

Storage Tank Equipment

Foaming Relief Vent



Protecting People, Property and our Planet

The Ideal Solution for Biogas Plants

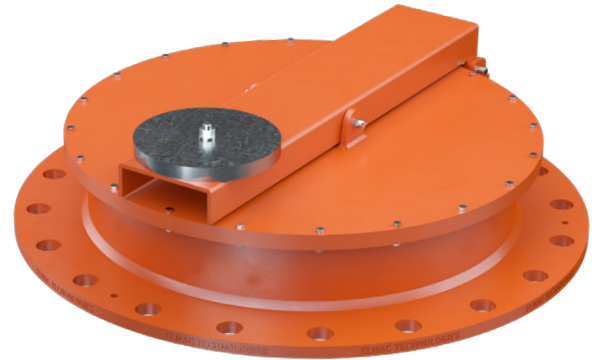
Non-sparking foaming relief vents from Elmac Technologies® allow pressure relief during unexpected foaming events. They are used extensively on anaerobic digesters and gas holders.

Principles of Operation

Foaming relief vents are fitted to digester tanks to allow emergency venting during an excessive pressure or foaming event. This eliminates the likelihood of a costly tank rupture in circumstances where abnormal internal pressure may exceed the capability of a normal pressure relief vent or valve.

During a foaming event the lid will lift at a pre-determined pressure, thus providing a greatly enlarged venting area. The Foaming Relief Vents incorporate a PTFE insert between the pallet and the corrosion resistant seat and this ensures a tight seal below set pressure.

The vents can be fitted with an additional spring-loaded vacuum valve that will protect the tank from damage under excessive vacuum conditions.



Features and Benefits

- Hinged pallet can be lifted manually to allow access to the tank for cleaning and inspection
- Range of sizes and materials to suit any application
- Wide range of pressure settings to provide maximum tank protection whilst ensuring minimum gas loss
- Low cost maintenance

Elmac Expertise

Elmac has been manufacturing protection equipment since 1948 and brings enhanced levels of flame and explosion protection to a diverse range of process applications

Elmac designs world-leading technical solutions utilising Computational Fluid Dynamics software and state-of-the-art, in-house testing facilities. Our highly qualified Research & Development team is renowned for developing patent-protected solutions for the most challenging applications.

Standards Compliance

It is very important all equipment fitted to anaerobic digesters and/or biogas tanks is certified in accordance with the European ATEX directive such that it can operate safely within zoned areas. ATEX zoned areas are those in which an explosive atmosphere is likely.



Customer Support

Tel: +44 (0) 1352 717 555

Email: sales@elmactech.com

Fax: +44 (0) 1352 717 642

Coast Road, Greenfield, Flintshire, CH8 9DP United Kingdom

Foaming Relief Vent

Foam Relief Venting for Tanks and Digesters

Model	Foaming Relief Vent
Sizes (Nominal Bore)	10", 12", 16", 18", 20", 24", (other sizes available on request)
Process Connection	PN16, ANSI 150#, API650 (20" & 24") other sizes available on request
Materials	Stainless Steel (recommended for biogas applications), Carbon Steel (other materials available on request)
Diaphragm & Insert	Antistatic PTFE
Weight	Lead Plate (Standard), Stainless Plate (optional)
Pressure Settings	Standard +7.5mbar(g) (3" W.C.) to +90mbar(g) (36" W.C.)

Anaerobic Digester Foaming

Anaerobic digestion foaming is a regularly encountered phenomenon that must be considered in the design of a tank's venting system. Foaming occurs when dissolved gases, within a liquid digestate (mainly methane and carbon dioxide), are rapidly released in a process known as flash evaporation.

This rapid release of gas causes can create large volumes of foam that builds up in the surface layer of the liquid. The effect is similar to the rapid opening of a carbonated drink after being shaken.

The very large volumes of gas generated in process tank applications require that the pressure build up within the tank be relieved in a matter of seconds. Failure to relieve the pressure quickly and effectively can result in catastrophic damage to the roof and supporting structure of the tank.

Predicting the nature of the foam produced in a two-phase flow, comprising both liquid and gas, is a complex process. Foaming is often not considered to be a normal operating condition and can therefore be overlooked at the design stage. It is critical that foaming be considered when selecting a venting solution for a digester tank and that adequate provision be made prior to operation.

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Integration with Other Safety Systems

Two sets of pressure/vacuum relief valves (PVRVs) combined with flame arresters are usually installed on the digester roof in the form of a 'cowhorn' arrangement. Excessive foaming will interfere with flow through the cow horn and this can result in clogging of the flame arrester.

As a result, the PVRV may not effectively relieve the excessive pressure or vacuum, and this can result in catastrophic damage to the tank and local environment. Accordingly, a foaming relief vent should be installed as a secondary safety device in order to facilitate emergency pressure relief in such events.

Foaming Relief Vent

The foaming relief vent (FRV) is a new innovation, designed to relieve pressure within a tank during foaming events. The FRV will operate automatically when subjected to pressures exceeding a predetermined set pressure, thus alleviating the risk of blockage to the primary PVRV system and ensuring the continued safe operation of the flame arresters installed.

The foaming relief vent is set at a pressure above the pressure relief setting of the PVRV but below the design pressure of the tank it is protecting. This ensures that the vent remains closed, conserving product and preventing leaks to the environment, during normal operation.



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