D.A.R. METALL AG

Business Portfolio

Development, Technology and Consulting

AluVerde · ASIS · IPSE · CastBriX · CBAM

06.11.2026 · Ebeleben

darmetall.de

Where to find us

Ebeleben, Thuringia	Production and headquarters
Munich, Bavaria	R&D, business development
Vienna	R&D
Turkey	Production and sales office
Ukraine	Technology development
Kazakhstan	Sales office
China	Cooperation for refractory production
South Korea	Cooperation for refractory production



What we do



Aluminium Production

- Leader in dry-mechanical recycling
- Focus on aluminium and plastic composites
- Highly environmentally friendly
- Energy efficient



Refractory materials

- Design and manufacture of new materials
- Use in all metallurgical units
- ISO certified
- High market and customer responsiveness



Technology

- Holistic technological solutions
- Individual strengths through targeted partnerships
- Efficient and sustainable production processes



Decarbonisation

- Systematic CO_2 reduction of industrial processes
- Holistic decarbonisation solutions
- Measurable, verified results for customers

AluVerde

Low-Carbon Aluminium Granules

Aluminium recycled dry-mechanically without melting – up to 84 % lower PCF.



D.A.R. Production Process

Composite materials

IBA*

Electricity

PV plant



AluVerde



Polymers

EcoPEX

Recycling

MineralMix

* IBA = Incineration Bottom Ash

Production process

- Recycling of aluminium from scrap and IBA
- Dry-mechanical separation of contaminants
- Electrical energy only, supported by our own PV plant

Product

- No melting required – direct product application
- Energy efficient compared to thermal processes

Up to 84 % lower PCF with AluVerde

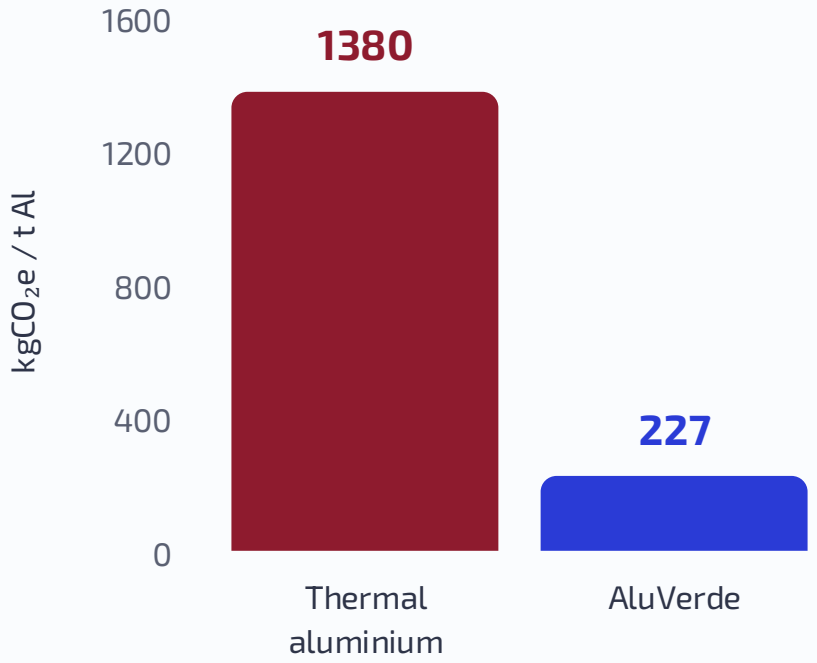
AluVerde available in different sizes and qualities

1380 $kgCO_2e$ / t Al

PCF* of thermal, molten produced aluminium

227 $kgCO_2e$ / t Al

PCF** of D.A.R. Metall aluminium granules (AluVerde)



* EU averaged value from ecoinvent database · ** Determined according to DIN ISO 14067 (following GHG Protocol)

ASIS

Aluminium Shot Injection System

Automated injection of low-PCF aluminium granules for EAF, BOF and AOD.



