CHEMISTRY THAT MATTERS™

THE MATERIAL DIFFERENCE OF THERMOPLASTIC IN ENABLING ELECTRIC MOBILITY

SPE TPO 2025

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October 2025

FOR TPO PRESENTATION

AGENDA

- Innovations in Auto/Mobility & SABIC's Contributions
- Electric Mobility: Industry Challenges & Potential Solutions
- Thermoplastic intensive Battery Packs for Automotive
- Thermoplastic intensive Charging Stations
- Questions?

SABIC CONTRIBUTIONS TO INNOVATIONS IN AUTO/MOBILITY

AUTOMOTIVE – SABIC'S INDUSTRY INNOVATIONS

Always anticipating customer needs and working toward solutions

Automotive Innovation Award Winners

Heritage (1950s –)

Industry-firsts in multiple applications across entire vehicle

1983

Lexan PC for automotive forward lighting (Mutual dev. W/ Ford)

2015

Plastic-metal hybrid floor rocker reinforcement

2016

Thin-wall bumpers (STAMAX™, PPc)

Air intake manifold (PPc)

2017

Tailgate components (STAMAX, PPc)

Lightweight IP via structural foaming (STAMAX™)

Largest Rear quarter window (LEXAN™)

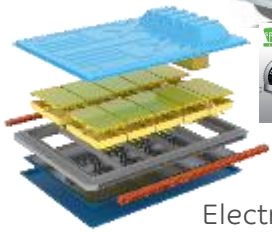
2018/19

Haptics for interiors (HAPSOFT™ PPc)

2020/21

PMH armor for EV batteries

Front panel-Grille-less front ends



Electrification-battery pack solutions

ELECTRIC MOBILITY: INDUSTRY CHALLENGE & POTENTIAL SOLUTIONS

INDUSTRY CHALLENGES & POTENTIAL SOLUTIONS

INDUSTRY NEEDS

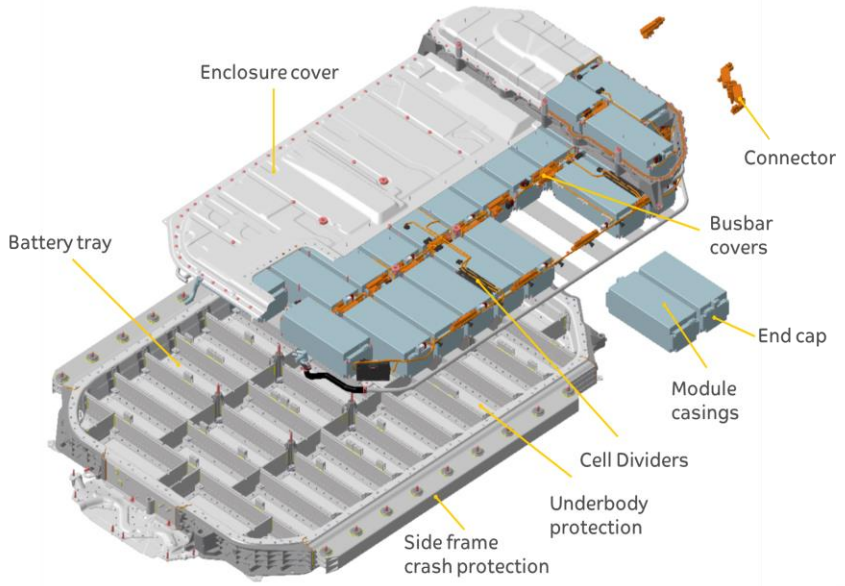
1 Fire safety – prevent thermal runaway

2 Reduce complexity – reduce weight and cost

3 Reduce environmental impact

ENABLING ELECTRIFICATION
BLUEHERO™
MATERIALS
SOLUTIONS
EXPERTISE
CHEMISTRY THAT MATTERS™

SABIC SOLUTIONS



Understand customers current architecture and challenges

Optimized solutions for battery packs

Optimized solutions for charging stations

Industry needs lightweight, integrated, safe, and cost-effective solutions for EV battery packs and charging stations

THERMOPLASTIC INTENSIVE BATTERY PACKS FOR AUTOMOTIVE

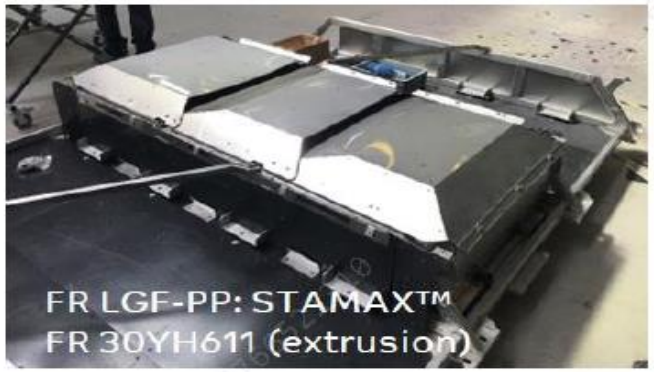
PROOF OF CONCEPT: INDUSTRY RECOGNITIONS

FORD TRANSIT HIGH VOLTAGE BUSBAR
FR PPc (H1030)

spe 2024 AWARD WINNER

GLOBALLY, FIRST FR PPc solution for HIGH VOLTAGE BUSBAR INSULATION, replacing conventional PA

