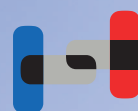




# CONVEYOR BELT



**HWASEUNG** Corporation

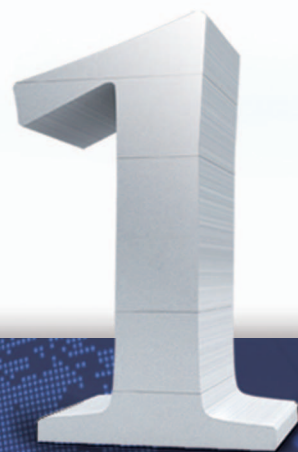


# Hwaseung engages the world

## Hwaseung creates value

Since its foundation in 1953, Hwaseung has actively responded to the changing world and achieved growth with constant challenges and innovation.

Currently, with a global network that embraces the world with businesses in automotive parts, advanced materials, footwear ODM, chemical and trade networks, Hwaseung is enhancing competencies in overseas business and accelerating growth to become a GLOBAL STANDARD group that enriches the future life for humanity.



## HWASEUNG belongs to following department

### **Automotive Parts**

With the greatest market share in weatherstrips and hoses in Korea, we are striving to become one of the BIG 3 companies in the global marketplace.

### **Advanced Materials**

We provide the very best products and technologies that win global recognition as Korea's No.1 rubber materials company.

### **Footwear ODM**

We are shaping the world's best brand with trends that keep us one step ahead of global brands.

### **Chemical**

We are enhancing global competitiveness in the future chemical industry by developing high-value products.

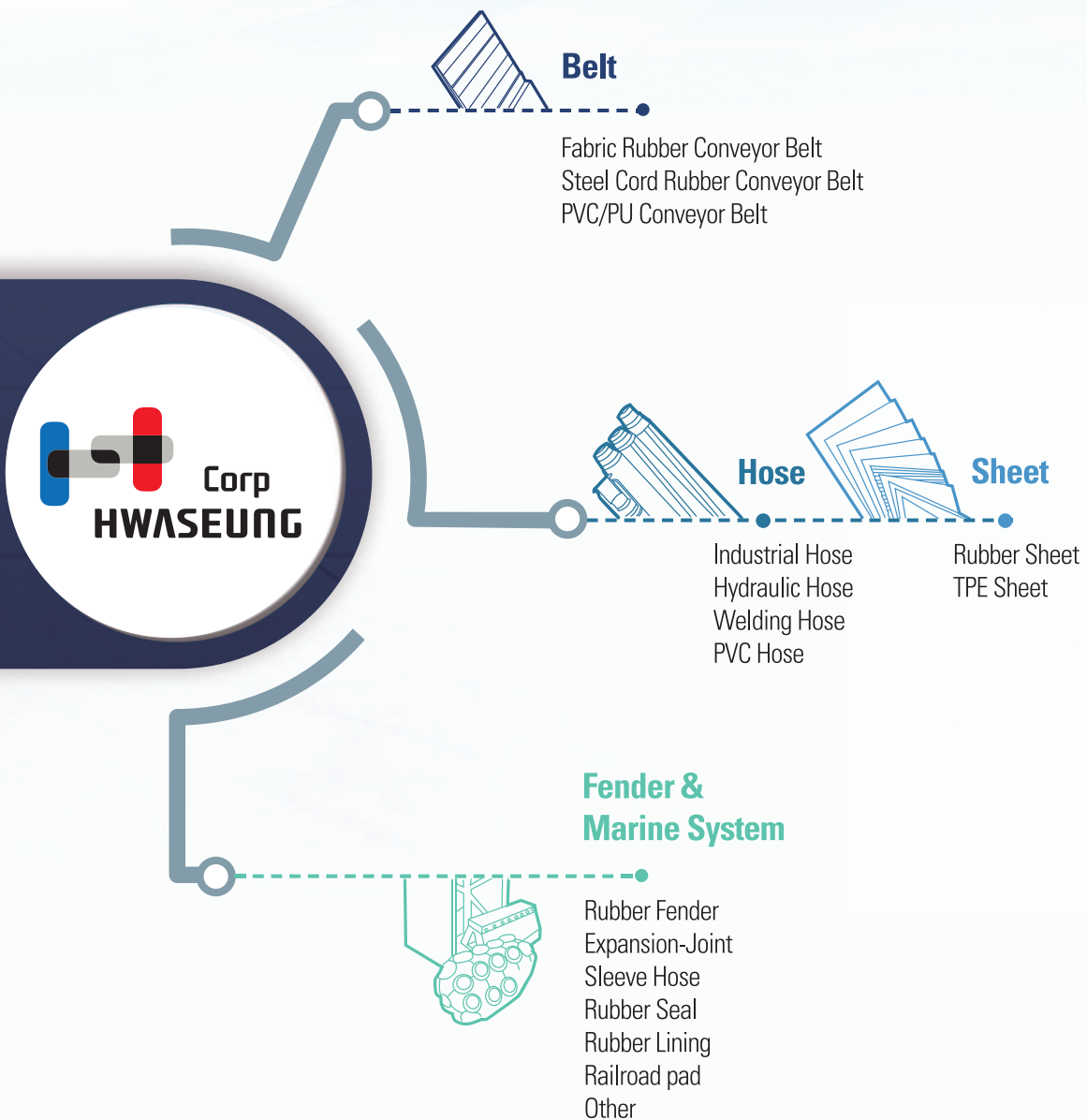
### **Trade Networks**

We are constantly developing new businesses by building a global network with 21st-century strategic business in mind.





## Business Area





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# HWASEUNG Corporation

## FABRIC RUBBER CONVEYOR BELT

HWASEUNG CORP conveyor belts are quality products with an extremely high degree of reliability. HWASEUNG CORP is a qualified manufacturer of different types of conveyor belts meeting all the requirements for most industrial activities and settings.

### GENERAL SPECIFICATIONS

FEATURE OF CARCASS(FABRIC & STEEL)

GENERAL & ABRASION-RESISTANT C/BELT

FLAME (FIRE) RESISTANT CONVEYOR BELT

HEAT-RESISTANT CONVEYOR BELT

OIL & OIL /HEAT-RESISTANT CONVEYOR BELT

CAKELESS CONVEYOR BELT

LTE BELT (Life Time Estimation)

MULTI CONVEYOR BELT

STRAIGHT WARP FABRIC CONVEYOR BELT

CPW FABRIC / PIPE CONVEYOR BELT

ROUGH TOP / COAL FEEDER CONVEYOR BELT

INCLINE (CHEVRON-CLEATED) CONVEYOR BELT

SIDEWALL CONVEYOR BELT

LTE PULLEY LAGGING SHEET

SPECIAL PURPOSE OF EXWILL





# GENERAL SPECIFICATIONS

## Construction of fabric rubber conveyor belt

### Top Cover

Designed to protect the carcass from service conditions like oil, heat, abrasion, etc.

### Carcass

Extremely low stretch characteristics of fabric and good troughability.

### Bottom Cover

Excellent in abrasion and flexibility, provides wearing surface against pulleys and idlers.

### Skim Coat

Compounded for excellent adhesion between plies for protecting against ply separation.

## Cover Rubber Thickness

Condition		Moderately Abrasive	Abrasive	Very Abrasive	Extremely Abrasive
Material Carried		Fine Coal, Grain, Wood Chips, Ash, Cement, etc.	Sand, Coal, Clay, Salt, etc.	Limestone, Crushed Stone, Coke, etc.	Ores, Slag, Cullet, etc.
Lump Size Belt Cycle (Seconds)	inch	0" ~ 2"(0-50mm)	2" ~ 6"(50-150mm)	6" ~ 10"(150-250mm)	8" ~ 12"(200-300mm)
	inch	1/16" ~ 1/8" (1.5-3.0mm)	1/8" ~ 3/16" (3.0-5.0mm)	3/16" ~ 1/4" (5.0-6.0mm)	1/4" ~ 5/16" (6.0-8.0mm)
0~20	inch	1/16" ~ 3/32" (1.5-2.5mm)	1/8" ~ 3/16" (3.0-5.0mm)	3/16" ~ 1/4" (5.0-6.0mm)	1/4" ~ 5/16" (6.0-8.0mm)
20~60	inch	1/16" ~ 1/32" (1.5-0.8mm)	1/8" ~ 3/32" (1.5-2.5mm)	1/8" ~ 3/16" (3.0-5.0mm)	3/16" ~ 1/4" (5.0-6.0mm)
60~300	inch				

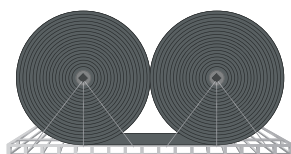
## Fabric C/Belt Maximum Capacity

- Width : Max 2,600mm

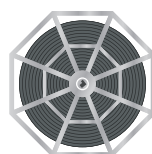
- Weight : Max 30 tons

- Length : Customized

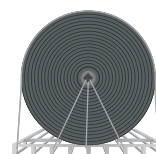
## Packing Type



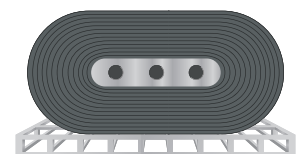
Cassette Packing



Steel Reel Packing



Steel Pallet Packing



Eclipse Packing



## FEATURE OF CARCASS (FABRIC & STEEL)

This construction, utilizing all nylon, offers maximum impact and damage resistance from materials and is suitable for transporting a variety of materials (ore, crushed stones, grain, sand, etc.). Several types of carcass using NN/EP fabrics with various thickness are available according to the load conditions.

