



THIELE Lashing Products



Product Overview of Lashing Products

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General Information

The Securing of Loads with THIELE Lashing Products



Load securing requires measures aimed at safeguarding the load against physical forces of movement arising during transport.

Nevertheless, vehicles are encountered on our roads every day that are carrying insufficiently secured loads or loads not safeguarded at all. More often than not, changes in speed or direction produce forces causing the cargo to no longer stay in place but move irregularly on the vehicle.

To avoid this risk, every load has to be secured on the carrier irrespective of whether it is light or

heavy and even when the vehicle runs at low speed. The conditions on which load securing methods are based apply to normal vehicle operation. However, „normal vehicle operation“ as a rule does not mean the carrier always travels evenly and foresightedly. Usual traffic conditions undoubtedly include full braking, uneven road surfaces, extreme evasion maneuvers and the like.

Measures implemented to secure loads must take all these conditions into account and if securing proves ineffective, insurance cover may be lost partly or even entirely. In such a case the relevant company or private person must bear the arising costs alone which may often lead to their economic ruin.

It is still not sufficiently known to all those concerned that the responsibility for load securing does not only lie with the driver of a vehicle but with all other participants in the forwarding chain as well (e.g. owner, sender, carrier, hauler etc.).

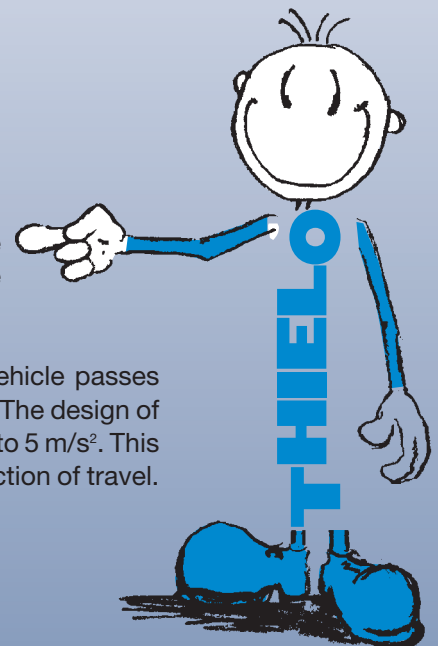


Physical Basics

THIELO, expert on Load Securing, informs us about some Physical Fundamentals that are good to know.

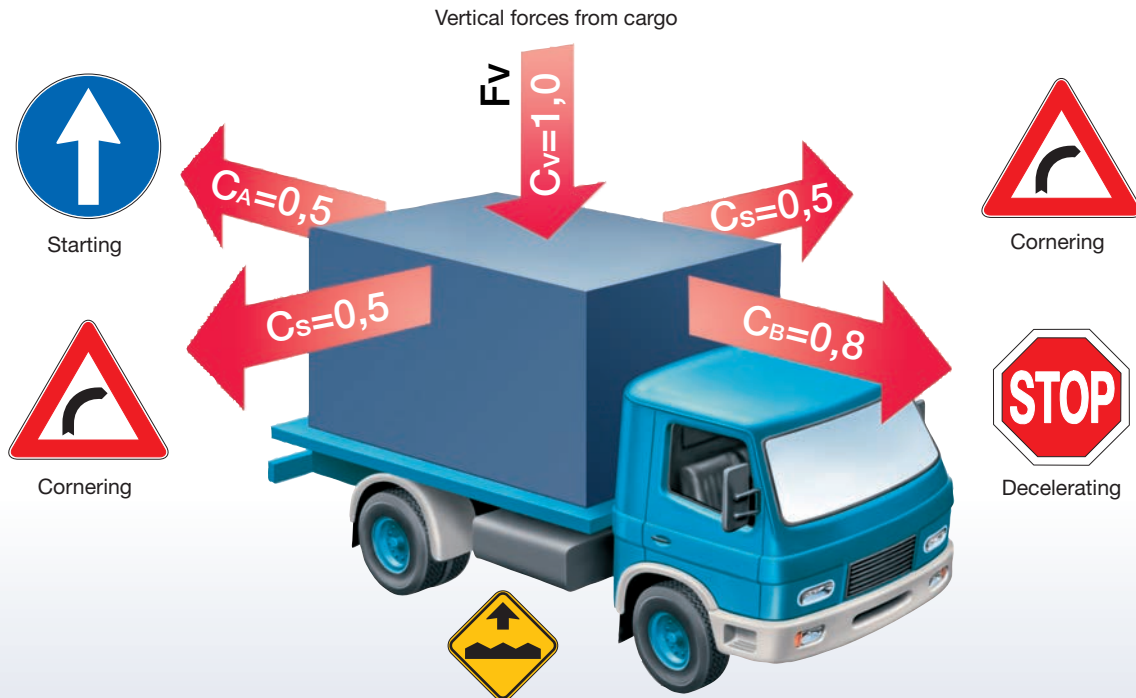
In the event of an emergency braking operation of the vehicle down to zero speed deceleration rates of up to 8 m/s^2 may arise. To put it in another way, 80 % of the weight of a given cargo component has to be absorbed by means of suitable securing means to prevent the load from sliding forward.

The centrifugal forces acting transversely to the direction of travel when a vehicle passes through turns must also be taken into account in the context of cargo securing. The design of commercial vehicles permits building up rates of acceleration in the range of up to 5 m/s^2 . This means that 50 % of the cargo weight has to be secured transversely to the direction of travel.



General Information

Arising Forces when Driving



Starting

Weight forces (acceleration force) to the rear
 $F_A = 0.5 \times F_V = 50\%$ of the cargo weight

Decelerating

Weight forces (deceleration force / negative acceleration) to the front
 $F_B = 0.8 \times F_V = 80\%$ of the cargo weight

Cornering

Weight forces (centrifugal force) acting sideways
 $F_S = 0.5 \times F_V = 50\%$ of the cargo weight

Accordingly, assuming a cargo weight F_V of $m = 15.000$ kgs, 15.000 daN will exert thrusting or pushing forces as follows:

Forces of Cargo

Cargo Weight [%]	Forces of Cargo	Force [daN min.]
100	Vertical force of cargo	$F_V = 15.000$
80	Longitudinal forward force	$F_B = 12.000$
50	Transverse force of cargo (right/left)	$F_S = 7.500$
50	Longitudinal rearward force	$F_A = 7.500$

Table 1

All these forces must be retained by means of load securing or lashing devices.



General Information

Securing Methods

Basically, a distinction is to be made between force- and form-closed cargo securing.

Force closure → Tie-down lashing

Form closure → Direct lashing

Tie-down Lashing

The perhaps most commonly used load securing method is tie-down lashing (see pic. 1 and 2).

The load securing devices are arranged over the cargo, attached to lashing fixtures and then tightened using maximum hand force.

The pre-tensioning force thus applied acts additionally to the weight force causing the cargo to be pressed onto the load area and frictional forces to increase. The sum from the weight and pressing forces takes effect in „all directions“. This in particular is the major advantage of the tie-down lashing method.

Vertical angle α primarily determines the effectiveness of the tie-down lashing method. When using a 90° angle 100% of the force introduced into the lashing system takes effect, at 30° this is only 50%. For this reason, the lashing angle β should never be less than 30° .

Moreover, the following should be considered for tie-down lashing operations:

- A high degree of friction must exist between the cargo and the load area as well as between the individual cargo components.
- The sliding friction coefficient must be known or well assessable.
- The cargo must be capable of withstanding high pre-tensioning forces.
- The lashing points on the vehicle must be designed to take the arising loads.
- Due to settling processes, the pre-tension of the load securing device must be regularly checked during transit so as to rule out that pre-tensioning forces will decrease and no longer be adequate.



The magnitude of the frictional force depends on the characteristics of the materials in contact with each other. It is clearly evident that a piece of metal will easier slide to and from a metal surface than on a surface consisting of rubber.

