Temperature Range

Crucibles for TGA-DTA Sensor (HTP40000A53.000-00) of the STA 509 *Jupiter*® and DSC 500 *Pegasus*® (DSC404F1A53.000-00)					
Material	Temp. Range	Consisting of	Dimension/ Volume	Remarks	Order Number [Order Number Pierced Lid]
Tungsten	Max. 2400°C	Crucible	80 µl	Wall thickness 0.3 mm	GB453520
Tungsten	Max. 2400°C	Crucible	80 µl	Wall thickness 0.2 mm, BN liner available	NGB808999 [NGB809406]
BN	Max. 1600°C	Liner	80 µl	For NGB808999	NGB805943
Glassy carbon	Max. 2000°C	Crucible	60 µl	Up to 500°C stable in oxidizing atmosphere	GB395116
Graphite	Max. 2400°C	Crucible	150 µl		GB427607 [NGB814940]
Al_2O_3	Max. 1700°C	Crucible	150 µl		GB399147 [GB399973]
ZrO_2	Max. 2000°C	Crucible	150 µl		GB399148
Y_2O_3	Max. 1700°C	Crucible	150 µl	Not useable in contact with alumina	NGB815846

TGA-DTA crucibles for highest temperatures

TGA for Highest Temperature Range

Crucibles for TGA Sample Carrier (HTP40000A52.000-00) of the STA 509 *Jupiter*®				
Material	Temp. Range	Consisting of	Dimension/Volume	Order Number
Tungsten	Max. 2400°C	Crucible	300 µl	NGB809001
Graphite	Max. 2200°C	Crucible	300 µl	GB445333

Tungsten crucible (right) and graphite crucible (left)

Sealing Press, Sample Preparation and Pressure-Tight Crucibles

Sealing Press/Tools

- The sealing press (order no. 6.240.10-80.0.00A) can be equipped with five toolkits for sealing and stamping of different crucible types:
  - Toolkit for *Concavus* pan: order no. 6.240.10-85.0.00
  - Toolkit for Al crucible: order no. 6.240.10-81.0.00
  - Toolkit for low-pressure Al crucibles 40 µl and 100 µl: order no. 6.240.10-86.0.00
  - Toolkit for sealing of mediumpressure crucibles: order no. 6.240.10-83.0.00
  - Stamping tool kit 6.240.10-84.0.00 for SFI crucible NGB810405
  - Toolkit for inserting slidein lid (order no. NGB815051) into *Concavus* pan: order no. DSC21400A80.030-00
- Sealing tool for the high-pressure crucibles, order no. 6.239.2-92.4.00

Sample Preparation

For the sample preparation, we offer two kits for the low- and high-temperature range:

- Kit for low-temperature range: cutting board, scissors, hollow punch, scriber, glass-fiber brush, tweezers, spatula, scalpel, 5 scalpel blades, 5 single-edge blades, ball pen, post-it, space for business card of the NETZSCH contact, manual order no. 6.240.12-99.0.00
- Kit for high-temperature range: cutting board, scissors hollow punch, scriber, glass-fiber brush, tweezers, spatula, scalpel, 5 scalpel blades, 5 single-edge blades, shaping tool, crucible holder, weighing support, crucible box with 4 Al_2O_3 crucibles, post-it, manual order no. DSC404F1A99.000-00

- *SampleCutter* tool for cutting and creating of plane-non-metallic samples (e.g., polymer granulates), order no. NGB814695
  - 10 spare blades for *SampleCutter*, order no. NGB 814821

- Crucible box with 10 positions for transport and storage of the samples during preparation; dimension of the positions: 10.5 mm x 10.5 mm x 5.2 mm, order no. NGB823922

Sensors and Sample Carriers

Sensor and Sample Carriers for the TG 309 *Libra*® and STA 319 *Jupiter*®

DSC-TGA Sensor for the TG 319 *Jupiter*®				
Sensor Type	Temperature Range	Crucible/Volume/ Order Number	Radiation Shield	Order Number
Type S	10°C to 1100°C	6x Al_2O_3, 85 µl, crucible GB399972, lid GB399973	Included	STA31900A70.000-00
		-	Without	STA31900A70.000-00

TGA sample carrier type P and radiation shield

DSC-TGA sensor for the STA 319 *Jupiter*®

TG 309 *Libra*® and STA 319 *Jupiter*®				
Sample Carrier Material	Temperature Sensor Type	Remarks	Radiation shield and crucible included	Order Number
Al_2O_3	Type P	Higher sensitivity for c-*DTA*®, with SiO_2 coating, up to 7 mm crucible	x	TGA30900A60.000-00
			-	TGA30900A60.010-00
Al_2O_3	Type P	Higher sensitivity for c-*DTA*®, with SiO_2 coating, up to 9 mm crucible*	x	TGA30900A61.000-00
			-	TGA30900A61.010-00
Al_2O_3	Type P	Sample support made of Al_2O_3, up to 7 mm crucible	x	TGA30900A62.000-00
			-	TGA30900A62.010-00
Al_2O_3	Type P	Sample support made of Al_2O_3; up to 9 mm crucible	x	TGA30900A63.000-00
			-	TGA30900A63.010-00
Al_2O_3	Type P	Sample support made of Al_2O_3, with protected thermocouple, particularly suitable for corrosive media, up to 7 mm crucible	x	TGA30900A65.000-00
			-	TGA30900A65.010-00
Al_2O_3	Type P	Sample support made of Al_2O_3, with protected thermocouple, particularly suitable for corrosive media, up to 9 mm crucible	x	TGA30900A66.000-00
			-	TGA30900A66.010-00
Radiation shield		Made of Al_2O_3		6.220.10-60.3.00

* Not recommended for ASC

DTA and DSC Sensors for the DSC 500 *Pegasus*®

DTA Sensors with Integrated Radiation Shields for the DSC 500 *Pegasus*®			
Sensor Type	Temperature Range	Crucible/Volume/Order Number	Order Number*
Type S	25°C to 1650°C	2x Al_2O_3, 0.3 ml, NGB810411	DSC404F1A56.000-00
Type S, protected thermocouples	25°C to 1650°C	2x Al_2O_3, 0.3 ml, NGB810411	DSC404F1A68.000-00
Type B	25°C to 1750°C	2x Al_2O_3, 0.3 ml, NGB820035	DSC404F1A57.000-00
W3%Re/W25%Re	25°C to 2000°C	2x tungsten, 0.08 ml, GB453520	DSC404F1A53.000-00

* All sensors without crucible available under: DSC404F1Axx.0**1**0-00

DSC Sensors with Integrated Radiation Shields for the DSC 500 *Pegasus*® – for Standard & c_p Measurements**				
Sensor Type	c_p	Temperature Range	Crucible/Volume/Order Number	Order Number*
Type S	-	25°C to 1650°C	2x Al_2O_3 crucible GB399972 and lid GB399973	DSC404F1A69.000-00
Type S, round design	x	25°C to 1650°C	2x PtRh crucible, NGB825767, lid NGB825768 2x Al_2O_3 crucible, GB399972, lid GB399973	DSC404F1A54.000-00
Type P	x	-150°C to 1000°C	2x Al_2O_3 crucible, GB399972, lid GB399973	DSC404F1A59.000-00
Type E	-	-150°C to 700°C, inert -150°C to 500°C, oxidizing	2x Al_2O_3 crucible, GB399972, lid GB399973	DSC404F1A70.000-00
Type K	-	-150°C to 800°C, inert -150°C to 500°C, oxidizing	2x Al_2O_3 crucible, GB399972, lid GB399973	DSC404F1A71.000-00
Type S	x	25°C to 1650°C	2x PtRh crucible, NGB825767, lid NGB825768 2x Al_2O_3 crucible, GB399972, lid GB399973	DSC404F1A72.000-00
Type B	x	25°C to 1750°C	2x PtRh crucible, NGB825767, lid NGB825768 2x Al_2O_3 crucible, GB399972, lid GB399973	DSC404F1A76.000-00
Type K, octagonal	x	-150°C to 800°C, inert -150°C to 500°C, oxidizing	2x Al_2O_3 crucible, GB399972, lid GB399973	DSC404F1A77.000-00
Type S, octagonal	x	25°C to 1650°C	2x PtRh crucible, NGB825767, lid NGB825768 2x Al_2O_3 crucible, GB399972, lid GB399973	DSC404F1A78.000-00
Type E, octagonal	x	-150°C to 700°C, inert -150°C to 500°C, oxidizing	2x Al_2O_3 crucible, GB399972, lid GB399973	DSC404F1A79.000-00

