

# Light Weight Hydrogen Storage Tanks for Fuel Cell Vehicles



Optimal Laminate design & Winding Technology



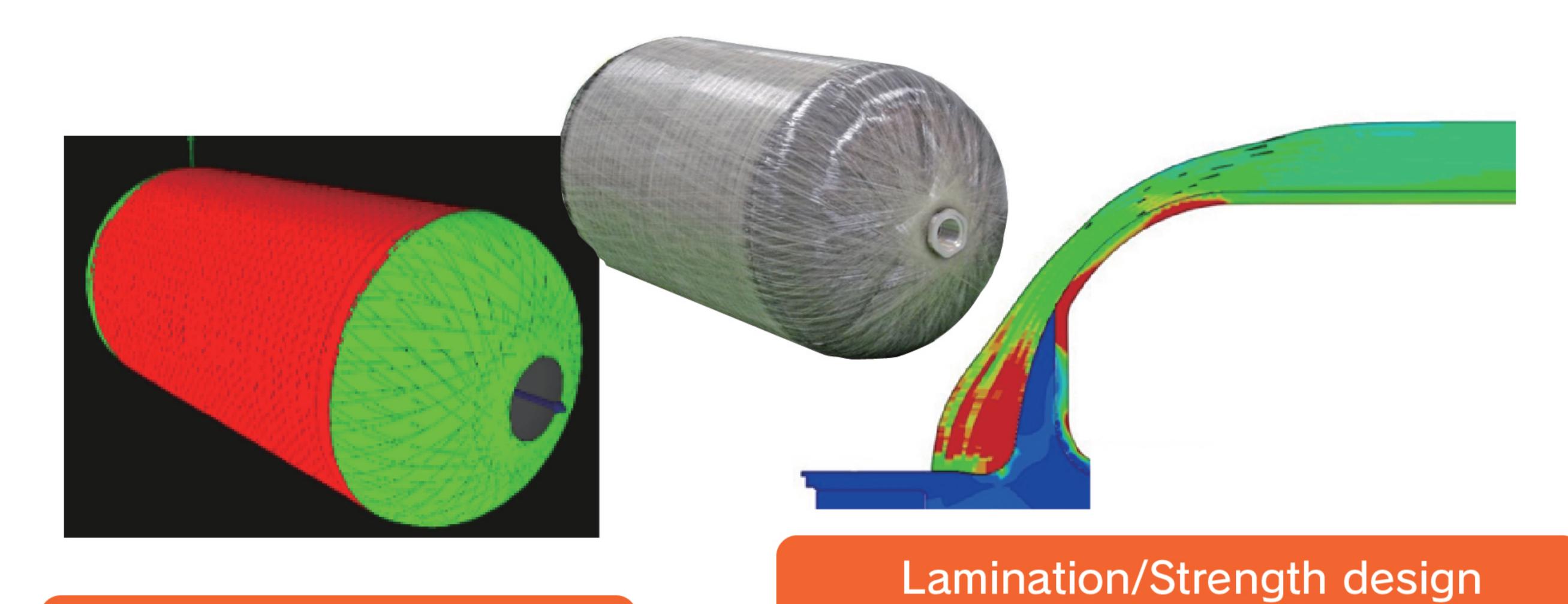
In Development

# Establishing optimum stacking design and winding technology on the premise of mass production

Resin liner composite utilizing technical know-how of plastic fuel tank production

Feature

- Weight reduction realized by Yachiyo original optimal design of CFRP laminate
- Weight reduction / Quality improvement with CFRP winding technology to uniform lamination quality



# Exhibit prototype specifications

Winding simulation

Water Capacity	79L
Size	Ф425mm×914mm
Working Pressure (Nominal)	70MPa
Burst Pressure (Minimum)	157.5MPa

Mass Comparison by type

100
80
40

with FEA (Finite Element Analysis)

\*\*As a result of our investigation,it varies depending on pressure resistance/ capacity / diameter.

