



MobilityScience™

SEALING THE FUTURE: SILICONE FOAM GASKETS FOR EV BATTERY PACKS

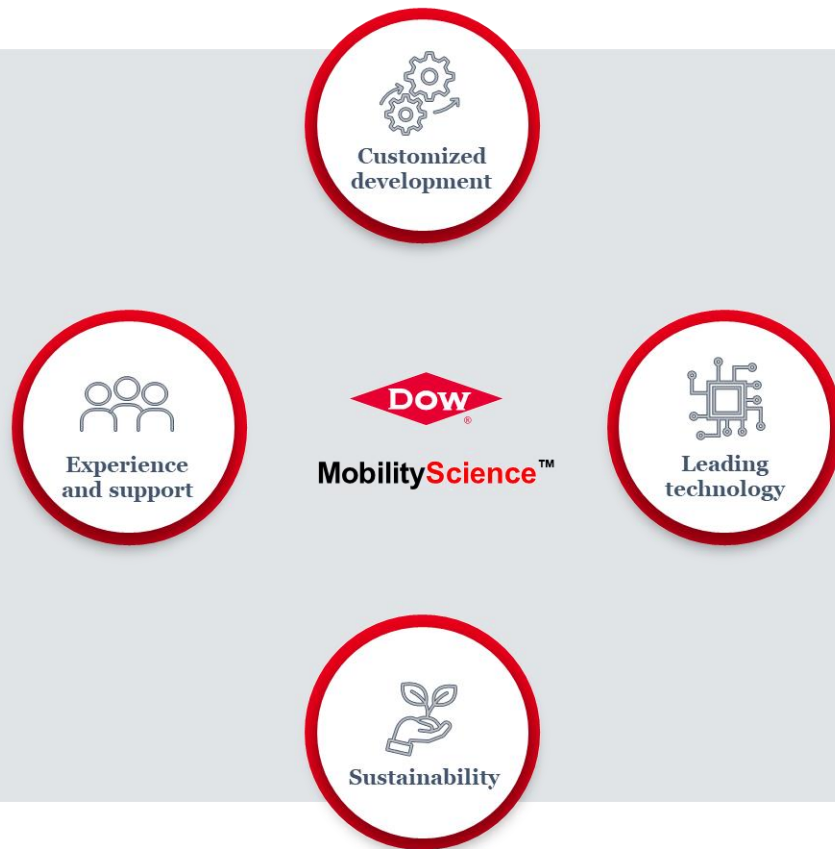
JULIA SUNDERLAND

ASSOCIATE RESEARCH SCIENTIST

DOW - CONSUMER SOLUTIONS R&D

SILICONES PRODUCT DEVELOPMENT

***Adhesives & Bonding Expo / Foam Expo USA 2025 |
June 24, 2025***



Adhesives & sealants

Conformal coatings
& encapsulants

Acoustic options
(PU, acrylic, POE)

Electrically & thermally
conductive materials

Foam technology
(PU, silicone, POE)

Elastomers
(POE, EPDM, silicone)

Polymer modifiers
& compatibilizers

Composites

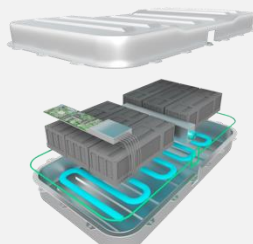
Moldable optics

Tire options

Synthetic leather
& haptic materials



Interior & seating



Battery systems



Safety
(airbag, tires, lighting)



E-mobility (power
electronics, sensors)



