

## Insulated Panels Identification and disposal



**Advice and guidance on the  
identification and disposal of  
metal faced Insulated Panels  
used in buildings**

# Introduction and foreword

This EPIC Guide has been prepared to assist all who are involved at some stage in the disposal of Insulated Panels used on or in buildings, whether for reuse, recycling or as end of life waste.

Few panels have to date entered the waste stream and therefore there is little experience concerning the disposal of Insulated Panels. EPIC has conducted research as well as carrying out a number of trials and the Guide has been prepared to inform and provide the latest knowledge and experience on the disposal of Panels.

This Guide has been prepared in conjunction with the National Federation of Demolition Contractors and the Institute of Demolition Engineers and should be of interest to professionals in the Demolition industry, the Environment Agency and those responsible for building stock that uses or contains panels.

## Metal faced Insulated Panels

This guidance document specifically covers building panels of a sandwich type construction that have metal facings either side of an insulation material.

These panels are variously known as Insulated Panels, Sandwich Panels or Composite Panels

Because of the very specific use and nature of metal-faced panels used in Construction, the scope of the Guide has been restricted to panels with steel or aluminium facings.

## Systems not covered by the guide

The following construction products, some of which are occasionally referred to as 'panels' are **not** covered by the guide.

- Insulated boards with thin foil facings – used to line buildings or in cavities
- Roofing boards used as a separate component to insulate roofs
- Other composite Insulated panels with non-metallic facings e.g. GRP, plasterboard or timber composition facings.

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# Where are Insulated Panels used?

Insulated panels can be divided into two main groups:

- Panels designed for the external roofs and walls of buildings
- Panels designed for use internally

## 1.1 External roofs and walls

Insulated panels can be seen almost anywhere as they are the most commonly used roof and wall cladding on out-of-town retail and warehouse developments, industrial units, and are also used extensively on leisure, education and health buildings.

Insulated Panels were first used in significant quantities in the late 1970s, mainly on industrial and warehouse buildings. The variety of applications continually expanded to cover:

- Factories and industrial premises
- Warehouses and distribution
- Workshops and transport depots
- Retail: out-of-town stores and distribution

From the 1990s insulated panels have been increasingly used in the following areas:

- Offices, particularly low/medium storey height
- Leisure including stadiums, sports halls, cinemas
- Education – schools and universities
- Health – smaller hospitals; hospital extensions; clinics
- Transport buildings – airports, bus stations, motorway services

The full extent of their current widespread use can be viewed at [www.epic.uk.com](http://www.epic.uk.com).





## Where are Insulated Panels used?

### Which panels are used externally?

Insulated Panels are also known as “composite” or “sandwich panels”.

Many in the demolition trade will not yet have come across insulated panel systems, as they have a life expectancy in excess of 30 years. Sometimes known as “composite” or “sandwich panels”, they consist of an insulating core between two metal facings and are designed to help speed the construction process, provide high performance insulation for the building and give an attractive modern appearance. (See section 2)

The main difference between panels is the insulating core. Three types have been used for external panels: PUR (polyurethane) or PIR (polyisocyanurate) rigid foam; Mineral Wool (MW); and expanded (EPS) or extruded (XPS) Polystyrene

Over 90% of all panels used externally for roofs or walls have PUR (polyurethane) or PIR (polyisocyanurate) rigid foam as the insulating core. These insulation materials are amongst the best that are commonly available thanks largely to the closed cell insulation formulation structure. However some of the gases used in older panels are classified as having ODP – ozone depleting potential requiring specific treatment at end of life. (See section 3)

Cores  
90% PIR/PUR  
10% MW/PS

The remaining 10% of panels have a MW core. There are also a small quantity of PS cored panels in use. These two cores are used only on external walls – never on external roofs.

A detailed breakdown of the types of panels and where they have been used is illustrated on Page 9, Table 1

### 1.2 Internal walls and ceilings

Insulated panels used internally account for approximately 25% of the total panel usage. The principal applications are:

- As Cold Stores
- As the walls and ceilings of internal compartments to control temperature and hygiene.
- As lining panels, generally within existing buildings
- As separating, usually fire resisting, walls between different sections of a building.

With the exception of separating walls, panels designed for internal use are generally simpler in construction, designed for ease of construction and demountability to enable changes in configuration and layout to be made retrospectively.



## Where are Insulated Panels used?

### Which panels are used internally?

There are few hard and fast rules regarding the types of panels and core insulations that can be found in the various internal applications as all the insulation types have been specified for most applications. The most frequent use of panels for internal applications has been in cold stores; food processing; controlled assembly areas; and in some factories, warehouses and retail distribution.

#### Cold stores/storage buildings

Panels have been used for over 40 years to insulate buildings for cold storage purposes either as linings or to create compartments within a building. Panels with PS cores were used almost exclusively until the mid 1990s, initially using EPS and to a lesser extent XPS as the core material. From the mid 1990s some MW panels and an increasing amount of PUR/PIR panels have been used.

#### Internal compartments – box within box

These compartments are common within the food processing industry and also in some industries where a 'clean' environment is required. Wall panels are generally freestanding and interlocking and are not connected to a supporting framework. Ceiling panels are generally supported by the wall panels with the addition of supporting hangers where larger spans are used.

