



Electrical Engineering Safety

Decision Sheet 13.1

Electricity Distribution

Supplies in Mines

– General Considerations –

Use of 0.6/1kV Rated Cables in IT Earthed Systems with voltages up to 1kV in Non-Hazardous Areas

***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

IT Earthed systems are used in mining applications to assist in the control of energy associated with earth faults on cables and machines. It is desirable to limit the energy associated with an earth fault to reduce the risk of explosion and prospective

NO LIVE LINE WORK

TEST BEFORE YOU TOUCH

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touch and step potentials to levels that will not cause harm to persons in the vicinity of the earth fault.

Issues

AS 2081.5 Appendix A recommends that equipment ~~a cable~~ supplied from IT earthed systems to ...*”be rated so that it is able to withstand phase-to-phase voltage between phase and earth. For example, a 3 phase cable for use on an 11 kV system should be rated 11 kV phase-to-phase and 11 kV phase-to-earth, not 11 kV phase-to-phase and 6.35 kV phase-to-earth.”* This requirement is related to the fact that a cable in an IT earthed system will experience full line voltage from phase to earth in the event of an earth fault.

In non-mining applications, the first fault in an IT system is not always required to be disconnected, so it is feasible that in some IT situations, a phase conductor could be subjected to line voltage to earth for an extended period of time. However, in NSW mining applications, the first earth fault on an IT system must be detected and cleared within 500mSec.

Further, 0.6/1kV Polymeric insulated cables constructed to AS/NZS3008.1 have to be built to withstand insulation testing as outlined in AS/NZS1660.3. These tests require the conductor insulation to withstand 1.8kV for 4 hours, and 3.5kV for five minutes when submersed in water (Clause 3.2).

Position

- Users should obtain a statement from the cable manufacturer / supplier that the cable is suitable for use on an IT system.
- Users should request and apply information from the cable manufacturer / supplier on the risk controls that must be implemented when used on an IT system
- Polymeric insulated cables rated at 0.6kV/1kV may be used in IT earthed systems up to 1kV provided there are two means to detect and clear any earth fault on the system within 500 milliseconds.
- Cables must be compliant to AS/NZS3008.1.
- SWA PVC cables are preferred (where current ratings allow) as they offer both additional mechanical and electrical protection.

