K-LINE INSULATORS LIMITED
TORONTO, ONTARIO, CANADA

Catalogue D-TIF

Totally Insulated Framing System (TIF™)
3-Phase TIF™ Tri-Frame - Distribution
15kV - 69kV (Patent No.: US 9,685,772)

ISO9001
SAI GLOBAL
FILE No. 000117

3-Phase TIF™ Tri-Frame - Distribution

Totally Insulated Framing System (Patent No.: US 9,685,772)

Generally Insulators are used to support electrical conductors on Overhead Distribution and Sub-Transmission systems to prevent line to ground contact. Conductors may be attached to Deadend/Suspension Insulators and suspended from Crossarms or supported on Line Post/Pin Insulators on Crossarms or Side Post Brackets. Conventional Crossarms have service life limitations due to wood rot, steel corrosion or fiber reinforced polymer (FRP) deterioration.

K-LINE INSULATORS LIMITED (KLI) is introducing the Totally Insulated Framing (TIF™) Tri-Frame design for Distribution Lines for nominal voltages up to and including 69 kV. This innovative design reduces many common concerns and difficulties encountered with wood, steel or fiberglass Crossarms.

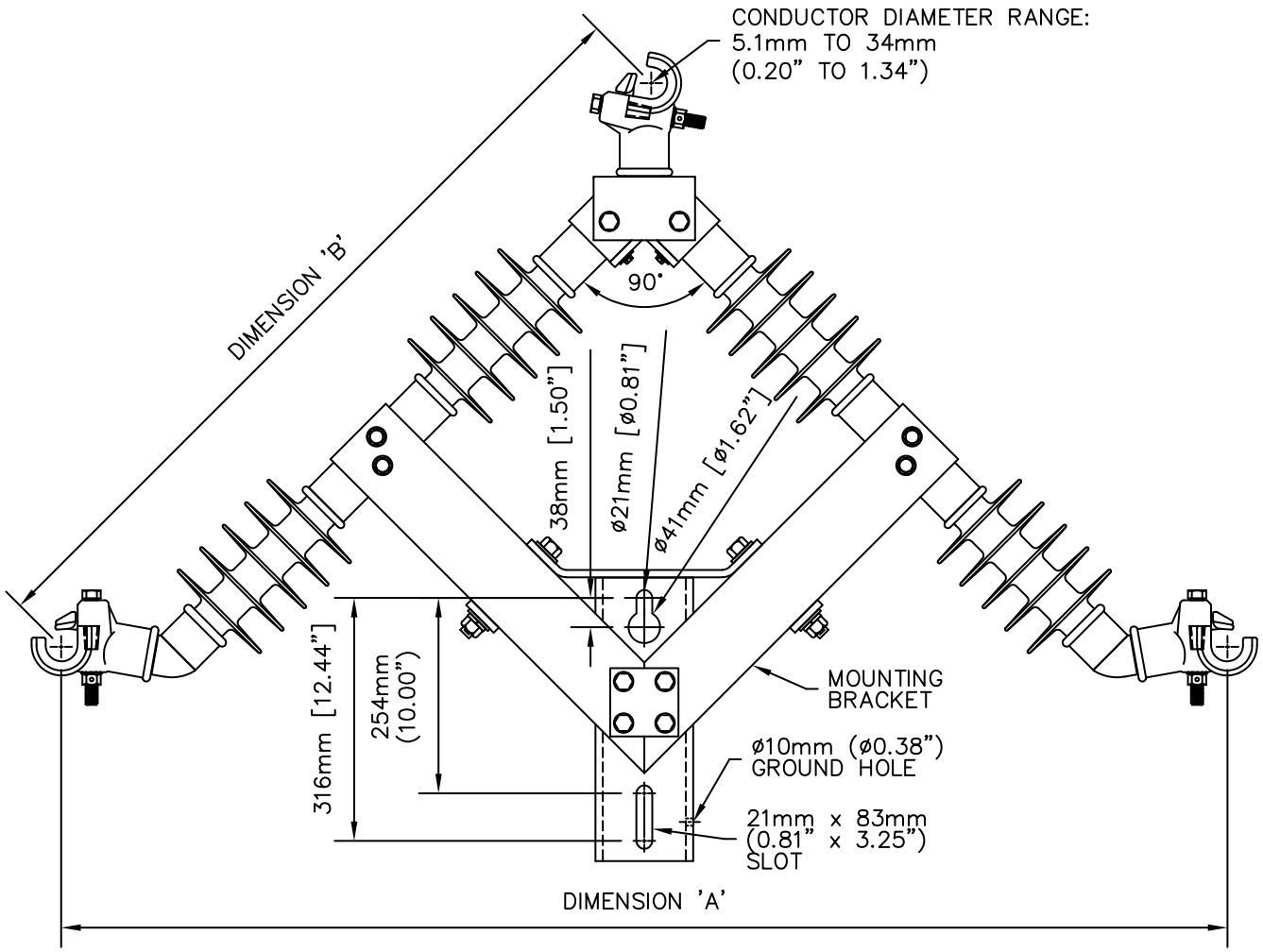
K-LINE INSULATORS LIMITED (KLI) Totally Insulated Framing (TIF™) Systems offer alternative line designs that increase service life, reduce installation labour costs, enhance system reliability and improves safety during installation. **KLI** TIF™ Systems are a new, cost effective approach for Line Design, Construction, Maintenance and "Hardening" of Distribution and Sub-Transmission Systems.

