Underground Mining Vehicles

Innovative Drivetrain Solutions

Complete Systems | Transmissions | Controls | Driveshafts | Axles

DANA SPICER® Off-Highway Systems

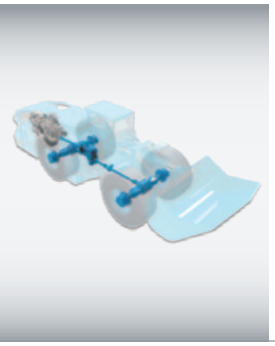
Construction

Agriculture

Mining

Forestry

Material Handling



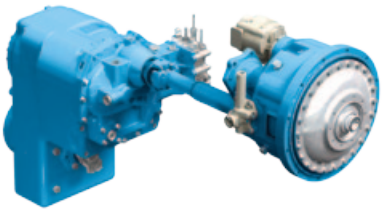
Drivetrain Systems

With a comprehensive line of Spicer® brand products designed specifically for mining vehicles – including scoops, shuttles, mine trucks, load haul dumpers (LHDs), personnel carriers, self-propelled blast-hole drills, and site utility vehicles – Dana can provide you with the most innovative and flexible drivetrain solutions in the industry. At Dana, we offer everything from a complete driveline system to individual components that work within your specified designs. Whatever your requirements are, you can rely on more than 100 years of Dana innovation to provide products that work continuously and efficiently in challenging environments where vehicle performance, efficiency, reliability, and operating costs are key considerations.

Spicer® drivetrain systems for underground mining vehicles are designed to improve traction, positioning, braking, and reliability, as well as providing unique features that maximize productivity. And, every Spicer drivetrain component is designed, tested, and manufactured to meet your exacting standards.

Spicer® Transmissions

The Spicer transmission range offers a variety of options to provide vehicle designers with complete flexibility. Converter and transmission packages are available with integral, mid-mount, and remote configurations. Spicer transmissions deliver smooth shift characteristics, driver comfort, and enhanced vehicle performance. They also feature advanced charge pump systems, providing increased oil flows to maximize performance in high-energy duty cycles, as well as cold temperature environments.



A remote-mounted transmission is available for the undergroung mining market to allow for installation flexibility.

Spicer® Electronic Controls

Spicer electronic controls provide improved shift quality and reduced acceleration jerk while supplying seamless transitions for the entire range of maneuvers.

Spicer® Axles

Spicer axles offer a range of differential designs that supply excellent torque-bias performance and required traction for varying ground conditions. One example is the Hydraloc™ torque-biasing differential, which provides optimum maneuverability and traction on widely varying ground conditions found at mining sites.

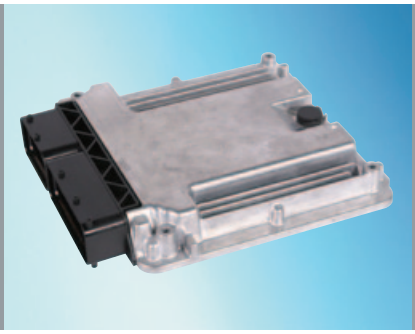
Spicer® Driveshafts

Spicer driveshafts offer design flexibility and the durability to work reliably on varied and uneven terrains found at mining sites. More than a century of quality and innovation is reflected in every Spicer driveshaft, ranging from 400 to 15,000,000 Nm. At Dana, we continuously develop new designs, materials, and processes for Spicer driveshafts, providing more power, greater efficiency, and better overall performance.

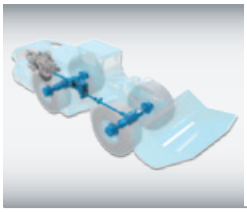
Braking Systems

Simple and reliable liquid-cooled braking systems increase stopping power and decrease brake temperatures by distributing the braking effort over a high percentage of the axle surface envelope. Posi-Stop™ fail-safe service brakes predominantly used in ramp mining vehicles are world-renowned for delivering high-integrity, high-reliability performance through spring-applied hydraulic-release (SAHR) actuation.

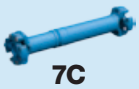
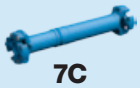
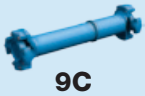
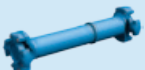
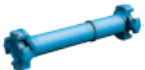
The Spicer® APC120 controller features state-of-the-art design, ensuring high reliability and seamless integration.