In practical testing on load surfaces as well as in laboratory tests a multitude of so-called sliding friction coefficients have been determined which serve as calculation basis for cargo securing purposes. These coefficients are identified by the symbol μ_D .

Dynamic friction coefficients of common cargo

Material pairing	Sliding friction coefficient (μ_D)
Steel on steel, oiled	0.10
Timber on steel plates	0.30
Steel on wood	0.40
Pre-cast concrete component with wood interlayer on wood (concrete/wood/wood)	0.40
Concrete on lattice beam	0.60

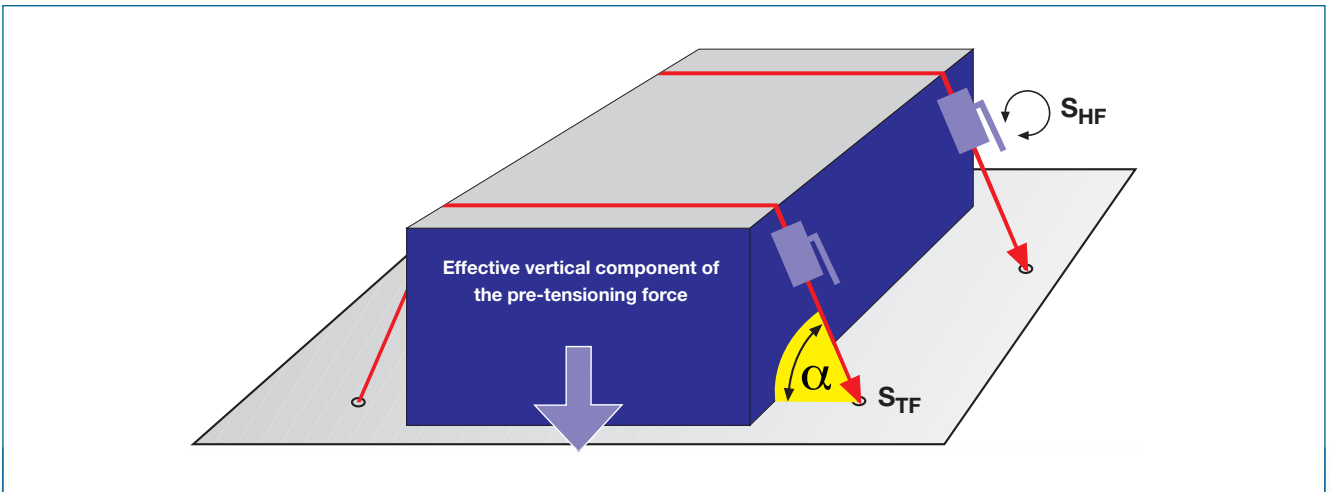
Table 2



General Information

Tie-down Lashing

Force introduction via the tensioning element



pic. 1

Due to the lashing angles tie-down lashing requires high pre-tensioning forces.

S_{HF} = Standard Hand Force (max. 50 daN) applied to the lever of the ratchet or screw tensioner. Only, if the tensioning element is tightened by hand (S_{HF}) at 50 daN can the pretensioning force (S_{TF}) indicated on the identification tag be reached.

S_{TF} = Standard Tension Force = Remaining force after the lever of the tensioning device has been released; i.e. the actually remaining force exerted by the load securing device.

The pre-tensioning force **F_T** is determined according to the following equation:

$$F_T \geq \frac{C_{A,S} - \mu_D}{\mu_D \times \sin \alpha} \times \frac{F_V}{k \times n} \quad [\text{daN max.}]$$

The meaning of formular symbols:

C_{A,S}* = Acceleration coefficient (in travel direction C_A = 0.8; transversely and counter to the drive direction C_S = 0.5)

C_V* = Acceleration coefficient, vertical

μ_D = Dynamic friction coefficient (sliding friction coefficient)

sin α = Sine function of the lashing angle

F_V = Vertical force of the cargo (cargo weight) ; (F_V = m x g x C_V)

k = Transfer coefficient (loss of pre-tensioning force due to friction between cargo and load securing device)
1.5 times if the load securing device is tightened by means of a tensioning device

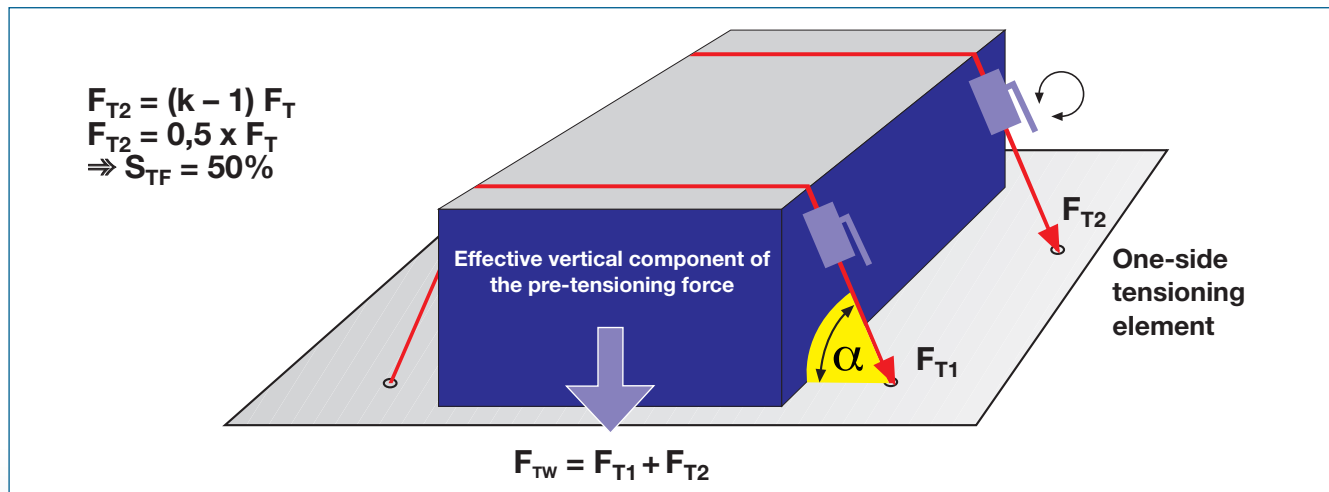
n = number of lashing devices

*Assumption: Cargo on road trucks and trailers

General Information

Tie-down Lashing

Over-the-top lashing



pic. 2

Pre-tensioning forces

Table 3 provides estimated pre-tensioning forces that are required to safely secure cargo.

Cargo-weight (F_V) [daN max.]	Sliding-friction coefficient [μ_D]	Lashing angle [α]	Total pretensioning force [daN max.]	Lashing angle [α]	Total pretensioning force [daN max.]
2.000	0,10	50°	12185	80°	9485
	0,40	50°	1745	80°	1355
	0,60	50°	580	80°	455
10.000	0,10	50°	60925	80°	47425
	0,40	50°	8725	80°	6775
	0,60	50°	2900	80°	2275
30.000	0,10	50°	182775	80°	142275
	0,40	50°	26175	80°	20325
	0,60	50°	8700	80°	6825

The data shown is based on material pairings listed in Table 2.

Table 3

As is evident from Table 3, the sliding friction coefficient and lashing angle are decisive significance!

Reach your destination with your cargo
safely secured!

