



Crucibles Overview

DSC

TGA

TGA/DSC



High Quality Crucibles
for the Best Thermal Analysis Results

METTLER TOLEDO

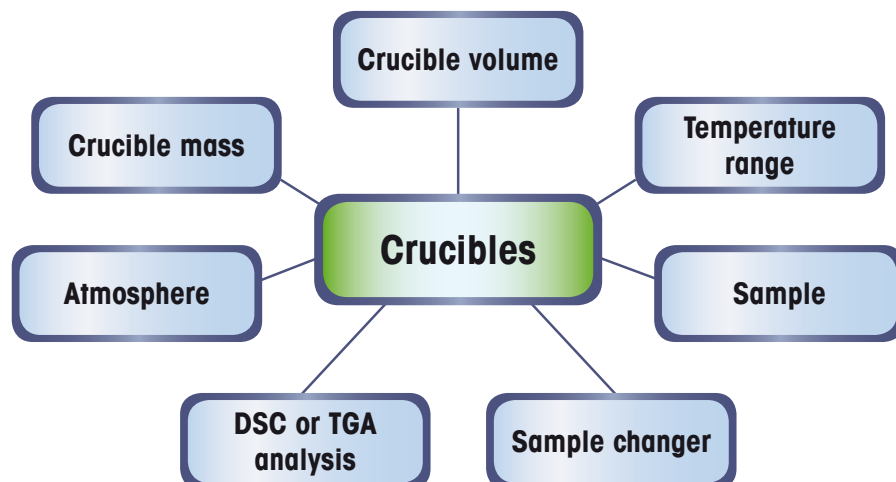
Crucibles for Thermal Analysis

Crucibles serve as containers for samples during thermoanalytical measurements. They guarantee that the sensor is not contaminated by the measurement. The type of crucible used for a measurement can have a large effect on the quality of the results obtained, and in addition, also influences important characteristics of the DSC measuring cell. Considering the relevant factors before the measurement can often help to save time later on when interpreting the curve.

Features and benefits:

- **Large volume** – increases the sensitivity
- **Low mass** – pushes the resolution to the limit
- **Purity** – no interaction of the sample with the crucible
- **Material** – guarantees high thermal conductivity and form stability
- **Flatness** – ensures perfect thermal contact and no artifacts

The following points are particularly important for DSC and SDTA measurements:



Choosing the right crucible guarantees the best results

The Sample Robot

Precise and Reliable Like a Swiss Watch

No sample reaction before measurement

The sample robot can remove the protective crucible lid from the crucible or pierces the lid of hermetically sealed aluminum crucibles immediately before measurement. This unique feature prevents the sample taking up or losing moisture between weighing-in and measurement. It also protects oxygen-sensitive samples from oxidation.



The sample robot is very robust and operates reliably 24 hours a day and throughout the whole year.

Automatic and efficient

All our DSC and TGA models can be automated. The sample robot can process up to 34 samples even if every sample requires a different method and a different crucible.



Simple robust design



Universal gripper



Unique "wasp" crucible lid piercing device

Extremely Wide Crucible Range



Aluminum crucible standard

40 μ L crucibles with lids
Set of 100 pcs
without pin ME-00026763
with pin, 00027331

40 μ L crucibles without lids
Set of 400 pcs
without pin, 51119870

Piercing lid
Set of 400 pcs
51119873

This is the standard type of pan for DSC measurements – it is very shallow (low in height) and has a strong flat base (this ensures that temperature gradients are as low as possible).

Hermetically sealed: to suppress the endothermic evaporation, vaporization or sublimation of volatile substances in the DSC.

The maximum pressure is 0.2 MPa.

Comment: Particularly with TGA measurements using the sample changer, it is possible that the sample can partially dry out or take up moisture or oxygen from the laboratory air. This can be prevented with an aluminum lid. The lid (see cover) is automatically pierced before transfer to the measuring cell (3 needle diameters: 0.1 mm, 0.7 mm and 1.0 mm).

50 μ m hole in the lid: for measurements in a self-generated atmosphere. Overlapping decomposition reactions are often better separated.

Large hole in the lid (0.35 mm to 2 mm): the atmosphere in the pan is practically the same as in the furnace, but substances are prevented from creeping out of the pan or spluttering.



Aluminum crucible light

20 μ L crucible with lids
Set of 100 pcs
without pin, 51119810

The light aluminum pan gives the shortest signal time constant, especially when using helium as a purge gas. The pan is particularly suitable for measuring polymer films, disks and powders – the samples are pressed down tightly against the base of the pan. It is less suitable for liquid samples because liquids might be squeezed out of the pan on sealing. The narrow space between the pan and the lid leads to the formation of a self-generated atmosphere. Piercing the lid beforehand allows contact with the atmosphere. A special die set is required for the crucible sealing press.



