HI-SPEED INDUSTRIAL SERVICE QualiTest® Diagnostics

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July 7, 2022

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Sonoco
Memphis, TN

The following is a summary of findings from the quarterly vibration survey performed at your facility on 6/30/2022. Please let us know if there are any questions or comments.

QualiTest® uses a four step rating system for defects.

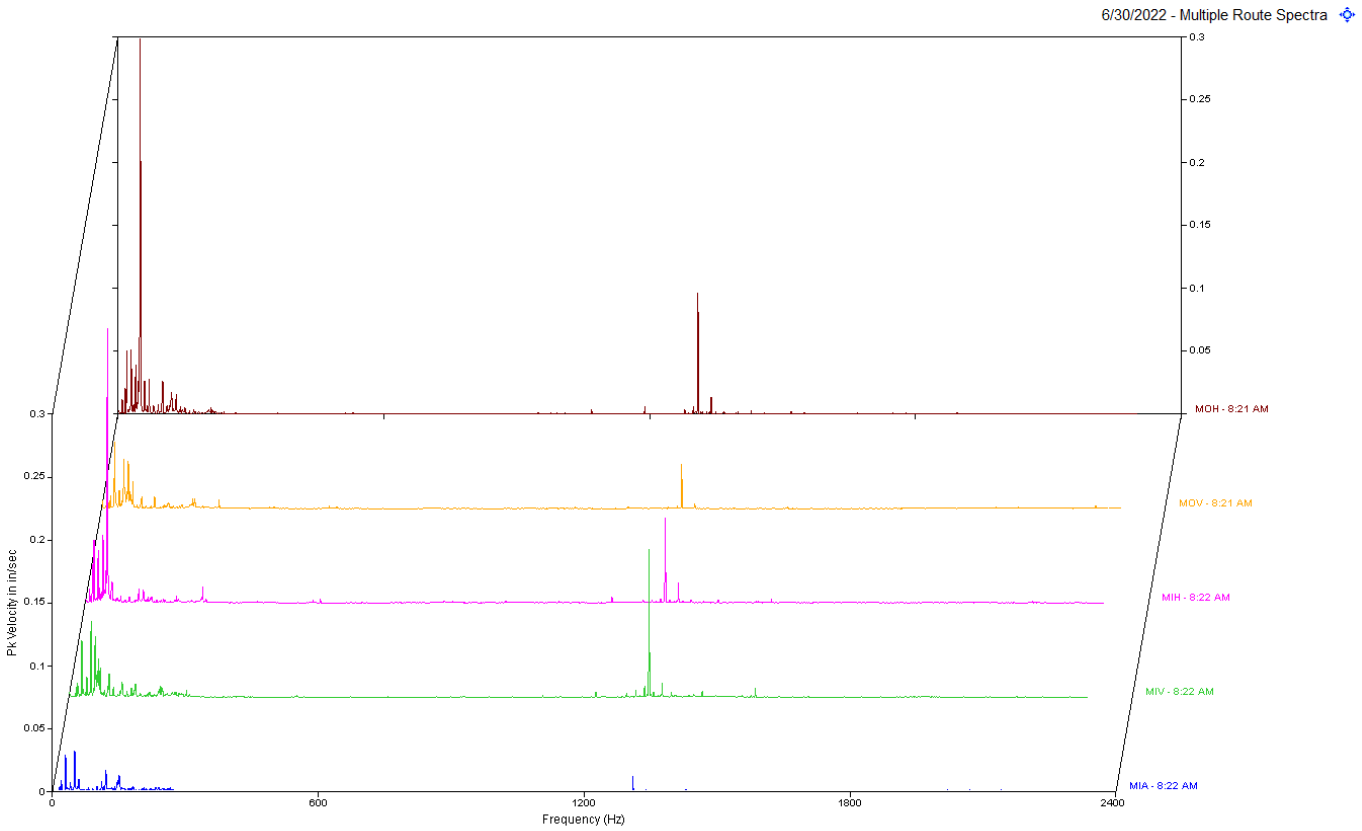
Class I: Defect is present, but effect on reliability is not clear; no immediate action is required. Continue to normally monitor.

Class II: Defect (s) present that may cause problem in long term (2-6 months). Repair during normal maintenance scheduling. Continue to monitor.