### Nylon Fabric (NN)

#### • Special Features

- Exceptionally shock & impact resistant to the carrying surface

Grade		NN100	NN120	NN150	NN200	NN250	NN300	NN350	NN400	NN500
Min. Tensile Strength	kg/cm-ply	100	120	150	200	250	300	350	400	500
	lb/in-ply	560	672	840	1,120	1,400	1,680	1,960	2,240	2,800
Working Tension Rating (Vulcanized)	kg/cm-ply	8.4	10.0	12.5	16.7	20.8	25.0	29.2	33.3	41.7
	lb/in-ply	46.7	56.0	70.0	93.3	116.7	140.0	163.3	186.7	233.3
Approx. Gauge per Ply with Skim Coat	mm	0.9	1.2	1.3	1.5	1.6	1.8	2.0	2.2	2.7
	inch	0.035	0.047	0.051	0.059	0.063	0.071	0.079	0.087	0.106

### Polyester & Nylon Fabric (EP)

The combination of polyester in warp and nylon in filling provides technically low-stretch and high impact abuse resistance

#### • Special Features

- Low elongation

Grade		EP100	EP125	EP150	EP200	EP250	EP300	EP350	EP400	EP500
Min. Tensile Strength	kg/cm-ply	100	125	150	200	250	300	350	400	500
	lb/in-ply	560	700	850	1,120	1,400	1,680	2,000	2,240	2,800
Working Tension Rating (Vulcanized)	kg/cm-ply	10.0	12.5	15.0	20.0	25.0	30.0	35.0	40.0	50.0
	lb/in-ply	56.0	70.0	84.0	112.0	140.0	168.0	200.0	224.0	280.0
Approx. Gauge per Ply with Skim Coat	mm	0.9	1.2	1.4	1.5	1.9	2.0	2.1	2.4	3.2
	inch	0.035	0.047	0.055	0.059	0.075	0.079	0.083	0.094	0.126

#### • Carcass Grade (EP & NN)

Grade	160	200	250	315	400	500	630	800	1000	1250	1600	2000
2ply	160/2	200/2	250/2	315/2	400/2							
3ply			250/3	315/3	400/3	500/3	630/3	800/3	1000/3	1250/3		
4ply					400/4	500/4	630/4	800/4	1000/4	1250/4	1600/4	
5ply						500/5	630/5	800/5	1000/5	1250/5	1600/5	2000/5
6ply							630/6	800/6	1000/6	1250/6	1600/6	2000/6





## • Minimum Pulley Diameter

- Fabric C/Belt

NN FABRIC (mm)					EP FABRIC (mm)				
Fabric \ PLY	3ply	4ply	5ply	6ply	Fabric \ PLY	3ply	4ply	5ply	6ply
NN 100	300	400	500	600	EP 100	300	450	550	650
NN 120	300	400	500	600	EP 125	350	500	600	700
NN 150	350	450	550	650	EP 150	400	500	600	700
NN 200	400	500	600	750	EP 200	450	600	700	850
NN 250	400	550	700	850	EP 250	500	650	800	950
NN 300	450	600	750	900	EP 300	550	700	850	1050
NN 350	500	650	800	950	EP 350	600	750	950	1150
NN 400	550	700	850	1050	EP 400	700	950	1200	1400
					EP 500	800	1100	1400	1600

※ Note Tail & Take-Up Pulley : Effect 80% of above value, Bend & Snub Pulley : Effect 70% of above value.

## • Initial Elongation & Permanent Elongation

Item	Initial Elongation	Permanent Elongation
NN Belt	0.5% ~ 0.6%	1.5% ~ 2.5%
EP Belt	0.2% ~ 0.4%	0.9% ~ 1.5%
Straight Warp Belt	0.2% ~ 0.3%	0.6% ~ 0.7%
ST-Cord Belt	0.1%	0.2%

## • Modulus

FABRIC C/BELT																(kN/m, Ply)
Item	NN								EP							
	100	120	150	200	250	300	350	400	100	125	150	200	250	300	350	400
Modulus	650	710	800	1000	1200	1400	1600	1800	1000	1300	1600	2200	2800	3400	4000	4600

ST-CORD C/BELT											(kN/m, Ply)
Item	ST-CORD										
	630	800	1000	1200	1500	1800	2000	2500	3000	3500	
Modulus	25,000	35,000	45,000	55,000	70,000	80,000	90,000	115,000	140,000	165,000	



# GENERAL & ABRASION-RESISTANT C/BELT

This construction, utilizing all nylon, offers maximum impact and damage resistance from materials and is suitable for transporting a variety of materials (ore, crushed stones, grain, sand, etc.). Several types of carcass using NN/EP fabrics with various thickness are available according to the load conditions.

## General

Cover Rubber Grade : JIS, KS, AS, BS, RMA, DIN, SANS

Cover Grade		Specification of Cover Rubber		
		Tensile Strength Min. (MPa)	Elongation Min. (%)	Abrasion Max. (mm <sup>3</sup> )
JIS/KS	G	14	400	250
	S	18	450	200
AS/BS	N	17	400	200
RMA	2	14	400	175
DIN	Z	15	350	200
	Y	20	400	150
SANS	N	17	400	150

※ Note : Abrasion test is based on DIN 53516

The properties of RMA-2 can be customized or adjusted by customer's demand or request with prior discussion.

## Abrasion-Resistant Line-up

Cover Rubber Grade : RMA, SANS, AS, DIN

Cover Grade		Specification of Cover Rubber		
		Tensile Strength Min. (MPa)	Elongation Min. (%)	Abrasion Max. (mm <sup>3</sup> )
RMA	1	17	400	125
SANS	M	25	450	120
AS/BS	M	24	450	125
	A	17	400	70
DIN	X	25	450	120
	W	18	400	90
SSAR		18	400	50

※ Note : Abrasion test is based on DIN 53516

# FLAME<sub>(FIRE)</sub> RESISTANT CONVEYOR BELT

The HS Flame (Fire) Resistant Conveyor Belt is composed of special type compounds by using the flame resistant materials to protect damage to the belt itself in the case of a fire. We, Hwaseung Corp, are comply to international standards of flame resistant conveyor belts, such as MSHA (Mine Safety and Health Administration, US Labor) in the U.S. and the Russian Federation, and as such, hold official certificates from authorized organizations from each country. The HS Flame Resistant Conveyor Belt is suitable for mining, power, electric utilities, and coal cleaning plants.

## FR-MOR

FR-MOR Grade is fire resistant with medium oil resistance and accepted by the US-MSHA (Mine Safety and Health Administration). It is recommended for the typical applications like oil-treated coal and grain industries requiring fire & oil resistance, and static conductivity with lower electric resistance than 1MΩ.

## FR-SOR

FR-SOR Grade is compared with FR-MOR, Oil resistance has improved dramatically

## FR-SBR

FR-SBR Grade is a SBR fire resistant cover rubber meeting US-MSHA (Mine Safety and Health Administration) standards. It provides high resistance to abrasion and cold.

## FR-GR

FR-GR Grade is a specially compounded SBR cover rubber for under-ground operations requiring fire resistance and static conductivity. The important characteristic is the self-extinguishable cover rubber.

## FR-A (Advance)

FR-A (Advance) grade is especially effective for not only excellent abrasion resistance, but also advanced flame resistance.

This grade can be expected to have a long life through improved properties of cover rubber.

## FR-SAR (Super Abrasion Resistance)

FR-SAR (Super Abrasion Resistance) grade is especially recommended where there is a need for extremely abrasion resistant application under severe line conditions. Also, the superior properties of the cover rubber has the longest durability of the belts.

## Characteristics by Grade

Grade	Standard applied	Cover Rubber			
		Min. Tensile Strength		Min. Elongation (%)	Max. Elongation (%)
		Mpa	psi		
FR-MOR	MSHA/MOR(USA)	15	2180	400	-
FR-SOR	MSHA/SOR(USA)	13.7	1990	400	250
FR-SBR	MSHA/SBR(USA)	14	2030	400	250
FR-GR	ISO, DIN, JIS, KS	14	2030	400	-
FR-A (Advance)	Special	18	2610	450	150
FR-SAR (Super Abrasion Resistance)	Special	25	3630	450	120

## Test of Flame Resistance



Finger Burning Test



Drum Friction test machine

※ Our products are Flame Resistant-certified with noted agencies such as the MSHA in the U.S., as well as in state agencies in the Russian Federation, etc.



# HEAT-RESISTANT CONVEYOR BELT

The performance-proved HS Belt : Heat resistant belt meets the needs of hot service applications, like hot sintered ore, hot pellet, hot clinker, hot chemical, fertilizer, hot cement, etc.

## • Special Features

- Excellent heat resistant and abrasion resistant cover rubber compound
- Recommended to protect belt from surface cracking and hardening by heat

## • Heat-Resistant Belt Line-up

Type	Compound of Cover Rubber	Temperature Range of Use					Application
		Temperature	Average Material		Belt Surface		
			Max°F	Max°C	Max°F	Max°C	
ECO-HT	EPM/SBR	Lump Max.	550(650)	300(350)	270(300)	130(150)	Top cover : EPM, Bottom cover : SBR Economical version of HT-710 (dried clay, cement clinker, etc.)
		Fines Max.	300(400)	150(200)			
HT-400 (HR-100)	SBR	Lump Max.	300	150	210	100	For low temperature with abrasive material (coke, sintered products, etc.)
		Fines Max.	250	120			
HT-550 (HR-130)	EP(D)M	Lump Max.	450	230	260	130	
		Fines Max.	300	145			
HT-710 (HR-150)	EPM	Lump Max.	650	350	300	150	For higher temperature use (dried clay, cement clinker, etc.)
		Fines Max.	400	200			
HT-850 (HR-180)	EPM	Lump Max.	700	370	350	180	
		Fines Max.	450	230			
SUPER-HT (HR-200)	SUPER EPM	Lump Max.	750	400	400	200	For super high temperature application (sintered ore, cement clinker, chemicals, etc.)
		Fines Max.	480	250			

HT-710 & SUPER-HT HS conveyor belts are the best selection for wide ranges of high temperature application. Heat-resistant conveyor belts are most suitable for heat resistant applications where the temperature of material to be carried is over 60°C (140°F).

