



Ohio Brass Metal Oxide Station and Intermediate Arrester Quality Assurance

The following tests are performed by the Ohio Brass Company to assure compliance with the latest industry standards for station and intermediate class metal-oxide surge arresters, as well as assure long-term in-service reliability.

MOV Disc Tests

Visual Test – After successful completion of electrical testing, each metal-oxide disc is visually inspected to verify no damage is present.

10-kA Discharge Voltage – Each disc is subjected to a 10-kA discharge with a wave shape of 1.0 percent. This measured value is then stamped on the disc and used as the basic reference value when assembling multiple discs into complete arrester units.

AC Test (Watts Loss and Capacitive Current) – After the 10-kA discharge voltage has been measured, the AC watts loss and capacitive current are measured by the following procedure: The disc is energized for a three second “soak-in” period at 2-5 mA, depending on the type of arrester. After the three-second “soak-in”, the voltage is immediately reduced to approximately 50 percent of the disc’s 10-kA discharge voltage. At this voltage level, the disc’s watts loss and capacitive component of current are measured.

Rated Energy Test – Each disc is subjected to three groups of rated energy discharges, in sets of two or three shots, depending on the type of arrester. The magnitude of the discharge current is either 450, 650 or 1000 amperes, and the current duration is 1.9 milliseconds. Each disc is fan cooled between each group sequence to within 20 degrees Celsius of room temperature.

The above tests are performed on a 100 percent basis. The following tests are performed on a statistical sampling basis:

Square-Wave Energy Test – This test is performed on a five disc sample from each batch. Each disc is subjected to two 3.2-millisecond duration square wave energy discharges, spaced one minute apart. The current magnitude of the two discharges is either 450, 650 or 1000 amperes. The disc is then fan cooled for a minimum of 15 minutes. Then the magnitude of the discharge current is raised by 100, 150 or 200 amperes, depending on the type of arrester. The disc is subjected to two more square wave discharges, spaced one minute apart, at this current level. The current is then increased by steps until disc failure occurs. The ultimate energy capability of the failed disc is defined as the energy discharged on the last shot prior to failure.



100-kA High-Current Test – This test is performed on a quarterly basis for station class and performed on every batch for intermediate class. The test sample consists of five discs from a batch. Each sample disc is subjected to two 100-kA discharges spaced five minutes apart. The permissible wave shape range is 4/10 to 6/15 microseconds. After a minimum one-hour cool down period, the disc's watts loss and 10-kA discharge voltage are measured and compared to the disc's watts loss and 10-kA discharge voltage prior to the two high-current discharges.

Accelerated Aging Test – This test is performed on two discs from each batch. Each disc is energized to a minimum voltage related to a percentage of the 10-kA discharge voltage. The discs are tested in circulating fan ovens at 130 degrees Celsius for 250 hours. At the conclusion of the test, the disc watts loss is plotted versus the square root of time.

Arrester Testing – After assembly operations, the finished arresters are 100 percent tested as follows:

Starting Voltage – The voltage necessary to produce 1 mA peak resistive current is measured. For example, an acceptable range for a 48-kV MCOV rated station class arrester is 55.2 - 62.4 kV rms. ⁽¹⁾

Internal Ionization – RIV must be equal to or less than 10-microvolts above background with an applied voltage of 1.05 times MCOV and less than 50-microvolts with an applied voltage of 1.25 times MCOV.

Grading Current – Grading current is measured at MCOV. The acceptable peak current range is as follows:

- Type VN: 1.35 ± .25 mA
- Type VL: .87 ± .16 mA
- Type VI, PVI: .60 ± .15 mA

The above testing procedure indicates our diligence in producing high quality metal-oxide varistors.

⁽¹⁾Starting voltage test replaces sparkover testing for gapped silicon-carbide arresters and is used primarily to assure the correct MOV discs were inserted in the housing during assembly.

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