



# ***Service, Parts & Maintenance Information Book***

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**brevini**

# Dana Component Terminology

**Balancing** – A procedure by which the mass distribution of a rotating body is checked, and corrected to insure smooth operation.

**Ball Yoke** – See Tube Yoke.

**Bearing Cross Hole** – See Cross Hole.

**Bearing Cup Assembly** – Consists of a bearing cup with needle rollers generally held in place by a seal guard and bearing seal. Sometimes the assembly includes a thrust washer.

**Bearing Cup** – A cup-shaped member used as the bearing bore of a bearing cup assembly and for positioning a thrust end of a cross trunnion.

**Bearing Retainer** – A heavy, formed metal cap used to retain a bearing cup assembly in Quick Disconnect end yoke or flange yoke designs.

**Bearing Seal** – A flexible member of a bearing cup assembly which prevents the escape of lubricant from or entry of foreign matter into a bearing.

**Bearing Strap** – Stamped metal strap used to retain a bearing cup assembly in a half-round end yoke or flange yoke design.

**Boot** – A flexible member which prevents the escape of lubricant from or entry of foreign matter into the slip spline members.

**Boot Clamp** – A thin adjustable band used to hold the boot in position on the slip spline members.

**Boot Seal** – See Boot.

**Centre Bearing** – Consists of a rolling element bearing isolated in rubber and a bracket configuration for attachment to the vehicle frame.

**Companion Flange** – A fixed flange member that attaches the driveshaft assembly to another drivetrain component.

**Coupling Shaft** – The coupling member or members of a multiple-piece driveline which includes a centre bearing.

**Cross** – See Journal Cross.

**Cross Hole** – A through hole in each lug ear of a yoke used to locate a bearing cup assembly.

**Deflector** – See Slinger.

**Driveline** – An assembly of one or more coupling shafts and a driveshaft with provisions for axial movement, which transmits torque and/or rotary motion at a fixed or varying angular relationship from one drivetrain component to another.

**Driveshaft** – An assembly of one or two universal joints connected to a tubular shaft member which accommodates axial movement.

**Driveshaft Length (Centre Line to Centre Line or CL to CL)** – The distance between the outermost universal joint centres on a driveshaft. On driveshafts with variable length centres, it is usually measured in the compressed or installed lengths.

**Ear** – One of two projecting parts of a yoke symmetrically located with respect to the yoke's rotational axis.

**End Fitting** – An end yoke or companion flange (including S.A.E., DIN and T-Type styles) that attaches a driveshaft to another drivetrain component.

**Flange Yoke** – A full-round or Quick Disconnect style yoke which attaches a driveshaft to a companion flange.

**Glidecote** – The blue, nylon, wear-resistant coating on Spicer yoke shafts and tube shafts.

**Grease Zerk Fitting** – The fitting on the shoulder or centre of a journal cross or on a relubable slip spline that allows for lubrication.

**Inboard Yokes** – Yokes that make up the ends of a driveshaft or coupling shaft assembly, i.e. tube yokes, slip yokes, yoke shafts, and centre bearing end yokes.

**Installation Height Tools** – Round, hard plastic disk that are supplied with all Spicer Life Series replacement universal joint kits to ensure proper bearing cup assembly installation specifications.

**Journal Cross** – The core component of a universal joint which is an intermediate drive member with four equally spaced trunnions in the same plane.

**Lug Ear** – See Ear.

**Midship Shaft** – A machined element consisting of spline teeth, a pilot for a centre bearing and a piloting hub that attaches to tube of a coupling shaft assembly.

**Needle Rollers** – One of the rolling elements of a bearing cup assembly.

**Outboard Components** – Yokes that are not a part of a driveshaft, i.e. transmission, axle, transfer case end yokes and/or companion flanges.

**Phase Angle** – The relative rotational position of each yoke on a driveshaft or driveline.

**Pressure Relief Hole** – A hole in the welch plug of Spicer slip yokes that allows air to escape from the slip member assembly.

**Purge** – The act of flushing old grease and contaminants from universal joint kits and slip member assemblies with fresh grease.

**Quick Disconnect Cross Hole** – A semicircular hole located on the end of each lug ear of some end yoke and flange yoke designs used to locate a bearing cup assembly.

**Retaining Ring** – See Snap Ring.

**Retaining Ring Groove** – See Snap Ring Groove.

**Seal Can** – A metal ‘can’ that permanently seals the slip member on a driveshaft. Usually found on European-style driveshaft assemblies.

**Seal Guard** – A covering member used to protect a bearing seal on the bearing cup assembly.

**Serrated Flange** – See T-Flange.

**Shaft Length** – Distance between the outermost universal joint centre to joint centre.

**Shaft Support Bearing** – See Centre Bearing.

**Slinger** – A stamped metal or non-metal ring which prevents the entry of foreign matter into a centre bearing, transmission, axle or transfer case.

**Slip** – The total permissible length of axial travel.

**Slip Yoke** – A yoke which accommodates axial movement.

**Slip Yoke Plug** – See Welch Plug.

**Slip Yoke Seal** – Pop-on or threaded ring that contains a seal that protects the slip member assembly from environmental contaminants and retains lubricant.

**Snap Ring** – A removable member used as a shoulder to retain and position a bearing cup assembly in a yoke cross hole.

**Snap Ring Groove** – A groove used to locate a snap ring.

**Spline** – A machined element consisting of integral keys (spline teeth) or keyways (spaces) equally spaced around a circle or portion thereof.

**Spline Sleeve** – A tubular-type, machined element consisting of internal splines which is attached to a tube or tube yoke in a driveshaft assembly.

**Spring Tab** – A patented stamped metal plate that takes the place of a bearing plate and acts as a structural member by reducing looseness in a universal joint kit. Found only on Spicer Life Series driveshaft assemblies.

**Stub Shaft** – See Tube Shaft.

**Tang** – A nib of metal found on Quick Disconnect end yoke and/or flange yoke style cross holes, used to locate a bearing cup assembly.

**T-Flange** – A companion flange and flange yoke design which has a serrated flange face. Found most often in European applications.

**T-Type Flange** – See T-Flange.

**Thrust Washer** – A washer found in the bottom of a bearing cup assembly that reduces needle roller friction, bearing heat and guards against end galling on the journal cross trunnions.

**Tubing** – See Tube.

**Tube O.D. (outside diameter)** – The outside diameter of a tube.

**Tube Yoke** – An inboard yoke with a piloting hub for attachment to a tube or spline sleeve.

**Tube Shaft** – A machined element consisting of spline teeth and a piloting hub that attaches to the tube of a driveshaft assembly.

