



You Build, We Protect!

NEWSLETTER

HEGGEL® Corr 220

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Industrial Exhaust Pipelines: Safeguarding Operations and the Environment

Industrial exhaust pipelines represent indispensable components of infrastructure dedicated to the management and transportation of exhaust gases and byproducts resulting from diverse industrial processes. These pipelines assume a pivotal role in guaranteeing the safe and efficient operation of facilities while simultaneously minimizing adverse environmental impacts.

In the context of heavy industries like oil and gas,

a multitude of processes generate exhaust gases encompassing combustion byproducts, waste emissions, and other potentially hazardous substances. Effective collection, transportation, and often treatment of these gases are imperative to adhere to environmental regulations, safeguard worker well-being, and ensure the smooth functioning of industrial operations. This is where the significant role of exhaust pipelines becomes evident.





Versatile Industrial Applications

Flue Gas Exhaust:

In the operations of oil refineries and natural gas processing facilities, exhaust pipelines serve as essential pathways for transporting flue gases produced during the combustion of hydrocarbons in various heating and power generation units. These pipelines perform a critical function by facilitating the removal of harmful pollutants, including sulfur dioxide (SO₂), nitrogen oxides (NO_x), and particulate matter. This active contribution aids in both air quality management and compliance with stringent environmental regulations.

Vapor Recovery Systems:

In the domain of oil and gas storage and distribution, vapor recovery systems are deployed to capture and reclaim volatile organic compounds (VOCs) and other hydrocarbon vapors that escape during storage, loading, and unloading procedures. Operating as the backbone of this process, exhaust pipelines efficiently transport these recovered vapors to processing units or storage tanks, where they can be either reused or safely disposed of.



Stack Exhaust:

Within large industrial complexes, towering stacks or chimneys often release exhaust gases into the atmosphere. Connected to these stacks, exhaust pipelines play a vital role in channeling emissions away from populated areas and sensitive ecosystems. By dispersing these emissions safely at higher altitudes, they effectively reduce the environmental impact associated with industrial processes.

Flare Gas Systems:

Oil and gas facilities frequently encounter the need to combust excess or unwanted gases via flare systems to prevent dangerous pressure build-up. Exhaust pipelines play a crucial role in ensuring the safe routing of these flare gases to elevated flare stacks. Here, they are subjected to controlled burning, mitigating emissions and the potential risk of explosions.



Emission Control and Abatement:

Exhaust pipelines stand as integral components within emission control systems, serving as the bridge between industrial processes and environmental responsibility. These pipelines are intricately connected to equipment such as catalytic converters, scrubbers, and filters, which collectively act to remove harmful pollutants from exhaust gases before their release into the atmosphere. This meticulous approach is indispensable for upholding rigorous environmental regulations and minimizing the adverse impact of industrial activities on air quality.

Safety and Ventilation:

In environments where the accumulation of toxic or combustible gases is a concern, such as petrochemical plants or offshore drilling platforms, exhaust pipelines assume a vital role in safeguarding the well-being of workers. These pipelines facilitate the essential task of ventilation and the removal of hazardous gases from enclosed spaces, substantially reducing the risk of accidents and exposure to potentially harmful substances.



Exposure Risks and Corrosion Challenges

Exposure to corrosive and potentially harmful substances within industrial exhaust pipelines, particularly in the oil and gas sector, poses significant concerns.

Hydrochloric acid (HCl) is a highly corrosive gas found in exhaust gases from various industrial processes, such as chemical manufacturing or combustion of specific materials. Exposure to HCl gas can result in severe corrosion of pipeline materials, potentially leading to structural weaknesses, leaks, or failures. Moreover, HCl exposure can pose health risks to workers if released into the environment.

Hydrogen fluoride (HF) is an extremely hazardous gas encountered in industrial processes like aluminum production and semiconductor manufacturing. HF is highly corrosive and can cause severe health issues upon exposure, including skin and respiratory irritation, burns, and damage to internal organs. It can also accelerate corrosion of pipeline materials.

Although air itself is not corrosive, it can contain oxygen and moisture, which can contribute to corrosion and pipeline material degradation, especially in the presence of other corrosive substances. Oxygen supports corrosion processes, leading to gradual metal degradation. Moisture in the air can promote rust formation and other corrosive compounds on inner pipeline surfaces.



