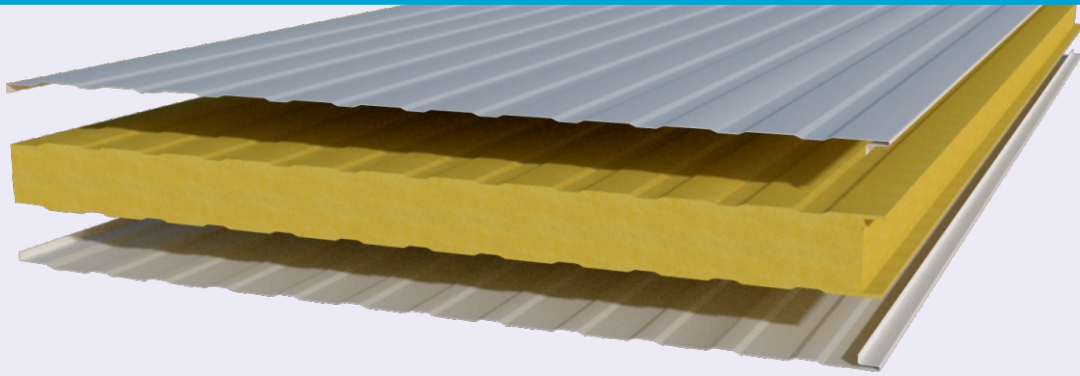


Integrated Recovery Technology Review & Guidance:  
**Composite Insulated Panels**



# Introduction



Recent changes in guidance on the best practice and regulation of the recycling and disposal of composite insulated panels requires a review of earlier industry advice for the refrigeration, cold room, construction and demolition industries.

In 2011 guidance was published on the identification and disposal of metal faced insulated panels used in buildings. This document considers the 2011 review and the 2013 BIFREP (Building Insulation Foam Resource Efficiency Partnership) Building Insulation Foam Resource Efficiency Action Plan to take account of:

- Environment Agency guidance document 'Flammability of fridge insulation foam produced with a hydrocarbon blowing agent' December 2012.

SEPA (Scottish Environmental Protection Agency) guidance on the:

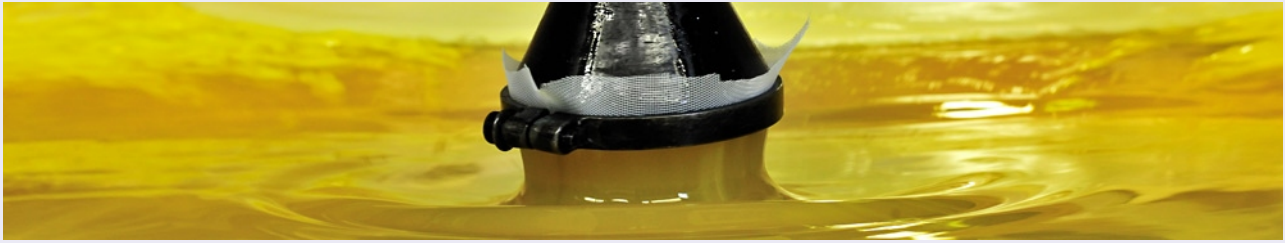
- The Industrial Emissions Directive implemented in UK legislation in 2013.
- The industry and regulator's recognition of the serious fire risk in shredding Pentane blown foam in conventional metal fragging plants.
- The treatment of composite insulated building panels and refrigerated equipment which need to be disposed of at an appropriately permitted site.

The authors acknowledge the report by BIFREP which considered the disposal issues pertinent to composite insulated panels.

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## Insulated Foam Panels



### Technical Scope

This document deals specifically with metal faced insulated panels and the processing technology necessary for their compliant disposal.

Panels of this type are used primarily in buildings, cold room installations (food, pharmaceuticals and data rooms) and refrigerated display equipment. The element which most affects the end of life disposal route for such panels is the **blowing agent** (solvent gas) used to expand the foam into the cavity between the sheet metal, creating a closed cell structure in the polymer, trapping these gases which have desirable thermal properties. Therefore mineral fibre products will not be discussed.

### Manufacturing

Panels are generally produced through a continuous laminating process consisting of a 'core' of thermally efficient insulant bonded between 'pre-stressed' galvanised steel sheet.

### Insulating Foam Types

#### Polyurethane (PUR) & Polyisocyanurate (PIR)

PUR/PIR are the most efficient and commonly used core materials for insulated panels, used in over 90% of all panels.

