

LOADED SOUND TEST SUMMARY SHEET

NAME OF DEVICE UNDER TEST (DUT)
TOOL OPERATOR
COMPUTER OPERATOR
TEST DATE

Grinder
Edward Zechmann
Hyunsu Kim
12/9/2005

TEST DESCRIPTION
TEST LOCATION
MANUFACTURER
MODEL
SERIAL NUMBER
MODE OF OPERATION
RUN NUMBER
YEAR MADE

Sound Power Level Measurement
UC anechoic lab
Bosch
1752G7
484000595
Normal
1

DIMENSIONS (inches)
WEIGHT (lbs.)
TECHNICAL SPECIFICATIONS
MOUNTING CONDITIONS
LOADING CONDITIONS
K1 (dBA)
K2 (dBA)
TEMPERATURE (CELSIUS)
HUMIDITY %
BAROMETRIC PRESSURE ("Hg, Pa)

Length 18, Width 10, Height 6
11.5 lbs
7 inch angle grinder wheel, Norton 75942, with guard
HELD TIGHTLY BY OPERATOR WITH BOTH HANDS
FULL SPEED, LOADED WITH STEEL BLOCK ON RUBBER
0
1.47
24 C
13
30.42 "Hg

TEST ENVIRONMENT
TOOL TESTING STANDARD
MEASUREMENT STANDARD
MICROPHONE SET-UP
SURFACE RADIUS

SEMI ANECHOIC, SEMI HEMISPHERICAL
ANSI S12.15-1992
ISO 3744:1994-05-01
10-MICROPHONES
2.00 meters

RATED POWER (WATTS)
ACTUAL INPUT POWER (WATTS)
VOLTAGE (VOLTS)
CURRENT (AMPS)
RATED RPM
ACTUAL RPM

1800
NA
NA
NA
6000
NA

SOUND POWER LEVEL (dBA)
SOUND POWER (WATTS) A-weighted
SWLA - k2 (dBA)
SWLA - k2 (WATTS) A-weighted
SOUND PRESSURE LEVEL (dBA) @ 2 meters

108.6
0.07192
107.1
0.05129
94.6

AT THE NOMINAL HEARING ZONE OF OPERATOR
SOUND PRESSURE LEVEL (dBA)

107.6

Average Directivity Study

TEST DATE 12/9/2005
DUT Grinder
Manufacturer Bosch
Model Number 1752G7
Serial Number 484000595
Mode Normal
Run Number 1

A-weighted Sound Pressure Level

	Position1	Position2
Mic #	dBA	dBA
0	98.5	97.1
1	95.1	95.4
2	90.3	93.3
3	88.1	92.1
4	97.0	93.3
5	93.7	88.4
6	91.0	92.7
7	88.6	96.5
8	96.1	95.6
9	95.4	95.1
10	107.6	104.5
dB difference	10.4	8.7

A-weighted Directivity Index

Mic #	dBA	dBA
0	5.2	3.1
1	1.7	1.5
2	-3.1	-0.7
3	-5.2	-1.8
4	3.6	-0.6
5	0.3	-5.6
6	-2.4	-1.3
7	-4.8	2.6
8	2.7	1.6
9	2.0	1.2
10	14.2	10.6

SOUND DATA SHEET

PRODUCT INFORMATION

TEST CONDITIONS

TEST DATE	12/9/2005		
DUT	Grinder	Actual Power (watt)	NA
Manufacturer	Bosch	Voltage (Volts)	NA
Model Number	1752G7	Current (Amps)	NA
Serial Number	484000595	Actual RPM	NA
Mode of Operation	Normal	Temperature (Deg. F)	24 C
Run Number	1	Humidity (%)	13

Baro. Press. (inch of Hg) 30.42 "Hg

Measurement Data

Linear (unweighted) Position 1

Sound Power (dB)	108.11	108.59	109.26	109.04	108.52	109.17	107.52	108.29	107.78	108.60	108.01	107.46	107.71	107.85	108.46	108.36
Sound Power (Watts)	0.06478	0.07225	0.08434	0.08019	0.07109	0.08255	0.05646	0.06753	0.05994	0.07242	0.06328	0.05571	0.05899	0.06098	0.07007	0.06852
Sound Pressure (dB)	94.11	94.59	95.26	95.04	94.52	95.16	93.52	94.29	93.77	94.60	94.01	93.46	93.71	93.85	94.45	94.36

Linear (unweighted) Position 2

Sound Power (dB)	109.35	108.78	108.58	108.56	108.40	108.54	107.98	107.70	107.89	108.53	107.51	108.35	107.65	107.49	107.56	108.13
Sound Power (Watts)	0.08614	0.07546	0.07206	0.07170	0.06926	0.07150	0.06286	0.05883	0.06154	0.07122	0.05643	0.06834	0.05819	0.05608	0.05704	0.06503
Sound Pressure (dB)	95.35	94.77	94.57	94.55	94.40	94.54	93.98	93.69	93.89	94.52	93.51	94.34	93.65	93.49	93.56	94.13

