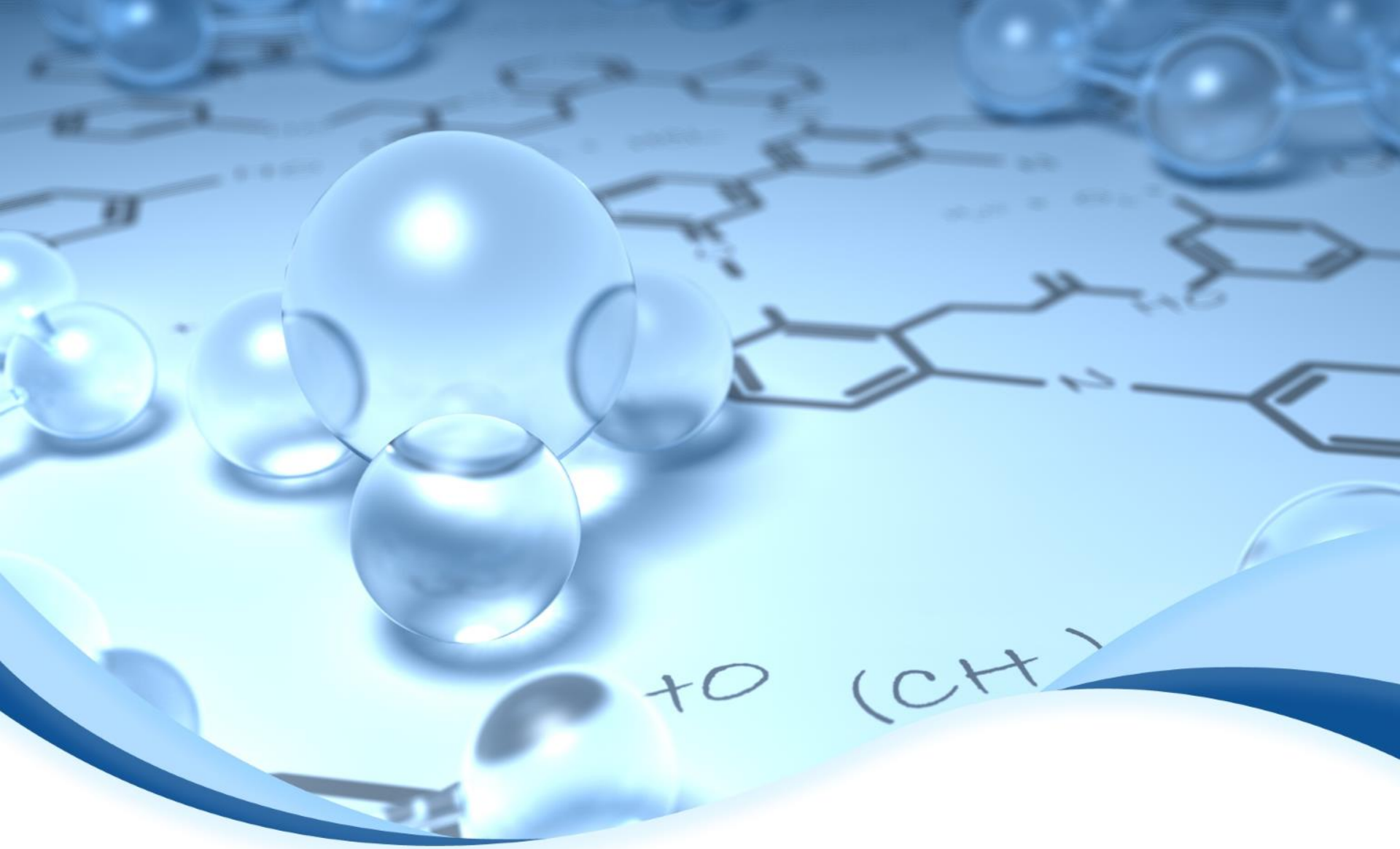

Chevron Phillips Chemical Company LP

New Technology in Design, Materials & Processing

ARM Rotational Molding Fall Conference
October 2018
Montreal, QC Canada

Outline

- Machine – Persico Electric
- Mold – 5 Gallon Water Can
- Resins – MDPE & LDPE
- Design
- Processing
- Impact Data
- Conclusion

