DoD Workshop SUR/FIN 2010
Commercial Fastener Coatings
Dörken

Mr. Albert Gelles
Technical Manager, Doerken Corporation, USA.
**Commercial Fastener Coatings Dorken**

DOD Vehicle Workshop, 15-16 June 2010, Grand Rapids, MI. Sponsored by SERDP/ESTCP.
DELTA MKS

DELTA® protects surfaces.
Dörken

- A manufacturer, developer, and supplier of zinc-rich corrosion protective coating systems and technology.

- Primary Products and Trademarks:
  - DELTA®-TONE 9000 (Zinc Rich Basecoat)
  - DELTA-PROTEKT® KL 100 (Zinc Rich Basecoat)
  - DELTA®-SEAL (Organic Sealer, multiple colors)
  - DELTA-PROTEKT® VH (Clear Water-based sealer)
  - DELTACOLL® (Inorganic Sealer, multiple colors)
Ewald Dörken AG.

- Founded 1892
- 740 Employees, Exports to 30 countries, MKS reps. in 12 countries
- Global Tech-Center, Production, R&D located in Herdecke, Germany
- ~$250 Million Annual Sales
All product is manufactured in Germany

Benefits include:

- Global availability
- Global consistency
- Centralized R&D
- Environmental Compliance
Global Applicator List Available @ www.doerken-mks.com (infocenter, job coater)
NA Technical Center 11200 Cedar Knoll Drive - Grass Lake, MI 49240
Technical Center - Fastener Application Testing

Torque, Tension, Angle, Friction Testing
Technical Center – Coating Examination Testing

- Coating Thickness: X-Ray Fluorescence (Fischerscope)
- Coating Examination: Nikon Microscope
- Temperature and Humidity: ESPEC Platinous Chamber with Yokogawa Recorder
Technical Center – Corrosion Testing

- Cyclical Corrosion: Auto Technology Cyclical Corrosion Chamber
- Neutral Salt Spray Testing: Auto Technology Corrosion Test Chamber
The Delta-MKS Division of Dörken

- Over 30 years manufacturing and developing Zinc-Rich Corrosion Protective coating systems. (Delta®-Tone 9000)
- Solvent Based Chemistry Zinc-Rich Basecoats and Organic Topcoats.
- Water Based Chemistry for Clear Silicate Topcoats (Delta-Protekt® VH Series)
- All Products are Composed of High Grade Materials which ensures the highest quality attributes in the finished product.
Micro coating anti-corrosion systems

**Basecoat**
- Zn-Flake
  - DELTA®-Tone 9000 *(Inorganic)*
  - DELTA-PROTEKT® KL 100 *(Inorganic)*
  - DELTA-PROTEKT® KL 105 *(Inorganic/Integral Lube)*
  - DELTA-PROTEKT® KL 108 *(Inorganic/Hi CoF)*
  - DELTA-PROTEKT® KL 101 *(Inorganic)*

**Topcoat**
- for Zn-Flake Basecoat & Phosphate
  - DELTA®-SEAL *(Organic)*
  - DELTA-PROTEKT® VH 300, 301, & 302 *(Inorganic Water based)*
  - DELTA-PROTEKT® VL 411 & 450 *(UV)* *(Organic)*
  - DELTA®-Lube Clear, Blue & Green *(Organic Water Based)*

**Topcoat**
- for Electroplating
  - DELTACOLL® *(Inorganic)*
  - DELTA PROTEKT® VH 350, 351, & 352 *(Inorganic Water based)*
Zinc Rich Basecoats: DELTA® -Tone 9000 and DELTA-PROTEKT® KL 100

Composition:
- >70% Zinc Metal in Milled Flake Form
- Titanium Binder
- ~10% Aluminum

In Applied Form:
- Typical Coating Thickness <10µm
- Conductive
- Silver / Grey Appearance

May Be Applied To:
- Bare Steel Substrates (Degreased)
- Zn or Fe Phosphated Substrates
- Other Metal Alloy Substrates
Dörken Zinc-Rich Coating Systems

- May be applied to fasteners ≥M6. Smaller fastener sizes possible with special processing. (Thin coating system, 5-25 µm)
- No Hydrogen Embrittlement Due to Process Technique
  - Suitable for High Strength Fasteners.
- Always Chromium (VI)-free
- Integrated Friction Modification for Consistent Torque in Assembly
  - Average µtot = 0.10 – 0.16 (ISO16047)
  - Multiple friction levels available
- High Corrosion Protection
  - ASTM B117, ISO 9227 > 1000 Hours No Red Corrosion
  - ASTM G85 Annex 4 (S0₂) > 1000 Hours No Red Corrosion
  - GM9540P > 120 Cycles
  - SAE J2334 > 80 Cycles
DELTA®-TONE + DELTA®-SEAL

0 h SST

480 h SST

960 h SST

2000 h SST end of test without any red rust
120 Cycles GM9540P – Delta-Protekt KL 100 and Delta-Seal GZ Silver
ASTM G85-02 Annex 4 – Salt Fog/SO$_2$

Delta-Protekt KL 100 and Delta-Seal GZ Silver: 1008 Hours ASTM G85-02 Annex 4
Delta-Protekt KL 101
>5000 Hours ASTM B117
General application process.

1. Pretreatment
   - Degreasing
   - Shot blasting
   - Phosphating*
     *partly recommended

2. Coating
   - Dip Spinning
   - Dipping
   - Spraying
   - Spin coating

3. Preheating

4. Curing
   - Conveyor oven
   - Box oven
   - Inductive drying

5. Cooling
Coating application techniques.
Performance Specifications:
• ISO 10683 *Fasteners-Non-electrolytically applied zinc flake coatings*
• ASTM – Pending
• GMW 3359
Our markets.

- AUTOMOTIVE
- WIND ENERGY
- AEROSPACE
- CONSTRUCTION
- ENGINEERING
- OTHERS
Approved by all major OEMs worldwide*

*just a selection
Wind Energy Applications

- 15 years experiences protecting rotorblade assemblies:

**DELTA®-TONE + DELTA®-SEAL**
## Specification approval of the DELTA-MKS® systems.

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Sur/Fin 2010 Exhibitor – Booth #102

Fred Schultz
Vice President, North America
Telephone: 1 (517) 522-4600
eMail: fschultz@doerkenusa.com

Ron Strong
Fastener Specialist
Telephone: 1 (517) 522-4600
eMail: rstrong@doerkenusa.com

Steve Wilde
Technical Sales
Telephone: 1 (586) 855-8775
eMail: swilde@doerkenusa.com

Albert Gelles
Technical Manager
Telephone: 1 (517) 522-4600
eMail: agelles@doerkenusa.com

www.doerken-mks.com