The TIF™ Tri-Frame configuration for Distribution or Sub-Transmission Lines offers an integrated one-piece framing concept that forms a compact three phase framing. TIF™ Tri-Frames are delivered fully assembled in a one piece frame configuration for rapid installation by simply bolting the TIF™ Tri-Frame assembly to the pole. Patented K-CLAMP® or conventional Line Post End Fittings can be supplied with TIF™ Tri-Frame designs. The TIF™ Tri-Frame provides required horizontal and vertical conductor spacing and clearances and is an alternative to typical single circuit Crossarm or Armless Construction Standards. TIF™ offers significant cost savings over conventional line construction practices due to reduced labour for installation of the TIF™ Tri-Frame. Installation is a simple matter of Bolting the TIF™ Tri-Frame to the Pole with two Bolts compared to conventional line design and construction practices which normally require installation of Crossarms/Braces or Pole Top/Side Post Brackets, Insulator Pins/Studs, Insulators and related hardware.

Summary of TIF™ Feature/Advantages/Benefits:

- TIF™ Tri-Frame offers improved safety in application. Rapid installation reduces Lineman exposure time in energized work environment
- Improved system reliability with integrated KLI proprietary Silicone Rubber Insulators
- Corrosion resistant Aluminum Alloy End Fittings and Frame
- TIF™ eliminates Crossarm life limitations due to rot, hidden corrosion and fiberglass deterioration
- TIF™ is lightweight and can be transported by line crews into areas difficult to access and erected in place without heavy lifting equipment
- TIF™ avoids vandalism associated with glass and porcelain insulators
- Improved aesthetics and compact triangular appearance
- TIF™ Tri-Frame Insulator configuration discourages "roosting" thus minimizing the probability of wildlife contact issues.

3-Phase TIF™ - Distribution (Patent No.: US 9,685,772)



TECHNICAL DATA

SPECIFICATIONS	UNITS		CATALOGUE NUMBER		
		KL35TIF_	KL46TIF_	KL69PTIF_	KL69P1TIF_
Voltage Class	kV	35	46	46	69
Leakage	mm (in)	660 (26)	860 (34)	1170 (46)	1525 (60)
Critical Impulse Flashover (Pos.)	kV	195	240	300	360
Low-Frequency Wet Flashover	kV	85	115	150	190*
Dimension 'A' (Approx.)	mm (in)	1520 (60)	1730 (68)	1930 (76)	2235 (88)
Dimension 'B' (Approx.)	mm (in)	1060 (42)	1210 (48)	1350 (53)	1570 (62)
Vertical Design Load **	kN (lbs)	6.0 (1350)	6.0 (1350)	6.0 (1350)	5.5 (1240)
Transverse Design Load **	kN (lbs)	5.5 (1240)	5.5 (1240)	5.5 (1240)	5.5 (1240)
Weight (Approx.)	kg (lbs)	37.2 (82.0)	40.3 (88.9)	44.0 (96.9)	50.5 (111.0)

*The value shown is as per CSA.
**Individual conductor loads

NOTE: The selection of the appropriate TIF™ design model depends on the minimum insulation voltage design required. Additionally, the minimum phase spacing requirement must also be considered in selecting the TIF™ design model.

Ordering Information
The TIF™ Framing Assemblies are available with K-CLAMPS® or Horizontal/Vertical Trunnions. Add suffix **K** for K-CLAMP® or **T** for Horizontal & **V** for Vertical Trunnions. Conductor Clamps are ordered separately.

3-Phase TIF™ - Distribution Field Trial (Patent No.: US 9,685,772)

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