



**CARLISLE**  
BRAKE & FRICTION

## ON-HIGHWAY PRODUCT GUIDE

EXPERIENCED. GLOBAL. INNOVATIVE.



# The Carlisle Brake & Friction Advantage

Carlisle Brake & Friction is dedicated to remain at the forefront of brake component and friction material solutions development for heavy-duty, On-Highway truck and fleet applications. World-class manufacturing original equipment expertise, superior development practices and advanced application engineering are the basis of Carlisle's capacity to support this ideal platform for producing only the highest-quality brake products on the market today. Carlisle backs all of its products with a limited lifetime warranty for form, fit and workmanship. Whether its cost per mile reduction, improved drivability or safety, Carlisle's aftermarket brake products will meet or exceed your expectations. Take the risk out of purchasing replacement parts and request a Carlisle solution.

## On-Highway Brake & Friction Solutions

### Brake Block Materials

#### EC20

Economy grade for the price sensitive buyer

#### EC23

Standard grade for the price sensitive buyer

#### MB20

Designed for the price sensitive, medium grade buyer

#### MB21

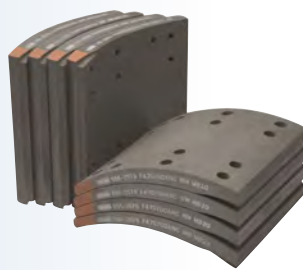
Delivers a longer lining life with excellent drum compatibility

#### MB23

Severe duty lining for long lasting performance

#### CF2000

Premium grade linings designed for over-the-road hauling



### Brake Shoes

Carlisle brake shoes are engineered to meet the demands required in heavy-duty brake applications



### Brake Shoe Assemblies

#### Carlisle Brake Block Set

Our shoe riveting operation uses the highest quality rivets manufactured to OE specifications



### Clutch Friction

#### VT Carbotic, VT Ceramic

World-class design by industry experts ensures form, fit and function.



### Disc Brake Pads

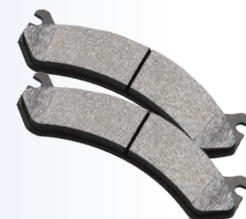
#### F1 Carbon

#### Semi-Metallic Compound

#### F3 Carbon

#### Semi-Metallic Compound

High Performing disc brake pads for medium to heavy-duty truck applications.



### FMSI Cross Reference

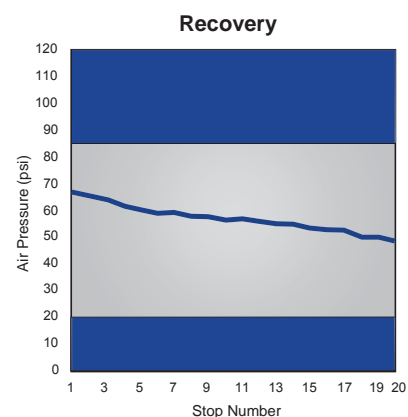
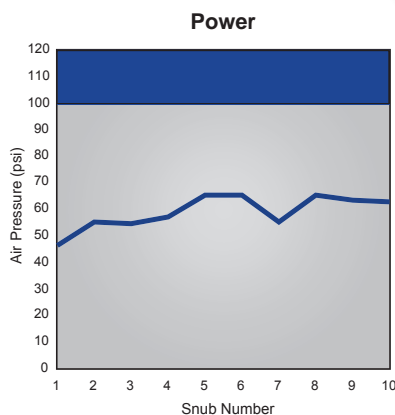
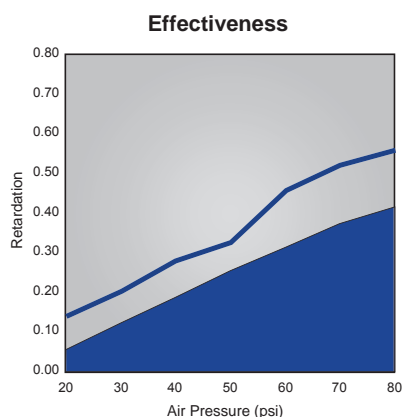
## Economy Grade Brake Lining Designed for Long Haul Freight Applications

EC20 brake block is rated for 20,000# axle loads and was specifically developed for the price sensitive fleet operator. This standard grade brake lining meets the requirements of F.M.V.S.S. #121 dynamometer testing standards. EC20 was designed for use with S-cam air brakes on trucks, tractors, and trailers operating in long haul, on-highway freight applications that do not require a severe service lining.

### EC20 Features

- Economy block rated at 20,000# on 16-1/2" x 7" "S" cam brake
- Ideal for long haul applications
- Smooth and consistent stopping performance
- Supports brake system longevity through drum friendly performance
- Sufficient wear characteristic

EC20 was designed to provide the On-Highway market with an economical, standard duty solution without sacrificing quality and performance. This friction material was engineered for over-the-road, general hauling and standard duty applications where severe braking demands or extended product life cycles are not requirements. EC20 will perform most ideally in applications that experience low to moderate temperatures and operate in typical long haul environments. Extensive test results validate stable performance attributes under standard duty cycles, conditions and loads.



Testing conducted in accordance with F.M.V.S.S. #121 criteria @ 20,000# axle load; 16 1/2 x 7" S-cam air brake; 30 x 5.5" input power and a 20.8" tire rolling radius. Shaded area indicates non-compliance.



