Morgan
Advanced Materials

HALDENWANGER

# → Laboratory ceramics

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# Contents



All products listed in this catalogue are in accordance with DIN 40680 – subject to inadvertent modifications, errors and omissions.
Special sizes and custom designs available on request.



# What is Laboratory Porcelain?

Laboratory Porcelain results from thousands of years of systematic development of porcelain itself – an impervious silicate material that is made by firing a mixture of natural minerals such as china clay, quartz and feldspar.

The properties of Haldenwanger Laboratory Porcelain correspond to the DIN EN 60672 standard, group 100, type 110. Temperature stability and resistance to physical and chemical attack are important characteristics. Consistant quality is ensured through strict control of raw materials and production. Laboratory Porcelain is a potassium aluminium silicate. Under the microscope, a transparent cut shows that Haldenwanger Laboratory Porcelain is a material in which scorched and prismatic mullite crystals ($3Al_2O_3 \cdot 2SiO_2$) are embedded in a glass matrix. As a silicate, Haldenwanger Laboratory Porcelain is very resistant to all types of acids, even at boiling temperatures, with the exception of hydrofluoric acid.

Although less resistant to warm and highly concentrated alkalis than to acids, it still performs better than glass. Molten alkali salts attack Laboratory Porcelain. Its resistance to high temperatures comes from the mullite structure of the material. Although its glass phase softens at very high temperatures, the mullite structure has a stabilising effect and prevents deformations. Therefore, unglazed Laboratory Porcelain can be used at temperatures of up to 1350°C according to the application. Glazed Laboratory Porcelain can be used at temperatures of up to 1000°C. After that, the glaze begins to soften.


Haldenwanger has been manufacturing Laboratory Porcelain for more than 150 years and development is still ongoing. New market demands in terms of form and quality mean continual custom. Many standard products must comply with a range of different national norms. Laboratory Porcelain is mainly used in industrial laboratories and research institutes worldwide as an aid in chemical analyses and preparation work.

# Why should I use Haldenwanger Laboratory Porcelain?

### Quality and resistance for more than 150 years

Despite our long history, we have taken care to maintain the original size and shape of our products. New challenges in an ever-growing market have led us to new developments. Ensuring the best refractoriness and resistance to physical and chemical attack has always been of the utmost importance to us.

We guarantee consistently high standards by performing quality checks at all levels, e.g. on raw materials, in the forming process and during final product inspection. To this end, we have established our own state-of-the-art testing and development centre as well as a pilot plant.

Our products are continuously tested to comply with DIN 12851 regulations. This comprehensive and strict DIN standard specifies the requirements and test procedures for laboratory equipment made of hard porcelain (C110).

### → Imperviousness of the ceramic body

No single area of any sample may show:

- any kind of discoloration in glaze-free areas
- penetration of dye between the ceramic body and glazing

### → Dense glazing (no pores, no cracks)

No single sample may show trajectories of excess glazing slurry or any discoloration along the edges.

### → Thermal shock resistance

No single sample may fail by fracture and no crazing may appear after quenching.

### → Refractoriness of the glazing up to 900°C

Glazed pieces may not stick together at 900°C.

### → No weight change during annealing

No single sample may show a weight change exceeding 0.1 mg per 10 g material.

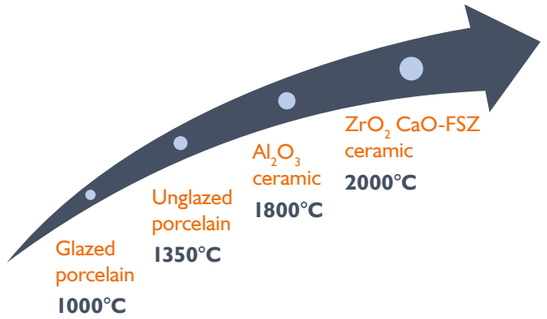
### → Chemical resistance to hydrochloric acid, soda and caustic soda

No single sample may show a weight loss of more than:

- 1 mg per $dm^2$ of the wetted inner surface area (hydrochloric acid)
- 10 mg per $dm^2$ of the wetted inner surface area (diluted soda)
- 60 mg per $dm^2$ of the wetted inner surface area (caustic soda)

### Technical support

As a producer of high-performance ceramics, Haldenwanger offers not only the best materials but also technical support with materials selection and application. Our laboratory ceramics portfolio includes products that deliver temperature stability up to 2000°C (as for instance $ZrO_2$ – materials on request).




| Material | Application temperature | WAK* $10^{-6}K^{-1}$ |
|---|---|---|
| Glazed porcelain | 1000°C | 5.3 |
| Unglazed porcelain | 1350°C | 5.3 |
| $Al_2O_3$ | 1800°C | 8–9 |
| $ZrO_2$ CaO-FSZ | 2000°C | 10 |

Please note that all values quoted (page 4–5) are based on test specimens and may vary according to component design. These values cannot be guaranteed and can only be transferred to other forms and dimensions to a limited extent. They should be used for guidance only. In the field, for example, Alsint 99.7 moulded pieces demonstrate mechanical strength values between 160 and 300 MPa, depending on wall thickness, actual shape, surface finish, the shaping process and post-processing.

