

LOADED SOUND TEST SUMMARY SHEET

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

Hammer Drill
Manual Mode, Brian Kim
Edward Zechmann
6/10/2009

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

Sound Power Level Measurement
UC anechoic lab
Makita
HP1501
1016836G
FULL SPEED, LOADED, WITH OPERATOR
2

DIMENSIONS (inches)
WEIGHT (lbs.)
TECHNICAL SPECIFICATIONS
MOUNTING CONDITIONS
LOADING CONDITIONS

11.8" length, 2.9" width, 8.0" height
3.7
9/16" chuck
Hammer Drill pushed into concrete block in sand in a cardboard box
FULL SPEED, LOADED WITH CONCRETE BLOCK

K1 (dBA)
K2 (dBA)
TEMPERATURE (CELSIUS)
HUMIDITY %
BAROMETRIC PRESSURE ("Hg)

0
0.08
24
42
29.92

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

600
-
-
-
2800
-

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

103.6
0.02304
103.6
0.02265
89.6

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

105.6

Average Directivity Study

TEST DATE 6/10/2009
DUT Hammer Drill
Manufacturer Makita
Model Number HP1501
Serial Number 1016836G
Mode FULL SPEED, LOADED, WITH OPERATOR
Run Number 2

A-weighted Sound Pressure Level

	Position1	Position2
Mic #	dBA	dBA
0	89.7	89.7
1	91.8	88.6
2	89.5	88.9
3	86.9	88.4
4	89.1	88.0
5	91.3	86.1
6	89.5	88.2
7	87.3	91.7
8	92.2	90.7
9	90.3	88.7
10	105.6	102.5
dB difference	5.4	5.7

A-weighted Directivity Index

Mic #	dBA	dBA
0	-0.1	0.8
1	2.1	-0.3
2	-0.3	0.0
3	-2.9	-0.5
4	-0.7	-0.9
5	1.5	-2.8
6	-0.3	-0.7
7	-2.5	2.8
8	2.5	1.8
9	0.5	-0.2

SOUND DATA SHEET

PRODUCT INFORMATION

TEST DATE 6/10/2009
DUT Hammer Drill
Manufacturer Makita
Model Number HP1501
Serial Number 1016836G
Mode of Operation FULL SPEED, LOADED, WITH OP
Run Number 2

TEST CONDITIONS

Actual Power (watt) -
Voltage (Volts) -
Current (Amps) -
Actual RPM -
Temperature (Deg. F) 24
Humidity (%) 42
Baro. Press. (inch of Hg) 29.92

Measurement Data

Linear (unweighted) Position 1

Sound Power (dB)	104.76	104.43	103.05	102.48
Sound Power (Watts)	0.02993	0.02772	0.02017	0.01770
Sound Pressure (dB)	90.76	90.42	89.04	88.48

Linear (unweighted) Position 2

Sound Power (dB)	102.50	103.66	103.09	103.28
Sound Power (Watts)	0.01779	0.02320	0.02038	0.02127
Sound Pressure (dB)	88.50	89.65	89.09	89.27

A-weighted Position 1

Sound Power (dBA)	105.15	104.77	103.16	102.63
Sound Power (Watts)	0.03270	0.03002	0.02071	0.01834
Sound Pressure (dBA)	91.14	90.77	89.16	88.63

A-weighted Position 2

Sound Power (dBA)	102.51	103.77	103.13	103.09
Sound Power (Watts)	0.01782	0.02380	0.02056	0.02038
Sound Pressure (dBA)	88.51	89.76	89.13	89.09

