



Electrical Engineering Safety

Decision Sheet 8.1

Use of Insulation Testers in a Hazardous Zone

A basis for consistent application of Electrical Engineering Safety issues at NSW mines

Decision Sheets are developed by the Inspectors of Electrical Engineering in response to issues raised or questions asked by others in the DPI, in particular Mine Safety Operations and from our external clients. They are for use by any staff in Mine Safety Operations, but primarily by Electrical Engineering staff. They can be distributed externally to the DPI.

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Preamble

Electrical plant in a hazardous zone must be tested and maintained. An essential test is the insulation resistance test; this is traditionally carried out using an insulation resistance test instrument colloquially referred to by a particular brand name “megger”. Legislation via a gazette notice specifies that portable apparatus that is not explosion protected must not produce incendive arcs in “normal operation”.

In all cases the CMH&S reg clause 19(1)(s)(ii) requires that the electrical engineering management plan for a coal operation must make provision for specific procedures for the use of electrical test instruments.

Comment - These considerations could be extended to apply to some other types of test instruments.

Issue

What is portable apparatus?

What is “normal operation” of an insulation tester?

Is it acceptable to consider an insulation resistance test instrument as suitable to be taken in to the hazardous zone under the mine's portable apparatus management plan.

Do the requirements extend to the circuit being tested, especially when the circuit originates in a non hazardous zone and extends into a hazardous zone?

Is an exemption required to use an insulation tester in a hazardous zone?

Position

What is portable apparatus? *Portable electrical apparatus* means electrical apparatus capable of being carried manually while it is being used but does not include a caplamp. (This is derived from the definition in the repealed Coal (Underground Mines) Regulation 1999, Clause 133.



What is normal operation of an insulation tester? Normal use means connected securely to the circuit prior to testing, then testing, then allowing discharge through the instrument, then removal of the test leads from the tester.

Note: To operate normally requires having prior knowledge of the circuit under test, regarding where it goes, environment and potential damage sites.

Is an insulation tester suitable for use in a hazardous zone pursuant to the operation's portable apparatus management plan? Provided the instrument complies with the gazette notice, it can be suitable. The mine operator, when selecting which insulation resistance test instrument to allow in the hazardous zone, must consider the overall suitability of the apparatus, the competency of persons using it, and the necessary safe work procedures for its use.

Is an exemption required to use an insulation tester in a hazardous zone? No exemptions should be required to use an insulation resistance test instrument in normal operating circumstances.

RE High Voltage insulation resistance test instrument

High voltage installations in a hazardous zone are (in the vast majority of circumstances) associated with longwall equipment. When testing 11 kV cables going into the hazardous zone, the insulation resistance test instrument must be in the safe area. Under these conditions the test voltage is in the 11 kV cable which is normally allowed to be energised at this voltage anyway. The inbye plugs and adaptor must be coupled and flameproof. (It may be necessary to use cable couplers and /or a blanking plug to meet this requirement when testing separated cables).

When testing 3.3kV equipment, this is invariably within a hazardous zone. The testing should be done from a safe area where the switchgear arrangements permit (11/3.3kV transformer and switchgear is located in a non hazardous zones). Where the instrument has to be taken in the hazardous zone it should not be taken into the hazardous zone until the mining official in charge of the area gives permission and a "gas free permit" has been issued.

