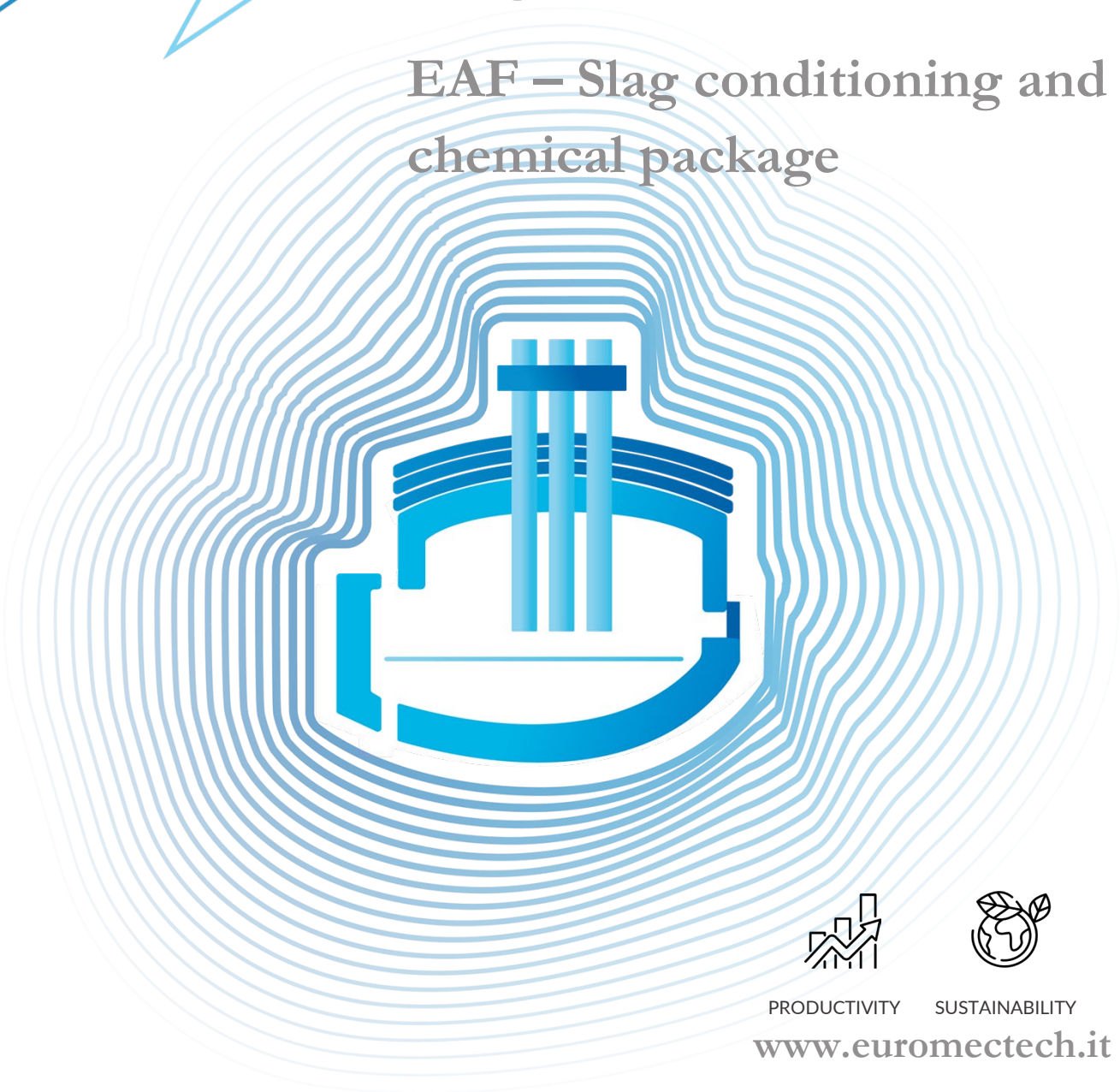
EUROMEC

ENGINEERING AND INDUSTRIAL SYSTEMS

EUROMEC

EAF – Slag conditioning and chemical package



PRODUCTIVITY SUSTAINABILITY

www.euromectech.it

EUROMEC is a leading company in the field of Slag Conditioning and chemical packages for the steelmaking industry.

