

# zinc

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Metaullics

Movement of molten zinc is characterised by levels – pumps deliver metal to its points of use

## Molten metal master

Established for over 50 years, Metaullics Systems specialises in molten metal pumping and processing equipment for aluminium, magnesium and zinc, and provides related systems for their treatment and purification.

The firm is a division of the Pyrotek Incorporated Group of Companies – a privately owned business with headquarters in Spokane, Washington, USA. Pyrotek specialises in the development, manufacture and supply of high temperature materials, technologies and engineered systems for molten metal management and other metallurgical applications. The group has manufacturing units and sales offices at over 60 locations worldwide and supplies a wide range of products for liquid metal distribution, treatment and filtration.

It was the combination of Pyrotek's global reach with Metaullics' complementary range of technologies that resulted in Metaullics joining Pyrotek as a new division in February 2005. Richard Chandler, general manager, Metaullics Systems Division, formerly president of Metaullics, commented on joining Pyrotek: "Metaullics has excellent products, but in many cases lacked the resources to service the worldwide market as thoroughly as we would have liked. Pyrotek is much better represented to take our products to market globally, especially metal treatment products for foundries."

Today, Metaullics' head office and major

In some respects the zinc industry has lagged behind technology trends in other areas of non-ferrous metal production, but Metaullics Systems is now bringing its knowledge of molten metal technology in aluminium production to the zinc sector. Richard Barrett asks the head of Pyrotek, of which Metaullics forms a major division, to outline Metaullics' strategy and products.

manufacturing facilities are located in the USA and Metaullics Systems Europe, with headquarters in the Netherlands, provides warehousing, sales and distribution in Europe and the Middle East, and offers direct technical support and service on a local basis. Metaullics also supplies electromagnetic pumping technology through its affiliate company EMP Technologies, in the UK.

Metaullics' pump products are used in segments of the aluminium industry including primary smelters, secondary melters and alloyers, non-ferrous foundries and die-casters and recyclers. Its recent focus on the needs of the zinc and galvanizing industries has resulted in several innovative technologies specifically for companies operating in them.

Combining the skills and technologies of Pyrotek and Metaullics has created a one-stop supply chain of technical support and

products useful for processing aluminium, zinc, lead and other non-ferrous metals, such as magnesium. Metaullics Systems is an ISO 9001 certified company.

Metaullics contributes about 20% of Pyrotek's revenue. Allan Roy, Pyrotek president and ceo, says: "Their technologies appealed. They were in some areas that we weren't, and we believed that they were better in some areas that we were in. That has proven to be the case."

Roy stresses the importance of innovation and development to Pyrotek: "There is a real need for technology and improvements in the zinc industry. I'll be very disappointed if in five years' time we are doing the same in zinc as we are now."

He says that a lot of the technical issues that have been solved in the aluminium sector still exist in the zinc industry: "The aluminium industry is bigger and major companies with large research centres

have spent huge amounts on making better quality products."

But now there is a growing demand for higher quality in the zinc industry too: "Better metal can be delivered through the greater use of ceramics and refractories over steel. Continuous galvanizers still have quality problems in their systems. Some are using 30 to 40-year-old technology. They now have a great opportunity to change and we want to be a driving force in doing that."

He also points to the reduction in the numbers of staff engineers in zinc businesses: "A whole level of management has gone and customers now say: 'We want help'." Pyrotek has its own r&d centre in Quebec, Canada, with 20-30 staff and a metal research centre in the UK.

"Pyrotek will be creating a separate zinc division this year and Metaullics will be a key part of that," says Roy. "Business is good. Sales are increasing and we're very happy. I think any company that is not doing well in current markets must be doing something wrong."

John Fryatt, Metaullics Systems zinc product manager Europe, confirms the enthusiasm of the zinc industry: "We are seeing growing interest in the galvanizing business – both in general HDG and now in continuous galvanizing too. For both strip steel and wire, continuous galvanizing projects are working out. The primary sector is coming on as well: there is growth all round."

