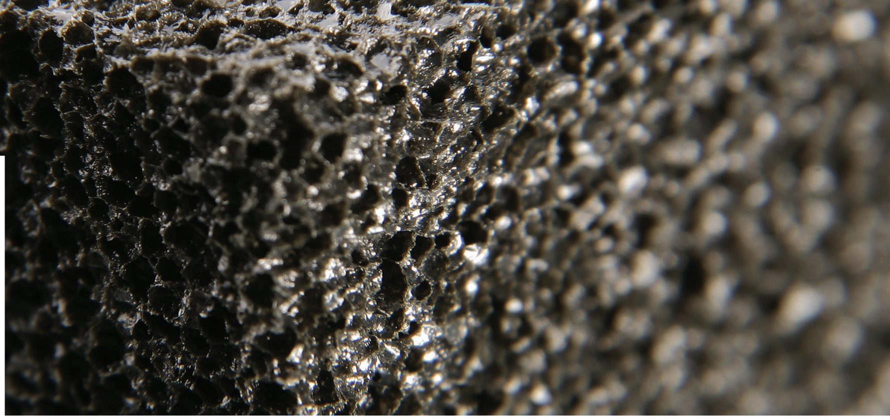


OWENS CORNING® FOAMGLAS®

TECHNICAL NEWSLETTER

COMBUSTIBLE LIQUIDS IN INSULATION

Fires can result when combustible liquids, such as oils and heat transfer fluids, are absorbed by insulation materials (also called “wicking”). Even certain insulation materials that are noncombustible can absorb liquids that are combustible and, consequently, can contribute to the spreading of a fire.

Under certain conditions these combustible liquids can auto-ignite without the presence of an open flame. This occurs by slow oxidation and temperature buildup within the saturated insulation, and, finally, spontaneous combustion. As a result, system engineers often specify non-absorptive, non-combustible cellular glass insulation systems as recommended system for applications with a risk of leaking organic fluids.

Cellular glass insulation is also recommended for low temperature applications to minimize the potential danger of condensed hydrocarbon gases or liquid oxygen and their risk of possible interaction with organic materials.

Possible Problems

Absorbent insulation materials can create a serious fire hazard because they can retain large quantities of combustible liquids should a system leak occur. Compounding this potential danger is the fact that leakage and absorption may go undetected while developing into a serious threat to personnel, property and production.

Fires caused by leakage into insulation lagging on hot surfaces have occurred with lubricating oil and hydraulic fluid in power stations and ship engine rooms, as well as with a variety of liquids in chemical and related industries. Included in the wide range of potentially dangerous liquids and gases are heat transfer fluids, chemical intermediates, resins, solvents, vegetable oils, silicones, fatty acids, explosives and oxidizers.

The danger posed by auto-ignition

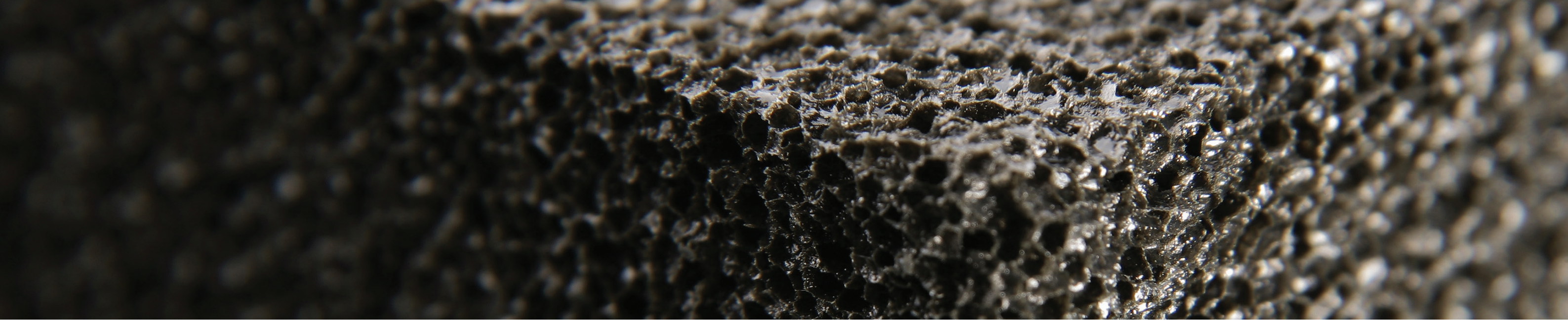
With heat transfer fluids, e.g., hydrocarbons, a slow oxidation occurs in porous insulation where system temperatures are above 500°F (260°C). Insulation materials such as calcium silicate and perlite and various permeable materials offer a large reaction surface and space for collection of vapor.

