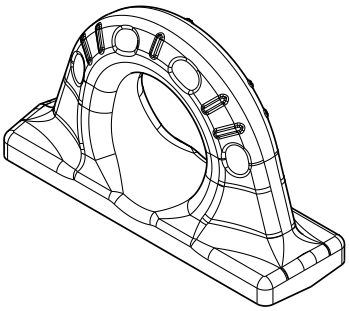
OPERATING INSTRUCTIONS

LIFTING POINTS THI-EYE TWN 1490



WARNING

The following operating instructions must always be followed to avoid the risk of personal injury or property damage.

Do not use a lifting point before reading these operating instructions.

1. ABOUT THIS INSTRUCTION

These operating instructions describe in particular how lifting points THI-EYE according to TWN 1490 (TWN = THIELE works standard) are to be safely used for lifting purposes.
Compliance with these instructions is essential to help avoid hazards and increases the reliability and service life of the lifting points.

DANGER **DANGER!** Indicates a hazardous situation, which, if not avoided, will result in death or serious injury.

WARNING **WARNING**! Indicates a hazardous situation, which, if not avoided, could result in death or serious injury.

CAUTION **CAUTION!** Indicates a hazardous situation, which, if not avoided, could result in minor or moderate injury.

NOTICE **NOTICE!** Is used to address practices not related to physical injury.

SAFETY INSTRUCTIONS **SAFETY INSTRUCTIONS** signs indicate specific safety-related instructions or procedures.

DEFINITIONS

Working Load Limit (WLL)

The maximum load, which a lifting point is designed to support.

NOTICE

Read ASME B30.9 for sling inspection criteria.
Read ASME B30.26 “Rigging Hardware”, Chapters 26-0, 26-1, 26-4.

2. BASIC SAFETY REQUIREMENTS

WARNING

To prevent the risk of injury never walk or stay under lifted loads!

The working load limit must not be exceeded!

Lifting points as well as lifting and attachment means to be used must be free from defects!

Working under the influence of drugs, medications impairing the sense and/or alcohol is strictly forbidden!

SAFETY INSTRUCTIONS

- Operators, fitters and maintenance personnel must in particular observe the operating instructions of the used chain sling. The operating instructions for the load, if it contains instructions for lifting, must also be observed.
- The specific safety and operating regulations and standards issued locally in the country where the items are used must be observed.
- The directions given in these operating instructions and specified documentations relating to safety, assembly, operation, inspection, and maintenance must be made available to persons operating and using the lifting points.
- These operating instructions must be available in a place near the product during the time the equipment is used. Please contact the manufacturer if replacements are needed. Also see Chapter 10.
- During operation work, wear your personal protective equipment!
- **Improper assembly and use may cause personal injury and/or damage to property.**
- Assembly and removal as well as inspections and maintenance must exclusively be carried out by skilled, qualified, trained and authorized persons only.
- Structural changes are impermissible (e.g. welding on of additional parts, grinding).
- **Operators must carry out a visual inspection before each use.**
- **Ensure that slings or lashing equipment suspended in the eyelet can always move freely in any angular position.**
- Never use worn-out, bent or damaged lifting points.
- Only lift loads that do not exceed the working load limit of the used chain sling. Do not use force when mounting/positioning the attachment components.
- The load must resist and tolerate the forces to be applied without suffering deformation.
- Only lift loads that are freely movable and not attached or fastened.
- Do not start lifting before you have made sure the load has been correctly attached and balanced.
- **No one including you (operator) must be in the way of the moving load (hazard area).**
- During lifting your hands or other body parts must not come into contact with lifting means. Only remove lifting means manually (use your hands).
- Never move a suspended load over persons.
- Avoid impacts, e.g. due to abruptly lifting loads with chain in slack condition.
- Never cause suspended loads to swing.

SAFETY INSTRUCTIONS

- Always monitor a suspended load.
- Put the load only down in flat places/sites where it can be safely deposited.
- Assume for sufficient place for the personnel to move when choosing the route of transportation and storage location. Danger to life and risk of injury by crushing hazards!
- In the event of doubts or concerns about the proper and safe use, inspection, maintenance or similar things contact your safety officer or the manufacturer.
- The reuse of welded-on and later detached lifting points is not permitted.

THIELE will not be responsible for damage caused through non-observance of the instructions, rules, standards and notes indicated!

As a rule, lifting points are not permitted for the transportation of persons.

3. DESCRIPTION AND INTENDED USE

THIELE lifting points THI-EYE are exclusively intended for attachment to steel structures and components.

Sling chains according to ASTM A906/A906M-02, ISO 7593 or ISO 4778 may be used.

Lifting points THI-EYE consist of a forged weld-on support which can be loaded to 100 % in all tensile directions.

