

Heraeus



Laboratory Equipment

Heraeus Platinum Labware



Standard
Laboratory Equipment



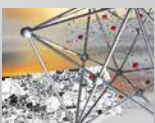
XRF Programme



Accessories



Precious Metal
Semifinished Products



High Strength DPH Alloys

Heraeus is a leading provider of precious metal services and products. Our core competence comprises the manufacture and processing of precious metal materials that require complex processing techniques. For more than 150 years Heraeus has produced high-quality platinum products, backed by a team of experienced chemists and metallurgists. These products include platinum crucibles, dishes and lids used for various fusion or melting processes in the analytical lab.

The use of precious metals is still essential because of their excellent chemical resistance to aggressive media. Precious metals remain stable even at high temperatures.

Reinforced Rim

The stability of dishes can be increased with the addition of a reinforced rim. Rather than simply increasing the thickness of the upper rim, Heraeus goes a step further with the addition of an inlaid, welded platinum wire. This wire reduces

the "wrinkling effect" that most platinum dishes experience, therefore leading to increased life, an easier dish to clean and maintain, and the reduction in sample contamination.

Dispersion Hardened (DPH) Alloy

Through a special process, Heraeus has created a Dispersion Hardened (DPH) alloy. The inclusion of finely dispersed zirconia offers an economical way to increase the mechanical strength of the product resulting in longer service times.

As a leading manufacturer, Heraeus offers a wide range of standardized platinum labware directly from stock. Covering all lab applications, Heraeus offers world-class quality at competitive pricing. With our recycling programme used labware can be returned to recover your investment.

We look forward to assisting you in the choice of materials, technical design and the handling of your precious metal products.

Precious metals are employed in nearly all branches of industry, for instance as:

- A material for crucibles in wet chemical and X-ray fluorescence analysis or ignition
- An inert material for instruments to determine chemical and physical properties
- A material for electrodes in analysis and measurement techniques
- Corrosion resistant materials for use in chemical plants
- A material for space technology
- A material for reaction tubes in the polymer industry
- A material for growing single crystals
- Materials for lining melting tanks in the glass industry
- A material for glass fibre bushings and thermocouple thimbles



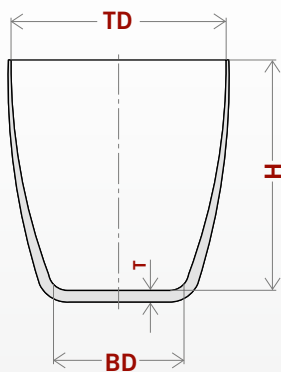
Important Note on Handling:

New items made of precious metals should not touch each other when they are used for the first time in a muffle furnace. Due to the smooth surface the parts weld together. For this reason care must always be taken to keep sufficient distance between them. A new crucible or a new dish should not be covered with a new lid.

To prevent contamination with platinum poisons, which eventually lead to premature failure of the equipment, crucibles and dishes should only be handled with crucible tongs or tweezers with platinum shoes (see our range of accessories on page 18). For further hints on handling platinum see pages 24 – 28.

Crucibles – High Form

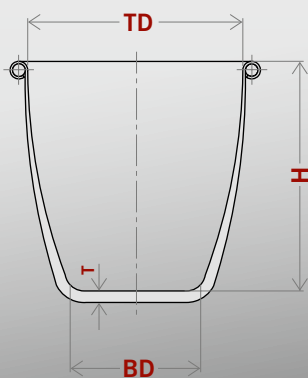
Crucibles, high form



Working capacity [ml]	Internal diameter [mm]		Height [mm]	Weight [g]	Heraeus drawing	Article Number
	top TD	bottom BD				
5	19	12	25	5	Ti 1/1	87000869
8	22	13	27	6	Ti 1/2	87000870
10	24	14	28	8	Ti 1/3	87000871
12	26	16	29	10	Ti 1/4	87000872
15	28	17	33	12	Ti 1/5	87000873
20	30	18	35	18	Ti 1/6	87000874
25	34	20	38	21	Ti 1/7	87000875
30	36	22	40	25	Ti 1/8	87000876
40	40	25	45	30	Ti 1/9	87000877
50	45	27	48	36	Ti 1/10	87000878
75	53	32	56	56	Ti 1/11	87008452
100	56	35	60	66	Ti 1/12	87008453

The weights given refer to Platinum.

Crucibles, high form, with reinforced rim



Working capacity [ml]	Internal diameter [mm]		Height [mm]	Weight [g]	Heraeus drawing	Article Number
	top TD	bottom BD				
5	19	12	25	7	Ti 2/1	87009306
8	22	13	27	7	Ti 2/2	87043265
10	24	14	28	9	Ti 2/3	87042757
12	26	16	29	11	Ti 2/4	87008532
15	28	17	33	13	Ti 2/5	87008533
20	30	18	35	19	Ti 2/6	87008534
25	34	20	38	22	Ti 2/7	87008535
30	36	22	40	27	Ti 2/8	87008536
40	40	25	45	32	Ti 2/9	87008537
50	45	27	48	38	Ti 2/10	87008538
75	53	32	56	58	Ti 2/11	87003349
100	56	35	60	68	Ti 2/12	87008540

The weights given refer to Platinum.

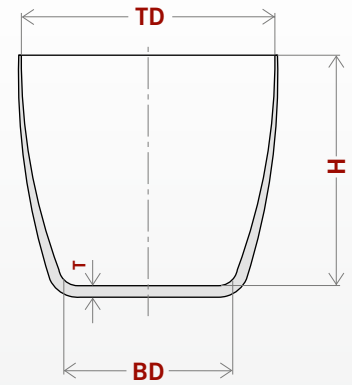


Crucibles – Wide Form

Crucibles, wide form

Working capacity [ml]	Internal diameter [mm]		Height [mm]	Weight [g]	Heraeus drawing	Article Number
	top	bottom				
	TD	BD	H			
5	26	16	20	5	Ti 3/1	87043130
8	28	18	23	6	Ti 3/2	87008531
10	29	18	24	8	Ti 3/3	87043919
12	30	18	25	10	Ti 3/4	87008628
15	32	19	27	12	Ti 3/5	87044843
20	34	22	30	18	Ti 3/6	87026734
25	36	22	32	21	Ti 3/7	87048136
30	38	22	34	25	Ti 3/8	87008632
40	45	25	40	30	Ti 3/9	87008633
50	50	30	42	36	Ti 3/10	87042560
75	55	36	45	56	Ti 3/11	87005488
100	62	40	48	66	Ti 3/12	87008636

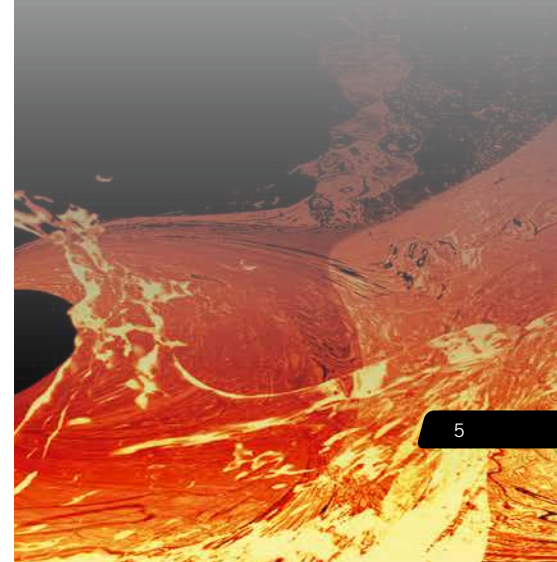
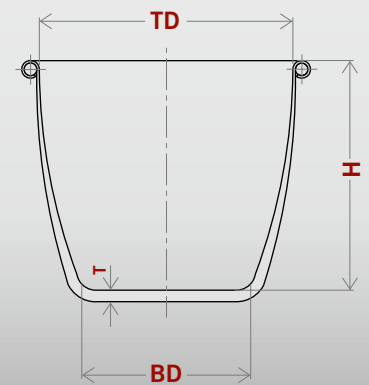
The weights given refer to Platinum.



Crucibles, wide form, with reinforced rim

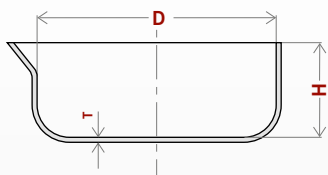
Working capacity [ml]	Internal diameter [mm]		Height [mm]	Weight [g]	Heraeus drawing	Article Number
	top	bottom				
	TD	BD	H			
5	26	16	20	7	Ti 4/1	81136013
8	28	18	23	7	Ti 4/2	81025084
10	29	18	24	10	Ti 4/3	81020751
12	30	18	25	11	Ti 4/4	87008689
15	32	19	27	13	Ti 4/5	81015438
20	34	22	30	19	Ti 4/6	87050943
25	36	22	32	22	Ti 4/7	81018439
30	38	22	34	25	Ti 4/8	87045584
40	45	25	40	33	Ti 4/9	87048712
50	50	30	42	38	Ti 4/10	81003141
75	55	36	45	56	Ti 4/11	81003839
100	62	40	48	68	Ti 4/12	87050709

The weights given refer to Platinum.



Dishes – Cylindrical Form

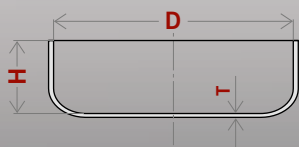
Dishes, cylindrical form



Working capacity [ml]	Ø internal (D) [mm]	Height (H) [mm]	Weight [g]	Heraeus drawing	Execution	Article Number
20	40	20	8	Scha 1/1	with pouring lip	87000897
40	50	25	13	Scha 1/2	with pouring lip	87000898
60	60	30	20	Scha 1/3	with pouring lip	87000899
80	65	33	25	Scha 1/4	with pouring lip	87000900
100	70	35	36	Scha 1/5	with pouring lip	87001402
130	75	38	40	Scha 1/6	with pouring lip	87001403
150	80	40	48	Scha 1/7	with pouring lip	87001404
200	90	45	60	Scha 1/8	with pouring lip	87001405
300	100	50	90	Scha 1/9	with pouring lip	87008794
400	110	55	113	Scha 1/10	with pouring lip	81136472
500	120	60	130	Scha 1/11	with pouring lip	81114230
600	130	65	157	Scha 1/12	with pouring lip	87042108

The weights given refer to Platinum.

