

VIBRATION AND NOISE TESTING OF MODEL 40 NEEDLE SCALER

Tested by: Peter Tornqvist

Reported by: Peter Tornqvist

Power Tool Tested

Type: Needle Scaler

Company: Desco Manufacturing Company, Inc.

Model No.: 40 (PN 130.049)

Serial No.: first batch

Mass: 3.60 kg

No-load frequency: 2.700 blows per minute.

Equipment and Test Procedure

See Appendices 1, 2, and 3 for details.

28 standard 7 inch (175mm) steel needles with a diameter of 1/8 inch (3.2mm) was used during the test.

Operating Data and Results

During the vibration and noise testing the room temperature was 22.0°C and the atmospheric pressure was 762mm Hg. The working conditions for the tool was as follows:

Frequency: 3,400 blows per minute.

Compressed air pressure: 6.40 bar.

Compressed air temperature: 22.0°C.

Air flow rate: 100 l/min of free air.

Vibration Test Results

Test Run No.	Integrated Vibration Value (m/s ²)
1	2.4
2	2.1
3	2.3
4	2.3
5	2.3
Arithmetic Mean Value	2.28
Standard Deviation	0.22

NOTE: Measurements were also made with the accelerometer tightly fastened to the midpoint of the handle. These measurements show considerable lower values than the vibration level on the housing. As this is a tool which is used with two hands we are reporting on the area which produces the higher levels.

Noise Test Results

Microphone Location	Sound Level (dB(A)) for Test No.						Average
	1.	2.	3.	4.	5.	6.	
A	92.5	92.2	92.5	92.2	92.2	92.1	92.3
B	92.3	92.6	92.4	92.5	92.6	92.6	92.5 ± 0.1
C	92.0	92.0	92.2				92.1
D	88.3	89.3	89.1				89.1

The labeled value L_c , is determined to 93 dB(A) per ISO 7574/2.

Meets current ISO standards as of June 2009

Appendix I

EQUIPMENT FOR VIBRATION AND NOISE MEASUREMENTS.

Compressed Air Supply

The compressed air was supplied from the compressor tank via a regulator and a $\frac{1}{2}$ inch diameter hose to the measuring station consisting of an air flow meter (Rotameter), a fine tuning pressure regulator, a vessel (approx. 0.8 l volume) fitted for air pressure and air temperature measurements and 5m of $\frac{1}{2}$ inch diameter hose connecting the vessel and the tool.

Vibration Measurement Equipment

The measurements were made with a Bruel & Kjaer 2513 vibration meter (Serial No. 911491) and a 4374 accelerometer (Serial No. 1850885). The accelerometer was mounted on an aluminum bar (6x6x10 mm long) with cyanoacrylate glue. A mechanical filter was inserted between the sensor and the aluminum bar. The aluminum bar was mounted on the tool such that the measurement direction coincided with the longitudinal direction of the tool. See also under the "Test Procedure".

Noise Measurement Equipment

The measurements were made with a Bruel & Kjaer model 2209 precision meter (Serial No. 413058) equipped with 1 inch microphone. This instrument fulfills the demands according to class I (IEC 651). It was calibrated before and after the measurements with pistophone calibrator 4420 (Serial No. 422823).

Weighting filter A (per IEC 651) was used. The reading of the sound level was made in the "fast" position and the interval was noted (normal range less than 1-1.5 dB(A)).

The measurements were made in a room with concrete walls and floor. Some wooden furnishings were present.

Other Equipment

The frequency of the stroke was measured with stroboscope.

Appendix 2

TEST PROCEDURE FOR VIBRATION MEASUREMENTS

The vibration level of the needle scaler was measured per below:

1. A needle scaler from the first batch was used for this test. The aluminum bar with the accelerometer was secured tightly to the housing with a steel hose clamp. The hose clamp was positioned 50mm from the front end of the housing.
2. ISO 8662-1:1988 (E) was followed.
3. A 5mm thick mild steel plate was welded to a heavy profile. The assembly was placed on a work bench. The needle scaler was operated to scale the weld area.
4. 5 test runs were performed by the same operator. Each test run consisted of stable operation for at least one minute during which the integrating function of the meter was operating.
5. The vibration meter was in position "Leg and Peek" during the measurements.
6. During the measurements the temperature, pressure, and flow of compressed air to the tool was noted.

Appendix 3

TEST PROCEDURE FOR NOISE MEASUREMENTS

The sound level of the tool was measured per below:

1. The sound level was measured in four positions. For each position the microphone was placed 1.6m above the floor level and 1m from the surface of the tool (see figure).
2. The sound level was measured three times for each position per above. The position with the highest average sound level was determined. This position was then measured an additional three times and selected as the representative position.
3. During the measurements the temperature, pressure, and flow of compressed air to the tool was noted.
4. The sound level was measured during idling. During actual operation there will be additional process noise which often is considerably louder than the noise during idling.
5. In other aspects the methods and the placement of the object to be tested have been according to the guidelines established and accepted for performing industrial hygiene measurements of noise which can lead to hearing impairment. L_c , i.e. the labeled value was calculated as suggested in ISO 757472.