Freeberg Industrial Fabrication Corp.

2874 Progress Place
Escondido, CA 92029

SDAPCD
Emissions ID 96605

March 2025

Prepared by:

Yorke ENGINEERING, LLC
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Risk Reduction Audit and Plan for Reporting Year 2021

Freeberg Industrial Fabrication Risk Reduction Audit and Plan for Facility Reporting Year 2021

Prepared for:

Freeberg Fabrication Industrial Corp.
2874 Progress Place
Escondido, CA 92029

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List of Acronyms and Abbreviations

AB	Assembly Bill
HHI	Health Hazard Index
HRA	Health Risk Assessment
kW	Kilowatt
MEIR	Maximally Exposed Individual Resident
MEIW	Maximally Exposed Individual Worker
OEHHA	Office of Environmental Health Hazard Assessment
PM	Particulate Matter
PMI	Point of Maximum Impact
PTE	Potential to Emit
SDAPCD	San Diego County Air Pollution Control District
TAC	Toxic Air Contaminant
U.S. EPA	United States Environmental Protection Agency
UTM	Universal Transverse Mercator

Freeberg Industrial Fabrication Risk Reduction Audit and Plan for Reporting Year 2021

1.0 INTRODUCTION

The Freeberg Industrial Fabrication Corporation (Freeberg) facility located at 2874 Progress Place in Escondido, CA, participates in the California Air Toxics "Hot Spots" Program under Assembly Bill 2588 (AB 2588), which is administered by the San Diego County Air Pollution Control District (SDAPCD). As part of this program, a health risk assessment (HRA) based on 2021 facility emissions was conducted by Freeberg with assistance from Yorke Engineering, LLC (Yorke). The HRA predicted the non-cancer acute Health Hazard Index (HHI) exceeded the SDAPCD Rule 1210 risk reduction levels.

In accordance with SDAPCD Rule 1210, Yorke has prepared this risk reduction audit and plan on behalf of Freeberg. The plan outlines the procedures that Freeberg will use to reduce facility risks below the risk reduction levels applicable to the 2021 HRA.

Freeberg has installed or is in the process of installing improved filtration on its emission sources, ensuring that the updated HRA modeling indicates no elevated health risks.

1.1 Facility Information

Freeberg Industrial Fabrication is one of the largest International Traffic in Arms Regulation registered, ISO-9001:2015 certified, manufacturers of sheet metal and structural steel parts in Southern California. In addition to providing a full range of manufacturing services including metal cutting, forming, welding, painting and electro-mechanical assembly, the company has a strong engineering team to provide build-to-print planning and original engineering design services. Freeberg is a small business that has the size and equipment to handle large, heavy parts made of carbon steel, stainless steel, aluminum, and other metals.

The Freeberg SDAPCD emissions ID is 5985 and the facility site number is APCD1997-SITE-09909. The facility address is:

2874 Progress Place
Escondido, CA 92029

The facility's equipment includes:

- Five coating booths (SDAPCD Permits APCD1998-PTO-911307, APCD1998-PTO-961518, APCD1999-PTO-961519, and APCD1999-PTO-961520);
- One abrasive blasting booth (SDAPCD Permit APCD1999-PTO-961521);
- Eighteen (18) welding machines – permit exempt;
- Two laser cutters – permit exempt; and
- Solvent usage – permit exempt.

All sources can operate at any time of day but typically operate between 6:00 a.m. and 11:00 p.m. on weekdays.

The team responsible for preparation and implementation of the risk reduction audit and plan are listed in Table 1-1.

Table 1-1: Plan Contacts

Steve Olejnik		**Julie Mitchell**
Freeberg		**Yorke Engineering, LLC**
Address:	2874 Progress Place Escondido, CA, 92029	2356 Moore Street, Suite 206 San Diego, CA, 92110
Phone:	(760) 737-7614	(619) 375-9142
E-mail:	Steve.Olejnik@freeberg.com	JMitchell@YorkeEngr.com

1.2 Permit Action

The permit application accompanying this plan is for the risk reduction actions as required per Rule 1210 and to modify the equipment description in the permit for the Abrasive Blasting permit APCD1999-PTO-961521 to revise the filter efficiency to be ≥ 96.3%. The General Permit or Registration Application Form is provided in Appendix A. A fee of $7,690 will accompany the permit application.

2.0 RISK REDUCTION

2.1 Risk Reduction Evaluation

The HRA modeling predicted that the non-cancer acute HHI exceeded the Rule 1210 risk reduction thresholds.

This risk evaluation examines the sources and pollutants that cause a significant portion of the acute HHI at the Maximally Exposed Individual Resident (MEIR) and other actual receptor locations and assesses potential reduction measures.

2.1.1 HRA Results – Acute Health Hazard Index

The acute HHI was calculated for an exposure duration of 1 hour. The SDAPCD acute HHI analysis used maximum simultaneous hourly emission rates from all sources.

The modeling predicted that the acute HHI isopleth extended off-site in all directions in a terrain following manner as shown in Figure 2-1. The disconnect in the acute isopleths is an effect of the elevated plume model combined with the topography in the modeling domain resulting in risk values appearing fragmented around the project area.

AERMOD uses source parameters to predict plume rise per source. The welding, laser cutting, and abrasive blasting sources are represented as volume sources which have no plume rise, and the coating sources have a low exhaust temperature which creates minimal plume rise. AERMOD predicts concentrations based on a simple Gaussian distribution around the calculated plume height, creating straight-line plumes regardless of topography. AERMOD does not account for plume depletion or flow up or down slope. Thus, risks within the zone of impact (over 1 for acute risks) primarily occur at elevations between 220-245 meters. The facility base elevation is 223 meters.

The HIA at the point of maximum impact (PMI), MEIR, and Maximally Exposed Individual Worker (MEIW) were predicted to be above the public notification threshold of 1.0. The PMI was predicted to occur on the western fenceline next to an undeveloped plot of land. The MEIR was predicted to occur northwest of the facility in a residential neighborhood off Hill Valley Drive. The MEIW was predicted to occur 70 meters to the west of the facility, at a job site off Hill Valley Drive.

The maximum acute HHI at an actual receptor occurred at the MEIR, receptor 10 [Universal Transverse Mercator (UTM) coordinates 487,649, 3,665,254]. The acute HHI at the MEIR was mainly due to nickel emissions targeting the immune system from the laser cutting and welding operations (87%) as shown in Tables 2-1 and 2-2 below. The source/pollutant profile is very similar for the other receptors over the risk reduction threshold.

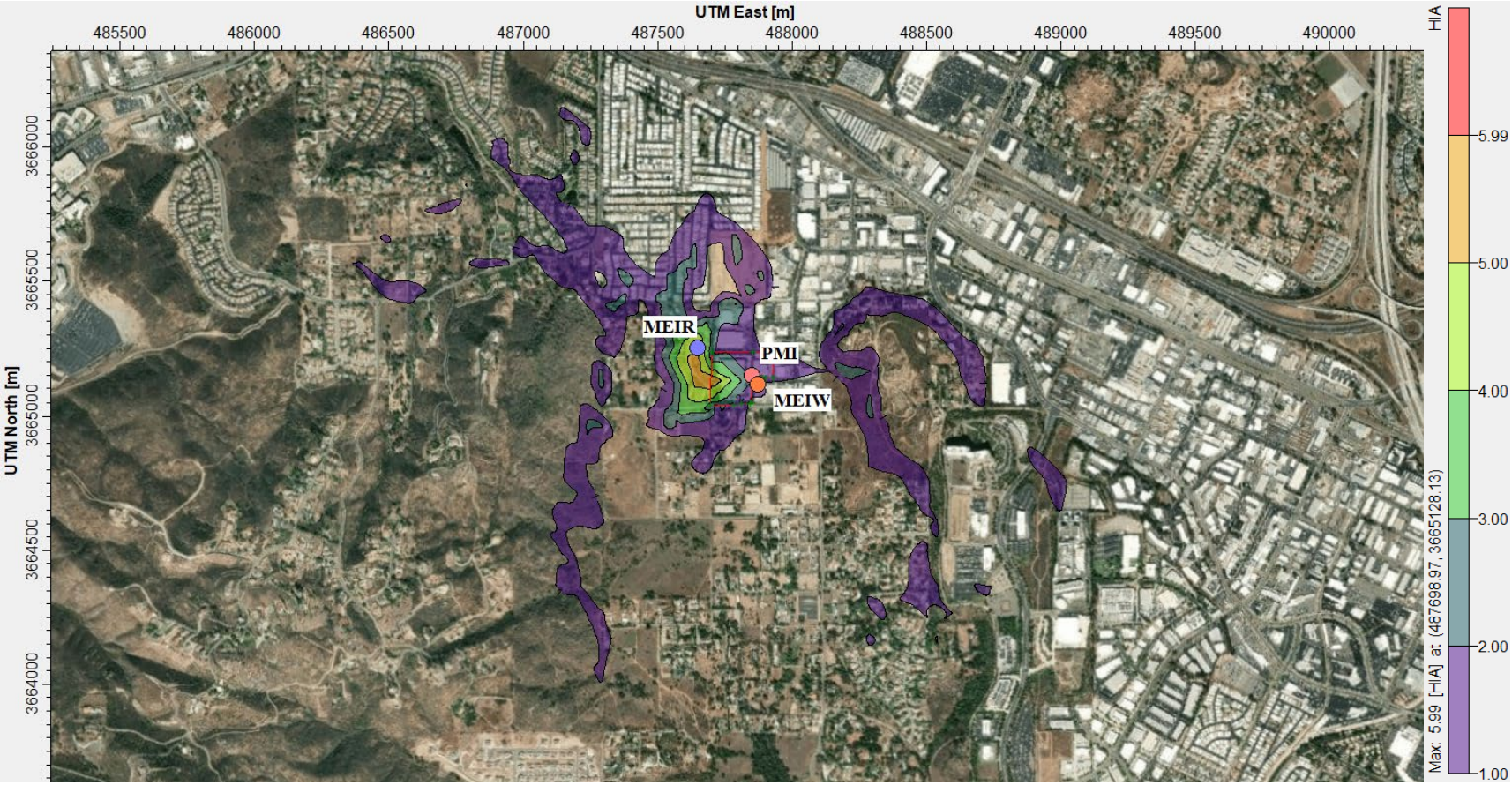
Table 2-1: Acute HHI Results Per Source from All Pollutants Targeting the Immune System at MEIR

Source ID	Description	MEIR	
		Acute HHI	Contribution (%)
ALL	All Sources	4.55	100%
LASERCUT	Laser Cutting	2.12	46.62%
WELDING	Welding	1.92	42.31%
ABBLAST	Abrasive Blasting	0.50	11.07%
COATING	Coating	0	0.00%

