

Mechanical Vacuum Systems for Steel Degassing



 **EDWARDS**

Vacuum science... product solution.

Mechanical vacuum systems for steel degassing

Which vacuum technology do you choose when you're building a new steel degasser or upgrading an existing system?

Dry mechanical pumps or steam ejectors? It's a key decision.

For VD, VOD and RH processes, the smart money is on dry technology. Increasingly mechanical dry pumps are replacing traditional steam ejectors as the vacuum technology of choice for new installations, and the trend is accelerating. It is not hard to see why.

Lower running costs and improved productivity are just two of the reasons. Dry pumps have been proved to reduce energy costs by as much as 97% compared to steam ejectors.

High reliability and dependable performance are also key factors, given the exceptional demands that secondary metallurgy processes can make on vacuum equipment.

Higher pumping speeds, lower ultimate vacuum, minimal maintenance and lower environmental impact all lend further weight to the case for mechanical dry pumps.

Dry or steam? The choice is yours



Edwards leads the way

Edwards leads the way in vacuum for secondary metallurgy by a considerable margin. Our leading market position is built on our understanding of customers processes and our expertise in providing vacuum solutions for VD, VOD and RH processes.

Edwards has by far the largest installed base of dry pumps in the global steel industry, including the world's largest mechanical vacuum pumping system, in China. Used for degassing 230-tonne batches of liquid steel, the system has a pumping capacity of 1,000,000 m³/hr at 0.67 mbar.

Yet our systems require the fewest number of pumps per tonne. Moreover, Edwards pumps can be easily integrated into existing systems, with as much or as little technical support as you need.

Edwards can take care of the commissioning and start-up phase onsite. We can assist with integration of controls into the customer's device management system, fine-tuned to the particular process. And we offer a comprehensive range of options for aftersales service, maintenance and repair.

We don't just supply vacuum pumps. We provide solutions, and the system that's right for you.





VD and VOD Processes

Processes in the growing secondary metallurgy sector depend on several vacuum-based treatments: Vacuum Degassing (VD) for alloy steels; Vacuum Oxygen Decarburising (VOD) for stainless steels; and combinations of both treatments, for example Vacuum Degassing Oxygen Blowing (VDOB) and Vacuum Carbon Decarburising (VCD), for low and ultra-low carbon steels.

These processes operate at varying vacuum levels, with different process gas loads, and in differing types of vacuum vessels, including tank, ladle, ladle to ladle, stream and RH designs.

Edwards vacuum systems have been successfully applied to all these secondary metallurgy processes at customers production facilities around the world. Modular system design enables degassing and decarburising melt sizes up to 200 tonnes in electric steelmaking facilities (mini-mills).

RH Processes

In large integrated steelmaking facilities, typically equipped with basic oxygen converters, secondary metallurgical processing is carried out mainly in Ruhrstahl Heraeus (RH) systems.

These facilities process steels in ladle sizes of over 400 tonnes and require much larger pumping capacities - up to 1,000,000 m³/hr or more. Until a few years ago, RH plants were considered too large for dry mechanical pumping systems. But technological advances and successful installations mean that the huge potential for dry pump technology in this process is now being recognised.