* All sensors without crucible available under: DSC404F1Axx.0**1**0-00
** c_p recommended up to 1400°C

DTA sensor with protected thermocouples

DSC sensor in round design with Pt crucibles

DSC sensor

DSC Sensors for Operation with the Automatic Sample Changer (ASC) for the DSC 500 *Pegasus*®

DSC Sensors with Integrated Radiation Shields for the DSC 500 *Pegasus*® – for ASC Operation, Octagonal Design				
Sensor Type	c_p	Temperature Range	Crucible/Volume/Order Number	Order Number*
Type S	x	25°C to 1650°C	2x PtRh crucible, NGB825767, lid NGB825768 2x Al_2O_3 crucible, GB399972, lid GB399973	DSC404F1A73.000-00
Type P	x	-150°C to 1000°C	2x PtRh crucible, NGB825767, lid NGB825768 2x Al_2O_3 crucible, GB399972, lid GB399973	DSC404F1A75.000-00
Type K	x	-150°C to 800°C, inert -150°C to 500°C, oxidizing	2x Al_2O_3 crucible, GB399972, lid GB399973	DSC404F1A74.000-00
Type E	x	-150°C to 700°C, inert -150°C to 500°C, oxidizing	2x Al_2O_3 crucible, GB399972, lid GB399973	DSC404F1A66.000-00

* All sensors without crucible available under: DSC404F1Axx.0**1**0-00

DSC sensor in octagonal design for ASC operation

TGA Sample Carriers for the STA 509 *Jupiter*®

TGA Sample Carriers for the STA 509 *Jupiter*® – for Standard Measurements				
Material/ Sensor Type	Temperature Range	Crucible/Volume/Order Number	Radiation Shield	Order Number
Type P	-150°C to 1000°C	Al_2O_3, 3.4 ml, GB445213	Included	HTP40000A55.000-00
		-	Without	HTP40000A55.010-00
Type S	25°C to 1650°C	Al_2O_3, 3.4 ml, GB445213	Included	HTP40000A58.000-00
		-	Without	HTP40000A58.010-00
Type B	25°C to 1750°C	Al_2O_3, 3.4 ml, NGB820041	Included	HTP40000B58.000-00
		-	Without	HTP40000B58.010-00
Made of Al_2O_3, W3%Re/W25%Re	25°C to 1650°C	Al_2O_3, 3.4 ml, GB445213	Included	HTP40000A62.000-00
		-	Without	HTP40000A62.010-00
Made of fused silica, type S	25°C to 1100°C	Crucible required: Fused silica, 3.4 ml, NGB811507	Included	HTP40000A64.000-00
		-	Without	HTP40000A64.010-00
W3%Re/W25%Re	25°C to 2400°C	Tungsten, NGB809001	Included	HTP40000A52.000-00
		-	Without	HTP40000A52.010-00
Radiation shield made of tungsten	25°C to 2400°C	-	Complete	HTP40000A53.020-00

TGA type S sample carrier with different crucibles and plates, TGA type W sample carrier (W3%Re/ W25%Re); for more crucibles and plates, see TGA crucibles table.

TGA Sample Carriers and TGA-DTA Sensors for the STA 509 *Jupiter*®

TGA Sample Carriers and TGA-DTA Sensors for the STA 509 *Jupiter*® with Special Design				
Material/ Sensor Type	Temperature Range	Crucible Type	Radiation Shield	Order Number
TGA, type S, length 250 mm, for water vapor furnace HTP40000A88	25°C to 1650°C	Al_2O_3 slip-on plate, ø 17 mm	Included	HTP40000A57.000-00
		-	Without	HTP40000A57.010-00
TGA, made of Al_2O_3, type S, for hanging samples, sample size max. 13 x 20 mm	25°C to 1650°C	Options: net-shaped cage made of Pt, order no. NGB813036 or order no. NGB813037 (see page 17)	Included	HTP40000A60.000-00
			Without	HTP40000A60.010-00
TGA, made of Al_2O_3, type S, for measurements in an immersion bath (e.g., salt solution), for hanging samples	25°C to 1650°C	Special container made of Al_2O_3, 3 immersion container made of Pt and 5 immersion container made of BN	tube made of glass (single order no. NGB801706)	HTP40000B60.000-00
TGA-DTA, type S, hanging samples	25°C to 1650°C		Included	HTP40000A61.000-00
			Without	HTP40000A61.010-00

Advantages of the Sample Carrier for Hanging Samples

- Sample can be hung down directly
- Bendable thermocouple type S
- Improved contact between the sample and purge gas
- Sample dimensions up to 13 x 20 mm
- Very slow mass increase detectable (µg/hour range)
- Long-term signal stability, typical drift less than 0.1µg/h
- Choice of atmosphere:
  - O_2
  - Corrosive
  - Controlled humidity

TGA-DTA sensor for hanging samples

TGA sample carrier for hanging samples

TGA sample carrier for measure-ments in an immersion bath

TGA-DTA Sensors for the STA 509 *Jupiter*®

TGA-DTA Sensors for the STA 509 *Jupiter*® – for Standard Measurements

Sensor Type	Temperature Range	Crucible/Volume/Order Number	Radiation Shield	Order Number
Type E	-150°C to 700°C, inert -150°C to 500°C, oxidizing	2x Al_2O_3, 0.3 ml, NGB810411	Included	HTP40000A50.000-00
		-	Without	HTP40000A50.010-00
Type K	-150°C to 700°C, inert -150°C to 500°C, oxidizing	2x Al_2O_3, 0.3 ml, NGB810411	Included	HTP40000A51.000-00
		-	Without	HTP40000A51.010-00
Type P	-150°C to 1000°C	2x Al_2O_3, 0.3 ml, NGB810411	Included	HTP40000B56.000-00
		-	Without	HTP40000B56.010-00
Type P, protected thermocouples	-150°C to 1000°C	2x Al_2O_3, 0.3 ml, NGB810411	Included	HTP40000B59.000-00
		-	Without	HTP40000B59.010-00
Type S	25°C to 1650°C	2x Al_2O_3, 0.3 ml, NGB810411	Included	HTP40000A56.000-00
		-	Without	HTP40000A56.010-00
Type S, protected thermocouples	25°C to 1650°C	2x Al_2O_3, 0.3 ml, NGB810411	Included	HTP40000A68.000-00
		-	Without	HTP40000A68.010-00
Type B	25°C to 1750°C	2x Al_2O_3, 0.3 ml, NGB820035	Included	HTP40000B57.000-00
		.	Without	HTP40000B57.010-00
Type D (W3%Re-W25%Re), protected thermocouples	25°C to 1500°C, not for oxidizing atmospheres!	2x Al_2O_3, 0.3 ml, NGB810411	Included	HTP40000A94.000-00
		-	Without	HTP40000A94.010-00
Type D (W3%Re-W25%Re)	25°C to 1650°C, not for oxidizing atmospheres!	2x Al_2O_3, 0.3 ml, NGB810411	Included	HTP40000A65.000-00
		-	Without	HTP40000A65.010-00
W3%Re/W25%Re	25°C to 2400°C, not for oxidizing atmospheres!	2x tungsten, NGB808999, wall thickness 0.2 mm	Included	HTP40000A53.000-00
		-	Without	HTP40000A53.010-00
Radiation shield made of tungsten	25°C to 2400°C	-	Complete	HTP40000A53.020-00

TGA-DTA sensors with different crucibles and plates; for more crucibles, please see TGA

TGA-DTA sensor Type W (W3%Re/ W25%Re)