Class III; Defect (s) present that may cause failure in short term (less than 2 months). This should be addressed as soon as practical, with a high maintenance priority. Increase monitoring frequency.

Class IV; Defect (s) present that makes continued reliability unpredictable, and possibility of secondary damage is high. Repairs should be made ASAP. An unscheduled shutdown should be considered for repairs

Defects

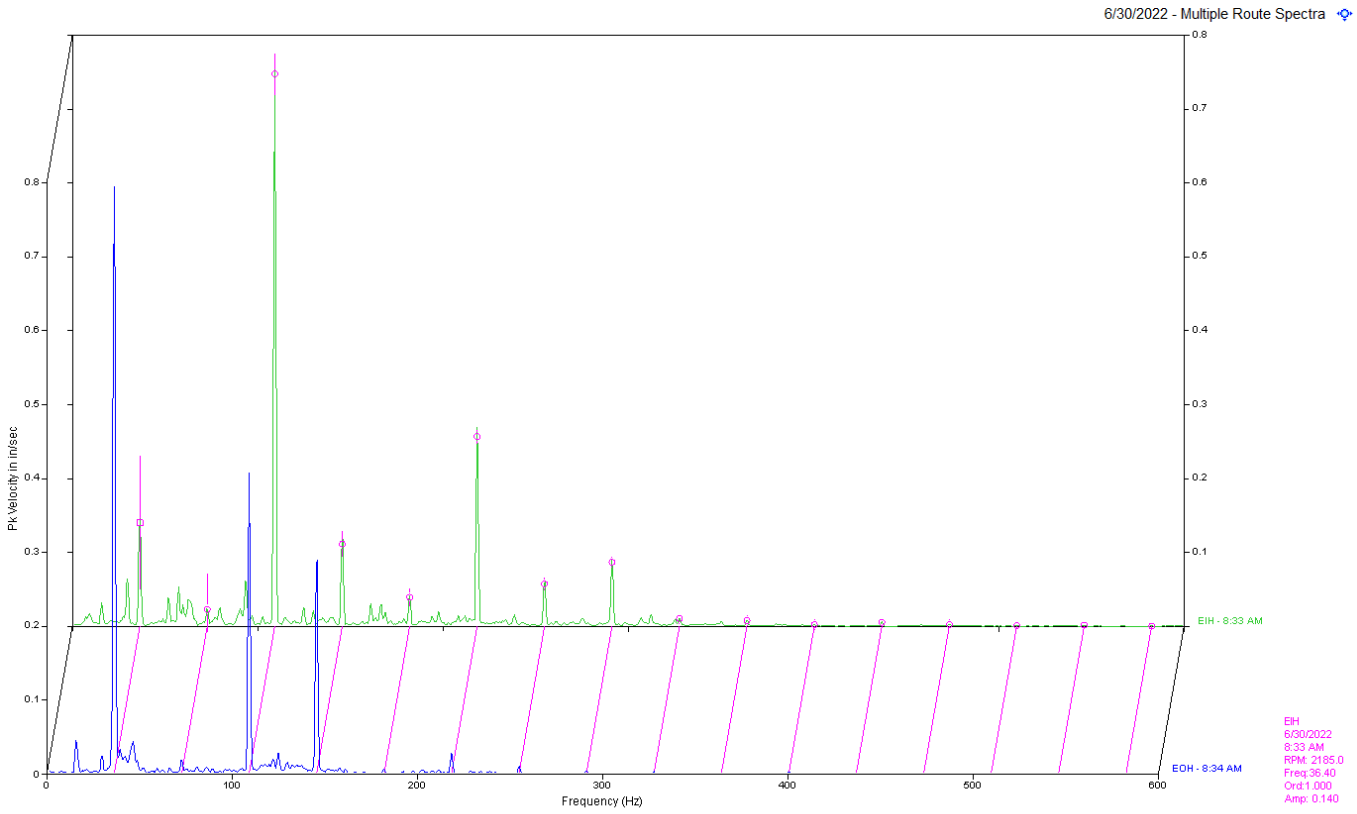


CLASS II Vacuum Pump #2

Motor data shows some increased amplitudes. Spectral data above is the motor spectra. There appears to be an increase in vibration at 44 orders of motor rpm. This is likely rotor bar pass frequency. There is also a non-synchronous vibration in the lower frequency range at MOH. This may be a belt harmonic vibration. For now, ensure belts are in good shape and properly tightened. Motor will be watched closely for rotor bar issues.