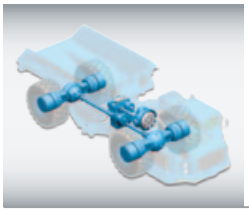
The RD.120 remote display is available for the APC120 and provides basic operating information and diagnostic codes.



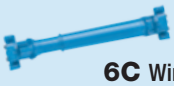
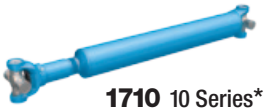
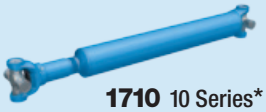
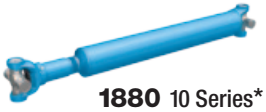
Mining Load Haul Dumpers (LHDs)

BUCKET LIFT CAPACITY	TRANSMISSIONS	AXLES	DRIVESHAFTS
3–4 Tonnes (3–4 Tons)	 T20000	 14D  113	 4C/5C/6C Wing Series*  7C Wing Series*  1480/1550/1710 10 Series*
4.5–6.5 Tonnes (5–7 Tons)	 32000  33000	 14-16D  114  37RM116	 6C Wing Series*  7C Wing Series*  1550/1710 10 Series*
8–9 Tonnes (9–10 Tons)	 32000  33000	 19D  43RM175	 7C Wing Series*  8C/8.5C Wing Series*  9C Wing Series*  1710 10 Series*
11–13 Tonnes (12–14 Tons)	 TE27  6000	 19D	 8.5C Wing Series*
14–15.5 Tonnes (15–17 Tons)	 TE32  6000	 53R	 8C/8.5C Wing Series*  9C Wing Series*  1880 10 Series*
16.5–20 Tonnes (18–22 Tons)	 8000	 53R	 8C/8.5C Wing Series*  9C Wing Series*  1880 10 Series*

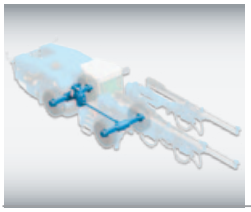
*Other driveshaft series and end-fitting designs available.



Mining Trucks

PAYLOAD CAPACITY	TRANSMISSIONS	AXLES	DRIVESHAFTS
15 – 20 Tonnes (16.5 – 22 Tons)	 32000 C5000	 114  14D	 6C Wing Series*  7C Wing Series*  1550/1610 10 Series*
25 – 30 Tonnes (28 – 33 Tons)	 6000	 37RM116  16D  19D	 6C Wing Series*  7C Wing Series*  8.5C Wing Series*  1710 10 Series*
35 – 40 Tonnes (39 – 44 Tons)	 8000	 43RM175  19D  21D	 7C Wing Series*  8.5C Wing Series*  1710 10 Series*
45 – 50 Tonnes (50 – 55 Tons)	 8000	 53R300	 8C Wing Series*  9C Wing Series*  1880 10 Series*

*Other driveshaft series and end-fitting designs available.



Mining Drill Carriers

CURB WEIGHT	TRANSMISSIONS	AXLES	DRIVESHAFTS
15 – 20 Tonnes (16.5 – 22 Tons)	 T20000	 123	 5C/6C Wing Series*  7C Wing Series*  1480 10 Series*
25 – 30 Tonnes (28 – 33 Tons)	 T20000	 113	 5C/6C Wing Series*  7C Wing Series*  1480 10 Series*
35 – 40 Tonnes (39 – 44 Tons)	 T20000  T24000	 37R  113  114	 6C Wing Series*  7C Wing Series*  8.5C Wing Series*
45 – 50 Tonnes (50 – 55 Tons)	 32000  33000	 37R  114	 6C Wing Series*  7C Wing Series*  8.5C Wing Series*
60 Tonnes (67 Tons)	 T36000	 37R  43R	 6C Wing Series*  7C Wing Series*  8.5C Wing Series*  1710 10 Series*
70 Tonnes (77 Tons)	 T36000	 43R	 7C Wing Series*  8.5C Wing Series*  1710 10 Series*

*Other driveshaft series and end-fitting designs available.

