

—INTERNATIONAL—
ANNEX III

Technical Details of Sound Signal Appliances

1. Whistles

(a) Frequencies and range of audibility

The fundamental frequency of the signal shall lie within the range 70-700 Hz. The range of audibility of the signal from a whistle shall be determined by those frequencies, which may include the fundamental and/or one or more higher frequencies, which lie within the range 180-700 Hz (+/- 1%) for a vessel of 20 meters or more in length, or 180-2100Hz (+/- 1%) for a vessel of less than 20 meters in length and which provide the sound pressure levels specified in paragraph 1(c) below.

(b) Limits of fundamental frequencies

To ensure a wide variety of whistle characteristics, the fundamental frequency of a whistle shall be between the following limits:

- (i) 70-200 Hz, for a vessel 200 meters or more in length;
- (ii) 130-350 Hz, for a vessel 75 meters but less than 200 meters in length;
- (iii) 250-700 Hz, for a vessel less than 75 meters in length.

—INLAND—
ANNEX III
33 CFR 86

Technical Details of Sound Signal Appliances

SUBPART A—WHISTLES

§ 86.01 Frequencies and range of audibility

The fundamental frequency of the signal shall lie within the range 70-525 Hz. The range of audibility of the signal from a whistle shall be determined by those frequencies, which may include the fundamental and/or one or more higher frequencies, which lie within the frequency ranges and provide the sound pressure levels specified in § 86.05.

§ 86.03 Limits of fundamental frequencies

To ensure a wide variety of whistle characteristics, the fundamental frequency of a whistle shall be between the following limits:

- (a) 70-200 Hz, for a vessel 200 meters or more in length;
- (b) 130-350 Hz, for a vessel 75 meters but less than 200 meters in length;
- (c) 250-525 Hz, for a vessel less than 75 meters in length.

—INTERNATIONAL—
ANNEX III—Continued

(c) Sound signal intensity and range of audibility

A whistle fitted in a vessel shall provide, in the direction of maximum intensity of the whistle and at a distance of 1 meter from it, a sound pressure level in at least one 1/3-octave band within the range of frequencies 180-700 Hz (+/- 1%) for a vessel of 20 meters or more in length, or 180-2100Hz (+/- 1%) for a vessel of less than 20 meters in length, of not less than the appropriate figure given in the table below.

Length of vessel in meters	1/3-octave band level at 1 meter in dB referred to 2×10^{-5} N/m ²	Audibility range in nautical miles
200 or more	143	2
75 but less than 200	138	1.5
20 but less than 75	130	1
Less than 20	120 ^{*1} 115 ^{*2} 111 ^{*3}	0.5

NOTE: The range of audibility in the table above is for information and is approximately the range at which a whistle may be heard on its forward axis with 90 percent probability in conditions of still air on board a vessel having average background noise level at the listening posts (taken to be 68 dB in the octave band centered on 250 Hz and 63 dB in the octave band centered on 500 Hz). In practice the range at which a whistle may be heard is extremely variable and depends critically on weather conditions; the values given can be regarded as typical but under conditions of strong wind or high ambient noise level at the listening post the range may be much reduced.

*1 When the measured frequencies lie within the range 180-450Hz

*2 When the measured frequencies lie within the range 450-800Hz

*3 When the measured frequencies lie within the range 800-2100Hz

—INLAND—
ANNEX III—Continued

§ 86.05 Sound signal intensity and range of audibility

A whistle on a vessel shall provide, in the direction of the forward axis of the whistle and at a distance of 1 meter from it, a sound pressure level in at least one 1/3-octave band of not less than the appropriate figure given in Table 86.05 within the following frequency ranges (± 1 percent):

- (a) 130-1200 Hz, for a vessel 75 meters or more in length;
- (b) 250-1600 Hz, for a vessel 20 meters but less than 75 meters in length;
- (c) 250-2100 Hz, for a vessel 12 meters but less than 20 meters in length.

Table 86.05

Length of vessel in meters	Fundamental frequency range (Hz)	For measured frequencies (Hz)	1/3 octave band level at 1 meter in dB referred to 2×10^{-5} N/m ²	Audibility range in nautical miles
200 or more	70-200	130-180	145	2
		180-250	143	
		250-1200	140	
75 but less than 200	130-350	130-180	140	1.5
		180-250	138	
		250-1200	134	
20 but less than 75	250-525	250-450	130	1.0
		450-800	125	
		800-1600	121	
12 but less than 20	250-525	250-450	120	0.5
		450-800	115	
		800-2100	111	

NOTE: The range of audibility in the table above is for information and is approximately the range at which a whistle may usually be heard on its forward axis in conditions of still air on board a vessel having average background noise level at the listening posts (taken to be 68 dB in the octave band centered on 250 Hz and 63 dB in the octave band centered on 500 Hz). In practice the range at which a whistle may be heard is extremely variable and depends critically on weather conditions; the values given can be regarded as typical but under conditions of strong wind or high ambient noise level at the listening post the range may be much reduced.