TGA-DTA sensor Type S, protected thermocouples

TGA-DSC Sensors for the STA 509 *Jupiter*®

TGA-DSC Sensors for the STA 509 *Jupiter*® – for Standard & c_p Measurements*					
Sensor Type	c_p*	Temperature Range	Crucible/Volume/ Order Number	Radiation Shield	Order Number
Type K octagonal	-	-150°C to 800°C, inert -150°C to 500°C, oxidizing	2x Al_2O_3, 85 µl, crucible GB399972, lid GB399973	Included	HTP40000A77.000-00
			-	Without	HTP40000A77.010-00
Type E octagonal	-	-150°C to 700°C, inert -150°C to 500°C, oxidizing	2x Al_2O_3, 85 µl, crucible GB399972, lid GB399973	Included	HTP40000A79.000-00
			-	Without	HTP40000A79.010-00
Type P	x	-150°C to 1000°C	2x Al_2O_3, 85 µl, crucible GB399972, lid GB399973	Included	HTP40000A59.000-00
			-	Without	HTP40000A59.010-00
Type S	-	25°C to 1650°C	2x Al_2O_3, 85 µl, crucible GB399972, lid GB399973	Included	HTP40000A69.000-00
			-	Without	HTP40000A69.010-00
Type S, round design, especially for c_p	x	25°C to 1650°C	2x PtRh crucible, NGB825767, lid NGB825768 2x Al_2O_3 crucible, GB399972, lid GB399973	Included	HTP40000A54.000-00
			-	Without	HTP40000A54.010-00
Type S	x	25°C to 1650°C	2x PtRh crucible, NGB825767, lid NGB825768 2x Al_2O_3 crucible, GB399972, lid GB399973	Included	HTP40000A72.000-00
			-	Without	HTP40000A72.010-00
Type S octagonal version	x	25°C to 1650°C	2x PtRh crucible, NGB825767, lid NGB825768 2x Al_2O_3 crucible, GB399972, lid GB399973	Included	HTP40000A78.000-00
				Without	HTP40000A78.010-00
Type E	-	-150°C to 700°C, inert -150°C to 500°C, oxidizing	2x Al_2O_3, 85 µl, crucible GB399972, lid GB399973	Included	HTP40000A70.000-00
			-	Without	HTP40000A70.010-00
Type K	-	-150°C to 800°C, inert -150°C to 500°C, oxidizing	2x Al_2O_3, 85 µl, crucible GB399972, lid GB399973	Included	HTP40000A71.000-00
			-	Without	HTP40000A71.010-00
Type B	x	25°C to 1750°C	2x PtRh crucible, NGB825767, lid NGB825768 2x Al_2O_3 crucible, GB399972, lid GB399973	Included	HTP40000A76.000-00
			-	Without	HTP40000A76.010-00

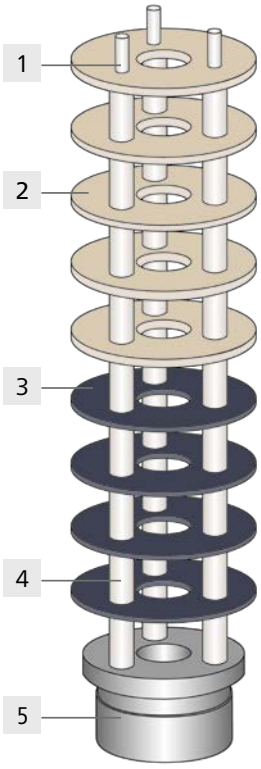
* c_p recommended up to 1400°C

TGA-DSC Sensor

Different TGA-DSC c_p-Sensors

Radiation Shields for STA Systems

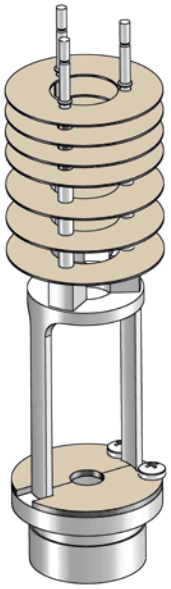
Radiation Shields for STA Systems	
Material/Type	Order Number
Standard radiation shield made of Al_2O_3	HTP40000A72.040-00
Radiation shield for TGA sample carrier and TGA-DTA sensor type W (W3%Re/W25%Re)	HTP4000A53.020-00
Radiation shield for *SKIMMER* made of Al_2O_3	STA440S0A72.040-00
Radiation shield for *SKIMMER* for sample carriers type W (W3%Re/W25%Re)	STA440S0A52.020-00
Carrier sleeve for radiation shield for low temperature furnaces, e.g., copper or high speed furnace	HTP40000A72.050-00



Radiation Shield with 3 Supporting Bars

Radiation Shield with 3 Supporting Bars

Component parts		Order number
Radiation shield – Complete		HTP40000A72.040-00
1	Supporting bar made of Al_2O_3	GB348216
2	Disk for radiation shield made of Al_2O_3	NGB809780
3	Disk for radiation shield made of nickel	NGB809779
4	Spacing tube made of Al_2O_3	GB351383
5	Metal base for radiation shield	NGB809778



Radiation Shield for TGA Sample Carrier and TGA-DTA Sensor Type W (W3%Re/W25%Re)

TGA, TGA-DTA and TGA-DSC Sensors for Operation with the Automatic Sample Changer (ASC) for the STA 509 *Jupiter*®

TGA, TGA-DTA and TGA-DSC Sensors for the STA 509 *Jupiter*® – for Operation with the Automatic Sample Changer (ASC)					
Sensor Type	c_p*	Temperature Range/ Atmosphere	Crucible/Volume/ Single Order Number	Radiation Shield	Order Number
TGA-DSC, Type P	x	-150°C to 1000°C	2x PtRh crucible, NGB825767, lid NGB825768 2x Al_2O_3 crucible, GB399972, lid GB399973	Included	HTP40000A63.000-00
			-	Without	HTP40000A63.010-00
TGA-DSC, Type E	x	-150°C to 700°C, inert 150°C to 500°C, oxidizing	2x Al_2O_3, 85 µl, crucible GB399972, lid GB399973	Included	HTP40000A66.000-00
			-	Without	HTP40000A66.010-00
TGA-DSC, Type S	x	25°C to 1650°C	2x PtRh crucible, NGB825767, lid NGB825768 2x Al_2O_3 crucible, GB399972, lid GB399973	Included	HTP40000A73.000-00
			-	Without	HTP40000A73.010-00
TGA-DSC, Type K	x	-150°C to 800°C, inert -150°C to 500°C, oxidizing	2x Al_2O_3, 85 µl crucible GB399972, lid GB399973	Included	HTP40000A74.000-00
			-	Without	HTP40000A74.010-00
TGA-DSC, Type B	x	25°C to 1750°C	2xPtRh crucible, NGB825767, lid NGB825768 2x Al_2O_3 crucible, GB399972, lid GB399973	Included	HTP40000B73.000-00
			-	Without	HTP40000B73.010-00
TG-DTA, Type S, with protected thermocouples and slip-on plates	-	25°C to 1650°C	Spare part: slip-on plate made of Al_2O_3, NGB815222; 2x Al_2O_3 crucible, GB399972, lid GB399973	Included	HTP40000B68.000-00
			Spare part: slip-on plate made of Al_2O_3, NGB805010	Without	HTP40000B68.010-00
TGA, type P	-	-150°C to 1000°C	Spare part: slip-on plate made of Al_2O_3, NGB809010 Crucible: Al_2O_3, 85 µl, GB399972	Included	HTP40000A67.000-00
			-	Without	HTP40000A67.010-00
TGA, type S	-	25°C to 1650°C	Spare part: slip-on plate made of Al_2O_3, NGB809010 Crucible: Al2O3, 85 µl, GB399972 Lid: GB399973	Included	HTP40000A75.000-00
			-	Without	HTP40000A75.010-00

* c_p recommended up to 1400°C

TGA-DSC sensor for ASC operation

TGA-DTA sample carrier (with protected thermocouples) and slip-on plates for ASC operation

Special Sample Carriers for Special Applications – Oxygen Trap System: *OTS*®

The *OTS*® oxygen trap system, for the STA 509 *Jupiter*® and DSC 500 *Pegasus*® removes traces of residual oxygen in the gas atmosphere inside the instrument. A residual oxygen content of <1ppm can be achieved.

A ceramic substrate bearing a getter ring is mounted on the sample carrier or in the sample carrier tube.

