How To Use This Catalog

Welcome To The RSVP Tooling Interactive Catalog Section

Clickable & Touch Links

Within each page we have included a wide range of links that can be click when viewed on a computer or touched on a smart device (phones and pads).

The side tabs to the left when click will return you to the section index.

On the master index and section indexes the line items also contain links to the indicated pages.

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Icon Links

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Click this icon to follow our short RSVP tweets. Quick tips and helpful links to increase your threading quality and productivity.

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Click this icon to visit our video channel. When this icon is next to a product you can directly link to a demonstration video.

Click this icon to quickly access our extensive knowledge base within the RSVP Tooling website.

This icon is not active within this PDF.

Click this icon to return to the section index for that product or page.

Downloading this catalog to a smart device - phones or pads

This catalog can be viewed on smart devices such as phones and pads. Most free PDF viewers will allow you to flip from page to page.

However, if you would like to take advantage of the built in interactive features you will need to download an app.

We have reviewed many apps and have found that "ezPDF Reader" seems to work the best on both the Apple and Droid product lines. It is available in two forms - one for the pads and one for the phones.

Start by going to your apps download center on your device. Search for "ezPDF Reader" and look for the above icon. Purchase the app that matches your device (at the time this catalog was created ezPDF reader was selling for $2.99). Download and activate the app.

To download the RSVP Tooling Catalog follow the "ezPDF Reader" instructions to download a file from the internet to the app. On the home screen of "ezPDF Reader" select "URL Download" and enter the following URL - "http://www.rsvptooling.com/RSVPcatalog.pdf". Once the catalog is loaded to "ezPDF Reader" you can start using the interactive features.

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Axial Thread Rolling Index

Axial

For producing long threads, or threads without run-out restriction, RSVP axial rolling heads are the ideal selection. Axial heads feed on from the end of the part and require one revolution of the spindle for each pitch of thread to be produced. Controlled forward axial motion, either by cam or CNC feed, are recommended although manually operated lathes can also give excellent results. RSVP axial heads are self opening and require an external closing action to reset them. Right hand rolling heads are required for rolling right hand threads and the spindle direction must also be right hand. Left hand threads require corresponding heads and spindle rotation.

How To Order

Selecting The Correct Thread Rolling Head

There are two main factors that govern the choice of thread rolling head:

1. The thread size has to be within the standard capacity of the thread rolling head.

2. There must be sufficient clearance within the machine for the head to operate.

On pages 30 to 53 the range of axial thread rolling heads is illustrated, showing the outline dimensions and standard thread sizes for each head. Left hand and rotating versions of these heads are available in all the standard sizes. Special high-helix heads can also be supplied to accommodate Acme and multi-start threads.

Example:

In order to produce a 7/16 - 14 UNC stud, there is a choice between the RA-1, RA-2 and RA-3 heads. This choice may be limited by the clearance on the machine so it is most important to know the maximum diameter and projection available. If the maximum diameter that will clear when the machine turret indexes is 3.75", then the RA-3 head, at 4.60" diameter, is no longer a viable option. The choice between the RA-1 or the RA-2 should then be made with consideration given to any other threads that may need to be produced on the chosen head. If 7/16 UNC is the maximum thread size required then the RA-1, with a range of 1/4 UNC up to 7/16 UNC would be the recommended choice. However, if thread sizes above 7/16 UNC are required then the RA-2, with a range of 5/16 UNC up to 5/8 UNC, should be selected. Having selected the appropriate thread rolling head, please specify the required shank diameter from the options available.

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Selecting Thread Rolls

When ordering thread rolls it is important to specify as much information as possible about the rolls and the application so that the correct rolls may be promptly supplied. The minimum details required are as follows:

The full thread specification (e.g. 3/8 - 16 UNC, 7/16 - 20 UNF, 1/2 - 14 NPSM, 1/4 - 19 BSP)

The thread rolling head for which the rolls are required (RA-1, RA-23, RA-01 Etc.)

The lead required on the rolls (1K standard short lead, 2K standard long lead, or other special lead)

Using the 7/16 - 14 UNC stud example, to be produced using the RA-2 head, the final order would read as follows:

Quantity	Description
1	RA-2 THREAD ROLLING HEAD, 1" DIAMETER SHANK
2 SETS	7/16 - 14 UNC ROLLS WITH 2K LEAD, TO SUIT RA-2 HEAD

Should there be any doubt about the type of lead required on the rolls, or the size of head to be used, please provide our technical department with a component drawing so that we may make our own recommendations. Test samples may be produced with customer's material on special request.

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Thread Rolling Advantages

Advantages To Using An RSVP Thread Rolling System

Thread rolling is now recognized as the fastest and most reliable method of producing quality threads, with RSVP axial and tangential heads and rolls at the forefront of this technology.

The introduction of radial thread rolling offers a new dimension to users of this process, and means thread production can be measured in fractions of a second!

The applications for RSVP thread rolling heads are almost limitless, with models available to suit virtually every type of lathe in the industry.

Technical support
It should be noted that many of the features of thread rolling are shared by axial, tangential and radial rolling heads. Customers are advised to contact our technical department for assistance in selecting the appropriate equipment.

RSVP enjoy the advantage of a dedicated manufacturing facility that offers the customer unrivaled technical support and know-how across a full range of thread rolling and thread cutting products. This expertise applies throughout our thread rolling program and is available to all our customers in North America.

The Benefits Of Thread Rolling
In order to select the appropriate rolling head, it is important to understand the principles of thread rolling.

The cold forming rolling process produces threads by plastic deformation of the material. This in turn imparts high strength plus excellent surface finish, combined with improved wear and corrosion resistance.

As a result, rolled threads are indispensable to safety critical applications in the aerospace, nuclear and automotive industries.

The high rates of material deformation required to roll threads have a most beneficial consequence; very short cycle times. Compare thread rolling with other widely used methods and the potential savings in time and cost are self evident. Figure 1 illustrates the time saving over single point as 7.2 seconds per thread. Multiply this by over 200,000 parts per annum to give a total time saving of 400 hours. This equates to 10 extra weeks of valuable machine time!

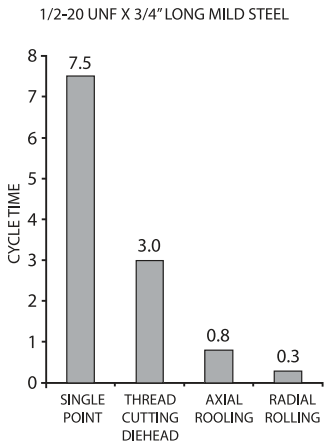

Figure: 1

Axial, Tangential Or Radial?
Before choosing the optimum rolling system, there are certain criteria that must be met:

a. Material - for axial rolling should have minimum elongation of 5% and the tensile strength should not exceed 1700 N/mm^2. However, 8% elongation and 1000 N/mm^2 are preferred for radial rolling.

b. pindle - should be fast enough to permit rolling speeds of 60-180 sfm when axial thread rolling and 60-90 sfm when radial rolling. The work piece must always be on the same center line as the rolling head.

c. Power - available power for rolling at high speeds is essential. Radial rolling requires additional torque to axial and tangential rolling as the process is completed in just one revolution of the rolls.

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Introduction to Axial Thread Rolling

Description

The thread rolling process is now widely acknowledged as the fastest and most efficient method of producing accurate external threads, with surface finish and mechanical properties unobtainable by any other method.

This simple cold forming operation enables engineers to produce threaded fasteners and components to the most exacting standards with ease and repeatability on a wide range of materials. In fact, many high tensile and safety critical components, such as used in the aerospace industries, demand a rolled thread for its high strength properties and no other threading method will be accepted in these cases.

The properties of a rolled thread are best illustrated by examining the cross section of a thread that has been produced by thread rolling and comparing it to a thread that has been produced by conventional cutting.

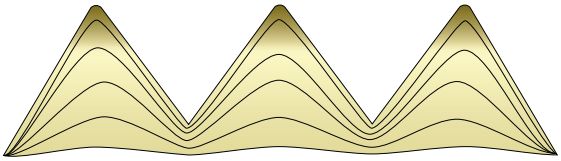

Figure 1: Grain structure of rolled thread

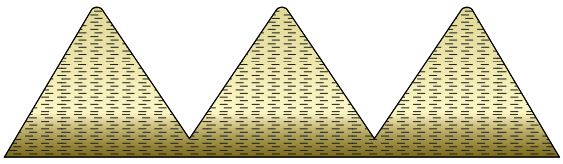

Figure 2: Grain structure of cut thread

The rolled thread form does not break through the grain of the material as occurs with a cut thread and is subsequently more resistant to fracture during tensile loading. The compressive action that takes place during thread rolling serves to increase the hardness of the material, improve its tensile and yield strengths due to the burnishing action of rolling. As a result, thread rolling gives a highly polished finish that resists surface corrosion.

Axial Thread Rolling

The thread rolling heads detailed on pages 30 - 49 of this catalog all function by means of axial or end feeding. This process requires the head to be applied to the end of a prepared blank at a controlled feed rate so that the lead on the thread rolls engage with the lead chamfer on the blank. Once the rolls have engaged with the blank the head will feed itself axially along the part until it reaches the end of its stroke. At this point the forward motion of the head is arrested and the pull off mechanism operates to open the head so that the rolls clear the thread and the head can then be retracted from the part. Due to the self feeding action of the head, it is equally suited to machines without a feed control mechanism as well as machines with lead screws or CNC controlled slides.

On manual type machines the head is reset by the operator before each threading pass using the standard handle equipped with the head. The same method is used when the head is mounted into the turret of a CNC chucking lathe. When operated under automatic cycle on either cam or CNC bar autos, the manual ball type handle is replaced by a closing pin which has to be actuated by an external closing lever or strike plate mounted at the indexing position of the machine turret (the same principle as a conventional diehead). Some machine tool manufacturers offer separate pneumatic actuating units which are ideally suited to closing thread rolling heads.

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Axial Application

Applications

Axial thread rolling heads have an established reputation for reducing thread cycle times and increasing productivity on a wide range of conventional and CNC controlled machines. The nature of thread-rolling, being up to four times faster than traditional cutting methods, requires the machine tool to be able to run at much higher speeds which can place limitations on older lathes and cam autos that were designed for cutting at lower speeds and feeds. The widespread use of CNC lathes with their elevated spindle speeds and accurate programmable feed rates has helped to increase the potential applications for axial thread rolling heads, especially on smaller diameter threading where single point methods are slower and less accurate. High resolution programming to .0001" (.001mm) enables pre-rolling blank diameters to be maintained more accurately on CNC lathes which is advantages when producing threads to tight tolerances.

The basic criteria for selecting a machine for thread rolling are as follows:

Spindle Speed: The machine spindle must be capable of rotating at the speed required for the thread to be rolled.

Feed Control: Automatic machines should be equipped with a controllable feed mechanism that allows a smooth start to the rolling process and a positive, accurate stop mechanism for reliable opening of the head. On both manual and automatic machines, a heavy or sticking slide will not allow the self-feeding of the head to function correctly and premature opening of the head will result. Over feeding of the head will cause damage both to the start threads on the piece part as well as the rolls and must be avoided.

Alignment: As with all on center end working tools, it is essential that the machine spindle and the head are not misaligned, as this can result in malformed threads, shortened roll life and in severe cases breakage to the thread rolling head.

Coolant: An adequate supply of good quality, particle-free coolant should be obtainable from the machine coolant system.

If the basic criteria outlined above are met, then successful thread rolling can be achieved on most types of turning machines, including CNC lathes, multi-spindle screw machines, single-spindle screw machines, turret lathes, centre lathes and special purpose threading machines.

Material Properties

Axial thread rolling proves most successful on materials that have an elongation of 10% or more and a tensile strength of below 1500N/mm^2 (140,000 psi). It is often possible to roll materials outside these parameters, but the life of the thread rolls can be so reduced as to make the process uneconomic. Certain free cutting grades of steel and brass may have low tensile strengths and good elongation factors but are often susceptible to flaking at the root and flanks of the thread, especially on Acme, trapezoidal and coarse v-form threads. For these applications, it is advisable to obtain material grades that offer good machinability combined with a low lead content.

The following chart gives an indication of the types of materials that can be thread rolled using an axial head, combined with the recommended rolling speeds for standard v-form threads:

	feet/min	meters/min
Low - medium carbon steels	100 - 200	30 - 60
Medium case hardening steels	100 - 200	30 - 60
High alloy steels	120 - 250	35 - 75
Stainless steels	120 - 225	35 - 70
Copper alloys	200 - 300	60 - 90

As a guide, coarse pitches and high tensile materials are rolled at the lower end of the above speed ranges. Fine pitches and light alloys may be rolled at the top end of the above speed ranges.

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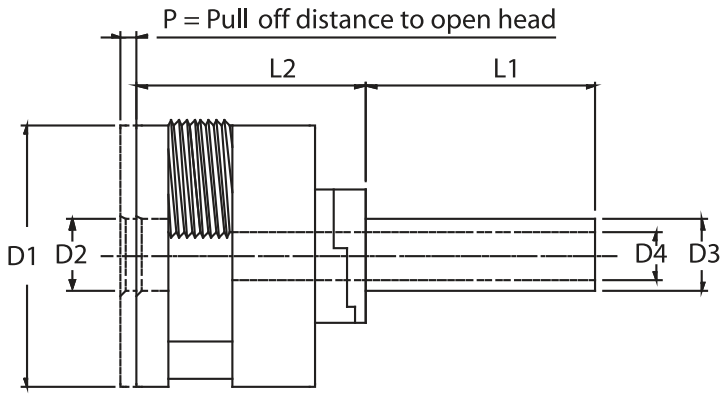
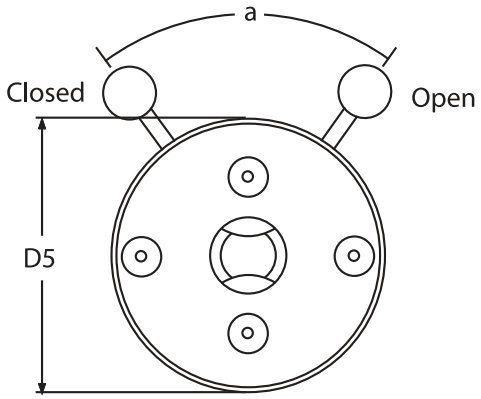
RA-0 - Axial Head

AXIAL THREAD ROLLING HEADS
FOR RIGHT HAND THREADS
FOR STATIONARY APPLICATIONS





Dimensions

Helix Angle in Head = 4°		D1	D2	D3	D4	D5 max	L1	L2	P	a
Allowable Component Lead	inches	1.970	0.453	3/4	0.260	2.146	1.970	1.520	0.080	50°
Angle = 2° 25' - 5° 12'	mm	50	11.5	20	6.5	54.5	50	39	2	

The following thread rolls may be ordered as standard on the RA-0 head

ISO Metric

Nominal Size x Pitch mm
M 1.4 x 0.3
M 1.6 - M 1.8 x 0.35
M 2.0 - M 2.3 x 0.4
M 2.2 - M 2.6 x 0.45
M 2.5 - M 3.0 x 0.5
M 3.0 - M 3.5 x 0.6
M 4.0 x 0.7
M 4.0 - M 4.5 x 0.75
M 5.0 x 0.8
M 5.0 - M 5.5 x 0.9

Unified Coarse UNC

Nominal Size x TPI
No. 1 x 64
No. 2 x 56
No. 3 x 48
No. 4 - No. 5 x 40
No. 6 - No. 8 x 32
No. 10 - No. 12 x 24

Unified Fine UNF

Nominal Size x TPI
No. 0 x 80
No. 1 x 72
No. 2 x 64
No. 3 x 56
No. 4 x 48
No. 5 x 44
No. 6 x 40
No. 8 x 36
No. 10 x 32
No. 12 x 28

Whitworth BSW

Nominal Size x TPI
1/16 x 60
3/32 x 48
1/8 x 40
5/32 x 32
3/16 - 7/32 x 24

Whitworth Fine BSF

Nominal Size x TPI
3/16 x 32
7/32 x 28

Threads outside of the listed standard series may also be rolled on this head provided that their helix does not fall outside the permissible range.

Left hand threads are dimensionally the same as right hand heads but open and close on the opposite direction. Thread rolls can be used in both right hand and left hand heads.

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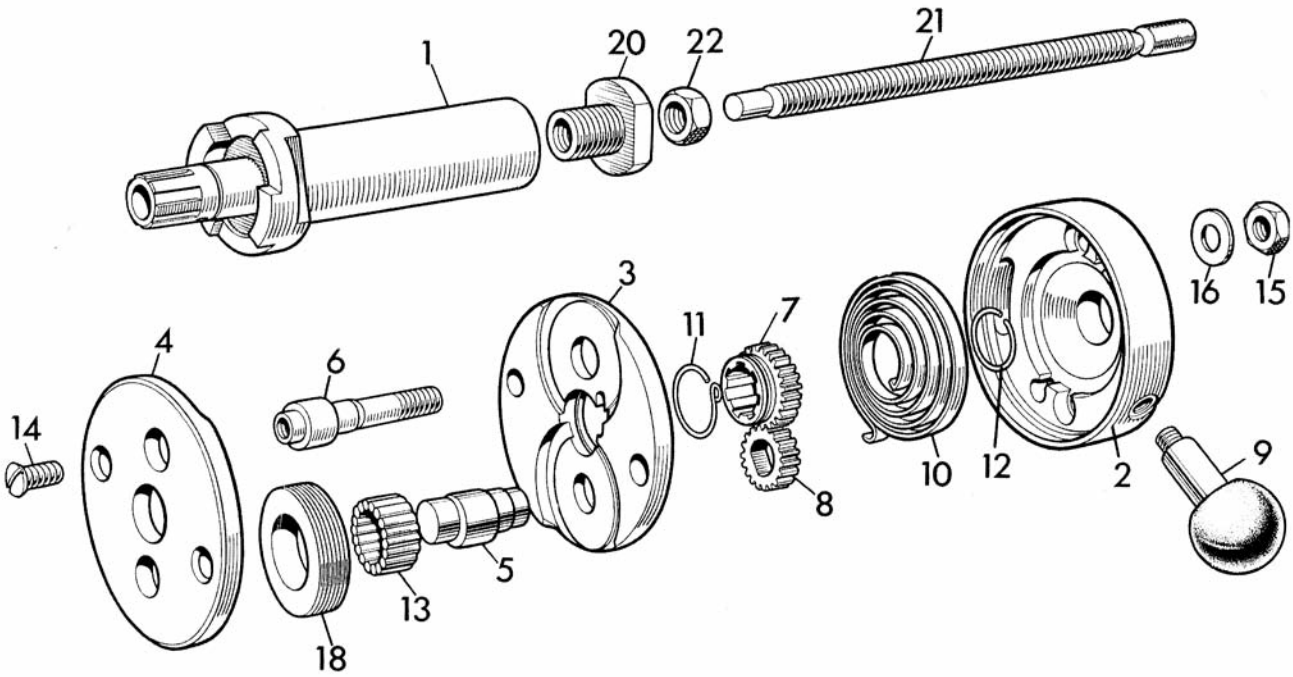
RA-0 - Axial Head

Spare Parts



Ref	Qty	Description
1	1	Shank
2	1	Spring housing
3	1	Centre plate (back)
4	1	Front plate
5	2	Eccentric spindle
6	2	Spacer stud
7	1	Centre gear
8	2	Outer gear
9	1	Handle

Ref	Qty	Description
10	1	Coil spring
11	1	Circlip
12	1	Circlip
13*	36	Needle roller bearing
14	2	Front plate screw
15	2	Hexagon nut
16	1	Ring washer

* Tungsten carbide bushes (13) are available as an alternative option to needle roller bearings

Ref	Qty	Description
17		
18	2	Thread roll
19		
20	1	Stop screw body
21	1	Stop screw
22	1	Hexagon nut
23		
24		
25		

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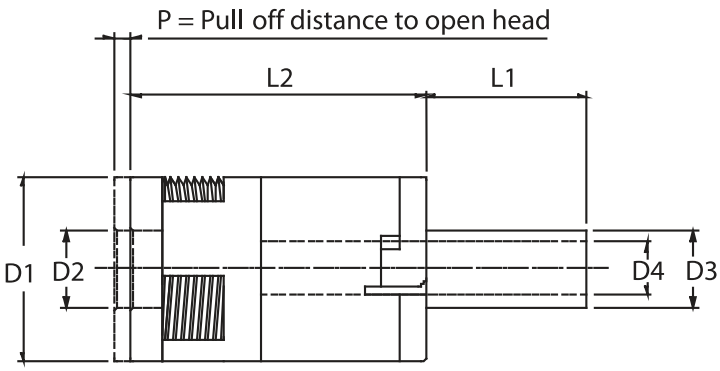
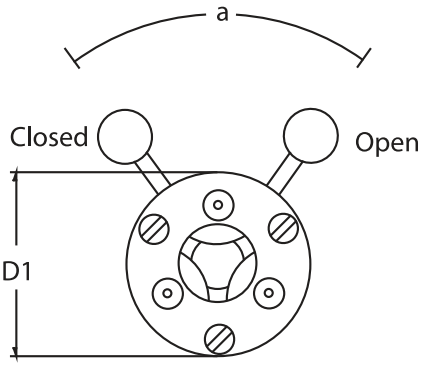
RA-001 - Axial Head

AXIAL THREAD ROLLING HEADS
FOR RIGHT HAND THREADS
FOR STATIONARY APPLICATIONS





Dimensions

Helix Angle in Head = 4°		D1	D2	D3	D4	L1	L2	P	a
Allowable Component Lead	inches	1.575	0.275	3/4 / 5/8	0.295	0.985	1.575	0.060	32°
Angle = 2° 25' - 5° 12'	mm	40	7	20 / 16	7.5	25	40	1.5	

The following thread rolls may be ordered as standard on the RA-001 head

ISO Metric

Nominal Size x Pitch mm
M 2.6 x 0.45
M 3.0 x 0.5
M 3.5 x 0.6
M 4.0 x 0.7

Unified Coarse UNC

Nominal Size x TPI
No. 4 - No. 5 x 40
No. 6 - No. 8 x 32

Whitworth BSW

Nominal Size x TPI
1/8 x 40
5/32 x 32

Unified Fine UNF

Nominal Size x TPI
No. 4 x 48
No. 5 x 44
No. 6 x 40
No. 3 x 56

Threads outside of the above standard series may also be rolled on this head provided that their helix does not fall outside the permissible range.

Left hand threads are dimensionally the same as right hand heads but open and close on the opposite direction. Thread rolls can be used in both right hand and left hand heads.

