



Laboratory equipment
made of platinum





Introduction	4
Platinum equipment for the laboratory	7
FKS platinum	7
STANDARD LABORATORY EQUIPMENT	8
Crucibles, with or without reinforced rim	8
Lids for crucibles and dishes	9
Carbonization crucibles	9
DISHES	10
Dishes, flat bottom, with or without reinforced rim	10
SPECIAL PURPOSE DISHES	11
Dishes for ashing flour	11
Wine dishes, flat bottom	11
Wine dishes, flat bottom, with reinforced rim	11
MICROANALYSIS EQUIPMENT	12
Boats, mini-crucibles and micro-crucibles	12
X-RAY FLUORESCENCE ANALYSIS EQUIPMENT (XRF) (RFA)	13
Casting dishes, round and square design	14
Crucibles, casting dishes and lids for Schoeps, VAA, USG, AAG	15
Crucibles and casting dishes for Claisse-Fluxer	16
Crucibles, casting dishes and lids for Perl-X fusion equipment	17
Crucibles for Leco- und Linn fusion equipment	18
Double-cone crucibles	18
Crucibles with three pins	18
Crucibles and casting dishes for Herzog fusion equipment	19
Crucibles and casting dishes for Oxiflux fluxing system	20
Crucibles and casting dishes for Phoenix fusion equipment	20
LABORATORY ACCESSORIES	21
Crucible tongues and tweezers made of chromium-nickel steel	21
Spatulas and inoculation loops	21
ELECTRODES	22
Fischer electrode	22
Electrodes: Winkler, Woelbling and Schoeniger	22
APPLICATIONS OF PLATINUM EQUIPMENT	23
Applications and recommended temperature ranges	23
HANDLING PLATINUM EQUIPMENT	24
How to prolong service life	24
Physical and chemical specifications	26
Melting temperatures of precious metal alloys	26
Resistance of platinum group metals to corrosive media	27
Precious metal recovery / recycling	28
ÖGUSSA PRODUCTS	29

ÖGUSSA

Österreichische Gold- und Silber-Scheideanstalt based in Vienna is an internationally active company in the field of precious metals and related technologies. Our company has been founded in 1862 in Vienna as a refinery and began to broaden its range of products and services to other industrial applications. Our use of the very latest technological processes enables us to meet our customers' high expectations every day. We are continuously investing in future-oriented, environmentally sound operating and manufacturing systems, research and development, quality assurance, customer-oriented expertise and employee qualification and specialization. Ögussa supports its clients across the globe by working together with them in partnerships which assure long-term success and continuous development.

Our clients have in us a partner which is certified compliant with: ISO 9001:2000 (quality management), ISO 14.001 (environmental management), ISO 13.485 (medical devices), TS 16.949 (automotive industry) and Responsible Care (voluntary initiative of the chemicals industry).



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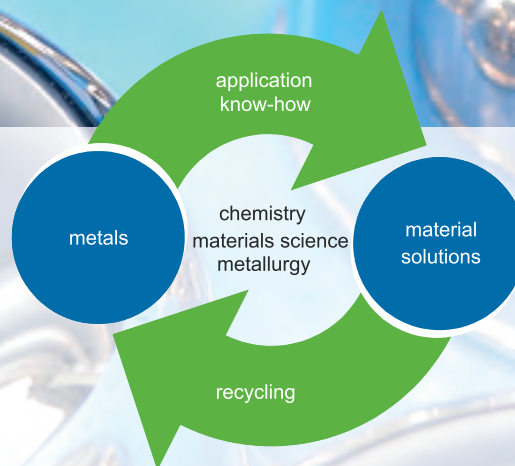
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Part of the Umicore Group

UMICORE



Ogussa is part of Umicore, a materials technology group whose activities are centred on four business areas: **Advanced Materials, Precious Metals Products and Catalysts, Precious Metals Services and Zinc Specialties**. Each business area is divided into market-focused business units, be it in products that are essential to everyday life or those at the cutting edge of new technological developments.

Umicore focuses on application areas where it knows its expertise in materials science, chemistry and metallurgy can make a real difference. Umicore generates approximately 50 % of its revenues and spends approximately 80 % of its R&D budget in the area of clean technology, such as emission control catalysts, materials for rechargeable batteries and photovoltaics, fuel cells and precious metals recycling. Umicore's overriding goal of sustainable value creation is based on this ambition to develop, produce and recycle materials in a way that fulfils its mission: „**Materials for a better life**“.

The Umicore Group has industrial operations on all continents and serves a global customer base. It generated a turnover of € 9.2 billion (€ 2.1 billion excluding metal) in 2008 and currently employs some 15,500 people.



PLATINUM EQUIPMENT FOR THE LABORATORY

The special performance characteristics of appliances made of platinum have made them the standard equipment for doing chemical analysis in manufacturing and research laboratories. The relevant materials are alloys of the platinum group metals (platinum, rhodium, iridium and palladium) or gold. On request, all the appliances are also available in pure platinum and silver. The constituents of the alloys are determined by the material characteristics required by the application process. Wetting behavior, corrosion resistance, melting point and long time rupture strength are adapted to the application and the application's parameters.

These characteristics can be substantially enhanced by using dispersion-hardened or fine-grain stabilized materials - abbreviated FKS. Another advantage of this high-performance material is the economic benefit of its clearly longer useful life.

To provide you with an easy-to-use catalogue we have compiled the most important models and specifications. Customized solutions and modifications are just as much part of our modern and flexible manufacturing process as are innovations. The precious metals extracted by our experts from used crucibles and recycled into new alloys and products have the highest purity.

FKS PLATINUM

Platinum is an extremely resistant material. But there are applications which exceed its physical and chemical limits. FKS platinum (FKS="feinkornstabilisiert") was developed to expand this range of applications. An addition of zirconium oxide strengthens platinum, contributes to grain refining and reinforces the structure of the Pt alloys.

Dispersion-strengthened platinum has been accepted for applications both in the glass industry and the laboratory. **FKS platinum** and **FKS platinum alloys** feature a number of outstanding characteristics which benefit users:

- No structural change during annealing (recrystallization) → better mechanical resistance
- Increase in tensile strength and yield strength as much as two-fold
- Increase in long time rupture strength → **appliances made of FKS Pt can be used up to three times longer than those made of Pt alloys common**
- Increase of the max. use temperatures by as much as 20 % in comparison to commonly used alloys
- Higher degree of chemical resistance

These materials are available:

FKS Pt	pure platinum fine-grain stabilized
FKS Pt/Au 95/5	platinum-gold 95/5 fine-grain stabilized
FKS Pt/Rh 90/10	platinum-rhodium 90/10 fine-grain stabilized

Ögussa supplies all crucibles and dishes, especially for X-ray fluorescence analysis, made both of traditional Pt alloys as well as of FKS Pt. This gives users the option of selecting the variant which is best for them.

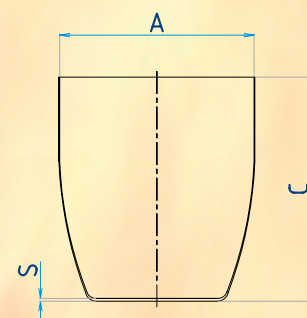
Please order our separate FKS brochure!



CRUCIBLES

made of platinum/iridium 97/3, platinum/gold 95/5 or FKS-platinum/gold 95/5

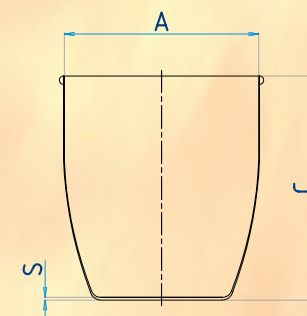
Inner Ø	Height	Base thickness	Capacity	Weight	Ögussa Code
mm	mm	mm	ml	g	
A	C	S			
20	23	0,19	5	3,7	20
23	26	0,17	7	5,2	21
26	30	0,20	10	7,7	22
28	32	0,29	15	12	23
30	35	0,36	20	17	24
35	37	0,36	25	21	25
35	40	0,36	30	25	26
40	45	0,36	40	30	27
45	50	0,36	50	38	28
50	55	0,40	75	52	29
55	60	0,40	100	65	30



Crucible with reinforced rim

made of platinum/iridium 97/3, platinum/gold 95/5 or FKS-platinum/gold 95/5

Inner Ø	Height	Base thickness	Capacity	Weight	Ögussa Code
mm	mm	mm	ml	g	
A	C	S			
20	23	0,19	5	4,5	20V
23	26	0,17	7	6	21V
26	30	0,20	10	9	22V
28	32	0,29	15	14	23V
30	35	0,36	20	19	24V
35	37	0,36	25	23	25V
35	40	0,36	30	27	26V
40	45	0,36	40	33	27V
45	50	0,36	50	41	28V
50	55	0,40	75	55	29V
55	60	0,40	100	69	30V

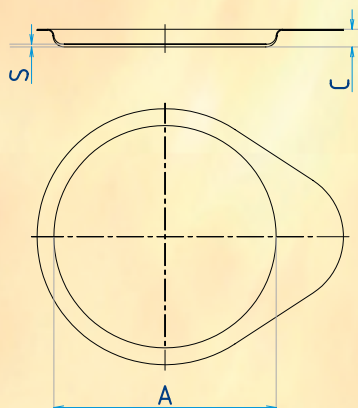


Reinforced crucible rims prevent early deformations and cracks along the edge and contribute to extending the useful life of the appliances.





