







MOBICONE MCO 90i EVO2 | HIGHLIGHTS

# THE HIGHLIGHTS

Perfectly equipped.



- > Very good accessibility and a high level of safety
- > Simple transport thanks to hydraulic foldings and reduced transport height

### 01 Feeding unit

> Simple sliding mechanism for fast set-up and transport, easy adaptation of the material discharge pattern into the crusher

### 02 CFS (Continuous Feed System)

> Innovative feed control with CFS (Continuous Feed System) guarantees optimum material flow

#### 03 Crusher unit

> Cone crusher with large stroke for maximum crushing capacity

#### 04 Overload systems

> Effective overload systems protect the crusher

### 05 Drive

> Efficient and powerful diesel direct drive

### 06 Operating concept

- > SPECTIVE intuitive operating concept
- > With SPECTIVE CONNECT, important information is available directly on your smartphone

#### 07 Post screening unit

> Single-deck vibrating screen with optimized surface utilization



MOBICONE MCO 90i EVO2 | **FEEDING UNIT** 

# **WELL THOUGHT-OUT FEEDING UNIT**

For short set-up times and optimum loading.





up to 298 US t/h
Feed capacity

approx. 8.6 yd<sup>3</sup>
Hopper volume

approx. 10.9 yd<sup>3</sup>
Hopper volume with hopper extension



#### The MOBICONE MCO 90i EVO2's feeding unit is compact and equipped with a simple sliding mechanism.

With the sliding mechanism, the MCO 90i EVO2 features compact transport dimensions without requiring component disassembly enabling fast set-up and easy transport. The sliding mechanism makes it possible to adapt the material discharge pattern into the crusher. The crusher can therefore be ideally loaded.

To protect the crusher from metallic material, a metal detector is installed in the standard version of the feeding unit. A magnetic remover is also available - an effective measure for increasing operational safety and reducing downtimes.

The bolted relief beam with exchangeable wear elements supports and protects the material to be conveyed, and ensures an even distribution of the feed material.

To ensure a long service life, the hopper is a bolted construction made of robust wear-resistant steel. A steep hopper rear wall prevents caking in the feed area. The optional hopper extension increases the hopper volume and remains on the machine during transport. Rear-side loading by a wheel loader can be carried out conveniently via the hydraulically foldable hopper filling aid.

#### **KLEEMANN > PROCESS KNOWLEDGE**

High cost-effectiveness and top product quality require homogeneous loading of the cone crusher. How the material is loaded is decisive: to guarantee even distribution of the material, rear-side loading by a wheel loader should be carried out. This can be performed comfortably with the hydraulically foldable hopper filling aid.

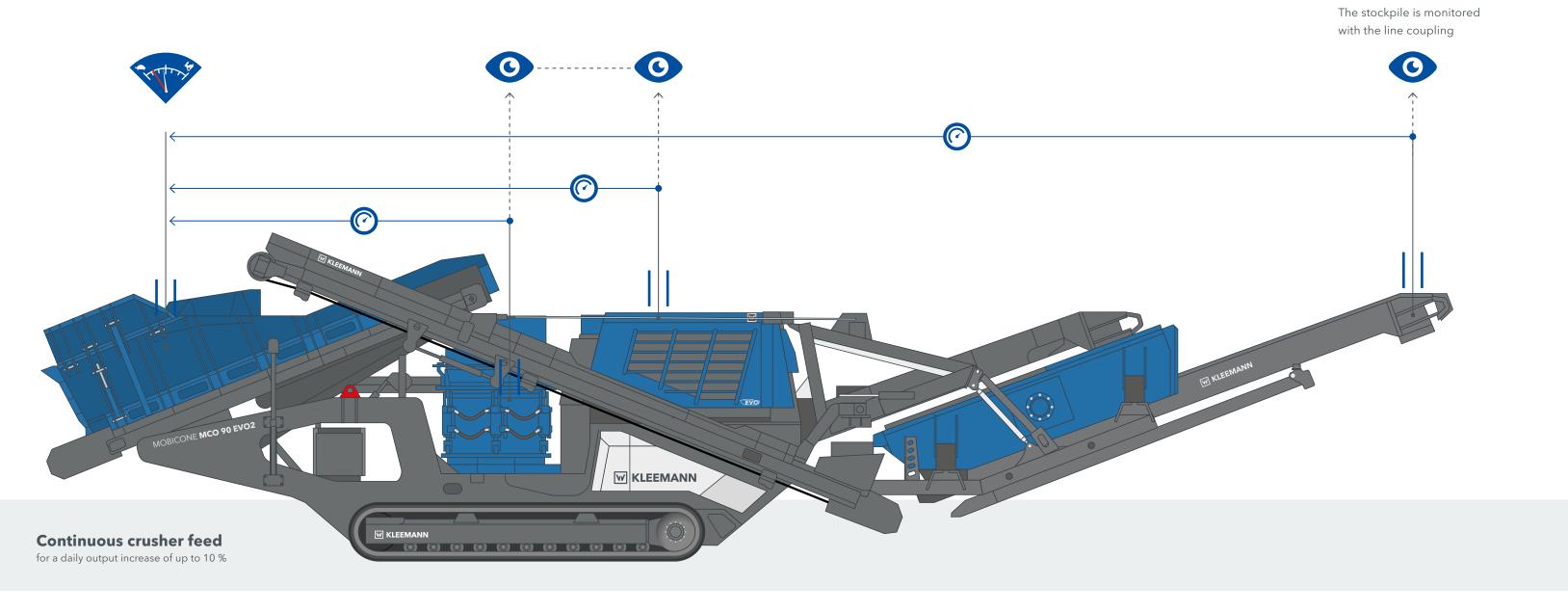
The material not only distributes itself evenly before it reaches the crusher, it also forms a material layer that acts as natural wear protection.



