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A Brand like a friend

New Nanotechnology Developments for Corrosion Protection

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Content

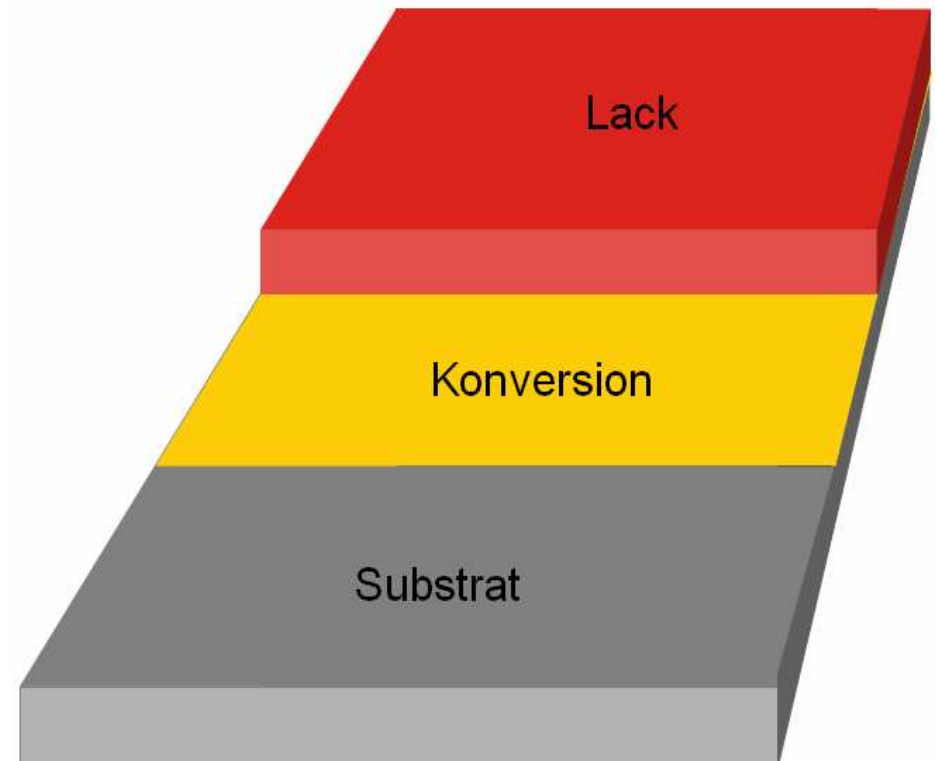


**Adhesive
Technologies**

- Tasks of metal pretreatment
- Traditional metal pretreatment: Iron- and Zincphosphating
- Question about Phosphating
- Presentation of „Nanoceramics“ – Bonderite[®] NT-1 & TecTalis[®]
 - Process
 - Benefits
 - Corrosion protection in comparison with traditional processes

Why metal pretreatment?

- **Prior to painting substrates are often:**
 - Dusty
 - Oily (forming oils, temporary corrosion protection)
 - Corroded (rust, welding scale)
- **Pretreatment provides:**
 - Cleaning
 - Paint Adhesion
 - Better Corrosion Protection