The first panels produced were manufactured using CFCs as the blowing agent. These gases are now known to deplete the ozone layer.

From the mid 1980s the insulating panel industry gradually moved from CFCs to HCFCs. These blowing agents reduced the ozone depleting potential by 90% but are still classed as ozone depleting substances (ODS). From 2000 the industry gradually moved to hydrocarbons (HCs) or hydrofluorocarbons (HFCs).

#### Polystyrene (PS)

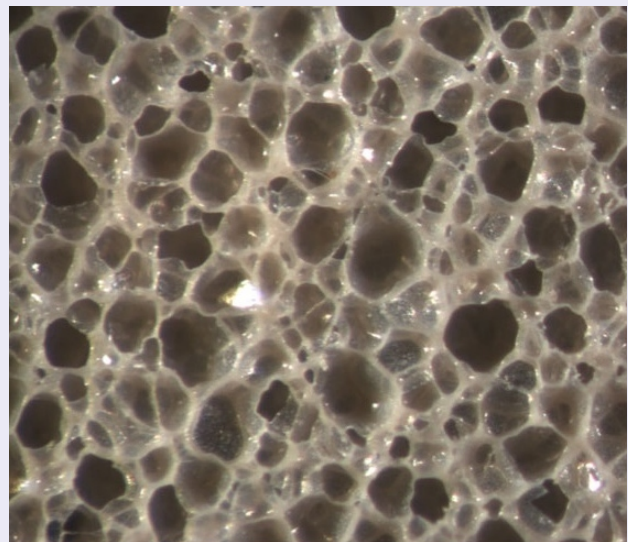
PS has been used as a core material for over 40 years almost entirely for panels used internally and especially within the Cold Store Industry.

### Phenolic (PF)

Phenolic Foam is a rarely used core material in panels for specific projects, used on internal walls and ceilings.

### History

Composite insulated panels have been manufactured and used in buildings, cold rooms and refrigerated equipment for over 40 years.



Closed Cell Polyurethane Foam

Initially PS cored panels were used almost exclusively, until around the mid 1990s when EPS and XPS panels came into production. Since then PUR/PIR have increased in use and are now by far the most dominant core materials.



Composite Insulated Panels used in Commercial Refrigerated Equipment

## Blowing Agents

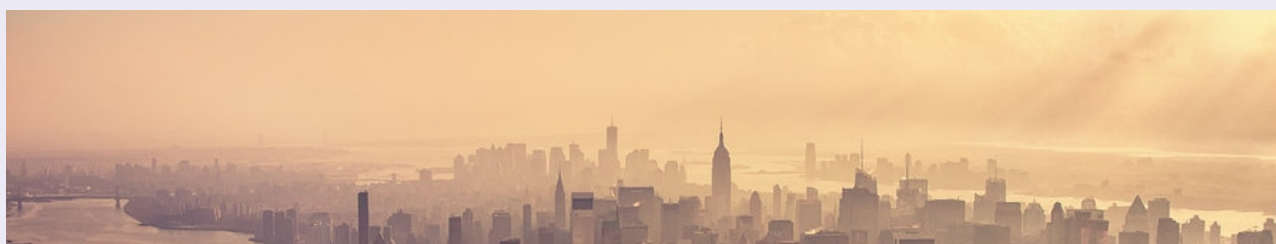
### Chlorofluorocarbons (CFCs)



Skilfully crafted by the French DuPont company back in the late 1920s and later marketed under the brand name 'Freon', CFCs are among the most polluting solvents ever conceived. CFC is an organic compound that contains carbon, chlorine, and fluorine, produced as a volatile derivative of methane and ethane. One of the elements that make up CFCs is chlorine. Very little chlorine exists naturally in the atmosphere. But it turns out that CFCs are an excellent way of introducing chlorine into the ozone layer. In the stratosphere, the CFC molecules break down by the action of solar ultraviolet radiation and release their constituent chlorine atoms. Once released chlorine can go on to essentially steal, by catalytic reaction, an oxygen atom from an ozone molecule ( $O^3$ ), thus removing it by decomposition. The Chlorine Monoxide molecule which is formed can then go on to shed this oxygen atom, reforming the chlorine atom which can then go on to repeat the process.

