

## Universal Joints

### Borgeson Heavy-Duty Steering Universal Joints and Splined Steering Shafts

High-quality **Borgeson** universal joints are specifically made for steering use in demanding racing applications. Unlike cheaper pin-and-block joints, these joints use sealed needle-roller bearings that provide long life, smooth operation, and great reliability with zero maintenance.

|   |                        |         |
|---|------------------------|---------|
| Needle bearing joint, .75" smooth bore at both ends .....   | Part No. 1492-01 ..... | \$75.99 |
| Needle bearing joint, .75" smooth bore at one end, 3/4-36 spline other end .....  | Part No. 1492-10 ..... | \$77.99 |
| Needle bearing joint, .75" smooth bore at one end, 9/16-36 spline other end .....   | Part No. 1492-11 ..... | \$80.99 |
| <i>The 9/16-36 spline is commonly used on British formula car steering racks (e.g., Jack Knight and our own custom-made racks).</i> |                        |         |
| Needle bearing joint, 3/4-36 spline at both ends .....  | Part No. 1492-30 ..... | \$82.99 |
| Needle bearing joint, 3/4-36 spline at one end, 9/16-36 spline other end .....  | Part No. 1492-31 ..... | \$82.99 |
| Needle bearing joint, 9/16-36 spline at both ends .....   | Part No. 1492-32 ..... | \$82.99 |

### Aluminum Needle Bearing Joints

These Borgeson needle bearing joints are similar to the steel units above, but made of aluminum for minimum weight. Aluminum joints are available in splined versions only.

|  |                        |         |
|--|------------------------|---------|
| Aluminum needle bearing joint, 3/4 bore x 3/4 bore .....             | Part No. 1493-01 ..... | \$73.99 |
| Aluminum needle bearing joint, 3/4 bore x 3/4-36 spline .....        | Part No. 1493-10 ..... | \$82.99 |
| Aluminum needle bearing joint, 3/4 bore x 9/16-36 spline .....       | Part No. 1493-11 ..... | \$81.99 |
| Aluminum needle bearing joint, 3/4-36 spline x 3/4-36 spline .....   | Part No. 1493-30 ..... | \$84.99 |
| Aluminum needle bearing joint, 9/16-36 spline x 9/16-36 spline ..... | Part No. 1493-32 ..... | \$84.99 |

### Steering Shafts, Splined at one end

Our steel steering shafts measure 3/4" diameter with a 3/4-36 spline at one end. Three different lengths are available, each with a 1" long spline at one end. You can easily cut them down to the exact length required.

|   |                        |         |
|---|------------------------|---------|
| 5" long steel steering shaft, 3/4-36 spline at one end .....  | Part No. 1496-05 ..... | \$25.99 |
| 16" long steel steering shaft, 3/4-36 spline at one end ..... | Part No. 1496-16 ..... | \$25.99 |
| 36" long steel steering shaft, 3/4-36 spline at one end ..... | Part No. 1496-36 ..... | \$28.99 |

### Steering Shaft Supports

|  |                          |         |
|--|--------------------------|---------|
| Low Carbon Steel PTFE-Lined Rod End, 3/4" bore x 3/4-16 Male Thread .....  | Part No. 3060-12-R ..... | \$32.99 |
| Firewall-Mount Support Bearing in Bolt-On Flange, 3/4" Bore .....  | Part No. 1499-001 .....  | \$29.99 |
| <i>Steel flange bolts to your sheet metal firewall. Requires a 1 7/8" hole through the firewall. The bearing fits a 3/4" OD shaft. Allows the shaft to be positioned at up to a 25° angle to the firewall.</i> |                          |         |

**Steering Shaft Support for '98 and up Van Diemen FF1600 / FF2000 .....** Part No. 3420-501 .....

*\$164.99*  
This beautifully machined, black anodized aluminum support replaces the sloppy original split-race bearing with a high-quality, PTFE-lined bearing for smooth operation with no free play. Includes a 7/8" bore bearing. Requires no modifications to the chassis. Made in USA.

# BORGESON

## UNIVERSAL COMPANY, INC

Needle Bearing Joints  
Part Nos. 1492-XX  
and 1493-XX



Splined Steering Shafts  
Part No. 1496-XX

### Attaching Borgeson joints to steering shafts

**Splined** joints usually have a 5/16-18 setscrew and lock-nut (Loctite is recommended on the setscrew). A flat or groove must be filed on the shaft for the setscrew. **Smooth bore** joints should use two 3/16" hardened shear pins in each yoke, 90° to each other and about 3/8" apart. **Welding is not recommended** because of the risk of heat damage to the bearings and because of the difficulty in ensuring a good weld.

Firewall Flange-Mount Support  
Part No. 1499-001



Van Diemen  
Support, Part  
No. 3420-501

## Shift Linkage Joints

### Apex MS-20271 Universal Joints

Avoid damage when welding these joints to the shaft by using the Anti-heat<sup>®</sup> compound on page 140.



