

C-NCAP MPDB Compatibility Assessment

Barrier Face Measurement calculation – Barrier Intrusion Height



Introduction

This document describes the Barrier Intrusion Height component of the Barrier Face Measurement calculation performed in the REPORTER templates:

- C-NCAP MPDB Compatibility Assessment **2022**
- C-NCAP MPDB Compatibility Assessment **2023**

The calculation follows the method specified in the [C-NCAP Management Protocol \(2021 edition\)](#).



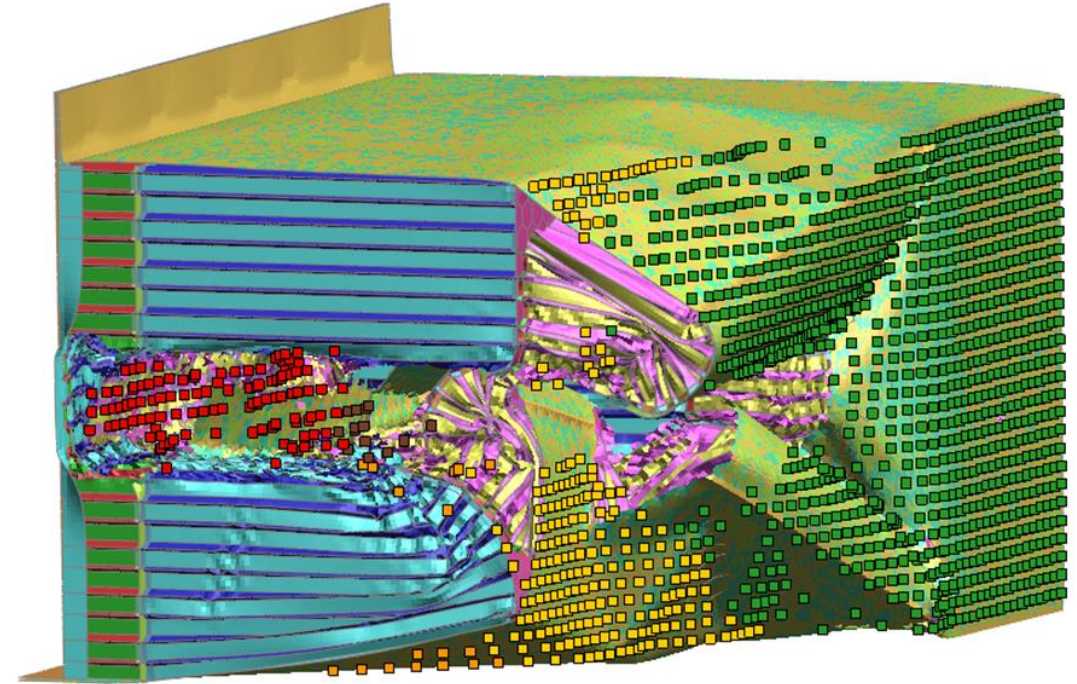
Introduction (cont.)

Compatibility is assessed based on four criteria: standard deviation of barrier deformation, occupant load criterion, barrier intrusion depth, and barrier intrusion height.

Standard deviation of barrier deformation is calculated using intrusion depth measurements at the forward projection of 1400 grid points on the barrier backplate and within an assessment area defined in part by vehicle geometry.

Barrier intrusion height is calculated for certain vehicle geometries and considers an area adjacent to the assessment area described above.