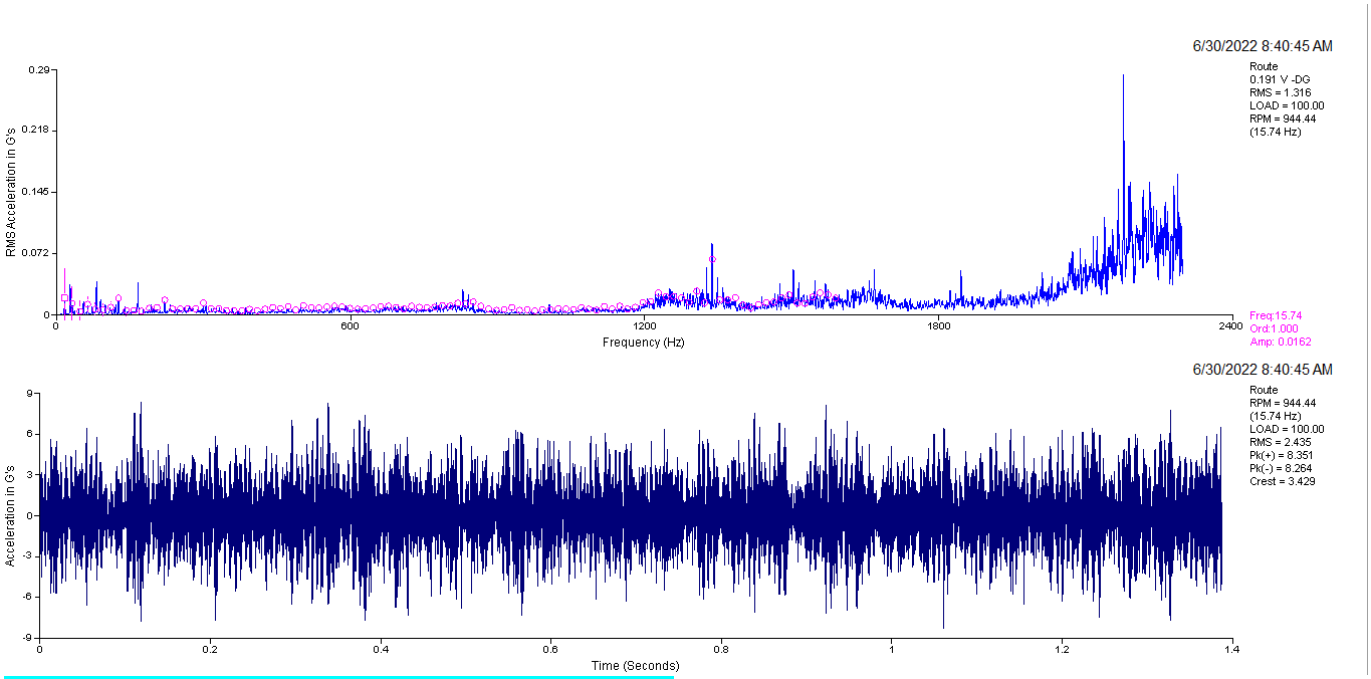
CLASS III P8 Oven Fan

Data was taken on the motor this survey but not on the fan because the fan bearings are not safe for access. Previous data taken has shown several high amplitude rpm harmonics throughout spectra. This indicates mechanical looseness and wear of the bearings/housings and/or fan shaft. If no actions have been taken since last month's report then it is still recommended to inspect fan bearings and shaft for looseness and wear soon.



