

Lashing chains in quality grade 12-ICE

ICE-VSK-CURT

ICE lashing chain combinations
must only be used for lashing.

User instruction

This safety instruction / declaration of the manufacturer
has to be kept on file for the whole lifetime
of the product and forwarded with the product.
Translation of the original user instruction



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Hint for the change of EN 12195-1:2003:

The EN 12195-1:2011 is contradictory to the results of many academic and by practical confirmed tests. The status of an accepted technical regulation (acc. to §22, Abs. 1 StVO) is doubtful (and currently not confirmed by case law).

To guarantee a sufficient safety level, the following statements refer to the DIN EN 12195-1:2004 resp. to the VDI 2700 ff.

Declaration of the manufacturer

We hereby declare (supported by certification as per ISO 9001) that the equipment, as mentioned below, corresponds to the appropriate, basic requirements of safety and health of the corresponding EU regulation in the design as it is sold by us because of its design and construction. In case of any modification of the equipment, not being agreed upon with us, this declaration becomes invalid. Furthermore, this declaration will become invalid if the equipment is not used according to the prescriptions mentioned in the manual and if the necessary examinations are not carried out regularly as per EN 12195.

Herstellererklärung

Hiermit erklären wir (unterstützt durch die Zertifizierung nach ISO 9001), dass die nachfolgend bezeichnete Ausrüstung aufgrund ihrer Konzipierung und Bauart, sowie der von uns in Verkehr gebrachten Ausführung, den einschlägigen grundlegenden Sicherheits- und Gesundheitsanforderungen der betreffenden europäischen Norm EN 12195-Teil 3 entspricht. Bei einer nicht mit uns abgestimmten Änderung der Ausrüstung verliert diese Erklärung ihre Gültigkeit. Weiterhin verliert diese Erklärung ihre Gültigkeit, wenn die Ausrüstung nicht entsprechend den in der Betriebsanleitung aufgezeigten bestimmungsmäßigen Fällen eingesetzt wird und die regelmäßig durchzuführenden Überprüfungen nicht vorgenommen werden.

Designation of the equipment:

Lashing chain

Type: **ICE-VSK-CURT**

Manufacturer's sign:

Bezeichnung der Ausrüstung:

Zurrkette

Type: **ICE-VSK-CURT**

Herstellerzeichen:



Before use of ICE lashing chains please read user instruction carefully. Make sure that you have understood all subject matters. Non-observance can lead to personal and material damage and eliminates warranty.

In the following user manual, the ICE-CURT is mentioned regularly, and the product range includes (synonym for ICE-CURT-GAKO, ICE-CURT-K-GAKO, ICE-CURT-SL and ICE-CURT-K-SL).

To describe the special characteristics of the different types, the appropriate naming is mentioned.

1 Safety instructions



ATTENTION

Wrong assembled or damaged ICE lashing chains can lead to injuries of persons and damage of items when loads fall down. Please inspect all lashing chains before each use.

The securing disc at the ICE-CURT includes strong magnets. The usage of these lashing system is due to safety requirements therefore strictly forbidden for people with heart pacemaker or any other implanted defibrillators.

After a short driving distance check the tensioning of the ICE lashing chains and tighten them if necessary.

When using a choke hitch, reduce LC by 20 % based on the stated LC.

ICE-CURT must only be loaded with pull forces. Bending forces are forbidden (see Pic. 19).

2 Intended use

ICE lashing chains must **not be used** for lifting!

The chosen ICE lashing chain must be strong and long enough for the intended usage and must have according to the lashing method the correct length.

In a complete assembled ICE lashing chain, no chain and / or components of a lower quality grade must be built in. ICE lashing chains must only be assembled with chains and components from the same manufacturer.

Due to different characteristics and because of alternation in length under load, different lashing means (f.e. ICE lashing chains and lashing belts made out of chemical fiber) must **not** be used for lashing of same load.

Pay attention when using additional connecting parts and lashing devices for load securing that they fit to the ICE lashing chain.

3 Selecting ICE lashing chains

3.1 Considerable facts

When selecting and using ICE lashing chains please consider the following facts:

- necessary lashing force
- method of lashing
- type of load which has to be secured

The size, shape and the weight of the load determine the correct selection, but also the intended lashing method (see EN 12195), the environment of transport and the kind of load.

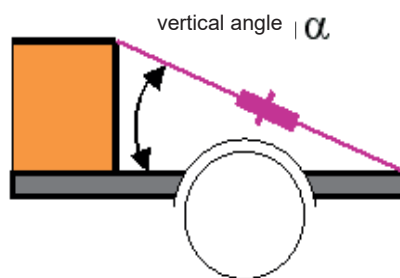
Calculate the number of lashing chains according to EN 12195 and VDI 2700 or use the RUD lashing card.

3.2 Sliding „ μ “ coefficient of friction acc. VDI 2700-2

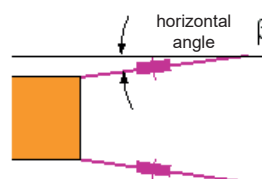
To see additional material pairings look also into DIN EN 12195-1

Material pairing	dry	wet	greasy
wood/wood	0.20-0.50	0.20-0.25	0.05-0.15
metal/wood	0.20-0.50	0.20-0.25	0.02-0.10
metal/metal	0.10-0.25	0.10-0.25	0.01-0.10

Table 1: Sliding coefficient of friction (μ)



Pic. 1: vertical angle α



Pic. 2: horizontal angle β

3.3 Which ICE lashing chain for which load?

Diagonal lashing for round steel link chains of quality grade 12 - Grade 120

Chain type	LC Lashing capacity [daN]	Max. weight in metric tons (Horizontal angle β : 20°-45° and use of 2 lashing chains for each direction) α : 0°-30° vertical angle											
								α : 30°-60° vertical angle					
		$\mu=0.1$	$\mu=0.2$	$\mu=0.3$	$\mu=0.4$	$\mu=0.5$	$\mu=0.6$	$\mu=0.1$	$\mu=0.2$	$\mu=0.3$	$\mu=0.4$	$\mu=0.5$	$\mu=0.6$
ICE-VSK 6	3600	6.2	8.4	10.4	13.0	17.4	26.2	4.5	6.3	9.0	12.8	19.2	32.0
ICE-VSK 8	6000	10.5	14.0	17.4	21.8	29.1	43.9	7.6	10.7	15.0	21.4	32.0	53.4
ICE-VSK 10	10000	17.5	23.4	29.0	36.4	48.6	73.1	12.8	17.9	25.0	35.6	53.4	89.0
ICE-VSK 13	16000	28.0	37.5	46.4	58.2	77.8	117.0	20.5	28.6	40.0	57.1	85.5	142.4
ICE-VSK 16	25000	43.7	58.6	72.6	91.0	121.6	182.8	32.0	44.7	62.5	89.1	133.6	222.5

Table 2:



Important hint
Mind the determined angles!

