Safety Clamp Type Series
Typ A-MP, C and T

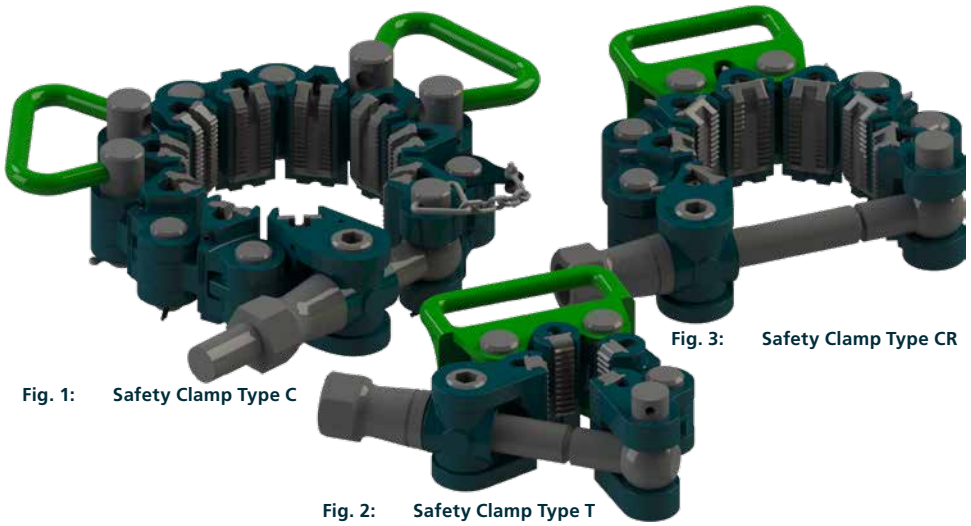

Fig. 1: Safety Clamp Type C

Fig. 2: Safety Clamp Type T

Fig. 3: Safety Clamp Type CR

Operating Instructions
Original Operating Instructions

Safety Clamp Typ-C Range	Safety Clamp Typ A-MP Größe	Safety Clamp Typ-T Größe
3.3/4" - 43"	2.7/8" - 36.1/8"	1.1/8" - 4.1/2"

Manual PN 88003-D Revision: 13, 10-2018

FORUM Handling Tools

Revision history

Version	Date	Author	Changes
1	2006	BVOT, ROK	Initial Release
2	2006-10	BVOT, ROK	Design and Part List Update
3	2009-07	BVOT, ROK	Design and Part List Update
4	2010-10	BVOT, ROK	Design and Part List Update
5	2010-11	BVOT, ROK	Design and Part List Update
6	2011-04	BVOT, ROK	Design and Part List Update
7	2012-02	BVOT, ROK	Design and Part List Update
8	2012-08	BVOT, ROK	Design and Part List Update
9	2013-06	BVOT, ROK	Design and Part List Update
10	2014-09	BVOT, ROK	Design and Part List Update
11	2015-12	FORUM B+V OT	Re-Release, Type series, Safety Clamp Type Series, Layout, Company Name
12	2018-04	FORUM Handling Tools, M.H	Merged Document AOT, FB+V, Document Update, Contact Worldwide changed
13	2018-10	FORUM Handling Tools, St.S	Design Update

Document Approval

Version	Author	Eng. Check	Approval Check
13	FORUM Handling Tools St.S 10-2018	FORUM Handling Tools as per rev. 12	FORUM Handling Tools as per rev. 12

API Q
7K-0001
8C-0037

All data in this manual takes place using best knowledge. This manual bases on the latest product information that was available at the time of printing. Depending on ongoing technical improvements (ISO 9001), FORUM Handling Tools reserves the right to alter the design and specifications without notice. The values specified in this manual represent the nominal value of a unit produced in series. The values in individual units may have slight differences. Only with written consent from FORUM Handling Tools may the contents of this instruction manual be passed on to third persons. Procedure descriptions and explanations are not to be passed on to third persons. Copying or multiplying for internal use is permitted. We are grateful for suggestions and comments regarding this documentation or the product itself.
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Table of contents

A. General

I Basic Information

This operation maintenance manual (hereinafter called OMM) refers to the C, T and A-MP Safety Clamp Type Series (hereinafter called Safety Clamp) from FORUM Handling Tools for use on oil drilling platforms and rigs.

When installed in potentially explosive atmospheres, the instructions that follow the Ex symbol must be followed. Personal injury and/or damages to the Safety Clamp may occur, if these instructions are not followed.

This OMM is intended for the operator of the Safety Clamp. It is intended to ensure safe operation and must be read carefully and kept, where it is accessible for Safety Clamp users at all times.

This OMM contains all information on safe and proper operation of the Safety Clamp. Observance of these instructions is required for safe operation.

In addition, it is necessary to observe all applicable national and local regulations [e.g. accident prevention regulations and environmental regulations] well as the company's own internal safety regulations.

For installation, maintenance and repair work and proper training of the operating personnel, FORUM Handling Tools recommends requesting service from FORUM Handling Tools itself.

II Intended Use

The FORUM Handling Tools Safety Clamp is designed for pipe diameter 1 1/8" through 43". Adding or removing Safety Clamp links change the effective working range approximately 1-inch in diameter.

The Safety Clamp uses the positive gripping principle. It is ideal for applications like safeguarding strings of flush joint tubing against dropping or providing a shoulder to position strings of flush line pipe for welding.

In addition observing all instructions in this operating manual, intended use also includes observing all prescribed assembly, disassembly, startup, operating, repair and maintenance work at the specified intervals as well as all safety precautions.
The operation of the Safety Clamp is allowed for the intended use only. The permissible range of application is specified in the technical data.

INFO

The abbreviation **t** and the word **ton** are used to describe short tons. If the metric ton is referred it will explicit be named in the text or the abbreviation ton.
1 sh ton = 2000 lb = 907,19 kg
1 metric ton = 2204,62 lb = 1000 kg

III Improper Use

INFO

Improper use of the Safety Clamp releases FORUM Handling Tools from any liability for personal injury or property damage resulting therefrom.

The Safety Clamp is designed to be attached to equipment strings or flush surface tubulars as they are assembled or disassembled. The Safety Clamp prevents the equipment string from being dropped down-hole accidentally if the Hand Slips or Elevators securing the string lose their grip.

The following operations are prohibited:

- Using the Safety Clamp with tubular sizes for which use is not specified.
- Any use of the Safety Clamp, which is not intended.
- Using the Safety Clamp as a hoisting device.

Moreover, operation of the Safety Clamp is prohibited under the following conditions:

- When Equipment is used for applications other than intended.
- When Equipment, or parts thereof, are damaged or when the additional equipment is not installed properly.
- When protective or safety equipment is damaged, unusable, improperly installed or not present.
- When the Safety Clamp is not operating properly.
- When foreign objects or personnel are located in the hazard area of the Safety Clamp.
- When conversions or modifications have been performed without previous written approval by FORUM Handling Tools.
- When equipment not approved by FORUM Handling Tools are used.
- When the prescribed maintenance intervals have been exceeded.
- When replacement parts not approved by FORUM Handling Tools are used.
- When companies not authorized by FORUM Handling Tools have performed repair or service work on the Safety Clamp.

Observe also the chapter "Warranty and Liability".

IV IV Potential Misuse

This OMM contains information and warnings on procedures that address hazardous conditions and could cause personal injury but cannot reflect all fashions in, which hazardous consequences may occur due to service and/or operation. All personnel using the Safety Clamp or service procedures contained within this OMM must be completely satisfied that personal and/or Safety Clamp safety will not be compromised. Common methods of misuse include but are not limited to:

1. Use without all warning and identification labels present. This can cause operating personnel to misunderstand the areas of the Safety Clamp that can cause serious injury.
2. Use with insufficient and/or worn assemblies and parts. This can cause failure causing a suspended hazard, which can result in serious injury or death.
3. Use of the Safety Clamp in methods not intended. The Safety Clamp should be used only in the methods described in this OMM.

V Warranty and Liability

V-01 Liability

The technical information, data and instructions for operation contained in this OMM correspond to the status at the time of print and are provided according to the best of our knowledge in consideration of our previous experience and expertise. We reserve all rights to make technical modifications within the scope of technical development of the Safety Clamp treated in this OMM. Claims or entitlements can not be deduced or derived from information, illustrations and descriptions in this OMM. FORUM Handling Tools is liable for all warranty obligations made within the scope of the contract for any faults or omissions on our part, excluding further claims. Claims for damages suffered are excluded regardless of the legal grounds. Translations are complete according to best knowledge. We cannot assume any liability for translation errors, even when the translation was accomplished at our order. Only the original text is binding. The original text language for FORUM Handling Tools documents is English. The descriptions and illustrations do not necessarily reflect the scope of delivery or any parts orders. The drawings and illustrations are not to scale.

V-02 Warranty

FORUM Handling Tools general terms of purchase and delivery apply. Purchasers recognize these conditions on the day the contract is signed at the latest. The terms and duration of FORUM Handling Tools warranty are specified in the sales documents as well as the order confirmation. These will be submitted to the operating company as information at the time the contract is signed, at the latest.

The manufacturer assumes no warranty whatsoever for damage or interruptions in operation resulting from failure to observe the operating instructions.

The OMM is to be supplemented by the operating company with operating instructions based on existing national regulations on accident and environmental protection, including information on supervisory and reporting obligations taking into consideration operating peculiarities, e.g. in regard to work organization.

Warranty claims, complaints within the scope of the guarantee and liability for personal injury and property damage are excluded, when such result from any of the following causes:

- Any use other than intended;
- Improper installation, operation, maintenance or repair;
- Operation with defective, improperly attached or non-operational safety and/or protective equipment or devices;
- Failure to observe the instructions in the operating manual regarding safe conduct;
- Impermissible structural modifications;
- Use of replacement parts not approved by FORUM Handling Tools;
- Normal wear or insufficient inspection of components subject to wear;
- External effects or force majeure;
- Lubricating the Safety Clamp Type Series with other lubricants than those recommended by FORUM Handling Tools.

INFO

Any structural modification to the Safety Clamp by the operating company requires previous written approval by FORUM Handling Tools. Failure to obtain such approval voids the warranty as well as the declaration of conformity and releases FORUM Handling Tools from any product liability. Following modifications or installation of optional equipment, all safety equipment must be reinstalled and checked by the operator for proper function.

VI Obligations of the Operating Company

VI-01 Planning and Checking Safety Measures

The obligation of the operating company to due diligence includes planning safety measures and supervising their observance. All personnel performing work on and with the Safety Clamp have to be trained by the operating company for the work performed on and with the Safety Clamp.

All personnel must have read and understood the OMM.

VI-02 Minimizing Risk of Injury

The following principles apply to minimize the risk of injury:

- Ensure that only qualified personnel perform work on the Safety Clamp.
- The operating company must authorize the personnel for such work.
- The personnel must wear the prescribed protective equipment.
- Procedures, competencies and responsibilities must be clearly defined and established in the area of the Safety Clamp. Proper behavior in the event of a malfunction must be clear for everyone. The personnel must be given regular training.

VI-03 Trouble-free Operation

The following principles apply for trouble-free operation:

- Keep the complete OMM at the location, where the Safety Clamp is in operation, where it is easily accessible for everyone and in an easily legible condition.
- Use the Safety Clamp exclusively for its intended purpose.
- Use the Safety Clamp only when it is in a perfect operating state.
- Before starting work, check to ensure that it is in a safe operating state and functioning properly.

VI-04 Requirements for Operator

Basic knowledge of safe handling and use of the Safety Clamp includes knowledge of the general safety precautions. Ensure that the Safety Clamp Type Series is operated only in compliance with the general safety precautions and other instructions in this OMM.

VI-05 Training

The operating company is obligated to organize and hold regular training to ensure that all personnel involved with transporting, installing, operating and/or servicing the Safety Clamp is familiar with the required procedures and safety precautions.

VI-06 Minimum Qualifications

All work on the Safety Clamps requires special knowledge and qualifications on the part of the operating personnel. All personnel working on Safety Clamp must have the following qualifications:

- Personal suitability for the work performed.
- Suitable qualifications for the work performed.
- Familiarity with the safety equipment and its function.
- Familiarity with this operating manual – particularly the safety precautions – and all chapters relevant for the work to be performed.
- Familiarity with the elementary instructions on operating safety and accident prevention.

In general, all employees must have one of the following minimum qualifications:

- Technical training for independent work on the Safety Clamp Type Series.
- Sufficient qualifications for working on the Safety Clamp Type Series under supervision and at the instructions of a trained specialist.

VI-07 User Groups

This OMM is subdivided into the following user groups:

Personnel	Qualifications
Operating personnel	Sufficiently trained in: • Functional procedures on the Safety Clamp. • Operating procedures. Knowledge: • Competency and responsibility in regard to the work to be performed. • Behavior in emergencies.
Service personnel	Basic knowledge of: • Mechanics. • [Pneumatics]. Authorizations (according to standards of safety engineering): • Starting up the Safety Clamp. • Marking of the Safety Clamp.

VI-08 Special Technical Knowledge

The following work should be performed only by specially trained personnel:

Work Performed	Qualifications
Work on mechanical parts	Personnel qualified or trained in industrial mechanics; work is to be performed only under supervision and upon instruction of a person qualified according to generally accepted codes of practice in industrial mechanics.

VII Safety Symbols

The safety precautions in this OMM contain standardized depictions and symbols. Three hazard classes distinguish, depending on the probability of occurrence and severity of the consequences. Selection of the WARNING category depends on the probability of occurrence and the possible extent of damage.

⚠ CAUTION

Indication of recognizable hazard for humans or possible property damage.

Failure to observe can lead to reversible injuries or property damage!

The symbol as specified in ANSI Z535.6 emphasizes the cause.

» Measures for avoiding are listed.

⚠ WARNING

Indication of recognizable hazard for humans.

Failure to observe can lead to irreversible injuries!

The symbol as specified in ANSI Z535.6 emphasizes the cause.

» Measures for avoiding are listed.

⚠ DANGER

Indication of imminent hazard for humans.

Failure to observe can lead to irreversible or lethal injuries!

The symbol as specified in ANSI Z535.6 emphasizes the cause.

» Measures for avoiding are listed.

VII-01 Preliminary Safety Precautions

Safety precautions are given in the preceding form at the beginning of complete chapters or sections. They apply for the entire chapter or the entire subsequent section.

VII-02 Safety Precautions Relevant for Action

If a safety precaution applies only for one single action or a short series of actions, it is integrated into the text preceding the possible hazard point.

For example:

1. Attach hoisting gear to eye bolts in cover.

⚠ **CAUTION** of pinching/crushing hands! The cover can fall shut when the retainer is not engaged. Never open the cover by hand.

2. Open the cover with a crane and suitable hoisting gear.
3. ...

VII-03 Instructions for Safe Procedure

Special work steps to ensure Safe Procedure are depicted as follows (example):

Safe Procedure

1. Shut off equipment.
2. Disconnect supply lines.
3. Attach equipment to crane.
4. ...

VII-04 Linguistic Conventions

This documentation uses terms and symbols intended to help you find information more easily, perform work steps more effectively and recognize dangerous situations more quickly. These symbols and terms are explained below:

All important text sections are printed in **bold** face.

- Lists without any necessary sequence are marked with a dash (-) at the left side of the column.
- Individual activities to be performed are indicated by a dot (•) to the left of the column.

Relevant consequences of an action or work step are marked with an arrow (») in the left margin.

Sequential numbers (1, 2, 3...) in the left margin indicates enumerations in a certain sequence (e.g. a series of work steps).

For example:

1. Unscrew nuts on equipment feet.
2. Lift equipment.
3. ...

For greater clarity, the illustrations are located in the right column with the text opposite or directly below the associated text section. Larger illustrations extending over the entire width of the page are located before the explanatory text. The illustrations are provided with captions in telegraph style.

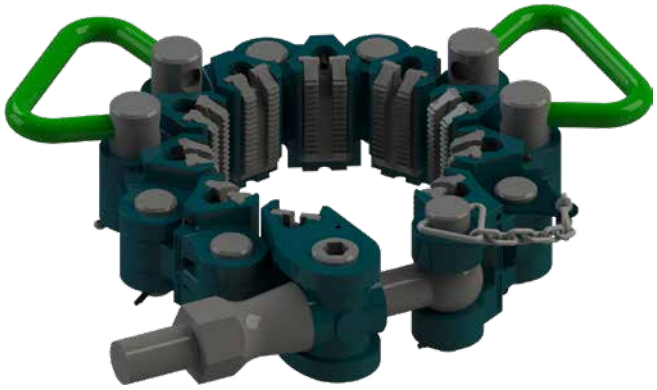

Fig. 4: Illustration Example Safety Clamp

INFO

Additional information and relationships requiring special attention distinguish in this manner.

VIII Personal Protective equipment (PPE)

The following symbols located at appropriate points in the OMM indicate that it is mandatory to wear personal protective equipment:

WEAR PROTECTIVE GLOVES!

WEAR EYE PROTECTION!

WEAR SAFETY SHOES!

WEAR PROTECTIVE HELMET!

WEAR EAR PROTECTION!

IX Conformity

The Safety Clamp satisfies all requirements in applicable directives and standards. A sample of the EC Declaration of Conformity is given in the appendix.

INFO

This operating manual is a part of the technical documentation for the Safety Clamp Type Series. The EC Declaration of Conformity is delivered together with the Safety Clamp. Keep these instructions and the associated documents for later use.

X Contact FORUM Handling Tools Worldwide

In the event of problems that cannot be solved with the aid of this manual, please contact one of the following addresses.

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Tel: + 1 780.980.0345
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Parqu Industrialxico
Tel: + 52.81.8245.6800

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Jebel Ali Free Zone Dubai UAE
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629908
Tel: + 65.6465.4850
Fax: + 65.6465.4851
Outside of Office hours:
+ 65.913.898.12

XI Online Technical document access

XI-01 Information via homepage

INFO

For further and actual information, you can also visit our homepage in the Internet.

A digital version of the operation instructions for this product as well as the operation instructions, safety – and update notes for other FORUM Handling Tools products can be reached via the **blohmvoss-oiltools** homepage. To join our Internet Technical Documentation service with the latest updates on new technical documentation in a casual way, you must register to our service with your email-address and name in the customer-login area ❶ on **www.blohmvoss-oiltools.com**.

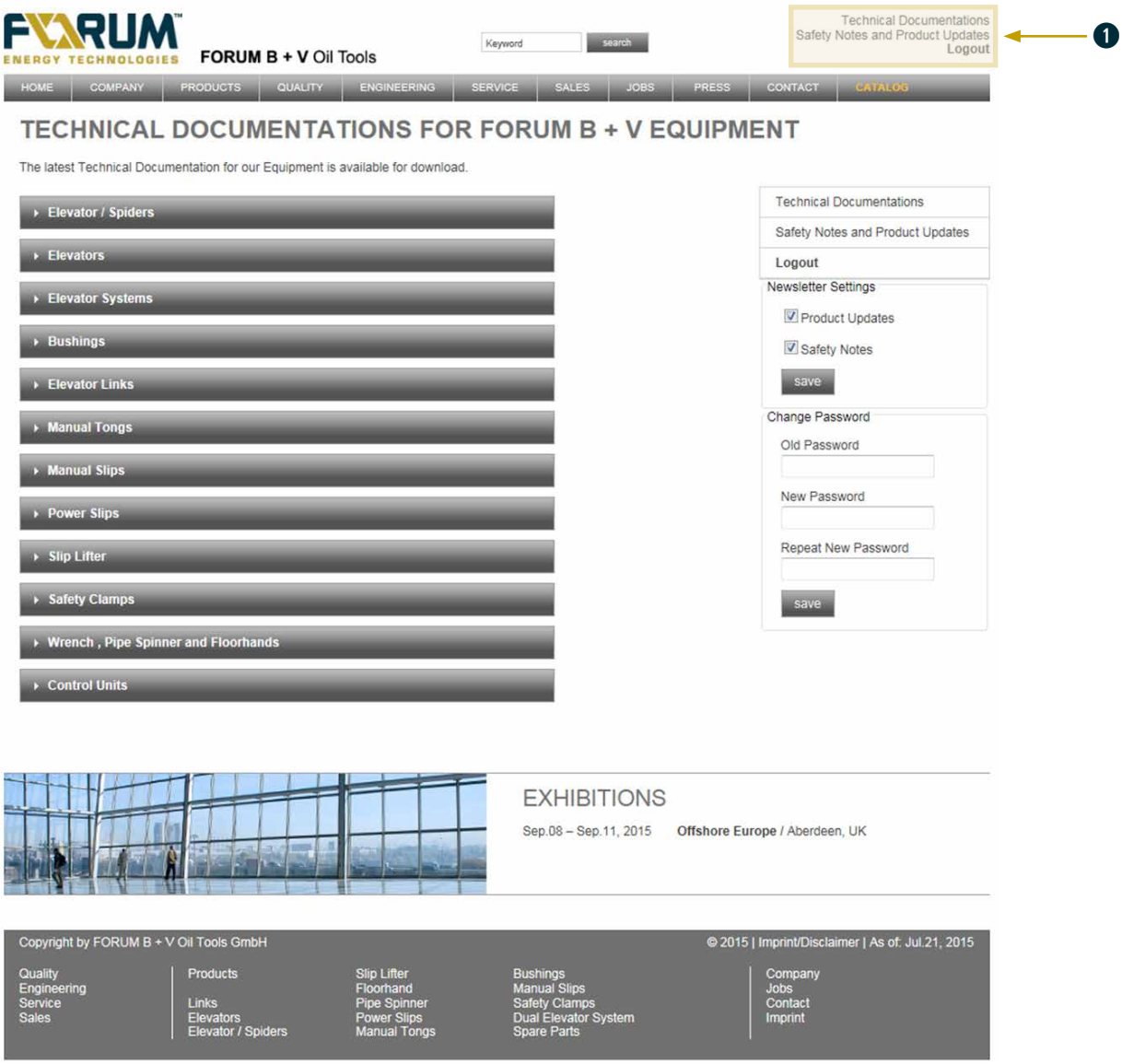

Fig. 5: Illustration Homepage

XI-02 Information via Extranet

INFO

For further and actual information, you can also visit our Extranet homepage.

A digital version of the operation instructions for this product as well as the operation instructions, safety – and update notes for other FORUM Handling Tools products can be reached via the **Extranet**. To join our Internet Technical Documentation service with the latest updates on new technical documentation in a casual way, you must register to our service with your email-address and name in the customer-login area ❶ on **https://www.accessoiltools.com/fx/**.

Fig. 6: Illustration FORUM Extranet

XII Abbreviations

Abbr.	Description	Abbr.	Description
Air	Pneumatic Operated	**°C**	Degree Celsius
Csg	Casing	**F**	Degree Fahrenheit
DC	Drill Collars	**ft**	foot or feet
dia.	diameter	**ft.lb**	foot pounds (= torque)
DP	Drill Pipe	**gpm**	(US) gallon per minute
EU	External Upset	**in**	inch(es)
Hyd	Hydraulic Operated	**kW**	kilowatt
ID	inside diameter	**kPa**	kilop Pascal
IEU	Internal External Upset	**kg**	kilogram(s)
IU	Internal Upset	**lb**	pound(s)
OD	outside diameter	**m**	meter(s)
P/N	part number	**mm**	millimeter(s)
qty	quantity	**Nm**	Newton meter (= torque)
max	maximum	**oz**	ounce(s)
min	minimum	**psi**	pounds per square inch
no	number	**sh T**	short ton
Tbg	tubing	**t**	Metric Ton
w/	with		
w/o	without		
w/Zip	with Zip groove		

DESCRIPTION

1 Description

The FORUM Handling Tools Safety Clamps are designed for use with pipe diameter 1.1/8" through 43". The Safety Clamp gripping size is changed by adding or removing intermediate links with an effective working range change of approximately 1 inch in diameter per intermediate link. The Safety Clamp uses the positive gripping principle. The Safety Clamp modification to match the gripping size [OD] can easily performed on the rig floor. Once the proper number of immediate tubular segments is installed, the Safety Clamp is ready for service. The operation of the Safety Clamp is allowed for its intended use only and are not to be used as a hoisting device. All parts are made by heat-treated hardened steel and are suitable for maximum load and maximum gripping safety. A description of the optional accessories is given in the following chapters and in the parts lists. The materials used and the production processes satisfy API 7K standards.

⚠ **WARNING** The Intermediate Links and Inserts of the different Safety Clamp types are not interchangeable.

⚠ **WARNING** Never use the Safety Clamp as a hoisting equipment! The Safety Clamp must be used in conjunction with Hand Slips.

1.1 Type Series Assemblies

⚠ **NOTE** FORUM Handling Tools generally recommends to note the heat no. [Chargen-Nr.] when end or intermediate links are exchanged. This procedure allows, in accordance with the API7K, to keep track of the performed changes in the OEM supplied databook.

1.1.1 Standard Safety Clamp

When the Safety Clamp is engaged, each individual Insert instantly grips tightly on the surface of the pipe. If the pipe string weight takes effect, or if any load applies on the Insert, the tapered mount causes the Insert to be pressed more tightly against the surface of the pipe, i.e. the pipe is secured against any further movement by means of the Safety Clamp. The gripping pressure at all points around the pipe is Always uniform minimizing risk of crushing thin-walled pipes or damaging the pipe surface.

⚠ **NOTE** Safety Clamp top level assembly numbers with a -01 suffix have a Nut Retention System that reduces dropped object risk by preventing the Nut from inadvertently separating from the Screw without additional disassembly steps.

⚠ **NOTE** For Safety Clamp with part numbers beginning with 99 the component size table must be consulted to retract the correct number of nut and pins to be installed (refer to section 1.7 "Component Sizes" on page 16)

1.1.2 Pneumatic Safety Clamp

The pneumatic Safety Clamp is handled as a normal Safety Clamp around the pipe. The pneumatic kit replaces manual tightening through a wrench and sledgehammer and consists of the Safety Clamp C-Type and the respective pneumatic kit. The pneumatic kit (P/N 99630) is used to turn the tightening/loosening bolt automatically. The pneumatic kit (P/N 99650) uses a mounted thread bolt to tighten the Safety Clamp while the Pneumatic kit (P/N 99620) uses a pneumatic wrench.

⚠ **NOTE** To order a complete Safety Clamp C-Type with a pneumatic kit, please add – 1 to the part number (i.e. 99500-1 for a 3.3/4" – 4.5/8" Type C Pneumatic Safety Clamp). The pneumatic kit is only available for Safety Clamps with part numbers beginning with 995.

