

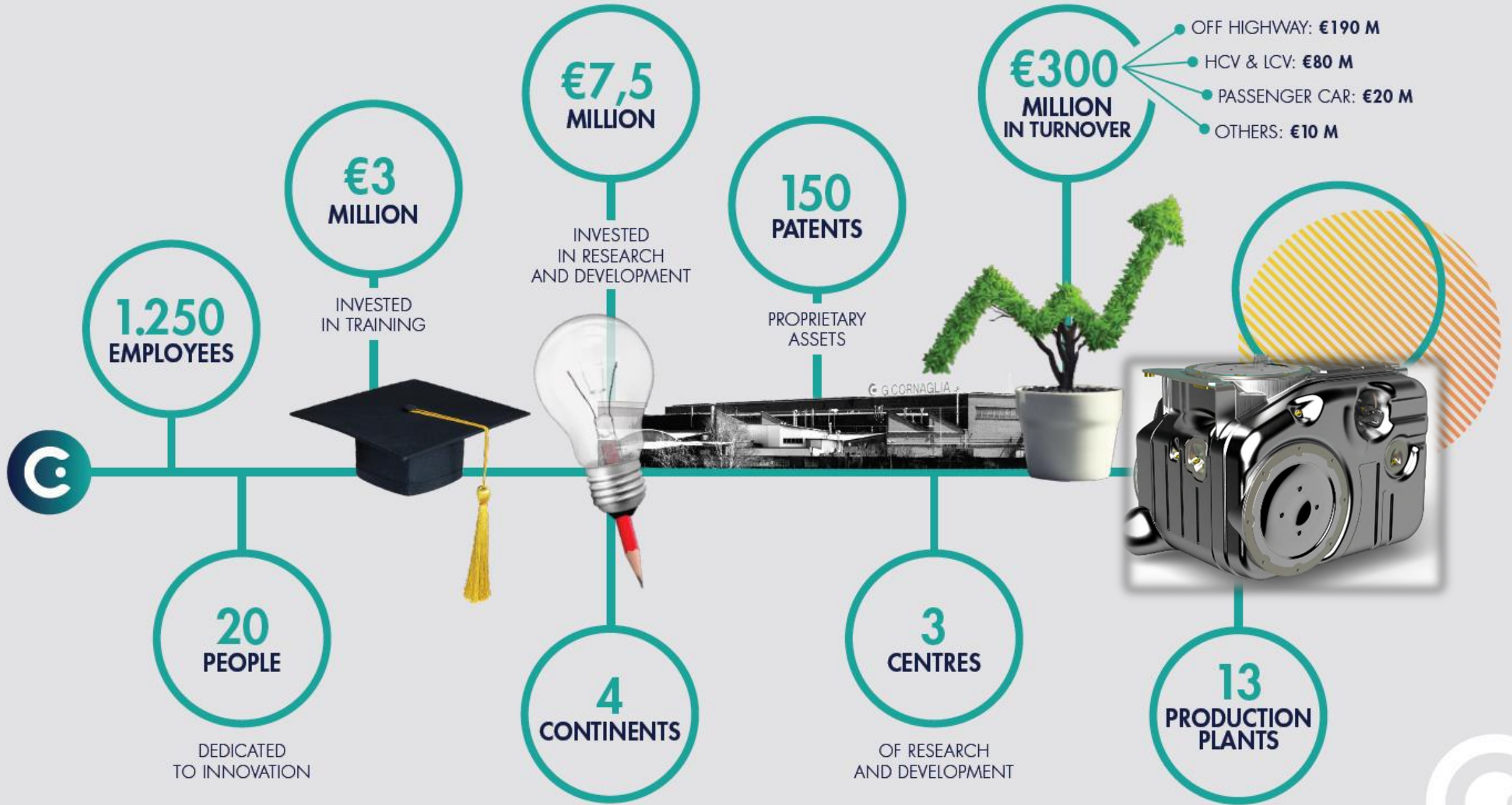
# Mangla Cor-Tubi

## ECT - 2023

G. Petrafesa



*Build relationship*



