

Guidelines for Calculating and Reporting Emissions from Laser or Plasma Cutting of Metal Materials Operations

December 2024

Fume emissions from laser or plasma cutting should follow the EPA AP-42 guidance (Emission of Fume, Nitrogen Oxide and Noise in Plasma Cutting of Stainless and Mild Steel).

PM Emissions

Fumes should be considered PM emissions. The tables from the EPA document have been converted into imperial units.

Emissions of Fumes in Plasma Cutting of Mild and Stainless Steel

Material, thickness	Dry	Semi-Dry	Wet
	(lb/min)	(lb/min)	(lb/min)
Mild steel, 8 mm	0.057	0.0088	0.00088
Stainless steel, 8 mm	0.088	0.0101	0.0011
Stainless steel, 35 mm	0.0075	0.00066	0.000044

Emissions of Fumes Expressed as Percent of Total Amount of Material Removed by Cutting

Material, thickness, cutting speed	Dry (%)	Semi-Dry (%)	Wet (%)
Mild steel, 8 mm, 5 m/min	5	0.5	0.05
Stainless steel, 8 mm, 3.5 m/min	7	0.7	0.07
Stainless steel, 35 mm, 0.375 m/min	1	0.1	0.01

NOx Emissions

The tables from the EPA document have been converted into imperial units.

Emissions of Nitrogen Oxides	Dry (lb/min)	Semi-Dry (lb/min)	Wet (lb/min)
Mild steel, 8 mm	0.023	0.013	0.007
Stainless steel, 8 mm	0.023	0.011	0.006
Stainless steel, 35 mm	0.033	0.019	0.009

TAC Emissions

TAC emissions are estimated by multiplying the weight fraction of the TACs from SDSs by the PM emissions above. If SDS values are not available, the following defaults from the EPA document may be used.

Components in Fume	Manganese (%)	Copper (%)	Hexavalent Chromium (%)	Nickel (%)	Molybdenum (%)
Mild Steel	1.4	1.4			
Stainless Steel	10	6	20	8	1

Example

Two hours of 8 mm stainless steel were cut in the data year using a semi-wet process. Since we record two hours per year. The emission factors need to be converted from mins to hours.

PM emission factor, $lb/hr = 60 min/hr \times 0.0101 lb PM/min = 0.606 lb/hr$

NOx emission factor, lb/hr = 60 min/hr x 0.011 lb NOx/min = 1.32 lb/hr

Manganese emission factor, $lb/hr = PM EF \times 0.1 = 0.0606$

Copper emission factor, $lb/hr = PM EF \times 0.06 = 0.364$

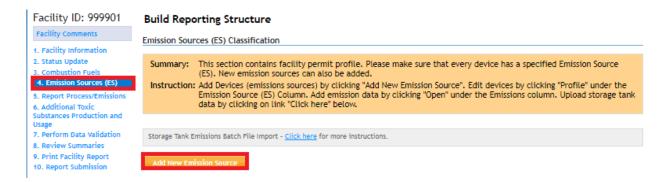
Hexavalent chromium emission factor, $lb/hr = PM EF \times 0.2 = 0.121$

Nickel emission factor, $1b/hr = PM EF \times 0.08 = 0.0485$

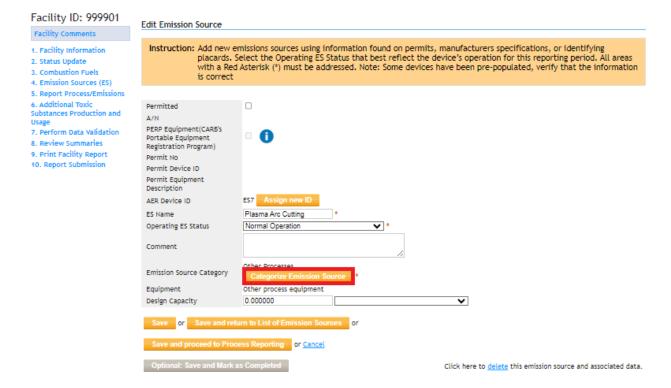
Molybdenum emission factor, $lb/hr = PM EF \times 0.01 = 0.0606$