Panels incorporating a polystyrene (PS) core dominated this type of application until the mid 1990s, when substitution by PIR and Mineral Wool panels started due to concerns about fire performance.

#### Lining panels

Panels used for lining are similar to the compartment panels described above in terms of core materials and joint design.

*NOTE: Aluminium foil faced lining boards should not be confused with metal-faced insulated panels. Boards are usually supported within an H-section grid format*

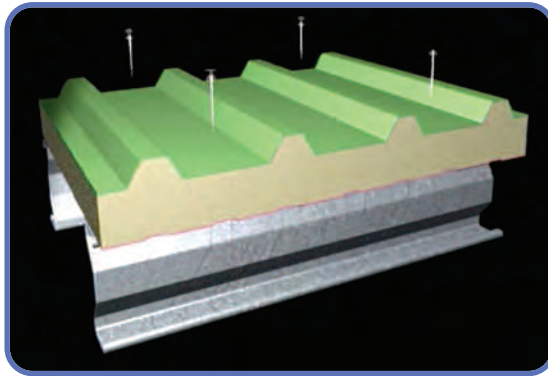
#### Separating walls

Insulated panels are sometimes used as an alternative to the more general masonry-based compartment wall constructions. These panels are fully supported on a structural frame. Core materials are predominantly Mineral Wool with some PIR.



# 2 Insulated Panels and their construction

## 2.1 What are metal-faced Insulated Panels?



Panels consist of three main components

- Outer metal facing
- Core of Insulation Material
- Internal metal facing

Panels used for the external roofs and walls of buildings can vary in thickness from 30 to 150 mm according to use and age.

Panels used for internal walls/linings and ceilings can vary in thickness from 50 to 300 mm according to use; degree of temperature control e.g. Cold Stores etc.

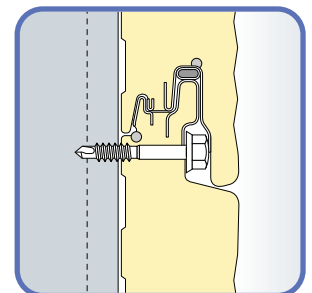
The metal facings protect the core insulation and provide other useful functions e.g. weather tightness; moisture barrier; hygienic surface; fire protection etc.

### Panel joints

At the edges the metal facings are usually profiled to form an interlocking joint.

Very occasionally panels are held by 'H' section bars or by specially designed aluminium extrusions.

Some cold store panel systems use key-operated interlocking mechanisms.



## 2.2 Metal facings

This Guide covers only panels manufactured with metal facings.

The majority of metal facings are profiled from sheet steel and can be flat or lightly profiled as used for wall panels, or deeply profiled as used for all roof panels and some wall panels. Most steel facings normally have a PVC, PVDF or other paint coating for protection against weather or other environments and a thin paint finish on the alternate facing. Other coatings are used for specific applications e.g. hygienic 'food safe' coatings for use within the food industry.

A few 'architectural' and 'special application' panels have been made with aluminium facings.

Small quantities of insulated composite systems are made with other facings such as plastics, GRP and various timbers and boards. These are outside the scope of this guide.

Insulation boards with thin facings on either side e.g. aluminium foil or bituminous felts are often wrongly described as 'panels'.

Insulated panels should not be confused with foil-faced boards, which are sometimes used as wall linings.

## 2 Insulated Panels and their construction

### 2.3 Insulating cores

This is the component of an Insulated panel that most affects disposal of panels at end of life

#### Blowing agents

The central core can be made of various insulating materials. Insulated panels with cores of PUR, PIR and PF are manufactured using blowing agents that are retained in a closed cell structure to create a highly efficient insulant. (See section 3.3 for definition of abbreviations)

One of the most efficient and easiest blowing agent to use was CFC. However this gas had a relatively high ozone depleting potential (ODP) and was replaced firstly by HCFC and then after extensive development research by non-ODS gases such as Pentane and HFC.

The type of insulation therefore has a direct bearing on method of disposal depending whether the insulation does or does not contain gases with ODP. Section 3 describes the Regulatory requirements concerning these gases.

#### Polyurethane (PUR/PIR)

- PUR/PIR is the most efficient and commonly used core material for insulated panels, used in over 90% of all panels.
- Initially panels were manufactured using CFC as a blowing agent.
- From the mid 1980s the insulating panel industry gradually moved from CFCs to HCFC. This blowing agent reduced the ODP by 90% but is still classed as an ODP substance.
- From 2000 the industry gradually changed to pentane or HFCs and to PIR panels.

#### Polyisocyanurate (PIR)

- All panels produced since 1/1/ 2004 are PIR and are non-ODS.

#### Mineral wool (MW)

Mineral wool cores are used in a small number of wall panels on the external walls of buildings

Internally MW panels are used in certain applications for walls, ceilings and as internal compartment walls

#### Polystyrene (PS)

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

The other major use of PS cored panels has been in the food industry.

#### Phenolic (PF)

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

# 3

## Regulatory requirements

40% of panels in use are not subject to regulatory restrictions.

### 3.1 Current requirements

The dismantling and disposal of Insulated panels is subject to the normal rules concerning recycling, waste and landfill. In addition Insulated Panels that contain ozone depleting substances (ODS) as blowing agents (gases trapped within the closed-cell structure) are subject to additional requirements concerning the recovery of ODS 'where practical'.

