

Capsugel[®] liquid-filled capsule portfolio

Unique capsules to help you launch
market-disrupting dietary supplements





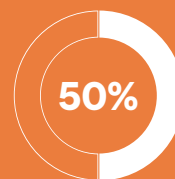
Differentiate

in the competitive dietary supplement market

Meet consumer demand for a fast-absorbing, visually unique supplement. Our premium Capsugel® liquid-filled capsules combine proprietary capsule design and fusion technology with innovative ingredient delivery systems, allowing you to **create highly functional and uniquely experiential nutraceutical products.**



Capsules are the **globally preferred dosage form**



50%

50% of consumers prefer capsules¹

Why Capsugel® liquid-filled capsules?

Compared to other dosage forms, such as softgels, tablets, or powder-filled capsules, our liquid-filled capsules:

Enhance product quality

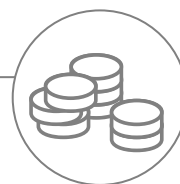
with a patented capsule design and capsule closure fusion technology

Enhance ingredient functionality

with innovative ingredient delivery systems, capsule polymers, and fillings

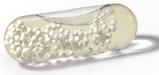



Capsugel® liquid-filled capsules—available in a wide selection of polymers—help meet some of today’s most demanding formulation challenges and growing consumer trends:

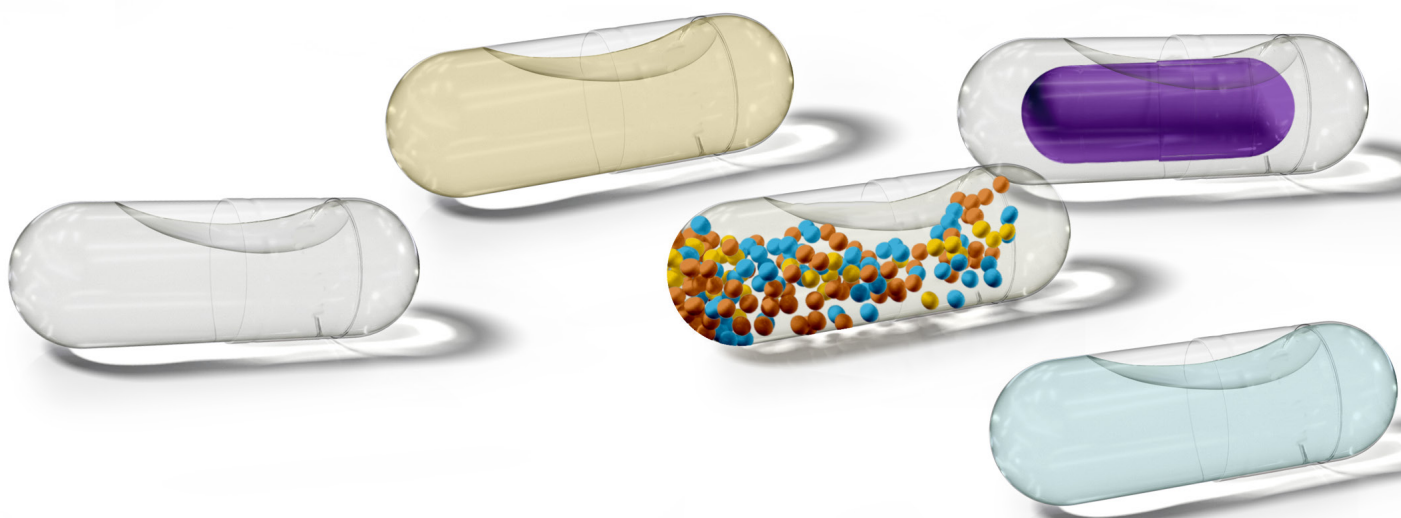
- Moisture protection
- Customizable absorption
- Tamper-evident
- Leak- and clump-resistant
- Visually unique
- Taste and odor masking
- Customizable printing and colors



Consumers are willing to pay more for premium capsules

Premium dosage forms command premium pricing with consumers in market. In a comparison of popular women’s multivitamin brands, Lonza’s Capsugel® liquid-filled capsules commanded a premium end-consumer price.*

| | Dosage form | Example price consumers would pay at retail |
|--|--|---|
|  | Capsugel® beadlets technology | \$1.00 |
|  | Capsugel® liquid-filled capsule | \$0.43 |
|  | Softgel | \$0.41 |
|  | Tablet | \$0.13 |



Build your next innovation

Proprietary capsule design and fusion technology

A better product experience

A proprietary capsule design and fusion process make Capsugel® liquid-filled capsules tamper-evident, as well as leak- and clump-resistant.



