Compressor Noise Evaluation

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OVERVIEW
THE DECIBEL
SOUND REGULATIONS
BASICS OF ON-SITE ASSESSMENT

History of the Decibel

Engineers at Bell Laboratories used logarithmic expression for the Ratio of Electrical Power

$$\text{Ratio} = \log_{10} (P_1 / P_2)$$

Because normal sound pressure levels cover a very wide range

0.000,000,1 PSI to 0.001 PSI

Using logarithms to express the Sound Pressure Level would eliminate having to work with a large range of numerical values.

Thus!! THE BEL

$$Bel = \log_{10} \ (P^2/P_R^2)$$

$P_R =$ A Baseline or Reference Level

$P_R = 0.00002$ Newtons/Meter^2

The Bel was too big, so the Bel was decimated.

Decimated Bel = $10 \log_{10} (P^2/P_R^2)$

Decibel = $10 \log_{10} (P^2/P_R^2)$

$dB = 20 \log_{10}(P/P_R)$

$P_R = 0.00002$ Newtons/Meter^2

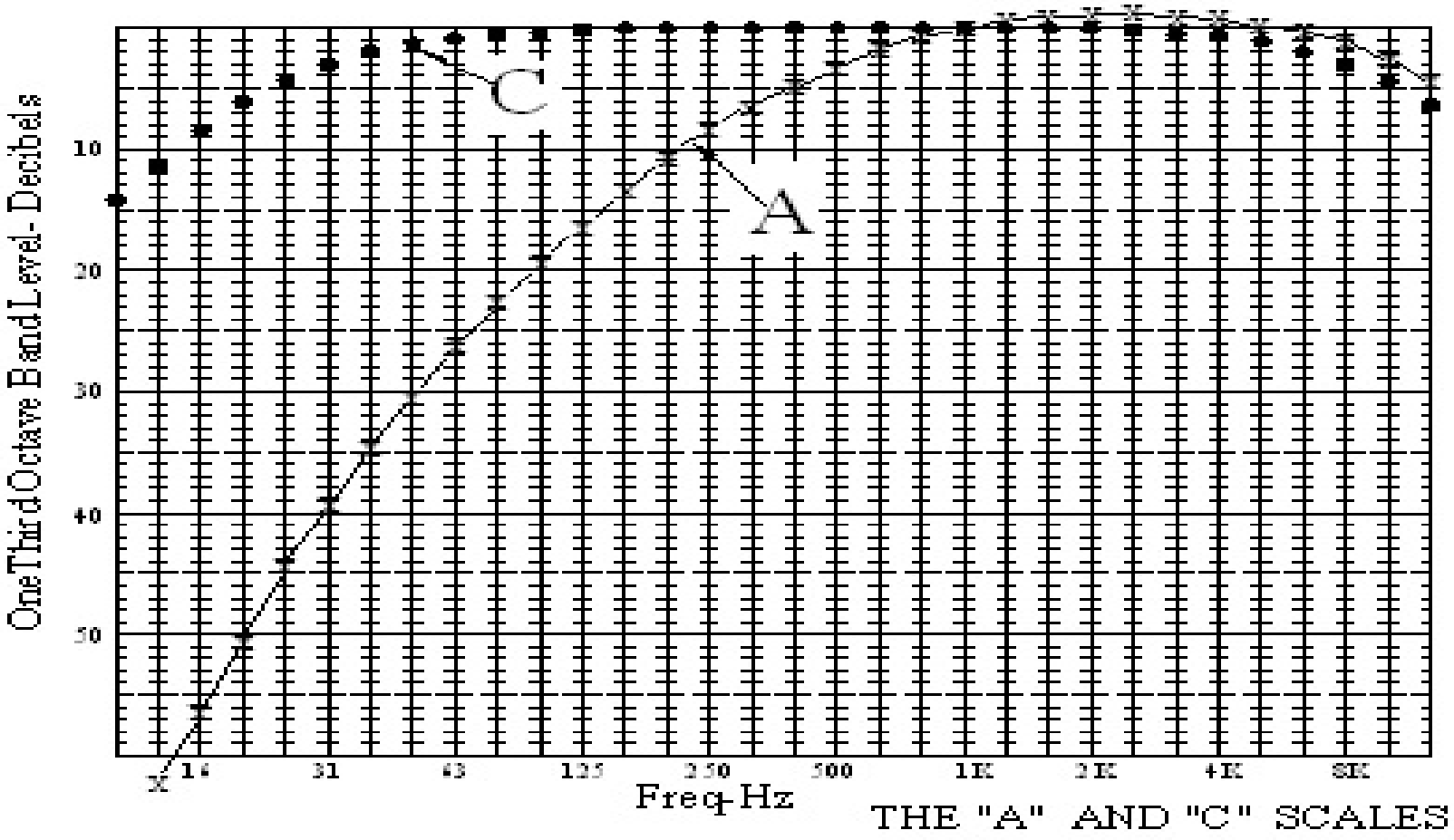
1 Newton = 0.225 Pounds

1 Newton/Meter^2 = 94 dB

The

A and C Scales

Why?



THE "A" AND "C" SCALES

NOISE LAWS

Regulations - Ordinances

Establishment of the
Environmental Protection Agency

and the

Noise Control Act of 1972

The Day-Night Noise Level
shall not exceed 55 dB(A)

$L_{dn} \leq 55$ dB(A)

Daytime

7:00am to 10:00pm – 55 dB(A)

Nighttime

10:00pm to 7:00am – 45 dB(A)

A 10 dB penalty is added to the Nighttime Noise Level

Not possible to Reduce Noise From 55 dB(A) during the Daytime to 45 dB(A) during the Nighttime

Steady Noise of 48.6 dB(A) equals

L_{dn} = 55 dB(A)

State of Colorado
CRS 25-12

25 Ft. Beyond Property Line		
Residential	55 dB(A)	50 dB(A)
Commercial	60 dB(A)	55 dB(A)
Light Industrial	70 dB(A)	65 dB(A)
Industrial	80 dB(A)	75 dB(A)
Construction	80 dB(A)	75 dB(A)

COGCC Follows State of Colorado except
Nighttime starts at 7:00pm instead of 10:00pm

Residential/Ag Rural	55 dB(A)	50 dB(A)
Commercial	60 dB(A)	55 dB(A)
Light Industrial	70 dB(A)	65 dB(A)
Industrial	80 dB(A)	75 dB(A)
Low Frequency	65 dB© @ 25 ft.	

From Noise Source 350 ft. – 50 dB(A) Equals

50 ft	67
100 ft.	61
200 ft.	55
350 ft.	50
400 ft.	49
500 ft.	47
1320 ft.	38
2640 ft.	32
5280 ft.	26

Summary

EPA	$L_{dn} \geq 55$ dB(A)
FERC	$L_{dn} \geq 48.6$ dB(A) @ R
Colorado	$L_{dn} \geq 55/50$ dB(A) @ 25’
COGCC	$L_{dn} \geq 55/50$ dB(A) @ 350’/R