Aim

To enhance your pre-existing knowledge of the Dangerous Substances and Explosive Atmospheres Regulations known as DSEAR, thus enabling you to undertake a provisional risk assessment to enable zone identification.
Objectives

- **Determine**: Determine where DSEAR applies
- **Conduct**: Conduct risk assessment to identify zones
- **Know**: Know how to determine ATEX rating
- **Compile**: Compile DSEAR register
The DSEAR Journey

- Part 1 (c) Health & Safety at Work Act etc (1974)
- ATEX directive 137 incorporated into SI. No. 2776 the purpose to **identify** circumstances at work where dangerous substances and their application are found.
- Review these activities and risk assess
- Review or initiate control measures
- Identify probability of a flammable atmosphere that may exist or be created and its duration.
- Identify likely ignition sources
- Scale or spread of a fire or explosion
- Other places that may impact

DSEAR shall not....

- Apply where it involves domestic premises involving gas installations & fitments for heating!
- Where regulations 13 and 14 apply
Definition

DSEAR defines a dangerous substance as one meeting the criteria of an;

- Explosive
- Oxidising
- Extremely flammable
- Highly flammable or Flammable

Source; ACOP L138 Ed 2 (2013)
# Equipment categories

**Category**

<table>
<thead>
<tr>
<th>Cat 1</th>
<th>Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Intrinsically safe</td>
</tr>
<tr>
<td></td>
<td>Special protection</td>
</tr>
<tr>
<td></td>
<td>Encapsulated</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cat 2</th>
<th>Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Intrinsically safe</td>
</tr>
<tr>
<td></td>
<td>Special protection</td>
</tr>
<tr>
<td></td>
<td>Flameproof</td>
</tr>
<tr>
<td></td>
<td>Pressurised</td>
</tr>
<tr>
<td></td>
<td>Increased safety</td>
</tr>
<tr>
<td></td>
<td>Oil immersion</td>
</tr>
<tr>
<td></td>
<td>Powder filled</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cat 3</th>
<th>Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Luminaires for Zone 2 &amp; all above</td>
</tr>
</tbody>
</table>

**Category**

<table>
<thead>
<tr>
<th>Zone</th>
<th>Suitability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cat 1 G</td>
<td>Zone 0</td>
</tr>
<tr>
<td>Cat 1 D</td>
<td>Zone 20</td>
</tr>
<tr>
<td>Cat 2 G</td>
<td>Zone 1</td>
</tr>
<tr>
<td>Cat 2 D</td>
<td>Zone 21</td>
</tr>
<tr>
<td>Cat 3 G</td>
<td>Zone 2</td>
</tr>
</tbody>
</table>

**Group 1 Mining applications**

**Group 11 Surface industries**

*Source: Source; BS EN 60529:+A2;2013*
Cat 1,2 & 3 lighting

Cat 1 hazard certain
Cat 2 hazard likely
Cat 3 hazard low
Gas

- This gas incomer is **Zone 2** “A place in which an explosive atmosphere consisting of a mixture with air of a dangerous substance in the form of gas, vapour or mist and is not likely to occur in normal operation but, if it does will persist for a short period only”

- Should a leak ensure the system has a ‘slam shut valve’ that stops further leakage.

Class 3 fuel

- From 1\textsuperscript{st} June 2015, the classification of diesel (EN 590) and similar fuel oils changed pursuant to the CLP Regulation Classification, Labelling and Packaging (EU regulation 1272/2008 which is seeking to move the EU towards a globally harmonised system of classification and labelling of substances and mixtures).

- It follows that, as of 1\textsuperscript{st} June 2015, the upper flashpoint for flammable liquid increased from 55°C to 60°C, and, as a result, diesel, along with other similar fuel oils, is now classified as a flammable liquid.

