

MECAMAX[®] MB STEELS

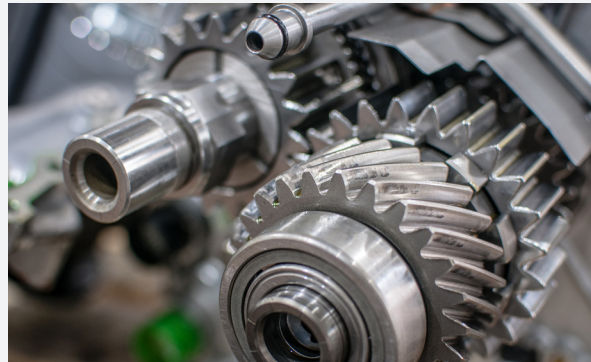
Create Value in Machining

SIDENOR technologies to increase end-user productivity



What is MECAMAX® MB?

- Developed by Sidenor in order to **reduce machining costs** of steel parts in a wide range of machining operations (turning, drilling, broaching...)
- This technology is recommended for **high performance applications** guaranteeing the required mechanical properties



Where is MECAMAX® MB Used?

- Tailored solutions for any part /process /customer

For any...



steel grade

In all...



machining operations

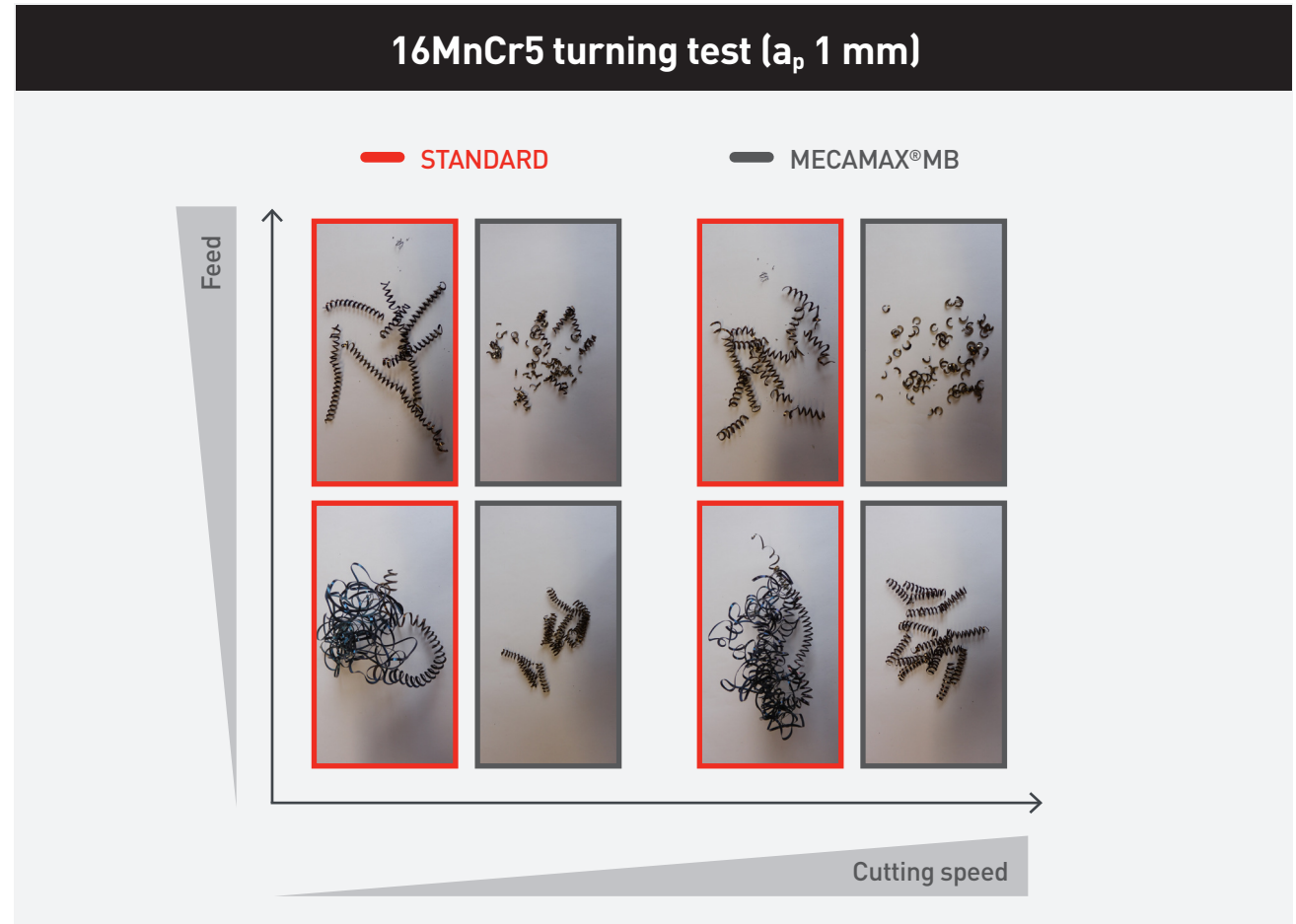
Whatever...



the part is

How does MECAMAX® MB Improve Machinability?

