WHITE PAPER

Is Your Welding or Abrasive Blasting Shop Compliant with EPA's NESHAP Rule 6X?

Many companies involved in welding, abrasive blasting and other metalworking processes have continued to exhaust fumes and dust outside, despite EPA emissions regulations. This white paper summarizes the EPA's National Emission Standards for Hazardous Air Pollutants (NESHAP) Rule 6X and highlights the role of cartridge dust and fume collection as a cost-effective control strategy.

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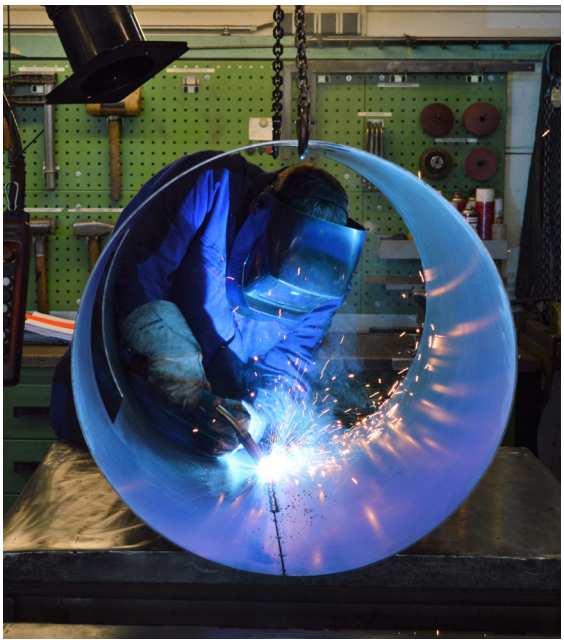
AIR POLLUTION CONTROL

The Clean Air Act required the Environmental Protection Agency (EPA) to develop air emission standards for a list of 187 hazardous air pollutants (HAPs). The standards are enforced to reduce exposure to HAPs, because they are known to cause cancer and other serious health effects, such as birth defects.

The EPA introduced its National Emission Standards for Hazardous Air Pollutants (NESHAP) in 2008. Within this standard are the HAPs that apply to the metal fabrication industries – known as Metal Finishing Hazardous Air Pollutants or MFHAPs. These are defined as materials that contain either:

- 0.1% cadmium, chromium, lead, or nickel by weight
- or 1.0% manganese by weight

Manganese is the material of widest concern to the welding industry, as it is virtually a universal component of welding wire.



Fumes are released into the air during metalworking processes like welding.

Which facilities are governed by the rule?

How do you know if your facility is using these hazardous materials? As a starting point, consult the Safety Data Sheets (SDSs) for the base materials that you are using – e.g., welding rod, welding wire, etc. A standard SDS will list hazardous ingredients in Section 2 (Figure 1). For example, if the material is shown to contain <2.50% manganese by weight, the material is subject to the NESHAP 6X rule.

The rule applies to companies that are primarily engaged (50% or more of total labor) in one or more of the following **categories** (Figure 2):

- Electrical and electronic equipment finishing
- Fabricated metal products
- Fabricated plate work (boiler shops)
- Fabricated structural metal manufacturing
- Heating equipment (except electric)
- Industrial machinery and equipment finishing
- Iron and steel forging
- Primary metal products manufacturing
- Valve and pipe fittings

SAFETY DATA SHEET

Issue Date: 12-Jan-2018 Revision Date: 12-Jan-2018 Version: 5

1. PRODUCT AND COMPANY IDENTIFICATION

Product Identifier
Product Name: OneQuat® Multi Mod Concentrate
EPA Registration Number: 1021-2607
Other means of Identification
Part Code: 3126

Recommended use of the chemical and restrictions on use:
Recommended Use: Insecticide.

Details of the supplier of the safety data sheet

Manufacturer Address: McLaughlin Gormley King Company 8810 10th Avenue North Minneapolis, MN 55427 FAX #: (763) 544-6437
Telephone Number: (800) 645-6466, or (763) 544-0341
e-Mail Address: mgk-sds@mgk.com

Emergency telephone numbers:
24 Hour TRANSPORTATION Emergency:
International:
24 Hour MEDICAL Emergency: SafetyCall®: (888) 740-8712, or (952) 852-9509
Comments: MGK® Hours of operation are 8:00 a.m. to 4:30 p.m. CST, 14:00 to 22:30 GMT. For MEDICAL EMERGENCIES or PESTICIDE INCIDENTS, call 24 hours a day to (888) 740-8712, or (952) 852-9509.

2. HAZARDS IDENTIFICATION

Environment: OSHA has not adopted the environmental - portion of the GHS regulations, however, this SDS may include information on environmental effects.

Classification:

OSHA Regulatory Status:
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200).

