

ZINC *Protects!*

Closing the Loop

An Introduction to Recycling Zinc-Coated Steel

Michael Martin and Roger Wildt



This zinc-coated steel scrap will be recycled into new products



Closing the Loop

An Introduction to Recycling Zinc-Coated Steel

Michael Martin and Roger Wildt

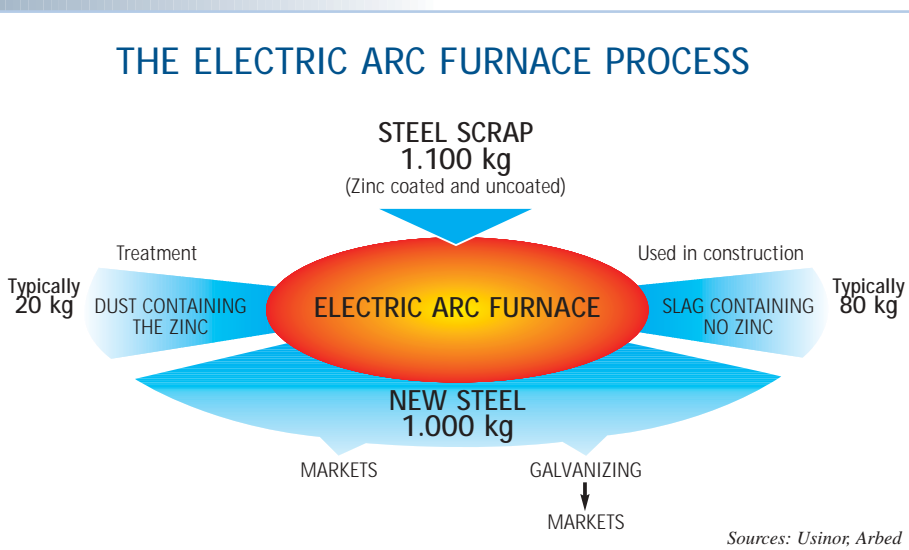
Zinc-coated steel comes with a "buy recycled" guarantee, since all of the zinc-coated steel you buy today contains some portion of recycled scrap.

A Sustainable Material

Zinc coatings lengthen the life of steel structures by keeping steel performing at peak condition. This benefit alone enables a huge conservation of natural resources by reducing the waste inherent with premature end-of-life. The recycling of zinc-coated steel adds to this conservation because energy requirements for re-melting steel and recovering the zinc are less than those required for producing the original metals. Steel and zinc both meet the objectives of an environmentally conscious society in search of sustainable materials.

For the zinc and steel industries, recycling of zinc-coated steel provides an important new source of raw material. The recycling loop is endless - both zinc and steel can be recycled again and again without any loss of their physical or chemical properties.

The Recycling Process



Most steel products are recycled at the end of their service life. Zinc coated steels are easily collected and treated in existing process streams. The Electric Arc Furnace (EAF) is the most widely used process for recycling zinc-coated steel. The high temperatures cause zinc - which is volatile at high temperatures - to leave the furnace along with other gases. The gas stream is treated and the zinc collected in the dust, of which zinc (18-35%) and iron are the main constituents. These dusts undergo an enrichment process in a rotary kiln, known

as a Waelz kiln. This leads to the production of zinc oxide, which in turn becomes a raw material for the production of zinc metal. Several new technologies are in use or under development for processing EAF dusts and the valuable metals they contain.