**Trunnion(s)** – Any of the four projecting journals of a cross.



START



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PREVIOUS PAGE



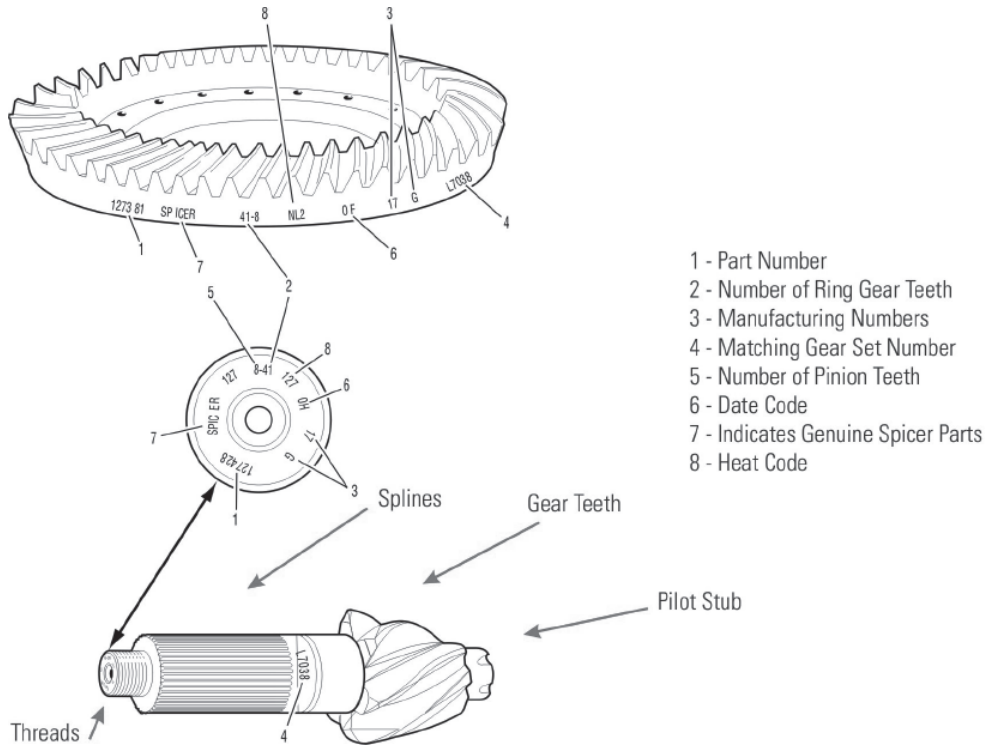
NEXT PAGE



END

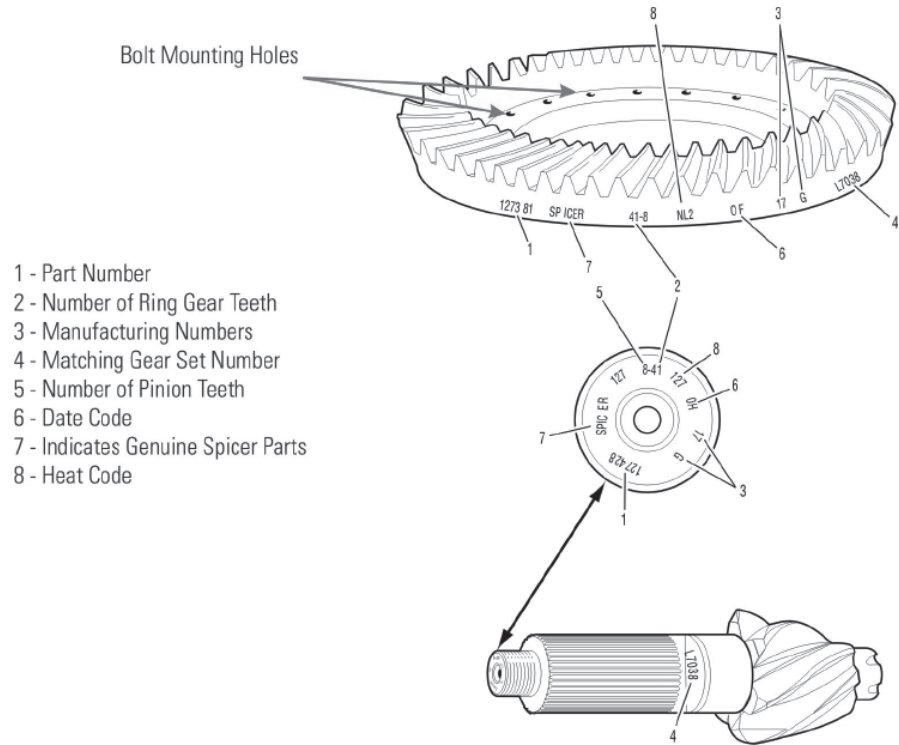
# Drive Pinion

## Drive Pinion Identification



# Ring Gear

## Ring Gear Identification



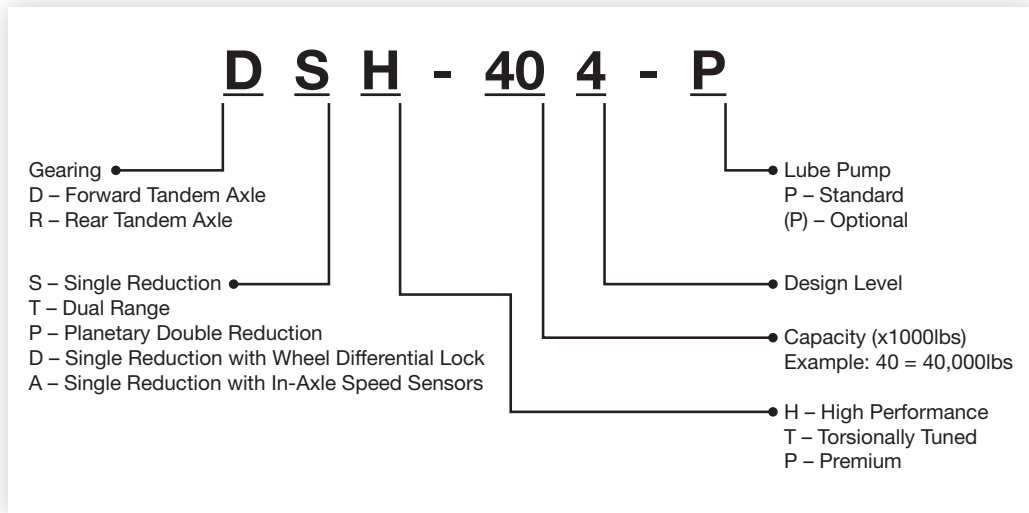
# Serial Tag Identification

## Drive Axle Identification Tag Location

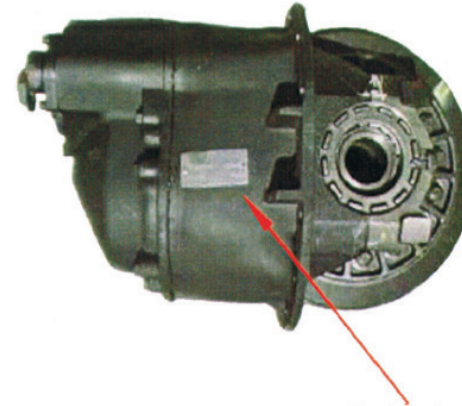
### Serial Tag contains the following information:

- Specification number assigned by Spicer
- Axle Serial Number
- Axle Model
- Axle Ratio
- Country of Build