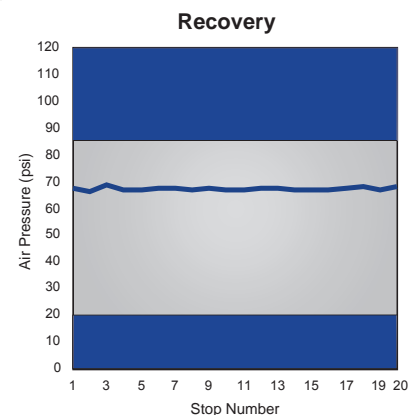
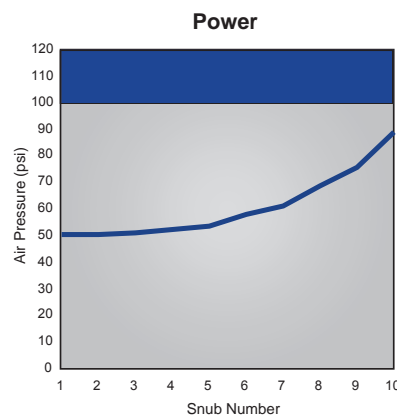
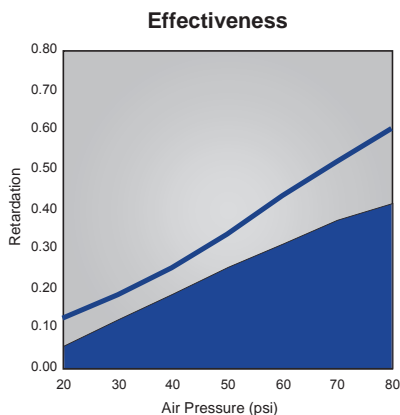
## Standard Grade Brake Linings Designed for Severe Duty Applications

EC23 brake block is rated for 23,000# axle loads and was specifically developed to exhibit high performance characteristics for the value driven operator. The friction material meets the requirements of F.M.V.S.S. #121 dynamometer testing standards. EC23 was designed for severe duty hauling such as liquid tanker, grain, cement or refuse collection. The brake lining is also suited for low powered brake systems that require a more aggressive lining.

### EC23 Features

- Performance characteristics of an OE replacement at aftermarket cost
- Consistent stopping power
- Ideal for general freight applications
- A wide-spread favorite among budget conscious fleet owners

EC23 was engineered as a standard grade solution for value driven fleet operators in search of a consistent brake solution able to withstand the harsh demands of heavy duty brake applications. EC23 has undergone extensive laboratory and field testing to confirm that its ample stopping power is combined with positive fade and recovery characteristics. These test results validate consistent performance attributes under standard duty cycles, conditions and loads.



Testing conducted in accordance with F.M.V.S.S. #121 criteria @ 23,000# axle load; 16 1/2 x 7" S-cam air brake; 30 x 5.5" input power and a 20.8" tire rolling radius. Shaded area indicates non-compliance.

## Premium Grade Brake Lining Designed for Medium-Duty Applications

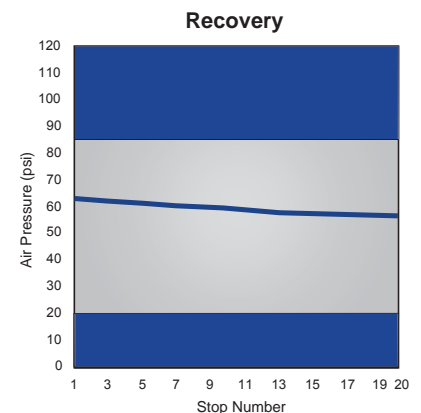
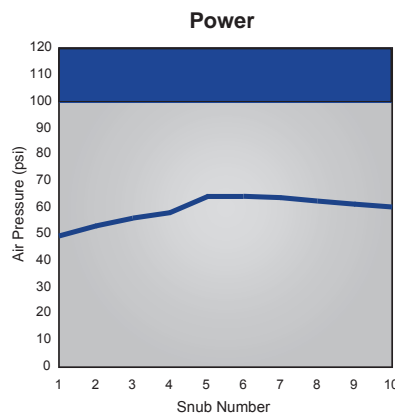
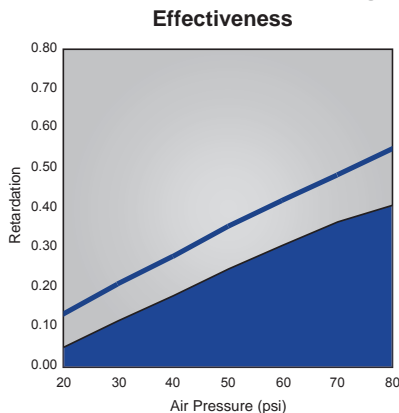
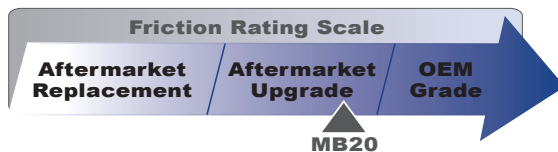
MB20 is a premium quality brake block rated for 20,000# axle loads. Engineered to demonstrate consistent performance and resistance to wear over an extensive life cycle, MB20 provides the fleet operator with an economical advantage by lowering maintenance costs and vehicle downtime. Excellent resistance to brake fade and consistent brake recovery characteristics guarantee high performance braking with every stop. MB20 is ideally suited for over-the-road dry freight, general hauling, and most other standard heavy truck vocations.

### MB20 Features

- Extensive wear characteristics ensure exceptional value
- Performance characteristics of an OE upgrade
- Dependable stopping power
- Ideal for general freight hauling
- Available in a wide range of FMSI numbers

MB20 demonstrates OE grade friction stability characteristics that result in superior performance, safe braking, exceptional recovery and consistent braking effectiveness. In addition, MB20 exhibits a strong tolerance to high temperatures resulting in less wear. Less wear will result in fewer shoe replacements, decreased downtime and reduced labor costs over the service life of the application.