Persico Smart Machine

Machine Capabilities

- Electric heat
- Separate heating stages - Ramping, Set points
- Internal air temperature monitoring on every cycle
- Zone heating
- Air cool
- Maximum size – 59” x 78.8”
- Vacuum – reduce cycle time
- Internal air cool
- Multiple layers
- “Rock n Roll” or standard rotation
- Small foot print

Water Can

Designed by Chevron Phillips Chemical Company's Plastic Technical Center – Bartlesville, OK

Five-gallon water tank showcases exceptional benefits in design, processing and materials.

Design

- Water Can includes two ergonomic handles
- Center hole adds stiffness to the tank
- Center hole allows addition of tanks to A.T.V. spare tire rack
- Bottom insert allows attachment of spigot or hose
- Quick disconnect allows a series of tanks to be filled with one connection

Water Can Mold

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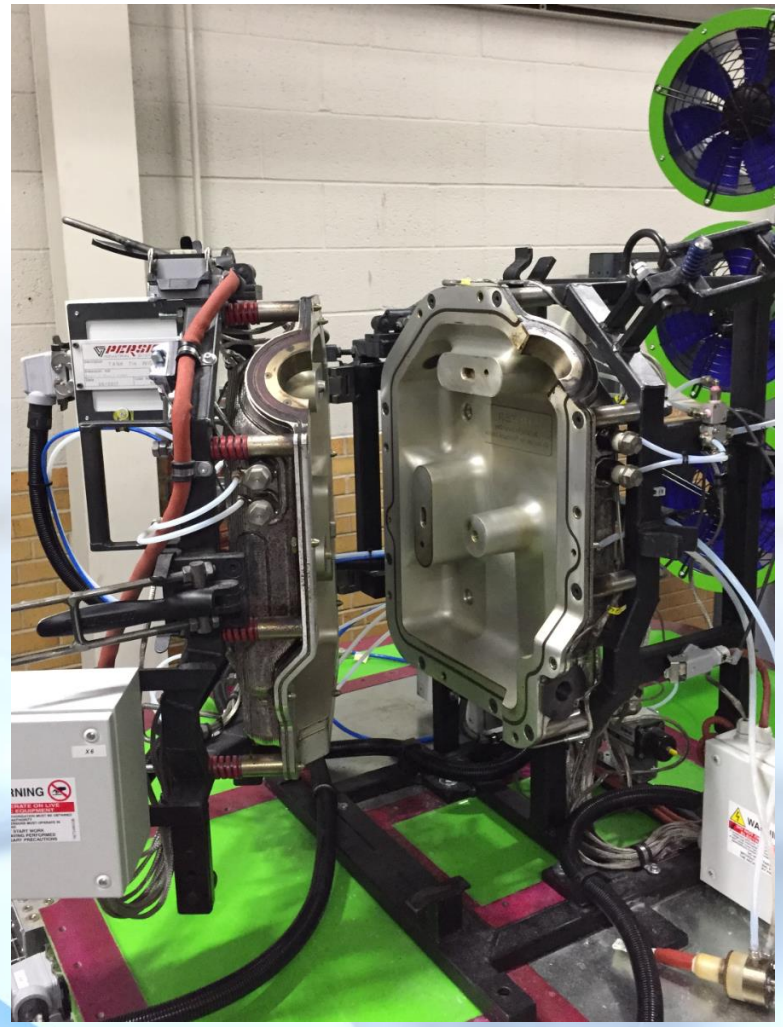
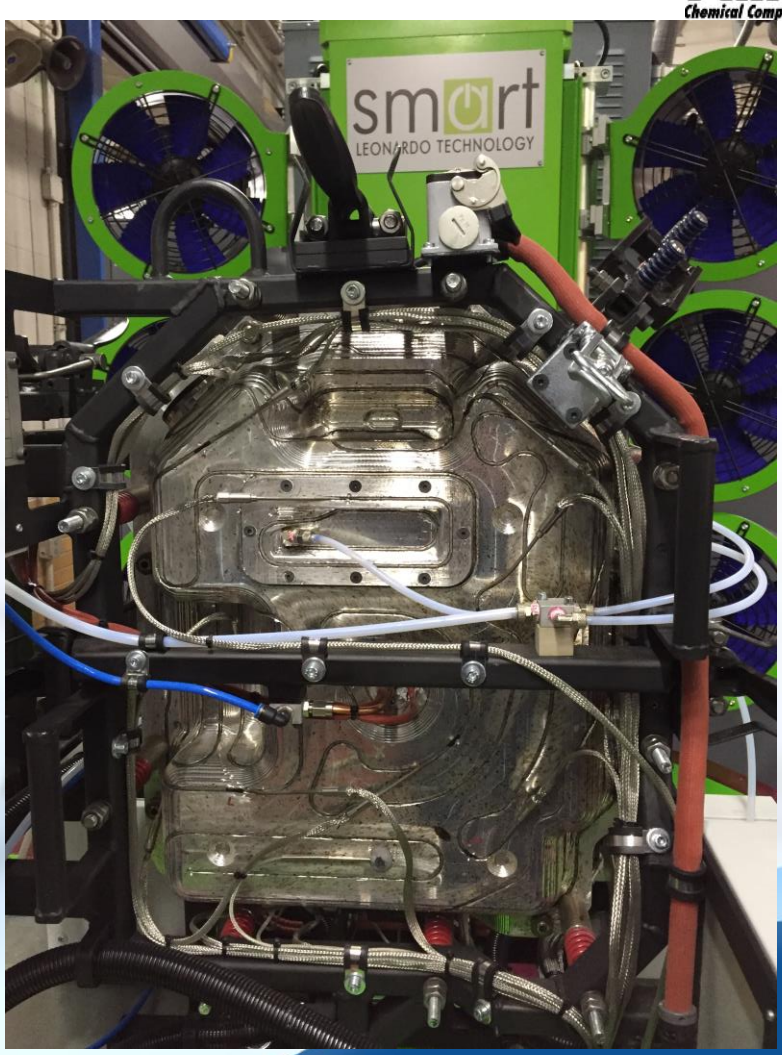




