

# Corrosion Control Metalizing Brief Overview

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**TMS METALIZING  
SYSTEMS, LTD.**

*"The Metalizing Source"*

# Presentation Content

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- Metalizing Overview
- Standards & Surface Preparation
- Application & Inspection

# Metalizing Overview

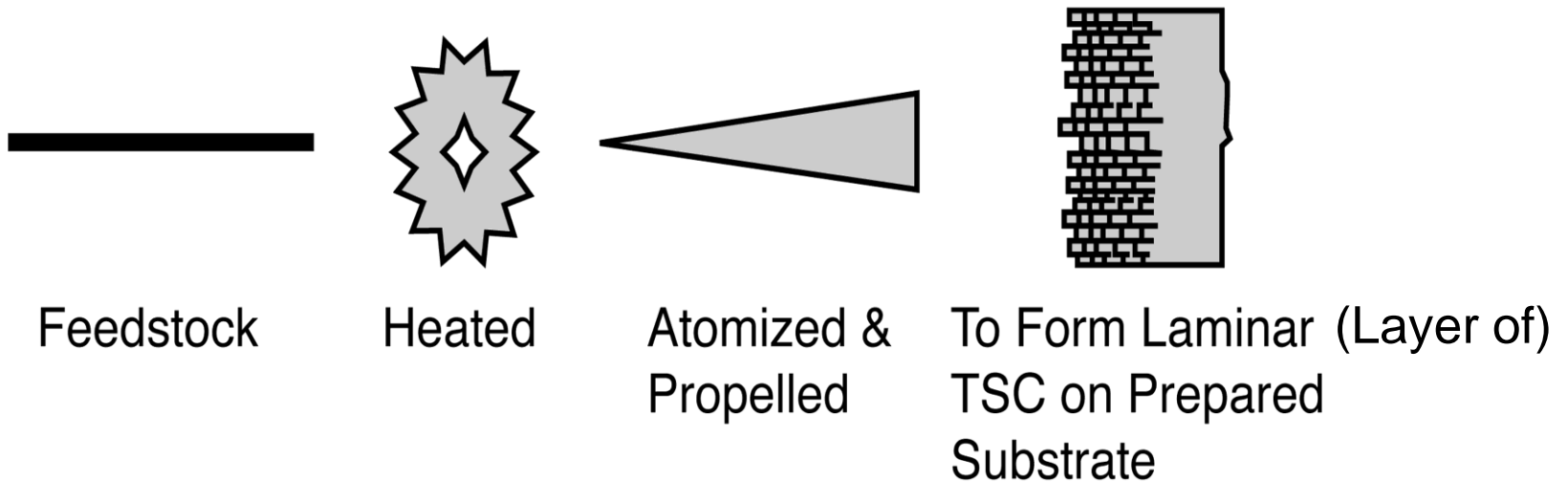
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# What is Metalizing?

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## Thermal Spraying



# Metalizing Materials

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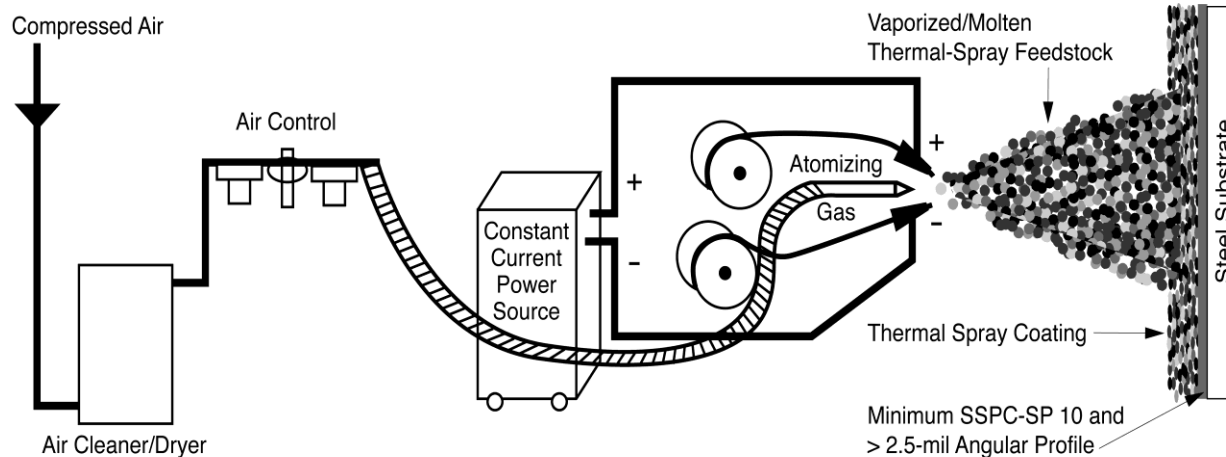
- Aluminum, zinc, and their alloys in the form of wire are heated to a plastic or molten state.

