



Nemag user manual rope pear socket

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Liability

The terms for liability as specified in the general conditions of NEMAG B.V. shall apply, unless otherwise mentioned in this manual or agreed between NEMAG B.V. and the customer in writing.

Product warranty

Any warranties, expressed or implied, concerning the use of Rope Pear Sockets and Quick Release Links apply to new, unused products when tested in a standard testing machine under controlled conditions, in direct tension, and at a uniform rate of speed. The term "Breaking load" contains no implication of what load a Rope Pear Socket and Quick Release Link will withstand if not properly used, or if it suffers abuse. All equipment using Rope Pear Sockets and Quick Release Links must be properly maintained. Rope Pear Sockets and Quick Release Links must be properly stored, handled, used and maintained within the rules of user manual. Most importantly, Rope Pear Sockets and Quick Release Links must be regularly inspected before and during each use. Inspections must meet local or applicable national safety regulations. Damage, abuse, overloading or improper maintenance can cause failure and accidents. If in doubt about the safe and proper use of Rope Pear Sockets and Quick Release Links consult manufacturer.



1 General information

1.1 Purpose of the document

This manual gives the information that is necessary for safe use of the product. Read and understand this manual before you use the product.

1.2 Conventions

1.2.1 Language

The original text of the manual is written in US English. Any translation is a derivative of the original text.

1.2.2 Illustrations

The illustrations in the manual are a typical example of the delivered product. Essential differences in configuration between product types are indicated in the text.

1.2.3 Units

All data in this manual is given in accordance with metrical European units and standards.

1.3 Admonitions



DANGER

Indicates a hazard with a high level of risk which, if not avoided or if the instruction is executed incorrectly, will cause death, serious personal injury, or damage to the product.



WARNING

Indicates a hazard with a medium level of risk which, if not avoided or if the instruction is executed incorrectly, can cause death, serious personal injury, or damage to the product.



CAUTION

Indicates a hazard with a low level of risk which, if not avoided or if the instruction is executed incorrectly, can cause minor personal injury, or damage to the product.



NOTE

Indicates important information for correct use of the product.

1.4 Availability and storage

Keep this manual at a safe location for future reference. All manuals can be downloaded from our website. NEMAG B.V. can supply more copies on request.

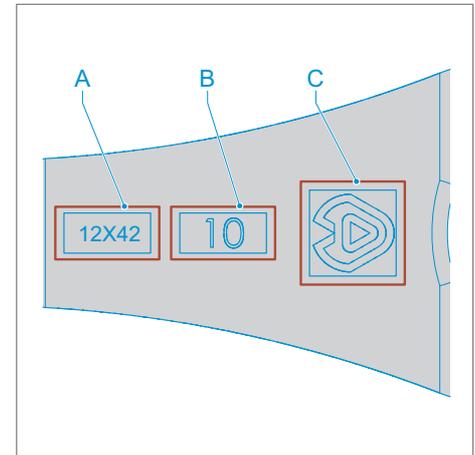
2 Safety information

2.1 Markings

The following information is given on the NEMAG Rope Pear Socket:

- A Batch code
- B Size
- C NEMAG logo

The figures for batch code and size in the illustration are an example.



2.2 Safety instructions

- Always obey the safety instructions in this manual and in the manual(s) of associated equipment that is used with the NEMAG Rope Pear Socket.
- The NEMAG Rope Pear Socket and any associated equipment must be used, maintained and stored in accordance with this manual, the manual(s) of the associated equipment, and the applicable local legislation.
- The NEMAG Rope Pear Socket must be inspected before and during each use, as described in this manual, and in accordance with the applicable local legislation.
- Do not subject the NEMAG Rope Pear Socket to temperatures that are higher than 350° C.
- Do not subject the NEMAG Rope Pear Socket to temperatures that are higher than 300° C for more than 100 hours.
- Do not use the NEMAG Rope Pear Socket if it has become highly magnetic.
- Do not install a steel wire rope with a diameter that differs from the specifications in section 3.1.
- Do not use the NEMAG Rope Pear Socket if the number of undergone load cycles is more than 250,000 loads at SWL.
- Do not use the NEMAG Rope Pear Socket if it has been overloaded by more than 200%.
- Do not use the NEMAG Rope Pear Socket if it is permanently deformed or seriously damaged.
- Do not weld or heat-treat the NEMAG Rope Pear Socket.
- Reject and destroy the NEMAG Rope Pear Socket if any of the conditions in chapter 7 occurs.