5 Gallon Water Can Mold

- Vertical mold open
- Easy part removal
- No crane
- Good ergonomics
- Allows for manual addition for multi layers
- Future automated addition of materials possible
- Hinged system saves parting lines

Mold Capabilities

- 10 Zones for heating
  - Sides / Top
  - Core
  - Inserts
  - Handles
- Vertical Swing for ergonomics
- Vacuum
- Internal air cooling
- Evaluate –
  - Mechanical properties
  - Flow
  - Inserts
  - Layer properties
  - Process savings

Materials (Continued)

The handles were molded with three layers, comprising of two layers of rotational molding grade, Marlex® 1007 Polyethylene sandwiching a third layer of Marlex® HMN TR-935 Polyethylene

The blue resin used in the tanks is MDPE, Marlex® HMN TR-935 Polyethylene with a density of 0.936 g/cc with a melt index of 6 g/10 minutes

Materials

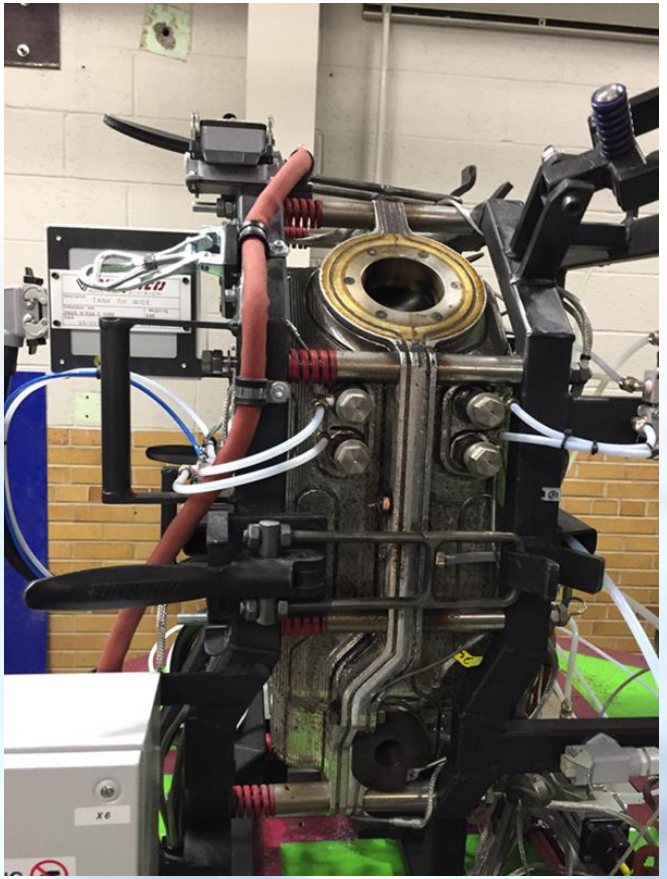
Marlex® 1007 (LDPE) has a density of 0.917 g/cc with a melt index of 7 g/10 minutes.

The colors were compounded, then pulverized by Spectra Colors using an Orenda® grinder **without Cryogenics!**

Natural Marlex® 1007 is a stable, polyethylene resin without antioxidants or UV additives , ensuring good taste and odor results.

Marlex® 1007 Polyethylene was compounded black & then molded as the outer layer of the handle.

Resin Addition



Inserts

Processing

Utilization of separate heating zones allowed use of different colors and materials in the handles

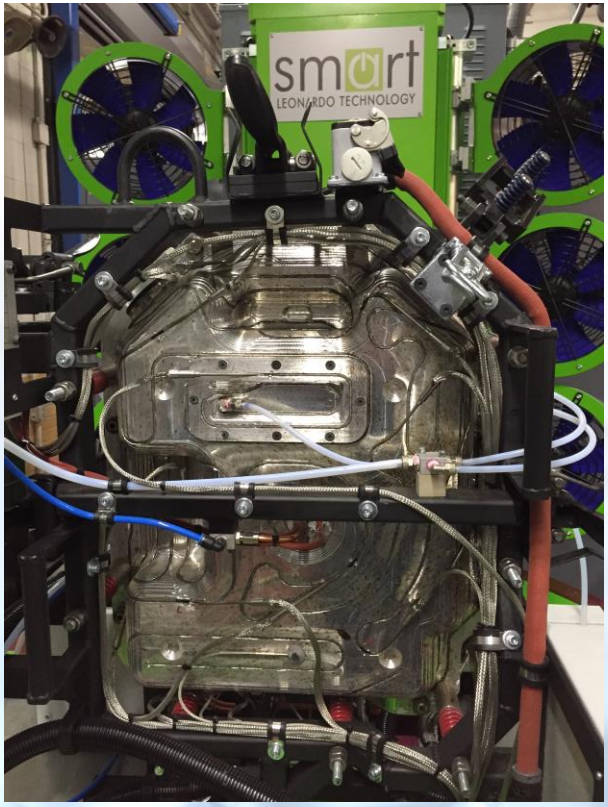
Separate heating zones allowed extra material to build on inserts without increasing overall wall thickness

