

METABLEN

P-570A & P-501A

Processing aid for PVC resin

Mitsubishi Chemical Corporation

Performance Additives Department

Acrylic Polymers, Hiroshima R&D Center, Development Division

Technical information

- **METABLEN P-570A:**

Metablen P-570A has high acceleration ability of fusion and its ability stands out at low temperature condition.

Especially, it is valuable for using low thermal stability compounds such as Ca/Zn stabilizer or CPVC.

- **METABLEN P-501A**

METABLEN P-501A can improve the “gloss” of molded products without increasing processing torque.

METABLEN P-501A is suitable for window profile and pipe application.

Characteristic of METABLEN P-570A&P-501A

Weight-average molecular weight (*10⁴)

50

100

150

250

300

450

500

Reduced viscosity: $\eta_{sp}/c \times 10$ (MCC method)

1.0

4.0

7.0

9.0

13.0

Solution viscosity: η

1.0

3.0

4.5

6.5

8.0

10.0

P-570A

P-501A

P-551J

P-533J

P-531A

Rigid Calendering
(Prevent Flow mark)

Flexible Calendering (High filler ratio)

Extrusion molding (Improve surface appearance)

Foam application (Uniformed cell size)

Injection molding (Prevent jetting)

Secondary molding
(Vacuum moldability)

Blow molding (Prevent drawdown)

Typical powder property

			P-570A	P-501A
Powder property	Viscosity (MCC method)	-	1.0	2.9
	Moisture	%	<1.5	<1.5
	Bulk density	g/cm ³	0.35	0.36
	Average particle size	μm	143	123

Acceleration of fusion (1)

	Dosage Level (phr)	Fusion time (sec.)	Max torque (kg-cm)	Equilibrium torque (kg-cm)
BLANK	—	180	332	221
METABLEN P-570A	1	50	358	218
	3	30	374	210
	5	10	397	205
	7	5	397	205
METABLEN P-501A	3	65	398	220
METABLENEN P-551J	3	40	392	231
DOP	1	195	300	205
	3	80	309	198
	5	60	302	185
	7	50	286	169

【Formulation】

PVC (Pn=800)	100
Tin stabilizer	1.5
Internal lubricant	0.5
METABLEN C-201	5.0
METABLEN L-1000	0.5
Processing aid	Vari.

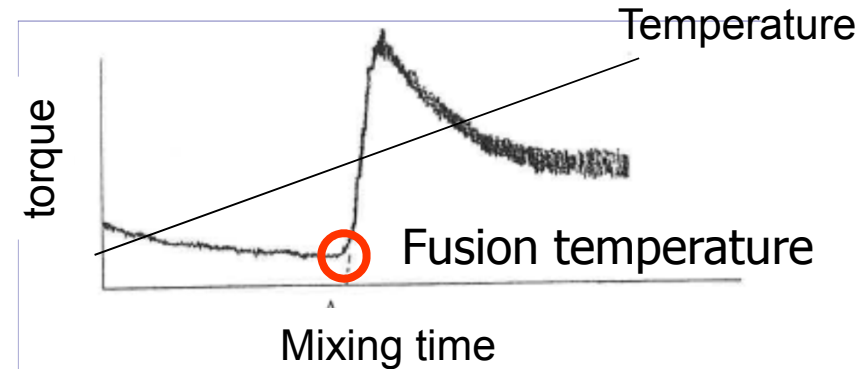
【Fusion behavior】

Plast-mill
 Temperature; 155deg.C
 Screw rotation speed; 30rpm
 Charge amount; 55g
 Pre-heating;5min

METABLEN P-570A promotes fusion time without increase of equilibrium torque.