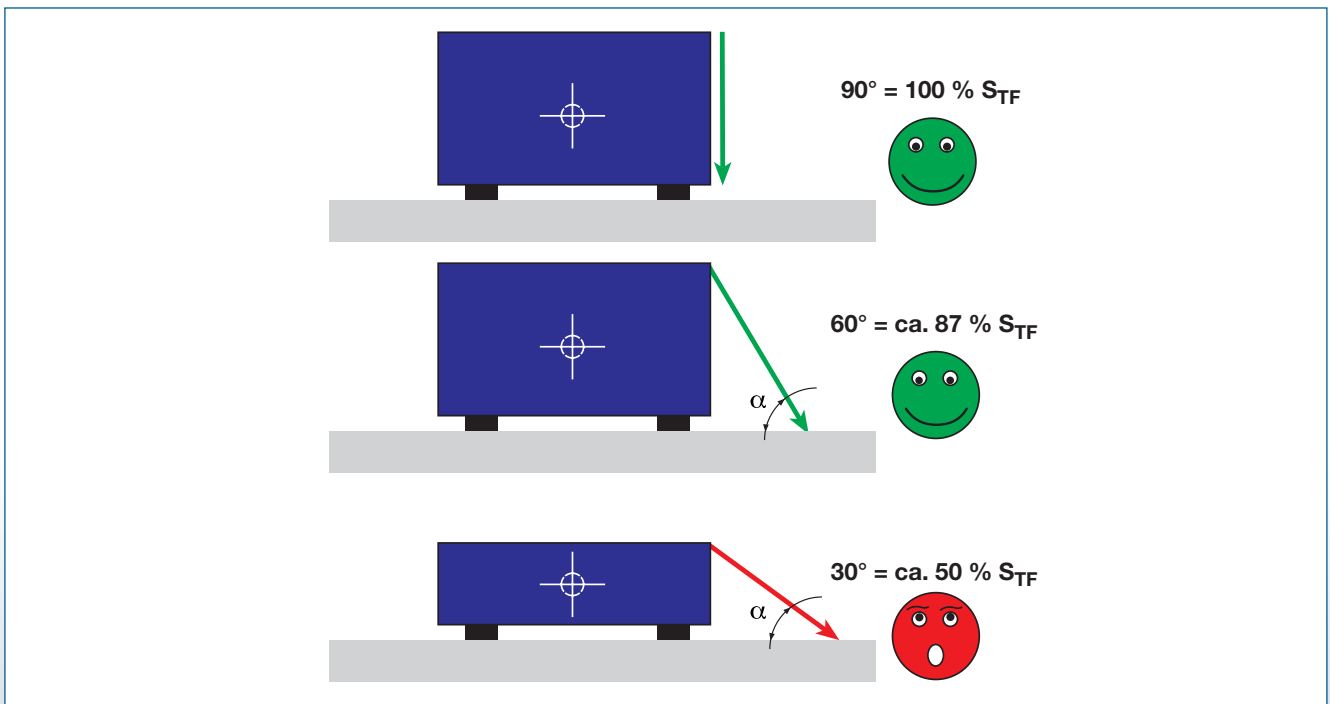




General Information

Tie-down Lashing

Pre-tensioning forces



pic. 3

As is evident, significantly high pre-tensioning forces are sometimes needed and it is obvious that such forces can only be applied with appropriately sized load securing device.

The most important parameters of load securing device are as follows:

Lashing Capacity (LC)

Lashing Capacity in [daN]

Standard Tension Force (S_{TF})

- S_{TF} min. = $0,25 \times LC$ for chains of diameter = 6 to 10 mm
- min. = $0,15 \times LC$ for chains of diameter = 13 and 16 mm
- S_{TF} max. = $0,50 \times LC$

Both characteristics can be seen from the identification tag of the chain. The lashing force is the largest force in straight pull, for which a lashing device is designed to use. The Standard Tension Force (S_{TF}) is the force that remains in the load securing device when the tensioning lever has been released, i.e. the actually remaining force exerted by the system.

To determine how many lashing elements are needed, the calculated total pre-tensioning force must be divided by the standard tension force of the load securing device selected. During the use of belt systems, a double-digit number of belts can be necessary for common loads.

This is no doubt completely unsuitable for practical purposes. However, using THIELE-lashing chains may reduce the required number of tensioners by a factor eight. Nevertheless, it is generally recommended to use anti-slip mats for tie-down lashing and direct lashing to increase the coefficient of friction.

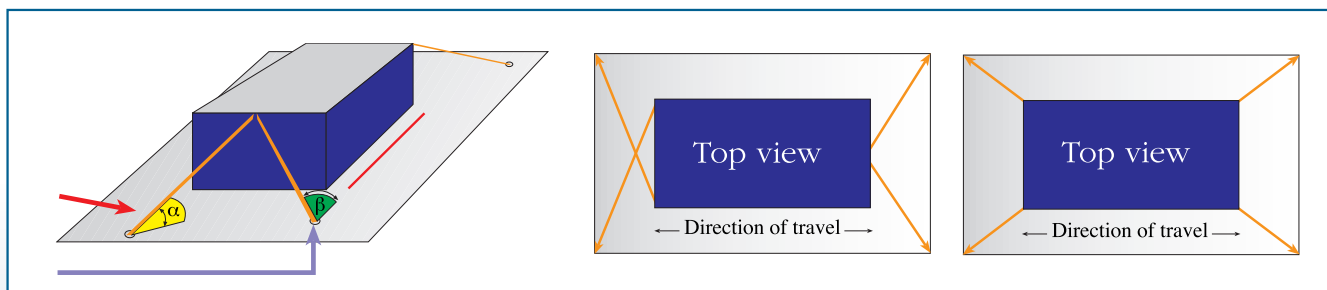
General Information

Direct Lashing

Direct lashing is a highly effective cargo securing method, because it makes use of the lashing capacity of the lashing device. Since the load securing device is not pre-tensioned, only little manual power is needed for tightening. The lashing device must be fixed onto a lashing point at the load area and then at the load itself. It shall only be pretensioned by handforce in order to avoid sagging or swinging of the chain.

The design prerequisite for a chain to be used as a safety device is the lashing capacity (LC). The lashing capacity is the decisive parameter for the chain size as well as for the related tensioning and connecting elements.

Diagonal Lashing



pic. 4

In this case, physical laws prescribe the limits according to which the lashing angles should be selected. Calculations show that it is recommended to keep horizontal angles in line between 20° and 45°. If the angle is smaller than 20° and the friction coefficient is smaller than 0.5, an additional dimensioning of the average lashing force against slipping during vehicle cornering is requested. If, on the other hand, the angle is larger than 60°, the lashing capacity will increase unproportionally high. Theoretically, they would even be infinitely larger in the case of a 90° angle. Based on these considerations, it can be said that the frequently applied diagonal/cross-wise lashing method for securing of load in travel direction is not favorable, at least in its extreme configuration (horizontal angle).

There are also recommended limits at the vertical angle which can lead to disproportional increase of the forces in the tensioning device. Certainly, the best use of the average lashing capacities is at a vertical angle between 0° and 30°.

The requested lashing capacity (LC) is calculated according to the following formula, considering the described factors:

$$LC \geq \frac{F_V \text{ [daN]} \times (C_{A,S} - \mu_D)}{(\sin \alpha \times \mu_D + \cos \alpha \times \cos \beta) \times n}$$

Based on the formula above, a lashing device that will have at least the same admissible lashing capacity must be selected.

Symbols used in the formula:

LC = Lashing Capacity

F_V = Vertical force of the cargo (cargo weight); ($F_V = m \times g \times c_V$)

μ_D = Dynamic friction coefficient (sliding friction coefficient)

$C_{A,S}^*$ = Acceleration coefficient (in travel direction $C_A = 0.8$; transversely and counter to the travel direction $C_S = 0.5$)

C_V^* = Acceleration coefficient, vertical

α = Vertical angle of the lashing legs

β = Horizontal angle of the lashing legs

n = Number of lashing chains in the respective direction

*Assumption: Cargo on road trucks and trailers





General Information

Load Securing Device

Lashing chains are elements best suited for securing of loads. They offer major advantage because their working capacity is known which allows an exact calculation of the securing of load.

For standard lashing chains exclusively shortlink round steel chains to DIN EN 818-2 or PAS 1061 must be used. Longlink round steel chains are to be used for log transportation only.

In the interest of your own as well as public safety, exclusively use the shortening elements according to DIN EN 1677-1 for the shortening of a lashing chain offered and approved by the chain manufacturer. If using self-made shorteners, the capacity of the lashing device can no longer be granted.

When using lashing hooks, all safety requirements according to DIN EN 1677-2 are observed (hook with safety latch) and taken into consideration.