These packages are linked to EUROMEC strategy to create value for its customers in term of:

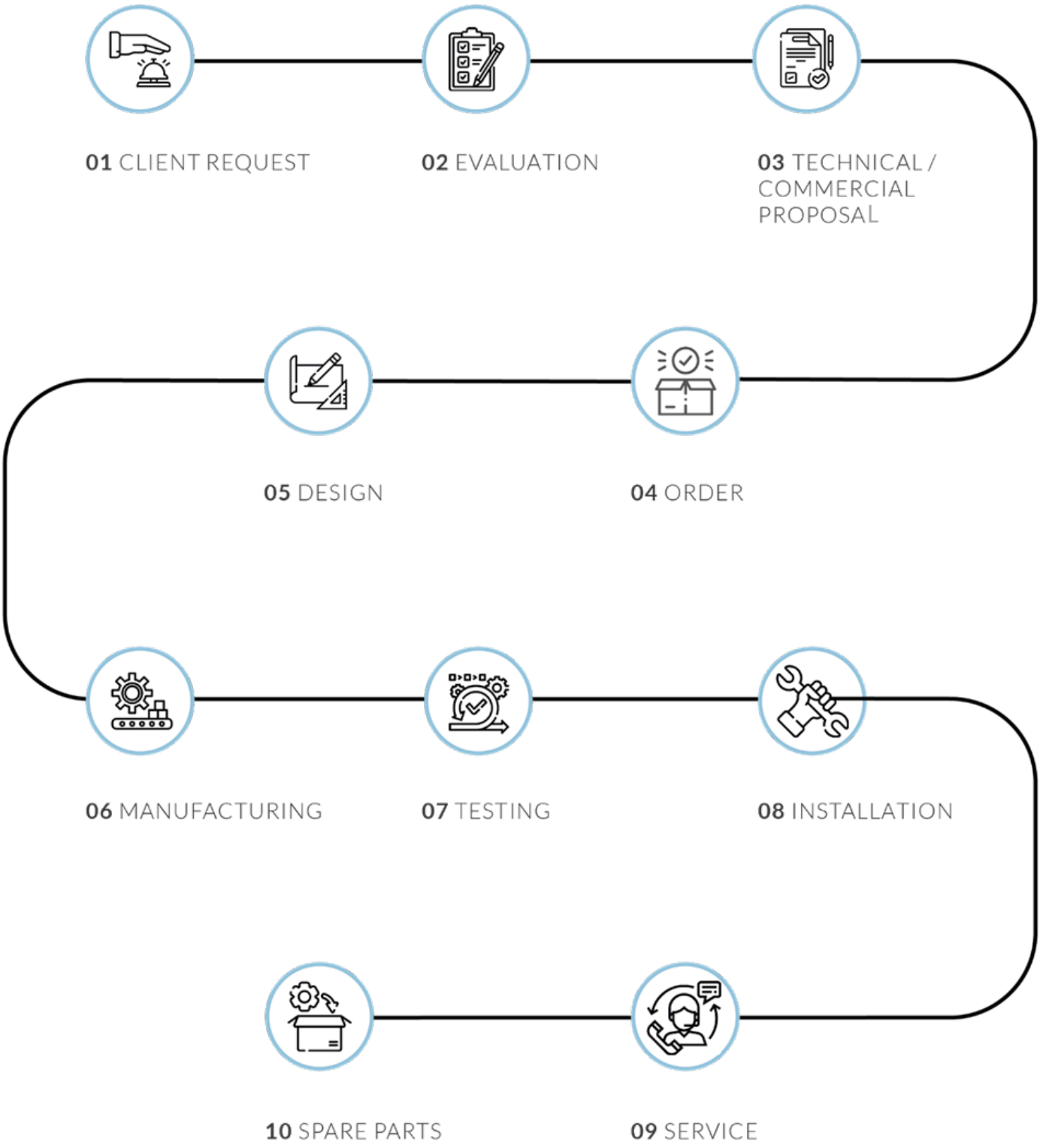
Improving the
PRODUCTIVITY

Improving the
SUSTAINABILITY

A solid and reliable design is clearly linked to EUROMEC reputation following 30 years of history.

EUROMEC, a better everyday life for industrial people.

Euromec's services



Euromec EAF Slag Conditioning and Chemical Packages

Electric Arc Furnace is driven by a complex and dynamic process. A proper use and balance of electrical and chemical energy (mass and energy balance).

A wise use of chemical energy is linked to the optimization of:

- Metallic charge melting control
- Combustion control
- Slag chemistry conditioning:
  - Iron Oxide control
  - De-phosphor. control
  - Oxidize carbon, silicon, etc.
- Foaming slag practice
- Refractory life

EUROMEC EAF Slag conditioning and Chemical Package is a state of the art, solid and reliable package supporting the furnace operator in a productive, safe and sustainable way.