Aluminum crucible

25 μ L crucible with lids
Set of 100 pcs
without pin, 30085850

The 25 μ L aluminum crucible is optimized for enthalpy measurements which aim to achieve the best possible reproducibility. The flat base with a diameter of 4 mm and the crucible height of 1.6 mm ensure that the temperature gradients are kept as low as possible. The crucible can be hermetically sealed to suppress endothermic evaporation, vaporization or sublimation when carrying out DSC measurements on volatile substances. The maximum permissible pressure is 0.2 MPa.



Aluminum crucible

160 μ L crucible with lids
Set of 40 pcs
with pin, 00027811

This very large crucible is used for DSC measurements of samples that exhibit very weak effects. Temperature gradients within the sample are to be expected because of the height of the crucible, which is the reason why measurement peaks are somewhat broader. For the same reason, heating rates of more than 10 K/min should not be used.



Aluminum crucible

100 μ L crucible without lids
Set of 400 pcs
without pin, 51119872

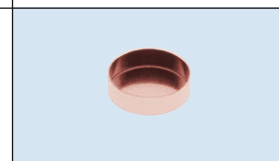
This crucible allows you to use larger quantities of sample if the signal obtained from the sample in a 40 μ L pan is too weak.

The crucibles can be sealed just like a standard pan.

The copper pan is supplied without a lid. It is almost exclusively used for the determination of oxidative stability (OIT) in the presence of copper, which exerts a catalytic effect. Usually the induction time measured in this way is compared with the value obtained with an inert aluminum pan.

Copper crucible

40 µL crucible without lids
Set of 100 pcs
without pin, 51140407



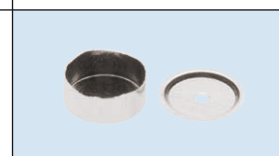
Platinum crucibles are mainly used for TGA or DSC measurements at temperatures above 640 °C. SDTA and DSC curves measured with platinum crucibles are usually better than those obtained using crucibles made of alumina, which has a poorer thermal conductivity. They can also be reused. After mechanical cleaning store them, if need be, in water (or even in 10% hydrochloric acid) because many salts are soluble in water. Oxides form chlorides in hydrochloric acid, which can then be removed by rinsing. After drying, heat the crucibles to red heat to ensure that no weight loss occurs when they are used.

Warning: Molten metals form alloys with platinum very easily.

This can result in a hole being formed in the bottom of the crucible. And soot (or carbon black) is a so-called platinum poison in a non-oxidizing atmosphere. In the 1600 °C furnace, a crucible can stick to the crucible holder, which is also made of platinum. This can be prevented by placing a sapphire disk (00017759) on the crucible holder.

Platinum crucible

Pt crucible with lids
Set of 4 pcs
without pin
30 µL, 51140842
70 µL, 51119654
150 µL, 00024126



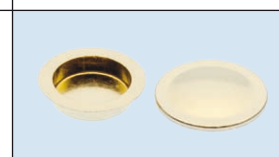
The gold pan is chemically resistant and would be used much more frequently if it were not so expensive. Apart from some types of the aluminum pans, it is the only pan that can be hermetically sealed by cold welding. However, the gold surface becomes dirty during longer periods of storage, which makes cold welding more difficult. To clean the pan and lid, we recommend that you heat them to about 500 °C for a short time prior to use (heat cleaning). The maximum pressure is 0.25 MPa.

The gold plated aluminum crucible is chemically resistant and can also be hermetically sealed through cold welding. The maximum permissible pressure is 0.2 MPa.

Caution: Molten metals form alloys with gold very easily, which can result in a hole in the bottom of the crucible.

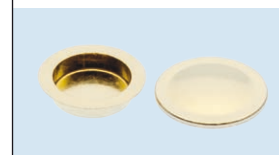
Gold crucible

40 µL crucibles with lids
Set of 6 pcs
without pin, 00027220



Aluminum crucible gold plated

40 µL crucibles with lids
Set of 10 pcs
51142973



The medium pressure crucible is sealed with a FPM O-ring. FPM is slightly permeable to water vapor. If this causes problems with aqueous solutions, O-rings made of Kel-F (polytrifluorochloroethylene, PCTFE) are also available (ME-00026933); PCTFE however shows a DSC melting peak at about 220 °C. The maximum pressure is 2 MPa.