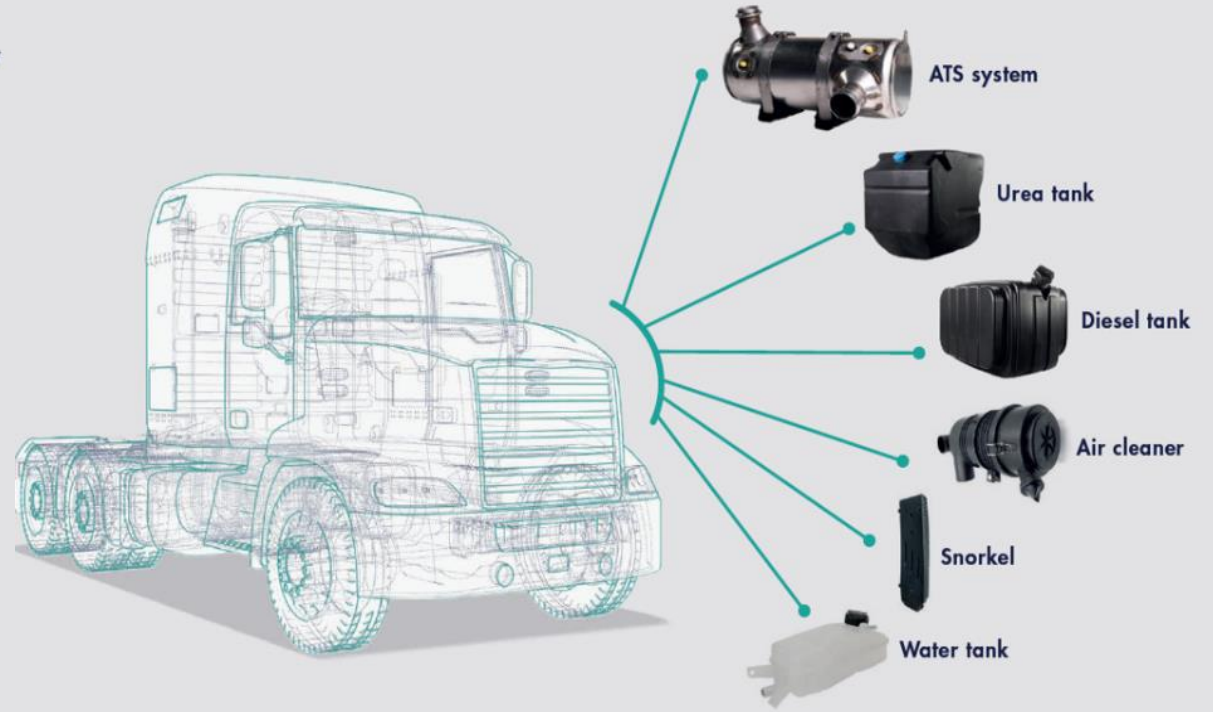
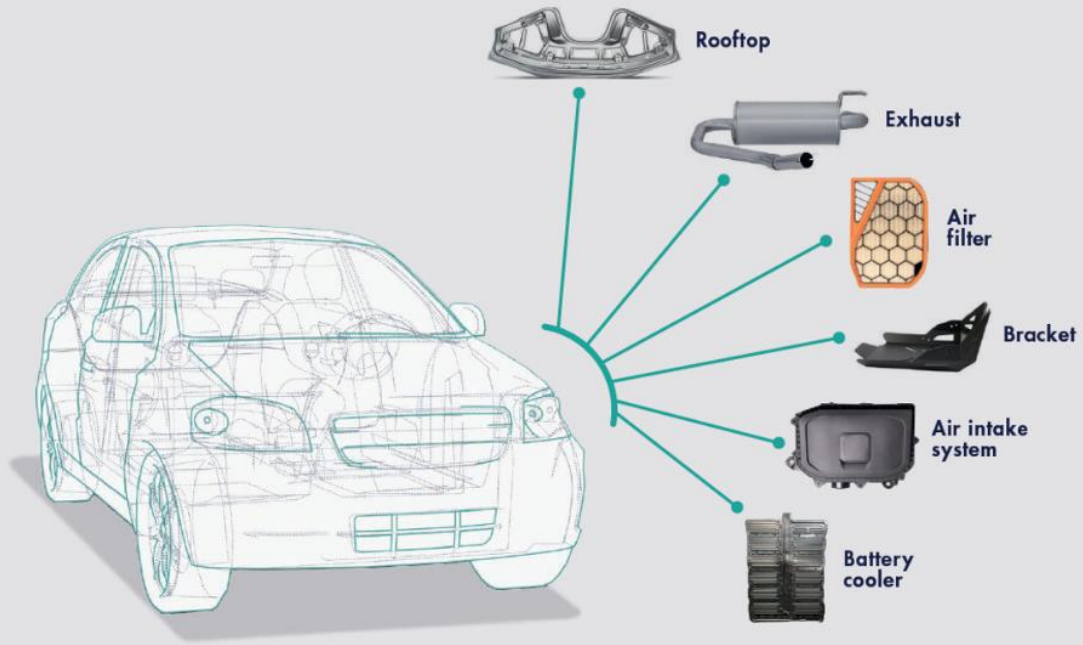
# TECHNOLOGICALLY ADVANCED SOLUTIONS



