MARYLAND DEPARTMENT OF THE ENVIRONMENT

AIR AND RADIATION ADMINISTRATION
APPLICATION FOR A PERMIT TO CONSTRUCT

DOCKET # 01-26

COMPANY: Galvco of Maryland, DBA Baltimore Galvanizing Company

APPLICATION: One galvanizing line comprising of the following: one (1) Westech Pulse-fired high velocity natural gas fired galvanizing furnace rated at 1.5 MMBtu/hr, one (1) Rite Boiler No. 48 rated at 0.48 MMBtu firing natural gas, one (1) Westech portable galvanizing centrifuge system and various processing tanks.

LOCATION: 7110 Quad Avenue, Baltimore, Maryland 21237

ITEM	DESCRIPTION
1	Notice of Application and Opportunity to Request an Informational Meeting
2	Permit to Construct Application - Forms 5, 5 EP, 5T and Form 5EP, emissions calculations, site location map, site plan, process flow diagram, safety data sheets, and EJ report
4	Technical Brochure for the Westech Pulse-fired high velocity natural gas fired galvanizing furnace rated at 1.5 MMBtu/hr, one (1) Rite Boiler No. 48 rated at 0.48 MMBtu firing Natural gas and one (1) Westech portable galvanizing centrifuge system
5	Zoning Approval Letter

MARYLAND DEPARTMENT OF THE ENVIRONMENT
AIR AND RADIATION ADMINISTRATION

NOTICE OF APPLICATION AND
OPPORTUNITY TO REQUEST AN INFORMATIONAL MEETING

The Maryland Department of the Environment, Air and Radiation Administration (ARA) received a Permit-to-Construct application from Galvco of Maryland, DBA Baltimore Galvanizing Company on October 15, 2025, for the installation of one galvanizing line comprising of the following: one (1) Westech Pulse-fired high velocity natural gas fired galvanizing furnace rated at 1.5 MMBtu/hr, one (1) Rite Boiler No. 48 rated at 0.48 MMBtu firing natural gas, one (1) Westech portable galvanizing centrifuge system and various processing tanks. The proposed installations will be located at 7110 Quad Avenue in Baltimore, Maryland 21237.

In accordance with HB 1200/Ch. 588 of 2022, the applicant provided an environmental justice (EJ) Score for the census tract in which the project is located. The EJ Score, expressed as a statewide percentile, was shown to be 99.5, which the Department has verified. This score represents a combined measure of pollution and the potential vulnerability of a population to the effects of pollution.

Copies of the application, the MDE EJ Screening Tool Report (which includes the score), and other supporting documents are available for public inspection on the Department's website at https://mde.maryland.gov/programs/Permits/AirManagementPermits/Pages/index.aspx (click on Docket Number 01-26). Any applicant-provided information regarding a description of the environmental and socioeconomic indicators contributing to that EJ score can also be found at the listed website. Such information has not yet been reviewed by the Department. A review of the submitted information will be conducted when the Department undertakes its technical review of all documents included in the application.

Pursuant to the Environment Article, Section 1-603, Annotated Code of Maryland, the Department will hold an informational meeting to discuss the application and the permit review process if the Department receives a written request for a meeting within 10 working days from the date of the second publication of this notice. A requested informational meeting will be held virtually using teleconference or internet-based conferencing technology unless a specific request for an in-person informational meeting is received. All requests for an informational meeting should be directed to the attention of Ms. Shannon Heafey, Air Quality Permits Program by email to shannon.heafey@maryland.gov or by mail to the Air and Radiation Administration, 1800 Washington Boulevard, Baltimore, Maryland 21230.

Further information may be obtained by calling Ms. Shannon Heafey at 410-537-4433.

Christopher R. Hoagland, Director
Air and Radiation Administration

AIR QUALITY
PERMIT TO CONSTRUCT APPLICATION

GALVCO OF MARYLAND,
DBA BALTIMORE GALVANIZING COMPANY

ARM Project 25010536

7110 Quad Avenue,
Baltimore, Maryland

Submitted to:

Maryland Department of the Environmental
Air Quality Permits Program
1800 Washington Blvd.
Baltimore, Maryland 21230

Prepared for:

Baltimore Galvanizing Company
7110 Quad Avenue,
Baltimore, Maryland 21237

Prepared by:

ARM Group LLC
Engineers and Scientists

September 2025

AIR QUALITY PERMIT TO CONSTRUCT APPLICATION CHECKLIST

OWNER OF EQUIPMENT/PROCESS	
COMPANY NAME:	Galvco of Maryland, DBA Baltimore Galvanizing Company
COMPANY ADDRESS:	7110 Quad Avenue, Baltimore, Maryland 21237
LOCATION OF EQUIPMENT/PROCESS	
PREMISES NAME:	Baltimore Galvanizing Company
PREMISES ADDRESS:	7110 Quad Avenue, Baltimore, Maryland 21237
CONTACT INFORMATION FOR THIS PERMIT APPLICATION	
CONTACT NAME:	Alfred M. Yates (ARM Group LLC)
JOB TITLE:	Senior Engineer
PHONE NUMBER:	610-585-9808
EMAIL ADDRESS:	ayates@armgroup.net
DESCRIPTION OF EQUIPMENT OR PROCESS	
Second galvanizing spin line for small parts	

Application is hereby made to the Department of the Environment for a Permit to Construct for the following equipment or process as required by the State of Maryland Air Quality Regulation, COMAR 26.11.02.09.

Check each item that you have submitted as part of your application package.

☒ Application package cover letter describing the proposed project

☒ Complete application forms (Note the number of forms included or NA if not applicable.)

No. 1 Form 5
No. 1 Form 5T
No. 2 Form 5EP
No. _____ Form 6
No. _____ Form 10
No. _____ Form 11
No. _____ Form 41
No. _____ Form 42
No. _____ Form 44

☐ Vendor/manufacturer specifications/guarantees

☒ Evidence of Workman's Compensation Insurance

☒ Process flow diagrams with emission points

☒ Site plan including the location of the proposed source and property boundary

☒ Material balance data and all emissions calculations

☒ Material Safety Data Sheets (MSDS) or equivalent information for materials processed and manufactured.

☐ Certificate of Public Convenience and Necessity (CPCN) waiver documentation from the Public Service Commission (1)

☐ Documentation that the proposed installation complies with local zoning and land use requirements (2)

(1) Required for emergency and non-emergency generators installed on or after October 1, 2001 and rated at 2001 kW or more.

(2) Required for applications subject to Expanded Public Participation Requirements.

MARYLAND DEPARTMENT OF THE ENVIRONMENT

1800 Washington Blvd ▪ Baltimore, Maryland 21230
(410) 537-3230 ▪1-800-633-6101 ▪ www.mde.state.md.us

Air and Radiation Management Administration ▪ Air Quality Permits Program

APPLICATION FOR PROCESSING/MANUFACTURING EQUIPMENT

Permit to Construct X Registration Update ☐ Initial Registration ☐

1A. Owner of Equipment/Company Name

Baltimore Galvanizing Company

Mailing Address

7110 Quad Avenue
Street Address

Baltimore | MD | 21237
City | State | Zip

Telephone Number

(410) 288-1188

Signature

Dan Klahr

David Klahr, General Manager
Print Name and Title

9/15/2025
Date

DO NOT WRITE IN THIS BLOCK
2. REGISTRATION NUMBER

County No. (1-2) | Premises No. (3-6)
Registration Class (7) | Equipment No. (8-11)
Data Year (12-13) | Application Date

1B. Equipment Location and Telephone Number (if different from above)

7110 Quad Ave.
Street Number and Street Name

Baltimore | MD | 21237 | (410) 288-1188
City/Town | State | Zip | Telephone Number

Premises Name (if different from above)

3. Status (A= New, B= Modification to Existing Equipment, C= Existing Equipment)

Status	New Construction Begun (MM/YY)	New Construction Completed (MM/YY)	Existing Initial Operation (MM/YY)
A	0725	1225	
15	16-19	20-23	20-23

4. Describe this Equipment: Make, Model, Features, Manufacturer (include Maximum Hourly Input Rate, etc.)
Second galvanizing spin line capable of galvanizing up to 1,000 pounds/hour of small parts.

5. Workmen's Compensation Coverage WCN6007584 (Binder/Policy Number) 10/1/25 (Expiration Date)

Company ENCOVA INSURANCE

NOTE: Before a Permit to Construct may be issued by the Department, the applicant must provide the Department with proof of worker's compensation coverage as required under Section 1-202 of the Worker's Compensation Act.

6A. Number of Pieces of Identical Equipment Units to be Registered/Permitted at this Time 2

6B. Number of Stack/Emission Points Associated with this Equipment 2

7. Person Installing this Equipment (if different from Number 1 on Page 1)

Name_____ Title_____

Company_____

Mailing Address/Street_____

City/Town_____ State_____ Telephone (_____) _____

8. Major Activity, Product or Service of Company at this Location

The Baltimore Galvanizing Company (Galvco) is a metal galvanizing company located at 7110 Quad Avenue in Baltimore, Maryland. Galvco operates an existing galvanizing line in the main building. A proposed second galvanizing spin line for small parts is being installed in the smaller building at the rear of the site. The following equipment is proposed: one (1) caustic tank; one (1) caustic rinse tank; four (4) hydrochloric acid pickling tanks; one (1) flux tank; one (1) acid rinse tank; one (1) zinc galvanizing bath tank; and one (1) final rinse tank. The emissions from the zinc galvanizing tank will be vented from a ten feet tall stack. The proposed second galvanizing line can process up to 1,000 pounds of small parts per hour.

9. Control Devices Associated with this Equipment

None [ ] 24-0

Simple/Multiple Cyclone	Spray/Adsorb Tower	Venturi Scrubber	Carbon Adsorber	Electrostatic Precipitator	Baghouse	Thermal/Catalytic Afterburner	Dry Scrubber
[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
24-1	24-2	24-3	24-4	24-5	24-6	24-7	24-8

Other

[X] cribe Lids to cover pickling tanks when not in use and the use of a fume suppresent additive to minimize HCl fugitive emissions

24-9

10. Annual Fuel Consumption for this Equipment Refer to attached air emissions calculations

OIL-1000 GALLONS	SULFUR %	GRADE	NATURAL GAS-1000 FT^3	LP GAS-100 GALLONS	GRADE
[ ][ ][ ][ ][ ][ ]	[ ][ ]	[ ]	[ ][ ][ ][ ][ ][ ][ ]	[ ][ ][ ][ ]	[ ]
26-31	32-33	34	35-41	42-45	

COAL- TONS	SULFUR %	ASH%	WOOD-TONS	MOISTURE %
[ ][ ][ ][ ][ ][ ][ ]	[ ][ ][ ]	[ ][ ][ ]	[ ][ ][ ][ ][ ]	[ ][ ]
46-52	53-55	56-58	59-63	64-65

OTHER FUELS _____ (Specify Type) [ ] 66-1 ANNUAL AMOUNT CONSUMED _____ (Specify Units of Measure)

OTHER FUEL _____ (Specify Type) [ ] 66-2 ANNUAL AMOUNT CONSUMED _____ (Specify Units of Measure)

1= Coke 2= COG 3=BFG 4=Other

11. Operating Schedule (for this Equipment)

Continuous Operation	Batch Process	Hours per Batch	Batch per Week	Hours per Day	Days Per Week	Days per Year
[X]	[ ]	[ ][ ]	[ ]	[ ][8]	[6]	[3][1][3]
67-1	67-2	68-69		70-71	72	73-75

Seasonal Variation in Operation:

No Variation	Winter Percent	Spring Percent	Summer Percent	Fall Percent	(Total Seasons= 100%)
[X]	[ ][ ]	[ ][ ]	[ ][ ]	[ ][ ]	
76	77-78	79-80	81-82	83-84	

12. Equivalent Stack Innformation- is Exhaust through Doors, Windows, etc. Only? (Y/N) N (85)

If not, then	Height Avove Ground (FT)	Inside Diameter at Top	Exit Temperature (ºF)	Exit Velocity (FT/SEC)
	10	1		
	86-88	89-91	92-95	96-98

NOTE:
Attach a block diagram of process/process line, indicating new equipment as reported on this form and all existing equipment, including control devices and emission points.

13. Input Materials (for this equipment only)
Is any of this data to be considered confidential? N (Y or N)

		INPUT RATE			
NAME	**CAS NO. (IF APPLICABLE)**	**PER HOUR**	**UNITS**	**PER YEAR**	**UNITS**
1. Small Metal Parts		up to 1,000	Lbs./hr	Varies	
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
TOTAL					

14. Output Materials (for this equipment)
Process/Product Stream

		OUTPUT RATE			
NAME	**CAS NO. (IF APPLICABLE)**	**PER HOUR**	**UNITS**	**PER YEAR**	**UNITS**
1. Galvanized Small Metal Parts		up to 1,000	Lbs./hr	Varies	
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
TOTAL					

15. Waste Streams- Solid and Liquid

		OUTPUT RATE			
NAME	**CAS NO. (IF APPLICABLE)**	**PER HOUR**	**UNITS**	**PER YEAR**	**UNITS**
1.Waste Hydrochloric Acid	7647-01-0			Approx. 27,000	gallons
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
TOTAL					

16. Total Stack Emissions (for this equipment only) in Pounds Per Operating Day

Particulate Matter	Oxides of Sulfur	Oxides of Nitrogen
1	0	0
99-104	105-110	111-116

Carbon Monoxide	Volatile Organic Compounds	PM-10
0	0	1
177-122	123-128	129-134

17. Total Fugitive Emissions (for this equipment only) in Pounds Per Operating Day

Particulate Matter	Oxides of Sulfur	Oxides of Nitrogen
0	0	6
135-139	140-144	145-149

Carbon Monoxide	Volatile Organic Compounds	PM-10
1	0	0
150-154	155-159	160-164

Method Used to Determine Emissions (1= Estimate 2= Emission Factor 3= Stack Test 4= Other)

TSP	SOX	NOX	CO	VOC	PM10
2	2	2	2	2	2
165	166	167	168	169	170

AIR AND RADIATION MANAGEMENT ADMINISTRATION USE ONLY

18. Date Rec'd. Local _____ **Date Rec'd. State** _____ **Return to Local Jurisdiction** **Date**_____ **By**_____

Reviewed by Local Jurisdiction Date_____ By_____ **Reviewed by State** Date_____ By_____

19. Inventory Date **Month/Year** (171-174) **Equipment Code** (175-177) **SCC Code** (178-185)

20. Annual Operating Rate (186-192) **Maximum Design Hourly Rate** (193-199) **Permit to Operate Month** (200-201) **Transaction Date (MM/DD/YR)** (202-207)

Staff Code (208-210) **VOC Code** (211 212) **SIP Code** (213 214) **Regulation Code** (215-218) **Confidentiality** (219)

Point Description (220-238) **Action** (239) A: Add C: Change

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1800 Washington Boulevard ● Baltimore, Maryland 21230
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FORM 5EP: Emission Point Data

Complete one (1) Form 5EP for EACH emission point (stack or fugitive emissions) related to the proposed installation.

Applicant Name: Baltimore Galvanizing Company

1. Emission Point Identification Name/Number

List the applicant assigned name/number for this emission point and use this value on the attached required plot plan:
Galv 002

2. Emission Point Description

Describe the emission point including all associated equipment and control devices:
Emission point for second small parts galvanizing unit (galvanizing kettle with heater). No control devices are proposed.

3. Emissions Schedule for the Emission Point

Continuous or Intermittent (C/I)?	C	**Seasonal Variation** Check box if none: ☒ Otherwise estimate seasonal variation:	
Minutes per hour:	60	Winter Percent	
Hours per day:	8	Spring Percent	
Days per week:	6	Summer Percent	
Weeks per year:	52.1	Fall Percent	

4. Emission Point Information

Height above ground (ft):	10	Length and width dimensions at top of rectangular stack (ft):	Length: 1.0 foot dia.	Width:	
Height above structures (ft):	10.0				
Exit temperature (ºF):	varies	Inside diameter at top of round stack (ft):		1.0	
Exit velocity (ft/min):	1	Distance from emission point to nearest property line (ft):			
Exhaust gas volumetric flow rate (acfm):	Ambient	Building dimensions if emission point is located on building (ft)	Height 13	Length 70	Width 40

5. Control Devices Associated with the Emission Point

Identify each control device associated with the emission point and indicate the number of devices. ***A Form 6 is also required for each control device***. If none check none:

☒ None

☐ Baghouse No. _____

☐ Cyclone No. _____

☐ Elec. Precipitator (ESP) No. _____

☐ Dust Suppression System No. _____

☐ Venturi Scrubber No. _____

☐ Spray Tower/Packed Bed No. _____

☐ Carbon Adsorber No. _____

- ☐ Cartridge/Canister
- ☐ Regenerative

☐ Thermal Oxidizer No. _____

- ☐ Regenerative

☐ Catalytic Oxidizer No. _____

☐ Nitrogen Oxides Reduction No. _____

- ☐ Selective ☐ Non-Selective
- ☐ Catalytic ☐ Non-Catalytic

☐ Other No. _____
Specify:

FORM 5EP: Emission Point Data

6. Estimated Emissions from the Emission Point

Criteria Pollutants	At Design Capacity (lb/hr)	At Projected Operations		
		(lb/hr)	(lb/day)	(ton/yr)
Particulate Matter (filterable as PM10)	0.26	0.26	2.1	0.3
Particulate Matter (filterable as PM2.5)	0.26	0.26	2.1	0.3
Particulate Matter (condensables)	0.26	0.26	2.1	0.3
Volatile Organic Compounds (VOC)	0.0082	0.0082	0.20	0.036
Oxides of Sulfur (SOx)	0.00090	0.00090	0.022	0.0039
Oxides of Nitrogen (NOx)	0.25	0.25	6.1	1.12
Carbon Monoxide (CO)	0.036	0.036	0.86	0.16
Lead (Pb)	0.000015	0.000015	0.00012	0.000019
Greenhouse Gases (GHG)	**At Design Capacity (lb/hr)**	**At Projected Operations**		
		(lb/hr)	**(lb/day)**	**(ton/yr)**
Carbon Dioxide (CO_2)	184	184	4,400	807
Methane (CH_4)	0.0035	0.038	0.083	0.15
Nitrous Oxide (N_2O)	0.0003	0.0003	0.0083	0.0015
Hydrofluorocarbons (HFCs)	N/A	N/A	N/A	N/A
Perfluorocarbons (PFCs)	N/A	N/A	N/A	N/A
Sulfur Hexafluoride (SF6)	N/A	N/A	N/A	N/A
Total GHG (as CO_2e)	184	184	4,400	807
List individual federal Hazardous Air Pollutants (HAP) below:	**At Design Capacity (lb/hr)**	**At Projected Operations**		
		(lb/hr)	**(lb/day)**	**(ton/yr)**

(Attach additional sheets as necessary.)

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FORM 5EP: Emission Point Data

Complete one (1) Form 5EP for EACH emission point (stack or fugitive emissions) related to the proposed installation.

Applicant Name: Baltimore Galvanizing Company

1. Emission Point Identification Name/Number

List the applicant assigned name/number for this emission point and use this value on the attached required plot plan:
Acid 002

2. Emission Point Description

Describe the emission point including all associated equipment and control devices:
Emission point for second small parts galvanizing unit (Hydrochloric Acid pickling tanks). No control devices are proposed.

3. Emissions Schedule for the Emission Point

Continuous or Intermittent (C/I)?	C	**Seasonal Variation** Check box if none: ☒ Otherwise estimate seasonal variation:	
Minutes per hour:	60	Winter Percent	
Hours per day:	8	Spring Percent	
Days per week:	6	Summer Percent	
Weeks per year:	52.1	Fall Percent	

4. Emission Point Information

Height above ground (ft):	3	Length and width dimensions at top of rectangular stack (ft):	Length: building doors	Width: building boors
Height above structures (ft):	0			
Exit temperature (ºF):	Ambient	Inside diameter at top of round stack (ft):		doors
Exit velocity (ft/min):	1	Distance from emission point to nearest property line (ft):		40
Exhaust gas volumetric flow rate (acfm):	ambient	Building dimensions if emission point is located on building (ft)	Height 13	Length 70 / Width 40

5. Control Devices Associated with the Emission Point

Identify each control device associated with the emission point and indicate the number of devices. ***A Form 6 is also required for each control device***. If none check none:

- ☒ None
- ☐ Baghouse No. _____
- ☐ Cyclone No. _____
- ☐ Elec. Precipitator (ESP) No. _____
- ☐ Dust Suppression System No. _____
- ☐ Venturi Scrubber No. _____
- ☐ Spray Tower/Packed Bed No. _____
- ☐ Carbon Adsorber No. _____
  - ☐ Cartridge/Canister
  - ☐ Regenerative
- ☐ Thermal Oxidizer No. _____
  - ☐ Regenerative
- ☐ Catalytic Oxidizer No. _____
- ☐ Nitrogen Oxides Reduction No. _____
  - ☐ Selective ☐ Non-Selective
  - ☐ Catalytic ☐ Non-Catalytic
- ☐ Other No. _____
  Specify:

FORM 5EP: Emission Point Data

6. Estimated Emissions from the Emission Point

Criteria Pollutants	At Design Capacity (lb/hr)	At Projected Operations		
		(lb/hr)	(lb/day)	(ton/yr)
Particulate Matter (filterable as PM10)	N/A	N/A	N/A	N/A
Particulate Matter (filterable as PM2.5)	N/A	N/A	N/A	N/A
Particulate Matter (condensables)	N/A	N/A	N/A	N/A
Volatile Organic Compounds (VOC)	N/A	N/A	N/A	N/A
Oxides of Sulfur (SOx)	N/A	N/A	N/A	N/A
Oxides of Nitrogen (NOx)	N/A	N/A	N/A	N/A
Carbon Monoxide (CO)	N/A	N/A	N/A	N/A
Lead (Pb)	N/A	N/A	N/A	N/A
Greenhouse Gases (GHG)	**At Design Capacity (lb/hr)**	**At Projected Operations**		
		(lb/hr)	**(lb/day)**	**(ton/yr)**
Carbon Dioxide (CO_2)	N/A	N/A	N/A	N/A
Methane (CH_4)	N/A	N/A	N/A	N/A
Nitrous Oxide (N_2O)	N/A	N/A	N/A	N/A
Hydrofluorocarbons (HFCs)	N/A	N/A	N/A	N/A
Perfluorocarbons (PFCs)	N/A	N/A	N/A	N/A
Sulfur Hexafluoride (SF6)	N/A	N/A	N/A	N/A
Total GHG (as CO_2e)	N/A	N/A	N/A	N/A
List individual federal Hazardous Air Pollutants (HAP) below:	**At Design Capacity (lb/hr)**	**At Projected Operations**		
		(lb/hr)	**(lb/day)**	**(ton/yr)**
Hydrochloric Acid	0.015	0.003	0.02	34

(Attach additional sheets as necessary.)

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FORM 5T: Toxic Air Pollutant (TAP) Emissions Summary and Compliance Demonstration

Applicant Name: Baltimore Galvanzing Company

Step 1: Quantify premises-wide emissions of Toxic Air Pollutants (TAP) from new and existing installations in accordance with COMAR 26.11.15.04. Attach supporting documentation as necessary.

Toxic Air Pollutant (TAP)	CAS Number	Class I or Class II?	Screening Levels (µg/m^3)			Estimated Premises Wide Emissions of TAP			
						Actual Total Existing TAP Emissions	Projected TAP Emissions from Proposed Installation	Premises Wide Total TAP Emissions	
			1-hour	8-hour	Annual	(lb/hr)	(lb/hr)	(lb/hr)	(lb/yr)
ex. ethanol	*64175*	*II*	*18843*	*3769*	*N/A*	*0.60*	*0.15*	*0.75*	*1500*
ex. benzene	*71432*	*I*	*80*	*16*	*0.13*	*0.5*	*0.75*	*1.00*	*400*
Hydrochloric Acid	7647-01-0	II	29.83	165.27	0.70	0.011	0.003	.014	34
Copper	7440-50-8	II	N/A	2.0	N/A	0.000008	0.0001	0.0001	0.14
Nickel	7440-02-0	I	N/A	2.0	N/A	0.000075	0.001	0.0018	0.28

(attach additional sheets as necessary.)

Note: Screening levels can be obtained from the Department's website (http://www.mde.maryland.gov) or by calling the Department.

Step 2: Determine which TAPs are exempt from further review. A TAP that meets either of the following Class I or Class II small quantity emitter exemptions is exempt from further TAP compliance demonstration requirements under Step 3 and Step 4.

Class II TAP Small Quantity Emitter Exemption Requirements (COMAR 26.11.15.03B(3)(a))
A Class II TAP is exempt from Step 3 and Step 4 if the Class II TAP meets the following requirements: Premises wide emissions of the TAP shall not exceed 0.5 pounds per hour, and any applicable 1-hour or 8-hour screening level for the TAP must be greater than 200 µg/m^3.

Class I TAP Small Quantity Emitter Exemption Requirements (COMAR 26.11.15.03B(3)(b))
A Class I TAP is exempt from Step 3 and Step 4 if the Class I TAP meets the following requirements: Premises wide emissions of the TAP shall not exceed 0.5 pounds per hour and 350 pounds per year, any applicable 1-hour or 8-hour screening level for the TAP must be greater than 200 µg/m^3, and any applicable annual screening level for the TAP must be greater than 1 µg/m^3.

If a TAP meets either the Class I or Class II TAP Small Quantity Emitter Exemption Requirements, no further review under Step 3 and Step 4 are required for that specific TAP.

FORM 5T: Toxic Air Pollutant (TAP) Emissions Summary and Compliance Demonstration

Step 3: Best Available Control Technology for Toxics Requirement (T-BACT, COMAR 26.11.15.05)
In the following table, list all TAP emission reduction options considered when determining T-BACT for the proposed installation. The options should be listed in order beginning with the most effective control strategy to the least effective strategy. Attach supporting documentation as necessary.

Target Pollutants	Emission Control Option	% Emission Reduction	Costs		T-BACT Option Selected? (yes/no)
			Capital	Annual Operating	
ex. ethanol and benzene	*Thermal Oxidizer*	*99*	*$50,000*	*$100,000*	*no*
ex. ethanol and benzene	*Low VOC materials*	*80*	*0*	*$100.000*	*yes*
Hydrochloric Acid	acid air scrubber	90	$200,000	$200,000	no
Hydrochloric Acidl	tank lids during non-use	66.7	$3,000	-	yes
Hydrochloric Acid	fume suppresent	80	TBD	variable	yes
Copper and Nickel	wet scrubber	95	$200,000	variable	no

(attach additional sheets as necessary)

Step 4: Demonstrating Compliance with the Ambient Impact Requirement (COMAR 26.11.15.06)
Each TAP not exempt in Step 2 must be individually evaluated to determine that the emissions of the TAP will not adversely impact public health. The evaluation consists of a series of increasingly non-conservative (and increasingly rigorous) tests. Once a TAP passes a test in the evaluation, no further analysis is required for that TAP. "Demonstrating Compliance with the Ambient Impact Requirement under the Toxic Air Pollutant (TAP) Regulations (COMAR 26.11.15.06)" provides guidance on conducting the evaluation. Summarize your results in the following table. Attach supporting documentation as necessary.