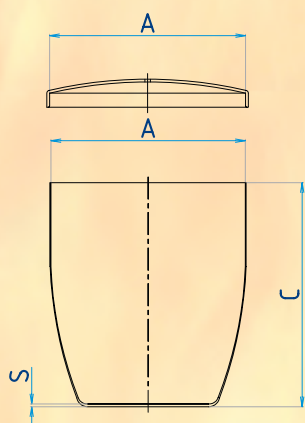
**LIDS – fit crucibles and dishes both with and without reinforced rims
made of platinum/iridium 97/3, platinum/gold 95/5 or FKS-platinum/gold 95/5**



Inner Ø	Height	Material thickness	Weight	Ögussa code
mm	mm	mm	g	
A	C	S		
20	2,8	0,13	2,0	20DE
23	2,8	0,13	2,3	21DE
26	3,1	0,13	2,6	22DE
28	3,1	0,13	3,2	23DE
30	3,6	0,13	3,6	24DE
35	4,1	0,13	4,7	26DE
40	4,5	0,13	5,8	27DE
45	4,5	0,13	6,6	28DE
50	5,1	0,13	8,8	29DE
55	5,1	0,13	10,5	30DE
60	5,4	0,13	12,1	42DE
70	5,4	0,13	15,0	43DE
80	6,0	0,13	19,9	44DE
90	6,0	0,13	24,0	45DE
100	6,0	0,13	27,0	46DE
110	6,0	0,13	31,0	47DE
120	6,0	0,13	37,0	48DE
130	6,0	0,13	42,0	49DE

CARBONIZATION CRUCIBLES

made of platinum/iridium 97/3, platinum/gold 95/5 or FKS-platinum/gold 95/5
with overlapping lid, tightly closing lid and hole in the centre, diameter 2 mm



Inner Ø	Height	Base thickness	Capacity	Weight	Ögussa code
mm	mm	mm	ml	g	
A	C	S			
35	37	0,36	25	25	25VK

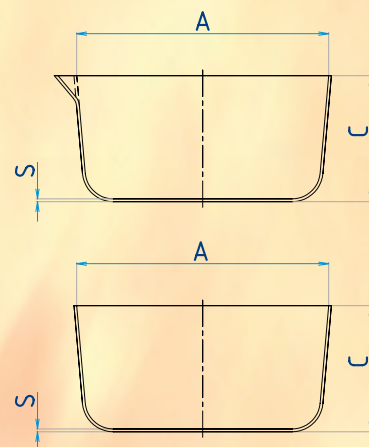




DISHES WITH FLAT BASE

made of platinum/iridium 97/3, platinum/gold 95/5 or FKS-platinum/gold 95/5

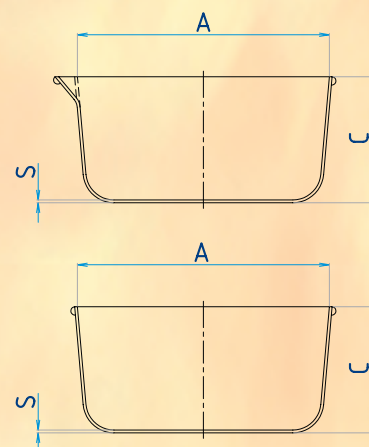
Inner Ø	Height	Base thickness	Capacity	Weight	Ögussa code	
					with spout	without spout
mm	mm	mm	ml	g	A	C
40	20	0,16	20	8	40	40X
50	25	0,18	35	14	41	41X
60	30	0,18	50	22	42	42X
70	35	0,20	90	32	43	43X
80	40	0,22	150	48	44	44X
90	45	0,24	200	65	45	45X
100	50	0,27	250	90	46	46X
110	55	0,30	325	125	47	47X
120	60	0,31	400	150	48	48X
130	65	0,31	500	175	49	49X



DISHES WITH FLAT BASE and reinforced rim

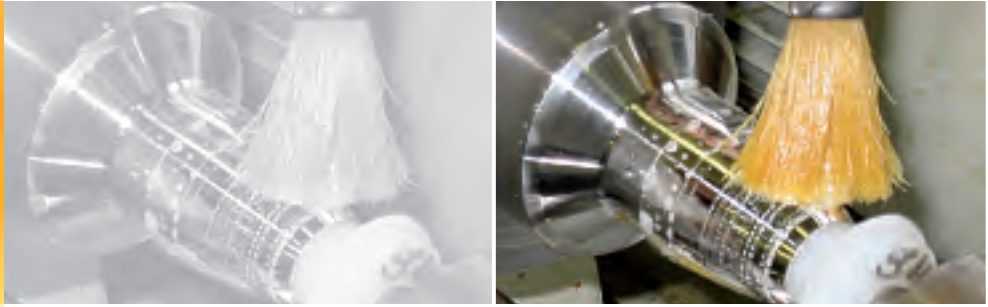
made of platinum/iridium 97/3, platinum/gold 95/5 or FKS-platinum/gold 95/5

Inner Ø	Height	Base thickness	Capacity	Weight	Ögussa code	
					with spout	without spout
mm	mm	mm	ml	g	A	C
40	20	0,16	20	10	40V	40VX
50	25	0,18	35	16	41V	41VX
60	30	0,18	50	26	42V	42VX
70	35	0,20	90	36	43V	43VX
80	40	0,22	150	53	44V	44VX
90	45	0,24	200	71	45V	45VX
100	50	0,27	250	96	46V	46VX
110	55	0,30	325	132	47V	47VX
120	60	0,31	400	157	48V	48VX
130	65	0,31	500	183	49V	49VX



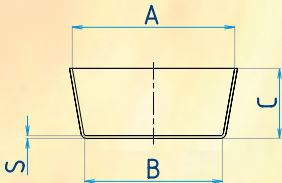
Reinforced dish rims prevent early deformations and cracks along the edge and contribute to extending the useful life of the appliances.





DISHES FOR ASHING FLOUR *

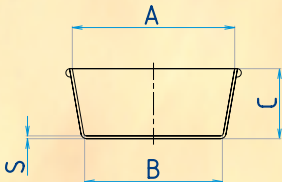
made of gold/platinum 90/10 or gold/palladium 80/20



Upper inner Ø	Base inner Ø	Height	Base thickness	Weight Au/Pt	Weight Au/Pd	Ögussa code
mm	mm	mm	mm	g	g	
A	B	C	S			
40	36	16	0,15	7,0	6,2	60
45	36	18	0,13	7,0	6,2	61
50	45	20	0,15	10,0	8,8	62

DISHES FOR ASHING FLOUR with reinforced rim *

made of gold/platinum 90/10 or gold/palladium 80/20



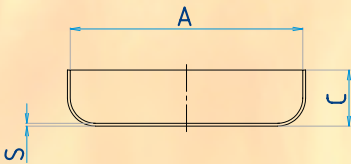
Upper inner Ø	Base inner Ø	Height	Base thickness	Weight Au/Pt	Weight Au/Pd	Ögussa code
mm	mm	mm	mm	g	g	
A	B	C	S			
40	36	16	0,15	9,0	9	60V
45	36	18	0,13	9,0	8	61V
50	45	20	0,15	12,0	10,6	62V

* Dishes made of a gold alloy comprising 10 % platinum or 20 % palladium are used to analyze the contents of flour ash. The Au-Pd alloy is characterized by a high-degree of deformation resistance and weight consistency and enables rapid work in the laboratory as a result of catalytically accelerated incineration.