From manual feeding to precise injection

CONVENTIONAL PROCESSES

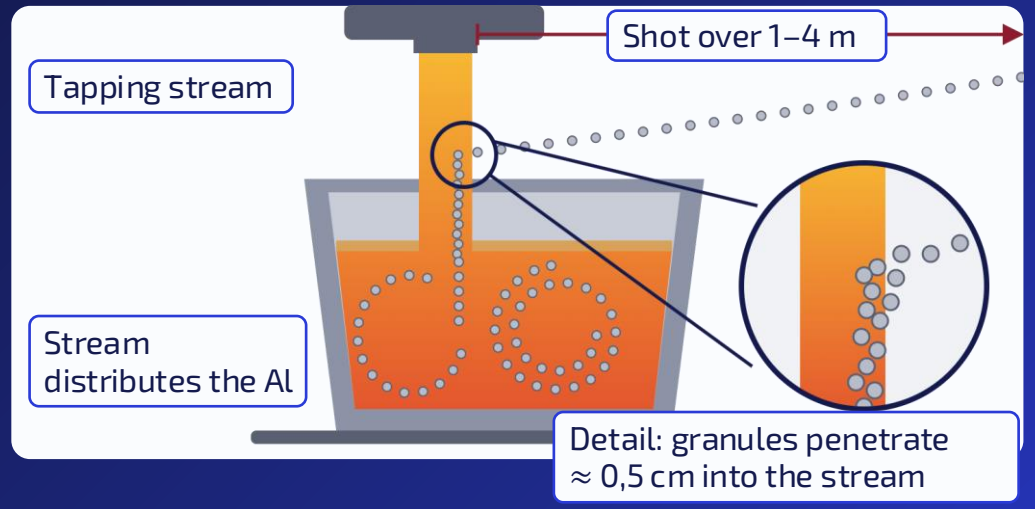
Deoxidation with ingots or pyramids



- Manual aluminium feeding from top into the teeming ladle
- Inhomogeneous aluminium distribution
- Burn-out losses due to floating and reaction on the surface
- Products with high PCF due to thermal production

ASIS – ALUMINIUM SHOT INJECTION SYSTEM

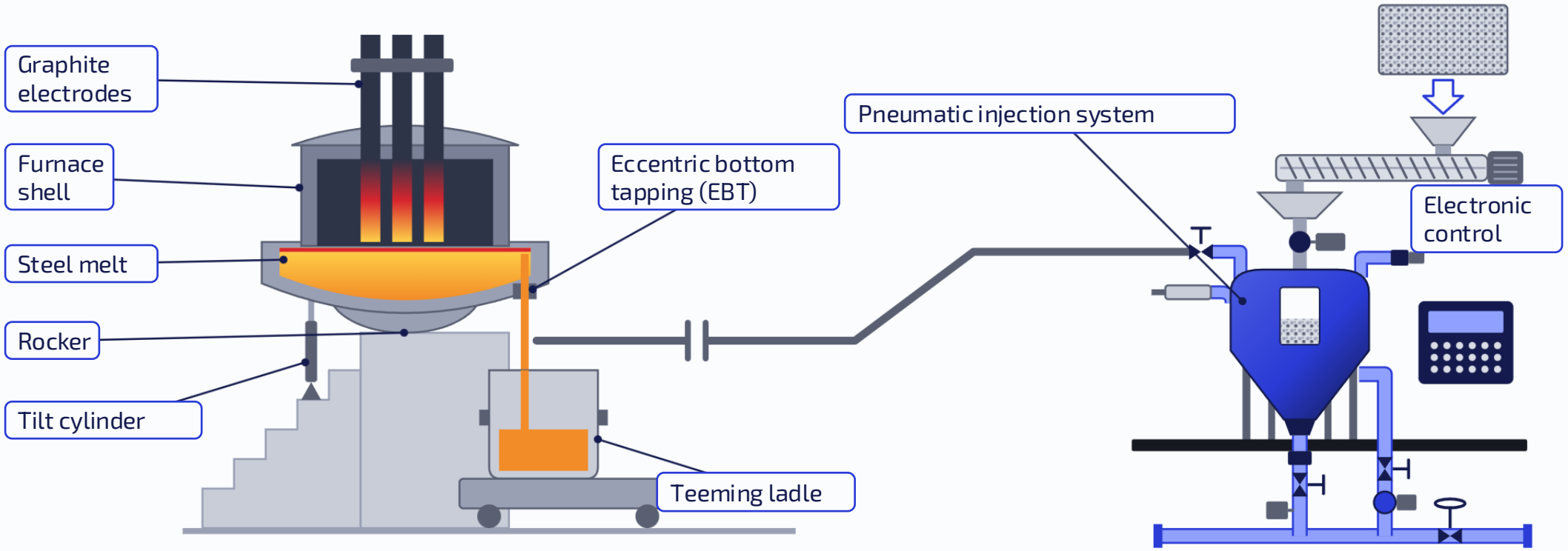
Granules injected into the tapping melt flow



- Available for EAF, BOF and AOD
- Fully automated feeding with an accuracy of 1 kg
- AI-based automatic quality control and dosing
- Minimal burn-out
- Homogeneous deoxidation
- High specific reaction surface due to low grain size