A-weighted Position 1

Sound Power (dBA)	108.38	108.93	109.58	109.37	108.82	109.49	107.86	108.58	108.05	108.87	108.20	107.70	108.01	108.09	108.61	108.53
Sound Power (Watts)	0.06880	0.07808	0.09087	0.08643	0.07630	0.08884	0.06116	0.07208	0.06390	0.07710	0.06611	0.05889	0.06322	0.06446	0.07265	0.07121
Sound Pressure (dBA)	94.37	94.92	95.58	95.36	94.82	95.48	93.86	94.58	94.05	94.87	94.20	93.70	94.01	94.09	94.61	94.52

A-weighted Position 2

Sound Power (dBA)	109.55	109.05	108.85	108.82	108.69	108.85	108.31	108.02	108.26	108.83	107.90	108.68	108.02	107.83	107.96	108.48
Sound Power (Watts)	0.09007	0.08042	0.07675	0.07622	0.07392	0.07682	0.06782	0.06345	0.06701	0.07637	0.06170	0.07380	0.06339	0.06068	0.06257	0.07052
Sound Pressure (dBA)	95.54	95.05	94.85	94.82	94.69	94.85	94.31	94.02	94.26	94.83	93.90	94.68	94.02	93.83	93.96	94.48

Calculations

Average A-weighted Sound Data

Sound Power (dBA)	108.57
Sound Power (Watts)	0.0719
Sound Pressure (dBA)	94.57

Std. Deviation SWLA	0.5273
95 % Confidence Level	0.1582
Mean SPLA-k2	93.10

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	12/9/2005
TEST DESCRIPTION	Human Exposure to Vibrations
TEST LOCATION	UC ANECHOIC LAB
MANUFACTURER	Bosch
MODEL	1752G7
SERIAL NUMBER	484000595
MODE OF OPERATION	Normal
RUN NUMBER	1
YEAR MADE	0
DIMENSIONS (inches)	Length 18, Width 10, Height 6
WEIGHT (lbs.)	11.5 lbs.
TECHNICAL SPECIFICATIONS	7 inch angle grinder wheel, Norton 75942, with guard
MOUNTING CONDITIONS	HELD TIGHTLY BY OPERATOR WITH BOTH HANDS
LOADING CONDITIONS	FULL SPEED, LOADED WITH STEEL BLOCK ON RUBBER
TEMPERATURE (CELSIUS)	24 C
HUMIDITY %	13
BAROMETRIC PRESSURE ("Hg, Pa)	30.42 "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 3
LOCATION ACCEL 1	right hand, right side of tool body, horizontal, midway from bottom to top of tool
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)	1800
ACTUAL INPUT POWER (WATTS)	NA
VOLTAGE (VOLTS)	NA
CURRENT (AMPS)	NA
RATED RPM	6000
ACTUAL RPM	NA
Vibrations	
Accelerometer 1	
X, Y, Z arms m/s ² weighted	4.4, 7.3, 4.7
X, Y, Z arms m/s ² linear	54.3, 53.5, 48.7
Total arms m/s ² (weighted, linear)	9.7, 90.7
Accelerometer 2	
X, Y, Z arms m/s ² weighted	8.1, 11.5, 7.8
X, Y, Z arms m/s ² linear	50.5, 97.8, 57.8
Total arms m/s ² (weighted, linear)	16.3, 125.7

VIBRATIONS DATA SHEET

TEST DATE	12/9/2005		
DUT	Grinder	Actual Power (watt)	NA
Manufacturer	Bosch	Voltage (Volts)	NA
Model Number	1752G7	Current (Amps)	NA
Serial Number	484000595	Actual RPM	NA
Mode of Operation	Normal	Temperature	24 C
Run Number	1	Humidity (%)	13

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	3.4	4.0	4.4	4.5	4.6	4.6	4.6	4.7	4.9	4.7	5.1	4.8	5.2	5.3	5.7	5.7	5.4
Y	7.6	8.3	8.3	8.0	7.2	7.8	7.3	7.1	7.0	7.4	7.9	8.2	9.2	8.8	9.3	9.6	10.0
Z	6.5	5.7	5.2	5.1	4.6	4.8	3.9	4.8	4.5	4.4	3.6	4.9	4.9	4.6	4.2	4.0	5.6
Total arms	10.6	10.9	10.8	10.5	9.6	10.3	9.5	9.8	9.6	9.8	10.0	10.7	11.7	11.3	11.7	11.9	12.7

Accelerometer 1	arms linear m/s ²																
X	45.8	50.2	55.3	56.4	56.7	56.4	57.3	55.5	54.8	54.2	57.7	56.1	58.5	58.5	60.2	59.7	53.3
Y	51.2	55.1	54.1	54.8	53.4	50.6	53.2	51.5	54.8	53.8	55.4	61.7	63.6	60.5	61.6	64.5	75.3
Z	47.1	50.4	50.7	49.7	47.4	46.1	37.9	47.4	45.7	44.7	39.4	53.9	44.8	50.9	55.1	51.3	69.7
Total arms	83.3	89.9	92.5	93.0	91.2	88.7	86.9	89.3	89.9	88.5	89.2	99.3	97.3	98.4	102.3	101.8	115.6

