

NOVEMBER 30, 2020

Standards update CSA M424 Series on Underground Mobile Mining Equipment


THE INFORMATION IN THIS PRESENTATION IS LIMITED TO THOSE WHO NEED TO KNOW THE INFORMATION IN ORDER TO SUPPORT THE PROJECT AND IS NOT INTENDED TO BE SHARED WITH ANYONE.

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CSA Group

- Established in 1919
- Independent organization
- A leader in standards research, development, education and advocacy
- 12 areas of focus
- +3,000 Standards and codes
- Over 10,000 dedicated members
- Accredited by SCC in Canada and ANSI in USA

**Enhance the lives of
Canadians through
the advancement of
standards in the
public and private
sectors**



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Standards Development

Standards Development Process

- Set of steps and stages to support the development of a quality standard.
- Consensus principle.

Committee participation

- Volunteer members.
- Relevant stakeholder groups will be represented in the matrix.
- Committee size determined so all necessary interests are represented in a balanced fashion, yet effective functioning is possible.

Balanced Matrix

- Each category has a minimum and maximum number of voting members.
- Ensures all points of view are represented, and that the proportion is maintained.



Worker and Public Safety Program

Areas of Focus in Occupational Health and Safety (OHS)

- OHS Management Systems
- Occupational Diving
- OHS Nanotechnology
- Machinery and Equipment Safety
 - Forestry
 - Mining
 - Robotics
 - Workplace Electrical Safety
- Personal Protective Equipment
- Elevation Hazards
- Worker Wellness

Areas of Focus in Public Safety

- OHS Standards for Public Safety Personnel
- Transportation Safety






CSA M424 Underground Mining Equipment Series of Standards

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CSA OHS Mining Portfolio of Standards

- **CSA-M424.1-16** *Flameproof non-rail-bound diesel-powered machines for use in gassy underground coal mines*
- **CSA-M424.2-16** *Non-rail-bound diesel-powered machines for use in non-gassy underground mines*
- **M424.3-M90 (R2016)** *Braking performance rubber tired, self propelled underground mining machines*
- **M421-16 (R2021)** *Use of electricity in mines*
- **M422-14 (R2019)** *Fire-performance and antistatic requirements for conveyor belting*
- **M423-M87 (R2021)** *Fire-resistant hydraulic fluids*
- **M427-M91 (R2021)** *Fire-performance and antistatic requirements for ventilation materials*
- **M430-90 (R2021)** *Roof and rock bolts, and accessories*
- **G4-15 (R2020)** *Steel wire rope for general purpose and for mine hoisting and mine haulage*



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CSA M424 Underground Mining Equipment Series of standards

CURRENT STATE

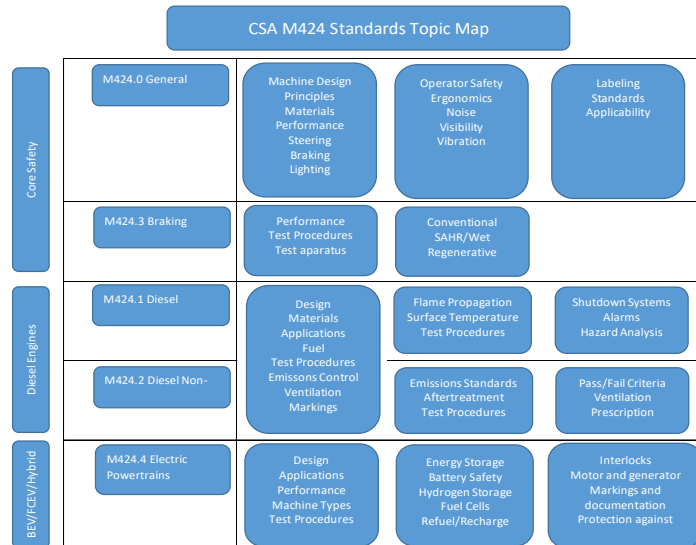
<p>CSA M424.1 Flameproof non-rail-bound diesel-powered machines for use in gassy underground coal mines</p>	<p>CSA M424.2 Non-rail-bound diesel-powered machines for use in non-gassy underground mines</p>	<p>CSA M424.3 Braking Performance Rubber-Tired, Self-Propelled Underground Mining Machines</p>
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REVISED STRUCTURE