1.1.3 Main Assemblies

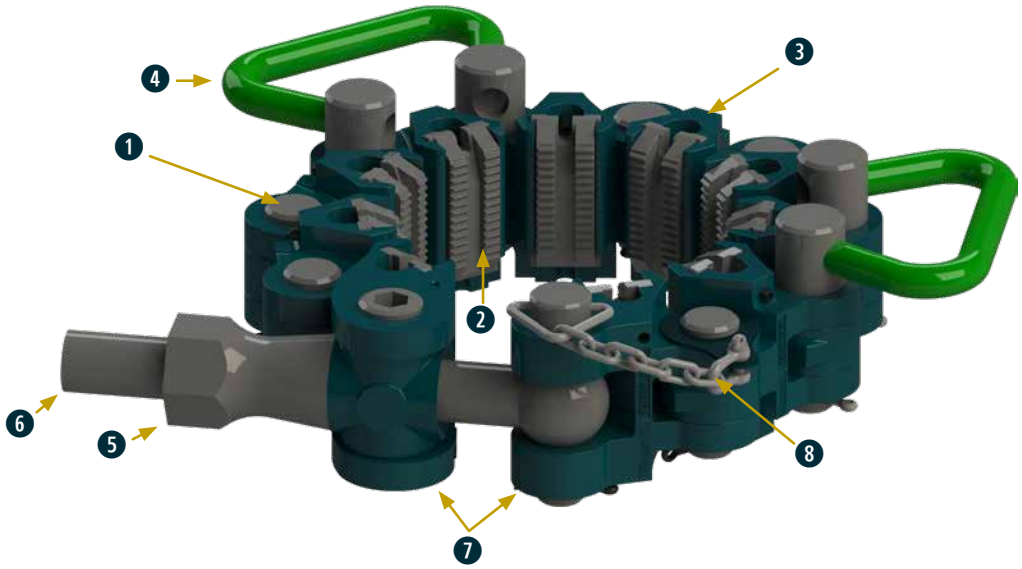

Fig. 7: Safety Clamp C-Type

1	Intermediate Link Pin	2	Insert	3	Intermediate Link	4	Handle
5	Makeup Nut	6	Screw	7	End Link	8	Safety Cable / Chain

NOTE For Safety Clamp with part numbers beginning with 99 the component size table must be consulted to retract the correct number of nut and pins to be installed (refer to section 1.7 "Component Sizes" on page 17)

1.2 Type Series overview

1.2.1 Safety Clamp Type-T

Safety Clamp Type T (Tubing) are specially designed for small pipes from 1.1/8" to 4.1/2".

P/N	Type	Pipe Size
88003	Safety Clamp Type-T	1.1/8" - 2"
11-125-01	Safety Clamp Type-T	1.1/8" - 2"
88004	Safety Clamp Type-T	2.1/8" - 3.1/4"
11-126-01	Safety Clamp Type-T	2.1/8" - 3.1/4"
88005	Safety Clamp Type-T	3.1/2" - 4.1/2"
11-127-01	Safety Clamp Type-T	3.1/2" - 4.1/2"

1.2.2 Safety Clamp Type-C

Safety Clamp Type C (Casing) are designed for pipe sizes from 3.3/4" to 43" and with a Single Screw (Type-CR and Type-CL) or with a Double Screw (Type-CXL Type).

WARNING The safe working load of the Safety Clamp Type C is 10 sh tons and must Never be exceeded.

P/N	Type	Pipe Size
99500	Safety Clamp Type-C	3.3/4" – 4.5/8"
12-127-01	Safety Clamp Type-CR	3.3/4" – 4.5/8"
99501*	Safety Clamp Type-C	4.1/2" – 5.5/8"
12-128-01	Safety Clamp Type-CR	4.1/2" – 5.5/8"
99502*	Safety Clamp Type-C	5.1/2" – 6.5/8"
12-129-01	Safety Clamp Type-CR	5.1/2" – 6.5/8"
99503*	Safety Clamp Type-C	6.1/2" – 7 5/8"
12-130-01	Safety Clamp Type-CR	6.1/2" – 7.5/8"
99504*	Safety Clamp Type-C	7.1/2" – 8.5/8"
12-131-01	Safety Clamp Type-CR	7.1/2" – 8.5/8"
99505*	Safety Clamp Type-C	8.1/2" – 9.5/8"
12-132-01	Safety Clamp Type-CR	8.1/2" – 9.5/8"
99506*	Safety Clamp Type-C	9.1/2" – 10.5/8"
12-133-01	Safety Clamp Type-CR	9.1/2" – 10.5/8"
99507*	Safety Clamp Type-C	10.1/2" – 11.5/8"
12-134-01	Safety Clamp Type-CL	10.1/2" – 11.5/8"
12-150-01**	Safety Clamp Type-CL	10.1/2" – 11.5/8"
99508*	Safety Clamp Type-C	11.1/2" – 12.5/8"
12-135-01	Safety Clamp Type-CL	11.1/2" – 12.5/8"
12-151-01**	Safety Clamp Type-CL	11.1/2" – 12.5/8"
99509*	Safety Clamp Type-C	12.1/2" – 13.5/8"
12-136-01	Safety Clamp Type-CL	12.1/2" – 13.5/8"
12-152-01**	Safety Clamp Type-CL	12.1/2" – 13.5/8"
99510*	Safety Clamp Type-C	13.1/2" – 14.5/8"
12-137-01	Safety Clamp Type-CL	13.1/2" – 14.5/8"
12-153-01**	Safety Clamp Type-CL	13.1/2" – 14.5/8"
99511*	Safety Clamp Type-C	14.1/2" – 15.5/8"
12-138-01	Safety Clamp Type-CL	14.1/2" – 15.5/8"
12-154-01**	Safety Clamp Type-CL	14.1/2" – 15.5/8"
99512*	Safety Clamp Type-C	15.1/2" – 17"
12-145-01	Safety Clamp Type-CXL	15.1/2" – 17"
12-155-01**	Safety Clamp Type-CXL	15.1/2" – 17"
99513*	Safety Clamp Type-C	16.1/2" – 18"
12-146-01	Safety Clamp Type-CXL	16.1/2" – 18"
12-156-01**	Safety Clamp Type-CXL	16.1/2" – 18"
99514*	Safety Clamp Type-C	17.1/2" – 19"
12-147-01	Safety Clamp Type-CXL	17.1/2" – 19"
12-157-01**	Safety Clamp Type-CXL	17.1/2" – 19"
99515*	Safety Clamp Type-C	18.1/2" – 20"
12-148-01	Safety Clamp Type-CXL	18.1/2" – 20"
12-158-01**	Safety Clamp Type-CXL	18.1/2" – 20"
99516*	Safety Clamp Type-C	19.1/2" – 21"
12-149-01	Safety Clamp Type-CXL	19.1/2" – 21"

P/N	Type	Pipe Size
12-159-01**	Safety Clamp Type-CXL	19.1/2" – 21"
99517*	Safety Clamp Type-C	21.1/2" – 23"
12-160-01**	Safety Clamp Type-CXL	21.1/8" – 23"
99518*	Safety Clamp Type-C	22.1/2" – 24"
99519*	Safety Clamp Type-C	24.1/2" – 26"
12-161-01**	Safety Clamp Type-CXL	24.1/8" – 26"
99525*	Safety Clamp Type-C	29.1/2" – 30.1/2"
12-162-01**	Safety Clamp Type-CXL	29.1/2" – 31"
99528	Safety Clamp Type-C	31.1/2" – 32.1/2"
99526*	Safety Clamp Type-C	35.1/2" – 36.1/2"
12-163-01**	Safety Clamp Type-CXL	35.1/2" – 37"
99532	Safety Clamp Type-C	41.1/2" – 42.1/2"
12-164-01**	Safety Clamp Type-CXL	41.1/2" – 43"

* Compatible with pneumatic kit.

** Type-C Series with lifting clevis. Not to be used as a hoisting device.

1.2.3 Safety Clamp Type A-MP

Safety Clamps of the A-MP Type Series are designed to handle tubing and casing pipes.

P/N	Type	Pipe Size
31-009	Safety Clamp Type A-MP-S	2.7/8" – 4.1/8"
31-010	Safety Clamp Type A-MP-S	4" – 5"
31-011	Safety Clamp Type A-MP-R	4.1/2" – 5.5/8"
31-012	Safety Clamp Type A-MP-R	5.1/2" – 7"
31-013	Safety Clamp Type A-MP-R	6.3/4" – 8.1/4"
31-014	Safety Clamp Type A-MP-R	8" – 9.1/4"
31-015	Safety Clamp Type A-MP-R	9.1/4" – 10.1/2"
31-016	Safety Clamp Type A-MP-M	10.1/2" – 11.1/2"
31-017	Safety Clamp Type A-MP-M	11.1/2" – 12.1/2"
31-018	Safety Clamp Type A-MP-M	12.1/2" – 13.5/8"
31-019	Safety Clamp Type A-MP-M	13.5/8" – 14.3/4"
31-020	Safety Clamp Type A-MP-M	14.3/4" – 15.7/8"
31-021	Safety Clamp Type A-MP-L	15.7/8" – 17"
31-022	Safety Clamp Type A-MP-L	17" – 18.1/2"
31-023	Safety Clamp Type A-MP-L	18.1/8" – 19.3/8"
31-024	Safety Clamp Type A-MP-XL	19.3/8" – 20.3/8"
31-025	Safety Clamp Type A-MP-XL	20 3/8" – 21 1/2"
31-032	Safety Clamp Type A-MP-XL	21" – 22.5/8"
31-033	Safety Clamp Type A-MP-XL	22.5/8" – 23.3/4"
31-034	Safety Clamp Type A-MP-XL	23.3/4" – 24.7/8"
31-035	Safety Clamp Type A-MP-XL	24.7/8" – 26"
31-036	Safety Clamp Type A-MP-XL	26" – 27.1/8"
31-039	Safety Clamp Type A-MP-XL	29.3/8" – 30.1/2"
31-044	Safety Clamp Type A-MP-XL	35" – 36.1/8"

1.3 Technical Data

Temperature ambient working range – 20°C to + 60°C / – 4°F to + 104°F

Temperature working range – 40°C to + 45°C upon special request.

1.3.1 Safety Clamps Type-C

Range and Weight

P/N	Range	Weight [kg/ lb]
99500	3.3/4" – 4.5/8"	23 [50.7]
12-127-01	3.3/4" – 4.5/8"	19.3 [42.45]
99501	4.1/2" – 5.5/8"	25 [55.1]
99501-1	4.1/2" – 5.5/8"	17 [37.5]
12-128-01	4.1/2" – 5.5/8"	21.5 [47.5]
99502	5.1/2" – 6.5/8"	27 [59.5]
99502-1	5.1/2" – 6.5/8"	19 [41.9]
12-129-01	5.1/2" – 6.5/8"	26.2 [57.7]
99503	6.1/2" – 7 5/8"	28.9 [63.8]
99503-1	6.1/2" – 7 5/8"	21 [46.3]
12-130-01	6.1/2" – 7.5/8"	25.4 [55.96]
99504	7.1/2" – 8.5/8"	31 [68.3]
99504-1	7.1/2" – 8.5/8"	23 [50.7]
12-131-01	7.1/2" – 8.5/8"	31 [68.3]
99505	8.1/2" – 9.5/8"	32.7 [72.2]
99505-1	8.1/2" – 9.5/8"	23 [50.7]
12-132-01	8.1/2" – 9.5/8"	33 [72.7]
99506	9.1/2" – 10.5/8"	35 [77.2]
99506-1	9.1/2" – 10.5/8"	27 [59.5]
12-133-01	9.1/2" – 10.5/8"	29.2 [64.4]
99507	10.1/2" – 11.5/8"	38 [83.8]
99507-1	10.1/2" – 11.5/8"	30 [66.1]
12-134-01	10.1/2" – 11.5/8"	33.1 [72.92]
12-150-01	10.1/2" – 11.5/8"	39.2 [86.37]
99508	11.1/2" – 12.5/8"	40 [88.2]
99508-1	11.1/2" – 12.5/8"	32 [70.5]
12-135-01	11.1/2" – 12.5/8"	35 [77.16]
12-151-01	11.1/2" – 12.5/8"	41.1 [90.61]
99509	12.1/2" – 13.5/8"	42 [92.6]
99509-1	12.1/2" – 13.5/8"	34 [74.9]
12-136-01	12.1/2" – 13.5/8"	36.9 [81.4]
12-152-01	12.1/2" – 13.5/8"	43 [94.85]
99510	13.1/2" – 14.5/8"	45 [99.2]
99510-1	13.1/2" – 14.5/8"	36 [79.4]
12-137-01	13.1/2" – 14.5/8"	38.8 [85.64]
12-153-01	13.1/2" – 14.5/8"	44.9 [99.09]
99511	14.1/2" – 15.5/8"	40 [88.2]
99511-1	14.1/2" – 15.5/8"	38 [83.7]
12-138-01	14.1/2" – 15.5/8"	40.8 [89.88]
12-154-01	14.1/2" – 15.5/8"	46.9 [103.33]
99512	15.1/2" – 16.5/8"	48 [105.8]
99512-1	15.1/2" – 16.5/8"	89.5 [197.3]
12-145-01	15.1/2" – 17"	45.9 [101.3]
12-155-01	15.1/2" – 17"	58.2 [128.2]
99513	16.1/2" – 17.5/8"	50 [110.2]
99513-1	16.1/2" – 17.5/8"	94 [207.2]
12-146-01	16.1/2" – 18"	47.9 [105.54]
12-156-01	16.1/2" – 18"	60.1 [132.44]
99514	17.1/2" – 18.5/8"	52 [114.6]
99514-1	17.1/2" – 18.5/8"	97 [213.8]
12-147-01	17.1/2" – 19"	49.8 [109.78]
12-157-01	17.1/2" – 19"	62 [136.68]
99515	18.1/2" – 19.5/8"	54 [119.1]
99515-1	18.1/2" – 19.5/8"	100 [220.5]
12-148-01	18.1/2" – 20"	51.7 [114.02]
12-158-01	18.1/2" – 20"	63.9 [140.92]
99516	19.1/2" – 21"	60 [132.3]
99516-1	19.1/2" – 21"	103 [227.1]
12-149-01	19.1/2" – 21"	53.6 [118.26]

P/N	Range	Weight [kg/ lb]
12-159-01	19.1/2" – 21"	65.8 [145.16]
99517	21.1/2" – 22.5/8"	57 [125.6]
99517-1	21.1/2" – 22.5/8"	106 [233.7]
12-160-01	21.1/8" – 23"	69.7 [153.64]
99518	22.1/2" – 24"	56 [123.5]
99518-1	22.1/2" – 24"	109 [240.3]
99519	24.1/2" – 26"	90 [198.4]
99519-1	24.1/2" – 26"	112 [246.9]
12-161-01	24.1/8" – 26"	75.5 [166.35]
99525	29.1/2" – 30.1/2"	104 [229.3]
99525-1	29.1/2" – 30.1/2"	118 [260.1]
12-162-01	29.1/2" – 31"	85.1 [187.55]
99528	31.1/2" – 32.1/2"	120 [264.6]
99526	35.1/2" – 36.1/2"	117 [257.9]
99526-1	35.1/2" – 36.1/2"	136 [299.8]
12-163-01	35.1/2" – 37"	96.6 [212.99]
99532	41.1/2" – 42.1/2"	142 [313.1]
12-164-01	41.1/2" – 43"	108.1 [238.43]

1.3.2 Safety Clamp Type-T

Range and Weight

P/N	Range	Weight [kg/ lb]
88003	1.1/8" – 2"	16 [35.3]
11-125-01	1.1/8" – 2"	13.4 [29.5]
88004	2.1/8" – 3.1/4"	17 [37.5]
11-126-01	2.1/8" – 3.1/4"	15.2 [33.45]
88005	3.1/4" – 4.1/2"	18 [39.7]
11-127-01	3.1/2" – 4.1/2"	17 [37.4]

1.3.3 Safety Clamp Type A-MP

Range and Weight

P/N	Range	Weight [kg/ lb]
31-009	2.7/8" – 4.1/8"	58 [128]
31-010	4" – 5"	60 [133]
31-011	4.1/2" – 5.5/8"	54 [120]
31-012	5.1/2" – 7"	59 [130]
31-013	6.3/4" – 8.1/4"	63 [138]
31-014	8" – 9.1/4"	67 [147]
31-015	9.1/4" – 10.1/2"	70 [155]
31-016	10.1/2" – 11.1/2"	74 [163]
31-017	11.1/2" – 12.1/2"	78 [171]
31-018	12.1/2" – 13.5/8"	81 [179]
31-019	13.5/8" – 14.3/4"	85 [187]
31-020	14.3/4" – 15.7/8"	88 [195]
31-021	15.7/8" – 17"	98 [215]
31-022	17" – 18.1/2"	101 [223]
31-023	18.1/8" – 19.3/8"	105 [231]
31-024	19.3/8" – 20.3/8"	127 [280]
31-025	20.3/8" – 21.1/2"	131 [288]
31-032	21" – 22.5/8"	134 [296]
31-033	22.5/8" – 23.3/4"	138 [304]
31-034	23.3/4" – 24.7/8"	142 [312]
31-035	24.7/8" – 26"	145 [320]
31-036	26" – 27.1/8"	149 [328]
31-039	29.3/8" – 30.1/2"	152 [336]
31-044	35" – 36.1/8"	160 [352]

1.4 Recommended Lubricants

FORUM Handling Tools recommends use of the following lubricants for effective lubrication under various ambient conditions:

Brand	Name	Temperature range*	Remarks
Finke	Aviaticon XRF Low-Viscosity Grease	- 20°C to + 29°C (- 4°F to + 84.2°F)	NLGI 0
Fuchs	NESSOS SF0 EP grease for non-oil tight gear trains	- 20°C to + 29°C (- 4°F to + 84.2°F)	NLGI 0 DIN 51826 GPOF-25
Castrol	MP grease	- 20°C to + 29°C (- 4°F to + 84.2°F)	-
Chevron	Avi-Motive W	- 20°C to + 29°C (- 4°F to + 84.2°F)	-
Exxon	Lidok EP2	- 20°C to + 29°C (- 4°F to + 84.2°F)	-
Gulf	Gulfcrown EP@	- 20°C to + 29°C (- 4°F to + 84.2°F)	-
Mobil	Mobilux EP2	- 20°C to + 29°C (- 4°F to + 84.2°F)	-
Shell	Alvania EP2	- 20°C to + 29°C (- 4°F to + 84.2°F)	-
Texaco	Multifak EP2	- 20°C to + 29°C (- 4°F to + 84.2°F)	-
Union	Unoba EP2	- 20°C to + 29°C (- 4°F to + 84.2°F)	-

* For temperatures above + 30°C (+ 86°F) FORUM Handling Tools recommends using the specified lubricants in consistency class NLGI 2.

1.5 Operational Environment

The Safety Clamp is designed and constructed for use in the drilling industry on ships and platforms. The Safety Clamp is approved for operation in explosion hazard areas. The corresponding ATEX certificates are present in the Data book. The Classification according to CE (with reference to the ATEX guideline) is as followed:

CE Ex II 2G IIB T6 for manual equipment

with

CE	CE – marking (with reference to the ATEX guideline)
Ex	Marking of the equipment for the Ex – range
II	equipment Group (II)
2	equipment Category
G	For explosive mixtures of air and combustible gases, mists or vapors (G)
IIB	Category for Gases
T6	Temperature class

1.6 Optional Accessories

To ease the handling and to support the Equipment functions, the following accessories are available from FORUM Handling Tools for the Safety Clamp. Please contact your local FORUM Handling Tools representative for detailed information.

- **Manual Grease Pump** **PN 755667-3**
- **Pneumatic Kit** **3.3/4" - 42.1/2"** **PN 99620**
  22" - 42.1/2" **PN 99650**
- **Transport Box** **PN 99612**

⚠ **NOTE** The Pneumatic Kit for Safety Clamps is only available for the BVT product line [PN starting with 995].

- **Support Clevis** **PN 12-119**
  The support clevis is an optional expansion which, allows the user to lift heavy Safety Clamps safely.

Fig. 8: Support Clevis

Fig. 9: Pneumatic kit

Fig. 10: Manual Grease Pump

Fig. 11: Transport Box

1.7 Equipment Markings

Markings are generally used for traceability and provide general information about the component/ device. All markings are in compliance to the latest API 7K 6th Edition and at least include the following information:

General Markings according to API 7K 6th Edition

- API Stamp (API monogram, spec, license)
- Manufacturer's specifications (FORUM logo)
- Production Date (Month / Year)
- Part number (marking P/N before the part number)
- Serial number (marking S/N before the serial number)
- Load Rating
- Own weight
- Maximum weight in kg, if the weight increases by attachments
- CE-ATEX marking (CE Ex II 2G IIB T5 / T6)
- Country of manufacture

Supplementary Requirements - SR

Supplementary Requirements, abbreviated by "SR", are labeled beside the general markings, if additionally ordered. Supplementary Requirements in according to API 7K 6th Edition are:

- SR 1 - Proof Load Testing.
- SR 2 - Low-temperature Testing.
- SR 3 - Data Book.
- SR 4 - Additional Volumetric Examination of Castings.
- SR 5 - Volumetric Examination of Wrought Material.

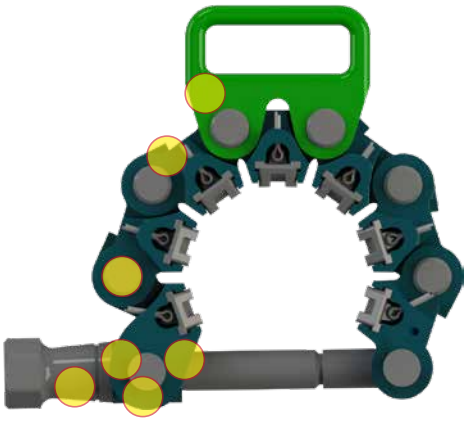

Fig. 12: Equipment Marking I

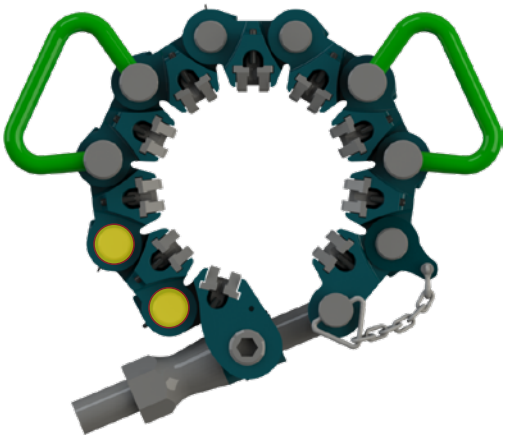

Fig. 13: Equipment Marking II

1.8 Component Sizes

The pipe diameters and matching components for the Safety Clamp are listed with part numbers. To order components please contact the FORUM Handling Tools Service Department at the address given (refer to section X "Contact Worldwide" on page 11).

1.8.1 Component Sizes for Safety Clamps Type-T

Part No.	Pipe Size Inch	Components type and quantity					
		Segment Part No	Segments Quantity (ends)	Locks Quantity	Handle Quantity	Inserts Part No	Inserts Quantity
88003	1.1/8" - 2"	99450	2 (+2)	1	1	99451	4
88004	2.1/8" - 3.1/4"	99450	3 (+2)	1	1	99451	5
88005	3.1/2" - 4.1/2"	99450	4 (+2)	1	1	99451	6

1.8.2 Component Sizes for Safety Clamps Type-C

Part No.	Pipe Size Inch	Components type and quantity					
		Segment Part No	Segments Quantity (ends)	Locks Quantity	Handle Quantity	Inserts Part No	Inserts Quantity
99500	3.3/4" - 4.5/8"	99601	5 (+2)	1	2	99608	7
99501	4.1/2" - 5.5/8"	99601	6 (+2)	1	2	99608	8
99502	5.1/2" - 6.5/8"	99601	7 (+2)	1	2	99608	9
99503	6.1/2" - 7.5/8"	99601	8 (+2)	1	2	99608	10
99504	7.1/2" - 8.5/8"	99601	9 (+2)	1	2	99608	11
99505	8.1/2" - 9.5/8"	99601	10 (+2)	1	2	99608	12
99506	9.1/2" - 10.5/8"	99601	11 (+2)	1	2	99608	13
99507	10.1/2" - 11.5/8"	99601	12 (+2)	1	2	99608	14
99508	11.1/2" - 12.5/8"	99601	13 (+2)	1	2	99608	15
99509	12.1/2" - 13.5/8"	99601	14 (+2)	1	2	99608	16
99510	13.1/2" - 14.5/8"	99601	15 (+2)	1	2	99608	17
99511	14.1/2" - 15.5/8"	99601	16 (+2)	1	2	99608	18
99512	15.1/2" - 17"	99601	14 (+4)	2	4	99608	18
99513	16.1/2" - 18"	99601	15 (+4)	2	4	99608	19
99514	17.1/2" - 19"	99601	16 (+4)	2	4	99608	20
99515	18.1/2" - 20"	99601	17 (+4)	2	4	99608	21
99516	19.1/2" - 21"	99601	18 (+4)	2	4	99608	22
99517	21.1/2" - 23"	99601	20 (+4)	2	4	99608	24
99518	22.1/2" - 24"	99601	21 (+4)	2	4	99608	25
99519	24.1/2" - 26"	99601	23 (+4)	2	4	99608	27
99525	29.1/2" - 30.1/2"	99601	28 (+4)	2	4	99608	32
99526	35.1/2" - 36.1/2"	99601	34 (+4)	2	4	99608	38
99528	31.1/2" - 32.1/2"	99601	30 (+4)	2	4	99608	34
99532	41.1/2" - 42.1/2"	99601	39 (+4)	2	4	99608	43

1.8.3 Component Sizes for pneumatic Safety Clamps Type-C

Part No.	Pipe Size Inch	Components type and quantity					
		Segment Part No	Segments Quantity (ends)	Locks Quantity	Handle Quantity	Inserts Part No	Inserts Quantity
99500-1	3.3/4" - 4.5/8"	99601	5 (+2)	1	2	99608	7
99501-1	4.1/2" - 5.5/8"	99601	6 (+2)	1	2	99608	8
99502-1	5.1/2" - 6.5/8"	99601	7 (+2)	1	2	99608	9
99503-1	6.1/2" - 7.5/8"	99601	8 (+2)	1	2	99608	10
99504-1	7.1/2" - 8.5/8"	99601	9 (+2)	1	2	99608	11
99505-1	8.1/2" - 9.5/8"	99601	10 (+2)	1	2	99608	12
99506-1	9.1/2" - 10.5/8"	99601	11 (+2)	1	2	99608	13
99507-1	10.1/2" - 11.5/8"	99601	12 (+2)	1	2	99608	14
99508-1	11.1/2" - 12.5/8"	99601	13 (+2)	1	2	99608	15
99509-1	12.1/2" - 13.5/8"	99601	14 (+2)	1	2	99608	16
99510-1	13.1/2" - 14.5/8"	99601	15 (+2)	1	2	99608	17
99511-1	14.1/2" - 15.5/8"	99601	16 (+2)	1	2	99608	18
99512-1	15.1/2" - 17"	99601	14 (+4)	2	4	99608	18
99513-1	16.1/2" - 18"	99601	15 (+4)	2	4	99608	19
99514-1	17.1/2" - 19"	99601	16 (+4)	2	4	99608	20
99515-1	18.1/2" - 20"	99601	17 (+4)	2	4	99608	21
99516-1	19.1/2" - 21"	99601	18 (+4)	2	4	99608	22
99517-1	21.1/2" - 23"	99601	20 (+4)	2	4	99608	24
99518-1	22.1/2" - 24"	99601	21 (+4)	2	4	99608	25
99519-1	24.1/2" - 26"	99601	23 (+4)	2	4	99608	27
99525-1	29.1/2" - 30.1/2"	99601	28 (+4)	2	4	99608	32
99526-1	35.1/2" - 36.1/2"	99601	34 (+4)	2	4	99608	38

1.9 RFID-Chip Equipped Handling Equipment

INFO

For further information, you may access the Forum/IC Database from the FET Website or at **www.infochip.com**.