- MECAMAX® MB technology is demonstrated to improve the steel machinability
 - ✓ ... facilitating the chip fragmentation
 - ✓ ... reducing the tool wear
 - ✓ ... increasing productivity
 - ✓ ... enhancing steel isotropy in comparison to other improved machinability steels



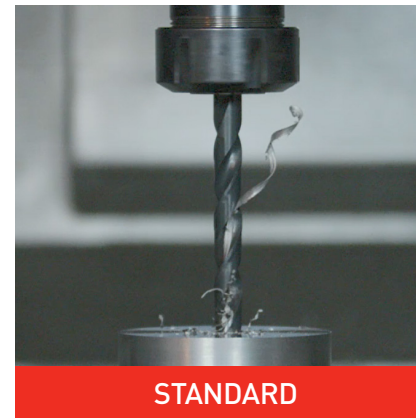
Excellent Chip Quality

- The long chips generated during the machining of standard grades produce severe overcosts:

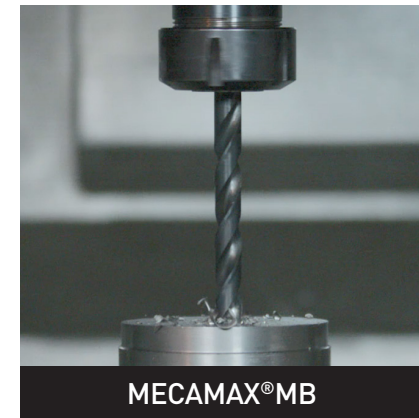


- ✓ Accumulation of chips in the work areas
- ✓ Block of extractor conveyors
- ✓ Machine stops and robot failures
- ✓ Chips tangled up in parts...

- These setbacks can be solved by **MECAMAX® MB technology**, which **promotes chip fragmentation**



STANDARD

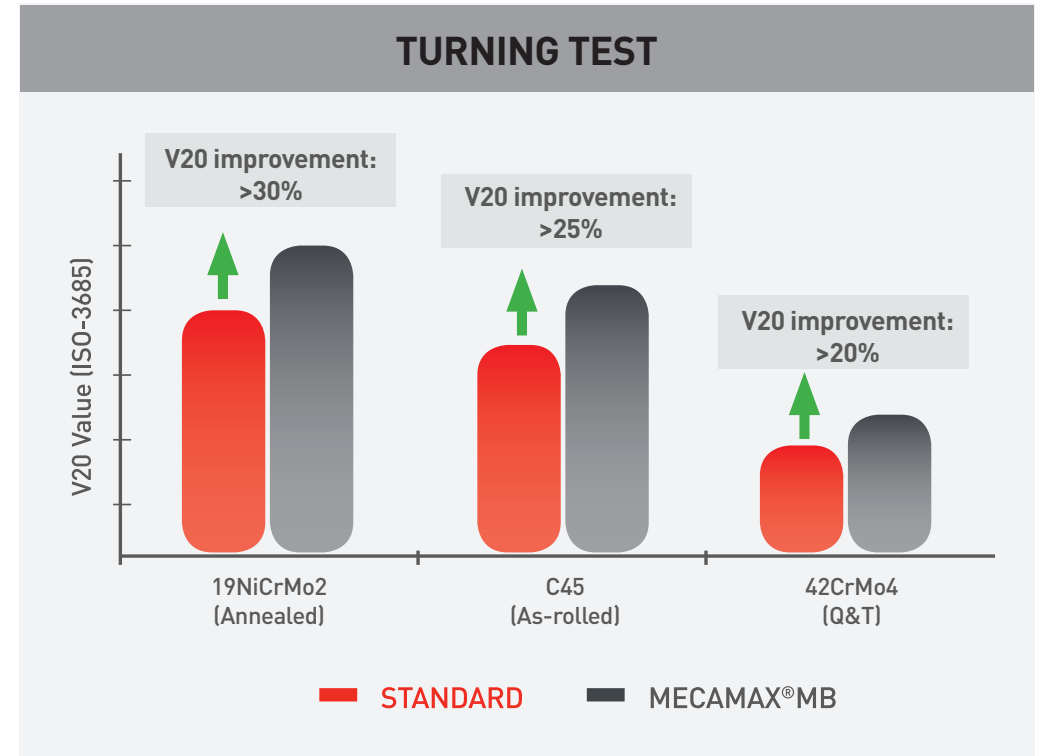
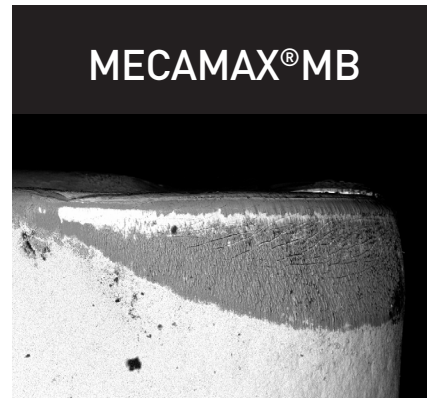
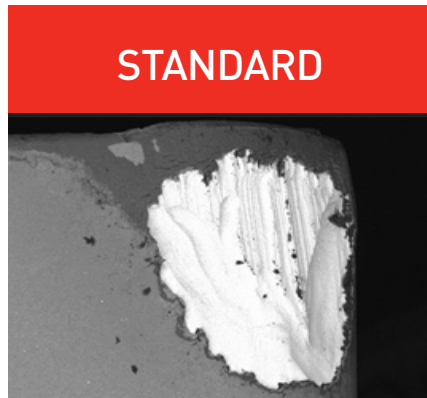


