



ADVANCED METALLIC SUBSTRATE DESIGN FOR 2W APPLICATION

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New Delhi, India

Confidential

AGENDA

EMITEC TECHNOLOGIES

CHALLENGES IN 2W/3W FOR FUTURE LEGISLATION

DEVELOPMENT OF CS TECHNOLOGY

DEVELOPMENT OF BELT MANTLE (BM) TECHNOLOGY

TESTING OF CS TECHNOLOGY

BENEFITS OF CS TECHNOLOGY

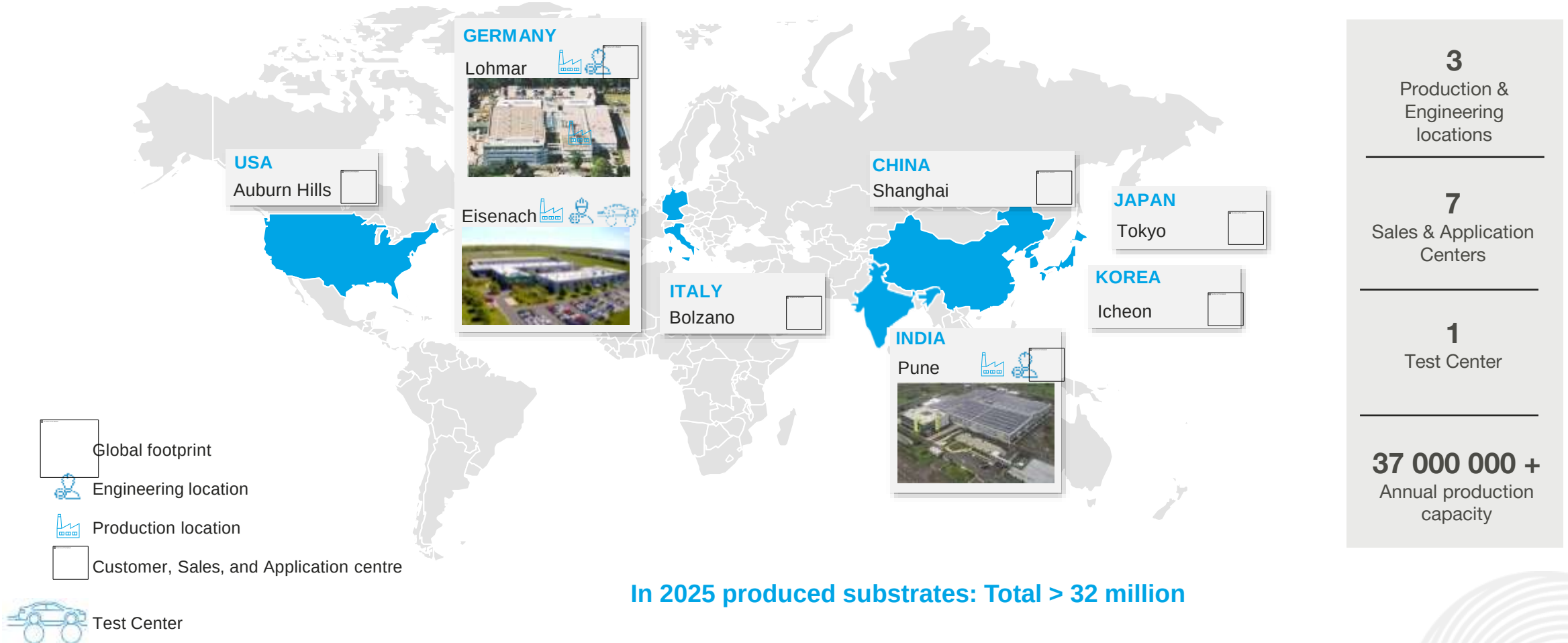
SUMMARY



EMITEC TECHNOLOGIES

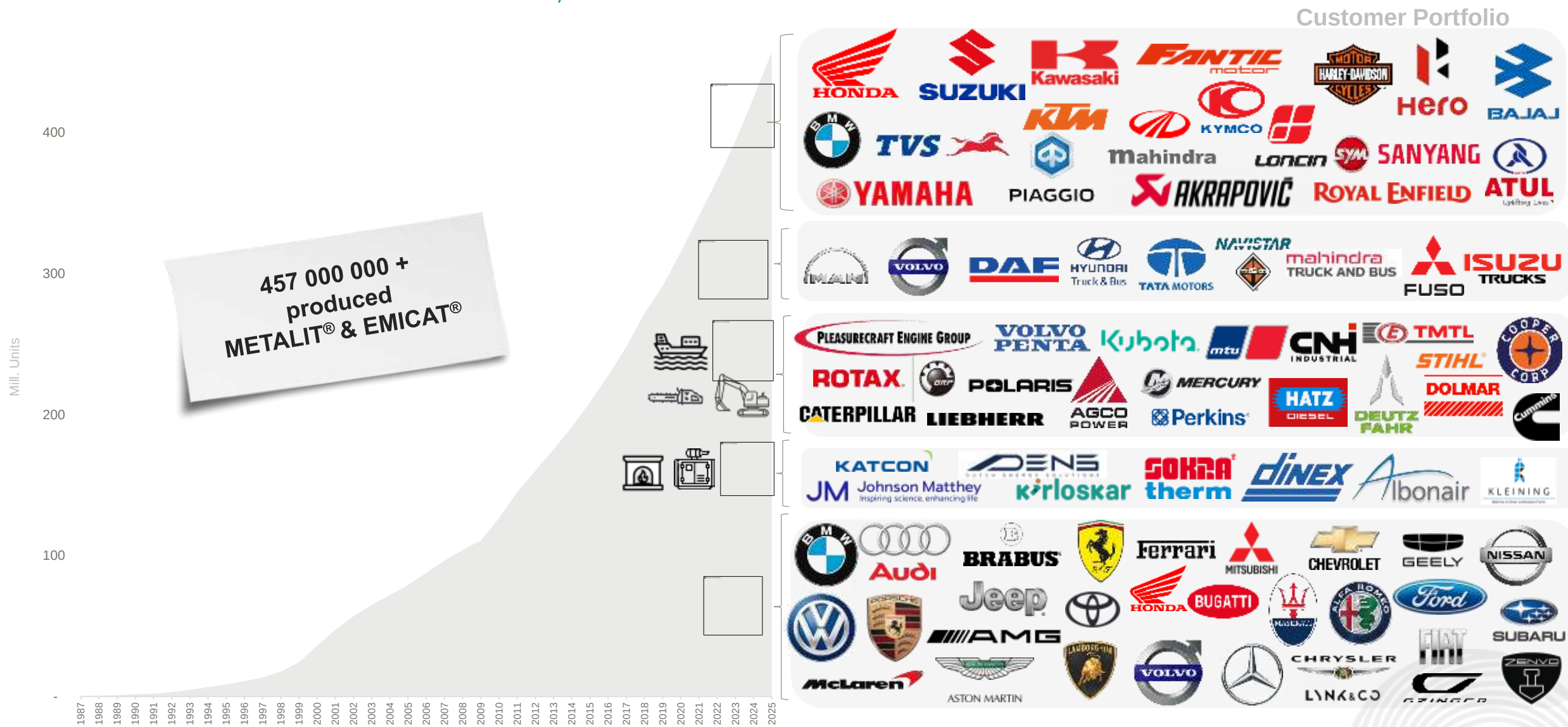
GLOBAL FOOTPRINT

High capacity facilities for serial production and new product launches with potential for capacity expansion