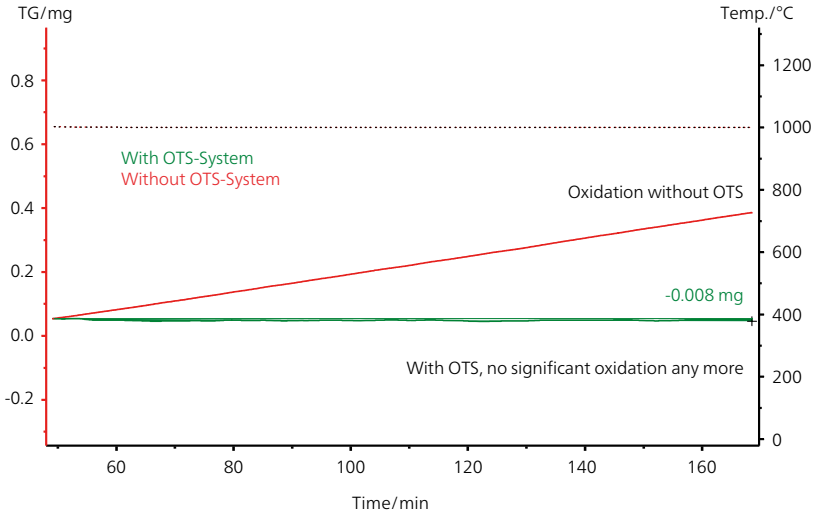
This getter ring is capable of almost entirely eliminating the residual oxygen after evacuation.

Residual O_2 level is a function of:

- Vacuum tightness of the instrument
- Desorption of O_2 from the walls
- Vacuum tightness of the gas supply
- Purity of the purge gas

OTS® – for STA 509 *Jupiter*® and DSC 500 *Pegasus*®	
Instrument	Order Number
STA – *OTS*® getter support and ring; incl. 3 rings	HTP40000A97.010-00
STA – *OTS*® getter support and ring; incl. 3 rings; shortened version for using with protected sample carrier HTP40000A68.000-00 DSC	HTP40000A97.020-00
DSC – *OTS*® getter support and ring; incl. 3 rings	HTP40000A98.010-00
STA/DSC – getter ring (for ordering separately)	NGB809270

Please note: The *OTS*® system can be used with all sensor types. Restrictions may occur with sensor type P when used with the steel and silver furnace. Please contact your sales & service representative for details.



STA measurement of zirconium under isothermal conditions

Oxidation of Zirconium

In this example, a zirconium sample (190.0 mg) was measured with a high-temperature STA in a helium atmosphere under isothermal conditions (1000°C). After three hours, oxidation of the Zr sample (red curve) led to a total mass increase of approx. 0.38 mg when no *OTS*® was used. When the *OTS*® system was applied to the sample carrier for a measurement on the same sample mass, however, no significant oxidation occurred (green curve). The mass increase was determined to amount to only 0.008 mg.

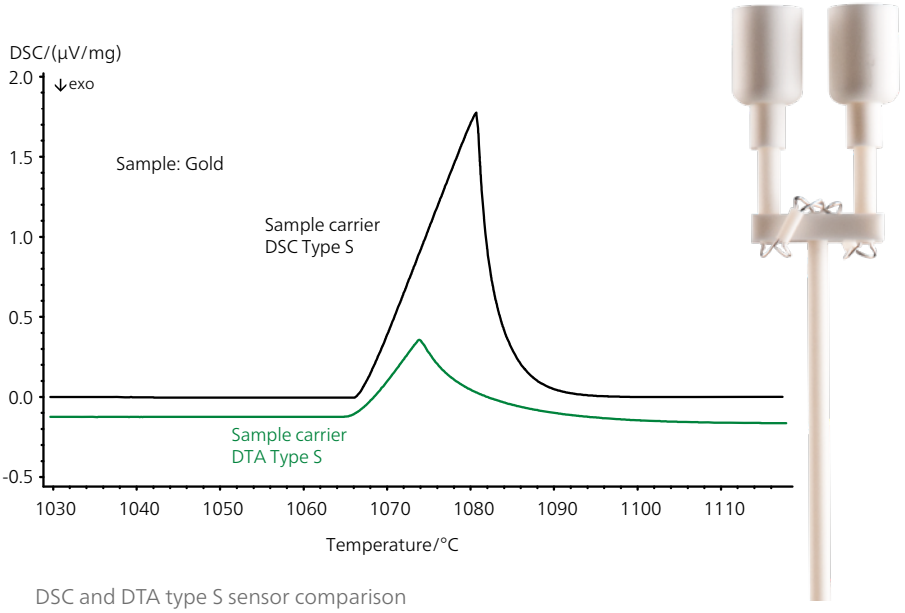
Different Sensor Types – The Right Sensor for Each Application

The STA 509 *Jupiter*® and DSC 500 *Pegasus*® systems are unique in their flexibility. One of their out-standing features is their capability for easy insertion of different sensor types and sample carriers in a matter of only a few seconds.Selection of the right crucible, together with the most appropriate furnace out of nine options, allows a single instrument to cover an extremely broad application range.Of course, the vacuum-tight design of these instruments further extends the measurement capabilities in the temperature range between -150°C and 2400°C.

Advantages of True DSC Measurements

True DSC measurements require special sensors with optimized design and thermocouple posit-ioning. They are not the same as a calibrated DTA test.

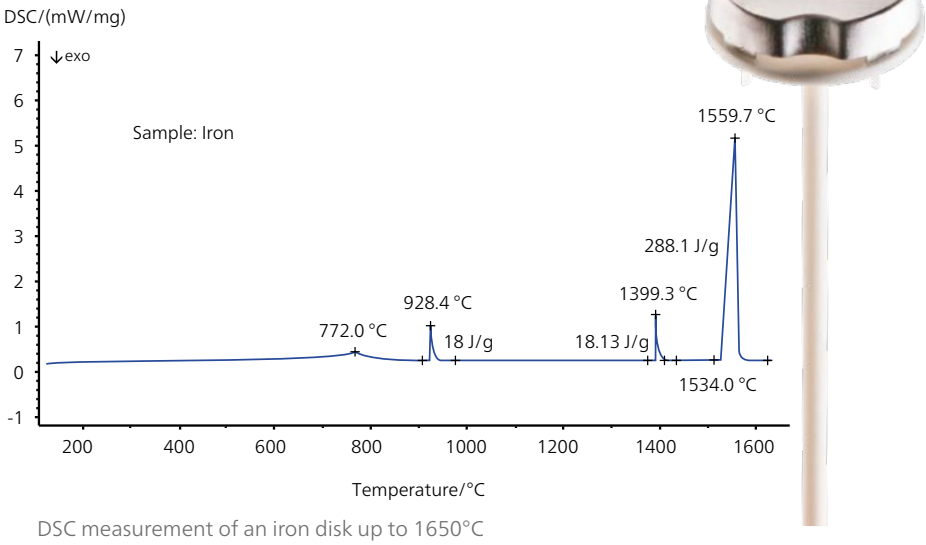
- DSC sensors offer a more stable baseline, a higher sensitivity, an improved detection limit, and a shorter time constant.
- Therefore, transition peaks are sharp, reliable and easy to separate from the baseline curvature.
- DSC sensors can detect weak transitions and glass transition steps and offer excellent reproducibility.
- DSC-c_p sensors are capable of measuring the specific heat (c_p).



DSC and DTA type S sensor comparison

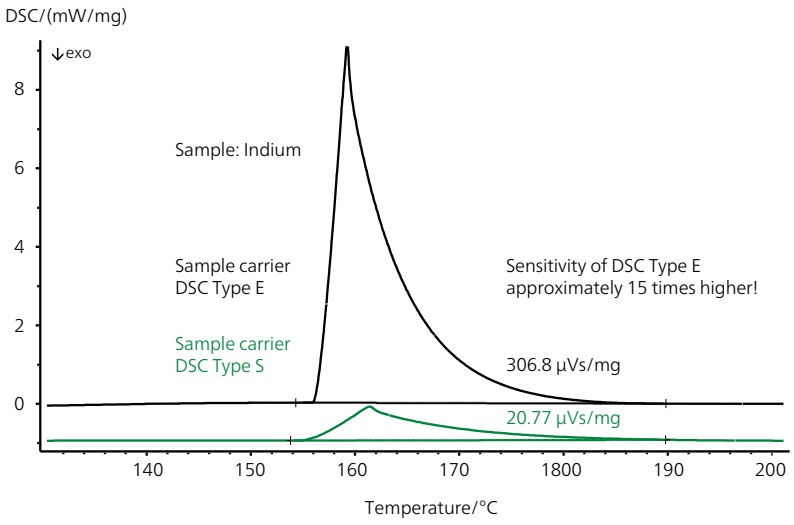
Detection of Weak Effects with the High-Temperature DSC Sensor

This example shows a DSC measurement of an iron disk between room temperature and 1650°C. The iron disk was placed in a Pt+Al_2O_3 liner closed with a Pt lid. The sample mass amounted to 129.68 mg and was heated in an argon atmosphere at a rate of 20 K/min. The DSC type S sensor is especially designed for c_p determination and exhibits out-standing sensitivity. Even the weakest of effects such as iron solid-solid transitions can clearly be detected. Melting occurs at 1534 °C (onset).



