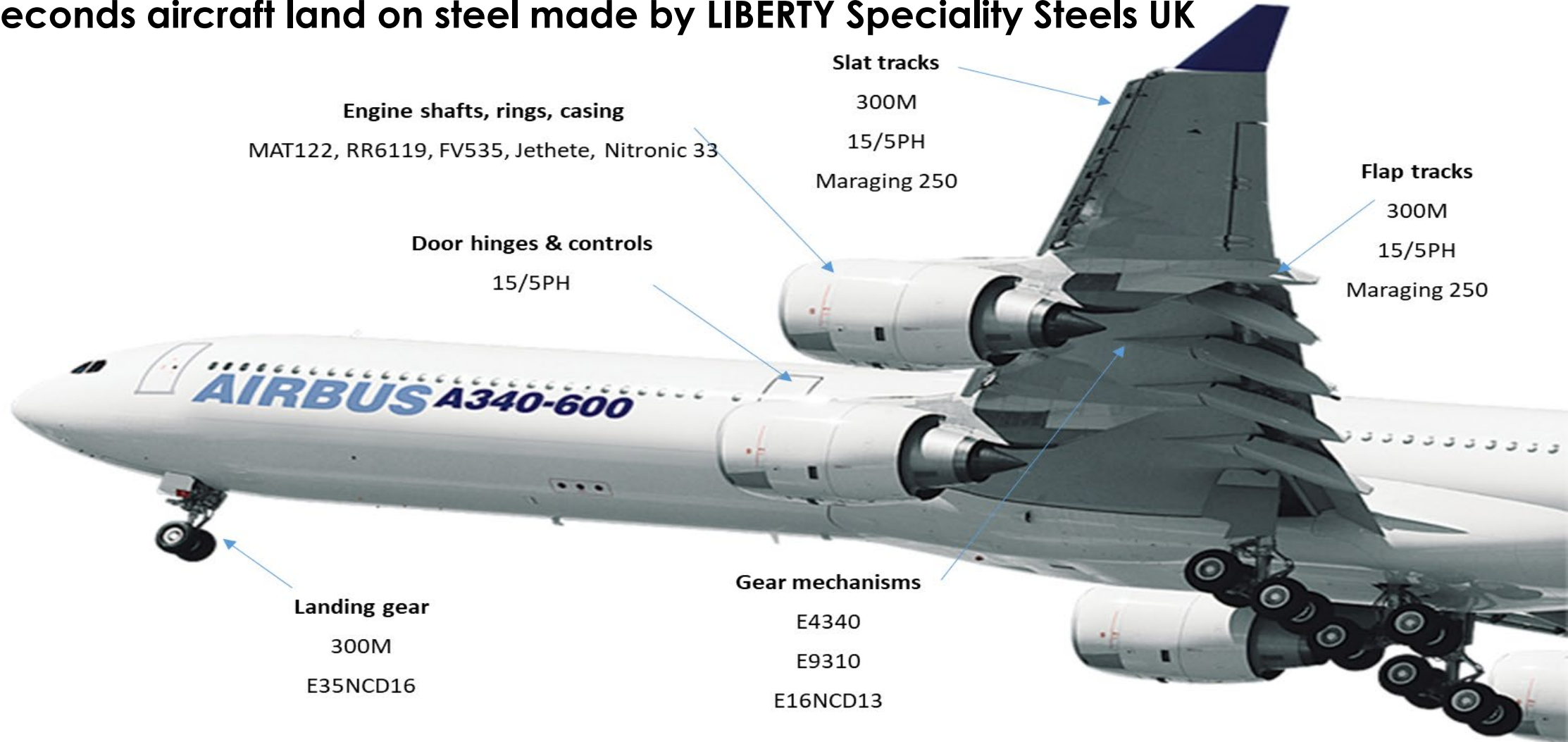




Aerospace Grade Steel

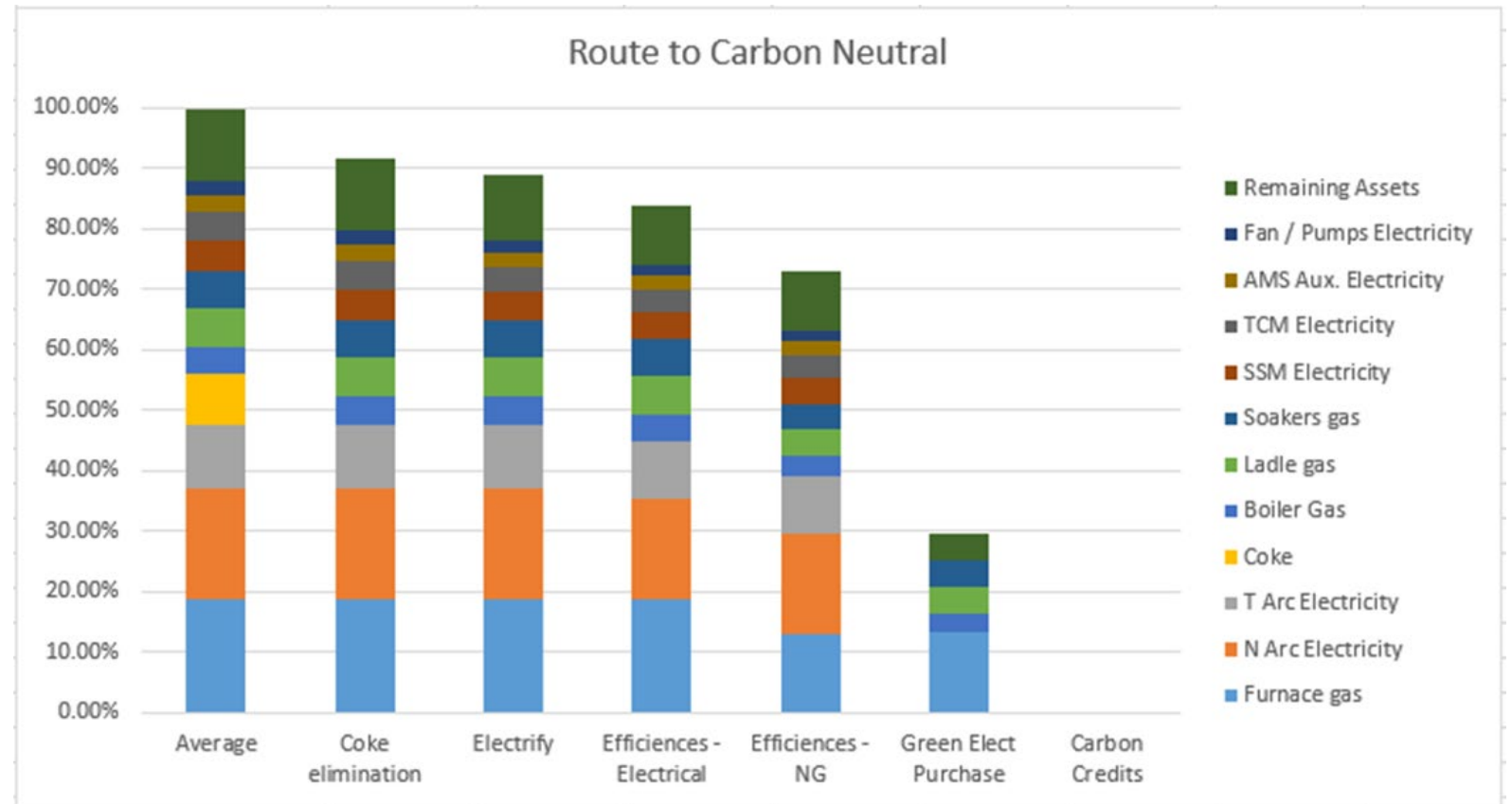
Every 3 seconds aircraft land on steel made by LIBERTY Speciality Steels UK



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.



