

**EGS** |  
Electrical Connection Products



# Quality Assurance/Certifications

## Quality Program

- ASME NQA-1
- ANSI N45.2
- ASME B31.1
- ASME Section IX
- AWS
- 10CFR50 Appendix B
- 10CFR21
- IEEE 323
- IEEE 344
- CSA Z299
- CSA N285
- CSA B51
- NUPIC and NIAC audited

## Certifications

- ASME Section III, N, NA, NPT
- ASME Section III Class 1, 2, 3 and MC
- ISO 9001

## Employee Involvement

- Appendix J Program Owners Group
- Ice Condensers Users Group (ICUG)
- ASME NQA-1 Committee
- IEEE-323 Standard Committee
- IEEE-344 Standard Committee
- IEEE-C37.98 Standard Committee
- IEEE-C37.105 Standard Committee
- IEEE-SC-2 Standard Committee
- IEEE-649 Standard Committee
- IEEE-NPEC Conformity Assessment Steering Group (CASG)
- EPRI Generic Seismic Technical Evaluations of Replacement Items (G-STERI)
- EPRI Seismic Qualification Reporting and Testing Standardization (SQRSTS)
- EPRI Critical Characteristics for Seismically Sensitive Items (CCASSI)
- EPRI Guidance for the Utilization of Commercial Grade Items
- EPRI Guidelines for EMI Testing
- Seismic Changes in JUTG to USNRC NUREG's CR-3875 ASME-AG-1
- Nuclear Air & Gas Treatment Code Committee



N



NA



NPT

Activities conducted in accordance with the requirements of the ASME Boiler and Pressure Vessel Code.

# EGS Electrical Connection Products

## Who We Are

Curtiss-Wright Nuclear Division is the industry leader of safety-related and environmentally qualified electrical connection products. EGS, a product and service brand of Curtiss-Wright Nuclear, features a wide range of Class-1E splice and sealing solutions. All EGS connection products are qualified to withstand harsh conditions found inside and outside containment areas in BWR, PWR, and CANDU reactor designs.

## Benefits

### *Improved System Performance Inside and Outside Containment*

- Allows for equipment prep outside containment
- Reduces equipment vulnerabilities in harsh conditions
- Improves signal strength and electrical performance

### *Helps Achieve ALARA Goals*

- Less time at device
- Less dose, more man-power availability
- Same tasks with fewer personnel

### *Customizable Install Applications*

- Electric Actuators
- Limit Switches
- Proximity Switches
- Pressure Transmitters
- Resistance Temperature Detectors (RTDs)
- Temperature Controls (TCs)
- Solenoid Operated Valves (SOVs)
- Motor Operated Valves (MOVs)
- Motors
- Reactor Control Circuits

### *Savings Realized*

- Less maintenance, less dose, more generation
- Quicker system availability
- Reduced human performance error

## EGS Quick Disconnect Connectors (QDCs)

The EGS QDC is a value added device designed to provide an environmental seal of an electrical connection or equipment interface. Once installed, the QDC becomes an integral counterpart to its host equipment due to its nimble disconnect/reconnect functionality, which reduces maintenance time. The EGS QDC also improves the ability of electrically operated equipment to withstand the harsh environments found within commercial nuclear power plants and DOE facilities.

The EGS Generation 3 Quick Disconnect Connector (QDC) is an improved version of the current QDC (Generation 1). The Generation 3 QDC has increased total integrated radiation dose, applied thermal aging for greater than 1,000 hours, attained higher LOCA temperature/pressure, attained greater MSLB temperature and included submergence during LOCA design basis accidents.

## EGS Electrical Penetration Assemblies (EPAs)

EPAs transfer electrical power and signals through the containment wall and ensure the pressure boundary is maintained during Design Basis Accident conditions. The standard EGS EPA is configured as a bulkhead mounted flange with individual feedthrough modules. Flange aperture and modules are supplied with redundant seals and internal nitrogen gas containment leakage monitoring. Individual modules can be reverse engineered to mate with existing flanges. EGS EPAs are qualified to specific or generic EQ requirements.

EGS EPAs are available in the following designs:

- Fiber Optic
- Coaxial
- Triaxial

## Specialty Cable Assemblies

Curtiss-Wright Nuclear provides Specialty Cable Assemblies that utilize EGS QDCs (and other OEM connectors) to mate with existing plant configurations. These assemblies are qualified to specific or generic EQ requirements.

Special Cable Assembly applications:

- In-core Instrumentation (ICI)
- Heated Junction Thermocouple (HJTC)
- Core Element Drive Mechanism (CEDM)
- Air Handling Unit (AHU) Fan Power and Instrumentation
- Reed Switch Position Transducer (RSPT)
- Core Exit Thermocouple (CET)
- Control Rod Drive Mechanism (CRDM)
- In-core Neutron Monitoring/Self-Powered Neutron Detector (SPND)
- Penetration Connections



# EPA Feedthrough Module Product Line



- Sizes: 3/8", 1/2", 3/4", and 1-1/2" NPT
- Style options: Bayonet or Hex Nut
- Aluminum option available for mild environments
- Compatible with ALARA considerations
- Qualified life: 40 years at 150°F (62.6°C)
- IEEE qualified: LOCA, HELB, radiation, seismic



## Generation 3 QDC

- Available enhancements: Inner seal, 360° EMI Shield and Double Shielded Cable, Welded QDC Pin Side Housing
- Compatible with ALARA considerations
- Qualified life: 60 years at 144°F (62.2°C)
- IEEE qualified: LOCA, HELB, MSLB, MSIV, radiation, seismic, submergence