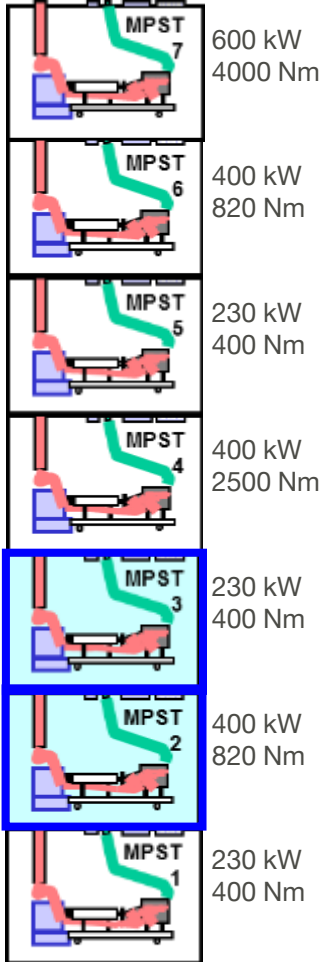
EMITEC TECHNOLOGIES

TOTAL PRODUCTION 1987 – 2026, WE SUPPORT ALL MAJOR OEMS

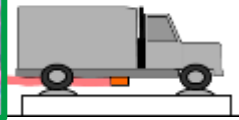


PRODUCT AND APPLICATION DEVELOPMENTS SUPPORTED BY A TEST CENTER

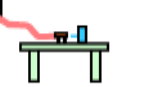
VIEW CENTRAL FLOOR



Heavy Duty chassis dymo



Flow Bench



KPST 4



KPST 3



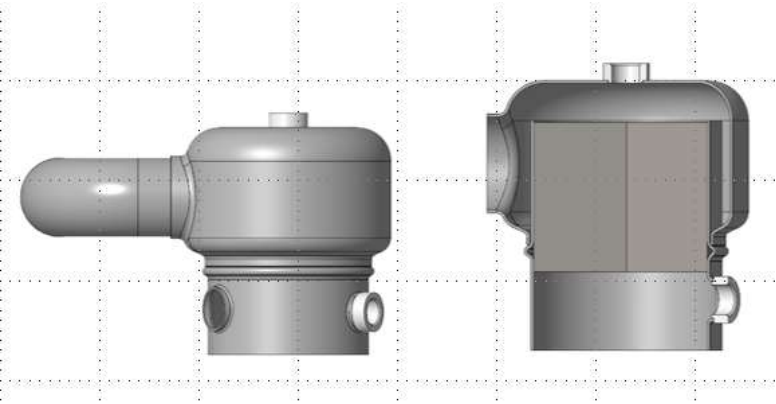
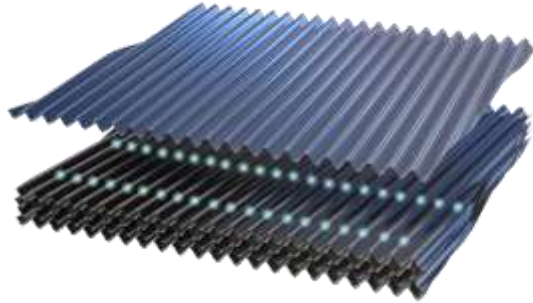
KPST 2



KPST 1



UNIQUE DESIGN SOLUTION



Emitec is developing unique
system solutions



AGENDA

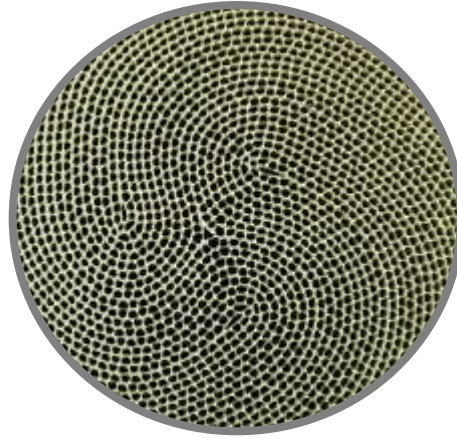
- EMITEC TECHNOLOGIES
- **CHALLENGES IN 2W/3W FOR FUTURE LEGISLATION**
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CHALLENGES IN 2W INDUSTRY

Efficient

- Volume ↓
- Back pressure ↓



Durable

- Thermo - Mechanical stability ↑



Affordable ₹

- Weight ↓
- System Cost ↓

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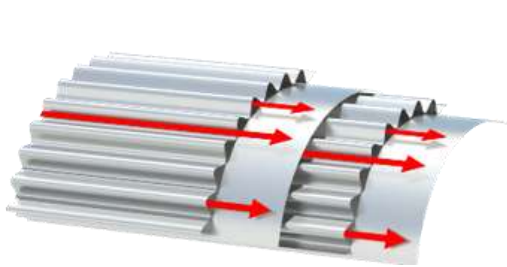
• BENEFITS OF CS TECHNOLOGY

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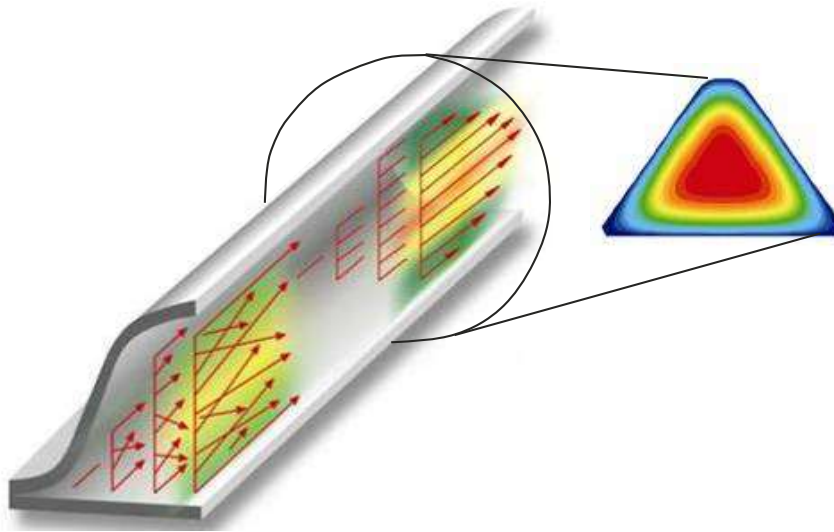


