

Tested medium tolerance round steel link chains

Part 1: Grade 5

DIN
5687-1

ICS 53.020.30

Supersedes
June 1980 edition.

Descriptors: Steel, chains, grade 5, requirements.

Rundstahlketten – Teil 1: Güteklasse 5, mittel toleriert, geprüft

In keeping with current practice in standards published by the International Organization for Standardization (ISO), a comma has been used throughout as the decimal marker.

Clauses 7 and 8 of this standard include safety requirements within the meaning of the *Gerätesicherheitsgesetz* (German Equipment Safety Law).

Foreword

This standard has been prepared by the *Normenausschuß Rundstahlketten* (Round Steel Link Chains Standards Committee), Technical Committee *Anschlagketten und Zubehör*, in cooperation with the *Norddeutsche Metall-Berufsgenossenschaft*.

Amendments

The following amendments have been made to the June 1980 edition.

- a) The text of the standard has been restructured.
- b) As regards the manufacturing proof test, the acceptance inspection, marking, test certificate and use, reference is now made to DIN 685-3 to DIN 685-5.

Previous editions

DIN 5687-1: 1972-06, 1980-06.

1 Scope and field of application

This standard specifies dimensions and requirements for tested medium tolerance round steel link chains of grade 5, mainly used for manufacturing chain slings as specified in DIN 5688-1.

2 Normative references

This standard incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the titles of the publications are listed below. For dated references, subsequent amendments to or revisions of any of the publications apply to this standard only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies.

- DIN 685-1 Tested round steel chains – Concepts
- DIN 685-2 Tested round steel chains – Safety requirements
- DIN 685-3 Tested round steel chains – Testing

Continued on pages 2 to 5.

Translation by DIN-Sprachendienst.

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

DIN 685-4 Tested round steel chains – Marking and test certificate
DIN 685-5 Tested round steel chains – Use
DIN 5688-1 Grade 5 chain slings with hook or ring type terminal fittings
DIN 17115 Steel for welded round steel chains – Technical delivery conditions

3 Concepts

For concepts, see DIN 685-1.

4 Dimensions and designation

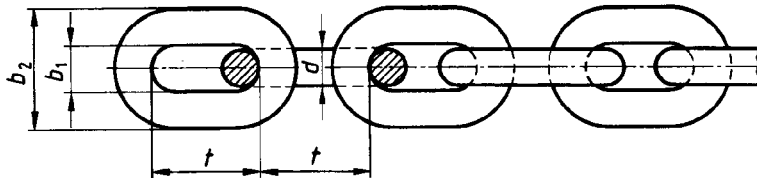


Figure 1

Designation of a grade 5 round steel link chain, with a nominal link size, d , of 8 mm and a pitch, t , of 24 mm:

Chain DIN 5687 – 5 – 8 × 24

Designation to be used when ordering:

Example of an order for 100 m of round steel link chain of grade 5, with a nominal link size, d , of 8 mm and a pitch, t , of 24 mm:

100 m chain DIN 5687 – 5 – 8 × 24

5 Material

Chains shall be made at least of grade 15 Mn3 Al steel as specified in DIN 17115.
The material composition and manufacture shall be as specified in DIN 685-2.

6 Finish

6.1 Surface finish

The standard surface finish shall be natural black, other finishes being the subject of agreement.

6.2 Weld

The weld diameter, d_s , shall neither be less than d nor exceed d by more than 7,5 %. Welds shall be positioned in the centre of one leg of the links, with the length affected by welding, a , not exceeding the value of d (cf. annex B).

7 Requirements

7.1 Dimensions

The chain dimensions and limit deviations shall be in accordance with table 1. The chain length as supplied shall not differ from the length ordered by more than $\pm 1,75$ %.

7.2 Heat treatment

The chains shall be heat treated and meet the requirements specified in DIN 685-2.

Table 1: Dimensions and mass

Dimensions in mm

Nominal link size		Pitch		Width		Approx. mass, in kg/m
(<i>d</i>)	Limit deviations	<i>t</i>	Limit deviations	Inside <i>b</i> ₁ min.	Outside <i>b</i> ₂ max.	
6	± 0,2	18	± 0,5	8	21,6	0,8
8	± 0,3	24	± 0,7	10,8	28,8	1,4
10	± 0,4	30	± 0,9	13,5	36	2,2
13	± 0,5	39	± 1,2	17,5	46,8	3,8
16	± 0,6	48	± 1,4	21,5	57,6	5,7
18	± 0,9	54	± 1,6	24,3	64,8	7,3
20	± 1	60	± 1,8	27	72	9
22	± 1,1	66	± 2	29,5	79,2	10,9
26	± 1,3	78	± 2,3	35	93,6	15,2
28	± 1,4	84	± 2,5	37,8	100,8	17,6
32	± 1,6	96	± 2,9	43,2	115	23
36	± 1,8	108	± 3,2	48,5	130	29
40	± 2	120	± 3,6	54	144	36
45	± 2,3	135	± 4,1	61	162	45,5

