SECTION 26 05 00
COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Sleeves for raceways and cables.
2. Sleeve seals.
3. Grout.
4. Access floor seals
5. Fire rated sleeves
6. Watertight Seals
7. Smoke and Firestopping Seals
8. Expansion/Deflection Fittings
9. Conduit sealing bushings
10. Cable supports
11. Acoustical Sealant
12. Caulking
13. ARC/Fire Proofing Materials
14. Cable Ties
15. Measure Pulling Tape

1.2 RELATED WORK

A. Section 26 00 10 – Basic electrical requirements, is an integral part of this section. Requirements and work indicated in 26 00 10 are not repeated in this Section.

B. Division 07 specification sections.

1.3 COORDINATION

A. Coordinate work under provisions indicated in Section 26 00 10.

1.4 QUALIFICATIONS / QUALITY ASSURANCE

A. Conform to requirements indicated in Section 26 00 10.

1.5 REGULATORY REQUIREMENTS AND STANDARDS

A. Conform to requirements indicated in Section 26 00 10.

1.6 SUBMITTALS

A. Submit as required here in and under Section 26 00 10.

1.7 EXTRA MATERIALS

A. Furnish under provisions indicated in Section 26 00 10.

B. Provide the following additional materials: None

1.8 PROJECT RECORD DOCUMENTS

A. Submit under provisions indicated in Section 26 00 10.

1.9 OPERATION AND MAINTENANCE DATA

A. Submit under provisions indicated in Section 26 00 10.

1.10 WARRANTY

A. Provide under provisions indicated in Section 26 00 10.

1.11 LEED / SUSTAINABILITY

A. Conform to requirements indicated in Section 26 00 10.

PART 2 - PRODUCTS

2.1 SLEEVES FOR RACEWAYS AND CABLES

A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

C. Sleeves for Rectangular Openings: Galvanized sheet steel.

1. Minimum Metal Thickness:
   a. For sleeve cross-section rectangle perimeter less than 50 inches (1270 mm) and no side more than 16 inches (400 mm), thickness shall be 0.052 inch (1.3 mm).
   b. For sleeve cross-section rectangle perimeter equal to, or more than, 50 inches (1270 mm) and 1 or more sides equal to, or more than, 16 inches (400 mm), thickness shall be 0.138 inch (3.5 mm).

2.2 SLEEVE SEALS

A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.

1. Manufacturers: Subject to compliance with requirements, provide products of one of the following:
   a. O.Z. Gedney
   b. Advance Products & Systems, Inc.
   c. Calpico, Inc.
   d. Metraflex Co.
   e. Pipeline Seal and Insulator, Inc.
   f. Substitutions: Under provisions of Section 26 00 10.
2. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
3. Pressure Plates: Carbon steel. Include two for each sealing element.
4. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.3 GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

B. Polywater® InstaGrout™ Sealant creates a barrier to protect electrical structures and equipment. It keeps out moisture and stops insects, snakes and rodents from tunneling

through earthen gaps into the enclosure. The strong, lightweight seal withstands freeze-thaw cycles and environmental extremes. It is compatible with cable jacket materials and will not corrode metal. Polywater® InstaGrout™ Sealant is a two-part system packaged in pre-measured quantities for easy, onsite mixing. The repair compound flows and expands around complex conduit stub-ups. It adheres to metals, plastics, wood, and concrete. InstaGrout™ self-levels and covers uneven dirt and sand base material. The result is a continuous barrier created from a convenient liquid system.

2.4 ACCESS FLOOR SEALS

A. Description: Brush type seal with brushes extending to cover the entire opening to provide a flexible air seal.

1. Manufacturers: Subject to compliance with requirements provide products of one of the following:
   a. Sealeze
   b. PDU Cables
   c. Koldlok
   d. Armour flex insulation-plenum rated low smoke rating (25max)
   e. “The Plugg” foam barrier (www.theplugguc.com)
   f. Subzero “the cube”
   g. Gaphog
   h. Substitutions under provisions of Section 26 00 10.

