

Industrial Solutions

# polycom<sup>®</sup> high-pressure grinding roll

for energy-efficient,  
high-pressure grinding  
of raw material



thyssenkrupp





Maximum availability and significantly lower specific energy consumption than conventional grinding systems: these are the key advantages of modern polysius® grinding plants with polycom® high-pressure grinding rolls and static-dynamic sepol® separators. Virtually slip-free grinding in the grinding gap reduces the wear rate to a minimum. The separate process-specific steps of grinding, separating and drying enable individual process optimization of the grinding plant.



# A rolling success

The performance of polycom® high-pressure grinding rolls throughout the world is second to none, even when it comes to the toughest applications in the cement industry.

For decades, polycom® high-pressure grinding rolls have been used successfully in the grinding of raw materials and binding agents. polycom® HPGR grinding is based on the principle of supplying the material to be ground to two counter-rotating rolls via a feed system. These rolls draw the feed material into the gap between them, where it is ground under high pressure. A hydro-pneumatic system generates the required grinding pressure of up to 250 MPa.

The grinding process produces compacted cakes containing a high proportion of fines, as well as coarser particles with cracks in them. These compacted cakes are broken up, separated and, if necessary, subjected to further grinding.

## Design of the polycom® high-pressure grinding roll

The polycom® consists of the following main components:

- two roll units
- machine frame with feed system
- hydraulic unit and lubrication system
- drive unit

The polycom® design and the coordinated plant design options ensure optimum accessibility of all components for assembly, maintenance and servicing.

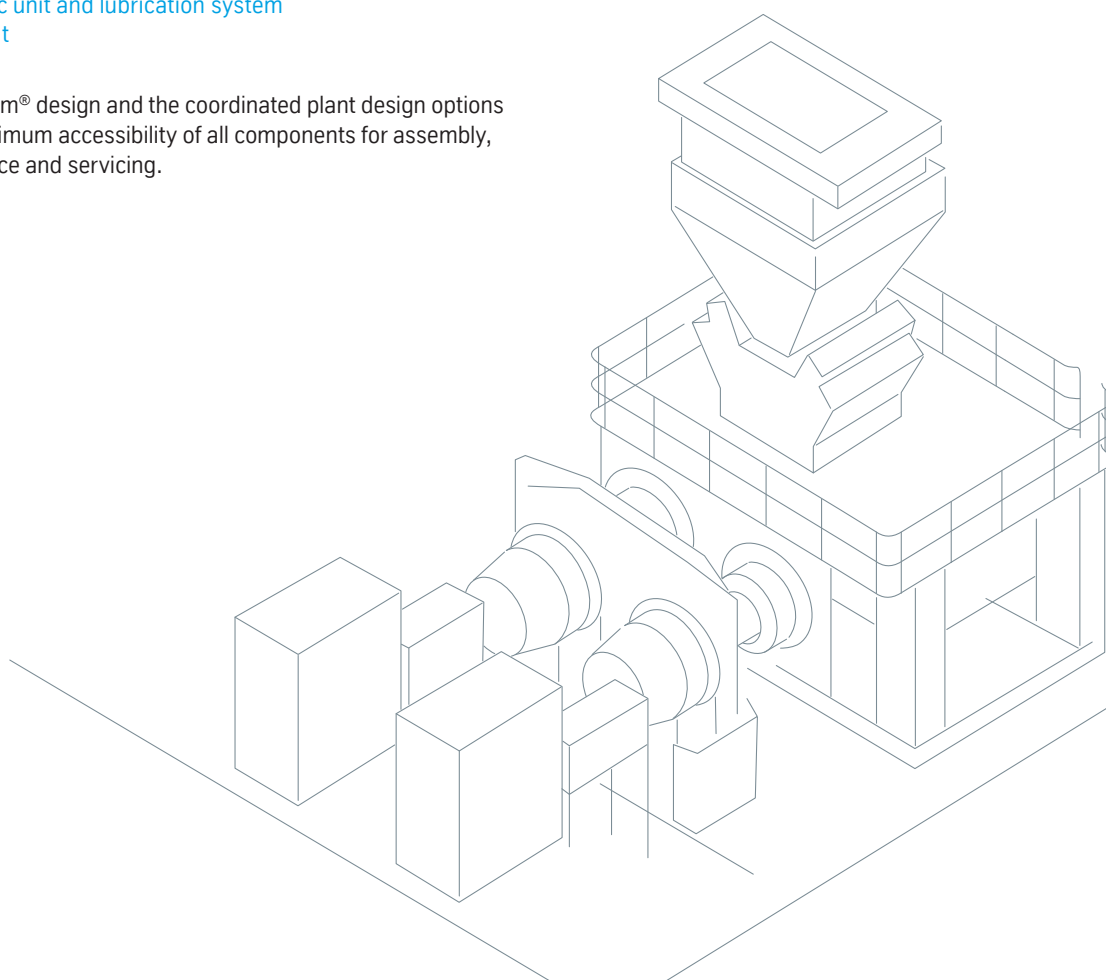
## Raw material grinding

High-pressure grinding of raw material is particularly suitable for:

- brittle raw materials with high grindability
- raw materials with moderate moisture content

polysius® raw material grinding systems with polycom® high-pressure grinding rolls are designed almost exclusively as finish grinding plants in combination with the static-dynamic sepol® separator. Thanks in particular to their much lower specific energy consumption, finish grinding plants without downstream ball mills offer an economically superior concept in comparison with conventional systems. In addition, no water injection is required to stabilize the grinding bed – this saves valuable resources.

Within the scope of conversion or expansion projects involving existing ball mills, the polycom® can also be integrated into a primary grinding or combi grinding plant, in order to increase capacity.



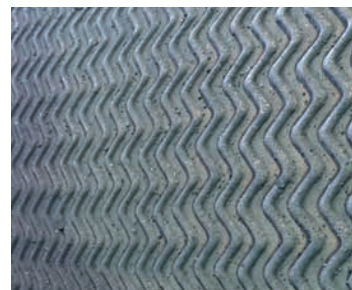
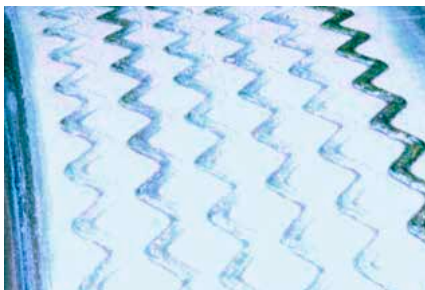


# Wear and tear - not with us!

The compact roll units of the polycom® are delivered fully pre-assembled and can be inserted directly into the machine frame. This reduces to a minimum the time it takes to assemble the complete grinding plant. For manufacturing, maintenance and servicing, thyssenkrupp Industrial Solutions has workshops and service centers available throughout the world.

Forged/Welded roll bodies for  
low capital expenditure

Autogenous wear protection forms between the profiles welded onto the roll body surface. The expected service life of a forged roll body with multilayer welded-on hardfacing is limited due to the material properties.

