



## Acrylic Processing Aid

### PVC Foam Regulator : AIP 5300

Revision date: 1st July, 2017

### Part 1: Introduction

AIP 5300 is a kind of acrylic processing aid. It can promote fusion and melt strength of PVC compound. It can be applied to PVC foaming process, such as free foam, Celuka foam and co-extrusion foam, etc. This grade is more favorable for the general application like PVC foam boards, pipes or profiles.

### Part 2: Advantages

- Promote fusion of PVC compound
- stabilizes the micro-cells generated by blowing agent to achieve the low density and high strength of the foam.
- Outstanding melt strength enhancement
- Excellent surface gloss
- Uniform cell structure

### Part 3: Application

AIP 5300 can be widely used in the foaming window profile, pipe, board etc.

### Part 4: Technical specification

Specification	Unit	Test standard	AIP 5300
Appearance	--	--	White powder
Bulk density	g/cm <sup>3</sup>	GB/T 1636-2008	0.45±0.10
Sieve residue (30 mesh)	%	GB/T 2916	≤2.0
Volatile content	%	ASTM D5668	≤1.50

Intrinsic viscosity ( $\eta$ )	--	GB/T 16321.1-2008	11.00-13.00
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## Part 5: Performance Comparison

### 5.1 Basic formulation for following tests

Mixing equipment type: SHR-5A from Zhang Jiagang Beier Machinery Co., Ltd

Mixing condition: 120°C

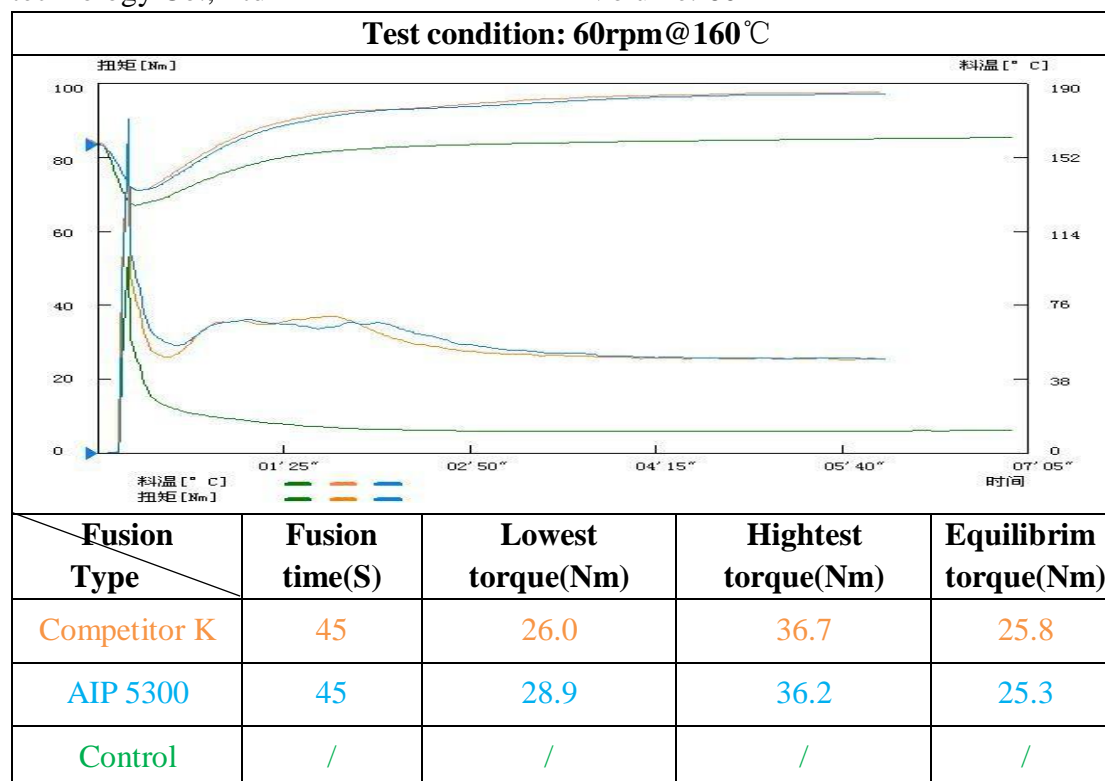
Volume: 5L

Ingredients	0# Control	1# Competitor K	2# AIP5300
PVC(K-65)	100.00	100.00	100.00
Ca-Zn stabilizer	4.50	4.50	4.50
CaCO <sub>3</sub>	30.00	30.00	30.00
TiO <sub>2</sub> (Rutile)	5.00	5.00	5.00
PE wax	0.20	0.20	0.20
OPE wax	0.30	0.30	0.30
Foaming agent AC PF-K	0.60	0.60	0.60
Foaming agent WF-108	1.20	1.20	1.20
G-60	0.80	0.80	0.80
AIP2300	2.00	2.00	2.00
Competitor K	--	10.00	--
AIP5300	--	--	10.00

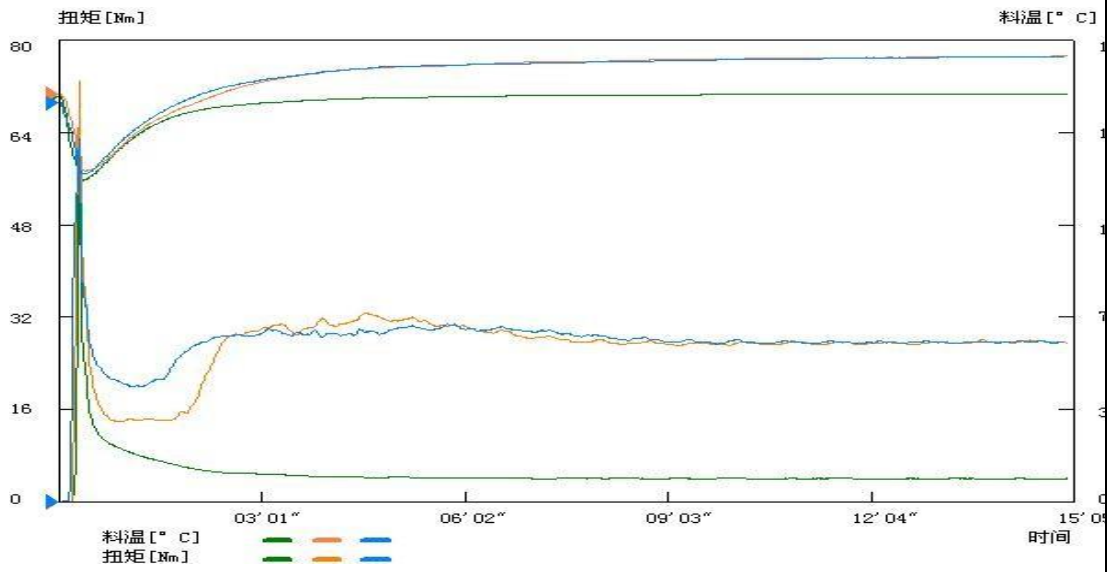
### 5.2 Fusion property comparison

Test equipment type: RM-200C torque rheometer from Harbin Hapro Electrical technology Co., Ltd

