

UNLOADED SOUND TEST SUMMARY SHEET

| | |
|---|---------------------------------------|
| NAME OF DEVICE UNDER TEST (DUT) | Grinder |
| TOOL OPERATOR | Unloaded |
| COMPUTER OPERATOR | Brian Kim, Ed Zechmann |
| TEST DATE | 5/6/2009 |
| TEST DESCRIPTION | Sound Power Level Measurement |
| TEST LOCATION | UC anechoic lab |
| MANUFACTURER | Bosch |
| MODEL | 1752 |
| SERIAL NUMBER | 391000064 |
| MODE OF OPERATION | FULL SPEED, UNLOADED |
| RUN NUMBER | 2 |
| YEAR MADE | 2005 |
| DIMENSIONS (inches) | Length 17.5", Width 4.5", Height 6.3" |
| WEIGHT (lbs.) | 11.5 |
| TECHNICAL SPECIFICATIONS | 7 inch angle grinder |
| MOUNTING CONDITIONS | free-free, bungee cords |
| LOADING CONDITIONS | Full speed no load |
| K1 (dBA) | 0 |
| K2 (dBA) | -0.02 |
| TEMPERATURE (CELSIUS) | 24 |
| HUMIDITY % | 39 |
| BAROMETRIC PRESSURE ("Hg) | 29.88 |
| 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) | 1800 |
| ACTUAL INPUT POWER (WATTS) | 971 |
| VOLTAGE (VOLTS) | 8.9 |
| CURRENT (AMPS) | 115 |
| RATED RPM | 6000 |
| ACTUAL RPM | 5896 |
| SOUND POWER LEVEL (dBA) | 98.8 |
| SOUND POWER (WATTS) A-weighted | 0.00766 |
| SWLA - k2 (dBA) | 98.9 |
| SWLA - k2 (WATTS) A-weighted | 0.00769 |
| SOUND PRESSURE LEVEL (dBA) @ 2 meters | 84.8 |
| AT THE NOMINAL HEARING ZONE OF OPERATOR | |
| SOUND PRESSURE LEVEL (dBA) | 97.1 |

Average Directivity Study

TEST DATE 5/6/2009
DUT Grinder
Manufacturer Bosch
Model Number 1752
Serial Number 391000064
Mode FULL SPEED, UNLOADED
Run Number 2

A-weighted Sound Pressure Level

| Mic # | Position1 dBA |
|-------|------------------|
| 0 | 86.1 |
| 1 | 83.0 |
| 2 | 81.7 |
| 3 | 85.4 |
| 4 | 87.1 |
| 5 | 83.1 |
| 6 | 82.0 |
| 7 | 86.9 |
| 8 | 85.5 |
| 9 | 83.7 |
| 10 | 97.1 |

dB difference 5.4

A-weighted Directivity Index

| Mic # | dBA |
|-------|------|
| 0 | 1.6 |
| 1 | -1.4 |
| 2 | -2.7 |
| 3 | 1.0 |
| 4 | 2.7 |
| 5 | -1.3 |
| 6 | -2.4 |
| 7 | 2.4 |
| 8 | 1.1 |
| 9 | -0.7 |

SOUND DATA SHEET

PRODUCT INFORMATION

TEST DATE 5/6/2009
DUT Grinder
Manufacturer Bosch
Model Number 1752
Serial Number 391000064
Mode of Operation FULL SPEED, UNLOADED
Run Number 2

TEST CONDITIONS

Actual Power (watt) 971
Voltage (Volts) 8.9
Current (Amps) 115
Actual RPM 5896
Temperature (Deg. F) 24
Humidity (%) 39
Baro. Press. (inch of Hg) 29.88

Measurement Data

Linear (unweighted) Position 1

| | | | | | |
|---------------------|---------|---------|---------|---------|---------|
| Sound Power (dB) | 99.00 | 99.19 | 99.12 | 98.95 | 98.74 |
| Sound Power (Watts) | 0.00794 | 0.00830 | 0.00817 | 0.00786 | 0.00748 |
| Sound Pressure (dB) | 84.99 | 85.19 | 85.12 | 84.95 | 84.74 |

A-weighted Position 1

| | | | | | |
|----------------------|---------|---------|---------|---------|---------|
| Sound Power (dBA) | 98.86 | 99.00 | 98.93 | 98.82 | 98.58 |
| Sound Power (Watts) | 0.00770 | 0.00794 | 0.00782 | 0.00762 | 0.00721 |
| Sound Pressure (dBA) | 84.86 | 85.00 | 84.93 | 84.81 | 84.58 |

Calculations

Average A-weighted Sound Data

| | |
|----------------------|--------|
| Sound Power (dBA) | 98.84 |
| Sound Power (Watts) | 0.0077 |
| Sound Pressure (dBA) | 84.84 |

| | |
|-----------------------|--------|
| Std. Deviation SWLA | 0.1602 |
| 95 % Confidence Level | 0.1990 |
| Mean SPLA-k2 | 84.86 |