Source; EU regulation 1272 (2008)
## Hazardous area conformity plate

<table>
<thead>
<tr>
<th>Certification</th>
<th>Equipment protection</th>
<th>Gas Group</th>
<th>Temperature class</th>
<th>Ingress protection</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CENELEC</strong></td>
<td>ia</td>
<td>11C</td>
<td>T6</td>
<td>IP66</td>
</tr>
<tr>
<td>Central European Committee for Electrical Standardisation</td>
<td>Intrinsically safe with 2 faults Zones 0-20</td>
<td>Group 11 (Surface) 11C = hydrogen</td>
<td>T6-85°C</td>
<td>6= gas tight 6= Powered water jets</td>
</tr>
<tr>
<td><strong>BASEEFA</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>British Approval Service for Electrical Equipment in (UK awarding body)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SIRA</strong></td>
<td></td>
<td></td>
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<tr>
<td>Scientific Instrument and Research Association</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: UVSAR (2011)
Marking ATEX (CENELEC standard)
Equipment labelling
Temperature classification

- Gas / Oil

Auto-ignition classes and temperatures for gas

- Hydrogen 560° (T1)
- Methane 537° (T1)
- Ethylene 425° (T2)
- Acetylene 305° (T2)
- Kerosene 210° (T3)
- Ethyl ether 160° (T4)
- Carbon disulphide 95° (T6)

- Dust
Oil

- DSEAR **Zone 1** “a place in which an explosive atmosphere consisting of a mixture with air of a dangerous substance in the form of a gas, vapour or mist is likely to occur in normal operation or occasionally”

- All **Class 3** oil products require pumps and valves to be rated to Zone 1 requirements.

Source; DSEAR ACoP L138 Ed 2 (2013)
Dust

- **DSEAR Zone 20** “A place in which an explosive atmosphere in the form of a cloud of combustible dust in air is present continuously, or for long periods or frequently”
- Dust is normally only experienced during the filling process.
- Moisture content of wood chip’s often mean no airborne dust particulates, hence DSEAR would not apply.
- What is spontaneous ignition temperature for wood dust?

*Source; DSEAR ACoP L138 Ed 2 (2013)*
# DSEAR risk assessment

<table>
<thead>
<tr>
<th>Date</th>
<th>Location</th>
<th>Hazard identified</th>
<th>Workplace activity</th>
<th>Identify how risk arises</th>
<th>Existing or required control measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>10/05/18</td>
<td>Boiler house</td>
<td>Gas incomer</td>
<td>Boiler maintenance</td>
<td>Isolation failure during boiler maintenance</td>
<td>Equipment not rated to 2G</td>
</tr>
<tr>
<td>10/05/18</td>
<td>Biomass store</td>
<td>Wood dust</td>
<td>Boiler operation</td>
<td>Dust in air during re-fuelling</td>
<td>LEV &amp; equipment rated to CAT 2D</td>
</tr>
</tbody>
</table>

A risk assessment can be quantitative, qualitative or both

*Source: DSEAR Regulation 5(4) & ACoP L138 Ed 2 (2013) Para 154*
Risk steps

1. Establish substance has been classified by Classification, Labelling and Packaging Regulations (CLP) within the earlier definitions.

2. Assess the physical and chemical properties of the substance and work process to determine whether work activity creates a potential for fire, explosion or energetic release or may produce flammable substances or thermal runaway.

3. As dust is not fully recognised within the legislation a detailed knowledge of the materials and processes are required to mitigate risk.

Source; CLP regulation (Regulation (EC) No 1272/2008)
Decommissioning

- Temporary or Permanent
- Carry out a full environmental risk assessment.
- Sample any surrounding soil and groundwater (you should do this before, during and post decommissioning) - the results from this will be important in your risk assessment.
- Remove any residual product from the tank and pipes (this is called ‘bottoming’).
- Remove any explosive vapours from the tank and pipes to make them safe, before removing them from the ground.
- Remove and then clean tanks, pipes, dispensers and separators.

Source: ISO 14001 (2015), The Blue Book and PETEL 65/34
Keep vents clear from obstruction

14.7 psi
Questions

Remember DSEAR is a statutory duty and if you have premises pre 2002 and DSEAR applies, you may be breaking the law and invalidating your building insurance?