BLUEBUS BATTERY ENCLOSURE
FR STAMAX™ 30YH570



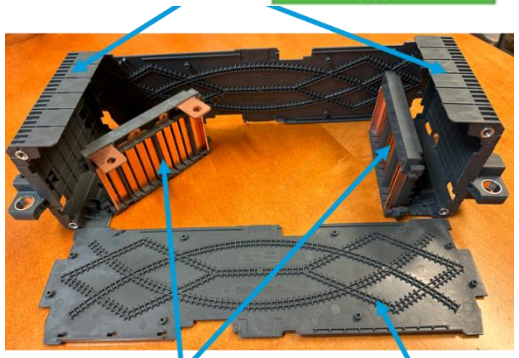
spe 2024 AWARD WINNER

GLOBALLY, FIRST FR thermoplastic for such a large battery enclosure, enhancing safety performance

HYUNDAI IONIQ6 BEV BATTERY MODULE

- **Enhanced fire safety**
- **20% cost saving** vs. incumbent FR PA (Nylon)
- **10% weight reduction** vs. FR PA (Nylon) solution

spe 2023 AWARD FINALISTS



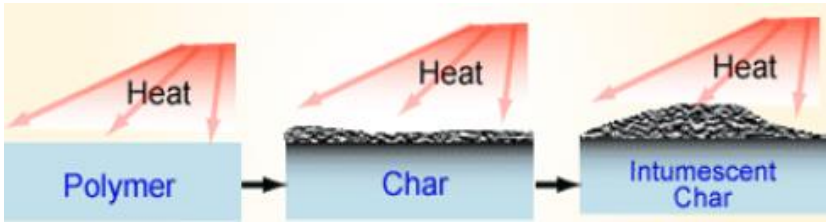
HONDA pHEV-CRV BATTERY COVER

- **Non-halogenated** FR PP solution
- **Enhanced Fire safety**
- **40% lighter** vs metal

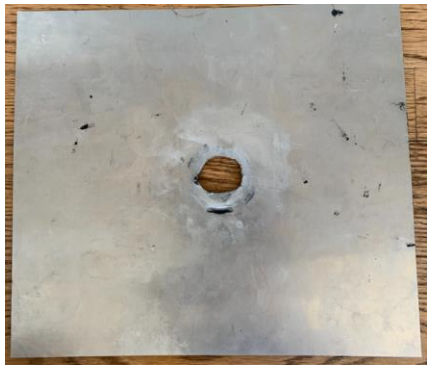
WHY SUCH MATERIALS? REDUCED SCALE FIRE TEST