Being a member of the VGKL (Verband des Groß- und Außenhandels für Krankenpflege- und Laborbedarf), a trade association for leading wholesalers of laboratory equipment, we have always been at the cutting edge of technology.

In addition, Haldenwanger offers training courses in the theory and usage of Laboratory Porcelain.

### Aggressive reagents

| Laboratory Porcelain | Chemical resistance |
|---|---|
| All acids (20°C): | excellent* |
| All acids (boiling): | excellent* |
| Warm, highly-concentrated alkaline solutions: | good |
| Molten alkaline salts: | unsuitable |

* Exception: hydrofluoric acid

| Alsint 99.7-Oxide Ceramics | |
|---|---|
| All acids (20°C): | excellent* |
| All acids (boiling): | excellent* |
| Warm, highly-concentrated alkaline solutions: | good |
| Molten alkaline salts: | unsuitable |

* Exception: highly concentrated hydrofluoric acid, boiling phosphoric acid, boiling potassium hydroxide and sodium hydroxide solutions

| High temperatures | Heat resistant |
|---|---|
| Glazed Laboratory Porcelain: | up to max. 1000°C |
| Unglazed Laboratory Porcelain: | up to max. 1350°C |
| Alsint 99.7 Oxide Ceramics: | up to max. 1800°C |

### High-wear conditions

For example:

- mortar and pestle
- ball mill
- mouthpieces
- shaft-protection sleeves, etc.

### New developments

We are constantly optimising our Laboratory Porcelain to meet your needs.

### Highest standards

- Our Laboratory Porcelain complies with DIN EN 60672-3, Group C 100, Type C 110.
- Laboratory articles made of Alsint 99.7 Oxide Ceramics comply with DIN EN 60672, Group C 700, Type C 799.

Stringent product controls, from the raw materials to the finished product, ensure the consistently high quality of our products.

| Laboratory Porcelain | Unit | Hard porcelain | Pythagoras |
|---|---|---|---|
| Type according to DIN EN 60672-3 | – | C 110 | C 610 |
| Range of application | – | Laboratory Porcelain | Chemical-technical products |
| Water absorption capacity | % | ≤ 0.2 | ≤ 0.2 |
| Bulk density | $g/cm^3$ | 2.4 | 2.6 |
| Flexural strength 20°C (3-Punkt) | Vol.-% | 70–90 | 120 |
| Thermal expansion 20–1000°C | µm | 5.3 | 6 |
| Thermal conductivity 200°C | MPa | 1.4 | 2 |
| Maximum temperature exposure | GPa | 1350 unglazed/1000 glazed | 1400 unglazed |

| Oxide Ceramics | Unit | Alsint 99.7* | Alsint porous |
|---|---|---|---|
| $Al_2O_3$ content | % | 99.7 | 99.5 |
| Alkali content | % | 0.05 | 0.05 |
| CaO stabiliser content | % | – | – |
| Type according to DIN VDE 0335 | – | C 799 | – |
| Water absorption capacity | % | ≤ 0,2 | 2–3.5 |
| Bulk density | $g/cm^3$ | 3.75–3.94 | 3.5–3.6 |
| Flexural strength 20°C (3-Punkt) | MPa | 300 | 70–110 |
| Young's modulus | GPa | 300–380 | – |
| Hardness (Mohs' scale) | – | 9 | – |
| Thermal expansion 20–1000°C | $1/10^6$ K | 8–9 | 8–9 |
| Thermal conductivity 20–100°C | W/m K | 25 | – |
| Thermal shock resistance | – | good | good |
| Average pore diameter | µm | – | 1–3 |
| Specific thermal capacity 20–100°C | J/kg K | 900 | – |
| Maximum temperature exposure** | °C | 1800 | 1700 |

*We recommend that products be heated at a rate not exceeding 30–50°C per hour, **dependent on load

# Haldenwanger quality – the proven best!

**Why is thermal shock resistance of the utmost importance for Laboratory Porcelain?**

Thermal shock resistance as described in DIN 51068 is a material's response to repeated subjection to thermal stresses occurring in (rapidly) changing temperature fields. Heating up and cooling down laboratory ceramics may lead to thermal stresses within the ceramic body. Compressive and tensile stresses may form due to the temperature gradients within the material. In extreme situations, local stresses may exceed the strength level of the material, resulting in cracking. Thus, excellent thermal shock properties are most important for the longevity of Laboratory Porcelain.


Haldenwanger crucibles shown before (left) and after (right) anneal testing. The result confirms the thermal stability of the glazing, even after multiple testing cycles.

Competitor crucibles shown before (left) and after (right) anneal testing. Significant discoloration can be detected after the first anneal cycle.

**Custom ceramics**

The following pages will provide an overview of our current Laboratory Porcelain product range. In addition, we offer bespoke products in variable material and shape/size combinations.

Also, we can apply your logo, serial numbers and barcodes on the glazing.

Haldenwanger is your number one specialist in high-temperature and laboratory ceramics. Thanks to our more than 150 years of experience, we can offer the ideal solution.

**We would be pleased to advise you – in many European languages!**


**Core competencies of Morgan Advanced Materials:**

- **Application Engineering**
- **Materials Science**
- **Customer Focus**


# Zirconium oxides

**Zirconia Crucibles CaO-FSZ**

We offer customised zirconia crucibles for several applications. Calcium fully stabilised zirconia possesses high refractory properties in temperatures of up to 2000°C.