Calculations

Average A-weighted Sound Data

Sound Power (dBA)	103.63
Sound Power (Watts)	0.0230
Sound Pressure (dBA)	89.62

Std. Deviation SWLA	0.9670
95 % Confidence Level	0.8085
Mean SPLA-k2	89.54

LOADED VIBRATIONS TEST SUMMARY SHEET

NAME OF DEVICE UNDER TEST (DUT)	Hammer Drill
TOOL OPERATOR (SUBJECT OF TEST)	Manual Mode, Brian Kim
COMPUTER OPERATOR	Edward Zechmann
TEST DATE	6/10/2009
TEST DESCRIPTION	Human Exposure to Vibrations
TEST LOCATION	UC ANECHOIC LAB
MANUFACTURER	Makita
MODEL	HP1501
SERIAL NUMBER	1016836G
MODE OF OPERATION	FULL SPEED, LOADED, WITH OPERATOR
RUN NUMBER	2
YEAR MADE	2008
DIMENSIONS (inches)	11.8" length, 2.9" width, 8.0" height
WEIGHT (lbs.)	3.7
TECHNICAL SPECIFICATIONS	9/16" chuck
MOUNTING CONDITIONS	Hammer Drill pushed into concrete block in sand in a cardboard box
LOADING CONDITIONS	FULL SPEED, LOADED WITH CONCRETE BLOCK
TEMPERATURE (CELSIUS)	24
HUMIDITY %	42
BAROMETRIC PRESSURE ("Hg)	29.92
TEST ENVIRONMENT	SEMI ANECHOIC, SEMI HEMISPHERICAL
MEASUREMENT STANDARD	ISO 5349-1 and ISO 5349-2
ACCELEROMETER SETUP	2 - ACCELEROMETERS
SETUP DIAGRAM	Hammer_drill_3_sv_accel_setup.doc
LOCATION ACCEL 1	right hand, on left side of tool, near back of tool, near trigger
ORIENTATION ACCEL 1	X away from drill bit, Y toward top of tool, Z toward left side of tool
LOCATION ACCEL 2	left hand, left grip, on top of side handle
ORIENTATION ACCEL 2	X toward drill bit, Y toward left side of tool, Z toward top of tool
ADAPTER TYPE	Accel 1-side adapter, Accel 2-tall two stem adapter
OPERATOR POSTURE	Bending over the tool, both hands gripping and pressing tool to concrete
HAND GRIP FORCE	Hands gripping tightly to control tool and pressing electrical switch
RATED POWER (WATTS)	600
ACTUAL INPUT POWER (WATTS)	-
VOLTAGE (VOLTS)	-
CURRENT (AMPS)	-
RATED RPM	2800
ACTUAL RPM	-
Vibrations	
Accelerometer 1	
X, Y, Z arms m/s ² weighted	21.7, 17.3, 15.6
X, Y, Z arms m/s ² linear	235.4, 251.5, 136.5
Total arms m/s ² (weighted, linear)	32, 371
Accelerometer 2	
X, Y, Z arms m/s ² weighted	28, 9.3, 7.4
X, Y, Z arms m/s ² linear	583.2, 345.1, 283.9
Total arms m/s ² (weighted, linear)	30.5, 736

VIBRATIONS DATA SHEET

TEST DATE	6/10/2009		
DUT	Hammer Drill	Actual Power (watt)	-
Manufacturer	Makita	Voltage (Volts)	-
Model Number	HP1501	Current (Amps)	-
Serial Number	1016836G	Actual RPM	-
Mode of Operation	FULL SPEED, LOADED, WITH C	Temperature	24
Run Number	2	Humidity (%)	42

Accelerometer 1	arms weighted m/s ²							
Axis	1	2	3	4	5	6	7	8
X	22.3	22.5	24.0	24.7	22.6	19.9	17.3	20.4
Y	18.5	13.5	15.6	14.0	19.7	16.8	22.3	17.8
Z	15.8	14.1	15.1	11.2	17.4	14.8	16.5	19.5
Total arms	33.0	29.8	32.3	30.5	34.6	29.9	32.7	33.3

Accelerometer 1	arms linear m/s ²							
X	259.0	241.5	253.2	242.8	250.6	198.2	213.3	224.6
Y	285.4	269.2	272.7	237.9	232.4	213.0	246.8	254.9
Z	147.4	127.7	129.6	114.3	158.4	130.3	134.0	150.1
Total arms	412.6	383.5	394.0	358.6	376.7	318.8	352.6	371.4

Accelerometer 2	arms weighted m/s ²							
Axis	1	2	3	4	5	6	7	8
X	63.5	19.5	22.7	21.1	25.3	21.0	24.6	26.1
Y	14.2	8.4	8.2	8.0	8.2	8.5	8.9	10.0
Z	8.6	6.7	6.8	6.7	6.7	7.0	7.1	9.6
Total arms	65.7	22.3	25.0	23.5	27.4	23.7	27.1	29.6

Accelerometer 2	arms linear m/s ²							
X	701.0	586.0	669.2	630.3	509.1	475.0	542.0	552.8
Y	435.2	393.9	371.3	336.9	311.7	290.3	308.8	312.8
Z	313.1	294.9	264.6	240.0	295.9	265.7	290.0	306.7
Total arms	882.5	765.2	809.8	753.9	666.3	616.9	687.9	705.3

Average arms								
Weighted m/s ²	Accel 1	Accel 2	Linear	Accel 1	Accel 2			
X	21.7	28.0	X	235.4	583.2			
Y	17.3	9.3	Y	251.5	345.1			
Z	15.6	7.4	Z	136.5	283.9			
Total arms m/s ²	32.0	30.5		371.0	736.0			
Std. Deviation	1.8	14.4		28.5	84.9			
95 % Confidence Level	1.5	12.0		23.8	70.9			