<p>CSA M424.0 Underground Mining Mobile Equipment – General Requirements</p>	<p>CSA M424.1 Flameproof non-rail-bound diesel-powered machines for use in gassy underground coal mines</p>	<p>CSA M424.2 Non-rail-bound diesel-powered machines for use in non-gassy underground mines</p>	<p>CSA M424.3 Braking Performance Rubber-Tired, Self-Propelled Underground Mining Machines</p>	<p>CSA M424.4 Non-rail-bound electrically-powered machines for use in non-gassy underground mines</p>
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CSA M424 series of standards - Topic Map



CSA M424 Series key updates

- **CSA-M424.0, *Underground mining mobile equipment – General requirements***
 - Adoption with Canadian deviations of ISO 19296:2018
 - Requirements common to a variety of underground mining mobile equipment Describes the technical aspects and procedures necessary for the design, performance, and testing of core design and safety requirements
 - Intended to be used in conjunction with the additional M424 suite of standards as applicable
- **CSA-M424.3, *Braking performance - Rubber-tired, self-propelled underground mining machines***
 - Maximum rated speed and rated gross mass limitation removed.
 - Service braking requirements added for hydrostatic drive systems, systems with combined brake and steering function, machines designed to tow trailers
 - Requirement for test report
 - New Annex on maximum force levels for braking system controls during performance tests
 - New Annex with calculated values for stopping distances



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CSA M424 Series key updates cont'd

- **CSA-M424.1, *Flameproof non-rail-bound diesel-powered machines for use in gassy underground coal mines***
 - Ignition hazard assessment introduced with Annex added for guidance
 - Compatibility with MSHA and ISO requirements
 - Generally applicable machine requirements removed/ retained only those that pertain to machines for gassy underground mines
 - Several types of flame arrester technologies allowed
- **CSA-M424.2, *Diesel-powered machines for use in non-gassy underground mines***
 - Scope expanded to include larger/ more varied diesel-powered machines
 - Non-engine related general machine safety requirements transferred to CSA M424.0
 - Engine emissions testing pass/fail criteria lowered to reflect modern technologies
 - EQI concept for ventilation rate determination removed
 - Ventilation rate determination for retrofit emission control devices enabled



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CSA M424 Series key updates cont'd

- **CSA-M424.4, *Self-propelled, electrically-driven, non-rail-bound, mobile machines for use in underground non-gassy mines***
 - Considers battery electric as the base system configuration
 - Hydrogen fuel-cell-electric and diesel-electric systems are also considered as on-board sources of electrical energy supply and addressed
 - Other energy storage technologies are also considered for application as possible sources for electric propulsion
 - Applies for on-board voltages 50 V-1.5 kV AC at any frequency and 75 V-2.1 kV DC
 - Voltages contained within on-board devices are not considered
 - Hazards relevant to the voltage range for underground mobile machines within its scope when the machinery is used as intended.
 - Specifies appropriate technical measures for eliminating or reducing risks arising from significant hazards during commissioning, operation, and maintenance

CSA M424 Series status and application

- Current status
 - Public review completed for CSA M424.0, M424.1, M424.2, M424.3
 - Public review for CSA M424.4 closing December 8, 2021
<https://publicreview.csa.ca/>
- Next steps
 - Addressing public review comments
 - Technical committee ballot – formal approval
 - English publication – March 2022
 - French publication – August 2022
- Referenced in regulations
- CSA M424.1 and M424.2 referenced in CanmetMINING engine approval program



Thank you.

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