When you are in doubt about the safe and correct use of the NEMAG Rope Pear Socket, refer to NEMAG B.V.



3 Technical specifications



NOTE

The working load is maximally equal to 1/5th of the indicated minimum breaking load.



NOTE

The working load is the recommended maximum load for grabbing operations when NEMAG Quick Release Links and NEMAG Rope Pear Sockets pass over a wide 'U' cable sheave. For other applications, you must adhere to a safety factor that is in line with official local and international directives.

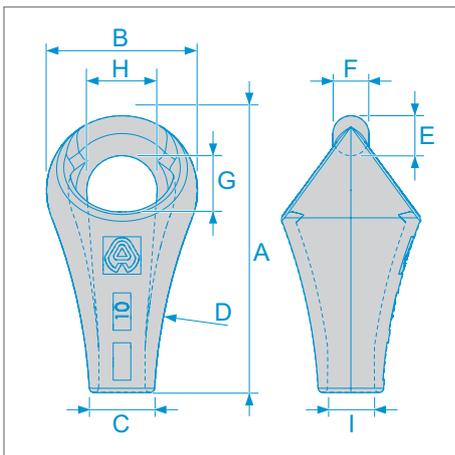


NOTE

The breaking strength of the NEMAG Rope Pear Socket is equal or higher than the breaking strength of the average applicable steel wire rope in that size of socket (based on the construction 6x36WS with steel core with a tensile strength of 1960 N/mm²).

For the NEMAG Rope Pear Socket type S, the breaking strength is related to special steel wire ropes with a smaller diameter that have a higher breaking load, like 8-strand wire ropes.

3.1 NEMAG Rope Pear Sockets



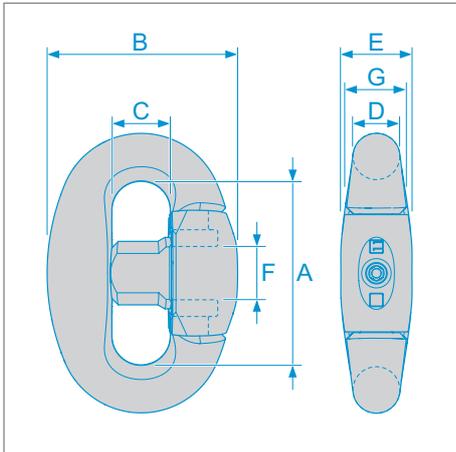
Pear size	Wire rope diam. (mm)	Working load (kg)	Breaking load (kg)	Dimensions (mm)									L (mm)	Weight (kg)
				A	B	C	D	E	F	G	H	I		
2	12-13	2,000	14,000	95	56	25	195	15.5	13.5	22	25	16	41	0.4
3	14-15	2,500	17,500	109	64	28	220	17.5	15.5	24	29	19	48	0.7
4	16-17	3,000	22,500	123	70	31	220	19.5	17.5	26	31	23	58	0.9
5	18-19	4,500	27,500	135	84	33	245	21	19	30	42	23	64	1.4
6	20-21	5,000	35,000	152	84	36	310	23	21	33	38	26	74	1.6
7	22-24	7,000	42,500	166	100	40	310	26	23	37	48	30	78	2.2
8	25-27	8,000	52,500	186	100	43	350	28	25	39	44	32	90	2.5
9	28-30	11,000	70,000	202	120	45	350	32	28	40	58	35	98	3.7
10	31-33	13,000	85,000	222	120	52	445	32	28.5	45	56	39	110	4.0
11	34-36	15,000	95,000	239	142	55	445	36	31.5	50	70	42	110	6.1
12	37-39	17,000	110,000	264	142	60	495	39	34.5	51	64	45	130	6.3
13	40-42	21,000	125,000	285	166	63	555	43	36.5	59	80	48	132	8.8
14	43-45	26,000	155,000	312	166	68	595	47	40	62	72	51	155	10.7
15	46-48	30,000	180,000	337	170	75	595	51	44	66	68	55	170	11.6
17	52-56	42,500	240,000	400	220	84	880	60	54	75	90	63	200	22.1



