



# UNCHAIN YOUR RIDE

MOTORCYCLE, POWERSPORTS,  
AND SCOOTER BELT DRIVE SYSTEMS

EST. 1911 | DENVER, COLORADO

# WHY BELT DRIVE



## CLEAN

No lubrication required, minimal wear and tear

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## QUIET

Operates with minimal noise and designed to absorb vibrations

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## SMOOTH

Maintains consistent tension and power transfer

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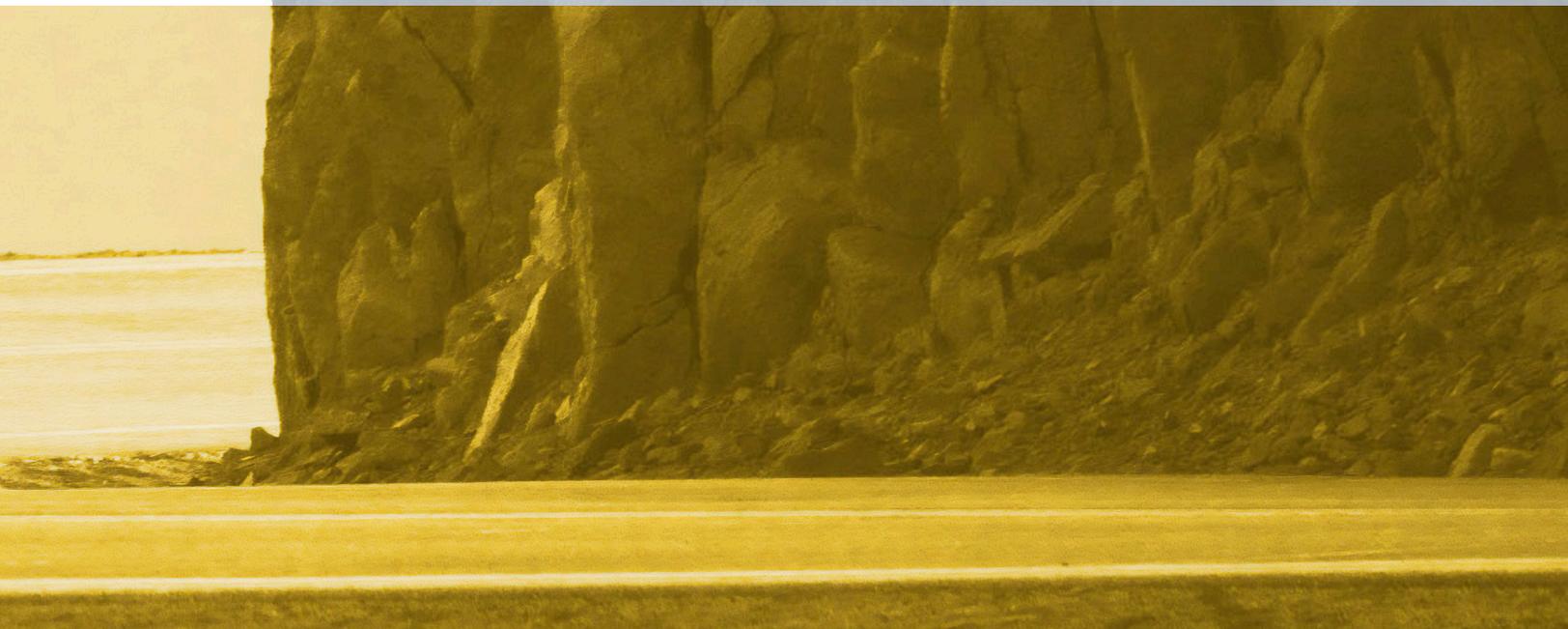
## STRONG

Reinforced with carbon fiber tensile cords and resilient materials

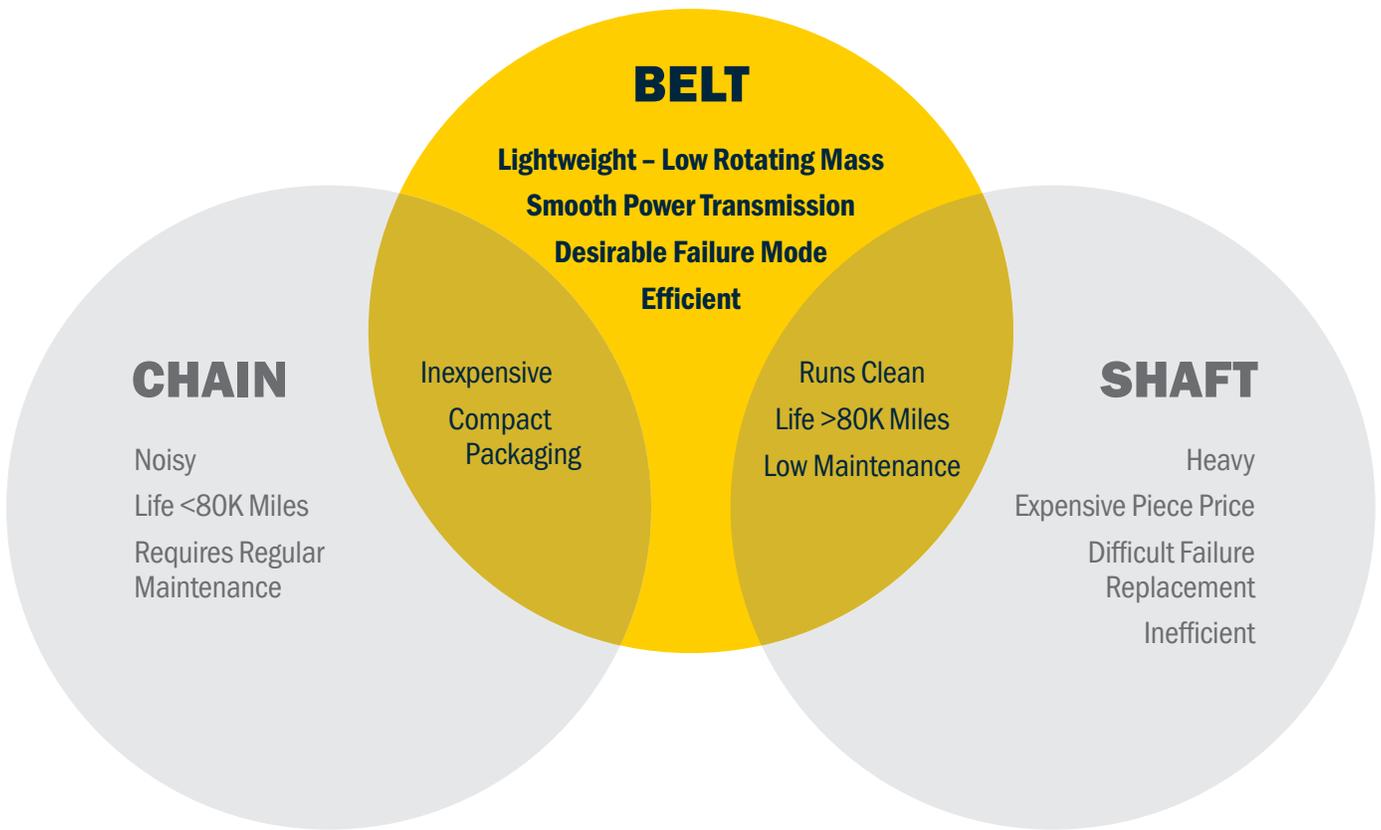
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Gates Belt Drive systems aren't just components; they're the lifeblood of motorcycles and scooters, engineered with precision to meet the highest standards. For motorcycle manufacturers, these systems promise modern cleanliness, whisper-quiet operation, smooth performance, and reliable strength. Gates Belt Drive systems are a clear choice for those who demand excellence and innovation on the road.