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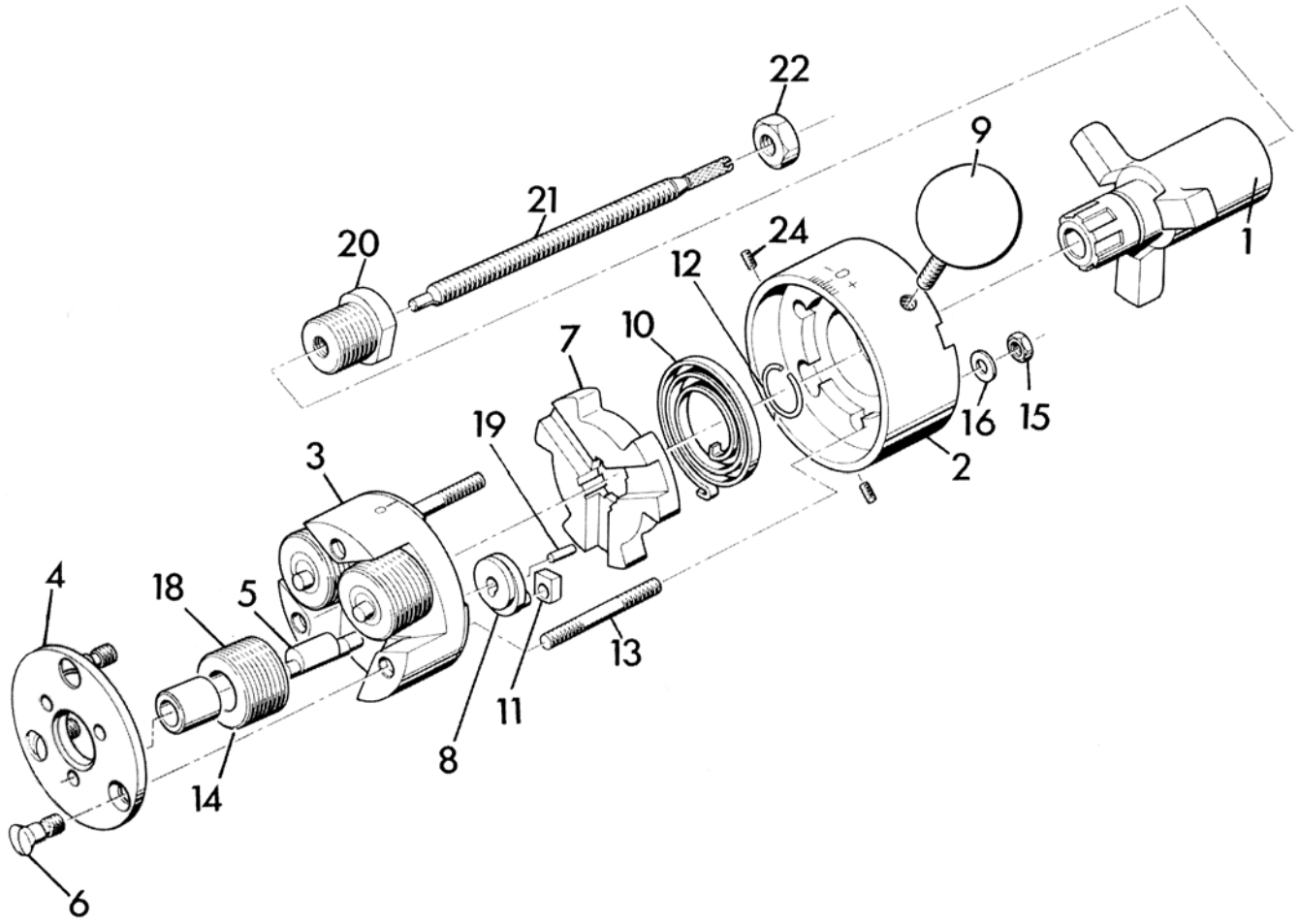
RA-001 - Axial Head

Spare Parts



Ref	Qty	Description
1	1	Shank
2	1	Spring housing
3	1	Centre plate
4	1	Front plate
5	3	Eccentric spindle
6	3	Front plate screw
7	1	Clutch plate
8	3	Cam
9	1	Handle

Ref	Qty	Description
10	1	Coil spring
11	3	Hardened slide
12	1	Circlip
13	3	Studs
14	3	Carbide bushing
15	3	Hexagon nut
16	3	Washer

Ref	Qty	Description
17		
18	3	Thread roll
19	3	Shear pin
20	1	Stop screw body
21	1	Stop screw
22	1	Hexagon nut
23		
24	2	Set screw
25		

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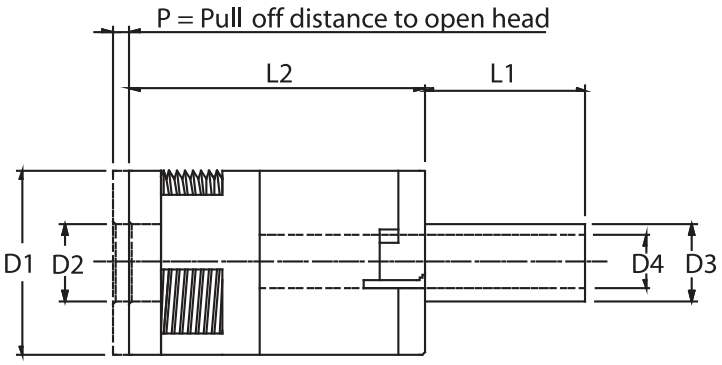
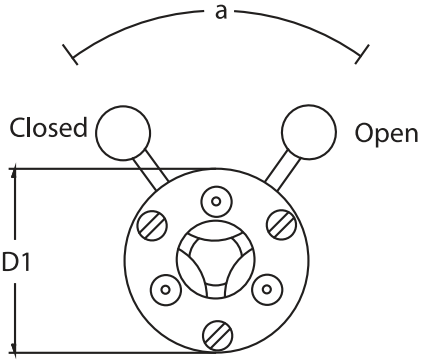
RA-01 - Axial Head

AXIAL THREAD ROLLING HEADS
FOR RIGHT HAND THREADS
FOR STATIONARY APPLICATIONS





Dimensions

Helix Angle in Head = 3° 30'		D1	D2	D3	D4	L1	L2	P	a
Allowable Component Lead	inches	1.575	0.470	3/4 / 5/8	0.295	0.950	1.710	0.060	32°
Angle = 2° 5' - 4° 33'	mm	40	12	20 / 16	7.5	24	43.5	1.5	

The following thread rolls may be ordered as standard on the RA-01 head

ISO Metric

Nominal Size x Pitch mm
M 3.5 x 0.6
M 4.0 x 0.7
M 4.0 - M 4.5 x 0.75
M 5.0 x 0.8
M 5.0 - M 5.5 x 0.9
M 6.0 x 1.0

ISO Metric Fine

Nominal Size x Pitch mm
M 4.0 - M 5.0 x 0.5

Unified Coarse UNC

Nominal Size x TPI
No. 8 x 32
No. 10 - No. 12 x 24
1/4 x 20

Unified Fine UNF

Nominal Size x TPI
No. 6 x 40
No. 8 x 36
No. 10 x 32
No. 12 x 28
1/4 x 28

Whitworth BSW

Nominal Size x TPI
5/32 x 32
3/16 - 7/32 x 24

Whitworth Fine BSF

Nominal Size x TPI
3/16 x 32
7/32 x 28
1/4 x 26

Threads outside of the above standard series may also be rolled on this head provided that their helix does not fall outside the permissible range.

Left hand threads are dimensionally the same as right hand heads but open and close on the opposite direction. Thread rolls can be used in both right hand and left hand heads.

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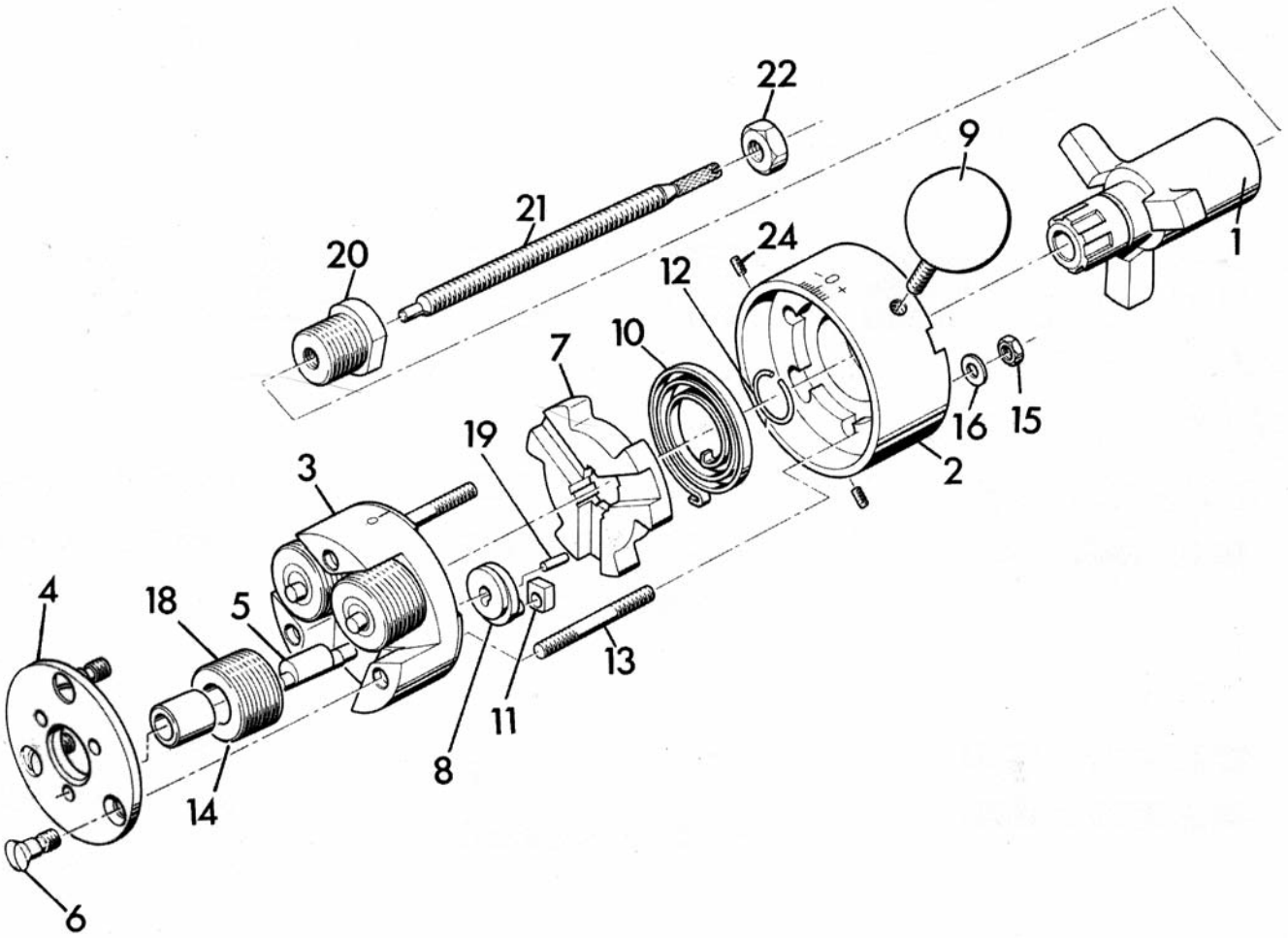
RA-01 - Axial Head

Spare Parts



Ref	Qty	Description
1	1	Shank
2	1	Spring housing
3	1	Centre plate
4	1	Front plate
5	3	Eccentric spindle
6	3	Front plate screw
7	1	Centre gear
8	3	Cam
9	1	Handle

Ref	Qty	Description
10	1	Coil spring
11	3	Hardened slide
12	1	Circlip
13	3	Stud
14	3	Carbide bushing
15	3	Hexagon nut
16	3	Washer

Ref	Qty	Description
17		
18	3	Thread roll
19	3	Shear pin
20	1	Stop screw body
21	1	Stop screw
22	1	Hexagon nut
23	1	Ball
24	2	Set screw
25		

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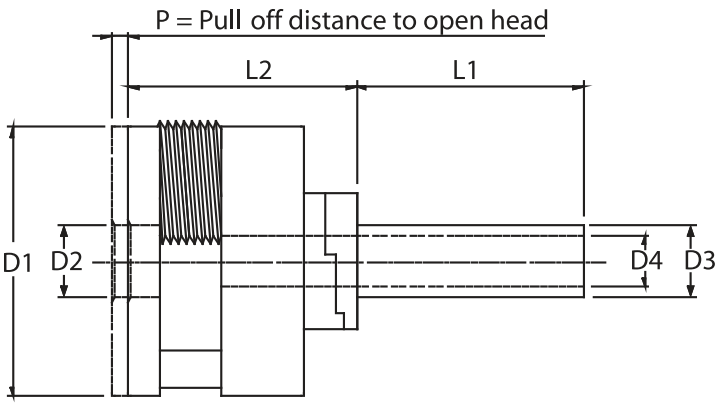
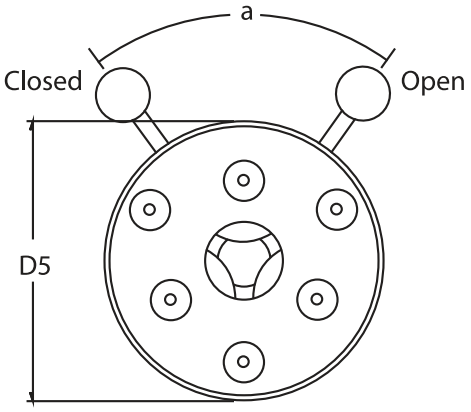
RA-1 - Axial Head

AXIAL THREAD ROLLING HEADS
FOR RIGHT HAND THREADS
FOR STATIONARY APPLICATIONS





Dimensions

Helix Angle in Head = 3° 30'		D1	D2	D3	D4	D5 max	L1	L2	P	a
Allowable Component Lead	inches	2.520	0.670	3/4	0.440	2.756	2.360	1.970	0.080	60°
Angle = 2° 5' - 4° 33'	mm	64	17	20	11	70	60	50	2	

The following thread rolls may be ordered as standard on the RA-1 head

ISO Metric

Nominal Size x Pitch mm
M 6.0 - M 7.0 x 1.0
M 8.0 - M 9.0 x 1.25
M 10.0 x 1.5

ISO Metric Fine

Nominal Size x Pitch mm
M 6.0 - M 7.0 x 0.75
M 8.0 x 1.0
M 10.0 x 1.25

Unified Coarse UNC

Nominal Size x TPI
1/4 x 20
5/16 x 18
3/8 x 16
7/16 x 14

Unified Fine UNF

Nominal Size x TPI
1/4 x 28
5/16 - 3/8 x 24

Whitworth BSW

Nominal Size x TPI
1/4 x 20
5/16 x 18
3/8 x 16

Whitworth Fine BSF

Nominal Size x TPI
1/4 x 26
5/16 x 22
3/8 x 20
7/16 x 20

American Pipe Threads

Nominal Size x TPI
1/16x27 NPT & NPTF
1/8x27 NPT & NPTF

Threads outside of the above standard series may also be rolled on this head provided that their helix does not fall outside the permissible range.

Left hand threads are dimensionally the same as right hand heads but open and close on the opposite direction. Thread rolls can be used in both right hand and left hand heads.

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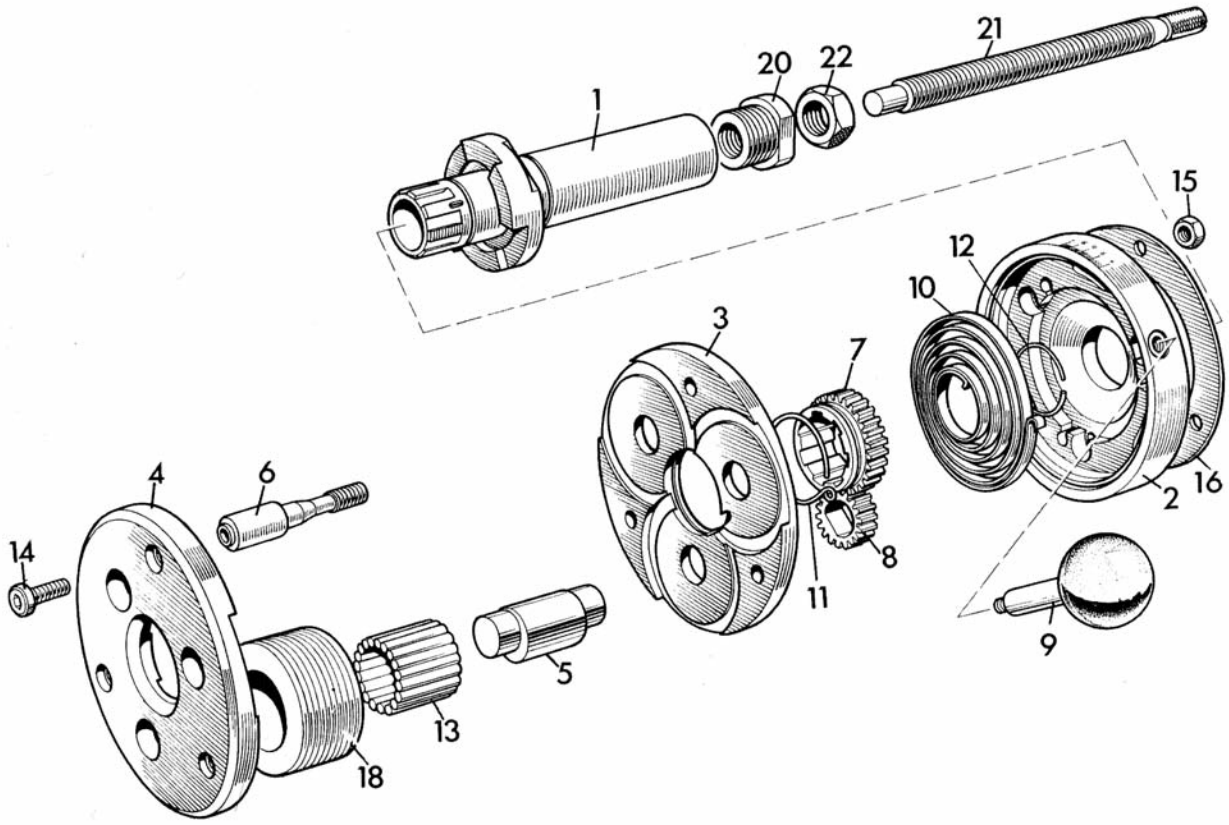
RA-1 - Axial Head

Spare Parts



Ref	Qty	Description
1	1	Shank
2	1	Spring housing
3	1	Centre plate
4	1	Front plate
5	3	Eccentric spindle
6	3	Spacer stud
7	1	Centre gear
8	3	Outer gear
9	1	Handle

Ref	Qty	Description
10	1	Coil spring
11	1	Circlip
12	1	Circlip
13*	57	Needle roller bearing
14	3	Front plate screw
15	3	Hexagon nut
16	1	Ring washer

*Tungsten carbide bushes (13) are available as an alternative option to needle roller bearings

Ref	Qty	Description
17		
18	3	Thread roll
19		
20	1	Stop screw body
21	1	Stop screw
22	1	Hexagon nut
23		
24		
25		

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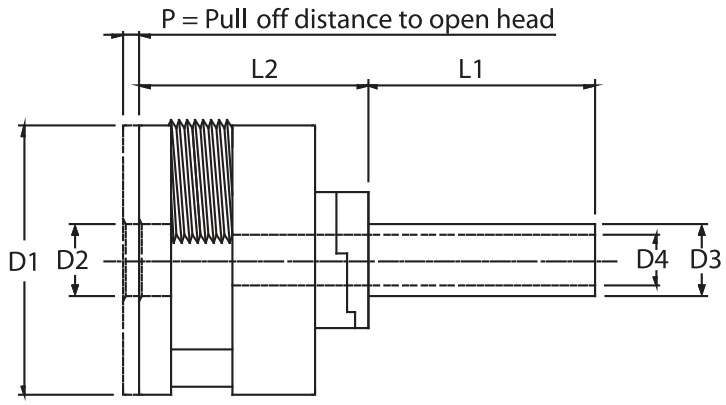
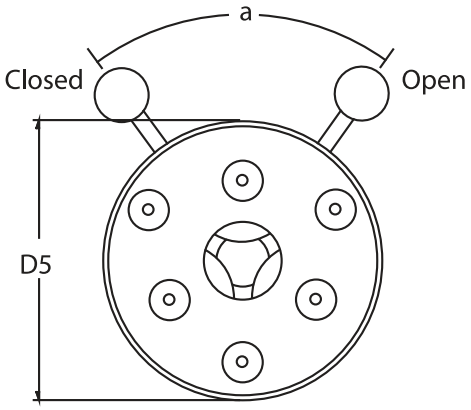
RA-12 - Axial Head

AXIAL THREAD ROLLING HEADS
FOR RIGHT HAND THREADS
FOR STATIONARY APPLICATIONS





Dimensions

Helix Angle in Head = 1° 50'		D1	D2	D3	D4	D5 max	L1	L2	P	a
Allowable Component Lead	inches	2.520	0.790	3/4	0.430	2.756	2.360	1.970	0.080	60°
Angle = 1° 5' - 2° 23'	mm	64	20	20	11	70	60	50	2	

The following thread rolls may be ordered as standard on the RA-12 head

ISO Metric

Nominal Size x Pitch mm
M 6.0 - M 7.0 x 0.5
M 7.0 - M 8.0 x 0.5
M 6.0 - M 7.0 x 0.75
M 8.0 - M 9.0 x 0.75
M 9.0 - M 10.0 x 0.75
M 10.0 - M 11.0* x 0.75
M 11.0* - M 12.0* x 0.75
M 8.0 - M 9.0 x 1.0
M 9.0 - M 10.0 x 1.0
M 10.0 - M 11.0* x 1.0
M 11.0* - M 12.0* x 1.0
M 10.0 - M 11.0* x 1.25
M 11.0* - M 12.0* x 1.25
M 12.0* x 1.5

Unified Fine UNF
Whitworth Fine BSF

Nominal Size x TPI
1/4 - 5/16 x 40
5/16 - 3/8 x 36
7/16* x 36
5/16 - 3/8 x 32
7/16* - 1/2* x 32
3/8 - 7/16* x 28
1/2* x 28
7/16* - 1/2* x 26
3/8 - 7/16* x 24
7/16* - 1/2* x 24
7/16* - 1/2* x 22
7/16* - 1/2* x 20

Whitworth Pipe BSP

Nominal Size x TPI
G 1/8 x 28
G 1/4* x 19

American Pipe Threads

Nominal Size x TPI
1/8x27 NPT & NPTF
1/4x18 NPT & NPTF

* For short threads up to 0.551" length including thread run-out

Left hand threads are dimensionally the same as right hand heads but open and close on the opposite direction. Thread rolls can be used in both right hand and left hand heads.

