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CANAM pipe & supply

CATALYTIC HEATER COMPANY

Decades of experience in the Oil and Gas Industry, simple and reliable operation, a proven track record of safety and effectiveness. Prevent freezing in oilfield equipment using safe, flameless heat with Catalytic Heaters.

Equipment Heating Overview

General Information

The Oil and Gas Industry lives with obvious problems created by paraffin, water, and hydrates. The Natural Gas Industry in particular faces a great number of issues. Most of which are created by the way they must economically conduct their business. They operate at high pressure, hydrostatically test their facilities, store gas in aquifers, restrict flow in order to measure, cut pressure for delivery customers, and face challenging ambient conditions.

Since the early 1980s, the industry has turned to products from Catalytic Heater Company, to address many of the issues they face. Catalytic heaters are recognized as a unique source of intense localized heat to help prevent internal freezing due to hydrates in the gas stream and to provide heat for prevention of external build up of "frost balls." The most unique factor of a catalytic heat source is they are suitable for use in hazardous or potentially hazardous areas.

Concepts of Operation

Catalytic heaters have an energy potential of 6000 BTU per hour per square foot of radiant surface area. All heaters are configured to operate on either natural gas or propane fuel. The catalytic combustion process is requires that the catalyst bed be preheated to approximately 225° F. This is accomplished using an electric heating element, the connections for which are typically enclosed in an explosion proof junction box. When this heated catalyst material comes in contact with fuel and oxygen, a chemical reaction produces infrared energy. The catalytic material is not consumed as part of this process. Once the combustion process has begun, the electrical element can be turned off. The heater will operate indefinitely as long as the fuel and air supply are not interrupted.

The majority of the heat given off by a catalytic heater is infrared. As this infrared energy strikes an object, it transfers heat into that object. The rate at which the temperature of the object rises depends on the intensity of the radiation and the ability of the material to absorb the infrared heat. Most solid objects and many liquids readily absorb infrared heat.

Equipment Selection

Freeze-ups counteracted by Catalytic heaters in equipment heating installations are most often caused by the development of hydrate formations in the gas stream when saturated gas is cooled as it contacts cold piping, especially at restrictions such as orifice plates, etc. The wet gas may be from local production or it may be from underground gas storage.

Elevated gas storage pressures increase the chance for freeze-up of wet gas upon withdrawal from storage, as the hydrate formation temperatures are higher with elevated gas pressures than with normal gas distribution pressures. The formation temperatures may be higher in some high pressure storage fields than ambient air temperatures even during the summer months.

Gas temperatures in deep wells may also be quite high so that contact with a cooler section of pipe or with the cool outer wall of a meter will cause vapors to become liquids, to fall out and to collect at an unwanted point in the piping. In many cases, Catalytic heaters will revaporize this liquid accumulation.

Aside from the elimination of liquid fall-out and hydrate formation by preventing the cooling of wet gas in exposed piping or equipment, we can also look for hydrate formation in regulators due to the presence of turbulence. Hydrates frequently form when regulators are delivering a minimum quantity of wet gas. The gas passages in the regulator are only partially open and the inlet pressures at the regulator approach maximum pipeline pressures in the system, a condition creating severe turbulence. The point of lowest temperature is usually immediately adjacent to the regulator valve so that heat applied at that point will often avoid a freeze-up.

To determine the requirements of the installation, we will first calculate the basic heat load, or BHL. This is dependent on the amount of fluid, the specific heat, and the temperature rise. The desired temperature rise is based on the accounts for the difference between the temperatures of the incoming fluid compared to the desired temperature and also accounts for temperature loss due to pressure drops.

Second, the heat losses due to conduction along the pipe, convection, and poor heat transfer must be considered. The losses depend on equipment size, outside temperature, wind velocity, and a variety of other factors.

Over the years, thousands of installations based on the process described above have shown predictable and reliable patterns when it comes to equipment selection. Canam and its channel partners routinely rely on heuristics that have been validated by countless installations in every variety of condition the oil and gas industry has to offer.

Product Safety

The nature of the catalytic process makes it exceptionally well-suited for safe operation in a variety of environments in the Oil and Gas Industry, and Catalytic heaters have an excellent track record of safety. The primary safety concern for many users is the potential presence of an ignition source in an environment where potentially explosive vapors may be present. Catalytic heaters consume gas, but never produce or require a flame in any phase of their operation. They don't serve as a competent ignition source for any Group D gas including propane, acetone, ammonia, benzene, butane, ethanol, gasoline, methanol, and natural gas. Canam offers products that are listed for use in Class I Division 1 or 2 Group D environments when required.

Additionally, the electrical connection that is used to preheat the catalytic element is only required to be connected temporarily during the start-up phase. Furthermore, the electrical connections for the heating element can be terminated in an explosion proof junction box if desired.

Canam products also have an excellent track record for general personnel safety. For equipment heating applications, the face of the heater is typically enclosed in a stainless steel enclosure that mounts directly to the equipment. This limits opportunity for personnel to come into direct contact with the face of the heater, making burns a very uncommon occurrence.