

KUNSTSTOFF	Pipes of Acrylonitrile-Butadiene-Styrene (ABS) or Acrylonitrile-Styrene-Acrylester (ASA) Dimensions	DIN 16 891
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Rohre aus Acrylnitril-Butadien-Styrol (ABS) oder Acrylnitril-Styrol-Acrylester (ASA); Masse

For connection with the Standard ISO 161/I-1978 published by the International Organization for Standardization (ISO), see Explanations.

Dimensions in mm

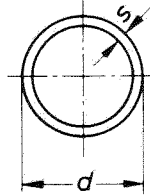
1 Scope

This Standard applies to pipes of acrylonitrile-butadiene-styrene (ABS) or acrylonitrile-styrene-acrylester (ASA) which meet the requirements of DIN 16 890.

2 Other relevant Standards

DIN 16 890 Pipes of Acrylonitrile-butadiene-styrene (ABS) or acrylonitrile-styrene-acrylester (ASA); general quality requirements, testing

3 Dimensions, designation



Designation of a pipe of ABS of outside diameter $d = 40$ mm and wall thickness $s = 2.4$ mm:

Pipe DIN 16 891 – ABS 40 x 2.4

Table 1. Pipe series (see Tables 2 and 3 for permissible deviations)

d	Pipe series									
	1	2	3	4	5					
	s ¹⁾	Weight ²⁾ kg/m ≈	s ¹⁾	Weight ²⁾ kg/m ≈	s ¹⁾	Weight ²⁾ kg/m ≈	s ¹⁾	Weight ²⁾ kg/m ≈	s ¹⁾	Weight ²⁾ kg/m ≈
25	—	—	—	—	—	—	—	—	1,8	0,153
32	—	—	—	—	—	—	1,8	0,2	1,9	0,209
40	—	—	—	—	—	—	1,8	0,253	2,4	0,33
50	—	—	—	—	1,8	0,32	1,9	0,335	3	0,506
63	—	—	—	—	1,8	0,406	2,3	0,513	3,8	0,804
75	—	—	1,8	0,486	1,9	0,51	2,8	0,731	4,5	1,13
90	—	—	1,8	0,586	2,2	0,714	3,3	1,04	5,3	1,6
110	1,8	0,719	2,2	0,877	2,7	1,05	4	1,51	6,5	2,39
125	2	0,9	2,5	1,12	3,1	1,38	4,6	1,98	7,4	3,08
140	2,2	1,12	2,8	1,39	3,5	1,72	5,1	2,46	8,3	3,87
160	2,5	1,44	3,2	1,82	3,9	2,18	5,8	3,18	9,5	5,04

1) In conformity with the details of ISO Standard 161/I – 1978, the wall thicknesses s of the pipes have been calculated on the basis of the equation $\frac{p \cdot d}{2\sigma + p}$ and rounded off to 0.1 mm. Values < 0.005 mm have not been rounded off. The calculation was effected with $\sigma = 8$ N/mm² (p is to be inserted in N/mm²).

2) Calculated at a mean density of 1.06 g/cm³.
For this purpose, one half of the permissible deviation in the wall thickness was added to the minimum wall thickness.

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Explanations on page 3

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In all cases the latest German-language version of this Standard shall be taken as authoritative

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Table 2. Permissible deviations in outside diameters

d	Permissible deviation ³⁾ in the mean outside diameter + ... 0
25 up to 90	0,3
110 and 125	0,4
140 and 160	0,5
³⁾ The values shown are calculated according to the equation: permissible deviation in the mean outside diameter = $0.003 d$; with a minimum of 0.3 mm and rounded off to 0.1 mm.	

Table 3. Permissible deviations in wall thicknesses

s	Permissible deviation ⁴⁾ + ... 0
1,8 up to 2	0,4
2,2 up to 3	0,5
3,1 up to 4	0,6
4,5 and 4,6	0,7
5,1 up to 5,8	0,8
6,5	0,9
7,4	1
8,3	1,1
9,5	1,2
⁴⁾ The values shown are calculated from the equation: permissible deviation in the wall thickness = $0.1 s + 0.2$ mm; rounded off to 0.1 mm.	

