



NEW PRODUCT

INNOVATIVE POLYMERS FOR THE SPORTING GOODS INDUSTRY

- **INNOVATIVE Performance Rubber Compounds**
- **Performance Cushioning Foams**
- **Creative and Unique Color & Optics**
- **Global Technical Support, including all Major Asian Production Countries**

Proud of the high quality of our products

MYUNG KWANG
MYUNG KWANG CHEMICAL IND.CO.,LTD



MYUNG KWANG CHEMICAL INDUSTRY COMPANY LIMITED



Clear Rubber

Transparent Outsole



Strong Sole Units



MYUNG KWANG CHEMICAL IND.CO.,LTD.
ISO 9001 CERTIFICATE NO. KQS-5033

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STRONG

Since 1981

- Advanced Technology
- Accumulated Know-how
- Excellent Quality
- Competitive Price
- Stable & On-Time Delivery

Special Rubber
Clear Rubber
Special Sponge
Water-based Adhesive
Solvent-based Adhesive
Press Sensitive Adhesive (PSA)
Gel Pad
Compounding Chemical
INK

MKC

Myung Kwang Chemical Ind. Co., Ltd

ISO 9001



HIGH QUALITY PRODUCTS WITH GOOD IDEAS

MKC HIGH QUALITY PRODUCTS



Compounding Chemicals



Solvent - based Adhesives



Press Sensitive Adhesives



Enamel & Ink



Water based Adhesives, The Adhesives for Construction



Clear Rubbers

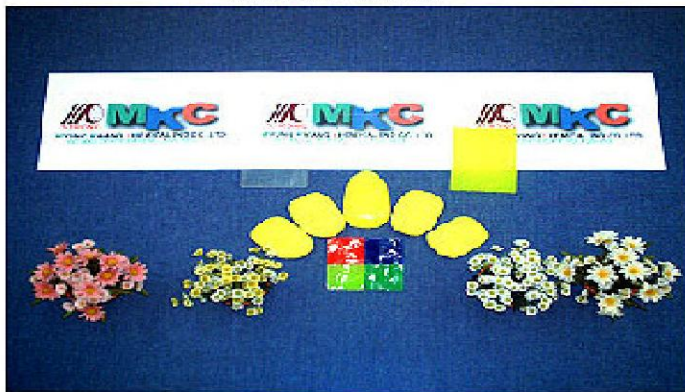
MK High Quality Main Products&Know-how



Special Rubber



Special Sponge



Gel Pads



Contents

STRONG

Since 1981

- Advanced Technology
- Accumulated Know-how
- Excellent Quality
- Competitive Price
- Stable & On-Time Delivery

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 Myung Kwang Chemical Ind. Co., Ltd



Introduction



In the rapidly changing Korea shoe industry and in spite of the increasing cost of labor, raw materials, equipment, MYUNG KWANG CHEMICAL CO.,LTD. continues to grow.

MYUNG KWANG was established in 1981 and we have been producing rubber, compounding chemicals, adhesives, screen ink etc. Most of them were exported overseas. Positive and creative thinking of

MYUNG KWANG has resulted in progress of research, improvement of

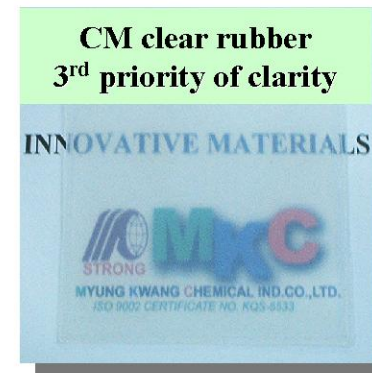
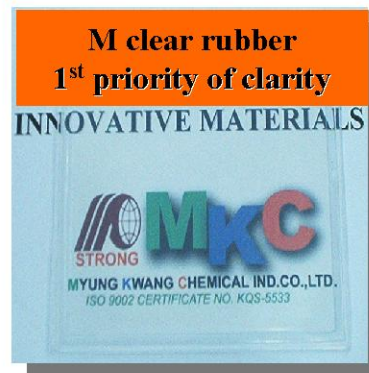
products and foundation of overseas offices in China, Vietnam, Indonesia, etc. MYUNG KWANG is proud of the high quality of our products.

We will make your products increase value added.

Try it once and you'll be satisfied.

"Manufacturer & Exporter & Trade Company In Korea"

MKC CLEAR RUBBER SERISE



Presented by MyungKwang Chemical Ind. Co., LTD.,

1. Clear rubber series :

1) M/SM/CM Clear Rubber

Offers excellent physical properties such as transparency, **high abrasion** and superior bonding strength with other shoe's materials.



2) HD Clear Rubber

Offers excellent physical properties, transparency, and **high hardness**.
So this is available **functional shoe's** outsole like soccer and golf shoe.

3) Sticky Clear Rubber

Offers excellent physical properties such as transparency, **high abrasion** and superior bonding strength with other shoe's materials. This offers not only **excellent grip** and **anti-skid function** at wet & dry condition but also **shock absorption**.

4) NOVO Clear Rubber

Offers good transparency and more physical properties such as tensile strength, tear strength and heat-resistance than "M Clear Rubber".
Curing system is **designed by sulfur(S)**, so this can be **applied to the foxing tape, toe-guard calender and molding sole** for hot-air vulcanizing type shoe manufacturing.

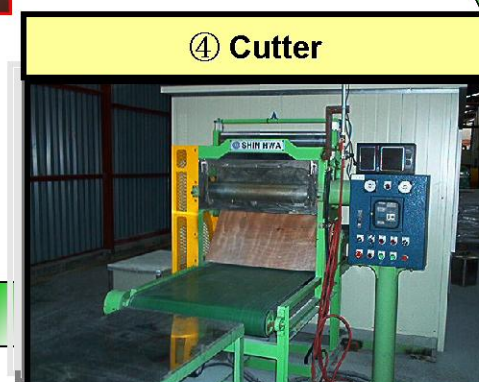
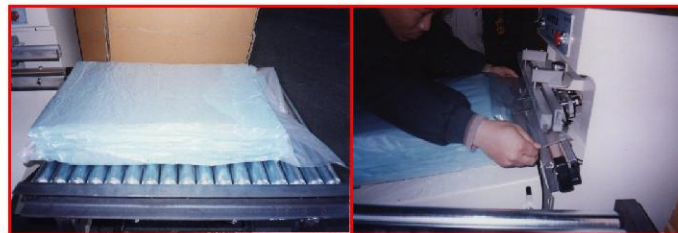
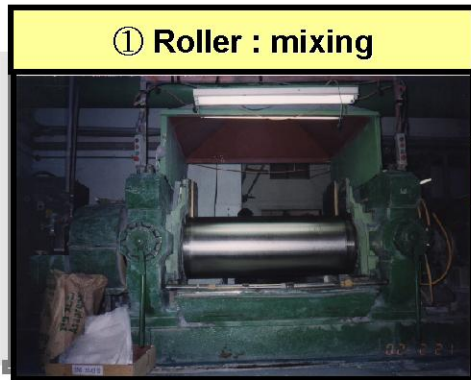
MKC's New technology :
Solution of preventing from yellowing on Clear rubber

