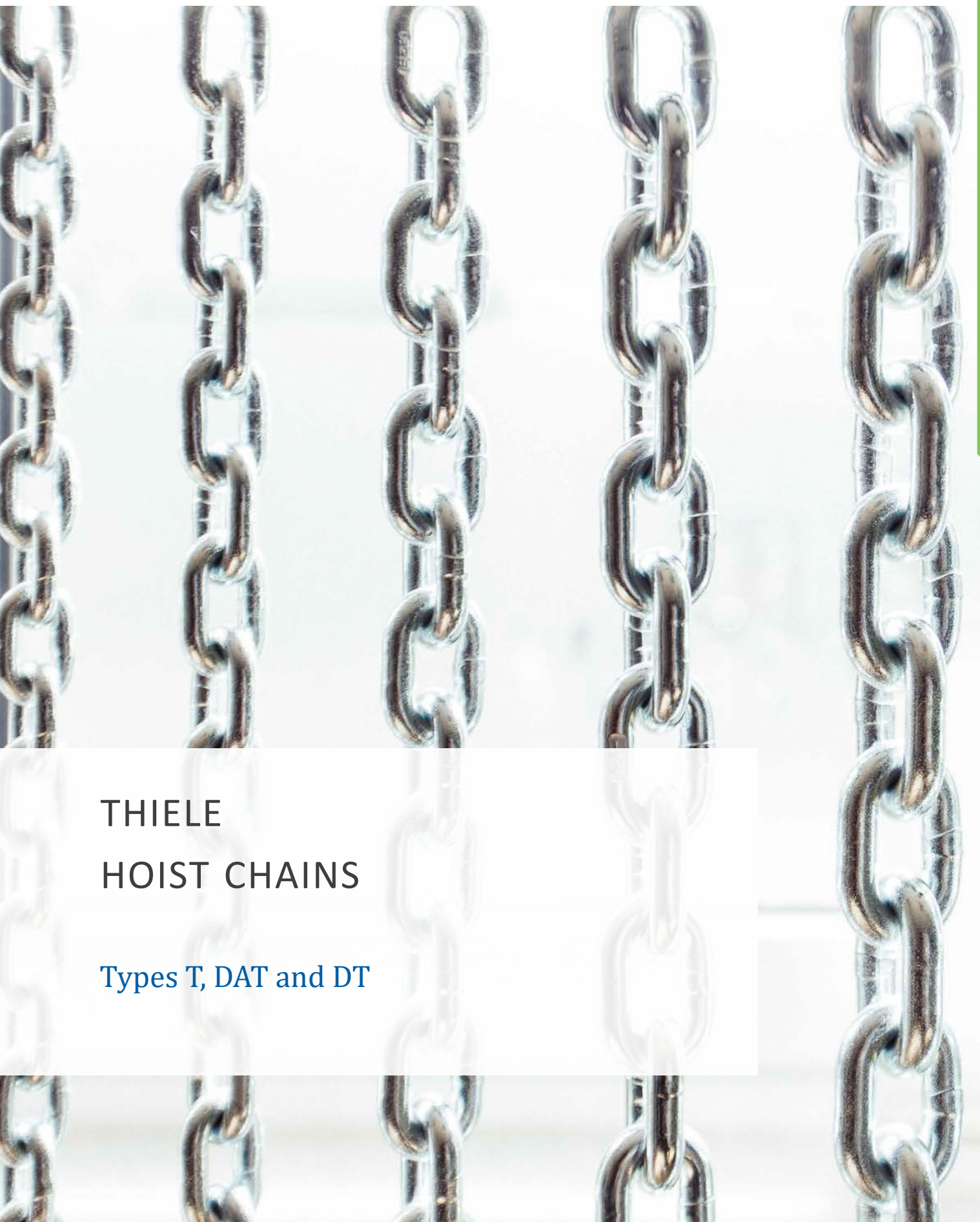


THIELE
HOIST CHAINS

Types T, DAT and DT

THK

Hoist Chains

THIELE hoist chains according to the DIN 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 continuous heat treatment facilities. Therefore, THIELE hoist chains have a homogenous high tensile strength with an outstanding core ductility along the chain strands and roundings.

