## ARROW & COLT

**Arrow**
**Colt**

## DESCRIPTION

Brake system is hydraulically actuated, using a tandem master cylinder and a power brake unit. All models are equipped with disc brakes on front wheels and drum brakes on the rear wheels. Front disc brakes consist of a rotor and a single piston floating caliper assembly. Rear brakes are self-adjusting, leading-trailing shoe/drum type. Rear brakes are actuated by a dual piston wheel cylinder. Parking brake is cable actuated, operating on the rear wheel brake assemblies. All models use a combination valve to control pressure to rear wheels.

## ADJUSTMENT

### FRONT DISC BRAKE PADS

Front brakes are self-adjusting.

### REAR BRAKE SHOES

Rear brakes are self-adjusting.

### PEDAL HEIGHT & FREE PLAY

Adjust pedal height (distance from top of brake pedal to toe board) to specifications by adjusting master cylinder push rod. Set clearance between end of stop light switch and stop to .020-.040" (.51-1.0 mm). After making these two adjustments correct free play should be obtained.

**Pedal Height & Free Play Adjustment**

| Application | Pedal Height In. (mm) | Free Play In. (mm) |
|---|---|---|
| All Models | 6.5-6.7 | .4-.6 |
| | (160-165) | (10-15) |

### PARKING BRAKE

**Coupe, Sedan, Hatchback** – Fully release parking brake. Remove parking lever cover to gain access to adjustment nut. Adjust nut until clearance between lever and stop is about .008-.08" (.2-2 mm).

**Hardtop, Station Wagon** – **1)** Release parking brake lever. Loosen cable attaching bolt and adjusting nut. Move cable lever to right. Adjust clearance of left side to .04" (1.0 mm). Tighten attaching bolt. Clearance is measured between extension lever and stopper.

**2)** With left cable adjusted, turn adjusting nut until same clearance is obtained on right extension lever. With parking brake properly adjusted, lever stroke should be 4-6 notches (8-12 clicks).

### COMBINATION VALVE

**NOTE** – *Valve accomplishes three functions: Pressure control of rear service brakes; trouble warning; deactivating rear brake pressure control when front service brakes fail.*

**Pressure Test** – Use two pressure gauges that will measure at least 1,500 psi. Hook one gauge to master cylinder rear side and one to rear wheel cylinder. Pressure reading should be as shown in chart. Replace defective as required.

**Brake Hydraulic Pressure Chart**

| Application | Pressure |
|---|---|
| Wheel Cylinder | 460±28.4 psi |
| Master Cylinder | 640 psi |

**Warning Light Test** – Slightly loosen bleeder screw of one wheel cylinder and depress brake pedal. At this time warning light should come on. If light doesn't work, check switch and wire connector.

**Combination Valve Reset** – Tighten whichever bleeder screw has been opened (ie: drum wheel cylinder), then loosen the opposite system bleeder screw (ie: caliper wheel cylinder). Press brake pedal down until light goes out, close bleeder.

