

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

ENGINEERING AND COMPLIANCE

APPLICATION PROCESSING AND CALCULATION

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The plasma cutter is cutting stainless steel plates for racks used in their heat treating operations. They are replacing old racks as they become unusable. The machine will cut slats and legs that are assembled to make the racks. This machine is not used for manufacturing purposes.

The proposed total linear feet cut is 3,088 linear feet/month and 18,528 linear feet/year. The material is 0.5" thick with a 1/16" wide cut.

RA330 material contains 16% max of manganese compounds, 33% max of chromium compounds, and 99% max nickel content. 304 Stainless material contains 10% max of manganese compounds, 27% chromium compounds, 22% max nickel content, .2% phosphorous content, .35% selenium compounds.

ASSUMPTIONS

Operating Schedule: 6 months/year, 1 wk/month, 2 days/wk, 5 hrs/ day

Thickness: 0.5 inches

Width: 1/16 inch

Emission factors: Joe Tramma's memo dated 03/25/1991;

- 1) PM emission factor (steel plate) = .145 lb/lb of metal melted
- 2) CR +6 emissions = .00022 lb/lb in metal melted

Control

- 1) Hepa control efficiency = 99.97%

Plate Data:

Max Cut per Month = **3,088 linear feet**

Max Cut per Week = 3,088 ft/month * (1wk/month) = **3,088 linear feet**

Max Cut per Day = 3,088 feet/wk * (1wk/ 2 days) = **1,544 linear feet**

Max Cut per Hour = 1,544 feet/day * (1 day/ 5hrs) = **309 linear feet**

RA330/304 stainless

Leg Cutting

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Notch Volume = .0625"W x 9.25"L x 0.5 inches Thick = .289 cu. inches

Total Notch Volume = .289 cu. inches/notch x 12 notches/leg x 35 legs/plate = 121.38 cu. inches per plate

RA330 Total: 10 plates x 121.38 cu. inches = 1,213.8 cu. inches

304 Stainless Total: 6 plates x 121.38 cu. inches = 728.28 cu. inches

Leg - Longitudinal

20' x 6 cuts = 120' = 1440 inches x (.0625"W) x (0.5"T) = 45 cu. inches per plate

Leg - Transverse

8' x 4 cuts = 32' = 384 inches x (.0625"W) x (0.5"T) = 12 cu. inches per plate

Total per plate (cubic inches) = 12 cu. inches + 45 cu. inches = 57 cu. inches

RA330 Leg Total: 10 plates x 57 cu. inches = 570 cu. inches

304 Stainless Leg Total: 6 plates x 57 cu. inches = 342 cu. inches

RA330

Slat- Longitudinal

20' x 48 cuts = 960' = 11,520 inches x (.0625"W) x (0.5"T) = 360 cu. inches per plate

Slat - Transverse

8' x 4 cuts = 32' = 384 inches x (.0625"W) x (0.5"T) = 12 cu. inches

Total per plate (cu. inches) = 360 cu. inches + 12 cu. inches = 372 cu. inches per plate

RA330 Slat Total: 7 plates x 372 cu. inches = 2,604 cu. inches

304 Stainless

Slat- Longitudinal

20' x 48 cuts = 960' = 11,520 inches x (.0625"W) x (0.5"T) = 360 cu. inches per plate

Slat - Transverse

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$$8' \times 4 \text{ cuts} = 32' = 384 \text{ inches} \times (.0625''\text{W}) \times (0.5''\text{T}) = 12 \text{ cu. inches}$$

$$\text{Total per plate (cu. inches)} = 360 \text{ cu. inches} + 12 \text{ cu. inches} = 372 \text{ cu. inches per plate}$$

$$304 \text{ Stainless Slat Total: } 4 \text{ plates} \times 372 \text{ cu. inches} = 1488 \text{ cu. inches}$$

RA330 Combined Total

$$1,213.8 + 570 + 2604 = 4387.8 \text{ cu. inches}$$

304 Stainless Combine Total

$$728.28 + 342 + 1488 = 2,558.3 \text{ cu. inches}$$

Emissions:

FROM MSDS,

Density, RA330 steel = .287 lbs/cu. inches

Density, 304 Stainless = .285 lbs/cu. inches

$$\text{RA330: } 4387.8 \text{ cu. inches/yr} \times .287 \text{ lbs/ cu.inch} = 1,259.3 \text{ lbs/yr}$$

$$\text{304SS: } 2558.3 \text{ cu. inches/yr} \times .285 \text{ lbs/ cu. inch} = 729.1 \text{ lbs/yr}$$

$$\text{Total} = 1,988.4 \text{ lbs melted/yr}$$

TOTAL UNCONTROLLED EMISSIONS:

Assumptions: Max monthly limit proposed is based on yearly limit divided into 6 months

Max hourly emissions based on max yearly and average 5 month/year operating schedule

PM emissions (lbs/hr)

$$= 1988.4 \text{ lbs/yr} \times 0.145 \text{ lb/lb metal melted} = 288.32 \text{ lbs/yr}$$

$$= 288.32 \text{ lbs/yr} (1\text{yr}/5 \text{ months}) (1\text{month}/1\text{week}) (1\text{week}/2\text{days}) (1\text{day}/5\text{hrs}) = 5.77 \text{ lbs/hr max}$$

PM 10 emissions, max (lbs/day)

$$= 5.77 \text{ lbs/hr} \times 5\text{hr/day} \times .95 \text{ PM10/ PM} = 27.4 \text{ lbs PM10/day, max}$$

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RA330

$$\text{CR}+6 = 1259.3 \text{ lbs/yr} \times .33 \times .00022 \text{ lb/lb of CR in metal melted} = .091 \text{ lb/yr}$$

304 Stainless

$$\text{CR}+6 = 729.1 \text{ lbs/yr} \times .27 \times .00022 \text{ lb/lb of CR in metal melted} = .043 \text{ lb/yr}$$

Total Hex Chrome

$$(.043 \text{ lbs/yr} + .091 \text{ lbs/year}) \times (1 \text{ yr}/5 \text{ months}) \times (1 \text{ week}/2 \text{ days}) \times (1 \text{ day}/5 \text{ hrs}) = .00268 \text{ lbs/hr}$$

Assumptions: 63% material cut is RA330. 37% material cut is 304 Stainless

Total Nickel

$$\begin{aligned} \text{Ni} &= (288.32 \text{ lbs/yr} \times .63 \times .99) + (288.32 \text{ lbs/yr} \times .37 \times .22) = 203.3 \text{ lbs/yr} \\ &= 203.3 \text{ lbs/yr} (1 \text{ yr}/5 \text{ months}) (1 \text{ week}/2 \text{ days}) (1 \text{ day}/5 \text{ hrs}) = 4.07 \text{ lbs/hr} \end{aligned}$$

Total Manganese

$$\begin{aligned} \text{Mn} &= (288.32 \text{ lbs/yr} \times .63 \times .16) + (288.32 \times .37 \times .1) = 39.73 \text{ lbs/yr} \\ &= 39.73 \text{ lbs/yr} (1 \text{ yr}/5 \text{ months}) (1 \text{ week}/2 \text{ days}) (1 \text{ day}/5 \text{ hrs}) = .79 \text{ lbs/hr} \end{aligned}$$

Total Phosphorous

$$\begin{aligned} \text{P} &= 288.32 \text{ lbs/yr} \times .002 = .58 \text{ lbs/yr} \\ &= .58 \text{ lbs/yr} (1 \text{ yr}/5 \text{ months}) (1 \text{ week}/2 \text{ days}) (1 \text{ day}/5 \text{ hrs}) = .012 \text{ lbs/hr} \end{aligned}$$

Total Selenium

$$\begin{aligned} \text{Se} &= 288.32 \text{ lbs/yr} \times .0035 = 1.01 \text{ lbs/yr} \\ &= 1.01 \text{ lbs/yr} (1 \text{ yr}/5 \text{ months}) (1 \text{ week}/2 \text{ days}) (1 \text{ day}/5 \text{ hrs}) = .02 \text{ lbs/hr} \end{aligned}$$

TOTAL CONTROLLED EMISSIONS

System Control Factor = 0.0003 (1-99.97%)

100% PM expected to be PM10 after control

PM Emissions

Max Hourly:

$$\text{PM}/\text{PM}10 = 5.77 \text{ lbs/hr} \times .0003 = .001731 \text{ lbs/hr}$$

Max Daily:

$$\text{PM}/\text{PM}10 = .001731 \times 5 \text{ hr/day} = .008655 \text{ lbs/day}$$

30 day Average:

$$288.32 \text{ lbs/yr} \times 1 \text{ yr}/6 \text{ mo} \times 1 \text{ mo}/30 \text{ day} \times .0003 = .00048 \text{ lbs/day, avg.}$$

$$\text{Chrome} +6 = .00268 \text{ lbs/hr} \times .0003 = .0000008 \text{ lbs/hr}$$

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Nickel = 4.07 lbs/hr x .0003 = .001221 lbs/hr

Manganese = .79 lbs/hr x .0003 = .000237 lbs/hr

Phosphorous = .012 lbs/hr x .0003 = .0000036 lbs/hr

Selenium = .02 lbs/hr x .0003 = .000006 lbs/hr

RULES EVALUATION:

Rule 212 - Standard for Approving Permits

Paragraph 212(c)(1) Requires a public notice for all new or modified permit units that may emit air contaminants located within 1,000 feet from the outer boundary of a school. According to the website geodistance.com the nearest school, Westle Gaines Elementary, is approximately 1,750 feet from Aerocraft's property line. A 30-Day Public Notice is not required under this paragraph.

