

SUSTAINABILITY WITH SILICONES | LIOSIL® FC & LIOSIL® HC

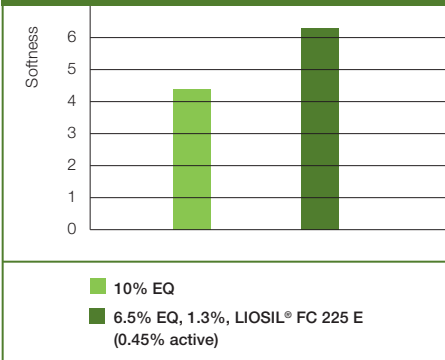
# LIOSIL® SILICONE PRODUCTS: HELP TO ACHIEVE SUSTAINABLE GOALS

**LIOSIL® silicone products function as effective softening and care agents in household care products. Additionally, they open up multiple paths to sustainable stewardship of natural resources.**

**Saving Resources by Improving Efficacy**

Silicones are highly efficient softening agents. So, part of the esterquat surfactant in a fabric softener can be replaced by a small amounts of silicone. With LIOSIL® FC 225 E, formulators can achieve the same effect with much smaller amounts of active ingredients, thereby saving raw materials and preserving natural resources (see table 1).

**Table 1: Raw Material Savings through the Addition of Silicone**



What's more, use of suitable silicone products, such as LIOSIL® FC 201 E, opens in combination with polyquaternium-37 the door to fabric softeners with no esterquats. The fabric softener manufacturer can, in this case, make do with much less active agent.



LIOSIL® is a registered trademark of Wacker Chemie AG.

**Fabrics Last Longer**

Shear and frictional forces subject fabric to mechanical stress when worn or washed; resulting in altering the shape and color of the fabric and damaging its fibers.

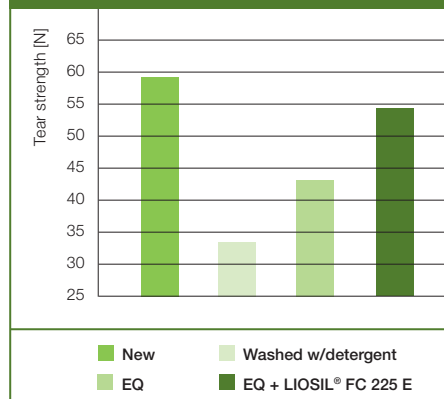
As a simple test shows, silicones help fabrics retain their shape when washed (see table 2).

**Table 2: Reduced Shrinkage of Cotton T-Shirts**



The lubricating effect of LIOSIL® FC 207 E is another example. By reducing friction, it keeps fibers from catching on each other, thereby increasing the tear strength of the fabric (see table 3). In other words, the silicone significantly reduces wear due to washing.

**Table 3: Tear Strength of Fabrics after 10 Machine Washes at 40 °C**



Printings on modern garments can be quickly damaged during the washing process. When washed with fabric softeners containing LIOSIL® FC products, the printings retain their good appearance (see table 4). Garments can be washed and worn more often.

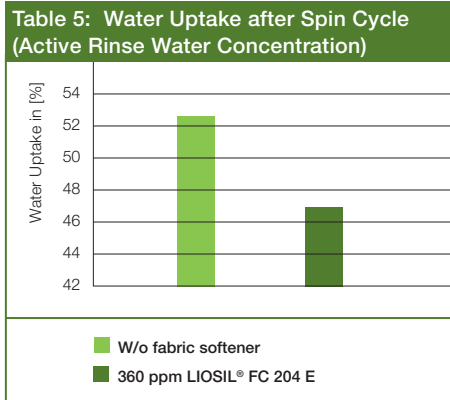
**Table 4: Significantly Lower Damage of Printings after 10 Washes by Using Silicone-Based Softeners**



**Silicones Help Save Energy**

The moisture in fabrics after washing can have an impact on environmental aspects especially when the fabrics are dried in a tumble dryer.

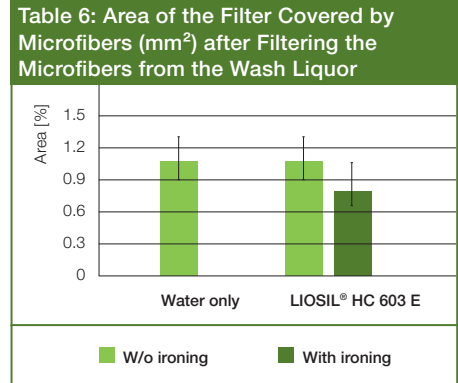
A fabric softener containing LIOSIL® FC 204 E makes laundry less damp after the spin cycle than in the case when laundry is rinsed without a fabric softener (see table 5). This reduces the energy demand of the clothes dryer by some 0.3 kWh. Saving electrical energy helps reduce CO<sub>2</sub>



This reduction in moisture content is also moderating the rise in indoor humidity when laundry is line-dried inside the home. This reduces the risk of mold formation, as well as the need for elevated heat in drying rooms during the colder months.

**Prevention of Fiber Release**

The film-forming properties of the silicone can be utilized for improving fiber integrity, thus reducing the formation of microfibers in the wash. When LIOSIL® HC 603 E, a formulation containing a reactive, film-forming silicone, is used in the rinse cycle and the treated fabric is then ironed after drying, a flexible silicone film forms on the fiber, making it harder for the fabric to shed microfibers (see table 6).



Even in small amounts, silicones function as effective active agents in household care products, reducing resources, extending the life of fabrics and consumer articles and helping consumers use these items more efficiently.

LIOSIL® Products Used as Softening and Care Agents in Household Care Products				
Product	Description	Biocide System	Focus Application and Main Effect	
LIOSIL® FC 228 E	Macroemulsion of amino-functional PDMS	Phenoxyethanol	Softening	Easy ironing, fabric stability
LIOSIL® FC 225 E	Macroemulsion of amino-functional PDMS	Phenoxyethanol	Softening	Easy ironing, fabric stability
LIOSIL® FC 207 E	Microemulsion of amino-functional silicone	CIT/MIT	Softening, fabric stability	Easy ironing
LIOSIL® FC 201 E	Macroemulsion of amino / OH-functional silicone	CIT/MIT	Softening, easy-ironing	Fabric stability, anti-wrinkle
LIOSIL® FC 204 E	Emulsion of a self-dispersing amino-functional silicone	CIT/MIT	Fast dry	Softening
LIOSIL® HC 603 E	Microemulsion of functionalized silicones	-	Impregnation	Softening, fabric stability
LIOSIL® HC 621 E	Microemulsion of functionalized silicones	-	Impregnation	Fabric stability

Wacker Chemie AG, Hanns-Seidel-Platz 4, 81737 Munich, Germany  
[www.wacker.com/contact](http://www.wacker.com/contact), [www.wacker.com](http://www.wacker.com)

Follow us on:



The data presented in this medium are in accordance with the present state of our knowledge but do not absolve the user from carefully checking all supplies immediately on receipt. We reserve the right to alter product constants within the scope of technical progress or new developments. The recommendations made in this medium should be checked by preliminary trials because of conditions during processing over which we have no control, especially where other companies' raw materials are also being used. The information provided by us does not absolve the user from the obligation of investigating the possibility of infringement of third parties' rights and, if necessary, clarifying the position. Recommendations for use do not constitute a warranty, either express or implied, of the fitness or suitability of the product for a particular purpose.