WINE DISHES

FLAT BASE

made of platinum/iridium 97/3, platinum/gold 95/5 or FKS-platinum/gold 95/5

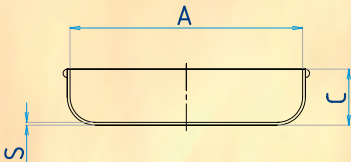


Inner Ø	Height	Base thickness	Capacity	Weight	Ögussa code
mm	mm	mm	ml	g	
A	C	S			
85	20	0,14	75	22,0	65

WINE DISHES

FLAT BASE, with reinforced rim

made of platinum/iridium 97/3, platinum/gold 95/5 or FKS-platinum/gold 95/5



Inner Ø	Height	Base thickness	Capacity	Weight	Ögussa code
mm	mm	mm	ml	g	
A	C	S			
85	20	0,14	75	25,0	65V

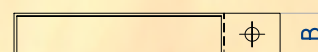
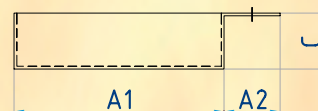




BOAT WITH HANDLE of pure platinum, platinum/iridium 97/3 or platinum/gold 95/5

Boat length	Handle length	Width	Height	Weight	Ögussa code
mm	mm	mm	mm	g	
A1	A2	B	C		
15	6	4	4	1	SHI

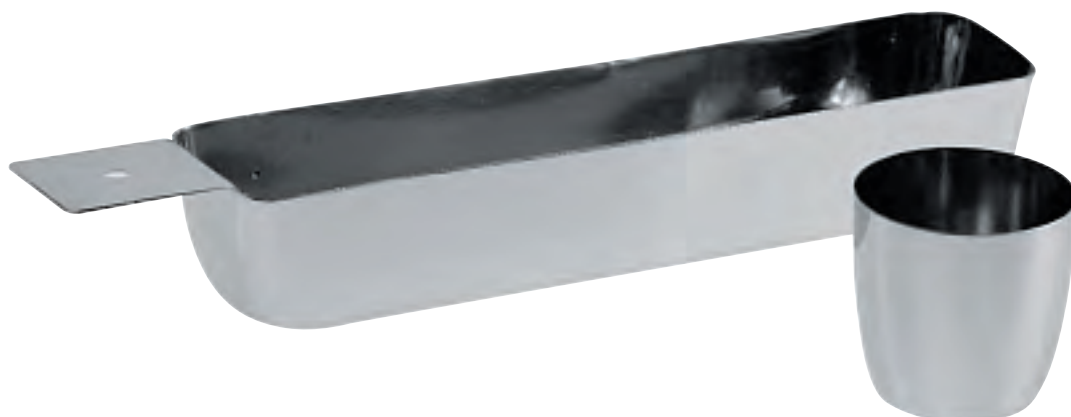
The boat is made to order (with and without handle, rounded or sharp cornered, other dimensions are also available).



MINI-CRUCIBLES of pure platinum, platinum/iridium 97/3 or platinum/gold 95/5

Upper inner Ø	Base inner Ø	Height	Base thickness	Weight	Ögussa code
mm	mm	mm	mm	g	
A	B	C	S		
Mini-crucibles					
12,5	12	15	0,15	1,5	64
Lids					
12	-	2	0,13	0,6	64DE

Mini-crucibles and micro-crucibles can be made to order in a variety of dimensions.





X-RAY FLUORESCENCE ANALYSIS EQUIPMENT (XRF)

In many industrial laboratory applications XRF is used to identify the constituent components in the field of receiving inspection and quality assurance.

In this context, homogenous melts produced under reproducible conditions provide the best starting basis. Melts are far superior to what are known as powder compacts in terms of measurement accuracy and reproducibility.

A number of manufacturers offer melt and fusion equipment in a variety of designs. All of them have one thing in common: **special-purpose crucibles are needed** for the melt and **casting dishes made of platinum gold** to produce the fused glass disk. Ögussa offers crucibles and casting dishes for the most common melting equipment. Custom fabrications are possible.

The material which has asserted itself is an alloy made of platinum with 5 % gold because its greater stability at temperatures up to 1,200 °C (2192°F) is highly suitable and exhibits less wetting especially with silicon melts which means that the melts can be more easily removed from the casting dishes.

For applications at higher temperatures of up to max. 1,500 °C (2732°F) our fine-grain stabilized FKS Pt/Au 95/5 is especially recommendable (see the table on page 23 – recommended temperature ranges).

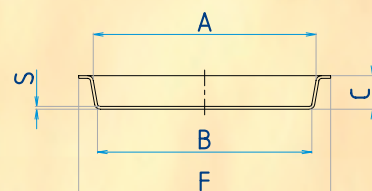




CASTING DISHES, ROUND DESIGN *

made of platinum/gold 95/5 or FKS-platinum/gold 95/5

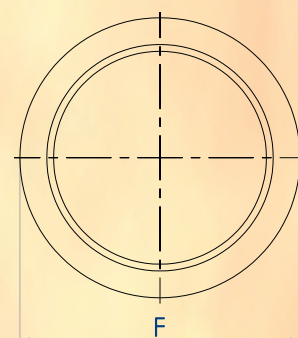
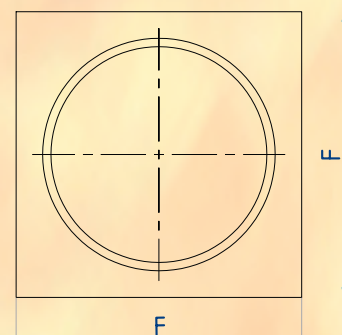
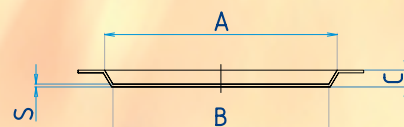
Upper inner Ø	Base inner Ø	Height	Overall Ø	Material thickness	Weight	Ögussa code
mm	mm	mm	mm	mm	g	
A	B	C	F	S		
31	29	3,8	41	0,8	23	AB1R
34	32	3,8	41	0,8	23	AB2R
36	34	3,8	51	0,8	35	AB3R
41	39	3,8	51	0,8	35	AB4R



CASTING DISHES, SQUARE DESIGN *

made of platinum/gold 95/5 or FKS-platinum/gold 95/5

Upper inner Ø	Base inner Ø	Height	Edge length	Material thickness	Weight	Ögussa code
mm	mm	mm	mm	mm	g	
A	B	C	F	S		
31	29	3,8	41	0,8	30	AB1
34	32	3,8	41	0,8	30	AB2
36	34	3,8	51	0,8	46	AB3
41	39	3,8	51	0,8	46	AB4

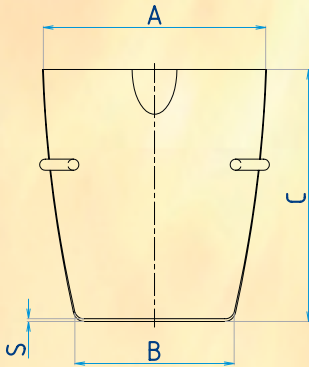


* All casting dishes with greater material thicknesses are available on request. To obtain perfect sample results in XRF we supply these casting dishes with high-gloss polished inner working surface.





CRUCIBLES FOR FUSION EQUIPMENT BY SCHOEPS, VAA, USG, AAG made of platinum/gold 95/5 or FKS-platinum/gold 95/5



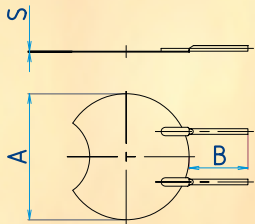
Upper inner Ø mm	Base inner Ø mm	Height mm	Base thickness mm	Weight g	Design	Ögussa code
A	B	C	S			
34	20	38	0,35	33		82
34	20	38	0,50	41		80
34	20	38	0,50	43	reinforced rim	80BRV
34	20	38	0,60	44		81

All Schoeps appliances are supplied with bracket (see drawing) as a standard.
On request we can also equip the appliances with a continuous ring or soldered-on pins.

CASTING DISHES FOR SCHOEPS, VAA, USG, AAG

All the casting dishes on page 14, sharp and round cornered, fit this fusion appliance.

LIDS FOR FUSION EQUIPMENT BY SCHOEPS, VAA, USG, AAG made of platinum/gold 95/5 or FKS-platinum/gold 95/5



Lid Ø mm	Pin length mm	Material thickness mm	Weight g	Ögussa code g
A	B	S		
45	21	0,3	14	88





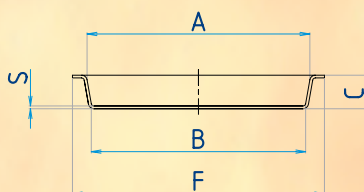
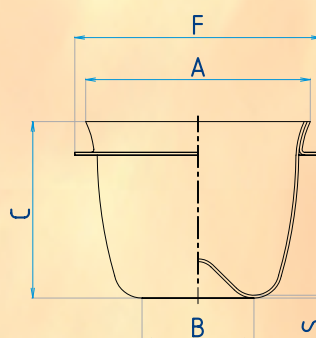
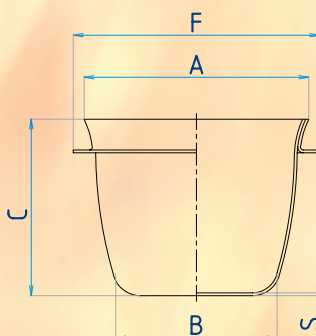
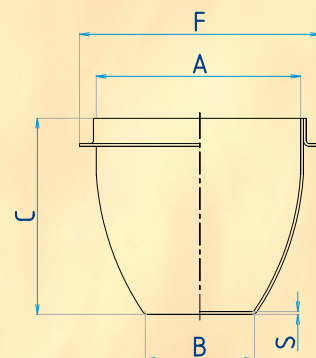
CRUCIBLE FOR CLAISSE FLUXERS made of platinum/gold 95/5 or FKS-platinum/gold 95/5

Upper inner Ø	Base inner Ø	Height	Overall Ø	Base thickness	Weight	Design	Ögussa code
mm	mm	mm	mm	mm	g		
A	B	C	F	S			
37	20	35	44	0,45	35	flat base	72
39,5	20	32	43	0,35	30	flat base	71
39,5	20	32	43	0,35	30	convex base	70

CASTING DISH FOR CLAISSE FLUXERS made of platinum/gold 95/5 or FKS-platinum/gold 95/5

Upper inner Ø	Base inner Ø	Height	Overall Ø	Material thickness	Weight	Ögussa code
mm	mm	mm	mm	mm	g	
A	B	C	F	S		
26	25	6	45	0,60	25	78
33	32	6	45	0,60	25	79
36	35	6	45	0,60	25	77
40	38	6	45	1,00	41	76
40	38	6	45	0,6	24	75

To obtain perfect sample results in XRF we supply these casting dishes with high-gloss polished inner working surface.





