MATERION

Ceramics Inc.

6100 S. Tucson Boulevard
Tucson, AZ 85706

AIR QUALITY PERMIT APPLICATION

PERMIT #1571

MAY 02, 2011

PREPARED BY:
RICHARD MANES

MATERION

CERAMICS
6100 S. Tucson Blvd., Tucson, AZ 85706
520.746.0699 | 520.573.9077 www.materion.com

May 02, 2011

Mukonde Chama, Air Permits Supervisor
Pima County Department of Environmental Quality
33 N. Stone Ave. Suite 700
Tucson, AZ 85701

Re: Submittal of Air Quality Permit Renewal Application – Permit # 1571

Dear Mr. Chama,

The following Air Quality Permit application is being submitted for the Materion Ceramics Inc. facility located at 6100 S. Tucson Blvd., Tucson, AZ 85706.

Pursuant to PCC 17.12.165.H/ PCC 17.12.160.I, I, Kenneth R Harrison certify that based on information and belief formed after reasonable inquiry, the statements and information in this document are true, accurate, and complete.

If you have additional questions or require more information, please call me at: 520-746-0699, ext. 262.

Sincerely,

Ken Harrison by - RCN

Signature of Primary Responsible Official (On file with PDEQ)

Title: Plant Manager

Cc: R. Napoles
L. Szuhay

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AIR QUALITY PERMIT RENEWAL APPLICATION –

INTRODUCTION AND GENERAL BACKGROUND

The necessity of an air quality permit for the Materion Ceramics Inc. facility is based upon two criteria. The first are requirements of 40 CFR 61.30, "National Emission Standard for Beryllium." The second is due to the presence of fossil fuel fired equipment falling under Pima County Code 17.16.165. As such, this application contains information relevant in order to ensure compliance with these standards. Materion is also evaluating other products and markets, one product currently under R&D is a cadmium metal matrix used in the manufacture of solar equipment. This new material process is discussed later within this document.

Under 40 CFR 61.30, the facility is limited to total beryllium containing emissions not to exceed 10 grams per day. In order to ensure compliance, several points must be met. They are:

- Knowledge of potential emission points.
- Ability to perform verification performance testing.
- Ability to ensure that air pollution control systems operate within parameters necessary to maintain verification performance testing conditions at all times.
- Methods to ensure that there are no fugitive emissions from the facility.

To respond to the first bullet point, all manufacturing or support operations with the potential to generate airborne beryllium containing particulate are included in a facility-wide dust collection system. This system includes four separate subsystems identified by Materion as the: 15K, 40K, Torit and the Hunt Air systems. All four of these subsystems combine to be exhausted from a single stack, providing one emission point.

A list of those pieces of equipment with the potential to emit airborne beryllium containing particulate is included with this application, but it must be recognized that the list is not an all-inclusive list of equipment serviced by the dust collection system. Only those pieces of equipment relevant to 40 CFR 61.30 compliance have been included in the separate listing.

The single emission point allows the use of standard stack testing methods in order to meet the second bullet point listed above. The method approved for use is EPA Method 103, with an approved modification to include the use of an in-stack filter in order to provide more efficient sample collection.

In order to meet the third bullet point listed above, it is necessary to understand the basic operation of the dust collection system. All four subsystems use High Efficiency Particulate Air (HEPA) filtration as the final control measure to clean the air prior to exhausting through the stack. HEPA filters are rated as 99.97% efficient for particles of 0.3 micrometers in diameter and more efficient at all other particle sizes. Particles larger than 0.3 micrometers are trapped through simple mechanical filtration and particles smaller than 0.3 micrometers are trapped through electrostatic attraction. HEPA filters are the most effective particulate control technology available. In order to ensure proper operation, the

resistance to air passing through the filter (referred to as the "pressure drop") is monitored. As pressure increases it indicates that the filter has collected particulates to a point that air cannot pass through at the same volume as was prior to being loaded. A decrease in pressure, which is below a base line value or below the manufactures recommended value, indicates that air passes "too easily", indicating possible leakage.

In order to lengthen the useful life of the HEPA filters, pre-filters and particle detectors are used prior to the final HEPA filters. Although these pre-filters and particle detectors are part of the system, they should not be considered air pollution control devices, since the lower performance rating of the pre-filters cannot guarantee removal of particulate necessary for compliance with 40 CFR 61.30. Also, presence of the pre-filters does not affect the performance of the final HEPA filters. The particle detectors serve only to notify that final HEPA filter loading is occurring and do not perform any actual control. In addition to the particle detectors positioned in the three (3) pollution control units, Materion has recently purchased and installed a fourth particle detector which is located in the main stack. By installing the new particle probe in the main stack it provides an additional maintenance tool in our monitoring program.

For the 15K and 40K subsystems, which handle the dry manufacturing processes resulting in virtually all of the airborne particulate, a method of collecting the majority of these particles is included. As particles collect on the pre-filter resistance to air passing through the filter is increased. When pressure reaches a predetermined set point the controller activates a reverse air pulse process, a burst of compressed air known as a "blow down." This removes the majority of the particulate from the pre-filter, which falls down into the bottom area, or hopper, of the dust collector and is subsequently collected in drums.

It is important to note that the performance of the pre-filters themselves is not dependant on the number of pieces of equipment serviced or the amount of particulate being introduced to the filter. Although the blow down frequency will change depending on the rate of particulate loading, the performance of the filter is unaffected. It is also important to recognize that verification performance (stack) tests only test what emissions pass through the final HEPA filters. The pre-filters and particle detectors serve only to extend the life of the final HEPA filters. Again, presence of the pre-filters does not improve the performance of the final HEPA filters, only the useful life.

The pressure drop across the final HEPA filters is also continuously monitored by use of photohelic gauges. These gauges are provided with two adjustable alarm set points. The set points have been set inside of the permitted pressure drop boundaries and therefore if the pressure drop ever reached the upper or lower alarm set point the photohelic gauges automatically shut down the entire dust collection system. This provides continuous "fail safe" monitoring of final HEPA filter performance.

Finally, to respond to the fourth bullet item, the entire manufacturing facility is maintained under negative pressure relative to the outside environment. The facility has also created an Emissions Prevention Plan whereby personnel perform routine inspections of all exterior doorways, vents, and other openings for possible fugitive emissions.

To facilitate PDEQ with ensuring compliance with PCC 17.16.165, a list of fossil fuel fired equipment is included, along with estimated emissions.

With respect to new product development, Materion is working with a new product involving the use of Cadmium, which is still currently under R&D. A permit has been applied for and all relevant documents have been provided and approved by the Pima County Department of Environmental Quality. The Pima County Code – Title 17 has been reviewed for applicability and determined that the requirements set forth under 17.16.430 are being met. The Federal Air Quality Regulations have also been evaluated, under subpart XXXXXX of 40 CFR 63 - National Emission Standards for Hazardous Air Pollutants Area Source Standards for Nine Metal Fabrication and Finishing Source Categories, which includes cadmium, however it is our interpretation that these rules are not applicable, because the rules apply to an area source that is "primarily engaged" in the subject source categories and that is not relevant to the Materion facility (see definition from the final rule below).

Primarily engaged means the manufacturing, fabricating, or forging of one or more products listed in one of the nine metal fabrication and finishing source category descriptions in Table 1, "Description of Source Categories Affected by this Subpart," where this production represents at least 50 percent of the production at a facility, and where production quantities are established by the volume, linear foot, square foot, or other value suited to the specific industry. The period used to determine production should be the previous continuous 12 months of operation. Facilities must document and retain their rationale for the determination that their facility is not "primarily engaged" pursuant to §63.10(b) (3) of the General Provisions.

In summary, the information included in this application includes:

- Standard Application Form, as required under Pima County Code Chapter 17.
- Emission Sources Form, as required under Pima County Code Chapter 17.
- A list of commonly used abbreviations and acronyms, for ease in understanding subsequent information.
- "Potential to Emit" summary tables and supporting documentation.
- Written process descriptions, as required under Pima County Code Chapter 17.
- Basic flow diagrams, as required under Pima County Code Chapter 17. It must be recognized that these flow diagrams are not indicative of the only possible operating scenarios. Alternative operating scenarios do exist in which certain indicated steps may be omitted or alternative equipment utilized. These diagrams are meant to provide a basic understanding of production steps, and are not intended to limit manufacturing options.
- A list of equipment relevant to ensuring 40 CFR 61.30 compliance.
- A floor plan to provide location information for equipment relevant to 40 CFR 61.30.
- Diagrams and information relating to the dust collection system.
- Stack information, as required under Pima County Code Chapter 17.
- A list of all supporting procedures and record keeping logs that were submitted previously to the Pima County Department of Environmental Quality and are in use with the operation and maintenance functions of the facility and pollution control equipment.

PROCESS DESCRIPTION

General Production Overview

The overall process within the BCP facility is to use beryllium oxide powder to manufacture ceramic products. This is accomplished by processing the UOX powder obtained from our Elmore, Ohio facility as described below.

The UOX powder is received into the Material Preparation area. It goes through various steps including the introduction of additives and binders, testing to ensure proper particle size and characteristics, and is then placed in containers to be used in the forming processes. Greater details are given in the specific process description and flow chart for that area.

Following powder preparation, containers of powder are transported to three production areas. They are Pressing, Extrusion, and Lasers. One of three forming methods is used in each area. They are dry pressing in the Pressing area, extrusion in the Extrusion area, or Iso-pressing in the Lasers area.

The Pressing area uses a variety of mechanical (4, 5 or 6 ton presses) or hydraulic (12, 30, 125 or 200 ton presses). After forming, parts are placed into atmospheric kilns for firing. After firing, any required final machining is performed. This may include tumbling, lapping, grinding, dicing, or other steps to reach final customer specifications. Parts are cleaned, inspected, packaged, and placed into stock or sent to the customer.

The Extrusion area uses an extrusion press to form rod product of varying diameters. After the extrusion forming, parts are placed into atmospheric kilns for firing. After firing, any required final machining is performed. This may include centerless grinding, dicing, or other steps to reach final customer specifications. Parts are cleaned, inspected, packaged, and placed into stock or sent to the customer.

The Lasers area uses an ISO Static press, or Iso-press to form cylindrical, square or rectangular shapes. After forming, rough machining of the unfired cylindrical parts is performed in what is known as "green machining". After rough machining, these parts are placed into kilns for firing. After firing, any required final machining is performed. The other shapes that are Iso-pressed are typically fired first and then distributed for final machining operations. The machining steps associated with Iso-pressed parts may include drilling, centerless grinding, lapping, dicing, or other steps to reach final customer specifications. The parts are cleaned, inspected, and some are sent to be metalized, while others proceed to packaging. Metallization can include roll-coating, spraying or screen printing of a moly manganese base coat onto the parts. The parts are then fired in hydrogen atmosphere furnaces. Some parts also require some degree of nickel plating, which is applied through an electrolytic process. Finally, parts are cleaned, inspected, packaged, and sent to the customer.

Description of Product(s): BeO ceramic items

PIMA COUNTY DEPARTMENT OF ENVIRONMENTAL QUALITY
33 North Stone Ave., Suite 700 _ Tucson, AZ 85701 _ Phone: (520) 243-7400

STANDARD PERMIT APPLICATION FORM

(As required by A.R.S. § 49-480, and Title 17 of the Pima County Code)

Permit to be issued to (Business License Name of Organization):
Materion Ceramics Inc.

Mailing Address: 6100 S. Tucson Blvd.
City: Tucson **State:** AZ **ZIP:** 85706

Plant Name (if different than item #1): Same

Name (or names) of Owner or Operator: Same
FAX #: (520) 573-9077 **Phone:** (520) 746-0699

Name of Owner's Agent: N/A
FAX #: _____ **Phone:** _____

Plant/Site Manager/Contact Person: Kenneth R. Harrison
FAX #: (520) 573-9077 **Phone:** (520) 746-0699

Proposed Equipment/Plant Location Address: 6100 S. Tucson Blvd.
City: Tucson **State:** AZ **ZIP:** 85706
Indian Reservation (if applicable): N/A
Township/Range/Section, Latitude/Longitude, Elevation: Lat: 032 05 58 Long: 110 56 09 Elev: 2705

General Nature of Business: Manufacturing
Standard Industrial Classification Code: 3264 **State Permit Class:** II

Type of Organization: ☒ **Corporation** ☐ **Individual Owner** ☐ **Partnership** ☐ **Government Entity** ☐ **Other** _____

Permit Application Basis ***(Check all that apply)*****:** ☐ **New Source** ☐ **Revision** ☒ **Renewal of Existing Permit** ☐ **Portable Source** ☐ **General Permit**
For renewal or revision, include existing permit number: 1571
Date of Commencement of Construction or Modification:
N/A
Is any of the equipment to be leased to another individual or entity? ☐ **Yes** ☒ **No**
Signature of Responsible Official of Organization: Ken Harrison by [illegible]

Official Title of Signer: Plant Manager

Typed or Printed Name of Signer: Kenneth R. Harrison
Date: 5/02/11 **Telephone Number:** (520) 746-0699
DEQ Form (3/19/98)

COMPANY NAME: Materion Ceramics Inc.

EMISSION SOURCES

Date 04/12/11

Estimated Potential to Emit as per 17.04.340.A.182
Review of application and issuance of permits will be expedited by supplying all necessary information on this table

REGULATED AIR POLLUTANT DATA					EMISSION POINT DISCHARGE PARAMETERS										
EMISSION POINT (1)		CHEMICAL COMPOSITION OF TOTAL STREAM	R. AIR POLLUTANT EMISSION TABLE		UTM COORDINATED OF EMISSIONS PT. (5)			STACK SOURCES (6)					NONPOINT SOURCES (7)	
NUMBER	NAME	REGULATED AIR POLLUTANT NAME (2)	#/ hr. (3)	TONS/ YEAR (4)	ZONE	EAST (Mtrs)	NORTH (Mtrs)	HEIGHT ABOVE GROUND /feet	HEIGHT ABOVE STRUC. /feet	EXIT DATA DIA (ft.)	EXIT DATA VEL (ft.)	EXIT DATA TEMP (°F)	LENGTH (ft.)	WIDTH (ft.)
1	Stack	Beryllium (see pg. 8)	0.000918	0.00402				72	50	5.8	41	88		
		Cadmium (see pg. 9 – 10)	0.00625	0.0274										
		Total VOCs (See pg. 11)	1.8860	8.261										
		Total HAPs (see pg. 11)	0.5085	2.1833										
	Vents (aggregate)	Particulates (see pg 13)	0.0402	0.176076										
		Sulfur Dioxide (see pg. 13)	0.003216	0.014086										
		Nitrogen Oxides (see pg. 13)	0.52528	2.300726										
		Carbon Monoxide (see pg. 13)	0.44166	1.934488										
		VOC's – Natural Gas (see pg. 13)	0.028944	0.126775										

GROUND ELEVATION OF FACILITY ABOVE SEA LEVEL: 2705 feet
PDEQ STANDARD CONDITIONS ARE 293K AND 101.3 KILOPASCALS (14.04.340.A.230)

General Instructions:

1. Identify each emission point with a unique number for this plant site, consistent with emission point identification used on plot plan for previous permits, and Emission Inventory Questionnaire. Include fugitive emissions. Limit emission point numbers to Eight (8) character spaces. For each emission point use as many Lines as necessary to list regulated air pollutant date. Typical Emission point names are: heater vent, boiler, tank, reactor separator, baghouse, fugitive, etc. Abbreviations are O.K.
2. Components to be listed include regulated air pollutants as defined in 17.04.340.A.199. Examples of typical component names are: Carbon Monoxide (CO), Nitrogen Oxides (NO_x), Sulphur Dioxide (SO_2), Volatile Organic Compounds (VOC), particulate matter (PM), particulates less than 10 microns (PM_{10}), etc. Abbreviations are O.K.
3. Pounds per hour (#/hr) is maximum potential emission rate expected by applicant.
4. Tons per year is annual maximum potential emission rate expected by applicant, which takes into account process operating schedules.
5. As a minimum, applicant shall furnish a facility plot plan as described in the filing instructions. UTM coordinates are required only if the source is a major source or is required to perform refined modeling for the purposes of demonstrating compliance with ambient air guidelines.
6. Supply additional information if appropriate:
   (a) Stack exit configuration other than a round vertical Stack. Show length and width for a rectangular stack. Indicate if horizontal discharge with a note.
7. Dimensions of nonpoint sources as defined by 17.04.340.A.161.

ABBREVIATIONS AND ACRONYMS USED IN THIS APPLICATION

Abbreviation or Acronym	Meaning
15K	An abbreviation for 15,000. Used to describe the Farr dust collection system with 15,000 cubic feet per minute capacity.
40K	An abbreviation for 40,000. Used to describe the Farr dust collection system with 40,000 cubic feet per minute capacity.
APC	An abbreviation for **A**ir **P**ollution **C**ontrol Equipment
Be	An abbreviation for the element "**Be**ryllium".
BeO	An abbreviation for "**Be**ryllium **O**xide". This is the chemical form of beryllium utilized at Brush Ceramic Products.
CFM	An acronym for "**C**ubic **F**eet per **M**inute". Used as a unit designation for airflow volume.
Cd	An abbreviation for the element "**C**admium".
DOT	An acronym for the United States "**D**epartment **o**f **T**ransportation".
EH&S	An abbreviation for "**E**nvironmental, **H**ealth and **S**afety". Used to designate the Environmental, Health and Safety group within Brush Ceramic Products.
HAPS	An acronym for "**H**azardous **A**ir **P**ollutant**S**". This is an Environmental Protection Agency designated list under the Clean Air Act.
HEPA	An acronym for "**H**igh **E**fficiency **P**articulate **A**ir" filters. Used to describe filters which are rated at 99.97% efficiency at removing particles of 0.3 microns in size. Efficiency is greater at all other particulate sizes, both larger and smaller.
MCI	An acronym for "**M**aterion **C**eramics **I**nc.
MSDS	An acronym for "**M**aterial **S**afety **D**ata **S**heet". This refers to chemical information developed by manufacturers in response to Occupational Safety and Health Administration regulations.
PDEQ	An acronym for "**P**ima County **D**epartment of **E**nvironmental **Q**uality".
POTW	An acronym for "**P**ublicly **O**wned **T**reatment **W**orks. Used to describe the Pima County wastewater treatment system.
UOX	An abbreviation for "**U**rea derived **OX**ide". It describes the manufacturing method.
VOC	An acronym for "**V**olatile **O**rganic **C**hemical".
WWTP	An acronym for "**W**aste**W**ater **T**reatment **P**lant". This refers to the Brush Ceramic Products internal system used to pre-treat industrial wastewater prior to discharge to the Pima County sewer system.

AIR QUALITY PERMIT APPLICATION - BERYLLIUM EMISSIONS WORK SHEET

(From Main Stack)

April 11, 2011

Measured Emissions From Stack Testing:

02/01/2010	<0.045 grams Be/Day*
02/03/2009	<0.10 grams Be/Day*
03/03/2008	<0.10 grams Be/Day*
03/07/2007	<0.10 grams Be/Day*
06/22/2006	<0.10 grams Be/Day
03/30/2006	<0.10 grams Be/Day
Average	0.091grams Be/Day

* Because the laboratory values were less than the minimum detection limit, the actual detection limit was used to arrive at estimated emissions.

Estimated Maximum Operating Hours per Year:
24 hours/day X 52 weeks/year X 7 days/week = 8,760 hours/year

Estimated Emissions per Hour:
(0.091grams Be/day) X (1 pound/454 grams) X (1 day/24 hours) = 0.00000835 Pounds Be/Hour

Estimated Emissions per Year (Pounds):
(0.00000835 pounds Be/hour) X (8,760 hours/year) = 0.0732 Pounds Be/year

Estimated Emissions per Year (Tons):
(0.00000835 pounds Be/hour) X (8,760 hours/year) X (1 ton/2000 pounds) = 0.0000366 Tons Be/year

Potential to Emit at 10 grams per Day:

(Federal Standard - 40 CFR 61, Subpart C (limit of 10 grams per day)).

Estimated Maximum Operating Hours per Year:
(24 hours/day) X (52 weeks/year) X (7 days/week) = 8,760 hours/year

Estimated Emissions per Hour:
(10 grams Be/day) X (1 pound/454 grams) X (1 day/24 hours) = 0.000918 Pounds Be/Hour

Estimated Emissions per Year (Pounds):
(0.000918 pounds Be/hour) X (8,760 hours/year) = 8.040 Pounds Be/year

Estimated Emissions per Year (Tons):
(0.000918 pounds Be/hour) X (8,760 hours/year) X (1 ton/2000 pounds) = 0.00402 Tons Be/year

AIR QUALITY PERMIT APPLICATION – CADMIUM (Cd) EMISSIONS WORK SHEET

(Reference 17.16.430)

April 12, 2011

This process is new and still remains under R&D with limited production availability and therefore the following are only estimates.

Estimated Production Rate:
2 parts per day

Estimated Operating Hours per Day:
16 hours per day

Estimated Operating Days per Week:
4 days/week

Estimated Operating Hours per Year:
(16 hours/day) X (4days/week) X (52weeks/year) = 3,328 hours/year

Estimated Emissions per Part Produced:
0.05 pounds/part produced (see note 1 below)

Estimated Emissions per Hour:
(0.05 pounds/part) X (2 parts produced/day) X (1 day/16hours) = 0.00625 Pounds Cd/Hour

Estimated Emissions per Year (Pounds):
(0.00625 pounds Cd/hour) X (3,328 hours/year) = 20.8 Pounds Cd/year

Estimated Emissions per Year (Tons):
(0.00625 pounds Cd/hour) X (3,328 hours/year) X (1 ton/2000 pounds) = 0.0104 Tons Cd/year

Potential to Emit at 0.05 Pounds Loss/Part:

(Federal Standard - 40 CFR 61, Subpart C (limit of 10 grams per day)).

Estimated Maximum Operating Hours per Year:
(24 hours/day) X (52 weeks/year) X (7 days/week) = 8,760 hours/year

Estimated Emissions per Hour:
(0.05 pounds Cd/part) X (4parts (est.of max. parts produced)/day) X (1 day/24 hours) = 0.00833 Pounds Cd/Hour

Estimated Emissions per Year (Pounds):
(0.00833 pounds Cd/hour) X (8,760 hours/year) = 73.0 Pounds Cd/year

Estimated Emissions per Year (Tons):
(0.00833 pounds Cd/hour) X (8,760 hours/year) X (1 ton/2000 pounds) = 0.0365 Tons Cd/year

A measured operating schedule is not obtainable, because this product is still under R&D at this time with limited production and there is no data currently available to help determine product demand or sales forecast estimates. For the purpose of this data the current maximum operating hours per day and the initial average number of parts able to be produced in one hour is being used as the basis of the operating schedule estimate.

Material Balance:

The material balance calculations were arrived at by the following data:

1. All raw incoming powder was weighed and recorded as weight per container.
2. The number of containers (by weight), including any makeup powder, was recorded for each part produced.
3. The part was weighed after pressing.
4. The as pressed part was subtracted from the initial raw material (by weight) used to make the part.
5. The concentration of cadmium in the raw material was multiplied by the total pounds lost to arrive at an estimated total loss of cadmium per year.

VOCs AND HAPs

Room #	DEPT.	CHEMICAL NAME	MSDS#	Annual Qty. Used Lbs.	VOC%	VOC Lbs/ Hour	VOC Lbs/ Year	PTE VOC Lbs/ Hour	PTE VOC Lbs/ Year	PTE VOC TPY	HAP Name	HAP %	HAP Lbs/ Hour	HAP Lbs/ Year	PTE HAP Lbs/ Hour	PTE HAP Lbs/ Year	PTE HAP TPY
16,19,30,32,33,36,37,4	PLATING	ACETONE	001350	360	100%	0.1731	360	0.1731	1516	0.758							
19,30,48	CHEMICAL SHED	AMYL ACETATE	000036	15	100%	0.0074	15	0.0074	64	0.032							
47	MAINTENANCE	ARMAFLEX 520 ADHESIVE	001745	7	79%	0.0026	5	0.0026	23	0.012	TOLUENE	18.0%	0.0006	1.25	0.0006	5.2535	0.0026
19,48	CHEMICAL SHED	BARRETT SN	000202	260							NICKEL SULFAMATE	30.0%	0.0375	78	0.0375	328.5000	0.1643
19,48	CHEMICAL SHED	BARRETT SNR-24	001263	65							NICKEL COMPOUNDS	54.0%	0.0169	35	0.0169	147.8250	0.0739
39	STORES	CLEAN SOLUTIONS HD STRIPPER	001978	64	91%	0.0280	58	0.0280	245	0.123							
48	CHEMICAL SHED	DEFY PLUS	001658	37	71%	0.0125	26	0.0125	110	0.055							
53	YARD	DUCT SEAL 321	001733	32	32%	0.0049	10	0.0049	43	0.022	ETHYLENE GLYCOL METHANOL	5.0%	0.0008	2	0.0008	6.7595	0.0034
48	CHEMICAL SHED	GALV-ALUM METAL PRIMER	001800	59	45%	0.0127	26	0.0127	111	0.055							
47	MAINTENANCE	GASOLINE, all grades	001910	7	100%	0.0031	7	0.0031	27	0.014	BENZENE	4.9%	0.0002	0.32	0.0002	1.3434	0.0007
5,11,15,16,17,23,24, 28,32,33,36,37,51,	UBIQUTOUS	GLANCE	001878	25	40%	0.0047	10	0.0047	41	0.021	ETHYLENE GLYCOL MONOBUTYL	50.0%	0.0059	12	0.0059	51.8019	0.0259
19,28,30, 48	METALIZING/CLEANING	HYDROCHLORIC ACID	000516	2128							HYDROCHLORIC ACID	40.0%	0.4092	851	0.4092	3584.1877	1.7921
5,7,11,15,16,19,28,30,	UBIQUTOUS	ISOPROPYL ALCOHOL	000645	355	100%	0.1707	355	0.1707	1495	0.748							
48	CHEMICAL SHED	JETTACIN	000260	130	5%	0.0031	7	0.0031	27	0.014							
38	WASTEWATER TREATMENT	KOCH 100	0001696	644	70%	0.2166	450	0.2166	1897	0.949							
38	WASTEWATER TREATMENT	KOCH UC2	0001738	443	2%	0.0032	7	0.0032	28	0.014							
19,28,30,48	METALIZING/CLEANING	NITRIC ACID	000861	661	100%	0.3177	661	0.3177	2783	1.391							
43	MATERIAL PREP	OCTYL ALCOHOL	000198	7	100%	0.0033	7	0.0033	29	0.015							
38	WASTEWATER TREATMENT	POL-E-Z	001750	1280	14%	0.0868	180	0.0868	760	0.380							
39,43,47,	MAINTENANCE	PVC-711 CEMENT	001080	15	90%	0.0065	14	0.0065	57	0.028							
31	ENGINEERING	QUICKMOUNT	001400	8							METHYL METHACRYLATE	100.0%	0.0038	8	0.0038	33.0185	0.0165
11	JANITORIAL	RE-JUV-NAL 1gal	001823	8	95%	0.0038	8	0.0038	33	0.017							
43	MATERIAL PREP	RHOPLEX B60A EMULSION	000452	1500	54%	0.3894	810	0.3894	3411	1.706							
35,47	MAINTENANCE	SAFETY-KLEEN 105 SOLVENT	001922	804	100%	0.3865	804	0.3865	3386	1.693	TETRACHLORETHYLENE	0.2%	0.0008	2	0.0008	6.7722	0.0034
18,19,30,31,32,33,35,3 6,37,38,40,43,47,48,53	UBIQUTOUS	SIMPLE GREEN	001532	851	6%	0.0241	50	0.0241	211	0.106							
30,35,39	MSG MAINTENANCE	STATE 999 DEGREASER	000814	54	4%	0.0010	2	0.0010	9	0.005							
30	METALIZING	STATICIDE #510	001944	0.5	99%	0.0002	0.49	0.0002	2	0.001							
43	MATERIAL PREP	TRIETHYLENE GLYCOL	001806	28							TRIETHYLENE GLYCOL	100%	0.0136	28	0.0136	118.8917	0.0594
38,48	WASTEWATER TREATMENT	UCARCIDE 50 ANTIMICROBIAL	001966	26							METHANOL	0.5%	0.0001	0.13	0.0001	0.5475	0.0003
15,16,27,32,35,36,37,3 9,47	Several	WD-40 LIQUID	000340	27	75%	0.0098	20	0.0098	86	0.043							
19,27,30,33,34,35,41,4 3,47,48	Several	WINDEX	000447	694	1%	0.0017	3	0.0017	15	0.007							
19,30	METALIZING	XYLENES	000439	26	100%	0.0124	26	0.0124	109	0.055	XYLENE	75.0%	0.0093	19	0.0093	81.7775	0.0409
Several	Several	BERYLLIUM OXIDE	000047	SEE NOTES							BERYLLIUM COMPOUNDS	99.0%	0.00000835	0.0732	0.0009	8.0396	0.0040
36/37/15	ISO PRESS/ MACHINING	CADMIUM	001889 001973	SEE NOTES							CADMIUM	100.0%	0.00625	20.8	0.0083	73.0000	0.0365
	Total Estimated Emissions			**10,619**		**1.8860**	**3,923**	**1.8860**	**16,522**	**8.261**			**0.5047**	**1,037**	**0.5077**	**4,448**	**2.1833**

Emissions are based on 2080 hours per year.

Maximum Potential To Emit (PTE) is based on 8760 hours per year (24hrs. per day x 365 days per year).

Annual Quantity Used Lbs. was determined by phsical inventories perfromed throughout the facility.

VOC/HAPs Lbs/Hour Std. was arrived at by dividing the net quantity of VOCs or HAPs used per year by the standard hours worked per year of 2080 hours.

VOC/HAPs Lbs. per Year Std. was determined by the Annual Quantity Used multiplied by the percent concentration of the VOC or HAP.

VOC/HAPs PTE Lbs. per Hour was arrived at by dividing the PTE Lbs. per Year by the maximum hours of 8760 that could be worked in a year.

VOC/HAPs PTE Lbs. per Year was arrived at by multiplying the VOC or HAP Lbs. per Year Std. by the ratio of standard hours worked (2080) to the maximum hours that could be worked (8760).

See page 8 Beryllium Emissions were determined using the method limit of detection, because all measured values were below the method limit of setection.

See page 9 - 10 Cadmium Emissions were determined by applying a mass balance to the estimated production capacity. For the Potential To Emit Calculation, the standard emission rate was used and applied to 8760 hours per year.