## • Kinds of Materials and Belt Surface Temperatures

Materials Carried	Lump Size		Temperature of Materials Carried		Belt Surface Temperature	
	(mm)	Inch(″)	Max°F	Max°C	Max°F	Max°C
Sintered Ore	25~200	1~8	390~750	200~400	270~300	130~150
Return of Sintered Ore	10 downward	0.4	480	260	300~370	150~190
Coke	100~200	4~8	160~210	70~100	120~140	50~60
Raw Material	30 downward	1.2	360~410	180~220	210~250	100~120
Clinker	10~30	0.4~1.2	210~410	100~220	210~230	100~110
Cement	Powder		210~250	100~125	170~190	80~90
Metal Powder	-	-	340	170	250~270	120~130
Molding Sand	-	-	390~480	200~250	170~190	80~90







### • User Attention

The temperature of material being transported and the belt's surface temperature vary according to the material and shape. For instance, when materials have a temperature of 150°C (300°F) (such as coke or sintered ore) and have a relatively small contact area, HS conveyor belt's surface temperature remains at 60-80°C (140-180°F). In contrast, when powdered material like cement is being conveyed, the material temperature and the belt surface temperature do not differ so greatly. The life of a heat-resistant belt is largely affected by the belt's surface temperature during

- Rubber cover and carcass should not deteriorate due to heat

### • Characteristics indispensably required for heat-resistant HS conveyor belt are as follows

- Rubber cover and carcass should not deteriorate due to heat
- Rubber cover and carcass should maintain excellent properties, even at high temperatures and good adhesion to form one unit, even when they are exposed to high temperatures

The surface temperature of the heat-resistant HS conveyor belt varies with the material type, belt speed, loading rate and size, depending on circumstances and conditions. In order to select the proper heat-resistant HS conveyor belt, it is necessary to consider not only the material temperature to be conveyed, but also the surface temperature of the HS conveyor belt.

### • Restrictions on the use of heat-resistant belt

#### SBR Heat-resistant belt

Do not use SBR heat-resistant belt when :

- Strong acid or alkaline is used
- Oil products and oil-stained substances are used
- The operation site or the materials require flame-resistant belts

#### EPR (EPM) Heat-resistant belt

Do not use EPR (EPM) heat-resistant belts when

- Conveying oil products and oil stained products except vegetable oil products
- The location of the materials requires flame-resistant belts





# OIL & OIL / HEAT-RESISTANT C/BELT

The cover rubber is especially compounded for applications requiring resistance to oils.

It has outstanding abrasion, ozone and weather resistance. This HS conveyor belt is recommended for conveyor lines causing swelling and sponginess by oils.

## LOR/MOR

This grade is to resist moderate oil-resistant operations which involve wood chips, linseed, cottonseed and whole soybeans, where static conductivity is needed.

## OR-200

This grade has superior oil resistance to various kinds of animal and vegetable oils with the ability to endure severe cold temperatures of up to -45°C (50°F).

## OR-300

This grade has excellent resistance to the toughest oil applications, such as oil-treated coal and petroleum-based oils.

## HTN/HOT

This grade is recommended for conveying hot asphalt with material temperatures of up to a maximum of 150°C (300°F, in normal conditions) where both oil & heat resistance are required.

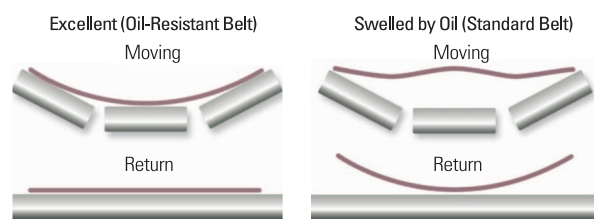
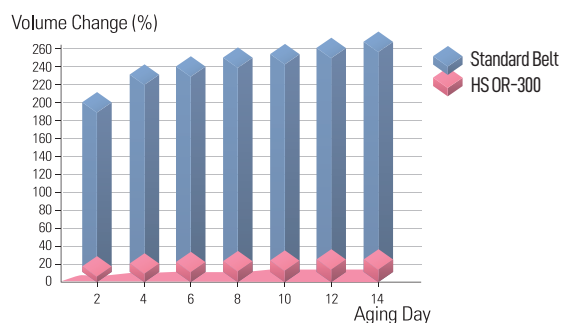
### • Cover Rubber Grade

Type	Min. Tensile Strength		Min. Elongation (%)	Volume Change (%) ASTM #1,3 Oil	Use
	MPa	psi			
LOR MOR	10 10	1400 1400	Min. 350 Min. 350	Max. 15 Max. 30	Wood chip, linseed, cottonseed, kernel corn, and whole soybeans, static conductivity, and moderate oil resistance
OR-200	12	1700	Min. 350	Max. 90	Oil-treated materials and for carrying oily metal turnings and shavings, crushed soybeans, animal or vegetable fats
OR-300	12	1700	Min. 400	Max. 20	Oily metal parts, crushed soybeans, automatic hydrocarbons such as benzol, toluene and petroleum based oils
HTN/HOT	12	1700	Min. 400	Max. 60	Hot asphalt and other oil & heat-resistant applications

※ Note : Oil resistance (volume change) and immersion condition : 70°C×96Hrs

※ LOR/MOR Volume Change (%) ASTM #1 Oil, the other items are Volume Change (%) ASTM #3 Oil

### • Volume Change Ratio



# LTE BELT (Life Time Estimation)

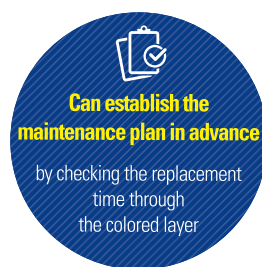


Conveyor belts are like blood vessels of the human body supplying raw materials from the production facilities in the industrial field. But so far, it has not been easy to estimate the lifetime of the belts just with preventive inspection. Hwaseung Corp developed colored conveyor belts that can estimate and diagnose the lifetime in advance by visually checking the abrasion with LTE BELT, the innovative new product that saves costs by extending the belt replacement time up to 20%.

## • Developed for the first time in Korea! Obtained patents in Korea and US

- The conveyor belt consists of carcass that delivers force, cover rubber that protects the carcass and adhesive rubber that binds the carcass to the cover rubber. The cover rubber should be replaced when the adhesive rubber is exposed as the materials are transported and the cover rubber is worn out. However, it was difficult to check the abrasion of conveyor belts since the cover rubber and adhesive rubber were both black color.

LTE BELT developed by Hwaseung Corp is an innovative new product that enables workers easily to check the abrasion and replace the belt by supplementing this weakness.

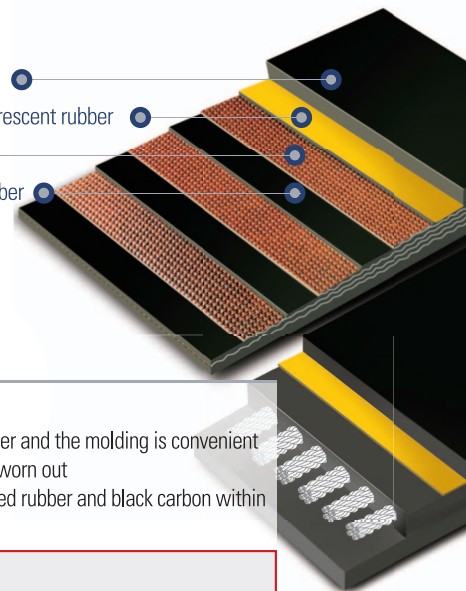


Cover rubber

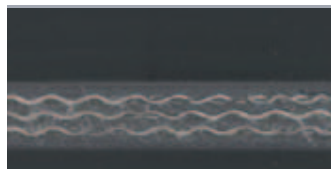
Colored/fluorescent rubber

Carcass

Adhesive rubber

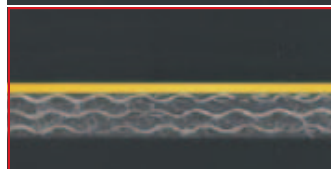


## • Performance comparison of LTE belts



### Black rubber

- It is widely used since there is little contamination in processing rubber and the molding is convenient
- But it is difficult to distinguish abrasion when the product surface is worn out
- There may be a deviation in the property of matter by applying recycled rubber and black carbon within the black rubber mixture.