Hoist chains are designed for the following applications:

T-Type:
> for manual chain hoists and lever blocks
> for motor-driven, low-speed hoists

DAT-Type:
> motor-driven, high-speed hoists with a high load capacity

DT-Type:
> motor-driven hoists

Advantages of THIELE Hoist Chains:

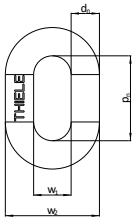
- High dimension accuracy
- Homogenous high tensile strength
- Outstanding core ductility
- High resistance against brittle fracture (espacially with the galvanized version)
- High wear resistance

Hoist Chains

Hoist Chains Type T

TWN 0062

The hoist chains TWN 0062 (T type) are used as load chains predominantly in manually operated hoists, e.g. in TM Chain Blocks and TM Lever Blocks. They are also used in motor-driven electric chain hoists that are used as maintenance hoists in wind turbines. The hoist chains are tempered, galvanized and comply with the DIN EN 818-7.



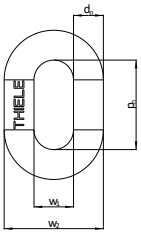
Dimension	Article-No.		Nominal Size		Pitch		Width		Working Load Limit	Weight app.	Measuring Length	
	bright polished	electro galvanized	d_n	Tol. ±	p_n	Tol. ±	w_1 [mm] min.	w_2 [mm] max.			11 x p	Tol. ±
[mm]			[mm]	[mm]	[mm]	[mm]			[t]	[kgs/m]	[mm]	[mm]
4 x 12	–	–	4,0	+0,20 / -0,20	12	+0,15 / -0,10	4,80	13,60	0,50	0,35	132,0	+0,40 / -0,20
4,2 x 12,2 [2]	–	–	4,2	+0,10 / -0,20	12	+0,15 / -0,10	4,80	13,70	0,50	0,39	134,2	+0,40 / -0,20
5 x 15	–	F09016	5,0	+0,20 / -0,20	15	+0,20 / -0,10	6,00	17,00	0,80	0,54	165,0	+0,50 / -0,30
5,3 x 15,2 [2]	–	–	5,3	+0,10 / -0,20	15	+0,20 / -0,10	5,90	16,90	0,80	0,63	167,2	+0,50 / -0,30
6 x 18	–	F09026	6,0	+0,20 / -0,20	18	+0,25 / -0,10	7,20	20,40	1,10	0,79	198,0	+0,60 / -0,30
7 x 21 [1]	F09030	F09031	7,0	+0,10 / -0,28	21	+0,30 / -0,00	8,40	23,40	1,50	1,08	231,0	+0,70 / -0,00
7 x 22	–	F09036	7,0	+0,30 / -0,30	22	+0,30 / -0,15	8,40	23,80	1,50	1,06	242,0	+0,80 / -0,40
7,4 x 21,2	–	–	7,4	+0,10 / -0,30	21	+0,30 / -0,15	8,40	23,80	1,50	1,23	233,2	+1,70 / -0,70
8 x 24	–	F09046	8,0	+0,30 / -0,30	24	+0,30 / -0,15	10,20	27,20	2,00	1,41	264,0	+0,80 / -0,40
9 x 27 [1]	F09050	F09051	9,0	+0,10 / -0,40	27	+0,25 / -0,10	10,80	30,40	2,50	1,79	297,0	+0,70 / -0,30
10 x 30	–	F09056	10,0	+0,40 / -0,40	30	+0,40 / -0,20	12,00	34,00	3,20	2,16	330,0	+1,00 / -0,50
11 x 31 [1] [2]	F09060	F09061	11,0	+0,30 / -0,40	31	+0,30 / -0,15	13,20	36,50	3,80	2,75	341,0	+0,90 / -0,30
13 x 36 [1]	F09065	F09066	13,0	+0,10 / -0,50	36	+0,35 / -0,15	15,20	42,90	5,30	3,87	396,0	+1,10 / -0,20
16 x 45 [1]	F09070	F09071	16,0	+0,30 / -0,60	45	+0,45 / -0,25	18,20	52,80	8,00	5,82	495,0	+1,40 / -0,50
18 x 50	F09075	F09076	18,0	+0,90 / -0,90	50	+0,65 / -0,35	21,60	61,20	10,00	7,40	550,0	+1,75 / -0,85
22 x 66 [1]	F09080	F09081	22,0	+0,80 / -1,10	66	+0,65 / -0,35	27,00	75,00	15,00	10,70	726,0	+2,00 / -0,70
31,5 x 90 [1] [2]	F09085	F09086	31,5	+1,60 / -1,60	90	+1,20 / -0,60	37,80	107,10	31,50	22,40	990,0	+3,20 / -1,60

[1] Limited tolerances. Also complies with RAG 726 300. | [2] Similar to DIN EN 818-7

Hoist Chains Type DAT

TWN 0063

The hoist chains TWN 0063 (DAT Type) are used as load chains predominantly in electric chain hoists for universal industrial applications. The hoist chains are case-hardened, galvanized and comply with the DIN EN 818-7.



