

→ Fused Silica



## HalRoller™ -FS – Fused Silica Rollers for Glass Tempering

HalRoller-FS Fused Silica Rollers are since decades successfully used worldwide as transport rollers in the manufacture of tempered safety glass. Tempered safety glass finds its application as architectural glass, e.g., for shop-window glass, curtain walls, glass doors, etc. and in automotive. HalRoller FS are used in both continuous and reversible furnaces from the main furnace manufacturers and operators of the glass industries. Fused silica reveals near-to-zero thermal expansion. This property results in excellent thermal shock resistance.



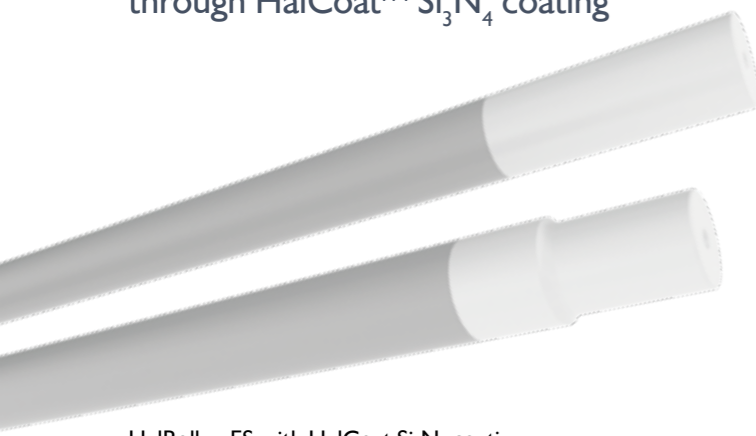
Glass tempering furnace with HalRoller-FS

	Physical property	Unit	Value
GENERAL	Main components	%	99.7 SiO <sub>2</sub>
	Bulk density	$\frac{g}{cm^3}$	1.92–2.00
	Water absorption capacity	%	4–6
	Open porosity	Vol.-%	10–14
	Average pore diameter	$\mu m$	0,2
MECHANICAL	Average flexural strength at 20°C	MPa	30–40
	700°C		45–60
	Young's modulus	GPa	30–40
THERMAL	Linear coefficient of thermal expansion at 20–1000°C	$\frac{1}{10^6 K}$	0.5
	T <sub>max</sub> depends on operating conditions but may not exceed	°C	1000

The values listed above pertain to test specimens. They are for reference purposes only and cannot be applied unconditionally to other shapes and dimensions.

## HalCoat™

Fused Silica Rollers for hot stamping of metal sheets with extra-long service life through HalCoat™ Si<sub>3</sub>N<sub>4</sub> coating



HalRoller-FS with HalCoat Si<sub>3</sub>N<sub>4</sub> coating

HalRoller-FS fused silica rollers coated with our patented HalCoat Si<sub>3</sub>N<sub>4</sub> are the best choice in steel treatment applications such as in hot stamping furnaces. HalCoat Si<sub>3</sub>N<sub>4</sub> has highly effective melt-repellent properties, especially against aluminum. Its application effectively minimizes the formation of slag buildup caused by the dripping melt on the fused silica rollers. The expected service life of fused silica rollers protected by a HalCoat Si<sub>3</sub>N<sub>4</sub> coating is several times higher than that of uncoated rollers.

	Physical property	Unit	Value
	Main components	%	> 98 Si <sub>3</sub> N <sub>4</sub>