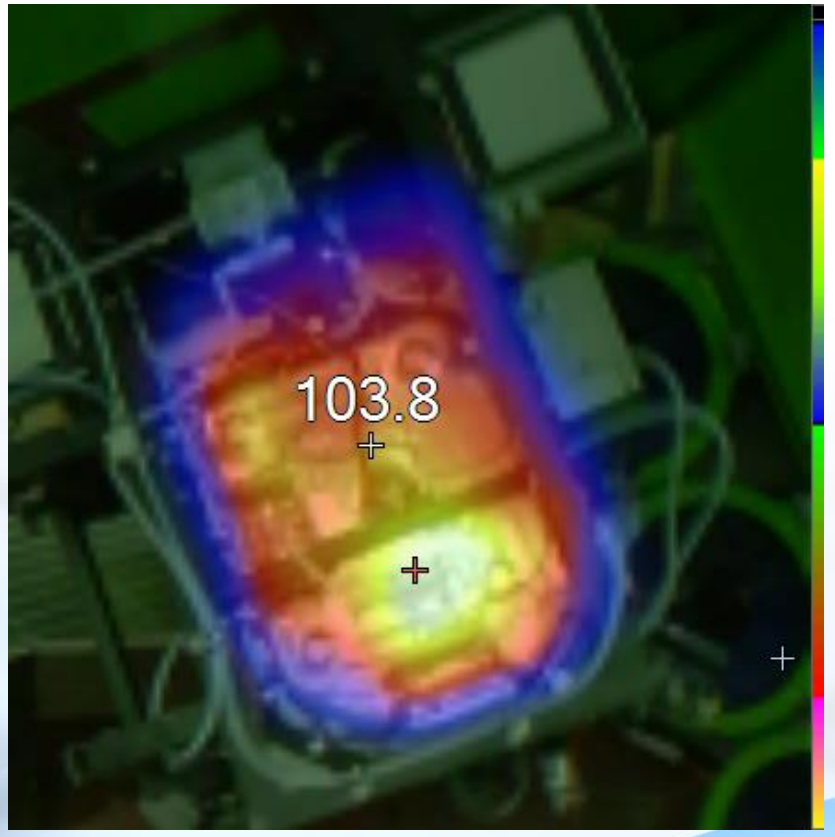
Since the mold is electrically heated, multiple layers are easy to add

Molding is consistently monitored and controlled by the peak internal air temperature for precision throughout the seasons

Each molding utilizes vacuum technology, reducing mold time by up to 20% per layer

