

July 2024

Position paper

Use of non-certified electrical equipment in a hazardous zone

There are instances where an underground coal mine may require a particular item of portable non explosion protected electrical plant where investigations identify that there is no readily available explosion protected option. s 82 of the Work Health and Safety (Mines and Petroleum Sites) Regulation 2022 details exceptions to the requirements of explosion protection that can be applied to portable electrical plant.

The exceptions detailed in s 81 to the explosion requirements should not be considered alternative means of operation.

The use of non-certified electrical equipment in the hazardous zone was first introduced in 1999 and the position that the Regulator holds is that the use of this equipment should only be considered under the following circumstances:

1. There is no explosion protected item available that performs the same function.
2. The mine operator has determined that there is no reasonably practical alternative to the use of the apparatus. e.g., A non explosion protected battery powered screwdriver cannot be considered to have no reasonably practical alternative as there are manual screwdrivers readily available.
3. The equipment has been assessed as being fit for purpose by a person competent to make that determination.
4. The environment has been monitored for concentrations of methane by a person competent to do so immediately prior to, and in the immediate vicinity of, the location where the item is to be used, and at regular intervals whilst the item is within the hazardous zone.
5. The item remains under the control of the person authorised to take the item underground.
6. Batteries should not be removed underground.
7. Batteries should not be stored underground.
8. Batteries should not be charged underground.

Target audience

This position paper is intended for underground coal mine operators and people in control of electrical engineering activities in underground coal mining operations.

Legislation requirements

The Regulation controls the principles relating to the risk of methane explosion due to an electrical source. A hazardous zone is defined in the Regulation and applies to all underground coal mines.

Only electrical equipment that is certified as being explosion protected is permitted to be used in the hazardous zone as prescribed in s 81 of the Regulation (Use of plant in the hazardous zone – explosion protection required).

Legislation references

Work Health and Safety (Mines and Petroleum Sites) Regulation 2022

- **Schedule 15 Dictionary**

hazardous zone, at an underground coal mine, means each of the following—

- (a) any part at the mine in which the concentration of methane in the general body of the air is 1.25% by volume or greater,
- (b) a return airway,
- (c) any part of an intake airway that is on the return side of points that are within 100m outbye of—
 - (i) the most inbye completed line of cut-throughs, or
 - (ii) any longwall or shortwall face, but only to the extent the intake airway is on the intake side of that face, but not if the longwall face is an installation face at which the development of the face, and mining for development coal, have been completed and at which longwall mining has yet to commence.

- **Section 81 Use of plant in hazardous zone – explosion-protection required**
- **Section 82 Exceptions to Explosion Protection requirements**

Informative

Prevention of methane explosion by electrical equipment

For a methane explosion to occur you must have an explosive concentration of methane and a spark or thermal effect to set off the ignition. Both the gas concentration and the ignition source are managed by independent controls.

Methane concentration is maintained at a safe level by providing a constant source of fresh air to dilute the gas as it is liberated. Both the quantity of air and the concentration of gas are continuously monitored and arranged to automatically trip power, should either fall outside of predetermined limits.

Only electrical equipment that is certified as being explosion protected is permitted to be used in hazardous locations.

The combination of the above controls provides two independent measures for the prevention of ignition, each having a factor of safety.

Only equipment that has been certified as being compliant with the explosion protection techniques prescribed in the Work Health and Safety (Mines and Petroleum Sites) Regulation 2022 s 81 (2)(b) is permitted to remain energised when the methane concentration or air quantity falls outside the safe limits.

The above equipment is designed to have at least two layers of protection or have been tested to remain explosion protected with two faults applied.

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