MECAMAX®MB

Drilling laboratory tests on 16MnCr5 standard and MECAMAX® MB under the same cutting parameters

Minimum Tool Wear

- Tool wear reduction up to 50% thanks to the:
 - ✓ Self-lubrication effect
 - ✓ Reduction of the cutting temperature and forces



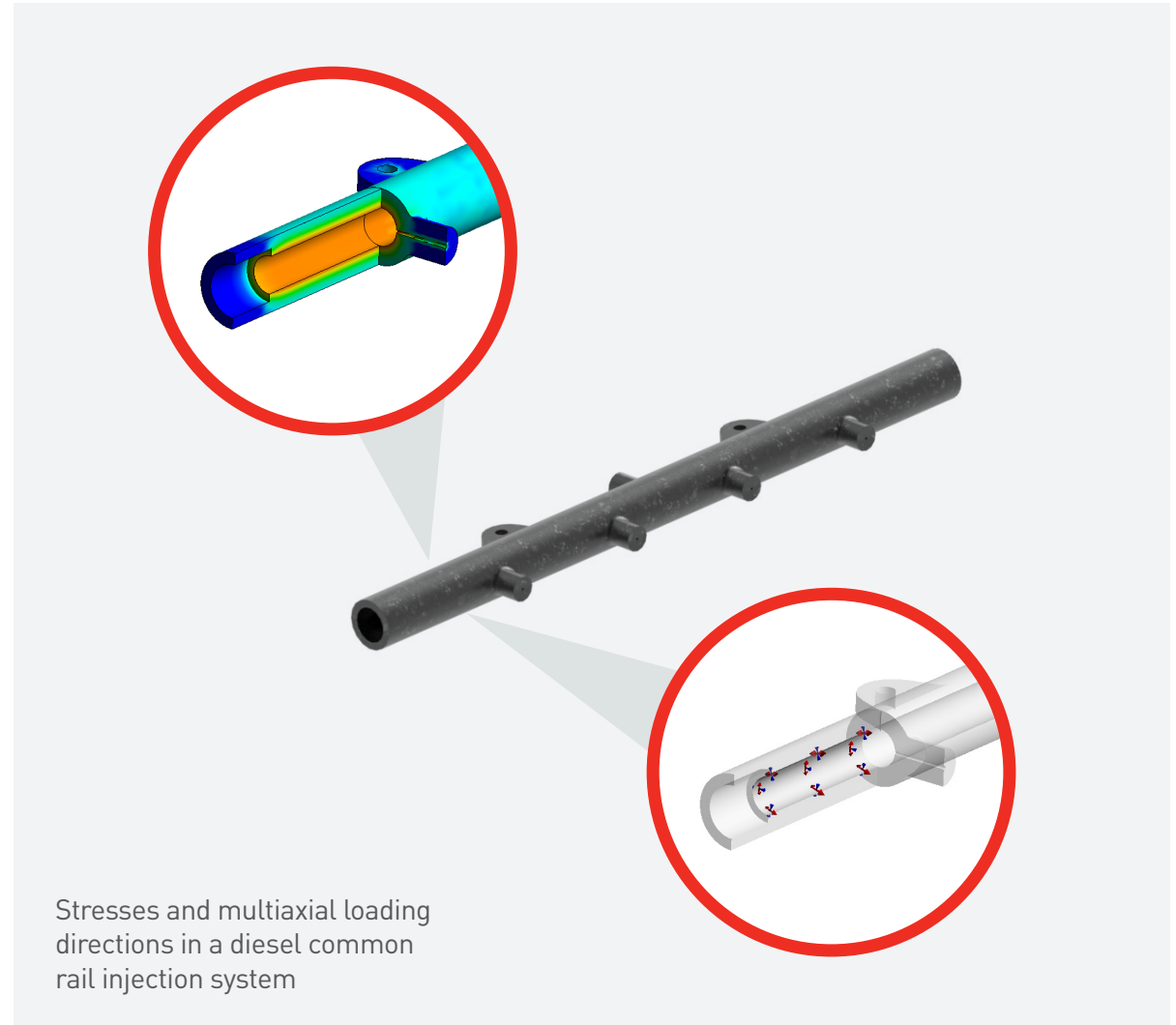
Maximizing Productivity

- Both chip quality and cutting tool life determine economic efficiency of machining process
- **Productivity increase is guaranteed** (up to 50%):
 - ✓ Optimization of the total working time (less tool changes are necessary)