THIELE lifting points meet EC Machinery Directive 2006/42/EC requirements and feature a safety factor of at least 4 based on the working load limit.

The lifting points are marked with the working load limit (WLL), manufacturer's mark, CE mark and traceability code.

THIELE lifting points are designed to withstand 20 000 dynamic load changes under maximum load conditions. In the event of higher loads (e.g. multi-shift/automatic operation) the working load limit must be reduced.

Lifting points must exclusively be used

- within the limits of their permissible working load limit,
- for permissible attachment modes and sling angles,
- within the temperature limits prescribed,
- with properly laid welding seams,
- by trained and authorized persons.

Working load limits of different modes of assembly can be seen in the load table.

The THI-EYE can also be used as lashing points. If the THI-EYE are used **exclusively** for lashing, the maximum lashing capacity (LC) is calculated by doubling the working load limit to LC = 2 x WLL.

Alternate use for lifting and lashing is only permitted up to the load corresponding to the working load limit (WLL), i.e. LC = WLL!

Even a single load above the load capacity specification (LC > WLL) makes the further use as a lifting point impermissible.

4. COMMISSIONING

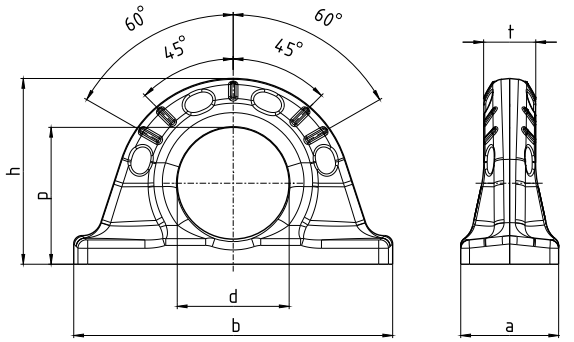
Prior to using the components for the first time make sure that

- the lifting points comply with the order and have not been damaged,
- test certificates and operating instructions are at hand,
- markings correspond with what is specified in the documentation,
- inspection deadlines and the qualified persons for examinations are determined,
- visibility and functional testings are carried out and documented,
- documentation is safely kept in an orderly manner.

Dispose of the packing in an environmentally compatible way according to local rules.

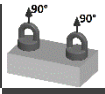
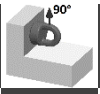
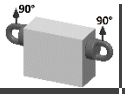
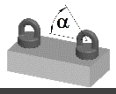
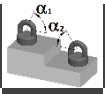
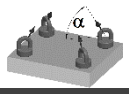
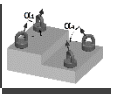
5. TECHNICAL DATA

5.1 Dimensions



Nominal size WLL [t]	WLL [lbs]	Article no.	Dimensions [inch]						Mass [lbs]
			a	b	t	h	d	p	
1,6 t	3 500	F32300	1.18	3.94	0.63	2.28	1.38	1.65	1.10
3,2 t	7 000	F32300	1.61	5.39	0.75	3.15	1.97	2.36	2.20
5,0 t	11 000	F32301	2.01	6.77	1.02	3.90	2.36	2.87	4.63
10,0 t	22 000	F32302	3.76	8.98	1.46	5.24	3.15	3.86	11.46
20,0 t	44 000	F32303	3.54	10.71	1.97	7.09	4.53	5.51	23.15
31,5 t	69 400	F32304	4.25	12.60	2.44	8.19	5.12	6.30	40.79

5.2 Load table for different number of legs/lifting points and sling angles

Attachment type												
Number of legs	1-Leg	2-Legs	1-Leg	2-Legs	2-Legs			2-Legs	3-/4-Legs			3-/4-Legs
Sling angle α	α=90° ±7°	α=90° ±7°	α=90° ±7°	α=90° ±7°	30°≤α<45°	45°≤α<60°	60°≤α<75°	asym.	30°≤α<45°	45°≤α<60°	60°≤α<75°	asym.
Marking	MAXIMUM TOTAL LOAD [lbs] [5]											
1,6 t	3 500	7 000	3 500	7 000	3 500	5 000	6 100	3 500	5 300	7 500	9 100	3 500
3,2 t	7 000	14 000	7 000	14 000	7 000	10 000	12 200	7 000	10 600	15 000	18 300	7 000
5,0 t	11 000	22 000	11 000	22 000	11 000	15 600	19 100	11 000	16 500	23 400	28 600	11 000
10,0 t	22 000	44 000	22 000	44 000	22 000	31 200	38 200	22 000	33 000	46 800	57 200	22 000
20,0 t	44 000	88 000	44 000	88 000	44 000	62 400	76 400	44 000	66 000	93 500	114 500	44 000
31,5 t	69 400	138 800	69 400	138 800	69 400	98 200	120 300	69 400	104 200	147 300	180 400	69 400

6. ASSEMBLY

6.1 Preparations

All components to be installed or used must be in perfect condition and the relevant working load limits of all parts must accommodate the respective load to be handled.