A. Vacuum packing system

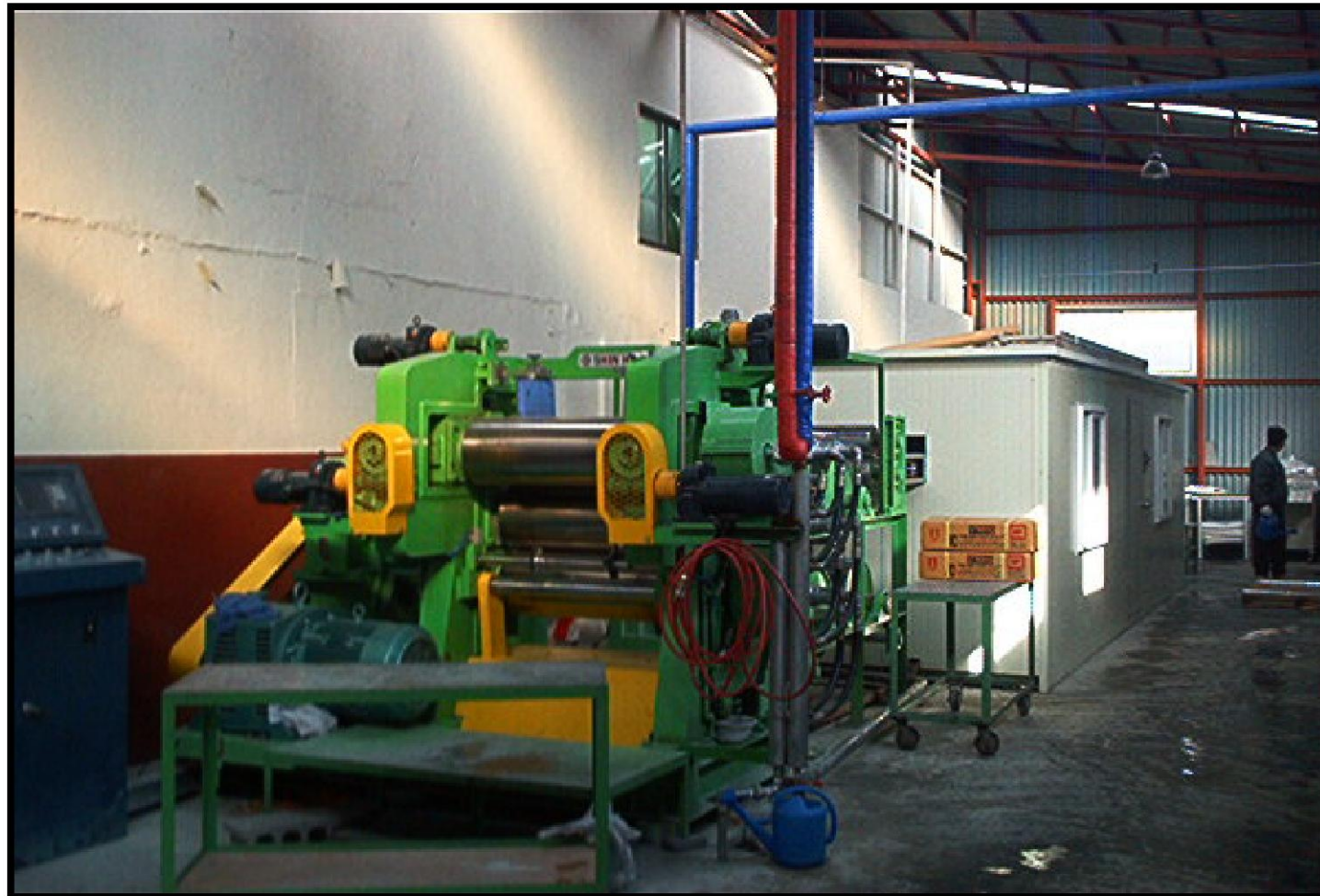
From virgin M/B until customers' full wearing, the same physical properties will be guaranteed by the vacuum treated New process.

- Keeping storage long time period at maximum.
- Located upstairs not access directly to the earth humidity.
- Keep original physical properties while it's just produced for 12 months.
- Prevent yellowishing caused by whole kinds of outer effects.
- Have a competitive price(same as before).
- Be referred the tables as following pages

Vacuum packing process 1-1



Vacuum packing process 2-2



MKC Clear Rubber Product Kinds

2006. 08. 22

	55-F	55-H	60-F (Regular Type)	65-F (Regular Type)	65-F (Regular Type)	65TCR-F (Core-S)	65TCR-F (Core-S)	65SM-H	85-H	65CM-H
HD	50-51	53-57	60-62	68-70	66-68	68-70	66-69	68-70	84-87	67-70
Eb(%)	495	650	740	525	510	565	535	520	400	530
Tb(kg/cm ²)	62	101	11N	142	136	138	121	135	16.5N	110
300%	29	37	-	60	45	56	50	45	-	55
Tear(kg/cm)	23	25	11N	43	38	46	40	30	20.5N	34
Sp.gr	1.014	1.038	1.066	1.074	1.071	1.073	1.072	1.081	1.1120	1.090
Abrasion			74(DIN)	Akron 0.16	Akron 0.15			Akron 0.14	64(DIN)	Akron 0.23
P.O Type	DCP	DCP	3M	DCP	3M	In put 2 Step DCP	In put 2 Step 3M	DCP	DCP	DCP
Use Silica	Fumed	Hydrous	Fumed	Fumed	Fumed	Fumed	Fumed	Hydrous	Hydrous	Hydrous
Transparency Grade(*)	3.5	3	4	4.5	5	5	5	3.5	5	2.5
Charateristic	.expensive better than 55-H .working order	.Cheap cost .Working order	.Marketing Adidas	.Marketing NIKE .Good Scorch	.very scorch speed .Bad Rubber Flow	.only User use Curing Control .Price Merit	.Only User use Curing Control .Price Merit	.Cheap better than 65-F .Half Trans- parency	.Marketing Adidas .good Trans parent	.Cheap Better than 65SM-H .Very Cheap
Curing Time	150℃x7'	150℃x7'	150℃x7'	150℃x7'	150℃x7'	150℃x7'	150℃x7'	150℃x7'	150℃x7'	150℃x7'

Note : (*) is 5(Good) ↔ 0 (Bad) . F,H : Used Silica Kind

MYUNG KWANG CHEMICAL. IND., LTD.

