

ALUMINIUM RECYCLING

Aluminium Scrap Arisings and Recycling Rates

Aluminium is a versatile metal with a range of valuable properties. It is lightweight, ductile (malleable), resistant to corrosion, non-magnetic and has the ability to conduct electricity. As a result, aluminium is used in a range of sectors including transport, building and electrical applications and in the manufacture of packaging products. The automotive sector has increased its use of aluminium by almost 500% in the last 30 years, leading to improved fuel efficiency in cars as a result of lightweighting.

In 2001, the UK produced 1.17 million tonnes of aluminium ingot. Around 50% of this resulted from in-house fabrication recycling, 29% from primary aluminium smelting and the remaining 21% from old scrap. The UK exported around 0.26 million tonnes and imported around 0.34 million tonnes of aluminium as ingot, and as extruded and rolled products.

There are two types of scrap aluminium: new scrap which arises in industry from the manufacture and fabrication of aluminium and aluminium alloy products, and old scrap derived from end-of-life products. New aluminium scrap has a recycling rate of virtually 100%, and recycling rates for aluminium in waste transport and building products are high, estimated at 95% and 70%, respectively.

Aluminium is also used for packaging products, including aluminum beverage cans, aerosol canisters, foil and trays. In 2001, businesses obligated under the UK's Packaging Regulations reported 120,234 tonnes of aluminum packaging, of which 29,030 tonnes were recycled. This is equivalent to an aluminum packaging recycling rate of 24%.

Aluminium Recycling Operations

In the UK, primary aluminium is manufactured from imported alumina, which is produced from the aluminium ore, bauxite. Primary aluminium smelting requires heavy capital investment. There are two large primary smelters in the UK at Lynemouth and Anglesey, and one smaller smelter in the Scottish Highlands. UK primary production of aluminium amounts to 340,800 tonnes per annum.

In comparison, the capital costs of secondary aluminium production are less, and there are around 20 major secondary smelters operating in the UK, accepting both new and old scrap. Scrap merchants grade and densify aluminium scrap according to standard classifications for feedstock into the smelters. Used beverage cans tend to be collected separately from this scrap route, through local authority schemes and can banks. The UK has the largest aluminium can recycling plant in Europe, operated by Alcan at Warrington. Alcan invested £28M in the site, which has an annual processing capacity of 70,000 tonnes of waste beverage cans.

Aluminium recycling can be both economically and environmentally preferable to primary manufacturing of aluminium. Primary smelting of aluminium uses around 14 kWh to produce 1kg of aluminium, whereas the secondary smelting consumes only around 5% of this energy. Secondary smelting also avoids the environmental impacts associated with bauxite mining and alumina production.

Technical and Economic Barriers to Recycling Aluminium

It is technically feasible to recycle all old aluminium scrap, as aluminium can be repeatedly recycled into new products without deterioration in either quality or value. However, old aluminium scrap does require more preparation than new scrap, which is generally free of contaminants and of a more consistent quality. Additional pre-treatment prior to reprocessing into aluminium ingots is required to deal with coatings on used beverage cans and ferrous contamination of aluminium scrap.

The main barrier to increasing recycling of aluminium scrap is the ability to extract the aluminium component from the waste stream. The value of aluminium scrap is around 10 times more than the value of scrap steel and this high value encourages increased collection. Recycling rates are generally high for large arisings of aluminium waste in automotive and building applications.

Aluminium packaging products have a relatively low collection rate compared to other aluminium waste products, as arisings are smaller and geographically widespread. However, various factors are helping to improve these collection and recycling rates, including the Packaging Waste Regulations (see below) and the price of aluminium beverage cans. The value of baled aluminium beverage cans was around £730/tonne in 2002. This is partly due to the increased aluminium share of the can market. Around 75% of beverage cans were made from aluminium in 2001, compared with 60% in 1998. The market for aluminium recyclers is currently looking favourable.

Industry Initiatives

ALUPRO was formed in May 1999 from the merger of the Aluminium Can Recycling Association and the Aluminium Foil Recycling Campaign. ALUPRO work with local authorities, waste management companies, metal merchants (cash for cans centres), community groups, bank systems, schools programmes and kerbside systems to encourage the collection of aluminium packaging waste.

In November 1999, ALUPRO announced plans to target the collection of more waste foil from the domestic waste stream through two new routes - local authorities and cash-for-cans partners. Cash-for-cans centres pay cash to charities, schools and groups that collect aluminium cans. Foil suffers from greater levels of contamination than aluminium cans, although the value of waste foil currently stands between £400 and £450 per tonne (2002). This is hoped to drive the initiative.

Government Initiatives & Legislation

Packaging Waste Regulations

The EC Directive on Packaging and Packaging Waste is implemented in the UK through the Producer Responsibility Obligations (Packaging Waste) Regulations. The Directive required the UK to meet various objectives including the recovery of 50% of all packaging waste with a minimum recycling target of 15% recycling of individual materials, including aluminium, by 2001. The Directive targets are currently being reviewed and are likely to be increased. The UK Regulations have placed obligations on certain businesses in the packaging chain to ensure the recovery and recycling of packaging waste.

Accredited reprocessors of packaging are able to issue Packaging Waste Recovery Notes (PRNs) as evidence that recovery/recycling of packaging waste has taken place. Revenue from the sale of PRNs can be reinvested in recycling, for example in improving collection schemes.

Government Programmes

The *Waste and Resources Action Programme (WRAP)* was established in 2001 to promote sustainable waste management. WRAP's particular focus is creating stable and efficient markets for recycled materials and products.

WRAP is focusing on the 100 million tonnes of waste of commercial, industrial and municipal waste. There are seven programmes - three focus on generic areas –financial mechanisms, procurement and standards and specification. It also focuses on four specific materials – paper, glass, wood and plastic.

Further Contacts

Further information and publications on these issues and initiatives are available from the following sources:

Government Contacts

Department of Trade and Industry
Recycling Policy Section
Sustainable Development Directorate
151 Buckingham Palace Road
London SW1W 9SS
Tel: 020 7215 1036 Fax: 020 7215 5835
Web Site: www.dti.gov.uk/sustainability

Department of the Environment, Food and Rural Affairs
Waste Strategy Division
Ashdown House
123 Victoria Street
London SW1E 6DE
Tel: 020 7944 3000 Fax: 020 7944 6409
Web Site: www.defra.gov.uk

The Environment Agency
Head Office
Rio House
Waterside Drive, Aztec West
Almonsbury
Bristol BS32 4UD
Tel: 01454 624411 Fax: 01454 624409
Web Site: www.environment-agency.gov.uk

The Waste Resources Action Programme (WRAP)
The Old Academy
21 The Horse Fair
Banbury
Oxon OX16 0AH
Tel: 0808 100 20 40 Fax: 01295 819911
Web Site: www.wrap.org.uk

Industry Contacts

The Aluminium Federation Ltd
Broadway House
Calthorpe Road
Five Ways
Birmingham B15 1TN
Tel: 0121 456 6100 Fax: 0121 456 2274
Web site: www.alfed.org.uk

The Aluminium Packaging Recycling Organisation Ltd
1 Brockhill Court
Brockhill Lane
Redditch B97 6RB
Tel: 01527 597757 Fax: 01527 594140
Web site: www.alupro.org.uk

The European Aluminium Association
Av. de Broqueville 12
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Belgium
Tel : + 32 2 775 63 63 Fax : + 32 2 779 05 31
Web site: www.aluminium.org

Further Reading

Waste Strategy 2000 - England and Wales
(Part I and Part II)
Department of the Environment, Transport and the Regions
(DETR), 2000

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