



THE HJ FAMILY
OF COMPANIES

▪ SINCE 1969 ▪

H-J Low voltage **thermoplastic bushings** for pole mounted and pad mounted transformers electrical and dimensional characteristics

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1) INTRODUCTION

Low voltage bushings are an important component of distribution transformers, whether they are pole mounted or pad mounted, and are often relegated to low priority. These bushings, however, are responsible for the withdrawal of operation of many transformers in distribution utilities, primarily because of leaks. These leaks generally occur due to deterioration of the gaskets caused by the exposure to sunlight, excessive tightening, or heating of the cables' connection terminals to higher than nominal temperatures.

These substitutions add unnecessary costs to the distribution system, which could simply be avoided with the

application of thermoplastic bushings supplied by The H-J Family of Companies, which include technologies that prevent accelerated deterioration of the gaskets.

H-J's philosophy is that the bushings have a design that allows their life span, including their component parts, to be the same as the transformer's, avoiding unnecessary removal of the transformer before it completes its life cycle.

2) THERMOPLASTIC H-J BUSHINGS

2.1) *Electrical and Dielectric Characteristics*

The electrical and dielectric characteristics of low voltage H-J thermoplastic bushings are as follows:

Rated voltage (kV)	1,2
Rated current (A)	160, 250, 400, 630, 800, 1000, 1250 e 1600
Power frequency withstand voltage dry and wet, 1 min (kV)	10
Rated lightning impulse withstand voltage (kV)	30 or 45

2.2) *Constructive characteristics*

Insulating body	Thermoplastic (PBT)
PBT melting temperature (°C)	215 (Minimum)
UV stable	In accordance with ASTM G 154, 1500h
Terminals	Olhal ou Spade (2, 4 or more holes)
Terminal type	Forged or casting
Gaskets	Buna N

2.3) Constructive details

Figures 1 and 2 show details of the H-J thermoplastic bushings with an eye and a spade type terminal, which can be two, four or more NEMA holes for any rated current.

We, also, highlight the following:

a) In H-J bushings only two gaskets are used in the sealing system. One installed between the terminal and the insulator and another installed between the insulator and the tank;

b) The gaskets are totally protected from sunlight, avoiding their deterioration for this reason;

c) The H-J thermoplastic bushing uses the philosophy of a tightening nut for each gasket.

In this way, the lower nut, installed in the conductor, tightens the gasket between the terminal and the insulation body. In turn, the thermoplastic inner nut tightens the gasket between the insulation body and the tank.



Figure 1 - General view of the H-J bushing.

3) Bushing Assembly

In addition to the aforementioned, it is important to note that thermoplastic bushings are assembled at the HJ factory in the United States, by a fully automated, human-free system, with control of all steps of the process, assuring total quality to the product.

3) Bushing Assembly

The use of HJ thermoplastic bushings reduces the operating costs (Opex) of distribution utilities or users of transformers in commercial and industrial installations, as it minimizes the need to withdraw from operation transformers that are in good operating conditions, significantly reducing leaks in the secondary bushings.

Thus, uniform tightening of the gaskets is achieved, helping to prevent leakage;

d) It should be noted that for the gasket installed near the tank, there is a compression limit (between 25 and 30% of its width) given by the contact between the insulating body and the tank, avoiding unnecessary compression;

On the other hand, the gasket between the terminal and the insulator is installed by means of an automatic process, without human interference, with torque control, which guarantees an adequate tightening;

e) H-J thermoplastic bushings withstand higher bending loads when compared to porcelain bushings, supporting strains that may be caused by the weight of installed cables, thus reducing the possibility of leaks under these conditions.

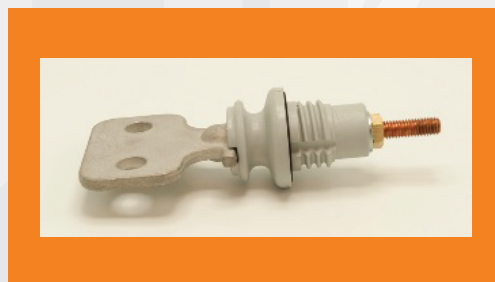


Figure 2 - General view of H-J bushing with eye type terminal two holes Nema connector.

This is due to the better protection from exposure to sunlight and to proper compression control of the gaskets. In addition, because the thermoplastic bushings withstand much higher tensile stresses than porcelain bushings, the stress on the gaskets is reduced, also minimizing the possibility of leaks.

Additionally, from the point of view of the manufacturer, the bushing has the advantage of being supplied completely assembled, tested and with all components. This avoids the need to separately purchase parts and components and minimizes assembly time on the transformer.