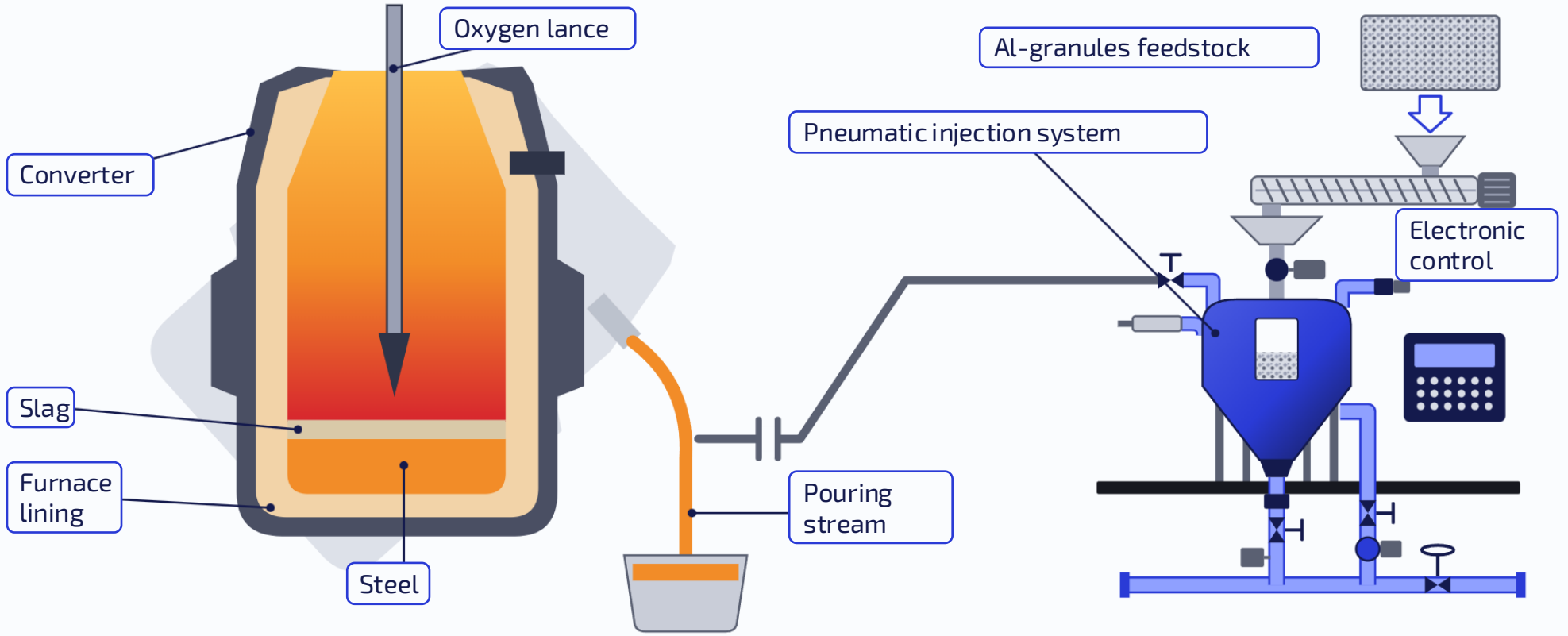
ASIS in the EAF

EAF | BOF | AOD



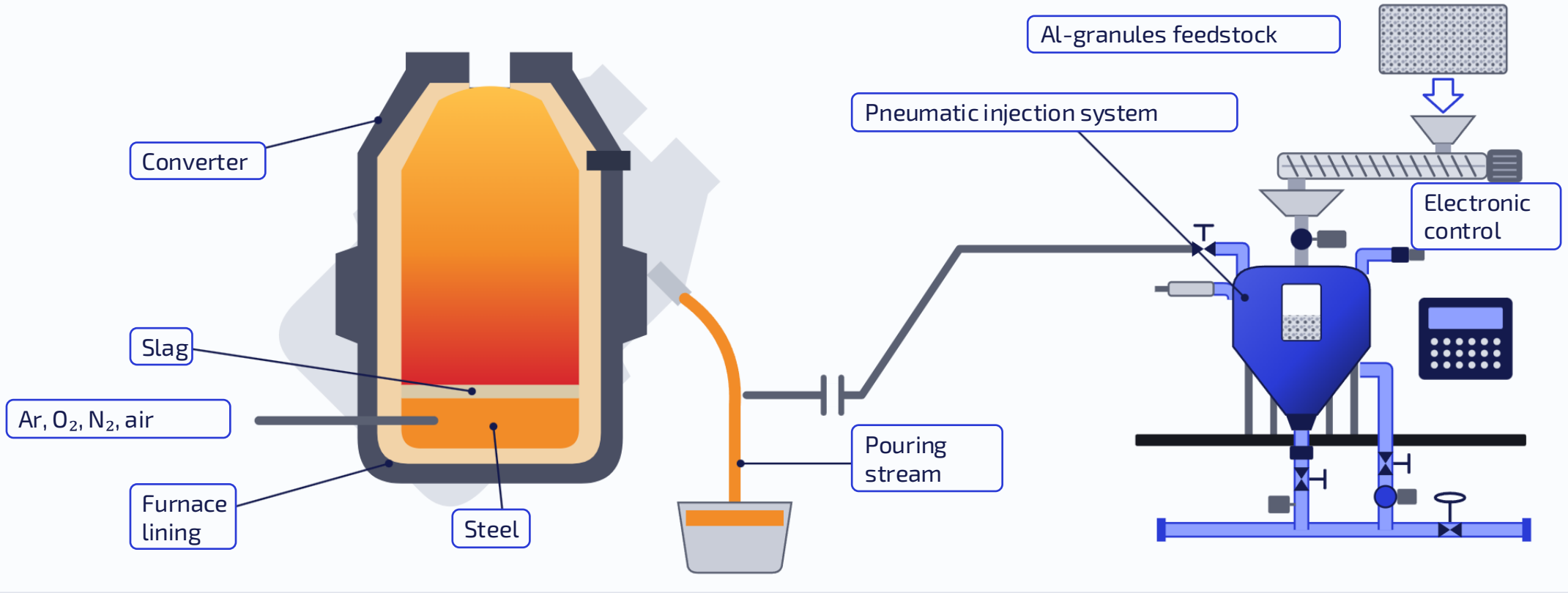
ASIS in the BOF

EAF | **BOF** | AOD

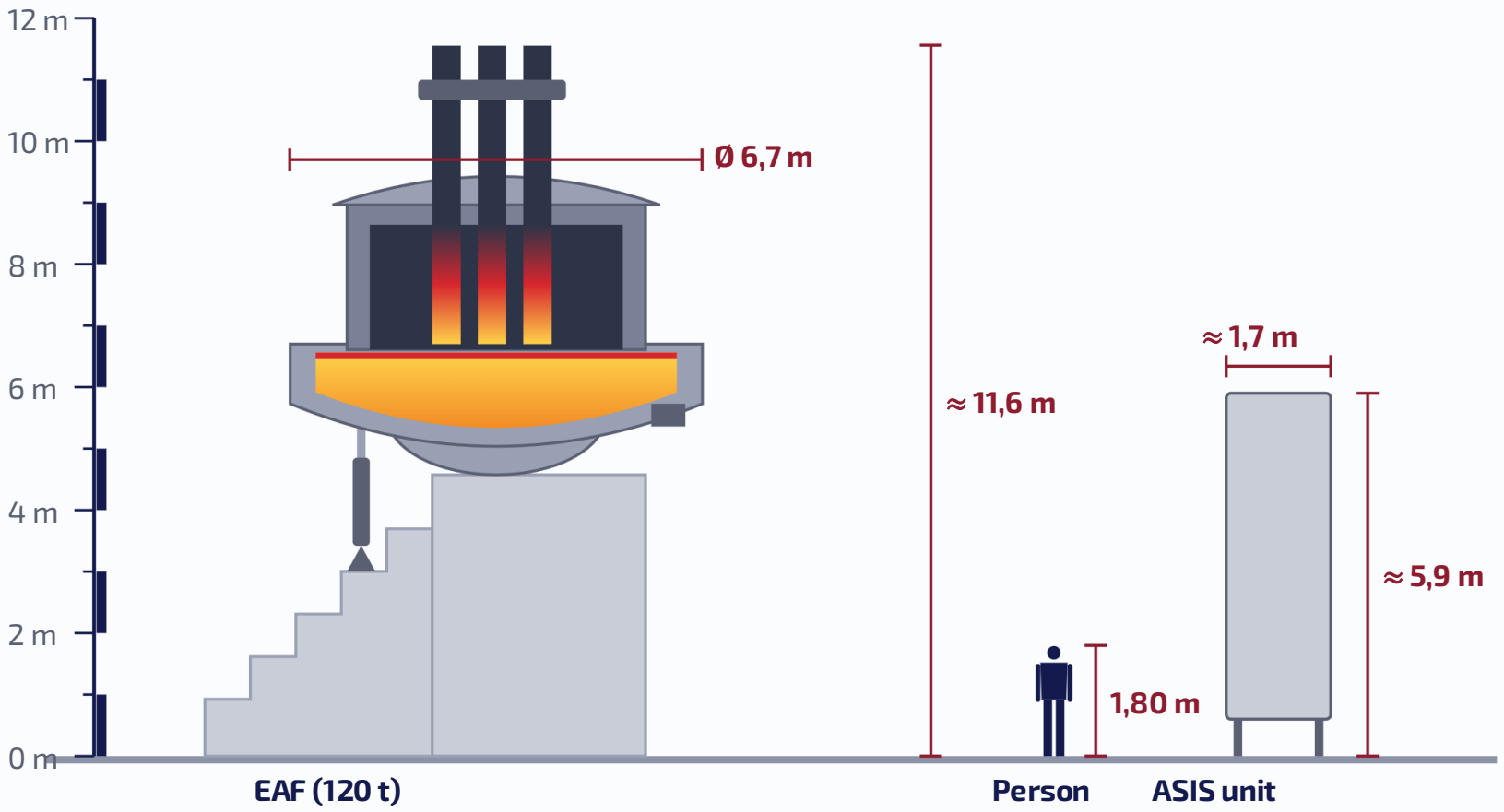


ASIS in the AOD

EAF | BOF | **AOD**



EAF and ASIS unit to scale



ASIS unit: ≈ 1,7 m wide, ≈ 5,9 m high.

The silo can be extended in height as required.

Exemplary showcase: Scope 3 emissions

INPUT DATA

PCF aluminium		
AluVerde	0,227	t CO_2e / t Al
Al-secondary molten / casted	1,379	t CO_2e / t Al
Al consumption		
Al consumption without ASIS	2	kg Al / t steel
ASIS Al-saving factor	20 %	
ASIS Al consumption	1,60	kg Al / t steel
Annual steel production	1 300 000	t steel / a

RESULT: ASIS + ALUVERDE VS. AL-SECONDARY

