

# Tangential Chasers



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Landis has a wealth of experience in designing, making and customizing tangential chasers. All are created to produce better performance, improve productivity, lower costs and boost threading efficiency.

All the tangential chaser information you need is right here at your fingertips—just click on the subject of your choice.



# Landis Tangential Chasers



**TANGENTIAL** positioning with line contact at workpiece centerline gives natural cutting clearance and best tool performance.

Dovetail clamping with back-up screw provides rigidity required to cut Acme and similar forms requiring heavy metal removal.

Long length (from 1" on smaller to 6-1/2" on larger heads) allows repeated regrinds with attendant long tool life.

Not necessary to regrind all chasers of set in equal amounts. Metal removed at regrind dependent upon condition of each chaser.

Chaser damaged beyond use can be replaced in set with single tool (used or unused) from user stock or new from factory.

A few thousandths metal removal at regrinding, usually .030" or less depending upon tool condition, restores the cutting edge.

Chasers can be used to cut threads with any die head whose chaser holders are of the proper form and which accept that same size tool. Using proper holders, 15/16" wide x 2-1/8" long - 16 pitch chasers could be used to produce 3/4-16P UNF, 3/8-16P UNC, or other size threads in the 16P UN series. Tool inventory is reduced since individual chaser sets do not need to be stocked for every diameter and pitch combination.

Same chasers can be used to thread right- and left-hand by grinding cutting angles on opposite ends. Right- and left-hand holder sets required.

Special chaser holders and chasers are required for Acme, Modified Square, and similar forms.



## Chart 1

### Landis Tangential Chaser System Versus Radial Heads and Chasers

A Comparison In Performance, Productivity, Costs, and Threading Efficiency!

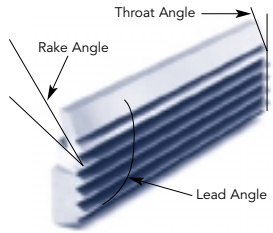
| Capabilities Performance   | Landis System | Radials   |   |
|--|---------------|-----------|---|
| Oversize capacity  | <b>YES</b>    | <b>NO</b> | Radial die heads have a standard range but no oversize capacity. A 1-1/4" radial head has a maximum O.D. capacity of 1-1/4". A 1-1/4" 10F Landmatic, by comparison, has a nominal standard range (unlimited thread length) of 1/4" to 1-1/4" O.D. Using oversize chaser holders extends the head's range to 2-5/8" O.D. (maximum thread length is restricted).  |
| Interchangeable chasers  | <b>YES</b>    | <b>NO</b> | Using chasers which incorporate a specific built-in helix angle limits the performance and versatility of the radial head. Interchangeable chaser holders give the Landis head far more versatility and tool economy. The same physical size chaser set can be used to cut threads not only on standard, special, and oversize diameter and pitch combinations of a particular head, but it can often be used with other size and models of Landis heads. This can greatly reduce chaser inventory because a single Landis head can frequently do what two or more competitive heads do, and the same chaser set can be used to cut more than one diameter, or can be used in more than one head. |
| Cut same pitch on different diameters with same head and chasers                       | <b>YES</b>    | <b>NO</b> | Radial chasers can only be used to thread one diameter and pitch combination because the helix angle is contained in the chaser. With the Landis system, the helix angle is built into the holder. The same chaser set, with suitable chaser holders, will cut the same pitch on different diameters. The same set of chasers could be used to cut 1/4"-20P UNC and 1/2"-20P UNF.   |
| Adjust forward/backward from workpiece centerline to obtain best cutting performance   | <b>YES</b>    | <b>NO</b> | No adjustment of the radial chaser, in relation to the cutting edge to the workpiece centerline is possible. With its tangential mounting and varying of the cutting position possible, the Landis chaser better absorbs cutting forces and the cutting edge can be moved toward or away from the centerline. This permits the cutting edge to be moved until the very best tool life and thread geometry are obtained.   |
| Cut left- and right-hand threads with same chasers                                     | <b>YES</b>    | <b>NO</b> | Separate chaser sets are required to cut right- and left-hand threads with radial heads. With suitable chaser holders, both ends of any Landis chaser can be ground and used to cut threads of either hand.   |
| Cut different materials with same chasers by frequently altering rake angle of chasers | <b>YES</b>    | <b>NO</b> | Different radial chaser sets can be required to cut different materials. Varying the rake angle allows the Landis chaser to cut a wide variety of materials. Changing the rake does not change the chaser positioning relative to the work centerline, and it can be changed as often as desired.   |
| Regrind chasers individually... replace chasers individually                           | <b>YES</b>    | <b>NO</b> | Radial chasers must be fixture ground in sets. Landis chasers can be hand ground, individually regrind, or, when needed, individually replaced within a set.  |
| Regrind up to 80% of original chaser length  | <b>YES</b>    | <b>NO</b> | The narrow width of the radial chaser offers a very limited regrindable life, and there is no provision to move the cutting edge to compensate for material lost through regrinding. Landis chasers, which range from 1" to 5" or more in length, are regrindable for approximately 80% of original length.   |
| Features that are permanent for life of the tool                                       | <b>YES</b>    | <b>NO</b> | The basic geometry of Landis chasers is permanent for the life of the tool. However, the physical geometry of radial chasers can be altered by regrinding which can affect performance. Regardless of whether standard or incorporating special features, like roughing and finishing form for cutting coarse pitches in one pass or centering throats to assure concentricity, the throat and special feature remain permanent for the life of the tool and relief and thread run-out amounts are never affected.  |

# Landis Tangential Chasers

## Cutting Angles

The cutting end grind is a composite of three angles, the throat, lead, and rake.

