

# MIN-E-CON

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Micro Miniature Interconnection Assemblies

# ABOUT MIN-E-CON

- Located in Irvine, California
- Over 40 years in business
- All product built in Irvine CA facility.
- Privately owned
- Focus is entirely on micro connectors and harnesses

# PRODUCT OVERVIEW

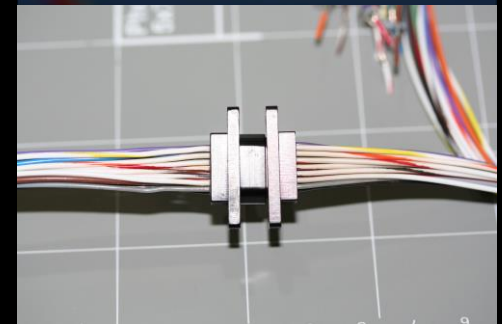
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Min-E-Con

# PRODUCTS - MICRO-D - MIL 83513

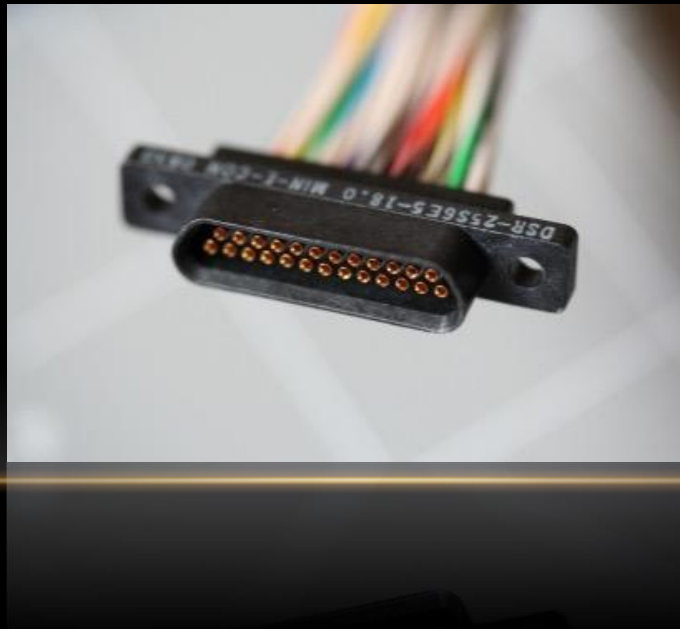
- Micro-D Connector

- Based off of the MIL-DTL-83513 but highly upgraded
- Used widely in the down hole industry for decades
- Available in 9, 15, 21, 25, 31, 37, 51, 60 and 100 contacts
- Multiple hardware/attachment options
- Right angle and vertical mount with PC tails
- Wire to Wire and Wire to board configurations
- Machined Aluminum Shell
- Interfacial Seal
- 200C Rated
- Rated at 3A, 600VAC Max per contact at ambient
- 2000 Matings
- Min-E-Con Designation - MNR (200C, Nickel Shell) or MBR (200C, Black Anodized shell)



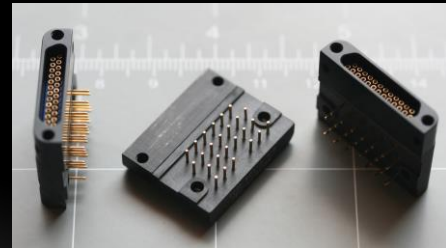
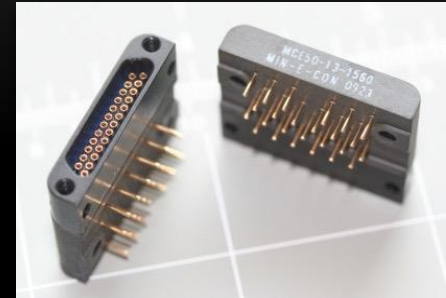
# MICRO-D - LOW PROFILE

- Available in plastic or machined Aluminum shell
- Performance similar to standard Micro-D
- The MEC low profile is also known as the Original D or Small D connector.
- The low profile version has a smaller height dimension than the traditional micro-d.
- Does not mate with standard micro-d's
- Min-E-Con Designation - DSMR (Metal Shell) & DSR (Plastic Shell)