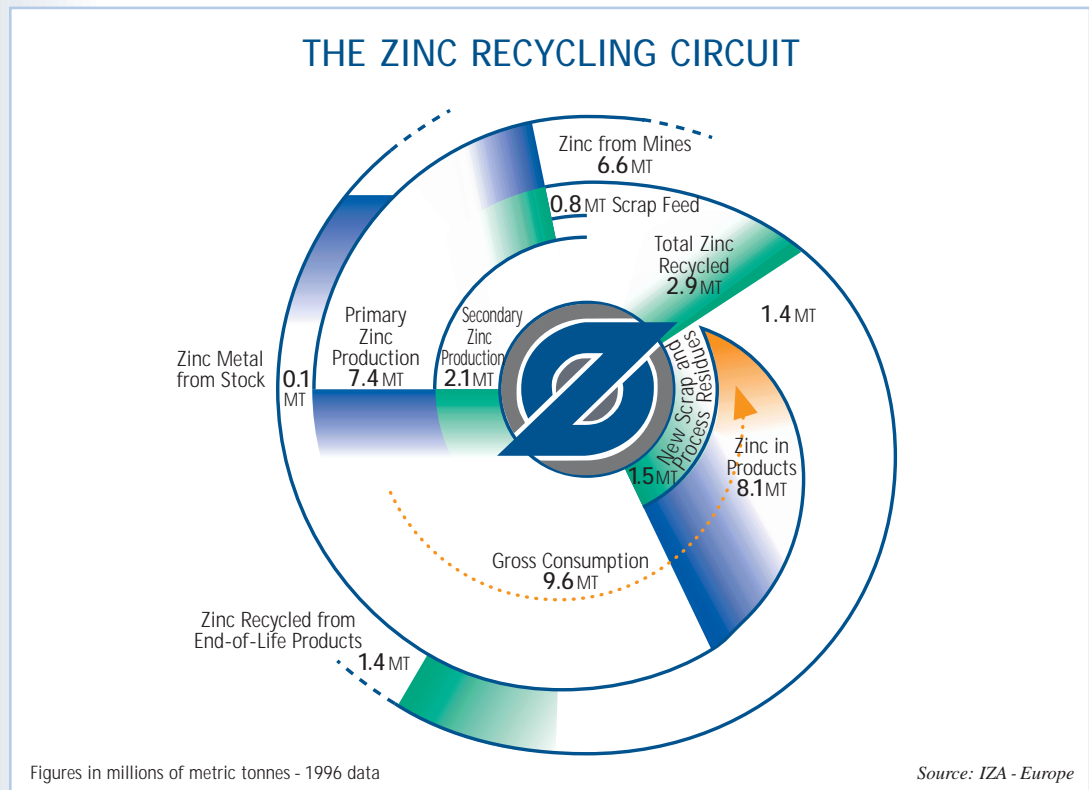
Michael Martin and Roger Wildt are consultants to International Zinc Association

The Growing Resource

Zinc-coated steel for recycling is obtained today from three sources:

- Scrap arising during the production of galvanized steel sheet
- Scrap generated during product manufacturing and installation
- End-of-life products

Due to great variations in product life-span, the rhythm of zinc recycling from end-of-life products is very variable. The amount of zinc-coated scrap steel available for recycling, however, has been rising over the last ten years in parallel with the growing use of galvanized steel.



Production scrap from continuous galvanizing lines is recycled along with scrap from assembly lines for cars, washing machines and refrigerators. In fact, virtually all of the zinc-coated steel scrap that arises during production processes, product manufacturing and installation, is recycled.

The majority of zinc-coated steel sheet, however, is still in the marketplace in the form of cars, appliances and building products. Zinc-coated steel and other zinc products are slow to enter the recycling circuit by the very nature of their durability. Many zinc-coated steel products have long life-spans, ranging from 15 years for cars to 25-100 years for building products. Street lighting columns, for example, typically remain in service for 40 years or more, and transmission towers for 70 years. They are usually replaced due to obsolescence rather than corrosion.

***In North America,
over 13 million cars
and 46 million
domestic appliances
– all made with
zinc-coated steel –
are recycled
each year.***



Nearly 70% of zinc from end-of-life products – the so-called old scrap – is recycled. Old zinc scrap consists of die cast parts, brass objects, end-of-life vehicles, household appliances, old air conditioning ducting, obsolete highway barriers, street lighting and so on. Each year, nearly 3 million MT of zinc are recycled in this way.

Over the next ten years, the supply of zinc-coated steel scrap is expected to increase by more than 50%, with the highest increase coming from the automotive sector. Thus the amount of zinc-coated steel scrap recovered - via recycling - from production processes and old products will increase from 6.5 million MT (1995) to over 10 million MT in 2005.

An Electric Arc Furnace

All types of zinc-coated steel products are recyclable. Both technology and recycling capacity are being developed in response to environmental awareness and the need for new supplies of raw materials.

Case Study: Recycling a Zinc-Coated Steel Lighting Column

The service life of a zinc-coated steel lighting column is at least 30 years. It usually ends not because the steel has corroded but because of accidental damage or because the column has become obsolete. The column is returned to the highway authority's maintenance yard and sold for scrap. The scrap merchant cuts the column in pieces and sells it to

a supplier of scrap to the steel industry. The column pieces then become part of the feedstock for an Electric Arc Furnace. The steel component of the column is recovered as steel. The zinc coating oxidises and enters the furnace dust, from where it is recovered and becomes part of the feedstock for producing new zinc.



For further information about recycling zinc, two more brochures are available from IZA

*Zinc Recycling - The General Picture
(English, French, German, Spanish)*

*Zinc Recycling - Zinc Coated Steel
(English, French, German, Spanish, Italian)*

Published by International Zinc Association (IZA), 168 Avenue de Tervueren, 1150 Brussels - Belgium
Tel: 32.2.7760070, Fax: 32.2.7760089, Email: email@iza.com, Internet: <http://www.zincworld.org>

The Zinc logo is a registered trademark available to producers and users of zinc. For information, contact IZA.