Acute toxicity - Oral Category 4
Acute toxicity - Inhalation (Dusts/Mists) Category 4
Serious eye damage/eye irritation Category 2B

Label elements

WARNING

Emergency Overview

Figure 1: Example of a Safety Data Sheet (SDS)

The rule impacts companies engaged in six **processes**:

- Dry abrasive blasting (three types)
- Dry grinding
- Dry polishing with machines
- Dry machining
- Spray painting (two types)
- Welding

Exceptions include military installations; NASA facilities; national nuclear security facilities; military munitions facilities; research or laboratories as defined in the Clean Air Act; tool, quality control and equipment repair facilities; and welding facilities using less than 2,000 pounds of rod or wire that does not contain any identified HAPs (per the SDS).

Standard Industrial Classification (SIC) Codes Affected by Rule 6X

3621	Motors and Generators Mfg.
3699	Electrical Machinery, Equipment & Supplies
3499	Fabricated Metal Products
3443	Fabricated Plate Work and Boiler Shops
3441	Fabricated Structural Metal Fabrication
3433	Heating Equipment, except Electric
3531	Construction Machinery Mfg.
3533	Oil and Gas Field Machinery Mfg
3561	Pumps and Pumping Equipment Mfg.
3462	Iron and Steel Forging
3399	Primary Metals Products Mfg.
3494	Valves and Pipe Fittings Mfg.

This is not a complete list. There are over 200,000 companies in SIC codes 3400, 3500 and 3700. If they are emitting visible smoke, this rule could apply to them as well.

Figure 2: SIC codes impacted by NESHAP Rule 6X

Your facility is likely to be impacted if you are in one of the industry categories listed above, are primarily engaged in one of the processes identified above, exhaust the air straight outdoors, and fail an EPA Method 22 Fugitive Emission test.

Method 22 is conducted to provide a visual determination of fugitive emissions from material sources. It is performed by an observer with two stopwatches. The observer stands 15 feet or more from an exhaust stack with a clear view of the exhaust with the sun at their back and lines up a dark background. They start the watch in their left hand and run it continuously for 15 minutes.

They start the watch in their right hand when emissions are observed (opacity), and stops it when they are not. Rule 6X applies if opacity is observed during 20% or more of the 15-minute test period. Opacity is defined as the quality of a particle that makes it impervious to light. We recommend you contract an environmental engineering consultant to conduct the Method 22 test in order to provide third-party confirmation of whether your facility is compliant.

Required actions

NESHAP Rule 6X went into effect on July 25, 2011, which means that facilities not in compliance were required to notify the EPA by that date. The rule is highly applicable to welding shops, so every facility engaged in welding needs to be aware of the rule and the required actions. As noted, welding processes use manganese, a hazardous substance associated with birth defects. However, this author's field experience has shown that many companies remain unaware of the deadline and the rule itself, especially smaller facilities that do not have a dedicated Environmental Health & Safety (EHS) specialist on staff.

Some welding shops rely on standard HVAC filtration to clean the air, exhausting welding fumes out to the atmosphere in violation of the new EPA requirement. Still other facilities simply open the shop door when fumes build up inside, with the same result. Even a dedicated dust and fume collection system may be in violation if it exhausts air outside and is older and/or not properly designed to handle the current processes.

What actions are necessary if Rule 6X applies and a company has failed the Method 22 test?

1. Notify the EPA.
2. "Tier 1" response: Change the process to eliminate the HAP. For example, you might experiment with using different materials and/or different settings to reduce emissions. Whatever changes you make, equipment must always be operated according to manufacturer's instructions.
3. Conduct another Method 22 emissions test.
4. "Tier 2" response: If the second test fails, "Corrective action must take place immediately after the failed Method 22 test" per the Federal Register, page 42985, Welding compliance, Tier 2.

The role of cartridge dust and fume collection

A dust and fume collector with high-efficiency filter cartridges offers multiple benefits as a corrective strategy. The regulation identifies cartridge filtration as an acceptable control device to eliminate visible emissions, and it will be the solution of choice in many cases.

A well-designed dust collection system will properly filter welding fumes and other hazardous contaminants. The filtered air can either be recirculated back into the facility or exhausted outside. These dust collection systems use self-cleaning mechanisms that pulse dirt off the filters, allowing them to run for extended periods between filter change-outs.

If air is exhausted outdoors, the EPA Rule 6X procedures apply as above. Contact the EPA Regional Office (http://www.epa.gov/ttn/atw/6X/6xpg.html) to find out which agency enforces this rule for a specific location. Under Method 22, the EPA requires ongoing annual compliance that is specific to the operation and is based on the date that the facility originally declares compliance.

If a company opts to recirculate the filtered air instead of exhausting it outside, the EPA NESHAP requirement no longer applies. However, the indoor air must still comply with OSHA permissible exposure limits (PELs) (http://www.osha.gov). The dust collector may also require safety monitoring filters (also called after-filters) for added filtration and backup protection.

