

THE PROPOSED EUROPEAN STANDARD FOR VARIABLE MESSAGE SIGNS

EN 12966 has been a long time in the preparation, so much so, explains Roger Stainforth, that it has become the de facto before the de jure standard. Here he discusses beam width and the importance for specifiers of understanding the new classes and when their use is appropriate.

The proposed European Standard for Variable Message Signs, prEN 12966, is the culmination of many years of diligent effort by representatives of industry, governments and testing authorities from across Europe.

The objective of the standard is to provide a set of functional requirements that are not technology specific and, when followed by designers and manufacturers, will result in a product of good quality and performance. The net result will be enhanced safety because mandatory and advisory messages will be displayed on signs that are both legible and reliable. Drafting of the proposed standard has taken an inordinate time, something approaching a decade for the original survivors of the drafting committee, the author joined the fray as one of three United Kingdom representatives five years ago.

When the standard finally comes out of the Brussels system as EN 12966 it will be time for two and a half cheers. Why do I say two and a half and not three cheers? Because so many versions of the various drafts are in the public domain that prEN12966 has, in the absence of anything else save the Highways Agency's TR 2136 requirements, become the *de facto* before the *de jure* standard. Bureaucracy has been overtaken by necessity. It is interesting to note that the Highways Agency has tracked the basic tenets of prEN12966 in successive issues of TR2136. In fact at one point it was the early drafts of the European standard that borrowed ideas from TR2136

As a designer and manufacturer of variable message signs, I have always had a concern that certain aspects of prEN12966 could, with the best intentions in the world, be misinterpreted by individuals charged with responsibility for selecting the performance classes for Visual and Physical Performance, chapters 7 and 8 respectively. The particular section on which I shall concentrate in the remainder of this article is beam width because if you ask for too much for a given application you might get a shock when you see the price!

Effective class combinations

The proposed standard draws attention to effective class combination in Annex E.5 which is quoted verbatim below.

“For effective use the correct selection of combinations of luminance, luminance ratio and beam width is essential. For example, the selection of the highest (brightest) Luminance class L3 for long viewing distance means, that in practice a narrow beam width is only required; this means, that the available light has a distribution to cover the lane width at a significant distance from the sign.

‘Wider beam widths distribute the light laterally over a larger angle; and consequently have a shorter viewing distance. Typically to maintain the brightness between Beam Width classes B1 and B7 the luminance required for B7 class would be approximately 24 times the B1 class. Consequently for the shorter viewing distance the luminance required is less, therefore for wider Beam Width classes it is only necessary to select the lower luminance classes.

‘Because the Luminance Ratio is linked to Luminance for any particular sign or colour, the selection of Luminance Ratio class to be used depends on the Luminance and therefore on the Beam Width. For wider Beam Width classes it is also only necessary to select the lower Luminance Ratio classes.’

Beam Width

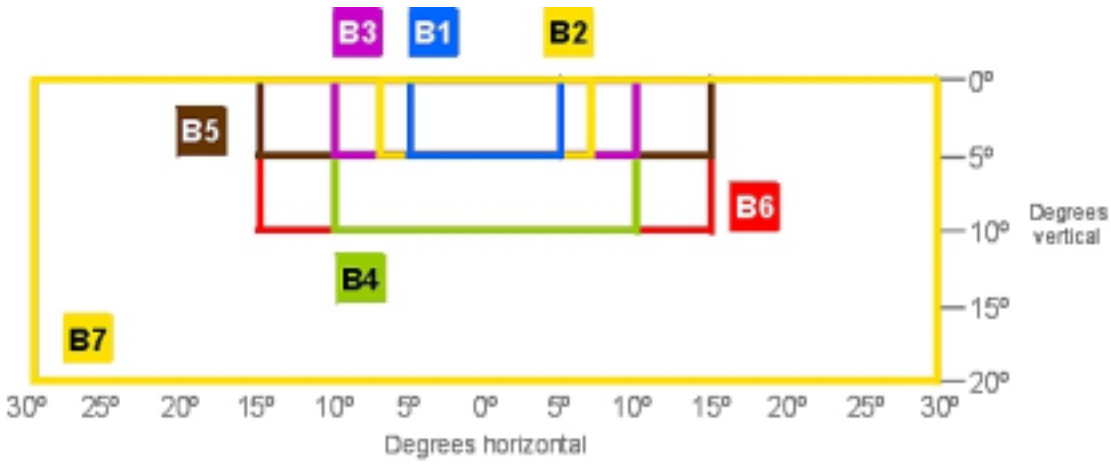
Well now, did you all understand that? Quite a lot of it I suspect, but here are some tables and illustrations to support the paragraphs above.

Seven beam width classes B1 to B7 are given in Table 6 of the proposed standard.