Volume: 60ml

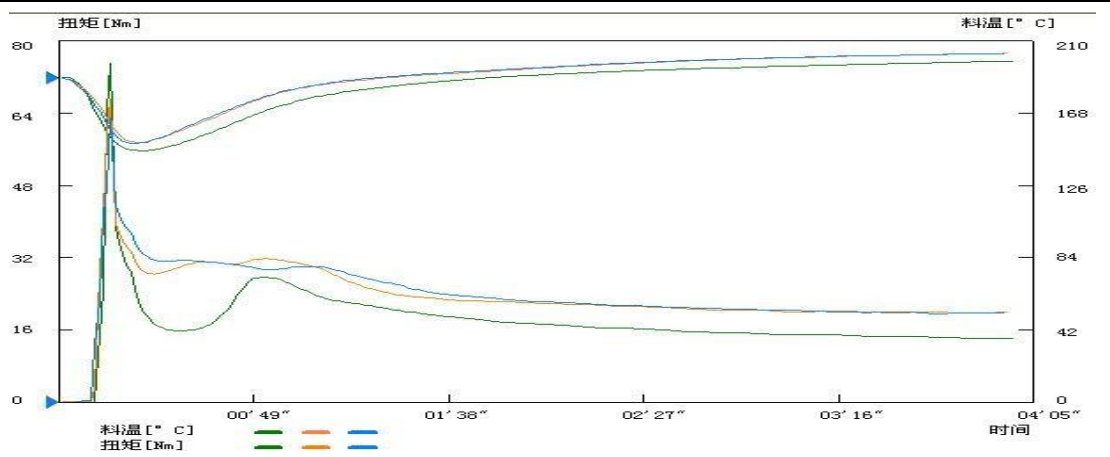


**Test condition: 30rpm@160°C**

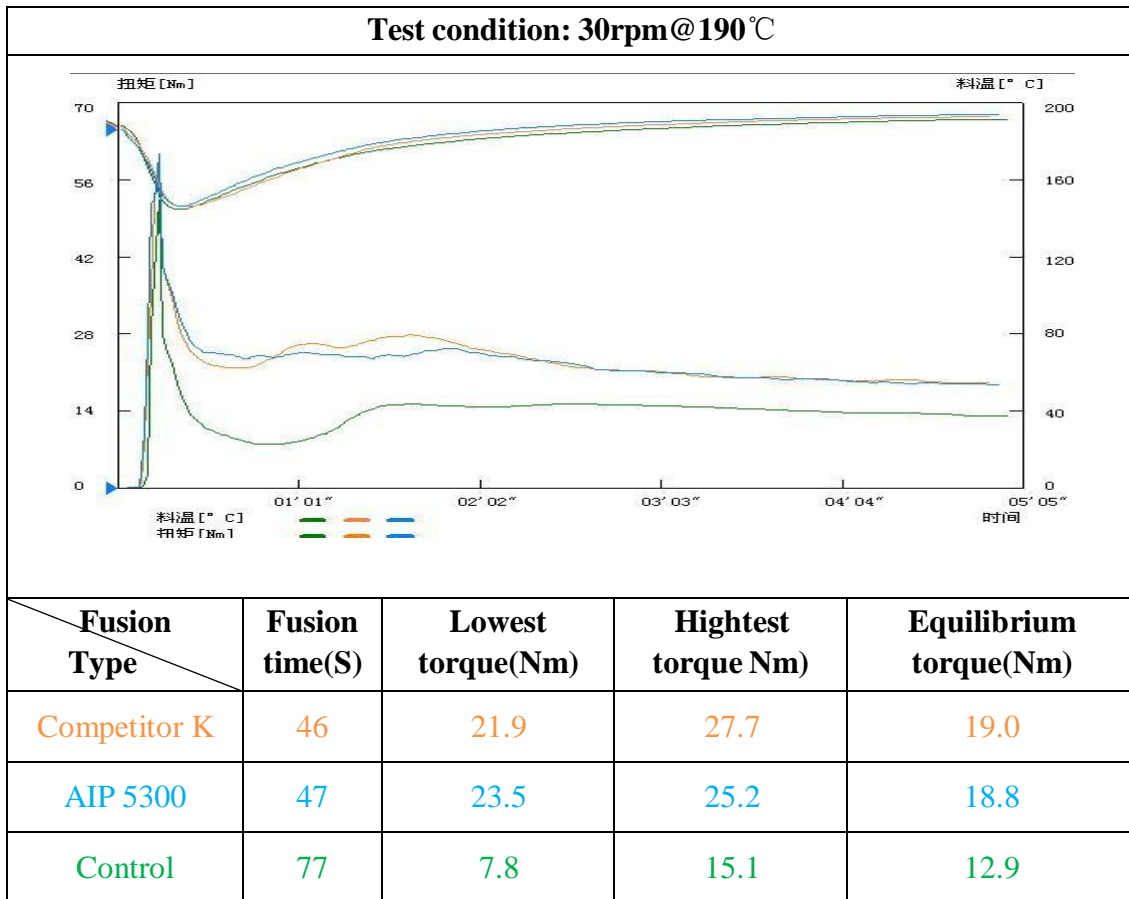


Fusion Type	Fusion time(S)	Lowest torque(Nm)	Highest torque Nm)	Equilibrium torque(Nm)
Competitor K	140	14.4	32.5	27.7
AIP 5300	133	20.0	30.8	27.7
Control	/	/	/	/