type S

Pear size	Wire rope diam. (mm)	Working load kg *	Breaking load kg	Dimensions (mm)									L (mm)	Weight (kg)
				A	B	C	D	E	F	G	H	I		
924	22-24	11,000	70,000	192	133	40	325	31	27	40	58	29	96	4.1
1026	25-27	13,000	85,000	212	143	43	375	35	30.5	43	60	32	108	5.0
1130	28-30	15,000	95,000	239	156	45	400	36	31.5	50	70	35	122	6.0
1232	31-33	17,000	110,000	249	165	52	425	39	34.5	57	72	38	118	8.2
1336	34-36	21,000	125,000	257	184	62	450	43	36.5	60	80	42	118	9.1
1440	37-40	26,000	155,000	297	192	60	475	47	40	62	80	46	142	11.8
3221	42-44	32,500	189,000	314	204	66	425	53	46	70	80	49	144	13.8
1548	46-48	30,000	180,000	329	192	67	575	51	44	66	80	57	157	12.4
1648	46-48	36,000	215,000	343	218	70	500	56	50	75	90	54	157	16.3

3.2 NEMAG Quick Release Links



Link size	Working load (kg)	Breaking load (kg)	Dimensions (mm)							Weight (kg)
			A	B	C	D	E	F	G	
4	3,000	25,000	76	76	24.5	19	30	21	25.2	1.0
5	4,500	33,000	84	84	27	21	32.5	23	28	1.3
6	5,000	37,500	92	92	29.5	23	35	25	30.3	1.6
7	7,000	49,000	100	100	32	25	38	28	32.8	2.0
8	8,000	54,000	108	108	34.5	27	40.5	31	35.3	2.6
9	9,500	60,000	116	116	37	29	43.5	34	38	3.0
10	12,000	75,000	128	128	40.5	32	48	37	41.6	4.2
11	15,000	95,000	140	140	44	35	53	40	45.8	5.5
12	17,000	110,000	152	152	47.5	38	57	43	49.6	7.1
13	21,000	135,000	164	164	51	41	61.5	46	53.4	9.1
14	26,000	160,000	176	173	54	44	66	50	58	10.8
15	30,000	175,000	188	188	58	47	70.5	52	61	13.7
17	42,500	260,000	222	222	68	56	84	62	71	22.8



NOTE

The force transmitting parts of the NEMAG Quick Release Link are made of material in accordance with the specifications laid down in standard EN 1677-1 Components for slings – Forged steel components – Grade 8.



3.3 Connection between NEMAG Rope Pear Sockets and NEMAG Quick Release Links

A NEMAG Rope Pear Socket can be connected with a NEMAG Quick Release Link of the same size, or to a NEMAG Quick Release Link of a different size as shown in the table below. The example below shows how you can find the correct size Quick Release Link and Rope Pear Socket. An additional safety factor can be included.

Given:

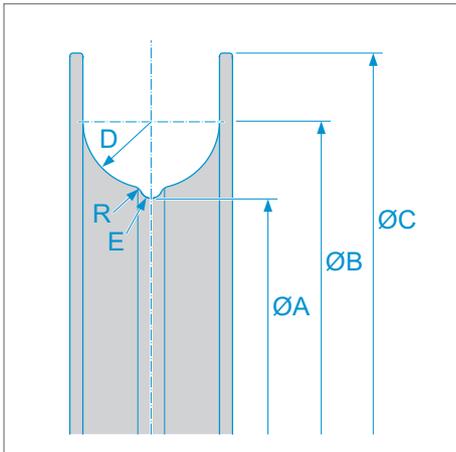
- Steel wire rope with a diameter of 26 mm
- Safe working load of the steel wire rope: 10,000 kg

1. According to section 3.1, select NEMAG Rope Pear Socket no. 1026
2. Then, according section 0 and the table below, NEMAG Quick Release Link no.10 is possible