Dimension	Article-No.		Nominal Size		Pitch		Width		Working Load Limit	Weight app.	Measuring Length	
	bright polished	electro galvanized	d_n	Tol. ±	p_n	Tol. ±	w_1 [mm] min.	w_2 [mm] max.			11 x p	Tol. ±
[mm]			[mm]	[mm]	[mm]	[mm]			[t]	[kgs/m]	[mm]	[mm]
4 x 12	–	F09008	4,0	+0,20 / -0,20	12	+0,15 / -0,10	4,80	13,60	0,40	0,35	132,0	+0,40 / -0,20
4,2 x 12,2 [2]	–	–	4,2	+0,10 / -0,20	12	+0,15 / -0,10	4,80	13,70	0,40	0,39	134,2	+0,40 / -0,20
5 x 15	–	F09018	5,0	+0,20 / -0,20	15	+0,20 / -0,10	6,00	17,00	0,60	0,54	165,0	+0,50 / -0,30
5,3 x 15,2 [2]	–	–	5,3	+0,10 / -0,20	15	+0,20 / -0,10	5,90	16,90	0,60	0,63	167,2	+0,50 / -0,30
6 x 18	–	F09028	6,0	+0,20 / -0,20	18	+0,25 / -0,10	7,20	20,40	0,90	0,79	198,0	+0,60 / -0,30
7 x 21 [1]	–	F09033	7,0	+0,10 / -0,28	21	+0,30 / -0,00	8,40	23,40	1,20	1,08	231,0	+0,70 / -0,00
7 x 22	–	F09038	7,0	+0,30 / -0,30	22	+0,30 / -0,15	8,40	23,80	1,20	1,06	242,0	+0,80 / -0,40
7,4 x 21,2 [2]	–	–	7,4	+0,10 / -0,30	21	+0,30 / -0,15	8,40	23,80	1,20	1,23	233,2	+1,70 / -0,70
8 x 24	–	F09048	8,0	+0,30 / -0,30	24	+0,30 / -0,15	10,20	27,20	1,60	1,41	264,0	+0,80 / -0,40
9 x 27 [1]	–	F09053	9,0	+0,10 / -0,40	27	+0,25 / -0,10	10,80	30,40	2,00	1,79	297,0	+0,70 / -0,30
10 x 30	–	F09058	10,0	+0,40 / -0,40	30	+0,40 / -0,20	12,00	34,00	2,50	2,16	330,0	+1,00 / -0,50
11 x 31 [1] [2]	–	F09063	11,0	+0,30 / -0,40	31	+0,30 / -0,15	13,20	36,50	3,00	2,75	341,0	+0,90 / -0,30
13 x 36 [1]	–	–	13,0	+0,10 / -0,50	36	+0,35 / -0,15	15,20	42,90	4,20	3,87	396,0	+1,10 / -0,20
16 x 45 [1]	–	–	16,0	+0,30 / -0,60	45	+0,45 / -0,25	18,20	52,80	6,30	5,82	495,0	+1,40 / -0,50
18 x 50	–	–	18,0	+0,90 / -0,90	50	+0,65 / -0,35	21,60	61,20	8,00	7,40	550,0	+1,75 / -0,85
22 x 66 [1]	–	–	22,0	+0,80 / -1,10	66	+0,65 / -0,35	27,00	75,00	12,50	10,70	726,0	+2,00 / -0,70
31,5 x 90 [1] [2]	–	–	31,5	+1,60 / -1,60	90	+1,20 / -0,60	37,80	107,10	31,50	22,40	990,0	+3,20 / -1,60

[1] Limited tolerances. Also complies with RAG 726 300. | [2] Similar to DIN EN 818-7

Calibrated Hand Chain

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

**Execution: Electro galvanized*

Nominal Stress

Type T [N/mm²] min.	Type DAT [N/mm²] min.	Type DT [N/mm²] 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

Elongation and Deflection

Properties / Type	Elongation at Break A [%] min.	Deflection f [mm] min.
T	10	0,8 d_n
DAT	10	2,5 x WLL[1)]
DT	5	2,5 x WLL[1)]

[1)] Without surface cracks or visual damages

Surface Hardness

Surface Hardness[1)] / Type	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	500	500

[1)] At defined measuring points acc. to DIN EN 818-7.

