



# THIELE Hoist Chains



## Fine Tolerance Hoist Chains



THIELE hoist chains according to EN 818-7 are manufactured on modern digital controlled production lines. The high dimension accuracy enables high performance hoists a faultless run of the chain over the sprocket. The heat treatment is being done in modern and environmental friendly continuous heat treatment facilities. Therefore, THIELE hoist chains have a homogenous high tensile strength with an exceeding core ductility along the legs and rounding of each link.

**Hoist chains are basically designed for the following applications:**

**Type T:**

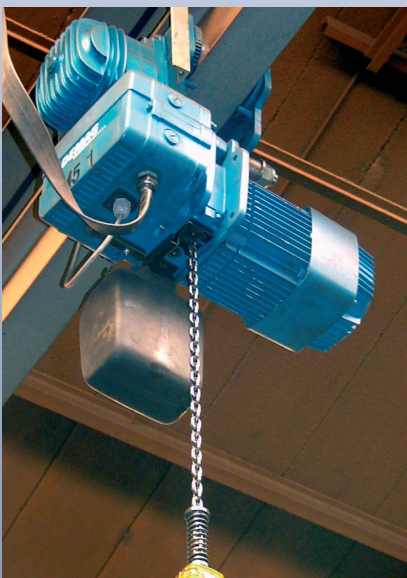
- + for manual chain hoists
- + for motor-driven, low-speed hoists
- + no significant abrasion from the working environment

**Type DAT:**

- + motor-driven, high-speed hoists with a high load capacity
- + high wear resistance over longer operating periods

**Type DT:**

- + motor-driven hoists
- + abrasive working environment

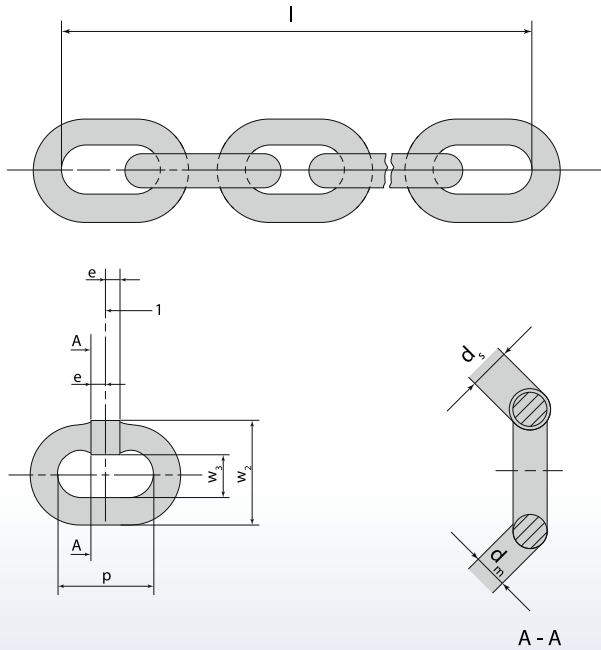


**Notice:**

Case-hardened chains are not suitable for use in portable, hand-operated hoists.

## Fine Tolerance Hoist Chains

### Dimensions



#### Key

- 1 intersection
- $l$  multi pitch length
- $p$  pitch
- $d_m$  material diameter
- $d_w$  weld-point diameter
- $e$  length of weld-point section
- $w_3$  internal width of weld point
- $w_2$  external width over weld point