Table 2-2: Acute HHI Results Per Pollutant from All Sources at MEIR

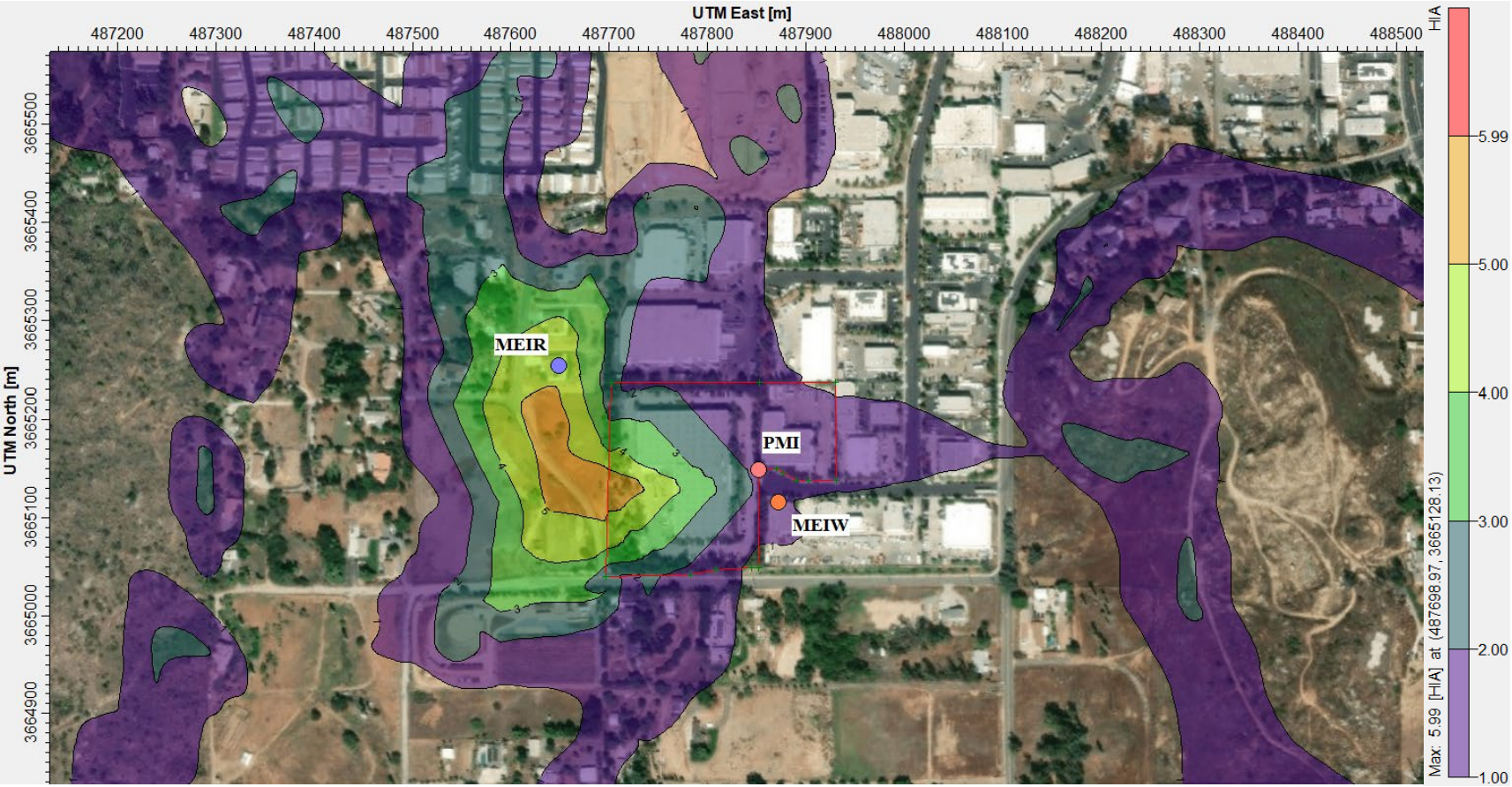
Pollutant	CAS No.	Target Organs											
		Alimentary	Bone	Cardiovascular	Central Nervous	Endocrine	Eye	Hematologic	Immune	Kidney	Reproductive/ Development	Respiratory	Skin
Nickel	7440020	0	0	0	0	0	0	0	4.546	0	0	0	0
HexaMeDiisocyan	822060	0	0	0	0	0	0	0	0	0	0	0.1343	0
1,2,4TriMeBenze	95636	0	0	0	0.0593	0	0	0	0	0	0	0	0
EGBE	111762	0	0	0	0	0	0.0108	0	0	0	0	0.0108	0
Xylenes	1330207	0	0	0	0.0075	0	0.0075	0	0	0	0	0.0075	0
MEK	78933	0	0	0	0	0	0.0055	0	0	0	0	0.0055	0
TriMeBenzns	25551137	0	0	0	0.0036	0	0	0	0	0	0	0	0
Toluene	108883	0	0	0	0.0015	0	0.0015	0	0	0	0	0.0015	0
Copper	7440508	0	0	0	0	0	0	0	0	0	0	0.0008	0
Formaldehyde	50000	0	0	0	0	0	0.0003	0	0	0	0	0	0
ToluneneDiisocyn	26471625	0	0	0	0	0	0	0	0	0	0	8E-06	0
Vanadium	7440622	0	0	0	0	0	2E-06	0	0	0	0	2E-06	0
Total Acute HHI		**0**	**0**	**0**	**0.072**	**0**	**0.026**	**0**	**4.546**	**0**	**0**	**0.16**	**0**

Figure 2-1: 2021 Acute HHI Isopleth – Extended View



Red Circle.....PMI
Purple Circle.....MEIR
Orange Circle .....MEIW

Figure 2-2: Acute Hazard Index Isopleth and Locations of PMI, MEIR, MEIW – Near View



Red Circle.....PMI
Purple Circle.....MEIR
Orange Circle.....MEIW

3.0 RISK REDUCTION MEASURES PROPOSED

3.1 Risk Reduction Measures

The HRA modeling for 2021 predicted that the nickel emissions from the laser cutting and welding, followed by the abrasive blasting operations contributed to the elevated acute HHI. Thus, the risk reduction evaluation focused on reductions associated with the nickel emissions from these sources.

Freeberg has undertaken a rigorous evaluation of the controls associated with the laser cutting, welding, and abrasive blasting operations.

In 2021, the facility filtered the air exhausted from the laser cutters, although to reduce emissions further, Freeberg proposes using higher efficiency particulate filters. For cutting stainless steel with the Fiber Laser Cutter, the system will use high efficiency particulate air (HEPA) filters with a 99.97% or higher filtration efficiency on 0.3 micron particles.

Carbon steel is cut using the CO_2 Laser cutter with new filters that meet the MERV 15 standards with a control efficiency of 98% for particulate matter (PM) smaller than 3 microns. These MERV 15 filters have already been installed on the CO_2 Laser cutter exhaust. Specification sheets for the new filters for the CO_2 Laser and Fiber Laser cutters are provided in Appendix B. Note the MERV 15 specification sheets show 100% control efficiency for PM_{10}, but a more conservative efficiency of 98% will be used in the risk reduction assessment. The filtered air exhausts into the northern section of the main building and is exhausted to the atmosphere through roof vents and open bay doors.

In 2021, all welding occurred in the northern section of the main building without any controls and exhausted to the atmosphere through roof vents and open bay doors. Welding stainless steel accounts for the majority of the nickel emissions from all welding activities. Thus, Freeberg has moved all stainless steel welding to a segment of the east building (2864 Progress Place) that is enclosed and has a new Robovent Senturion dust collector with MERV 15 filters. Specification sheets for the new filters associated with the dust collector are provided in Appendix B. Based on data from the dust collector vendor, the control efficiency for PM smaller than 10 microns is 95%. During welding activities, the room remains closed and is exhausted to the atmosphere through multiple roof vents. Carbon steel will continue to be welded in Freeberg's main building without any fume extraction for now.

Abrasive blasting occurs in an enclosed blast station that filters the air before exhausting into the main building. Freeberg has replaced all 80 filters for the blast booth with new nano media filters with a higher control efficiency of 96.3% for PM smaller than 1 micron. Filter specification data are provided in Appendix B. The filtered air exhausts into the northern section of the main building and is exhausted to the atmosphere through roof vents and open bay doors.

Freeberg is continuing to review other shop functions and machinery for possible upgrades for additional emission reductions.

This Risk Reduction Plan proposes the following measures:

- Laser Cutting – Stainless Steel use of filters with a control efficiency of 99.97% and carbon steel use of filters with a control efficiency of 98%.

- Stainless Steel Welding – enclosing the activity and using a dust control system with a control efficiency of 95%.
- Abrasive Blasting – use of filters with a control efficiency of 96.3%

To ensure compliance with the equipment description in the permit for the Abrasive Blasting (APCD1999-PTO-961521) should be modified to revise the filter efficiency to be ≥ 96.3%.

There are no permits associated with the laser cutting or welding operations as these source are explicitly exempt from permitting per SDAPCD Rule 11 (d)(7)(iv) for welding and (d)(10)(i) for metal cutting. Since Freeberg commenced operation prior to November 15, 2000, and there have not been any substantive changes to the operations, review of uncontrolled TAC emissions is not required per Rule 11(a)(5)(ii).

Although there are no permits associated with the laser cutting or welding operations, use of these control devices are required to meet the quadrennial Rule 1210 and AB2588 Hotspots program, thus are enforceable.

Therefore, these reductions will be real, permanent, quantifiable, and enforceable through the modifications to the permit for the Abrasive Blasting (APCD1999-PTO-961521) and compliance with SDAPCD Rule 1210.

3.2 Emissions with Selected Risk Reduction Measures

The emissions from all sources were evaluated to include any foreseeable new or increased emissions of TACs from the stationary source per Rule 1210.

Per the SDAPCD's interpretation of foreseeable new or increased emissions, they have requested all sources be modeled at full potential to emit (PTE) levels. Since this Risk Reduction Plan examines acute risks, all sources were assumed to operate at full capacity with all materials used in a given hour, which is an overestimation of actual emissions.

The emission profile developed for this Risk Reduction Plan is based on the same calculation methods used in the 2021 inventory with the implementation of the proposed controls. Detailed emission calculations are presented in Appendix C.

3.2.1 Laser Cutting Emissions

The laser cutting emissions are calculated based on the SDAPCD provided methodology which is based on the EPA backed study by Bromeen et al[1]. This study provided different emission factors for stainless and mild steel and the district applied a control efficiency of 90%.

The risk reduction measure for the Fiber and CO_2 laser cutters is the use of new filters that meet the HEPA and MERV 15 standards with control efficiencies of 99.97% and 98%, respectively. The SDAPCD emission factors were updated to apply the improved control efficiency. Note the MERV 15 specification sheets provided in Appendix B show 100% control efficiency for PM_{10}, but a more conservative efficiency of 98% has been used in the risk reduction assessment.

[1] Emission of Fume, Nitrogen Oxides and Noise in Plasma Cutting of Stainless and Mild Steel, https://www.epa.gov/sites/default/files/2020-11/documents/welding.pdf

Modeled emissions are based on the maximum cutting rate for all three metals occurring simultaneously in a given hour, even though there are only two tables, thus at most two metals could be cut simultaneously. The HRA modeling assumed the emissions are released from two volume sources covering the northern section of the main building where the laser cutting operations occur.

3.2.2 Welding Emissions

Welding emissions are calculated based on the SDAPCD approved methodology from the 2021 inventory. This is based on the SDAPCD Welding Guidance[2] and the district specific metal factors, or default factors, as applicable.

