

LOADED SOUND TEST SUMMARY SHEET

NAME OF DEVICE UNDER TEST (DUT)	Grinder
TOOL OPERATOR	Edward Zechmann
COMPUTER OPERATOR	Hyunsu Kim
TEST DATE	12/6/2005
TEST DESCRIPTION	Sound Power Level Measurement
TEST LOCATION	UC anechoic lab
MANUFACTURER	Porter Cable
MODEL	7430
SERIAL NUMBER	010318WT4080
MODE OF OPERATION	Normal
RUN NUMBER	1
YEAR MADE	
DIMENSIONS (inches)	Length 12, Width 9, Height 5
WEIGHT (lbs.)	4.6 lbs.
TECHNICAL SPECIFICATIONS	4 1/2 inch grinder
MOUNTING CONDITIONS	HELD TIGHTLY BY OPERATOR WITH BOTH HANDS
LOADING CONDITIONS	FULL SPEED, LOADED WITH STEEL BLOCK ON RUBBER
K1 (dBA)	0
K2 (dBA)	1.3
TEMPERATURE (FARHENHEIT, CELSIUS)	23 C
HUMIDITY %	14
BAROMETRIC PRESSURE ("Hg, Pa)	30.28 "Hg
TEST ENVIRONMENT	SEMI ANECHOIC, SEMI HEMISPHERICAL
TOOL TESTING STANDARD	ANSI S12.15-1992
MEASUREMENT STANDARD	ISO 3744:1994-05-01
MICROPHONE SET-UP	10-MICROPHONES
SURFACE RADIUS	2.00 meters
RATED POWER (WATTS)	720
ACTUAL INPUT POWER (WATTS)	NA
VOLTAGE (VOLTS)	NA
CURRENT (AMPS)	NA
RATED RPM	10000
ACTUAL RPM	NA
SOUND POWER LEVEL (dBA)	98.9
SOUND POWER (WATTS) A-weighted	0.00768
SWLA - k2 (dBA)	97.6
SWLA - k2 (WATTS) A-weighted	0.00569
SOUND PRESSURE LEVEL (dBA) @ 2 meters	84.9
AT THE NOMINAL HEARING ZONE OF OPERATOR	
SOUND PRESSURE LEVEL (dBA)	96.1

Average Directivity Study

TEST DATE 12/6/2005
DUT Grinder
Manufacturer Porter Cable
Model Number 7430
Serial Number 010318WT4080
Mode Normal
Run Number 1

A-weighted Sound Pressure Level

	Position1	Position2
Mic #	dBA	dBA
1	88.6	86.7
2	85.7	85.2
3	81.0	84.3
4	79.6	83.5
5	85.8	83.7
6	83.8	80.9
7	82.6	82.9
8	79.4	86.2
9	87.4	84.4
10	86.0	86.3
11	96.1	93.7
dB difference	9.2	5.9

A-weighted Directivity Index

Mic #	dBA	dBA
0	4.6	2.3
1	1.7	0.8
2	-3.0	-0.1
3	-4.4	-1.0
4	1.8	-0.7
5	-0.2	-3.5
6	-1.4	-1.5
7	-4.6	1.7
8	3.4	0.0
9	2.0	1.9
10	12.1	9.3

SOUND DATA SHEET

PRODUCT INFORMATION

TEST CONDITIONS

TEST DATE	12/6/2005															
DUT	Grinder					Actual Power (watt)	NA									
Manufacturer	Porter Cable					Voltage (Volts)	NA									
Model Number	7430					Current (Amps)	NA									
Serial Number	010318WT4080					Actual RPM	NA									
Mode of Operation	Normal					Temperature (Deg. F)	23 C									
Run Number	1					Humidity (%)	14									

Measurement Data

Baro. Press. (inch of Hg) 30.28 "Hg

Linear (unweighted) Position 1

Sound Power (dB)	100.28	99.52	99.18	99.34	98.57	98.57	98.38	99.83	99.58	99.37	98.68	97.92	97.58	97.95	97.28	97.69
Sound Power (Watts)	0.01066	0.00896	0.00829	0.00859	0.00720	0.00720	0.00689	0.00961	0.00907	0.00865	0.00738	0.00620	0.00572	0.00623	0.00535	0.00587
Sound Pressure (dB)	86.27	85.52	85.18	85.34	84.57	84.57	84.38	85.83	85.57	85.37	84.68	83.92	83.57	83.94	83.28	83.68