The most significant legislative articles relating to the disposal at end-of-life of metal faced panel systems are;

- EC Regulation No. 2037/2000 which relates to ozone depleting substances
- The Landfill (England and Wales) Regulations 2002 which implements the Landfill Directive (Council Directive 1999/31/EC)
- The Hazardous Waste Directive (91/689/EC) and
- The Waste Incineration Directive (WID) (2000/76/EC)

In the case of fridge recycling the UK Government has introduced legislation to capture ODS in fridge recycling plants. There is no legislation to specifically require the same treatment for ODS from foams used in construction. However products such as ODS containing panels are classified as 'special' or 'hazardous' waste and are therefore subject to restriction on dismantling – no crushing on site for example – and disposal through treatment plants or as hazardous waste.

### 3.2 Proportion of Insulated Panels with ODS

The following figures relate to panels with PUR/PIR and PF cores, which account for 90% of panels in use.

#### A. Panels NOT subject to regulatory restrictions relating to dismantling or disposal

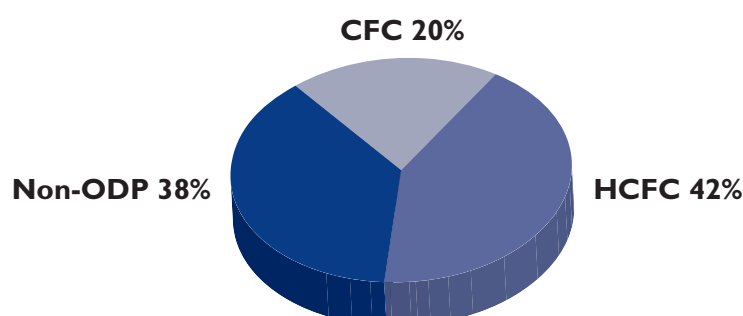
Approximately 40% of panels in use are not subject to regulatory restrictions. These include all PIR Insulated Panels produced in the UK after 2004 including all current production. They do not contain any (ODS) and are classed as non-hazardous.

Current panels produced to satisfy the 2006 to 2010 Energy Conservation Requirements are 2.5 to 3 times thicker than the early panels of the 1970/80s, as are panels used in Cold Store Applications. They make up the greatest group of panels by volume.

#### B. Panels subject to regulatory restrictions relating to dismantling or disposal

The older PUR insulated panels used CFCs or HCFCs, which are Ozone Depleting Substances and are subject to regulatory requirements. CFCs blowing agents were used generally until 1994 after which they were rapidly phased out in favour of HCFC blown panels which reduced the ODP content by 90%. HCFC blown panels were in turn phased out between 2000 and 2004 in favour of non-ODP panels.

CFC panels account for about 20% of existing panel building stock and HCFC panels for a further 40%.





# 3 Regulatory requirements

**Table I: External building envelope – types of panel by construction**

The information is for guidance only and illustrates where the various types of core material are most likely to be found.

Sector	Roof			External Wall				
	PIR core 2004-date	PIR/PUR Pre 2004	PUR Pre 1994	PIR core 2004-date	PIR/PUR Pre 2004	PUR Pre 1994	MW core	PS core
	No ODS	HCFC ODS	CFC ODS	No ODS	HCFC ODS	CFC ODS		
Factories and warehouses and retail distribution	●	●	●	●	●	●		
Offices	●	●	◐	●	●	◐	●	○
Retail – especially large out-of-town	●	●	◐	●	●		●	
Leisure – stadia, sports halls and cinema	●	●	◐	●	●	◐	●	◐ ○
Education	●	●	◐	●	●		●	○
Health	●	●		●	●			
Transport – depots, workshops, hangars etc.	●	●	●	●	●	●		
Transport – transit buildings	●	●		●	●		●	

◐ = very small number of buildings. ○ = occasional use, often as infill panel with curtain wall stick-system.

## 3.3 Definitions and abbreviations

The following abbreviations are used in Table I and throughout this Guide.

- ODS = ozone depleting substance
- ODP = ozone depleting potential
- CFC = chlorofluorocarbon
- HCFC = hydrochlorofluorocarbon
- HFC = hydrofluorocarbon

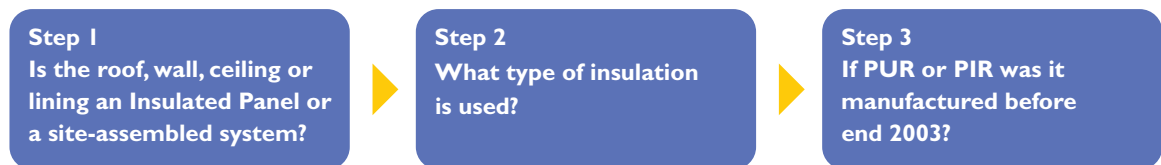
# 4

## How to identify types of panel

### 4.1 Need for identification

From Section 3 it is clearly important to correctly identify the type of panel prior to disposal and particularly to make the distinction between PUR insulated panels produced before 2004 and PIR produced after. Whilst those produced before may have been manufactured using Ozone Depleting Substances (ODS) such as CFCs and HCFCs, none produced from 2004 onwards will contain these substances.