Dishes, cylindrical form without pouring lip



Working capacity [ml]	Ø internal (D) [mm]	Height (H) [mm]	Weight [g]	Heraeus drawing	Execution	Article Number
20	40	20	8	Scha 2/1	without pouring lip	87008951
40	50	25	13	Scha 2/2	without pouring lip	87020213
60	60	30	20	Scha 2/3	without pouring lip	87013313
80	65	33	25	Scha 2/4	without pouring lip	87013315
100	70	35	37	Scha 2/5	without pouring lip	87013316
130	75	38	40	Scha 2/6	without pouring lip	87013319
150	80	40	48	Scha 2/7	without pouring lip	87013104
200	90	45	60	Scha 2/8	without pouring lip	87013011
300	100	50	90	Scha 2/9	without pouring lip	87008758
400	110	55	113	Scha 2/10	without pouring lip	81009749
500	120	60	130	Scha 2/11	without pouring lip	5017912
600	130	65	157	Scha 2/12	without pouring lip	5019215

The weights given refer to Platinum.

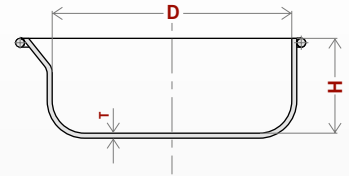


Dishes – Cylindrical Form

Dishes, cylindrical form with reinforced rim

Working capacity [ml]	Ø internal (D) [mm]	Height (H) [mm]	Weight [g]	Heraeus drawing	Execution	Article Number
20	40	20	9	Scha 3/1	with pouring lip	87008846
40	50	25	15	Scha 3/2	with pouring lip	87008927
60	60	30	22	Scha 3/3	with pouring lip	87008848
80	65	33	27	Scha 3/4	with pouring lip	87008849
100	70	35	40	Scha 3/5	with pouring lip	87008850
130	75	38	43	Scha 3/6	with pouring lip	87008851
150	80	40	52	Scha 3/7	with pouring lip	87008852
200	90	45	64	Scha 3/8	with pouring lip	87008853
300	100	50	94	Scha 3/9	with pouring lip	87008854
400	110	55	118	Scha 3/10	with pouring lip	5019216
500	120	60	135	Scha 3/11	with pouring lip	5019217
600	130	65	163	Scha 3/12	with pouring lip	81021040

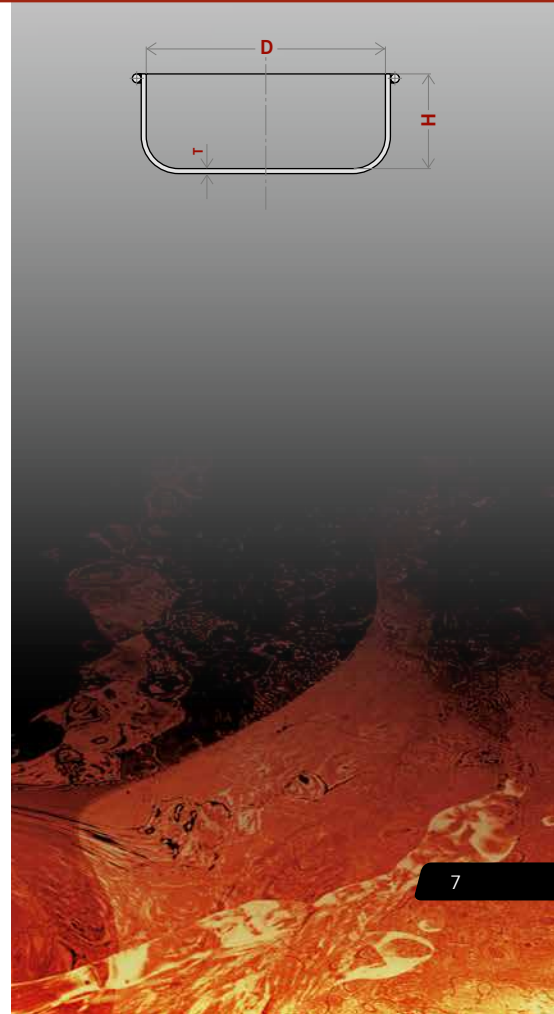
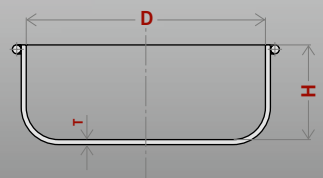
The weights given refer to Platinum.



Dishes, cylindrical form with reinforced rim, without pouring lip

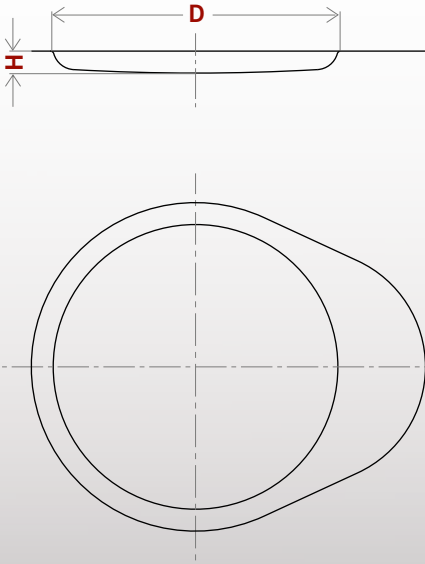
Working capacity [ml]	Ø internal (D) [mm]	Height (H) [mm]	Weight [g]	Heraeus drawing	Execution	Article Number
20	40	20	9	Scha 4/1	without pouring lip	87028219
40	50	25	15	Scha 4/2	without pouring lip	87016222
60	60	30	22	Scha 4/3	without pouring lip	87008954
80	65	33	27	Scha 4/4	without pouring lip	87020057
100	70	35	40	Scha 4/5	without pouring lip	87016702
130	75	38	43	Scha 4/6	without pouring lip	87017936
150	80	40	52	Scha 4/7	without pouring lip	87016719
200	90	45	64	Scha 4/8	without pouring lip	87028488
300	100	50	94	Scha 4/9	without pouring lip	87003728
400	110	55	118	Scha 4/10	without pouring lip	5019218
500	120	60	135	Scha 4/11	without pouring lip	5019219
600	130	65	163	Scha 4/12	without pouring lip	81016131

The weights given refer to Platinum.



Lids for Crucibles and Dishes

Lids suitable for crucibles and dishes



Ø (D) [mm]	Height (H) [mm]	Thickness [mm]	Weight [g]	Heraeus drawing	Article Number
18	2.00	0.15	2	Tid 1/1	87000879
21	3.00	0.15	2	Tid 1/2	87000880
23	3.00	0.15	3	Tid 1/3	87000881
25	3.00	0.15	3	Tid 1/4	87000882
27	3.00	0.15	3	Tid 1/5	87000883
29	3.00	0.15	4	Tid 1/6	87000884
33	3.00	0.15	5	Tid 1/7	87000885
35	3.00	0.15	5	Tid 1/8	87000886
39	3.50	0.15	7	Tid 1/9/Schad 1/1	87000887
44	4.00	0.15	9	Tid 1/10	87000888
52	4.00	0.15	11	Tid 1/11	87008746
55	3.00	0.15	12	Tid 1/12	87008747
49	3.50	0.15	9	Schad 1/2	87009048
59	4.00	0.15	14	Schad 1/3	87008931
64	4.50	0.15	15	Schad 1/4	87009153
69	5.00	0.15	18	Schad 1/5	87009061
74	5.00	0.15	20	Schad 1/6	87008983
79	6.00	0.15	24	Schad 1/7	87014495
89	7.00	0.15	31	Schad 1/8	87042963
99	8.00	0.15	38	Schad 1/9	87014752
109	9.00	0.15	48	Schad 1/10	81055317
119	10.00	0.15	58	Schad 1/11	5018633
129	12.00	0.15	66	Schad 1/12	81065043

Lids have a flange and are formed with a grip for better handling. They can be supplied for all our standard crucibles and dishes.



Crucibles and casting dishes for the preparation of samples for X-ray fluorescence analysis (XRF)

XRF is used for routine quality assurance of the production in many branches of industry. For example, in iron and steel, manufacture of cement, animal feed, fertilizer, refractories, and in all fields of metal processing, the analysis of samples which have been homogenized by a fusion process is achieving ever increasing importance compared to the direct analysis of powder compacts.

Numerous manufacturers offer fusion equipment for the manual, semi-automatic or fully automatic preparation of samples for XRF analysis.

On the following pages you will find the appropriate crucibles, lids and casting dishes for the most commonly used fusion devices.

The inner surface of casting dishes must be smooth, bright and very flat in order to obtain a microscopically smooth surface on the fused bead. Beam scattering caused by surface effects could lead to false interpretation of the analysis results. Therefore, all our casting dishes undergo a post-treatment and a particularly critical final inspection.

The good stability of platinum, even in the 1100 – 1200°C temperature range, is further improved by the addition of 5% gold. The alloy has higher strength and, in particular when melting silicates, a low wettability so that the melt can be removed easily from the crucibles and casting dishes.

Articles made of Platinum/Gold 95/5% DPH are characterised by a further increase in strength and reduction in grain growth. Their use is to be recommended especially at temperatures above 1150°C as it results in a prolongation of the service life.



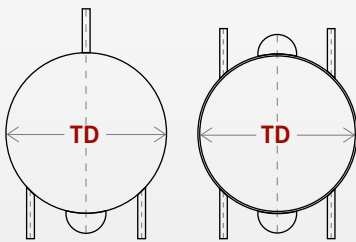
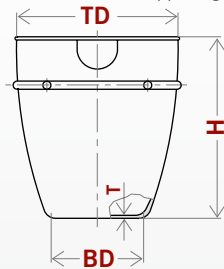
The range of designs and sizes of special crucibles and casting dishes is being constantly extended and adapted to new generations of equipment and analysis procedures.

We are pleased to support you in new developments and special wishes.