Our process, in 3 easy steps

1 Design



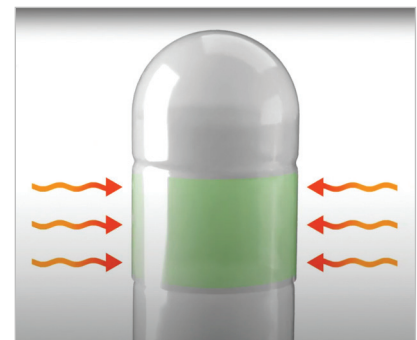
Starts with a specially designed capsule, with a 4x larger seal zone compared to traditional banding method

2 Seal



Sealing fluid is applied

3 Fuse



Gentle heat fuses the cap and body together, protecting against leaks

Improve functionality and maintain the quality of your ingredients

Each patented, specially-designed Capsugel® liquid-filled capsule is flushed with nitrogen prior to being securely sealed via a proprietary, micro-spray fusion technology. Combined, this cutting-edge capsule and fusion technology offers superior protection against leaks, tampering, and breakdown caused by oxidation.

Nitrogen acts as a **barrier against oxidation**

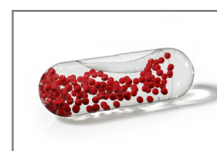
Proprietary fusion technology is **tamper-evident and leak-resistant**

Hard polymer shell means a **clump-resistant product**

Proprietary capsule design and fusion process **protects ingredients from moisture**



Taste and odor masking for strong-smelling ingredients



All-in-one formulation
Enables multi-ingredient formula combinations

Supports absorption

Proprietary filling and sealing fusion technology aids ingredient absorption

Highly customizable

Vast selection of capsule polymers and liquid fillings for optimal compatibility and consumer or formulation needs

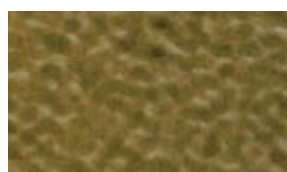
Highly stable²

Other liquid-filled dosage forms, like softgels, are permeable to oxygen, meaning potential loss in stability

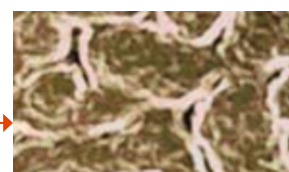
Under the microscope

Liquid-filled hard polymer capsule shell resists vapor transfer, creating oxidation barrier and protecting ingredients from degradation

Lonza **liquid-filled hard polymer** capsule shell



Softgel structure



Higher permeability due to plasticizer channels³

Capsule polymers

Customize your liquid-filled capsule

Whether you're looking to stay ahead of market trends, formulate new products, or enhance an existing line, **Lonza has the right capsule polymer for you.**

We offer a wide range of capsule polymers—from gelatin to HPMC to pullulan—to fit the characteristics of your ingredients and the cultural and dietary preferences of your consumers.



Gelatin

From our basic, premium gelatin polymer, to more specialty consumer- or market-driven gelatins, we offer the world's most popular two-piece hard gelatin capsules

Vegetarian

Our wide selection of animal-free, vegetarian polymers delivers on increasing consumer interest in the origin of supplements and plant-based diets

Manufactured in **pharmaceutical-grade, state-of-the-art facilities**

Gelatin polymers—the world’s most globally accepted capsule polymer, sourced to meet Lonza standards

| | Key benefits | Release profile | Oxygen protection | Glossy finish | Available in multiple sizes | Widely accepted around the world** |
|-----------------------|--|-----------------|-------------------|---------------|-----------------------------|------------------------------------|
| Bovine-Porcine | Standard gelatin formulation with supply continuity | Immediate | ✓ | ✓ | ✓ | ✓ |
| Bovine | Considers religious requirements | Immediate | ✓ | ✓ | ✓ | ✓ |
| Porcine | BSE-averse market innovation | Immediate | ✓ | ✓ | ✓ | ✓ |
| Marine* | Sustainably-sourced from fish Complements marine-based formulas | Immediate | ✓ | ✓ | ✓ | ✓ |