To control welding emissions, all stainless steel welding now occurs in a separate enclosed room with a dust collector system. The dust collector control efficiency of 95% is applied to all stainless steel welding (materials 316, 630, 308, 309 and 347). No controls are applied to the welding for the other metals.

The HRA modeling assumed that welding on all different metals occurred simultaneously in a given hour at the maximum weld rate. This is an extremely conservative assumption. For HRA modeling the stainless steel emissions are released from a volume source covering the location where this activity occurs in the eastern building. The other metal emissions are released from two volume sources covering the northern section of the main building.

3.2.3 Abrasive Blasting Emissions

Abrasive Blasting emissions are calculated using the default SDAPCD Abrasive Blasting Profile for Steel Grit (A07)[3] and Garnet (A03)[4] for uncontrolled emissions. The blast station now uses 80 new nano media filters that have a control efficiency of 96.3% which is applied to the uncontrolled emissions.

Abrasive blasting occurs in an enclosed blast station where at most one blast media can be used at a given time. Freeberg primarily uses G80 steel grit blast material. Since only one material can be used in a given hour, the HRA emissions are based on the highest of the two materials.

For HRA modeling the emissions are released from two volume sources covering the northern section of the main building where the abrasive blasting operation occurs.

3.2.4 Coating Emissions

No changes were made to the coating emissions from the 2021 approved SDAPCD inventory. Emissions are exhausted to the atmosphere through the coating booth stacks.

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[2] SDAPCD Welding Guidance https://www.sdapcd.org/content/dam/sdapcd/documents/permits/emissions-calculation/welding/APCD-Welding-Operations.pdf

[3] https://www.sdapcd.org/content/dam/sdapcd/documents/permits/emissions-calculation/abrasive-blasting/APCD%20Steel%20Grit%20Blast%20Medium%20Site%20Specific%20Controls.pdf

[4] https://www.sdapcd.org/content/dam/sdapcd/documents/permits/emissions-calculation/abrasive-blasting/A03-ABRASIVE-BLASTING-GARNET-UNCONTROLLLED-POST-Rev.pdf

Detailed emission calculations used in the risk reduction HRA are provided in Appendix C and electronically to the SDAPCD with changes highlighted in yellow.

3.3 HRA Results with Risk Reduction Measures

To demonstrate that the installation of the new dust control systems and filters will be sufficient to reduce the acute HHI below the significance thresholds, an updated HRA was conducted.

The risk reduction HRA modeling was conducted using the emissions discussed in Section 3.2. This HRA only examined the acute non-cancer health impacts, as this was the only health risk above the risk reduction thresholds. The HRA was conducted in the same manner as the previously submitted assessment, following the SDAPCD HRA guidelines (SDAPCD 2022), which are based on the Office of Environmental Health Hazard Assessment (OEHHA 2015) Tier 1 technique and guidance from SDAPCD HRA staff.

3.3.1 Risk Reduction HRA Results – Acute Health Hazard Index

The acute HHI was calculated for an exposure duration of 1 hour. The risk reduction acute HHI analysis used maximum hourly emission rates from all sources, even though all sources do not operate simultaneously or continuously. Emissions are described in Section 3.2.

The risk reduction HRA calculated that the acute HHI was below the threshold of 1.0 at all receptors. Figure 3-1 shows the isopleth and locations of the point of maximum impact (PMI), MEIR and MEIW. Table 3-1 presents the HIA at the PMI, MEIR, MEIW and maximum sensitive receptor, plus the coordinates of each receptor.

Table 3-1: Risk Reduction Acute Hazard Index Results

Receptor	Exposure Duration	Acute Hazard Index	UTM Easting (m)	UTM Northing (m)	Receptor Number
PMI	1-Hour	0.70	487,699	3,665,118	3,135
MEIR		0.46	487,651	3,665,238	2,038
Sensitive		0.11	488,850	3,664,607	157
MEIW		0.39	487,627	3,665,083	137

The MEIR was predicted to occur approximately 160 feet to the west of the facility in a residential neighborhood off Hill Valley Drive. The location of the peak sensitive receptor was predicted to occur at Palomar Medical Center Medical Offices, to the east of Citracado Parkway which is located more than 1.0 kilometers to the southeast of the facility and is therefore not shown in the isopleth in Figure 3-1. The MEIW was predicted to occur west of the facility where there appears to be a container and vehicles as part of a job site off Hill Valley Drive.

The nickel emissions account for all of the HIA at the MEIR and MEIW targeting the immune system. At the PMI and sensitive receptor, hexamethylene diisocyanate accounts for more than 84% of the risk, targeting the respiratory system.

The abrasive blasting operations account for more than 80% of the HIA at the MEIR and MEIW while the coating operations account for more than 99% of the HIA at the PMI and sensitive receptor.

Appendix D presents detailed tables summarizing the risk reduction HRA results at each receptor type, broken down by pollutant and source. Air dispersion modeling and risk calculation files will be provided electronically to the SDAPCD.

This HRA demonstrates that the installation of the dust collection system and improved filters will reduce the acute HHI below the risk reduction threshold at all receptors.

Figure 3-1: Risk Reduction Acute HHI Isopleth and Locations of PMI, MEIR and MEIW

Red Circle.....PMI
Purple Circle.....MEIR
Orange Circle .....MEIW

3.4 Risk Reduction Schedule

Freeberg has already moved the stainless steel welding to the east building and installed the new Robovent Senturion dust collector with MERV 15 filters.

The 80 new nano media filters have been installed on the abrasive blasting booth exhaust.

The Fiber and CO_2 laser cutters currently use MERV 15 filters, and HEPA filters will be installed on the Fiber laser cutter for all stainless steel cutting by June 30, 2025.

Therefore, all risk reduction measures will be implemented by June 30, 2025.

Upon completion of SDAPCD's review of this Risk Reduction HRA and installation of the Fiber laser cutter HEPA filters, the facility operations will be below the significant health risk thresholds. Therefore, no annual progress reports on the implementation of these reduction measures are needed. This plan culminates Freeberg's requirements for the AB 2588 risk reduction program for acute HHI risks for reporting year 2021.

APPENDIX A – GENERAL PERMIT APPLICATION

Internal Use Only	
APP ID: APCD	-APP/CER-
SITE ID: APCD	-SITE-

GENERAL PERMIT OR REGISTRATION APPLICATION FORM

San Diego County Air Pollution Control District

Submittal of this application does not grant permission to construct or to operate equipment except as specified in Rule 24(c).

REASON FOR SUBMITTAL OF APPLICATION:

- ☐ New Installation
- ☐ Amendment to Existing Authority to Construct or Application
- ☐ Change of Permit Conditions
- ☐ Registration of Portable Equipment
- ☐ Existing Unpermitted Equipment or Rule 11 Change
- ☐ Change of Equipment Location
- ☐ Change Permit to Operate Status to Inactive
- ☐ Modification of Existing Permitted Equipment
- ☐ Change of Equipment Ownership ***(please provide proof of ownership)***
- ☐ Banking Emissions
- ■ Other (Specify) Risk Reduction Plan for 2021 HRA

List affected APP/PTO Record ID(s): APCD1999-PTO-961521

APPLICANT INFORMATION

Name of Business (DBA) Freeberg Industrial Fabrication Corp

Does this organization own or operate any other APCD permitted equipment at this or any other adjacent locations? ■ Yes ☐ No

If yes, list assigned Site Record IDs listed on your Permits APCD1997-SITE-09909

Name of Legal Owner (if different from DBA)

Equipment Owner	Authority to Construct Mailing Address
Name: Freeberg Industrial Fabrication Corp	Name: Freeberg Industrial Fabrication Corp
Mailing Address: 2874 Progress Pl	Mailing Address: 2874 Progress Pl
City: Escondido State: CA Zip: 92029	City: Escondido State: CA Zip: 92029
Phone: (760) 737-7614	Phone: (760) 737-7614
E-Mail Address: Steve.Olejnik@freeberg.com	E-Mail Address: Steve.Olejnik@freeberg.com

Permit To Operate Mailing Address	Invoice Mailing Address
Name: Freeberg Industrial Fabrication Corp	Name: Freeberg Industrial Fabrication Corp
Mailing Address: 2874 Progress Pl	Mailing Address: 2874 Progress Pl
City: Escondido State: CA Zip: 92029	City: Escondido State: CA Zip: 92029
Phone: (760) 737-7614	Phone: (760) 737-7614
E-Mail Address: Steve.Olejnik@freeberg.com	E-Mail Address: Steve.Olejnik@freeberg.com

EQUIPMENT/PROCESS INFORMATION: Type of Equipment: ■ **Stationary** ☐ **Portable,** ***if portable please enter below the equipment storage address.*** **If portable, will operation exceed 12 consecutive months at the same location** ☐ **Yes** ☐ **No**

Equipment Location Address 2874 Progress Pl City Escondido State: CA

Parcel No. Zip 92029 Phone (760) 737-7614 E-mail: Steve.Olejnik@freeberg.com

Site Contact Steve Olejnik Phone (760) 737-7614

General Description of Equipment/Process Metal fabrication

Application Submitted by ☐ Owner ■ Operator ☐ Contractor ☐ Consultant Affiliation

EXPEDITED APPLICATION PROCESSING: ☐ **I hereby request Expedited Application Processing and understand that:**
a) Expedited processing will incur additional fees and permits will not be issued until the additional fees are paid in full (see Rule 40(d)(8)(iv) for details) b) Expedited processing is contingent on the availability of qualified staff c) Once engineering review has begun this request cannot be cancelled d) Expedited processing does not guarantee action by any specific date nor does it guarantee permit approval.

☐ **This application contains trade secret or confidential information** *(see reverse for instructions)*

I hereby certify that all information provided on this application is true and correct.

SIGNATURE Steve Olejnik Date 3-10-2025

Print Name Steve Olejnik Company Freeberg Industrial Fabrication Corp

Phone (760) 737-7614 E-mail Address Steve.Olejnik@freeberg.com

Internal Use Only

Date Staff Initials: Amt Rec'd $ Fee Schedule

RNP: EMF: NBF: TA:

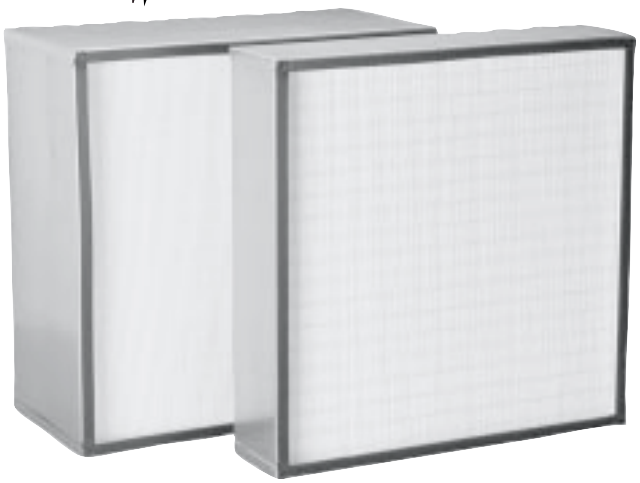
GEN_APP_Form_Rev Date: Aug. 2017

APPENDIX B – FILTER SPECIFICATION SHEETS

HEPA Filters

New and Improved!

