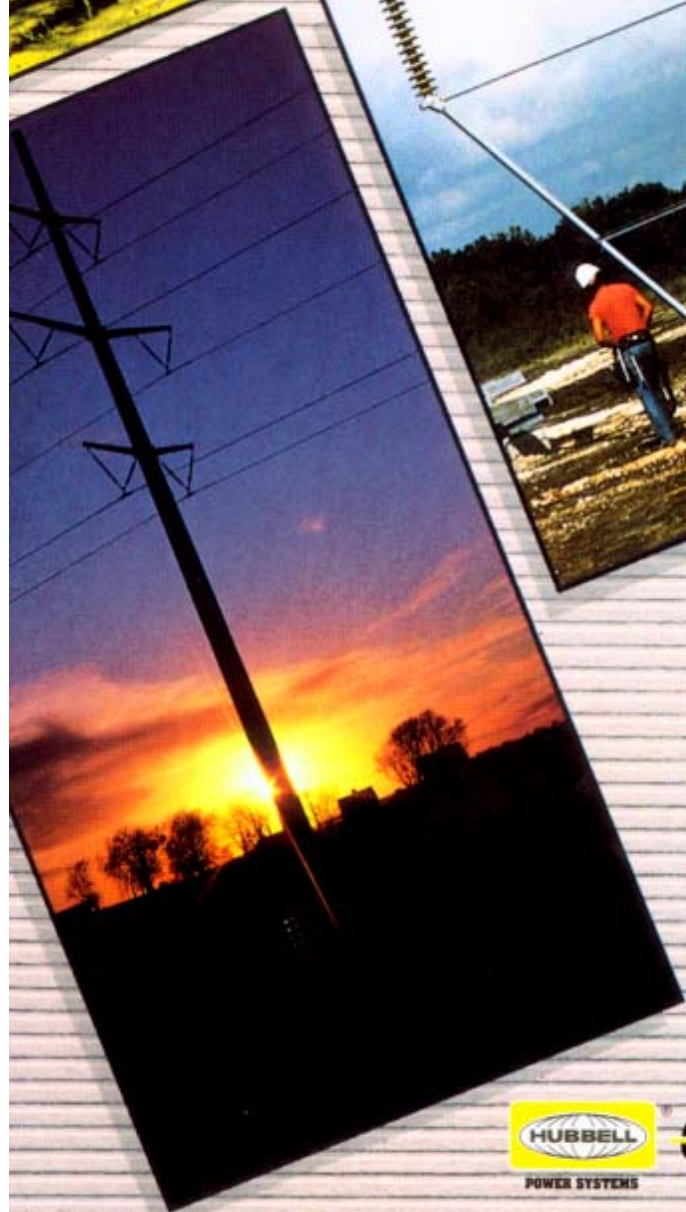
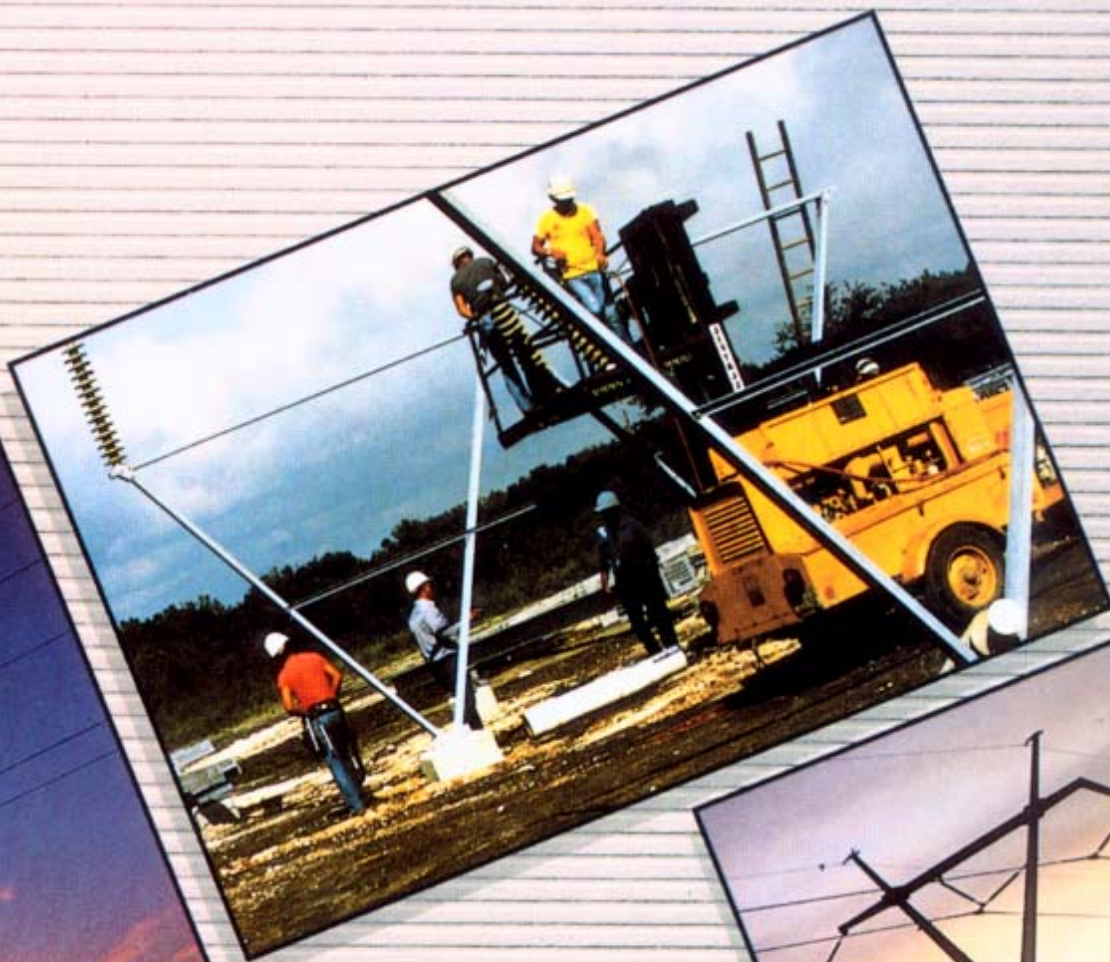


