Nordberg C series jaw crushers
Wear parts application guide
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**

Feed opening (depth of the cavity) defines the maximum feed size of the crusher. In the C 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.

### Dimensions to be deducted from the OSS

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**Nip angle**

The nip angle is the angle between the fixed and movable jaw dies. Too large a nip angle 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.
How to operate a C jaw crusher

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

1. **Check the feed size**
   - Oversize feed material decreases capacity and can cause unnecessary stresses to 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 than 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 lifetime.

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.
C jaw crusher wear parts

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

<table>
<thead>
<tr>
<th>Blasted rock</th>
<th>Standard</th>
<th>Super grip</th>
<th>Quarry</th>
<th>Superteeth</th>
<th>Quarry thick</th>
<th>Quarry + super grip</th>
<th>Quarry thick + super grip</th>
<th>Anti-slab</th>
<th>Recycling</th>
<th>Wavy like</th>
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* Can be used | ** Good choice | *** Recommended

Definitions for different rock types are presented in Wear and materials application guide, page 4.

* More cavities under development, ask for tailored solution options from your local Metso representative.
**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, XT810)**
- 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

**Supertooth (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 thick (XT710, XT810)**
- 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, XT810)**
- 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

**Quarry + Super grip (XT710, XT810)**
- 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)**
- Uneven tooth height (reduces slabs in feed material)
- Less slabby product

**Recycling (XT710)**
- Ideal for concrete, brick etc., demolition waste
- Wear and crushing forces in good balance
- Tooth spacing ideal for fines removal

**Wavy like (XT710)**
- Suitable for asphalt crushing
- Wide grooves (material flows easily through the cavity)
One or two piece jaw

Large C jaws (C110 and bigger) were originally designed to use a 2 piece jaw die design, while the smaller jaw crushers used a 1 piece jaw die design. A 1 piece jaw design is now also designed for large crushers (C110, C120, C125, C140, and C160).

Benefits of 1 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 2 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 1 piece jaws. Please contact your local Metso representative.

**EXISTING PROFILES**

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<th></th>
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*More cavities under development.*
When to change jaw dies
Change the jaw dies before they are worn through, in order to avoid damage to the crusher components (See instruction manual).

In crushers like 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. Jaw dies can be allowed to wear until the thickness is 60 to 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 to 25 mm, or when the corrugations are worn flat.

Jaw dies may need to be changed earlier than anticipated, if wear profile is distorted.

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

How to change jaw dies

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.

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

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 will allow for good work hardening of the manganese jaw dies, and 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.
Accessories

Intermediate plate
An intermediate plate can be used when feed capacity is low (empty cavity), feed size is small or feed is slippery.
• Increases length of crushing area in case of empty cavity or small feed size -- better wear profile and longer lifetime
• Improves nip angle providing better grip of 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 C jaw crushers (except for C125). Protection plates can also be purchased for other size crushers as an option.
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