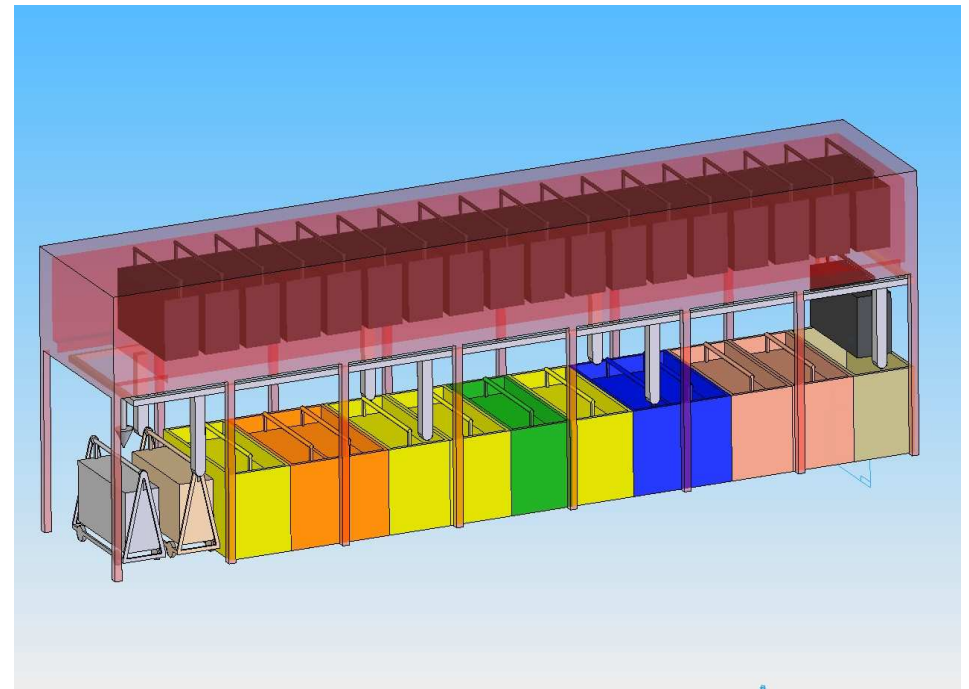


Traditional Metal Pretreatments



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- **Zincphosphating**
 - best corrosion protection
 - excellent paint adhesion
 - process difficult to monitor
 - very cost intensive
- **Ironphosphating**
 - simple, flexible process
 - moderate process costs
 - Low corrosion protection



Why should Phosphatings being replaced?



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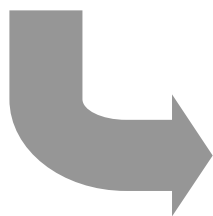
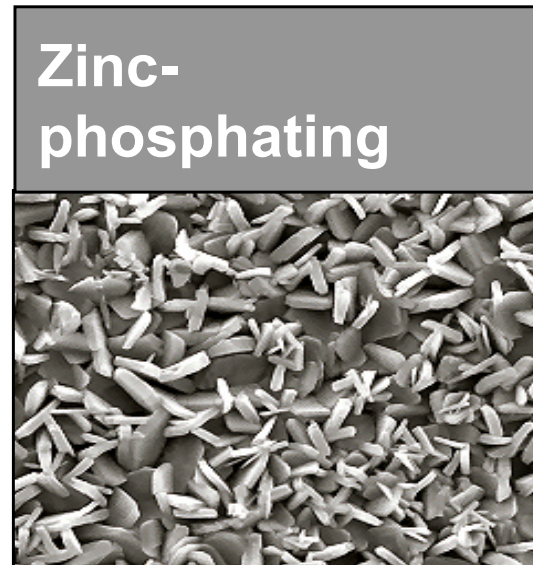
Question: “Which aspects of Zinc-/Fe-Phosphating are mostly unsatisfying?”

- **very high sludge formation**
- **very narrow process operation window – lot of parameter**
- **difficult multi metal pretreatment**
- **many process steps – lot of active bathes**
- **high amount of heavy metals (Zn, Mn, Ni)**
- **environmental unfriendly process (energy, phosphate, COD, heavy metals...)**

„Nanoceramics“ replace phosphating



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„Nanoceramics“ replace phosphating



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Which benefits provide „Nanoceramics“ with respect to



What are “Nanoceramics”