There are 3 Steps to the identification process.



### Step 1: Panels compared to other systems – EXTERNAL

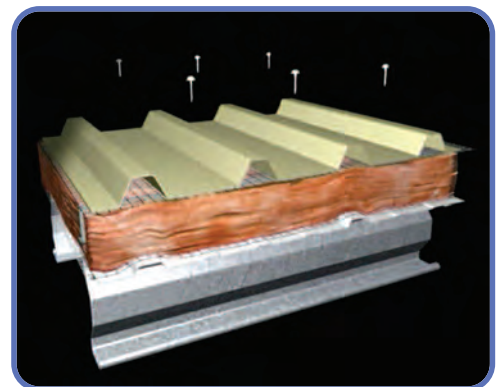
#### A. External roofs and walls

Insulated Panels, manufactured as factory produced cladding systems as described in Section 2, are often confused with metal cladding systems that are built-up on site.

#### Site assembled systems

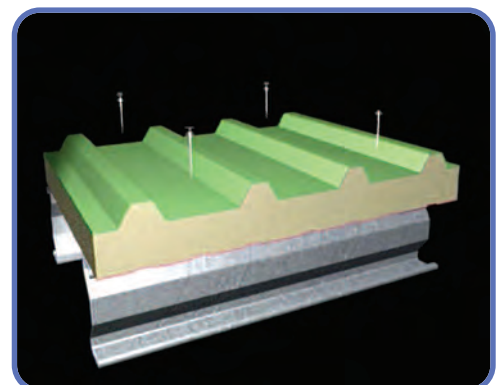
Metal clad industrial and commercial buildings built prior to the mid 1980's were mainly constructed using site-assembled cladding systems for the external roofs and walls. These systems still account for about 30% of the market and consist of:

- A profiled metal external weather sheet
- A glass fibre quilt type insulation
- A lining system usually comprising plasterboard in 'T'-bars, or occasionally a flat faced metal lining sheet



#### Insulated panel systems

Insulated Panels, delivered to site as a single piece component and incorporating a polyurethane [PUR] insulating core, started to be used in greater quantities from 1980, accounting for 10% of the market by 1990, 40% by the end of the 1990's and over 60% by 2006.



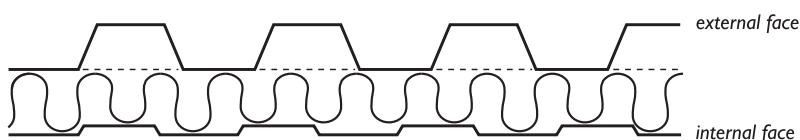
## 4 How to identify types of panel – Step 1

### Step 1: Is it a panel or a site assembled system?

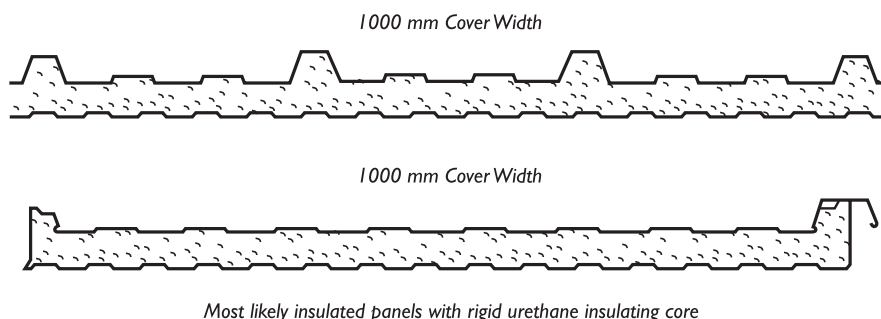
The shape of the external profile can provide a valuable clue to the type of cladding system.

#### Deep profiles

If the external facing is a regular deep profile, typically 35-40 mm, it is most likely to be a site assembled system with a glass or mineral fibre quilt insulation. A hollow sound when tapping the crown of the profile should indicate this type of system. This type of system is found on roofs, and walls of older buildings.

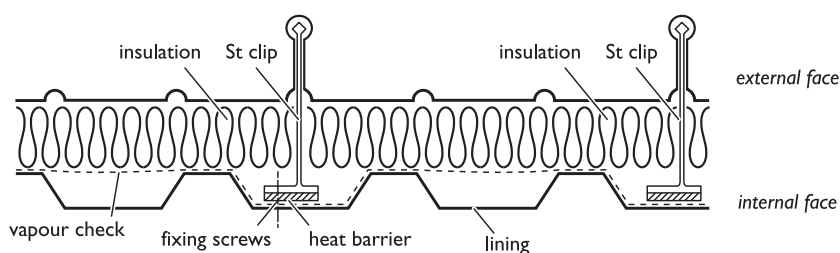


If the external face has an irregular profile with longer distance between crowns then the cladding is most likely to be an Insulated Panel. These panels are found on both roofs and walls of buildings



#### Standing seam profiles

Roof systems where the external sheet has a narrow raised rolled seam at the joints is most likely to be a site assembled 'standing seam system' with MW quilt insulation. However a small amount of panels with standing seam joints have been used since 1998. Check for firmness and solidity of the roof system and whether the internal facing has a micro-rib profile to confirm if it is a panel.



