

Underground Mining Vehicles

Drivetrain System Solutions

Complete Systems | Transmissions | Controls | Driveshafts | Axles



SPICER®

Off-Highway Systems



Construction



Agriculture



Mining



Forestry



Material Handling

Smart Drivetrain Systems for Mining Machines

Meeting the growing demand for safety, serviceability, and reliability throughout the mining industry, Dana's complete Spicer® drivetrain systems are specially designed for the highest level of performance in the harshest of environments. Spicer brand products are engineered specifically for mining vehicles, including mining trucks, load haul dumpers, self-propelled blast-hole drills, and site utility vehicles.

Spicer drivetrain systems for underground mining vehicles are designed to deliver improved traction, positioning, braking, and reliability, while providing unique features that maximize productivity.

Spicer® Transmissions

The Spicer transmission range offers a variety of options that provide vehicle designers with complete flexibility toward performance, layout, and controls. Our technology delivers smooth shift characteristics, driver comfort, and enhanced vehicle performance, and can be offered with basic or enhanced controls and with different efficiency packages to meet the exact needs of the machine operator. Converter and transmission packages are also available with integral, mid-mount, and remote configurations to best fit the vehicle.

Spicer® Electronic Controls

Spicer electronic controls enable OEMs to offer a complete range of best-in-class controls, such as diagnostics, system monitoring, load- and speed-compensated automatic shifting, shift overlap control, electronic inching, and automatic throttle up. Spicer controls enable communication between driveline components to



APC300 Electronic Controller

optimize productivity, maximize life, and reduce maintenance, all while following the highest safety standards.

Spicer® Axles

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

In addition to a wide range of ratios, a variety of differential designs is offered that supply excellent torque-bias performance on diverse ground conditions, such as the Hydra-Lok™

torque-biasing differential, which provides optimum maneuverability and traction.

Dana's next-generation axles are designed to accommodate optional Spicer® Smart Suite™ technology, a platform of fully integrated, connected-vehicle features that convert operating data from the drivetrain into actionable insights. Productivity is optimized through machine-learning algorithms built into the software which measure performance, forecast maintenance issues, and enable precise maneuvering in tight, subterranean work areas.

Spicer® Driveshafts

Dana's comprehensive range of Spicer Wing® Series driveshafts are designed for longer life, minimal maintenance, and lower operating cost. We have the right driveshaft to fit extensive mining vehicle needs – with torque capacities ranging from 1,500 Nm to more than 120,000 Nm and lubrication packages from extended to permanently lubricated.

At Dana, we continuously develop new designs, materials, and processes for Spicer driveshafts, providing more power, greater efficiency, and better overall performance.



Each Spicer® drivetrain component is designed, tested, and manufactured to meet the extreme operating conditions found in mining applications.

Mining Trucks

Payload Capacity	Drivetrain System Solutions			
Tonnes (Tons)	Transmission	Torque Converter	Axle	Driveshaft
5 to 10	T20000	C3000	182	6C
10 to 14	HR24000	C3000	183	6C, 7C
14 to 20	HR32000, TE14	C3000	16D	7C
20 to 25	HR32000	C3000	20D	8.5C
25 to 33	HR36000	C5000	20D	8.5C
33 to 36	6000	C8000	21D	8.5C
36 to 45	8000	C8000	21D	9C
45 to 49	8000	C8000	53R	9C
55 to 60	—	—	58R	9C

Mining Load Haul Dumpers (LHDs)

Payload Capacity	Drivetrain System Solutions			
Tonnes (Tons)	Transmission	Torque Converter	Axle	Driveshaft
Up to 3	T20000	C3000	182	5C, 6C
3 to 4	T20000	C3000	183	6C, 7C
4 to 8	HR32000, TE14	C3000	16D	6C, 7C
8 to 11	HR36000	C5000	20D	7C, 8.5C
11 to 13	6000, TE32	C8000	21D	8.5C
14 to 18	6000, TE32	C8000	53R	8.5C, 9C
18 to 22	8000	C8000, C9000	58R	9C

Mining Drill Carriers

Curb Weight	Drivetrain System Solutions		
Tonnes (Tons)	Transmission	Axle	Driveshaft
Up to 15	T20000	112	5C, 6C
15 to 20	T20000	123	6C, 7C
25 to 30	HR24000	123	6C, 7C
35 to 40	HR24000	113	7C
45 to 50	HR32000, TE14	37R/213	7C, 8.5C
Over 50	HR32000, TE14	43R/213	7C, 8.5C

Spicer® Products for Intelligent Drivetrains

Spicer® drivetrain products include intelligent features that are designed to meet the productivity and safety requirements of today's mining vehicles.



Spicer® TE32 Hydrodynamic Transmission

This 250 to 325 kW (330 to 430 hp) powershift transmission is the centerpiece of a robust, efficient drivetrain system that delivers simplified handling, improved operator comfort, and reduced noise.



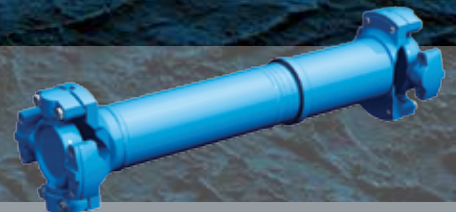
Spicer® TE14 Hydrodynamic Transmission

Compatible with engines up to 190 kW, this transmission platform bridges the gap between current hydrodynamic transmissions and future technologies, providing a range of options to accommodate specific customer and regional requirements for cost, fuel economy, and productivity benefits.