 - ✓ More parts per hour based on cutting speed increment



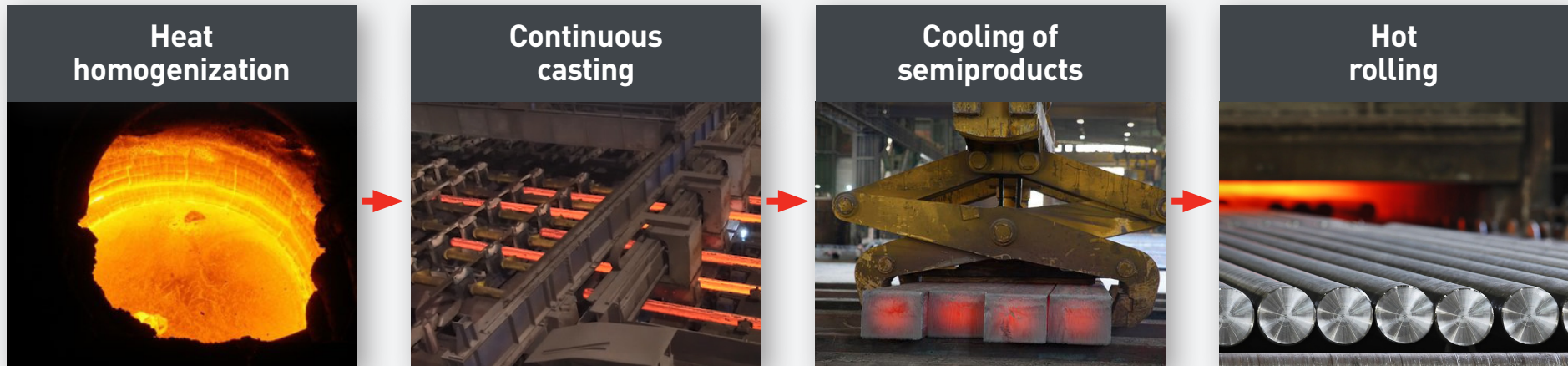
Isotropy optimization

- Sulphur addition is the most common way to improve the steel machinability, however the steel transversal properties are affected negatively
- To maintain the mechanical properties Sulphur content, and consequently machinability, must be reduced
- An alternative to compensate this machinability deterioration without penalising the **steel isotropy** is MECAMAX® MB



How is MECAMAX® MB Manufactured?

