



**DAVID R. KLUG
& ASSOCIATES, INC.**

6000 WATERDAM PLAZA DRIVE

SUITE 120

McMURRAY, PA 15317

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INTERNATIONAL MANUFACTURER'S REPRESENTATIVE SERVICES

SPECIALIZING IN

TUNNEL & MINE CONSTRUCTION APPLICATIONS

1. SEGMENTAL PRECAST CONCRETE TUNNEL LINING MANUFACTURING COMPONENTS

- 1.1 Dätwyler Gasket Sealing Systems, Schattdorf, Switzerland
Website: www.daetwyler-rubber.com
 - 1.1.1 Standard EPDM Gaskets
 - 1.1.2 Special Gasket Materials For Hydrocarbons
 - 1.1.3 Co-extruded (two component) Tunnel Gasket Profiles
 - 1.1.4 Hydrophilic Gasket Profiles

- 1.2 Anixter-Sofrasar Connection/Grouting Systems, Sarreguemines, France
Website: www.sofrasar.fr
 - 1.2.1 Steel Bolts With Plastic Sockets* Up To 38 mm Ø
 - 1.2.2 Steel Bolts With Steel Sockets* Up To 38 mm Ø
 - 1.2.3 Grout/Lifting Insert Assemblies Inclusive Of:
 - 1.2.3.1 Non-Return Valves Up To 10 Bar Resistance
 - 1.2.3.2 Sealing Screw Caps Up To 40 Bar Resistance
 - 1.2.3.3 Hydrophilic External O-Ring Seals
 - 1.2.4 Plastic Dowels For Circumferential Joint Connections
 - 1.2.4.1 Sof-Clip Dowel To Concrete
 - 1.2.4.2 Sof-Fix Dowel To Plastic Embedment
 - 1.2.5 Special Anchoring Systems
 - 1.2.5.1 For Divider Walls To Lining Connections
 - 1.2.5.2 For Rail Embedment To Concrete Connections

- 1.3 Ceresola Steel Moulds & Production Systems, Magden, Switzerland
Website: www.ceresola.com
 - 1.3.1 Precision Steel Moulds For Casting Precast Segments
 - 1.3.2 Carousel Plant Casting Systems Inclusive Of:
 - 1.3.2.1 Plant Layout And Design
 - 1.3.2.2 Concrete Handling And Vibrating Equipment
 - 1.3.2.3 Segment Curing Systems
 - 1.3.2.4 Segment De-moulding And Rollover Equipment
 - 1.3.2.5 Gasket Application Equipment

1. SEGMENTAL PRECAST CONCRETE TUNNEL LINING MANUFACTURING COMPONENTS

- 1.4 PennKote Ltd. Precast Segment Coating Systems
Website: www.pennkote.com
 - 1.4.1 PennSealer EE CT Epoxy Urethane Emulsion Coating – One Part
 - 1.4.2 Watertite SMA-2 Epoxy Polyurethane Coating – Two Part
 - 1.4.3 Other Specialty Coatings For Many Construction Applications
- 1.5 H-K Grout Bag Systems
Special Bags Installed To The Extrados Of Precast Segmental Linings And Inflated To Prevent Water Migration Behind The Precast Lining After Installation

2. TUNNEL REINFORCEMENT PRODUCTS

- 2.1 Steel Rebar Reinforcement
 - 2.1.1 Standard Fabricated Rebar Gr. 60 – 75 A625
 - 2.1.2 Prefabricated Rebar Panels Gr. 60 - 75 A706
 - 2.1.3 Special Rebar Reinforcement
 - 2.1.3.1 Stainless Steel Bar
 - 2.1.3.2 FRP Bar – For Tunnel Breakout Areas
 - 2.1.3.3 Epoxy Coated Bar
- 2.2 Welded Wire Fabric Reinforcement
 - 2.2.1 Standard Welded Wire Fabric 4"x 4", 6"x6" W2.1 – W4.0
 - 2.2.2 Specialty Welded Wire Fabric Up to D36.0, Wire Spacing as Required
 - 2.2.3 Supplied in Engineered Sheet Size to Minimize Waste
 - 2.2.3.1 Supplied Flat
 - 2.2.3.2 Supplied Prebent To Specified Radius
 - 2.2.4 FRP Welded Wire Fabric

3. ROCK BOLTING AND ANCHORING SYSTEMS

FiReP INTERNATIONAL AG, RAPPERSWIL, SWITZERLAND

Website: www.firep.com

- 3.1 FRP (Fiber Reinforced Polymer) Rock Bolts From FiReP AG
 - 3.1.1 Solid FRP Bolts – Available in 25 – 40 mm Ø
 - 3.1.2 Self-Drilling Grouted FRP Bolts
- 3.2 FRP Accessories
 - 3.2.1 FRP & Steel Nuts
 - 3.2.2 FRP, Plastic, & Steel Bearing Plates
 - 3.2.3 Spinning Tools & Grout Adapters
- 3.3 Anchoring Materials
 - 3.3.1 Polyester Cartridges For Solid FRP Bolts
 - 3.3.2 Cementitious Anchoring Grout For Self-Drilling Bolts

