

# TEMPLE ALLEN ELIMINATES VIBRATION, CAPTURES DUST

There are four primary health issues associated with sanding and grinding operations - high grip forces, poor postures, vibration exposure, and toxic dust. Temple Allen Industries makes EMMA™ and Wing-Top Sander equipment that successfully and reliably addresses all four.

## HAVS (HAND-ARM VIBRATION SYNDROME)

Over time, exposure to vibration can lead to irreversible damage to the fingers and hands known as HAVS (Hand-Arm Vibration Syndrome), with the symptoms becoming more problematic as vibration exposure continues. Vibration damage associated with pneumatic sanding tools can require surgery and cause permanent disability.

One booth at a typical major aerospace manufacturing facility might see vibration exposure cause three surgery-requiring injuries a year, at an annual cost of more than \$70,000. Additional costs can accrue via OSHA citations under the general duty clause, new worker training, absenteeism, lower productivity, and overtime.

8" Random orbital sanders that vibrate at 7m/s<sup>2</sup> can only be used for four hours in the EU. More powerful sanders - tools that do the job faster - can vibrate as much as 14.4m/s<sup>2</sup> - and can therefore only be used for 30 min.

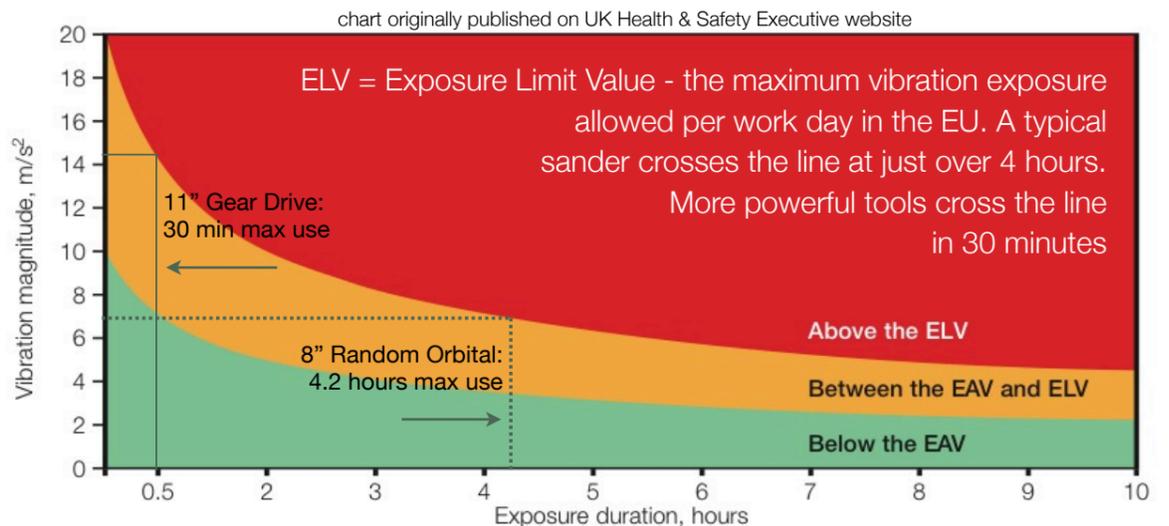
EMMA™ is uniquely capable of supporting the entire weight of the tool and applying exactly the optimum pressure on the surface - preventing the artisan being subjected to poor postures and high grip forces. EMMA also absorbs all vibration before it gets to the worker. These attributes successfully eliminate the first three health issues listed above.

## TOXIC AIRBORNE PARTICULATES

The fourth health issue associated with surface preparation operations is airborne paint dust. The US OSHA regulation 1910.1026 (c) establishes a Permissible Exposure Limit (PEL) that requires that no employee be exposed to hexavalent chromium in excess of 5 micrograms/cubic meter. Meeting the prior specification of 25 µg/m<sup>3</sup> (in effect until 2010) typically required full body suits and supplied air. Similar regulations protect workers from exposure to cadmium and lead.