In order to seal the crucible, the crucible sealing press must be equipped with a special die set.

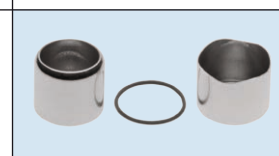
The crucible can also be sealed without using an O-ring (self-generated atmosphere).

Finally, the crucible (and the lid) can be used individually as open crucibles (e.g. for TGA measurements).

Medium pressure crucible

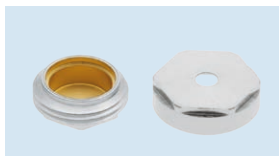
Stainless steel

120 µL crucibles with lids and
FPM O-rings
Set of 25 pcs
with pin, 00026929
without pin, 00029990



**High pressure crucible**

Stainless steel

30 μ L crucibles with lids,
seals not includedSet of 3 pcs
without pin, 51140404**High pressure crucible**

Stainless steel, gold plated

30 μ L crucibles with lids,
seals not includedSet of 3 pcs
without pin, 51140405**Seal**

Copper, gold-plated

Set of 60 pcs
51140403

The relatively light and flat construction of the crucible results in low temperature gradients. Compared to the larger pressure tight crucibles, it gives better DSC signals. The thread and the sealing tool with defined torque enable the crucibles to be easily and securely sealed. After the measurement, the crucible can be opened, cleaned and reused about 20 times using a new gold-plated copper seal each time. If the gold-plated crucible is used at temperatures above 350 °C, the crucible and the seal are welded together.

**High pressure crucible small**

Stainless steel, gold plated

25 μ L crucibles with lids and sealsSet of 25 pcs
without pin, 30077139

The gold-plated steel crucible 25 μ L (fast) and 40 μ L have proven highly effective in the field of safety investigations. However, they can only be used for one measurement each. The maximum pressure is 22 MPa.

The crucible lid is pressed into the crucible with the aid of a toggle press with a pressure of about a ton so that the rupture disk (Gold, Au 700/531) hermetically seals the crucible.

**High pressure crucible**

Stainless steel, gold plated

40 μ L crucibles with lids and sealsSet of 25 pcs
without pin, 00026731
with pin, 00026732**High pressure crucible**

nimonic

270 μ L crucible with lid1 pce
with pin, 00650072500 μ L crucible with lid1 pce
with pin, 00650066**Seal**1 pce
00027216

Nimonic 80A is a temperature resistant alloy made of Ni, Cr, Ti and Al. The crucible can be sealed thanks to its thread using a special sealing tool. After the measurement, it can be opened, cleaned and reused about 20 times with a seal disk each time. The maximum pressure is 10 MPa.

When sealed, the 270 μ L crucible has a height of about 10 mm and is therefore too high for the DSC (the furnace body can be extended using the so-called furnace expander (ME-51140735) provided the sample changer is not used). The 500 μ L crucible is 16 mm high and is therefore only suitable for use with TA4000 measuring cells with the flat lid.

PCA is a polycrystalline alumina oxide with properties similar to sapphire. Thanks to its material structure, PCA is very tight, chemically resistant, and inert. The PCA crucible can be recommended for all materials, including melting metals such as Fe or Ni.

PCA / Sapphire crucible

70 µL crucibles with lids

Set of 4 pcs
51140845



Alumina (aluminum oxide) crucibles are the crucibles that are normally used for TGA measurements, above all when the TG signal, and not the SDTA signal, is important. These crucibles can be reused. After mechanical cleaning, store them, if need be, in water (or possibly even in 10% hydrochloric acid) because many salts are soluble in water. Oxides form chlorides in hydrochloric acid, which can then be removed by rinsing. After drying, heat the crucibles to red heat to ensure that no weight loss occurs when they are used.

The 600 µL crucible is manufactured from alumina with a very low SiO₂ content and therefore can be used for measuring molten metals, even at higher temperatures.

Special aluminum lids for the alumina crucibles and the sapphire crucible. They are removed by the sample changer during the TG measurement.