Stratospheric ozone shields living organisms on Earth from the harmful effects of the Sun's ultraviolet radiation. Even a relatively small decrease in the stratospheric ozone concentration can result in an increased incidence of skin cancer in humans and in genetic damage in many organisms. CFCs have a lifetime in the atmosphere of about 20 to 100 years, and consequently one free chlorine atom from a CFC molecule can do a lot of damage, destroying ozone molecules for decades.

### Hydrofluorocarbons (HFCs)



Importantly, HFCs do not contain chlorine, therefore pose no risk as catalysts for ozone decomposition. However, once released into the atmosphere they are extremely effective at insulating the Earth from the loss of infra-red radiation, leading to global warming which requires no further explanation.

The global warming potential (GWP) of a substance represents how much a given mass of that chemical contributes to global warming, over a given time period compared to the same mass of carbon dioxide. Carbon dioxide's GWP is defined as 1.0. The GWP figures for HFCs are unacceptably high:

Chemical	Atmospheric Lifetime (years)	GWP	Use
HFC-134a (CH <sub>2</sub> FCF <sub>3</sub> )	14.6	1300	One of the most widely used refrigerant blends, component of other refrigerants, foam blowing agent, fire suppressant and propellant in metered-dose inhalers and aerosols.
HFC-245fa (C <sub>3</sub> H <sub>3</sub> F <sub>5</sub> )	7.6	1020	Foam blowing agent.

## Blowing Agents

### Hydrocarbons (HCs)



The most commonly used hydrocarbon blowing agent is cyclopentane (Pentane). As with many hydrocarbons, pentane is highly flammable and will create a risk of explosion when released.

The UK Environment Agency and Health and Safety Executive are acutely concerned that pentane releases are appropriately monitored and properly controlled. 2013 saw the effective inclusion of pentane blown foams into the loss monitoring regimes of Ozone Depleting Substances (ODS) treatment plants. These measures were implemented via the Environment Agency's report 'Flammability of fridge insulation foam produced with a hydrocarbon blowing agent'. The report represents the Agency's final determination on the fire and explosion risks of pentane blown fridge carcasses.

The requirement was necessary to avoid fire and explosion in third party shredding systems due to the misleading classification of baled insulated panels as non-hazardous, which led to them being processed through shredding systems which are not 'intrinsically safe' i.e. they do not include inert gas suppression and monitoring.

In DEFRA's WEEE BATRRRT guidance, it is stated that **'appliances containing hydrocarbons must be processed in intrinsically safe equipment'**.

With the implementation of these findings, operators are at risk of prosecution under sections 33 – 34 of the Environmental Protection Act 1990 if they continue to bale pentane blown foam carcasses and consign them for further processing knowing that they will be treated as non-hazardous metal product that may be processed by conventional shredding.

At manual separation facilities, the pentane blown foam may be safely separated from the steel/plastic element by manual methods before it is sent on for specialist treatment a hazardous waste, again due to the risks associated with the pentane it contains.

Many recyclers manually dismantle and cut away the foam using cutting discs, which presents additional fire risks from smouldering foam. This practise has already led to some serious fires. The claim from many recyclers is that they do not send the foam to metal re-processors. But it is likely that often the foam material will be baled and travel from the site along with the metal to be processed through a conventional frag plant. This would be a serious breach of the Hazardous Waste Regulations which carries a potentially unlimited fine and up to a 2 year jail sentence.

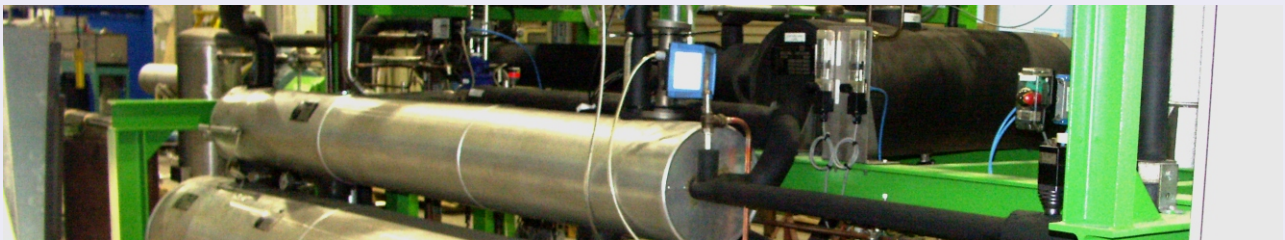
Co-processing through conventional small scale fridge recycling plants also presents significant risk as pentane blowing agents increase in the waste stream. Conventional fridge recycling plants are entirely encapsulated to enable the recovery of polluting solvents (CFCs/HFCs), this presents a risk that the shredding chamber will develop an explosive atmosphere during the processing of pentane containing material. Many efforts have been made to monitor lower explosion levels and inert the internal atmosphere using gaseous nitrogen. However, fires are still common.

