DEUTSCHE NORM May 2005

DIN 7080

ICS 71.120.10

Supersedes
DIN 7080:1999-05

Circular borosilicate sight glasses with unlimited pressure resistance at low temperatures

Runde Schauglasplatten aus Borosilicatglas für Druckbeanspruchung ohne Begrenzung im Tieftemperaturbereich

Document comprises 14 pages

Translation by DIN-Sprachendienst.
In case of doubt, the German-language original should be consulted as the authoritative text.

Foreword

This standard has been prepared by Technical Committee FNCA AA 1 *Anlagenteile* of the *Normenausschuss Chemischer Apparatebau* (Process Engineering Standards Committee).

Annexes A and B are informative.

Amendments

This standard differs from DIN 7080:1999-05 as follows:

a) Subclause 4.5.2 has been corrected in accordance with Corrigendum DIN 7080:1999-05.

b) Subclause 4.5.4 has been corrected.

c) “Permissible working pressure” has been replaced by “maximum permissible pressure”.

d) The standard has been editorially revised.

Previous editions

DIN 7080: 1943x-10, 1965-07, 1975-09, 1996-02, 1999-05

1 Scope

This standard applies to thermally prestressed circular borosilicate sight glasses that can be continuously subjected on one side to liquid or gas pressures at up to 280 °C and, in exceptional circumstances, to 300 °C (cf. subclause 4.3.2). The sight glasses can only be used at pressures and temperatures up to those specified if they are installed as described in clause 10. There is no limit on the use of sight glasses conforming to this standard at temperatures below ambient temperature.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

DIN 28120, *Circular sight glasses with case in main power connection*

DIN 28121, *Circular sight glasses with case in metal to metal contact type flanged joint*

DIN ISO 695, *Glass — Resistance to attack by a boiling aqueous solution of mixed alkali — Method of test and classification*

DIN ISO 718, *Laboratory glassware — Thermal shock and thermal shock endurance – Test methods*

DIN ISO 719, *Glass — Hydrolytic resistance of glass grains at 98 °C — Method of test and classification*

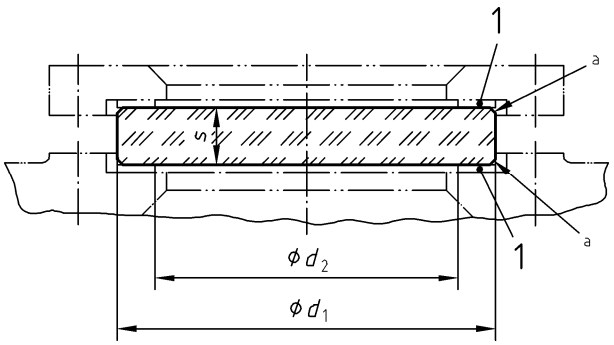
DIN ISO 1776, *Glass — Resistance to attack by hydrochloric acid at 100 °C — Flame emission or flame atomic absorption spectrometric method*

DIN ISO 2859-1, *Sampling procedures for inspection by attributes — Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection*

DIN ISO 7991, *Glass — Determination of coefficient of mean linear thermal expansion*

3 Dimensions and designation

Dimensions in millimetres



Key

1 Seal
a Chamfered edge (cf. Table 1)

Figure 1 — Sight glass

Designation of a circular sight glass having a diameter, d_1, of 100 mm and a thickness, s, of 15 mm:

Sight glass DIN 7080 — 100 × 15

The relationship between maximum permissible pressure and dimensions is shown in Table 1.

Table 1 — Dimensions

Diameter d_1	**Diameter** d_2	**Maximum permissible pressure, in bar**					
		8	10	16	25	40	50
		Thickness s					
45	32	—	—	—	—	10	12
(50)	35	—	—	—	10	12	—
(60)	45	—	—	10	12	15	—
63	48	—	—	10	12	15	—
80	65	—	—	12	15	20	—
100	80	—	—	15	20	25	—
125	100	—	15	20	25	—	—
150	125	—	20	25	30	—	—
175	150	—	20	25[a]	30[a]	—	—
200	175	20[a]	25	30	—	—	—
250	225	25[a]	30	—	—	—	—
Only applicable to containers made of enamelled steel							
135	110	—	—	—	25	—	—
265	240	30	—	—	—	—	—

Diameters in brackets are not for use in new designs.

[a] The safety factor for these sizes is between 4,5 and 4,9.

4 Material

4.1 General

The material used shall be thermally prestressed borosilicate glass conforming to the requirements specified in subclauses 4.2 to 4.5.

4.2 Mechanical strength

Unprestressed glass having a (tested) flexural tensile strength of about 40 N/mm^2 shall be thermally prestressed until the compressive prestress at the surface is not less than 100 N/mm^2 (see Annex A.1).

4.3 Thermal properties

4.3.1 Mean coefficient of linear thermal expansion

The mean coefficient of linear thermal expansion, α (20 °C, 300 °C), determined as specified in DIN ISO 7991 shall not exceed $5{,}0 \times 10^{-6}\ K^{-1}$.

4.3.2 Permissible working temperature

The continuous working temperature of the sight glass shall normally not exceed 280 °C.

It should be borne in mind that, at temperatures above 280 °C, a permanent decrease in the prestress is likely to occur (see Annex B [1]). For example, at a working temperature of 300 °C, the prestress will probably be only 90 % of the initial value after the sight glass has been in service for 300 hours.

However, use at temperatures between 280 °C and 300 °C is permissible provided suitable precautions are taken, such as

— protecting the sight glass with mica and

— restricting the cumulative working time above 280 °C to a maximum of 300 hours.

4.3.3 Thermal shock resistance

The thermal shock resistance of the sight glass determined as specified in DIN ISO 718 and subclause 7.4 shall be 230 °C.

4.4 Chemical resistance

The chemical resistance of borosilicate glass shall comply with the following:

— hydrolytic resistance class HBG 1 as in DIN ISO 719;

— acid resistance class as in DIN ISO 1776 not exceeding 100 µg $Na_2O/100\ cm^2$;

— alkali resistance class A2 as in DIN ISO 695 (see also Annex A.2).