A single reality, able to offer its customers **technologically advanced solutions** for different product segments.



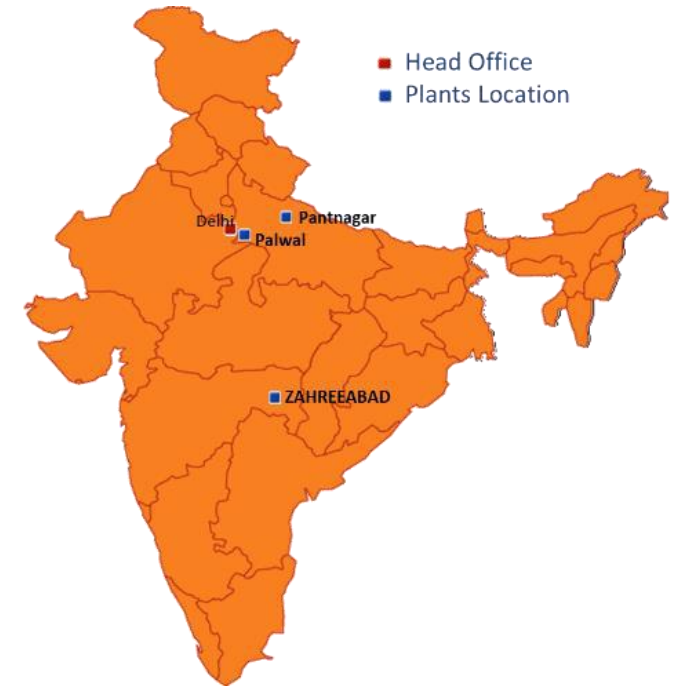




# Mangla Cor-Tubi JV

## Purpose

- Mangla Tubes is a pioneer manufacturer of mufflers, tubes and sheet metal components for premium Indian customers as Mahindra, CNH, Escorts/Kubota
- Thanks to Cornaglia expertise on catalyzed exhaust systems, the JV aims to enter the current BSVI and upcoming BSVII/Trem V markets.
- The JV development plan includes the installation of R&D center in India, capable of supporting design and validation of after treatment systems for local Customers.
- Production plants, strategically located close to main Customers, are the best starting points to the new technology production development.



JV with Mangla Tubes is part of Cornaglia expansion plan in Indian Country.  
OUR VISION: Lead clean emission drive for Commercial Vehicles & Off-road

segments.