# MICRO-D - LOW PROFILE WITH CHAMFERED EDGES

- Micro-D - Low Profile with Chamfered Edges
  - Most compact Micro-D package
  - Black anodized shell
  - Very Low Profile
  - Right angle PC board and wire to wire configurations
  - Designed to fit in circular tool housings
  - Min-E-Con Designation - DNBR



# MICRO-D - HYBRID POWER AND SIGNAL

- Utilizes traditional micro-d contacts for signal and larger (16 AWG/.062) contacts for power
- Power contact - 13A rating at ambient temperature
- 8 signal & 6 power and 9 signal & 4 power
- Other layouts possible



# PRODUCTS - STEAM SEALED CONNECTORS

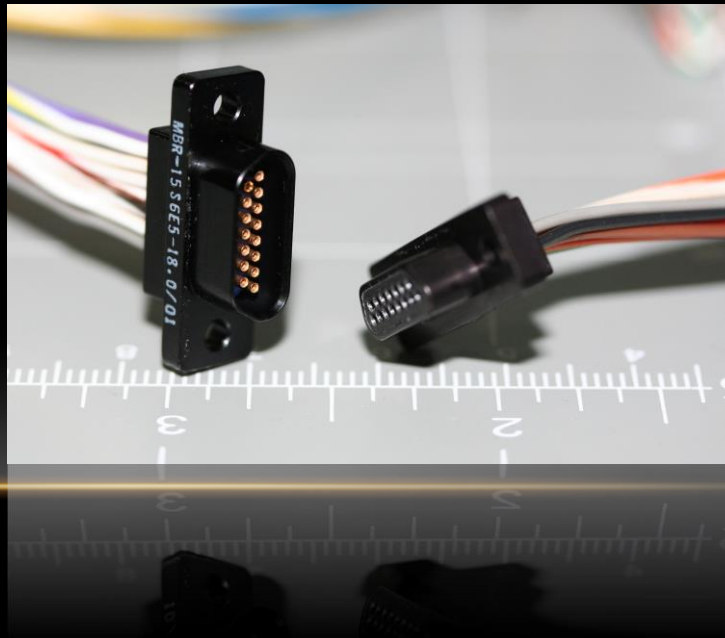
- MEC offers connectors with additional sealing for high pressure steam applications
- The sealing is achieved by adding a layer of hydrophobic material between the insulator and the epoxy back potting.
- This development was in response to SLB testing that determined steam was damaging connector back potting in some applications.
- No change to connector dimensions or usage. Available in most micro-d styles
- Connectors tested to - **500 hours at 100% humidity at 175C**
- Simply add suffix code /06 to any wired code to get a high temp with additional sealing - i.e. MBR15P6E518.0 /06





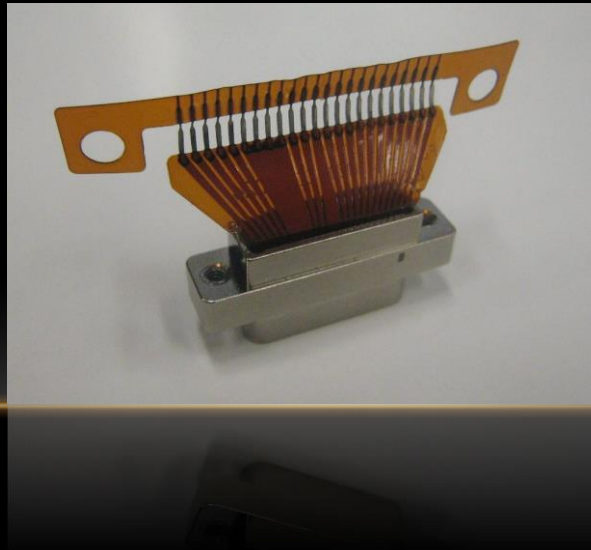
# NON-MAGNETIC CONNECTOR OPTIONS

- MEC offers several non magnetic options for its micro-d's
  - Plastic Shell or:
  - Black anodized Aluminum shells (instead of Nickel plate). Suffix /06
  - Special contacts - No Nickel flash between BeCu and Au plate. Suffix /07
  - Insulator remains standard PPS. Shell remains Aluminum.
  - No Change to standard connector dimensions - available option for any micro-d style
  - Suffix code /07 calls out Black anodized shell with no Nickel on contacts.



