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Maintenance of End Stop Buffers

Program Number 0170/0180

1 General information

The central topics of the document are:

- Reasons for maintenance of the end stop buffers
- Safety rules

Product reference

The document is valid for:

Product name	Program number	Program name
End stop buffer	0170	Rubber end stop buffer
	0180	Cellular end stop buffer

Why maintain end stop buffers

Reasons for regular maintenance are:

- Warranty, that the end stop buffers work properly
- Confirmation that the end stop buffers contribute to maintaining operational security
- Warranty claims for end stop buffers are preserved

Which type of maintenance shall be used?

The system operator must submit the end stop buffers to a **visual inspection**.

When shorten the maintenance intervals?

Shortening the maintenance intervals is required in case of special events or conditions (e.g. aggressive environmental conditions).



Keep records of regular maintenance!

The plant engineer must keep records of regular **visual inspections** of the end stop buffers. The plant engineer must enclose these records and the existing maintenance instructions to the maintenance documents for the system and integrate them into the documentation.

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2 Safety rules

The well-known safety regulations and country-specific regulations apply.

The safety rules defined by the system operator apply for entering and working on systems.

Only qualified specialists are allowed to carry out maintenance works and test procedures on the end stop buffers.

Qualified specialists at least must have the following knowledge and capabilities:

Knowledge	Capabilities
Knowledge of the symbols, specifications, units, representation conventions used in technical drawings and product documentations and their meaning.	<ul style="list-style-type: none"> • Being able to understand and interpret technical drawings • Demonstrate technical skills in handling mobile machines and facilities
Knowledge and understanding of specific terms and particularities with reference to end stop buffers.	<ul style="list-style-type: none"> • Take part in appropriate training and read, understand and be able to find product documentations
Detailed knowledge of maintenance work required to carry out a visual inspection of end stop buffers.	<ul style="list-style-type: none"> • Professional skills of installation work on systems and machines, in particular crane systems



WARNING!

Danger of crushing between fixed and moving parts of the system!

→ Prior to starting maintenance, test or repair works at the end stop buffers, switch off the system using the main switch!



WARNING!

The system must be observed during the first operating hour!

→ Observe the system for unusual characteristics/signals during the first operating hour.



WARNING!

Do not expose end stop buffers to continuous load!

→ Do not use end stop buffers as contact point (in the compressed state) for repair and maintenance works

→ Do not use end stop buffers as climbing aids

→ Do not expose end stop buffers to other extreme lateral loads (not larger than technically approved)



CAUTION!

Prerequisites for the operation of the end stop buffers!

Only start the operation of end stop buffers if the system is in accordance with the general guidelines for crane systems.

→ Ensure that the system is in accordance with the general guidelines for crane systems.

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CAUTION!

Prerequisites for recommissioning the system!

- Finish all works
- Avoid any self-running of machines
- Pace off the system and inform the personnel
- Observe the specifications of the system manufacturer



CAUTION!

Do not use any solvent-containing detergents!



CAUTION!

For works at a height of more than 2 m use appropriate approved aids and protective equipment!

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3 Maintenance schedule

The **visual inspection** serves for the maintenance of the end stop buffers. Based on visually perceptible factors, maintenance works will be carried out and measures will be derived, if required.

3.1 Inspection interval

Prerequisites:

- Maintain the end stop buffer in the crane or the system at regular intervals.
- The inspection interval is 12 months under normal operating conditions.



Shortening the inspection interval is required for systems in exposed locations, higher temperatures, high humidity or critical environment (= galvanizing plants, compost and waste handling or chemical process plants).

3.2 Retaining device



Use rubber end stop buffers and cellular end stop buffers with integrated retaining device, if the installation height is > 3 m.

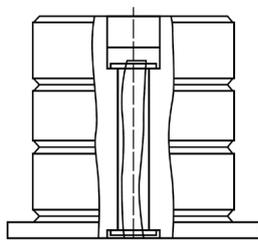


Fig. 1: Integrated rope safety device



All CXW end stop buffers are supplied with an integrated retaining device.

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End stop buffer diameter	Program number	Layout of the retaining device
up to 200 mm	0180 (cellular end stop buffer)	The base plates are made of glass fiber reinforced plastic and equipped with a foamed fastening element .
from 250 mm (optional at overall size 200 mm)	0180 (cellular end stop buffer)	The base plates are made of steel and with double priming. The integrated rope safety device of the cellular end stop buffer body is located in the area of the main axis (see Fig. 1).
All sizes	0170 (rubber end stop buffer)	The fastening element has been connected inseparably with the rubber end stop buffer body by vulcanization.