Genuine Torit-Built® Filters Engineered for Dust, Fume, and Mist Collection



A Variety of Configurations and Performance Options to Meet Your Needs

- 99.97% or higher filtration efficiency on 0.3 micron particles.
- Sturdy, beaded media pack design eliminates the need for aluminum separators.
- Variety of sizes and airflow capacities to meet specific application requirements.
- Durable, galvanized steel frame construction.
- High-density urethane gaskets with interlocking dovetail corners provide reliable seal.
- Efficiency and restriction test results printed on each filter.

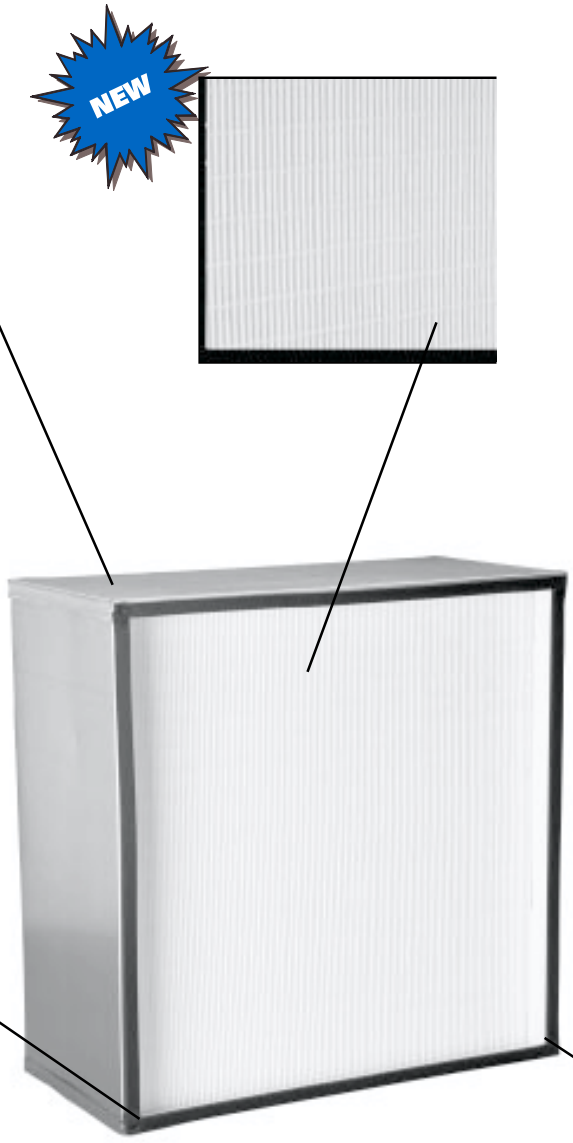
Français

- Filtration efficace à 99.97% sur particules de 0.3 micron.
- Conception de l'ensemble média de style sans séparateur.
- Variété de format et de capacité de volume d'air pour convenir à toutes les applications.
- Construction en acier galvanise durable.
- Joint d'étanchéité en uréthane à haute densité avec coins s'emboîtant un dans l'autre.
- Test de restriction et d'efficacité imprimé sur chaque filtre.

Español

- Eficiencia de filtración del 99.97% en partículas de 0.3 micras.
- El diseño del fuerte empaque del medio rebordeado elimina la necesidad de los separadores de aluminio.
- Diversidad de tamaños y capacidades de flujo de aire para cumplir requerimientos específicos de aplicación.
- Construcción de marco en acero galvanizado de alta duración.
- Los empaques de uretano de alta densidad con orillas conectoras aminaladas proporcionan un sello confiable.
- Descripción de pruebas de eficiencia y restricciones impresas en cada filtro.

Take a Close Look at Torit HEPA Filters



Galvanized Steel Frame
- Resists swelling in moist conditions
- Less weight than woodboard frames

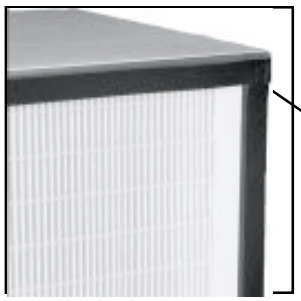
Cadre en acier galvanise
- Résiste à l'expansion dans la plupart des conditions
- Plus léger que les cadres en particules de bois

Marcos de acero galvanizado
- Resistente a hinchamientos en casi todas las condiciones
- Menos peso que el de marcos de madera

Beaded Filter Media Pack Design
- Contains more pleats per inch than aluminum separator-style filters
- Eliminates media damage caused by aluminum separators

Conception filtre de l'ensemble de média embouvetée
- Contient plus de plis par pouce que les filtres de style séparateur en aluminium
- Élimine les dommages provoqués par les séparateurs en aluminium

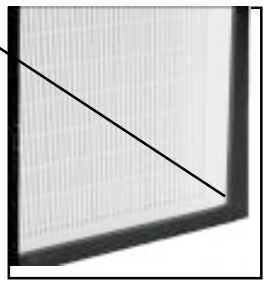
Diseño filtro de empaque rebordeado
- Contine más pliegues por pulgada que los filtros de tipo de separadores de aluminio
- Elimina los daños causados por separadores de aluminio



Gaskets/Corners
- High density urethane gaskets
- Interlocking dovetail corners
- One or two gaskets available for specific application requirements

Coins avec joint d'étanchéité
- Joint d'étanchéité en uréthane à haute densité
- coins s'emboîtant un dans l'autre
- Un ou deux types de joint d'étanchéités pour applications spécifiques

Empaques/Esquinas
- Empaques de uretano de alta densidad
- Orillas de cierre aminalado
- Uno o dos empaques disponibles para requerimientos específicos de aplicación



Urethane Potting Compound
- Media pack is securely attached to the frame interior

Composé de saturation à l'uréthane
- Ensemble de média fixé à l'intérieur de cadre de facon sécuritaire

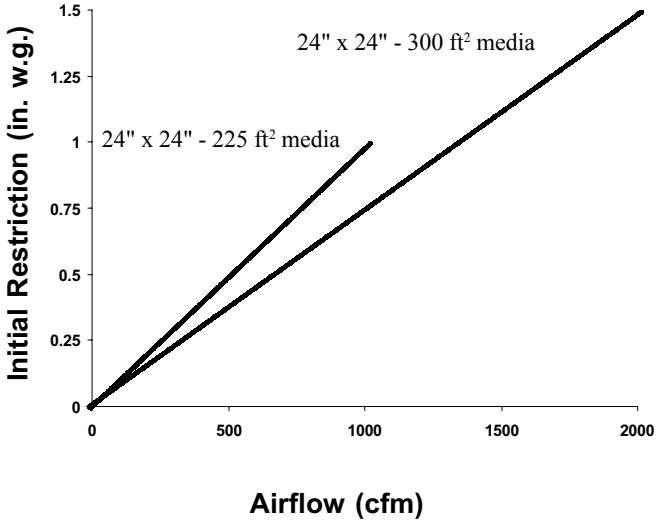
Componente de uretano acrisolado
- El empaque del medio filtrante está firmemente asegurado al marco interior

Torit HEPA Filters

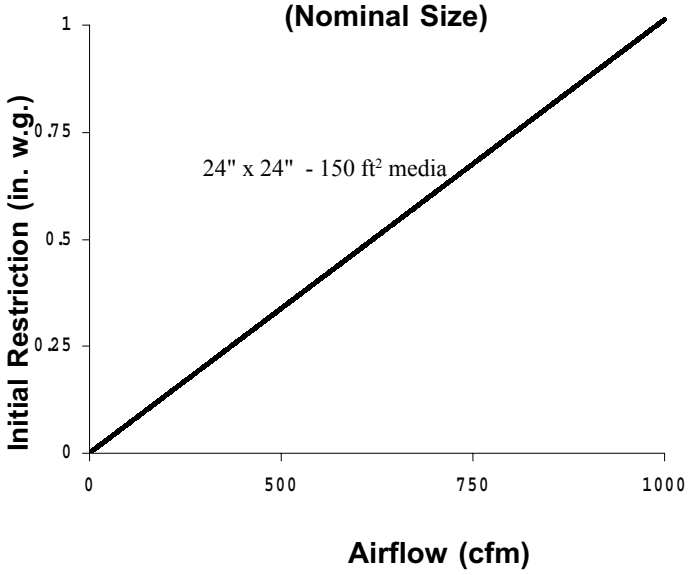
Initial Restriction vs Airflow

Typical Clean Filter Operating Performance

12-inch Deep Models (Nominal Size)



6-inch Deep Models (Nominal Size)



Filter Dimensions						Media		Approximate Weight	
H		W		D					
in	mm	in	mm	in	mm	ft²	m²	lbs.	kg
24.0	609.6	24.0	609.5	11.5	292.1	225	20.3	36.0	16.3
24.0	609.6	24.0	609.6	11.5	292.1	300	27.0	37.3	16.9
24.0	609.6	18.0	609.6	11.5	292.1	225	20.3	29.5	13.4
24.0	609.6	18.0	609.6	11.5	292.1	178	16.0	27.0	12.2
22.0	558.5	22.0	558.5	11.5	292.1	252	22.68	33.0	15.0
24.0	609.6	24.0	609.6	6.0	152.4	150	13.5	18.8	8.5
12.0	304.8	12.0	304.8	6.0	152.4	38	3.42	4.7	2.1

Specifications	Spécifications	Especificaciones
Composition of Media ■ Glass media. **Filtration Efficiency** ■ 99.97% or higher on 0.3 µm particles. **Construction** ■ 20-gauge galvanized steel frame. ■ High density urethane gasket. **Temperature Resistance** ■ Filter components withstand up to 180°F (82°C).	**Composition du matériau** ■ Média de verre. **Efficacité filtration** ■ 99.97% ou plus, sur particules de 0.3 micron. **Construction** ■ Cadre en acier galvanisé de jauge 20. ■ Joint d'étanchéité en uréthane à haute densité. **Température** ■ Composante du filtre résiste jusqu'à 82 C. (180 F.)	**Composición del medio** ■ Medio filtrante vítreo. **Eficiencia de filtración** ■ 99.97% o mayor en partículas de 0.3 micras. **Construcción** ■ Marco de acero galvanizado calibre 20. ■ Empaque de uretano de alta densidad. **Temperatura** ■ Los componentes del filtro soportan hasta 180 F. (82 C.)

Applications	Utilisations	Aplicaciones
■ Safety filters for dust, fume, and mist collection. ■ Use in Ultra-Lok™ and other safety filter retaining systems. ■ Industrial applications where indoor air quality is a concern.	■ Filtre de sûreté pour poussière, fumée et bruine. ■ Utilisé dans les filtre Ultra-Lok et autre filtre de sûreté. ■ Application à l'intérieur, en milieu industriel lorsque la qualité de l'air est importante.	■ Filtros de seguridad para humos, polvos y neblinas de aceite. ■ Para uso en Ultra-Lok y otros sistemas de seguridad de filtración. ■ Para aplicaciones industriales en las que se require calidad interna del aire.

Information contained in this document is subject to change without notice.