Use of flame retardant, non-halogenated structural thermoplastics

Final 20 seconds of 5.5-minute test @ 1100°C

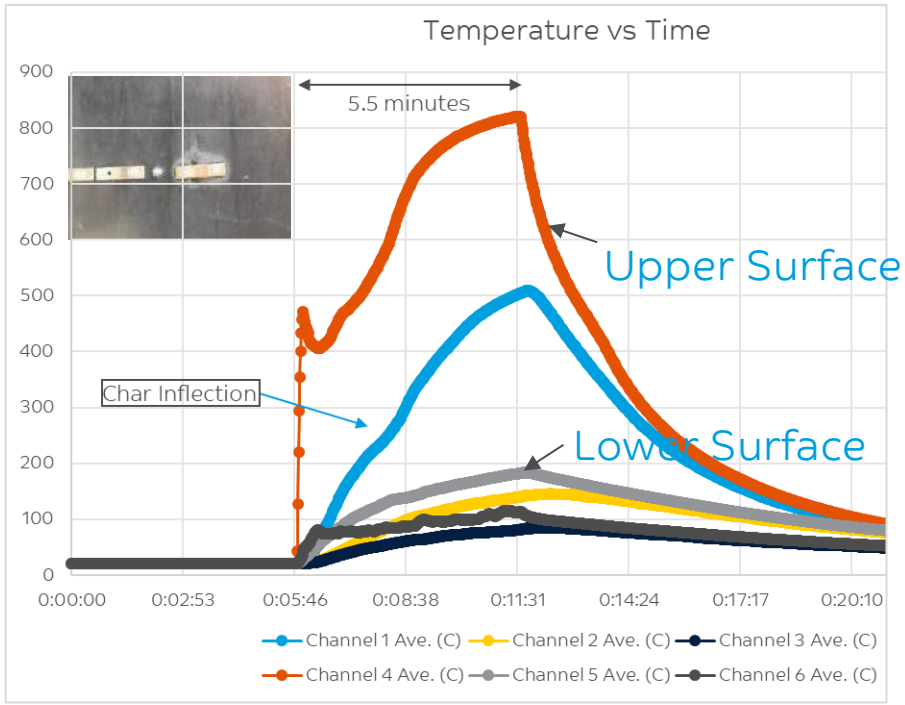


Aluminum sheet



Plastic sample

Non exposed side < 200°C

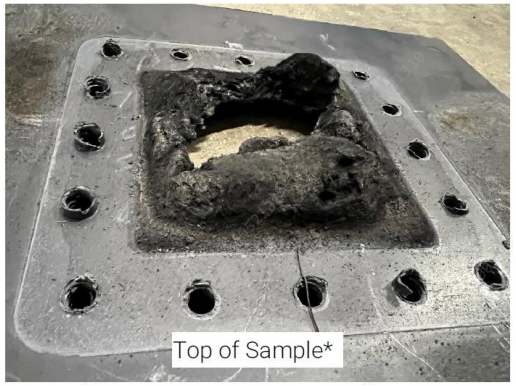


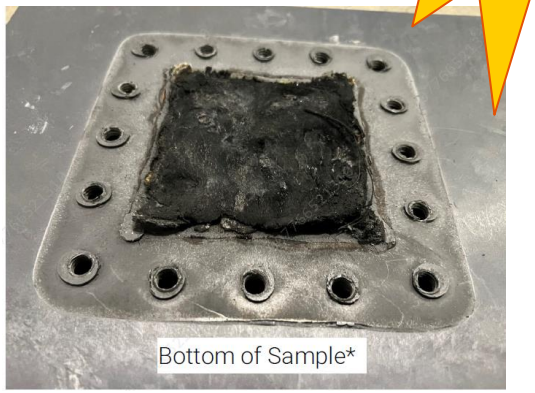
Innovative material solution – meeting challenging requirements

SAFETY: THERMAL RUNAWAY PERFORMANCE

UL 2596 – Thermal runaway test

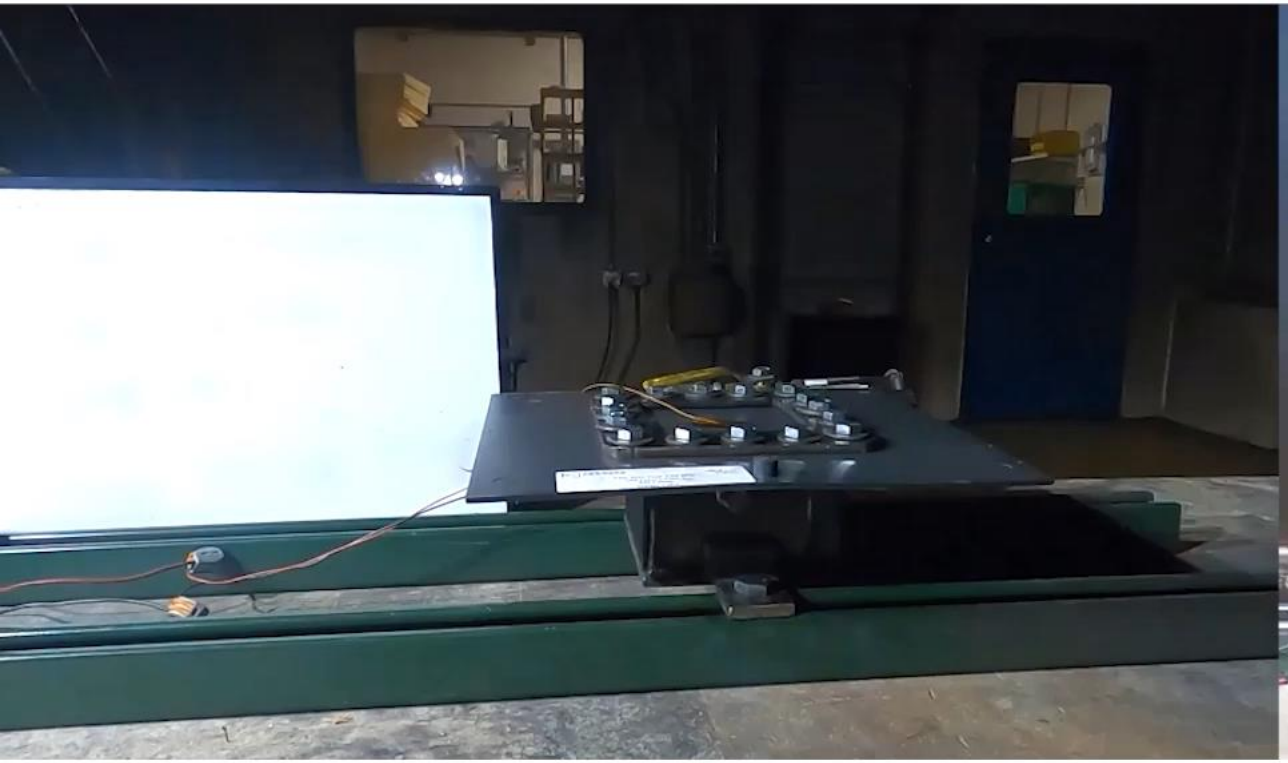
- 25 cells (type 18650)
- Combines pressure, ablative force, heat, and fire
- One of the most stringent tests available