CATALYST EFFECTIVENESS

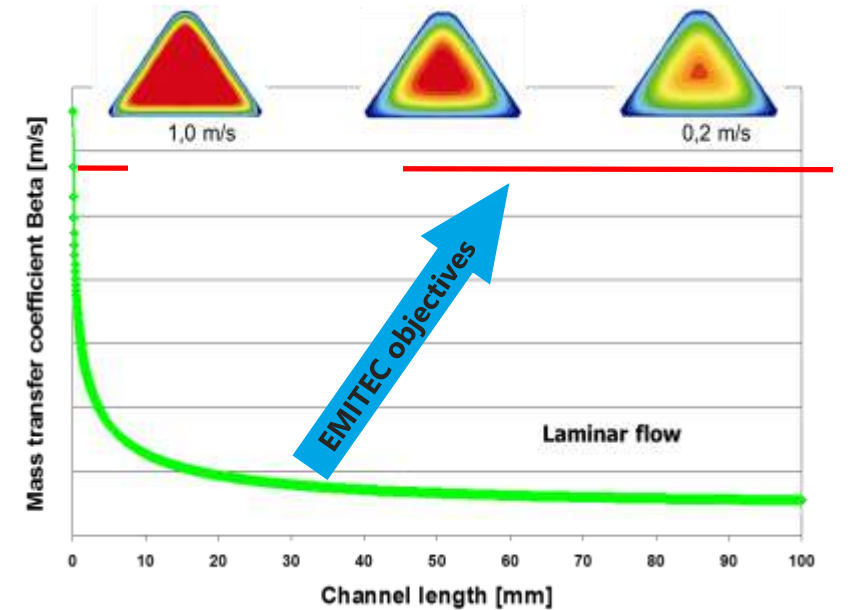
TRADITIONAL TECHNOLOGY



Std-Design®

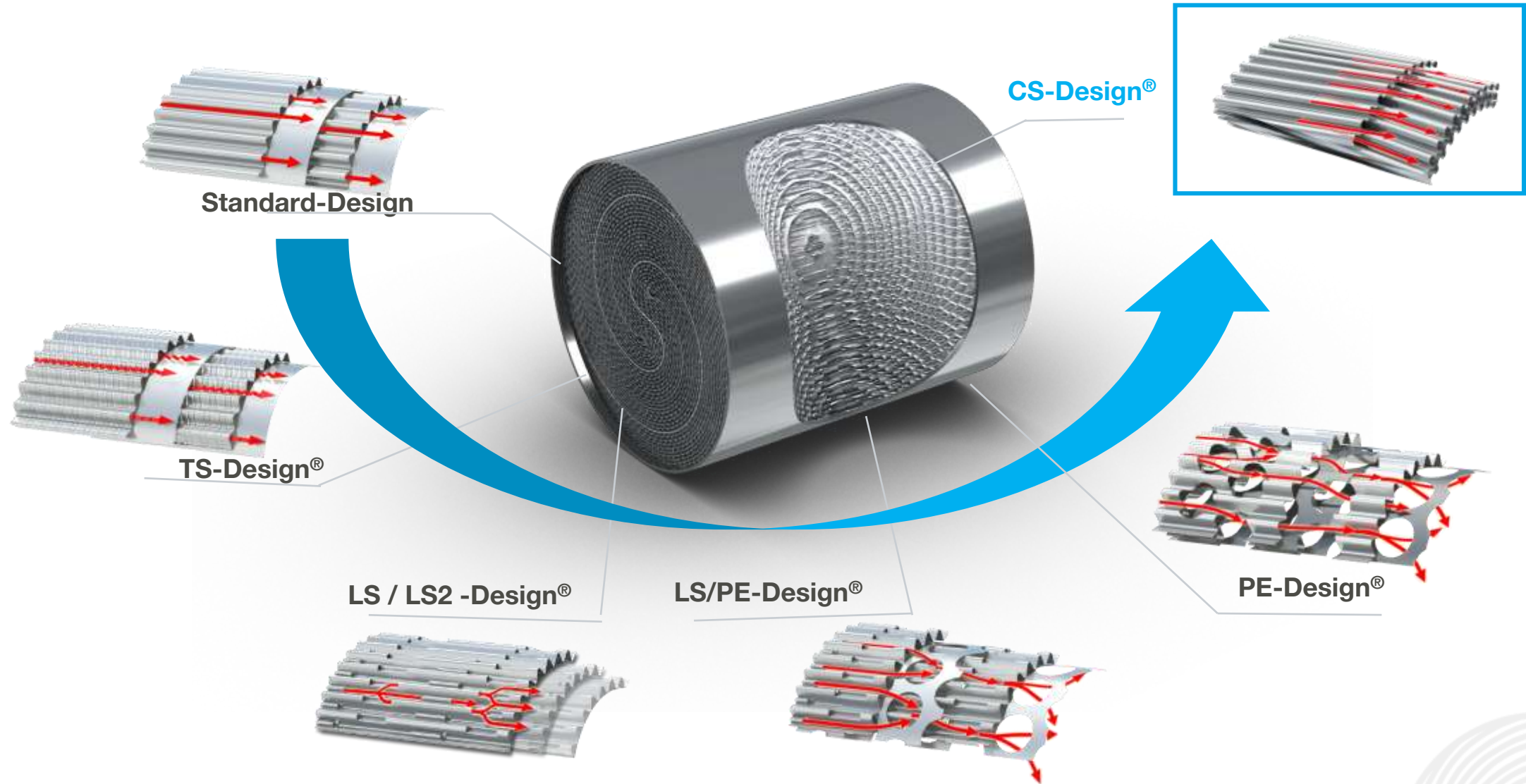


- Short entrance area with turbulent flow
- Laminar flow profile beyond entrance zone



NEW SUBSTRATE DESIGN

METALIT®: TURBULENCE GENERATING STRUCTURES

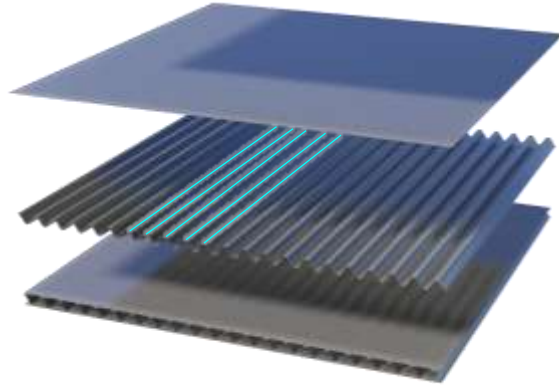


NEW HIGH EFFICIENT CS-DESIGN

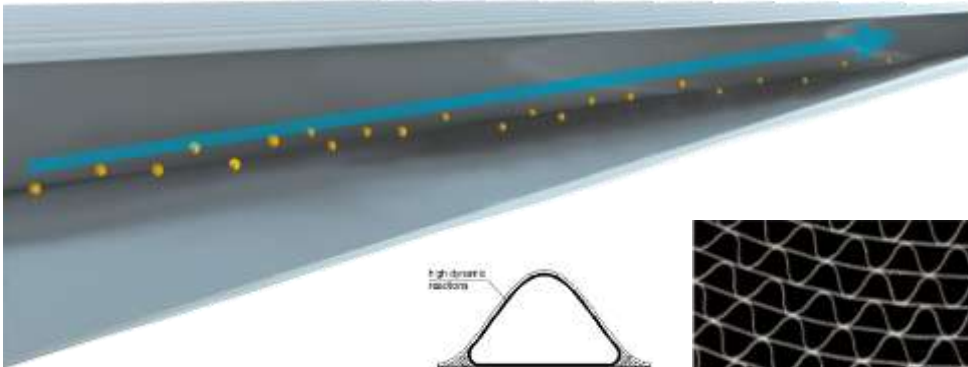
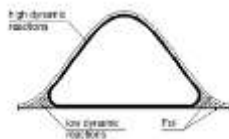
DESIGN CHARACTERISTICS BUILDING THE SUBSTRATES

Standard Design

Stacking of flat and corrugated
Layers to create a honeycomb body
=> **Contact lines**

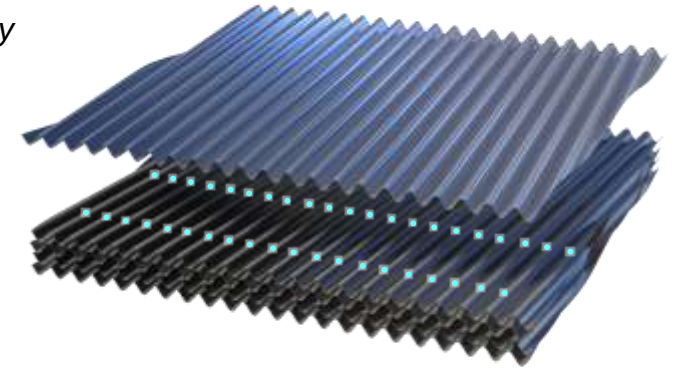


Laminar Flow through cell channels

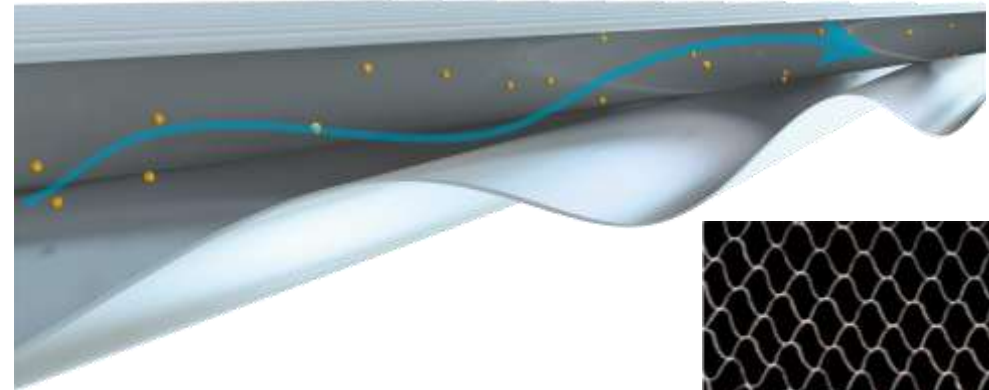
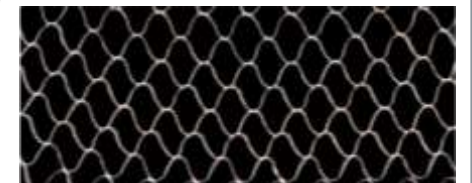