The mounting location for each lifting point has to ensure that

- the load can take the forces including test loads safely to be applied without suffering deformation,
- no areas of danger are created (crushing point, shearing point),
- transportation is not restrained by overhang,
- lifting accessories will not be bypassed,
- incorrect use is avoided,
- the suspension gear cannot be damaged, for example by sharp edges,
- the lifting points can be used easily.

Make sure the welding surfaces are grinded down, flat, dry, free of impurity, flawless and weldable (material see ISO/TR 15608 table 1, group 1).

6.2 Welding instructions

Welding instructions relating to weld-on supports (23MnNiCrMo5-4) to be attached to SAE1020, A283C, A570Gr40 or similar components.

The following general welding instructions shall be duly followed:

- ISO 2560 — Welding consumables – Covered electrodes for manual arc welding of non-alloy and fine grain steel
- ISO 14341 — Welding consumables – Wire electrodes and weld deposits for gas shield metal arc welding of non-alloy and fine grain steel
- ISO 3834-2 — Quality requirements for fusion welding of metallic materials
- EN 1011-1, 2 — Welding – recommendations for welding of metallic materials
- ISO 9606-1 — Qualification testing of welders – fusion welding
- DVS 0702-1/0711 — Factsheet - Requirements for operation and Personnel
- SEW 088 — Weldable unalloyed and low-alloyed steels – Recommendations for processing

Start tack-welding or welding in the middle of a long side.

Ensure the THI-EYE lie flat without an air gap during tack-welding.

Take care for an accurate cleaning of the root run.

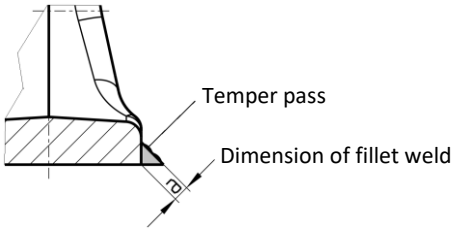
For corrosion protection, ensure that the weld seam is closed all the way round.

Take care to avoid end crater and continue the welding within one heat.

6.3 Miscellaneous

1. Minimum notched-bar impact strength values of ISO-V specimens KV = 27 J at -40° F (e.g. S355J4G3 or S355NL, EN 10025)
2. When selecting material grades other than those listed above please contact the base material and filler metal manufacturers for information.
3. The responsible welding supervisor on site must make sure the welding current is correctly adjusted to suit the given welding position.
4. A procedure check is recommended to confirm the selected settings.

6.4 Geometry data weld seams



Nominal size	Fillet weld a_{min} ≈ [inch]	Total length [inch]	Volume appr. [inch³]
1,6 t	0.157	9.84	0.244
3,2 t	0.236	13.39	0.744
5,0 t	0.276	16.93	1.288
10,0 t	0.315	22.44	2.227
20,0 t	0.472	26.77	5.974
31,5 t	0.591	31.50	10.984

⚠ WARNING

Perform a thorough inspection after welding. No cracks, notches, inclusions, pitting or undercuts are allowed.

6.5 Welding process MAG

Welding process	Metal active gas welding (MAG) ISO 9606-1; No. 135		
Welding groove	See sketch, taking into account ISO 9692-1		
Quality grade	For all layers according to ISO 5817 - C		
Wire electrode	ISO 14341-A:2011: ISO 14341-A-G 46 4 M21 3Si1 Possible alternatives must be selected and checked by the welding supervisor on site.		
Welding position	ISO 9606-1: PA, PB, PC, PF		
Preheating of parent metal	Thickness ≥ 20 mm: 150 °C / 302 °F		
Interpass temperature	≤ 400 °C / 752 °F		
Postweld heat treatment	Thickness ≥ 40 mm: Tempering at 400 °C / 752 °F or apply quenching and tempering layer technology		
Pass	Root run	Intermediate run/ Final run	Temper pass
Wire electrode diameter	1 mm	1,2 mm	1 or 1,2 mm
Welding current (=)	130 – 200 A	135 – 290 A	See root run or stringer pass. Note: The quench and temper layer must only be applied to the weld metal. Contact with the base metal must be avoided.
Electrode polarity	(= +)	(= +)	
Voltage	19 – 25 V	19 – 32 V	
Shield gas ISO 14175; M21	10 – 12 l/min	12 – 14 l/min	
Kind of pass	Stringer pass	Stringer pass	