### Size Table

Dimension [mm]	Nominal Size		Pitch		Width		Multi Pitch Length	
	d [mm]	tol. $\pm$ [mm]	p [mm]	tol. $\pm$ [mm]	$w_3$ [mm min.]	$w_2$ [mm max.]	11 x p [mm]	tol. $\pm$ [mm]
4 x 12	4,0	+0,20 / -0,20	12,0	+0,15 / -0,10	4,8	13,6	132,0	+0,40 / -0,20
4,2 x 12,2	4,2	+0,10 / -0,20	12,2	+0,15 / -0,10	4,8	13,7	134,2	+0,40 / -0,20
5 x 15	5,0	+0,20 / -0,20	15,0	+0,20 / -0,10	6,0	17,0	165,0	+0,50 / -0,30
5,3 x 15,2	5,3	+0,10 / -0,20	15,2	+0,20 / -0,10	5,9	16,9	167,2	+0,50 / -0,30
6 x 18	6,0	+0,20 / -0,20	18,0	+0,25 / -0,10	7,2	20,4	198,0	+0,60 / -0,30
7 x 21 <sup>1)</sup>	7,0	+0,10 / -0,28	21,0	+0,30 / -0,00	8,4	23,4	231,0	+0,70 / -0,00
7 x 22	7,0	+0,30 / -0,30	22,0	+0,30 / -0,15	8,4	23,8	242,0	+0,80 / -0,40
7,4 x 21,2	7,4	+0,10 / -0,30	21,2	+0,30 / -0,15	8,4	23,8	233,2	+1,70 / +0,70
8 x 24	8,0	+0,30 / -0,30	24,0	+0,30 / -0,15	10,2	27,2	264,0	+0,80 / -0,40
9 x 27 <sup>1)</sup>	9,0	+0,10 / -0,40	27,0	+0,25 / -0,10	10,8	30,4	297,0	+0,70 / -0,30
10 x 30	10,0	+0,40 / -0,40	30,0	+0,40 / -0,20	12,0	34,0	330,0	+1,00 / -0,50
11 x 31 <sup>1)</sup>	11,0	+0,30 / -0,40	31,0	+0,30 / -0,15	13,2	36,5	341,0	+0,90 / -0,30
13 x 36 <sup>1)</sup>	13,0	+0,10 / -0,50	36,0	+0,35 / -0,15	15,2	42,9	396,0	+1,10 / -0,20
16 x 45 <sup>1)</sup>	16,0	+0,30 / -0,60	45,0	+0,45 / -0,25	18,2	52,8	495,0	+1,40 / -0,50
18 x 50	18,0	+0,90 / -0,90	50,0	+0,65 / -0,35	21,6	61,2	550,0	+1,75 / -0,85
22 x 66 <sup>1)</sup>	22,0	+0,80 / -1,10	66,0	+0,65 / -0,35	27,0	75,0	726,0	+2,00 / -0,70
31,5 x 90 <sup>1)2)</sup>	31,5	+1,60 / -1,60	90,0	+1,20 / -0,60	37,8	107,1	990,0	+3,20 / -1,60

<sup>1)</sup>Limited tolerances. Also complies with RAG 726 300.

<sup>2)</sup>Similar to EN 818-7.



## Fine Tolerance Hoist Chains

### Working Load Limits

Nominal Diameter $d_n$ [mm]	Type T [t max.]	Type DAT [t max.]	Type DT [t max.]
4	0,5	0,4	0,25
5	0,8	0,6	0,4
6	1,1	0,9	0,56
7	1,5	1,2	0,75
8	2,0	1,6	1,0
9	2,5	2,0	1,25
10	3,2	2,5	1,6
11	3,8	3,0	1,9
12	4,5	3,6	2,2
13	5,3	4,2	2,6
14	6,0	5,0	3,0
16	8,0	6,3	4,0
18	10,0	8,0	5,0
20	12,5	10,0	6,3
22	15,0	12,5	7,5

### Nominal Stress

Type T [N/mm <sup>2</sup> min.]	Type DAT [N/mm <sup>2</sup> min.]	Type DT [N/mm <sup>2</sup> min.]
200*	160	100

\*Only for hand-operated hoists. For motor-driven hoists see DIN EN 818-7.