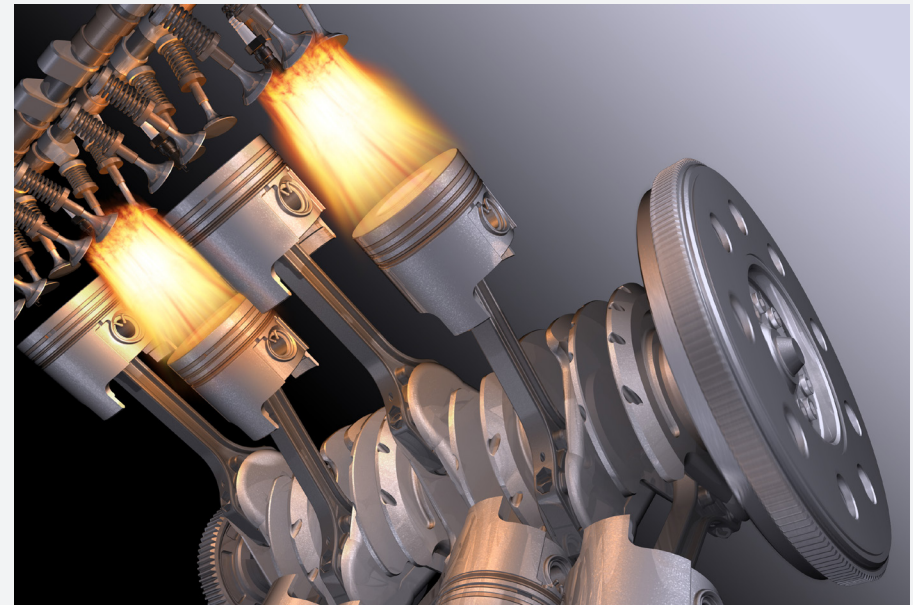
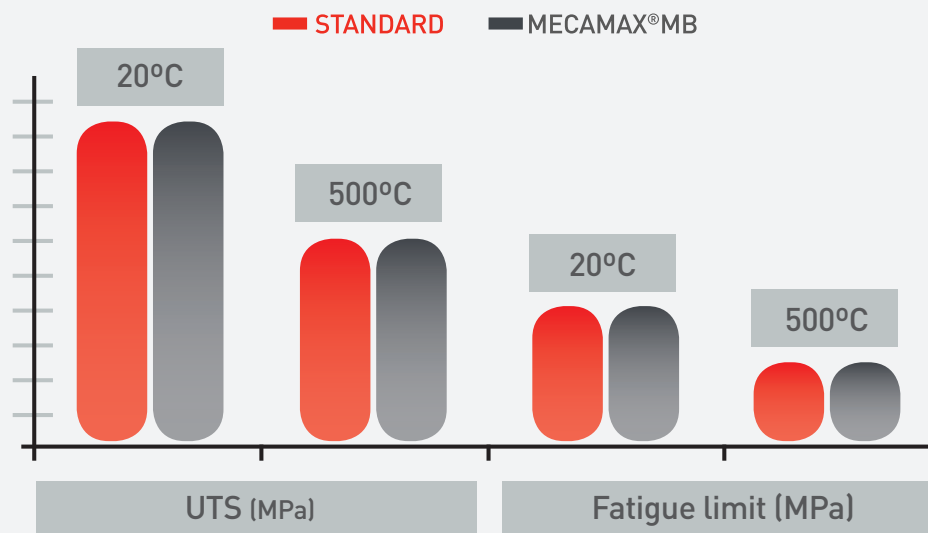
- The excellence of the manufacturing process ensures optimum quality of MECAMAX® MB steels. It comprises special developed procedures in the steel shop, continuous casting and rolling mill
- To optimize the process, SIDENOR made important investments in research, turning MECAMAX® MB steels into the best solution for your machining process



Mechanical Properties Are Not Affected

- The mechanical properties and fatigue performance are not deteriorated, even at high testing temperatures

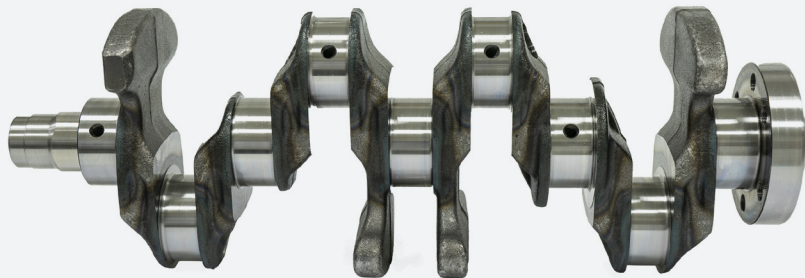
Same Mechanical Properties at High Temperature



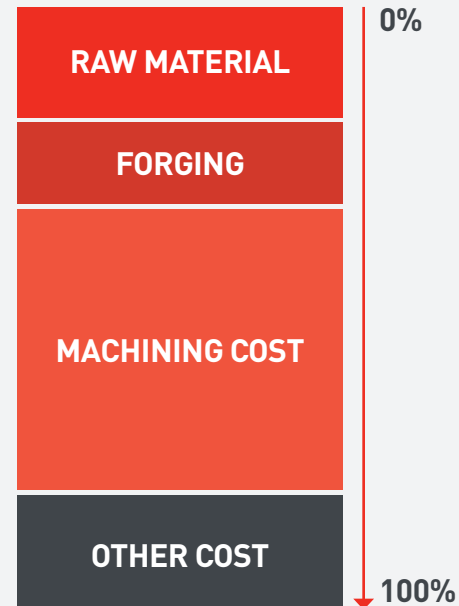
Cost Savings

- Depending on the part geometry and its manufacturing process, the **machining costs can be reduced up to 35%**