Accelerometer 2	arms weighted m/s ²																
Axis	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
X	7.3	4.2	8.6	9.3	12.7	13.9	11.0	13.7	13.2	13.1	17.5	9.5	7.6	6.4	5.4	4.6	7.6
Y	10.5	11.6	12.8	13.6	10.6	14.2	10.2	11.0	8.5	12.4	11.0	13.1	13.5	13.8	12.9	13.1	12.4
Z	7.7	7.7	8.0	8.0	8.0	8.4	8.0	8.3	8.1	8.5	8.8	8.0	8.7	8.7	8.4	8.5	8.4
Total arms	15.0	14.6	17.4	18.3	18.4	21.6	17.0	19.4	17.7	19.9	22.4	18.0	17.8	17.5	16.3	16.3	16.8

Accelerometer 2	arms linear m/s ²																
X	48.2	37.8	52.8	54.4	70.2	74.9	63.8	74.8	72.9	72.2	91.3	53.7	45.2	39.0	36.6	32.0	44.8
Y	81.4	80.9	85.4	84.9	76.6	92.4	78.4	87.3	71.1	81.2	70.1	96.5	95.3	94.2	94.0	88.6	113.1
Z	56.0	56.6	60.1	61.6	61.4	62.7	59.6	60.7	56.0	59.6	61.9	54.8	61.0	60.1	60.0	60.5	57.9
Total arms	109.9	105.7	117.0	118.2	120.7	134.5	117.4	130.0	116.2	123.9	130.7	123.3	121.9	118.4	117.4	111.9	134.7

Average arms						
Weighted m/s ²	Accel 1	Accel 2	Linear	Accel 1	Accel 2	
X	4.4	8.1	X	54.3	50.5	
Y	7.3	11.5	Y	53.5	97.8	
Z	4.7	7.8	Z	48.7	57.8	
Total arms m/s ²	9.7	16.3		90.7	125.7	
Std. Deviation	1.5	2.3		8.0	8.5	
95 % Confidence Level	0.4	0.7		2.4	2.5	

Accelerometer arms weighted m/s²

18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
4.5	4.3	4.1	4.1	3.9	3.5	3.4	3.3	4.1	3.7	3.9	3.4	3.7	3.8	4.0
8.2	7.8	6.7	7.4	6.5	5.7	5.0	5.1	6.7	6.0	6.3	5.0	5.6	5.6	6.3
6.0	5.6	5.0	5.1	4.9	4.2	4.0	3.7	5.0	3.9	4.1	4.1	4.2	4.6	4.8
11.1	10.5	9.3	9.9	9.1	7.9	7.2	7.1	9.3	8.1	8.5	7.3	7.9	8.2	8.9

Accelerometer arms linear m/s²

53.0	53.9	56.2	56.7	53.6	51.5	49.3	46.9	56.7	52.9	49.6	48.2	51.4	55.3	56.4
59.0	58.9	50.8	54.6	49.4	46.0	46.7	44.1	50.1	48.9	53.7	41.1	44.2	43.0	47.9
58.2	58.7	48.0	49.6	47.2	43.3	56.6	46.4	48.7	42.4	53.5	41.7	46.0	41.4	43.8
98.4	99.1	89.7	93.0	86.8	81.5	88.4	79.4	89.9	83.5	90.6	75.8	82.0	81.4	86.0

Accelerometer arms weighted m/s²

18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
6.2	6.4	7.5	7.9	7.8	7.1	6.3	6.1	6.8	5.8	7.2	4.9	5.2	5.0	5.0
11.7	11.5	11.0	11.6	11.2	10.5	10.1	10.0	11.3	10.6	10.9	10.1	10.8	10.5	11.3
7.8	7.8	7.4	7.7	7.3	6.9	6.8	6.7	7.5	7.0	7.0	6.6	7.1	6.9	7.4
15.4	15.3	15.2	16.0	15.5	14.4	13.7	13.5	15.1	14.0	14.8	13.0	13.9	13.5	14.4

Accelerometer arms linear m/s²

41.8	43.1	46.9	48.8	48.1	46.3	44.1	42.5	44.8	41.4	46.7	38.1	40.4	38.4	39.1
111.2	115.5	115.0	114.9	112.8	112.8	114.9	112.3	112.8	107.7	105.6	104.6	108.1	105.0	105.6
56.2	57.2	55.4	57.8	55.6	54.0	51.0	49.5	59.2	55.8	57.0	52.6	57.3	57.5	62.6
131.5	135.9	136.0	137.6	134.6	133.4	133.2	129.9	135.1	128.2	128.7	123.1	128.8	125.7	128.8