Values refer to:
stability of load, road transportation,
no combined lashing

4 Calculation formulas

4.1 Diagonal lashing

Formula for the determination of necessary lashing force LC (daN) of the required lashing mean:

- In driving direction, **with friction:**

$$LC = \frac{G(daN) \times (c_x - \mu)}{(\sin \alpha \times \mu + \cos \alpha \times \cos \beta) \times 2} (daN)$$

- Lateral to driving direction, **with friction:**

$$LC = \frac{G(daN) \times (c_y - \mu)}{(\sin \alpha \times \mu + \cos \alpha \times \sin \beta) \times 2} (daN)$$

- In driving direction, **without friction:**

$$LC = \frac{G(daN) \times c_x}{\cos \alpha \times \cos \beta \times 2} (daN)$$

- Lateral to driving direction, **without friction:**

$$LC = \frac{G(daN) \times c_y}{\cos \alpha \times \sin \beta \times 2} (daN)$$

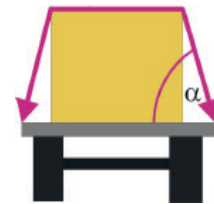
4.2 Vertical (frictional) lashing

Formula for the determination of the required total pre-tensioning force Fv (daN):

$$F_v = \frac{G \times (c_{x,y} - \mu)}{\mu \times \sin \alpha} (daN)$$

3.3 No. of required spans „n“

$$n = \frac{F_v}{STF \times 1,5}$$



Pic. 3:
vertical
angle α

- $c_{x,y}$ = accelerating factor
- c_x = accelerating factor in driving direction = 0,8
- c_y = accelerating factor against driving direction = 0,5
- c_y = accelerating factor lateral to driving direction = 0,5
- G = weight force in daN $\approx m$ = Load weight in kg
- μ = Sliding coefficient of friction (table 1)
- β = horizontal angle (Pic. 2)
- α = Vertical angle between loading platform and chain strand (Pic. 1 and Pic. 3)
- STF = Standard tensioning force (which can be achieved by the tensioning device at a hand force of 50 daN).
- n = No. of effective lashing strands

angle	sinus	cosine
0	0	1
10°	0.17	0.98
20°	0.34	0.94
30°	0.50	0.87
40°	0.64	0.77
45°	0.71	0.71
50°	0.77	0.64
60°	0.87	0.50
70°	0.94	0.34
80°	0.98	0.17
90°	1	0

Table 3:

5 Overview of ICE lashing chain types

5.1 ICE-VSK-CURT-IVH (vertical and direct lashing) - Ratched spindle tensioner

Chain Ø [mm]	Type	Permitted lashing force LC [daN]	Ratched spindle tensioner		Lmin [mm]	Weight [kg/pc.] (Tenionser+ chain)	Ref.-No.
			Type	Standard ten- sioning force STF [daN]			
6	ICE-VSK-6-CURT-IVH	3.600	ICE-CURT-6-GAKO	1.500	780	4,8+2,2	7903443
8	ICE-VSK-8-CURT-IVH	6.000	ICE-CURT-8-GAKO	2.800	1040	8,0+5,2	7901129
10	ICE-VSK-10-CURT-IVH	10.000	ICE-CURT-10-GAKO	2.800	1210	13,0+7,1	7901130
13	ICE-VSK-13-CURT-IVH	16.000	ICE-CURT-13-GAKO	2.800	1600	21,9+13,6	7902626
16	ICE-VSK-16-CURT-IVH	25.000	ICE-CURT-16-GAKO	direct lashing only	1910	34,5+24,3	7902627

Table 4: ICE-VSK-CURT-IVH (vertical and direct lashing)

5.2 ICE-VSK-CURT-IMVK (vertical and direct lashing) - Ratched spindle tensioner

Chain Ø [mm]	Type	Permitted lashing force LC [daN]	Ratched spindle tensioner		Lmin [mm]	Weight [kg/pc.]	Ref.-No.
			Type	Standard ten- sioning force STF [daN]			
6	ICE-VSK-6-CURT-IMVK	3,600	ICE-CURT-6-GAKO	1,500	770	6,3	7904614
8	ICE-VSK-8-CURT-IMVK	6,000	ICE-CURT-8-GAKO	2,800	1010	11,7	7904615
10	ICE-VSK-10-CURT-IMVK	10,000	ICE-CURT-10-GAKO	2,800	1170	17,0	7904616
13	ICE-VSK-13-CURT-IMVK	16,000	ICE-CURT-13-GAKO	2,800	1540	28,6	7904617
16	ICE-VSK-16-CURT-IMVK	25,000	ICE-CURT-16-GAKO	direct lashing only	1840	46,0	7904618

Table 5: ICE-VSK-CURT-IMVK (vertical and direct lashing)