# GATES BELT DRIVE SYSTEMS IMPROVE UPON THE BEST CHARACTERISTICS OF BOTH CHAIN AND SHAFT OPTIONS



## GATES BELT DRIVE SYSTEMS OUTPERFORM CHAIN WITHIN 2-WHEEL PERSONAL MOBILITY

MANUFACTURER PRIORITIES	POOR	GOOD	BEST
EFFICIENCY (OVER LIFETIME)		CHAIN	BELT
NOISE	CHAIN		BELT
WEIGHT / ROTATING MASS		CHAIN	BELT
DURABILITY / LIFE		CHAIN	BELT
MAINTENANCE	CHAIN		BELT
INSTALLED COST		BELT	CHAIN
TOTAL COST OF OWNERSHIP		CHAIN	BELT

## GATES MATERIAL SCIENCE ADVANCEMENTS IMPROVE BELT PERFORMANCE WITH CARBON FIBER TENSILE CORDS

**SIGNIFICANT IMPROVEMENTS OVER ALL OTHER TENSILE CORDS – INCLUDING ARAMID (KEVLAR®) AND STEEL**

High power density delivers the most compact and lightweight drive designs

High flex fatigue resistance – exceeding steel, glass, and aramid fibers

High modulus & dimensional stability – negligible elongation, keeping pitch fit constant at various loads

High strength-to-weight ratio

Low noise

Environmental resistance – no degradation from water, oil, most contaminants

Kevlar® is a registered trademark of affiliates of DuPont de Nemours, Inc.



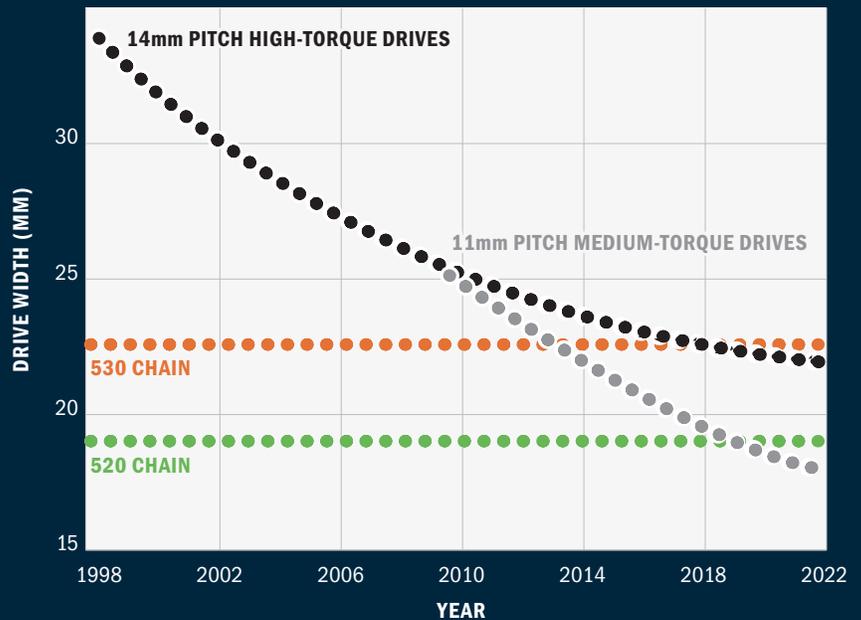
## BELT DRIVE EVOLUTION

Gates enjoys a 40+ year history in motorcycle drives – introducing our first drive belt in 1980 with continuous belt construction advancements creating narrower belt widths.