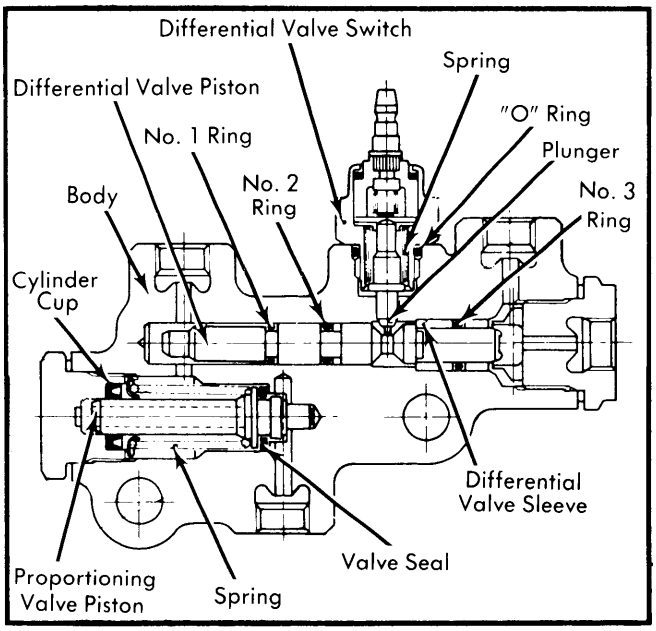


***Fig. 1 Section View of Combination Valve Showing Detail of Internal Components***

### HYDRAULIC SYSTEM BLEEDING

Attach a bleed tube to wheel cylinder bleeder screw and immerse opposite end of tube in a container partially filled with brake fluid. Depress and release pedal several times, hold in applied position, loosen bleeder screw, allow air to escape, and tighten bleeder screw. Continue operation until air bubbles are no longer seen in discharged fluid. Repeat procedure at remaining brake lines until all air is bled from system. Bleeding sequence is right-rear, left-rear, left-front, and right-front.

## REMOVAL & INSTALLATION

### FRONT DISC BRAKE PADS

**Removal** – Raise and support vehicle and remove front wheel. Remove pad protector by prying up edge of clip at center of protector. Hold center of "M" clip, detach "M" clip

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## ARROW & COLT (Cont.)

from pad and its ends from retaining pins, remove clip. Remove retaining pins from caliper and remove "K" spring. Remove pads from caliper by grasping backing plate area of pads with pliers.

**NOTE** – *Replace all pads (left and right side) at same time.*

**Installation** – Press piston to bottom of bore using a suitable tool, install disc pads and retaining pins. Install "K" spring and "M" clip, making sure positions are not reversed. See *Fig.* 2. Install pad protector, making sure clips face outward.

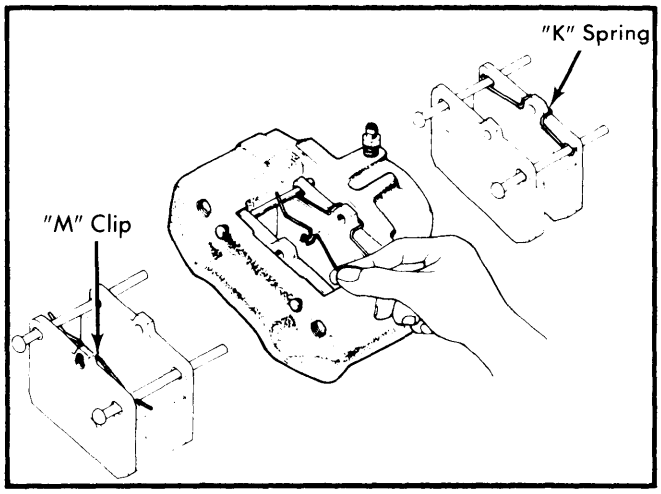


***Fig. 2 Installing Spring and Clip on Brake Pads and Retaining Pins***

### FRONT DISC BRAKE CALIPER

**Removal** – With disc pads removed, disconnect hydraulic line and remove bolts attaching caliper assembly to steering knuckle, and remove caliper assembly.

**Installation** – Reverse removal procedure, tighten caliper mounting bolts evenly, and bleed hydraulic system.

### FRONT DISC BRAKE ROTOR

**Removal** – With caliper assembly removed, remove hub dust cap, cotter pin, lock nut, and adjustment nut. Pull hub and rotor assembly from spindle, taking care not to drop outer wheel bearing. Remove bolts attaching rotor to hub, then separate.

**Installation** – Reverse removal procedure, tighten rotor-to-hub bolts evenly, and adjust wheel bearings. *See Wheel Bearing Adjustment in WHEEL ALIGNMENT Section.*

### REAR BRAKE SHOES

**Removal** – Raise and support vehicle and remove brake drum. Remove shoe hold-down springs. Disconnect strut-to-shoe spring and upper shoe return spring end from trailing shoe. Remove trailing shoe and lower return spring. Hold adjusting latch downward, pull adjusting lever toward center of brake, and remove leading shoe assembly. Remove upper shoe return spring and strut-to-shoe spring.

**Installation** – Reverse removal procedure and note the following: Apply brake grease to all shoe contact points of backing plate, adjuster assembly, and wheel cylinder. Adjust amount of engagement of adjusting lever with strut only after pulling lever fully toward center of brake. Note that adjusting lever and latch spring differ between right and left sides.

### REAR WHEEL CYLINDER

**Removal** – With rear drum and brake shoes removed, disconnect hydraulic line from wheel cylinder at rear of backing plate, remove bolts attaching cylinder, and remove wheel cylinder.

