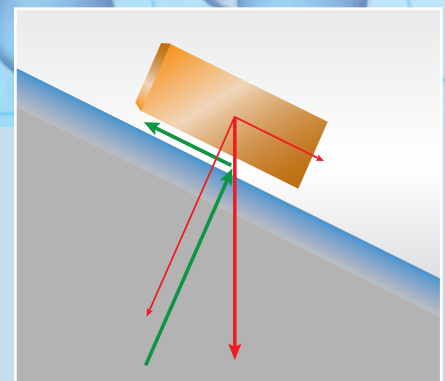


Fluorination improves surface properties

# Silicone

→ slips well → doesn't stick → is clean



## Objective

Due to their surface properties, many components tend to stick, causing significant restrictions in their application. The objective is to make the sticky surfaces of components smoother and cleaner.

## Solution

Intensive fluorination causes the fluorine atoms to be embedded in the surface of the component. Dynamic friction is significantly reduced. A rougher elastomeric surface amplifies this effect.

**The silicone's properties are not affected, and the surface modification remains stable over extended periods.**

## Materials

- Silicones, fluorine silicones
- Rubber (NBR, HNBR, EPDM)
- Thermoplastic elastomers

Problem	Effect of fluorination
Difficult assembly caused by sticky surfaces	Contacting surfaces have less friction, facilitating assembly
Creaking noise when sliding	Reduced static friction and breakaway force between silicone and counterpart surface
Touch-and-feel is sticky	Pleasant, smooth surface
Component is difficult to slide across the counterpart surface	Reduced dynamic friction between silicone and its counterpart
Small parts are difficult to separate and tend to stick together before assembly. This can disturb assembly and cause machine downtimes and rejects.	Parts are easily separated and installed.
Many valves and seals tend to stick in closed position if not moved over extended periods. Opening or releasing them may then be difficult.	Non-stick surface: Valves open even after extended periods of being closed, seals easily release from their seats.
Adhering dirt particles impair the visual appeal of - jewellery, - visible parts of high-quality devices, - cables, keyboards, etc.	Surfaces are no longer soiled by adhering dirt particles, the effect remains even after cleaning and sterilisation. Parts have a greater visual appeal.
Insufficient sealing tightness: Seals that are too sticky warp during assembly.	Seals slip into place easily and without warping or retaining force. Sealing tightness is more reliable.

### Friction forces between silicone and glass [N]

	Non-fluorinated		Fluorinated	
	Formula 1 [N]	Formula 7 [N]	Formula 1 [N]	Formula 7 [N]
LSR2650B	15.6	3.9	1.0	
LSR2630B	10.1	6.3	0.7	
FSL7651A	9.2	5.6	0.8	
FVMQ	12	11	6	
Silplus60Ex	9.2	2	0.8	

Source: Innovent e.V.

# Fluor Technik System GmbH



FTS has focussed on the development and manufacture of fluorination systems and fluorination services for more than 20 years. Realised projects, memberships in trade associations, cooperation with universities and research institutes, as well as many patents, are proof of FTS' expertise. We are member of the Flock Association of Europe FAoE e.V.

### Consulting

FTS advises on actions, potential applications and effects of gas-phase fluorination of plastics and other materials. For optimal results, FTS tests the treatment parameters in its own laboratory in close cooperation with its customers.

### Development and engineering

FTS develops and designs systems that are customised to our customers' individual requirements. We utilise our extensive experience in plant engineering and operation – from planning and engineering to installation and commissioning.

### Plant engineering

FTS builds inline and offline systems for gas-phase fluorination, adjusting them specifically to the requirements defined by the product or operation. Ancillary systems such as fluorine supply, calcium carbonate absorber and work safety devices are included in the equipment design.

### Service

FTS offers a full range of services: from operator training and routine maintenance to system extension and conversion. We support the approval and certification of the systems.

### Job order production

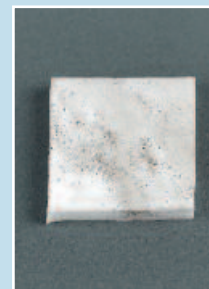
FTS refines the surfaces of supplied products for further processing and installation: bulk material, products placed in transport units, web material, etc.



Non-fluorinated  
Rubber doesn't stick – without talcum or silicone oil



Fluorinated



Non-fluorinated  
Soiling behaviour of silicone



Fluorinated



O-rings are easy to separate and install



Non-sticking profiled seals



Flock Association  
of Europe  
...be part of the leaders