Zirconia is extensively used in the chemical processing industry due to its outstanding chemical resistance to alkalis, acids and caustics.

Our crucibles stand for high purity, tight tolerances and stability in thermal processes.

Order-based production for customised dimensions; availability upon request.

| Material properties | Unit | Values |
|---|---|---|
| $ZrO_2$- + $HfO_2$ content | % | 94 |
| CaO stabiliser content | % | 5 |
| Bulk density | g/cm³ | > 5.4 |
| Thermal expansion 20–1000°C | 1/10⁶ K | 10 |
| Thermal conductivity 200°C | W/m K | 1.5–3.0 |
| Flexural strength | MPa | 200 |
| Maximum temperature exposure without load | °C | 2000 |

Please note that all values quoted are based on test specimens and may vary according to component design. These values are not guaranteed in any way and should only be treated as indicative values. They should be used for guidance only and for no other purpose.

**Pointers on the correct use of Laboratory Porcelain:**
The expected lifetime of Laboratory Porcelain is a function of various factors such as heating and cooling rates, the degree of filling (half/completely filled), the homogeneity of the filling within the crucible, the geometry of the crucible (round/angular, wall thickness, radii, transitions), usage (e.g. during cleaning), etc.

In order to avoid damaging the material, please heed the following guidelines:

**Maximum temperature:**
- glazed porcelain 1000°C
- unglazed porcelain 1350°C
- $Al_2O_3$-crucibles 1800°C
- $ZrO_2$ CaO-FSZ-crucibles 2000°C

**Maximum heating rate:**
- Porcelain-crucibles 150°C/h
- Alsint-crucibles 50°C/h
- $ZrO_2$ CaO-FSZ-crucibles 50°C/h

At higher application temperatures (> 400°C), curved crucibles 33 and 33 D should preferably be used over the angular crucible 33 C.

**Minimum degree of filling:**
- choose the right size according to the content, minimum-degree of filling 75% (to avoid temperature differences)
- homogeneous filling within the crucible

**Operation during cool-down phase:**
- only use pre-heated crucible tongs
- place hot crucibles on porous ceramic materials only, such as R-SiC or alumo-silicate materials

## Mortars

**Article no. 55**
with spout
$T_{max}$ depends on the application, but should not exceed 200°C

| Size no. | DIN | Inner Ø mm | Height mm | Capacity approx. ml | SU unglazed | SU glazed |
|---|---|---|---|---|---|---|
| 00 | 12906 | 50 | 32 | 20 | 20 | 10 |
| 0 a | | 65 | 40 | 70 | 20 | 10 |
| 1 | | 70 | 45 | 75 | 20 | 10 |
| 2 | 12906 | 80 | 50 | 100 | 10 | 10 |
| 3 | | 90 | 55 | 170 | 10 | 10 |
| 4 | 12906 | 115 | 63 | 300 | 10 | 5 |
| 5 | 12906 | 130 | 65 | 400 | 5 | 5 |
| 6 a | 12906 | 150 | 70 | 700 | 5 | 5 |
| 8 | 12906 | 180 | 80 | 1,000 | 2 | 1 |
| 11 | 12906 | 240 | 100 | 2,600 | 1 | 1 |
| 15 | 12906 | 330 | 140 | 6,000 | 1 | 1 |

When ordering, please specify whether the grinding surface should be glazed or unglazed.

## Pestles

**Article no. 56**
$T_{max}$ depends on the application, but should not exceed 200°C

| Size no. | DIN | Length Ø mm | Head Ø mm | SU unglazed | SU glazed |
|---|---|---|---|---|---|
| 000 | | 100 | 22 | 20 | 10 |
| 00 | 12906 | 115 | 24 | 20 | 10 |
| 0 a | | 125 | 28 | 20 | 10 |
| 1 | 12906 | 135 | 30 | 20 | 10 |
| 2 | 12906 | 150 | 36 | 10 | 10 |
| 3 | 12906 | 175 | 42 | 10 | 10 |
| 4 | | 180 | 45 | 10 | 5 |
| 5 | | 185 | 48 | 5 | 5 |
| 6 a | 12906 | 210 | 55 | 5 | 5 |
| 8 | | 215 | 60 | 2 | 1 |

When ordering, please specify whether the grinding surface should be glazed or unglazed.

## Evaporating basins

**Article no. 109**
form B, semi-deep, with spout, size 5/0–5 glazed inside and outside
size 6–10 glazed except outside base
$T_{max}$ depends on the application, but should not exceed 400°C

| Size no. | DIN | Ø mm | Height mm | Capacity approx. ml | SU |
|---|---|---|---|---|---|
| 5/0 | 12903 | 40 | 16 | 10 | 100 |
| 4/0 | 12903 | 50 | 20 | 20 | 100 |
| 000 | 12903 | 63 | 25 | 40 | 100 |
| 00 | | 70 | 26 | 50 | 100 |
| 0 | 12903 | 80 | 34 | 75 | 100 |
| 1 | | 85 | 35 | 95 | 100 |
| 2 | 12903 | 100 | 40 | 115 | 50 |
| 4 | | 110 | 45 | 220 | 50 |
| 5 | 12903 | 115 | 47 | 310 | 10 |
| 6 | | 150 | 45 | 370 | 10 |
| 6 a | 12903 | 160 | 64 | 640 | 5 |
| 7 b | 12903 | 200 | 80 | 1,000 | 5 |
| 9 | 12903 | 250 | 86 | 2,200 | 2 |
| 10 | 12903 | 310 | 110 | 3,400 | 2 |