**Installation** – Reverse removal procedure, tighten mounting bolts evenly, and bleed hydraulic system.

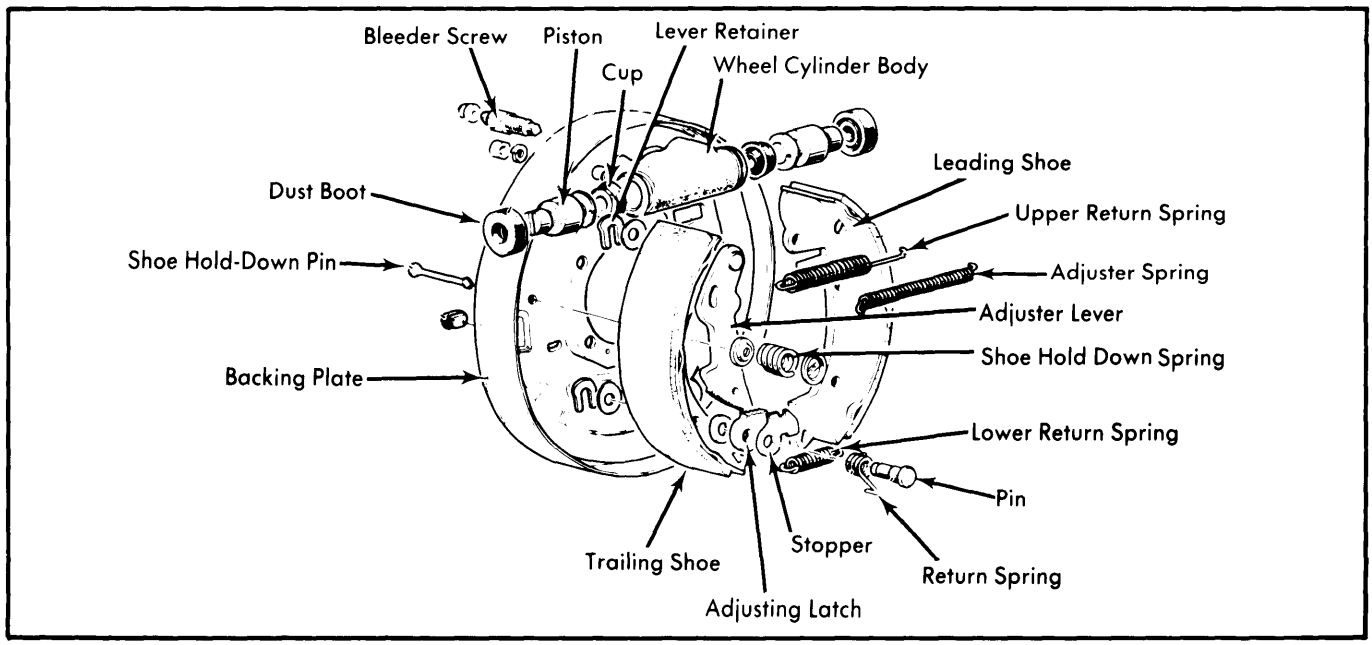


***Fig. 3 Exploded View of Rear Brake Assembly for Component Identification***

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## ARROW & COLT (Cont.)

### MASTER CYLINDER

**Removal** – Disconnect hydraulic lines from master cylinder, then depress brake pedal slowly several times to discharge brake fluid. On models with power brakes, remove clevis bolt retaining master cylinder push rod to brake pedal, then on all models, remove cylinder attaching bolts and lift off master cylinder.

**Installation** – Reverse removal procedure, check and adjust pedal height, and bleed hydraulic system.

### POWER BRAKE UNIT

NOTE – *Before removal or overhaul test check valve. Pull off vacuum hose, place finger over check valve and crank engine; vacuum should be created.*

**Removal** – With master cylinder removed, disconnect vacuum hose from power brake unit. Remove pin connecting power unit operating rod to brake pedal, then loosen attaching nuts and remove power unit.

**Installation** – Reverse removal procedure and note the following: Apply a suitable sealer to power unit mounting surface and vacuum line connections. Adjust pedal height and bleed hydraulic system.