XRF Programme – Autofluxer and Vulcan

Crucibles in Platinum/Gold 95/5% suitable for Autofluxer and Vulcan

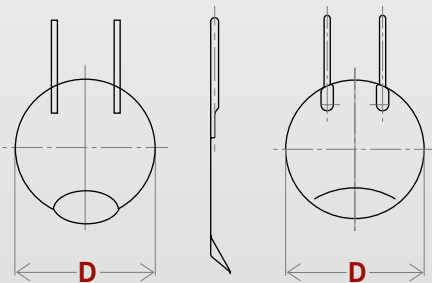
3 or 4 pins,
with or without supp. ring



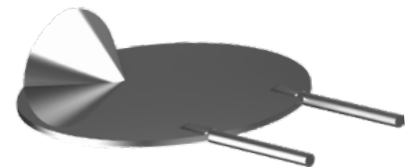
Internal diameter [mm]	Height [mm]		Weight approx. [g]	Execution	Article Number
	top	bottom			
TD	BD	H			
34	20	38	25	3 pins, with pouring lip	87004033
34	20	38	43	3 pins on support ring, with pouring lip	87043878
34	20	38	44	3 pins on support ring with reinforced rim, with pouring lip	87014866
34	20	38	51	3 pins on support ring with reinforced rim, with pouring lip	81083378



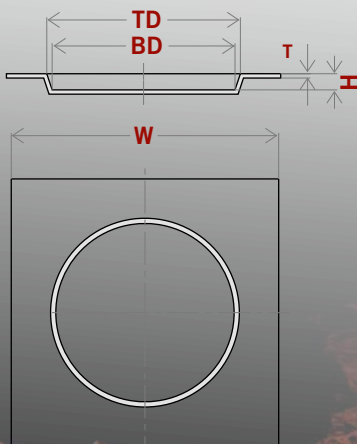
Lids in Platinum/Gold 95/5% suitable for Autofluxer and Vulcan



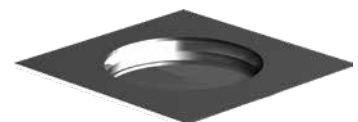
Internal diameter [mm]	Weight approx. [g]	Execution	Article Number
D			
45	14	2 pins (straight)	80019941
40	9	2 pins (bended)	81103169



Casting dishes in Platinum/Gold 95/5% suitable for Autofluxer and Vulcan

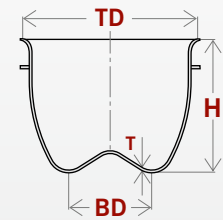
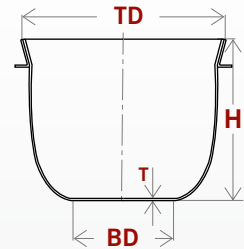


Total flange diameter [mm]	Internal diameter [mm]		Height [mm]	Weight approx. [g]	Execution	Article Number
	top	bottom				
W	TD	BD	H			
41	31	29	3	27	-	87001434
41	31	29	3	34	reinforced bottom	81020905
41	34	32	3	31	-	80008877
41	34	32	3	38	reinforced bottom	81016758
51	36	34	3	45	reinforced bottom	87001438
51	36	34	3	58	reinforced bottom	81138442
51	41	39	3	45	reinforced bottom	87001439
51	41	39	3	58	reinforced bottom	87046576



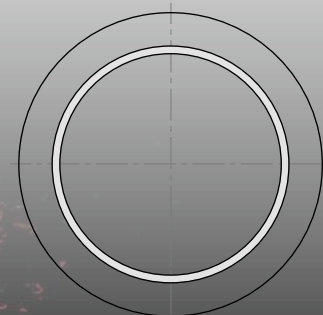
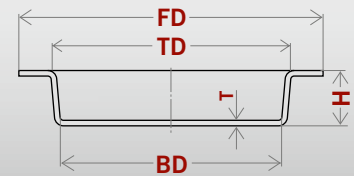
Crucibles in Platinum/Gold 95/5% suitable for Claisse

Internal diameter [mm]		Height [mm]	Weight approx. [g]	Execution	Article Number
top	bottom				
TD	BD	H			
36.5	20	32	30	flat bottom	5015043
36.5	20	32	30	flat bottom, dimples in wall	5015133
36.5	20	32	31	dimple in bottom	81151910



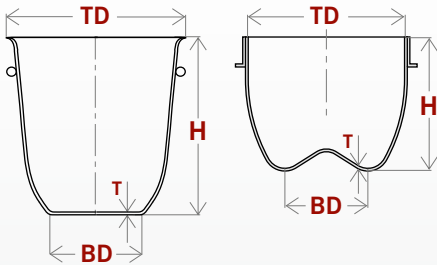
Casting dishes in Platinum/Gold 95/5% suitable for Claisse

Total flange diameter [mm]	Internal diameter [mm]		Height [mm]	Weight approx. [g]	Execution	Article Number
	top	bottom				
FD	TD	BD	H			
39	32	30	6	21	-	81128798
39	32	30	6	27	reinforced bottom	81128800
41	34	32	6	23	-	81143538
41	34	32	6	29	reinforced bottom	81143539
44	37	35	6	26	-	81143540
44	37	35	6	33	reinforced bottom	81143581
48	40	38	6	34	-	81012204
48	40	38	6	43	reinforced bottom	81138359
49	42	40	6	35	-	81130393
49	42	40	6	43	reinforced bottom	81130554



XRF Programme – Eagon2

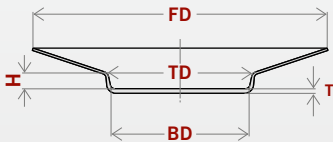
Crucibles in Platinum/Gold 95/5% suitable for Eagon2



Internal diameter [mm]	Height [mm]		Weight approx. [g]	Execution	Article Number
	top	bottom			
TD	BD	H			
37.5	18.7	36.5	42	reinforced rim, flat bottom	81141733
37.5	18.7	36.5	42	reinforced rim, dimple in bottom	81141748
37.3	17.7	37	40	reinforced rim, flat bottom (wide top)	81096698
37.3	17.7	37	40	reinforced rim, dimple in bottom (wide top)	81074265



Casting dishes in Platinum/Gold 95/5% suitable for Eagon2

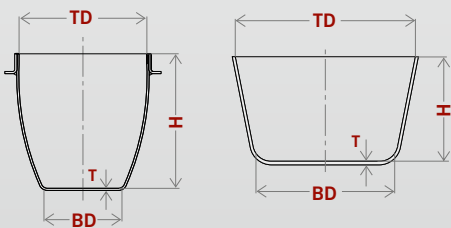


Total flange diameter [mm]	Internal diameter [mm]		Height [mm]	Weight approx. [g]	Execution	Article Number
	top	bottom				
	TD	BD	H			
50	32	30.5	4.5	33	–	81141841
50	32	30.5	4.5	50	reinforced bottom	81141842
56	40.5	39	4.5	54	–	81141201
56	40.5	39	4.5	62	reinforced bottom	81141157



XRF Programme – Herzog

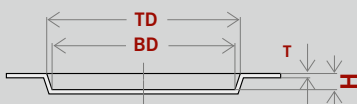
crucibles in Platinum/Gold 95/5% suitable for Herzog



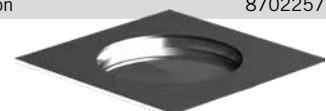
Internal diameter [mm]	Height [mm]		Weight approx. [g]	Execution	Article Number
	top	bottom			
TD	BD	H			
36	22	38	64	with crucible holder	81016287
36	22	38	64	with crucible holder, outside sandblasted	5054483
38	24	38	85	with crucible holder	5018714



casting dishes in Platinum/Gold 95/5% suitable for Herzog

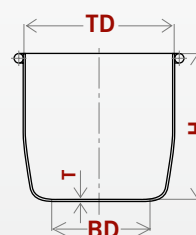
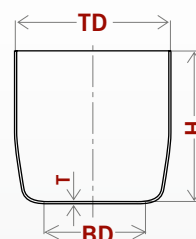


Total flange diameter [mm]	Internal diameter [mm]		Height [mm]	Execution	Article Number
	top	bottom			
	TD	BD			
44	31	29	3.5	round version	81097059
44	24	32	3.5	round version	87051740
50	41	39	5	round version	81136768
50	41	38	4.5	squared version	87022578



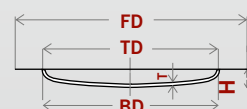
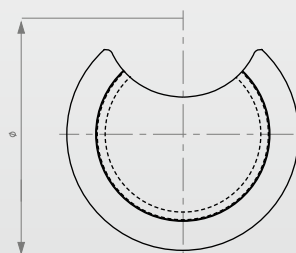
Crucibles in Platinum/Gold 95/5% suitable for Katanax

Internal diameter [mm]	Height [mm]		Weight approx. [g]	Execution	Article Number
	top	bottom			
TD	BD	H			
39.7	28	31.7	26	–	81016795
39.7	28	31.7	28	reinforced rim	81121812
39.7	28	31.7	30	reinforced bottom	81125010
44	28	31.7	28	wide rim	81153527
44	28	31.7	43	wide rim, reinforced bottom	5019956



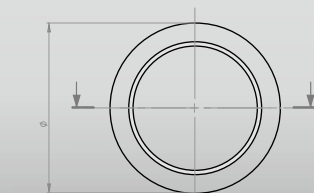
Lid in Platinum/Gold 95/5% suitable for Katanax

Internal diameter [mm]	Height [mm]		Weight approx. [g]	Execution	Article Number
	top	bottom			
TD	BD	H			
53	–	4	15	–	–

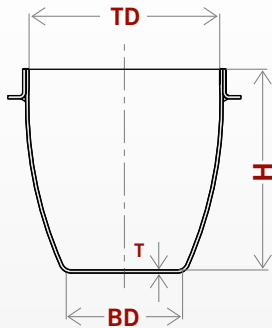


Casting dishes in Platinum/Gold 95/5% suitable for Katanax

Total flange diameter [mm]	Internal diameter [mm]		Height [mm]	Weight approx. [g]	Execution	Article Number
	top	bottom				
FD	TD	BD	H			
39	32	30	6	21	–	81128798
39	32	30	6	27	reinforced bottom	81128800
41	34	32	6	23	–	81143538
41	34	32	6	29	reinforced bottom	81143539
44	37	35	6	26	–	81143540
44	37	35	6	33	reinforced bottom	81143581
48	40	38	6	34	–	81012204
48	40	38	6	43	reinforced bottom	81138359
49	42	40	6	35	–	81130393
49	42	40	6	43	reinforced bottom	81130554



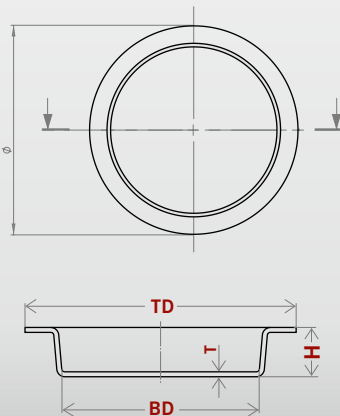
Crucibles in Platinum/Gold 95/5% suitable for Leco