Solution for high temperature & pressure loads offers confidence for use in this application

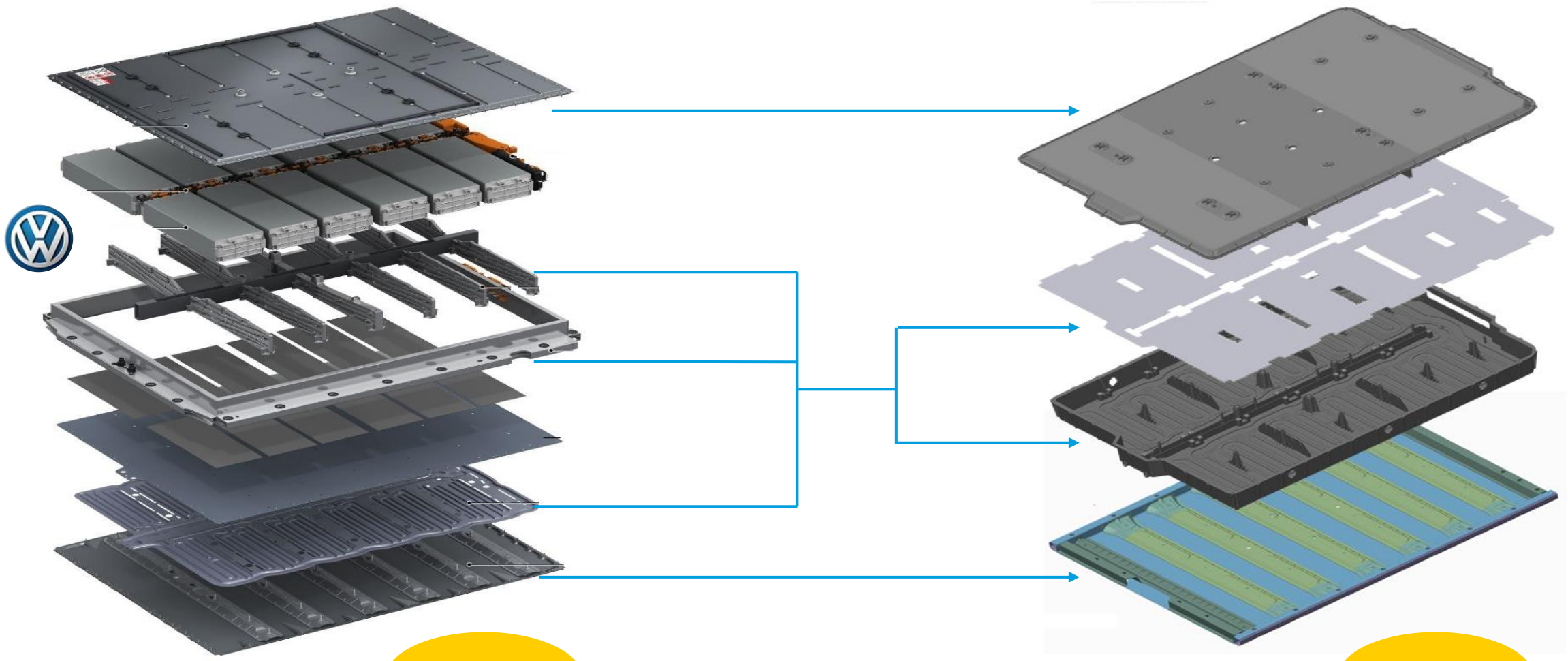
UL 2596 — THERMAL RUNAWAY TEST



Standard Solution

SABIC Solution
30YH570 @ 4.0 mm

THERMOPLASTIC INTENSIVE DESIGN

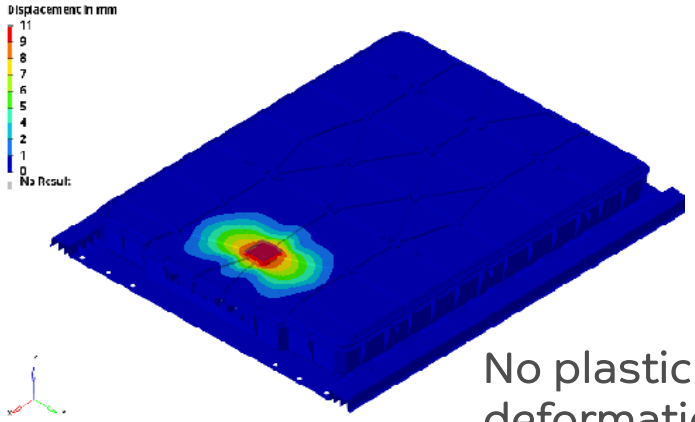


Incumbent 110 Kg

New Solution 99 Kg

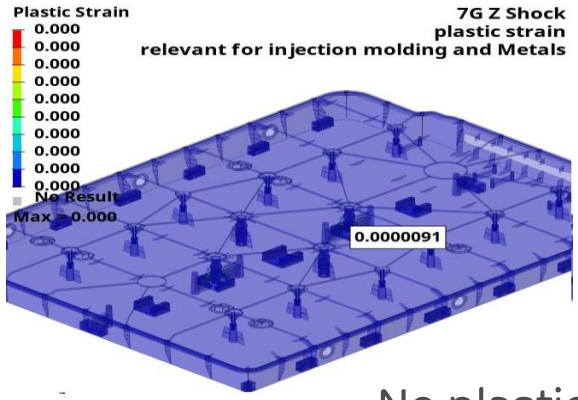
PERFORMANCE EVALUATION

Worker Load



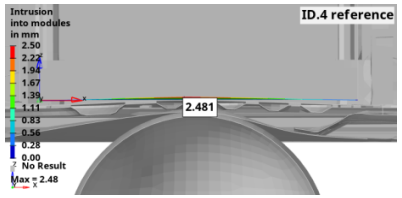
No plastic deformation

Mechanical Shock

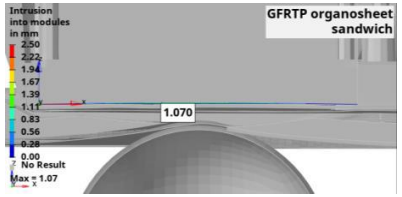


No plastic strain

Bottom Bollard Impact