## OVERHAUL

### FRONT DISC BRAKE CALIPER

**Disassembly** – Remove caliper attaching bridge bolts and separate outer and inner halves. Remove retaining ring and dust seal, apply compressed air to fluid inlet, and remove piston. Remove piston seal taking care not to damage caliper bore or seal groove.

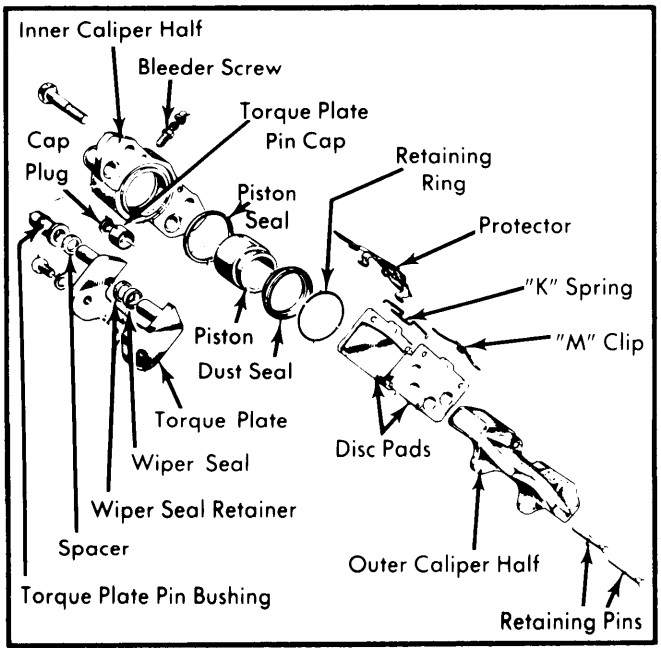


***Fig. 4 Disassembled View of Disc Brake Caliper***

**Cleaning & Inspection** – Clean all metal parts in trichloroethylene, alcohol, or brake fluid; clean piston seal in brake fluid or alcohol; clean dust seal and other rubber parts in alcohol only. Inspect caliper bore and piston for wear, damage or rust; replace parts as necessary.

NOTE – *Manufacturer recommends replacing piston seal and dust seal whenever piston has been removed.*

**Reassembly** – Reverse disassembly procedure and note the following: Apply rubber grease to piston seal and brake fluid to piston when reassembling. If torque plate was removed from inner caliper half, clean torque plate shaft and shaft bore in caliper, then apply special rubber grease to rubber bushing, wiper seal inner surface, and torque plate shaft before reassembly. Tighten bridge bolts of caliper halves evenly.

NOTE – *Possible cause of increased pedal stroke is: Insufficient fit between piston and piston seal. Correct by manually levering piston to seat several times. This will create a better fit between piston and seal. Make sure brake pad is removed during this procedure.*

### MASTER CYLINDER

**Disassembly** – Remove dust boot, retaining ring, stop washer, and piston stop bolt, and withdraw primary piston assembly, secondary piston assembly, and secondary return spring from master cylinder. NOTE – *Do not disassemble primary piston assembly.* Remove check valve caps, tube seats, check valves, and check valve springs.

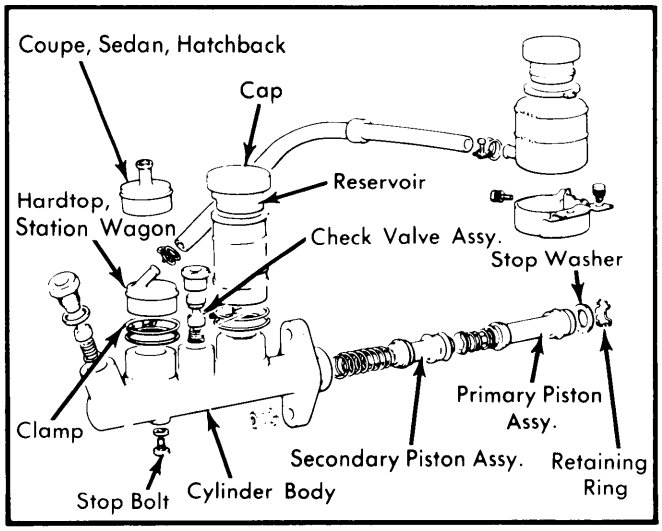


***Fig. 5 Disassembled View of Master Cylinder***

**Inspection** – Check master cylinder bore and piston for wear or other damage and replace as necessary. Check clearance between cylinder bore and piston; if clearance exceeds .006", replace parts as necessary. Check all parts of secondary piston assembly; if any parts are found defective, replace complete secondary piston assembly.