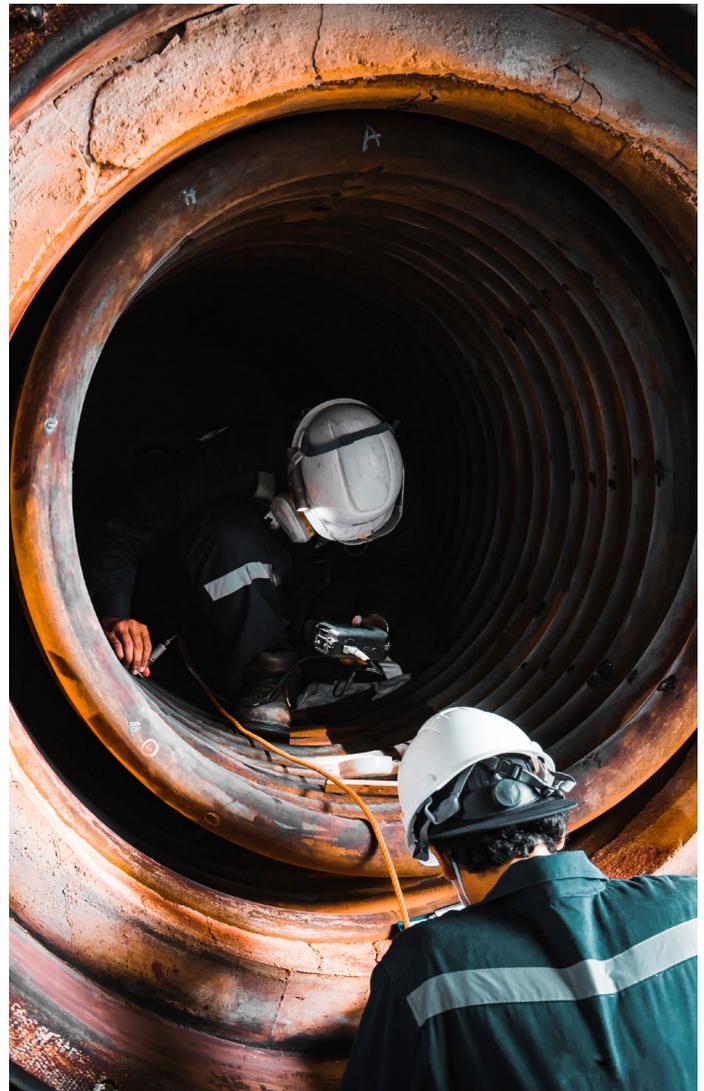
High humidity or the presence of water vapor in exhaust gases can promote corrosion, particularly in pipelines handling corrosive substances. Water vapor can facilitate electrochemical reactions involved in corrosion processes, corroding pipeline materials. Additionally, it can lead to acidic solution formation when combined with other corrosive gases like HCl or HNO₃.



Nitric acid (HNO_3) is a highly corrosive and toxic gas often found in exhaust gases from processes involving nitrogen oxides (NO_x), such as combustion engines or chemical manufacturing. Exposure to HNO_3 gas can result in severe pipeline material corrosion and poses health risks, including respiratory and skin irritation. Proper materials selection and corrosion control measures are essential when handling HNO_3 -containing exhaust gases.

While the discussed exposures encompass common occurrences in industrial exhaust pipelines, it is vital to recognize that specific substances or conditions can lead to deterioration based on unique industrial processes or environments. Additional potential deteriorating exposures include Carbon Dioxide (CO_2), capable of inducing corrosion in specific industrial applications, particularly in the presence of moisture, that CO_2 can form carbonic acid when dissolved in water; Sulfur Dioxide (SO_2), the corrosive gas that is frequently present in exhaust gases from sulfur-containing fuel combustion, reacting with moisture to create highly corrosive sulfuric acid; Solid Particles and Contaminants, carried by exhaust gases, causing abrasion and erosion on pipeline surfaces, potentially resulting in material loss and structural weakness; and Elevated Temperatures, which are commonly generated in industrial furnaces or combustion processes, generating thermal stress, and accelerating material deterioration.

