

PMMA Retardant Synergist AR-S210

AR-S210, developed by Inovia, is an advanced synergist for the flame retardant AR-S11 in transparent PMMA (polymethyl methacrylate). Combined with the AR-S210, the use of AR-S11 can be greatly reduced. PMMA with 2% AR-S11 plus 12% AR-S210 can reach UL94 V0@1.6 mm without affecting the transparency and yellowness index. Additionally, The modified PMMA exhibits significant weatherability in xenon-arc aging tests.

1. Materials:

PMMA: Arkema V040

Flame retardant: Inovia AR-S11, AR-S210

2. Processing:

Drying: 85°C for 4h

Extrusion Temperature: 200~220°C. Twin screw extrusion machine with side liquid feeding device.

Injection Temperature: 210~225°C, mold temperature: 80°C

3. Physical property data of flame-retardant PMMA

Table 1. Flame Retardant Performance

AR-S11	AR-S210	UL 94 Rating
2%	12%	1.6mm V0

Table 2. Optical Properties

	Method	Thickness	PMMA	Flame retardant PMMA
Transmittance (%)	ASTM D 1003	1.6mm	92.4	91.8
Haze (%)	ASTM D 1003	1.6mm	0.50	1.52
YI	ASTM E313	1.6mm	1.58	1.41

Table 3. Mechanical Properties

	Method	Unit	PMMA	Flame retardant PMMA
Tensile strength at yield	ISO 527	MPa	82	65
Elongation at break	ISO 527	%	5.0	1.7
Flexural stress	ISO 178	MPa	90	114
Flexural modulus	ISO 178	MPa	2339	3946
Charpy un-notched impact strength	ISO 179	kJ/m ²	18.3	13.7
Charpy notched impact strength	ISO 179	kJ/m ²	2.4	1.5

Table 4. Thermal Properties

	Method	Unit	PMMA	Flame retardant PMMA
VST (10N)	ISO 306	°C	112	92
HDT (1.8MPa)	ISO 75	°C	81	61
Tg	/	°C	114	89

Table 5. Processing Flowability

	Method	Unit	PMMA	Flame retardant PMMA
Melt index	ISO 1133	g/10min	4.5 (230°C / 3.8kg)	7.1 (210°C / 3.8kg)