

damaged valves.

Inspect valve spring (6513), valve spring retainers (6514), valve spring retainer keys (6518) and sleeves. Replace any visibly damaged parts.

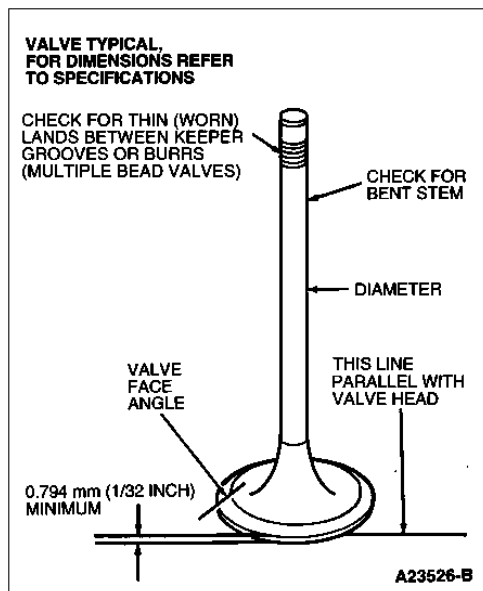
Valves, Refacing

⚠ CAUTION: Replace any excessively worn or damaged valve train parts.

Minor pits or grooves may be removed. Replace valves that are severely damaged if the face runout cannot be corrected by refinishing or stem clearance exceeds specification. Refer to [Section 03-01](#) for specifications. Use Rotunda Motorized Valve Refacer 139-00041 or equivalent.

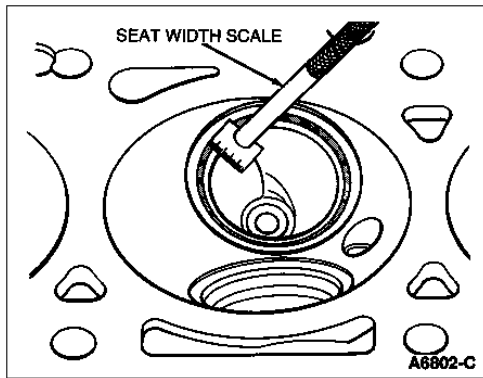
The valve refacing operation should be closely coordinated with the valve seat refacing operations so that the finished angles of the valve face and valve seat will meet specifications and provide a compression-tight fit.

Make sure refacer grinding wheels are properly dressed. Refer to the following illustration for critical valve dimensions.



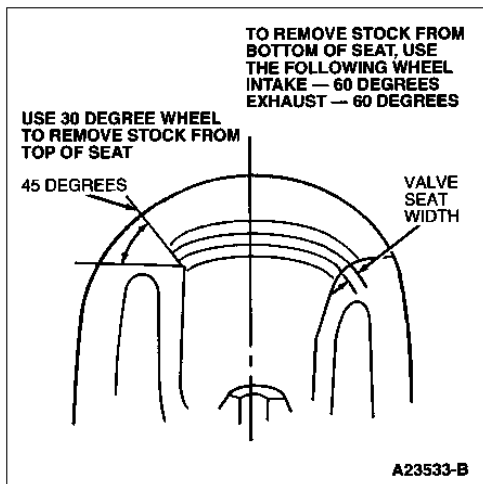
Valve Seat Contact Width

Use a seat width scale or machinist scale to measure the valve seat width. Reface the valve seats if the width is not within specifications. Refer to [Section 03-01](#) for specifications.



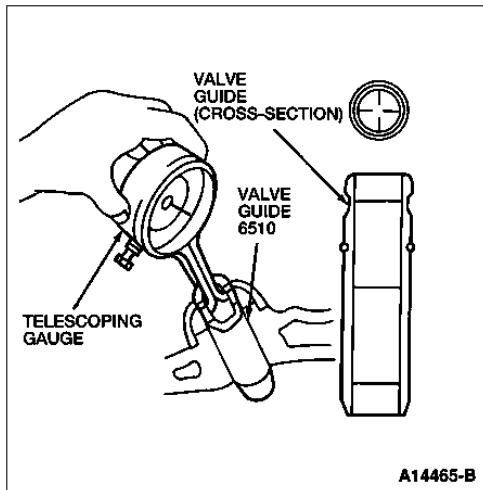
If the valve seat width exceeds the maximum limit, remove enough stock from the top edge and/or bottom edge of the seat to reduce the width to specification.