Linear (unweighted) Position 2

Sound Power (dB)	99.10	99.69	98.67	98.90	98.52	98.36	97.94	98.56	98.10	98.38	98.71	98.14	99.09	98.18	98.01	99.00
Sound Power (Watts)	0.00813	0.00932	0.00737	0.00776	0.00712	0.00685	0.00623	0.00718	0.00645	0.00688	0.00742	0.00652	0.00811	0.00657	0.00632	0.00795
Sound Pressure (dB)	85.10	85.69	84.67	84.90	84.52	84.35	83.94	84.56	84.09	84.37	84.70	84.14	85.09	84.17	84.01	85.00

A-weighted Position 1

Sound Power (dBA)	100.35	99.59	99.31	99.42	98.69	98.64	98.46	100.05	99.78	99.59	98.92	98.19	97.78	98.20	97.41	97.82
Sound Power (Watts)	0.01085	0.00910	0.00852	0.00875	0.00739	0.00731	0.00701	0.01011	0.00950	0.00910	0.00781	0.00660	0.00600	0.00660	0.00551	0.00605
Sound Pressure (dBA)	86.35	85.59	85.30	85.42	84.68	84.64	84.45	86.04	85.78	85.59	84.92	84.19	83.78	84.20	83.41	83.82

A-weighted Position 2

Sound Power (dBA)	99.16	99.83	98.74	98.96	98.56	98.42	98.03	98.64	98.24	98.49	98.83	98.33	99.15	98.43	98.27	99.26
Sound Power (Watts)	0.00824	0.00962	0.00748	0.00788	0.00717	0.00695	0.00636	0.00731	0.00667	0.00706	0.00763	0.00681	0.00823	0.00696	0.00671	0.00842
Sound Pressure (dBA)	85.16	85.83	84.74	84.96	84.55	84.42	84.03	84.63	84.24	84.48	84.82	84.33	85.15	84.43	84.27	85.25

Calculations

Average A-weighted Sound Data

Sound Power (dBA)	98.85
Sound Power (Watts)	0.0077
Sound Pressure (dBA)	84.85

Std. Deviation SWLA	0.6974
95 % Confidence Level	0.2092
Mean SPLA-k2	83.55

LOADED VIBRATIONS TEST SUMMARY SHEET

NAME OF DEVICE UNDER TEST (DUT)	Grinder
TOOL OPERATOR (SUBJECT OF TEST)	Edward Zechmann
COMPUTER OPERATOR	Hyunsu Kim
TEST DATE	12/6/2005
TEST DESCRIPTION	Human Exposure to Vibrations
TEST LOCATION	UC ANECHOIC LAB
MANUFACTURER	Porter Cable
MODEL	7430
SERIAL NUMBER	010318WT4080
MODE OF OPERATION	Normal
RUN NUMBER	1
YEAR MADE	
DIMENSIONS (inches)	Length 12, Width 9, Height 5
WEIGHT (lbs.)	4.6 lbs.
TECHNICAL SPECIFICATIONS	4 1/2 inch grinder
MOUNTING CONDITIONS	HELD TIGHTLY BY OPERATOR WITH BOTH HANDS
LOADING CONDITIONS	FULL SPEED, LOADED WITH STEEL BLOCK ON RUBBER
TEMPERATURE (CELSIUS)	23 C
HUMIDITY %	14
BAROMETRIC PRESSURE ("Hg)	30.28 "Hg
TEST ENVIRONMENT	SEMI ANECHOIC, SEMI HEMISPHERICAL
MEASUREMENT STANDARD	ISO 5349-1 and ISO 5349-2
ACCELEROMETER SETUP	2 - ACCELEROMETERS
SETUP DIAGRAM	Accelerometer Location and Orientation Diagram for Grinders
LOCATION ACCEL 1	right hand, right side of tool body, horizontal, on hand grip
ORIENTATION ACCEL 1	X away from grinder wheel, Y toward bottom of tool, Z see diagram
LOCATION ACCEL 2	left hand, front side handle
ORIENTATION ACCEL 2	X toward bottom of tool, Y toward left side of tool, Z toward grinder wheel
ADAPTER TYPE	Accel 1-side adapter, Accel 2-tall two stem adapter
OPERATOR POSTURE	Standing over tool, both hands gripping and holding tool with back and forth motion
HAND GRIP FORCE	Hands gripping tightly to control tool and pressing electrical switch
RATED POWER (WATTS)	720
ACTUAL INPUT POWER (WATTS)	NA
VOLTAGE (VOLTS)	NA
CURRENT (AMPS)	NA
RATED RPM	10000
ACTUAL RPM	NA
Vibrations	
Accelerometer 1	
X, Y, Z arms m/s ² weighted	3.7, 6.2, 7.4
X, Y, Z arms m/s ² linear	82.6, 66.4, 57.6
Total arms m/s ² (weighted, linear)	10.4, 120.9
Accelerometer 2	
X, Y, Z arms m/s ² weighted	13.1, 13.3, 11.3
X, Y, Z arms m/s ² linear	91, 96.9, 102.6
Total arms m/s ² (weighted, linear)	22, 169.2