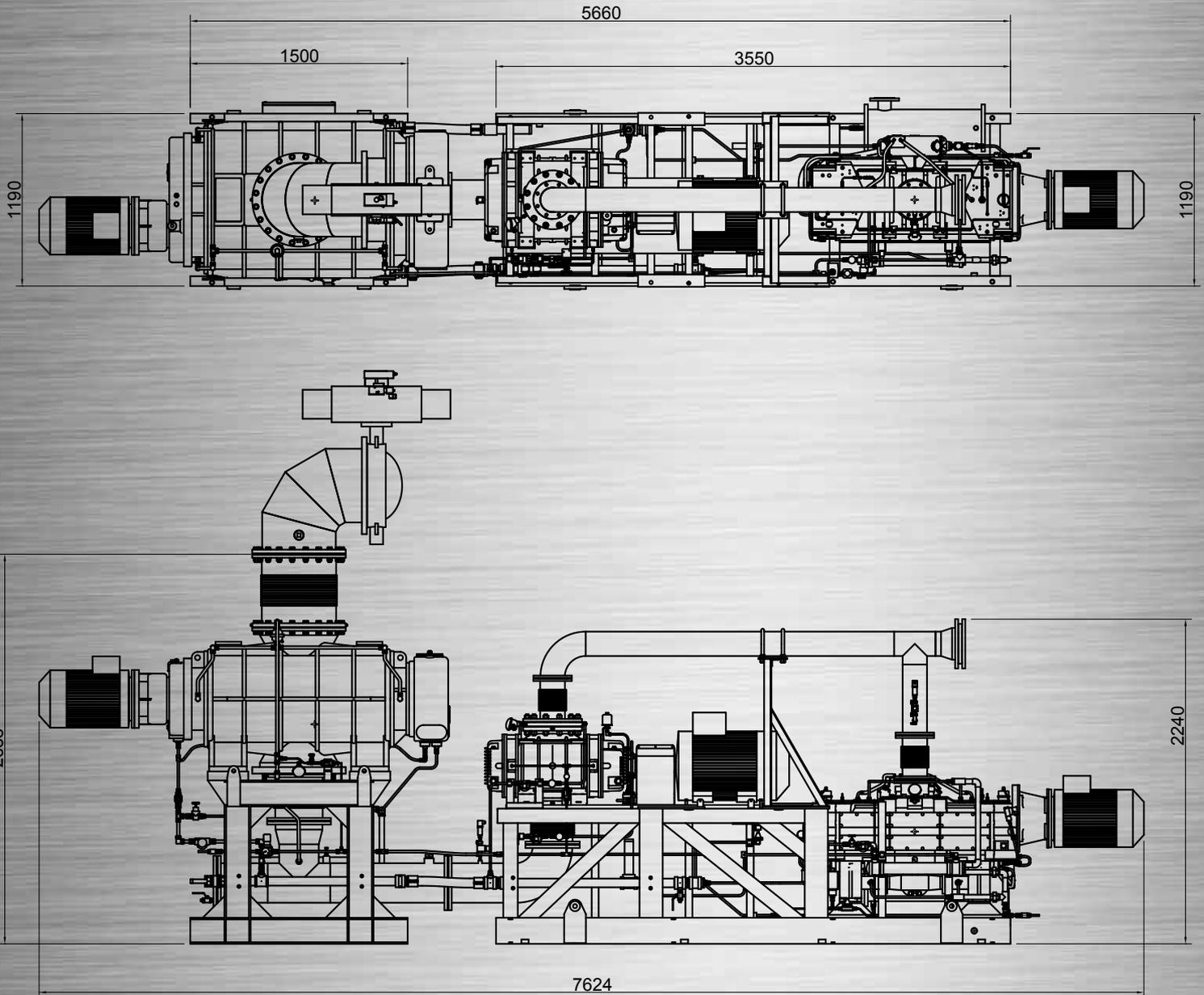
Edwards has developed a 'super' degasser module to address the high volume flow rates needed to successfully degas and decarburise steel products, using multiple high volumetric flow boosters in parallel to handle the gas loads produced, while optimising the total number of system elements required.

Whether you are planning a new installation at a greenfield site or upgrading/replacing an existing installation, Edwards is your vacuum partner of choice.





General Assembly Technical Specification



Note: this is an example of a typical steel degassing module system for VD applications. Edwards systems can be adapted for individual customer requirements



Operating costs comparison

Operating Costs	Steam Ejectors	Dry running pumps including filter
	€/tonne	€/tonne
Energy and fluids	1,6041667	0,0282000
Maintenance	0,5694556	0,0042014
Spares	0,0100000	0,0300000
TOTAL COST	2,1836222	0,0624014
Saving	0%	97%

On a typical VD plant processing 300,000 tonnes of steel per year, the operating costs of a modular dry pump system can be less than 10% of the equivalent steam ejector system.

Aftersales service

Dry mechanical pumps require minimal maintenance, but all vacuum equipment needs servicing at some point. No matter how simple or complex your requirement, Edwards has the service solution that's right for you.

With a global installed base of 750,000 pumps, we understand how vacuum pumps and systems perform in real life. We know how to get the best from our products, whatever the application, we know how to look after them.

Whether it's quick telephone support, routine maintenance or establishing a complete embedded engineering team on site, Edwards is your vacuum partner of choice.

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