

NOISE CONTROL

JUNE 28, 1983

SUBJECT: UTILIZING MUFFLERS IN TANK CAR CLEANING/RAILROAD DEPARTMENT

DISTRIBUTION:

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OBJECTIVES: 1. SAFETY

A. TO PROTECT AND INSURE THE PHYSICAL WELFARE OF EMPLOYEES

B. TO PROVIDE BETTER AND MORE PLEASANT WORKING CONDITIONS

2. TO PROVIDE A WORK ENVIRONMENT CONDUCIVE TO MAXIMUM EFFORT
AND INCREASED MORALE

THIS IS THE CONCLUSION OF AN EXTENDED AND COMPREHENSIVE NOISE SURVEY USING
MUFFLERS FOR NOISE CONTROL. THESE RESULTS SHOW THAT REDUCTION AND CONTROL
OF EXCESSIVE NOISE IS FEASIBLE AND EFFECTIVE BY THIS METHOD.

A SEPARATE SURVEY ON EACH OF THE FOLLOWING PAGES SHOWS:

1. APPLICATION OF MUFFLER
2. RESULTS OF NOISE SURVEY (BEFORE AND AFTER)
3. CONCLUSION
4. RECOMMENDATION
5. SUGGESTED PURCHASING INFORMATION

ALLIED WITAN (ALWITCO) MUFFLERS WERE USED AND THEY PROVED TO BE INEXPENSIVE,
EASY TO INSTALL AND EFFECTIVE. MUFFLERS RECOMMENDED ARE CONSIDERED BEST
OVER-ALL FOR PERFORMANCE, DURABILITY AND THRUST NECESSARY TO ACCOMPLISH EACH
PARTICULAR TASK.

ALL SURVEY RESULTS ARE IN DECIBELS (DBA).

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lrj

APPLICATION: CLEANING AND DRYING POLYETHYLENE HOPPER CAR BOTTOM OUTLETS
WITH AIR USING 3/4 INCH AIR HOSE WITH MUFFLER AS NOZZLE.
DURATION 5 TO 7 MINUTES PER CAR.

RESULTS:	WITHOUT MUFFLER	WITH MUFFLER R-88/D
AT HEARING ZONE OF OPERATOR	124	110
10 FT. FROM SOURCE	108	95
20 FT. FROM SOURCE	104	88
AIR NOISE ONLY--AT HEARING ZONE	121	96

NOISE REDUCTION ACHIEVED WITH MUFFLER: 14 DBA WHEN AIR APPLIED TO CAR
25 DBA AIR NOISE ONLY

CONCLUSION: EXCELLENT REDUCTION OF AIR NOISE. INITIAL LEVELS WERE
EXTREMELY HIGH.

RECOMMENDATION: SHOULD BE PURCHASED AND USED. HEARING PROTECTION
WOULD STILL BE NECESSARY.

MUFFLER USED: ALWITCO AIR EJECTOR AE TYPE R-88/D WITH ONE INCH MALE
PIPE CONNECTION. PRICE \$17.30 EACH.

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APPLICATION: DRYING INTERIOR OF TANK CARS WITH AIR USING 3/4 INCH AIR
HOSE WITH MUFFLER AS NOZZLE. DURATION - 15 MINUTES PER CAR.

RESULTS:	WITHOUT MUFFLER	WITH MUFFLER R-88
ON DOME PLATFORM NEXT TO MANWAY	108	98
INSIDE DOME MANWAY AT TOP OF CAR	122	108
INTERIOR OF CAR	126	112
ELEVATED WALKWAY 12 FT. FROM SOURCE	88	78

NOISE REDUCTION ACHIEVED WITH MUFFLER: 14 DBA WHEN DRYING INTERIOR OF CAR

CONCLUSION: EXCELLENT REDUCTION OF AIR NOISE. INITIAL LEVELS WERE
EXTREMELY HIGH.

RECOMMENDATION: SHOULD BE PURCHASED AND USED. HEARING PROTECTION
WOULD STILL BE NECESSARY BY ANYONE ON OR INSIDE TANK CAR.