Optimize

TYPE3

## Plastic Tailgate

From steel to resin



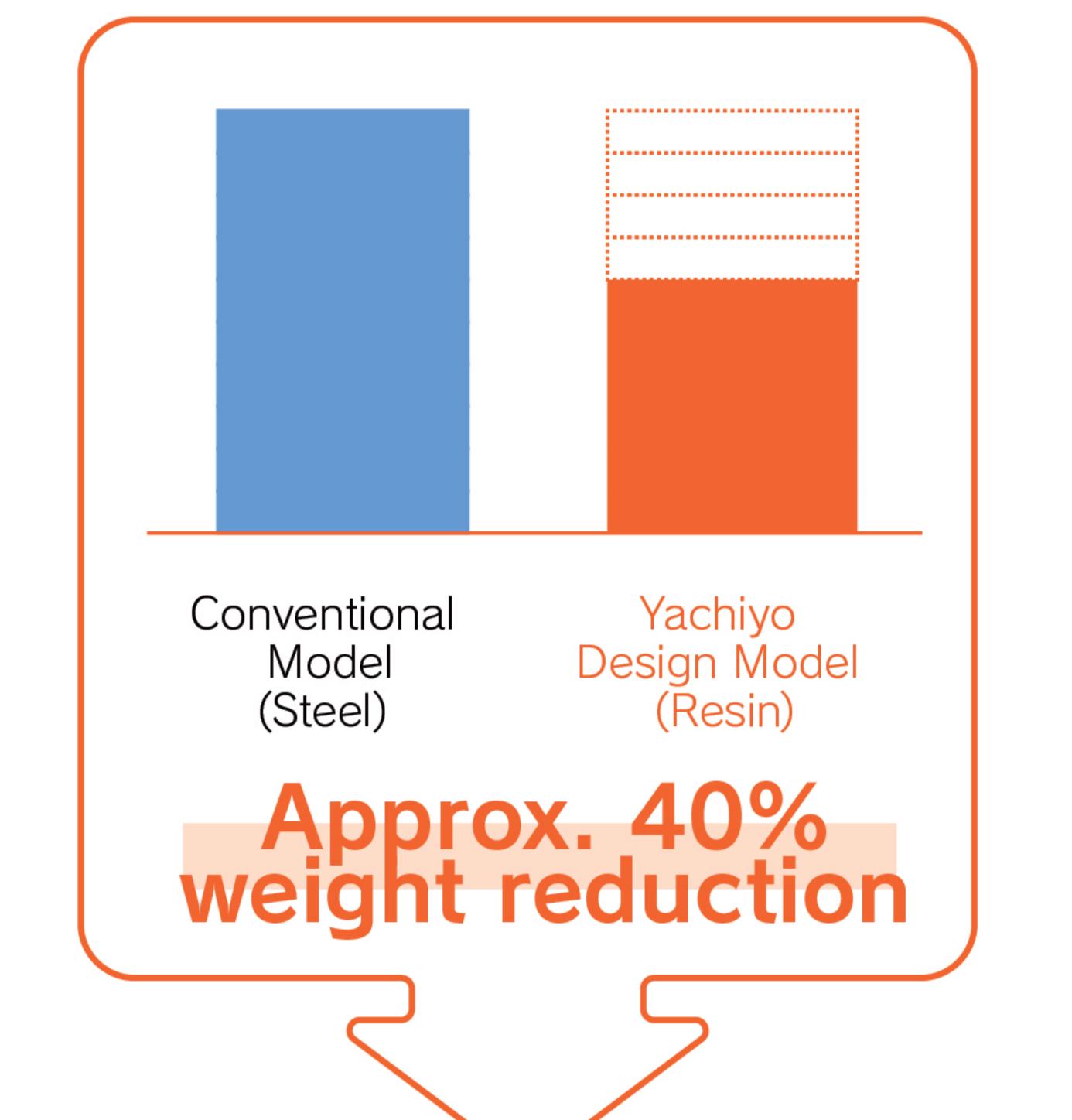
Reference Exhibit



In Development

#### Conventional Model (Steel)

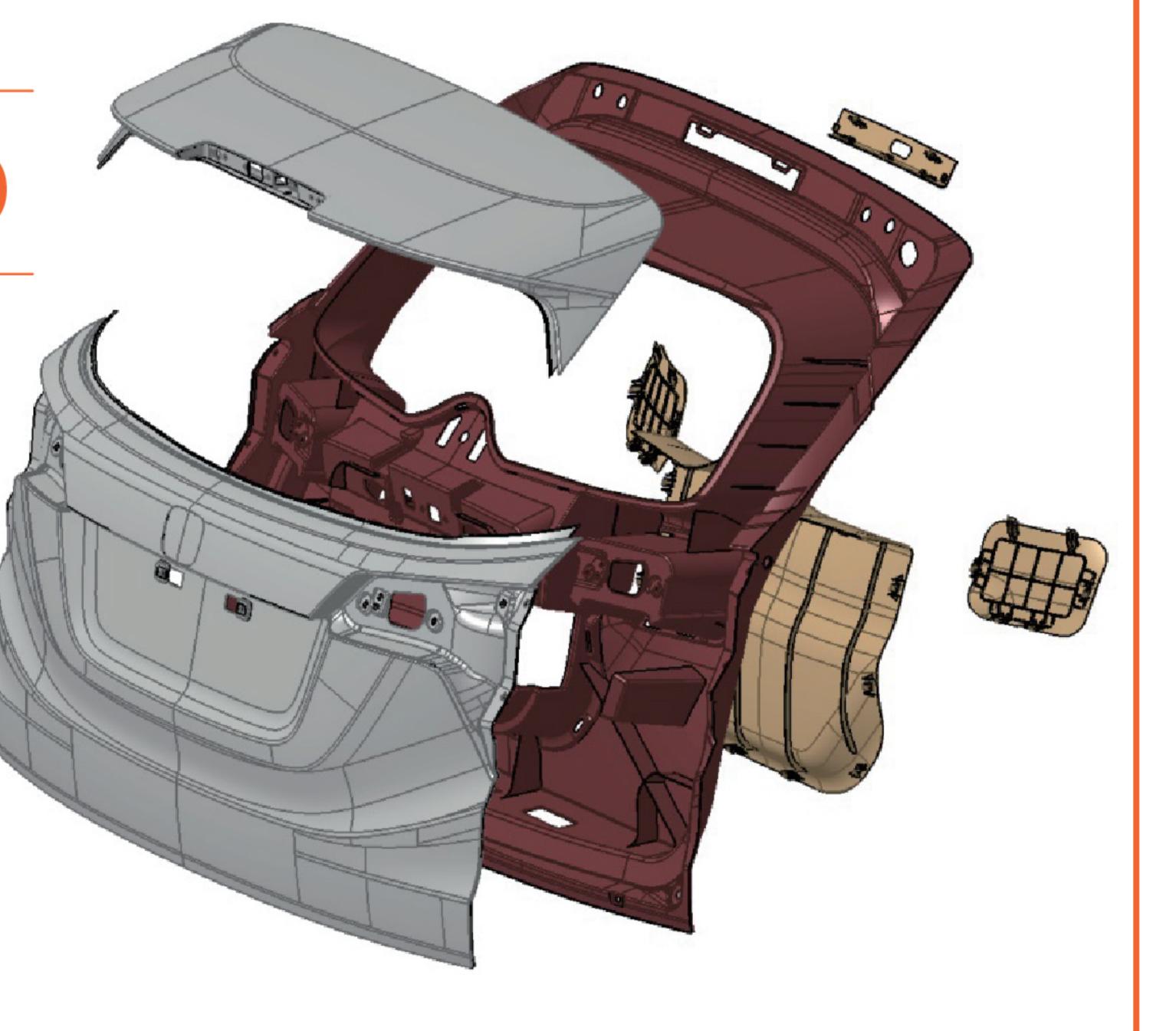




#### Yachiyo Design Model (Resin)

#### Feature

- Approx. 40% lighter than steel
- Reduce number of sub-components by integrated parts
- Light weight and high rigidity Outer:PP Inner:PP-GF material
- High designability



