Technical information No.010E

Flame retardancy of Sodium Antimonate "SA-A"

Sodium antimonate "SA-A" as high heat-resistance flame retardant has been employed in engineering plastics such as polyamide or polyester to improve their higher performance.

SA-A, pentavalent antimonate, provides engineering plastics with flame retardance without adversely affecting the material features of the original plastics and SA-A keeps original heat and hydrolysis resistance of the plastics.

Although high water content (adhesive and crystal water) and coarse particle size which are existing features of sodium antimonite cause hydrolysis and bad dispersibility, SA-A is being produced as non-water and fine type under our tight quality control.

The refractive index of this grade is close to those of plastics, thus SA-A keeps original transparency and clear coloring of the plastics better than antimony trioxide.

Standard Assay

Table 1 SA-A Typical data

English name	Sodium Antimonate	
Chemical formula	NaSbO ₃	
CASNo.	15432-85-6	
Appearance	White powder	
Bulk specific	0.0	
gravity(g/cm³)	0.6	
NaSbO ₃ (%)	98.4	
As (%)	0.03	
Pb (%)	0.01	

^{*}Typical data is not guaranteed data but observed data

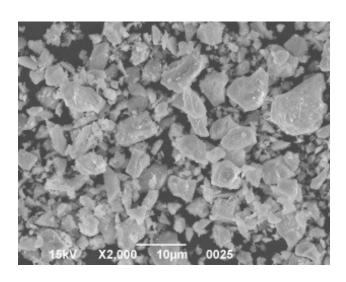


Fig.1 SA-A SEM Photograph

Refractive Index

The refractive index of this grade is close to those of plastics, thus SA-A keeps original transparency and clear coloring of the plastics better than antimony trioxide.

Table.2 Refractive index

Chemical name	Refractive index	
Sodium Antimonate SA-A	1.73	
Antimony Trioxide PATOX-M (Standard Grade)	2.08	

Thermal Stability

Sodium antimonate does not have melting point, and it is stable until decomposition at 1400°C. Therefore SA-A is being applied to engineering plastics which require high temperature process.

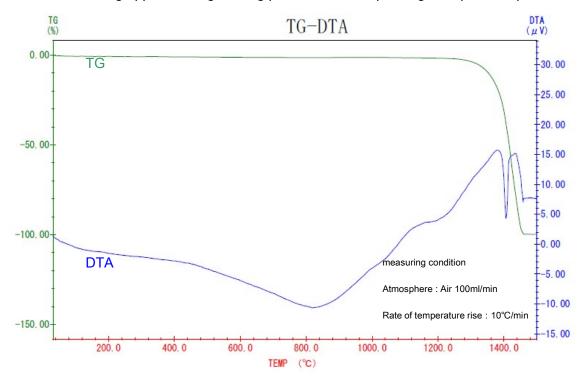


Fig. 2 Thermal behavior of Sodium Antimonate SA-A

Particle Size Distribution

SA-A is fine-grained for cutting coarse particle and shows good dispersibility, so is not ruined plastics strength. We also have other grade "SA-AF" as finer grade.

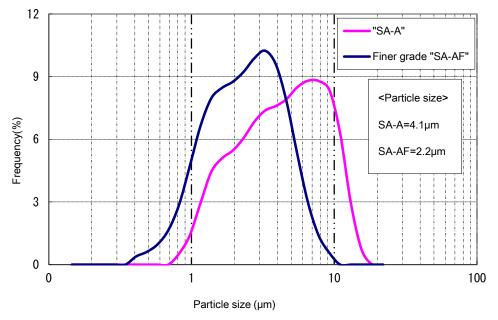


Fig. 3 Particle size distribution data

Flame Retardant Property

Sodium Antimonate which is pentavalent antimonite, shows effective flame retardance by combining with halogen flame retardant. (Antimony 1 : Halogen 5 by mole ratio)

Table.3 Examples of Sodium Antimonate mixture

Type of Poly (Phr)	mers	Flame retardant Typical Date (Phr)			LOI (%)	UL-94 (0.8mm)	
	100		15		5.0	30.5	V-0
GF-PET	100	Br-PS	20	SA-A	6.7	34.6	V-0
(GF 30%)	100	(Br 68w%)	25	SA-A	8.3	38.6	V-0
	100		30		10.0	40.8	V-0

^{*}LOI: Compliance "JIS K 7201".

