



Global Manufacturer Quality Supplier Full System Designer

Brake Systems • Hydraulic Systems • Friction Components
Clutch Assemblies • Transmission Discs

No matter what market your next heavy-duty vehicle is designed for, Carlisle can satisfy your hydraulic control, brake and friction needs. From breadth of product, to a problem-solving design team, to global manufacturing and support, we are ready to stop your vehicle or equipment.

From the Pedal to the Brake and the Friction

Carlisle Brake & Friction (CBF) is a leading solutions provider of high performance and severe duty brake, clutch and transmission applications to OEM and aftermarket customers in the mining, construction, military, agricultural, motorsports, industrial and aerospace markets. The strength of CBF's brands, including Wellman Products Group, Carlisle Industrial Brake & Friction, Hawk Performance, Japan Power Brake, and VelveTouch, gives our customers access to a diverse range of the most highly engineered braking, friction, clutch, and transmission products available to the market today. With eleven manufacturing facilities globally located in the U.S., U.K., Italy, China, India, and Japan, and with over 2,000 employees, CBF serves over 100 leading original equipment manufacturers in 50 countries, making CBF the right choice for your new brake or friction design, no matter where you are in the world or what you want to be.

Your OEM Partner

Since our introduction of a caliper disc park brake more than 50 years ago, we've been a key partner to most of the major OEMs. Our organization is well positioned to provide global customer support from a manufacturing and service perspective. The bottom line ... Carlisle stands as an experienced supplier of complete brake solutions that OEMs can count on for their next design.

Before selecting your next brake supplier, check out the company that's fluent in the international language of braking... Carlisle.

WORLD-CLASS QUALITY ASSURANCE

ISO 14001:2015, ISO 9001:2015, IATF 16949:2016

CARLISLE
BRAKE & FRICTION

The Carlisle Advantages...

Since 1925, Carlisle has been driving friction innovation. We empower world-class original equipment manufacturers with products and services that yield a significant competitive advantage.

Carlisle Benefits

Customer-Centric

Dedicated to the Success of Our Customers

Advanced Engineering

Extensive Application Knowledge Solutions Provider

Global Capabilities

Engineering, Manufacturing & Sales Support in Asia, the Americas, EMEA

World-Class Quality Assurance

ISO 14001:2004, ISO 9001:2000, ISO-TS 16949:2002

Superior Material Technology

Broadest Range of Material
Friction Material Innovator

Experience

Reliable Supplier to World-Class OEMs for over 85 Years

Full System Solutions

From Pedal to Wheel

Research and Development

Full in-House Brake and Friction Design Capability

Global Engineering & Application Support

- 5 Engineering Laboratories Located Worldwide: Solon (US), Bloomington (US), Pontypool (UK), Orzinuovi (IT), and Suzhou (PRC)
- 26 Inertia Dynamometers
- 80+ Engineers
- 9 Patents
- 22 Pro-E Seats
- 4 Seats Mechanical FEA Software

*For complete technical data,
visit our website at*
www.CarlisleCBF.com





**Construction,
Ag & Industrial
Park Brakes**

Applications: Front-end loaders, backhoe loaders, ADTs, tele-handlers, tractors, rough terrain cranes, underground mining, winches, industrial applications.

**SA2500/SA7000/SA10000/
SA14000**

Designed for medium duty dynamic and static applications.

Features:

- Quick change linings
- Open caliper for easy access and serviceability
- Simple lining adjustment
- Lining retraction spring eliminates drag

PD1134/PD1591/PD1599

The spring apply, hydraulic release PD series caliper brakes are designed for medium duty static applications.

Features:

- Floating caliper design
- Requires a fixed disc mounting
- Manual adjustment maximizes lining wear
- Multiple brakes may be mounted on a single disc

SCL25

The SCL25 series caliper brakes are designed for static and limited dynamic applications.

Features:

- Floating caliper design
- Simple lining adjustment
- Manual spring release
- Heavy spring option for high torque applications

RT5000/RT7000

The RT series are mechanically actuated, sliding caliper brakes designed for static/secondary applications.

