

# FEDERAL HEAVYWEIGHT CONVEYOR BELTING



**Federal**  
Conveyor Components

# Federal provides high performance conveyor belting service

The Federal line of conveyor belting gives high performance, long-lasting service in bulk-haulage and bucket elevator applications under the severest operating conditions. This is a result of Federal's special combination of tough synthetic fabric plies, superior adhesions, and protective covers designed for specific belt applications.

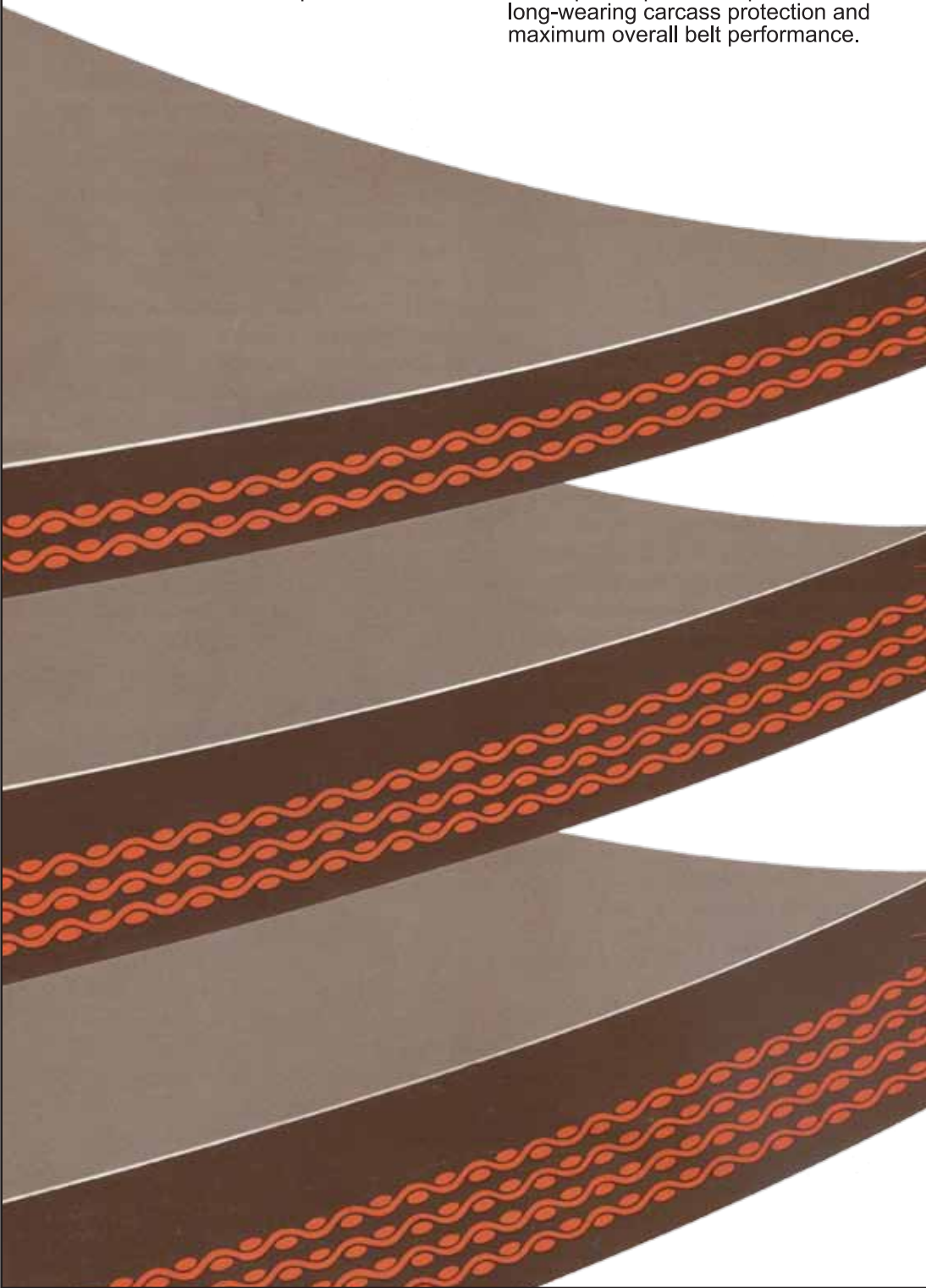
In conventional multiple-ply belting, the weight of the belt increases in direct proportion to the increase in the number of plies. The belt gets heavier and bulkier as plies are added. Federal's unique construc-

tion concentrates high strength in fewer plies so that the belt can be made with less weight and thickness than multiple-ply belts. This makes Federal Belting more flexible so that it can travel easily over smaller pulleys. The reduction in weight makes it easier to install and saves on the energy needed to drive the belt.