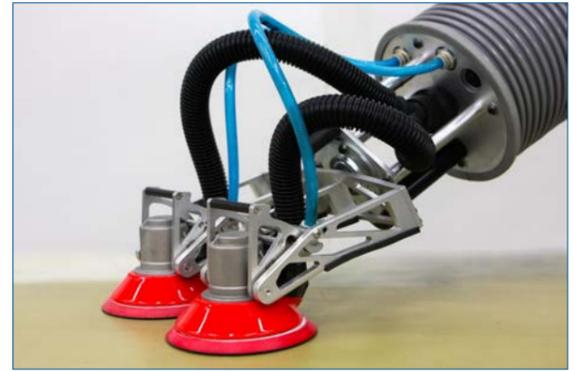
Workers will inevitably tilt the sander away from the surface, which breaks the vacuum seal and allows dust to escape into the shop environment. The uncollected dust that doesn't escape sits on the surface and clogs the abrasive, requiring more powerful tools and more frequent paper changes. EMMA in contrast always holds the sander (or sanders) flat on the surface, which allows the vacuum to work at peak efficiency, so that the shop stays clean and the abrasives last several times longer.

Equipped with the right abrasive and our integrated vacuum, Temple Allen equipment can allow the operator to meet the new OSHA dust exposure specification wearing a P95 dust mask, though unless everyone in the facility is using an EMMA or Wing-Top Sander system, we recommend maintaining your current PPE standards.



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ERGONOMIC SANDING & GRINDING SYSTEMS  
THAT PROTECT WORKERS AND  
BOOST PRODUCTIVITY



## Measurable Gains In Productivity:

- Typically at least 50% faster
- Sand 3x longer before changing paper
- Experience virtually dustless operations

## Enhanced Safety - Top of Plane to Bottom Line:

- Eliminates vibration and high grip force trauma
- Boosts worker health, morale, and availability
- No more sore shoulders or aching backs
- Captures paint dust, keeps shop cleaner

## Quality You Can Touch, See, And Measure:

- Consistently higher quality surface
- Reduces scrapped parts and scalloping damage

## Simplifies Workflow & Operations:

- Requires few modifications to the existing workflow
- Available with integrated vacuum systems
- All-pneumatic, no electricity
- 97% or better availability

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## ERGONOMIC RISK ASSESSMENT

Most Temple Allen clients perform their own in-house ergonomic risk assessments, while some rely on outside consultants. Either way, for tasks associated with surface treatment operations such as sanding or grinding, they'll generate a form resembling the one shown below. This interactive form will generate a total risk score for an activity based on the operator posture, force applied, and vibration exposure associated with the activity, and the duration and frequency of the risk-associated components of that activity. Note that orange and red cells indicate potentially dangerous operations, and management action is recommended for any total score greater than 20. Aerospace sanding operations, however, typically score at least 45.

Temple Allen - Ergonomic Risk Evaluation Form									
Left Body Parts	# of Categories	Right Body Parts	# of Categories	Central Support	# of Categories	Total			
Fingers, Palm, and Wrist	8	Fingers, Palm, and Wrist	8	Neck	3	50	Clear Boxes		
Forearm/Elbow	6	Forearm/Elbow	7	Back	6				
Upper Arm/Shoulder	6	Upper Arm/Shoulder	6	Legs	0				
Total	20	Total	21	Total	9				