5.3 ICE-VSK-CURT-IVS (vertical and direct lashing) - Ratched spindle tensioner

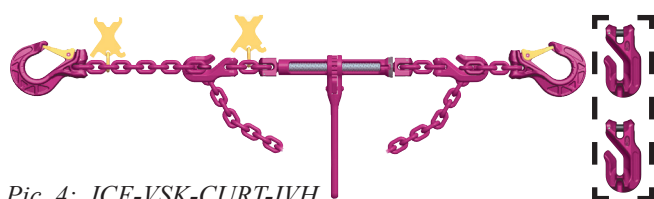
Chain Ø [mm]	Type	Permitted lashing force LC [daN]	Ratched spindle tensioner		Lmin [mm]	Weight [kg/pc.]	Ref.-No.
			Type	Standard ten- sioning force STF [daN]			
6	ICE-VSK-6-CURT-IVS	3,600	ICE-CURT-6-GAKO	1,500	680	6,4	7904602
8	ICE-VSK-8-CURT-IVS	6,000	ICE-CURT-8-GAKO	2.800	870	11,9	7904603
10	ICE-VSK-10-CURT-IVS	10,000	ICE-CURT-10-GAKO	2.800	1000	17,7	7904604
13	ICE-VSK-13-CURT-IVS	16,000	ICE-CURT-13-GAKO	2.800	1330	29,9	7904605
16	ICE-VSK-16-CURT-IVS	25,000	ICE-CURT-16-GAKO	direct lashing only	1590	48,8	7904606

Table 6: ICE-VSK-CURT-IVS (vertical and direct lashing)

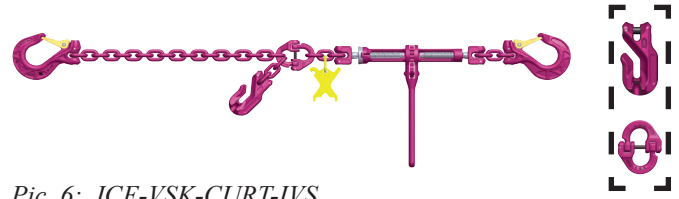
5.4 ICE-VSK-CURT-SL (vertical and direct lashing) - Ratched spindle tensioner

Chain Ø [mm]	Type	Permitted lashing force LC [daN]	Ratched spindle tensioner		Lmin [mm]	Weight [kg/pc.]	Ref.-No.
			Type	Standard ten- sioning force STF [daN]			
6	ICE-VSK-6-CURT-SL	3,600	ICE-CURT-6-SL	1.500	640	6,5	7903444
8	ICE-VSK-8-CURT-SL	6,000	ICE-CURT-8-SL	2.800	817	12,6	7900026
10	ICE-VSK-10-CURT-SL	10,000	ICE-CURT-10-SL	2.800	935	18,1	7900027

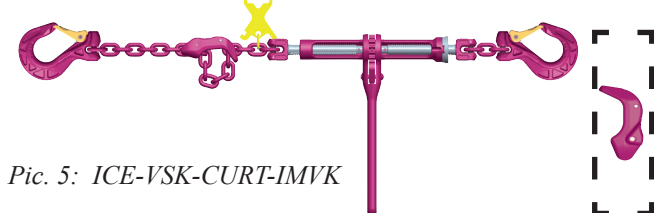
Table 7: ICE-VSK-CURT-SL (vertical and direct lashing)



Pic. 4: ICE-VSK-CURT-IVH



Pic. 6: ICE-VSK-CURT-IVS



Pic. 5: ICE-VSK-CURT-IMVK



Pic. 7: ICE-VSK-CURT-SL

5.5 ICE-VSK-CURT-K-IVH (direct lashing only) - Bar spindle tensioner

Chain Ø [mm]	Type	Permitted lashing force LC [daN]	Bar spindle tensioner		Lmin [mm]	Weight [kg/pc.] (Tensioner+ chain)	Ref.-No.
			Type	Standard ten- sioning force STF [daN]			
6	ICE-VSK-6-CURT-K-IVH	3,600	ICE-CURT-K-6-GAKO	direct lashing only	780	4.8+2.5	7904493
8	ICE-VSK-8-CURT-K-IVH	6,000	ICE-CURT-K-8-GAKO	direct lashing only	1040	8.0+4.5	7904494
10	ICE-VSK-10-CURT-K-IVH	10,000	ICE-CURT-K-10-GAKO	direct lashing only	1210	13.0+6.4	7904495
13	ICE-VSK-13-CURT-K-IVH	16,000	ICE-CURT-K-13-GAKO	direct lashing only	1600	21.9+12.6	7904496
16	ICE-VSK-16-CURT-K-IVH	25,000	ICE-CURT-K-16-GAKO	direct lashing only	1910	34.5+23.2	7904497

Table 8: ICE-VSK-CURT-IVH (direct lashing only)

5.6 ICE-VSK-CURT-K-IMVK (direct lashing only) - Bar spindle tensioner

Chain Ø [mm]	Type	Permitted lashing force LC [daN]	Bar spindle tensioner		Lmin [mm]	Weight [kg/pc.]	Ref.-No.
			Type	Standard ten- sioning force STF [daN]			
6	ICE-VSK-6-CURT-K-IMVK	3,600	ICE-CURT-K-6-GAKO	direct lashing only	770	6.6	7904608
8	ICE-VSK-8-CURT-K-IMVK	6,000	ICE-CURT-K-8-GAKO	direct lashing only	1010	11.0	7904610
10	ICE-VSK-10-CURT-K-IMVK	10,000	ICE-CURT-K-10-GAKO	direct lashing only	1170	16.3	7904611
13	ICE-VSK-13-CURT-K-IMVK	16,000	ICE-CURT-K-13-GAKO	direct lashing only	1540	27.6	7904612
16	ICE-VSK-16-CURT-K-IMVK	25,000	ICE-CURT-K-16-GAKO	direct lashing only	1840	44.9	7904613

Table 9: ICE-VSK-CURT-IMVK (direct lashing only)