FORUM Handling Tools outfits/supplies certain equipment with patent pending RFID Technology. This technology allows for easy real-time access to pertinent equipment information and technical documentation anytime, anywhere. The database is accessible via the internet or mobile application.

Tier I Access – General Access

As standard, the customer will be assigned and issued login information to the database provided for their assets/equipment. Once logged into the database, customers will be able to see all assets assigned to them. Attached to each asset is complete documentation including all contents of databook related to that specific asset. The customer will be able to view, download and print all documents associated with their particular assets.

Tier II Access – User Access

Customers opting for improved access as a system user will have the full functionality of Tier I Access but will be able to manipulate their assets. Additional functionality includes but is not limited to:

- Assigning Inspection and Certification due dates and reminders.
- Attaching Internal Inspection Checklists/ Documentation.
- Managing Asset Locations.
- Assigning Internal Asset/Serial Numbers.

INFO

For detailed RFID instruction, please refer to Forum Document 1155081, FORUM RFID User Manual (refer to section XI "Online Technical document access" on page 12).

Frequently Asked Questions (FAQ)

- How do I know if my equipment has RFID?

» RFID tags are embedded and clearly marked (“RFID”) on equipment in inconspicuous locations generally at the upper visible part of the equipment.

- What type of RFID tag are we using?

» The RFID tags used in FORUM equipment operate on the UHF Frequency.

- How can I scan the tag?

» Standard NFC UHF Frequency Reader (available through Forum).

- What is on the tag/chip?

» The chip identification number is the only information physically on the chip. All other information is stored on the cloud-based database associated with the chip identification number.

- Whom do I contact to get Tier I access or to inquire about Tier II access?

» Forum Sales personnel can help with basic access and upgrade information.

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SAFETY

2 Safety

The Safety Clamp is designed and produced in consideration of all required safety precautions. Failure to observe the safety precautions and operating instructions specified in this OMM, can lead to hazardous situations when operating the Safety Clamp. While it is not possible to eliminate all hazardous situations with awareness and instruction from this OMM, good judgment should be used at all times surrounding the use of the Safety Clamp. The Safety Clamp should only be used for its intended purpose. Rectify all faults immediately, which could have a negative effect on the Safety Clamp safety.

2.1 General Safety Precautions

Ensure that any work on the Safety Clamp, particularly installation, only personnel with the necessary qualifications perform maintenance and repair work, and who are familiar with the associated risks. For safe and proper operation of the Safety Clamp, it is essential that all personnel working on the Safety Clamp take the prescribed safety measures and observe the safety precautions specified in this OMM. The Safety Clamp contains components subject to wear (e.g. Hinge Pins). After longer periods of operation, the safety can be reduced due to wear. Service the Safety Clamp regularly in compliance with the maintenance chart to ensure that all safety requirements are always fulfilled. Check the specified wear limits regularly. Replace worn or defective parts immediately with new parts. If safe operation is no longer guaranteed, take the Safety Clamp out of service. Advise the responsible service organization. Rectify every fault, which affects the safety immediately. All safe grab areas and lifting points are painted green ❶.

Fig. 14: Safe gripping points

⚠ **NOTE Handles/ grip points** are marked in green. During operation, these grips are the only places the Safety Clamp can be handled safely.

⚠ **WARNING** Never remove the safety equipment or replace it with equipment not approved by FORUM Handling Tools. Failure to observe can lead to hazardous situations, for which FORUM Handling Tools cannot be held responsible. Always keep all safety equipment in perfect condition and check regularly.

INFO

The operating company is responsible for ensuring safe and correct use of the equipment within the sense of the hazard and risk analysis. The operating company is also obligated to issue and supervise observance of operating instructions on safe use as well as to observe the instructions in this OMM.

2.2 Depictions and Symbols

The safety precautions in this operating manual are indicted using standardized depictions and symbols. Concrete Examples of the symbols and terms used in this OMM are explained below. These are used in the form shown wherever possible hazards are present.

⚠ DANGER

Suspended load!

This indicates injury risks from transporting heavy components.

⚠ WARNING

Danger of pinching/crushing hands!

This indicates injury risks from moving parts, which pose a hazard of pinching or crushing hands.

⚠ WARNING

Separated pneumatic lines pose an injury hazard!

This symbol marks areas where injuries are possible from disconnecting pneumatic lines in which the pressure has NOT been relieved.

⚠ WARNING

Defective pneumatic lines pose an injury hazard!

This symbol marks areas where injuries are possible from defective pneumatic lines.

⚠ WARNING

Health hazards from service products!

This symbol warns of health hazards resulting from contact of service products (e.g. lubricants, hydraulic fluids) with the skin, mucous membranes, eyes and respiratory paths.

2.3 Organizational Measures

The operating company is responsible for ensuring that all legally and officially prescribed approvals for operation of the Safety Clamp are present and in compliance with national laws and regulations. The company operating the Safety Clamp must provide the required personal protective equipment. All safety features present must be checked regularly in compliance with national and local requirements. The operating instructions must be kept so that they are available to those operating the Safety Clamp at all times.

Personal Protective equipment

The required Personal Protective equipment (PPE) must be used when operating the Safety Clamp. This is to be provided by the operating company.
The following PPE is recommended:

- Oil resistant protective clothing,
- Protective gloves,
- Eye protection,
- Safety shoes,
- Protective helmet.

All parts of the protective equipment must be checked regularly for damage in compliance with the specific national regulations and replaced as required.

2.4 Safety Precautions against Remaining Hazards

The Safety Clamp was designed and produced according to the state-of-the-art in consideration of the safety precautions specified in EC Directive 2006/42/EC on Machinery.

The Safety Clamp may be used only for:

- Its intended purpose.
- When it is in a technically safe state.

Nevertheless, it is not possible to exclude completely all hazardous situations, which could arise when the Safety Clamp is used. Reference is made to these remaining risks at the beginning of each chapter and at the corresponding points in the description and measures for avoiding these risks are explained.

⚠ WARNING

Mechanically generated sparks.

During some troubleshooting tasks, like such as clamping components, the use of metal equipment can generate sparks.

- The use of metallic tools in hazardous areas must be prohibited by the operating company.

» Only use non-metallic tools for loosening of clamping components.

2.4.1 Danger of Pinching/Crushing

⚠ WARNING

Danger of pinching/crushing hands!

Moving parts pose a hazard during assembly, set-up and conversion work as well as during operation.

» Never reach between moving components.

⚠ WARNING

Danger of pinching/crushing feet!

Moving parts pose a hazard during assembly, set-up and conversion work as well as during operation.

» Never stand below moving components.

During assembly, set-up and conversion work as well as during operation pinching/crushing hazards can be posed. Pay attention to hands, feet and body when performing the work specified. Always ensure that no one is in a hazardous position.

2.4.2 Human Error

Ignorance of hazards, inattentiveness and limited reactions can lead to hazard situations while working with the Safety Clamp.

Safe Work

1. All personnel working on the Safety Clamp are responsible for paying attention to their colleagues.
2. Consumption of alcohol and drugs is prohibited.
3. Work on the Safety Clamp is not permissible after taking medication, which reduces reactions.
4. At a minimum, visual contact must exist between the operator in the doghouse and the personnel at the Safety Clamp, to allow communication via hand signals.
5. Always keep the personal protective equipment in perfect condition.
6. All personnel working on or with the Safety Clamp must be familiar with and observe the safety precautions in this OMM.
7. The instructions for handling and maintenance intervals specified in this OMM must be observed.
8. Keep a copy of this OMM near the Safety Clamp, where it is accessible at all times.

2.4.3 Incorrect Handling of Pneumatic equipment

⚠ WARNING

Defective pneumatic lines pose an injury hazard!

Route pneumatic lines safely and check regularly for damage.

» Provide lines with chafe protection.

» Replace defective lines immediately.

⚠ WARNING

Separated pneumatic lines pose an injury hazard!

Compressed air can escape under high pressure.

» Always relieve pressure in pneumatic equipment before working on equipment.

» Check pneumatic connections regularly to ensure that they are properly fastened.

⚠ WARNING

Lubricants can pose a health hazard!

Lubricants can lead to skin and eye injury and poisoning symptoms upon contact.

» Avoid direct contact with lubricants.

WEAR EYE PROTECTION!

WEAR PROTECTIVE GLOVES!

Pneumatic lines, which are weakened due to incorrect routing or damage can burst under load. The compressed air then escapes under pressure resulting in a powerful jet, which can lead to skin or eye injury.

Pneumatic system safety instructions

9. Lay pneumatic lines so that they are not kinked or pinched.
10. Release the pressure in all lines carrying compressed air prior to any maintenance and repair work. Lower all pneumatically controlled components to the ground. Move all control levers of the pneumatic control valves several times.
11. Compressed air escaping under high pressure can lead to eye and skin injuries. Always consult a doctor immediately even if the wound seems insignificant – otherwise serious infections or irreparably damages could set in!
12. Replace the hose or line if one of the problems mentioned below is detected:

- Damaged or leaky pneumatic seals.
- Worn or torn shells or uncovered reinforcement branches.
- Expanded shells in several positions.
- Foreign bodies jammed or stuck in protective layers.

13. Re-tighten leaking fittings and hose connections only when the system is not under pressure; i.e. release the pressure before working on pressurized lines!
14. Never weld or solder damaged or leaking pressure lines and screw connections. Replace damaged parts with new ones!
15. Never search for leaks with your bare hands, Always wear protective gloves!
16. Repair or replace Leaks and damaged pressure lines immediately.

⚠ **NOTE** Further information of the pneumatically operated impact wrench can be found in the manufacturers Product Information. Please refer to section 8 “Appendix” on page 86.

SAFETY INSTRUCTIONS

for Safety Clamp

***OUR** goal is to produce tools that help you work safely and efficiently.*
*The most important safety device for this tool is **YOU**.*
***YOUR** good judgement is the best protection against injury.*

Maintenance Hazards

- **Use only** Access Oil Tools/ Forum B+V Oil Tools parts.
- **Practice safety all the time** when servicing this tool by always using the proper safety methods, materials, and personal protective equipment (e.g., eye, head, and hands).
- **To protect yourself** against flying chip fragments, always wear eye protection when removing or replacing inserts.
- **Our equipment is made** of cast alloy heat treated steel and should never be welded on in the field. Improper welding can cause cracks or brittleness in the casting, which could result in drastic weakening or failure of the equipment. Any welding or machining must be performed by an authorized FORUM Certified Repair Center.
- **Improper welding** and/or re-machining of the equipment can cause personal injury, property damage, or death.
- If pin holes or die slots show **excessive wear,** discard and replace component.
- **Do not use** oversized pins or attempt to weld component. Discard and replace worn pins.

Operation Hazards

- **Use the handles** to operate Safety Clamps. Failure to use the handles can cause serious injury.
- **Do not use** the safety clamp without the proper number of segments being installed. Use of the Safety Clamps with the improper number segments can cause serious injury.
- **Clean and grease** Safety Clamps before daily use.
- If the **Safety Clamp lock opening distance limitations** *(Refer to chapter 6 wear data)* are reached, verify that the configuration is correct for the clamped pipe size. If it does correspond remove or replace them.
- **Never interchange** links from different product lines.

Workplace Hazards

- **Keep hand/ fingers clear** of clamp segments when installing the clamps on the pipe. Wear the proper hand protection when using these Safety Clamps.
- **Maintain a balanced body** position and secure footing when using these clamps.
- **For professional use only.**

FORUM™ Pipe Handling Tools

DO NOT DISCARD - GIVE TO OPERATOR

SAFETY INSTRUCTIONS

for Safety Clamp

__OUR__ goal is to produce tools that help you work safely and efficiently.
The most important safety device for this tool is __YOU__.
__YOUR__ good judgement is the best protection against injury.

Inspection Guide

⚠ Basic Inspection

- Check all Component condition and function
- Replace bad/worn components
- Check all connections for proper installation

Task / Interval	Daily	Weekly
1. Grease all grease points and check state of lubrication	☑	☑
2. Check Safety Clamp parts for wear and cracks	☑	☑
3. Check functioning of Safety Clamp as a whole.	!	!
4. Check completeness and condition of warning labels and plates	☒	☑
5. Check for loose items, worn parts and cracks	☒	☑

⚠ Inspection Intervals and tasks

Refer to Chapter 6 of Operation Maintenance Manual for detailed information on Inspections intervals and tasks.

Your Safety Notes:

FORUM™ Pipe Handling Tools

DO NOT DISCARD - GIVE TO OPERATOR

TRANSPORT / SET-UP

3 Transport / Set-up

Ensure that only sufficiently qualified and trained personnel perform set-up and installation work.

Read these instructions carefully before setting up the Safety Clamp and putting it into service.

3.1 Delivery

The Safety Clamp and all accessory parts are shipped in transport boxes, which are stored on pallets. All items on the pallets are secured against tipping and slipping with transport straps.

» Instructions for safe transport are attached to the transport box.

» Transport the packed equipment as specified in these instructions.

» Safety Clamps are placed in individual transport boxes.

3.1.1 Scope of Delivery

The scope of delivery includes all components required for the intended operation of the Safety Clamp Type Series as described in Chapter „Description“ on page 16.

INFO

The contract documents and shipment papers specify the precise scope of delivery. Check these documents carefully on delivery. In the event of any discrepancies please contact the FORUM Handling Tools representative specified in „Contact Worldwide“ on page 11 immediately.

INFO

For customer with incoming goods inspection covering a MPI we recommend to order equipment and parts without painting. The paint removal by sand blasting or similar will lead to a modified the surface for which found indications are declined by FORUM Handling Tools.

3.1.2 Unpacking and Disposal of Packing Material

Check scope of delivery

1. Are any transport damages visible?
2. Is the shipment complete? Compare the scope of delivery with the specifications in the shipping documents.

If the Safety Clamp has been damaged during transport or the shipment is incomplete, please notify the manufacturer immediately (refer to section X “Contact Worldwide” on page 11). Dispose of the packaging material ecologically in compliance with all applicable regulations.

3.1.3 Intermediate Storage

If intermediate storage of the equipment is necessary, observe the following:

- Leave the Safety Clamp in its transport packaging. This provides sufficient protection against external influences. Secure the Safety Clamp to prevent it from slipping or falling due to motion.

Fig. 15: Storage example I

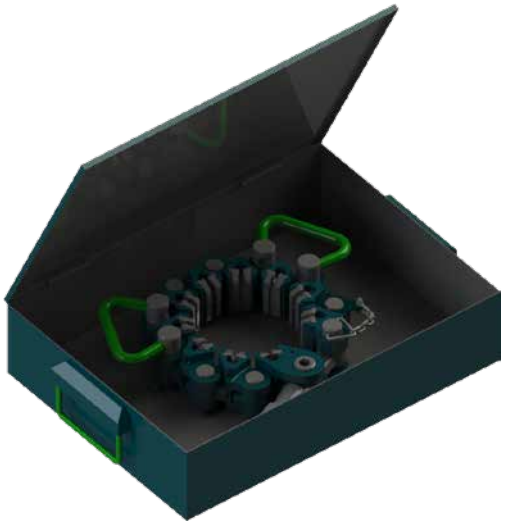

Fig. 16: Storage example II

3.2 Transport

⚠ DANGER

Suspended load!

A falling load can cause severe, even lethal injuries.

» Never stand beneath or in the swing area of suspended loads.

WEAR PROTECTIVE HELMET!

WEAR PROTECTIVE GLOVES!

WEAR SAFETY SHOES!

Principles for transport

1. Ensure that transport routes are sufficiently dimensioned.
2. Always use pallets for longer transport distances.
3. The total weight (object to be transported + means of transport, e.g. forklift) must not exceed the supporting capacity of the subsurface.
4. Ensure that only sufficiently qualified personnel perform such work.
5. Secure the area against unauthorized entry. If necessary, mark the area with information signs to warn of maintenance and repair work.
6. Secure moving parts in a suitable manner.
7. Use only approved slinging and transport equipment, which is in perfect condition and suitable for the intended purpose.
8. Secure Safety Clamp against slipping/sliding. Observe Safety Clamp weight. Observe center of gravity.
9. Never stand under suspended loads.
10. Transport the Safety Clamp carefully. Do not fasten, lift or pull the Safety Clamp on parts that could be damaged. Avoid sudden stops.
11. Always use hoisting equipment (slings, hoisting cables, shackles, etc.), which have been inspected and are sufficiently dimensioned and marked.
12. Ensure that all installation and hoisting procedures accomplish in compliance with recognized rules of practice and industrial standards.

3.3 Lifting arrangements

This chapter shows safe lifting arrangements for the main assemblies.

Lifting safety on installation site

Hoist the Safety Clamp safely

1. Attach the Safety Clamp only at the green marked handles or support clevises, if equipped.
2. Use wire ropes with circular slings with a load carrying capacity appropriate to the weight of the Safety Clamp.
3. Attach the hoisting ropes so that they are tensioned straight without kinks.
4. Use hoisting cables and load hooks with sufficient supporting capacity.

⚠ CAUTION

Safety Clamps are scoped under API 7K and are not designed to be used as a hoisting device. As a result, the hoisting eyes installed on the tool are only to be used to lift the weight of the Safety Clamp.

⚠ DANGER

Safe Lifting!

Always make sure that there is enough personnel to handle the Safety Clamp.

3.3.1 Lifting arrangements for Safety Clamps with handles

Fig. 17: Hoisting points for transport

1. When lifting the Safety Clamp manually, use as many workers as there are green marked handles.
2. Only handle Safety Clamps at the green marked handles.

⚠ **WARNING** Danger of contusion because of folding Safety Clamp segments! Ensure that anyone has their hands only on green marked handles.

3.3.2 Lifting arrangements on holding points

⚠ **WARNING** Safety Clamp are NOT to be used as a hoisting device.

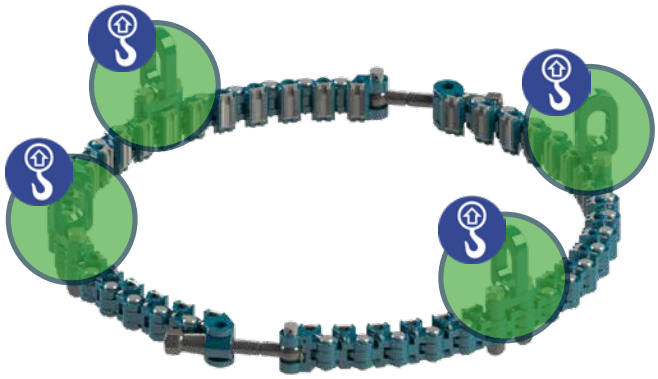

Fig. 18: Hoisting points for transport

1. Always use all attachment points.
2. Only use approved hoisting equipment.

⚠ **WARNING** Danger of contusion because of folding Safety Clamp segments! Ensure that anyone got their hands only on green marked handles.

3.4 Installation and Arrangement

⚠ WARNING

Pinching/crushing hazard from lowering!

Severe pinching/crushing up to loss of limbs.

» Never step over edge of rotary table with feet.

⚠ DANGER

Suspended load!

The falling load can cause severe, even lethal injuries.

» Never stand beneath or in the swing area of suspended loads.

WEAR PROTECTIVE HELMET!

WEAR PROTECTIVE GLOVES!

WEAR SAFETY SHOES!

The Safety Clamp is completely pre-assembled before shipment, so that they can be installed immediately after unpacking at the installation site. The Safety Clamp size components have to be installed according to pipe string operation at customer site. The Safety Clamp type A-MP, T and C must always be used with Hand Slips.

3.4.1 Installation and removal of a Safety Clamp type C, A-MP and T without a pneumatic kit

⚠ **NOTE** The Installation process between C, T and A-MP Safety Clamp vary. Please refer to the Note **CT** or **A-MP** at the start of the task.

1. **CT** Remove the cotter pin from the End Link Pin (if present) ❶ and remove the end link pin afterwards ❷

A. **A-MP** Remove the Nut and the Thrust Washer ❶ to open the Safety Clamp.

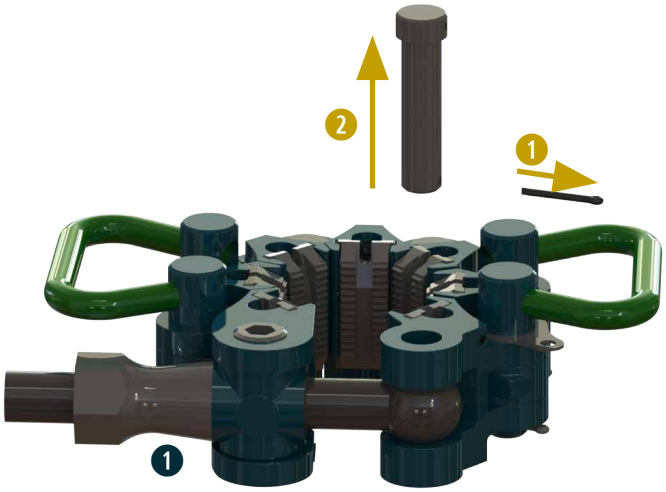

Fig. 19: Installation step 1 and 2

2. **CT** Open the Safety Clamp screw ❸.

B. **A-MP** Pull the Screw out of the Latch Link. The Safety Clamp is now open.

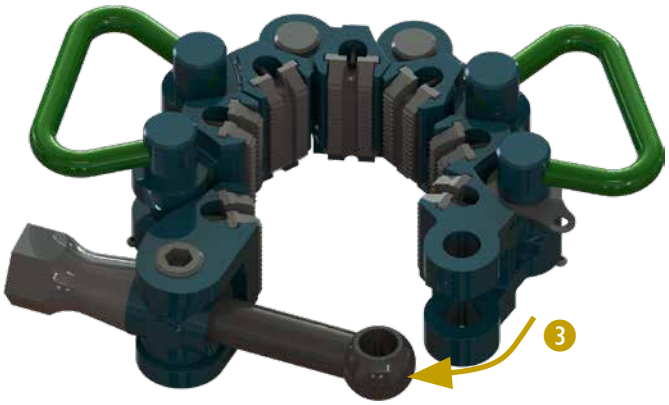

Fig. 20: Installation step 3

3. **CT** / **A-MP** Wrap the Safety Clamp around the pipe in the desired location ❹ approximately 4" to 6" above the Slips.

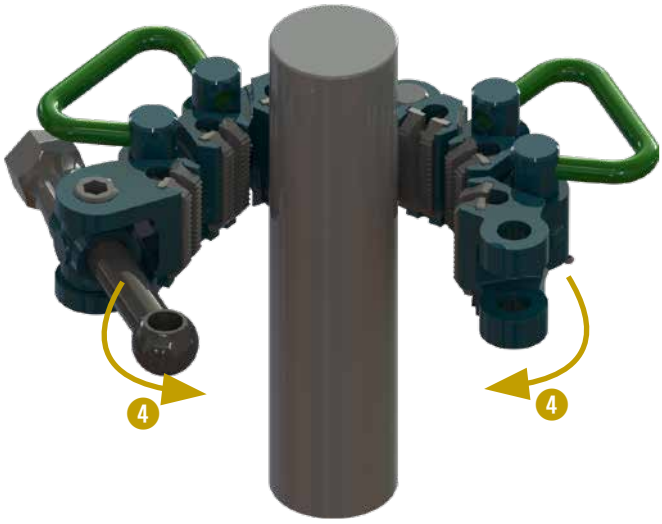

Fig. 21: Installation step 4

4. **CT** Align the holes in the Screw and End Link 5.

C. **A-MP** Align the screw into the latch link.

NOTE The Nut may have to be loosened to allow proper alignment.

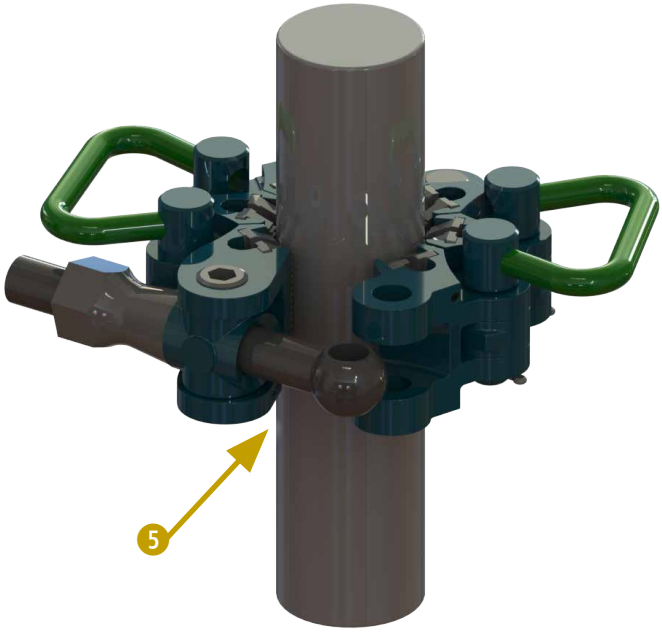

Fig. 22: Installation step 5

5. **CT** / **A-MP** Insert the End Link Pin 6 and cotter pin (if present) afterwards 7.
6. **CT** / **A-MP** Torque the Nut to between 99.7 ft-lb [135 Nm] and 295 ft-lb [400 Nm] using the nut wrench.

NOTE The Removal takes place in reverse order.

WARNING Over torqueing can cause loss of safe working load.