CRUCIBLE FOR PERL-X FUSION EQUIPMENT made of platinum/gold 95/5 or FKS-platinum/gold 95/5

Upper inner Ø	Base inner Ø	Height	Ø incl. flange	Base thickness	Weight	Design	Ögussa code
mm	mm	mm	mm	mm	g		
A	B	C	F	S			
40	40	40	50	1,0	95	cylindrical	90
40	40	40	49	0,8	85	cylindrical	91
40	40	40	48	0,8	80	cylindrical	91A
40	40	40	50	0,8	78	cylindrical	91B
40	40	40	50	0,8	85	cylindrical	92
40	22	40	49	0,9	80		93
40	22	40	49	1,1	100		94
40	24	40	48	0,8	75		95

CASTING DISHES FOR PERL-X FUSION EQUIPMENT made of platinum/gold 95/5 or FKS-platinum/gold 95/5

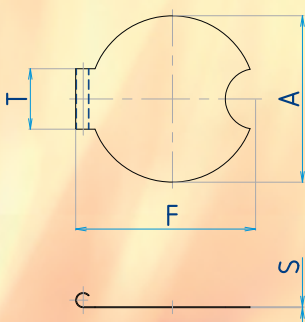
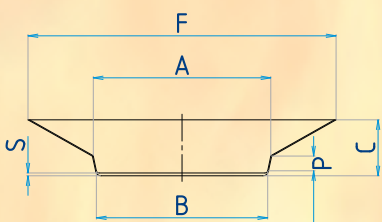
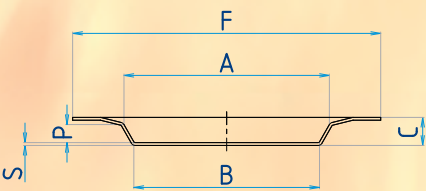
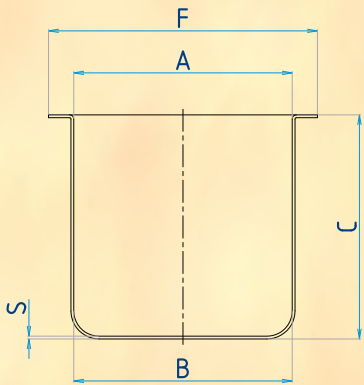
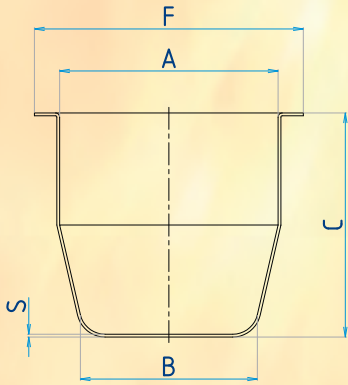
Upper inner Ø	Base inner Ø	Height	Ø incl. flange	Base thickness	Weight	Ögussa code
mm	mm	mm	mm	mm	g	
A	B	C	F	S		
low profile						
32	30	5	55	1,0	50	104
36	35	2,7	55	0,7	40	105
37	34,5	4,9	55	0,9	45	106
37	34,5	5	55	1,0	55	107
37	35	5	55	1,0	55	108
high profile						
34	32	10	65	1,0	55	109
32	30,5	10	65	1,0	55	110
40	38,5	10	65	1,0	60	111
40,5	39,5	11,5	65	1,0	65	112
37	35	10	63,5	1,0	50	113
41	39,5	10	60	1,0	65	114
35,5	33,5	10,5	65	0,7	53	115

The **bead height** (designated **P** in the drawing) is generally 3 mm. Other bead heights available on request. To obtain perfect sample results in XRF we supply these casting dishes with high-gloss polished inner working surface.

LIDS FOR PERL-X FUSION EQUIPMENT made of platinum/gold 95/5 or FKS-platinum/gold 95/5

Upper inner Ø	Overall length	Material thickness	Weight	Hinge width	Ögussa code
mm	mm	mm	g	mm	
A	F	S		T	
55	68	0,5	30	18	100A
55	68	0,5	27	10	100
55	60	0,5	27	19,2	101
55	68	0,5	27	10	102

On request we can also fabricate other dimensions. We can also produce v-shaped cut-outs.





CRUCIBLE FOR LECO FUSION EQUIPMENT made of platinum/gold 95/5 or FKS-platinum/gold 95/5

Upper inner Ø	Base inner Ø	Height	Ø incl. flange	Base thickness	Weight	Ögussa code
mm	mm	mm	mm	mm	g	
A	B	C	F	S		
37	20	35,0	44	0,45	35	120
37	20	40,0	44	0,50	40	121

CRUCIBLE FOR LINN FUSION EQUIPMENT made of platinum/gold 95/5 or FKS-platinum/gold 95/5

Upper outer Ø	Base outer Ø	Height	Base thickness	Weight	Ögussa code
mm	mm	mm	mm	g	
A	B	C	S		
41	20	49,5	0,40	35	125
34,6	19,6	48,0	0,55	42	126
35	20	48,0	0,40	35	127

Casting dishes for Leco and Linn fusion appliances are on page 16 (casting dishes for Claisse fluxers).

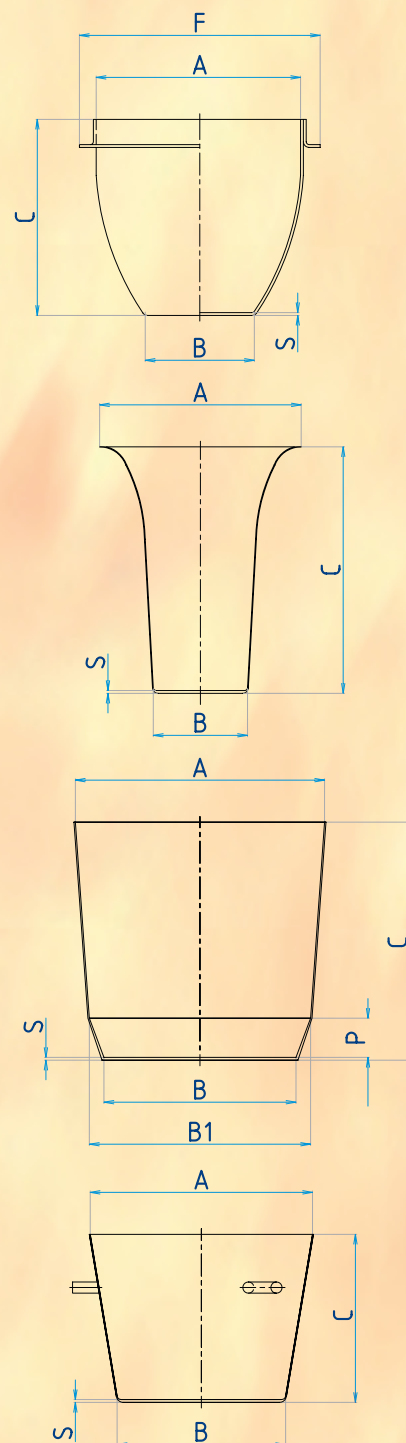
DOUBLE-CONE CRUCIBLES made of platinum/gold 95/5 or FKS-platinum/gold 95/5

Upper inner Ø	Ø upper cone	Base inner Ø	Height	Base thickness	Weight	Ögussa code
mm	mm	mm	mm	mm	g	
A	B1	B	C	S		
38	34	29	39,3	0,80	53	67A
40	36	34	40	0,80	64	67B
45	41	36	43,3	0,80	75	67

The **Perl height** (designated **P** in the drawing) is generally 3 mm. Other Perl heights available on request. To obtain perfect sample results in XRF we supply these crucibles with high-gloss polished inner working surface.