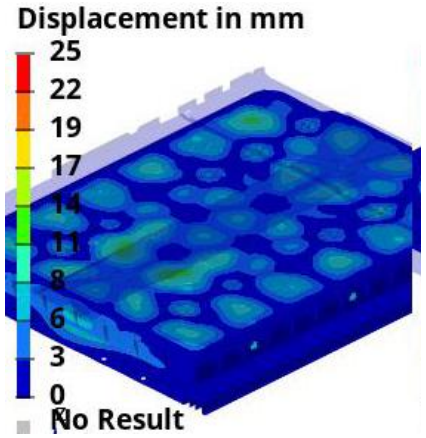


Incumbent ~
2.5 mm intrusion



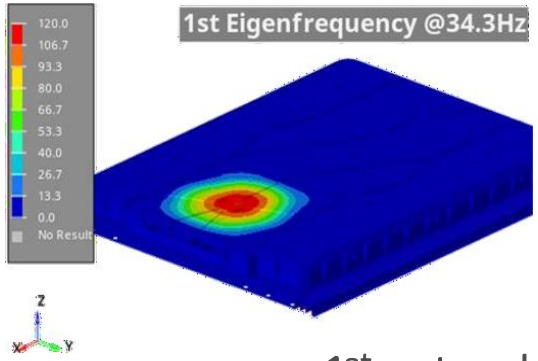
Proposed ~
1.1 mm intrusion

Internal Pressure



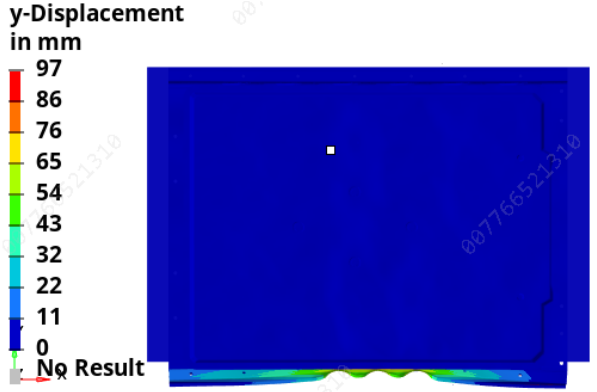
No plastic deformation

Model Analysis



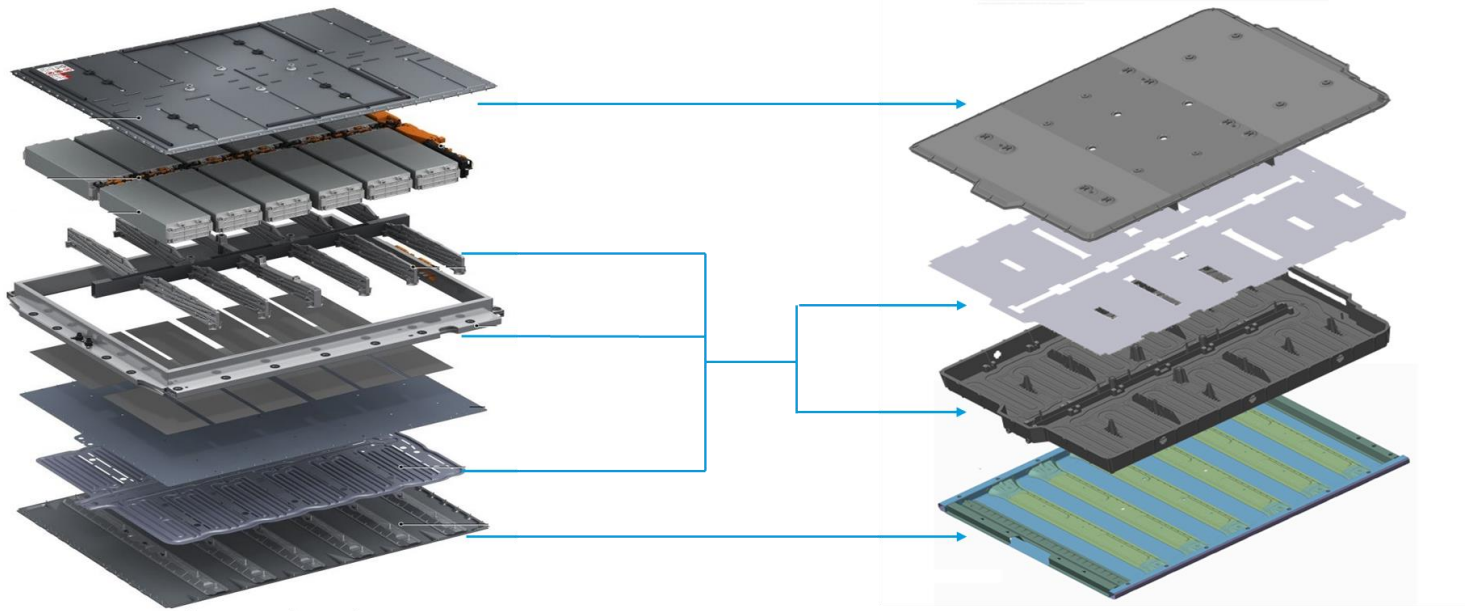
1st natural frequency
> baseline frequency

Side Crush Analysis



No impact to module

THERMOPLASTIC BATTERY ENCLOSURE VALIDATION EFFORTS



Incumbent
Aluminum intensive

New Solution
Plastic intensive

Mass = 110 Kg

Mass = 99 Kg

Up to 10% weight saved and up to 40% cost saved*

