

BALIFOR M – The smart solution for high performance applications

The new Molybdenum-Nitride coating
for the automotive industry



Automotive



BALIFOR M

the MoN-solution for the automotive industry

The automotive industry is constantly challenged by legal, environmental, political and social expectations which have to be fulfilled within the industrial process at financially tolerable conditions.

Technological innovations also require new solutions for the production process. Where carbon-based coatings were the best fit, nowadays they might have to be replaced where the temperatures of the working environment rise too high or where aggressive lubricants have to be used.

If you need stable conditions in tribological contacts under high loads at high temperatures of up to 800° Celsius, BALIFOR™ M from Oerlikon Balzers guarantees the best protection of both friction partners.

The excellent compatibility with lubricants and additives is one of the main advantages of BALIFOR™ M. It is the alternative solution when carbon-based coatings suffer from thermal degradation and/or are not compatible with lubricants.

The advantages of BALIFOR M

Properties of MoN-based coatings can be adjusted over a wide range:

- 15 – 35 GPa film hardness
- COF in (minimum) lubricated systems similar to a-C:H (DLC about 0.06)
- High compatibility to lubricants and additives, not affected by MoDTC
- Stable up to 450° C, HT versions up to 800° C
- Very low wear and counter-body wear
- Gradient layers and running-in layers

BALIFOR M shows high performance in comparison to carbon-based coatings

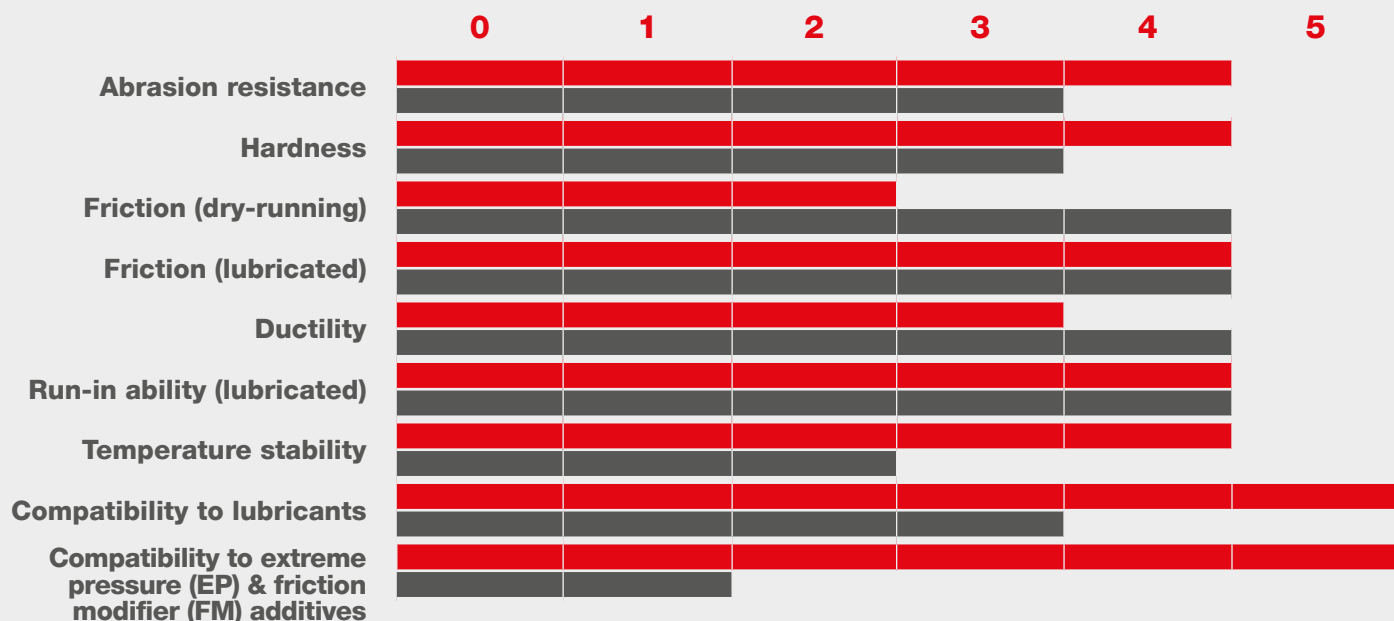
Carbon-based coatings are suitable for many applications in and around vehicles. But the stability of these coatings ends at approx. 350° C – under high load even at 250° C! BALIFOR™ M clearly proves its performance in direct

comparison when considering

- best wear protection under high stress
- remarkable low counter body wear, and
- operating under high temperatures