Toxic Air Pollutant (TAP)	CAS Number	Screening Levels ($\mu g/m^3$)			Premises Wide Total TAP Emissions		Allowable Emissions Rate (AER) per COMAR 26.11.16.02A		Off-site Concentrations per Screening Analysis ($\mu g/m^3$)			Compliance Method Used?
		1-hour	8-hour	Annual	(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)	1-hour	8-hour	Annual	AER or Screen
ex. ethanol	*64175*	*18843*	*3769*	*N/A*	*0.75*	*1500*	*0.89*	*N/A*	*N/A*	*N/A*	*N/A*	*AER*
ex. benzene	*71432*	*80*	*16*	*0.13*	*1.00*	*400*	*0.04*	*36.52*	*1.5*	*1.05*	*0.12*	*Screen*
Hydrochloric Acid	7647-01-0	29.83	165.27	0.70	0.014	34	0.04	36.52	N/A	N/A	N/A	AER
Copper	7440-50-8	N/A	2.0	N/A	0.0001	0.14	0.003	N/A	N/A	N/A	N/A	AER
Nickel	7440-02-0	N/A	2.0	N/A	0.0018	0.28	0.003	N/A	N/A	N/A	N/A	AER

(attach additional sheets as necessary)

If compliance with the ambient impact requirement cannot be met using the allowable emissions rate method or the screening analysis method, refined dispersion modeling techniques may be required. Please consult with the Department's Air Quality Permit Program prior to conducting dispersion modeling methods to demonstrate compliance.

ATTACHMENT A

Air Emissions Calculations

GALVCO MARYLAND LLC - #005-00302
Permit to Construct - Second Galvanizing Unit
Potential to Emit (POT) and Actual Emissions (AE) Calculations

Calculation Inputs:

Total Zinc Used	=	8,784,000	lbs
	=	4,392	T
Annual Fuel Consumption	=	1,500,000	BTU/hr
		(1,500,000 BTUs/hr) x (1 scf/1,000 BTUs) x (24 hr/day)	
	=	36,000	scf/day
	=	13,140,000	scf/yr
Total Work Days			
Metal Galvanizing	=	(6 d/wk) x (52 wk/yr)	
	=	313	working d/yr

PM10 Emissions = 0.52 lbs/ton of galvanizined products (Emissions from Hot-Dip Galvanizing Processes Final Report EPA – 905/4-76-002, 1976).

Boiler/furnace operation	=	(7 d/wk) x (52 wk/yr)	
	=	365	working d/yr

Potential to Emit and Actual Emissions Calculations for Furnace and Galvanizing Tank:

PM_{10}:

Potential to Emit

Natural Gas Combustion

13,140,000	scf/yr	x	1.9	lb/MMscf	=	24.97 lb/yr
25	lb/yr	x	(1 yr/365 d)		=	0.068 lb/day
25	lb/yr	x	(1 T/2000 lb)		=	0.01248 T/yr

Galvanizing Tank

4,392	Zn T/yr	x	0.52	lb/T (PM)	=	2,283.8 lb/yr
2,284	lb/yr	x	(1 yr/312 d)		=	7.32 lb/day
2,284	lb/yr	x	1	T/2000 lb	=	1.142 T/yr

lb/hr (natural gas) + lb/hr (galvanizing tank)	=	0.26	lb/hr
lb/d (natural gas) + lb/day (galvanizing tank)	=	7.4	lb/day
T/yr (natural gas) + T/yr (galvanizing tank)	=	**1.15**	**T/yr**

Actual Emissions

8 hours/day	x	(8,000 pounds) (0.52 lbs/ton of product)	=	2.1	lbs/day
52.1 weeks/year	x	(5 days/week)	=	261	days/yr
261 days/yr	x	2.1 pounds zinc emitted/hour	=	542	lb/yr
542 lb/yr	x	(ton/2,000 lbs)	=	**0.3**	**T/yr**

VOCs:

Annual

13,140,000	scf/yr	x	5.5	lb/MMscf	=	72.3 lb/yr
72.3	lb/yr	x	(1 yr/366 d)		=	0.197 lb/day
72.3	lb/yr	x	(1 T/2000 lb)		=	**0.036** **T/yr**

SO_2:

Annual

13,140,000	scf/yr	x	0.6	lb/MMscf	=	7.9 lb/yr
7.9	lb/yr	x	(1 yr/366 d)		=	0.0215 lb/day
7.9	lb/yr	x	(1 T/2000 lb)		=	**0.0039** **T/yr**

NO_x:

Annual

13,140,000	scf/yr	x	170	lb/MMscf	=	2,233.8 lb/yr
2,233.8	lb/yr	x	(1 yr/366 d)		=	6.10 lb/day
2,233.8	lb/yr	x	(1 T/2000 lb)		=	**1.12** **T/yr**

CO:

Annual

13,140,000	scf/yr	x	24	lb/MMscf	=	315.4 lb/yr
315.4	lb/yr	x	(1 yr/366 d)		=	0.862 lb/day
315.4	lb/yr	x	(1 T/2000 lb)		=	**0.16** **T/yr**

GALVCO MARYLAND LLC - #005-00302
Permit to Construct - Second Galvanizing Unit
Potential to Emit (POT) and Actual Emissions (AE) Calculations

The Potential to Emit (PTE) calculations provide the theoretical maximum emmissions assuming operation of the secondary small parts galvanzing unit 24 hours per day, 365 days per year. The Actual Emissions (AE) assume operational limits of eight hours per day, five days per week. The secondary small parts galvanzing unit is capable of processing 1,000 pounds of metal parts per hour. The emission factor for particulate emissions from the galvanizing process was derived from AP-42. The emissions of each pollutant is estimated based on the percentage of impurities in the zinc. The percentage of metals was obtained from the most recent monthly galvanizing kettle metal analysis.

Zinc:

Total Zinc Processed

4392	T/yr	x	(2000 lb/T)	=	8,784,000	lb/yr
8,784,000	lb/yr	x	(1 yr/366 d)	=	24,000	lb/d
24,000	lb/d	x	(1d/24 hr)	=	1,000.0	lb/hr

Potential to Emit Calculations

Calculated Emissions

24,000	lb/d	x	0.52 lb/ton of galvanzied product*	=	6.2	lb/d
6.24	lb/d	x	(1d/24 hr)	=	0.260	lb/hr
6.24	lb/d	x	(312 d/1 yr)	=	1,947	lb/yr
1946.9	lb/yr	x	(1 T/2000 lb)	=	**1.0**	**T/yr**

*Emission factor from Hot-Dip Galvanizing Processes Final Report EPA – 905/4-76-002, 1976), conservatively assumes that zinc comprises 100% of the particulate emissions from the galvanizing process.

Actual Emission Calculations

Calculated Emissions

8	hours/day	x	(8,000 pounds) (0.52 lbs/ton of product)	=	2.1	lbs/day
52.1	weeks/year	x	(5 days/week)	=	261	days/yr
261	days/yr	x	2.1 pounds zinc emitted/hour	=	542	lb/yr
542	lb/yr	x	(ton/2,000 lbs)	=	**0.3**	**T/yr**

Lead Emissions:

Potential to Emit Calculations

6.24	lb/d Zn	x	0.007% Pb/Zn	=	0.00044	lb/d
0.00044	lb/d	x	(1d/24 hr)	=	0.0000182	lb/hr
0.00044	lb/d	x	(312 d/1 yr)	=	0.136	lb/yr
0.14	lb/yr	x	(1 T/2000 lb)	=	**0.00007**	**T/yr**

Actual Emission Calculations

542	lb/yr Zn	x	0.007% Pb/Zn	=	0.03793	lb/yr
0.00044	lb/d	x	(8 hrs/day)		**0.00015**	**lb/d**
0.0379	lb/yr	x	(1 T/2000 lb)	=	**0.000019**	**T/yr**

Cadmium Emissions:

Potential to Emit Calculations

6.24	lb/d Zn	x	0.0004% Cd/Zn	=	0.000025	lb/d
0.0000250	lb/d	x	(1d/24 hr)	=	0.00000104	lb/hr
0.0000250	lb/d	x	(312 d/1 yr)	=	0.0078	lb/yr
0.0078	lb/yr	x	(1 T/2000 lb)	=	**0.00000**	**T/yr**

Actual Emission Calculations

542	lb/yr Zn	x	0.000% Pb/Zn	=	0.00217	lb/yr
0.0022	lb/yr	x	(1 T/2000 lb)	=	**0.000001**	**T/yr**

Aluminum Emissions:

Potential to Emit Calculations

6.24	lb/d Zn	x	0.0010%	Al/Zn	=	0.0000624	lb/d
0.0000624	lb/d	x	(1d/24 hr)		=	0.00000260	lb/hr
0.0000624	lb/d	x	(312 d/1 yr)		=	0.0195	lb/yr
0.0195	lb/yr	x	(1 T/2000 lb)		=	**0.0000097**	**T/yr**

Actual Emission Calculations

542	lb/yr Zn	x	0.001%	Al/Zn	=	0.00542	lb/yr
0.0054	lb/yr	x	(1 T/2000 lb)		=	**0.000003**	**T/yr**

Copper Emissions:

Potential to Emit Calculations

6	lb/d Zn	x	0.0200%	Cu/Zn	=	0.001248	lb/d
0.00	lb/d	x	(1d/24 hr)		=	0.0000520	lb/hr
0.00	lb/d	x	(312 d/1 yr)		=	0.3894	lb/yr
0.389	lb/yr	x	(1 T/2000 lb)		=	**0.0001947**	**T/yr**

Actual Emission Calculations

542	lb/yr Zn	x	0.020%	Cu/Zn	=	0.10837	lb/yr
0.1084	lb/yr	x	(1 T/2000 lb)		=	**0.000054**	**T/yr**

Iron Emissions:

Potential to Emit Calculations

6.24	lb/d Zn	x	0.0020%	Fe/Zn	=	0.000125	lb/d
0.0001248	lb/d	x	(1d/24 hr)		=	0.00000520	lb/hr
0.0001248	lb/d	x	(312 d/1 yr)		=	0.0389	lb/yr
0.0389	lb/yr	x	(1 T/2000 lb)		=	0.0000195	T/yr

Actual Emission Calculations

542	lb/yr Zn	x	0.002%	Fe/Zn	=	0.01084	lb/yr
0.0108	lb/yr	x	(1 T/2000 lb)		=	**0.000005**	**T/yr**

Tin Emissions:

Potential to Emit Calculations

6.24	lb/d Zn	x	0.0030%	Sn/Zn	=	0.000187	lb/d
0.0001872	lb/d	x	(1d/24 hr)		=	0.00000780	lb/hr
0.0001872	lb/d	x	(312 d/1 yr)		=	0.0584	lb/yr
0.0584	lb/yr	x	(1 T/2000 lb)		=	**0.000029**	**T/yr**

Actual Emission Calculations

542	lb/yr Zn	x	0.003%	Sn/Zn	=	0.01626	lb/yr
0.0163	lb/yr	x	(1 T/2000 lb)		=	**0.000008**	**T/yr**

Nickel Emissions:

Potential to Emit Calculations

6.24	lb/d Zn	x	0.0400%	Ni/Zn	=	0.002496	lb/d
0.0024960	lb/d	x	(1d/24 hr)		=	0.00010400	lb/hr
0.0024960	lb/d	x	(312 d/1 yr)		=	0.7788	lb/yr
0.7788	lb/yr	x	(1 T/2000 lb)		=	**0.000389**	**T/yr**

Actual Emission Calculations

542	lb/yr Zn	x	0.040%	Ni/Zn	=	0.21674	lb/yr
0.2167	lb/yr	x	(1 T/2000 lb)		=	**0.00010837**	**T/yr**

GALVCO MARYLAND LLC - #005-00302
Permit to Construct - Second Galvanizing Unit
Potential to Emit (POT) and Actual Emissions (AE) Calculations

Annual emissions rate derived from a hot dip galvanizing calculation guidance package created by the Texas Commission on Environmental Quality's Air Permits Division.

Potential to Emit Calculations for Acid Tank:

Fugative Emissions Rate (see below calculations)	=	0.015	lb/hr

Proposed Actual Emissions Calculations for Acid Tank:

Daily HCl emissions (see calculations below)	=	0.02	lb/day
(x 313 days/yr, 8 hrs/day[covered remaining time])			
Quantity of acid in the evaporated acid-water solution	=	**0.004**	**T/yr**
0.00 T/yr x (2000 lb/1 T)	=	**7**	**lb/yr**

Emission Factor Calculations:

Individual Tank Surface Area	=	20.6	ft^2
Number of Tanks	=	4	
Total Tank Surface Area (A)	=	82.4	ft^2
Operating Temperature	=	20	˚C
Acid Concentration	=	16.0	% HCL
Air Velocity (V)	=	1.0	fps
Vapor Pressure (Pv)	=	0.043	mmHg
Evaporation Rate (E)	0.015 =	25[0.46 + 0.117(V)]log[(760 - Pa)/(760 - Pv)]	
*Pa = 0 for this calculation	=	0.000353	lb/hr-ft^2
Uncontrolled Emission Rate (ER_1)	=	E x A	
	=	0.029072	lb/hr
Actual Fugitive Emissions Rate	=	$(0.5)(ER_1)$	
*Assuming 50% capture efficiency for the building	=	0.015	lb/hr
** Assumes pickling tanks are covered with a lid during the 16 hours/day when not in use to prevent fugative emissions.	=	0.12	lb/day (with lids)
*** Assumes a fume suppresent is added to pickling tanks, which reduces the HCl evaportation by 80-percent.	=	**0.02**	**lb/day (with lids & fume suppresent))**
	=	**0.003**	**lb/hr (with lids & fume suppresent))**

GALVCO MARYLAND LLC - #005-00302
Permit to Construct - Second Galvanizing Unit
Potential to Emit (POT) and Actual Emissions (AE) Calculations

Emissions Factors for Greenhouse Gases from Natural Gas Combustion

Constituent	Emission Factor (lb/MMscf)
CO_2	122,847
N_20	0.23
CH_4	2.32

Fuel Consumption (Natural Gas)

13,140,000 scf

1 year = 365 days

CO_2

13,140,000	scf	x	122,847	lb/MMscf	=	1,614,212 lb/yr
1,614,212	lb/yr	x	1	yr/366 d	=	4,422 lb/d
4,422	lb/d	x	1	d/24 hrs	=	184.3 lb/hr
1,614,212	lb/yr	x	1	T/2000 lbs	=	807.1 T/yr

N_2O

13,140,000	scf	x	0.2	lb/MMscf	=	3.04 lb/yr
3.04	lb/yr	x	1	yr/366 d	=	0.0083 lb/d
0.0083	lb/d	x	1	d/24 hrs	=	0.0003 lb/hr
3.04	lb/yr	x	1	T/2000 lbs	=	0.001521119 T/yr

CH_4

13,140,000	scf	x	2.3	lb/MMscf	=	30.42 lb/yr
30.42	lb/yr	x	1	yr/366 d	=	0.0833 lb/d
0.0833	lb/d	x	1	d/24 hrs	=	0.0035 lb/hr
30.42	lb/yr	x	1	T/2000 lbs	=	0.0152 T/yr

ANTIVAPOR

Blocking agent
for acid fumes

For a correct hot dip galvanizing process, the surface of the steel products to be treated must be prepared beforehand. Part of this preparation occurs in the pickling stage which consists of removing the oxides from the surface of the pieces by immersion in solutions containing hydrochloric acid (HCl) or sulphuric acid (H_2SO_4). Inevitably during this operation the acid attack on the steel will produce hydrogen, contaminating the working environment with acid fumes. These fumes are more or less visible according to the humidity and temperature of the working environment.

ANTIVAPOR is the economical solution to this problem because it controls the phenomenon where it takes place by acting on the hydrogen, which is the main element responsible for the fume emission.

THE ADVANTAGES OF USING ANTIVAPOR

- It reduces the acid fumes in the working environment by 70% and more;
- It improves working conditions for those operating the plant;
- It reduces plant maintenance costs while increasing its life span, e.g. overhead cranes;
- It reduces the hydrogen embrittlement phenomenon in the processed materials;
- It is simple to use;
- It has no disadvantages;
- Its effect lasts for the entire duration of the bath-life of the pickle solution.

PREPARATION OF A NEW PICKLING BATH WITH ANTIVAPOR

1. Verify the volume of the bath;
2. Pour the necessary quantity of mains water, not recovery water, to reach the desired final concentration;
3. Add ANTIVAPOR following the instructions given by our personnel;
4. Add the corrosion inhibitor;
5. Pour the acid in the bath until it reaches its full working level, pouring it under the surface of the water;
6. Start the pickling.

To avoid any risk in the plants we recommend to always use fresh acids, of guaranteed source, and always accompanied by certified analysis.

MANAGEMENT OF THE BATH

Our technicians are ready and willing to advise you on the necessary and correct quantities of ANTIVAPOR to be used.

Based upon ARM's conversations with the manufacturer, acid fume emission reductions of around 80% are possible using liberal application of this product.

soprin
products and services for the galvanizing industry

ANTIVAPOR

VERSIONS OF ANTIVAPOR

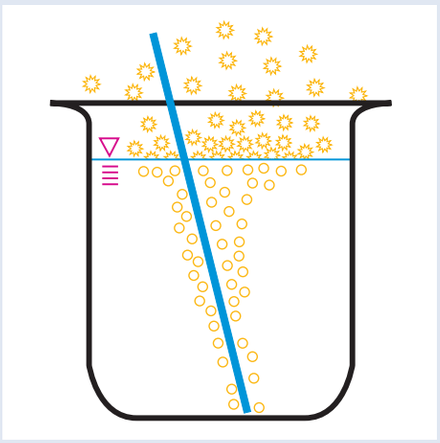
ANTIVAPOR D: for pickling baths containing hydrochloric acid (HCl)

ANTIVAPOR G: for pickling baths containing sulphuric acid (H_2SO_4)

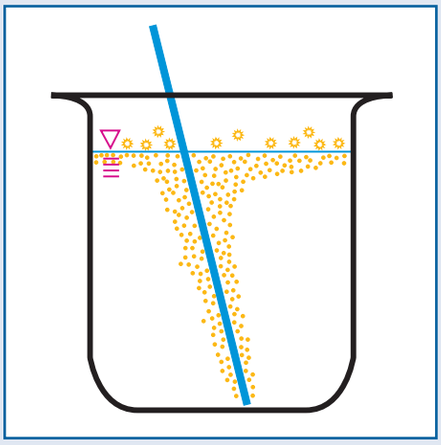
N.B. FOR THE USE, HANDLING AND STOCK OF THE PRODUCT FOLLOW THE INSTRUCTIONS SHOWN IN THE SAFETY DATA SHEET. DO NOT MIX THE PRODUCT WITH OTHER NOT COMPATIBLE PRODUCTS.

Please do not hesitate to contact us for any further information.

The present technical sheet replaces all those precedent. July 2013.



Pickling action without **ANTIVAPOR**



Pickling action with **ANTIVAPOR**

soprin

products and services for the galvanizing industry

Soprin s.r.l.

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GALVCO MARYLAND LLC - #005-00302

Emissions Calculations and Supporting Documentation

January 1, 2024 through December 31, 2024

Calculation Inputs:

Total Zinc Used	=	564,359	lbs
	=	282	T
Annual Fuel Consumption	=	73,443	Therms/yr
		(100,000 BTUs/1 Therm) x (1 scf/1,000 BTUs)	
	=	20,121	scf/day
	=	7,344,300	scf/yr
TOSD Fuel Consumption	=	29,505	Therms/(153 days)
	=	2,950,500	scf/(153 days)
	=	19,284	scf/day
Total Work Days			
Metal Galvanizing	=	(6 d/wk) x (52 wk/yr)	
	=	312	working d/yr

PM10 Emissions = 0.52 lbs/ton of galvanizined products (Emissions from Hot-Dip Galvanizing Processes Final Report EPA – 905/4-76-002, 1976).

Boiler/furnace operation	=	(7 d/wk) x (52 wk/yr)	
	=	366	working d/yr

PM_{10}:

Natural Gas Combustion

7,344,300	scf/yr	x	1.9	lb/MMscf	=	13.95 lb/yr
14	lb/yr	x	(1 yr/366 d)		=	0.038 lb/day
14	lb/yr	x	(1 T/2000 lb)		=	0.00698 T/yr

Galvanizing Tank

282	Zn T/yr	x	0.52	lb/T (PM)	=	146.7 lb/yr
147	lb/yr	x	(1 yr/312 d)		=	0.47 lb/day
147	lb/yr	x	1	T/2000 lb	=	0.073 T/yr

lb/d (natural gas) + lb/day (galvanizing tank)	=	0.51	lb/day
T/yr (natural gas) + T/yr (galvanizing tank)	=	0.08	T/yr

VOCs:

Annual

7,344,300	scf/yr	x	5.5	lb/MMscf	=	40.4 lb/yr
40.4	lb/yr	x	(1 yr/366 d)		=	0.110 lb/day
40.4	lb/yr	x	(1 T/2000 lb)		=	0.020 T/yr

TOSD

19,284	scf/day	x	5.5	lb/MMscf	=	0.106 lb/d

SO_2:

Annual

7,344,300	scf/yr	x	0.6	lb/MMscf	=	4.4 lb/yr
4.4	lb/yr	x	(1 yr/366 d)		=	0.0120 lb/day
4.4	lb/yr	x	(1 T/2000 lb)		=	0.0022 T/yr

NO_x:

Annual

7,344,300	scf/yr	x	170	lb/MMscf	=	1,248.5 lb/yr
1,248.5	lb/yr	x	(1 yr/366 d)		=	3.41 lb/day
1,248.5	lb/yr	x	(1 T/2000 lb)		=	0.624 T/yr

TOSD

19,284	scf/day	x	170	lb/MMscf	=	3.278 lb/d

CO:

Annual

7,344,300	scf/yr	x	24	lb/MMscf	=	176.3 lb/yr
176.3	lb/yr	x	(1 yr/366 d)		=	0.482 lb/day
176.3	lb/yr	x	(1 T/2000 lb)		=	0.088 T/yr

GALVCO MARYLAND LLC - #005-00302
State Air Pollutants of Concern and Hazardous Air Pollutants
January 1, 2024 through December 31, 2024

Approximately 282 tons of zinc were processed between January 1, 2024 and December 31, 2024. The emission factor for particulate emissions from the galvanizing process was derived EPA sources. The emissions of each pollutant is estimated based on the percentage of impurities in the zinc.

Zinc:

Total Zinc Processed

282	T/yr	x	(2000 lb/T)	=	564,359	lb/yr
564,359	lb/yr	x	(1 yr/312 d)	=	1,809	lb/d
1,809	lb/d	x	(1d/24 hr)	=	75.4	lb/hr

Calculated Emissions

1,809	lb/d	x	0.52 lb/ton of galvanzied product*	=	0.47	lb/d
0.47	lb/d	x	(1d/24 hr)	=	0.020	lb/hr
0.47	lb/d	x	(312 d/1 yr)	=	146.7	lb/yr
146.7	lb/yr	x	(1 T/2000 lb)	=	0.07	T/yr

*Emission factor from Hot-Dip Galvanizing Processes Final Report EPA – 905/4-76-002, 1976), conservatively assumes that zinc comprises 100% of the particulate emissions from the galvanizing process.

Lead Emissions:

0.47	lb/d Zn	x	0.007% Pb/Zn	=	0.00003	lb/d
0.00003	lb/d	x	(1d/24 hr)	=	0.0000014	lb/hr
0.00003	lb/d	x	(312 d/1 yr)	=	0.010	lb/yr
0.01	lb/yr	x	(1 T/2000 lb)	=	0.00001	T/yr

Cadmium Emissions:

0.47	lb/d Zn	x	0.0004% Cd/Zn	=	0.000002	lb/d
0.0000019	lb/d	x	(1d/24 hr)	=	0.00000008	lb/hr
0.0000019	lb/d	x	(312 d/1 yr)	=	0.0006	lb/yr
0.0006	lb/yr	x	(1 T/2000 lb)	=	0.0000003	T/yr

Aluminum Emissions:

0.47	lb/d Zn	x	0.0010% Al/Zn	=	0.0000047	lb/d
0.0000047	lb/d	x	(1d/24 hr)	=	0.00000020	lb/hr
0.0000047	lb/d	x	(312 d/1 yr)	=	0.0015	lb/yr
0.0015	lb/yr	x	(1 T/2000 lb)	=	0.0000007	T/yr

Copper Emissions:

0.47	lb/d Zn	x	0.0200% Cu/Zn	=	0.000094	lb/d
0.000094	lb/d	x	(1d/24 hr)	=	0.0000039	lb/hr
0.000094	lb/d	x	(312 d/1 yr)	=	0.0293	lb/yr
0.029	lb/yr	x	(1 T/2000 lb)	=	0.0000147	T/yr

Iron Emissions:

0.47	lb/d Zn	x	0.0020% Fe/Zn	=	0.000009	lb/d
0.0000094	lb/d	x	(1d/24 hr)	=	0.00000039	lb/hr
0.0000094	lb/d	x	(312 d/1 yr)	=	0.0029	lb/yr
0.0029	lb/yr	x	(1 T/2000 lb)	=	0.0000015	T/yr

Tin Emissions:

0.47	lb/d Zn	x	0.0030% Sn/Zn	=	0.000014	lb/d
0.0000141	lb/d	x	(1d/24 hr)	=	0.00000059	lb/hr
0.0000141	lb/d	x	(312 d/1 yr)	=	0.0044	lb/yr
0.0044	lb/yr	x	(1 T/2000 lb)	=	0.0000022	T/yr

Nickel Emissions:

0.47	lb/d Zn	x	0.0400% Ni/Zn	=	0.000188	lb/d
0.0001881	lb/d	x	(1d/24 hr)	=	0.00000784	lb/hr
0.0001881	lb/d	x	(312 d/1 yr)	=	0.0587	lb/yr
0.0587	lb/yr	x	(1 T/2000 lb)	=	0.0000293	T/yr

GALVCO MARYLAND LLC - #005-00302

Existing Galvanizing Line - Toxic Air Pollutants

January 1, 2024 through December 31, 2024

Total 2024 annual emissions rate derived from a hot dip galvanizing calculation guidance package created by the Texas Commission on Environmental Quality's Air Permits Division.