A slow exo-thermal oxidation reaction between the organic and limited air can begin at 500°F (260°C). Then, when the insulation is exposed to open air during repairs, etc. ignition can take place because the organic is above its auto-ignition temperature. Multiple researches have shown that the auto-ignition temperature of certain heat transfer fluids was reduced drastically when absorbed by insulation.

Oils such as lubricating, fuel, hydraulic, etc. can cause a similar auto-ignition action. The volume occupied by the penetrating oil in permeable materials enlarges by one-thousand fold. Oxidation begins immediately and the auto-ignition point could be reduced in such a way that the combination of oil, oxygen and a permeable insulation material could lead to the material bursting into flames at routine operating temperatures. In fact, studies of oil-soaked lagging fires have found ignition at temperatures as low as 176°F (80°C).

The auto-ignition temperatures for oils are much lower than those for heat transfer fluids. However, many specifiers are less aware of the potential danger with oils than those with the transfer fluids. Lower auto-ignition temperatures also occur with gases. For example, ethylene oxide, which normally has an ignition point of 1060°F (571°C), was found to have a much lower ignition point after being absorbed by porous insulation materials.[1]

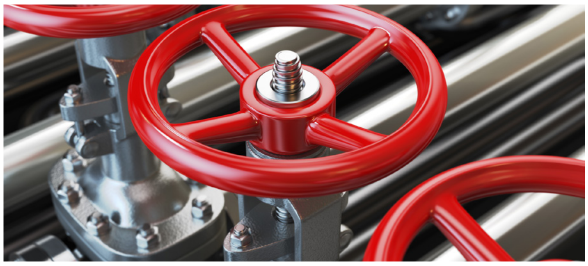
[1] Britton, L G. Spontaneous fires in insulation. United States: N. p., 1991. Web. doi:10.1002/prsb.720100108.



Leak sources

Most major leaks result from component failure. Expansion joints, leaky valves, equipment flanges and areas where insulation is in contact with flat surfaces are among the critical points that collect and absorb leaked chemicals.

These areas should receive extra attention when insulating your heat transfer pipework and system engineers recommend always using cellular glass insulation for these critical points.



Wicking test with calcium silicate, microporous silicate and perlite.

FOAMGLAS® Cellular Glass Insulation

Non-combustibility

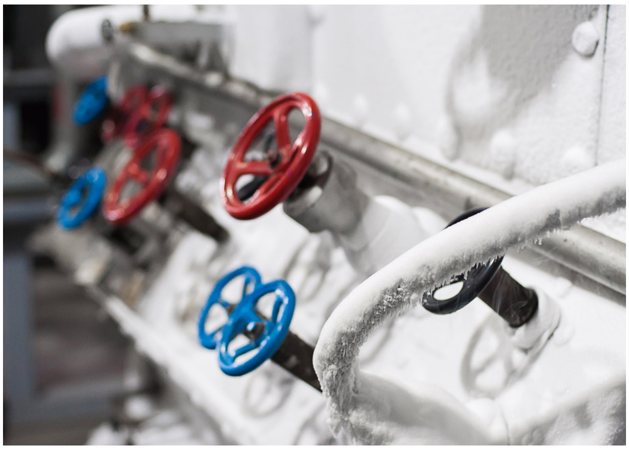
Many manufacturers of heat transfer fluids often specify FOAMGLAS® cellular glass insulation material where organic leakage and contamination are possible. The non-absorbent, inorganic, closed-cell nature of cellular glass insulation prevents the absorption of liquid and vapor organics, eliminates the risk of auto-ignition within the insulation due to leakage.