## Model Identifier Drive Axle

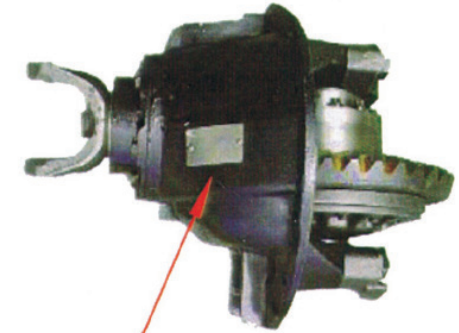


Forward Tandem DS Carrier



Tag Location

Rear Tandem/Single Axle Carrier Assembly



Tag Location

# Current Dana Axle Models

## Tandem Axles

- DSH40
- D46-170 & D50-170
- D52-190
- D52-590

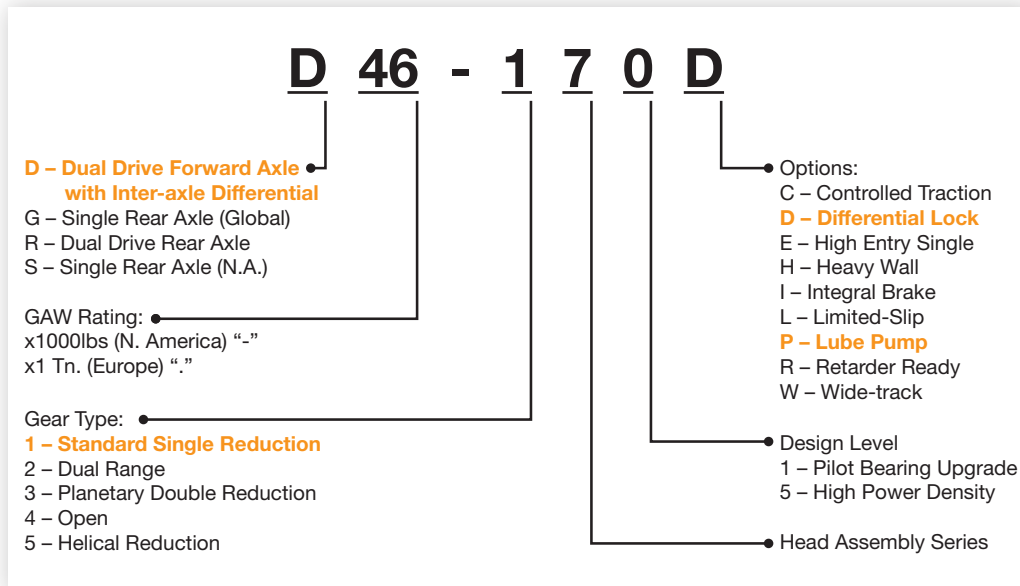
## Tri Drive Axles

- T78-190
- T78-590

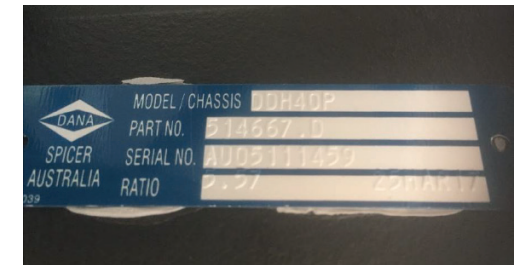
## Steer Axles

- E1322I & E1462I
- D2000F

## Drive Axle Model Nomenclature



## Drive Axle Model Identification



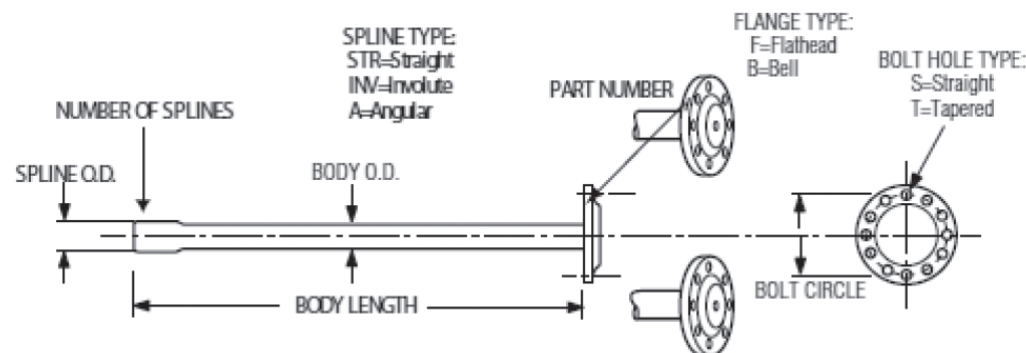
- Drive Axle Model Identification
- All Spicer heavy axle carriers are identified by either one of two tags. The tag is located on the diff carrier.
- Tag One (U.S Tag)
- Customer Part Number
- Ratio
- Spec Number
- Model
- Serial Number
- P/D Upgrade

- Tag 2 (Australian)
- Model Number
- Part Number
- Serial Number
- Ratio
- Date
- AU = Ratio changed at Dana Australia



# Dana Axle Shafts

- Current axle shafts are listed two ways – by spline count and numerically
- Superseded axle shafts are grouped at the end of the charts
- The charts also includes dimensions and other information to help identify the right shaft. The drawing shows the correct way to measure an axle shaft.



## 41 Spline

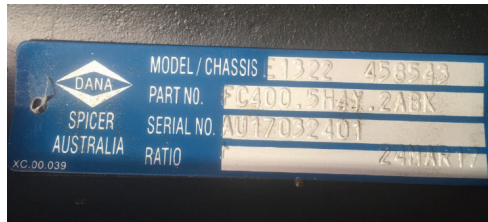
Part No.	Body		Spline		Flange		Bolt		Notes
	Length (in)	Diameter (in)	O.D. (in)	O.D. (in)	Circle (in)	No. Holes	Hole Type		
128514	38.130	1.87	2.11	8.50	7.00	8	773-STR		
128558	38.130	1.87	2.11	8.50	7.00	8	773-STR	IASS shaft with 11.00" spline	
128521HX	38.130	1.87	2.11	8.50	7.00	8	948-TPR		
127437	38.976	1.87	2.11	8.50	7.00	8	635-STR		
128516	38.976	1.87	2.11	8.50	7.00	8	948-TPR		
128560	38.976	1.87	2.11	8.50	7.00	8	948-TPR	Diff lock shaft with 11.00" spline	
390SR101-2	39.440	1.89	2.11	8.38	7.00	8	948-TPR		
571350C2	40.000	1.89	2.11	8.38	7.00	8	778-STR		

Part No.	Model	Body		Type	No.	O.D. (in)	Spline		Bolt Circle (in)	Flange		Diff Lock Spline
		Length (in)	Diameter (in)				Range Type	O.D. (in)		No. Holes	Hole Type	
129304	D/R652	49.500	2.25	1	36	2.31	B	8.50	7.24	8	948-TPR	
129306	404, 454, Wide Track	45.500	1.87	1	41	2.11	B	8.50	7.00	8	635-STR	
129330	402, 403, 451, 17433, 21060T, 2260B, 22060T	41.500	1.87	1	41	2.11	B	8.50	7.00	8	948-TPR	
129332	402, 403	40.690	1.87	1	41	2.11	B	8.50	7.00	8	773-STR	
129336	462, 463, 23090D	40.000	2.06	1	36	2.31	B	8.50	7.00	8	773-STR	11.00"
129388	404 Wide Track	43.887	1.87	1	41	2.11	B	8.50	7.00	8	773-STR	

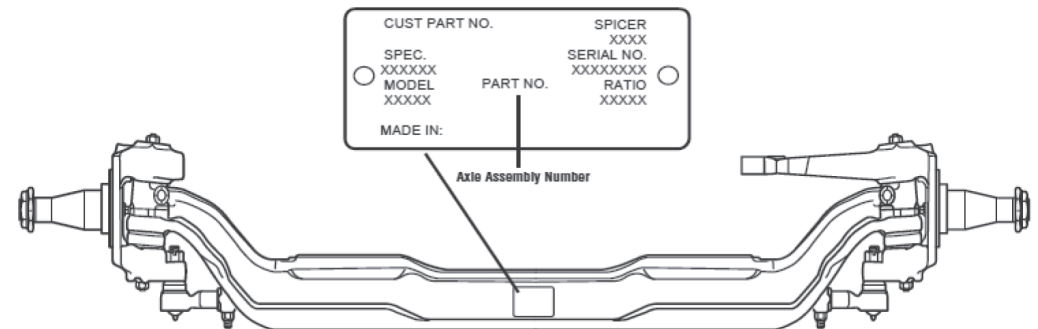
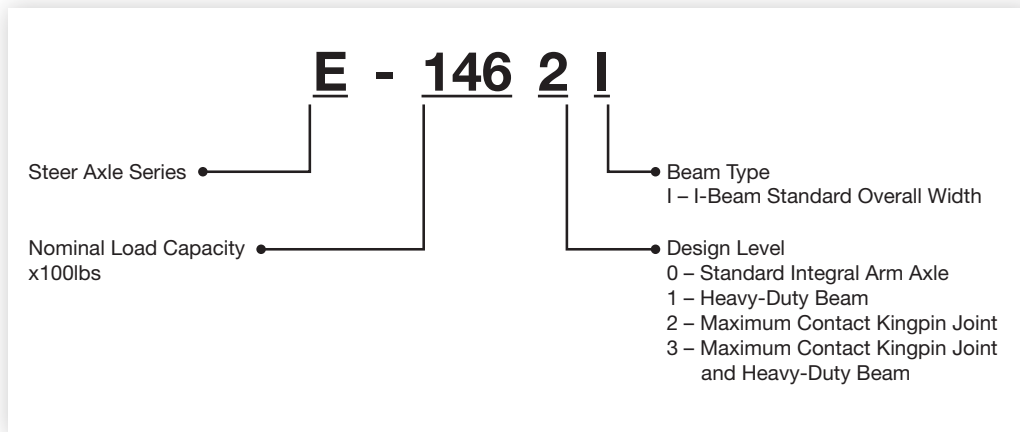
# Steer Axle Model Identification

The Spicer front non drive steering axles are identified with a tag located between the spring pads, on the front side of the centre beam section.