Internal diameter [mm]		Height [mm]	Weight approx. [g]	Execution	Article Number
top	bottom				
TD	BD	H			
37	20	35	36	supporting ring	87016293



Casting dishes in Platinum/Gold 95/5% suitable for Leco

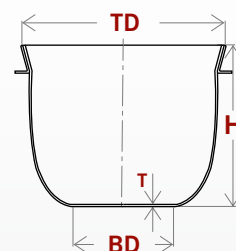


Total flange diameter [mm]	Internal diameter [mm]		Height [mm]	Weight approx. [g]	Execution	Article Number
	top	bottom				
FD	TD	BD	H			
39	32	30	6	21	-	81128798
39	32	30	6	27	reinforced bottom	81128800
41	34	32	6	23	-	81143538
41	34	32	6	29	reinforced bottom	81143539
44	37	35	6	26	-	81143540
44	37	35	6	33	reinforced bottom	81143581
48	40	38	6	34	-	81012204
48	40	38	6	43	reinforced bottom	81138359
49	42	40	6	35	-	81130393
49	42	40	6	43	reinforced bottom	81130554



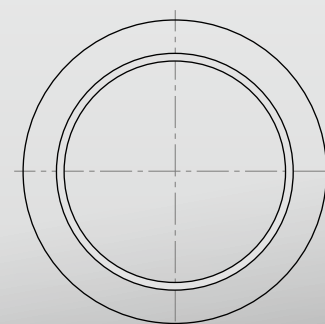
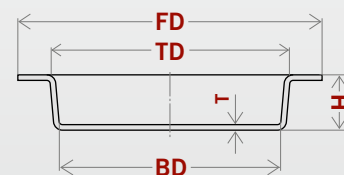
Crucibles in Platinum/Gold 95/5% suitable for Nieka

Internal diameter [mm]		Height [mm]	Weight approx. [g]	Execution	Article Number
top	bottom				
TD	BD	H			
36.5	20	32	30	flat bottom	5015043



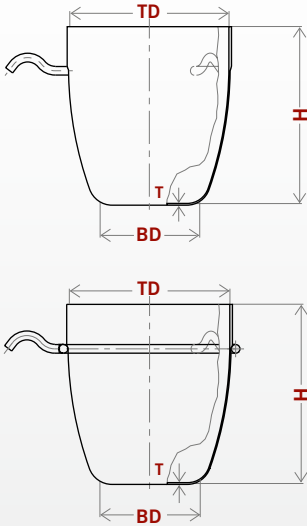
Casting dishes in Platinum/Gold 95/5% suitable for Nieka

Total flange diameter [mm]	Internal diameter [mm]		Height [mm]	Weight approx. [g]	Execution	Article Number
	top	bottom				
	TD	BD	H			
39	32	30	6	21	-	81128798
39	32	30	6	27	reinforced bottom	81128800
41	34	32	6	23	light version	81143538
41	34	32	6	29	-	81143539
41	34	32	6	36	reinforced bottom	81086851
44	37	35	6	26	light version	81143540
44	37	35	6	33	-	81143581
44	37	35	6	40	reinforced bottom	81151538
48	40	38	6	34	-	81012204
48	40	38	6	43	reinforced bottom	81138359
49	42	40	6	35	light version	81130393
49	42	40	6	43	-	81130554
49	42	40	6	48	reinforced bottom	81151539



XRF Programme – OxiFlux

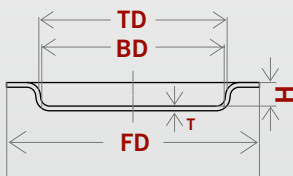
Crucibles in Platinum/Gold 95/5% suitable for the OxiFlux



Internal diameter [mm]		Height [mm]	Weight approx. [g]	Execution	Article Number
top	bottom				
TD	BD	H			
36	22	40	28	3 pins	87012402
36	22	40	38	3 pins on support ring	87016022



Casting dishes in Platinum/Gold 95/5% suitable for the OxiFlux

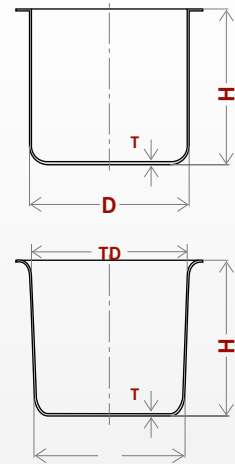


Total flange diameter [mm]	Internal diameter [mm]		Height [mm]	Weight approx. [g]	Execution	Article Number
	top	bottom				
FD	TD	BD	H			
43	32	31	4.5	30	squared version	87016616
51	40	39	4.5	45	squared version	87016128



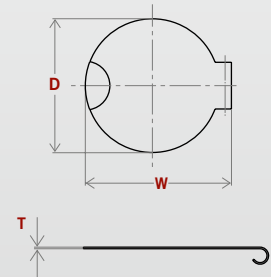
Crucibles in Platinum/Gold 95/5% suitable for Perl-X

Total flange diameter [mm]	Internal diameter [mm]		Height [mm]	Weight approx. [g]	Execution	Article Number
	top	bottom				
	TD	BD	H			
48	40	40	39	80	cylindrical version with rim (NBX U3)	80046699
48	40	40	39	100	cylindrical version with rim	81148230
50	40.4	38	39	78	conical version (NBX U3 NL)	81033592
50	40.4	38	39	98	conical version (NBX U3 N)	81033595



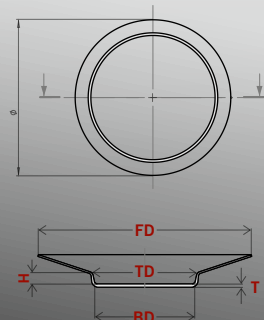
Lids in Platinum/Gold 95/5% suitable for Perl-X

Diameter [mm]	Total length [mm]	Weight approx. [g]	Execution	Article Number
D	W			
55	60	27	-	87045011



Casting dishes in Platinum/Gold 95/5% suitable for Perl-X

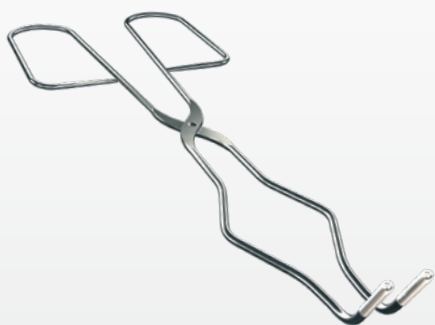
External diameter [mm]	Diameter [mm]		Internal height [mm]	Weight approx. [g]	Execution	Article Number
	top	bottom				
FD	TD	BD	H			
65	32.4	30	3.6	45	NBX PX	81033000
55	32	30.5	2.5	50	NBX P3 R	81034130
65	32	30.5	3.5	53	NBX PX R	87014850
65	35.5	33.5	3.4	48	NBX P16	81032409
55	37	34.5	3.5	46	-	80046700
60	40.5	39.5	3.5	65	NBX P15 R60	81033740
65	40.5	39.5	3.5	50	NBX P14/P15	81034661
65	40.5	39.5	3.5	65	NBX P15 R	81033740



Other Accessories

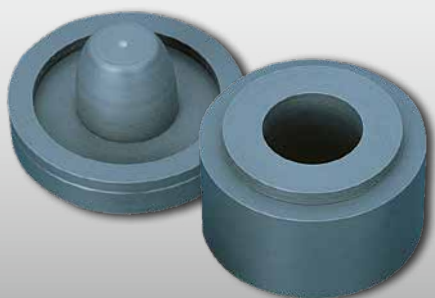
Heraeus produces handling equipment made of precious metals and precious metal alloys. In order to prevent contamination of the precious metal equipment when placing it in the furnace or when removing it, conventional crucible tongs are fitted with platinum shoes.

Crucible tongs in stainless steel



Total length of the tongs [mm]	Weight per pair of shoes approx. [g]	Heraeus Standard	Article Number
230	2.5	Ge 20/230	5015168
300	3	Ge 20/300	5017070
400	5.5	Ge 20/400	5015169
500	5.5	Ge 20/500	5015170
600	7	Ge 20/600	5015231

Plastic formers



Items of precious metal laboratory equipment are sensitive to mechanical deformation due to their use at high temperatures and the resulting loss of their original hardness. The walls of the crucibles and dishes can become wrinkled after they have been used several times, thus making cleaning more difficult.

The shape can be restored by carefully using our Heraeus Plastic Formers. To simplify the process we produce plastic formers which match the crucible and dish sizes you use.



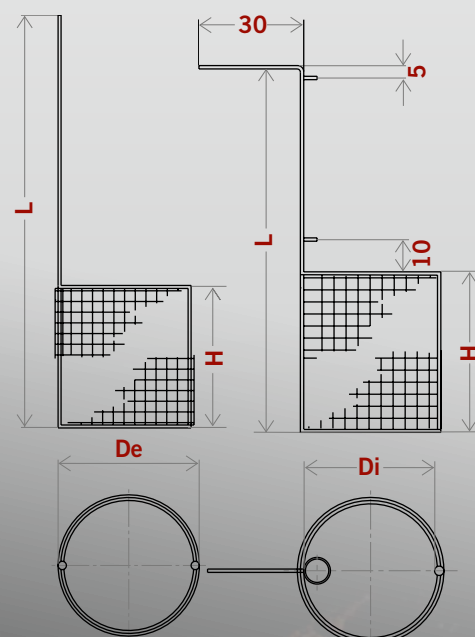
Platinum and platinum alloys distinguish themselves as electrode materials because of their high electrical conductivity and resistance to chemical attack.

Platinum/Iridium 90/10 is used as the electrode material to ensure mechanical stability.

The following tables show different electrode designs of which only the most common are listed. To increase the surface area, electrodes can be sand-blasted if required (Fischer electrodes are always sand-blasted). We will be pleased to produce special electrodes on request.

