Řetězárna a.s.®	**Medium tolerance chains for chain slings – Grade 10**	**according to PN 63-17 / PAS 1061**

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OPERATING, FITTING AND MAINTENANCE

1. INTRODUCTION

Welded chains for chain slings, Grade 10, are noted for their high quality, high utility value and long life. They are manufactured with utmost care and concern for operational safety.

These operating and maintenance instructions contain the most important information for users of our chains. Safe operation and long life of the chains are subject to compliance with these instructions. All operating personnel as well as personnel responsible for inspections and storage of the chains must be familiar with the instructions. If the chain is a part of another type of chain sling, installation must observe the instructions for the given chain sling.

These chains comply with PN 63-17, PAS 1061 and machinery according to Directive 2006/42/EC.

2. SELECTING A CHAIN FOR A CHAIN SLING

Chains are selected for specific chain slings according to their load-bearing capacity in the standard PN 63-17. The chain produced by Řetězárna a.s. can be combined with any elements of other manufacturers that meet the relevant EN standards, Directive 2006/42/EC and mechanical properties of the chain according to PN 63-17 and PAS 1061. It is forbidden to combine parts of different strength grades!

2.1. LOAD-BEARING CAPACITY

The maximum load-bearing capacity for which a chain can be used is defined in Table 1. The breaking strength shown in Table 1 is specified for a “black-black” chain without surface treatment. For surface finishes, the tear loading lower by 7% is allowed due to the reduced friction ratio.

Chain Chain size d x p mm	**Load-bearing capacity** WLL t	**Test load** MPF kN	**Breaking strength** BF kN
6 x 18	1.4	35.3	56.5
7 x 21	1.9	48.1	77.0
8 x 24	2.5	62.8	101
10 x 30	4	98.2	157
13 x 39	6.7	166	265
16 x 48	10	251	402

Table 1: Mechanical properties of chains

2.1.1. Use at various temperatures

The load-bearing capacity of the chain must be reduced when used at operating temperatures exceeding 300°C. If the chain is used within the permissible temperature range specified in Table 2, its load-bearing capacity is not reduced permanently when it returns to normal temperature. However, if the temperature of 380°C is exceeded, the chain must be put out of operation.

Ambient temperature °C	from -40 to +300°C	from -300 to 380°C	over 380°C
The load-bearing capacity is reduced to:	100%	60%	use inadmissible

Table 2: Temperature limits

2.1.2. Adverse conditions

Use in adverse conditions (chemical or abrasive environment) must be consulted with the manufacturer.

2.1.3. Additional surface treatment

The manufacturer is not responsible for any chain damage or for any change of its mechanical properties caused by additional surface treatment (such as coating with various materials, etc.) applied by the customer.
It is forbidden to have Grade 10 chains galvanized, hot-dip galvanized, phosphated, etc.
Mechanical properties are guaranteed only in the condition in which the chain was supplied to the customer.

2.2. MANUFACTURER'S CERTIFICATE

With every delivery, the customer receives a test certificate in accordance with the standard ČSN EN 10 204-3.1, containing the following information: manufacturer information, product identification, quantity, dimensions, results of required tests.

2.3. DESIGNATION

Each reel is labelled with the identification of the manufacturer, the “CE” mark, the chain diameter, the number of the production batch, the length of the chain and the number of pieces in the reel. Only chains of an identical length can be included in one reel.

The chains are marked with the Grade **10**, the manufacturer's mark  and the code for backtracking, all repeated on at least every 1 m of the chain.

3. CHAIN USE

3.1. GENERAL INSTRUCTIONS

The chains must be handled as machine elements. It is recommended not to drag chains along the ground and not to subject them to weather effects. It is forbidden to overload them and perform non-professional repair.

3.2. PERMISSIBLE LOAD (LOAD-BEARING CAPACITY)

Load-bearing capacities specified in the standard PN 63-17/PAS 1061 (see Table 1) apply for general chain use.
If the chain is used as a part of a machine, the load-bearing capacity must be specified by the manufacturer of the machine according to the Directive 2006/42/EC.
The chain must not be overloaded and it must not be subjected to impacts reducing its life.