B. Description: Solid pliable seal to seal off openings around conduit or conductors.

1. Manufacturers: Subject to compliance with requirements, provide products of one of the following:
   a. Compressible material.
   b. Armour flex sheet material – plenum rated, low smoke (25 max)
   c. Nelson tan caulking fire seal putty.
   d. Substitutions under provisions of Section 26 00 10.

2.5 FIRE RATED SLEEVE

A. Description: Pre filled fire barriers.

1. Manufacturers: Subject to compliance with requirements provide products of one of the following:
   a. 3M Quick pass fire barrier
   b. Specified Technologies Inc. (STI)
   c. Roxtec
   d. Substitutions: Under provisions of Section 26 00 10.

2.6 WATERTIGHT SEALS

A. Manufacturers: Subject to compliance with requirements provide products of one of the following:

1. O-Z Gedney Type WSK or FSK (if only one side is accessible)
2. Crouse Hinds
3. Appleton
4. Polywater Corporation FST foam sealant inside conduits.
5. Substitutions: or equal, under provisions of Section 26 00 10.

B. The foam duct sealant shall be FST™Sealant. The foam duct sealant shall be a two part “blown” urethane foam with 98% closed cell content. The foam duct sealant shall have a compressive strength of 300 pounds (ASTM D1691), and shall have a tensile strength of 250 pounds (ASTM D1623). The foam duct sealant shall have a flexural strength of 450 pounds(ASTM D790), and shall withstand temperatures from -20° F to 200° F. The foam duct sealant shall be chemically resistant to gasoline, oils, dilute acids and bases. The foam duct

sealant shall be available as a kit suitable for sealing various sized ducts. The product shall foam and react in five to ten minutes at 70° F. When installed, the sealant shall be capable of holding 7.25 psi air pressure continuously (equivalent of 16.4 feet water-head pressure).

2.7 SMOKE AND FIRESTOPPING SEALS

A. Manufacturers: Subject to compliance with requirements provide products of one of the following:

1. Specified Technologies Inc
2. 3M.
3. Protective Coatings, Inc.
4. Carborundum Company.
5. Substitutions: or equal, under provisions of Section 26 00 10.

2.8 EXPANSION/DEFLECTION FITTINGS

A. Manufacturers: Subject to compliance with requirements provide products of one of the following:

1. O-Z Gedney – DX for up to 3/4 inch movement in any direction.
2. Crouse-Hinds – XD for up to 3/4 inch movement in any direction.
3. Spring City Electrical Mfg. Co. - Type DF for up to 3/4 inch movement in any direction.
4. Manufacturer of raceways including but not limited to busway, cable tray, wireway, fiber guide, etc.
5. Substitutions: or equal, under provisions of Section 26 00 10.

B. Where greater movement than 3/4 inch is required provide fittings or combination of fittings that allow movement in all directions. Fittings shall allow expansion of 3 inches, compression of 3 inches and deflection of 2 inches.

2.9 CONDUIT SEALING BUSHINGS

A. Description: Seals interior of conduit against fluids and gases.

1. Manufacturers: Subject to compliance with requirements provide products of one of the following:
   a. O.Z. Gedney type CSB
   b. Substitutions: or equal, under provisions of Section 26 00 10.

B. Description: Seals around exterior of conduit against fluid and gas.

1. Manufacturers: Subject to compliance with requirements provide products of one of the following:
   a. O.Z. Gedney type CSM
   b. Substitutions: or equal, under provisions of Section 26 00 10.

2.10 CABLE SUPPORTS

A. Description: Fitting with wedge type cable support for cables 600V or less installed vertically

1. Manufacturers: Subject to compliance with requirements provide products of one of the following:
   a. O.Z. Gedney one piece plus type ‘S’ – indoors
   b. O.Z. Gedney type CMT – outdoors
   c. Substitutions: or equal, under provisions of Section 26 00 10.