**Reassembly** – Reverse disassembly procedure and note the following: Apply rubber grease to all parts (except boots) before reassembly. When assembled, check that return port is not blocked by piston cup when piston is located at return position.

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**POWER BRAKE UNIT**

**Disassembly** – 1) Hold front shell flange (master cylinder end of power unit) in a vice and remove clevis and lock nut. Scribe alignment mark on front and rear shells for reassembly reference. Holding neck of rear shell on both sides with pipes, remove rear shell by turning it counterclockwise. NOTE – *The diaphragm spring can be removed at the same time.* Remove diaphragm plate assembly from rear shell.

2) Using suitable driver, remove rear shell retainer and lift out bearing and valve body seal. Pull diaphragm from diaphragm plate assembly, then using a screwdriver, remove silencer retainer and lift out silencer and filter. Hold valve plunger, with key hole facing down and remove stop key by lightly pushing valve rod while shaking unit, then remove valve rod and plunger assembly. Remove reaction disc. NOTE – *Valve rod plunger assembly can not be disassembled.* Remove flange from front shell, then pull off plate and seal assembly.

**Cleaning & Inspection** – Thoroughly clean and dry each part. NOTE – *Cups and plastic parts must be wiped off only.* Inspect diaphragm plate for damage and cracks. NOTE – *Diaphragm plate is made of plastic and should be handled carefully at all times.* Check push rod for damage and straightness. Check front and rear shells for cracks, damage and deformation. Repair or replace any defective part.

**Reassembly** – 1) Apply a sufficient amount of silicone grease to the following parts (see illustration): Front shell seal and push rod sliding surfaces (A); push rod and seal contact surfaces (B); diaphragm lug-to-rear shell contacting surface (C); outside surface of reaction disc (D); reaction disc inserting part of diaphragm plate (E); rear shell seal and diaphragm plate sliding surfaces (F); interior of piston plate into which plunger assembly is inserted and seal sliding surfaces (G).

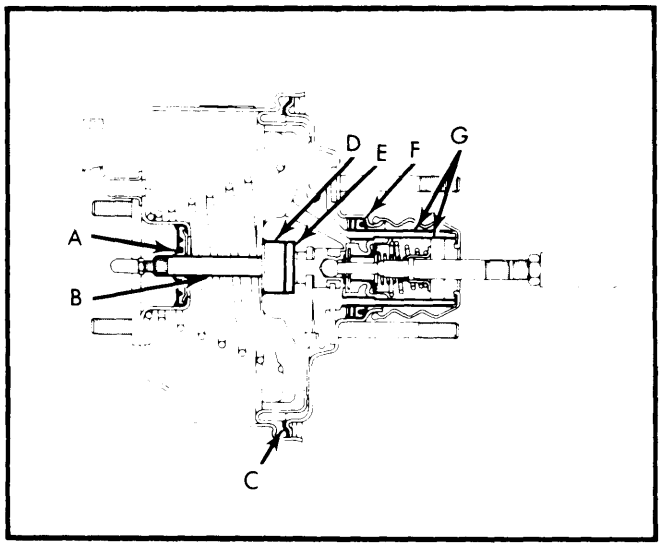


***Fig. 6 Lubricate at Points Indicated in Illustration***

2) Install seal and bearing into rear shell, then press in retainer. Gently install valve rod and plunger, then install stop key with chamfered end toward piston side. NOTE – *After installing stop key, pull plunger assembly to ensure plunger is securely locked by stop key.* Install reaction disc and diaphragm in diaphragm plate assembly, then install silencer filter and silencer into rear of diaphragm plate and press in retainer.