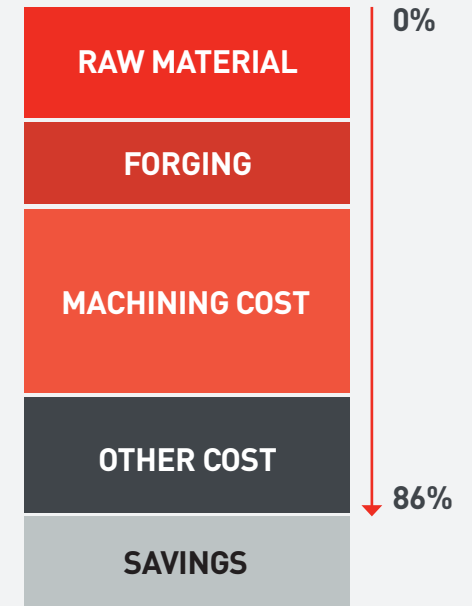
Crankshaft Manufacturing Costs Breakdown



STANDARD



MECAMAX®MB



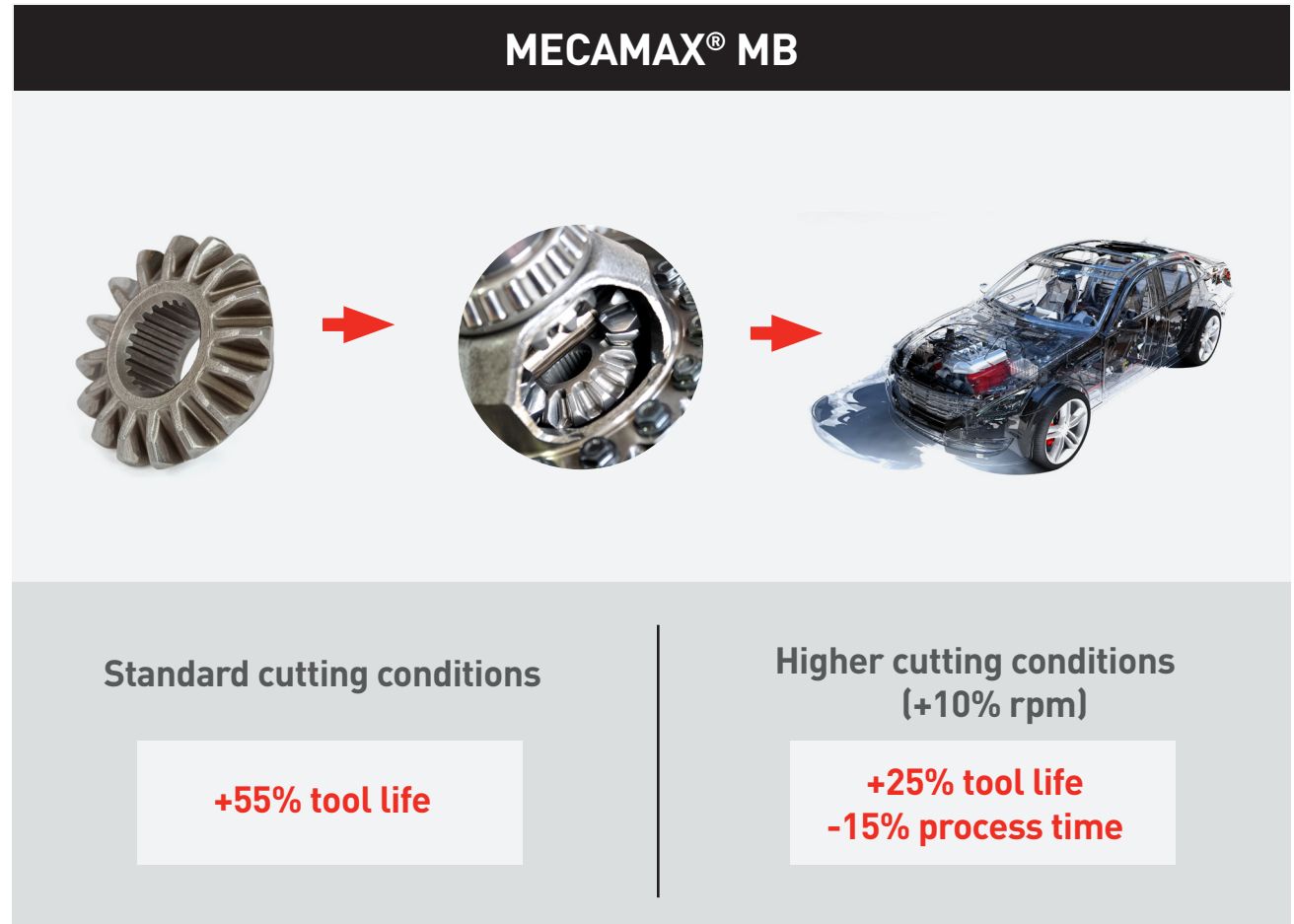
Real Implementation in Automotive Industry