Federal Belting is available with a wide variety of specially-compounded rubber covers for a full range of general and special service requirements. These have been developed to provide superior long-wearing carcass protection and maximum overall belt performance.

Additional belt serviceability is afforded by the high-strength synthetic fabric used in the Federal carcass. It has optimum resistance to stretch, resists chemical attack, has only one-tenth the water absorption of nylon and does not become stretchy when wet. The synthetic carcass is also engineered for high impact, tear and rip resistance and the fabric is chemically bonded to the rubber for high resistance to delamination.

Federal's outstanding features provide long-service life in bulk-haulage conveyor and bucket elevator applications, assuring you of top value for your conveyor belting dollar.



## Two-ply

- Top Cover
- Skim
- Synthetic Carcass Fabric
- Bottom Cover

## Three-ply

- Top Cover
- Skim
- Synthetic Carcass Fabric
- Bottom Cover

## Four-ply

- Top Cover
- Skim
- Synthetic Carcass Fabric
- Bottom Cover

# Federal Conveyor Belting is available in covers for every rugged application

## HIGH IMPACT SERVICE

### Grade 1

RMA Grade 1 Cover. Excellent abrasion resistance. Best resistance to combined cutting, gouging and heavy impact. Recommended for use with heavy logs from debarker, large-lump ores (iron, copper, molybdenum), rocky earths, traprock, quartz ores, granite, glass cullet and similar materials.

## HEAVY DUTY ABRASIVE SERVICE

### Grade 2

RMA Grade 2 Cover. For long-wearing service where heavy continuous abrasion is the primary concern, and cutting and gouging from sharp lumps are intermittent conditions. Recommended for the majority of above-ground applications including: log handling from woodyard to debarkers, run-of-mine and sized coal, coal mine refuse, crushed ores, phosphate rock, potash, trona, salt, sand, crushed rock or limestone, aggregates, earth, slag, and other abrasive materials.

## HIGH TEMPERATURE SERVICE

### Super-Hot Belts

#### Super-Hot

Highest Grade EPDM Cover. Premium belt for high-temperature service with maximum resistance to the effects of extremely hot abrasive loads. For "blanket" loads of hot fines to 400°F (204°C) or coarse lumps, 2-inch and over, to 450°F (232°C). Provides maximum service life on enclosed systems with high ambient temperature.

#### Super-Hot Ozone

EPDM Cover. Excellent resistance to the effects of high-temperature loads and abrasive materials in the temperature range of 350°F (177°C) for fines and 400°F (204°C) for coarse lumps. Excellent resistance to hardening and cracking within its recommended service temperature range, and is highly resistant to the effects of ozone.

#### Super-Hot Oil-Resistant

Butyl Cover. Recommended for a service temperature range of 350°F (177°C) for "blanket" loads of fines

and 400°F (204°C) for moderately abrasive friable lumps, 2-inch and over.

### Super-Hot Type SOR

Excellent resistance to heat and abrasion in the service temperature range of 250°F (121°C) for fines, and 350°F (177°C) for lumps, 2-inch and over. Covers will not harden and crack as rapidly as ordinary abrasive-service covers in the recommended service temperature range. Designed primarily for abrasive lump service.

## OIL-RESISTANT SERVICE

### Type SOR

Special oil-resistant covers designed for a high degree of resistance to the effects of vegetable and petroleum oils at normal ambient temperatures, where abrasion is moderate. SOR is the most economical belt for general oil resistance, and for handling a variety of whole grains, soybeans, milo, and seeds in high-volume terminals, particularly when in contact with large amounts of crushed beans or kernels. Also recommended for specialized service in solid waste disposal handling sewage sludge and for oil-treated coal where fire resistance is not required.