Horizontal Panels	Left			Right			Central Support		
	Fingers, Palm, & Wrist	Elbow & Forearm	Upper Arm & Shoulder	Fingers, Palm, & Wrist	Elbow & Forearm	Upper Arm & Shoulder	Neck	Back (Upper or Lower)	Legs (Upper or Lower)
<b>Posture</b>	<input type="checkbox"/> Grips with awkward posture <input type="checkbox"/> Wrist Deviation >10 degrees	<input type="checkbox"/> Rotation of the forearm <input type="checkbox"/> Lifting with arm fully extended	<input type="checkbox"/> Arms away from the body (front or side) no support <input type="checkbox"/> Hands above the head or elbows above the shoulders <input type="checkbox"/> Arms behind body	<input type="checkbox"/> Grips with awkward posture <input type="checkbox"/> Wrist Deviation >10 degrees	<input type="checkbox"/> Rotation of the forearm <input type="checkbox"/> Lifting with arm fully extended	<input type="checkbox"/> Arms away from the body (front or side) no support <input type="checkbox"/> Hands above the head or elbows above the shoulders <input type="checkbox"/> Arms behind body	<input type="checkbox"/> Head forward >10 degrees <input type="checkbox"/> Head backwards <input type="checkbox"/> Head Rotated >10 degrees <input type="checkbox"/> Repeated Bending <input type="checkbox"/> Side bending >10 degrees	<input type="checkbox"/> Forward >20 degrees <input type="checkbox"/> Backwards >5 degrees <input type="checkbox"/> Rotated >10 degrees <input type="checkbox"/> Side bent >20 degrees	<input type="checkbox"/> Squatting <input type="checkbox"/> Kneeling <input type="checkbox"/> Standing on 1 leg
<b>Force</b>	<input type="checkbox"/> Pinch Grip >2 lbs <input type="checkbox"/> Power grip >6 lbs <input type="checkbox"/> Contact stress on fingers, palms, and/or wrists <input type="checkbox"/> Impact to Palm	<input type="checkbox"/> Visible or perceived effort <input type="checkbox"/> Contact stress on forearm <input type="checkbox"/> Contact stress on elbow	<input type="checkbox"/> Visible or perceived effort <input type="checkbox"/> Contact stress <input type="checkbox"/> Lifting, pushing, pulling, >10 lbs	<input type="checkbox"/> Pinch Grip >2 lbs <input type="checkbox"/> Power grip >6 lbs <input type="checkbox"/> Contact stress on fingers, palms, and/or wrists <input type="checkbox"/> Impact to Palm	<input type="checkbox"/> Visible or perceived effort <input type="checkbox"/> Contact stress on forearm <input type="checkbox"/> Contact stress on elbow	<input type="checkbox"/> Visible or perceived effort <input type="checkbox"/> Contact stress <input type="checkbox"/> Lifting, pushing, pulling, >10 lbs	<input type="checkbox"/> >1 lbs or wearing headgear <input type="checkbox"/> Contact stress	<input type="checkbox"/> Walking/standing on hard surfaces (no padding) <input type="checkbox"/> Lifting, pulling, pushing, or carrying >20 lbs <input type="checkbox"/> Contact Stress <input type="checkbox"/> Standing >80% of the day	<input type="checkbox"/> Climbing >40 flights a day <input type="checkbox"/> Contact stress using leg/knee as hammer <input type="checkbox"/> >10 lbs shear/Pull or Contact force
<b>Vibration</b>	<input type="checkbox"/> Evident	<input type="checkbox"/> Evident	<input type="checkbox"/> Evident	<input type="checkbox"/> Evident	<input type="checkbox"/> Evident	<input type="checkbox"/> Evident	<input type="checkbox"/> Evident	<input type="checkbox"/> Evident	<input type="checkbox"/> Evident
<b>Duration (time)</b>	<input type="checkbox"/> Continuous Effort (>6 secs)	<input type="checkbox"/> Continuous Effort (>6 secs)	<input type="checkbox"/> Continuous Effort (>6 secs)	<input type="checkbox"/> Continuous Effort (>6 secs)	<input type="checkbox"/> Continuous Effort (>6 secs)	<input type="checkbox"/> Continuous Effort (>6 secs)	<input type="checkbox"/> Continuous Effort (>6 secs)	<input type="checkbox"/> Continuous Effort (>6 secs)	<input type="checkbox"/> Continuous Effort (>6 secs)
<b>Frequency (event/min)</b>	<input type="checkbox"/> >2 times/min for more than 2 hours total per workday	<input type="checkbox"/> >2 times/min for more than 2 hours total per workday	<input type="checkbox"/> >2 times/min for more than 2 hours total per workday	<input type="checkbox"/> >2 times/min for more than 2 hours total per workday	<input type="checkbox"/> >2 times/min for more than 2 hours total per workday	<input type="checkbox"/> >2 times/min for more than 2 hours total per workday	<input type="checkbox"/> >2 times/min for more than 2 hours total per workday	<input type="checkbox"/> >2 times/min for more than 2 hours total per workday	<input type="checkbox"/> >2 times/min for more than 2 hours total per workday
<b>TOTAL</b>	8	6	6	8	7	6	3	6	0

The Temple Allen Ergonomic Risk Assessment Form example above is filled out for sanding horizontal panels (flight controls, helicopter blades, etc.) - operations where the part is at a consistently comfortable height and gravity is helping provide contact pressure. Even so, the simple act of holding onto a vibrating tool and moderately extending one's reach are enough to generate a score more than double that which requires management action. Sanding operations on vertical panels or overhead represent even greater risk to the artisans responsible, and the risk assessment score for those operations is commensurately higher.

Contact Temple Allen to get a working copy of this form to help analyze operations in your own facility, or to discuss how our equipment can protect your personnel and improve your operations - email us at [info@templeallen.com](mailto:info@templeallen.com) or call 301.541.3662.