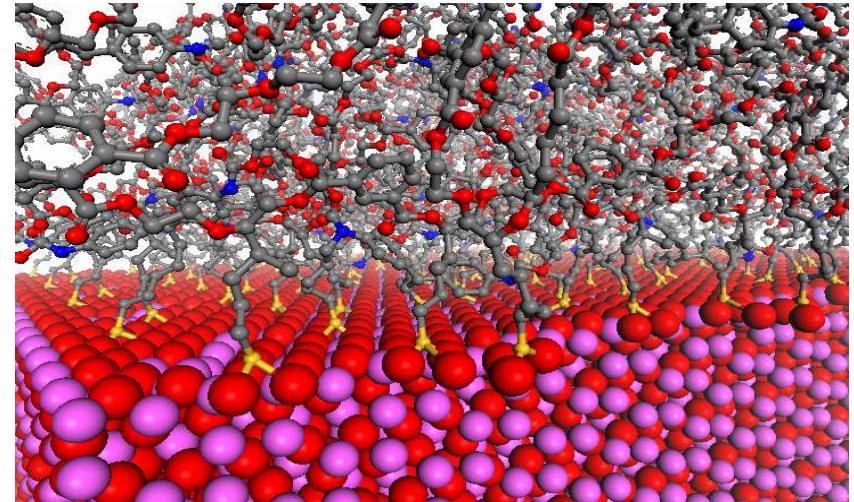
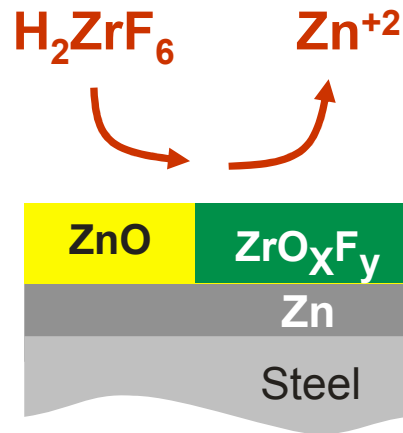
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- **phosphate free** metal pretreatment process
- provides excellent **paint adhesion and corrosion protection**
- **replacement** of iron- or zincphosphating
- **multimetal** pretreatment process (steel, zinc, aluminium)
- forming a thin “ceramic” conversionlayer (**Nanoceramics**)
- application in existing lines (**dip or spray**)

Nanocearmic coatings Chemical Reaction

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M = treated substrate; Fe, Zn, Al, Mg

pH = 3.8 – 5.0

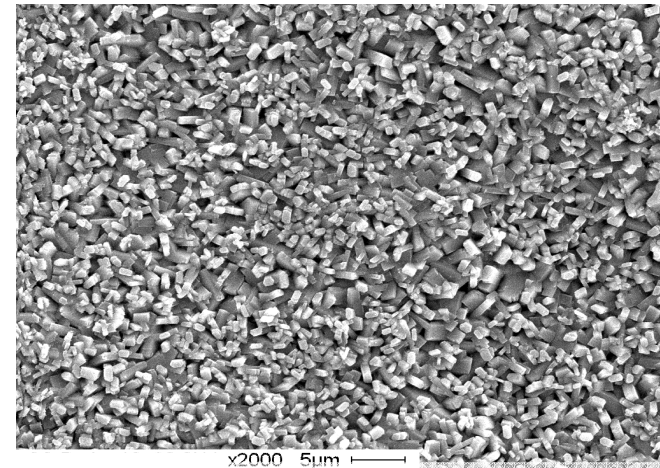
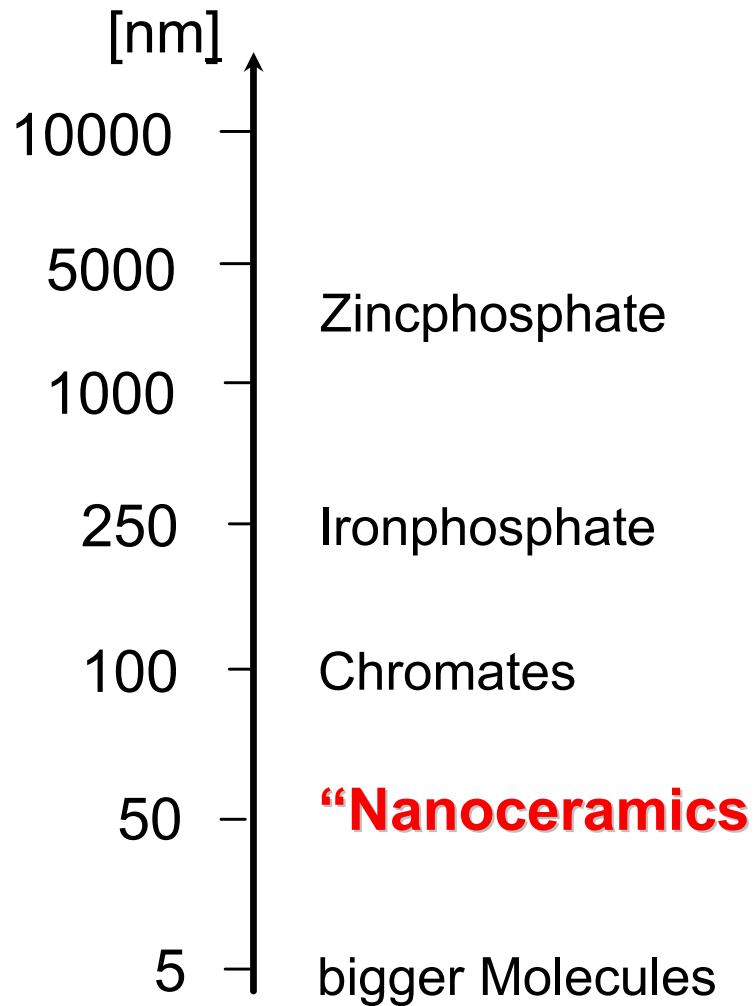
T = 10 - 50 °C

