

Glass-ribbon

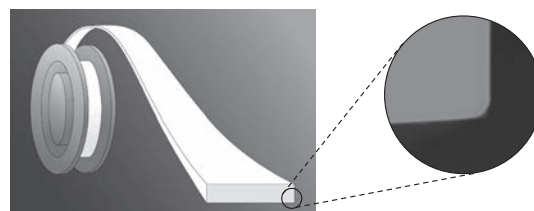
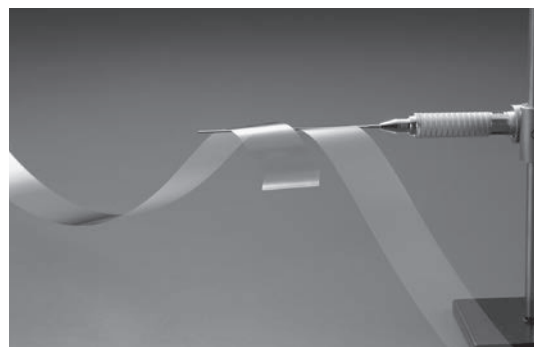
Glass-ribbon is so thin that it can be bent or rolled up like resin film. The glass surface is unpolished, but it is extremely flat and smooth. Glass-ribbon is characterized by rounded edges on both sides, as shown in the bottom photo. This enables enhanced durability in the face of bending and twisting pressure.

Features

- Super thin
- High flexibility
- High reliability

Properties

Glass Material		A	D	T
Coefficient of thermal expansion	$\times 10^{-7}/K$	66	38	100
Softening point	$^{\circ}C$	740	940	760
Dielectric constant	1MHz, 25 $^{\circ}C$	6.5	5.3	7.7
Refractive index (n_d)		1.51	1.52	1.52
Young's modulus	GPa	77	73	75



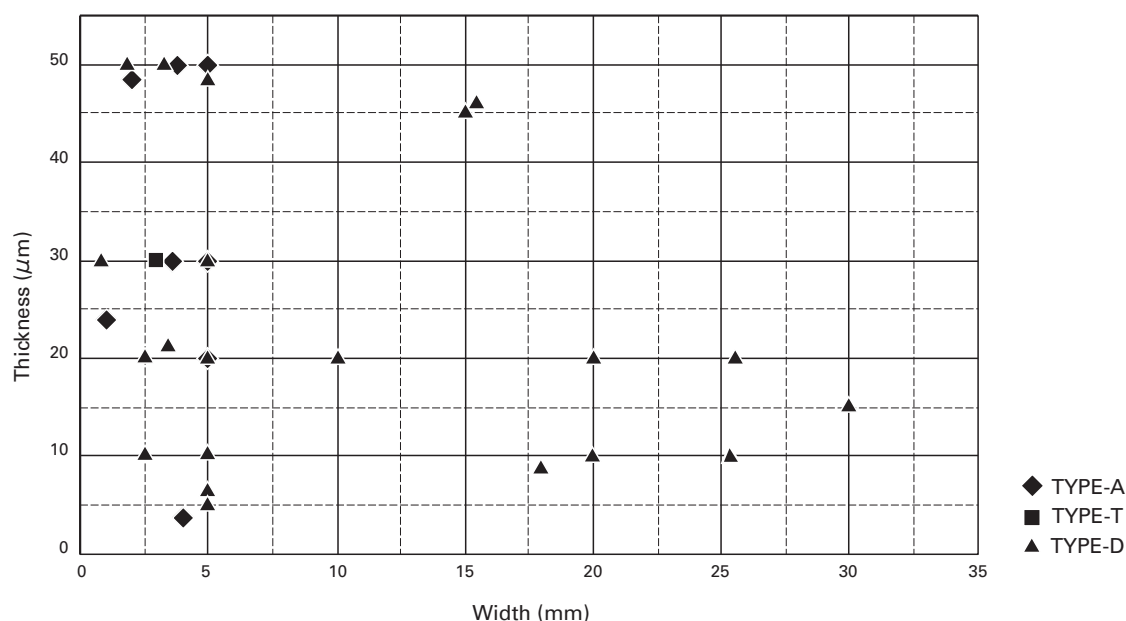
SEM image of enlarged edge

Dimensions

Thickness	4 μm -50 μm	Thickness tolerance : $\pm 0.002mm$ with thickness of 0.010mm and over $\pm 0.001mm$ with thickness under 0.010mm
Width	0.5mm-30mm	Width tolerance : $\pm 0.5mm$ with width of 10mm and over $\pm 0.1mm$ with width under 10mm
Aspect ratio (width/thickness)	Up to 3000	
Length	Up to 100m	

We are able to accommodate individual requests.

Sample Lineup



Applications

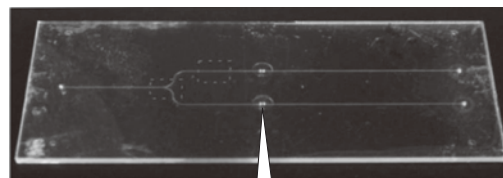
Microchip for Micro Total Analysis System

Glass-ribbon has been adopted for microchip stop valves of the Micro Total Analysis System that was developed by RIKEN. Glass-ribbon is extremely thin ($4\text{--}6\mu\text{m}$) and can be created in precisely required sizes. RIKEN has highly appreciated Glass-ribbon and has adopted it as a suitable material for valves to control solution flows.

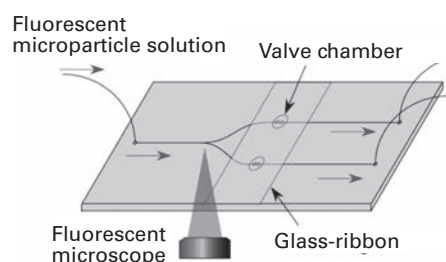
Glass-ribbon



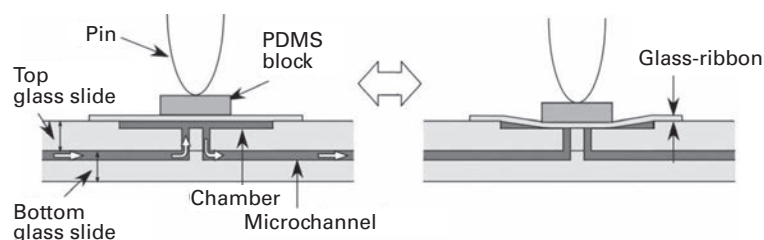
A fabricated all-glass-based microchip



Design and observation method of a prototype chip for valve demonstration



Cross-sectional view showing the working principle of the valve



Patentee : RIKEN Patent : JP Patent No. 6172711; US Patent No. 9073054

Reference

"Electric actuating valves incorporated into an all glass-based microchip exploiting the flexibility of ultra-thin glass"

Tanaka RSC Advances, 3(26), 10213-10220 (2013)

Images courtesy of RIKEN

Diaphragm

As a development item, Glass-ribbon or ultra-thin glass can be sealed with glass frit by laser-sealing technology for potential use as a diaphragm.

It has excellent hermetic properties compared to resin seal.

- Thickness of the sealed glass: $50\mu\text{m}$ or less
- Thickness of the substrate glass: 0.5mm or less