5.7 ICE-VSK-CURT-K-IVS (direct lashing only) - Bar spindle tensioner

Chain Ø [mm]	Type	Permitted lashing force LC [daN]	Bar spindle tensioner		Lmin [mm]	Weight [kg/pc.]	Ref.-No.
			Type	Standard ten- sioning force STF [daN]			
6	ICE-VSK-6-CURT-K-IVS	3,600	ICE-CURT-K-6-GAKO	direct lashing only	680	6.7	7904596
8	ICE-VSK-8-CURT-K-IVS	6,000	ICE-CURT-K-8-GAKO	direct lashing only	870	11.2	7904598
10	ICE-VSK-10-CURT-K-IVS	10,000	ICE-CURT-K-10-GAKO	direct lashing only	1000	17.0	7904599
13	ICE-VSK-13-CURT-K-IVS	16,000	ICE-CURT-K-13-GAKO	direct lashing only	1330	28.9	7904600
16	ICE-VSK-16-CURT-K-IVS	25,000	ICE-CURT-K-16-GAKO	direct lashing only	1590	47.7	7904601

Table 10: ICE-VSK-CURT-IVS (direct lashing only)

5.8 ICE-VSK-CURT-K-SL (direct lashing only) - Bar spindle tensioner

Chain Ø [mm]	Type	Permitted lashing force LC [daN]	Bar spindle tensioner		Lmin [mm]	Weight [kg/pc.]	Ref.-No.
			Type	Standard ten- sioning force STF [daN]			
6	ICE-VSK-6-CURT-K-SL	3,600	ICE-CURT-K-6-SL	direct lashing only	640	6.8	7904498
8	ICE-VSK-8-CURT-K-SL	6,000	ICE-CURT-K-8-SL	direct lashing only	817	11.7	7904499
10	ICE-VSK-10-CURT-K-SL	10,000	ICE-CURT-K-10-SL	direct lashing only	935	17.3	7904500

Table 11: ICE-VSK-CURT-SL (direct lashing only)



Pic. 8: ICE-VSK-CURT-K-IVH



Pic. 10: ICE-VSK-CURT-K-IVS



Pic. 9: ICE-VSK-CURT-K-IMVK

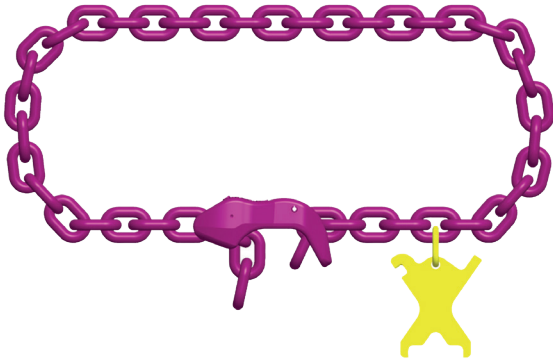


Pic. 11: ICE-VSK-CURT-K-SL

5.9 ICE-VSK KK (ICE endless chains)

Chain Ø [mm]	Designation	Lashing capacity LC [daN]	Chain length [mm]	Weight [kg/unit]	Article No.
6	ICE-VSK-KK-6	3,600	1,000	1.2	7901307
8	ICE-VSK-KK-8	6,000	1,200	2.5	7901308
10	ICE-VSK-KK-10	10,000	1,200	4.2	7901309
13	ICE-VSK-KK-13	16,000	1,500	8.8	7901310
16	ICE-VSK-KK-16	25,000	1,500	13.4	7901311

Table 12: ICE-VSK KK



Pic. 12: ICE-VSK KK



Pic. 13: Connection on ICE endless chain

6 Assembly / connection ICE endless chains

In the absence or grossly inappropriate lashing points, we recommend the use of ICE endless chains (refer to Pic. 13). ICE endless chains are suitable for both the head lashing as well as the connecting adapters.

The ICE endless chains are marked with the LC of the single strand. By duplicating when utilised as a connecting adapter, marked LC can also be transferred as restraining force when it is adhered to a maximum spread angle of 90°.

Handling:

1. Initial position:

The ICE endless chains are opened.

2. Attaching

Attach the ICE endless chains in the desired position. The chains must not be twisted. Position the shortening claw in such a way that it is not attached to an edge in a state of use.

3. Creating a basket

Hang the chains into the shortening claw at the desired length (note Pic. 14 and Pic. 15).

To do this, press the safety bolts and slide the desired chain link up to the end position of the mounting pocket. Release the safety bolts and inspect the locking. The endless chain is now ready for connecting the ICE lashing mean.

4. Open

Press the safety bolts and pull the chain link out of mounting pocket. The ICE endless chains are now back in the initial position.

5. Securing pin

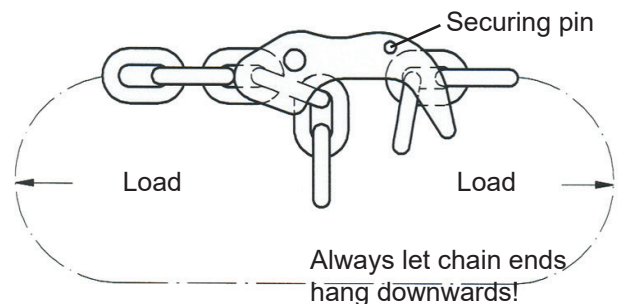
Insert the securing pin flush so that it does not protrude. Like this the multi-shortening claw is firmly fixed in the chain strand.



ATTENTION

The usage of the Multi-Shortening Claw without securing pin is generally not intended.

If you use the Multi-Shortening-Claw though, without securing pin, make sure before each use that the chain is completely engaged into the locking groove (Pic. 15). During pulling the shortenend strand, chain must be always fully engaged into the locking groove. If this is not the case, a misuse of the chain resp. the shortenend unit can lead to a malfunction of the whole system. If an operator uses the shortener without the securing pin we recommend to create a work instruction (where appropriate with a risk assessment). The securing pin must only be assembled or disassembled by a competent person (with appropriate knowledge) considering this instruction.