MB20 easily passes the F.M.V.S.S. #121 dynamometer testing standard with a type 30 air chamber and a 5.5" slack adjuster in combination with a 20.8" tire rolling radius. Results from these tests show that MB20 demonstrates ample stopping power, complemented by solid fade and recovery characteristics.



Testing conducted in accordance with F.M.V.S.S. #121 criteria @ 20,000# axle load: 16 1/2 x 7" S-cam air brake; 30 x 5.5" input power and a 20.8" tire rolling radius. Shaded area indicates non-compliance.



## Premium Grade Brake Linings Designed for Severe Duty, High-Speed, Full-Load Applications

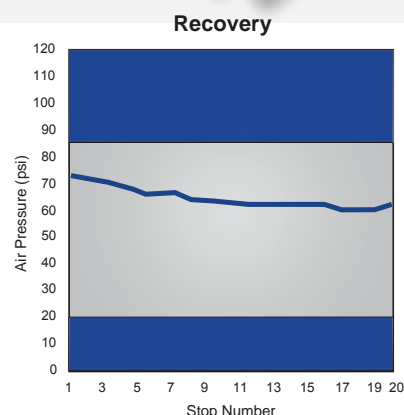
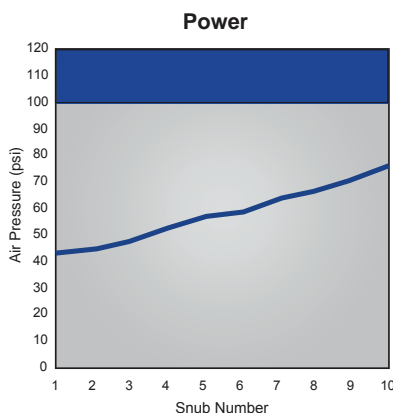
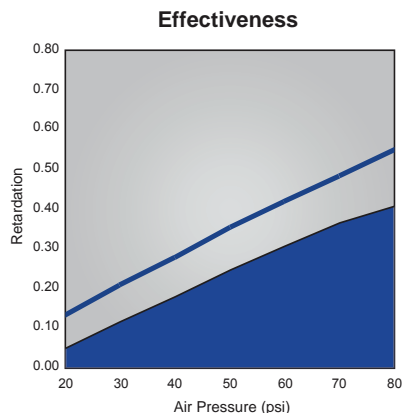
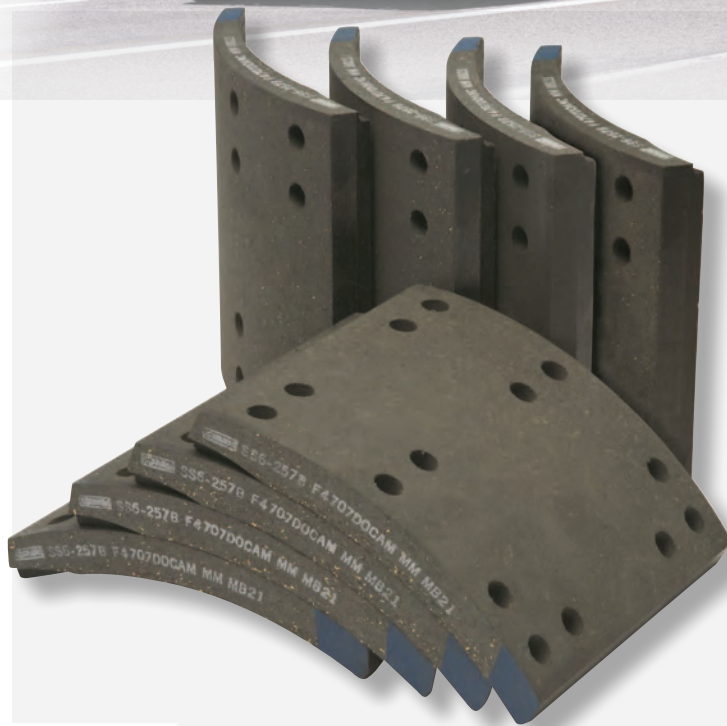
MB21 brake linings represent the On-Highway industry's highest quality premium grade friction material. MB21 is a technologically advanced lining formulation designed to address fleet demands for brake linings that provide a longer service life with excellent drum compatibility. MB21 was designed to fulfill a wide range of over-the-road service applications and will improve your bottom line by providing long-lasting performance and reducing the occurrence of brake maintenance expense requirements.

### MB21 Features

- Longest service life of any brake lining in its class
- Performance characteristics of an OE upgrade
- Dependable stopping power
- Excellent brake fade and recovery characteristics
- Excellent drum compatibility

As the test results below indicate, MB21 easily meets the Federal regulations for brake effectiveness, fade and recovery in accordance with the F.M.V.S.S. #121 inertia dynamometer test procedure. MB21 passes these tests with comfortable margins using a 5.5" slack adjuster, as opposed to a 6" arm length. This makes MB21 suitable for tractor as well as trailer brake systems.

MB21 shows a highly desirable flat performance curve in both brake fade and recovery. This is a result of the excellent heat dissipation properties of the lining, allowing it to perform repeated stops without losing effectiveness. In testing against competitive linings, MB21 significantly outperforms all comparable linings in the vital stopping power category.



Testing conducted in accordance with F.M.V.S.S. #121 criteria @ 20,000# axle load: 16 1/2 x 7" S-cam air brake; 30 x 5.5" input power and a 20.8" tire rolling radius. Shaded area indicates non-compliance.