Scope 3 CO_2e emissions specific		
ASIS + AluVerde	0,362	kg CO_2e / t steel
Al-secondary molten / casted	2,758	kg CO_2e / t steel
Specific saving	−2,396	kg CO_2e / t steel
Scope 3 CO_2e emissions annual		
ASIS + AluVerde	471	t CO_2e / a
Al-secondary molten / casted	3 585	t CO_2e / a
Annual reduction	−3 114	t CO_2e / a



ASIS at a glance

1 kg

Feeding accuracy – aluminium is dosed fully automatically.

≈ 20 %

Savings in aluminium consumption.

84 %

Up to 84 % lower CO_2e emissions thanks to the low PCF of the granules.

3

Furnace types: available for EAF, BOF and AOD.

- Available for EAF, BOF and AOD
- Fully automated feeding with an accuracy of 1 kg
- AI-based automatic quality control and dosing
- Minimal burn-out
- Homogeneous deoxidation
- High specific reaction surface due to low grain size

15 steel mills in 9 countries

Customer	Country	Production unit
Benteler Steel/Tube GmbH	Germany	EAF
Buderus Edelstahl GmbH	Germany	EAF
Stahl Gerlafingen AG	Switzerland	EAF
ARVEDI	Italy	EAF
Deutsche Edelstahlwerke GmbH	Germany	EAF
BGH Edelstahl GmbH	Germany	EAF
TENARIS Silcotube	Romania	EAF
TENARIS Dalmine	Italy	EAF
Georgsmarienhütte GmbH (GMH Group)	Germany	EAF
Stahlwerk Bous GmbH (GMH Group)	Germany	EAF
CELSA Group	Spain	EAF
Adria Celik	Croatia	EAF
Moldova Steel Works	Moldova	EAF
Tosyali Toscelik	Turkey	EAF
Severstal*	Russia	3 × BOF

* Installed in 2020/2021

IPSE

Inject Polymers Save Environment

PEX and EcoPEX polymers as a substitute for fossil carbon in slag foaming.