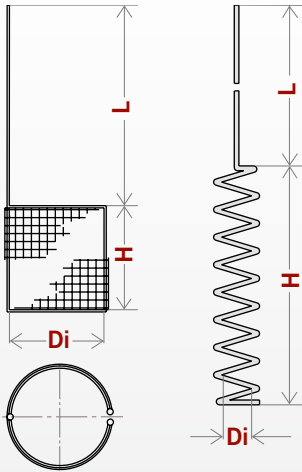
Electrodes of Platinum/Iridium 90/10%

Description	Total height [mm]	Electrode height [mm]	Diameter int./ext. [mm]	Diameter wire [mm]	Weight approx. [g]	Heraeus Standard	Article Number
	L	H	Di/De				
Fischer electrode	To increase the surface area of the wire, the electrode is sand-blasted. Suitable for fast tests with high current densities in stirred or still electrolytes.						
inner electrode	200	40	32 (Da)	0.12	14	EI 03/1	87001430
inner electrode	200	40	32 (Da)	0.25	20	EI 03/2	87001431
outer electrode	125	50	38 (Di)	0.12	16	EI 04/1	87001432
outer electrode	125	50	38 (Di)	0.25	23	EI 04/2	87001433

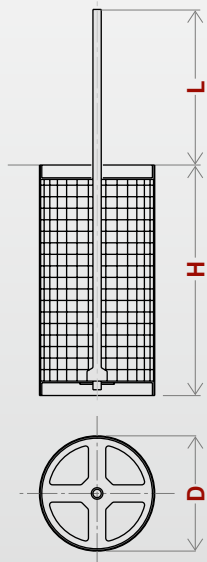


Electrodes

Electrodes of Platinum/Iridium 90/10%

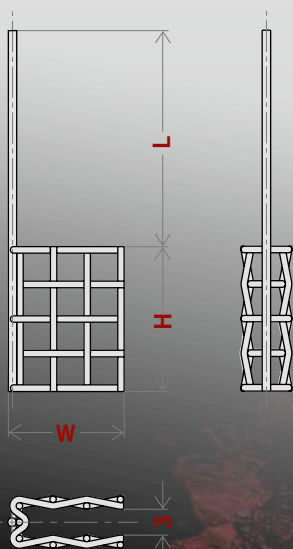


Description	Total height [mm]	Electrode height [mm]	Diameter int./ext. [mm]	Diameter wire [mm]	Weight approx. [g]	Heraeus Standard	Article Number
	L	H	Di/De				
Winkler electrode	This design consists of a slit gauze cylinder in which a wire spiral is concentrically positioned.						
Gauze cylinder	100	50	35	0.12	16	EI 01/1	87001427
Gauze cylinder	100	50	35	0.25	22	EI 01/2	87001428
Spiral	80	70	10	1.10	7	EI 02	87001429



Description	Total height [mm]	Electrode height [mm]	Diameter int./ext. [mm]	Diameter wire [mm]	Weight approx. [g]	Heraeus Standard	Article Number
	L	H	Di/De				
Wölbling electrode	In this electrode the gauze is fixed stably to the central rod at the top and bottom via a solid cross.						
	100	40	20	0.12	11	EI 05/1	87009912
	100	40	20	0.25	14	EI 05/2	87006456
	100	40	30	0.12	20	EI 05/1	87014965
	100	40	30	0.25	26	EI 05/2	87023099

Electrodes/meshes of chemically pure Platinum



Description	Connection length [mm]	Width [mm]	Electrode height [mm]	Wire diameter [mm]	Weight approx. [g]	Heraeus Standard	Article Number
	L	W	H				
Schöniger electrode	This design consists of a platinum wire mesh bent into a U-shape. It is used mainly for the rapid determination of halogens and sulphur.						
Gauze cylinder	35	10	10	0.76	3	EI 06	87001425

Precious Metal Semifinished Products

Precious Metal Semifinished Products

Heraeus supplies precious metal semi-finished products in a great variety of alloy compositions, dimensions and shapes. Let us know your application criteria and we will be pleased to advise you in choosing the appropriate material.

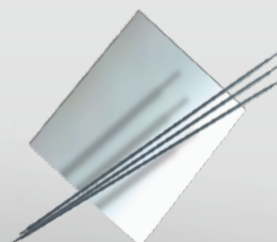
Wire

Alloy	Diameter [mm]	Execution	Weight per m [g]	Article Number
Ag	0.250	annealed	0.55	81122185
Ag	0.500	annealed	2.10	81122186
Ag	1.000	annealed	8.25	81122187
Au	0.500	annealed	3.80	81088265
Au	0.750	annealed	8.55	81122604
Au	1.000	annealed	15.20	81122606
Pt	0.100	hard drawn	0.20	5017934
Pt	0.200	hard drawn	0.70	87042590
Pt	0.250	hard drawn	1.05	87048076
Pt	0.300	hard drawn	1.55	87014883
Pt	0.400	hard drawn	2.70	5017935
Pt	0.500	hard drawn	4.25	81012831
Pt	0.600	hard drawn	6.10	5017936
Pt	0.700	hard drawn	8.25	5017937
Pt	0.800	hard drawn	10.80	5017938
Pt	1.000	hard drawn	16.80	87030160
PtIr 90/10	0.200	hard drawn	0.70	87006447
PtIr 90/10	0.300	hard drawn	1.55	81123755
PtIr 90/10	0.500	hard drawn	4.25	87013102
PtIr 90/10	0.600	hard drawn	6.10	87012468
PtIr 90/10	0.800	hard drawn	10.85	81123751
PtIr 90/10	1.000	hard drawn	16.95	81123720



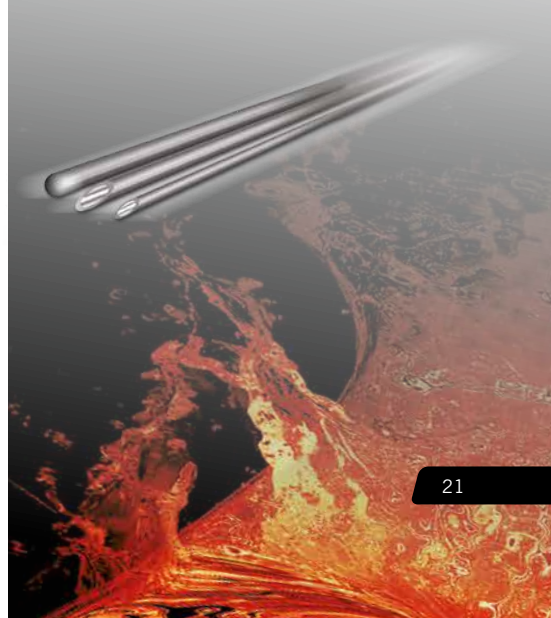
Sheets

Alloy	Diameter [mm]	Execution	Weight per m [g]	Article Number
Pt	0.100	100 x 100	21.5	5014197
Pt	0.150	100 x 100	32.20	87016260
Pt	0.200	100 x 100	42.90	87021120
Pt	0.250	100 x 100	53.60	87014620
Pt	0.300	100 x 100	64.40	87013097
Pt	0.500	100 x 100	107.25	87020526
Pt	1.000	100 x 100	214.50	81143789



Tubes

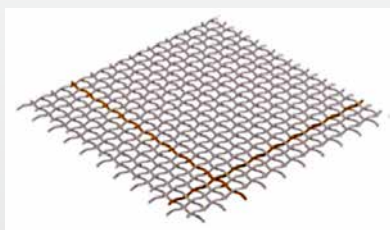
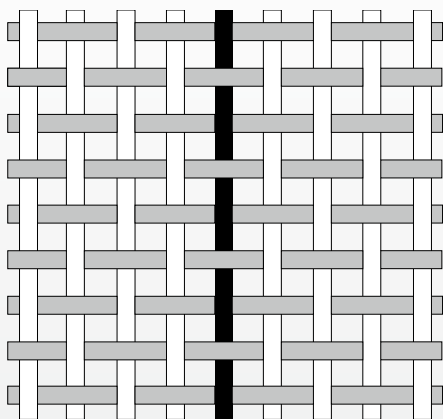
Alloy	Diameter [mm]	Execution [mm]	Weight per m [g]	Article Number
Pt-DPH	8.00	0.50	251.00	81082933
Pt-DPH	9.00	0.40	230.00	81061359
Pt-DPH	9.50	0.30	185.00	81128852
Pt-DPH	9.50	0.40	244.00	81125552
Pt-DPH	9.50	0.50	302.00	81125389
Pt-DPH	10.00	0.50	319.00	81075551
Pt-DPH	10.36	0.18	123.00	81079037
Pt-DPH	11.00	0.25	180.00	81128274
Pt-DPH	11.00	0.50	352.00	81099118
Pt-DPH	13.70	0.18	163.00	81094090
PtRh 90/10	9.10	0.48	260.00	81060083
PtRh 90/10	9.20	0.40	222.00	81071150
PtRh 90/10	9.50	0.50	283.00	81081083
PtRh 80/20	12.00	0.75	530.00	81119280



Precious Metal Semifinished Products

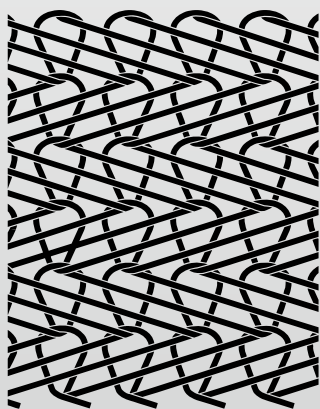
Gauzes for the manufacture of electrodes, filters, catalysts, etc. are available according to the following table even in very small quantities.

Gauze pieces (plain weave)



Alloy	Wire diameter [mm]	No. of meshes per cm ²	Weight per 100 x 100 mm [g]	Article Number
Platinum (Pt)	0.04	3600	3.900	81021389
Platinum (Pt)	0.06	1024	3.855	81014921
Platinum (Pt)	0.076	1024	6.200	81023582
Platinum (Pt)	0.12	250	7.250	81024877
Platinum (Pt)	0.12	420	10.340	81049701
Platinum (Pt)	0.25	100	21.900	81015295
Platinum (Pt)	0.76	16	76.800	81087907
Gold (Au)	0.06	1024	3.680	81021969
Gold (Au)	0.25	100	18.560	81020731
Silver (Ag)	0.06	1024	1.900	81049349
Silver (Ag)	0.15	342	7.476	87047039
Silver (Ag)	0.35	64	17.708	-
PtRh10	0.06	1024	4.000	87008190
PtRh10	0.076	1024	6.000	81024592
PtRh10	0.230	49	11.600	81139173
PtIr10	0.12	250	8.000	81060034
PtIr10	0.25	100	22.000	81025154

Gauze pieces (warp knitted)



Alloy	Wire diameter [mm]	No. of meshes	Weight per 100 x 100 mm [g]	Article Number
PtRh3	0.076	high	6.000	81140496
PtRh3	0.076	medium	3.050	81143059
PtRh3	0.076	low	3.600	5035662
PtRh5	0.060	high	4.000	81136803
PtRh5	0.060	low	3.780	81143820
PtRh5	0.076	high	6.000	81136880
PtRh5	0.076	medium	5.400	81139635
PtRh5	0.076	low	3.000	81138085
PtRh10	0.06	-	3.800	81142464
PtRh10	0.076	high	6.160	81132891
PtRh10	0.076	low	6.040	81140492



Platinum Labware Replacement Programme

Heraeus protects your Precious Metal Investments

We know that recycling your used precious metal labware plays an important role in buying new Heraeus Platinum Labware because it often covers the majority of the cost. Heraeus has developed cost-effective programs to accommodate our customers' unique needs.