## Severe Duty Brake Linings Designed for Heavy-Duty Applications

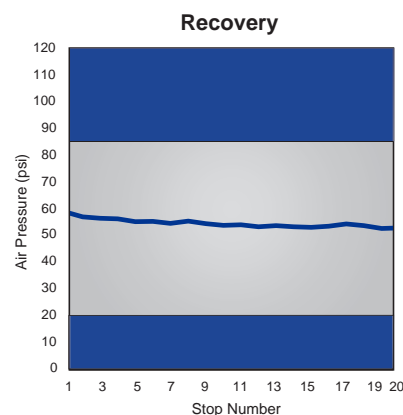
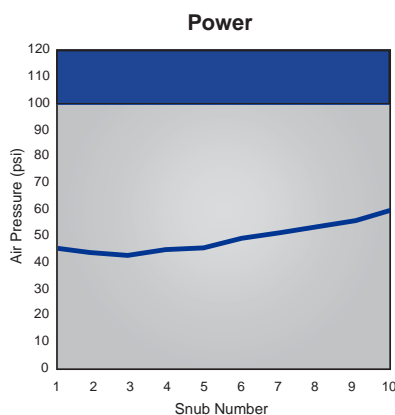
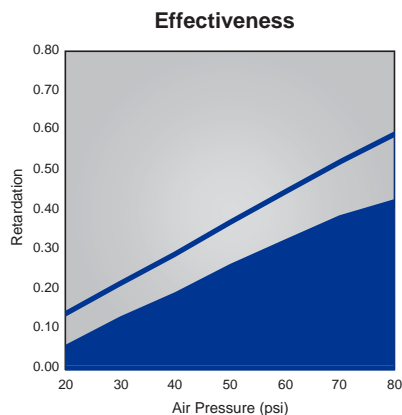
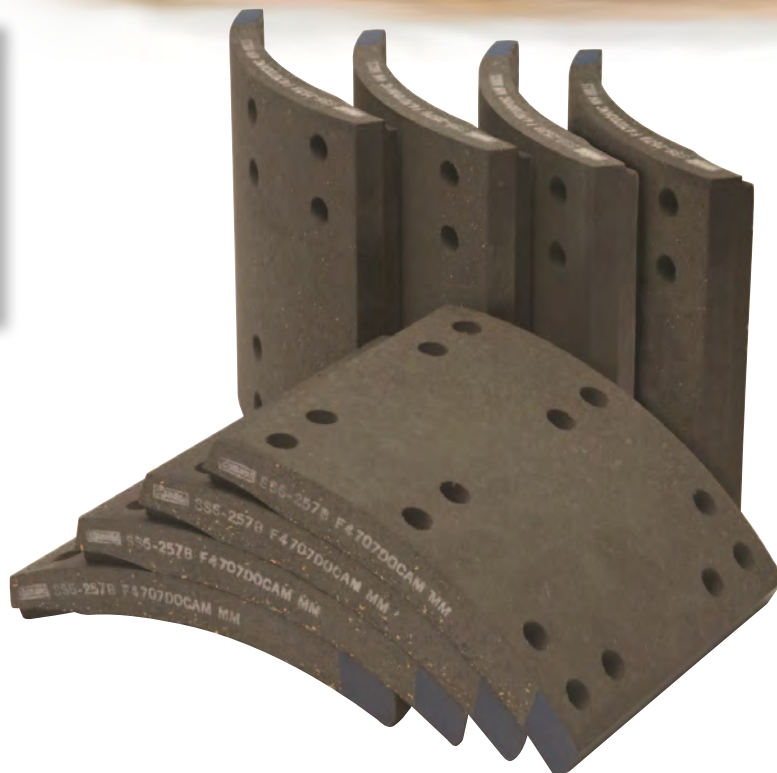
MB23 is a technologically advanced lining formulation designed to address fleet needs for a brake lining that provides excellent service life in a demanding environment. Applications like liquid tanker, grain, cement or standard duty refuse need specific friction materials designed to handle their unique stopping requirements. MB23 will improve your bottom line through better performance and longer life.

### MB23 Features

- Designed for severe duty applications
- Long service life in demanding environments
- Dependable stopping performance
- Excellent brake fade and recovery characteristics
- Excellent drum compatibility

As the test results below indicate, MB23 easily meets the Federal regulations for brake effectiveness, fade, and recovery in compliance with the F.M.V.S.S. #121 inertia dynamometer test procedure.

MB23 shows a highly desirable flat performance curve in both brake fade and recovery. This is a result of the excellent heat dissipation properties of the material, allowing it to perform repeated stops without losing effectiveness.



Testing conducted in accordance with F.M.V.S.S. #121 criteria @ 20,000# axle load: 16 1/2 x 7" S-cam air brake; 30 x 5.5" input power and a 20.8" tire rolling radius. Shaded area indicates non-compliance.



## Premium Grade Brake Linings Designed for Over-the-Road Hauling

Carlisle now offers a brake lining with performance characteristics proven to extend and maintain braking performance. Carlisle *Cohesive Friction* brake linings are free from abrasive particles that “dig” into the drum as many of today’s heavy duty brake linings do. Cohesive Friction creates a transfer layer of non-abrasive particles which smear onto the face of the drum. This approach to heavy duty braking results in a friction material that will *Increase the Life of your Brake Linings*.