VIBRATIONS DATA SHEET

TEST DATE	12/6/2005		
DUT	Grinder	Actual Power (watt)	NA
Manufacturer	Porter Cable	Voltage (Volts)	NA
Model Number	7430	Current (Amps)	NA
Serial Number	010318WT4080	Actual RPM	NA
Mode of Operation	Normal	Temperature	23 C
Run Number	1	Humidity (%)	14

Accelerometer 1	arms weighted m/s ²																
Axis	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
X	3.7	3.8	3.8	3.7	3.6	3.7	3.7	3.0	3.1	3.5	3.7	3.8	3.6	3.9	3.7	3.9	3.2
Y	6.0	5.5	5.4	5.6	4.9	5.5	5.2	5.2	4.5	3.7	4.0	4.9	4.7	5.2	4.8	5.1	9.1
Z	5.8	5.6	5.4	5.7	4.8	5.3	5.7	4.8	6.1	6.3	5.8	6.0	5.1	4.7	4.8	5.4	6.9
Total arms	9.1	8.7	8.5	8.8	7.7	8.5	8.6	7.7	8.2	8.1	8.0	8.6	7.8	8.0	7.7	8.4	11.9

Accelerometer 1	arms linear m/s ²																
X	90.5	83.0	84.5	81.1	84.3	85.1	88.0	85.4	80.6	76.7	77.2	74.5	75.4	81.8	78.4	80.6	77.1
Y	70.2	64.3	65.5	65.5	64.7	67.0	65.3	62.4	62.5	57.2	57.4	60.6	60.0	66.5	60.4	61.1	77.1
Z	50.4	48.2	47.5	49.3	45.5	48.1	50.6	42.6	49.8	49.4	47.5	48.2	45.5	45.3	45.3	47.6	53.0
Total arms	125.1	115.6	117.0	115.3	115.6	118.6	120.7	114.0	113.5	107.6	107.2	107.5	106.5	114.7	108.8	111.8	121.2

Accelerometer 2	arms weighted m/s ²																
Axis	1	2	3	4	5	6	7	8	9	10	11	12	13	14.0	15.0	16.0	17.0
X	11.7	12.4	11.9	11.3	11.0	11.3	10.8	10.3	9.6	14.2	13.8	12.6	12.0	13.1	13.4	14.3	15.2
Y	13.4	13.4	13.6	13.4	12.7	14.9	14.5	11.4	10.1	10.4	10.2	9.0	6.2	6.3	8.5	11.0	14.2
Z	9.7	10.2	10.5	10.4	10.3	10.9	10.9	10.4	10.6	9.5	10.1	11.4	10.8	10.4	10.1	10.7	10.3
Total arms	20.2	20.9	20.9	20.4	19.7	21.6	21.1	18.5	17.4	20.0	19.9	19.2	17.3	17.8	18.8	21.0	23.2

