

Transmission Joints

for Pipe-Type Cables with LPP or Paper Insulation up to 345kV

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G&W LPP joints rated up to 345kV are designed for pipe-type high pressure fluid filled (HPFF), 3-core cables with laminated polypropylene paper (LPP) or paper insulation, handling rated fluid-filled pressures up to 400 psi.

PRODUCT OVERVIEW

All necessary construction materials and parts are supplied with each kit, including tapes, carbon steel casings, reducers and cable supports (spiders). The joint features a field-machined (FM) connector and a field-applied	LPP/paper-insulated body, including cable insulation “stepping” at the connector and stress control slopes at ground electrodes. Every joint is custom designed and engineered for the specific	cable system requirements and field constraints. The 345kV-rated joint can fit in a typical 18’x6’ manhole. For details and more available layout options, contact G&W.
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TESTING

The joint is qualified per IEEE 404-12 at 345kV system voltage level. It was subjected to a test program that includes withstanding 500kV AC for 24 hours as well as a 1300kV BIL impulse test at 105° C, followed by an AC integrity test. The Test Report is available upon request.

Additional engineering tests were performed at a reduced oil pressure of 100 psi to test the design margins of the system.

ELECTRICAL CHARACTERISTICS OF 345kV JOINT LCJ 180–L

Nominal System Voltage Rating	345kV
Maximum System Voltage	362kV
Rated Line to Ground Voltage	199.2kV
Rated BIL	1300kV
AC Withstand for 24 h	500kV
Standard	IEEE 404-12 (Table 4)
Cable Range	Suitable for LPP Cables up to 3000 KCM
Continuous Current	Same as Cable
Short-Circuit Current	Same as Cable

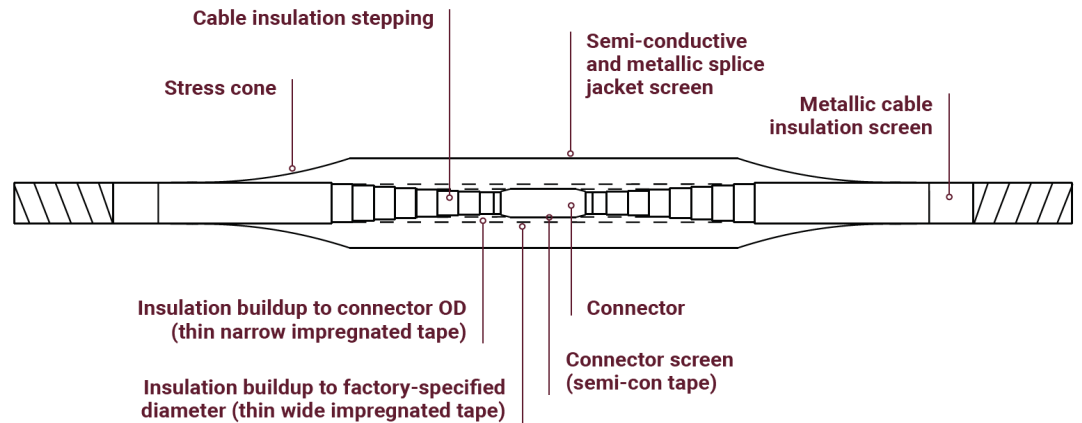
CASINGS

Casings are made of carbon steel pipe, designed to withstand operating and transient pressures of the fluid-filled pipe-type system.

Each diameter is different and is designed to slide over one another (telescoping design). This minimizes the required length for installation of the joint and overall manhole size.

Once the joint body is built, casings are field welded to one another and to the reducers at each end to form the joint housing.

JOINT CORE DESIGN



REDUCERS

Reducers provide connection between the cable pipe and the joint housing at both ends of the joint. Cable skid wires are secured to the reducers, providing solid grounding for the cable and the joint.

During construction of the joint reducers, pipes are capped, enabling lines to be filled with dry air or nitrogen. They are then pressure and leak tested.

