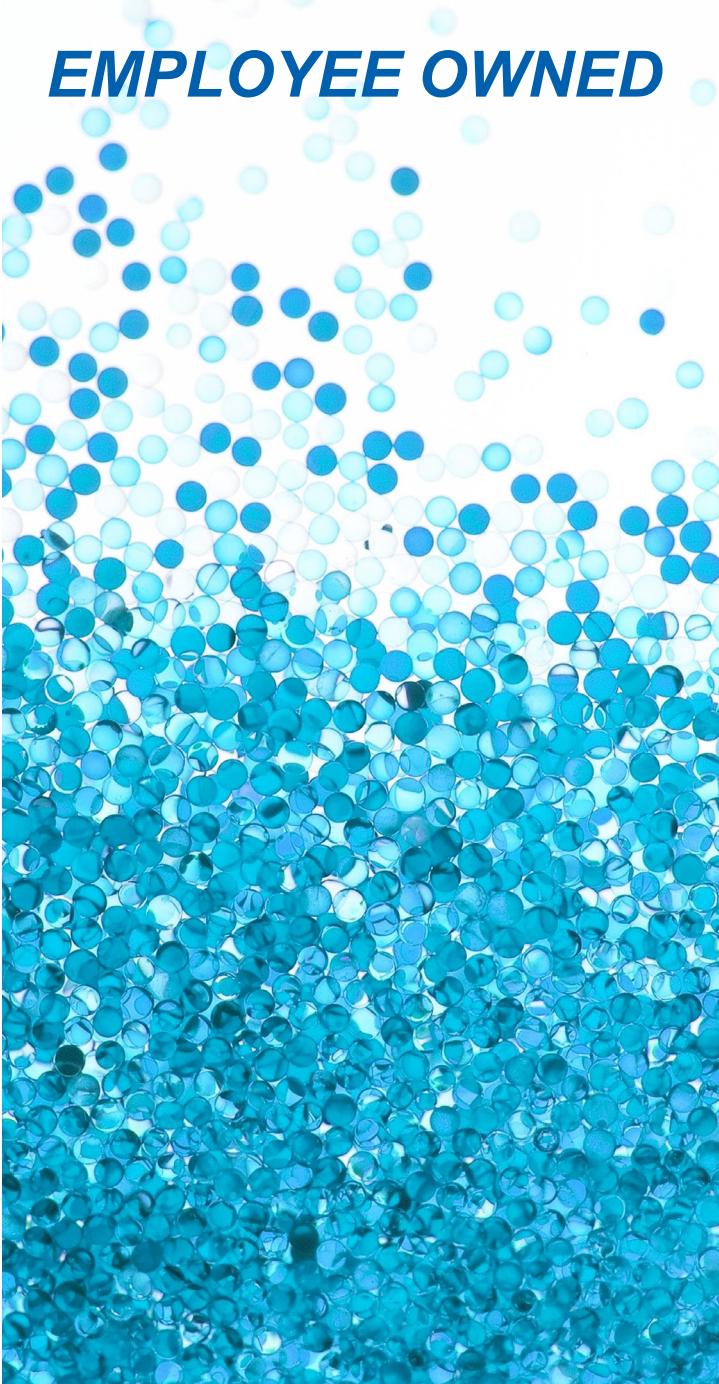


EMPLOYEE OWNED



ENGINEERED PARTICLES

AVEKA has many techniques to engineer particles that are applied to a wide range of materials serving a variety of industries such as food, personal care, and agriculture. Our broad scientific and engineering expertise gives us the ability to investigate and tailor the particles to best meet your needs.

The technologies we use to design engineered particles include processes such as spray-drying, prilling, and microencapsulation. We offer a number of bead formation techniques that provide innovative delivery systems and visual appeal. Each technique offers unique and specific advantages dependent on factors such as:

- BEAD SIZE
- RELEASE MECHANISM
- ENCAPSULATION MATERIAL

AVEKA brings years of particle engineering experience, with proven technologies and an extensive intellectual property position to assist in developing and producing your unique, functional particle.

AVEKA is your GO-TO particle solution provider from R&D to production.

HIGHLIGHTS

- SPRAY DRYING
- PRILLING
- DRY WATER
- ALGINATE ENCAPSULATION

	Spray Drying	Prilling	Alginate soft Beads
Core Materials: Liquids			
Water miscible	some		
Hydrophobic (oils, etc)	■	■	■
Core Materials: Solids			
Water soluble		■	
Water insoluble	■	■	■
Wall Material			
Typical material	sugars, starch	wax	salt of alginic acid
Release Mechanism			
Pressure (breakage)	■	■	■
Dissolving	■	■	■
Heat (melting)		■	slight
Chewing	■	■	■
Digestion	slight	■	■
Approved for:			
Food	■	■	■
Cosmetics	■	■	■
Capsules			
Type	core-shell	matrix	matrix
Typical payload, %	0-50	0-60	0-30
Size limits, microns	5-30	20-2000	200-5000
Process			
Relative cost	low	medium	medium

ADVANTAGES	Low cost, able to make water soluble walls	Can set release temperature by matrix material selection	Approved for foods, beverages, wet or dry delivery
DISADVANTAGES	Limited to water soluble wall materials	Matrix-type capsule presents less resistance to fill release	Capsules somewhat fragile. Some fills may leak slowly
IDEAL SYSTEM	Vitamin E oil in a water soluble shell	Flavor, color and nutraceuticals, solids	Emollients and fragrances for personal care products, flavors, color of food