MOBICONE MCO 90i EVO2 | CFS

# **CONTINUOUS FEED SYSTEM (CFS)**

For a continuous crusher feed.



#### Uniform loading is indispensable to achieve a good product, optimum throughput and low wear.

To ensure that the crushing chamber is always filled evenly and optimally, the Continuous Feed System (CFS) monitors the crusher level, the utilization at the crusher drive, the speed of the crusher and the stockpile probe at the crusher discharge conveyor or the fine grain conveyor. Depending on the fill level

of the crusher, the frequency-controlled adjustment of the output of the feeding conveyor is carried out. The CFS facilitates the operator's work as the machine automatically regulates a homogeneous material flow, therefore ensuring optimum loading of the crusher.

#### **KLEEMANN >** PROCESS KNOWLEDGE

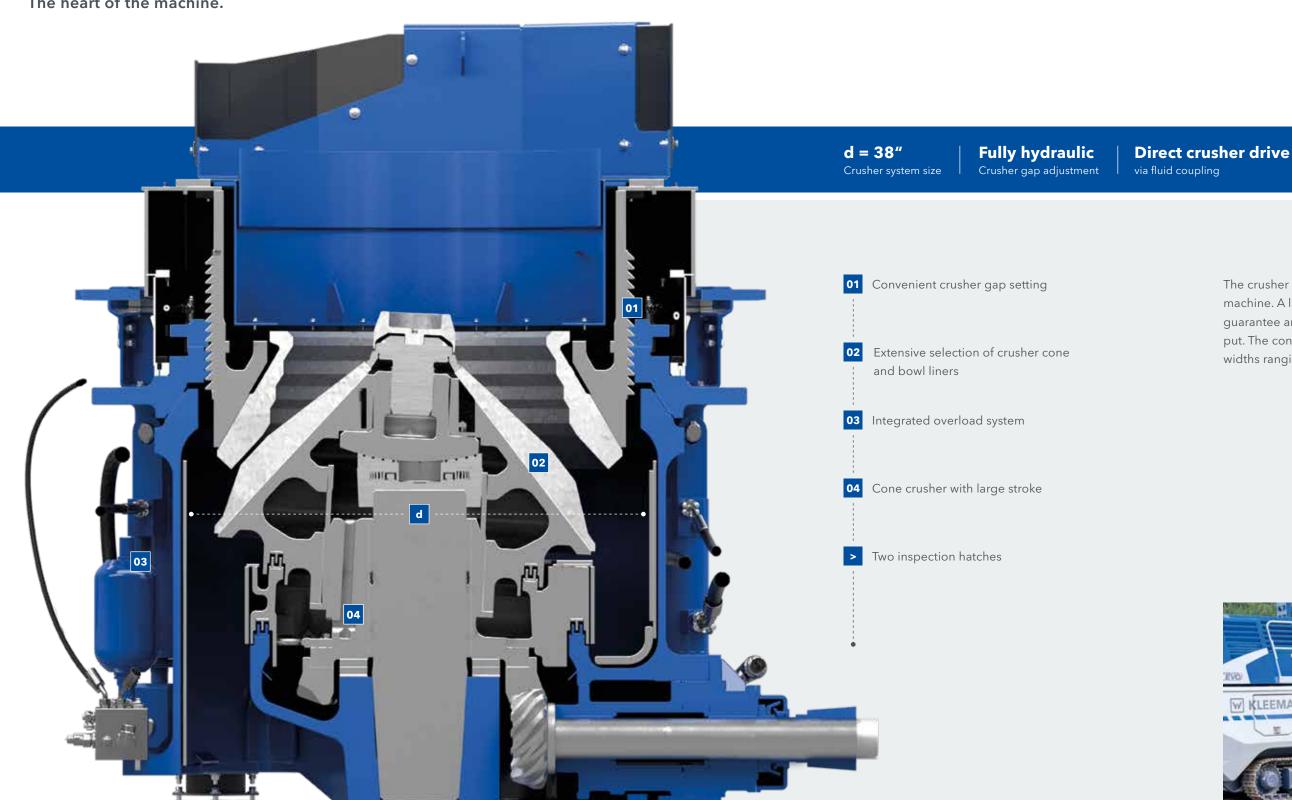
The CFS regulates the feeding unit's belt speed in good time to achieve an ideal crusher fill level. The CFS learns continuously at the same time and can therefore optimize its performance.