Entering Data into the AER Webtool

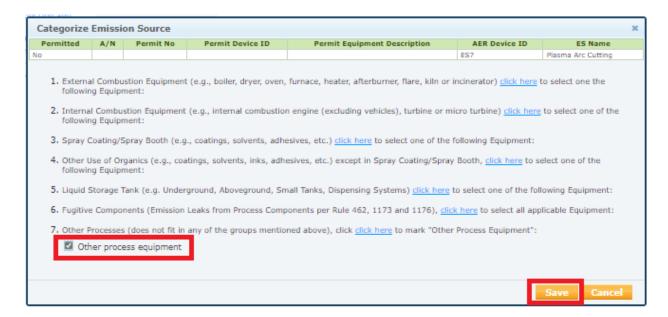
Click on Emission Sources (ES) on the menu on the left-hand side. Then click on the orange Add New Emission Source button



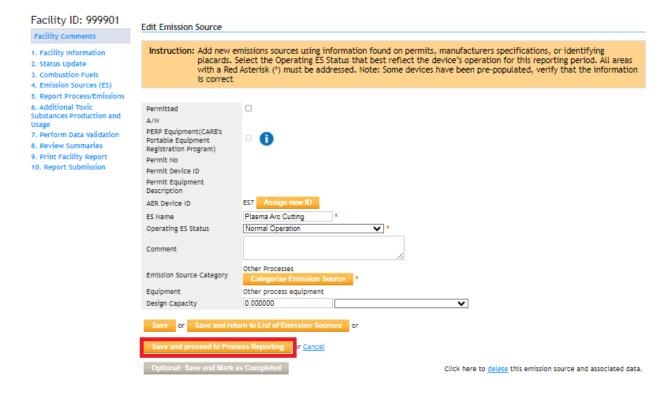
Enter data in the text boxes with the red asterisk, then click on the orange Categorize Emission Sources button.



Click on the Other Process check box and click save.



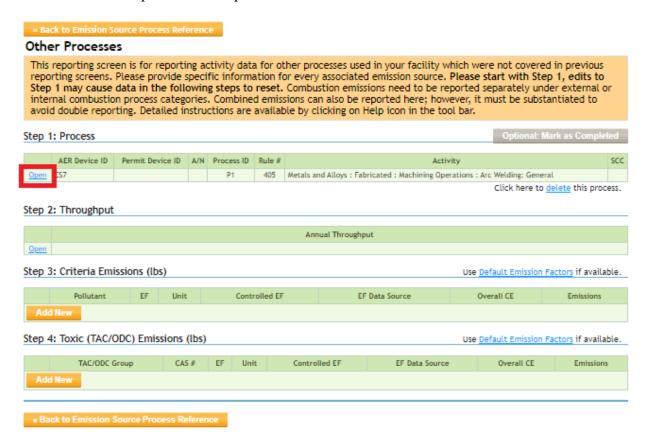
Click on the orange Save and Proceed to Process Reporting button



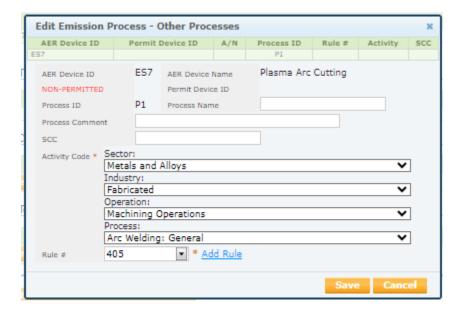
Click on the blue Open link next to Process ID P1



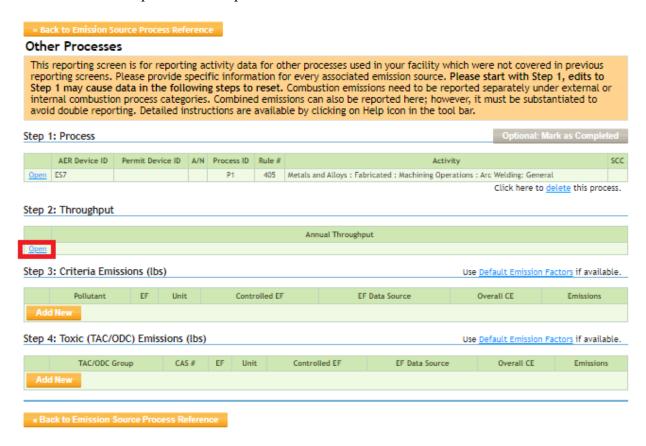
Click on the blue Open link in Step 1



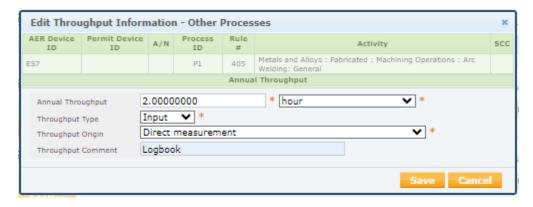
Choose the following options and click save.