Hereinafter please find the description of:

- Euromec pneumatic carbon storage and injection system
- Euromec pneumatic polymers storage and injecion system
- Euromec pneumatic lime storage and injection system.

Carbon storage and injection system

Euromec carbon injection system is designed to provide a controlled carbon flow rate to EAF process with the proper accuracy.
The accuracy of the regulation in term of flow rate stability and the reliability of the system are key factors for the EAF process regulation allowing a dynamically regulated foaming slag practice.

TYPICAL ARRANGEMENT:

Carbon Storage bin
The bin designed with a suitable volume to be defined according to EAF process requirements. The bin is equipped with a carbon continuous level monitoring system and further instrumentation to be able to assist the EAF process automation. The end cones are fluidized. Carbon moves from a Carbon Storage Bin to a Carbon Pressurized Dispenser.

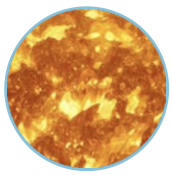
Carbon Pressurized Dispenser
A pressurized dispenser, with a suitable volume to be defined according to EAF process requirements, is a suitable technology to guarantee the proper carbon flow rate (30÷60kg/min each line) to the EAF Carbon Injectors. Design and technology of the Euromec Pressurized dispenser are confidential.

The Pressurized Dispenser is equipped with a dedicated weighing system with a weight measurement accuracy of ± 0.05% per cell. The Pressurized Dispenser is equipped with:

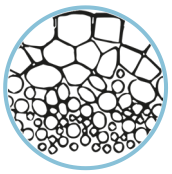
- a special fluidizing bottom (an Euromec confidential design solution);
- valves and instrumentation rack;
- **a proprietary proportional pneumatic valve with special antiwear coating and other special solutions are part of the Euromec design.**

Weighing system, valves, special proportional valve, and instrumentation is a suitable architecture for the proper EAF process automation control.

FEATURES



FASTER SLAG CONDITIONING



FOAMY SLAG

SHORT-TERM RETURN ON INVESTMENT

PRODUCTIVITY SUSTAINABILITY

Euromec pneumatic polymers storage and injection system

Euromec polymers injection system is designed to provide a controlled polymers flow rate to EAF process with the proper accuracy.
Polymers injection in the EAF is an INNOVATIVE trend for carbon substitution in the EAF process.

The main avvantages of this trend are:

- **Environment: CO2 emission reduction**
- **Costs: polymers/recyced polymers are a cheaper option in term of costs compared to the carbon.**

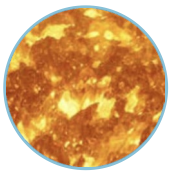
TYPICAL ARRANGEMENT:
Polymers Storage bin
The bin designed with a suitable volume to be defined according to EAF process requirements. The bin is equipped with a continuous level monitoring system and further instrumentation to be able to assist the EAF process automation. The end cones are fluidized. Polymer moves from a Storage Bin to a Pressurized Dispenser through an Euromec's architecture specifically designed for the Polymers.

Polymers Pressurized Dispenser
A pressurized dispenser equipped with a proprietary Euromec design (dedicated to the polymer material) is a suitable technology to guarantee the proper polymer flow rate (30÷60kg/min each line) to the EAF Polymer Injectors. Design and technology of the Euromec Pressurized dispenser are confidential.

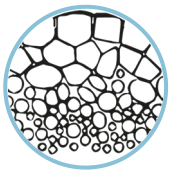
The Pressurized Dispenser is equipped with a dedicated weighing system with a weight measurement accuracy of ± 0.05% per cell. The Pressurized Dispenser is equipped with:

- a special fluidizing bottom (an Euromec confidential design solution);
- valves and instrumentation rack;
- other Euromec specific arrangements.

FEATURES



PROPER SLAG CONDITIONING



FOAMY SLAG

COST REDUCTION COMPARED TO CARBON

CO2 EMISSION REDUCTION

SHORT-TERM RETURN ON INVESTMENT

PRODUCTIVITY

SUSTAINABILITY

Weighing system, valves, specific arrangements for Polymers and instrumentation is a suitable architecture for the proper EAF process automation control.

Euromec Polymers Injection System

The Euromec Polymers Injection System design is the result of few years of investments for the product development.
Several tests in several meltshops in the north of Italy have been performed over the past 4 years thanks to Euromec pilot test plants.
Following this extensive experience Euromec is now able to design and supply a proper dedicated technology for the Polymers injection in EAF.
On this perspective we are market leaders with 4 (four) industrial scale plants already installed and running starting since 2020.