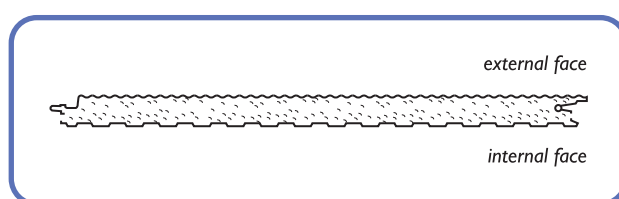
# 4 How to identify types of panel – Step I

## Roofs without easy access

Where roof access is not easily possible to identify the cladding system, inspecting the internal lining can provide valuable clues. The internal facing of an insulated panel will be relatively flat with a mini-box profile. The corresponding liner sheet for site assembled systems will have a profiled liner approximately 20 mm or deeper.

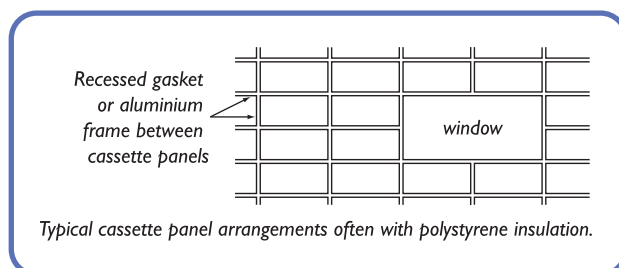
## Micro-rib profiles

Wall claddings that run vertically from ground or short wall to eaves and which have a micro-rib or flat profile will be an Insulated Panel System. Similarly cladding running in a horizontal format between columns will be Insulated Panels. (See also cassette panels below).



## Cassette systems

Wall cladding systems that are a multiplicity of small panels i.e. 2.5 x 1.2 metres tightly supported in a support frame or grid are likely to be panels. However the type of insulation should be carefully checked as some panel types were manufactured with polystyrene cores.



## Curves

Curved roofs where the radius is quite noticeable are most likely to be constructed using the standing seam system (above). Curved roofs with a very shallow curve with or without a standing seam joint system could be constructed from Insulated Panels. The end of the panel/cladding at the eaves or gutter should be checked to confirm the type of system that has been used.

Diagram 1: Roofs – identification by profile shape

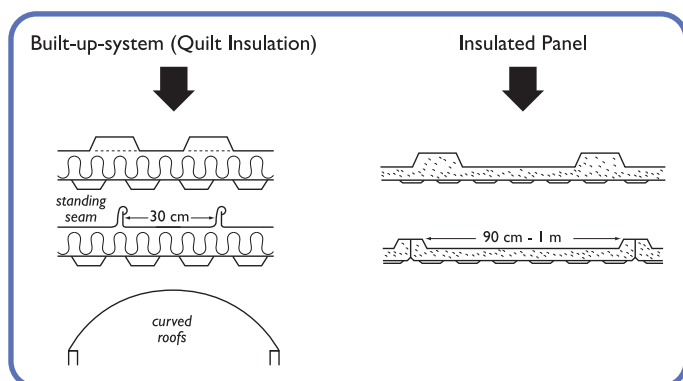
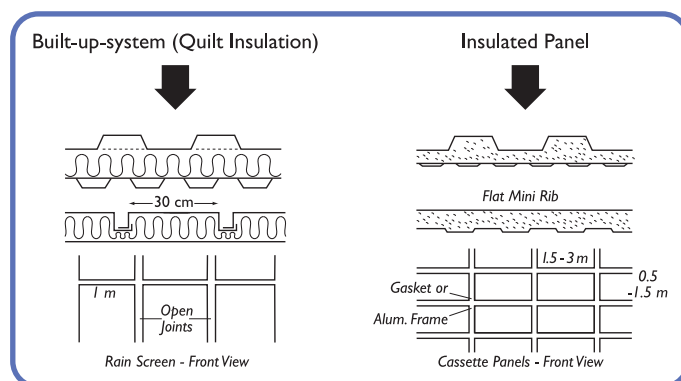


Diagram 2: Walls – identification by profile shape



# 4

## How to identify types of panel – Step I

### Step I: Panels compared to other systems – INTERNAL

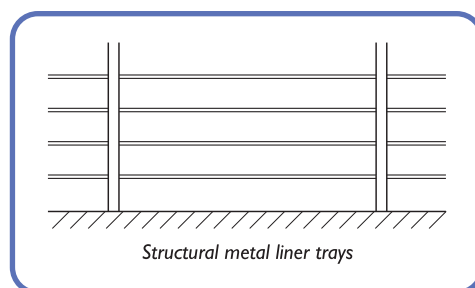
#### Internal walls and ceilings

Insulated panels are frequently used to create environmentally enclosed spaces within buildings. Some examples are illustrated in section 1.2. The panels have micro-rib or flat facings and will be of varying thickness according to the storage temperature requirements i.e. ambient activities, chilled storage etc.

The type of panel and the insulating core can only be determined by inspection at an end or cut section.

#### Metal liner sheets or trays

Where metal linings or claddings are used, tapping the liner for most constructions will determine if it is a solid insulated panel or a hollow built-up system. It should be noted that some thick structural linings have been used in sports halls etc. where the incidence of damage is high. These liner sheets are generally mounted horizontally and may not exhibit a hollow sound.