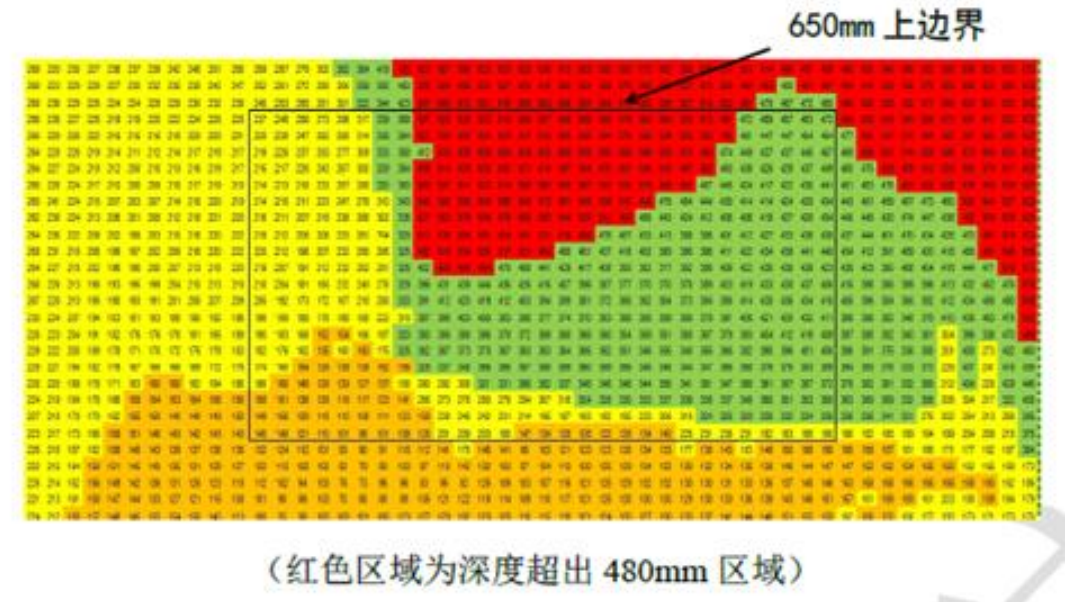
The purpose of these slides is to disambiguate our approach to the calculation of barrier height intrusion penalty.



Barrier intrusion height | *Protocol text*

“1.2.1.2.6.4 Barrier intrusion height

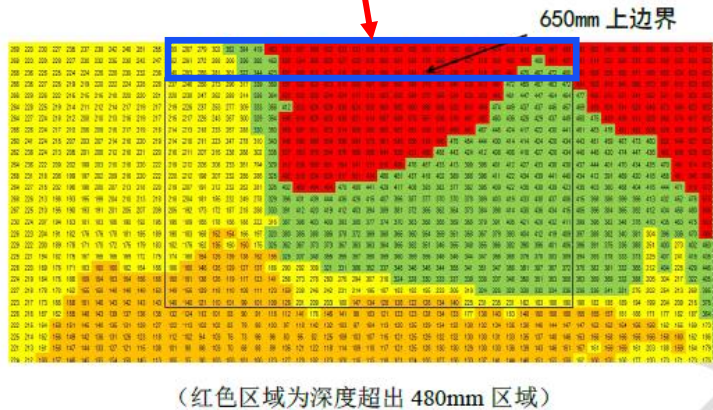
For vehicles under curb mass status, the height of lower end of longitudinal tube is more than 508mm; if the upper boundary of assessment area is in the area above 650mm, and main energy absorption structure caused at least continuous 6 elements (area 20mmX20mm) compressed depth more than 480mm, and stress pattern of the area outside 480mm area shows no attenuation trend (figure 3-15), then 1 point modifier will be applied. The height of lower end of longitudinal tube is located at complete vertical cross section of front most of main energy absorption structure, and it should be the height of lower end of complete cross section rectangle, which can envelope the front end of main energy absorption structure. The non-energy absorption parts like welding revers should not be considered in the rectangle.”



“(Red area is the area with depth more than 480mm)
Figure 3-15 example of intrusion height modifier”

Barrier intrusion height | *Interpretation*

If the bottom of the assessment area is at least 508 mm above ground and the top is more than 650 mm above the ground, superimpose a rectangle above the intrusion point grid. Check whether there are at least “**continuous 6 elements** (area 20mmX20mm) compressed depth more than 480mm”

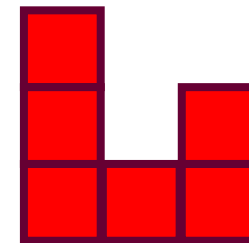
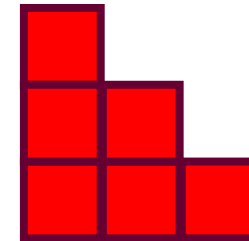


1. What kinds of shapes and orientations of 6 elements are acceptable?

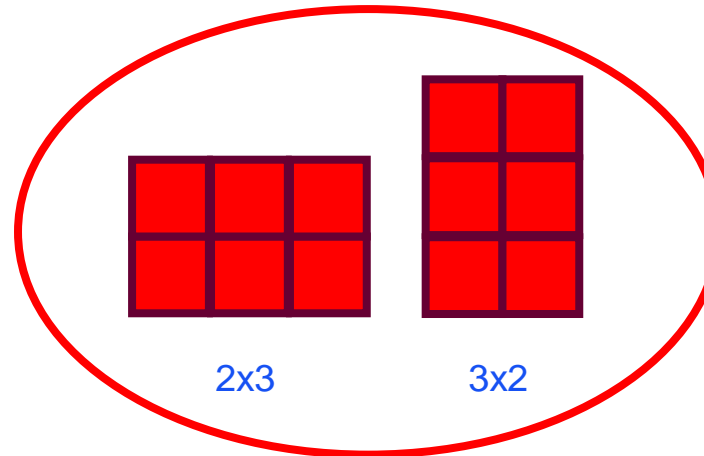
Interpretation: 2x3 or 3x2 rectangles.