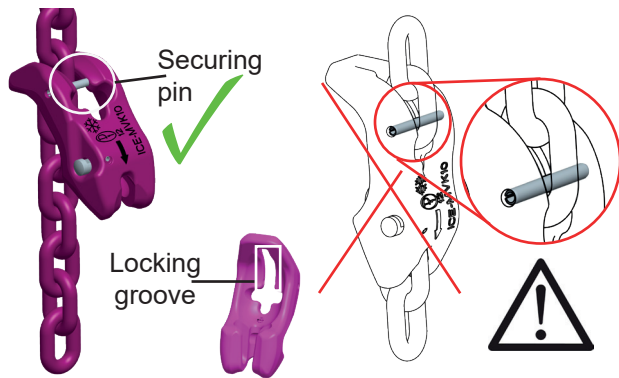


Pic. 14: Assembly / connection on ICE endless chains



ATTENTION

Ensure that the securing pin is inserted behind the chain link (and not inside a chain link).

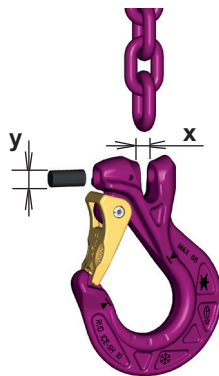


Pic. 15: Securing pin

7 Assembly system kit quality grade 12-ICE

The clevis system yields by its size adjustment a fool proof, mandatory allocation of the correct ICE chain diameter to the component.

- Clevis groove **x** avoids the connection of a bigger ICE chain (Pic. 16).
- Pin diameter **y** avoids the connection of a smaller ICE chain (Pic. 16).
- Only ICE chains and ICE components of the same nominal size must be assembled together.



Pic. 16:

8 Use of the ICE lashing chains



HINT

ICE lashing chains **must only be used for lashing and not for lifting of loads!**

- ICE lashing chains ICE-VSK-CURT-K (sizes 6-16 mm) and ICE-VSK-CURT (size 16 mm) are not suitable for vertical lashing. ICE-CURT-K-Bar spindle tensioners in the nominal sizes 6-16 mm, as well as ICE-CURT-Ratchet spindle tensioners of the size 16 mm must be equipped with identification tags without STF-statement, when assembled in ICE lashing chains (approval is only valid for direct lashing)!

Type	Ref.-Nr.
ICE-VSK-KZA-K-6	7905320
ICE-VSK-KZA-K-8	7905321
ICE-VSK-KZA-K-10	7905322
ICE-VSK-KZA-K-13	7905323
ICE-VSK-KZA-16	7903502

Table 13: Identification tag without STF

- Assemble resp. use only chains, components and connecting pins which are marked with ICE-D1-12.
- The clamping sleeve for the securing of the load pin must be positioned in such a way that the groove can be seen from to the outside.

- Use clamping sleeve only once!
- **Use original RUD-ICE spare parts only.**

8.1 General information

- The usage is only permitted for authorized and trained persons.
- Temperature range ICE lashing chains: -40°C up to 100 °C
- Inspect ICE lashing means regularly and before every use and watch out for visible defects. Visible defects are f.e. deformation, cracks, breakage, incomplete marking.
- When using ICE lashing chains pay attention to the following regulations and requirements:
 - **EN 12195-1** Load restraint assemblies on road vehicles - Safety - Part 1: Calculation of lashing forces.
 - **EN 12195-3** Load restraint assemblies on road vehicles - Safety - Part 3: Lashing chains
 - **VDI-Richtlinie 2700**-VDI-Guide line 2700- Securing of loads on road vehicles and the corresponding data sheets.
 - Loading requirements and recommendations of Deutsche Bahn AG
 - Accident avoiding regulation- vehicles **BGV D 29** (former UVV VBG 12)
 - Handbook „Load securing on vehicles“ **BGI 649**
- The usage under chemical influences like acids, bases is forbidden.
- Use only ICE lashing chain where the declaration can be read and which are equipped with identification tags. Avoid damage of identification tags by keeping them away from edges of the load and if possible keep the identification tags away from load.
- Before initial usage make sure that:
 - The ICE lashing chain conforms to the order.
 - That the test certificate/manufacturer's declaration is on hand.
 - That the statement on the identification tags of the ICE lashing chains are according to the indication of the manufacturer's declaration.
- ICE lashing chains are used in straight strands, without twisting, knotting and kinking.
- Hooks must not be loaded at the tip. The hooks must be equipped with safety latches to avoid unintentional unhooking.
- Remove slings before lashing.
- Watch out for deep hanging electricity overhead power lines.
- ICE lashing chains must not be overloaded: The max. hand force SHF must only be applied by hand. No additional mechanical auxiliary material like bars, or levers must be used unless they are part of the tensioning element.
- Pay attention that the ICE lashing chains will not be damaged by sharp edges of the load on which they are used. Use edge protection, use next bigger chain dimension or reduce LC by 20 %.

- Plan the lashing as well as the opening of the ICE lashing chain. Consider that load might be partially be taken off.
- Before off loading, the ICE lashing chains must be released in such a way that the load stands free.
- Opening of lashing: Make sure that load stands safe before opening the lashing and that off loading persons are not at risk by falling down. If necessary, additional lashing means have to be attached for the ongoing transport to the load, to avoid dropping of load.
- Special hints:

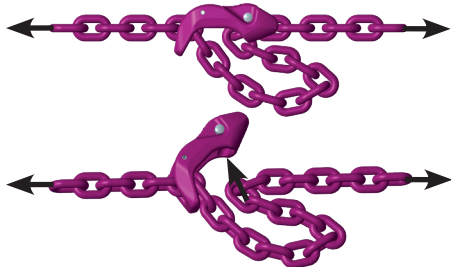
Lashing chain types ICE-VSK-CURT-IMVK and ICE-VSK-CURT-K-IMVK (Pic. 5 and 9):

Make sure that chains are attached as shown in Pic. 17.



ATTENTION

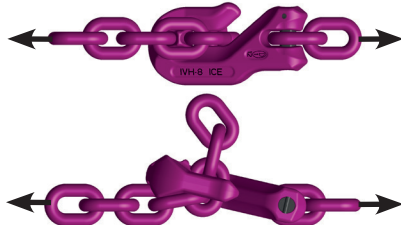
The usage of the Multi-Shortening Claw without securing pin is generally not intended (see Warning on page 6).