Acceleration of fusion (2)

Processing aid	Fusion temperature [°C]
BLANK	167
METABLENP-570A	143
METABLENP-501A	160
METABLENP-550A	157
METABLENP-551J	150
METABLENP-533J	157
METABLENP-531A	160
DOP	165



【Formulation】

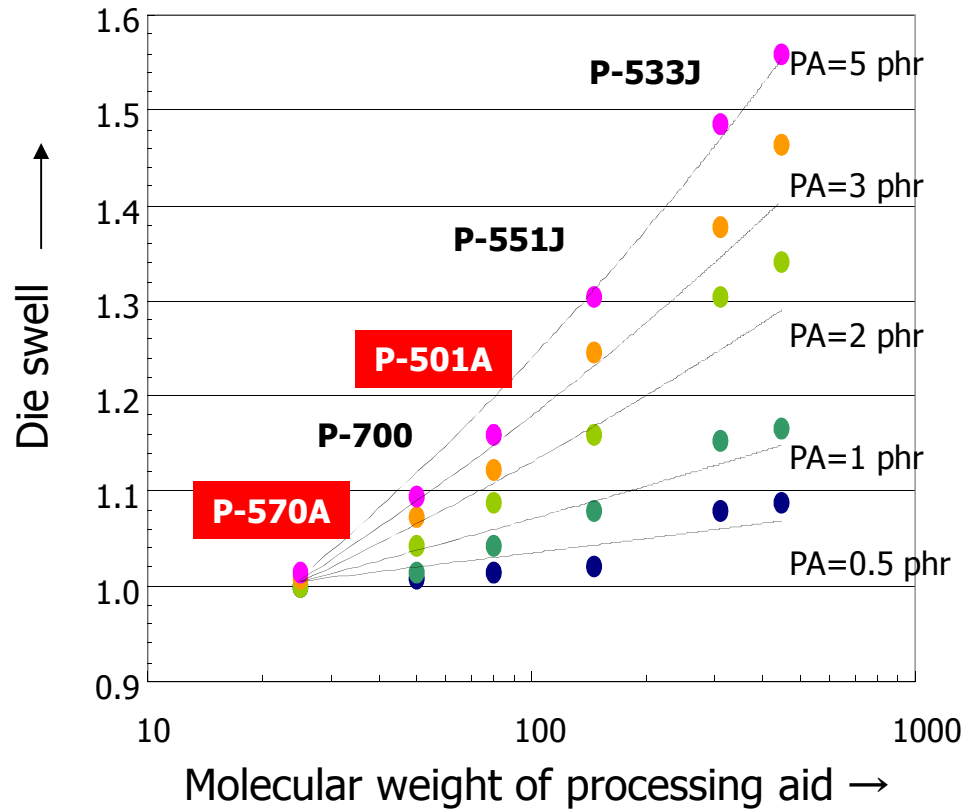
PVC (Pn=800)	100
Tin stabilizer	1.5
Internal lubricant	1.0
External lubricant	0.5
Processing aid	2.0

【Fusion behavior】

Plast-mill
 Heat up; 3°C/min.
 Screw rotation speed; 30rpm
 Charge amount; 55g
 Pre-heating; 5min

METABLEN P-570A has high acceleration ability of fusion and its ability stands out at low temperature condition.

Relationship between Mw of processing add and Die swell



【Formulation】

PVC (Pn=800)	100
Tin stabilizer	2.0
Internal lubricant	0.6
METABLEN C-201	5.0
METABLEN L-1000	0.4
Processing add	0~5

【Molding condition】

Φ 30mm single extruder
 L/D=20、CR=3.0、30rpm
 C1/C2/D=160/180/200°C
 Die: φ 5mm

METABLEN P-570A and P-501A have little effect on die swell.

Calendering

Processing aid	Bank stability	Flow mark	Metal releasability	Sticking Time (min)
BLANK	○	○	○	15
P-570A	○~◎	○	○~◎	16
P-551J	◎	△	△	14
P-533J	◎	×	△	13
DOP	○	○	△	12

【Formulation】

PVC (Pn=800)	100
Tin stabilizer	1.5
Internal lubricant	0.5
METABLEN C-201	5.0
METABLEN L-1000	0.5
Processing aid	3.0.