Spicer® C3000 Torque Converter

When teamed up with Spicer hydrodynamic transmissions, this torque converter delivers optimal operating efficiency for virtually any off-highway application. Built with at least three pump drives, the C3000 is designed specifically for high stall speed transmissions.



Spicer® 183 Planetary Rigid Non-Steering Axle

Offers Posi-Stop™ brake and wheel end planetary reduction, resulting in high efficiency and easy service. Posi-Stop outboard wheel speed multi-disc brakes provide excellent and stable torque performance under the most severe underground braking duty cycles.

Spicer® 20D Planetary Rigid Non-Steering Axle

The latest D-Series™ model, this technology offers a bolt-on solution for 19D customers. Enhancing brake capacity by up to 30 percent and bearing life by up to 60 percent, this heavy-duty axle is built for extreme environments.

Spicer® Wing® Series Driveshaft

Including the most comprehensive line of wing-style driveshafts available today, Spicer wing-bearing style driveshafts are designed for longer life, minimal maintenance, and lower operating costs.

Product Specifications

Spicer® Planetary Rigid Non-Steering Axles - Outboard Brakes

Product	Dynamic Load (Kg)	Maximum Output Torque (Nm)	Planetary Ratio	Ratio Range	Flange to Flange (mm)	BCD (mm)
182	12,000	53,000	6	from 17.72 up to 26.25	1080	335
183	15,000	65,000	6	from 14.77 up to 26.25	from 1152 upto 1270	335 or 425
14D	18,160	67,800	4.941	from 19 up to 31	from 1155 up to 2514	511
16D	19,068	111,600	4.941	from 23 up to 31	from 1472 up to 2768	511
20D	30,000	210,000	6	from 25.87 up to 32.67	from 1702 up to 2768	511
53R	50,000	283,000	6.25	from 25.63 up to 41.07	from 2433 up to 2957	508
58R	55,000	397,000	6.474	from 29.5 up to 35.97	2721	695

Note: Drill carriers can use axles with inboard brakes: 123, 113, 114

Spicer® Hydrodynamic Transmissions

Product	Power Range (kW)	Speeds	Vertical Drop	Installation Layout
T20000	Up to 100	3 / 4 / 6	Intermediate & Long Drop	Integral-Midmount-Remote
TE14	Up to 185	3 / 4 / 6 / 8	Short & Long Drop	Integral-Midmount-Remote
TE32	Up to 320	4	Short & Long Drop	Integral-Midmount
HR24000	Up to 120	3 / 4 / 6	Short & Long Drop	Integral-Midmount-Remote
HR36000	Up to 220	3 / 4 / 6	Short & Long Drop	Integral-Midmount-Remote
6000	Up to 300	4	Long Drop	Remote
8000	Up to 400	4 / 8	Long Drop	Remote

Spicer® Wing® Series Driveshafts

Driveshaft	Functional Torque Limit		Swing Diameter	
	Nm	ft-lb	mm	in
4C	3,300	2,434	116	4.57
5C	5,600	4,180	123	4.84
6C	7,200	5,310	150	5.91
7C	10,700	7,892	158	6.22
8C	15,500	11,432	216	8.50
8.5C	20,300	14,972	175	6.89
9C	27,400	20,206	223	8.73

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



Spicer® Parts: The genuine difference.

Dana's global aftermarket network provides durable products for mining vehicles. These genuine Spicer® parts are manufactured to the standards of OE parts because they are OE parts.

With Dana craftsmanship, you'll get longer life and less downtime. And because we are constantly innovating manufacturing processes, the Spicer replacement parts you purchase will meet or even exceed the OE parts that you are replacing. Best of all, complete interchangeability with existing parts provides total product compatibility with no change in part number.

But beyond engineering the industry's leading performance parts, Dana offers extensive support resources to ensure your customers are getting the most out of their vehicles. Brochures, catalogs, and interactive apps are all available at spicerparts.com.

Genuine Clark® is Genuine Spicer®

The Clark® and Clark-Hurth® brands were acquired by Dana in 1997 and have since been fully integrated into the Spicer line of transmissions and axles. Numerous mining vehicles still in service today are equipped with Clark-branded components, and Dana supports these machines in the aftermarket with Spicer products.



To learn more, go to
Spicerparts.com/applications/off-highway



Global Quality Standards

To consistently deliver world-class quality, Dana builds on our manufacturing excellence by employing global quality standards at every facility and technology center worldwide. Throughout all stages of product development, we integrate global resources and local expertise with rigorous process controls. This allows us to deliver identical products wherever our customers are located that meet and exceed standards set. Such a steadfast commitment to quality is one of the reasons why we are the supplier of choice for many world-leading off-highway OEMs.

Learn more about Dana's advanced drivetrain systems by visiting dana.com/offhighway.

About Dana Incorporated

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 six continents.

About Dana Off-Highway Drivetrain Technologies

Dana delivers fully optimized Spicer® drivetrain systems and individual product solutions to customers in construction, agriculture, material-handling, underground mining, and forestry markets, bringing global expertise to the local level with technologies customized to individual requirements through a network of strategically located technology centers, manufacturing locations, and distribution facilities.

**Dana Off-Highway
Driveline Technologies**
3939 Technology Drive
Maumee, Ohio, USA 43537
dana.com



SPICER®

Off-Highway Systems

Application Policy

Capacity ratings, features, and specifications vary depending upon the model and type of service. Application approvals must be obtained from Dana; contact your representative for application approval. We reserve the right to change or modify our product specifications, configurations, or dimensions at any time without notice.