Figure 1



## Lead Angle

The lead angle, Figure 1, is the angle made by the end of the chaser and its stamped edge.

Based on the helix angle at which the chaser is used, type of die head and feed involved, the degree of lead angle determined allows the cutting edge to fall on the workpiece centerline.

## Rake Angle

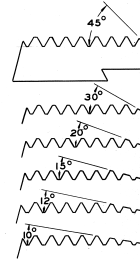
The rake angle, which establishes the chaser cutting edge and its action causes the thread form of the chaser to be reproduced on the workpiece, is varied to suit the machineability of the material.

Beginning with a recommended "starting" angle for a given material, the user may need to try a higher or lower rake angle until the best result is obtained.

Unless information is given to the contrary, chasers are furnished with a 22° positive rake suitable for threading mild steel. When the user specifies that chasers will be used for other materials, they will be processed with rake angles and heat treatment suitable for that material.

Recommended starting rake angles are given in the 17th and earlier editions of the Landis Threading and Forming / Thread Data Handbook.

Figure 2



## Throat Angle

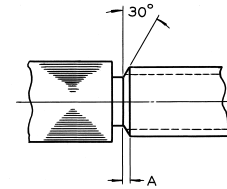
Permanent for life of the tool and never requires regrinding, the throat angle forms the thread and can remove excess material on the diameter.

Chasers are generally furnished with either a 20° standard long throat starting below thread root, to remove excess material. Standard 20° and 30° short throats start at thread root.

Throats longer or shorter than above are available for special needs.

| THROAT ANGLE | CHIP THICKNESS | NO. OF THDS. IN THROAT |
|--------------|----------------|------------------------|
| 45°          | .0177          | 0.7                    |
| 30°          | .0125          | 1.2                    |
| 20°          | .0086          | 1.9                    |
| 15°          | .0065          | 2.6                    |
| 12°          | .0052          | 3.2                    |
| 10°          | .0043          | 3.9                    |

Figure 3



When unusual amounts of metal are to be removed, such as when Acme, Modified Square, or similar forms are involved, throats longer than 20° are furnished. Throats of 10° or 12°, Figure 2, are frequently recommended in those instances.

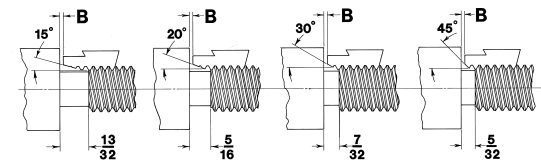
Using the longest possible throat is always recommended. The lower the throat angle, the more imperfect throat threads, the lighter the chip load, the better the finish and the longer the tool life.

When shoulder engagement is required, the width of the relief (A in Figure 3) will dictate the degree of chaser throat angle that can be used. To allow the finished thread to be completely formed, the relief width must be sufficient to allow the entry of the throat plus the first full thread of the chaser. Figure 4 shows the widths that would be required using the same chaser with four different throats.

If possible, design or change the relief of shoulder engagement on parts to provide a relief that will allow the use of the longest possible throat.

Refer to the 17th or earlier editions of the Landis Threading and Forming / Thread Data Handbook for relief dimensions required when threading inch and metric threads.

Figure 4



# Landis Tangential Chasers

## Chaser Grinds

Grinds generally used are "lip-rake," "straight thread leadscrew," and "taper pipe."

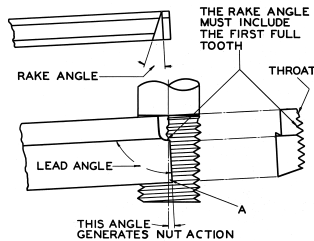
More detailed information on these, other types of end grinds, and specific grinding instructions can be found in the Landis Threading and Forming / Thread Data Handbook.

## Lip Rake

Excluding Lanco style heads used with leadscrew feed, chasers used with both pull-off, self-opening and yoke operated heads are ground with a lip rake as shown in Figure 5.

The lip-rake grind geometry results in the rear threads of the chaser extending over the workpiece centerline when the chasers are mounted in the chaser holders.

Figure 5



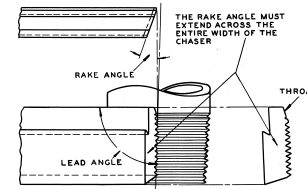
This results in the extended rear threads forming a self-leading, nut action with the workpiece threads that have been produced.