Alumina crucible

30 µL crucibles with lids
Set of 20 pcs, 51140843

Special aluminum lids
Set of 40 pcs, 5119649



Alumina crucible

70 µL crucibles with lids
Set of 20 pcs, 00024123

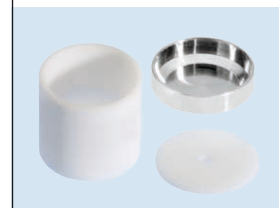
Special aluminum lids
Set of 40 pcs, 5119649



Alumina Crucible

300 µL crucibles with lids
Set 10 pcs, 30267108

Special aluminum lids
Set of 40 pcs, 51140477



Alumina crucible

900 µL crucibles with lids
Set of 4 pcs, 5119960

Special aluminum lids
Set of 40 pcs, 51140469



Alumina crucible

150 µL crucibles with lids
Set of 20 pcs, 00024124

Special aluminum lids
Set of 40 pcs 51140477



Alumina crucible

600 µL crucibles with lids
Set of 4 pcs, 30077260

Special aluminum lids
Set of 40 pcs, 30077266

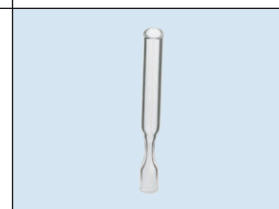
These Duran glass crucibles have the advantage that they are transparent and are chemically resistant. The sample is filled through the neck of the glass crucible. The crucible is sealed by melting the neck in a small flame. A special holder (ME-00027815) is available that allows the sample to be cooled during sealing. The maximum pressure is 5 MPa.

When sealed, the crucible has a height of about 10 mm and is therefore too high for the DSC82x (the furnace body can be extended using the so-called furnace expander (ME-51140735) provided the sample changer is not used).

Glass crucible

100 µL

Set of 50 pcs
without pin, 00027812



Crucible Sealing Press

The press allows the pan to be sealed very easily. Under the pressure of the plunger the pan is cold welded hermetically with the lid. After changing plunger and die you can use the press for other crucibles.

With these exchangeable assemblies you adjust the sealing press to the various crucibles.



A1

Die and plunger
for Al crucible light



A2

Die and plunger
for crucible, sealable by
cold welding (included in
delivery)



A3

Die and plunger
for medium pressure
crucible

High Pressure Crucible Sealing Tool for Reusable Crucibles



B

It consists of a lower part to keep the hexagonal crucible and of an upper part (turning head) that fits on the crucible cover. You close the crucible with the seal disk by turning until a sliding clutch is activated. After the measurement you open the crucible with the same tool.

51119915

High Pressure Crucible Sealing Tool



C

This is the tool for cylindrical crucibles made of Nimonic. You fix the crucible in one of the tools and the cover in the other to seal them with the required torque.

00650067

Tool Kit for Toggle Press



D

This assembly fits in the Maeder press used to seal the 40 and 25 μ L high pressure crucibles.

00026733

Type	Designation	Part number
A	Crucible sealing press (incl. A2)	00119410
1	Die and plunger for Al crucible light	51140547
1a	Die and plunger for gold plated Al crucibles	51142272
2	Die and plunger for cold hermetically welded crucible	00027809 and 00027386
3	Die and plunger for medium pressure crucible	00119428
B	High pressure crucible sealing tool, reusable	51119915
C	High pressure crucible sealing tool	00650067
D	Tool kit for toggle press (Maeder press, KP2.1N)	00026733