DSC measurement of an iron disk up to 1650°C

DSC Sensor Types E and S



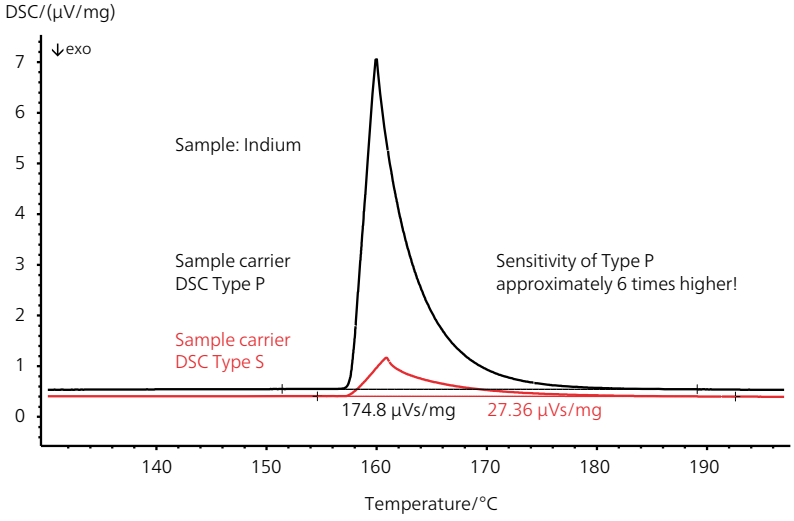
DSC sensor types E and S comparison

DSC sensor types E, K and P allow measurements with extremely high sensitivity.

DSC type S and B sensors have the advantage of a wide temperature range and a short time constant.

The DSC signal in the lower temperature range is approx. 15 times higher for sensor type E than for type S. On the other hand, the resolution of type S is very high.

DSC Sensor Types P and S



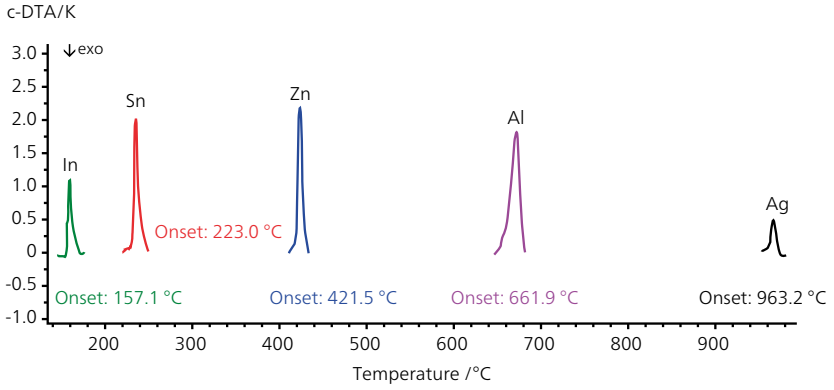
Comparison of DSC sensor types P and S

In the lower temperature range up to 1000°C, the DSC sensor type P has excellent sensitivity and well-pronounced resolution compared to the hightemperature sensor type S. The latter is designed for measurements up to 1650°C. Its sensitivity increases with temperature.

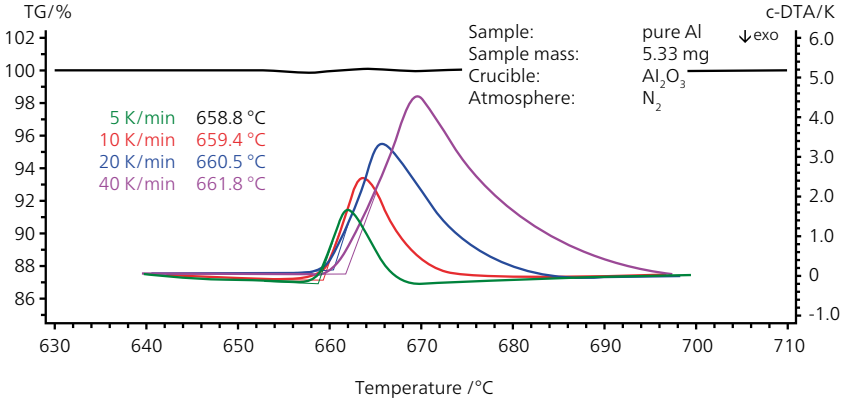
This example shows that the DSC sensor type P is a good alternative to the DSC sensors type E and K (max. 700°C/800°C in an inert atmosphere) when temperatures up to 1000°C are required.

Calibration

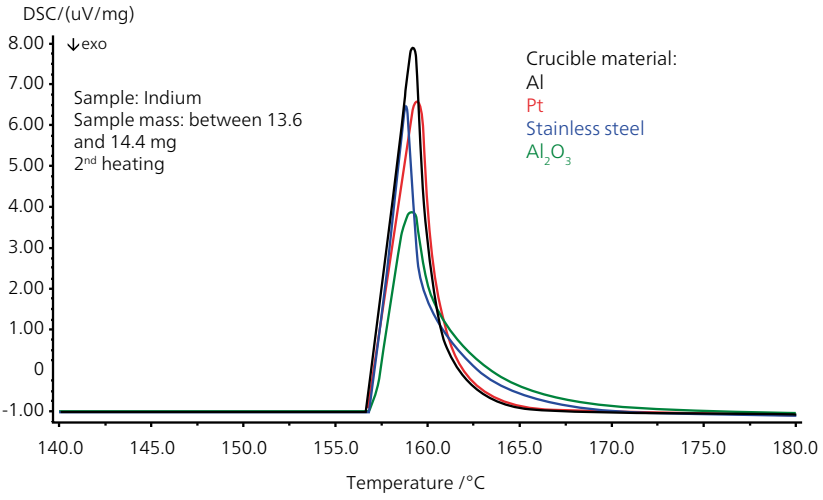
Selection of Calibration Materials, Conditions and Crucibles



There are various reference materials which can be used for c-DTA® calibration routines.



c-DTA® calibration in the TG 309 *Libra*® systems. Excellent coupling of the Platinel sensor with the crucible guarantees that the influence of the heating rate will be small.



DSC and STA (TGA-DSC/DTA) measurements are strongly influenced by the crucible material.

The measurements shown here on indium in Al, Pt, stainless steel and Al_2O_3 crucibles clearly demonstrate that both the thermal conductivity and the mass of the crucible have an effect on the DSC and DTA peak shape.

The calibration procedures take these effects into consideration and eliminate the influence of the crucible material on the measurement results.

Calibration Materials

Reference materials must be homogeneous and stable, and the certified values must be accurate. Finding a material that can be used as a reference for more than one property is one of the goals of current research.

Various calibration kits and individual standards are available for each thermoanalytical method presented (DSC, TGA and STA) allowing the instrument to be calibrated across its entire temperature range and allowing for the use of different crucible types. The table gives an overview of possible combinations of calibration and crucible materials.

