LA TEST ALUMINIUM RECYCLING AND ENVIRONMENTAL TECHNOLOGY IN EUROPE

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ABSTRACT

Recycling of aluminium requires 5% of the energy needed to produce new aluminium from ore. Currently, there is increased market pressure to produce a cleaner and more cost effective product from scrap aluminium whilst minimising emissions to the environment and maximising fuel efficiency. The case for decoating is, therefore, overwhelming.

As the growth in the use of aluminium products, in general and coated products in particular, has proceeded so has the technology of decoating.

This paper presents and discusses the technology involved in successful decoating and the types of plant currently in use.

MARKETS FOR RECYCLING

To illustrate the size of recycling market in U.S.A. the amount of metal produced by secondary smelters (recycle melters) equalled 1,414,000 metric tonnes in 1990, which was larger than the entire primary smelting production in 1958.

In Europe can production and recycling is below that of U.S.A. but is growing fast.

DECOATING.

The objective of decoating is a straightforward one: to remove the coating, which may be paint, lacquer, plastic paper or oil with minimal interference to the aluminium surface. Whilst chemical solvent treatments are possible the most cost effective method is by thermal processing. There are three types of thermal processing plant in use for decoating, but the process technology is very similar and, therefore, the information given in this paper is generally applicable to all three types.

COATINGS.

It is not possible to give a single definition for the coloured coatings. A variety of chemical compounds are used which are predominantly organic and very volatile. Benzene and toluene are often present in small quantities. The inorganic component is usually restricted to the colouring and for added mass. Paint and lacquer suppliers have their own formulations and these are proprietary information.

Packaging material coatings also vary widely. Paper laminates may be 50% coating and plastic laminates significantly higher.

Increasingly, due to a large extent to tighter emission controls, oily scrap is being processed in a controlled environment. Oil contents be as high as 10% by weight and very often contain water from machining operations. Typically, the oils are of light grade used in forming operations.

TYPES OF SCRAP.

It is now possible to recycle the following types of aluminium scrap:-

<table>
<thead>
<tr>
<th>Material</th>
<th>Code</th>
</tr>
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<tbody>
<tr>
<td>Used beverage cans</td>
<td>UBC</td>
</tr>
<tr>
<td>New can stock</td>
<td>NCS</td>
</tr>
<tr>
<td>Used food cans</td>
<td>UFS</td>
</tr>
<tr>
<td>Mixed low copper</td>
<td>MLC</td>
</tr>
<tr>
<td>Painted siding</td>
<td></td>
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<tr>
<td>Extrusion and Swarf</td>
<td></td>
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</tbody>
</table>

Of these materials MLC, Painted Siding, NCS and Extrusions have traditionally proved difficult to process effectively.

MLC contains high levels of tramp materials yet it is the cheapest source of scrap material. Environmental regulations now preclude feeding it directly into the smelter.

Painted Siding is the product of coil coating lines. The coating contains higher than average levels of volatiles.

NCS is the spoil from beverage can production. NCS is degraded by lubricating oil used in the forming process.

Extrusions are typified by aluminium window frames. There is an increasing practice of bonding in polyurethane insulation foam.

Other difficulties can arise from the use of vinyl coatings in the latest generation of soft drink containers.