### Mechanical Properties

Nominal Size $d_n$ [mm]	Test Force (MPF) [kN min.]	Breaking Force (BF) [kN min.]
4	12,6	20,1
5	19,6	31,4
6	28,3	45,2
7	38,5	61,2
8	50,3	80,4
9	63,6	102,0
10	78,5	126,0
11	95,0	152,0
12	113,0	181,0
13	133,0	212,0
14	154,0	246,0
16	201,0	322,0
18	254,0	407,0
20	314,0	503,0
22	380,0	608,0

## Fine Tolerance Hoist Chains

### Elongation and Deflection

Type	Properties	Elongation at Break A [% min.]	Deflection f [mm min.]
T		10	$0,8 d_n$
DAT		10	b
DT		5	b

### Surface Hardness

Type	Surface Hardness <sup>1)</sup>	$d_n < 7$ mm [HV5 min.]	$d_n = 7-11$ mm [HV10 min.]	$d_n > 11$ mm [HV10 min.]
T		360	360	360
DAT		500	500	450
DT		550	550	500

<sup>1)</sup>At defined measuring points acc. to EN 818-7.

### Hardening Depth

Nominal Size $d_n$ [mm]	Type	
	DAT [mm]	DT [mm]
$< 8$	$(0,04 \pm 0,01) d_n$	$(0,05 \pm 0,01) d_n$
$\geq 8$	$(0,03 \pm 0,01) d_n$	$(0,04 \pm 0,01) d_n$

### Chemical Composition

The steel must contain nickel and at least one of the other alloying elements with the minimum contents indicated in the following table:

Grade	Mass content according to cast analysis		
	Type T [% min.]	Type DAT [% min.]	Type DT [% min.]
Nickel	0,40	0,70	0,90 <sup>2)</sup>
Chromium	0,40	0,40	0,40
Molybdenum	0,15	0,15	0,15

<sup>2)</sup>A higher surface hardness and/or a greater hardening depth requires a higher nickel content in order to prevent embrittlement.

### Fatigue Strength

Hoist chains of type DAT and DT must be capable of withstanding at least  $2 \times 10^6$  cycles in the following stress range without failure.

Upper Stress ( $\sigma$ ) [N/mm <sup>2</sup> max.]	Medium Stress ( $\sigma$ ) [N/mm <sup>2</sup> ]	Lower Stress ( $\sigma$ ) [N/mm <sup>2</sup> min.]
200	120	120



## Fine Tolerance Hoist Chains

### Operating Temperatures

THIELE hoist chains of type T and DAT can be used at operating temperatures of up to 200°C. They must not be used at temperatures above 200°C.

Type	Lowest Temperature	
	[°C max.]	
T	-40	
DAT	-20	
DT	-10	

### Surface

THIELE-hoist chains are produced as standard in either bright or galvanised finish. Other surface treatments, such as zinc-flake coating and thick-film passivation, are available on request. THIELE galvanising is carried out using the drum method. Because of its process characteristics this technique provides a more uniform corrosion protection for the hoist chain than the continuous galvanisation method. After galvanising THIELE hoist chains are tested with a manufacturers proof force. This is designed to exclude any chains showing signs of material embrittlement.

### Marking

The marking relates to the specifications of EN 818-1. The quality marking for the hoist chain is 'T', 'DAT' or 'DT', according to type.

### Test Certificates

If a hoist chain is being supplied in meters it must bear the appropriate CE-marking in accordance with the EU-machinery directive. It must also be accompanied by the required supporting documents, including a declaration of conformity operating instructions can be downloaded on [www.thiele.de](http://www.thiele.de). The test certificate must meet the requirements of EN 818-1.