Connecting and shortening parts must have devices preventing them from unintentional release.

Screw tensioners must have a safety device (securing of screw removal) against unintentional release.

Multi purpose ratchet hoists must also meet EN 13157 requirements.

The complete Lashing Chain to DIN EN 12195-3 consists of:

Load Securing Devices	Tensioning Elements	Connecting Elements	Identification Tags
Round steel chains	Tighteners, Tensioners, Multi purpose ratchet hoists	Hooks, Shackles, Chain shorteners, End-links	Metal tags

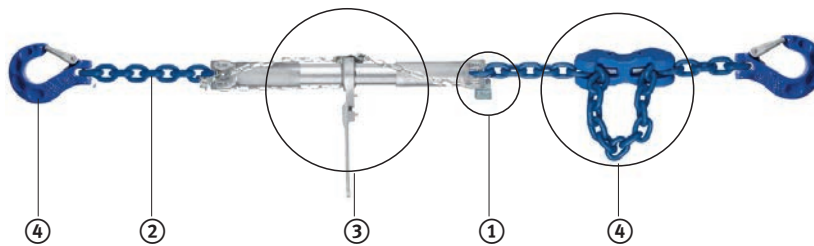




General Information

Inspection of Lashing Chains

Due to use, load securing devices are also subject to a certain amount of wear and can be damaged by improper use. It is thus strictly required that round steel chains as well as components are inspected at regular intervals by a qualified person to make sure they are taken out of service or repaired without delay when damaged or worn out.



Criteria for rejection from operation:

Component:	Indicators:
1. Identification Tag - Tag conforming to standard	> Missing or illegible tags
2. Load Securing Device - Round steel chain	> Elongation of a single link at the outer length more than 3% > Elongation of a single link in the pitch more than 5% > Wear exceeding 10% of nominal diameter > Visible deformation > Surface cracks
3. Tensioning Element - Tensioner - Tightener - Multi Purpose ratchet hoist	> Deformation > Cracks > Severe signs of wear > Severe corrosion
4. Component - End link - Chain connector - Shackle - Shortening claw - Shortening hook - Lashing hook	> Deformation > Cracks > Severe signs of wear > Severe corrosion > Hook widening by more than 10%





General Information

Inspection of Lashing Chains

Do NOT use...

... round steel chains

- with working load limit or lashing capacity lower than specified in the Grade 80 standard EN 818-2
- without manufacturer's name

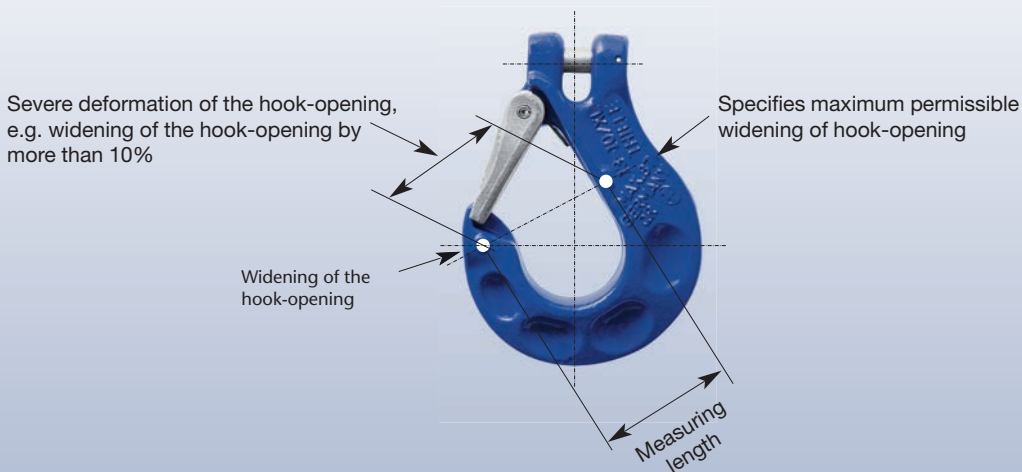
... tensioning elements

- without screw removal mechanism
- without manufacturer's name
- with long handles that are capable of producing a pre-tensioning force over $0.5 \times LC$

... shortening components or lashing hooks

- which may reduce the breaking force of the chain
- without safety latches or locking pins

Lashing Hooks / Sling Hooks



The embossed maximum permissible limit with measuring points enables an easy check of the hook-opening.

Repair work must exclusively be performed by qualified personnel. Only clearly identifiable lashing chains are allowed to be repaired.

THIELE offers regular in-house and on-site competence training.

More detailed information regarding the inspection of lashing chains are provided in the respective chain operating instructions.

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

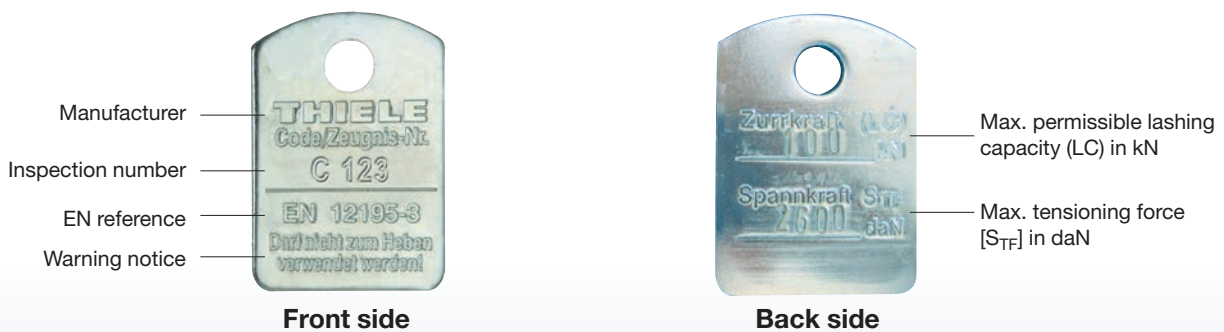


General Information

Identification Tag

THIELE lashing chains are equipped with an identification tag specifying the chain's performance characteristics. Therefore a clear identification of the chain is given and mix-up is avoided. Information on the chain tag and how to use this information is shown below. Since July 1st, 2001 the information on the tag is required according to DIN EN 12195-3.

Identification Tag according to DIN EN 12195-3



Tags as per DIN EN 12195-3 show on their front the number of the standard specification, the name of the chain manufacturer, the inspection number, as well as a warning that the chain must not be used for lifting. On the back-side of the tag the maximum permissible lashing capacity (LC) in kN and the maximum standard tension force [S_{TF}] in daN is hardstamped.



How to Use Lashing Chains


To make sure lashing chains have a long service life without wear and damage there are some aspects to be observed when handling these chains.


- Do not overload lashing chains.
- The maximum hand force of 50 daN must only be applied with one hand. Using bars, levers or similar tools is prohibited.
- Make sure the lashing chain cannot damage the cargo and vice versa.
- Make use of e.g. edge protectors to prevent damage to the cargo and wear to chain and cargo.
- Never use chains with knots or chains connected by screws, bolts or similar.
- To shorten chains, exclusively use the shortening elements offered and approved by the chain manufacturer, otherwise the safety of the chain cannot be warranted.




Grade 80 Lashing Chains and Components

Lashing Chains

Trade Size	Article-No.	Lashing Capacity (LC) under straight load [kN max.]	Weight app. [kgs]	TWN 1400
8-8	F34171	40	8,50	 <p>Lashing Chain with Tensioner</p>
10-8	F34172	63	12,50	
13-8	F34173	100	21,00	
16-8	F34174	160	37,70	

Trade Size	Article-No.	Lashing Capacity (LC) under straight load [kN max.]	Weight app. [kgs]	TWN 1401
8-8	F34171R	40	8,50	 <p>Lashing Chain with Ratchet</p>
10-8	F34172R	63	12,50	
13-8	F34173R	100	21,00	

Trade Size	Article-No.	Packaging Unit	Weight app. [kgs]	TWN 1402
-	Z07264	-	0,05	 <p>Identification Tag</p>

Note: Identification tag for lashing chains acc. to EN 12195-3.