Beyond its well established range of pumps for molten metal, Metaullics has two technologies designed specifically for the zinc industry: MSA® superalloys; and its MZR zinc recovery system (see panels).

The latest application for the superalloys is in galvanizing: "We have a brand new technology to use Metaullics' MSA superalloys on submerged galvanizing rolls, laid down as weld overlay over the whole roll to improve roll life and resist dross adhesion. MSA superalloys are available in a range of formulations tailored to various bath chemistries," says Fryatt.

For the MZR equipment, the company is investigating sales and hiring options: "There is value locked up in waste products. We are still looking at different options with customers – both permanent installation on site or, perhaps for smaller galvanizers, toll processing; possibly at a central location." On this point Roy adds:

"We are still listening carefully to customers. It is still too early to say what they will be deciding."

Fryatt believes parts of the zinc industry have been missing an opportunity: "We can provide benefits for productivity with a waste management approach. We have observed a very big reluctance amongst galvanizers to form a closed loop, preferring to let someone else buy their skimmings, dross and residues instead. Our equipment can recover the useful and valuable zinc to go back into their systems – not only in the secondary industry and galvanizing, but in the primary sector too."

Further afield, he sees applications in land reclamation: "There is a lot of contaminated land in the 'old world'. Our work on waste management could be transferred to environmental applications... land management is especially important in Europe," he concludes.

## METAUILLICS PRODUCTS

Metaullics Systems is a global supplier of molten metal pumps, distribution systems, alloying systems and scrap and waste recovery systems for all sectors of the zinc primary, secondary and die-casting industries. It is rapidly developing its technologies in molten metal and dross management activities on continuous galvanizing lines and with general hot dip galvanizing processes and procedures.

## MOLTEN METAL PUMP SYSTEMS

Molten metal pumps are used to transfer and to circulate liquid metal. Some can be fitted with custom filters to deliver clean, filtered metal at the immediate point of use. For galvanizers, pumps are used to empty galvanizing pots and kettles in HDG operations and to manage top dross accumulations in the snout of continuous galvanizing lines.

Transfer pumps work against gravity and overcome the limitations of gravity-fed systems. Their applications include furnace-to-furnace transfers, furnace-to-ladle transfers, furnace-to-laundry transfers, furnace-to-casting machine transfers and transfers to pouring large ingots, sows and castings. They improve plant safety by eliminating furnace tap-outs and provide an economic alternative to tilting furnaces. Productivity is improved by delivering metal directly to the point of use and by

## Main product types

- Centrifugal and electromagnetic molten metal pumps for aluminum and zinc applications.
- Systems for molten aluminium filtration and degassing.
- Filter media for molten aluminium.
- Integrated systems for treating and melting light-gauge aluminium scrap.
- Treated and purified graphite tubes and rods.
- State-of-the-art components for continuous galvanizing.

## MSA alloys

Metaullics Systems has developed superalloys specifically for long-term stability and service in galvanizing, galvanneal and Galvalume alloys. Called Metaullics Super Alloys (MSA), each patented formulation optimises material properties for uses that include bearings, pump inserts and rolls.

These specially designed alloys are said to exhibit:

- very low solubility in molten zinc/aluminium alloys;
- minimum aluminium diffusion into the material during service;
- low surface adhesion of zinc/iron and zinc/iron/aluminium dross;
- high surface hardness;
- excellent dimensional stability to 700°C;
- high thermal shock resistance.

pumping "on demand" with an easily controlled flow rate.

Transfer pumps can be driven by an electric or an air motor. The choice of drive is generally determined by the sensitivity of control required, the discharge volume needed or the head of metal to be managed. Transfer pumps share many common features with circulation pumps, but differ in their operating base designs, which are modified for discharge to a riser. The pump normally remains permanently in the furnace well and is activated whenever metal delivery is required. Metal is then pumped above the liquid metal line of the furnace and delivered to the required point of use.