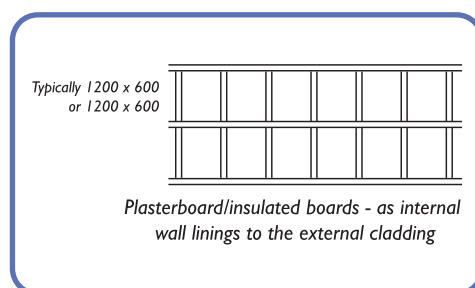


#### Other internal wall linings

A variety of wall linings have been used particularly in industrial and warehouse applications that should not be confused with panels.

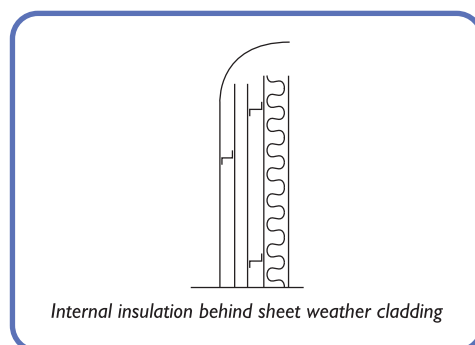
Most 15-20+ year old industrial buildings have non-metallic linings. These are typically made from plasterboard sheets in 'T-bars' as part of a built on site system.

Alternatively many older buildings have been retrofitted with faced insulation boards where the internal joint has been sealed with a tape. The facing of some boards is made of aluminium foil and has been mistaken for metal-faced panels.



#### Lined-out buildings

Some buildings are constructed of a basic shell with roof and wall cladding that acts as a weather sheet and which has been lined out with panels. In most of these lined-out buildings the panel core will be polystyrene.





## 4 How to identify types of panel – Step 2

### Step 2: Identifying the core insulation material

The earlier sections of this Guide have emphasised the importance of determining the type of core insulation as part of the process to determine the appropriate method of disposal.

It is therefore important to determine whether the type of insulant is PUR/PIR of an age that might contain ODS in the core, or whether the panel has a MW or PS core.

#### Records

The first stage should be to check whether the panel description is recorded, for example in the Construction Design and Management [CDM] Health and Safety File or architects/contractors records. If no record is available a visual check is the only alternative.

#### Visual checks

Where panels are to be reused it is sometimes possible to find a small exposed area at the side, top, or end of a panel or wall section. The core can also be exposed by unscrewing or removing a short section of flashing at a corner, reveal, or edge detail.

If the panels are to be sent for disposal rather than dismantled for re-use, then an area can be cut away to reveal the core.

#### Other helpful guidelines

**Roofs.** In the UK, only panels with a PIR/PUR core insulation have been used for roofs. The only task therefore is to determine that the roof system is constructed using Insulated Panels and not a site assembled system.

**Walls.** PIR/PUR is also the main core material for external walls. However mineral wool has latterly been used for wall panels and very occasionally PS has been used for some infill panels and a few 'architectural' panels. It is necessary to visually check the core.

#### Checking the different types of insulation

Normal procedure is to check whether the core used is MW or PS. If the insulation is neither of these then it is most likely that it is PUR or PIR.



#### Polystyrene (EPS and XPS)

EPS is well known, white in colour, and recognisable from its use as a packaging material. EPS was used in Cold Store Panels from 1960s to mid 1990s and in Food Industry panels from 1970s to mid 1990s

XPS has a closed cell consistency and can be confused with polyurethane if both samples are not available for comparison. However XPS can be identified by its colour, usually blue or green, and it does not feel friable (crumbly) if the surface is rubbed.



#### Mineral wool (MW) and glass fibre

MW Insulated Panels use a specific high-density form of MW with the fibres running perpendicular to the panel facings. This core material is quite distinctive and obviously fibrous in nature.

Site assembled systems use a quilt form of this insulation. It is of low density, spongy and very similar to loft insulation.

# 4

## How to identify types of panel – Step 3

### Step 3: PUR (Polyurethane) and PIR (Polycyanurate) cores

#### Rigid Urethane – Polyurethane (PUR) and polyisocyanurate (PIR)

If not MW or PS the core is most likely to be PUR or PIR, which is used in the majority of Insulated Panels.

It is not possible to visually distinguish between PUR and PIR.

For demolition purposes the important point is how to tell the difference between an ODS containing pre-2004 panel and post-2004 panels.



#### Panel markings

For post-2004 panels, all panels should have clear markings on the tape at the panel/panel joint and/or UV marking on the face. This gives information about the manufacturer, date and type of core. If in doubt the manufacturer can be contacted for more information.

#### Records

Panel marking started around 2002 and is in addition to records within the CDM H & S File, which should be more readily available for more recent constructions.

In addition some EPIC members have project records for recent contracts – 1995 onwards and it is worthwhile contacting them.

#### Date and thickness

Reference has been made throughout this guide to approximate dates when changes were made, especially from CFC to HCFC and to the current non-ODS panels. There is no definitive feature that will identify these changes and hence the age of the panel. However it can generally be assumed that for external roofs and walls, panels of 30 or 35 mm thickness were produced before the 1990s and will contain ODS blowing agents. Otherwise thickness is not a reliable guide as panels as low as 40 mm are still manufactured.