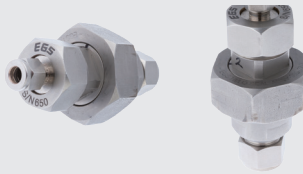


## Hard Line Connector

- Core Exit Thermocouple/MI Cable applications
- Connect/disconnect (push/pull)
- In-line or panel mount
- Installation kits available
- Qualified life: 33.58 years at 170°F (76.67°C)
- IEEE qualified: radiation, seismic, LOCA, chemical spray

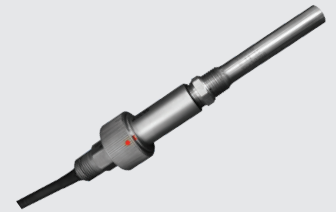


- Custom designed, custom qualified
- Replacement or new installation projects
- Can be supplied with an entire assembly
- Qualified life: 60 years
- IEEE qualified: LOCA, HELB, MSLB, radiation, seismic, thermal aging, submergence



## Hi/Lo Pressure Seal

- For seal table use in PWR reactors
- Stainless steel, metal-to-metal seal
- Customized to fit any seal table configuration
- Qualified life: >40 years at 150°F (65.56°C)
- IEEE qualified: radiation, seismic, cycle aging

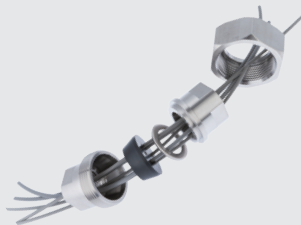


## Temperature Switch

- Adjustable temperature range from -100°F to 600°F (-73°C to 316°C)
- Electrical rating: 10A at 120 VAC, 5A at 240 VAC, and 2A at 120 VDC
- Electrical components hermetically sealed
- Qualified life: 40 years at 135°F (57°C)
- IEEE qualified: HELB, radiation, seismic



- Class 1E and Non-1E
- Fiber Optic and Mineral Insulated (MI) options, available upon request
- Mates to existing plugs/receptacles
- Replaces NSSS or A/E supplied cable assemblies
- Qualified life: 40 years at 170°F (76.67°C)
- IEEE qualified: LOCA, seismic, chemical spray



## Conduit Seal

- Avoids twisting of lead wire
- Utilizes existing field wires with grommet seal
- Multi-conductor capability
- Easy installation, no maintenance
- Qualified life: 40 years at 150°F (65°C)
- IEEE qualified: LOCA, radiation, seismic



## Electrical Conduit Seal Assembly (ECSA)

- Prevents moisture/water from entering conduit
- Prefabricated assembly with lead wires or cable
- Multi-conductor capability
- Easy installation, no maintenance
- Qualified life: 40 years at 150°F (65°C)
- IEEE qualified: radiation, seismic, LOCA



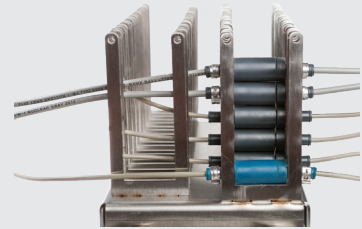
### BLUEBOOT Connector Series

- Non-safety related
- Connect/disconnect (push/pull)
- Easy installation, no maintenance
- Utilizes existing pigtails/field wires
- 1000V rating, up to 23 amps
- Temperature range: -193°F to 199°F (-125°C to 93°C)



### GRAYBOOT Splice Series

- Disconnect/reconnect functionality
- Reusable in-line style options: GRAYBOOT or GRAYBOOT "A"
- GB qualified life: 40 years at 133°F (56°C)
- GB-A qualified life: 40 years at 150°F (65.6°C)
- IEEE qualified: LOCA, radiation, seismic, submergence



### GRAYBOOT Mounting Rack

- Multi-splice organization tool
- Easy installation, no maintenance
- Ideal for EPA junction boxes
- Custom designed to customer specs
- Compatible with ALARA considerations
- IEEE qualified: seismic



### Flexible Metal Conduit

- All stainless steel/welded construction
- Leak-tight EQ pressure boundary
- Not affected by temperature or radiation
- Conduit diameters from 1/2" to 1-1/2"
- Lengths available from 18"
- IEEE qualified: LOCA, seismic



### Conformal Coating (PECC)

- Resin solution offers excellent dielectric properties
- Suitable for most qualified non-polystyrene terminal block materials
- Qualified life: 40 years at 194°F (90°C)
- IEEE qualified: radiation, seismic
- MIL-I-46058C; IPC-CC-830A qualified



### Thread Sealant (P-1)

- Easy to apply graphite paste for SST brass, galvanized steel, and carbon steel
- Acceptable for service temperatures up to 850°F (454°C)
- Radiation resistant
- IEEE qualified: LOCA, seismic



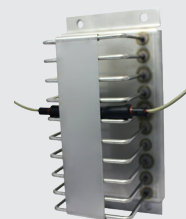
### Electrical Splicing Tape

- Low and medium voltage
- Ideal for motor leads, cable jacks, or end sealing
- Qualified life: 40 years at 194°F (90°C)
- IEEE qualified: LOCA, HELB, radiation, chemical spray



### Compact Splices

- For PWR/BWR and CANDU applications
- CSA certified for CANDU
- Lightweight, simple solution for single conductor splicing
- U.S.A. qualified life: 40 years at 150°F (65.6°C)
- CANDU qualified life: 40 years at 144°F (62.6°C)
- IEEE qualified: LOCA, radiation, seismic



### Splice Mounting Rack

- Multi-splice organization tool
- Easy installation, no maintenance
- Ideal for EPA junction boxes
- Custom designed to customer specs
- Compatible with ALARA considerations
- IEEE qualified: seismic

# Contact Information

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