- Australian Tag fitted after assembly
- Model & Chassis Number
- Part Number
- Serial Number
- Date
- AU = Built in Australia

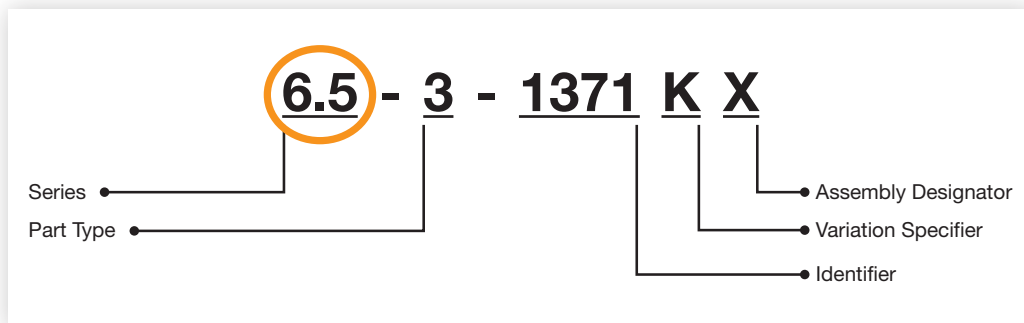


## Steer Axle Model Nomenclature



# Reading the J300P catalogue (Driveshaft 104)

## Driveshaft Component Part Number Structure



## 10 Series Components

### First Segment

1 = 1100-1140 Series	6.3 = 1760 Series
2 = 1210-1330 Series	6.5 = 1810 Series
3 = 1340-1480 Series	8 = 1820-1880 Series
4 = 1550 Series	9 = 1950 Series
5 = 1610-1650 Series	10 = 1000 Series
6 = 1710 Series	

## SPL Components

### First Segment

90 = SPL90 Series
170 = SPL170 Series
250 = SPL250 Series

# Driveshaft Component Part Number Structure

## Second Segment

### SPICER LIFE™ DRIVESHAFT COMPONENTS

**FLANGE YOKE (2)**  
(2 STYLES)

**SLIP YOKE ASSEMBLY (3)**

**END YOKE (4)**  
(3 STYLES)

**JOURNAL & BEARING KIT**

**TUBE YOKE w/TUBE (27)**

**TUBE YOKE (28)**  
(2 STYLES)

**YOKE SHAFT (82)**

**CENTER YOKE (26)**

**SHAFT SUPPORT BEARING ASSEMBLY**

**MIDSHIP TUBE SHAFT (53-57)**

**SERRATED BOES w/ LOCK PATCH (75)**

**LOCK STRAP (98)**

**After Spring '94**

**Pre-Spring '94**

**U-BOLT ASSEMBLY (94)**

**SOCKET YOKE (83)**

**BLIST CAP & WASHER KIT (A11-101) (94)**

**STRAP OR CAP & BOLT ASSEMBLY (70)**

**COUPLING SHAFT ASSEMBLY (SLIP YOKE STYLE)**

**SHORT COUPLED DRIVESHAFT**

**2 JOINT ASSEMBLY DRIVESHAFT**

**3 JOINT ASSEMBLY DRIVESHAFT**

**COUPLING SHAFT ASSEMBLY (END YOKE STYLE)**

**Warning:** Rotating shafts can be dangerous. You can snag clothes, skin, hair, hands, etc. This can cause a serious injury or death. Do not work on a shaft (with or without guards) when the engine is running.

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Toledo, Ohio 43697-0955

**SPICER**  
DANA

# Serrated Bolts 10 Series



## AUSTRALIA

DANA AUSTRALIA PTY. LTD. (INC IN N.S.W.)  
 ACN 001 238 180  
 P.O. BOX 1304, VESPER DRIVE  
 NARRE WARREN, VICTORIA, 3805 AUSTRALIA  
 39 - 45 WEDGEWOOD ROAD, HALLAM VICTORIA, 3803

## SPICER BULLETIN

BULLETIN NO: UP14-11-95  
 DATE: November 1995  
 FILE UNDER: Universal Joint Parts

TO: PARTS MANAGER / SERVICE MANAGER  
 SUBJECT: SERRATED BOLT DESIGN - FULL ROUND UNIVERSAL JOINT

A self locking bolt with lock patch is now used to retain the universal joint caps on 1610 through 1880 series full round end yokes, slip yokes and tube yokes.

This eliminates the need for a lockstrap. However, it is **EXTREMELY** important that the new bolts be torqued to the proper specifications.

(See Overleaf)

NEW-SERRATED BOLT WITH LOCK PATCH (FULL ROUND)

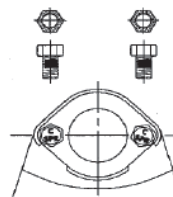


Figure 1.

**Re-Installing Serrated Bolts:** Loosely install new bolts. (See the following chart below for bolt part numbers.) Tighten the new bolts to the torque specified **⚠ See Warning**

### Torque Specifications

SERRATED BOLTS WITH LOCK PATCH/NO LOCK STRAP

SERIES	BOLT P/N	THREAD SIZE	BOLT TORQUE	
			(LB-FT)	(NM)
1610	5-73-709	312-24	26-35	35-48
<del>1710</del>	<del>6-73-209</del>	<del>375-24</del>	<del>38-48</del>	<del>52-65</del>
1760	6-73-209	375-24	38-48	52-65
<del>1810</del>	<del>6-73-209</del>	<del>375-24</del>	<del>38-48</del>	<del>52-65</del>
1880	7-73-315	438-20	60-70	81-95

OLD LOCK STRAP DESIGN (FULL ROUND)

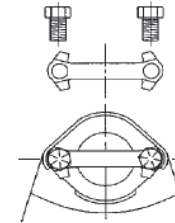


Figure 2.

**Retightening of Bolts: Lock Strap Design.** After lubricating the joint, run the bolts down until the bearing plates are flush to the yoke faces, torque bolts to specification shown below and then bend the tabs of the lock strap against the side of the bolt heads to lock the bolts in place. **⚠ See Warning**

### Torque Specifications

BOLT WITH LOCK STRAP (OLD)

SERIES	BOLT P/N	THREAD SIZE	BOLT TORQUE	
			(LB-FT)	(NM)
1610	5-73-109	312-24	26-35	35-48
<del>1710</del>	<del>6-73-109</del>	<del>375-24</del>	<del>38-48</del>	<del>52-65</del>
1760	6-73-109	375-24	38-48	52-65
<del>1810</del>	<del>6-73-109</del>	<del>375-24</del>	<del>38-48</del>	<del>52-65</del>
1880	7-73-115	438-20	60-70	81-95



### Warning

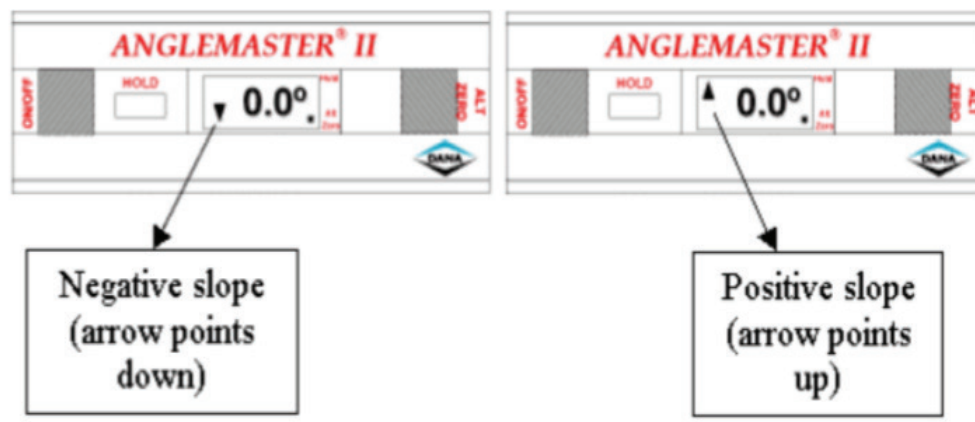
Failure to properly tighten bolts, and reuse of serrated bolts, could cause the driveshaft to loosen and separate from the vehicle or machine, which could cause a loss of control and could result in serious personal injury or death.