#### Testing

##### Testing for pentane

Many panels produced after 2000 used pentane as the blowing agent. These are non-ODS panels and are not subject to special waste disposal treatment. If these panels cannot be identified from records or by identification marks the use of pentane as the blowing agent can be detected using a small portable detector.

The portable pentane detector is a ToxiVision EX with tube and probe available from Shawcity Limited – Tel 01367 246 960. Email: [info@shawcity.co.uk](mailto:info@shawcity.co.uk).



##### Laboratory tests

If required there are simple scientific tests that can identify whether a PUR or PIR material contains an ODS blowing agent. This may be helpful to contractors to make an informed decision on what action to take. See the EPIC website for laboratories that offer this service, which will cost a few hundred pounds and is relatively quick.

# 5

## Demolition issues

### Guidance notes for Demolition Contractors

The following issues have been raised by the Demolition Industry and the guidance notes in this section present the current understanding and information on each point.

#### 5.1 Fire and the use of oxy-propane torches

Extensive studies have been carried out on the performance of Insulated Panels when subject to fire. Information has been gained from both large-scale fire tests and also case studies of actual fires. The results can be viewed on [www.epic.uk.com/fire](http://www.epic.uk.com/fire) studies.

Mineral Wool (MW), phenolic (PF) and polyisocyanurate (PIR) are generally unaffected in the developing stage of a fire, or if an oxy-propane torch is played on the surface.

##### Polyurethane (PUR)

Polyurethane (PUR) cored panels, in common with all panels, are protected by the metal facings. The large-scale tests and fire case histories illustrate that fire does not travel down the core and that there should be no particular problems from the panels if an oxy-propane torch is used to cut through supporting steel framework for a short duration in the proximity of a panel. Care should always be taken to ensure that there are no other flammable materials in the vicinity.

##### Polystyrene

Fire Risk Management procedures should be set up if Polystyrene has been identified as the core material. Of the common core materials used in Insulated Panels, Polystyrene is the only one that is affected by heat, flame and fire to the extent that it will propagate a fire in a building. This is despite the fact that the panels have metal facings.

**Oxy-propane torches should never be used in the vicinity of Insulated panels which have an insulating core made from POLYSTYRENE**

#### 5.2 Cutting panels to manageable size

Insulated panels can be up to 20 metres in length especially when used on roofs, and are usually between 3 and 10 metres on walls. They are generally cut to smaller lengths for transportation to the disposal site or recycling plant. Fridge plants can only take panels up to 2 metres in length.



The recommended method of cutting is to use an 'Evolution' type circular saw with a tungsten tipped blade ([www.evolutionpowertools.com](http://www.evolutionpowertools.com)) or reciprocating saw that will cut the majority of panels up to a thickness of 80 mm. Much thicker panels may require larger diameter blades or cutting from either side.

The small amount of ODS that is released in the cutting process is within the proportion allowable as a practical solution to the reclamation and capturing process.

EPIC do not recommend that an oxy-propane torch should be used to cut panels to smaller lengths due to the small quantities of imported panels with less well defined fire properties.

**Oxy-propane torches should never be used to cut insulated panels**

#### 5.3 Crushing

ODS containing panels should not be crushed using vehicles, plant or equipment in an attempt to powder the insulating foam and separate it from the metal facings.

# 6 Dismantling for reuse

## 6.1 Introduction

There is a small market for undamaged panels of more recent production and particularly panels that have an LPS 1181 fire certification.

[ For further information on LPS certificated panels see the EPIC Guide 'Insulated Panels – The Fire Safety Order (2005)', which gives guidance on determining whether panels have the LPS classification ([www.epic.uk.com](http://www.epic.uk.com)) Only panels produced in the UK from 2004 onwards can be guaranteed to have this certification.]

Panels are secured by external fixings to the building's secondary steelwork. The fixings are either visible or may be covered by a flashing or coverstrip and can be readily removed. Standard precautions for working at heights should be observed at all times.

## 6.2 Safe and efficient handling of panels

The panel industry has developed a range of mechanical handling techniques and crane lifting devices that enable panels to be safely placed or removed from the roofs and walls of buildings. These can be of equal value to Demolition Contractors.

The advantage of mechanical handling equipment goes beyond the health and safety aspects of on-site handling and lifting. These techniques also offer significant time savings and earlier project completion, reduced labour costs and the reduced likelihood of damage to panels.

One of the more recent developments in mechanical handling is a piece of equipment called the CLAD BOY® panel lifter (by 4 Cladding Services), which has been developed specifically for the insulated panel industry. The use of vacuums with soft suction seals helps to avoid damage to panel finishes and surfaces. In addition Oktopus Ltd have developed a system to handle wall panels using a similar principle.



## 6.3 Example of re-use

Re-use of insulated panels at end-of-life is always the preferred option and recent case studies have shown it to be a viable option. Using insulated panels in this manner at end-of-life has many benefits including significant financial savings for all involved. Mac-Fab Systems in Ireland re-used insulated panels from the Liffey Valley Shopping Centre in Dublin to great effect.