AXLES

Product	Dynamic Load (Kg)	Maximum Output Torque (Nm)	Planetary Ratio	Ratio Range	Input Speed (RPM)	Flange to Flange (mm)	OHBCD (mm)
123	12,000	58,000	6	From 14 up to 25	4,000	From 1,660 up to 1,920	335
113	15,000	65,000	6	From 15 up to 25	4,000	From 1,080 up to 2,050	425
114	20,000	110,000	6	From 20 up to 22	4,000	From 1,920 up to 2,180	425
14D2149	18,160	67,800	4.941	From 19 up to 31	4,000	From 1,155 up to 2,514	511
37RM116	18,500	116,000	6	From 22 up to 31	4,000	From 1,235 up to 1,472	511
37R118	33,000	118,000	6	From 22 up to 31	4,000	2,134	500
16D2149	19,068	111,600	4.941	From 23 up to 31	4,000	From 1,472 up to 2,768	511
19D2748	24,955	150,500	4.765	From 26 up to 33	4,000	From 1,702 up to 2,768	511
21D	27,000	211,000	4.667	From 19 up to 31	4,000	From 2,329 up to 2,748	495
43RM175	46,100	175,000	6	From 25 up to 34	3,500	1,997	511
43R183	47,200	175,000	6	From 26 up to 35	3,500	2,852	508
53R300	49,890	282,000	6.25	From 26 up to 41	3,000	From 1,893 up to 3,196	500 or 508
53R312	54,420	312,000	6.833	From 28 up to 45	3,000	From 2,721 up to 3,330	500 or 508

POWERSHIFT TRANSMISSIONS

Product	Power Range	Speed Number	Vertical Drop	Installation	Input Speed (RPM)	Disconnect	Parking Brake	ECU
T20000	Up to 100 Kw	2 or 3 or 6	IL-ID-LD	HR-MHR-R	3,100	YES	YES	OPTIONAL
T24000	Up to 120 Kw	3 or 4 or 6	SD-LD	HR-MHR-R	3,100	YES	YES	OPTIONAL
32000/33000	Up to 170 Kw	3 or 4 or 6	SD-LD	HR-MHR-R	3,100	YES	YES	OPTIONAL
T36000	Up to 240 Kw	3 or 4 or 6	SD-LD	HR-MHR-R	2,800	YES	YES	OPTIONAL
TE27	Up to 275 Kw	4	LD	H	3,100	YES	—	YES
TE32	Up to 320 Kw	4	SD-LD	H-MT	2,550	—	YES	YES
6000	Up to 300 Kw	4	LD	R	2,800	YES	NO	OPTIONAL
8000	Up to 400 Kw	4 or 8	LD	R	2,800	YES	NO	OPTIONAL

SPICER® WING™ SERIES DRIVESHAFTS

Driveshaft	Functional Torque Limit		Swing Diameter	
	Nm	ft-lb	mm	in
4C	3,300	2,434.1	116.0	4.570
5C	5,600	4,180.3	123.0	4.840
6C	7,200	5,310.0	150.0	5.910
7C	10,700	7,892.0	158.0	6.220
8C	15,500	11,432.0	216.0	8.500
8.5C	20,300	14,972.0	175.0	6.890
9C	27,400	20,206.0	223.0	8.730

SPICER® 10 SERIES DRIVESHAFTS

Driveshaft	Functional Torque Limit		Swing Diameter	
	Nm	ft-lb	mm	in
1480	5,500	4,000	134.9	5.310
1550	7,000	5,100	152.4	6.000
1610	Use Spicer Life Series® (SPL® 100)			
1710	15,700	11,500	200.2	7.880
1880	Use Spicer® Wing™ Series (9C and above) Use Spicer® Compact 2000™ (2060 or 2065)			

For additional configurations, contact Spicer Driveshaft Engineering for specific application information.

Dana Power Technologies

In addition to our established global position in drivetrain products, we offer a line of sealing and thermal-management technologies for the engine and transmissions of mining vehicles.

Victor Reinz® Sealing Products

We offer a comprehensive range of innovative sealing solutions for gasoline, diesel, and alternative-fuel underground mining vehicles.

Our product offerings include:

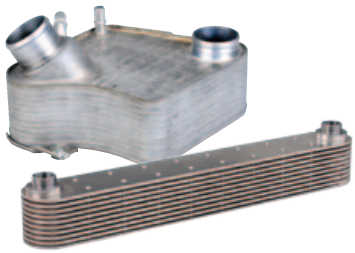
- Cylinder-head gaskets
- Cylinder-head cover modules
- Exhaust gaskets
- Valve stem seals
- Heat shields
- Secondary gaskets
- Cam covers

Long® Thermal-Management Products

We provide heat-transfer solutions that are uniquely engineered for the specific needs of underground mining vehicles.