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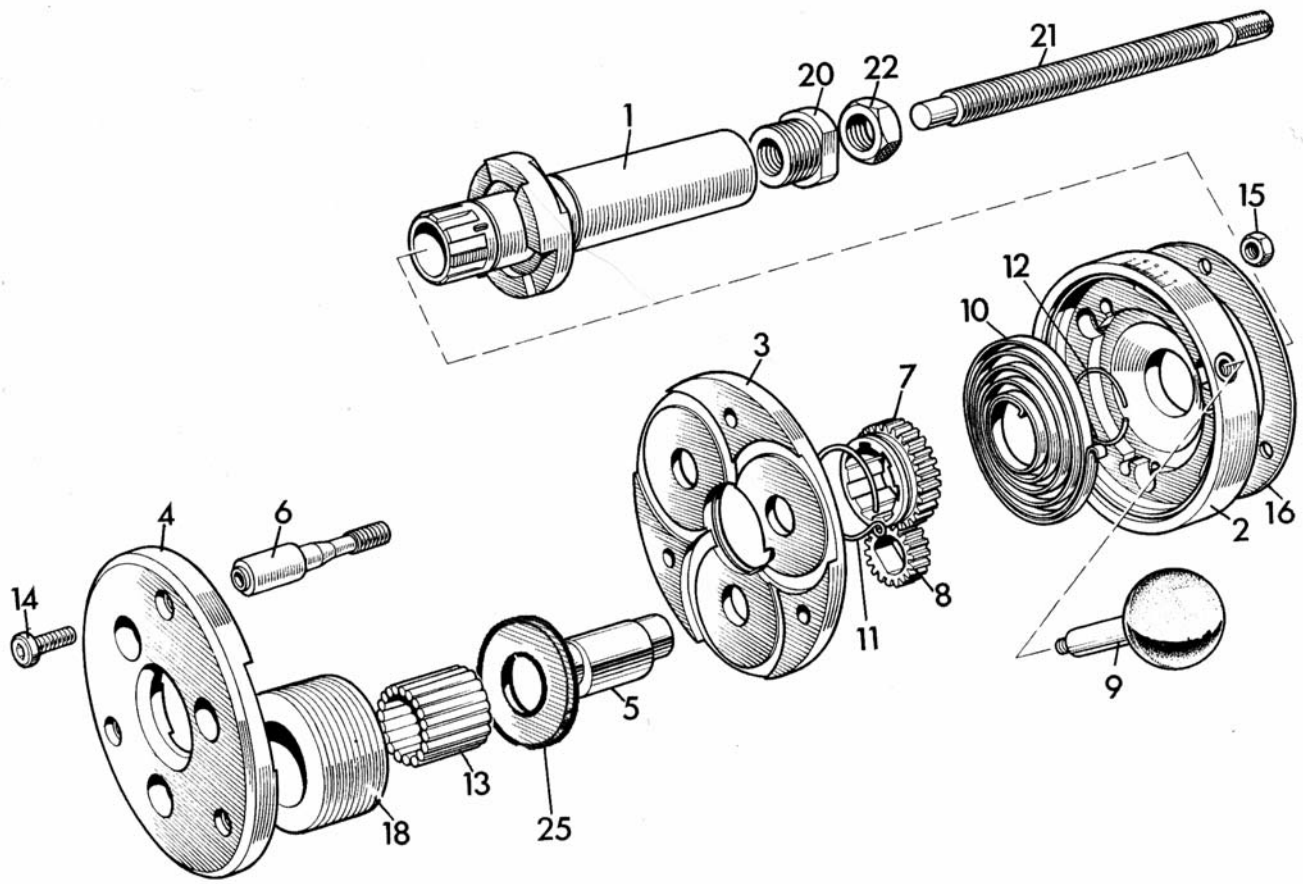
RA-12 - Axial Head

Spare Parts



Ref	Qty	Description
1	1	Shank
2	1	Spring housing
3	1	Centre plate
4	1	Front plate
5	3	Eccentric spindle
6	3	Spacer stud
7	1	Centre gear
8	3	Outer gear
9	1	Handle

Ref	Qty	Description
10	1	Coil spring
11	1	Circlip
12	1	Circlip
13*	54	Needle roller bearing
14	3	Front plate screw
15	3	Hexagon nut
16	1	Ring washer

* Tungsten carbide bushes (13) are available as an alternative option to needle roller bearings

Ref	Qty	Description
17		
18	3	Thread roll
19		
20	1	Stop screw body
21	1	Stop screw
22	1	Hexagon nut
23		
24		
25	3	Washer

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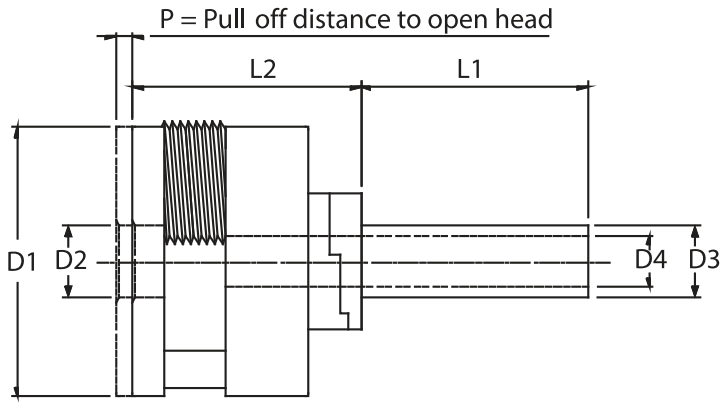
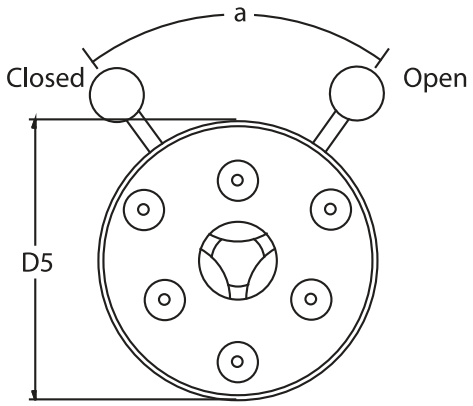
RA-2 - Axial Head

AXIAL THREAD ROLLING HEADS
FOR RIGHT HAND THREADS
FOR STATIONARY APPLICATIONS





Dimensions

Helix Angle in Head = 3°		D1	D2	D3	D4	D5 max	L1	L2	P	a
Allowable Component Lead	inches	3.460	0.940	1	0.670	3.681	2.990	2.720	0.120	60°
Angle = 1° 50' - 4° 15'	mm	88	24	25	17	93.5	76	69	3	

The following thread rolls may be ordered as standard on the RA-2 head

ISO Metric

Nominal Size x Pitch mm
M 8.0 - M 10.0 x 1.25
M 10.0 - M 12.0 x 1.5
M 12.0 - M 14.0 x 1.75
M 14.0 - M 16.0 x 2.0

ISO Metric Fine

Nominal Size x Pitch mm
M 8.0 - M 9.0 x 1.0
M 10.0 - M 12.0 x 1.25
M 12.0 - M 14.0 x 1.5

Unified Coarse UNC

Nominal Size x TPI
5/16 x 18
3/8 x 16
7/16 x 14
1/2 x 13
9/16 x 12
5/8 x 11

Unified Fine UNF

Nominal Size x TPI
5/16 - 3/8 x 24
7/16 - 1/2 x 20
9/16 - 5/8 x 18

Whitworth BSW

Nominal Size x TPI
5/16 x 18
3/8 x 16
7/16 x 14
1/2 - 9/16 x 12
5/8 x 11

Whitworth Fine BSF

Nominal Size x TPI
5/16 x 22
3/8 x 20
7/16 x 18
1/2 - 9/16 x 16
5/8 x 14

Whitworth Pipe BSP

Nominal Size x TPI
G 1/4 x 19

Threads outside of the above standard series may also be rolled on this head provided that their helix does not fall outside the permissible range.

Left hand threads are dimensionally the same as right hand heads but open and close on the opposite direction. Thread rolls can be used in both right hand and left hand heads.

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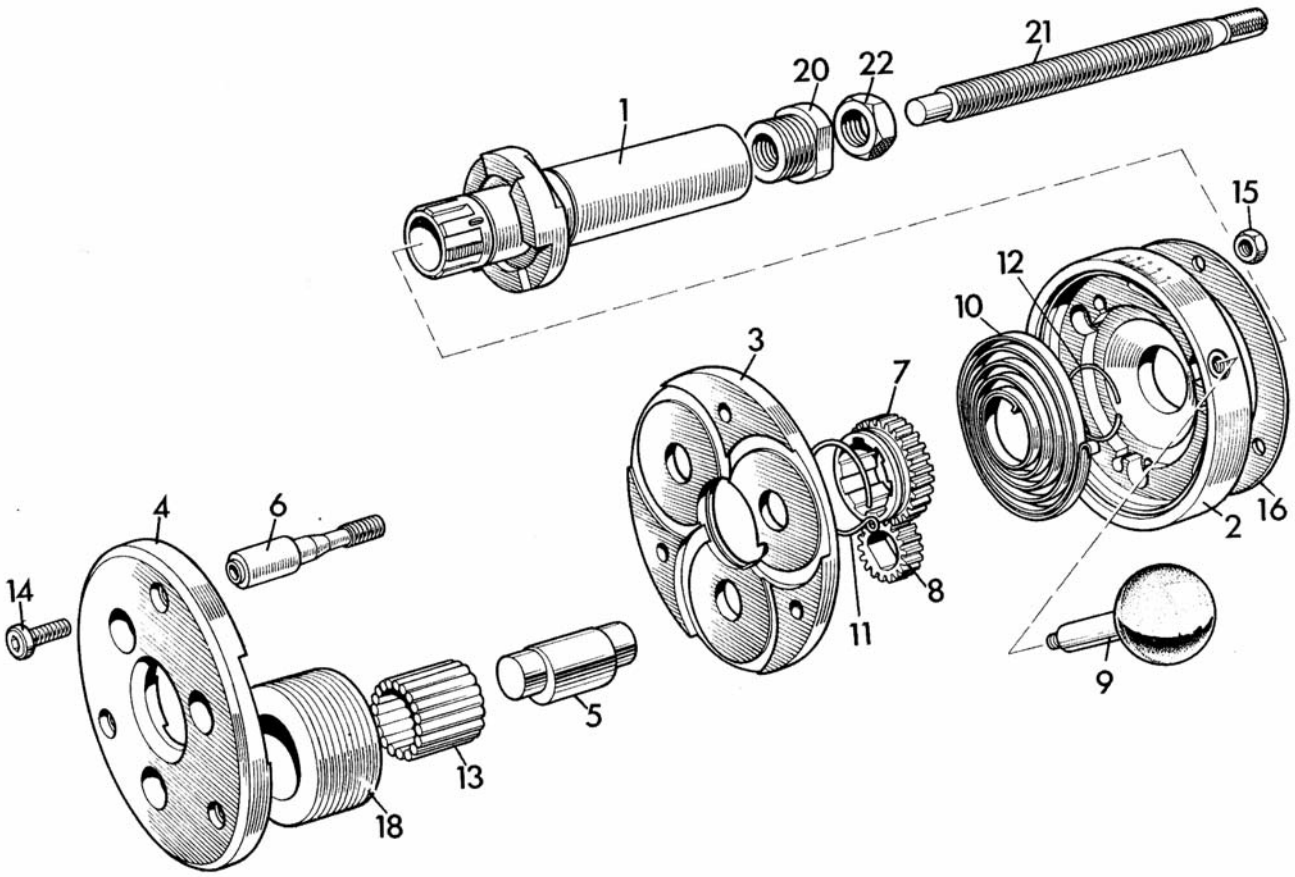
RA-2 - Axial Head

Spare Parts



Ref	Qty	Description
1	1	Shank
2	1	Spring housing
3	1	Centre plate
4	1	Front plate
5	3	Eccentric spindle
6	3	Spacer stud
7	1	Centre gear
8	3	Outer gear
9	1	Handle

Ref	Qty	Description
10	1	Coil spring
11	1	Circlip
12	1	Circlip
13*	57	Needle roller bearing
14	3	Front plate screw
15	3	Hexagon nut
16	1	Ring washer

*Tungsten carbide bushes (13) are available as an alternative option to needle roller bearings

Ref	Qty	Description
17		
18	3	Thread roll
19		
20	1	Stop screw body
21	1	Stop screw
22	1	Hexagon nut
23		
24		
25		

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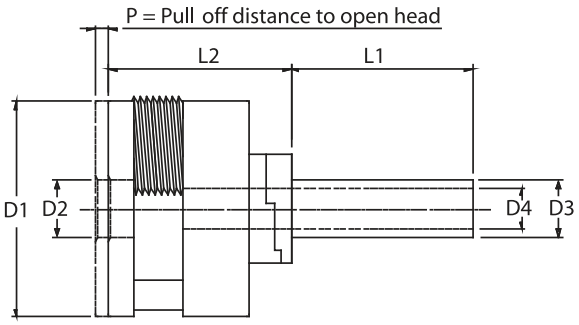
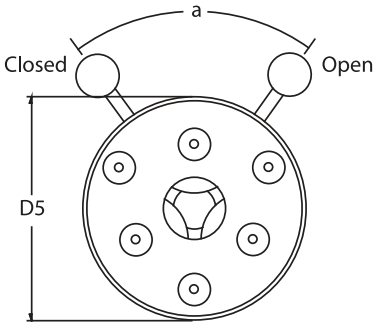
RA-23 - Axial Head

AXIAL THREAD ROLLING HEADS
FOR RIGHT HAND THREADS
FOR STATIONARY APPLICATIONS





Dimensions

Helix Angle in Head = 1° 25'		D1	D2	D3	D4	D5 max	L1	L2	P	a
Allowable Component Lead	inches	3.470	1.100	1	0.670	3.681	2.990	2.720	0.120	60°
Angle = 0° 50' - 2° 0'	mm	88	28	25	17	93.5	76	69	3	

The following thread rolls may be ordered as standard on the RA-23 head

ISO Metric Fine

Nominal Size x Pitch mm
M 8.0 - M 10.0 x 0.5
M 8.0 - M 10.0 x 0.75
M 10.0 - M 12.0 x 0.75
M 10.0 - M 12.0 x 1.0
M 12.0 - M 14.0 x 1.0
M 14.0 - M 16.0 x 1.0
M 16.0 - M 18.0* x 1.0
M 18.0* - M 20.0* x 1.0
M 14.0 - M 16.0 x 1.25
M 16.0 - M 18.0* x 1.5
M 18.0* - M 20.0* x 1.5
M 20.0* - M 22.0* x 1.5

Whitworth Pipe BSP

Nominal Size x TPI
G 1/8 x 28
G 1/4 x 19
G 3/8* x 19
G 1/2* x 14

Unified Fine UNF Whitworth Fine BSF

Nominal Size x TPI
5/16 - 3/8 x 40
5/16 - 3/8 x 36
3/8 - 7/16 x 36
7/16 - 1/2 x 36
1/2 - 9/16 x 36
5/16 - 3/8 x 32
3/8 - 7/16 x 32
7/16 - 1/2 x 32
1/2 - 9/16 x 32
9/16 - 5/8 x 32
7/16 - 1/2 x 28
1/2 - 9/16 x 28
9/16 - 5/8 x 28
7/16 - 1/2 x 26
1/2 - 9/16 x 26
9/16 - 5/8 x 26
3/4* x 26
continued...

Unified Fine UNF Whitworth Fine BSF

continued...

Nominal Size x TPI
7/16 - 1/2 x 24
1/2 - 9/16 x 24
9/16 - 5/8 x 24
3/4* x 24
1/2 - 9/16 x 22
9/16 - 5/8 x 22
3/4* x 22
1/2 - 9/16 x 20
9/16 - 5/8 x 20
11/16* - 3/4* x 20
9/16 - 5/8 x 18
3/4* x 18
3/4* x 16
3/4* x 14

American Pipe Threads

Nominal Size x TPI
1/8x27 NPT & NPTF
1/4x18 NPT & NPTF
3/8x18 NPT & NPTF

* For short threads up to 0.748" length including thread run-out

Left hand threads are dimensionally the same as right hand heads but open and close on the opposite direction. Thread rolls can be used in both right hand and left hand heads.

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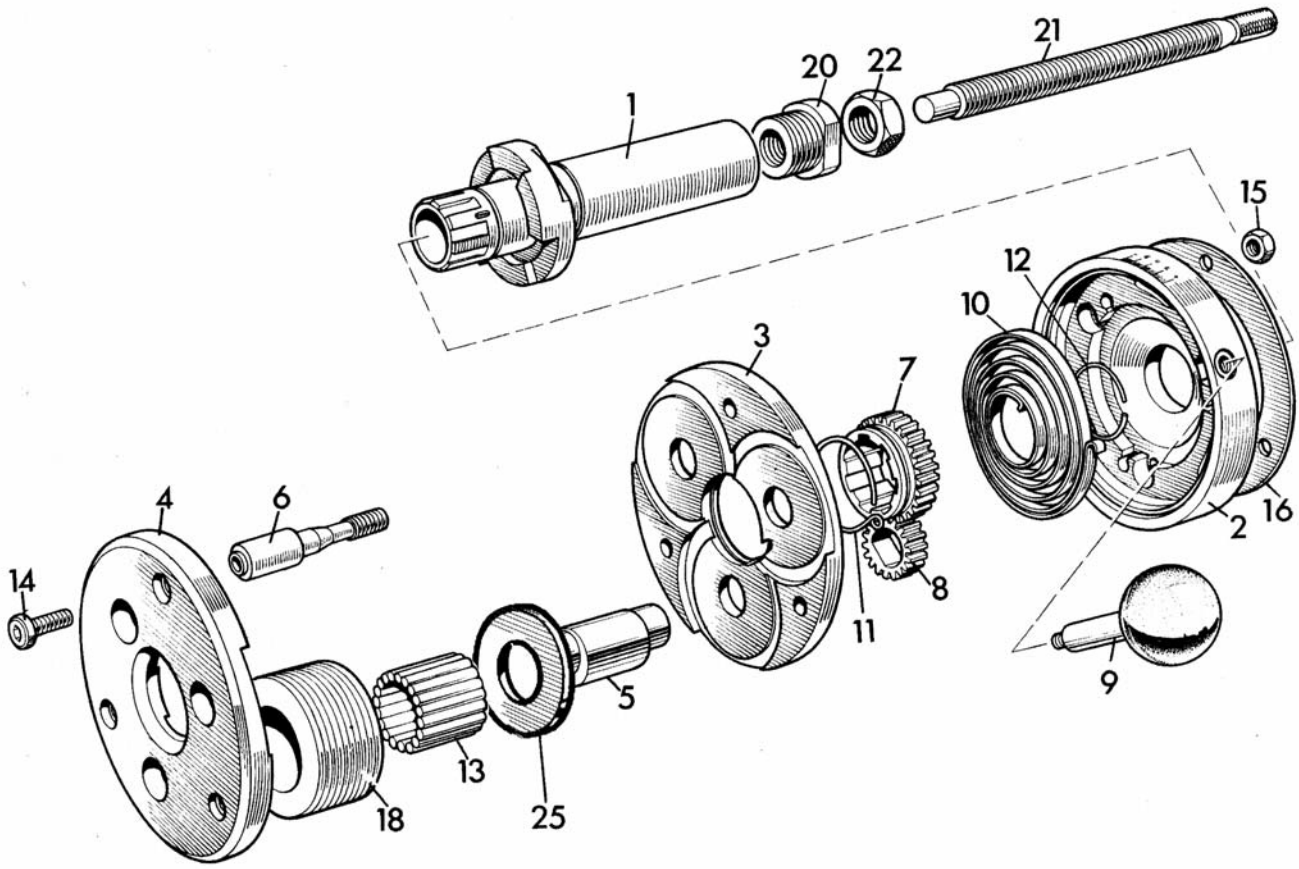
RA-23 - Axial Head

Spare Parts



Ref	Qty	Description
1	1	Shank
2	1	Spring housing
3	1	Centre plate
4	1	Front plate
5	3	Eccentric spindle
6	3	Spacer stud
7	1	Centre gear
8	3	Outer gear
9	1	Handle

Ref	Qty	Description
10	1	Coil spring
11	1	Circlip
12	1	Circlip
13*	57	Needle roller bearing
14	3	Front plate screw
15	3	Hexagon nut
16	1	Ring washer

*Tungsten carbide bushes (13) are available as an alternative option to needle roller bearings

Ref	Qty	Description
17		
18	3	Thread roll
19		
20	1	Stop screw body
21	1	Stop screw
22	1	Hexagon nut
23		
24		
25	3	Washer

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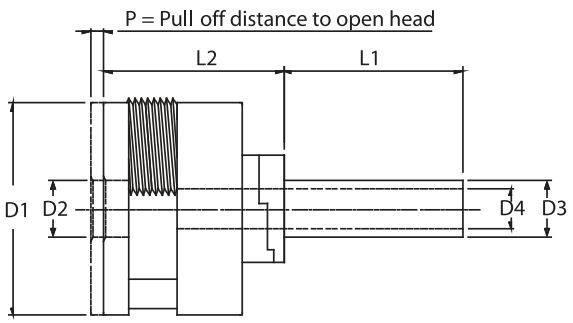
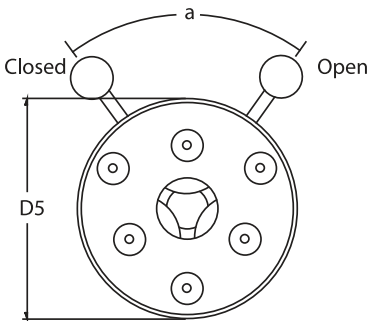
RA-233400 - Axial Head

AXIAL THREAD ROLLING HEADS
FOR RIGHT HAND THREADS
FOR STATIONARY APPLICATIONS





Dimensions

Helix Angle in Head = 1° 15'		D1	D2	D3	D4	D5 max	L1	L2	P	a
Allowable Component Lead	inches	3.780	1.540	1 / 1.1/4	0.550	4.528	2.360	3.250	0.120	30°
Angle = 0° 45' - 1° 40'	mm	96	39	25 / 30	14	115	60	82.5	3	

The following thread rolls may be ordered as standard on the RA-233400 head

ISO Metric Fine

Nominal Size x Pitch mm
M 16* - M 18* x 1.5
M 18* - M 20* x 1.5
M 20* - M 22* x 1.5
M 22* - M 24* x 1.5
M 24* - M 26* x 1.5
M 26* - M 28** x 1.5
M 28** - M 30** x 1.5
M 30** - M 32** x 1.5
M 32** - M 34** x 1.5
M 34** - M 36** x 1.5
M 22* - M 24* x 2.0
M 24* - M 26* x 2.0
M 26* - M 28** x 2.0
M 28** - M 30** x 2.0
M 30** - M 32** x 2.0
M 32** - M 34** x 2.0
M 34** - M 36** x 2.0

* For short threads up to 2.638" length including thread run-out

** For short threads up to 0.945" length including thread run-out

Whitworth Pipe BSP

Nominal Size x TPI
G 3/8* x 19
G 1/2* x 14
G 5/8* x 14
G 3/4* x 14
G 7/8** X 14
G 1** x 11

Unified Fine UNF Whitworth Fine BSF

Nominal Size x TPI
3/4* x 26
5/8* x 24
11/16* x 24
3/4* x 24
7/8* x 24
3/4* x 22
7/8* x 22
5/8* - 11/16* x 20
11/16* - 3/4* x 20
3/4* - 13/16* x 20
13/16* - 7/8* x 20
7/8* - 15/16* x 20
15/16* - 1* x 20

continued...