### ISO-Mechanism Groups

Chain Type	Mechanism groups (according to ISO 4301)													
	M <sub>2</sub>		M <sub>3</sub>		M <sub>4</sub>		M <sub>5</sub>		M <sub>6</sub>		M <sub>7</sub>		M <sub>8</sub>	
	T&DAT	DT	T&DAT	DT	T&DAT	DT	T&DAT	DT	T&DAT	DT	T&DAT	DT	T&DAT	DT
Nominal stress ( $\sigma_B$ ) at minimum breaking strength ( $BF_{min}$ )	800		800		800		800		800		800		800	
Nominal stress at production test force (MPF)	500		500		500		500		500		500		500	
Nominal stress ( $\sigma_{Lim}$ ) at dynamic limit load ( $F_{Lim}$ )	225	200	200		180		160		140		125		112	
Nominal stress ( $\sigma_{CF}$ ) at maximum permissible chain force ( $F_{CF}$ )	160	100	160	100	140	90	125	80	112	70	100	63	90	56

**Note:** The stress figures in this table are obtained by dividing the force by the entire cross section of both legs of the link, i.e. these are nominal stresses. The stresses are not uniformly distributed; the local tensile stress is much greater, especially at the outer faces of the link.

**Recommendation:** In order to guarantee optimised frictionless operation run between the sprocket and hoist chain, please send us your hoist sprocket.



## Fine Tolerance Hoist Chains

### Instructions for the Correct Use of Hoist Chains

1. Select the right size and finish of the chain under consideration of the selection criteria acc. to EN 818-7.
2. Pay attention to correct attachment of the chains in the hoist.

The hoist chain must be properly guided and should enter and leave the pocket wheels without twisting.

In order to ensure that the hoist chain runs smoothly over the pocket wheels without any unusual shocks, the drive wheels and tail wheels must match the type of chain used.

The connector element for the hoist in the last link of the chain strand should not widen the profile of the link at this point and there must be a clearance of at least 5% available at the inner width of the hoist chain.

3. Cleaning and lubricating

Hoist chains must be properly and continuously lubricated, especially in the joint areas, in order to ensure a long service life.

The hoist chain must not be exposed to any kind of contamination that could affect its freedom of movement.

4. Hoist chains are not allowed to be used as lifting chains. Equally, a hoist chain fitted to a hoist must not be used for bridle hitch or choke hitch slinging.



### Discard Criteria

Chain hoists should be immediately withdrawn from service if the chain exhibits any of the following defects:

- + deformation/stretch (even if this only affects individual chain links)
- + cut notches, cracks, incipient cracks, pinching
- + exposure to heat above the permitted range
- + severe corrosion
- + wear in excess of 10% (e.g. of averaged thickness of chain link)
- + increase of more than 5% in the pitch of individual links
- + increase in pitch, measured over 11 links, of more than 2% in the case of motor-driven hoists and 3% in the case of hand-operated hoists
- + illegible markings.



## Fine Tolerance Hoist Chains

### Article Numbers

#### Calibrated Hoist Chains

Dimension [mm]	Article-No. Type T		Article-No. Type DAT		Weight app. [kgs/m]
	bright	el. galvanized	bright	el. galvanized	
4 x 12	–	–	–	F09008	0,35
4,2 x 12,2	–	–	–	–	0,39
5 x 15	–	F09016	–	F09018	0,55
5,3 x 15,2	–	–	–	–	0,63
6 x 18	–	F09026	–	F09028	0,79
7 x 21 <sup>1)</sup>	F09030	F09031	–	F09033	1,08
7 x 22	–	F09036	–	F09038	1,06
7,4 x 21,2	–	–	–	–	1,23
8 x 24	–	F09046	–	F09048	1,41
9 x 27 <sup>1)</sup>	F09050	F09051	–	F09053	1,79
10 x 30	–	F09056	–	F09058	2,21
11 x 31 <sup>1)</sup>	F09060	F09061	–	F09063	2,75
13 x 36 <sup>1)</sup>	F09065	F09066	–	–	3,87
16 x 45 <sup>1)</sup>	F09070	F09071	–	–	5,82
18 x 50	F09075	F09076	–	–	7,40
22 x 66 <sup>1)</sup>	F09080	F09081	–	–	10,70
31,5 x 90 <sup>1)2)</sup>	F09085	F09086	–	–	22,40

<sup>1)</sup>Limited tolerances. Also complies with RAG 726 300.