First carbon tensile cord motorcycle drive belt in 2003

Introduced in 1999, Gates 14mm pitch high-torque belts are now narrower than 530 chain

Launched in 2010, our 11mm pitch medium-torque belts, now in Moto X9 construction, rival 520 chain width



# MOTORCYCLE, POWERSPORTS, AND SCOOTER BELT DRIVE SYSTEMS



# NEW PRODUCTS



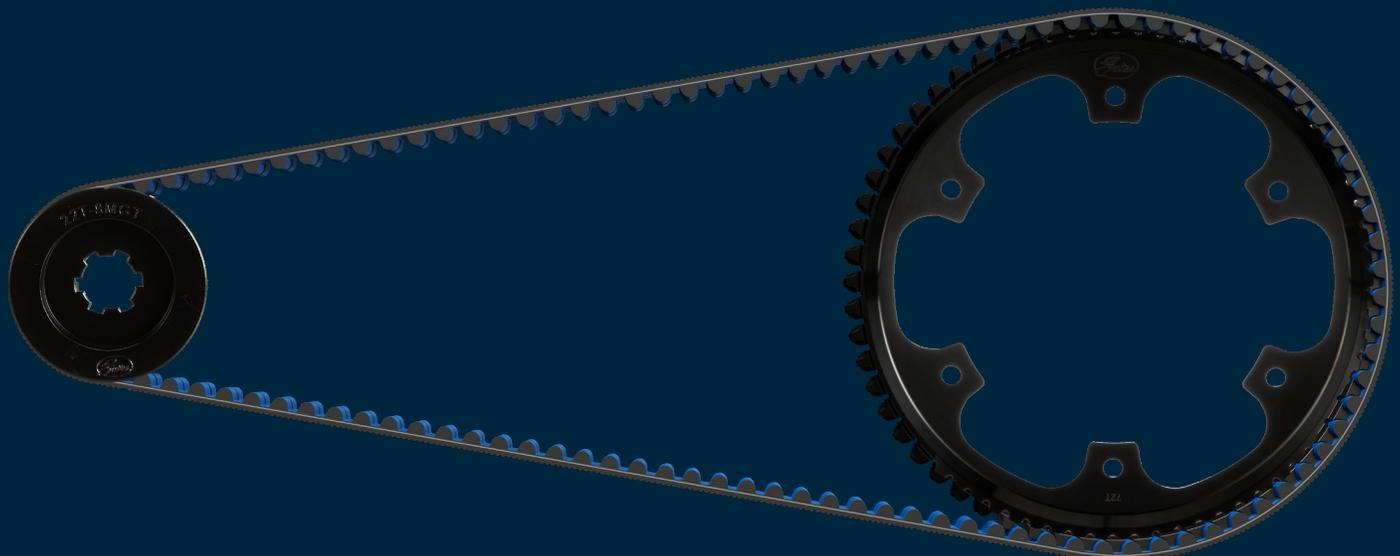
Contact us at  
[Gates.com/Mobility](https://www.gates.com/Mobility)

- MOTO X9 BELTS**
- MOTO X5 BELTS**
- MOTO XF SPROCKETS**
- CENTERTRACK SPROCKETS**

Our highly trained application engineers work with you from inception to completion, optimizing your design, selecting the ideal drivetrain products, and delivering a power transmission solution that exceeds performance goals for efficiency, durability and customer satisfaction.

## WORKING WITH GATES CAN HELP YOU ACHIEVE:

- Elimination of metal-on-metal chain clatter
- Corrosion resistance
- Reduced maintenance
- Increased durability
- Improved efficiency
- Weight reduction
- Higher speeds and torque
- Greater power and load
- Cleaner drives





# MOTO X9 BELTS

## MOTO X9 BELT CONSTRUCTION

### CARBON TENSILE CORD

Highest performance/stretch resistance

### POLYURETHANE COMPOUND

Highest strength and durability

### NYLON WEAR-LAYER

Industry leading abrasion resistance

## AVAILABILITY

OE ONLY

*Also available with CenterTrack for off-road applications.*



# NEXT GENERATION DRIVE BELT FOR MOTORCYCLES AND SCOOTERS

Gates most advanced drive belt combines our latest technologies in tooth profile design, polyurethane belt compound, carbon tensile cord, and belt construction – creating our narrowest drive belt for motorcycles and scooters.

Moto X9 delivers extraordinary performance while retaining Gates legendary long lasting and low maintenance characteristics.

## LEANER. LIGHTER. STRONGER.

Moto X9 advanced 11mm construction creates drive flexibility with significant advantages over previous generations of both 14mm and 8mm pitch belts.

Moto X9 is available in 8, 11 and 14mm pitch, and available with CenterTrack in 11 and 14mm pitch.



Download our white paper and view our webinar at: [GatesBeltDrive.com/MotoX9](http://GatesBeltDrive.com/MotoX9) to learn about the advantages Moto X9 belts bring to scooter and motorcycle applications, specifically related to the drivetrain weight and packaging, vehicle torque, and drivetrain longevity.

## DRIVE BENEFITS ACHIEVABLE WITH MOTO X9

### SMALLER DRIVE PACKAGE

Reduced Sprocket Diameters  
(20t DriveR Minimum)

Less Weight  
(Material Dependent)