Powertrain



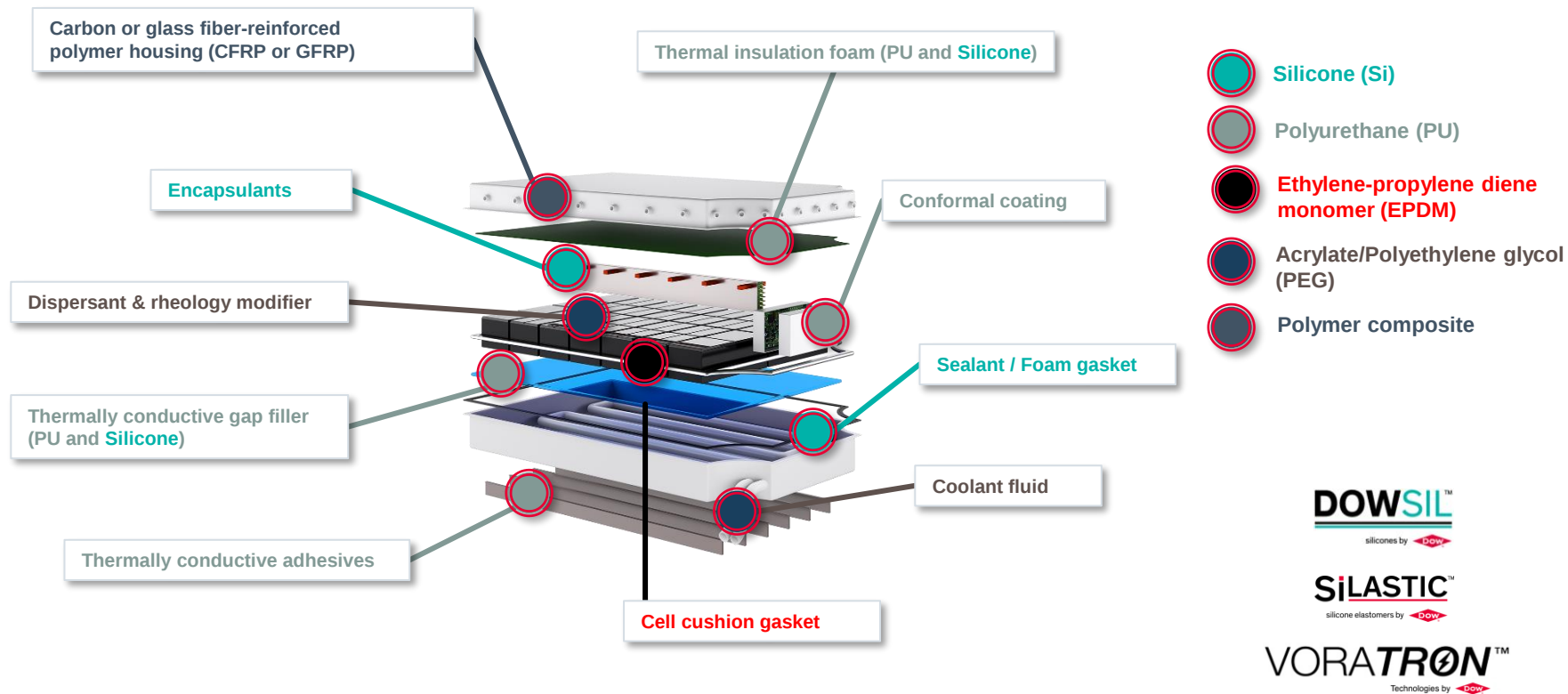
Exterior



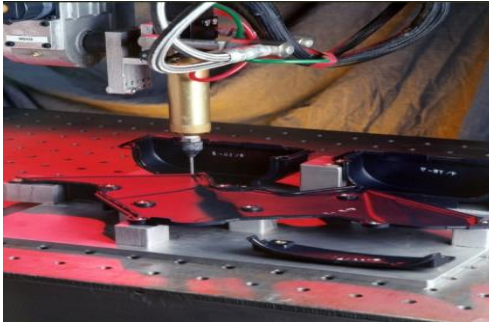
Engineered to help improve
long-lasting performance
in acoustics,
lightweighting,
safety, comfort



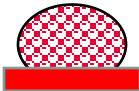
Sustainability
and **connectivity**
for the transition to
electric and autonomous
vehicles



- Mechanical protection from impact and vibration damping
- Environmental protection from debris, water, moisture and high temperatures
- Serviceability for repair and low compression set
- Die-cut and liquid dispensable gaskets
- Die-cut gaskets placement manually intensive
- Lower cost of ownership for dispensable gasket

