



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

1994 LUMBER AVENUE

WHEELING, WV 26003

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INTERNATIONAL MANUFACTURER'S REPRESENTATIVE SERVICES

SPECIALIZING IN

TUNNEL & MINE CONSTRUCTION APPLICATIONS

1. PRECAST CONCRETE SEGMENTAL TUNNEL LINING MANUFACTURING COMPONENTS

- 1.1 Optimas, Sofrasar Tunnel Products, Sarreguemines, France
Website: www.optimas.com
 - 1.1.1 Steel Bolts With Plastic Sockets - Up To 38 mm Ø
 - 1.1.2 Steel Bolts With Steel Sockets - Up To 38 mm Ø
 - 1.1.3 Grout/Lifting Insert Assemblies Inclusive Of:
 - 1.1.3.1 Non-Return Valves Up To 10 Bar Resistance
 - 1.1.3.2 Sealing Screw Caps Up To 40 Bar Resistance
 - 1.1.4 Plastic Dowels For Circumferential Joint Connections
 - 1.1.4.1 Sof-Fix FD – 40kN Pull-Out & 60kN Shear for small dia. tunnels
 - 1.1.4.2 Sof-Fix Anix – Up To 300kN Pull-Out & 300kN Shear
 - 1.1.4.3 Bicones – Up to 500kN Shear
 - 1.1.5 Radial Joint Connection Systems
 - 1.1.5.1 Guide Rods – Up To 60mm Ø
 - 1.1.5.2 Sof-RadLink Connection System
 - 1.1.6 Utility Anchoring System Embeds
- 1.2 CTS Cordes Tubes & Seals GmbH & Co. KG, Boizenbug, Germany
Website: www.cordes.de
 - 1.2.1 Standard EPDM Gaskets – Up To 44mm
 - 1.2.2 Anchored EPDM Gaskets – Up To 44mm (No Adhesive Required)
 - 1.2.3 Special Gasket Materials For Hydrocarbons
 - 1.2.4 Hydrophilic Gasket Profiles
 - 1.2.5 Hydrophilic/EPDM Composite Profiles
 - 1.2.6 TBM Tunnel Starter Seals

1. PRECAST CONCRETE SEGMENTAL TUNNEL LINING MANUFACTURING COMPONENTS

- 1.3 Herrenknecht Formwork Technology Steel Segment Moulds
Schwanau, Germany
Website: www.herrenknecht-formwork.de
 - 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

2. TUNNEL REINFORCEMENT PRODUCTS

- 2.1 Steel Rebar Reinforcement for Shafts & Tunnels
 - 2.1.1 Standard Fabricated Rebar Gr. 60 – 75 A625
 - 2.1.2 Prefabricated (Flat or Pre-Bent) Rebar Panels Gr. 60 - 75 A706
 - 2.1.3 Special Rebar Reinforcement
 - 2.1.3.1 Stainless Steel Bar
 - 2.1.3.2 GFRP 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 GFRP Welded Wire Fabric
- 2.3 Fiber Reinforcement – Steel
 - 2.3.1 Precast Segmental Lining Reinforcement
 - 2.3.1.1 Glued Fiber
 - 2.3.1.2 Loose Fiber
 - 2.3.2 Tunnel Final Lining Applications
 - 2.3.3 Shotcrete Reinforcement
- 2.4 Synthetic Fiber – Bi-Component
Contec Fiber AG – Switzerland
Website: www.contecfiber.com
 - 2.4.1 Concrix ES 50mm Length For Shotcrete
 - 2.4.2 Concrix HS35 35mm Length For Precast
 - 2.4.3 Supplied Bundled For Easy Handling And Dosing
 - 2.4.4 Test Data For Long Term Creep Resistance Available

3. NITTETSU “SUPERFINE” ULTRAFINE CEMENT

- 3.1 SuperFine Cement From Nittetsu
- For Grouting In Advance Of Tunnel Excavation
 - For Water Cut Off In Existing Tunnels
 - For Other Geotechnical Water Cut Off Applications

4. ROCK BOLTING AND ANCHORING SYSTEMS

FiReP INTERNATIONAL AG, RAPPERSWIL, SWITZERLAND

Website: www.firep.com

- 4.1 GFRP (Glass Fiber Reinforced Polymer) Rock Bolts From FiReP AG
- 4.1.1 Solid GFRP Bolts – Available in 18 – 50 mm Ø
 - 4.1.2 Self-Drilling Grouted GFRP Bolts For Face Support
- 4.2 GFRP Special Application Bolts and Accessories
- 4.2.1 GFRP Cablex Multi-Strand Cable Bolt 20m+
 - 4.2.2 GFRP Tielock Form Tie Bar
 - 4.2.3 GFRP Powermesh Reinforcing Fabric
- 4.3 GFRP Soft-Eyes for Shaft Construction
- 4.3.1 Polyester or Vinylester Resin Reinforcement - Straight
 - 4.3.2 Polyester or Vinylester Resin Reinforcement - Prebent