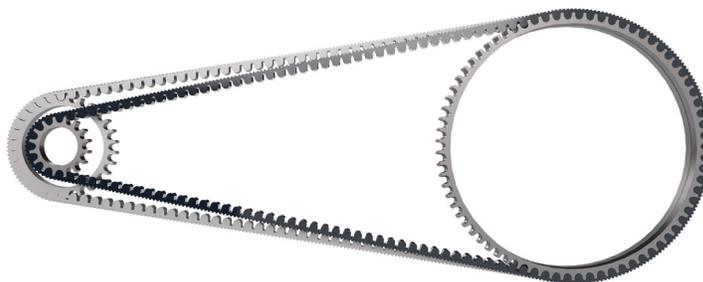


Narrower Belt Width

### DRIVE RATIO FLEXIBILITY

Increased Torque

Eliminate Gear or Reduction Drives for Electric Motors



### LONGER LIFE

UP TO  
**84%**

UNDER SAME LOAD CONDITIONS



# MOTO X5 BELTS

## MOTO X5 BELT CONSTRUCTION

### CARBON TENSILE CORD

Highest performance/stretch resistance

### NEXT GEN SYNTHETIC COMPOUND

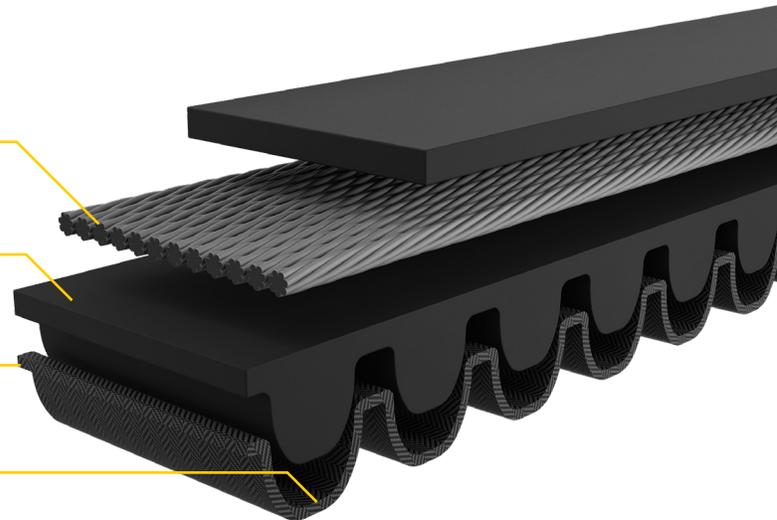
Highest strength/high stiffness

### NEW NYLON TOOTH FABRIC

Improved abrasion resistance

### 8M GT TOOTH PROFILE

Backward compatible with Moto X9 8M sprockets



# NEW DESIGN ENABLES QUIETER AND MORE EFFICIENT DRIVETRAINS

The innovative Moto X5 belt is a significant addition to the Gates Belt Drive portfolio as it offers the same core belt drive benefits of Clean, Quiet, Smooth, Strong, but with even quieter performance than its predecessors.

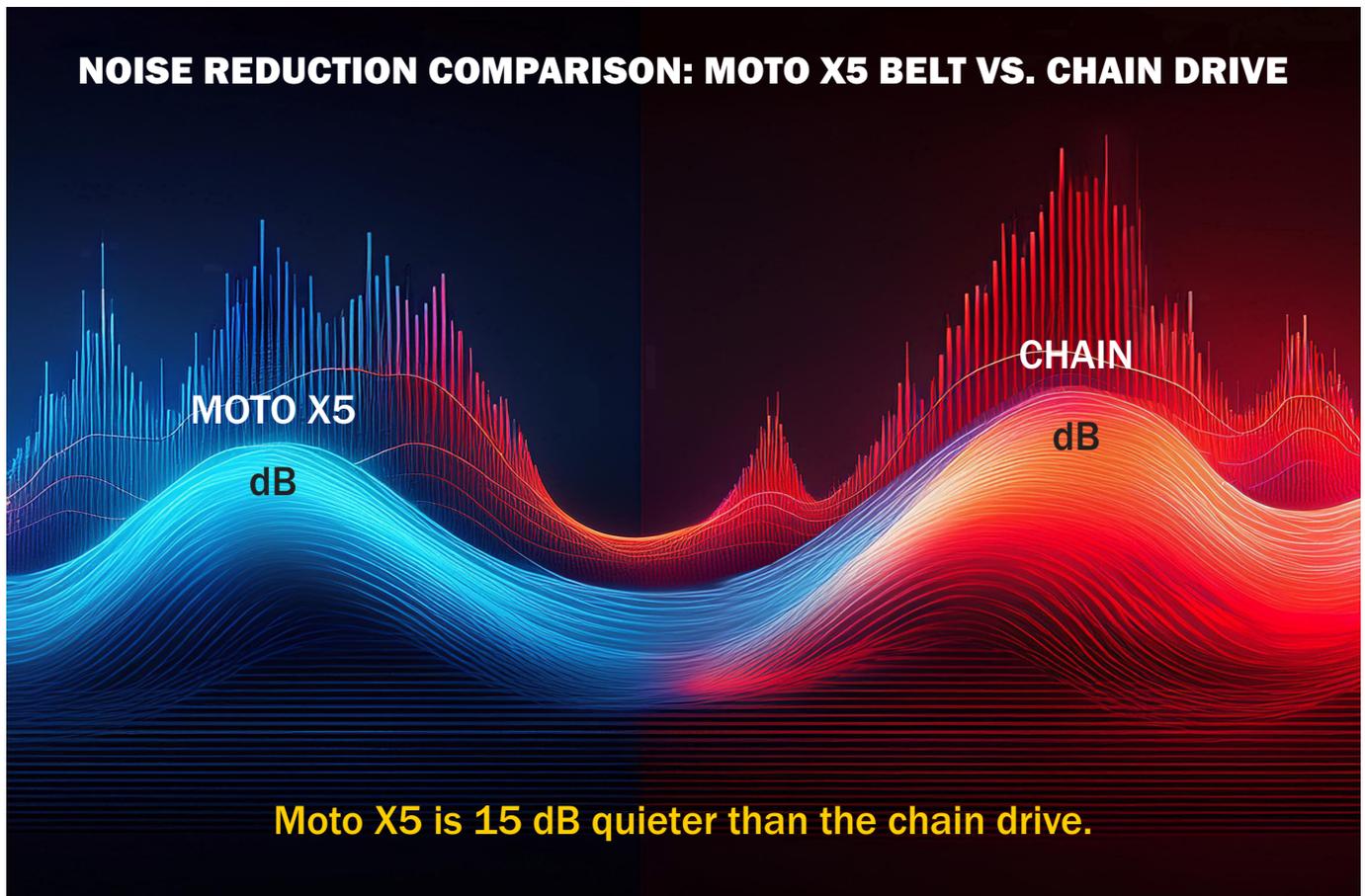
Gates achieved this breakthrough in belt technology through the combination of a high-stiffness, long-lasting synthetic compound with

Gates long-proven carbon fiber cord reinforcement. The combination not only provides durability and strength, it also results in the quietest belt drive system yet. Independent lab testing by AVL combined with Gates internal testing shows Moto X5 is up to 15 decibels quieter than chain over a range of vehicle speeds.

Additionally, throughout the life of the vehicle and under normal

operating and maintenance conditions, Moto X5 is more energy efficient than chain, which can lead to improved vehicle range, a critical factor on electric vehicle applications.

The Gates Moto X5 product line is designed specifically for mid-motor sit-down electric scooters and motorcycles typically found in commuting applications in the rapidly evolving Asian market.