EMISSIONS CALCULATIONS FOR NICKEL

Emissions Calculations for Nickel (Plating Room - #19)

Factor (From EPA AP 42 Table 12.20-4): 0.63 grains/Amp hr = 9.0×10^{-5} lbs/Amp hr

Current Process Data:
Estimated hours worked per year = 1,840
Process 8 racks per day = 40 racks/wk
550 pcs/wk (average)
48.5 Amp minute/rack

(48.5 Amp minute/rack)(40 racks/wk) = 1,940 Amp minute/wk

1,940 Amp minute/wk / 60 Amp minute/Amp hr = 32.3 Amp hr/wk

32.3 Amp hr/wk / 5 days/wk = 6.47 Amp hr/day

6.47 Amp hr/day / 8 hr/day = 0.81 Amp hr/hr

(9.0×10^{-5} lbs/Amp hr)(0.81 Amp hr/hr) = 7.29×10^{-5} lbs/hr

EQUIPMENT UTILIZING NATURAL GAS

EQUIP NO	Equipement Description	Equipment Room	Ventilation Source	Emission Point	Natural Gas InPut BTU	Purpose	Required in Emissions Calculations
1093	WATER EVAPORATOR	ROOM 18 NICKEL WWT	AMBIENT	AMBIENT	280,000	Production	Yes
3500	BOWEN SPRAY DRYER	ROOM 43 MAT PREP	15K	STACK	750,000	Production	Yes
5009	BRYANT STEAM BOILER	AREA 52 UTILITY CAGE	NA	ROOM 52	1,500,000	Process Control	Yes
5030	NORTH CLOTHES DRYER	ROOM 11 LAUNDARY	EF-1	STACK	165,000	Production	Yes
5031	SOUTH CLOTHES DRYER	ROOM 11 LAUNDARY	EF-1	STACK	165,000	Production	Yes
5121	HEATER	ROOM 16 EXTRUSION	NA	AMBIENT	400,000	Employee Comfort	No
5122	HEATER	ROOM 16 EXTRUSION	NA	AMBIENT	350,000	Employee Comfort	No
5200	HEATER	ROOM 9 WOMEN CHANGE	NA	AMBIENT	150,000	Employee Comfort	No
5201	HEATER	ROOM 8 MEN CHANGE	NA	AMBIENT	200,000	Employee Comfort	No
5204	HEATER	ROOM 35 MSG MAINT	NA	AMBIENT	150,000	Employee Comfort	No
5208	HEATER	ROOM 39 STORES	NA	AMBIENT	400,000	Employee Comfort	No
5212	HEATER	ROOM 47 MAINT. SHOP	NA	AMBIENT	45,000	Employee Comfort	No
5213	HEATER	ROOM 47 MAINT. SHOP	NA	AMBIENT	45,000	Employee Comfort	No
5288	PLANT BOILER WEST	ROOM 46 BOILER ROOM	AMBIENT	AMBIENT	1,250,000	Process Control	Yes
5289	PLANT BOILER EAST	ROOM 45 BOILER ROOM	AMBIENT	AMBIENT	1,250,000	Process Control	Yes

Adjusted means that natural gas equipment utilized for employee comfort is removed from the calculation.
Unadjusted means 100% of the natural gas equipment is used in the calculation.

5,360,000 Adjusted Total In-Put BTUs	**5.36** Million In-Put BTU
7,100,000 Unadjusted Total In-Put BTUs	**7.10** Million In-Put BTU

NATURAL GAS COMBUSTION THEORETICAL MAXIMUM EMISSION ESTIMATING TABLE

1 Pollutant	2 Millions of Input BTU per Hour	3 Hours per Year (Theoretical Maximum)	4 Emission Factor	5 Pounds per Year (#2 x #3 x #4)	6 Tons per Year (MPE), (#5/2,000)
PM10	5.36	8,760	0.0075	352.152	0.176076
SOx	5.36	8,760	0.0006	28.17216	0.01408608
NOx	5.36	8,760	0.0980	4601.4528	2.3007264
CO	5.36	8,760	0.0824	3868.9766	1.93448832
VOC	5.36	8,760	0.0054	253.54944	0.12677472

Emission Factors AP-42

MANUFACTURING EQUIPMENT WITH THE POTENTIAL TO GENERATE AIRBORNE BERYLLIUM OXIDE PARTICULATES

EQUIP NO	Equipement Description	Equipment Room	Ventilation Source	Emission Point
0001	CG #1	ROOM 16 EXTRUSION	40K	STACK
0002	CG #3 4303268	ROOM 15 COMPLEX	TORIT	STACK
0018	HONE	ROOM 16 EXTRUSION	NA	ROOM 16
0024	KARSTENS OD GRINDER 4000028	ROOM 37 LASER MACH	TORIT	STACK
0032	KENT SG 4000399A	ROOM 16 EXTRUSION	40K	STACK
0037	SURFACE GRINDER 4000400A	ROOM 15 COMPLEX	40K	STACK
0040	SURFACE GRINDER 4000397A	ROOM 15 COMPLEX	40K	STACK
0044	HAUNI-BLOHM 4000458A	ROOM 15 COMPLEX	40K	STACK
0064	WHEEL DRESSER 4000427A	ROOM 16 EXTRUSION	NA	ROOM 16
0097	CG #2	ROOM 16 EXTRUSION	40K	STACK
0160	BREAK ROD HOOD	ROOM 16 EXTRUSION	40K	STACK
0161	ULTRAMAGIC DRILL #2	ROOM 37 LASER MACH	TORIT	STACK
0163	SURFACE GRINDER - CHEVALIER	ROOM 15 COMPLEX	40K	STACK
0172	HOOD (PACKAGING)	ROOM 32 PRESSING	NA	AMBIENT
0191	PRAZI MILL	ROOM 37 LASER MACH	TORIT	STACK
0192	DEDTRU	ROOM 37 LASER MACH	TORIT	STACK
0194	KENT SURFACE GRINDER	ROOM 15 COMPLEX	40K	STACK
0196	9B LAPPER	ROOM 27 LAPPING	NA	ROOM 27
0201	HOOD BREAK ROD # 2	ROOM 25 N END	15K	STACK
0202	CENTERLESS GRINDER YEAR 1999	ROOM 15 COMPLEX	40K	STACK
0203	DEDTRU / HARIG OMNI GRUDD	ROOM 16 EXTRUSION	40K	STACK
0205	20 B LAPPER	ROOM 27 LAPPING	NA	ROOM 27
0210	DEDTRU WEST WALL	ROOM 37 LASER MACH	TORIT	STACK
0212	ID /OD GRINDER	ROOM 37 LASER MACH	TORIT	STACK
0213	MILL	ROOM 37 LASER MACH	40K	STACK
0217	MILL 2001	ROOM 15 COMPLEX	40K	STACK
0219	VERTICAL MILL	ROOM 15 COMPLEX	40K	STACK
0220	9B LAPPER	ROOM 27 LAPPING	NA	ROOM 27
0223	ID/OD GRINDER	ROOM 15 COMPLEX	40K	STACK
0224	ADT DICER	ROOM 15 COMPLEX	40K	STACK
0226	SURFACE GRINDER	ROOM 37 LASER MACH	40K	STACK
0227	SURFACE GRINDER	ROOM 37 LASER MACH	40K	STACK
1020	SAND BLASTER	ROOM 50 MET PREP	40K	STACK
1044	HOOD - SMALL, BLUE	ROOM 19 NI PLATE	Ambient	AMBIENT
1047	HOOD (WHITE) FOR PASTE	ROOM 50 MET PREP	40K	STACK
3022	HOOD	ROOM 43 MAT PREP	40 K	STACK
3052	PEDEMIN POLISHER	ROOM 43 MAT PREP	40 K	STACK
3502	100 GAL SLURRY TANK "G"	ROOM 43 MAT PREP	NA	ROOM 43
3504	100 GAL SLURRY TANK "F"	ROOM 43 MAT PREP	NA	ROOM 43
3521	30" SCREENER (IN HOOD)	ROOM 43 MAT PREP	40K	STACK
3522	TRANSFER HOOD	ROOM 43 MAT PREP	40K	STACK
3524	PK BLENDER	ROOM 43 MAT PREP	40K	STACK
3540	100 GAL SLURRY TANK "B"	ROOM 43 MAT PREP	NA	ROOM 43
3541	SWECO VIBRO ENRGY MILL #2	ROOM 43 MAT PREP	NA	ROOM 43

MANUFACTURING EQUIPMENT WITH THE POTENTIAL TO GENERATE AIRBORNE BERYLLIUM OXIDE PARTICULATES

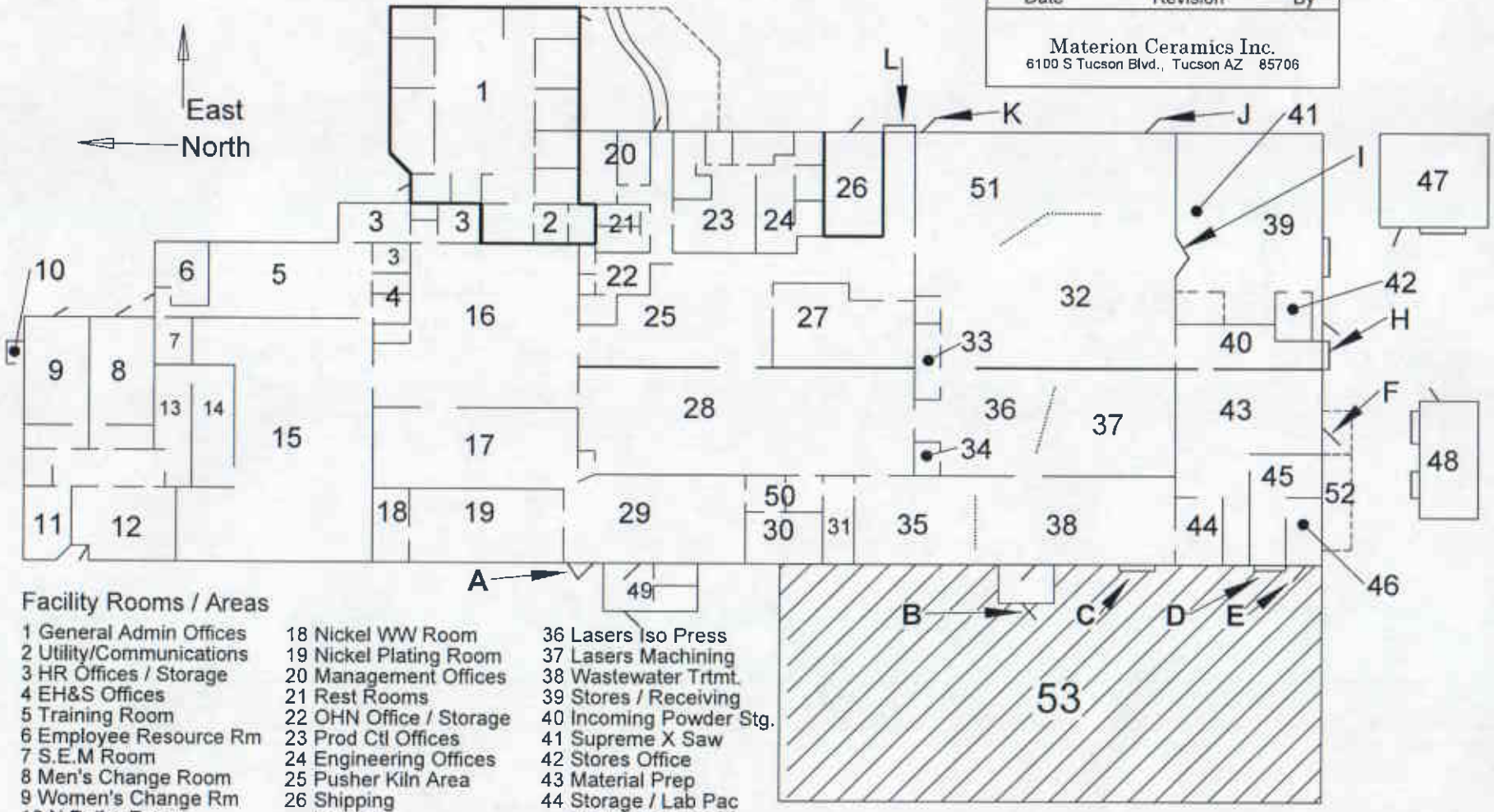
EQUIP NO	Equipement Description	Equipment Room	Ventilation Source	Emission Point
3558	SWECO VIBRO ENRGY MILL #1	ROOM 43 MAT PREP	NA	ROOM 43
3553	NORTON ROLLER MILL	ROOM 43 MAT PREP	40K	STACK
3569	DOWN DRAFT TABLE	ROOM 32 PRESSING	Self Contained	ROOM 32
3585	VACUUM TRANSFER HOOD	ROOM 43 MAT PREP	40K	STACK
3592	100 GAL SLURRY TANK "D"	ROOM 43 MAT PREP	NA	ROOM 43
3593	100 GAL SLURRY TANK "C"	ROOM 43 MAT PREP	NA	ROOM 43
3594	100 GAL SLURRY TANK "A"	ROOM 43 MAT PREP	NA	ROOM 43
3595	100 GAL SLURRY TANK "E"	ROOM 43 MAT PREP	NA	ROOM 43
4001	PRESS DORST #1 TPA-6 1988	ROOM 32 PRESSING	15K	STACK
4002	PRESS DORST #2 TPA-6 6303465	ROOM 32 PRESSING	15K	STACK
4003	PRESS DORST #3 TPA5 800013	ROOM 32 PRESSING	15K	STACK
4004	PRESS DORST #4 TPA5 6303464	ROOM 32 PRESSING	15K	STACK
4005	PRESS DORST #5 TPA5 800014	ROOM 32 PRESSING	15K	STACK
4006	PRESS DORST #6 TPA-5 800005	ROOM 32 PRESSING	15K	STACK
4007	PRESS DORST #7 TPA-5	ROOM 32 PRESSING	15K	STACK
4009	PRESS DORST #9 TPA-5	ROOM 32 PRESSING	15K	STACK
4012	PRESS HYDRAMET 12T	ROOM 32 PRESSING	15K	STACK
4014	PRESS DORST #14 TPA-5	ROOM 32 PRESSING	15K	STACK
4016	PRESS DORST #16 TPA-6 1988	ROOM 32 PRESSING	15K	STACK
4019	PRESS DORST #19 TPA-6 6031685	ROOM 32 PRESSING	15K	STACK
4021	PRESS DORST #11 TPA-5	ROOM 32 PRESSING	15K	STACK
4022	EXTRUDER LOOMIS 120T	ROOM 16 EXTRUSION	40K	STACK
4025	LATHE CNC SLANT JR.	ROOM 36 LASER FORM	40K	STACK
4026	ISO PRESS WET BAG	ROOM 36 LASER FORM	40K	STACK
4028	ACRA LATHE	ROOM 36 LASER FORM	40K	STACK
4029	ACRA LATHE	ROOM 36 LASER FORM	40K	STACK
4033	PRESS HYDRAMET 30-3	ROOM 32 PRESSING	15K	STACK
4034	PRESS HYDRAMET 30-4 6830439	ROOM 32 PRESSING	15K	STACK
4044	VIBRODYNE TUMBLER #6	ROOM 51 TUMBLING	15K	STACK
4045	VIBRODYNE TUMBLER #7	ROOM 51 TUMBLING	15K	STACK
4046	VIBRODYNE TUMBLER #1	ROOM 51 TUMBLING	15K	STACK
4052	POWDER HOOD-SMALL	ROOM 36 LASER FORM	15K	STACK
4053	POWDER HOOD- LARGE	ROOM 36 LASER FORM	40K	STACK
4054	VIBRODYNE #4 VE200	ROOM 51 TUMBLING	15K	STACK
4091	DOWN DRAFT TABLE #6	ROOM 35 MSG MAINT	Self Contained	ROOM 35
4095	LARGE PRESS UNLOAD HOOD	ROOM 51 TUMBLING	15K	STACK
4096	6 TON PRESS #22	ROOM 32 PRESSING	15K	STACK
4097	6 TON PRESS #21	ROOM 32 PRESSING	15K	STACK
4100	SM PRESS DUMP STATION	ROOM 51 TUMBLING	15K	STACK
4101	DOWN DRAFT TABLE 200 TON	ROOM 32 PRESSING	Self Contained	ROOM 32
4125	PRESS 125 TON	ROOM 32 PRESSING	15K	STACK
4200	PRESS 200 TON	ROOM 32 PRESSING	15K	STACK
4536	TK-I CLEANING HOOD	ROOM 28 LGE KILN	40K	STACK
5011	HOUSE VACUUM	ROOM 45 MECH	40K	STACK
5012	PROCESS VACUUM #1	ROOM 45 MECH	40K	STACK
5013	PROCESS VACUUM #2	ROOM 45 MECH	40K	STACK
5095	COOPERMATIC FILTRATION SYSTEM	AREA 53	TORIT	STACK
5103	TRASH COMPACTOR	AREA 53	TORIT	STACK
5105	TORIT DUST COLLECTOR	AREA 53	TORIT	STACK
5266	WASTE BAILER	ROOM 38 WASTEWATER TREATMENT	40K	STACK
5311	MONZA CENTERLESS GRINDER	ROOM 37 LASER MACH	TORIT	TORIT

Materion Ceramics Inc. Facility Layout

Drawing for Illustration Purposes Only
Sections May Not be to Scale

Date	Revision	By
03/15/2011	Current Layout	RN

Materion Ceramics Inc.
6100 S Tucson Blvd., Tucson AZ 85706



Facility Rooms / Areas

1 General Admin Offices
2 Utility/Communications
3 HR Offices / Storage
4 EH&S Offices
5 Training Room
6 Employee Resource Rm
7 S.E.M Room
8 Men's Change Room
9 Women's Change Rm
10 N Boiler Room
11 Laundry Room
12 Lunch Room
13 Respirator Storage
14 AS / Wk Boot Storage
15 Complex Machining
16 Extrusion
17 Small Kiln Room
18 Nickel WW Room
19 Nickel Plating Room
20 Management Offices
21 Rest Rooms
22 OHN Office / Storage
23 Prod Ctl Offices
24 Engineering Offices
25 Pusher Kiln Area
26 Shipping
27 Lapping
28 Large Kiln Room
29 Metalizing Firing
30 Met. Clean Room
31 Met. Office / Lab
32 Dry Pressing (all)
33 Tool Room
34 Metrology Room
35 Machine Services
36 Lasers Iso Press
37 Lasers Machining
38 Wastewater Trtmt.
39 Stores / Receiving
40 Incoming Powder Stg.
41 Supreme X Saw
42 Stores Office
43 Material Prep
44 Storage / Lab Pac
45 Mechanical Room
46 S Boiler Room
47 Maintenance Bldg.
48 Chemical Storage
49 Met. Rest Rooms
50 Metalizing Prep Rm
51 Inspection / Parts Clng
52 Compressors / Stm Blrs
53 Fenced Yard Area

Production Area Exit Doors

A. Metalizing Firing*
B. Wastewater Trtmt
C. Wastewater Trtmt**
D. Mechanical Room**
E. Boiler Room
F. Material Prep
H. Material Prep Rec**
I. Press Room*
J. Press Rm - S
K. Press Rm - N
L. East Service**

* Double Door ** Roll-Up Door

PROCESS DESCRIPTIONS

AND

PROCESS FLOW DIAGRAMS

PROCESS DESCRIPTION

Material Preparation – Rm. 43

The purpose of this area is to supply formulated ceramic powder to the departments that will use it to form beryllium oxide components to customer specs. This is accomplished by processing the UOX powder obtained from our Elmore, Ohio facility as described below.

UOX powder is received in a DOT rated stainless steel drum. The stainless steel drum placed in the vacuum transfer hood. The contents of the drum are conveyed by vacuum system into the high shear where the powder is mixed with a solution of de-ionized water, magnesium trisilicate (sintering aid), Darvan C (deflocculant), & ammonium hydroxide to form slurry. This slurry is pumped through a basket strainer to the 100 gallon tanks and then to the mills to further mix the ceramic materials and to reduce their particle sizes from 2-3 microns down to <1 micron. During this process the slurry is continuously circulated through the mills which overflow back into the 100 gallon tank(s). Binders are added. The slurry is then screened to remove any contaminants or debris.

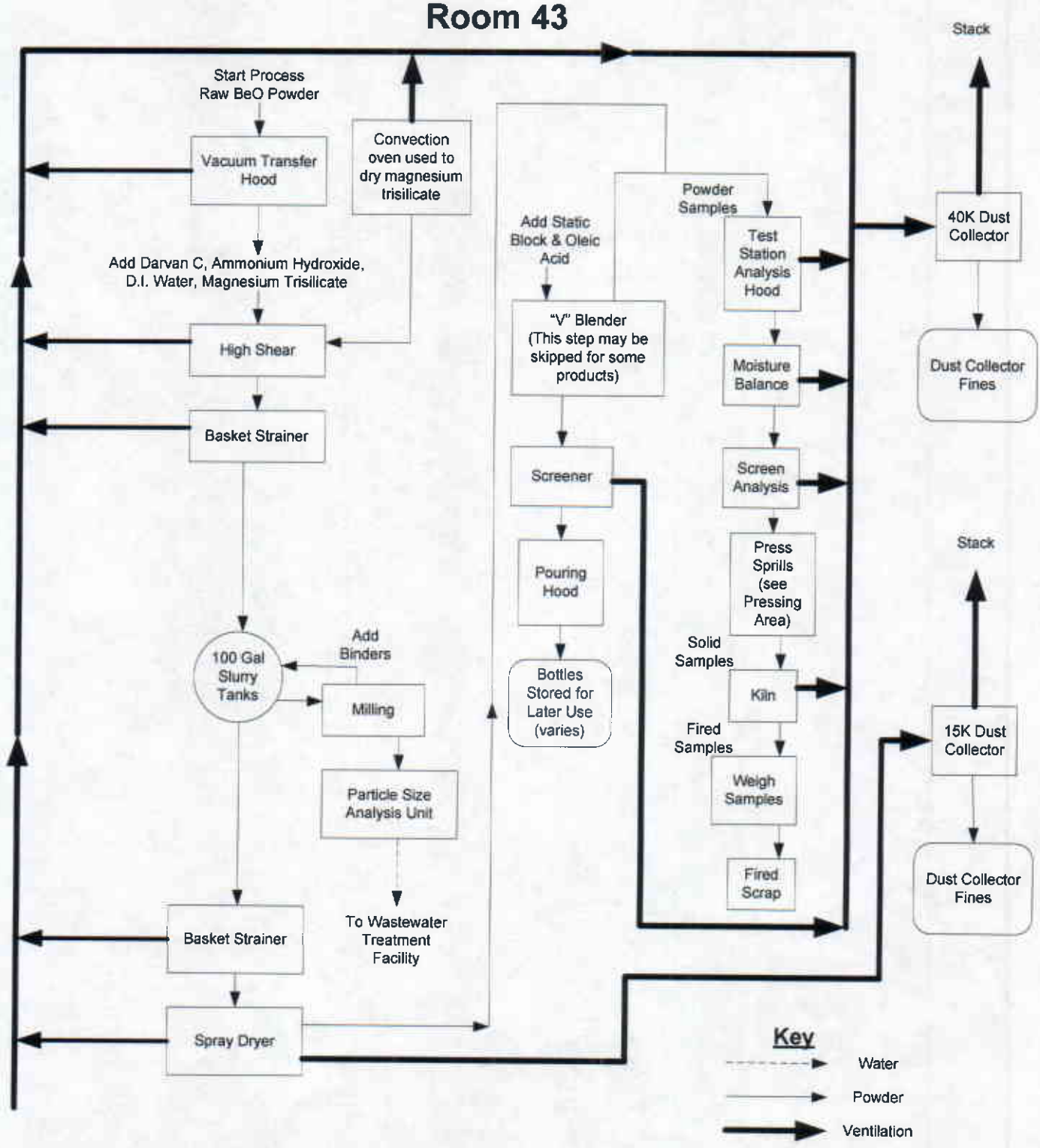
The slurry is then pumped into the spray dryer where the moisture is removed and it is converted back into powder of larger pre-determined particle size. It is again screened to remove any out of specification particles for the isopressing process. For the dry pressing procedures this powder is put into a "V" blender which blends pressing aids into the powder. It is again screened then sent to large and small presses. For extrusion the powder is blended with other materials specific for that operation. All transfer of prepared powder from one container/bottle to another when not in a sealed ventilated process is done in the pouring hood.

Before being distributed to manufacturing, all powders must be tested, characterized and approved for use. Samples of each material lot are taken at the analysis hood. Final residual moisture is measured using a moisture balance. Sample sprills are pressed using a pre-determined press on the press deck, which is not located in Material Prep. Several measurements are taken and recorded. These measurements are submitted to Quality for approval.

Description of Product(s): BeO powder

Material Preparation Area

Room 43



PROCESS DESCRIPTION

Laser Forming/Machining – Rm. 36, 37

Raw beryllium oxide powder enters this area to undergo development in the following manner:

The BeO goes into one of the ventilation hoods to be loaded into molds that are then Iso-pressed. The mold containing the then pressed BeO part is taken back to the ventilation hood for the BeO part to be released from the mold. It then goes to the ventilated lathes to be green machined. During green machining an in process inspection takes place. The parts are then fired in the kilns which are ventilated. The purpose of the ventilation is to remove heat, as well as any binders that are released from the parts during firing. The ventilation for all of these machines is connected to the facility pollution control equipment - dust collector system.

After firing the parts are inspected and sent to one of the machining processes to meet customer specs. During the machining process a water based coolant solution is used, the beryllium debris or swarf that is removed is collected into the house coolant system and returned for reuse after filtration. In many of the wet machining processes ventilation is also used.

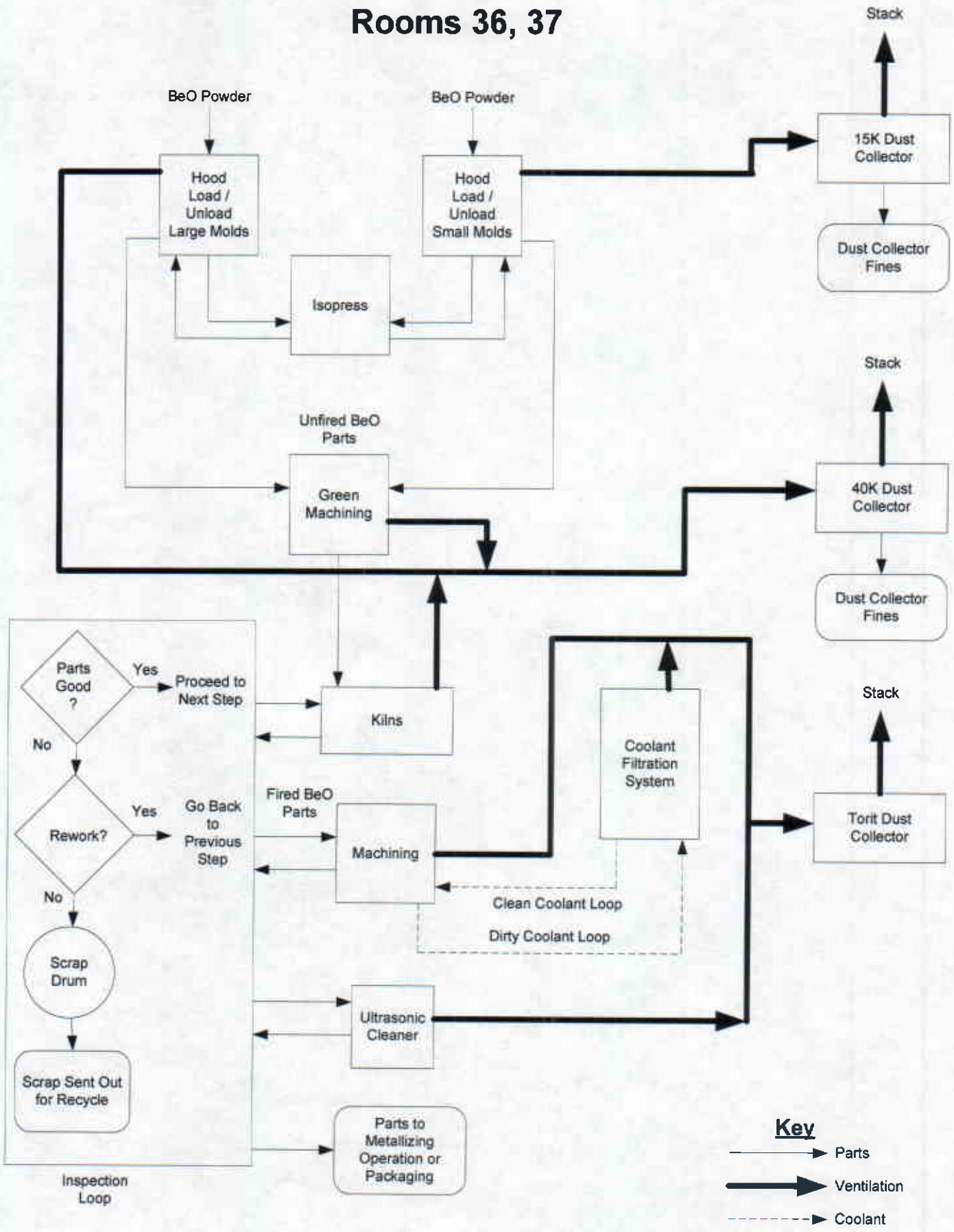
The machined products then proceed to an inspection step where quality determinations are made. If the components/parts meet customer specifications they advance to the next step which is cleaning. Those products that fail the inspection step are either recirculated back for rework or collected as scrap and sent back to Materion Brush Inc. for recycling. The cleaning steps utilize initial rinsing to remove grinding debris followed by a second rinse and then final cleaning in the ultrasonic cleaner which uses an acid cleaning solution. All wastewater produced by these cleaning operations is collected and processed through our industrial wastewater treatment system prior to discharging into the P.O.T.W. collection system.

The final process stage in this area involves a final inspection, and then the parts are transferred to an additional operation or metalizing / plating, or to the packaging and shipping department for customer shipping.

Description of Product(s): The end product from this area is drilled cylindrical BeO components for thermal management in microelectronics, military, aerospace and automotive applications.

