

ALL LEE FACET HEADS mount on standardized 5/8" round mast which may be adapted to units other than **LEE** with a 3/8" bolt on a flat surface 2½ or 3" lower than lap surface. Provide 1 bolt hole 5½" left and 2½" toward the front from lap center and 3 more at 1½" intervals in a line left from the first to adjust for 6 or 8" laps, grinding girdles, facets, etc. **Adjust Mast Location** before cutting either the crown or pavilion facets so gem reaches lap at all required angles to avoid possible variations from moving mast meanwhile. Use smooth paper or aluminum foil as shim between mast bottom and mounting surface before or beyond bolt if necessary to tilt mast slightly so gem contacts lap equally from edge to center.

Free Wheeling Spacer with U shape opening and counterbored recess slips between index plate over end of bearing while pushing back on index. When forming for round brilliant, best concentricity is unlikely as a cylindrical form; return to final grind of circumference after forming cone for pavilion. The narrow, more uniform edge will allow lighter, more even pressure to be used.

Angle Stop usually set at or near 90° when forming or faceting girdles while the elevating collar on the mast provides coarse or fine adjustments up or down for sizing. When cutting main facets, set at required angle with gem barely clear of lap surface and gradually lower with elevating fine adjustment while cutting 1 or more facets to required depth after which any more required to same angle and depth may be cut to the setting.

Gravity Feed Handle on models so equipped can provide exactly the same pressure to each facet cut at a particular setting. Some practise may be advised to enable lateral movements without any simultaneous downward hand pressure. Functions best with gems characteristically uniform in all directions in hardness or density such as quartz, beryl, etc. as opposed to corundum for example which usually requires more pressure or cutting time on certain facets than others especially on large facets. This may be corrected by going a second time over the facets in any set that are smaller and glossier than the softer facets. Use of a cutting lap in good condition so as to cut freely may lessen the effects of material variations. Polishing operations derive less benefit from use of the gravity handle and in some cases may progress more efficiently if it is removed so as to allow more frequent close inspections of individual facets.

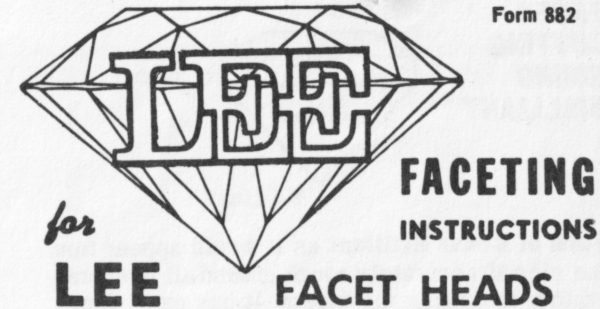
Zero Gauge assures alignment of crown and pavilion facets when proper transfer is made and is used when replacing index plates, etc. Index and splitter are on zero or center with index locking screw slightly loose until adjustment is completed. (See brochure illustrations). Angle on protractor should be about 70 to 85° (depending on model) when gauge is in contact with lap surface so chuck does not touch; keyway of gauge up. To prevent wear and loss of accuracy on gauge, use a piece of smooth paper as a shield between gauge and lap.

Compound Splits: If splitter adjustment has been made to correct transfer misalignment for example, it can be recentered before cutting facets while the gem retains corrected position as follows: note mark or No. required on splitter by making slight test cuts on gem then turn splitter back to center and an equal amount beyond; leave splitter in this position while dopped gem is replaced in chuck by zero gauge and perform operations as per paragraph **Zero Gauge** above then replace dopped gem in chuck and turn splitter dial to center. Gem is now corrected for misalignment or etc, splitter recentered for fancy facet cuts, etc. Loosen locking screw of splitter pawl or tooth before adjustments, tighten after. Adjust only while pawl is in a groove of index plate so as to retain respective alignment. Refer to **LEE Brochures** for further details and illustrations of various models and accessories.

Index Plates: 64 most generally useful; not too complex for round brilliant and simple cuts yet efficient for marquise, etc. by help of **Splitter**. Less splitter use required with 96 index which also divides evenly by 3 but is slower on simple cuts due to complexity. 32 is very fast for round brilliant and simpler cuts. 80 divides evenly by 5. All divide by 2 and multiples.

Table Polishing: See **Table Polisher, 45 Adapter** in brochures.