## INNOVATIVE FRONT SPROCKET LINE

Gates newest motorcycle/scooter sprocket solution provides customers with fast prototyping and a wide range of sprocket configurations. This cost-effective solution is available for high or low volume needs as well as for dimensional customizations as needed.



# MOTO XF SPROCKETS

Fast: prototype in 2-3 weeks

Wide range of sprocket configurations, including custom splines, single or dual flange, and offset variations

High-durability carbon steel (~120k km typical)

Corrosion coating options dependent on application or environmental requirements

Most cost-effective option at both low and high volume

Low MOQ

Standard parts available from inventory (see table next page), or:

1. Ability to Finish-On Demand to adjust dimensions for prototyping or small production, or
2. Made-to-order with specific dimensions for larger batches

### TECHNICAL SPECIFICATIONS

**MATERIAL**

POWDERED METAL

**COATING\***

BLACK E-COATING

**HARDNESS**

> 70 HRB  
> 100 HRB UPON REQUEST

\*Other options available upon request

#### PITCH AND TOOTH COUNTS



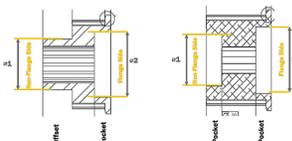
<b>11M</b>	<b>8M</b>
11M-22T	8M-22T
11M-23T	8M-24T
11M-24T	8M-25T

#### BELT WIDTH RANGE



**8MM:** 10-36mm  
**11MM:** 12-36mm

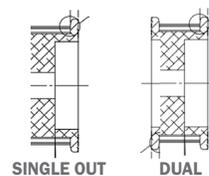
#### OFFSET



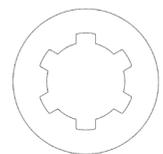
**NON-FLANGE SIDE**  
Offsets (Positive) or Pockets (Negative)

**FLANGE SIDE**  
Pockets (Negative)(Min 4.5mm)

#### FLANGE



#### SHAFT INTERFACE



Available with Involute Spline, Straight 6 Spline, Keyways, Plain Bore

**MADE-TO-STOCK MOTO XF PARTS AND DIMENSIONS** (ALL PLAIN BORE Ø12.0MM)

PART NUMBER	TOOTH COUNT	MAX BELT WIDTH (MM)	BELT TRACK WIDTH (MM)	FLANGE WIDTH (MM)	TOTAL WIDTH (MM)
<b>8MM GT PITCH</b>					
M1349-08022-ST26-54	22T	20	25.5	3.5	29
M1349-08024-ST26-54	24T				
M1349-08025-ST26-54	25T				
M1349-08022-ST41-54	22T	36	41.5	3.5	45
M1349-08024-ST41-54	24T				
M1349-08025-ST41-54	25T				
<b>11MM HTD PITCH</b>					
M1349-11022-ST28-54	22T	22	27.5	4.0	31.5
M1349-11023-ST28-54	23T				
M1349-11022-ST41-54	22T	36	41.5	4.0	45.5
M1349-11023-ST41-54	23T				

**CONFIGURATION EXAMPLES**



11M-22T, 12mm belt,  
1 flange, 25T involute



8M-25T, 25mm belt,  
2 flange, plain bore



8M-22T, 41mm wide,  
1 flange, 13Z spline



8M-25T, 20mm belt,  
2 flange, 6T straight spline



8M-22T, 41mm wide,  
2 flange, keyway



11M-24T, 41mm wide,  
1 flange, 19T involute



11M-24T, 25mm wide,  
2 flange, 24T involute



11M-22T, 20mm belt,  
2 flange, 6T straight spline

## INNOVATIVE CENTERTRACK BELT SYSTEMS NOW ENABLE OFF-ROAD APPLICATIONS

Gates has now expanded the proven CenterTrack bicycle sprocket technology for wider belt applications of motorcycles and scooters. This new CenterTrack design delivers all the benefits of belt drive plus the debris-shedding off-road capabilities previously associated only with chain. Elimination of the standard outer flanges reduces system width, weight, and cost.

# CENTERTRACK

## CENTERTRACK CONSTRUCTION

### STRONG

Debris shedding capability ideal for off-road applications

### QUIET

Improved noise reduction vs. flanged belt drive system

### LIGHT

Reductions in width (5mm+) and weight (up to 10%)