# **YACHIYO**

http://www.yachiyo-ind.co.jp

# 八千代工業株式会社

お問い合わせは、こちらまで

**204-2954-1956** 受付時間:9時~12時、13時~16時 ただし、土日および当社指定休日は除く

### Roof System Evolution



Reference Fxhihit



### PANORAMA Flagship

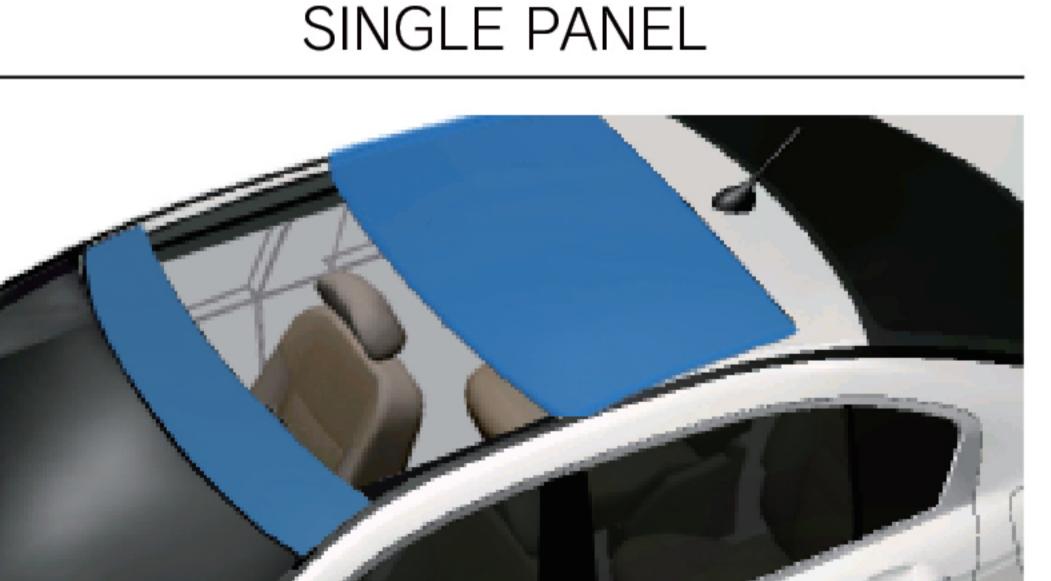


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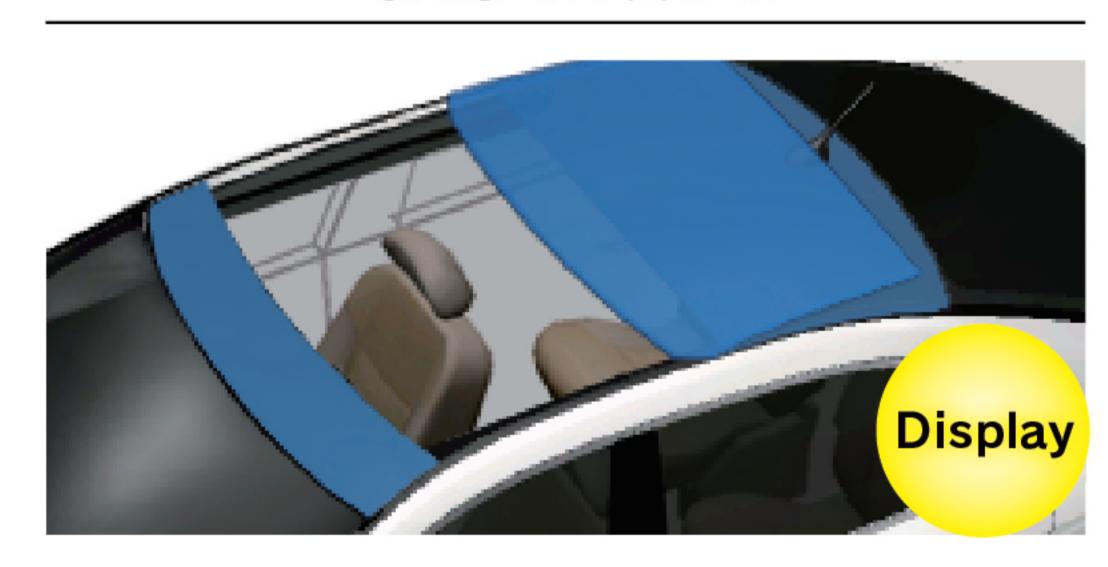
Feature

High designability,
Thin profile and maximum opening

TOP LOAD EXTERIOR SLIDE



TOP LOAD EXTERIOR SLIDE SINGLE PANEL



## PANORAMA High-end



Development

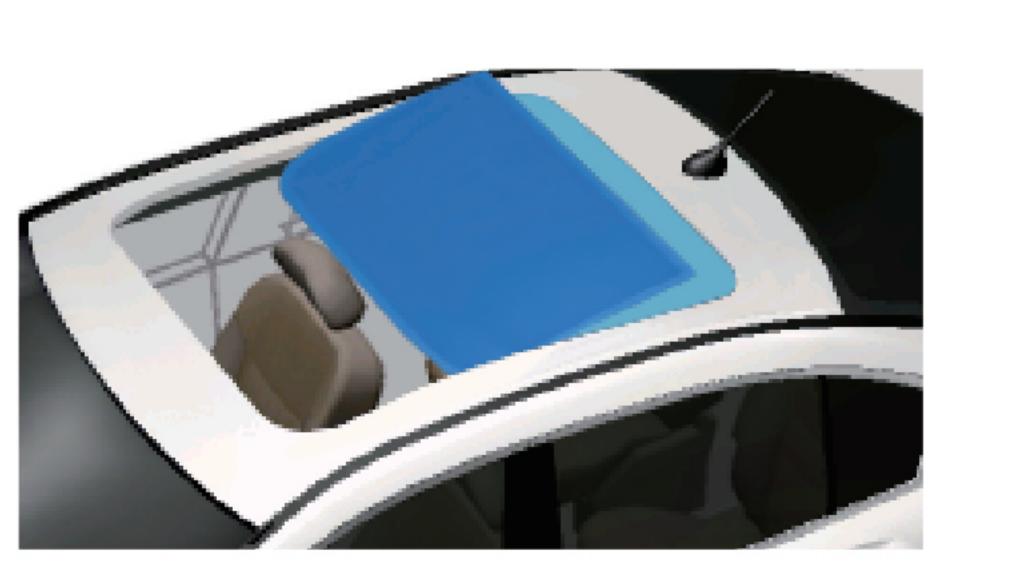
Feature Thin profile and maximum opening