Unified Fine UNF Whitworth Fine BSF

continued...

Nominal Size x TPI
1* - 1.1/16* x 20
1* - 1.1/16* x 20
1.1/16* - 1.1/8** x 20
1.1/8** - 1.3/16** x 20
5/8* x 18
3/4* x 18
7/8* x 18
1* x 1.1/16* x 18
1.1/16* - 1.1/8** x 18
1.1/8 - 1.3/16 x 18
11/16* - 3/4* x 16
3/4* - 13/16* x 16
13/16* - 7/8* x 16
7/8* - 15/16* x 16
15/16* - 1* x 16
1* - 1.1/16* x 16
1.1/16* - 1.1/8** x 16
1.1/8** - 1.3/16** x 16
1.3/16** - 1.1/4** x 16
1.1/4** - 1.5/16** x 16
1.5/16** - 1.3/8** x 16

continued...

Unified Fine UNF Whitworth Fine BSF

continued...

Nominal Size x TPI
1.3/8** - 1.7/16** x 16
13/16* - 7/8* x 14
7/8* - 15/16* x 14
15/16* - 1* x 14
1* - 1.1/16* x 14
1.1/16* - 1.1/8** x 14
1.1/8** - 1.3/16** x 14
1.3/16** - 1.1/4** x 14
1.1/4** - 1.5/16** x 14
1.5/16** - 1.3/8 x 14
1.3/8** - 1.7/16** x 14
7/8* - 15/16* x 12
15/16* - 1* x 12
1* - 1.1/16* x 12
1.1/16* - 1.1/8** x 12
1.1/8** - 1.3/16** x 12
1.3/16** - 1.1/4** x 12
1.1/4** - 1.5/16** x 12
1.5/16** - 1.3/8** x 12
1.3/8** - 1.7/16** x 12

American Pipe Threads

Nominal Size x TPI
3/8x18 NPT & NPTF

Left hand threads are dimensionally the same as right hand heads but open and close on the opposite direction. Thread rolls can be used in both right hand and left hand heads.

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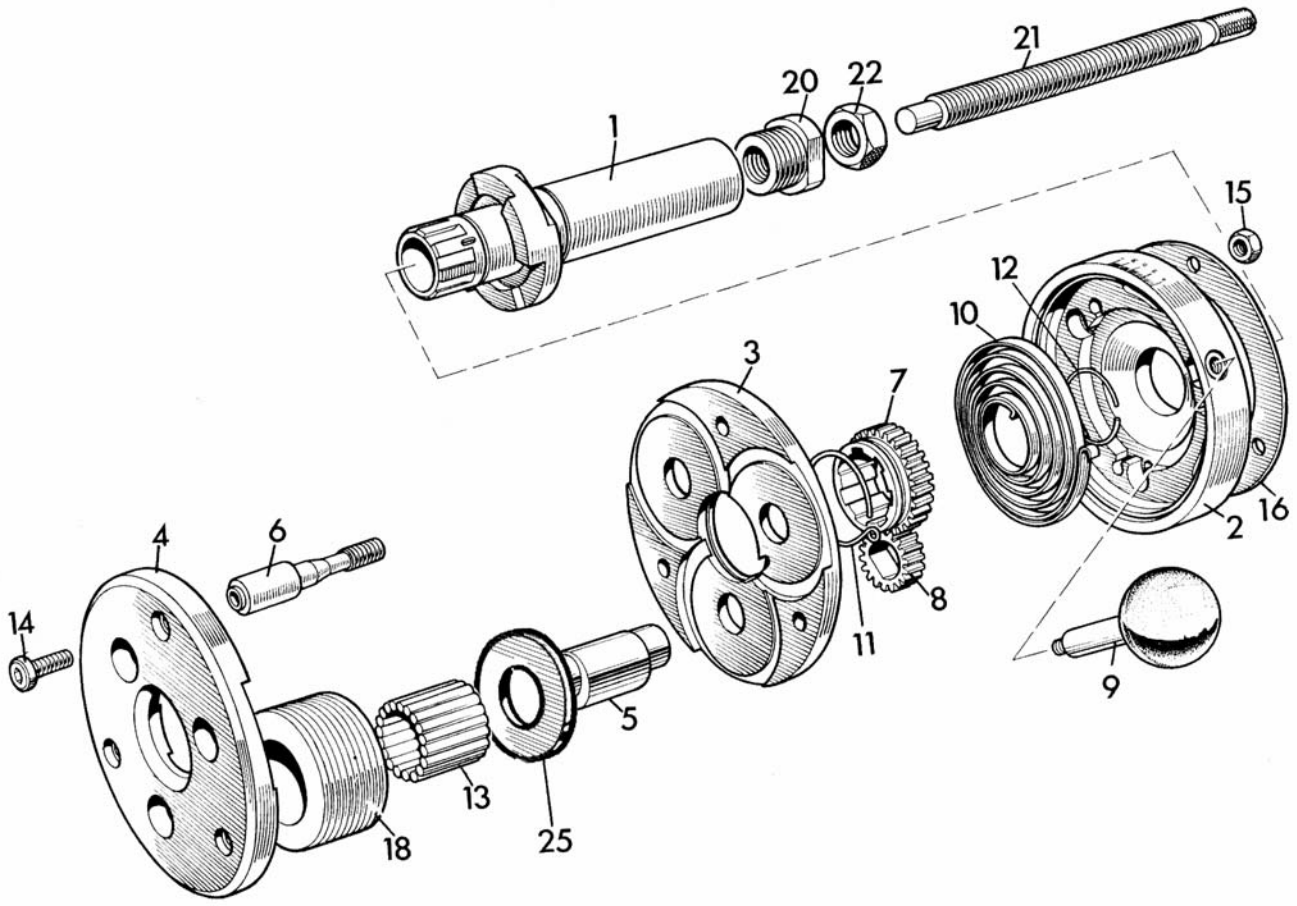
RSVP Tooling, Inc.

RA-233400 - Axial Head

Spare Parts



Ref	Qty	Description
1	1	Shank
2	1	Spring housing
3	1	Centre plate
4	1	Front plate
5	3	Eccentric spindle
6	3	Spacer stud
7	1	Centre gear
8	3	Outer gear
9	1	Handle

Ref	Qty	Description
10	1	Coil spring
11	1	Circlip
12	1	Circlip
13*	72	Needle roller bearing
14	3	Front plate screw
15	3	Hexagon nut
16	1	Ring washer

*Tungsten carbide bushes (13) are available as an alternative option to needle roller bearings

Ref	Qty	Description
17		
18	3	Thread roll
19		
20	1	Stop screw body
21	1	Stop screw
22	1	Hexagon nut
23		
24		
25	3	Washer

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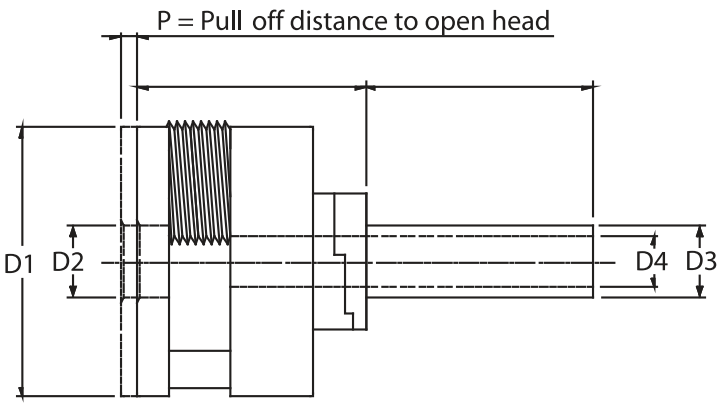
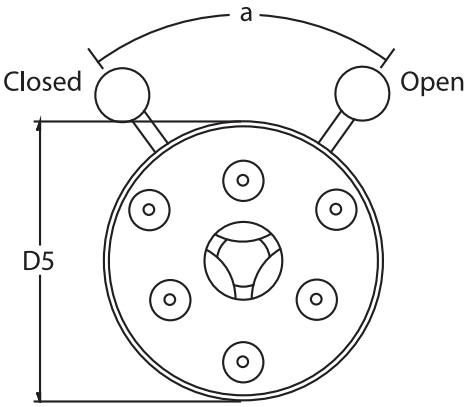
RA-3 - Axial Head

AXIAL THREAD ROLLING HEADS
FOR RIGHT HAND THREADS
FOR STATIONARY APPLICATIONS





Dimensions

Helix Angle in Head = 2° 40'		D1	D2	D3	D4	D5 max	L1	L2	P	a
Allowable Component Lead	inches	4.600	1.500	1.25/1.5	0.870	5.157	3.540	3.270	0.160	60°
Angle = 1° 35' - 3° 30'	mm	117	38	30 / 40	22	131	89	83	4	

The following thread rolls may be ordered as standard on the RA-3 head

ISO Metric

Nominal Size x Pitch mm
M 12.0 - M 14.0 x 1.75
M 14.0 - M 16.0 x 2.0
M 18.0 - M 20.0 x 2.5
M 20.0 - M 22.0* x 2.5

ISO Metric Fine

Nominal Size x Pitch mm
M 12.0 - M 14.0 x 1.5
M 14.0 - M 16.0 x 1.5
M 18.0 - M 20.0 x 2.0
M 20.0 - M 22.0* x 2.0

* For short threads up to 0.945" length including thread run-out.

Threads outside of the above standard series may also be rolled on this head provided that their helix does not fall outside the permissible range.

Unified Coarse UNC

Nominal Size x TPI
7/16 x 14
1/2 x 13
9/16 x 12
5/8 x 11
3/4 x 10
7/8* x 9

Unified Fine UNF

Nominal Size x TPI
7/16 - 1/2 x 20
9/16 - 5/8 x 18
3/4 x 16
7/8 x 14*

Whitworth BSW

Nominal Size x TPI
7/16 x 14
1/2 - 9/16 x 12
5/8 - 11/16 x 11
3/4 x 10
7/8* - 15/16* x 9

Whitworth Fine BSF

Nominal Size x TPI
7/16 x 18
1/2 - 9/16 x 16
5/8 - 11/16 x 14
3/4 x 12
7/8* - 15/16* x 11

Whitworth Pipe BSP

Nominal Size x TPI
G1/4 x 19
G 1/2 x 14

American Pipe Threads

Nominal Size x TPI
1/4x18 NPT & NPTF

Left hand threads are dimensionally the same as right hand heads but open and close on the opposite direction. Thread rolls can be used in both right hand and left hand heads.

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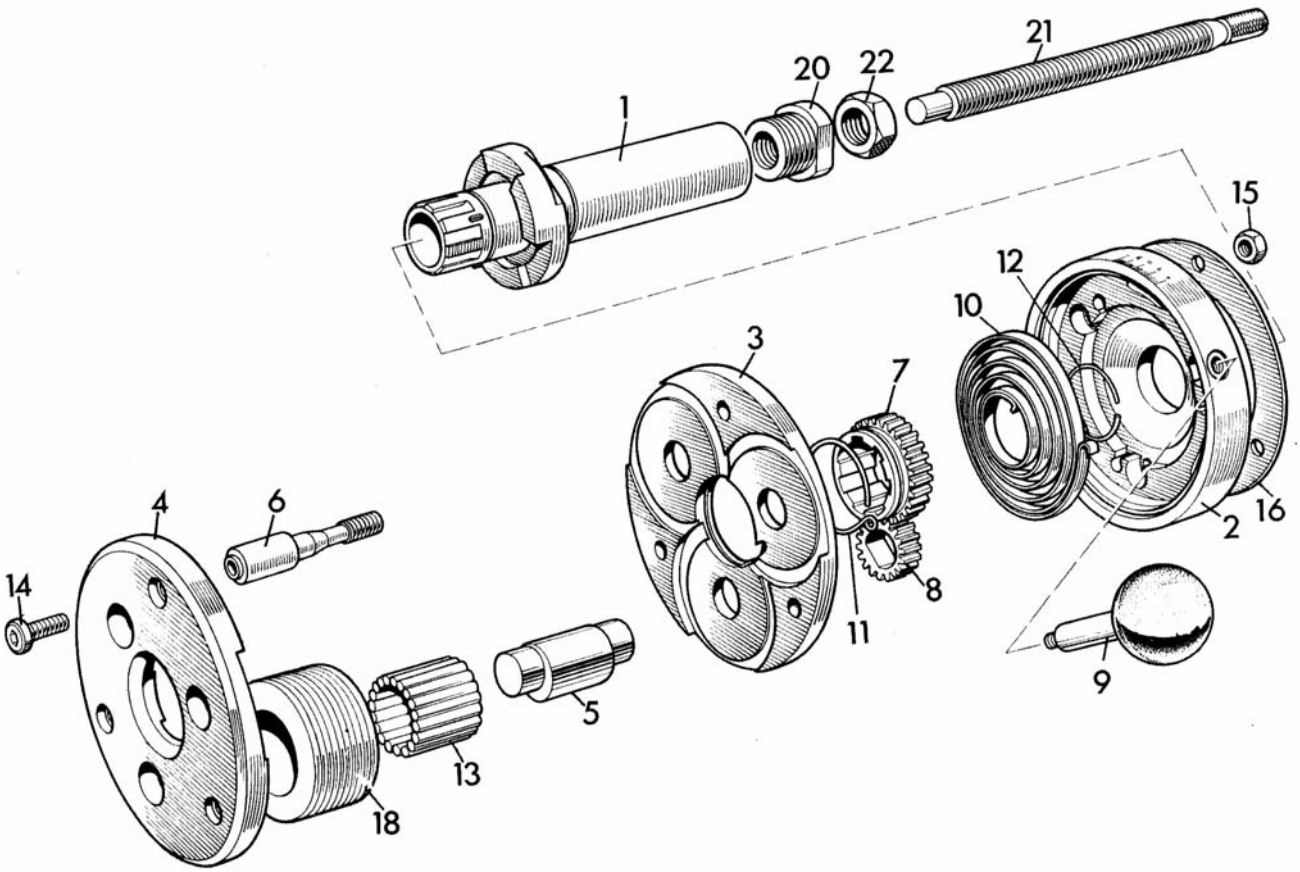
RSVP Tooling, Inc.

RA-3 - Axial Head

Spare Parts



Ref	Qty	Description
1	1	Shank
2	1	Spring housing
3	1	Centre plate
4	1	Front plate
5	3	Eccentric spindle
6	3	Spacer stud
7	1	Centre gear
8	3	Outer gear
9	1	Handle

Ref	Qty	Description
10	1	Coil spring
11	1	Circlip
12	1	Circlip
13*	54	Needle roller bearing
14	3	Front plate screw
15	3	Hexagon nut
16	1	Ring washer

* Tungsten carbide bushes (13) are available as an alternative option to needle roller bearings

Ref	Qty	Description
17		
18	3	Thread roll
19		
20	1	Stop screw body
21	1	Stop screw
22	1	Hexagon nut
23		
24		
25		

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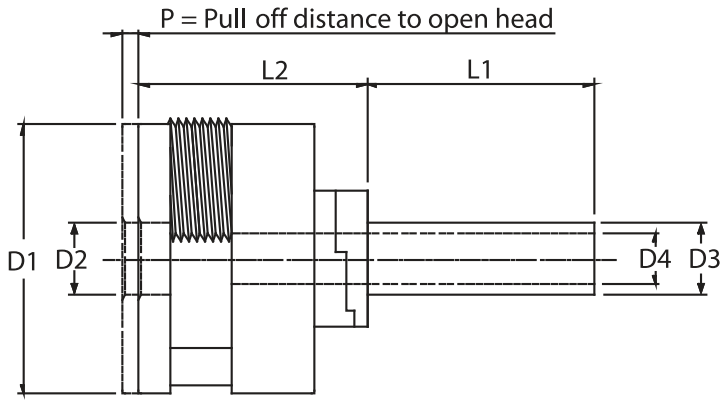
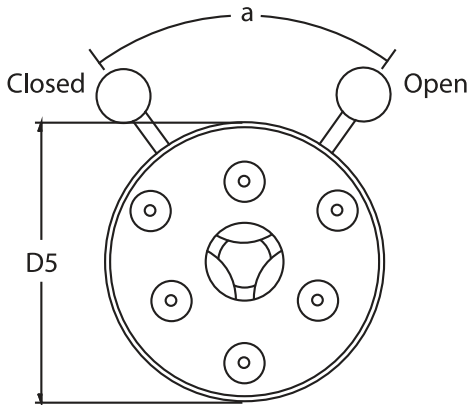
RA-34 - Axial Head

AXIAL THREAD ROLLING HEADS
FOR RIGHT HAND THREADS
FOR STATIONARY APPLICATIONS





Dimensions

Helix Angle in Head = 1° 15'		D1	D2	D3	D4	D5 max	L1	L2	P	a
Allowable Component Lead	inches	4.610	1.730	1.25/1.5	0.870	5.039	3.540	3.290	0.160	60°
Angle = 0° 45' - 1° 40'	mm	117	44	30 / 40	22	128	89	83.5	4	

The following thread rolls may be ordered as standard on the RA-34 head

ISO Metric Fine

Nominal Size x Pitch mm
M 12.0 - M 14.0 x 1.0
M 14.0 - M 16.0 x 1.0
M 16.0 - M 18.0 x 1.0
M 18.0 - M 20.0 x 1.0
M 16.0 - M 18.0 x 1.5
M 18.0 - M 20.0 x 1.5
M 20.0 - M 22.0* x 1.5
M 22.0* - M 24.0* x 1.5
M 24.0* - M 27.0* x 1.5
M 27.0* - M 30.0* x 1.5

Whitworth Pipe BSP

Nominal Size x TPI
G1/4 x 19
G 1/2 x 14

Unified Fine UNF Whitworth Fine BSF

Nominal Size x TPI
9/16 - 5/8 x 26
3/4 x 26
9/16 - 5/8 x 24
3/4 x 24
7/8* x 24
9/16 - 5/8 x 22
3/4 x 22
7/8* x 22
9/16 - 5/8 x 20
3/4 x 20
7/8* x 20
1* x 20
5/8 x 18
3/4 - 13/16 x 18
7/8* - 15/16* x 18

continued...

Unified Fine UNF Whitworth Fine BSF

continued...

Nominal Size x TPI
15/16* - 1* x 18
1.1/8* x 18
3/4 x 16
7/8* x 16
1* x 16
1.1/8* x 16
7/8* x 14
1* x 14
1.1/8* x 14
1* x 12
1.1/8* x 12
1.1/8* x 11

American Pipe Threads

Nominal Size x TPI
3/8x18 NPT & NPTF
1/2x14 NPT & NPTF
3/4x14 NPT & NPTF

* For short threads up to 0.945" length including thread run-out

Left hand threads are dimensionally the same as right hand heads but open and close on the opposite direction. Thread rolls can be used in both right hand and left hand heads.

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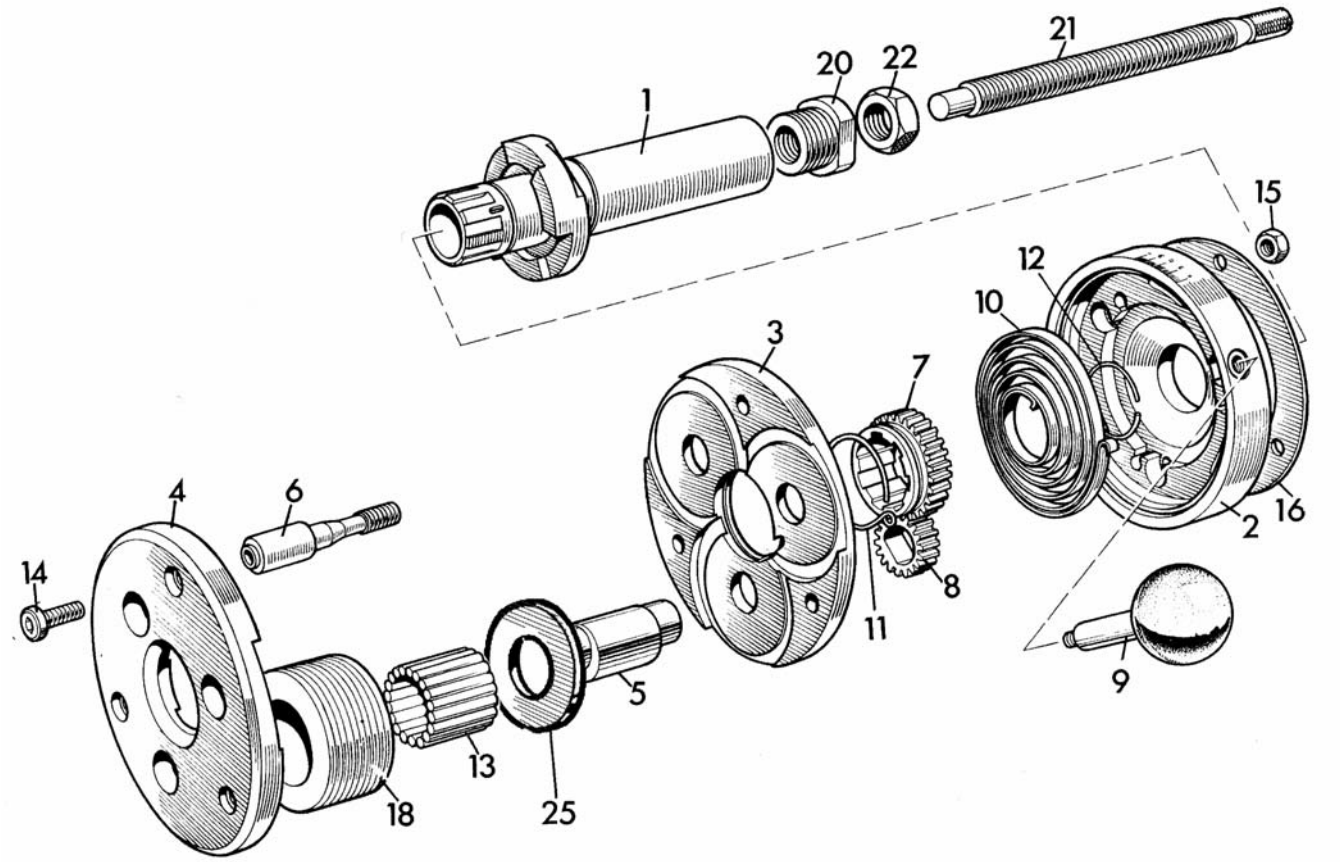
RSVP Tooling, Inc.