With Landmatic stationary and J Landex pull-off heads, it facilitates automatic self-opening. With JN and Landex yoke-operated heads, it stabilizes lead.

With Lanco heads that are hand fed, it improves lead-on action and serves to maintain proper lead.

The actual lip-rake section of the chaser, which falls on the workpiece centerline when the chaser is mounted, extends from the stamped edge back to include the first or second full thread, depending on the pitch of chaser.

Figure 6



## Leadscrew Grind

Chasers used by yoke operated Lanco heads fed by leadscrew are ground as in Figure 6.

This is a combination grind with the lead and rake angles ground in a single pass. The rake angle is dictated by the material to be worked while the lead is based on  $90^\circ$  minus the helix angle of the chaser holders in which the chasers are to be mounted.

The cutting edge of tools ground in this manner falls directly on the centerline of the workpiece.

No self-leading action between the chasers is present to interfere with the feed generated by the leadscrew.

## Taper Pipe Grind

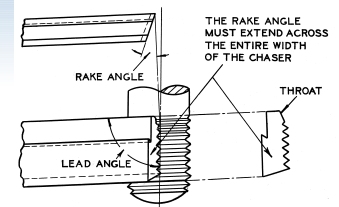
Standard Landis die heads, those which do not incorporate a receding or taper attachment mechanism, produce standard pipe threads by "jam-cutting."

Chasers used to jam-cut, cut across their full width and are ground as in Figure 7.

Extending across the entire width of the chaser, this combination grind is essentially the same as a leadscrew grind.

The rake is usually  $22^\circ$  for mild steel pipe, the lead is  $90^\circ$  minus the helix angle of the chaser holders to be used.

Figure 7



# Landis Tangential Chasers

Centering Throats  
Rough/Fin. Throat  
Rough/Fin. Forms

## SPECIAL DESIGNS

### Centering Throats

Centering Throat chasers will produce threads with a high degree of concentricity with the O.D. when threading long length workpieces where lack of rigidity would normally be experienced.

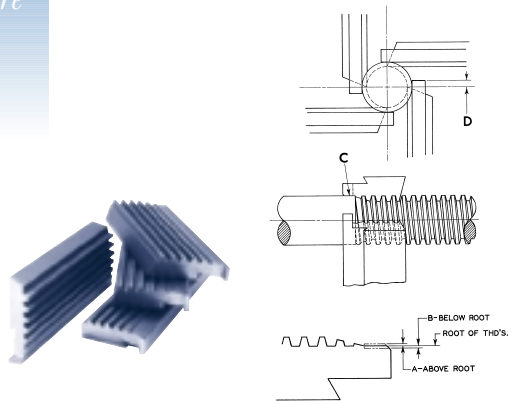
With its pad extending over center, the cutting edge of the chaser can be set slightly back of center for freest cutting action without experiencing out-of-roundness.

Centering Throats can only be used where the O.D. of the work is held uniform. Uniformity is required since the throat section, C in Figure 8, bears on the workpiece as it extends over center, illustrated by D, to provide a steadying action.

Centering Throats can also be useful when keyways or other interrupted cuts must be dealt with.

The throat projection bridges the cut preventing digging in and possible tool chipping.

Figure 8



### Roughing and Finishing Throat Chasers

Roughing and Finishing throat chasers allow quality threads when UN and similar vee forms are to be cut on difficult to machine alloys.

As shown by the broken lines in Figure 9, the thread form in the throat section is modified and reduced in profile. The wedge produced by the modification eliminates welding on the corners. See A. A tooth of full, unmodified width "B", finishes the thread to final form.

This feature can be furnished on any throat angle and is particularly recommended where short throat chasers are used to thread into limited reliefs on shouldered parts. In many instances, the R and F throat chaser will eliminate the poorer tool life and finish associated when using standard short throats.

Figure 9

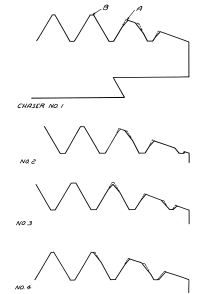
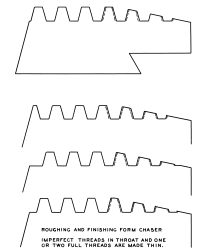


Figure 10



### Roughing Form Throat and Roughing and Finishing Form Chasers

Roughing and Finishing Form chasers are used to give the best finish possible on Acmes, Modified Square, and similar forms that require large amounts of metal to be removed.

With this form, the profile of the imperfect throat threads and one or two full threads are reduced and made thinner as in figure 10. Each modified tooth progressively removes a few thousandths until the thread is finished by the first or second full thread.

Roughing form throat chasers give the same type of cutting action as roughing and finishing form.

The reduced profile, however, is confined to the imperfect threads of the throat section and these chasers are therefore used to thread into a relief on shouldered work or where the length of imperfect thread is restricted.