MKC FUNTIONAL RUBBER SERISE



Presented by MyungKwang Chemical Ind. Co., LTD.,

2. Special rubber series :

1) High grip sole, HGS-2003

- a) Excellent grip in Wet & dry condition (72/slip angle)
- b) Silica based compound (good bonding / various color)
- c) Any color

2) High abrasion rubber, MK-2500

- a) Strong abrasion(1,200 NBS, %)
- b) New compound (poly-isoprene & ethylene derivatives)
Offer good bonding strength, blooming and tear strength.
- c) Press works possible
- d) Any color

3) Anti-static rubber, ASR-2003

- a) Prevent electric shock & static(Resistivity 500 MΩ.cm)
- b) Dust-absorption & anti-slip
- c) Black color only

4) Shock absorption rubber, SAR-2004

- a) Excellent & stable impact absorption rubber
- b) Same working process like normal rubber
- c) Superior shock absorbing function for wear
- d) Any color



5) Cold sensitive rubber, CSR-2005

- a) **Rapid hardness change effect** under severe temperature shift
(room temperature : Shore's 70A ↔ cold weather : 95A)
- b) Sulfur cure based cross-linking system can be offered superior physical properties
- c) Suitable for wearing winter season.
- d) Any color

6) Blown sole rubber, DCD

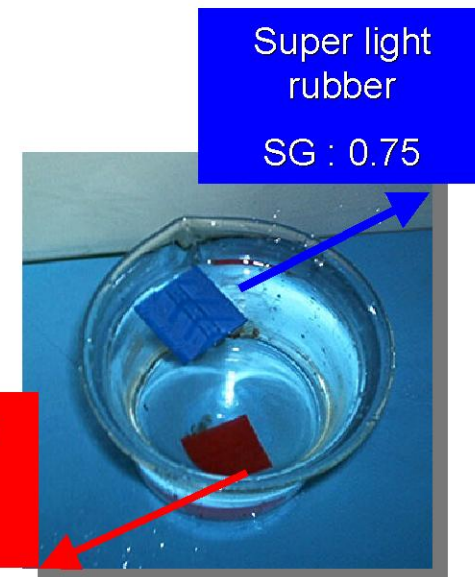
- a) **HIGH CUSHIONY SOLE**
- b) High abrasion
- c) Suitable for die cutting sole
- d) Any color

7) Super light rubber, SLR-2008

- a) **30% LIGHTER** than standard outsole rubber.
- b) **NO OUTSOLE TRIMMING REQUIRED!**
- c) Environmentally friendly product(no rubber waste).
- d) **50% less rubber** required for outsole pressing!
- e) **No Post Curing or Die Cutting** required.
- f) Any color

8) Fire-proof rubber, FPR-2009

- a) **Excellent fire-proof property**
- b) No flame when fire a sample directly during 10 seconds
- c) Any color



9) E-10HD

MKC NEW PRODUCT RUBBER

10) No degreasing rubber, MK-NDR

10)-1. What is MK-NDR ;

- A. Newly developed solid rubber outsole compound in order to see good bonding power between outsole rubber & midsole without doing buffing process.
- B. SSBR·SBR ·BR polymers grafted with reactive glycidyl group w/c when reacted with the hydroxyl group of the silica fillers will give extraordinary reinforcements in rubber compounds.

10)-2. Benefit for you ;

- A. No need to buffing process for outsole rubber to have better bonding with substrates. (No more dust in working place)
- B. No need to degreasing process.
(Just dipping inside 70 °C warm water)
- C. No more waste water.(environmental friendly)
- D. Save labor cost by eliminating buffing works.
- A. Bonding power stability.
- B. Be able to improve good abrasion & grip without using coupling agent of SI-69 & A-189.

MKC SPECIAL SPONGE SERISE



Presented by MyungKwang Chemical Ind. Co., LTD.,

3. Special sponge series :

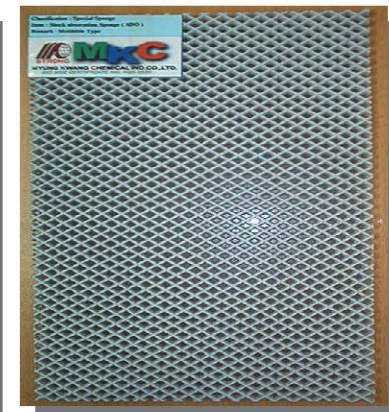


1) Shock absorption sponge series

Division	Hardness (Shore's C)	Resilience (%)	Compression Set (%)	Test Sheet	Sponge Size (mm)	Remarks
BIM-50	50 ± 3	25	40	Phylon	1,350 X 920 X 40	Moldable / Die-Cut
BIM-45	45 ± 3	17	41	Phylon	1,500 X 1,000 X 45	Moldable / Die-Cut
BIM-40	40 ± 3	14	40	Phylon	1,500 X 1,000 X 45	Moldable / Die-Cut
BHD-45	45 ± 3	15	25	Sponge	1,260 X 800 X 32	Die-Cut
BHD-45N	50 ± 3	15	40	Phylon	1,260 X 800 X 32	Moldable / Die-Cut
MEDO	50 ± 3	25	50	Phylon	1,550 X 1,000 X 40	Moldable / Die-Cut
HDS-50	50 ± 3	35	24	Phylon	1,400 X 950 X 45	Moldable / Die-Cut, Developed for Sockliner
HDS-30	30 ± 3	20	40	Sponge	1,500 X 1,000 X 45	Die-Cut, Developed for Sockliner

2) Well-ventilated in-lay sole, ADO

- a) Ventilating sponge(functional sponge)
- b) Compression set rate(42%)
- c) Soft touchness
- d) Widely using for cup-inlay-sole
- f) Any color



3) High rebounding sponge(HES – 60)

- a) Excellent resilience(60%)
- b) Soft touchness
- c) For cup-inlay-sole & die cutting not suitable for phylon mid-sole welding
- d) Any color

4) Low compression set sponge(LCS – 50)

- 1) Excellent recovery property
- 2) Soft touchness
- 3) Widely using for inlay-sole and mid-sole
- 4) Any color

5) Anti-static sponge(MK – 878)

- 1) Anti-static function
- 2) Safety purpose using workers for oil refinery, filling station, electronics company etc.
- 3) Only black color

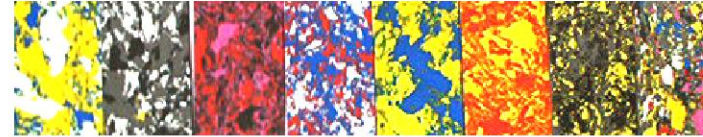
6) Super light sponge

- 1) Lower specific gravity than regular EVA sponge
- 2) Shape memory effect
- 3) Welding & die cutting for Upper
- 4) Any color



7) Amazing color sponge, NATURAL

- 1) Natural color
- 2) Same physical property like normal E.V.A. sponge
- 3) Weldable sponge for phylon mid-sole
- 4) Any color



8) Various color sponge, MULTI

- 1) Various & fine color shade
- 2) Same physical property like normal E.V.A. sponge
- 3) Weldable sponge for phylon mid- sole
- 4) Any color

9) Slow recovery sponge

- 1) Soft touch as silk
- 2) Excellent shock absorption sponge
- 3) Die cutting sponge for In-lay sole
- 4) Any color