Polymers instead of coal for slag foaming

Conventional process: coal injection

Fossil carbon for slag foaming



Coal
~90 % carbon → CO_2 (g) bubbles →

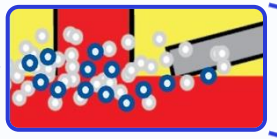


Polymer as substitute for fossil carbon

PE $(C_2H_4)_n$ injection: C and H react with oxygen to CO_2 and H_2O gas



PE ~80 % carbon
~15 % hydrogen → CO_2 (g) and H_2O (g) bubbles →



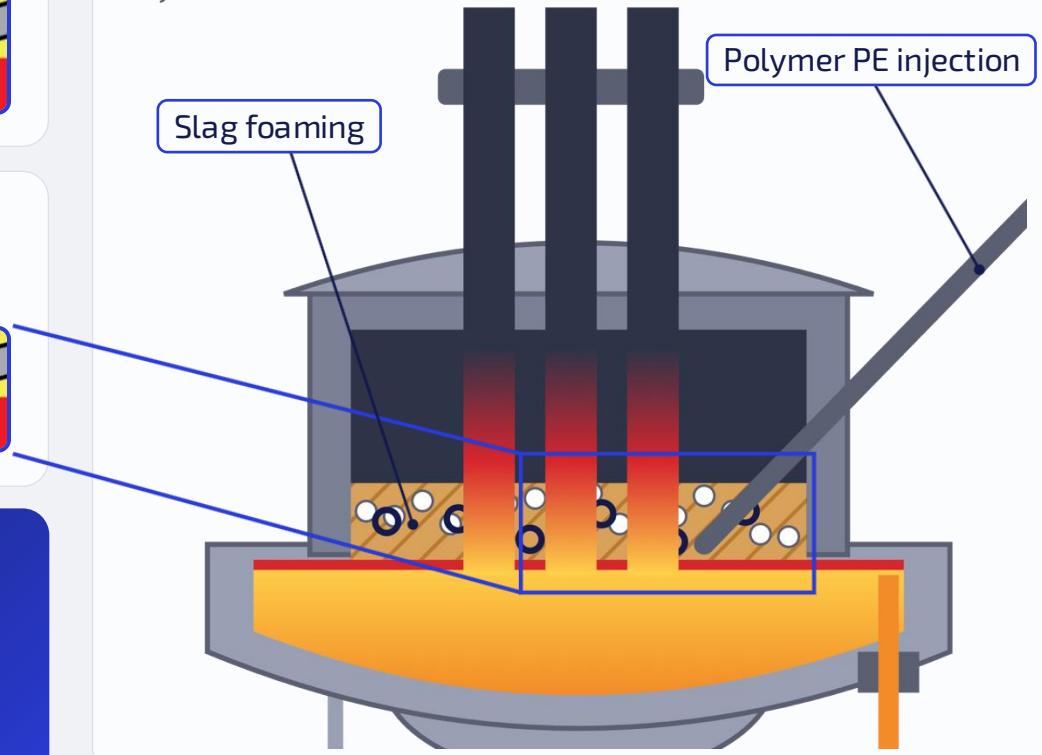
CONCLUSION

Hydrogen in polymer supports slag foaming

- Reduction of material consumption
- Reduction of CO_2e emission up to 30 % by H_2O gas reaction

Schematic presentation of IPSE in the EAF

Polymer PE is injected through the lance directly into the slag layer.



Exemplary showcase PEX

Reduction of Scope 1 emissions by application of PEX polymers as carbon / coal substitute

	Value	Unit
Annual steel production	1 300 000	t steel / a
ETS EU carbon permit costs (15.07.2025)	70,50	€ / t CO_2e
Case 1: 100 % coal		
CO_2 emissions annual	34 320	t CO_2 / a
CO_2 emissions specific	26,40	kg CO_2 / t steel
ETS EU carbon permit costs	2 419 560	€ / a
Case 2: 50 % coal / 50 % PEX mixture		
CO_2 emissions annual	28 417	t CO_2 / a
CO_2 emissions specific	21,86	kg CO_2 / t steel
Savings case 2 vs. case 1		
Annual CO_2 emissions reduction	–5 903	t CO_2 / a
Specific CO_2 emissions reduction	–4,54	kg CO_2 / t steel
Annual ETS EU carbon permit costs reduction	–416 164	€ / a
Specific ETS EU carbon permit costs reduction	–0,32	€ / t steel
Case 3: 100 % PEX		
CO_2 emissions annual	23 795	t CO_2 / a
CO_2 emissions specific	18,30	kg CO_2 / t steel
Savings case 3 vs. case 1		
Annual CO_2 emissions reduction	–10 525	t CO_2 / a
Specific CO_2 emissions reduction	–8,10	kg CO_2 / t steel
Annual ETS EU carbon permit costs reduction	–742 008	€ / a
Specific ETS EU carbon permit costs reduction	–0,57	€ / t steel

ASSUMPTIONS FOR STEEL PRODUCTION

- 1.3 Mio t steel per year
- 8.0 kg coal injection per t of steel
- 90 % carbon content in coal

MIXTURE 50 % COAL / 50 % POLYMER

Reduction of CO_2 Scope 1 emission: **17,2 %**
Annual savings for ETS cost: **416 164 € / a**