MUFFLER USED: ALWITCO AIR EJECTOR AE TYPE R-88 WITH ONE INCH MALE PIPE
CONNECTION. PRICE \$17.30 EACH

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APPLICATION: STEAMING INTERIOR OF TANK CAR USING TWO MUFFLERS CONNECTED TO A TEE AT END OF ONE INCH STEAM LINE, PROVIDING THRUST OF STEAM TO EACH END OF CAR. DURATION - 15 MINUTES PER CAR.

RESULTS:	WITHOUT MUFFLERS	WITH MUFFLERS R-88
ON DOME PLATFORM 3 FT. FROM SOURCE	106	100
ELEVATED WALKWAY 10 FT. FROM SOURCE	95	90
ELEVATED WALKWAY UNDER ROOF, EAST END	86	82
ELEVATED WALKWAY UNDER ROOF, WEST END	77	75
GROUND LEVEL NEXT TO CAR	89	85
GROUND LEVEL NORTH SIDE OF SHED	83	80
GROUND LEVEL SOUTH SIDE OF SHED	82	79
GROUND LEVEL EAST SIDE OF SHED	89	85
GROUND LEVEL WEST SIDE OF SHED	77	75

CONCLUSION: VERY EFFECTIVE IN REDUCING STEAM NOISE

RECOMMENDATION: SHOULD BE PURCHASED AND INSTALLED. HEARING PROTECTION WOULD NO LONGER BE REQUIRED UNLESS WITHIN 10 FEET OF SOURCE.

MUFFLER USED: ALWITCO AIR EJECTOR AE TYPE R-88 WITH 1 INCH MALE PIPE CONNECTION. PRICE \$17.30 EACH.

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APPLICATION: AIR DRIVEN 3 INCH SUCTION PUMP MFD. BY WARREN RUPP CO. USED
TO PUMP WATER FROM TANK CARS.

RESULTS:	WITHOUT MUFFLER	WITH MUFFLER X-10
1 FT. FROM SOURCE	100	85
5 FT. FROM SOURCE	94	79
10 FT. FROM SOURCE	91	77
15 FT. FROM SOURCE	89	75
20 FT. FROM SOURCE	87	74
25 FT. FROM SOURCE	85	73

CONCLUSION: EXCELLENT REDUCTION OF AIR NOISE, BELOW OSHA STANDARD

RECOMMENDATION: SHOULD BE PURCHASED AND INSTALLED. HEARING PROTECTION
WOULD NO LONGER BE NECESSARY.

MUFFLER USED: ALWITCO AIR EXHAUST EP TYPE X-10 WITH 1 INCH MALE PIPE
CONNECTION. PRICE \$10.75 EACH.

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APPLICATION: AIR DRIVEN 2 INCH SUCTION PUMP, MFD. BY PRESSED AND
WELDED PRODUCTS. USED TO PUMP WATER FROM TANK CARS.

RESULTS:	WITHOUT MUFFLER	WITH MUFFLER X-10
1 FT. FROM SOURCE	102	81
5 FT. FROM SOURCE	93	78
10 FT. FROM SOURCE	90	76
15 FT. FROM SOURCE	88	75
20 FT. FROM SOURCE	87	74
25 FT. FROM SOURCE	85	72

CONCLUSION: EXCELLENT REDUCTION OF AIR NOISE, BELOW OSHA STANDARD

RECOMMENDATION: SHOULD BE PURCHASED AND INSTALLED. HEARING PROTECTION
WOULD NO LONGER BE NECESSARY.

MUFFLER USED: ALWITCO AIR EXHAUST EP TYPE X-10 WITH 1 INCH MALE PIPE
CONNECTION. PRICE \$10.75 EACH.

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APPLICATION: AIR DRYER AIR RELEASE.

RELEASE CYCLE - ON 4 MINUTES, OFF 1 MINUTE.

RESULTS:	WITHOUT MUFFLER	WITH MUFFLER X-10	WITH MUFFLERS X-10 & T-10 CONNECTED
1 FT. FROM SOURCE	116	110	96
3 FT. FROM SOURCE	112	103	94

CONCLUSION: EXCELLENT REDUCTION OF AIR RELEASE NOISE WHEN MUFFLERS X-10 and T-10 ARE CONNECTED TOGETHER.

