Aerospace Grade Steel

Every 3 seconds aircraft land on steel made by LIBERTY Speciality Steels UK

Engine shafts, rings, casing
MAT122, RR6119, FV535, Jethete, Nitronic 33

Door hinges & controls
15/5PH

Landing gear
300M
E35NCD16

Slat tracks
300M
15/5PH
Maraging 250

Gear mechanisms
E4340
E9310
E16NCD13

Flap tracks
300M
15/5PH
Maraging 250
**Aerospace GREENSTEEL**

Premium quality steel produced with minimum environmental impact

- EAFs are diverse, flexible and a very low carbon method of making the extremely high-quality steels.

- Current GWP of 300M is 1.91kgCo2/kgCS

- 70% reduction in direct carbon emissions
Aerospace Scrap Challenge

The evolution of steel manufacture will impact future scrap availability

- Aerospace steel grades are analytically challenging
- Evolution from BOS to EAF will impact scrap availability
- Demand remains for low levels of embedded residuals
- LIBERTY Speciality Steels recognises this challenge.
Aerospace Grade Steel

Safety Critical Applications

Key characteristics for Aerospace steel grades.

- **Strength**
- **Stiffness**
- **Toughness**
- **Low levels of dissolved gasses**
- **Fatigue Resistance**
- **Ease of manufacture**

Although some of these characteristics are developed in downstream processes analytical control is key to facilitating these characteristics.
75% of the UK scrap market is classified as basic with 10% being Low Residual

- Low residual scraps are required to control elements such as copper and tin.

- LR availability in the UK is limited and expensive.

- Can we reduce our dependence on LR scraps.

### Scrap Grade Proportion of UK market Cu+Sn %

<table>
<thead>
<tr>
<th>Scrap Grade</th>
<th>Proportion of UK market</th>
<th>Cu+Sn %</th>
</tr>
</thead>
<tbody>
<tr>
<td>3B (Fragmentised)</td>
<td>29%</td>
<td>0.284</td>
</tr>
<tr>
<td>No1 Basic (oversize)</td>
<td>21%</td>
<td>0.375</td>
</tr>
<tr>
<td>No2 Basic (3mm)</td>
<td>15%</td>
<td>0.587</td>
</tr>
<tr>
<td>0A Demolition</td>
<td>10%</td>
<td>0.225</td>
</tr>
<tr>
<td>8A New Production</td>
<td>10%</td>
<td>0.055</td>
</tr>
<tr>
<td>6A Tin Cans</td>
<td>7%</td>
<td>0.78</td>
</tr>
<tr>
<td>9A, 9D, 12A Cast Iron</td>
<td>8%</td>
<td>0.65</td>
</tr>
</tbody>
</table>
Analytical variability for aerospace steels allows for use of basic scraps

- 98 live Aerospace grades
- Wide range of aerospace specifications
- Alloying elements recovered from own arising scraps
- Higher residual levels allow for use of basic scraps.
- Scrap processing can reduce the copper content of scrap
Scrap processing enables increased use of basic scraps due to low copper content

- 3b Frag processing reduced Copper by 0.18%
- Pre shredder will increase processing capacity
- Maximising use of own arising alloyed scraps

Feedstock:
- 5C
- Depolluted vehicles
- HMS
- No.2

1. Pre-shredder (twin shaft); Mobile crane/grab fed grab
2. Pre-shred Product cleaning; Crane Fed / Vibro / Magnet Drum
3. Mobile Picking Station – Pick out non-ferrous material?
Although Aerospace steel grades present significant analytical challenges, good scrap selection and scrap cleaning can reduce our dependence on low residual scraps.

EAFs can produce high quality, low Co2 steels.

ENJOY YOUR FLIGHT HOME!
Thank You!

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