## Evaporating basins

**Article no. 130**
french shape, with spout and round base, glazed inside and outside
$T_{max}$ depends on the application, but should not exceed 400°C

| Size no. | Ø mm | Height mm | Capacity approx. ml | SU |
|---|---|---|---|---|
| 3 | 75 | 40 | 70 | 10 |
| 5 | 97 | 50 | 190 | 10 |
| 6 | 110 | 52 | 270 | 10 |
| 7 | 125 | 60 | 350 | 10 |

**Article no. 131**
french shape, with spout and flat base, glazed inside and outside
$T_{max}$ depends on the application, but should not exceed 400°C

| Size no. | Ø mm | Height mm | Capacity approx. ml | SU |
|---|---|---|---|---|
| 2 | 58 | 24 | 30 | 20 |
| 3 | 75 | 30 | 60 | 20 |
| 4 | 84 | 36 | 100 | 10 |
| 5 | 97 | 40 | 150 | 10 |
| 6 | 110 | 50 | 250 | 10 |
| 7 | 125 | 52 | 290 | 10 |
| 8 | 150 | 60 | 400 | 5 |

**Article no. 888**
form A, shallow, with spout, glazed except outside base
$T_{max}$ depends on the application, but should not exceed 400°C

| Size no. | DIN | Ø mm | Height mm | Capacity approx. ml | SU |
|---|---|---|---|---|---|
| 000 | 12903 | 40 | 9 | 5 | 30 |
| 00 | 12903 | 50 | 11 | 10 | 30 |
| 0 | 12903 | 63 | 13 | 20 | 30 |
| 2 | 12903 | 80 | 20 | 40 | 20 |
| 4 | 12903 | 100 | 22 | 80 | 20 |
| 6 | 12903 | 125 | 27 | 270 | 20 |
| 6 a | 12903 | 160 | 35 | 450 | 10 |
| 8 | 12903 | 190 | 55 | 1,100 | 3 |
| 9 | 12903 | 240 | 65 | 1,750 | 3 |
| 10 | 12903 | 300 | 60 | 2,500 | 2 |

## Incinerating dishes

**Article no. 33**
cylindrical, glazed except outside base
$T_{max}$ depends on the application, but should not exceed 1000°C

| Size no. | Ø mm | Height mm | Capacity approx. ml | SU |
|---|---|---|---|---|
| 1 | 40 | 21 | 15 | 40 |
| 2 | 50 | 25 | 30 | 30 |
| 4 | 60 | 31 | 60 | 20 |

**Article no. 33 C**
conical, rectangular, glazed except outside base
$T_{max}$ depends on the application, but should not exceed 400°C

| Size no. | Length mm | Width mm | Height mm | SU |
|---|---|---|---|---|
| 00 | 48 | 26 | 10 | 30 |
| 00 b | 55 | 42 | 16 | 20 |
| 4 b | 70 | 46 | 13 | 20 |
| 7 | 96 | 55 | 16 | 10 |

**Article no. 33 D**
shallow, glazed except outside base
$T_{max}$ depends on the application, but should not exceed 1000°C

| Size no. | Ø mm | Height mm | Capacity approx. ml | SU |
|---|---|---|---|---|
| 2 | 37 | 10 | 8 | 40 |
| 3 | 42 | 11 | 10 | 40 |
| 4 | 48 | 12 | 15 | 30 |

## Flour incinerating dishes

**Article no. 5032**
according to Prof. Mohs, glazed except outside base
$T_{max}$ depends on the application, but should not exceed 1000°C

| Size no. | Ø mm | Height mm | Capacity approx. ml | SU |
|---|---|---|---|---|
| 1 | 56 | 23 | 30 | 100 |



## Melting crucibles

**Article no. 79**
low shape, glazed, minimum filling level 75%
$T_{max}$ depends on the application, but should not exceed 1000°C

| Size no. | DIN | Upper Ø mm | Height mm | Capacity approx. ml | Lid | SU |
|---|---|---|---|---|---|---|
| 000 a | 12904 | 30 | 20 | 8 | 7 | 100 |
| 00 | 12904 | 35 | 23 | 11 | 7 a | 100 |
| 0 | 12904 | 40 | 26 | 20 | 6 | 100 |
| 1 | 12904 | 45 | 29 | 25 | 5 | 100 |
| 2 * | 12904 | 50 | 32 | 40 | 4 | 100 |
| 2 a | 12904 | 60 | 38 | 65 | 3 | 100 |
| 3 | 12904 | 70 | 47 | 95 | 2 | 50 |
| 4 | | 83 | 55 | 180 | 1 | 20 |