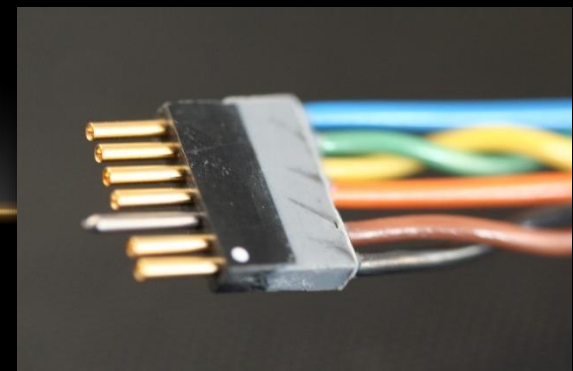
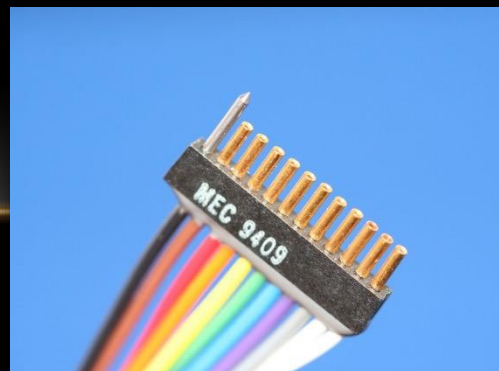
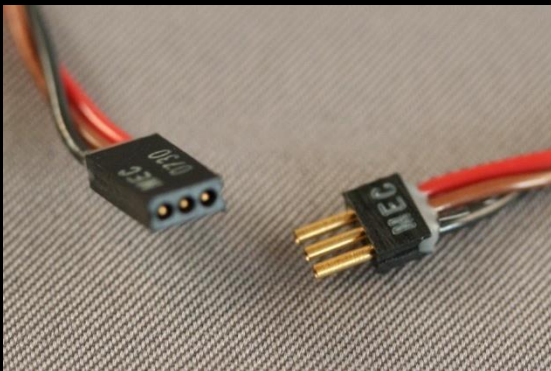
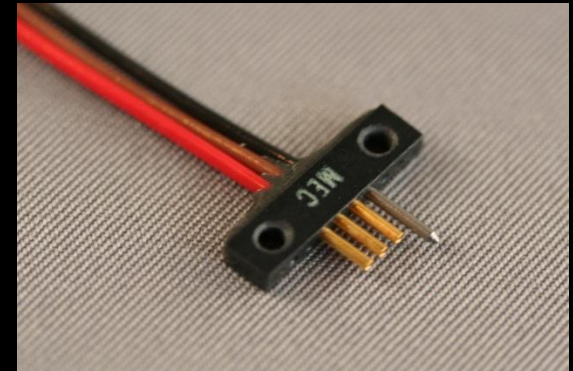
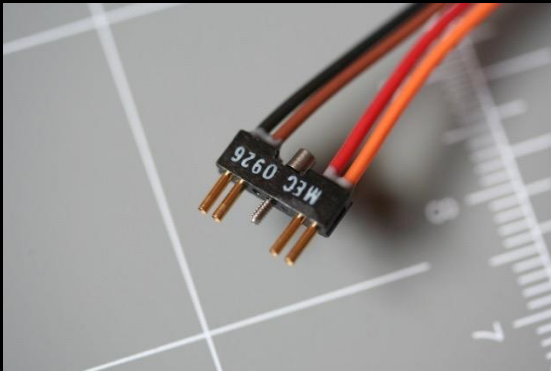
# FLEX CIRCUIT TO MICRO-D

- Min-E-Con can terminate most flex circuit designs into connectors.
- Flex circuits offer many advantages including space savings and routing options superior to traditional wiring.
- We can work with your approved flex circuit manufacturer on the terminations we need to install into our connectors and deliver a terminated product to you.
- If you do not have a flex circuit manufacturer we can work with our local supplier to provide you what you need to your specifications
- “Sculptured Flex” terminations are ideal for terminating to our Micro-D