**Result:** a high-quality final product with a high throughput and low wear.

MOBICONE MCO 90i EVO2 | CRUSHER UNIT

# **POWERFUL CRUSHER UNIT**

The heart of the machine.



The crusher unit of the MCO 90i EVO2 is the centrepiece of the machine. A large stroke and the three-arm crusher structure guarantee an impressive crushing capacity and high throughput. The cone crusher, with its various crushing tools, covers gap widths ranging from 3/16"-1 3/4".



MOBICONE MCO 90; EVO2 | CRUSHER UNIT

The MOBICONE MCO 90i EVO2 mobile cone crusher has a high, constant crusher drive power of up to 248 hp and a maximum of up to 355 hp. A continuous crushing process and higher production volume in special applications is therefore possible. Thanks to a short heating-up phase of the lube oil, the plant is

quickly ready for operation. Changes are also very easy and take place entirely without sealing compound. The cone crusher, with its various crushing tools, covers gap widths ranging from 3/16"-1 3/4". Further conversion tasks on the crusher are not required for this wide spectrum of applications.



#### Cone crusher with large stroke

The MCO 90i EVO2 crusher unit features a three-arm design and a large stroke for high crushing capacities. Thanks to its stable design and high crusher drive power, a high reduction ratio is possible.

**Result:** high throughput combined with top reliability

#### Gap setting

To make adaptations to the desired final grain size or to compensate for wear, a simple gap setting is indispensable. The adjustment of the crushing gap can be carried out conveniently via the touch panel or the radio remote control. A real bonus for efficiency and productivity.

**Rule of thumb:** the smaller the CSS, the more closely the process has to be monitored with regard to overloading - the ringbounce detection helps here.



01 Crusher passage 02 Gap setting

#### **KLEEMANN > PROCESS KNOWLEDGE**

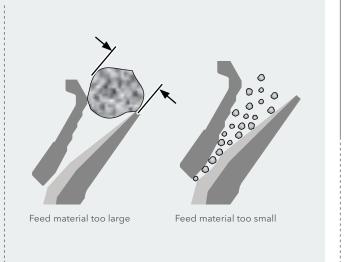
The correct feed size greatly influences the crushing result, the wear and output of the cone crusher.

If the **feed material is too large**, the feed behaviour is not ideal and the crushing capacity is reduced. Crushing then takes place above the actual crushing zone of the tool, which leads to increased and uneven wear. In the worst case, ringbounce can occur.