* Conradson crucible acc. to ASTM D 189-65

**Article no. 79 C**
tall shape, glazed, minimum filling level 75%
$T_{max}$ depends on the application, but should not exceed 1000°C

| Size no. | DIN | Upper Ø mm | Height mm | Capacity approx. ml | Lid | SU |
|---|---|---|---|---|---|---|
| 00 | | 26 | 34 | 11 | 8 | 100 |
| 0 | 12904 | 30 | 38 | 15 | 7 | 100 |
| 1 | 12904 | 35 | 44 | 24 | 7/7 a | 100 |
| 2 | 12904 | 40 | 51 | 40 | 6/7 a | 100 |
| 3 | 12904 | 46 | 58 | 50 | 5 | 50 |
| 4 | 12904 | 51 | 65 | 85 | 4 | 50 |
| 5 | 12904 | 60 | 79 | 140 | 3 | 25 |

**Article no. 79 MF**
medium-high shape, glazed, minimum filling level 75%
$T_{max}$ depends on the application, but should not exceed 1000°C

| Size no. | DIN | Upper Ø mm | Height mm | Capacity approx. ml | Lid | SU |
|---|---|---|---|---|---|---|
| 9 | | 25 | 20 | 5 | 9 | 100 |
| 8 | | 30 | 25 | 10 | 7 | 100 |
| 7 | 12904 | 35 | 28 | 13 | 7 a | 100 |
| 7 a | 12904 | 40 | 32 | 20 | 6 | 100 |
| 6 | 12904 | 45 | 36 | 38 | 5 | 100 |
| 6 a | 12904 | 50 | 40 | 50 | 4 | 100 |
| 5 | | 52 | 43 | 60 | 4 | 100 |
| 4 | 12904 | 60 | 50 | 90 | 3 | 100 |
| 3 | | 63 | 55 | 110 | 3/2 | 50 |
| 2 | 12904 | 70 | 60 | 150 | 2 | 50 |
| 1 | | 82 | 65 | 230 | 1 | 20 |
| 1 a | | 89 | 75 | 300 | 1 a | 10 |

## Filtering crucibles

**Article no. 84**
with porous base
$T_{max}$ depends on the application, but should not exceed 400°C

| Size no. | DIN | Rim Ø mm | Base Ø mm | Height mm | Capacity approx. ml | SU |
|---|---|---|---|---|---|---|
| P2/2 | 12909 | 35 | 24 | 40 | 25 | 1 |

Porosity: P2 ≈ 7µm

## Gooch crucibles

**Article no. 82 A**
wide shape, with perforated base, glazed
$T_{max}$ depends on the application, but should not exceed 600°C

| Size no. | Upper Ø mm | Base mm | Height mm | Capacity approx. ml | SU |
|---|---|---|---|---|---|
| 2 | 39 | 25 | 42 | 25 | 15 |
| 3 | 42 | 26 | 45 | 35 | 10 |

Lid 79 D, filtering discs 31 B have to be ordered separately.
Filter holes approx. 0.5 mm in Ø

**Article no. 82 R**
tall shape, with perforated base, glazed
$T_{max}$ depends on the application, but should not exceed 600°C

| Size no. | Upper Ø mm | Base mm | Height mm | Capacity approx. ml | SU |
|---|---|---|---|---|---|
| 3 | 35 | 24 | 41 | 25 | 20 |

Lid 79 D, filtering discs 31 B have to be ordered separately.
Filter holes approx. 0.5 mm in Ø

## Crucible lids

**Article no. 79 D**
$T_{max}$ depends on the application, but should not exceed 600°C

| Size no. | DIN | Inner Ø mm | SU |
|---|---|---|---|
| 9 | | 28 | 50 |
| 8 | | 33 | 50 |
| 7 | 12904 | 37 | 50 |
| 7 a | 12904 | 45 | 50 |
| 6 | 12904 | 49 | 50 |
| 5 | | 54 | 50 |
| 4 | | 64 | 25 |
| 3 | | 70 | 25 |
| 2 | 12904 | 76 | 25 |
| 1 | | 89 | 20 |
| 1 a | | 94 | 10 |

## Filtering discs

**Article no. 31 B**
according to Dr Witt
$T_{max}$ depends on the application, but should not exceed 600°C

| Ø mm | SU |
|---|---|
| 22 | 30 |
| 25 | 30 |

## Funnels

**Article no. 126**
according to Dr Hirsch
$T_{max}$ depends on the application, but should not exceed 200°C

| Size no. | DIN | Nominal size* Ø mm | Inner Ø mm | Height mm | Tube length mm | Outer Ø mm | Tube top Ø mm | Tube bottom Ø mm | SU |
|---|---|---|---|---|---|---|---|---|---|
| 5/0 | 12905 | 8 | 9 | 45 | 22 | 30 | 7 | 5.5 | 10 |
| 4/0 | | – | 11 | 56 | 25 | 40 | 9 | 6 | 10 |
| 4/0 a | | – | 13 | 61 | 27 | 45 | 12 | 7 | 10 |
| 000 | 12905 | 16 | 15 | 74 | 33 | 52 | 11.5 | 8 | 10 |
| 00 | 12905 | 25 | 27 | 102 | 42 | 72 | 16 | 11 | 10 |