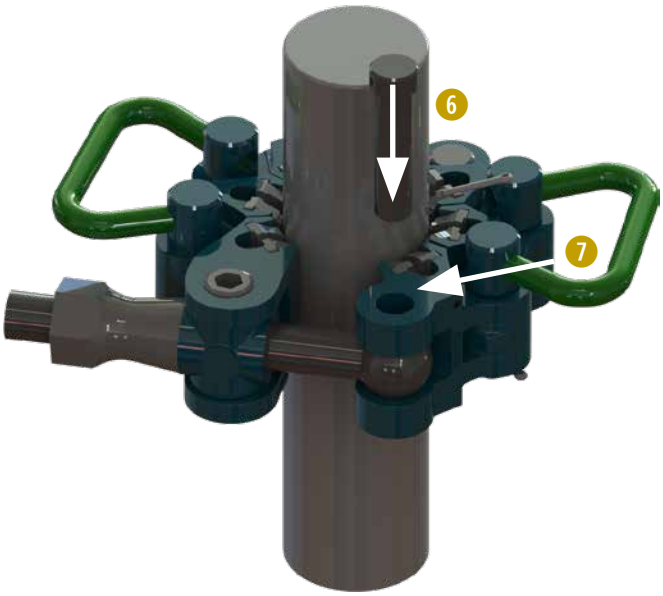

Fig. 23: Installation step 6 and 7

3.4.2 Installation and removal of a Safety Clamp type C with a pneumatic kit

1. Remove the cotter pin from the End Link Pin (if present) ❶ and remove the end link pin afterwards ❷

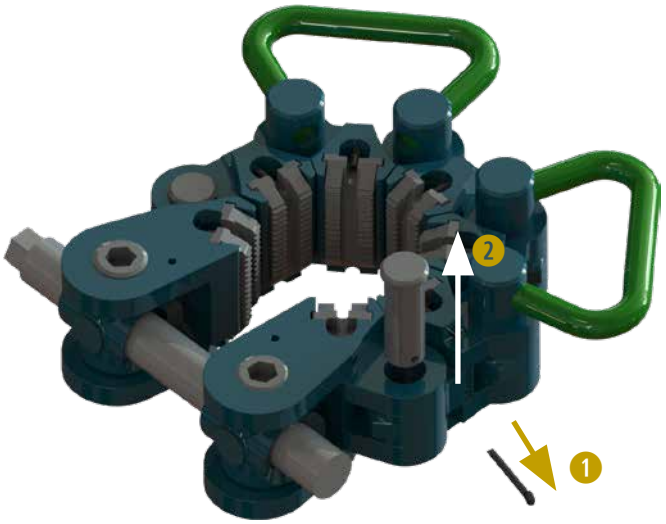

Fig. 24: Installation step 1 and 2

2. Open the Safety Clamp screw ❸.

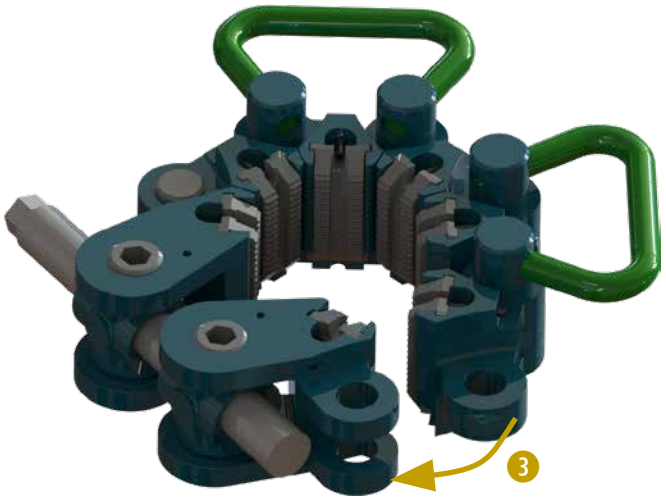

Fig. 25: Installation step 3

3. Wrap the Safety Clamp around the pipe in the desired location ❹, approximately 4" to 6" above the Slips.

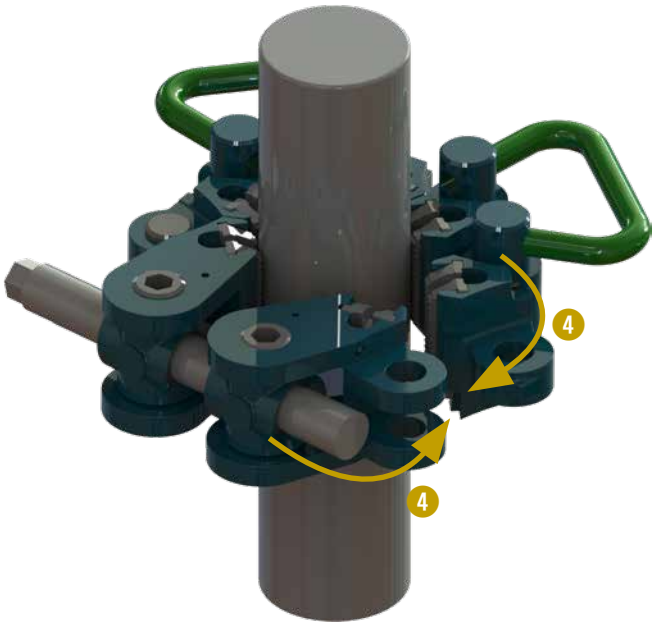

Fig. 26: Installation step 4

4. Align the holes in the Screw and End Link 5.

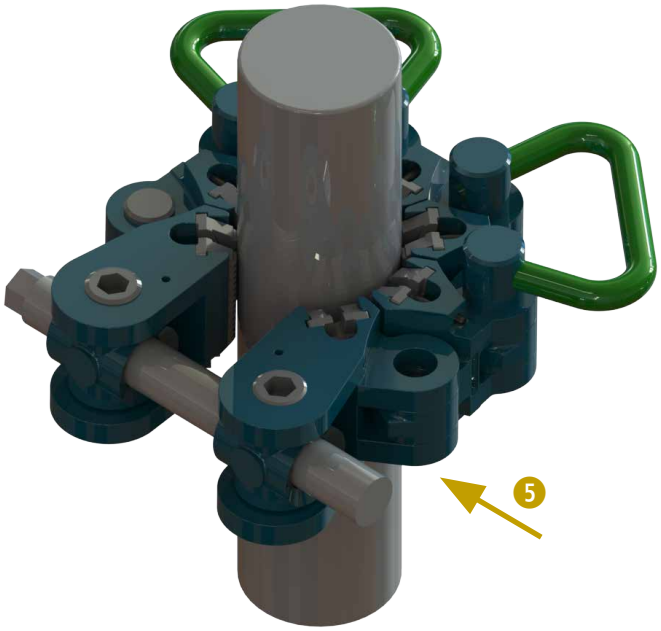

Fig. 27: Installation step 5

5. Insert the End Link Pin 6 and cotter pin (if present) afterwards 7

6. Torque the Nut to between 99.7 ft-lb [135 Nm] and 295 ft-lb [400 Nm] using the nut wrench.

NOTE The Removal takes place in reverse order.

WARNING Over torqueing can cause loss of safe working load.

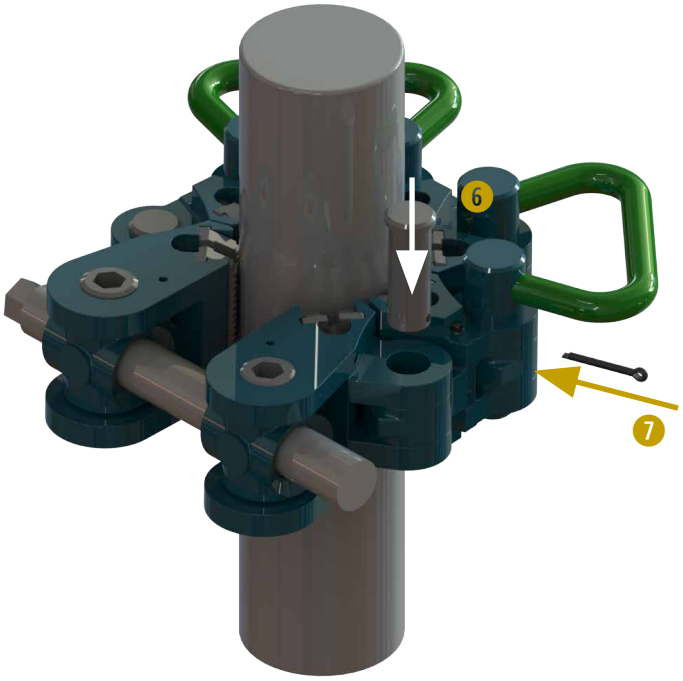

Fig. 28: Installation step 6 and 7

3.5 Installation Schematics of a Safety Clamp with pneumatic kit

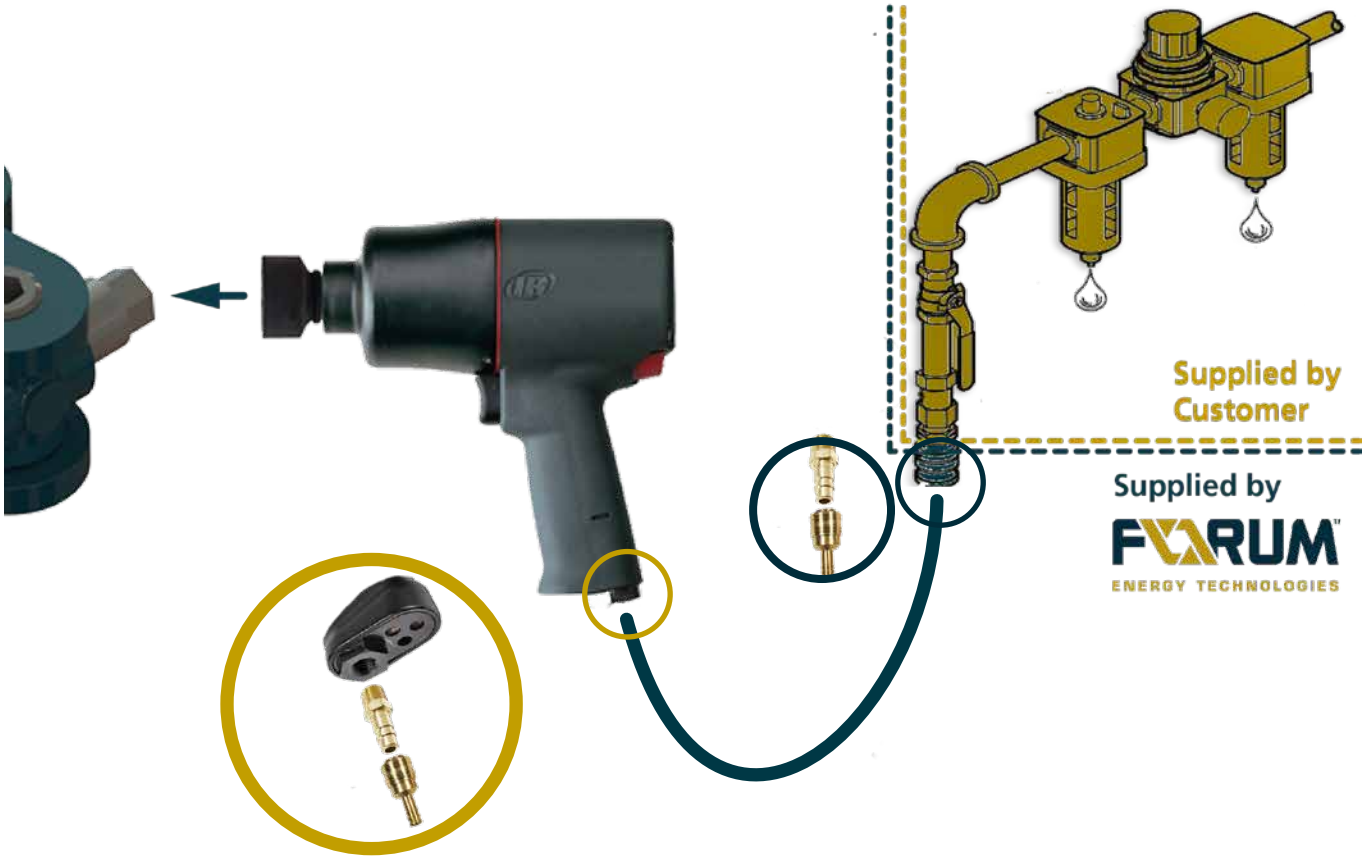

Fig. 29: Installation Schematics

3.6 Installation Checklists

Prior to use following checks must be carried out:

Installation Checklist Safety Clamp

OK	☐	Make sure Safety Clamp screw is fastened and all inserts/pins are secured.
OK	☐	All Inserts are properly installed.
OK	☐	All lubrication points are lubricated.
OK	☐	Make sure all bolts and nuts are tightened.
OK	☐	Check for visible damages.
OK	☐	The space requirements have been complied and working area is free of unnecessary object and personnel.

Installation Checklist Pneumatic Kit

OK	☐	Pneumatic hose is firmly connected to pneumatic coupling.
OK	☐	Pneumatic coupling is firmly connected to impact wrench.

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COMMISSIONING / OPERATION

4 Commissioning and Operation

4.1 Commissioning

Ensure that the
Safety Clamp Type Series are operated only by personnel trained for this work and familiar with the risks involved in operating the equipment.

Read these instructions carefully before setting up the equipment and putting it into service.

INFO

FORUM Handling Tools recommends having the Safety Clamp put into service by FORUM Handling Tools Commissioning Service.

⚠ WARNING

Danger of pinching/crushing feet!

Transporting and setting down heavy components.

» Never step below moving equipment parts.

⚠ DANGER

Suspended load!

The falling load can cause severe, even lethal injuries.

» Never stand beneath or in the swing area of suspended loads.

⚠ WARNING

Health hazards from service products!

This symbol warns of health hazards resulting from contact of service products (e.g. lubricants, hydraulic fluids) with the skin, mucous membranes, eyes and respiratory paths.

WEAR PROTECTIVE HELMET!

WEAR PROTECTIVE GLOVES!

WEAR SAFETY SHOES!

Safety considerations for operation

1. Do not touch the Safety Clamp in operation
2. During operation, keep a safe distance from the Safety Clamp.
3. Before initial start-up and before every start of operation, check for the proper function in order to avoid accidents during operation!

4.1.1 Connecting the pneumatically operated impact wrench to the pneumatic System [For Safety Clamps with pneumatic kit only]

Ensure that only personnel trained for such work perform work on the pneumatic system and are conscious of the risks involved.

WEAR EYE PROTECTION!

WEAR PROTECTIVE GLOVES!

WEAR EAR PROTECTION!

INFO

During installation, when setting up and taking down as well as during operation of the Safety Clamp ensure that the pneumatic lines Do not chafe. If necessary provide pneumatic lines with chafe guard.

Ensure that required operating data is observed:

Operating pressure (Air)	90 Psi to 160 Psi (6.2 bar to 11.03 bar)
Nut size	$^{17}/_{18}$"

INFO

Further information of the pneumatically operated impact wrench can be found in the manufacturer's Product Information, which is located in the appendix.

Installation of the pneumatic kit

1. Remove the pneumatic kit out of the packaging.
2. Screw the straight connection with pneumatic plug into the impact wrench and then install the nut at the front end (square) of the impact wrench. Secure the nut with a cotter pin.
3. Unroll the supply hose and check for damages.
4. Put one of the quick coupling sleeves of the supply hose onto the pneumatic plug of the impact wrench. Pay attention to the clicking noise that the quick coupling system makes when it is securely connected to each other.
5. Put the other quick coupling sleeve of the supply hose onto the pneumatic plug of the maintenance unit, which belongs to the pneumatic system. Pay attention to the clicking noise that the quick coupling system makes when it is securely connected to each other.
6. Slowly increase the pressure on the pressure regulator of the maintenance unit until the required operating pressure is reached.
7. Rotate the impact wrench alternately left and right.
8. You have now successfully installed the pneumatic kit.

NOTE Perform tasks in reverse order to re-install the pneumatic kit.

4.1.2 Safety Clamp Commissioning Checklist

FORUM Handling Tools strongly recommends accomplishing the commissioning with the FORUM Handling Tools Commissioning Service.

Prior to use of the FORUM Handling Tools following checks must be carried out:

⚠ **NOTE**: Read manual before first use !

OK	☐	Check crew is aware of all dangers regarding handling the Safety Clamp.
OK	☐	Go through OMM with crew.

Scope of supply

OK	☐	Cross check all delivered parts.
OK	☐	Check Installation and Lubrication.
OK	☐	Check Inserts for correct seating.
OK	☐	Apply grease to all lubrication points (refer to section 6.1 “Lubrication” on page 42).
OK	☐	Check all Pins for securing.
OK	☐	Check torque of the Safety Clamp screw.

4.2 Operating the Safety Clamp

⚠ WARNING

Danger of pinching/crushing feet!

Take care transporting and setting down heavy components.

» Never step below moving equipment parts.

⚠ WARNING

Danger of pinching/crushing hands!

» Do not touch the Safety Clamp while in operation.

⚠ DANGER

Suspended load!

The falling load can cause severe, even lethal injuries.

» Never stand beneath or in the swing area of suspended loads.

WEAR PROTECTIVE HELMET!

WEAR PROTECTIVE GLOVES!

WEAR SAFETY SHOES!

It is necessary to remove the Safety Clamp for the following user operations:

- Changing and replacing components in the Safety Clamp when changing the type/size of pipe used.
- Maintenance work, repair or inspection of the Safety Clamp.

⚠ **NOTE** For Safety Clamp with part numbers beginning with 99 the component size table must be consulted to retract the correct number of nut and pins to be installed (refer to section 1.8 “Component Sizes” on page 21).

4.2.1 Operational description

The Safety Clamp is designed to be attached to equipment strings or flush surface tubulars as they are assembled or disassembled and prevents the equipment string from being dropped down-hole accidentally if the Hand Slips or Elevators securing the string lose their grip. Safety Clamps must always be used with Hand Slips. The safe design load of 10 short tons must never be exceeded.

⚠ **CAUTION** Never attempt to use Safety Clamp as hoisting or lifting Equipment.

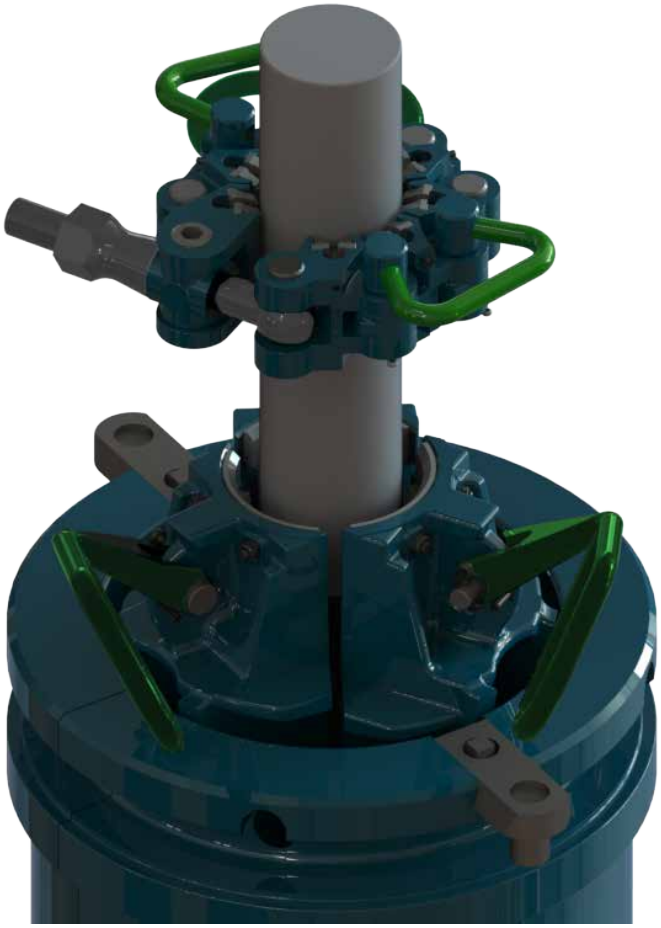

Fig. 30: Standard Safety Clamp with Hand Slips and Bowl

4.2.2 Safety Clamp conversion

4.2.2.1 Safety Clamp conversion to a pneumatic Safety Clamp

NOTE For a detailed listing of all pneumatic kit compatible Safety Clamps, please refer to chapter 1.2.2.

1. Remove the cotter pins from the end link pins and remove the end link pins afterwards ❶.

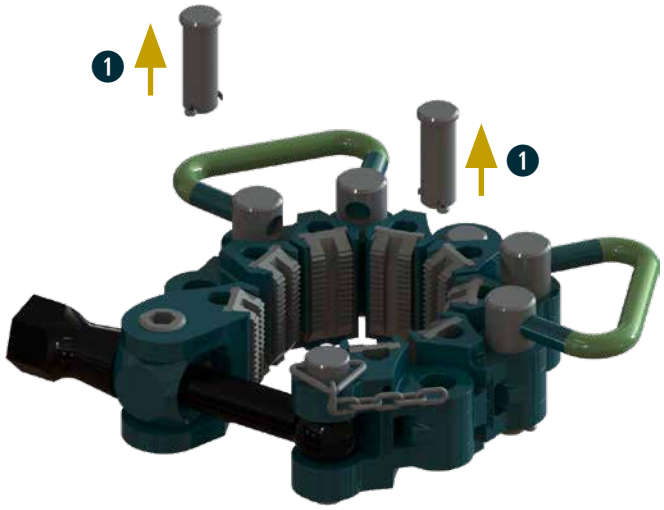

Fig. 31: Conversion step 1

2. Remove the nut, screw and end links ❷.

Fig. 32: Conversion step 2

3. Place the new pneumatic kit ❸ and the removed end link pins from step 1 ❹ to Safety Clamp.
4. Secure end link pins with cotter pins.
5. The Safety Clamp lock is now ready for fastening.

WARNING Danger of contusion because of folding Safety Clamp segments!

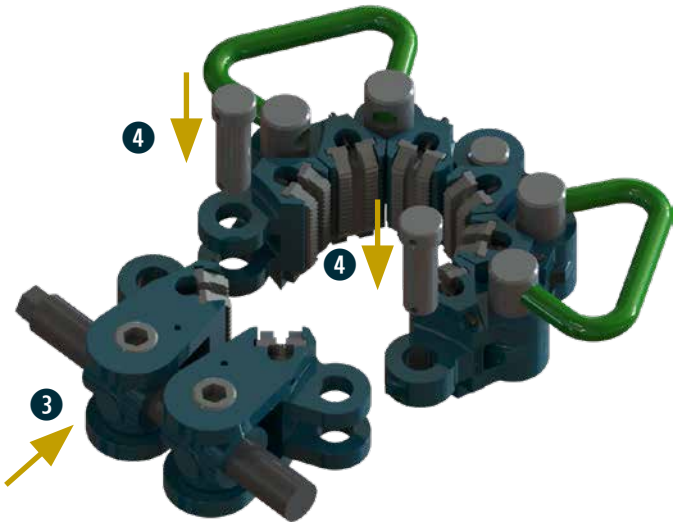

Fig. 33: Conversion step 3

4.2.2.2 Safety Clamp expansion with support clevis

1. Remove the cotter pins from the intermediate link pins as shown and remove the link pins afterwards ❶.

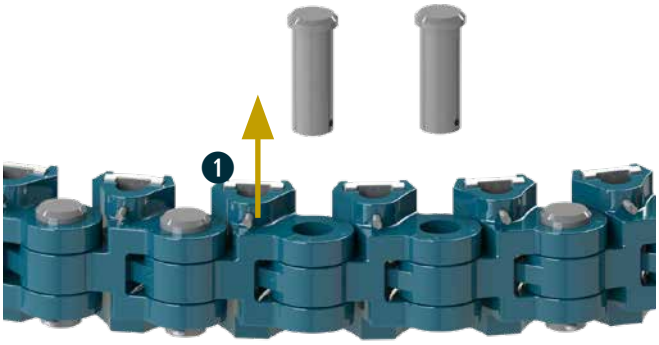

Fig. 34: Expansion step I

2. Place the support clevis ❷ on top of two intermediate links w. Secure the support clevis with two screws ❸ and nuts ❹

⚠ **WARNING** Danger of contusion because of folding Safety Clamp segments!

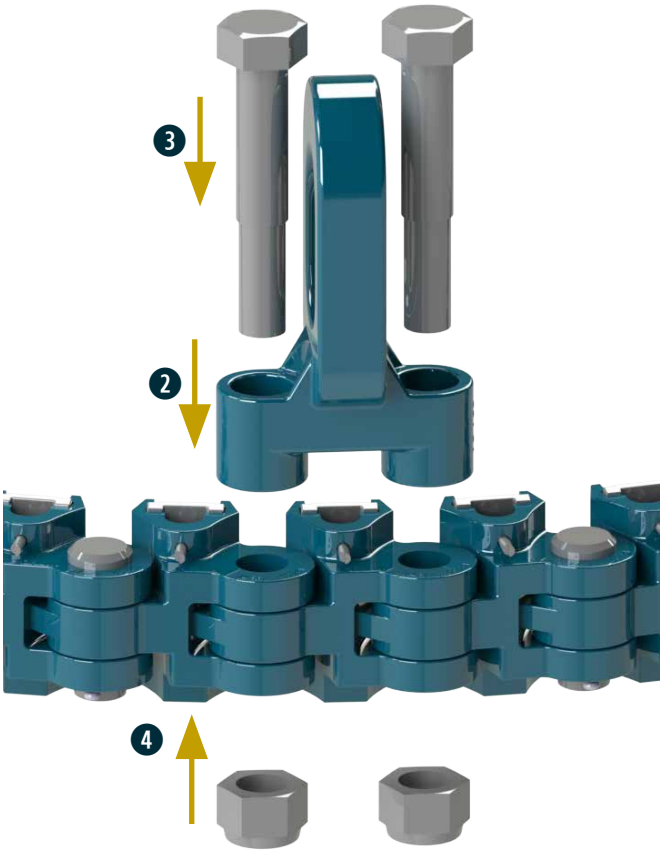

Fig. 35: Expansion step II

4.3 Troubleshooting

Common Symptoms	Useful steps for troubleshooting: Has the correct Safety Clamp type been selected?	Correct Safety Clamp size to the size of the pipe ?	Are there damaged, oxidized, loose or loosened components?	Is there dirt or other objects in the working area?	Has the correct pressure been set?	Are there visible or hearable symptoms which indicate damages to the Safety Clamp?	Is the Safety Clamp installed as recommend by FORUM Energy Technologies?	Are there damaged, loose or loosened pneumatic components?	Lubrication points are lubricated as recommend by FORUM Energy Technologies?	Are there blocked grease nipples?	The inserts are properly installed and intact?	Further help: Contact Technical Support in case of an emergency, for advanced help and tips and especially if troubleshooting is without success!
The Safety Clamp does not grip as it should.	✔	✔	✔	✔		✔	✔				✔	!
The Safety Clamp seems to be inflexible.			✔	✔			✔		✔			!
The to be hold pipe slips through.	✔	✔	✔	✔		✔	✔				✔	!
The Safety Clamp can not be tightened.		✔	✔	✔		✔			✔			!
The Pneumatic Expansion does not work as it should.					✔			✔				!
Device is grease dry unless lubrication has been performed.										✔		!

! FORUM Handling Tools recommends to follow this step in case of unsolvable problems!

✔ FORUM Handling Tools recommends to follow this shown step.

NOTE This table doesn't show all possible common symptoms. It cannot be excluded that different symptoms may occur in combination. Therefore, it is necessary to go through troubleshooting in a useful order. FORUM Handling Tools recommends to call the Technical Support early before losing too much time for troubleshooting. Always consider the recommended safety notes while troubleshooting. Do not perform troubleshooting while the Equipment is under load. Do not make any form of reparation, expansions or changes, which are not recommended and supported by FORUM Handling Tools. Contact technical support, if there are single components or assemblies, which have to be replaced!

⚠ WARNING

Separated pneumatic lines pose an injury hazard!

Compressed air can escape under high pressure.

» Always relieve pressure in equipment before performing maintenance work.

Ensure that sufficiently qualified and trained personnel perform maintenance work only.

⚠ WARNING

Danger of pinching/crushing feet!

Take care transporting and setting down heavy components.

» Never step below moving equipment parts.

⚠ WARNING

Danger of pinching/crushing hands!

» Do not touch the Safety Clamp while in operation.

