Innovative silicone solutions for the textile industry

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Outline

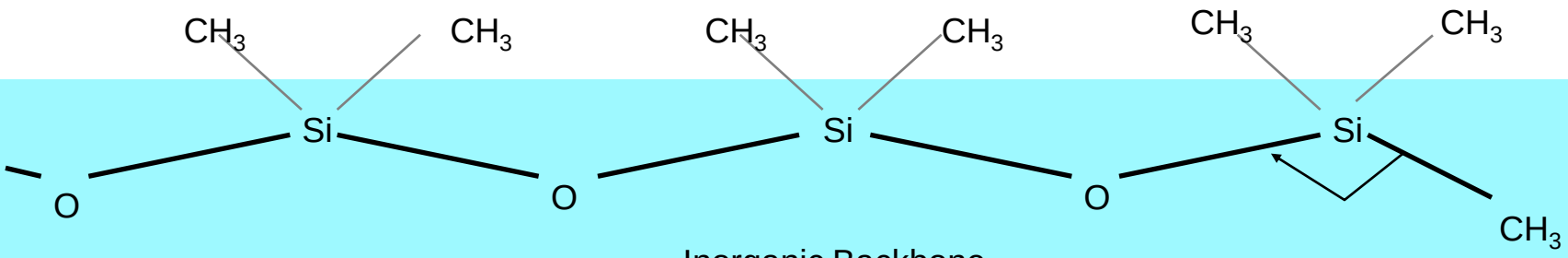
- What are silicones?

- Recent innovations:
  - Silicone encapsulation – Dow Corning® DS 9000 multifunctional additive
  - Water preservation – Dow Corning® GP 8000 for denim washing
  - Impact protection – DEFLEXION™ range
  - Screen printing inks – Dow Corning® 9600 series

What are Silicone?

Silicone Molecule:
- long and strong
- free to move

Organic Pending group



Inorganic Backbone

Rotation About the Bonds	
C-C	3.3 kcal/mol
Si-O	0.2 kcal/mol

Si-O bond is free to move

Bond	Strength
C-C	85 kcal/mol
C-O	81 kcal/mol
Si-O	117 kcal/mol

Si-O bond is stable

Bond	Angle	Length
C-C	112 ^{o}	0.154 nm
C-O	111 ^{o}	0.142nm
Si-O	130 ^{o}	0.163nm

Si-O bond is even and long.

Key properties of silicone

Silicone structure	Silicone performance
Strong Si-O bond	Chemical and thermal stability
Flexible backbone	Easy orientation, high compressibility
Low intermolecular attraction	Liquid at high molecular weights Low friction with polymers High gas permeability High spreading coefficient
Methyl Pendant Groups	Low polarity/ low surface tension Limited solubility Hydrophobic surface

Dow Corning® DS 9000
Multifunctional Additive

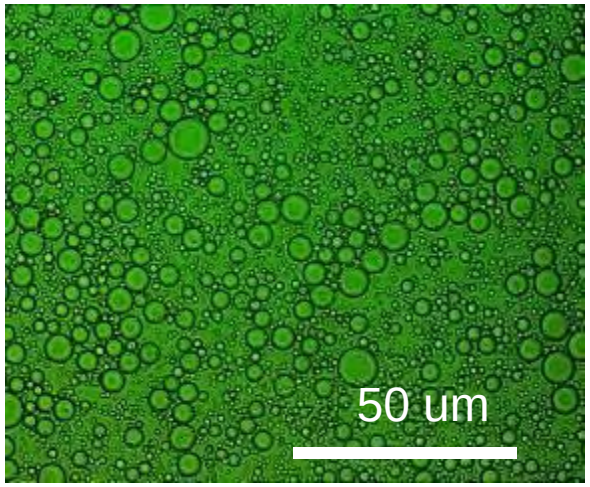
- An encapsulated silicone finish particularly adapted to provide:
  - Hydrophobicity
  - Softness

- And extend the range of applications to be used in combination:
  - with flame retardants
  - with fluorocarbons

Why Encapsulation?

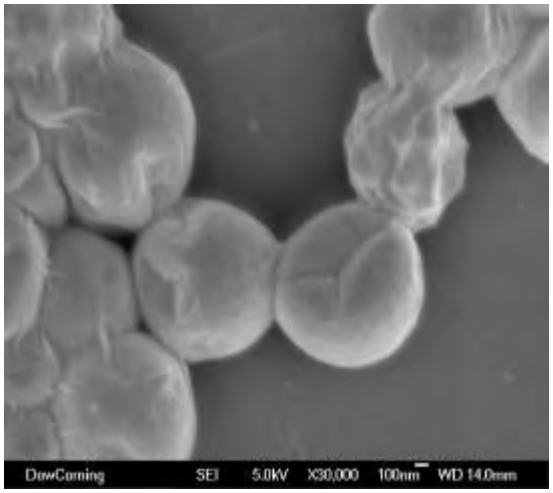
- To protect (re)actives against their environment
- To increase the shelf-life.
- To isolate incompatible products.
- To change the sensory properties.
- To control the release
- To trigger the release

What is Encapsulation?