Features:

- Quick change organic or sintered metal linings
- Open caliper for easy access and serviceability
- Less fade in emergency than drum brakes



**Mining Haulage
Park Brakes**

Applications: Haulage trucks, ADTs, industrial applications.

G1 Series

The spring apply, hydraulic release G1 series caliper brakes are designed for high torque static applications with some dynamic capabilities.

Features:

- Hydraulic or air actuated
- Available with manual or automatic slack adjusters
- Less fade in emergency than drum brakes
- Equipped with Carlisle premium linings
- Provides dynamic stop capabilities
- Open caliper provides easy access for inspection

G2 Series

The spring apply, hydraulic release G2 series caliper brakes are designed for high torque static applications with NO dynamic requirements.

Features:

- 5, 6, or 7 spring configurations available
- Manual adjustment to compensate for lining wear
- Equipped with Carlisle premium linings

SCL70 Series

The spring apply, hydraulic release SCL70 series caliper brakes are designed for medium to high torque applications with NO dynamic requirements.

Features:

- Multiple calipers may be used on a single disc
- Both disc and caliper require a fixed mounting
- Flexible mounting alternatives to accommodate numerous vehicle types
- Equipped with Carlisle premium linings



**Combination Park
& Service Brakes**

Applications: Mining haulage trucks, underground mining shuttle vehicles, pavement profilers, mobile construction, industrial equipment.

HDBC4225 Series

The HDBC Series caliper brake is a combination service and park brake designed for dynamic and static applications. One set of opposed pistons are the SAHR park brake while the other two sets of opposed pistons are the hydraulically actuated service brake.

Features:

- Ductile cast iron construction
- High torque range for heavy-duty service conditions
- Park brake includes retracting springs and auto adjustment
- Also available as a service brake only

SCL8 & SCL10 Series

The SCL8 and SCL10 series caliper brakes are combination service and park designed for dynamic and static applications. One set of opposed pistons is the SAHR park brake while the other pair of opposed pistons is the service.

Features:

- Ductile cast iron construction
- Medium torque ranges for severe service conditions
- Caliper and disc require fixed mountings
- SCL10 available with retracting springs and auto adjusters
- Multiple calipers may be used on a single disc



**Medium Duty
Construction
Service Brakes**

Applications: Wheel loaders, ADTs, mobile cranes, tow behind scrapers, logging vehicles, industrial equipment.

Two Piston Brakes

A2, AA2, B2, C2

The A, B, and C series caliper brakes are hydraulically applied two piston brakes for a variety of dynamic braking requirements.

Features:

- Aluminum housings available for some models
- Carlisle premium linings
- Flexible mounting alternatives to fit a wide range of vehicles
- Open caliper provides easy access for service
- B and C brakes have retracting springs and automatic adjusters

Four Piston Brakes

A4, AA4, M4, H4, SCL2

The A, M, H, SCL2 series brake calipers are hydraulically applied four piston brakes designed for a variety of dynamic braking requirements.

Features:

- Aluminum housings available for some models
- Carlisle premium linings
- Flexible mounting alternatives to fit a wide range of vehicles
- Open caliper provides easy access for service

Six Piston Brakes

H6, HH6, M6, HDB640, SCL35

The H, M, HDB640 and SCL35 series brakes are hydraulically applied six piston brakes designed for a variety of dynamic braking requirements. These brakes are typically mounted to a bracket on the vehicle's axle or mounting bracket for service applications. Multiple calipers can be mounted on a single disc to proportionately increase torque output.

Features:

- Carlisle premium linings
- Flexible mounting alternatives to fit a wide range of vehicles
- Open caliper provides easy access for service
- Multiple brakes can be mounted on a single disc



Heavy Duty Mining Haulage Service Brakes

Applications: Mobile mining and construction equipment, industrial equipment.