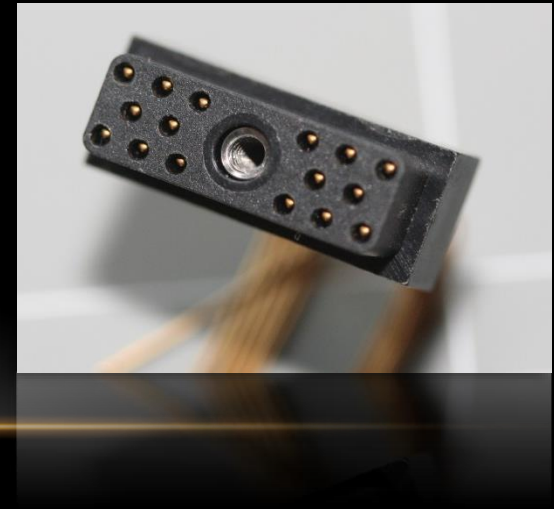
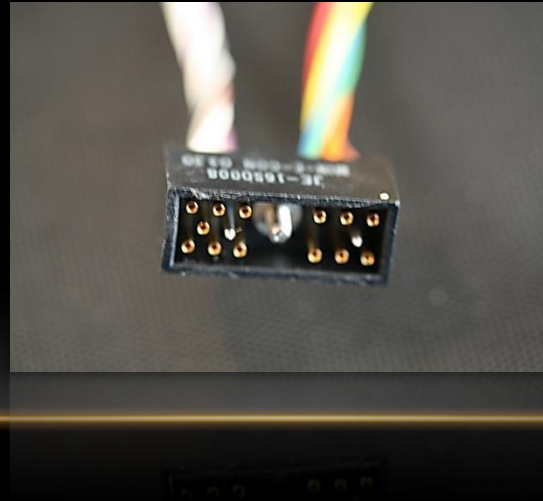
# PRODUCTS – STRIP CONNECTOR

- Strip Connector:
  - Modular, Highly Configurable, Cost Effective, Shorter Lead Time
  - Stackable
  - Utilizes same High-Rel Contacts as the Micro-D - 3A/600V
  - High temp - 200C
  - Many options and configurations - Guide Pins, Jackscrews and board mounting holes



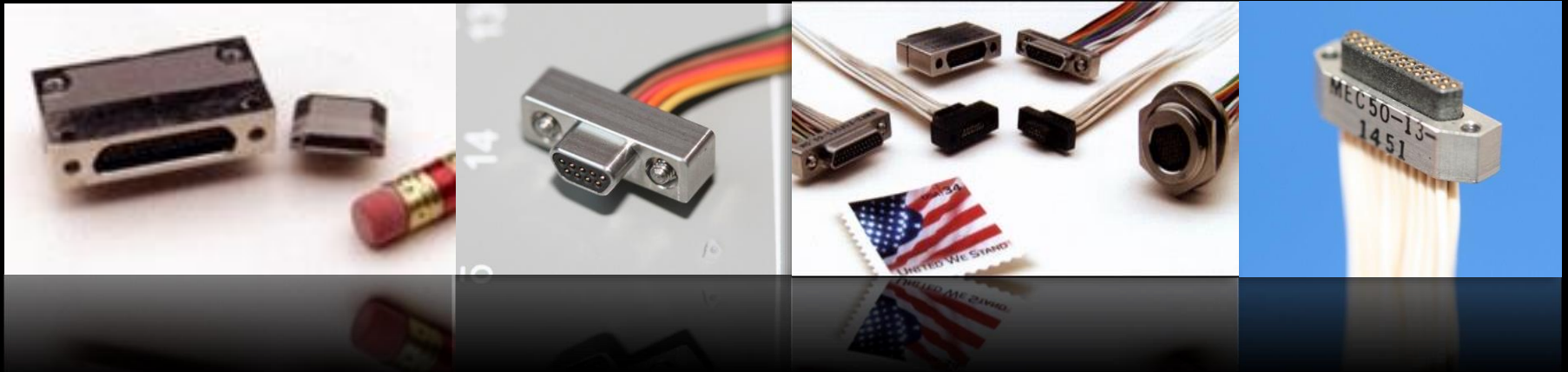
# PRODUCTS – J SERIES

- Space saving design
- Ryton/PPS body. Contacts – 3A, 600V Max
- 200C Rating
- Center jackscrew
- Same high reliability contact systems as micro-d. 200C rated
- Wire to wire, wire to board, PC tails



