

# KUMHO SAN

(Styrene-acrylonitrile)



## 1. Product Introduction

As copolymers of styrene and acrylonitrile, Kumho SAN resins have excellent chemical resistance, transparency, heat resistance, process ability and mechanical properties.

Kumho SAN resins are suitable for use in electric and electronic equipments, office applications, automobile parts, electric fans, disposable lighters and various containers.

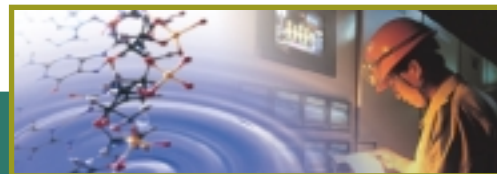
Kumho SAN resins have various grades of high flow, high transparency, high heat resistance, high rigidity and high chemical resistance. Grades are classified in accordance with processing scheme, such as composition and molecular weight of styrene and acrylonitrile.

## 2. Characteristics & Applications

Grade	Characteristics	Applications
SAN 320	High Transparency Super High Flow	Water tank for humidifier, Mixer, Juicer, Stereo dust cover, Compact container cap, Pencile case, Stationary, etc
SAN 323	High Flow High Rigidity	
SAN 325	High Transparency	Electric fan, Stereo dust cover, Pencil case, Office applications like case for lead of sharp-pointed pencil, Cosmetic container cap, etc.
SAN 330	High Transparency High Rigidity	Sunvisor, Blower fan, Food drier, Electric fan, etc.
SAN 335	High Transparency High Rigidity	
SAN 350 SAN 350H	High Strength High Heat Resistance	Cassette tape case, Flowmeter case, Parts for medical supplies, Disposables lighters, Electric & electronic parts, etc.
SAN 360	High Rigidity Chemical Resistance	Automobile battery case, Disposable lighters, etc.
SAN 310	Water Clear	Cosmetic container, Hanger, Pencile case, Cup, etc.

## 3. Handling Precautions

- Keep away from fire : Styrene-acrylonitrile copolymer is flammable.
- Wear protective gear when handling. San produces toxic fumes, such as carbon monoxide, when burned or heated.
- If spilled, replace in its container, and If skin or eye contact occurs, wash off with water.
- In case of fire, wear protective gear including a gas mask, since toxic fumes, such as carbon monoxide, are produced when SAN is burned.



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## 4. Typical Properties for SAN

Test Item / Unit	Test Condition	ASTM	SAN 320	SAN 323	SAN 325	SAN 330	SAN 335	SAN 350	SAN 350H	SAN 360	SAN 310
Tensile Strength [kg/cm <sup>2</sup> (psi)]	23°C	D638	670 (9,510)	690 (9,800)	700 (9,940)	700 (9,940)	720 (10,220)	780 (11,080)	810 (11,500)	800 (11,360)	640 (9,090)
Elongation [%]	5mm/min	D638	3	3	3	4	5	4	4	4	4
Flexural Strength [kg/cm <sup>2</sup> (psi)]	23°C	D790	700 (9,940)	750 (10,650)	840 (11,930)	950 (13,490)	1,050 (14,910)	1,050 (14,910)	1,100 (15,620)	1,200 (17,040)	840 (13,944)
Flexural Modulus [kg/cm <sup>2</sup> (psi)]	23°C	D790	34,600 (491,320)	34,200 (485,640)	34,500 (489,900)	34,500 (489,900)	34,500 (489,900)	35,900 (509,780)	35,200 (499,840)	35,800 (508,360)	34,000 (482,800)
Rockwell Hardness	M scale	D785	84	85	84	85	84	86	86	87	83
Izod Impact Strength [kg · cm/cm (ft.lb/in)]	3.2mm, Notched, 23°C (73°F)	D256	1.5 (0.27)	1.5 (0.27)	1.5 (0.27)	1.5 (0.27)	1.5 (0.27)	1.5 (0.27)	1.5 (0.27)	1.5 (0.27)	1.5 (0.28)
Heat Distortion Temp [°C (°F)]	18.6kgf/cm <sup>2</sup> (264psi) unannealed	D648	90 (194)	91 (196)	92 (198)	92 (198)	92 (198)	93 (199)	94 (201)	94 (201)	88 (190)
Vicat Softening Temp [°C (°F)]	1kg	D1525	107 (225)	107 (225)	107 (225)	108 (226)	107 (225)	109 (228)	109 (228)	110 (230)	103 (217)
Melt Flow Index [g/10min]	200°C, 5.0kg	D1238	10	9	7	3.0	3.0	3.5	2	2.5	6.5
	230°C, 3.8kg	D1238	41	30	21	9	9	11	5	7	20
Mold Shrinkage [%]	-	D955	0.2~0.6	0.2~0.6	0.2~0.6	0.2~0.6	0.2~0.6	0.2~0.6	0.2~0.6	0.2~0.6	0.2~0.6
Specific Gravity	-	D792	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Water Absorbion [%]	24hr, Immersion in water	D570	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Dielectric Strength [V/mil]	-	D149	550	550	550	550	550	550	550	550	550
Volume Resistivity [ $\Omega$ ·cm]	-	D257	10 <sup>16</sup>	10 <sup>16</sup>	10 <sup>16</sup>	10 <sup>16</sup>	10 <sup>16</sup>	10 <sup>16</sup>	10 <sup>16</sup>	10 <sup>16</sup>	10 <sup>16</sup>
Flammability [Rating]	1/16" (1.6mm)	UL94*	HB	HB	HB	HB	HB	HB	HB	HB	HB
	1/12" (2.2mm)		HB	HB	HB	HB	HB	HB	HB	HB	HB
	1/8" (3.2mm)		HB	HB	HB	HB	HB	HB	HB	HB	HB
Food Sanitation	FDA**		Suitable	Suitable	Suitable	Suitable	Suitable	Suitable	Suitable	Suitable	Suitable

\* UL File No. E65424 (CSA File No. LS66457)


\*\* FDA and Japan Public Welfare Dept.


NOTE 1) These are typical property values, not specifications

NOTE 2) In case of colored products, the values could vary slightly by color.

NOTE 3) Values are measured at 23°C and in RH of 50% on injection molded specimens


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