Grade 80 Lashing Chains and Components

Load Reductions

Temperature Application Range

Temperature Application Range	Working Load Limit
-40°C to 200°C	100 %
over 200°C to 300°C	90 %
over 300°C to 380°C	75 %

If Grade 80 - alloy slings are used at temperatures exceeding 200°C, then the working load limit has to be reduced.
Safe working load indicated in % acc. to tables 1, 2 or 3 by chain temperatures of:

Load Factor at Asymmetry

No. of Legs	1		2		3		4	
	Inclination Angle β		Inclination Angle β		Inclination Angle β		Inclination Angle β	
	-	0° – 45°	45° – 60°	0° – 45°	45° – 60°	0° – 45°	45° – 60°	
Load Factor	1	1	1	1,4	1	1,4	1	

Grade 80 Round Steel Link Chains TWN 0805



Trade Size	Article-No.			Nominal Size		Pitch		Inside Width	Outside Width	Working Load Limit [t max.]	Weight app. [kgs]
	self-coloured	RAL 9005	corrothiel	d [mm]	tol. \pm [mm]	p [mm]	tol. \pm [mm]	w ₁ [mm min.]	w ₂ [mm max.]		
6-8	F01452	F01453	F01454	6,00	0,24	18,00	0,5	7,80	22,20	1,12	0,8
7-8	F01458	F01459	F01457	7,20	0,20	21,80	0,6	9,45	25,20	1,50	1,1
8-8	F01464	F01465	F01429	8,00	0,32	24,00	0,7	10,40	29,60	2,00	1,4
10-8	F01469	F01470	F01450	10,00	0,40	30,00	0,9	13,00	37,00	3,15	2,2
13-8	F01474	F01475	F01476	13,00	0,52	39,00	1,2	16,90	48,10	5,30	3,8
16-8	F01479	F01480	F01487	16,00	0,64	48,00	1,4	20,80	59,20	8,00	5,7
18-8	F01484	F01485	F04580	18,00	0,90	54,00	1,6	23,40	66,60	10,00	7,3
20-8	F01494	F01495	F04606	20,00	1,00	60,00	1,8	26,00	74,00	12,50	9,0
22-8	F01499	F01500	F04629	22,00	1,10	66,00	2,0	28,60	81,40	15,00	10,9
26-8	F01514	F01515	F04695	26,00	1,30	78,00	2,3	33,80	96,20	21,20	15,2
28-8 *	F01519	F01520	F01521	28,00	1,40	84,00	2,5	36,40	104,00	25,00	17,6
32-8	F01524	F01525	F01526	32,00	1,60	96,00	2,9	41,60	118,00	31,50	23,0
36-8 *	F01529	F01530	F04814	36,00	1,80	108,00	3,0	46,80	133,00	40,00	29,0
40-8 *	F01534	F01535	F04838	40,00	2,00	120,00	4,0	52,00	148,00	50,00	36,0
45-8 *	F01539	F01540	F04889	45,00	2,30	135,00	4,0	58,50	167,00	63,00	45,5
50-8 *	F01545	F01546	F04900	50,00	2,50	150,00	4,5	67,50	180,00	80,00	56,0
56-8 *	F01555	F01556	F04908	56,00	2,80	170,00	5,0	75,60	201,60	100,00	72,5
63-8 *	-	F01566	-	63,00	3,20	190,00	6,0	88,00	230,00	125,00	89,0
71-8 *	-	F01598	-	71,00	3,60	210,00	6,0	99,00	260,00	160,00	110,0

*These sling chains are only available in welded finish

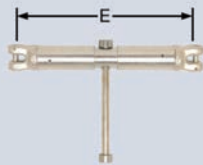
Elongation at break, self coloured: min. 25%; bright finished: min 20%.

Factor: Working Load Limit : Proof Force : Breaking Force = 1 : 2,5 : 4 (200 : 500 : 800 N/mm²);




Grade 80 Lashing Chains and Components

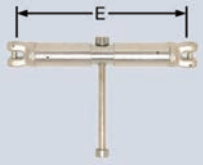
Chain Tensioners

Trade Size	Article-No.	Norm. straight load (S_{TF}) [daN min.]	Tensioner under straight load [kN max.]	Dimensions [mm]			Weight app. [kgs]	TWN 1450
				$E_{max.}$	$E_{min.}$	lift		
8-8	F34179	1800	40	345	270	75	2,10	 <p>Short Chain Tensioner acc. to DIN EN 12195-3</p>
10-8	F34199	2200	63	375	275	100	2,70	
13-8	F34189	2600	100	460	340	120	4,00	

Note: Can also be used in slings; also rated for lifting.

Trade Size	Article-No.	Norm. straight load (S_{TF}) [daN min.]	Tensioner under straight load [kN max.]	Dimensions [mm]			Weight app. [kgs]	TWN 1451
				$E_{max.}$	$E_{min.}$	lift		
8-8	F34175	1800	40	345	270	75	2,50	 <p>Short Chain Tensioner with Ratchet acc. to DIN EN 12195-3</p>
10-8	F34195	2200	63	375	275	100	3,50	
13-8	F34185	2600	100	460	340	120	5,00	

Note: Can also be used in slings; also rated for lifting.

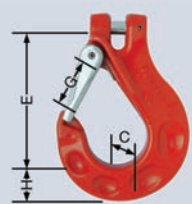
Trade Size	Article-No.	Norm. straight load (S_{TF}) [daN min.]	Tensioner under straight load [kN max.]	Dimensions [mm]			Weight app. [kgs]	TWN 1452
				$E_{max.}$	$E_{min.}$	lift		
13-8	F341871	2600	100	675	445	230	7,20	 <p>Chain Tensioner with Spindle acc. to DIN EN 12195-3</p>
16-8	F34197	3100	160	835	555	280	11,80	

Note: Can also be used in slings; also rated for lifting.

Grade 80 Lashing Chains and Components

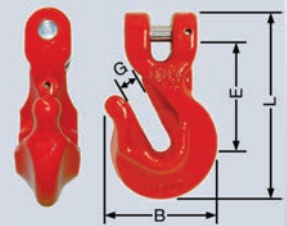
Hooks

New


Trade Size	Article-No.	Working Load Limit [t max.]	Dimensions [mm]				Weight app. [kgs]	TWN 1340/1
			E	G	H	C		
6-8	F336010	1,12	75	24	20	17	0,36	 <p>Clevis Sling Hook with Safety Latch</p>
8-8	F336110	2,00	92	30	25	22	0,75	
10-8	F336210	3,15	113	37	32	28	1,40	
13-8	F336310	5,30	133	42	41	35	2,50	
16-8	F336410	8,00	162	51	50	41	4,40	
18-8*	F33651	10,00	195	60	52	50	7,59	
20-8*	F33656	12,50	220	65	58	55	9,68	
22-8*	F33661	15,00	244	75	64	61	10,62	

*TWN 0835/1. **Note:** The new TWN 1340/1 replaces the TWN 0835/1 (only trade sizes 6-8 to 16-8). Forged safety latch.

Shortening Components

Trade Size	Article-No.	Working Load Limit [t max.]	Dimensions [mm]				Weight app. [kgs]	TWN 0827
			E	G	L	B		
8-8	F33200	2,00	61	9	101	61	0,53	 <p>Clevis Shortening Hook</p>
10-8	F33210	3,15	73	12	125	75	0,97	
13-8	F33220	5,30	95	15	160	95	2,18	
16-8	F33230	8,00	112	18	188	120	3,40	
20-8	F33245	12,50	148	22,5	242	141	7,30	

Note: With extra wide chain bed.