5. TUNNEL SCANNING AND PROFILING SERVICES

DIBIT MEASURING TECHNIQUE USA INC., BELLEVUE, WA

- SERVICES PROVIDED ON A SUBCONTRACT BASIS BY TRAINED TECHNICIANS

Website: www.dibit.at

- 5.1 Tunnel Profiling And Documentation During Construction
- 5.1.1 Digital Recording Of Conditions Encountered
 - 5.1.2 Scanning Of Tunnel Excavation For "Tights"
 - 5.1.3 Documentation Of Placement Of Initial Support
 - 5.1.4 Documentation Of Placement Of Final Lining
 - 5.1.5 Electronic Record Of "As Built" Conditions
- 5.2 Tunnel Profiling And Documentation Of Existing Structures
- 5.2.1 Digital Recording Of Existing Tunnel Condition
 - 5.2.2 Scanning And Documentation Of Existing Tunnel Profile
 - 5.2.3 Development Of An Electronic Record For Future Comparison

6. **SPECIALTY WATERPROOFING AND GROUTING SERVICES**
RENESCO INC., MOOSSEEDORF, SWITZERLAND / CHANTILLY, VA
Website: www.renesco.com
 - 6.1 Installation Of Membrane Waterproofing Systems On Subcontracted Basis
 - 6.2 PVC and FPO (Hydrocarbon Resistant) Membrane System Installations
 - 6.3 HDPE and VLDPE Membrane System Installations
 - 6.4 Spray Applied Waterproofing Application
 - 6.5 Specialty Grouting and Injection Services on Subcontracted Basis
 - 6.5.1 Cementitious Grouting
 - 6.5.2 Chemical Grouting
 - 6.5.3 Contact Grouting
 - 6.5.4 Compensation Grouting

7. **STEEL FORMING SYSTEMS FOR TUNNELS AND SHAFTS**
EUROFORM S.R.L., GESSATE (MI) - ITALY
Website: www.euroformsrl.com
 - 7.1 Steel Forms For Placement Of Tunnel/Shaft Final Linings
 - 7.1.1 Running Tunnel Lining Forming Systems
 - 7.1.2 Station And Tunnel Enlargement Forming Systems
 - 7.1.3 Shaft Lining Forming Systems
 - 7.1.4 Open Cut Tunnel Lining Forming Systems

8. **SPECIALTY DESIGNER/CONSULTANT FOR TUNNEL CONSTRUCTION SYSTEMS**
ROWA TUNNELING LOGISTICS AG, WANGEN, SWITZERLAND
Website: www.rowa-ag.ch
 - 8.1 TBM Back-up Systems
 - 8.2 Special Plants for Rock Support and Installation
 - 8.2.1 Grout Injection Plants
 - 8.2.2 Shotcrete Application Systems
 - 8.2.3 Work Platforms in Tunnels & Shafts
 - 8.2.4 Ring Beam Erectors
 - 8.3 Logistics Systems for Supply and Muck Disposal
 - 8.3.1 Transportation Systems
 - 8.3.2 Rotary Dumps
 - 8.3.3 Special Locomotives for Inclines or Declines
 - 8.3.4 Special Cars for Muck, Grout, or Segments

9. TUNNEL SUPPORT SYSTEMS – STEEL

- 9.1 Cold Rolled Structural Rings & Arch Supports
- 9.2 Liner Plates For Tunnel & Shaft Construction
- 9.3 Special Fabricated Steel Structures & Liners
- 9.4 Lattice Girders For NATM Tunnel Construction
- 9.5 Steel Lagging & Decking
- 9.6 Corrugated Structural Plate Portal Canopies

10. SPECIALTY SERVICES

10.1 Klug Construction Systems, LLC

D.R. Klug & Associates, Inc. is the exclusive marketing agent for Klug Construction Systems, LLC, a distributor of engineered reinforcement, geotechnical and support products used in underground heavy civil and mine construction projects. Klug Construction Systems, LLC has an international customs broker that coordinates the shipment from foreign manufacturing plant to the project site in North America with minimum customer involvement.

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11. CONTACT INFORMATION

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