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TWO DAY FACETING TUITION SCHEDULE AND TOPICS TO BE COVERED

The objective is to cut and polish a stone of simple but effective design and gain experience of the cutting process using an Ultra Tec V5 digital faceting machine. To do this it is first necessary to understand the machine and its operation, to understand facet diagrams and the information they provide and to learn how to orientate and dop the rough. These topics will be covered first. Cutting the pavilion of the stone will follow and upon completion the stone will be mounted in the transfer fixture ready for release the following morning. Any time left in the day will be devoted to other matters outlined below. Day two will involve completion of transfer and cutting the crown of the stone. When complete any remaining time will be spent dealing with theoretical items not covered on day 1. It is anticipated that the stone can be completed and released from the dop by the end of the day.

Understanding the faceting machine

The mast
The base unit – platen – 'safety' nut
Splash pan - splash pan hold down arms - sponge
Height control
Angle control – 'hard' stop
Digital angle display
Fore and aft control
Rotational control – index gears – symmetry
Cheater
Speed and direction controls
Water supply and waste water
45 Degree adapter
Table alignment tool
Dops and the quill
Laps
Lighting

Sundry items and further information on laps is provided here: https://www.bespokegems.uk/equipment-links

Trim saw – comments on use
Facet saw – comments on use

Selection of rough

Gemstone properties
Use of immersion fluid
Synthetic v natural for the learning process
Preforming
Measuring to ensure the chosen design can be accommodated – see below
Orientation for pleochroism, closed C axis, birefringence

Facet diagrams

Design and optimisation software – GemCad, GemRay, Gem Cut Studio
Understanding the information provided
Optimising designs to maximise light performance and colour for the chosen material, the compromises
Unsuitability of some designs for lower RI materials
Apex crowns v tabled crowns
For Gem2 (Optimised for CZ with minimum RI 2.15) the information block provides the following:
P/W = 0.393 C/W = 0.115
Available rough indicates that a stone of 9 mm length and width can be cut from it. What is the minimum depth of rough required?
P/9 = 0.393 so P = 9 x .393 = 3.537 mm. C/W = 0.115 so C = 9 x 0.115 = 1.035 mm. Total = 4.572 mm.
Allowing 0.4 mm for the girdle (UKFCG competition rules say 0.3mm +/- 0.1mm) total required 4.972 mm.
'Optimised' for spinel Gem Cut Studio suggests the same pavilion angles but a reduction in crown height. Is this desirable? Maybe, maybe not!

Cutting strategies

CAM, Centre Angle Method
OMNI method
CLAM, Corner Locator Angle Method
ECED, Equal Centre to Edge Distance method
'Clever' CAM – preforms
Barion cuts

Dopping

Dops
Positioning rough for good yield – use of the transfer fixture
The importance of degreasing
Adhesives and their application
Transfer
Release upon completion
Clean-up of stone and dop

Cutting and polishing

The importance of cleanliness
Zeroing the cheater

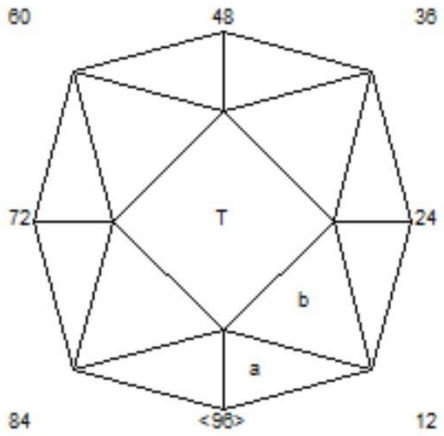
Laps
Water supply
Holding the stone, use of the handle and hand pressure
Roughing out the pavilion and girdle
Limitations of dial readings
Hearing completion of a cut to depth
Consistency in depth of cut at a predetermined position on the lap
Use of the loupe
Fine cutting
Prepolishing
Polishing
Use of the cheater
Keeping notes
Cutting the crown
Obtaining an even and level girdle
Girdle thickness
Cutting the table – use of the 45 degree adapter, cheater and angle adjustments
Adjusting table meets

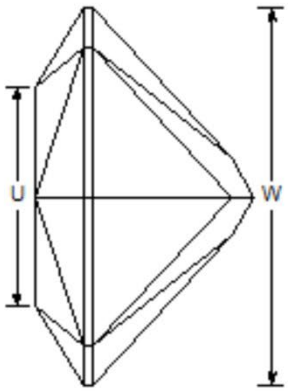
Storing cut stones

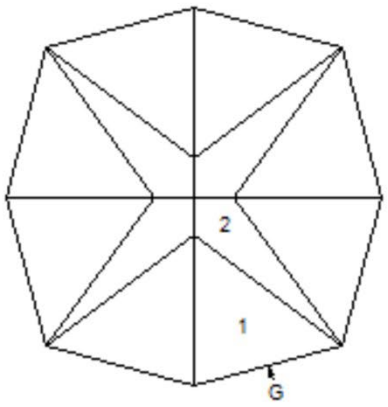
Price list for recommended Ultra Tec supplied items (June 2025)

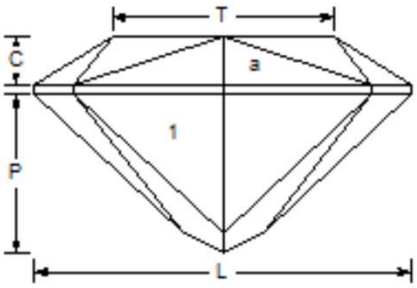
Ultra Tec digital V5	$5,590
Or Ultra Tec Digital V5	$4,490
Lamp	$106
Index gear set, 64, 72, 80	$205
Table aligner	$66
Master lap	$65
600 mesh plated diamond lap	$100
1,200 mesh plated diamond lap	$110
BATT lap X 2	$476
Extra set of 12 dops 3, 4, 5, 6, 8 mm	$150
Pandimonium 3,000 mesh prepolish	$29
Pandimonium 60,000 mesh polish	$29
Prof. Iggy's Snake Oil	$12.50
Alcohol lamp	$15
Dop wax	$34
Shipping and handling (approx.)	$400

Two variations on the design suggested as a first stone. These will be discussed in detail during the course of tuition.