100 % POLYMER FOR SLAG FOAMING

Reduction of CO_2 Scope 1 emission: **30 %**
Annual savings for ETS cost: **742 008 € / a**

PEX REFERENCE LIST

Stahl Gerlafingen	Switzerland
ArcelorMittal	Germany
ESF Feralpi	Germany
Georgsmarienhütte (GMH Group)	Germany

Exemplary showcase EcoPEX

Reduction of Scope 1 emissions by application of PEX polymers as carbon / coal substitute

	Value	Unit
Annual steel production	1 300 000	t steel / a
ETS EU carbon permit costs (15.07.2025)	70,50	€ / t CO_2e
Case 4: 50 % coal / 50 % EcoPEX mixture*		
CO_2 emissions annual	27 274	t CO_2 / a
CO_2 emissions specific	20,98	kg CO_2 / t steel
Savings case 4 vs. case 1		
Annual CO_2 emissions reduction	–7 046	t CO_2 / a
Specific CO_2 emissions reduction	–5,42	kg CO_2 / t steel
Annual ETS EU carbon permit costs reduction	–496 743	€ / a
Specific ETS EU carbon permit costs reduction	–0,38	€ / t steel
Case 5: 100 % EcoPEX*		
CO_2 emissions annual	20 228	t CO_2 / a
CO_2 emissions specific	15,56	kg CO_2 / t steel
Savings case 5 vs. case 1		
Annual CO_2 emissions reduction	–14 092	t CO_2 / a
Specific CO_2 emissions reduction	–10,84	kg CO_2 / t steel
Annual ETS EU carbon permit costs reduction	–993 486	€ / a
Specific ETS EU carbon permit costs reduction	–0,76	€ / t steel

* Up to / projection based on PEX figures in relation to actual results

ASSUMPTIONS FOR STEEL PRODUCTION

- 1.3 Mio t steel per year
- 8.0 kg coal injection per t of steel
- 90 % carbon content in coal

EcoPEX = pelletised PEX with 15 % biomass



PEX granulate 0,7–5 mm



EcoPEX pellets 6 × 6 mm



EcoPEX pellets 4 × 6 mm

ADVANTAGES OVER PEX

- Higher density
- Better handling
- Better flowability
- 15 % more CO_2 savings

CastBriX

Innovative Refractories

Carbon-free refractory bricks for longer ladle lifetimes and lower energy consumption.