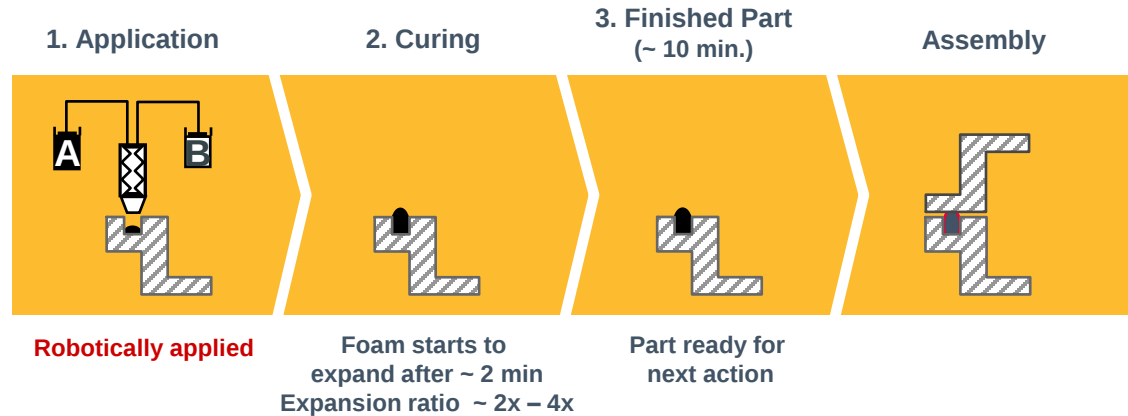


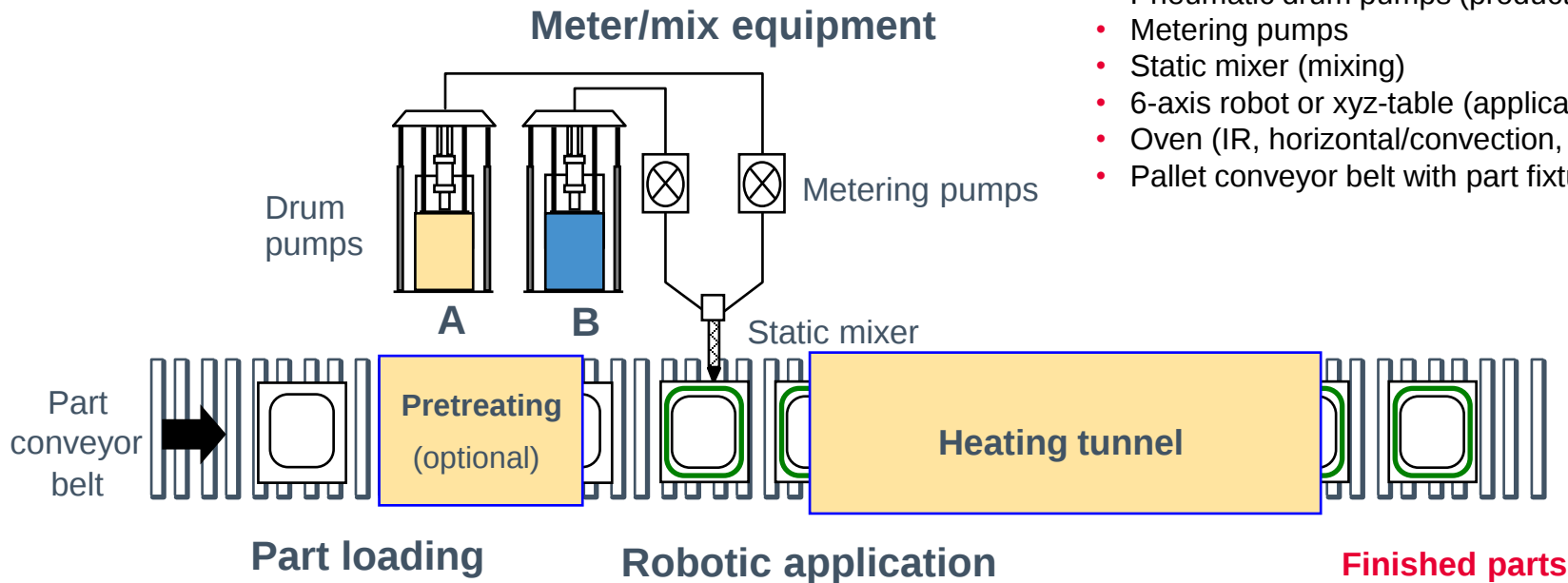
OVERVIEW: DISPENSED SILICONES AS SEALS AND GASKETS

Technology	Adhesive Gaskets	Foam Gaskets	Rubber Gasket
Seals by:	Adhesion	Compression	Compression
Boundaries	No service gasket Seal gap typically < 2mm	Service gasket Seal gap typically > 2 mm	
Assembly Method	Wet assembly (= assembly <u>PRIOR</u> to cure)	Dry assembly (= assembly <u>AFTER</u> cure)	
Recommended Product Group	1-part RTV 2-part RTV	2-part RTV silicone foam	2-part HTV (gasket LSR)
Manually Applicable	Yes, possible	No	No