RECOMMENDATION: SHOULD BE PURCHASED AND USED. THIS NOISE SOURCE IS WITHIN A CONCRETE BLOCK WALL ENCLOSURE WITH OTHER NOISY EQUIPMENT. HEARING PROTECTION IS ALREADY REQUIRED AND SHOULD CONTINUE TO BE REQUIRED.

MUFFLERS USED: ALWITCO AIR EXHAUST EP TYPE X-10 WITH ONE INCH MALE PIPE CONNECTION. PRICE \$10.75 EACH.

ALWITCO TF TYPE T-10 THRU-FLOW MUFFLER WITH ONE INCH MALE PIPE CONNECTIONS. PRICE \$13.20.

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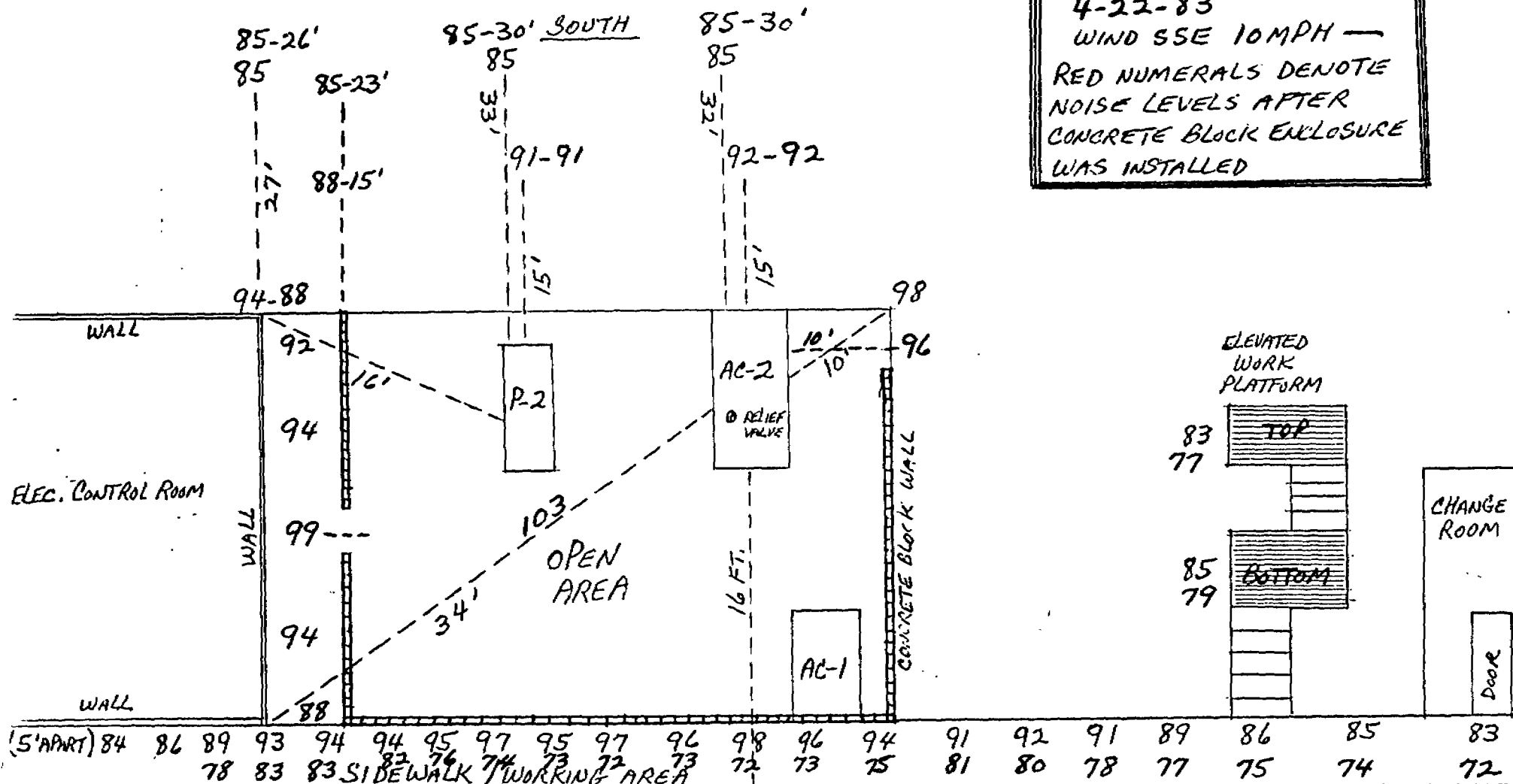
2-23-82 WEST END BLDG. 4101 WIND CFX/11