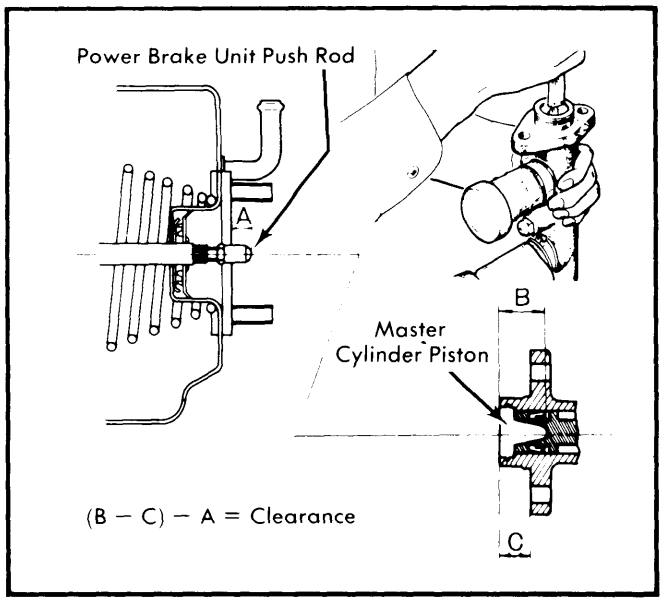


***Fig. 7 Locations for Measuring Master Cylinder Push Rod-to-Piston Clearance***

3) Install diaphragm plate assembly into rear shell, then install valve body guard (rear end first) into end of seal retainer. Install rear shell into front shell, then install push rod and front shell flange. Align marks made at disassembly, then turn rear shell until its notch touches stopper fully. Check clearance between power unit push rod and master cylinder piston (see illustration); clearance should be .30" (7.6 mm) or less. If clearance is not to specifications, correct by adjusting push rod length. Install yoke onto threaded end of power unit operating rod.

### TIGHTENING SPECIFICATIONS

| Application | Ft. Lbs (mkg) |
|---|---|
| Master Cylinder | |
| Check Valve Caps | 18-25 (2.5-3.5) |
| Piston Stop Bolt | 1-2 (.14-.28) |
| Retaining Nuts | 6-9 (.83-1.2) |
| Hydraulic Lines | 9-12 (1.2-1.7) |
| Caliper Mounting Bolts | 58-72 (8.0-10.0) |
| Caliper Bridge Bolts | 58-69 (8.0-9.5) |
| Rotor-to-Hub Bolts | 25-29 (3.5-4.0) |
| Hydraulic Line-to-Caliper | 9-12 (1.2-1.7) |
| Wheel Cylinder Bolts | 4-7 (.55-.97) |
| Bleeder Screw | 4-7 (.55-.97) |

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**BRAKE LINING SPECIFICATIONS**

| Application | Drum Dia. In. (mm) | Width | | Length | | Thickness | |
|---|---|---|---|---|---|---|---|
| | | Front In. (mm) | Rear In. (mm) | Primary In. (mm) | Secondary In. (mm) | Primary In. (mm) | Secondary In. (mm) |
| Arrow & Colt | 9 (229) | ① | 1.57 (39.8) | 9.57 (243) | 9.57 (243) | .169 (4.29) | .169 (4.29) |

① — Front disc brake equipped.

**BRAKE SYSTEM SPECIFICATIONS**

| Application | Drum Diam. In. (mm) | Wheel Cylinder Diameter | | Master Cylinder |
|---|---|---|---|---|
| | | Front In. (mm) | Rear In. (mm) | Diameter In. (mm) |
| Arrow & Colt | 9 ① (229) | ② | .750 (19.1) | .815 (20.69) |

① — Rear Drum.
② — Caliper Bore Diameter — 2.012" (51.1 mm).

**DISC BRAKE ROTOR SPECIFICATIONS**

| Application | Disc Diameter In. (mm) | Lateral Runout In. (mm) | Parallelism In. (mm) | Original Thickness In. (mm) | Minimum Refinish Thickness In. (mm) | Discard Thickness In. (mm) |
|---|---|---|---|---|---|---|
| Arrow & Colt | .... | .006 (.152) | .... | .51 (12.9) | ..... | .45 (11.4) |

**BRAKE DRUM SPECIFICATIONS**

| Application | Drum Diameter In. (mm) | Original Diameter In. (mm) | Maximum Refinish Diameter In. (mm) | Discard Diameter In. (mm) |
|---|---|---|---|---|
| Arrow & Colt | 9 (229) | 9.000 (229) | ..... | 9.079 (230.6) |

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