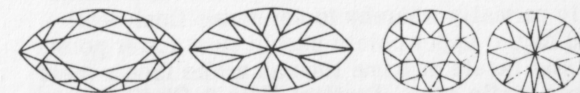
Care and Maintenance are very important. Water and abrasives can cause rapid wear, corrosion, binding, etc. if allowed to remain in critical parts of facet head. Frequently lubricate with light oil; water is more likely to seep into dry joints. Occasionally take apart, clean and lubricate with light cup grease. Dops should not be left in chuck overnight or longer unless chuck was clean and dry before insertion and dop is slightly oily (shank) when inserted. Models with split chuck should have threads and taper of knurled cap well lubricated to prevent binding; do not use excess force to tighten. If binding occurs do not use pliers directly on knurl, protect by wrapping with a strip of leather or canvas.



This is to supplement advice given in **Lee Facet Head** and **Lee Laps and Accessories** brochures as may be obtained free through **Lee** dealers or direct. This information is intended primarily to demonstrate basic operations and functions. For beginners there are various books, magazines or faceting classes available through dealers, clubs etc. Faceting is an art which many have learned with **Lee** equipment without personal instructions but some individuals progress better by classes. Regardless of information received elsewhere, a careful study should be made of **Lee** suggestions so as to avoid possibly conflicting or impractical concepts offered by users of other brands.

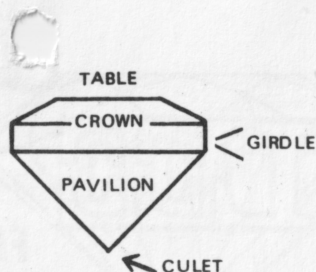
Cabochon Equipment and experience are helpful for beginners since initial forming is similar and can be done on same, however it is not necessary and many individuals start faceting without it. Instructions for cutting a round brilliant intend to demonstrate operations of **Lee** equipment as well as to provide a basic example for beginners. By completing the crown first it is easier to control its height as well as the table size. After some experience or for anyone who has a **Lee Preform Attachment** it may be preferable to complete the pavilion first and crown last.

Shapes Below have 4 main facets indexed as per round: 64, 32, 48, 16. Intermediate mains aligned to form. Fine splitter and angle adjustments are made on any facets as required. Make large rough sketch noting angles and indexing for reference when polishing same facets.

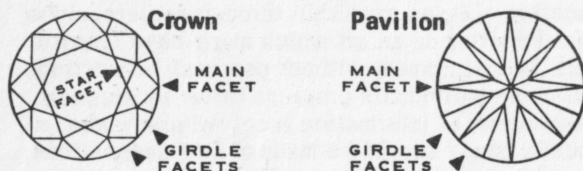


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FACET CUTTING ROUND BRILLIANT



Form of Round Brilliant as it would appear from the side if accurately rough ground all over preparatory to cutting the facets. It has extra depth, girdle thickness, etc. to be cut away by facets. Preliminary rough grinding made additional allowances for irregularities. Average brilliants are about 2/3 as deep as diameter with crown about 1/3, pavilion 2/3 of finished depth. Finished table usually 50-60% of diameter.



Cutting the Crown Facets. The 8 main facets are cut first and at the angle given for the particular gem in the table headed **Main Facet Angles**. On 64 index plate index 64, 32, 48, 16, 24, 56, 8, 40. If table is already polished, leave it slightly oversize to allow for reduction when cutting star facets. Cut the 8 star facets halfway between the main facets or at 4, 12, 20, 28, 36, 44, 52, 60 at an angle about 10 to 20 degrees less than mains or so they extend 1/3 to 1/2 the distance from the table to girdle at the same time their adjoining points meet at edge of table. **Do not cut the first star facet fully at first.** Partially cut at least 3 adjoining to determine the final depth of cut and angle. Adjoining points should meet in center of main facet width. After cutting star facets reset angle to about 5 to 7 degrees greater than angle of mains to cut 16 girdle facets at indexes halfway between main and star indexes or 2, 6, 10, 14, 18, 22, 26, 30, 34, 38, 42, 46, 50, 54, 58, 62 but as suggested above, cut the first few facets only partially whereby to determine final depth and angle; upper points should meet lower points of star facets at same time as girdle facets meet along girdle edge. **Pavilion Main & Girdle facets** index same as crown. Girdle angles about 2 degrees more than mains and to reach at least 2/3 to 3/4 of distance from girdle to culet.