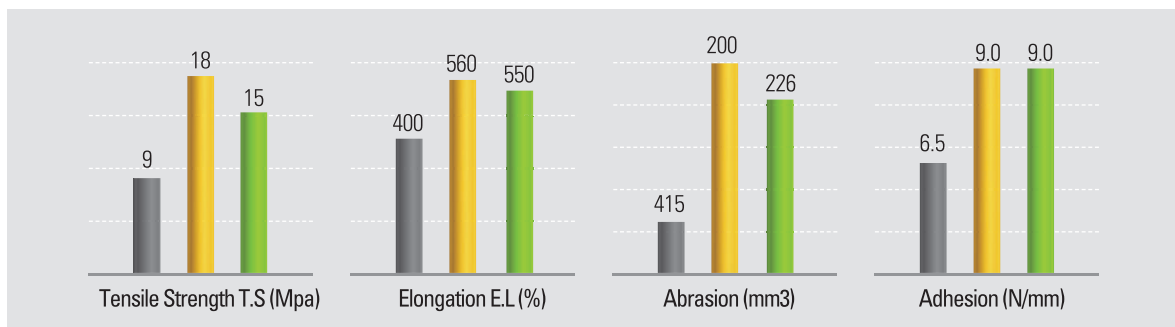


### Colored / fluorescent rubber

- Easy to distinguish abrasion of product surface due to its high legibility
- Improving adhesion and wear resistance by adding silicon dioxide to the colored rubber mixture
- saving cost by extending the belt replacement time by maximum 20%

## • Performance evaluation comparison of LTE belts

■ Black rubber ■ Colored rubber ■ Fluorescent rubber



Evaluation of physical properties of LTE belts >

Verified excellent test results such as durability and adhesion (N/mm) of colored and fluorescent cover rubber





# CAKELESS CONVEYOR BELT

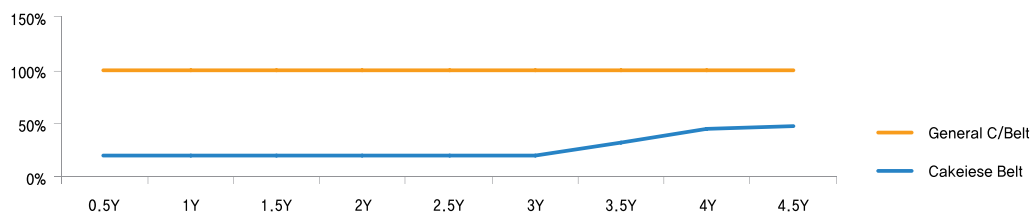
## • Characteristic

- Enhanced slipperiness by adding synthetic component on the top cover rubber = Lower cake
- Due to decreasing quantity of cake, it has a effect of reducing maintenance cost.
- Enhancing belt life time by reducing quantity of cake which prevent from surface damage and abrasion.

## • Usage Analysis

Items	General BELT	CAKELESS BELT
Surface		
Life time of C/Belt	4 Years (Average)	4.5 Years (improved by half year )
CAKE Rate(%)	100%	CAKE Attach 30% Decreased (Cost saved by lower cake rate)

<Attachment of CAKE >



# MULTI CONVEYOR BELT

## • Definition

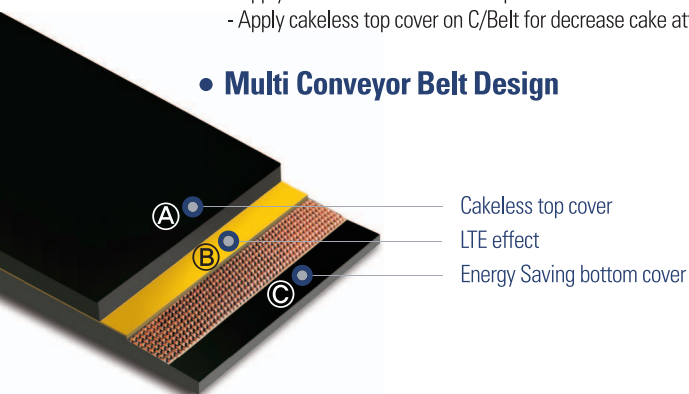
- Decrease electric utility fee by decreasing power loss on conveyor belt line.

## • Characteristic

- Control viscoelastic of rubber compound for decrease indentation resistance.
- Apply colored rubber between top cover rubber and first fabric ply for estimate lifespan.
- Apply cakeless top cover on C/Belt for decrease cake attaching phenomenon on surface.



## • Multi Conveyor Belt Design



## • Product effect Summary

### Ⓐ Cakeless effect

- Cost saving by reducing Q'ty of CAKE
- Improves Belt life by preventing surface damage and abrasion
- Coefficient of friction comparison : Normal C/Belt vs HS C/Belt

### Ⓑ LTE effect

- Estimate replacement time by checking colored rubber when Top cover has been worn out

### Ⓒ Energy saving effect

- Decrease electric utility fee by decreasing power loss on conveyor belt line



# STRAIGHT WARP FABRIC C/BELT

HS Straight Warp conveyor belt has been developed in order to withstand the toughest use in conveying large quantities of material. Reduced ply type of Straight Warp belts have excellent resistance to flexural fatigue, shocks and impacts with outstanding troughability.

## • Special Features

- Straight Warp construction increases resistance to fatigue and impacts
- Troughability is much better than normal fabric
- Low stretch requires less take-up travel
- The single or two-ply construction makes for easy splicing
- Straight Warp with binder warp system is dimensionally stable
- The elongation is approximately 0% at a 10% load (such that this belt can be used for long-distance conveyor lines)
- Available with various cover grades and gauges

### Top Cover

Designed to meet particular services.

### Bottom Cover

Provides wearing surface against pulleys and idlers.

## • Straight Warp Fabric Grade

Grade	No. of plies	Tensile Strength (kg/cm-ply)	Tensile Strength (PIW)	10% Stretch (%)	Approx. Carcass Thickness (mm)
SW 630	1	630	360	Max. 1.0	2.6
SW 800	1	800	455	Max. 1.0	3.2
SW 1000	1	1000	570	Max. 1.0	4.0
SW 1250	1	1250	715	Max. 1.0	4.1
SW 1500	1	1500	585	Max. 1.0	4.4
SW 1600	1	1600	915	Max. 1.0	4.6
SW 1250	2	1250	715	Max. 1.0	5.8
SW 1600	2	1600	915	Max. 1.0	7.0
SW 2000	2	2000	1140	Max. 1.0	8.6

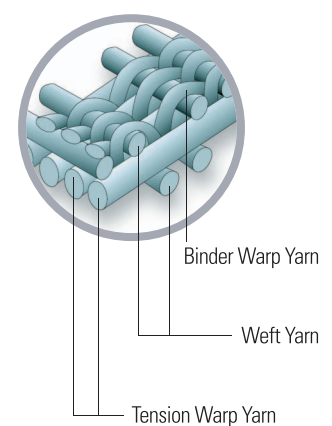
### Carcass

Straight warp fabric for high tensile strength.

## • Technical Data

Grade		SW 630	SW 800	SW 1000	SW 1250	SW 1250	SW 1600	SW 2000
No. of Plies		1	1	1	1	2	2	2
Min. Width for Troughing Empty 35° Idlers		24"	24"	30"	30"	36"	36"	36"
Min. Pulley Diameter (inch)	Head & Drive	16"	18"	20"	22"	36"	36"	36"
	Tail & Take-up	14"	16"	18"	20"	24"	30"	30"
	Bend & Snubs	12"	14"	16"	18"	20"	24"	24"

## Structure of Fabric





## CFW FABRIC C/BELT

Developed to solve today's general conveyor belt problems with transporting quarry.  
No more problems with the HS conveyor belt, especially the primary conveyor line.

※ CFW : Crow's Foot Weave Fabric

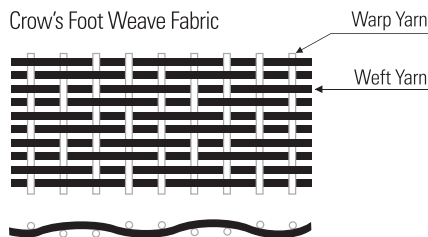


### CFW Fabric Specification

The specially-designed Crow's Foot Weave fabric used in the "Quarry Supreme" belt has extremely high tear strength, up to 5 times stronger compared with a plain, woven standard fabric. Fastener holding ability is excellent with up to more than 90% efficiency.

#### • CFW Fabric Grade & Cover Rubber

Specification		CFW250x2P	CFW250x3P	CFW315x2P	CFW315x3P	CFW315x4P	CFW350x3P	CFW350x4P
No. of Plies		2	3	2	3	4	3	4
Working Tension Rating	(kg/cm)	50	75	63	95	126	105	140
	(lb/inch)	280	420	350	530	700	580	780
Thickness(inch)		3/16" ~ 1/4"	1/4" ~ 5/16"	1/4" ~ 5/16"	1/4" ~ 5/16"	5/16" ~ 3/8"	5/16" ~ 3/8"	5/8" ~ 1/2"



## PIPE CONVEYOR BELT

HS pipe conveyor belt is designed to be suitable for resistance to flex fatigue and abrasion by materials to be carried along with superior ply adhesion.



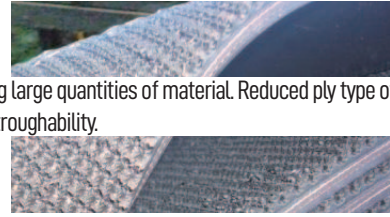
#### • Special Features

- Closed transportation in order to prevent materials from overflowing, drop-down, scattering, and mixing with foreign materials from outside
- HS pipe conveyor belt is economical for curve (45°~90°) and incline (up to 30°) transportation due to easy design of conveyor line and limited space

Pipe Diameter (mm, ø)	Cross Section Area (75%)	Belt Speed (m/min)	Capacity (m³/hr)	Material Size (mm)	Comparison with Standard C/Belt (mm)
150	0.013	120	95	30~50	300 ~ 500
200	0.023	130	180	50~70	500 ~ 600
250	0.041	140	344	70~90	600 ~ 750
300	0.049	145	441	90~100	750 ~ 900
350	0.066	175	693	100~120	900 ~ 1,050
400	0.108	200	1296	120~150	1,050 ~ 1,200
500	0.155	225	2093	150~200	1,200 ~ 1,500
600	0.216	250	3240	200~250	1,500 ~ 1,800
700	0.290	275	4620	250~300	1,800 ~ 2,000
850	0.404	300	7272	300~400	2,000 ~ 2,200

## ROUGH TOP C/BELT

HS Straight Warp conveyor belt has been developed in order to withstand the toughest use in conveying large quantities of material. Reduced ply type of Straight Warp belts have excellent resistance to flexural fatigue, shocks and impacts with outstanding troughability.

