



STANDARD PROCEDURE INSTRUCTION

Title		SPI
Vehicle Emission Testing		# 36-12
Department	Supersedes SPI Dated	Effective Date
Safety, Health & Environment	NEW	May 15, 2014

Vehicle Emission Testing

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1. PURPOSE

1.1. To provide instructions for vehicle emission testing at Vale Manitoba Operations.

2. SCOPE

2.1. This SPI applies to Vale, Rental and Contractor vehicles operating indoors in the surface plant and underground on Vale Manitoba Operations property.

2.2. A review of this SPI will be initiated every three years or when changes in legislation take place. Improvements to this SPI will be made available to the Manager of Safety, Health & Environment (SHE) department or a designate.

2.3. Additional forms, appendices, work instructions, among others that are or might become part of this SPI will be updated separately and will be reviewed and approved by the Manager of Safety, Health and Environment department or a designate.

3. LEGAL REQUIREMENTS

- The Workplace Safety and Health Act, Operation of Mines Regulation, Man. Reg. 212/2011 (Part 4, Part 15).
- The Workplace Safety and Health Act, Man. Reg. W210-217/2006 (Part 22).

4. TESTING REQUIREMENTS

4.1. New equipment or a new engine must have a current (within 12 months) emission certification or pass Vale vehicle emission testing by the department that owns that mobile equipment prior to entering service.

4.2. SHE department may request a copy of emission testing results for vehicles operating indoors in the surface plant or underground.

4.3. Contractor and rental vehicles shall present vehicle emission certification that has been completed within the previous 12 months, prior to entering Vale MB



Title Vehicle Emission Testing		SPI 36-12
Department Safety, Health & Environment	Supersedes SPI Dated New	Effective Date May 15, 2014

Operations property. If certification is not available the vehicle shall be tested for permissible exhaust levels by the renting or contracting department.

4.4. Contractor testing results shall be submitted to the SHE – Health department and the Department where equipment will be utilized.

4.5. Each department or plant-site shall be responsible for the following:

- a) Test tailpipe emission for CO, CO₂, NO_x and aldehydes once per year or:
 - i. when requested by an operator, or
 - ii. as part of the Preventative Maintenance (PM) system and,
 - iii. following major engine overhaul.
- b) On the surface test tailpipe emission for respirable combustible particles¹ once per year or:
 - i. when requested by an operator, or
 - ii. following major engine overhaul.
- c) Operation of the engine shall be tagged out and serviced when CO exceeds 0.15% (1500 ppm) in undiluted exhaust or when other gaseous substances exceed the TLV at the operator’s position.
- d) Operation of the engine shall be shut down when CO exceeds 20 ppm in a general operating area (example: garage). It is recommended to install a carbon monoxide alarm for monitoring.
- e) Multiple exhaust pipes shall be tested simultaneously or immediately one after the other. The results shall be averaged.
- f) If an engine has been converted from using one type of fuel into another type of fuel the above mentioned criteria apply.

4.6. Permissible vehicle emission exhaust levels are specified in the Table 1 (Appendix).

5. SH&E DEPARTMENT – INSPECTION AND REPORTING

5.1. SHE department shall perform a vehicle emission audit of the mobile equipment running indoors in surface plant twice per year.

¹ Manitoba Regulation does not provide monitoring technique for sampling respirable combustible particles in exhaust. Substitute with an area or personal sample.



Title Vehicle Emission Testing		SPI 36-12
Department Safety, Health & Environment	Supersedes SPI Dated New	Effective Date May 15, 2014

5.2. Sampling procedures and equipment – hand-held vehicle exhaust analyzer:

- Digital exhaust gas tester should be able to test the following gases: CO, NO₂ and NO, CO₂ and O₂ (optional).
- Must be resistant to high humidity.
- Must have at least 2 meters (6.5 ft.) of testing tube.
- Procedures on calibration and field bump testing shall follow manufacturer’s guidelines and recommendations.
- Sorbent tubes or other sampling equipment that meets the specifications outlined in the NIOSH Manual of Analytical Methods can be used to test for aldehydes and all other gases, when a digital exhaust tester does not have appropriate sensors.

5.3. Secure vehicle with wheel chocks prior to testing. Wear applicable personal protective equipment.

5.4. Avoid standing directly behind or in front of a vehicle. Do not breathe in exhaust.

5.5. An employee taking exhaust measurements shall wear heat resistant gloves when installing/removing probe from the exhaust pipe.

5.6. Two-speed emission test specifications shall be used to test vehicle emissions:

- Idle test – run engine for 4 minutes. Then test for 3 minutes or until stable for CO.
- High speed idle test at 2500 rpm (where applicable) – run engine for 4 minutes. Then test for 3 minutes or until stable for CO.

5.7. Results of tests and measurements stating a “Fail / Pass” shall be kept and made available upon request. “Failed” equipment must be tagged out and repaired. Once repaired, equipment shall pass an additional vehicle emission test prior to being returned to service.

5.8. SHE department reserves the right to perform audits on any mobile equipment operating on the plant site.



Title Vehicle Emission Testing		SPI 36-12
Department Safety, Health & Environment	Supersedes SPI Dated New	Effective Date May 15, 2014

6. TRAINING

6.1. SHE department can assist in selecting hand-held vehicle exhaust analyzer for the operating department.

6.2. Prior to the initial analyzer use, training must be provided by the manufacturer or distributor of the equipment. An operating department shall arrange for refresher training by a manufacturer or distributor every three (3) years or when requested by an equipment operator.

Approved By	Title Vice President, Vale Manitoba Operations
Date	



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APPENDIX

Gas	Undiluted engine exhaust limits (ppm)	Personal exposure levels (TLV) within operator's breathing zone (ppm)
Carbon Monoxide (CO)	1500	25
Carbon Dioxide (CO ₂)	100000	5000
Nitric Oxide (NO)	940	25
Nitrogen Dioxide (NO ₂)	170	0.2
Nitrous Oxides (NO _x)	1100	50
Formaldehyde (HCHO)	40	0.3 (STEL)

Table 1: Undiluted Engine Exhaust Pass/Fail Criteria. The limits apply to all types of fuel (propane, diesel etc.).

The table adopts permissible exhaust levels in accordance with the Operation of Mines Regulation MR212/2011. Underground mines may follow their own procedure as outlined in the "Gastec Tube Chart" (Mine Ventilation). Underground permissible exhaust levels cannot exceed limits stated in the table above.