		NEMAG Quick Release Link														
		size	4	5	6	7	8	9	10	11	12	13	14	15	17	
NEMAG Rope Pear Socket	2															
	3		■													
	4		■													
	5		■	■	■	■										
	6			■	■	■	■									
	7				■	■	■	■								
	8					■	■	■	■							
	9						■	■	■	■						
	10							■	■	■	■					
	11								■	■	■	■				
	12									■	■	■	■			
	13										■	■	■	■		
	14											■	■	■	■	
	15												■	■	■	
	17														■	
		type s														
		924					■	■	■							
	1026						■	■	■							
	1130							■	■	■						
	1232								■	■	■					
	1336									■	■	■				
	1440										■	■	■	■		
	3221												■	■		
	1548											■	■	■		
	1648													■	■	

Connection possible
 Connection not possible

3.4 Wide 'U' cable sheaves



Pear size	Wire rope diam. (mm)	Link sizes	Dimensions (mm)					
			A	B	C	D	E	R
4	16-17	4	560	694	750	60	9	7
5	18-19	4-5-6	630	788	850	70	10	9
6	20-21	5-6-7	710	880	960	75	11	12
7	22-24	6-7-8	710	890	970	80	12	10
924	22-24	8-9-10	710	890	970	80	12	10
8	25-27	7-8-9	800	984	1060	80	14	13
1026	25-27	9-10	800	984	1060	80	14	13
9	28-30	8-9-10	900	1116	1210	95	15	13
1130	28-30	10-11-12	900	1116	1210	95	15	13
10	31-33	9-10-11	1000	1240	1360	105	17	16
1232	31-33	11-12-13	1000	1240	1360	105	17	16
11	34-36	10-11-12	1000	1240	1360	105	19	14
1336	34-36	12-13-14	1000	1240	1360	105	19	14
12	37-39	11-12-13	1200	1450	1560	110	20	12
1440	37-40	13-14-15	1200	1450	1560	110	20	12
13	40-42	12-13-14	1200	1450	1560	110	21	12
3221	42-44	15	1200	1455	1560	110	23	16
14	43-45	13-14-15	1400	1655	1760	110	23	16
15	46-48	14-15	1600	1870	1960	110	25	25
1548	46-48	14-15	1400	1655	1760	110	25	16
1648	46-48	15-17	1400	1680	1760	122	25	16
17	52-56	17	1800	2085	2200	122	29	18



NOTE

Wide 'U' cable sheaves generally have the dimensions as shown in the table above. In case of different dimensions, refer to NEMAG B.V.



NOTE

Diameter C has been designed for a NEMAG Quick Release Link that is one size larger than the NEMAG Rope Pear Socket that is indicated in the table.

Radius E depends on the diameter of the applied steel wire rope.

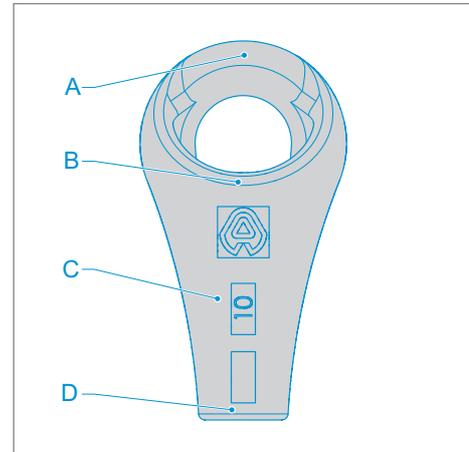
4 Description and function

4.1 Overview

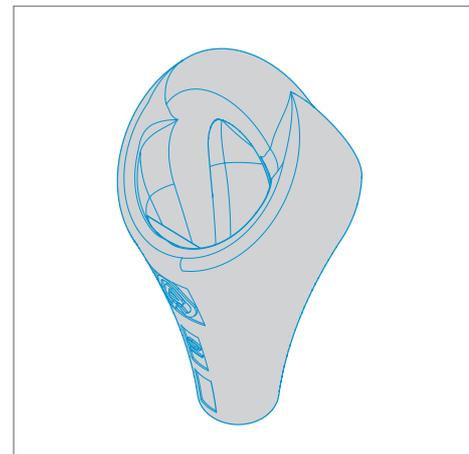
- A Bow
- B Level cam for casting material
- C Body
- D Outer end

NEMAG Rope Pear Sockets are cast from austenitic manganese steel, which combines a high toughness and a high resistance to wear. The NEMAG Rope Pear Socket generally lasts longer than the steel wire rope itself.