10) Fire-proof sponge

- 1) Excellent fire-proof property
- 2) Welding & die cutting sponge for Upper
- 3) No flame when fire a sample directly during 10 seconds
- 4) Any color



RUBBER COMPOUNDING CHEMICAL SERISE



Presented by MyungKwang Chemical Ind. Co., LTD.,

4. Compounding chemicals :

NO.	DIVISION	ITEM	MAIN COMPONENT	APPLICATION
1	Coupling Agent	CA-69/ CP-75/ MK-69	Silane	Rubber, Tire Tread
2	Scorch Stabilizer	SUNCUTTOR-90 S-80MB	Insoluble Sulfur General Sulfur	Rubber, Tire Belt, Ebonite, Tire Tread S-80MB : Stable sulfur M/B
3	Dispersing & Releasing Agent	SAZ-33/ FAZ-38	Organic Fatty Acid, Fatty Acid Ester	Polymer (Synthetic, Natural Rubber)
4	Reinforcing, Processing Agent for Adhesion and Cohesion	PAZ-30/ PAZ-57/ RAZ-20	Synthetic Resin	Compounding, Extruding, Injection, Tackifying for Rubber
5	Antioxidant	SANTOL-D	Micro wax Polymer of 2,2,4-Trimethyl-1,2-Di-hydroquinoline	Rubber, Tire Tread, Latex Foam, Plastics wax, Food, Diene Rubber, Footwear, Tube, Special Rubber for Industry
		SANTOL-SPS	Styrenated Phenol(powder)	
		SANTOL-BHT	2,6-Di-Tert-Betyl-4-Methyl-phenol	
		MK-LSP	Styrenated Phenol(Liquid)	
6	Activator	AZ-SL/ PAZ-500	Organic High Molecular Polymer	Activator, Scorch Stabilizing Agent for Rubber
7	Softner	SOFTNER	Fatty Acid	Softner for Rubber
8	Retarder	PAZ-20	Aromatic, Organic Compound	Retarder for Vulcanizing
9	Peptizing Agent	PEPTOL-909	Fatty Acid ester	Natural, Special Rubber, Decreasing Mooney Viscosity
10	Deodorant	SMELAR-800	Special Organic Compound, Special Organic Perfume	Footwear, Special Rubber, Organic Matter, Food, Formaline, Ammonia
11	Discolor-Resistant	DISCOLOR-4210	Phenol System	Rubber, PU
12	Bleaching Agent	KAZ-068	Optical Brightner	Increasing Whiteness
13	Sponge Cell Stabilizer	PAL-50M	Organic Synthetic Resin, Fatty Acid, Organic Polymer, Organic Peroxide	EVA, RB Rubber, Dispersing Polymer Promoter for Sponge
14	No Buffing Agent	WS-7350R	Organic Synthetic Compound	Rubber, EVA, RB Sponge (CR, PU System)
15	Anti-Blooming Agent	BS-2		Plastic, Rubber, Latex glove
16	New M/B Master Batch	ACC. M/B S. M.B	Accelator and vacalizing agent	All Rubber Compound
* Etc chemical can be make by user request.				

4-1. Adhesive chemicals :

NO	DIVISION	ITEM	MAIN COMPONENT	APPLICATION
17	NR System Primer & Tackifier	MK-100S(NT)	Grafted CR	PU, PVC Leather, Soft Leather(No Buffing)
		SPR-130(NT)	Grafted NR	Polyester, Action Leather, PU, PVC Leather
		PAZ-30S(NT)	Thermosetting Resin	Catalyst for NR, CR system Adhesives
		MK-506CNT	Grafted NR	Primer for NR system
18	Waterbased PU Adhesive	A-11/ A-4	Poly Urethane Emulsion	Waterbased PU adhesive
19	Waterbased PU Primer	MWP-01/ MWP-02/ MWP-03		Waterbased PU Primer for Leather, Fabric, Canvas
20	Waterbased Hardner	MDA-300		Waterbased Hardener
21	Waterbased Sticker-making adhesive	MKW-6700T	Water-based P.S.A.	Waterbased Sticker-making adhesive
22	Waterbased combining adhesive	MKW-681GS		Waterbased Combining adhesive
23	Waterbased CR adhesive	CMK-3000CR	CR Emulsion	Waterbased CR adhesive for Cup-Insole making
* B : Brush Type D : Dipping Type W : White color Products H : Transparent products NT : Toluene Free				



WATER-BASED ADHESIVES



Presented by MyungKwang Chemical Ind. Co., LTD.,

5. Water-based adhesives :

NO	DIVISION	ITEM	MAIN COMPONENT	APPLICATION
1	Latex Adhesive	B-610H(W)	Polymer of NR latex and Synthetic latex derivative	Adhesion of Cotton and Uncured rubber
		D-710H(W)		
		D-810H(W)		Heat-vulcanizing adhesives for upper materials. Especially,Leather,Polyester, T.C
		LB-433H(W)		
		LD-433H(W)		
	B-110H(W)			
2	Friction type	B-150F	Synthetic latex modifier	Coating agent for friction (Shoes, Belt, Hose, etc)
3	Adhesive for drawing of Insole	T-200H/ T-600H	Polymer of NR latex and Synthetic latex derivative	Adhesion of Texion and Tricot
4	Tackifier(Watersoluble)	CO-90	Synthetic Resin (Terpene)	Long Tacky Time
		CO-12603	Synthetic Resin (Phenol)	Short Tacky Time
5	Thickening Agent (Watersoluble)	VISCOMATE-20L	Sodium-Polyacrylate	Adhesion for Latex form sheet (Reinforcement of Viscosity and Adhesion)
6	Antioxidant for Latex	SP-EM	Stynrene Phenol Resin	Antioxidant for Natural Latex (Latex Sponge, Gloves, Balloon, nipple, Parts of Medicine)
		W-EM	Special Wax	
		BHT-EM	DBPC	
7	Hardener(Watersoluble)	WP-4(N)	Isocyanate	Hydrophile Property(Insoluble in Organic Solvent)
8	Coating Agent	MK-EM	Acryl Resin	Leather, Cotton, Texon, Chemisheet
9	Wetting Agent	MK-5	Denaturant of organic Fatty Acid	Permeating Agent, Reinforcing Agent for Leather's Physical Properties
10	Improver of Latex Reactivity	MK-2030	Acryl Modifier	Additive of Natural and Synthetic Latex
11	Mark's spraying Agent	MGR	Poly-vinyl-alc ohol	Rubber boots' making, mold coating, the painting
12	Hot Melt Adhesive	HA-70H(W)	Organic highly polymerized compound	Back of Toe-Cap(MEK Type)
13	Last Coating Agent	LCS-10(NT)	PU resin, Synthetic resin	Prevention Stain of Last, Improvement Releasing Property (Coat-Iron, Polyethylene, MEK Type)
		LCS-25(NT)	Polystyrene, Synthetic resin	
14	No buffing Adhesive	NEWTEX-2	Synthetic latex	No buffing Adhesive for uncured Rubber (Watersoluble), No BTX
15	NR System Adhesive	SVH(W)	Denaturant of NR	No Buffing Adhesive for Molded sole (MEK), No BTX
16		MK-100MH(W)		PVC Leather