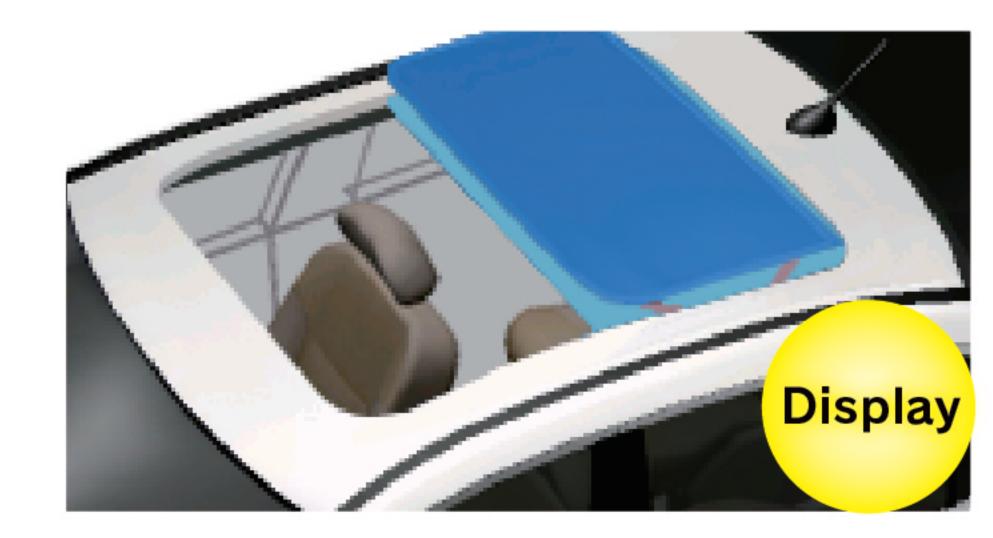
BOTTOM LOAD INNER SLIDE

BOTTOM LOAD EXTERIOR SLIDE

BOTTOM LOAD TOP SLIDE

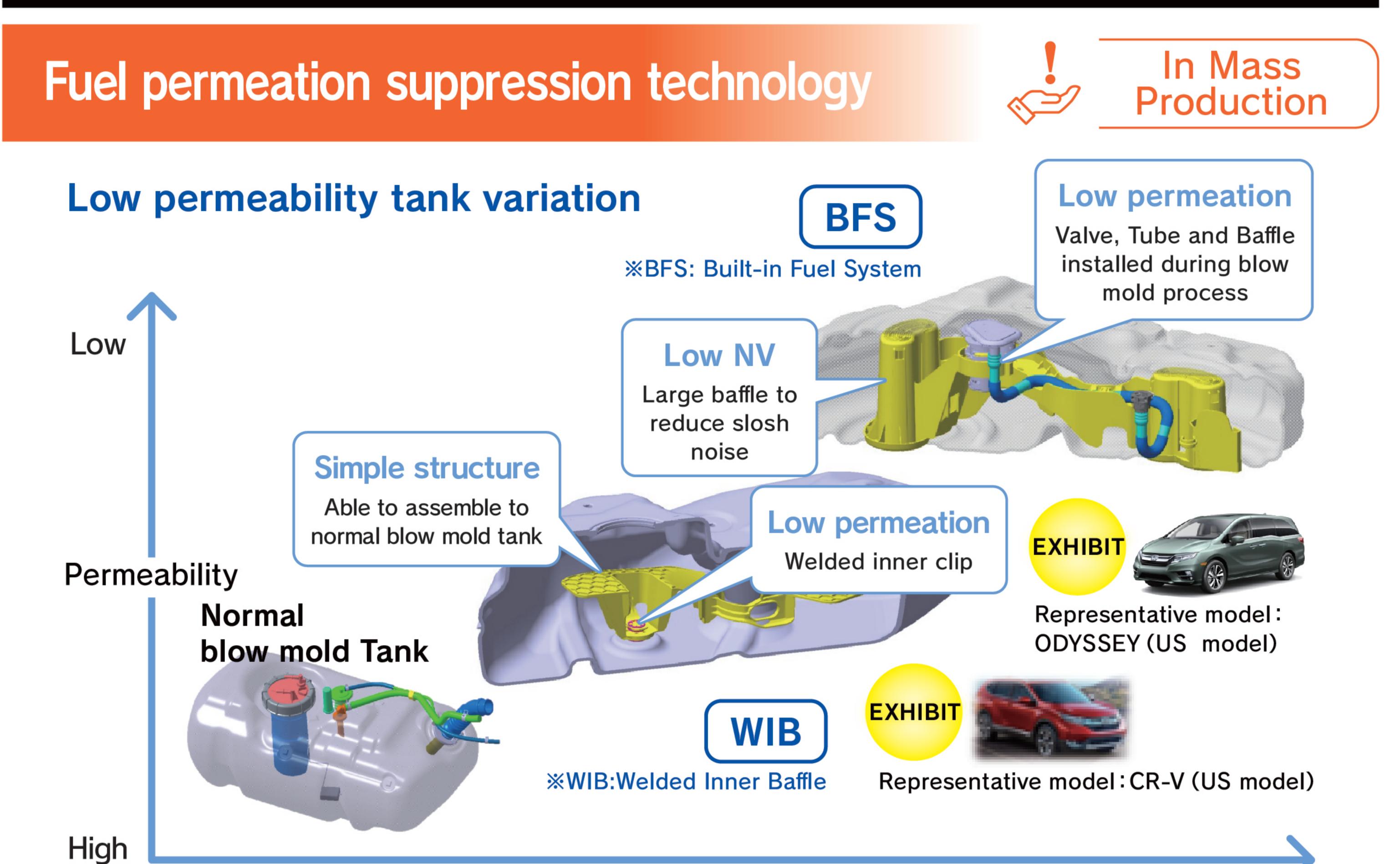