Platinum Labware Replacement Programme

This programme is designed for users of platinum labware who wish to replace old labware with new labware. It provides maximum values for your old precious metal materials and includes a simplified, transparent and complete quotation.

Why do we call it a replacement programme?

Your new Heraeus Labware is made from precious metals which adhere to Heraeus' strict purity and quality standards. Heraeus replaces your old contaminated labware with new, clean precious metals.

Global refining with locations worldwide

Heraeus refineries are located throughout the world, making it easy to return your material to a Heraeus location near you. Heraeus handles a wide variety of precious metal recyclables such as crucibles, dishes, electrodes, thermocouple wire, and many other types of high grade precious metal scrap and sweepings.

What can be purchased with recycling credit?

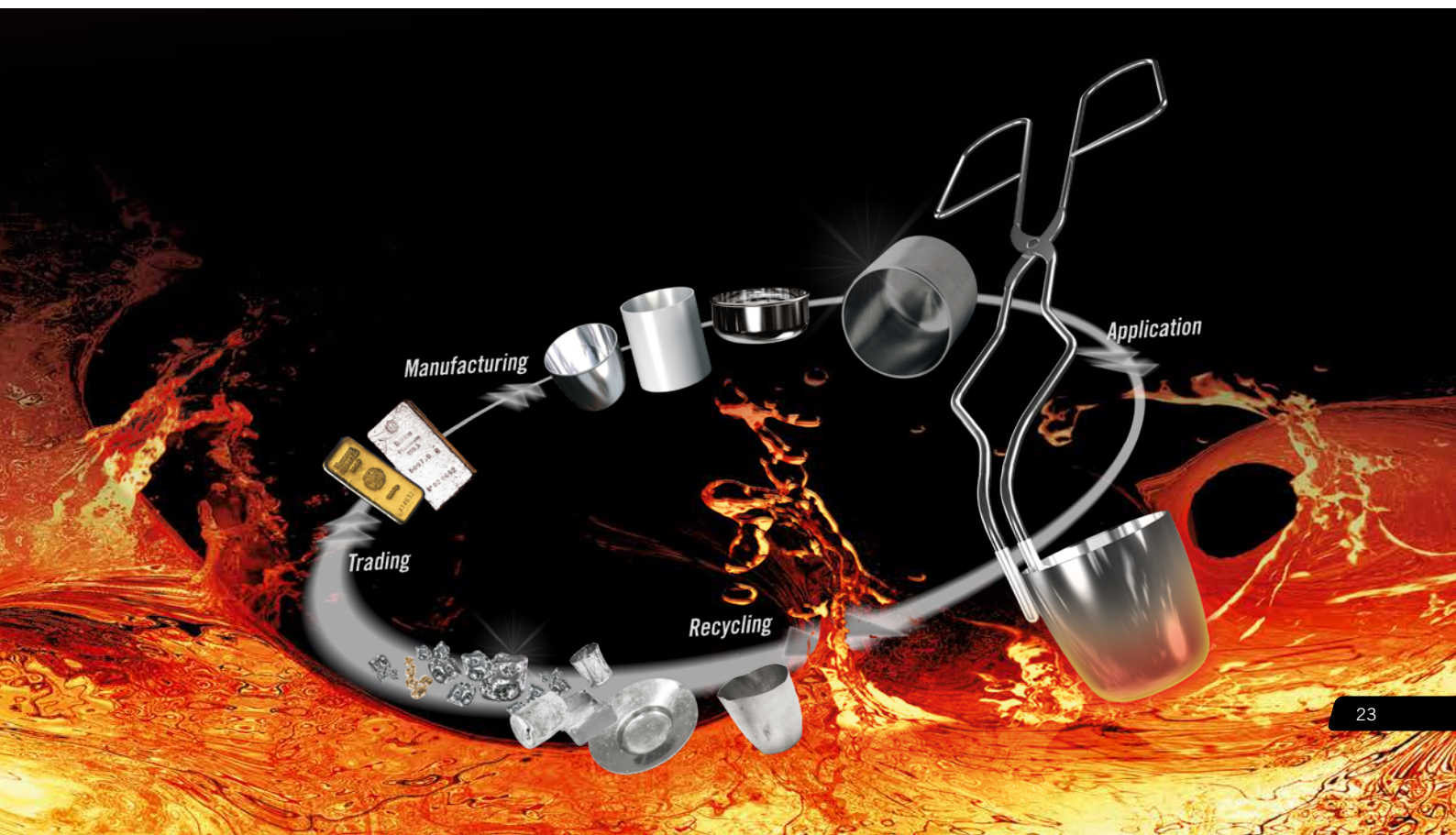
In addition to new labware, Heraeus can provide you with a variety of useful products such as rod, wire, sheet, foil, tubes, gauzes, powders, specialty components and an endless array of other precious metal parts. Your recycling credit can be used to purchase any Heraeus precious metal product.

Deal directly with the manufacturer and refiner

When you purchase Platinum Labware from Heraeus you are working directly with a manufacturer with over 160 years of precious metal manufacturing and refining experience. There is no need to add unnecessary costs through a middle man or wholesaler.

The Heraeus Promise

You can be confident that your new Heraeus Platinum Labware is of the highest purity and quality. Heraeus is recognized as a global leader in precious metal manufacturing and precious metal refining. Our processes ensure our customers access to accurate, traceable results and the maximum values for your precious metals.



■ Handling Platinum Equipment

The excellent resistance of platinum and the platinum group metals (Ir, Rh and Pd) to acids and oxidation at high temperatures, their high melting points and low vapour pressures make these metals indispensable materials for apparatus in the chemistry laboratory.

However, when using platinum equipment it must be remembered that even platinum is not a universal wonder material which is resistant to everything. For instance, damage can result from elements which form low-melting phases with platinum, from very aggressive chemical media or from evaporation.

Damage to platinum by tin, lead and bismuth

The formation of alloys with most metals leads to a reduction in the melting point of platinum, especially in the case of the low-melting metals tin, lead and bismuth. Thus, it is possible that even with low concentrations and at moderate temperatures the melting point can be exceeded in localised areas, which results in the destruction of the apparatus (see Table "Melting Temperatures of Low-Melting Precious Metal Alloys" on page 30).

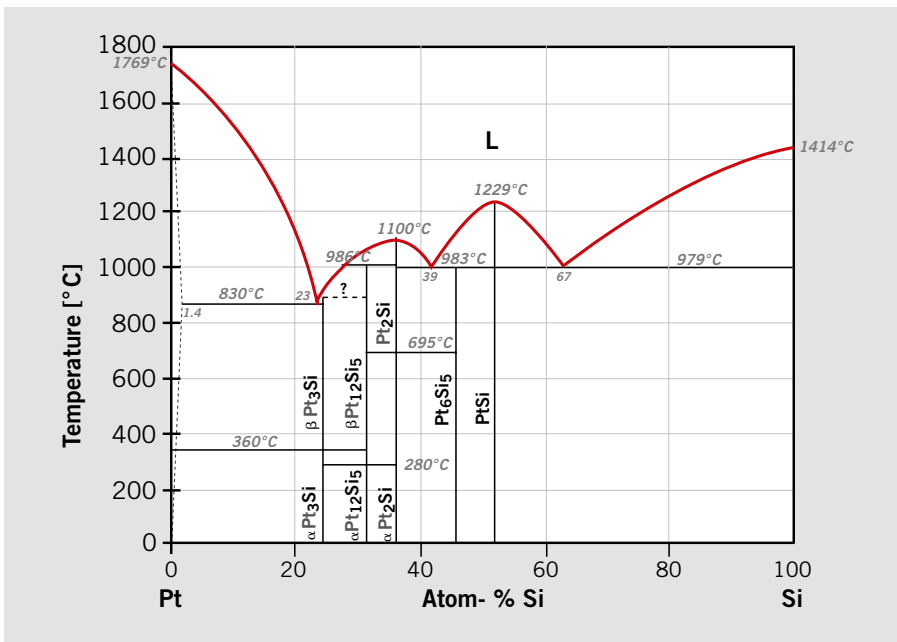
It should be noted that, due to thermal decomposition and especially under reducing conditions, chemical compounds can dissociate and release these detrimental elements. Therefore, to avoid reduction, heating processes and ignitions should be carried out in oxidising atmospheres, i.e. in open crucibles. In this context it should be especially noted that hydrogen may be absorbed by platinum at 400° C, diffuse through the walls of equipment at higher temperatures and can reduce the material contained within.

Damage to platinum by carbon

Apart from reducing conditions in the environment, the presence of carbon or organic substances can also result in the reduction of chemical compounds and thus the release of elements which can damage platinum. Carbon itself can also cause damage to the structural integrity of platinum. Please take special care to adjust the flame when working with bunsen burners and ensure that gas-heated fusion equipment is adjusted to an oxygen-rich flame.



Phase diagram of the Pt-Si system

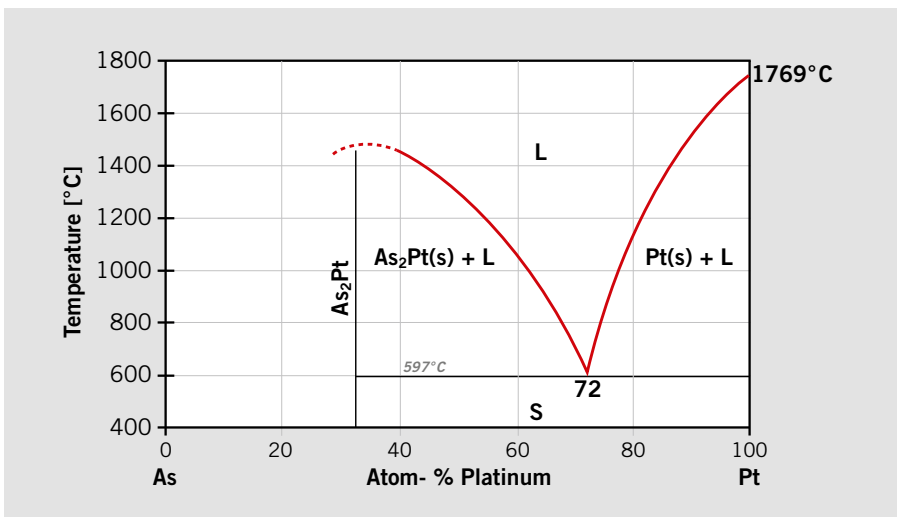


Damage to platinum by silicon, lead, antimony and phosphorus

A platinum alloy with a low melting point is formed when the elements silicon, antimony or arsenic are present in very small quantities. The alloy formation occurs preferentially at the grain boundaries. The embrittlement which is associated with this process can lead to the formation of cracks.