Application Location	On assembly site	On assembly site or at tiered supplier	
Typical Profile			

- Serviceability benefits with foam and rubber gaskets over adhesive seals
- Foam gasket: lightweighting and compression set benefits

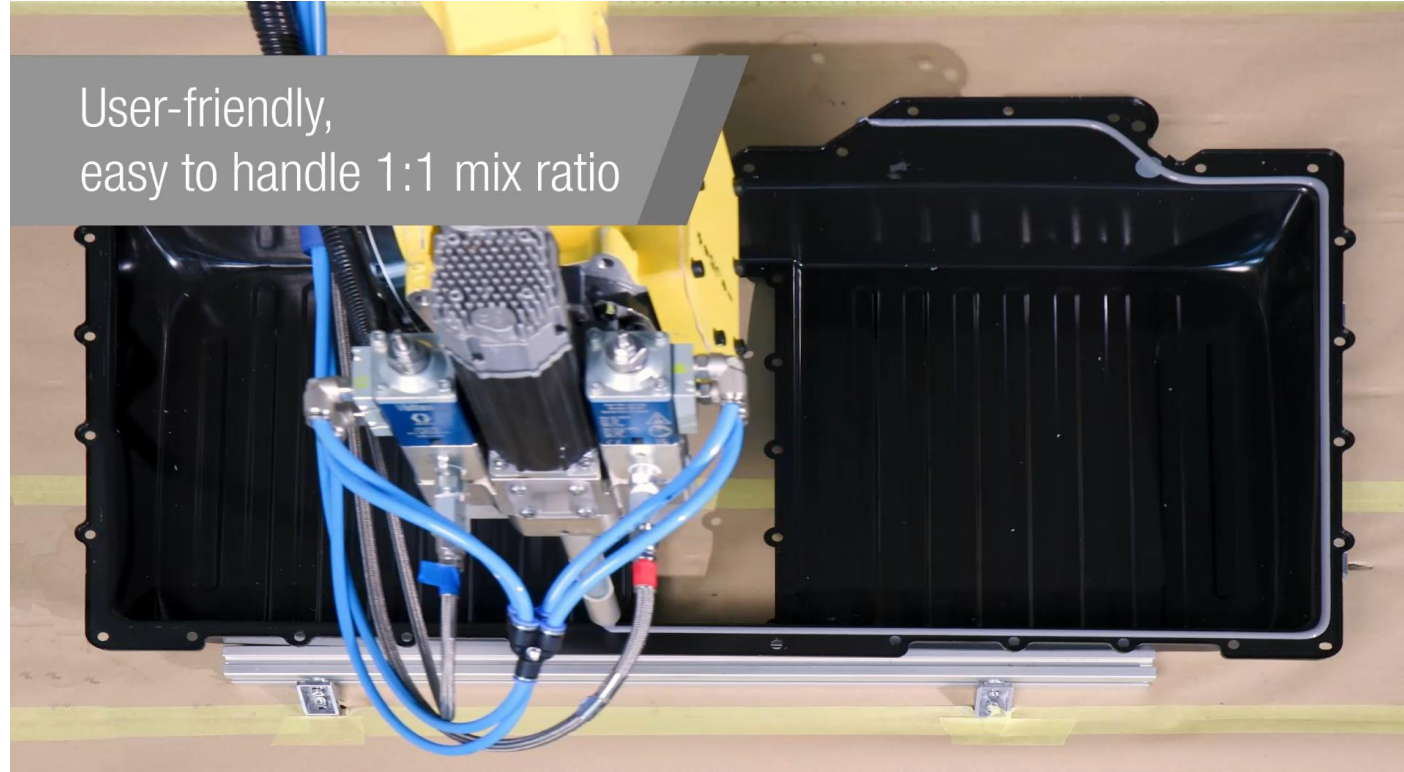
- 2-part liquid silicone dispensed directly onto the surface to be sealed. Foams and crosslinks to provide a low modulus seal
- Platinum catalyzed, room temperature or heat cure, 1:1 mix ratio
- **Self-foaming; does not require an added blowing agent**
- Typically used where the part needs to be serviceable
- Durable environmental seal