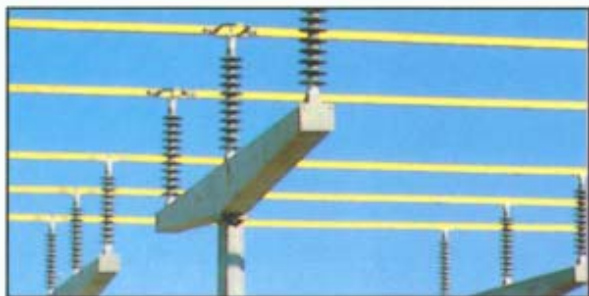
# Hi\*Lite<sup>®</sup>

Cost Effective Polymer  
Transmission Insulation



**OHIO BRASS**

# Hi\*Lite<sup>®</sup> Insulators: Dollars Saved Through the Life of Your Line



Hi\*Lite insulators have been in production for 20 years and field trial units have been in service for nearly 26 years. With over 6,000 miles of complete Hi\*Lite lines, this insulator constitutes 60 percent of all transmission polymer insulators in service worldwide.

Although our excellent construction -- live silicone interface with O-rings, hydrophobic polymer and swaged end fittings -- is often the topic, this brochure focuses on the cost saving benefits associated with Hi\*Lite.

## Power Loss

Hi\*Lite insulators have only 1/10 the energy losses compared to their porcelain counterparts. This results in a significant operating cost savings. The following examples show present value energy savings.