Hence, a comprehensive assessment of specific industrial processes, gases, and conditions is essential to accurately identify all potential deteriorating exposures. Once identified, the implementation of appropriate materials, corrosion prevention measures, and maintenance strategies can effectively mitigate the effects of these exposures on exhaust pipelines.





Protection Strategies Against Corrosion and Exposure Risks

To protect industrial exhaust pipelines from exposure risks and corrosion challenges across various applications, several key protective measures should be considered:

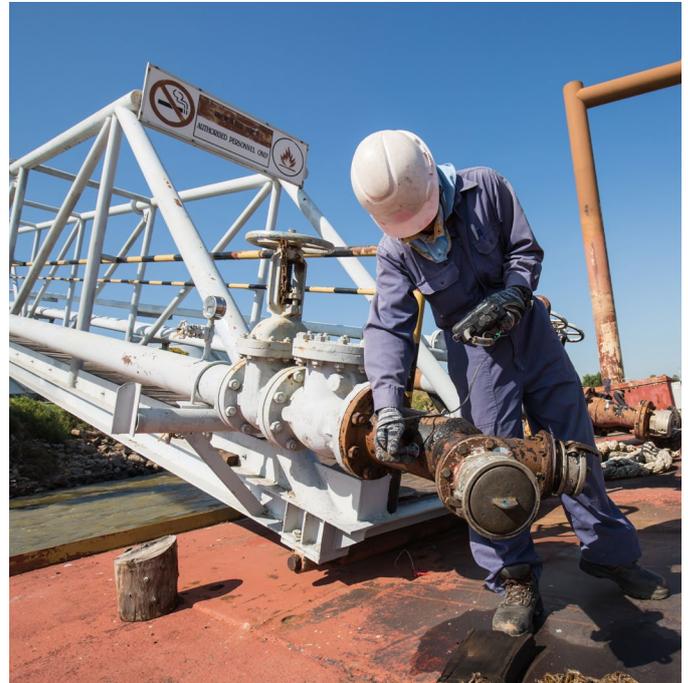
When selecting materials for pipelines, it is crucial to prioritize resistance to corrosion from the specific substances encountered in industrial processes. Materials such as stainless steel, corrosion-resistant coatings, or lined pipes can effectively prevent deterioration.

The application of appropriate corrosion-resistant coatings to the interior surfaces of pipelines, such as epoxy, polyethylene, or ceramic coatings, creates a protective barrier between corrosive substances and the pipeline material, providing essential protection.

Implement real-time monitoring and control systems to continuously assess the condition of the pipelines, including temperature, pressure, and corrosion rates, can provide early warnings of potential issues.

Utilizing cathodic protection systems, such as sacrificial anodes or impressed current systems, is another effective way to mitigate corrosion by diverting the corrosion process away from the pipeline material.

Ensuring compatibility between pipeline materials and the substances they transport is vital to prevent chemical reactions that could accelerate corrosion, offering another reliable solution.



Implementing real-time monitoring systems to continuously assess pipeline conditions, including temperature, pressure, and corrosion rates, can provide early warnings of potential issues.

In pipelines where humidity or water vapor is a concern, employing moisture-removal systems, desiccants, or impactful insulation can significantly minimize the presence of moisture, contributing to corrosion protection.

Exploring innovative materials and technologies that enhance the durability and resilience of exhaust pipelines in challenging environments not only bolsters environmental sustainability but also ensures the long-term integrity of critical infrastructure. These measures collectively form a robust framework for the safe and efficient operation of industrial exhaust systems.



Corrosion-Resistant Coatings are often favored as a superior method for protecting industrial exhaust pipelines from corrosion and exposure risks. These coatings create a robust barrier between the pipeline material and the corrosive substances encountered in industrial processes.

This barrier effectively isolates the material from direct contact with these corrosive agents, preventing the initiation of corrosion. The versatility of corrosion-resistant coatings allows them to be applied to various pipeline materials, including steel, aluminum, or concrete, providing tailored corrosion protection solutions for different pipeline types and environments. This adaptability ensures that the coating can offer optimal protection against the specific chemicals or conditions present in the industrial process.