Actual Emissions Calculations for Acid Tanks:

Daily HCl emissions (see calculations below)	=	0.08	lb/day
(x 313 days/yr, 8 hrs/day[covered remaining time])			
Quantity of acid in the evaporated acid-water solution	=	**0.01**	T/yr
0.01 T/yr x (2000 lb/1 T)	=	**27**	**lb/yr**

Emission Factor Calculations:

Individual Tank Surface Area	=	75	ft^2
Number of Tanks	=	4	
Total Tank Surface Area (A)	=	300	ft^2
Operating Temperature	=	20	˚C
Acid Concentration	=	16.0	% HCL
Air Velocity (V)	=	1.0	fps
Vapor Pressure (Pv)	=	0.043	mmHg
Evaporation Rate (E)	=	25[0.46 + 0.117(V)]log[(760 - Pa)/(760 - Pv)]	
*Pa = 0 for this calculation	=	0.000353	lb/hr-ft^2
Uncontrolled Emission Rate (ER_1)	=	E x A	
	=	0.105843	lb/hr
Fugitive Emissions Rate	=	$(0.5)(ER_1)$	
*Assumes 50% capture efficiency for the building	=	0.053	lb/hr
** Assumes pickling tanks are covered with a lid during the 16 hours/day when not in use to prevent fugative emissions.	=	0.42	lb/day
*** Assumes a fume suppresent is added to pickling tanks, which reduces the	=	**0.08**	**lb/day (with lids & fume suppresent))**
HCl evaportation by 80-percent.	=	**0.011**	**lb/hr (with lids & fume suppresent))**

GALVCO MARYLAND LLC - #005-00302

Greenhouse Gas Air Pollutants

January 1, 2024 through December 31, 2024

Emissions Factors for Greenhouse Gases from Natural Gas Combustion

Constituent	Emission Factor (lb/MMscf)
CO_2	122,847
N_20	0.23
CH_4	2.32

Fuel Consumption (Natural Gas)

73,443 Therms x 100,000 BTU/Therm x 1 scf/1000 BTU = 7,344,300 scf

1 year = 366 days

CO_2

7,344,300	scf	x	122,847	lb/MMscf	=	902,226	lb/yr
902,226	lb/yr	x	1	yr/366 d	=	2,465	lb/d
2,465	lb/d	x	1	d/24 hrs	=	102.7	lb/hr
902,226	lb/yr	x	1	T/2000 lbs	=	451.1	T/yr

N_2O

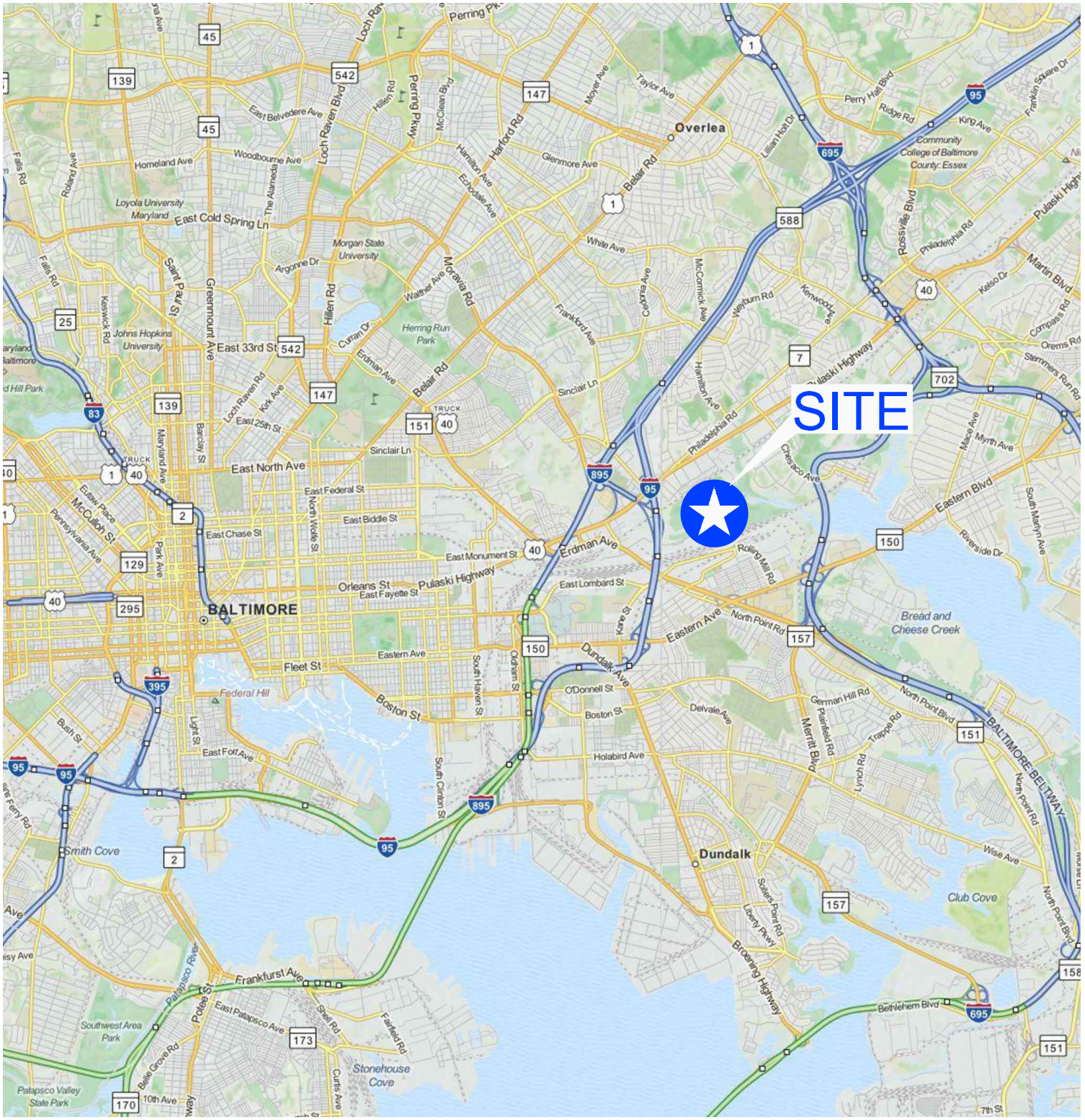
7,344,300	scf	x	0.2	lb/MMscf	=	1.70	lb/yr
1.70	lb/yr	x	1	yr/366 d	=	0.0046	lb/d
0.0046	lb/d	x	1	d/24 hrs	=	0.0002	lb/hr
1.70	lb/yr	x	1	T/2000 lbs	=	0.00085	T/yr

CH_4

7,344,300	scf	x	2.3	lb/MMscf	=	17.00	lb/yr
17.00	lb/yr	x	1	yr/366 d	=	0.0465	lb/d
0.0465	lb/d	x	1	d/24 hrs	=	0.0019	lb/hr
17.00	lb/yr	x	1	T/2000 lbs	=	0.0085	T/yr

ATTACHMENT B

Site Location Map



7,000 14,000 21,000

SCALE IN FEET

N

GENERAL LOCATION MAP

Galvco Maryland

Stormwater Pollution Prevention Plan

JUNE 2014	Scale: 1" = 7,000'	M14128

ARM Group Inc.

Earth Resource Engineers and Consultants

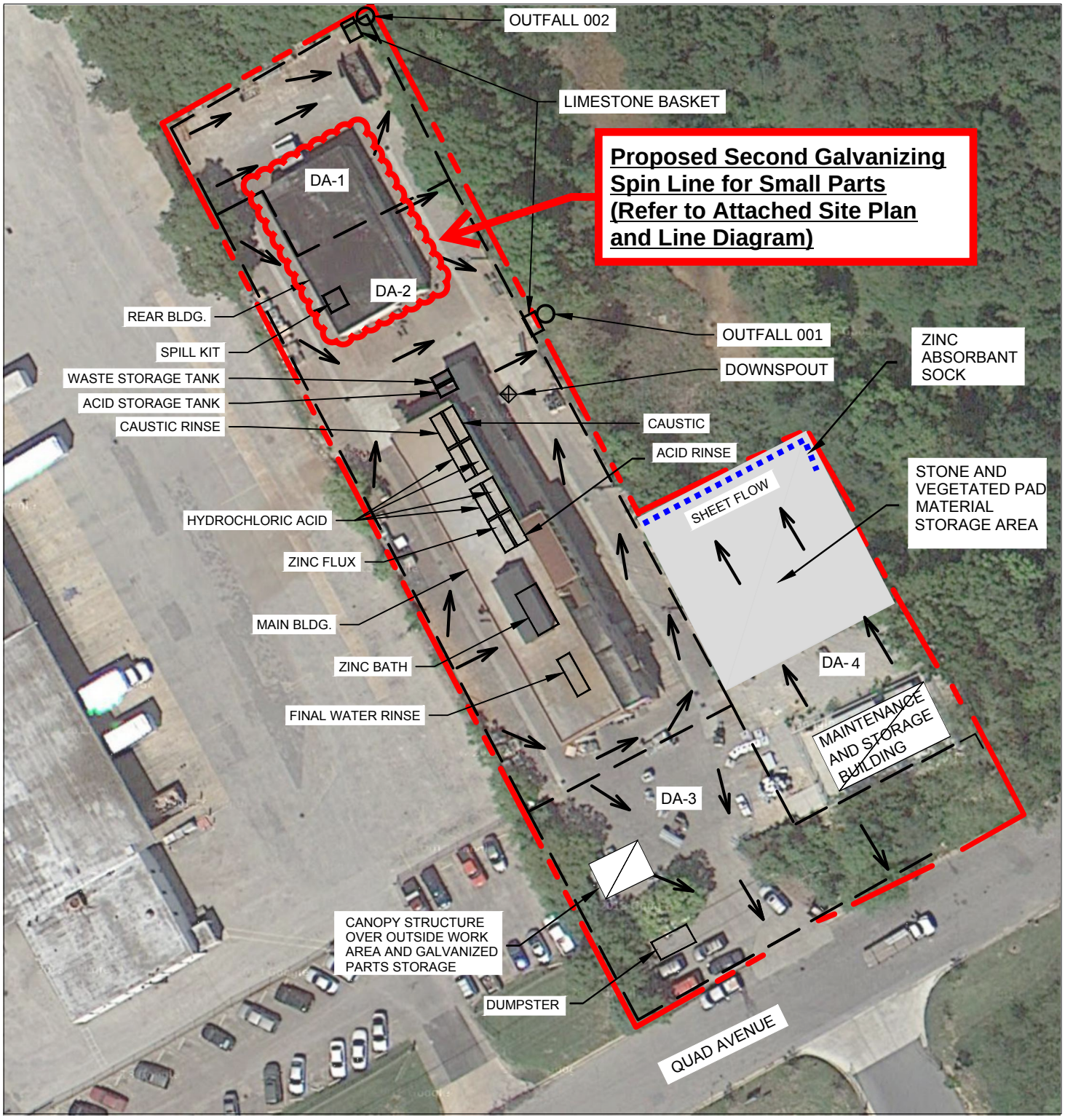
www.armgroup.net

Figure

A

ATTACHMENT C

Site Plan



LEGEND

- Property Boundary (1.6 -cres)
- Drainage -rea(D-)
- Runoff Flow Direction
- Outfall
- Downspout

60 30 0 60 120

GR-PHIC SC-LE IN FEET

SITE MAP

Galvco Maryland

Stormwater Pollution Prevention Plan

JUNE 2025	Scale: 1" = 60'	150376M

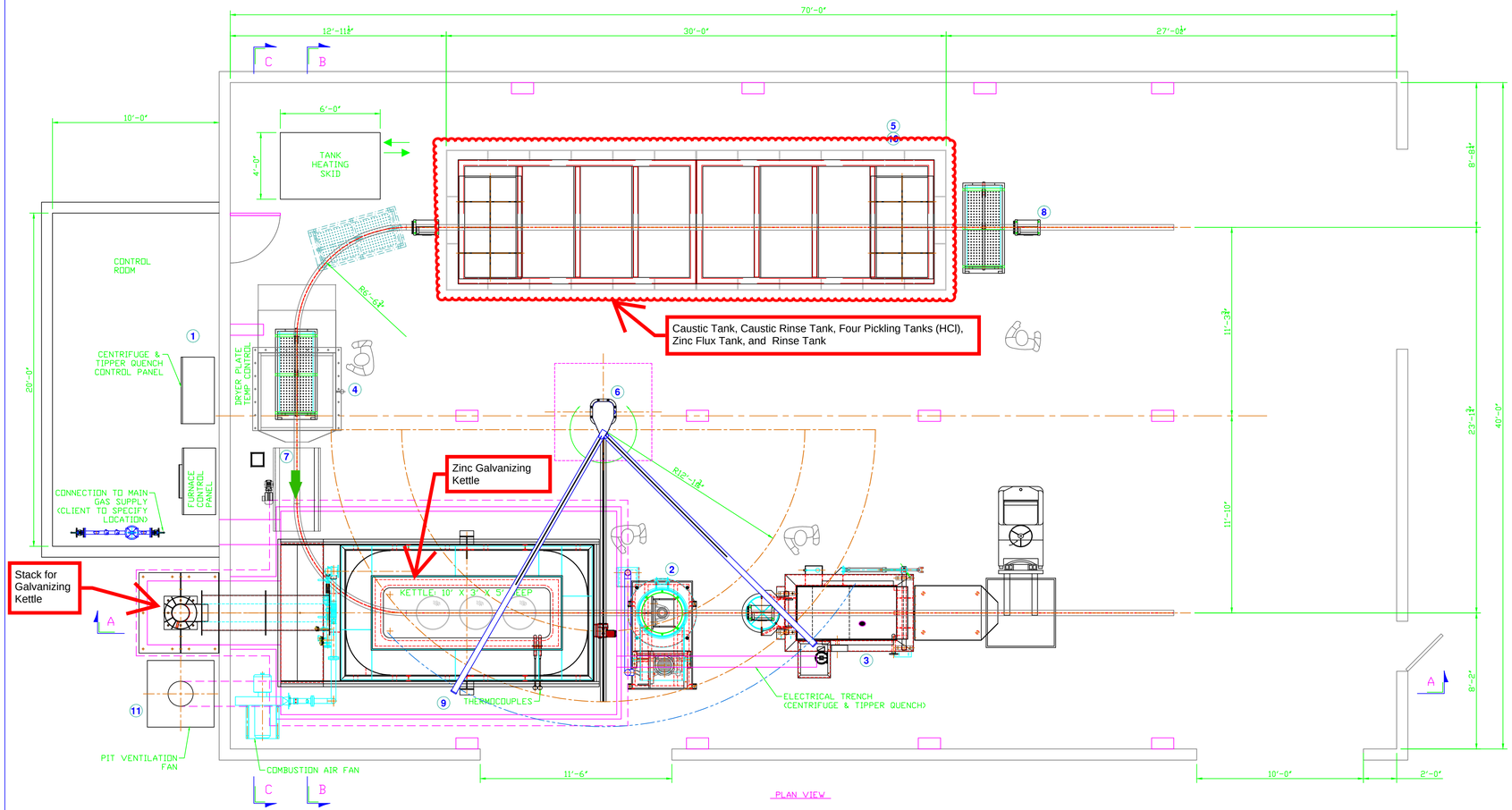
ARM Group Inc.
Engineers and Scientists

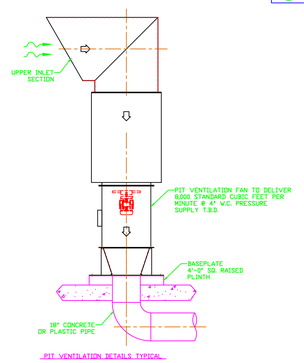
Figure B

ATTACHMENT D

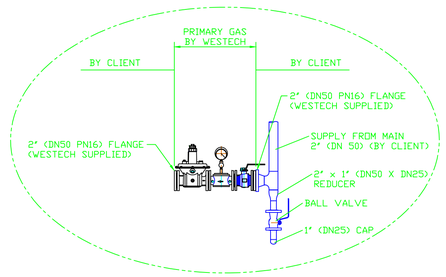
Process Flow Diagram

	REQUIREMENTS FOR CUSTOMER SUPPLY	
TAG	LOCATION	DESCRIPTION
1	FURNACE PANEL	25 FLA 480V, 3ph, 60Hz
2	CENTRIFUGE	65 FLA 480V, 3ph, 60Hz
3	TIPPER/QUENCH	10 FLA 480V, 3ph, 60Hz
4	DRYING TABLE	30 FLA 480V, 3ph, 60Hz
5	TANK HEATING (BY CLIENT)	100 FLA 480V, 3ph, 60Hz
6	JIB CRANE	7 FLA 480V, 3ph, 60Hz
7	BUCKET RETURN CONVEYOR	10 FLA 480V, 3ph, 60Hz
8	CHAIN HOISTS	30 FLA 480V, 3ph, 60Hz
9	GAS FROM MAINS	FLOW TBD Scfm MAX 5 PSI/MIN 2 PSI
10	TANK FILL WATER	FILL ONLY
11	PIT VENTILATION FAN	12 FLA 480V, 3ph, 60Hz



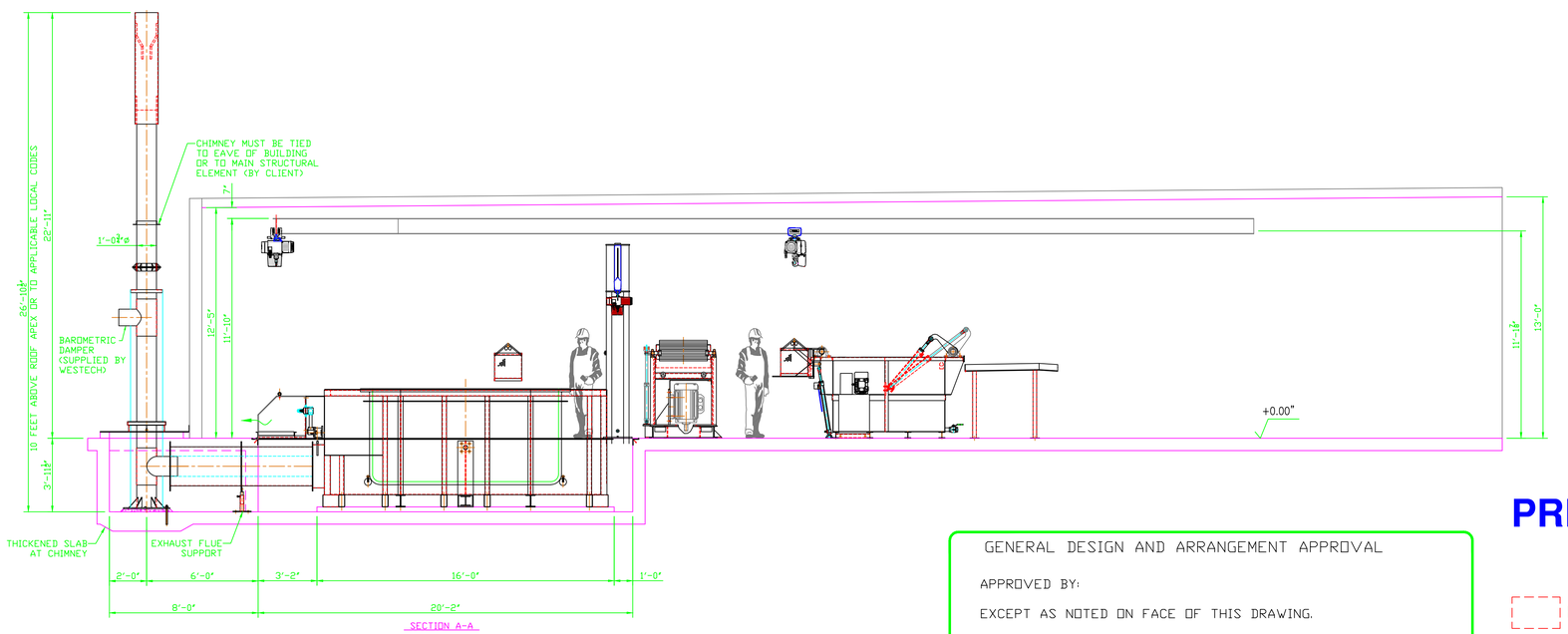


PIT VENTILATION DETAILS TYPICAL

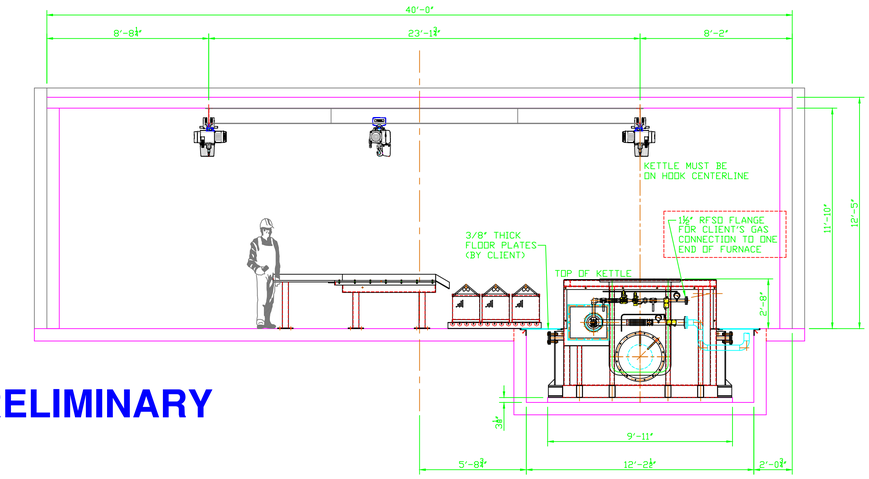


DETAIL 'A'

GAS SUPPLY - 45 STANDARD CUBIC METERS PER HOUR @ 8000 KCAL/SCM. (PRESSURE MUST NOT FALL BELOW MIN. UPON INCREASE FROM LOW TO HIGH FIRE IN 7.5 SECONDS.)



SECTION A-A



SECTION B-B

PRELIMINARY

GENERAL DESIGN AND ARRANGEMENT APPROVAL

APPROVED BY:

EXCEPT AS NOTED ON FACE OF THIS DRAWING.

DATE:

RED RECTANGLE DENOTES SUBJECT TO CHANGE

REF: MWP

Site Plan and Line Diagram
Proposed Second Galvanizing Spin Line for Small Parts

COPIES ISSUED

DATE	SENT TO	REMARKS
AUG/12/24	THERMETAL	REVIEW
AUG/22/24	THERMETAL	REVIEW

DWN	MWP	AUG/5/22
CHK	JDH	AUG/5/22
APPR		
SCALE	1/4"=1'-0"	

REVISIONS

1	GENERAL	JUL/31/24 TLT
2	ADDED CONTROL ROOM & PIT VENTILATION	AUG/13/24 TLT

Western Technologies, Inc.
4404 South Maybelle Avenue
Tulsa, Oklahoma, USA 74107
Phone:(918)712-2406
Fax:(918)712-9850

WESTECH WESTERN TECHNOLOGIES

DETAILS: SHEET I OF II
PLANT LAYOUT
BALTIMORE GALV

JOB NO. 4909 | DWG NO. JB-4909-1-1b | REV NO. 2

ATTACHMENT E

Safety Data Sheets

Safety Data Sheet

Revision Date Mar-12-2015 **Item #** Multi **Safety Data Sheet** 1910

1. PRODUCT AND COMPANY IDENTIFICATION

CONTROLLED DOCUMENT IF STAMPED IN RED

Product Name Hydrochloric Acid [HCl] (8%-37%)
UN/ID No. UN1789
Synonyms Hydrochloric Acid 5.5° - 23° Baume, Muriatic acid, Hydrogen chloride

Recommended Use pH adjustment, Chemical intermediate
Uses advised against Consumer uses: Private households (= general public = consumers).

Company Name
PVS-Nolwood Chemicals, Inc
10900 Harper Ave.
Detroit, MI 48213
(800) 284-9735

24 Hour Emergency Phone Number CHEMTREC 1-800-424-9300

2. HAZARDS IDENTIFICATION

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

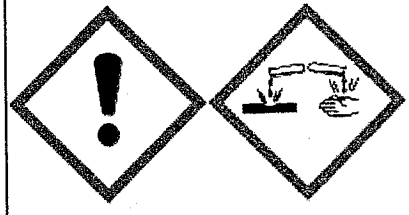
Acute toxicity - Inhalation (Gases)	Category 4
Acute toxicity - Inhalation (Dusts/Mists)	Category 4
Skin corrosion/irritation	Category 1 Sub-category B
Serious eye damage/eye irritation	Category 1
Specific target organ toxicity (single exposure)	Category 3

Emergency Overview

DANGER

Hazard statements
Causes serious eye damage
Causes severe skin burns and eye damage
Harmful if inhaled
May cause respiratory irritation. May cause drowsiness or dizziness

Physical hazards
Corrosive
May be corrosive to metals
Generation/formation of fumes



Precautionary statements
Prevention

- Wear eye/face protection
- Wear protective gloves/protective clothing/eye protection/face protection
- Use only outdoors or in a well-ventilated area
- Do not breathe dust/fume/gas/mist/vapors/spray
- Wash face, hands and any exposed skin thoroughly after handling

Response	• Immediately call a POISON CENTER or doctor/physician • IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing • IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower • IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing • IF SWALLOWED: Rinse mouth. DO NOT induce vomiting • Wash contaminated clothing before reuse
Storage	• Store locked up • Store in a well-ventilated place. Keep container tightly closed
Disposal	• Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)	None known.
Other Information	
Other hazards	• May be harmful if swallowed
Unknown Acute Toxicity	0% of the mixture consists of ingredient(s) of unknown toxicity

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS No.	EC No.	Weight-% *
Water	7732-18-5	231-791-2	63-92
Hydrogen chloride	7647-01-0	231-595-7	8-37

*The exact percentage (concentration) of composition has been withheld as a trade secret.

4. FIRST AID MEASURES

General advice	• Immediate medical attention is required
Eye contact	• Immediate medical attention is required • Immediately flush with plenty of water. After initial flushing, remove any contact lenses and continue flushing for at least 15 minutes • Do not rub affected area
Skin Contact	• Immediate medical attention is required • Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes
Inhalation	• Remove to fresh air • Call a physician or poison control center immediately • If not breathing, give artificial respiration • If breathing is difficult, give oxygen
Ingestion	• Call a physician or poison control center immediately • Do NOT induce vomiting • Rinse mouth • Drink 4 to 8 ounces (120-240 ml) of water or milk as soon as possible after ingestion. • Never give anything by mouth to an unconscious person
Note to physician	Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated. Do not give chemical antidotes. Asphyxia from glottal edema may occur. Marked decrease in blood pressure may occur with moist rales, frothy sputum, and high pulse pressure. Treat symptomatically.
Self-protection of the first aider	Use personal protective equipment as required. Avoid contact with skin, eyes or clothing.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media

- CO_2 (except for Cyanides), dry chemical, dry sand, alcohol-resistant foam
- Water spray, fog or alcohol-resistant foam
- Move containers from fire area if you can do it without risk
- Use water spray or fog; do not use straight streams
- Dike fire control water for later disposal; do not scatter the material

Unsuitable extinguishing media

- Note: Most foams will react with the material and release corrosive/toxic gases

Specific hazards arising from the chemical

- The product causes burns of eyes, skin and mucous membranes
- Thermal decomposition can lead to release of irritating and toxic gases and vapors
- In the event of fire and/or explosion do not breathe fumes

Protective equipment and precautions for firefighters

- Wear a self-contained breathing apparatus and chemical protective clothing

Flammable properties

- Non-combustible, substance itself does not burn but may decompose upon heating to produce corrosive and/or toxic fumes
- Contact with metals may evolve flammable hydrogen gas

Explosive properties

- No information available

6. ACCIDENTAL RELEASE MEASURES

Personal precautions

- Use personal protective equipment as required
- Evacuate personnel to safe areas
- Avoid contact with skin, eyes or clothing
- Keep people away from and upwind of spill/leak

Environmental precautions

- For small spills, absorb material with clay absorbent or other compatible material. Dispose of the waste material according to local, state and governmental requirements.
- For large spills, contain the material using barriers of absorbent pigs, clay absorbent or earth dams.