CS-Design

Alternating stacking of diagonally
corrugated layers
=> **Contact points**



Improved mass transfer through exchange with other cell channels



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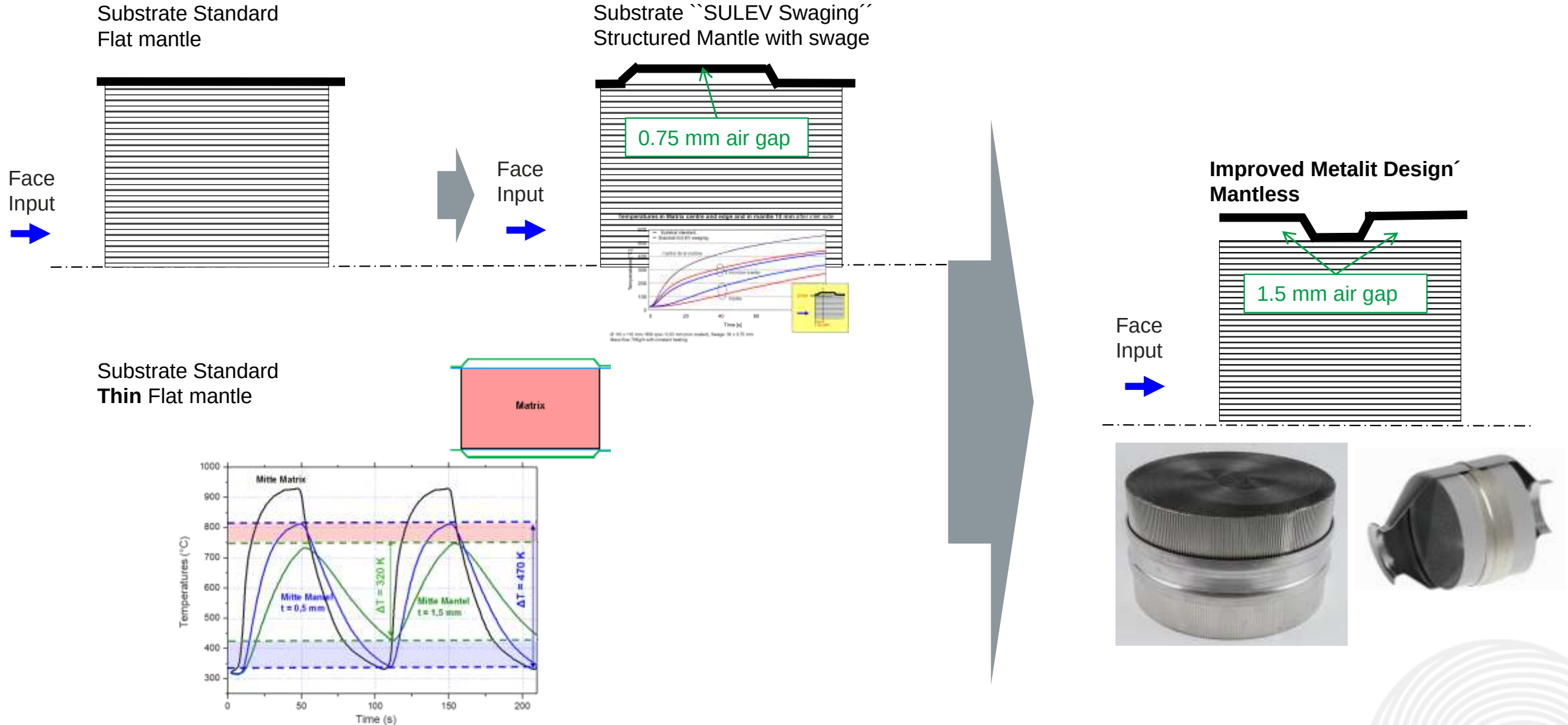
• BENEFITS OF CS TECHNOLOGY

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BELT MANTLE (BM) DESIGN

REDUCTION OF MATRIX HEAT LOSSES



CS DESIGN WITH BELT MANTLE (CS-BM)

INTRODUCING AN ADVANCED BUT SIMPLIFIED SUBSTRATE BM-DESIGN



**Substrate decoupled to mantle by in-build air gap insulation:
=> improved light-off behavior
=> opportunity for new, cost optimized canning methods**

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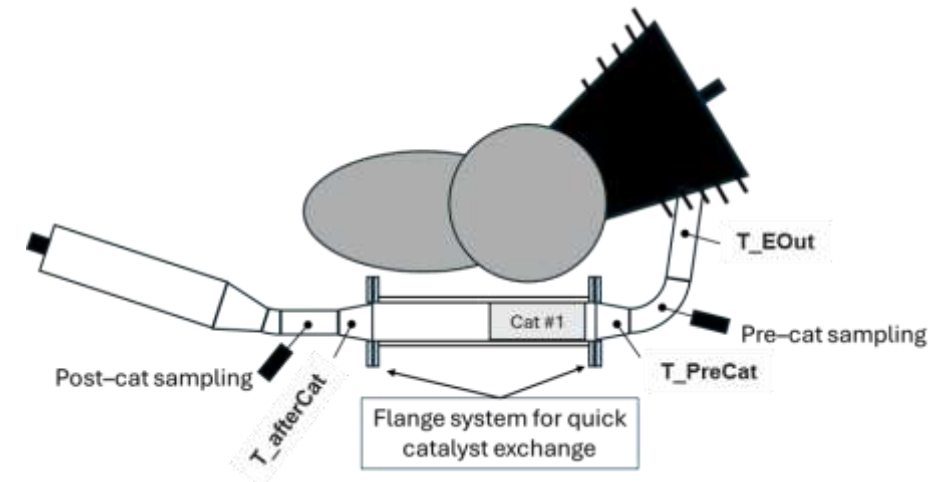
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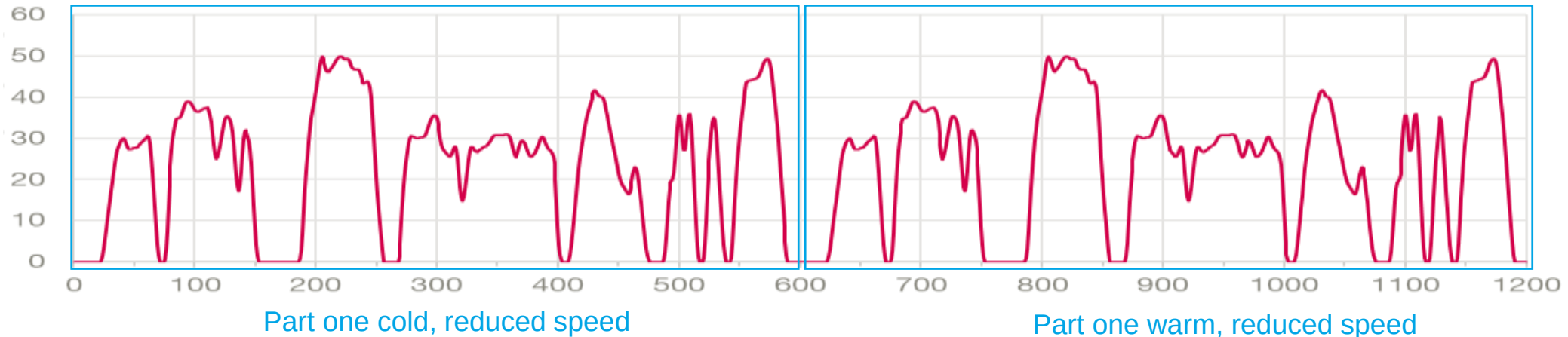


TEST SETUP AND CYCLE

Displaced volume	100 cm ³
Exhaust Gas After Treatment	Three-way catalyst
Transmission	5 gears manual
Vehicle Kerb Weight [kg]	112
Maximum Speed	85
Homologation	BS6
WMTC Class	Class 1



WMTC Class 1



Emission results:

Bag 1

Bag 2

AFTERTREATMENT SYSTEM

SINGLE BRICK SYSTEM

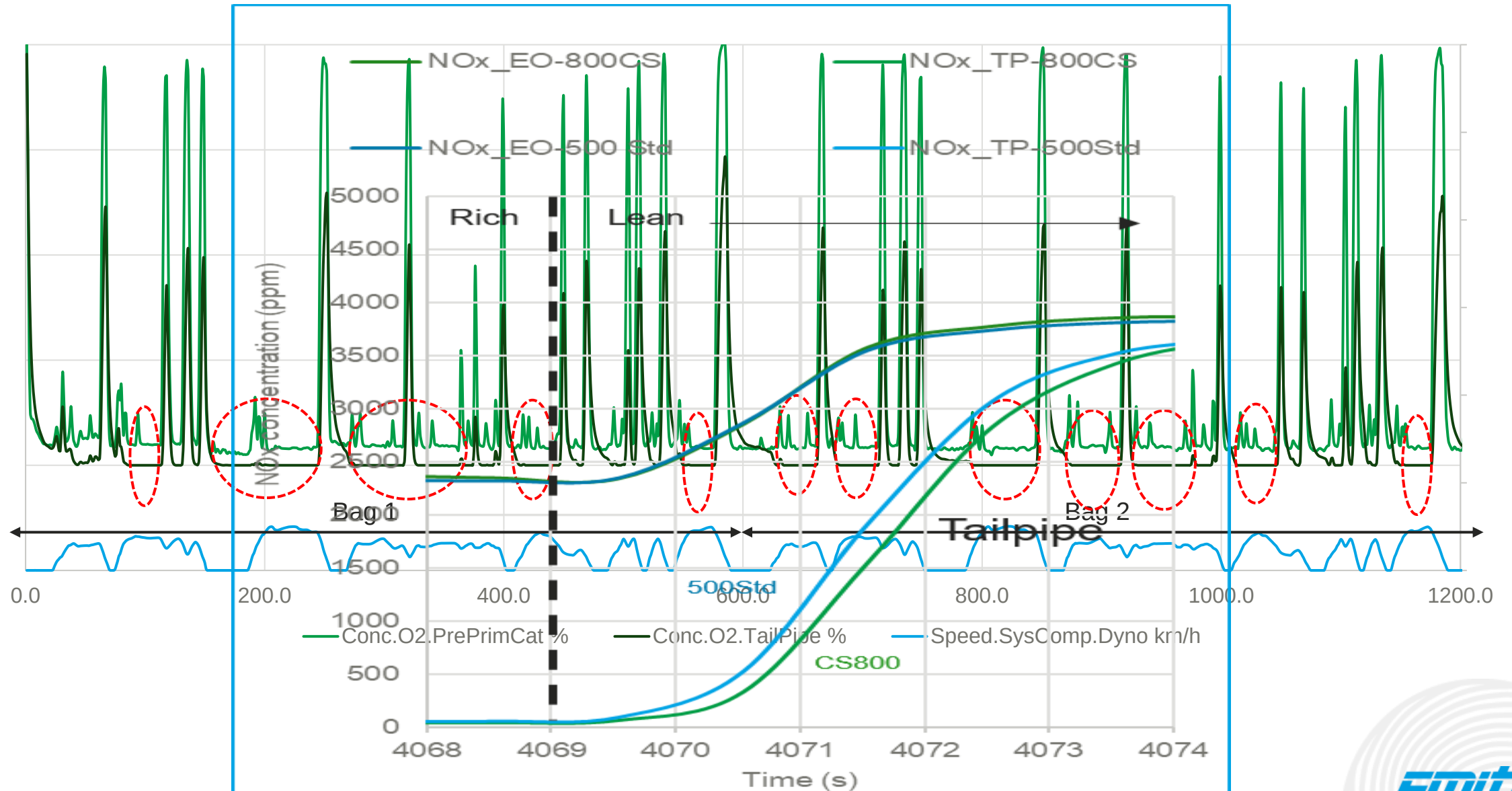
Catalyst systems	1 st brick (Ø40 x L mm)	2 nd brick (Ø40 x L mm)
Current LS System*	Length = 60 mm	Length = 60 mm
Single 200/400 LS	Length = 60 mm	none
Single 300/600 LS		none
Single 400/800 LS		none
Single 300 CS		none
Single 500 CS		none
Single 600 CS		none
Single 800 CS		none

*Series PGM loading is different



WMTC CYCLE

OXYGEN CONCENTRATION



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◉ **BENEFITS OF CS TECHNOLOGY**

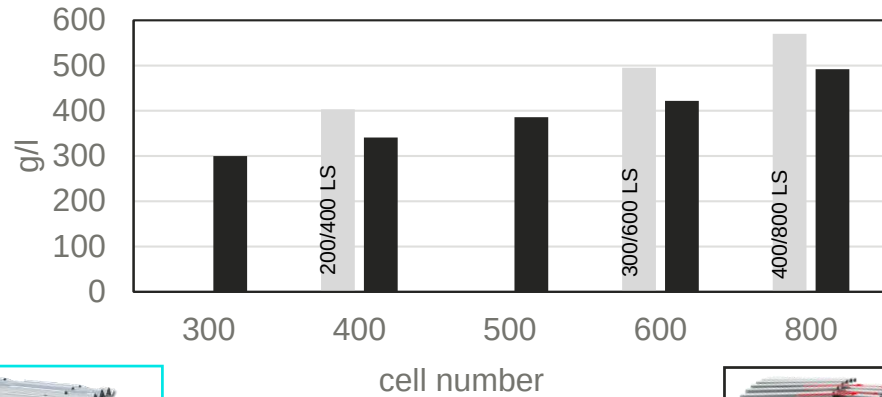
◉ SUMMARY



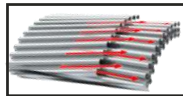
BENEFITS OF CS TECHNOLOGY

CHARACTERISTIC COMPARISON WITH LS-DESIGN

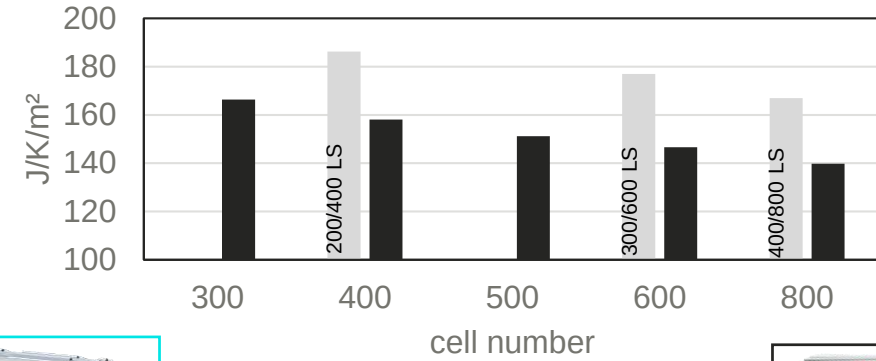
Foil material usage



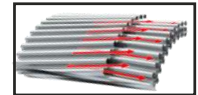
■ LS substrates ■ CS substrates



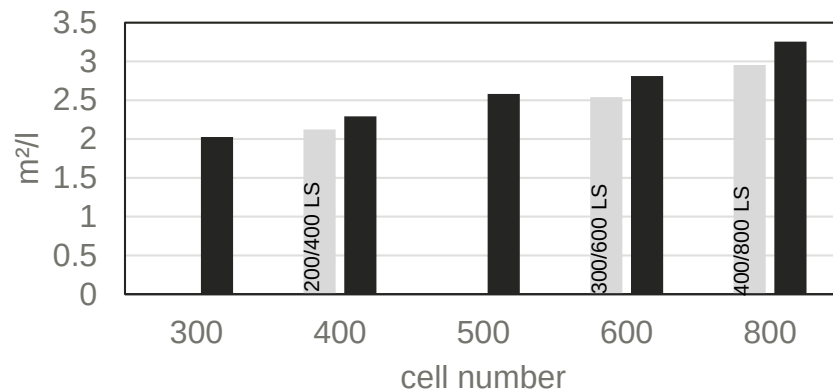
Cold start factor C_p/GSA



■ LS substrates ■ CS substrates

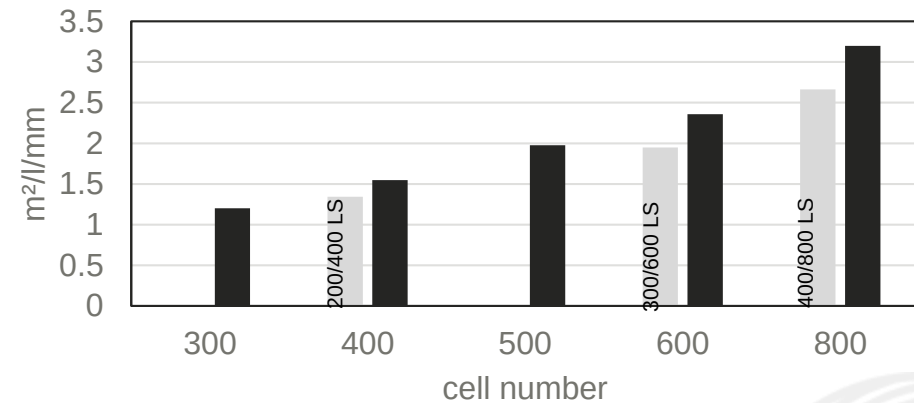


Geometric Surface Area (GSA)