Donaldson Company, Inc.
Dust Collection Group
P.O. Box 1299
Minneapolis, MN 55440
800-365-1331
www.torit.com
e-mail: dustmktg@mail.donaldson.com

Printed in U.S.A.
Printed on Recycled Paper

Form HEPA (01/02)

CO2 Laser Cutter Filter

Blue Heaven Technologies

2820 S. English Station Road - Louisville, KY 40299
Tel: (502) 357-0132 Fax (502) 267-8379

Date: 27-Jun-14 TEST NO. 14-1146

ASHRAE Standard 52.2-2012 TEST REPORT

Filter Description

Manufacturer	Donaldson Co.
Filter Model	DFO UWFR
Part Number	P191920
Generic Filter Type	Pleated
Nominal Dimensions (H x W x D)	14 1/4" (11.5") OD x 11" (8") ID x 26"L (Oval)
Pocket / Pleat Quantity	Standard
Media Type	Ultra Web
Est. Gross Media Area	Standard
Adhesive Type	N/A

Test Conditions

Loading Dust Type	ASHRAE	Test Air Temp (degrees F.)	79
Barometric Pressure (In. Hg.)	29.41	Relative Humidity (%)	48

Test Results

Airflow Rate (CFM)	**932**
Nominal Face Velocity (fpm)	**N A**
Initial Resistance (in WG)	**0.87**
Final Resistance (in WG)	**4.00**
Dust Fed (gms) to Final Resistance	**938**
E1 (%) Composite Minimum Avg. Efficiency 0.30 - 1.0 um	**88**
E2 (%) Composite Minimum Avg. Efficiency 1.0 - 3.0 um	**98**
E3 (%) Composite Minimum Avg. Efficiency 3.0 - 10.0 um	**100**
Minimum Efficiency Reporting Value (MERV)	**MERV 15 @ 932 CFM**

Comments Tested For: Donaldson Co.

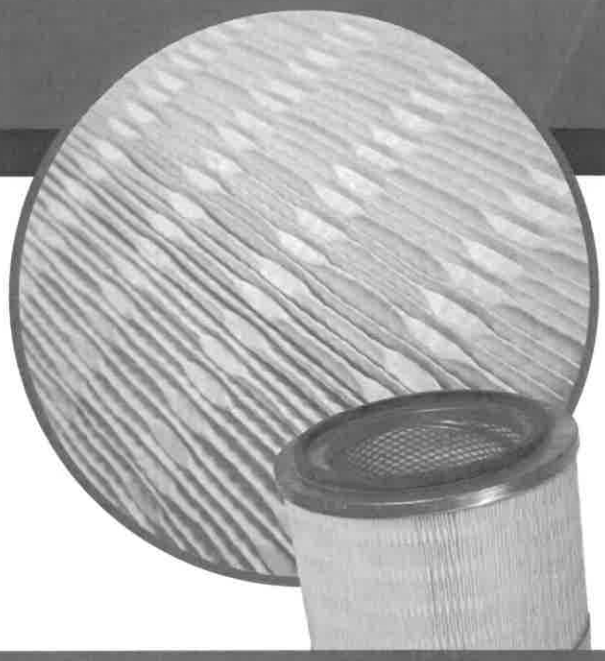
Final Pressure Drop ("w.c.)	4.00"w.c.
Dust Holding Capacity (gms)	938
Average Arrestance (%)	100.0

Test Performed by: JPS Approved By: RMcS Test Completed: 27-Jun-14

Welding Filter

RoboVent®

Making a Difference One Breath at a Time



A15 PleatLock Premium Filter

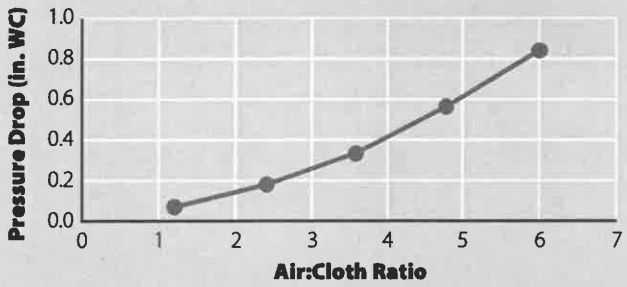
A15 PleatLock premium filter media is a proprietary cellulose polyester blend with a fire retardant additive and an initial Minimum Efficiency Reporting Value of 15 (MERV15). The base media is enhanced with a direct-spray nanofiber to promote surface loading during operation and dust release during pulse-cleaning.

The media provides the highest filtration efficiency among cellulose polyester blends. RoboVent's new PleatLock technology has been engineered to outlast even the toughest competitor filter. With added dimples within the pleats, there is up to 35% more media space to capture more particulate, allowing for longer time between filter changes. This saves time and money!

Standard Product Characteristics

Base Media:	Cellulose/Polyester Blend
Pulse Layer:	Nanofiber
Max. Temperature:	225°F
Max. Humidity:	95%
Length Tolerance:	± 1/4 inch
Diameter Tolerance:	± 1/8 inch
ASHRAE Efficiency:	MERV 15*
End Cap:	Galvanized Steel

Resistance to Air Flow of Clean Filter



A15 PleatLock Filter Sizes

ITEM NUMBER	MEDIA AREA (FT^2)	END CAP CONFIGURATION	SF SIZE (IN)	OD (IN)	ID (IN)	LENGTH (IN)
PL-10D12-A15-C	68	OPEN/CLOSED	NA	10.38	6	12
PL-12D26-A15	205	OPEN/OPEN	NA	12.75	8.38	26
PL-12D36-A15-C	284	OPEN/CLOSED	NA	12.75	8.38	36
PL-14D26-A15	233	OPEN/OPEN	NA	13.88	9.5	26
PL-14D26-A15-C	233	OPEN/CLOSED	NA	13.88	9.5	26
PL-14D26-A15-SF	233	SQUARE/CLOSED	16x16	13.88	9.5	26
PL-14D36-A15	322	OPEN/OPEN	NA	13.88	9.5	36
PL-14D36-A15-C	322	OPEN/CLOSED	NA	13.88	9.5	36
PL-14D36-A15-SF	322	SQUARE/CLOSED	16x16	13.88	9.5	36
PL-14D52-A15-SF	465	SQUARE/CLOSED	16x16	13.88	9.5	52
→ PL-14D52-A15-SF21	465	SQUARE/CLOSED	15x21	13.88	9.5	52
PL-18D16-A15	190	OPEN/OPEN	NA	17.38	12.63	16
PL-18D12-A15-C	190	OPEN/CLOSED	NA	17.38	12.63	12
PL-22D12-A15	202	OPEN/OPEN	NA	22.38	17.88	12
PL-22D14-A15-C	236	OPEN/CLOSED	NA	22.38	17.88	14
PL-22D36-A15	606	OPEN/OPEN	NA	22.38	17.88	36
PL2-14D52-A15-SF	465	SQUARE/CLOSED	17x18	13.88	9.5	52
PL-22D21-A15	353	OPEN/OPEN	NA	22.38	17.88	21

* Note: MERV estimated on clean filter only. Assumes this is minimum.

Steve Olejnik

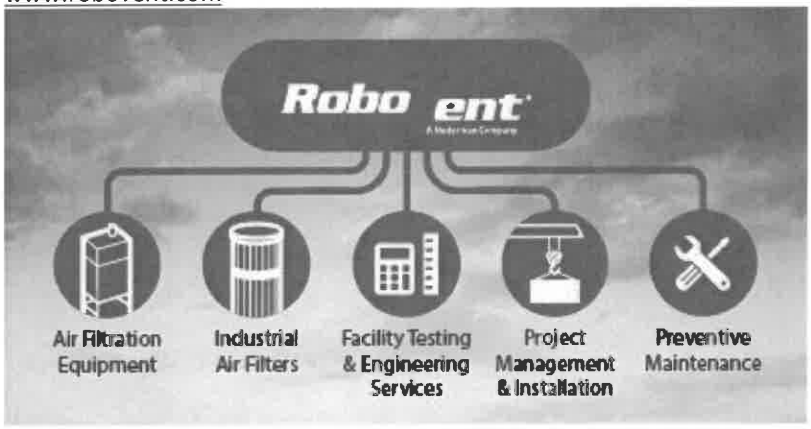
From: Josh Bakenhus <Josh.Bakenhus@robovent.com>
Sent: Thursday, September 26, 2024 8:29 AM
To: Steve Olejnik
Cc: Bobby Garrett
Subject: RE: Filter Data

Below is the MERV15 efficiency requirements directly from the US EPA's website.

15	0.30-1.0 greater than or equal to 85% 1.0-3.0 greater than or equal to 90% 3.0-10.0 greater than or equal to 95%

JOSH BAKENHUS
Project Manager

Robovent | Project Management
4405 S. 19th Street, Council Bluffs, IA 51501 | USA
Direct: 402-660-9057
www.robovent.com



From: Steve Olejnik <Steve.Olejnik@freeberg.com>
Sent: Thursday, September 26, 2024 10:23 AM
To: Josh Bakenhus <Josh.Bakenhus@robovent.com>
Cc: Bobby Garrett <bobby.garrett@freeberg.com>
Subject: RE: Filter Data

Hi Josh,

APPENDIX C – RISK REDUCTION HRA EMISSIONS

Yorke
ENGINEERING, LLC
www.YorkeEngr.com

Freeberg Laser Cutting Emissions

Device ID	90902			
Material Name		1 - 304L STAINLESS STEEL	2 - 316L STAINLESS STEEL	3 - MILD STEEL
Maximum Hourly Usage (minutes/hr)		30.00	30.00	30.00

SDAPCD Default Emission Factors

Pollutant Name	CAS	304L STAINLESS STEEL	316L STAINLESS STEEL	MILD STEEL
EF		[lb/min]	[lb/min]	[lb/min]
Particulate Matter (PM10)	85101	4.04E-04	4.02E-04	2.68E-04
Total Particulates (TSP)	11101	4.04E-04	4.02E-04	2.68E-04
Aluminum	7429905	0.00E+00	0.00E+00	8.32E-08
Chromium, Hexavalent	18540299	2.17E-06	1.94E-06	1.33E-08
Chromium, Non-Hexavalent	7440473	7.25E-05	6.48E-05	4.43E-07
Copper	7440508	0.00E+00	1.73E-06	7.25E-07
Manganese	7439965	8.07E-06	5.95E-06	2.09E-06
Nickel (except nickel oxide)	7440020	4.04E-05	4.04E-05	4.83E-07
Phosphorous	7723140	1.82E-07	1.25E-07	4.83E-08

Notes:

Emission factors based on SDAPCD calculations including 90% control from the dust collector, based on Bromsen paper

Revised RRP Emission Factors

Pollutant Name	CAS	304L STAINLESS STEEL	316L STAINLESS STEEL	MILD STEEL
EF		[lb/min]	[lb/min]	[lb/min]
Particulate Matter (PM10)	85101	1.21E-06	1.21E-06	5.36E-05
Total Particulates (TSP)	11101	1.21E-06	1.21E-06	5.36E-05
Aluminum	7429905	0.00E+00	0.00E+00	1.66E-08
Chromium, Hexavalent	18540299	6.51E-09	5.82E-09	2.66E-09
Chromium, Non-Hexavalent	7440473	2.17E-07	1.94E-07	8.86E-08
Copper	7440508	0.00E+00	5.19E-09	1.45E-07
Manganese	7439965	2.42E-08	1.78E-08	4.18E-07
Nickel (except nickel oxide)	7440020	1.21E-07	1.21E-07	9.66E-08
Phosphorous	7723140	5.46E-10	3.75E-10	9.66E-09

Notes:

Emission factors based on SDAPCD emissions but incorporating a control efficiency of 98% based on filter specification sheet for CO2 laser and 99.97% based on filter specification sheet for fiber laser.