Cornaglia's purpose is to use its expertise to generate a positive impact on green mobility. All products are shaped with a forward-looking sight to always be ready for change. The final commitment is a sustainable future for the planet and for us all.





# E7 / BSVII ATS System



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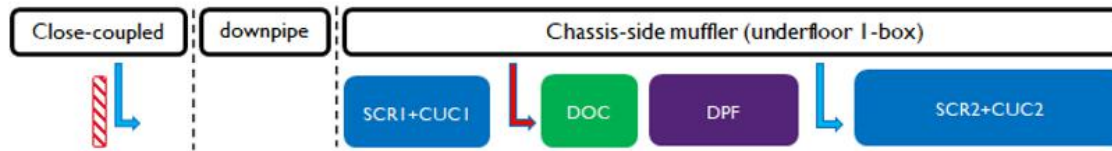
# Euro7 / BSVII developments

## ATS architecture

Upcoming E7 / BS VII regulations require a significant step ahead in exhaust after treatment technology.

Main targets are:

- Maximize emission reduction at cold start
- minimize urea deposit
- optimize fuel consumption



Legenda					
	Electric heater (option)		DEF injection + mixer		HC injector (+mixer)



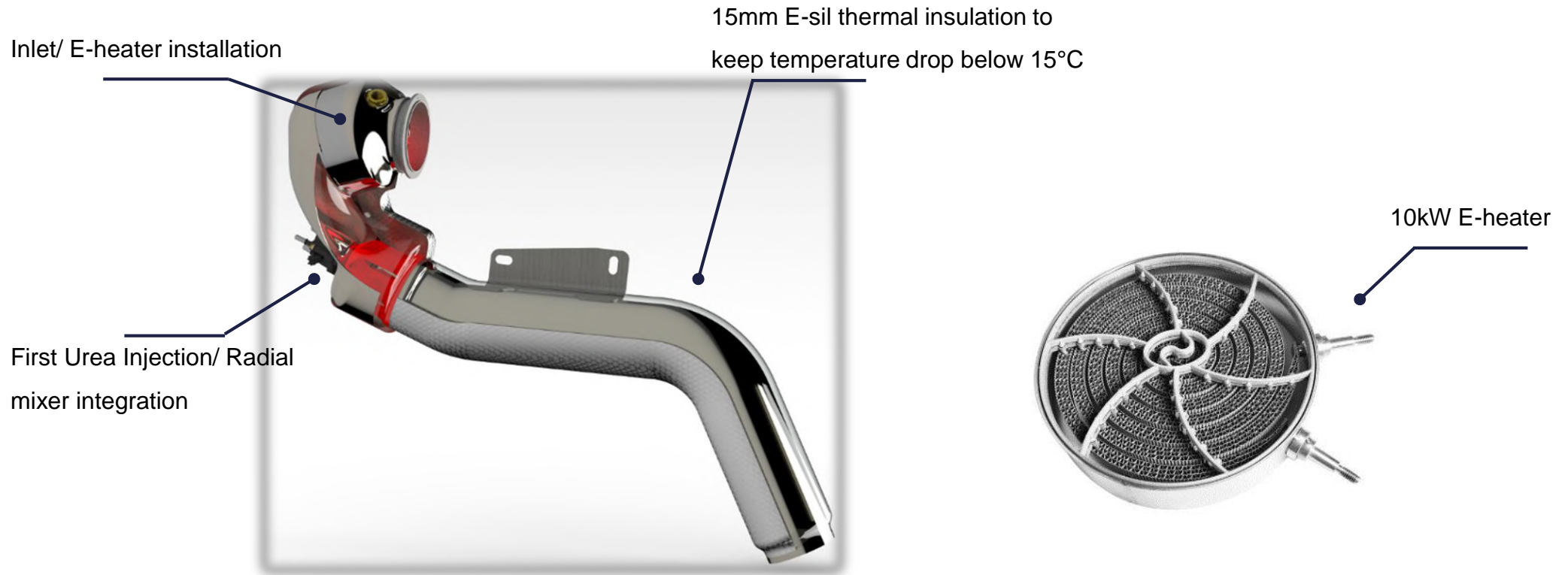
To meet new emission requirements, Cornaglia ATS design solution includes close coupled **e-heater** and **first urea injection** + chassis-mounted muffler implementing **DOC/DPF** and **double stage SCR**.





