

SEATTLE FACETOR

DESIGN June 1989

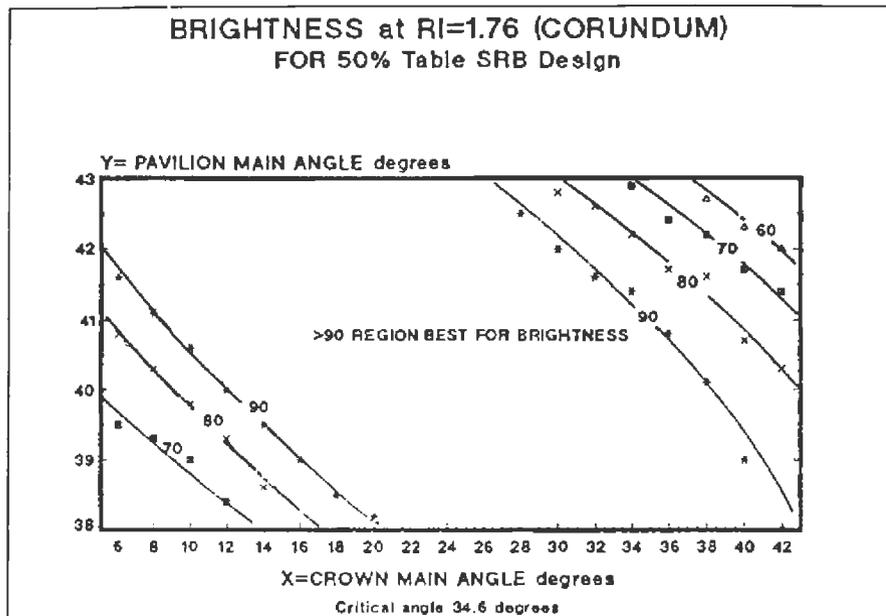


Figure 1 BRIGHTNESS CONTOUR PLOT FOR CORUNDUM EXTENDED LOW RANGE

Figure 1 is an extended range Brightness Contour Chart for CORUNDUM. Here we show lower Crown Main Angles than the 30 to 42 degrees we presented in the April SFD issue. At 30 degrees Crown Main we had not reached the lower limit..all brightness values were greater than 90. After finding that Quartz designs could be cut at very much lower angles than 30 degrees, we wondered how far the lower limit might be for CORUNDUM.

We actually tried Crown Main Angles as low as 2 degrees, but as a practical limit we did not think anyone would want to go much below 6 degrees for esthetic reasons, so Figure 1 has a Crown Main Angle scale that runs from 6 to 42 degrees. Within that extreme range of crown angles there are matching pavilion mains that give Brightness Values above 90. For example with Corundum if you want to use a 43 degree pavilion any crown angle between 6 and 26 will be satisfactory. For a 41 degree pavilion from about 8 degrees to 36 and for a 39 degree pavilion any crown main angle from about 16 to 40 degrees.

If one contrasts Figure 1 with the Quartz chart in the May 1989 SFD issue, there are major differences. For one thing there is no "critical angle" line on the Corundum chart, because the RI=1.76 corresponds to a 34.6 degree critical angle which is well below our 38 degree pavilion angle limit. Thus SRB designs used in this study do not have dark centers within the range of angles in Figure 1. The entire region between the "90 degree contours" are good conditions for brightness in Corundum stones. We were careful to use the Tangent-Ratio transformation for all of the designs used in this study, consequently although thickness and average brightness may vary, the appearance (relative size and location of facets as seen from the plan view) was identical. Because of this, the facetor is free to choose any angle combination and be assured the facet arrangement will be the same in plan view. By varying crown and/or pavilion angles the overall depth (elevation profile) can be varied to make good use of the rough without sacrificing brightness.

Table 1 CROWN MAIN ANGLE FOR CORUNDUM SRB DESIGN 50% TABLE

T/W	P=Pavilion Main Angle degrees					
	38	39	40	41	42	43
0.485-0.505	21	18	15	11	8	9
0.506-0.525	25	22	19	16	12	11
0.526-0.545	28	26	23	20	17	13
0.547-0.565	32	29	27	23	21	17
0.566-0.585	35	34	32	29	25	22
0.586-0.605	38	36	34	31	28	24
0.606-0.615	41	39	37	34	32	--

Table 1 is based on the relationship

$$T/W = 0.02 + 0.25 \tan C + 0.50 \tan P$$

where

T/W = Overall thickness / width

C=Crown main angle degrees and

P=Pavilion main angle degrees

which assumes a 2% girdle thickness and the SRB design. Both "C" and "P" must simultaneously satisfy the conditions of Figure 1 which indicate the >90 average brightness criterion. Under these conditions we have a choice of angle combinations that will give almost equally bright stones with different total thickness.

For example: if we want a stone with thickness half the width (T/W = 0.5) and a 39 degree pavilion main then Table 1 indicates we should use a 29 degree crown main.