SOLVENT-BASED ADHESIVES



Presented by MyungKwang Chemical Ind. Co., LTD.,

6. Solvent-based adhesives :

NO	DIVISION	ITEM	MAIN COMPONENT	APPLICATION
1	Primer for CR System Adhesive	MK-305	CR Graft	PVC Leather, Synthetic Leather
		MK-120L		PVC Leather, Synthetic Leather, Nylon Textile
		MK-22M		Cured Rubber, Rubber Sponge
		MK-880E	Rubber Derivative	EVA Sponge
2	Primer for PU System Adhesives	MK-23S	PU Derivative	PVC, PU Leather, Synthetic Leather & Sole, PU coated Leather
		MK-112H(F)		Primer for specially waterbased PU adhesive (Higher viscosity than MK-23S)
		MK-119H(F)		Primer for specially waterbased PU adhesive (Higher viscosity than MK-112)
		MK-18N(*MK-18S)		Nylon Textile(*Nylon Sole)
		MK-0070(NT)	Special Chlorine Thimer	Cured Rubber, RB, TR
		MK-2070(NT)		Less Yellowing Type of MK-0070
		MK-0080(*MK-0090)	Rubber Derivative	EVA Sponge, (*Improvement of PU Adhesive property)
MK-222(NT)	Special Chlorine	Oil Leather primer		
3	Primer for NR System Adhesives (for Hot-air Vulcanizing shoe-making)	MK-100S	NR Graft	PU, PVC Leather, Soft Leather (No Buffing)
		SPR-130		Polyester, Action Leather, PU, PVC Leather
		MK-506CN		Oil Leather
		PAZ-30S	Thermosetting Resin	Catalyst for NR, CR System Adhesives
4	CR system Adhesive	MK-192C(W)	CR Graft	Adhesive for upper material (Less yellowing than #220C(W))
		MK-220C(W)		Adhesive for Sole material
		MK-700	CR	Construction (Interior decoration), General use (Resin Addition)
		MK-901		A Time coating specially leather shoe making
		MK-825C(W)	CR + Phenol	For Sewing Dept.
		MK-3000	CR Derivative	For Cup-insole making
5	PU System Adhesive	MK-5010	PU Denaturant	PU adhesive (Clear looking)
		MK-5040		PU adhesive (Milky white looking)
		MK-5050		PU adhesive
6	NR System Adhesive (for Hot-air Vulcanizing shoe-making)	MK-100MH(W)	NR Graft	PVC Leather
		SVH(W)		For molded Sole (No Buffing)
7	CR System Adhesive (for Hot-air Vulcanizing shoe-making)	MK-60C(W)	CR Graft	PVC Leather
8	No Buffing Primer of Rubber, EVA Sponge	K-7	Vinyl denaturant	Brush type UV primer for phylon
		K-9(NT)		Dipping type UV primer for phylon
9	The Others (Adhesives)	EAZ-40	Synthetic Resin	Stiffener of heel counter
		MK-8400SH	Special Synthetic Resin	Heat-resistat adhesive for attaching rubber and Phylon in Phylon

ACRYL-BASED ADHESIVES



Presented by MyungKwang Chemical Ind. Co., LTD.,

7. Press Sensitive adhesives(Acryl-based adhesives) ;

NO	ITEM	Appearance	Main component	Application	REF
1	SK-2000S	Transparent Viscous liquid	Acrylic Ester Copolymer	Combining PU Sponge(PU Foam) with Nylon, Polyester	
2	SK-2000S-2				Toluene Free
3	SK-2000E	White viscous liquid	Acrylic Denaturant	Combining soft EVA pad with Nylon, Polyester, Cotton Duck (Canvas)	
4	SK-2000E-2				Toluene Free
5	SK-2000P	Transparent Viscous liquid	Acrylic Ester	High frequency combining EVA with Spandex, Hilex	
6	SK-2000P-2		Copolymer		Toluene Free
7	SK-2000TR		Acrylic Ester	Combining PU Sponge(PU Foam) with Non-woven fabric, Tricot	
8	SK-2000TR-2		Copolymer		Toluene Free
9	SK-2000B		Acrylic Denaturant	Thermal resistant combining PU Sponge(PU foam) with Nylon, Polyester. For	
10	SK-2000B-2				Toluene Free
11	SK-2000HF	Acrylic Ester Copolymer	Textile coating for waterproof, wind-protecting and warm-protecting		
12	SK-2000HF-2			Toluene Free	
13	SK-7800E	Yellowish transparent viscous liquid	Acrylic Ester Copolymer	Heat or catalytic cure type adhesive. EVA sheet, Nylon, Cotton, Polyester cohesion	
14	SK-7800E-2				Toluene Free
15	SK-6600B	Yellowish viscous liquid	Acrylic Denaturant	Thermal-resistant combining of PU sponge (PU foam) with Nylon, Polyester For sewing	
16	SK-6600B-2				Toluene Free
17	SK-8500	Transparent Viscous liquid		Thermal-resistant combining of PU sponge (PU foam) with Cotton, Polyester	
18	SK-8500-2				Toluene Free
19	SK-700	Yellowish transparent viscous liquid		Apply to double faced tape cohesive	
20	SK-700-2				Toluene Free
21	ST-7900	Transparent Viscous liquid	Acrylic Ester Copolymer	General double faced tape cohesive	
22	ST-7900-2				Toluene Free
23	ST-8300B	Bluish Transparent Viscous liquid		Protection film (PET & etc) cohesive	
24	ST-8300B-2				Toluene Free
25	ST-2200	Transparent Viscous liquid		General label sticker cohesive applied on paper, vinyl, PVC	
26	ST-2200-2				Toluene Free