Laser Forming/Machining

Rooms 36, 37



PROCESS DESCRIPTION

Metallizing/Clean Room/Firing Areas – Rm. 29, 30, 50

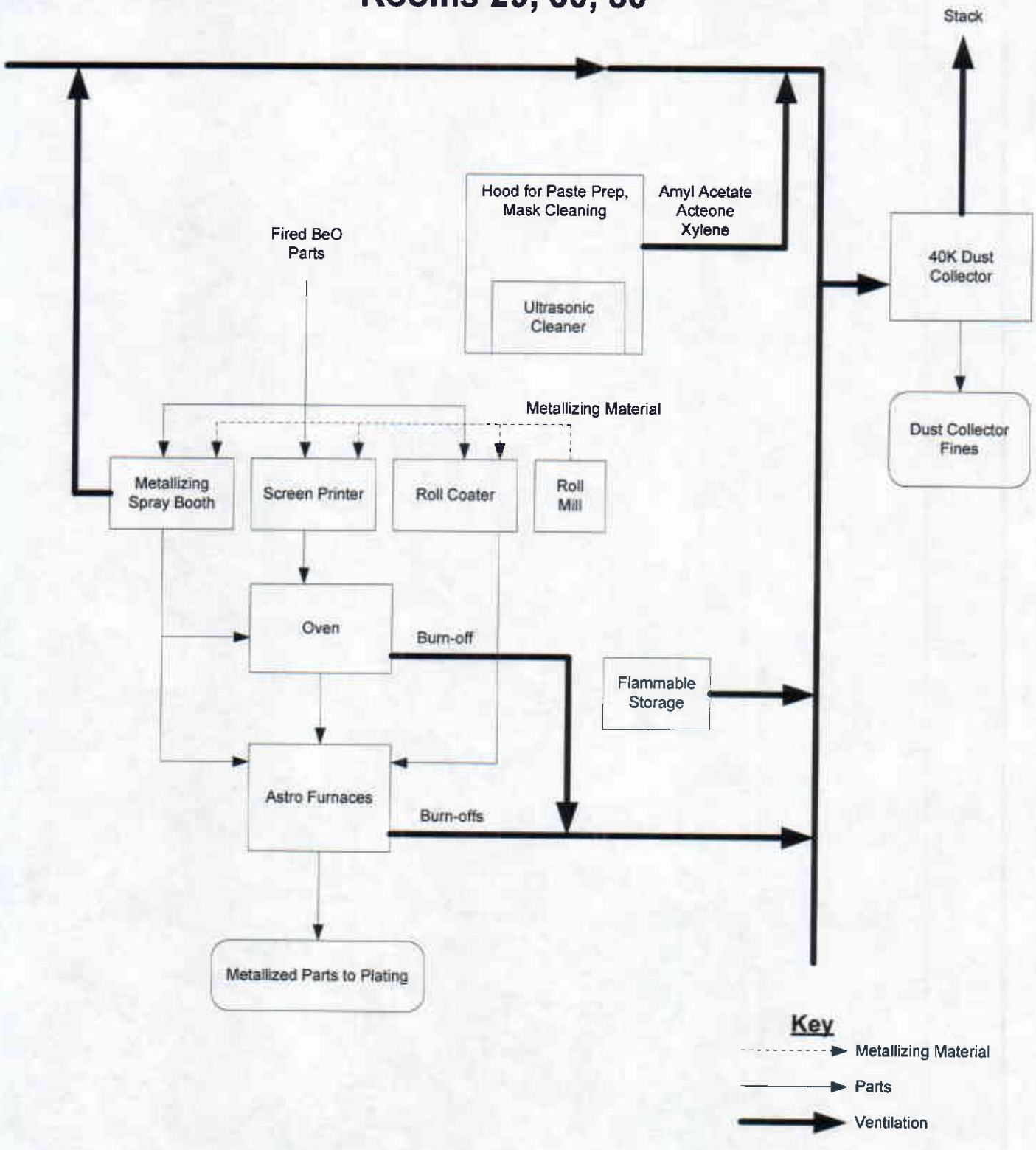
Fired BeO parts are brought into the clean room to be metalized in preparation for plating. The metallization process consists of cleaning the parts, then coating all or part of the ceramic with a molybdenum/manganese base coat that is applied either by roll-coating, spraying, paint brushing, or screen printing. This coating allows the plating material to stick to the ceramic anywhere the coating is present. Parts are then dried and fired in a hydrogen atmosphere furnace to bond the molybdenum/manganese coating to the ceramic. After inspection, the parts are sent to plating. All parts are inspected after each operation for quality elements. Defective parts may be reworked, or scrapped, in which case they are returned for recycling to our Elmore facility.

There are a number of test and ancillary equipment used in this process including abrasive spray hood, roll mill, Veeco tester, sonic cleaner, and Fischer Scopes.

Description of Product(s): BeO parts ready for plating operation (Room 19)

Metallizing / Clean Room / Firing Areas

Rooms 29, 30, 50



PROCESS DESCRIPTION

Plating Area – Rm. 19

BeO parts are coated with a molybdenum/manganese base in the metalizing area and then fired in a hydrogen atmosphere furnace to sinter the metallization. After firing they are transferred to the plating area for nickel plating as follows: The parts are attached to racks and immersed in an alkaline bath, heated, rinsed then immersed in a hydrochloric acid bath, rinsed again and finally placed into the nickel plating bath. Following the nickel plating bath the parts are rinsed and then immersed in deionized water. They are removed from the rack, placed in carriers, and immersed in ammonium hydroxide then rinsed again and placed in a hot deionized water bath, cleaned with isopropyl alcohol and blown dry in a hood. They are inspected for plating thickness and fired again in a hydrogen atmosphere furnace to sinter the nickel plating. The entire process is repeated a second time to add a second layer of nickel.

Parts are inspected after firing and if any overspray is present it is removed by the use of abrasive blasting. If re-work on plated parts is required a solution of aqua regia acid (70% Hydrochloric acid and 30% Nitric acid) is used to strip the metallization off. Parts that do not require any re-work proceed directly to inventory or to the packaging area for shipment to the customer. Occasionally, parts may require additional machining steps (room 7 or 8).

The plating room is isolated from the facility wastewater collection system. Wastewater, spent plating chemicals, and spent cleaning chemicals are all transferred to a holding tank. The pH is adjusted in the holding tank and then the wastewater is pumped into an evaporation system. Water vapor from the evaporators is vented to atmosphere. The remaining solids are drummed and disposed as hazardous waste.

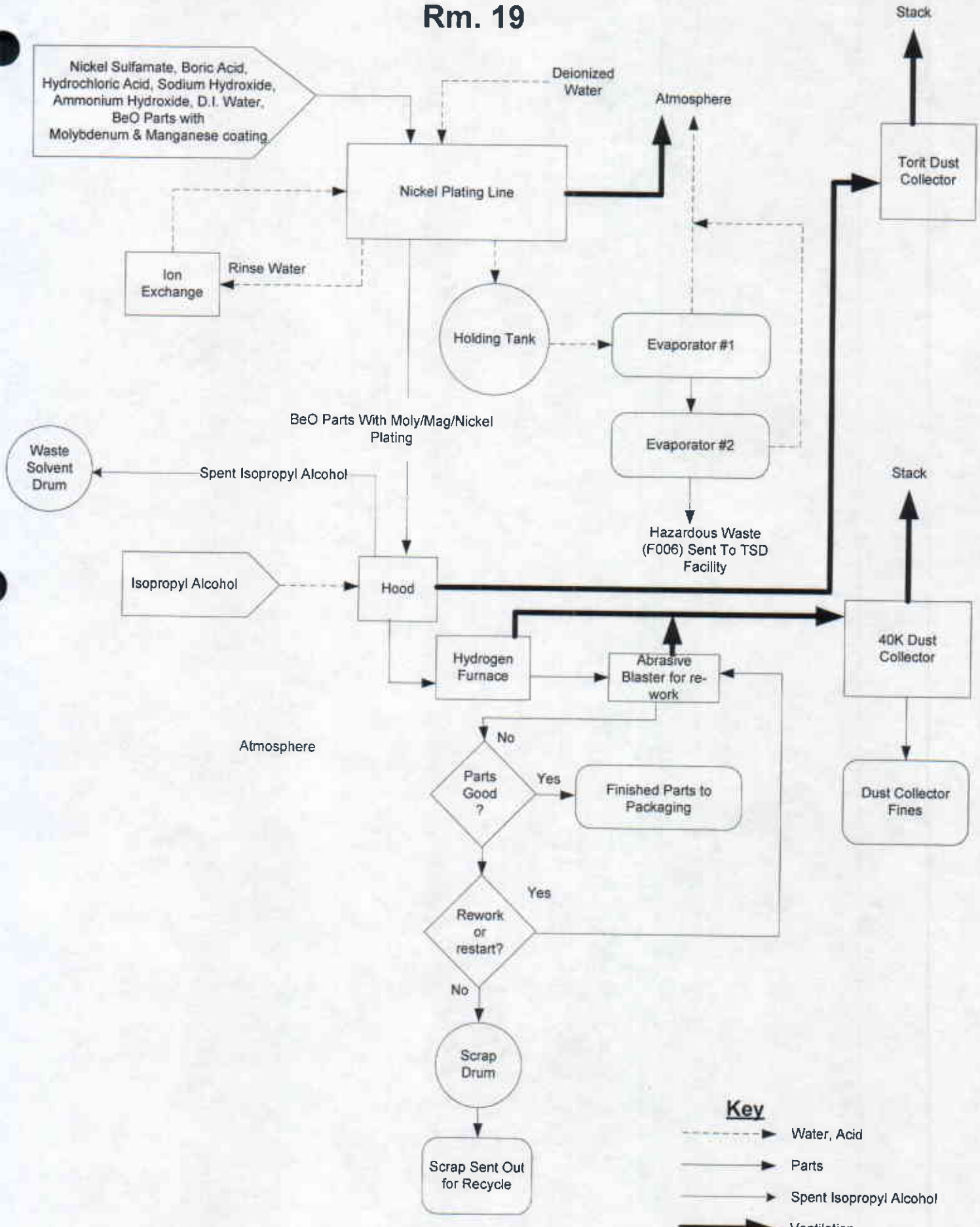
The majority of equipment in this room is vented to atmosphere. There are no BeO particulate generating operations. It is estimated that 2.5% of the total acid used is lost as a fugitive emission. Emissions from the nickel bath have never been detected. Engineering estimate was used to determine potential annual emissions.

One hood does vent through the Torit Dust Collector to the plant stack. There is no BeO particulate generation from this operation; the hood was vented in this manner for convenience.

Description of Product(s): The end product from this area is nickel plated BeO parts.

Plating Area

Rm. 19



PROCESS DESCRIPTION

Extruded Products – Rm. 16

Extrusion:
Beryllium Oxide, in the form of a clay like powder, is loaded into the extrusion press. The material is then forced through the extruder die under hydraulic pressure to create rod shaped parts. The rod material is broken off as it exits the extrusion press and is laid onto a parts rack. When the parts rack is full it is placed into a ventilated dryer for a predetermined amount of time. Following the drying step the parts are removed from the rack and placed into a sagger which is then loaded into a kiln and fired. Fired rod is then placed into stock.

When a customer order is received, rod is removed from stock and brought to a rod breaking hood where defective sections of the rod is removed and discarded as scrap. The BeO rod then undergoes further processing by following one of two possible processes. For larger diameter rod, processing is performed in the Complex area. For smaller diameter rod, the Dicing process is used.

BeO rod is mounted onto plates using hot wax and then the plates are taken to a dicing machine and the BeO rod is cut to length. The parts are removed from the plate using a caustic solution in an ultrasonic cleaner then rinsed in a sink and dried in the dryer. The rod diameter is pre-tumbled and machined to a finished size on the Centerless Grinder and then re-tumbled for finish radius and to remove sharp edges. After tumbling they are rinsed in a sink, and inspected for quality control purposes. Parts may be machined, tumbled and rinsed a second time.

Final inspection and ultrasonic cleaning is performed. Depending on customer specifications parts may or may not be clean fired in a small kiln. Parts are then sent to Packaging. All water drained from the ultrasonic cleaners, sinks, and tumblers is processed through the facility's industrial wastewater pre-treatment system.

Description of Product(s): The end products from this area are cylindrical rod shaped BeO parts.

Dicing:
Kiln fired beryllium oxide input products enter this room and are scheduled for dicing (machining) operations on one of several pieces of equipment. Control technology is applied to these machines by a containment system that includes ventilation hoods and a waste water collection system. These hoods totally encapsulate the machinery for the containment of any mists and liquids. Furthermore, each of the ventilation hoods is connected to the facility Pollution Control Equipment - Dust Collector system.

During the machining operation a coolant solution is applied. The beryllium oxide debris, or swarf, that is removed is carried in the coolant water which is directed to the facility filtration system, filtered and returned back to the machining operations. The mists that may contain particulate are carried through the ventilation system to

the dust collectors where filtration is accomplished prior to discharging to the ambient air.

After machining, parts are cleaned. The cleaning steps involve initial rinsing to remove grinding debris, followed by a second rinse and then final cleaning in an ultrasonic cleaner utilizing an alkaline cleaning solution. All waste water produced within these cleaning operations is collected and processed through our industrial wastewater treatment plant prior to discharging into the P.O.T.W. collection system.

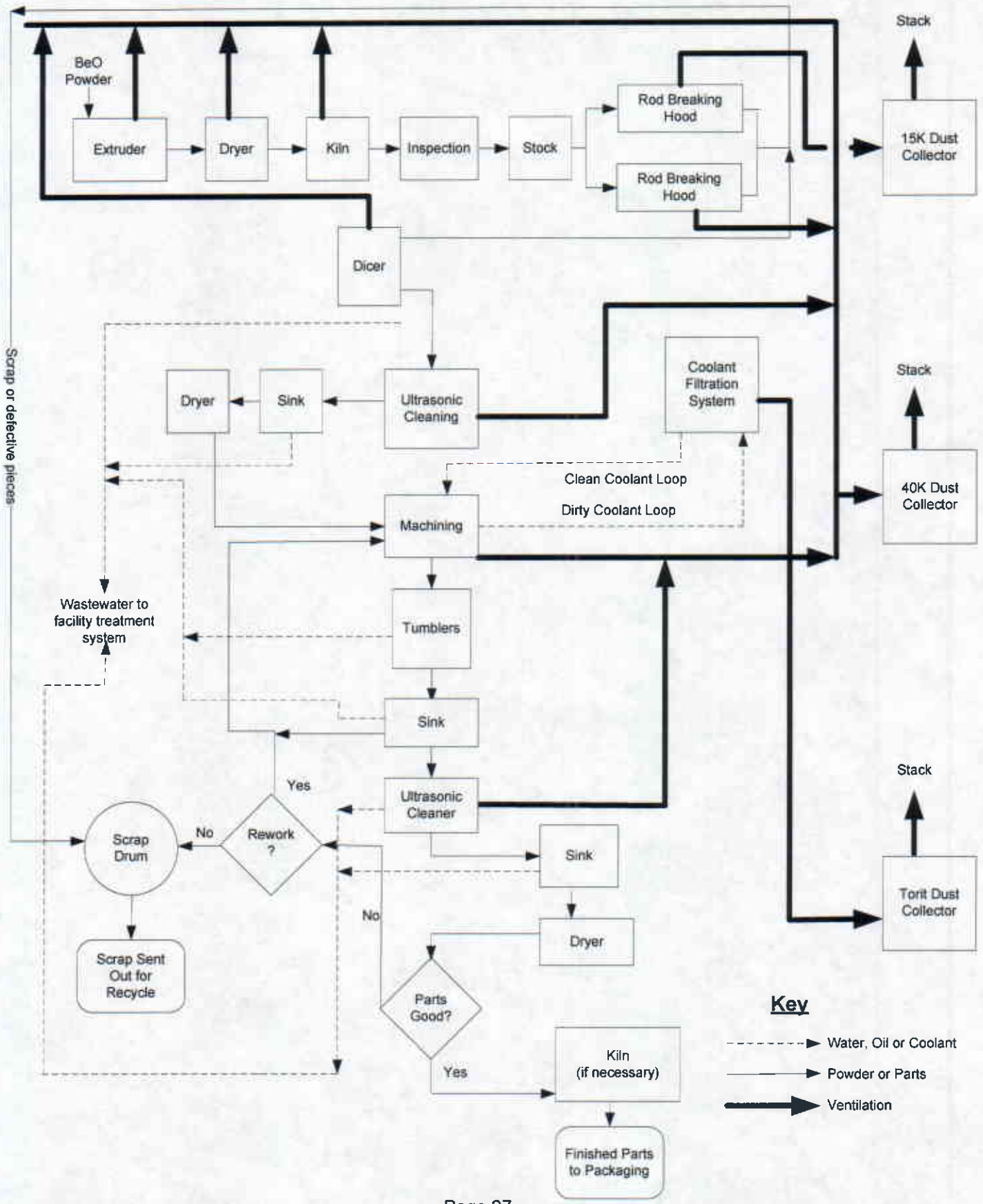
The machined beryllium oxide products proceed to an inspection step where quality determinations are made. Those products that fail the inspection are either recirculated back for rework, or collected as scrap and sent back to our corporate facility for recycling.

The final process stage in this area is the transfer of the machined products to either an additional operation for further processing or to the packaging area for shipment to the customer.

Description of Product(s): The end product from this area is BeO plate components.

Extruded Products Area

Rm. 16



PROCESS DESCRIPTION

Dry Pressing (Large and Small) – Rm. 32

There are two distinct product lines manufactured in this area. One is referred to as "Small Press and the other is "Large Press". Although the two processes are very similar, there are some slight differences in process steps. BeO powder is prepared and loaded into plastic bottles in the Material Prep room (43). Bottles of powder are issued to a specific job. Powder bottles are placed into a ventilated roller, which rolls the powder bottles to ensure that the powder is free flowing. The issued powder is connected to a hose and feed assembly. The powder bottle is then inverted and clamped into a holder. This allows for a gravity feed system from the bottle to the die set. Each press is equipped with ventilation from the facility dust collection system. Parts are produced by compressing the powder in the die cavity. Following the setup, samples of the parts are taken to the sample kiln for firing. These sample parts are a "first article" to determine if the setup and powder will give the desired final results. Parts are checked for dimensions, and visual quality. If the samples are accepted, production may begin. If not then specific adjustments are made and test pieces are run again, fired and inspected.

During the production run, the pressed parts are placed into containers referred to as "saggers" and loaded into a kiln for firing. These kilns are ventilated to the facility dust collection system.

After firing, the parts are placed in a tumbler for the removal of burrs and excess edge material. The tumblers are supplied with potable water and ventilated. Any Wastewater that is generated during the process is directed to the facility wastewater treatment plant.

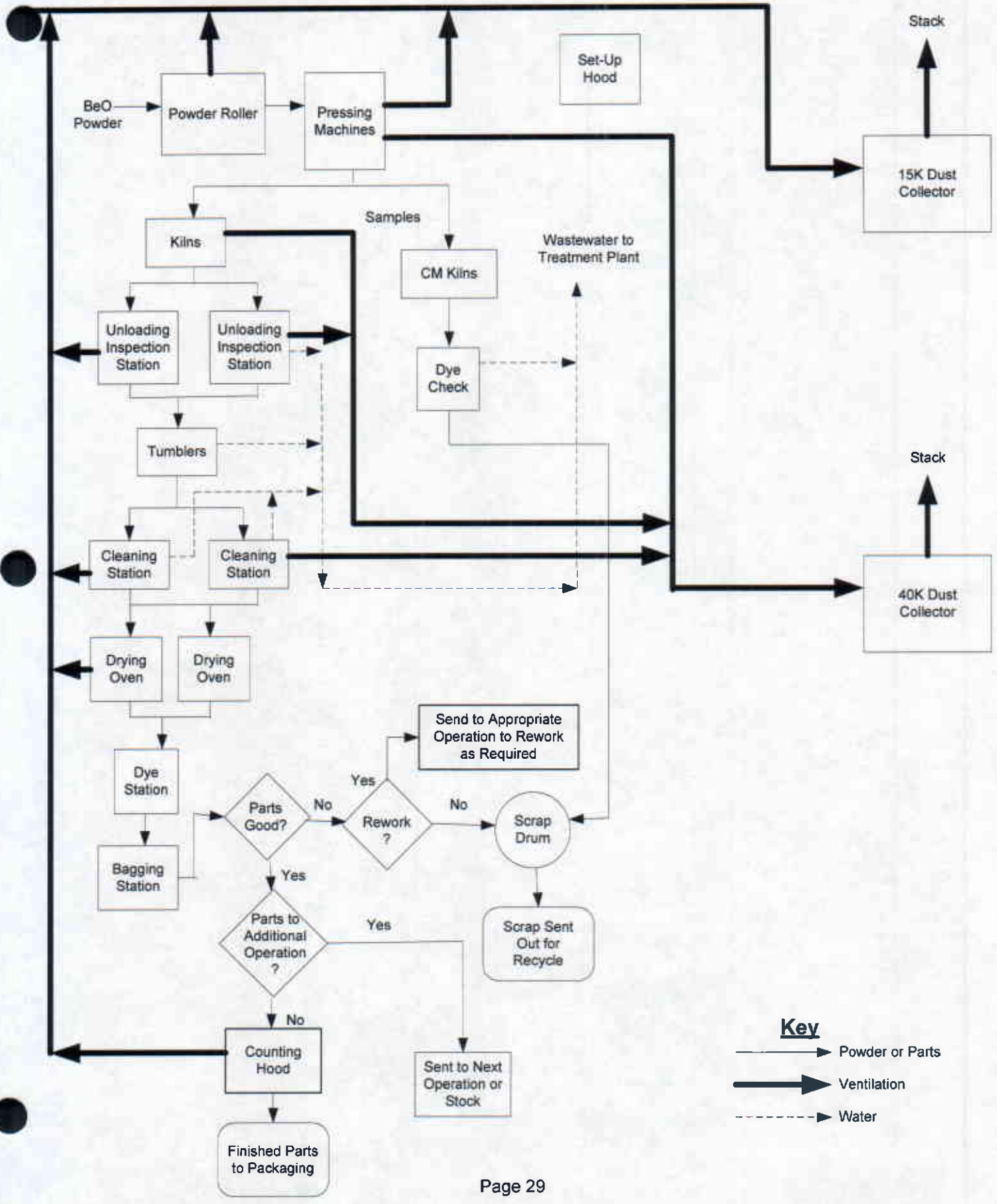
The BeO product passes through a cleaning step in one of a series of cleaning units, utilizing a basic alkaline cleaner or bleach solution. One rinsing unit is supplied with ventilation from the facility dust collection system. Wastewater produced is directed to the facility wastewater pretreatment system for treatment prior to discharge to the Pima County collection system.

After cleaning, the parts are inspected to ensure dimensional and visual specifications. Product that fails the inspection will either be recirculated back to a machining step for re-work, or if the product condition is not re-workable it is collected as scrap and sent for recycle. Good parts are sent to Packaging for shipment to the customer, or stock awaiting other operations such as lapping, dicing, plating, etc.

Description of Product(s): The end product from this area is a thin, flat BeO part.

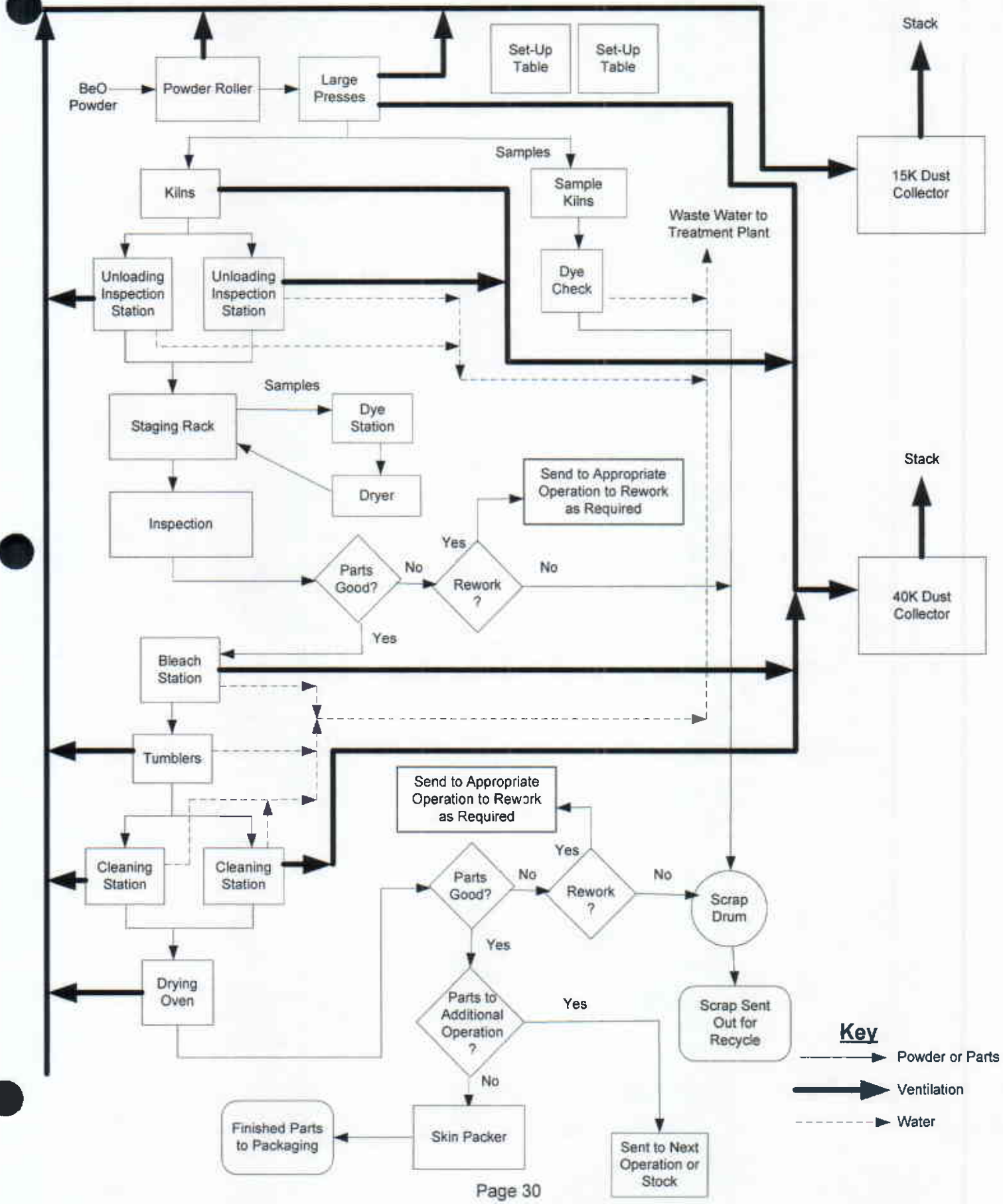
Small Press

Rm. 32



Large Press Area

Room 32



PROCESS DESCRIPTION

Complex Machine Area – Rm. 15

Complex Machining: Fired beryllia ceramic in the form of parts or block material are received for machining operations from isopress cell or from customer stock. These materials are issued to a particular job number for machining to customer criteria.

Machining operations performed in this area are:

- Surface Grinding
- Drilling
- Cutting
- Slicing
- Honing
- Milling
- Dicing

Per standard operating procedures all machining operations are done wet with machining coolant. This coolant is collected from the operation to a central filter and holding tank which supplies filtered coolant back to all machining operations in this area, thus forming a closed loop system.

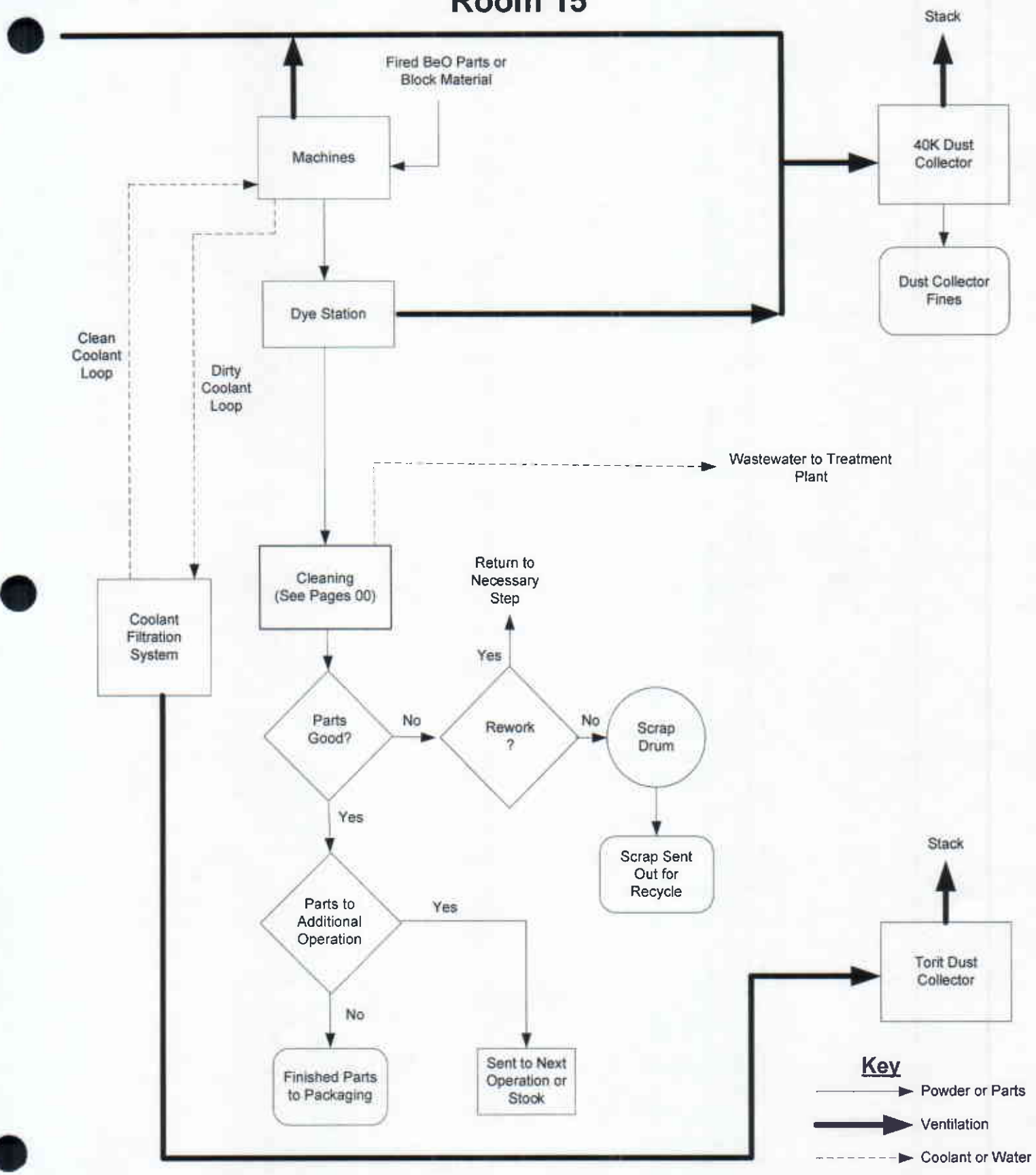
Most machines are provided with a containment hood that is supplied with ventilation from one of the dust collector systems. The few pieces of equipment that are not provided with a hood use materials such as oil or coolant to control airborne beryllium oxide particulates.

Parts are machined then dyed to verify quality. Parts may also undergo tumbling to remove burrs or radius edges. Finished products are cleaned in ultrasonic cleaners and then rinsed. All ultrasonic cleaning stations and sinks in this area drain to the wastewater treatment plant collection system. These products are then inspected and sent to the next operation or to shipping. Parts failing inspection are collected as recyclable scrap.

Description of Product(s): The end product from this area is machined BeO parts.

Complex Machining Area

Room 15



PROCESS DESCRIPTION

Lapping Area – Rm. 27

Lapping: Fired BeO input products enter this room and are placed on a job rack until scheduled for lapping. When equipment becomes available, the job is sent to one of the lapping machines for processing. Lapping machines are used to remove material from the surfaces of the BeO components. During this operation a specific grade of silicon carbide grinding media is placed into a tank and mixed with an oil-based carrying fluid. This fluid is commonly referred to as lapping grit. After the lapping machine is loaded with BeO parts the lapping grit is pumped from the mixing tank into a distribution ring which then feeds down through tubes mounted in the upper plate of the lapper. The grinding fluid or lapping grit is continuously pumped through the machine until the product dimensions have been reached.