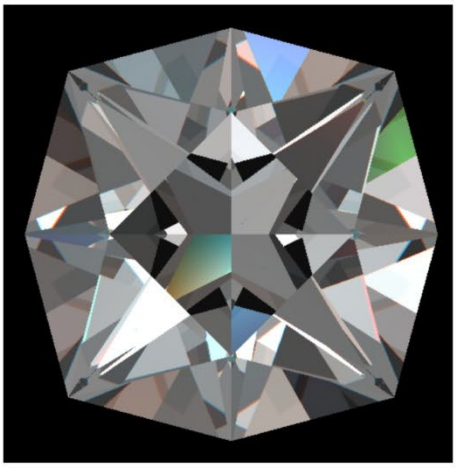






Gem2 stacked

By Steve Sweetman Feb.2020
Angles for R.I. = 2.160
25 + 8 girdles = 33 facets
4-fold, mirror-image symmetry
96 index
L/W = 1.000 T/W = 0.586 U/W = 0.586
P/W = 0.424 C/W = 0.126
Vol./W³ = 0.202



PAVILION			
1	43.92°	04-20-28-44-52-68-76-92	Cut to TCP
G	90.00°	04-20-28-44-52-68-76-92	Establish gem size / outline
2	37.22°	12-36-60-84	To girdle meets
CROWN			
a	32.28°	04-20-28-44-52-68-76-92	Establish girdle thicknes
b	19.82°	12-36-60-84	Cut to girdle meets
T	0.00°	Table	Cut to a - b meets

To follow on from Tom Herbst's GeM101, this mirror image symmetry design takes things a step further with 4 table meets to make but total number of meets is the same. Angles for optimised for CZ. Works well for lowewr RIs but optimise in GemRay or Gem Cut Studio.
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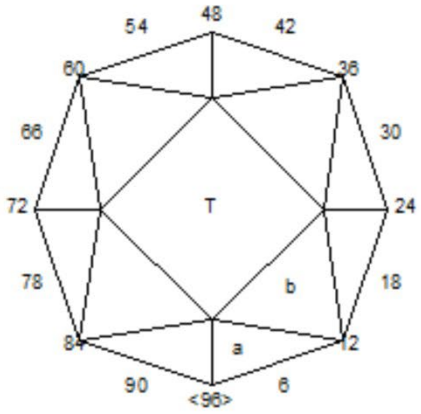
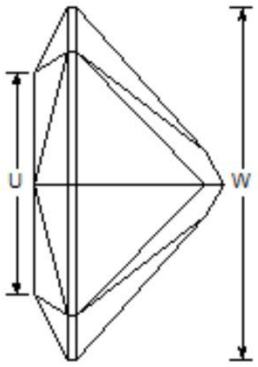
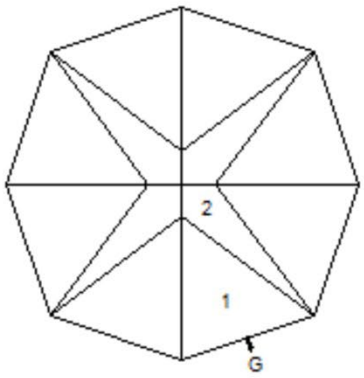
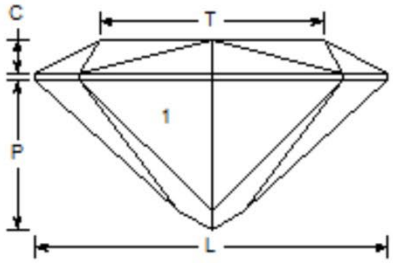


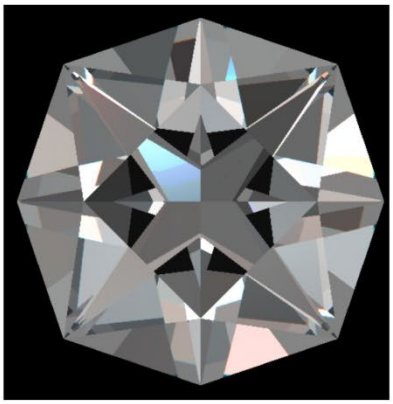






Gem2-5 stacked

by Steve Sweetman Feb 2020
Angles for R.I. = 2.150
25 + 8 girdles = 33 facets
4-fold, mirror-image symmetry
96 index
L/W = 1.000 T/W = 0.634 U/W = 0.634
P/W = 0.423 C/W = 0.099
Vol./W³ = 0.173



PAVILION

1	43.92°	05-19-29-43-53-67-77-91	Cut to TCP
G	90.00°	05-19-29-43-53-67-77-91	Establish size
2	38.73°	12-36-60-84	To girdle meets

CROWN

a	29.62°	05-19-29-43-53-67-77-91	Establish girdle thickness
b	17.97°	12-36-60-84	To girdle meets
T	0.00°	Table	To a - b meets

A modification of Gem2 to demonstrate the affects of changing outline by changing girdle index spacing from 4 to 5. Unaltered angles produced a big head shadow and loss of brightness. Raising the crown and pavilion angles corrected this.
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