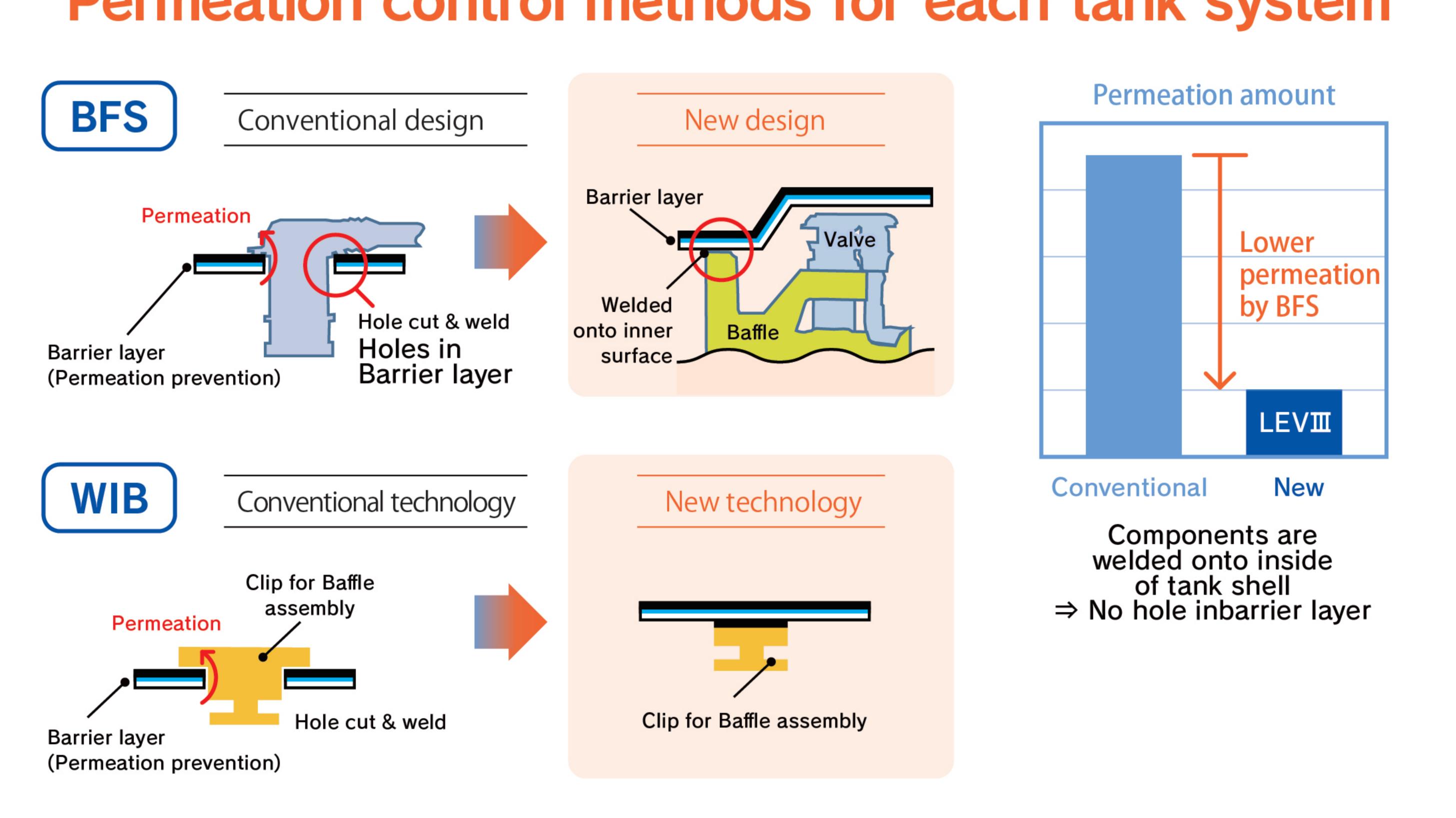


#### Emission regulation corresponding development



Quietness (Slosh noise reduction)

## Permeation control methods for each tank system



### High