ISO 23875 (Air Quality Control Systems for Operator Enclosures – Performance Requirements and Test Methods

Jeff Moredock

MINERALS COUNCIL
SOUTH AFRICA

Biography

Jeff Moredock is the Executive Vice President, Standards and Regulation, at Sy-Klone International in Jacksonville, Florida. He serves as the United States Technical Advisory Group Chair for ISO TC-82 Mining. He serves as ISO TC-82 Mining - Convenor for Working Group 9- Operator Enclosures, and International Project lead for ISO 23875 Mining - Operator enclosures - Air quality control systems and air quality performance testing. Jeff is an advocate for clean air in operator enclosures. Jeff serves as President of the International Society of Environmental Enclosure Engineers (ISEEE). Jeff is a published author and active researcher in the area of operator enclosure air quality and was the principal private sector researcher for NIOSH's Pittsburg Mining Research Division Smart Cab project. Jeff teaches advanced cab theory for ISEEE and speaks regularly on operator enclosure air quality topics.

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ISO-23875 Mining — Air quality control systems for operator enclosures — Performance requirements and test methods

Minerals Council Conference

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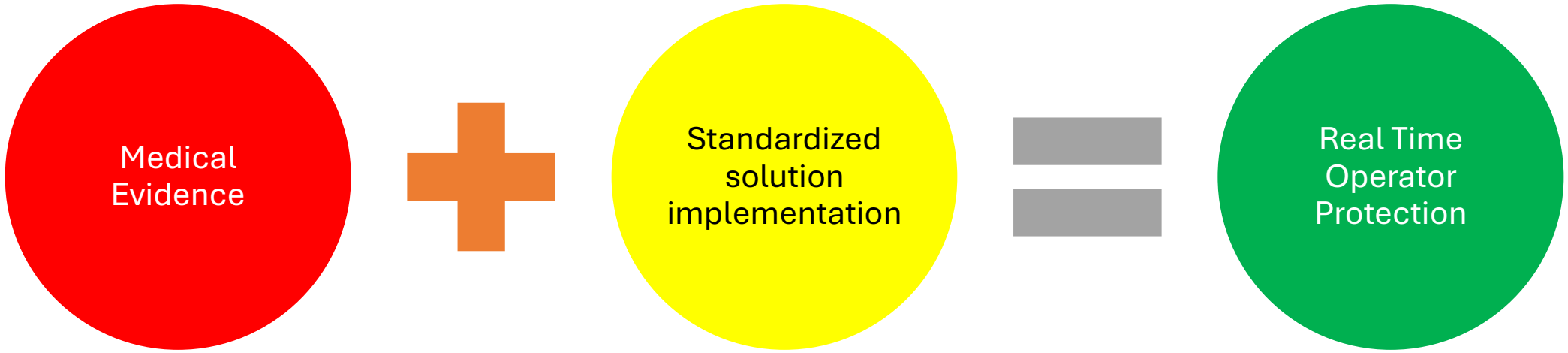
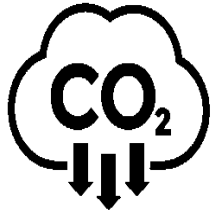
Operating on a simple premise



What is ISO 23875?

- ISO 23875 is an international standard that creates a consistent approach to designing, testing, operating, and maintaining operator enclosures over the life of the machine.

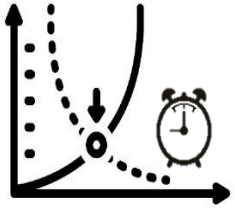
ISO 23875 Standardizes Performance Metrics



Maintain Defined CO_2 Levels

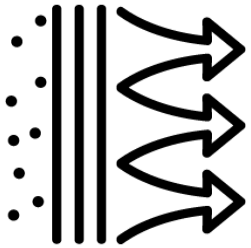
First alarm for CO2 = Ambient CO2+400ppm

Second alarm is the Action Level of 2500 ppm



Recirculation Efficiency

Maximum respirable particulate matter concentration ≤25 µg/m3 at start/end of decay test, maximum of 120 seconds decay time



Increased Filter Efficiency

A filter that meets more stringent test criteria, > 94% efficiency at 0.3µ, that meets the labelling requirements, and passes the system leakage and decay tests

System Maintains Cab Pressurization

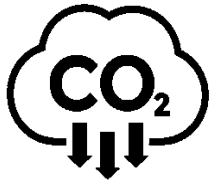
Minimum sustained pressurization, when the machine starting device moves to the “on” position shall be ≥20 Pa, maximum sustained pressure shall not exceed 200 Pa