The effects are particularly hazardous when organic matter containing phosphorus is ignited, e.g. in flour ignition. Damage to apparatus by silicon corrosion can occur during heat treatment in furnaces with silicon carbide heating elements. Spalling of the exposed silicon carbide rods can lead to silicon being deposited on the platinum equipment or on the furnace floor which then diffuses into the platinum equipment.

Phase diagram of the Pt-As system



Damage to platinum by sulphur

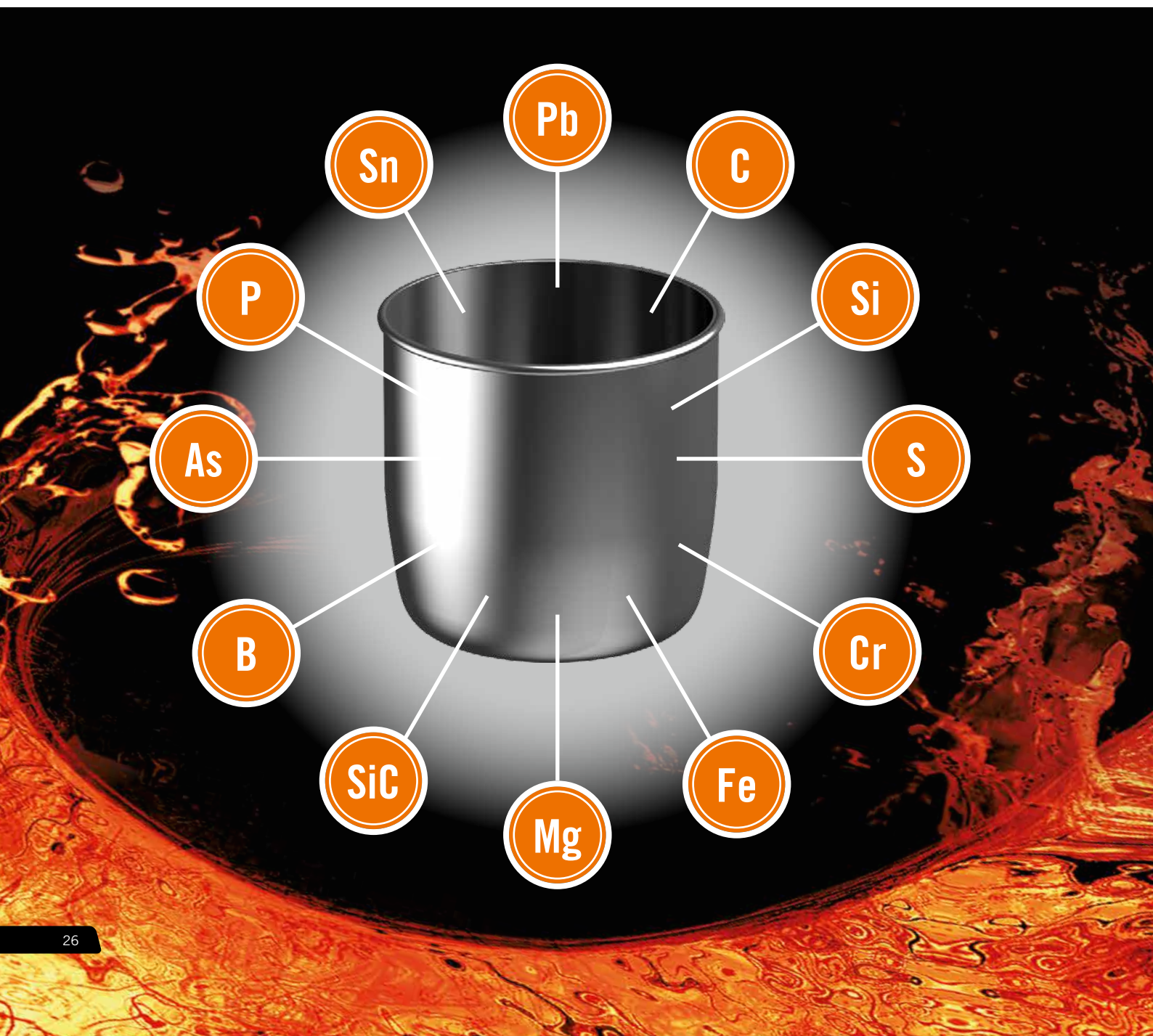
Sulphur can also cause platinum corrosion. This problem is encountered, for example, when preparing fused tablets for XRF from samples containing high levels of sulphur in the form of sulphides.

Handling Platinum Equipment

Further potential hazards

A further potential hazard is contamination of the crucible on its external surface, for instance by placing it on a dirty surface. At elevated temperatures the contamination can then lead to one of the damage mechanisms described above. We recommend, therefore, that only crucible tongs or tweezers whose tips are protected with platinum should be used when handling hot crucibles. The crucible tongs must not be immersed into acids and alkalis beyond the platinum shoes, because of the danger that liquid could penetrate between the tongs and the shoe resulting in corrosion from within.

Naturally, care must also be taken that the triangles on which the laboratory equipment is usually heated are not contaminated by corrosive materials such as heavy-metal salts, phosphates, etc. Unprotected iron triangles or wire gauzes should not be used, but only those with platinum/iridium buttons, or those made of platinum wires. Alternatively non-precious metal wire triangles which are protected by oxide ceramic tubes at contact points may be used. Contact with ferrous materials should be generally avoided.



Heraeus has prepared a summary of the most important precautionary measures using actual case histories.¹⁾

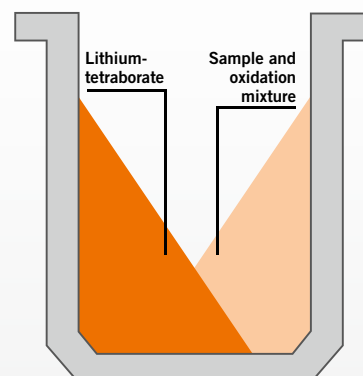
The phenomenon which is commonly known as “platinum corrosion” is not corrosion in the usual sense of aqueous corrosion, rusting, etc. It is usually the formation of a compound which results from a reaction of platinum with another element. It has a low melting point, and results in the formation of a eutectic with an even lower melting point between the compound and the platinum.

The inner surface of the crucible is more difficult to protect especially when samples to be prepared contain both “poisons” and carbon. Examples are ferro-alloys (ferro-silicon), carbides (grinding media containing silicon carbide), active carbon, spent catalysts from oil refineries.

Petin et al.²⁾ describe an elegant procedure for carrying out a combined oxidation-fusion treatment:

1.25 g of the following low melting oxidation mixture is prepared: (60% NaNO_3 + 20% KNO_3 20% $\text{Sr}(\text{NO}_3)_2$) + 2 g Na_2CO_3 + 1.5 g $\text{Li}_2\text{B}_4\text{O}_7$, $\text{Li}_2\text{B}_4\text{O}_7$. The sample (250 mg) is mixed with this oxidation mixture and then added to the lithium tetraborate which is in the crucible. The oxidation mixture is composed in such a way that at the beginning of the fusion the components of the sample are encapsulated in a layer of molten salt before the nitrates decompose. In this way the platinum is protected from contact with the sample. The nitrates are selected so that they decompose over a broad temperature range starting with NaNO_3 at 380°C and continues up to $\text{Sr}(\text{NO}_3)_2$ at $> 1100^\circ\text{C}$, in order to ensure that the oxidation media do not completely decompose before the sample oxidises and dissolves in the lithium tetraborate.

Although the techniques described above are only necessary for strongly reducing samples, they clearly show that, with appropriate care, platinum crucibles can be used reliably for the fusion of a very broad variety of XRF samples.



Charging a crucible for the fusion of ferro-alloy samples (Petin et al.²⁾)

The main precautionary measures

The main precautionary measures which must be observed when platinum equipment is used in an analytical laboratory are:

- Never place the crucible on an SiC support
- Take care to keep sufficient distance between the crucibles and SiC heating elements
- Ensure strongly oxidising conditions for samples containing carbon (ferro-alloys, carbides, etc.)
- Never touch the crucible with your bare hands
- Use Pt clad tongs
- Avoid mechanical damage of the crucibles
- Use separate crucibles for samples which are known to contain hazardous impurities (S, P, Pb, etc.)

1) J. Merker, F. Schölz, D. F. Lupton: “Correct Use of Platinum in the XRF Laboratory”, “Tricks of the Trade” at the 19th Durham Conference on X-ray Analysis, University of Durham, England, 18 – 21 September 1995
2) J. Petin, A. Wagner and F. Bentz “Combination of Oxidation and Melt Treatment for a Rapid Preparation of Metallic and Other Oxidising Samples for X-ray Fluorescence Analysis”, Steel Research, 56 (1985), 215-218

Handling Platinum Equipment

Treatment of electrodes

The dissolution of electrolytically deposited metal layers from platinum electrodes is achieved with analytically pure acids. Burning off gauze electrodes over an open flame is not to be recommended because of the risk that impurities remain embedded in the corners and that these then form an alloy. Furthermore this heating causes an undesirable softening of the wire gauze and thus reduces its resistance to deformation. Clean electrodes should be stored in a desiccator.

The stability of the remaining metals of the platinum group (Ir, Rh, Pd, Os, Ru) in aggressive media is shown in the Table "Stability of the Platinum Group Metals in Corrosive Media" on page 30.

Should problems arise in the course of using platinum equipment or should the solution to a specific problem be required, we are pleased to be at your service with further information.

