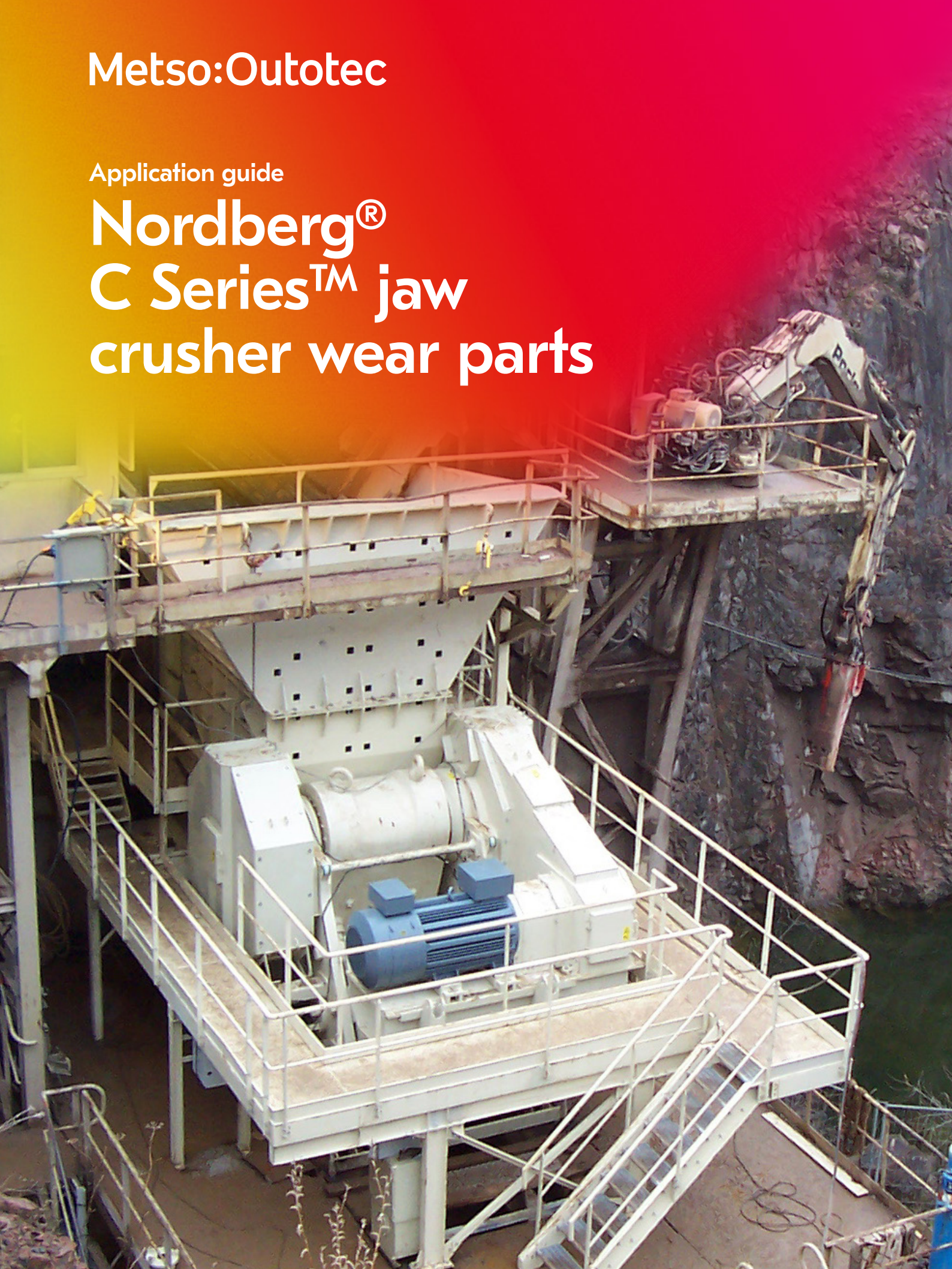
Metso:Outotec

Application guide

Nordberg® C Series™ jaw crusher wear parts



Maximize the potential of your jaw crusher

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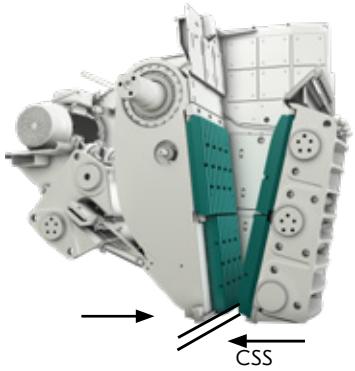
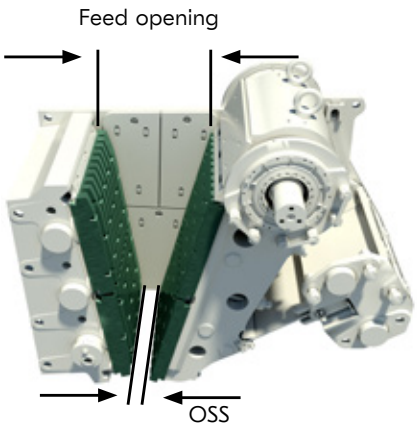
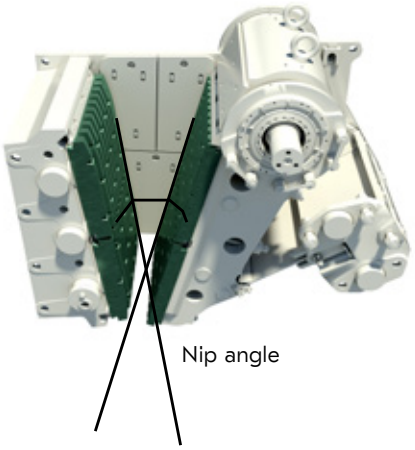
Nordberg® C Series™ jaw crusher







C Series™ jaw crusher basic concepts

The jaw crusher is a compression type crusher. Feed material is crushed between fixed and movable jaw dies. Large particles are crushed in a single layer, referred to as single-layer crushing. Smaller particles are crushed rock on rock, referred to as multi-layer crushing.

Feed opening

The feed opening (depth of the cavity) defines the maximum feed size of the crusher. In the C Series™ jaw crusher, the feed opening is measured from the top of the tooth of the fixed jaw to the bottom of the tooth of the movable jaw in a straight line perpendicular to the center line of the crushing cavity.

The maximum feed size is approximately 80% of the feed opening.

Open side setting (OSS)

The open side setting is measured when the crusher is at rest. The setting is measured either top to top, or bottom to top, depending on the tooth profile of the jaw dies.

Closed side setting (CSS)

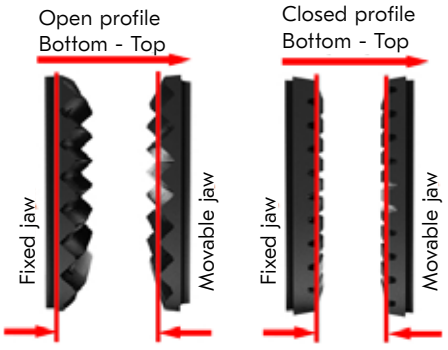
The closed side setting can be calculated by deducting the stroke from the OSS. CSS is the most important crusher parameter since it defines the maximum product size and has significant bearing on capacity, product gradation, power draw, and wear. Check the machine's instruction manual for the permitted minimum CSS.

Nip angle

The nip angle is the angle between the fixed and movable jaw dies. A nip angle that is too large reduces the capacity and increases the wear, as the feed material grinds and gouges the jaw dies in an upwards direction during the compressive stroke of the pitman.