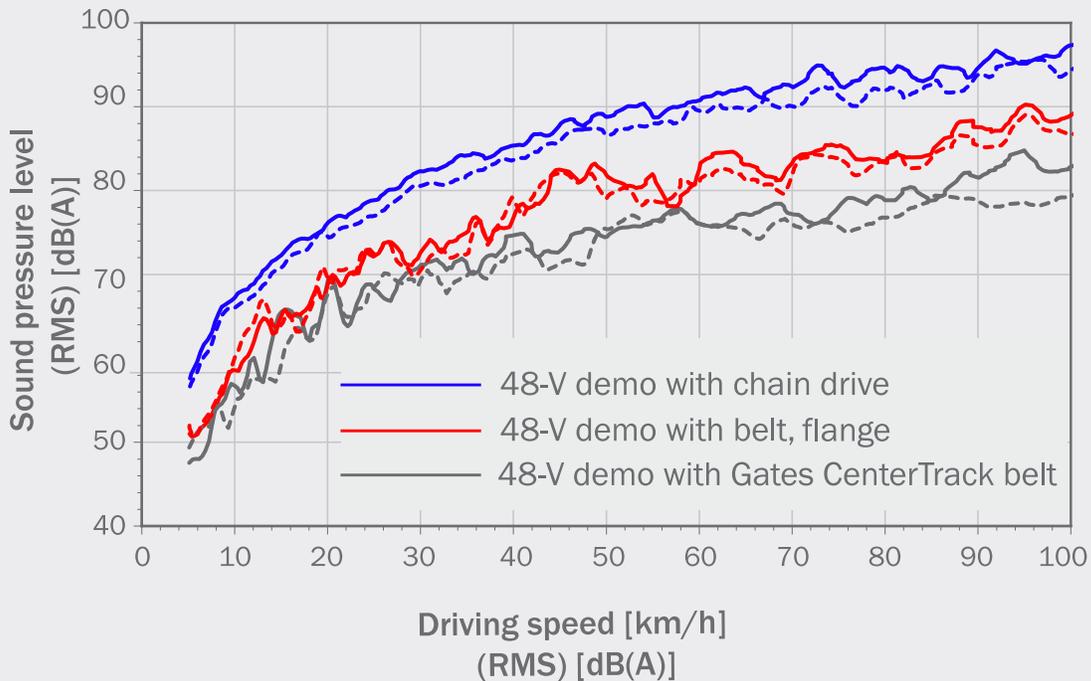


## NOISE ADVANTAGE OF CENTERTRACK BELT VS. CHAIN

The acoustics of an electric motorcycle - and Gates innovative solutions' impact on such - were 3rd-party evaluated and published in the July 2022 issue of ATZ Worldwide Magazine.

Specifically, the test completed an acoustic comparison of three different powertrain concepts: chain, belt (with side flange sprockets), and belt (with CenterTrack sprockets).

As expected, chain delivered the highest levels of the three, with the Gates CenterTrack solution improving on the quieter levels of the belt (flange) solution.



[READ MORE](#)

## WIDEST PORTFOLIO IN THE INDUSTRY



IN ADDITION TO OUR BELT DRIVE SYSTEMS,  
GATES ALSO OFFERS A VARIETY OF SOLUTIONS FOR  
ACCESSORY DRIVES, COOLING, CVT BELTS AND MORE.

## BELTS

- Synchronous
- CVT belts
- CAM belts in oil
- V-belts



## SPROCKETS

- CenterTrack for debris-shedding
- Wear and corrosion resistance coatings
- Paint and finish options
- Global manufacturing and assembly capabilities



## TOOLS

- Mobile tensioning app
- Sonic tension meter
- EZ Align laser alignment tool



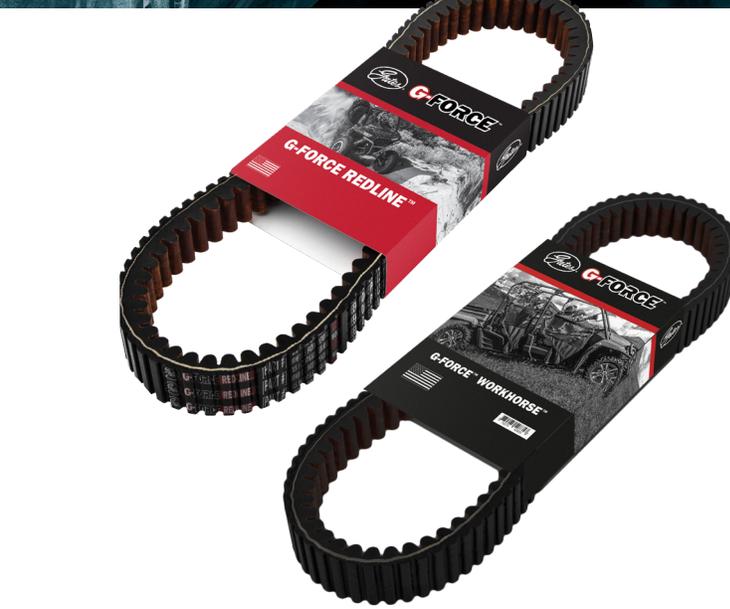
## THERMAL MANAGEMENT

- Formed engine hose
- Hose - tube assemblies
- Hydraulic hose
- Fuel lines



## GATES IS PUSHING THE LIMITS OF WHAT'S POSSIBLE TO REDEFINE THE RECREATIONAL RIDE EXPERIENCE

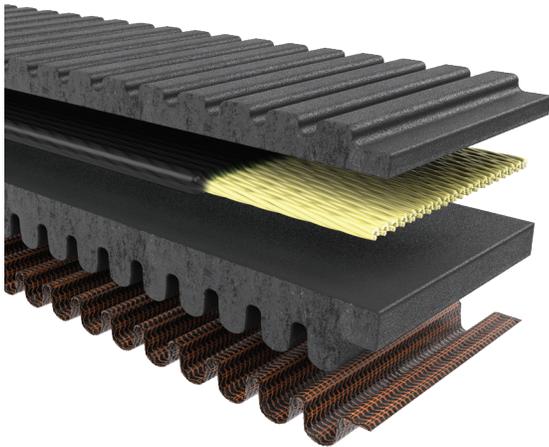
The next generation of continuously variable transmission (CVT) belts are higher performing and more durable than ever before to meet the demands of today's and tomorrow's high-performance ATV, UTV, and snowmobile platforms.



Visit [Gates.com/GForce](https://www.gates.com/GForce)

# WHICH BELT IS RIGHT FOR YOUR RIDE?

Same high tensile aramid cord and ethylene elastomer construction.  
G-Force RedLine includes a fabric cog jacket for higher abrasion resistance.



**G-FORCE REDLINE™**  
BUILT FOR THE TOUGHEST TRAILS

**G-FORCE WORKHORSE™**  
BUILT TO HAUL

## VEHICLE TYPE UTV/ATV/SNOWMOBILE

NO	Low-range engine size, stock vehicle (≈150-399cc)	<b>YES</b> <b>G-FORCE WORKHORSE™</b> CVT BELT
NO	Mid-range engine size, stock vehicle (≈400-799cc)	
<b>YES</b> <b>G-FORCE REDLINE™</b> CVT BELT  G-Force RedLine was specifically designed for these newer vehicles and turbo options.	High-range engine size, stock vehicle (≈800-1100cc)	NO
	Extremely high-range engine size, stock vehicle (up to 1300cc)	NO
	Extensive aftermarket vehicle/engine modifications/turbo-charging	NO

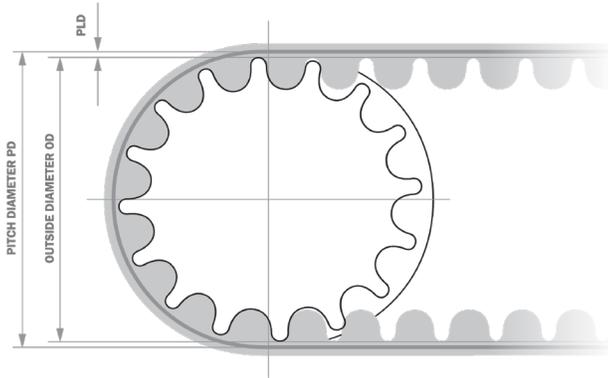
# MEETING YOUR DESIGN NEEDS AT EVERY TURN

Partner with Gates early in your design to extend your engineering team and expand your power transmission experience to achieve the right balance between performance and cost effectiveness. We start by understanding:

How does your design move, operate, and function?