M6, J6, SCL19, SCL56

All the brakes in this group are hydraulically actuated, six piston brakes, designed for high energy, high torque dynamic braking. Multiple calipers may be mounted on a single disc to proportionately increase torque output. They are typically bolted to a flange on the vehicle axle or mounting bracket.

Features:

- Ductile iron castings for superior brake durability
- Equipped with Premium Carlisle linings
- Optional seal materials available for compatibility with all actuation fluids and temperatures
- Open caliper provides easy access for visual inspection and serviceability
- Automatic adjusters and spring activated piston retraction available on some models

F4, FF4, FF6, PD1425

The F and PD1425 series brakes are hydraulically actuated, four or six piston brakes with retracting springs and automatic adjusters. These brakes are typically mounted to the armature shaft of an electric wheel motor.

Features:

- Ductile iron castings for superior brake durability
- Equipped with Premium Carlisle linings
- Optional seal materials available for compatibility with all actuation fluids
- Modular piston design for easy serviceability
- Piston insulators are standard to protect brake components from heat transfer (applies to F series brakes)



Full Circle Dry Disc Brakes

Applications: Electric and internal combustion fork lift trucks, transmission mounted park brakes, towed agricultural equipment, scissor-lifts, aerial lifts.

FCL

The FCL series brake is a 4 piston, hydraulically actuated, full circle disc brake designed for the front load wheels of lift trucks.

Features:

- High torque output
- Extended friction life
- Quiet operation
- Enclosed design eliminates brake contamination
- Available with a SAHR park brake option

FCS

The Carlisle FCS series brake is a hydraulically actuated full circle disc brake designed for use on the front load wheels of reach type lift trucks.

Features:

- High torque output
- Extended friction life
- Utilizes wheel web as a friction surface
- Adaptable to a variety of applications
- Quiet operation
- Enclosed design eliminates brake contamination

FCP (SAHR)

The Carlisle FCP series brake is a spring applied, hydraulically released (SAHR) park brake. Designed as a transmission mounted brake, the FCP is adaptable to a wide range of applications.

Features:

- High torque output
- Extended friction life
- Quiet operation
- Enclosed design eliminates brake contamination
- Design can be sized to fit the application



Ball & Ramp Brakes

Applications: Agricultural tractors and agricultural vehicles.

Carlisle's ball and ramp brake is a standard design on many agricultural machines. It is a highly efficient low cost mechanical braking solution and is available in many agricultural tractors and vehicles. Our ball and ramp brakes are available in a number of diameters and the brake can be actuated with a slave cylinder or manual lever.

Features:

- Dry and oil-immersed braking systems available
- Available in diameters ranging from 100mm to 350mm
- High efficiency and low cost
- Simple mechanical brake/park brake solution
- Available with manual apply lever

Slave Cylinders

Variety of designs for most agricultural and industrial brake applications that require a slave cylinder.

Features:

- Available for both mineral and Glycol (DOT 3, 4) brake fluids
- Designed to meet a range of operating pressures and temperatures
- Variable stroke if required
- Large variety of pushrod lengths and sizes
- Range of diameters from 15.8mm to 35mm for standard pusher type
- Concentric design for "puller type" negating the use of levers and minimizing the use of frictional loss
- Range of metric or imperial ports
- Designs for integrated cylinder/park lever arrangement for in-axle braking systems



Service & Service Brakes

Applications: Front end loaders, rough terrain cranes, tow tractors, lift trucks, industrial tractors, mobile mining and construction equipment. Brakes are the former ArvinMeritor, Rockwell and Warner Electric drum brake lines.

DLH Series Brakes (Cast Ductile Spider)

A hydraulically actuated, dual leading shoe drum brake which incorporates two wheel cylinders for balance and uniform torque.

Features:

- Replaceable anchor pins
- Brake linings are 1/2 inch thick, bonded to cast shoes
- Straight bore, double acting wheel cylinders
- Wheel cylinders available in 1 1/2", 1 3/4" and 1 7/8" sizes
- Easily accessible manual adjusters

Brake Sizes: 12 1/4" and 17"
Shoe Widths: 2 1/2" and 4"

DSH Series Brakes (Cast Ductile Spider)

This hydraulically actuated, dual servo, self-energizing drum brake with floating brake shoes. This brake is ideal for low speed, heavy-duty service conditions.