# Measuring UJ & Driveline Angles

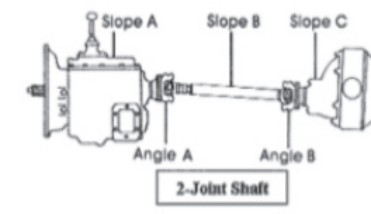
The Anglemaster can be used wherever there is a need for a precise measurement of angles and slopes. The information below is a step by step guide on how to use the Anglemaster in measuring driveline angles to avoid vibration problems associated with incorrect driveshaft and u-joint working angles.

## Step by step guide to measuring angles

The slope at which a driveline component is installed is a slope of inclination. It is considered either positive or negative depending on whether the slope points up or down when viewed from the transmission toward the rear of the vehicle. A negative driveline slope points down, while a positive driveline slope points up.

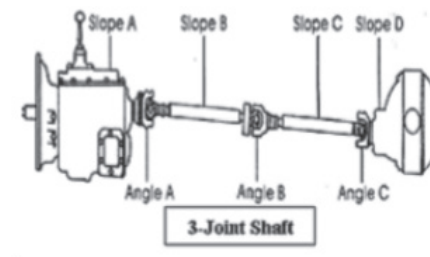


The operating angle of a u-joint is the relationship between two slopes, such as the transmission slope and the tube slope. If you imagine two lines parallel to each component, the angle where these two lines meet is the operating angle. (Angle A, Angle B, Angle C).



High angles combined with high RPMs result in serious vibration problems and reduced u-joint life. Driveline angles should be equal to or within 1° of each other. When checking driveshaft angles, be sure all tyres are inflated to their normal operating pressure. Park the vehicle on the surface which is as nearly level as possible both from front to back and from side to side.

Also remember to check driveshaft angles while the vehicle is unloaded, and again when it is loaded. This can tell you a lot about operating vibrations that are only present under certain conditions.



Using your Spicer Anglemaster digital driveline inclinometer, determine the operating angles by placing the instrument on the driveline components. Begin with the transmission and work toward the axle.

# Measuring UJ & Driveline Angles

1. Place the unit on the first slope (Slope A) and allow the reading to stabilise approximately 10 seconds.
2. Push the 'Alt Zero' button.
3. The display will read 0.0° and the 'Alt Zero' button indicator will flash. The slope you are using will be the new reference.
4. Move the unit to the next adjacent slope (Slope B). The reading obtained is the operating angle of the two slopes (Angle A).
5. To obtain additional operating angles, push the 'Alt Zero' button again, and then repeat the above process starting at the second slope (Slope B as the Alternate Zero and measure Slope C to get Angle B).

**Note:** For maximum universal joint life and to reduce driveline vibration, operating angles should be:

1. Between 1° and 3°; and
2. Equal at either end of a shaft to within 1°

## Anglemaster-2 & Adapter Kits

This information is to inform both service and parts departments that the Anglemaster-2 is available for purchase.

The Anglemaster provides a high level of accuracy and ease of use in measuring angles and slopes. This tool was designed initially to measure driveshaft angles to avoid vibration problems associated with incorrect driveshaft and universal joint working angles. However due to its accuracy, it can be used wherever there is a need for precise measurement of angles or slopes.



Three convenient adapters are available for the Anglemaster-2. These adapters permit direct access to the surface being measured, eliminating the need to disassemble the driveshaft assembly. These adapters can be used on both 10 series & SPL series drivelines.

# 10 Series Driveshaft Components



## 10 Series™ Driveshaft Components

Nomenclature





Flange Yoke



Bearing Plate Style Universal Joint



Companion Flange or End Yoke



Midship Shaft and Nut



Tube Yoke



Snap Ring Style Axle/Transmission/Transfer Case Slip Yoke



Bearing Plate Slip Yoke with Dust Cap



Snap Ring Style Universal Joint and Quick-Disconnect Bearing Strap and Bolts



Standard or Self-Aligning Center Bearing



Tube Shaft with Glidecote®



**Genuine Spicer® Driveshaft Components –there is no substitute.**

When it comes to keeping your vehicle up and running, why take a risk with unproven knock-off replacement parts? Genuine Spicer® service parts are the same as the original equipment parts, adhering to rigid manufacturing specifications for performance and reliability. Unlike non-genuine parts, our wide range of Spicer® driveshafts provides less drivetrain vibration, improved balance and stiffness, and more lateral protection against environmental contaminants. It all adds up to longer-life parts for maximum time on the road and minimum operating costs. Proving the best replacement part is always the original.

This document is intended for nomenclature purposes only and is not to be used for assembly instruction. It does not include every possible scenario or product name. Parts pictured are for reference only and are not intended to be all-inclusive. Alignment or yoke size are not representative of all forms of phasing. Yoke size are phased per Original Equipment Manufacturers requirements.

Warning: Rotating shafts can be dangerous. You can snag clothes, skin, hair, hands, etc. This can cause a serious injury or death. Do not work on a shaft (with or without a guard) when the engine is running.

## Demand the best . . . Demand genuine Spicer!





# How to measure a yoke

This section will demonstrate how to use the Spicer Yoke Ruler to determine the correct Spicer driveshaft series when all you have is a yoke from a driveshaft.

**Note:** This ruler will only measure Spicer Series yokes and is not inclusive of all driveshaft series. Refer to chart on the next page for u-joint kit number choices.

## Full Round Yokes



- Measure from the outside of the yoke ears
- Read result on opposite ear

## Half Round Yokes



- Measure from the inside of the tab
- Read result on opposite tab

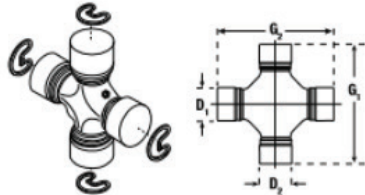
## Wing Style Yokes



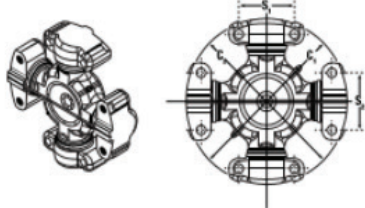
- Measure from the inside of the pilot diameter
- Read result on opposite pilot diameter

# How to measure a yoke

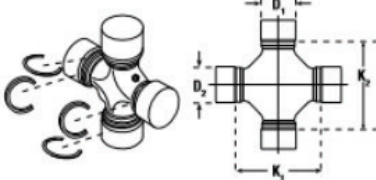
### Outside Snap Rings



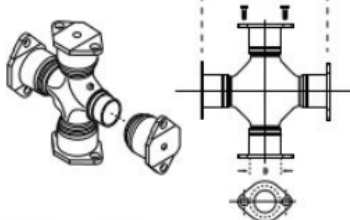
### Wing™ Series



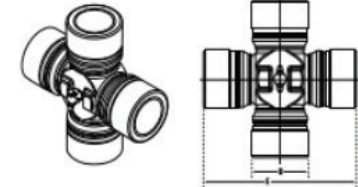
### Inside Snap Rings



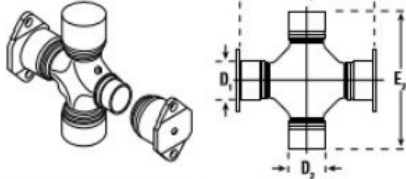
### Bearing Plate Style



### Spicer Life Series® (SPL® 140, 170, 250, and 350)



### Half Round Style



### Sample of the K350 Dimensional Pages

**Bearing Plate (BP) Style**

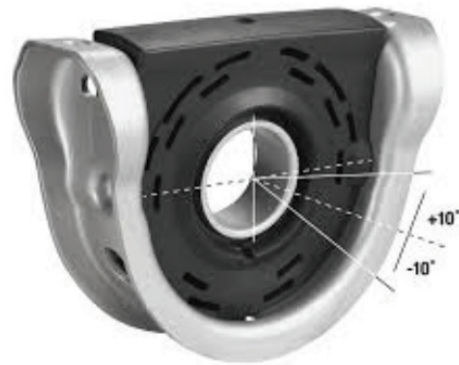
E Bearing Cap	D Bearing Cap Diameter	OE SPL	OE Series	Universal Drive Ratio	Spicer Part Number
4.562	1.562	SPICER	1500	Y	5-1153X
5.312	1.875	SPICER	1610	Y	5-279X
6.004	1.938	SPICER	1710	Y	5-280X
6.004	1.938	SPICER	1710	Y	5-280-43X