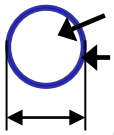


Dow Corning Developed Encapsulation Technology

Dow Corning patented technology



Silicone Droplets in Water



Core = Internal Phase = Encapsulate

Shell = External Phase = Wall

Capsule Size

Inorganic Shell Encapsulated Silicone Droplets

Dow Corning Encapsulation Technology

Key Features

- Payload above 90%
- Very low content of organic surfactants - Improved hydrophobicity
- Can be used for sensitive actives
- No formaldehyde released during encapsulation

Dow Corning® GP 8000 Eco Softner

Total solution – Ways to Process Denim

- 30-50% **less** water required
- **Less** energy
- **Fewer** steps
- **Less** time
- **Increased** productivity

Eco + total costs advantage

A Combination of Unique Competences

Silicone Expertise

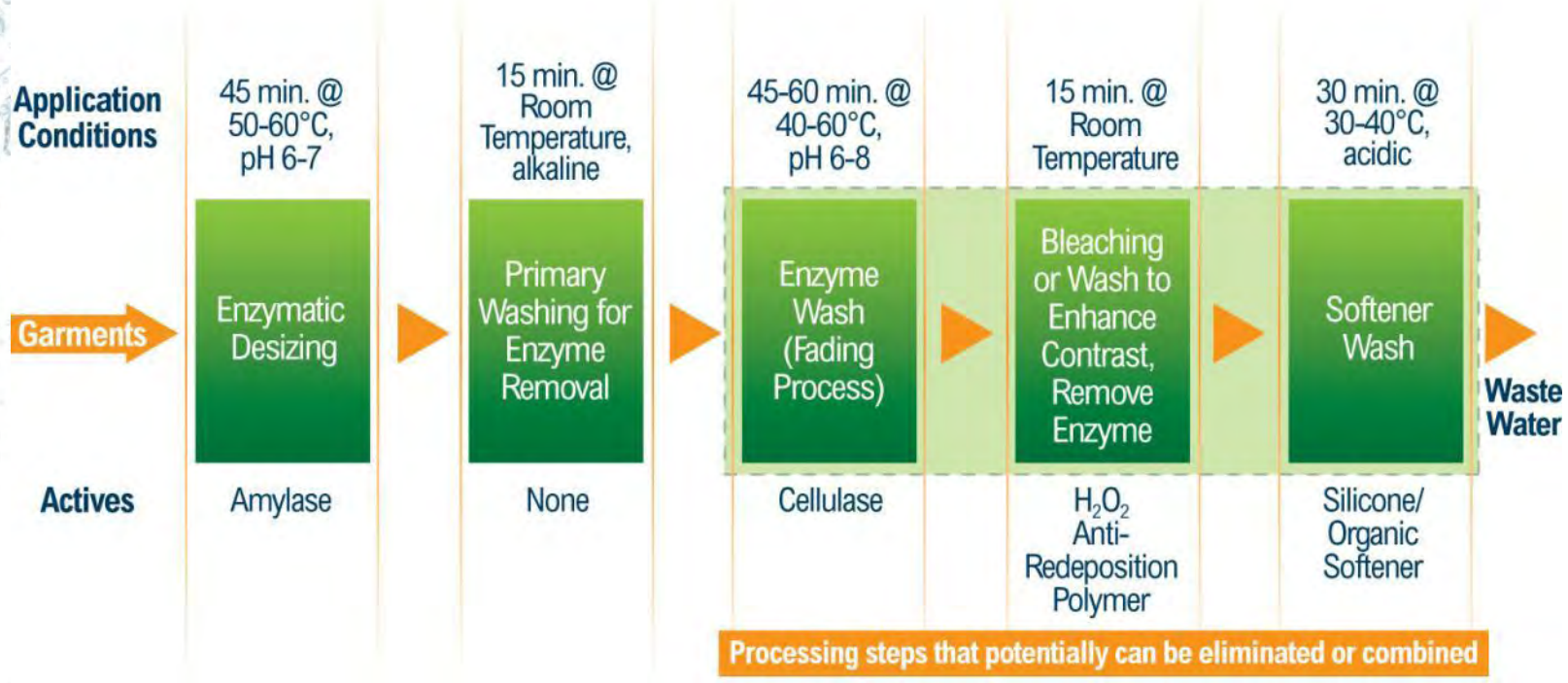
Granulation Formulation

Granulation Manufacturing

Granule

Dow Corning® GP 8000 Eco Solution typical process

Streamlines production and reduces water consumption




DEFLEXION™
from DOW CORNING

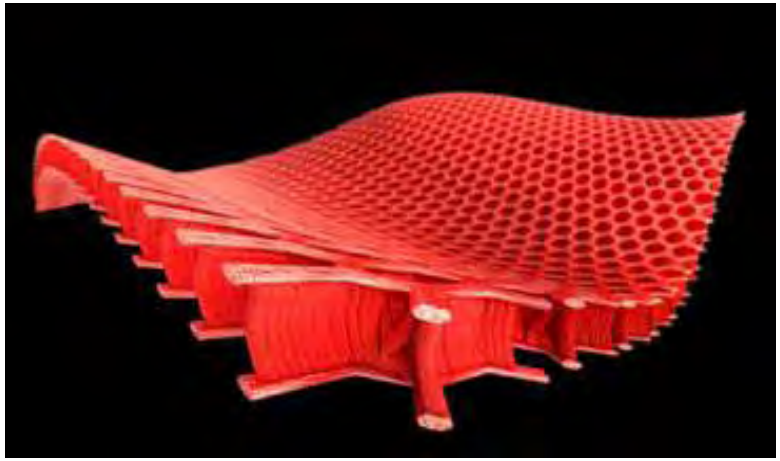
DEFLEXION™ Technology

UNIQUE IMPACT PROTECTION TECHNOLOGY

- Impact Protection
- Comfortable Impact Protection
- Durable Impact Protection
- Versatile Textile Format

EXCITING NEW BRANDED POSITION

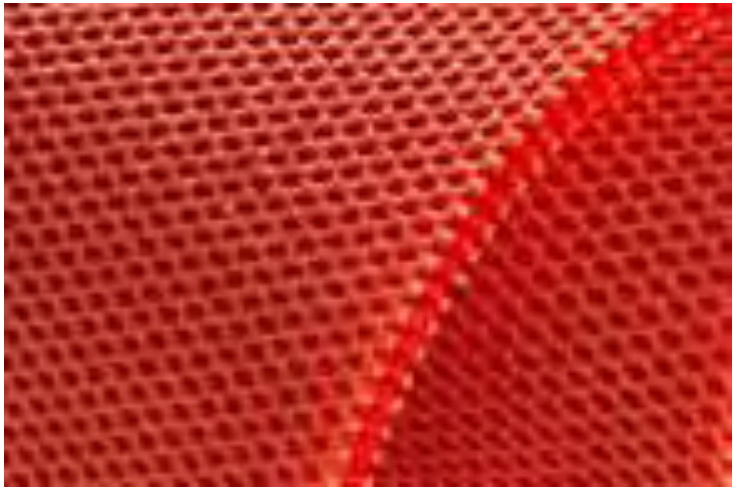
- Awareness and excitement at the user level
- www.dowcorning.com/deflexion
- Co-marketing
- Point of Sale Support – hangtags, videos, posters, etc.



DEFLEXION™ S-Range

3D SPACER TEXTILES IMPREGNATED WITH SILICONES

- Good protection
- Flexible
- Naturally breathable
- Washable
- Durable