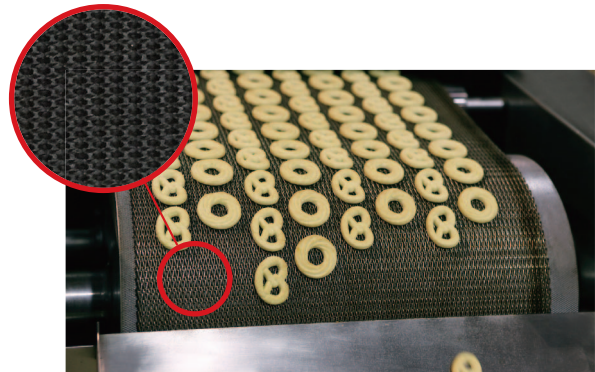
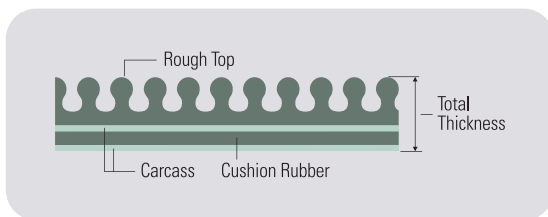


### • Special Features

- Cushioning effect absorbs vibration and reduces slippage
- Usable at an angle of 25~35 degrees, depending on goods to be carried
- Low friction coefficient with bare back bottom
- Two to three plies of synthetic fabrics provide high strength and flexibility
- Various colored cover rubbers are available upon request

### • Type of Rough Top Belt

2PLY	Black	Rough top X BARE
3PLY	Black	Rough top X BARE

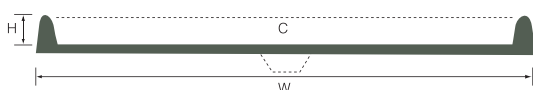


## COAL FEEDER C/BELT

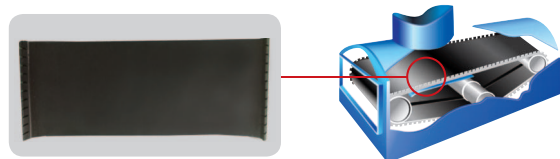
This belt is used for feeding systems, controlling the accurate input and quantity of materials.



### • Cross-Section View



### • Feeding System





# INCLINE (CHEVRON-CLEATED) C/BELT

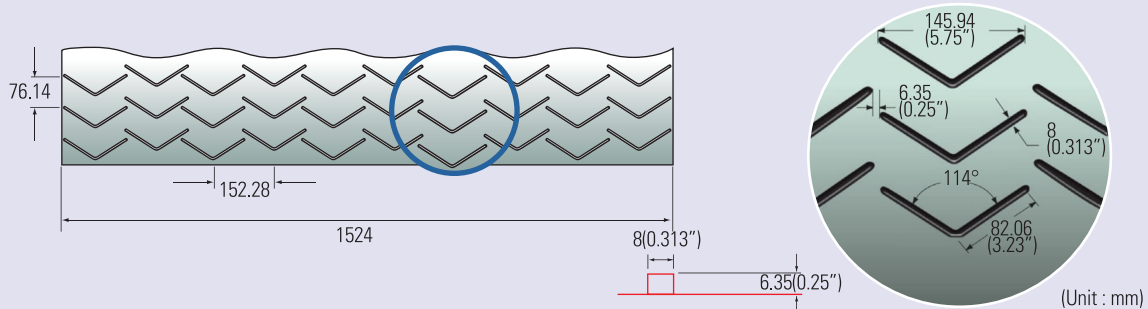
HS Incline (Chevron-Cleated) conveyor belt is used to carry sand, fine coal, and grain materials by using steep inclines. Chevron-Cleats increase the quantity of granular materials in fabric incline applications.



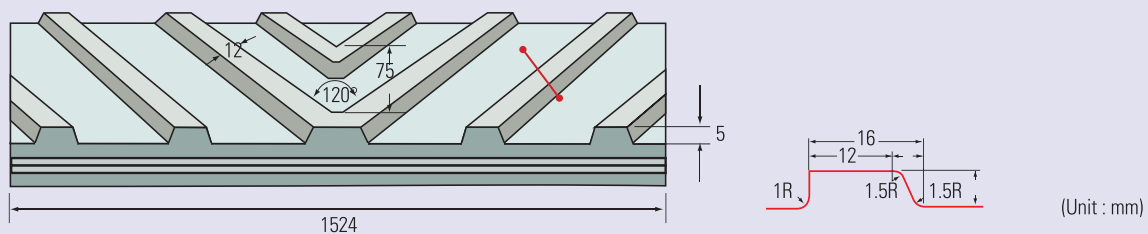
## • Special Features

- High quality fabric with low stretch
- Cleat angle and pitch are designed for smooth travel over return idlers
- Higher angle of 17~30 degrees of incline
- Wear-resistant and oil-resistant black rubber are available

### Multi-V Cleated Incline Belt



### V Cleated Incline Belt



### Steep Incline Belt

#### C15 Type

(Unit : mm)

A Belt Width	B Pattern Width	C Pitch
500	385	250
600	385	250
650	385	250
750	600	370
900	600	370
1000	600	370

#### C25 Type

(Unit : mm)

A Belt Width	B Pattern Width	C Pitch
600	550	250
650	550	250
750	550	250
800	550	250
900	750	330
1000	750	330
1050	750	330
1200	750	330



# SIDEWALL C/BELT

This HS belt is designed with two corrugated sidewalls molded to a cross-rigid basebelt. It was developed in order to meet larger capacities with steeper inclined lines.

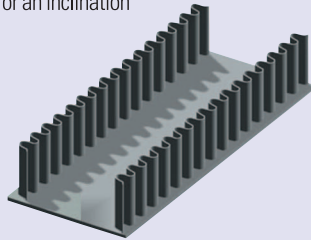


## • Special Features

- Increase the transporting capacity up to 4 times compared to standard conveyor belt
- Save installation space due to the possibility of increasing the angle of inclination up to 90°
- Protect materials from friction with solid cleats mounted on the belt

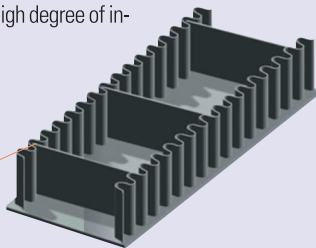
### Type I

This type of sidewall belt has no fin and is normally used for an inclination from 0–16°



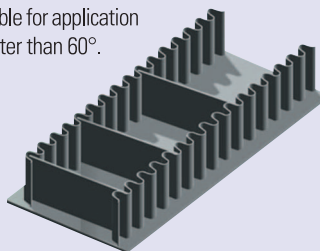
### Type II

The cross-fin provides better performance to be used to a high degree of inclination of 15–60°



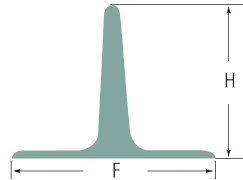
### Type III

The cross-fin, with wider base belt construction, is suitable for application when incline is greater than 60°.

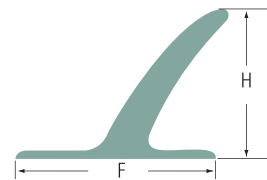


## Fin Type

### • T-Type



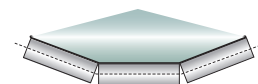
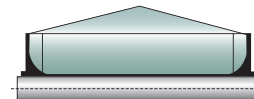
### • C-Type



## Comparison of Cross Section Area

Cross Rigid Basebelt

Standard Exwill Conveyor Belt



## Various Installation

### • I-Type



### • L-Type



### • S-Type



### • RL-Type



## Cross Rigid Base Belt

In order to give maximum stability in the transverse direction, this base belt is reinforced with specially designed filament fabrics which provides better return in side support, no wear and tear of cleats, and cover rubber is available with various compounds, like abrasion oil, heat, and flame resistance.



## SPECIAL PURPOSE OF EXWILL

Various kinds of fabric carcass and a wide ranges of rubber materials make it possible to select the best HS conveyor belt for the intended application.

### • Heat & Flame-Resistant Conveyor Belt

Developed conveyor belt which serves dual purposes with heat & flame resistant properties

### • Heat & Abrasion-Resistant Conveyor Belt

Developed conveyor belt to extend life span of heat resistance and conveyor belt with better abrasion resistance

### • Cold-Resistant [Eskimo] Conveyor Belt

The Eskimo (Cold-resistant conveyor) belt not only has a long life span, but also is efficient operating in a low temperature environment, even to -50°C (-58° F)

### • Air-Supported Conveyor Belt

Air-supported conveyor belt is specially designed to operate without a roller. This belt is driven by air pressure on the sliding bed.

1. Weight : Lighter weight compared to conventional conveyor belt
2. Flexibility : Better flexibility of belt fabric's weft
3. Bottom cover slipperiness : Enhanced slipperiness of bottom cover

### • Seal Belt

The Seal Belt is used to prevent materials scattered from scattering in case of CSU (Continuous Ship Unloader) is used. This belt's main market is power plants. The two types are Bar/Mesh type & Fabric type.

### • LTE Pulley Lagging Sheet

Lagging sheet for conveyor belt pulley.

1. Apply CR polymer on inner side for enhancing adhesion with pulley(iron).
2. Apply colored rubber on lagging sheet for estimate replace period.

## HS-EXWILL Design program on WEB

### • Definition

- Build 3W(Whenever, Wherever, Whatever) system through program on WEB.

### • Characteristic

- Calculate strength design of conveyor belt on WEB and Mobile.
- Calculate forecast lifetime of conveyor belt on WEB and Mobile.



**Customers :**

Please fill in the blanks with relevant information as completely as possible to place an order for an HS Conveyor Belt that best fits your company's needs.