Methods for cleaning up

- Dike far ahead of liquid spill for later disposal
- Soak up with inert absorbent material
- Take up mechanically, placing in appropriate containers for disposal
- Clean contaminated surface thoroughly
- Prevent product from entering drains
- Dam up
- After cleaning, flush away traces with water

Other Information

- Do not get water inside containers or in contact with substance

7. HANDLING AND STORAGE

Advice on safe handling

- Avoid contact with skin, eyes or clothing
- Use personal protective equipment as required
- Ensure adequate ventilation, especially in confined areas
- In case of insufficient ventilation, wear suitable respiratory equipment
- Use only with adequate ventilation and in closed systems

Storage Conditions

- Keep container tightly closed in a dry and well-ventilated place
- Keep out of the reach of children
- Keep containers tightly closed in a dry, cool and well-ventilated place
- Keep in properly labeled containers

Incompatible materials

Amines, Alkali, Copper, Zinc, Contact with metals may evolve flammable hydrogen gas, Incompatible with strong acids and bases, Incompatible with oxidizing agents

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Chemical Name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Hydrogen chloride 7647-01-0	Ceiling: 2 ppm	Ceiling: 5 ppm Ceiling: 7 mg/m³	IDLH: 50 ppm Ceiling: 5 ppm Ceiling: 7 mg/m³

Exposure Guidelines

Engineering Controls Ensure adequate ventilation, especially in confined areas.

Individual protection measures, such as personal protective equipment

Respiratory protection
- A respiratory protection program that meets OSHA 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant the use of a respriator.

Eye/face protection
- Tight sealing safety goggles
- Face protection shield

Skin and body protection
- Wear protective gloves and protective clothing

General Hygiene Considerations
- When using do not eat, drink or smoke
- Wash contaminated clothing before reuse
- Keep away from food, drink and animal feeding stuffs
- Contaminated work clothing should not be allowed out of the workplace
- Regular cleaning of equipment, work area and clothing is recommended
- Avoid contact with skin, eyes or clothing
- Take off all contaminated clothing and wash it before reuse
- Wear suitable gloves and eye/face protection

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical state	Liquid
Appearance	clear
Color	colorless
Odor	Pungent
Odor threshold	No information available

Property	Values	Remarks • Method
pH	<1	
Melting point/Freezing Point	-11 to -26 °C / 12 to -15 °F	
Boiling point / boiling range	103-53 °C / 217-127 °F	
Flash point	No information available	
Evaporation rate	No information available	
Flammability (solid, gas)	No information available	
Flammability Limit in Air		
Upper flammability limit (%)	No information available	
Lower flammability limit (%):	No information available	
Vapor pressure	16-63 mm Hg	@20 ° C
Vapor density	No information available	
Specific Gravity	1.04-1.19	
Water solubility	Miscible in water	
Solubility in other solvents	No information available	
Partition coefficient	No information available	
Autoignition temperature	No information available	
Decomposition temperature	No information available	
Kinematic viscosity	No information available	
Dynamic viscosity	1.15-1.77 cps @ 20°C	
Explosive properties	No information available	
Oxidizing properties	No information available	

Other Information

Softening point °C	No information available
Molecular weight	36.46

VOC Content (%)	No information available
Density	No information available
Bulk density	8.76-9.91 Pounds per gallon (lb/gal)

10. STABILITY AND REACTIVITY

Stability • Stable under recommended storage conditions

Conditions to avoid • Exposure to air or moisture over prolonged periods

Incompatible materials Amines, Alkali, Copper, Zinc, • Contact with metals may evolve flammable hydrogen gas
• Incompatible with strong acids and bases
• Incompatible with oxidizing agents

Hazardous Decomposition Products • Thermal decomposition can lead to release of irritating and toxic gases and vapors

Possibility of Hazardous Reactions • Reacts with many compounds

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Principle Routes of Exposure Inhalation Skin Contact Eye contact

Inhalation Inhalation of corrosive fumes/gases may cause coughing, choking, headache, dizziness, and weakness for several hours. Pulmonary edema may occur with tightness in the chest, shortness of breath, bluish skin, decreased blood pressure, and increased heart rate.

Ingestion Ingestion causes burns of the upper digestive and respiratory tracts.

Skin Contact Corrosive, Causes burns.

Eye contact Corrosive to the eyes and may cause severe damage including blindness.

Chemical Name	Oral LD50	Dermal LD50	Inhalation LC50
Hydrogen chloride 7647-01-0	= 700 mg/kg (Rat)	> 5010 mg/kg (Rabbit)	= 3124 ppm (Rat) 1 h

Information on toxicological effects

Symptoms Inhalation of corrosive fumes/gases may cause coughing, choking, headache, dizziness, and weakness for several hours. Pulmonary edema may occur with tightness in the chest, shortness of breath, bluish skin, decreased blood pressure, and increased heart rate

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Sensitization No information available.

Germ cell mutagenicity No information available.

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen. This product contains one or more substances which are classified by IARC as carcinogenic to humans (Group I), probably carcinogenic to humans (Group 2A) or possibly carcinogenic to humans (Group 2B).

Chemical Name	ACGIH	IARC	NTP	OSHA
Hydrogen chloride 7647-01-0	-	Group 3	-	-

IARC (International Agency for Research on Cancer)
Not classifiable as a human carcinogen

Reproductive toxicity No information available.

STOT - single exposure No information available.

STOT - repeated exposure No information available.

Chronic toxicity Chronic exposure to corrosive fumes/gases may cause erosion of the teeth followed by jaw necrosis. Bronchial irritation with chronic cough and frequent attacks of pneumonia are common. Gastrointestinal disturbances may also be seen. Avoid repeated exposure. Possible risk of irreversible effects.

Target Organ Effects Eyes, Respiratory system, Skin.

Aspiration hazard No information available.

Numerical measures of toxicity - Product Information

Unknown Acute Toxicity 0% of the mixture consists of ingredient(s) of unknown toxicity
The following values are calculated based on chapter 3.1 of the GHS document . mg/kg mg/l

12. ECOLOGICAL INFORMATION

Ecotoxicity

31.286% of the mixture consists of components(s) of unknown hazards to the aquatic environment

Persistence and degradability No information available.
Bioaccumulation No information available

Other adverse effects No information available

13. DISPOSAL CONSIDERATIONS

Disposal of wastes
- Dispose of in accordance with federal, state and local regulations
- Dispose of hazardous waste in a RCRA licensed facility

Contaminated packaging
- Do not reuse container

US EPA Waste Number D002

14. TRANSPORT INFORMATION

DOT

Proper shipping name	HYDROCHLORIC ACID
Hazard Class	8
UN/ID No.	UN1789
Packing Group	II
Reportable Quantity (RQ) (lbs)	5000
Description	UN1789, Hydrochloric acid, 8, II
Special Provisions	A3, A6, B3, B15, IB2, N41, T8, TP2
Emergency Response Guide Number	157

IATA

UN/ID No.	UN1789
Proper shipping name	HYDROCHLORIC ACID
Hazard Class	8
Packing Group	II
ERG Code	8L
Special Provisions	A3

IMDG

UN/ID No.	UN1789
Proper shipping name	HYDROCHLORIC ACID
Hazard Class	8
Packing Group	II
EmS-No.	F-A, S-B

15. REGULATORY INFORMATION

US Federal Regulations

SARA 311/312 Hazard Categories

Acute health hazard	Yes
Chronic Health Hazard	Yes
Fire hazard	No
Sudden release of pressure hazard	No
Reactive Hazard	No

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

Chemical Name	SARA 313 - Threshold Values %
Hydrogen chloride - 7647-01-0	1.0

CWA (Clean Water Act)

This product contains the following substances which are regulated pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

Chemical Name	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants	CWA - Hazardous Substances
Hydrogen chloride 7647-01-0	5000 lb	-	-	X

CERCLA

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Chemical Name	Hazardous Substances RQs	CERCLA/SARA RQ	Reportable Quantity (RQ) (lbs)
Hydrogen chloride 7647-01-0	5000 lb	5000 lb	RQ 5000 lb final RQ RQ 2270 kg final RQ

US State Regulations

California Proposition 65

This product does not contain any Proposition 65 chemicals

U.S. State Right-to-Know Regulations

Chemical Name	New Jersey	Massachusetts	Pennsylvania
Hydrogen chloride 7647-01-0	X	X	X

DEA List I, List II

Chemical Name	U.S. - DEA - List I or Precursor Chemicals	U.S.- DEA - List II or Essential Chemicals
Hydrogen chloride 7647-01-0	-	50 gallon, Export Volume 27 kg, Export Weight 0 kg, Domestic Sales Weight

International Inventories

TSCA	Complies
DSL/NDSL	Complies
EINECS/ELINCS	Complies
ENCS	Does not comply
IECSC	Complies
KECL	Complies
PICCS	Complies
AICS	Complies

Legend:

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
ENCS - Japan Existing and New Chemical Substances
IECSC - China Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
AICS - Australian Inventory of Chemical Substances

16. OTHER INFORMATION

NFPA	Health hazards 3	Flammability 0	Instability 1	Physical and Chemical Properties -
HMIS	Health hazards 3	Flammability 0	Physical hazards 1	Personal protection D

Item #	**Multi**
Safety Data Sheet	**1910**
Issue Date	Oct-22-2014
Revision Date	Mar-12-2015
Issue Date	Mar-12-2015
Version	1
Revision Note	*** Updated value on SDS.

Disclaimer

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End of Safety Data Sheet

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

Product identifier

Trade name : **CAUSTIC SODA SOLUTION (50%)**

Relevant identified uses of the substance or mixture and uses advised against

Use : Starting material for industrial applications

Details of the supplier of the safety data sheet:
Bayer MaterialScience AG
BMS-IO-S&T-PSRA-PSI Product Safety
51368 Leverkusen

Tel. +49 214 30 25026
Fax: +49 214 30 50035
e-mail: productsafety@bayerbms.com
Emergency telephone number: Contact: tel +32 3 5403321 (Bayer Antwerpen NV)
In noodgevallen: tel. +32 3 5403070 (Bayer Antwerpen NV)
En cas de demandes et d'urgence: +33 (0) 1.49.06.50.00
(Bayer SAS., Puteaux Cedex, France)

2. HAZARDS IDENTIFICATION

Classification of the substance or mixture

Classification (1272/2008/CE):
Skin corrosion, Category 1A (H314)
Corrosive to metals, Category 1 (H290)

Classification (2006/121/EC, 1999/45/EC):
Causes severe burns.

Label elements

Hazardous components which must be listed on the label
sodium hydroxide

Labelling (1272/2008/CE):

Danger

Hazard statements:
H314 Causes severe skin burns and eye damage.
H290 May be corrosive to metals.

Precautionary statements:
P260 Do not breathe dust or mist.

P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P330 + P331 IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353 IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 IF exposed or concerned:
P310 Immediately call a POISON CENTER or doctor/ physician.

Labelling (2006/121/EC, 1999/45/EC):

Labeling and classification in accordance with the EC Dangerous Preparations Directive (1999/45/EC) and subsequent amendments
C Corrosive

Contains:
sodium hydroxide

R-phrase(s)	
R35	Causes severe burns.

S-phrase(s)	
S26	In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S37/39	Wear suitable gloves and eye/face protection.
S45	In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

3. COMPOSITION/INFORMATION ON INGREDIENTS

Type of product: Mixture

Hazardous components

sodium hydroxide (caustic soda)
Concentration [wt.-%]: ca. 50
CAS-No.: 1310-73-2
EINECS-No.: 215-185-5
Index-No.: 011-002-00-6
Classification (1272/2008/CE): Met. Corr. 1 H290 Skin Corr. 1A H314
Specific threshold concentration (GHS):

Skin Corr. 1A	H314	>= 5 %
Skin Corr. 1B	H314	2 - < 5 %
Skin Irrit. 2	H315	0,5 - < 2 %
Eye Irrit. 2	H319	0,5 - < 2 %

Classification (67/548/EEC): C R35
Specific threshold concentration

Xi	R36/38	0,5 - < 2 %
C	R34	2 - < 5 %
C	R35	>= 5 %

4. FIRST AID MEASURES

Description of first aid measures

General advice: Remove victims from the danger zone without endangering your own safety. Remove contaminated clothing (including underwear and shoes) immediately.

If inhaled: Bring accident victims out into the fresh air. If patient has difficulty in breathing, administer oxygen, keep the patient calm and warm. Call a physician immediately.

In case of skin contact: After contact with skin, wash immediately with plenty of water. Apply sterile protective bandage; consult GP.

In case of eye contact: Hold the eyes open and rinse with preferably lukewarm water for a sufficiently long period of time (at least 10 minutes). Contact an ophthalmologist.

If swallowed: If swallowed, rinse mouth with water (only if the person is conscious). DO NOT induce the patient to vomit, medical advice is required.

Most important symptoms and effects, both acute and delayed

Notes to physician: See Chapter 11 for information on toxicology.

Indication of any immediate medical attention and special treatment needed

Therapeutic measures: Basic first aid, decontamination, symptomatic treatment. Treat with a corticoid metered aerosol depending on the amount inhaled.

5. Fire-fighting measures

Suitable extinguishing media: Carbon dioxide (CO_2), Foam, extinguishing powder, in cases of larger fires, water spray should be used.

Unsuitable extinguishing media: High volume water jet

Special hazards arising from the substance or mixture:

Burning releases carbon monoxide, carbon dioxide, oxides of nitrogen and traces of hydrogen cyanide. In the event of fire and/or explosion do not breathe fumes.

Advice for fire-fighters:

During fire-fighting respirator with independent air-supply and airtight garment is required.

Fight fire in early stages if safe to do so. Containers at risk from fire should be cooled with water and, if possible, removed from the danger area. Do not allow contaminated extinguishing water

to enter the soil, ground-water or surface waters.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures: Put on protective equipment (see chapter 8). Ensure adequate ventilation/exhaust extraction. Keep unauthorized persons away.

Environment related measures: Do not flush into surface water or sanitary sewer system.

Methods and material for containment and cleaning up: Take up with absorbent for chemicals or, if necessary with dry sand. Fill into labeled, sealable containers. Also place used cleaning materials into closable receptacles.

Reference to other sections: For further disposal measures see chapter 13.

7. HANDLING AND STORAGE

Precautions for safe handling:

Handle and open container with care. Provide sufficient air exchange and/or exhaust in work rooms.

Organize work procedures so that workers are not exposed to the effects of the products. Vent waste air only via suitable separators or scrubbers.

Precautions should generally be taken against electrostatic charges according to the equipment used and the way the product is handled and packaged.

The precautions required in the handling of irritant or corrosive substances must be taken. Contact with skin and eyes and inhalation of vapors must be avoided under all circumstances.

Careful attention to industrial and personal hygiene is essential. Keep away from foodstuffs, drinks and tobacco. Wash hands before breaks and at the end of workday. Keep working clothes separately. Change contaminated or soaked clothing immediately. If the suit becomes contaminated, first take a shower with the suit on.

Conditions for safe storage, including any incompatibilities:

Keep container dry and tightly closed in a cool and well ventilated place.

VCI storage class (VCI = German Association of the Chemical Industry): 8BL

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Components with workplace control parameters

Substance	CAS-No.	Basis	Type	Value	Ceiling Limit Value	Remarks
sodium hydroxide (caustic soda)	1310-73-2	OEL (BE)	TWA	2 mg/m3		current

For technical protective measures to limit exposure see also Chapter 7 "Handling and storage".

Exposure controls

Respiratory protection:
If vapors form, respirators must be used. In the event of vapors up to 0,5 % vol. percent, use a filtered respirator with DIN EN 141 B-P2 (color code grey/white) combination filter and with DIN 141 B-P3 combination filter up to 1 % vol. At higher concentrations or under uncertain conditions a respirator with independent air supply must be used.

Hand protection:
Suitable materials for safety gloves; EN 374:
Nitrile rubber - NBR: thickness >=0,35mm; breakthrough time >=480min.
Polyvinyl chloride - PVC: thickness >=0,5mm; breakthrough time >=480min.
Polychloroprene - CR: thickness >=0,5mm; breakthrough time >=480min.
Butyl rubber - IIR: thickness >=0,5mm; breakthrough time >=480min.
Fluorinated rubber - FKM: thickness >=0,4mm; breakthrough time >=480min.
Recommendation: contaminated gloves should be disposed of.

Eye protection:
Wear eye/face protection.

Skin and body protection:
Impervious protective clothing. On possible contact with the product (sampling, product leakage): full protection or chemical protection clothing.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance:	liquid
Colour:	colourless
Odour:	odourless
Odour Threshold:	not established
pH:	> 14 at 100 g/l at 20 °C
Melting point/range:	12 °C
Boiling point/boiling range:	140 °C at 1.013 hPa
Flash point:	not applicable
Evaporation rate:	not established
Flammability (solid, gas):	not applicable
Burning number:	not applicable

Vapour pressure:	not established	
Vapour density:	not established	
Density:	1,52 g/cm³ at 20 °C	DIN 51757
	1,54 g/cm³ at 15 °C	DIN 51757
	1,505 g/cm³ at 50 °C	DIN 51757
Miscibility with water:	miscible	
Surface tension:	not established	
Partition coefficient (n-octanol/water):	not established	
Autoignition temperature:	not applicable	
Ignition temperature:	not applicable	
Decomposition temperature:	not established	
Viscosity, dynamic:	79 mPa.s at 20 °C	
Explosive properties:	not established	
Dust explosion class:	not applicable	
Oxidising properties:	not established	

10. STABILITY AND REACTIVITY

Hazardous decomposition products: No hazardous decomposition products when stored and handled correctly.

11. TOXICOLOGICAL INFORMATION

Information on toxicological effects

Acute toxicity, oral:
sodium hydroxide (caustic soda)

No valid data available.

Acute toxicity, dermal:
sodium hydroxide (caustic soda)

No valid data available.

Acute toxicity, inhalation:
sodium hydroxide (caustic soda)

No valid data available.

Primary skin irritation:
sodium hydroxide (caustic soda)
rabbit
Result: Corrosive

Primary mucosae irritation:

sodium hydroxide (caustic soda)
Since the product is already classified "corrosive" (C; R 34 or R 35), the risk of serious damage to the eyes is implicit.

CMR Assessment:
sodium hydroxide (caustic soda)
Mutagenicity: Not mutagenic in Ames Test.

Additional information:
sodium hydroxide (caustic soda)
Causes severe burns.

Prolonged or repeated exposure may cause irritation of skin and eyes. After swallowing danger of the stomach perforation. On inhalation: irritation of mucous membrane, coughing and shortness of breath.

12. ECOLOGICAL INFORMATION

Do not allow to escape into waterways, wastewater or soil.

Toxicity

Acute fish toxicity:
sodium hydroxide (caustic soda)
LC50 189 mg/l
Species: Leuciscus idus (Golden orfe)
Exposure duration: 48 h

Acute toxicity for daphnia:
sodium hydroxide (caustic soda)
EC50 76 mg/l
Species: Daphnia magna (Water flea)
Exposure duration: 24 h

Persistence and degradability

Biodegradability:
sodium hydroxide (caustic soda)
The methods for determining the biological degradability are not applicable to inorganic substances.

Bioaccumulative potential

Bioaccumulation:
sodium hydroxide (caustic soda)
Bioaccumulation is unlikely.

Additional information on ecotoxicology:
sodium hydroxide (caustic soda)
Toxic effect on fish, plankton and on sedentary organisms, also through shifting of pH value. Causes no biological oxygen consumption. No inhibition of activity of waste bacteria after neutralization.

13. DISPOSAL CONSIDERATIONS

Dispose in accordance with applicable international, national and local laws, ordinances and statutes. For disposal within the EC, the appropriate code according to the European Waste Catalogue (EWC) should be used.

Waste treatment methods
After containers have been emptied as thoroughly as possible (e.g. by pouring, scraping or draining until "drip-dry"), they can be sent to an appropriate collection point set up within the framework of the existing take-back scheme of the chemical industry. Containers must be recycled in compliance with national legislation and environmental regulations.

None disposal into waste water.

14. TRANSPORT INFORMATION

ADR/RID

UN Number	:	1824
Description of the goods	:	SODIUM HYDROXIDE SOLUTION
Packaging group	:	II
Hazard identification No	:	80
hazard label	:	8
Environmentally hazardous	:	no

Limited quantity regulations applicable in accordance with chapter 3.4 ADR/RID in compliance with threshold value

ADN

UN Number	:	1824
Description of the goods	:	SODIUM HYDROXIDE SOLUTION
Packaging group	:	II
Hazard identification No	:	80
hazard label	:	8
Environmentally hazardous	:	no

ADNR_TS

UN Number	:	1824
Description of the goods	:	SODIUM HYDROXIDE SOLUTION
Packaging group	:	II
hazard label	:	8 (N3)
Environmentally hazardous	:	no

IATA

UN Number	:	1824
Description of the goods	:	SODIUM HYDROXIDE SOLUTION
Class	:	8
Packaging group	:	II
hazard label	:	8
Packing instruction (cargo	:	855

aircraft)		
Packing instruction (passenger aircraft)	:	851

IMDG

UN Number	:	1824
Description of the goods	:	SODIUM HYDROXIDE SOLUTION
Class	:	8
Packaging group	:	II
IMDG-Labels	:	8
Marine pollutant	:	no
Special precautions for user	:	Corrosive. Keep away from foodstuffs, acids and alkalis.

15. REGULATORY INFORMATION

Safety, health and environmental regulations/legislation specific for the substance or mixture

Water contaminating class (Germany): 1 slightly water endangering
(In accordance with Annex 4 to the Directive on Water-Hazardous Substances)

Any existing national regulations on the handling of irritant or corrosive substances must be observed.

16. OTHER INFORMATION

Full text of hazardous (H) warnings referred to under sections 2 and 3 of the CLP classification (1272/2008/CE).

H290	May be corrosive to metals.
H314	Causes severe skin burns and eye damage.

Full text of R-phrases referred to under sections 2 and 3 of the EU classification (67/548/EEC,1999/45/EC).

R35	Causes severe burns.

Further information
The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

CONTICHIM NORTH AMERICA INC.

Caustic Soda Solution 50% (Membrane)

CAS-No.: 001310-73-2 **Chemical Formula: NaOH**

Specification:

PROPERTY	MIN.	MAX.	UNIT	TEST METHOD
Caustic Soda (NaOH)	49	51	%	AI-P EL 4.4
Sodium Oxide (Na20)	38	39.5	%	
Sodium Chloride (NaCL)		60 ppm	mg/kg	AI-P EL 4.40
Sodium Sulfate (Na2SO4)		40	mg/kg	AC-F Nr. 186
Carbonate (Na2CO3)		150	mg/kg	AC-F Nr. 1249
Sodium Chlorate (NaCLO3)		15	mg/kg	AC-F Nr. 371
Silica (as SiO_2)		10	mg/kg	AC-F Nr. 92
Iron (as Fe^2)		5	mg/kg	AI-P EL 4.19
Aluminium (Al2O3)		1	mg/kg	AC-F Nr. 192
Alkaline Eartha (as Ca^{2+})		5	mg/kg	AC-F Nr. 707
Nickel (NI)		1	mg/kg	CH-P EL 4.18

NSF

Maryland Chemical Company
INCORPORATED
3310 Childs Street • Baltimore, Maryland 21226

Zaclon Galvanizing Fluxes (K;F;C;CS)
Safety Data Sheet

SECTION 1: Identification

1.1. Product identifier

Product name : Zaclon Galvanizing Fluxes (K;F;C;CS)

1.2. Recommended use and restrictions on use

Manufacturing

1.3. Supplier

Zaclon LLC
2981 Independence Road
Cleveland, OH 44115
T 800-356-7327

1.4. Emergency telephone number

Emergency number : Chemtrec 1 800 424 9300

SECTION 2: Hazard identification

2.1. Classification of the substance or mixture

Classification (GHS-CA)

Acute toxicity (oral) Category 4	H302
Skin corrosion/irritation Category 1B	H314
Specific target organ toxicity (single exposure) Category 3	H335
Hazardous to the aquatic environment - Acute Hazard Category 1	H400
Hazardous to the aquatic environment - Chronic Hazard Category 1	H410

Full text of H statements : see section 16

2.2. GHS Label elements, including precautionary statements

GHS-US/CAN Classification

Hazard pictograms :

Signal word : Danger

Hazard statements :
H302 - Harmful if swallowed
H314 - Causes severe skin burns and eye damage
H335 - May cause respiratory irritation
H400 - Very toxic to aquatic life
H410 - Very toxic to aquatic life with long lasting effects

Precautionary statements :
P260 - Do not breathe dust/fume/gas/mist/vapors/spray
P264 - Wash thoroughly after handling
P270 - Do not eat, drink or smoke when using this product
P271 - Use only outdoors or in a well-ventilated area
P273 - Avoid release to the environment
P280 - Wear protective gloves/protective clothing/eye protection/face protection
P301+P312 - IF SWALLOWED: Call a POISON CENTER or doctor if you feel unwell
P301+P330+P331 - IF SWALLOWED: Rinse mouth. Do NOT induce vomiting
P303+P361+P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water
P304+P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing
P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P310 - Immediately call a POISON CENTER/doctor
P312 - Call a POISON CENTER/doctor if you feel unwell
P321 - Specific treatment (see label)
P330 - Rinse mouth
P363 - Wash contaminated clothing before reuse
P391 - Collect spillage
P403+P233 - Store in a well-ventilated place. Keep container tightly closed
P405 - Store locked up
P501 - Dispose of contents/container in accordance with local/regional/national/international regulations..

2.3. Other hazards

No additional information available

2.4. Unknown acute toxicity (GHS-CA)

No data available

SECTION 3: Composition/Information on ingredients

3.1. Substances

Not applicable

3.2. Mixtures

Name	Product identifier	%	GHS-CAN classification	GHS-US classification
Ammonium chloride	(CAS No) 12125-02-9	40 - 75	Acute Tox. 4 (Oral), H302 Eye Irrit. 2, H319 Comb. Dust	Acute Tox. 4 (Oral), H302 Eye Irrit. 2, H319 Comb. Dust
Zinc chloride	(CAS No) 7646-85-7	25 - 60	Acute Tox. 4 (Oral), H302 Skin Corr. 1B, H314 Aquatic Acute 1, H400 Aquatic Chronic 1, H410	Acute Tox. 4 (Oral), H302 Skin Corr. 1B, H314 Aquatic Acute 1, H400 Aquatic Chronic 1, H410

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures after inhalation : If inhaled, remove to fresh air immediately. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen. Call a physician.

First-aid measures after skin contact : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician. Wash contaminated clothing before reuse and discard shoes.

First-aid measures after eye contact : In case of contact, immediately flush eyes with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician.