### Watts Loss Reduction\* (watts per insulator string)

Voltage kV	Relative Humidity				
	30%	50%	70%	90%	100%
69	0.6	0.8	0.9	1.0	4.0
138	1.0	2.4	4.5	7.2	8.0
230	1.0	2.5	5.7	14.0	29.0
354	2.5	4.2	8.5	15.0	30.0
500	2.8	7.8	11.5	33.0	56.0

### Dollar Savings\*

Voltage kV	Interest %	Energy Cost (\$)	Percent of Year @ Humidity Level %					\$ Savings Per String (1)
			rh < 40	40<rh<60	60<rh<80	80<rh<99	rh=100	
69	6	0.06	5	25	35	30	5	8.26
69	8	0.06	5	25	35	30	5	6.55
69	6	0.05	10	25	40	24	1	5.93
138	6	0.06	5	25	35	30	5	37.84
138	8	0.06	5	25	35	30	5	29.99
138	6	0.05	10	25	40	24	1	27.24
230	6	0.06	5	25	35	30	5	65.80
230	8	0.06	5	25	35	30	5	52.15
230	6	0.05	10	25	40	24	1	43.86
345	6	0.06	5	25	35	30	5	80.27
345	8	0.06	5	25	35	30	5	63.62
345	6	0.05	10	25	40	24	1	56.68
500	6	0.06	5	25	35	30	5	148.80
500	8	0.06	5	25	35	30	5	117.92
500	6	0.05	10	25	40	24	1	100.90

(1) Present value of cost savings over 40 year line life



\* Power loss measurements under dynamic humidity conditions on l-strings.

Savings will vary depending on various factors as shown above. See your Ohio Brass district manager for a free computer program to compute your energy/dollar savings.

# Savings in Transport and Handling

## Savings in Transport and Handling

Hi\*Lite insulators' light weight and one-piece construction reveal many cost savings in transporting insulators from the warehouse to the job site. The higher the line voltage, the greater the savings available.

The following example illustrates typical cost savings associated with the installation of 10 miles of 345 kV line, comparing Hi\*Lite with porcelain insulators.



### Example - 10 Miles, 345 kV, 250 Strings of Insulators

<b>Porcelain -</b>	4,500 bells, 52-5, 14.2 lbs. ea., total 63,900 lbs. 750 crates at 3.1 cu. ft. = 2,325 cu. ft. Insulator cost = \$54,000 (\$12.00/bell)
<b>Hi*LITE -</b>	250 #511016, 15.6 lbs. ea., total 3,900 lbs. 5 crates at 75 cu. ft. = 375 cu. ft. Insulator cost = \$45,900

	<u>Savings</u>
1. Storage space at receiving point (3 mos.) porcelain - 580 sq. ft.; polymer - 100 sq. ft. ....	480 sq. ft. \$60.00
2. Off-load, re-load at receiving point porcelain - 10 man-hrs.; polymer - 2 man-hrs. ....	8 man-hrs. \$160.00
3. Breakage - off-loading, storage, re-loading porcelain - 1 percent; polymer - 0.....	1 percent \$540.00
4. Truck - receiving point to tower sites (5 miles) porcelain - 2.00/cwt.; polymer 1.00/cwt. ....	\$1.00/cwt \$600.00
5. Off-load at tower site porcelain - 5 man-hrs.; polymer - 1 man-hr. ....	4 man-hrs. \$80.00
6. Unpack at tower site porcelain - 50 crates/hour, 25 man-hrs. polymer - 50 insulators/hour, 5 man-hrs. ....	20 man-hrs. \$400.00
7. Breakage - off-loading through string assembly & cleaning porcelain - 1 percent; polymer - 0.....	1 percent \$540.00
8. Assemble strings, attach blocks porcelain - 40 man-hrs.; polymer - 8 man-hrs. ....	32 man-hrs. \$640.00
9. Clean insulators porcelain - 10 min./string; polymer - 3 min./string ....	29 man-hrs. \$580.00
10. Lift string into place (2 men) porcelain - 5 min./string; polymer - 2 min./string ....	25 man-hrs. \$500.00
11. Install & connect to tower (2 men) porcelain - 5 min./string; polymer - 2 min./string ....	25 man-hrs. \$500.00
12. Breakage - lifting & installation porcelain - 0.5 percent; polymer - 0.....	0.5 percent \$270.00
13. Cleanup packaging materials at jobsite porcelain - 6 man-hrs.; polymer - 1.5 man-hrs. ....	4.5 man-hrs. \$90.00
14. Insulator Purchase Cost .....	15% \$8,100.00

