

# INSULATING WATER AND WASTEWATER SYSTEMS IN THE NORTH ... A SUPPLIER'S PERSPECTIVE

In 1969, factory insulated piping systems were a relatively new concept, and pipes were previously protected from freezing using sawdust or expanded polystyrene board insulation. Alternatively, at the time, pipes could be protected from freezing by continuous bleeding through the winter, if there was an adequate water supply. This was also an expensive method of freeze protection because it would use a large volume of expensive water.

The technology of urethane foam was previously applied to insulating box cars, freezer compartments in ships, irregular shaped buildings, and tanks. A significant opportunity with urethane foam insulation of pipe was the savings associated with keeping the pipes buried shallow, because freezing temperatures around the pipe were no longer an issue with the insulation. Urethane foam was originally applied to the ductile iron pipe with the thin polyethylene molding material being left in place as the outer jacket.

As experience was gained, the factory insulated piping system improved through better manufacturing techniques, the addition of a variety of pipe materials, the addition of various types of protective jackets, and better joint/fitting kits. These features were complemented by a complete system for electrical heat tracing. The overall system manufacturing improvements also afforded improvements on the engineering side of the equation as well.

Increasing awareness of the product in the west was accomplished through communication to municipal and mining engineers, government agencies such as Indian and Northern Affairs, Federal and Provincial Public Works departments and municipalities. Municipalities across the north and engineers associated with infrastructure design were the main priorities in the early years of applying the product and these priorities remain so to this day.

Offering customers what they needed in this relatively new market allowed the insulating manufacturers to quickly add depth and diversity to the product range. This led to the first complete NWT water and service kit in the early 1980s, providing a unique specification/part number to simplify the product specification

and ordering. Over the years these service kits have evolved into three distinct versions depending on the northern region where they would be installed.



*NWT service kit for residential water service connection.*

In the insulation of main pipe itself, for the northern municipalities that prefer to use C-900 ductile iron or PVC piping, the insulation was applied flush to the bell end with the associated insertion depth cut back on the spigot to allow for ease of joining in the field. Complementary to the pipe insulation, these municipalities usually used factory insulated copper goosenecks with unique shapes, sizes and installation configurations.

In the City of Yellowknife the preference has been to use two full style goosenecks manufactured into the ends of a factory insulated 10 metre length of  $\frac{3}{4}$  in copper pipe, which eliminates a union on each. As part of the installation of the service, a recirculating pump was installed in each building, with no heat trace cable needed. The corresponding ductile iron sanitary sewer service would only be insulated if the total run was over a certain length and the ground cover was insufficient to provide insulation.

By Gregg Gaylard, Past President, URECON Pre-Insulated Pipe

## 1969 INSULATED PIPE



*Original style factory insulated goosenecks- these are now produced on one end of a full length of insulated copper pipe*

In the communities of Whitehorse and Watson Lake, Yukon, the original style of factory insulated goosenecks services included a thaw wire which could be energized by an adjustable current generator. These service connections have evolved into one full length of insulated copper pipe.

In Inuvik, as part of the ongoing utilidor replacement program, the engineers chose schedule 80 factory insulated cement lined steel pipe with a robust galvanized steel outer jacket for the above grade system. This recirculating water and gravity sewer system has stood the test of time and is designed to accommodate road and snowmobile crossings at key locations. A similar application has been used in Norman Wells for the portion of their system which is above ground.

In Dawson City, the challenging soil conditions with discontinuous permafrost presented a real engineering challenge. The first factory insulated HDPE piping system that was installed in Dawson City for the sewer system ended up being crushed by repeated freeze thaw cycles. Ed Shillington, with Stanley Associates, who was the engineer that had specified insulated piping on the first Urecon project in western Canada in Fort Chipewyan, AB, took on the challenge to develop a system that would perform.

An analysis of the freezing conditions suggested that the solution to the problem was a heavier core pipe wall, more polyurethane foam insulation, and more structural support in the event of a loss

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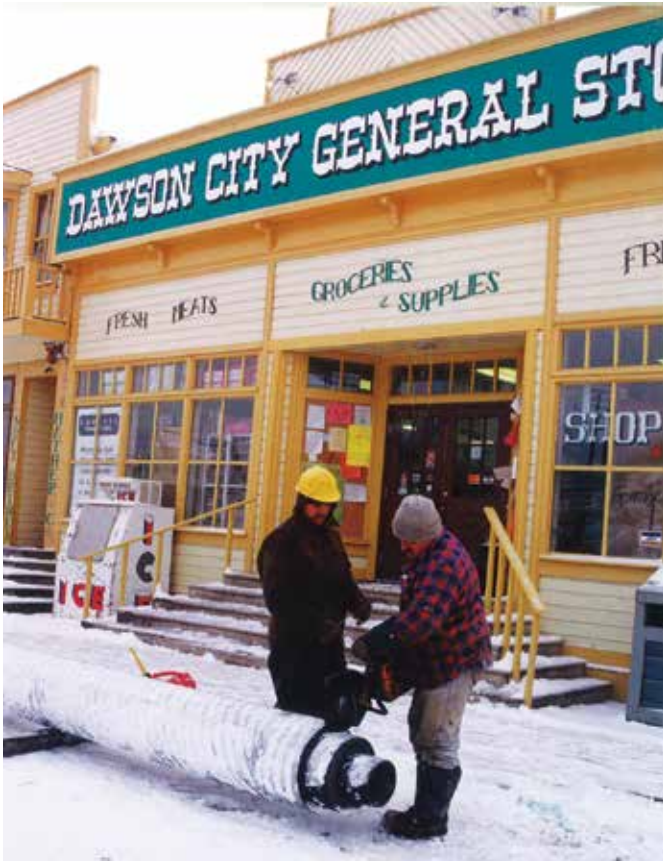
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1969 INSULATED PIPE

*The recirculating water and gravity sewer system has stood the test of time and is designed to accommodate road and snowmobile crossings at key locations.*



Dawson City, YK factory insulated HDPE sewer main with CMP jacket

of back fill support. To provide a solution, the standard factory insulated / PE jacketed pipe assembly was inserted and centered (with polyurethane foam) in a robust corrugated metal pipe outer jacket. This configuration provided the support strength to prevent crushing and maintain grade. Insulated joint kits and service tees were also designed to be waterproof and as structurally strong as the pipe sections. Improvements to the system have been made over the years and it continues to perform as intended.

Ed Shillington was then hired as a consultant to assist in the investigation of cost overruns for the Barrow, Alaska underground utilidor municipal system installed in the 1980s. This work led to additional Alaska projects for Ed. He ended up opening an office in Anchorage, and Urecon continued to work with him. This association led to a project for the supply of very large order of insulated pipe for a project in Ulaanbaatar, Mongolia.

The close association with contractors and engineers in Whitehorse led to another unique opportunity to provide insulated urethane pipe for the upgrading of the piped infrastructure serving the British Antarctic Survey station, on Rothera Island at the South Pole.

Over the years the application of insulated piping has literally spanned the globe to the north and south. This minor claim to fame gives bragging rights for products that are truly field proven in the harshest environment that Mother Nature can muster, from one end of the planet to the other. 💧

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