## Regulation of Atmospheric Pollutants

### Overarching EU Directives

The Waste Framework Directive (2008/98/EC)  
 The Industrial Emissions Directive (2010/75/EU)  
 The Landfill Directive (1999/31/EC)

### Ozone Depleting Substances (CFCs) and substances with a high Global Warming Potential (HFCs)



eSynergy East Midlands Cryogenic Solvent Recovery Plant - Cryo-Condap 20 - 160

The Fluorinated Greenhouse Gases Regulations 2009 implement the EU F Gas Regulation and its supplementary Commission Regulations in Great Britain (Northern Ireland has its own regulations). The Environmental Protection (Controls on Ozone-Depleting Substances) Regulations 2011 and the Ozone-Depleting Substances (Qualifications) Regulations 2009 implement the EU ODS Regulation.

Both the EU F Gas and the ODS Regulations require all businesses dealing with any of the relevant controlled substances to report to the European Commission on an annual basis.

The DEFRA BATRRRT (Best Available Treatment Recovery and Recycling Technique) document requires recyclers to implement the standards of recovery contained in the 2002 'Guidance on the Recovery and Disposal of Controlled Substances Contained in Refrigerators and Freezers' document. This document specifies the following methods for the recovery of ODS and high GWP solvent blowing agents:

#### Direct Incineration

This usually involves the incineration of the entire panel or fridge cabinet. This method has been trialed in Europe, although the method successfully destroys the blowing agents, there have been problems. In the Netherlands operators were unable to cope with the amount of slag produced by the metals contained in the waste. This leads on to the obvious drawback which is the inability to recover the materials from the process, making it an unsustainable method for most foam containing products as a minimum materials recovery target is set.

#### Mechanical Shredding to attenuate gaseous emissions using either:

##### Activated Carbon Bed

This method is costly in consumable materials, also spent carbon must go for incineration then to hazardous landfill.

##### Cryogenic Condensation

Considered the most appropriate method for the recovery of blowing agents for several reasons. The liquid nitrogen vaporised in the cryogenic process is reused to 'inert' the shredder process to protect against the release of hydrocarbons. The only products produced in the process are recovered blowing agents and water. These gases can be efficiently co-processed through a pyrolytic process, breaking down the CFC and HFC molecules with little production of oxides controlled by the Industrial Emissions Directive.

## Recent Regulatory Developments

### Highly Flammable Gases (Pentane) and IED (Industrial Emissions Directive)



Since the publishing of the Environment Agency document 'Flammability of fridge insulation foam produced with a hydrocarbon blowing agent' in December 2012, all wastes containing hydrocarbon blown insulation foam should be consigned as hazardous waste to comply with the managers duty of care.

*All waste that consists of or contains fridge insulation foam that was made with a hydrocarbon (pentane) blowing agent should be classified and consigned as hazardous waste with the H3A hazard property. The same potential issues/implications are likely to apply to the classification/consignment, storage and treatment of other similar waste foam materials that contain a hydrocarbon blowing agent (e.g. building insulation foam).*

The clear advice of the Environment Agency is that composite panels either designed for use in refrigeration including cold rooms or general construction panels should be consigned as mirror hazardous with the hazard codes HP3 (H3A) unless otherwise proven not to be by tests on a **'waste stream to waste stream basis'**. The authors consider that based on the experience in shredding plants the hazard property codes HP1 and HP15 should also be applied in such instances.

The presence of pentane in insulation foam requires that the material be processed through an 'intrinsically safe' process as defined by BATRRT. The term intrinsically safe is widely used in regulation to describe the general requirements for the design of equipment used in explosive atmospheres or the likely presence of explosive atmospheres. Equipment must meet the standards contained in **I.S. EN60079-1:2007**.

The recently implemented Industrial Emissions Directive (IED) codifies seven existing Directives comprising those on IPPC, large combustion plants, waste incineration, activities using organic solvents, and three on titanium dioxide production, into one combined Directive. The IED requires a wide range of industrial activities to be regulated and applies to installations previously covered by regulations but also includes a range of new activities.

