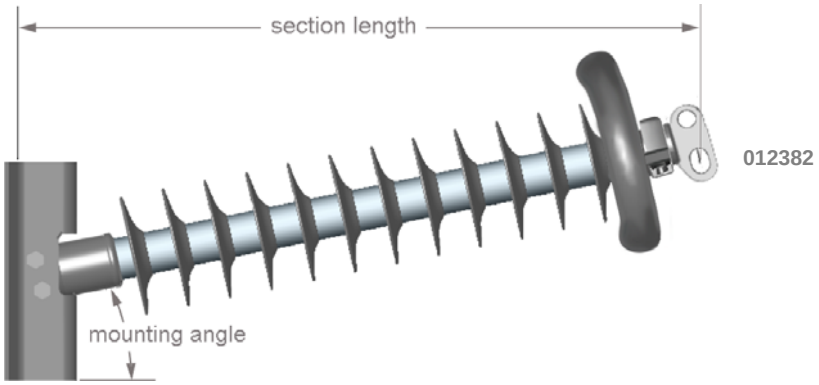
INSULATOR, HORIZONTAL LINE POST, POLYMER, FOR 230 kV NOMINAL SYSTEMS



Note: Size and number of actual weathersheds will vary.

1. Scope

This Material Standard applies to polymer, horizontal line post insulators used to construct 230 kV transmission lines. Insulators have a drop eye end fitting and are designed for mounting on single wood poles.

This standard applies to the Seattle City Light Stock Numbers: 012382, and 013308.

2. Application

Horizontal line post insulators are used on wood or steel poles to support transmission conductors. The following table gives the application for each of the Stock Numbers.

Stock No	Application
012382	230 kV, nominal, wood poles, curved base
013308	230 kV, nominal, steel poles, flat base

3. Industry Standards

Insulators shall meet the applicable requirements of the following national standards:

ANSI C29.1-1988 (R2002) Test Methods for Electrical Power Insulators

ANSI C29.2-1992 (R1999) Wet Process Porcelain and Toughened Glass - Suspension Type

ANSI C29.11-1989 (R1996) Tests for Composite Suspension Insulators for Overhead Transmission Lines

ASTM A153-1982 Zinc Coating (Hot Dip) on Iron and Steel Hardware

4. Requirements

4.1 Common Requirements

Ultimate mechanical strength ratings shall be based on fully assembled insulators; insulators with base and end fittings attached.

60 Hz dry flashover, kV rms, minimum	618
60 Hz wet flashover, kV rms, minimum	555
Positive critical impulse flashover, kV crest, minimum	990
Horizontal coupling length, in	74 (plus 1, minus 1)
Mounting angle, degrees	12
Leakage, in, minimum	177
Strike/dry arc distance, in, minimum	63

standards coordinator	*standards supervisor*	*unit director*
Aida Diop	John Shipek	Darnell Cola

4. Requirements, continued

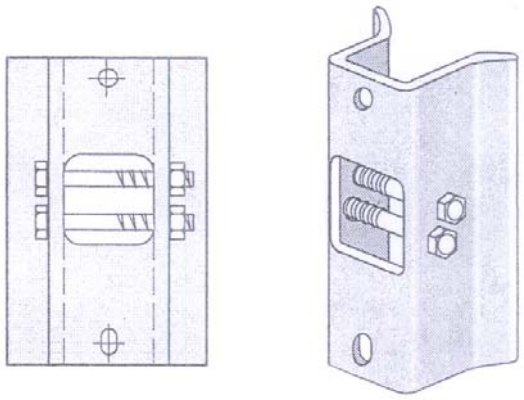
4.1 Common Requirements, continued

Ultimate mechanical strength in cantilever, lbs, minimum	2,330 as defined by ANSI C29.1-1988 (R2002) and ANSI C29.7-1996 (R2002), section 8
Maximum design cantilever (MDC), lbs, minimum	930 where MDC is defined as 40% of the ultimate mechanical strength in cantilever
Ultimate mechanical strength in tension, lbs, minimum	15,000 at 0% MDC as defined by ANSI C29.1-1988 (R2002), section 5
End fitting type (line end), in	extended two-hole (also known as two-hole drop eye) with centers of holes or slots spaced 2-3/4 inches (plus 2-1/4, minus 0) apart
Weathershed/sheath material	silicon rubber – to qualify as silicon type, weathershed/ sheath material must be composed of at least 33% silicon by weight; “EP/silicon alloys” do not qualify
Weathershed/sheath material color	gray