RA-34 - Axial Head

Spare Parts



Ref	Qty	Description
1	1	Shank
2	1	Spring housing
3	1	Centre plate
4	1	Front plate
5	3	Eccentric spindle
6	3	Spacer stud
7	1	Centre gear
8	3	Outer gear
9	1	Handle

Ref	Qty	Description
10	1	Coil spring
11	1	Circlip
12	1	Circlip
13*	57	Needle roller bearing
14	3	Front plate screw
15	3	Hexagon nut
16	1	Ring washer

*Tungsten carbide bushes (13) are available as an alternative option to needle roller bearings

Ref	Qty	Description
17		
18	3	Thread roll
19		
20	1	Stop screw body
21	1	Stop screw
22	1	Hexagon nut
23		
24		
25	3	Washer

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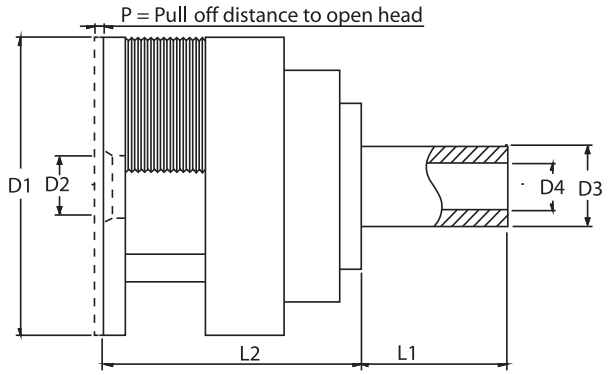
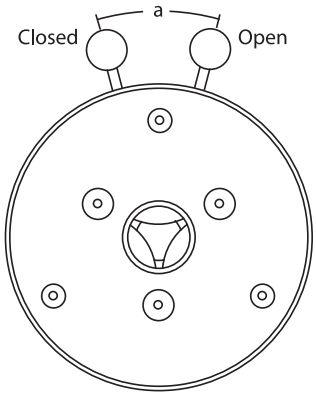
RA-4 - Axial Head

AXIAL THREAD ROLLING HEADS
FOR RIGHT HAND THREADS
FOR STATIONARY APPLICATIONS





Dimensions

Helix Angle in Head = 2° 30'		D1	D2	D3	D4	L1	L2	P	a
Allowable Component Lead	inches	6.339	1.811	1.5 / 2	1.100 / 1.260	2.953	6.142	0.157	30°
Angle = 1° 30' - 3° 10'	mm	161	46	40 / 50	28 / 32	75	156	4	

The following thread rolls may be ordered as standard on the RA-4 head

ISO Metric

Nominal Size x Pitch mm
M 14.0 - M 16.0 x 2.0
M 18.0 - M 20.0 x 2.5
M 20.0 - M 22.0 x 2.5
M 24.0 - M 27.0 x 3.0
M 27.0 - M 30.0 x 3.5

ISO Metric Fine

Nominal Size x Pitch mm
M 14.0 - M 16.0 x 1.5
M 16.0 - M 18.0 x 1.5
M 18.0 - M 20.0 x 2.0
M 22.0 - M 24.0 x 2.0

Unified Coarse UNC

Nominal Size x TPI
9/16 x 12
5/8 x 11
3/4 x 10
7/8 x 9
1 x 8
1.1/8 x 7

Unified Fine UNF

Nominal Size x TPI
9/16 - 5/8 x 18
3/4 x 16
7/8 x 14
1 x 12

Left hand threads are dimensionally the same as right hand heads but open and close on the opposite direction. Thread rolls can be used in both right hand and left hand heads.

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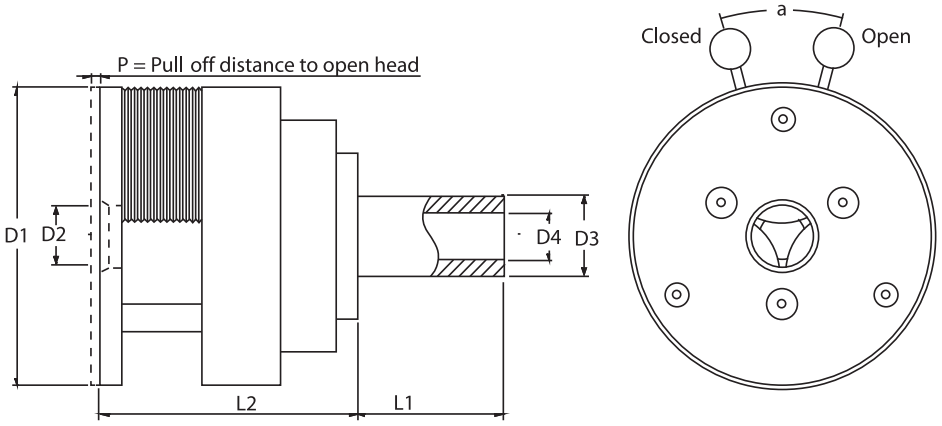
RA-45 - Axial Head

AXIAL THREAD ROLLING HEADS
FOR RIGHT HAND THREADS
FOR STATIONARY APPLICATIONS



Dimensions

Helix Angle in Head = 1° 10'		D1	D2	D3	D4	L1	L2	P	a
Allowable Component Lead	inches	6.339	1.890	1.5 / 2	1.100 / 1.260	2.953	6.220	0.157	30°
Angle = 0° 40' - 1° 40'	mm	161	48	40 / 50	28 / 32	75	158	4	

The following thread rolls may be ordered as standard on the RA-45 head

ISO Metric Fine

Nominal Size x Pitch mm
M 18.0 - M 20.0 x 1.5
M 20.0 - M 22.0 x 1.5
M 22.0 - M 24.0 x 1.5
M 24.0 - M 27.0 x 1.5
M 27.0 - M 30.0 x 1.5
M 30.0 - M 33.0 x 1.5
M 33.0 - M 36.0 x 1.5
M 36.0 - M 39.0* x 1.5
M 38.0* - M 40.0* x 1.5
M 24.0 - M 27.0 x 2.0
M 27.0 - M 30.0 x 2.0
M 30.0 - M 33.0 x 2.0
M 33.0 - M 36.0 x 2.0
M 36.0 - M 39.0* x 2.0
M 39.0* - M 42.0* x 2.0

Unified Fine UNF
Unified Extra Fine UNEF

Nominal Size x TPI
3/4 - 13/16 x 20
13/16 - 7/8 x 20
7/8 - 15/16 x 20
15/16 - 1 x 20
1 - 1.1/16 x 20
1.1/16 - 1.1/8 x 20
1.1/8 - 1.3/16 x 20
1.3/16 - 1.1/4 x 20
1.1/4 - 1.5/16 x 20
1.1/16 - 1.1/8 x 18
1.1/8 - 1.3/16 x 18
1.3/16 - 1.1/4 x 18
1.1/4 - 1.5/16 x 18
1.5/16 - 1.3/8 x 18
13/16 - 7/8 x 16
7/8 - 15/16 x 16
15/16 - 1 x 16
1 - 1.1/16 x 16
continued...

Unified Fine UNF
Unified Extra Fine UNEF

continued...

Nominal Size x TPI
1.1/16 - 1.1/8 x 16
1.1/8 - 1.3/16 x 16
1.3/16 - 1.1/4 x 16
1.1/4 - 1.5/16 x 16
1.5/16 - 1.3/8 x 16
1.3/8 - 1.7/16 x 16
1.7/16* - 1.1/2* x 16
1.1/2* - 1.9/16* x 16
7/8 x 14
1 - 1.1/16 x 12
1.1/16 - 1.1/8 x 12
1.1/8 - 1.3/16 x 12
1.3/16 - 1.1/4 x 12
1.1/4 - 1.5/16 x 12
1.5/16 - 1.3/8 x 12
1.3/8 - 1.7/16 x 12
1.7/16 - 1.1/2* x 12
1.1/2* - 1.9/16* x 12

* For short threads up to 1.102" including run-out

Left hand threads are dimensionally the same as right hand heads but open and close on the opposite direction. Thread rolls can be used in both right hand and left hand heads.

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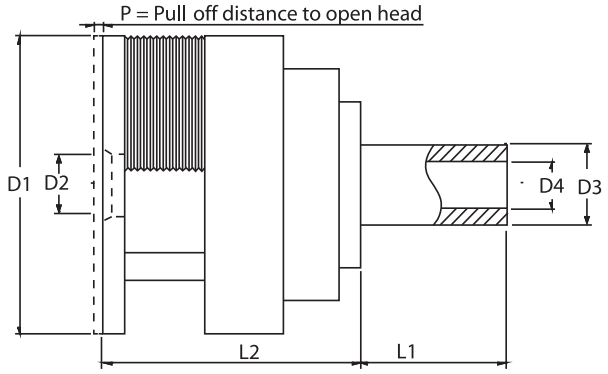
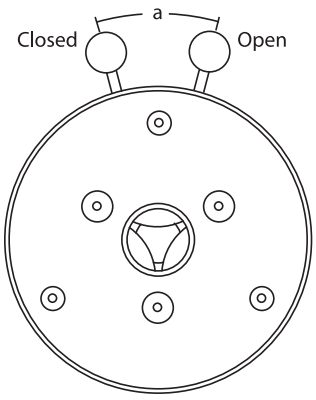
A5 - Axial Head

AXIAL THREAD ROLLING HEADS
FOR RIGHT HAND THREADS
FOR STATIONARY APPLICATIONS





Dimensions

Helix Angle in Head = 2° 30'		D1	D2	D3	D4	L1	L2	P	a
Allowable Component Lead	inches	8.031	2.165	2 / 2.5	1.260 / 1.575	3.740	6.850	0.197	30°
Angle = 1° 30' - 3°	mm	204	55	50 / 70	32 / 40	95	174	5	

The following thread rolls may be ordered as standard on the RA-5 head

ISO Metric

Nominal Size x Pitch mm
M 18.0 - M 20.0 x 2.5
M 20.0 - M 22.0 x 2.5
M 24.0 - M 27.0 x 3.0
M 30.0 - M 33.0 x 3.5
M 36.0 - M 39.0 x 4.0

Unified Coarse UNC

Nominal Size x TPI
3/4 x 10
7/8 x 9
1 x 8
1.1/8 - 1.1/4 x 7
1.3/8 - 1.1/2 x 6

ISO Metric Fine

Nominal Size x Pitch mm
M 18.0 x 1.5
M 18.0 - M 20.0 x 2.0
M 22.0 - M 24.0 x 2.0
M 30.0 - M 33.0 x 3.0
M 33.0 - M 36.0 x 3.0

Unified Fine UNF

Nominal Size x TPI
3/4 x 16
7/8 x 14
1 x 12

Left hand threads are dimensionally the same as right hand heads but open and close on the opposite direction. Thread rolls can be used in both right hand and left hand heads.

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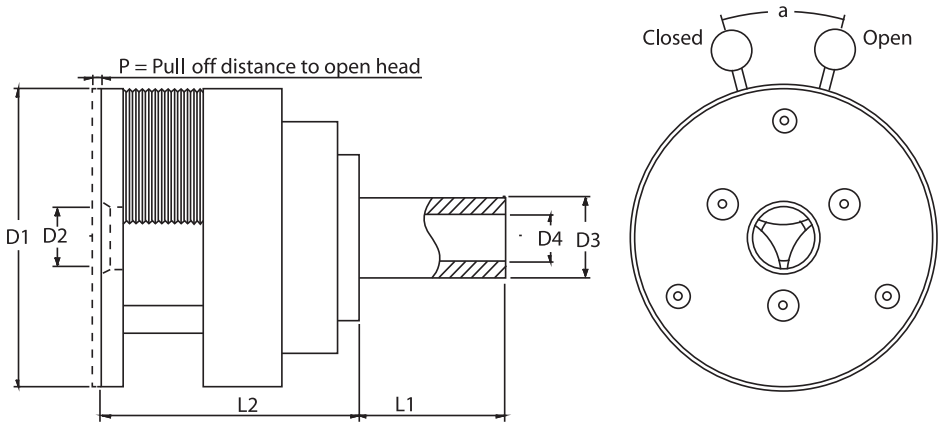
RA-56 - Axial Head

AXIAL THREAD ROLLING HEADS
FOR RIGHT HAND THREADS
FOR STATIONARY APPLICATIONS



Dimensions

Helix Angle in Head = 1°		D1	D2	D3	D4	L1	L2	P	a
Allowable Component Lead	inches	8.031	2.283	2 / 2.5	1.260 / 1.575	3.740	6.614	0.197	30°
Angle = 0° 35' - 3° 30'	mm	204	58	50 / 70	32 / 40	95	168	5	

The following thread rolls may be ordered as standard on the RA-56 head

ISO Metric Fine

Nominal Size x Pitch mm
M 22.0 - M 24.0 x 1.5
M 24.0 - M 27.0 x 1.5
M 27.0 - M 30.0 x 1.5
M 30.0 - M 33.0 x 1.5
M 33.0 - M 36.0 x 1.5
M 36.0 - M 39.0 x 1.5
M 39.0 - M 42.0 x 1.5
M 42.0 - M 45.0 x 1.5
M 45.0 - M 48.0* x 1.5
M 27.0 - M 30.0 x 2.0
M 30.0 - M 33.0 x 2.0
M 33.0 - M 36.0 x 2.0
M 36.0 - M 39.0 x 2.0
M 39.0 - M 42.0 x 2.0
M 42.0 - M 45.0 x 2.0
M 45.0 - M 48.0* x 2.0
M 48.0* - M 50.0* x 2.0

continued...

ISO Metric Fine

continued...

Nominal Size x Pitch mm
M 50.0* - M 52.0* x 2.0
M 42.0 - M 45.0 x 3.0
M 45.0 - M 48.0* x 3.0
M 48.0* - M 50.0* x 3.0
M 50.0* - M 52.0* x 3.0

Unified Fine UNF
Unified Extra Fine UNEF

Nominal Size x TPI
7/8 - 1 x 20
1 - 1.1/8 x 20
1.1/8 - 1.1/4 x 20
1.1/4 - 1.3/8 x 20
1.3/8 - 1.1/2 x 20
1.1/16 - 1.3/16 x 18
1.3/16 - 1.5/16 x 18
1.5/16 - 1.7/16 x 18

continued...

Unified Fine UNF
Unified Extra Fine UNEF

continued...

Nominal Size x TPI
1.7/16 - 1.9/16 x 18
1.9/16 - 1.11/16 x 18
7/8 - 1 x 16
1 - 1.1/8 x 16
1.1/8 - 1.1/4 x 16
1.1/4 - 1.3/8 x 16
1.3/8 - 1.1/2 x 16
1.1/2 - 1.5/8 x 16
1.5/8 - 1.3/4 x 16
1.3/4 - 1.7/8* x 16
1.7/8* - 2* x 16
1.1/8 - 1.1/4 x 12
1.1/4 - 1.3/8 x 12
1.3/8 - 1.1/2 x 12
1.1/2 - 1.5/8 x 12
1.5/8 - 1.3/4 x 12
1.3/4 - 1.7/8* x 12
1.7/8* - 2* x 12
2* - 2.1/8** x 12
1.3/4 - 1.7/8* x 8
1.7/8* - 2* x 8
2* - 2.1/8** x 8

* For thread lengths up to 3.74"
** For short threads up to 1.496" including run-out

Left hand threads are dimensionally the same as right hand heads but open and close on the opposite direction. Thread rolls can be used in both right hand and left hand heads.

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Axial Operation

Operation

Thread rolling remains a simple and efficient process, provided the three main conditions listed below are met and adhered to at all times:

The material to be rolled must be suitable for thread rolling. Attempting to roll unsuitable material may at best give poor thread quality, and at worst cause severe damage to both the rolls and the thread rolling head.

The correct rolling speed should be selected according to the material being rolled and the profile of the thread form required. Reference to material properties, and the rolling speeds chart will enable the correct spindle speed to be calculated. For most standard V-form threads such as unified, metric & Whitworth, 100 ft/min (30m/min) should be considered as the absolute minimum speed, with only Acme, trapezoidal and similar thread forms being attempted at speeds as low as 65 ft/min (20m/min). Attempting to roll at too low a speed will most likely result in premature thread roll failure. Conversely, a higher rolling speed will often improve a material's rolling characteristics, thus improving thread roll life.

An adequate supply of good quality coolant is essential for successful thread rolling, as it is for most machining processes. The choice between neat cutting oils and water soluble is often governed by the type of machine being used or, where applicable, the user's environmental / health and safety policy. While neat cutting oils normally possess superior lubricating and extreme pressure properties, they do not dissipate heat away from the rolls as efficiently as water soluble solutions, unless some type of refrigeration unit is incorporated into the coolant system. When mixing soluble oils it is advisable to maximize the ratio of oil to water, as this gives the best combination of lubrication and cooling properties needed for thread rolling. Finally, once the choice of coolant has been made, ensure the supply is both copious and free of metallic particles. An insufficient supply will soon result in the rolls overheating, while particulate contamination can cause damage to the thread rolls, their bearings and the head mechanism.

Having satisfied the principal machining conditions outlined above, the following steps should be followed when setting up for each thread size:

Blank Preparation

Such is the variety of components that can be rolled it is impossible to illustrate the pre-rolling blank for every application. However, with few exceptions, component blanks fall in to one of three following categories:

A. Rod/tube drawn or ground to pre-rolling size.

When producing studs, linkages, U-bolts, conduit and similar parts, pre-machining can be eliminated by careful selection of material stock that has been drawn or ground to the correct pre-rolling diameter. The increasing popularity of thread rolling has resulted in rod and tube mills offering many standard materials in a range of pre-rolling diameters for most commercial thread sizes. It is often found the blank diameter will be at or within .002"/.05mm of the threads effective diameter, but before committing production to any given supply of bar stock, it is advisable to run sample batches in order to determine that both the basic stock size and tolerance will suit the application. Consideration should be given to the fact that a variation in blank diameter will affect the resultant major diameter by a ratio of approximately three to one when rolling directly on to bar stock. For example, if a drawn rod is supplied with a tolerance of nominal size 0.0/-0.002" (0.0/-0.05mm), then the rolled major diameter will have a tolerance band of 0.006" (0.15mm) which is allowable for most threads of class 2A and 6G fit. If a tighter tolerance on major diameter is required, then ground stock should be considered ahead of drawn stock.

Once the correct diameter of bar or tube has been selected, it only remains for the blank to be pre-chamfered to facilitate the initial engagement of the rolls and leave the finished piece part with a clean lead in thread (See figures 3 & 4).

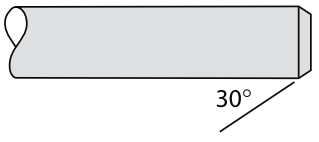

Figure: 3 Pre-rolled rod

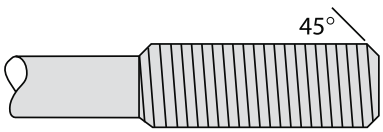

Figure: 4 Rod after rolling

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B. Blank pre-turned up to a shoulder.

Most thread rolling applications involve the piece part being turned in the spindle prior to the actual rolling process. This has the distinct advantage the blank and the rolling head will be in line which eliminates the problems involved with misalignment. The required blank diameter will need to be determined by machining several trial parts to the following procedure:

1. The rolling head has to be adjusted as close as possible to its final running position. With the head in its closed position, a plain plug, turned to the minor diameter of the thread, is placed between the thread rolls in the head. The three nuts (part number 15) are slackened off and the head is adjusted down so that the rolls grip the plug. The plug is then removed and the head adjusted down 1/2 a division on the graduated scale to remove any play in the bearings.

2. The piece part is turned down to the pitch diameter, minus .002"/.05mm, with a chamfer machined to .010"-.020" (.25mm-.5mm) below the root diameter. The angle of the chamfer should be no more than 30 degrees to the axis, with 20-25 degrees being ideal (See figure 5). After rolling, the resultant chamfer should be approximately 45 degrees, due to the flow of material at this point (figure 6).

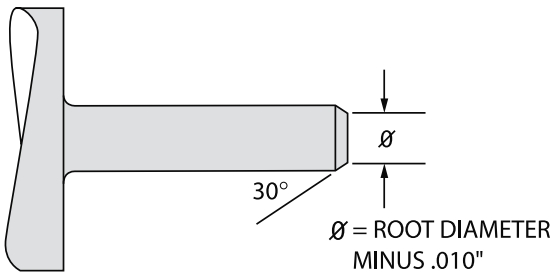

Figure: 5 Before rolling

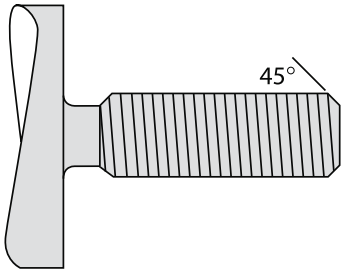

Figure: 6 After rolling

3. The opening position of the rolling head is then determined by advancing it forward, in the open condition, until the front faces of the rolls are just short of the shoulder. On a conventional machine, the mechanical stops would be set at this point, whereas on a CNC machine the Z-axis position should be noted and used as the end point in the program. This procedure should be undertaken with the spindle stationary and as previously stated, with the head in the open condition.