For more information on genuine Spicer products, visit us on the web at [www.SpicerParts.com](http://www.SpicerParts.com)

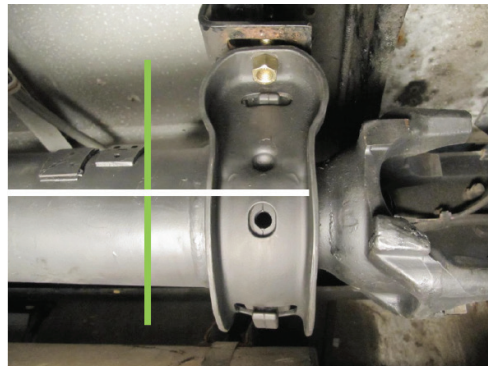
# Self Aligning Centre Bearing Installation

To correctly align a centre bearing rubber isolator, follow the steps below:

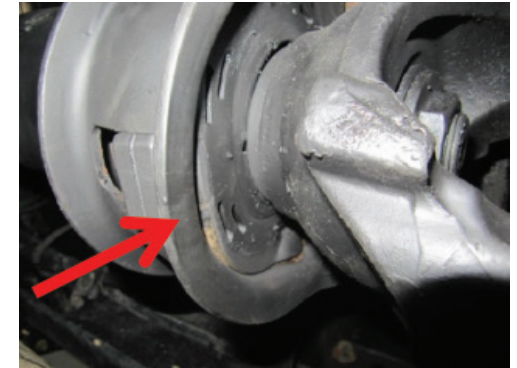
- Be certain the centre bearing isolator lines up perpendicularly with coupling shaft
- Install the bolts securing the centre bearing rubber isolator metal centre bearing bracket to proper specification
- Verify the centre bearing rubber isolator remained perpendicular to the coupling shaft once the metal centre bearing bracket bolts are tightened to specification



- The green line represents the correct alignment of the centre bearing rubber isolator
- The white line represents the centre line of the coupling shaft
- Rubber isolator is perpendicular to the coupling shaft for correct alignment



- Misaligned rubber isolators can cause the bearing to dislodge from the rubber isolator causing damage and premature failure
- To prevent such failures, ensure that the centre bearing rubber isolator is aligned and perpendicular to the coupling shafts centre line in all planes vertically and horizontally
- **IMPORTANT:** The metal centre bearing bracket may be misaligned up to 10 degrees in either direction as long as the centre bearing rubber isolator is perpendicular to the centre line of the coupling shaft
- Incorrect alignment can cause the centre bearing rubber isolator to make contact with the end yoke and result in a premature failure



# End Fitting Inspection

## Inspect for:

- Damaged half round bearing straps
- Loose bearing strap bolts
- Loose companion flange bolts and nuts
- Damaged or worn tangs on end fittings
- Damaged or missing snap rings
- Rotating bearing cups
- If any of these conditions are present component replacement is necessary
- Check end fittings for looseness
- If looseness is evident consult, Transmission, axle or transfer case OEMs service and maintenance manuals

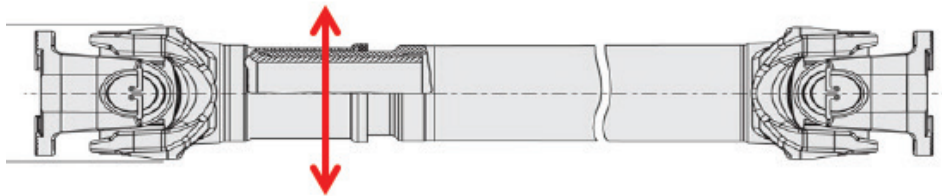
# Universal Joint Inspection

- Check for excessive looseness between the ends of the universal joint bearing cup assemblies and trunnions
- Grasp the yoke on the driveshaft and attempt to move the yoke horizontally & vertically. There should be less than .006" (.15mm) movement. If looseness is greater than .006" (.15mm) in either direction the UJ must be replaced
- With re-lubable style UJs check for the presence and any damage of all grease Zerk (Nipples) If any of the above are found repair or replace grease fitting as required



# Slip Assembly Inspection

- Check slip yoke to be sure plug is not loose damaged or missing
- Check for the presence of all grease Zerks (Nipples). If applicable. Grease fittings should not be missing loose or fractured
- Check the slip yoke seals & dust caps ensure that they are properly attached and not loose or damaged
- If there is excessive looseness between the mating components, with the presence of vibration, all slip assembly components should be replaced (10 Series only)
- For SPL slip yokes Check the slip member assembly for excessive radial looseness. Using a dial indicator, take hold of the tubing near the slip member with both hands and try to move vertically, up and down relative to the ground
- Apply effort perpendicular to shaft axis making note of total indicator travel.
- Allowable indicator travel is .000-.012 in



.012 in Maximum Radial Movement

# Centre Bearing Inspection

- Inspect the centre bearing bracket bolts for looseness
- Visually inspect the centre bearing rubber cushion for damage. Make sure the slingers are not rubbing against the rubber cushion
- Verify that the rubber cushion is properly seated in the metal bracket. If any of these conditions are evident, replacement of the centre bearing assembly is necessary
- Check the centre bearing end fitting and fitting nut washer for any looseness. There should not be any movement