Crucible Data

Part no	Designation	Quantity	Volume μL	With pin	Without pin	With lid	Without lid	Pan weight [mg]	Lid weight [mg]	Max. pressure MPa	Max. temperature $^{\circ}\text{C}$	\varnothing base mm	Height mm without lid
51119810	Aluminum crucible light	100	20		•	•		14	9	0.2	640	6	1.6
00026763	Aluminum crucible standard	100	40		•	•		33	17	0.2	640	6	1.6
51119870	Aluminum crucible standard	400	40		•		•	33	-	0.2	640	6	1.6
00027331	Aluminum crucible standard	100	40	•		•		33	17	0.2	640	6	1.6
51119872	Aluminum crucible	400	100		•		•	63	-	0.2	640	6	4.2
30085850	Aluminum crucible	100	25		•	•		28	17	0.2	640	4	1.6
00027811	Aluminum crucible large	40	160	•		•		80	17	0.2	640	6	6.4
51119871	Aluminum lid standard	400						-	17		640		
51140832	Aluminum lid pierced 50 μm	400						-	17		640		
51119873	Aluminum piercing lid	400						-	16		640		
51140407	Cu crucible	100	40		•		•	75	-		750	6	1.65
51140842	Platinum crucible small	4	30		•	•		180	85		1600	6	2.3
51119654	Platinum crucible medium	4	70		•	•		275	85		1600	6	4.2
00024126	Platinum crucible large	4	150		•	•		420	140		1600	7.3	4.2
51142973	Aluminum crucible gold plated	10	40		•	•		70	40	0.2	350	6	1.6
00027220	Gold crucible	6	40		•	•		270	130	0.25	750	6	1.65
00026929	Medium pressure crucible	25	120	•		•		170	140	2	250	6	5.5
00029990	Medium pressure crucible	25	120		•	•		170	140	2	250	6	5.5
00026933	Seal for medium pressure crucible	30						-	-		230		
51140404	High pressure crucible	3	30		•	•		300	270	15	750	7	2.5
51140405	High pressure crucible gold plated	3	30		•	•		325	270	15	350	7	2.5
51140403	Seal for high pressure crucible	60						-	-				
30077139	High pressure crucible small	25	25		•	•		620	280	22	400	6.4	4.7
00026732	High pressure crucible	25	40	•		•		1150	280	22	400	7	5.9
00026731	High pressure crucible	25	40		•	•		1150	280	22	400	7	5.9
00650072	High pressure crucible	1	270	•		•		1060	1070	10	750*	7.6	8.4
00650066	High pressure crucible	1	500	•		•		-	-	10	750*	7.6	14.4
00027216	Seal for high pressure crucible	1						-	-		750*		
51140845	PCA / Sapphire crucible	4	70		•	•		200	60		2000	6	4.5
51140843	Alumina crucible small	20	30		•	•		95	60		2000	6	2.6
00024123	Alumina crucible medium	20	70		•	•		185	60		2000	6	4.5
00024124	Alumina crucible large	20	150		•	•		280	110		2000	8	4.5
30267108	Alumina crucible large	10	300		•	•		520	100		2000	8	9
30077260	Alumina crucible large	4	600		•	•		880	230		2000	12	9.2
51119960	Alumina crucible large	4	900		•	•		770	270		2000	12	10
00027812	Glass crucible	50	100		•		•	400	-	5	500	6	7

E: Only with large furnace (900/600 μL alumina crucible: only without the lid piercing kit)

* Above 500 $^{\circ}\text{C}$ and in the presence of oxygen, scaling of the material may occur.

F: Only with DSC20, 25, 27HP, 30; STAR[®] DSC82x and STAR[®] System DSC 1/2/3 with furnace expander (without sample changer)



Material	Sealing tool	for DSC	for TGA	suitable for sample robot	Turn table U1	Turn table U2	Turn table U3	Page
Al 99.99%	A1	•	•	•	•	•	•	4
Al 99.99%	A2	•	•	•		•	•	4
Al 99.99%	A2	•	•	•	•	•	•	4
Al 99.99%	A2	•						4
Al 99.99%	A2	•	•	•	•	•	•	4
Al 99.99%	A2	•	•	•	•	•	•	4
Al 99.99%	A2	F						4
Al 99.99%		•						4
Al 99.99%		•	•	•	•		•	4
Al 99.99%		•	•	•	•		•	4
E-Cu 99.90%		•	•	•	•	•	•	5
Pt Rh 20%		•	•	•	•	•	•	5
Pt Rh 20%		•	•	•	•	•	•	5
Pt Rh 20%		•	E	•	•		•	5
Al 99.5%, 5 µm gold plated	A1a	•	•	•	•	•	•	5
Au 99.99%	A2	•	•	•	•	•	•	5
X5 CrNi 18 9	A3	•						5
X5 CrNi 18 9	A3	•		•		•	•	5
KEL-F								-
X2 CrNiMo18143	B	•		•			•	6
X2 CrNiMo18143, 5 µm gold plated	B	•		•			•	6
Cu, 2 µm gold plated								6
X2 CrNiMo18143, 5 µm gold plated	D	•		•				6
X2 CrNiMo18143, 5 µm gold plated	D	•					•	6
X2 CrNiMo18143, 5 µm gold plated	D	•		•			•	6
NiCr 20 TiAl	C	F						6
NiCr 20 TiAl	C	F						6
Au 700/531								6
AlO ₃ 99.9%			•	•	•	•	•	7
Al ₂ O ₃ 99.7%			•	•	•	•	•	7
Al ₂ O ₃ 99.7%			•	•	•	•	•	7
Al ₂ O ₃ 99.7%			E	•	•		•	7
Al ₂ O ₃ 99.7%			E	•	•	•	•	7
Al ₂ O ₃ 99.5%			E	•	•	•	•	7
Al ₂ O ₃ 99.8%			E					7
Glass Duran®		F						7



Crucible handling set complete consisting of:	51142765
• Funnel	00026783
• Tweezers	51191865
• Needle standard	00029772
• Needle thin (0.35 mm)	51140833
• Crucible holder	51142312

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