SDAPCD default control efficiency	90%
RRP Control efficiency - CO2 Laser	98%
RRP Control efficiency - Fiber Laser	99.97%

RRP Emissions

Material Name		304L STAINLESS STEEL	316L STAINLESS STEEL	MILD STEEL	
Pollutant	CAS	Hourly Emissions (lb/hr)			Total Laser Cutting Emissions (lb/hr)
Particulate Matter (PM10)	85101	3.64E-05	3.62E-05	1.61E-03	1.68E-03
Total Particulates (TSP)	11101	3.64E-05	3.62E-05	1.61E-03	1.68E-03
Aluminum	7429905	0.00E+00	0.00E+00	4.99E-07	4.99E-07
Chromium, Hexavalent	18540299	1.95E-07	1.75E-07	7.98E-08	4.50E-07
Chromium, Non-Hexavalent	7440473	6.52E-06	5.83E-06	2.66E-06	1.50E-05
Copper	7440508	0.00E+00	1.56E-07	4.35E-06	4.51E-06
Manganese	7439965	7.26E-07	5.35E-07	1.25E-05	1.38E-05
Nickel (except nickel oxide)	7440020	3.64E-06	3.64E-06	2.90E-06	1.02E-05
Phosphorous	7723140	1.64E-08	1.12E-08	2.90E-07	3.17E-07

Yorke ENGINEERING, LLC
www.YorkeEngr.com

Freeberg Welding Emissions

Device ID		90901														
Welding Type		MIG						TIG								
Welding Material Name		2 - Maxal 5356 MIG	4 - PINNACLE 316L MIG	10 - PINNACLE ER630 MIG	12 - Kobelco 316LTI MIG	13 - Hobart Quantum Arc 6 MIG	14 - Hobart Excel Arc 71 MIG	1 - Maxal 5356 TIG	3 - PINNACLE 316L TIG	5 - PINNACLE 308L TIG	6 - PINNACLE 309L TIG	7 - PINNACLE 70S-2 TIG	8 - PINNACLE 70S-6 TIG	9 - PINNACLE SIB ER4043 TIG	11 - Wash. Alloy ER347 TIG
Maximum Hourly Usage (lb/hr)		1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

SDAPCD Uncontrolled Emission Factors

Emission Factor Basis		Maxal 5356 MIG	PINNACLE 316L MIG	PINNACLE ER630 MIG	Kobelco 316LTI MIG	Hobart Quantum Arc 6 MIG	Hobart Excel Arc 71 MIG	Maxal 5356 TIG	PINNACLE 316L TIG	PINNACLE 308L TIG	PINNACLE 309L TIG	PINNACLE 70S-2 TIG	PINNACLE 70S-6 TIG	PINNACLE SIB ER4043 TIG	Wash. Alloy ER347 TIG
SDAPCD EQ Name:		2	4	10	12	13	14	1	3	5	6	7	8	9	11
Pollutant Name		Maxal 5356 MIG	PINNACLE 316L MIG	PINNACLE ER630 MIG	Kobelco 316LTI MIG	Hobart Quantum Arc 6 MIG	Hobart Excel Arc 71 MIG	Maxal 5356 TIG	PINNACLE 316L TIG	PINNACLE 308L TIG	PINNACLE 309L TIG	PINNACLE 70S-2 TIG	PINNACLE 70S-6 TIG	PINNACLE SIB ER4043 TIG	Wash. Alloy ER347 TIG
EF		[lb/lb rod]	[lb/lb rod]	[lb/lb rod]	[lb/lb rod]	[lb/lb rod]	[lb/lb rod]	[lb/lb rod]	[lb/lb rod]	[lb/lb rod]	[lb/lb rod]	[lb/lb rod]	[lb/lb rod]	[lb/lb rod]	[lb/lb rod]
Total Particulates (TSP)	11101	1.00E-02	3.20E-03	1.00E-02	3.20E-03	1.00E-02	1.00E-02	1.00E-02	3.20E-03	5.40E-03	1.00E-02	5.20E-03	5.20E-03	1.00E-02	1.00E-02
Particulate Matter (PM10)	85101	1.00E-02	3.20E-03	1.00E-02	3.20E-03	1.00E-02	1.00E-02	1.00E-02	3.20E-03	5.40E-03	1.00E-02	5.20E-03	5.20E-03	1.00E-02	1.00E-02
Chromium, Total	5	6.83E-06	3.18E-04	8.95E-04	7.72E-03	0.00E+00	0.00E+00	6.83E-06	3.18E-04	5.80E-04	1.31E-03	7.67E-07	9.09E-07	0.00E+00	1.11E-03
Chromium, Hexavalent	18540299	3.42E-07	1.59E-05	4.47E-05	7.72E-03	0.00E+00	0.00E+00	3.42E-07	1.59E-05	2.90E-05	6.56E-05	3.84E-08	4.55E-08	0.00E+00	5.53E-05
Copper	1067	5.46E-06	2.45E-06	1.98E-04	0.00E+00	1.09E-05	0.00E+00	5.46E-06	2.45E-06	3.25E-06	4.10E-05	4.83E-06	4.83E-06	1.64E-05	4.10E-05
Manganese	7439965	0.00E+00	3.18E-05	2.73E-05	2.45E-04	7.81E-05	9.56E-05	0.00E+00	3.18E-05	5.61E-05	9.56E-05	3.32E-05	4.26E-05	2.73E-06	9.56E-05
Nickel (except nickel oxide)	7440020	0.00E+00	2.05E-04	2.60E-04	2.26E-04	0.00E+00	0.00E+00	0.00E+00	2.05E-04	2.86E-04	7.10E-04	3.41E-07	4.55E-07	0.00E+00	5.46E-04
Phosphorous	7723140	0.00E+00	2.80E-07	1.64E-06	0.00E+00	3.82E-07	1.64E-06	0.00E+00	2.80E-07	5.61E-07	1.64E-06	3.69E-07	3.98E-07	0.00E+00	1.64E-06
Aluminum	7429905	5.11E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.11E-03	0.00E+00	0.00E+00	0.00E+00	2.02E-06	0.00E+00	5.10E-03	0.00E+00
Beryllium	7440417	1.64E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.64E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.64E-08	0.00E+00
Zinc	7440666	5.46E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.46E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.46E-06	0.00E+00
Vanadium	7440622	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.14E-07	1.70E-07	0.00E+00	0.00E+00
Cobalt	7440484	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.00E-06	0.00E+00	1.00E-06	1.00E-06	0.00E+00	0.00E+00

Notes:
Emissions factors based on SDAPCD Welding Guidance (https://www.sdapcd.org/content/dam/sdapcd/documents/permits/emissions-calculation/welding/APCD-Welding-Operations.pdf)
No SDAPCD profiles for ER630 MIG, 6 MIG, 71 MIG so assumed 0.01 lb/lb rod for the TSP & PM10 for these profiles
Default Fume Correction Factors from NASSCO (Dr. Bell) are 0.5464 (GMAW, TIG, & MIG), 0.2865 (SMAW & FCAW), and 1.0 (unspecified)
Metal composition percentages are from the SDSs
Stainless steel welding occurs in a separate enclosed room with a dust control system
Stainless steel control efficiency 95.00% Applied to the emission calculations below

Pollutant Name	CAS	2 - Maxal 5356 MIG	4 - PINNACLE 316L MIG	10 - PINNACLE ER630 MIG	12 - Kobelco 316LTI MIG	13 - Hobart Quantum Arc 6 MIG	14 - Hobart Excel Arc 71 MIG	1 - Maxal 5356 TIG	3 - PINNACLE 316L TIG	5 - PINNACLE 308L TIG	6 - PINNACLE 309L TIG	7 - PINNACLE 70S-2 TIG	8 - PINNACLE 70S-6 TIG	9 - PINNACLE SIB ER4043 TIG	11 - Wash. Alloy ER347 TIG
% Composition		%	%	%	%	%	%	%	%	%	%	%	%	%	%
Chromium, Total	5	0.125	18.18	16.375	19	0	0	0.125	18.18	19.66	24	0.027	0.032	0	20.25
Chromium, Hexavalent	18540299	0.125	18.18	16.375	19	0	0	0.125	18.18	19.66	24	0.027	0.032	0	20.25
Copper	1067	0.1	0.14	3.625	0.75	0.2	0	0.1	0.14	0.11	0.75	0.17	0.17	0.3	0.75
Manganese	7439965	0	1.82	0.5	1.75	1.43	1.75	0	1.82	1.9	1.75	1.17	1.5	0.05	1.75
Nickel (except nickel oxide)	7440020	0	11.72	4.75	13	0	0	0	11.72	9.7	13	0.012	0.016	0	10
Phosphorous	7723140	0	0.016	0.03	0.03	0.007	0.03	0	0.016	0.019	0.03	0.013	0.014	0	0.03
Aluminum	7429905	93.57	0	0	0	0	0	93.57	0	0	0	0.071	0	93.25	0
Beryllium	7440417	0.0003	0	0	0	0	0	0.0003	0	0	0	0	0	0.0003	0
Zinc	7440666	0.1	0	0	0	0	0	0.1	0	0	0	0	0	0.1	0
Vanadium	7440622	0	0	0	0	0	0	0	0	0	0	0.004	0.006	0	0
Cobalt	7440484	0	0	0	0	0	0	0	0	0	0	0	0	0	0