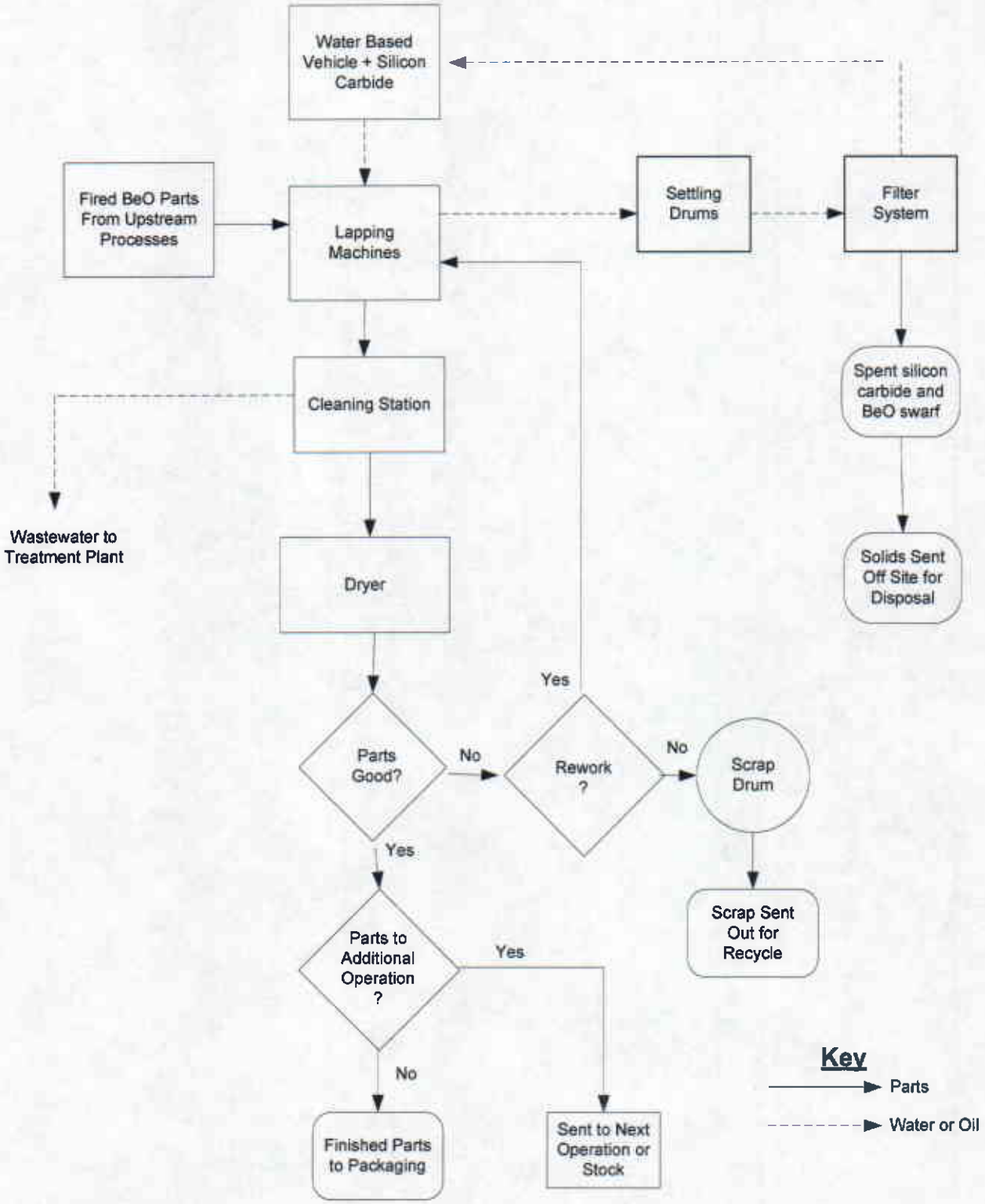
As the lapping grit flows through the process, it is collected in a trough beneath the bottom plate of the lapper and is collected into a waste sump. From there, it is pumped to a series of settling drums where the BeO containing grit is allowed to settle. The supernatant fluid is pumped through a filtration system and then discharged to a holding tank for re-use. Solids from the settling drums and filters are sent off-site for disposal.

After lapping the product is transferred to cleaning where it is placed into an ultrasonic cleaner utilizing a phosphoric acid solution. Deionized water is used for initial and final rinsing. The rinse waters and spent phosphoric acid, after being neutralized, are discharged into the facility wastewater collection system for pretreatment.

After the cleaning step, the product is dye checked for visual identification of any defects. After inspection the good parts are cleaned with Deionized water and placed into a drying unit for the removal of residual moisture. Completing the process an inspection is conducted to ensure dimensional specifications. Product that fails the inspection will either be re-worked, or if the product condition is not re-workable it is collected as scrap and sent for recycle. The product is then either distributed to other processes for further development, or is sent directly to the Packaging/Shipping department for distribution to the customer.

Description of Product(s): The end product from this area is lapped BeO parts.

Lapping Area
Room 27



PROCESS DESCRIPTION

Cadmium / Tin Process – Rooms 36, 37, 15

The Cadmium / Tin powder arrives in receiving packed in individual plastic bottles, inside a small, steel drum.

The bottles are removed from the barrel in receiving, placed onto a cart, and taken to the ready rack in the Isopress area. Just before a bottle of powder is to be used, it is subject to agitation in a Turbula for 30 seconds. Then, the tape sealing the lid is removed, the bottle is placed inside the large Isopress hood, the lid is removed, and the powder is poured carefully into the mold bag. The bottle is recapped, and set aside.

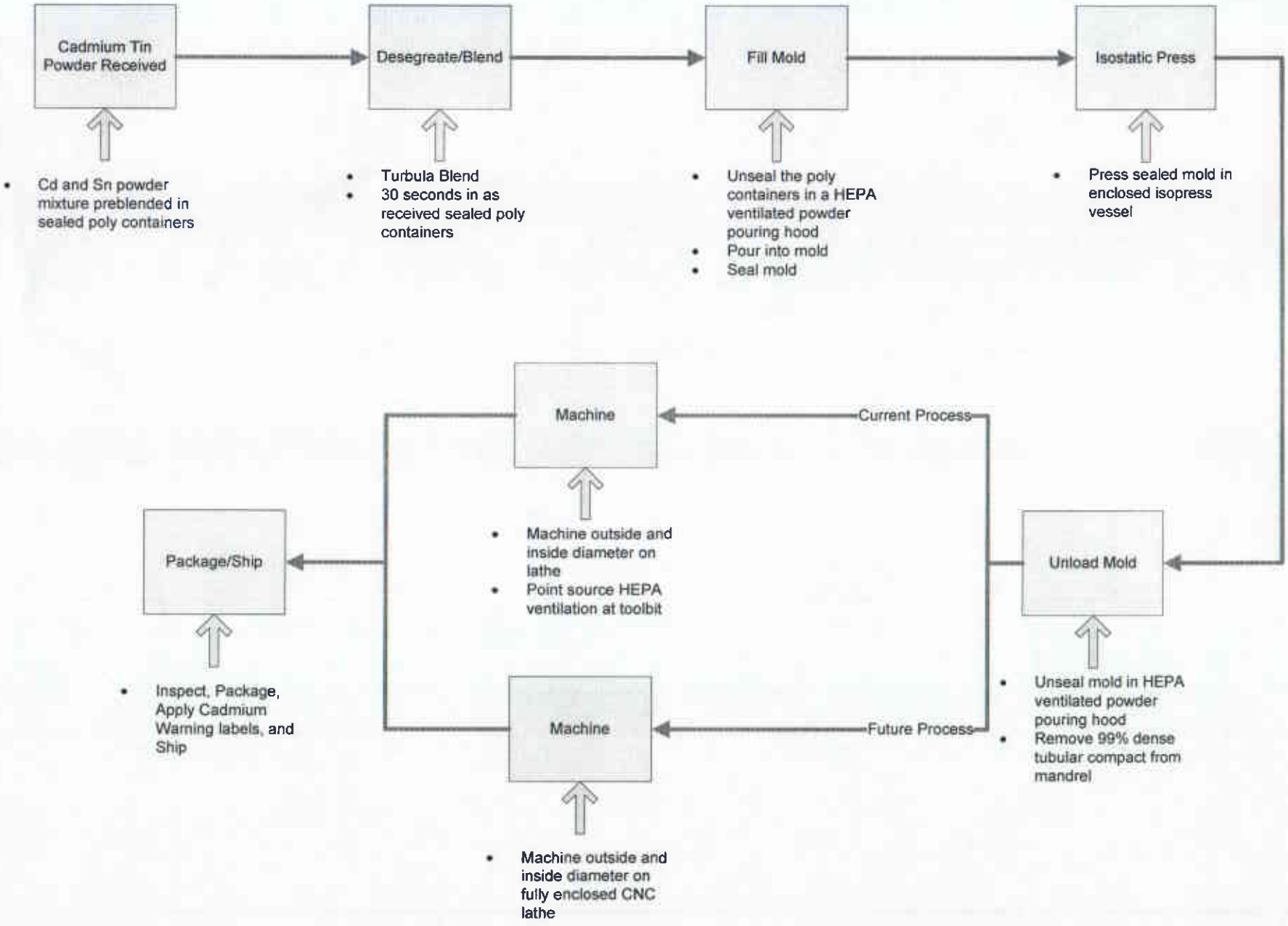
The mold bag is sealed, and placed into the Isopress for compaction.

Once the part is pressed, the mold bag is returned to the large Isopress hood, and the part is removed and placed into a plastic zip lock (planars) or a large open plastic bag (tubes). The plastic bags are used only to protect the compact from the possibility of oxidation. Once all parts are pressed, the parts are moved to machining. If the parts are tubular, they are machined in the green machining area, adjacent to the Isopress area, to final dimension. If the parts are planar, they are moved to the HAAS for machining to final dimension.

The finished parts are moved to final inspection. After passing inspection, they are individually wrapped in plastic bags, and moved to receiving.

In receiving, they are packed in foam rubber, and boxed. Once they are appropriately packed and boxed, they are moved to shipping for labeling and shipment.

CADMIUM TIN PROCESS FLOW



PROCESS DESCRIPTION

Aqua Regia Cleaning Area – Rm. 28

Cleaning: Fired beryllium oxide (BeO) components enter this area for special cleaning. Some parts have been cleaned in previous process steps and undergone inspection. There are currently two primary cleaning methods utilized in this process. One of the methods uses a phosphoric acid solution in an ultrasonic cleaner. This method is used for parts that do not have the red dye residue on them while the other method uses an Aqua Regia acid solution. This method is used to clean the dyed parts and remove metal marks.

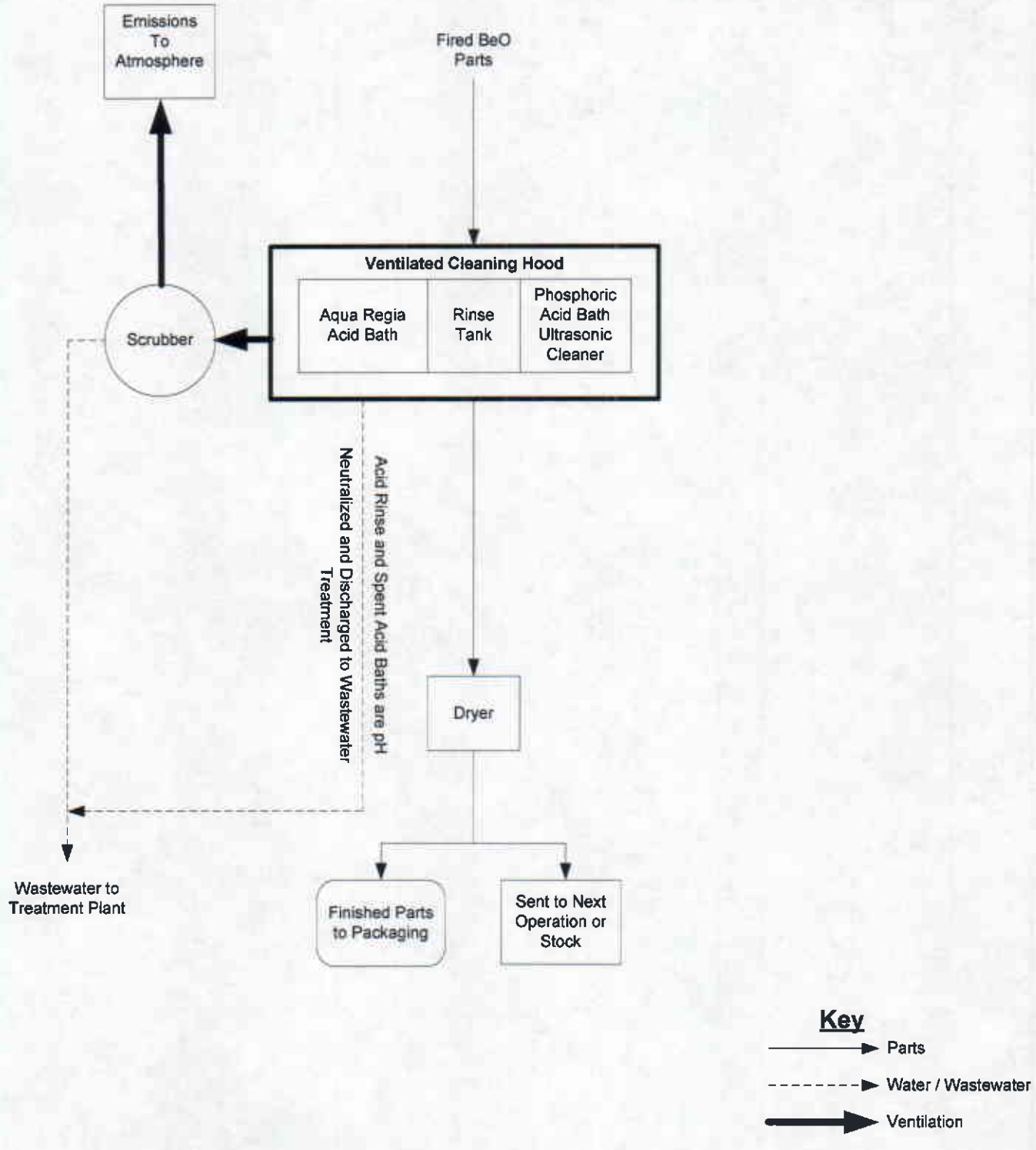
Both of these cleaning systems are accomplished under ventilation. The air stream from the hood is carried through a scrubber unit, where potable water is pH adjusted, using sodium hydroxide, and sprayed into the air stream in a countercurrent flow for the removal of acidic vapors prior to being discharged into the ambient air. Water is fed into the scrubber with a controlled bleed rate to keep the dissolved solids from building and causing problems. Water from the scrubber is discharged to the facility wastewater treatment system.

Parts are rinsed with deionized water and placed in a dryer. Any residual water spots are removed using isopropyl alcohol. After drying has been accomplished the product is packaged and routed to the packaging area for customer delivery.

Description of Product(s): The end product from this area is cleaned BeO parts.

Aqua Regia Cleaning Area

Room 28



PROCESS DESCRIPTION

Facilities – Rm. 10, 11, 35, 45, 46, 47, 48, 52, 53

Coopermatic Filtration System - Production equipment that is involved in wet: cutting, grinding, or other machining operations requires cutting fluid to cool the tooling and flush away grinding swarf. The coolant and grinding swarf is collected into collection sumps inside the facility and then transferred to the Coopermatic filtration system. The Coopermatic filtration system utilizes a series of tube filters that are pre-coated with diatomaceous earth. The filtered coolant is collected in a storage tank and is pumped back into the facility for re-use.

Laundry Room, Dryers and Hot Water Boilers – The facility laundry room has laundry equipment that is used to wash uniforms, towels, etc. The washing machines are supplied with hot water. The two dryers located in the laundry room are vented by the Hunt system (see below), HEPA filtered, and discharged through the stack.

Wastewater Treatment plant – An on-site wastewater treatment system treats all wastewater used in the production areas of this facility other than the plating room and domestic sewerage. Wastewater is processed through a membrane system and then through an activated carbon unit prior to discharge to the Pima County Wastewater collection system. The solids are dewatered and then shipped out to a landfill.

Dust collection systems (4), Booster Blower, House Vacuum – The dust collection system consists of:
[1] A Torit primary collector for wet applications followed by a secondary HEPA final filter.
[2] Two Farr cartridge filter dust collectors (15K and 40K) each with a final HEPA filter house
[3] Two Hunt HEPA filtered systems (Air Handlers 12 and 13) that are used to provide ventilation to the shoe room and respirator storage room and vent tables.
[4] Exhaust Fan #1 system which provides ventilation to the facility laundry room dryers, one downdraft table in the respirator room, floor vent in the shoe room and bleed off air from Air Shower #1.
All systems discharge through the stack. A booster blower and house vacuum system are also incorporated as part of the 40K dust collector system.

Cooling towers and support equipment - There is one cooling tower used as a process cooling tower and 3 chiller units that provide air conditioning to several areas of the facility.

Bulk hydrogen trailer and nitrogen tank – A bulk storage tank of liquid nitrogen and a gaseous hydrogen tube trailer are used on-site to provide controlled atmospheres to the furnaces for firing metallized BeO ceramic.

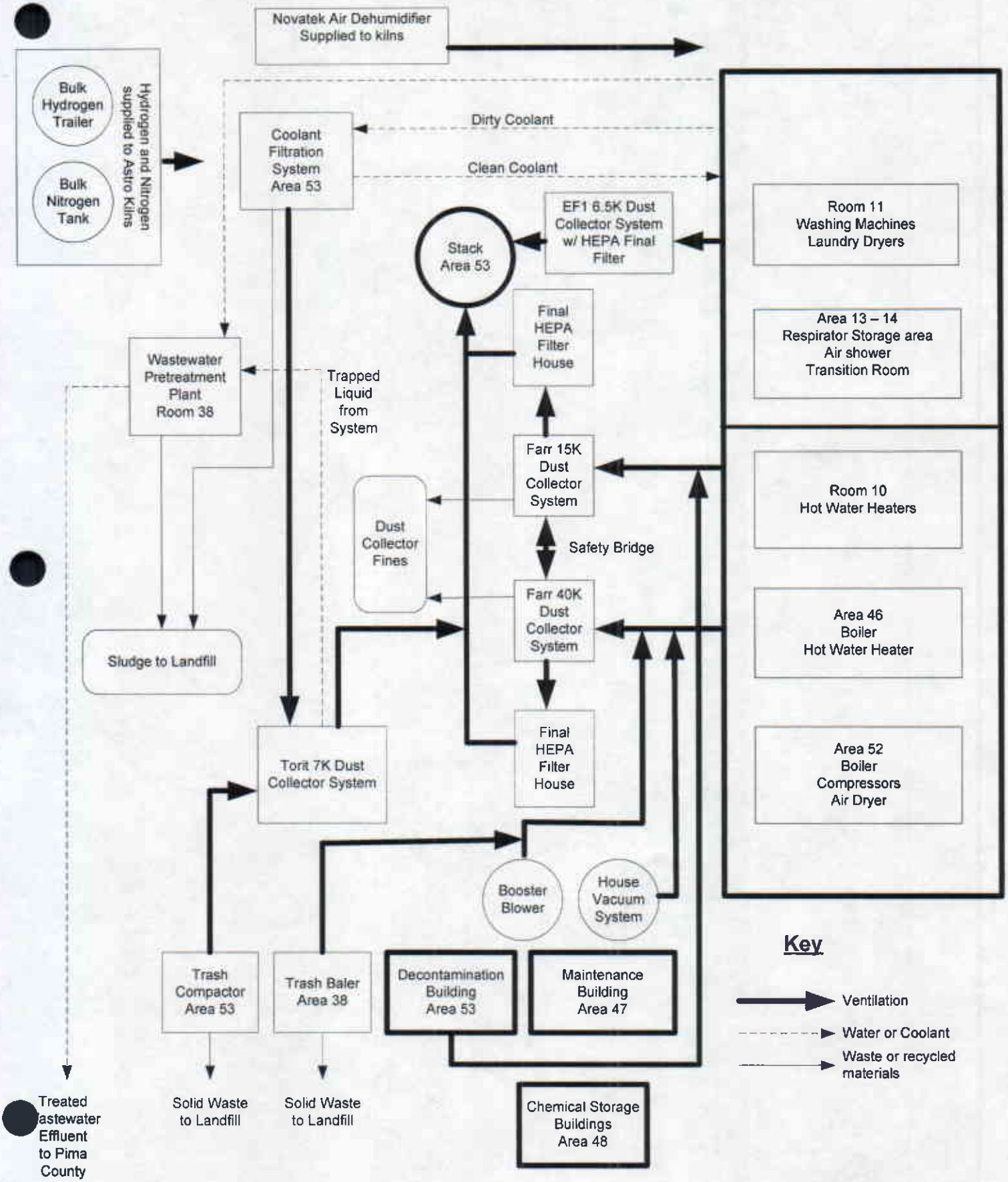
Out Buildings – Decontamination, Maintenance and Chemical Storage – The decontamination building houses a high pressure hot water system that is used for

cleaning potentially contaminated materials. Ventilation is provided by the 15K Farr dust collection system. The maintenance building houses maintenance supplies and machinery used to maintain the facility. No beryllium containing materials are allowed in this building and therefore there is no dust collection present. The chemical storage buildings are separated into two sections. Section 1 contains all the solvents and oil products and section 2 contains all the acids and bases and some of the nickel platting chemicals.

Description of product(s) - there are no products produced in these areas.

Facilities Areas

Rooms 11 / 10 / 38 / 45 / 47 / 48 / 52 / 53



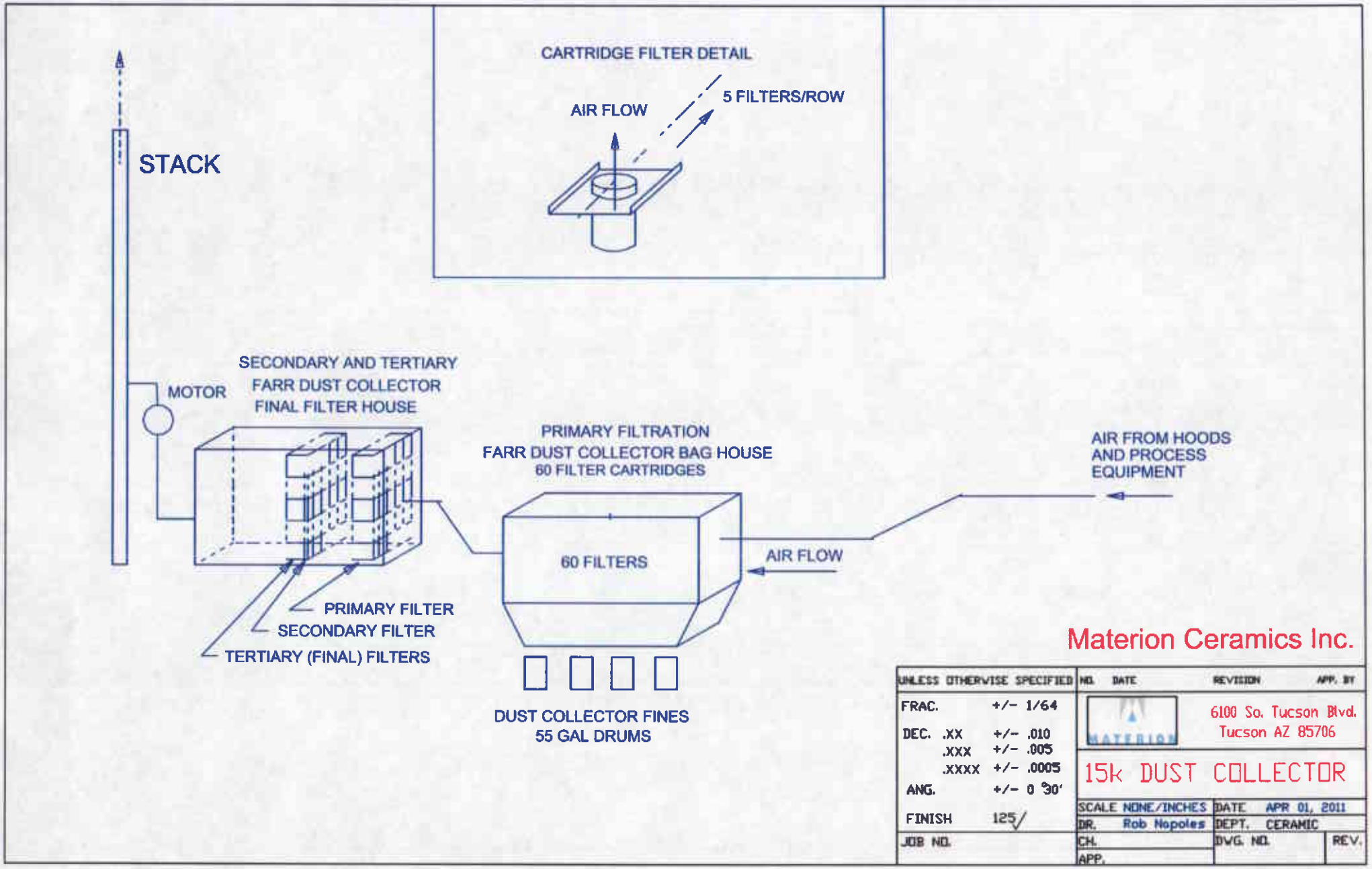
KILNS, METALLIZING EQUIPMENT AND WASTEWATER TREATMENT EQUIPMENT

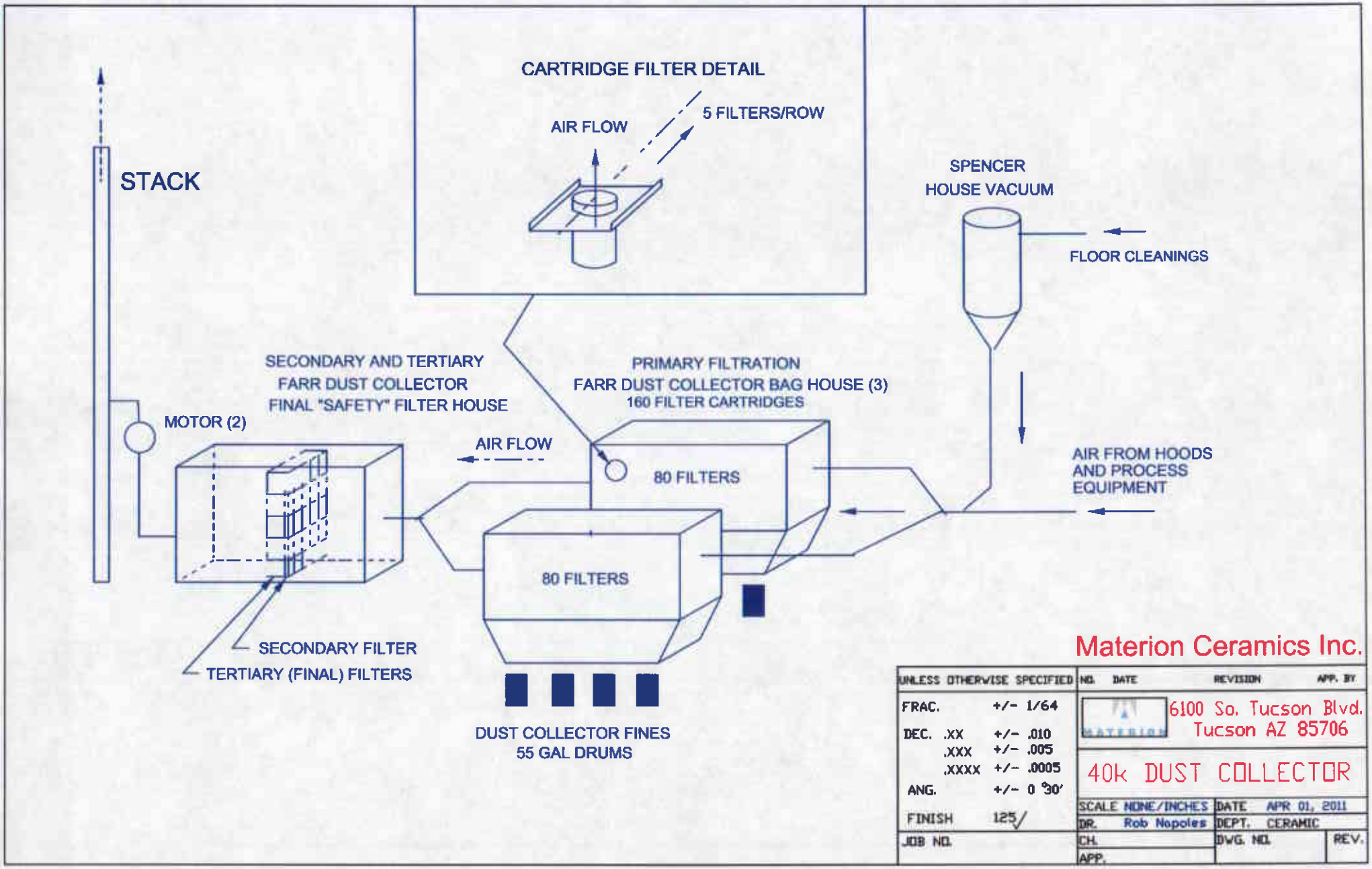
Equipment that does not transfer or generate beryllium oxide particulates

EQUIP NO	Equipement Description	Equipment Room	Ventilation Source	Emission Point
0501	COOLANT RETURN SYSTEM-DRILLING	ROOM 37 LASER MACH	40K	STACK
1031	NICKEL PLATTING LINE	ROOM 19 NI PLATE	AMBIENT	AMBIENT
1038	WATER EVAPORATOR (Electric)	ROOM 18 NI PLATE WASTEWATER	AMBIENT	AMBIENT
1051	SCREEN PRINTER	ROOM 30 CLEAN RM	NA	ROOM 30
1055	VACUUM OVEN	ROOM 30 CLEAN RM	NA	ROOM 30
1065	ROLL COATER-SPEC/APPS PARTS	ROOM 30 CLEAN RM	NA	ROOM 30
4501	PK-1 KILN	ROOM 17 SM KILN	40K	STACK
4502	PK-2 KILN	ROOM 17 SM KILN	40K	STACK
4503	PK-3 KILN	ROOM 17 SM KILN	40K	STACK
4504	PK-4 KILN	ROOM 28 LGE KILN	40K	STACK
4505	PUSHER KILN	ROOM 25 N END	NA	ROOM 25
4506	CM KILN	ROOM 32 PRESSING	NA	ROOM 32
4507	PK-7 KILN	ROOM 28 LGE KILN	40K	STACK
4508	PK-8 KILN	ROOM 28 LGE KILN	40K	STACK
4509	PK-9 KILN	ROOM 28 LGE KILN	40K	STACK
4510	PK-10 KILN	ROOM 28 LGE KILN	40K	STACK
4512	TK-2 KILN	ROOM 25 N END	40K	STACK
4514	TK-4 KILN	ROOM 28 LGE KILN	40K	STACK
4515	BLUE M	ROOM 17 SM KILN	40k	STACK
4516	PK-6 UNIQUE 2	ROOM 17 SM KILN	40k	STACK
4517	PK-12 KILN	ROOM 17 SM KILN	40K	STACK
4521	PK-11 KILN	ROOM 28 LGE KILN	40K	STACK
4537	SAMPLE KILN	ROOM 32 PRESSING	NA	ROOM 32
4538	SAMPLE KILN	ROOM 32 PRESSING	NA	ROOM 32
4539	SAMPLE KILN	ROOM 32 PRESSING	NA	ROOM 32
1036	ASTRO FURNACE 2	ROOM 29 ASTRO RM	40K	STACK
1090	ASTRO FURNACE 4	ROOM 29 ASTRO RM	40K	STACK
1091	LINDBERG FURNACE	ROOM 29 ASTRO RM	40K	STACK
3056	OVEN-200^ ISOTEMP 500 SERIES	ROOM 43 MAT PREP	40 K	STACK
5313	FIBER KILN - SMALL (Electric)	ROOM 32 PRESSING	ROOM 32 PRESSING	ROOM 32
5314	FIBER KILN - LARGE (Electric)	ROOM 28 LGE KILN	ROOM 28 LGE KILN	ROOM 28

APC EQUIPMENT LIST

Description	Make	Serial No.	Date of Manufacture	Type	Capacity
Farr dust collector system					15,000 CFM
- Fan	Brod & McClung – Pace Co.	84-48116-01	1984	Electric	
- Cartridge filter housing	Farr APC	84DC0915	1984	N/A	
Cartridge filter	Farr APC or equivalent	N/A	N/A	95.95%	
-Final filter housing	Farr APC	5024 (BCP internal part no.)	1984	N/A	
Primary filter	Farr APC or equivalent	N/A	N/A	30%	
Secondary filter	Farr APC or equivalent	N/A	N/A	95%	
Final filter	Farr APC or equivalent	N/A	N/A	HEPA	
Farr dust collector system					40,000 CFM
- Fan	Brod & McClung – Pace Co.	80-37946-01	1980	Electric	
- Cartridge filter housing (east)	Farr APC	80-02	1980	N/A	
- Cartridge filter housing (west)	Farr APC	81DC0194	1980	N/A	
Cartridge filter	Farr APC or equivalent	N/A	N/A	95.95%	
- Final filter housing	Farr APC	800018	1980	N/A	
Secondary filter	Farr APC or equivalent	N/A	N/A	30%	
Final filter	Farr APC or equivalent	N/A	N/A	HEPA	
Torit dust collector system					7,000 CFM
- Fan	New York Blower Co.	M12245100	1995	Electric	
- Primary filter housing	Donaldson Torit	5105 (BCP internal part no.)	1985	N/A	
Wire mesh screen	Airsan Corp. or equivalent	N/A	N/A	N/A	
Mist stop filters	Purapak or equivalent	N/A	N/A	95%	
- Final filter housing	Donaldson Torit	5099 (BCP internal part no.)	1995	N/A	
Prefilter	Farr APC or equivalent	N/A	N/A	95%	
Final filter	Farr APC or equivalent	N/A	N/A	HEPA	
Hunt dust collector system (EF1)					6,500 CFM
- Fan	Loren Cook Co.	180 CIC	2001	Electric	(#12 & #13)
- Filter housing	Flanders / CSC Corp.	BG1-2H2W-2GGF-304-D1	2001	N/A	
Prefilter	Farr APC or equivalent	N/A	N/A	30%	
Rigaflow filter	Farr APC or equivalent	N/A	N/A	95%	
Prefilter	Farr APC or equivalent	N/A	N/A	30%	
Final filter	Farr APC or equivalent	N/A	N/A	HEPA	


CARTRIDGE FILTER DETAIL
AIR FLOW
5 FILTERS/ROW
STACK
MOTOR
SECONDARY AND TERTIARY
FARR DUST COLLECTOR
FINAL FILTER HOUSE
PRIMARY FILTRATION
FARR DUST COLLECTOR BAG HOUSE
60 FILTER CARTRIDGES
AIR FROM HOODS
AND PROCESS
EQUIPMENT
60 FILTERS
AIR FLOW
PRIMARY FILTER
SECONDARY FILTER
TERTIARY (FINAL) FILTERS
DUST COLLECTOR FINES
55 GAL DRUMS
Materion Ceramics Inc.
UNLESS OTHERWISE SPECIFIED
NO. DATE REVISION APP. BY
FRAC. +/- 1/64
DEC. .XX +/- .010
.XXX +/- .005
.XXXX +/- .0005
ANG. +/- 0 °30'
FINISH 125
JOB NO.
6100 So. Tucson Blvd.
Tucson AZ 85706
15k DUST COLLECTOR
SCALE NONE/INCHES
DATE APR 01, 2011
DR. Rob Napoles
DEPT. CERAMIC
CH.
APP.
DWG. NO.
REV.