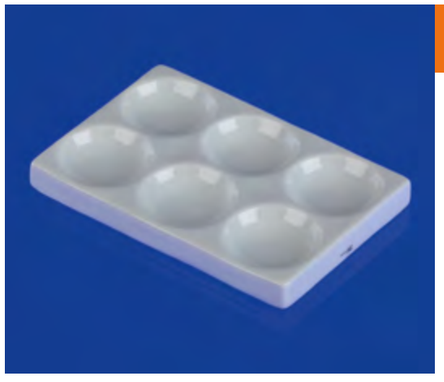
**Article no. 127 C**
according to Dr Büchner
$T_{max}$ depends on the application, but should not exceed 200°C

| Size no. | DIN | Nominal size* Ø mm | Inner Ø mm | Height mm | Tube length mm | Capacity approx. ml | Tube top Ø mm | Tube bottom Ø mm | SU |
|---|---|---|---|---|---|---|---|---|---|
| 000 | | 18 | 19 | 47 | 20 | 3 | 9 | 8 | 10 |
| 00 | | 27 | 29 | 60 | 30 | 10 | 10.5 | 8.5 | 10 |
| 0 | | 40 | 42 | 76 | 37 | 25 | 12.5 | 10 | 10 |
| 0 a | 12905 | 45 | 48 | 100 | 41 | 50 | 16 | 14 | 10 |
| 1 | 12905 | 55 | 59 | 129 | 53 | 75 | 19 | 16.5 | 10 |
| 2 | 12905 | 70 | 74 | 150 | 75 | 135 | 21 | 15.5 | 10 |
| 2 a | 12905 | 90 | 95 | 165 | 75 | 290 | 24 | 20 | 10 |
| 3 | 12905 | 110 | 114 | 201 | 90 | 580 | 31 | 23 | 3 |
| 4 | 12905 | 125 | 130 | 232 | 106 | 795 | 31.2 | 25.5 | 2 |
| 4 a | 12905 | 150 | 155 | 235 | 110 | 1,250 | 35 | 25 | 2 |
| 5 | 12905 | 185 | 190 | 260 | 120 | 1,900 | 35 | 25 | 1 |
| 6 | 12905 | 240 | 250 | 330 | 138 | 4,300 | 40 | 26 | 1 |
| 6 a | 12905 | 270 | 279 | 300 | 125 | 5,800 | 48 | 29.6 | 1 |
| 8 | 12905 | 320 | 330 | 350 | 150 | 10,600 | 55 | 36 | 1 |

* The nominal size is equivalent to the diameter of suitable filter paper.

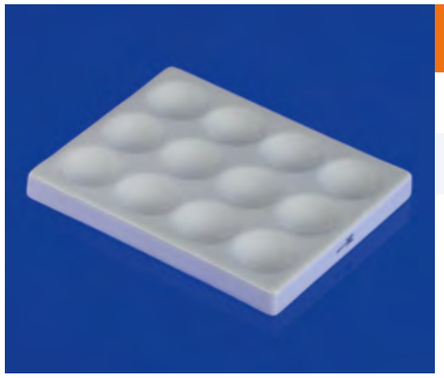
## Spot plates

**Article no. 61 A**
rectangular, with 6 wells, glazed
$T_{max}$ depends on the application, but should not exceed 400°C



| Size no. | Cavities | | | | | | SU |
|---|---|---|---|---|---|---|---|
| | Length mm | Width mm | Height mm | Number | Ø mm | Depth mm | |
| 3 | 115 | 80 | 12 | 6 | 36 | 11 | 10 |

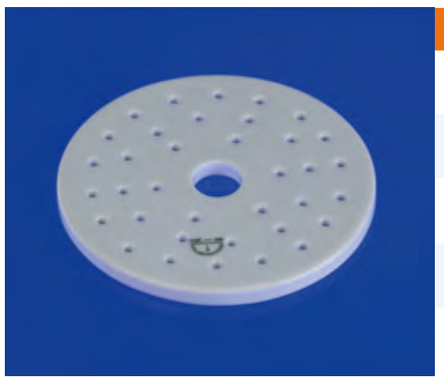
**Article no. 61 B**
rectangular, with 12 wells, glazed
$T_{max}$ depends on the application, but should not exceed 400°C



| Size no. | Cavities | | | | | | SU |
|---|---|---|---|---|---|---|---|
| | Length mm | Width mm | Height mm | Number | Ø mm | Depth mm | |
| 2 | 119 | 85 | 6 | 12 | 20 | 3 | 10 |
| 3 | 127 | 97 | 12 | 12 | 25 | 6 | 10 |

## Desiccator plates

**Article no. 119 C**
with central hole 20 mm in Ø and filter holes approx. 5 mm in Ø
$T_{max}$ depends on the application, but should not exceed 600°C



| Size no. | DIN | Height mm | Ø mm | SU |
|---|---|---|---|---|
| 90 | 12911 | 7.9 | 90 | 10 |
| 140 | 12911 | 8.9 | 140 | 10 |
| 190 | 12911 | 9.4 | 190 | 10 |
| 235 | 12911 | 10.6 | 235 | 10 |
| 280 | 12911 | 10.6 | 280 | 1 |