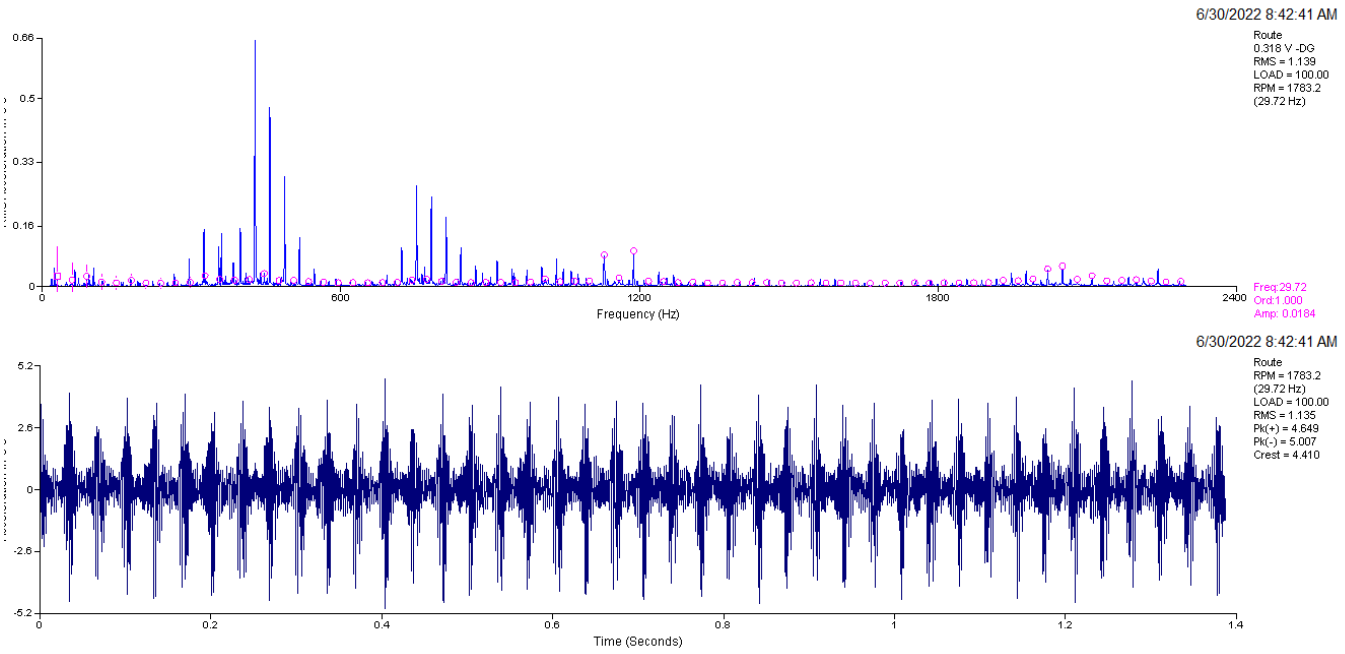
CLASS III Coater Main Exhaust Fan

Fan vibration has increased significantly since last survey in May. Fan data shows a high 1 and 3 x rpm peaks in fan spectra. This is likely due to looseness. A lift check of the fan shaft at the bearings should be done asap. There should be more than .003"-.004" lift. Inspect fan wheel also ensuring no build up and inspect fan base/structure/frame for cracks. Perform ASAP.