SERVICE

SERVICE

5 Service

INFO

Operational safety and readiness of the equipment Do not only depend on your skill, but also on maintenance and servicing of the equipment. Insist on using Original Equipment Manufacturer (OEM) spare parts when carrying out maintenance and repair work. This ensures operational safety and readiness of your equipment.

5.1 Malfunction

If a malfunction occurs or the Safety Clamp Do not operate as expected, trouble shoot as follows:

If the cause of the malfunction cannot be determined and remedied, contact FORUM Handling Tools Technical Support.

1. Check for proper lubrication of the Safety Clamp.
2. Collect all information on the malfunction and define the problem.
3. Attempt to find a quick solution to the problem.
4. Check the last changes/modifications.
5. Isolate the problem.
6. Replace any defective components.

INFO

In the event of problems, which cannot be remedied with the aid of this manual, please contact the FORUM Handling Tools Technical Support or one of the authorized service companies (refer to section X “Contact Worldwide” on page 11).

5.2 Repair

It is only permissible for the customer/company operating the equipment warranty. Only FORUM Handling Tools or an authorized service company performs repair work required on the Safety Clamp.

INFO

Please contact FORUM Handling Tools Technical Support or one of the authorized service companies (refer to section X “Contact Worldwide” on page 11) to perform repair or maintenance work.

5.3 Drawing, Parts List and Spare Parts

INFO

Please contact the FORUM Handling Tools Technical Support or one of the authorized service companies (refer to section X “Contact Worldwide” on page 11) to order replacement parts or in the event of any questions.

INFO

The number of handles needed on the Safety Clamps depends on the Safety Clamp size and type:

C and A-MP Type

» 2 handles – < 15.5/8”
» 4 handles – > 15.5/8”

T Type

» Always 1 handle

5.3.1 Drawing and Part list for the Safety Clamps C Type

5.3.1.1 Safety Clamps C Type, with Nut Retention System

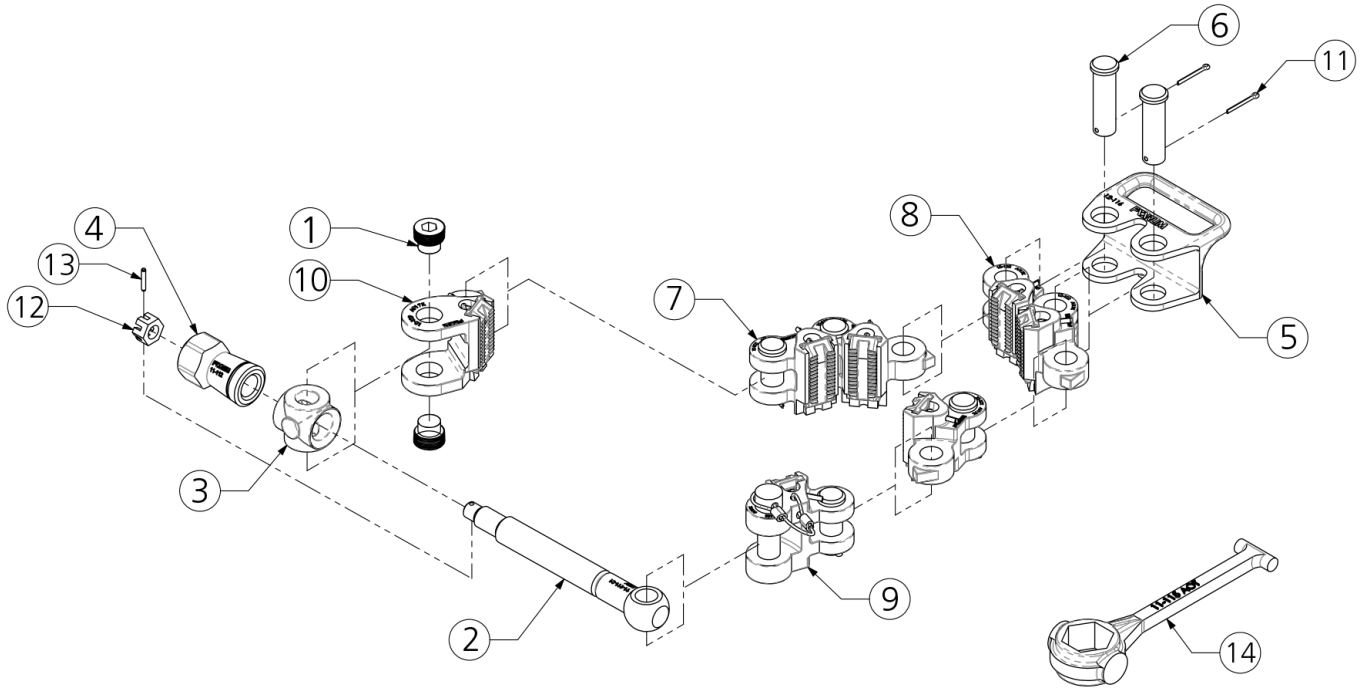

Fig. 36: Principle drawing of a Safety Clamp Type C

Part list for the Safety Clamp C Type with Nut Retention System

Pos.	Description	P/N	CR-Safety Clamp 12-127-01 3.3/4" - 4.5/8"	CR-Safety Clamp 12-128-01 5.1/2" - 6.5/8"	CR-Safety Clamp 12-129-01 5.1/2" - 6.5/8"	CR-Safety Clamp 12-130-01 6.1/2" - 7.5/8"
1	Pivot Block Pin	11-114	2	2	2	2
2	Srew	11-111-01	1	1	1	1
3	Pivot Block	11-113	1	1	1	1
4	Nut	11-112-01	1	1	1	1
5	Handle	12-116-C	1	2	2	2
6	Link Pin	11-117	2	4	4	4
7	Intermediate Link Sub Assembly	12-101	3	2	3	4
8	Intermediate Link Sub Assembly (no Link Pin)	12-112	2	4	4	4
9	End Link Sub Assembly (Removable Link Pin)	12-114	1	1	1	1
10	End Link Sub Assembly	12-113	1	1	1	1
11	Cotter Pin	51435-12	2	4	4	4
12	Nut, Hex-Slotted (UNC-2B)	50512-C	1	1	1	1
13	Pin, Roll	51603-09-C	1	1	1	1
14	Nut Wrench	11-115	1	1	1	1

Pos.	Description	P/N	CR-Safety Clamp 12-131-01 7.1/2" - 8.5/8"	CR-Safety Clamp 12-132-01 8.1/2" - 9.5/8"	CR-Safety Clamp 12-133-01 9.1/2" - 10.5/8"	CL-Safety Clamp 12-134-01 10.1/2" - 11.5/8"
1	Pivot Block Pin	11-114	2	2	2	2
2	Srew	11-111-01	1	1	1	1
3	Pivot Block	11-113	1	1	1	1
4	Nut	11-112-01	1	1	1	1
5	Handle	12-116-C	1	2	2	2
6	Link Pin	11-117	2	4	4	4
7	Intermediate Link Sub Assembly	12-101	3	2	3	4
8	Intermediate Link Sub Assembly (no Link Pin)	12-112	2	4	4	4
9	End Link Sub Assembly (Removable Link Pin)	12-114	1	1	1	1
10	End Link Sub Assembly	12-113	1	1	1	1
11	Cotter Pin	51435-12	2	4	4	4
12	Nut, Hex-Slotted (UNC-2B)	50512-C	1	1	1	1
13	Pin, Roll	51603-09-C	1	1	1	1
14	Nut Wrench	11-115	1	1	1	1

Pos.	Description	P/N	CL-Safety Clamp 12-135-01 11.1/2" - 12.5/8"	CL-Safety Clamp 12-136-01 12.1/2" - 13.5/8"	CL-Safety Clamp 12-137-01 13.1/2" - 14.5/8"	CL-Safety Clamp 12-138-01 14.1/2" - 15.5/8"
1	Pivot Block Pin	11-114	2	2	2	2
2	Srew	11-111-01	1	1	1	1
3	Pivot Block	11-113	1	1	1	1
4	Nut	11-112-01	1	1	1	1
5	Handle	12-116-C	2	2	2	2
6	Link Pin	11-117	4	4	4	4
7	Intermediate Link Sub Assembly	12-101	9	10	11	12
8	Intermediate Link Sub Assembly (no Link Pin)	12-112	4	4	4	4
9	End Link Sub Assembly (Removable Link Pin)	12-114	1	1	1	1
10	End Link Sub Assembly	12-113	1	1	1	1
11	Cotter Pin	51435-12	4	4	4	4
12	Nut, Hex-Slotted (UNC-2B)	50512-C	1	1	1	1
13	Pin, Roll	51603-09-C	1	1	1	1
14	Nut Wrench	11-115	1	1	1	1

Pos.	Description	P/N	CXL-Safety Clamp 12-135-01 11.1/2" - 12.5/8"	CXL-Safety Clamp 12-136-01 12.1/2" - 13.5/8"	CXL-Safety Clamp 12-137-01 13.1/2" - 14.5/8"	CXL-Safety Clamp 12-138-01 14.1/2" - 15.5/8"
1	Pivot Block Pin	11-114	2	2	2	2
2	Srew	11-111-01	1	1	1	1
3	Pivot Block	11-113	1	1	1	1
4	Nut	11-112-01	1	1	1	1
5	Handle	12-116-C	2	2	2	2
6	Link Pin	11-117	4	4	4	4
7	Intermediate Link Sub Assembly	12-101	9	10	11	12
8	Intermediate Link Sub Assembly (no Link Pin)	12-112	4	4	4	4
9	End Link Sub Assembly (Removable Link Pin)	12-114	1	1	1	1
10	End Link Sub Assembly	12-113	1	1	1	1
11	Cotter Pin	51435-12	4	4	4	4
12	Nut, Hex-Slotted (UNC-2B)	50512-C	1	1	1	1
13	Pin, Roll	51603-09-C	1	1	1	1
14	Nut Wrench	11-115	1	1	1	1

Pos.	Description	P/N	CXL-Safety Clamp 12-145-01 15.1/2" - 17"	CXL-Safety Clamp 12-146-01 16.1/2" - 18"	CXL-Safety Clamp 12-147-01 17.1/2" - 19"	CXL-Safety Clamp 12-148-01 18.1/2" - 20"
1	Pivot Block Pin	11-114	4	4	4	4
2	Srew	11-111-01	2	2	2	2
3	Pivot Block	11-113	2	2	2	2
4	Nut	11-112-01	2	2	2	2
5	Handle	12-116-C	4	4	4	4
6	Link Pin	11-117	8	8	8	8
7	Intermediate Link Sub Assembly	12-101	6	7	8	9
8	Intermediate Link Sub Assembly (no Link Pin)	12-112	8	8	8	8
9	End Link Sub Assembly (Removable Link Pin)	12-114	2	2	2	2
10	End Link Sub Assembly	12-113	2	2	2	2
11	Cotter Pin	51435-12	8	8	8	8
12	Nut, Hex-Slotted (UNC-2B)	50512-C	2	2	2	2
13	Pin, Roll	51603-09-C	2	2	2	2
14	Nut Wrench	11-115	1	1	1	1

Pos.	Description	P/N	CXL-Safety Clamp 12-149-01 19.1/2" - 21"
1	Pivot Block Pin	11-114	4
2	Srew	11-111-01	2
3	Pivot Block	11-113	2
4	Nut	11-112-01	2
5	Handle	12-116-C	4
6	Link Pin	11-117	8
7	Intermediate Link Sub Assembly	12-101	10
8	Intermediate Link Sub Assembly (no Link Pin)	12-112	8
9	End Link Sub Assembly (Removable Link Pin)	12-114	2
10	End Link Sub Assembly	12-113	2
11	Cotter Pin	51435-12	8
12	Nut, Hex-Slotted (UNC-2B)	50512-C	2
13	Pin, Roll	51603-09-C	2
14	Nut Wrench	11-115	1

NOTE Add -B to the end of the part number to include the storage box.

Example: 12-149-01-B

Storage Box P/N 11-120 for sizes < 18"

Storage Box P/N 31-334 for sizes > 18"

5.3.1.2 Safety Clamps C Type, with Lifting Clevis and Nut Retention System

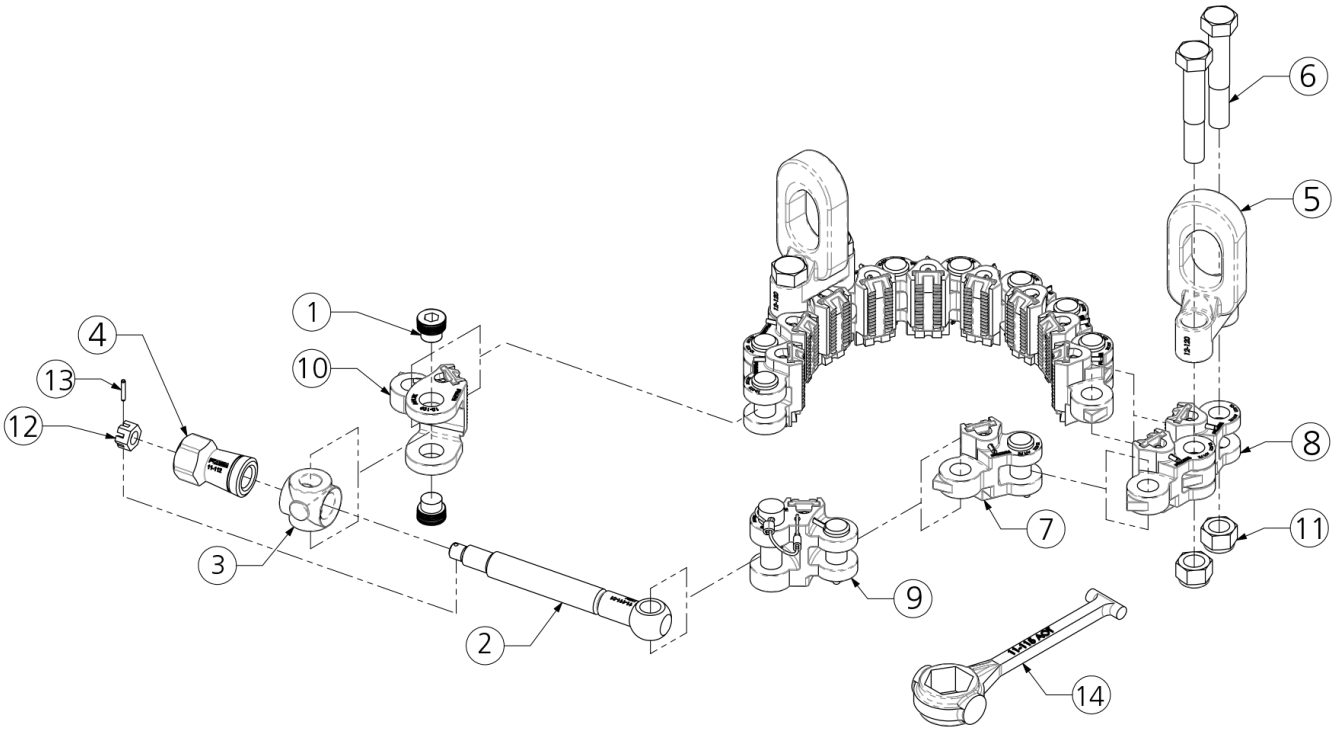

Fig. 37: Principle drawing of a Safety Clamp Type C

Part list for the Safety Clamp C Type with Nut Retention System

Pos.	Description	P/N	CL-Safety Clamp 12-150-01 10.1/2" - 11.5/8"	CL-Safety Clamp 12-151-01 11.1/2" - 12.5/8"	CL-Safety Clamp 12-152-01 12.1/2" - 13.5/8"	CL-Safety Clamp 12-153-01 13.1/2" - 14.5/8"
1	Pivot Block Pin	11-114	2	2	2	2
2	Srew	11-111-01	1	1	1	1
3	Pivot Block	11-113	1	1	1	1
4	Nut	11-112-01	1	1	1	1
5	Safety Support Clevis	12-120	2	2	2	2
6	Screw, Cap-Hex Head	55017-44-C8	4	4	4	4
7	Intermediate Link Sub Assembly	12-101	8	9	10	11
8	Intermediate Link Sub Assembly (no Link Pin)	12-112	4	4	4	4
9	End Link Sub Assembly (Removable Link Pin)	12-114	1	1	1	1
10	End Link Sub Assembly	12-113	1	1	1	1
11	Nut, Hex-Self Locking (Nylon Insert) UNF	58002-16-SZ-8	4	4	4	4
12	Nut, Hex-Slotted (UNC-2B)	50512-C	1	1	1	1
13	Pin, Roll	51603-09-C	1	1	1	1
14	Nut Wrench	11-115	1	1	1	1

Pos.	Description	P/N	CL-Safety Clamp 12-154-01 14.1/2" - 15.5/8"	CXL-Safety Clamp 12-155-01 15.1/2" - 17"	CXL-Safety Clamp 12-156-01 16.1/2" - 18"	CXL-Safety Clamp 12-157-01 17.1/2" - 19"
1	Pivot Block Pin	11-114	2	4	4	4
2	Srew	11-111-01	1	2	2	2
3	Pivot Block	11-113	1	2	2	2
4	Nut	11-112-01	1	2	2	2
5	Safety Support Clevis	12-120	2	4	4	4
6	Screw, Cap-Hex Head	55017-44-C8	4	8	8	8
7	Intermediate Link Sub Assembly	12-101	12	6	7	8
8	Intermediate Link Sub Assembly (no Link Pin)	12-112	4	8	8	8
9	End Link Sub Assembly (Removable Link Pin)	12-114	1	2	2	2
10	End Link Sub Assembly	12-113	1	2	2	2
11	Nut, Hex-Self Locking (Nylon Insert) UNF	58002-16-SZ-8	4	8	8	8
12	Nut, Hex-Slotted (UNC-2B)	50512-C	1	2	2	2
13	Pin, Roll	51603-09-C	1	2	2	2
14	Nut Wrench	11-115	1	1	1	1

Pos.	Description	P/N	CXL-Safety Clamp 12-158-01 18.1/2" - 20"	CXL-Safety Clamp 12-159-01 19.1/2" - 21"	CXL-Safety Clamp 12-160-01 21.1/8" - 23"	CXL-Safety Clamp 12-161-01 24.1/8" - 26"
1	Pivot Block Pin	11-114	4	4	4	4
2	Srew	11-111-01	2	2	2	2
3	Pivot Block	11-113	2	2	2	2
4	Nut	11-112-01	2	2	2	2
5	Safety Support Clevis	12-120	4	4	4	4
6	Screw, Cap-Hex Head	55017-44-C8	8	8	8	8
7	Intermediate Link Sub Assembly	12-101	9	9	12	15
8	Intermediate Link Sub Assembly (no Link Pin)	12-112	8	8	8	8
9	End Link Sub Assembly (Removable Link Pin)	12-114	2	2	2	2
10	End Link Sub Assembly	12-113	2	2	2	2
11	Nut, Hex-Self Locking (Nylon Insert) UNF	58002-16-SZ-8	8	8	8	8
12	Nut, Hex-Slotted (UNC-2B)	50512-C	2	2	2	2
13	Pin, Roll	51603-09-C	2	2	2	2
14	Nut Wrench	11-115	1	1	1	1

Pos.	Description	P/N	CXL-Safety Clamp 12-162-01 29.1/2" - 31"	CXL-Safety Clamp 12-163-01 35.1/2" - 37"	CXL-Safety Clamp 12-164-01 41.1/2" - 43"
1	Pivot Block Pin	11-114	4	4	4
2	Srew	11-111-01	2	2	2
3	Pivot Block	11-113	2	2	2
4	Nut	11-112-01	2	2	2
5	Safety Support Clevis	12-120	4	4	4
6	Screw, Cap-Hex Head	55017-44-C8	8	8	8
7	Intermediate Link Sub Assembly	12-101	20	26	32
8	Intermediate Link Sub Assembly (no Link Pin)	12-112	8	8	8
9	End Link Sub Assembly (Removable Link Pin)	12-114	2	2	2
10	End Link Sub Assembly	12-113	2	2	2
11	Nut, Hex-Self Locking (Nylon Insert) UNF	58002-16-SZ-8	8	8	8
12	Nut, Hex-Slotted (UNC-2B)	50512-C	2	2	2
13	Pin, Roll	51603-09-C	2	2	2
14	Nut Wrench	11-115	1	1	1

NOTE Add -B to the end of the part number to include the storage box.

Example: 12-149-01-B

Storage Box P/N 11-120 for sizes < 18"

Storage Box P/N 31-334 for sizes > 18"

5.3.1.3 Safety Clamps C Type

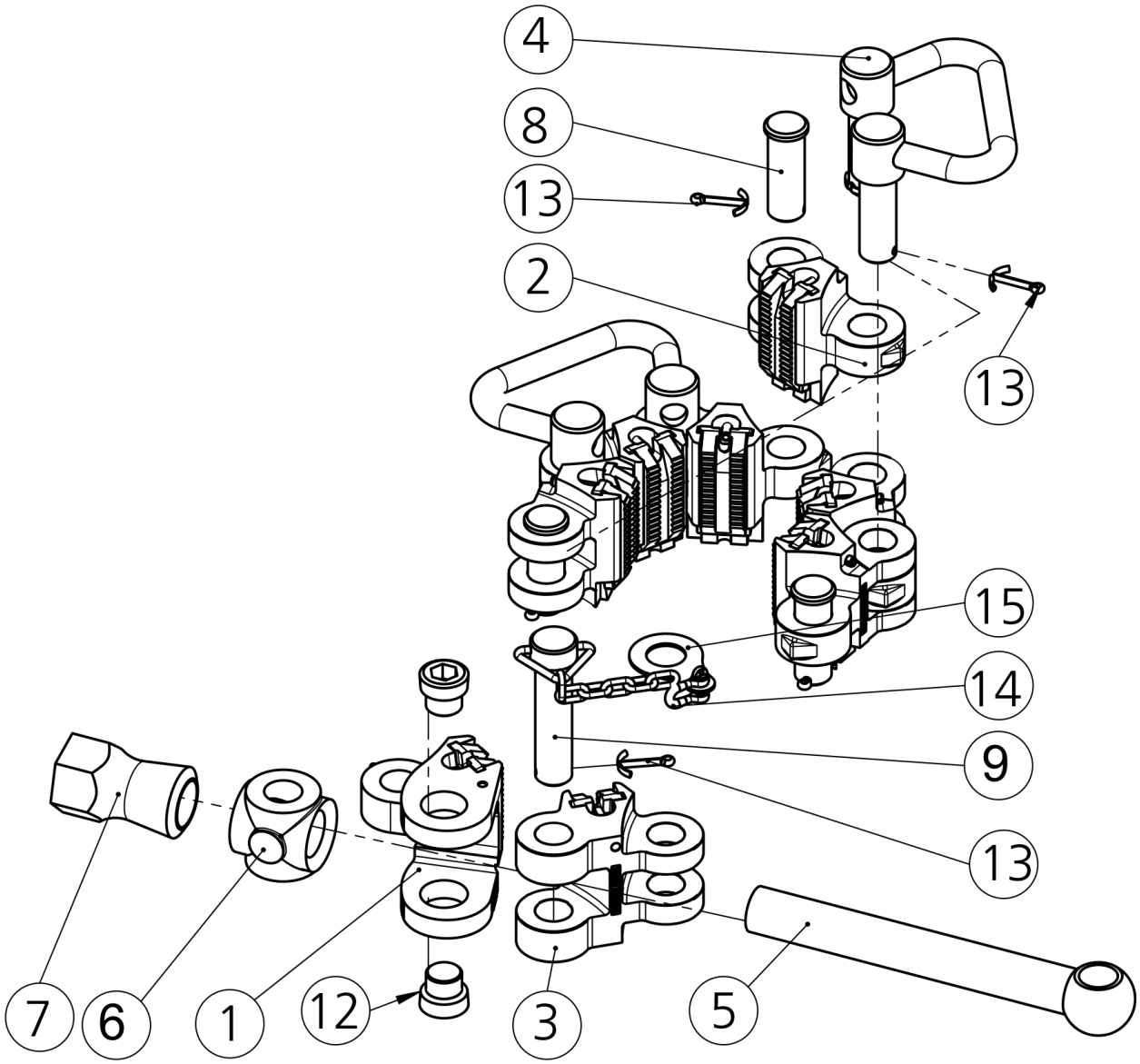

Fig. 38: Principle drawing of a Safety Clamp Type C

Part lists of the standard Safety Clamps C Type

Pos.	Description	P/N	99500 3.3/4" – 4.5/8"	99501 4.1/2" – 5.5/8"	99502 5.1/2" – 6.5/8"	99503 6.1/2" – 7 5/8"	99504 7.1/2" – 8.5/8"	99505 8.1/2" – 9.5/8"	99508 11 1/2" - 12 5/8"
1	End Link, Pivot Block Assembly	99600-A	1	1	1	1	1	1	1
2	Link Intermediate Assembly	99601-A	5	6	7	8	9	10	13
3	End Link Assembly	99602-A	1	1	1	1	1	1	1
4	Handle	99603	2	2	2	2	2	2	2
5	Safety Clamp Screw	99604	1	1	1	1	1	1	1
6	Pivot Block	99605	1	1	1	1	1	1	1
7	Safety Clamp Nut	99606	1	1	1	1	1	1	1
8	Intermediate Link Pin	99607	2	3	4	5	6	7	10
9	End Link Pin with Chain	99610	1	1	1	1	1	1	1
10*	Safety Clamp Nut Wrench	99611	1	1	1	1	1	1	1
11*	Box for Safety Clamp*	99612	1	1	1	1	1	1	1
12	Pivot Block Pin	99614	2	2	2	2	2	2	2
13	Cotter Pin	752331	7	8	9	10	11	12	15
14	Shackle	645037-2	1	1	1	1	1	1	1
15	Conector Sheet	99625	1	1	1	1	1	1	1
16	Info Sign	99491	1	1	1	1	1	1	1

Pos.	Description	P/N	99509 12 1/2" - 13 5/8"	99510 13 1/2" - 14 5/8"	99511 14 1/2" - 15 5/8"	99512 15 1/2" - 17"	99513 16 1/2" - 18"	99514 17 1/2" - 19"	99515 18 1/2" - 20"
1	End Link, Pivot Block Assembly	99600-A	1	1	1	1	1	1	1
2	Link Intermediate Assembly	99601-A	14	15	16	16	17	18	19
3	End Link Assembly	99602-A	1	1	1	1	1	1	1
4	Handle	99603	2	2	2	4	4	4	4
5	Safety Clamp Screw	99604	1	1	1	1	1	1	1
6	Pivot Block	99605	1	1	1	1	1	1	1
7	Safety Clamp Nut	99606	1	1	1	1	1	1	1
8	Intermediate Link Pin	99607	11	12	13	13	14	15	16
9	End Link Pin with Chain	99610	1	1	1	1	1	1	1
10*	Safety Clamp Nut Wrench	99611	1	1	1	1	1	1	1
11*	Box for Safety Clamp*	99612	1	1	1	1	1	1	1
12	Pivot Block Pin	99614	2	2	2	2	2	2	2
13	Cotter Pin	752331	16	17	18	18	19	20	21
14	Shackle	645037-2	1	1	1	1	1	1	1
15	Conector Sheet	99625	1	1	1	1	1	1	1
16	Info Sign	99491	1	1	1	1	1	1	1

Pos.	Description	P/N	99516 19 1/2" - 21"	99517 21 1/2" - 23"	99518 22 1/2" - 24"	99519 24 1/2" - 26"	99525 29 1/2" - 30 1/2"	99526 35 1/2" - 36 1/2"	99528 31 1/2" - 32 1/2"	99532 41 1/2" - 42 1/2"
1	End Link, Pivot Block Assembly	99600-A	1	1	1	1	1	1	1	1
2	Link Intermediate Assembly	99601-A	21	22	23	25	30	36	30	39
3	End Link Assembly	99602-A	1	1	1	1	1	1	1	1
4	Handle	99603	4	4	4	4	4	4	4	4
5	Safety Clamp Screw	99604	1	1	1	1	1	1	1	1
6	Pivot Block	99605	1	1	1	1	1	1	1	1
7	Safety Clamp Nut	99606	1	1	1	1	1	1	1	1
8	Intermediate Link Pin	99607	18	19	20	22	27	33	27	36
9	End Link Pin with Chain	99610	1	1	1	1	1	1	1	1
10*	Safety Clamp Nut Wrench	99611	1	1	1	1	1	1	1	1
11*	Box for Safety Clamp	99612	1	1	1	1	1	1	1	1
12	Pivot Block Pin	99614	2	2	2	2	2	2	2	2
13	Cotter Pin	752331	23	24	25	27	32	38	32	47
14	Shackle	645037-2	1	1	1	1	1	1	1	1
15	Conector Sheet	99625	1	1	1	1	1	1	1	1
16	Info Sign	99491	1	1	1	1	1	1	1	1

* Position 10 and 11 are not illustrated.