CRUCIBLES WITH THREE PINS made of platinum/gold 95/5 or FKS-platinum/gold 95/5

Upper inner Ø	Base inner Ø	Height	Base thickness	Weight	Ögussa code
mm	mm	mm	mm	g	
A	B	C	S		
44	32	30	1,00	60	66
40	30	30	0,45	33	68
40	30	30	0,30	20	69





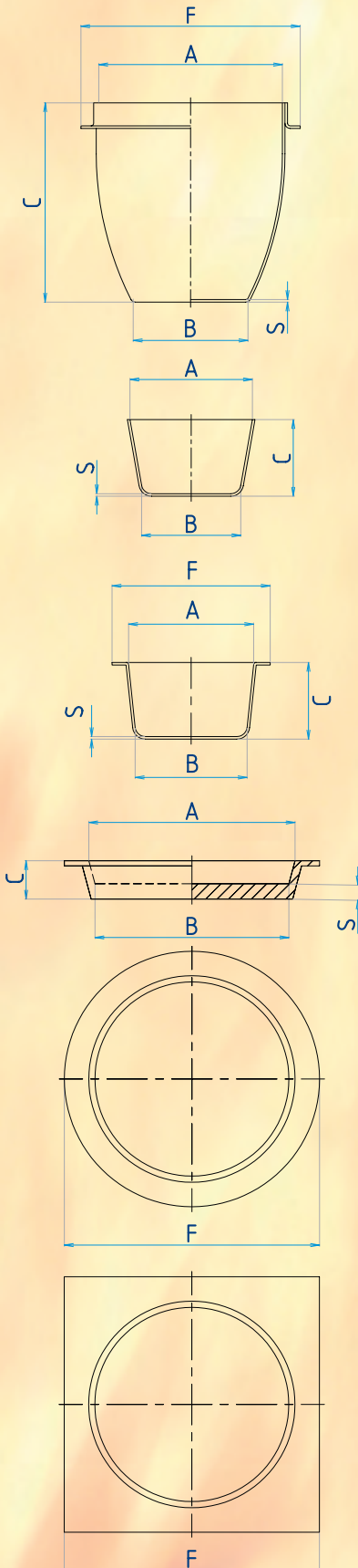
CRUCIBLES FOR HERZOG FUSION EQUIPMENT made of platinum/gold 95/5 or FKS-platinum/gold 95/5

Upper inner Ø	Base inner Ø	Height	Ø incl. flange	Base thickness	Weight	Ögussa code
mm	mm	mm	mm	mm	g	
A	B	C	F	S		
36	22,3	38,5	44	0,60	52	132
50	38,5	30	-	1,00	90	130
50	38,5	30	62	1,00	110	131

CASTING DISHES FOR HERZOG FUSION EQUIPMENT made of platinum/gold 95/5 or FKS platinum/gold 95/5

Upper inner Ø	Base inner Ø	Height	Ø incl. flange	Base thickness	Weight	Design	Ögussa code
mm	mm	mm	mm	mm	g		
A	B	C	F	S			
34	32	6	44	2,50	65	round	788
40	38	7,5	50	3,00	113	square	682

To obtain perfect sample results in XRF we supply these casting dishes with high-gloss polished inner working surface.





CRUCIBLES FOR OXIFLUX FUSION SYSTEMS made of platinum/gold 95/5 or FKS-platinum/gold 95/5

Upper inner Ø	Base inner Ø	Height	Base thickness	Weight	Design	Ögussa code
mm	mm	mm	mm	g		
A	B	C	S			
36	18	40	0,35	30	with pins	160
36	18	40	0,35	37	with support ring	161

CASTING DISHES FOR OXIFLUX FUSION SYSTEMS made of platinum/gold 95/5 or FKS-platinum/gold 95/5

Upper inner Ø	Base inner Ø	Height	Ø incl. flange	Base thickness	Weight	Ögussa code
mm	mm	mm	mm	mm	g	
A	B	C	F	S		
32	31	4,8	43	0,80	34	162

To obtain perfect sample results in XRF we supply these casting dishes with high-gloss polished inner working surface.

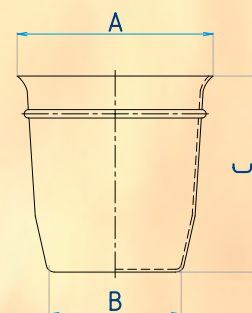
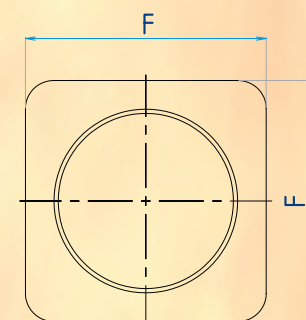
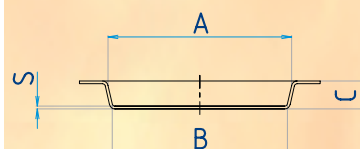
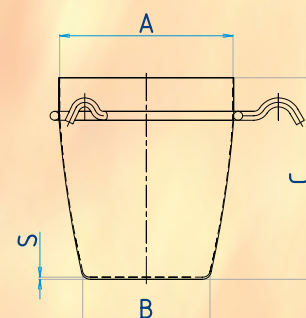
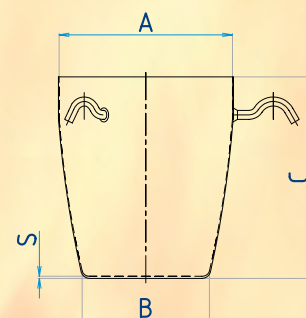
CRUCIBLES FOR PHOENIX FUSION EQUIPMENT made of platinum/gold 95/5 or FKS-platinum/gold 95/5

Upper inner Ø	Base inner Ø	Height	Base thickness	Weight	Ögussa code
mm	mm	mm	mm	g	
A	B	C	S		
36	22	36	0,45	40	151

The supporting ring is also available in a round or semi-round design.

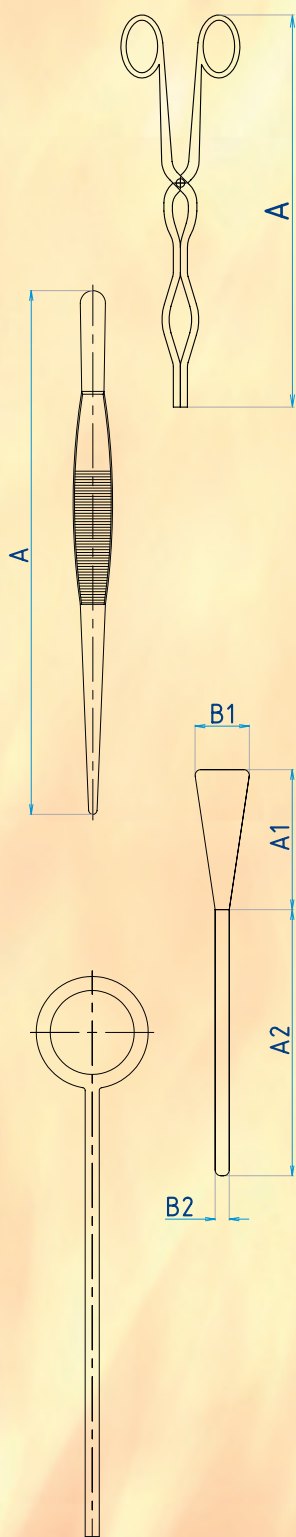
CASTING DISHES FOR PHOENIX FUSION EQUIPMENT

All the casting dishes on page 14, square and round, fit this fusion equipment.





Ögussa makes a number of accessories to enable you to expertly handle crucibles and dishes in the laboratory, such as crucible tongs made of chromium nickel steel in various lengths, which are fitted with platinum shoes or solid platinum tips. As a special design we offer platinum shoes which extend up to the swivel-joint. Tweezers can also be supplied with platinum shoes or solid platinum tips.



CRUCIBLE TONGS MADE OF CHROMIUM-NICKEL STEEL

Shoes or tips made of platinum/iridium 97/3, platinum/gold 95/5 or pure platinum

Overall length	approx. weight per pair	Design	Ögussa code
mm	g		
A			
200	4-5	with Pt shoes	S 200
250	4-5	with Pt shoes	S 250
300	4-5	with Pt shoes	S 300
400	7-8	with Pt shoes	S 400
500	7-8	with Pt shoes	S 500
600	9-10	with Pt shoes	S 600
200	10-12	with solid Pt tips	M 200
250	10-12	with solid Pt tips	M 250
300	10-12	with solid Pt tips	M 300
400	24-25	with solid Pt tips	M 400
500	30-35	with solid Pt tips	M 500
600	30-35	with solid Pt tips	M 600

Special design: Pt shoes extending up to swivel joint on request.
Material thickness of shoes, 0.20 - 0.25 mm.

TWEEZERS MADE OF CHROMIUM NICKEL STEEL

Shoes or tips made of platinum/iridium 97/3, platinum/gold 95/5 or pure platinum

Overall length	approx. weight per pair	Design	Ögussa code
mm	g		
A			
145	2	with Pt shoes	S 145
145	4	with solid Pt tips	M 145

SPATULAS

For reasons related to stability spatulas are fabricated from the alloy platinum/iridium 90/10 and are available in a variety of lengths and shapes.

Please let us know dimensions you need for your applications.

Legend to the spatula drawing: **A1** spatula length, **A2** handle length, **B1** spatula width, **B2** handle width

INOCULATION LOOPS

Eyelets made of platinum/iridium 90/10 for microbiology and medical applications are available in various diameters and lengths. Please let us know the dimensions you need.



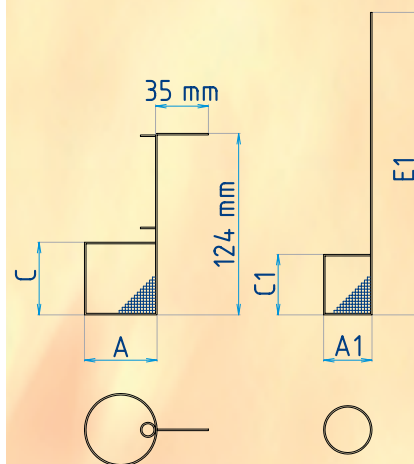


The platinum alloy containing 10 % iridium is especially suitable for electroanalysis. It is especially important that electrodes exhibit a high degree of electrical conductivity and resistance to chemical corrosion. Ögussa supplies as a standard Fischer, Winkler, Woelbling and Schoeniger electrodes. Other designs can also be produced on request. As a principle Fischer electrodes are sand-blasted, others only on customer request. We also make repairs on request.