Trade Size	Article-No.	Working Load Limit [t max.]	Dimensions [mm]				Weight app. [kgs]	TWN 0827/1
			E	G	L	B		
8-8	F33201	2,00	61	9	101	61	0,54	 <p>Clevis Shortening Hook with Safety Pin</p>
10-8	F33211	3,15	73	12	125	75	0,99	
13-8	F33221	5,30	95	15	160	95	2,18	
16-8	F33231	8,00	112	18	188	120	3,45	
20-8	F33246	12,50	148	22,5	242	141	7,35	

Note: With extra wide chain bed, complies to DIN 5692.

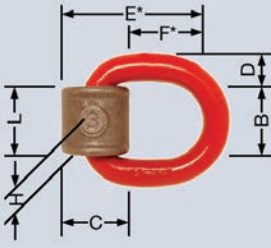


Grade 80 Lashing Chains and Components

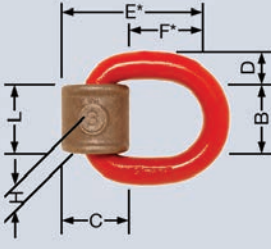
Connectors

Trade Size	Article-No.	Working Load Limit [t max.]	Dimensions [mm]						Weight app. [kgs]	TWN 1320
			E	G	A	C	B	F		
6-8	F30806	1,12	46	15	62	42	11	6	0,07	 <p>THI-LOK®</p>
7/8-8	F30816	2,00	56	20	78	55	14	9	0,16	
10-8	F30826	3,15	69	25	93	68	18	12	0,30	
13-8	F30836	5,30	84	30	116	75	23	15	0,60	
16-8	F30846	8,00	102	35	146	97	26	19	1,20	
18-8	F30850	10,00	122	36	165	110	31	22	1,86	
20-8	F30855	12,50	134	45	185	122	36	26	2,33	
22-8	F30860	15,00	145	46	198	132	38	26	3,16	
26-8	F30870	21,20	164	55	225	156	44	30	5,00	
32-8	F30880	31,50	192	65	268	192	55	37	9,33	

Lifting Points

Trade Size	Art.-No.	Working Load Limit [t max.]	Lashing Capacity (LC) [daN max.]	Dimensions [mm]							Weight approx. [kgs]	TWN 0119
				E*	F*	C	L	H	D	B		
6-8	F35103	1,12	2.200	59	31	32	32	28	12	36	0,24	
8-8	F35113	2,00	4.000	69	37	38	38	33	14	42	0,46	
10-8	F35123	3,15	6.300	84	46	45	44	38	18	48	0,63	
13-8	F35133	5,30	10.000	120	69	60	60	51	24	66	1,90	
16-8	F35143	8,00	16.000	127	66	68	65	61	28	72	2,67	
22-8	F35163	15,00	-	178	98	96	109	80	39	120	8,09	
32-8	F35183	31,50	-	292	174	145	165	118	56	180	27,30	
40-8	F35193	50,00	-	371	228	186	210	145	72	230	60,00	

Note: *E- and F-Dimension vertical to the welding level.

Trade Size	Art.-No.	Working Load Limit [t max.]	Lashing Capacity (LC) [daN max.]	Dimensions [mm]							Weight approx. [kgs]	TWN 0124
				E*	F*	C	L	H	D	B		
6-8	F35107	1,12	2.200	56	30	32	32	28	12	36	0,25	
8-8	F35110	2,00	4.000	67	37	38	38	33	14	42	0,43	
10-8	F35124	3,15	6.300	81	45	45	44	38	18	48	0,72	
13-8	F35139	5,30	10.000	117	69	60	60	54	24	66	1,90	
16-8	F35144	8,00	16.000	122	67	68	65	61	28	72	2,80	

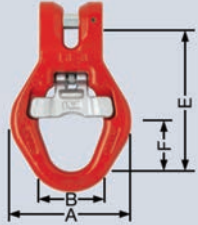
Note: *E- and F-Dimension vertical to the welding level.



Grade 80 Lashing Chains and Components

Special Lifting Points

New

Trade Size	Article-No.	Working Load Limit [t max.]	Dimensions [mm]				Weight app. [kgs]	TWN 0869
			E	F	B	A		
13-8	F313800	5,30	142	57,5	65	122	1,92	 <p>Skip Suspension Link for one-hand use with Pin Coupling and forged Safety Latch</p>
16-8	F313850	8,00	141	57,5	65	122	1,92	





Grade 100 Lashing Chains and Components

Round Steel Link Chains TWN 1805 acc. to PAS 1061 **XL-400**



Trade Size	Artikel-No.	Nom. Size (d) [mm]	Pitch (p) [mm]	Pitch Tol. (±) [mm]	Inside Width w ₁ [mm min.]	Outside Width w ₂ [mm max.]	Working Load Limit [t max.]	Weight app. [kg/m]
6-10	F01610B	6	18	0,5	7,80	22,20	1,40	0,9
8-10	F01615B	8	24	0,7	10,92	29,60	2,50	1,6
10-10	F01622B	10	30	0,9	13,00	37,00	4,00	2,5
13-10	F01629B	13	39	1,2	17,48	48,10	6,70	4,3
16-10	F01635B	16	48	1,4	20,80	59,20	10,00	6,5
20-10	F01638B	20	60	1,8	26,00	74,00	16,00	10,1
22-10	F01650B	22	66	2,0	28,60	81,40	19,00	12,3
26-10	F01660B	26	78	2,3	33,80	96,20	26,50	17,1
New 32-10	F01670B	32	96	2,9	41,60	118,40	40,00	23,0

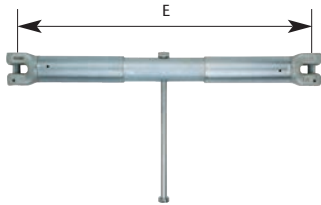
Coated with environmentally friendly AQUA-chain lacquer (RAL 5002).





Grade 100 Lashing Chains and Components

Chain Tensioners



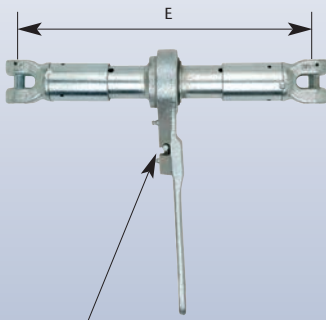
The Chain Tensioner with Spindle TWN 1454

is designed in accordance to standard EN 12195-3 and EN1677-1. In combination with other lashing and connecting components, it is mainly used in lashing chains for the securing of loads in all industry sectors. Additionally, it is suitable for overhead lifting purposes.

The tensioners achieve a high pre-tension force with less effort because of the screw transmission. This feature is important for tying down, because only the pretension force contributes to the securing of loads.

Trade Size	Article-No.	Norm. straight load (S_{TF}) [daN min.]	Tensioner under straight load [daN max.]	Dimensions [mm]			Weight approx. [kgs]
				E_{max}	E_{min}	Hub	
13-10	F341877	2.600	13.000	675	445	230	7,20
16-10	F341977	3.100	20.000	834	554	280	11,80

Note: Also suitable for lifting.



The Chain Tensioner with Ratchet TWN 1455

is designed in accordance with standard EN 12195-3 and EN1677-1. Together with other lashing and connecting components, they are mainly used in lashing chains for the securing of loads in all industry sectors. Additionally, they are suitable for overhead lifting purposes.

The ratchet tensioners achieve a high pre-tension force with less effort because of the screw transmission. This feature is important for tying down because only the pretension force contributes to the securing of loads.

Note: The life time of the chain tensioner with ratchet may be considerably extended by regular lubrication at the greasing nipple.

Trade Size	Article-No.	Norm. straight load (S_{TF}) [daN min.]	Tensioner under straight load [daN max.]	Dimensions [mm]			Weight approx. [kgs]
				E_{max}	E_{min}	Hub	
13-10	F341878	2.600	13.000	675	445	230	8,40
16-10	F341978	3.100	20.000	834	554	280	13,50

Note: Also suitable for lifting.