Above Ambient Systems

Heat transfer fluids are generally used at 350-750°F (175-400°C) which require thermal shock-resistant insulation systems. FOAMGLAS® insulation systems can be configured specifically for use with above ambient temperature applications. Our systems may include multiple layer configurations, coatings and other components that are resistant to thermal cracking.

Cryogenic/Cold and Below Ambient Systems

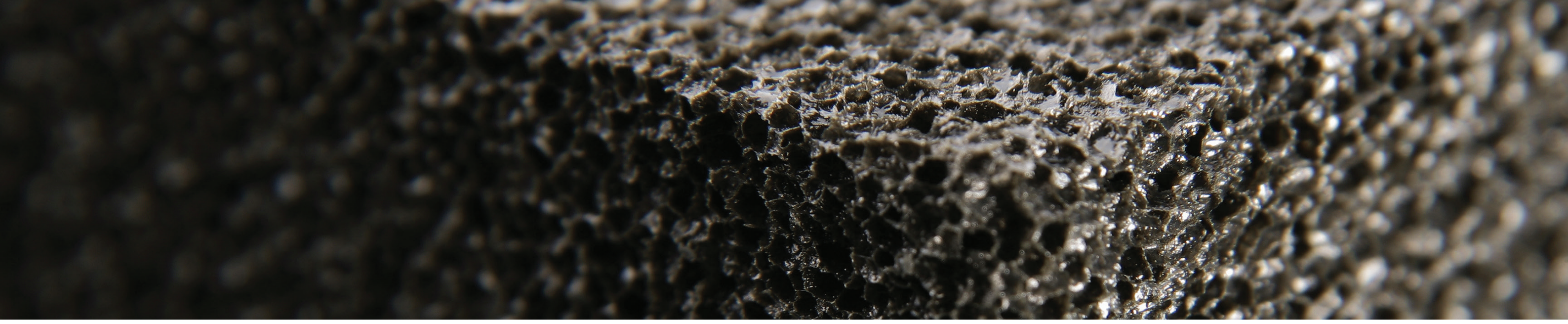
Low temperatures gases can condense within permeable insulations and create a fire risk. Rigid, organic polyurethane and polyisocyanurate can absorb combustible hydrocarbon gases. FOAMGLAS® cellular glass insulation finds widespread application in cryogenic pipe applications. Liquid oxygen can self-detonate by mechanical shock when in contact with organic and some inorganic materials. Consequently, no organic insulation materials should be used at cryogenic temperatures below -297°F (-183°C) – the condensation temperature of oxygen. FOAMGLAS® cellular glass insulation has been proven liquid oxygen-compatible as it will not interact with liquid oxygen, and minimize the dangers associated with oxidizing of organic materials.



Prefabrication and ease of inspection

For both vessel and pipeline applications, FOAMGLAS® cellular glass insulation can be prefabricated, including pre-applied finishes, for efficient, time-saving installation and inspection.

For leak-prone valves and flanges, reusable covers of FOAMGLAS® insulation can be fabricated, incorporating latched, metal outer jacketing. These covers can not only save fuel without producing a fire risk, but also provide easy access for inspection and maintenance.



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Pittsburgh Corning LLC
ONE OWENS CORNING PARKWAY
TOLEDO, OHIO, USA 43659

For web-based Sales and Technical Service inquiries, please visit **www.foamglas.com**

To contact by phone or email:

Industrial & Commercial Sales
Americas
+1 800-327-6126

Asia-Pacific
Singapore: + 65 9635-9184
China: +86 (0) 21 6101 7179
Japan: +81 3 6365 4307

Europe, Middle East & Africa
+32 13-661-721

Technical Services
Americas & Asia Pacific
+1 800-327-6126
foamglastechnical@owenscorning.com

Europe, Middle East & Africa
+32 13-611-468
Industrytechnical@foamglas.com

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