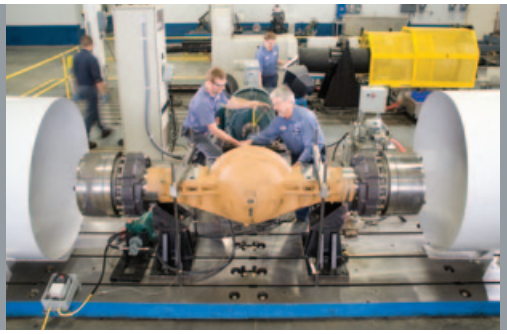
Our product offerings include:

- Engine oil coolers
- Transmission oil coolers
- Charge-air coolers
- Special coolers for thermal management of batteries and electronic components



Dana Global Replacement Parts and Service

We are proud to operate global service parts distribution centers and more than 60 authorized Spicer Service Centers for our customers in more than 100 countries. This global presence ensures that you get local access to the parts and technical support that you need. We also provide a single source for Long thermal-management and Victor Reinz sealing system replacement parts. Precision-engineered and rigorously tested, only these genuine parts can provide the reliable performance required to minimize downtime and costs.



The torsional durability test validates original design calculations and exemplifies the constant pursuit of quality at every stage of systems development.

Every Spicer® drivetrain component is designed, tested, and manufactured to meet your exacting standards.

DANA

SPICER®
Drivetrain Products

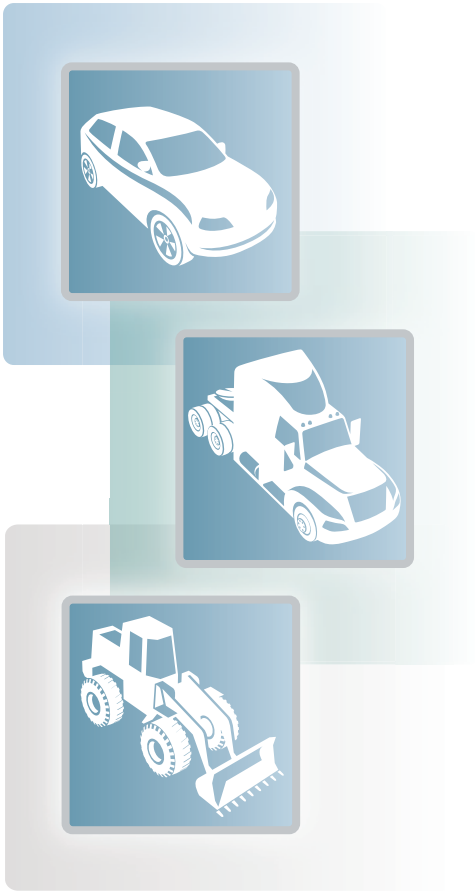
Axles
Driveshafts
Off-Highway Transmissions

VICTOR REINZ®
Sealing Products

Gaskets and Seals
Cylinder-Head Cover Modules
Thermal-Acoustic Protective Shielding

LONG®
Thermal Products

Transmission Oil Coolers
Engine Oil Coolers
Battery Coolers



About Dana Holding Corporation

Dana is an integral partner for virtually every major vehicle and engine manufacturer worldwide. We are a leading supplier of drivetrain, sealing, and thermal technologies to the global automotive, commercial-vehicle, and off-highway markets. Founded in 1904, we employ thousands of people across five continents.

About Dana Off-Highway Driveline Technologies

Dana Off-Highway Driveline Technologies includes research and development, manufacturing, and assembly operations in Belgium, Brazil, China, Hungary, India, Italy, Mexico, the United Kingdom, and the United States. We design, manufacture, assemble, and market Spicer® axles and transaxles, driveshafts and end-fittings, transmissions, torque converters, electronic controls, and brakes. We also provide genuine replacement parts and service.

Dana Off-Highway Driveline Technologies serves more than 1,000 vehicle assembly and manufacturing facilities in 30 countries. Construction, agriculture, forestry, underground mining, material handling, outdoor power, leisure/utility vehicles, and industrial equipment are just some of the markets that demand the quality found in Spicer products and genuine service parts.

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Shanghai, China 200235

DANA **SPICER®**
Off-Highway Systems

www.dana.com/offhighway

APPLICATION POLICY

Capacity ratings, features, and specifications vary depending upon the model and type of service. Application approvals must be obtained from Dana Off-Highway Driveline Technologies. We reserve the right to change or modify our product specifications, configurations, or dimensions at any time without notice.