CODE	CONSTRUCTION		WARP TENSILE STRENGTH		ALLOWABLE WORKING TENSION		APPROX. GAUGE PER PLY (IN BELT)	
	Warp	Welt	lb/in-ply	kg/cm-ply	lb/in-ply	kg/cm-ply	inch	m/m
CC-55	Cotton	Cotton	310	55	31	5.5	0.050	1.25
CC-65	Cotton	Cotton	367	65	36	6.5	0.050	1.25
NN-100	Nylon	Nylon	560	100	56	10.0	0.048	1.10
NN-150	Nylon	Nylon	840	150	84	15.0	0.048	1.20
NN-200	Nylon	Nylon	1120	200	112	20.0	0.052	1.30
NN-250	Nylon	Nylon	1400	250	140	25.0	0.056	1.40
NN-300	Nylon	Nylon	1680	300	168	30.0	0.057	1.45
NN-400	Nylon	Nylon	2230	400	223	40.0	0.060	1.55
EP-100	Polyester	Nylon	560	100	56	10.0	0.048	1.10
EP-150	Polyester	Nylon	840	150	84	15.0	0.048	1.20
EP-200	Polyester	Nylon	1120	200	112	20.0	0.052	1.30
EP-250	Polyester	Nylon	1400	250	140	25.0	0.056	1.40
EP-300	Polyester	Nylon	1680	300	168	30.0	0.057	1.45
EP-400	Polyester	Nylon	2230	400	223	40.0	0.060	1.55

# Federal

Conveyor Components



**RATED OPERATING TENSION** (Pounds/inch of width - piw)

# Federal Conveyor Belting

Belt Style	FEDERAL						
	2150	2220	3330	4440	3600	4800	5100
Plies	2	2	3	4	3	4	5
Mechanical Fastener	150	220	330	440	600	720	720
Vulcanized Splice	150	220	330	440	600	800	1000

Federal manufactures a complete line of conveyor belting fabrics and cover compounds for all types of service conditions. This catalog does not include all conveyor belting ply structures by tension rating (PIW), and/or cover compounds, that are available. Consult your Federal representative for additional fabric constructions and cover compound styles that are available for your particular application.

**BELT THICKNESS** (In inches. Add thickness of covers to carcass thickness to obtain overall thickness.)

Belt Style	FEDERAL						
	2150	2220	3330	4440	3600	4800	5100
Carcass Thickness	.114	.164	.212	.258	.237	.326	.415

FEDERAL MINE (Fire-Resistant)						
2150	2220	3330	4440	3600	4800	5100
.114	.164	.212	.258	.237	.326	.415

**BELT WEIGHT** (piw per linear foot. Add carcass weight factor to top and bottom cover weight factors to obtain total belt weight.)

**Carcass Weight Factors**

Belt Style	FEDERAL						
	2150	2220	3330	4440	3600	4800	5100
Oil-Resistant	.059	.066	.092	.129	.117	.162	.206
Heat-Resistant	.052	.060	.083	.117	.111	.153	.194
All Others	.053	.061	.084	.118	.111	.153	.194

FEDERAL MINE (Fire-Resistant)						
2150	2220	3330	4440	3600	4800	5100
.065	.087	.111	.135	.123	.170	.217

**Cover Weight Factors**

Cover Thickness	1/16"	3/32"	1/8"	5/32"	3/16"	7/32"	1/4"	9/32"	5/16"	11/32"	3/8"	13/32"	7/16"	15/32"	1/2"
Oil-Resistant	.036	.054	.072	.090	.108	.126	.144	.162	.180	.198	.216	.234	.252	.270	.288
Heat-Resistant	.028	.042	.056	.070	.084	.098	.112	.126	.140	.154	.168	.182	.196	.210	.224
All Others	.032	.048	.064	.080	.096	.112	.128	.144	.160	.176	.192	.208	.224	.240	.256
Federal Mine	.042	.063	.084	.105	.126	.147	.168	.189	.210	.231	.252	.273	.294	.315	.336

**LOAD SUPPORT DATA** (Maximum belt width in inches)

NR - Not Recommended

Material Conveyed	Light to 45 pcf			Medium 45-105 pcf			Heavy 105-165 pcf			Extra Heavy 165-200 pcf		
	20°	35°	45°	20°	35°	45°	20°	35°	45°	20°	35°	45°
Idler Trough	20°	35°	45°	20°	35°	45°	20°	35°	45°	20°	35°	45°
2150	42	36	30	36	30	24	30	24	NR	NR	NR	NR
2220	48	42	36	42	36	30	36	30	24	30	24	NR
3330	60	54	48	54	48	42	48	42	36	42	36	30
4440	72	72	60	72	60	48	60	54	48	54	48	48
3600	72	72	60	72	60	48	60	54	48	54	48	42
4800	72	72	72	72	72	60	72	60	54	60	54	48
5100	72	72	72	72	72	72	72	72	60	72	60	54