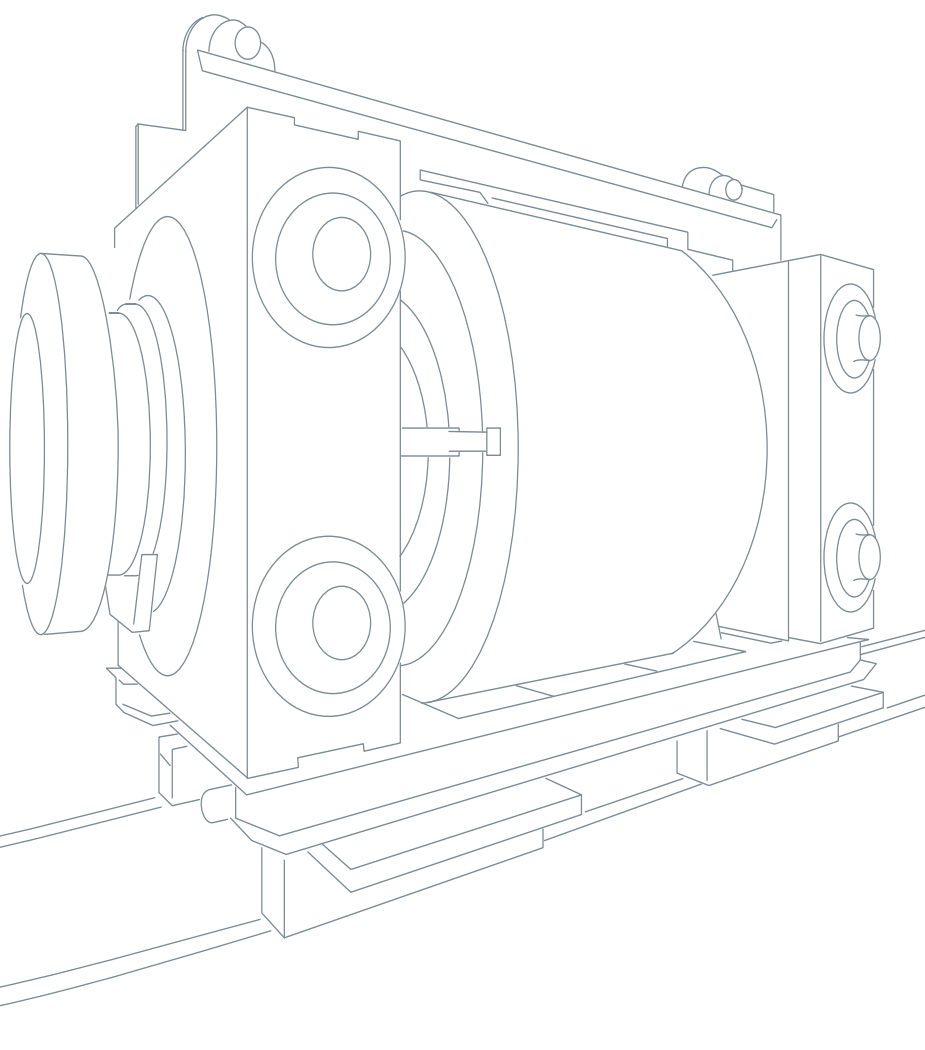


We are continuously developing the ground-breaking wear protection concept of the roll bodies of the polycom® to constantly keep abreast of ever-increasing demands.

Various wear protection concepts are available for raw material grinding. The selection of a suitable concept depends on the following factors:

- raw material properties (such as the specific wear rate and the grain size)
- process conditions (such as the grinding process and the required grinding pressure)
- customer requirements (capital costs, maintenance and servicing concept).

Since the dried material in the grinding gap is largely subjected to interparticle high-pressure grinding, the roll bodies of the polycom® achieve a much longer service life than the grinding elements of conventional grinding systems, especially at high specific wear rates.



**Premium-quality compound-cast roll bodies for the highest demands**

Durable compound-cast roll bodies (ductile main casting with an outer hard layer of extremely high compressive strength) guarantee maximum service life, even in the case of exceedingly high specific wear rates. Maintenance work is limited to maintenance of the profiles welded onto the roll body surface and between which autogenous wear protection forms.



**Roll bodies with hard metal studs for low maintenance costs**

Roll bodies with hard metal studs can be a useful alternative for raw material grinding. They are best suited to low grinding pressures and high specific wear rates. If necessary, individual studs can be replaced.

# Full of energy – but efficient!

Combining a polycom® high-pressure grinding roll and a static-dynamic sepol® separator in a finish grinding plant for raw material increases energy efficiency significantly.

As the grindability of the raw material increases, so does the efficiency of high-pressure grinding – and the polycom® reveals its full potential. Compared to a roller mill, it is thus able to save up to 20 percent of the energy required for grinding; compared to a conventional ball mill, it can even save up to 50 percent.

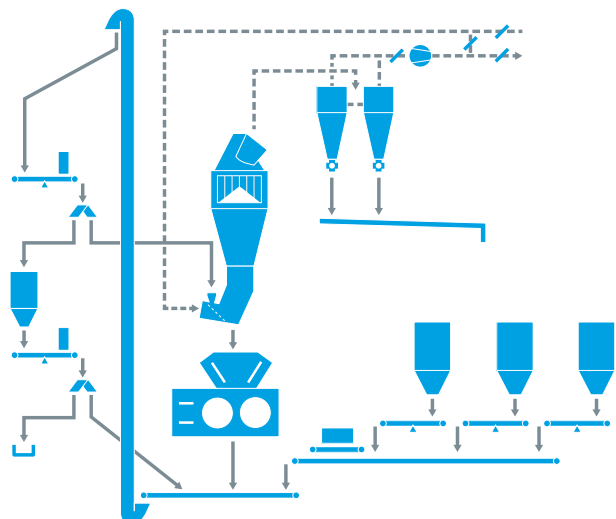
Maximum energy savings are achieved by combining the polycom® with a static-dynamic sepol® separator in a finish grinding plant. Besides the classic separator load parameters, the design of the sepol® separator depends mainly on the conveying-air/hot-gas flow rate required to transport or dry the ground material.

Compared to a grinding plant with a roller mill, the required specific separating air flow rate is up to 25 percent lower and the pressure loss in the separating system up to 40 percent lower, resulting in further significant energy savings.

Thus, in the case of dry, brittle raw materials with high specific grindability, the energy consumption for grinding and separating can be reduced by up to 5 kWh/t compared to a roller mill, due to the efficiency of the high-pressure grinding and a separating system optimized for the respective application.



Each polysius® grinding plant is custom-engineered based on the raw material properties, production requirements and local conditions.