AC-2 AND PUMP P-2 RUNNING (AC-2 PANELS OFF)

4-22-83

WIND SSE 10MPH —

RED NUMERALS DENOTE
NOISE LEVELS AFTER
CONCRETE BLOCK ENCLOSURE
WAS INSTALLED



← TRACK 414 - POLY HOPPER CARS SPOTTED →

READINGS ON SIDEWALK/WORKING AREA TAKEN 5 FT. APART NEXT TO CARS

NORTH

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9-23-82
 DRYING HOPPER CAR

AIR NOISE ONLY-WITHOUT MUFFLER-HEARING ZONE — ~~121~~ 121

~~FOR THE ONLY DRYING CAR WITH A MUFFLER~~
 (ONE LENGTH OF AIR HOSE)

	R-88/D 1 IN.	R-68/D 3/4 IN.	D-88 1 IN.	D-68 3/4 IN.	WITHOUT MUFFLER, DRYING CAR
OPR. HEARING ZONE	110	109	109	113	124
10'	95	93	93	96	104
20'	88	87	86	91	96
AIR NOISE ONLY-WITH MUFFLER-HEARING ZONE	96	93	93	92	
BEST OVER-ALL FOR THRUST, DURABILITY + PERFORMANCE 9-23-82 AIR NOISE ONLY REDUCED 25 DBA - 94 0/10 — DRYING CAR WITH R-88/D REDUCED NET 14 DBA - 80 0/10					

6/23/83

APPLICATION: DRYING INTERIOR OF TANK CARS WITH AIR USING 3/4 INCH AIR HOSE
WITH MUFFLER AS NOZZLE. DURATION - 5 MINUTES PER CAR.

R-88
BEST OVERALL
↓ 6-23-83

RESULTS:

ON DOME PLATFORM NEXT TO MANWAY
- INSIDE DOME MANWAY AT TOP OF CAR
- INTERIOR OF CAR
ELEVATED WALKWAY 12 FT. FROM SOURCE

AIR ONLY
BEFORE INSTALLING
MUFFLER

~~109-110~~ 108
~~120-122~~ 122
~~126-128~~ 126
~~90-92~~ 88

AFTER INSTALLING
MUFFLER R-88

98-99 98
107-108 108
112-114 110-112
79-81 78

1 INCH
R-88/D 79WJ 80 80LJ
NOT ENOUGH ↑ THRUST ↑
6-23-83

IDENTICAL RESULTS WERE OBTAINED USING A ONE INCH R-88 MUFFLER WITH BUSHING
1" TO 3/4", PRICE \$17.30.

DRYING HOPPER CAR

9-16-82

	<u>D-88 (1 in.)</u>	<u>TOGETHER 80-LJ/R-88</u>	<u>T-07 (3/4 in.) D-88 (1 in.)</u>	<u>T-07 ON IN LINE</u>
OPR. HEARING ZONE	107			
10'	97			
20'	92			
AIR NOISE ONLY WITH MUFFLER-HEARING ZONE	93			
	CANT CUT DOWN AIR PRESSURE WITH D-88	NOT ENOUGH THRUST	NOT ENOUGH THRUST	NOT ENOUGH THRUST