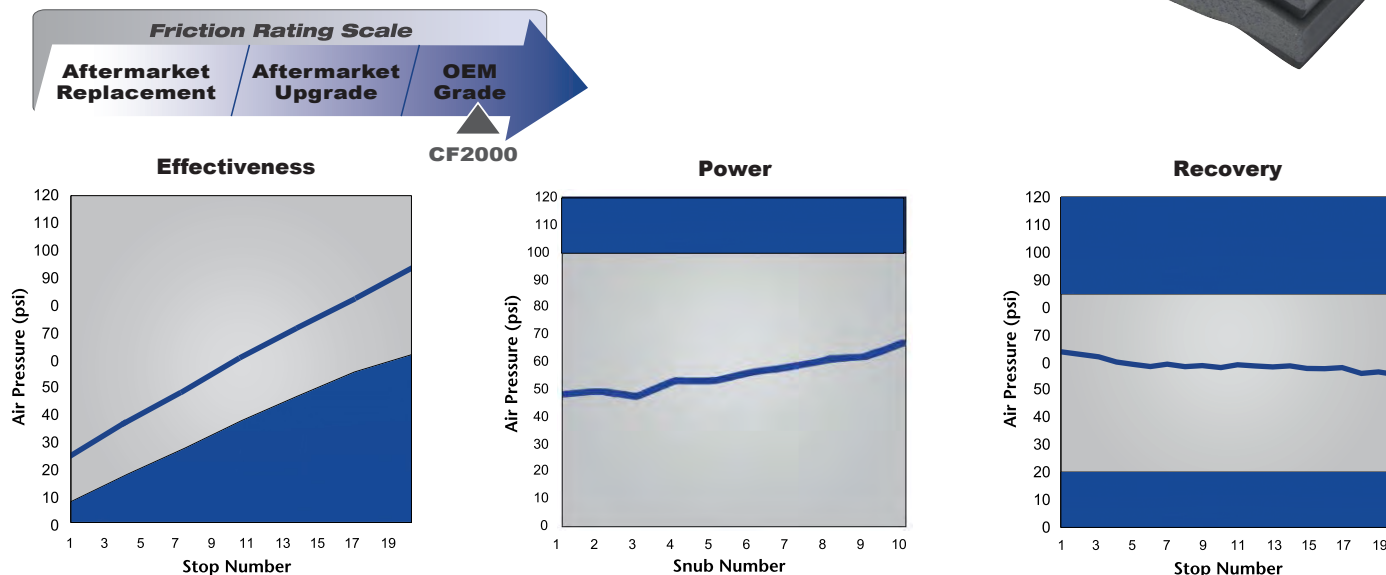
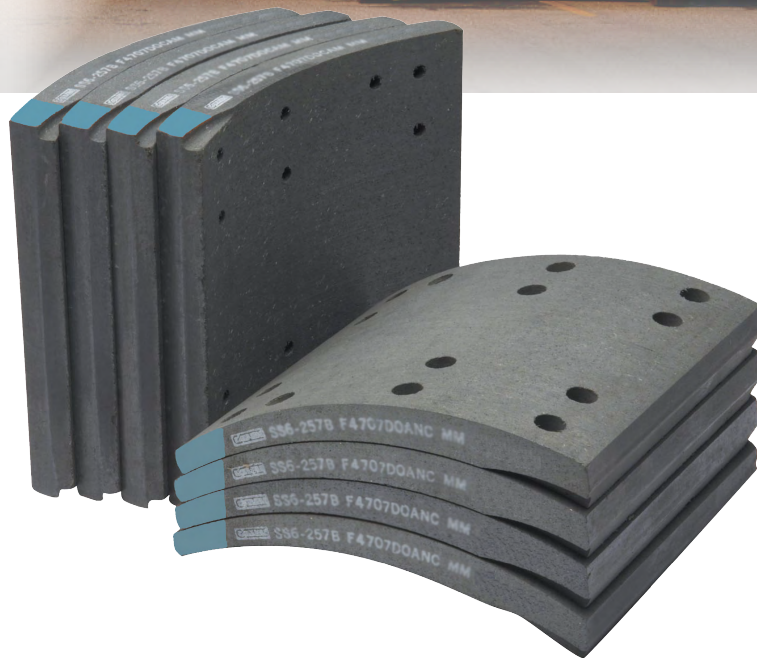
### CF2000 Features

- Increase the life of your brake linings through an even distribution of heat over a larger area of friction material
- Increase the life of your drums with the elimination of abrasive particles
- Eliminate drum hot spotting and thermal cracking with a conformable friction material
- A Reduce uneven tire wear and increase wheel end component life through the conformability of the lining compensating for out-of-round drums
- Reduce brake noise by eliminating abrasive particles
- Eliminate early morning brake sickness and unladen truck braking problems through the conformable/organic nature of the lining

Cohesive Friction linings are soft and conforming to the drum, unlike hard abrasive friction linings. But the biggest benefit of a soft material that doesn’t use abrasive particles is that it will substantially *Increase the Life of your Brake Drums*.

CF2000 is the Cohesive Friction material designed for the vast majority of over-the-road hauling. CF2000 will allow fleets of all sizes and varied operating conditions to extend their maintenance cycles through a longer lasting brake lining that is easier on drums, tires and other wheel end components.

Below are results from FMVSS #121 tests showing how CF2000 easily meets all federal requirements for stopping power, retardation and power through recovery.



Testing conducted in accordance with F.M.V.S.S. #121 criteria @ 23,000# axle load; 16 1/2 x 7" S-cam air brake; 30 x 5.5" input power and a 20.8" tire rolling radius. Shaded area indicates non-compliance.



## Carlisle Brake Shoes with Induction Hardened Ends for Heavy-Duty Fleet Brake Systems

Today's fleet managers understand the importance of quality foundation (brake shoe) to the overall performance of a brake system. Very often when heavy-duty trucks and trailers arrive for relines, the mechanics find a brake shoe that is twisted, stretched and distorted. A relined brake shoe that has not been returned to OE specifications will often result in cracked or loose linings and represent a safety hazard. For many fleets this situation has forced them to purchase an increasing number of additional brake relines, raising costs and increasing vehicle downtime.