**TROUGHABILITY DATA** (Minimum belt width in inches for empty belt troughing)

Belt Style	FEDERAL						
	2150	2220	3330	4440	3600	4800	5100
Idlers 20°	14	14	18	24	24	30	42
Idlers 35°	18	18	20	30	30	36	42
Idlers 45°	18	24	24	30	36	42	48

FEDERAL MINE (Fire-Resistant)							
2150	2220	3330	4440	3600	4800	5100	
14	18	20	24	24	30	42	
18	20	24	30	30	36	42	
18	24	30	30	36	42	48	

**BELT MODULUS OF ELASTICITY (Bm)** (Pounds/inch of width - piw)

Belt Style	2150	2220	3330	4440	3600	4800	5100
Temperature Condition A*	12500	18300	25000	31000	34000	42000	48000
Temperature Condition B**	--	14500	20500	25000	--	--	--

\* A. Material loads through 250°F fines, 300°F lumps.  
 \*\* B. Material loads above 250°F fines, 300°F lumps.

**CARCASS IMPACT INDEX** (6-PLY, 42-OZ = 1.0)

Belt Style	2150	2220	3330	4440	3600	4800	5100
Index No.	1.3	1.6	2.0	2.4	2.5	3.0	3.5

**RECOMMENDED MINIMUM PULLEY DIAMETERS FOR VULCANIZED SPLICES** (Inches)

Minimum Pulley Diameter (inches)														
% of Rated Belt Tension	FEDERAL							FEDERAL MINE (Fire-Resistant)						
	2150	2220	3330	4440	3600	4800	5100	2150	2220	3330	4440	3600	4800	5100
81-100%	16	16	18	24	24	30	36	16	18	20	24	24	30	36
61-80%	14	14	16	20	20	24	30	14	16	18	20	20	24	30
41-60%	12	12	14	18	18	20	24	12	14	16	18	18	20	24
up to 40%	10	10	12	16	16	18	20	10	12	14	16	16	18	20

**RECOMMENDED MINIMUM PULLEY DIAMETERS FOR MECHANICAL SPLICES**

Determined by type and size of fasteners used.

**RECOMMENDED MINIMUM TAKE-UP TRAVEL ALLOWANCE**

(Percent of center-to-center distance.)

Operating tension (% of Rated Tension)	Automatic Take-Up		Screw Take-Up	
	Vulcanized Splice	Mechanical Fastener	Vulcanized Splice	Mechanical Fastener
75-100%	2 1/2% + 2 ft	2%	4%	1 1/2%
Up to 75%	2 1/2% + 2 ft	1 1/2%	3%	1%



## RATED OPERATING TENSION (Pounds/inch width - piw)

Service	FEDERAL						
	2150	2220	3330	4440	3600	4800	5100
Industrial & Mining	100	170	250	330	465	620	775
Grain, Woodchip, etc. (less than 50 pcf)	120	190	280	370	520	690	870

## Federal Bucket Elevator Belting

Federal manufactures a complete line of conveyor belting fabrics and cover compounds for all types of service conditions. This catalog does not include all conveyor belting ply structures by tension rating (PIW), and/or cover compounds, that are available. Consult your Federal representative for additional fabric constructions and cover compound styles that are available for your particular application.

## MAXIMUM BUCKET PROJECTION (Inches)

Service	Discharge	FEDERAL						
		2150	2220	3330	4440	3600	4800	5100
Industrial & Mining	Centrifugal	6	6	7	10	10	11	12
Industrial & Mining	Continuous	--	5	7	10	12	14	16
Grain, Woodchip, etc. (less than 50 pcf)	All	6	7	8	10	12	14	16

## RECOMMENDED MINIMUM PULLEY DIAMETERS (Inches)

% of Rated Tension	FEDERAL						
	2150	2220	3330	4440	3600	4800	5100
81-100%	16	16	18	24	30	36	42
61-80%	14	14	16	20	24	30	36
up to 60%	12	12	14	18	20	24	30