**DATA - INQUIRY FORM**

No. \_\_\_\_\_

Date. \_\_\_\_\_

Company					
Conveyor No.				Operation Site	
※ Belt width		mm(in.)		※ Belt width	
				m/min.(feet/min.)	
※ Materials	Kind of the material			Apparent specific gravity	
	Size	mmø(in.ø)~mmø(in.ø)		Ratio of maximum lump size contained	
	Temperature	Max. °C (°F)		Max. °C (°F)	
※ Capacity of transportation		Max. t/h		Average t/h	
※ Surface temperature of the belt		Max. °C (°F)		Max. °C (°F)	
※ Centers of conveyor		Horizontal m(feet)		Max. m(feet)	
※ Lift		m(feet)			
※ Angle of inclination		Max. Deg.		Average. Deg.	
Drive	Type				
	Surface of the pulley	With Rubber lagging ( )		Without Rubber lagging ( )	
	Angle of wrap	Deg.			
Carrier Roller	Angle of trough				
	Spacing of carriers				
	Spacing of return idlers				
	Weight of moving parts other than material transported	Carrier Roller	kg/m(lb/in.)	Carrier Roller kg/m(lb/in.)	
Take-up	Type				
	Effective length of the take-up				
	Weight of the take-up				
	Position of the take-up	Head		Tail	
Diameter of pulley	Drive pulley	mmø(in.ø)		※ Drawing of Conveyor Belt Line	
	Head pulley	mmø(in.ø)			
	Tail pulley	mmø(in.ø)			
	Take-up pulley	mmø(in.ø)			
	Snub Pulley	mmø(in.ø)			
Driving motor	Horse power	kw(hp)			
	Type				
	Revolution	rpm			
	Cycle				

※ Mandatory information ■ You can download this DATA - INQUIRY FORM from our web-site : [www.hs-exwill.com](http://www.hs-exwill.com)



# HWASEUNG Corporation

## STEEL CORD RUBBER CONVEYOR BELT

HWASEUNG CORP Steel Cord Rubber Conveyor Belt can be widely used in the coal industry, mines, ports, power plants and chemical industry for conveying materials.

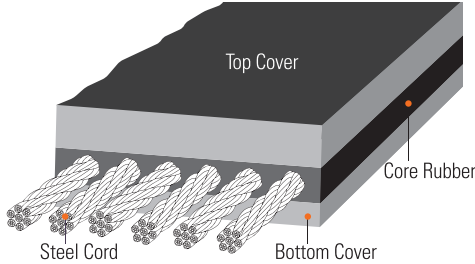
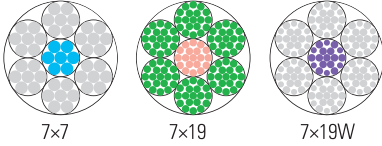
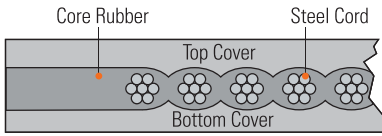
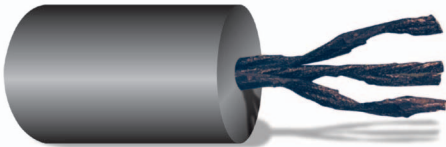
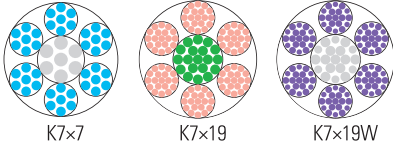
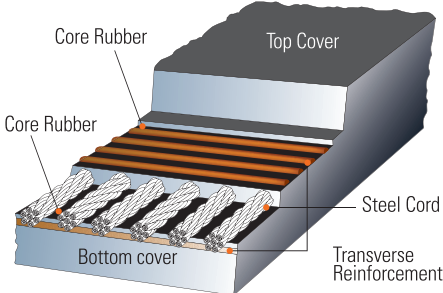
STRUCTURE  
SPECIFICATIONS  
SPECIALTY



HWASEUNG Corporation



# STRUCTURE

General ConstructionType	Structure
 <p>Steel Cord</p> <p>Bottom Cover</p> <p>Core Rubber</p> <p>Top Cover</p> <p>Cord structure of General Construction type</p>  <p>7×7      7×19      7×19W</p>	<p>The belt reinforcement consists of galvanized steel cord and core rubber which possess superior adhesive properties. The belt body is comprised of the reinforcement covered with top and bottom layers of rubber. The steel cord is composed of a left and right twisting wire, arranged evenly and longitudinally in the belt.</p>
	Features
	<p>With large tensile strength, long service life, minimal elongation, excellent troughability and superior flexing resistance, the belt is suitable for conveying materials over long distances with large loads and at high speeds.</p>
	 <p>Core Rubber</p> <p>Top Cover</p> <p>Steel Cord</p> <p>Bottom Cover</p>
New Construction Type	Features
<p>Steel cord penetrated with core rubber</p>  <p>Cord structure of General Construction type</p>  <p>K7×7      K7×19      K7×19W</p>	<p>Each strand of steel wire has enough room for the core rubber to penetrate. This greatly strengthens the bonding strength between the rubber and steel cord. Since the anti-corrosive resistance to steel cord is good, the mutual shearing of strands and twisting of strand wire can be relaxed. The service life of the belt can be prolonged, because the dynamic fatigue resistance is excellent.</p>
Transverse Reinforcement	Structure
 <p>Core Rubber</p> <p>Top Cover</p> <p>Core Rubber</p> <p>Steel Cord</p> <p>Bottom cover</p> <p>Transverse Reinforcement</p>	<p>On both sides or one side, the transverse reinforcement (steel cord, steel wire cord, fiber cord or textile fabric) is laid out.</p>
	Features
	<p>Good impact resistance and excellent properties make for reducing tears by external force, increasing belt life and rip resistance, and allowing cord protection.</p>



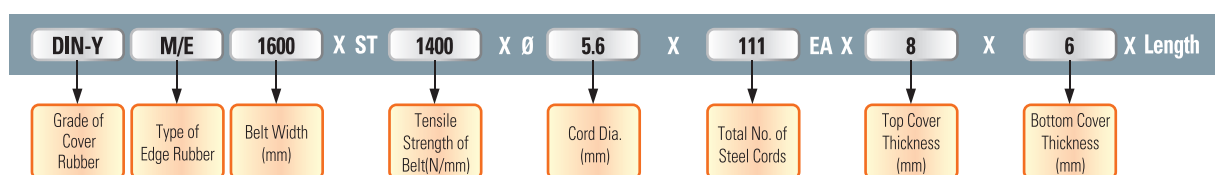
# SPECIFICATIONS

## Specifications

Belt type		ST 500	ST 500	ST 800	ST 1000	ST 1250	ST 1400	ST 1600	ST 1800	ST 2000	ST 2250	ST 2500	ST 2800	ST 3150	ST 3500	ST 4000	ST 4500	ST 5000	ST 5400
Tensile strength(N/mm)		500	630	800	1000	1250	1400	1600	1800	2000	2250	2500	2800	3150	3500	4000	4500	5000	5400
Max. Dia. of Cord(mm)		2.8	3	3.5	4	4.5	4.5	5	5	6	6.3	7.2	7.6	8.1	8.6	9.2	10.1	10.6	11.5
Min.Breaking Strength of Cord(KN/Cord)		5.6	7	8.9	13.2	16.5	18.5	21.1	23.7	26.4	29.6	41.7	46.7	52.5	58.4	66.7	80.4	89.3	103.9
Weight of Cord(g/m)		30.7	34.7	47.8	64	79.8	79.8	97.3	97.3	137	155	196	221	253	280	316	385	414	496
Pitch(mm)		10	10	10	12	12	12	12	12	12	12	15	15	15	15	15	16	16	17
Max.Working Strength of Belt(N/mm)		72	90	115	145	180	200	230	260	290	320	360	400	450	500	580	640	720	770
Min. Thickness of Cover(mm)		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	5.0	5.5	5.5	6.0	6.5	7.0	7.5	8.0
Min. Pulley Diameter (mm)	Head & Drive	600	600	650	750	850	950	1000	1200	1200	1400	1500	1550	1700	1800	1850	2000	2100	2400
	Tail & Take-up	500	500	500	550	700	750	800	950	950	1200	1200	1250	1350	1400	1400	1600	1700	1900
	Bend & Snubs	350	350	400	450	500	510	600	700	700	800	900	950	1000	1050	1050	1200	1250	1400
Belt Width(mm)		No. of steel cords																	
500 ± 5.0		45	45	45	38	38	38	38	-	-	-	-	-	-	-	-	-	-	-
650 ± 6.5		60	60	60	50	50	50	50	50	50	50	40	40	40	40	40	37	37	35
750 ± 7.5		70	70	70	59	59	59	59	59	59	59	47	47	47	47	47	44	44	41
800 ± 8.0		75	75	75	63	63	63	63	63	63	63	50	50	50	50	50	47	47	44
900 ± 9.0		85	85	85	71	71	71	71	71	71	71	57	57	57	57	57	53	53	50
1000 ± 10.0		95	95	95	79	79	79	79	79	79	79	64	64	64	64	64	59	59	56
1050 ± 10.5		98	98	98	82	82	82	82	82	82	82	66	66	66	66	66	62	62	58
1200 ± 12.0		113	113	113	94	94	94	94	94	94	94	76	76	76	76	76	71	71	67
1400 ± 14.0		133	133	133	111	111	111	111	111	111	111	89	89	89	89	89	83	83	78
1500 ± 15.0		141	141	141	118	118	118	118	118	118	118	94	94	94	94	94	89	89	93
1600 ± 16.0		151	151	151	126	126	126	126	126	126	126	101	101	101	101	101	95	95	89
1800 ± 18.0		171	171	171	143	143	143	143	143	143	143	114	114	114	114	114	107	107	101
2000 ± 20.0		-	-	-	159	159	159	159	159	159	159	128	128	128	128	128	120	120	113
2200 ± 22.0		-	-	-	176	176	176	176	176	176	176	141	141	141	141	141	132	132	125