FISCHER ELECTRODE made of platinum/iridium 90/10

Net		Cylinder				Overall length	Weight	Design	Ögussa code
M/cm ²	mm	outer		inner					
	Ø Wire	Ø mm	mm	Ø mm	mm	mm	g		
		A	C	A1	C1	E1			
225	0,12	38	50	33	40	200	33	light	FI 1
100	0,25	38	50	33	40	200	41	heavy	FI 2

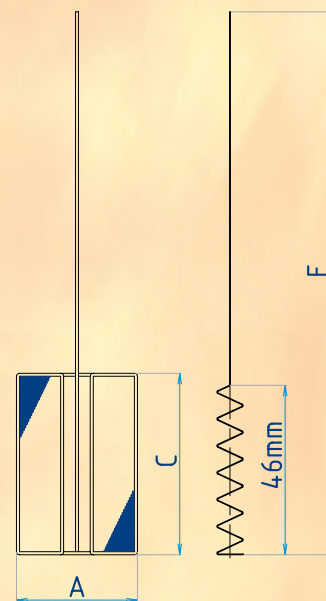
This electrode consists of an outer and an inner net cylinder. Suitable for rapid tests with high current densities in stirred or quiescent electrolytes.



WINKLER ELECTRODE made of platinum/iridium 90/10

Net		Cylinder		Overall length	Weight	Design	Ögussa code
M/cm ²	mm	Ø mm	mm				
	Ø Wire	A	C	E	g		
225	0,12	35	50	150	15	light	WI 1
100	0,25	35	50	150	21	heavy	WI 2
	1,1		46	150	5,5	spiral	WI 1B

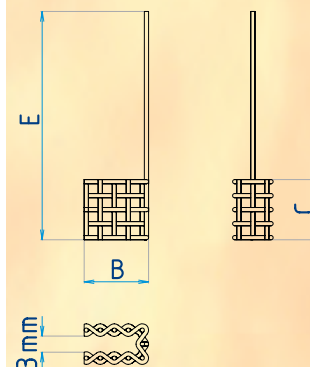
This electrode consists of a slotted net cylinder in which a with spiral is concentrically arranged. Suitable for applications such as electrogravimetric identification of Cu and Zn.



WOELBLING ELECTRODE made of platinum/iridium 90/10

Net		Cylinder		Overall length	Weight	Design	Ögussa code
M/cm ²	mm	Ø mm	mm				
	Ø Wire	A	C	E	g		
100	0,25	18	40	150	15	solid	WB 1
100	0,25	18	40	150	16	hollow	WB 2
100	0,25	30	40	150	20	solid	WB 3
100	0,25	30	40	150	22	hollow	WB 4
100	0,25	45	50	150	35	solid	WB 5
100	0,25	45	50	150	37	hollow	WB 6

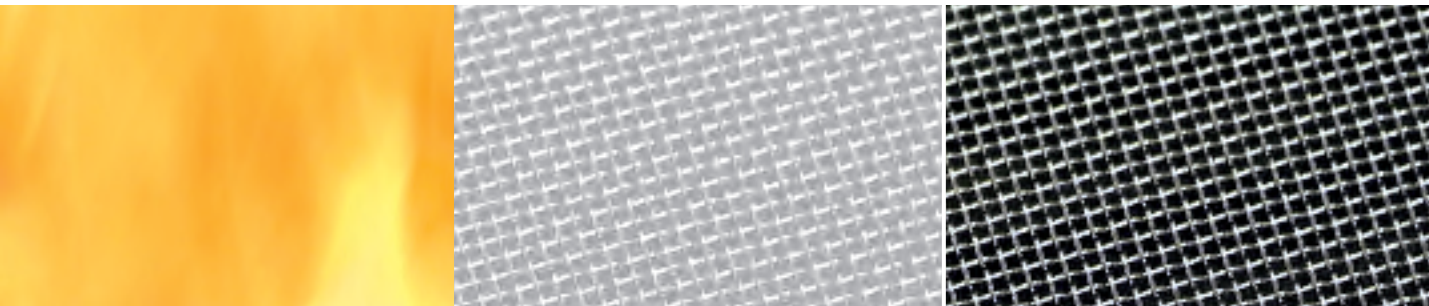
In this electrode the net is attached permanently above and below to a solid cross on the centre rod.



SCHOENIGER ELECTRODE made of pure platinum

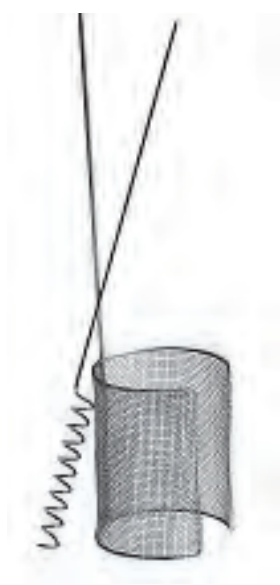
Net		Electrode width	Electrode height	Overall length	Weight	Ögussa code
M/cm ²	mm					
	Ø Wire	B	C	E	g	
16	0,75	10	10	40	3	ELS

This electrode consists of a pure platinum wire mesh bent in a U-shape. Primary applications: quick tests for halogen and sulphur.



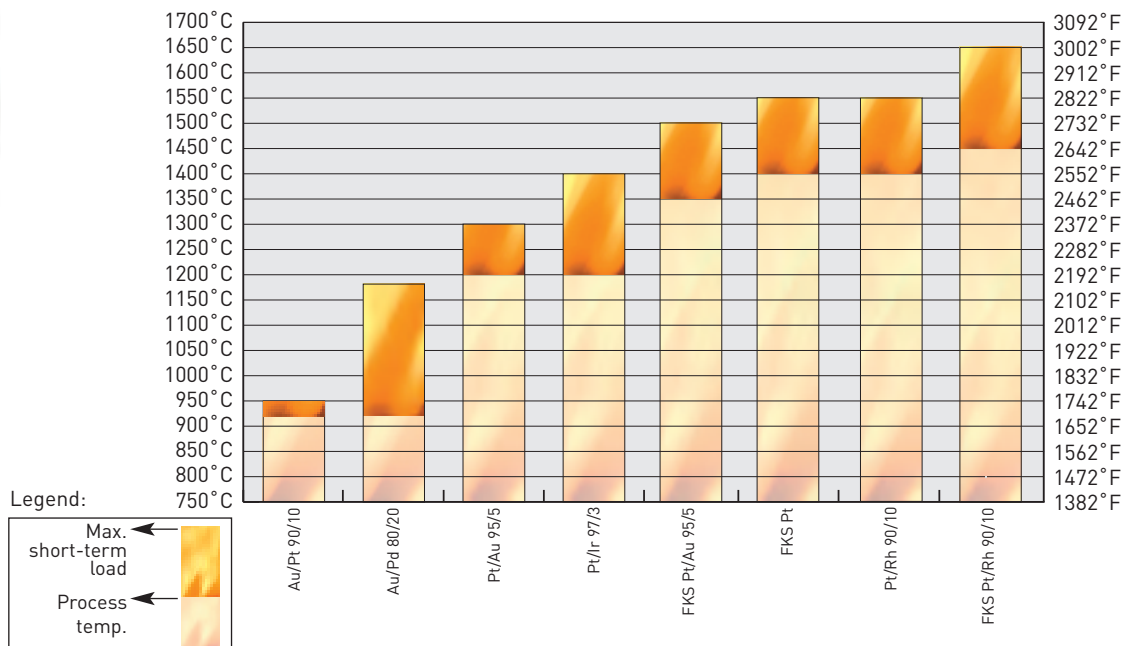
APPLICATIONS and RECOMMENDED TEMPERATURE RANGES

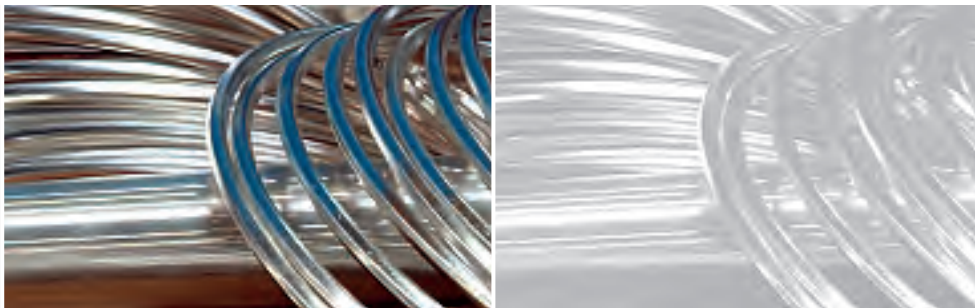
Application	Unit	Material	Process temperature		Maximum temperature	
			°C	°F	°C	°F
Ashing and carbonization of organic substances, acidic and alkaline dissolutions, evaporations, incineration of filter residues, reduction of liquids, etc.	crucible dish	Pt/Ir 97/3	1200	2192	1400	2552
Melt fusions	crucible	Pt/Au 95/5	1200	2192	1300	2372
		Pt/Rh 90/10	1400	2552	1550	2822
High temperatures melt fusions	crucible casting dish	FKS-Pt	1400	2552	1550	2822
		FKS Pt/ Au 95/5	1350	2462	1500	2732
		FKS-Pt/Rh 90/10	1450	2642	1650	3002
Flower ashing	dish	Au/Pt 90/10	920	1688	950	1742
		Au/Pd 80/20	920	1688	1180	2156
Electroanalytic identifications of metals, potential measurements	elektrodes	Pt/Ir 90/10				
Gravimetry, S+Cl	Schöninger-elektrodes	Pt				



The uses we recommended here are based on many years of experience in application engineering. High temperatures, corrosive media, platinum poisons, etc. can considerably impact the useful life of the equipment. The alloys listed represent only a limited selection of the alloys made by Ögussa. If you have any questions or special needs please feel free to contact us.