1x6



Anything!



2x3

3x2

Barrier intrusion height | *Interpretation (cont.)*

2. Do these elements need to be contiguous with the main assessment area?

Interpretation: No.

Red rectangles identify example selections of elements which are valid for assessment. (These selections are illustrative, not exhaustive.) The example on the left is not contiguous with the main assessment area, but it is still valid.

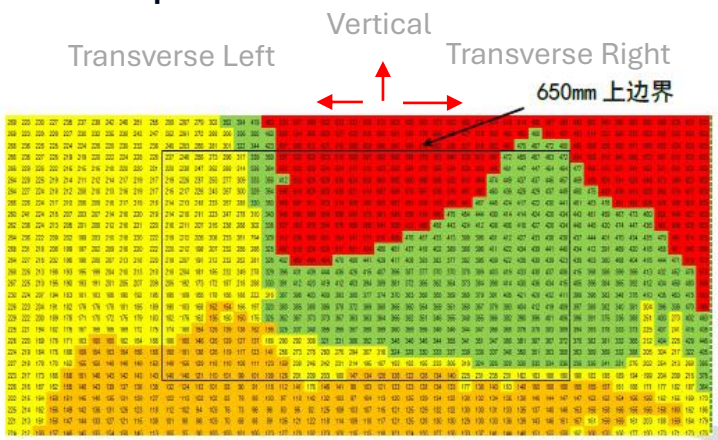
364	363	363	363	316	236	159	116	86	69	59	53	47	41	38	32	26	20	15	11	6	2	0	0	-1	-2	-3	-4	-5	-6	-7
363	363	364	364	325	231	164	119	91	70	57	49	42	35	29	24	19	14	11	7	4	2	1	1	1	0	0	-1	-1	-2	-3
363	364	364	364	344	230	163	119	90	71	57	47	39	32	27	21	17	13	10	7	4	2	1	1	1	0	0	0	-1	-1	-1
364	364	364	365	331	227	164	120	91	72	58	47	38	31	25	20	16	13	10	7	4	2	1	1	0	0	0	0	-1	-1	-1
364	364	365	365	318	228	164	121	92	72	58	47	38	31	25	20	16	13	10	7	4	3	2	1	0	0	0	-1	-1	-1	-1
364	364	365	365	331	228	164	121	93	73	58	46	39	30	24	20	16	13	10	7	5	3	2	1	0	0	0	-1	-1	-1	-1
364	365	365	365	332	226	164	122	93	73	58	47	37	30	24	19	16	13	10	7	5	3	2	1	0	0	0	0	-1	-1	-1
365	365	365	366	321	225	167	123	93	75	58	46	38	29	24	19	16	13	10	7	5	3	2	1	0	0	0	0	-1	-1	-1
365	365	365	366	331	224	165	123	94	73	59	46	36	29	24	19	15	13	10	7	5	3	2	1	0	0	0	0	-1	-1	-1
365	365	366	366	318	225	165	124	95	73	58	45	36	29	23	19	15	13	10	7	5	3	2	1	0	0	0	0	-1	-1	-1
365	366	366	366	328	224	166	124	95	75	57	45	36	29	23	19	15	12	10	7	5	3	2	1	1	0	0	0	-1	-1	-1
366	366	366	366	330	225	165	127	95	74	59	45	36	29	23	18	15	12	10	7	5	3	2	1	1	0	0	0	0	-1	-1
366	366	366	367	319	225	166	125	96	74	57	45	35	29	23	18	15	12	10	7	5	3	2	1	1	0	0	0	0	-1	-1
366	366	367	367	331	225	166	126	96	75	57	46	35	28	23	18	15	12	10	7	5	4	2	1	1	0	0	0	0	0	-1
367	367	367	367	326	226	170	129	96	74	58	44	35	28	23	18	15	12	10	7	5	4	2	1	1	1	0	0	0	0	-1
367	367	367	367	320	226	167	126	96	74	57	44	35	28	23	19	15	13	10	7	5	4	2	2	1	1	0	0	0	0	-1
367	367	367	368	315	227	168	127	96	74	57	44	35	28	23	19	15	13	10	8	5	4	3	2	1	1	0	0	0	0	-1
367	368	368	368	319	229	172	127	96	74	57	44	36	28	23	19	15	13	10	8	6	4	3	2	1	1	0	0	0	0	0
368	368	368	368	332	231	170	130	96	74	58	44	36	28	24	19	15	13	10	8	6	4	3	2	1	1	1	0	0	0	0
368	368	368	368	332	231	170	127	98	75	56	43	35	28	23	19	15	13	10	8	6	4	3	2	1	1	1	0	0	0	0
368	368	369	369	320	233	170	128	96	74	56	43	34	28	23	19	16	13	10	8	6	4	3	2	2	1	1	0	0	0	0
369	369	369	369	332	234	171	128	96	73	56	43	34	28	23	19	15	13	10	8	6	4	3	2	2	1	1	1	0	0	0
369	369	369	369	318	235	171	128	96	73	56	44	34	28	23	19	15	13	10	8	6	5	3	3	2	1	1	1	0	0	0
369	369	369	370	333	236	172	128	99	75	57	43	34	28	23	19	15	13	10	8	6	5	4	3	2	2	1	1	1	0	0