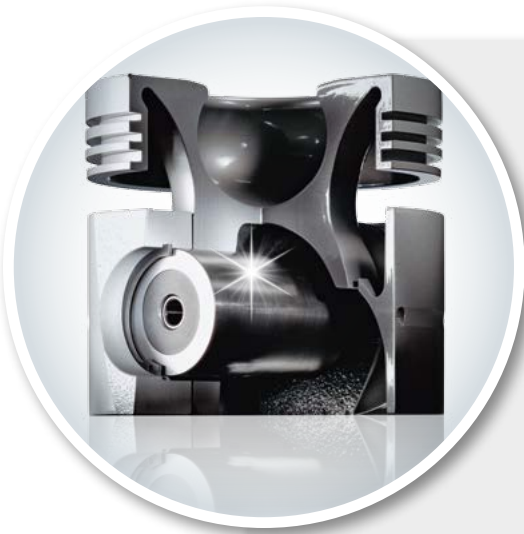
MoN based compared to DLC (a-C:H)

Subjective assessment in 6 steps from 0 (not suitable) to 5 (excellent)

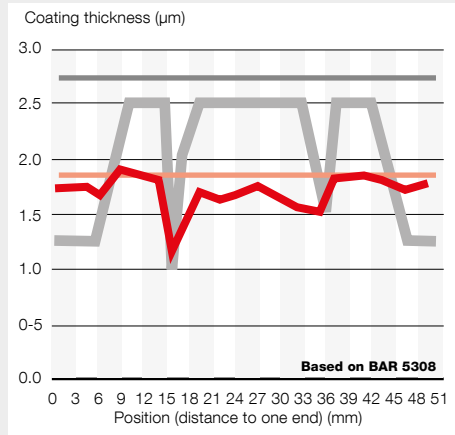


Applications of BALIFOR M

The state of the art MoN solution for the automotive industry



BALIFOR M for piston pins compared to DLC



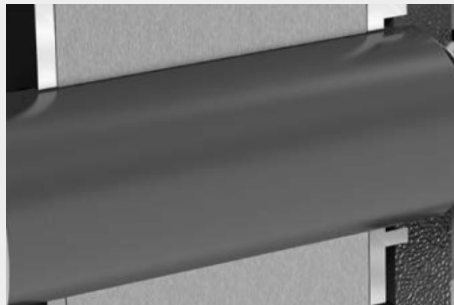
MoN coated piston pin after 500h engine test:

- noncritical wear at the edge of the con-rod bore
- schematic of a typical DLC wear profile

- Total thickness typical DLC-coating (µm)
- Nominal thickness typical DLC-coating (µm)
- Total thickness MoN-coating (µm)
- Nominal thickness MoN-coating (µm)



BALIFOR M shows the maximum friction reduction in exhaust tract applications at temperatures up to 800°C

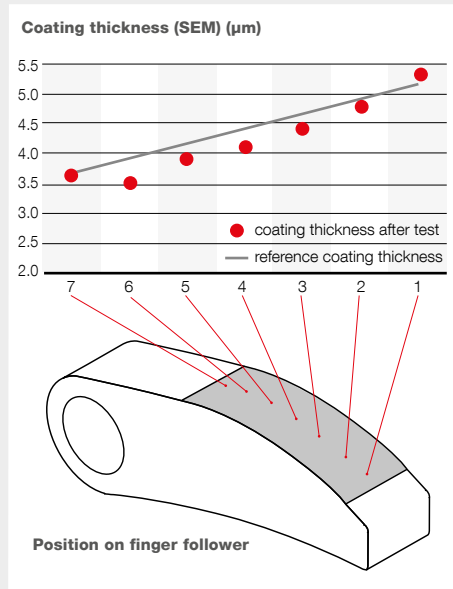


Friction reduction in a bearing:

- at temperatures up to 800°C
- at low to moderate loads
- multilayer MoN / AlTiN (formation of solid lubricant MoO₃ at higher temperatures)
- suitable for applications in the exhaust tract

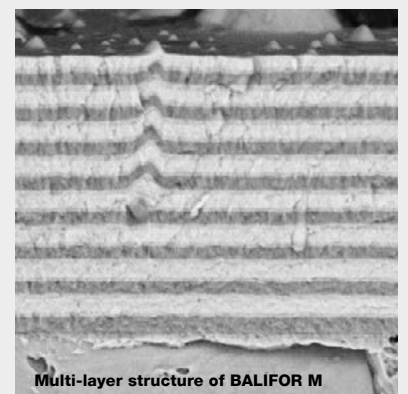


BALIFOR M the state of the art solution for Cam-followers



Cam-follower after life test:

- coating architecture adapted to cyclic impact stress
- maximum wear approx. 0.4 µm
- wear correlated to smoothing





**Learn more about our MoN-coating BALIFOR M!
Get in contact with us now!**

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