# PRODUCTS - NANO

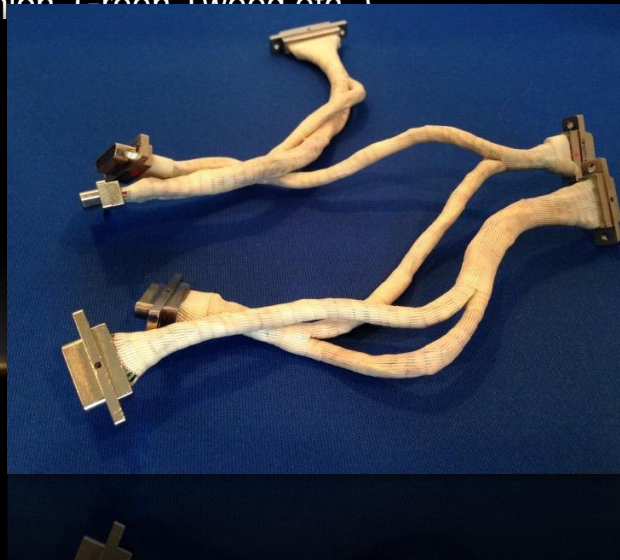
- Smallest connector available
- Body is machined Stainless Steel
- Contact design is the same as Micro-D but scaled smaller
- Nano is 1/5 size of the micro-d
- High reliability. 200C rated. 1A, 250V per contact Max.
- Wire to wire, Wire to board. Right angle PC mount.
- NMR1 is Nanonics drop in replacement with .025 centerline spacing
- NMR2 is for new design - .030 centers with significant improvements over NMR1
- Dual Lobe Nano also available.





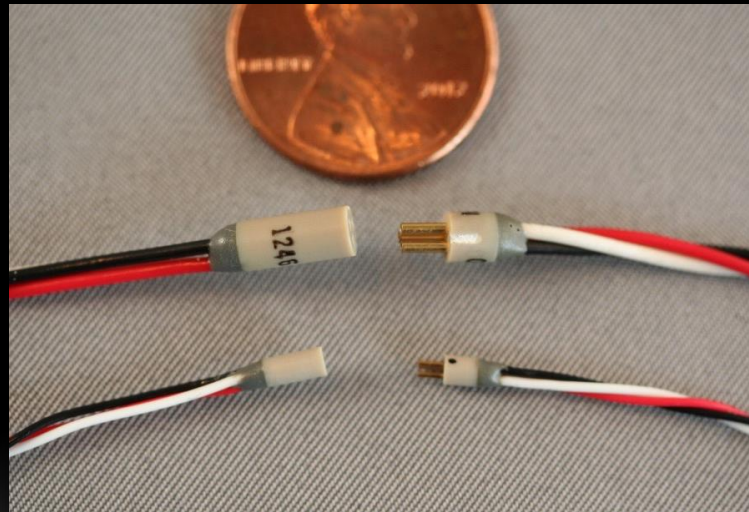
# PRODUCTS - CUSTOM HARNESSES

- MEC builds complex harnesses involving any number of connectors.
- 40% of total business is building harnesses
- MEC harnesses do not have splices
- Double Crimps are possible with Min-e-con contacts and no others.
- Harnesses are 100% quality tested
- Can be tape wrapped, sleeved, labeled, lacing cord to customer specifications
- Harnesses can incorporate other products such as
  - Toroids / Filters
  - PC boards
  - Other manufacturers connectors
  - Contacts (Winchester, Kemlon, Green Tweed etc.)



# PRODUCTS – PEEK FLEX MICRO & NANO

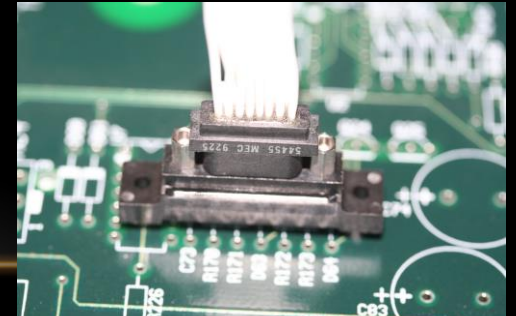
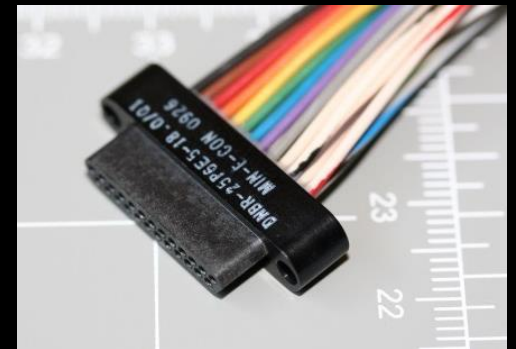
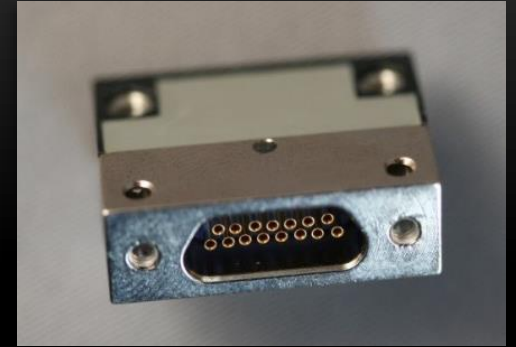
- Bodies machined from PEEK and populated with micro or nano contacts
- Very flexible form factor – can be modified to suit customer needs quickly
- Available in any contact number
- Available in any shape
- High temp 200C
- Options – guide pins, jackscrew, pc tails, alignment marks, hermaphroditic