<sup>2)</sup>Similar to EN 818-7.

#### Calibrated Hand Chain

Dimension [mm]	Article-No.	Weight app. [kgs/m]
5 x 25	Z02655*	0,46

\*Execution: Electro galvanized.

### Advantages at a glance:

- + Fine toleranced dimensions
- + Homogen tensile strengths
- + Excellent core ductility
- + High safety against hydrogen embrittlement (electro galvanized chains)
- + High wear resistant





## Fine Tolerance Hoist Chains

### Maintenance and Handling of Hoist Chains

#### Maintenance:

Hoist chains are subject to significant interlink wear due to the deflection on the drive wheel and, possibly, also on the tail wheels (e.g., bottom block).

Further wear is due to the frictional contact of the chain link arm on the wheel pockets or even the guide elements.

To keep this wear to a minimum, a hoist chain should be fully lubricated, if possible, as part of the initial startup.

The lubricating film on the hoist chain left from manufacturing processes or warehousing is not sufficient.

When lubricating, make sure the lubricant also reaches the inner sides of each rounded area on every link. This increases the service life considerably.

If the chain is dirty and unlubricated, this can cause premature wear and subsequent chain failure.

Unless specified otherwise by the chain hoist manufacturer, lubricate the chain, for example, with a mineral oil according to DIN 51502 CLP 220 or, in case of a dusty or dirty environment, with a dry-film lubricant such as UNIMOLY C 220 Spray.

#### Exceptions:

In rare cases, chain hoists are used in very dusty environments with abrasive media, which means the dust sticks to the chains because of the lubricant and thus contributes to wear instead of preventing it. Here, the use of DAT hoist chains (deeper case depth) without lubrication is recommended.

Hoists are used in food production as well. This requires the use of stainless steel chains and / or food grade lubricant depending on the application.

#### Inspections:

The respective, valid regulations DGUV-54 as well as the stipulations of DIN 685-5, DIN EN 818-6, and DIN EN 818-7 must be observed, as well as the operating instructions of the hoist and any national or local rules and regulations.

The hoist chain should be checked at regular intervals according to the accident prevention rules and regulations. The minimum requirement here is an inspection within one year.

Depending on the operating and environmental conditions (multi-shift, automatic or continuous operation, corrosion, heat, etc.), the hoist chain should be checked at shorter intervals.

Inspection intervals are to be defined by the operator in these cases.

Shorter inspection intervals are recommended, unless empirical values are not available.

The inspection should include checking the dimensional accuracy, deformation, and a visual inspection concerning any possible cracks, notches or similar visual aspects.

The inspection must include the entire chain length in order to be effective.

Defects must be repaired immediately, before further operation of the hoist.

After three years, at the latest, an additional inspection for cracks must also be carried out.

The hoist chain must be discarded if the average diameter ( $d_m$ ) at any point of an individual chain link is less than the nominal thickness ( $d_n$ ) by more than 10%.

The formula for this is as follows:

$$d_m = (d_1 + d_2) / 2 < 0.9 \times d_n$$

( $d_1$  and  $d_2$  are to be determined at an offset of 90° to one another in the same cross-section)

The hoist chain must also be discarded if the inner pitch of a single chain link has become enlarged by more than 5% or if any measurement distance across 11 chain links (sum across 11 internal pitches) has increased by more than 2%.

Hoist manufacturers usually provide exact dimensional values in their operating instructions, or corresponding gauges are available.

The wear of the wheels should be checked if possible during a chain inspection.

If the chain drive is maintained well, used chain wheels can certainly be used with a new hoist chain. However, it is to be assumed that the service life of new hoist chains with used wheels is lower than with new wheels.

#### Storage:

Store hoist chains in a dry location at temperatures between 0 and 40 °C..



Please refer to our operating instructions for further information on the use and maintenance of hoist chains in the THIELE download-center on our website [www.THIELE.de](http://www.THIELE.de)