Calibration Materials

Common Calibration Materials/Phase Transition Temperature		Crucible Materials								
		Al_2O_3	C	SiO_2	Al	Ag	Au	Stain-less Steel	Pt	W
Adamantan	-64.5°C	✓	✓	✓	✓	✓	✓	✓	✓	✓
H_2O	0.0°C	-	-	✓	✓	✓	✓	✓	✓	-
Biphenyl	69.2°C	✓			✓				✓	
$RbNO_3$	164.2°C	!			✓	✓	✓		✓	
Benzoic acid	122.4°C	✓			✓				✓	
In	156.6°C	✓	✓	✓	✓	-	!	✓	!	
Sn	231.9°C	✓	✓	✓	✓	-	-	!	-	
Bi	271.4°C	✓			✓	-	-	✓	-	
$KClO_4$	300.8°C	✓			✓	✓	✓		✓	
Pb**	327.5°C	✓	✓	✓	✓	-	-	✓	-	!
Zn**	419.5°C	✓	✓	✓	✓*	-	-	-	-	✓
Ag_2SO_4	426.4°C	✓			✓			-	✓	
CsCl	476.0°C	✓			✓	✓	✓	✓	✓	
Li_2SO_4	578.0°C	✓	✓	✓	✓		✓		✓	
Al**	660.3°C	✓	✓	!	-	-	-	-	-	✓
$BaCO_3$	808.0°C	✓		-	-	-		-	✓	
Ag**	961.8°C	✓	✓	✓	-	-	-	-	-	✓
Au**	1064.2°C	✓	-	✓	-	-	-	-	-	✓
Ni**	1455.0°C	!***	-	-	-	-	-	-	-	

✓ No solubility or effects on the melting temperature expected
! Corrosion reactions possible with negligible changes in the melting temperature
- Melt or transformation product reacts with the crucible material. Changes in the melting temperature can be expected.
Compatibility unknown
* Special preparation of the crucible necessary
** Metalls not recommended in oxygen containing atmosphere
*** OTS (S.40) suggested

Calibration Kits for DSC and DTA

Various calibration kits for different temperature ranges, methods, and crucible materials are available. The following tables show the common calibration kits for DSC and DTA measurements with their order numbers,materials transition temperatures (e.g., melting point), lid perf ration, and compatibility with crucible material. These kits are used for temperature and enthalpy calibration.

Mass calibration of the TGA systems can usually be done automatically with an internal weight. For temperature calibration via the c-*DTA*® feature, the DSC/DTA calibration kits can be used.

DSC Sets for C_p, Sensitivity and Enthalpy Calibration

Material	Disc ø	Thickness	For crucible type	Order No.
Sapphire	6 mm	Set of 0.25, 0.5, 0.75 and 1.0 mm	Metallic	6.235.1-91.1.00
Sapphire	6 mm	0.25 mm	Metallic	GB398543
Sapphire	6 mm	0.5 mm	Metallic	GB398454
Sapphire	6 mm	0.75 mm	Metallic	GB398455
Sapphire	6 mm	1.0 mm	Metallic	GB398456
Sapphire	5.2 mm	Set of 0.25, 0.5, 0.75 and 1.0 mm	Al_2O_3	6.235.1-91.2.00
Sapphire	5.2 mm	0.25 mm	Al_2O_3	GB397592
Sapphire	5.2 mm	0.5 mm	Al_2O_3	GB397593
Sapphire	5.2 mm	0.75 mm	Al_2O_3	GB397594
Sapphire	5.2 mm	1.0 mm	Al_2O_3	GB397595
Sapphire	4 mm	Set of 0.25, 0.5, 0.75 and 1.0 mm	Cold-weldable Al crucibles	6.239.2-91.5.00
Sapphire	4 mm	0.25 mm	Cold-weldable Al crucibles	GB397973
Sapphire	4 mm	0.5 mm	Cold-weldable Al crucibles	GB397974
Sapphire	4 mm	0.75 mm	Cold-weldable Al crucibles	GB397975
Sapphire	4 mm	1.0 mm	Cold-weldable Al crucibles	GB397976

DSC Standard Set* – Substances in Sealed Al Standard Crucibles **Order No.: 6.239.2-91.3.30**
(Volume 25 µl, sample mass approx. 10 mg) For HP-DSC also

Transition (°C)	Material		Pierced lid
-64.5	Adamantane**	$C_{10}H_{16}$	
156.6	Indium	In	x
231.9	Tin	Sn	x
271.4	Bismuth	Bi	x
419.5	Zinc	Zn	x
476.0	Cesium chloride	CsCl	x

* Standard set can be used with high-pressure DSC
** HP-DSC: only atmospheric pressure

DSC Standard Set* – Substances in Sealed Al *Concavus* Crucibles Made of Al
(sample mass approx. 10 mg) **Order No.: DSC21400B00.913-30**

Transition (°C)	Material		Pierced lid
-64.5	Adamantane**	$C_{10}H_{16}$	
156.6	Indium	In	x
231.9	Tin	Sn	x
271.4	Bismuth	Bi	x
419.5	Zinc	Zn	x
476.0	Cesium chloride	CsCl	x

* Standard set can be used with high-pressure DSC
** HP-DSC: only atmospheric pressure

DSC Low Pressure Set – Substances in Al Low-Pressure Crucibles **Order No.: DSC21400A00.917-30 (40 µl), DSC21400A00.918-30 (100 µl)** (Volume 40 µl/100 µl, max. 3 bar, sample mass approx. 10 mg)

Transition (°C)	Material		Pierced lid
-64.5	Adamantane	$C_{10}H_{16}$	
156.6	Indium	In	x
231.9	Tin	Sn	x
271.4	Bismuth	Bi	x
419.5	Zinc	Zn	x
476.0	Cesium chloride	CsCl	x

DSC High-Pressure Set – Substances in CrNi Steel Crucibles **Order No.: 6.240.1-91.4.30**
(Volume 27 µl, max. 100 bar, sample mass approx. 10 mg)

Transition (°C)	Material	
-64.5	Adamantane	$C_{10}H_{16}$
156.6	Indium	In
231.9	Tin	Sn
271.4	Bismuth	Bi
476.0	Cesium chloride	CsCl

DSC High-Pressure Set – Substances in CrNi Steel Crucibles **Order No.: 6.240.1-91.5.30**
(Volume 100 µl, sample mass approx. 10 mg)

Transition (°C)	Material	
-64.5	Adamantane	$C_{10}H_{16}$
156.6	Indium	In
231.9	Tin	Sn
271.4	Bismuth	Bi
476.0	Cesium chloride	CsCl

DSC Medium-Pressure Set – Substances in CrNi Steel Crucibles **Order No.: 6.240.1-91.6.00**
(Volume 120 µl , max. 20 bar, sample mass approx. 10 mg)

Transition (°C)	Material	
-64.5	Adamantane	$C_{10}H_{16}$
0.0	Water	H_2O
156.6	Indium	In
231.9	Tin	Sn

DSC/DTA Set for the Use in Al_2O_3 Crucibles, Individual Substances in Glass Vials **Order No.: 6.223.5-91.1.30**
-150°C to 750°C

Transition (°C)	Material		Quantity	Single Order No.
-64.5	Adamantane (Powder)	$C_{10}H_{16}$	400 mg	6.217.1-92.1.09
156.6	Indium	In	400 mg	6.223.5-91.3.01
231.9	Tin	Sn	400 mg	6.223.5-91.3.02
271.4	Bismuth	Bi	400 mg	6.223.5-91.3.11
419.5	Zinc	Zn	400 mg	6.223.5-91.3.03
476.0	Cesium chloride	CsCl	400 mg (for individual order, vial contains 500 mg)	6.223.5-91.2.05
660.3	Al wire	Al	400 mg	6.223.5-91.3.05

DSC/DTA Individual Substances in Glass Vials for Use in Pt Crucibles
RT to 1000°C

Transition (°C)	Material		Quantity	Single Order No.
69.2	Biphenyl*	$C_{12}H_{10}$	500 mg	6.223.5-91.2.01
122.4	Benzoic acid	C_6H_5COOH	500 mg	6.223.5-91.2.02
300.8	Potassium perchlorate*	$KClO_4$	500 mg	6.223.5-91.2.04
426.2	Silver sulfate	Ag_2SO_4	500 mg	6.223.5-91.2.08
476.0	Cesium chloride	CsCl	500 mg	6.223.5-91.2.05
808.0	Barium carbonate	$BaCO_3$	500 mg	6.223.5-91.2.07

* Hazardous material
Please note that, due to very high cargo surcharges, we do not offer hazardous calibration materials together with the instrument. These reference materials will be offered separately.