If the **feed material is too small**, the power of the crusher is not adequately used and the final product quality suffers. Partial washout develops on the crushing tool, which leads to a reduction in the crushing capacity and a shorter service life of the crushing tool.

Fines in the feed material must generally be avoided.

**Rule of thumb:** the supplied content of fines of 0-2" should not exceed 5 %!



MOBICONE MCO 90i EVO2 | **OVERLOAD SYSTEMS** 

### **EFFECTIVE OVERLOAD SYSTEMS**

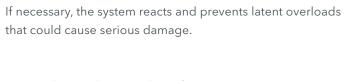
To protect the plant.

During the crushing process, various short-term or prolonged overload situations can arise. With the MOBICONE MCO 90i EVO2 cone crusher, intelligent overload systems protect against damage and failures.

The integrated "Tramp Release" overload system protects the crusher against uncrushable material such as wood or metal.

The bowl, including the bowl liner, lifts to allow uncrushable material to fall through. The plant therefore remains protected.





Additional overload detection is provided by the intelligent "Ringbounce Detection". Here, the hydraulic pressure and other parameters of the crusher are monitored continuously.

Two modes can be set in the software:





#### PRECISE MODE for the production of grit

- > The machine stops feeding as soon as ringbounce is detected; the operator receives a fault message and can adapt the process.
- > In this mode, no additional impermissible oversize grain is produced and the machine is protected against crusher damage





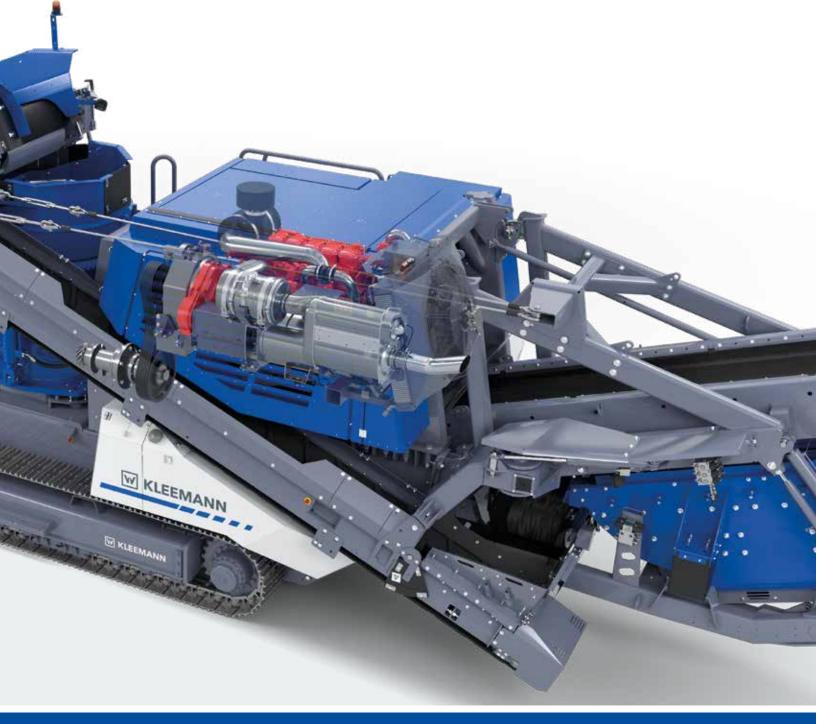
> After a definable time without ringbounce, the gap is closed again.

> Thanks to virtually uninterrupted operation, the system automatically adjusts the gap, oversize particles are accepted or, in the case of operation with a pre-screening unit, returned to the circuit.

MOBICONE MCO 90i EVO2 | **DRIVE** 

## **INNOVATIVE DRIVE CONCEPT**

Impressive performance - with the best possible consumption values.







#### The MOBICONE MCO 90i EVO2 has an innovative "diesel-direct-electric" drive concept which is both powerful and economical.