TCR SYSTEM

Presented by MyungKwang Chemical Ind. Co., LTD.,

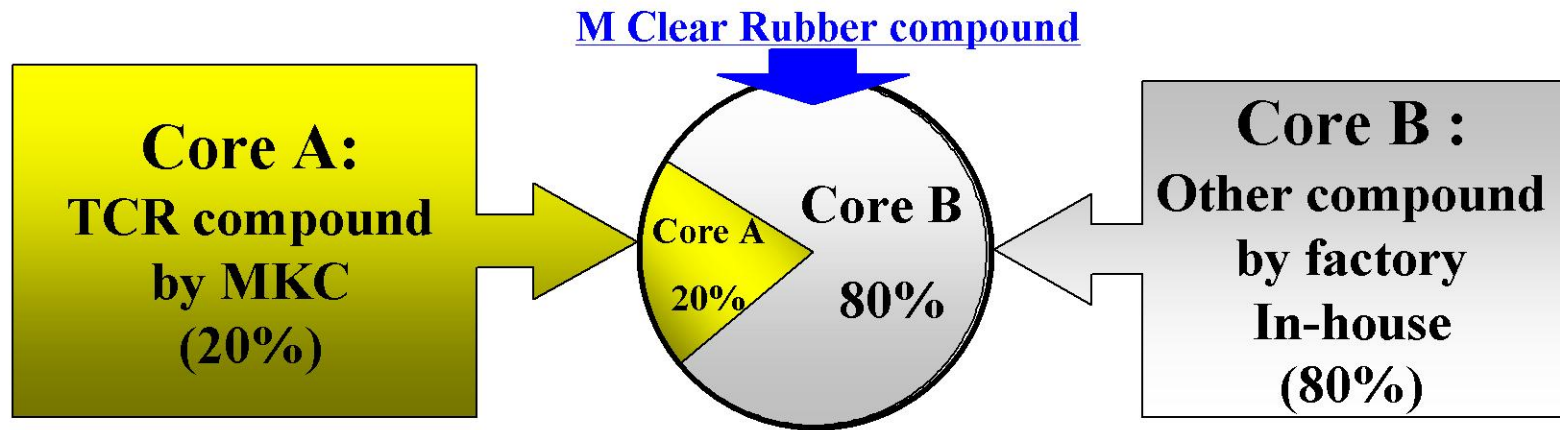
1. What's TCR ?

TCR is core rubber system for clear rubber.

2. The advantage

- 1st **No need** to keep big space
to secure large amount of compound while using TCR system.*
- 2nd **Be adapt** to In-house policy
cause capable to manufacture core B part (80%) by factory themselves.*
- 3rd **Easy** to control the desired quantity of compound while in needs.*
- 4th **Easy** to control long-term stock.
(about 12 months referring to our internal study)*
- 5th **Save** material cost.  Expect decreasing shoe's cost.
(refer to next page)*

3. Composition of M Clear Rubber compound



4. Cost comparison

① Current M Clear rubber compound(unit price based on FOB Pusan)

② New TCR system

↓ Saving 23.91%



Above price is based on Core A (used 10.00kgs)
Core B (used 42.56kgs)

Note

1. MKC item will be supplied to factory by vacuum packing system for preventing yellowing problem further .
2. MKC offers technical service how to mix Core A and B efficiently.
3. Above price is estimated by MKC costing team.

MKC NEW INNOVATION PRODUCT

1. E10-HD



Introduction of E-10HD

*~E10HD is the master-batch(MB) developed based on our advanced S-SBR "Asaprene E10".
This MB is prepared under the optimum condition to make the most of the original polymer performance.*

Incorporating small amount of E-10HD into a rubber compound can provide you the following benefits;-

- 1) Good abrasion with no usage of silane
- 2) Good traction for dry & wet condition
- 3) Good bonding without buffing

SPM picture of E10HD (dark: silica / gray: rubber)

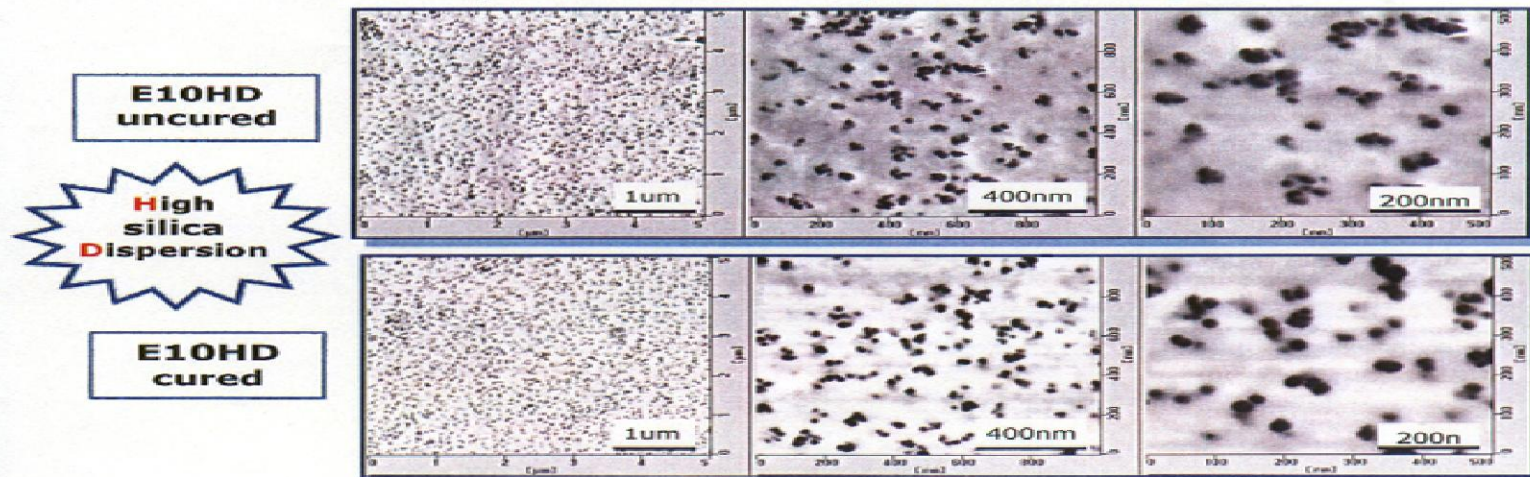


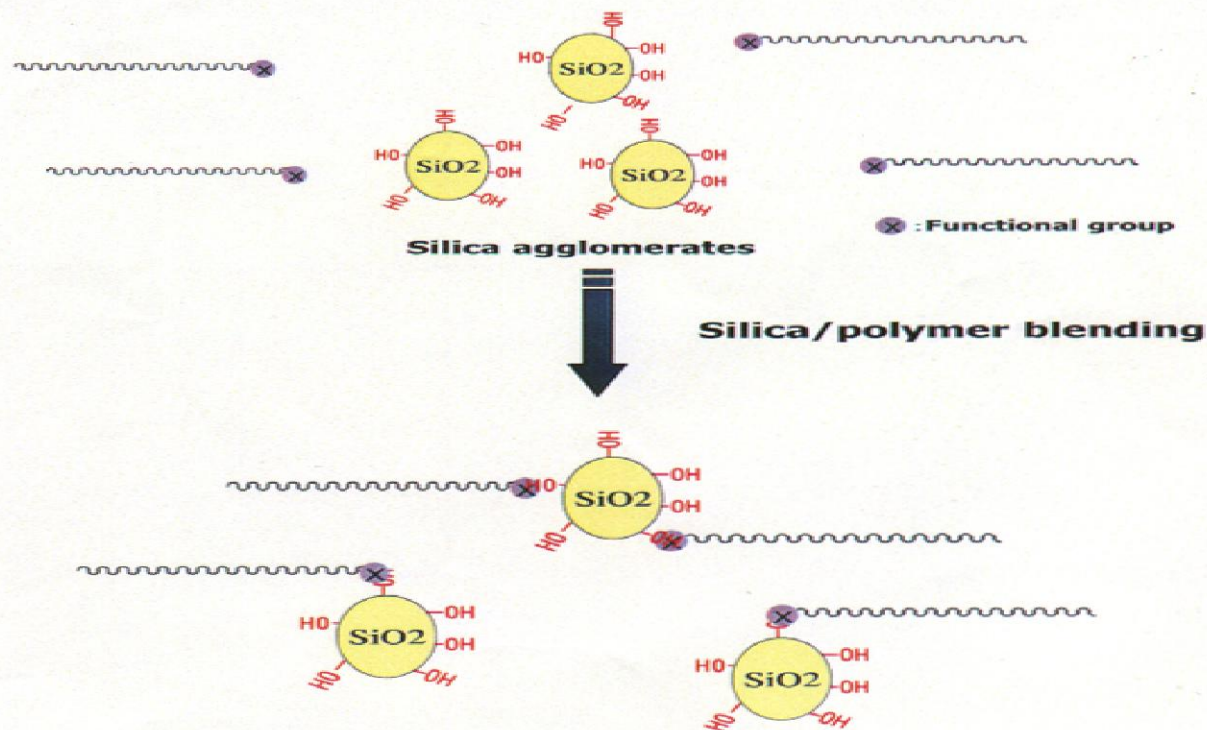
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4	General Guideline for efficient use of "E-10HD" <ul style="list-style-type: none">◆ Recommended formulation for compounds for outsole<ol style="list-style-type: none">1. "E-10HD" based rubber formulation2. Additives formulation◆ Trouble-shooting
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1. What is "E-10HD" ?

