Haptics of Lightweight and Soft TPE Skins for Automotive Interiors

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October 8, 2018
Cockpit & Overhead Systems
IAC’s Narrower Focus on Core Products
Injection Molded Soft Skin (IMSS) TPE

- Material has been developed jointly with Kraton Polymers
- Lightweight material with consistent dimension throughout the part
- Costs can be reduced in comparison to IMGL and Slush Molding
- Allows for more design freedom
- No painting required for cosmetics and performance
- Low oil formulation due to high flow polymers resulting in lower VOC, fogging and mass loss in heat age
Benefits of IMSS TPE

Reduced Skin Density vs. PVC

▪ There is a push in the industry towards a lightweight and soft to the touch interior
▪ This requires new materials to be developed to fit the new direction
▪ The finished part is less porous than that of a slush part

Improved Design Flexibility

▪ More complicated geometries can be achieved
▪ Allows undercuts and die locks on the “A” surface
▪ Smaller “A” surface radii capability for closer fit gaps
▪ Allows designs to be molded into the “B” surface
  ▪ Possibly Passenger Air Bag Score Line

Consistent Skin Thickness

▪ IM process allows for a controlled thickness in the part
▪ Slush processes create thicker skins in corners and tight radii
▪ IMGL sheets must be stretched as they deform to the desired part
  ▪ This creates thin areas across the part
▪ With less changes in thickness it is easier to optimize the foaming of the part

Reduced Tooling Cost

▪ There is not a need for multiple Nickel tools for slush molding to make up cycle time
  ▪ One injection molding machine can replace up to 5 slush tools

Reduced Cycle Time

▪ Molding a skin takes about 1 minute
▪ Molding using Slush can take around four and half minutes.
  ▪ You would need to invest in 4-5 slush machines to make up for the cycle time difference
Removing IMSS TPE Skin From Press
Our Study With SynTouch

- We needed to compare our new material to a material that a customer had already approved.
- SynTouch’s technology allows us to better compare an approved material to new iterations of material, and tooling:
  - SynTouch’s technology is sensitive enough to detect changes that most humans cannot perceive.
  - SynTouch’s technology takes out human biases toward certain preferences when comparing materials.
- We needed data that was quantitative, so that the data could be analyzed properly.
Develops human-like tactile sensors and new applications of “Machine Touch”

Founded in 2008 as a spinoff from USC

Based in Los Angeles, CA
How do you Quantify Touch?
Artificial Hearing

Artificial Vision

Artificial Touch
Can tell you a lot about engineering properties…
but not human perception

✔ Precise
✖ Not Relevant
Expert Human Perception

- Tactile Sensing
- Signal Processing
- Exploratory Strategies
- Decision Making

✔ Relevant
✖ Not Precise
How to perceive touch?

Can we design an instrument to do the same thing?
Quantifying Touch

Human-Like Tactile Sensing

Signal Processing
Inspired by Human Neurophysiology
Quantifies 15 Dimensions That Describe the Way Things Feel

It’s like PANTONE® for Touch!
Tan Tesla
PSC: 7402C
R:239 G:209 B:158

Alcantara White
PSC: 7541
R:255 G:255 B:252

Ash Wood
R:51 G:48 B:48

IAC Group – Proprietary and Confidential
Send or Test Samples of Your Materials
Share Test Results and Custom Analysis
We have this data…
Now what can we use it for?
Discover and diagnose inconsistencies in manufacturing processes.
Quantitative measurements enable specifications and tolerances for touch.
Maintaining a Consistent feel

- Ensure feel is maintained thorough various product design changes.
Matching that desirable feel in inexpensive and ethical alternatives.
Justifying a specific market claim about a product feel.