- 4. TUNNEL SCANNING AND PROFILING SERVICES**
DIBIT MEASURING TECHNIQUES USA INC., FAIRFAX, VA
- SERVICES PROVIDED ON A SUBCONTRACT BASIS BY TRAINED TECHNICIANS
Website: www.dibit-scanner.at
 - 4.1 Tunnel Profiling And Documentation During Construction
 - 4.1.1 Digital Recording Of Conditions Encountered
 - 4.1.2 Scanning Of Tunnel Excavation For "Tights"
 - 4.1.3 Documentation Of Placement Of Initial Support
 - 4.1.4 Documentation Of Placement Of Final Lining
 - 4.1.5 Electronic Record Of "As Built" Conditions
 - 4.2 Tunnel Profiling And Documentation Of Existing Structures
 - 4.2.1 Digital Recording Of Existing Tunnel Condition
 - 4.2.2 Scanning And Documentation Of Existing Tunnel Profile
 - 4.2.3 Development Of An Electronic Record For Future Comparison

- 5. FLEXIBLE MEMBRANE WATERPROOFING FOR NATM AND OPEN CUT TUNNELS**
WISKO AMERICA INC. TUNNEL WATERPROOFING, CHANTILLY, VA
Website: www.wiskoamerica.com
 - 5.1 Installation Of Membrane Waterproofing On Subcontracted Basis
 - 5.2 PVC Membrane System Installations
 - 5.3 Hydrocarbon Resistant Membrane Installations
 - 5.4 Special Waterbarrier Grid System Applications To Membranes Of Various Types
 - 5.5 Special Installation Procedures For Cut & Cover Tunnels
 - 5.6 Membrane Joint Testing Procedures For All Applications
 - 5.7 Special Mobile Scaffolding Systems For Waterproofing Placement

- 6. STEEL FORMING SYSTEMS FOR TUNNELS AND SHAFTS**
CERESOLA TLS AG, MAGDEN, SWITZERLAND
Website: www.ceresola.com
 - 6.1 Steel Forms For Placement Of Tunnel/Shaft Final Linings
 - 6.1.1 Running Tunnel Lining Forming Systems
 - 6.1.2 Station And Tunnel Enlargement Forming Systems
 - 6.1.3 Shaft Lining Forming Systems
 - 6.1.4 Open Cut Tunnel Lining Forming Systems
 - 6.1.5 Special Forming Systems Designed To Meet A Specific Requirement
 - 6.1.6 On-site Engineering Services Available

**7. SPECIALTY DESIGNER/CONSULTANT FOR TUNNEL CONSTRUCTION SYSTEMS
ROWA TUNNELING LOGISTICS AG, WANGEN, SWITZERLAND
Website: www.rowa-ag.ch**

- 7.1 TBM Back-up Systems
- 7.2 Special Plants for Rock Support and Installation
 - 7.2.1 Grout Injection Plants
 - 7.2.2 Shotcrete Application Systems
 - 7.2.3 Work Platforms in Tunnels & Shafts
 - 7.2.4 Special Lifting Platforms
 - 7.2.5 Ring Beam Erectors
- 7.3 Logistics Systems for Supply and Muck Disposal
 - 7.3.1 Transportation Systems
 - 7.3.2 Rotary Dumps
 - 7.3.3 Special Locomotives for Inclines or Declines
 - 7.3.4 Special Cars for Muck, Grout, or Segments
 - 7.3.5 Wireless or Cable Train Track Surveillance Systems
- 7.4 Consulting & Engineering Services
 - 7.4.1 Construction Procedures / Methods
 - 7.4.2 Construction Cycle Review & Development
 - 7.4.3 Productivity Evaluation & Calculations
 - 7.4.4 Installation Planning & Start-up Consultation
 - 7.4.5 Cost Development & Comparisons
 - 7.4.6 Risk Management Services

8. TUNNEL SUPPORT SYSTEMS – STEEL

- 8.1 Cold Rolled Structural Rings & Arch Supports
- 8.2 Liner Plates For Tunnel & Shaft Construction
- 8.3 Special Fabricated Steel Structures & Liners
- 8.4 Lattice Girders For NATM Tunnel Construction
- 8.5 Steel Lagging & Decking
- 8.6 Corrugated Structural Plate Portal Canopies

9. CEMENTITIOUS PRODUCTS

- 9.1 Ultra Fine Cements From Nittetsu/Surecrete
Surecrete Inc., Seattle, WA
Website: www.surecrete.com
- For Grouting In Advance Of Tunnel Excavation
- For Water Cut Off In Existing Tunnels
- For Other Geotechnical Water Cut Off Applications
- 9.2 Prepackaged Shotcrete Mixes
- Manufactured To Meet Project Design Requirements
- 9.3 Steel Fibers
- For Shotcrete Reinforcement
- For Precast Segmental Lining Reinforcement
- For Tunnel Final Lining Applications

10. SPECIALTY SERVICES

- 10.1 **KSL Construction Systems, Inc.**
D.R. Klug & Associates, Inc. is the exclusive marketing agent for KSL Construction Systems, Inc. a distributor of engineered reinforcement, geotechnical and support products used in underground heavy civil and mine construction projects.
Tel: 724-942-2450
Fax: 724-942-4671
- 10.2 **Consulting Services**
D.R. Klug & Associates Inc. Performs Consulting Service For Employee Placement Requirements, Specialty Contractor & Designer Evaluation Services and Alternative Construction Methodology Practices, All Associated With Work To Be Performed In The Underground Heavy Civil and Mine Construction Industry

11. CONTACT INFORMATION

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