- Good results regardless of the forming route:

- ✓ Direct machining
- ✓ Hot forming
- ✓ Cold forging

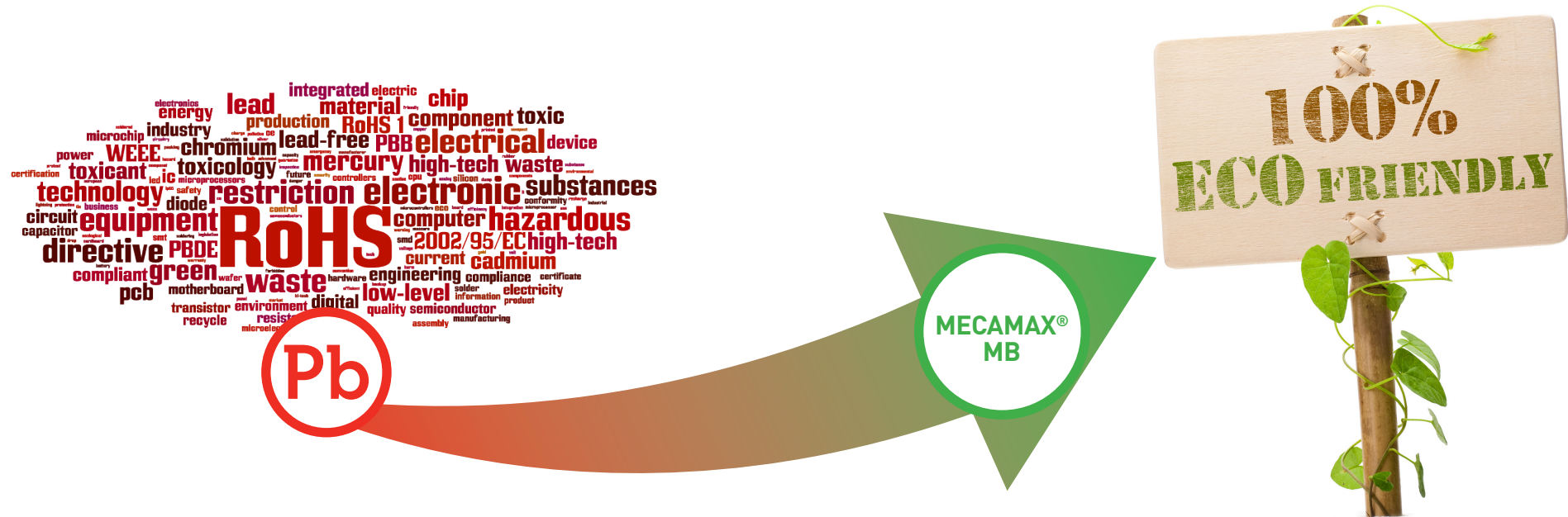


PRODUCTIVITY



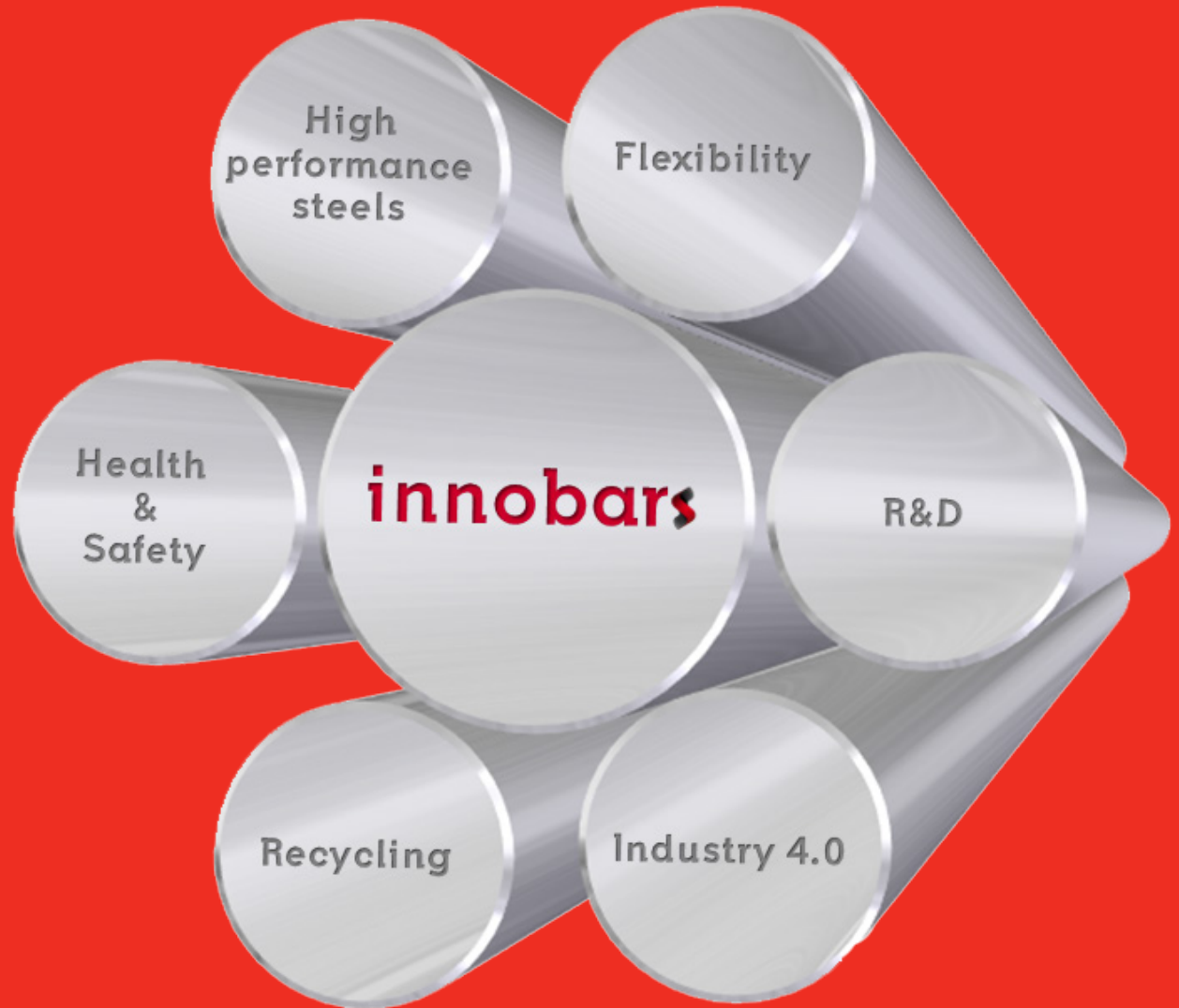
An Eco-Friendly Material

- Many of MECAMAX® MB applications are for non-toxic replacement of leaded steels. Unlike other machinability improved steels containing Pb, MECAMAX® MB is harmless to health and can be recycled as many times as you want without following any special regulation.



MECAMAX® Technology

Engineering Steels with
Improved Machinability



MECAMAX® Technology: Engineering Steels With Improved Machinability

MECAMAX® MB

Technology
MECAMAX® MB



Improved machinability steels for high performance applications

MECAMAX® MB STEELS
Improved machinability steels specifically designed to reduce the machining costs in a wide range of machining operations guaranteeing, at the same time, the required mechanical properties.

APPLICATION
Mainly recommended for pieces with complex geometry and/or with high machining costs. Specifically designed for low and medium cutting speeds (turning, drilling, milling, broaching, ...).

ADVANTAGES

| | | |
|--|---|--|
| Reduced tool wear Productivity increase and/or savings in cutting tools. | Very good chip quality Defects in the pieces are avoided, no production stops due to chip accumulation... | Applicable to all the steel grades Case hardening, quench and tempering, microalloyed... steels. |
|--|---|--|

Improved machinability steels for high performance applications

MECAMAX® AV

Technology
MECAMAX® AV



Improved machinability steels for high cutting speeds

MECAMAX® AV STEELS