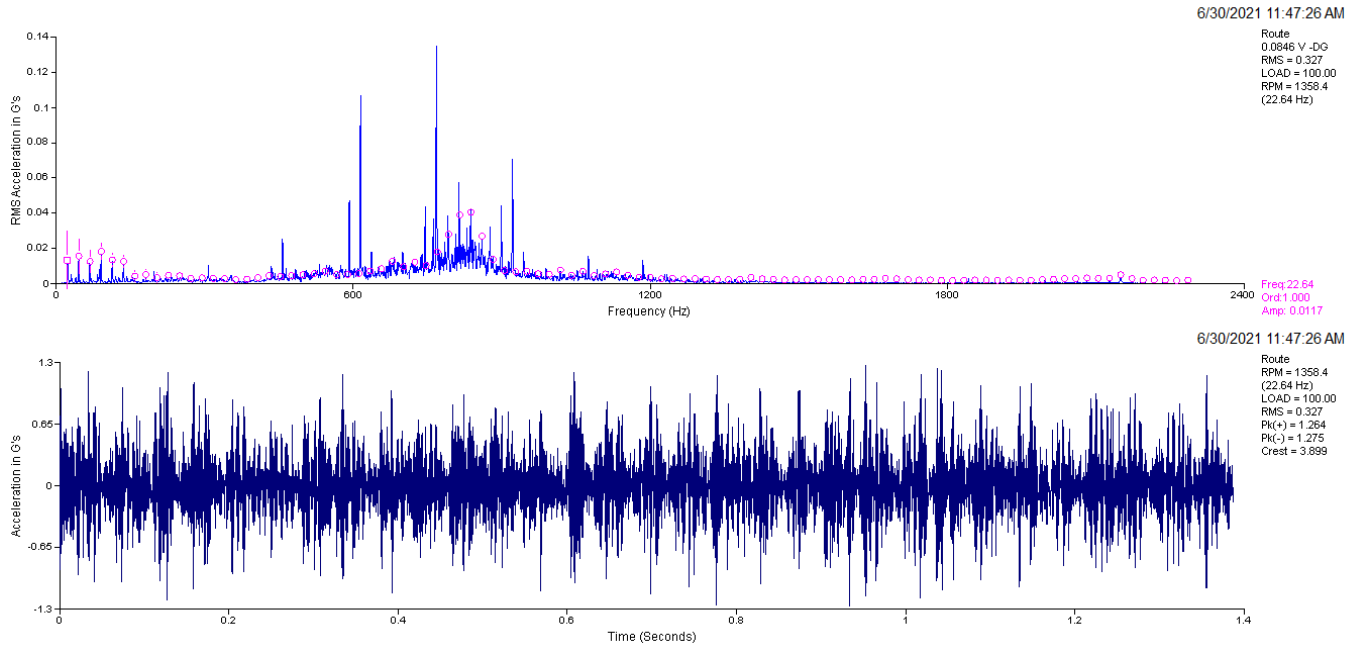
CLASS II Zone 3 Supply Fan (Fan Inboard Horizontal)

High frequency non-synchronous vibration indicates bearing defects are present in the fan bearings. Bearings should be replaced as scheduling allows.



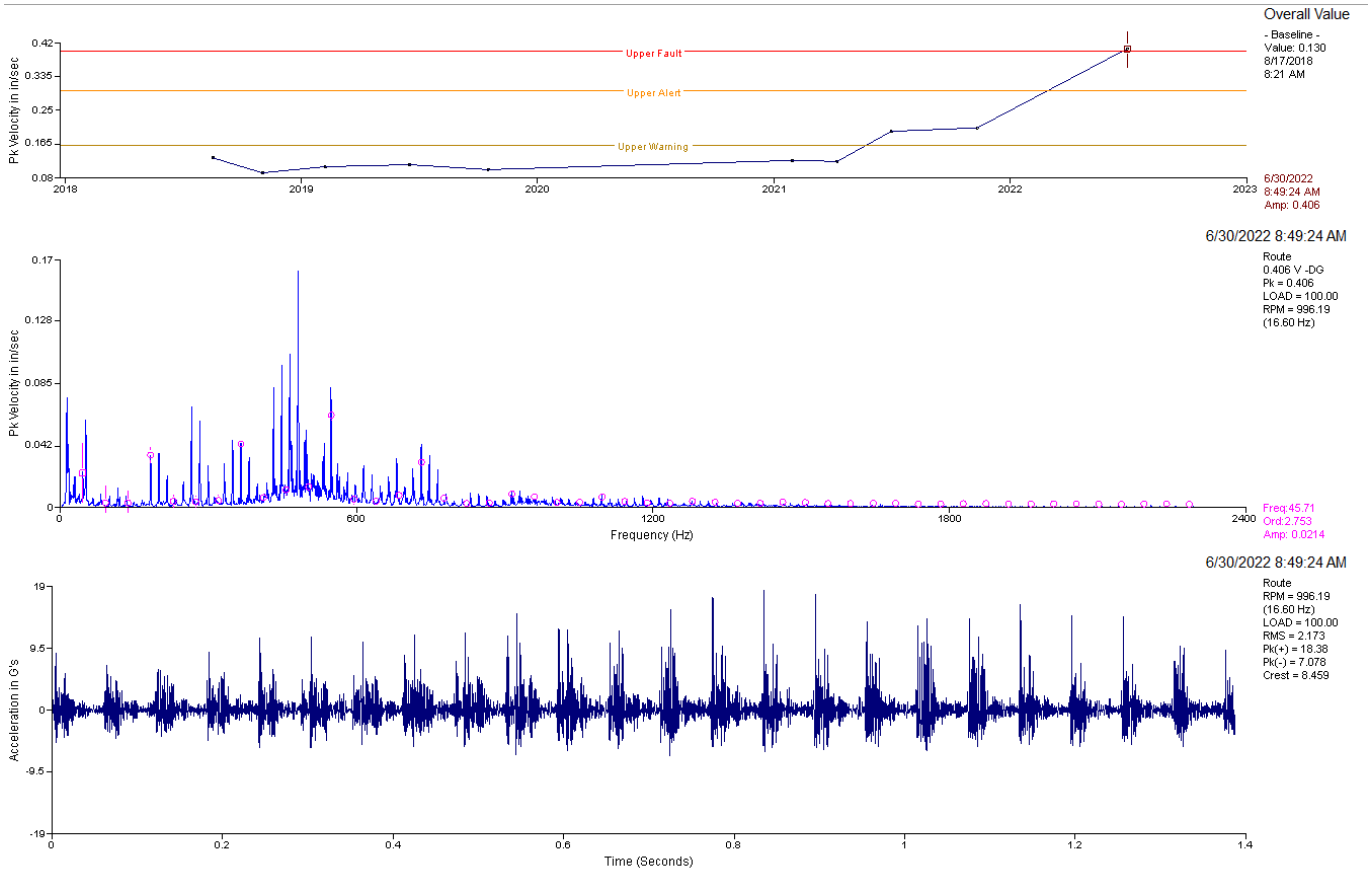
CLASS II Zone 4 Supply Fan (Motor Inboard Horizontal)

