"slightly small" a redundant measure

A little work on the size tables given on page 3 of ISO/IEC JTC1/SC2/WG2 N 4115, Proposal to add Wingdings and Webdings Symbols, shows that the two tables used in N4115 (for diamonds and squares) are near enough identical to each other, and to the range of sizes illustrated in Table 2.5 in UTR 25 (Unicode and Mathematics).

This suggests that the classification "slightly small", introduced in N4115, is redundant, as are the 2 "slightly small" shapes, 1F7D7 and 1F786.

Apart from one reference to regression, some distant remembrance of exponentials, logarithms and elementary Euclidean geometry would help when reading this – stuff you probably learnt around the ages of 11 or 12.

the classification of sizes

Rotate a square 45° and it becomes a diamond. If a square has sides of length *s*, its height will be *s*. If a diamond has sides of length *s*, its height will be $\sqrt{2}s$. If we remove that factor of $\sqrt{2}$ from the quoted sizes of diamonds, we can merge diamonds and squares into a single classification.

diamonds				squares		
		height	side	side		
1	tiny	280	198	198	tiny	1
2	very small	418	296	296	very small	2
3	small	558	395	394	slightly small	3
4	medium small	838	592	592	small	4
5	medium	1184	837	790	medium small	5
6	regular	1675	1184	1184	medium	6
				1480	regular	7
				2048	large	8

With one exception, the sizes (the lengths of the sides) line up, and with one exception, the category names line up. That can easily be rectified: we dispense with the oddly-named "slightly small" category, moving the other names up one row, and we simply ignore the difference between 837 and 790.

~~The body height of the Webdings fonts is 2048. Any square that size is solid black, not a geometrical object, and anyone wishing to use solid black in plaintext (?!?) is already adequately catered for by the Block Elements, and U+2588 in particular, so the last row has also been dropped from the table.~~

diamonds				squares		
		height	side	side		
1	tiny	280	198	198	tiny	1
2	very small	418	296	296	very small	2
3	small	558	395	394	small	3
4	medium small	838	592	592	medium small	4
5	medium	1184	837	790	medium	5
6	regular	1675	1184	1184	regular	6
				1480	large	7
				2048	XL	8

The body height of the Wingdings fonts is 2048. This is an exceptional category, it is not a member of the set of graduated sizes. There are currently only 3 glyphs with this size: a black square, a white square and a black circle. The XL black square differs from U+2588 in having no overshoot.

A "medium small" square can now be expected to have a side of length 592, when drawn with a body-height of 2048, which is within a few percent of the size of the "medium small" square shown in Table 2.5.

We have reduced the 3 classifications — (i) UTR 25, (ii) Wingdings/ Webdings triangles, squares, circles, &c, and (iii) Wingdings/Webdings diamonds and lozenges — into one. We still have to harmonize 3 graduation scales.

the graduation of sizes

The 2 sequences of side lengths are likely to be evenly spaced points on a geometric progression, which we can test by regressing x_i on (a renumbered) i.

	i	diamonds		squares	
		x_i	$y_i = e^{ai + b}$	x_i	$y_i = e^{ai + b}$
			a= 0.341451 b= 5.324895		a= 0.339388 b= 5.322832
tiny	0	198	205	198	205
very small	1	296	289	296	288
small	2	394	407	394	404
medium small	3	592	572	592	567
medium	4	837	805	790	797
regular	5	1184	1132	1184	1119
large	6	1480	1593	1480	1571

That's good enough, we don't need to overdo the stats: accidentally or deliberately, the chosen sizes approximate a GP. For the font used for Table 2.5 of UTR 25, a "regular" square, sitting on the base line and

centred on the math axis reaches a little past caps height, the "tiny" black square was made twice the width of a vertical stem, and that was the graduation defined. The ratio of their sides was 1:5, and there are (coincidentally) 5 steps from "tiny" to "regular", so each step up represented an increase in size of $\sqrt[5]{5}$.

Just for the record, $\sqrt[5]{5} = 1.379730$, $e^{0.341451} = 1.406988$ and $e^{0.339388} = 1.404088$. That is to say, there is not a lot of difference — approximately one point of printed area for a 72pt regular square.

Other fonts will have other landmarks they want to pick up on (a fact noted in passing in N4115), so there is no point in getting obsessive, at the encoding stage, about the exact dimensions of each size of square.

		N4115	points at 72pt*	UTR Table 2.5	points at 72pt*
1	tiny	198	7	120	9
2	very small	296	10	166	12
3	small	394	14	228	16
4	medium small	592	21	315	23
5	medium	790 837	28 29	435	31
6	regular	1184	42	600	43
7	large	1480	52	827	60
	XL	2048	72	1000	72

* this is the height, in points, of the printed area of a square, when the glyph as a whole is scaled to 72pt.

and finally...

Different faces define their character boxes differently, and allocate the space within those boxes differently.

Verdana Courier Times New Roman Bookman Old Style Wide Latin Palatino Garamond

Geometric shapes are normally centred on the math axis, and may be presumed to be independent of the baseline. The height of the math axis above the baseline, however, and consideration of caps height, x-height, etc, can be expected to produce differences in the way different fonts implement geometric shapes.