Barrier intrusion height | Interpretation (cont.)

3. How is 'attenuation trend' defined?

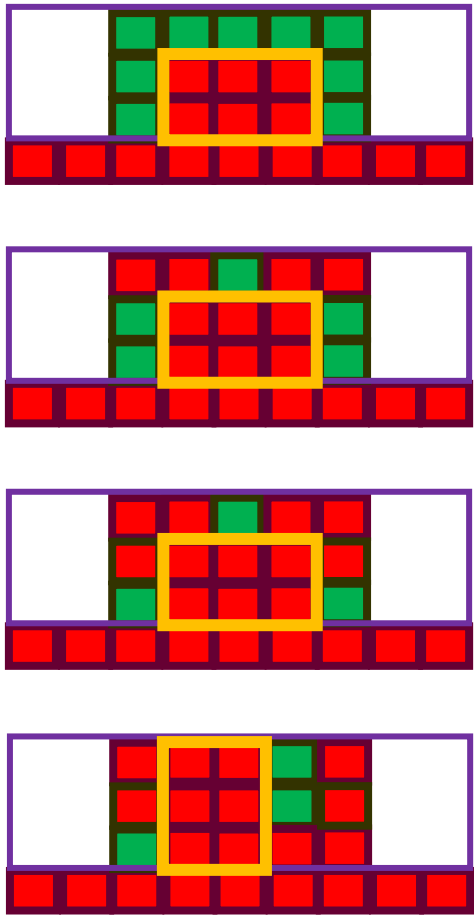
Interpretation: Two criteria must be met:

- a) In the vertical direction (if a cell exists): the colour of at least one cell must be different from the colour in the main assessment area.
- b) In the transverse direction: the colour of at least one cell must be different on both sides of the 6-element area as compared to its middle.

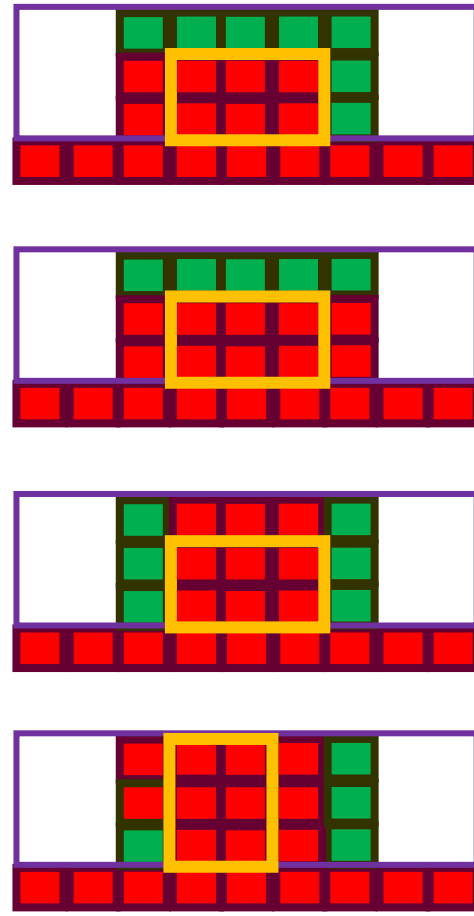


(红色区域为深度超出 480mm 区域)

ATTENUATION = YES



ATTENUATION = NO



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