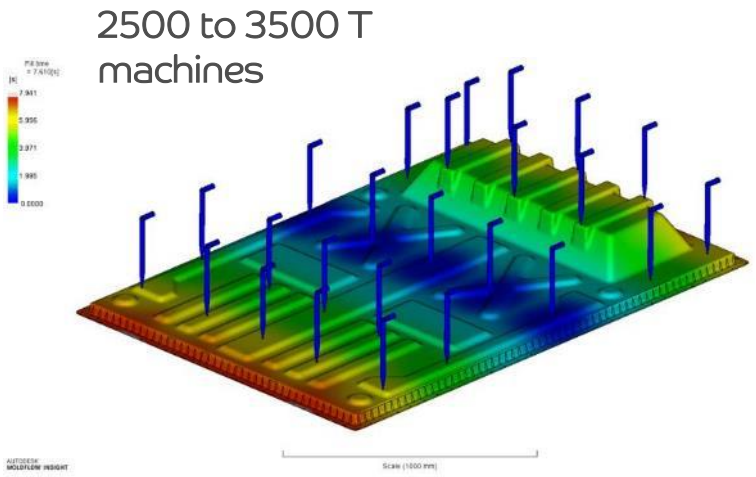
Prototype part successfully molded

- Performance validation completed through extensive predictive engineering
- NEXT→ physical testing of prototype parts

* Estimated based on 250k annual volume for China volume by a third party (Caresoft) DeltaCosting™

ECONOMICALLY-DRIVEN MANUFACTURING TECHNOLOGIES

Low Pressure Injection Molding



- Complex ribbed parts
- Warpage correction capability
- Structural foam capability
- Integrated crash absorption

Compression Molding

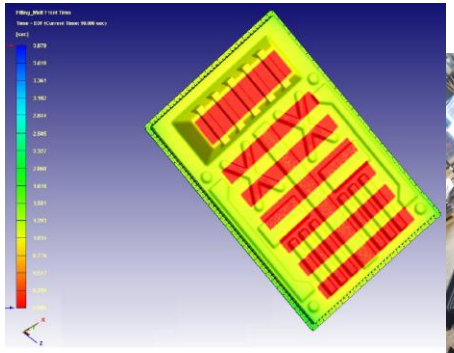
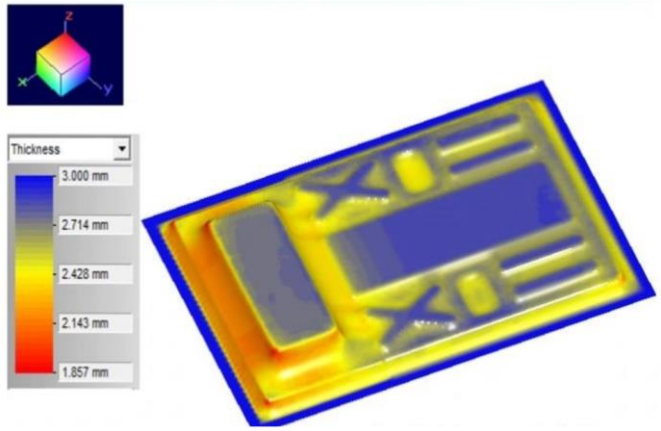