"E-10HD" is the result of our original technology compounding Asaprene™ E10 with silica. Asaprene™ E10 is an advanced S-SBR with OH functional group. This group is activated by our new mixing technology and reacts with the silanol groups at silica surface.

Reaction mechanism of silica/OH functional group of Asaprene™ E10



2. Basic characteristics of "E-10HD"

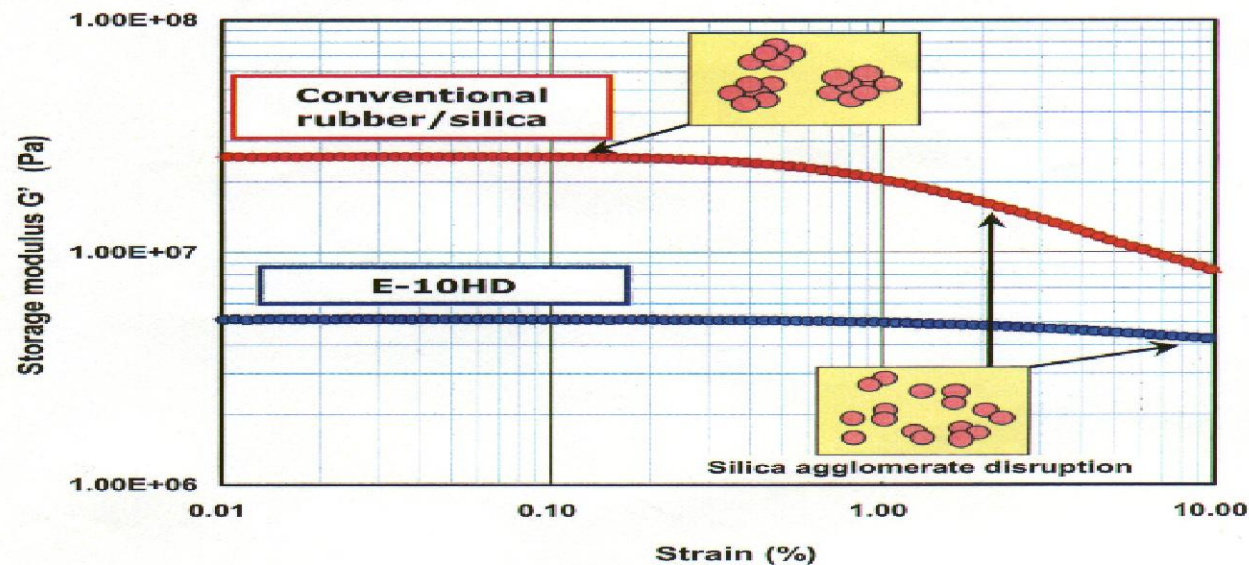
"E-10HD" can provide the following benefits to a rubber outsole compound.

- ◆ **Improve abrasion resistance**
 - * Excellent abrasion resistance without using silane coupling agent
- ◆ **Improve traction for both dry & wet**
- ◆ **Improve bonding strength to EVA midsole, Leather Upper & Nylon Upper**
 - * Without buffing
 - * With water-based primer/cement system
- ◆ **Improve processability**

E-10HD

Composition: Asaprene™ E10/Silica=75/25

The fine silica dispersion in "E-10HD" enhances its elasticity and reduces stiffness.



3. Benefits E10HD can provide to a rubber compound

High abrasion

Outsole formula for high abrasion resistance is made possible by "E-10HD" with no usage of silane coupling agent, maintaining BR content at low level.

Abrasion property comparison between general formula & E-10HD formula

Material	Formula No	General outsole formulation	E-10HD outsole formulation		
			A	B	C
Rubber	BR-01	62	60	70	60
	SSBR 1205	14	0	20	0
	IR-2200	24	30	0	0
	NR	0	0	0	30
	"E-10HD"	0	13	13	13
	ZEOSIL#175	40	40	40	40
	A-1289	0.7	0	0	0
	ZNO	0	4.0	4.0	5.0
	PEG-4000	3.0	2.5	2.5	3.0
	ST/A	0.7	1.0	1.0	1.0
	SP	1.0	1.0	1.0	1.0
	WB212	2.0	2.0	2.0	2.0
	M-75%	0.6	0.6	0.6	0.6
	DM-75%	1.5	1.5	1.5	1.5
	TS-75%	0.1	0.1	0.1	0.1
	IS50%	3.2	3.2	3.2	3.2
	etc	7.9	0	0	0
	Total	160.7	158.9	158.9	160.4
	Hardness Shore A	62-63	63-65	63-65	61-63
	Specific Gravity	1.12	1.121	1.119	1.1068
	Tensile Strength (N/mm²)	12	14	13	16
	300% Modulus (N/mm²)	5.4	-	-	-
	Tear Strength (N/mm)	18	25	24	21
	Breaking Elongation (%)	616	715	635	675
	Abrasion DIN (mm³ Loss)	60	55	48	59
	Cementation to Leather Upper (N/cm²)	35	52-55	52-55	52-55
	Blooming	No	No	No	No

High traction/High abrasion

Outsole formula for high traction/high abrasion outsole compound is made possible by E-10HD with no usage of silane, and can solve the poor bonding problem of BIIR compound.