# Euro7 / BSVII developments

## 13L engine 460kW - heavy duty ATS architecture – Close Coupled



Cold start emission of the engine is becoming a major challenge, Cornaglia close coupled module is designed to guarantee fast heat up of the system, thanks to **e-heater** integration and **effective**

**thermal insulation**



# Euro7 / BSVII developments

## 13L engine 460kW - heavy duty ATS architecture – chassis mounted muffler

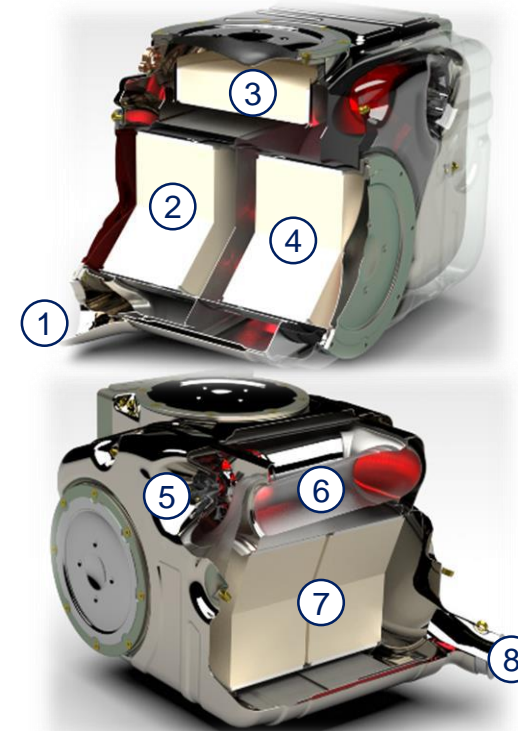
Compact «box type» ATS system,  
chassis mounted

15mm E-sil thermal insulation to meet  
200°C skin teperature target

AISI 441 stainless steel

Second stage urea injection  
integrated design

Lo-SCR, DOC and DPF serviceable and  
size-adaptable to engine rating



#	Component
1	Inlet pipe
2	Lo-SCR
3	DOC
4	DPF
5	Urea Injection
6	Mixing Pipe
7	2x SCR bricks
8	Outlet pipe

Cornaglia ATS optimized design allows the integration of E7/BSVII ATS technology into current E6/BSVI vehicle space claim, preserving functional and durability requirements