	Feed opening depth		Cavity width	
	mm	in	mm	in
C80	510	20	800	32
C96	600	24	930	37
C100	760	30	1000	40
C106	700	28	1060	42
C116	800	32	1150	45
C3054	760	30	1380	54
C110	850	34	1100	44
C120	870	35	1200	48
C125	950	37	1250	49
C130	1000	39	1300	51
C140	1070	42	1400	55
C145	1100	43	1400	55
C150	1200	47	1400	55
C160	1200	47	1600	63
C200	1500	59	2000	79

Dimensions to be deducted from the OSS		
	mm	in
C80	24	1
C96	32	1 1/4
C100	32	1 1/4
C106	34	1 5/16
C116	37	1 1/2
C3054	32	1 1/4
C110	36	1 3/8
C120	37	1 1/2
C125	41	1 5/8
C130	41	1 5/8
C140	41	1 5/8
C145	41	1 5/8
C150	41	1 5/8
C160	41	1 5/8
C200	50	2




Nordberg C150

How to operate a C Series™ jaw crusher

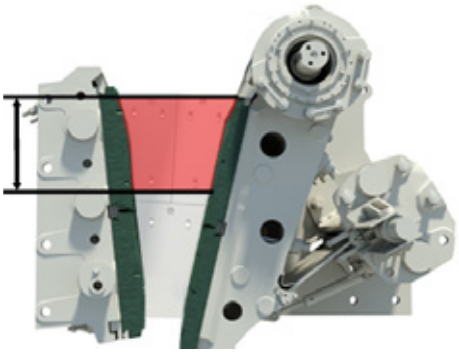
In order to reach optimum capacity and maximize the lifetime of wear parts, consider the following points:

1. Check the feed size

- Oversized feed material decreases capacity and can cause unnecessary loading on the crusher components.
- Small feed size increases wear at the bottom of the cavity and may cause poor utilization of wear parts.

2. Check the feed arrangement

- In order to reach optimum capacity and maximize on the life of the wear parts, the crusher cavity should be full.
- The feed must be distributed evenly across the crushing chamber.



3. Apply proper scalping

- Fines (material smaller then CSS) should be removed from the feed material. This is done by the grizzly bar section of the feeder. Fines in the jaw crusher increase the percentage of contact area against the jaw dies. This increases scratching and grinding and reduces life time.

4. Choose the correct jaw dies for the application

5. Check the wear profile of the jaws

- An uneven wear profile will decrease capacity, increase wear, and increase crushing forces.

Note: Feed material characteristics, such as gradation, bulk density, moisture, clay content and crushability, have significant impact on crusher capacity.


Lokotrack LT120

C Series™ jaw crusher wear parts

Due to the wide range of applications and feed material, many types of jaws are available for the C Series™ jaw crusher. Below you will find features and basic recommendations for selecting the wear parts.

Standard (XT710)

- Good in gravel and non abrasive rock
- Tooth spacing ideal for fines removal
- Power requirement and crushing stresses are in balance
- Less slabby product
- Reduced lifetime in abrasive application

Super grip (XT710)

- Good in gravel and non abrasive rock
- Tooth spacing ideal for fines removal
- Power requirement and crushing stresses are in balance
- Less slabby product
- Reduced lifetime in abrasive application

Quarry (XT710, MX*)

- Good in abrasive and/ or blasted rock
- Flat tooth profile maximizes lifetime (more surface area to crush with)
- More wearable Mn-steel than in standard jaws
- Higher stresses and power requirements
- Less space for fines to pass through (fines removal from feed material is important)
- Increase in slabby product

Superteeth (XT710)

- General use in gravel and blasted rock
- Tooth spacing ideal for fines removal
- More tooth contact surface area compared to standard profile
- More wearable Mn-steel than in standard jaws
- Power requirement and crushing stresses are in balance
- Less slabby product

Quarry + Super grip (XT710)

- Good in blasted rock, difficult natural rock and slippery rock
- Sharp tooth profile (good grip on the rock)
- Power requirement and crushing stresses are in balance
- Tooth spacing ideal for fines removal
- Can be used when scalping is not efficient
- Less slabby product

Anti-slab (XT710, MX*)

- Uneven tooth height (reduces slabs in feed material)
- Less slabby product

Quarry thick (XT710, MX*)

- Good in abrasive and/or blasted rock
- Fixed jaw die is 40 mm thicker than quarry jaw die (provides longer lifetime)
- Flat tooth profile maximizes lifetime (more surface area to crush with)
- More wearable Mn-steel than in standard jaws
- Higher stresses and power requirements
- Less space for fines to pass through (fines removal from feed material is important)
- Increase in slabby product

Quarry thick + Super grip (XT710)