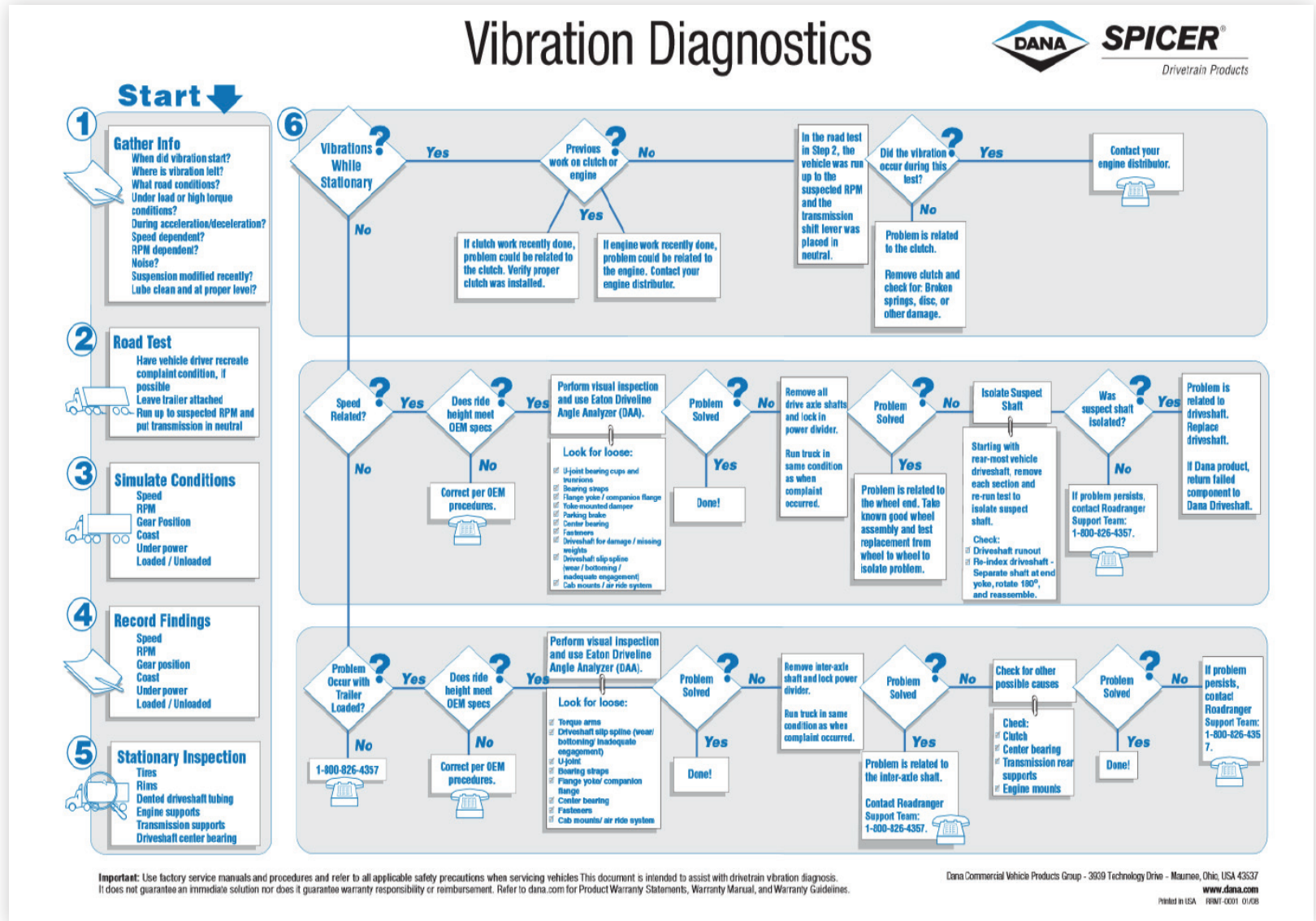
# Causes of Vibration

The three most common causes of driveshaft vibration are:

- Driveshaft Imbalance
- Critical Speed
- Universal Joint Operating Angles

Other causes can include:

- Loose / damaged engine / transmission mounts
- Incorrect Clutch installation
- Wheel ends
- Incorrect ride heights
- Loose UJ retaining hardware
- Worn slip splines
- Worn / damaged centre bearings



# Spicer Driveshaft Lubrication

## Spicer® Driveshaft Lubrication Intervals

Series	City	On-Highway	Linehaul	On/Off-Highway
<b>Spicer® 10 Series™</b> (1310 thru 1810) Slip members also require lubrication.	10,000kms or 250 hours (whichever comes first)	10,000kms or 250 hours (whichever comes first)	10,000kms or 250 hours (whichever comes first)	5,000kms or 250 hours (whichever comes first)
<b>Spicer Life Series®: Light-Duty</b> (1310 thru 1410) Slip members are booted and permanently lubricated. Always inspect boots and clamps at every lube interval.	10,000kms or 250 hours (whichever comes first)	10,000kms or 250 hours (whichever comes first)	10,000kms or 250 hours (whichever comes first)	5,000kms or 250 hours (whichever comes first)
<b>Spicer Life Series®: Medium-Duty*</b> (SPL55, SPL70 & SPL100) Slip members are booted and permanently lubricated. Always inspect boots and clamps at every lube interval.	10,000kms or 250 hours (whichever comes first)	10,000kms or 250 hours (whichever comes first)	10,000kms or 250 hours (whichever comes first)	5,000kms or 250 hours (whichever comes first)
<b>Spicer Life Series®: Heavy-Duty*</b> (SPL140 – All Lube Intervals) (SPL170, SPL250, SPL350 – All Lube Intervals after the First Lube cycle listed above) Slip members are booted and permanently lubricated. Always inspect boots and clamps at every lube interval.	10,000kms or 250 hours (whichever comes first)	10,000kms or 250 hours (whichever comes first)	10,000kms or 250 hours (whichever comes first)	5,000kms or 250 hours (whichever comes first)

## Spicer Life® SF™ Lubrication Cycle

### Spicer Life SF™: Service-Free

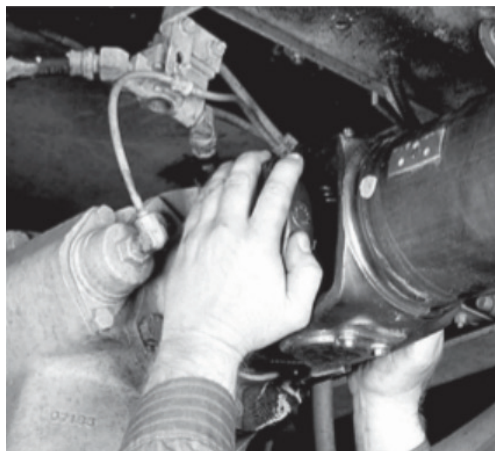
(Spicer u-joint part numbers with a 'SF' in the suffix... i.e. SPL250-SF3X)

Permanently lubricated for the life of the product.

\* We require relubrication with Spicer® ultra-premium synthetic grease or Chevron Ultra-Duty EP-2 or compatible lithium-based grease meeting N.L.G.I. Grade 2 specifications as well as ASTM D4950 'LB' specifications.

# Failure Analysis Guide

## Driveshaft Components – How to inspect driveshafts and identify failed components



### Routine Inspection Steps

1. Check the output and input end yokes for looseness.
2. Check for excessive radial looseness of output/input shaft.
3. Check for looseness across ends of u-joint.
4. Check the slip spline for excessive radial movement.
5. Check the shaft for damage, bent tubing or missing balance weights.
6. Check for loose or missing plug.

### Failure Analysis

Component failures can result from improper maintenance, installation or assembly procedures.

This quick reference guide assists service technicians in recognising component failures and identifying probable causes.

 **DANGER** 

**Rotating shafts can be dangerous.  
You can snag clothes, skin, hair, hands, etc.  
This can cause serious injury or death.  
Do not go under the vehicle when the engine is running.**

### Preventative Maintenance

Driveshaft inspection should be performed as part of a regular maintenance routine. Normal vehicle maintenance and recognition of component discrepancies is necessary to prevent serious mechanical problems as well as driver discomfort. Failure to perform normal maintenance may also void the vehicle warranty.

### How to identify failure and probable cause

#### Universal Joints



#### Burned U-Joint Cross

- Lack of lubrication (improper maintenance)
- Wrong lubrication type
- Improper application



#### End Galling

- Excessive u-joint operating angles
- Improper assembly procedures
- Sprung or bent yoke
- Lack of lubrication (improper maintenance)



#### Fractured U-Joint

- Excessive torque loads
- Shock loads
- Improper application



#### Brinelling

- Excessive continuous torque loads
- Seized slip yoke splines
- Excessive driveline angles
- Sprung or bent yoke
- Over tightened 'U' Bolts



START



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END



# Failure Analysis Guide

## How to identify failure and probable cause

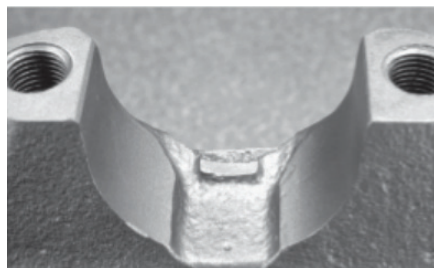
### Universal Joints



#### Spalling

- Water contamination
- Improper lube type
- Lubrication failure

### Yokes



#### Broken Tang Half Round

- Improper bearing retainer bolt torque
- Improper installation
- Strap was re-used instead of replaced

### Tubing



#### Twisted Tubing

- Excessive torque
- Driving into immovable object under power
- Spinning tires that suddenly grab hold

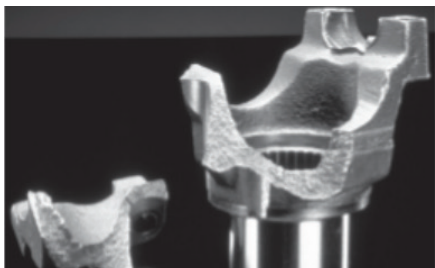
### Tube Shafts



#### Fractured Spline

- Excessive torque loads
- Shock loads
- Improper application

### Yokes



#### Fractured Yoke

- Excessive torque loads
- Shock loads
- Improper application
- U-joint kit failure



#### Bent Yoke

- Excessive torque
- Improper application
- Improper u-joint removal



#### Broken Weld

- Shock loads
- Improper welding procedures
- Excessive vibration

### Genuine Spicer Components

Spicer service parts are the same quality used by the major OE's to assemble new trucks. Each component is engineered to work together to offer quality and reliability. Specify Genuine Spicer parts for all of your driveshaft repairs.