# Cornaglia Urea Radial Mixer

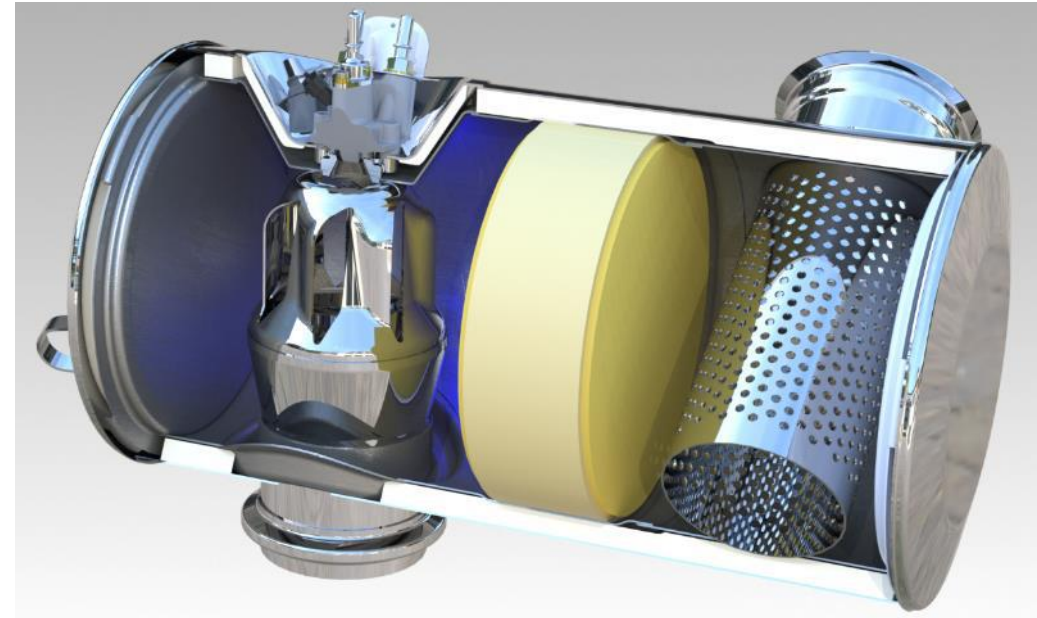


*Build relationship*

# Cornaglia Urea Radial Mixer

## Advantages

- ✓ Co-axial urea injection w/o **contact between spray and wings**
- ✓ **High urea mixing efficiency** leading to **optimal NH<sub>3</sub> conversion** and **negligible urea deposit** compared to competitors
- ✓ **High swirl flow on every range** of engine operative points
- ✓ Very low back pressure translates in **low fuel consumption**
- ✓ Single part made by stamping operations
- ✓ Patented design

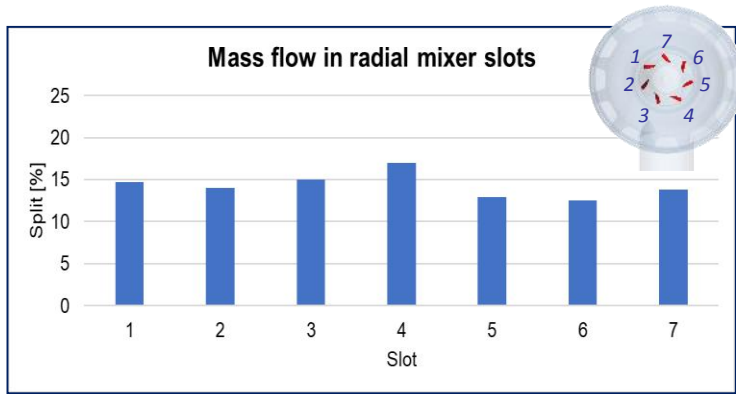


Cornaglia development of urea Radial Mixer is the answer to the new emission regulation challenge. **Successfully tested for long term urea deposit test, proved to be the new benchmark of mixing efficiency.**

