

Your application, our system

Refrigeration Systems in Cold Storage

COOL-FIT[®] PE Plus Piping System: 3 in 1

- + Low-temperature PE carrier piping system
- + Pre-installed PUR insulation
- + Pre-installed outer HDPE jacket

Less installation time and cost

Pre-insulated pipes and fittings, delivered ready to install

No condensation, Mold-free, & Energy efficient

High density PUR closed cell insulation

Corrosion-free – Maintenance-free

Carrier pipe in PE, low temperature and high impact resistant

UV and Weather resistant

Outer jacket in high density black polyethylene is vapor-tight and 100% water-tight

Reduced weight

65% lighter than metal systems

Long lasting

25-year-plus life span

Fits your cooling application

32–450 mm (1"–18") 150 psi from -58°F to 140°F

Suitable for water, brine, glycol solutions, and ice slurry



Pre-insulated simplicity

A cold storage refrigeration plant needs to be long-lasting, reliable and ideally with low energy consumption. The secondary cooling systems plays an important role here and moreover the piping system.

COOL-FIT PE Plus is the best solution to achieve an excellent performance.

GF Piping Systems has a long history of successful projects in the cold store and distribution business. Most often COOL-FIT and all associated components are installed on the Medium-Temperature cooling loop, which is used for the storage of fruits, vegetables, dairy products, meat, fish, etc.

These type of installations with COOL-FIT benefit from a simple and cost-effective installation, minimized maintenance, reduced weight, top quality insulation properties all within a long life-span.

Low temperature cooling loops can also use secondary fluids such as glycol or brine (-13F to -28F), have also successfully chosen COOL-FIT as their piping system.

Cold storage facilities using secondary cooling profit from a lower insurance policy and a simpler risk management program compared to those using a direct expansion solution.

COOL-FIT PE Plus

Pre insulated HDPE pipes and fittings with high density, closed cell PUR insulation and a hard UV resistant jacket.

Transition fittings

Complete range of threaded or flanged connections that make COOL-FIT PE Plus easily compatible with existing metal loops.

Extended valve range

Either manual or actuated (electric and pneumatic), a wide range of plastic valves allow the perfect control of the flow.

Joining technique

Simple, reliable and fast are the main characteristics of the electrofusion process. A machine-assisted process that minimizes the human error factor and has been used for more than 30 years.



COOL-FIT® PE Plus for Glycol, Chilled Water and Brine

Secondary Piping System Specification

When selecting a piping system for the secondary cooling lines, several criteria need to be considered but the most important would be life-span, efficiency, weight and ease of installation.

Lifetime and Efficiency

Metal piping systems post-insulated on-site have traditionally been the choice in secondary cooling, bringing daily challenges to facility and maintenance managers and a busy schedule for maintenance.

The heavy weight of metal pipes needs to be carefully evaluated as it has a strong impact on load calculations of a building's structure, especially since most loops will be running either up on the roof or hanging from the ceiling.

Conveying a fluid at a temperature below the ambient without condensation or mold requires adequate thickness, the proper type of insulation and a good, intact vapor barrier. The challenge is keeping the integrity of the insulation, vapor sealing and external jacket during the life-span of the system and there are many possibilities of damaging insulation and therefore compromising the vapor barrier.

This in turn leads to further costly energy losses, dripping, and corrosion of the metal, thus compromising the efficiency and operation of the whole plant. Furthermore, condensation may drip onto the food stored below; this is highly undesirable and can cause contamination, leading to scrapping of stock or loss of food quality.

A pre-insulated HDPE (High Density Polyethylene) piping system with high-quality closed cell polyurethane insulation protected by a robust and UV-resistant HDPE outer jacket is a welcome alternative to problematic metal piping in secondary cooling – this is COOL-FIT PE Plus.

The media pipe is HDPE which has an operating temperature range from -58F up to 140F – ideal to withstand the fluid temperatures of secondary coolants.

Besides being corrosion free, the smoothness of the inner wall of the components prohibits build-up of deposits from the fluid, preventing reduction of flow in the pipe – scaling.

HDPE has a pipe roughness factor of $2.33 \cdot 10^{-5}$ ft. compared to steel's $3.10 \cdot 10^{-4}$ ft – about 12 times smoother. This characteristic improves system efficiency in terms of reduced pressure loss, a performance that remains constant over the years.

The high-quality (0.015 BTU/h ft °F), high density (≥ 4.37 lb/ft³) and closed cell PUR (Polyurethane) insulation is manufactured directly on the pipes and fittings, leaving no room for thermal bridges. This provides temperature stability along the line and

prevents condensation in extreme temperature and humidity conditions.

A stable temperature with lower heat loss along the pipeline allows for a higher cooling temperature that decreases the temperature delta at the chiller and reduces energy consumption. The insulation is bonded during the manufacturing procedure to an HDPE hard jacket, which is water and vapor tight and 100% UV resistant - great solution for outdoor applications as well.

This hard jacket ensures the insulation integrity, enabling easy manipulation of parts during installation together with minimized maintenance and a simple hanging methodology – no need for any special pre-insulated pipe supports and no risk of thermal bridges.

COOL-FIT PE Plus is joined using an electrofusion process: a simple, fast and reliable machine-assisted process that minimizes the human error factor and has been used for more than 30 years. The vapor barrier is provided by the flexible lips of the fittings together with a butyl tape, easily placed underneath them.

