

# GOODSON

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# **BRONZEWALL II INSTRUCTIONS**

## **Bronze Wall II; Follow these steps:**

1. Thread the valve guide with self-piloting tap. This tap assures true alignment and cylindrical bore even with extremely worn valve guides. Tip: Run a reamer, .004" oversize, through valve guide before tapping operation.
2. Screw bronzewall bushing in the guide using the special inserting tool. This tool may be run using the optional power driver (adaptor BW2-640). It is best to start the first few threads by hand and then to power the bushing the rest of the way into the guide. Hold a finger over the opening at the other end of the guide and when the nose of the installation tool is just poking through the guide, the bushing is fully installed. With the bushing installed, remove the power driver, grasp the knurled knob on the top of the installation tool and twist backwards smartly to break off the installation tang.
3. Unwind the excess bronzewall bushing material away from the valve guide and trim, using the piloted cut-off tool supplied with the kit.
4. Using the ball sizing swages, swage the bushing to the desired size. The swage may be driven manually through the guide using a soft face hammer or it may be air powered using the optional air driver adaptors. This completes the bronzewall installation.

## **Bronzewall Installation Tips:**

Choosing the sizing swage: Swage size should be determined by measuring the OD of the valve stem and adding .001"-.002". This gives a good starting point for swaging the bronzewall guides. The valve guide will generally end up being .001" smaller than the size marked on the swage due to spring back of the bronze material. This varies depending upon the type of cylinder head, the starting size of the bronzewall II bushing before swaging, and the diameter of the valve guide.

## **Optional Installation Instructions:**

For high performance or specialized applications, it is sometimes advantageous to hone the valve guide to final size rather than swage to a final size. The normal installation instructions are followed for tapping and bushing installation, but choose a swage that will just seat the bronzewall bushing into the cylinder head. A swage that is either slightly under or the same size as the valve stem is best. Then the optional valve guide hone (P-190), can be used to hone the valve guide to a precision-finished diameter. The guide can be checked with a dial bore gauge or a small hole gauge and an outside micrometer. Another method that is often used where a honed finish is desired, is to swage the bronzewall bushing so that the valve has a tight "O" fit in the guide and then follow up using a small diameter ball hone (available as an option). The ball hone performs a deburring and surface finishing operation on the interior of the guide. The guide should be honed so that the valve has a smooth, sliding fit. One of the advantages of the bronzewall process is that guide may be run

very tight, with as little as .0007" stem to guide clearance. This is because of the natural resiliency of the bronzewall material and the ability to retain oil in the groove area between the bronzewall wire bearing surfaces.

### **Bronzewall Valve Guide Cautions:**

Some cylinder heads require special treatment when installing bronzewall guide bushings. For instance, the Ford Escort head and others of this type, have very thin machined area on the top of the valve guide for the installation of positive type stem seals. If normal bronzewall installation procedures are followed, the top of the guide will split during the swaging process. For heads like the Escort, it is found best to do all of the installation and tapping from the combustion chamber side of the head rather than the top of the head. Procedure is as follows:

1. Mount the cylinder head on appropriate head stands and tap the guides from the combustion chamber side.
2. Install the bushings from the combustion chamber side. Hold your finger at the top of the valve guide and when the installation tool is just being felt touching your finger, stop installing the bushing. Reverse the installation tool to break off the tang and then trim off the excess bushing. It will be noted that approximately 2 unfinished threads will be left at the top of the guide where no bronzewall bushing is present if this procedure is followed. This will prevent any pressure from being applied to the thin seal of the guide during the swaging operation.
3. Swage as with normal bronzewall installation and a finished guide will result that will be reliable, and without any cracks or chips in the seal area of the guide.

**Note:** There are some types of valve guides that are not rebuildable using the bronzewall process. These are valve guides that have deep snap ring grooves machined on the OD (early Chevrolet Luv valve guides). It will be found that the tapping operation outs the valve guide very thin at the bottom of the snap ring groove and during the bronzewall installation process the tops of the guides will break off. If they don't break off they will most likely come off later during seal installation or even while the engine is running later on allowing the seal and the top of the guide to go up and down with the valve. These valve guides, of course, are not rebuildable by knurling, installation of guide liners, or any other rebuild process. It is best to replace these guides rather than attempt to rebuild them.

### **Alternative Uses for Bronzewall:**

Because of the very nature of the bronzewall process, it is an appropriate repair for reducing the diameters of small holes such as throttle-shaft bores in carburetors, kinkage bushing pivot points, small motor bearings and any other small bearing bore diameter that can be tapped and have an insert put in it. The bronzewall bushing can be trimmed to any length ahead of time before installation which makes it very handy for small repairs. In most cases, the excellent wear characteristics of bronzewall wire will equal or be better than original bushings.