CARTRIDGE FILTER DETAIL
AIR FLOW
5 FILTERS/ROW
STACK
SPENCER
HOUSE VACUUM
FLOOR CLEANINGS
SECONDARY AND TERTIARY
FARR DUST COLLECTOR
FINAL "SAFETY" FILTER HOUSE
PRIMARY FILTRATION
FARR DUST COLLECTOR BAG HOUSE (3)
160 FILTER CARTRIDGES
MOTOR (2)
AIR FLOW
80 FILTERS
AIR FROM HOODS
AND PROCESS
EQUIPMENT
80 FILTERS
SECONDARY FILTER
TERTIARY (FINAL) FILTERS
DUST COLLECTOR FINES
55 GAL DRUMS
Materion Ceramics Inc.
UNLESS OTHERWISE SPECIFIED
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.XXX +/- .005
.XXXX +/- .0005
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FINISH 125
JOB NO.
NO. DATE REVISION APP. BY
6100 So. Tucson Blvd.
Tucson AZ 85706
40k DUST COLLECTOR
SCALE NONE/INCHES
DATE APR 01, 2011
DR. Rob Napoles
DEPT. CERAMIC
CH.
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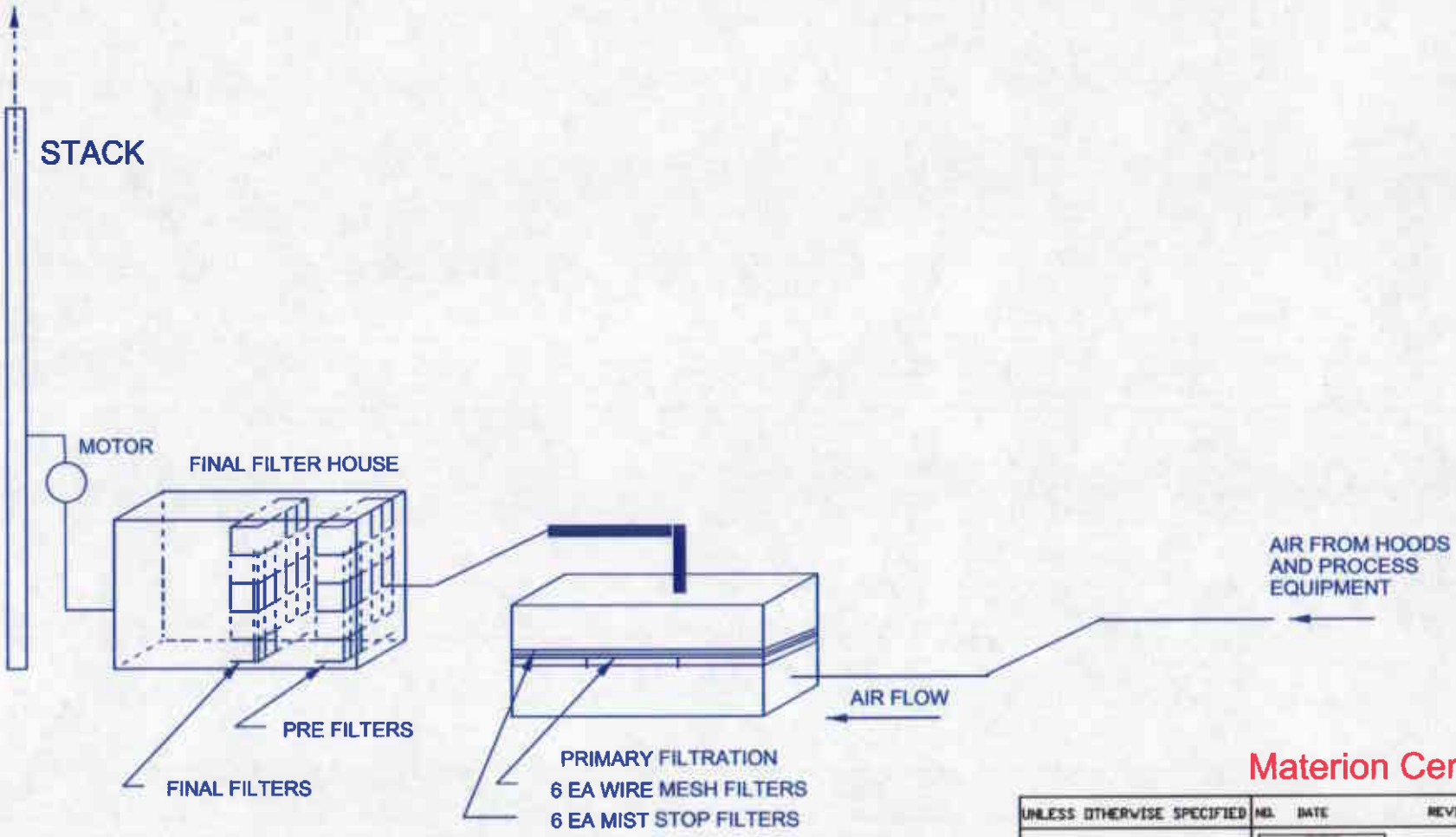
DWG. NO.
REV.



Materion Ceramics Inc.

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.XXX +/- .005				
.XXXX +/- .0005				
ANG. +/- 0 °30'				
FINISH 125√				
JOB NO.				

6100 So. Tucson Blvd.
Tucson AZ 85706

Torit 7K Dust collector

SCALE NONE/INCHES	DATE APR 01, 2011
DR. Rob Napoles	DEPT. CERAMIC
CH.	DWG. NO. REV.
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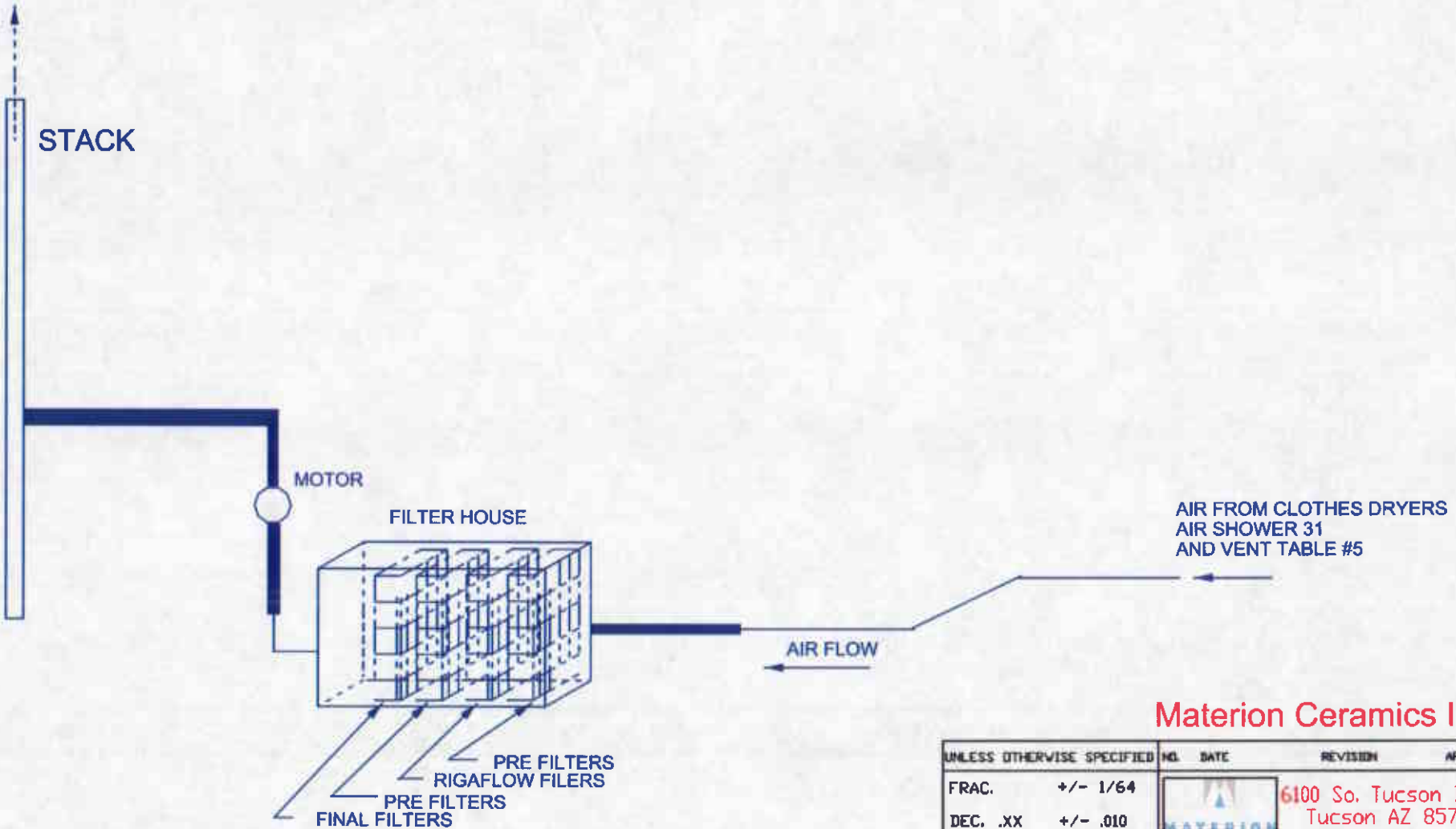

Materion Ceramics Inc.

UNLESS OTHERWISE SPECIFIED	NO.	DATE	REVISION	APP. BY
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DEC. .XX +/- .010				
.XXX +/- .005				
.XXXX +/- .0005				
ANG. +/- 0 30'				
FINISH 125				

6100 So. Tucson Blvd.
Tucson AZ 85706

Hunt (EF-1) System

SCALE NONE/INCHES	DATE APR 01, 2011
DR. Rob Napoles	DEPT. CERAMIC
CH.	DWG. NO. ■ REV.
APP.	
JOB NO.	

STACK INFORMATION

Identification: Facility main stack

Description: Exhaust stack for facility Farr, Torit and Hunt systems

Facility Dimensions: Approximately 420 feet long and 130 feet wide, 51,000 square feet in area.

Stack Exit Gas Temperature: 70-90 degrees Fahrenheit (primarily ambient)

Stack Exit Gas Velocity: 40-45 feet per second

Stack Height: 72 feet

Stack Inside Dimensions: 69.0 inches diameter, 25.967 square feet area

APPENDIX A

DUST COLLECTION SYSTEMS – LIST OF REFERENCED PROCEDURES AND FORMS

COPY OF APPLICABLE PROCEDURES AND FORMS

APC REFERENCED PROCEDURES AND FORMS

ISO DOCUMENT #	DOCUMENT TITLE	ISSUED / APPROVAL DATE
	PROCEDURES	
EV-3-0004	Emissions Prevention Plan	2/19/2008
EV-3-0009	Dust Collector Drum Changeout	4/9/2008
EV-3-0011	40K Final Safety Filter Change	10/12/2006
EV-3-0012	15K Final Safety Filter Change	10/12/2006
EV-3-0013	Torit Filter Change	10/12/2006
EV-3-0014	40K SSM (Startup/Shutdown/Malfunction) Plan	12/19/2008
EV-3-0015	15K SSM (Startup/Shutdown/Malfunction) Plan	12/19/2008
EV-3-0016	Torit SSM (Startup/Shutdown/Malfunction) Plan	12/19/2008
EV-3-0017	EF-1 SSM (Startup/Shutdown/Malfunction) Plan	12/19/2008
EV-3-0018	Clearance Sampling for BeO (Beryllium Oxide)	12/19/2008
EV-3-0019	BeO (Beryllium Oxide) Powder Spill Response	12/4/2009
EV-3-0052	Spenser House Vacuum SSM (Startup/Shutdown/Malfunction) Plan	7/8/2009
EV-3-0063	Dust Collector Inspection Procedure	4/1/2011
	FORMS	
EV-4-0059	40K Maintenance Log	3/11/2009
EV-4-0060	15K Maintenance Log	3/11/2009
EV-4-0061	Torit Maintenance Log	3/11/2009
EV-4-0062	EF-1 Maintenance Log	3/11/2009
EV-4-0069	Weekly APC Ventilation System Inspection Log	8/22/2008
EV-4-0085	Dust Collector Drum Changeout Log	4/11/2008
EV-4-0119	Spenser House Vacuum Maintenance Log	7/7/2009
EV-4-0132	Materion Facility Layout	4/25/2011

MATERION CERAMICS

EMISSIONS PREVENTION PLAN

Document number: **EV-3-0004**	Revision: **A**
Page 1 of 6	Original Issue date: 02/19/2008
Prepared by/Author: Mike Berakis	Approved by: John Scheatzle

1. PURPOSE

1.1. The facility's operations are subject to the National Emission Standard for Hazardous Air Pollutants (NESHAPS) for Beryllium (40 CFR 61, Subparts A and C).

1.2. Air Quality Operating Permit number 1571 is in place to ensure Materion Ceramics continues to monitor and report the functionality of air pollution control (APC) equipment. It also requires a comprehensive inspection and preventive maintenance program be in place. The APC systems are directly tied to the operation of a process and must be treated as any other piece of production equipment. For successful operation, each system will require:

- Routine Inspection
- Preventative Maintenance
- Quick Response to Malfunctions

2. SCOPE

2.1. This is a written procedure to ensure Materion Ceramics identifies all exhaust vents, doorways, and outside ductwork associated with APC equipment at the facility, and monitors these areas to prevent the release of beryllium emissions outside the facility.

3. REFERENCES /APPLICABLE DOCUMENTS

3.1. PDEQ Air Quality Operating Permit number 1571 issued November 2006
3.2. EV-3-0009 Dust Collector Drum Change Procedure dated 10/12/2006
3.3. EV-3-0011 40K Final Safety Filter Change Procedure 10/12/2006
3.4. EV-3-0012 15K Final Safety Filter Change Procedure 10/12/2006
3.5. EV-3-0013 6.5 Final Safety Filter Change Procedure 10/12/2006
3.6. EV-3-0014 40K SSM (start up shutdown malfunction) plan dated 7/02/2007
3.7. EV-3-0015 15K SSM plan dated 7/02/2007
3.8. EV-3-0016 Torit SSM plan dated 7/02/2007
3.9. EV-3-0017 EF-1 SSM plan dated 7/02/2007
3.10. EV-3-0018 Clearance sampling for BeO procedure dated 2/07/2007
3.11. EV-3-0019 BeO powder spill response procedure dated 2/07/2007
3.12. EV-4-0059 40K maintenance log dated 2/07/2007
3.13. EV-4-0060 15K maintenance log dated 2/07/2007
3.14. EV-4-0061 Torit maintenance log dated 2/07/2007
3.15. EV-4-0062 EF-1 maintenance log dated 2/07/2007
3.16. EV-4-0069 APC Inspection log dated 7/19/2007
3.17. EV-4-0072 - Attachment 1 Monitoring locations for APCs
3.18. EV-4-0073 - Attachment 2 Powered exhaust vent locations

3.19. EV-4-0074 - Attachment 3 Exits, doorway, and equipment access locations

4. DEFINITIONS

4.1. The 40,000 cubic feet per minute capacity HEPA filtered APC system (40K) that includes two eighty cartridge filter houses and one two stage final safety filter house.

4.2. The 15,000 cubic feet per minute capacity HEPA filtered APC system (15K) that includes one sixty cartridge filter house and one three stage final safety filter house.

4.3. The 7,000 cubic feet per minute capacity HEPA filtered APC system (Torit) that includes one multi-stage wet separator filter, one primary filter bank, and one final safety filter bank.

4.4. The 6,500 cubic feet per minute capacity HEPA filtered APC system (EF1) that includes one primary filter bank and one final safety filter bank.

4.5. All exhaust ductwork originating from the building to the APC equipment and from the APC equipment to the final stack.

4.6. All exits, doorways, or equipment access ways directly adjacent to the production areas listed in EV-4-0073, Attachment 2.

4.7. Powered exhaust vents 1 – 8 as listed in permit 1571 and shown in EV-4-0074 Attachment 3.

5. PROCEDURE

5.1. Daily Inspections

5.1.1. Pressure drop readings shall be recorded from the 40K, 15K, EF1, and the Torit APC systems each day the units are in operation. Readings shall be recorded on the APC Monitoring Log, EV-4-0069 and kept for a period of five years. The record shall include the date, time readings were made, the specific segment of the collection system to which the pressure drop applies, the value of the pressure drop noted on the gauge and the name or initials of the person making the reading.

5.1.2. Acceptable operating limits are outlined in the table below:

Dust Collection System Component	Segment	Operating Range (in. water gauge)	Failure Indication (in. water gauge)
40,000 CFM (A)	East Primary Cartridges	1.5 – 2.5	<0.1, >7.0
40,000 CFM (B)	West Primary Cartridges	1.5 – 2.5	<0.1. >7.0
40,000 CFM (D)	Final filters	0.4 – 2.4	<0.1, >7.0
15,000 CFM (C)	Primary Cartridges	1.5 – 2.5	<0.1, >7.0
15,000 CFM (E)	Final filters	0.4 – 1.5	<0.1, >7.0
7,000 CFM (F)	Final filters	0.4 – 2.4	<0.1, >7.0
6,500 CFM (G)	All Filters	1.5 – 4.0	<0.1, >7.0

5.1.3. If any APC system segment reading falls outside of the listed operating range, the Start up Shut down Malfunction plan for the corresponding unit shall be followed (EV-4-0059, EV-4-0060, EV-4-0061, and EV-4-0062).

5.1.4. The upper value in the operating range shall act as the trigger point for scheduling a filter / cartridge change. The change procedure for the corresponding unit shall be followed (EV-3-0011, EV-3-0012, EV-3-0013).

5.2. Weekly Inspections

5.2.1. The physical components of the APC systems shall be visually inspected. This inspection shall include but not be limited to:
5.2.1.1. Ductwork outside the facility, to ensure mechanical integrity
5.2.1.2. Expansion joints, to look for cracks or other leaks
5.2.1.3. Structures, to look for cracks, excessive corrosion and general overall condition

5.2.2. The 8 powered exhaust vents listed in Table III of permit 1571 shall be inspected for physical integrity, condition, operation, and the absence of any visible emission or evidence of emission on the area surrounding the vent.

5.2.3. All doorways specified in EV-4-0074, Attachment 3 of this plan (any exit that is directly from a beryllium processing area) shall be inspected to ensure good physical integrity, proper operating condition, and the absence of any visible emission or evidence of emission in the area surrounding the doorway.

5.2.4. Collection drum levels will be inspected for the level of material collected and integrity of the drum.
5.2.4.1. When dust collection drums are ¾ full, as found by light tapping on the side of the drum, the drum will be scheduled for change out following EV-3-0009 as soon as practicable by initiating a work order. The work order notification number must be listed on EV-4 -0069.

5.2.5. Weekly inspections shall be recorded on the APC inspection log EV-4-0069 and maintained for a period of five years. Records shall include the date, initials of the person making the inspection, system problems / corrective actions, or incident number reference for any issues found.

5.2.6. Any work, start up, shut down, filter change, or repair done on the APC equipment shall be recorded in the respective system maintenance log (EV-4-0059, EV-4-0060, EV-4-0061, and EV-4-0062).

5.2.7. Upon discovery, any problem, full drum, or discrepancy found during a weekly inspection will be recorded on an APC inspection log EV-4-0069 Closure of the discrepancy will be managed in the work order system or under the incident response program. Repetitive annotations on subsequent weekly inspection logs are not necessary once a problem or discrepancy has been identified.

5.3. Incidental Response

5.3.1. Any possible emissions or visible BeO outside production areas, notify EH&S and follow EV-3-0018 Clearance sampling for BeO.

5.3.2. Any in plant spill or upset condition follow BeO powder spill response procedure EV-3-0019 to prevent any beryllium emissions from escaping the facility.

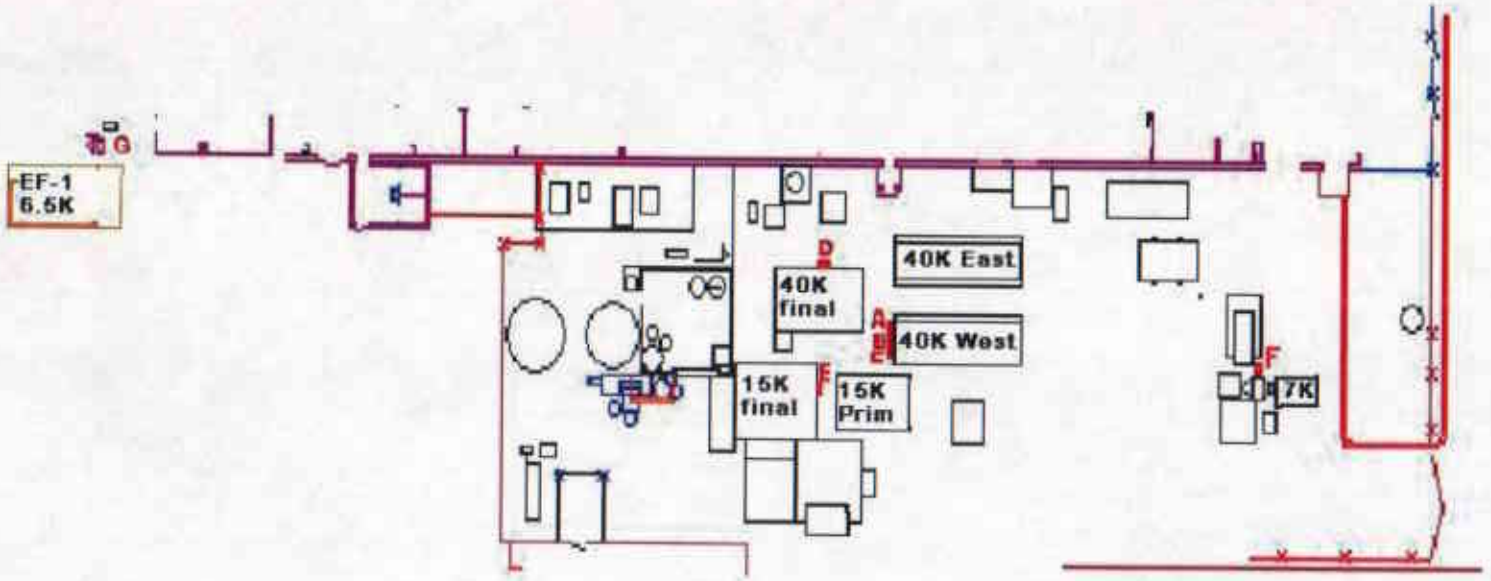
6. ATTACHMENTS

6.1. EV-4-0073 - Attachment 2 Powered exhaust vent locations
6.2. EV-4-0074 - Attachment 3 Exits, doorway, and equipment access locations

7. REVISION HISTORY

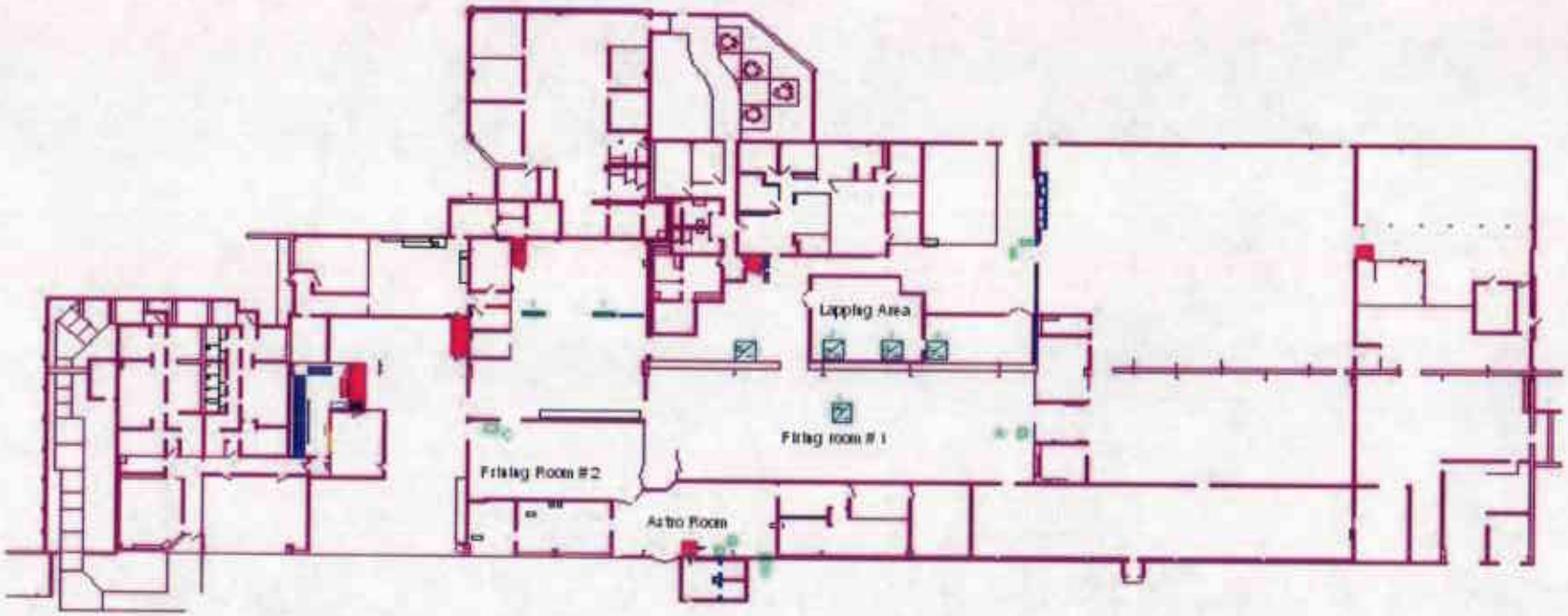
7.1. DCR# 1540 – New Document

Attachment # 1 Emissions Prevention Plan
Monitoring locations for APCs (A-G)



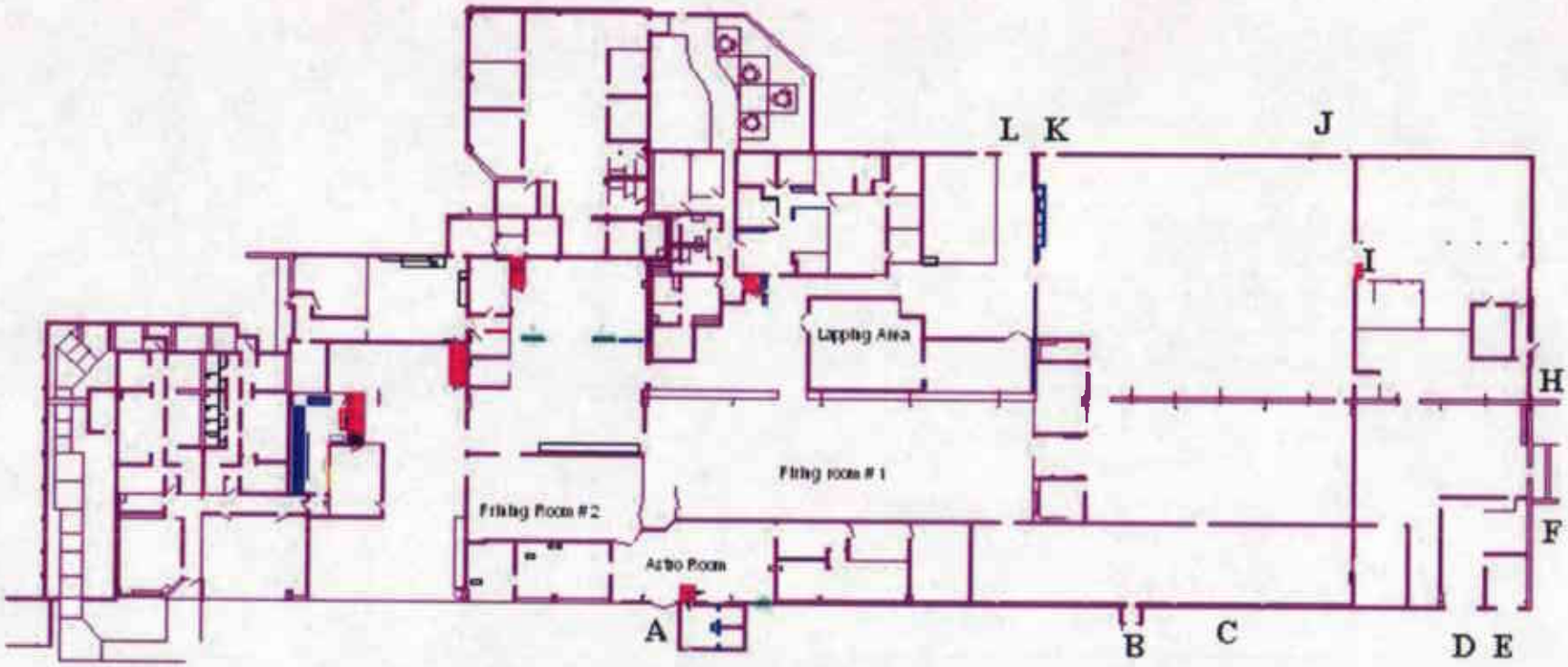
40K - East Primary	"A"	Operating range 1.5 - 2.5
40K - West Primary	"B"	Operating range 1.5 - 2.5
40K - Final Filters	"D"	Operating range 0.4 - 2.4
15K - Primary	"C"	Operating range 1.5 - 2.5
15K - Final Filters	"E"	Operating range 0.4 - 1.5
7K - Final Filters	"F"	Operating range 0.4 - 2.4
6.5K - All Filters	"G"	Operating range 1.5 - 4.0

Attachment #2 Emissions Prevention Plan
Powered exhaust vent locations



Power for fans designated by letters A - D
"A" located in firing room #1 controls vents 1,4,5
"B" Located adjacent to pressing area controls vents 2,3
"C" Located in firing room #2 controls vents 6,7

Attachment # 3 Emissions Prevention Plan
Exits, doorway and equipment access locations



MATERION CERAMICS

DUST COLLECTOR DRUM CHANGE OUT

Document Number: **EV-3-0009**	Revision: **C**
Page 1 of 3	Original Issue date: 04/09/08
Prepared by/Author: Richard Manes	Approved by: Ken Harrison

1. PURPOSE

1.1 The purpose of this work instruction is to identify steps involved in the changing out of a dust collector drum. This work instruction must be adhered to at all times in order to protect the worker(s) and the environment. This process will be scheduled when the drum level is ¾ full as specified within the facility's air quality permit.