Physical properties of E-10HD compound for High Traction Rubber

Formulation(phr)/Properties		Formula No					
		A	B	C	D	E	F
Rubber	BR01	60	60	70	60	50	50
	"E-10HD"	26.7	40	40	13.3	40	26.7
	IR-2200	-	-	-	10	-	-
	KNB-35L	20	10	-	20	20	30
Additives	KB	1					
	ZEOSIL 175GR	40	35		41	35	38
	PEG-4000	3.2	3.2		3.5	3.6	3.6
	ZIN-2	5	7		5	7.5	7
	ST/A	0.5					
	SP/P	0.5					
	BHT	0.5					
	S-80%	2					
	TS-80%	0.2					
	DM	1.3		1.5			
	M	0.4	0.4	0.3	0.4	0.4	0.3
Total		161.3	161.6	161.7	159.4	162.7	161.8
Cure Tendency by Rheometer	TS-2	1'55"	1'35"	2'24"	1'19"	2'16"	2'37"
	T-90	3'03"	2'37"	4'09"	2'01"	3'18"	3'49"
	Cure Time	4'00"	4'00"	4'30"	3'30"	4'00"	5'30"
Cured properties	Hardness (Shore A)	67-69	66-68			67-69	
	Density (G/CBCM)	1.147	1.156	1.143	1.142	1.170	1.146
	Tensile N/mm ²	14.2	14.7	13.5	14.9	14.5	14.8
	Elongation (%)	700	660	700	670	630	660
	Tear (N/mm)	26.5	27.8	27.2	25.6	23.6	20.8
	Resilience(%) ^{*1)}	36	38	41	38	36	34
	Abrasion DIN (mm ³ Loss)	48	54	54	56	63	54
	Abrasion Akron (CC Loss)	0.25	0.30	0.30	0.34	0.32	0.29
	Cementation to EVA midsole ^{*2)} (N/cm)	38.0	38.7	34.7	39.0	39.0	36.2
	Blooming Test (WF)	NO					

*1) Resilience test method :DIN 53512

*2) 24hrs after bonding: Non-buffing outsole/water-based primer & cement applied for the outsoles.

4. General Guideline for efficient use of "E10HD"

General Information

- ◆ Just replacing 10 to 20 phr of a rubber polymer such as SBR1502 with 13.3 to 26.7 phr of E-10HD in an existing outsole compounds.
- ◆ Slight increase of accelerator is necessary.
* Proper dispersion must be achieved.
- ◆ Follow normal compounding procedure as any rubber outsole compounds.

Recommended formulation for outsole compounds

1. "E10HD" based rubber formulation

Compounds for General Outsole such as;-

- ✓ Hardness:60-65A
- ✓ No usage of silane coupling agent
- ✓ Non Buffing
- ✓ Excellent Bonding with water-based primer (>30N/cm for cementation to EVA midsole and >50N/cm for cementation to leather upper)

As you see in the map below, in the E10HD based formulation, 60% of BR content should be enough to obtain a reasonable abrasion property.

DIN abrasion	Rubber Formulation		
	BR	IR* or NR	"E-10HD"*
60 ~ 50	60	30	13.3
50 ~ 40	70	20	13.3

Note:

1. IR: It should be better to use IR rather than NR if you wants better abrasion property.
2. "E-10HD": 13.33% of "E-10HD" comprises 10% of E10 polymer and 3.3% of TOKUSIL URT.

2.Additive formulation

Optimizing the dosage of activators and accelerators is very important to obtain a good physical properties for E-10HD compounds. Our formulation mentioned below does not contain a silane coupling agent. Non-silane compound is less reactive than silane compound, so that it should be necessary to increase the dosage of activators and accelerators.

In order to determine the dosage, we recommend to increase it until TS-2 and T-90 of E-10HD compound reaches to the same level as your original compound that you want to improve with E-10HD.

Please refer to the following example of additive formulation.

An example of additive formulation

Additives	Material Name	PHR	Information
Silica	Zeosil 175 Tokusil USG Hisil 255G	36 ~ 41	36 ~37 phr for 60A compound 40 ~41 phr for 65A compound
Activator	PEG-4000	3.5 ~ 4.5	
Activating agent	ZnO	5.0	
Processing agent	ST-A	1.0	
Anti-Oxidant	SP-P	1.0	
Accelerators*	Mix #2-75%	3.0	Mix #2 comprises of DM/ Hexa/DPG. Made by Hung Hsin (Taiwan)
	TS-80%	0.3	
Sulfur	S-80%	2.0	

Note:

For a black outsole compound, DM/M/TS-80% accelerator system is recommended for tight curing. The formulation is:-

DM/M/TS-80%=1.3-1.5phr/0.3-0.5phr/0.2phr

Trouble-shooting for "E-10HD" compound

Problem	Main cause	Counter-measure
Poor abrasion	Poor dispersion	Do not start mixing with cold kneader. Please pre-heat kneader until its temp, reaches to 50-60°C.
	Under-cure	<ol style="list-style-type: none"> 1. Put more accelerators. 2. Put more activators.
Poor bonding	Under-cure	<ol style="list-style-type: none"> 1. Put more accelerators. 2. Put more activators.
	Contamination of outsole surface	<ol style="list-style-type: none"> 1. Clean outsole surface properly. 2. Check the condition of "ultra-sonic washing" machine.
Blooming	Not cured properly	<ol style="list-style-type: none"> 1. Increase accelerators a bit according to "Additive Formulation (P.9). 2. Increase activators a bit according to "Additive Formulation (P.9). 3. Use "Mix#2" instead of current accelerators
Abrasion drops after pigments are mixed	Under-cure	<ol style="list-style-type: none"> 1. Pigments usually comprises of 50% of pigment and 50% of rubber, so that retard curing. You need to increase accelerators a bit. 2. TiO₂ increases the compound hardness, so that silica content should be decreased. 3. Other pigments do NOT increase the hardness. If the compound gets softer, it is highly possible that the compound is under-cured. You should need to increase accelerators a bit.

THANK YOU !!



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- * Oil-resistance Rubber (OR-2004)
- * High Abrasion Rubber (MK-2500)
- * Antistatic Rubber (ASR-2003)
- * Shock Absorption Rubber (SAR-2004)
- * New Material Functional Polymer (E-10HD)



*** Special Sponge**

- * Fire-proof Sponge (FPS-2010)
- * High Rebounding Sponge (HES-60)
- * Low Compression Set Sponge (LCS-30)
- * Shock Absorption Sponge (BIM-40)
- * Slow Recovery Foam (SRF-30)
- * Blown Rubber (DCD-2)
- * Multi EVA Sponge (MES# Serise)



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| <ul style="list-style-type: none"> • C.R, PU, Acrylic Based Adhesives (Based Toluene Free Adhesives) • Water Based Adhesives (Cold Type or Vulcanizing Type) • Newtex Serise (Vulcaingzed Shoe Water Soluble Adhesives) • Special Ink & Enamel • The Adhesives for Construction | <ul style="list-style-type: none"> • Compounding Chemicals • Internal Releasing Agent (SAZ#33) • Retarder Agent (PAZ#20) • No Buffing Agent (MK-ER100) • Anti-Blooming Agent (BS#2) • Vulcanizing Adhesive Agent (PAZ#57) |
|--|---|