Features:

- Replaceable anchor pins
- Cable operated park brake is optional
- Automatic adjustment
- 5/16" bonded linings

Brake Sizes: 12 1/4" and 12 1/2"
Shoe Widths: 2 1/4"

FSH Series Brakes (Backing Plate)

The brake features two internal floating shoes with hydraulic cylinder actuation. Mechanical hand brake available.

Features:

- 3/16" to 1/4" thick bonded linings
 - 7/8" to 1 1/2" cylinder sizes
 - Internal cams or automatic adjustment
- Brake Sizes:** 8" to 12 1/2"
Shoe Widths: 1 1/4" to 2 1/4"



Park Brakes

Carlisle Wedge Brakes

When wedge brakes are applied, an air or hydraulic power unit actuates the wedge pushing the rollers, forcing the two plungers outward, pushing the brake shoes against the drum.

RS Series Wedge Brakes (Single Wedge)

Brake Sizes: 17 1/4" to 28"
Shoe Widths: 2 1/4" to 8"

RD Series Wedge Brakes (Dual Wedge)

Brake Sizes: 20" to 46"
Shoe Widths: 3" to 20"

RT Series Wedge Brakes (Triple Wedge)

Brake Sizes: 36" and 42"
Shoe Sizes: 14" and 18"

Park Brakes

Applications: Lift trucks, tugs, construction equipment, medium duty trucks.

DLM Series

This manually actuated, balanced brakes has two internal, self-aligning floating shoes and floating lever actuation.

Features:

- Replaceable anchor pins
- Brake linings are 1/2" thick, bonded to cast shoes
- Easily accessible manual adjusters
- Brake Sizes: 7 1/4", 10" and 13 3/8"
- Shoe Widths: 1 1/2" to 2"

DSW Series (Cast Ductile Spider)

The spring applied, hydraulically released park brake based on proven wedge technology is designed to be mounted on the drive shaft or transmission.

Features:

- High torque, compact design
- Available in a manual version
- Can be mounted on transmission or drive train
- Air actuation available
- Position sensor indicates brake is applied or if brake fails

Brake Sizes: 12 1/2"
Shoe Widths: 2 1/2"



Military Brakes

Applications: Carlisle is a well recognized brake supplier of military applications. Carlisle is ITAR certified and experienced in export and import regulations.

RT7000 Series

OE on the current HUMVEE, the RT7000 mechanical park brake meets or exceeds the severe requirements for this upgraded vehicle.

Features:

- Rugged ductile iron construction
- Long life corrosion protection
- High temperature linings

FCH Series

Hydraulically actuated drum service brake designed to meet the stringent demands of military attack vehicles.

Features:

- Floating wheel cylinder design
- Automatic adjustment
- Scalable design for heavier, upgraded vehicles

HSAPS Series

The "Hydraulic Spring Apply Park Service" brake was designed for an upgraded military vehicle with critical space and weight constraints. The design features an integrated SAHR park brake that meets severe grade hold requirements.

Features:

- Rugged ductile iron construction
- Automatic park brake adjustment
- Minimal space claim

Wind Turbine Yaw & Rotor Brakes

WBA6-120 (WTB Series)

- Six 120mm piston, split caliper brake
- Max Tangential Brake Force - 567,000 N*
- Max Pressure - 3,000 psi / 206.8 bar
- Yaw application

WBA4-90 (WTB Series)

- Four 90mm piston split caliper brake
- Max Tangential Brake Force - 170,900 N*
- Max Pressure - 2,500 psi / 172.4 bar
- Rotor and yaw application

Applications: Off-highway, heavy-duty equipment including mining, construction and agriculture vehicles.