The figures for batch code and size in the illustration are an example.



The standard NEMAG Rope Pear Socket is designed for installation and use with common steel wire ropes.



The NEMAG Rope Pear Socket type S is especially designed for installation and use with high strength / compacted steel wire ropes.

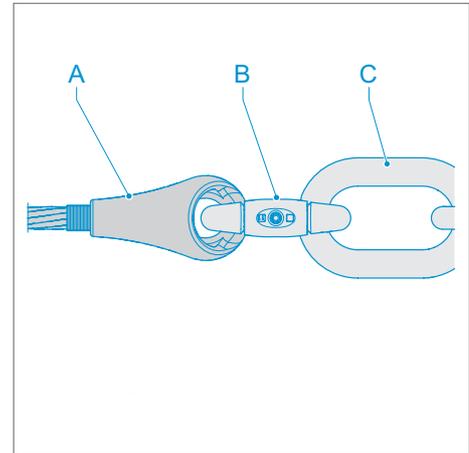


4.2 Intended use

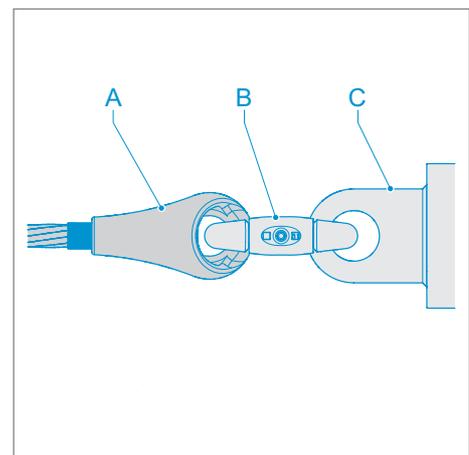
The NEMAG Rope Pear Socket is an end connection for steel wire ropes. The NEMAG Rope Pear Socket ensures a strong connection with other steel wire ropes, chains or appliances, especially in combination with the NEMAG Quick Release Link.

Typical applications of the NEMAG Rope Pear Socket are:

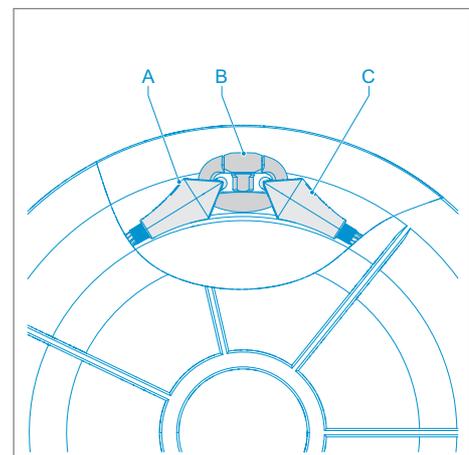
- Assembly of 1 outer end of a steel wire rope fitted with a NEMAG Rope Pear Socket (A) and 1 chain outer end (C), connected with a NEMAG Quick Release Link (B).



- Assembly of 1 outer end of a steel wire rope fitted with a NEMAG Rope Pear Socket (A) and 1 piece of equipment that is fitted with a fixed eye (C), connected with a NEMAG Quick Release Link (B).



- Assembly of 2 outer ends of steel wire ropes fitted with NEMAG Rope Pear Sockets (A, C), connected with a NEMAG Quick Release Link (B). This combination is suitable to pass over a special rope sheave, called a wide 'U' sheave.
See also section 0.



For other applications, refer to NEMAG B.V.

5 Installation

The NEMAG Rope Pear Socket can be fitted to the steel wire rope in 2 ways:

- with 2-component casting resin, or;
- with metallic casting mass.