4. With the head set to the approximate size, and the blank turned to the lowest estimate of the required pre-rolling diameter, the first attempt at rolling is then made, using the appropriate spindle speed for the thread being rolled and advancing the head at, or just below, the required feed rate (1 X pitch/rev). At the opening position the head stops advancing, allowing it to pull off and trip open as the drive coupling disengages between the shank and spring housing. (A short, half a second dwell on the machine cam or in the CNC program is required to allow the head to open before it is retracted).

It is most likely that the first component rolled following the above procedure will be oversize on the pitch diameter and undersize on the major diameter. If this is the case, then the next step is to adjust the head down another 1/2 division on the graduated scale and then roll another test piece. By adjusting the head down, the pitch diameter will decrease, while the major diameter will increase. After just one or two further test pieces, the pitch diameter should be established to suit the gauges, but the major diameter may still be undersized. If this is the case, calculate the amount by which the major diameter needs to increase and adjust the blank diameter up by a third of this amount. Ideally, when both the pitch and the major diameters are at the middle limit of their tolerances, the crest of the thread should have a slight truncation and not quite be fully formed. A fully formed thread, while giving a smooth and polished appearance, is a sign of over rolling which causes over stressing of the rolls and reduces their working life.

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C. Thread rolling into an undercut

The same principles for thread rolling up to a shoulder apply when thread rolling into an undercut, except for the blank profile at the undercut itself. Here, the chamfer is machined on the front of the blank must also be machined at the undercut, as illustrated in figure 7.

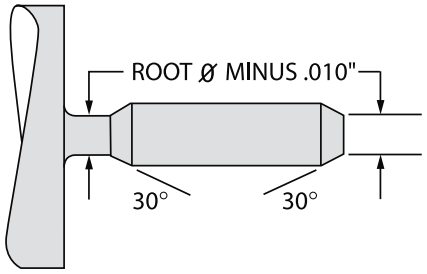

Figure: 7 Blank with undercut

In selecting the width of undercut, consideration should be given for the length of run out required when the thread rolling head opens. Axial thread rolls are available with two standard styles of lead: 1K and 2K.

Rolls designated 1K have one modified lead thread that enables the rolls to engage on the end of the blank and allows for the material to be progressively formed up to the full thread depth. Chosen as the standard short lead, these rolls generate a runout length of 2.3 X P, where P is the pitch of the thread being rolled. This formula allows for the length of the lead on the rolls and for the opening action of the thread rolling head and is therefore only a close approximation. In practice, it may be found that a shorter runout is obtained when a sample component is rolled.

Note: If the standard 1K lead is too long for the desired undercut, rolls can be supplied with special extra short leads of 0.6K or even 0.3K. However, by concentrating the rolling process into a shorter lead, roll life can be significantly reduced. Subsequently, 0.6 and 0.3K leads are only recommended on low tensile, ductile materials.

The preferred standard lead for most thread rolling applications is 2K, as this spreads the working load over two start threads on each roll, giving a general increase in roll life over 1K lead rolls. Due to the extra lead thread on each roll, the runout length on the component will increase by one extra pitch. The following examples show the runout for each type of lead on some typical threads:

Length	Runout Lead	Thread formula	Runout size
0.3 K	1.6 x Pitch	M6 x 1	1.6mm
0.6 K	2 x Pitch	7/16 x 20 UNF	0.10"
1 K	2.3 x Pitch	M14 x 2	4.6mm
2 K	3.3 x Pitch	3/4 x 10 UNC	0.33"

Assembling Rolls Into Head

Remove the front plate screws to release the front plate, revealing the eccentric spindles on which the thread rolls are to be mounted. For the A0 head, which has 2 rolls, the rolls are assembled 1-2 or A-B while for all right hand 3 roll heads, the rolls are assembled 1,2,3 or A,B,C in a clockwise direction as viewed by the operator (for left hand thread rolling heads, rolls are assembled counter clockwise). Before assembly, it is recommended to smear all contact surfaces with a good quality lubricating grease or paste to minimize friction and wear. This will help protect the rolls, needle bearings and eccentric spindles which perform at high speeds under severe loads.

With the rolls in the correct sequence, insert the needle bearings or carbide bushes, replace the front plate and secure tightly with the front plate screws. Always ensure that the full amount of needle bearings are loaded between the rolls and the eccentric spindles (refer to head breakdown). For example, the A2 head requires 57 needle bearings, which is 19 per roll. Insufficient needle bearings in just one roll will reduce accuracy, promote roll failure and cause excessive wear to the eccentric spindle. This potential problem is eliminated by the use of carbide bushings, which are also quicker and easier to replace and allow roll changeovers to be accomplished with the head still mounted in the machine turret.

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Axial Thread Rolling

With the rolls assembled and the front plate tightened down, it should be possible to rotate the rolls freely by hand. The head can now be adjusted to suit the thread to be rolled by following this simple procedure:

a. Ensure the head is in the closed condition.

b. Loosen the 3 nuts (part number 15) which will allow the front cage of the head to be rotated relative to the spring housing. Note the setting line and graduated scale. As the head is adjusted in the minus direction (-), the rolls close down, opening outwards when the head is adjusted in the plus (+) direction.

c. The head can now be adjusted down on to a setting piece, which can be a screwed sample or a plain plug machined to the minor diameter of the thread. If the head is adjusted to either the + or - limit, and is still not to size, remove the 3 nuts and ring washer (part number 16). The front cage assembly is then removed, rotated about 120 degrees in the desired direction of adjustment, and then reassembled on the spring housing. Another indicator will then line up at one end of the graduated scale, permitting further adjustment in the desired direction.

d. When the head has been successfully adjusted down on to the setting piece, the 3 nuts can then be re-tightened. The first component to be rolled at this setting is invariably oversize, and the head will then need to be adjusted down in 1/2 division increments until the desired pitch diameter is achieved. Any necessary alterations to the blank diameter can now be made to produce the correct major diameter on the thread.

IMPORTANT SAFETY WARNING:

When setting the thread rolling head, do not, under any circumstances, attempt to re-roll a previously rolled component as this can cause damage both to the rolls and the thread rolling head.

The procedures described above should ensure safe, trouble free operation of axial thread rolling heads. Any variation from these procedures, whether intentional or accidental, could cause rolls to chip or splinter. It is therefore recommended that safety glasses are worn at all times when thread rolling heads are used on non-enclosed machinery.

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Problem Solving

Fault / Condition	Probable Cause	Remedy
Major diameter is under size with truncated form, but the pitch diameter is correct	The pre-rolling blank diameter is undersize	Increase the pre-rolling blank diameter in small increments until correct major is obtained
Major diameter is undersize with truncated form and the pitch diameter is oversize	Thread rolling head is not adjusted correctly to size	Adjust thread rolling head down This will decrease the pitch but increase the major diameter
Both major diameter and pitch diameter are oversize	Blank diameter is oversize Head is adjusted oversize	Reduce blank diameter and readjust head, then follow setup procedure
The first 2 or 3 threads are rough or malformed	The approach rate of the thread rolling head is too fast or too slow	Check feed cam, programmed feed rate or hydraulic system according to type used
	Chamfer angle is too high or not uniform	Check that chamfer is not more than 30 degrees to the axis and is smooth/uniform
	The thread rolling head and component are misaligned	Check that the thread rolling head is on center with spindle
Thread slivers/flakes	Insufficient ductility	Change material/grade
	Material is leaded for free cutting	If other machining parameters permit, change to a low or non leaded grade of material
	Swarf/metal particles present in the coolant	Flush out and change coolant Improve filtration system
	Over rolling Thread form is full	Reduce blank diameter until thread form starts to truncate
Poor finish on thread	Thread rolls worn or chipped on the leads	Reverse rolls in the head before the leads chip. Replace badly damaged rolls
Component is bent or out of round	Blank is bent prior to rolling or bends during rolling	Material has inherent stress Anneal material
	Blank is not perfectly round	Check pre-turning operation particularly on long threads
	Thread rolling head and component are misaligned	Check that the thread rolling head is on center with spindle

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Axial Rolling Speeds

Blank Diameter Inches		Rolling Speed - FPM: 66	82	98	115	131	164	197	230	262	295	328	Blank Diameter mm
		Rolling Speed - Meters/Minute: 20	25	30	35	40	50	60	70	80	90	100	
		Component Rotating at ... RPM											
1/32	0.031	8000	10000	12000	14000	16000	20000	24000	28000	32000	36000	40000	1
5/64	0.078	3200	4000	4800	5600	6400	8000	9600	11200	12800	14400	16000	2
1/8	0.125	2000	2500	3000	3500	4000	5000	6000	7000	8000	9000	10000	3
5/32	0.156	1600	2000	2400	2800	3200	4000	4800	5600	6400	7200	8000	4
3/16	0.188	1300	1700	2000	2300	2700	3300	4000	4700	5300	6000	6700	5
1/4	0.250	1000	1300	1500	1800	2000	2500	3000	3500	4000	4500	5000	6
9/32	0.281	890	1100	1300	1600	1800	2200	2700	3100	3600	4000	4400	7
5/16	0.313	800	1000	1200	1400	1600	2000	2400	2800	3200	3600	4000	8
3/8	0.375	670	830	1000	1200	1300	1700	2000	2300	2700	3000	3300	9 - 10
7/16	0.438	570	710	860	1000	1100	1400	1700	2000	2300	2600	2900	11
1/2	0.500	500	630	750	880	1000	1300	1500	1800	2000	2300	2500	12 - 13
9/16	0.563	440	560	670	780	890	1100	1300	1600	1800	2000	2200	14
19/32	0.594	420	530	630	740	840	1100	1300	1500	1700	1900	2100	15
5/8	0.625	400	500	600	700	800	1000	1200	1400	1600	1800	2000	16 - 17
3/4	0.750	330	420	500	580	670	830	1000	1200	1300	1500	1700	18 - 19
13/16	0.813	310	380	460	540	620	770	920	1100	1200	1400	1500	20 - 21
7/8	0.875	290	360	430	500	570	710	860	1000	1100	1300	1400	22 - 23
15/16	0.938	270	330	400	470	530	670	800	930	1100	1200	1300	24
1	1.000	250	310	380	440	500	630	750	880	1000	1100	1300	25 - 27
1.1/8	1.125	220	280	330	390	440	560	670	780	890	1000	1100	28 - 29
1.3/16	1.188	210	260	320	370	420	530	630	740	840	950	1100	30 - 31
1.1/4	1.250	200	250	300	350	400	500	600	700	800	900	1000	32
1.5/16	1.313	190	240	290	330	380	480	570	670	760	860	1000	33
1.3/8	1.375	180	230	270	320	360	450	550	640	730	820	910	34 - 35
1.7/16	1.438	170	220	260	300	350	430	520	610	700	780	870	36 - 37
1.1/2	1.500	170	210	250	290	330	420	500	580	670	750	830	38 - 39
1.9/16	1.563	160	200	240	280	320	400	480	560	640	720	800	40 - 41
1.3/4	1.750	140	180	210	250	290	360	430	500	570	640	710	42 - 44
2	2.000	130	160	190	220	250	310	380	440	500	560	630	45 - 50

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Lead Angles based on Basic Pitch Diameter

For UN Threads

Diameter			Threads per inch													
	Inches	mm	80	72	64	56	50	48	44	40	36	32	30	28	26	24
No. 0	0.060	1.52	4°23'	4°57'	5°42'	6°42'	7°43'	8° 8'	9° 6'	10°21'	11°55'	14° 6'				
No. 1	0.073	1.85	3°30'	3°57'	4°31'	5°17'	6° 3'	6°16'	7° 5'	8° 2'	9° 9'	10°43'				
No. 2	0.086	2.18	2°56'	3°17'	3°46'	4°22'	4°59'	5°14'	5°48'	6°31'	7°25'	8°37'	9°23'			
No. 3	0.099	2.51	2°30'	2°49'	3°12'	3°43'	4°14'	4°26'	4°55'	5°30'	6°14'	7°13'	7°44'	8°32'	9°25'	9°16'
No. 4	0.112	2.84	2°12'	2°27'	2°48'	3°14'	3°41'	3°51'	4°15'	4°45'	5°23'	6°12'	6°43'	7°18'	8° 2'	8°53'
No. 5	0.125	3.18	1°57'	2°11'	2°29'	2°52'	3°16'	3°24'	3°45'	4°11'	4°46'	5°26'	5°52'	6°22'	7° 0'	7°43'
No. 6	0.138	3.51	1°45'	1°58'	2°14'	2°34'	2°55'	3° 3'	3°21'	3°44'	4°13'	4°50'	5°13'	5°39'	6°12'	6°50'
No. 8	0.164	4.17	1°28'	1°38'	1°51'	2° 5'	2°25'	2°27'	2°43'	3° 5'	3°28'	3°58'	4°32'	4°37'	5° 2'	5°32'
No. 10	0.190	4.83	1°15'	1°24'	1°35'	1°49'	2° 5'	2° 9'	2°22'	2°37'	2°56'	3°21'	3°40'	3°54'	4°25'	4°39'
No. 12	0.216	5.49	1° 6'	1°13'	1°23'	1°36'	1°46'	1°53'	2° 3'	2°17'	2°33'	2°55'	3° 6'	3°22'	3°37'	4° 1'
1/4"	0.250	6.35	0°57'	1° 3'	1°12'	1°22'	1°33'	1°37'	1°46'	1°57'	2°11'	2°24'	2°40'	2°53'	3° 7'	3°24'
9/32"	0.281	7.14	0°50'	0°56'	1° 3'	1°12'	1°22'	1°25'	1°34'	1°43'	1°56'	2°11'	2°21'	2°31'	2°44'	3° 0'
5/16"	0.313	7.95	0°45'	0°50'	0°57'	1° 5'	1°13'	1°16'	1°24'	1°33'	1°43'	1°57'	2° 5'	2°15'	2°27'	2°40'
11/32"	0.344	8.74	0°40'	0°45'	0°51'	0°59'	1° 6'	1° 9'	1°15'	1°24'	1°34'	1°46'	1°54'	2° 2'	2°12'	2°24'
3/8"	0.375	9.53	0°37'	0°41'	0°47'	0°54'	1° 1'	1° 3'	1° 9'	1°16'	1°25'	1°37'	1°43'	1°51'	2° 0'	2°11'
13/32"	0.406	10.31	0°34'	0°38'	0°43'	0°50'	0°56'	0°58'	1° 4'	1°10'	1°18'	1°29'	1°35'	1°42'	1°50'	2° 0'
7/16"	0.438	11.13	0°32'	0°36'	0°40'	0°46'	0°52'	0°54'	0°59'	1° 5'	1°12'	1°22'	1°27'	1°34'	1°42'	1°51'
15/32"	0.469	11.91	0°30'	0°33'	0°37'	0°43'	0°48'	0°50'	0°55'	1° 1'	1° 8'	1°17'	1°22'	1°27'	1°35'	1°43'
1/2"	0.500	12.70	0°28'	0°31'	0°35'	0°40'	0°45'	0°47'	0°52'	0°57'	1° 3'	1°12'	1°16'	1°22'	1°29'	1°37'
17/32"	0.531	13.49			0°33'	0°38'	0°42'	0°44'	0°48'	0°53'	0°59'	1° 7'	1°11'	1°17'	1°24'	1°30'
9/16"	0.563	14.30			0°31'	0°36'	0°40'	0°42'	0°45'	0°50'	0°56'	1° 3'	1° 8'	1°12'	1°18'	1°25'
19/32"	0.594	15.09			0°29'	0°34'	0°38'	0°39'	0°43'	0°47'	0°53'	1° 0'	1° 4'	1° 9'	1°14'	1°20'
5/8"	0.625	15.88			0°28'	0°32'	0°36'	0°37'	0°41'	0°45'	0°50'	0°57'	1° 0'	1° 5'	1°10'	1°17'
11/16"	0.688	17.48			0°25'	0°29'	0°33'	0°34'	0°37'	0°41'	0°46'	0°51'	0°55'	0°59'	1° 4'	1° 9'
3/4"	0.750	19.05			0°23'	0°27'	0°30'	0°31'	0°34'	0°37'	0°42'	0°47'	0°50'	0°54'	0°58'	1° 3'
13/16"	0.813	20.65				0°25'	0°27'	0°29'	0°31'	0°35'	0°38'	0°43'	0°46'	0°50'	0°53'	0°58'
7/8"	0.875	22.23				0°23'	0°25'	0°27'	0°29'	0°32'	0°36'	0°40'	0°43'	0°46'	0°50'	0°54'
15/16"	0.938	23.83				0°21'	0°24'	0°25'	0°27'	0°30'	0°33'	0°37'	0°40'	0°43'	0°46'	0°50'
1"	1.000	25.40				0°20'	0°22'	0°23'	0°25'	0°28'	0°31'	0°35'	0°37'	0°40'	0°43'	0°47'
1.1/16"	1.063	27.00				0°19'	0°21'	0°22'	0°24'	0°26'	0°29'	0°33'	0°35'	0°38'	0°41'	0°44'
1.1/8"	1.125	28.58				0°18'	0°20'	0°21'	0°23'	0°25'	0°28'	0°31'	0°33'	0°36'	0°38'	0°42'
1.3/16"	1.188	30.18				0°17'	0°19'	0°20'	0°21'	0°24'	0°26'	0°29'	0°31'	0°34'	0°36'	0°39'
1.1/4"	1.250	31.75				0°16'	0°18'	0°19'	0°20'	0°22'	0°25'	0°28'	0°30'	0°32'	0°35'	0°37'
1.5/16"	1.313	33.35				0°15'	0°17'	0°18'	0°19'	0°21'	0°24'	0°26'	0°28'	0°30'	0°33'	0°36'
1.3/8"	1.375	34.93				0°14'	0°17'	0°17'	0°18'	0°20'	0°23'	0°25'	0°27'	0°29'	0°31'	0°34'
1.7/16"	1.438	36.53								0°19'	0°22'	0°24'	0°26'	0°28'	0°30'	0°32'
1.1/2"	1.500	38.10								0°18'	0°21'	0°23'	0°25'	0°27'	0°29'	0°31'
1.5/8"	1.625	41.28										0°21'	0°23'	0°24'	0°26'	0°29'
1.3/4"	1.750	44.45										0°20'	0°21'	0°22'	0°24'	0°27'
1.7/8"	1.875	47.63										0°18'	0°20'	0°21'	0°23'	0°25'
2"	2.000	50.80										0°17'	0°18'	0°20'	0°21'	0°23'

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Lead Angles based on Basic Pitch Diameter

For UN Threads

Diameter			Threads per inch												
	Inches	mm	20	18	16	14	13	12	11	10	9	8	7	6	5	4.5
No. 0	0.060	1.52														
No. 1	0.073	1.85														
No. 2	0.086	2.18														
No. 3	0.099	2.51														
No. 4	0.112	2.84														
No. 5	0.125	3.18	9°46'	11°16'	13°18'											
No. 6	0.138	3.51	8°35'	9°51'	11°30'											
No. 8	0.164	4.17	6°55'	7°50'	9°10'	10°57'	12° 9'	13°36'								
No. 10	0.190	4.83	5°47'	6°34'	7°36'	9° 1'	9°56'	11° 4'								
No. 12	0.216	5.49	4°58'	5°37'	6°28'	7°39'	8°24'	9°19'	10°29'							
1/4"	0.250	6.35	4°12'	4°43'	5°26'	6°23'	6°59'	7°43'	8°38'	9°47'						
9/32"	0.281	7.14	3°40'	4° 9'	4°43'	5°32'	6° 3'	6°40'	7°26'	8°23'						
5/16"	0.313	7.95	3°15'	3°40'	4°12'	4°53'	5°20'	5°52'	6°32'	7°20'	8°23'	9°46'				
11/32"	0.344	8.74	2°51'	3°17'	3°46'	4°26'	4°46'	5°15'	5°49'	6°31'	7°26'	8°38'				
3/8"	0.375	9.53	2°47'	3° 0'	3°24'	3°58'	4°20'	4°43'	5°15'	5°52'	6°40'	7°44'				
13/32"	0.406	10.31	2°27'	2°44'	3° 7'	3°37'	3°47'	4°26'	4°46'	5°20'	6° 3'	6°59'	8°16'	10° 7'		
7/16"	0.438	11.13	2°15'	2°31'	2°53'	3°20'	3°37'	3°58'	4°24'	4°53'	5°32'	6°23'	7°32'	9°10'	11°43'	
15/32"	0.469	11.91	2° 5'	2°20'	2°40'	3°60'	3°21'	3°40'	4° 3'	4°30'	5° 6'	5°52'	6°55'	8°26'	10°40'	
1/2"	0.500	12.70	1°57'	2°11'	2°29'	2°53'	3° 7'	3°24'	3°46'	4°12'	4°43'	5°26'	6°23'	7°44'	9°46'	11°16'
17/32"	0.531	13.49	1°50'	2° 3'	2°20'	2°41'	2°55'	3°12'	3°31'	3°57'	4°24'	5° 3'	5°56'	7°10'	9° 2'	10° 3'
9/16"	0.563	14.30	1°43'	1°55'	2°11'	2°31'	2°44'	3° 0'	3°17'	3°40'	4° 9'	4°44'	5°32'	6°40'	8°23'	9°37'
19/32"	0.594	15.09	1°38'	1°49'	2° 4'	2°23'	2°35'	2°49'	3° 6'	3°27'	3°59'	4°27'	5°12'	6°15'	7°50'	8°57'
5/8"	0.625	15.88	1°33'	1°43'	1°57'	2°15'	2°27'	2°40'	2°56'	3°15'	3°40'	4°11'	4°53'	5°52'	7°20'	8°23'
11/16"	0.688	17.48	1°24'	1°34'	1°46'	2° 2'	2°12'	2°24'	2°38'	2°56'	3°17'	3°46'	4°24'	5°14'	6°31'	7°26'
3/4"	0.750	19.05	1°16'	1°25'	1°37'	1°51'	2° 0'	2°11'	2°24'	2°40'	3° 0'	3°24'	3°58'	4°43'	5°52'	6°40'
13/16"	0.813	20.65	1°10'	1°18'	1°29'	1°42'	1°50'	2° 0'	2°12'	2°27'	2°44'	3° 7'	3°37'	4°20'	5°20'	6° 3'
7/8"	0.875	22.23	1° 5'	1°12'	1°22'	1°34'	1°42'	1°51'	2° 2'	2°15'	2°32'	2°53'	3°20'	3°28'	4°53'	5°32'
15/16"	0.938	23.83	1° 1'	1° 8'	1°16'	1°27'	1°35'	1°43'	1°54'	2° 5'	2°20'	2°40'	3° 6'	3°40'	4°30'	5° 6'
1"	1.000	25.40	0°57'	1° 3'	1°12'	1°22'	1°29'	1°37'	1°46'	1°57'	2°11'	2°29'	2°53'	3°24'	4°12'	4°44
1.1/16"	1.063	27.00	0°53'	0°59'	1° 7'	1°17'	1°24'	1°31'	1°39'	1°56'	2° 3'	2°20'	2°41'	3°12'	3°55'	4°24'
1.1/8"	1.125	28.58	0°50'	0°56'	1° 3'	1°13'	1°18'	1°25'	1°34'	1°43'	1°56'	2°11'	2°32'	3° 0'	3°40'	4° 8'
1.3/16"	1.188	30.18	0°47'	0°53'	1° 0'	1° 9'	1°14'	1°21'	1°28'	1°38'	1°49'	2° 4'	2°23'	2°49'	3°27'	3°53'
1.1/4"	1.250	31.75	0°45'	0°50'	0°57'	1° 5'	1°10'	1°16'	1°24'	1°33'	1°43'	1°57'	2°15'	2°40'	3°15'	3°40'
1.5/16"	1.313	33.35	0°43'	0°48'	0°54'	1° 2'	1° 7'	1°12'	1°19'	1°27'	1°38'	1°51'	2° 8'	2°31'	3° 6'	3°29'
1.3/8"	1.375	34.93	0°41'	0°45'	0°51'	0°59'	1° 4'	1° 9'	1°15'	1°24'	1°34'	1°46'	2° 2'	2°24'	2°56'	3°17'
1.7/16"	1.438	36.53	0°39'	0°43'	0°49'	0°56'	1° 1'	1° 6'	1°12'	1°20'	1°29'	1°41'	1°56'	2°17'	2°47'	3° 8'
1.1/2"	1.500	38.10	0°37'	0°42'	0°47'	0°54'	0°58'	1° 3'	1° 9'	1°16'	1°25'	1°36'	1°51'	2°11'	2°40'	3° 0'
1.5/8"	1.625	41.28	0°34'	0°38'	0°43'	0°50'	0°53'	0°58'	1° 4'	1°10'	1°18'	1°29'	1°42'	2° 0'	2°26'	2°44'
1.3/4"	1.750	44.45	0°32'	0°36'	0°40'	0°46'	0°50'	0°54'	0°59'	1° 5'	1°12'	1°22'	1°34'	1°52'	2°15'	2°31'
1.7/8"	1.875	47.63	0°30'	0°33'	0°37'	0°43'	0°46'	0°50'	0°55'	1° 1'	1° 8'	1°17'	1°28'	1°43'	2° 5'	2°20'
2"	2.000	50.80	0°28'	0°31'	0°35'	0°40'	0°43'	0°47'	0°51'	0°57'	1° 3'	1°11'	1°22'	1°37'	1°57'	2°11'