A typical production unit consists of:

- Pneumatic drum pumps (product supply)
- Metering pumps
- Static mixer (mixing)
- 6-axis robot or xyz-table (application)
- Oven (IR, horizontal/convection, etc.)
- Pallet conveyor belt with part fixturing

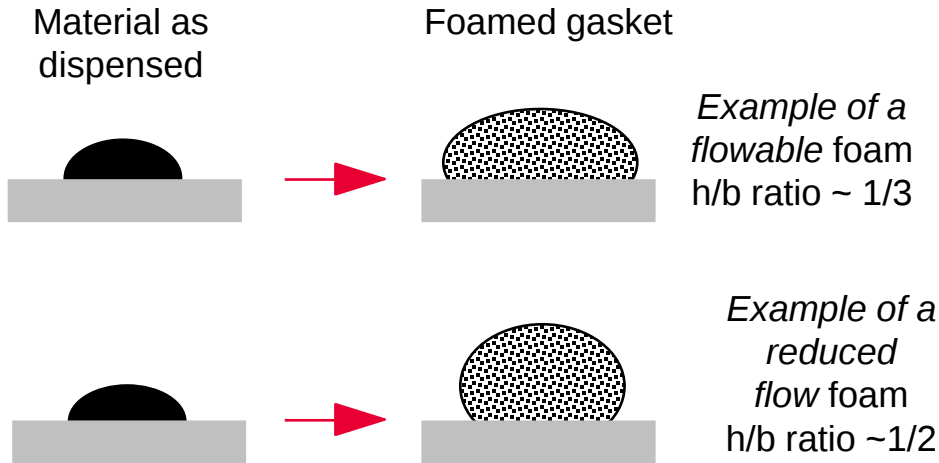


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Typical properties only, not to be construed as specifications.

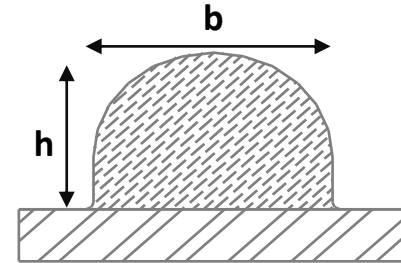
1. **Mixing** and dispense of Part A and Part B
2. Bead expansion through **foaming** reaction
3. Final hardening through **curing** reaction