There is a better solution for slightly more than the cost of a reline, a new set of OE grade Carlisle brake shoes will save operators and fleet owners by eliminating recycling costs, decreasing vehicle downtime and increasing brake system mileage.

Carlisle brake shoes are an excellent way for fleet owner to replenish shoe core banks, as well as assure a quality foundation of a heavy duty fleet brake system. Carlisle brake shoes are offered in a wide range of FMSI numbers to fit wide range of truck and trailer applications.



### Brake Shoe Features

- Long-term durability through induction hardened cam and anchor ends
- Very limited shoe distortion and deformation due to coining after welding process
- Enhanced resistance to environmental conditions through E-coating
- Guaranteed consistent ISO9001 quality

### All Carlisle Brake Shoes Feature Induction Hardened Ends



#### Benefit

- Improved performance and life due to consistent, true pin contact
- Repetitive use of shoe results in lower lifetime maintenance cost

### Competitive Shoes with Non-hardened Flared Ends



#### Detriment

- Less than full block to drum contact area resulting in less braking effort
- Improper pin contact causing premature wear
- Inability to re-use the shoe

## Lined Brake Shoes in a Wide Range of Performance Grades

Carlisle offers brake shoe sets in a diverse variety of performance grades ranging from standard to premium quality. From the fleet owner seeking an effective, yet economical alternative, to the heavy-duty transport company in search of the optimal friction solution for long lasting performance, Carlisle can deliver the ideal brake shoe assembly to fit the needs of a diverse customer base. Carlisle brake shoes provide a solid foundation for your brake system, ensuring proper fitment between lining and shoe allowing the customer to maximize lining wear and therefore reduce costs.



### Carlisle Brake Linings

- Dependable stopping performance
- Excellent brake fade and recovery characteristics
- Carlisle product certification
- Excellent drum compatibility
- Fewer unscheduled relines



### Carlisle Brake Shoes

- Extended performance and shoe life through induction hardened ends
- Engineered to exceed OE specification and provide consistent performance
- Manufactured to ISO9001 quality standards



### Carlisle Shoe Assemblies

- Highest quality rivets to ensure lining stability of each shoe
- Automated riveting machine to secure a correct lining attachment and tightness
- Torque test on every 100th shoe to confirm attachment at a minimum of 32" lbs. per rivet
- Comprehensive quality control for a tight, secure, relined brake shoe





## Low Friction and Iron Wear for Longer Life and Reduced Maintenance Costs

VelveTouch® by Carlisle is the undeniable leading friction brand in the severe duty and high performance clutch markets. The VelveTouch® by Carlisle brand clutch buttons provide rebuilders and clutch manufacturers with a substantial performance advantage that ensures repeat business through superior product performance, durability, design and quality.



### Features

- Designed for class 5 to class 8 heavy-duty applications
- Manufactured in ISO certified facilities
- Higher friction levels than other AM clutch button suppliers
- Increased life and reduced annual maintenance costs
- Aggressive and smooth engagement formulations available
- Extended life of pressure plate and fly wheel with ultra-gentle friction formulations



## Button Advancement

DOWNFORCE™ technology process incorporates a bend across VSR cores. When riveted to the carrier plate, this creates tremendous down-force across the body of the button and ensures optimal flatness. Maximizing control over button height results in an effectively balanced disc and minimizes risks of clutch drag. Carlisle's DOWNFORCE™ design has been approved and implemented by the largest OE manufacturers for both new and rebuilt clutches.



## Transmission Disc

VelveTouch power shift transmission discs and opposing plates provide OE level form, fit and function to aftermarket rebuilders and installers.

Carlisle understands the need for different friction material technologies for the heavy-duty transmission market. Unlike other aftermarket manufacturers, Carlisle's VelveTouch product line offers the proper friction material technology for each application.



## Premium Grade Friction Material for Light to Medium Duty Commercial Trucks

VelveTouch® Carbon Semi-Metallic disc brake pads are designed for severe duty automotive and truck fleet applications. This unique formulation combine the performance and heat resistance of carbon fiber composites with the durability of traditional semi-metallic brake pads. Advanced friction technology partnered with the quality and safety of Aerospace design is the foundation of Carbon Semi-Metallic brake pads.

Whether its cost per mile reduction, improved drivability or safety, VelveTouch® Carbon Semi-Metallic brake pads will meet or exceed your expectations.



### Features

- Mechanical bond friction material retention system
- Lower cost per mile
- Extend Vehicle up-time
- Noise minimize (NVH)
- Safety / Fade resistance



### Materials

#### F1 Carbon Semi-Metallic Compound

Designed for class 1 through 3 automotive and truck fleet applications

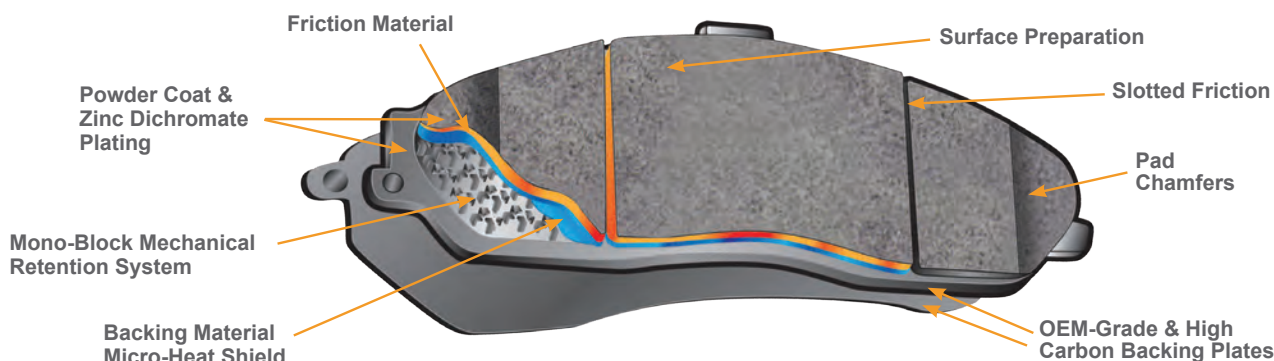
- Emergency vehicles
- SUV, RV, limo & pick-up trucks
- Police & taxi
- Light and medium-duty commercial trucks