Available for powder- or liquid-filling | Broad capsule size selection

Certifications and compliance**



Documentation**

- ✓ Stability summary report
- ✓ Ink specifications
- ✓ Allergen declarations
- ✓ Technical reference files
- ✓ Product composition and specification sheet
- ✓ BSE safety declaration
- ✓ Export certifications
- ✓ Nutritional analysis

Vegetarian polymers—an advanced portfolio that meets evolving consumer demands

| | Name | What is it? | Application examples | Release profile | Key benefits | Enables organic label |
|---|-----------------------|--|--|-----------------|--|-----------------------|
| HPMC Hypromellose | Capsugel® Vcaps® Plus | Our most versatile vegetarian capsule | All types of supplements | Immediate | Protects moisture-sensitive ingredients Glossy, gelatin-like finish | ✓ in the EU |
| | Capsugel® Vcaps® | Our customer-favorite vegetarian capsule | Herbs, minerals | Immediate | Protects moisture-sensitive ingredients Matte, natural-looking finish | --- |
| | Capsugel® DRcaps® | Our designed release capsule | Probiotics, enzymes, strong-smelling ingredients | Designed | Protects acid-sensitive ingredients Designed release of ingredients | --- |
| Pullulan Naturally fermented from tapioca | Capsugel® Plantcaps® | Our cleanest label vegetarian capsule | Omega-3s, vitamin K, strong-smelling ingredients | Immediate | Protects oxygen-sensitive ingredients Clean label formulation | ✓ in the US† |

Available for powder- or liquid-filling | Broad capsule size selection



* OceanCaps®

** Depending on polymer selection and regional differences

† Made with organic

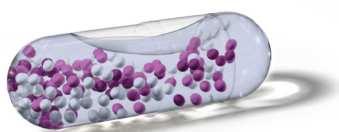
Capsugel[®] liquid-filled capsule technology

Maximize ingredient functionality
and performance

Combine multiple ingredients in **one powerful dose**

Lonza's unique ingredient delivery systems and wide variety of filling options help maximize your product's potential, solving formulation challenges and creating eye-catching supplements.

Ingredient delivery systems



Beadlets technology*

- Customizable release profile—targeted or multi-phase
- Easily pair liquids and solids



DUOCAP® capsule-in-capsule technology*

- Customizable release profile
- Suited for combination or dual release with solids and liquids



Beadlets + capsule technology*

- Proprietary delivery system
- Suited for combination or dual release with solids and liquids



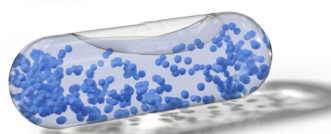
Tablet technology**

- Targeted or multi-phase release profile
- Easily pair liquids and high-volume solid ingredients



MiniTabs technology**

- Targeted or multi-phase release profile
- Easily pair liquids and high-volume solid ingredients



Lipid multi-particulate technology**

- Sustained or modified release profile with added odor/taste masking
- Increase ingredient bioavailability with varied particle sizes (50 – 300 microns)
- Available as dry- or -liquid filled

Fillings

Oil

Enhance bioavailability and stability, formulate with native lipid ingredient forms

Suspension

Enable the combination of solids + liquids, maximize load

Aqueous†

Maximize soluble actives, deliver hygroscopic actives, enhance stability

Semi-solid

Maximize bioavailability, stability, and load

Custom-build a solution to maximize differentiation, familiarity, and brand loyalty

Personalize your liquid-filled capsule to build a product that meets your exact brand and development needs.



Popular personalizations



Color

Customize your capsules with a nearly limitless array of colors, including food-based coloring and titanium-dioxide (TiO₂) free options.



Printing

Maximize your branding with customizable printing across a wide selection of inks, including a menu of unique food-based inks.

Partnering beyond the capsule

Launch with Lonza™ innovation services

Our full suite of services turns ideas into breakthrough products

Whether you are looking for your next big idea, have a technical challenge, or need formulation or manufacturing support, our end-to-end concept-to-market services help you launch your next product.

Our services help you with:

- Product design
- Product development
- Product manufacturing
- Distribution and logistics
- Post-launch support

Together
we enable a
healthier world

Contact us or your Lonza Capsules & Health Ingredients sales representative to **start your next project today**

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