

Reprinted from THE REVIEW OF SCIENTIFIC INSTRUMENTS, Vol. 40, No. 9, 1238, September 1969
Printed in U. S. A.

An Improved Tool for Refinishing the Conical Ends of High Pressure Tubing

HARRY A. DAVIS, JR., JOHN R. HASTINGS, AND MEYER WAXMAN

National Bureau of Standards, Washington, D. C. 20234

(Received 22 April 1969; and in final form, 8 May 1969)

WE have developed a simple tool for refinishing the conical ends of high pressure tubing. The tool uses the threaded portion of the tubing as the reference for alignment and can be used to refinish tubing that has a bend directly behind the gland nut (see Fig. 1). In contrast, commercial coning tools that clamp onto the tubing require that the tubing be straight over the distance of several centimeters from the clamped portion to the end of the tubing.

The tool, shown in Fig. 2, consists of a body, a lock nut, and two cutters, one for shaping the conical surface and the other for squaring off the tip of the tubing. The body is a knurled brass cylinder about 10 cm long by $2\frac{1}{2}$ cm o.d. with a reamed hole for the cutters extending along the axis from one end to within about 1 cm of the other end. A left-hand threaded hole extends along the rest of the axis to a short counterbored hole about 3 mm deep. The lock nut is a left-hand threaded, stainless steel nut with a shoulder. The tubing is securely fastened to the body by threading the lock nut onto the tubing, threading the tubing into the body, and then tightening the shoulder of the lock nut against the end of the body. The cutter for

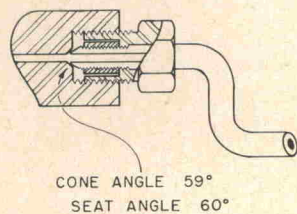


FIG. 1. Typical coned-and-threaded connection.

shaping the conical surface, ground in two-fluted form from a tool steel rod, and the squaring off cutter, a standard four-fluted end mill, fit closely but freely within the reamed hole. The design of the tool inherently assures that the conical surface is accurately aligned with respect to the threaded portion of the tubing.

To refinish tubing, the user mounts the conical cutter

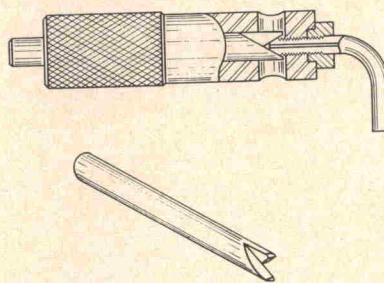


FIG. 2. Tool for refinishing the conical ends of high pressure tubing.

in a chuck or collet of a lathe or any other machine capable of rotating the cutter at a constant rate of less than 100 rpm. After assembling the tool and grasping the body, he starts the cutter rotating and brings the tubing against its cutting edges. A diametrical hole in the body makes it easy to observe the cutting process, supply cutting fluid, and remove chips. After refinishing the conical surface, the user substitutes the end mill for the conical cutter and squares off the tip of the tubing to increase its strength and reduce its distortion when the pressure seal is formed.

We wish to thank John Queiser for his grinding of the conical cutter.

MAR 12 1971