5.3.2 Pneumatic-Kit for Safety Clamp

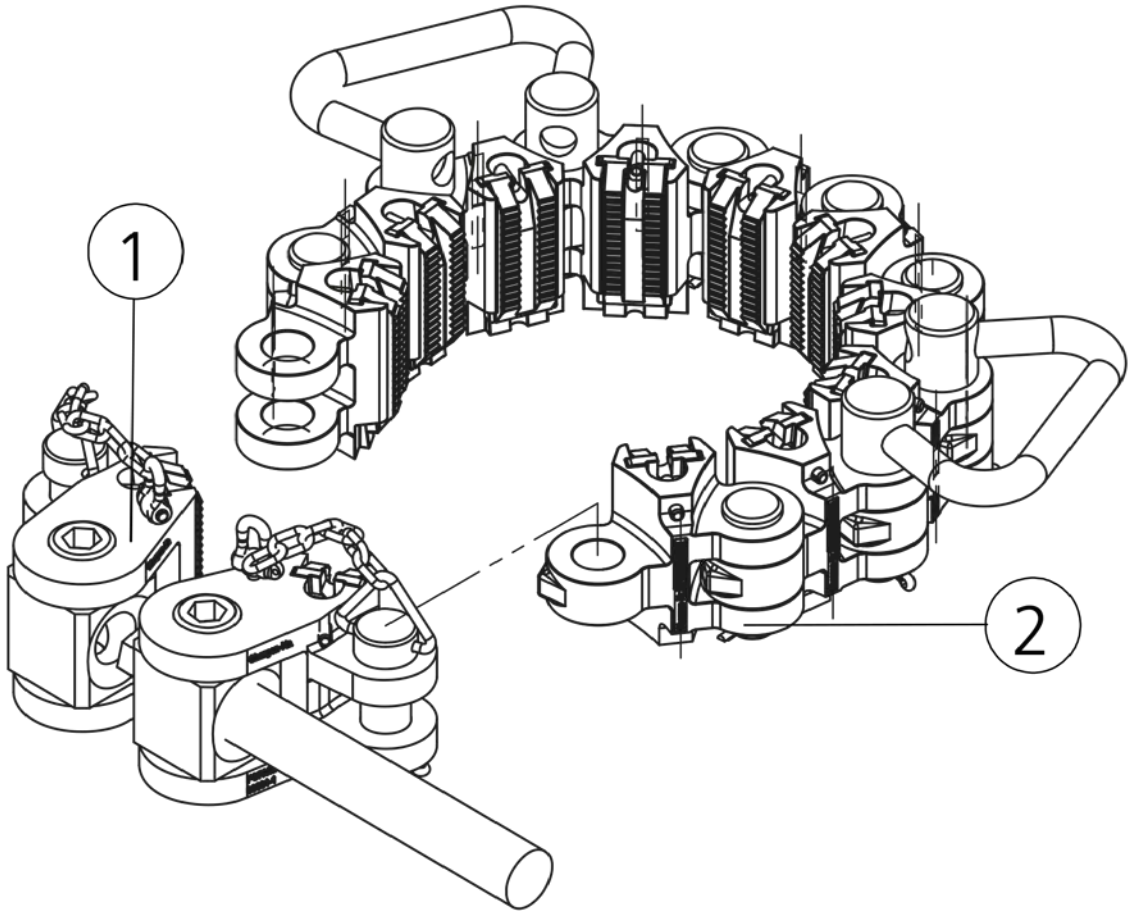

Fig. 39: Principle drawing Pneumatic-Kit for Safety Clamp

Part list Pneumatic Kit for Safety Clamp Type C

Pos.	P/N	Description
1	99630	Pneumatic-Kit for Safety Clamp (3.3/4 "- 22")
1	99650	Pneumatic-Kit for Safety Clamp (18.1/2" - 36.1/2")
2	-	refer to section 5.3.1 “Drawing and Part list for the Safety Clamps C Type” on page 51
3	99620	Pneumatic wrench assembly

5.3.2.1 Pneumatic Kit for the Safety Clamp Type C Sizes 3.3/4" – 22"

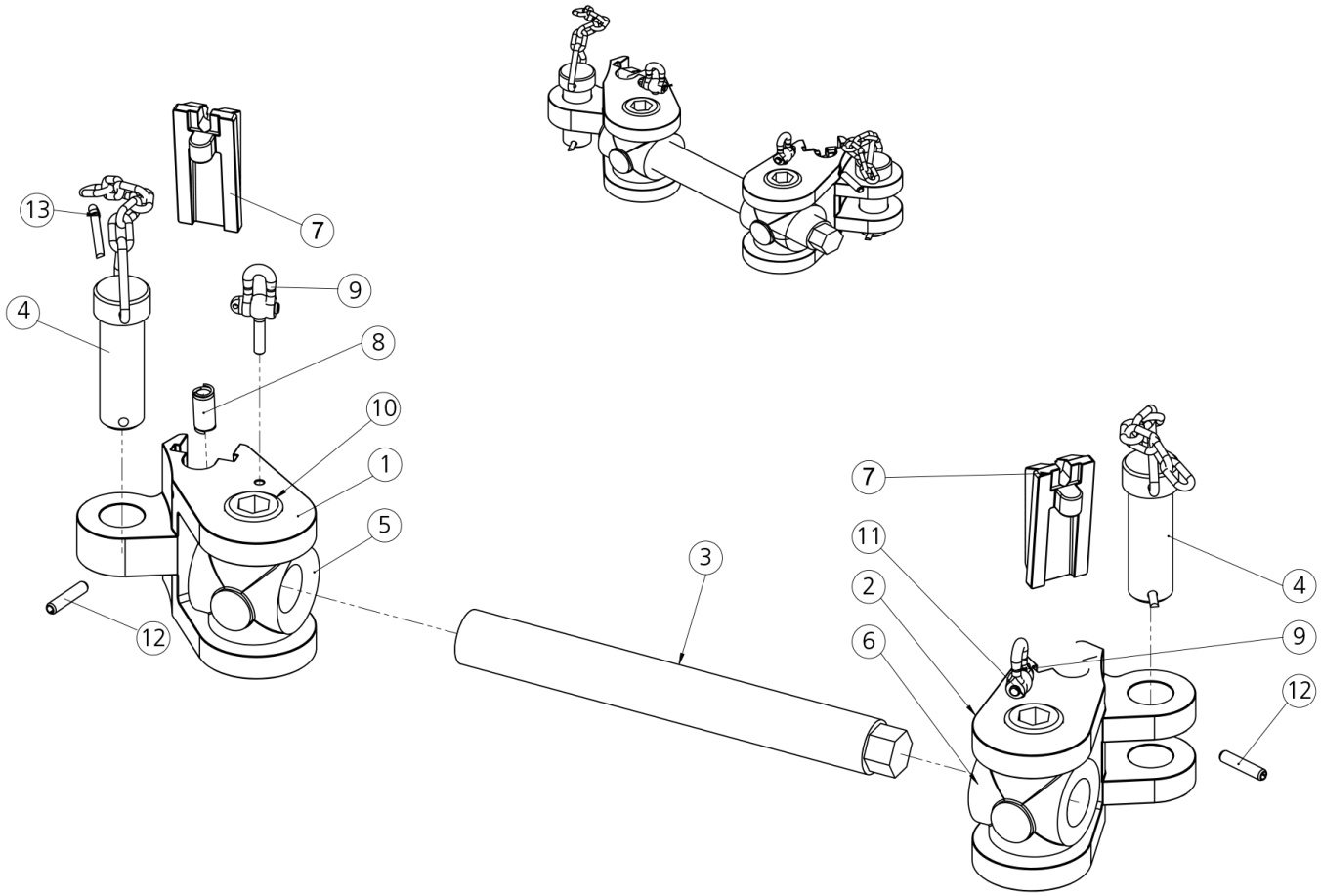

Fig. 40: Principle drawing of the pneumatic kit for the Safety Clamp sizes 3.3/4" – 22"

Part list for Pneumatic Kit P/N 99630

Pos.	Qty.	P/N	Description
1	1	99600-1	End Link, (Screw pneumatic) Left
2	1	99631-1	End Link, (Screw pneumatic) Right
3	1	99634	Left/Right hand thread bolt
4	2	99619	End Link Pin with Chain(pneumatic)
5	1	99632	Pivot Block L
6	1	99633	Pivot Block R
7	2	99608	Insert (without Cotter Pin)
8	2	99609	Insert Spring for Safety Clamp
9	4	645037-2	Shackle
10	4	99614	Pivot Block Pin
11	2	660414-1	Eye Screw
12	2	70123	Spring-type straight pin
13	2	752331	Split Pin

5.3.2.2 Pneumatic Kit for the Safety Clamp C Type Sizes 22" – 42.1/2"

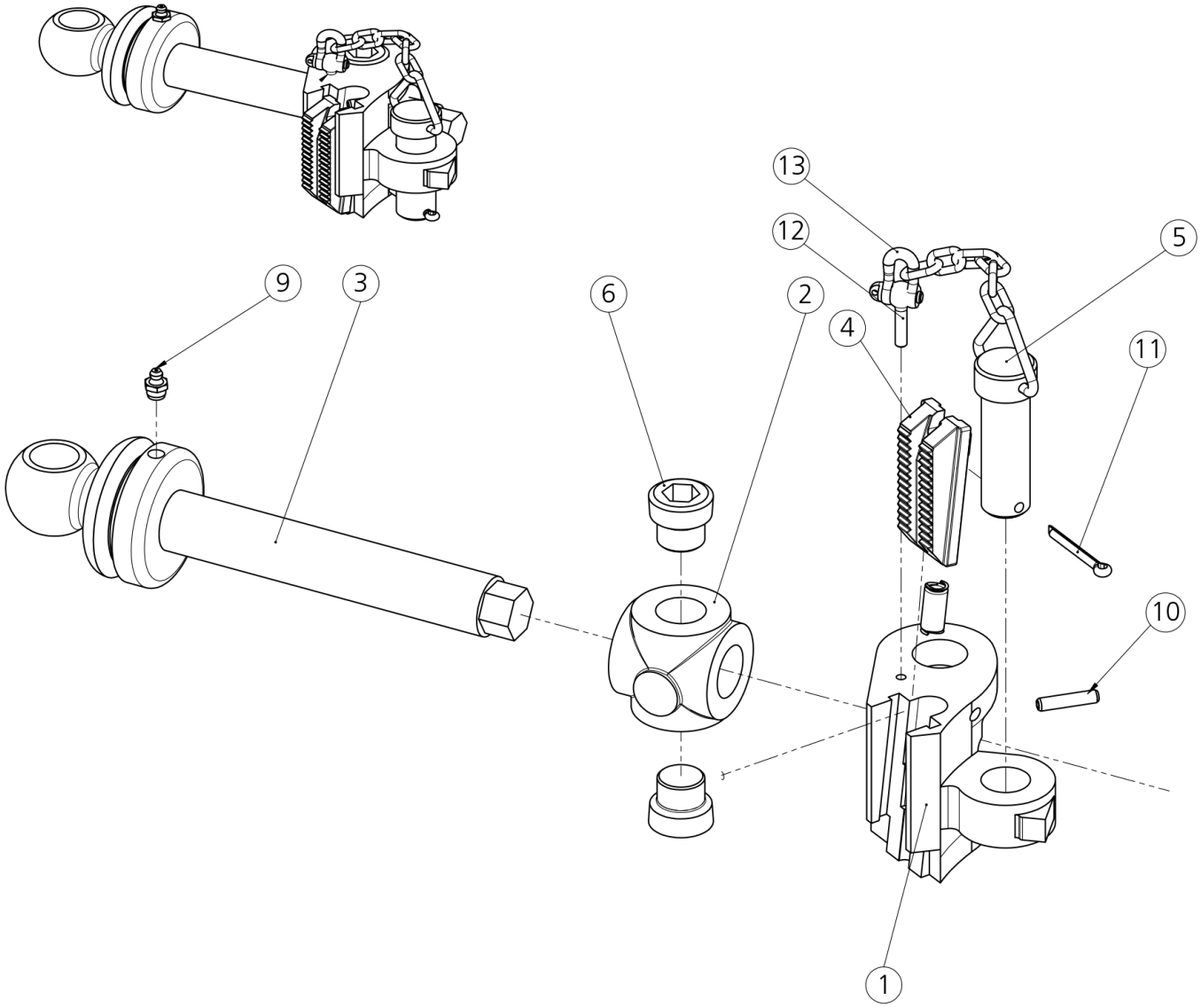

Fig. 41: Principle drawing of the Pneumatic Kit for the Safety Clamp C Type Sizes 22" – 42.1/2"

Part list for Pneumatic Kit P/N 99650

Pos.	Qty.	P/N	Description
1	1	99600-A	End Link, Pivot Block L
2	1	99633	End Link, Pivot Block R
3	1	99651	Rotation Bolt
4	1	99619	End Link Pin with Chain(pneumatic)
5	2	99614	Pivot Block Pin
6	1	70064	Grease Nipple
7	1	752331	Split Pin
8	1	660414-1	Eye Screw
9	1	645037-2	Shackle
10	1	99612	Box for Safety Clamp
11	1	99491	Info Sign
13	1	645037-2	Shackle

5.3.2.3 Pneumatic wrench Assembly

Fig. 42: Illustration of the Pneumatic wrench Assembly

Part list for Pneumatic wrench Assembly P/N 99620

Pos.	Qty.	P/N	Description
1	1	99635	Pneumatic Impact Wrench
2	1	613905-10	Coupling
3	1	99636	Pneumatic Hose

5.3.3 Drawing and Part list for the Safety Clamps T Type

5.3.3.1 Safety Clamps T Type I

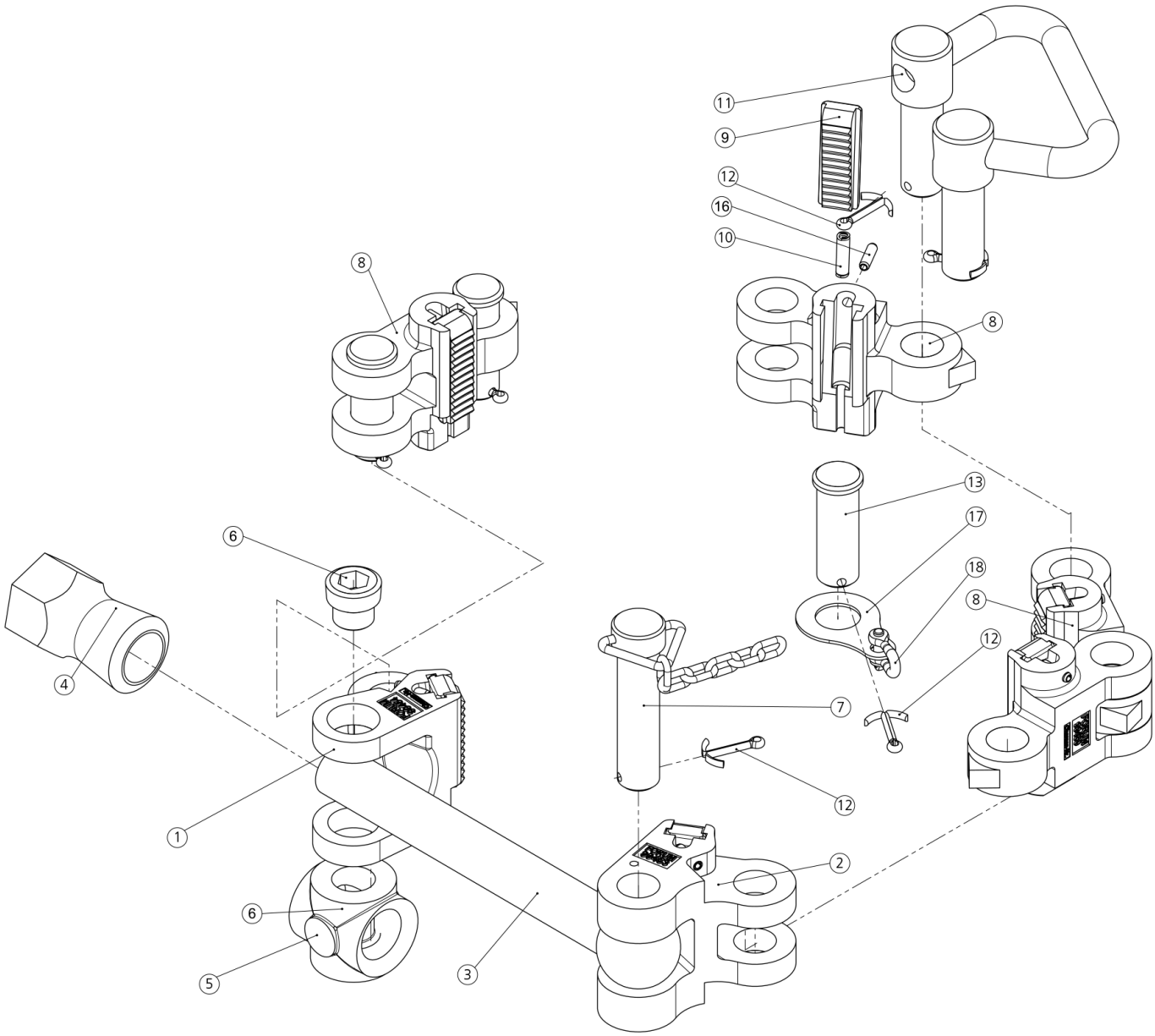

Fig. 43: Principle drawing of a Safety Clamp Type T

Part lists of the standard Safety Clamps T Type

Pos.	Description	P/N	88003	88004	88005
1	End Link, Pivot Block (Type "T")	99454	1	1	1
2	End Link (Screw Type "T")	99453	1	1	1
3	Safety Clamp Screw (Type "C")	99604	1	1	1
4	Safety Clamp Nut	99606	1	1	1
5	Pivot Block (Type "C")	99605	1	1	1
6	Pivot Block Pin (Type "C")	99614	2	2	2
7	End Link Pin with Chain	99610	1	1	1
8	Link Intermediate for "T"-Type Clamp	99450	2	3	4
9	Slip Insert for "T"-Type Clamp	99451	4	5	6
10	Pressure spring	99452	4	5	6
11	Handle for Safety Clamp (Type "T")	98603	1	1	1
12	Split Pin	752331	4	5	6
13	Intermediate Link Pin	99607	1	2	3
14	Safety Clamp Nut Wrench (Type "C" + "T")	99611	1	1	1
15	Box for Safety Clamp	99612	1	1	1
16	Spring-type straight pin	621438	4	5	6
17	Connector sheet	99625	1	1	1
18	Shackle	645037-2	1	1	1
*	Info SignSafety Clamps	99491	1	1	1

* not shown on illustration.

5.3.3.2 Safety Clamps T , with Nut Retention System

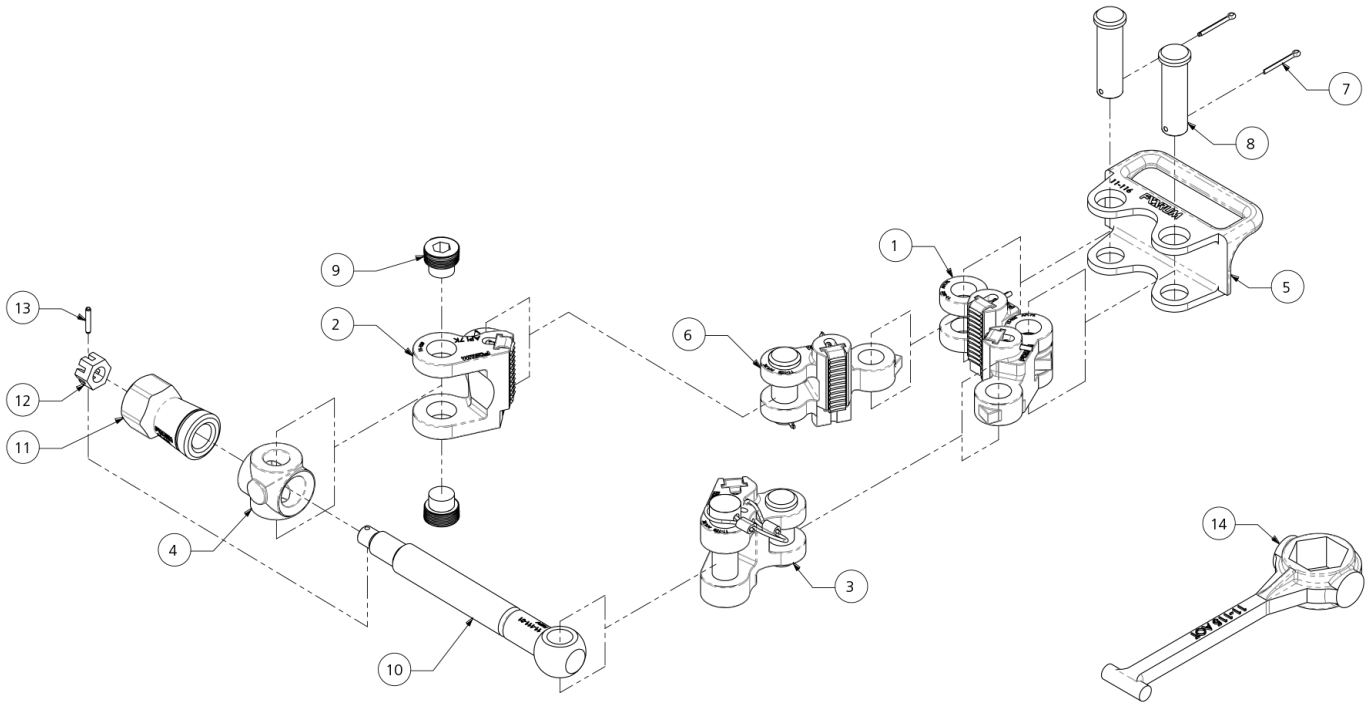

Fig. 44: Principle drawing of a Safety Clamp Type T , with Nut Retention System

Pos.	Description	P/N	Safety Clamp T 11-125-01 1.1/8" – 2"	Safety Clamp T 11-126-01 2.1/8" – 3.1/4"	Safety Clamp T 11-127-01 3.1/2" – 4.1/2"
1	Intermediate Link Sub Assembly (No Link Pin)	11-123	2	2	2
2	End Link Sub Assembly	11-124	1	1	1
3	End Link Sub Assembly (Removable Link Pin)	11-128	1	1	1
4	Pivot Block	11-113	1	1	1
5	Handle	11-116-C	1	1	1
6	Intermediate Link Sub Assembly	11-122	2	3	4
7	Cotter Pin	51435-12	2	3	4
8	Link Pin	11-117	2	3	4
9	Pivot Block Pin	11-114	2	3	4
10	Screw	11-111-01	1	1	1
11	Nut	11-112-01	1	1	1
12	Nut, Hex-Slotted (Unc-2B)	50512-C	1	1	1
13	Pin, Roll	51603-09-C	1	1	1
14	Nut Wrench	11-115	1	1	1
*	Storage Box	11-120	1	1	1

* not shown on illustration.

5.3.4 Drawing and Part lists for the Safety Clamps Type A-MP

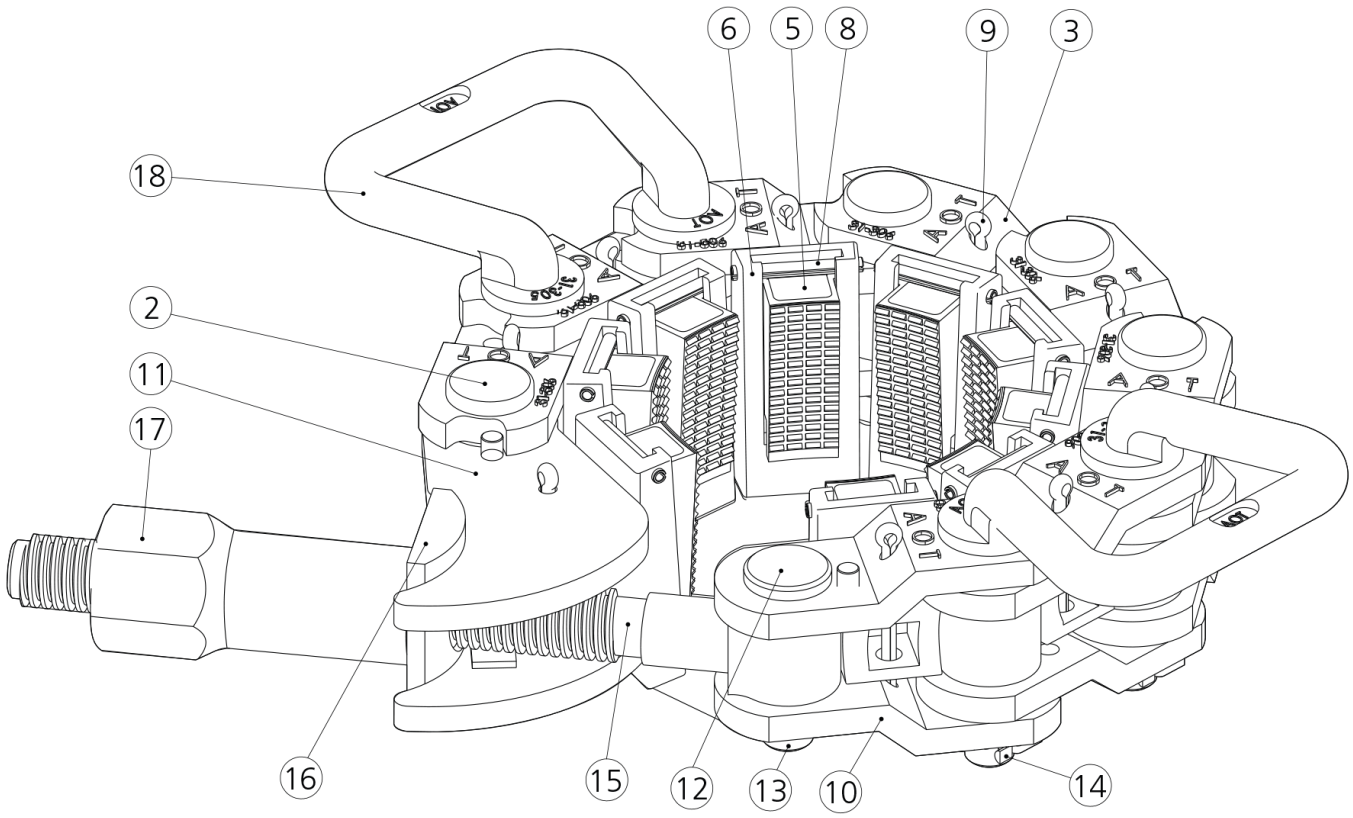

Fig. 45: Principle drawing of a Safety Clamps Type A-MP

Part list for the Safety Clamp A-MP Type

The Safety Clamps of the A-MP type series differ only in the number of link assemblies and their handles.