Circular Micro & Nano - 3 Contacts

# PRODUCT CUSTOMIZATION

- A large amount of what we do is specialty and custom.
- Many of the products we think of as standard today began as requests from custom product
  - The Brick
  - The Hybrid
  - The DNBR (Chamfered Edge)
- Challenge us with what you need!



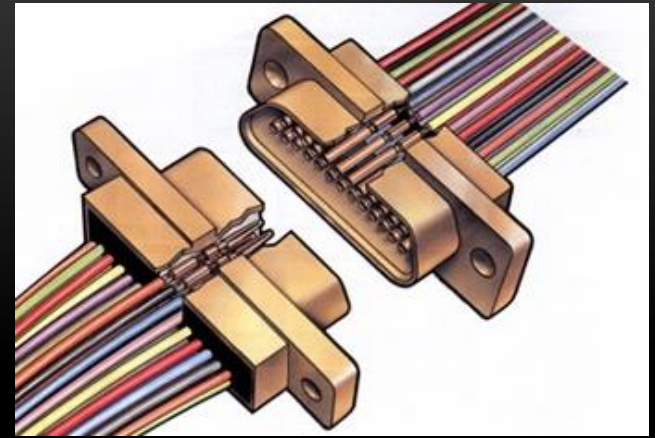


# MIN-E-CON FEATURES AND BENEFITS

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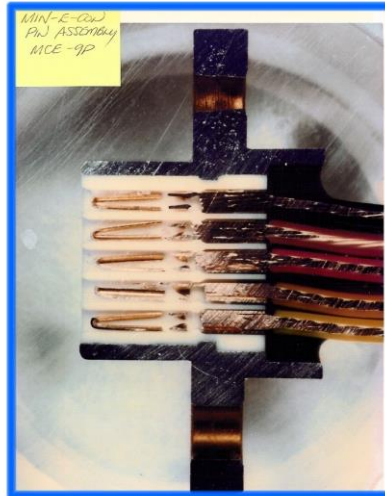
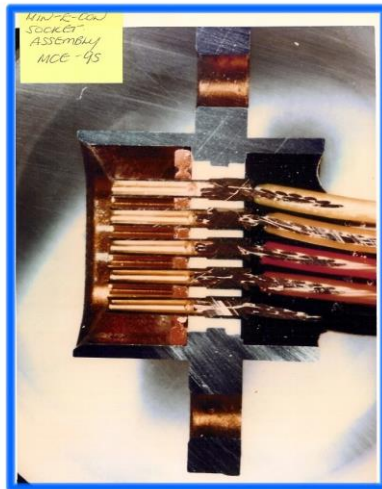
# MIN-E-CON CONTACTS

- The Min-e-con pin contact is a dual cantilever design.
- The male pin is protected in the cavity of the plastic insulator
- The tubular machined socket is exposed and guided into the pin insulator cavity by means of a lead in chamfer
- Once mated - the compressed beams of the pin contact provide constant pressure resulting in high reliability and unlimited points of contact between pin and socket.
- The system provides low insertion forces and 2000 mating cycles
- The male contact is constructed from a special alloy designed to prevent stress relief at high temperatures. This is an upgrade over traditional BeCu materials.



# MIN-E-CON INSULATOR SYSTEM

- Min-E-Con molds the insulator into the shell. This guarantees retention of the insulator body. In other connectors - insulators are glued, clipped or friction fit into the shell.
- Min-E-Con uses a patented Fifty-Lok system to retain the contact within the insulator.
- The Fifty-Lok system uses shoulders molded into the insulator that capture the contact retention clips and prevent removal.
- Min-E-Con Uses a proprietary back potting to stake the exiting wires and provide sealing and strain relief. This system can be augmented with an additional layer of sealing for applications where steam and moisture is expected.