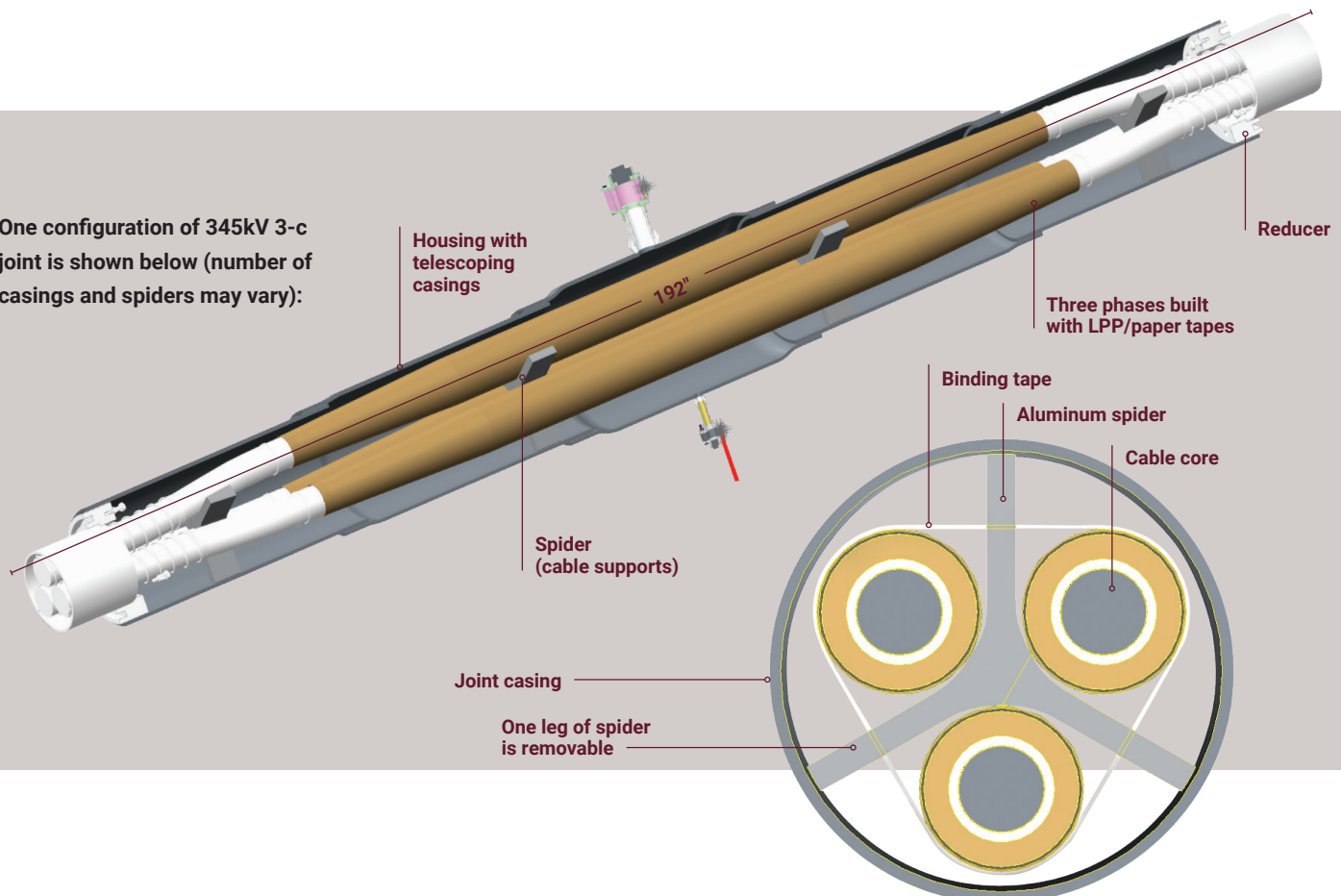
CABLE SUPPORTS (SPIDERS)

Aluminum spiders provide support for the cable cores inside the housing and prevent potential damage from thermo-mechanical bending (TMB).

Spiders hold the joint body off the casings, providing

protection from high temperatures during welding operations in the field. Spider numbers and positions may vary depending on the specific joint design. They are sized to fit joint casings.

One configuration of 345kV 3-c joint is shown below (number of casings and spiders may vary):



CONNECTOR

The field-machined (FM) connector is designed with a low connector profile to reduce longitudinal stress at the connector and overall diameter of the joint.