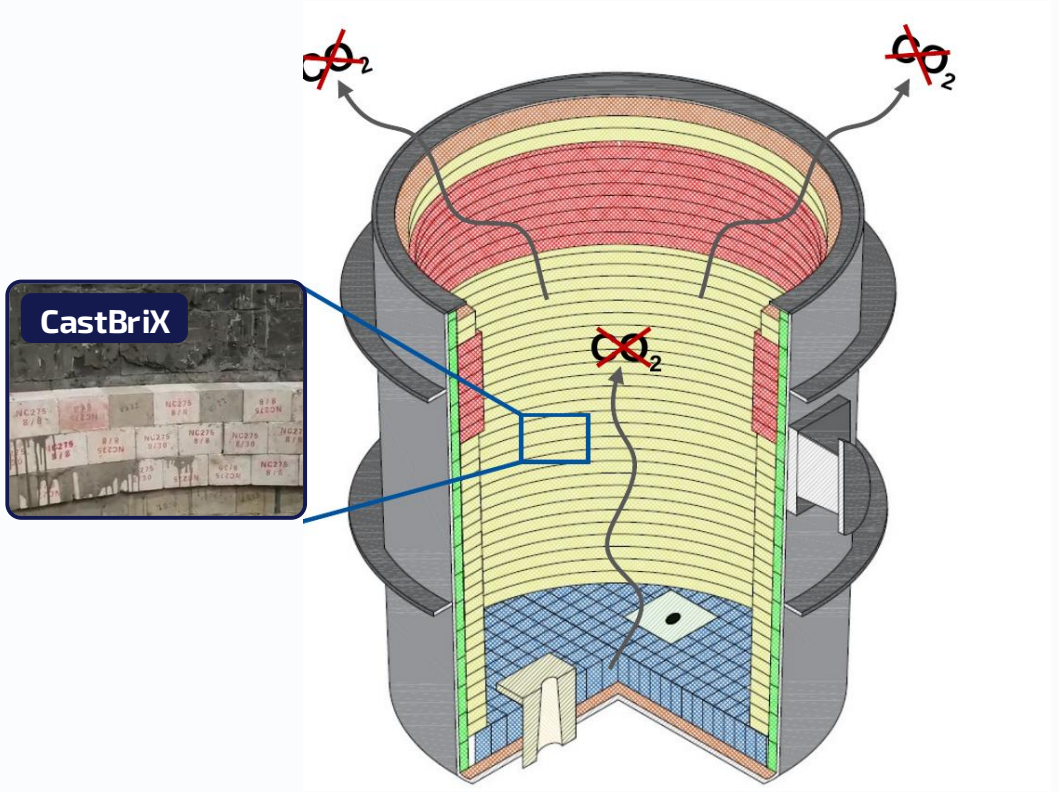
Innovative CastBriX

CO_2-emission savings using CastBriX

- Carbon-free CastBriX do not produce any CO_2 emissions
- Increased mechanical, thermal and lifetime performance leads to 2.5 times higher lifetime by repairs of CastBriX
- Reduction of heat losses and energy consumption
- Savings of up to 15 t CO_2 within one ladle lifetime

Further savings using CastBriX

- Longer maintenance intervals
- Savings of CO_2e and expenses by energy reduction
- 5–10 % cost reduction possible



CastBriX at a glance

0 CO_2

from the carbon-free bricks themselves

2.5 ×

higher lifetime by repairs

≤ 15 t CO_2

saved within one ladle lifetime

5–10 %

cost reduction and additionally more use cycles (~40)

OUR APPROACH

Carbon-free refractory bricks for longer ladle lifetimes and lower energy consumption.



CastBriX performance in steel mills

Steel mill	Production unit	Ladle size	Country
Shougang Qiangang – 1st Steelmaking Plant	BOF	210 t	China
Baosteel – #1 Plant	BOF	300 t	China
Baosteel – #2 Plant	BOF	250 t	China
Baosteel – Stainless Steel Branch	Carbon steel	150 t	China
Baosteel – Heavy Plate Branch	BOF	150 t	China
Baosteel – Meishan Steel #1 Plant	BOF	162 t	China
Baosteel – Meishan Steel #2 Plant	BOF	250 t	China
Maanshan Iron & Steel – #4 Plant	BOF	300 t	China
Maanshan Iron & Steel – #1 Plant	BOF	120 t	China
Wuhan Iron & Steel – #4 Division	BOF	200 t	China
Wuhan Iron & Steel – CSP	CSP	170 t	China
Wuhan Iron & Steel – 3rd Steelmaking Plant	BOF	300 t	China
MMZ	EAF	120 t	Moldova
BlueScope Steel	BOF	280 t	Australia

CBAM

Carbon Border Adjustment Mechanism

Verified emissions data for exports into the EU – prepared by D.A.R. Metall.



Why you must react now

Since 1 January 2026

CBAM definitive period for iron and steel, aluminium, cement, fertilisers, hydrogen and electricity.

CO_2 costs

EU importers of CBAM goods must report embedded emissions and buy CBAM certificates per ton of CO_2.

Until 30 September 2027

Importers buy CBAM certificates for the embedded emissions; the first annual declaration for 2026 is due by 30 September 2027.

THE PROBLEM

EU importers need the embedded emissions of every product – from the producer outside the EU.

- Without actual, verified installation data, conservative EU default values apply, causing higher CBAM costs
- Higher CBAM costs make non-EU suppliers less competitive
- Actual emissions must be reported following the CBAM methodology and be verified by an accredited verifier

We prepare your CBAM reporting following the CBAM methodology

1

Data collection

- Installation and production routes
- Precursors, energy and fuels
- On site or remote

2

Calculation

- Embedded direct and indirect emissions
- Calculation following the CBAM methodology

3

Reporting

- Preparation of all required CBAM documents for the verification process
- Preparation of the emissions report for the EU importer

4

Verification support

- Assistance in finding an accredited verifier
- Support during the verification process
- Updates for every reporting year

NEXT STEP **Lower emissions mean lower CBAM costs: ASIS, IPSE and CastBriX reduce the embedded emissions of steel.**

CONTACTS

Talk to us

D.A.R. Metall AG
Am Schlotheimer Berg 1
DE-99713 Ebeleben

Tel.: +49 (0) 36020 703-0
Fax: +49 (0) 36020 703-99
www.darmetall.de

Maxim Schumacher

Project Manager

Mobile +49 174 380 2005
Maxim.Schumacher@darmetall.eu

Stephan Goeldel, M.Sc.

R&D and Business Development

Mobile +49 152 241 57729
Stephan.Goeldel@darmetall.eu

Christian Artner

CEO

Mobile +49 176 1333 9022
Christian.Artner@darmetall.eu