#### F3 Carbon Semi-Metallic Compound

Designed for class 2 through 6 commercial truck fleets

- Conventional vans
- Large walk-in delivery trucks
- School bus
- Utility vehicles
- Construction vehicles

## VelveTouch®... Performance You Can Count On





# VelveTouch/ Med-Duty FMSI Cross Reference

FMSI NUMBER	VELVETOUCH NUMBER
D0120	WPD0120x
D0122	WPD0052x
D0138	WPD0154x
D0149	WPD0149x
D0153	WPD0153x
D0154	WPD0154x
D0184	WPD0184x
D0199	WPD0199x
D0202	WPD0154x
D0205	WPD0387x
D0224	WPD0224x
D0225	WPD0225x
D0236	WPD0236x
D0249	WPD0387x
D0269	WPD0269x
D0313	WPD0052x
D0333	WPD0333x
D0352	WPD0352x
D0369	WPD0369x
D0370	WPD0370x
D0376	WPD0376x
D0380	WPD0184x
D0387	WPD0387x
D0392	WPD0153x
D0411	WPD0411x
D0415	WPD0782x
D0436	WPD0436x
D0438	WPD0438x
D0450	WPD0450x
D0459	WPD0459x
D0477	WPD0477x
D0499	WPD0499x
D0505	WPD0505x
D0506	WPD0506x
D0508	WPD0508x
D0512	WPD0782x
D0543	WPD0149x
D0546	WPD0546x
D0559	WPD0782x
D0591	WPD0591x
D0607	WPD0387x
D0614	WPD0153x
D0614	WPD0614x
D0614A	WPD0614Ax
D0626	WPD0632x
D0632	WPD0632x
D0641	WPD0782x
D0642	WPD0642x
D0642	WPD0642x
D0652	WPD0652x
D0654	WPD0387x
D0655	WPD0655x
D0655	WPD0655x
D0658	WPD0782x
D0667	WPD0667x
D0673	WPD0506x
D0679	WPD0679x
D0698	WPD0508x

FMSI NUMBER	VELVETOUCH NUMBER
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D0702	WPD0897x
D0702	WPD0966x
D0711	WPD0711x
D0712	WPD0477x
D0714	WPD0508x
D0717	WPD0184x
D0726	WPD0726x
D0729	WPD0729x
D0748	WPD0748x
D0754	WPD0508x
D0756	WPD0756x
D0756	WPD0824x
D0756A	WPD0756xA
D0757	WPD0757x
D0758	WPD0758x
D0759	WPD0782x
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D0785	WPD0785x
D0786	WPD0786Ax
D0786	WPD0786x
D0789	WPD0369x
D0792	WPD0792x
D0802	WPD0802x
D0814	WPD0508x
D0820	WPD0820x
D0821	WPD0821x
D0824	WPD0756x
D0825	WPD0825x
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D0949	WPD0949x
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D0965	WPD0965x
D0967	WPD0967x
D0970	WPD0970x

# VelveTouch/ Med-Duty FMSI Cross Reference

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D1011	WPD1011x
D1012	WPD1012x
D1027	WPD1027x
D1028	WPD1160x
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D1036	WPD1036x
D1039	WPD1039x
D1044	WPD1044x
D1047	WPD1047x
D1055	WPD1055x
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D1058	WPD1058x
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D1067	WPD1067x
D1068	WPD1068x
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D1069	WPD1069x
D1076	WPD1076x
D1077	WPD0702x
D1083	WPD1083x
D1084	WPD1084x
D1092	WPD1092x
D1096	WPD0702x
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D1318A	WPD1318xA
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D1328	WPD1328x
D1329	WPD1329x
D1330	WPD1330x

FMSI NUMBER	VELVETOUCH NUMBER
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D1334	WPD1334x
D1335	WPD1335x
D1363	WPD1092x
D1363	WPD1363x
D1367	WPD1092x
D1376	WPD1508x
D1377	WPD1377x
D1380	WPD1092x
D1392	WPD1392x
D1399	WPD1399x
D1400	WPD1400x
D1411	WPD1411x
D1414	WPD1414x
D1455	WPD1455x
D1490	WPD1490x
D1498	WPD1498x
D1507	WPD0883x
D1508	WPD1508x
D1540	WPD1540x
D1563	WPD1044x
D1565	WPD1565x
D1565A	WPD1565xA
D1629	WPD1455x
D1680	WPD1680x
D1691	WPD1691x
D1746	WPD1746x
D1774	WPD1774x
D1775	WPD1775x
D7027	WPD7027x
	WPD6000x
	WPD6000xA
	WPD6001x
	WPD7024x
	WPD7026x