※ Note : Belts beyond the above specifications can also be made upon request

## Example of Identification



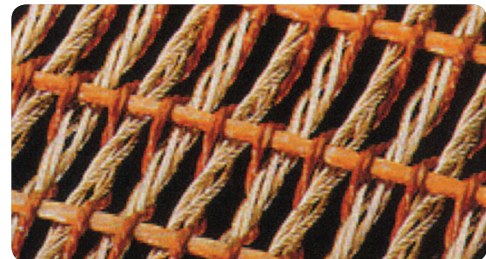
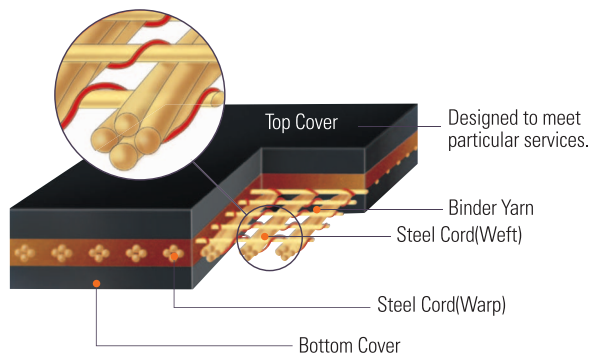
# SPECIALTY

## • Special Features

- Low elongation of steel mesh belt reduces the length of take-up
- Excellent adhesion between steel mesh and cover rubber to resist flex fatigue and impact
- Single carcass reinforcement has much better flexibility
- Steel mesh belt offers superior resistance to the repeated impacts
- Easy splicing by finger type vulcanizing joint

## Steel Mesh Grade (IW-R Type) : Special

Grade		IW630R	IW800R	IW1000R	IW1250R	IW1400R	IW1600R	IW1800R	IW2000R
Tensile Strength(Warp)	N/mm	630	800	1000	1250	1400	1600	1800	2000
Working Tension Rating(Warp)	N/mm	63	80	100	125	140	160	180	200
Tensile Strength(Weft)	N/mm	200	200	200	200	200	200	200	200
Carcass Thickness	mm	5	5.6	5.6	6.4	6.4	7.2	7.2	7.2
Weight	kg/m <sup>2</sup>	3.45	4.35	5.2	6.4	6.9	7.9	9.1	9.8



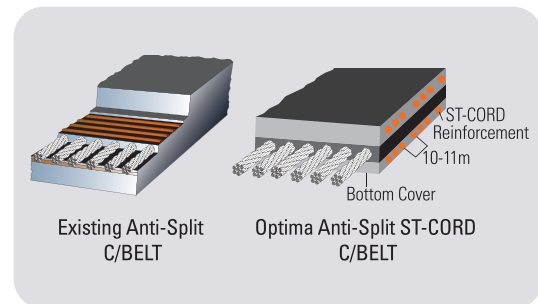
## Optima Anti-Split ST-CORD C/BELT

### 1. Definition & Characteristics

- Conveyor belt which has ST-CORD reinforcement running along the width inserted inside of top & bottom covers in 10~11m increments as anti-splitting measures in conveying

### 2. Characteristics & Effectiveness

- Lifetime of C/Belt will be increased by 30% due to the top & bottom covers which have been inserted with ST-CORD across the width of the belt
- The price is 20% lower because of the nonlinear width direction ST-CORD placed in 10~11m increments



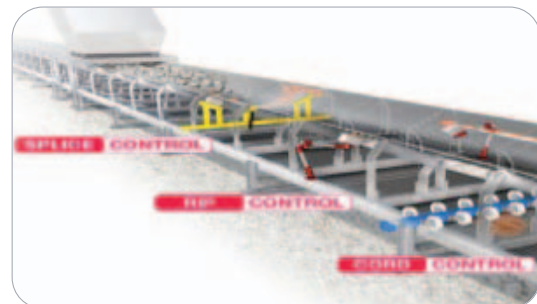
## Anti-Tear Sensor C/BELT

### 1. Definition & Characteristics

Anti-Tear sensor installed inside of the belt, which senses longitudinal tear and stops operation automatically to minimize the damage caused by tears

### 2. Characteristics & Effectiveness

- Monitoring longitudinal tear at all speeds with minimal interface
- Enhanced efficiency by better use of manpower



# HWASEUNG Corporation

## PVC/PU CONVEYOR BELT

HWASEUNG CORP Lightrans produces conveyor and process belts for light and medium duty operations in all industrial and service sectors. Exwill belts are compatible with all types of conveyors, whether horizontal, roller-supported, troughed, and inclined, etc.

PVC/PU CONVEYOR BELT  
PVC/PU SPECIFICATIONS



HWASEUNG Corporation



# PVC/PU CONVEYOR BELT

HS Lightrans produces conveyor and process belts for light and medium duty operations in all industrial and service sectors. HS belts are compatible with all types of conveyors, whether horizontal, roller-supported, troughed, and inclined, etc.

## • Special Features

- Robust
- Longitudinally flexible
- No need to change dimensions
- Eco-friendly & low noise during operation
- Light-weight with low overall thickness
- Low elongation
- Economical conditions
- Small drum diameters
- Easy to maintain
- Good working circumstance
- Simple method / convenient to put into machinery
- Small take-up ranges

## • Applications

**Light duty PVC/PU conveyor belts are available for various applications in all industries.**

- Food handling
- Wood industry
- Corrugated boxboard
- Textile industry
- Metal sheet industry
- Package handling
- Distribution center
- Fish/fruit industry

## • Structure

### Carcass

Various tension-member constructions make up the foundation of the belt according to the use of different fabric. These belts are meet various requirements, such as belt tracking, elongation, low noise and anti-static properties.

### Bottom Cover

Smooth cover, fabric, impregnated fabric or embossed cover can be used. These can be used for sliding bed or rolling support effect.

### Top Cover

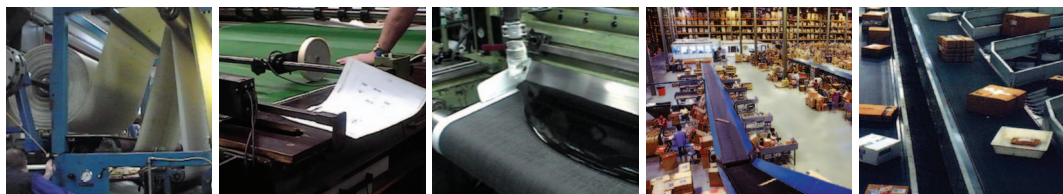
The mechanical characteristics of a belt depend on the various coating materials, thickness and patterns.

## Covers

HS lightrans is very flexible in having various covers with different colors according to customer's specifications, such as a nonstandard covers or surface.

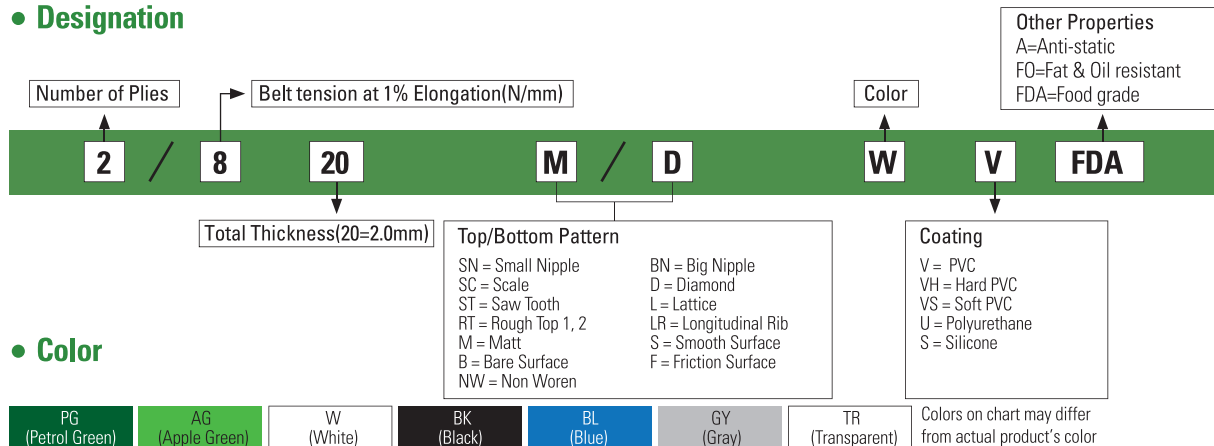
## FDA Belts

HS FDA belts are appropriate for conveying foodstuffs with resistance to animals and vegetable oils and fats, which can help to meet with FDA standards.