pressurized tank development corresponding to vehicle electrification



Reference

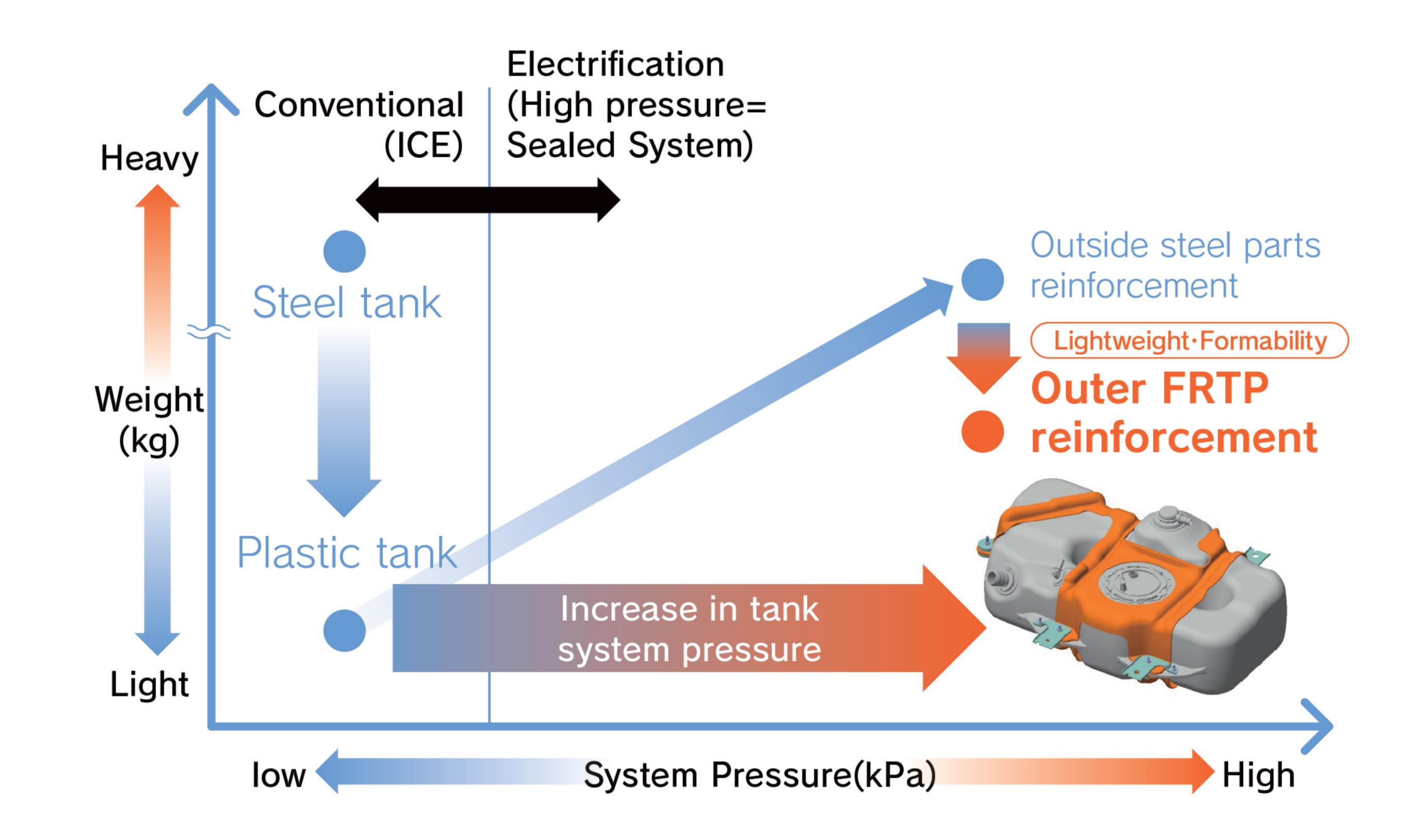
Weight reduction of reinforcement parts with FRTP