## COMPOUND CODES

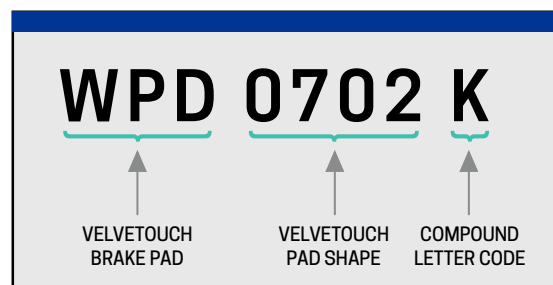
CARBON SEMI-METALLIC F1.....K

CARBON SEMI-METALLIC F3.....T

## CODE BREAKDOWN

**WPD0702x**

INSERT COMPOUND CODE





# Quality Supplier of Genuine Replacement Parts

## Products Offered

- Brake system solutions including: brake assemblies, hydraulic controls, friction components, clutch assemblies and transmission discs
- Replacement parts with OE grade features
- Limited Lifetime Warranty
- Superior material technology



## Markets Served

- Agriculture
- Mining
- Construction
- On-highway
- Industrial material handling
- Light rail
- Military



## Research & Development

- Expert team of product development engineers and material scientists
- Talent driven innovation
- OE expertise ensures continuous product efficiencies and stability



## Sales & Technical Support

- Global team of experienced sales engineers to provide technical support upfront
- Program Managers developing specific solutions for customers
- Field support and product training available upon request



## Manufacturing Excellence

- Quality management to ensure each part is manufactured to CBF excellence standards
- Supply and Operations Planning including demand planning forecasting
- Six Sigma culture



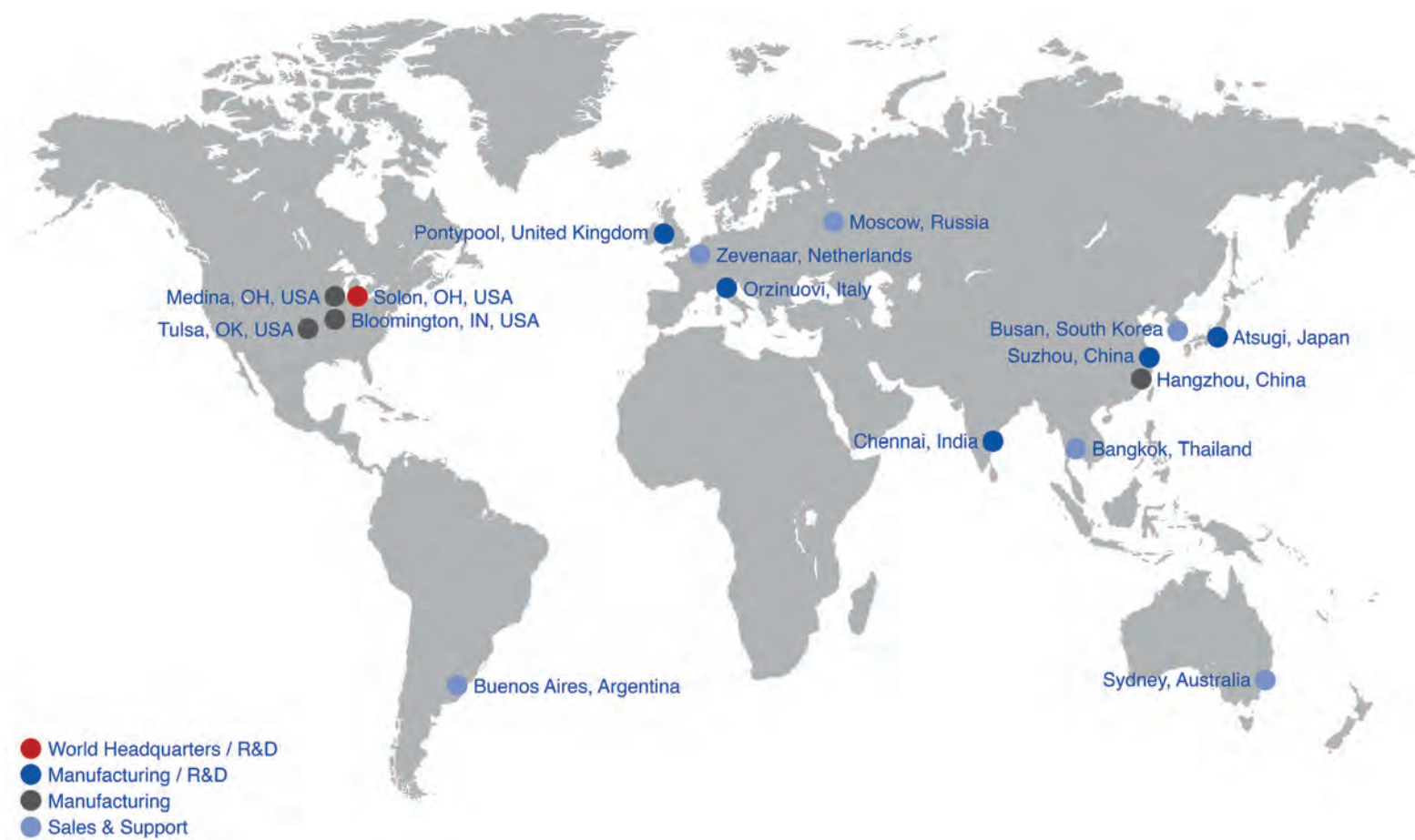
## Customer Service

- Specific support focused exclusively on aftermarket
- Local customer service teams in all CBF regions
- Over 100 years of combined representative experience



# Carlisle Brake & Friction – Your Global Resource

Today, more than ever, it is imperative that suppliers are prepared to support their customers around the world. Carlisle Brake & Friction has established a network of manufacturing and distribution facilities around the globe that give us a presence in the world's fastest growing markets. This commitment to the global marketplace makes Carlisle the right choice for your new brake or friction design, no matter where you are or what you want to be.



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