time = 30 - 180 s

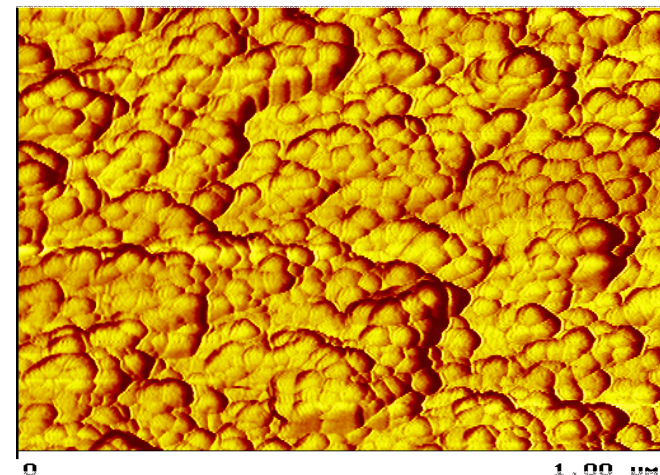
Nanoceramic Coating Dimensions



Adhesive Technologies



SEM (Scanning Electron Microscopy)
Phosphate Coating



AFM (Atomic Force Microscopy)
TecTalis Coating

Typical Bonderite® NT-1 process



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- Alkaline cleaning – the only heated step
- DI-Rinse prior to Bonderite® NT-1
- Conversion coating with Bonderite® NT-1 (20 sec. or more)
- DI-Rinse after Bonderite® NT-1
- Optional: Dryer after Bonderite® NT-1
- Powder coat, wet paint, CED/AEDC