On the intake and exhaust seats, use a 60-degree angle grinding wheel to remove stock from the bottom of the seat (raise the seats). A 30-degree angle wheel is used to remove stock from the top of the seats (lower the seats).



Valve Guide Inner Diameter

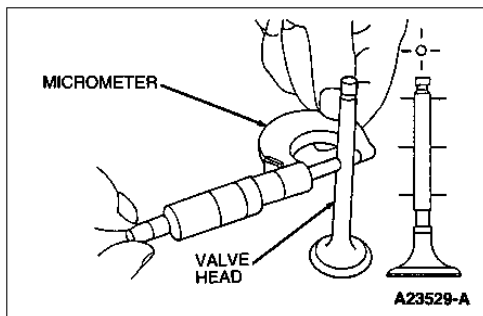
Measure the inner diameter of the valve guides at the points shown.



If valve guide is not within specifications as listed in Section 03-01 , replace the cylinder head.

Valve Stem Diameter

Measure the diameter of each valve at the points shown.



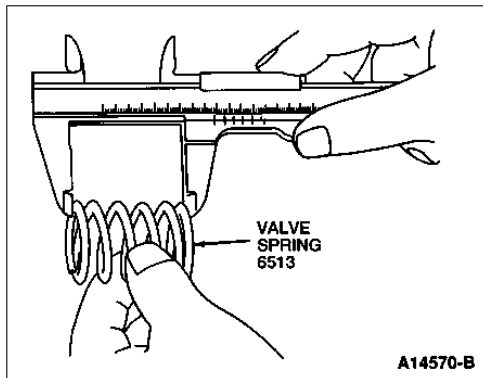
If the stem diameter is not within specification, replace the valve.

The stem diameter of the intake valves (6507) should be within 6.995-6.975 mm (0.2753-0.2746 inch).

The stem diameter of the exhaust valves (6505) should be within 6.970-6.949 mm (0.2744-0.2735 inch).

Valve Spring Length Inspection

Inspect each valve spring for cracks or damage and replace as necessary. Measure the free length of each valve spring as shown.

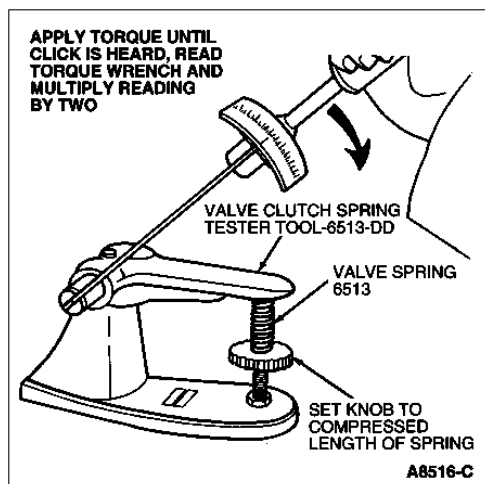


The standard valve spring free length is 42.16 mm (1.659 inches). If a valve spring is not within specifications, replace the valve spring.

Valve Spring Tension

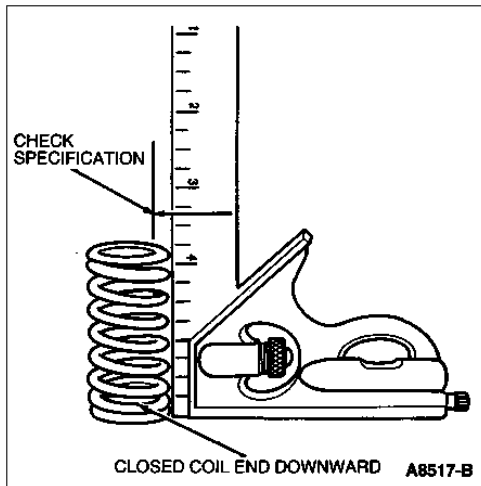
Inspect valve spring, valve spring retainers and valve spring retainer keys for wear or damage. Replace any damaged parts.