RRP Emissions - Controlled Stainless and Uncontrolled Other

Metal		Aluminum/Magnesium	Stainless Steel	Stainless Steel	Stainless Steel	Mild Steel	Mild Steel	Aluminum/Magnesium	Stainless Steel	Stainless Steel	Stainless Steel	Carbon Steel	Carbon Steel	Aluminum/Silicon	Stainless Steel		Model Input Emissions	
Welding Material Name		Maxal 5356 MIG	PINNACLE 316L MIG	PINNACLE ER630 MIG	Kobelco 316LTI MIG	Hobart Quantum Arc 6 MIG	Hobart Excel Arc 71 MIG	Maxal 5356 TIG	PINNACLE 316L TIG	PINNACLE 308L TIG	PINNACLE 309L TIG	PINNACLE 70S-2 TIG	PINNACLE 70S-6 TIG	PINNACLE SIB ER4043 TIG	Wash. Alloy ER347 TIG	Total Annual Welding Emissions (lb/yr)			
Pollutant	CAS	Hourly Emissions (lb/hr)														Total Hourly Welding Emissions (lb/hr)	CAS	Total Hourly SS Welding Emissions (lb/hr)	Total Hourly Non SS Welding Emissions (lb/hr)
Total Particulates (TSP)	11101	1.00E-02	1.60E-04	5.00E-04	0.00E+00	1.00E-02	1.00E-02	1.00E-02	1.60E-04	2.70E-04	5.00E-04	5.20E-03	5.20E-03	1.00E-02	5.00E-04	6.25E-02	11101	2.09E-03	6.04E-02
Particulate Matter (PM10)	85101	1.00E-02	1.60E-04	5.00E-04	0.00E+00	1.00E-02	1.00E-02	1.00E-02	1.60E-04	2.70E-04	5.00E-04	5.20E-03	5.20E-03	1.00E-02	5.00E-04	6.25E-02	85101	2.09E-03	6.04E-02
Chromium, Total	5	6.83E-06	1.59E-05	4.47E-05	0.00E+00	0.00E+00	0.00E+00	6.83E-06	1.59E-05	2.90E-05	6.56E-05	7.67E-07	9.09E-07	0.00E+00	5.53E-05	2.42E-04	7440473	2.26E-04	1.53E-05
Chromium, Hexavalent	18540299	3.42E-07	7.95E-07	2.24E-06	0.00E+00	0.00E+00	0.00E+00	3.42E-07	7.95E-07	1.45E-06	3.28E-06	3.84E-08	4.55E-08	0.00E+00	2.77E-06	1.21E-05	18540299	1.13E-05	7.67E-07
Copper	1067	5.46E-06	1.22E-07	9.90E-06	0.00E+00	1.09E-05	0.00E+00	5.46E-06	1.22E-07	1.62E-07	2.05E-06	4.83E-06	4.83E-06	1.64E-05	2.05E-06	6.23E-05	7440508	1.44E-05	4.79E-05
Manganese	7439965	0.00E+00	1.59E-06	1.37E-06	0.00E+00	7.81E-05	9.56E-05	0.00E+00	1.59E-06	2.80E-06	4.78E-06	3.32E-05	4.26E-05	2.73E-06	4.78E-06	2.69E-04	7439965	1.69E-05	2.52E-04
Nickel (except nickel oxide)	7440020	0.00E+00	1.02E-05	1.30E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.02E-05	1.43E-05	3.55E-05	3.41E-07	4.55E-07	0.00E+00	2.73E-05	1.11E-04	7440020	1.11E-04	7.96E-07
Phosphorous	7723140	0.00E+00	1.40E-08	8.20E-08	0.00E+00	3.82E-07	1.64E-06	0.00E+00	1.40E-08	2.80E-08	8.20E-08	3.69E-07	3.98E-07	0.00E+00	8.20E-08	3.09E-06	7723140	3.02E-07	2.79E-06
Aluminum	7429905	5.11E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.11E-03	0.00E+00	0.00E+00	0.00E+00	2.02E-06	0.00E+00	5.10E-03	0.00E+00	1.53E-02	7429905	0.00E+00	1.53E-02
Beryllium	7440417	1.64E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.64E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.64E-08	0.00E+00	4.92E-08	7440417	0.00E+00	4.92E-08
Zinc	7440666	5.46E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.46E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.46E-06	0.00E+00	1.64E-05	7440666	0.00E+00	1.64E-05
Vanadium	7440622	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.14E-07	1.70E-07	0.00E+00	0.00E+00	2.84E-07	7440622	0.00E+00	2.84E-07
Cobalt	7440484	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.00E-08	0.00E+00	1.00E-06	1.00E-06	0.00E+00	0.00E+00	2.05E-06	7440484	5.00E-08	2.00E-06

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Freeberg Abrasive Blasting Emissions

Device ID	961521		
Material Name		**G80 Steel Grit**	**Garnet 36**
Maximum Hourly Usage (ton/hr)		0.30	0.28

Note: Only 1 material can be used in a given hour

SDAPCD Default Uncontrolled Emission Factors

Emission Factor Basis		**G80 Steel Grit**	**Garnet 36**
SDAPCD EQ Name:		1	2
Pollutant Name	**CAS**	**G80 Steel Grit**	**Garnet 36**
EF		**[lb/ton]**	**[lb/ton]**
Total Particulates (TSP)	11101	7.60E+00	8.00E+00
Particulate Matter (PM10)	85101	7.60E+00	8.00E+00
Cadmium	7440439	3.61E-03	3.80E-03
Chromium, Total	7440473	3.65E-02	3.84E-02
Copper	7440508	3.27E-03	3.44E-03
Lead	7439921	3.27E-03	3.44E-03
Manganese	7439965	3.65E-02	3.84E-02
Nickel (except nickel oxide)	7440020	3.65E-02	3.84E-02
Silica, Crystalline (Respirable)	1175	0.00E+00	1.28E-01

Notes:

Emissions factors based on SDAPCD Abrasive Blasting Profiles for Steel Grit (A07) and Garnet (A03).

RRP Emissions

Material Name		**G80 Steel Grit**	**Garnet 36**	
Pollutant	**CAS**	**Hourly Emissions (lb/hr)**		**Maximum Hourly Abrasive Blasting Emissions (lb/hr)**
Total Particulates (TSP)	11101	8.44E-02	8.14E-02	8.44E-02
Particulate Matter (PM10)	85101	8.44E-02	8.14E-02	8.44E-02
Cadmium	7440439	4.01E-05	3.87E-05	4.01E-05
Chromium, Total	7440473	4.05E-04	3.91E-04	4.05E-04
Copper	7440508	3.63E-05	3.50E-05	3.63E-05
Lead	7439921	3.63E-05	3.50E-05	3.63E-05
Manganese	7439965	4.05E-04	3.91E-04	4.05E-04
Nickel (except nickel oxide)	7440020	4.05E-04	3.91E-04	4.05E-04
Silica, Crystalline (Respirable)	1175	0.00E+00	1.30E-03	1.30E-03

Note: Only 1 material can be used in a given hour, thus HRA emissions are the highest of the 2 materials

Control Efficiency

SDAPCD default control efficiency	95.00%	
RRP Control efficiency	96.30%	based on the nano media filter specification

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Freeberg Coating Emissions

Device ID	190901																		
Material Name	**1 - AMERCOAT 385 WHITE**	**2 - 68HS ZINC PRIMER**	**3 - AMERCOAT 385 SOLAR RED**	**4 - AMERLOCK 2 RED**	**5 - AMERSHIELD BRIGHT RED**	**6 - AMERSHIELD GRAY RAL 7032**	**7 - AMERSHIELD WHITE**	**8 - Amershield Tinted Colors**	**9 - PSX 700 TINTED COLORS**	**10 - AMERSHIELD BLACK**	**11 - AMERCOAT 395PA**	**12 - Dimetcote 21-5 Zinc**	**13 - Cardinal 6400-6406 Polyurethane**	**14 - Cardinal 6407-6409 Polyurethane**	**15 - Intrepid MIL PRF-23377K Primer**	**16 - Intrepid MIL PRF-85285 Polyurethane**	**17 - Sherwin-Williams Polane 2.8 S Plus Polyurethane**	**18 - Sherwin-Williams Polane 2.8 SprayFill Primer**	**19 - Acetone**
Maximum Hourly Usage (gal/hr)	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	1.00	2.00	2.00	0.65	1.00
Density (lb/gal)	10.92	24.21	10.53	10.94	9.89	10.43	10.91	10.49	10.92	10.19	10.84	33.30	14.39	12.03	10.24	8.95	12.78	13.97	6.59
VOC (lb/gal)	2.60	2.40	2.60	1.50	2.20	2.20	2.20	2.20	6.18	2.20	2.60		3.50	3.50	1.87	2.44	2.80	2.80	
Percent Solids (%)	71.11	66.77	71.38	77.91	70.03	70.51	71.51	71.87	91.79	69.98	72.16	61.63	49	49	56	37.5	59	62	

SDAPCD Data

Pollutant Name	**1 - AMERCOAT 385 WHITE**	**2 - 68HS ZINC PRIMER**	**3 - AMERCOAT 385 SOLAR RED**	**4 - AMERLOCK 2 RED**	**5 - AMERSHIELD BRIGHT RED**	**6 - AMERSHIELD GRAY RAL 7032**	**7 - AMERSHIELD WHITE**	**8 - Amershield Tinted Colors**	**9 - PSX 700 TINTED COLORS**	**10 - AMERSHIELD BLACK**	**11 - AMERCOAT 395PA**	**12 - Dimetcote 21-5 Zinc**	**13 - Cardinal 6400-6406 Polyurethane**	**14 - Cardinal 6407-6409 Polyurethane**	**15 - Intrepid MIL PRF-23377K Primer**	**16 - Intrepid MIL PRF-85285 Polyurethane**	**17 - Sherwin-Williams Polane 2.8 S Plus Polyurethane**	**18 - Sherwin-Williams Polane 2.8 SprayFill Primer**	**19 - Acetone**	**CAS**
Index	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
Percentage	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	
Volatile Organic Compounds (VOC)																				43104
Total Organic Gases (TOG)																				43101
Total Particulates (TSP)																				85101
Particulate Matter (PM10)																				11101
1,2,4-Trimethylbenzene	2.60E-01	3.55E+00	1.49E+00	1.13E+00	3.60E-01	3.60E-01	3.60E-01	3.60E-01		3.60E-01	1.67E+00						1.40E-01	2.60E-01		95636
Acetone															8.75E+00	1.38E+01			1.00E+02	67641
Aluminum															2.80E-01	2.70E-01	8.90E-01			7429905
Barium				6.15E+00			3.18E+00		1.33E+00		8.30E-01									7440393
Butanol															3.75E+00					71363
Carbon black extracts										2.16E+00			1.67E+01	1.60E+01		8.80E-01				1050
Cumene	4.70E-01	1.80E-01	4.70E-01								4.70E-01						4.00E-02			98828
Epoxy resins	1.63E+01	5.52E+00																		1091
Ethanol									5.60E-01											64175
Ethyl Benzene	1.00E+00	6.40E-01	9.30E-01	4.40E-01			9.70E-01				4.70E-01									100414
Ethylene Glycol Butyl Ether	3.38E+00														3.75E+00					111762
Formaldehyde															3.00E-03					50000
Hexamethylene-1,6-diisocyanate																	3.47E-03			822060
Maleic anhydride							7.00E-02													108316
Methyl Ethyl Ketone													2.50E+00	2.40E+00		1.50E+00				78933
Methyl Isobutyl Ketone		3.07E+00																		108101
Naphthalene	4.70E-01		9.30E-01					7.20E-01			9.40E-01									91203
Propylene Glycol Methyl Ether															3.75E+00					107982
Propylene glycol monomethyl ether acetate					5.41E+00	5.41E+00	7.90E-01	2.49E+00		5.41E+00	3.41E+00									108656
Silica, Crystalline (Respirable)		1.43E+01			7.20E-01	7.20E-01	7.20E-01	7.20E-01		7.20E-01		5.00E-01						2.60E-01		1175
Toluene									7.50E-01											108883
Toluene diisocyanates																		4.00E-06		26471625
Trimethylbenzenes																	4.30E-01	8.60E-01		25551137
Xylenes (mixed)	3.49E+00	2.51E+00		2.40E-01			5.37E+00								3.75E+00		4.00E-02	2.60E-01		1210
Zinc															4.45E+00					7440666
Zinc oxide		7.10E-01										1.30E+00								1314132

Notes:
Ethanol was not included in the HRA modeling since there are no toxicity factors associated.