Influence of flow characteristics on the aspect ratio

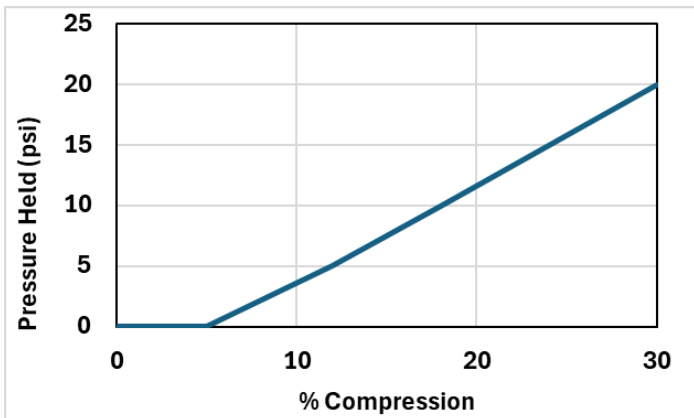
Bead Dimensions

Typical aspect ratio h/b :
~ 0.65-0.85

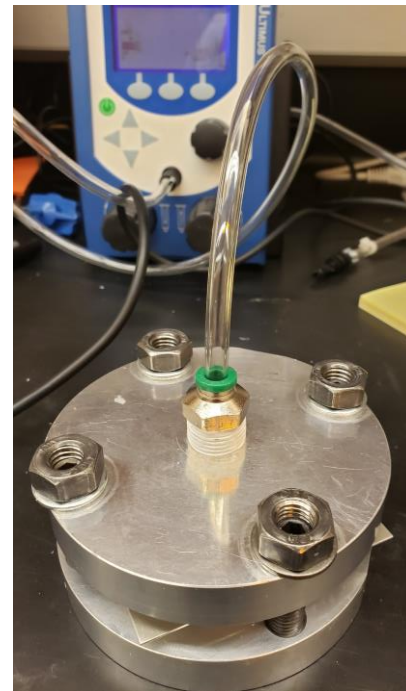
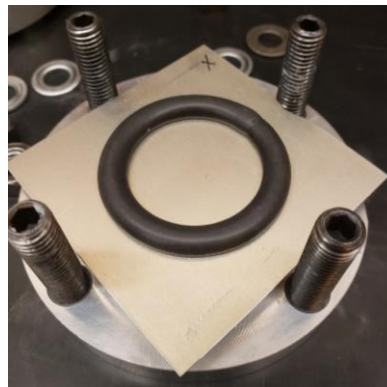


Generally limited to rounded/D shape

Internal testing of pressure leakage
with circular beads



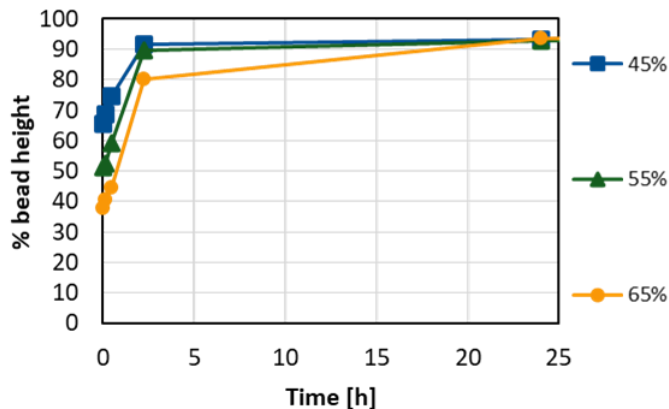
Pressure already held at >5% compression!



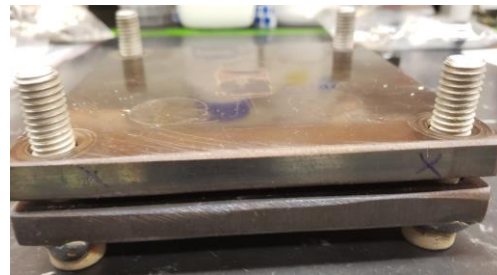
Typical properties only, not to be construed as specifications.

- Exposure to various temperature conditions
- Evaluation of foam recovery
- Compression set testing

