



SAFETY ALERT

Defective Restrained Back to Back Couplers

INCIDENT

A Department of Primary Industries inspection of two Crouse Hinds – Macey 425A, 660/1100V back to back couplers at an approved cable repair workshop has identified two potentially dangerous situations.

1. A 425 ampere (A) back to back coupler had a 300A interior moulding fitted and arranged in a 425A orientation. This had the potential for arcing between the 300A pins and 425A sockets under load conditions, with a significantly increased risk of initiating a short circuit arcing fault.
2. A 425A back to back coupler had both jacking screws retained in the receptacle body within a brass bush held in position with a grub screw. The bushing was inserted incorrectly and it was possible to pull the jacking screw out (along with the bush).

The jacking screw is used to assist insertion and withdrawal of a restrained plug. The jacking screw must also withstand forces generated by an internal ignition of gas or an arcing fault. Under these conditions the jacking screw must retain the plug so that explosion protected properties are not compromised.

The defective jacking screw arrangement could have enabled an unplanned partial withdrawal of the plug (e.g. when a cable is under tension). This partial withdrawal could have initiated arcing from partially connected pins and sockets.

CIRCUMSTANCES

1. A plug with 425A sockets fitted into a 425A back to back receptacle with 300A pins increased the risk of a short circuit arcing fault to an unacceptable level.
2. Jacking screws were not threaded directly into a receptacle casing presenting an unacceptable risk of compromising explosion protected properties and short circuit arcing faults.

INVESTIGATION

1. The back to back coupler was inspected and 300A pins were found to be fitted and oriented for 425A, illustrated below:



Photo 1.
300A pins and 425A orientation



Photo 2.
425A pins and 425A orientation

2. The back to back coupler was inspected and the retention of the jacking screw was found to be inadequate. Photo 3 shows an acceptable arrangement. Photos 4, 5, 6 and 7 show the unacceptable bushing arrangement.



Photo 3.
Jacking screw in a threaded case
- ACCEPTABLE ARRANGEMENT



Photo 4.
Jacking screw in a case with a bushing
- UNACCEPTABLE ARRANGEMENT



Photo 5.
*Casing bored to accept a bush – **UNACCEPTABLE ARRANGEMENT***



Photo 6.
Jacking screw with a threaded bush dislodged from receptacle body
– UNACCEPTABLE ARRANGEMENT



Photo 7.
Bush – showing score marks where the grub screw has failed to retain the bush within the receptacle body.

(Note the bush lip on the right hand side should have been on the left hand side)

– UNACCEPTABLE ARRANGEMENT

RECOMMENDATIONS

- 1) Mines using this type of product must immediately inspect all 300A and 425A back to back couplers of this make to ensure the correct pins are fitted and that the pins are in the correct orientation.
- 2) Mines using this type of product must immediately inspect all 300A and 425A back to back couplers of this make. Any back to back couplers with a bushed thread for the jacking screw should be immediately withdrawn from service and measures taken to ensure it will not be used again.
- 3) The manufacturer should immediately advise customers and distributors to remove the equipment from service.
- 4) Cable Repair Workshops and Approved Workshops that may repair this type of receptacle should modify inspection procedures to ensure identification of the two unsafe conditions referred to in this alert.

Further information on plugs and receptacles can be obtained from DPI web site at www.minerals.nsw.gov.au.

Signed



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