Air recirculation is the single best way to maximize return on investment with a dust collector. By recirculating heated or cooled air back through the plant instead of venting it outdoors, you eliminate the cost of replacing that conditioned air. Many facilities report five- to six-figure annual energy savings as well as additional savings from earned utility rebates and incentives.

Air quality testing of a recirculating dust collector

Camfil APC's welding department in Jonesboro, Arkansas, uses a Gold Series X-Flo ambient weld fume collector to enhance indoor air quality. This compact, heavy-duty collector contains 48 high-efficiency filter cartridges and an integrated HEPA safety monitoring filter system for backup protection. The smoke is collected at the ceiling level and the cleaned air recirculates back into the plant.

Recirculating cartridge dust collection system in Jonesboro facility.

To find out if the indoor air would meet OSHA PELs for dust and fumes generated by the welding process, we engaged an independent laboratory to perform emissions testing. They equipped four welders with sampling devices in their breathing zones to test the ambient air quality in the weld shop. Figure 3 shows the results |of the testing, with all values expressed in milligrams per cubic meter (mg/m^3).

The right-hand column displays the average exposure of the four welders for each material, based on an 8-hour time-weighted average. For all materials, readings showed that exposure was only a small fraction of the PEL. For example, the recorded level of manganese was only 0.10 mg/m^3, dramatically below the OSHA PEL of 5.0 mg/m^3. Also, the level of respirable dust was only 0.20 mg/m^3, well below the OSHA threshold.

Whether or not a company opts for a recirculating system, a high-efficiency dust/fume collector can nearly eliminate employee exposure to welding chemicals. They provide a cleaner and greener work environment that safeguards employee health, comfort and morale, boosts productivity, and enhances manufacturing reliability.

Material	OSHA PEL (mg/m^3)	Average 8-hour TWA Breathing Zone Measurement of 4 Welders (mg/m^3)
Antimony	0.5	0.00084
Beryllium	0.002	0.00014
Cadmium	0.005	0.00014
Chromium	0.005	0.0028
Cobalt	0.1	0.00042
Copper	1.0	0.014
Iron Oxide	10.0	0.88
Lead	0.05	0.0035
Manganese	5.0	0.1
Molybdenum	5.0	0.00014
Nickel	1.0	0.00028
Vandium	0.05	0.0014
Zinc Oxide	5.0	0.038

Figure 3: Results of Jonesboro indoor air quality testing

Additional considerations for selecting dust collection equipment

Source-capture systems with flexible arms or hoods are popular for applications involving small parts and fixture welding. For larger areas, managers often opt to use an ambient system that filters all the air in the shop using a central system or multiple smaller collectors. This system enables a facility to vary its operations and still capture all the dust/fumes. Booths or custom enclosures form a middle ground between the two systems. They isolate a specific area for dust/fume collection.

Consider total cost of ownership (TCO), also known as life-cycle cost. The equipment with the lowest initial cost may not be the best investment. A design that allows air recirculation, uses less compressed air and reduces maintenance can offer a payback of as little as 1 to 2 years.

Ask for a written guarantee of emissions. Sometimes equipment suppliers talk about "removing 99.9% of contaminants" of a certain particle size. The EPA and OSHA don't regulate percentage efficiency claims. Instead, they need to know that emissions will be at or below required thresholds. Ask the filtration manufacturer for a written guarantee of emissions performance stated as grains per cubic foot.

For best results, follow performance guidelines published by the American Conference of Governmental Industrial Hygienists (ACGIH). Look for a local air filtration/dust collection supplier who is experienced in applying EPA NESHAP Rule 6X as well as appropriate OSHA and NFPA standards for air quality and fire/explosion protection. A knowledgeable supplier will also be able to project return on investment (ROI) using high-efficiency dust collection versus other control strategies.

ABOUT THE AUTHOR

Brian Richardson, Technical Departments Manager, has been with Camfil Air Pollution Control since 2008 and has worked in and around manufacturing facilities for almost 25 years. He started as a Research and Development engineer, and progressed through various management positions where he was tasked with troubleshooting and servicing dust collectors and training personnel on the maintenance and construction aspects of the equipment. In his current role, Brian is a liaison between the manufacturing areas, sales and engineering departments and helps manage the company's maintenance and local community training programs. Camfil APC is a leading global manufacturer of dust collection equipment and is part of Camfil, the largest air filter manufacturer in the world. For further information, contact (800) 479-6801 or (870) 933-8048, e-mail ***filterman@camfil.com***, or visit ***www.camfilapc.com.***

REFERENCES

Federal Register Environmental Protection Agency 40 CFR Part 63

NESHAP Nine Metal Fabrication and Finishing Area Source Categories 40 CFR Part 63 Subpart 6X Questions and Answers

Minnesota Small Business Environmental Assistance Program (SBEAP)

US EPA Office of Air Quality Planning and Standards

EPA Method 22 – Visual Determination of Fugitive Emissions