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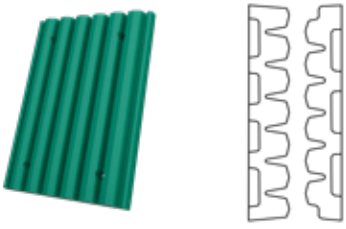


Coarse Corrugated Jaws

- Improved material flow due to more surface area for fines to flow
- Better wear life due to better fines removal and height of teeth, leading to improved process up-time
- Improved product quality due to less slabby material
- More production than regular jaw plate

Note: We have more tooth profiles and alloys available, please contact your Metso Outotec representative for more information

One- or two-piece jaws

Large C Series™ jaw crushers (C110™ and bigger) were originally designed for use with a two-piece jaw die, while the smaller jaw crushers used a one-piece jaw die design.

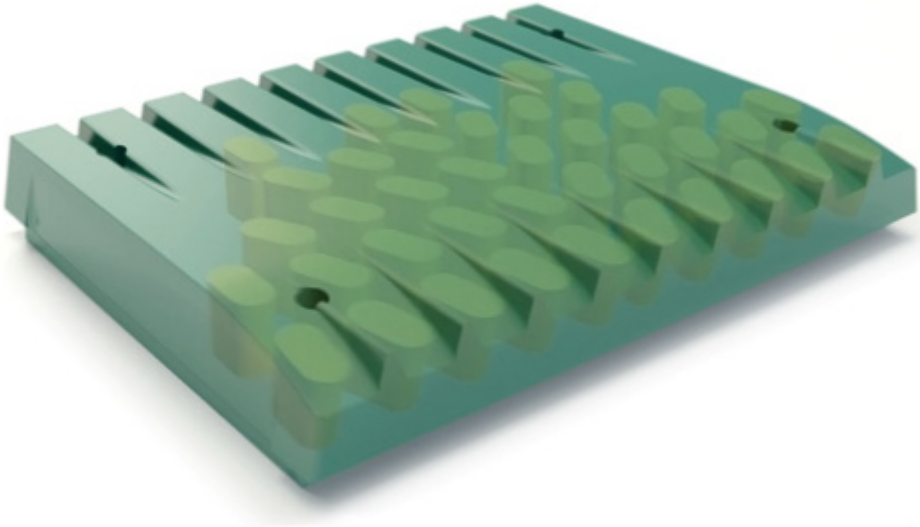
Benefits of one-piece jaw die design

- Faster jaw die replacement - less downtime
- Fewer parts - center wedges not required
- Easy to install - suitable for limited maintenance space, mobile applications

Benefits of two-piece jaw die design

- Longer lifetime expectation (when changed as recommended)
- Reduced scrap rate and cost/ton
- Standard lifting tool supplied with the crusher
- Good nip angle if jaws are rotated according to recommendations

Note: New lifting tool is required for one-piece jaws. Please contact your local Metso Outotec representative.



MX jaws

Metso Outotec MX jaws offer an outstanding wear life and are especially suitable for demanding and abrasive applications. The MX technology is invented and patented by Metso Outotec.

Double the wear life

The MX jaw is a hybrid product, in which the manganese steel acts as the matrix and the wear surface is covered by Metso Outotec's special wear-resistant material in the areas where it's needed. Its unique characteristics keep the optimal wear profile longer and make the jaw extremely wear resistant. It is possible to achieve double the wear life compared to manganese jaws, and sometimes even triple the wear life — depending on the application.

Improved safety

Long wear life means fewer liner change-outs and less maintenance work and, consequently, safer operations. Moreover, since Metso Outotec's MX jaws are designed to fit the crusher perfectly, they can be installed quickly and safely.

When to change jaw dies

Jaw dies need to be changed before they are worn through, in order to prevent damage to the crusher components.

In some crushers, like the C105™ and C3055™, the jaw die design on the ends is different. The locking wedges on these crushers are located behind the jaw dies rather than at the top of the jaw die. The jaw dies can be allowed to wear until the thickness is 60-65 mm thick or the teeth are worn flat.