Weight Savings

Modern industrial architecture, especially larger industrial buildings, such as cold stores or production facilities, are very sensitive to weight loads that affect the static load of the building.

In average COOL-FIT PE Plus is up to 40% lighter than post-insulated metal solutions – it may allow for a lighter structure or to free space on the production or storage floor, by moving equipment overhead.

Cold stores usually have very high ceilings (up to 23ft) and the cooling lines need to be installed as high as possible to avoid any interference with the everyday operations. The reduced weight of the piping system will allow for simple lift media as cherry-picker lifts to be safely and commonly used.

No dripping and no mold

The top quality PUR insulation of the COOL-FIT PE Plus pipes and fittings will avoid condensation even in extreme ambient conditions.

Over the years post-insulated systems see the vapor sealing compromised and tend to absorb water from the environment. This affects negatively the thermal conductivity of the insulation, reducing the energy efficiency of the system thus increasing the operating costs. This water trapped in a closed area will also originate corrosion on the metal pipes, as well as ice-build-ups that could lead to cracking.

Reduce your costs

COOL-FIT PE Plus reduces the time on-site to a minimum: easy to handle, simple to hang, pre-insulated and with a robust jacket allows for a faster installation, with less trades required.

When compared with traditional post-insulated metal systems,

not only it is a cost effective solution in terms of initial investment, but it also significantly decreases the downtime for repairs and therefore of the maintenance costs while increasing the efficiency of the whole facility.

Maintenance-free

The COOL-FIT PE Plus system consists of corrosion-free pipes and fittings insulated with top quality PUR closed cell insulation which is protected by a UV resistant, robust and corrosion-free jacket. The vapor sealing created for this system, using the lips of the fittings together with the butyl tape, totally encapsulate the insulation and grant a perfect barrier to any water absorption for the designed life-span of more than 25 years.

Reduced Pressure Loss – less energy for the pumps

The smoothness of plastic pipes prohibits the build-up of deposits from the fluid, preventing the reduction of flow in the pipe. The inner bore of COOL-FIT PE Plus sees no change during the whole life-span of the system.

Full support during the complete process

GF Piping System will support you during all phases of your project: from design and specification through bidding and installation, our local teams will answer any questions.

We are able to assist with all relevant engineering calculations, product range information, best practices of design and installation of plastic piping systems and will also train the installers on-site. Our CAD, Revit and BIM libraries are available on-line to ensure the accuracy of your project.

www.cool-fit.georgfischer.com





Refrigeration and cooling systems in cold storage

Top quality

COOL-FIT PE Plus can improve the efficiency of your secondary system by up to 30%. With insulation thermal conductivity, (λ) of 0.026 W/m.K, due to top-quality high-density PUR insulation combined with PE's low thermal conductivity (0.38 W/m.K, steel 90 W/m.K), COOL-FIT offers exceptionally low energy loss characteristics for your piping system.

Size* (mm)	Insulation Thickness	
	(mm)	(in)
32	26	1.0
63	27.2	1.1
110	31	1.2
160	40	1.6
280	53.7	2.1
315	61.1	2.4
450	82.4	3.2

*Other sizes are also available

No condensation or ice build-up

All COOL-FIT PE Plus pipes have about a 30 mm insulation thickness, which guarantees the end-user, even under the most severe environmental conditions, no condensation or ice build-up on the outside of the insulation.

Medium	Medium Temperature	Ambient	Humidity	COOL-FIT
Propylene Glycol	-8°C (18°F)	+30°C (86°F)	up to 85%	no condensation

Wind velocity 0.5 m/sec, COOL-FIT black.

COOL-FIT PE Plus is supported by the external jacket pipe; there's no need for expensive and inefficient insulated pipe supports. No energy bridges are created when hanging COOL-FIT pipe. The temperature-independent rigid foam also increases the allowable pipe support distances, such as 10.8 ft for d225 (8") pipe.



No corrosion

COOL-FIT's complete plastic construction is designed and manufactured by GF Piping Systems. The system includes pipes, fittings, transition fittings to metals, manual valves and measurement and control devices. Zero corrosion both externally and internally guarantees an excellent lifespan.

Smooth pipes reduce pressure losses

The smoothness of PE pipes ($\lambda=0.007$) not only prevents encrustation on the internal surface of the pipe, but also reduces pressure losses to a minimum. (Steel surface roughness 0.1 – 0.15)

Pressure Drop	COOL-FIT
1000 m (3281'), -6°C (21°F) Propylene Glycol at 20 m ³ /hr (88 gpm) in 110 mm (4") pipe	0.8 bar (12 psi)

Simple reliable installation

COOL-FIT PE Plus electrofusion technology is based on the tried and tested ELGEF electrofusion techniques. With our new MSA electrofusion machines we provide safe and easy welds to improve installation experience.

Low weight

Low-density plastic enables speedy, easy handling on-site with a simple, cost-effective hanging structure. The low weight and UV/weather resistant outer jacket makes COOL-FIT PE Plus ideal for roof-top installations.

lbs per 100 m (328 ft) of piping	COOL-FIT PE	COOL-FIT PE Plus	Carbon steel
110 mm (4")	688	1366	3526
160 mm (6")	967	2186	6200

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