First-aid measures after ingestion : If swallowed, do not induce vomiting. Give large quantities of water. Call a physician immediately. Never give anything by mouth to an unconscious person.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/injuries after inhalation : Causes irritation of lungs and upper respiratory passages.

Symptoms/injuries after skin contact : Causes severe skin burns.

Symptoms/injuries after eye contact : Causes eye damage.

Symptoms/injuries after ingestion : Not a likely route of exposure during normal product use. May be fatal from significant ingestion.

4.3. Indication of any immediate medical attention and special treatment needed

No additional information available

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : As appropriate for combustibles in area.

Unsuitable extinguishing media : None.

5.2. Special hazards arising from the substance or mixture

Fire hazard : May release ammonium chloride fumes, zinc oxide fumes, zinc chloride fumes, and ammonia and hydrogen chloride gases in a fire.

Explosion hazard : None known.

5.3. Advice for firefighters

Protection during firefighting : Firefighters should wear full protective gear.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel

No additional information available

6.1.2. For emergency responders

No additional information available

6.2. Environmental precautions

Avoid release to the environment.

6.3. Methods and material for containment and cleaning up

For containment : Stop the flow of material, if this is without risk.

Methods for cleaning up : Confine spill and soak up with absorbent. Place in an approved container and dispose in accordance with local, state and federal regulations.

6.4. Reference to other sections

No additional information available

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Do not get in eyes, on skin, on clothing. Avoid breathing dusts, mists, or fumes. Wash thoroughly after handling.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Store in a tightly closed container in a dry place. Do not store with cyanides or sulfides.

7.3. Specific end use(s)

Manufacturing

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Ammonium chloride (12125-02-9)		
USA - ACGIH	ACGIH TWA (mg/m³)	10 mg/m³ (fume)
USA - ACGIH	ACGIH STEL (mg/m³)	20 mg/m³ (fume)
Canada (Quebec)	VECD (mg/m³)	20 mg/m³ (fume)
Canada (Quebec)	VEMP (mg/m³)	10 mg/m³ (fume)
Alberta	OEL STEL (mg/m³)	20 mg/m³ (fume)
Alberta	OEL TWA (mg/m³)	10 mg/m³ (fume)
British Columbia	OEL STEL (mg/m³)	20 mg/m³ (fume)
British Columbia	OEL TWA (mg/m³)	10 mg/m³ (fume)
Manitoba	OEL STEL (mg/m³)	20 mg/m³ (fume)
Manitoba	OEL TWA (mg/m³)	10 mg/m³ (fume)
New Brunswick	OEL STEL (mg/m³)	20 mg/m³ (fume)
New Brunswick	OEL TWA (mg/m³)	10 mg/m³ (fume)
New Foundland & Labrador	OEL STEL (mg/m³)	20 mg/m³ (fume)
New Foundland & Labrador	OEL TWA (mg/m³)	10 mg/m³ (fume)
Nova Scotia	OEL STEL (mg/m³)	20 mg/m³ (fume)
Nova Scotia	OEL TWA (mg/m³)	10 mg/m³ (fume)
Nunavut	OEL STEL (mg/m³)	20 mg/m³ (fume)
Nunavut	OEL TWA (mg/m³)	10 mg/m³ (fume)
Northwest Territories	OEL STEL (mg/m³)	20 mg/m³ (fume)
Northwest Territories	OEL TWA (mg/m³)	10 mg/m³ (fume)
Ontario	OEL STEL (mg/m³)	20 mg/m³ (fume)
Ontario	OEL TWA (mg/m³)	10 mg/m³ (fume)
Prince Edward Island	OEL STEL (mg/m³)	20 mg/m³ (fume)
Prince Edward Island	OEL TWA (mg/m³)	10 mg/m³ (fume)
Saskatchewan	OEL STEL (mg/m³)	20 mg/m³ (fume)
Saskatchewan	OEL TWA (mg/m³)	10 mg/m³ (fume)
Yukon	OEL STEL (mg/m³)	20 mg/m³ (fume)
Yukon	OEL TWA (mg/m³)	10 mg/m³ (fume)

Zinc chloride (7646-85-7)		
USA - ACGIH	ACGIH TWA (mg/m³)	1 mg/m³ (fume)
USA - ACGIH	ACGIH STEL (mg/m³)	2 mg/m³ (fume)
USA - OSHA	OSHA PEL (TWA) (mg/m³)	1 mg/m³ (fume)
Canada (Quebec)	VEMP (mg/m³)	1 mg/m³ (fume)
Alberta	OEL STEL (mg/m³)	2 mg/m³ (fume)
Alberta	OEL TWA (mg/m³)	1 mg/m³ (fume)
British Columbia	OEL STEL (mg/m³)	2 mg/m³ (fume)
British Columbia	OEL TWA (mg/m³)	1 mg/m³ (fume)
Manitoba	OEL STEL (mg/m³)	2 mg/m³ (fume)
Manitoba	OEL TWA (mg/m³)	1 mg/m³ (fume)
New Brunswick	OEL STEL (mg/m³)	2 mg/m³ (fume)

Zinc chloride (7646-85-7)		
New Brunswick	OEL TWA (mg/m³)	1 mg/m³ (fume)
New Foundland & Labrador	OEL STEL (mg/m³)	2 mg/m³ (fume)
New Foundland & Labrador	OEL TWA (mg/m³)	1 mg/m³ (fume)
Nova Scotia	OEL STEL (mg/m³)	2 mg/m³ (fume)
Nova Scotia	OEL TWA (mg/m³)	1 mg/m³ (fume)
Nunavut	OEL STEL (mg/m³)	2 mg/m³ (fume)
Nunavut	OEL TWA (mg/m³)	1 mg/m³ (fume)
Northwest Territories	OEL STEL (mg/m³)	2 mg/m³ (fume)
Northwest Territories	OEL TWA (mg/m³)	1 mg/m³ (fume)
Ontario	OEL STEL (mg/m³)	2 mg/m³ (fume)
Ontario	OEL TWA (mg/m³)	1 mg/m³ (fume)
Prince Edward Island	OEL STEL (mg/m³)	2 mg/m³ (fume)
Prince Edward Island	OEL TWA (mg/m³)	1 mg/m³ (fume)
Saskatchewan	OEL STEL (mg/m³)	2 mg/m³ (fume)
Saskatchewan	OEL TWA (mg/m³)	1 mg/m³ (fume)
Yukon	OEL STEL (mg/m³)	2 mg/m³ (fume)
Yukon	OEL TWA (mg/m³)	1 mg/m³ (fume)

8.2. Exposure controls

Appropriate engineering controls : Provide adequate local exhaust ventilation to maintain worker exposure below exposure limits.

Hand protection : Use neoprene or PVC rubber gloves, apron, boots; long sleeve shirt and pants. If considerable contact is likely, wear impervious (rubber) clothing or acid suit.

Eye protection : Use chemical splash goggles.

Skin and body protection : Wear suitable working clothes.

Respiratory protection : If airborne concentrations are above the applicable exposure limits, use NIOSH approved respiratory protection.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state : Solid

Appearance : Granular or fine particle

Color : White to off-white

Odor : Odorless.

Odor threshold : No data available

pH : No data available

Relative evaporation rate (butylacetate=1) : No data available

Melting point : ~343 °C (~650°F)

Freezing point : No data available

Boiling point : Decomposes

Flash point : No data available

Self ignition temperature : No data available

Decomposition temperature : No data available

Flammability (solid, gas) : No data available

Vapor pressure : No data available

Relative vapor density at 20 °C : No data available

Specific gravity : 67 lb/cu ft3

Solubility : No data available

Log Pow : No data available

Log Kow : No data available

Viscosity, kinematic : No data available

Viscosity, dynamic : No data available

Explosive properties : No data available

Oxidizing properties : No data available

Explosive limits : No data available

9.2. Other information

No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity

No additional information available

10.2. Chemical stability

The product is stable at normal handling and storage conditions.

10.3. Possibility of hazardous reactions

Will not occur.

10.4. Conditions to avoid

None.

10.5. Incompatible materials

Incompatible with cyanides and sulfides (may release toxic gases).

10.6. Hazardous decomposition products

At high temperatures, (~343°C; ~650°F) as in intended use, ammonium chloride fumes, zinc oxide fumes, zinc chloride fumes, and ammonia and hydrogen chloride gases may be released.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity (oral) : Oral: Harmful if swallowed.

Acute toxicity (dermal) : Not classified

Acute toxicity (inhalation) : Not classified

ATE CA (oral)	500 mg/kg body weight

Ammonium chloride (12125-02-9)	
LD50 oral rat	1650 mg/kg

Zinc chloride (7646-85-7)	
LD50 oral rat	1100 mg/kg

Skin corrosion/irritation : Causes severe skin burns and eye damage.
pH: 2.5 - 3.56 (2 lb/gal solution)

Serious eye damage/irritation : Eye damage, category 1, implicit
pH: 2.5 - 3.56 (2 lb/gal solution)

Respiratory or skin sensitization : Not classified

Germ cell mutagenicity : Not classified

Carcinogenicity : Not classified

Reproductive toxicity : Not classified

Specific target organ toxicity – single exposure : May cause respiratory irritation.

Toxic effects described in animals from short exposures include corrosion of mucosal surfaces, liver effects, and kidney effects. Toxic effects in animals occurring only with inhalation exposures are lower respiratory infection with pulmonary edema

Specific target organ toxicity – repeated exposure : Not classified

Human health effects of overexposure by inhalation, ingestion, or skin or eye contact may initially include: eye irritation with discomfort, tearing, or blurring of vision, skin irritation with discomfort or rash; or irritation of the upper respiratory passages. Higher exposures may lead to these effects; skin and eye burns or ulceration; temporary lung irritation effects with cough, discomfort, difficulty breathing, or shortness of breath; possibly modest initial symptoms, followed in hours by severe shortness of breath, requiring prompt medical attention; fatality from gross overexposure by fume inhalation or by significant ingestion. There are inconclusive or unverified reports of human sensitization. Individuals with pre-existing diseases of the lungs may have increased susceptibility to the toxicity of excessive exposures.

When the Zaclon® products are heated to high temperatures as those encountered in the galvanizing process, irritating zinc chloride fumes and gaseous hydrogen chloride may be released. Severe exposures may cause pulmonary edema. Heating may also release zinc oxide fumes which may cause metal fume fever.

Aspiration hazard : Not classified

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : Very toxic to aquatic life with long lasting effects.

Aquatic acute : Very toxic to aquatic life.

Aquatic chronic : Very toxic to aquatic life with long lasting effects.

Ammonium chloride (12125-02-9)	
LC50 fish 1	209 mg/l (Exposure time: 96 h - Species: Cyprinus carpio [static])

Zinc chloride (7646-85-7)	
BCF fish 1	16000

12.2. Persistence and degradability

No additional information available

12.3. Bioaccumulative potential

Zinc chloride (7646-85-7)	
BCF fish 1	16000

12.4. Mobility in soil

No additional information available

12.5. Other adverse effects

Ozone : Not classified

SECTION 13: Disposal considerations

13.1. Disposal methods

Product/Packaging disposal recommendations : Dispose of contents/container in accordance with local/regional/national/international regulations.

SECTION 14: Transport information

14.1. Basic shipping description

In accordance with TDG

TDG

UN-No. (TDG) : UN2331

Packing group : III - Minor Danger

TDG Primary Hazard Classes : 8 - Class 8 - Corrosives

Transport document description : UN2331 ZINC CHLORIDE, ANHYDROUS, 8, III

Proper Shipping Name (TDG) : ZINC CHLORIDE, ANHYDROUS

Hazard labels (TDG) : 8 - Corrosive substances

Explosive Limit and Limited Quantity Index : 5 kg

Excepted quantities (TDG) : E1

Passenger Carrying Road Vehicle or Passenger Carrying Railway Vehicle Index : 25 kg

Marine pollutant : Yes (IMDG only)

14.2. Transport information/DOT

DOT

DOT NA no. : UN2331

UN-No.(DOT)	:	2331
Packing group (DOT)	:	III - Minor Danger
Transport document description	:	UN2331 Zinc chloride, anhydrous, mixture, 8, III
Proper Shipping Name (DOT)	:	Zinc chloride, anhydrous, mixture
Contains Statement Field Selection (DOT)	:	
Class (DOT)	:	8 - Class 8 - Corrosive material 49 CFR 173.136
Division (DOT)	:	8
Hazard labels (DOT)	:	8 - Corrosive

Dangerous for the environment	:	Yes
Marine pollutant	:	Yes

DOT Special Provisions (49 CFR 172.102)	:	IB8 - Authorized IBCs: Metal (11A, 11B, 11N, 21A, 21B, 21N, 31A, 31B and 31N); Rigid plastics (11H1, 11H2, 21H1, 21H2, 31H1 and 31H2); Composite (11HZ1, 11HZ2, 21HZ1, 21HZ2, 31HZ1 and 31HZ2); Fiberboard (11G); Wooden (11C, 11D and 11F); Flexible (13H1, 13H2, 13H3, 13H4, 13H5, 13L1, 13L2, 13L3, 13L4, 13M1 or 13M2). IP3 - Flexible IBCs must be sift-proof and water-resistant or must be fitted with a sift-proof and water-resistant liner. T1 - 1.5 178.274(d)(2) Normal..... 178.275(d)(2) TP33 - The portable tank instruction assigned for this substance applies for granular and powdered solids and for solids which are filled and discharged at temperatures above their melting point which are cooled and transported as a solid mass. Solid substances transported or offered for transport above their melting point are authorized for transportation in portable tanks conforming to the provisions of portable tank instruction T4 for solid substances of packing group III or T7 for solid substances of packing group II, unless a tank with more stringent requirements for minimum shell thickness, maximum allowable working pressure, pressure-relief devices or bottom outlets are assigned in which case the more stringent tank instruction and special provisions shall apply. Filling limits must be in accordance with portable tank special provision TP3. Solids meeting the definition of an elevated temperature material must be transported in accordance with the applicable requirements of this subchapter.
DOT Packaging Exceptions (49 CFR 173.xxx)	:	None
DOT Packaging Non Bulk (49 CFR 173.xxx)	:	213
DOT Packaging Bulk (49 CFR 173.xxx)	:	240
DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27)	:	25 kg
DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75)	:	100 kg
DOT Vessel Stowage Location	:	A - The material may be stowed ‘‘on deck’’ or ‘‘under deck’’ on a cargo vessel and on a passenger vessel.
Other information	:	No supplementary information available.

14.3. Air and sea transport

IMDG

UN-No. (IMDG)	:	2331
Proper Shipping Name (IMDG)	:	ZINC CHLORIDE, ANHYDROUS
Transport document description (IMDG)	:	UN 2331 ZINC CHLORIDE, ANHYDROUS, 8, III, MARINE POLLUTANT/ENVIRONMENTALLY HAZARDOUS
Class (IMDG)	:	8 - Corrosive substances
Packing group (IMDG)	:	III - substances presenting low danger

IATA

UN-No. (IATA)	:	2331
Proper Shipping Name (IATA)	:	Zinc chloride, anhydrous
Transport document description (IATA)	:	UN 2331 Zinc chloride, anhydrous, 8, III, ENVIRONMENTALLY HAZARDOUS
Class (IATA)	:	8 - Corrosives
Packing group (IATA)	:	III - Minor Danger

SECTION 15: Regulatory information

15.1.Canada National regulations

Ammonium chloride (12125-02-9)

Listed on the Canadian DSL (Domestic Sustances List)

Zinc chloride (7646-85-7)

Listed on the Canadian DSL (Domestic Sustances List)

15.2. US Federal regulations

Ammonium chloride (12125-02-9)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

Zinc chloride (7646-85-7)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

15.3. US State regulations

Ammonium chloride (12125-02-9)

U.S. - Massachusetts - Right To Know List
U.S. - Minnesota - Hazardous Substance List
U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - Pennsylvania - RTK (Right to Know) List

Zinc chloride (7646-85-7)

U.S. - Massachusetts - Right To Know List
U.S. - Minnesota - Hazardous Substance List
U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - Pennsylvania - RTK (Right to Know) List

SECTION 16: Other information

Full text of H-phrases:

H302	Harmful if swallowed
H314	Causes severe skin burns and eye damage
H319	Causes serious eye irritation
H335	May cause respiratory irritation
H400	Very toxic to aquatic life
H410	Very toxic to aquatic life with long lasting effects

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product

Votorantim | Metais

Material Safety Data Sheet

ZINC METAL

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

- Product name: ZINC METAL
- Product use: raw material
- Applicant : Votorantim Metais-Cajamarquilla S.A
  Alt.Km.9.5 Carretera Central, desvío a Huachipa,
  Cajamarquilla, Lima 15-Perú
  P.O. Box: 43-0015, Lima 43, Perú
  Telephone 51-1-3172200, Fax 51-1-3172227
  E-mail: Postmast@vmetais.com.pe
- Emergency phone number : 51-1-3172242 (Perú)

Product Use: Zinc metal is used to coat steel for corrosion protection (galvanizing, electroplating, electrogalvanizing), as an alloying element in bronze, brass, aluminum and other metal alloys, for zinc die casting alloys, for zinc dry cell batteries, for the production of zinc sheet for architectural and coinage applications, as a reducing agent in organic chemistry and for other chemical applications.

SECTION 2. COMPOSITION / INFORMATION ON INGREDIENTS

Ingredient	Approximate Percent by Weight	C.A.S. Number	Occupational Exposure Limits (OELs)		LD_{50} / LC_{50} Species and Route
Zinc	99+	7440-66-6	OSHA PEL ACGIH TLV NIOSH REL	None established None established None established	No Data

NOTE: OELs for individual jurisdictions may differ from OSHA PELs. Check with local authorities for the applicable OELs in your jurisdiction.
OSHA - Occupational Safety and Health Administration. ACGIH - American Conference of Governmental Industrial Hygienists. NIOSH - National Institute for Occupational Safety and Health. OEL – Occupational Exposure Limit. PEL – Permissible Exposure Limit. TLV – Threshold Limit Value. REL – Recommended Exposure Limit.
The OSHA PEL final rule limits for zinc oxide dust are 10 mg/m³ (total) and 5 mg/m³ (respirable); the OSHA PEL final rule limit for zinc oxide fume is 5 mg/m³. Note that the OSHA PEL final rule limits are currently non-enforceable due to a court decision. The OSHA PEL transitional limits therefore remain in force at present. They are 15 mg/m³ (total) and 5 mg/m³ (respirable) while the transitional PEL for zinc oxide fume is 5 mg/m³. The ACGIH TLV for zinc oxide is 2 mg/m³ (respirable fraction) with a Short Term Exposure Limit (STEL) of 10 mg/m³ (respirable fraction). The NIOSH REL for zinc oxide (dust or fume) is 5 mg/m³ 10 hr TWA with a 15 mg/m³ ceiling limit (15 minute sample) for zinc oxide dust and a 10 mg/m³ STEL for zinc oxide fume (15 minute sample).

Trade Names and Synonyms: High Grade Zinc; Special High Grade Zinc; C-CAST® Zinc; Zn

SECTION 3. HAZARDS IDENTIFICATION

Emergency Overview: A lustrous bluish-silver metal that does not burn but may form explosive mixtures if dispersed in air as a fine powder. Contact with acids or alkalis generates flammable hydrogen gas which can accumulate in poorly-ventilated areas. Do NOT use water or foam in fire fighting. Apply dry chemical, sand or

special powder extinguishing media. Zinc is relatively non-toxic and poses little immediate health hazard to personnel or the environment in an emergency situation.

Potential Health Effects: Pure zinc dust is relatively non-toxic to humans by inhalation. However, acute over-exposure to zinc oxide fume may cause metal fume fever, characterized by flu-like symptoms such as chills, fever, nausea, and vomiting. Ingestion of soluble salts may cause abdominal irritation resulting in nausea and vomiting. Prolonged or repeated skin contact with zinc dust may cause a mild dermatitis in some individuals. Zinc is not listed as a carcinogen by OSHA, NTP, IARC, ACGIH or the EU. (see Toxicological Information, Section 11)

Potential Environmental Effects: In the form in which the product is sold, it does not represent a significant threat to the environment. However, extended exposure in the aquatic or terrestrial environments may lead to the release of zinc in a bioavailable form (see Ecological Information, Section 12)

EU Risk Phrase(s): Not applicable - zinc is not listed as a dangerous substance.

SECTION 4. FIRST AID MEASURES

Eye Contact: Flush with warm running water, including under the eyelids, for at least 15 minutes. If irritation persists, seek medical attention.

Skin Contact: *Dust:* Remove contaminated clothing and wash affected area with soap and warm water. Seek medical attention if irritation develops or persists. *Molten Metal:* Flush contact area to solidify and cool but do not attempt to remove encrusted material or clothing. Cover burns and seek medical attention immediately.

Inhalation: Remove victim from exposure area to fresh air immediately. If breathing has stopped, give artificial respiration. Keep affected person warm and at rest. Medical oxygen may be administered, if available, where breathing is difficult. Seek medical attention immediately.

Ingestion: If victim is conscious, dilute stomach contents with 2-4 cupfuls of water or milk. Do not induce vomiting. Seek medical attention immediately and bring a copy of this MSDS. Never give anything by mouth to an unconscious person.

SECTION 5. FIRE FIGHTING MEASURES

Fire and Explosion Hazards: Massive metal is not flammable; however, finely-divided metallic dust or powder may form flammable or explosive dust clouds when mixed with air. Bulk metallic dust in a damp state may heat spontaneously and ignite on exposure to air. Contact with acids and alkali hydroxides results in evolution of hydrogen gas which is potentially explosive. Mixtures with potassium chlorate or ammonium nitrate may explode on impact.

Extinguishing Media: Apply dry chemical, dry sand, or special powder extinguishing media. Water may be ineffective for extinguishing a fire but should be used to keep fire-exposed containers cool. Do NOT use water or foam on molten metals.

Fire Fighting: If possible, move material from fire area and cool material exposed to flame. Apply dry chemical, sand, or special powder extinguishing media. Zinc oxide fumes may evolve in fires. Fire fighters should be fully trained and wear full protective clothing including an approved, self-contained breathing apparatus which supplies a positive air pressure within a full facepiece mask.

Flashpoint and Method: Not Applicable

Upper and Lower Flammable Limit: Lower Flammable Limit (Zinc Dust): 500 g/m^3; Upper Flammable Limit: Not Applicable

Autoignition Temperature: Approximately 680ºC (dust cloud in air), 460 ºC (dust layer)

SECTION 6. ACCIDENTAL RELEASE MEASURES

Procedures for Cleanup: Solid metal is recyclable. Vacuuming recommended for accumulated metal dust. Molten metal should be allowed to solidify prior to clean-up. Return uncontaminated spilled material to the process if possible. Place contaminated and non-recyclable material in suitable labeled containers for later disposal. Treat or dispose of waste material in accordance with all local, regional and national requirements, as applicable.

Personal Precautions: Protective clothing, gloves, and respirator equipment are recommended for persons exposed to potentially hazardous levels of zinc dust or fume. Close-fitting safety goggles may be necessary in some circumstances to prevent eye contact with zinc dust or fume. Where molten metal is involved, wear heat-resistant gloves and suitable clothing for protection from hot-metal splash.

Environmental Precautions: Zinc in the metallic form has limited bioavailability and poses no immediate ecological risk. However, contamination of water and soil should be prevented.

SECTION 7. HANDLING AND STORAGE

Store zinc in a DRY covered area, separate from incompatible materials. Zinc ingots suspected of containing moisture should be THOROUGHLY DRIED before being added to a molten bath. Ingots may contain cavities that collect moisture. Entrained moisture will expand explosively when immersed in a molten bath. Always practice good personal hygiene. Refrain from eating, drinking, or smoking in work areas. Thoroughly wash hands before eating, drinking, or smoking in appropriate designated areas. No special packaging materials are required.

EU Safety Phrase(s): Not applicable - zinc is not listed as a dangerous substance.

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Protective Clothing: Gloves and coveralls or other work clothing are recommended to prevent prolonged or repeated direct skin contact when zinc is processed. Eye protection should be worn where fume or dust is generated. Respiratory protection may be required where zinc oxide fume is generated. Where hot or molten metal is handled, heat resistant gloves, goggles or faceshield, and clothing to protect from hot metal splash should be worn. Safety type boots are recommended.

Ventilation: Use adequate local or general ventilation to maintain the concentration of zinc oxide fumes in the working environment well below recommended occupational exposure limits. Supply sufficient replacement air to make up for air removed by the exhaust system. Where metallic dust particles of zinc metal are being collected and transported by a ventilation system, use a non-sparking, grounded ventilation system separate from other exhaust ventilation systems. Locate dust collectors and fans outdoors if possible and provide dust collectors with explosion vents or blow out panels.

Respirators: Where zinc oxide dust or fumes are generated and cannot be controlled to within acceptable levels, use appropriate NIOSH-approved respiratory protection equipment (a 42CFR84 Class N, R or P-95 particulate filter cartridge).

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:
Bluish-silver lustrous metal

Odour:
None

Physical State:
Solid

pH:
Not Applicable

Vapour Pressure:
1 mm at 487ºC
Negligible @ 20ºC

Vapour Density:
Not Applicable

Boiling Point/Range:
908ºC

Freezing/Melting Point/Range:
420ºC

Specific Gravity:
7.1

Evaporation Rate:
Not Applicable

Coefficient of Water/Oil Distribution:
Not Applicable

Odour Threshold:
None

Solubility:
Insoluble in water

SECTION 10. STABILITY AND REACTIVITY

Stability & Reactivity: Massive metal is stable under normal temperatures and pressures. It slowly becomes covered with a white coating of a hydrated basic zinc carbonate on exposure to moist air. Damp zinc dust or powder may heat spontaneously and ignite on exposure to air and moisture. Zinc metal will react with acids and strong alkalies to generate hydrogen gas. A violent, explosive reaction may occur when powdered zinc is heated with sulphur. Powdered zinc will become incandescent or ignite in the presence of fluorine, chlorine or bromine. Powdered zinc can also react explosively with halogenated hydrocarbons if heated. Mixtures with potassium chlorate or ammonium nitrate may explode on impact.

Incompatibilities: Contact with acids and alkalis will generate highly flammable hydrogen gas. Contact with acidic solutions of arsenic and antimony compounds may evolve highly toxic ARSINE or STIBINE gas. Zinc is incompatible with oxidizing agents, acids, alkalies, and halogenated hydrocarbons, as well as ammonium nitrate, barium peroxide, barium nitrate, chlorates, chlorine, chlorine triflouride, chromium trioxide, ethyl acetoacetate + tribromoneopentyl alcohol, fluorine, hydrazine mononitrate, hydroxylamine, lead nitrate, manganese + barium nitrate + barium peroxide, manganese chloride, nitric acid, performic acid, potassium chlorate, potassium nitrate, potassium peroxide, selenium, sodium chlorate, sodium peroxide, sulphur, telluride, water, ammonium sulphide, arsenic trioxide, carbon disulphide, calcium chloride, sodium hydroxide, chlorinated rubber, catalytic metals, halocarbons, o-nitroanisole, nitrobenzene, oxidants, paint primer base, pentacarbonyliron, transition metal halides, and seleninyl bromide.