B. Description: Fitting with wedge type cable support for cables over 1000V installed vertically.

1. Manufacturers: Subject to compliance with requirements provide products of one of the following:
   a. O.Z. Gedney multi-segment plus type “R” – indoors
   b. O.Z. Gedney type CMT – outdoors

c. Substitutions: or equal, under provisions of Section 26 00 10.

2.11 ACOUSTICAL SEALANT

A. Manufacturers: Subject to compliance with requirements provide products of one of the following:

1. D.A.P.
2. Pecora - Type BR-96
3. Fremco
4. U.S.G.
5. Substitution: or equal, under provisions indicated in Section 26 00 10.

B. Sealants for acoustical purposes shall be silicone non-setting sealants.

2.12 CAULKING

A. Manufacturers: Subject to compliance with requirements provide products of one of the following:

1. D.A.P.
2. Pecora – Type BR-96
3. Fremco
4. U.S.G.
5. Substitution: or equal, under provisions indicated in Section 26 00 10.

B. Sealants shall be low VOC 20 year silicone non-setting sealants.

2.13 ARC/FIRE PROOFING MATERIALS

A. Manufacturers: Subject to compliance with requirements, provide products of one of the following:

1. Plymouth 53 plyarc with 77 ply glass.
2. 3M Sotch 77 with Sotch 69 glass ply cloth.
3. D.A.P.
4. Pecora - Type BR-96
5. Fremco
6. U.S.G.
7. Substitution: or equal, under provisions indicated in Section 26 00 10.

B. Cable arc-proof type shall be flexible, conformation organic fabric, coated one side with a flame retardant flexible elastomer, self-extinguishing, with the following minimum properties:

1. Thickness ASTM D100, 0.76mm.
2. Intumescent to 0.3 inch (8mm) thick.
3. Compatible with cable jacket.

C. Type for first course on metal objects: 10 miL (250 micrometer) thick, corrosion-protective, moisture resistant, PVC pipe wrapping tape.

D. Glass cloth tape: Pressure sensitive adhesive type, ½ inch (13 mm) wide.

2.14 CABLE TIES

A. General-Purpose Cable Ties: Fungus inert, self extinguishing, one piece, self locking, Type 6/6 nylon.

1. Minimum Width: 3/16 inch (5 mm).
2. Tensile Strength at 73 deg F (23 deg C), According to ASTM D 638: 12,000 psi (82.7 MPa).
3. Temperature Range: Minus 40 to plus 185 deg F (Minus 40 to plus 85 deg C).
4. Color: Black except where used for color-coding.

B. UV-Stabilized Cable Ties: Fungus inert, designed for continuous exposure to exterior sunlight, self extinguishing, one piece, self locking, Type 6/6 nylon.

1. Minimum Width: 3/16 inch (5 mm).
2. Tensile Strength at 73 deg F (23 deg C), According to ASTM D 638: 12,000 psi (82.7 MPa).
3. Temperature Range: Minus 40 to plus 185 deg F (Minus 40 to plus 85 deg C).
4. Color: Black.

C. Plenum-Rated Cable Ties: Self extinguishing, UV stabilized, one piece, self locking.

1. Minimum Width: 3/16 inch (5 mm).
2. Tensile Strength at 73 deg F (23 deg C), According to ASTM D 638: 7000 psi (48.2 MPa).
3. UL 94 Flame Rating: 94V-0.
4. Temperature Range: Minus 50 to plus 284 deg F (Minus 46 to plus 140 deg C).
5. Color: Black.

2.15 MEASURE/PULLING TAPE

A. Manufacturers: Subject to compliance with requirements provide products of one of the following:

1. Greenlee Tool Division
2. Substitution: or equal under provisions indicated in Section 26 00 10.

B. Polyester measure pulling tape. Durable and stretch resistant.

1. ½" width – average breaking strength 1250 lbs.
2. ¾" width – average breaking strength 2500 lbs.