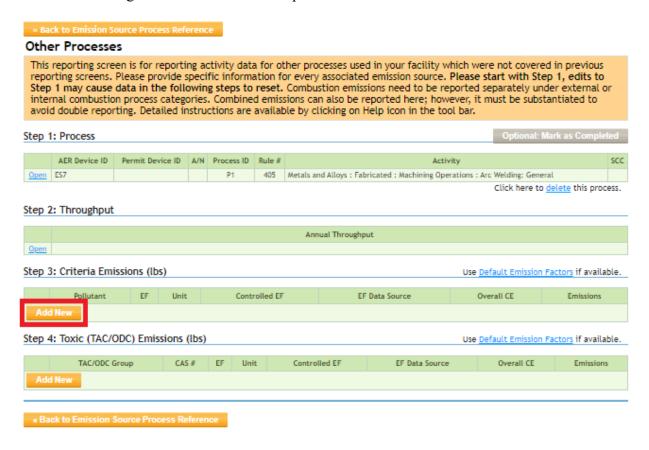
Click on the blue Open link in Step 2



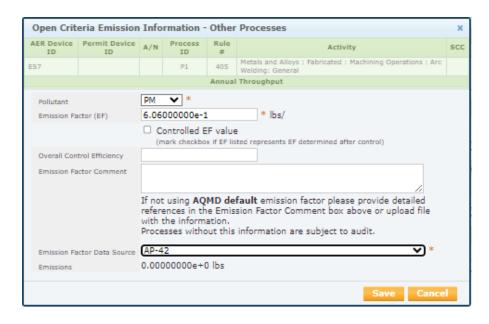
Add the throughput, throughput type, throughput origin, and throughput comment. Then, click the orange Save button.



Click on the orange Add New button in Step 3



Choose PM as the pollutant, and the emission factor, and chose AP-42 for the emission factor data source. Then click the orange Save button.

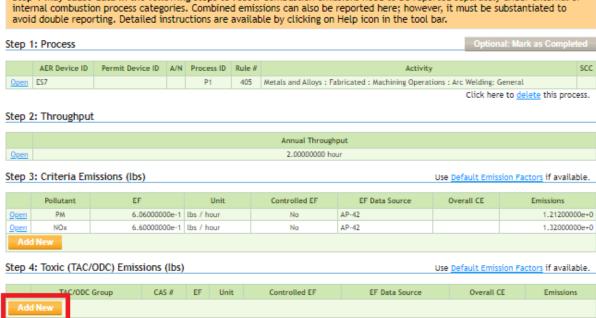


Repeat this process for NOx.

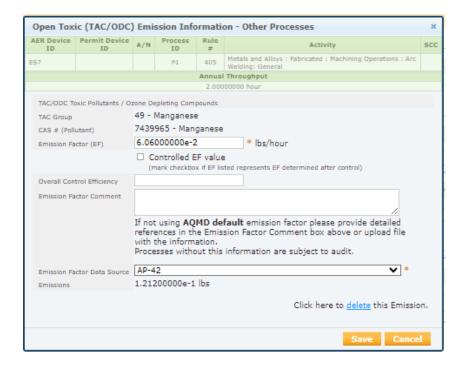
Click on the orange Add New button in Step 4

Other Processes

This reporting screen is for reporting activity data for other processes used in your facility which were not covered in previous reporting screens. Please provide specific information for every associated emission source. Please start with Step 1, edits to Step 1 may cause data in the following steps to reset. Combustion need to be reported separately under external or internal combustion process categories. Combined emissions can also be reported here; however, it must be substantiated to avoid double reporting. Detailed instructions are available by clicking on Help icon in the tool bar.



Choose Manganese, enter the emission factor and choose AP-42 for the emission factor data source.



Repeat for the other TAC emissions.