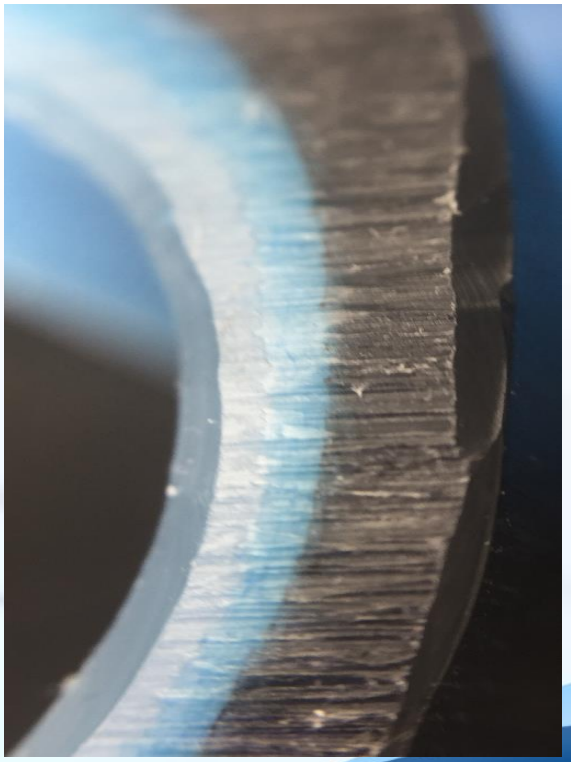
Heat Zones





Multiple Layers

Layers



Thanks to…

Spectra Color
Your Partner in Plastics

PERSICO

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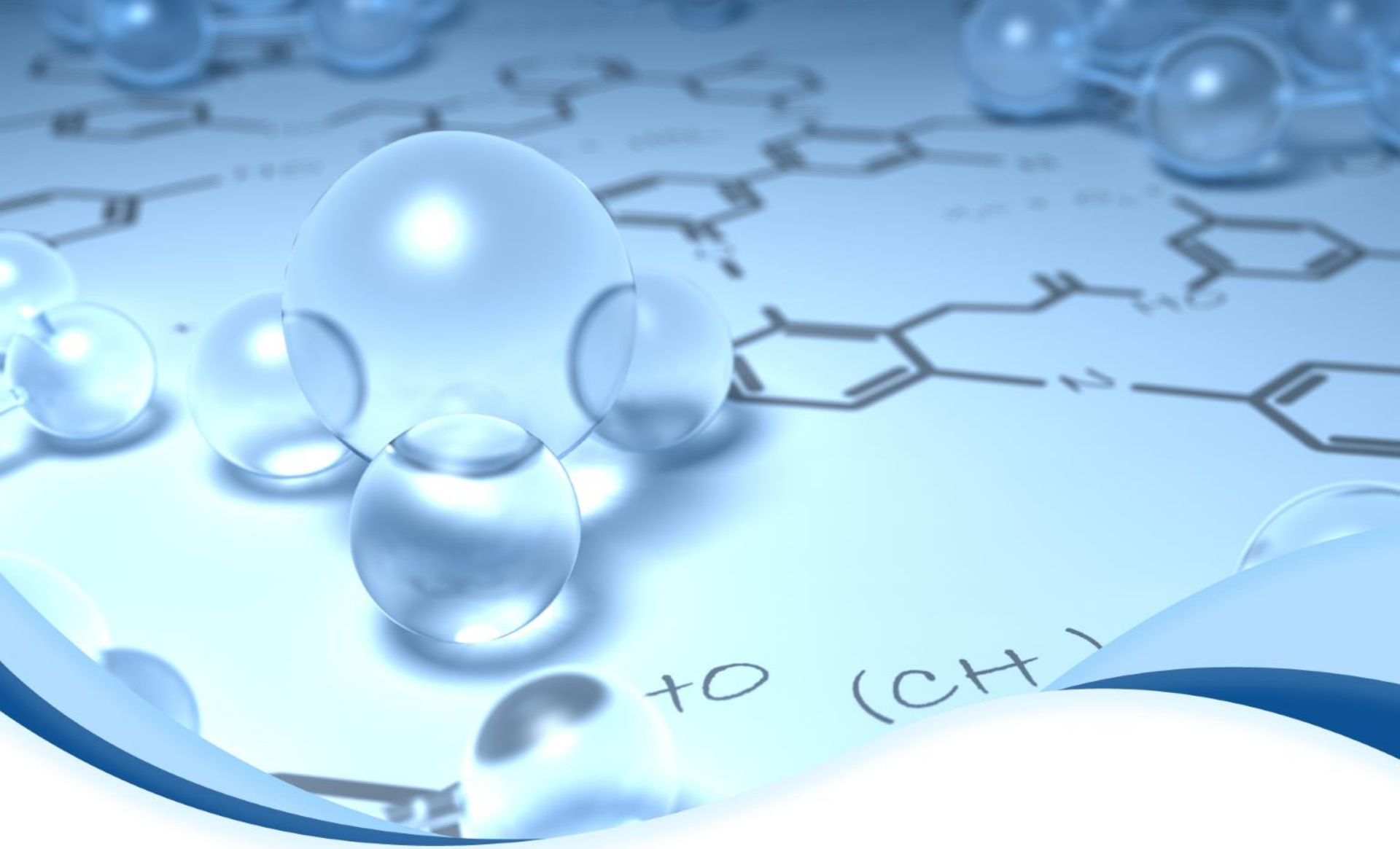
Technology by Orenda

Jesse Johnson
Shawn McAfee
Michael Henley



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Questions?

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