Damage to platinum by salts, halogen compounds and acids

Less critical than the damage mechanisms described above is corrosion due to salts, halogen compounds or acids. Normally the advantages of using platinum crucibles are greater than the risk of damage by corrosion. At room temperature platinum only dissolves slowly in aqua regia. Amongst the most severe effects are the melting of alkali metal hydroxides and alkali cyanides at high temperatures. Potassium compounds react more strongly than sodium compounds in such fusion preparations. Alkalis have the effect of being oxygen carriers and oxidise platinum to yellow-brown platinum oxide. For this reason molten salt preparations, above all in soda and soda-potash fusions, should always be carried out in covered crucibles. In this way the carbon dioxide released during the fusion can be retained as a protective gas over the melt and prevents the crucible from oxidation.

Evaporation losses

It is not always appreciated that a thin oxide film forms on platinum in air at room temperature and evaporates at elevated temperatures. The platinum loss which occurs as a result can lead to significant damage over very long operating periods, e.g. at 900° C in air. This effect can be counteracted to a limited extent by alloying with a few percent of rhodium.

Platinum-iridium alloys with higher iridium contents, on the other hand, suffer from evaporation losses which are very much greater than for other platinum alloys when exposed to air for long periods.³⁾

Cleaning crucibles

Crucibles and dishes of platinum or platinum alloys are cleaned by boiling in a suitable solvent. Platinum utensils can be cleaned very thoroughly by melting potassium pyrophosphate in them. For the removal of substances which have alloyed with the surface we recommend that the apparatus be scoured with alumina powder.

The use of grinding media containing carbon (e.g. SiC) should be avoided at all costs. Any remaining alumina residues should be removed with a hydrofluoric acid treatment. Contaminated utensils may not, under any circumstances, be cleaned by heating, because the impurities might thereby diffuse into the platinum.

The excellent resistance of platinum and the platinum group metals (Ir, Rh and Pd) to acids and oxidation at high temperatures, their high melting points and low vapour pressures make these metals indispensable materials for apparatus in the chemistry laboratory.

However, when using platinum equipment it must be remembered that even platinum is not a universal wonder material which is resistant to everything. For instance, damage can result from elements which form low-melting phases with platinum, from very aggressive chemical media or from evaporation.

3) H. Jehn: "High Temperature Behaviour of Pt-Group Metals in Oxidizing Atmospheres", Journal of the Less Common Metals, 100 (1984), 321

Material Properties and Possible Applications

The alloys listed in the table below represent only a small selection of the alloys produced by Heraeus. We will be pleased to help you with your inquiries or special requirements.

Material	Melting point or range [° C]	Material properties	Possible applications
Pt	1769	High thermal and chemical stability. Platinum in various purities.	Laboratory apparatuses such as crucibles and dishes which are only exposed to low mechanical stresses.
Pt-DPH	1769	The finely dispersed oxide particles in platinum and platinum alloys significantly increase the mechanical strength and corrosion resistance.	Laboratory equipment and structural components which are subject to high mechanical stresses at high temperatures.
PtAu 95/5-DPH	1675 – 1745		
PtRh 90/10-DPH	1840 – 1870		
PtIr 97/3	1772 – 1773	The mechanical strength, thermal and corrosion resistance become greater with increasing iridium content. Platinum-iridium alloys suffer from increased weight loss in oxidising atmosphere.	Laboratory apparatuses or structural components which are exposed to severe mechanical, thermal and corrosive effects.
PtIr 90/10	1780 – 1800		
PtIr 80/20	1830 – 1855		
PtRh 90/10	1840 – 1870	The mechanical strength, thermal and corrosion resistance become greater with increasing rhodium content. An advantage of the platinum-rhodium alloys is that only a minimal weight loss occurs even in oxidising atmosphere.	Heavy-duty laboratory equipment, electrodes, glass fibre bushings and lining materials for components to contain molten glass.
PtRh 80/20	1870 – 1910		
PtAu 95/5	1675 – 1745	The gold content reduces the wetting by glass melts so that the glass can be easily removed after solidification without leaving any residues. The mechanical strength is also increased and the tendency to recrystallize is reduced.	These properties make PtAu 95/5 the preferred material for apparatus for the preparation of samples for X-ray fluorescence analysis (XRF).
AuPt 90/10	1120 – 1180	This gold alloy shows increased mechanical strength compared with pure gold and good resistance to phosphorus. Platinum based alloys are more susceptible to corrosion by phosphorus.	Dishes, e.g. for flour ignition, sugar ignition, etc.
Ag	961	Good conductivity, chemical stability (in particular, resistance to phosphorus).	Crucibles for reagents which corrode platinum alloys; contact materials.
Au	1063		
Ir	2447	Iridium is the preferred material for oxide melts because of its good corrosion resistance and high temperature stability in inert atmospheres.	Crucibles for crystal growing. Components which are subject to severe thermal conditions.

Physical and Chemical Properties

Melting temperatures [°C] of low melting precious metal alloys

Alloy	Pt	Pd	Au	Ag	Rh	Ir
B	825	743	1050	961	1131	1046
Si	830	798	370	835	1389	1470
P	588	788	935	878	1245	1262
As	597	–	665	540	–	–
Sn	1070	–	278	221	–	–
Sb	633	590	360	485	610	–
Pb	290	265	213	304	–	–
Bi	730	–	241	262	–	–
S	1240	623	–	742	925	–



Material	Melting Point Melting Range [°C]	Density [g/cm ³]	Linear expansion coefficient (20 – 100°C) 10 ⁻⁶ [K ⁻¹]	Electrical resistivity (annealed) bei 20°C [V • mm ² • m ⁻¹]	Temperature coefficient of electrical resistivity (0 – 100°C) 10 ⁻⁴ [K ⁻¹]
Pt	1769	21.45	9.1	0.107	39.0
Ir	2447	22.65	6.8	0.049	43.0
Pd	1554	12.02	11.1	0.099	38.0
Rh	1963	12.41	8.3	0.043	46.0
Os	3050	22.61	6.1	0.096	42.0
Ru	2315	12.20	9.1	0.073	46.0
Au	1063	19.32	14.1	0.027	40.0
Ag	961	10.49	18.7	0.016	41.0
PtRh 10	1840 – 1870	20.00	10.0	0.200	16.3
PtRh 20	1870 – 1910	18.10	9.3	0.208	13.4
PtIr 10	1780 – 1800	21.60	8.6	0.250	12.0
PtIr 20	1830 – 1855	21.70	7.7	0.310	7.5
PtAu 5	1675 – 1745	21.32	–	0.180	21.0

Physical and Chemical Properties

Resistance of the Platinum Group Metals to Corrosive Media

Corrosive medium	Chemical formula	Temperature [°C]	Pt	Pd	Au	Ag	Rh	Ir
Aluminum sulphate	Al ₂ (SO ₄) ₃	100	1	1	1	1	1	–
Bromine, dry	Br ₂	20	3	4	1	1	1	4
Bromine, moist	Br ₂	20	3	4	1	1	1	2
Bromine water		20	1	2	1	1	1	–
Hydrobromic acid	HBr	20	2	4	2	1	1	1
Hydrobromic acid	HBr	100	4	4	3	1	1	3
Chloride, dry	Cl ₂	20	2	3	1	1	1	1
Chloride, moist	Cl ₂	20	2	4	1	1	1	3
Acetic acid, glacial	CH ₃ COOH	100	1	1	1	1	1	–
Fluorine	F ₂	20	2	–	–	–	–	–
Hydrofluoric acid 40%	HF	20	1	1	1	1	1	1
Iodine, dry	I ₂	20	1	4	1	1	1	2
Iodine, moist	I ₂	20	1	2	2	1	1	1
Hydroiodic acid	HI	20	1	4	1	1	1	2
Potassium hydroxide	KOH	400	3	2	2	–	4	4
Potassium cyanide	KCN	20	1	3	–	–	–	–
Potassium cyanide	KCN	100	3	4	–	–	–	–
Potassium bisulphate	KHSO ₄	500	1	2	3	1	–	–
Aqua regia	HNO ₃ + 3 HCl	20	4	4	1	1	1	4
Aqua regia	HNO ₃ + 3 HCl	100	4	4	1	2	1	4
Copper chloride	CuCl ₂	100	1	2	–	–	–	–
Copper sulphate	CuSO ₄	100	1	1	1	1	1	–
Sodium hypochlorite	NaClO	20	1	3	2	2	4	4
Sodium hydroxide	NaOH	500	2	2	2	–	4	4
Ortho-phosphoric acid	H ₃ PO ₄	100	1	2	1	1	1	4
Mercuric chloride	HgCl ₂	100	1	1	1	1	3	–
Nitrit acid 95%	HNO ₂	100	1	4	1	1	1	4
Sulphurite acid 36%	HCl	20	1	1	1	1	1	1
Sulphurite acid 65%	HCl	20	1	4	1	1	1	3
Sulphurite acid 65%	HCl	100	2	4	1	1	1	4
Hydrochloric Acid 96%	H ₂ SO ₄	20	1	1	1	1	1	1
Hydrochloric Acid 96%	H ₂ SO ₄	100	1	3	2	1	1	1
Hydrochloric Acid 96%	H ₂ SO ₄	300	2	4	3	–	–	–
Hydrogen sulphide	H ₂ S	20	1	1	1	1	1	1
Selenic acid	H ₂ SeO ₄	20	1	3	–	–	–	–
Selenic acid	H ₂ SeO ₄	100	3	4	–	–	–	–
Hydrogen peroxide	H ₂ O ₂	100	4	–	–	–	–	–

1 = no corrosion 2 = slight corrosion 3 = noticeable corrosion 4 = destructive corrosion

The values given in the table are guidelines and cannot be guaranteed for specific applications.

Thermal conductivity at 20°C [Wm-1K-1]	Yield point [MPa]		Tensile strength [MPa]		Tensile elongation [%]		Vickers hardness		Young's modulus [GPa]
	annealed	hard	annealed	hard	annealed	hard	annealed	hard	
74	70	290	150	330	40	3.0	42	98	170
59	93	–	450	–	7	–	210	453	528
75	65	400	180	480	35	3.0	40	210	121
88	68	–	800	1925	9	–	410	410	380
87	–	–	–	–	–	–	350	1000	570
105	38	–	500	–	3	–	240	750	430
312	50	260	180	300	40	3.0	40	90	78
419	120	320	140	380	37	3.0	35	110	80
30	180	670	300	680	32	1.5	102	204	255
–	110	920	380	940	32	2.0	113	273	268
31	220	630	340	650	32	2.0	105	215	220
–	380	920	570	940	21	2.0	190	300	230
–	370	610	460	635	7	1.0	139	194	180

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