PROCESS TEMPERATURE AND MAX. SHORT-TERM TEMPERATURE LOADS





Platinum and the metals of the platinum group are among the most robust metals. Their high degree of resistance to chemical corrosion and their high melting temperatures make them excellent materials for equipment in a chemical laboratory. The catalytic effectiveness accelerates the ashing of organic materials, for example of filter residues.

Since pure platinum is very soft and already loses its hardness and deformation resistance at temperatures of 700 to 1,000 °C (1292 to 1832°F). The mechanical strength is increased with additives of iridium, gold or rhodium.

HOW TO PROLONG SERVICE LIFE

The alloys formed by platinum with most metals have substantially lower eutectic points in comparison to pure platinum. Even at mid-range temperatures, along the grain boundaries of the crucible material metals or other elements can accumulate and form local low-melting phases which lead to the destruction of the crucible (see the table on page 26).

In air-tight conditions chemical reduction reactions can cause the release of the platinum poisons. For this reason checks of mass loss and ashing should always be performed under oxidizing conditions.

When applying heat with a Bunsen burner you should always ensure that the flame is rich in oxygen. The presence of carbon and/or organic substances in the sample can lead to the reduction of chemical compounds and, hence, to the release of elements harmful to platinum.

With other elements such as silicon, phosphorous, boron and sulphur, you must exercise enormous care. In the process phase shifts occur more frequently along the grain boundary and lead to an embrittlement of the appliance. You should pay particular attention to this danger when ashing flour and other organic compounds which contain phosphorous.

Destruction or damage can also occur from an external source, such as when the platinum appliance is in contact with silicon-carbide heating rods in a muffle furnace or with metallic debris on the oven floor which is diffused into the appliance during a longer period of contact.

We recommend you keep laboratory surfaces clean at all times where appliances may be placed in order to avoid soiling the appliance with substances which at higher temperatures can react with platinum. This includes handling hot platinum appliances with tongs and tweezers whose tips are protected with platinum shoes. To prevent any corrosion from inside, you must not allow any corrosive media to penetrate between the tongs and the platinum shoes.

If you heat platinum appliances with a Bunsen burner, they must only come into contact with triangles which are either ceramic-coated or fitted with platinum knobs. You must prevent any contact between the platinum appliances and ferrous materials.



IMPACT OF ACIDS AND SALT MELTS

When conducting wet chemical analyses remember that halogen compounds, aqua regia and other intensely oxidizing acidic mixtures can chemically corrode platinum even at room temperature (see table on page 27). More serious are the corrosive effects at higher temperatures of melts of diverse alkali metal hydroxides and cyanides. In this context potassium compounds generally react more intensively than the corresponding sodium salts with platinum appliances.

With soda and soda-potash fusions, the crucible is covered to create a CO₂ atmosphere over the fusion which protects the crucible from oxidation.

HEATING

You must avoid heating platinum appliances for unnecessarily long periods of time since this will lead to a coarsening of the crystal structure, embrittlement and cracking. Incinerating platinum appliances must not come into contact with other metals (crucible tongs, tweezers, iron triangles, wire meshes, etc.). The ceramic surface on which the appliance rests in the oven floor and while cooling must be clean and completely free of contaminants. When several new platinum appliances are **simultaneously incinerating** in the muffle oven, you must ensure that they are not in contact with each other (this applies especially to crucibles with new lids). As a result of self-diffusion the **appliances could weld together**.

FKS platinum inhibits crystal growth and extends the useful life of the appliances (by as much as a factor of 3) owing to the fine-grain stabilizing effects, especially at high temperatures.

TIPS FOR LONGER SERVICE LIFE

Simple precautionary steps to prolong the service life of your equipment are:

- Use heavily used crucibles when sample constituents are unknown
- Never place a crucible directly on a silicon-carbide heating rod
- Oven linings must not contain any platinum-damaging elements
- In the presence of organic materials assure good oxidizing conditions (possibly by adding small amounts of ammonium nitrate before heating)
- Only touch hot appliances with Pt coated tongs
- Always operate Bunsen burners with a strongly oxidizing (blue/colourless) flame (avoid yellow = reducing flame)
- Use FKS alloys

CLEANING

Basically, decocting the crucibles and dishes in a suitable solvent is sufficient.

If this does not result in adequate cleaning we recommend melting out with potassium hydrogen sulphate or potassium diphosphate.

Materials superficially alloyed can be scrubbed out with a corundum-based polish. Never use a polish which contains metal carbide.

Any residue of polish containing corundum can be removed by hydrofluoric acid.

Platinum appliances must not be cleaned by annealing them because this promotes the unwanted process of diffusion.

HANDLING ELECTRODES

Electrolytically precipitated metals are dissolved with pure acids and then the electrodes are cleaned with deionized water and dried in a drying cabinet.

Annealing leads to unwanted softening which in turn makes the net electrodes easier to deform.

Besides, incompletely dissolved metals could be permanently diffused in.

PHYSICAL AND CHEMICAL SPECIFICATIONS



INFLUENCE OF PLATINUM-DAMAGING SUBSTANCES ON THE MELTING TEMPERATURE

Element	Pt		Pd		Au		Ag		Rh		Ir	
	°C	°F	°C	°F	°C	°F	°C	°F	°C	°F	°C	°F
B	825	1517	743	1369	1050	1922	961	1762	1131	2068	1046	1915
Si	830	1526	798	1468	370	698	835	1535	1389	2532	1470	2678
P	588	1090	788	1450	935	1715	878	1612	1245	2273	1262	2304
As	597	1107	-	-	665	1229	540	1004	-	-	-	-
Sn	1070	1958	-	-	278	532,4	221	429,8	-	-	-	-
Sb	633	1171	590	1094	360	680	485	905	610	1130	-	-
Pb	290	554	265	509	213	415,4	304	579,2	-	-	-	-
Bi	730	1346	-	-	241	465,8	262	503,6	-	-	-	-
S	1240	2264	623	1153	-	0	742	1368	925	1697	-	-

PHYSICAL DATA OF PRECIOUS METALS AND PRECIOUS METAL ALLOYS

Material	Melting point, melting interval		Density (g/cm ³)	Coefficient of linear expansion (20-100°C) 10 ⁻⁶ (K ⁻¹) (68-212°F) 10 ⁻⁶ (K ⁻¹)	Specific electrical resistance (annealed) at 20° C (Ω*mm ² *m ⁻¹) 68° F (Ω*mm ² *m ⁻¹)	Temperature coefficient of the specific electr. resistance (0-100°C) 10 ⁻⁴ (K ⁻¹) (32-212°F) 10 ⁻⁴ (K ⁻¹)
	°C	°F				
Pt	1769	3216,2	21,45	9,1	0,107	39,0
Ir	2447	4436,6	22,65	6,8	0,049	43,0
Pd	1554	2829,2	12,02	11,1	0,099	38,0
Rh	1963	3565,4	12,41	8,3	0,043	46,0
Os	3050	5522,0	22,61	6,1	0,096	42,0
Ru	2315	4199,0	12,20	9,1	0,073	46,0
Au	1063	1945,4	19,32	14,1	0,027	40,0
Ag	961	1761,8	10,49	18,7	0,016	41,0
PtRh 10	1840-1870	3344-3398	20,00	10,0	0,200	16,3
PtRh 20	1870-1910	3398-3470	18,10	9,3	0,208	13,4
PtIr 10	1780-1800	3236-3272	21,60	8,6	0,250	12,0
PtIr 20	1830-1855	3326-3371	21,70	7,7	0,310	7,5
PtAu 5	1675-1745	3047-3173	21,32	-	0,180	21,0
FKS-Pt*	1769	3216,2	21,45	-	-	-
FKS-PtAu5*	1675-1745	3047-3173	21,32	-	-	-
FKS-PtRh10*	1840-1870	3344-3398	20,00	-	-	-

