



INTERNATIONAL FLOW TECHNOLOGIES, INC.

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GENERAL DESCRIPTION

I. INTRODUCTION TO PIPEFREEZE PLUGS

The process of Pipefreeze plugs involves the local application of a refrigerant to the outer wall of a section of pipeline to freeze the liquid content of the pipe, thus forming an ice plug. By suitable choice of plug position and dimension, a section of pipe can be isolated to facilitate its removal, and allow repair or modification to be carried out.

By employing the Pipefreeze plugs process the complete system does not have to be drained and, in some cases, can continue to operate without interruption. The advantages gained in reduced down time, prevention of product contamination and subsequent loss contribute to a considerable financial saving to the customer. In addition, the risk to personnel and to the environment from systems dealing with toxic liquids is reduced.

Pipefreeze plugs techniques can be applied to almost any liquid encountered in a large variety of industrial processes. Systems operating at almost any pressure employing pipe-work up to a large bore dimensions can be successfully dealt with by using the correct plug to pipe interface strength.

II. PIPEFREEZING METHODS

A variety of pipefreezing methods exist employing various refrigerants, the more commonly known methods, together with their basic characteristics, are as follows:

III. LIQUID NITROGEN (LN)

The most effective of the normal refrigerants, operating at a temperature of – 196°C, it is much quicker to produce a plug than CO₂ and does not normally require an additional heat medium.

III. THE IFT METHOD

The IFT method of pipefreezing employs the use of specially designed jackets, which are the result of twenty years of investigation and experience.

The IFT jackets are manufacture from aluminum to N8 specifications and consist of two semi-circular sections, which form a complete tube when bolted

Linestop® • Valve Inserting • Pipefreeze® • Large Tapping

together. Each section consists of an inner and outer aluminum wall, the cavity between the walls filled with high-grade thermal insulating material.

The jackets are provided with bosses, which facilitate filling the cavity between the inner wall and the pipe-work with the refrigerant. Interconnection between the boss and the refrigerant vessel can be either by loose or solid connection.

The ends of the jacket are sealed to the pipe-work using a mastic sealant, thus preventing any loss of refrigerant.

The refrigerant used in the IFT method is Liquid Nitrogen, which is an inert, non-toxic gas operating at a temperature of -196°C - 321 °F.

The advantages of employing the IFT method are four folds:

1. The majority of applications can be dealt with by using the standard range of jackets, thus eliminating the time required to manufacture special equipment.
2. By employing Liquid Nitrogen the time required to achieve a positive plug is considerably reduced.
3. Expertise gained over a wide spectrum of application of pipefreezing techniques ensures a safe, efficient and prompt service to the customer.
4. The customer is provided with a cost effective service to solve maintenance problems.

General Conditions for Pipe Freezing

1. It is understood that the reference pipe is in good condition and suitable for pipe-freezing.
2. The **absence of flow** is necessary to achieve a successful isolation. If flow is present and application does not form an ice plug, quoted price will still be billed.
3. The temperature of the lines is close to or below **100 Deg. F.**
4. Due to pipe imbrittlement during the pipe freezing process, refrain from unnecessary disturbance of the pipe.
5. Customer shall provide ladders, scaffolding, or any other special equipment needed to the access work area.
6. All permits to be provided by customer.
7. IFT will provide basic ventilation. If the project is in confined space or if the site requires additional ventilation it will be the customers responsibility to provide additional ventilation.
8. Access to site and all piping modifications provided by customer

Safety Requirements

It is a requirement of this proposal that your staff and all personnel working in the immediate area of the project are made aware that a Liquid Nitrogen pipe-freezing application is being carried out and that all necessary safety precautions are observed.