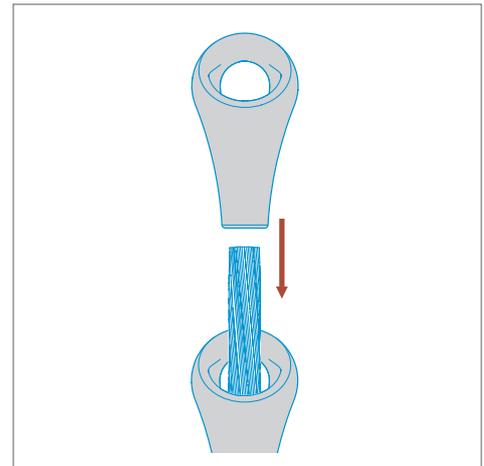
The general method for installation is the same for both casting materials. Refer to the table at the end of this procedure for the required volume of casting material.



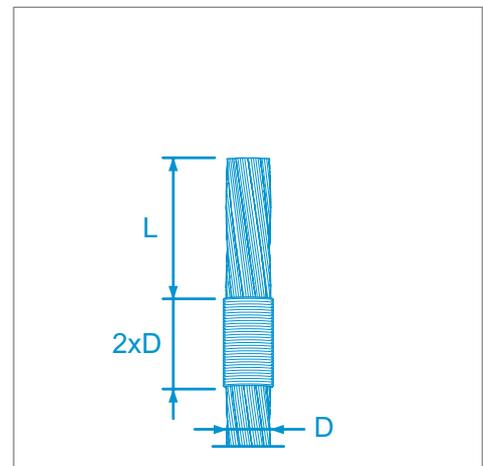
NOTE

Refer to the instructions that come with the casting material and to the supplier of the steel wire rope for specific information about the use of the casting material.

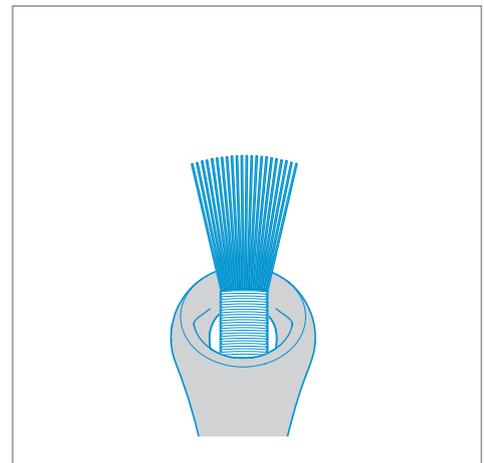
1. Make sure that the conical case inside the NEMAG Rope Pear socket is free of any paint and grease.
2. Place the NEMAG Rope Pear Socket over the steel wire rope.



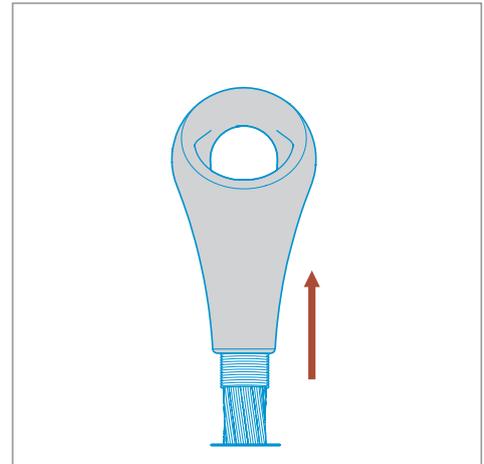
3. Carefully tie up the wire rope over a length of at least 2 times diameter (D) of the steel wire rope. Start at a distance (L) from the top of the steel wire rope. Distance L is to be found on next page table.



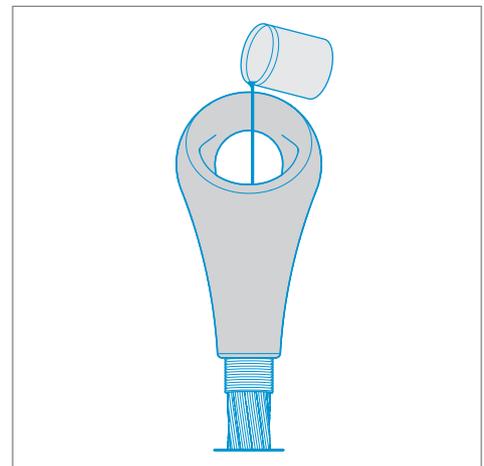
4. Untwine all strands so that the end of the steel wire rope looks like a broom.
5. Thoroughly clean the broom. Remove any grease with a (branded) degreaser or with an ultrasonic cleaning agent. Keep the broom in a downward position while you clean it to prevent that liquid comes into the steel wire rope. Let the cleaned end of the steel wire rope dry.