On other crushers the ends of the jaw dies are much thinner. The wedge retention design where the locking wedges make contact is much thinner. This allows for the ends of the jaw die thickness to wear to 20-25 mm, or when the corrugations are worn flat. Jaw dies may need to be changed earlier than anticipated if wear profile is abnormal.

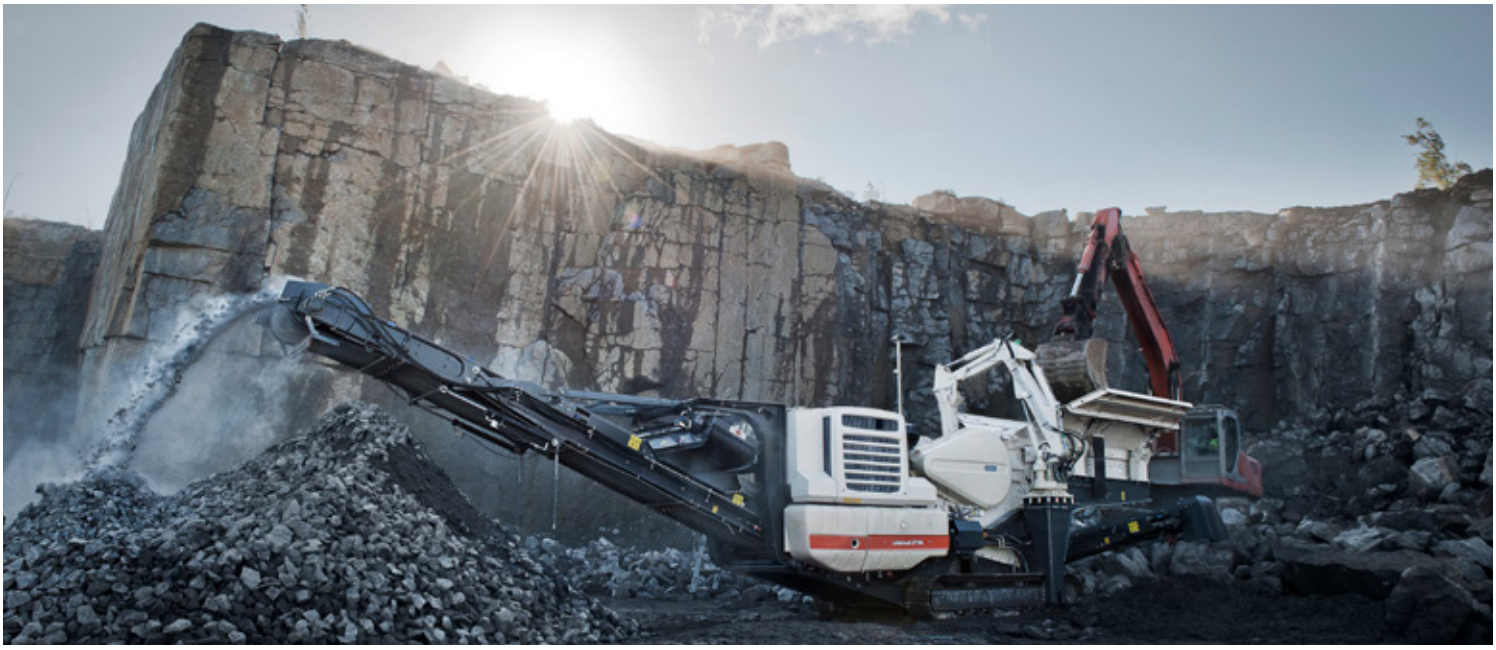
On single toggle jaw crushers, the fixed jaw die may wear at a faster rate. The table on the right shows the indicative lifetime of the wear components.

Jaws with locking wedges in the back can wear to a thickness of 60-65 mm until they must be changed.

Jaws with a wedge retention design can wear to a thickness of 20-25 mm until they must be changed.

Indicative lifetimes of wear parts. Usually the fixed jaw wears the fastest.

Note: See the instruction manual for more detailed information about when and how to change wear parts



How to change jaw dies

Jaw crusher wear parts need to be changed following the correct procedures to avoid risks.