3.3. CHAINS FOR CHAIN SLINGS

Grade 10 medium tolerance welded chain is used mostly in Grade 10 chain slings. Due to its size and design it is not suitable for use in hoists or conveyors.

It is forbidden to combine parts from different strength grades in one chain sling!
All parts of the chain sling (if it is assembled by the customer) must be properly certified.

3.4. CHAIN LIFE IN TERMS OF FATIGUE

The products are intended for up to 20,000 working cycles. If the number of load cycles is exceeded, the high dynamic load may damage the chain and it must be replaced.

If it is necessary to achieve a higher number of load cycles, it is possible to use larger nominal chain sizes or to reduce the permissible load.

4. MAINTENANCE

4.1. INSPECTION BEFORE FIRST USE

Before using the chain for the first time, make sure that you have the test certificate from the manufacturer and that the chain is a Grade 10 chain (see the designation on the chain, see Chapter 2.3).

4.2. STANDARD INSPECTION DURING OPERATION

Regularly inspect the chain integrated in a chain sling to reveal apparent damage, such as twisting, bending, elongation of links, etc.

4.3. INSPECTING THE TECHNICAL CONDITION OF CHAINS

During operation, chains are exposed to conditions that may affect their reliability and safety. It is therefore necessary to check their technical condition on a regular basis. The frequency of inspections should be determined by the owner according to the parameters of the operation in which the chain is used. Chain slings should be inspected by a responsible person at intervals not exceeding 12 months. It is recommended to perform a check every week or before every start-up of the hoist. If the chain is used as a part of a machine, the frequency of professional inspections must be specified by the manufacturer of the machine according to the parameters of the operation in which the chain is used.

Before a professional inspection, the chain must be cleaned of oil, dirt and rust. Any cleaning method is permissible as long as it does not damage the original metal. It is forbidden to burn the chain with open flame, dip it in acid or use a method which could cover any cracks or surface defects.

Then the whole length of the chain is inspected in adequate light. During inspections and professional inspections of link chains it is also necessary to check their designation and to search for any external defects of individual links, such as: change of shape, surface condition, degree of wear, change of link thickness and any cracks. Faulty chains must be put out of operation.

4.4. PUTTING CHAINS OUT OF OPERATION

A chain must be put out of operation in case of the following defects:

- Chain elongation (as a result of overloading), or insufficient play between the chain links
- Wear of chain links – Wear caused by foreign objects on the straight section of a chain link
  – Wear caused by mutual contact between the bends of links by more than 10% of the original cross-section
- Cuts, notches, cracks, deep corrosion, heat change in colour, bent or twisted links.

4.5. REPAIRS AND MODIFICATIONS OF CHAINS

Grade 10 welded chains may only be repaired by the manufacturer. It is not allowed to perform any additional surface treatment and additional heat treatment without consulting the manufacturer.
It is strictly forbidden to connect tested chains with wires or screws!

5. TRANSPORTATION AND STORAGE

The chains must be transported and stored in such a way as to exclude any negative weather effects and the presence of corrosive substances. Corrosive environment significantly reduces the life of a new chain.

The buyer shall check the chain after its takeover without undue delay and report immediately any apparent defects to the chain supplier. Later claims raised on the basis of apparent defects of the chain will not be accepted by the supplier.

In order to avoid atmospheric corrosion, the chain according to PN 63-17/PAS 1061 is only supplied powder coated.

When chain slings are not used, they should be stored in a suitable rack or on a shelf and protected from weather effects. It is inappropriate to leave them lying freely on the ground, as they could be damaged.

When chain slings are left on the crane hook, they should be hooked into the suspension eye, as to reduce their free swinging and to prevent them from getting caught on anything.

In the case of chains supplied in barrels, they shall be pulled out starting from the end marked with a tag and plastic sleeve, due to the way they are stored in the factory. It is the only free end of the chain; the ends of the other chains are only marked with a tag (without a plastic sleeve) and they are always fastened to the adjacent chain by wire. As a result, when pulling out the free end, the other chains are also unwound and pulled out subsequently.

6. CHAIN DISPOSAL

Worn and discarded chains are to be disposed of as normal metal waste at a waste collection facility (in accordance with Act no. 185/2001 Coll. on waste as “O” - Other).