**Bead Height Recovery after X% Compression
after Exposure at 100 °C, 7 days**



Compression device for
compression% variations

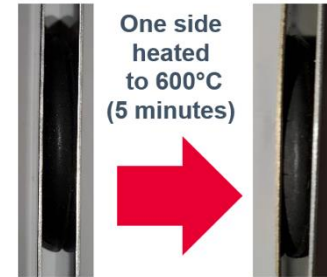
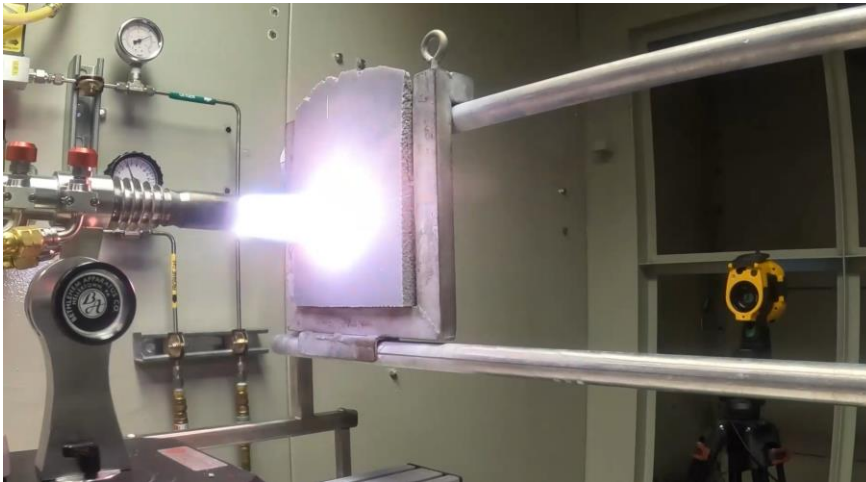


Recovery monitored of
flattened bead after
compression release



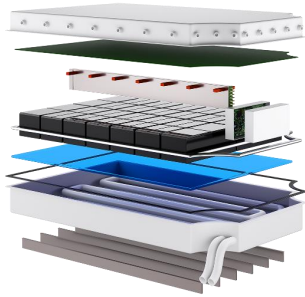
Routine testing of thermal properties

- Torch testing
- Hot Plate testing

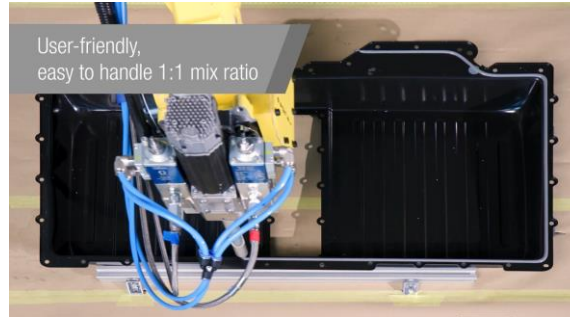


THANK YOU! QUESTIONS?

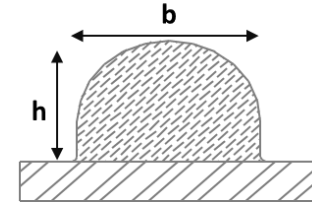
Servicable Foam Gasket



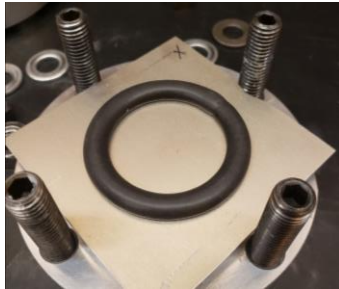
Robot Dispense



Typical aspect ratio h/b :
~ 0.65-0.85



Pressure Leakage



Low Compression Set



Thermal Protection



Dispensable silicone foam gaskets are alternatives to die-cut foams and show lower cost of ownership.

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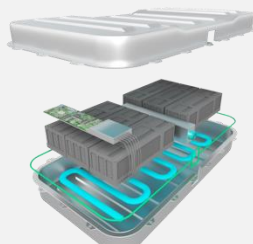
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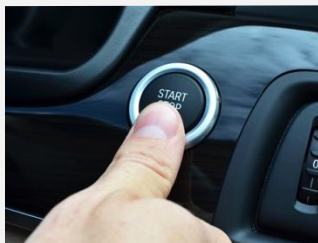
Interior & seating



Battery systems



Safety
(airbag, tires, lighting)



E-mobility (power
electronics, sensors)



Powertrain



Exterior



Engineered to help improve
long-lasting performance
in acoustics,
lightweighting,
safety, comfort



Sustainability
and **connectivity**
for the transition to
electric and autonomous vehicles

THANK YOU

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