

§ 201.25 Measurement location and weather conditions for measurement on receiving property of the noise of retarders, car coupling, locomotive load cell test stands, and stationary locomotives.

(a) Measurements must be conducted only at receiving property measurement locations.

(b) Measurement locations on receiving property must be selected such that no substantially vertical plane surface, other than a residential or commercial unit wall or facility boundary noise barrier, that exceeds 1.2 meters (4 feet) in height is located within 10 meters (33.3 feet) of the microphone and that no exterior wall of a residential or commercial structure is located within 2.0 meters (6.6 feet) of the microphone. If the residential structure is a farm home, measurements must be made 2.0 to 10.0 meters (6.6 to 33.3 feet) from any exterior wall.

(c) No measurement may be made when the average wind velocity during the period of measurement exceeds 19.3 km/hr (12 mph) or when the maximum wind gust velocity exceeds 32.2 km/hr (20 mph).

(d) No measurement may be taken when precipitation, e.g., rain, snow, sleet, or hail, is occurring.

§ 201.26 Procedures for the measurement on receiving property of retarder and car coupling noise.

(a) *Retarders*—(1) *Microphone*. The microphone must be located on the receiving property and positioned at a height between 1.2 and 1.5 meters (4 to 5 feet) above the ground. The microphone must be positioned with respect to the equipment in accordance with the manufacturers' recommendations for Type 1 or 2 performance as appropriate. No person may stand between the microphone and the equipment being measured or be otherwise positioned relative to the microphone at variance with the manufacturers' recommendations for Type 1 or 2 performance as appropriate.

(2) *Data*. The maximum A-weighted sound levels (FAST) for every retarder sound observed during the measurement period must be read from the indicator and recorded. At least 30 con-

secutive retarder sounds must be measured. The measurement period must be at least 60 minutes and not more than 240 minutes.

(3) *Adjusted average maximum A-weighted sound level*. The energy average level for the measured retarder sounds must be calculated to determine the value of the average maximum A-weighted sound level ($L_{ave\ max}$). This value is then adjusted by adding the adjustment (C) from Table 2 appropriate to the number of measurements divided by the duration of the measurement period (n/T), to obtain the adjusted average maximum A-weighted sound level ($L_{adj\ ave\ max}$) for retarders.

(b) *Car coupling impact*—(1) *Microphone*. The microphone must be located on the receiving property and at a distance of at least 30 meters (100 feet) from the centerline of the nearest track on which car coupling occurs and its sound is measured (that is, either the microphone is located 30 meters (100 feet) from the nearest track on which couplings occur, or all sounds resulting from car coupling impacts that occur on tracks with centerlines located less than 30 meters (100 feet) from the microphone are disregarded). The microphone shall be positioned at a height between 1.2 and 1.5 meters (4 and 5 feet) above the ground, and it must be positioned with respect to the equipment in accordance with the manufacturers' recommendations for Type 1 or 2 performance as appropriate. No person may stand between the microphone and the equipment being measured or be otherwise positioned relative to the microphone at variance with the manufacturers' recommendations for Type 1 or 2 performance as appropriate.

(2) *Data*. The maximum A-weighted sound levels (FAST) for every car coupling impact sound observed during the measurement period must be read from the indicator and recorded. At least 30 consecutive car coupling impact sounds must be measured. The measurement period must be at least 60 minutes and not more than 240 minutes, and must be reported.

TABLE 2—ADJUSTMENT TO $L_{ave\ max}$ TO OBTAIN $L_{adj\ ave\ max}$ FOR RETARDERS AND CAR COUPLING IMPACTS¹

[n/T=number of measurements/measurement duration (min)]	C=Adjustment in dB]
0.111 to 0.141	-9
0.142 to 0.178	-8
0.179 to 0.224	-7
0.225 to 0.282	-6
0.283 to 0.355	-5
0.356 to 0.447	-4
0.448 to 0.562	-3
0.563 to 0.708	-2
0.709 to 0.891	-1
0.892 to 1.122	0
1.123 to 1.413	+1
1.414 to 1.778	+2
1.779 to 2.239	+3
2.240 to 2.818	+4
2.819 to 3.548	+5
3.549 to 4.467	+6

¹ $L_{adj\ ave\ max} = L_{ave\ max} + C$ in dB. Values in Table 2 were calculated from $C = 10 \log n/T$ with intervals selected to round off values to the nearest whole decibel. The table may be extended or interpolated to finer interval gradations by using this defining equation.

(3) *Adjusted average maximum A-weighted sound level.* The energy average level for the measured car coupling sounds is calculated to determine the average maximum sound level ($L_{ave\ max}$). It is then adjusted by adding the adjustment (C) from Table 2 appropriate to the number of measurements divided by the duration of the measurement period (n/T), to obtain the adjusted average maximum A-weighted sound level ($L_{adj\ ave\ max}$) for car coupling impacts.

§ 201.27 Procedures for: (1) Determining applicability of the locomotive load cell test stand standard and switcher locomotive standard by noise measurement on a receiving property; (2) measurement of locomotive load cell test stands more than 120 meters (400 feet) on a receiving property.

(a) *Microphone.* The microphone must be located at a receiving property measurement location and must be positioned at a height between 1.2 and 1.5 meters (4 and 5 feet) above the ground. Its position with respect to the equipment must be in accordance with the manufacturers' recommendations for Type 1 or 2 performance as appropriate. No person may stand between the microphone and the equipment being measured or be otherwise positioned relative to the microphone at variance to the manufacturers' recommendations for Type 1 or Type 2 performance as appropriate.

(b) *Data.* (1) When there is evidence that at least one of these two types of nearly steady state sound sources is affecting the noise environment, the following measurements must be made. The purpose of these measurements is to determine the A-weighted L_{90} statistical sound level, which is to be used as described in subparagraph (c) below to determine the applicability of the source standards. Before this determination can be made, the measured L_{90} is to be "validated" by comparing the measured L_{10} and L_{99} statistical sound levels. If the difference between these levels is sufficiently small (4 dB or less), the source(s) being measured is considered to be a nearly steady state source.

(2) Data shall be collected by measuring the instantaneous A-weighted sound level (FAST) at a rate of at least once each 10 seconds for a measurement period of at least 15 minutes and until 100 measurements are obtained. The data may be taken manually by direct reading of the indicator at 10 second intervals (± 1 second), or by attaching a statistical analyzer, graphic level recorder, or other equivalent device to the sound level meter for a more continuous recording of the instantaneous sound level.

(3) The data shall be analyzed to determine the levels exceeded 99%, 90%, and 10% of the time, i.e., L_{99} , L_{90} , and L_{10} , respectively. The value of L_{90} is considered a valid measure of the A-weighted sound level for the standards in § 201.16 only if the difference between L_{10} and L_{99} has a value of 4 dB or less. If a measured value of L_{90} is not valid for this purpose, measurements may be taken over a longer period to attempt to improve the certainty of the measurement and to validate L_{90} . If L_{90} is valid and is less than the level in applicable standards for these source types, the sources are in compliance. If the measured value of L_{90} is valid and exceeds the initial 65 dB requirement for any of the source types that appear to be affecting the noise environments, the evaluation according to the following paragraph (c) is required.

(c) *Determination of applicability of the standard when L_{90} is validated and is in excess of one or more of the source standards.* The following procedures must be