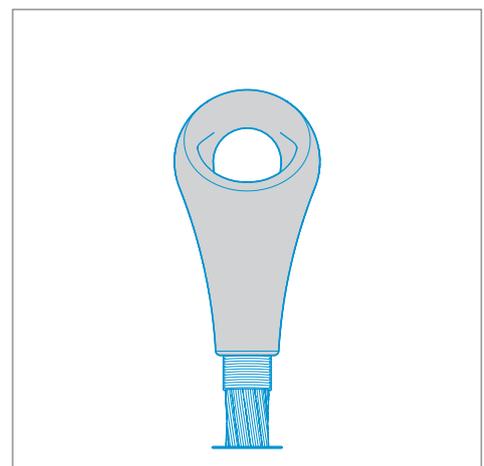
6. Slide the NEMAG Rope Pear Socket over the broom until the untwined strands almost reach the level cam for casting, inside the conical case. Then lock the steel wire rope and the NEMAG Rope Pear Socket in a vertical position. The steel wire rope must be perfectly in line with the body of the NEMAG Rope Pear Socket and hang straight over a length of 24 times the diameter of the steel wire rope.



7. If you use 2-component casting resin:
 - a. First pour a little bit of resin from above into the NEMAG Rope Pear Socket until some first resin leaks out of the underside of the body of the NEMAG Rope Pear Socket. This to make sure that the underside of the body is completely filled with resin.
 - b. Close the underside of the NEMAG Rope Pear Socket at the end of the wire rope with a flexible sealant. This prevents further leakage of casting resin.



8. If you use metallic casting mass: Close the underside of the NEMAG Rope Pear Socket before you pour in the casting mass.
9. Pour the resin or casting mass from above into the NEMAG Rope Pear Socket, up to the level cam. Also refer to the instructions that come with the casting material.





Rope Pear Socket

NEMAG Rope Pear Socket	Steel wire rope	L	Required volume of casting material
size	diameter (mm)	(mm)	cubic centimetre (cc)
4	16-17	58	70
5	18-19	64	85
6	20-21	74	125
7	22-24	78	150
8	25-27	90	175
9	28-30	98	195
10	31-33	110	200
11	34-36	110	400
12	37-39	130	400
13	40-42	132	700
14	43-45	155	700
15	46-48	170	700
17	52-56	200	1550

Rope Pear Socket type S

NEMAG Rope Pear Socket	Steel wire rope	L	Required volume of casting material
size	diameter (mm)	(mm)	cubic centimetre (cc)
924	22-24	96	205
1026	25-27	108	290
1130	28-30	122	340
1232	31-33	118	460
1336	34-36	118	700
1440	37-40	142	750
3221	42-44	144	800
1548	46-48	157	970
1648	46-48	157	1150



NOTE

The indicated volume of casting material for each size of the NEMAG Rope Pear Socket is an indication and is subject to change.

6 Maintenance

Carry out maintenance (lubrication, cleaning, inspection and tests, removing burrs) as described in this chapter and according to the applicable local legislation.

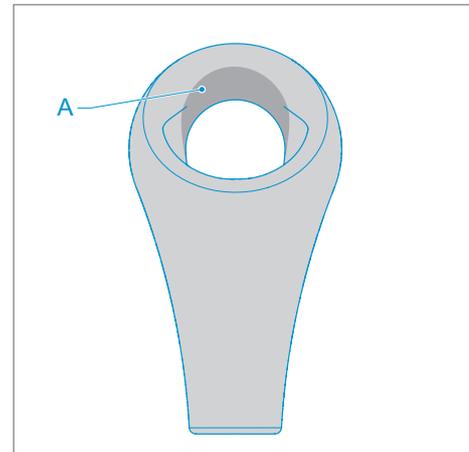
6.1 Lubrication

- Grease the contact areas (A). This extends the lifetime of both the NEMAG Quick Release Link and the NEMAG Rope Pear Socket.
- Use EP3 or EP4 grease (lubricant for high-pressure contact surfaces).
- Apply grease after every 24 hours of use.