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Lead Angles based on Basic Pitch Diameter

For Metric Screw Threads M Profile

Diameter		Pitch										
mm	inches	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.75	0.80	1.00	1.25
1.4	0.055	4° 32'	5° 26'	6° 22'	7° 22'							
1.6	0.063	3° 53'	4° 38'	5° 26'	6° 15'	7° 7'						
1.8	0.071	3° 24'	4° 3'	4° 44'	5° 26'	6° 9'						
2.0	0.079	3° 2'	3° 36'	4° 11'	4° 48'	5° 26'	6° 46'					
2.2	0.087	2° 44'	3° 14'	3° 45'	4° 18'	4° 51'	6° 1'	7° 17'				
2.5	0.098	2° 22'	2° 48'	3° 15'	3° 43'	4° 11'	5° 10'	6° 13'	6° 46'	7° 20'		
3.0	0.118	1° 57'	2° 18'	2° 40'	3° 2'	3° 24'	4° 11'	5° 0'	5° 26'	5° 52'		
3.5	0.138	1° 39'	1° 57'	2° 15'	2° 33'	2° 52'	3° 31'	4° 11'	4° 32'	4° 53'	6° 22'	
4.0	0.157	1° 26'	1° 41'	1° 57'	2° 13'	2° 29'	3° 2'	3° 36'	3° 53'	4° 11'	5° 26'	7° 7'
4.5	0.177	1° 16'	1° 30'	1° 43'	1° 57'	2° 11'	2° 40'	3° 9'	3° 24'	3° 40'	4° 44'	6° 9'
5.0	0.197	1° 8'	1° 20'	1° 32'	1° 45'	1° 57'	2° 22'	2° 48'	3° 2'	3° 15'	4° 11'	5° 26'
6.0	0.236	0° 57'	1° 6'	1° 16'	1° 26'	1° 36'	1° 57'	2° 18'	2° 29'	2° 40'	3° 24'	4° 23'
6.3	0.248	0° 54'	1° 3'	1° 12'	1° 22'	1° 32'	1° 51'	2° 11'	2° 21'	2° 31'	3° 13'	4° 9'
8.0	0.315	0° 42'	0° 49'	0° 57'	1° 4'	1° 11'	1° 26'	1° 41'	1° 49'	1° 57'	2° 29'	3°10'
10.0	0.394	0° 33'	0° 39'	0° 45'	1° 51'	0° 57'	1° 8'	1° 20'	1° 26'	1° 32'	1° 57'	2° 29'
12.0	0.472	0° 28'	0° 33'	0° 37'	0° 42'	0° 47'	0° 57'	1° 6'	1° 11'	1° 16'	1° 36'	2° 2'
14.0	0.551	0° 24'	0° 28'	0° 32'	0° 36'	0° 40'	0° 48'	0° 57'	1° 1'	1° 5'	1° 22'	1° 44'
16.0	0.630	0° 21'	0° 24'	0° 28'	0° 31'	0° 35'	0° 42'	0° 49'	0° 53'	0° 57'	1° 11'	1° 30'
18.0	0.709		0° 22'	0° 25'	0° 28'	0° 31'	0° 37'	0° 44'	0° 47'	0° 50'	1° 3'	1° 20'
20.0	0.787			0° 22'	0° 25'	0° 28'	0° 33'	0° 39'	0° 42'	0° 45'	0° 57'	1° 11'
22.0	0.866			0° 20'	0° 23'	0° 25'	0° 30'	0° 36'	0° 38'	0° 41'	0° 51'	1° 5'
24.0	0.945				0° 21'	0° 23'	0° 28'	0° 33'	0° 35'	0° 37'	0° 47'	0° 59'
27.0	1.063					0° 21'	0° 25'	0° 29'	0° 31'	0° 33'	0° 42'	0° 52'
30.0	1.181						0° 22'	0° 26'	0° 28'	0° 30'	0° 37'	0° 47'
33.0	1.299						0° 20'	0° 24'	0° 25'	0° 27'	0° 34'	0° 42'
36.0	1.417							0° 22'	0° 23'	0° 25'	0° 31'	0° 39'
39.0	1.535							0° 20'	0° 21'	0° 23'	0° 29'	0° 36'
42.0	1.654								0° 20'	0° 21'	0° 26'	0° 33'
45.0	1.772									0° 20'	0° 25'	0° 31'
48.0	1.890										0° 23'	0° 29'
52.0	2.047										0° 21'	0° 27'

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Lead Angles based on Basic Pitch Diameter

For Metric Screw Threads M Profile

Diameter		Pitch										
mm	inches	1.50	1.75	2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00
1.4	0.055											
1.6	0.063											
1.8	0.071											
2.0	0.079											
2.2	0.087											
2.5	0.098											
3.0	0.118											
3.5	0.138											
4.0	0.157											
4.5	0.177											
5.0	0.197	6° 46'										
6.0	0.236	5° 26'	6° 32'									
6.3	0.248	5° 7'	6° 9'	7° 15'								
8.0	0.315	3° 53'	4° 38'	5° 26'	7° 7'							
10.0	0.394	3° 2'	3° 36'	4° 11'	5° 26'	6° 46'						
12.0	0.472	2° 29'	2° 56'	3° 24'	4° 23'	5° 26'	6° 32'					
14.0	0.551	2° 6'	2° 29'	2° 52'	3° 41'	4° 32'	5° 26'	6° 22'	7° 22'			
16.0	0.630	1° 49'	2° 9'	2° 29'	3° 10'	3° 53'	4° 38'	5° 26'	6° 15'	7° 7'		
18.0	0.709	1° 36'	1° 54'	2° 11'	2° 47'	3° 24'	4° 3'	4° 44'	5° 26'	6° 9'	6° 55'	
22.0	0.866	1° 18'	1° 32'	1° 46'	2° 14'	2° 44'	3° 14'	3° 45'	4° 18'	4° 51'	5° 26'	6° 1'
24.0	0.945	1° 11'	1° 24'	1° 36'	2° 2'	2° 29'	2° 56'	3° 24'	3° 53'	4° 23'	4° 54'	5° 26'
27.0	1.063	1° 3'	1° 14'	1° 25'	1° 48'	2° 11'	2° 35'	2° 59'	3° 24'	3° 50'	4° 16'	4° 44'
30.0	1.181	0° 57'	1° 6'	1° 16'	1° 36'	1° 57'	2° 18'	2° 40'	3° 2'	3° 24'	3° 47'	4° 11'
33.0	1.299	0° 51'	1° 0'	1° 9'	1° 27'	1° 46'	2° 5'	2° 24'	2° 44'	3° 4'	3° 24'	3° 45'
36.0	1.417	0° 47'	0° 55'	1° 3'	1° 20'	1° 36'	1° 54'	2° 11'	2° 29'	2° 47'	3° 5'	3° 24'
39.0	1.535	0° 43'	0° 51'	0° 58'	1° 13'	1° 29'	1° 44'	2° 0'	2° 16'	2° 33'	2° 50'	3° 7'
42.0	1.654	0° 40'	0° 47'	0° 54'	1° 8'	1° 22'	1° 36'	1° 51'	2° 6'	2° 21'	2° 37'	2° 52'
45.0	1.772	0° 37'	0° 44'	0° 50'	1° 3'	1° 16'	1° 30'	1° 43'	1° 57'	2° 11'	2° 25'	2° 40'
48.0	1.890	0° 35'	0° 41'	0° 47'	0° 59'	1° 11'	1° 24'	1° 36'	1° 49'	2° 2'	2° 15'	2° 29'
52.0	2.047	0° 32'	0° 38'	0°43'	0° 54'	1° 6'	1° 17'	1° 29'	1° 40'	1° 52'	2° 4'	2° 16'

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Recommended Blank Diameters

Blank Diameters for Parallel Rolled Threads UNF & UNC - Class 2

Size		Steel														Aluminum Alloy			
		10-50 C Soft		30-50 C Soft		30-50 C or Alloy 15-25 RC		30-50 C Chrome Nickel 26-32 RC		Stainless Chrome 300 Series*		Stainless Chrome 400 Series*		Brass and Bronze		Soft		Hard	
O.D.	Pitch	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
#0	80	.0504	.0498	.0507	.0501	.0509	.0503	.0511	.0505	.0513	.0507	.0515	.0509	.0507	.0501	.0509	.0503	.0507	.0501
#1	72	.0623	.0617	.0627	.0621	.0629	.0622	.0631	.0625	.0633	.0626	.0635	.0628	.0627	.06321	.0629	.0622	.0627	0621
#1	64	.0612	.0605	.0616	.0609	.0618	.0611	.0620	.0613	.0622	.0615	.0624	.0617	.0616	.0609	.0618	.0611	.0616	.0609
#2	64	.0742	.0735	.0746	.0739	.0748	.0741	.0750	.0743	.0752	.0745	.0754	.0747	.0746	.0739	.0748	.0741	.0746	0739
#2	56	.0726	.0719	.0730	.0723	.0732	.0725	.0734	.0728	.0737	.0730	.0739	.0732	.0730	.0723	.0732	.0725	.0730	.0723
#3	56	.0855	.0847	.0859	.0852	.0861	.0854	.0863	.0856	.0866	.0858	.0868	.0860	.0859	.0852	.0861	.0854	.0859.	.0852
#3	48	.0835	.0827	.0840	.0832	.0842	.0834	.0844	.0837	.0846	.0839	.0849	.0841	.0840	.0832	.0842	.0834	.0840	.0832
#4	48	.0964	.0956	.0969	.0961	.0971	.0964	.0974	.0966	.0976	.0968	.0979	.0971	.0969	.0961	.0971	.0964	.0969	.0961
#4	40	.0936	.0928	.0941	.0933	.0943	.09335	.0946	.0938	.0948	.0940	.0951	.0943	.0941	.0938	.0943	.0935	.0941	.0933
#5	44	.1081	.1073	.1086	.1078	.1088	.1080	.1091	.1082	.1093	.1085	.1096	.1088	.1086	.1078	.1088	.1080	.1086	.1078
#5	40	.1065	.1057	.1070	.1062	.1073	.1064	.1075	.1067	.1078	.1070	.1081	.1072	.1070	.1062	.1073	.1064	.1070	.1062
#6	40	.1195	.1187	.1200	.1192	.1203	.1194	.1205	.1197	.1208	.1200	.1211	.1202	.1200	.1192	.1203	.1194	.1200	.1192
#6	32	.1153	.1144	.1159	.1149	.1161	.1152'	.1164	.1155	.1167	.1158	.1170	.1161	.1159	.1149	.1161	.1152	.1159	.1149
#8	36	.1436	.1427	.1442	.1432	.1444	.1435	.1447	.1438	.1450	.1441	.1453	.1444	.1442	.1432	.1444	.1435	.1442	.1432
#8	32	.1412	.1402	.1417	.1408	.1420	.1411	.1423	.1414	.1426	.1416	.1429	.1419	.1417	.1408	.1420	.1411	.1417	.1408
#10	32	.1671	.1661	.1677	.1667	.1680	.1670	.1683	.1673	.1686	.1676	.1689	.1679	.1677	.1667	.1680	.1670	.1677	.1667
#10	24	.1591	.1589	.1608	.1596	.1611	.1599	.1614	.1602	.1618	.1606	.1621	.1609	.1608	.1596	.1611	.1599	.1608	.1596
#12	28	.1900	.1889	.1907	.1896	.1910	.1899	.1913	.1902	.1916	.1905	.1920	.1908	.1907	.1896	.1910	.1899	.1907	.1896
#12	24	.1861	.1848	.1868	.1855	.1871	.1859	.1874	.1862	.1878	.1865	.1881	.1869	.1868	.1855	.1871	.1859	.1868	.1855
1/4	20	.2144	.2131	.2151	.2138	.2155	.2142	.2159	.2146	.2166	.2153	.2159	.2146	.2151	.2138	.2155	.2142	.2151	.2138
1/4	28	.2241	.2228	.2248	.2235	.2251	.2238	.2255	.2242	.2261	.2248	.2255	.2242	.2248	.2235	.2251	.2238	.2248	.2235
5/16	18	.2729	.2716	.2737	.2724	.2741	.2728	.2745	.2732	.2753	.2740	.2745	.2732	.2737	.2724	.2741	.2728	.737	.2724
5/16	24	.2823	.2810	.2830	.2817	.2834	.2821	.2837	.2824	.2845	.2832	.2837	.2824	.2830	.2817	.2834	.2821	.2830	.2817
3/8	16	.3306	.3291	.3315	.3300	.3320	.3305	.3324	.3309	.3333	.3318	.3324	.3309	.3315	.3300	.3320	.3305	.3315	.3300
3/8	24	.3448	.3434	.3455	.3441	.3459	.3445	.3463	.3449	.3471	.3457	.3463	.3449	.3455	.3441	.3459	.3445	.3455	.3441
7/16	14	.3871	.3855	.3880	.3864	.3885	.3869	.3890	.3874	.3899	.3883	.3890	.3874	.3880	.3864	.3885	.3869	.3880	.3864
7/16	20	.4012	.3999	.4021	.4008	.4025	.4012	.4029	.4016	.4037	.4024	.4029	.4016	.4021	.4008	.4025	.4012	.4021	.4008
1/2	13	.4458	.4440	.4468	.4450	.4473	.4455	.4478	.4460	.4488	.4470	.4478	.4460	.4468	.4450	.4473	.4455	.4468	.4450
1/2	20	.4637	.4623	.4646	.4632	.4650	.4636	.4655	.4641	.4663	.4649	.4655	.4641	.4646	.4632	.4650	.4636	.4646	.4632
9/16	12	.5039	.5021	.5050	.5032	.5055	.5037	.5060	.5042	.5070	.5052	.5060	.5042	.5050	.5032	.5055	.5037	.5050	.5032
9/16	18	.5225	.5210	.5234	.5219	.5238	.5223	.5243	.5228	.5252	.5237	.5243	.5228	.5234	.5219	.5238	.5223	.5234	.5219
5/8	11	.5614	.5595	.5625	.5606	.5630	.5611	.5636	.5617	.5647	.5628	.5636	.5617	.5625	.5606	.5630	5611	.5625	.5606
5/8	18	.5850	.5833	.5859	.5842	.5864	.5847	.5869	.5852	.5878	.5861	.5869	.5852	.5859	.5842	.5864	.5847	.5859	.5842
3/4	10	.6799	.6779	.6811	.6791	.6817	.6797	.6823	.6803	.6834	.6814	.6823	.6803	.6811	.6791	.6817	.6797	.6811	.6791
3/4	16	.7052	.7034	.7062	.7044	.7067	.7049	.7072	.7054	.7082	.7064	.7072	.7054	.7062	.7044	.7067	.7049	.7062	.7044
7/8	9	.7972	.7952	.7985	.7965	.7991	.7971	.7998	.7978	.8010	.7990	.7998	.7978	.7985	.7965	.7991	.7971	.7985	.7965
7/8	14	.8240	.8221	.8251	.8232	.8257	.8238	.8262	.8243	.8273	.8259	.8262	.8243	.8251	.8232	.8257	.8238	.8251	.8232
1	8	.9131	.9107	.9144	.9120	.9151	.9127	.9158	.9134	.9172	.9148	.9158	.9134	.9144	.9120	.9151	.9127	.9144	.9120
1	12	.9408	.9388	.9420	.9400	.9426	.9406	.9432	.9412	.9443	.9423	.9432	.9412	.9420	.9400	.9426	.9406	.9420	.9400
1-1/8	7	1.0262	1.0235	1.0276	1.0250	1.0283	1.0257	1.0290	1.0264	1.0304	1.0278	1.0290	1.0264	1.0276	1.0250	1.0283	1.0257	1.0276	1.0250
1-1/8	12	1.0657	1.0637	1.0669	1.0649	1.0675	1.0655	1.0681	1.0661	1.0693	1.0673	1.0681	1.0661	1.0669	1.0649	1.0675	1.0655	1.0669	1.0649
1-1/4	7	1.1510	1.1483	1.1525	1.1498	1.1533	1.1506	1.1540	1.1513	1.1555	1.1528	1.1540	1.1513	1.1525	1.1498	1.1533	1.1506	1.1525	1.1498
1-1/4	12	1.1906	1.1885	1.1919	1.1898	1.1925,	1.1904	1.1931	1.1910	1.1943	1.1922	1.1931	1.1910	1.1919	1.1898	1.1925	1.1904	1.1919	1.1898
1-3/8	6	1.2601	1.2571	1.2617	1.2587	1.2625	1.2595	1.2633	1.2603	1.2649	1.2619	1.2633	1.2603	1.2617	1.2587	1.2625	1.2595	1.2617	1.2587
1-3/8	12	1.3153	1.3133	1.3166	1.3146	1.3171	1.3152	1.3178	1.3158	1.3191	1.3171	1.13178	1.3158	1.3166	1.3146	1.3172	1.3152	1.3166	1.3146
1-1/2	6	1.3850	1.3820	1.3866	1.3836	1.3874	1.3844	1.3882	1.3852	1.3898	1.3868	1.3882	1.3851	1.3866	1.3836	1.3874	1.3844	1.3866	1.3836
1-1/2	12	1.4402	1.4382	1.4415	1.4395	1.4422	1.4402	1.4428	1.4408	1.4441	1.4421	1.4428	1.4408	1.4415	1.4395	1.4422	1.4402	1.4415	1.4395
1-3/4	5	1.6124	1.6094	1.6142	1.6112	1.6150	1.6120	1.6159	1.6129	1.6177	1.6147	1.6159	1.6129	1.6142	1.6112	1.6150	1.6120	1.6142	1.6112
2	4-1/2	1.8474	1.8442	1.8493	1.8461	1.8503	1.8471	1.8512	1.8480	1.8531	1.8499	1.8512	1.8480	1.8442	1.8461	1.8503	1.8471	1.8442	1.8461

Note: These dimensions are for set-up reference. Diameters must be finally established by actual rolling.

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RSVP Tooling, Inc.