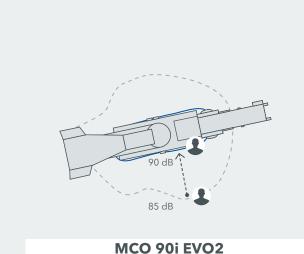
The MCO 90i EVO2 stands out with its holistic drive concept with an efficient diesel direct drive whereby the crusher is driven directly via a fluid coupling from the diesel engine. The power and load-dependent fan ensures a low-noise and even more economical operation. Via a power splitter gearbox, the generator is driven by a large cardan shaft, which means that the more maintenance-intensive timing belts are not required. The drive system pumps are activated via a clutch coupling and can there-

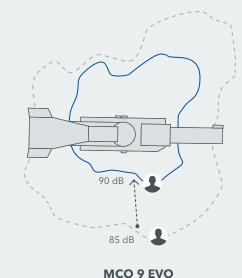
fore draw on the full power of the diesel engine - for enhanced driving performance. All other hydraulic pumps for auxiliary and set-up functions and for the cooler drive are also driven via the gearbox.

The plant can be optionally equipped with a heat package (5 to 122 °F) or cold package (-13 to 104 °F).

#### **KLEEMANN > PROCESS KNOWLEDGE**

Thanks to the output- and load-dependent fan, the basic configuration of the plant is very low-noise, which makes work near the machine a lot more pleasant and easier on the operator.





**Diesel-direct-electric** 

385 hp

up to 30 % less consumption

compared to hydraulic drives

MOBICONE MCO 90i EVO2 | OPERATING CONCEPT 20 | 21

# THE SPECTIVE INTUITIVE **OPERATING CONCEPT**

For a better result.

With the increasing demands that are placed on modern crushing plants, their complexity also increases. At the same time, the technology must be safe and as simple as possible to master - without long training sessions. This is precisely the strength of the SPECTIVE operating concept.

The MOBICONE MCO 90i EVO2 can be operated simply and intuitively with the different SPECTIVE components. Apart from the touch panel, the holistic operating concept includes a large and small radio remote control and the SPECTIVE CONNECT digital solution.







#### 01 Touch panel and operating buttons

From the starting procedure and on to making the initial settings, from the elimination of malfunctions and on to maintenance - on its 12" touch panel, SPECTIVE provides users with all important plant information in a clearly arranged manner and enables all plant settings from a single location. The optimized arrangement of the button below the display is self-explanatory in combination with the display and guarantees high operating comfort. The lockable operating mode selector switch protects against misoperation. The user guidance and visualization of the operating process are even more clearly presented. Troubleshooting aids and support contribute to minimization of downtimes.

#### 03 Small radio remote control

Thanks to its compact size, the small radio remote control is suitable for carrying in the loading device. All relevant functions can therefore be operated in automatic mode conveniently in the excavator or wheel loader. The small radio remote control is the ideal complement to SPECTIVE CONNECT.

#### 02 Radio remote control

**04 SPECTIVE CONNECT** 

The new radio remote control allows operation of all plant functions, including the complete set-up and driving operation, from a safe distance. Once it has been set up and put into operation in automatic mode, for most procedures the operator no longer has to go to the plant. Furthermore, advantages in the field include the long battery runtime (> 10h) with LED for battery charge indication, a battery change without tripping an emergency stop and a very long range.

With SPECTIVE CONNECT, users receive a display of the user interface via smartphone anywhere they may be - for example, in the excavator or wheel loader. Apart from relevant data such as speed, consumption values and fill levels, fault messages or warnings are also displayed. In addition, important process and machine data can be summarized in a report and conveniently transmitted.

#### **KLEEMANN >** GOOD TO KNOW

#### **Everything at a glance with WITOS®**

The WITOS FleetView telematics system supports efficient fleet and service management. Information on the operating status of the machines is available independently of location and time. Even users with only one machine benefit from

From support for maintenance and diagnostic processes to the targeted monitoring of the machines: the range of services is diversified and ideally complements the WIRTGEN GROUP Smart Service agreements.

MOBICONE MCO 90i EVO2 | **OPERATING CONCEPT** 

### **SPECTIVE CONNECT**

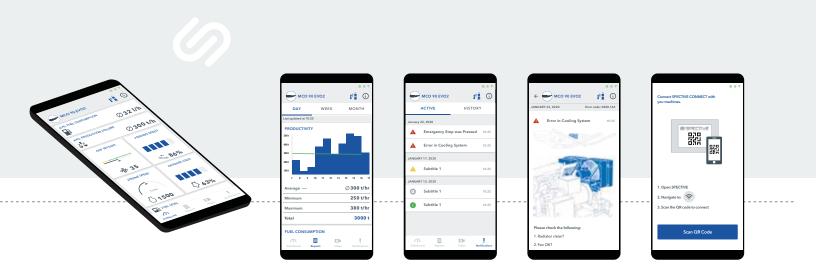
Plant data on your smartphone.