Grade 100 Lashing Chains and Components

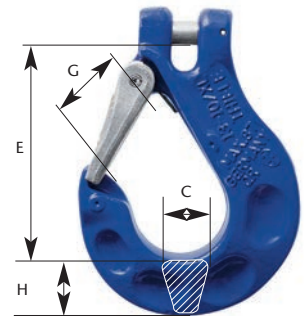
Hooks

The Clevis Sling Hook TWN 1840/1

with its heavy-duty forged safety latch and its clevis is designed to the corresponding trade size. The onforged measurement points and maximum admissible values allows an easy inspection of the hook-opening. The safety latch is protected by wear edges on the hook body. Additionally, the safety latch has a fixed position due to the forged seat at the tip of the hook. The special shape makes the THIELE-original unique.

100% magnetic crack-tested.

DGUV-approved.



Trade Size	Article-No.	Working Load Limit [t max.]	Dimensions [mm]				Weight approx. [kgs]
			E	G	H	C	
6-10	F336050	1,40	75	24	20	17	0,36
8-10	F336150	2,50	92	30	25	22	0,75
10-10	F336250	4,00	113	37	32	28	1,40
13-10	F336350	6,70	133	42	41	35	2,50
16-10	F336450	10,00	162	51	50	41	4,40

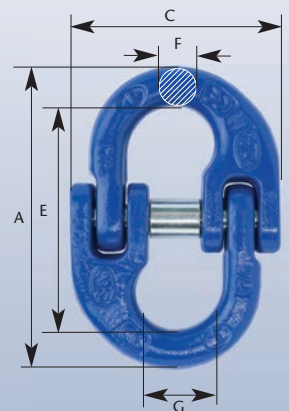
Connectors

Connecting Link XL-LOK® TWN 1820

XL-LOK® connecting links according to THIELE plant standard (TWN) are designated for safe lifting, moving and slinging of weights. Working load limits and product requirements are based on the EN 1677-1, taking a 25% higher working load limit into account. Spare parts are available according to TWN 1921.

100% magnetic crack-tested.

DGUV-approved.

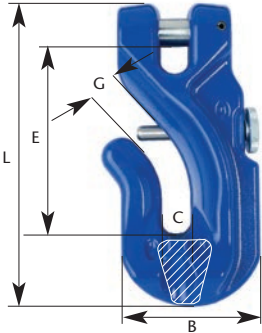


Trade Size	Article-No.	Working Load Limit [t max.]	Dimensions [mm]					Weight approx. [kgs]
			E	G	A	C	F	
6-10	F30807	1,40	45,0	14,0	61,0	38,5	7,6	0,07
8-10	F30817	2,50	62,0	19,0	85,0	55,0	10,0	0,20
10-10	F30827	4,00	72,0	23,8	97,2	65,5	12,6	0,35
13-10	F30837	6,70	87,3	28,0	125,3	82,5	16,7	0,74
16-10	F30847	10,00	105,0	34,3	146,2	109,0	20,6	1,16
New 22-10	F30861	19,00	140,0	47,3	193,0	132,5	26,0	3,30



Grade 100 Lashing Chains and Components

Shortening Components



New

The **Clevis Shortening Hook TWN 1827/1 with Safety Pin** complies with DIN 5692 makes the lifting of loads safer due to a system inspection which means that the shortening hook fulfills the test requirements assembled into the chain. The new shape of the shortening hooks TWN 1827 offer you much more safety than with conventional shortening hooks. The extra wide chain attachment enables us to guarantee you an especially firm seating of the inserted chain link and it is also protected from damage at the same time. The locking pin prevents an accidental loosening of the sling chain. The special shape makes the THIELE-original unique.

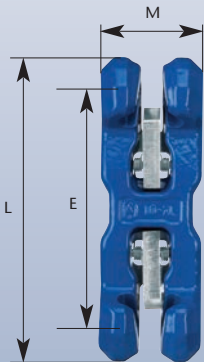
With our new TWN 1827/1 shortening hook, we are offering you Grade 100 perfection combined with a long shelf life of your slinging equipment.

100% magnetic crack-tested.

DGUV-approved.

Trade Size	Article-No.	Working Load Limit [t max.]	Dimensions [mm]					Weight approx. [kgs]
			E	G	L	B	C	
6-10*	F33195	1,40	-	-	-	-	-	-
8-10	F33205	2,50	71	9,5	110	55	34	0,51
10-10	F33215	4,00	83	12,5	132	67	42	0,95
13-10	F33225	6,70	109	15,5	168	79	54	1,76
16-10*	F33235	10,00	-	-	-	-	-	-

*In development.



The **RAPID-Shortening Claw TWN 1852**

can be assembled and disassembled fast and easily with no additional tools. The ergonomic and compact design enables its positioning at any place on the chain. Two robust locking devices avoid the unsafe release of the chain in a loaded or unloaded condition. The locking device is equipped with a robust spring system.

100% magnetic crack-tested.

Trade Size	Article-No.	Working Load Limit [t max.]	Dimensions [mm]			Weight approx. [kgs]
			E	L	M	
8-10	F34775	2,5	111	148	48	0,79
10-10	F34780	4,0	134	180	60	1,97
13-10	F34785	6,7	179	240	78	2,70
16-10	F34790	10,0	222	296	96	9,00

Grade 100 Lashing Chains and Components

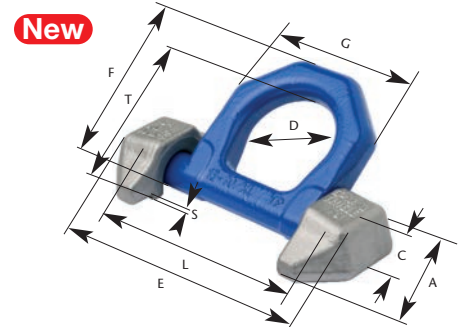
Lashing Points

Lashing Point with two Welding Brackets TWN 1473

The lashing points according to this TWN-works standard are designed for load securing of goods. They comply with the requirements of the DIN EN 12640. The production- and proof-requirements are based on the DIN EN 1677, part 1 and 4, taking a 25% higher lashing capacity into consideration.

The rings are marked with the lashing capacity (in LC) and show a tracability code. The safety factor is 1:2 related to the lashing capacity.

Finish: RAL 5002.



Lashing Capacity (LC) [daN]	Article-No.	Article-No. (Ring only)	Lashing Capacity (LC) [daN max.]	Dimensions [mm]								Weight app. [kgs]	
				A	C	D	E	F	G	L	T		S
10-10	F352001	F352002	8.000	65	28	48	134	74	74	105	70	2	0,79
13-10	F352011	F352012	13.500	80	37	60	170	93	100	135	85	2	1,70



Lashing Point „Compact“ with Spring TWN 1880

A perfect interplay of compactness and easy handling. The spring holds the D-link in its desired position. The small dimension of the TWN 1880 were the focus during the development process. A high lashing capacity and compact design makes our lashing point particularly remarkable.

The lashing point rotates 180°.

Finish: RAL 5002.



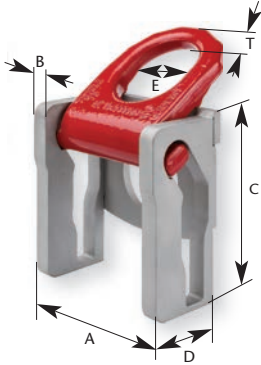
Trade Size	Article-No.	Lashing Capacity (LC) [daN max.]	Dimensions [mm]						Weight app. [kgs]
			D	B	A	E*	H	C	
6-10	F35204	3.000	14	38	65	42	25	49	0,42
8-10	F35205	5.000	15	45	76	45	27	50	0,57
10-10	F35206	8.000	17	50	85	57	31	55	1,66
13-10	F35207	13.500	23	68	116	79	44	77	2,20
16-10	F35208	20.000	27	69	130	72	54	92	3,35

*Upright standing ring.