UNLOADED VIBRATIONS TEST SUMMARY SHEET

| | |
|--|---|
| NAME OF DEVICE UNDER TEST (DUT) | Grinder |
| TOOL OPERATOR (SUBJECT OF TEST) | Unloaded |
| COMPUTER OPERATOR | Brian Kim, Ed Zechmann |
| TEST DATE | 5/6/2009 |
| TEST DESCRIPTION | Human Exposure to Vibrations |
| TEST LOCATION | UC ANECHOIC LAB |
| MANUFACTURER | Bosch |
| MODEL | 1752 |
| SERIAL NUMBER | 391000064 |
| MODE OF OPERATION | FULL SPEED, UNLOADED |
| RUN NUMBER | 2 |
| YEAR MADE | 2005 |
| DIMENSIONS (inches) | Length 17.5", Width 4.5", Height 6.3" |
| WEIGHT (lbs.) | 11.5 |
| TECHNICAL SPECIFICATIONS | 7 inch angle grinder |
| MOUNTING CONDITIONS | free-free, bungee cords |
| LOADING CONDITIONS | Full speed no load |
| TEMPERATURE (CELSIUS) | 24 |
| HUMIDITY % | 39 |
| BAROMETRIC PRESSURE ("Hg) | 29.88 |
| TEST ENVIRONMENT | SEMI ANECHOIC, SEMI HEMISPHERICAL |
| MEASUREMENT STANDARD | ISO 5349-1 and ISO 5349-2 |
| ACCELEROMETER SETUP | 2 - ACCELEROMETERS |
| SETUP DIAGRAM | grinder_9_sv_accel_setup.doc |
| LOCATION ACCEL 1 | right hand, top of tool, near back of tool |
| ORIENTATION ACCEL 1 | X toward left side of tool, Y away from grinder wheel, Z toward top of tool |
| LOCATION ACCEL 2 | left hand, left grip, on top of side handle |
| ORIENTATION ACCEL 2 | X toward grinder wheel, Y toward left side of tool, Z toward top of tool |
| ADAPTER TYPE | Accel 1-side adapter, Accel 2-side adapter |
| OPERATOR PRESSURE | - |
| HAND GRIP FORCE | Band clamp over rubber mechanical low-pass filter |
| RATED POWER (WATTS) | 1800 |
| ACTUAL INPUT POWER (WATTS) | 971 |
| VOLTAGE (VOLTS) | 8.9 |
| CURRENT (AMPS) | 115 |
| RATED RPM | 6000 |
| ACTUAL RPM | 5896 |
| Vibrations | |
| Accelerometer 1 | |
| X, Y, Z arms m/s ² weighted | 11.6, 5.4, 14.3 |
| X, Y, Z arms m/s ² linear | 76.3, 107.1, 126 |
| Total arms m/s ² (weighted, linear) | 19.2, 182.1 |
| Accelerometer 2 | |
| X, Y, Z arms m/s ² weighted | 3.3, 3, 4 |
| X, Y, Z arms m/s ² linear | 43.4, 41.9, 47.7 |
| Total arms m/s ² (weighted, linear) | 6, 76.9 |

VIBRATIONS DATA SHEET

| | | | |
|-------------------|----------------------|---------------------|------|
| TEST DATE | 5/6/2009 | | |
| DUT | Grinder | Actual Power (watt) | 971 |
| Manufacturer | Bosch | Voltage (Volts) | 8.9 |
| Model Number | 1752 | Current (Amps) | 115 |
| Serial Number | 391000064 | Actual RPM | 5896 |
| Mode of Operation | FULL SPEED, UNLOADED | Temperature | 24 |
| Run Number | 2 | Humidity (%) | 39 |

| | | | | | |
|-----------------|--------------------------------|------|------|------|------|
| Accelerometer 1 | arms weighted m/s ² | | | | |
| Axis | 1 | 2 | 3 | 4 | 5 |
| X | 11.9 | 11.6 | 11.5 | 11.6 | 11.6 |
| Y | 5.3 | 5.3 | 5.4 | 5.6 | 5.5 |
| Z | 14.0 | 14.2 | 14.3 | 14.4 | 14.4 |
| Total arms | 19.2 | 19.1 | 19.1 | 19.3 | 19.3 |

| | | | | | |
|-----------------|------------------------------|-------|-------|-------|-------|
| Accelerometer 1 | arms linear m/s ² | | | | |
| X | 77.0 | 76.2 | 75.9 | 76.4 | 76.2 |
| Y | 104.2 | 102.4 | 106.0 | 112.2 | 110.7 |
| Z | 122.1 | 123.0 | 126.1 | 129.8 | 128.9 |
| Total arms | 178.0 | 177.2 | 181.4 | 187.9 | 186.3 |

| | | | | | |
|-----------------|--------------------------------|-----|-----|-----|-----|
| Accelerometer 2 | arms weighted m/s ² | | | | |
| Axis | 1 | 2 | 3 | 4 | 5 |
| X | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 |
| Y | 3.5 | 3.0 | 2.9 | 2.9 | 2.9 |
| Z | 4.2 | 4.1 | 3.9 | 4.0 | 3.9 |
| Total arms | 6.4 | 6.0 | 5.9 | 5.9 | 5.9 |

| | | | | | |
|-----------------|------------------------------|------|------|------|------|
| Accelerometer 2 | arms linear m/s ² | | | | |
| X | 44.1 | 43.1 | 42.8 | 44.6 | 42.4 |
| Y | 43.4 | 42.1 | 41.5 | 41.7 | 40.7 |
| Z | 49.1 | 48.4 | 47.4 | 47.2 | 46.6 |
| Total arms | 79.0 | 77.3 | 76.2 | 77.1 | 75.0 |

| | | | | | |
|-----------------------------|---------|---------|--------|---------|---------|
| Average arms | | | | | |
| Weighted m/s ² | Accel 1 | Accel 2 | Linear | Accel 1 | Accel 2 |
| X | 11.6 | 3.3 | X | 76.3 | 43.4 |
| Y | 5.4 | 3.0 | Y | 107.1 | 41.9 |
| Z | 14.3 | 4.0 | Z | 126.0 | 47.7 |
| Total arms m/s ² | 19.2 | 6.0 | | 182.1 | 76.9 |
| Std. Deviation | 0.1 | 0.2 | | 4.8 | 1.5 |
| 95 % Confidence Level | 0.1 | 0.3 | | 5.9 | 1.8 |