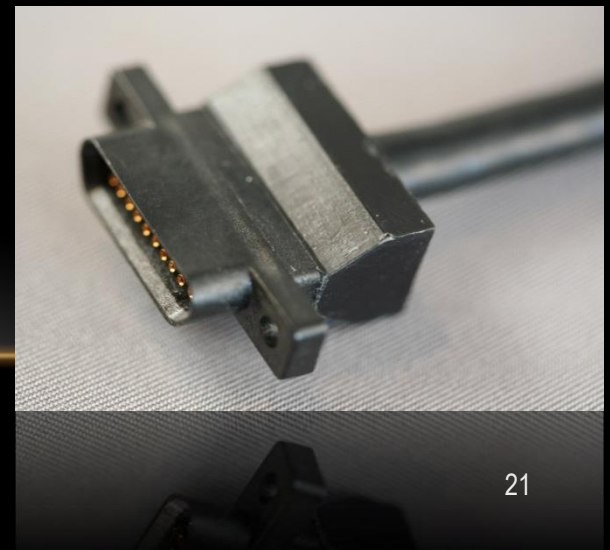
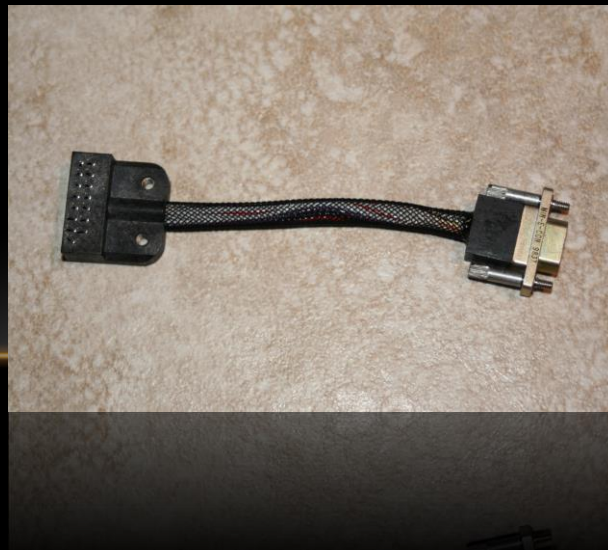
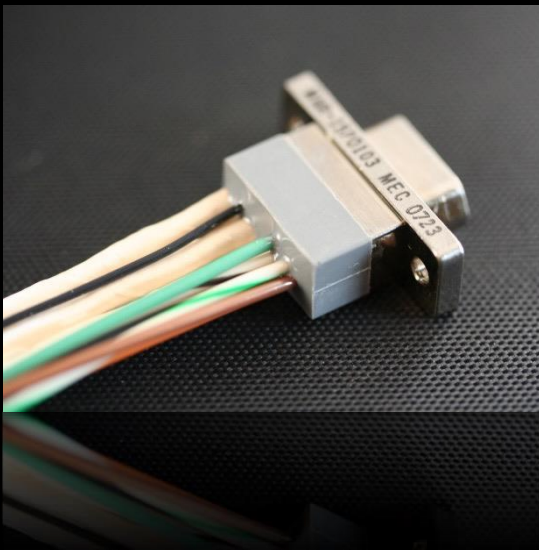
# MIN-E-CON WIRE TERMINATIONS

- Wires are machine stripped and crimped into contacts before being inserted into the connector.
- Teflon wires are carefully etched to allow greater adhesion to the epoxy
- Customers can specify particular wires if custom wires are needed.
- The open crimp area of the MEC contact allows special wire terminations
  - Double Crimping - multiple wires into single contact
  - Shield termination
  - Terminating single wire to multiple contacts
  - Splicing



# EPOXY BACK POTTING

- MEC uses a proprietary back potting to stake and seal the back of the connector.
- Back potting can be customized and extended to customer dimensions
- Extended back potting can provide :
  - Added strain relief
  - Right angle and 45 degree wire exits
  - Gripping areas for ease of mating and un-mating.
  - Added coverage and security for complex double crimping, shield terminations and splicing.
  - Termination of cable jackets or woven sleeving



# THANK YOU

- We appreciate your time !
- We are here to support you, let us know how we can help!