2. APPLICABLE DOCUMENTS

2.1 EV-4-0085 Dust Collector Drum Change Out Log
2.2 EV-4-0059 40K Maintenance Log
2.3 EV-4-0060 15K Maintenance Log
2.4 EV-4-0069 Weekly APC Ventilation System Inspection Sheet

3. EQUIPMENT/ACCESSORIES

Setup Equipment	**Drum Change Out Kit**
HEPA filtered shop vacuum	Paint stick
Drum area enclosure	Mallet
Pails (for water)	15/16 socket and wrench
Empty open top steel drum (DOT Approved)	Box of gloves
Particulate protective suit	Plastic bags (to cover blast gate)
Respirator (PF of 1000 minimum)	Plastic ties
PPE (Particulate resistant suit and two pairs of gloves with the first pair taped to the sleeve of the suit.	Side cutting pliers
HEPA filtered negative pressure air machine	Vinyl tape
Drum dolly	Trash bags
6mil (or equivalent) plastic sheeting	3/16 Allen wrench
	Razor knife
	Respirator cleaning supplies
	Sponges
	Duct tape

	Leveling bar

4. PROCEDURE

4.1 Responsibilities

4.1.1 All employees required to perform this task are responsible for being aware of this procedure and following the rules outlined in Section 4.2 below.

4.1.2 Any supervisor of an employee required to perform this task is responsible for ensuring that the rules outlined in Section 4.2 below are completely understood prior to initiation of the task.

4.2 Preparation

4.2.1 Spray down drum area with water or use a HEPA filtered vacuum cleaner to remove debris (i.e. leaves and dirt) and to clean surfaces prior to containment construction.

4.2.2 Assemble all necessary equipment and accessories.

4.2.3 Place a new DOT approved 55 gallon steel drum inside the containment. Remove the retaining ring and lid first.

4.2.4 Isolate the area around the drum with the containment structure.

4.2.5 Position the HEPA filtered negative air machine outside of the containment area on the opposite side of entrance door.

4.2.6 Connect the negative air machine to the containment.
Turn on negative air machine and verify that the pressure drop, as read on the magnahelic, is not at or above the manufacturer's recommendation of 3.2 inches of water. If the pressure drop is at or greater that 3.2 inches of water, then do not use the equipment until the filter is changed and the pressure drop is below 3.2 inches of water.-Log the negative air machine pressure drop in the designated collector maintenance log.

4.2.7 Shut off plant air supply to blow down system.

4.2.8 Properly don all required personal protective equipment (i.e. respirator, gloves and particulate resistant suit). At a minimum put on two (2) pair of gloves and tape the inner glove to the sleeve of the suit.

4.3 Drum Change

4.3.1 Close blast gate of drum to be changed and remove blast gate bag.

4.3.2 Place used blast gate bag in plastic garbage bag.

4.3.3 Tap down hopper chute and drum with mallet.

4.3.4 Remove retaining ring and vinyl tape from lid of full drum.

4.3.5 Lift hopper lid and remove full drum from under hopper.

4.3.6 Place new drum under hopper lid and lower lid onto drum.

4.3.7 Place lid on full drum and seal with vinyl tape.

4.3.8 Install retaining ring around rim of full drum.

4.3.9 Install retaining ring around rim of hopper lid.

4.3.10 Use vacuum hose as necessary to clean area.

4.3.11 Open blast gate and wet wipe all blast gate surfaces with a sponge.

4.3.12 Place a new bag over the blast gate and seal with vinyl tape.

4.3.13 Wipe all interior containment and drum surfaces with wet sponge.

4.3.14 Remove all personal protective equipment except respirator and place in plastic garbage bag. Seal bag with tape and exit containment area. Respirator can be removed outside the containment area.

4.3.15 Verify that the pressure drop is still below 3.2 inches of water and place a cover over intake end of negative air machine while in operation and seal with duct tape. Turn off negative air machine and return to storage area.

4.3.16 Remove full drum from hopper area with forklift and place under waste ramada.

4.3.17 Place sealed garbage bags in the BeO contaminated trash.

4.4 Completion

4.4.1 Mark new drum with start date.

4.4.2 Mark full drum with removal date and proper labeling.

4.4.3 Record in log EV-4-0085 - Dust Collector Drum Change Out Log.

4.5 Reporting

4.5.1 If at any time during the dust collector drum change out process there are any discrepancies in normal operating conditions, an incident report must be filed and documented in the applicable maintenance collector log.

5. REVISION HISTORY

5.1 DCR# 1178 – New Document

5.2 DCR# 1714 – Revised, 04/01/08

5.3 DCR# 2249 – Revised, 04/07/10, to identify PPE and clarify requirements and operational parameters for the negative air machine.

MATERION CERAMICS

40K FINAL SAFETY FILTER CHANGE

Document number: **EV-3-0011**	Revision: **A**
Page 1 of 5	Original Issue date: 10/12/06
Prepared by/Author: Mike Berakis	Approved by: John Scheatzle

1. **PURPOSE**
   1.1 The purpose of this work instruction is to identify all necessary steps involved in the changing out of the final safety filers in the 40K dust collection system. This work instruction must be adhered to at all times in order to protect the worker(s) and the environment. This process will be scheduled when the pressure drop across the filters reaches the upper operating range.

2. **APPLICABLE DOCUMENTS**
   2.1 EV-4-0059 – 40K Collector Maintenance Log

3. **EQUIPMENT/ACCESSORIES**
   3.1 6 mil Polyethylene sheeting / Containment
   3.2 6 mil Polyethylene garbage bags
   3.3 Duct tape
   3.4 PVC pipe
   3.5 Wet/dry HEPA vacuum
   3.6 Empty open top steel drum
   3.7 Particulate resistant suits
   3.8 Protective gloves
   3.9 Respirators of 1000 PF or higher
   3.10 HEPA filtered negative pressure air machine
   3.11 Mops and buckets
   3.12 HEPA vacuum
   3.13 Airless paint sprayer
   3.14 Waste boxes
   3.15 Encapsulant (Latex Paint)

4. **PROCEDURE**
   4.1 Responsibilities
      4.1.1 All employees required to perform this task are responsible for being aware of this procedure and following the rules outlined in Section 4.2 below.

4.1.2 Any supervisor of an employee required to perform this task is responsible for ensuring that the rules outlined in Section 4.2 below are completely understood prior to initiation of the task.

4.1.3 This procedure will be audited by the supervisor of the project and documented in the maintenance log EV-4-0059.

4.2 Preparation

4.2.1 Assemble all necessary equipment and accessories.

4.2.2 Build decontamination containment room around the final filter inlet side entry door to the 40K final filter.

4.2.3 Attach the HEPA filtered negative air machine to the decontamination containment room, turn the unit on to "High" and verify DP is with in the specified range. (If the range is not with in parameters do not operate the unit, do not proceed with cartridge change)

4.2.4 Log negative air machine DP in log, EV-4-0059.

4.3 40K Dust Collector Shutdown

4.3.1 Open safety bridge leading to the 40K dust collection system to maintain negative pressure in the facility dust collection systems.

4.3.2 Mechanically shut down the 40K dust collection system

4.4 Personal protective equipment donning

4.4.1 All personnel entering the decontamination containment and/or the 40K final safety filter housing shall don two particulate resistant suits, gloves and respirator.

4.5 Initiation of 40K final safety filter housing air flow control.

4.5.1 Start HEPA filtered negative air machine.

4.5.2 Open 40K final safety filter housing inlet and outlet side doors to initiate air flow control. Air flow should be moving from the clean side to the dirty side of the collector. If the air flow is not moving in this direction verify containment is set up correctly and HEPA negative air machine is operating properly.

4.6 Final safety filter removal.

4.6.1 Final filters will be wetted and the air misted with water prior to and during removal of all final safety filters.

4.6.2 Wetting and removal will be done from the inlet side.

4.6.3 Filters will then be placed in 6 mil polyethylene bag, sealed with duct tape, and placed in the decontamination containment.

4.6.4 Bagged filters will then be placed in another 6 mil polyethylene bag, sealed with duct tape, and placed in cart to be transported to facility decontamination building for disposal preparation.

4.7 40K Final safety filter housing cleaning.

4.7.1 All internal housing surfaces will be wet cleaned using water filled airless paint sprayer, sponges and a wet/dry HEPA filtered vacuum. Wet methods will be the primary means of particulate control used throughout this project to minimize airborne dust.

4.7.2 Upon completion of cleaning, all internal final safety filter housing surfaces will be coated with an encapsulant.

4.7.3 Decontamination containment room will be cleaned using wet methods. All surfaces of the containment will be wiped down using a wet sponge. Cleaning materials shall be placed in 6 mil polyethylene bag(s) and sealed with duct tape for disposal.

4.8 Final safety filter replacement.

4.8.1 All new final safety filters will be inserted in filter mounting rack. Care will be taken to ensure proper sealing of the filter gasket.

4.9 Personal protective equipment doffing and beryllium contaminant control.

4.9.1 All personnel exiting the final filter inlet side of the 40K final safety filter housing will remove their outer-most suit and place it in a 6 mil plastic bag prior to leaving the final filter inlet side area. Upon entering the decontamination containment they will then doff their final particulate protective suit in 6 mil plastic bag upon exiting decontamination containment.

4.9.2 All personnel exiting the final filter outlet side of the 40K final safety filter housing will remove outer-most particulate resistant suit and place in a 6 mil plastic bag. Immediately upon exiting the final filter outlet side door they will doff their final particulate protective suit in a 6 mil plastic bag.

4.9.3 Respirators will only be removed after exiting either the final filter outlet side of the 40K final safety filter housing or the decontamination containment room. Entry back into containment will require re-donning of PPE per section 4.4 of this procedure.

4.10 40K dust collector start up.

4.10.1 Both inlet and outlet side access doors to the final safety filter housing must be closed and sealed.

4.10.2 Mechanically start up 40K dust collection system.

4.10.3 Close safety bridge leading to the 15K dust collection system.

4.10.4 Record baseline DP readings in the collector maintenance log, EV-4-0059 and make note in the maintenance log of the baseline values.

4.11 Dye checking 40K final safety filters.

4.11.1 Fluorescent dye powder will be introduced upstream of the 40K final safety filters.

4.11.2 40K dust collection system will then be shut down using steps listed in paragraph 5.2 of this procedure.

4.11.3 40K final safety filter housing outlet side access door will be opened and black light will be used to identify any potential leaks of the fluorescent dye powder.

4.11.4 Record any leaks or adjustments made in the collector maintenance log, EV-4-0059. Also note the amount and color of dye used.

4.11.5 After dye check procedure is complete, 40K dust collector start up procedure will be followed as outlined in paragraph 4.10 of this procedure.

4.12 Performance verification.

4.12.1 The gauges showing pressure drop across the cartridges shall be observed to verify that the filters are operating within defined ranges.

4.12.2 Diatomaceous earth may be added to the system to Pre-coat the cartridges in the event the pressure drop is below the lower operational range.

4.13 Project completion.

4.13.1 Upon performance verification, the decontamination containment room will be disassembled. The plastic walls, ceiling and floor will be placed in 6 mil polyethylene bags and sealed with duct tape for disposal.

4.13.2 Prior to turning off the HEPA filtered negative air machine, the inlet shall be sealed.

4.13.3 All filters and potentially contaminated project debris shall be disposed of in accordance with applicable regulations.

4.13.4 Make any final notations in the collector maintenance log, EV-4-0059 regarding functionality of the system.

4.14 Inspections

4.14.1 The following will be inspected by the supervisor before, during, and upon completion of the cartridge change operation and the times documented in the collector maintenance log, EV-4-0059.

4.14.1.1 DP on the portable HEPA

4.14.1.2 Integrity of the containment

4.14.1.3 Any visible emissions released from the containment.

4.14.1.4 All personnel working on the project should be identified in the collector maintenance log EV-4-0059.

5. ATTACHMENTS

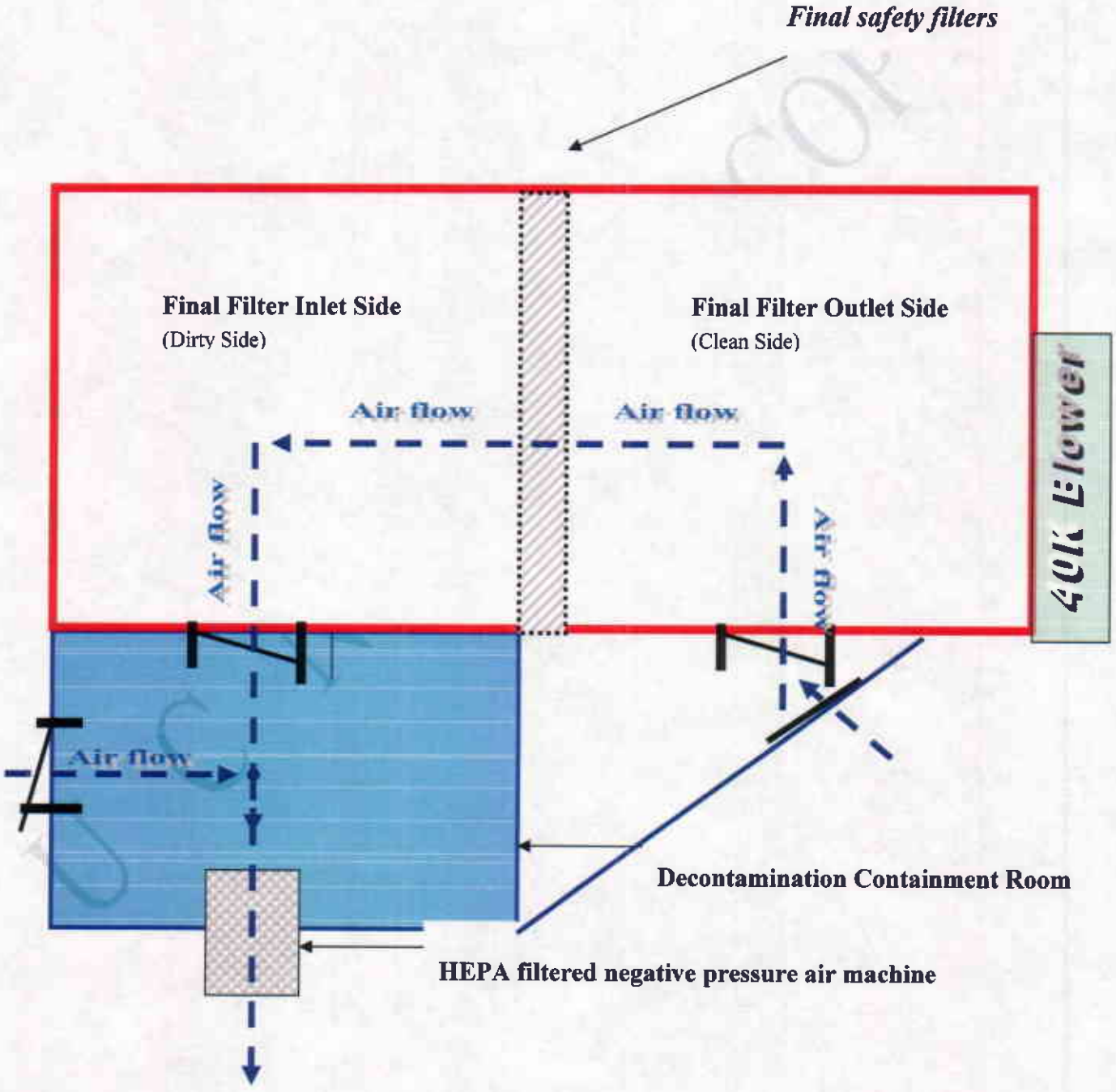
5.1 Appendix A - 40K final safety filter housing project diagram

6. REVISION HISTORY

6.1 DCR#1179 – New Document

Appendix A

40K Final Safety Filter Housing Project Diagram



MATERION CERAMICS

15K FINAL SAFETY FILTER CHANGE OUT

Document number: **EV-3-0012**	Revision: **A**
Page 1 of 5	Original Issue date: 10/12/06
Prepared by/Author: Mike Berakis	Approved by: John Scheatzle

1. PURPOSE

1.1 The purpose of this work instruction is to identify all necessary steps involved in the changing out of the final safety filers in the 15K-dust collection system. This work instruction must be adhered to at all times in order to protect the worker(s) and the environment. This process will be scheduled when the pressure drop across the filters reaches the upper operating range.

2. APPLICABLE DOCUMENTS

2.1 EV-4-0060 – 15K Collector Maintenance Log

3. EQUIPMENT/ACCESSORIES

3.1 6 mil Polyethylene sheeting / containment
3.2 6 mil Polyethylene garbage bags
3.3 Duct tape
3.4 PVC pipe
3.5 Wet/dry HEPA vacuum
3.6 Empty open top steel drum
3.7 Particulate resistant suits
3.8 Protective gloves
3.9 Respirators of 1000 PF or higher
3.10 HEPA filtered negative pressure air machine
3.11 Mops and buckets
3.12 HEPA vacuum
3.13 Airless paint sprayer
3.14 Waste boxes
3.15 Encapsulant (Latex Paint)

4. PROCEDURE

4.1 Responsibilities

4.1.1 All employees required to perform this task are responsible for being aware of this procedure and following the rules outlined in Section 4.2 below.

4.1.2 Any supervisor of an employee required to perform this task is responsible for ensuring that the rules outlined in Section 4.2 below are completely understood prior to initiation of the task.

4.1.3 This work instruction will be audited by the supervisor of the project and documented in the collector maintenance log, EV-4-0060.

4.2 Preparation

4.2.1 Assemble all necessary equipment and accessories.

4.2.2 Build decontamination containment room around the final filter inlet side entry door to the 15K final filter housing.

4.2.3 Attach the HEPA filtered negative air machine to the decontamination containment room, turn the unit on to "High" and verify DP is within the specified range. (If the range is not with in parameters do not operate the unit, do not proceed with cartridge change)

4.2.4 Log negative air machine DP in collector maintenance log EV-4-0060.

4.3 15K dust collector shutdown

4.3.1 Open safety bridge leading to the 40K-dust collection system to maintain negative pressure in the facility dust collection systems.

4.3.2 Mechanically shut down the 15K-dust collection system.

4.4 Personal protective equipment donning

4.4.1 All personnel entering the decontamination containment and/or the 15K final safety filter housing shall don two particulate resistant suits, gloves and a respirator.

4.5 Initiation of 15K final safety filter housing air flow control.

4.5.1 Start HEPA filtered negative air machine

4.5.2 Open 15K final safety filter housing inlet and outlet side doors to initiate air flow control. Air flow should be moving from the clean side to the dirty side of the collector. If the air flow is not moving in this direction verify containment is set up correctly and HEPA negative air machine is operating properly.

4.6 Final safety filter removal.

4.6.1 Final filters will be wetted and the air misted with water prior to and during removal of all final safety filters.

4.6.2 Wetting and removal will be done from the inlet side.

4.6.3 Filters will then be placed in 6-mil polyethylene bag, sealed with duct tape, and placed in the decontamination containment.

4.6.4 Bagged filters will then be placed in another 6-mil polyethylene bag, sealed with duct tape, and placed in cart to be transported to facility decontamination building for disposal preparation.

4.7 15K Final safety filter housing cleaning.

4.7.1 All internal housing surfaces will be wet cleaned using a water filled airless paint sprayer, sponges and a wet/dry HEPA filtered vacuum. Wet methods will be the primary means of particulate control used throughout this project to minimize airborne levels.

4.7.2 Upon completion of cleaning, all internal final safety filter-housing surfaces will be coated with an encapsulant.

4.7.3 Decontamination containment room will be cleaned using wet methods. All surfaces of the containment will be wiped down using a wet sponge.

Cleaning materials shall be placed in 6-mil polyethylene bag(s) and sealed with duct tape for disposal.

4.8 Final safety filters replacement.

4.8.1 All new final safety filters will be inserted in filter mounting rack. Care will be taken to ensure proper sealing of the filter gasket.

4.9 Personal protective equipment doffing and beryllium contaminant control.

4.9.1 All personnel exiting the final filter inlet side of the 15K final safety filter housing will remove their outer-most suit and place it in a 6 mil plastic bag prior to leaving the final filter inlet side area. Upon entering the decontamination containment they will then doff their final particulate protective suit in 6-mil plastic bag upon exiting decontamination containment.

4.9.2 All personnel exiting the final filter outlet side of the 15K final safety filter housing will remove outer-most particulate resistant suit prior to exiting this area in a 6 mil plastic bag. Immediately upon exiting the final filter outlet side door they will doff their final particulate protective suit in a 6 mil plastic bag.

4.9.3 Respirators will only be removed after exiting either the final filter outlet side of the 15K final safety filter housing or the decontamination containment room.

4.9.4 Entry back into containment will require re-donning of PPE per section 4.4 of this procedure.

4.10 15K dust collector start up.

4.10.1 Both inlet and outlet side access doors to the final safety filter housing must be closed and sealed.

4.10.2 Mechanically start up 15K-dust collection system.

4.10.3 Close safety bridge leading to the 40K-dust collection system.

4.10.4 Record baseline DP readings in the collector maintenance log EV-4-0060.

4.11 Dye checking 40K final safety filters.

4.11.1 Fluorescent dye powder will be introduced upstream of the 40K final safety filters.

4.11.2 15K-dust collection system will then be shut down using steps listed in paragraph 4.3 of this procedure.

4.11.3 15K final safety filter housing outlet side access door will be opened and black light will be used to identify any potential leaks of the fluorescent dye powder.

4.11.4 Record any leaks or adjustments made in the collector maintenance log EV-4-0060. Also, note the amount and color of dye used. After dye check procedure is complete, 15K-dust collector start up procedure will be followed as outlined in paragraph 4.10 of this procedure.

4.12 Performance verification.

4.12.1 The magnahelic gauges showing pressure drop across the final safety filters shall be observed to verify that the filters are within the operating rages.

4.12.2 Diatomaceous earth may be added to the system to Pre-coat the cartridges in the event the pressure drop is below the lower operational range.

4.13 Project completion

4.13.1 Upon performance verification, the decontamination containment room will be disassembled. The plastic walls, ceiling and floor will be placed in 6 mil polyethylene bags and sealed with duct tape for disposal.

4.13.2 Prior to turning off the HEPA filtered negative air machine, the inlet shall be sealed to prevent any potential release of contamination from the filter surface.

4.13.3 All filters and potentially contaminated project debris shall be disposed of in accordance with applicable regulations.

4.13.4 Make any final notations in the collector maintenance log regarding functionality of the system.

4.14 Inspections

4.14.1 The following will be inspected by the supervisor before, during, and upon completion of the cartridge change operation and documented in the collector maintenance log EV-4-0060.

4.14.2 DP on the portable HEPA

4.14.3 Integrity of the containment

4.14.4 Any visible emissions released from the containment.

4.14.5 All personnel working on the project should be identified in the collector maintenance log EV-4-0060.

5. ATTACHMENTS

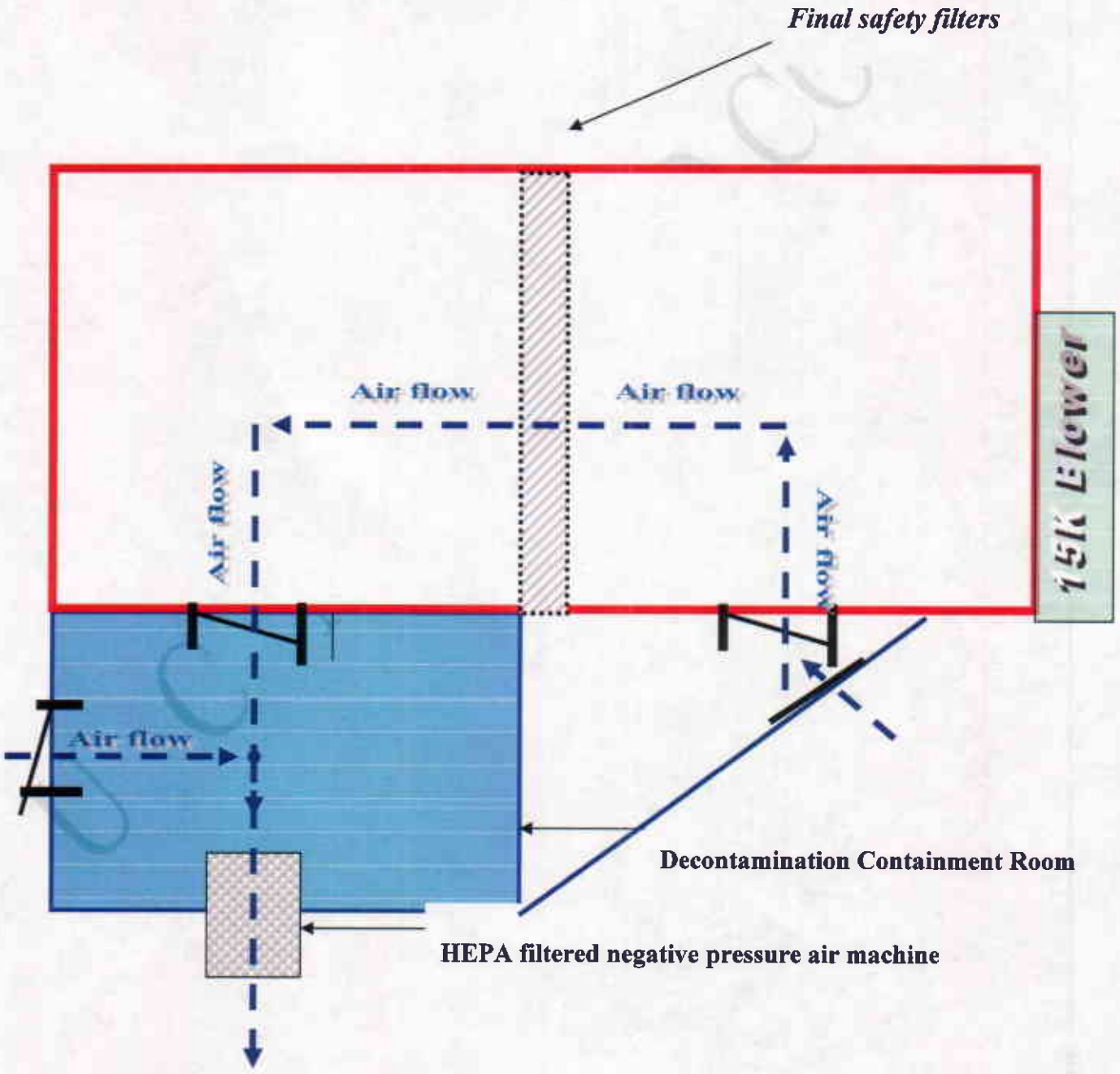
5.1 Appendix A - 15K final safety filter housing project diagram.

6. REVISION HISTORY

6.1 DCR#1180 – New Document

Appendix A

15K Final Safety Filter Housing Project Diagram



MATERION CERAMICS

TORIT FILTER CHANGE

Document number: **EV-3-0013**	Revision: **A**
Page 1 of 4	Original Issue date: 10/12/06
Prepared by/Author: Richard Manes	Approved by: Ken Harrison

1. PURPOSE

1.1 The purpose of this work instruction is to identify all necessary steps involved in the changing out of all filters in the Torit wet mist dust collection system. This work instruction must be adhered to at all times in order to protect the worker(s) and the environment. This process will be scheduled when the pressure drop across the filters reaches the upper operating range.