## Conveyor and Bucket Elevator Belt Inquiry Data

### Conveyor Belt

An inquiry for a conveyor belt where the general belt requirements and specifications have already been established should include the following information:

1. Belt length
2. Belt width
3. Maximum operating tension
4. Top cover thickness
5. Bottom cover thickness
6. Cover grade
7. Type of application
  - a. Material conveyed
  - b. Conditions belt must withstand, such as: high abrasion, high temperature or low temperature (°F), presence of oil or chemicals (type), and any other special requirements such as MSHA fire resistance. If the belt is to convey coal, indicate whether it will be used in mining or in a steam generating plant, and if it must meet MSHA fire requirements and/or oil-resistant requirements.
8. Idler troughing angle (20°, 35°, 45°)

### Design Details

A complete analysis of a conveyor system for determining the conveyor belt specifications requires consideration of the following design details. Consult Federal for additional information.

1. Material conveyed
2. Max. loading rate or capacity
3. Belt width in inches
4. Belt speed in feet per minute
5. Profile of the conveyor system
6. Conveyor drive
7. Pulley diameters
8. Take-up type
9. Idlers
10. Type of loading arrangements
11. Ambient temperature range
12. Type of belt splice to be used

### Bucket Elevator Belt

An inquiry for bucket elevator belts where the general belt requirements and specifications have already been established should include the following information:

1. Belt length
2. Belt width
3. Maximum operating tension
4. Cover thickness, bucket side & pulley side

5. Material handled
6. Cover grade, if known, or information on special conditions of temperature, oil, chemicals, fire resistance, etc.
7. Buckets: type, size, material
8. Type of splice used
9. Existing pulley diameters

### Design Details

Where calculation of belt tension leading to a belt recommendation is required, the following information must be furnished:

1. Belt width, inches
2. Vertical lift, feet
3. Type of take-up
4. Head pulley surface; bare or lagged
5. Material handled, including bulk weight PCF; lump size; special conditions of temperature, oil, chemicals, fire resistant requirements, etc.
6. Buckets:
  - a. Continuous or centrifugal (spaced)
  - b. Type and size (width, projection, depth)
  - c. Material
  - d. Spacing in same row
  - e. Number of rows

# Federal Conveyor Belting For Every Application

In addition to the streamlined belting covered in this catalog, Federal manufactures a complete modernized line of conventional multiple-ply belting. And of course, there is Federal's premium performance Straight-Warp belting which is also offered in a fire-resistant version, Mine-Straight-Warp belting. For higher tension service, there is Mine II belting, plus Federal's line of Steel Cord belting. A complete line of Light Weight Food and Package Handling belting provides total coverage of the low tension portion of conveyor belting requirements.

## **MULTIPLE-PLY BELTING**

The Federal line also includes conventional multiple-ply belting for various applications. Multiple-ply belting is available from Federal in the full range of tension ratings, MP-35 to MP-240. Multiple-ply

belting is also available in a fire-resistant style to meet MSHA fire resistant requirements.

## **STRAIGHT-WARP BELTING**

Straight-Warp belting for conveyors and bucket elevators uses Federal's exclusive carcass construction. A strong, tough, rip-resistant belting designed for conveyors and bucket elevators demanding the highest performance standards. Available with tension ratings to 550 piw for Style C cut-edge belting and to 1500 piw for Style M molded-edge belting.

## **MINE-STRAIGHT-WARP FOR FIRE-RESISTANT APPLICATIONS**

The exclusive Federal carcass construction is available in Mine-Straight-Warp belting. It is especially

designed for fire-resistant applications in both above and underground service. MineFlex meets MSHA requirements for fire resistance. It is available in Style C cut-edge belting for tension ratings to 500 piw, and Style M molded-edge belting for ratings to 1500 piw.

## **STEEL CORD BELTING**

For high tension service to above 5000 piw, Federal offers Steel Cord conveyor belting. Available with RMA Grade 1 or 2; MSHA Fire-Resistant; and Oil-Resistant covers.

## **LIGHT WEIGHT BELTING**

Federal manufactures Light Weight belting for all types of applications such as package handling belting, Steep Grade belting for inclines to 45°, and food handling belting that meets FDA and USDA Federal Meat and Poultry requirements.



# Federal

## Conveyor Components

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