Grade 100 Lashing Chains and Components

Lashing Points



ZK-Module TWN 1471

The newly developed ZK-Module from THIELE is a lashing ring with cassette that can easily be adapted and attached to the side frames of trailers. These lashing rings are made of the same steel which is used in the manufacture of lashing chains.

The THIELE ZK-Module is approved by the German TÜV-inspection board and complies with the European standard DIN EN 12640.

It offers 100% lashing capacity and is capable of withstanding strain in all directions. The lashing point has a swivel range of 150°, enabling the secure lashing of low-load goods as well as goods that need protection beyond the load platform. Further on, the lashing ring is completely retractable, preventing accidents from happening when walking on the cargo area.

A new designed an patented slotted shape of the cassette enables a mechanical positioning of the lashing ring in pulling direction. Therefore the handling of lashing is considerably simplified for the operator.

Finish lashing ring: RAL 3003.

Legal protection of registered design: DE 20 2015 100 750.

Trade Size	Article-No.	Execution*	Lashing Capacity (LC) [daN max.]	Dimensions [mm]						Weight app. [kgs]
				A	B	C	D	E	T	
5	F352390	N	5.000	107	12	119	61	52	14	2,60
5 New	F352395	S	5.000	107	12	119	61	52	14	2,60
10	F352380	N	10.000	137	15	144	73	62	18	3,60
10 New	F352385	S	10.000	137	15	144	73	62	18	3,60

*The plates of the lashing cassette in the execution „N“ (=Normal) are produced in micro-alloyed steel. The execution „S“ (=Special) are produced from special steel and may be hot dip galvanized (up to 500°C), together with the vehicle frame.

The standard DIN EN 12640 specifies the minimum testing requirements for lashing points on road trucks and trailers with flat-bed bodies and a permissible total weight of more than 3,5 t that are meant for mixed cargo transportation. Lashing points are devices to which lashing devices may be directly fastened. A lashing point can be, for example, an oval link, hook, lug or lashing rail. This type of lashing points in practice are very often leading to problems.

A non-appropriate dimensioning and use of non-suitable lashing points, as well as the damage of the lashing point and frame of the vehicle, shows a high potential danger for traffic. During application oval links are often exposed to unforeseen torque which may cause a damage to the body-work of the vehicle (see picture). Very often requested inclination angles are not properly considered. Further if not in use oval links can cause unnecessary noise exposure in traffic. The new developed THIELE ZK-module (lashing ring with cassette) may be easily fitted and adopted at the side frame of the trailer.



Lashing Ring

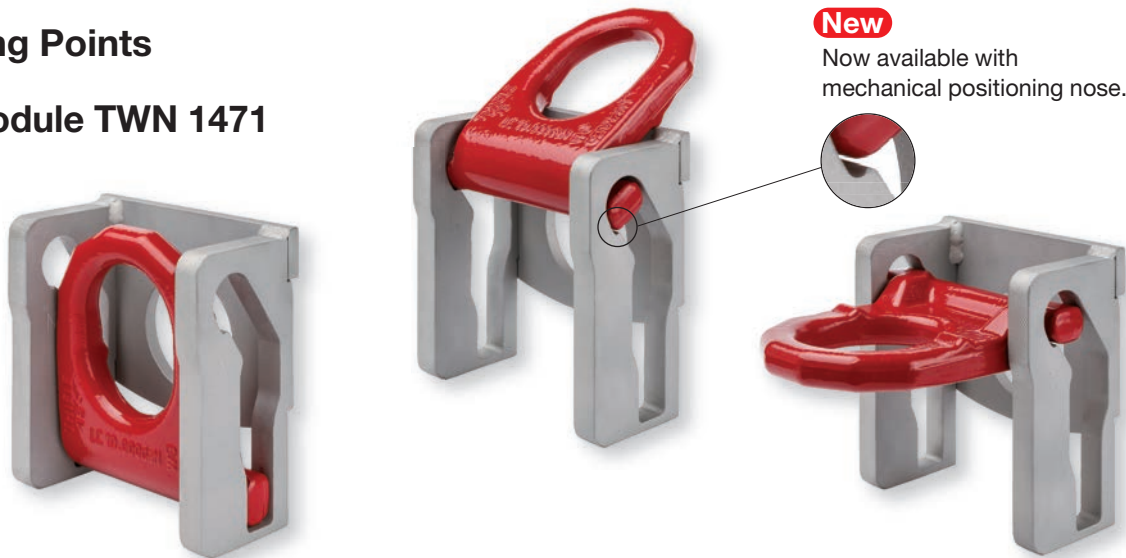
The lashing ring is marked with permissible lashing capacity (LC), manufacturer name (THIELE) and DIN EN standard number (DIN EN 12640), so that official agencies are able to check its correct installation. The ZK-module made by THIELE provides highest safety for load securing and in the heavy-duty road traffic.



Grade 100 Lashing Chains and Components

Lashing Points

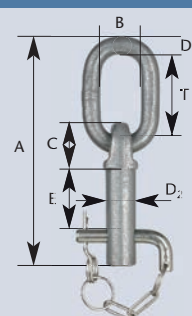
ZK-Module TWN 1471



New

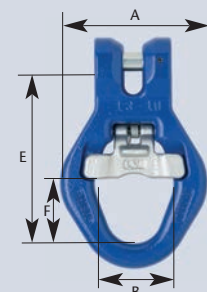
Now available with mechanical positioning nose.

New

Lashing Capacity (LC) [daN max.]	Article-No.	Dimensions [mm]								Weight app. [kgs]	TWN 1474
		A	B	C	D ₁	D ₂	E	F	T		
8.000	F352255	197	35	41	16	26	51	45	70	1,0	 <p>Lashing Point, plugable with Intermediate Link</p>



Special Sling Components

Trade Size	Article-No.	Working Load Limit [t max.]	Dimensions [mm]				Weight app. [kgs]	TWN 1869
			E	F	B	A		
13-10	F313805	6,70	142	57,5	65	122	1,92	 <p>Skip Suspension Link for one-hand use with Pin Coupling and forged Safety Latch</p>

New



Tensioners

TM Lever Block TWN 1001



Advantages for your Application:

- + With overload protection¹⁾
- + Lightweight robust steel construction
- + Super strength THIELE alloy load chain as per EN818-7, galvanized
- + Minimum headroom
- + Minimum effort to raise maximum load by easy handling
- + Hooks with strong cast steel safety latches
- + Lower hook easy turnable with roller bearing
- + Also approved for tensioning as per EN 12195
- + Protected automatic weston brake with unique twin pawls
- + Durable baked enamel paint protection
- + Spare parts available
- + TÜV / GS / CE approved
- + Supplied with THIELE test certificates
- + Manuals available in 5 languages



TM Ratchet Tensioner

¹⁾Except TM-LB 025

	Unit	TM-LB 025 ²⁾	TM-LB-OP 075N	TM-LB-OP 150N	TM-LB-OP 300N	TM-LB-OP 600N
Working Load Limit (Lashing Capacity)	[t max.]	0,25	0,75	1,5	3,0	6,0
Lift app. 1,50 m	[Article-No.]	F061901	F062411	F062511	F062611	F062711
Lift app. 3,05 m	[Article-No.]	F061902	F062412	F062512	F062612	F062712
Lift app. 4,60 m	[Article-No.]	F061903	F062413	F062513	F062613	F062713
Lift app. 6,10 m	[Article-No.]	F061904	F062414	F062514	F062614	F062714
Falls of chain	[pieces]	1	1	1	1	2
Effort to lift for max. Working Load	[kgs]	2,5	14	22	32	34
Loadchain diameter	[mm]	4	6	8	10	10
Length of lever handle (D)	[mm]	160	280	410	410	410
Headroom (A)	[mm]	230	325	380	480	620
Width (B)	[mm]	85	136	160	180	235
Depth (C)	[mm]	92	148	172	200	200
Hook-opening (upper)	[mm]	25	42	46	54	62
Hook-opening (lower)	[mm]	25	42	46	54	62
Net weight	[kgs]	1,8	7	11	21	31

²⁾Without overload protection.