Composite insulated panels and refrigeration equipment are accepted at recycling sites for physico-chemical treatment. Before the new provisions of the IED there were no implied statutory limits on the amount of equipment which could be accepted, stored and treated in any given period at sites approved as waste operations, except any limits imposed by the permitting authority. The IED provisions now limit waste operators to 10 tonnes per day processing and 50 tonnes of storage at any given time pending crushing or shredding (regardless of any level of pre-treatment/manual dismantling). All facilities wishing to crush or shred refrigeration equipment must now apply to be approved as a waste installation and must demonstrate compliance with BATRRT (Best Available Treatment Recovery and Recycling Technique) if they are to exceed these limits. This has led to a significant increase in the emissions abatement and loss monitoring obligations on such sites and the duty of care obligations of producers consigning such waste types.

Any manager consigning panels for disposal to a specific plant should be satisfied that not only the plant is authorised to accept the panels but that the consignment is made in a manner where the recipient clearly understands they must only shred the panels in an intrinsically safe system. In our view if there is a known risk that the material will be shredded in a non-intrinsically safe system, for example where the operator does not accept that they waste is hazardous then it should not be consigned to such fate.

# Landfill Diversion



Landfill has historically been the predominant method for disposing of waste in the UK. In 1999 The European Directive 1999/31/EC on the Landfill of Waste (Landfill Directive) introduced measures for reducing the impact of landfilling and reducing the UK's heavy reliance on it, setting targets for diversion to other waste management options.

### The Landfill Directive:

- Introduced minimum standards for the location, design, construction and operation of landfills.
- Sets targets for the diversion of Biodegradable Municipal Waste (BMW) from landfill.
- Controls the nature of waste accepted for landfill.
- Defines the different categories of waste (municipal waste, hazardous waste, non-hazardous waste and inert waste) and applies to all landfills, defined as waste disposal sites for the deposit of waste onto or into land.

As the UK Government's landfill diversion targets are being met by landfill tax the general cost of landfill has rocketed. The cost of landfilling foam has also been propelled by increased costs of engineering and the experience of landfills of the increased risks of environmental harm from inter alia fires involving foam products.

As landfills close their doors to difficult and high risk wastes such as highly flammable foams, the Environment Agency, driven by the more stringent regulation through the IED, are insisting that appropriate techniques are employed in mechanical recycling plants to manage an even greater fire risk.



Mixed Metals and Plastics

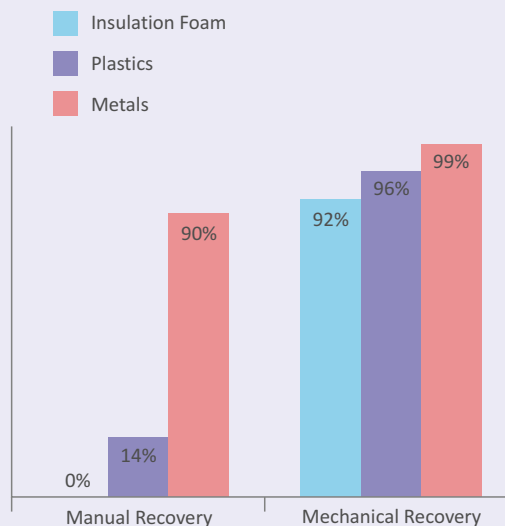
Costs of hazardous landfill have also been severely affected. Currently, all of the mainstream blowing agents are classed as hazardous waste residues.

*Waste residues resulting from waste shredding/defragging activities that co-process degassed fridge carcasses that contain insulation foam produced with a hydrocarbon blowing agent are likely to be classified as hazardous waste under code 19 02 04\* (premixed wastes composed of at least one hazardous waste).*

*Environment Agency Guidance Document - Flammability of fridge insulation foam produced with a hydrocarbon blowing agent LIT 7627*