This proactive approach allows for timely maintenance and ensures that the coating remains effective throughout its intended lifespan. However, it is important to note that the effectiveness of corrosion-resistant coatings depends on proper surface preparation and application techniques. Adhering to industry best practices and guidelines is essential to maximize the benefits of these coatings and maintain the integrity and safety of industrial exhaust pipelines.

HEGSEL Corr 220, a corrosion-resistant coating, provides a customizable solution for industrial pipelines. Its tailored material and thickness options ensure optimal protection against specific corrosive substances, extending the equipment's lifespan and reducing maintenance needs, resulting in significant cost savings. The coating also offers durability against abrasion, erosion, and mechanical wear, enhancing overall longevity and minimizing repair expenses. Ease of application, and minimal disruption to industrial operations further contribute to the appeal of **HEGSEL Corr 220** as a reliable corrosion protection choice.





High Aggressive Chemical Resistant Coating

HEGSEL Corr 220 is an advanced resin-based coating system, specifically engineered to provide unparalleled protection for components exposed to highly aggressive chemicals commonly encountered in the chemical industry.

Its standout feature lies in its remarkable chemical resistance, which remains superior even at elevated temperatures, setting it apart from other coatings that often falter under similar conditions. What further distinguishes **HEGSEL Corr 220** is its exceptional adhesion directly to steel and concrete surfaces, making it an ideal choice for safeguarding large secondary containment areas, where robust protection is paramount. This coating system not only ensures the integrity of industrial equipment and structures while also offering reassurance in settings where chemical durability is crucial.

HEGSEL Corr 220 represents an innovative nano-technology-based coating with exceptional capabilities, boasting ultra-high resistance to full immersion in concentrated organic and mineral acids, as well as alkalis and solvents, whether at room temperature or elevated conditions. This coating's ability to withstand such harsh chemical environments is truly remarkable. What sets **HEGSEL Corr 220** apart is its ambient temperature curing, simplifying application processes and minimizing downtime. Additionally, **HEGSEL Corr 220** showcases excellent abrasion resistance, providing long-lasting protection even in demanding industrial settings.



HEGSEL Corr 220 stands out as an impressive coating solution with its glossy surface finish. It offers the advantage of being solvent-free, boasting a 100% solid content. This not only enhances its environmental friendliness but also ensures robust and long-lasting protection.

Furthermore, the self-priming, single-coat application of **HEGSEL Corr 220**, without the need for a primer, streamlines the entire application process, making it an exceptionally practical and efficient choice for industries seeking outstanding corrosion protection and exceptional chemical resistance.

The product is also offered in a specialized variant known as **HEGSEL Corr 220 AF**, specifically formulated to provide innovative anti-fouling properties.



Application Areas

- Internal pipe lining
- Chemical storage tank
- Process vessel internal linings
- Concrete walls/floors
- Secondary containment areas
- External coating for insulated pipes operating at sub-ambient temperatures
- Road/sea chemical tankers

Typical Chemical Resistance (Full Immersion)

- 98% Sulfuric acid
- 37% Hydrochloric acid
- 100% Glacial acetic
- Methylenechloride
- Tetrahydrofuran
- 84% Phosphoric acid
- 50% Nitric Acid
- 50% NaOH (Caustic)
- Monoethanolamine
- Carbon Disulphide
- Digylcolamine (DGA)
- Methyldiethanolamine (MDEA)
- 15% Sodium Hypochlorite
- 100% Phenol
- Hydrazine
- MEK

Technical Data		Value	Unit
Abrasion Resistance ASTM D4060 (Tabor CS-17/1kg/1000 cycles)		26	mg weight loss
Impact Resistance ASTM G14	Forward	10	Joules
	Reverse	3	Joules
Adhesives Strength (Cohesive failure) ASTM D4541	Brush grade	19.3	MPa
	Spray grade	30.9	MPa
Elongation to break BS 6319: Part 7: 1985		1.5	%
Tensile Strength BS 6319: Part 7: 1985		40	MPa
Compressive Strength BS 6319: Part 2: 1983		120	MPa
Temperature Resistance NACE TM0174	Immersed	+130	°C
	Non-Immersed	+150	°C