Check the valve springs for proper pressure at the specified valve spring lengths using Valve Clutch Spring Tester TOOL-6513-DD or equivalent. Weak valve springs cause poor engine performance. Replace any valve spring not within specification. For specifications, refer to [Section 03-01](#) . Manually rotating the valve springs while installed in the engine will not determine condition of valve springs.



Valve Spring Squareness

Check each valve spring for squareness using a steel square and a flat surface. Stand the valve spring and square on end of the flat surface. Slide the valve spring up to the square. Revolve the valve spring slowly and observe the space between the top coil of the valve spring and the square.



Refer to Specifications in Section 03-01 for out-of-square limits. Follow the same procedure to new valve springs before installation.

Rocker Arm**Cleaning**

Clean all parts thoroughly using solvent. Make sure all oil passages are open.

Inspection

Inspect the pad at the valve end of the rocker arm (6564) for indications of scuffing or abnormal wear. If the pad is grooved, replace the rocker arm. Inspect the valve tappet-to-rocker arm ball for nicks, scratches, scores or scuffs. Replace all damaged components.

Inspect rocker arm roller for abnormal wear. Rotate rocker arm roller to check for bearing wear. If any wear or damage is found, replace rocker arm and inspect camshaft (6250) as outlined.

Intake Manifold

Cleaning

⚠ CAUTION: Remove all filings and foreign matter that may have entered the intake manifold (9424) as a result of service. Check and ensure that all pressed in core plugs and tubes are fully seated and tight or possible damage to engine may occur.

Remove all gasket material from the machined surfaces of the intake manifold. Clean the intake manifold in a suitable solvent and dry it with compressed air.

Inspection

Inspect the intake manifold for cracks, damaged gasket surfaces or other problems that would make it unfit for further service. Clean the Exhaust Gas Recirculation (EGR) and PCV passages.

Exhaust Manifold**Cleaning**

Remove all foreign material from all inlet and outlet seating surfaces of the exhaust manifold (9430).

Inspection

Inspect the cylinder head joining flanges of the exhaust manifold for evidence of exhaust gas leaks.

Inspect the exhaust manifolds for cracks, damaged gasket surfaces or other damage that would make them unfit for further service. Warped or cracked exhaust manifolds must be replaced.

Flywheel Inspection

Inspect the flywheel (6375) for cracks or other damage that would make it unfit for further service. Inspect the flywheel ring gear for worn, chipped or cracked teeth. If the teeth are damaged, replace the flywheel.





SPECIFICATIONS

LUBRICANT/ADHESIVE/CLEANER SPECIFICATIONS

Description	Part Number	Ford Specification
Engine Oil	XO-10W30-QSP	ESE-M2C153-E
	XO-10W30-DSP	

SPECIAL SERVICE TOOLS/EQUIPMENT

Special Service Tools Required

Tool Number/ Description	Illustration
T50T-100-A Impact Slide Hammer	
T59L-100-B Impact Slide Hammer	
T73L-6011-A Engine Cylinder Hone Set	
T73L-6600-A Engine Oil Pressure Gauge	

Special Service Tools Desired

Tool Number	Description
D81L-4201-A	Feeler Gauge
D81L-6002-B	Plastigage
D81L-6002-D	Piston Ring Groove Cleaner
D81P-6002-E	Valve Seat Runout Gauge
D83L-4201-A	Straight Edge
D87C-77000-A	Transmission Test Adapter
TOOL-4201-C	Dial Indicator with Bracketry
TOOL-6505-E	Valve Stem Clearance Tool
TOOL-6513-DD	Valve Clutch Spring Tester

Rotunda Equipment

Model	Description
014-00705	Pressurization Kit
112-R0030	Oil Leak Detector
139-00002	Valve Seat Cutter Kit
139-00041	Motorized Valve Refacer
164-R0250	Vacuum/Pressure Tester
164-R0253	Compression Tester