- Performs from -20°C to + 40°C
- Flexible from -10°C to + 40°C
- Works when wet



- Ideal integrated into garments worn for long periods of time or in warm conditions.

- Two Products in the S-Range

DEFLEXION™ TP-Range

DEFLEXION™ from DOW CORNING

SILICONE THERMOPLASTIC SYSTEM

- High level of protection
- Flexible
- Washable
- Durable
- Airflow
- Strong
- Does not bounce

- Good in body armour and for the protection of delicate/fragile objects
- Four products in the TP-Range
- Two thicknesses
- Available perforated or non-perforated

Case Study

DEFLEXION™ from DOW CORNING

RODEOTECH Rodeo Body Protectors

- Manufacturer of Rodeo Vests in the US uses DEFLEXION™ products
- Professional Riders shown to walk away unhurt from falls and tramplings
- DEFLEXION™ body protectors are comfortable and effective

New *Dow Corning*® 9600 Series Textile Printing Inks

- Environmentally sound, Non Toxic and Safer
  - Ink base is 100% silicone
  - Waterless
  - Solventless
  - No PVC, Phthalates nor Formaldehyde
  - Curing at Lower Temperatures and/or
  - Shorter Times
  - Comply with Nike RSL and Adidas A-01 tests

Dow Corning® 9600 Series Textile Printing Inks

- Outstanding Elasticity
  - Up to 850%
- No Color Migration on PES dyed fabrics
- Heat Resistant
  - Iron-able, non-melting
- Chemical Resistance
  - Chlorine, solvents, etc

Potential Applications

- Jerseys
- Jackets
- Pants
- Shorts
- Uniforms
- Hats & caps
- Gloves
- Bathing suits
- Shirts
- Sweaters
- Socks
- Sleepwear
- Jeans
- T-shirts
- Undergarments
- Sweatshirts

Dow Corning Textiles Global Presence

Thank you for your attention