# One design – many options

When grinding raw material, a wide variety of process-related demands are placed on the grinding system. This is where the polycom® demonstrates its full flexibility.

What's more: in addition to the machine, we also consider the entire grinding system during the planning stage, in order to find the most efficient overall solution in terms of capital and operating costs.

The polycom® is individually configured according to the material to be ground and its properties, the grinding process and the specific requirements placed on the finished product.

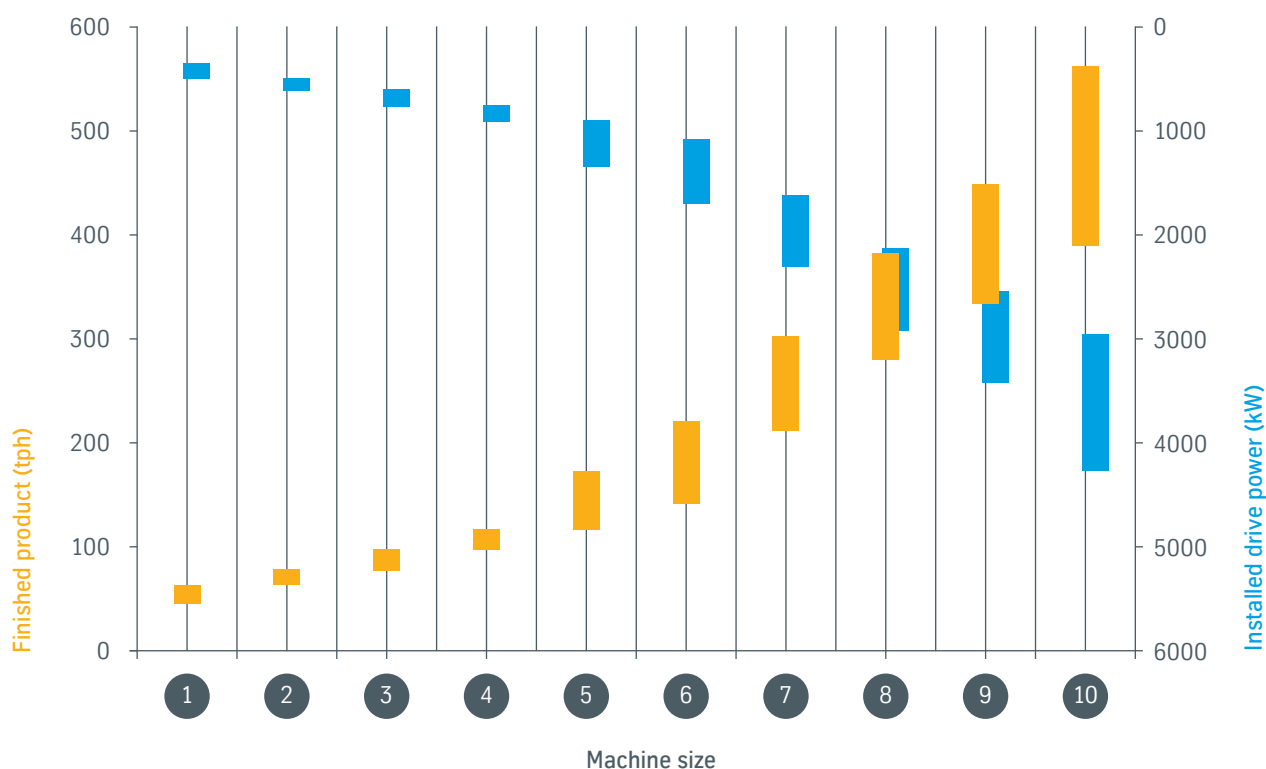
We tailor the following to the respective application:

- roll body diameter
- roll body width
- roll body circumferential speed
- grinding pressure

Again, the separate process-specific steps for grinding, separating and drying represent a decisive advantage, as the overall process can be quickly and easily adjusted to suit your requirements. Fluctuations in the material to be ground can easily be compensated for, and differences in the requirements placed on the finished product can be quickly accommodated.

Once installation and commissioning are completed, we continue to be a partner on which you can rely: our service division is there for you whenever and wherever you need it.

## polycom® high-pressure grinding roll for raw material grinding



Finished-product output of various polycom® machine sizes (in the case of average grindability and finished-product fineness), as well as the installed drive power



## Industrial Solutions

thyssenkrupp Industrial Solutions AG  
Graf-Galen-Straße 17  
59269 Beckum, Deutschland  
T: +49 2525 990  
F: +49 2525 992100  
[www.thyssenkrupp-industrial-solutions.com](http://www.thyssenkrupp-industrial-solutions.com)

engineering.tomorrow.together.