Pos.	Description	P/N	A-MP-S 31-009 2.7/8" - 4.1/8"	A-MP-S 31-010 4" - 5"	A-MP-R 31-011 4.1/2" - 5.5/8"	A-MP-R 31-012 5.1/2" - 7"
1	Link Assembly for A-MP-S only	31-335	AR	AR	AR	AR
1	Link Assembly for all A-MP, except A-MP-S	31-319	AR	AR	AR	AR
2	Link Pin with Cotter Pin	31-307	AR	AR	AR	AR
3	Link with Cotter Pin	31-306	AR	AR	AR	AR
4	Carrier Assembly with Die for A-MP-S only	31-325	AR	AR	AR	AR
4	Carrier Assembly with Die	31-324	AR	AR	AR	AR
5	Die Roll Pin for A-MP-S only	31-333	AR	AR	AR	AR
5	Die Roll Pin for all A-MP, except A-MP-S	31-310	AR	AR	AR	AR
6	Carrier	31-109	AR	AR	AR	AR
7	Spring	31-311	AR	AR	AR	AR
8	Roll Pin	31-418	AR	AR	AR	AR
9	Cotter Pin	31-528	AR	AR	AR	AR
10	Side Bar Links	31-318	1	1	1	1
11	Latch Link for all A-MP, except A-MPL	31-304	1	1	1	1
11	Latch Link for A-MPL only	31-321	1	1	1	1
12	Pin with Cotter Pin	31-308	1	1	1	1
13	Bushing	31-315	1	1	1	1
14	Cotter Pin	31-510	AR	AR	AR	AR
15	Screw	31-302	1	1	1	1
16	Thrust Washer	31-714	1	1	1	1
17	Make Up Nut	31-303	1	1	1	1
18	Handle for A-MP-S,R,M only	31-305	2	2	2	2
18	Handle for A-MP-L,XL only	31-305	4	4	4	4
19	Nut Wrench	31-320	1	1	1	1

NOTE Add -B to the end of the part number to include the storage box.

Example: 30-025-B

Storage Box P/N 11-120 for sizes < 12.1/2"

Storage Box P/N 31-334 for sizes > 12.1/2"

Pos.	Description	P/N	A-MP-R 31-013 6.3/4" - 8.1/4"	A-MP-R 31-014 8" - 9.1/4"	A-MP-R 31-015 9.1/4" - 10.1/2"	A-MP-M 31-016 10.1/2" - 11.1/2"
1	Link Assembly for A-MP-S only	31-335	AR	AR	AR	AR
1	Link Assembly for all A-MP, except A-MP-S	31-319	AR	AR	AR	AR
2	Link Pin with Cotter Pin	31-307	AR	AR	AR	AR
3	Link with Cotter Pin	31-306	AR	AR	AR	AR
4	Carrier Assembly with Die for A-MP-S only	31-325	AR	AR	AR	AR
4	Carrier Assembly with Die	31-324	AR	AR	AR	AR
5	Die Roll Pin for A-MP-S only	31-333	AR	AR	AR	AR
5	Die Roll Pin for all A-MP, except A-MP-S	31-310	AR	AR	AR	AR
6	Carrier	31-109	AR	AR	AR	AR
7	Spring	31-311	AR	AR	AR	AR
8	Roll Pin	31-418	AR	AR	AR	AR
9	Cotter Pin	31-528	AR	AR	AR	AR
10	Side Bar Links	31-318	1	1	1	1
11	Latch Link for all A-MP, except A-MPL	31-304	1	1	1	1
11	Latch Link for A-MPL only	31-321	1	1	1	1
12	Pin with Cotter Pin	31-308	1	1	1	1
13	Bushing	31-315	1	1	1	1
14	Cotter Pin	31-510	AR	AR	AR	AR
15	Screw	31-302	1	1	1	1
16	Thrust Washer	31-714	1	1	1	1
17	Make Up Nut	31-303	1	1	1	1
18	Handle for A-MP-S,R,M only	31-305	2	2	2	2
18	Handle for A-MP-L,XL only	31-305	4	4	4	4
19	Nut Wrench	31-320	1	1	1	1

Pos.	Description	P/N	A-MP-M 31-017 11.1/2" - 12.1/2"	A-MP-M 31-018 12.1/2" - 13.5/8"	A-MP-M 31-019 13.5/8" - 14.3/4"	A-MP-M 31-020 14.3/4" - 15.7/8"
1	Link Assembly for A-MP-S only	31-335	AR	AR	AR	AR
1	Link Assembly for all A-MP, except A-MP-S	31-319	AR	AR	AR	AR
2	Link Pin with Cotter Pin	31-307	AR	AR	AR	AR
3	Link with Cotter Pin	31-306	AR	AR	AR	AR
4	Carrier Assembly with Die for A-MP-S only	31-325	AR	AR	AR	AR
4	Carrier Assembly with Die	31-324	AR	AR	AR	AR
5	Die Roll Pin for A-MP-S only	31-333	AR	AR	AR	AR
5	Die Roll Pin for all A-MP, except A-MP-S	31-310	AR	AR	AR	AR
6	Carrier	31-109	AR	AR	AR	AR
7	Spring	31-311	AR	AR	AR	AR
8	Roll Pin	31-418	AR	AR	AR	AR
9	Cotter Pin	31-528	AR	AR	AR	AR
10	Side Bar Links	31-318	1	1	1	1
11	Latch Link for all A-MP, except A-MPL	31-304	1	1	1	1
11	Latch Link for A-MPL only	31-321	1	1	1	1
12	Pin with Cotter Pin	31-308	1	1	1	1
13	Bushing	31-315	1	1	1	1
14	Cotter Pin	31-510	AR	AR	AR	AR
15	Screw	31-302	1	1	1	1
16	Thrust Washer	31-714	1	1	1	1
17	Make Up Nut	31-303	1	1	1	1
18	Handle for A-MP-S,R,M only	31-305	2	2	2	2
18	Handle for A-MP-L,XL only	31-305	4	4	4	4
19	Nut Wrench	31-320	1	1	1	1

NOTE Add -B to the end of the part number to include the storage box.

Example: 30-025-B

Storage Box P/N 11-120 for sizes < 12.1/2"

Storage Box P/N 31-334 for sizes > 12.1/2"

Pos.	Description	P/N	A-MP-L 31-021 15.7/8" - 17"	A-MP-L 31-022 17" - 18.1/2"	A-MP-L 31-023 18.1/8" - 19.3/8"	A-MP-XL 31-024 19.3/8" - 20.3/8"
1	Link Assembly for A-MP-S only	31-335	AR	AR	AR	AR
1	Link Assembly for all A-MP, except A-MP-S	31-319	AR	AR	AR	AR
2	Link Pin with Cotter Pin	31-307	AR	AR	AR	AR
3	Link with Cotter Pin	31-306	AR	AR	AR	AR
4	Carrier Assembly with Die for A-MP-S only	31-325	AR	AR	AR	AR
4	Carrier Assembly with Die	31-324	AR	AR	AR	AR
5	Die Roll Pin for A-MP-S only	31-333	AR	AR	AR	AR
5	Die Roll Pin for all A-MP, except A-MP-S	31-310	AR	AR	AR	AR
6	Carrier	31-109	AR	AR	AR	AR
7	Spring	31-311	AR	AR	AR	AR
8	Roll Pin	31-418	AR	AR	AR	AR
9	Cotter Pin	31-528	AR	AR	AR	AR
10	Side Bar Links	31-318	1	1	1	1
11	Latch Link for all A-MP, except A-MPL	31-304	1	1	1	1
11	Latch Link for A-MPL only	31-321	1	1	1	1
12	Pin with Cotter Pin	31-308	1	1	1	1
13	Bushing	31-315	1	1	1	1
14	Cotter Pin	31-510	AR	AR	AR	AR
15	Screw	31-302	1	1	1	1
16	Thrust Washer	31-714	1	1	1	1
17	Make Up Nut	31-303	1	1	1	1
18	Handle for A-MP-S,R,M only	31-305	2	2	2	2
18	Handle for A-MP-L,XL only	31-305	4	4	4	4
19	Nut Wrench	31-320	1	1	1	1

Pos.	Description	P/N	A-MP-XL 31-025 20.3/8" - 21.1/2"	A-MP-XL 31-032 21" - 22.5/8"	A-MP-XL 31-033 22.5/8" - 23.3/4"	A-MP-XL 31-034 23.3/4" - 24.7/8"
1	Link Assembly for A-MP-S only	31-335	AR	AR	AR	AR
1	Link Assembly for all A-MP, except A-MP-S	31-319	AR	AR	AR	AR
2	Link Pin with Cotter Pin	31-307	AR	AR	AR	AR
3	Link with Cotter Pin	31-306	AR	AR	AR	AR
4	Carrier Assembly with Die for A-MP-S only	31-325	AR	AR	AR	AR
4	Carrier Assembly with Die	31-324	AR	AR	AR	AR
5	Die Roll Pin for A-MP-S only	31-333	AR	AR	AR	AR
5	Die Roll Pin for all A-MP, except A-MP-S	31-310	AR	AR	AR	AR
6	Carrier	31-109	AR	AR	AR	AR
7	Spring	31-311	AR	AR	AR	AR
8	Roll Pin	31-418	AR	AR	AR	AR
9	Cotter Pin	31-528	AR	AR	AR	AR
10	Side Bar Links	31-318	1	1	1	1
11	Latch Link for all A-MP, except A-MPL	31-304	1	1	1	1
11	Latch Link for A-MPL only	31-321	1	1	1	1
12	Pin with Cotter Pin	31-308	1	1	1	1
13	Bushing	31-315	1	1	1	1
14	Cotter Pin	31-510	AR	AR	AR	AR
15	Screw	31-302	1	1	1	1
16	Thrust Washer	31-714	1	1	1	1
17	Make Up Nut	31-303	1	1	1	1
18	Handle for A-MP-S,R,M only	31-305	2	2	2	2
18	Handle for A-MP-L,XL only	31-305	4	4	4	4
19	Nut Wrench	31-320	1	1	1	1

NOTE Add -B to the end of the part number to include the storage box.

Example: 30-025-B

Storage Box P/N 11-120 for sizes < 12.1/2"

Storage Box P/N 31-334 for sizes > 12.1/2"

Pos.	Description	P/N	A-MP-XL 31-035 24.7/8" - 26"	A-MP-XL 31-036 26" - 27.1/8"	A-MP-XL 31-039 29.3/8" - 30.1/2"	A-MP-XL 31-044 35" - 36.1/8"
1	Link Assembly for A-MP-S only	31-335	AR	AR	AR	AR
1	Link Assembly for all A-MP, except A-MP-S	31-319	AR	AR	AR	AR
2	Link Pin	31-307	AR	AR	AR	AR
3	Link	31-306	AR	AR	AR	AR
4	Carrier Assembly with Die for A-MP-S only	31-325	AR	AR	AR	AR
4	Carrier Assembly with Die	31-324	AR	AR	AR	AR
5	Die for A-MP-S only	31-333	AR	AR	AR	AR
5	Die for all A-MP, except A-MP-S	31-310	AR	AR	AR	AR
6	Carrier	31-309	AR	AR	AR	AR
7	Spring	31-311	AR	AR	AR	AR
8	Roll Pin	51604-18	AR	AR	AR	AR
9	Cotter Pin	51405-28	AR	AR	AR	AR
10	Side Bar Links (Pair)	31-318	1	1	1	1
11	Latch Link for all A-MP, except A-MPL	31-304	1	1	1	1
11	Long Latch	31-321	1	1	1	1
12	Pin with Cotter Pin	31-308	1	1	1	1
13	Bushing f/ Screw Pin	31-315	1	1	1	1
14	Cotter Pin	31-510	AR	AR	AR	AR
15	Screw	31-302	1	1	1	1
16	Thrust Washer	31-714	1	1	1	1
17	Nut	31-303	1	1	1	1
18	Handle for A-MP-S,R,M only	31-305	2	2	2	2
18	Handle for A-MP-L,XL only	31-305	4	4	4	4
19	Nut Wrench	31-320	1	1	1	1

NOTE Add -B to the end of the part number to include the storage box.

Example:30-025-B

Storage Box P/N 11-120 for sizes < 12.1/2"

Storage Box P/N 31-334 for sizes > 12.1/2"

5.3.5 Safety Clamp A-MP Type – number of link assemblies

Type A-MP-S

P/N	Range	Links Qty.	Gripping Dies
31-009	2.7/8" – 4.1/8"	7	8
31-010	4" – 5"	8	9

Type A-MP-R

P/N	Range	Links Qty.	Gripping Dies
31-011	4.1/2" – 5.5/8"	7	8
31-012	5.1/2" – 7"	8	9
31-013	6.3/4" – 8.1/4"	9	10
31-014	8" – 9.1/4"	10	11
31-015	9.1/4" – 10.1/2"	11	12

Type A-MP-M

P/N	Range	Links Qty.	Gripping Dies
31-016	10.1/2" – 11.1/2"	12	13
31-017	11.1/2" – 12.1/2"	13	14
31-018	12.1/2" – 13.5/8"	14	15
31-019	13.5/8" – 14.3/4"	15	16
31-020	14.3/4" – 15.7/8"	16	17

Type A-MP-L

P/N	Range	Links Qty.	Gripping Dies
31-021	15.7/8" - 17"	17	18
31-022	17" - 18.1/2"	18	19
31-023	18.1/8" - 19.3/8"	19	20

Type A-MP-XL

P/N	Range	Links Qty.	Gripping Dies
31-024	19.3/8" – 20.3/8"	19	20
31-025	20.3/8" – 21.1/2"	20	21
31-032	21" – 22.5/8"	21	22
31-033	22.5/8" – 23.3/4"	22	23
31-034	23.3/4" – 24.7/8"	23	24
31-035	24.7/8" – 26"	24	25
31-036	26" – 27.1/8"	25	26
31-039	29.3/8" – 30.1/2"	28	29
31-044	35" - 36 1/8"	32	31

SERVICE

5.4 Recommended Spare Parts [RSP] Safety Clamp type series

FORUM Handling Tools recommended spare parts provide a list of potential wear items that may be beneficial to keep on hand for repair and maintenance.

5.4.5.1 Safety Clamp T Type

refer to section 5.3.3 “Drawing and Part list for the Safety Clamps T Type” on page 61

Qty.	P/N	Description
3	11-101	Link Complete
3	11-103-IC	Die
6	11-105	Spring
6	51403-06	Cotter Pin
3	11-106	Link Pin
2	11-117	Handle Link Pin
6	51435-12	Cotter Pin
1	11-110	End Link Pin W/ Cable
2	11-114	Pivot Block Pin
1	50512-C	Nut, Hex-Slotted
1	51603-09-C	Roll Pin

5.4.5.2 Safety Clamp C Type

refer to section 5.3.1 “Drawing and Part list for the Safety Clamps C Type” on page 51

P/N	Description	CR Type Qty.	CLType Qty.	CL w/ Lifting Clevis Qty.	CXL Type Qty.	CL/CXL w/ Lifting Clevis Qty.
12-101	Link Complete	7	9	9	11	22
12-103	Die	7	9	9	11	22
12-105	Spring	13	18	18	22	44
51437-08	Cotter Pin	13	18	18	22	44
11-106	Link Pin	7	9	9	11	22
11-117	Handle Link Pin	2	2	2	4	4
51435-12	Cotter Pin	6	6	6	8	8
11-110	End Link Pin W/ Cable	1	1	1	1	1
11-114	Pivot Block Pin	2	2	2	4	4
50512-C	Nut, Hex-Slotted	1	1	1	2	2
51603-09-C	Roll Pin	1	1	1	2	2
12-120	Safety Support Clevis	-	-	1	-	2
55017-44-C8	Screw, Cap-Hex Head	-	-	2	-	4
58002-16-SZ-8	Nut, Hex-Self Locking	-	-	2	-	4

refer to section 5.3.1.3 “Safety Clamps C Type” on page 55

Pos.	Description	P/N	99500-RSP	99501-RSP	99502-RSP	99503-RSP	99504-RSP	99505-RSP	99506-RSP	99507-RSP
8	Intermediate Link Pin	99607	1	1	1	2	2	3	4	4
9	Insert	99608	7	8	9	9	10	12	13	14
10	Insert Spring	99609	7	8	9	9	10	12	13	14
16	Cotter Pin	752331	24	24	30	30	30	33	36	36
-	Spring Type Straight Pin	70123	10	27	27	27	30	40	50	50

Pos.	Description	P/N	99508-RSP	99509-RSP	99510-RSP	99511-RSP	99512-RSP	99513-RSP	99514-RSP	99515-RSP
8	Intermediate Link Pin	99607	5	5	6	6	7	7	8	8
9	Insert	99608	15	15	16	16	17	17	18	18
10	Insert Spring	99609	15	15	16	16	17	17	18	18
16	Cotter Pin	752331	42	42	48	48	54	54	60	60
-	Spring Type Straight Pin	70123	60	60	70	70	80	80	90	90

Pos.	Description	P/N	99516-RSP	99517-RSP	99518-RSP	99519-RSP	99525-RSP	99526-RSP	99528-RSP	99532-RSP
8	Intermediate Link Pin	99607	9	9	10	10	11	11	12	12
9	Insert	99608	19	19	20	20	21	21	22	22
10	Insert Spring	99609	19	19	20	20	21	21	22	22
16	Cotter Pin	752331	66	66	72	72	78	78	84	84
-	Spring Type Straight Pin	70123	100	100	110	110	120	120	130	130

5.4.5.3 Safety Clamp A-MP Type

refer to section 5.3.4 “Drawing and Part lists for the Safety Clamps Type A-MP” on page 63

P/N	Description	A-MP-S Qty.	A-MP-R Qty.	A-MP-M Qty.	A-MP-L Qty.	A-MP-XL Qty.
31-335	Link Complete	4	-	-	-	-
31-319	Link Complete	-	6	8	10	14
31-333	Die	4	-	-	-	-
31-310	Die	-	6	8	10	14
31-311	Spring	9	12	17	20	26
TBD	Roll Pin	9	12	17	20	26
31-307	Link Pin	4	6	8	10	14
TBD	Cotter Pin (link pin)	4	6	8	10	14
TBD	Cotter Pin (carrier)	-	-	-	-	-

5.4.5.4 Pneumatic Kit Spare Parts

refer to section 5.3.2 “Pneumatic-Kit for Safety Clamp” on page 57

Spare Parts PN 99630-RSP for Size 3.3/4” – 22”

Pos.	Qty.	P/N	Description
5	10	752331	Split Pin
6	1	99619	End Link Pin with Chain(pneumatic)
7	2	99608	Insert (without Cotter Pin)
8	4	99614	Pivot Block Pin (Type "C")
9	10	99638	Spring Cotter Pin
11	2	660414-1	Eye Screw
12	4	645037-2	Shackle
13	2	99609	Insert Spring for Safety Clamp
14	1	613905-10	Coupling
16	1	99636	Pneumatic Hose DN 6 26 ft

Spare Parts PN 99650-RSP for Size 22” – 42.1/2”

Pos.	Qty.	P/N	Description
4	2	99608	Insert (without Cotter Pin)
5	1	99619	End Link Pin with Chain (pneumatic)
6	2	99614	Pivot Block Pin (Type "C")
8	2	99609	Insert Spring for Safety Clamp Type "C"
9	3	70064	Grease Nipple
10	10	70123	Spring-type straight pin
11	10	752331	Split Pin
12	2	660414-1	Eye Screw
13	4	645037-2	Shackle

INSPECTION / MAINTENANCE

6 Inspection / Maintenance

This chapter contains important information on how to service your equipment safely, correctly and economically. It helps to avoid dangerous situations and reduce repair costs and downtimes. Furthermore, the reliability and the service life of the equipment will be increased by following the instructions in this OMM.

Ensure that only sufficiently qualified and trained personnel perform setup and installation work.

Read these instructions carefully before setting up the Safety Clamp and putting it into service.

WEAR EYE PROTECTION!

WEAR PROTECTIVE HELMET!

WEAR PROTECTIVE GLOVES!

WEAR SAFETY SHOES!

Instructions for inspection and maintenance

1. In the event of visible damage or excessive wear, contact the FORUM Handling Tools Service Department or an authorized repair company.
2. Ensure that exclusively the FORUM Handling Tools Service Department or an authorized repair company observing the FORUM Handling Tools welding instructions performs welding work on primary load components.
3. Ensure that all other maintenance work is performed only by personnel trained for this work and familiar with the risks involved in operating the equipment.
4. Ensure that all repair work not performed by FORUM Handling Tools is, Nevertheless, performed in compliance with the manufacturer's specifications and instructions.
5. Minor cracks or defects in critical and non-critical areas, which may be removed without reducing safety or operation of the Equipment, can be removed by grinding and blending (refer to section 6.4.2 "Examination methodology and acceptance of wear data criteria" on page 76).
6. After repair, always check the repaired part in a suitable manner to ensure that the defect has been remedied.

Prerequisites for maintenance work

1. Ensure that the Safety Clamp is stable and resting down on a good supporting surface so that it cannot tip.
2. Provide sufficient lighting at the workplace.
3. The Safety Clamp must be removed and cleared from the area around well center to avoid objects dropped downhole during maintenance.

Trouble shooting

» In all events where the Safety Clamp's function is not as expected, the following checks must be carried out to identify the cause.

1. Check proper lubrication.
2. Check size and installation.

6.1 Lubrication

⚠ WARNING

Lubricants can pose a health hazard!

Lubricants irritate skin and eyes.

» Avoid contact with lubricants.

WEAR EYE PROTECTION!

WEAR PROTECTIVE GLOVES!

INFO

The specified lubricants can be obtained through FORUM Handling Tools. Contact your local representative.

Lubrication Points on the Equipment

The Safety Clamp needs to be lubricated regularly on hourly basis in operation following locations:

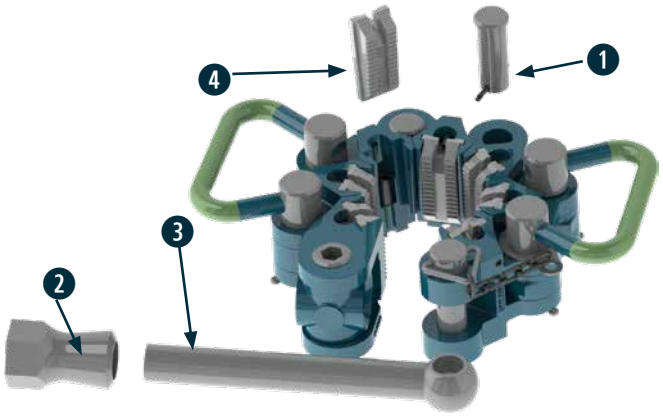

Fig. 46: Grease points on Safety Clamp

❶	Pins	❷	Nut
❸	Screw	❹	Insert taper

6.2 Inspections

FORUM Handling Tools recommends to perform inspections in compliance with API RP 7L at specified intervals and in inspection categories. Otherwise, the frequency of required inspections depends on the conditions of use of the Safety Clamp.

Before inspection, remove all foreign material such as dirt, paint, lubricants, oil, abrasion, etc. from the affected parts. Use suitable methods such as stripping off paint, steam cleaning or sand blasting.

After an inspection the scope and results of the tests performed has to be documented.

In the event of cracks, excessive wear, etc. contact FORUM Handling Tools or an authorized service company.

INFO

The specified maintenance intervals are recommended for the FORUM Handling Tools Safety Clamp Type Series during its service life. The necessity of inspections depends primarily on the following conditions:

- Ambient conditions
- Load cycles
- Regulatory requirements
- Period of use
- Tests
- Repairs
- Overhauls

Inspection Intervals

Category	Intervals	Preparatory measures
I	Daily	- Safety Clamp on rig
II	Weekly	- Safety Clamp on rig
III	Semi-anually	- Safety Clamp on rig - Safety Clamp partly dismantled
IV	Every year	- Safety Clamp on rig - Safety Clamp partly dismantled

INFO

The above-mentioned inspection intervals refer to a 100% use of the Safety Clamp on each day of a week (24/7). Personal inspection intervals may vary according to the type and extent of use and may need to be adjusted. All inspection categories are in accordance with the latest API RP 7L.

Ensure that only sufficiently qualified and trained personnel accomplish maintenance work.

6.2.1 Inspection of Pneumatic equipment

Check the Pneumatic equipment daily for leaks. If unacceptably high leakage occurs internally or externally contact FORUM Handling Tools or an authorized service company.

6.2.2 Inspection Following Removal

Generally, the Safety Clamp should be inspected immediately before it is taken out of service temporarily or stored. Moreover, it should be inspected before putting back into service.

- It is necessary to disassemble the Safety Clamp in an appropriately equipped workshop to check for excessive wear, deformation, cracks and other damage.
- Perform repair work only in compliance with the manufacturer's recommendations. These are available from FORUM Handling Tools.
- Ensure that only FORUM Handling Tools or an authorized service company in compliance with the welding specifications issued by FORUM Handling Tools accomplishes welding work on cast parts.
- If the field inspection indicates that further inspection work is required, remove the Safety Clamp and have it inspected in an appropriately equipped workshop.
- Check carefully for visible wear and material fatigue.

6.2.3 Inspection Following Critical Loads

Perform an inspection IMMEDIATELY following any critical or unexpected loads. Critical loads could be:

- Shock load resulting for the Safety Clamps contacting the slips in the event the slips lose their grip.
- Operation at very low ambient temperatures (< – 20 °C / – 4 °F).

6.3 Inspection Categories

6.3.1 Inspection Category I

The Safety Clamp has to be observed during operation. Recognizing inadequate performance and apparent defects is the goal of this category.