SPECTIVE CONNECT is the logical extension of SPECTIVE since the crusher's human-machine interface is brought directly to the operator in the excavator or the wheel loader.

SPECTIVE CONNECT can be used to display all relevant operating data such as engine speed, consumption, throughput (in conjunction with belt scale) and fill levels of the MCO 90i EVO2, as well as fault messages, warnings and other messages.

Work does not need to be interrupted to view the status.

The option for preparing and sending a clearly arranged report ensures additional transparency for the operator.



#### **KLEEMANN >** GOOD TO KNOW

#### Is your plant ready for SPECTIVE CONNECT?

If your plant is equipped with the SPECTIVE CONNECT option, then simply download the app for your smartphone and get started!

- 1. Select the WiFi symbol on the SPECTIVE start screen.
- 2. Scan the QR code and you will be connected with the plant immediately. Following this, the connection is always established when you are in the vicinity of the machine.







#### 01 Dashboard

A non-verbal display provides a clearly arranged presentation of all information on the crushing plant relevant to the operator:

- > Average fuel consumption
- > Average production output
- > The current gap setting
- > Speed and utilization
- > Feed speed
- > Fill levels

#### 02 Fault elimination aids

All active faults incl. fault history, warnings and messages can be displayed in the same manner as the SPECTIVE touch panel. The operator knows what has to be done and is also supported in a targeted manner with fault elimination aids.





#### 03 Reporting

A clearly arranged report on the crushing plant's operation and output allows the operator and operating company to draw conclusions regarding the current utilization of the plant.

The following can be displayed:

- > Average fuel consumption
- > Average production output (belt scale for crusher discharge conveyor)
- > Plant utilization (when is the plant stationary, when is it fully utilized,...)

The reports can be sent conveniently as a PDF.

The availability of SPECTIVE CONNECT depends on the country-specific situation. Further information can be obtained from your local contact person or under www.wirtgen-group.com/spective-connect-kleemann



MOBICONE MCO 90i EVO2 | POST SCREENING UNIT

### **POST SCREENING UNIT**

Contributes to final product quality.



The large screening surface with optimum screen utilization enables effective screening even with grain sizes below 0.79". The discharge height is designed for a high stockpile volume and optimally tuned to the transfer to the subsequent crushing or screening stage. The assembly and disassembly of the post screening unit can be carried out quickly and easily in a few minutes.

discharge. A kidney-shaped stockpile can therefore be created manually.

Note: The MCO 90i EVO2 can also be subsequently retrofitted with a post screening unit. The more powerful generator this requires can also be provided in the initial configuration.

Oversize grain can be processed in a closed material circuit via a return conveyor. As an option, the conveyor can be swivelled hydraulically by up to 100°, which also enables side

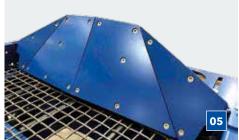


Assembly and disassembly Single deck vibrating screen highly efficient even with small grain sizes < 0.79"

can be carried out in a few minutes









MOBICONE MCO 90i EVO2 | ACCESSIBILITY + SAFETY

## **ACCESSIBILITY AND SAFETY**

For outstanding operating comfort.

#### A machine can be easy to operate and safe, but convenient maintenance is also very important to the operator.

All machine components are especially easy to access to guarantee trouble-free production, simple operation and fast service. A central drain point for fluids, for example, enables ergonomic maintenance. Spray systems at different transfer points, as well as LED lighting for illuminating the work area, are included in the plant's basic configuration.

Central drain point



#### Additional options increase operating comfort

Optionally available Premium lighting provides even better illumination of the machine environment. Simple refuelling of the machine is possible from the ground or with the help of a refuelling pump for filling from tanks.

#### The focus is always on safety

The MOBICONE MCO 90i EVO2 is also ideally equipped in terms of safety features. All function- and safety-related cylinders are equipped with safety valves (lowering/brake holding valves). Each cylinder stays in its current position - to protect the machine operator and machine in the event of deactivation or failure. Thanks to plant operation via the radio remote control, and therefore from a safe distance, safety on the construction site is also increased.