DSC/DTA Set* for the Use in Al_2O_3 Crucibles Individual Substances in Glass Vials **Order No.: 6.223.5-91.3.30**
RT to 1500°C

Transition (°C)	Material		Quantity	Single Order No.
156.6	Indium	In	400 mg	6.223.5-91.3.01
231.9	Tin	Sn	400 mg	6.223.5-91.3.02
271.4	Bismuth	Bi	400 mg	6.223.5-91.3.11
419.5	Zinc	Zn	400 mg	6.223.5-91.3.03
660.3	Aluminum wire	Al	400 mg	6.223.5-91.3.05
961.8	Silver wire	Ag	400 mg	6.223.5-91.3.06
1064.2	Gold wire	Au	400 mg	6.223.5-91.3.07
1455.0	Nickel wire	Ni	400 mg	6.223.5-91.3.08

* Standard set can be used with high-pressure DSC

Calibration Kits for TGA and STA

Temperature Calibration via Magnetic Transitions	
TG 309 *Libra*®, STA 319 *Jupiter*®	Order Number
5 Curie Standards (RT to 1100°C)	6.221.2-91.3.00
Calibration supplement for magnetic transition (magnets) TG 309 *Libra*® and STA 319 *Jupiter*® (except ASC 204 samples) TG 309 *Libra*® and STA 319 *Jupiter*® (for ASC 204 samples)	 TGA30900A93.020-00 TGA30900A93.010-00

STA 509 *Jupiter*®	Order Number
5 Curie Standards (RT to 1100°C)	6.221.2-91.3.00
Calibration supplement for magnetic transition (magnets)	HTP40000A96.030-00

Verification of Mass Changes for STA 509 *Jupiter* and TG 309 *Libra*® and STA 319 *Jupiter*® – Substance in Glass Vial

Material		Quantity	Single Order No.
Calcium oxalate monohydrate	$C_2H_2CaO_5$	2 g	6.223.5-91.2.10

c-*DTA*® Set (TGA) for the Use in Al_2O_3 Crucibles, Substances in Glass Vials **Order No.: 6.221.5-91.1.30**
RT to 1000°C

Transition (°C)	Material		Quantity	Single Order No.
156.6	Indium	In	400 mg	6.223.5-91.3.01
231.9	Tin	Sn	400 mg	6.223.5-91.3.02
271.4	Bismuth	Bi	400 mg	6.223.5-91.3.11
419.5	Zinc	Zn	400 mg	6.223.5-91.3.03
660.3	Aluminum wire (ø 1 mm)	Al	400 mg	6.223.5-91.3.05
961.8	Silver wire (ø 0.5 mm)	Ag	400 mg	6.223.5-91.3.06

c-*DTA*® Set* (TGA) for the Use in Al_2O_3 Crucibles, Substances in Glass Vials
Order No.: TGA209F1D91.010-30
RT to 1100°C

Transition (°C)	Material		Quantity	Single Order No.
156.6	Indium	In	400 mg	6.223.5-91.3.01
231.9	Tin	Sn	400 mg	6.223.5-91.3.02
271.4	Bismuth	Bi	400 mg	6.223.5-91.3.11
419.5	Zinc	Zn	400 mg	6.223.5-91.3.03
660.3	Aluminum wire (ø 1 mm)	Al	400 mg	6.223.5-91.3.05
961.8	Silver wire (ø 0.5 mm)	Ag	400 mg	6.223.5-91.3.06
1064.2	Gold (ø 1.0 mm)	Au	400 mg	6.223.5-91.3.07

* This calibration set is recommended for the TG 309 *Libra*® and STA 319 *Jupiter*®

Chemical Behavior of Pt, Al_2O_3 and Graphite Crucibles and Sensors

Environmental Effects: Chemical Behavior of Crucibles and Sensors Made of Pt, Al_2O_3 and C

In practice, the service life of sensors (thermocouples) and crucibles is most heavily impacted by interactions with the environment. Diffused impurities, released from the samples, change the thermal tension or may even cause initial cracking of the thermocouple wire and crucible wall. The following tables give some details on the chemical compatibility of Pt, Al_2O_3 and C thermocouples and crucibles with other sample materials and gas atmospheres. The following lists also serve to illustrate how important regular inspections and calibration measurements are.

These overviews are not exhaustive, but meant rather as a guideline for the user. The temperatures given are primarily literature values. Temperatures under test conditions might shift to lower values. It is always advisable to run preliminary tests in separate furnaces.

Chemical Behavior of Platinum (Pt)		
Critical	No resistance	Limited resistance
▪ Halogens (Cl_2, F_2, Br_2), aqua regia ▪ Li_2CO_3, prior to emission of CO_2 (decomposition) ▪ PbO, $FeCl_2$ ▪ Be alloys (evaporation) ▪ HCl with oxidants (e.g., chromic acid, manganates, ▪ iron (III) and molten salts); reducing atmospheres ▪ Metals and metal vapors (e.g., B, Pb, Zn, Sn, Ag, Au, ▪ Li, Na, K, Sb, Bi, Ni, Fe, etc.;m Se > 320°C (evaporation) ▪ Metals and metal oxides with reducing sub- stances such as C, organic compounds or H_2 ▪ Oxides in an inert gas atmosphere at higher temperatures (reduction) ▪ Sulfur (roughening of the surface, embrittlement) ▪ Alkali hydroxides, -carbonates, -sulfates, -cyanides and rhodanides at higher temperatures ▪ $KHSO_4$ at higher temperatures ▪ Carbon black or free carbon >1000°C ▪ SiO_2 under reducing conditions ▪ SiC and Si_3N_4 >1000°C (release of elementary Si) ▪ HBr, KCl solution at high temperatures	▪ Mixtures of KNO_3 and NaOH at 700°C under exclusion of air ▪ Mixtures of KOH and K_2S at 700°C under exclusion of air ▪ LiCl at 600°C; $MgCl_2$, $Ba(NO_3)_2$ at 700°C ▪ HBr, HI, H_2O_2 (30%); HNO_3 at 100°C ▪ KCl decomposition products which form during melting at 768°C	▪ KHF_2, LiF_2, NaCl at 900°C ▪ Mixtures of NaOH and $NaNO_3$ at 700°C under exclusion of air

DSC sample carrier type S (Pt-Pt10%Rh)

Chemical Behavior of Alumina (Al_2O_3)

Critical

- N_2 in the presence of carbon (formation of AlN; not recommended to measure carbon black in N_2 atmosphere at elevated temperatures)
- F_2: formation of AlF_3 and O_2
- Cl_2: formation of $AlCl_3$ at >700°C
- Sulfur: no reaction with liquid sulfur; formation of sulfides occur in the presence of carbon in the gas phase
- H_2S: when heated, formation of Al_2S_3
- C: formation of carbides and Al above 1400°C
- HF: reaction to AlF_3 and H_2O at higher temperatures
- $CuSO_4$: above 1000°C, diffusion through the bottom of the crucible
- Compounds containing Si, e.g., $MoSi_2$; contamination of Al_2O_3 > 1200°C
- Metal fluorides: formation of $[AlF_6]^{-3}$ anions and salts similar to cryolites
- SiO_2 glass: melt dissolves Al_2O_3
- Hydrogen sulfates of alkaline metals and alkaline-earth metals
- HCl: above 600°C, reactions in the presence of carbon
- B_2O_3 (Borax): melt dissolves Al_2O_3; formation of Al-borates and -borides
- Alkaline and alkaline-earth oxides and their salts with volatile anions; important for hydroxides, nitrides, nitrates, carbonates, peroxides, etc.
- CaC_2: when heated, formation of Al_4C_2
- PbO: reaction above 700°C
- $Me^{II}O$: Me= Fe^{2+}, Cu^{2+}, Ni^{2+}, etc., formation of spinels, CaO formation above 1200°C
- Alkaline and alkaline-earth ferrites: melt dissolves Al_2O_3
- Ti-alloys (very high oxygen affinity)
- Reactions with Fe-Ni- and Mg-alloys possible at higher temperatures

Chemical Behavior of Graphite (C)

Critical

- O_2: reaction above 400°C
- N_2: reaction starting at 1700°C (formation of small amounts of cyanides)
- Oxides
- Water vapor
- F_2, Br_2: reaction at room temperature
- Sulfur
- Si: formation of SiC at approx. 1400°C
- Chromic acid
- Chlorosulfonic acid HSO_3Cl
- SiO_2: formation of SiC: formation of SiC via intermediate product SiO (technical production of SiC above 1800°C; however, reaction between SiO_2 and C begins at lower temperature).
- Nitrous gases (NO, NO_2)
- Sulfuric acid, H_2SO_4: concentrated acid critical above 150°C, fuming acid already at room temperature
- Nitric acid, HNO_3: diluted acid critical at 90°C, fuming acid already at room temperature
- SO_3: critical above 100°C
- Danger of explosion with perchloric acid, $HClO_4$
- NaOCl: critical above 50°C

Material Compatibility – Sample in Crucible

The right crucible must always be chosen for the given experiment. Crucible materials should be specially selected depending on the application and sample materials in order to prevent reactions between the sample and crucible.