Real-time Operator Cab Monitoring

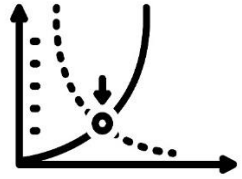
Cab pressurization and CO2 levels monitored by permanently installed monitoring system

“Operator enclosures are a safe haven for operators when operating in dusty environments”

ISO 23875 Standardizes Performance Testing

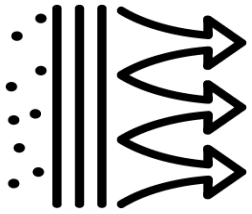


CO2 test quantifies CO2 levels in the operator enclosure – Sets



Decay test quantifies recirculation system effectiveness

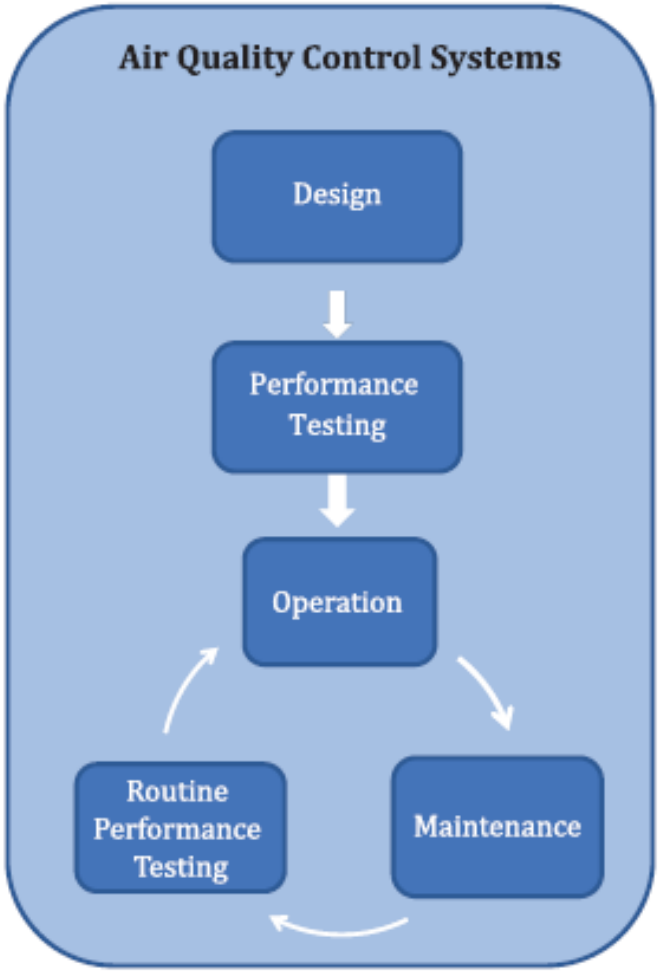
Cab pressure test – quantifies the enclosures ability to hold pressure



HVAC Low pressure side leakage test identifies leakage points after the intake air filter

ISO 23875:2021 – Annex B

- Annex B address the operational integration of the machine through a best practice approach applied to:
  - Maintenance practices/process
  - Occupational Hygiene practice/process
  - Documentation requirements
  - Auditing practices
  - Ongoing certification and system performance validation



ISO 23875:2021 – Designed to facilitate operator protection for the life of the machine

- Acceptable air quality is quantified by regulation and medical science
- Operator enclosure air quality performance is determined by regular measurement
- Engineering control performance is determined by system tests
- Success is achieved when:
  - air quality regulation exists
  - air quality is routinely measured
  - engineering control systems are routinely tested, and the
  - administrative structure supports the processes which produce continuous compliance.

“ISO 23875 provides a road map for those seeking compliance with dust exposure thresholds in operator enclosures”

ISO 23875 for the Real World

ISO Compliant installation on P&H Shovel

	Before	After
Sample type	**Pre ISO 23875 compliance**	**Post ISO 23875 compliance**
Six personal and area samples taken over several weeks	**Silica Concentration as a percent of the Occupational Exposure Limit (OEL)**	
Personal	479%	Below the limit of detection
Area - Cab	521%	18%
Personal	124%	Below the limit of detection
Area- Cab	141%	18%
Personal	82%	Below the limit of detection
Area- Cab	190%	50%

Samples taken over several weeks on mining shovel operating in extreme ultrafine dust environment with high silica content.

Questions?

ISO 23875 has already changed the culture on our mine site. Our operators and maintenance staff are no longer tolerant of poorly performing cabs. After having experienced good air quality in their cabs and properly operating HVAC systems, they won't go back to the way it was before we implemented ISO 23875.

Site Hygienist, in coal mine B.C., Canada

Presenter Biography

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