RADIAL Thread Rolling Operation

Unlike the axial and tangential rolling systems, radial rolling does not require a controlled feed motion in order to produce a thread.

The RSVP RE style rolling head simply needs to be positioned over the part using the forward stroke of the machine. This may be a standard turret lathe, CNC machine or rotary transfer machine.

When the head is in position, the trip lever is actuated and the rolling process begins (fig. 2). The external trip can only be actuated when the head is stationary. For applications where the head is revolving, an internal trip must be actuated by a push rod mechanism through the shank (or flange) of the head.

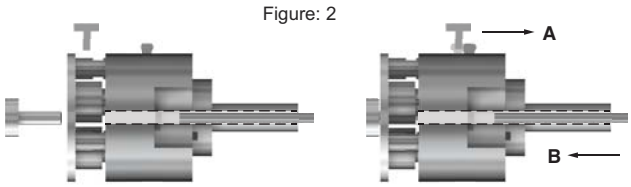
The tripping of the head causes all 3 rolls to rotate under spring pressure until they contact the blank. At this point they pinch up against the part, and are driven round one full revolution. During this rotation of the rolls, their geometry effects a "squeezing down" in a radial direction and the thread is rapidly formed (fig. 3).

Once the rolls have completed the threading cycle, they are returned to the start position with their flats facing the threaded part. This allows the head to be retracted without damage to the thread. The head is now re-set and ready for the next cycle (fig. 4).

It is not advisable to trip the head without a blank in position as the rolls would not return to their start point. If a rolling pass is then attempted, the rolls will hit against the blank, damaging the rolls and possibly the head.

In automatic, un-manned cycles, it is advisable to operate some means of checking device, to ensure that the head is in the reset position before any attempt is made to roll a thread. The external trip lever can be actuated automatically or by hand. For manual operation, a ball type handle can be attached to the trip lever which accepts an M5 x 0.8 thread. For automatic tripping, it is required that the external lever is brought up against a machine stop precisely at the point when the head reaches the desired rolling position. The head must not still be advancing forward after it is tripped.

Figure: 2



A - External trip actuated on contacting fixed stop

B - Internal trip actuated by pushrod through shank or flange

Figure: 3

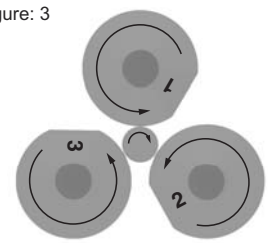
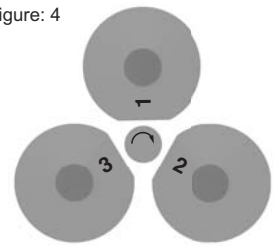


Figure: 4



Rotating direction of spindle
Most conventional spindles run in a right-hand, or clockwise direction, so RE radial heads and rolls are primarily supplied for this condition. These standard, right hand heads should not be solely associated with right hand threads. Right and left hand threads can be produced on the same head; it is only the roll design that alters.

The standard shank style heads illustrated in this publication can be mounted in most lathe turrets and used stationary, in which case the component & spindle rotate in the conventional right hand direction.

When used in rotating mode, RSVP radial heads can be shank or flange mounted. The heads must then be tripped by an internal push rod that passes through the back of the head. Actuation is normally by mechanical, hydraulic or pneumatic means.

Clamping of the component
The radial rolling action is completed in one revolution of the rolls which requires high momentary torque. This in turn imparts high loads on the part being rolled. It is imperative the work holding system is able to resist these high forces, and hydraulic clamping is usually preferred.

Blank preparation
Ensuring the blank diameter is correct is an essential ingredient for trouble free thread rolling. As with other rolling methods, the blank diameter is initially set at or just below the pitch diameter of the thread. Successive rolling passes will then determine the best blank size by trial and error. Threads rolled by the radial method should not exhibit smooth, fully formed crests as this indicates over-rolling which will shorten roll life.

Safety
Radial thread rolling combines high spindle speeds with extremely fast cycle times. Machinery should always be adequately guarded. If RSVP radial heads are to be fitted to manually operated lathes, then full eye protection should always be worn.