Features:

- British Columbia certified
- Alberta certified
- Superior stopping performance
- Improved life characteristics
- Quiet performance
- Specialized formula
- Consistent braking - less speed sensitive
- Increased life = lower operation costs (CPR - cost per hour)
- Parts available up to 46" diameter

Paper Materials

N-266

- Oil cooled friction material with a moderately high energy capacity
- Moderately high dynamic coefficient of friction
- Positive lockup and resistance to rougher opposing surfaces
- Well suited for powershift transmission and wet brake applications
- Significant tolerance to operate under very high unit loading

N-269

- Oil cooled friction material with a moderately high energy capacity
- Dynamic coefficient of friction
- Possesses a very high static friction level
- Material also sees use as a wet parking brake due to the high static friction level

N-360

- Medium energy capacity
- Designed for Off Highway mine truck brakes and loader brakes
- Smooth engaging paper for low unit operating pressures

N-401

- Oil cooled friction material with high energy capacity and coefficient of friction
- Used primarily in powershift and counter shaft transmission designed for a positive lockup
- Ability to survive extreme conditions capable of destroying resilient organic materials



Wet & Dry Friction

N653

- Medium to high energy capacity
- Premium for any brake application
- Consistent friction stability
- High heat and pressure capability

N670

- Medium to high energy capacity
- Ability to withstand high unit operating pressures
- High heat capacity
- Smooth engagement characteristics

Sintered Materials

S-156 Bronze

- Developed as a premium transmission friction material where high coefficient of friction and high energy was a requirement
- Excellent erosion resistance against oil cavitations with great load and wear resistance
- Production applications include planetary, powershift and automatic transmissions and accessory clutches on earthmoving, ordnance and industrial equipment

S-154 Bronze

- Developed where high coefficient of friction and long slipping times were required
- Excellent wear resistance at moderate energy long slip conditions in tractor applications
- Production applications include steer clutch and steer brake modules and accessory clutches on earthmoving, ordnance and industrial equipment

Molded Linings

Applications: Industrial clutch and brake for marine industry, forestry and paper, mining, energy exploration, agriculture, stamping press

Features:

- ISO 9001 certified
- Custom designs for specific applications
- Wide range of product sizes 3/8" OD - 62" OD - up to 35' in length
- Over 100 non-asbestos formulas
- Wide range of friction coefficients
- Full R&D testing facilities



On-Highway Friction

Brake Blocks & Lined Shoe Assemblies

Asbestos free organic friction that passes the F.M.V.S.S.#121 dynamometer testing standard.

EC-20

Standard grade brake linings

- Designed for use with S-cam air brakes on trucks, tractors, and trailers operating in general freight, on-highway applications that do not require a severe service lining

EC-23

Standard grade brake linings

- Designed for severe duty hauling and low powered brake systems that require a more aggressive lining

MB-20

Premium grade brake linings

- Designed for 20,000# axle applications
- Available in a wide range of FMSI numbers
- Dependable stopping power

MB-21

Premium grade brake linings

- The longest service life of any brake lining in its class
- Excellent brake fade and recovery characteristics
- Excellent drum compatibility
- Dependable stopping performance

Clutch Buttons

- Superior friction and steel disc life reduces annual maintenance costs
- Choose between aggressive and smooth engagement formulations
- Extend pressure plate and fly wheel life with ultra-gentle friction formulations

Carbon/Carbon Composites

Racing brake and clutch friction and industrial applications

- Custom formulation and carbon silicon carbide (C/SiC) options
- Non-friction use in air to 750°F (400°C) or inert to 3600°F (2000°C)



Hydraulic Valves & Adjusters

Applications (for 1100 & 2100 Series Valves): Articulated dump trucks, mining haulage trucks, mobile cranes, lift trucks, industrial equipment airport tugs.

1100 Series Valves

The 1100 Series single and tandem circuit, modulating hydraulic control valves are capable of modulating output pressures to a maximum of 3,500 psi (24,133 kPa).