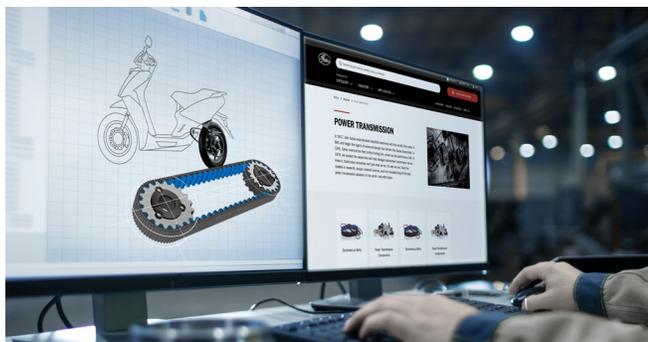
What temperatures, environments, fuel efficiency, loads, or power demands will your system require?

What type of service, maintenance, and support is required to meet your market demand?



The image displays several screenshots of the 'MOBILITY DRIVE ANALYSIS' software. The top-left screenshot shows the 'APPLICATION DETAILS' and 'MOTOR DETAILS' sections, including fields for motor type, power, and speed, and diagrams of a 2-stage belt drive. The top-right screenshot shows the 'BELT DRIVE RATIO & GEOMETRY DETAILS' table, which lists various gear ratios and their corresponding metrics. The middle-left screenshot shows the 'ULTIMATE TENSILE STRENGTH' section with a table of motor torque values. The middle-right screenshot shows the 'BELT TENSION SET DESIGN' section, detailing locked (fixed) center, adjustable idler, cam adjuster, and idler screws. The bottom-right screenshot shows the 'REAR AXLE SLOT CALCULATION' section, including a table of slot dimensions and a diagram of a rear axle assembly. The software interface is clean and professional, with a clear layout of data and diagrams.

From there, we apply our proprietary software tools to optimize your drivetrain design. To learn more, visit: [GatesBeltDrive.com](http://GatesBeltDrive.com)



## GATES DESIGN POWER

Gates innovative and industry-first Mobility Drive Analysis tool makes it easier for engineers from bicycle, scooter, motorcycle, and powersports OEMs to design Gates clean, quiet, durable and low-maintenance belt systems into their next-generation vehicles, further accelerating conversion from chain and other technologies.

### DRIVE SYSTEM DESIGN

Advanced Systems Engineering

Component Modeling and Design

### DRIVE SYSTEM VALIDATION

Clarify System Targets

Product Testing Assistance

Drive Improvement Analysis

### VA/VE ANALYSIS

Evaluate Opportunities to Improve Drive System

Supply Chain Simplification

### GLOBAL PROJECT COORDINATION

Seamless Global Collaboration to Completion

Global Sourcing Capabilities

## HANDLING THE BELT

Gates motorcycle belts are extremely durable and offer long life when properly handled. However, caution must be used before and during installation to avoid damaging the carbon tensile cords that make up the backbone of the belt's strength. Excessive bending and twisting creates crimps which can lead to belt breakage under high load.

**Do not** twist, backbend, crimp, invert, bundle or zip tie the belt. **Do not** use the belt as a strap wrench or chainwhip. **Do not** lubricate, pry on, or roll on the belt.