Scope/Prerequisites/Procedure:

- Daily visual inspection of the Safety Clamp for damages and defects during operation. Repair them if necessary.
- Functional test.
- A person with appropriate expertise must carry out the test.

6.3.2 Inspection Category II

The inspection of category II includes all inspections of inspection category I and additional tests.

Scope/Prerequisites/Procedure:

- Checking the state of lubrication, the condition of the entire Safety Clamp (corrosion, lose or missing parts).
- A person with appropriate expertise must carry out the test.

6.3.3 Inspection Category III

The inspection of category III includes all inspections of inspection category II and additional tests.

Scope/Prerequisites/Procedure:

- Non-Destructive Testing (NDT) of selected critical areas and verification of all wear limits.
- Before carrying out an NDT test, remove all foreign material such as dirt, paint, lubricants, oil and abrasion from the affected parts. Use suitable methods such as pickling, steam cleaning and sandblasting.

6.3.4 Inspection Category IV

The inspection of category IV includes all inspections of inspection category III and additional tests.

Scope/Prerequisites/Procedure:

- Before carrying out an NDT test, remove all foreign material such as dirt, paint, lubricants, oil and abrasion from the affected parts. Use suitable methods such as pickling, steam cleaning and sandblasting.
- Nondestructive material testing (NDT) of all critical areas and replacement of selected consumables and pneumatic components [if applicable].

6.3.5 Inspection Intervals and inspection tasks

Pos.	Task	Daily	Weekly	Semiannually	Annually
1	Function test and ongoing observation.	✓	✓	✓	✓
2	Functionality of Feedback.	✓	✓	✓	✓
3	Checks for cracks and loose fittings/hoses.	✓	✓	✓	✓
4	Checks for signs of deformations and leakages.	✓	✓	✓	✓
5	Check for signs of wear and corrosion.	✓	✓	✓	✓
6	Check for no loose components and presence of all warning signs.	✗	✓	✓	✓
7	Check for state of lubrication and conservation.	✗	✓	✓	✓
8	Checking the condition of the overall structure and the interaction of all components and possible attachments with the Safety Clamp.	✗	✓	✓	✓
9	Checking wear limits (component measurement).	✗	✗	✓	✓
10	NDT tests of selected components (Safety Clamp is largely assembled).	✗	✗	✓	✓
11	Complete NDT test of all critical areas (Safety Clamp is completely disassembled).	✗	✗	✗	✓
12	Exchange of selected pneumatic components.	✗	✗	✗	✓
13	Replacement of wear-intensive components (recommended spare parts).	✗	✗	✗	✓

✓ Necessary ✗ Unnecessary

INFO

NDT Non-destructive testing

- Magnetic Particle Inspection (MPI)
- Ultrasonic Measurement Methods (UT)
- Eddy Current Testing (ET)
- Dye Penetrant Inspection (DPI)

6.3.6 Inspection Checklist

INFO

The following checklist serves as a copy template for inspections to be performed in compliance with API 7L. Performed inspections must always be documented and stored safely.

Ensure that only sufficiently qualified and trained personnel accomplish maintenance work.

Safety Clamp Model: _____

Serial number: _____

☐ **Inspection Category I**

Date / Place of Inspection:	Result OK	Result NOK	Name of Inspection Operator / Supervisor:	Sign:
	☐	☐		

Remarks:

☐ **Inspection Category II**

Date / Place of Inspection:	Result OK	Result NOK	Name of Inspection Operator / Supervisor:	Sign:
	☐	☐		

Remarks:

☐ **Inspection Category III**

Date / Place of Inspection:	Result OK	Result NOK	Name of Inspection Operator / Supervisor:	Sign:
	☐	☐		

Remarks:

☐ **Inspection Category IV**

Date / Place of Inspection:	Result OK	Result NOK	Name of Inspection Operator / Supervisor:	Sign:
	☐	☐		

Remarks:

6.4 Critical Areas

The whole Clamp is considered critical and must be checked accordingly, see previous pages.

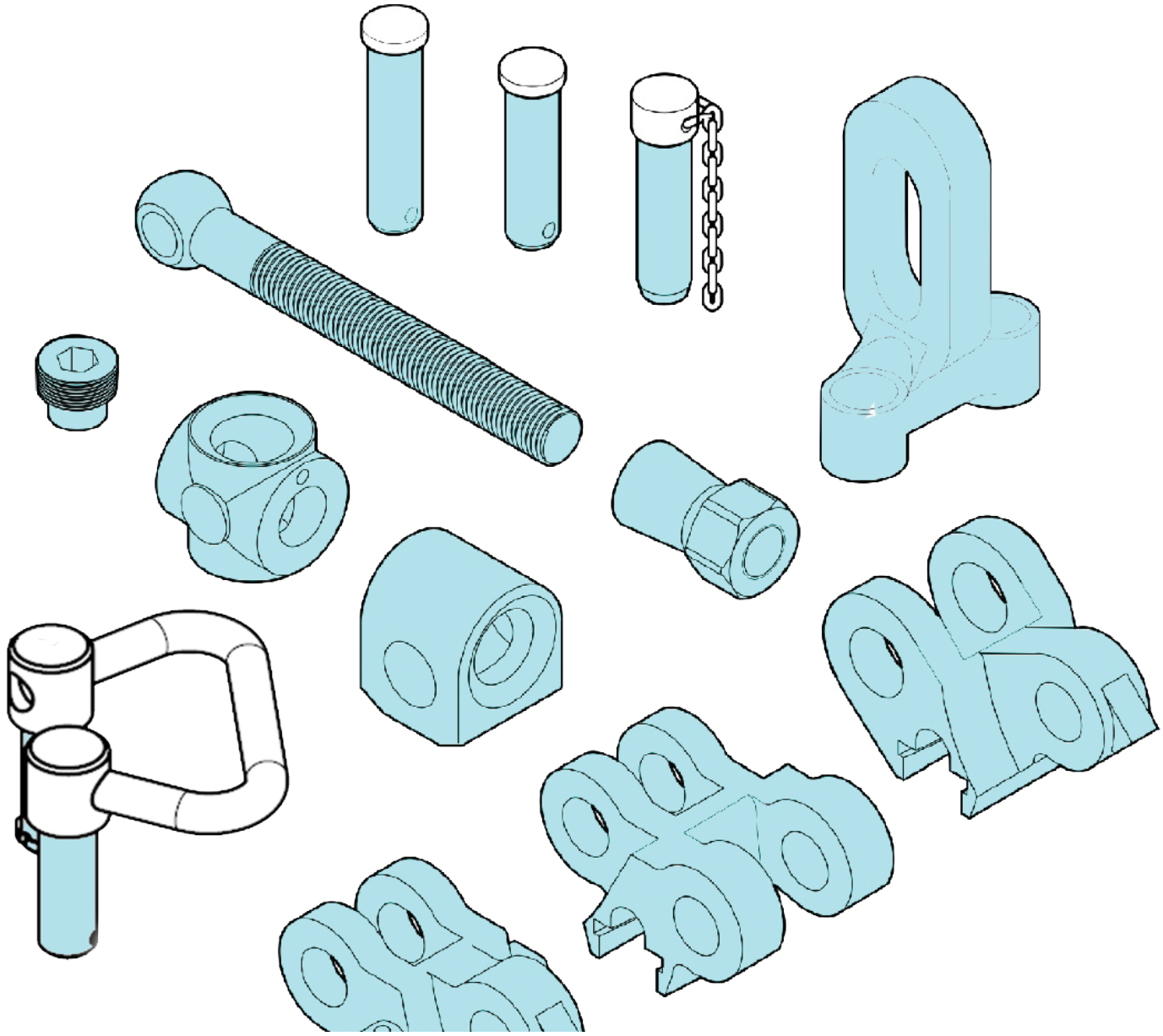

Fig. 47: Critical areas Safety Clamp parts

6.4.1 Wear data criteria

All repairs not performed by FORUM Handling Tools, should nevertheless be done in accordance with their methods and procedures or with their agents. Minor indications or cracks, which may be removed without reducing safety or operation of the Safety Clamp, can be removed by grinding (see critical areas).

Following the repair, the parts should again be inspected by an appropriate method to insure that the defect has been completely removed.

6.4.2 Examination methodology and acceptance of wear data criteria

All kind of repairs not performed by FORUM Handling Tools should nevertheless be done in accordance with their methods and procedures or with their agents. Minor cracks or defects in critical and non-critical areas, which may be removed without reducing safety or operation of the Equipment, can be removed by grinding and blending. However, grinding should not exceed 3/32-inch (2.4 mm) deep or 25% of the original material thickness on cast surfaces. Machined surface discontinuities or discontinuities beyond acceptable depths should be evaluated by FORUM Handling Tools or a FORUM authorized repair facility.

Following the repair, the parts should again be inspected by an appropriate method to insure that the defect has been completely removed.

METHODOLOGY per API

Subject the above identified critical areas to a 100% magnetic particle examination. Such an examination is only to be performed after the areas have been final heat treated and machined. Machined surfaces shall be examined by the wet fluorescent method; other surfaces shall be examined by the wet or dry method. Magnetic particle examinations are to be performed in accordance with ASTM E709. Non-ferromagnetic materials shall be examined by the liquid penetrant method in accordance with ASME BPVC, Section V, Subsection A, Article 6 and Subsection B, Article 24 or ASTM E165.

Examiners must be certified Level II (as a minimum) in accordance with the American Society of Nondestructive Testing ASNT-TC-1A.

Use the reference photographs described in ASTM E125 to evaluate identified discontinuities. These photographs contain actual discontinuities identified in accordance with ASTM E709 using a peak magnetizing current of 600 to 800 amps and a prod spacing of 4-inches to 6-inches.

⚠ **NOTE** The white discontinuities in the photographs are a result of painting the casting area with a slurry of lamp-black in kerosene, gasoline, or alcohol. The black line discontinuities are a result of applying red magnetic powder to the casting surface and photographing the magnetic particle discontinuities.

Each referenced photograph from ASTM E125 is identified with a number that corresponds to the severity degree identified in “Discontinuity Severity” Table. It is understood that it is impossible to rigidly interpret magnetic particle discontinuities on castings to a set of referenced photographs.

⚠ **NOTE** In any case which causes trouble interpreting the associated indication length please contact Forum for double check (refer to section X “Contact Worldwide” on page 11).

6.5 Wear Data

6.5.1 General

Item	Wear Data
Screw Nut	Replace if thread gaulding is present on the threads.
Springs Cotter Pins Pins	Replace if there are signs of wear and/ or fatigue.
Inserts	Replace if teeth are rounded, broken or missing.
Die Slots Pin Holes	Replace if there are signs of excessive wear. Do not use oversized pins and attempt to weld.

6.5.2 Link Pins

Type C	**Intermediate Link Pin P/N 96607 Handle Pin P/N 99617**	**End Link P/N 99610**
	in [mm]	in [mm]
Total Clearance "A"	0.047 [1.20]	0.055 [1.40]
Pin Ø (New-Min)	0.983 [24.96]	0.976 [24.80]
Pin Ø (Worn-Min)	0.976 [24.80]	0.970 [24.64]
Bore Ø (New-Max)	1.02 [25.90]	1.020 [25.90]
Bore Ø (Worn-Max)	1.034 [26.26]	1.031 [26.20]

Type CR, CL, CXL (SN > 215864)	**Intermediate Link Pin P/N 11-106 Handle Pin P/N 11-117**	**End Link P/N 11-110**
	in [mm]	in [mm]
Total Clearance "A"	0.040 [1.02]	0.040 [1.02]
Pin Ø (New-Min)	0.991 [25.17]	0.991 [25.17]
Pin Ø (Worn-Min)	0.986 [25.04]	0.986 [25.04]
Bore Ø (New-Max)	1.020 [25.91]	1.020 [25.91]
Bore Ø (Worn-Max)	1.031 [26.19]	1.031 [26.19]

Type CR, CL, CXL (SN < 215864)	**Intermediate Link Pin P/N 11-106 Handle Pin P/N 11-117**	**End Link P/N 11-110**
	in [mm]	in [mm]
Total Clearance "A"	0.040 [1.02]	0.046 [1.17]
Pin Ø (New-Min)	0.991 [25.17]	0.985 [25.02]
Pin Ø (Worn-Min)	0.986 [25.04]	0.980 [24.89]
Bore Ø (New-Max)	1.020 [25.91]	1.020 [25.91]
Bore Ø (Worn-Max)	1.031 [26.19]	1.031 [26.19]

Type T (SN > 215864)	**Intermediate Link Pin P/N 11-106 Handle Pin P/N 11-117**	**End Link P/N 11-110**
	in [mm]	in [mm]
Total Clearance "A"	0.040 [1.02]	0.040 [1.02]
Pin Ø (New-Min)	0.991 [25.17]	0.991 [25.17]
Pin Ø (Worn-Min)	0.986 [25.04]	0.986 [25.04]
Bore Ø (New-Max)	1.020 [25.91]	1.020 [25.91]
Bore Ø (Worn-Max)	1.031 [26.19]	1.031 [26.19]

INFO

- "Total clearance A" supersedes all worn dimensions for pins and bores.
- Wear Data does not apply to Type C and Type T handles (P/N: 12-116 and 11-116).
- Maximum Clearance "B" = 0.094" [2.387 mm] for all Safety Clamps Type C,T and A-MP.

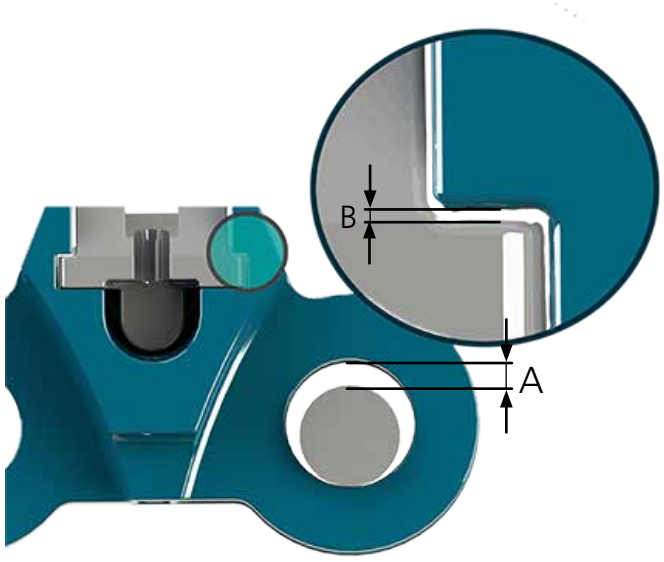

Fig. 48: Measurement wear data

Type T (SN < 215864)	Intermediate Link Pin P/N 11-106 Handle Pin P/N 11-117	End Link P/N 11-110
	in [mm]	in [mm]
Total Clearance "A"	0.046 [1.17]	0.046 [1.17]
Pin Ø (New-Min)	0.991 [25.17]	0.985 [25.02]
Pin Ø (Worn-Min)	0.986 [25.04]	0.980 [24.89]
Bore Ø (New-Max)	1.03 [26.16]	1.020 [25.91]
Bore Ø (Worn-Max)	1.037 [26.34]	1.031 [26.19]

Type A-MP (SN > 215864)	Intermediate Link Pin P/N 31-307 Handle Pin P/N 31-305	End Link P/N 31-307
	in [mm]	in [mm]
Total Clearance "A"	0.040 [1.02]	0.040 [1.02]
Pin Ø (New-Min)	0.870 [22.10]	0.870 [22.10]
Pin Ø (Worn-Min)	0.865 [21.97]	0.865 [21.97]
Bore Ø (New-Max)	0.888 [22.56]	0.888 [22.56]
Bore Ø (Worn-Max)	0.910 [23.11]	0.910 [23.11]

Type A-MP (SN < 215864)	Intermediate Link Pin P/N 31-307 End Link P/N 31-307	Handle Pin P/N 31-305
	in [mm]	in [mm]
Total Clearance "A"	0.046 [1.17]	0.070 [1.78]
Pin Ø (New-Min)	0.991 [25.17]	0.840 [21.34]
Pin Ø (Worn-Min)	0.986 [25.04]	0.835 [21.21]
Bore Ø (New-Max)	1.03 [26.16]	0.895 [22.73]
Bore Ø (Worn-Max)	1.037 [26.34]	0.910 [23.11]

6.5.3 Inserts

Type C - Insert P/N 99608	in [mm]
Total clearance "B"	0.094 [2.387]

INFO

- "Total clearance A" supersedes all worn dimensions for pins and bores.
- Wear Data does not apply to Type C and Type T handles (P/N: 12-116 and 11-116).
- Maximum Clearance "B" = 0.094" [2.387 mm] for all Safety Clamps Type C,T and A-MP.

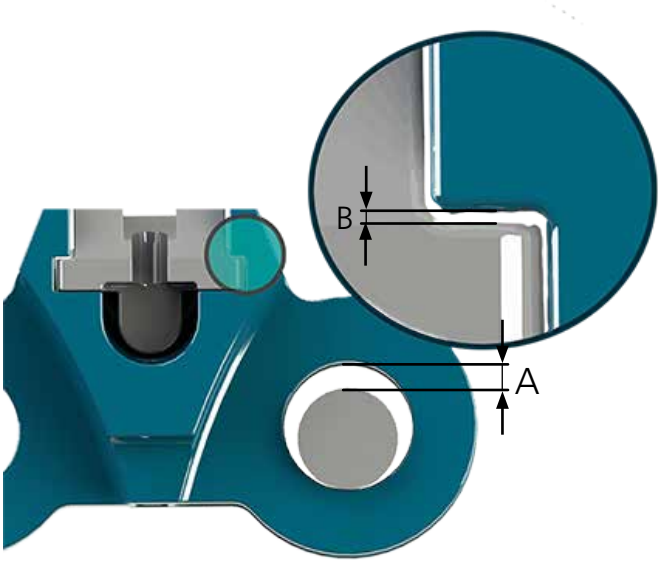

Fig. 49: Measurement wear data

6.6 Cleaning

⚠ WARNING

Health hazards from service products!

Splashes of diluted drilling mud and small parts.

Always wear your personal protective equipment.

WEAR EYE PROTECTION!

WEAR PROTECTIVE GLOVES!

The operating conditions and operating environment result in contamination on the Safety Clamp. Remove this contamination regularly to prevent incrustation and ensure safe operation of the equipment.

6.6.1 Time of Cleaning

Clean contamination from drilling from the Safety Clamp regularly. The equipment should be cleaned thoroughly at the end of each shift. Also observe the instructions in Chapter „6.3.5 Inspection Intervals and inspection tasks“.

6.6.2 Procedure and Cleaning Agents

FORUM Handling Tools recommends cleaning the Safety Clamp with a high pressure steam cleaner.

1. Clean the Safety Clamp thoroughly from inside and outside.
2. Lubricate the Safety Clamp as specified - refer to section 6.1 “Lubrication” on page 71.

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STORAGE / DISPOSAL

7 Storage / Disposal

7.1 Storage

Safe Storage

1. Ensure that the Safety Clamp is stored so that no one can be injured by moving parts or sharp edges.
2. Secure the Safety Clamp with tensioning cables or in another manner to prevent it from slipping or tipping when moved.
3. Store the Safety Clamp on a pallet located on an even, supporting surface. Observe the weight specifications in the technical data.
4. Protect the Safety Clamp against water penetration with a plastic tarp.
5. Remove the Pneumatic Assembly and store it separately.

Storage after Use

Lubrication	
	• Apply lubricant to all bare surfaces.
Protection of equipment	• Protect all other bare surfaces with Tectyl Type 864 or an equivalent agent.
Ambient Conditions	• Store in dry surroundings (maximum humidity 80%).

INFO

For more information on STORAGE feel free to contact FORUM Handling Tools Technical Support or refer to our Storage brochure with this **download link**.

Fig. 50: Correct Storage

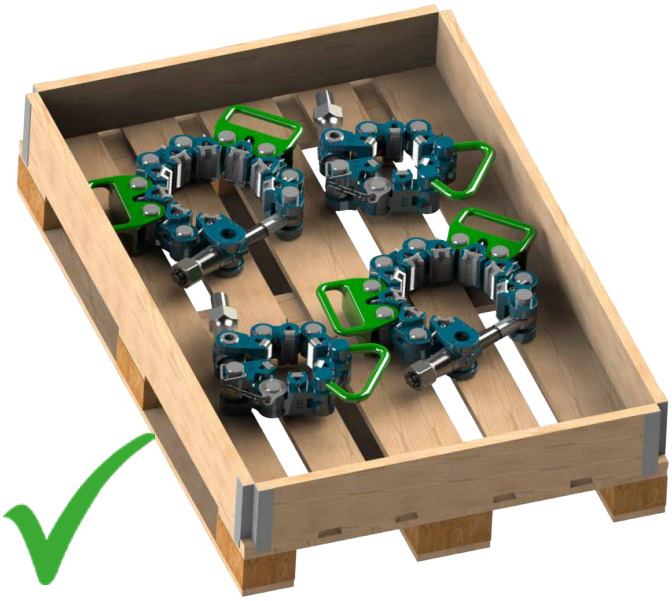

Fig. 51: Correct Storage (if storage box is not used)

Fig. 52: Incorrect Storage (if storage box is not used)

7.2 Disposal

When used properly the Safety Clamp does not pose any hazard for users or the environment.

However, operation of the Safety Clamp requires use of lubricants and cleaning agents, which can pollute the environment. For this reason always ensure that such substances are disposed of properly according to international, national and local regulations.

Never dispose oils, greases, oily cleaning rags or oily water together with industrial or domestic wastes.

Observe the safety data sheets published by the manufacturers on environmental hazards and disposal of the service and operating products used.

Ensure that all service and operating products as well as replacement parts are disposed of safely and ecologically.

Please note specifically that FORUM Handling Tools is not obligated to take back used equipment.

List of Service Products Used

The Safety Data Sheets on the service products used are included in the appendix to this OMM.

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APPENDIX

APPENDIX

8 Appendix

A. Sample of EC Declaration

FORUM B + V Oil Tools GmbH

EC-DECLARATION OF CONFORMITY

We, **FORUM B + V Oil Tools GmbH**
Hermann-Blohm-Strasse 2
20457 Hamburg / Germany

declare that the products: **Safety Clamps Clamp-C, Clamp-T**

which is the subject of this declaration, fulfils all of the relevant requirements of:

2006/42/EC	Machinery Directive
2014/34/EC	ATEX Directive of Equipment for use in hazardous areas

Amongst others following harmonized and technical standards and specifications were used:

API 7K, 6. Edition	Specification for Drilling and Well Servicing Equipment
ISO 14693	Petroleum and natural gas industries - Drilling and well-servicing equipment
DIN EN ISO 12100	Safety of machinery, Risk assessment and Risk Reduction
DIN EN ISO 80079-36	Non-electrical equipment for use in potentially explosive atmospheres

Description of Product:

The following named lifting accessory will be described in more detail in the accompanying Data Book and/or certificate and the associated Technical Documentation

Product / Device Type:	[refer to data book]
Rated Capacity:	[refer to data book]
Part Number:	[refer to data book]
Serial Number:	[refer to data book]
Delivery date:	[refer to data book]
Order No.:	[refer to data book]
Marking:	CE Ex II 2G T6

The Engineering Manager of FORUM B + V Oil Tools GmbH, Hermann-Blohm-Strasse 2, 20457 Hamburg, Germany, is authorized to compile the technical files. Documents in accordance to Directive 2014/34/EU Article 13 (1) b) ii) have been deposit at the notified body IBExU - Institut fur Sicherheitstechnik GmbH, Fuchsmühlenweg 7, D-09599 Freiberg, Notified Body No. 0637, reference IB-14-6-001/200, Archive-No. 219/14. FORUM B + V Oil Tools has established a quality assurance system in accordance to ISO 9001 and API 01 approved by API Quality Registrar, Washington D.C./USA, Registration No. 2850 + 01-2769.

Hamburg, issued on [refer to data book]

Authorized Representive Name Matthias Theiss
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Tax-No.: 46/722/02375, VAT-ID. No.: DE 294 745 990
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EUR-Acc.: IBAN: DE73 3003 0880 0012 8350 19
USD-Acc.: 401 / 2835 / 006 / IBAN: DE50 3003 0880 4012 8350 06
14.09.2017

Fig. 53: EC Certificate of Conformity Sample

B. Third Party Documents

I Safety Data-Sheet

Material Name	Link to file
[Aerosol] Krylon Paint Aerosols	
[Aerosol] Rust O Leum Paint Aerosols	
[Hydraulic Fluid] Aral Vitam GF 32	
[Hydraulic Fluid] Citgo AW 68	
[Hydraulic Fluid] Conoco Megaflow AW 32 68	
[Hydraulic Fluid] Shell Tellus S2 M 32	
[Hydraulic Fluid] Shell Tellus S2 M 68	
[Hydraulic Fluid] Shell Tellus S2 V 15	
[Hydraulic Fluid] Shell Tonna S2 M 68	
[Lubricant] Buster 2007	
[Lubricant] AVIATICON FETT XRF	
[Lubricant] KO5	
[Lubricant] Lubrimatic Multipurpose Lithium	
[Lubricant] MasterPro Hi Temp WB	
[Lubricant] Mobil CM L	
[Lubricant] Mystik JT 6 Multi purpose #2	
[Lubricant] Permatex 767 Anti Seize Lubricant	
[Lubricant] Shell Gadus S2 V220 2	
[Lubricant] Shell Stamina RLS 2	
[Lubricant] Sprayon LU 100 White Lithium	
[Lubricant] Super S Hi Temp Red	
[Lubricant] Thermaplex Hi Temp Bearings	

Material Name	Link to file
[Paint] Paint Gallon	
[Paint] Paint Marker	
[Paint] Paint Marking Ink	
[Paint] Ruthless Paint and Varnish Remover	
[Paint] Startex Paint Thinner	
[Paint] Uni Paint Markers	
[Safety adhesive] Loctite 242 Threadlocker	
[Safety adhesive] Loctite 262 (High Strength)	
[Safety adhesive] Loctite 515 Gasket Eliminator	
[Safety adhesive] Loctite Clover Compound	
[Safety adhesive] Loctite Silver Grade Anti Seize	

II Components

Component Name	Link to file
[Safety Washer] NordLock	
[Lifting] RUD VRS Starpoint	
[Lifting] RUD VLBG Load Ring	

Our goal is to become the leading provider of mission critical oilfield products and related services in terms of customer satisfaction, safety and financial performance.

Our experienced management team and employees are dedicated to solving our customers' problems. We invest in long term relationships and cooperate on product development with our clients, we consider them our partners.

OUR CORE VALUES

Integrity: In everything we do, in every interaction, both internally and externally, we strive to operate with the upmost integrity and mutual respect.

Customer focused: Our products enhance our customer's performance and we listen to their needs and work with them to solve their challenges.

Good place to work: We are committed to creating a workplace that fosters innovation, teamwork and pride. Every team member is integral to our success and is treated equally and fairly.

No one gets hurt: The safety of our employees and customers is our first priority coupled with a healthy respect for the environment.

FORUM™
ENERGY TECHNOLOGIES

FORUM Handling Tools

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