Features:

- Flow capabilities exceed competitive designs
- Externally adjustable for precise pressure settings
- Rugged cast iron construction
- Automotive style pedal feedback

2100 Series Valves

The valves are available in single circuit (2101) and parallel circuit (2102) configurations and are capable of modulating output pressures to a max of 3,500 psi (24,133 kPa).

Features:

- Spool sleeve design allows for easy serviceability
- Large supply and return ports provide high flow capabilities
- Externally adjustable to provide precise pressure settings
- Standard pilot apply (optional on the 2101 series)
- A number of pedal and switch options are available

Hydraulic Adjusters

Carlisle's automatic adjusters are used for in-line adjustment of high displacement hydraulic brakes, such as wet brakes. The adjuster functions to maintain running clearance at each brake application. In drum brake applications, the adjuster also compensates for clearance reduction due to thermal contraction of the brake.

Features:

- Rugged cast iron construction
- Available in single and dual circuit configurations
- Capacities range from 3.5 to 15.0 cu in
- Piston replacement kits available



Standard & Boosted Master Cylinders

Applications: Farm tractors, agricultural equipment, lift-trucks, backhoe loaders, construction vehicles. Carlisle has a vast array of master and slave cylinders that provide a hydrostatic medium for delivering a set volume of braking oil from the pedal to the brake.

Boosted Cylinders

Patented design for mineral oil single/twin pedal braking systems providing a boosted, progressive pedal feel.

Features:

- Generic design enables performance to be easily matched to most agricultural and industrial applications.
- Self bleed design purges any ingressed air.
- PTFE seal technology
- No reservoir required, uses supply oil from braking or clutch systems.

Single Boosted Cylinders

- For up to 120+ HP machines
- Boost Ratios of 2.65:1 to 6.2:1
- Master cylinder diameters from 25.4 to 35mm
- Supply pressure range 15 bar to 40 bar

MIDI Twin

Boosted Cylinders

- For up to 130+ HP machines
- Boost ratios from 3:1 to 5:1
- Master cylinder diameters from 25.4 to 28.5mm
- Supply pressure range 15 bar to 25 bar

Compact Twin Boosted Cylinders

- For 120 to 350+ HP machines
- Boost Ratios of 2.65:1 to 6.2:1
- Master cylinder diameters from 25.4 to 35mm
- Supply pressure range 15 bar to 40 bar

Master Cylinders

OE supplier to the majority of agricultural and construction machine manufacturers.

Features:

- Metric or Imperial ports
- Bore diameters from 15.8mm to 31.75mm
- Available for mineral oil or brake fluid



Genuine Carlisle Replacement Parts

Genuine Service Parts

From concept design to engineering release, all Carlisle component parts are developed and tested specifically for your original Carlisle Brake System. Specific replacement items and repair kits are available for each braking system assembly. When it comes to disc brakes, Carlisle's advanced lining design, corrosion protected pistons, and optimum sealing material for all vehicle applications ensure maximum brake life and true value.

- Genuine Carlisle replacement parts will guarantee superior brake performance, less machine down time, lower life-cycle costs and safer operating conditions.

Quality

"Quality by Choice, Not by Chance" applies as much to our replacement parts as our original brakes. Repeated quality certifications by all major OEM customers and a warranty rate far below industry standards illustrate our quality record.

- Unlike "will-fit" brands, Carlisle utilizes the latest design and test technology to ensure long life and superior performance.

Carlisle Economics

Many "look-alike" brake parts in today's market claim "equal quality at a lesser price". Carlisle has proven these claims to be false time and time again.

- Value is not always a reflection of price. Specific competitive testing and life-cycle analysis confirm that Carlisle is the best value – far outperforming "look-alikes".

Carlisle Service

Total customer service ranges from design and testing, to delivery and troubleshooting... with total customer satisfaction being the Carlisle goal.

- Customer orders are entered and tracked by the most sophisticated computer software available.
- Warehousing and shipping procedures have been established to move product quickly and efficiently.
- Field service technicians are available to troubleshoot and train at your site.

Carlisle...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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