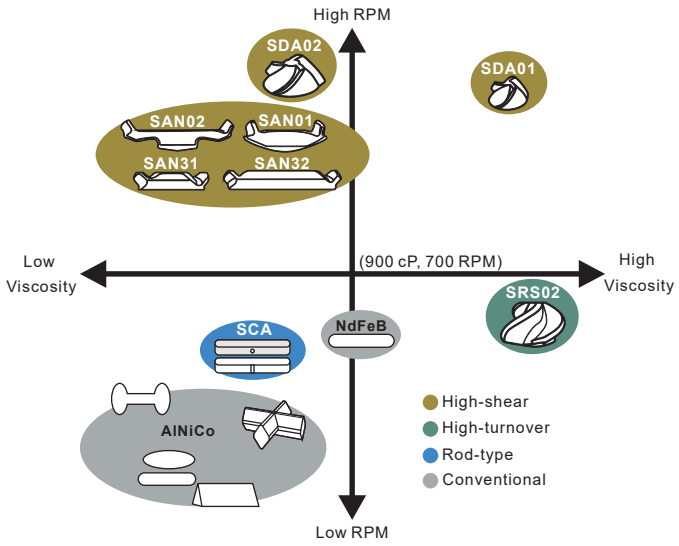
FLXR ENGINEERING

MAGNETIC STIR BAR FOR COMPLEX LIQUIDS

Impeller-like Mixing without Overhead Mixer

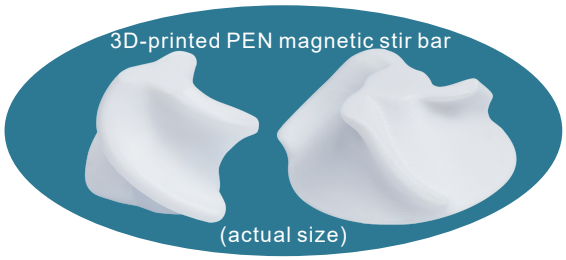
Labware

US patent pending technology



Type of magnetic stir bars categorized by performance toward various speed and viscosities.

Problem		Solution
Irreproducible results	»	Improved stiring effect via CFD
PTFE relies on PFAS technology	»	PEN is PFAS-free and recycled with PET
PTFE not compatible with gamma	»	PEN supports autoclave, gamma and EtO
Stir bar decoupling	»	4x stronger SmCo magnet



High Turnover Design

Reference impeller: Propeller impeller

SRS

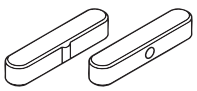
02
Ø 28 mm
H 19 mm

Flow movement	Hybrid axial/radial
Flow direction	Up/Down
Weight	6.20 ± 0.25 g
Viscosity range	1-1500 cP
RPM range	100-1100 RPM
Preferred vessel	

Rod Type

Reference impeller: Flat-blade paddle

SCA



11 (11A)	20 (20A)	
L 11mm	L 20 mm	
W 6 mm	W 6 mm	
H 6 mm	H 6 mm	
30 (30A)	40 (40A)	
L 30 mm	L 40 mm	
W 6 mm	W 6 mm	
H 6 mm	H 6 mm	

Flow movement		Radial
Weight	11 (A)	0.70 ± 0.03 g
	20 (A)	1.05 ± 0.05 g
	30 (A)	2.00 ± 0.10 g
	40 (A)	2.40 ± 0.10 g
Viscosity range		1-200 cP
RPM range		100-1100 RPM
Preferred vessel		

(Customization avaliable)

High Shear Design

Reference impeller: Cowl disk

SAN

01	02	
L 40 mm	L 55 mm	
W 13 mm	W 13 mm	
H 15 mm	H 15 mm	
31	32	
L 39 mm	L 57 mm	
W 13 mm	W 13 mm	
H 9 mm	H 9 mm	

Flow movement		Hybrid axial/radial
Weight	01	8.00 ± 0.25 g
	02	8.10 ± 0.25 g
	31	6.90 ± 0.20 g
	32	12.40 ± 0.40 g
Viscosity range		1-200 cP
RPM range		100-1100 RPM
Preferred vessel		

