

Assessment on the Minimum Sound Level of the Horn

**60th GRB Working Party on Noise
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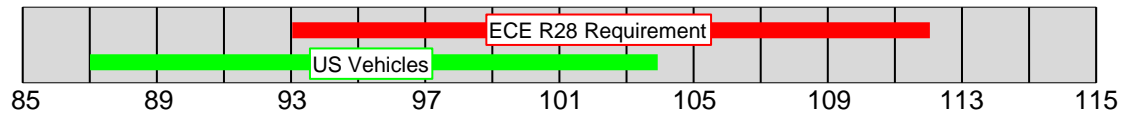
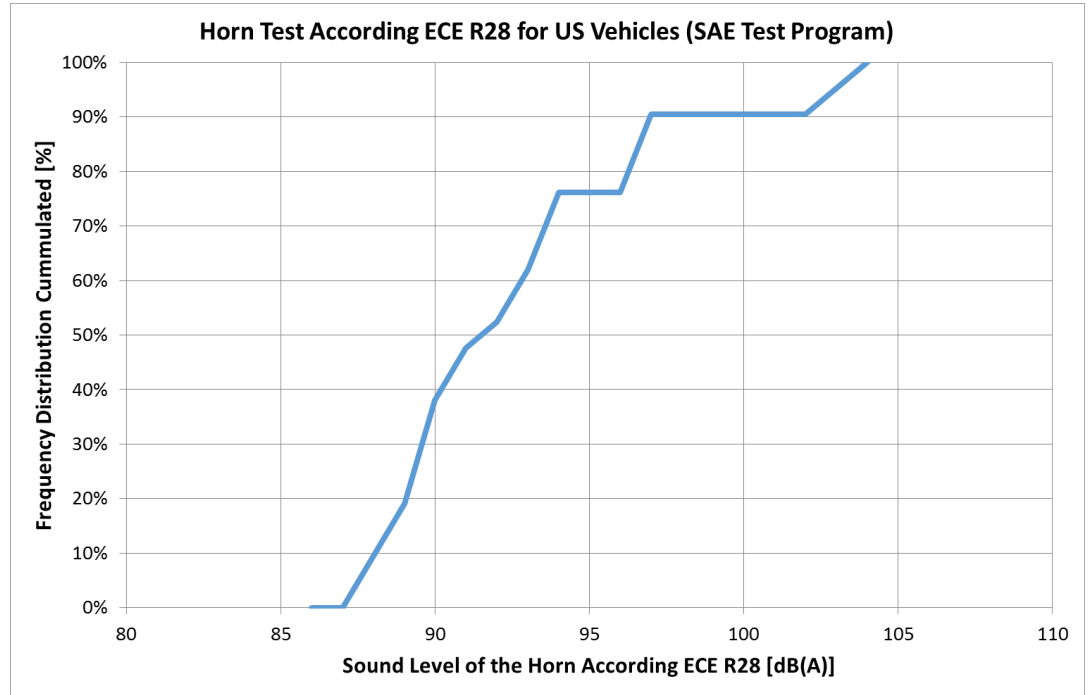
INTERNATIONAL ORGANIZATION OF MOTOR VEHICLE MANUFACTURERS

Review of Regulatory Situation in Countries that do not apply ECE R28

Countries that Require the Installation of a horn, but do not use ECE R28 (Excerpt)					
Country	Regulation Code	ECE R 28 conform	Min Sound	Max Sound	Test Procedure
Argentina	Decree 779/95 Art. 30	No	-	104 dB	IRAM Standard
Australia (Federal)	ADR 42/04	No	-	-	
Canada	Highway Traffic Act 1964, Chapter 14	No	-	-	Audible in 200ft distance (60m) (under normal traffic conditions)
Gulf Cooperation Council (GCC)	GSO 42/2003 Art. 26	No	88 dB(A)	125 dB(A)	Microphone at 2m distance and 1,25m height
Iceland	411/1993 Art. 13	No	-	-	
Korea	KMVSS Art. 53	No	90 dB(C)		Tested in 2m distance ; min required Sound is 90 dB(C)
Malaysia	L.N. 170/1959 24	No	-	-	
Mexico	RTCPJF Art. 45	No	-	-	Audible in 60m distance (under normal traffic conditions)
New Zealand	Land Transport Rule 32017/5	No	-	-	Audible in 100m distance (under normal traffic conditions)
Saudi Arabia	M/49 Dec. 23, 1971 Art. 83	No	-	-	Horns shall not be used at all near mosques, hospitals, and schools; nor shall they be used within inhabited areas, except in cases of extreme necessity
Singapore	S 345/74 24	No	-	-	The instrument or apparatus fitted to a trailer under paragraph (3) or (4) shall not have a multi-tone or produce an unduly harsh, shrill, loud or alarming noise.
United States of America	49 CFR 393G § 393.81	No	-	-	Connecticut: Audible in 200ft distance (60m) (under normal traffic conditions)

SAE Assessment on typical Horn Level of US Vehicles

SAE Market Assessment	
Vehicle	ECE R28 Result
Midsize Car	87,9
Midsize Car	93,1
Midsize Car	90,2
Vans&Midsize SUV	92,3
Vans&Midsize SUV	89,2
Large SUV	89,1
Large SUV	93,9
Large SUV	96,4
Large SUV	88,8
Luxury Large Car	87,8
Luxury Large Car	97,0
Luxury Large Car	88,8
Small SUV	90,0
Small SUV	94,0
Pickups (N1)	103,8
Pickups (N1)	102,4
Sports Car	96,8
Sports Car	91,8
Sports Car	92,8
Sports Car	89,8
Small Car	91,0



More than 60% of the tested vehicles have sound values for the horn below 93 dB(A).

Recalculation of Korean Horn Requirement

Korea
 Level: 90 dB(C)
 Distance: 2.0 m

ECE R28
 Level: 93 dB(A)
 Distance: 7.0 m

Frequency	A-Filter	C-Filter	Delta A-C
Hz	dB	dB	dB
20	-50,5	-6,5	-44,0
25	-44,7	-4,4	-40,3
...
100	-19,1	-0,3	-18,8
...
1000	0,0	0	0,0
1250	0,6	0	0,6
1600	1,0	-0,1	1,1
2000	1,2	-0,2	1,4
2500	1,3	-0,3	1,6
3150	1,2	-0,5	1,7
4000	1,0	-0,8	1,8
5000	0,5	-1,3	1,8
...
8000	-1,1	-3	1,9
...
20000	-9,3	-11,2	1,9

Distance Correction:

The sound levels attenuates by -3 to -6dB per doubling of the distance. This means that measuring in 7 m distance the sound level is approximately **-5.8 dB** more quiet compared to a measurement in 2 m distance.

Filter Correction:

Applying an A-Filter instead a C- Filter will result in slightly higher sound level of approximately **+ 1.6 dB**.

Result:

$$L_{\text{Korea(ECE R28 conform)}} = 90 \text{ dB} - 5.8 \text{ dB} + 1.6 \text{ dB} = \mathbf{85.8 \text{ dB}}$$

Conclusions from the Review of other Regulations

- There is no country that requires higher sound levels compared to ECE R28.
- Most countries require only that a horn is installed.
- Some countries require that the horn is audible in a certain distance „under normal conditions of traffic“, but no country provides a test method for this requirement.
- An assessment of SAE for the US market indicates that the typical horn level of US vehicles is between 88dB and 95dB, with 60% of the vehicles under 93 dB horn level.

It is concluded that a minimum sound level of 87 dB(A) for the vehicles a specified in paragraph xxx of ECE R28 provides a sufficient level of safety.