Hardening Depth

Type	Hardening Depth at Nominal Size d_n < 8 mm [mm]	Hardening Depth at Nominal Size d_n ≥ 8 mm [mm]
DAT	(0,04 ± 0,01) d_n	(0,03 ± 0,01) d_n
DT	(0,05 ± 0,01) d_n	(0,04 ± 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:

Type	Mass content according to cast analysis depending on grade		
	Nickel [%] min.	Chromium [%] min.	Molybdenum [%] min.
T	0,40	0,40	0,15
DAT	0,70	0,40	0,15
DT	0,90 [2)]	0,40	0,15

[1)] *A higher surface hardness and/or higher hardening depth requires a higher nickel content in order to prevent embrittlement.*

Fatigue Strength

THIELE Hoist chains of type T, DT and DAT must be capable of withstanding at least 2 x 10^6 cycles in the following stress range without failure.

Upper Stress (σ) [N/mm²] max.	Medium Stress (σ) [N/mm²]	Lower Stress (σ) [N/mm²] min.
200	120	40

Operating Temperatures

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

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

Surface

THIELE Hoist Chains are produced as standard in either bright or galvanized finish. Other surface treatments, such as zinc-flake coating and thick-film passivation, are available on request. After the galvanizing, 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 complies with the specifications of the DIN EN 818-1.
The quality markings for the hoist chain are 'T', 'DAT' or 'DT', according to type.
Hoist chains must bear the appropriate CE-marking in accordance with the EU-machinery directive, 2006/42/EC if supplied meterwide.

Test Certificates

THIELE Hoist Chains are delivered with the test certificates according to the DIN EN 10254. Declaration of conformity and operating instructions can be downloaded on *www.thiele.de*. The test certificates must meet the requirements of the DIN EN 818-1.

ISO-Mechanism Groups

Stress \ Chain Type	Mechanism groups (according to ISO 4301)													
	M_2		M_3		M_4		M_5		M_6		M_7		M_8	
	T&DAT	DT	T&DAT	DT	T&DAT	DT	T&DAT	DT	T&DAT	DT	T&DAT	DT	T&DAT	DT
	[N/mm²] min.		[N/mm²] min.		[N/mm²] min.		[N/mm²] min.		[N/mm²] min.		[N/mm²] min.		[N/mm²] min.	
Nominal stress (σ_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 (σ_{Lim}) at dynamic limit load (F_{Lim})	225	200	200		180		160		140		125		112	
Nominal stress (σ_{CF}) at maximum permissible chain force (F_{CF})	160	100	160	100	140	90	125	80	112	70	100	63	90	56

The stress figures are obtained by dividing the force with the entire cross section of both legs of the link.
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 an optimised frictionless operation run between the sprocket and hoist chain, we recommend to send your sprocket hoist for on site testing.*

Instructions for the correct use of Hoist Chains

1. **Size Selection**
   Select the size and finish of the chain under consideration of the selection criteria according to the DIN EN 818-7.

2. **Assembling**
   Pay attention to correct assembly of the chains into the hoist. The hoist chain must be properly guided and should enter and leave the pocket wheel 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 the chain.
   The connector element for the hoist in the last link of the chain strand should not widen the profile of the link. There must be a clearance of at least 5 % at the inner width of the hoist chain.

3. **Cleaning and Lubricating**
   In order to ensure a long service life, hoist chains must be properly lubricated, especially in joint areas. The hoist chain must not be exposed to any kind of contamination that could affect its free mobility.

4. **Safety Note**
   Hoist chains are not allowed to be used as lifting chains.
   As well, 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 (also only individual chain links are effected)
- Sign of cut notches, cracks, incipient cracks, pinching, etc.
- Exposure to heat above the permitted temperature range
- Severe corrosion
- Wear in excess of 10 % (on the averaged thickness of chain link)
- Elongation of more than 5 % in the pitch of individual links
- Increase of pitch, dimension of more than 2 % for motor-driven hoists and 3 % for hand-operated hoists (measured over 11 links)
- Illegible markings

Maintenance and Handling of Hoist Chains and Drive Wheels

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., lower block).
Further, wear is due to the frictional contact of the chain leg 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 different 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. Because of the lubricant the dust sticks to the chain 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 also used in food production. 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 818-7, 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 chains 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 chains should be checked at shorter intervals. Inspection intervals are to be defined by the operator in these cases.

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 must be stored in a dry location at temperatures between 0 °C and 40 °C.

All operating manuals are available in the THIELE download-center on our website www.THIELE.de.

Notes