Rubber Engineering Testing Report

Report no. : TR-15-02-007

Purpose ☐ Quality ☐ Cost ☑ Productivity ☑ Process ☑ PCR ☐ New Compound

CONFIDENTIAL

Project Title : Add auto air blow process at 45L4 mixing line

Leader Name : Mr.Bundhit Chaihirunkarn

Project Duration : Within March 2015

Project Target : Can use auto air blow process instead of manual process (First priority is "Blue kanban" compounds)

Background : On step of cleaning (rake out) on mixing process used manual sweep by broom that wasted time for waiting operator to start cleaning .
Moreover this step provided feed door open to clean that remained carbon or chemicals blow out of a door.

Action : To add auto air blow process and adjust optimize mixing condition for make higher cleaning efficiency.

Result :

Compound no.	Properties and weight	Unit	Specification	Manual process In January 2015			Air Blow process
				Min.	Max.	Avg.	-
E648	1.Primary Properties						
	Hardness (Manual)	-	56 - 64	60	62	61	61
	100% Modulus	MPa	-	1.90	2.30	2.10	2.00
	Tensile strength	MPa	15.0 - 23.0	16.7	19.7	18.4	18.5
	Elongation at break	%	450 - 590	500	579	543	535
	Specific Gravity	-	1.077 - 1.107	1.090	1.095	1.093	1.092
	Dispersion	-	Min. C	C	A	B	B
	2.Weight after compounding	kg	44.78 - 45.69	45.17	45.68	45.39	45.40
E691	1.Primary Properties						
	Hardness	-	56 - 64	59	61	60	60
	100% Modulus	MPa	1.10 - 3.50	1.90	2.40	2.10	2.10
	Tensile strength	MPa	10.6 - 20.6	11.5	15.8	14.0	14.1
	Elongation at break	%	250 - 430	312	384	357	354
	Specific Gravity	-	0.980 - 1.010	0.991	0.996	0.993	0.996
	Dispersion	-	Min. C	B	A	A	A
	2.Weight after compounding	kg	41.76 - 42.61	41.85	42.56	42.27	42.24
64W6C	1.Primary Properties						
	Hardness (Manual)	-	64 - 74	69	71	70	70
	100% Modulus	MPa	2.50 - 5.10	3.10	3.80	3.40	3.50
	Tensile strength	MPa	13.1 - 21.7	15.2	17.5	16.4	16.7
	Elongation at break	%	248 - 462	323	386	359	348
	Specific Gravity	-	1.116 - 1.146	1.129	1.133	1.131	1.132
	Dispersion	-	Min. C	C	B	B	C
	2.Weight after compounding	kg	43.88 - 44.78	44.23	44.72	44.49	44.63
T839	1.Primary Properties						
	Hardness	-	74 - 82	78	80	80	79
	100% Modulus	MPa	-	7.40	10.1	9.10	9.30
	Tensile strength	MPa	8.30 - 12.3	9.00	10.8	9.70	9.70
	Elongation at break	%	100 - 150	100	144	118	119
	Specific Gravity	-	1.345 - 1.375	1.358	1.366	1.362	3.000
	Dispersion	-	Min. C	A	A	A	A
	2.Weight after compounding	kg	48.87 - 49.87	49.00	49.66	49.50	49.70
T629	1.Primary Properties						
	Hardness	-	55 - 65	60	63	62	62
	100% Modulus	MPa	-	3.60	4.40	4.00	4.00
	Tensile strength	MPa	8.8 - 12.8	9.9	11.2	10.7	10.8
	Elongation at break	%	170 - 330	224	254	239	247
	Specific Gravity	-	1.290 - 1.320	1.313	1.320	1.317	1.317
	Dispersion	-	Min. C	B	A	A	A
	2.Weight after compounding	kg	45.41 - 46.34	45.90	46.21	46.06	46.21
34A7C	1.Primary Properties						
	Hardness (Manual)	-	69 - 79	76	78	77	77
	100% Modulus	MPa	-	4.00	4.80	4.50	4.60
	Tensile strength	MPa	14.6 - 24.4	17.8	20.5	19.5	19.5
	Elongation at break	%	203 - 377	283	324	308	315
	Specific Gravity	-	1.201 - 1.231	1.210	1.217	1.214	1.216
	Dispersion	-	Min. C	C	C	C	C
	2.Weight after compounding	kg	46.11 - 47.06	46.34	47.05	46.75	46.79

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Discussion :

1. Auto air blow process makes a good cleaning efficiency that indicated on pictures of chamber and pressure lid (blowing time 15 sec).
2. Compound that composed of high content of plasticizer can't be used auto air blow process for cleaning (cleaned by operator).
3. If the next step of air blow doesn't have raw material feeding, program will automatically operate by itself. This is advantage for improve productivity. But for this test, the first target is change manual cleaning by operator to auto air blow and the next step, engineer is going to modify the mixing condition for support automatic operation system of auto air blow program. (E648 already adjust cond.)
4. The opearators don't need to waiting for cleaning (rake out) that can decrease time for cleaning and working load of them.
5. Rubber properties and weight of rubber are in the inspection spec (weight loss is same level with manual cleaning).

Conclusion :

1.Cleaning efficiency of auto air blow process is better than manual cleaning (rake out) by operator.
2.Compounds at line 45L4 can use auto air blow process for cleaning instead of manual cleaning (rake out).

☑ Project Acheivement
☐ Project Non-Acheivement

Issue date	Issue	Check	Approve
18-Feb-15	Bundhit C	H. Patchararat	H. Patchararat