Pic. 17:

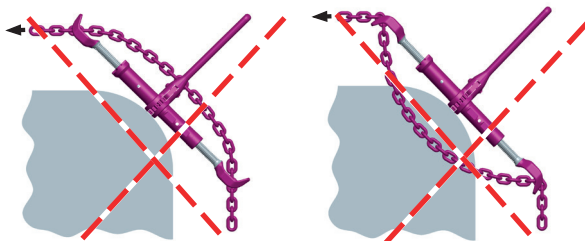
Lashing chain types ICE-VSK-CURT-IVH and ICE-VSK-CURT-K-IVH (Pic. 4+6 and 8+10):

Pay attention that the attached chain is positioned at the bearing point resp. at the bale of the the hook (Pic. 18).



Pic. 18:

- Inspect after a short driving distance the tensioning of the ICE lashing chains und retighten them if necessary.
- ICE-CURT must only be loaded with pull forces. Bending forces are forbidden (see Pic. 19).



Pic. 19: . Forbidden bending force

8.2 Tensioning action ICE lashing chain



ATTENTION

The securing disc has strong magnets. The usage of these lashing system is due to safety requirements therefore strictly forbidden for people with a heart pacemaker or any other implanted defibrillator.

1. Loosening the securing disc

Release the securing disc of the load tube.



IMPORTANT HINT

Make sure that the securing disc does not stick to the load tube. Otherwise there is a danger of damaging the securing disc.

2. Opening/turning-out the ICE-CURT

Turn the spindles as far as the turn-out securing device.



IMPORTANT HINT

Spindles **must not be released** with an additional force against the turn-out securing device. There is a danger of damaging the thread.



Pic. 20:

3. Exclude twisting of the chain

Pay especially attention that the ICE lashing chains **are not twisted** and turned straight before they will be attached to the lashing points.

4. Fastening at the lashing point

Attach the ICE Star hooks, ICE end links, or end fittings into the intended lashing points.

5. Carry out rough shortening

Carry out a rough shortening by hooking the chain into a shortening element (Pic. 17, Pic. 18, Pic. 26 - Pic. 28).

6. Switching the ratchet mechanism to „Tensioning“ (only for Ratched spindle tensioner ICE-CURT-GAKO -SL)

Set the pawl to the two „triangle symbols“ so that the tensioning device is released by the ratchet mechanism (see Pic. 21).



Pic. 21:

The load tube will turn into the direction of arrow when ratchet operates (see Pic. 22).



Pic. 22:

7. Ensure that the securing disc is loosened

Make sure that the securing disc has been released from the load tube (see Pic. 20). Otherwise there is a risk of damaging the securing disc.

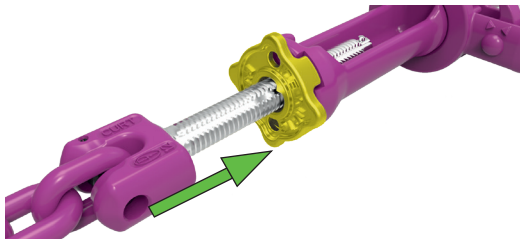
8. Tighten

Tighten the ICE tensioner ICE-CURT, by applying a hand force of **50 daN** = 50 KG (110 lbs.) to the end of the ratchet lever.

9. Locking the securing disc

After tightening has been done, slide securing disc into the direction of the load tube. The securing disc must form fit and easy run into the **cross profile** of the load tube (see Pic. 23).

If this is not the case, turn spindle and load tube until both cross profiles are congruent. Then push the securing disc into the final position. The disc is hold by magnet force in position and avoids a self-acting release of the ICE-CURT caused by vibrations.



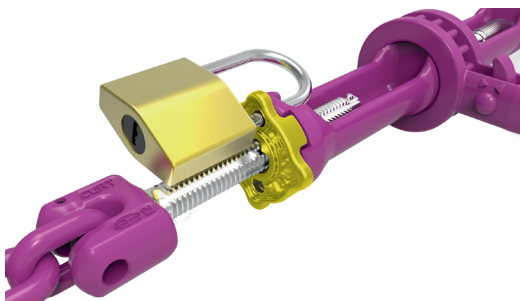
Pic. 23:

10. Optionally ICE lashing chains of the ICE-ratchet tensioner ICE-CURT-GAKO and -SL can be protected against theft by using a padlock (Type ABUS 85/40 HB), see Pic. 24.



IMPORTANT HINT

Please check after a short driving distance the tightening of the ICE lashing chain and take up slack.



Pic. 24:

8.3 Release procedure ICE lashing chain

1. Loosening the securing disc

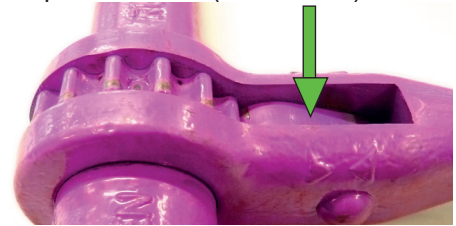
Release the securing disc from the load tube.



IMPORTANT HINT

Make sure that the securing disc does not stick to the load tube. Otherwise there is a risk of damaging the securing disc.

2. **Switching the ratchet mechanism to „Release“ (only for Ratched spindle tensioner ICE-CURT-GAKO -SL)**
Press the detent pawl at the two triangle symbols downwards resp. to the back (see Pic. 25).



Pic. 25:

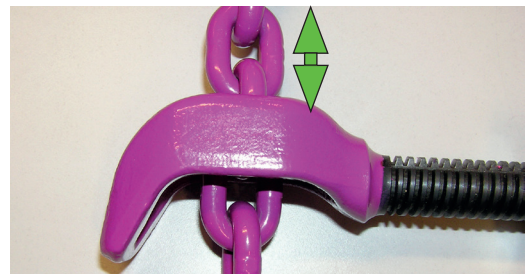
The load tube will turn against the direction of arrow when ratched operates (see Pic. 22).

8.4 Feature ICE-CURT-(K)-SL

To ensure safe handling of the ICE-CURT-(K)-SL (with shortening latch) the following factors have to be obeyed.