Hazardous Decomposition Products: Thermal oxidation of zinc metal, powder or dust will generate zinc oxide fume which, on inhalation in sufficient quantity, can produce metal fume fever, a transient, influenza-like illness.

SECTION 11. TOXICOLOGICAL INFORMATION

General: Zinc, especially in the metal form, is relatively non-toxic. However, it can react with other materials, such as oxygen or acids, to form compounds that can be potentially toxic. The primary route of exposure would be through inhalation of zinc oxide fume from welding or burning or overheated melting pots.

Acute:
Skin/Eye: Contact with zinc powder or dust or zinc oxide fume may cause local irritation but would not cause tissue damage.

Inhalation: If excessive quantities of zinc oxide fume are inhaled, it can result in the condition called metal fume fever. The symptoms of metal fume fever will occur within 3 to 10 hours, and include immediate dryness and irritation of the throat, tightness of the chest, and coughing which may later be followed by flu-like symptoms of fever, malaise, perspiration, frontal headache, muscle cramps, low back pain, occasionally blurred vision, nausea, and vomiting. The symptoms are temporary and generally disappear, without medical intervention, within 24 to 48 hours of onset. There are no recognized complications, after affects, or chronic affects that result from this condition.

Ingestion: When ingested in excessive quantities, zinc can irritate the stomach resulting in nausea and vomiting.

Chronic: There is no chronic form of metal fume fever but in rare instances an acute incident may be followed by complaints such as bronchitis or pneumonia. Some workers may develop a short-term immunity (resistance) so that repeated exposure to zinc oxide fumes does not cause metal fume fever. This immunity (resistance) however is quickly lost after short absences from work (weekends or vacations). Workers exposed to finely-divided metallic zinc for up to 35 years revealed no acute or chronic illnesses attributable to zinc. Prolonged or repeated skin contact with zinc dust or powder may cause dryness, irritation and cracking (dermatitis) since zinc is astringent and may tend to draw moisture from the skin. Zinc dust is not listed as a human carcinogen by the Occupational Safety and Health Administration (OSHA), the National Toxicology Program (NTP), the International Agency for Research on Cancer (IARC), the American Conference of Governmental Industrial Hygienists (ACGIH) or the European Union (EU).

SECTION 12. ECOLOGICAL INFORMATION

Zinc in the metallic form has limited bioavailability and poses no immediate ecological risk. However, processes in the environment may alter its bioavailability. In aquatic systems, zinc bioaccumulates in both plants and animals. In terrestrial systems, the mobility of zinc in soil is dependent on soil conditions, such as cation exchange capacity, pH, redox potential, and chemical species present in the soil. Zinc also bioaccumulates in terrestrial plants, vertebrates, and mammals, with plant uptake from soil dependent on the plant species, soil pH, and soil composition.

SECTION 13. DISPOSAL CONSIDERATIONS

If material cannot be returned to process or salvage, dispose of in accordance with applicable regulations.

SECTION 14. TRANSPORT INFORMATION

PROPER SHIPPING NAME
U.S. DOT AND TRANSPORT CANADA..... Not a regulated product
HAZARD CLASSIFICATION..... Not applicable
U.S. DOT AND TRANSPORT CANADA
PRODUCT IDENTIFICATION NUMBER ..... Not applicable
MARINE POLLUTANT ..... No
IMO CLASSIFICATION..... Not regulated

SECTION 15. REGULATORY INFORMATION

Regulation (EC) n°1907/2006 (REACH), as amended by Regulation (EU) n°453/2010:
REACH number : **01-2119467174-37-0068**

EU Risk Phrase(s): Not applicable - zinc is not listed as a dangerous substance.

U.S.
INGREDIENT LISTED ON TSCA INVENTORY ..... Yes

HAZARDOUS UNDER HAZARD COMMUNICATION STANDARD ..... No

CERCLA SECTION 103 HAZARDOUS SUBSTANCES..... Zinc ..... Yes .....RQ: 1,000 lbs. (454 kg.)
** reporting not required when diameter of the pieces of solid metal released is equal to or exceeds 100 micrometers (0.004 inches).*

EPCRA SECTION 302
EXTREMELY HAZARDOUS SUBSTANCE..... No

EPCRA SECTION 311/312 HAZARD CATEGORIES ..... No Hazard Categories Apply

EPCRA SECTION 313 Toxic Release Inventory	This product does not contain any toxic chemicals subject to the Toxic Release reporting requirements. However, potential by-products from working with this product, "Zinc (Fume or Dust)" CAS 7440-66-6 are reportable.

CANADIAN:

INGREDIENTS LISTED ON DOMESTIC SUBSTANCES LIST..... Yes

WHMIS CLASSIFICATION: ..... N/A. Zinc is not a Controlled Product under CPR

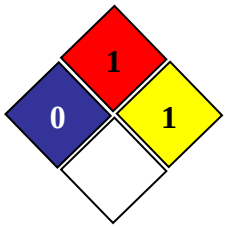
EUROPEAN UNION:

LISTED ON THE EUROPEAN INVENTORY OF EXISTING COMMERCIAL CHEMICAL SUBSTANCES (EINECS)..... Yes

EU CLASSIFICATION:..... N/A. Zinc is not listed as a dangerous substance.

SECTION 16. OTHER INFORMATION

NFPA : Health: **0** Fire Hazard: 1 Reactivity: 1 special hazard:



- The information in this Material Safety Data Sheet is based on the following references:
- American Conference of Governmental Industrial Hygienists, 1991, Documentation of the Threshold Limit Values and Biological Exposure Indices, Sixth Edition, plus updates.
- American Conference of Governmental Industrial Hygienists, 2003, Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices.
- American Conference of Governmental Industrial Hygienists, 2002, Guide to Occupational Exposure Values.
- Canadian Centre for Occupational Health and Safety (CCOHS) Hamilton, Ontario, CHEMINFO Record No. 548 – Zinc (Last Revision 2003-03-02).
- European Economic Community, Commission Directives 91/155/EEC and 67/548/EEC.
- Industry Canada, SOR/88-66, Controlled Products Regulations, as amended.
- Merck & Co., Inc., 2001, The Merck Index, An Encyclopedia of Chemicals, Drugs, and Biologicals, Thirteenth Edition.
- National Library of Medicine, National Toxicology Information Program, 2003, Hazardous Substance Data Bank.
- Patty's Toxicology, Fifth Edition, 2001 E. Bingham, B. Cohrssen & CH Powell (Eds.)
- Sax, N. Irving, 1989, Dangerous Properties of Industrial Materials, Seventh Edition.
- U.S. Department of Health and Human Services, National Institute for Occupational Safety and Health, NIOSH Pocket Guide to Chemical Hazards. CD-ROM Edition DHHS(NIOSH) Publication No. 2001-145, Aug 2001.
- U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry, May 1994, Toxicological Profile for Zinc.
- Urben, P.G., 1995, Bretherick's Handbook of Reactive Chemical Hazards, Fifth Edition.

Notice to Reader

Date of preparation: (August 2006) **Last revision: (18/12/2012)**

Although reasonable precautions have been taken in the preparation of the data contained herein, it is offered solely for your information, consideration and investigation. Votoratim Metais-Cajamarquilla S.A. extend no warranty and assume no responsibility for the accuracy of the content and expressly disclaim all liability for reliance thereon. This material safety data sheet provides guidelines for the safe handling and processing of this product; it does not and cannot advise on all possible situations, therefore, your specific use of this product should be evaluated to determine if additional precautions are required. Individuals exposed to this product should read and understand this information and be provided pertinent training prior to working with this product.

ANALYTICAL REPORT

Date:	December 13, 2024

Report No. BGMD0004

Eastern Alloys, Inc.
PO BOX 317 - Maybrook, NY 12543
(845) 427-2151 FAX (845) 427-5185
www.eazall.com

SAMPLE DATE	12/3/2024		CUSTOMER		Baltimore Galvanizing						
SAMPLE TYPE	C		C CODE		BGMD		C PO	0			
Lab # / SAMPLE ID	**Al**	**Bi**	**Cd**	**Cu**	**Fe**	**Ni**	**Pb**	**Sn**	Zn by diff	0	0
24ZC1335 GALV KETTLE	0.0010	0.152	0.0004	0.018	0.019	0.001	0.0069	0.0034	99.80		
	.001-.003	.090-.125				.040-.050					
	ADD AL					ADD NICKEL					

Other Comments — Sample Type - D =Disk; C=Cylinder; P=Pin

TESTING CERT #0776.01

David Similton ds

David Similton, Sr. Lab Tech.

ATTACHMENT F

Photos of Proposed 2nd Galvanizing Spin Line Equipment

Photo A – Example of Proposed Pickling Tank (To Be Installed)

Photo B – Example of Proposed Zinc Galvanizing Kettle (To Be Installed)

Proposed Secondar Galvanizing Spin Line Photographs
ARM Project No. 25010536

Baltimore Galvanizing Company
7110 Quad Avenue, Baltimore, Maryland

Photo C – Proposed Small Boiler to Heat Tanks (To Be Installed)

Photo D – Proposed Centrifuge for Removing Excess Zinc from Parts (To Be Installed)

Proposed Second Galvanizing Spin Line Photographs
ARM Project No. 25010536

Baltimore Galvanizing Company
7110 Quad Avenue, Baltimore, Maryland

ARM Group LLC
Engineers and Scientists

October 15, 2025

Mr. George O. Ikhinmwin
Regulatory and Compliance Engineer
Air and Radiation Administration
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, Maryland 21230

Re: Response to MDE Comments
Galvco of Maryland,
DBA Baltimore Galvanizing Company
ARM Project No. 25010536

Dear Mr. Ikhinmwin:

On behalf of Galvco of Maryland, DBA Baltimore Galvanizing Company (Galvco), ARM Group LLC (ARM) is pleased to submit the following responses to your emailed comments dated September 25, 2025. For ease of reference, the comments are listed below in italic bold, followed by our response.

Comment 1. ***Environmental Justice Report - Please provide a copy of the Environmental Justice Report, which can be accessed using MDEnvironScreen.***

Response 1: A copy of the Environmental Justice Report is included as Attachment A.

Comment 2. ***Proposed boiler information - Please provide the technical data/brochure with boiler make, model and size in MMBtu/hr. Completion of Form 11 - Application for Fuel Burning Equipment is required.***

Response 2: The completed Form 11 and catalog sheet for the proposed 1.5 MMBtu/hr furnace used to heat the galvanizing tank is provided in Attachment B. The completed Form 11, Form 5EP and catalog sheet for the proposed 0.48 MMBtu/hr boiler used to heat the flux and caustic tanks is provided in Attachment C.

Comment 3. ***Proposed centrifuge information - Please provide a technical data/brochure with the centrifuge make, model and operating parameters. Completion of Form 5 – Application for Processing /Manufacturing Equipment is required.***

Response 3: *A catolog cut sheet of the electric centrifuge is provided in Attachment D. Please note that this unit is powered by electricity and solely used to spin excess molten zinc from parts after being dipped in the galvanizing tank. As such, there are no*

air emissions from this unit. Therefore, Form 5 is not required to be submitted for the centrifuge.

Comment 4. ***Project narrative - Provide a project narrative (a description of the current operation, reason for expansion, how the new process differs from the existing process, and a brief discussion on the current facility-wide emissions relative to future emissions when the proposed new project is in place).***

Response 4: *A project narrative is provided in Attachment E.*

If you have any questions regarding this submittal or require additional information, please contact me at 610-585-9808 or at ayates@armgroup.net.

Respectfully submitted,

ARM Group LLC

Alfred M. Yates
Senior Engineer

Attachments: As stated

cc: Russ Patterson, Western Technologies Inc.
David Klahr, Baltimore Galvanizing

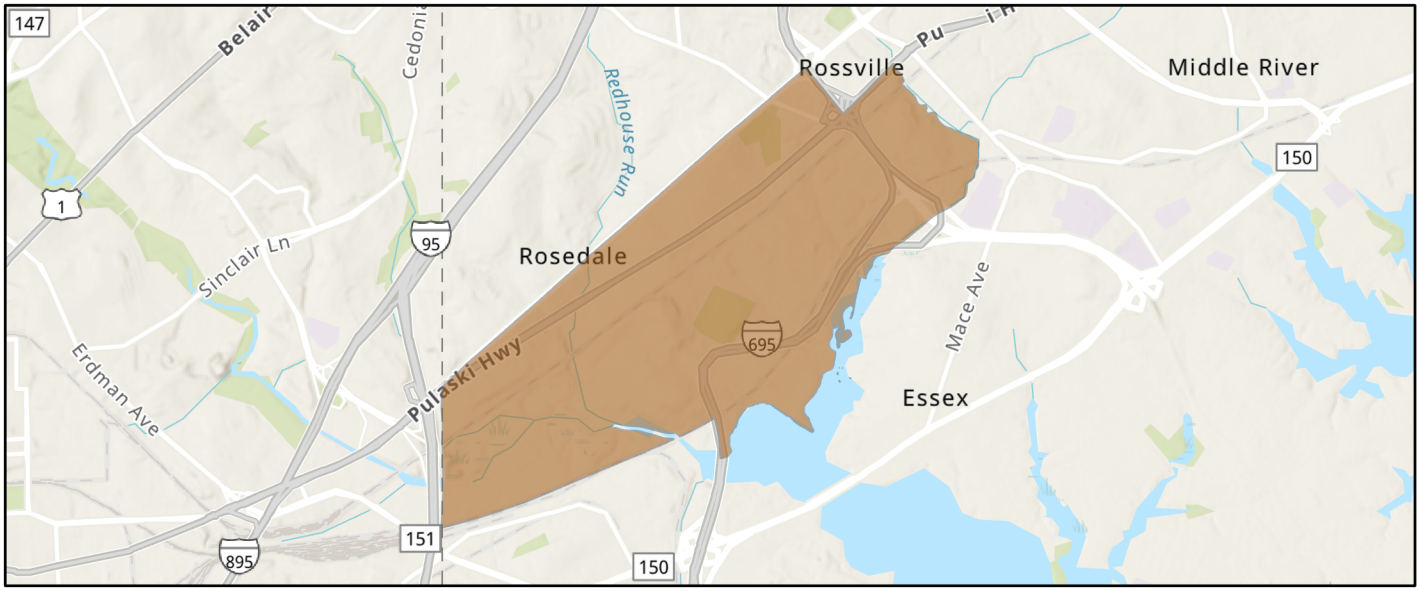
Attachment A

Environmental Justice Report

MDEnviroScreen Report

Census Tract ID: 24005450100

County: Baltimore



MDEnviroScreen Summary

EJ Score: 99.5

Overburdened Community: Yes

Underserved Community: Yes

MDEnviroScreen EJ Score Indicators

Pollution Burden Exposure

Indicator	Percentile
PM 2.5	37.3
Ozone	74.6
Diesel PM	76.6
Cancer Risk	89.1
Respiratory Hazard	32.4
Traffic	74.5
Toxic Release	98.9
Hazardous Landfill	97.5

Pollution Environmental Effect

Indicator	Percentile
Lead Paint	79.4
RMP Facility	82.3
Superfund	98.4
Hazardous Waste	90.1
Wastewater	97.6
Brownfield	97.5
Power Plant	79.6
CAFO	0
Mining	61.1

Sensitive Population

Indicator	Percentile
Low Birth Weight	94
Asthma Discharge	79
Myocardial Infarction	99.9
Lack of Broadband	54.3
Low Income*	73.1

*Low Income is included in Underserved but grouped into Sensitive Population for EJ Score Calculation

*The MDEnviroScreen EJ score represents a combined measure of pollution and the potential vulnerability of a population to the effects of pollution. The EJ score in MDEnviroScreen does not include data from every available map layer. For example, it does not include race/ethnicity or age, however, MDE has made that information available for informational purposes only. Collecting and displaying this data allows users to evaluate the relationships between demographics and pollution burden, and can be used to better understand issues related to environmental justice and racial equity in Maryland. MDE cautions users against using the "Underserved" map layer, or its subcategories, in any manner that would be considered discriminatory under applicable law.

Date Exported: 7/23/2025

Attachment B

Form 11 and Technical Brochure for 1.5 MMBtu/hr Galvanizing Furnace

MARYLAND DEPARTMENT OF THE ENVIRONMENT
Air and Radiation Administration ● Air Quality Permits Program
1800 Washington Boulevard ● Baltimore, Maryland 21230
(410) 537-3230 ● 1-800-633-6101● www.mde.maryland.gov

FORM 11
APPLICATION FOR
FUEL BURNING EQUIPMENT

☑ Permit to Construct ☐ Registration Update ☐ Initial Registration

1. Owner Information

Owner Name: Galvco of Maryland, DBA Baltimore Galvanizing Company
Owner Street Address: 7110 Quad Avenue, Baltimore
City/State/Zip Code: Maryland 21237

2. Location of Equipment/Process

☐ Check if different from above. If checked, complete the following:
Premises Name: _____
Premises Street Address: _____
City/State/Zip Code: _____

3. Contact Information

Contact Name: Alfred M. Yates (ARM Group LLC)
Job Title: Senior Engineer
Phone Number: 610585-9808
Email Address: ayates@armgroup.net

4. Workers' Compensation Coverage Information

Before a Permit to Construct may be issued by the Department, the applicant must provide the Department with proof of worker's compensation coverage as required under Section 1-202 of the Workers' Compensation Act.

Company Name: _____
Binder/Policy Number: _____ Expiration Date: _____

5. Person Installing Fuel Burning Equipment (if different from 1 above)

Installer Name and Title: _____
Installer Company Name: _____
Installer Street Address: _____
City/State/Zip Code: _____
Phone Number: _____

6. Description of Major Activity, Product, or Service of Company at this Location (include applicable SIC code)

Second galvanizing spin line capable of to 1,000 pounds/hour of small parts (SIC Code 3479).

7. Fuel Burning Equipment Type

☑
☐ New Equipment
☐ Modification to Existing Equipment
☐ Existing Equipment

8. Projected Construction/Existing Operation Dates

Projected Construction Start Date: 10/2025
Projected Construction End Date: **~~12/2025~~**
Projected Operating Date of New/Modified Equipment: 12/2025
Existing Equipment Initial Operating Date: _____

9. Description of the Fuel Burning Equipment (include make, model, manufacturer, as applicable)

Installation of Westech Pulse-Fired High Velocity Galvanizing Furnace (1.5 MMBtu/hr)

10. Supplemental Fuel Burning Equipment Information

Number of Pieces of Identical Equipment Units to be Registered/Permitted at this Time: 1

Maximum Rated Heat Input: 1.5 million Btu per hour

Number of Stack/Emission Points Associated with the Equipment/Process: 1
Note: Complete a Form 5EP for each stack/emission point.

11. Control Devices Associated with this Fuel Burning Equipment

Note: Complete a Form 6 for each control device

☑ None
☐ Dust Suppression
☐ Oxidizer
☐ Baghouse/Fabric Filter
☐ Venturi Scrubber
☐ Nitrogen Oxides Reduction
☐ Cyclone
☐ Electrostatic Precipitator
☐ Adsorption System
☐ Spray Tower/Packed Bed
☐ Other, specify: _____

12. Fuel Consumption for this Fuel Burning Equipment

☑ Natural Gas	13,140	1000 cubic feet/year	☐ Coal (attach fuel specifications)	_____	tons/year
☐ Propane/LP Gas	_____	100 gallons/year	☐ Wood (attach fuel specifications)	_____	tons/year
☐ Distillate Fuel Oil	_____	1000 gallons/year	☐ Other (describe): _____	_____	_____ (specify units)
☐ Residual Fuel Oil	_____	1000 gallons/year			

13. Fuel Burner Type

☐ Low NOx Burner

☐ Oil Burner (identify type below)
- ☐ Pressure Gun
- ☐ Air Atomizer
- ☐ Steam Atomizer
- ☐ Rotary Cup

☐ Coal Burner (identify type below)
- ☐ Cyclone
- ☐ Stoker
- ☐ Pulverized
- ☐ Hand Fired

☐ Other Burner Type, specify: _____

14. Operating Schedule for this Fuel Burning Equipment

☐ Comfort/Space Heat Only
☑ Process Heat Only
☐ Comfort/Space Heat or Process Heat
_____ % process heat

24 operating hours/day
7 operating days/week
365 operating days/year

Seasonal Variation? ☐ Yes ☑ No
If yes, complete the following:

_____ Winter Percent _____ Spring Percent
_____ Summer Percent _____ Fall Percent
Total Seasons = 100% operating time

15. Total Stack Emissions for this Equipment/Process

Nitrogen Oxides	6.1 lbs/operating day	Particulate Matter (PM-10)	2.1 lbs/operating day
Carbon Monoxide	0.9 lbs/operating day	Particulate Matter (PM-2.5)	2.1 lbs/operating day
Sulfur Oxides	0.02 lbs/operating day	Greenhouse Gases (CO_{2e})	4350 lbs/operating day
Volatile Organic Compounds	0.2 lbs/operating day		

16. Required Documents

☒ Air Quality Permit to Construct Application Checklist - Include all required items on the checklist with the Form 11 application

☐ Does this application include confidential information? If yes, submit one confidential copy of the application and one copy with all confidential information removed.

17. Responsible Party Certification Statement

"I CERTIFY UNDER PENALTY OF LAW THAT THE INFORMATION SUBMITTED IN THIS REQUEST FOR COVERAGE IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS."

Responsible Party Signature: Dan Klahr Date: 10/15/25

Printed Name and Title: David Klahr, Plant Manager

For ARA Use Only

Date Received:	
Date Reviewed:	
Reviewed By:	
ARA Premises Number:	
Associated ARA Registration Number or Numbers:	

Client: Baltimore Galv. Spin
Job# 4909

WESTECH
PULSE-FIRED '*TURBO*' HIGH VELOCITY GALVANIZING FURNACE

Technical Specifications:

Kettle Internal Dimensions	10' 0" x 3' 0" x 5' 0" deep
Avg. Production Rate	1,000 lbs./hr average
Max. Production Rate	5,483 lbs/hr
Zinc Content (with 4" freeboard)	58,000 lbs.
Number of Burners	1
Burner Type	High Velocity
Burner Position	One corner
Burner Ignition	Direct Spark
Flame Monitoring	Flame Rod
Maximum Heat Output	1,500,000 Btu/hr.
Fuel	Natural Gas
Fuel Calorific Value	955 Btu/ft³
Maximum Fuel Usage	1,594 Sft³/hr.
Required Gas Inlet Pressure	Max. 5 psi, Min. 2 psi (Pressure must not fall below min. upon increase from low to high fire in 7.5 seconds.)
Gas/Air Ratio Control	Ratio regulation on each Burner by impulse line.
Zinc Temperature Control	3-term P.I.D. pulse firing

	with Turbo function.
Main Control Panel	Free Standing Relay Logic
Electrical Connection	460V 3ph (4 wire) 60Hz or 230V 3ph (4 wire) 60Hz
Furnace External Dimensions	16’8” x 8’2” x 6’4” high
Furnace Weight	20,961 lbs.

SPECIFICATION

Combustion System

Air for combustion is provided by a blower fitted with an inlet filter/silencer, mounted on a skid frame. All other primary controls are mounted on the skid frame including a motorized air flow control valve, gas isolating valves, strainer or filter, appliance gas governor, pressure switches and main gas solenoid valves.

High velocity burner with silicon carbide firing tube is installed in 2 diagonally opposite corners (except for the single burner option). The burners are mounted on individually bolted mounting plates, allowing the furnace corner to be exposed for repairs if necessary.

The burner fires along the gallery formed between the kettle and the furnace insulation, resulting in high gas mass re-circulation and uniform heat transfer through the kettle wall and into the molten zinc.

Each burner has its own ratio control, gas and air setting valves, orifice meter and solenoid valves. All burners have individual safety control and the system will operate with only one burner firing.

The skid frame mounted equipment is connected to the furnace by gas and air manifold pipework.

All pressure safety control is on the skid frame. A gas pressure prove pressure switch ensures that the minimum gas inlet pressure is achieved prior to starting the system. The high gas pressure switch turns the system off in the event of a high gas pressure condition, which may damage equipment downstream of the primary controls. An air prove pressure switch ensures the fan is running and adequate air pressure is achieved prior to starting the system. Two further air pressure switches are mounted on the skid frame downstream of the motorized air valve. These are the high and low air prove pressure switches which guarantee the valve is opened to allow purging and closed to allow burner ignition. The change of state of the pressure switches in a predetermined time further proves the motorized air valve is working. Gas and air pressure gauges are also mounted on the module.

The gas and air mixture, to the burners, is pressure controlled. A proportionator or ratio regulator is fitted on each individual burner train. An air impulse line is connected from the air inlet to each burner to a corresponding ratio regulator. This ensures the gas pressure matches the air pressure which means that even in the event of a slight loss of air, due to a blocked air inlet filter, the gas/air ratio will be maintained, ensuring efficient combustion.

Temperature Control

Two thermocouple sheaths are immersed in the molten zinc, each sheath contains a duplex thermocouple. One thermocouple from one sheath is connected to the temperature controller and one thermocouple from the other sheath is connected to the chart recorder. A third thermocouple is connected to

a separate master over temperature alarm instrument, if local regulations demand it.

A 3-term (P.I.D.) microprocessor temperature controller monitors the temperature and, via proprietary control circuitry, gives a pulse output which opens the motorized air valve on the skid frame for a period of time, dependent upon the demand for heat. The control cycle is infinitely variable resulting in a close temperature control and safe heat transfer.

The exclusive Westech Turbo System enables the galvanizer to operate in normal demand periods at an optimum high fire rate reducing the normal maximum heat transfer rate. The Turbo setting is above the optimum high fire rate and enables the galvanizer to operate at an ultimate high fire rate for peak production periods. This system subjects the kettle to lower heat transfer rates for the majority of production time, but still allows occasional peak demand to be met.

System Safeguards

As described in 'Combustion System', pressure switches are mounted on the skid frame to protect equipment and ensure any unburned gas is purged from the furnace prior to burner ignition.

Each burner has independent flame protection that prevents the burners from igniting in a dangerous condition and switches the gas off to an individual burner in the event of a flame failure. Two main solenoid valves are mounted on the main gas line on the skid frame.

One solenoid valve on each burner is fitted with a closed position indication (C.P.I.) switch. The C.P.I. switch proves that the solenoid valve is closed when the burner is off. It prevents the system from operating with a solenoid failed unsafe.

Temperature Safeguards

The system is fitted with 4 zinc temperature alarms. These are 1 high temperature, 1 master high temperature, 1 low temperature, and 1 low-low temperature.

The high temperature alarm is normally set at 15ºF (8ºC) above the zinc temperature control set point and no higher than 856ºF (458ºC). If the zinc temperature exceeds 856ºF all burners are switched off. As the temperature drops below the alarm point the burners will re-ignite automatically.

The master high temperature alarm is set at 18ºF (10ºC) above the zinc temperature control set point and no higher than 860ºF (460ºC). If the zinc temperature exceeds 860ºF all the burners are switched off and will not re-light automatically until the alarm is manually re-set.

The low temperature alarm sounds the audible alarm and activates the flashing beacon, but does not switch burners off. It is normally set at 18ºF (10ºC) below the zinc temperature control set-point.