Material Name	**1 - AMERCOAT 385 WHITE**	**2 - 68HS ZINC PRIMER**	**3 - AMERCOAT 385 SOLAR RED**	**4 - AMERLOCK 2 RED**	**5 - AMERSHIELD BRIGHT RED**	**6 - AMERSHIELD GRAY RAL 7032**	**7 - AMERSHIELD WHITE**	**8 - Amershield Tinted Colors**	**9 - PSX 700 TINTED COLORS**	**10 - AMERSHIELD BLACK**	**11 - AMERCOAT 395PA**	**12 - Dimetcote 21-5 Zinc**	**13 - Cardinal 6400-6406 Polyurethane**	**14 - Cardinal 6407-6409 Polyurethane**	**15 - Intrepid MIL PRF-23377K Primer**	**16 - Intrepid MIL PRF-85285 Polyurethane**	**17 - Sherwin-Williams Polane 2.8 S Plus Polyurethane**	**18 - Sherwin-Williams Polane 2.8 SprayFill Primer**	**19 - Acetone**		
Pollutant	**Hourly Emissions (lb/hr)**																			**Total Hourly Coating Emissions (lb/hr)**	**CAS**
Volatile Organic Compounds (VOC)	5.20E+00	4.80E+00	5.20E+00	3.00E+00	4.40E+00	4.40E+00	4.40E+00	4.40E+00	1.24E+01	4.40E+00	5.20E+00		7.00E+00	7.00E+00	1.87E+00	4.88E+00	5.60E+00	1.82E+00		8.59E+01	43104
Total Organic Gases (TOG)	5.20E+00	4.80E+00	5.20E+00	3.00E+00	4.40E+00	4.40E+00	4.40E+00	4.40E+00	1.24E+01	4.40E+00	5.20E+00		7.00E+00	7.00E+00	1.87E+00	4.88E+00	5.60E+00	1.82E+00	6.59E+00	9.25E+01	43101
Total Particulates (TSP)	5.61E-01	1.17E+00	5.43E-01	6.16E-01	5.00E-01	5.31E-01	5.64E-01	5.45E-01	7.24E-01	5.15E-01	5.65E-01	1.48E+00	5.09E-01	4.26E-01	2.07E-01	2.42E-01	5.45E-01	2.03E-01		1.04E+01	85101
Particulate Matter (PM10)	5.61E-01	1.17E+00	5.43E-01	6.16E-01	5.00E-01	5.31E-01	5.64E-01	5.45E-01	7.24E-01	5.15E-01	5.65E-01	1.48E+00	5.09E-01	4.26E-01	2.07E-01	2.42E-01	5.45E-01	2.03E-01		1.04E+01	11101
1,2,4-Trimethylbenzene	5.68E-02	1.72E+00	3.14E-01	2.47E-01	7.12E-02	7.51E-02	7.86E-02	7.55E-02		7.34E-02	3.62E-01						3.58E-02	2.36E-02		3.13E+00	95636
Acetone															8.96E-01	2.46E+00			6.59E+00	9.95E+00	67641
Aluminum															1.04E-03	1.75E-03	8.22E-03			1.10E-02	7429905
Barium				4.86E-02			2.51E-02		1.05E-02		6.50E-03									9.07E-02	7440393
Butanol															3.84E-01					3.84E-01	71363
Carbon black extracts										1.59E-02			1.73E-01	1.39E-01		5.69E-03				3.34E-01	1050
Cumene	1.03E-01	8.72E-02	9.90E-02								1.02E-01						1.02E-02			4.01E-01	98828
Epoxy resins	3.56E+00	2.67E+00																		6.23E+00	1091
Ethanol									1.22E-01											1.22E-01	64175
Ethyl Benzene	2.18E-01	3.10E-01	1.96E-01	9.63E-02			2.12E-01				1.02E-01									1.13E+00	100414
Ethylene Glycol Butyl Ether	7.38E-01														3.84E-01					1.12E+00	111762
Formaldehyde															3.07E-04					3.07E-04	50000
Hexamethylene-1,6-diisocyanate																	8.87E-04			8.87E-04	822060
Maleic anhydride							1.53E-02													1.53E-02	108316
Methyl Ethyl Ketone													7.20E-01	5.77E-01		2.69E-01				1.57E+00	78933
Methyl Isobutyl Ketone		1.49E+00																		1.49E+00	108101
Naphthalene	1.03E-01		1.96E-01					1.51E-01			2.04E-01									6.53E-01	91203
Propylene Glycol Methyl Ether															3.84E-01					3.84E-01	107982
Propylene glycol monomethyl ether acetate					1.07E+00	1.13E+00	1.72E-01	5.22E-01		1.10E+00	7.39E-01									4.74E+00	108656
Silica, Crystalline (Respirable)		2.50E-01			5.14E-03	5.43E-03	5.68E-03	5.46E-03		5.30E-03		1.20E-02						8.53E-04		2.90E-01	1175
Toluene									1.64E-01											1.64E-01	108883
Toluene diisocyanates																		3.63E-07		3.63E-07	26471625
Trimethylbenzenes																	1.10E-01	7.81E-02		1.88E-01	25551137
Xylenes (mixed)	7.62E-01	1.22E+00		5.25E-02			1.17E+00								3.84E-01		1.02E-02	2.36E-02		3.62E+00	1210
Zinc															1.65E-02					1.65E-02	7440666
Zinc oxide		1.24E-02										3.13E-02								4.37E-02	1314132

Capture Efficiency	75.00%
Fallout Efficiency	50.00%
Solids Control Efficiency	94.80%
Transfer Efficiency	75.00%
Solvents Control Efficiency	

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Freeberg Solvent Cleaning Emissions

Material Name	1 - ACETONE
Annual Usage (gal/yr)	1,540.00
hour/day	8
day/year	260
Density (lb/gal)	6.59
VOC (lb/gal)	0.00

SDAPCD Data	
Emission Factor Basis	1 - ACETONE

Pollutant	Annual Emissions (lb/yr)	CAS
Volatile Organic Compounds (VOC)	0.00E+00	43104
Total Organic Gases (TOG)	1.01E+04	43101
Acetone	1.01E+04	67641
Pollutant	**Hourly Emissions (lb/hr)**	**CAS**
Volatile Organic Compounds (VOC)	0.00E+00	43104
Total Organic Gases (TOG)	4.88E+00	43101
Acetone	4.88E+00	67641

APPENDIX D – HRA RESULTS

Acute Hazard Index by Source for All Pollutants Combined at PMI, MEIR, MEIW and Sensitive Receptor
Freeberg RY2021 RRP

Sources	Point of Maximum Impact (PMI)		Maximally Exposed Individual Resident (MEIR)		Sensitive Receptor		Maximally Exposed Individual Worker (MEIW)	
	receptor #	3135	receptor #	2038	receptor #	157	receptor #	137
	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)
	487,698.76	3,665,118.29	487,651.27	3,665,237.51	488,849.93	3,664,607.45	487,627.05	3,665,083.03
	Acute Hazard Index	Contribution (%)	Acute Hazard Index	Contribution (%)	Acute Hazard Index	Contribution (%)	Acute Hazard Index	Contribution (%)
ALL	6.98E-01	100%	4.56E-01	100%	1.06E-01	100%	3.91E-01	100%
COATING	6.97E-01	99.97%	1.64E-01	35.99%	1.06E-01	99.99%	2.04E-01	52.17%
ABBLAST	3.98E-01	57.02%	3.68E-01	80.82%	2.10E-02	19.81%	3.41E-01	87.30%
SSWELD	4.64E-02	6.65%	7.74E-02	16.99%	2.71E-03	2.56%	4.04E-02	10.33%
LASERCUT	9.99E-03	1.43%	9.24E-03	2.03%	5.26E-04	0.50%	8.57E-03	2.19%
NONSSWEL	7.81E-04	0.11%	7.23E-04	0.16%	4.12E-05	0.04%	6.70E-04	0.17%

Notes:
Individual sources are not additive because risk is based on specific target organs, which may be different per source

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Maximum Acute Hazard Index by Pollutant at PMI, MEIR, MEIW and Sensitive Receptor
Freeberg RY2021 RRP

Pollutant CAS	Pollutant	Point of Maximum Impact (PMI)		Maximally Exposed Individual Resident (MEIR)		Sensitive Receptor		Maximally Exposed Individual Worker (MEIW)	
		receptor #	3135	receptor #	2038	receptor #	157	receptor #	137
		UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)
		487,698.76	3,665,118.29	487,651.27	3,665,237.51	488,849.93	3,664,607.45	487,627.05	3,665,083.03
		Acute Hazard Index	Contribution (%)	Acute Hazard Index	Contribution (%)	Acute Hazard Index	Contribution (%)	Acute Hazard Index	Contribution (%)
-	ALL	6.98E-01	100%	4.56E-01	100%	1.06E-01	100%	3.91E-01	100%
822060	HexaMeDiisocyan	5.87E-01	84.13%	1.38E-01	30.29%	8.90E-02	84.15%	1.72E-01	43.90%
7440020	Nickel	4.55E-01	65.21%	4.56E-01	100.00%	2.42E-02	22.91%	3.91E-01	100.00%
95636	1,2,4TriMeBenze	2.59E-01	37.14%	6.09E-02	13.37%	3.93E-02	37.14%	7.58E-02	19.38%
111762	EGBE	4.74E-02	6.79%	1.11E-02	2.45%	7.19E-03	6.80%	1.39E-02	3.55%
1330207	Xylenes	3.27E-02	4.68%	7.68E-03	1.69%	4.96E-03	4.68%	9.55E-03	2.44%
78933	MEK	2.39E-02	3.43%	5.62E-03	1.23%	3.63E-03	3.43%	6.99E-03	1.79%
25551137	TriMeBenzns	1.56E-02	2.23%	3.66E-03	0.80%	2.36E-03	2.23%	4.55E-03	1.16%
108883	Toluene	6.50E-03	0.93%	1.53E-03	0.34%	9.87E-04	0.93%	1.90E-03	0.49%
50000	Formaldehyde	1.11E-03	0.16%	2.61E-04	0.06%	1.68E-04	0.16%	3.24E-04	0.08%
7440508	Copper	1.86E-04	0.03%	1.81E-04	0.04%	9.89E-06	0.01%	1.60E-04	0.04%
26471625	TolueneDiisocyn	3.61E-05	0.01%	8.48E-06	0.00%	5.47E-06	0.01%	1.05E-05	0.00%
7440622	Vanadium	1.86E-06	0.00%	1.72E-06	0.00%	9.80E-08	0.00%	1.60E-06	0.00%
7440473	Chromium	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
18540299	Cr(VI)	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
7439965	Manganese	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
7723140	Phosphorus	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
7429905	Aluminum	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
7440417	Beryllium	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
7440666	Zinc	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
7440484	Cobalt	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
67641	[D] Acetone	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
7440393	Barium	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
71363	n-Butyl Alcohol	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
1050	CarbonBlackExtr	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
98828	Cumene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
1091	Epoxy resins	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
100414	Ethyl Benzene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
108316	Maleic Anhydrid	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
108101	MIBK	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
91203	Naphthalene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
107982	PGME	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
108656	PGMEA	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
1175	Silica, Crystln	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
1314132	Zinc Oxide	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
7440439	Cadmium	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
7439921	Lead	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%

Notes:
Individual pollutants are not additive because risk is based on specific target organs, which may be different per pollutant.