■ LS substrates ■ CS substrates

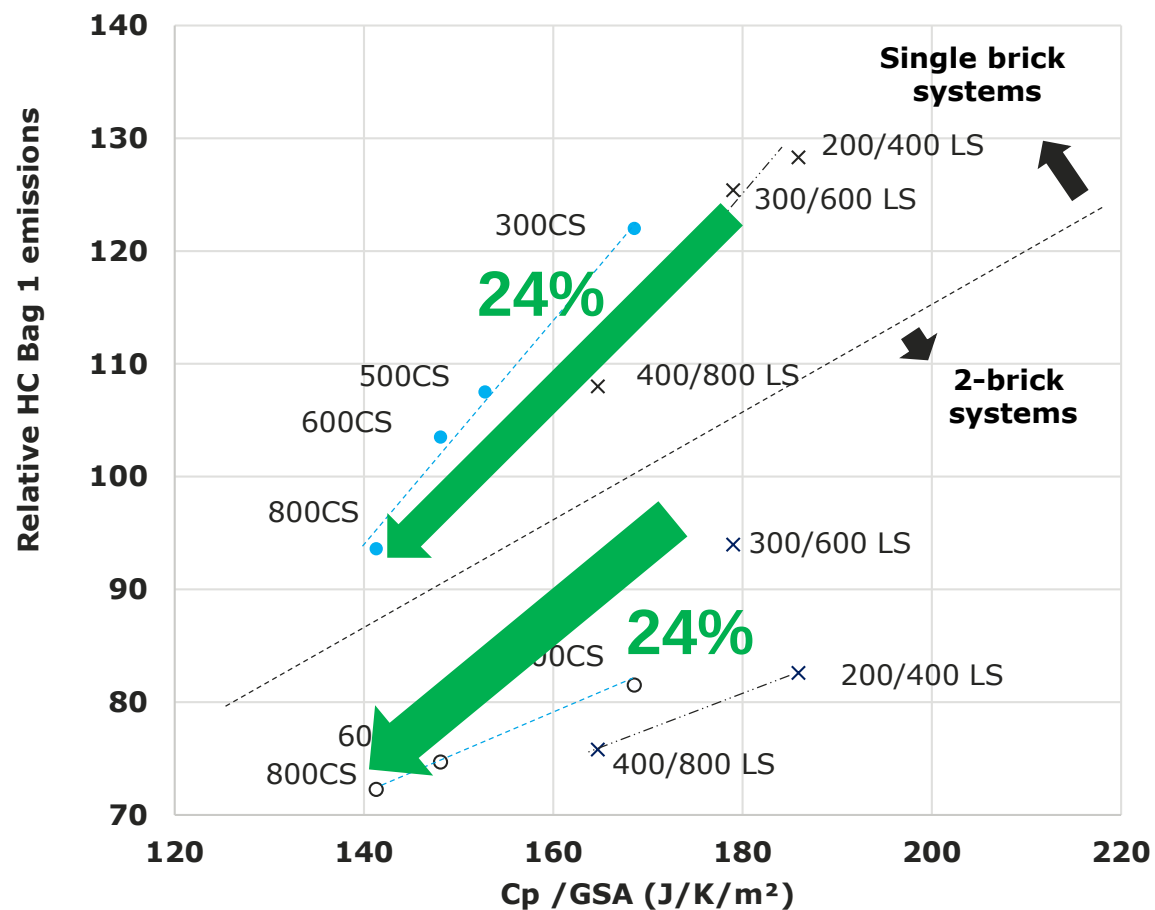
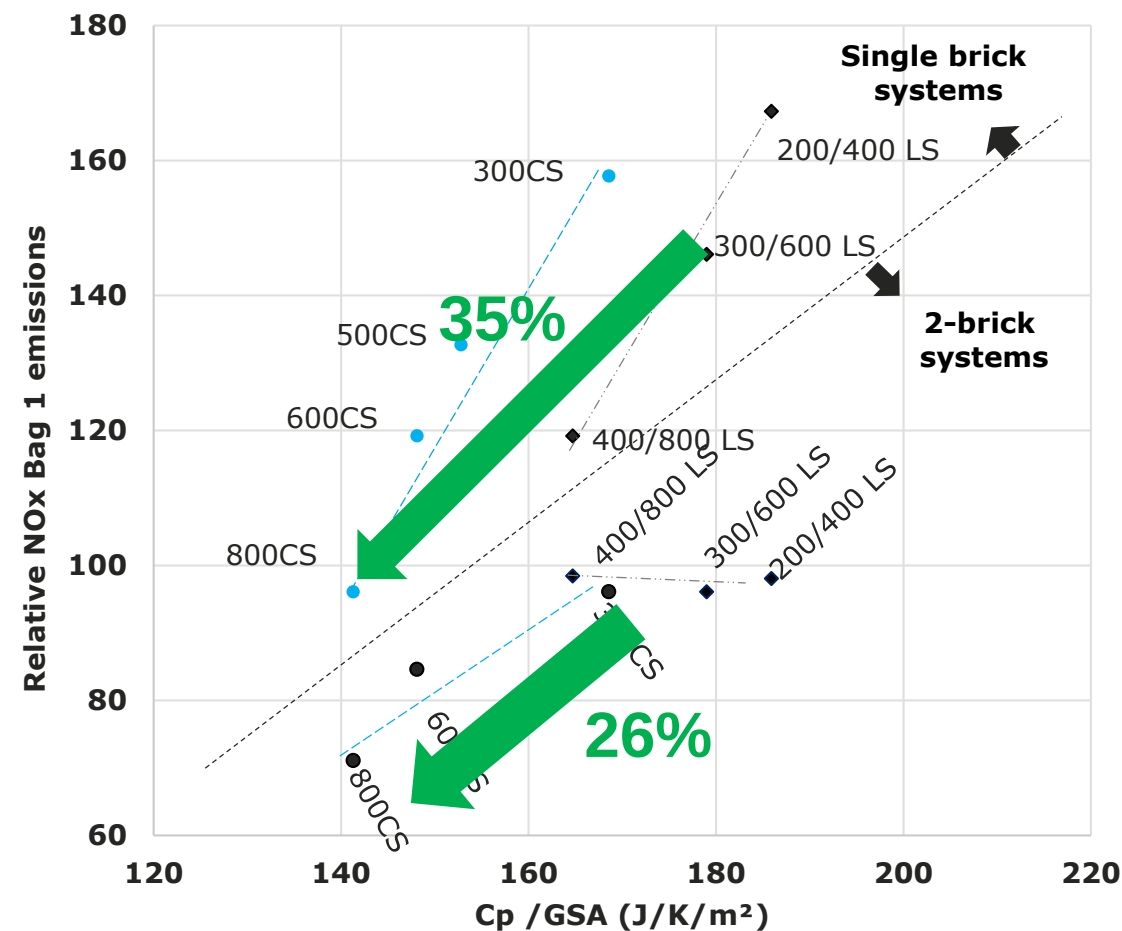
Performance factor GSA/dH