CIP Density Separation Cyclones





## Conventional Mechanical Recycling Plant

### Domestic Fridge Plants

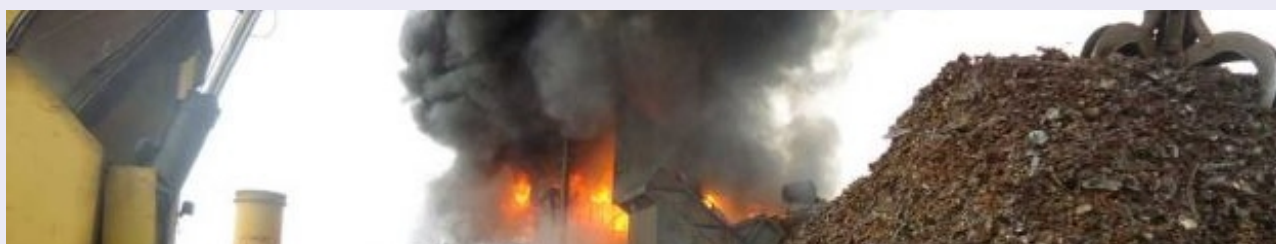


Domestic fridge plants were designed to deal with CFC and HFC gases which are both completely inert. Those solvents can only be contained and recovered if the entire system is encapsulated. This design feature creates an inherent danger when processing fridges containing hydrocarbons, such as pentane in the foam.

As pentane blown units represent a large proportion of the waste stream, fridge plant operators must assume that at any time the units being processed may be 100% pentane blown. The lower explosion limit (LEL) of pentane is a mere 2% v/v. Once this concentration is reached and a source of ignition is present, explosion is inevitable. Operators of domestic fridge plants control this risk by monitoring the LEL present in the encapsulated system and introducing gaseous nitrogen to suppress the level of oxygen present to avoid ignition. This is not to be confused with the hazard criteria of 2.5% by volume for the HP14 Hazard for risk of the ecotoxic poisoning of wild life, mainly aquatic life if waste leaches into water.

Domestic fridge plants are limited by the size of both the aperture and the shredding chamber, making the processing of building/cold room panels and larger commercial fridges difficult. Units must be cut down to small fractions and gradually processed. This material has a greater ratio of insulation foam making it difficult to suppress the atmosphere and control the LEL in the encapsulated system.

### Conventional Fraggling Plants



Conventional fraggling plants were designed to reduce non-hazardous metal based waste such as cars and demolition waste. These systems have large throughput capabilities, but do not utilise any gas monitoring. Despite the shredding chamber being open to air, explosive conditions can be created. Also due to the heat generated in the fraggling process the foam materials can ignite creating fires which can propagate very quickly throughout the plant.

Metal fraggling plants are not capable of safely processing any composite insulated panels containing blown foam and therefore are prohibited by the Environment Agency from doing so.

If described correctly, composite insulated panels cannot be accepted by fraggling plants. Producers of such waste have a duty of care to give a sufficient description identifying the hazardous properties, category and class, to enable the waste to be safely managed. Most hazardous wastes require a detailed description. Magistrates courts are able to impose fines of up to £5000 and sentences of up to 2 years in prison for failing to comply with this duty of care under sections 33 - 34 of the Environmental Protection Act 1990. Very serious breaches may be tried in the Crown Court where there are no limits on the fines which can be imposed.

## Integrated CIP Plant

### Pre-2004 CFC and HFC Blowing Agent Recovery



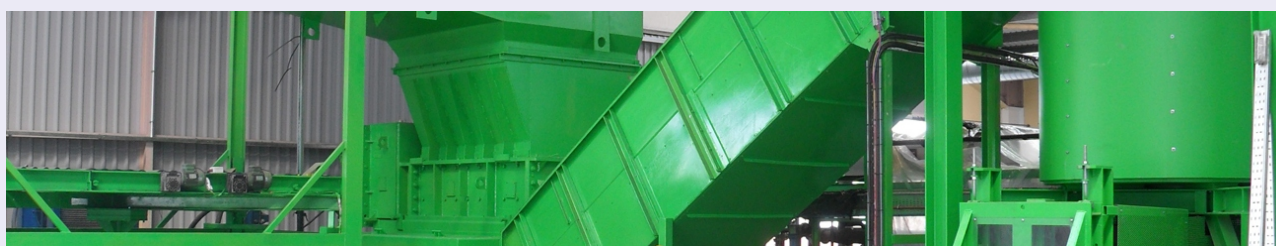
The integrated CIP plant draws together a number of existing technologies together with novel materials and process gas handling solutions to satisfy the most current BATRRRT requirements.

An enclosed cross-flow shredder reduces the material to a fine grade, suitable for entry to the separation system. All blowing agents are released and removed from the encapsulated system at this point. Process gas (including liberated blowing agents) is drawn off to the cryo-condensation plant, with a process gas volume of 350m<sup>3</sup>/h from the two step shredding process.

