



Freedom of Information Request

24th October 2022

Question & Answer

- 1. Studies of the siren volume including comparative studies of siren volume compared to other ambulance services. and justification for the volume selected**

The specification of our sirens is the standard 100w used by all EU ambulance services. This is typically a remote 100w amplifier providing audible warning either direct to a speaker or sound tube. Scottish Ambulance Service vehicles are fitted with a sound tube which allows the sound to be routed to the lower front of the vehicle and directional, reducing the volume to staff and patients on board, reducing 'reflection' of sound and directing sound in the direction of travel of the vehicle.

The Scottish Ambulance Service are not aware of any direct comparison studies with other ambulance services but note that there are nominally five vehicle converters of UK ambulances with the Scottish Ambulance Service contracted converter being one of the largest, converting vehicles for several other ambulance authorities using the same component suppliers. All converters use reputable component suppliers, typically Whelen, CODE3, MCS – all of which are 100w.

While we understand that there are situations where the volume may be an issue, we also have history of complaints where sirens are not loud enough and history of road traffic collisions with existing warning systems active. We strive to provide the optimum protection for our staff, patients, the public and all road users, respecting the impact from our use of vehicles under emergency conditions. Drivers have the discretion on the use of audible warning systems and are given guidance on the use of emergency warning systems during their emergency response training.

- 2. Audiology reports on the health impact of the volume on staff and the public.**

Scottish Ambulance Service vehicles are specified, designed and built to comply with BS EN 1789:2020 which includes specifications relating to noise and warning systems. Copies of the standards documentation are available through the normal processes with fees applied as appropriate.

Scottish Ambulance specific specification encompasses the CEN standards in BS EN 1789:2020 seeking specific clarification (Note the Scottish Ambulance Service specification predates the current CEN standards but has not materially changed in this measure:

Section 7.3 – Whole Body Vibration (WBV)

The converter is to ensure that the completed vehicle does not exceed the Exposure Limit Value (ELV) when compared to a standard eight hour working day for whole body vibration, hand arm vibration, and internal noise using the ISO Standards and analysed against the limits imposed by the EC Directives and UK Standards below:

Whole Body Vibration (WBV) in accordance with ISO 2631-1 Hand Arm Vibration (HAV) in accordance with ISO 5349-1 Internal noise (IN) measured in accordance with ISO 1999:1990

The test vehicle is fitted with tri-axial accelerometers and microphones on every seat and the stretcher. The vehicle is then driven over a test route based on a version of Vehicle Measurement Group procedure VMW004.

Fig 3 shows the results obtained in tabular format.

Test Report



			Vibration					Noise				
Load Condition:	Position:	Axis:	AB		VDV		Exposure Points:	Time to LEAV: hours	Time to UEAV: hours	Time to ELV: hours	Exposure Points:	
			Average Crest Factor (above 9 use VDV)	Time to EAV: hours	Time to ELV: hours	Time to EAV: hours						Time to ELV: hours
Configuration 1	Driver	X	8.7	5.27	>8	>8	>8					152
		Y	8.9	>8	>8	>8	>8					25
		Z	29.1	>8	>8	>8	>8					23
		HAV		>8	>8							52
	Commander	X	12.7	>8	>8	>8	>8					13
		Y	9.4	>8	>8	>8	>8					20
		Z	8.9	5.95	>8	>8	>8					135
	Head Crew	X	8.4	>8	>8	>8	>8		>8	>8	>8	<10
		Y	10.4	>8	>8	>8	>8					
		Z	11.8	7.69	>8	>8	>8					104
	Box, Forward Seat	X	8.2	>8	>8	>8	>8		>8	>8	>8	<10
		Y	8.5	>8	>8	>8	>8					
Z		15.1	4.46	>8	>8	>8					180	
Configuration 2		X										0
		Y										0
		Z										0
		HAV										0
	Box, Rearward Seat	X	7.2	>8	>8	>8	>8					31
		Y	8.5	>8	>8	>8	>8					35
		Z	12.9	2.64	>8	2.75	>8					303
	Patient	X	14.8	>8	>8	>8	>8		>8	>8	>8	<10
		Y	11.3	>8	>8	>8	>8					15
		Z	14.7	5.56	>8	>8	>8					41
		X										144
		Y										
Z												

In addition, for the protection of staff during 'testing', the siren is disabled when the handbrake is applied to prevent excess noise when the vehicle is stationary.

3. Studies on the discriminatory effects of ambulance volume on people with disabilities related to noise sensitivity.

No comparable studies have been undertaken by any UK NHS Ambulance Services to the best of the services knowledge.

The primary focus in the design and use of audible warning systems has traditionally been on the effectiveness in alerting other road users, pedestrian, or vehicle occupant, of an approaching emergency response vehicle which may present a risk to that road user allowing them to firstly be aware and secondly act appropriately where possible.

Any detailed study would be highly challenging due to the varying acoustics depending on surrounding buildings, trees, open space etc., the differing road user

location in open spaces, in cars, motorbikes etc., and the hearing impairments and or disabilities, all of which change how any individual will hear the audible warning.