9-17-82 { APPLIED TO CAR
AIR TEST ONLY
FOR THRUST }

79 WJ WITH HOLE IN
CENTER OF NOZZLE

NOT ENOUGH THRUST -
NOT EVEN CLOSE

80 LJ WITH HOLE IN
CENTER OF NOZZLE

NOT ENOUGH THRUST BUT
BETTER THAN ~~79~~ 79 WJ

DRYING HOPPER CAR

9-21-82

(TWO AIR HOSES CONNECTED)
=====

OPR. HEARING ZONE
10'
20'
AIR NOISE ONLY WITH
MUFFLER-HEARING ZONE

AIR ONLY - NO MUFFLER - 124
HEARING ZONE

R-88/D (1 in.)
FULL PRESSURE ~~107~~ 107

92

84

95

BEST THRUST & BEST
PERFORMANCE -
CANT CUT DOWN AIR
PRESSURE

ACTUAL REDUCTION WITH R-88/D
29 AIR ONLY WITH MUFFLER - 96%
17 NET WITH MUFFLER DRYING CAR - 86%
REDUCTION

R-68/D (3/4 in.)
FULL PRESSURE ~~105~~ 105

90

84

93

2ND BEST PERFORMER,
CANT CUT DOWN AIR
PRESSURE
THRUST GOOD BUT NOT
UP TO R-88/D

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AIR TESTING ONLY - NOT USED ON CARS

8-31-82

R-88 1"

106 - FULL PRESSURE

100 - HALF "

R-68 3/4"

105 - FULL PRESSURE

100 - HALF "

R-88 1" MOD. (EXTRA HOLES)

105 - FULL PRESSURE

98 - HALF "

R-68 3/4" MOD. (EXTRA HOLES)

106 - FULL PRESSURE

101 - HALF "

AIR ONLY
~~WITH MUFFLER~~
WITH MUFFLER

9-15-82
D-88-1"

~~R-88~~

102

R-88

107

R-88-MOD. EXTRA HOLES

107

D-88, R-88 + R-88-MOD. EXTRA HOLES SAME RESULTS (95) WHEN
USED WITH 3/4" MUFFLER T-07 - NOT ENOUGH THRUST

9-21-82

AIR ONLY
WITH MUFFLER

R-88/D-1"

104 - FULL PRESSURE

100 - HALF "

R-68/D-3/4"

102 - FULL PRESSURE

98 - HALF PRESSURE

APPLICATION: CLEANING AND DRYING POLYETHYLENE HOPPER CAR BOTTOM OUTLETS
WITH AIR USING 3/4 INCH AIR HOSE WITH MUFFLER AS NOZZLE.
DURATION 4 TO 5 MINUTES PER CAR.

RESULTS:

AT HEARING ZONE OF OPERATOR
10 FT. FROM SOURCE
20 FT. FROM SOURCE
AIR NOISE ONLY--AT HEARING ZONE

NO MUFFLER -
AIR HOSE ONLY
~~BEFORE INSTALLING~~
~~MUFFLER~~

~~118-124~~ 121
~~108-112~~ 108
~~104-108~~ 104
~~120-122~~ 122

(1 INCH)
~~BEFORE INSTALLING~~
MUFFLER-R-88

~~110-114~~ 115
~~98-102~~ 103¹⁰²
~~94-96~~ 99⁹⁹
~~102-103~~ 102¹⁰²

QUIETER,
HOWEVER,
NOT ENOUGH
THRUST!

79 WJ

80-81
77-80
74-78
77-78

NOT ENOUGH
THRUST TO
EJECT H₂O
ON FAR
SIDE.

80

97-103
85-90
81-84
86-87

80 LJ

96-103
88-92
84-88
83-84

IDENTICAL RESULTS WERE OBTAINED USING A ONE INCH R-88 MUFFLER WITH BUSHING
1" to 3/4", PRICE \$17.30.

8-26-82 - DRYING HOPPER CAR

MUFFLER R-88 (1 INCH) WITH AIR REDUCED TO APPROX. HALF PRESSURE :

OPR. HEARING ZONE - 110

10 FT. FROM SOURCE - 98

20 FT. " " - 91

AIR ONLY WITH R-88-OPR. HEARING ZONE - 92

PERFORMANCE OK USING MUFFLER WITH AIR REDUCED TO APROX. HALF PRESSURE

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