

CLAIMS

What is claimed is:

1. An electrical connection sealer (10), comprising:
an outer jacket (12) comprising a first piece of heat-shrinkable tubing, the outer jacket (12) having a pre-sealed end (22) and an open end (20) opposite the pre-sealed end (22), the pre-sealed end (22) being closed, and the first piece of heat-shrinkable tubing at the open end (20) being heat-recoverable and forming a cavity (16) for insertion of an electrical connection (50); and
a low-viscosity sealant (18) insertable into the cavity (16), said low-viscosity sealant (18) comprising a low-viscosity thermoplastic sealant (18) selected from the group consisting of polyolefin-based sealants where the base polymer is polyethylene, metallocene-formed polyethylene copolymer, metallocene-formed polypropylene copolymer, maleic anhydride functionalized polyethylene; polyolefin copolymer based sealants where the base polymer is ethylene-vinyl acetate copolymer; polyamide based sealants; thermoplastic elastomer based sealants; polyolefin and polyamide mixture based sealants; polyolefin and polyolefin copolymer mixture based sealants; polyolefin copolymer and polyamide mixture-based sealants; fluoropolymers or combinations thereof ;
wherein upon application of heat to the electrical connection sealer (10) with the electrical connection (50) and the low-viscosity sealant (18) in the cavity (16) of the electrical connection sealer (10), the electrical connection (50) being between a first insulated electrical wiring (60) having a multi-wire configuration comprising a bundle of first wires (62) and at least one second insulated electrical wiring (70) comprising at least one second wire (72), the electrical connection (50) being at a first end of the first wires (62) and the at least one second wire (72), the low-viscosity sealant (18) flows across and through the first wires (62) and the at least one second wire (72) and the first piece of heat-shrinkable tubing shrinks to encapsulate the electrical connection (50) and seal the electrical connection (50) and the low-viscosity sealant (18) substantially within the outer jacket (12).
2. The electrical connection sealer (10) of claim 1 further comprising an inner core (14) on an inner surface of the outer jacket (12), the inner core (14) comprising an inner core sealant.

3. The electrical connection sealer (10) of claim 1, wherein the low-viscosity sealant (18) is an adhesive band extending around the cavity (16).
4. The electrical connection sealer (10) of claim 1, wherein the low-viscosity sealant (18) is located at a base of the cavity (16).
5. The electrical connection sealer (10) of claim 1, wherein the electrical connection (50) is an end splice connection.
6. A method of sealing an electrical connection (50) in an electrical connection sealer (10), the method comprising:
applying heat to an electrical connection sealing assembly (80), the electrical connection sealing assembly (80) comprising:
the electrical connection sealer (10) comprising:
an outer jacket (12) comprising a first piece of heat-shrinkable tubing, the outer jacket (12) having a pre-sealed end (22) and an open end (20) opposite the pre-sealed end (22), the pre-sealed end (22) being closed, and the first piece of heat-shrinkable tubing at the open end (20) being heat-recoverable and forming a cavity (16); and
a low-viscosity sealant (18) in the cavity (16), said low-viscosity sealant (18) comprising a low-viscosity thermoplastic sealant (18) selected from the group consisting of polyolefin-based sealants where the base polymer is polyethylene, metallocene-formed polyethylene copolymer, metallocene-formed polypropylene copolymer, maleic anhydride functionalized polyethylene; polyolefin copolymer based sealants where the base polymer is ethylene-vinyl acetate copolymer; polyamide based sealants; thermoplastic elastomer based sealants; polyolefin and polyamide mixture based sealants; polyolefin and polyolefin copolymer mixture based sealants; polyolefin copolymer and polyamide mixture-based sealants; fluoropolymers or combinations thereof ;
a first insulated electrical wiring (60) having a multi-wire configuration comprising a bundle of first wires (62) having a first end extending into the cavity (16); and
at least one second insulated electrical wiring (70) comprising at least one second wire (72) extending into the cavity (16);
wherein a first end of the first wires (62) and the at least one second wire (72) form the electrical connection (50); inserting the electrical connection (50) into the cavity (16) of the electrical connection sealer (10), and

- wherein the applying heat heat-recovers the portion of the first piece of heat-shrinkable tubing not previously heat-recovered and causes the low-viscosity sealant (18) to flow across and through the first wires (62) and the at least one second wire (72), such that the first piece of heat-shrinkable tubing shrinks to encapsulate the electrical connection (50) and seal the electrical connection and substantially seal the low-viscosity sealant (18) within the outer jacket (12).
7. The method of claim 6, wherein the applying heat comprises a step selected from the group consisting of placing the electrical connection sealing assembly (80) in an infrared oven and applying hot air to the electrical connection sealing assembly (80).
 8. The method of claim 6, wherein the first piece of heat-shrinkable tubing has a predetermined hoop stress and wherein the predetermined hoop stress is adequate for pushing the low-viscosity sealant (18) into interstices in the first wires (62) and the at least one second wire (72).
 9. The method of claim 6, wherein the electrical connection sealer (10) further comprises an inner core (14) on an inner surface of the outer jacket (12), the inner core (14) comprising an inner core sealant.
 10. The method of claim 6, wherein the electrical connection (50) is an end splice connection.
 11. The method of claim 6, wherein the pre-sealed end (22) is pre-sealed by heat-recovering the first piece of heat-shrinkable tubing at the pre-sealed end (22) or by molding the outer jacket (12) at the pre-sealed end (22).