Ohio EPA

Division of Air Pollution Control

Engineering Guide #22

Questions:

Is a lightweight, manually opened and closed cover sufficient for small (3' x 5') open top vapor degreasers to meet the requirements of OAC rule 3745-21-09(O)(3)(c)(i)? What is an "enclosed design" degreaser?

(These questions were submitted by Jerold A. Noss of the Toledo Pollution Control Agency on May 2, 1980.)

Answers:

It should be noted that the requirements of OAC rule 3745-21-09(O) and the answers provided below in this Engineering Guide only apply to non-MACT open top vapor degreasers (OTVDs). U.S. EPA has developed the "Halogenated Solvent Cleaning" MACT rule - 40 CFR Part 63, Subpart T – which contains requirements for OTVDs. Solvent cleaners that are subject to Subpart T are not subject to OAC rule 3745-21-09(O) in accordance with OAC rule 3745-21-09(O)(6)(b), which states:

> "After June 15, 1999, except as provided in paragraph (O)(2)(e), paragraphs (O)(2) through (O)(5) of this rule shall not apply to any solvent metal cleaning operation which is subject to 40 CFR Part 63, Subpart T, provided the requirements of Subpart T are specified in the terms and conditions of [an] installation and/or operating permit issued by the director."

1. A manually operated cover is not sufficient if the opening is greater than 10 square feet. OAC rule 3745-21-09(O)(3) requires the installation and use of a cover, safety switches, and one of five control options for OTVDs. These control options are defined in paragraph (3)(c)(i) through (3)(c)(v) and will not be specifically stated here. The entity can make a choice from one of these five control options based on design and economic considerations. For facilities that select the control option under OAC rule 3745-21-09(O)(3)(c)(i), the rule does not permit the substitution of a manual cover for a powered cover when the OTVD opening is larger than 10 square feet (~1 m^2). A "powered cover" is considered to be any cover that is automated, motorized, or mechanically assisted (by springs or hydraulics).

A cover can reduce volatile organic compound (VOC) emissions by 20 - 53% depending on the frequency of its use and the type of cover.[2, 8] It can be a simple, one-piece lid or a sophisticated and automated unit that works in coordination with a hoist or conveyor. A simple unhinged and/or heavy cover is inconvenient to use and is often left off the degreaser.[1, 4] An automatic powered cover, in contrast, is more convenient to operate and is, therefore, used more readily.[1, 2, 3] An automatic cover is often manufactured from plastic impregnated fabrics. Closure can be by roll or guillotine action to minimize the disturbance of the vapor zone.

2. An "enclosed design" is another one of the five control options listed under OAC rule 3745-21-09(O)(3)(c). OAC rule 3745-21-09(O)(3)(c)(iii) specifies that the enclosed design has a “cover or door [that] opens only when the dry part is actually entering or exiting the open top vapor degreaser.” Many early U.S. EPA documents on degreasing were found to be inadequate in their coverage and description of an "enclosed design." [1, 2, 4 - 7]

   According to an article in “Metal Finishing”, Scapelliti explains that an enclosed vapor degreaser (EVD) is designed such that the parts are placed into the work zone where no solvent or solvent vapors are present until the lid is closed and the cleaning cycle begins.[9] Because of the automated cleaning cycle and the condensing system, the work load is essentially dry when it is removed from the degreaser and practically all solvent vapors that would normally be emitted are condensed for reuse. U.S. EPA found that the enclosed design is generally used only for non-OTVDs, such as a parts handling/conveyor system.[10]

References:

1. "Inspection Source Test Manual for Solvent Metal Cleaning (Degreasers)", Roger D. Allen, EPA-340/1-79-008, U.S. EPA, Washington, D.C., June 1979, p. 3.3-2 (http://www.epa.gov/nscep/).

2. "Control of Volatile Organic Emissions from Solvent Metal Cleaning", John C. Bollinger & Jeffrey L. Shumaker, EPA-450/2-77-022, U.S. EPA, Research Triangle Park, N.C., November 1977, p. iv, 2-19, 3-4, 3-32 (http://www.epa.gov/nscep/).

3. Air Pollution Engineering Manual, 2nd Ed., John A. Danielson, EPA, Research Triangle Park, N.C., May 1973, p. 873.

4. "Organic Solvent Cleaners - Background Information for Proposed Standards." Draft EIS, EPA-450/2-78-045a, October 1979, pp. 4-2, 4-5, 6-7, 8-49, 8-97.

5. Op. cit., Reference 1, p. 3.1-12 and 3.3-2

6. Op. cit., Reference 2, p. vi, 3-2 through 3-5 and 3-33.

7. Op. cit., Reference 4, p. 4-5, 4-6 and 6-6 through 6-11.

8. "Air Pollution Engineering Manual," Van Nostrand Reinhold, New York, NY, ISBN 0-442-00843-0, June 1992, pgs 353 – 355.

9. Scapelliti J., "Metal Finishing," Volume 98, Number 1, 2000, pgs 154, 156, 158 – 160 (http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6TX7-416JSH9-G&_user=6325873&_rdoc=1&_fmt=&_orig=search&_sort=d&_docanchor=&view=c&_searchStrId=950392827&_rerunOrigin=google&_acct=C000062840&_version=1&_urlVersion=0&_userid=6325873&md5=169f987d8a0823e10e7554e192893bd8).

10. "National Emissions Standards for Hazardous Air Pollutants: Halogenated Solvent Cleaning – Background Information Document," EPA-453/R-93-054, November 1993, pg. 3-37 (http://www.epa.gov/nscep/).

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