RESCUE PIPELINE
SERVICES

In-Field Flow Coating

What is In-Field Flow Coating Nano Technology?

RPS utilizes advanced “NANO” technology composite coatings that are unlike any other surface coating technology. Nano coatings utilize small molecular structures that create a covalent and ionic bond with the substrate in a way that is not possible with conventional coatings. The unique coating properties combined with RPS’s expertise in insitu pipeline application result in an ultra-slick, low friction surface providing lower friction loss, increased flow, lower energy consumption and reduced deposition of debris and contaminates.

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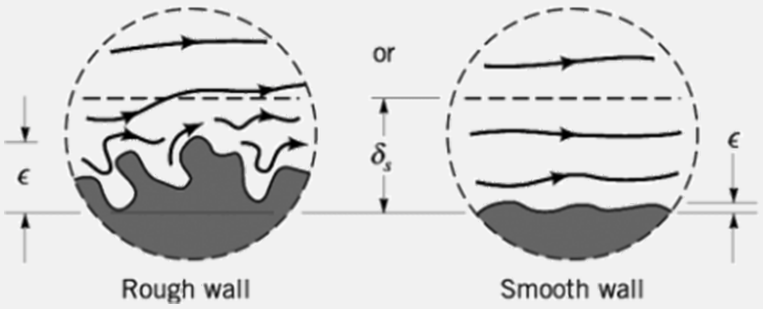
Unlock Your Pipelines Full Potential

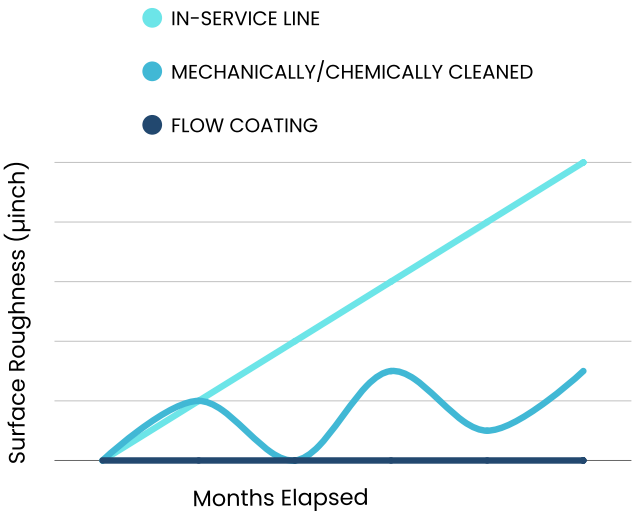
Internal pipeline surface roughness reduces capacity and profitability. As pipelines age the internal surface roughness continues to increase - over 50% of all pipelines are over 50 years old.

- Rougher pipelines cause larger pressure drops, higher energy input & reduced capacity
- Improved surface roughness creates laminar flow at the internal boundary
- Laminar flow helps in achieving the maximum flow capacity



Surface Roughness

- As pipelines age the surface roughness increases
- Potential efficiency increase for older pipelines is greater
- Routine pigging is beneficial, although the results are temporary



The graph above demonstrates how pipeline efficiency is maintained over time with IFC

Average Surface Roughness

SURFACE	MICRO-INCHES
Glass	50
Flow Coating	**120-200**
Commercial Steel (New)	180
Steel - Mechanically Cleaned	300-400
Steel - Chemically Cleaned	350-470
Steel - Weathered 90 Days	1000-1400
Steel - Weathered in Service	>4000

What is Nano Coating?

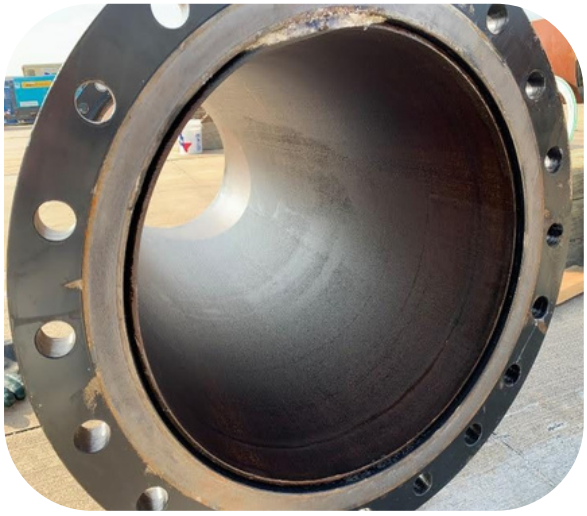
- Manipulation of matter occurs at the molecular or nanoscale level.
- Due to its size and structure, it can create unique chemical properties.
- The coating creates a self-organized, hydrophobic (water repelling) layer of nanoscale thickness.
- Does not form a layer on the substrate like traditional coatings, it becomes one with the substrate instead.
- It creates a covalent and chemical bond,

How Does It Work?

EXISTING IN-SERVICE PIPELINE

- Line de-inventoried and taken out of service
- Installation of temporary launcher/receiver assemblies
- Line cleaned to remove any hydrocarbons, deposits and loose corrosion scale
- Line Surface preparation similar to new pipelines
  - 1/4" penetration on pipe swab
  - Low dew point
- Multiple application of Coating using pig batch method
- Dry Air Purging after application to Cure Coating
- Return to service

Pipeline, post brush cleaning



Pipeline, post coating

NEW CONSTRUCATION / AFTER HYDROTESTING

- Can be Applied Directly After Hydro Testing (using same equipment spread)
- Surface preparation similar to drying specification
- 1/4" penetration on pipe swab
- Low dew point
- Multiple application of coating using pig batch method
- Dry Air Purging after application to Cure Coating

Advantages

COST

Cost savings involved with the downtime necessary for surface preparation and application as opposed to replacing the pipeline.

ADVANCED

Nanocomposite coating is unlike any traditional coating commercially available.

LONGEVITY

Pipeline integrity stays intact far longer than pipelines using traditional methods. Nano coating offers corrosion protection and scale protection as contaminants struggle to bind to the pipe surface. It is also abrasion resistant and not damaged by routine pigging and ILI inspection tools.

IMPROVES EFFICIENCY

Lower energy results in lower fuel consumption of the compressors and lower emissions to transport the same volume of product. Optimization of existing pipeline infrastructure is a low-cost resource for reducing GHG emissions and meeting lower emission targets.

ADAPTABLE

Specialized application expertise and techniques that can be performed in-place on long pipeline sections of any diameter.

Midstream Company Benefits

20% + MORE CAPACITY/REVENUE
without capital infusion in the line AND/OR the compression system

INCREASE IN EBITA/PROFIT
without increasing CAPEX/OPEX, only cost of coating and associated downtime

GREENHOUSE GAS IMPACT
from lower fuel usage shown towards corporate ESG goals