# PVC/PU SPECIFICATIONS

## • Designation



## • Color

## Example of Identification

Belt code	Top Cover (mm)				Bottom Cover (mm)			
	Material	Color	Thickness	Surface	Material	Color	Thickness	Surface
4/35 90 SN/F PG V	PVC	Petrol Green	2	Small nipple	PVC	Light Green	0.1	Impregnated
2/8 30 NW/B BK V A	PVC	Black	1.5	Non-woven cotton		Natural	0	Fabric
2/8 30 S/B AG V A	PVC	Apple Green	1	Smooth		Natural	0	Fabric
2/10 30 LR/B AG V	PVC	Apple Green	1.5	Longitudinal Lib		Natural	0	Silent Fabric
2/8 20 D/B AG V A	PVC	Apple Green	0.5	Diamond		Natural	0	Fabric
3/13 40 S/B AG V A	PVC	Apple Green	1	Smooth		Natural	0	Fabric
2/10 50 RT1/B AG V	PVC	Apple Green	3	Rough Top1		Natural	0	Silent Fabric
2/8 20 S/B AG V A	PVC	Apple Green	0.5	Smooth		Natural	0	Fabric
2/8 18 B/B W V A	PVC	White	-	Fabric		Natural	0	Fabric
2/10 60 RT2/B AG V	PVC	Apple Green	4	Rough Top2		Natural	0	Silent Fabric
2/8 20 S/B W V	PVC	White	0.5	Smooth		Natural	0	Fabric
2/8 27 L/B PG V A	PVC	Petrol Green	1.5	Lattice		Natural	0	Fabric
2/8 30 B/B W V	PVC	White	-	Cotton		Natural	0	Cotton
2/8 20 M/B PG V	PVC	Petrol Green	0.5	Matt		Natural	0	Fabric
2/8 30 S/D W V	PVC	White	1	Smooth	PVC	White	1	Diamond
3/13 50 S/D AG V A	PVC	Apple Green	1	Smooth	PVC	Apple Green	1	Diamond
2/8 30 S/D AG V A	PVC	Apple Green	1	Smooth	PVC	Apple Green	1	Diamond
2/8 20 S/B BK V	PVC	Black	0.5	Smooth		Natural	0	Fabric
2/8 40 NW/B BK V A	PVC	Black	2.5	Non-woven cotton		Natural	0	Fabric
2/8 60 BN/B AG V	PVC	Apple Green	4	Big nipple		Natural	0	Fabric
2/8 90 SC/B PG V	PVC	Petrol Green	7	Scale		Natural	0	Fabric
2/8 20 M/B BK V A	PVC	Black	0.5	Matt		Natural	0	Fabric
2/8 20 S/B W V FDA	PVC	White	0.5	Smooth		Natural	0	Fabric
2/8 30 S/B W V FDA	PVC	White	1	Smooth		Natural	0	Fabric
3/13 40 S/B W V FDA	PVC	White	1	Smooth		Natural	0	Fabric
2/8 30 S/D W V FDA	PVC	White	1	Smooth	PVC	White	1	Diamond

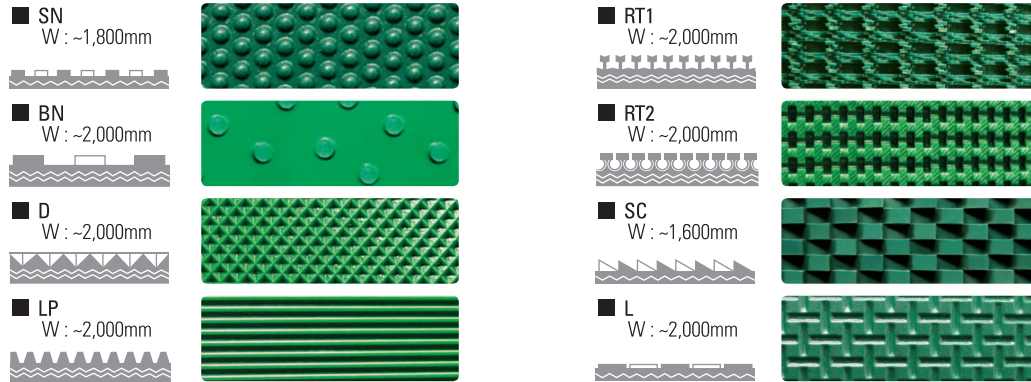
## PU Dimension

2/10 15 M/F W U A FDA	PU	White	0.5	Matt		Natural	0.1	Impregnated
2/10 14 M/F AG U A FDA	PU	Apple Green	0.5	Matt		Natural	0.1	Impregnated

Inclined conveying: Belts with embossed top covers for inclined or declined conveyors. The conveying angles that can be used here depend on the type of goods, the top face coating and external influences such as dust, moisture etc. HS Lightrans supplies belts with patterns for inclined conveying.

### Patterns for inclined conveying

HS Lightrans has developed and optimized a variety of surface textures for various applications. With HS patterned belts, an angle of incline of up to 30° can be achieved without profiles.



Special Characteristics	Temp.(°C)		Fabrics		Total Thickness mm			Load (N/mm)		Max.Width mm	Length m
	Min.	Max.	Plies	Weft				Breaking Load	1%		
	-10	80	4	Rigid	9	300	350	400	35	1800	50
Antistatic	-10	80	2	Rigid	3	60	80	120	8	1000	100
Antistatic	-10	80	2	Rigid	3	60	80	120	8	2000	100
	-10	80	2	Rigid	3	60	80	120	8	2000	100
Antistatic	-10	80	2	Rigid	2	40	60	120	8	2000	100
Antistatic	-10	80	3	Rigid	4	80	100	170	13	2000	100
	-10	80	2	Rigid	5	60	80	130	10	2000	100
Antistatic	-10	80	2	Rigid	2	40	60	120	8	2000	100
Antistatic	-10	80	2	Rigid	1.8	40	60	120	8	2000	100
	-10	80	2	Rigid	6	60	80	130	10	2000	100
	-10	80	2	Rigid	2	40	60	120	8	2000	100
Antistatic	-10	80	2	Rigid	2.7	60	80	120	8	2000	100
	-10	80	3	Rigid	3	60	80	170	13	1800	100
	-10	80	2	Rigid	2	40	60	120	8	2000	100
	-10	80	2	Rigid	3	80	80	120	8	2000	100
Antistatic	-10	80	3	Rigid	5	100	100	170	13	2000	100
Antistatic	-10	80	2	Rigid	3	80	80	120	8	2000	100
	-10	80	2	Rigid	2	40	60	120	8	2000	100
Antistatic	-10	80	2	Rigid	4	80	80	120	8	1000	100
	-10	80	2	Rigid	6	60	80	120	8	2000	50
	-10	80	2	Rigid	9	80	100	120	8	1600	50
Antistatic	-10	80	2	Rigid	2	40	60	120	8	2000	100
FDA	-10	80	2	Rigid	2	40	60	120	8	2000	100
FDA	-10	80	2	Rigid	3	60	80	120	8	2000	100
FDA	-10	80	3	Rigid	4	80	100	170	13	2000	100
FDA	-10	80	2	Rigid	3	80	80	120	8	2000	100
Antistatic/FDA	-15	90	2	Rigid	1.5	30	40	140	10	2000	100
Antistatic/FDA	-15	90	2	Rigid	1.4	30	40	140	10	2000	100



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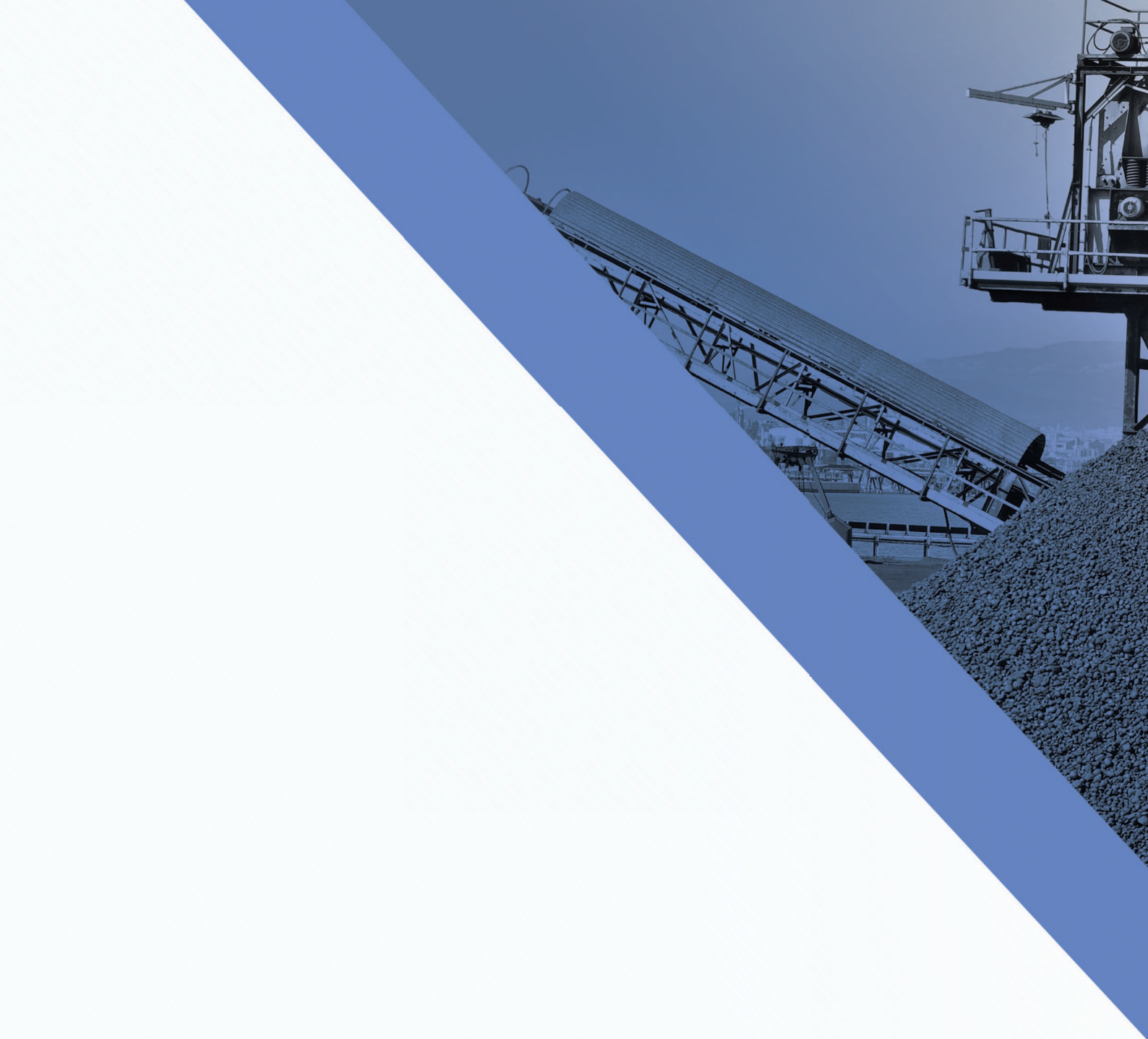
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