C. Factory lubricated to reduce burn through.

D. Easy to read footage markings for quick and accurate measurements.

PART 3 - EXECUTION

3.1 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION

A. Comply with NECA 1.

B. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.

C. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.

D. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.

E. Right of Way: Give way to piping systems installed at a required slope.

F. Seal all openings to prevent air transfer between spaces. Provide fire and smoke rated seals where required or indicated.

G. Provide grout, sealant or fittings for all openings around raceways penetrating walls, floors, or from underground as specified herein, required by the utility or required by code. Including padmount transformers, exterior equipment, equipment with underground services, etc. Seal keep moisture, gasses and rodents out of the equipment.

3.2 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Penetrations occur when raceways, cables, wireways, cable trays, or busways penetrate floors, concrete slabs, concrete or masonry walls, fire-rated floor and wall assemblies, acoustical or full height walls.

B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.

C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.

D. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.

E. Cut sleeves to length for mounting flush with both surfaces of walls.

F. Extend sleeves installed in floors 3 inches (75 mm) above finished floor level.

G. Size pipe sleeves to provide 1/4-inch (6.4-mm) annular clear space between sleeve and raceway or cable, unless indicated otherwise, required by fire or smoke seal product, or unless seismic criteria require different clearance.

H. Seal space outside of non-fire-rated, non-watertight sleeves with grout for penetrations of concrete and masonry and with approved joint compound for gypsum board assemblies.

1. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.

I. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and cable tray, busway, raceway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements herein and in Division 07 Section "Joint Sealants.".

J. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at cable tray, busway, raceway and cable penetrations. Install sleeves and seal penetration sleeves with firestop materials. Comply with requirements in Division 07 Section "Penetration Firestopping."

K. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.

L. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.

M. Underground, Exterior-Wall Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch (25-mm) annular clear space between raceway or cable and sleeve for installing mechanical sleeve seals.

3.3 SLEEVE-SEAL INSTALLATION

A. Install to seal exterior wall penetrations.

B. Use type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.4 FIRESTOPPING

A. Apply firestopping to penetrations of fire-rated floor and wall assemblies for electrical installations to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified herein and in Division 07 Section "Penetration Firestopping" and in this Section.

3.5 INSTALLATION OF SEALS

A. Watertight Seals

1. Conduits entering from the exterior or below grade shall have watertight fittings on the outside and on the inside of the conduit.
2. Conduits penetrating walls above grade shall be installed in sleeves. Seal with foam and caulking around sleeve and conduit to ensure a watertight and air tight seal.
3. Fittings on the outside of the conduit shall be O-Z Gedney type FSK or approved equal. Provide type WSK if penetration is within two feet of the high water table. Provide grounding attachment.
    a. Fittings on the inside of the conduit shall be O-Z Gedney type CSBI or approved equal. Provide type CSBG if penetration is within two feet of the high water table. Provide a blank fitting to seal spare or empty conduits.
    b. O-Z Gedney type CSM fitting may be used when sealing within a sleeve or cored hole.

B. Environmental Seals

1. Provide seals on raceways exposed to widely different temperatures, as in refrigerating or cold storage areas or when penetrating the building envelope. Install raceway seal to prevent circulation of air from warmer to colder sections through the raceway.
2. Provide seal under device plates for devices mounted or walls between conditioned and non-conditioned spaces, in computer rooms, rooms with gaseous fire suppression systems or clean rooms.
3. Seal air tight with caulking and insulation around light fixtures and equipment installed in exterior soffits.
4. Provide seals on raceways entering or leaving computer rooms, data halls and pressure-controlled rooms. Seal raceways air tight with pliable non-hardening material such as duct seal or an environmental seal fitting. Provide seal at panel, PDU or equipment connection. Provide threaded caps on unused conduits.