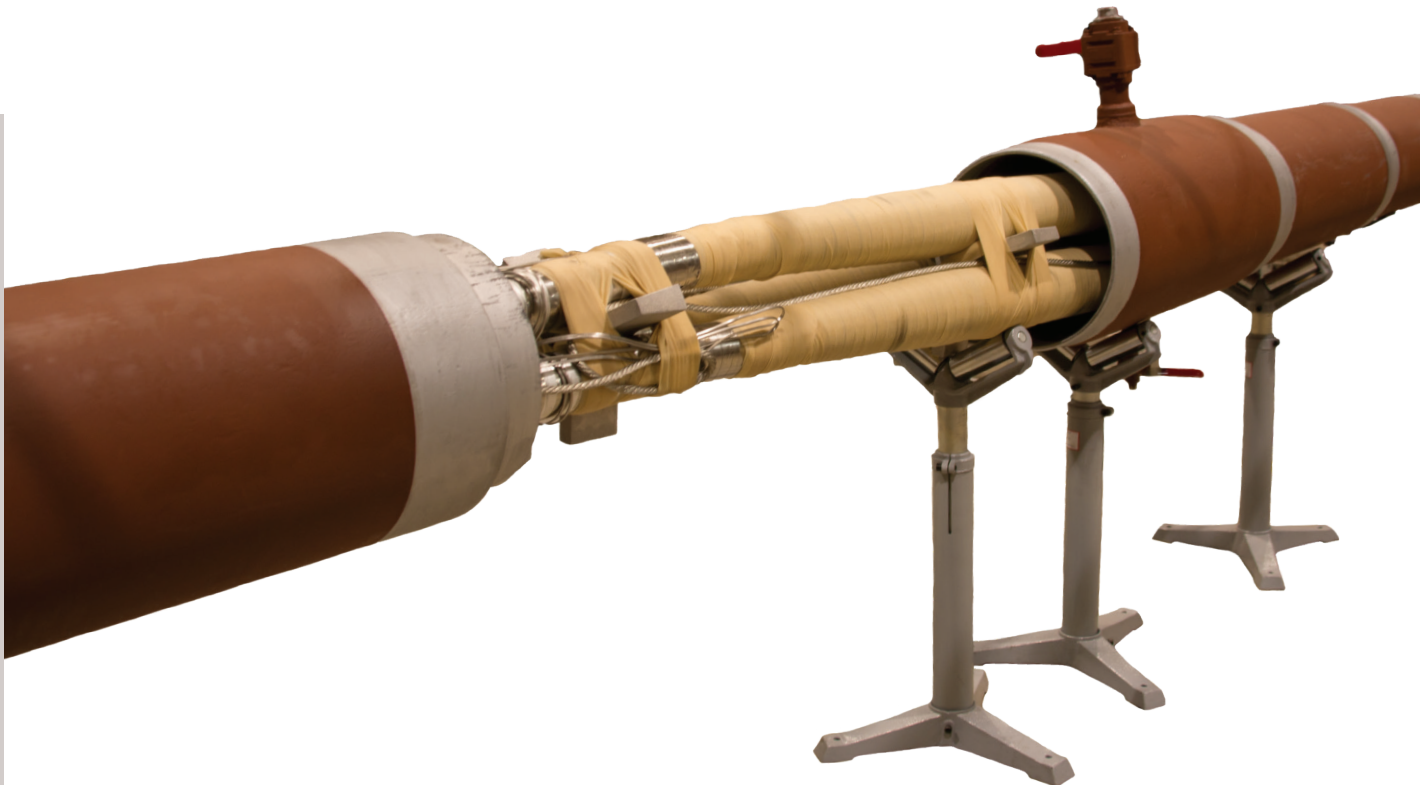
Sloped buildup of the lead foil (provided in the kit) is applied at the connector's edges for further reduction of the longitudinal component of the electrical stress.



Template for insulation stepping is designed for specific cable and provided in the joint kit.

CABLE INSULATION STEPPING

The logarithmic profile is engineered per the specific cable and provides uniform longitudinal stress distribution at the slopes toward the conductor.





Template for building the stress cone slope is designed per specific cable and provided with the kit.



Application of the tinned copper braid over the ground electrode of the joint.

JOINT INSULATION AND STRESS CONE SLOPE

The joint body insulation is built with provided flat, oil-impregnated LPP/paper tapes with low dissipation factor and high breakdown strength. This enables a smaller diameter and length of the joint.

The stress cone slope at the ground electrode of the joint evenly distributes electrical stress along the layers of the applied LPP/paper insulation and is designed per the specific cable.

SHIELDING AND GROUNDING MATERIALS

Semi-conductive shielding tape provides smooth electrodes over the connector (HV) and ground electrode over the joint body. The oil-impregnated, carbon black crepe paper tape is supplied in each joint kit per the specific joint construction.

Metallic shielding mesh and braids are applied over the ground electrode, providing a path for capacitive and short circuit currents. The shield is solidly grounded to the cable pipe and joint casings with jumper braids tied to the reducers.

ORDERING INFORMATION

CATALOG NUMBERS PER VOLTAGE LEVEL

SYSTEM VOLTAGE	BIL RATING
138kV	650kV
230	1050kV
345kV	1300kV

For fast and efficient ordering process, please provide the following information:

- System voltage
- Cable specification
- Cable pipe material, diameter and thickness
- Fluid-filled system pressure rating
- Manhole size

Contact us today

708.388.5010 or info@gwelec.com



Since 1905, G&W Electric has been a leading provider of innovative power grid solutions, including the latest in load and fault interrupting switches, reclosers, system protection equipment, power grid automation and transmission and distribution cable terminations, joints and other cable accessories. G&W is headquartered in Bolingbrook, Illinois, U.S.A., with manufacturing facilities and sales support in more than 100 countries, including Canada, Italy, China, Mexico, Brazil, India, UAE and Singapore. We help our customers meet their challenges and gain a competitive edge through a suite of advanced products and technical services.

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