Table 2: Mechanical properties

Dimensions in mm

Nominal link size (<i>d</i>)	Lifting capacity, in kg	Minimum manufacturing proof force, in kN	Minimum breaking force, in kN	Minimum bend deflection, <i>f</i>
6	750	19	30	5
8	1 250	32	50	7
10	2 000	50	80	8
13	3 200	80	125	11
16	5 000	125	200	13
18	6 300	160	250	15
20	8 000	200	320	16
22	10 000	250	400	18
26	12 500	320	500	21
28	16 000	400	630	23
32	20 000	500	800	26
36	25 000	630	1 000	29
40	32 000	800	1 250	32
45	40 000	1 000	1 600	36

7.3 Mechanical properties

The manufacturing proof force, breaking force and bend deflection of chains shall be as specified in table 2, with the total ultimate elongation being at least 25 %.¹⁾

These values shall also be achieved after re-heating of chains to 400 °C. No cracks shall occur when subjecting chains to bend testing.

8 Manufacturing proof test

For manufacturing proof testing, the specifications of DIN 685-3 shall apply.

9 Acceptance inspection

Acceptance inspection shall cover a dimensional check, tensile testing and bend testing as specified in DIN 685-3.

Any other tests may be agreed upon when ordering.

10 Marking

Marking of chains shall be as specified in DIN 685-4. In addition, chains shall have a green pentagonal identification tag affixed to each unit delivered, as illustrated in figure 2.

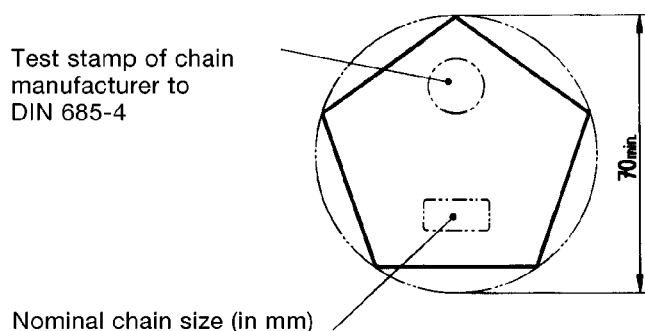


Figure 2

11 Test certificate

A test certificate shall be issued in accordance with DIN 685-4.

12 Use

Handling, inspection and maintenance of chains shall comply with the specifications of DIN 685-5.

Annex A

Other relevant standards

- | | |
|--------------|---|
| DIN 695 | Grade 2 chain slings with hook or ring type terminal fittings |
| DIN 32891 | Tested non-calibrated round steel link chains, grade 2 |
| DIN EN 818-2 | Safety of short link chains for lifting purposes – Part 2: Medium tolerance chain for chain slings, grade 8 |
| DIN EN 818-3 | Safety of short link chains for lifting purposes – Part 3: Medium tolerance chain for chain slings, grade 4*) |
| DIN EN 818-4 | Safety of short link chains for lifting purposes – Part 4: Chain slings, grade 8 |
| DIN EN 818-5 | Safety of short link chains for lifting purposes – Part 5: Chain slings, grade 4*) |
- VBG-Richtlinie (VBG Code of practice) 9a Lastaufnahmeeinrichtungen im Hebezeugbetrieb (Load carrying devices for lifting purposes)

¹⁾ Where natural black chain slings are to be supplied with a blank surface, the total ultimate elongation shall be at least 20 %, and the specifications for the manufacturing proof force and breaking force specified in table 2 shall be complied with.

*) At present at the stage of draft.

Annex B

Explanatory notes

This standard has been revised in form, not in substance.

The limit deviations for the pitch specified in table 1 correspond to a tolerance of $\pm 3\%$, rounded to 1/10 mm.

The link dimensions shown in table B.1 have been derived from the nominal link size, d , including widths b_1 and b_2 as given in table 1, which have been rounded to 1/10 mm.

Table B.1: Design dimensions as a function of link size

Minimum inside width, b_1 ¹⁾	$1,35 d$
Maximum diameter of welded leg, d_s	$1,075 d$
Diameter of unwelded leg, d	$1 d$
Approx. tolerance on width, B_t	$0,175 d$
Maximum outside width, b_2	$3,6 d$
¹⁾ The minimum inside width, together with a clearance between welds of interlocking links, s , equal to $0,275 d$, ensure freedom from kinking or locking of chain links.	

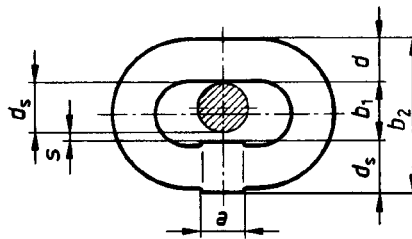


Figure B.1: Chain link (notation)

The values of mechanical properties given in table 2 are based on the values given in table B.2.

Table B.2: Design parameters for specifying mechanical properties

Stress at working load limit	125 N/mm^2
Stress at manufacturing test force	315 N/mm^2
Stress at breaking force	500 N/mm^2
Ratio of stresses at working load limit to those at manufacturing test force and breaking force	$1 : 2,5 : 4$
Minimum bend deflection	$f = 0,8 \times d$