Improved machinability steels specifically designed to increase the productivity and/or to reduce the machining costs in high speed cutting operations. The MECAMAX® technology does not have a detrimental effect on the mechanical properties of the steel.

APPLICATION
• Specifically designed for high speed cutting operations (high speed turning, high speed milling, ...).

ADVANTAGES

| | |
|--|--|
| Tool wear reduction Productivity increase and/or savings in cutting tools. | Applicable to all the steel grades Case hardening, quench and tempering, microalloyed... steels. |
|--|--|

Improved machinability steels for high cutting speeds

MECAMAX® PLUS

Technology
MECAMAX® PLUS



Improved machinability steels for all the cutting speed range

MECAMAX® PLUS STEELS
Steels with improved machinability specifically designed to increase the productivity, to reduce the machining costs and to obtain improved transversal properties with regard to the conventional microalloyed steels.

APPLICATION
• Their use is recommended for pieces which require many machining operations using different tool geometries and a wide cutting speed range.

ADVANTAGES

| | | |
|---|--|--|
| Machining improvement at any cutting speed Productivity increase and/or savings in cutting tools. | Applicable to all the steel grades Case hardening, quench and tempering, microalloyed... steels. | Optimized transversal mechanical properties Improvement of the transversal properties with regard to the conventional microalloyed steels. |
|---|--|--|

Improved machinability steels for all the cutting speed range

Thank you very much



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