4 Mode of delivery

As may be agreed, pipes are supplied in commercial lengths (permissible deviation $\begin{matrix} +20 \\ 0 \end{matrix}$ mm) and in fixed lengths (permissible deviation ± 10 mm). Where possible, ends cut at right angles to the pipe axis.

The permissible short weight of pipes is:

- for the individual pipe: 8 %
- for a batch of 100 pipes (load): 5 %

Further Standards

DIN 19 561 Pipes and moulded parts of ABS/ASA (acrylonitrile-butadiene-styrene/acrylester-styrene-acrylonitrile) with socket joints for hot water resistant sewers (HT) inside buildings; dimensions, technical conditions of delivery.

Explanations

This Standard has been drawn up by the Sub-Committee 504.1 "Aussendurchmesser und Betriebsdrücke" (Outside Diameters and Working Pressures).

This Standard conforms in substance to ISO Standard 161/I-1978 "Thermoplastics pipes for the transport of fluids — Nominal outside diameters and nominal pressures — Part 1: Metric series".

F: "Tubes en matières thermoplastiques pour le transport des fluides — Diamètres extérieurs et pressions nominales — Partie 1: Série métrique"

In this Standard, the customary range of supplies of pipes of ABS or ASA is summarized according to dimensions. The stipulated diameters and pipe series 1 to 5 are intended to satisfy, first, various requests concerning use of the pipes in terms of the stresses involved and of interchangeable assembly and, second, the desires of manufacturers and the trade for a limitation in the sense of rationalized production and stock control.

The series of outside diameters is based on preferred numbers. The weights are calculated on the basis of a mean density of 1.06 g/cm³, the last decimal place being rounded off.

The permissible stress σ is obtained from the creep strength (for definition see DIN 50 119), for which appropriate values have been obtained as a result of tests over a period of years aimed at 50 years' serviceability.

Using a safety coefficient, $\sigma = 8 \text{ N/mm}^2$ was adopted for pipes of ABS/ASA conforming to the requirements according to DIN 16 890.

The pipe series 1 to 5 were so graded that they correspond to the following internal pressures for water and other materials conveyed which are "non-hazardous" within the meaning of DIN 2403 (March 1965 edition), Section 7.2, and to temperatures up to 20 °C:

Pipe series	1	2	3	4	5
Internal pressure p in bar	2,5	3,2	4	6	10

The nominal diameters (see DIN 2402) and nominal pressures (see DIN 2401 Part 1) customary for the various fields of application to which pipes of series 1, 2, 3, 4 and 5 according to this Standard are to be allocated are to be specified for the field of application in question and laid down in the relevant Standards or other regulations.

In the light of the current state of knowledge of the long-term behaviour of ABS or ASA, pipes will withstand the permissible excess working pressures shown in Table 4 below, but the resistance to the materials conveyed is to be taken into account in each case. The creep strength drops at higher temperatures, with the result that the suitability of pipes at higher temperatures must be carefully checked in each individual case.

Table 4. Permissible excess working pressures

Material conveyed	Temperature up to °C	Pipe series according to DIN 16 891				
		1	2	3	4	5
		permissible excess working pressure in bar ⁵⁾				
Water and non-hazardous ⁶⁾ materials to which ABS or ASA is resistant	20	2,5	3,2	4	6	10
	40	—	1	1,6	2,5	4
	60	—	—	—	1	1,6
Hazardous ⁶⁾ materials to which ABS or ASA is resistant	20	1	1,6	2,5	3,2	6
	40	—	—	1	1,6	2,5
	60	—	—	—	—	1
Materials to which ABS or ASA is resistant to a limited extent only	20	—	1 ⁷⁾	1,6 ⁷⁾	2,5 ⁷⁾	3,2 ⁷⁾
	40	—	—	—	1 ⁸⁾	1,6 ⁷⁾
	60	—	—	—	—	—
When using these pipes, electrostatic charges which may possibly occur in certain circumstances are to be taken into account ⁸⁾ .						
5) For definition of permissible excess working pressure, see DIN 2401 Part 1						
6) "Hazardous" and "non-hazardous" within the meaning of DIN 2403						
7) In use, the degree of hazard of the material conveyed is to be taken into account, together with the service life as based on practical experience.						
8) For the prevention of danger due to electrostatic charges, Guidelines No. 4 of the Employers' Liability Insurance Association of the Chemical Industry, Weinheim see guidelines.						