2. APPLICABLE DOCUMENTS

2.1 EV-4-0061 – Torit Collector Maintenance Log

3. EQUIPMENT

3.1 6 mil Polyethylene sheeting / containment
3.2 6 mil Polyethylene garbage bags
3.3 Duct tape
3.4 2' x 4' wood planking
3.5 Wet/dry HEPA vacuum
3.6 Empty open top steel drum
3.7 Particulate resistant suits
3.8 Protective gloves
3.9 Respirators of 1000 PF or higher
3.10 HEPA filtered negative pressure air machine
3.11 Mops and buckets
3.12 Airless paint sprayer
3.13 Encapsulant (latex paint)

4. PROCEDURE

4.1 Preparation

4.1.1 Assemble all necessary equipment and accessories.
4.1.2 Build containment room around the primary filter housing and the final filter.
4.1.3 Attach the HEPA filtered negative air machine to the ventilation port on the west side of the final filter housing, turn the unit on "High" and verify DP is with in the specified range. (If the range is not with in parameters do not operate the unit, do not proceed with filter change)

4.1.4 Log negative air machine DP in collector maintenance log EV-4-0061.

4.2 Torit wet mist collection system shutdown

4.2.1 Turn system off.

4.2.2 Plug main supply duct leading into primary filter housing. Blind off main duct located down stream of the Torit blower. This only needs to be performed if replacing HEPA filters in the final filter housing.

4.3 Personal protective equipment donning

4.3.1 All personnel entering the containment area of the Torit shall don two particulate resistant suits, impervious gloves and respirator.

4.4 Initiation of Torit filter housing air flow control.

4.4.1 Remove small access door from primary filter housing.

4.4.2 Turn on HEPA filtered negative air machine.

4.5 Primary filter and final filter removal.

4.5.1 All filters will be wetted and the air misted with water prior to their removal.

4.5.2 Filters will then be placed in 6-mil polyethylene bag, sealed with duct tape, and placed in the decontamination portion(s) of the Torit containment.

4.5.3 Bagged filters will then be placed in another 6-mil polyethylene bag, sealed with duct tape, and placed in cart to be transported to facility decontamination building for disposal preparation.

4.6 Torit filter housing cleaning.

4.6.1 All internal housing surfaces will be wet cleaned using water filled airless paint sprayer, sponges and a wet/dry HEPA filtered vacuum. Wet methods will be the primary means of particulate control used throughout this project to minimize airborne beryllium levels.

4.6.2 Upon completion of cleaning, all internal filter-housing surfaces will be coated with an encapsulant (latex paint) if needed.

4.6.3 All surfaces of Torit containment will be cleaned using wet methods. Cleaning materials shall be placed in 6-mil polyethylene bag(s) and sealed with duct tape for disposal.

4.6.4 Decontamination of the containment room will be done using wet methods. All surfaces will be wiped down using a wet sponge.

4.7 Filter replacement.

4.7.1 All new filters will be inserted in filter mounting racks. Care must be taken to ensure proper sealing of the filter gasket(s).

4.7.2 Remove main supply duct plug.

4.7.3 Remove blind off main duct located above Torit blower and upstream of final filter housing.

4.7.4 Reseal all filter access doors.

4.8 Personal protective equipment doffing and beryllium contaminant control.

4.8.1 All personnel exiting the Torit containment will remove their outer-most suit and place it in a 6 mil plastic bag prior to leaving main containment area. Upon entering the decontamination portion(s) of the containment they will then doff their final particulate protective suit in 6-mil plastic bag upon exiting.

4.8.2 Respirators will only be removed after exiting the Torit containment.

4.9 Torit system start up.

4.9.1 Both inlet and outlet side access doors to the final safety filter housing must be closed and sealed.

4.9.2 Mechanically start up Torit wet mist collection system.

4.9.3 Record baseline DP readings in the collector log book and make note in the maintenance log of the baseline values.

4.10 Dye checking Torit final safety filters.

4.10.1 Fluorescent dye powder will be introduced upstream of the Torit final safety filters.

4.10.2 Torit wet mist dust collection system will then be mechanically shut down.

4.10.3 Torit final safety filter housing outlet side access door will be opened and black light will be used to identify any potential leaks of the fluorescent dye powder. Record any leaks or adjustments made in the collector maintenance log EV-4-0061. Also note the amount and color of dye used.

4.10.4 After dye check procedure is complete, Torit wet mist dust collector start up procedure will be followed as outlined in paragraph 5.9 of this procedure. Additionally, dye check will only be performed when replacing the final HEPA filters. Entry back into containment will require re-donning PPE per section 4.3.

4.11 Performance verification.

4.11.1 The magnahelic gauges showing pressure drop across the Torit filters shall be observed to verify that the filters are within operating rages.

4.11.2 Diatomaceous earth may be added to the system to Pre-coat the cartridges in the event the pressure drop is below the lower operational range.

4.12 Project completion.

4.12.1 Upon performance verification, the Torit containment will be disassembled. The plastic walls, ceiling and floor will be placed in 6 mil polyethylene bags and sealed with duct tape for disposal.

4.12.2 Prior to turning off the HEPA filtered negative air machine, the inlet shall be sealed.

4.12.3 All filters and potentially contaminated project debris shall be disposed of in accordance with applicable regulations.

4.13 Inspections

4.13.1 The following will be inspected by the supervisor before, during, and upon completion of the cartridge change operation and the times documented in the collector maintenance log EV-4-0061 DP on the portable HEPA

4.13.2 Integrity of the containment

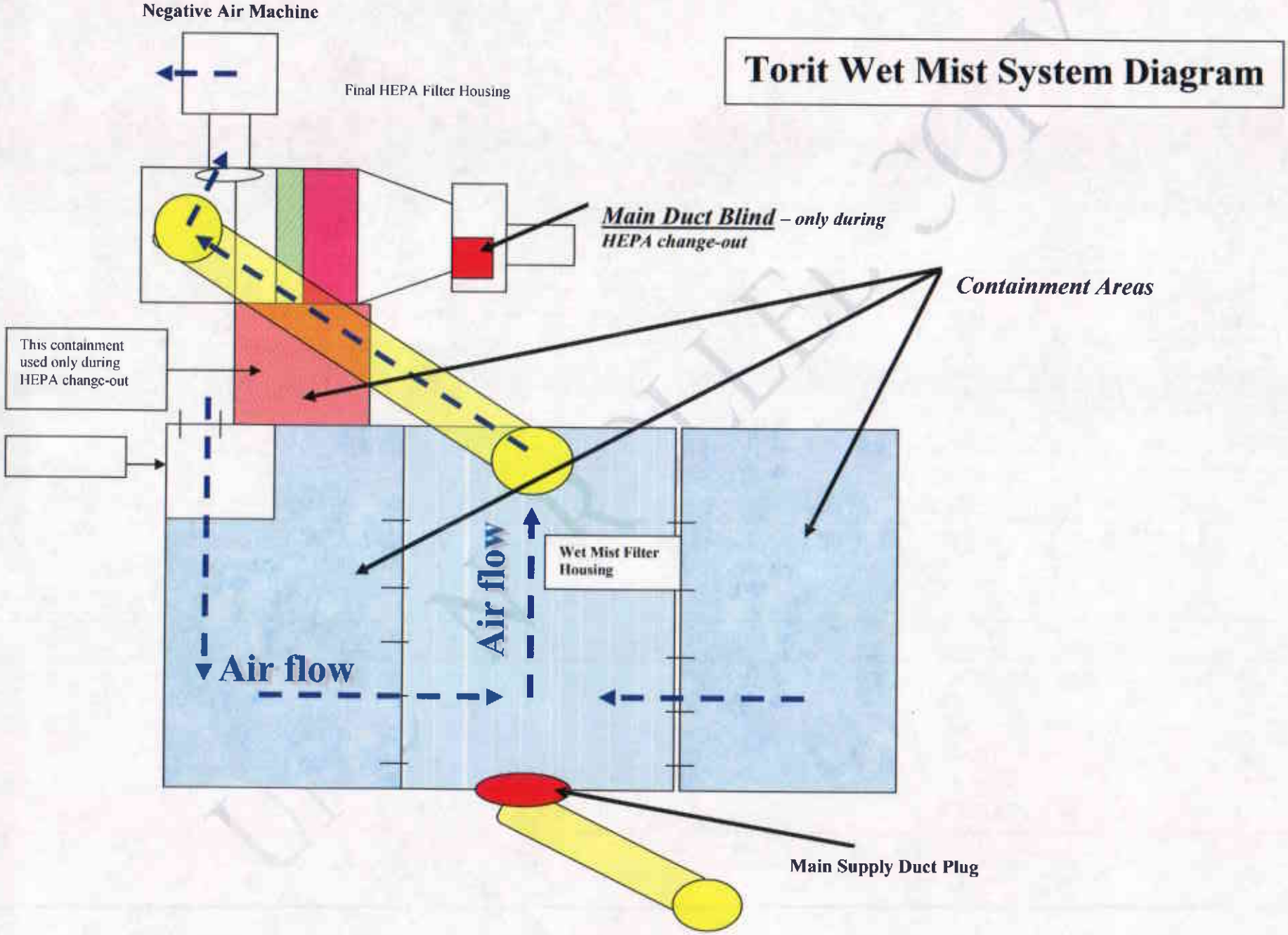
4.13.3 Any visible emissions released from the containment.

4.13.4 All personnel working on the project should be identified in the collector maintenance log EV-4-0061.

5. REVISION HISTORY

5.1 DCR#1181- New Document

Appendix A


Negative Air Machine
Final HEPA Filter Housing
Torit Wet Mist System Diagram
Main Duct Blind – only during HEPA change-out
Containment Areas
This containment used only during HEPA change-out
Wet Mist Filter Housing
Air flow
Air flow
Main Supply Duct Plug

MATERION CERAMICS

START UP, SHUTDOWN, MALFUNCTION PLAN FOR: 40,000 CFM DUST COLLECTOR SYSTEM (40K)

Document number: **EV-3-0014**	Revision: **A**
Page 1 of 4	Original Issue date: 02-19-08
Prepared by/Author: Mike Berakis	Approved by: John Scheatzle

1. PURPOSE

1.1 This procedure defines a standard method for the start up, shut down, and Malfunction of the 40,000 cfm Dust Collector System.

2. SCOPE

2.1 This procedure applies to Operations of 40,000 cfm Dust Collector System.

3. APPLICABLE DOCUMENTS

3.1 EV-4-0049 40 K maintenance log

4. DEFINITIONS

4.1 40K or 40,000 cfm Dust Collector System in this document will refer to all portions of that system outside the facility.

5. PROCEDURE

5.1 Start Up

5.1.1 The locations of the start up-shut down switches are on the east side of the 40K final filter house.

5.1.2 Place the "run / off" switch in "run" position.

5.1.3 Using an E-10 key, Place the "start up / run" switch in "start up" position.

5.1.4 Push the start button momentarily.

5.1.5 After unit starts, Use E-10 key and turn "run / start up" switch to "run".

5.1.6 In material prep room turn on MCC panel # 6 – 9 to start Booster blower and MCC panel #4 - 6 to start house vacuum system. If "hand/off/ auto" switches have been left in "hand" positions these two systems will start automatically with the 40K.

5.1.7 Verify dust collector is operating within the normal operating range. See excursion reaction plan in section 8.0 of this procedure.

5.1.8 Maintain differential pressure reading on all filters between 0.1 – 7.0 inches. Readings taken from photohelics "D", "A" and "B". The collector system must not run if gauge readings are below 0.1 or above 7.0. If either of these events occurs follow shut down procedure in section 5.2 of this procedure.

5.1.9 Log start up date, time and employees name in EV-4-0049 40K maintenance log.

5.2 Shut Down

5.2.1 Ensure all production affected by system has stopped by contacting production leader on duty.

5.2.2 Confirm all production affected by 15K has stopped and announce shut down of system over PA three times.

5.2.3 Place the "run / off" switch in "off" position.

5.2.4 Log date, time, employees name and reason for shut down in EV-4-0049.

5.3 Malfunction

5.3.1 If the malfunction has caused system shut down announce shut down of system over PA three times.

5.3.2 If the malfunction has caused system shut down ensure all production affected by system has stopped by contacting production leader on duty.

5.3.3 Investigate cause of shut down (see Excursion Reaction Plan section 5.4).

5.3.4 If at any time a reading goes out of a range, immediately call maintenance and attempt to diagnose and fix the problem by following the steps in section 5.4.

5.3.5 If you or maintenance personnel are unable to diagnose or fix the problem within one hour, call your supervisor and EH&S.

5.3.6 In case of major failure such as a fan unable to run or the DP reading moving above or below the failure points, you must SHUT DOWN THE PROCESS as soon as practicable then call your supervisor and EH&S. See section 5.4 of this procedure for shut down.

5.3.7 All excursions and malfunctions require an Incident Report to be filled out and an investigation is preformed.

5.3.8 If the root cause for any deviation cannot be found with the current shift of production, SHUT DOWN THE PROCESS AND COLLECTION SYSTEM.

5.4 Excursion Reaction

EXCURSION REACTION PLAN

Control Equipment ID – 5077
Emission Unit ID - # 1571
Emission Unit Name – 40,000 cfm Dust Collector

PARAMETER	PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION
Fan Inlet Static Pressure		Numerous causes	Call maintenance
RANGE TBD	**High**	cartridges blinded	Initiate blow down. If still high check filters and schedule change if needed.
		Inlet air restricted	Call Maintenance and EH&S to check dampers, flow switch, blast gates and ducts for damage.
	Low	Air leakage into collector	Check seals and gaskets
			Belts Slipping - Call Maintenance
			Filters may have a leak or are missing.
	Zero	Motor not running	See Fan Motor Amps
		Gauge pressure line plugged	Remove line from Gauge and clean. Make sure line is not connected to another gauge.
PRIMARY Cartridge FILTER Differential Pressure		Numerous causes	Call maintenance

System A and B			
	High above 2.5	Gauge pressure lines plugged	Remove lines from Gauge and clean. Make sure line is not connected to another gauge.
OPERATING Range (1.5-2.5)		Air leakage into primary collector	Check seals and ducts for leaks and repair/replace as needed.
		Filter Cleaning system not working	Check blowdown manifold pressure (90-100 psi) and solenoid valve
		Filter cartridges are blinded	Schedule system shut down and cartridge change out.
	Low below 1 .5	Numerous causes	Call maintenance
		Gauge pressure lines plugged	Remove lines from Gauge and clean. Make sure line is not connected to another gauge.
		Filter cartridge or seals may be allowing air to pass by.	Contact EH&S and maintenance to shut down the system and inspect filters.
	Zero	Fan not running.	Call maintenance to check motor amps.
		Gauge pressure lines plugged	Remove lines from Gauge and use Compressed air to clean. Make sure line is not connected to another gauge.
		Photohelic gauge failed	Call electrician to check and calibrate.
		Filter cartridges have holes or bad seals, allowing air to pass by.	Shut down the system and inspect filters.
Secondary or Final filter differential Pressure "D" RANGE (0.4 – 2.4)	**High Above 2.4**	Numerous causes	Call maintenance
		Gauge pressure lines plugged	Remove lines from Gauge and clean. Make sure line is not connected to another gauge.
		Air leakage into primary collector	Check seals and ducts for leaks and repair/replace as needed.
		Filters blinded	Schedule system shut down and cartridge change.
	Low below 0.4	Numerous causes	Call maintenance
		Gauge pressure lines plugged	Remove lines from Gauge and clean. Make sure line is not connected to another gauge.

		Filter cartridge or seals may be allowing air to pass by.	Shut down the system and inspect filters.

6. REVISION HISTORY

6.1 DCR# 1536 – New Document

MATERION CERAMICS

START UP, SHUTDOWN, MALFUNCTION PLAN FOR: 15,000 CFM DUST COLLECTOR SYSTEM (15K)

Document number: **EV-3-0015**	Revision: **A**
Page 1 of 4	Original Issue date: 02-19-08
Prepared by/Author: Mike Berakis	Approved by: John Scheatzle

1. **PURPOSE**

   1.1 This procedure defines a standard method for the start up, shut down, and Malfunction of the 15,000 cfm Dust Collector System.

2. **SCOPE**

   2.1 This procedure applies to Operations of 15,000 cfm Dust Collector System.

3. **REFERENCES /APPLICABLE DOCUMENTS**

   3.1 EV-4-0060 15 K maintenance log

4. **DEFINITIONS**

   4.1 15K or 15,000 cfm Dust Collector System in this document will refer to all portions of that system outside the facility.

5. **PROCEDURE**

   5.1 **Start Up**

   5.1.1 The location of the start up-shut down switches is on the south side of the 15K final filter house.
   5.1.2 Place the run / off switch in run position.
   5.1.3 Using an E-10 key, place the "start up / run" switch in "start up" position.
   5.1.4 Push the start button momentarily.
   5.1.5 After unit starts, Use E-10 key and turn "start up / run" switch to "run".
   5.1.6 Verify dust collector is operating within the normal operating range. See excursion reaction plan in section 5.4 of this procedure.
   5.1.7 Maintain differential pressure reading on all filters between 0.1 – 7.0 inches. Readings taken from photohelics "C" and "E". The collector system must not run if gauge readings are below 0.1 or above 7.0. If either of these events occurs refer to section shut down procedure in section 5.2
   5.1.8 Log start up date, time and employees name in EV-4-0060 15K maintenance log.

5.2 Shut Down

5.2.1 Ensure all production affected by system has stopped by contacting production leader on duty.
5.2.2 Confirm all production affected by 15K has stopped and announce shut down of system over PA three times.
5.2.3 Place the "run / off" switch in "off" position.
5.2.4 Log date, time, employees name and reason for shut down in EV-4-0060 15K maintenance log.

5.3 MALFUNCTION

5.3.1 If the malfunction has caused system shut down announce shut down of system over PA three times.
5.3.2 If the malfunction has caused system shut down ensure all production affected by system has stopped by contacting production leader on duty.
5.3.3 Investigate cause of shut down (see Excursion Reaction Plan Section 5.4).
5.3.4 If at any time a reading goes out of an operating range, immediately call maintenance and attempt to diagnose and fix the problem by following the steps in section 5.4.
5.3.5 If you or maintenance personnel are unable to diagnose or fix the problem within one hour, call your supervisor and EH&S.
5.3.6 In case of major failure such as a fan unable to run or the DP reading moving above or below the failure points, you must SHUT DOWN THE PROCESS as soon as practicable then call your supervisor and EH&S. See section 5.2 of this procedure for shut down.
5.3.7 All excursions and malfunctions require an Incident Report to be filled out and an investigation is preformed.
5.3.8 If the root cause for any deviation cannot be found with the current shift of production, SHUT DOWN THE PROCESS AND COLLECTION SYSTEM.

5.4 EXCURSION REACTION

EXCURSION REACTION PROCEDURE

Control Equipment ID – 5078
Emission Unit ID - # 1571
Emission Unit Name – 15,000 cfm Dust Collector

PARAMETER	PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION
Fan Inlet Static Pressure		Numerous causes	Call maintenance
RANGE TBD	**High**	cartridges blinded	Initiate blow down. If still high check filters and schedule change if needed.

		Inlet air restricted	Call Maintenance and EH&S to check dampers, flow switch, blast gates and ducts for damage.
	Low	Air leakage into collector	Check seals and gaskets
			Belts Slipping - Call Maintenance
			Filters may have a leak or are missing.
	Zero	Motor not running	See Fan Motor Amps
		Gauge pressure line plugged	Remove line from Gauge and clean. Make sure line is not connected to another gauge.
PRIMARY Cartridge FILTER Differential Pressure System "C"		Numerous causes	Call maintenance
	High above 2.5	Gauge pressure lines plugged	Remove lines from Gauge and clean. Make sure line is not connected to another gauge.
OPERATING Range (1.5-2.5)		Air leakage into primary collector	Check seals and ducts for leaks and repair/replace as needed.
		Filter Cleaning system not working	Check blowdown manifold pressure (90-100 psi) and solenoid valve
		Filter cartridges blinded	Schedule system shut down and cartridge change.
	Low below 1 .5	Numerous causes	Call maintenance
		Gauge pressure lines plugged	Remove lines from Gauge and clean. Make sure line is not connected to another gauge.
		Filter cartridge or seals may be allowing air to pass by.	Contact EH&S and maintenance to shut down the system and inspect filters.
	Zero	Fan not running.	Call maintenance to check motor amps.

		Gauge pressure lines plugged	Remove lines from Gauge and use Compressed air to clean. Make sure line is not connected to another gauge.
		Photohelic gauge failed	Call electrician to check and calibrate.
		Filter bags have holes or bad seals, allowing air to start up.	Contact EH&S and maintenance to shut down the system and inspect filters.
Secondary or Final filter differential Pressure "E" RANGE (0.4 – 1.5)	**High Above 1.5**	Numerous causes	Call maintenance
		Gauge pressure lines plugged	Remove lines from Gauge and clean. Make sure line is not connected to another gauge.
		Air leakage into primary collector	Check seals and ducts for leaks and repair/replace as needed.
		Filter cartridges blinded	Schedule system shut down and cartridge change.
	Low below 0.4	Numerous causes	Call maintenance
		Gauge pressure lines plugged	Remove lines from Gauge and clean. Make sure line is not connected to another gauge.
		Filter cartridge or seals may be allowing air to pass by.	Contact EH&S and maintenance to shut down the system and inspect filters.
Fan Motor Amps	**High**	Fan mechanical / electrical problem	Call Maintenance.
		Air Leakage in system.	Inspect upstream ductwork
Range TBD	**Low**	Belts Failed	Contact Maintenance
		Loss of flow rate in system	Check Dampers and Belts - Contact Maintenance and EH&S.
	Zero	Amp meter failed.	Call electrician to check
		Fan not running	Attempt to turn fan on and verify switch is in the on position.

6. REVISION HISTORY

6.1 DCR# 1537 – New Document

MATERION CERAMICS

START UP, SHUTDOWN, MALFUNCTION PLAN FOR: 7,000 CFM DUST COLLECTOR SYSTEM (Torit)

Document number: **EV-3-0016**	Revision: **A**
Page 1 of 4	Original Issue date: 02-19-08
Prepared by/Author: Mike Berakis	Approved by: John Scheatzle

1. PURPOSE

1.1 This procedure defines a standard method for the start up, shut down, and Malfunction of the 7,000 cfm Dust Collector System.

2. SCOPE

2.1 This procedure applies to Operations of 7,000 cfm Dust Collector System.

3. APPLICABLE DOCUMENTS

3.1 EV-4-0061 Torit maintenance log

4. DEFINITIONS

4.1 Torit collector or 7,000 cfm Collector System in this document will refer to all portions of that system outside the facility.

5. PROCEDURE

5.1 Start Up

5.1.1 The location of the start up-shut down switches is on the east side of the Torit (7,000) final filter house.
5.1.2 Place the "run / off" switch in "run" position.
5.1.3 Using an E-10 key, Place the "by pass / run" switch in "start up" position.
5.1.4 Push the start button momentarily.
5.1.5 After unit starts, Use E-10 key and turn "run / start up" switch to "run".
5.1.6 Verify dust collector is operating within the normal operating range. See excursion reaction plan in section 5.4 of this procedure.
5.1.7 Maintain differential pressure reading on final filters between 0.1 – 7.0 inches. Readings taken from photohelic # F. The collector system must not run if gauge readings are below 0.1 or above 7.0. If either of these events occurs refer to section 5.2 of this procedure.
5.1.8 Log start up date, time and employees name in EV-4-0061 Torit maintenance log.

5.2 Shut Down

5.2.1 Ensure all production affected by system has stopped by contacting the production leader on duty.
5.2.2 Confirm all production affected by Torit (7,000 cfm) has stopped and announce shut down of system over PA three times.
5.2.3 Place the "run / off" switch in "off" position.
5.2.4 Log date, time, employees name and reason for shut down in EV-4-0061 Torit maintenance log.

5.3 Malfunction

5.3.1 If the malfunction has caused system shut down announce shut down of system over PA three times.
5.3.2 If the malfunction has caused system shut down ensure all production affected by system has stopped by contacting production leader on duty.
5.3.3 Investigate cause of shut down (see Excursion Reaction Plan section 5.4).
5.3.4 If at any time a reading goes out of a range, immediately call maintenance and attempt to diagnose and fix the problem by following the steps in section 5.4.
5.3.5 If you or maintenance personnel are unable to diagnose or fix the problem within one hour, call your supervisor and EH&S.
5.3.6 In case of major failure such as a fan unable to run or the DP reading moving above or below the failure points, you must SHUT DOWN THE PROCESS as soon as practicable then call your supervisor and EH&S. See section 5.2 of this procedure for shut down.
5.3.7 All excursions and malfunctions require an Incident Report to be filled out and an investigation is preformed.
5.3.8 If the root cause for any deviation cannot be found with the current shift of production, SHUT DOWN THE PROCESS AND COLLECTION SYSTEM.

5.4 Excursion Reaction

EXCURSION REACTION PLAN

Control Equipment ID – 5098
Emission Unit ID - # 1571
Emission Unit Name – Torit 7,000 cfm Dust Collector

PARAMETER	PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION
Fan Inlet Static Pressure		Numerous causes	Call maintenance
RANGE TBD	**High**	Filters blinded	Check filters and schedule change if needed.
		Inlet air restricted	Call Maintenance and EH&S to check dampers, flow switch, blast

			gates and ducts for damage.
	Low	Air leakage into collector	Check seals and gaskets
			Belts Slipping - Call Maintenance
			Filters may have a leak or are missing.
	Zero	Motor not running	See Fan Motor Amps
		Gauge pressure line plugged	Remove line from Gauge and clean. Make sure line is not connected to another gauge.
PRIMARY FILTERS Differential Pressure System "F"		Numerous causes	Call maintenance
	High above 2.4	Gauge pressure lines plugged	Remove lines from Gauge and clean. Make sure line is not connected to another gauge.
OPERATING Range (0.4-2.4)		Air leakage into primary collector	Check seals and ducts for leaks and repair/replace as needed.
		Filters or bags blinded	Schedule system shut down and bags change.
	Low below 0.4	Numerous causes	Call maintenance
		Gauge pressure lines plugged	Remove lines from Gauge and clean. Make sure line is not connected to another gauge.
		Final Filters, bags or seals may be allowing air to pass by.	Contact EH&S and maintenance to shut down the system and inspect filters.
	Zero	Fan not running.	Call maintenance to check motor amps.
		Gauge pressure lines plugged	Remove lines from Gauge and use Compressed air to clean. Make sure line is not connected to another gauge.
		Photohelic gauge failed	Call electrician to check and calibrate.
		Filter bags have holes or bad seals, allowing air to start up.	Contact EH&S and maintenance to shut down the system and inspect filters.

Fan Motor Amps	**High**	Fan mechanical / electrical problem	Call Maintenance.
		Air Leakage in system.	Inspect upstream ductwork
Range TBD	**Low**	Belts Failed	Contact Maintenance
		Loss of flow rate in system	Check Dampers and Belts - Contact Maintenance and EH&S.
		Amp meter failed.	Call electrician to check and calibrate.
	Zero	Fan not running	Attempt to turn fan on and verify switch is in the on position.
		Photohelic gauge failed	Call electrician to check and calibrate.

6. REVISION HISTORY

6.1 DCR# 1538 – New Document

MATERION CERAMICS

START UP, SHUTDOWN, MALFUNCTION PLAN FOR: 6,500 CFM DUST COLLECTOR SYSTEM (EF-1)

Document number: **EV-3-0017**	Revision: **A**
Page 1 of 4	Original Issue date: 02-19-08
Prepared by/Author: Mike Berakis	Approved by: John Scheatzle

1. **PURPOSE**

   1.1 This procedure defines a standard method for the start up, shut down, and Malfunction of the 6,500 cfm Dust Collector System.

2. **SCOPE**

   2.1 This procedure applies to Operations of 6,500 cfm Dust Collector System.

3. **APPLICABLE DOCUMENTS**

   3.1 EV-4-0062 EF-1 maintenance log

4. **DEFINITIONS:**

   4.1 Exhaust Fan – 1, EF-1 or 6,500 cfm Dust Collector System in this document will refer to all portions of that system outside the facility.

5. **PROCEDURE**

   5.1 **Start Up**

   5.1.1 The location of the start up-shut down switch is in the hallway outside of laundry.
   5.1.2 Ensure EF-1; return air fans 1 & 2 and air handlers 12 & 13 are in the auto position.
   5.1.3 Insert an E-11 key, push in button with key and turn to the right, hold key in until both red and green lights are on.
   5.1.4 Let button out, turn key to the left to vertical position and remove key.
   5.1.5 The systems flashing trouble lights should go out in 12 minutes.
   5.1.6 Verify dust collector is operating within the normal operating range. See excursion reaction plan in this procedure.
   5.1.7 Maintain differential pressure reading on all filters between 0.1 – 7.0 inches. Readings taken from photohelic # G. The collector system must not run if gauge readings are below 0.1 or above 7.0. If either of these events occurs refer to section 5.2 of this procedure.
   5.1.8 Log start up date, time and employees name in EV-4-0062 EF-1 maintenance log.

5.2 Shut Down

5.2.1 Ensure all production affected by system has stopped by contacting the production leader on duty.
5.2.2 Confirm all production affected by EF-1 (6,500 cfm) has stopped and announce shut down of system over PA three times.
5.2.3 Insert an E-11 key, push in button with key and turn to the right, hold key in until both red and green lights are off.
5.2.4 Let button out, turn key to the left to vertical position and remove key.
5.2.5 The flashing trouble lights will stay on until system is restarted.
5.2.6 Log date, time, employees name and reason for shut down in EV-4-0062 EF-1 Maintenance Log.

5.3 Malfunction

5.3.1 If the malfunction has caused system shut down announce shut down of system over PA three times.
5.3.2 If the malfunction has caused system shut down ensure all production affected by system has stopped by contacting production leader on duty.
5.3.3 Investigate cause of shut down (see Excursion Reaction Plan section 5.4).
5.3.4 If at any time a reading goes out of a range, immediately call maintenance and attempt to diagnose and fix the problem by following the steps in section 5.4.
5.3.5 If you or maintenance personnel are unable to diagnose or fix the problem within one hour, call your supervisor and EH&S.
5.3.6 In case of major failure such as a fan unable to run or the DP reading moving above or below the failure points, you must SHUT DOWN THE PROCESS as soon as practicable then call your supervisor and EH&S. See section 5.2 of this procedure for shut down.
5.3.7 All excursions and malfunctions require an Incident Report to be filled out and an investigation is preformed.
5.3.8 If the root cause for any deviation cannot be found with the current shift of production, SHUT DOWN THE PROCESS AND COLLECTION SYSTEM.