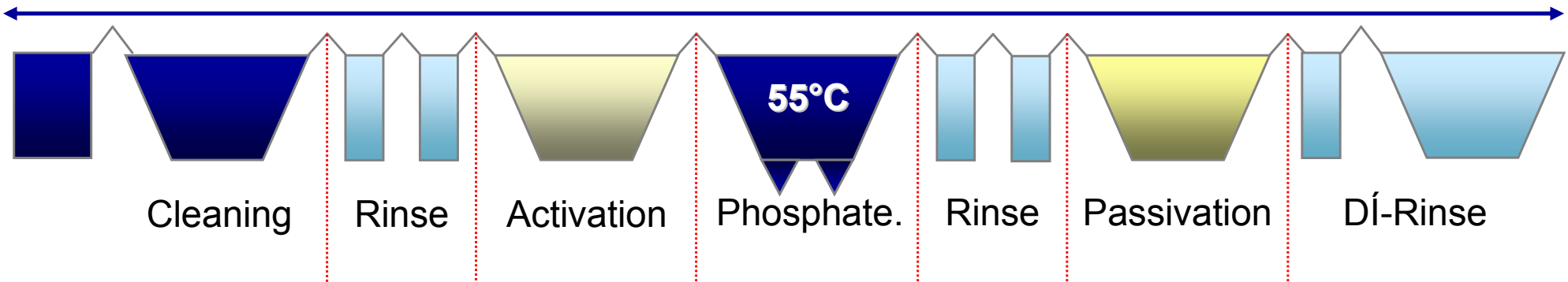
TecTalis[®] – process layout



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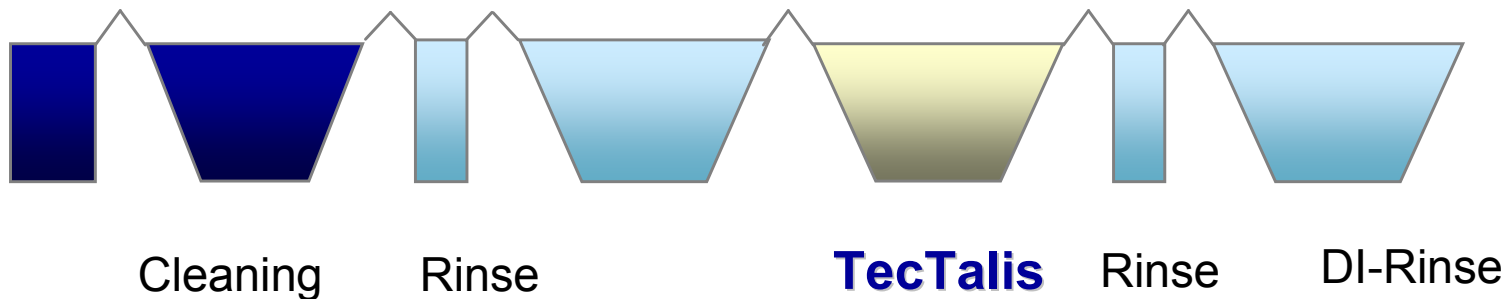
typical Zincphosphate line

230 m



typical TecTalis process

180 m



Corrosion protection and paint adhesion



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Corrosions tests

judgement of the area and the creep at the cut

- Constant climate test
 - Neutral Salt spray
 - Cycling climate test
 - Outdoor exposure
- DIN EN ISO 6270-2
DIN EN ISO 9227 AASS
VDA 621 415
VDA 621 414

