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Tractors and self-propelled machinery for agriculture — Air quality systems for cabs — Part 3: Filters for environmental cab HVAC systems



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1 Scope

This part of the S613 standard series is concerned with the generally accepted design principles and test procedures that define and qualify a filter for an HVAC system used in contaminated environments as part of an Occupational Health and Safety Management System (OHSMS). This document is intended to be a guide for engineers who are responsible for designs used in agricultural applications and for application specialists who are looking for a filter to be used when operating in a specific hazardous environment.

Filter performance specifications for the cab and HVAC system will be a primary consideration in this part of the standard. These performance specifications may be used by cab designers and filter manufacturers to develop air purification devices that can be used in a specific HVAC system for reduction of application specific air-borne contaminants as part of an OHSMS as defined in part 1.

Note: In this standard the term "filter" will be used to signify the air purifying device.

2 Normative References

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies unless noted. For undated references, the latest approved edition of the referenced document (including any amendments) applies.

ANSI/ASABE S613-1, Tractors and self-propelled machinery for agriculture — Air quality systems for cabs — Terminology and Overview

ANSI/ASABE S613-2, Tractors and self-propelled machinery for agriculture — Air quality systems for cabs — Part 2: Cab & HVAC design

ASHRAE 52.2, Standard — Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size

ISO 29463-1, High efficiency filters and filter media for removing particles from air — Part 1 Classification, performance testing and marking

3 Filter Design

Design elements which shall be considered are:

3.1 Frame construction which retains integrity in field application.

3.2 Seal and sealing surface for ease of installation with a reduced likelihood of seal damage on installation.

3.3 Filter retention means and frame to assure filter can be installed in a manner that is not likely to cause seal damage, seal failure, or filter media damage and remains locked in place during operation.

3.4 Filter media selected to:

3.4.1 Reduce the contaminant it is intended to protect against to a targeted level. (reference Guide to Occupational Exposure Values compiled by ACGIH)

3.4.2 Achieve the filter protection throughout the planned maintenance intervals.

3.5 Filter media construction considerations:

3.5.1 Achieve the filter filtration efficiency and pressure loss requirements for the defined maintenance interval for the required system airflow.

3.5.2 Filter media must withstand the vibration and operating conditions of the HVAC system it is intended for during operation.

3.5.3 Withstand handling of the filter during the installation and removal process.

3.5.4 Filter must withstand normal shipping and handling.

4 Particulate Filter Qualification Requirements

4.1 A particulate filter is to be rated under the ASHRAE 52.2 filtration efficiency test standard or ISO 29463-1, High efficiency filters and filter media for removing particles from air — Part 1 Classification, performance testing and marking with 2 modifications as defined in Annex A.

4.2 The particulate filter shall be clearly marked with its MERV or ISO 29463 rating.

4.3 The filter package shall be such that during shipping and storage it is not likely to be contaminated in foreseeable ambient and handling conditions.

4.4 The filter package shall contain information as to its use, projected service life, and application restrictions.

5 Vapor Filter Qualifications Requirements

5.1 A vapor filter should be evaluated to meet a 50:1 reduction ratio as described in Annex B.

5.2 The vapor filter shall be clearly marked with its reduction ratio. The filter package shall be such that during shipping and storage it is not likely to be contaminated in foreseen ambient conditions.

5.3 The filter package shall contain information as to its use, projected service life, and application restrictions.