**Total Savings \$13,060.00**

# More Cost Savings...

## Vandalism

Consider the number of trips necessary to change out several porcelain insulators on a structure. Whatever cost you calculate, simply add that to the cost savings for Hi\*Lite insulators. The polymer insulators are virtually unbreakable. If one maintenance trip is required with porcelain each year, at an average of \$300 a trip, you have spent over \$10,000 unnecessarily on maintenance.



## Design

Many utilities upgrade existing lines economically and efficiently, aided by Hi\*Lite insulators' light weight and versatility. Many also realize savings in right-of-way, with the flexibility of designing lines with Hi\*Lite. Several utilities cut costs by designing vertical substations, profiting from small profile and compact structure designs.



## Construction

Let's run down a list of Hi\*Lite savings that should be considered during the purchase of the insulator.

- Installed vs delivery cost
- No breakage
- No strings to assemble; no cotters to check
- Ground framing permits crane or chopper construction
- Light duty handling equipment
- Light duty delivery equipment
- Less maintenance after installation
- Units for maintenance easier to get to job site
- Weight can be ignored when calculating sags
- No movement on Vs when clipping in conductor
- Little or no cleaning required before installation
- More convenient packaging disposal
- No personnel or equipment cut or damaged by broken porcelain
- No lost time accidents from cuts or lifting heavy weight
- Less probability of accident during entire construction
- Less storage area; easier to inventory
- Workmen like to install them
- Cost savings on poles due to elimination of mounting bracket requirements.

## Right-of-Way

Hi\*Lite insulators' improved strength-to-weight ratio makes possible new system designs to reduce tower metal and overall line cost. Controlled-position construction is greatly simplified.

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# What our Customers Say



"We saved \$8,000 with Hi\*Lite (insulators)."

--LCRA

"...the excellent labor costs for aerial framing are a direct result of the use of the Ohio Brass Hi\*Lite insulators."

--Upper Missouri G&T Coop

"We saved \$4,000 per mile with polymer."

--Detroit Edison

"Construction went twice as fast as it would have if porcelain posts had been installed."

--Roseville (California) Electric Department

"The estimated project maintenance savings is \$120,000 over the life of the line."

--Public Service of New Mexico

"The contractor stated they saved roughly 1 1/2 man-hours per structure during erection of the single-pole, horizontal-post type structure."



"The overall savings in materials and labor for this initial installation were over 41 percent."

--Houston Lighting & Power



"This changeout was completed...about 80 percent less than the cost of either of two alternative proposals involving new construction."

--Commonwealth Edison

"We changed this design to utilize a vertically oriented bus arrangement supported from the 230 kV bus support steel columns. ... Considerable cost was saved in extra buswork and steel when compared to the horizontal arrangement."

--Southern Company Services

"We were able to realize a substantial savings in labor using the lightweight Hi\*Lite post insulators."

--Withlacoochee River Electric Cooperative

"The crews were complimentary of Hi\*Lite (insulators) saying construction time was saved because no Hi\*Lite (insulators) were broken."



"Framing the pole on the ground offers significant construction savings with lightweight Hi\*Lite insulators."

***For a complete article on each of these applications, please contact your Ohio Brass representative.***

NOTE: Because Hubbell has a policy of continuous product improvement, we reserve the right to change design and specifications without notice.