

Cutting SRBs in Various Materials

When cutting SRB's it's easy to decide to use the same angles - usually quartz - when cutting other materials. After all, if it works in quartz, then it will work on almost everything else with a higher Refractive Index, other than the few things you might cut, like opal, that have a lower RI. However, while this will work okay in higher RI materials, it will NOT give you optimum performance.

Based on his extensive studies and research, Jim Perkins has been working on doing actual test cuts of stones to verify his findings. Today, he released to a small handful of us, a chart of his recommended SRB angles for all the most common cutting materials. I am attaching it to this message, with Jim's permission, for your use. I suggest you both print it out and save it for future reference.

So that you understand how to use this chart, let me offer some guidelines extracted from Jim's original note:

- 1. Many of my findings agree with Harding's "Faceting Limits", some do not. My suggestions are based on a standard round brilliant with 96 index gear starting the P1 and C1 facets at index #3.**
- 2. My models are based on a 54% table. Now some will say this is too small and some will say it's about right. I think it is OK. However it's not too hard to adjust crown breaks and stars to change the table to whatever proportion you prefer. The only thing I'd remain consistent with is crown main angles + or - 1/2 degree.**
- 3. Regarding the angle difference between pavilion mains and breaks, this is simply a matter of preference. For lower R.I. material (up to 1.72) you can use the pavilion mains I have listed and add 2 degrees for the breaks instead of the 1 & 1/2 shown, or you can cut them as listed with spiked mains. The difference of having shorter breaks for low R.I. material is negligible IMHO.**

From 1.7+ I would recommend using spiked mains as shown. The longer breaks and skinny mains seem to fracture the light better IMHO. This seems to be consistent with VanSant and Gilbertson but not agreeable to Harding. Again, it's somewhat according to your own preference.

So there you have it folks. If you have any questions, please feel free to drop me a note and I'll clarify. Based on Jim's prior work, I'd suggest you do NOT exceed a 56% table. Enjoy!

Don C.

RECOMMENDED ANGLES FOR FACETING ROUND BRILLIANTS WITH EIGHT MAINS
WITH 54% TABLE WIDTH RELATIVE TO STONE WIDTH.

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MINERAL TYPE	REFRACTIVE INDEX	CRITICAL ANGLE		PAVILION BREAKS	PAVILION MAINS	CROWN BREAKS	CROWN MAINS	STAR FACETS	VOLUME
QUARTZ	1.54 - 1.55	40.54 - 40.18		44.5	43	41.2	36.2	20.9	0.221
BERYL	1.58	39.27		44.5	43	40	35	20.1	0.217
TOPAZ	1.61	38.4		42.5	41	39.6	34.3	20.7	0.208
TOURMALINE	1.62	38.12		41.5	40	38.4	33.3	19.7	0.201
PERIDOT	1.65	37.31		41.5	40	38.4	33.3	19.7	0.201
SPINEL	1.72	35.55		41.5	40	38.2	33.3	19	0.201
GARNET	1.75 - 1.81	34.85 - 33.54		39.5	38	36.3	31.5	17.9	0.189
HEAT TREATED SAPPHIRE	1.76 - 1.77	34.62 - 34.4		40.5	39	38	33	19.2	0.202
UNTREATED CORUNDUM	1.76 - 1.77	34.62 - 34.4		43.5	42	39	34	19.7	0.211
ZIRCON	1.81	33.54		40.5	39	37.4	32.5	18.6	0.197
YAG	1.83	33.12		40	38.5	36.7	31.8	18.3	0.197
CUBIC ZIRCONIA	2.16 - 2.17	27.58 - 27.44		42.5	41	40.5	35	20	0.207
DIAMOND	2.42	24.41	(TOLKOWSKY)	43	40.75	39.2	34.3	20.4	0.211