Accelerometer 2	arms linear m/s ²																
X	84.2	88.5	84.5	82.5	77.4	81.0	75.4	74.2	70.1	97.6	95.3	85.3	78.3	86.1	87.3	92.4	110.3
Y	97.9	96.3	97.3	97.2	90.2	107.0	101.7	79.7	69.6	71.0	70.0	59.9	41.3	47.5	60.8	77.3	109.7
Z	100.7	94.0	96.2	94.1	90.0	94.9	100.0	89.2	95.7	89.3	97.1	106.2	104.5	107.7	97.9	101.7	96.5
Total arms	163.7	161.0	160.9	158.5	149.1	164.3	161.3	140.7	137.5	150.1	153.0	148.8	137.0	145.8	144.6	157.7	183.1

Average arms						
Weighted m/s ²	Accel 1	Accel 2	Linear	Accel 1	Accel 2	
X	3.7	13.1	X	82.6	91.0	
Y	6.2	13.3	Y	66.4	96.9	
Z	7.4	11.3	Z	57.6	102.6	
Total arms m/s ²	10.4	22.0		120.9	169.2	
Std. Deviation	2.2	2.7		9.2	20.4	
95 % Confidence Level	0.7	0.8		2.8	6.1	

Accelerometer arms weighted m/s²

18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
3.4	3.7	3.7	3.3	3.6	3.7	3.5	3.7	4.1	3.8	3.7	3.7	3.9	3.997	3.583
8.0	7.9	7.5	7.6	7.2	7.5	7.3	6.8	7.7	7.3	6.6	6.8	6.6	6.432	6.9
9.3	10.2	9.5	9.1	8.9	9.0	8.0	9.3	10.1	10.5	9.5	10.1	9.9	9.835	9.453
12.7	13.4	12.6	12.4	12.0	12.3	11.4	12.1	13.4	13.3	12.1	12.7	12.5	12.412	12.24

Accelerometer arms linear m/s²

91.9	90.4	91.0	80.4	81.9	82.5	79.9	84.6	85.7	82.5	79.8	82.7	81.0	82.716	81.763
77.4	76.0	74.1	69.8	67.8	68.6	67.9	66.2	70.9	69.8	64.7	65.8	65.4	64.74	68.124
71.8	75.0	70.9	66.6	64.2	65.1	59.5	66.9	70.9	72.7	66.5	70.7	69.2	68.664	70.604
140.0	139.9	137.1	125.6	124.2	125.4	120.6	126.6	131.9	130.2	122.4	127.1	125.0	125.491	127.714

Accelerometer arms weighted m/s²

18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0	27.0	28.0	29.0	30	31	32
17.5	18.2	17.0	17.0	15.1	14.0	13.0	13.0	13.7	13.0	12.6	11.8	12.0	11.753	11.445
15.0	15.3	14.6	15.2	15.3	15.8	15.8	15.5	16.3	15.7	14.9	14.7	15.5	15.669	16.867
11.9	11.8	11.9	12.1	12.3	12.5	12.2	12.2	13.0	12.5	12.7	12.5	12.8	12.736	12.315
26.0	26.6	25.4	25.9	24.8	24.5	23.8	23.6	24.9	23.9	23.3	22.6	23.4	23.364	23.815

Accelerometer arms linear m/s²

130.8	130.7	121.3	119.1	101.2	92.9	88.6	87.9	90.4	86.2	84.2	79.5	83.2	81.679	82.95
116.9	113.5	110.6	112.4	111.9	113.2	115.7	113.4	117.7	116.2	112.3	110.6	117.2	118	127.612
115.0	112.8	117.0	114.7	105.6	100.6	104.9	108.2	107.7	107.6	101.4	99.5	104.8	108.067	120.762
209.8	206.6	201.6	199.9	184.2	177.6	179.6	179.7	183.4	180.3	173.2	168.6	177.9	179.65	194.291