METALUBE®

Technology Centre

- New product development is crucial to our business
- More than 20% of our UK staff are focused on developing new sustainable products
- Our Technology Centre is equipped with the latest state-of-the-art equipment

Metalube is a Carbon Neutral Company

Trees Planted in the Yorkshire Dales

GOLD 2023 ecovadis Sustainability Rating

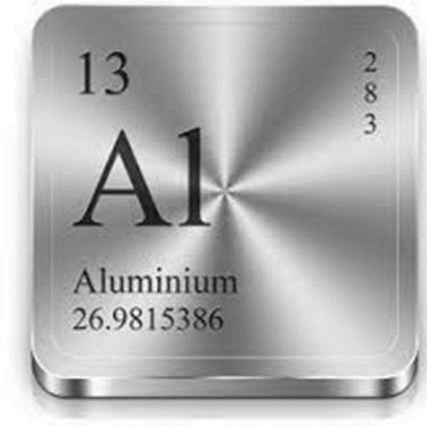
Ecovadis Gold Award

CARBON BALANCED PAPER

WORLD LAND TRUST™

Carbon Offsetting with the WLT

The Environmental Impact of the Aluminium Industry



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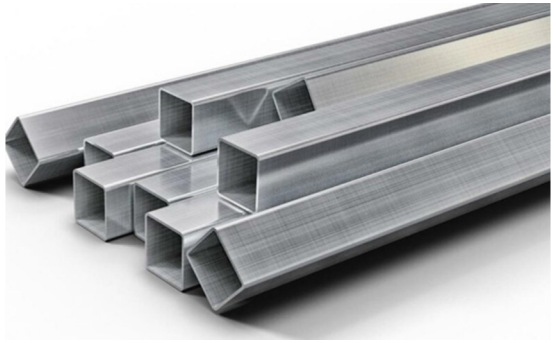
Why Aluminium



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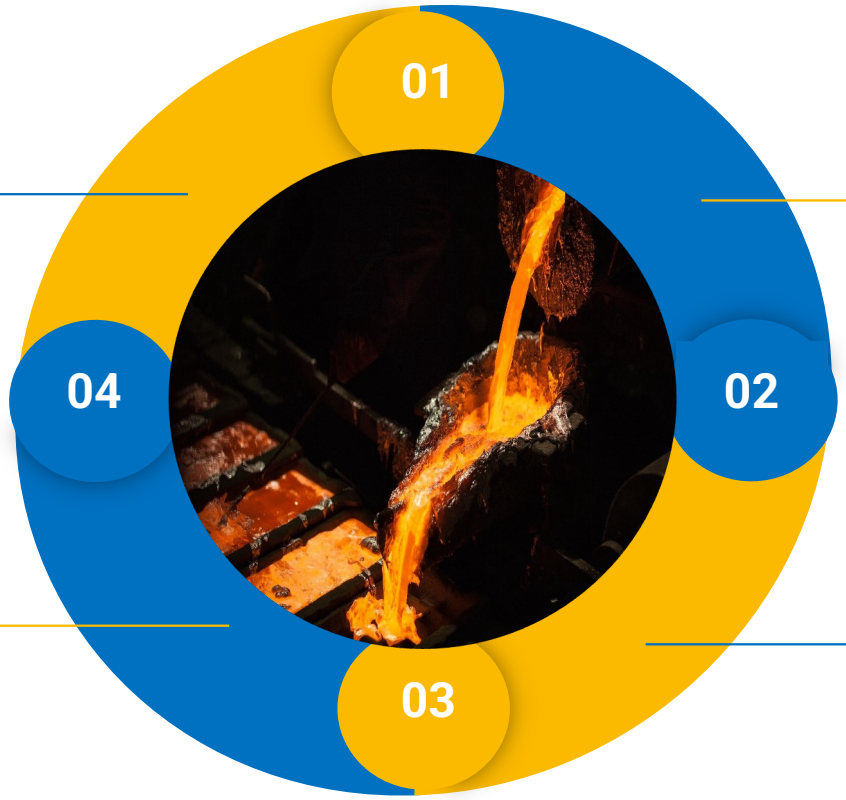
- Use of aluminium is inevitable
- How do we prolong the life of the aluminium assets
- How can we help minimise the Overhead Line Conductor industries carbon footprint

The Aluminium Industry: An Overview

01

Global Output of Aluminium 2021 was 67Mt.



02

1,175 Mt Greenhouse Gases

03

2% Global Emissions

04

10% of Aluminium produced used in Overhead Line Conductors

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The Sustainability of the Aluminium Industry

- 4 tons of mineral ore bauxite is required to produce 1 ton aluminium
- The 10 largest Bauxite mines involve surface mining practices - hazardous to human health and the environment.
- More than 70% of its energy consumption comes from fossil fuels
- Increasing of the proportion of recycled aluminium production
    - Energy requirements for recycled aluminium ~6% compared to that required from bauxite.

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CASE STUDY - EXAMPLE

- Ungreased ACSR conductor installed in a coastal region of Italy.
- After 5 years the conductor failed

- Fully greased conductor used in line replacement
- 15+ years conductor is still fully operational

CORROSION THEORY

Atmospheric Corrosion

Aluminium whilst a reactive metal is naturally passivated by a film of aluminium oxides.

Overtime the slow corrosion reaction occurs:

$2Al + 6H_2O \rightarrow 2Al(OH)_3 + 3H_2$

Atmospheric pollutants accelerate this reaction process.

Galvanic Corrosion

Caused when dissimilar metals are in contact with the presence of water and oxygen.

Galvanic Series:

- Zinc (-1.10V)
- Aluminium (-0.86V)
- Low alloy Steel (-0.68V)

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CORROSION IN PRACTICE

Product	-	Basic Grease	Formulated for Corrosion Resistance
Duration / Hours	**24**	**100**	**1000**
Q-Panels, Type S, SAE 1008. Preparation according to IEC61394/EN50326. ASTM B117 saltspray; 5%NaCl; 35°C			

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CASE STUDY - ASSESSMENT UNGREASED

ACSR				
Component	**CO_2 / kg**	**Material / kg**	**CO_2 / kg**	**CO_2 / %**
Aluminium	11.62	495	5742	90.88
Steel	1.56	334	533	4.83
Zinc	3.1	14	44	0.69
Total CO_2 / km		6319		
Material Life / Years		5		
kg CO_2 Contribution / Year		**1263**		

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CASE STUDY - ASSESSMENT GREASED

Greased ACSR				
Component	**CO_2 / kg**	**Material / kg**	**CO_2 / kg**	**CO_2 / %**
Aluminium	11.62	495	5742	90.03
Steel	1.56	334	533	8.35
Zinc	3.1	14	44	0.69
Grease	2.2	27	59	0.93
Total CO_2 / km		6378		
Material Life / Years		15+		
kg CO_2 Contribution / Year		**< 425**		

> 70% Reduction in GHS Emissions / yr

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CONCLUSION

- The aluminium industry has a large contribution to manmade GHG emissions, and the conductor industry is a large consumer of aluminium.
- The production of aluminium comes with a variety of sustainability hurdles
- Use of aluminium is inevitable
- We can help create a more sustainable future by prolonging aluminum conductor asset life
- Greased Vs Ungreased Conductor shows the longevity that can be achieved and with further grease innovations we aim to make aluminium conductors last longer
- Aluminium remains a key raw material in the future of energy distribution. Our duty to make a conductor as sustainable and carbon neutral as possible by seeking maximum payback on the spent emissions.