4.2 Stock Number 012382 Requirements, Bendable Curved Base

Base type (structured end)	Steel or aluminum gain channel (aka, bendable)
Base mounting bolt holes, in	one 15/16 or 1 diameter hole spaced 12 inches vertically from one 15/16 or 1 x 1-5/16 or 1-1/2 slot

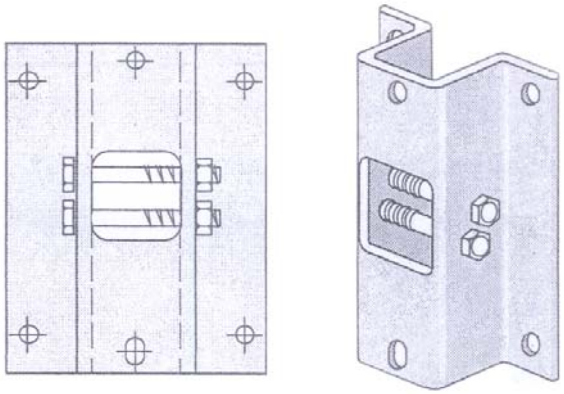
Figure 4.2, Bendable curved base



4.3 Stock Number 013308 Requirements, Flat Base

Base type (structured end)	Steel or aluminum formed channel
Base mounting bolt holes	Two holes spaced 12 inches vertically from one hole or slot. Four holes or slots in rectangular pattern spaced 10 inches vertically and 8 inches horizontally. Holes shall be designed to accommodate 3/4-inch nominal diameter fasteners.

Figure 4.3, Bendable flat base



5. Grading Ring

One 9-inch diameter (plus or minus 3 inches) grading ring shall be provided for the line end of each insulator. Grading rings shall be designed to allow easy installation and removal with the conductor in place. No information bands or tags shall be placed in the area where the grading ring brackets are mounted to the end fitting. Grading ring installation instructions shall be packaged with each insulator in a waterproof, ultraviolet-light resistant plastic envelope or other waterproof, Seattle City Light approved means.

6. Notice of Changes

Manufacturer shall provide Seattle City Light reasonable notice of anticipated insulator design changes. This includes, but is not limited to, changes in polymer formulation, dimensions, electrical characteristics, mechanical characteristics, or accessories.

7. Marking

Insulators shall be clearly and indelibly marked with the manufacturer's name or symbol, the year of manufacture, and the maximum design cantilever (MDC). Load ratings shall be stated in units of pounds. Labeling shall be in English.

8. Packaging

Insulators shall be packaged in wood crates to protect against physical damage that could occur during shipping, handling, or long-term outside storage. If slatted crates are used, each insulator shall be sealed in plastic. If sealed crates are used, plastic is not required.

Insulator weathersheds shall not bear any load due to its own weight or that of insulators or crates above or below it.

Crates shall be secured to pallets for handling by forklift. Pallets shall not exceed 4 feet in height or 1,000 pounds in weight. Crates shall be marked with the manufacturer's name or symbol, catalog number, Seattle City Light's Stock Number, and Purchase Order number.

Number of insulators per crate: 16 maximum.

9. Stock Unit: EA

10. Approved Manufacturers

	Manufacturers and Catalog Numbers	
Stock No	NGK-Locke	MacLean Power Systems
012382	L2-SN431-13-W	NBSG30XH043S0
013308	L2-SN431-18-W	H211074VA02

11. References

Diop, Aida; SCL Standards Engineer, subject matter expert for 6901.57 (aida.diop@seattle.gov)

Shipek, John; SCL Standards Engineer, subject matter expert and originator of 6901.57 (john.shipek@seattle.gov)