■ LS substrates ■ CS substrates

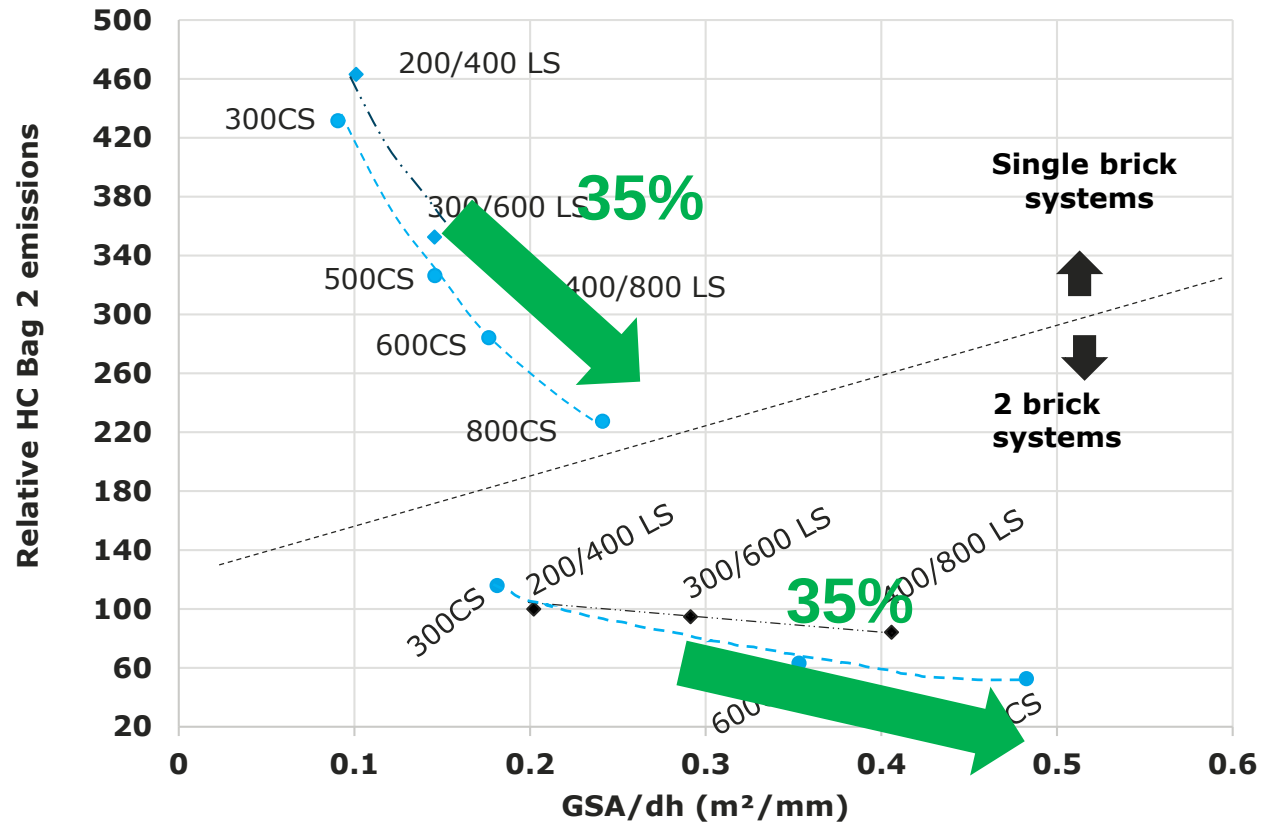
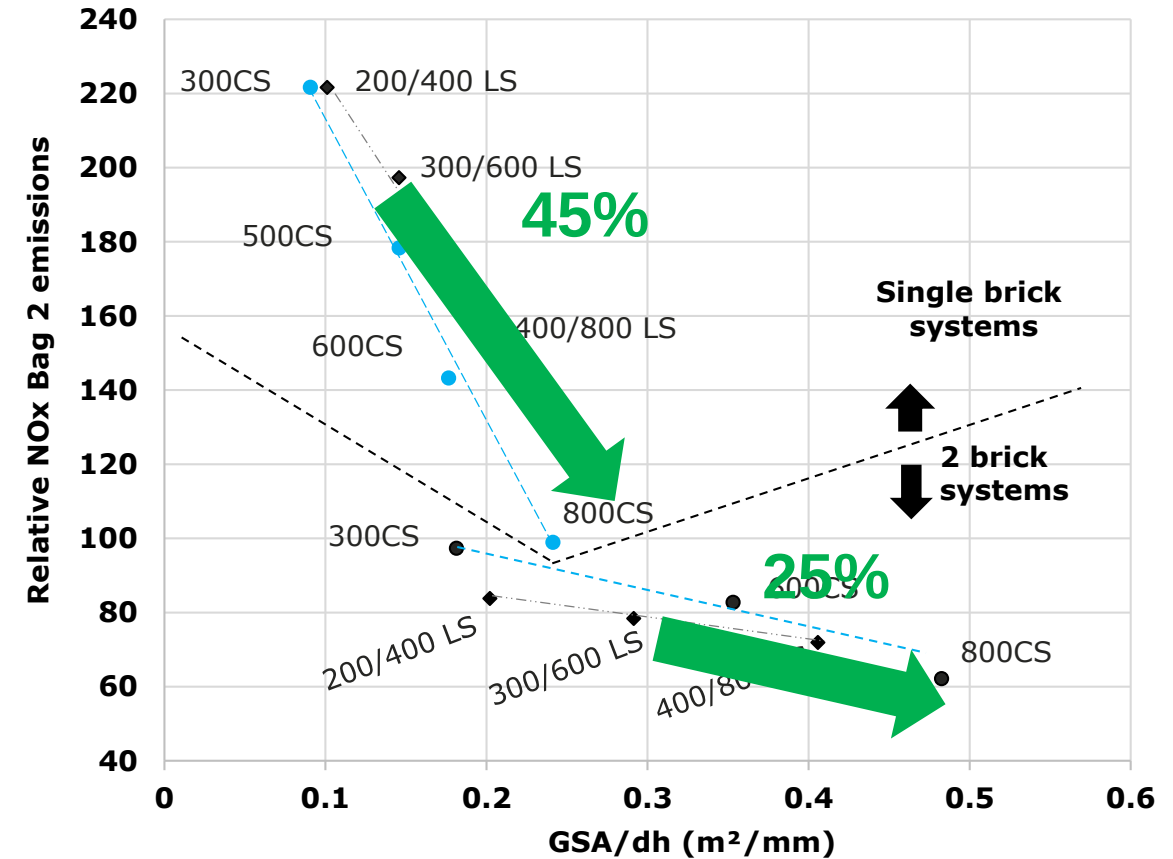
BENEFITS OF CS TECHNOLOGY

COLD START FACTOR (BAG 1) - HC AND NOX PERFORMANCE



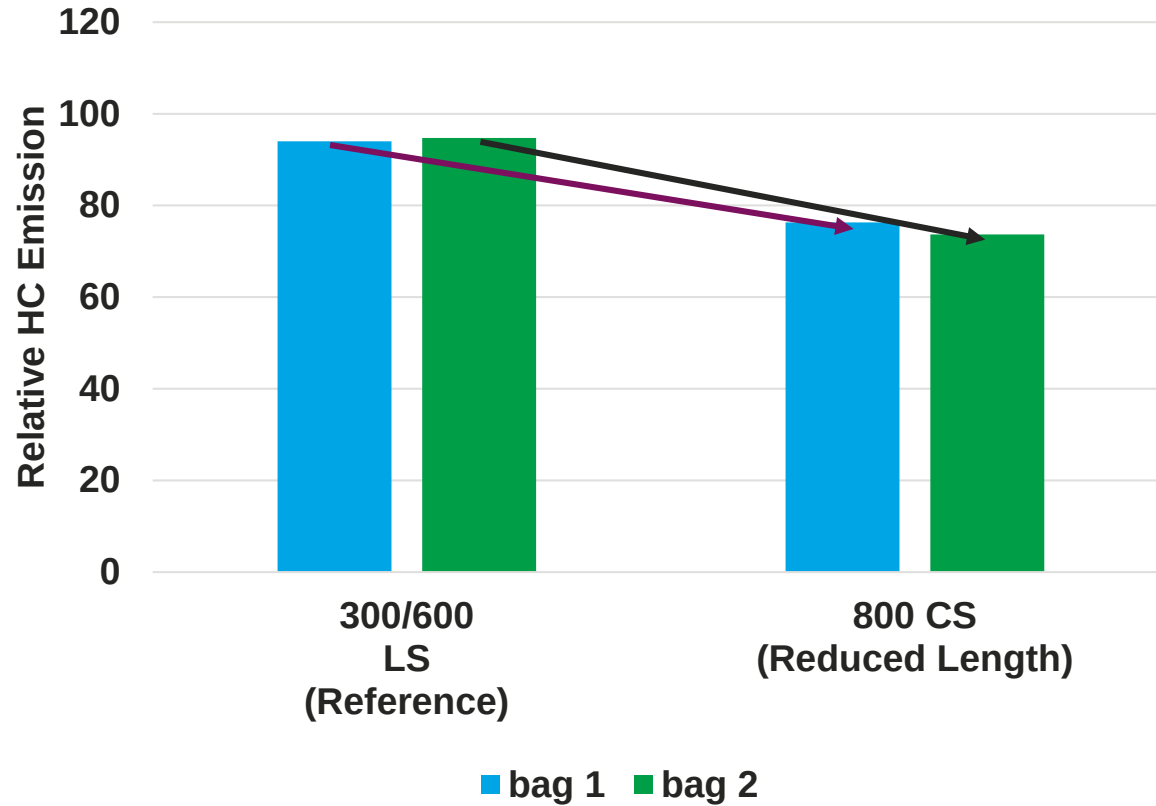
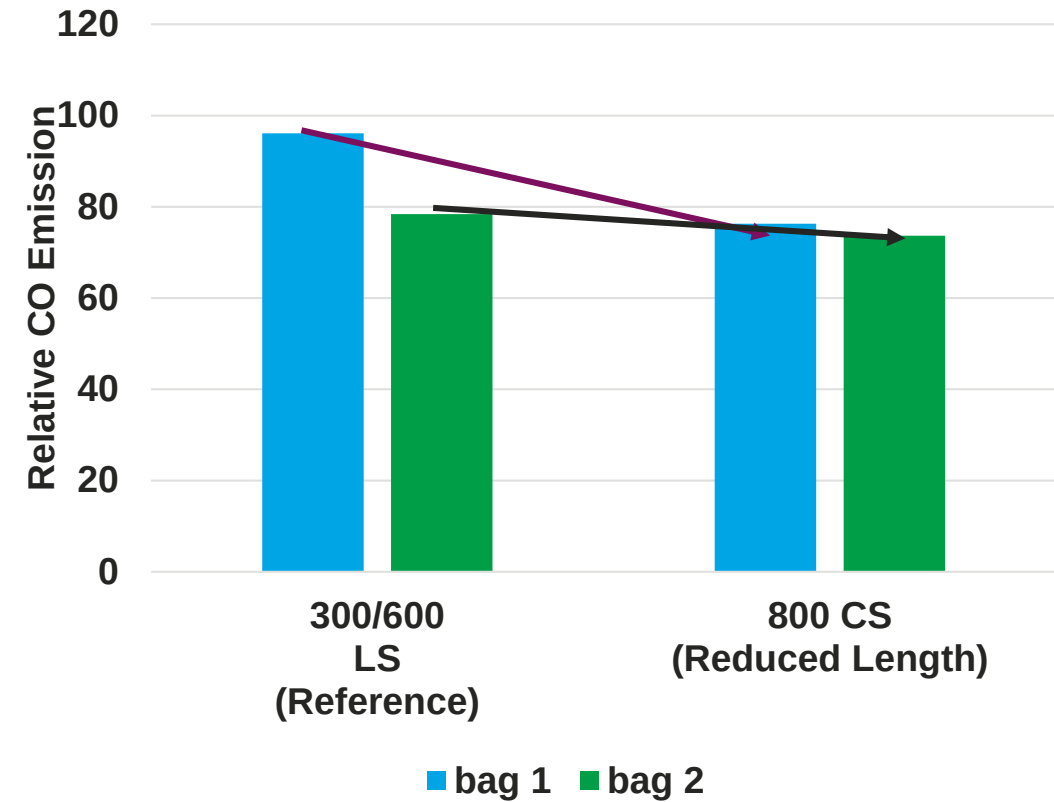
BENEFITS OF CS TECHNOLOGY