Figure 22: Filling simulation at 260°C and 4000 ton

- Long glass fiber reinforcement
- Deep drawn parts
- Low warpage

Thermoforming

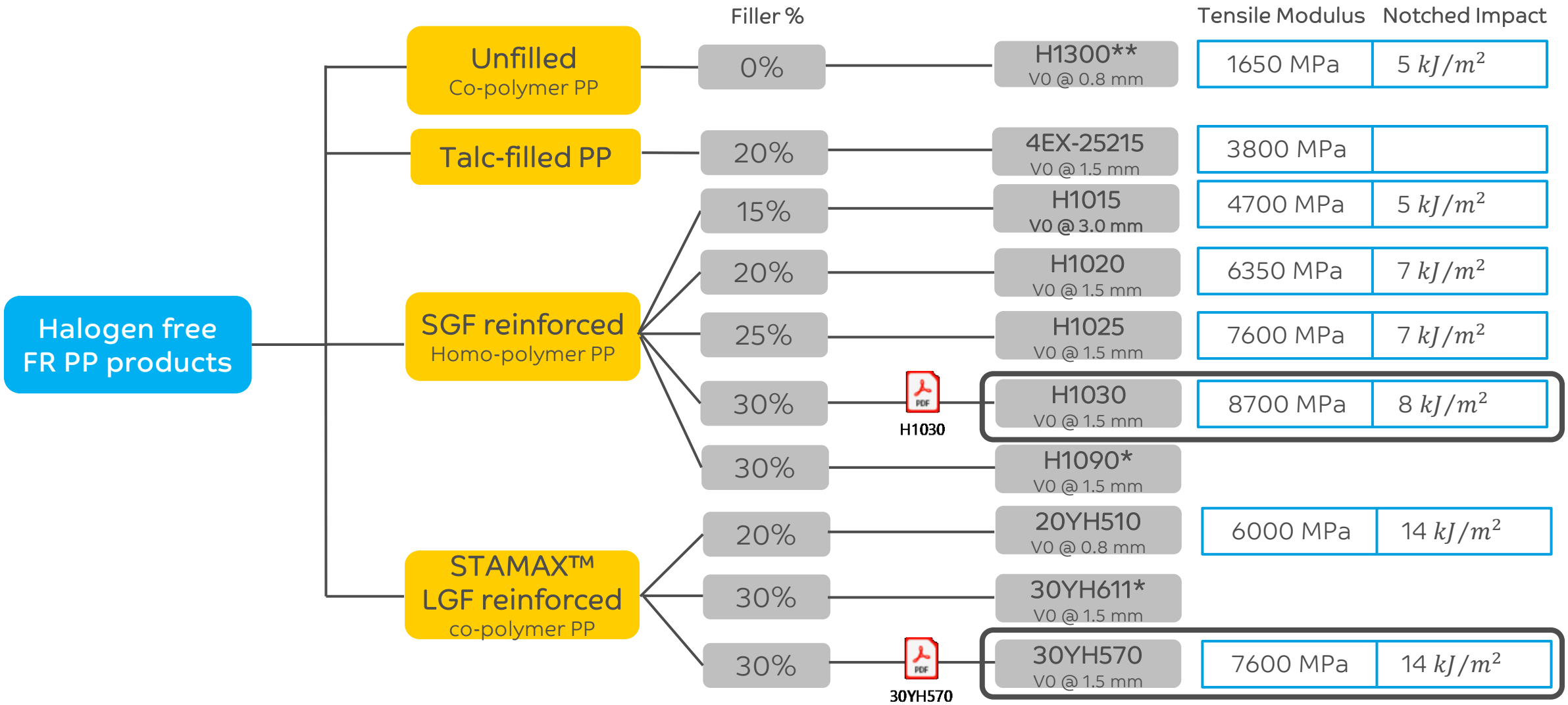


- Simple geometries
- Low volume series
- Low-cost prototyping

HYBRID BATTERY COVER MANUFACTURING

Click here for video

SABIC® HALOGEN-FREE FR PP PORTFOLIO



* Extrudable grades ** Locally produced in China now

SABIC FR ETP PORTFOLIO

CYCOLOY™	LEXAN™	VALOX™
FR PC/ABS	**FR PC**	**FR PBT (PBT/PC, PBT/PET)**
Grades for: - Enclosures - Modules	Glass fiber-un/filled grades for: - Enclosures - Cylinderical cells	Glass fiber-un/filled grades for: - Connectors - Enclosures - Battery tray
Typical Features and Benefits: • Aesthetics • Dimensional stability • Thin-wall FR capability • Balanced impact and flow • Low halogenated portfolio incl. Blue Angel & TCO99 • Molded in color	**Typical Features and Benefits:** • High impact & ductility • Transparency • Higher thermal stability vs CYCOLOY™ • Dimensional stability • Non-brominated & non-chlorinated Flame retardant • Molded in color, VISUALFX™ capability • Broad color capability	**Typical Features and Benefits:** • Electrical properties • Improved chemical resistance vs amorphous resins • Lower water absorption compared to PA • RTI 130°C • High CTI performance

THERMOPLASTIC-INTENSIVE CHARGING STATIONS

SABIC FULL PLASTIC EV CHARGING SOLUTION

ADVANTAGE FOR FULL PLASTIC EV CHARGING

Lightweight	Efficiency processing	Environment friendly	Design freedom	Advanced performance