Table 6 – Test angles for the various beam width classes

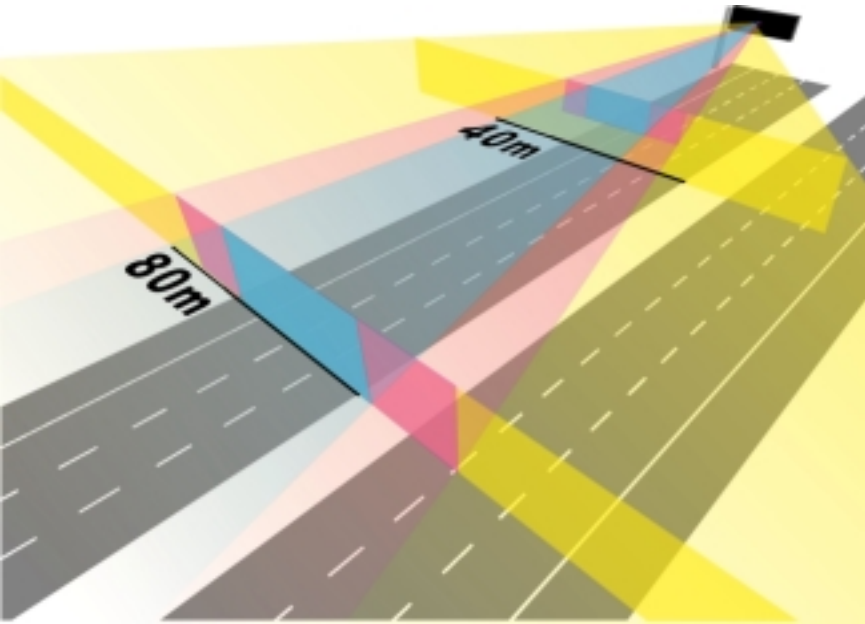
Beam width class	Test angles (degrees)	
	Horizontal	Vertical
B1	-5	0
	+5	0
	0	-5
B2	-7	0
	+7	0
	0	-5
B3	-10	0
	+10	0
	0	-5
B4	-10	0
	+10	0
	0	-10
B5	-15	0
	+15	0
	0	-5
B6	-15	0
	+15	0
	0	-10
B7	-30	0
	+30	0
	0	-20

To understand this table more graphically the illustration shows the relationship between classes. If B1 is considered as one unit then it is easier to see how B7 is 24 times B1.



The proposed standard actually states that B7 is only for specific applications. If we consider that B1 is the choice for, say, a high speed two lane and safety lane motorway or expressway then B3 and B4 could be applied to three, four and five lane highways and B5 and B6 would most likely be the selection for urban applications where approach speed is much slower. B7 is for special applications and must take cognisance of exceedingly slow approach speeds where wide-angle legibility is important such as the approach to car parks and for cyclists and pedestrians. Really it is hard to know where one would use B7.

Three dimensionally the effect of horizontal and vertical beam widths can be seen dramatically by considering Classes B1, B3 and B7.



It can be observed that B1 and B3 fit the application of a high-speed road, B1 for 2 or 3 lane and B3 for 3 to 5 lanes. B7 horizontal beam width is too wide and simply wastes emitted light in areas where it is of no value to drivers. The vertical angle determines the distance from the sign at which the emitted light touches the road surface and beyond which the message begins to cut out. In the diagram the cantilever mounted sign is vertical and has its central point 7 metres above the road surface. Thus, the approximate distances for the 3 classes are:

Class	Vertical Degrees		Distance - metres
	Up	Down	
B1	5	0	80m
B3	10	0	40m
B7	20	0	20m

If distance is equated to approach speed by noting that at 120 k/h a vehicle travels 33m/s, the driver has very little time to read the message once he or she is close to the sign. It is much better to concentrate on long distance legibility by selecting the appropriate character height and optical performance than to encourage drivers to crane their necks to read the message for the last few milliseconds!

However, in urban applications wider beam widths are necessary where smaller character sizes are deployed and approach speeds are slower.

Alignment

By adjusting the sign alignment horizontally and vertically the spread of the beam can be optimised to any given location and road layout. Using the 3D diagram you could mentally adjust the alignment of the sign to appreciate how a small adjustment to the horizontal and vertical alignments make a big difference to the distances at which messages are legible.

Energy (and financial) efficiency

Is there anyone reading this article who has not heard the arguments supporting global warming and the pleas to reduce energy consumption? So what has that got to do with variable message signs? Actually, quite a lot. By selecting the correct beam width for your application you can have an effect on the energy consumption of the VMS. Insisting on beam widths that are too wide for the location costs money, wastes energy and creates light pollution. For a long range viewing application of, say, 300 metres where a 400mm high character is required, Class B1 is probably the right choice depending on the number of lanes to be covered. If you select B7 just to be on the safe side and to cover every contingency you will require 24 times the light output and waste 23 times or 96% of the light output. Can you and your clients really afford it?

VMS Limited's *Rigel* LED technology has been designed with unique parabolic optical devices that employ the principle of total internal reflection and produces extremely accurate beam widths, optical efficacy and in consequence exceptionally low energy costs.

The views expressed in this article are the personal views of the author and do not necessarily reflect the view of the committee for the European Standards.

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