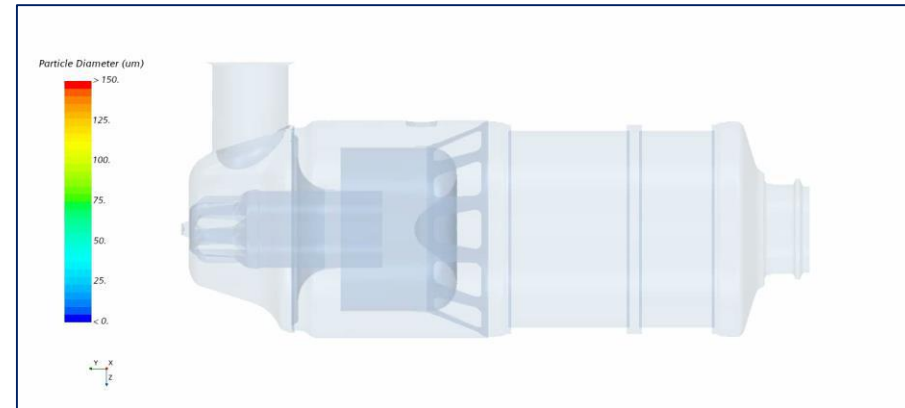




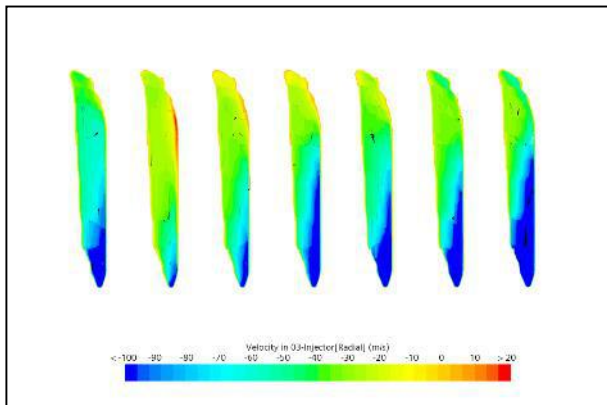
# Cornaglia Urea Radial Mixer Performances



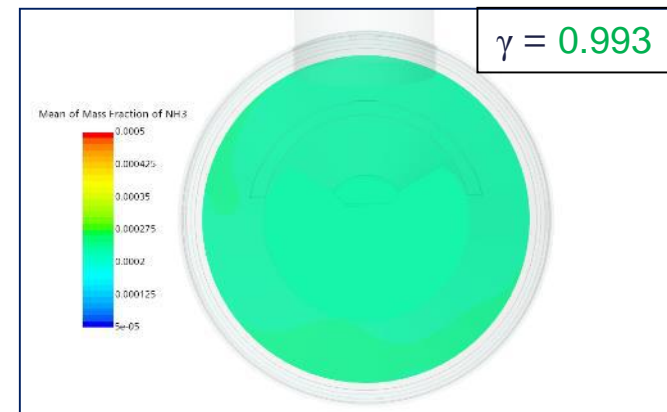
✓ < 5% mass flow unbalance on mixer wings = high swirl efficiency



✓ 100% evaporated spray mass before SCR = no residual liquid film



✓ Velocity distribution balance = minimized backpressure



✓ High value of NH3 uniformity = high NOx conversion efficiency

High swirl flow efficiency and exceptional urea evaporation rate, lead to optimal NH3 uniformity on SCR inlet, **ideal condition to properly reduce NOx emissions.**



# Cornaglia Urea Radial Mixer

## Long term deposit test

- Test performed on hot flow bench, total **150h** alternation of 3 low temperature engine points. Weight measurement every 24h to confirm absence of urea deposit
- Visual inspection after 150h shows drastic reduction in 3D deposit vs competition benchmark (- **90%**):



Steady state high mass flow cycle			
Test point [#]	Temperature, mixer inlet (before DEF dosing) [°C]	Exhaust mass flow [kg/h]	DEF dosing quantity, reference [g/h]
1	300	450	1560
2	300	575	1620
3	300	700	2220



**CORNAGLIA: 137g @24h**



VS



**COMPETITOR: 1200g @24h**

After long term validation test in the most challenging operative conditions, Cornaglia mixer shows **zero 3D deposit**. Outstanding performances compared to competition, makes the Radial Mixer the **new best in class** among mixing devices



# Conclusions

## Mangla Cor-Tubi Pvt. Ltd (MCPL)

- Cornaglia is an Italian company present all over the world; develops and supplies integrated after treatment systems and components for the main OEMs in the automotive market
- The joint venture with Mangla Tubes represents a concrete opportunity to extend the presence in the Indian market, where Mangla Tubes is a reliable supplier to Indian Customers.
- New emission regulations Euro 7 – BS VII impose challenges in the integration of e-heater, double stage SCR and thermal management.
- Cornaglia solution provides optimal layout integration respecting space claims, best in class performances and reliability, benchmark urea mixing efficiency thanks to patented Radial Mixer.
- For any request or further information about our products or services, please do not hesitate to contact us:

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**MANGLA COR-TUBI PVT. LTD.**  
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Thank you





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MOVING FROM TOMORROW