# 7

## Available disposal options

### 7.1 Introduction

EPIC and EPIC Members have been working with waste disposal experts to develop a range of practical and economically feasible methods that can allow demolition contractors to meet regulations and remain environmentally friendly without breaking the bank.

Working within the 'practical and economically feasible' framework EPIC has also been liaising with DEFRA and SEPA on methods that restrict the release of any ODP gases during dismantling and disposal.

### 7.2 Fridge recycling plant for processing pre-2004 ODS panels

Commercially viable end of life solutions are now available using existing refrigerator recycling plants for the recovery of ODS blowing agents from steel-faced insulated panels manufactured prior to 2004.

At present, due to the excellent long-term thermal and structural performance properties of insulated panels, the waste stream levels for pre-2004 products are very low. It is also important to recognise that the majority of these panels are less than 50 mm in thickness with a correspondingly low ODS content.

However the Panel Industry has carried out trials to assess suitable options for ODS disposal. This has led to the development of a simple process where panels are easily cut into the right size (2 metres maximum length) and fed into existing refrigerator recycling plants. Trials have successfully been carried out where panels have been processed in this way to meet EC Regulation 2037/2000. As a result of this procedure any ODS gases are captured, metal shavings are collected for recycling and the foam dust is bagged for further use or landfill.

Trials indicated that the cost is under £5 per m<sup>2</sup>, and in the near future it seems likely that schemes such as carbon offsetting could help to reduce or eliminate this cost completely. This is in sharp contrast to the rising cost of landfill disposal.



Fridge plant at EMR London



# 7 Available disposal options

## 7.3 Shredder plant for post-2004 non-ODS panels

For all PIR cored insulated panels manufactured since the start of 2004, the industry has developed a number of simple options to help demolition contractors to recycle these panels, with wholesale reuse the preferred choice. This is because many buildings are demolished long before the panel systems have actually reached the end of their useful life, and the panels are relatively easy to remove and transport. The costs involved in this process are relatively low and can often be recouped by the charges that can be made for the panels to be reused. (See section 6.3)

Where reuse is not possible the panels can be taken instead to a conventional shredder plant, which will separate the metal facings from the insulation core in readiness for sale or further processing.

EPIC has followed a number of projects that have successfully used this method, including one where 13,000m<sup>2</sup> of panels were processed. Also 2,200m<sup>2</sup> of insulated roof panels were recently removed from a site in West Bromwich and disposed of via a shredder plant, resulting in a net income of £0.10/m<sup>2</sup>.

### Pentane blowing agents

Some manufacturers of insulated panels now use pentane as a non-ODP blowing agent. Full-scale trials have shown that contrary to uninformed reports surrounding the use of pentane in insulated panels, the small amounts of pentane present in panels causes absolutely no problem whatsoever for shredder plants and poses no threat whatsoever to individuals dismantling the panels.

The small amounts of pentane present in panels causes absolutely no problem whatsoever for shredder plants.



Shredder plant at EMR Liverpool

## 7.4 Fridge recycling and shredder plants

A list of Fridge recycling and Shredder plants can be viewed on the EPIC website [www.epic.uk.com](http://www.epic.uk.com)

## 7.5 Treatment of polystyrene panels

### EPS

Steel facings can be removed and sent for recycling. The core insulation, **if in a clean condition and not crushed**, may be accepted for recycling into further insulation products by board manufacturers ([www.eps.co.uk](http://www.eps.co.uk)). Alternatively, the EPS core may be sent to landfill.

### EPS and XPS

Alternatively panels may be shredded in a similar manner to PIR panels. (See section 7.3)

EPIC was set up in 1991 to promote quality roofing and cladding systems through the use of factory-engineered panels. Insulated panels maximise thermal efficiency whilst reducing the risk and effects of condensation and significant energy loss through air leakage.

The new building regulations and today's cost competitive and quality conscious environment require that industrial and commercial buildings are high performance designs working with maximum efficiency and minimum running costs. Rigid urethane insulated panels allow designers to achieve these goals with confidence and minimum risk.

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### Download information from the EPIC website

This guide on the Identification and disposal of Insulated Panels has been prepared to assist all who are at some stage involved in the disposal of Insulated panels used on or in buildings, whether for reuse, recycling or as end of life waste. The guidance document and a list of shredder plants and refrigerator recycling plants can be downloaded from the website at [www.epic.uk.com](http://www.epic.uk.com)

### EPIC have also published a series of other guides including:

- Insulated Panels, Requirements and compliance – Building Regulations: Conservation of fuel and power 2010
- Fire safety, Specification and Installation of Insulated Panels
- Insulated Panels, The Fire Safety Order (2005)\*

\* Guides available in hard copy form through the website.

### Information on CD

EPIC has produced two CD Roms that provide comprehensive information on the design and performance of Insulated Panels used as the roofs and walls of buildings. These can be ordered directly from EPIC or through the EPIC website.

- Guide to the performance of insulated cladding systems: The CD covers cladding problems and solutions: thermal design and performance: and design detailing.
- Insulated cladding systems – performance in fire: The CD provides essential data about the fire performance of external cladding panels based on extensive research programmes.

### Acknowledgements

EPIC would like to thank the National Federation of Demolition Contractors and the Institute of Demolition Engineers for their guidance and support in the production of this guide.

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