# How does metalizing protect steel?

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- Corrosion occurs quickly if materials are not corrosion resistant or covered by a protective coating. Metalized coatings are used for the corrosion protection of steel in rural, industrial, marine and immersion service.
- Aluminum, zinc, and their alloys provide both barrier and cathodic protection when applied in non-through porosity thickness.

# Typical Metalizing Installation



Typical Arc-Spray Installation

# Electric Arc Metalizing in Progress

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# Metalizing onto Clean Steel

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# Special Properties

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- Very good resistance to high temperatures, sunlight, and weathering.
- When cut through exposing the substrate steel, or when applied in a through porosity thickness, these metalized coatings will retard corrosion through cathodic protection.
- Good impact and abrasion resistance.

# Environmental Advantages

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- No volatile organic compounds (VOCs) to cause air pollution (100% solids).
- No hazardous air pollutants (HAPs).
- Limited overspray into surrounding areas.

# Safety Issues

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- Exposure to vapors, metal dust, and arc ultraviolet radiation.
- Electrical shock and fire and explosion hazards.
- Open Flame (Flame Spray)
- No toxic or flammable solvent fumes.

# Economic Advantages

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- Long-term protection (40+ years) of steel structures resulting in low life-cycle costs (costs per year).\*
- Reduced rework for original coating defects.
- Reduced maintenance over structure life.

# Service Life for Exposure

TABLE 2 Thermally sprayed metal coating selection guide for 20- to 40-year life

Environment	Coating	Thickness mils [ $\mu\text{m}$ ]	Sealer*
<b>Atmospheric</b>			
Rural	Zinc or zinc-aluminum	6-8 [150-200]	No
Industrial	Zinc or zinc-aluminum	12-15 [305-380]	Yes
Marine	Aluminum or zinc-aluminum	12-15 [305-380]	No
<b>Immersion</b>			
Freshwater	Zinc-aluminum	12-15 [305-380]	Yes
Brackish Water	Aluminum	12-15 [305-380]	No
Seawater	Aluminum	12-15 [305-380]	No
<b>Alternate Wet-Dry</b>			
Freshwater	Zinc-aluminum	10-12 [250-305]	Yes
Seawater	Aluminum	12-15 [305-380]	Yes
<b>Abrasion</b>	Zinc-aluminum	14-16 [355-405]	Yes
<b>Condensation</b>	Zinc or zinc-aluminum	10-12 [250-305]	Yes

\* See Section 6, "Sealer Selection and Application," for further information.

# Standards & Surface Preparation

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- This section describes specifications and preliminary inspections and activities before applying a thermal spray coating.

# Review of Specifications

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- SSPC CS-23/AWS C2.23M/NACE No.12
- SSPC SP-5
- SSPC SP-10
- Referenced Standards – Not Included



# Surface Preparation Checks

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- Clean and dry air - free of moisture and oil.
- Check the blast media – free of contamination, debris & oil.

# Blasting Media and Mesh Size

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- Mesh size is selected to match the anchor tooth depth requirement and the blasting media used.
- SSPC CS-23/AWS C2.23M/NACE No. 12 references acceptable blast media.