**※FRTP:** Fiber Reinforced Thermoplastics

#### Feature

- Light weight (Replacement for steel parts)
- Formability (Respond for limitation of parts layout due to larger battery)
- FHEV/PHEV Suppress tank deformation in the high system pressure condition (Pressure target:more than 45kPa)



#### [Predicted increase in tank system pressure by investigating regulatory trend] We are required to correspond "the Corporate average fuel economy (CAFE) standards etc and the New energy vehicle regulation(ZEV)" Closed fuel tank Increase in tank Needs to improve required for FHEV fuel efficiency system pressure

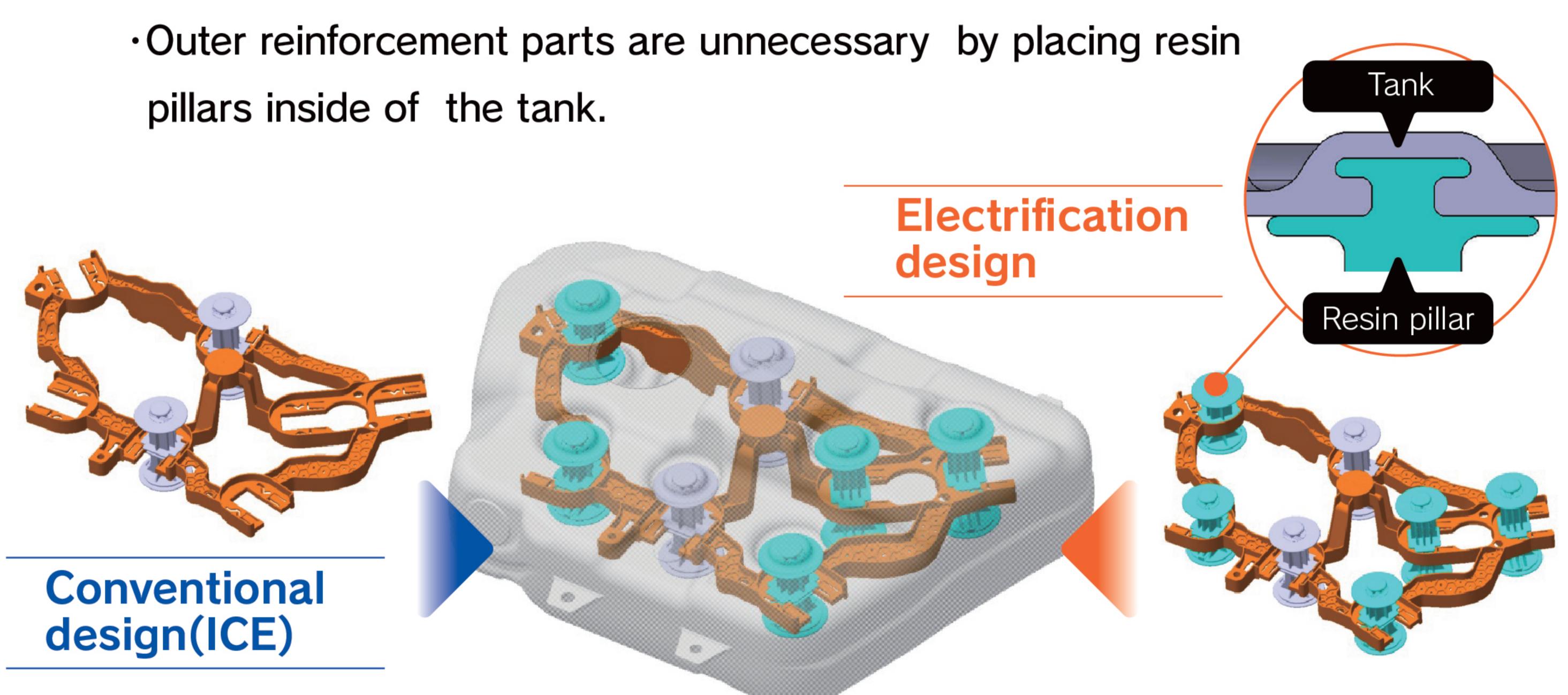
### In-Tank resin pillar technology

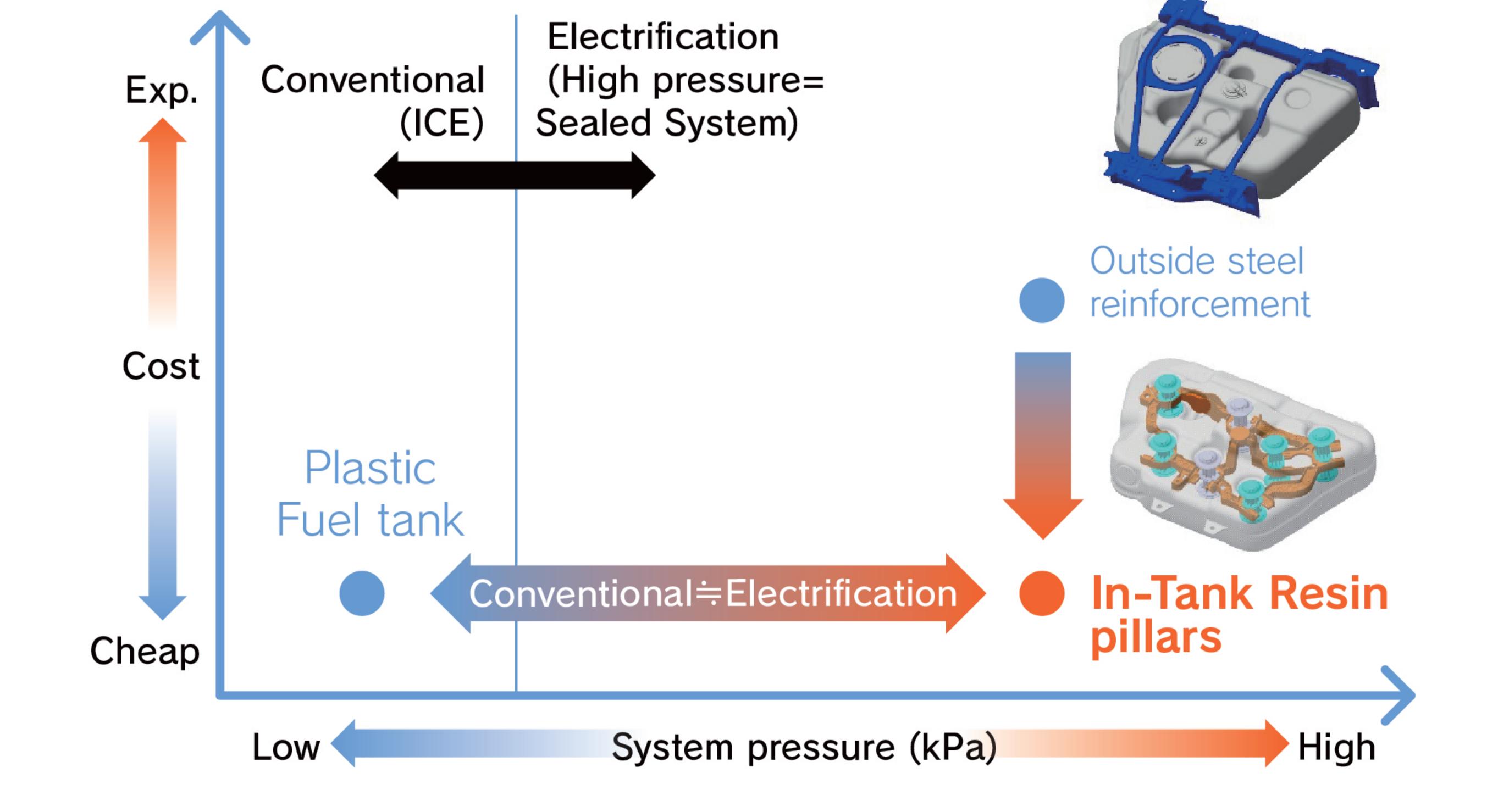


Development

#### **Feature**

- Commonality in Fuel tank system between closed/nonclosed tank platforms.
  - ·Compatible with both closed and non-closed tanks only by resin pillar design and layout changes
- Lightweight tank that satisfies sealing requirements at low cost





Please take a sample of lightweight parts and experience the differences in weight.