NOTE

Do not grease the NEMAG Rope Pear Socket when it is used in an environment with large quantities of abrasive particles. For example during transshipment of alumina or other abrasive / dusty ores.



6.2 Cleaning

During use, particles that stimulate wear can become embedded in the lubricant. Therefore, regularly clean the bow of the NEMAG Rope Pear Socket.

6.3 Visual inspection

Visually examine the NEMAG Rope Pear Socket for defects after every 200 hours of use.

6.4 Removing sharp hard points and burrs

Grind off sharp hard points (so-called nitride pins) and burrs that can develop as a result of wear. The inside of the bow must be smooth and free of burrs. Polishing the contact surfaces will increase the lifetime of the NEMAG Rope Pear Socket. Any surface defects must not exceed the limits for dye penetrant inspection (DPI) as indicated in standard EN 1371-1 level 3.



6.5 Inspection interval and lifetime indication



The data in the tables below are indicative lifetimes, based on our experience and general applications. High dynamic forces in the application decreases the lifetime significantly. You must assess the application to determine the required inspection interval and lifetime. At new applications, additional inspection intervals must be applied in order to determine the lifetime for that application. The number of load cycles per grab cycle is affected by the average amount of trimming works and the crane system.

Refer to section 6.3 for the methods of inspection.

Refer to chapter 7 for the criteria of rejection.



Grab operation: normally 1 load cycle during a grab cycle.

Criterion: Number of cycles at Safe Work Load (SWL)	Grab operation	General purpose and container operation
Inspection after	125,000 cycles at SWL	125,000 cycles at SWL
Do not use after	250,000 cycles at SWL	250,000 cycles at SWL

Criterion: Hours of operation	Grab operation	General purpose and container operation
Inspection after	1250 hours of operation	2000 hours of operation
Do not use after	2500 hours of operation	4000 hours of operation

Criterion: Shifts of operation	Grab operation	General purpose and container operation
24 hours per day operation	Inspection after 3 months Do not use after 6 months	Inspection after 6 months Do not use after 12 months
16 hours per day operation	Inspection after 4.5 months Do not use after 9 months	Inspection after 12 months Do not use after 24 months
8 hours per day operation	Inspection after 6 months Do not use after 12 months	Inspection after 12 months Do not use after 24 months

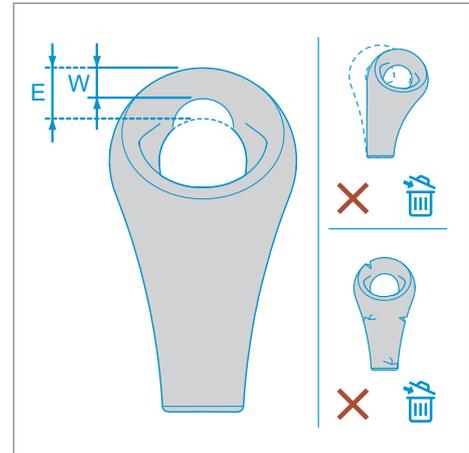
7 Rejection



WARNING

If any of the rejection criteria below are exceeded, the NEMAG Rope Pear Socket must be rejected and destroyed.

- Wear is more than 15% of the nominal dimension at any place.
- Dimension "W" must be \geq than 85% of the nominal dimension "E"
- Heating in excess of 350° C has taken place.
- Heating in excess of 300° C has taken place for more than 100 hours.
- Any form of welding work or heat treatment has taken place.
- Any permanent deformation or serious damage.
- Any cracks, or indication of cracks, in the material.
- The number of undergone load cycles is more than 250,000 loads at SWL.
- Overloading by more than 200% has taken place.
- The NEMAG Rope Pear Socket has become highly magnetic.





8 Transport and storage

8.1 Conservation for shipment

The NEMAG Rope Pear Socket has been conserved for shipment with a rust-proofing agent. Make sure that the NEMAG Rope Pear Socket does not make contact with substances that stimulate oxidation.

8.2 Storage

The minimum requirement for storage is protection against humidity. Check the conservation every 3 months if storage takes place in very humid conditions. If necessary, correct the conservation.