

# Silica Gel for Crossflow Membrane Filtration

author: Kenichi Yoshimoto  
Kasugai city, Aichi, Japan

FUJI SILYSIA CHEMICAL LTD.

Silica gel is used in kieselguhr filtration system as a stabilizing agent for beer. However, it has not generally been used in crossflow membrane filtration system because the rapid increase in trans-membrane pressure difference (TMP) is often observed with silica gel.

We have developed a special silica gel compatible with crossflow membrane filtration system. Our research concludes silica gels with a certain range of transmittance are compatible with crossflow membrane filtration system without the rapid increase in trans-membrane pressure difference. Our studies also find silica gel exhibits good adsorption ability of haze-forming polypeptides in beer filtration. Now one of the silica gels compatible with crossflow membrane filtration system has been commercialized by Fuji Silysia Chemical Ltd. and been released to the world market.

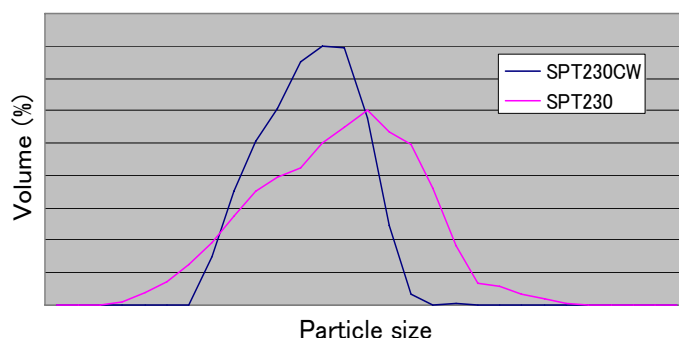
## Requirements of silica gel for crossflow membrane filtration system

- Less finer particle for filtration
- Specific range of particle distribution for circulation at the crossflow system.
- High particle strength
- High adsorption ability

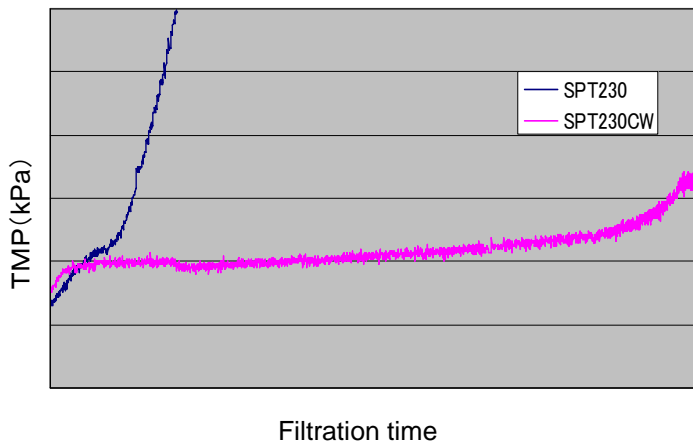
## Physical Characteristics of SPT230CW

Analysis items	unit	SPT230	SPT230CW
SiO <sub>2</sub> %	%	99.9	99.9
Surface Area	m <sup>2</sup> /g	759	747
pH	—	3.5	3.6
Ave. particle size	μm	16.6	13.1
Permeability (Darcy)		0.26	0.35
Transparency	%	12.9	79.5

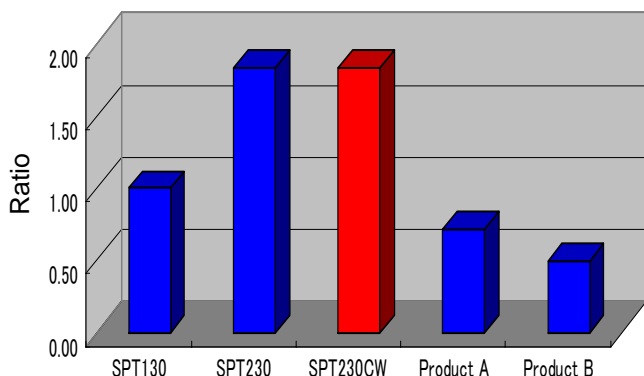
## Particle size distribution



## Comparison of TMP increasing



## Comparison of beer stabilizers



## Comparison of beer properties

Analysis items (unit)	SPT230	SPT230CW
Increase rate of TMP (kPa/min)	1.17	0.05
pH (-)	4.26	4.20
Alcohol (v/v%)	5.32	5.21
Original Extract (w/w%)	11.65	11.73
Apparent Extract (w/w%)	1.63	1.95
Sensitive Proteins in 2.5ml/l Tannin (EBCfu)	1.37	1.35
Color (EBC)	7.2	6.7
Chill Haze (EBCfu)	1.31	1.32