Adhesion-tests

judgement before and after corrosion test

- cross hatch
- stone chip -test
- Erichsen-Tiefung



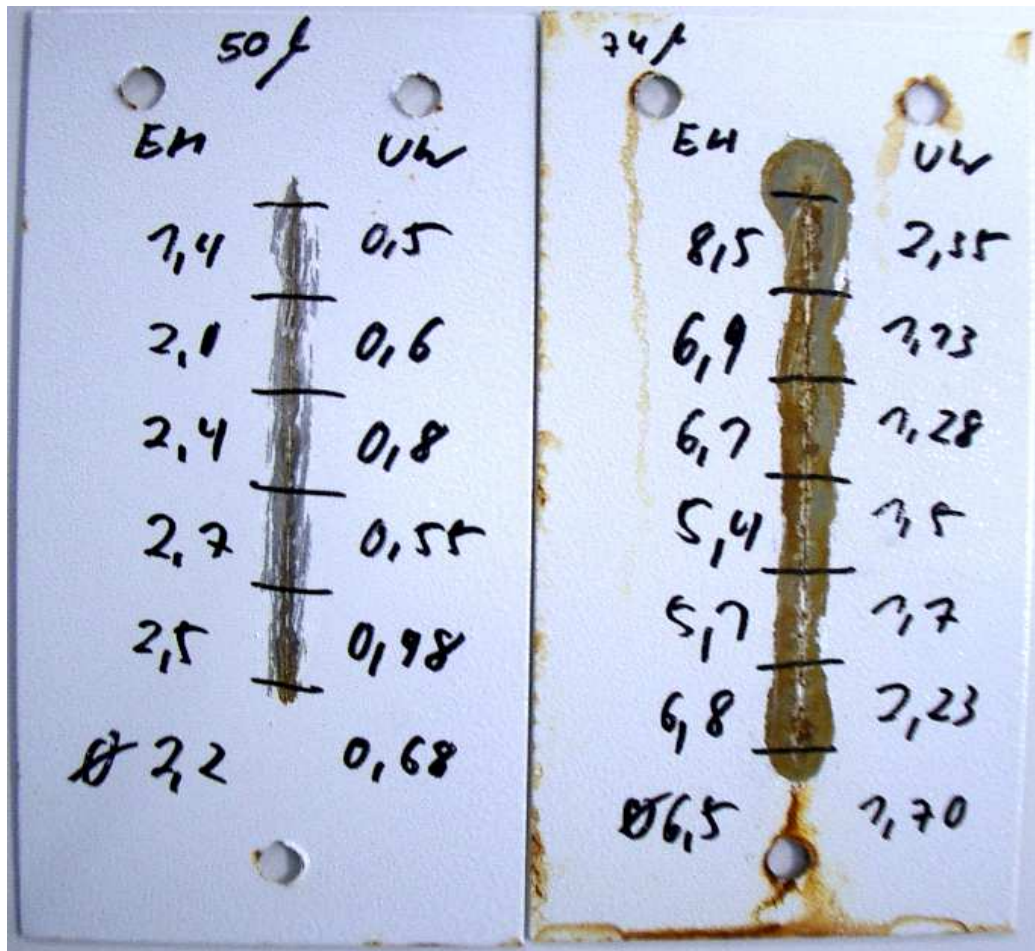
Performance: Bonderite® NT-1 vs FePhos



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Bonderite® NT-1

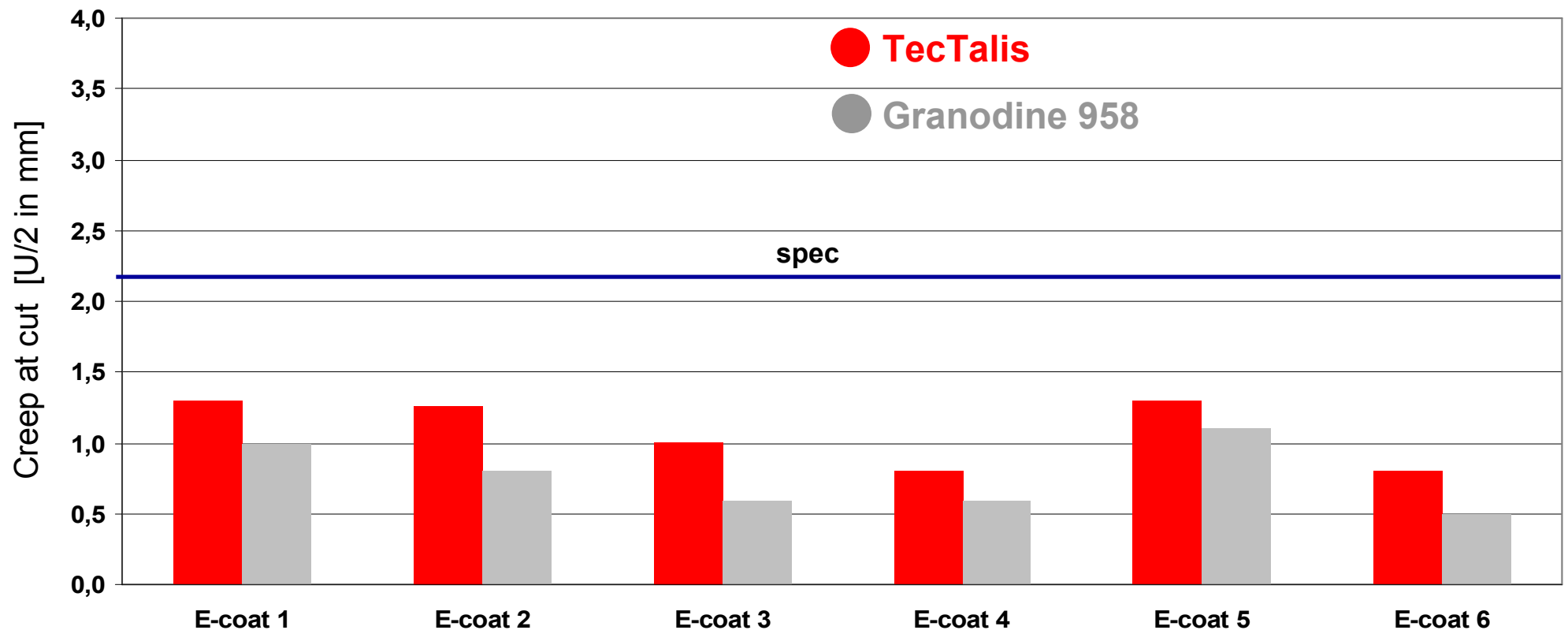
Fe-Phosphate



- Customer samples
- Creep after 500h NSS
- Bonderite® NT-1 (left)
 - **2.2 mm creep**
- Ironphosphate (right)
 - **6.5 mm creep**