SDA

01	02
Ø 22 mm	Ø 40 mm
H 12 mm	H 16 mm

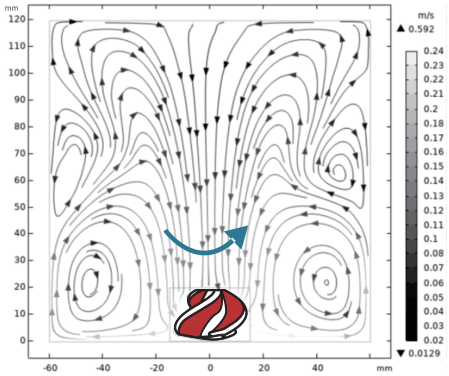
Flow movement		Hybrid axial/radial
Weight	01	4.90 ± 0.15 g
	02	11.70 ± 0.35 g
Viscosity range		1-200 cP
RPM range		100-1100 RPM
Preferred vessel		

» High-turnover design's applications include suspension of:
- Solid catalysts
- Powder in resins, paints, and creams
- Powdered flocculants

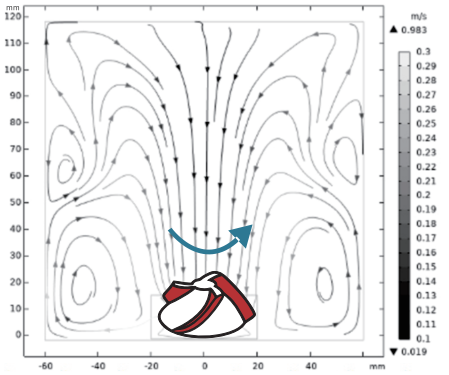
» High-shear design utilized in emulsion and dispersion processes of:
- Emulsion and suspension polymerization
- Cosmetic creams, ceramic slurries, and polishing compounds
- Conductive inks and nanoparticle suspensions

CFD Clip Plane

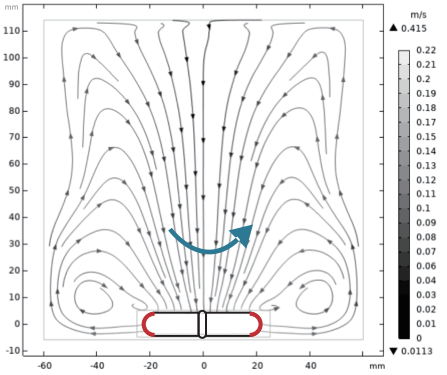
High Turnover Design (SRS)



High Shear Design (SDA & SAN)



Rod Type (SCA)



CFD-optimized HIGH-TURNOVER :

- Higher vorticity and power number
- Fluid adaptive hybrid radial/axial flow
- Bi-directional design for diverse viscosity (1-1,500 cP)

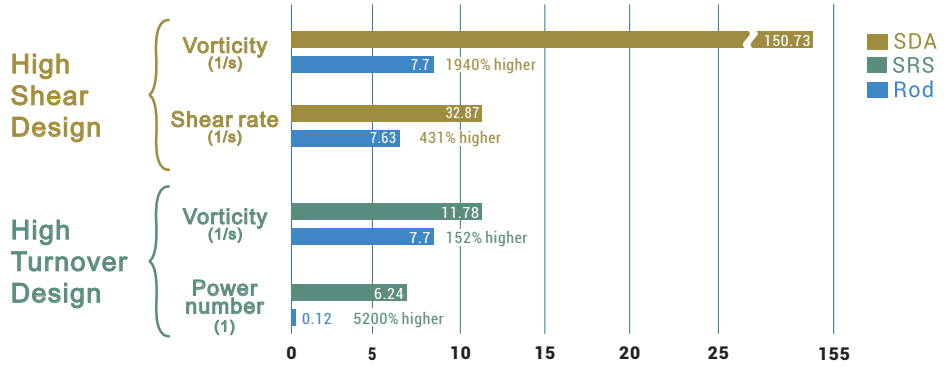
CFD-optimized HIGH-SHEAR:

- Engineered to achieve higher shear rates
- Generates large velocity gradients between fluid layers
- Able to achieve droplet size of 40 to 60 μm

CFD of ROD:

- Radial only flow pattern
- Works well for low-viscosity fluids
- Emulates straight paddle impeller

CFD Analysis Result



Chemical Resistance Chart

	PEN	PVDF	PTFE
Acetic acid (10%)	A	A	A
Acetic acid (40%)	A	A	A
Acetone	B	D	A
Ammonium chloride (25%)	A	A	A
Benzene	B	A	A
Chloroform	C	A	A
Cyclohexane	A	A	A
Cyclohexanol	A	A	A
Calcium chloride (10%)	A	A	A
Chromic acid (10%)	A	A	A
Citric acid	A	A	A
Diethyl ether	A	A	A
Dimethyl sulfoxide (DMSO)	C	C	A
Hydrobromic acid (47%)	A	A	A
Hydrochloric acid (10%)	A	A	A
Hydrochloric acid (37%)	A	A	A
Hydrofluoric acid (5%)	A	A	A
Hydrofluoric acid (50%)	D	B	A
Hydrogen peroxide (30%)	A	A	A
Isopropyl alcohol (IPA)	A	A	A
Methanol	A	A	A
Methyl ethyl ketone (MEK)	A	D	A
Nitric acid (10%)	A	A	A
Nitric acid (20%)	A	A	A
Nitric acid (67%)	D	B	A
Phosporic acid (10%)	A	A	A
Terrahydrofuran (THF)	B	B	A
Toluene	A	A	A
Triethanolamine	C	A	A
Vinyl chloride (monomer)	A	A	A
Xylene	A	A	A

	PEN	PVDF	PTFE
Dimethyl formamide (DMF)	C	D	A
Ethanol	A	A	A
Ethyl acetate	A	D	A
Ethylene diamine	C	B	A
Ethylene glycol	A	A	A
Eormaldehyde (40%)	A	A	A
Formic acid (10%)	A	A	A
Formic acid (30%)	C	B	A
Gasoline	A	A	A
Glycerol	A	A	A
Heptane	A	A	A
Hexane	A	A	A
Hydrobromic acid (10%)	A	A	A
Phosphoric acis (85%)	D	B	A
Potassium hydroxide (10%)	A	A	A
Potassium hydroxide (30%)	B	A	A
Sulfuric acid (10%)	A	A	A
Sulfuric acid (30%)	C	A	A
Sulfuric acid (>80%)	D	A	A
Sodium acetate (40%) sol	A	A	A
Sodium chloride (sat.) (32%)	A	A	A
Sodium bicarbonate (sat.)	A	A	A
Sodium hydroxide (10%) sol.	A	A	A
Sodium hydroxide (30%) sol.	A	C	A
Sodium hypochlorite	A	A	A
Styrene (monomer)	A	A	A

Resistance at 23°C, immersed for 30 days
Ranking definition:
A: weight change < 1%, tensile > 95%
B: weight change between 1~10%, tensile > 75%
C: weight change > 10%, tensile < 75%
D: dissolved or swelled

USP < 88 > Class VI
USP < 87 >
FDA
ISO 10993 - 4
PFAS FREE
STABLE

Carbon footprint estimation in $kgCO_2$ eq/kg:
PTFE : 9.6
316SS : 3.7
PEN : 3.4

Our Passion:
We're a group of scientists and engineers who absolutely love science and 3D-printing.

Our Mission:
We believe that scientific progress and environmental responsibility can (and should) go hand-in-hand.

RESPONSIBLY
MADE IN TAIWAN

FLXR Engineering Co., Ltd.
1 & 2F, No. 11-1, Wuquan 1st Road, Xinzhuang District, New Taipei City 24892, Taiwan
t +886-2-22901122 www https://www.flxr.engineering
f +886-2-22995222 @ hello@flxr.engineering
盈豐材料股份有限公司 24892新北市新莊區五權一路11-1號1、2樓

WWW YOUTUBE