WARNING!

When using as safety components observe the regulations and risk assessment!

Observe the regulations for the final product and the risk assessment to be performed.

→ Recommended replacement interval: 5 years for safety-relevant applications



NOTE!

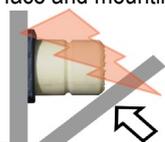
The integrated rope safety device prevents the end stop buffer from falling down if an error occurs. Causes for falling down can be a failure of the error seam, due to environmental conditions or other causes.

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3.3 Trouble shooting table

3.3.1 Trouble shooting table: General information

Visual observations	Description	Possible cause	Measure
Visual inspection: Condition and tight fit of the base plate and fastening elements			
Corrosion	Appearance of corrosion at the base plate or fastening element (screws, nuts, thread, bolts etc.).	Application or environmental cause	Observe, replace end stop buffer if required
Wrong transmission of force	Vertical force application to the end stop buffer surface (vertical/even counterpressure surface and mounting surface). 	Inadequate/wrong layout	Replace end stop buffer/ eliminate the cause
Wrong transmission of force	Unequal transmission of force on 2 end stop buffers mounted in parallel. 	Deterioration/deviation of the tracking accuracy (inaccurate/loose guidance)	Replace end stop buffer/ eliminate the cause

3.3.2 Trouble shooting table: Rubber end stop buffer (0170)

Visual observations	Description	Possible cause	Measure
Visual inspection: rubber end stop buffer			
Deformation	Plastic deformations, especially bulges and sink marks (deviation of the original rubber end stop buffer geometry). Reinforce cavity	Overload due to: 1. Insufficient layout 2. Improper application Insufficient dimensioning of the mounting or counterpressure plate	Replace rubber end stop buffer
Cracking	medium to large cracks (> 3 mm length) on rubber end stop buffer surface	Overload due to: 1. Insufficient layout 2. Improper application Symptoms of aging/environmental conditions	Replace rubber end stop buffer
Hardening	Internal crystallization of the rubber structure: Elasticity is lost. Harder structure as the original (cracking is the result).	Overload due to: 1. Insufficient layout 2. Improper application	Replace rubber end stop buffer

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Visual observations	Description	Possible cause	Measure
Visual inspection: rubber end stop buffer			
Discoloration	Whitish efflorescence due to diffusion of the rubber components at the rubber end stop buffer surface.	Symptoms of aging (usually uncritical)	Observation
Holes	medium to large holes (< 3 mm depth)	Overload due to: 1. Insufficient layout 2. Improper application	Replace rubber end stop buffer
		Symptoms of aging/environmental conditions	
		Penetration of pointed foreign substances	
		Insufficient dimensioning of the mounting or counterpressure plate	

3.3.3 Trouble shooting table: Cellular end stop buffer (0180)

Visual observations	Description	Possible cause	Measure
Visual inspection cellular end stop buffer			
Cracking	medium to large cracks (> 3 mm length) on the cellular end stop buffer surface	Overload due to: 1. insufficient layout 2. improper application	Replace cellular end stop buffer
		Symptoms of aging/environmental conditions	
Discoloration	Color changes from the original condition (white) to a brown surface color.	Symptoms of aging/environmental impact (normal material behavior)	No measures
Holes	medium to large holes (< 3 mm depth)	Overload due to: 1. insufficient layout 2. improper application	Replace cellular end stop buffer
		Symptoms of aging/environmental conditions	
		Penetration of pointed foreign substances	
		Insufficient dimensioning of the mounting or counterpressure plate	
Porous spots and velvety surface	Porous cellular end stop buffer surface, small cracks and changes of the surface quality.	Symptoms of aging/environmental impact	No measures

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Visual observations	Description	Possible cause	Measure
Visual inspection cellular end stop buffer			
Material breakout	Cellular end stop buffer form no longer complete, breakout spots and broken material.	Overload due to: 1. insufficient layout 2. improper application	Replace cellular end stop buffer
		Symptoms of aging	
		Insufficient dimensioning of the mounting or counterpressure plate	
Hydrolysis	Heat in connection with high humidity results in the decomposition/embrittlement of the cellular end stop buffer.	Environmental impact	Replace cellular end stop buffer
Microbes	Soil bacteria cause the destruction/rotting of the cellular body	Environmental impact	Replace cellular end stop buffer

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