MAIN FACET ANGLES

	Crown	Pavilion
Andalusite, Peridot, Phenacite	43°	39°
Tourmaline, Topaz, Spodumene	43	39
Beryl, Quartz	45	41
Corundum, Spinel, Epidote	37	42
Demantoid Garnet, Zircon	43	40
Other Garnets (also man made YAG)	37	42
Cubic Zirconia (man made)	37	42
GGG (man made)	35	41
Titania (Synthetic Rutile)	31	41
Strontium Titanate (man made)	31	41

Polishing the Crown Facets follows cutting of same and is done before gem is redopped or transferred to cut and polish pavilion facets. Polishing always begins with the row of facets furthest from girdle and progresses through successive rows to the girdle. The same angles and index positions are used as cutting but a slight amount of material will be removed which is compensated for by very slight adjustments in angle or elevation. Each facet will become larger in area as polished but will become smaller again as adjoining facets are polished. If the table was polished before the crown facets it should have been left about 10% oversize after star facets were cut. Extreme care is essential to achieving a perfect polish at the same time final depth and angle are reached. Compare pairs of opposing facets for size equality and perfect table centering. Before starting polishing operations, the gem, hands, etc. must be washed clean of abrasive matter created by any cutting operation. **Polishing Pavilion Facets** should require little further explanation except as follows.

Girdle Thickness may be about 1/4 mm or under 1/64" on small gems up to 1/4 or 1/2 carat. Larger gems up to about 5 carats to have a proportionately thicker edge up to about 1/2 mm. Larger gems up to 25 or 50 carats, etc. usually do not have a much heavier girdle but if cut from fragile material a heavier girdle may be left for better durability. **Extra Thickness** should be left on girdle when starting to cut pavilion main facets to allow further reduction from cutting girdle facets and again from polishing the facets. Careful comparisons of girdle thickness must be made as opposite main facets are being cut on the pavilion. There are too many possible causes for the girdle to be not of even thickness at this point if attempted to control purely by mechanical means such as angle stop, etc. Girdle edge may be considered finished if left with a fine grind such as from a 1200 diamond lap or it may be polished or faceted.

Dopping and Transfer. Please refer to the Facet Head brochure for illustrations and additional information about Dops, V-Block, Table polisher, etc. The gem is first dopped on a crown dop or one that has a conical hole in its tip after gem has been rough ground approximately to the form illustrated on this page. The dop must be a bit smaller than the diameter of gem so it will not be ground when the circumference of the gem is being ground. Stand dop in one of the holes of Dop Rack from which all other dops have been removed. Place a fragment of dop wax in hole of dop; heat dop with flame of a small propane torch about midway of dop length so entire dop reaches melting point of wax. When wax melts insert tip of gem; in a few seconds gem will reach temperature of the melted wax which will cause the wax to adhere to same. To test, raise gem slightly by grasping with tweezer or pad of folded paper. If wax sticks to gem like wet paint, press gem into dop so as to squeeze out all excess wax and if not needed to build up under overhang of gem, wipe excess off with small cloth or moistened fingers. Clamp V-block onto dop in rack as shown in illustration and press the upper dop down firmly so its solid flat end aligns fully with table of gem; if wax has meanwhile cooled too much to allow any necessary movement of gem, heat only enough to allow the gem to be tilted into alignment. Allow Spring Clip of V-block and upper dop to remain in place until dop wax is solidified. Crown facets are cut and polished after dopped gem is cooled. See Table Polisher information in brochure if table has not already been polished.

Transfer from Crown to Pavilion Dop after crown is completed may start by heating a solid tipped dop to melting point of dop wax and rubbing wax on tip to form a coat while dop is in rack. Clamp dop in V-block with thumbscrew while aligning gauge aligns dop keyway. Remove gauge to other end of V-block to engage keyway of dopped gem which has been secured by spring clamp. Insert projecting end of screw-held dop again in rack, heat to remelt wax while sliding other dop with gauge to squeeze out excess wax between gem table and dop end. Avoid softening wax on crown dop. When cool remove dops attached to gem out of rack and V-block, hold horizontally by pavilion dop, heat center of crown dop to remove. All wax should be removed from pavilion before hardening as possible, the balance dissolved off with alcohol. See transfer block brochures.