PERFORMANCE FACTOR (BAG 2) - HC AND NOX PERFORMANCE



BENEFITS OF CS TECHNOLOGY

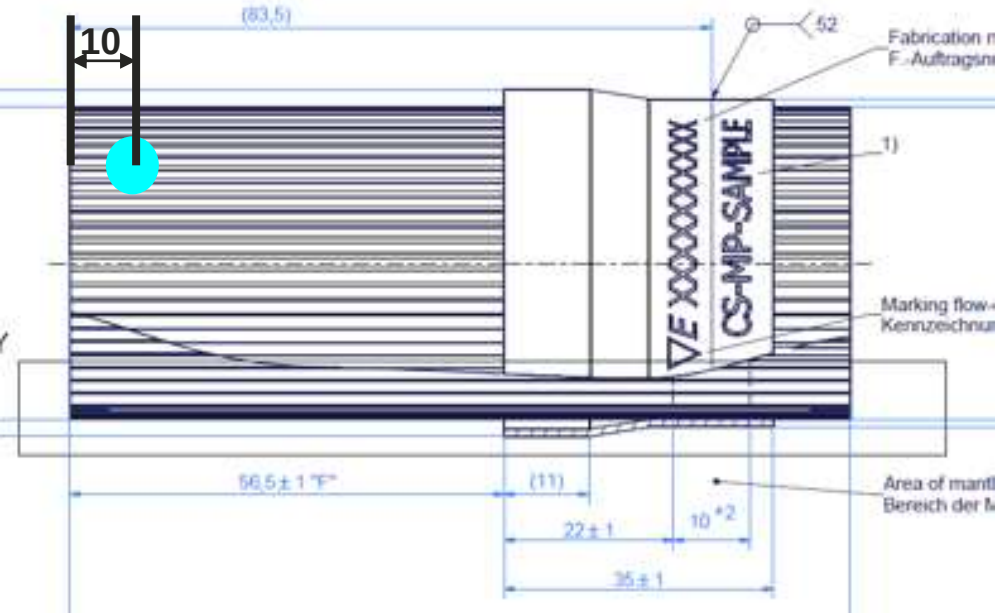
RESULTS WITH REDUCED VOLUME (2 BRICK SYSTEM)



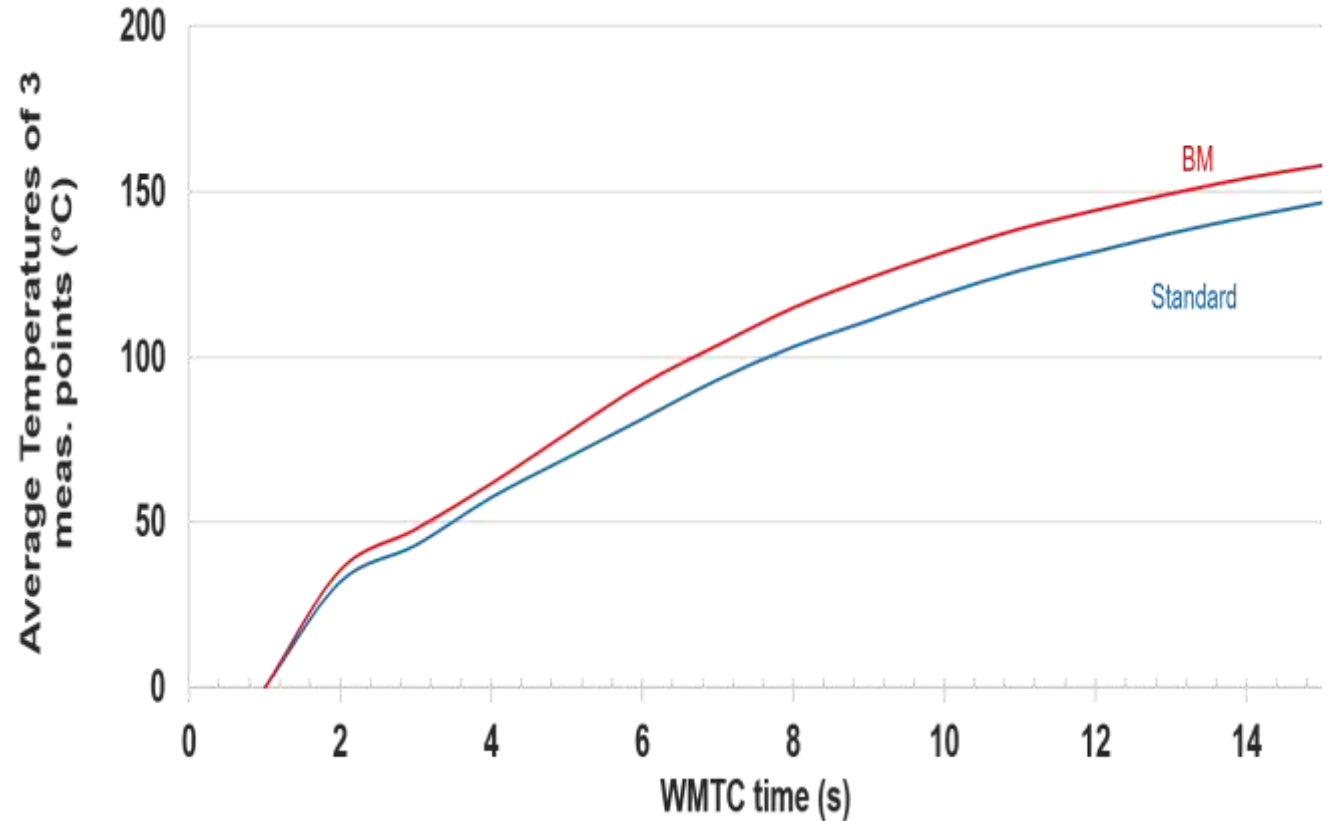
**CS Technology helps to reduce the volume by 15%
and overall system cost**

COMPARISON STD / BM; COLDSTART

EXHAUST TEMPERATURE PROFILE COMPARISON



- BM design offers higher temperature during cold phase over the standard mantle
- CS-BM emission testing underway



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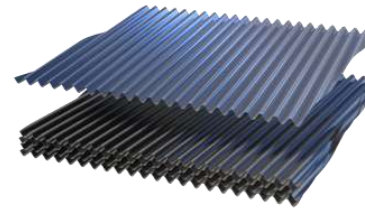
SUMMARY

CS Technology offers advantage over Current series LS

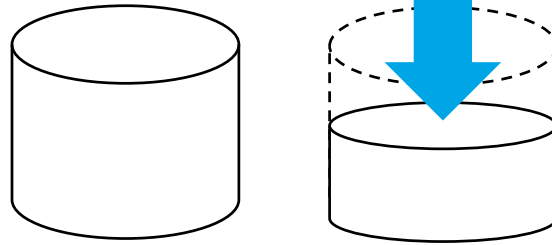
- Higher GSA



- Weight reduction due to no flat foil



- Volume reduction



- Overall system cost ₹ ↓

BM design offers temperature benefit over standard mantle design

A large, light gray fingerprint graphic is positioned on the left side of the slide, partially behind the text.

CLOSING SLIDE