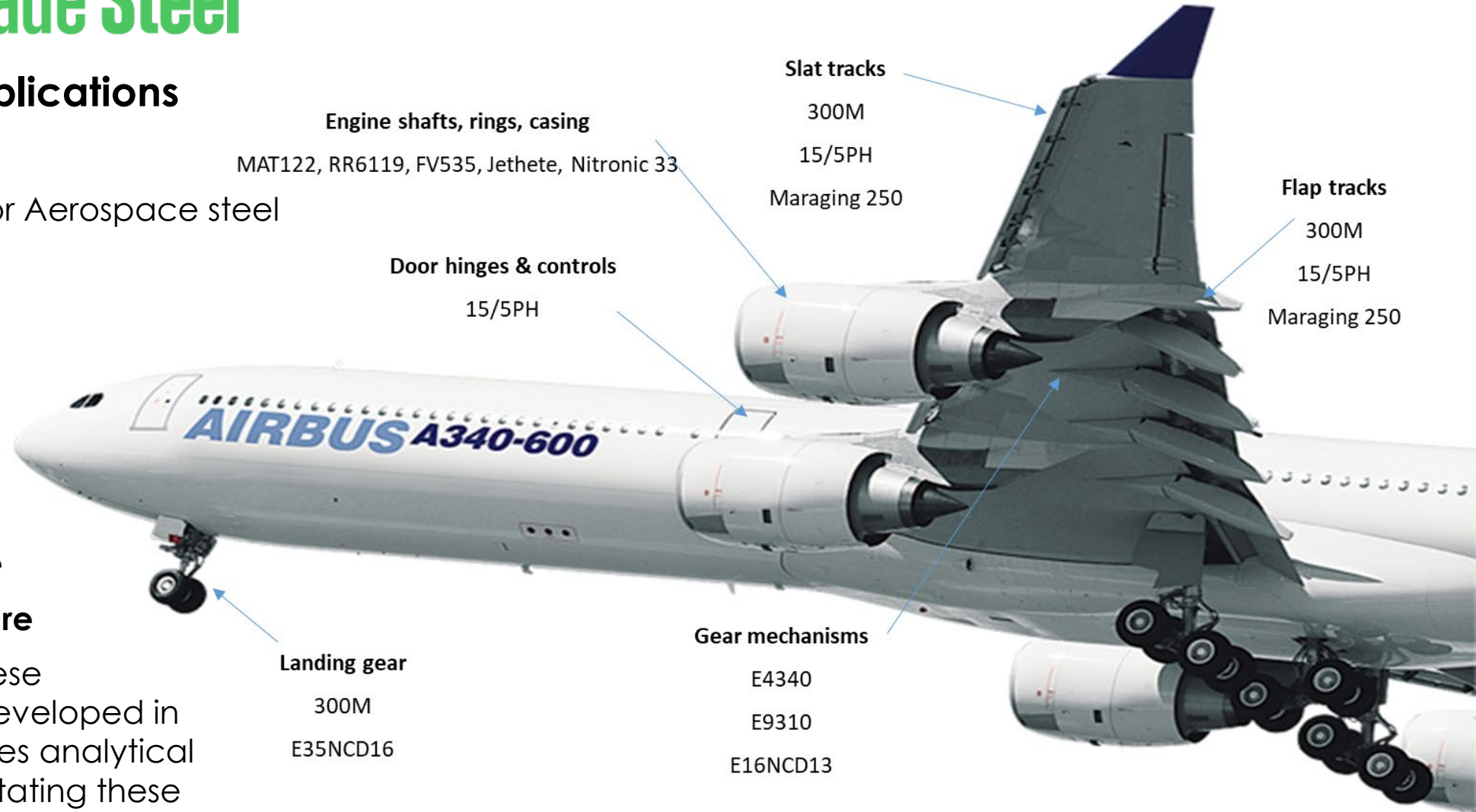
Aerospace Grade Steel

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



Aerospace Grade Steel

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 %
3B (Fragmentised)	29%	0.284
No1 Basic (oversize)	21%	0.375
No2 Basic (3mm)	15%	0.587
0A Demolition	10%	0.225
8A New Production	10%	0.055
6A Tin Cans	7%	0.78
9A,9D, 12A Cast Iron	8%	0.65

Aerospace Grade Steel

Analytical variability for aerospace steels allows for use of basic scraps

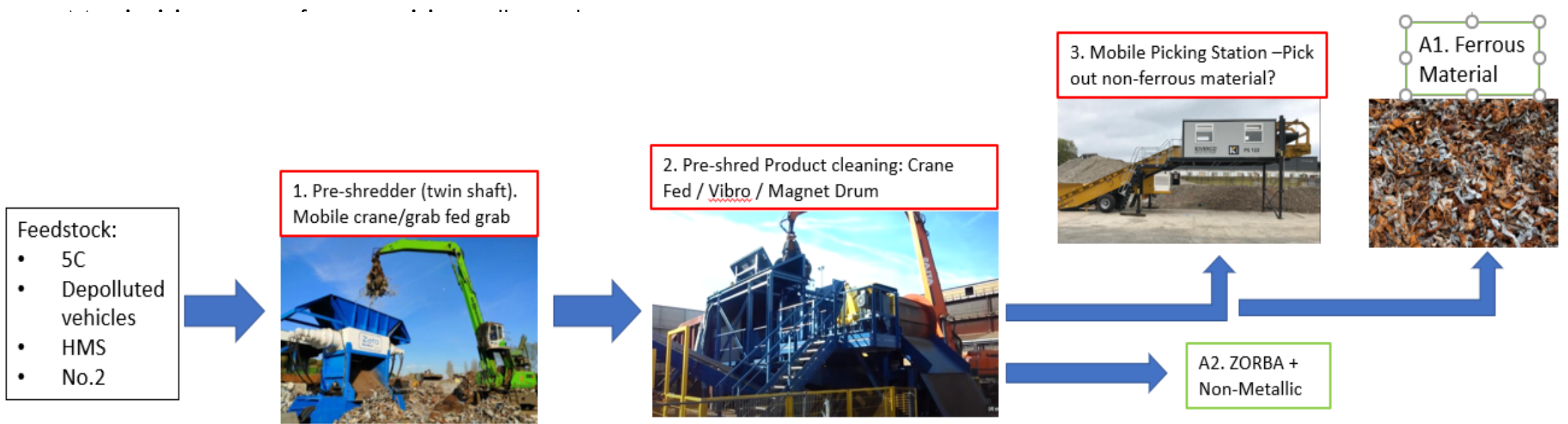
- 98 live Aerospace grades
- Wide range of aerospace specifications
- Alloying elements recovered from own arising scraps
- Higher residual levels allow for use of basic scraps.
- Scrap processing can reduce the copper content of scrap

	Phosphorus	Sulphur	Chrome	Molybdenum	Nickel	Copper	Tin
NCM steels Specification Range							
Highest Spec Max	0.04	0.015	3.5	2.3	4.3	0.5	0.06
Lowest Spec Max	0.007	0.0008	0.25	0.06	0.15	0.05	0.005

Aerospace Grade Steel

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





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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