These tables serve to indicate which of the common crucible types can be used for each application, including ceramics, metals, inorganics and other more general applications.

General Applications						
Materials/ Crucible Types	Pt/Rh	Al_2O_3	Al	Pt+Al_2O_3 liner	Al_2O_3 crucible sprayed with Y_2O_3	Graphite
Clays	✓	✓*	✓	✓*	✓*	No
Minerals	✓	✓*	✓	✓*	✓*	No
Oxide ceramics	✓	✓*	✓	✓*	✓*	No
Salts	✓	No	✓	No	No	✓*
Glasses	✓	No	✓	No	No	✓*
Metals	No**	✓	No	✓	✓	No
Polymers	✓	✓	✓	✓	✓	✓
Carbon materials	✓*	✓*	✓	✓*	✓*	✓
Inorganics	✓*	✓*	✓*	✓*	✓*	✓*

✓ No reaction expected
✓* Reactions possible at high temperatures
No** Not recommended; reactions may occur prior to or during melting.
This could lead to damage to the crucible and/or sensor. Extreme caution advised.

Ceramics

Materials/ Crucible Types	Pt/Rh	Al_2O_3	Al	Pt+Al_2O_3 liner	Al_2O_3 crucible sprayed with Y_2O_3	Graphite
Alumina (Al_2O_3)	✓	✓	✓	✓	✓	✓*
Zirconia (ZrO_2)	✓	✓	✓	✓	✓	✓*
MgO	✓	✓	✓	✓	✓	✓*
Y_2O_3	✓	No	✓	✓	✓	✓*
Silicon dioxide (SiO_2)	✓	No	✓	No	No	No
Silicon nitride (Si_3N_4)	No	✓*	✓	✓*	✓*	✓*
Aluminum nitride (AlN)	✓*	✓*	✓*	✓*	✓*	✓*
Boron nitride (BN)	✓*	✓*	✓*	✓*	✓*	✓*
Silicon carbide (SiC)	No	✓*	No information	✓*	✓*	✓*
Titanium oxide (TiO_2)	✓	✓	✓	✓	✓	✓*

Metals

Materials/ Crucible Types	Pt/Rh	Al_2O_3	Al	Pt+Al_2O_3 liner	Al_2O_3 crucible sprayed with Y_2O_3	Graphite
Al and Al-alloys	No**	✓	No	✓	✓	✓
Mg and Mg-alloys	No**	✓*	No	✓*	✓*	✓
Cu and Cu-alloys	No**	✓	No	✓	✓*	✓
Fe and Fe-alloys	No**	✓*	No	✓*	✓	No
Ni and Ni-alloys	No**	✓*	No	✓*	✓	No
Ti and Ti-alloys	No**	✓*	No	✓*	✓	No
Sn and Sn-alloys	No**	✓	No	✓	✓	✓
Au- and Ag-alloys	No**	✓	No	✓	✓	✓*
Cr-, Mo-, Co-alloys	No**	✓*	No	✓*	✓	No

Inorganics

Materials/ Crucible Types	Pt/Rh	Al_2O_3	Al	Pt+Al_2O_3 liner	Al_2O_3 crucible sprayed with Y_2O_3	Graphite
Silicon	No	No	✓	No	No	✓*
Iron oxide	✓	No	✓	No	No	No
Lead oxide	No	✓*	No information	✓*	✓*	No
Magnesium fluoride	✓	No	✓	No	No	No information
Calcium fluoride	✓	No	✓	No	No	✓
Copper oxide	✓	No	✓	No	No	No
Graphites	✓*	✓*	✓*	✓*	✓*	✓
Carbonates	✓	✓*	✓	✓*	✓*	No
Sulphates	✓	✓*	✓	✓*	✓*	No

✓ No reaction expected
✓* Reactions possible at high temperatures
No** Not recommended; reactions may occur prior to or during melting.
This could lead to damage to the crucible and/or sensor. Extreme caution advised.

Special Crucibles for Special Applications – BN and ZrO_2

ZrO_2 Crucibles

Due to the higher melting point in comparison to Al_2O_3, the applications temperature is about 2000°C. In an inert or reductive atmosphere, darkening of the crucibles may occur due to oxygen losses (ZrO_{2-x}).

This changes also the absorption of the thermal radiation coming from the furnace. This might also result in lower chemical resistance. Not useful for the melting of Ti or Zr alloys.

BN Crucibles

Not recommended for oxidizing atmospheres. Oxidizes in air at about 800°C.

In the presence of Ar, He, or in vacuum, tungsten embrittles and hardens when in contact with BN. Maximum temperature when in contact with tungsten (W), platinum (Pt), rhodium (Rh) or platinum/rhodium alloys: 1600°C

For other materials which get in contact with boron nitride (BN), the user has to ensure that no reactions occur damaging crucibles or liners. Delivered in a bag with Ar protective atmosphere. Might pick up moisture due to B_2O_3 impurity. It is recommended to store the BN crucibles in a desiccator in an Ar atmosphere after opening the bag.

Suitable for high melting fluorides as LiF, NaF etc.
Also appropriate for Si, MgAl alloys.

Recommendations for Cleaning Al_2O_3 and Pt Crucibles

In most cases, the majority of ceramic and metallic crucibles and their lids can be reused many times. In order to ensure a long lifetime of proper use, the following cleaning recommendationsare given for the most common crucibles, made of alumina (Al_2O_3) and platinum (Pt).

Acids must be handled very carefully under a fume hood. Use protective glasses, gloves and apron and read the MSD sheets. Acids should only ever be handled by a person experienced in the handling of chemicals.

All acids (especially HF) are very dangerous and can cause extremely serious injuries or death if they come in contact with the skin or are inhaled.

Work with acids is at the user's own risk. NETZSCH can assume no liability for damage or injury resulting from the use of acids.

Al_2O_3 Crucibles

- Contamination with organics (polymers, organic pyrolysis products, carbon black, etc.)
  Heat crucibles in air or oxygen to approx. 900°C to burn off the organics. If there are oxide fillers present, be careful with the end temperature, as there might be a reaction with alumina (lower the temperature and work in oxygen). Use a separate furnace, if available.
- Contamination with metals and alloys
  Clean with HCl acid (concen-tration 25% or higher). If there is no reaction with the contaminant, heat the beaker with the acid. If HCl alone does not work, use a mixture of HCl/ HNO3 (1:1) (both concentrated). This may be heated as well. oxides, but also the alumina.
- Oxides and other salts
  Some salts are water soluble. Boil the crucibles in distilled water. Use HCl or a mixture of HCl/ HNO3 (1:1) (both concentrated). Oxides are often very stable or have already reacted with the alumina. It could easily be the case that it is impossible to remove the deposits. In that case, the crucible must be discarded. HF dissolves oxides, but also the alumina.

Following these cleaning pro-cedures, rinse the crucibles several times with distilled water and let them dry at room tempera-ture. Then heat them in a separate furnace in air to 1500°C.

Pt Crucibles

- Contamination with organics (polymers, etc.)
  Heat crucibles in air or oxygen to approx. 900°C to burn off the organics. If oxide fillers are present, attempt to remove them mechanically or use HF (see next procedure) .
- Contamination with metals and alloys
  There is often no way of removing metals, as Pt will alloy with most metals at higher temperatures. However, make an attempt with HCl acid (concentration 25% or higher). If there is no reaction with the contaminant, try heating the beaker with the acid. Do not use a mixture of HCl/HNO_3 (1:1). This would also dissolve the Pt!
- Oxides and other salts
  Some salts are water soluble. Boil the crucibles in distilled water. Most oxides can be dissolved in HF. In some cases, it is helpful to warm the acid. Some salts can be dissolved in HCl.

Notes

The owner-managed NETZSCH Group is a leading global technology company specializing in mechanical, plant and instrument engineering.

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