#### Standard lighting

The standard lighting includes the illumination of the travel path, the steps and the area of the touch panel. A USB charging port for a mobile maintenance lamp is also available.



#### Premium lighting

The premium lighting includes a large number of headlamps for extended illumination of the machine area as well as a mobile maintenance lamp.

MOBICONE MCO 90i EVO2 | TRANSPORT

# **SIMPLE TRANSPORT**

Quickly on site. Immediately ready to work.



The MCO 90i EVO2 can be used very flexibly and is quickly ready for operation. And even if the work location changes frequently, the machine is quickly transportable and also quickly loaded thanks to its relatively light weight.

After arrival at the work site, set-up times are very short: the feeding unit and conveyors can be conveniently moved into operating position hydraulically and from a safe distance with SPECTIVE radio remote control.

The post screening unit can remain on the machine for transport, although it can also be disassembled in a few minutes. Thanks to its compact container dimensions, it is also easy to transport separately.

With a transport height reduced to 11' 2", transport is now even easier and more cost-effective - including the post screening unit.







MOBICONE MCO 90i EVO2 | **LINE COUPLING** 



### **TARGETED TO SUCCESS**

For perfect crushing results.

An ideal crushing result is always achieved when components of the complete plant are perfectly tuned to each other, combined with the settings made by the operator.

Before implementing the project, it is important to understand the full details of the application and to make important preparations. Our KLEEMANN experts will gladly support you!

#### **Important basics**

- > What do I want to achieve with my application? Define the objective of the application: output and/or quality
- > What does my application look like exactly? Take material samples and have them examined
- > Which machines are suitable for the application? KLEEMANN will support you with the AggFlow preparation

- > Which tools do I have to use? Info can be found in AggFlow
- > Do I have personnel trained for a cone crusher? KLEEMANN will train your personnel during commissioning
- > Have provisions been made for maintenance and spare part supply? Discuss this with your Service contact person

#### Areas of application of cone crushing plants

#### NATURAL STONE

Limestone / sandstone / greywacke / gravel / granite / gneiss / marble / quartzite / diabase / gabbro / basalt

Iron ore

Coal

Clay





#### With these tips, it is possible to define the ideal settings for any task:

#### A well filled crushing chamber

> Guarantees the throughput because a higher crushing effect is created in the crushing gap

#### Centrical feeding of the feed material

> Ensures homogeneous distribution in the crushing chamber

#### **Uniform feeding**

- > Guarantees stable process
- > Is achieved through the correct selection of the crushing tools, the crushing gap and the correct setting of loading via the CFS

#### Correct feed size

> Has a strong influence on the crushing result, wear and the output of the cone crushing plant

#### **Crushing ratio**

> The maximum crushing ratio (ratio of feed grain size/grain output) largely depends on the physical properties of the feed material. The following standard values result:

RUSHING RATIO				
Specification	Crushing stage	Compressive strength	Circuit	Crushing ratio
standard head	secondary	<300 Mpa	open/closed	4:1
short head¹	tertiary/quaternary	<300 Mpa	open/closed	3.5-4.5:1
short head²	tertiary/quaternary	<300 Mpa	open/closed	2-3:1

<sup>&</sup>lt;sup>1</sup> normal grain shape requirements

#### **KLEEMANN >** GOOD TO KNOW

In order to implement project with mobile cone crushers, it is important to understand the application and to collect all important information. We have created a questionnaire to assist you. Find out more on the Internet under www.wirtgen-group.com/questionnaire-kleemann



For further information, scan the code

<sup>&</sup>lt;sup>2</sup> high grain shape requirements

MOBICONE MCO 90i EVO2 | PROCESS ENGINEERING 34 | 35

## **CONE CRUSHER 1X1**

For a trouble-free work process.





#### Prior to starting: check process (AggFlow)

Before embarking on a new application, you have to check whether the installed tool is suitable for the task and which crushing gap can be operated. A check must be carried out to determine whether the cone crusher can process the feed material without any problems - to prevent damage caused by excessively coarse or fine material.

Process simulation (AggFlow) can provide support in this area.