PRJ2
PRJ1

Euromec pneumatic lime storage and injection system

The Euromec Lime Injection System is specifically designed to meet the demands of the steelmaking process for injecting lime powders. This system ensures a controlled flow rate of lime with high accuracy to EAF processes.
Compared to charging lime lumps through a scrap bucket or the EAF roof 5th hole, lime powder injection is considered the best practice. It offers several expected improvements, particularly in the control of slag conditions and the slag foaming process:

- **Reduction in lime consumption**
- **Decreased electrical energy consumption**
- **Lower on power on time**
- **Overall cost savings through extended refractory life and reduced consumption of O2, CH4 and C**
- **Improved steel quality, including lower N incorporation and optimal dephosphorization practice**
- **Environment benefits with reduced lime and/or fluxes dust in the Meltshop environment**

The accuracy of flow rate regulation and the system's reliability are crucial factors for effectively controlling the EAF process, enabling dynamic regulation of slag conditioning practices.

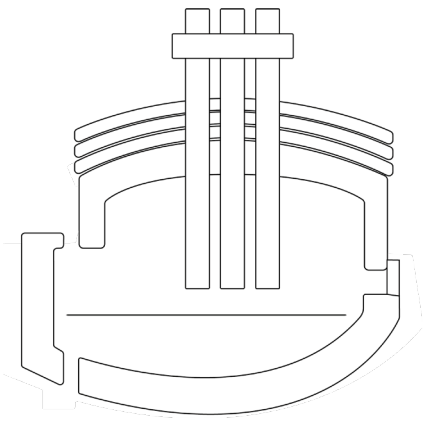
FEATURES

REDUCED LIME CONSUMPTION

REDUCED ELECTRICAL ENERGY CONSUMPTION

LOWER POWER ON TIME

LOWER NITROGEN INCORPORATION, DEPHOSPHORIZATION



PRODUCTIVITY SUSTAINABILITY

TYPICAL EUROMEC ARRANGEMENT:

Lime Storage Bin

The Lime Storage Bin is designed with a suitable volume to be defined according to EAF process requirements. The bin is equipped with a lime continuous level monitoring system and further instrumentation to be able to assist the EAF process automation. The end cone is fluidized.
The lime moves from the Lime Storage Bin to a Lime Pressurized Dispenser.

Lime Pressurized Dispenser

The pressurized dispenser, with a suitable volume to be defined according to EAF process requirements, is a suitable technology to guarantee the proper lime flow rate (80÷200kg/min) to the EAF lime injectors. Design and technology of the Euromec pressurized dispenser are confidential.
The Pressurized Dispenser is equipped with a dedicated weighing system with proper accuracy.
The Pressurized Dispenser is equipped with:

- a special fluidizing bottom (an Euromec confidential design solution);
- valve and instrumentation rack.

Downstream the fluidized bottom a properly designed rotary valve complete the equipment according to Euromec design.

Weighing system, fluidized bottom, valves, rotary valve and instrumentation is a suitable architecture for the proper EAF process automation

Main references:

Venezuela - Sidor	23/1106	Carbon injection system	2003
China - Hengli	23/1009	Carbon injection system	2003
China - Tianjin	24/0710	Carbon injection system	2004
China - Jiaxing	24/0713	Carbon injection system	2004
Italy - Padova	24/0304	Carbon injection system	2004
Spain - Siviglia	24/0705	Lime injection system	2004
Uruguay - Montevideo	25/0412	Carbon and lime injection system	2005
Romania – Targoviste	25/0509	Carbon injection system	2005
Italy - Padova	25/0216	Lime injection system	2005
Italy - Verona	26/1214	Lime and carbon injection system	2006
Norway - Mo I Rana	27/1003	Carbon injection System	2007
Russia	28/0206	Carbon injection system	2008
China - Tianjin	28/0701	Carbon injection system	2008
Brasil - Jeceaba Aminas Gerais	28/0315	Carbon injection system	2008
Colombia - Sogamoso	28/0210	Carbon injection system	2008
Oman	28/0907	Carbon injection system	2008
Iran - Mobarakeh	28/0503	Carbon injection system	2008
Iran - Mobarakeh	28/0504	Lime injection system	2008
Iran- Mobarakeh	28/0511	Lime/carbon injection system	2008
Malesya - Johor	28/0902	Carbon injection system	2008
Vietnam - Ho Chi Min City	29/0202	Carbon injection system	2009
India - Bhushan	29/0208	Carbon injection system	2009
Indonesia - Cilegon Krakatau	29/0405	Carbon injection system	2009
Iran - Ghaenat	29/1005	Lime/carbon injection system	2009
Iran - Ardakan Arfa	29/0304	Carbon injection system	2009
China - Beris Feida	10/0712	Carbon transport system	2010
Vietnam – Pomina 3	10/0206	Carbon injection system	2010