# Profile Depth and Measurement

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- Minimum depth 2.5 mils with a sharp angular shape (3.0 – 4.0 Corps of Engineers).

# Checking Profile for Dust

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- Cellophane tape test confirms absence of dust.
- Frequency of use is determined by the specifier.

# Holding Period After Blast Cleaning

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- No greater than six hours except: shorter time frame for high humidity and damp conditions (4 hours for the Corps of Engineers)
- Longer time frame in low-humidity or controlled shop environments.

# Alloy and Coating Thickness

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- Alloy and thickness are selected according to intended service environment and service life (Reference ANSI/AWS C2.18).

# Checks Before Starting Metalizing Operations

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- Safety controls in place?
- Surface preparation completed and to spec?
- Equipment components in proper working order and set according to the manufacturer's manual?
- Ambient conditions suitable for metalizing application?

# Ambient & Surface Conditions for Metalizing Application

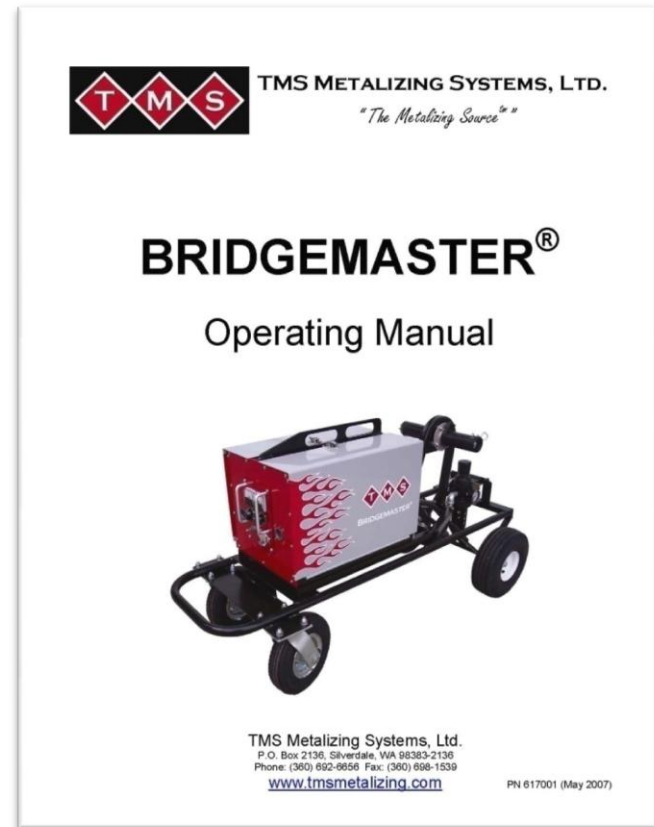
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- Surface temperature at least 5°F above dew point and not falling.
- Relative humidity no more than 85%.
- Monitor conditions frequently at actual work location, especially as weather changes.



# Read the Equipment Manual

- Consult the manual for the recommended operating parameters for the alloy you are spraying.



# Arc Spray Equipment Startup

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- Start the spray equipment and adjust the amperage to the desired setting.
- Lower the voltage to the minimum recommended, or reduce the voltage until an erratic arc is noticed. When this occurs, increase the voltage until the arc smooths out.

# Recommended Stand-off Distance

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# Keep Spray Perpendicular to Substrate



# Standard Spray Pattern

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- Apply in a block pattern, typically no more than 3 feet by 3 feet. ( 2 ft x 2 ft for the Corps of Engineers)
- Deposit approximately 2-3 mils coating thickness with each pass parallel to and overlapping the previous pass by about 40%.
- Apply successive passes perpendicular to each other to completely cover the substrate.

# Metalized Surface Finish

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- Uniform: without blisters, cracks, loose particles, or exposed steel.
- Examined with 10X magnification.

# Summary: Application

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- Coating applied in a block pattern, typically no more than 3 feet by 3 feet to deposit approximately 2-3 mils coating thickness with each pass parallel to and overlapping the previous pass by about 40%.



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