^{*}Typical data is not guaranteed data but observed data

^{*}The statement and methods presented herein about the products are based upon the best available data and practices currently known to us. However they are neither presentations nor warranties of performance, results or comprehensiveness of such data, and further. They do not imply any recommendation to infringe any patent or offer of a license under any license.

Moisture Absorbency

Generally antimonate has moisture absorbency and sodium antimonate "SA-A" also has same characteristic (Fig. 4). To prevent the moisture, SA-A is wrapped with the high dampproof bag (Fig. 5). After opening the bag, please avoid the moisture to keep the quality of product.

[SA-A moisture absorption test]

SA-A (powder, completely dehydrated) →

Exposed in the high humidity atmosphere (45 and 75% humidity) unopened packages of single lot.

→ moisture percentage measurement

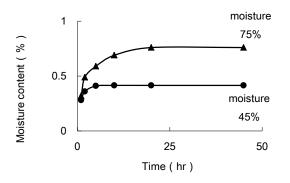


Fig.4 SA-A moisture absorption test

[SA-A (packaged) moisture absorption test]

Every sample for measurement (Karl Fischer method) is picked from unopened packages of single lot.

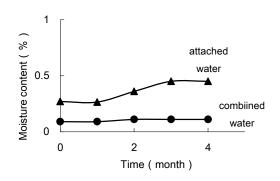


Fig.5 SA-A (packaged) moisture absorption test

Plastics Strength Feature

Antimony trioxide widely used as flame retardant and also used as catalyst of the PET resin. In some case, engineering plastics depolymerize due to catalyst action of antimony trioxide. But SA-A which is pentavalent antimonate provides engineering plastics flame retardance without deterioration of plastic features such as heat and hydrolysis resistance. As shown in Tab. 6, the resin which is compounded with sodium antimonite SA-A has higher strength than that of with antimony trioxide. Also the resin shows higher physical strength than that of with antimony trioxide under hot-humid atmosphere.



[Comparative testing on resin strength and heat and hydrolysis resistance]

PET resin kneading → Test pieces → Exposure test in hot-humid atmosphere → Resin strength measurements

Table.4 Resin composition

Table.5 Atmosphere test

Sample name	Resin Flame retardant		etardant
SA-A	PET(GF30%)	Br-PS	SA-A
compounded resin	100Phr	25Phr	8.3Phr
Sb2O3	PET(GF30%)	Br-PS	Sb2O3
compounded resin	100Phr	25Phr	10.4Phr

Conditions		
Temp	80°C	
Moisture	100%RH	

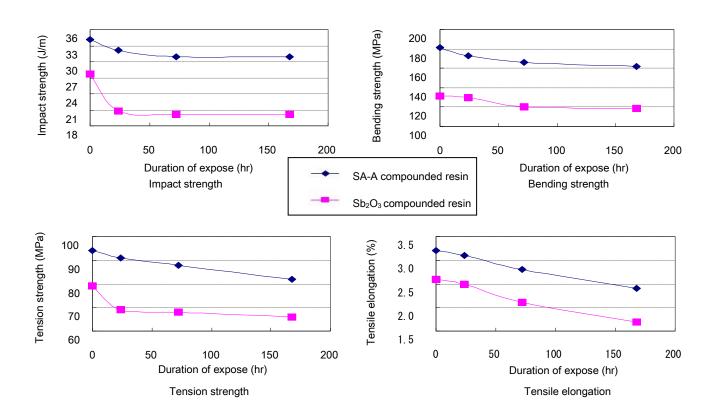


Fig.6 Strength tests of resins

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^{*}Impact strength: Compliance "ASTMD256", Tension strength & Tensile elongation: Compliance "JIS K 7113", ending elongation: Compliance "JIS K 7171"