500 kilos of building/cold room panels contains approximately 2 kilos of CFC, HCFC or HC as blowing agent in the foam, accordingly eSynergy came to 18 kg CFC/h as a design basis. 100% CFC fridges as the worst case for the cryo-condensation plant, however it is designed for mixed input of CFC and VOC (hydrocarbon blown) fridges. As such, the equipment was designed for the worst case scenario.

Equipment design and commissioning was supplied by Herco Kultechnik, specifying a capacity of 350 m<sup>3</sup>/hr (18 kg/hr R11) at 100% CFC input. Gaseous nitrogen from the condensation process is recycled back into the capsulated system to provide an inert atmosphere in areas of potential pentane build up. Cleaned gas from the system is also utilized (purge gas barrier).

### HC (Pentane) Intrinsically Safe Shredding and IED Emissions Abatement



The plant is fed using a unique loading system designed to elevate four meter long commercial cabinets to a height of six meters into a vacuum chamber before being injected into the shredding chamber. The system is hydraulically powered and represents the first practical solution to the encapsulated recycling of building/cold room panels and commercial refrigeration equipment containing hazardous materials.

All shredding of insulation foams takes place within an inert environment via streams of gaseous nitrogen from the cryo-condensation plant and the BOC supplied vaporisers. Inertisation is increased on demand depending on the oxygen level present in the shredding chamber, monitored at points of potential ignition. Automatic shutdown occurs when oxygen levels exceeds set limits or 25% of the lower explosion limit is reached. Pentane emissions must be prevented or reduced by way of appropriate abatement.

The plant has a processing capacity of 16 tonnes per hour and will treat the associated process gases to a purity within the 150mg/m<sup>3</sup> recently imposed by EU law. Liberated pentane blown foam still contains gas inside the closed cell foam at this point. Unlike CFC or HFC blown foams, this material stream is directed to the DPS energy from waste plant (pyrolysis) to utilise the calorific value of the material in other on-site processes and to achieve a massive reduction in volume.

## Integrated CIP Plant

### Residual Materials

#### Pyrolysis 'eSynergy Pyrovore ST-150'



The residual waste foam from the shredding of insulated foam materials is still regarded as hazardous waste. The cost of disposal to landfill is high because it needs special control and landfilling techniques. It is so light and can blow away as it is deposited if it is not bagged. Transport costs to the landfill are also high because the foam residues are low density and lorries are soon filled with this light material. This is one of the reasons why the disposal contractors in the sector charge such high fees for disposal.

The most economic route is to turn this residue into a resource at the facility. An exemplar of this is the integrated Pyrovore system at the eSynergy facility. The Pyrovore is a thermal degradation plant that converts the foam to high CV gases by thermal conversion. "Pyro" is Greek for "heat" and "Lysis" is Latin for change. It means change by heat.

The material is fed into a large 5m x 500mm tube where it is sealed from the ingress of oxygen and the tube heated to a high temperature, around 700-800C. It cannot burn or oxidise as there is **no oxygen or other halogen or reagent** available. Instead it simply breaks down to a gas. The gas is taken off and combusted with oxygen in a separate chamber. The energy released at this stage is used in part to heat the tube (achieving a state of self-fuelling). The remainder of the heat is used to undertake energy production or provide heat to other processes for example the sterilisation of health care waste, which is exactly what happens at eSynergy.

Not only is it possible to get near to zero landfill, but costs can be significantly lower than with a conventional facility that shreds waste and has to export the hazardous residues for processing elsewhere.

### Foam Disposal Comparison

Disposal Method	Emissions	IED Processing Limits	Fuel Consumption/Tonne	Processing Cost/Tonne
Incineration	Isocyanates, NOx, SOx	High	£9.6	£191
Pyrolysis	Trace Emissions	Low	Self-Fueling	£190

## Economics



### Costs

The economic landscape has altered dramatically over the last few years. The CFC/HFC blown panels have by and large been cut up manually and processed albeit quite inefficiently by domestic refrigeration plants where costs remain in the region of £650/tonne.

The estimated cost neutral option of sending Pentane blown panels to conventional fragmentiser shredders at major scrap yards as non-hazardous waste has not materialised. With the defacto classification of these panels as hazardous waste (unsuitable for conventional unabated shredding plants) disposal costs have soared with the acute shortage of suitable plants.