#### Fill evenly, avoid running empty

A material layer should always be present in the feed hopper, as this cushions the load of newly fed material and therefore reduces the wear on the feed hopper.

Overfilling the hopper can lead to blockages and the material can no longer reach the crusher in a trouble-free manner. If the feed hopper is not filled evenly, this results in a fluctuating filling level and empty running of the cone crusher.

With the following negative consequences:

> Flaky product

- > Increased and uneven wear
- > Increased share of coarse grains
- > Bearing damage through abrupt loading



#### Regular process monitoring during operation

- > Regular monitoring of the process is absolutely necessary to guarantee a uniform material flow. Overloading can be identified early and damage can be avoided.
- > Ensure that the hoppers are never overfilled; it may be necessary to adapt the process parameters. On material return sections, ensure that there is not too much material in the return flow; it may also be necessary in this case to adapt the process parameters.



#### **Observing maintenance and inspection intervals**

Regular maintenance and observance of the inspection intervals increase plant availability and therefore the total production output.

Regular maintenance and inspection allows damage to be avoided or to be identified in good time, therefore preventing long downtimes. The maintenance intervals are listed in the instruction manual.



#### Adapting the process in the event of overload

- > Watch out for overloading and keep the Ringbounce Detection overload system activated.
- > Signs of overloading include frequent tripping of the overload system, crusher stops, pulsating hydraulic hoses or a vibrating bowl (micro-vibrations).



#### Countermeasures:

- > The feed material must be pre-crushed to make it smaller or fine material must be prescreened.
- > Increase in gap size and, where necessary, increase in speed.



#### Avoid wet, sticky feed material

> Wet, sticky feed material causes jamming and clogging of the crushing chamber. This reduces the throughput and, as clogging of the crushing chamber increases, the feed material can become briquetted, which leads to blocking of the crushing process. The resultant uncontrollably high forces lead to permanent damage of the cone crusher or its failure.



> Avoid feeding with wet, sticky feed material; if necessary, pre-separate sticky material by means of prescreening. A clogged crushing chamber needs to be cleaned.



#### **Avoid fines**

> When fine material is fed in, tool wear is significantly higher than with prescreened feed material. Fines also lead to an increase in the crushing forces and the drive output is then possibly no longer sufficient. An excessive content of fines can trigger a latent overload (ringbounce) and lead to permanent crusher damage.



#### Countermeasures:

> Activate prescreening at the upstream jaw crusher and separate the fines. Alternatively, cut in a screen upstream of the cone crusher to separate the fine aggregate.



#### Observe correct feed size

- > If the feed material is too large, the material will not be drawn sufficiently into the crushing chamber and material blockages form. The result is a reduced crushing capacity, increased or uneven wear as well as damage to the crusher.
- > If the feed material is too small, the power of the crusher is not adequately used and product quality suffers. Partial washout can develop on the crushing tool. This can lead to a reduction in the crushing capacity, quality and a shorter tool service life.

#### Countermeasures:

> Select the tool to match the feed size or adapt the feed size to match the tool. Only feed material with a uniform grain size distribution and avoid gap grading.



38 | 39 MOBICONE MCO 90i EVO2 | SPARE PARTS/TECHNICAL DATA

# **SPARE PARTS**

Correct wear parts ensure the best results.

#### **APPLICATION-SPECIFIC WEAR PARTS**

#### **Crusher cone - versions**

- > Standard
- > Short Head

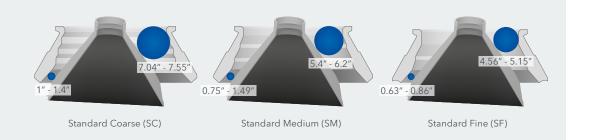
#### **Bowl liner - versions**

- > Standard Fine
- > Standard Medium
- > Standard Coarse
- > Short Head Fine
- > Short Head Medium
- > Short Head Coarse

Two qualities are available: > XPERT with 18 % manganese > XTRA with 20 % manganese

#### **Secondary crushing stage**

- > final product > 1.25"
- > open circuit
- > large feed opening



#### **Tertiary crushing stage**

- > final product > 1.25"
- > closed circuit
- > long calibration zone



Short Head Coarse (SHC)





Short Head Medium (SHM)

Short Head Fine (SHF)

Further information: parts.wirtgen-group.com







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