



# Container Performance Model for Beverages



## A Powerful Permeation Model

- For new package development
- For strategic analysis of alternative technologies
- For assessment of competitive materials/packages
- For package authorizations
- For light-weighting programs with existing packages
- For barrier technology development
- For materials development

Secure, Flexible, Fast, & Accurate!  
Validated against real-world data!

## Driven by Market & Industry Needs

M-RULE® is a flexible and robust tool which helps you meet the changing market and industry needs for your packaged products.

With M-RULE®, you can quickly optimize package weight, sidewall thickness, resin and closure, as well as evaluate different barrier technologies (including

oxygen scavengers) to achieve shelf-life targets.

You can simulate the full range of real environmental conditions experienced by your packaged products, including conditions in different markets and climates during filling, storage, and distribution.

You can quickly assess opportunities for cost savings and shelf-life extension based on changes to the package, changes to the filling conditions, and changes to your storage and distribution conditions, without the need to first create and evaluate physical prototypes.

## Powered by Science & Technology

M-RULE® is a unique permeation model.

It is not an empirical model driven by a database of permeation values. Rather, it is a fundamental model based on first-principles prediction of the diffusion and solubility of gases.

It inherently accounts for all the factors that affect permeation, including concentration-dependent diffusion,

temperature, crystallinity, orientation, stress and stress relaxation.

It simultaneously calculates the migration of O<sub>2</sub>, N<sub>2</sub>, CO<sub>2</sub> and H<sub>2</sub>O, and continually revises the diffusivities and solubilities of each of these permeants as a function of the above factors.

It incorporates Vitamin C degradation and oxygen scavengers. It also predicts

volume expansion and creep as a function of pressure and polymer modulus.

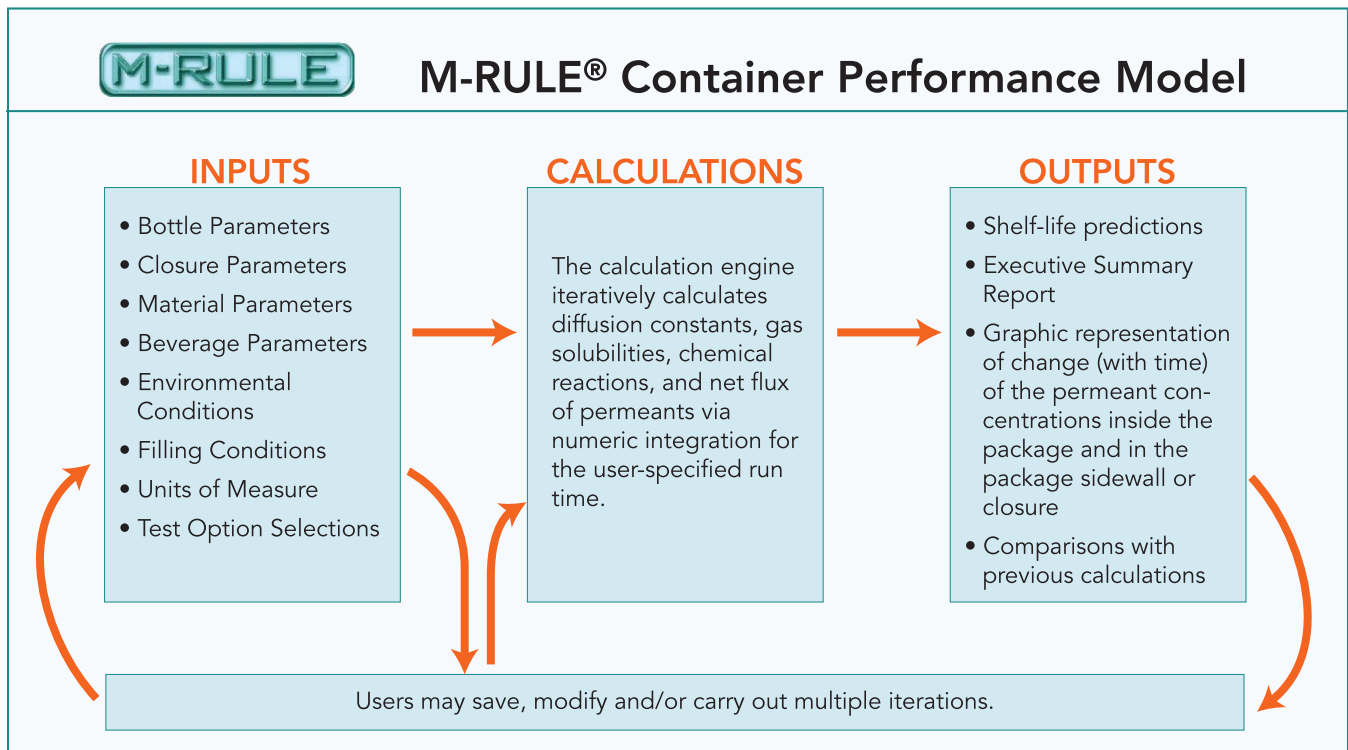
It includes all the major barrier technology options, including plasma coatings, multilayers, blends and nanocomposites.

It is accessed via a user-friendly Web-based interface with 128-bit encryption security.

## Built Upon Decades of Experience

M-RULE® integrates the expertise of the professional team of Container Science, Inc., Plastic Technologies, Inc., SBA-CCI, Inc., MXI Modeling, Inc. and CoreSouth Software, Inc. Consequently, M-RULE® draws upon decades of experience in:

- Applied Polymer Science
- Permeation Physics
- Chemical Kinetics
- Modeling/Computer Simulations
- Laboratory & Testing Procedures
- Chemical & Industrial Process Analysis
- Package Development & Improvement
- Industry Economic Analysis
- Value-Chain Modeling
- Project Management
- Software Development
- Technical Training



## Contact Us...

Let us demonstrate how the M-RULE® Container Performance Model for Beverages can help you meet your packaging objectives.

### Subscription/Sales Information:

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