These high-quality, heavy-duty universal joints are manufactured to Military Specification MS-20271. They are very strong, yet their compact, thin wall construction allows them to fit into those tight spots commonly found on shift linkages of rear engine cars. The joints are permanently lubricated and covered to exclude dirt. They are designed for cross-bolting, pinning, or welding to a close-fitting shaft or tube. (Welding must be done carefully to prevent heat damage.)

|   |                            |          |
|---|----------------------------|----------|
| Universal joint, 1/4 inch bore (2" long, static torque rating: 200 in.-lb.) .....         | Part No. 1490-1/4 .....    | \$162.99 |
| Universal joint, 3/8 inch bore (2.62" long, static torque rating: 675 in.-lb.) .....      | Part No. 1490-3/8 .....    | \$134.99 |
| Universal joint, 1/2 inch bore (2.75" long, static torque rating: 1,200 in.-lb.) .....    | Part No. 1490-1/2 .....    | \$119.99 |
| Universal joint, 5/8 inch bore (3.19" long, static torque rating: 2,100 in.-lb.) .....    | Part No. 1490-5/8 .....    | \$124.99 |
| Universal joint, 3/4 inch bore (3.62" long, static torque rating: 3,500 in.-lb.) .....    | Part No. 1490-3/4 .....    | \$137.99 |
| Universal joint, 13/16 inch bore (4.06" long, static torque rating: 4,700 in.-lb.) .....  | Part No. 1490-13/16 .....  | \$177.99 |
| Universal joint, 1 1/16 inch bore (4.62" long, static torque rating: 9,500 in.-lb.) ..... | Part No. 1490-1 1/16 ..... | \$174.99 |
| Universal joint, 1 1/4 inch bore (5.25" long, static torque rating: 14,500 in.-lb.) ..... | Part No. 1490-1 1/4 .....  | \$214.99 |

### Saddle Washers for Bolted Shift Linkage Joints

Standard flat washers do not present a proper bearing surface when used to bolt tubing joints. This can result in damage to the washer or the tubing, which eventually allows the bolt to loosen. Our plated steel washers are designed to be a precise fit on the OD of the Apex shifter joints above. All sizes have a 1/2" OD to match standard AN960 washers. Each saddle washer adds 0.10" to the required grip length (using two washers adds 0.20"). Sold individually.

|   |                             |        |
|---|-----------------------------|--------|
| Saddle Washer for 1/2" OD Tubing, #10 Bolt (Apex 3/8" bore joints), each .....  | Part No. 3077-002-500 ..... | \$2.99 |
| Saddle Washer for 5/8" OD Tubing, #10 Bolt (Apex 1/2" bore joints), each .....  | Part No. 3077-002-625 ..... | \$2.99 |
| Saddle Washer for 3/4" OD Tubing, #10 Bolt (Apex 5/8" bore joints), each .....  | Part No. 3077-002-750 ..... | \$2.99 |
| Saddle Washer for 7/8" OD Tubing, #10 Bolt (Apex 3/4" bore joints), each .....  | Part No. 3077-002-875 ..... | \$2.99 |
| Saddle Washer for 5/8" OD Tubing, 1/4" Bolt (Apex 1/2" bore joints), each ..... | Part No. 3077-003-625 ..... | \$2.99 |
| Saddle Washer for 3/4" OD Tubing, 1/4" Bolt (Apex 5/8" bore joints), each ..... | Part No. 3077-003-750 ..... | \$2.99 |
| Saddle Washer for 7/8" OD Tubing, 1/4" Bolt (Apex 3/4" bore joints), each ..... | Part No. 3077-003-875 ..... | \$2.99 |



Saddle Washers for  
Shift Linkage Joints  
Part No. 3077-002-size  
or 3077-003-size  
Sold individually  
(three are shown  
here for illustration)

### Borgeson Economy Shift Linkage Joints

These economical pin-and-block universal joints are similar in quality to the original shifter joints used by many racecar manufacturers. The heat-treated steel construction is quite strong. These joints are available in step sizes which often simplifies installation.

All sizes measure 3 3/8" long x 1" OD. These joints will last a long time if they are kept lubricated and free of dirt. The addition of some kind of boot or cover is recommended to keep dirt and water out.

|  |                                |         |
|--|--------------------------------|---------|
| Economy shifter joint, 1/2" bore at both ends .....            | Part No. 1484-001-.50 .....    | \$61.99 |
| Economy shifter joint, 1/2" bore one end, 5/8" other end ..... | Part No. 1484-001-.50/62 ..... | \$61.99 |
| Economy shifter joint, 5/8" bore at both ends .....            | Part No. 1484-001-.62 .....    | \$61.99 |
| Economy shifter joint, 5/8" bore one end, 3/4" other end ..... | Part No. 1484-001-.62/75 ..... | \$61.99 |
| Economy shifter joint, 3/4" bore at both ends .....            | Part No. 1484-001-.75 .....    | \$61.99 |

Never use these joints for steering!