**DO NOT TWIST**



**DO NOT BACKBEND**



**DO NOT CRIMP**



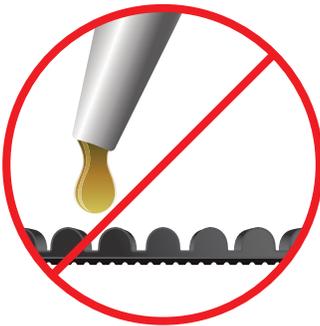
**DO NOT INVERT**



**DO NOT ZIP TIE**



**DO NOT USE BELT AS A SPROCKET REMOVAL TOOL**



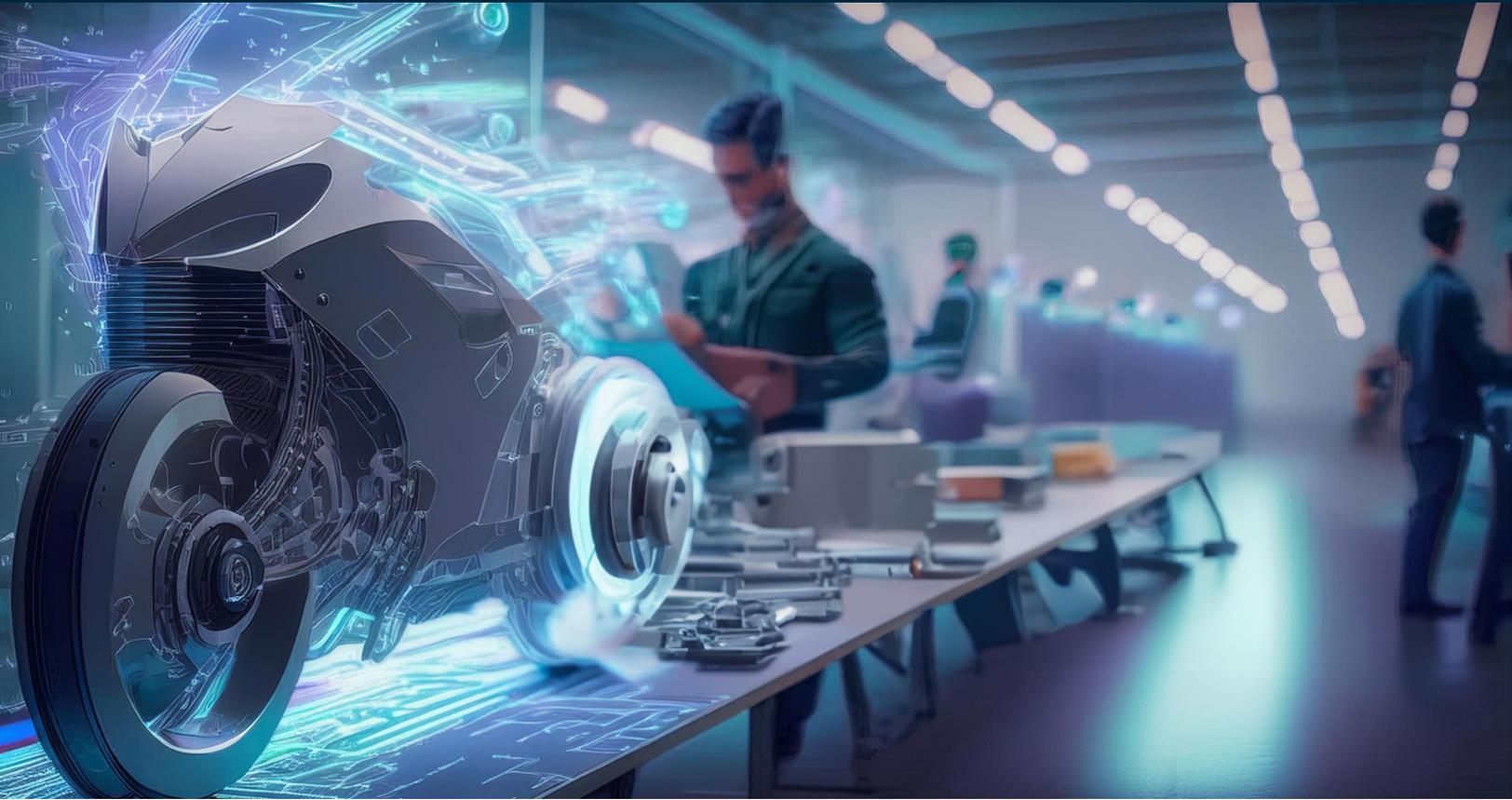
**DO NOT LUBRICATE**



**DO NOT PRY ON**



**DO NOT ROLL ON**



**GATES CORPORATION IS A LEADING MANUFACTURER OF APPLICATION-SPECIFIC POWER TRANSMISSION AND FLUID POWER SOLUTIONS. WE ARE DRIVEN TO CONTINUALLY PUSH THE BOUNDARIES OF MATERIALS SCIENCE TO ADVANCE THE WAY THE WORLD MOVES.**

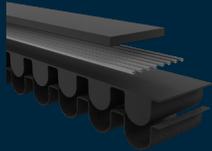
Gates belts are driving a revolution in personal and micromobility that is transforming how the world gets from A to B. From two-wheelers to four-wheelers, ICE or electric, we deliver belt drive solutions and engineering support to rapidly move your projects from concept to reality.

Our highly trained application engineers work with you from inception to completion, optimizing your design, selecting the ideal drivetrain products, and delivering a power transmission solution that exceeds performance goals for efficiency, durability, and customer satisfaction.

# GATES HISTORY OF PROVEN DRIVETRAIN TECHNOLOGY ADVANCEMENTS FOR MOBILITY

2022

GATES CARBON DRIVE 15TH ANNIVERSARY



GATES LAUNCHES

**MOTO X5  
MOTO XF**

GATES LAUNCHES CDC CENTERTRACK SYSTEM



2020

GATES LAUNCHES SIDETRACK SYSTEM



2012

GATES LAUNCHES BELT DRIVE CRANKSETS

2010

GATES LAUNCHES CENTERTRACK™ CONSTRUCTION



1986

INTRODUCED REVOLUTIONARY POLY CHAIN SYNCHRONOUS BELT

1942

CO-DEVELOPED SYNTHETIC RUBBER MASS PRODUCTION



1911

FOUNDED DENVER, CO

2023

GATES LAUNCHES G-FORCE WORKHORSE BELT



2021

INTRODUCED MOTO X9 - AN IMPROVED BELT SPECIFIC FOR MOTO/SCOOTER

**MOTO X9**



2019

GATES GLOBAL MOBILITY & G-FORCE REDLINE LAUNCH



2007

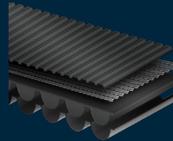
GATES CARBON DRIVE LAUNCHES FIRST BICYCLE BELT DRIVE SYSTEM



In 2012 Frank Schneider conquered Alpe D'huez Megavalanche Cup

2003

CARBON CORD POLY CHAIN®



1980

ENGINEERED BELTS TO REPLACE CHAIN ON MOTORCYCLES



1917

INVENTED V-BELTS



# WHICH GATES SOLUTION IS BEST FOR YOUR VEHICLE?

Trust Gates mobility application engineers to design and specify the ideal system to meet your requirements. From your performance and life requirements through to factory assembly, Gates Belt Drive is your engineering partner.

Contact us at [Gates.com/Mobility](https://www.gates.com/mobility)

## GATES GLOBAL FOOTPRINT DELIVERS PRODUCT SUPPORT THROUGHOUT YOUR PRODUCT'S LIFE-CYCLE: DESIGN, MANUFACTURING, AND AFTER-SALES

In-region / for-region manufacturing strategy	<b>13,500+</b>	EMPLOYEES
Local commercial teams establish close, long-term customer relationship	<b>100+</b>	LOCATIONS
Global market coverage within established channel presence	<b>128</b>	COUNTRIES SOLD TO

