

tekkusai

Apex surface data

A deep dive into the surface that actually shipped, and the test that showed me I was checking the wrong thing.

Product Apex, 1.5 mm etched glass, one time production run of 2,500

Instrument Mitutoyo SJ-220

Standard ISO 4287:1997, R profile

Filter Gaussian, λ_c 2.5 mm, λ_s 8 μm , five sampling lengths

Pad measured #1464 of 2,500, 10 July 2026

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Every number here is printed exactly as the machine reported it.

The factory and I pulled a pad out of the production run and measured it. Everything the machine reports is here (not just the parts that look good), with a plain description of what each number means.

This is pad #1464. It sits pretty much straight in the middle, not at either end of the extremes, and that is the point. This is what an Apex is, not the best one that we could find.

02 Every number

Pad #1464, measured 10 July 2026.

	MEASURED	WHAT IT MEANS
Ra	3.130 μm	How far the surface strays from its average height. The number everyone quotes, and the one that tells you least.
Rq	3.861 μm	The same idea as Ra, but it weighs the extremes more heavily.
Rz	21.113 μm	Average height from the deepest valleys to the highest peaks.
Rp	8.859 μm	The tallest single peak.
Rv	12.254 μm	The deepest single valley.
Rt	25.778 μm	Deepest valley to tallest peak across the whole run of the trace.
Rz1max	25.778 μm	The biggest single peak to valley drop found anywhere on it.
Rc	11.224 μm	Average height of the features themselves.
Rsk	-0.300	Which way the surface leans. Negative means flat tops sitting above open valleys.
Rku	3.107	How tightly the heights bunch around the middle.
RSm	194.85 μm	How far apart the peaks sit, on average.
RPc	51.32 /cm	How many peaks per centimetre. The same thing as RSm, counted instead of measured.
RΔq	0.223	How steep the sides of the peaks are.
Rk	10.896 μm	The depth of the flat zone your skates actually ride on.
Rpk	2.938 μm	How much material sits above that flat zone. The first thing a skate hits.
Rvk	4.164 μm	How deep the valleys run below it.
Mr1	6.363 %	The point where the peaks stop and the flat zone starts.
Mr2	91.465 %	The point where the flat zone stops and the valleys start.
A1	9.35	How much material there is above the flat zone. This is what your hand feels.
A2	17.77	How much empty space there is below it.
Rmr	0.024 %	How much material there is at a given height.
Rmr(c)1	0.924 %	The same, at the first height the machine checks.
Rmr(c)2	3.301 %	The same, at the second.
Rōc	2.050 μm	The distance between those two heights.

These are exactly as the machine reported them.

What that adds up to

A negative skew with a high peak count means a plateau. Flat tops sitting above open valleys, instead of a bunch of rounded points. Your skates glide on those flat tops. What sits above them, the **Rpk** and **A1** numbers, is what a skate hits first, and it is what your hand feels the most. That is what matters here, and it is not **Ra**.

03 The rest of the batch

The factory pulled 23 pads at random out of the 2,500 and measured each one in three places, far left, centre and far right. Across those 69 measurements the spacing between peaks ran from **146 to 268 µm**, while Ra moved a fraction as much.

Etching glass is chemistry, not machining. Hold the bath steady on one number and it will drift on another. Every etched surface anyone makes has a spread. I'm showing you mine because of what I found next.

04 The test that changed what I check

I had just built my ideal range around how far apart the peaks sit. So I tested whether that spacing actually predicts how a pad feels. It does not.

Three pads came to me coded A, B and C, marked only on the back. I ranked them by hand without knowing what they were.

CODED	PEAK SPACING, 3 SPOTS	WHERE IT RANKED ON PAPER	MY BLIND RANKING
B	195 / 259 / 266 µm	Widest spacing	Best one by hand
C	191 / 257 / 191 µm	In between	Middle ground
A	193 / 203 / 174 µm	Tightest spacing	Least liked by hand

It came out backwards. The pad our paper called worst was the one I liked best, and the one it called “ideal” came last. Across the range this batch sits in, how far apart the peaks are does not really tell you how a pad feels.

That part is worth knowing, and it is why the spread matters less than I thought. What your hand feels the most is the material sitting on top of the plateau, **Rpk** and **Mr1** and **A1**, not the distance between peaks. I check those now. It's part of the QC process.