



Govt. of India
Ministry of Labour and Employment
Directorate General of Mines Safety

No. DGMS (Approval)/AVA/ 01

Dhanbad, dated 25.05.2010.

To
The owners, Agent and Manager
Of all open cast mines

Sub : Audio visual Alarm for surface transport Machinery & other Heavy earth Moving Machinery.

Several accidents have occurred in open cast mines while reversing of equipment especially in dumpers/tippers. In most of the equipments the manufacturers provide audio visual alarm and rear view mirrors for assistance during reversal. Although the Audio-Visual Alarm gives warning to the work persons, it is a practice in mines that the operator takes the assistance of a spotter while reversing. The spotters are exposed to danger of being run over by transport machinery. The audio-visual alarm warning at times fail due to defective manufacturing and poor maintenance.

Hence to have a better quality of products in mines, the Audio-Visual alarm was included in the list of approved type and make and was notified in the Gazette of India vide GSR no 143 dated 25th July 2008.

In the view of experience gathered over a period of time, it has been decided to approve the design, specification and test procedures of the Audio-Visual alarm by this circular and shall be treated as a general order. Existing type of Audio-Visual alarms not in conformity with the design, specification and test procedures and not specially approved separately should be replaced as early as possible but not later than 31.08.2010.

The manufacturer and Workmanship

The manufacturer shall be reliable, having adequate facility for proper manufacturing and test facilities of the audio-visual alarms. Every part of the unit shall have good workmanship and good finish and shall be free from any defect. The manufacturer shall be fully responsible for the quality of the Audio-Visual alarms and conformity with prescribed specifications.

Design

The Audio-Visual alarm shall be provided at the rear of the vehicle which can be actuated by a pressure switch when the reverse gear is used by the operator. The unit shall be housed in a fully water proof case which is shock and vibration resistant and suitable for high pressure washing. The two components shall be connected by a suitable detachable cable with water proof joints. Two fail safe synchronized speakers should be provided in the Audio-Visual alarm. Mechanical lock shall be provided to prevent unauthorized tampering.

Specification

The sound of the Audio Visual Alarm should be more than the surrounding noise level so that it can be heard distinctly. 110 dB sound level is suitable for Audio visual alarms. However the sound level shall be within ± 5 dB of the value for which the equipment is designed when measured at a distance of 1.2 meters from the unit and the light intensity shall be not less than 300 lux when measured at a distance of 300mm from the unit. Red bright LED of suitable quantity must be used in the Audio-Visual alarm and shall start blinking when the vehicle is reversed.

Self adjusting back up alarm may be preferred where the sound level is automatically maintained at 5dB higher level than the surrounding noise level.

Testing

The sample of Audio-Visual alarm shall be drawn by the manufacturer as specified in IS: 13109 (part-1) 1991 & shall be tested as appended below.

The Audio-Visual alarm shall confirm to IS 13947(part I) of 1993 for the following protection against dust and water.

Degree of protection	Test condition as per IS 13947 (part I)-see sub clause
1. Protection against dust and shall prevent ingress of dust	C7.5&C7.6
2. Protection against dropping water	C 8.1
3. Protection against spraying water	C 8.3
4 Protection against splashing water	C 8.4

The Audio-Visual alarm shall also confirm to IS 13109 (part I) of 1991 for the following environmental requirements ;

TEST

1. Vibration test
2. Shock test
3. Bump test
4. Drop and Topple test
5. Cold test
6. Dry Heat test

Test condition

As per table 1 of IS 13109(part I) of 1991

7. Damp Heat(cyclic) test

The following endurance test of Audio-Visual alarm shall be carried out in accordance with SAEJ 994.

- | <u>Test</u> | <u>Test condition</u> |
|--|-----------------------|
| (a) Endurance test at high temperature | As per Para 7.1 |
| (b) Endurance test at room temperature | As per Para 7.2 |

Light intensity at a distance 300 mm should recorded and mentioned in the test report

Functional Test Requirements : Unless otherwise specified data measurement will be taken during a minimum test period of 1min operation at ambient temperature of $25^{\circ}\text{C} \pm 11^{\circ}\text{C}$ and supply voltage of 14V DC $\pm 0.2\text{VDC}$ for a nominal 12V alarm and 28V DC $\pm 0.2\text{VDC}$ for 24V alarm and the performance of functional test should be recorded in the test report. Sound level shall be checked before and after the above test and shall be within $\pm 5\text{dBA}$ of the value for which the equipment is designed.

Testing shall be carried out in Government labs, Institutes under CSIR, BIS approved test house and DGMS approved test houses.

Marking :

Each audio visual alarm shall be legibly marked on the body of the Audio Visual Alarm mentioning the serial number, batch number, date of manufacture. Copies of test reports for every lot shall be supplied.

Inspection and maintenance:

The user industry shall also be responsible to ensure correct quality and conformity to the prescribed specification and also take proper care while Audio-Visual alarms are in use.

At least two percent of the Audio-Visual alarms from the lot when supplied to the mine shall be randomly drawn and tested as mentioned above in a laboratory mutually agreed between manufacturer and the user industry. If the Audio-Visual alarms fail to conform to the specifications, the whole lot of Audio-Visual alarms shall be rejected.

A competent person shall check and inspect the Audio-Visual alarms daily. Once in a week, at least ten percent of the Audio-Visual alarms working in machinery shall be measured for the sound level and intensity of light and the readings shall be recorded in a bound paged book signed by a competent person and counter signed by the engineer of the mine.



Director General of Mines Safety