Material	Thermal conductivity at 20°C (Wm ⁻¹ K ⁻¹) 68°F (Wm ⁻¹ K ⁻¹)	Yield point (MPa)		Tensile strength (MPa)		Elongation at break (%)		Vickers hardness		Elasticity module (GPa)
		annealed	hard	annealed	hard	annealed	hard	annealed	hard	
Pt	74	70	290	150	330	40	3,0	42	98	170
Ir	59	93	-	450	-	7	-	210	453	528
Pd	75	65	400	180	480	35	3,0	40	210	121
Rh	88	68	-	800	1925	9	-	130	410	380
Os	87	-	-	-	-	-	-	350	1000	570
Ru	105	38	-	500	-	3	-	240	750	430
Au	312	50	260	180	300	40	3,0	40	90	78
Ag	419	120	320	140	380	37	3,0	35	110	80
PtRh 10	30	180	670	300	680	32	1,5	102	204	255
PtRh 20	-	110	920	380	940	32	2,0	113	273	268
PtIr 10	31	220	630	340	650	32	2,0	105	215	220
PtIr 20	-	380	920	570	940	21	2,0	190	300	230
PtAu 5	-	370	610	460	635	7	1,0	139	194	180
FKS-Pt*	-	180	-	265	-	25	-	85	-	-
FKS-PtAu5*	-	260	-	390	-	19	-	115	-	-
FKS-PtRh10*	-	330	-	445	-	16	-	115	-	-

Addition physical data can be found in the Landolt-Börnstein Comprehensive Index, 1996. Volume IV, Part 2. Springer Verlag

* Test compliant with Ögussa-Standard, 2001.



RESISTANCE TO CORROSIVE MEDIA OF PLATINUM GROUP METALS, GOLD AND SILVER

Corrosive medium	Conditions	(°C)	(°F)	Pd	Pt	Rh	Ir	Ru	Os	Au	Ag
Hydrochloric acid	36%	20	68	1	1	1	1	1	1	1	1
Hydrochloric acid	36%	100	212	2	1	1	1	1	3	1	2
Nitric acid	65%	20	68	4	1	1	1	1	3	1	4
Nitric acid	65%	100	212	4	1	1	1	1	4	1	4
Sulphuric acid	96%	20	68	1	1	1	1	1	1	1	2
Sulphuric acid	96%	100	212	3	1	2	1	1	1	1	4
Sulphuric acid	96%	300	572		2	3			1	3	4
Hydrobromic acid	60%	20	68	4	2	2	1	1	1		3
Hydrobromic acid	60%	100	212	4	4	3	1	1	3	1	4
Hydriodic acid	57%	20	68	4	1	1	1	1	2	1	4
Hydriodic acid	57%	100	212	4	4	1	1	1	3	1	4
Fluorohyric acid	40%	20	68	1	1	1	1	1	1	1	1
Phosphoric acid		100	212	2	2	1	1	1	4	1	1
Acetic acid	99%	100	212	1	1	1	1	1		1	1
Hydrochloric acid/chlorine	20%/saturated	20	68	3	2					4	4
Hydrochloric acid/chlorine	20%/saturated	80	176	4	4					4	4
Hydrochloric acid/chlorine	20%/saturated	100	212	3	3	2	2			4	4
Hydrochloric acid/bromine		20	68	4	2	2					4
Hydrochloric acid/bromine		100	212	4	2						4
Aqua regia		20	68	4	4	1	1		4	4	4
Aqua regia		100	212	4	4	1	1		4	4	4
Aqua regia		150	302	4	4		3			4	4
Hydrochloric acid/10% H ₂ O ₂		20	68	4						4	4
Hydrochloric acid/10% H ₂ O ₂		100	212	4	2					4	4
Hydrobromic acid/bromine	60%	100	212			4					
Water/bromine		20	68	2	1	1	1	1	1	4	2
Ethanol/Iodine		20	68	2	1	2	1	1		3	4
Sodium hypochloride solution		20	68	3	1	2		4	4	1	1
Sodium hypochloride solution		100	212	4	1	2	2	4	4	1	2
Potassium cyanide solution		20	68	3	1					4	4
Potassium cyanide solution		100	212	4	3					4	4
Copper(III) chloride solution		100	212	2	1					1	
NaOH melt	air access	500	932	2	2	2		4	4	2	2
KOH melt	air access	500	932	2	3	2		4	4	4	3
NaOH melt	air access	800	1472	3		2		4	4	4	4
KOH melt	air access	800	1472	3		2		4	4	4	4
KHSO ₄ melt	air access	440	824	2	1	3	1			2	4
NaCN melt	air access	700	1292	3	3	4	3	3		4	4
KCN melt	air access	700	1292	4	4	3	3	3		4	4
NaCN/KCN melt (2:1)	air access	550	1022	3	3	4	3	3		4	4
Chlorine, gaseous	dry	20	68	3	2	1	1	1	1	3	1
Chlorine, gaseous	moist	20	68	4	2	1	1	1	3	4	2
Bromine liquid	dry	20	68	4	3	1	1	1	4	4	1
Bromine liquid	moist	20	68	4	3	1	1	1	3	4	1
Iodine solid	dry	20	68	1	1	1	1	1	2		
Iodine solid	moist	20	68	2	1	2	1	1	1		4
Fluorine gaseous		20	68		2					1	1
Hydrogen sulphide gaseous	moist	20	68	1	1	1	1	1	1	1	

- 1 = no corrosion
- 2 = marginal corrosion
- 3 = strong corrosion
- 4 = destructive corrosion

These values in this table are only for reference purposes and should not be used for specific applications.

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RECYCLING AND ENVIRONMENT

At the end of the life cycle of used laboratory appliances the precious metals of these materials are recovered and recycled into new, high-quality products.

Proven and innovative processes are used in all phases of recovery. Exact analysis methods (ICP, XRF) guarantee precise and reliable results. At the same time, we ensure that the precious metals are reimbursed as quickly as possible.

Each step of the process, from the acceptance of the materials to the billing of the customer is precisely documented and completely traceable.

In wet-chemical and electrolytic refining processes the individual precious metals are recovered in a pure form and re-alloyed in our vacuum melting furnaces plants.



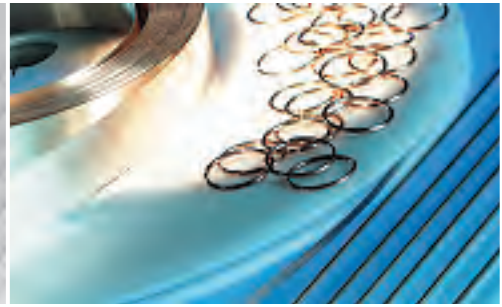
We create sustainable values and our pro-active activities contribute to environmental protection and minimize resource consumption. Our environment management system is certified compliant with ISO 14001 and Responsible Care.

For our clients this means reliable quality from a single supplier, competent advice on precious metal prices, products, reconditioning and logistics as well as technological and innovative support related to any questions about precious metals.



YOUR MATERIALS FOR PRECIOUS METAL RECOVERY

Gold and gold alloys	Silver and silver alloys	Platinum, palladium, rhodium and their alloys
<ul style="list-style-type: none"> • Old jewelry, raw gold material • Production waste • Waste from restorative and prosthetic stomatology (Dental) 	<ul style="list-style-type: none"> • Old jewelry • Production waste • Cutlery, tableware • Silver used in film and photography 	<ul style="list-style-type: none"> • Old jewelry • Production waste • Old laboratory equipment • Electrodes, thermo elements
Catalytic converters containing silver, platinum, palladium and rhodium	Galvanic waste containing gold, silver, platinum, palladium and rhodium	Other gold, silver, platinum, palladium and rhodium waste in the small trades and industry
<ul style="list-style-type: none"> • Used catalytic converters from the chemical industry 	<ul style="list-style-type: none"> • Baths containing precious metals • Ion exchange resins containing precious metals • Production waste • electroplating racks • Contacts 	<ul style="list-style-type: none"> • Crucible shards containing precious metals • mill material, sweeps, ashes



PRODUCTS:

- **Thermocouple wires** made of platinum/rhodium alloys, types R, S, B
- **Sheath tubes** to protect thermocouples with or without flange made of Pt/Rh and fine-grain stabilized (FKS) platinum in a variety of diameters and lengths.
- **Semi-finished platinum products:** wires, strips, sheets, foils, rods, tubes made of pure platinum and platinum alloys
- **Semi-finished palladium products:** wires, strips, sheets, rods, tubes made of palladium alloys
- **Semi-finished gold products:** wires, strips, sheets, rods, discs, tubes made of fine gold and gold alloys
- **Semi-finished silver products:** wires, strips, sheets, rods, tubes made of fine silver and silver alloys, also for electrical engineering
- **Gauzes:** made of silver, platinum and gold
- **Electroplating-Service:** gold, silver, rhodium, palladium plating
- **Precious metal baths** for the electroplating applications
- **Solders and fluxing agents**
- **Other precious metal products and compounds on request**
- **Recycling:** recovery of precious metals from any waste or residues containing precious metals

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THE WORLD OF PRECIOUS METALS



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