Performance: Comparison Tectalis® vs ZnPhos

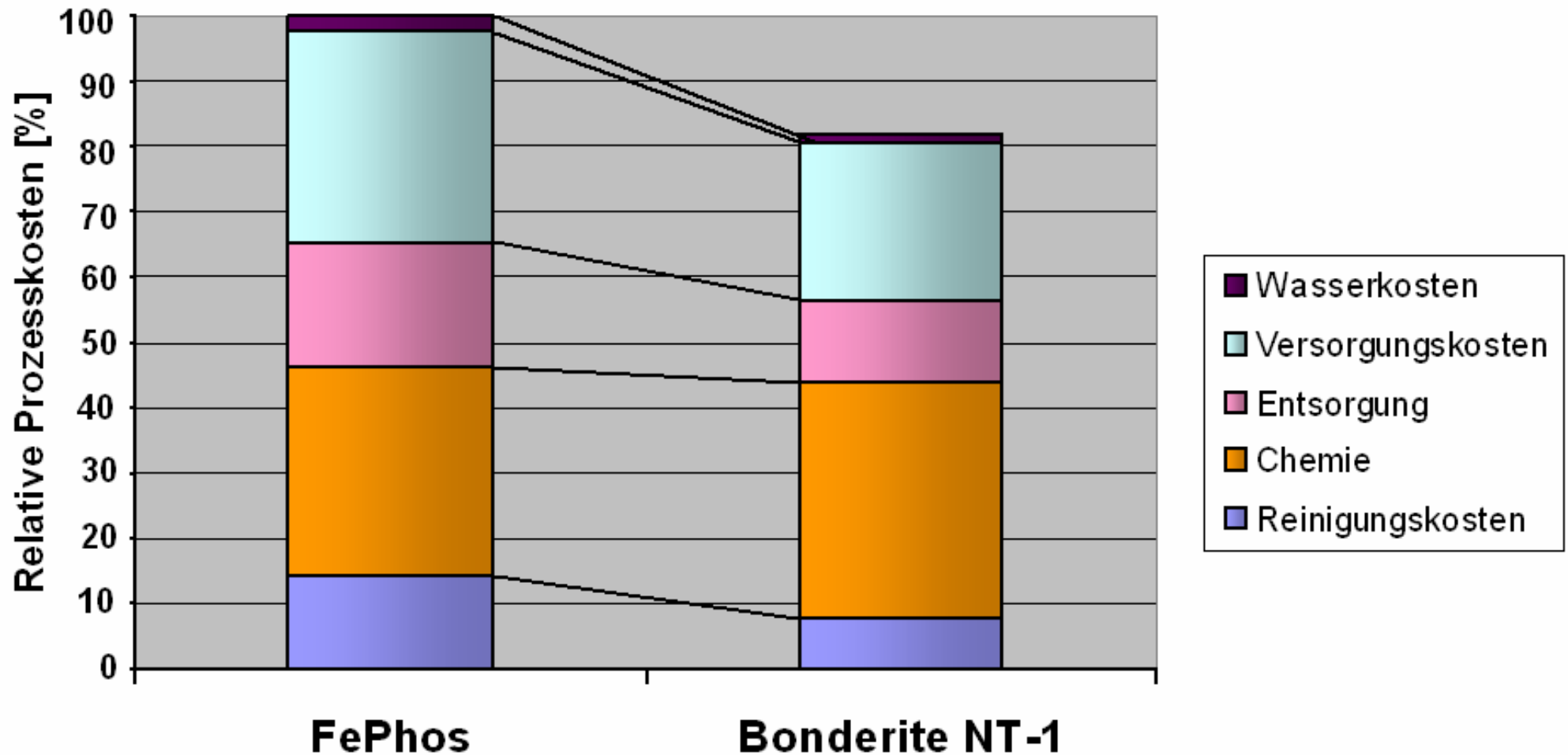
70 cycles VDA – Steel + CDP



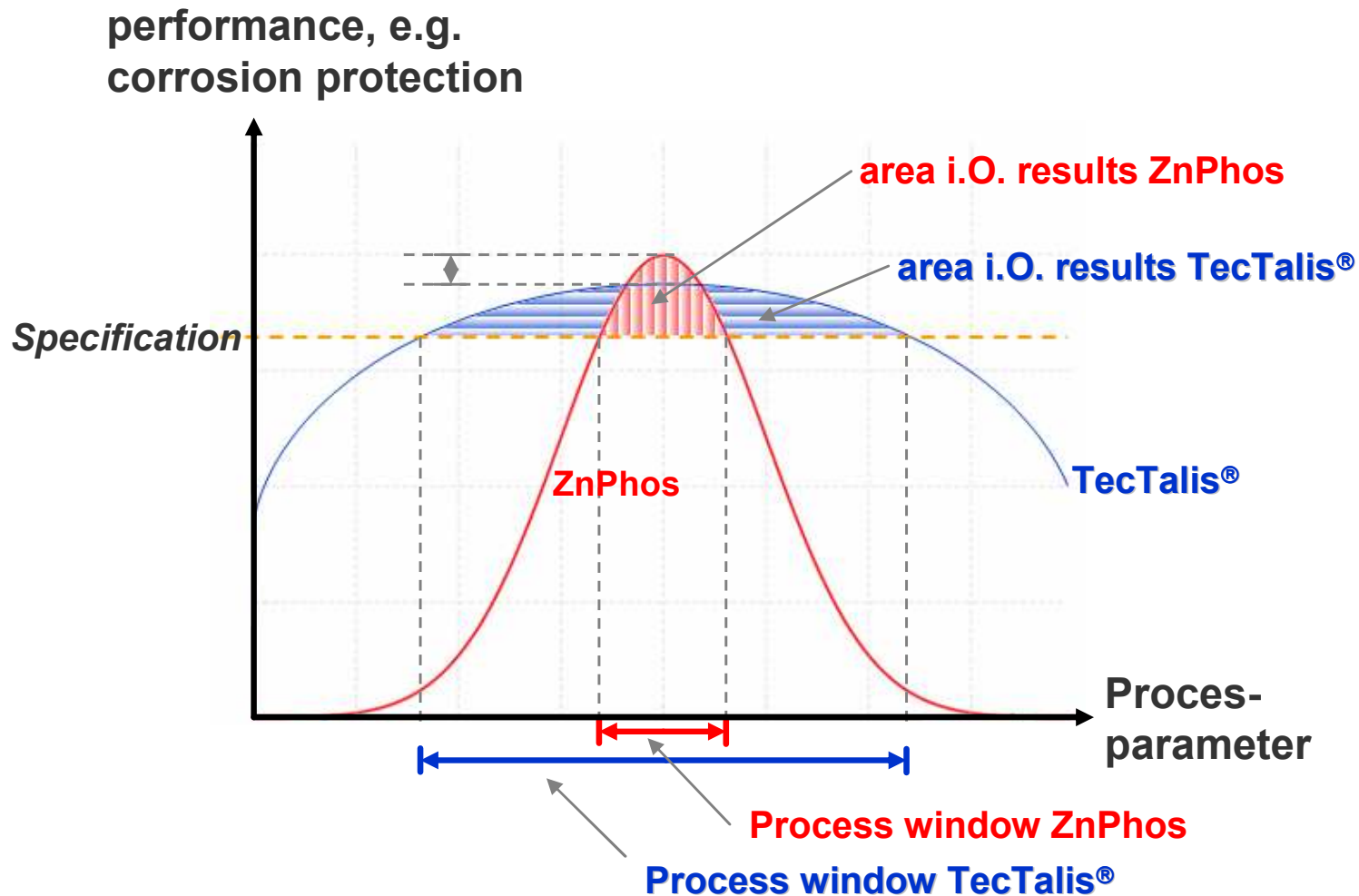
Comparison of process costs example:



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Performance – comparison ZnPhos vs TecTalis®



automatical processcontrole (Lineguard Supervisor) for critical parameter possible!!

Benefits of „Nanoceramics“ vs Phosphating



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Efficiency

- A lot of savings, e.g.
 - Maintenance and Cleaning
 - Water consumption
 - Heating (ambient temperature)
 - Sludge disposal
- Result in: Process costs decrease

Process

- conversion at ambient temperature
- short contact time
- simple bath monitoring (pH)
- real multimetal process

Environment

- low energy consumption
- no toxic heavy metals
- phosphate free conversion
- no contribution to COD
- less disposal (sludge)
- no hazardous substances

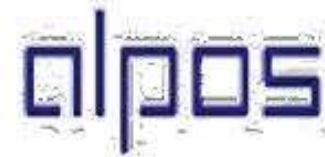
Quality

- enhancement of corrosion protection vs FePhos
- replacement of Zincphosphating in often possible
- Compatible with Al, Zn, steel and most available paint systems

„Nanoceramics“ - References



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Thanks for your attention!



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