Mexico - Tamsa	11/0103	Carbon injection system	2011
Mexico - Tamsa	11/0106	Lime injection system	2011
China - Xining	12/0207	Carbon injection system	2012
China - Guiyang	12/1113	Carbon injection system	2012
Italy - Vicenza	29/1014	Lime injection system	2012
Italy - Brescia	11/0806	Carbon injection system	2012
Brasil	12/0129	Carbon injection system	2012
Italy - Udine – Main contractor	12/0518	Carbon injection system	2012
France	12/0910	Carbon injection system	2012
Indonesia - Gunung Garuda	12/0201	Carbon injection system	2012
Iran - Chadormalu	12/0911	Lime and carbon injection systems	2013
China - Zysco	13/1205	Carbon and lime injection systems	2013
Italy - Lesegno	13/0101	Carbon injection system	2013
Italy - Lesegno	13/0102	Quartz injection system	2013
Italy - Verona	13/0410	Quartz injection system	2013
Italy - Lonato	13/0931	Lime storage and injection system	2014
Iran - Korasan	13/0703	Carbon and lime injection systems	2014
Thailandia - Bangkok	14/0101	Carbon injection system	2014
Italy - Osoppo	14/0715	Lime injection system	2015
Egypt – Giza	14/0925	Carbon injection system	2015
India - Raigarh	15/0301	Lime storage and injection system	2015
Iran - Mobarakeh	14/0809	Carbon injection system	2015
South Korea - Inkehon	14/0819	Carbon and lime injection systems	2015
Italy - Lonato	15/0234	Quartz injection system	2016
Italy - Calvisano	15/0804	Lime injection system	2016
Belgium - Charleroi	14/0209	Carbon injection system	2017
China - Anhui Province	17/0332	Carbon injection system	2017
China - Hongtai 1	17/0608	Carbon injection system	2017
China - Hongtai 2	17/1206	Carbon injection system	2017

China - Tangshan 1	17/0803	Carbon injection system	2017
China - Tangshan 2		Carbon injection system	2017
China - Feida 2	17/1211	Carbon injection system	2017
China - Yangzhou	18/0119	Carbon injection system	2018
China - Shandong Yongfeng 1	18/0324	Carbon injection system	2018
China - Shandong Yongfeng 2		Carbon injection system	2018
China - Lishui 1	18/0418	Carbon injection system	2018
China - Lishui 2		Carbon injection system	2018
China - Phoenix	18/0907	Carbon injection system	2018
France - Neuves Maisons	13/1028	Carbon injection system	2018
Italy - Brescia	13/0815	Lime injection system	2018
Italy - Odolo	15/1206	Lime injection system	2018
Italy - Brescia	18/0125	Carbon injection system	2018
Italy - Calvisano	18/0202	Carbon injection system	2018
Russia	18/0423	Carbon injection system	2018
Mexico	16/1022	Lime Injection system	2018
Italy - Caronno	19/0417	CaCO3 injection system	2019
Italy - Potenza	19/0203	Carbon injection system	2019
China - Guixin 1	19/0928	Carbon injection system	2019
China - Guixin 2		Carbon injection system	2019
China - Desheng	19/0726	Carbon injection system	2019
China - HBIS 1	20/168	Carbon injection system	2020
China - HBIS 2	20/168	Carbon injection system	2020
China - Donghai 1	20/157	Carbon injection system	2020
China - Donghai 1	20/157	Lime injection system	2020
China - Donghai 2	20/157	Carbon injection system	2020
China - Donghai 2	20/157	Lime injection system	2020
Canada - Welland	20/117	Carbon injection system	2020
Italy - Lonato	20/0226	Polymers injection system	2020

Japan	20/0228	Carbon injection system	2020
China - Sanbao 1	21/240	Carbon injection system	2021
China - Sanbao 2	21/300	Carbon injection system	2021
Germany – Henningsdorf	20/061	Lime injection system	2021
Italy - Vicenza	21/050	Polymers injection system	2021
Italy - Caronno	17/0217	Lime injection system	2022
Italy - Lesegno	20/041	Lime injection system	2022
Italy – Verona	21/105	Polymers injection system	2022
Italy – San Zeno	21/052	Carbon injection system	2023
Italy – San Zeno	21/052	Polymers injection system	2023

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