【Test method】

Sticking time;
Sticking time is counted from loading the compound on roll mill to the time the resin becomes irremovable on the roll.

8inch roll :200deg.c
Rotation : front/rear=17/14rpm

METABLEN P-570A has better metal releasability and flow marks during calendering.

Others

	Dosage level (phr)	Izod Impact strength (kJ/m ²)	Softing Temperature (°C)	Total Transmission (%)	Haze (%)	Gloss (60°)
BLANK	0	110	69	84	9.5	98
P-570A	1	103	69	85	8.2	—
	3	93	69	86	7.5	102
	5	87	68	86	7.3	—
P-501A	3	—	—	—	—	104
P-551J	3	91	69	86	7.9	102
DOP	1	83	67	84	9.3	—
	3	64	65	84	10.0	—
	5	47	61	83	10.6	—

【Formulation】

PVC (Pn=800)	100
Tin stabilizer	1.5
Internal lubricant	0.5
METABLEN C-201	5.0
METABLEN L-1000	0.5
Processing aid	3.0

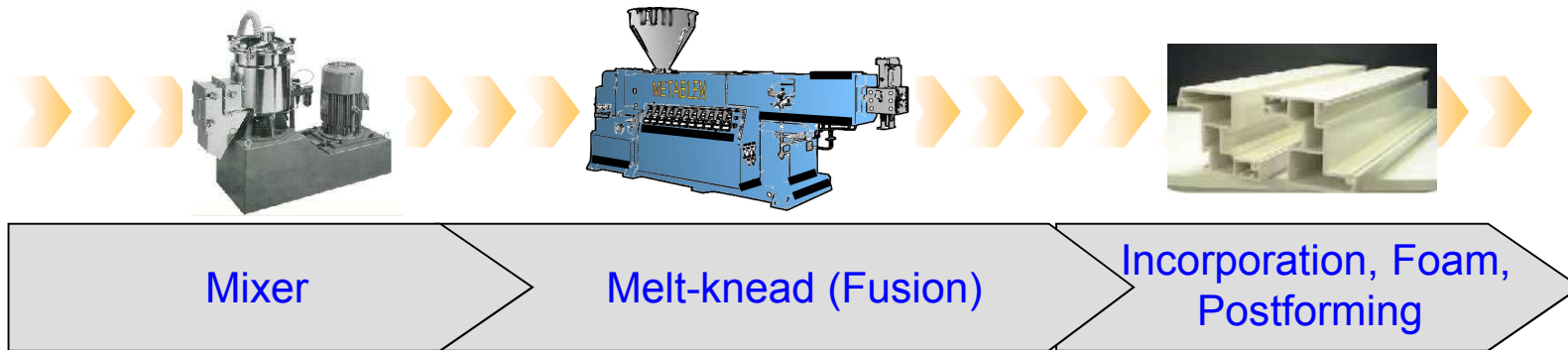
【 Test method 】

8inch roll :170deg.c ×5min
 Press :180deg.c×10min
 Test Plate:3mmt

METABLEN P-570A can retain the original properties compared to DOP.
 METABLEN P-501A has better gloss compare to other processing aids.

Choice of processing aid

★ Each processing aid has its own timing to work effectively ★



Avoid clumping
(Thermal stability,
plasticizer absorption)

Acceleration
of fusion

Lubricity
(Torque, exotherm)

Melt tension

Lubricity
(Die deposit,
productivity)

P-501A	○	↗	—	↗↗	—
P-551J	—	↗↗↗	—	↗↗	—
P-550A	○	↗↗↗	—	↗↗	—
P-700	○	↗↗	↗	↗	↗
P-570A	○	↗↗↗↗	↗	↗	↗
P-710	○	—	↗↗	—	↗↗
L-1000	○	↘	↗↗	—	↗↗
P-531A	—	↗↗	—	↗↗↗	—
P-533J	—	↗↗	—	↗↗↗	—

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