For detailed servicing instructions, refer to Spicer Driveshaft Service Manual No. 3264-\* or 3264-SPL for Spicer Life™ components.

# SVL Universal Joints for Commercial Applications

## SVL<sup>®</sup>



## All-makes coverage for commercial universal joints

SVL u-joints deliver reliable quality across all makes of commercial applications, and they have the backing of Dana, the worldwide leader in driveline products and steering column parts. SVL universal joints are designed and tested to ensure a combined level of performance and value that the competition cannot match.

## Six reasons to choose SVL products

### 1. Maximum Value

When genuine original equipment performance specifications are either not required or exceed your budget constraints, SVL products keep your vehicle rolling while protecting your bottom line.

### 2. Aftermarket Engineered

The SVL product line fulfills the aftermarket's need for reliable performance, and is fully validated by Dana's experienced engineering team.

### 3. Guaranteed Performance

SVL brand products have been designed and tested to deliver reliable performance. We have gone the extra mile to conduct quality and durability tests to ensure product performance. In addition, we provide a level of service that is unmatched.

### 4. Best in Category

The SVL brand products are engineering approved, performance tested and backed by Dana. SVL is the best choice in its brand category.

### 5. Availability

Why expose yourself to increased inventory costs and delivery risks? SVL brand products are stocked in the U.S.A. by Dana and are available for immediate shipment. Delivery lead times for competing imported products in the value brand category can be as much as 120-180 days and could require a large inventory investment.

### 6. Backed by Dana Holding Corporation

SVL brand products are backed by Dana Holding Corporation, the largest independent drivetrain manufacturer in the world. As an extension of Dana's current product offerings, SVL offers valuable driveline solutions that are affordable and delivered with the service and reliability our customers have come to expect.

Dana is also proud to offer parts bearing the legendary Spicer brand. Spicer parts, including the full line of u-joints, axle shafts, centre bearings, and more, are engineered to the exact specifications of original equipment manufacturers. Visit the Spicer parts website to learn more about the benefits of genuine Spicer quality.

# Available Service Tooling

Spicer Anglemaster – SPI400



Pro 360 Anglemaster II with case DANA logo in red. Related adapter tools and accessories sold separately.

Adapter Kit – SPIKIT500



**Contains:**

- SPI-CP501 – Light & Medium Universal Joint
- SPI-CP502 – Heavy Duty Half-Round Yoke
- SPI-CP160 – Heavy Duty Full-Round End Yoke

14" Lug Ruler – SPICP455



Go/No-Go Gauge – SPI347



# Dana Standard Repair Times

## Rear Drive Axles

Repair – Scope of Works	Timeframe – Standard Hours
Air Shift Assembly – R&R <b>Add:</b> Overhaul of air shift assembly	0.6 1.2
Electric Shift Unit – R&R <b>Add:</b> Overhaul of electric shift unit	0.8 1.2
Housing Breather Vent/Tube – R&R	0.2
Interaxle Differential (Power Divider) – R&R (No parts replaced)	0.8
Interaxle Differential (Power Divider) – Rebuild <b>Includes:</b> Replacement of helical gears, spider, thrust washers, side pinions, add and refill with lube. <b>Excludes:</b> R&R of the Interaxle Differential Assembly <b>Note:</b> It is not necessary to remove the differential carrier to service the interaxle differential assembly.	5
Input Shaft Bearing – R&R <b>Includes:</b> R&R u-joint, yoke, seal, bearing, steam clean, clean seal surface, and add lub	2.5
Lube Pump – R&R	2
Output Shaft Bearing – R&R <b>Includes:</b> R&R u-joint, yoke, seal, bearing, steam clean, clean seal surface, and add lube	2
Rear Cover (Forward Carrier) – R&R <b>Includes:</b> R&R u-joint, yoke and cover, steam clean, clean gasket surface, and add lube	1.5
Seal, Carrier (Input, Output, Pinion) – R&R <b>Includes:</b> R&R u-joint, yoke and cover, steam clean, clean seal surface, and add lube	1.5

Repair – Scope of Works	Timeframe – Standard Hours
Seal, Wheel (one) – R&R <b>Includes:</b> R&R wheel end equipment, seal, clean seal surface, adjust bearings, and add lube	1.3
Differential Carrier Assembly – R&R Single Drive Front of Tandem Rear of Tandem <b>Includes:</b> R&R differential carrier from housing, steam clean, drain and refill lube <b>Excludes:</b> Replacement or adjustment of any parts	3 3.5 3
Axle Housing (one) – R&R <b>Includes:</b> R&R axle assembly from chassis, R&R carrier from housing, transfer of all parts and bracketry not furnished with new housing, adjust service brakes and skid control sensor	11
Control Traction Differential – Overhaul <b>Includes:</b> Steam clean, disassembly, inspection, replacement of parts as needed, adjustments and refill with lube <b>Excludes:</b> R&R of the differential carrier <b>Note:</b> This repair operation is not warrantable for failures which occur after 3 years / 300,000 miles (480,000 km).	7
Differential Carrier Assembly – Overhaul Single Drive Front of Tandem Rear of Tandem <b>Includes:</b> Disassembly, parts inspection, perform required replacement and adjustment of all parts, gear set, and bearing replacement and set up <b>Excludes:</b> R&R of Carrier	7 10 7
Output Shaft Side Gear Bearing – R&R D404 Models D402 Models	1.5 1

# Dana Standard Repair Times

## Steering Axles

Repair – Scope of Works	Timeframe – Standard Hours
Ackerman Arm (one) – R&R <b>Includes:</b> Disconnect tie rod <b>Add:</b> Set Toe-in	0.5 0.3
Cross Tube (Centre Link) – R&R <b>Includes:</b> R&R of both tie rod ends <b>Add:</b> Set Toe-in	0.7 0.3
Steering Arm – R&R <b>Includes:</b> Drag link R&R <b>Add:</b> Reset Toe-in	0.7 0.3
Steering Arm Ball Stud (one) – R&R <b>Includes:</b> Drag link R&R	0.5
Steering Knuckle or Spindle (one) – R&R <b>Includes:</b> R&R wheel, brake assembly, hub, knuckle pin, thrust bearing, shim(s); Lubricate and adjust wheel bearings <b>Add:</b> Set Toe-in <b>Add:</b> Knuckle pin bushing overhaul	2.5 0.3 1.0
Tie Rod / Tie Rod End (one) – R&R <b>Includes:</b> R&R of one tie rod end <b>Add:</b> Set Toe-in	0.5 0.3

Repair – Scope of Works	Timeframe – Standard Hours
Wheel Alignment – (When required) Check Toe-in and Caster (does not include adjustment) Adjust Toe-in Adjust Caster Adjust Camber (factor set; adjustment not allowed) <b>Note:</b> Wheel alignments, toe-in, and caster adjustments are only reimbursed when required to complete a warrantable repair.	  0.3 0.3 0.5 N/A
Axle 'I' Beam – R&R <b>Includes:</b> R&R entire axle assembly, transfer all parts to new 'I' beam, lubricate all steering joints, R&R and adjust all brake components and wheel end equipment <b>Excludes:</b> Wheel alignment	6.1
Wheel Alignment – (When required) Check Toe-in and Caster (does not include adjustment) Adjust Toe-in Adjust Caster Adjust Camber (factory set; adjustment not allowed) <b>Note:</b> Wheel alignments, toe-in, and caster adjustments are only reimbursed when required to complete a warrantable repair.	  0.3 0.3 0.5 N/A



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