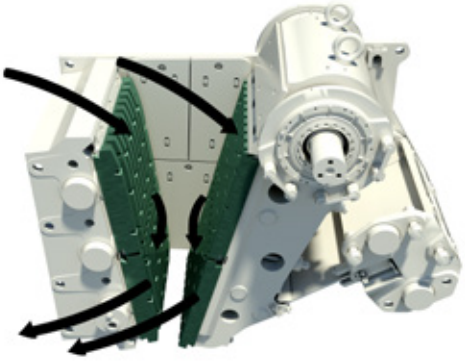
Two-piece jaw die rotation and replacement

- Worn out jaw dies are removed from the bottom of the crushing chamber.
- Work hardened upper jaw dies are installed at the bottom of the crushing chamber.
- New jaw dies are installed at the top of the crushing chamber.

One-piece jaw die rotation and replacement

- After a new jaw die installation, rotate the single-piece jaw dies when 30% of the tooth profile is worn.
- Rotate a second time when the tooth profile at the bottom of the jaw die is completely worn.

This procedure allows for good work hardening of the manganese jaw dies, and helps maintain the best nip angle for maximum throughput.



Note: Cupping may occur in the joint of movable jaws if the movable jaw is rotated when it is installed in the lower position. This may decrease the crusher's capacity and increase wearing on the fixed side.

Maintenance tools

Using the appropriate lifting tool for a specific wear part is crucial. When installing jaws, the Metso Outotec jaw crusher maintenance platform and the specially designed lifting tool can be used. These tools, designed exclusively for Metso Outotec jaws, improve working conditions by making it possible to carry out installations quickly and efficiently, without compromising safety.

Lifting tools

When the jaw die is being lifted, you need to make sure the lift is done correctly and safely. Metso Outotec supplies jaw plate lifting tool with the crusher. The jaw plate lifting tool has a locking mechanism that secures the tool to the jaw plate. Each end of the jaw plate has two lifting holes into which the tool is inserted, and locked. Because the jaw die lifting holes are in as-cast condition, a tolerance is applied to these holes. As long as the lifting holes are within the drawing tolerance, the lifting tool will properly engage and lock securely.

Once the lifting tool is inserted into the holes and locked properly and before the jaw plate is lifted, the tool should be moved back and forth to make sure it remains fully engaged, and does not show any sign of slipping out of the lifting holes.

The jaw plate hole inspection gauge was initially designed for Metso Outotec internal quality assurance purposes to check the lifting holes for the correct dimensional size. These gauges can also be purchased by Metso Outotec dealers, distributors and customers.

Lifting tool

Maintenance platform

The Nordberg® C Series™ maintenance platform is available for one- and two-piece jaw die set-ups. Its lightweight aluminum design with easy adjustability makes it easy to handle and improves working ergonomics as well as safety.

Maintenance platform

Complementary products

Intermediate plate

An intermediate plate can be used when the feed capacity is low (empty cavity), the feed size is small or the feed is slippery.

- Increases the length of the crushing area in case of empty cavity or small feed size, providing a better wear profile and a longer lifetime
- Improves the nip angle, providing better grip of the material in case the feed material is slippery
- Restrictions are decreased feed opening and maximum setting. These are reduced by the thickness of the intermediate plate. Crushing forces can be higher when using an intermediate plate.

Protection plate for pitman and front casting

Protection plates protect surfaces between the jaw dies on the pitman and front-end casting, especially when the material hardness and toughness is a concern, or when crushing at the minimum setting.

Protection plates are suitable for all applications and are delivered as standard equipment on large Nordberg® C Series™ jaw crushers (excluding the C125™). Protection plates can also be purchased for other size crushers as an option.

Fatboy cheek plates

A new cheek plate design with a new material (high alloy austenite). Based on field tests on abrasive applications, provides 1.5–2.5 times longer lifetime compared to standard AR cheek plate and thus reduces maintenance costs and time.

Metso Outotec is a frontrunner in sustainable technologies, end-to-end solutions and services for the aggregates, minerals processing and metals refining industries globally. By improving our customers' energy and water efficiency, increasing their productivity, and reducing environmental risks with our product and process expertise, we are the **partner for positive change.**

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