6.6 Manual welding process MMA

Welding process	Manual metal arc welding (MMA) ISO 9606-1; No. 111			
Welding groove	See sketch, taking into account ISO 9692-1			
Quality grade	For all layers according to ISO 5817 - C			
Wire electrode	ISO 2560 A:2010: min. ISO 2560-A-E 38 4 B 42 H5 [1)]			
Welding position	ISO 9606-1: PA, PB, PC, PF			
Preheating of parent metal	Thickness ≥ 20 mm: 150 °C / 302 °F			
Interpass temperature	≤ 400 °C / 752 °F			
Postweld heat treatment	Thickness ≥ 40 mm: Tempering at 400 °C / 752 °F or apply quenching and tempering layer technology			
Pass	Root run	Final run	Alternative final run	Temper pass
Wire electrode diameter	2,5 mm	3,2 mm	4,0 mm	2,5 or 3,2 or 4,0 mm
Welding current (=)	80 – 110 A	100 – 140 A	130 – 180 A	See root run or stringer pass Note: The quench and temper layer must only be applied to the weld metal. Contact with the base metal must be avoided.
Electrode polarity	(= +)	(= +)	(= +)	
Voltage	-	-	-	
Shield gas ISO 14175; M21	-	-	-	
Kind of pass	Stringer pass	Stringer pass	Stringer pass	

[1)] Re-drying according to manufacturer's instructions

7. CONDITIONS OF USE

7.1 Normal use

WARNING

The lateral line-shaped markings (see 5.1) make it easier to estimate the sling angles of connected sling or lashing equipment strands.

Using 4-leg slings may cause higher risk because only two opposite legs carrying the load. Check the working load limit of lifting points and sling carefully and chose if necessary bigger sizes.

7.2 Environmental influence

WARNING

Lifting points must not be used in environments where acids, aggressive or corrosive chemicals or their fumes are present.

7.3 Especially hazardous conditions

WARNING

The degree of danger when used in offshore applications, the lifting of hazardous loads, such as for example liquid metal or similar, risk potentials must be assessed by a competent person in the form of a risk analysis. Any additional rules and directives must be followed in this case.

7.4 Influence of temperature

WARNING

The permissible working load limit of the lifting points reduces at elevated temperatures.

The reduced working load limits shown in the following table shall only apply for short-term use at the temperatures indicated.

Temperature range °C	Temperature range °F	Remaining WLL
-40 °C ≤ t ≤ 200 °C	-40 °F ≤ t ≤ 392 °F	100 %
200 °C < t ≤ 300 °C	392 °F < t ≤ 572 °F	90 %
300 °C < t ≤ 400 °C	572 °F < t ≤ 752 °F	75 %

DANGER

If a lifting point has been exposed to temperatures exceeding the maximum values specified, it must not be used furthermore.

8. INSPECTION, MAINTENANCE, DISPOSAL

8.1 General

WARNING

Inspections and maintenance must be arranged by the owner!

Inspection intervals shall be determined by the owner!

Inspections must be regularly carried out and documented by competent persons, at least once a year or more frequently if the lifting points are in heavy-duty service. After three years at the latest they must additionally be examined for cracks. A load test is not a substitute for this examination.

The results of the inspection shall be kept in a file that has to be set up for each lifting point before first use. The register will show characteristic data as well as identity details.

Immediately stop using lifting points that show the following defects:

- missing or illegible identification/marking,
- deformation, elongation or fractures,
- cuts, notches, cracks, incipient cracks, pinching,
- heating beyond permissible limits,
- severe corrosion,
- wear exceeding 10 %, for example in the ring diameter area,
- weld failures.

WARNING

Cleaning (e.g. prior to inspections) must not take place by using flames or methods that might cause hydrogen embrittlement (e.g. pickling or immersion in acidic solutions).

8.2 Inspection service

THIELE offers inspection, maintenance and repair services by trained and competent personnel.

8.3 Maintenance

DANGER

Maintenance and repair work must only be performed by competent and trained persons.

WARNING

Minor notches or cracks may be eliminated by careful grinding observing the maximum cross section reduction requirement of 10 % and avoid making more severe cuts or scores.

All maintenance and repair activities must be documented properly.

8.4 Disposal

NOTICE

All components and accessories of steel taken out of service must be scrapped in accordance with local regulations and provisions.

9. STORAGE

Lifting points shall be properly stored in dry conditions at temperatures between 40° F and 100° F.

Do not store in a manner that cause mechanical damage.

10. THIELE OPERATING AND MOUNTING INSTRUCTIONS

NOTICE

Current operating and mounting instructions are available as a PDF download on the homepage.

11. PUBLISHING INFORMATION

Company	KWS Inc. (Distributor)	THIELE GmbH & Co. KG (Manufacturer)
Postal address	P.O. Box 470487 Tulsa, OK 74147 USA	Werkstrasse 3 58640 Iserlohn Germany
Phone number	+1 (539) 367 2274	+49 2371/947-0
Fax number	+1 (539) 367 2278	+49 2371/947-241
Email	sales@kwschain.com	info@thiele.de