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Recommended Blank Diameters

Blank Diameters for Parallel Rolled Threads UNF & UNC - Class 3

Size		Steel												Aluminum Alloy					
		10-50 C Soft		30-50 C Soft		30-50 C or Alloy 15-25 RC		30-50 C Chrome Nickel 26-32 RC		Stainless Chrome 300 Series*		Stainless Chrome 400 Series*		Brass and Bronze		Soft		Hard	
O.D.	Pitch	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
#0	80	.0512	.0507	.0514	.0510	.0515	.0511	.0517	.0513	.0519	.0515	.0517	.0513	.0514	.0510	.0515	.0511	.0514	.0510
#1	72	.0632	.0627	.0635	.0630	.0637	.0632	.0638	.0633	.0641	.0636	.0638	.0633	.0635	.0630	.0637	.0632	.0635	.0630
#1	64	.0621	.0616	.0624	.0619	.0625	.0620	.0627	.0622	.0630	.0625	.0627	.0622	.0624	.0619	.0625	.0620	.0624	.0619
#2	64	.0751	.0746	.0754	.0749	.0755	.0750	.0757	.0752	.0760	.0755	.0757	.0752	.0754	.0749	.0755	.0750	.0754	.0749
#2	56	.0735	.0730	.0738	.0733	.0739	.0734	.0741	.0736	.0744	.0739	.0741	.0736	.0738	.0733	.0739	.0734	.0738	.0733
#3	56	.0865	.0860	.0868	.0863	.0869	.0864	.0871	.0866	.0874	.0869	.0871	.0866	.0868	.0863	.0869	.0864	.0868	.0863
#3	48	.0845	.0840	.0848	.0843	.0850	.0845	.0852	.0847	.0855	.0850	.0852	.0847	.0848	.0843	.0850	.0845	.0848	.0843
#4	48	.0975	.0969	.0978	.0972	.0980	.0974	.0982	.0976	.0986	.0980	.0982	.0976	.0978	.0972	.0980	.0974	.0978	.0972
#4	40	.0947	.0941	.0950	.0945	.0953	.0947	.0955	.0949	.0958	.0952	.0955	.0949	.0950	.0945	.0953	.0947	.0950	.0945
#5	44	.1091	.1085	.1095	.1088	.1097	.1091	.1099	.1093	.1102	.1096	.1099	.1093	.1095	.1088	.1097	.1091	.1095	.1088
#5	40	.1077	.1071	.1081	.1075	.1083	.1077	.1085	.1079	.1088	.1082	.1085	.1079	.1081	.1075	.1083	.1077	.1081	.1075
#6	40	.1207	.1200	.1211	.1204	.1213	.1206	.1215	.1208	.1219	.1212	.1215	.1208	.1211	.1204	.1213	.1206	.1211	.1204
#6	32	.1164	.1157	.1169	.1162	.1171	.1164	.1174	.1167	.1178	.1171	.1174	.1167	.1169	.1162	.1171	.1164	.1169	.1162
#8	36	.1448	.1441	.1452	.1445	.1454	.1447	.1457	.1450	.1461	.1454	.1457	.1450	.1452	.1445	.1454	.1447	.1452	.1445
#8	32	.1424	.1417	.1429	.1422	.1431	.1424	.1433	.1426	.1437	.1430	.1433	.1426	.1429	.1422	.1431	.1424	.1429	.1422
#10	32	.1683	.1676	.1688	.1681	.1690	.1683	.1693	.1686	.1697	.1690	.1693	.1686	.1688	.1681	.1690	.1683	.1688	.1681
#10	24	.1615	.1607	.1620	.1612	.1622	.1614	.1625	.1617	.1630	.1622	.1625	.1617	.1620	.1612	.1622	.1614	.1620	.1612
#12	28	.1913	.1906	.1918	.1911	.1921	.1914	.1923	.1916	.1928	.1921	.1923	.1916	.1918	.1911	.1921	.1914	.1918	.1911
#12	24	.1874	.1866	.1879	.1871	.1881	.1873	.1884	.1876	.1889	.1881	.1884	.1876	.1879	.1871	.1881	.1873	.1879	.1871
1/4	20	.2159	.2150	.2164	.2155	.2167	.2158	.2170	.2161	.2176	.2167	.2170	.2161	.2164	.2155	.2167	.2158	.2164	.2155
1/4	28	.2254	.2246	.2259	.2251	.2261	.2253	.2264	.2256	.2269	.2261	.2264	.2256	.2259	.2251	.2261	.2253	.2259	.2251
5/16	18	.2724	.2737	.2753	.2743	.2756	.2746	.2759	.2749	.2765	.2755	.2759	.2749	.2753	.2743	.2756	.2746	.2753	.2743
5/16	24	.2839	.2830	.2845	.2836	.2847	.2838	.2850	.2841	.2855	.2846	.2850	.2841	.2845	.2836	.2847	.2838	.2845	.2836
3/8	16	.3326	.3314	.3333	.3321	.3336	.3324	.3340	.3328	.3346	.3334	.3340	.3328	.3346	.3334	.3340	.3328	.3333	.3321
3/8	24	.3463	.3453	.3469	.3459	.3472	.3462	.3475	.3465	.3480	.3470	.3475	.3465	.3469	.3459	.3472	.3462	.3469	.3459
7/16	14	.3893	.3880	.3900	.3887	.3903	.3890	.3907	.3894	.3914	.3901	.3907	.3894	.3900	.3887	.3903	.3890	.3900	.3887
7/16	20	.4032	.4022	.4038	.4028	.4041	.4031	.4044	.4034	.4051	.4041	.4044	.4034	.4038	.4028	.4041	.4031	.4038	.4028
1/2	13	.4480	.4467	.4487	.4474	.4491	.4478	.4495	.4482	.4502	.4489	.4495	.4482	.4487	.4474	.4491	.4478	.4487	.4474
1/2	20	.4657	.4646	.4664	.4653	.4654	.4643	.4670	.4659	.4676	.4665	.4670	.4659	.4664	.4653	.4654	.4643	.4664	.4653
9/16	12	.5062	.5049	.5070	.5057	.5070	.5057	.5078	.5065	.5085	.5072	.5078	.5065	.5070	.5057	.5070	.5057	.5070	.5057
9/16	18	.5246	.5233	.5253	.5240	.5253	.5240	.5260	.5247	.5267	.5254	.5260	.5247	.5253	.5240	.5253	.5240	.5253	.5240
5/8	11	.5636	.5623	.5644	.5631	.5644	.5631	.5653	.5640	.5661	.5648	.5653	.5640	.5644	.5631	.5644	.5631	.5644	.5631
5/8	18	.5871	.5858	.5878	.5865	.5878	.5865	.5885	.5872	.5892	.5879	.5885	.5872	.5878	.5865	.5878	.5865	.5878	.5865
3/4	10	.6825	.6810	.6834	.6819	.6834	.6819	.6843	.6828	.6852	.6837	.6843	.6828	.6834	.6819	.6834	.6819	.6834	.6819
3/4	16	.7073	.7060	.7080	.7067	.7080	.7067	.7088	.7075	.7096	.7083	.7088	.7075	.7080	.7067	.7080	.7067	.7087	.7067
7/8	9	.8002	.7986	.8010	.7994	.8011	.7995	.8021	.8005	.8030	.8014	.8021	.8005	.8010	.7994	.8011	.7995	.8010	.7994
7/8	14	.8262	.8249	.8270	.8257	.8270	.8257	.8279	.8266	.8287	.8274	.8279	.8266	.8270	.8257	.8270	.8257	.8270	.8257
1	8	.9160	.9142	.9170	.9151	.9170	.9152	.9180	.9162	.9191	.9173	.9180	.9162	.9170	.9152	.9170	.9152	.9170	.9152
1	12	.9434	.9419	.9443	.9428	.9428	.9415	.9452	.9437	.9461	.9446	.9452	.9437	.9443	.9428	.9428	.9415	.9443	.9428
1-1/8	7	1.0292	1.0273	1.0303	1.0284	1.0303	1.0284	1.0314	1.0295	1.0325	1.0306	1.0314	1.0295	1.0303	1.0284	1.0303	1.0284	1.0303	1.0284
1-1/8	12	1.0684	1.0669	1.0693	1.0678	1.0693	1.0678	1.0693	1.0678	1.0711	1.0696	1.0693	1.0678	1.0693	1.0678	1.0693	1.0678	1.0693	1.0678
1-1/4	7	1.1542	1.1523	1.1553	1.1534	1.1553	1.1534	1.1553	1.1534	1.1575	1.1556	1.1553	1.1534	1.1553	1.1539	1.1553	1.1534	1.1553	1.1534
1-1/4	12	1.1933	1.1918	1.1942	1.1927	1.1942	1.1927	1.1951	1.1936	1.1960	1.1945	1.1951	1.1936	1.1942	1.1927	1.1942	1.1927	1.1942	1.1927
1-3/8	6	1.2633	1.2613	1.2645	1.2625	1.2651	1.2631	1.2657	1.2637	1.2665	1.2649	1.2657	1.2637	1.2645	1.2625	1.2651	1.2631	1.2645	1.2625
1-3/8	12	1.3182	1.3167	1.3191	1.3176	1.3196	1.3181	1.3200	1.3185	1.3210	1.3195	1.3200	1.3185	1.3191	1.3176	1.3196	1.3161	1.3191	1.3176
1-1/2	6	1.3883	1.3862	1.3894	1.3874	1.3900	1.3880	1.3906	1.3886	1.3918	1.3898	1.3906	1.3886	1.3894	1.3874	1.3900	1.3880	1.3894	1.3874
1-1/2	12	1.4433	1.4416	1.4442	1.4425	1.4447	1.4430	1.4451	1.4434	1.4461	1.4444	1.4451	1.4434	1.4442	1.4425	1.4447	1.4430	1.4442	1.4435
1-3/4	5	1.6165	1.6141	1.6178	1.6154	1.6185	1.6161	1.6191	1.6167	1.6205	1.6181	1.6191	1.6167	1.6178	1.6154	1.6185	1.6161	1.6178	1.6159
2	4-1/2	1.8518	1.8493	1.8532	1.8507	1.8539	1.8514	1.8546	1.8521	1.8561	1.8536	1.8546	1.8521	1.8532	1.8507	1.8539	1.8514	1.8532	1.8507

Note: These dimensions are for set-up reference. Diameters must be finally established by actual rolling.

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Recommended Blank Diameters - Blank Dia. In Inches & MMs for Straight, Metric Threads

Size in MM			Steel												Aluminum Alloy			
			10-50 C Soft		30-50 C Soft		30-50 C or Alloy 15-25 RC		30-50 C Chrome Nickel 26-32 RC		Stainless Chrome 300 Series*		Stainless Chrome 400 Series*		Brass and Bronze		Soft		Hard	
O.D.	Pitch		Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
3	35	M/M	2.756	2.743	2.764	2.751	2.769	2.756	2.771	2.758	2.779	2.766	2.771	2.758	2.764	2.751	2.769	2.756	2.764	2.751
		In.	.1085	.1080	.1088	.1083	.1090	.1085	.1091	.1086	.1094	.1089	.1091	.1086	.1088	.1083	.1090	.1085	.1088	.1083
3	.5	M/M	2.652	2.639	2.659	2.647	2.664	2.652	2.667	2.654	2.675	2.662	2.667	2.654	2.659	2.647	2.664	2.652	2.659	2.647
		In.	.1044	.1039	.1047	.1042	.1049	.1044	.1050	.1045	.1053	.1048	.1050	.1045	.1047	.1042	.1049	.1044	.1047	.1042
3.5	.35	M/M	3.256	3.244	3.261	3.249	3.266	3.254	3.269	3.256	3.277	3.264	3.269	3.256	3.261	3.249	3.266	3.254	3.261	3.249
		In.	.1282	.1277	1284	.1279	.1286	.1281	.1287	.1282	.1290	.1285	.1287	.1282	.1284	.1279	.1286	.1281	.1284	.1279
3.5	6	M//M	3.084	3.071	3.094	3.081	3.096	3.084	3.101	3.089	3.109	3.096	3.101	3.089	3.094	3.081	3.096	3.084	3.094	3.081
		In.	.1214	.1209	.1218	.1213	.1219	.1214	.1221	.1216	.1224	.1219	.1221	.1216	.1218	.1213	.1219	.1214	.1218	.1213
4	.5	M/M	3.653	13.640	3.660	3.647	3.663	3.650	3.668	3.655	3.675	3.663	3.668	3.655	3.660	3.647	3.663	3.650	3.660	3.647
		In.	.1438	.1433	.1441	.1436	.1442	.1437	.1444	.1439	.1447	.1442	.1444	.1439	.1441	.1436	.1442	.1437	.1441	.1436
4	.7	M/M	3.520	3.505	3.528	3.513	3.533	3.518	3.538	3.523	3.548	3.533	3.538	3.523	3.528	3.513	3.533	3.518	3.528	3.513
		In.	.1386	.1380	.1389	.1383	.1391	.1385	.1393	.1387	.1397	.1391	.1393	.1387	.1389	.1383	.1391	.1385	.1389	.1383
4.5	.5	M/M	4.153	4.140	4.161	4.648	4.663	4.150	4.168	4.155	4.176	4.163	4.168	4.155	4.161	4.148	4.163	4.150	4.161	4.148
		In.	.1635	.1630	.1638	.1633	.1639	.1634	.1641	.1636	.1644,	.1639	.1641	.1636	.1638	.1633	.1639	.1634	.1638	.1633
5	.5	M/M	4.651	4.638	4.661	4.148	4.163	4.651	4.666	4.653	4.676	4.663	4.666	.4.653	4.661	4.648	4.663	4.651	4.661	4.648
		In.	.1831	.1826	.1835	.1830	.1836	.1831	.1837	.1832	.1841	.1836	.1837	.1832	.1835	.1830	.1836	.1831	.1835	.1830
5	.8	M/M	4.455	4.437	4.463	4.448	4.468	4.453	4.473	4.458	4.483	4.465	4.473	4.463	4.448	4.468	4.453	4.463	4.448	4.361
		In.	.1754	.1747	.1757	.1751	.1759	.1753	.1761	.1755	.1765	.1758	.1761	.1755	.1757	.1751	.1759	.1753	.1757	.1751
6	.75	M/M	5.484	5.469	5.494	5.479	5.499	5.484	5.504	5.489	5.512	5.496	5.504	5.489	5.494	5.479	5.499	5.484	5.494	5.479
		In.	.2159	.2153	.2163	.2157	.2165	.2159	.2167	.2161	.2170	.2164	.2167	.2161	.2163	.2157	.2165	.2159	.2163	.2157
6	1.0	M/M	5.314	5.293	5.326	5.306	5.334	5.314	5.339	5.319	5.352	5.331	5.339	5.319	5.326	5.306	5.334	5.314	5.326	5.306
		In.	.2092	.2084	.2097	.2089	.2100	.2092	.2102	.2094	.2107	.2099	.2102	.2094	.2097	.2089	.2100	.2092	.2097	.2089
7	.75	M/M	6.485	6.469	6.495	6.480	6.500	6.485	6.505	6.490	6.513	6.497	6.505	6.490	6.495	6.480	6.500	6.485	6.495	6.480
		In.	.2553	.2547	.2557	.2551	.2559	.2553	.2561	.2555	.2564	.2558	.1561	.2561	.2557	.2551	.2559	.2553	.2557	.2551
7	1.0	M/M	6.314	6.294	6.327	6.307	6.335	6.314	6.340	6.320	6.353	6.332	6.340	6.320	6.327	6.307	6.335	6.314	6.327	6.307
		In.	.2486	.2478	.2491	.2483	.2494	.2486	.2496	.2488	.2501	.2493	.2496	.2488	.2491	.2483	.2494	.2486	.2491	.2483
8	1.0	M/M	7.315	7.295	7.328	7.308	7.336	7.315	7.341	7.320	7.353	7.333	7.341	7.320	7.328	7.308	7.336	7.315	7.328	7.308
		In.	.2880	.2872	.2885	.2877	.2888	.2880	.2890	.2882	.2895	2.887	2.890	.2882	.2885	.2877.	.2888	.2880	.2885	.2877
8	1.25	M/M	7.150	7.130	7.163	7.142	7.168	7.148	7.176	7.155	7.188	7.168	7.176	7.155	7.163	7.142	7.168	7.148	7.163	7.142
		In.	.2815	.2807	.2820	.2812	.2822	.2814	.2825	.2817	.2830	.2822	.2825	.2817	.2820	.2812	.2822	.2814	.2820	.2812
9	1.0	M/M	8.313	8.293	8.326	8.306	8.334	8.313	8.339	8.319	8.352	8.331	8.339	8.319	8.326	8.306	8.334	8.313	8.326	8.306
		In.	.3273	.3265	.3278	.3270	.3281	.3273	.3283	.3275	.3288	.3280	.3283	.3275	.3278	.3270	.3281	.3273	.3278	.3270
9	1.25	M/M	8.151	8.131	8.164	8.143	8.169	8.148	8.176	8.156	8.189	8.169	8.176	8.156	8.164	8.143	8.169	8.148	8.164	8.143
		In.	.3209	.3201	.3214	.3206	.3216	.3208	.3219	.3211	.3224.	.3216	.3219	.3211	.3214	.3206	.3216	.3208	.3214	.3206
10	1.0	M/M	9.314	9.294	9.327	9.307	9.335	9.314	9.340	9.319	9.352'	9.332	9.340	9.319	9.327	9.307	9.335	9.314	9.327	9.307
		In.	.3667	.3659	.3672	.3664	.3675	.3667	.3677	.3669	.3682	.3674	.3677	.3669	.3672	.3664	.3675	.3667	.3672	.3664
10	1.5	M/M	8.984	8.956	8.999	8.971	9.007	8.979	9.014	8.989	9.030	9.004	9.014	8.989	8.999	8.971	9.007	8.979	8.999	8.971
		In.	.3537	.3526	.3543	.3532	.3546	.3535	.3549	.3539	.3555	.3545	.3549	.3539	.3543	.3532	.3546	.3535	.3543	.3532
11	1.5	M/M	9.982	9.954	9.997	9.970	10.005	9.977	10.012	9.987	10.027	10.003	10.012	9.987	9.997	9.970	10.005	9.977	9.997	9.970
		In.	.3930	.3919	.3936	.3925	.3939	.3928	.3942	.3932	.3948	.3938	.3942	.3932	.3936	.3925	.3939	.3928	.3936	.3925
12	1.5	M/M	10.983	10.955	10.998	10.970	11.006	10.978	11.013	10.988	11.029	11.003	11.013	10.988	10.998	10.970	11.006	10.978	10.998	10.970
		In.	.4324,	.4313	.4330	.4319	.4333	.4322	.4336	.4326	.4342	.4332	.4336	.4326	.4330	.4319	.4333	.4322	.4330	.4319
12	1.75	M/M	10.818	10.785	10.836	10.803	10.843	10.810	10.853	10.820	10.871	10.838	10.853	10.820	10.836	10.803	10.843	10.810	10.836	10.803
		In.	.4259	.4246	.4266	.4253	.4269	.4256	.4273	.4260	.4280	.4267	.4273	.4260	.4266	.4253	.4269	.4256	.4266	.4253
14	1.5	M/M	12.982	12.954	12.997	12.969	13.005	12.977	13012	12.987	13.028	13.002	13.012	12.987	12.997	12.969	13.005	12.977	12.997	12.969
		In.	.5111	.5100	.5117	.5106	.5120	.5109	.5123	.5113	.5129	.5119	.5123	.5113	.5117	.5106.	.5120	.5109	.5117	.5106
14	2	M/M	12.647	12.614	12.664	12.631	12.675	12.642	12.685	12.652	12.705	12.672	12.685	12.652	12.664	12.631	12.657	12.642	12.664	12.631
		In.	.4979	.4966	.4986	.4973	.4990	.4977	.4994	.4981	.5002	.4989	.4994	.4981	.4986	.4973	.4990	.4977	.4986	.4973
16	1.5	M/M	14.983	14.956	14.999	14.971	15.006	14.978	15.014	14.989	15.029	15.004	15.014	14.989	14.999	14.971	15.006	14.978	14.999	14.971
		In.	.5899	.5888	.5905	.5894	.5908'	.5897	.5911	.5901	.5917	.5907	.5911	.5901	.5905	.5894	.5908	.5897	.5905	.5894
16	2	M/M	14.648	14.615	14.666	14.633	14.676	14.643	14.686	14.653	14.707	14.674	14.686	14.653	14.666	14.633	14.676	14.643	14.666	14.633
		In.	.5767	.5754	.5774	.5761	.5778	.5765	.5782	.5769	.5790.	.5777	.5782	.5769	.5774	.5761	.5778	.5765	.5774	.5761
18	1.5	M/M	16.982	16.955	16.998	16.970	17.005	16.977	17.013	16.988	17.028	17.003	17.013	16.988	16.998	16.970	17.005	16.977	16.998	16.970
		In.	.6686	.6675	.6692	.6681	.6695	.6684.	.6698	.6688	.6704	.6694	.6698	.6688	.6692	.6681	.6695	.6684	.6692	.6681
18	2.5	M/M	16.312	16.274	16.335	16.297	16.345	16.307	16.358	16.320	16.380	16.342	16.358	16.320	16.3351	16.297	16.345	16.307	16.335	16.297
		In.	.6422	.6407	.6431	.6416	.6435	.6420	.6440	.6425	.6449	.6434	.6440	.6425	.6431	.6416	.6435	.6420	.6431	.6416
20	1.5	M/M	18.984	18.956	18.999	18.971	19.007	18.979	9.014	18.989	19.030	19.004	19.014	18.989	18.999	18.971	19.007	18.979	18.999	18.971
		In.	.7474	.7463	.7480	.7469	.7483	.7472	.7486	.7476	.7492	.7482,	.7486	1.7476	.7480	.7469	.7483	.7472	.7480	.7469
20	2.5	M/M	18.313	18.275	18.336	18.298	18.346	18.308	18.359	18.321	18.382	18.344	18.359	18.321	18.336	18.298	18.346	18.308	18.336	18.298
		In.	.7210	.7195	.7219	.7204	.7223	.7208.	.7228	.7213	.7237	.7222	.7228	.7213	.7219	.7204	.7223	.7208.	.7219	.7204
22	1.5	M/M	20.983	20.955	20.998	20.970	21.006	20.978	21.013	20.988	21.029	21.003	21.013	20.988	20.998	20.970	21.006	20.978	20.998	20.970
		In.	.8261	.8250	.8267	.8256	.8270	.8259	.8273	.8263	.8279	.8269	.8273	.8263	.8267	.8256	.8270	.8259	.8267	.8256
22	2.5	M/M	20.312	20.274	20.335	20.297	20.345	20.307	20.358	20.320	20.381	20.343	20.358	20.320	20.335	20.297	20.345	20.307	20.335	20.297
		In.	.7997	.7982	.8006	.7991	.8010	.7995	.8015	.8000	.8024	.8009	.8015	.8000	.8006	.7991	.8010	.7995	.8006	.7991
24	2	M/M	22.647	22.614	22.664	22.631	22.675	22.642	22.685	22.652	22.705	22.672	22.685	22.652	22.664	22.631	22.675	22.642	22.664	22.631
		In.	.8916	.8903	.8923	.8910	.8927	.8927	.8914	.8918	.8939	.8926	.8931	.8918	.8923	.8910	.8927	.8914	.8923	.8910
24	3	M/M	21.979	21.930	22.004	21.958	22.017	21.971	22.029	21.984	22.055	22.007	22.029	21.984	22.004	21.958	22.017	21.971	22.004	21.958
		In.	.8653	.8634	.8663	.8645	.8668	.8650	.8673	.8655	.8683	.8664	.8673	.8655	.8663	.8645	.8668	.8650	.8663	.8645
27	2	M/M	25.646	25.613	25.664	15.631	25.674	25.641	25.684	25.651	25.705	25.672	25.684	25.651	25.664	25.631	25.674	25.641	25.664	25.631
		In.	1.0097	1.0084	1.0104	1.0091	1.0108	1.0095	1.0112	1.0099	1.012	1.0107	1.0112	1.0099	1.0104	1.0091	1.0208	1.0095	1.0104	1.0091
27	3	M/M	24.981	24.933	25.006	24.961	25.019	24.973	25.032	24.986	25.060	25.011	25.032	24.986	25.006	24.961	25.109	24.973	25.006	24.961
		In.	.9835	.9816	.9845	.9827	.9850	.9832	.9855	.9837	.9866	.9847	.9855	.9837	.9845	.9827	.9850	.9832	.9845	.9827

Note: These dimensions are for set-up reference. Diameters must be finally established by actual rolling.

• Only Certain Grades Rollable

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