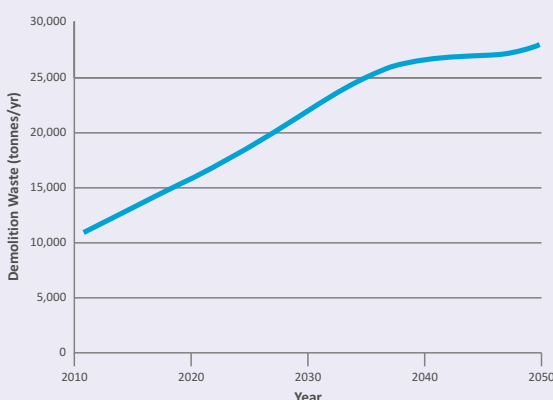
Those seeking a compliant disposal route for disposal will regularly encounter disposal charges of up to £750 a tonne plus transport costs.

### Demand

Based on known figures of construction materials used over the last 40 years, it is predicted that by 2020 there will be over 16,000 tonnes/annum of insulation foam products reaching the end of their life and due for disposal. When considering that demolition waste currently only accounts for 59% of the waste arising, it is likely that this figure would be in excess of 27,000 when construction wastes are included. If cold rooms and other refrigerated equipment were included, the overall waste arising

DEFRA Building Insulation Foam Resource Efficiency Action Plan September 2013

Estimated Growth in UK Foam Demolition Waste (2010-2050)



could be in excess of 40,000 tonnes/annum. The DEFRA Building Insulation Foam Resource Efficiency Action Plan September 2013 states that the most sustainable way to deal with the growing problem is through waste to energy technologies.

### Commodity

Processing through a system which can both extract the commodity value of the materials and utilise the energy value of the chemicals contained in residual materials dramatically reduces processing costs.

The CIP plant produces materials at grades which can go directly to smelting or extrusion. These levels of purity open up international markets, recycled products are shipped to China, India and other growing economies where they are reprocessed into new products.



Extruded Plastic Pellets

Recovering commodities in this way is critical to the competitive cost of the disposal service passed on to producers.

All efforts, therefore, must be made to recover materials. The eSynergy CIP plant uses a series of materials recovery techniques to separate and purify practically all of the materials processed.

eSynergy has in place a number of service agreements for the downstream reprocessing of recovered materials. The CIP plant is currently achieving in excess of 98% material recovery rates as reported to the Environment Agency.

## Summary

### Summary Advice



Anyone involved in the disposal of composite insulated panels in our view should adhere to the following principles:

- Every person in the chain of disposal, from demolition and decommissioning to final disposal, has a legal duty to ensure the waste is treated correctly.
- Panels contain hazardous waste in the form of foam and care needs to be taken when consigning it to a shredding plant that is authorised to treat it.
- Best environmental practice is thermal destruction of the foam after liberation from the metal in a waste to energy plant.
- In liberating the foam any shredding must be intrinsically safe, explosions and fires are not only a human hazard but have serious environmental consequences. Consignors should not only consider ecotoxic risk HP14 but H3A flammability risk, HP1 explosive risk and HP15 the transformation of the risk characteristics to HP1 and HP3 by processing.
- If you handle waste panels you have a legal obligation not to send or allow them to be sent to plants that cannot process them safely – not asking for evidence that they will not ultimately end up in a shredder without fire protection or gas recovery, places you at risk of prosecution if the foam panels contain Pentane, HFCs or CFCs. Sending them to a licenced facility that can both liberate the foam and convert it to energy is an assured route to regulatory compliance. The risk is most acute if you fail to adopt the precautionary principle and do not consignment the waste as hazardous with the correct hazard codes.

**Pentane panels and fridge carcasses should be classified as hazardous and must be treated appropriately**

**Pentane related fires have already destroyed several recycling plants**

**Safe recovery of CFC/HFC gases, and pyrolytic energy from waste for pentane represents best environmental practice**

**The newly implemented IED conditions create tighter control**

**True resource recovery is now essential to reduce disposal costs**

### Acknowledgements:

David Parkinson (DPS)  
Dr Mark Smeed (DPS)



#### Download information from the eSynergy website

This guidance on the disposal of Composite Insulated Panels has been prepared to assist all who are at some stage involved in the disposal of Composite Insulated Panels used in buildings, cold rooms or refrigeration equipment whether for reuse, recycling or as end of life waste. This guidance document and more specific information on treatment, recovery and recycling can be downloaded from the website at [esynergygroup.co.uk](http://esynergygroup.co.uk)

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