## Casseroles

**Article no. 17**
with porcelain handle, glazed except rim
$T_{max}$ depends on the application, but should not exceed 400°C

| Size no. | DIN | Ø mm | Height mm | Capacity approx. ml | SU |
|---|---|---|---|---|---|
| 4/0 | 12907 | 63 | 36 | 80 | 10 |
| 000 | 12907 | 80 | 46 | 140 | 10 |
| 0 | 12907 | 102 | 58 | 290 | 10 |
| 2 | 12907 | 127 | 70 | 500 | 4 |
| 4 | 12907 | 160 | 97 | 1,300 | 1 |
| 4 b | 12907 | 215 | 110 | 2,600 | 1 |

## Combustion boats

**Article no. 30**
glazed
$T_{max}$ depends on the application, but should not exceed 1000°C

| Size no. | Length mm | Width mm | Height mm | SU |
|---|---|---|---|---|
| 6 | 85 | 13 | 8 | 20 |
| 7 | 102 | 13 | 10 | 20 |
| 9 | 130 | 18 | 14 | 10 |

## Graduated beakers

**Article no. 51**
graduated inside, glazed except outside base
$T_{max}$ depends on the application, but should not exceed 400°C


| Size no. | Base Ø mm | Height mm | Capacity approx. ml | SU |
|---|---|---|---|---|
| 3 a | 80 | 100 | 250 | 3 |
| 5 a | 95 | 125 | 500 | 2 |
| 8 | 110 | 165 | 1,000 | 2 |
| 10 | 140 | 193 | 2,000 | 1 |
| 14 | 190 | 280 | 5,000 | 1 |

## Ball mills

**Article no. GSK**

$T_{max}$ depends on the application, but should not exceed 200°C

| GSK mill no. | Base Ø mm | Height mm | Capacity approx. ml | SU |
|---|---|---|---|---|
| 0 | 135 | 182 | 1,000 | 1 |
| 0 a | 150 | 222 | 1,500 | 1 |
| 0 b | 200 | 240 | 3,000 | 1 |
| 1 | 225 | 280 | 5,000 | 1 |
| 1 x | 288 | 333 | 10,000 | 1 |
| 1 a | 335 | 360 | 15,000 | 1 |

With lid, metal lock and sealing ring, glazed inside and outside.
Unglazed inside available upon request.

Sealing rings, inner rubber rings and metal locks as spare parts can also be purchased for each type of ball mill.

## Spoon spatulas

**Article no. 74**

$T_{max}$ depends on the application, but should not exceed 400°C

| Size no. | Length mm | SU |
|---|---|---|
| 2 | 121 | 20 |
| 4 | 170 | 20 |
| 6 | 210 | 10 |
| 8 | 305 | 5 |

## Clay plates porous

$T_{max}$ depends on the application, but should not exceed 600°C

| Ø mm | SU |
|---|---|
| 180 | 20 |
| 220 | 20 |

# Volume recommendations for ball fillings

## Unglazed balls

**Article no. 42 K**

| GSK mill no. | Capacity approx. l | Ball Ø mm 9 | 15 | 20 | 30 | 40 | 50 | Sales unit per 5 kg |
|---|---|---|---|---|---|---|---|---|
| 0 | 1 | 0.10 kg | 0.2 kg | 0.2 kg | – | – | – | |
| 0 a | 1.5 | 0.15 kg | 0.3 kg | 0.3 kg | – | – | – | |
| 0 b | 3 | 0.30 kg | 0.6 kg | 0.6 kg | – | – | – | |
| 1 | 5 | 0.50 kg | 1.0 kg | 1.0 kg | – | – | – | |
| 1 x | 10 | 0.50 kg | 1.5 kg | 1.5 kg | 1.5 kg | – | – | |
| 1 a | 15 | 1.00 kg | 1.5 kg | 1.5 kg | 1.5 kg | 2 kg | 2 kg | |
| Number of balls per kg approx. | | 1,080 | 230 | 95 | 30 | 12 | 6 | |
| Ball density per litre approx. | | 1.35 | 1.4 | 1.4 | 1.3 | 1.3 | 1.23 | |

# C and S determination

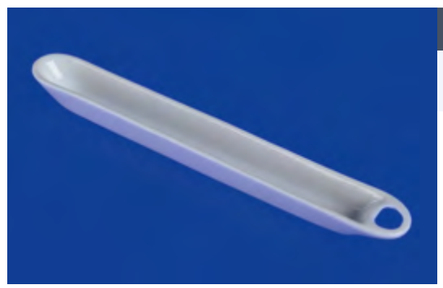
## Hard porcelain tubes unglazed

$T_{max}$ depends on the application, but should not exceed 1400°C

| Outer Ø mm | Inner Ø mm | Length mm | SU |
|---|---|---|---|
| 22 | 17 | 500 | 50 |
| 22 | 17 | 600 | 50 |
| 26 | 20 | 500 | 50 |
| 26 | 20 | 600 | 50 |

## Combustion boats unglazed

$T_{max}$ depends on the application, but should not exceed 1000°C



| Length mm | Width mm | Height mm | SU |
|---|---|---|---|
| 84 | 14 | 9 | 500 |

# Oxide Ceramics

## Alsint 99.7-combustion boats

| Length mm | Width mm | Height mm |
|---|---|---|
| 19 | 5 | 4 |
| 45 | 11 | 7 |
| 52 | 7.5 | 6 |
| 75 | 11 | 7 |
| 87 | 17 | 9 |
| 115 | 16 | 9 |
| 120 | 30 | 15 |
| 160 | 40 | 21 |
| 200 | 15 | 15 |