1. Positioning the ICE-CURT-(K)-SL

Position the ICE-CURT-(K)-SL at the required chain position.



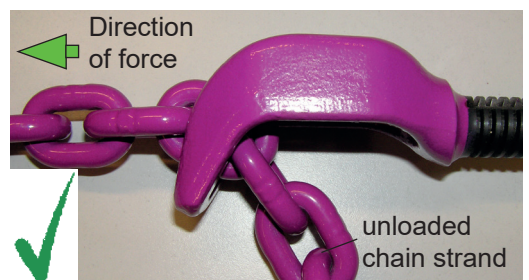
Pic. 26:

2. Positioning the chain

Pivot chain into the final position (compare Pic. 27 and Pic. 28).



Pic. 27:

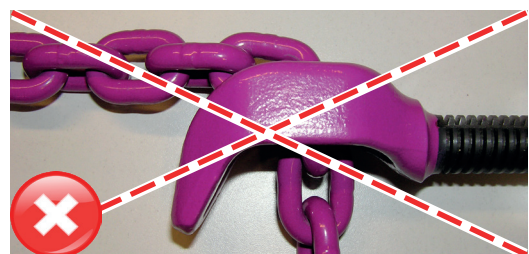


Pic. 28:

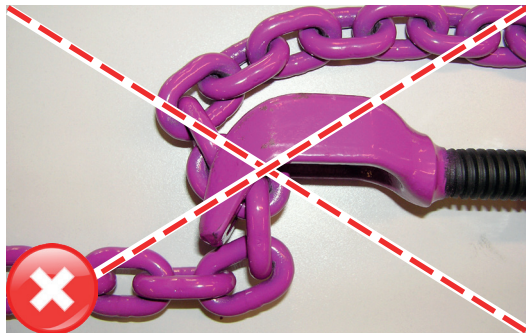
3. Make sure that the chain is always correct positioned in the shortening claw and will be loaded right.

4. Prohibited load types

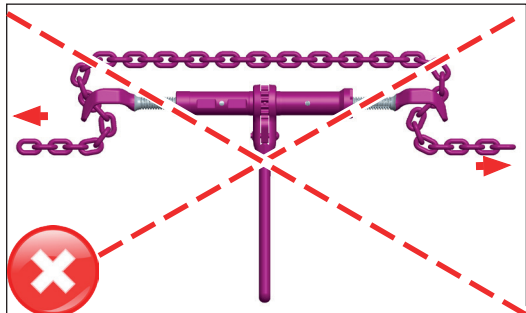
The following load types are forbidden (chain incorrect attached - see Pic. 29 - 32).



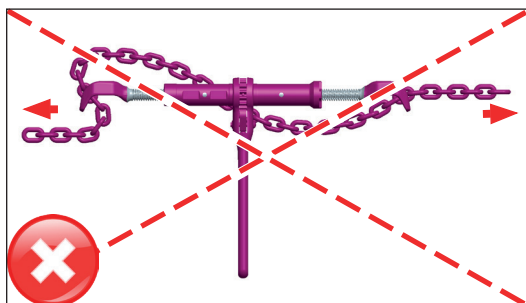
Pic. 29:



Pic. 30:



Pic. 31:



Pic. 32:

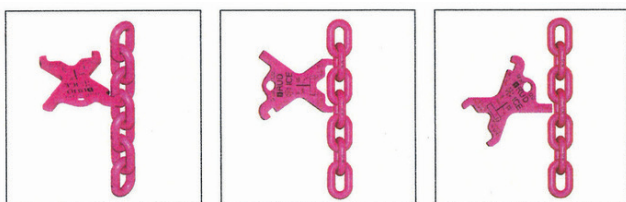
9 Inspection and testing

9.1 Visual and function test

ICE lashing chains must be inspected in time periods depending on the usage, at least once per year. Inspection and test has to be carried out by a competent person. The examination results have to be recorded in the chain card datasheet. Protocols on tests and other notes have to be kept on file.

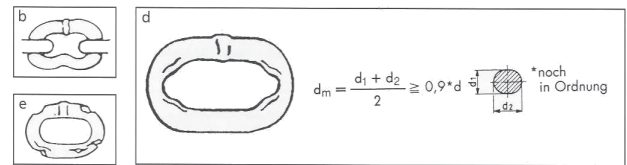
Should any of the following damage occur, ICE lashing chains should immediately be taken out for service and repair:

- The identification on the identification tags is unreadable or the tag is missing.
- Twisting, deformation and breakage of components and master / end links.
- Elongation of the chain by a plastic deformation at individual links by more than 5 % referred to the pitch of 3d (Pic. 33).



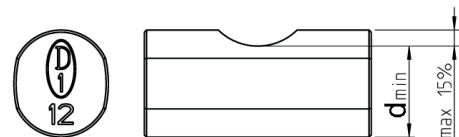
Pic. 33: Patented ICE lashing chain inspection gauge for an easy inspection of c) and d)

- Wear occurs at chain links caused by abrasion on the outside and between chain links hanging together. For measuring the wear with a caliber the chain must be unloaded. A wear up to 10 % (dm) is permissible (see Pic. 34).



Pic. 34:

- Function-impairing damage such as cuts, grooves, notches, failures, increased corrosion, discoloring due to heat, bent or twisted chains and components, especially deep notches in pulling tension force areas or transverse cracks are inadmissible.
- Width of mouth at ICE-Star hooks must not exceed 10 % of the nominal value. The hook securing (safety latch) must still slip into the hook tip in order to assure a form closure.
Carefully examine bed of the hook for notches.
Maximum allowed wear in the bed of hook = 5 %
- Max. permissible wear of the load pin = 15 %



Pic. 35:

10 Repair and Maintenance

10.1 General information about repair and maintenance

Repair works can only be carried out by experts disposing necessary knowledge and required skills. Pay attention to the following:

- Exchange broken, bent, twisted and deformed chains and components.
- Exchange the whole chain strand.
- Grind out small faults like notches and grooves very carefully (no notching effect must occur).
- The cross section of the material must not be reduced by more than 10 %.
- Welding must not be done on neither chain nor components.
- When replacing components use generally new retaining pins and securing elements (split taper sleeves).
- Use original RUD ICE spare parts only!
- ICE lashing chains must only be used in combination with ICE components (marked with ICE).
- Make notes about carried out repairs in the chain card file.