C. Acoustical Seals

1. Provide acoustical sealant around penetrations through sound-sensitive areas such as toilet rooms, conference rooms, electrical or mechanical rooms, elevator rooms, training rooms, etc. Provide at any wall where Architect or mechanical specifies sound attenuation provisions.

D. Firestopping Seals

1. Penetrations through fire-resistant-rated walls, partitions, floors or ceilings shall be fire stopped using approved methods and NRTL-listed products to maintain the fire resistance rating. Follow all listing and manufacturers recommendations and requirements.
2. Installation restrictions of the listing agencies shall be strictly adhered to (e.g. 24 inch (610 mm) minimum horizontal separation between boxes on opposite sides of the wall, maximum square inch opening on wall.
3. Fire stopping in sleeves or in areas that may require the addition or modification of installed cables or raceways shall be soft, pliable, non-hardening fire-stop putty. Putty shall be water resistant and intumescent.
4. Fire stopping in locations not likely to require frequent modifications shall be a NRTL-listed putty, caulk or mortar to meet the required fire resistance rating.
5. Box penetrations into a fire rated wall or shaft shall have a fire stopping pad installed on the back of the box.

6. Fire stopping of cable trays or busways through walls shall be with fire rated sleeves with intumescent material, non-hardening putty or with seal bags on tap, below and on sides of trays.
7. Fire stopping of plastic pipes shall be accomplished by using a collar specifically listed for the use.
8. Installation methods shall conform to a UL fire stopping system.
9. Provide gas tight sealing fitting and compound at each enclosure around conductors with intumescent fire protection insulation
10. Provide Specified Technologies SpecSeal fire stop plugs for conduit sleeves.

E. Explosion Proof seals

1. Provide seals where required by code.
2. Fill seal with sealant following manufacturer's recommendation being careful to spread conductors so as to allow seal to flow around all conductors.

3.6 EXPANSION/DEFLECTION FITTINGS

A. Install bonding ground wire across fitting.

B. Install as recommended by manufacturer. Allow for expansion, contraction or deflection after installation.

C. Install on raceways rising from underground where exposed to ground movement or extreme temperature variation or freezing.

D. Install on PVC conduit installations 100 feet or longer.

E. Install on raceways subject to varying environmental conditions such an exterior/interior, air conditioning/non-air conditioned, refrigerated/non-refrigerated spaces, etc.

F. Install where raceways cable trays or busways cross building expansion or seismic joints. Provide two expansion deflection fittings, one on each side of the joint or wall, with a continuous piece of raceway or busway across the joint.

G. Install where raceways cable trays or busways pass from one building to another.

3.7 WATER DAMS

A. Provide three inch high water dams across floor penetrations that are not water tight and where there are openings allow the passage of water such as for busway on cable tray penetrations, where seismic or other requirements leave openings around penetrations.

3.8 ARC PROOFING

A. Unless otherwise indicated, at locations with multiple feeders in manholes, hand holes or pits under equipment arc proof feeder conductors at locations not protected by conduit, direct burial, or termination materials. In addition to arc-proofing tape manufacturer's written instructions, apply arc proofing as follows:

1. Clean cable sheath.
2. Wrap metallic cable components with 10-mil (250-micrometer) pipe-wrapping tape.
3. Smooth surface contours with electrical insulation putty.
4. Apply arc-proofing tape in one half-lapped layer with coated side toward cable.
5. Band arc proofing tape with one-inch (25mm) wide bands of half-lapped, adhesive, glass cloth tape 2 inches (50mm) o.c.
6. Extend arc proofing one-inch (25mm) into duct.

3.9 MEASURE/PULLING TAPE

A. Provide measure/pulling tape in all empty raceways.

1. Provide ½" width, 1250 lbs rate in innterducts or raceways 2" or less in diameter.
2. Provide ¾" width, 2500 lbs rated in all other raceways.

B. Provide 12 inches minimum at each end. Secure tape so it will not fall back into raceway.

C. Install tape after cleaning underground raceway installations.

END OF SECTION