## HalLock™ – Mechanical End Cap Fastening

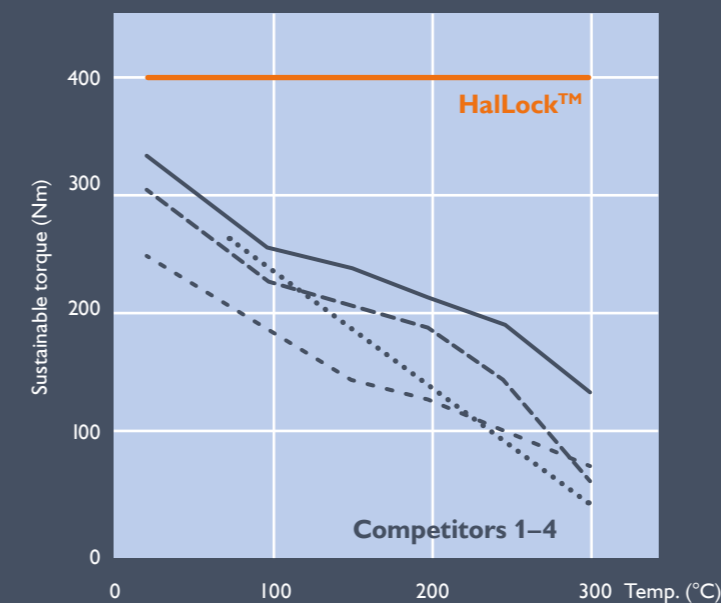
The patented HalLock fastening solution of our HalRoller-FS gives you maximum safety when tempering glass. This environmentally friendly cap fastening method has proven itself as a valid alternative to the previously used adhesive connection and allows operating temperatures of up to 300°C. HalLock enables problem-free use in the vacuum area – without outgassing of chemical substances or evaporation of formaldehyde.



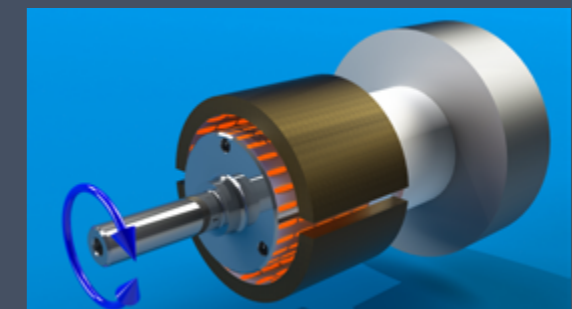
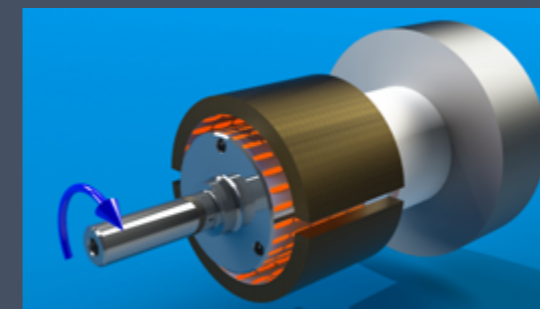
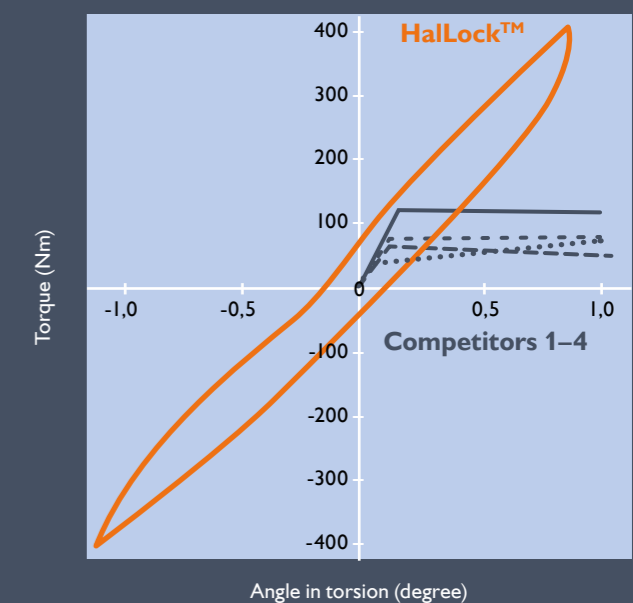
### HalLock: Excellent High Temperature Behaviour and Extended Longevity

Torque testing at various temperatures – HalLock end caps vs. competitor end caps using our unique teststand. Test parameters: T<sub>max</sub> = 300°C and M<sub>max</sub> = 400 Nm

#### Static testing at 25–300°C



#### Dynamic testing at 300°C



**Morgan Advanced Materials Haldenwanger**

has developed from its foundation in 1865 to become one of the world's leading manufacturers of high-tech ceramics. We offer you an extensive range of products made of oxide and non-oxide materials, which are primarily used in demanding thermal, chemical or even mechanical applications. Thanks to our wealth of expertise in ceramics, we serve you not only as a supplier, but also as a reliable partner in developing **solutions for your challenges.**