10.2 Lubrication of ICE CURT

The ICE CURT should be lubricated in regular intervals with grease at the lubricating point, to guarantee the running characteristics.

1. For lubrication open up the ICE-CURT towards the turn-out securing.

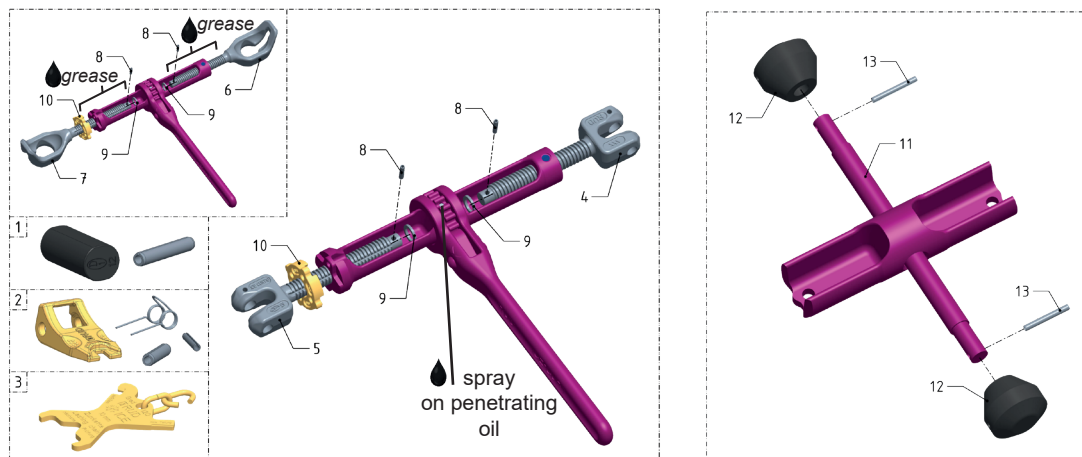


IMPORTANT HINT

Spindles must not be turned out with an increased expenditure of force. There is a risk of damaging the thread.

2. Lubricate the ICE-CURT at the marked lubrication points (see Pic. 36).

3. Once lubrication is finished turn spindles back.



Pic. 36: Spare parts ICE lashing chain

11 Overview of spare parts for ICE lashing chain

Pos	Components		ICE-VSK 6	ICE-VSK 8	ICE-VSK 10	ICE-VSK 13	ICE-VSK 16
1	retaining pin and securing pin for ICE components (pack of 10 pc/*4 pc)		7998740	7995739	7995740	7995741	7999102*
2	replacement latch for ICE Star hook ISH (latch, spring and pin)		7100300	7100301	7100302	7100303	7900419
3	ICE-VSK identification tag with connecting link	ICE-CURT	7903500	7995772	7995773	7995774	7903502
		ICE-CURT-K	7905320	7905321	7905322	7905323	
4	Spindle ICE-GAKO right hand thread		7910968	7910970	7910972	7910974	7910976
5	Spindle ICE-GAKO left hand thread		7910969	7910971	7910973	7910975	7910977
6	Spindle ICE-SL right hand thread		7910991	7910993	7910995	-	-
7	Spindle ICE-SL left hand thread		7910992	7910994	7910996	-	-
8	Securing pin (sleeve pin) to ensure that the spindle cannot be lost		59289	7995723		57895	59022
9	Unscrewing-securing-disc (to ensure that the spindle cannot be lost)		7908443	7908444		7908445	7908446
10	securing-disc (complete, with magnet)		7903495	7904226		7902680	7903867
11	bar		7904460	7904461		7904462	
12	protection caps		53690				
13	Securing pin (sleeve pin) to ensure that the protection caps cannot be lost		58223				

Table 14: Spare part list

12 Documentation in a lashing chain card file

Recorded in the chain card file is the consecutive history of the ICE lashing chain. Inclusive the initial application, inspection – and testing dates as well as repair and maintenance notes. When repairs have made, please make comments about reason.

The notes in the lashing chain card file report about ongoing inspections carried out by the user during the lifetime of the lashing chains.

Inspection during use				Chain card file for ICE lashing chains	
I-No.	Inspection and test results	repair		Kind of repair	Date
		yes	no		Signature of inspector
1					
2					
3					
4					
5					
6					

A	TYPE: _____	permissible pre tensioning force LC (lashing capacity) _____ daN		Standard tensioning force STF _____ daN	
A1	Identification tag ICE-VSK-KZS Ident-No.: _____			Reach / nom. length: _____ mm	
<p>All components like, ratchet tensioner, bar tensioner, lashing hooks, shortening elements, connecting elements, shackles, end links, overload indicator, are according to the RUD special quality grade ICE.</p> <p>All components, including the chain are marked as follows with the BG permittance stamp D1-12 and ICE markings.</p>					
		Manufac- turer's sign	Quality grade	Nomination	
B	round steel link chain	D1	12-ICE		
C1	Ratched spindle tensioner ICE-CURT-GAKO	D1	12-ICE		
C2	Bar spindle tensioner ICE-CURT-K-GAKO	D1	12-ICE		
C3	Ratched spindle tensioner ICE-CURT-SL	D1	12-ICE		
C4	Bar spindle tensioner ICE-CURT-K-SL	D1	12-ICE		
D1	lashing hook	D1	12-ICE		
D2	endlink	D1	12-ICE		
D3	shackle	D1	12-ICE		
D4	shortening element	D1	12-ICE		
D5	connecting element	D1	12-ICE		
E1	pre tensioning indicator				
E2	overload control				
Type (see overview)					
The original test certificates of the manufacturers are present. We hereby confirm that the assembly was carried out complete and correct.				The lashing chain was assembled by:	
Location and date _____				Signature _____	