Paragraph 212(c) (2) The equipment will not result in on-site emission increasing exceeding the daily maximum emissions as specified in the table in Rule 212(g). Therefore, a 30-day public notice period will not be required under this paragraph.

Paragraph 212(c)(3) Public notice will not be required under this paragraph. See Rule 1401 evaluation section. .

Rule 401- Visible Emission: No visible emission is expected if the equipment is well maintained and properly operated. Therefore, compliance is expected.

Rule 402- Nuisance: Since 2003, Aerocraft Heat Treating Co. was issued NOV # P51859 and NOV # P50289 for failure to comply with RECLAIM reporting requirements. The NOV's issued were not for nuisance or a violation leading to a nuisance. In addition, there are no complaints in the District Compliance CLASS data base alleging Aerocraft Heat Treating Co. of any nuisance. Compliance with this rule is expected without any nuisance problems.

Rule 404 - Equipment is expected to operate in compliance.

Rule 405 - Equipment is expected to operate in compliance.

Rule 1303(a)-BACT: BACT for a plasma cutter is a water table and nozzle water shroud or electrostatic precipitator. The operator has installed a dust collector/hepa filter

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emission control system for the plasma cutter which is better emission control than BACT.

Rule XIII -Modeling: Modeling is not required as the PM10 emissions are less than the .41 lb/hr specified in the appendix A of Rule 1303.

Rule XIII -Offsets: Offsets are not required because the project's potential to emit of PM10 is less than 0.5 lbs/day.

Rule 1401- New Source Review of Toxic Air Contaminants: MICR is less than one in a million based on max yearly toxic emission rates. Even though system has T-BACT and allows for higher max risk, MICR is below 1 in a million. Therefore, compliance is expected.

Reg XXX - Title V Permits: Aircraft has applied for a Title V renewal and "De Minimis Significant Permit Revision." Therefore, EPA 45-day review is required.

Maximum individual Cancer Risk (MICR) Calculations:

Total maximum individual cancer risk from the operation of the plasma cutter was calculated using the Rule 1401 Risk Assessment Program Version 7.0. Tier 1 screening revealed MICR is less than 1-per million for both the nearest residential receptor and the nearest offsite worker receptor (Risk Assessment attached). Since the total MICR is less than one-per-million, cancer risk screening passed. In addition, the Hazard Index Acute and Hazard Index Chronic both passed.

CONCLUSIONS AND RECOMMENDATIONS:

Based on the evaluation contained herein, the subject equipment will comply with all of the District's rules and regulations; therefore, I recommend the modification be issued to this equipment.

TIER 1 SCREENING RISK ASSESSMENT REPORT

Receptor Distance (actual)	25
Receptor Distance (for X/Q LOOKUP)	25

Tier 1 Results	
Cancer/Chronic ASI	Acute ASI
8.04E-01	4.07E-01
PASSED	PASSED

APPLICATION SCREENING INDEX CALCULATION

Compound	Average Annual Emission Rate	Max Hourly Emission Rate (lbs/hr)	Cancer / Chronic Pollutant Screening Level (lbs/yr)	Acute Pollutant Screening Level (lbs/hr)	Cancer / Chronic Pollutant Screening Index	Acute Pollutant Screening Index (PSI)
Chromium, hexavalent	4.82E-05	8.04E-07	2.24E-04		2.15E-01	
Nickel & nickel compounds (except nickel oxide):	7.33E-02	1.22E-03	1.25E-01	3.00E-03	5.84E-01	4.07E-01
Manganese and manganese compounds	1.42E-02	2.37E-04	2.98E+00		4.77E-03	
Phosphine	2.16E-04	3.60E-06	2.65E+01		8.17E-06	
Selenium and selenium compounds, other than hydrogen selenide	3.60E-04	6.00E-06	6.61E+02		5.44E-07	
TOTAL (APPLICATION SCREENING INDEX)					8.04E-01	4.07E-01