• Low density • Easy transport and shipping • Low-carbon footprint	• No polishing, no spraying • Short cycle time and high production efficiency • Mass production orientation	• Mature recyclable solutions (PCR, chemical, and bio based) • Quantifiable carbon footprint reduction	• Surface modeling • Fruitful color solution • Improve brand recognition	• Weatherability • Flame Retardant • Low temp Impact performance

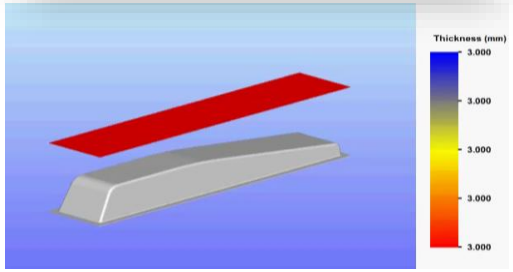
EV CHARGING APPLICATION TECHNOLOGY

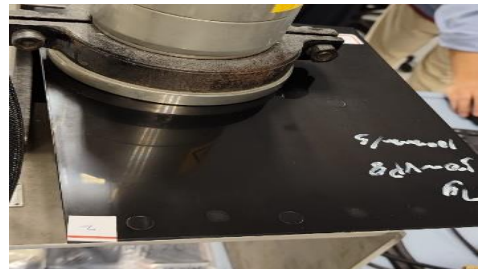
Industry design 01

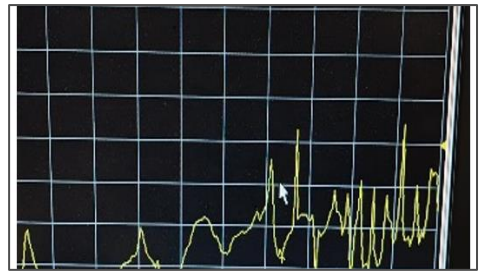
Prototype 02

Large part manufacturing 03

EMC performance 04







Promoted full plastic DC (integrated and split) charging with creative industry design and prototype

Successfully demonstrated thermoforming with LEXAN™ 945U and PP EX08

Evaluated foam and metal insert process for improving EMC performance

Developed full-chain application competence from design and process to electrical function

SABIC MATERIAL SOLUTION

Charging cabinet

Cabinet:
- GELOY™ HRA222F
- CYCOLOY™ CY6310
- LEXAN™ 945DU
- LEXAN 945U

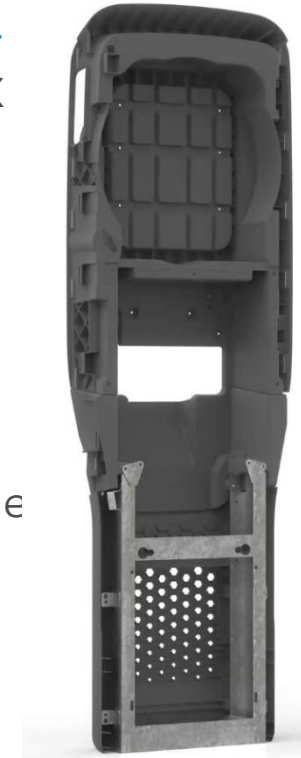
Requirements:
- Good surface appearance
- Excellent impact
- Molded in color
- Flame retardant

Charging coupler

CHARGING Coupler
- VALOX™ 3900WX
- VALOX 357X
- LEXAN 945DU

Requirements:
- High impact
- Flame retardant
- Weatherablity
- Electrical propertie

Structural parts



STAMAX™ resin (PP-LGF)

Requirements:
- High strength and stiffness
- High impact
- Flame retardant
- Function integration

Committed to provide material solutions that meet technical requirements of EV charging stations

QUESTIONS?


THANK YOU

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