

Company: Columbusmaskiner AB

Date: 2024-12-17

Measurement Personnel: Jari Palosaari, Alexander Österström

Measurement Instrument: Svantek 106

ID Number: 45142

SP70-PC	Measured RMS, m/s ²						m/s ²
Measurement Sequence / Position of Accelerometer	Dir.	1	Dir.	2	Dir.	3	a_v
Idle running side handle	X	1,139	Y	0,593	Z	0,565	1,4
Load/spin side handle	X	1,975	Y	1,29	Z	0,825	2,5
Idle running front handle	X	0,678	Y	0,212	Z	0,369	0,8
Load/spin front handle	X	0,793	Y	0,876	Z	0,554	1,3

Machine Type: Wheel Spinner

Manufacturer: Columbusmaskiner AB

Model: SP70-PC

Drive: Electric 400 V, 3-phase, 50/60 Hz

Power: 1.5 kW

Weight: 31 kg

1. Test Equipment

- **Vibration Meter:** Svantek SV 106
- **Accelerometer:** Kuber for measuring hand-arm vibrations in 3 directions (X, Y, Z)
- **Test Distance from Machine:** Measurements were taken at the machine's handles, where vibration levels are most relevant to user exposure.
- **Test Position:** Accelerometers were placed on the specific handles of the machine where vibrations most likely affect the user. Photos are available in the binder.

2. Test Procedure

Type of Test:

- Test was performed with a no-load operation for about 1 minute.
- A test was also performed by spinning the wheel to full speed and then braking. The test was repeated three times.

Referenced ISO Standards:

- **ISO 5349-1:2001** – "Mechanical Vibration — Measurement and Evaluation of Human Exposure to Hand-Transmitted Vibration — Part 1: General Guidelines"
 - **EN ISO 20643:2010** – "Mechanical Vibration — Measurement and Evaluation of Hand-Arm Vibration"
-

3. Measurement Results

- **Equivalent Vibration Level (Hand-Transmitted Vibration):**
 - No-load operation (side handle): 1.4 m/s²
 - No-load operation (front handle): 0.8 m/s²
 - Load/spin (side handle): 2.5 m/s²
 - Load/spin (front handle): 1.3 m/s²
 - **Maximum Vibration Levels:**
 - Maximum vibration level (hand-transmitted): 0.8 m/s²
 - **Test Conditions:**
 - Indoor, Temperature: 19°C
 - Background vibration level: The vibration levels in the test area were under 0.2 m/s² and were not considered to affect the result.
-

4. Compliance with EU Regulations

- **Machinery Directive 2006/42/EC:**

The machine complies with the essential health and safety requirements, including those regarding vibrations. The measured vibration levels are below the maximum allowed value for hand-transmitted vibrations, ensuring that the machine does not pose a risk to the user.
 - **Maximum Allowed Vibration Level:**

According to EN ISO 5349 and EN ISO 20643, hand-transmitted vibrations should not exceed 5.0 m/s² as an average value over an eight-hour working day. The maximum vibration level measured during the test was 2.5 m/s², ensuring that the machine does not pose a risk to the user.
-

5. Summary and Conclusions

- **Machine Meets Vibration Requirements:** Yes, the machine meets the vibration requirements according to ISO 5349 and EN ISO 20643.
 - **Maximum Vibration Levels:** 2.5 m/s² (Load/spin, side handle)
 - **Other Observations:** No significant deviation was observed during the test. Vibration levels were within acceptable limits for all operating modes.
 - **Recommendations:** No action required. Test results are within approved limits, and the machine complies with vibration requirements for CE marking.
-

Uncertainty Contributions:

- **Instrument Uncertainty (Svantek SV 106):** $\pm 5\%$
- **Calibration Uncertainty:** $\pm 2\%$
- **Variability in Repeated Measurements:** $\pm 5\text{--}10\%$
- **Mounting Method and Operator Influence:** $\pm 5\%$
- **Environmental Factors (Temperature, Background Vibration):** $\pm 2\%$

The total measurement uncertainty is estimated according to the standard method and is calculated to $\pm 15\%$ (expanded uncertainty with a coverage factor $k=2$, corresponding to a 95% confidence interval).

Impact on Results:

Considering the measurement uncertainty, this means:

- The maximum measured vibration level of 2.5 m/s^2 (Load/spin, side handle) may lie within the range of $2.13 - 2.88 \text{ m/s}^2$.
- Load/spin (side handle): $2.5 \pm 0.38 \text{ m/s}^2$
- Load/spin (front handle): $1.3 \pm 0.20 \text{ m/s}^2$

Conclusion:

Despite measurement uncertainty, the measured vibration levels remain within the acceptable limits for hand-transmitted vibrations according to EN ISO 5349 and EN ISO 20643. Since the machine operates in intervals where vibrations are short-term or periodic and do not exceed limits for long-term exposure, no further workplace assessment is needed.

6. Approval

- **Test Leader (Name, Title):** Jari Palosaari, Test Leader
Date: 2024-12-17
- **Responsible for Machine's CE Marking:** Alexander Österström, Technical Manager
Date: 2024-12-17

Columbusmaskiner AB

Hejargatan 13

632 29 Eskilstuna

Sweden

Email: info@columbusmaskiner.se

Phone: +46-724 544 244