5.4 Excursion Reaction

EXCURSION REACTION PLAN

Control Equipment ID – 5243
Emission Unit ID - # 1571
Emission Unit Name – EXHAUST FAN-1 6,500 cfm
Dust Collector

PARAMETER	PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION
Fan Inlet Static Pressure		Numerous causes	Call maintenance
RANGE TBD	**High**	Filters blinded	Check filters and schedule change if needed.
		Inlet air restricted	Call Maintenance and EH&S to

			check dampers, flow switch, blast gates and ducts for damage.
	Low	Air leakage into collector	Check seals and gaskets
			Belts Slipping - Call Maintenance
			Filters may have a leak or are missing.
	Zero	Motor not running	See Fan Motor Amps
		Gauge pressure line plugged	Remove line from Gauge and clean. Make sure line is not connected to another gauge.
PRIMARY FILTERS Differential Pressure System "G"		Numerous causes	Call maintenance
	High above 4.0	Gauge pressure lines plugged	Remove lines from Gauge and clean. Make sure line is not connected to another gauge.
OPERATING Range (1.5-4.0)		Air leakage into primary collector	Check seals and ducts for leaks and repair/replace as needed.
		Filters blinded	Schedule systems shut down and filter change.
	Low below 1.5	Numerous causes	Call maintenance
		Gauge pressure lines plugged	Remove lines from Gauge and clean. Make sure line is not connected to another gauge.
		Filters or seals may be allowing air to pass by.	Contact EH&S and maintenance to shut down the system and inspect filters.
	Zero	Fan not running.	Call maintenance to check motor amps.
		Gauge pressure lines plugged	Remove lines from Gauge and use Compressed air to clean. Make sure line is not connected to another gauge.
		Photohelic gauge failed	Call electrician to check and calibrate.
		Filters have holes or bad seals, allowing air	Contact EH&S and maintenance to shut down the system and inspect

		to start up.	filters.
Fan Motor Amps	**High**	Fan mechanical / electrical problem	Call Maintenance.
		Air Leakage in system.	Inspect upstream ductwork
Range TBD	**Low**	Belts Failed	Contact Maintenance
		Loss of flow rate in system	Check Dampers and Belts - Contact Maintenance and EH&S.
	Zero	Amp meter failed.	Call electrician to check and calibrate.
		Fan not running	Attempt to turn fan on and verify switch is in the on position.

6. REVISION HISTORY

6.1 DCR# 1539 – New Document

MATERION CERAMICS

CLEARANCE SAMPLES FOR BERYLLIUM OXIDE PROCEDURE

Document number: **EV-3-0018**	Revision: **A**
Page 1 of 2	Original Issue date: 02-19-08
Prepared by/Author: Mike Berakis	Approved by: John Scheatzle

1. PURPOSE

1.1 To establish the guidelines for taking clearance samples following the clean up of an upset condition or release of BeO.

2. SCOPE

2.1 This procedure applies to all departments at the Tucson facility.
2.2 The EH&S manager shall determine the application of this procedure for any incident.

3. EQUIPMENT

3.1 High volume sampling pump kit. (Available in the EH&S lab).
3.2 Two high volume air sampling pumps.
3.3 Air Sampling Sheet. (In sampling kit).
3.4 Two sampling cassettes. (In sampling kit).
3.5 Permanent marker and pen. (In sampling kit).
3.6 Watch or access to a clock. (In sampling kit).
3.7 Plastic bag. (In sampling kit).

4. PROCEDURE

4.1 Employees must receive training on taking air samples prior to performing such task.
4.2 Determine a representative area to be sampled within 10 feet from the area of suspected occurrence.
4.3 Obtain two high volume air samplers found in the pump kit.
4.4 Obtain two 37-millimeter MCE sampling cassettes.
4.5 Number the cassettes and put the corresponding numbers on the air-sampling sheet.
4.6 Attach sampling cassettes to high volume pumps.
4.7 Take caps off of cassettes.
4.8 Turn on pumps and write the start time on the air sample sheet.
4.9 Run air samples for **at least 60 minutes.**
4.10 Turn off pump and record stop time on the air sample sheet.
4.11 Take cassettes off of samplers.
4.12 Plug both ends of cassettes with caps.
4.13 Fill out the remainder of the air sample sheet.
4.14 Place cassettes and paperwork in a plastic bag.

4.15 Send samples to the DataChem Lab for analysis. (sampling sheets and Overnight Fed-ex forms should be supplied with the sampling kit).

DataChem Laboratories, Inc
960 West LeVoy Drive
Salt Lake City, UT 84213
1-800-356-9135

4.16 Once results are received from lab determine if the area can be cleared to return to normal operating conditions using the following criteria:

4.16.1 Production areas not normally in full-time respiratory protection can be cleared if both clearance samples are less than or equal to 0.2 micrograms per cubic meter of air.

4.16.2 Production areas normally in full-time respiratory protection can be cleared if both samples are less than or equal to 5.0 micrograms per cubic meter of air.

4.16.3 Office areas and any areas outside the plant can considered cleared if both clearance samples are < / = 0.01 for beryllium.

5. REVISION HISTORY

5.1 DCR# 1541 – New Document

MATERION CERAMICS

BERYLLIUM OXIDE POWDER SPILL RESPONSE

Document number: **EV-3-0019**	Revision: **B**
Page 1 of 2	Original Issue date: 12/04/2009
Prepared by/Author: Richard Manes	Approved by: Ken Harrison

1. PURPOSE

1.1 The purpose of this procedure is to provide guidelines for responding to a beryllium oxide powder spill in the facility

2. SCOPE

2.1 This procedure ensures that in the event of a spill or upset involving beryllium oxide powder the potential emission points referenced in the PDEQ air permit # 1571 are controlled

3. REFERENCES

3.1 EV-3-0001 – Plant Emergency Response Plan

3.2 Materion Ceramics air permit #1571

4. DEFINITIONS

4.1 Powder spill/upset condition – for the purposes of this procedure means any visible amount of BeO powder unintentionally released outside of control methods and routine processes

4.2 Responders – employees assigned by the IC in Charge, as specified in EV-3-0001, to participate in spill cleanup activities

5. PROCEDURE

5.1 In the event of a BeO Powder spill/upset condition inside the facility, the building PA system should be used to evacuate all personnel in the affected area immediately

5.1.1 The message should be repeated three times (i.e., "Powder spill in the press area, evacuate immediately; powder spill in the press area, evacuate immediately; etc.")

5.2 Any powered ceiling exhaust vents in surrounding areas must be turned off immediately

5.2.1 Vent switches are located in the firing rooms, lapping area, and Astro furnace room

5.2.2 Shut-off switches are labeled with a bright orange label

5.2.3 As specified in EV-3-0001, a report of the incident will be made and a notation included specifically stating that the ceiling vents were turned off as required by this procedure

5.3 Any person whose uniform has been contaminated by the spill is to proceed to the in-plant decontamination area located in the material preparation entrance

5.3.1 Assisting Responders will follow procedures as specified in the decontamination area for removal and disposal of contaminated uniforms

5.3.2 The decontamination process procedure listed in the decontamination area will be maintained, audited, and updated by the IC group

5.4 Any doors to the affected area should be closed to isolate the area as much as possible

5.5 The IC in Charge will evaluate the situation, coordinate with other IC's as needed, determine the extent of the spill, estimate the spilled amount, assign Responders to specific tasks, and begin clean up activities

5.5.1 If there are any questions as to appropriate PPE, an EH&S representative must be contacted

5.6 Responders must don protective coveralls for the cleanup, in addition to standard required PPE

5.7 Vacuuming is the preferred cleaning method

5.7.1 The house vacuum system may be used, or portable HEPA vacuums dedicated to spill cleanup should be obtained

5.8 Wet mopping or sponging should complete the cleanup

5.9 When the cleanup is complete, Responder coveralls should be removed in the area, turning them inside out as they are removed

5.9.1 The coveralls must be disposed of as contaminated material in a red topped waste can

5.10 As specified in EV-3-0001, an announcement will be made indicating that the spill have been cleaned and employees may return to the evacuated area to resume their work tasks

6. REVISION HISTORY

6.1 DCR# 1542 – New Document (02/19/08)

6.2 DCR# 2185 – Update procedural requirements (12/04/09)

MATERION CERAMICS

START UP, SHUTDOWN, MALFUNCTION PLAN FOR: SPENCER HOUSE VACUUM SYSTEM

Document number: **EV-3-0052**	Revision: **A**
Page 1 of 2	Original Issue date: 07-08-09
Prepared by/Author: Jim Mattioda Richard Manes	Approved by:

1.0 PURPOSE

1.1 This procedure defines a standard method for the start up, shut down, and Malfunction of the Spencer House Vacuum System.

2.0 SCOPE

2.1 This procedure applies to Operations of Spencer House Vacuum System.

3.0 APPLICABLE DOCUMENTS

3.1 EV-4-0118 Spencer House Vacuum Monthly Inspection Log
3.2 EV-4-0119 Spencer House Vacuum Maintenance Log

4.0 DEFINITIONS

4.1 Spencer House Vacuum System in this document will refer to all portions of that system inside and outside the facility.

5.0 PROCEDURE

5.1 **Start Up**

5.1.1 Insert E-10 key into the Start-Run switch and turn to Start position.
5.1.2 Turn the Off-Run selector switch to the Run position.
5.1.3 Push and hold the Start push button until the 40k starts.
5.1.4 Turn the E-10 key to the run position and pull the key from the switch. Note: The House vacuum is tied to the 40K dust collector system and therefore cannot be started unless the 40K system is operating.

5.2 **Shut Down**

5.2.1 Start-up Shut-Down Turn the 40K Run-off selector switch to the off position.

5.2.2 The house vacuum motor has a disconnect on the east wall next to the unit, this should be use for any malfunction shut-down of the unit or maintenance.

5.3 MALFUNCTION PLAN

MALFUNCTION PLAN **Control Equipment ID –** **Unit Name – Spencer House Vacuum System**			
CONDITION	**SEVERITY**	**PROBLEM**	**CORRECTIVE ACTION**
System not running	**Moderate**	**1. 40K Shut down 2. House Vacuum Motor failed (40K still running)**	**Call maintenance**
Bag Filter(s) broken (only determined through physical inspection)	**High**	**Hole worn in bag filter**	**Maintenance to determine failure through physical inspection. Verify containment, remove damaged bag filter(s), replace, restart and check.**
Low Vacuum Pressure	**Low**	**Individual pickup clogged at machine source**	**Inspect hose and inlet, remove any debris. Call maintenance**
Low Vacuum Pressure	**Low**	**Blockage in system**	**Call Maintenance.**
System Ducting	**High**	**Leakage**	**Emergency Shut Down**

			Contact Maintenance and EH&S

7.0 REVISION HISTORY

7.1 DCR# 2050 – New Document

MATERION CERAMICS

Dust Collector Inspection Procedure

Document number: **EV-3-0063**	Revision: **A**
Page 1 of	Original Issue date: **4/26/2011**
Prepared by/Author: **Richard Manes**	Approved by: **Ken Harrison**

1.0 PURPOSE

1.1 To ensure that all environmental air pollution control systems are operating as designed and within permitted limits.

2.0 APPLICABLE DOCUMENTS

2.1 PDEQ issued air quality permit
2.2 EV-4-0069 Weekly APC Ventilation System Inspection Sheet

3.0 RESPONSIBILITIES

3.1 Plant management is responsible for providing resources and support to facilitate all items covered in Section 6.
3.2 The EH&S Group is responsible for performing all inspections covered in Section 6, with the Maintenance and Production Supervision Group as a backup.

4.0 PROCEDURE

4.1 Daily inspections

4.1.1 Dust collector system particle detectors.
4.1.1.1 The data generated by the particle detectors utilized in the 40K, 15K, Torit and Stack shall be examined on a daily basis.
4.1.1.2 Any erratic readings shall be communicated to the EH&S Supervisor, or other facility staff personnel and investigations S hall be prompted to ensure that none of the systems are malfunctioning and that could also lead to excess environmental emissions.
4.1.2 Dust collector system pressure-drop readings.
4.1.2.1 Pressure drop readings shall be taken from the 40K system, the 15K system and the Torit system on a daily basis. Readings shall be recorded on the Weekly APC Ventilation System Inspection Sheet and kept for a period of five years. The record shall include the date, time readings were made, the specific segment of the collection system to which the pressure drop applies, the value of

the pressure drop noted on the gauge and the name of the person making the reading.

4.1.2.2 Acceptable operating limits are outlined in the table below:

Dust Collection System Component	Segment	Operating Range (in. water gauge)	Failure Indication (in. water gauge)	Meter ID Code (Stenciled at the location)
40,000 CFM Farr	Primary filters	1.5 – 2.5	<0.1, >7.0	A, B
40,000 CFM Farr	Final filters	0.4 – 2.4	<0.1, >7.0	D
15,000 CFM Farr	Primary filters	1.5 – 2.5	<0.1, >7.0	C
15,000 CFM Farr	Final filters	0.4 – 1.5	<0.1, >7.0	E
7,000 CFM Torit	Final filters	0.4 – 2.4	<0.1, >7.0	F
6.5 CFM (EF-1)	Primary and Final	1.5 – 4.0	<0.1, >7.0	G

4.1.2.3 If any dust collection system segment reading falls outside of the listed operating limits, an investigation will be initiated to determine cause(s) and corrective action(s).

4.1.2.4 If any dust collection system segment reading falls outside of the listed failure indication ranges, production and the dust collection system shall be immediately shut down and the facility Emergency Response procedure initiated.

4.2 Weekly inspections

4.2.1 Dust collector system mechanical inspection

4.2.1.1 The physical components of the dust collection system shall be visually inspected on a weekly basis. This inspection shall include (but not be limited to):

- Ductwork, to ensure mechanical integrity.
- Expansion joints, to look for cracks or other leaks.
- Belts, to look for cracks and ensure proper tension.
- Bearings, to ensure acceptable levels of heat and vibration.
- Motors, to ensure acceptable levels of heat.
- Fans, to ensure acceptable levels of vibration.
- Structures, to look for cracks, excessive corrosion and general overall condition.

4.2.1.2 Inspections shall be recorded on a log sheet and maintained for a period of five years. Records shall include the date, name of the person making the inspection, description of any discrepancies found and corrective action.

4.2.1.3 Any discrepancies found shall be communicated to the EH&S Supervisor, or other facility staff personnel, and appropriate action taken to ensure that no failure leading to excess environmental emissions will occur.

4.3 Monthly inspections

4.3.1 Final filter inspection

4.3.1.1 All final filters in the dust collection system will be visually inspected on a monthly basis. The purpose is to:

- Corroborate the pressure drop and particle detection readings.
- Monitor filter loading.
- Detect any discoloration or other unusual aspects, which may be indicative of system problems.

4.3.1.2 Inspections shall be recorded on the designated log sheet and maintained for a period of five years. Records shall include the date, name of the person making the inspection, description of any discrepancies found and corrective action.

4.3.1.3 Any discrepancies found shall be communicated to the EH&S Supervisor, or other facility staff personnel and appropriate action taken to ensure that no failure leading to excess environmental emissions will occur.

5.0 REVISION HISTORY

5.1 New Document

MAINTENANCE LOG

SPEC SHEET

BUILDING				ISO DOCUMENT #			
APC				EV – 4 - 0059			
EQUIPMENT NAME 40K DUST COLLECTOR SYSTEM				UNIT ID		MCI EQUIPMENT ID # 5077	
LOCATION Yard				MANUFACTURER			
MODEL NUMBER				SERIAL NUMBER		INSTALLATION DATE	
TYPE OF LUBRICATION REQUIRED			MOTOR	BEARINGS			
LUBRICATION FREQUENCY							
PULLY SIZE(S)			MANUFACTURER		PART NO.		
BELT(S)	NO OF -						
	STORES NO. -						
FILTER(S)	FOR -	FOR -	FOR -	FOR -			
	NO OF -	NO OF -	NO OF -	NO OF -			
	STORES NO. -	STORES NO. -	STORES NO. -	STORES NO. -			
BEARING(S)	FOR -	FOR -	FOR -	FOR -			
	NO OF -	NO OF -	NO OF -	NO OF -			
	STORES NO. -	STORES NO. -	STORES NO. -	STORES NO. -			
MOTOR INFORMATION	MANUFACTURER	MODEL NO.	SERIAL NO.	FRAME NO.			
	VOLTS	AMPS	PHASE	RPM	HP	BEARING NO.	SHAFT SIZE
MOTOR BASELINE AMPS		PHASE 1	PHASE 2	PHASE 3			
		DATE	DATE	DATE			
INTERLOCKED WITH BOOSTER BLOWER							

MAINTENANCE RECORD

Entry must be made for <u>any</u> repairs.

DATE	INITIALS	Work preformed - PM Breakdown etc...	INCLUDE ANY WORKORDER # ASSOCIATED TO THIS EQUIPMENT

MAINTENANCE LOG

SPEC SHEET

BUILDING	ISO DOCUMENT #
APC	EV – 4 - 0060

EQUIPMENT NAME	UNIT ID	MCI EQUIPMENT ID #
15K DUST COLLECTOR SYSTEM		5078

LOCATION	MANUFACTURER
Yard	

MODEL NUMBER	SERIAL NUMBER	INSTALLATION DATE

TYPE OF LUBRICATION REQUIRED	MOTOR	BEARINGS		
LUBRICATION FREQUENCY				

PULLY SIZE(S)			MANUFACTURER	PART NO.
BELT(S)	NO OF -			
	STORES NO. -			

FILTER(S)	FOR -	FOR -	FOR -	FOR -
	NO OF -	NO OF -	NO OF -	NO OF -
	STORES NO. -	STORES NO. -	STORES NO. -	STORES NO. -
BEARING(S)	FOR -	FOR -	FOR -	FOR -
	NO OF -	NO OF -	NO OF -	NO OF -
	STORES NO. -	STORES NO. -	STORES NO. -	STORES NO. -

MOTOR INFORMATION	MANUFACTURER	MODEL NO.	SERIAL NO.	FRAME NO.

VOLTS	AMPS	PHASE	RPM	HP	BEARING NO.	SHAFT SIZE

MOTOR BASELINE AMPS	PHASE 1	PHASE 2	PHASE 3
	DATE	DATE	DATE

MAINTENANCE RECORD

Entry must be made for any repairs.

DATE	INITIALS	Work preformed -PM Breakdown etc...	INCLUDE ANY WORKORDER # ASSOCIATED TO THIS EQUIPMENT

MAINTENANCE LOG

SPEC SHEET

BUILDING			ISO DOCUMENT #	
APC			EV – 4 - 0061	
EQUIPMENT NAME TORIT DUST COLLECTOR SYSTEM			UNIT ID	MCI EQUIPMENT ID # 5098
LOCATION Yard			MANUFACTURER	
MODEL NUMBER			SERIAL NUMBER	INSTALLATION DATE
TYPE OF LUBRICATION REQUIRED	MOTOR	BEARINGS		
LUBRICATION FREQUENCY				

PULLY SIZE(S)			MANUFACTURER	PART NO.
BELT(S)	NO OF -			
	STORES NO. -			

FILTER(S)	FOR -	FOR -	FOR -	FOR -
	NO OF -	NO OF -	NO OF -	NO OF -
	STORES NO. -	STORES NO. -	STORES NO. -	STORES NO. -
BEARING(S)	FOR -	FOR -	FOR -	FOR -
	NO OF -	NO OF -	NO OF -	NO OF -
	STORES NO. -	STORES NO. -	STORES NO. -	STORES NO. -

MOTOR INFORMATION	MANUFACTURER	MODEL NO.	SERIAL NO.	FRAME NO.
	VOLTS	AMPS / PHASE / RPM / HP	BEARING NO.	SHAFT SIZE

MOTOR BASELINE AMPS	PHASE 1	PHASE 2	PHASE 3
	DATE	DATE	DATE

MAINTENANCE RECORD

Entry must be made for any repairs.

DATE	INITIALS	Work preformed - PM Breakdown etc...	INCLUDE ANY WORKORDER # ASSOCIATED TO THIS EQUIPMENT

MAINTENANCE LOG

SPEC SHEET

BUILDING				ISO DOCUMENT #			
APC				EV – 4 - 0062			
EQUIPMENT NAME EF-1 DUST COLLECTOR SYSTEM				UNIT ID			MCI EQUIPMENT ID # 5243
LOCATION Roof				MANUFACTURER			
MODEL NUMBER				SERIAL NUMBER			INSTALLATION DATE
TYPE OF LUBRICATION REQUIRED				MOTOR	BEARINGS		
LUBRICATION FREQUENCY							
PULLY SIZE(S)				MANUFACTURER		PART NO.	
BELT(S)	NO OF -						
	STORES NO. -						
FILTER(S)	FOR -	FOR -		FOR -		FOR -	
	NO OF -	NO OF -		NO OF -		NO OF -	
	STORES NO. -	STORES NO. -		STORES NO. -		STORES NO. -	
BEARING(S)	FOR -	FOR -		FOR -		FOR -	
	NO OF -	NO OF -		NO OF -		NO OF -	
	STORES NO. -	STORES NO. -		STORES NO. -		STORES NO. -	
MOTOR INFORMATION	MANUFACTURER	MODEL NO.		SERIAL NO.		FRAME NO.	
	VOLTS	AMPS	PHASE	RPM	HP	BEARING NO.	SHAFT SIZE
MOTOR BASELINE AMPS		PHASE 1		PHASE 2		PHASE 3	
		DATE		DATE		DATE	
INTERLOCKED WITH RA-1. RA-2, AH-12 AND AH-13							

MAINTENANCE RECORD

Entry must be made for <u>any</u> repairs.

DATE	INITIALS	Work preformed - PM Breakdown etc...	INCLUDE ANY WORKORDER # ASSOCIATED TO THIS EQUIPMENT

MATERION
CERAMICS

Weekly APC Ventilation System Inspection Sheet

Week of Monday _____ **through Sunday** _____

DAILY Inspections to be Performed Monday – Sunday Each Week

Readings		Mon	Tue	Wed	Thur	Fri	Sat	Sun
Time Taken >								
Gauge	Range	Value	Value	Value	Value	Value	Value	Value
F Torit	0.4 — 2.4							
A 40K	1.5 — 2.5							
B 40K	1.5 — 2.5							
C 15K	1.5 — 2.5							
D 40K	0.4 — 2.4							
E 15K	0.4 — 1.5							
G EF-1	1.5 — 4.0							
Initial Complete >								
Date>								

List Any WON # of IR #'s Associated with Corrective Measures: _____

_____

_____

_____

_____

WEEKLY Inspections to be Performed Any Day Each Week

Powered Exhaust Vents Check

Are vents free of visible emissions and in good condition?

1	2	3	4	5	6	7	8
Y	Y	Y	Y	Y	Y	Y	Y
N	N	N	N	N	N	N	N

Record WON # or IR #s for all Corrective Measures: | Date | Auditor Initials

Building Exit Doors Check

Are doors closed, free of visible emission, & in good condition?

A	B	C	D	E	F	G	H	I	J	K	L
Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
N	N	N	N	N	N	N	N	N	N	N	N

Record WON # or IR #s for all Corrective Measures: | Date | Auditor Initials

System Segment Inspections

Are the system components free of damage and visible emissions? | Date | Auditor Initials

40K system >	Yes ☐	No, Needs Repair ☐	
15K system >	Yes ☐	No, Needs Repair ☐	
Torit system >	Yes ☐	No, Needs Repair ☐	
EFI system >	Yes ☐	No, Needs Repair ☐	
Drum Level Above ¾ Full? If YES, please schedule a drum change and complete a WON	Y	N	

List Any WON # or IR #'s Associated with Corrective Measures: _____

_____

Abbreviations Key: N/O = Facility Not Operating // M/O = Maintenance Only Activity // N/P = No Production Activity

DUST COLLECTOR
DRUM CHANGE OUT LOG

Permit 1571 - Part B, Sec 3 [G]

DATE	UNIT ID / HOPPER NUMBER e.g. 15K #6	DRUM INSERVICE DATE	DRUM REMOVAL DATE	DRUM NET WEIGHT LBS.	DRUM CONDITION	CORRECTIVE ACTION (Spill, Damaged Drum, etc.)	NAME OF PERSON MAKING CHANGE OUT Note – First entry in log must contain first & last name, thereafter initials may be used.

MAINTENANCE LOG

SPEC SHEET

BUILDING				ISO DOCUMENT # EV – 4 - 0119	
EQUIPMENT NAME SPENCER HOUSE VACUUM			UNIT ID		BCP EQUIPMENT ID # 5011
LOCATION MECHANICAL ROOM		MANUFACTURER SPENCER TURBINE			
MODEL NUMBER 5259		SERIAL NUMBER 303946			INSTALLATION DATE
TYPE OF LUBRICATION REQUIRED	MOTOR	BEARINGS			
	15 HP				
LUBRICATION FREQUENCY	N/A	SEALED			

PULLY SIZE(S)	N/A		MANUFACTURER	PART NO.
BELT(S)	NO OF - N/A			
	STORES NO. -			

FILTER(S)	FOR -	FOR -	FOR -	FOR -
	NO OF -	NO OF -	NO OF -	NO OF -
	STORES NO. -	STORES NO. -	STORES NO. -	STORES NO. -
BEARING(S)	FOR -	FOR -	FOR -	FOR -
	NO OF -	NO OF -	NO OF -	NO OF -
	STORES NO. -	STORES NO. -	STORES NO. -	STORES NO. -

MOTOR INFORMATION	MANUFACTURER	MODEL NO.		SERIAL NO.		FRAME NO. 215TZ	
	VOLTS 230/460	AMPS 39/19.5	PHASE	RPM 3480	HP 15	BEARING NO. 6308ZC3 6208ZC3	SHAFT SIZE

MOTOR BASELINE AMPS	PHASE 1	PHASE 2	PHASE 3
	DATE	DATE	DATE

INTERLOCKED WITH 40K DUST COLLECTOR					

MAINTENANCE RECORD

Entry must be made for <u>any</u> repairs.

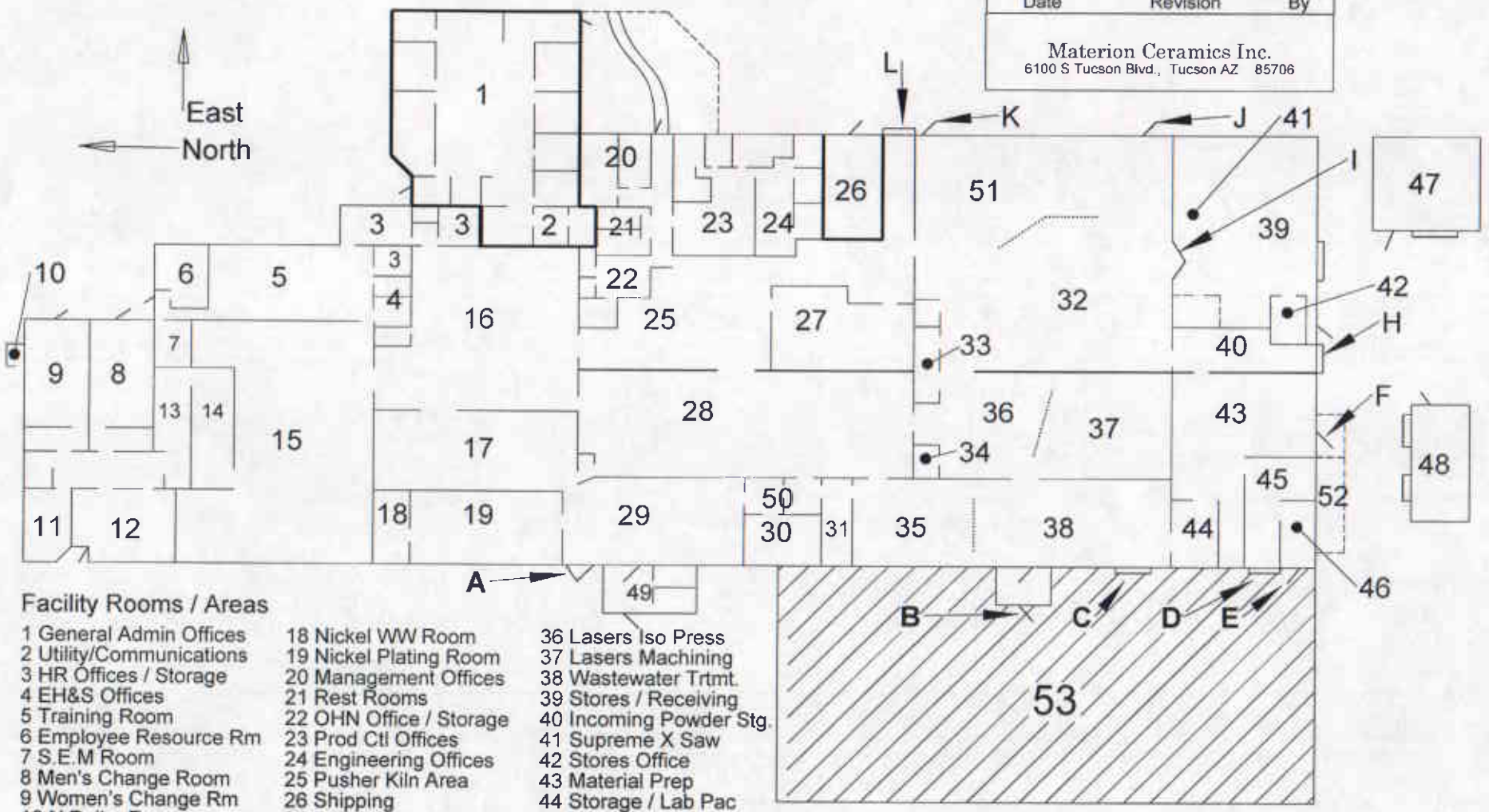
DATE	INITIALS	Work preformed - PM Breakdown etc...	INCLUDE ANY WORKORDER # ASSOCIATED TO THIS EQUIPMENT

Materion Ceramics Inc. Facility Layout

Drawing for Illustration Purposes Only
Sections May Not be to Scale

03/15/2011	Current Layout	RN
Date	Revision	By

Materion Ceramics Inc.
6100 S Tucson Blvd., Tucson AZ 85706



Facility Rooms / Areas

1 General Admin Offices
2 Utility/Communications
3 HR Offices / Storage
4 EH&S Offices
5 Training Room
6 Employee Resource Rm
7 S.E.M Room
8 Men's Change Room
9 Women's Change Rm
10 N Boiler Room
11 Laundry Room
12 Lunch Room
13 Respirator Storage
14 AS / Wk Boot Storage
15 Complex Machining
16 Extrusion
17 Small Kiln Room
18 Nickel WW Room
19 Nickel Plating Room
20 Management Offices
21 Rest Rooms
22 OHN Office / Storage
23 Prod Ctl Offices
24 Engineering Offices
25 Pusher Kiln Area
26 Shipping
27 Lapping
28 Large Kiln Room
29 Metalizing Firing
30 Met. Clean Room
31 Met. Office / Lab
32 Dry Pressing (all)
33 Tool Room
34 Metrology Room
35 Machine Services
36 Lasers Iso Press
37 Lasers Machining
38 Wastewater Trtmt.
39 Stores / Receiving
40 Incoming Powder Stg.
41 Supreme X Saw
42 Stores Office
43 Material Prep
44 Storage / Lab Pac
45 Mechanical Room
46 S Boiler Room
47 Maintenance Bldg.
48 Chemical Storage
49 Met. Rest Rooms
50 Metalizing Prep Rm
51 Inspection / Parts Clng
52 Compressors / Stm Blrs
53 Fenced Yard Area

Production Area Exit Doors

A. Metalizing Firing*
B. Wastewater Trtmt
C. Wastewater Trtmt**
D. Mechanical Room**
E. Boiler Room
F. Material Prep
H. Material Prep Rec**
I. Press Room*
J. Press Rm - S
K. Press Rm - N
L. East Service**

* Double Door ** Roll-Up Door

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