The low-low temperature alarm switches the burners to low fire, sounds the audible alarm and activates the flashing beacon. The alarm is normally set at 788ºF (420ºC) and prevents the burners switching to high fire if the zinc solidifies or the thermocouples are removed from the kettle.

The high temperature and low temperature alarms are configured on the temperature controller. The low temperature alarm is configured on the chart recorder and the master high temperature alarm is either configured on the chart recorder or a separate instrument, depending upon local regulations.

The dual high temperature alarms are configured on 2 instruments and connected to separate thermocouples in separate sheaths, ensuring complete safety for the kettle.

Furnace Structure

The furnace structure is fabricated from plate and tube in the form of a free standing ‘tank’.

The structure is braced by the steel tubes arranged as ‘U’ frames which allows cooling air to pass under the furnace, preventing heat transfer into the client’s concrete pit.

The internal base is insulated using insulation bricks and low thermal mass ceramic materials. The kettle sits on two layers of bricks in the base.

The internal walls of the furnace are insulated with a proprietary ceramic fiber convoluted module system held in place with special threaded stainless steel anchor rods. The internal walls of the furnace are painted with corrosion resistant paint prior to insulating and 2 vapor barriers are also installed to prevent products of combustion reaching the furnace walls and condensing causing corrosion.

The cavity between the kettle and furnace insulation is bridged using rigid stainless steel plates and insulated with ceramic fiber. Top plates are fitted over the insulation between the kettle and the furnace providing a flat surface without potential zinc traps. The top plates are fully welded, after melt-out, by the client prior to commencing production.

To prevent heat being transferred into the dross layer, on the bottom of the kettle, a proprietary and exclusive ceramic fiber product insulates the lower part of the kettle wall, reducing heat transfer and preventing over-heating.

A ledge plate is fitted along the long sides of the furnace, closing the gaps between the vertical tubes, preventing zinc and dirt entering the pit, after the floor plates are fitted. A small bar is welded under the ledge plate, to support the client's floor plates without forming a step that may hold dirt and zinc spillage.

The outside of the furnace structure is painted with a high temperature chemical resistant paint.

Substantial burner guards are provided to protect the combustion system from mechanical damage and zinc splash. They are fully welded by the client following installation.

Four removable lifting lugs are fitted to the furnace to ensure safe lifting of the furnace without damaging the structure.

Flame viewing ports are mounted adjacent to the burners providing a clear safe view of the flame profile through a glass-viewing window.

An exhaust port is provided, for exhaust gasses to leave the furnace, on either a side or end of the furnace.

Optional run-out ports can be fitted to allow molten zinc to escape from the furnace in the event of a kettle leak.

Electrical Control Cabinet

The control cabinet will be separate floor mounted enclosure with gray paint finish. A Plexiglas security door will be fitted to the cabinet door offering protection from dust, mechanical damage and unauthorized access while allowing clear view of the zinc temperature displays and lamps.

Individual flame monitoring units will be mounted inside the cabinet along with all motor starter circuit breakers, relays and timers etc. All components will be wired, labeled and numbered to assist in fault finding.

The following items will be mounted on the door of the control cabinet:

- A 3-term P.I.D. zinc temperature controller giving display of actual temperature and set point. The instrument will be configured with temperature alarms as described in 'Temperature Safeguards'.

- A single-pen fan-fold chart recorder with digital display of the zinc temperature and configured with temperature alarms as described in 'Temperature Safeguards'.

- Individual burner on/off switches enabling individual burners to be switched off for maintenance without interfering with production.

- Combustion air fan on/off switch allowing air pressure switches to be tested without the fan running and clean the filter without loosing the temperature displays.

- System auto/manual switch and air valve open and close push buttons, allowing the gas and air flows to be set without adjustment to the temperature controller. This feature also allows the air valve and thus burner output to be controlled manually in the event of a temperature control fault. All temperature alarms remain active during manual control.

- Air pressure gauge which indicates the combustion air pressure downstream of the motorized air valve. This not only shows if the system is on high fire or low fire but also shows the condition of the air filter. A drop in pressure would indicate a dirty filter.

- Ammeter for the combustion air fan motor indicating the demand by the motor on start-up and running.

- Lamp test push button illuminates all lamps when pressed to locate failed neon lamps.

- Panel display giving a visual representation of the furnace, burners and primary controls. Each burner would have its own set of lamp displays for on, off, spark, pilot and failed.

- In addition to individual burner indication the panel has high, low and low-low temperature indication lamps; gas low and high lamps; air high, low and purge incorrect lamps and air prove lamp.

  All lamps have 'memories' which maintain the lamp even after the fault has been removed. A memory 'reset' push-button resets the lamps when pressed.

Burner Terminal Box

A terminal box will be mounted at each end of the furnace (with multiple burners) and will house the burner ignition, transformers and terminal rail.

Leak Detection

Electrodes are fitted into the furnace run-out ports. In the event of a run-out the molten zinc forms a bridge between the electrodes and sounds an alarm.

Special Features (Optional)

Kettle Support Frame ('U' Frame)

The kettle support frame is designed to resist the hydrostatic load imposed on the kettle by the molten zinc. It is fabricated from a substantial steel beam that passes under the furnace, from side to side. A vertical steel column is welded on each end of the beam, which coincides with the props passing through the furnace structure. The end of the prop pushes on the inside face of the vertical column. The assembly offers independent support of the kettle without transferring loads to the client's floor, cellar wall or steelwork.

Auto Start-Up

The auto start-up function allows the kettle temperature to be raised at a pre-determined, controlled rate, up to the operating temperature. The heat-up schedule can be performed with an empty kettle or a kettle full of solid zinc. The process is engaged by a key-switch which by-passes the low temperature alarms and prevents accidentally switching to start-up.

Motorized Exhaust Damper - Pressure Control

The exhaust pressure control is a motorized butterfly damper electrically linked to the system motorized combustion air valve. The action of the valves are

matched which means that the exhaust pressure can be set and maintained preventing a negative pressure developing in the exhaust during low-fire intervals and reducing the furnace efficiency. A pressure switch is fitted in the exhaust that sounds an alarm if a negative pressure develops in the furnace.

Included are the following items only:

- 1 Fabricated steel furnace self contained and fully insulated.
- 1 High velocity natural gas burner. (option for two)
- 1 Air/gas pipework train **per burner.**
- 1 Gas service governor.
- 1 Main air manifold.
- 1 Main gas manifold.
- 1 Combustion air fan with filter.
- 2 Main solenoid valves **per burner**.
- 1 Gas limiting orifice valve **per burner**.
- 1 Gas/air ratio regulator **per burner**.
- 1 Gas orifice meter **per burner**.
- 1 Air orifice meter **per burner**.
- 1 Adjustable orifice air hand valve **per burner**.
- 1 Motorized butterfly valve.

- 1 Main Control Panel.
- 2 Thermocouples.
- 1 Set cabling interconnections.
- 3 Air pressure switches.
- 2 Gas pressure switches.
- 1 Burner guard per burner end.
- 2 Stainless Steel Props (1 per side)
- 1 Integral U-frame support
- 2 Main solenoid valve.
- 1 Gas inlet strainer.
- 1 Supervising engineer to oversee start-up.

Not included are the following:

(This list is for guidance only and may not be complete.)

- Transportation to site.
- Any civil construction work.
- On site cranage.
- Gas supply to our main isolating valve.
- Electricity to our main control panel and bonding the furnace structure to the main factory steelwork.
- Floor plate surround.
- Galvanizing kettle (See separate quotation)
- Labor for general mechanical and electrical hook-ups
- Exhaust flue and duct (We can supply the unit or the drawings)
- Pit Ventilation Fan and duct
- Chimney (We can supply the unit or the drawings)

- Final welding of top plates after meltout

Attachment C

Form 11, Form 5EP and
Technical Brochure for 0.48 MMBtu/hr Boiler

MARYLAND DEPARTMENT OF THE ENVIRONMENT
Air and Radiation Administration ● Air Quality Permits Program
1800 Washington Boulevard ● Baltimore, Maryland 21230
(410) 537-3230 ● 1-800-633-6101● www.mde.maryland.gov

FORM 11
APPLICATION FOR
FUEL BURNING EQUIPMENT

☑ Permit to Construct ☐ Registration Update ☐ Initial Registration

1. Owner Information

Owner Name: Galvco of Maryland, DBA Baltimore Galvanizing Company
Owner Street Address: 7110 Quad Avenue, Baltimore
City/State/Zip Code: Maryland 21237

2. Location of Equipment/Process

☐ Check if different from above. If checked, complete the following:
Premises Name: _____
Premises Street Address: _____
City/State/Zip Code: _____

3. Contact Information

Contact Name: Alfred M. Yates (ARM Group LLC)
Job Title: Senior Engineer
Phone Number: 610585-9808
Email Address: ayates@armgroup.net

4. Workers' Compensation Coverage Information

Before a Permit to Construct may be issued by the Department, the applicant must provide the Department with proof of worker's compensation coverage as required under Section 1-202 of the Workers' Compensation Act.

Company Name: _____
Binder/Policy Number: _____ Expiration Date: _____

5. Person Installing Fuel Burning Equipment (if different from 1 above)

Installer Name and Title: _____
Installer Company Name: _____
Installer Street Address: _____
City/State/Zip Code: _____
Phone Number: _____

6. Description of Major Activity, Product, or Service of Company at this Location (include applicable SIC code)

Second galvanizing spin line capable of to 1,000 pounds/hour of small parts (SIC Code 3479).

7. Fuel Burning Equipment Type

☑
☐ New Equipment
☐ Modification to Existing Equipment
☐ Existing Equipment

8. Projected Construction/Existing Operation Dates

Projected Construction Start Date: 10/2025
Projected Construction End Date: **~~12/2025~~**
Projected Operating Date of New/Modified Equipment: 12/2025
Existing Equipment Initial Operating Date: _____

9. Description of the Fuel Burning Equipment (include make, model, manufacturer, as applicable)

Installation of Rite Boiler Model No. 48W (0.48 MMBtu/hr) to heat flux and caustic tanks

10. Supplemental Fuel Burning Equipment Information

Number of Pieces of Identical Equipment Units to be Registered/Permitted at this Time: 1

Maximum Rated Heat Input: 0.48 million Btu per hour

Number of Stack/Emission Points Associated with the Equipment/Process: 1
Note: Complete a Form 5EP for each stack/emission point.

11. Control Devices Associated with this Fuel Burning Equipment

Note: Complete a Form 6 for each control device

☑ None
☐ Dust Suppression
☐ Oxidizer
☐ Baghouse/Fabric Filter
☐ Venturi Scrubber
☐ Nitrogen Oxides Reduction
☐ Cyclone
☐ Electrostatic Precipitator
☐ Adsorption System
☐ Spray Tower/Packed Bed
☐ Other, specify: _____

12. Fuel Consumption for this Fuel Burning Equipment

☑ Natural Gas	4,200	1000 cubic feet/year	☐ Coal (attach fuel specifications)	____	tons/year
☐ Propane/LP Gas	____	100 gallons/year	☐ Wood (attach fuel specifications)	____	tons/year
☐ Distillate Fuel Oil	____	1000 gallons/year	☐ Other (describe): ____	____	____ (specify units)
☐ Residual Fuel Oil	____	1000 gallons/year			

13. Fuel Burner Type

☐ Low NOx Burner

☐ Oil Burner (identify type below)
- ☐ Pressure Gun
- ☐ Air Atomizer
- ☐ Steam Atomizer
- ☐ Rotary Cup

☐ Coal Burner (identify type below)
- ☐ Cyclone
- ☐ Stoker
- ☐ Pulverized
- ☐ Hand Fired

☐ Other Burner Type, specify: ____

14. Operating Schedule for this Fuel Burning Equipment

☐ Comfort/Space Heat Only
☑ Process Heat Only
☐ Comfort/Space Heat or Process Heat
____ % process heat

24 operating hours/day
7 operating days/week
365 operating days/year

Seasonal Variation? ☐ Yes ☑ No
If yes, complete the following:

____ Winter Percent ____ Spring Percent
____ Summer Percent ____ Fall Percent
Total Seasons = 100% operating time

15. Total Stack Emissions for this Equipment/Process

Nitrogen Oxides	2.0 lbs/operating day	Particulate Matter (PM-10)	0.09 lbs/operating day
Carbon Monoxide	0.3 lbs/operating day	Particulate Matter (PM-2.5)	0.09 lbs/operating day
Sulfur Oxides	.007 lbs/operating day	Greenhouse Gases (CO_{2e})	435C lbs/operating day
Volatile Organic Compounds	0.06 lbs/operating day		

16. Required Documents

☒ Air Quality Permit to Construct Application Checklist - Include all required items on the checklist with the Form 11 application

☐ Does this application include confidential information? If yes, submit one confidential copy of the application and one copy with all confidential information removed.

17. Responsible Party Certification Statement

"I CERTIFY UNDER PENALTY OF LAW THAT THE INFORMATION SUBMITTED IN THIS REQUEST FOR COVERAGE IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS."

Responsible Party Signature: Dw Klahr Date: 10-15-25

Printed Name and Title: David Klahr, Plant Manager

For ARA Use Only

Date Received:	
Date Reviewed:	
Reviewed By:	
ARA Premises Number:	
Associated ARA Registration Number or Numbers:	

MARYLAND DEPARTMENT OF THE ENVIRONMENT
Air and Radiation Management Administration ● Air Quality Permits Program
1800 Washington Boulevard ● Baltimore, Maryland 21230
(410)537-3225 ● 1-800-633-6101● www.mde.maryland.gov

FORM 5EP: Emission Point Data

Complete one (1) Form 5EP for EACH emission point (stack or fugitive emissions) related to the proposed installation.

Applicant Name: Baltimore Galvanizing Company

1. Emission Point Identification Name/Number

List the applicant assigned name/number for this emission point and use this value on the attached required plot plan:
Boiler 002

2. Emission Point Description

Describe the emission point including all associated equipment and control devices:
Emission point for small boiler used to heat flux and caustic tanks. No control devices are proposed.

3. Emissions Schedule for the Emission Point

Continuous or Intermittent (C/I)?	C	**Seasonal Variation** Check box if none: ☒ Otherwise estimate seasonal variation:	
Minutes per hour:	60	Winter Percent	
Hours per day:	24	Spring Percent	
Days per week:	7	Summer Percent	
Weeks per year:	52.1	Fall Percent	

4. Emission Point Information

Height above ground (ft):	5	Length and width dimensions at top of rectangular stack (ft):	Length: N/A	Width:	
Height above structures (ft):	0				
Exit temperature (ºF):	varies	Inside diameter at top of round stack (ft):		1.0	
Exit velocity (ft/min):	1	Distance from emission point to nearest property line (ft):			
Exhaust gas volumetric flow rate (acfm):	Ambient	Building dimensions if emission point is located on building (ft)	Height 13	Length 70	Width 40

5. Control Devices Associated with the Emission Point

Identify each control device associated with the emission point and indicate the number of devices. ***A Form 6 is also required for each control device***. If none check none:

☒ None

☐ Baghouse No. _____

☐ Cyclone No. _____

☐ Elec. Precipitator (ESP) No. _____

☐ Dust Suppression System No. _____

☐ Venturi Scrubber No. _____

☐ Spray Tower/Packed Bed No. _____

☐ Carbon Adsorber No. _____

- ☐ Cartridge/Canister
- ☐ Regenerative

☐ Thermal Oxidizer No. _____

- ☐ Regenerative

☐ Catalytic Oxidizer No. _____

☐ Nitrogen Oxides Reduction No. _____

- ☐ Selective ☐ Non-Selective
- ☐ Catalytic ☐ Non-Catalytic

☐ Other No. _____
Specify:

FORM 5EP: Emission Point Data

6. Estimated Emissions from the Emission Point

Criteria Pollutants	At Design Capacity (lb/hr)	At Projected Operations		
		(lb/hr)	(lb/day)	(ton/yr)
Particulate Matter (filterable as PM10)	0.004	0.004	0.09	0.02
Particulate Matter (filterable as PM2.5)	0.004	0.004	0.09	0.02
Particulate Matter (condensables)	0.004	0.004	0.09	0.02
Volatile Organic Compounds (VOC)	0.003	0.003	0.06	0.01
Oxides of Sulfur (SOx)	0.0003	0.0003	0.007	0.001
Oxides of Nitrogen (NOx)	0.08	0.08	2.0	0.4
Carbon Monoxide (CO)	0.01	0.01	0.3	0.05
Lead (Pb)	0	0	0	0
Greenhouse Gases (GHG)	**At Design Capacity (lb/hr)**	**At Projected Operations**		
		(lb/hr)	**(lb/day)**	**(ton/yr)**
Carbon Dioxide (CO_2)	59	59	1,415	258
Methane (CH_4)	0.01	0.001	0.03	0.005
Nitrous Oxide (N_2O)	0.0001	0.0001	0.003	0.0005
Hydrofluorocarbons (HFCs)	N/A	N/A	N/A	N/A
Perfluorocarbons (PFCs)	N/A	N/A	N/A	N/A
Sulfur Hexafluoride (SF6)	N/A	N/A	N/A	N/A
Total GHG (as CO_2e)	184	184	4,400	807
List individual federal Hazardous Air Pollutants (HAP) below:	**At Design Capacity (lb/hr)**	**At Projected Operations**		
		(lb/hr)	**(lb/day)**	**(ton/yr)**

(Attach additional sheets as necessary.)

GALVCO MARYLAND LLC - #005-00302
Proposed Small Boiler Used to Heat Caustic and Flux Tanks
Potential to Emit (POT) and Actual Emissions (AE) Calculations

Calculation Inputs:

Fugitive Emissions Rate (see below calculations)

Annual Fuel Consumption	=	480,000	BTU/hr
		0	
	=	11,520	scf/day
	=	4,204,800	scf/yr

Total Work Days

Metal Galvanizing	=	(6 d/wk) x (52 wk/yr)	
	=	312	working d/yr

PM10 Emissions = 7.6 lb/MMscf of natural gas used per AP-42

Boiler/furnace operation	=	(7 d/wk) x (52 wk/yr)	
	=	365	working d/yr

Potential to Emit and Actual Emissions Calculations for Small Boiler heating the proposed caustic and flux tanks:

PM_{10}:

Potential to Emit

Natural Gas Combustion

4,204,800	scf/yr	x	7.6	lb/MMscf	=	31.96 lb/yr
32	lb/yr	x	(1 yr/365 d)		=	0.088 lb/day
32	lb/yr	x	(1 T/2000 lb)		=	0.01598 T/yr

VOCs:

Annual

4,204,800	scf/yr	x	5.5	lb/MMscf	=	23.1 lb/yr
23.1	lb/yr	x	(1 yr/365 d)		=	0.063 lb/day
23.1	lb/yr	x	(1 T/2000 lb)		=	**0.012 T/yr**

SO_2:

Annual

4,204,800	scf/yr	x	0.6	lb/MMscf	=	2.5 lb/yr
2.5	lb/yr	x	(1 yr/365 d)		=	0.0069 lb/day
2.5	lb/yr	x	(1 T/2000 lb)		=	**0.0013 T/yr**

NO_x:

Annual

4,204,800	scf/yr	x	170	lb/MMscf	=	714.8 lb/yr
714.8	lb/yr	x	(1 yr/365d)		=	1.96 lb/day
714.8	lb/yr	x	(1 T/2000 lb)		=	**0.36 T/yr**

CO:

Annual

4,204,800	scf/yr	x	24	lb/MMscf	=	100.9 lb/yr
100.9	lb/yr	x	(1 yr/365 d)		=	0.276 lb/day
100.9	lb/yr	x	(1 T/2000 lb)		=	**0.05 T/yr**

GALVCO MARYLAND LLC - #005-00302
Permit to Construct - Second Galvanizing Unit
Potential to Emit (POT) and Actual Emissions (AE) Calculations

Emissions Factors for Greenhouse Gases from Natural Gas Combustion

Constituent	Emission Factor (lb/MMscf)
CO_2	122,847
N_20	0.23
CH_4	2.32

Fuel Consumption (Natural Gas)

4,204,800 scf

1 year = 365 days

CO_2

4,204,800	scf	x	122,847	lb/MMscf	=	516,548	lb/yr
516,548	lb/yr	x	1	yr/366 d	=	1,415	lb/d
1,415	lb/d	x	1	d/24 hrs	=	59	lb/hr
516,548	lb/yr	x	1	T/2000 lbs	=	258	T/yr

N_2O

4,204,800	scf	x	0.2	lb/MMscf	=	0.97	lb/yr
0.97	lb/yr	x	1	yr/366 d	=	0.0027	lb/d
0.0027	lb/d	x	1	d/24 hrs	=	0.0001	lb/hr
0.97	lb/yr	x	1	T/2000 lbs	=	0.000486758	T/yr

CH_4

4,204,800	scf	x	2.3	lb/MMscf	=	9.74	lb/yr
9.74	lb/yr	x	1	yr/366 d	=	0.0267	lb/d
0.0267	lb/d	x	1	d/24 hrs	=	0.0011	lb/hr
9.74	lb/yr	x	1	T/2000 lbs	=	0.0049	T/yr

125 PSI Hot Water Boilers
Atmospheric / Natural Gas Fired

PRODUCT DESCRIPTION

Rite Atmospheric Natural Gas Fired Watertube Boilers are found at the heart of better engineered closed-loop heating systems all over North America. From conventional space heating systems to heat pumps to industrial process loads, Rite offers 47 basic models, ranging from 480 to 12,499 MBH Input (11 – 300 Boiler Horsepower). These heavy duty, long lasting boilers have been providing heat to schools, churches, commercial buildings, metal finishers and silicone chip makers (to name a few) – **Safely and reliably for nearly fifty years.**

So simple to maintain and operate, Rite Boilers feature **complete waterside access** so that virtually all scale and mud deposits can be seen and mechanically cleaned during a single scheduled maintenance shutdown. The result – **Better fuel efficiency and lower operating cost over the life of your boiler investment**. Consider a few of our other standard features: Floating heads that eliminate pressure vessel cracks and broken welds caused by thermal stress cycling (backed by **Rite's 25 year Thermal Shock Warranty**), Single Stacks on models to 7,500,000 BTUH input, Top supply and return water connections, Rugged Heat Exchangers with minimal pressure drop at normal flow rates can also handle the boiler firing under no flow conditions, Rite's bolted/gasketed headplates that eliminate any possibility of hydraulic explosion in the event that safety devices fail – and you have a better boiler by design.

RITE ATMOSPHERIC BURNER FEATURES

Rite Atmospheric Boilers are an excellent choice when: Low NOx emissions are not required, natural gas will be the only fuel used, the installation is indoors (See our line of weatherproof models for outdoor applications), and when lower combustion efficiencies at less than full firing rate are acceptable.

Atmospheric burners are far less expensive than power burners, so when the above criteria is met, then Atmospherics are a strong economical alternative to Rite's outstanding line of power burner fired water boilers. Other factors favoring Atmospherics are: Extremely low electrical power consumption (no energy hogging fan motors), Rapid start-up on demand (No pre-purge blower fan), Lighter weight, Lower height, and Whisper-quiet burner operation.

RITE ENGINEERING & MFG. CORP. COMMERCE, CALIFORNIA 90040 PHONE (562) 862-2135 FAX (562) 861-9821
www.riteboiler.com
Rev. 2/2014

125 PSI Water Heating Boilers / Atmospheric Models & Ratings / Natural Gas Fired

STACK / DRAFT REQUIREMENTS

- UL listed for use with Type B Vent.
- Minimum stack height including Draft Control is 10 feet.
- The stack should be supported independently of the boiler and an adjustable length section of stack should be installed after the draft control to allow for future separation. All Rite Boilers have internal stack supports to handle the weight of the stack during installation.
- Boilers with barometric damper draft control should draft between -.05" to -.09" W.C. when firing. Boilers with draft diverters will draft between -.02" to -.04" W.C.
- A draft gauge is installed on all boilers equipped with barometric dampers to help set and maintain the draft.

AIR REQUIREMENTS

Adequate Combustion/Ventilation Air is vital for safe, efficient operation. Refer to the latest edition of the Uniform Mechanical Code or consult your local Building and Safety Department for specific requirements.

Warning: Do not install in a room that will develop negative pressure without utilizing a properly sized induced draft fan.

ELECTRICAL REQUIREMENTS

- A Single Point 120/60/1 8 amp supply to the electrical panel.

NATURAL GAS SUPPLY REQUIREMENTS

(STATIC AND AT FLOW)

- Models 48 W * - 76 W * 6" w.c. min. to 14" w.c. max.
- Models 85 W * - 400 W * 7" w.c. min. to 14" w.c. max.
- Models 425 W * - 750 W * 15" w.c. min. to 28" w.c. max.
- Models 840 W * - 1250 W * 20" w.c. min. to 28" w.c. max.
- For other gas pressures, consult factory or your Rite Representative.

*Propane Supply Requirements: 11" w.c. min. to 14" w.c.

WATER TEMPERATURES & PRESSURE DROPS

- Minimum return water temperature is 135° F (after start-up). Lower temperature return factory options available.
- Maximum practical supply water temperature is 235° F. Higher temperature/pressure Rite Boilers available.
- Pressure drop for all models is less than 3 feet of total head.

ELEVATION DERATION

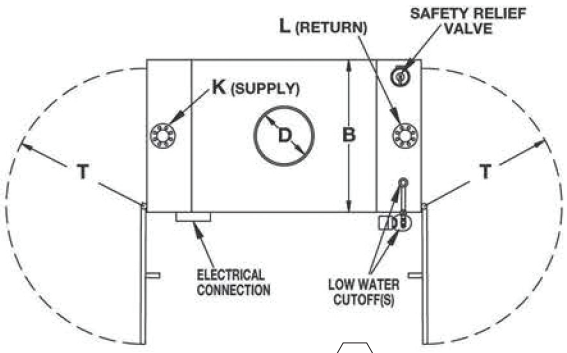
Ratings given below are for elevations up to 2000 feet. Above 2000 feet, ratings should be reduced at the rate of 4% for every 1000 feet above sea level.

B.T.U. FORMULA

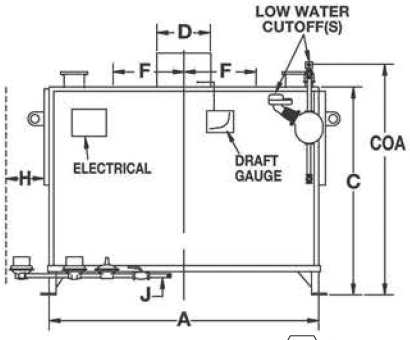
- BTU Output @ 0-2000' elevation = 60 x 8.3 x T x G.P.M.