**Test condition: 60rpm@190°C**



Fusion Type	Fusion time(S)	Lowest torque(Nm)	Highest torque(Nm)	Equilibrium torque(Nm)
Competitor K	24	28.3	31.9	19.8
AIP 5300	24	29.6	31.7	19.8
Control	39	16.2	27.7	14.0



### 5.2 Metal release property comparison

Dynamic thermal stability and sticking time on double-roller mill at 196°C

Time	△E with different time			Sticking time(s)
	4'	6'	8'	
0# Control	0.43±0.03	0.69±0.03	--	408±5
1#Competitor K	0.38±0.02	0.59±0.02	0.85±0.02	899±8
2# AIP 5300	0.32±0.01	0.52±0.01	0.70±0.01	992±10

### 5.3 Melt flowability of PVC compound

Test equipment: Melt flow rate meter Test standard: ASTM D1238

Melt Flow rate (g/10min)	
Test condition	220°C 3.8kg
0# Control	9.26±0.2
1# Competitor K	5.85±0.1
2# AIP 5300	7.14±0.2

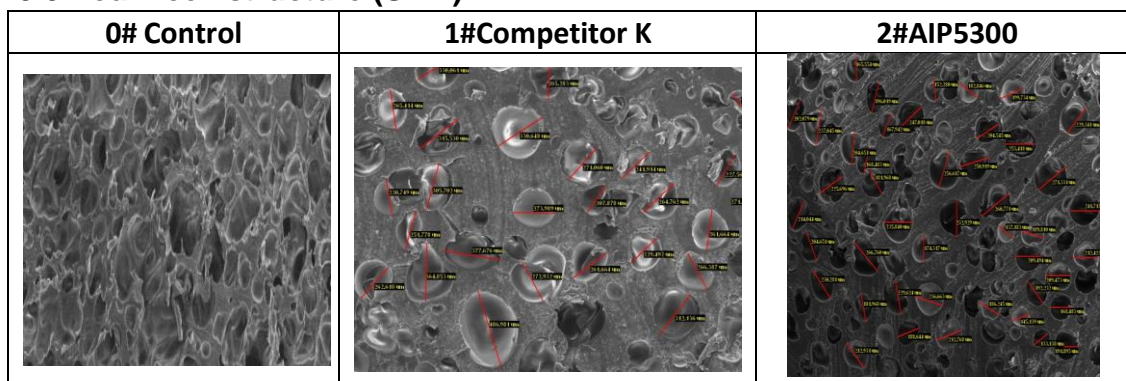
#### 5.4 Expansion properties comparison

Type	Foamed die swell ratio (%)	Density of extrusion bar with blowing agent (g/cm <sup>3</sup> )
0# Control	107.2±2.8	0.975±0.058
1#Competitor K	129.5±1.1	0.891±0.012
2# AIP 5300	138.6±1.5	0.855±0.009

Remarks:

$$\text{Foamed die swell ratio} = \frac{\text{Diameter of extrusion bar}}{\text{Die diameter of extrusion}} \times 100\%$$

#### 5.5 Foam cell structure (SEM)



#### 5.6 Surface quality of extruded foaming sheet

Type: Free foaming advertising board      Thickness:9mm

Type	Gloss (45°C)	Hardness	Density (g/cm <sup>3</sup> )
Test standard	ASTM D2457	GB/T 2411	GB/T 6343
1#Competitor K	7.5±0.2	30.6±0.4	0.50±0.02
2# AIP 5300	9.3±0.2	34.1±0.3	0.48±0.02

### Part 6: Packing, transportation and storage

20kg/25 kg bag, 250kg/500 kg super sack

This material is non-dangerous goods for land, air and marine transportation.

Material should be kept from flames, hot pipes, heaters or other sources of heat.

Adequate precautions should be taken to keep all dust levels below values that are hazardous to health and safety. The recommended maximum storage temperature for this material is 45°C.

## **Part 7: Safe Handling**

Please consult the MSDS before handling for additional information concerning personal protective equipment, Safety, Health and Environmental information, and always exercise the utmost care in handling.