## Alsint porous incinerating dishes

| Length mm | Width mm | Height mm |
|---|---|---|
| 420 | 200 | 50 |
| 350 | 240 | 40 |
| 350 | 230 | 58 |
| 280 | 210 | 100 |
| 220 | 170 | 100 |
| 210 | 170 | 300 |
| 100 | 100 | 110 |

## Alsint 99.7-incinerating dishes

| Length mm | Width mm | Height mm |
|---|---|---|
| 40 | 10.5 | 8.5 |
| 50 | 20 | 20 |
| 50 | 25 | 20 |
| 50 | 38 | 36 |
| 75 | 50 | 25 |
| 100 | 32 | 28 |
| 100 | 45 | 19 |
| 105 | 15 | 15 |
| 150 | 65 | 19 |
| 150 | 65 | 35 |
| 160 | 80 | 30 |
| 160 | 135 | 90 |
| 190 | 138 | 75 |
| 250 | 65 | 30 |

## Alsint 99.7-tubular crucibles

| Outer Ø mm | Inner Ø mm | Height mm |
|---|---|---|
| 14 | 10 | 100 |
| 16 | 12 | 100 |
| 20 | 15 | 100 |
| 22 | 17 | 100 |
| 24 | 19 | 100 |
| 30 | 25 | 100 |
| 34 | 28 | 100 |
| 38 | 32 | 100 |
| 44 | 38 | 100 |
| 48 | 40 | 100 |
| 55 | 45 | 100 |
| 60 | 50 | 100 |
| 38 | 32 | 200 |
| 44 | 38 | 200 |

### Custom design

We can custom made Alsint 99.7 components to your requirements. Simply send us your detailed specifications and we will provide you with an obligation-free quote. Alsint 99.7 is the material of choice for use under high-wear conditions, in chemical-technical and electrical engineering applications and in high-temperature technology.

### Important information concerning the use of Alsint 99.7 laboratory equipment

Due to their high refractoriness (melting point above 2000°C) and chemical resistance to a wide range of substances, crucibles and other devices made of Alsint 99.7 are used in multiple applications. However, these outstanding properties are only fully maintained with proper handling.

### Applications

**Chemical-technical applications:**

- Crucibles for crystal growing
- Crucibles for fusion processes
- Crucibles for annealing

**High-wear conditions:**

- Ball mill pots
- Milling balls
- Mouthpieces
- Shaft-protection sleeves



## Alsint 99.7-crucibles

cylindrical, flat base, minimum filling level 75%

| Size no. | Outer Ø mm | Inner Ø mm | Height mm | Capacity approx. ml | Lid |
|---|---|---|---|---|---|
| 1 A | 20 | 16 | 30 | 5 | 79 D/9 |
| 2 A | 30 | 26 | 40 | 15 | 79 D/8 |
| 3 A | 35 | 30 | 50 | 30 | 79 D/7 |
| 4 A | 40 | 36 | 60 | 60 | 79 D/7a |
| 5 A | 50 | 44 | 75 | 110 | 79 D/5 |
| 6 A | 65 | 55 | 100 | 270 | 79 D/3 |
| 7 A | 85 | 75 | 150 | 700 | 79 D/1 |
| 8 A | 125 | 110 | 220 | 2,200 | – |

conical, tall shape, minimum filling level 75%

| Size no. | Upper outer Ø mm | Lower outer Ø mm | Height mm | Capacity approx. ml | Lid |
|---|---|---|---|---|---|
| 00 B | 30 | 14 | 24 | 10 | 79 D/8 |
| 0 B | 41 | 18 | 37 | 25 | 79 D/7a |
| 1 B | 48 | 20 | 41 | 40 | 79 D/5 |
| 2 B | 54 | 24 | 50 | 60 | 79 D/4 |
| 3 B | 60 | 26 | 50 | 80 | 79 D/4 |
| 4 B | 66 | 30 | 56 | 100 | 79 D/3 |

conical, low wide shape, minimum filling level 75%

| Size no. | Upper outer Ø mm | Lower outer Ø mm | Height mm | Capacity approx. ml | Lid |
|---|---|---|---|---|---|
| 00 C | 25 | 15 | 30 | 10 | – |
| 0 C | 30 | 18 | 38 | 15 | 79 D/8 |
| 1 C | 33 | 18 | 40 | 20 | 79 D/7 |
| 2 C | 38 | 21 | 47 | 30 | 79 D/7a |
| 3 C | 42 | 25 | 54 | 45 | 79 D/6 |
| 4 C | 50 | 27 | 65 | 80 | 79 D/5 |
| 5 C | 62 | 32 | 75 | 150 | 79 D/3 |
| 6 C | 73 | 35 | 90 | 250 | 79 D/2 |
| 7 C | 85 | 35 | 100 | 350 | 79 D/1 |
| 8 C | 90 | 47 | 115 | 500 | 79 D/1a |
| 9 C | 105 | 54 | 130 | 750 | – |
| 10 C | 120 | 62 | 150 | 1,200 | – |

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