BOILER MODEL	Input MBH	Nominal Output		E.D.R.	Heating Surface Sq. Ft.	Water Content Gallons	G.P.M. 20° F Rise	G.P.H. 100° F Rise	Nominal Shipping Weight (lbs)
		MBH	Boiler Horsepower						
48 W	480	384	11	2400	49	21	38	465	1080
55 W	550	440	13	2750	56	23	44	535	1285
63 W	630	506	15	3162	63	24	51	615	1390
76 W	760	608	18	3800	75	27	61	740	1530
A90 W	900	720	21	4500	89	31	72	875	1700
85 W	850	680	20	4250	88	40	69	830	1735
90 W	900	720	21	4500	88	40	72	875	1735
105 W	1050	840	25	5250	101	43	84	1015	1865
120 W	1200	960	28	6000	115	47	97	1165	2000
135 W	1350	1080	32	6750	131	50	110	1315	2140
150 W	1500	1200	35	7500	145	54	120	1460	2265
165 W	1650	1320	39	8250	159	57	135	1600	2400
180 W	1800	1440	43	9000	174	61	145	1750	2510
200 W	2000	1600	47	10000	192	66	160	1950	2700
A150 W	1500	1200	35	7500	160	71	120	1460	2430
A165 W	1650	1320	39	8250	168	75	135	1600	2550
A180 W	1800	1440	43	9000	190	79	145	1750	2735
A200 W	2000	1600	47	10000	205	83	160	1950	2960
225 W	2250	1800	53	11250	230	89	180	2190	3160
250 W	2500	2000	59	12500	252	94	200	2430	3365
275 W	2750	2200	65	13750	273	100	220	2670	3590
300 W	3000	2400	71	15000	295	105	240	2920	3815
325 W	3250	2600	77	16250	318	111	265	3160	4040
350 W	3500	2800	83	17500	340	116	285	3400	4265
375 W	3750	3000	89	18750	362	122	305	3650	4490
400 W	4000	3200	95	20000	383	127	325	3900	4715
425 W	4250	3400	101	21250	405	133	345	4140	4940
450 W	4500	3600	107	22500	428	139	365	4380	5160
475 W	4750	3800	113	23750	450	145	385	4630	5385
500 W	5000	4000	119	25000	473	151	405	4870	5610
550 W	5500	4400	131	27500	526	190	445	5370	6120
600 W	6000	4800	143	30000	574	213	485	5850	6630
A650 W	6500	5200	155	32500	622	240	520	6250	7040
A700 W	7000	5600	167	35000	670	255	560	6720	7550
A750 W	7500	6000	180	37500	722	270	600	7200	8060
A400 W	4000	3200	95	20000	390	160	325	3900	4900
A450 W	4500	3600	107	22500	440	180	365	4380	5360
A500 W	5000	4000	119	25000	486	195	405	4870	5815
A550 W	5500	4400	131	27500	535	215	445	5370	6275
A600 W	6000	4800	143	30000	584	235	485	5850	6760
650 W	6500	5200	155	32500	632	250	520	6250	7245
700 W	7000	5600	167	35000	680	275	560	6720	7750
750 W	7500	6000	180	37500	730	290	600	7200	8240
840 W	8400	6700	200	41875	800	320	650	7800	8670
940 W	9400	7500	225	46875	900	345	770	9270	9280
1050 W	10500	8400	250	52500	1000	370	810	9740	9945
1150 W	11500	9200	275	57500	1100	395	925	11000	10500
1250 W	12499	9999	300	62494	1200	420	1005	12100	11220

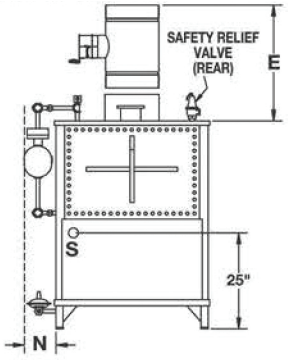
125 PSI Water Heating Boilers / Atmospheric Models & Dimensions / Natural Gas Fired



TOP VIEW 4



RIGHT SIDE VIEW 4



REAR VIEW 4

- **DIMENSIONS ARE IN INCHES - SUBJECT TO PRODUCTION TOLERANCES AND CHANGE WITHOUT NOTICE. CERTIFIED DIMENSIONS AVAILABLE UPON REQUEST.**
- **BOILERS APPROVED FOR INSTALLATION ON NON-COMBUSTIBLE FLOORS ONLY.**

1. Draft Diverters are supplied standard on Models 48W-120W only. Barometric Dampers will be shipped one size smaller than **D** dimension for stacks up to 25 feet of vertical height (as shown below in column **E**), full size (same as **D** dimension) for stacks 25 to 50 feet tall and one size larger for stacks over 50 feet tall. Barometic Damper Tee by others.
2. May vary - sizes shown are for UL gas trains at standard supply pressures. Gas connections are male NPT pipe thread. All other threaded connections are female NPT except where noted.
3. Flanges are ANSI 150 lb SA-105 flat face.
4. Standard right hand construction shown illustrated above. Left hand construction available at no extra charge.

BOILER MODEL	A	B	C	COA	D	E ①	F	H	J ②	K ③	L	N	S	T
	Length Jacket	Width Jacket	Height Flush	Height Overall	Stack Dia.	Draft Control (Space Req'd.)	Twin Stacks	Tube Maint.	Gas Conn.	Water Supply	Water Return	Side Space	Drain	Head Swing
48 W	40	26	48	57	9	9 D.D. (33)	-	40	3/4	2 MNPT	2 MNPT	10	1	20
55 W	45	26	48	57	10	10 D.D. (34)	-	45	1	2 MNPT	2 MNPT	10	1	20
63 W	50	26	48	57	10	10 D.D. (34)	-	50	1	2 MNPT	2 MNPT	10	1	20
76 W	58	26	48	57	12	12 D.D. (36)	-	58	1	2 MNPT	2 MNPT	10	1	20
A90 W	68	26	48	57	12	12 D.D. (36)	-	68	1	2 MNPT	2 MNPT	10	1	20
85 W	46	32	52	61	12	12 D.D. (36)	-	46	1	3 FL	3 FL	12	1 1/4	26
90 W	46	32	52	61	12	12 D.D. (36)	-	46	1	3 FL	3 FL	12	1 1/4	26
105 W	52	32	52	61	14	14 D.D. (38)	-	52	1	3 FL	3 FL	12	1 1/4	26
120 W	58	32	52	61	14	14 D.D. (38)	-	58	1 1/4	3 FL	3 FL	12	1 1/4	26
135 W	64	32	52	61	14	12 BARO	-	64	1 1/4	3 FL	3 FL	12	1 1/4	26
150 W	70	32	52	61	14	12 BARO	-	70	1 1/4	3 FL	3 FL	12	1 1/4	26
165 W	76	32	52	61	14	12 BARO	-	76	1 1/4	3 FL	3 FL	12	1 1/4	26
180 W	82	32	52	61	16	14 BARO	-	82	1 1/4	3 FL	3 FL	12	1 1/4	26
200 W	90	32	52	61	16	14 BARO	-	90	1 1/2	3 FL	3 FL	12	1 1/4	26
A150 W	55	42	57	66	14	12 BARO	-	55	1 1/4	4 FL	4 FL	14	1 1/2	34
A165 W	59	42	57	66	14	12 BARO	-	59	1 1/4	4 FL	4 FL	14	1 1/2	34
A180 W	65	42	57	66	16	14 BARO	-	65	1 1/2	4 FL	4 FL	14	1 1/2	34
A200 W	69	42	57	66	16	14 BARO	-	69	1 1/2	4 FL	4 FL	14	1 1/2	34
225 W	73	42	57	66	18	16 BARO	-	73	1 1/2	4 FL	4 FL	16	1 1/2	34
250 W	79	42	57	66	18	16 BARO	-	79	2	4 FL	4 FL	16	1 1/2	34
275 W	85	42	57	66	18	16 BARO	-	85	2	4 FL	4 FL	16	1 1/2	34
300 W	91	42	57	66	20	18 BARO	-	91	2	4 FL	4 FL	16	1 1/2	34
325 W	97	42	57	66	20	18 BARO	-	97	2	4 FL	4 FL	16	1 1/2	34
350 W	103	42	57	66	20	18 BARO	-	103	2	4 FL	4 FL	16	1 1/2	34
375 W	109	42	57	66	20	18 BARO	-	109	2	4 FL	4 FL	16	1 1/2	34
400 W	115	42	57	66	22	20 BARO	-	115	2	4 FL	4 FL	16	1 1/2	34
425 W	121	42	57	66	22	20 BARO	-	121	2	4 FL	4 FL	16	1 1/2	34
450 W	127	42	59	68	22	20 BARO	-	127	2	4 FL	4 FL	16	1 1/2	34
475 W	133	42	59	68	24	20 BARO	-	133	2	4 FL	4 FL	16	1 1/2	34
500 W	139	42	59	68	24	20 BARO	-	139	2	4 FL	4 FL	16	1 1/2	34
550 W	109	51	64	73	26	24 BARO	-	109	2 1/2	4 FL	4 FL	16	2	44
600 W	118	51	64	73	26	24 BARO	-	118	2 1/2	4 FL	4 FL	16	2	44
A650 W	129	51	64	73	28	24 BARO	-	129	2 1/2	5 FL	5 FL	16	2	44
A700 W	138	51	64	73	28	24 BARO	-	138	2 1/2	5 FL	5 FL	16	2	44
A750 W	147	51	64	73	30	28 BARO	-	147	2 1/2	5 FL	5 FL	16	2	44
A400 W	79	63	63	72	22	20 BARO	-	79	2	4 FL	4 FL	16	2	56
A450 W	87	63	63	72	22	20 BARO	-	87	2	4 FL	4 FL	16	2	56
A500 W	95	63	63	72	24	20 BARO	-	95	2	4 FL	4 FL	16	2	56
A550 W	102	63	63	72	26	24 BARO	-	102	2 1/2	4 FL	4 FL	16	2	56
A600 W	109	63	63	72	26	24 BARO	-	109	2 1/2	4 FL	4 FL	16	2	56
650 W	117	63	63	72	28	24 BARO	-	117	2 1/2	5 FL	5 FL	16	2	56
700 W	124	63	63	72	28	24 BARO	-	124	2 1/2	5 FL	5 FL	16	2	56
750 W	132	63	63	72	30	28 BARO	-	132	2 1/2	5 FL	5 FL	16	2	56
840 W	115	77	63	72	(2) 24	(2) 20 BARO	23	115	2 1/2	6 FL	6 FL	18	2	69
940 W	128	77	63	72	(2) 24	(2) 20 BARO	26	128	2 1/2	6 FL	6 FL	18	2	69
1050 W	140	77	63	72	(2) 26	(2) 24 BARO	29	140	2 1/2	6 FL	6 FL	18	2	69
1150 W	152	77	63	72	(2) 26	(2) 24 BARO	32	152	2 1/2	6 FL	6 FL	18	2	69
1250 W	164	77	63	72	(2) 26	(2) 24 BARO	35	164	2 1/2	6 FL	6 FL	18	2	69

Attachment D

Catalog Sheet for
Electric Centrifuge to Remove Molten Zinc

Western Technologies, Inc.

Portable Galvanizing Centrifuge Systems

The **Westech Portable Centrifuge** is simply a centrifuge machine that is portable, meaning that it can be moved if necessary. The portable centrifuge is mounted on a steel skid frame and can be lifted and carried with a forklift. The gross spinning capacity for the portable centrifuge is 100 kgs (220 lbs) total (combined load of bucket and parts). The Westech portable centrifuge is capable of running 30-40 buckets per hour and is operator controlled by means of a single, local pushbutton control station. Westech centrifuge systems use a variable frequency drive (VFD) coupled with a resistor as its braking system. This means that there are no discs or calipers for braking that will wear out. Westech centrifuge systems utilize high torque electric motors which are very effective for spinning excess molten zinc from small parts (0-700 RPM in approximately 5 seconds).

Please find a video of a portable centrifuge line at:
https://www.youtube.com/watch?v=deJZjX2V5JQ

The Centrifuge weight and dimensions when crated are:
2,290 x 1,370 x 1,780 (7'-6" x 4'-6" x 5'-10") Total Weight: 3,265 kgs (7,200 lbs)

Attachment E

Project Narrative

Baltimore Galvanizing Company (Galvco) Galvanizing Facility

Project Narrative for Permit-to-Construct Application

October 15, 2025

The Baltimore Galvanizing Company (Galvco) is a metal galvanizing company located at 7110 Quad Avenue in Baltimore, Maryland. Galvco has continuously operated a galvanizing facility at this location since approximately 1966. The Facility is located in the middle of an industrial area, which is bordered by railroad tracks, the Back River and Interstate 95. In addition, the galvanizing operations are located a minimum of a third of a mile from residences.

An existing galvanizing line is located in the main building of this property. A proposed second smaller line is being proposed in the rear building to galvanize small parts more efficiently. This proposed line will be similar to the existing line, but also contain a centrifuge to spin the parts and remove excess zinc while still molten.

This proposed galvanizing spin line will consist of the following equipment:

- Pretreatment tanks consisting of: one (1) caustic tank; one (1) caustic rinse tank; four (4) hydrochloric acid pickling tanks; one (1) flux tank; one (1) acid rinse tank; one (1) zinc galvanizing bath tank; and one (1) final rinse tank;
- Furnace (1.5 MMBtu/hour) and galvanizing kettle - parts will be dipped in the molten zinc contained in the kettle and heated by the furnace. The emissions from the zinc galvanizing tank will be vented from a ten feet tall stack;
- Small boiler (0.48 MMBtu/hour) - used to heat the caustic and flux tanks; and
- Electricity-powered centrifuge for spinning the galvanized parts to remove excess zinc while still molten.
- As part of this application, both the existing and proposed pickling tanks will be covered with lids and fume suppressants will be used to reduce pickling tank emissions below existing levels.

The proposed second galvanizing line can process up to 1,000 pounds of small parts per hour.

Existing Facility Air Emissions Summary

	Existing Galvanizing Line (tons/year)	Total (tons/year)
CO	0.1	**0.1**
NOx	0.6	**0.6**
SOx	0.002	**0.002**
PM10	0.1	**0.1**
VOC	0.02	**0.02**
Lead	0.000010	**0.000010**
HCl	0.230	**0.230**

Proposed New Facility Air Emissions

Pollutant		Galv 002	Acid 002	Boiler 002	Total
	Existing Galvanizing Line (tons/year)	Galvanizing Furnace and Tank (tons/year)	Pickling Tank (tons/year)	Small Boiler for Heating Flux and Caustic Tanks (tons/year)	(tons/year)
CO	0.1	0.2	0.0	0.05	**0.34**
NOx	0.6	1.1	0.0	0.4	**2.10**
SOx	0.002	0.004	0.0	0.001	**0.01**
PM10	0.1	0.3	0.0	0.02	**0.40**
VOC	0.02	0.04	0.0	0.01	**0.07**
Lead	0.000010	0.000019	0.0	0.00	**0.000029**
HCl *	0.014	0.0	0.003	0.00	**0.017**

Note *: Emissions from both existing and proposed pickling tanks will be reduced by placing lids on pickling tanks when not in use and the use of fume suppressants.

KATHERINE A. KLAUSMEIER
County Executive

C. PETE GUTWALD, AICP
Director, Department of Permits, Approvals and Inspections

February 25, 2026

ARM Group, LLC
4600 Lena Drive
Suite 201
Mechanicsburg, PA 17055
Attention: Jared Hockenberry

RE: 7110 Quad Avenue
Tax Acct. # 15-07-150250
13th Election District

To Whom It May Concern,

Your letter to the Director of Permits, Approvals and Inspections has been referred to me for reply. Based on the information contained in your letter and the BCZR (Baltimore County Zoning Regulations) the following has been determined.

The property known as 7110 Quad Avenue is currently zoned MH-IM (Manufacturing Heavy with an Industrial Major overlay). The property is located on the official Baltimore County Zoning Maps 096B1 (copy of map enclosed). Uses permitted in the MH-IM zone are as listed in Article 2, Section 256 of the Baltimore County Zoning Regulations. For a complete list of permitted uses please visit our website at www.baltimorecountymd.gov. There are no Zoning Cases pertaining to this property. This property was not developed as a PUD.

Per your letter, you are proposing to "install and operate a second smaller galvanizing line within an existing building." As you have correctly stated, "enameling, japanning, lacquering, galvanizing and plating" are permitted uses in the MH zone when located at least 300 feet from any residential zone or 200 feet from any business zone. I have verified that 7110 Quad Avenue meets those distance requirements. As such, no additional Zoning relief is required for your proposed project to add a second galvanizing line to your operation. You may file for any necessary building permit(s) when ready.

The Division of Code Inspections and Enforcement has indicated that there are no known current violation cases associated with the address referenced above.

The property improvements may be rebuilt to current density if they are damaged or destroyed, per sections 104 & 305 of the Baltimore County Zoning Regulations (BCZR).

Certificates of Occupancy are not available for structures built prior to March 1989, however, failure to possess the Certificate of Occupancy in no way constitutes a violation of Baltimore County's Zoning Regulations or County Codes. If available, certificates can be obtained through the Building Inspections Department, 410-887-3953.

Provided the property was developed and occupied in accordance with the Baltimore County approved development plan and all subsequent construction permit applications adhered to the approved development plan, then all current uses and structures meet the requirements of the BCZR and the present uses and structures on the property are in compliance with the applicable zoning regulations.

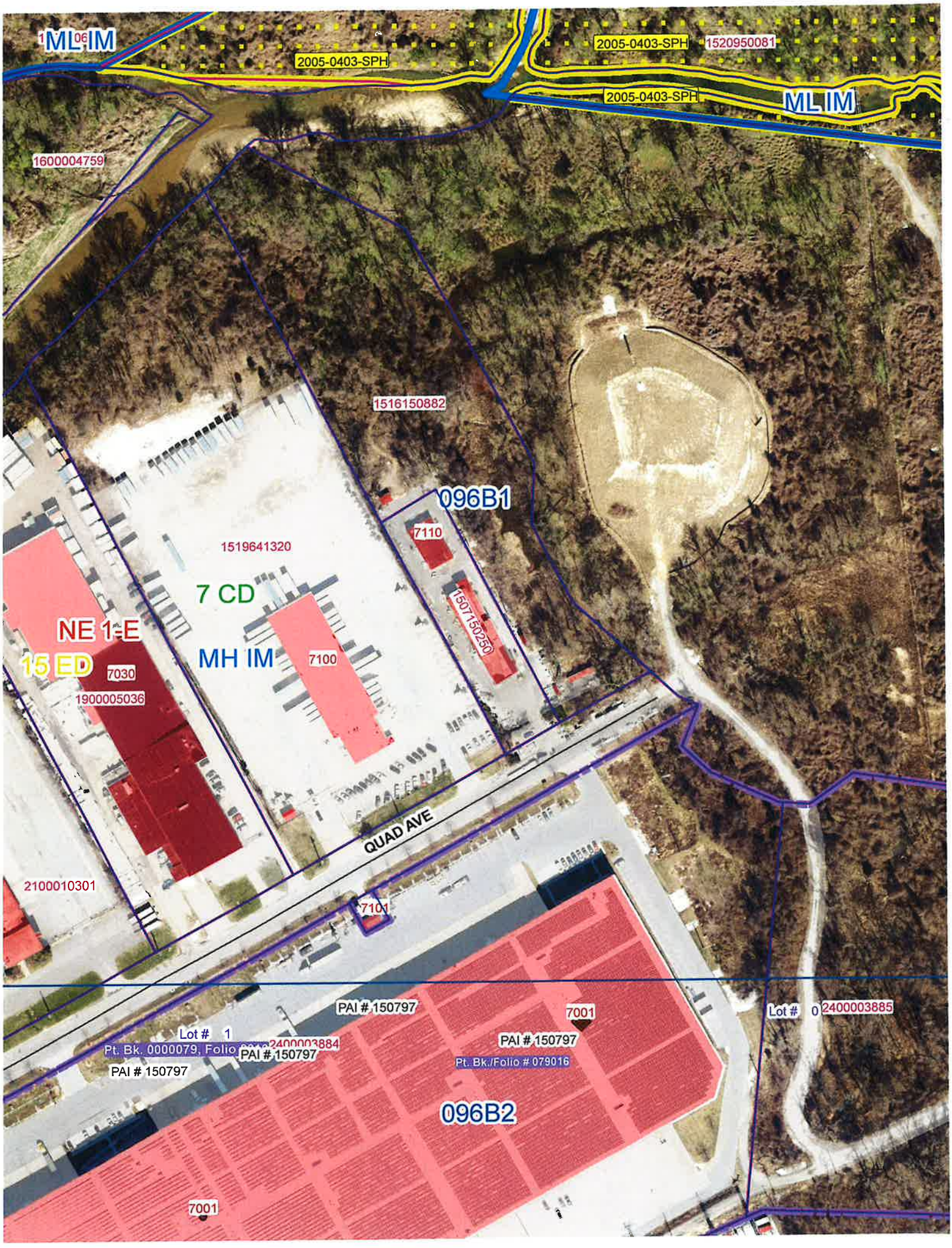
THE FOREGOING IS MERELY AN INFORMAL OPINION; IT IS NOT AN EXPERT OR LEGAL OPINION. IT IS NOT INTENDED TO BE RELIED ON AS EXPERT OR LEGAL ADVICE, AND IS NOT LEGALLY OR FACTUALLY BINDING ON BALTIMORE COUNTY OR ANY OF ITS OFFICIALS, AGENTS, OR EMPLOYEES. BALTIMORE COUNTY EXPRESSLY DISCLAIMS ANY AND ALL LIABILITY ARISING OUT OF, OR IN ANY WAY CONNECTED WITH THE INFORMATION PROVIDED IN THIS DOCUMENT, OR ANY INTERPRETATION THEREOF.

If you have any questions please do not hesitate to call me at 410-887-3391.

Sincerely,

Jason Seidelman
Zoning Review

JSS/26-0142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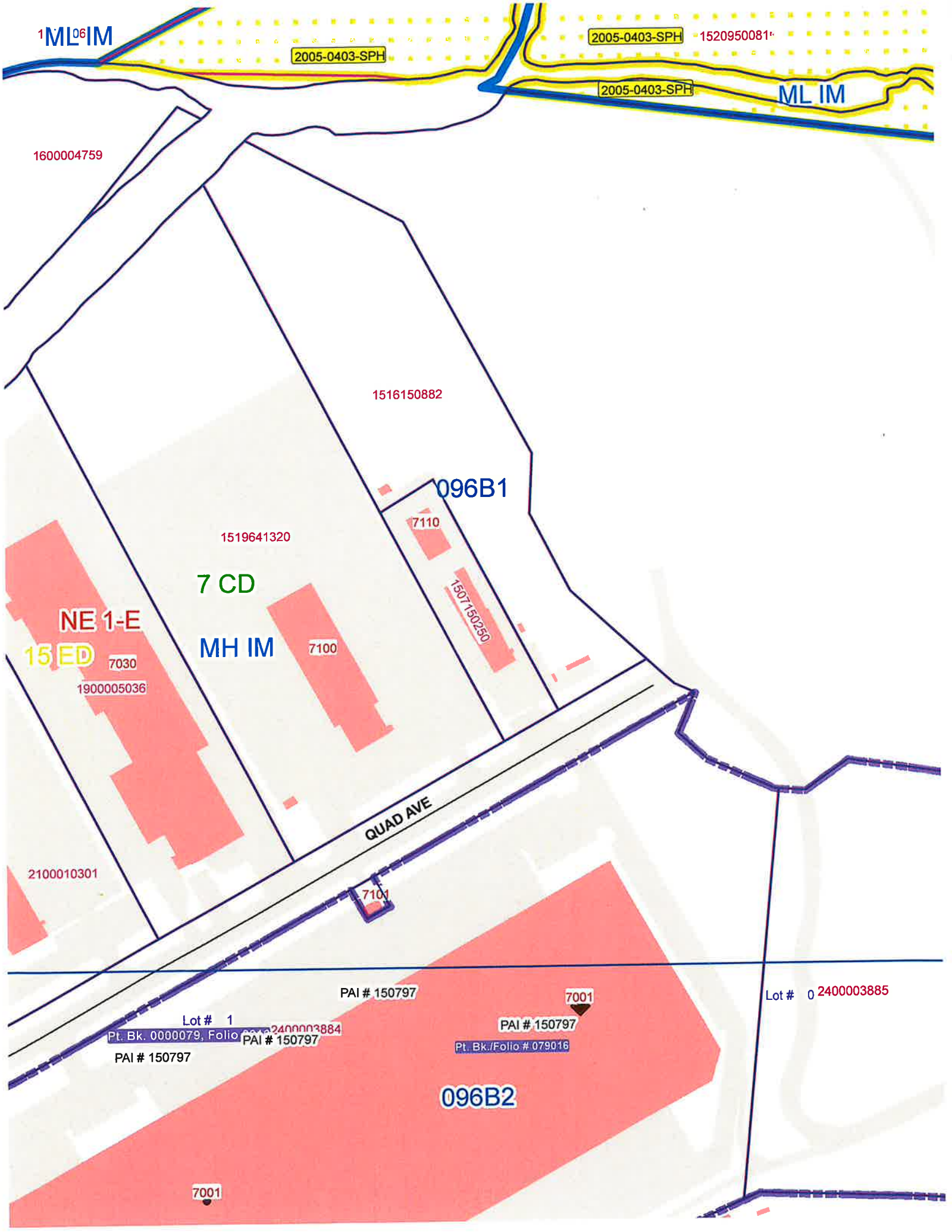
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PAI # 150797
PAI # 150797
Pt. Bk./Folio # 079016
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7001

26-0142 JS

ARM Group LLC

Engineers and Scientists

February 9, 2026

ATTENTION: Zoning Review Office
Department of Permits, Approvals and Inspections
Baltimore County Office Building
111 West Chesapeake Avenue, Room 124
Towson, Maryland 21204

Re: Request for Zoning Verification
Written – Type A
Baltimore Galvanizing Company
7110 Quad Avenue, Rosedale, MD 21237
Tax Account #: 1507150250
(Map 0096, Grid 0010, Parcel 0027)

To Whom It May Concern:

The Baltimore Galvanizing Company (Galvco) is a metal galvanizing company located at 7110 Quad Avenue in Rosedale, Maryland, 21237 (Tax Account #1507150250). The property has been continuously operating a galvanizing line since approximately 1966. Galvco wants to install and operate a second smaller galvanizing line within an existing building. The facility is in the middle of an industrial area, which is bordered by railroad tracks, the Back River and Interstate 95 (refer to attached figures and photos). The galvanizing operations are located a minimum of a third of a mile from residences.

Maryland Department of the Environment (MDE) is reviewing an air permit application for the proposed second galvanizing line and has requested that Galvo provide zoning verification. It is our understanding that the property is within the "Manufacturing, Heavy (M.H.)" zoning district and that "Enameling, japanning, lacquering, galvanizing and plating" are Permitted Uses when located at least 300 feet from any residence zone or 200 feet from any business zone. On behalf of Galvco, ARM Group is requesting written confirmation that the proposed galvanizing line is consistent with current zoning regulations to provide to MDE for the air permit.

If you have any questions or require additional information, please do not hesitate to contact the undersigned at 717-585-2954 or jhockenberry@armgroup.net. We appreciate your prompt assistance with this request.

Respectfully submitted,

ARM Group LLC

Digitally signed by Jared C. Hockenberry, P.E.
Date: 2026.02.09 12:47:16-05'00'

Jared C. Hockenberry, P.E.
Principal Engineer

Attachments: $200 Application Fee
Site Plan Documentation