Motor vibration data is showing signs of bearing defects/wear in the motor bearings. Replace motor as scheduling allows.



CLASS II Zone 5 Supply Fan (Fan Outboard Horizontal)

Non-synchronous vibration indicates bearing defects are present in the fan bearings. Bearings should be replaced as scheduling allows.



CLASS II Cooling Fan B (Fan Inboard Vertical)

Overall high freq. vibration is up. High frequency non-synchronous vibration indicates bearing defects are present in the fan bearings. Bearings should be replaced as soon as scheduling allows.

CLASS II P19 Oven Fan

Fan was not in service this survey. If no actions were taken since last survey, then the following still applies.
Data shows a high 1 x rpm vibration of the motor and fan in the vertical direction. Fan data (bottom spectrum) shows some non-synchronous peaks that are very close to motor rpm. It is unclear if these are bearing defect frequencies or motor harmonics. Directional vibration may be resonance or a mechanical issue such sheave misalignment or loose structure/fasteners. For now, it is recommended to inspect sheaves for parallel and angular misalignment. Ensure belts and sheaves are not worn.

Abbreviated Last Measurement Summary
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Database: sonoco.rbm

MEASUREMENT POINT	OVERALL LEVEL	HFD / VHFD
VACPUMP1 - VACUUM PUMP 1	(30-Jun-22)	
	OVERALL LEVEL	1 - 20 KHz
MOH - MOTOR OUTBOARD HORIZONTAL	.139 In/Sec	.339 G-s
MOV - MOTOR OUTBOARD VERTICAL	.224 In/Sec	.516 G-s
MIH - MOTOR INBOARD HORIZONTAL	.143 In/Sec	.349 G-s
MIV - MOTOR INBOARD VERTICAL	.171 In/Sec	.592 G-s
MIA - MOTOR INBOARD AXIAL	.263 In/Sec	.096 G-s
EIH - EQUIPMENT INBOARD HORIZONTAL	.055 In/Sec	.134 G-s
EIV - EQUIPMENT INBOARD VERTICAL	.045 In/Sec	.162 G-s
EIA - EQUIPMENT INBOARD AXIAL	.042 In/Sec	.253 G-s
EOH - EQUIPMENT OUTBOARD HORIZONTAL	.043 In/Sec	.134 G-s
EOV - EQUIPMENT OUTBOARD VERTICAL	.046 In/Sec	.161 G-s
EOA - EQUIPMENT OUTBOARD AXIAL	.041 In/Sec	.146 G-s
VACPUMP2 - VACUUM PUMP 2	(30-Jun-22)	
	OVERALL LEVEL	1 - 20 KHz
MOH - MOTOR OUTBOARD HORIZONTAL	.374 In/Sec	1.714 G-s
MOV - MOTOR OUTBOARD VERTICAL	.116 In/Sec	.657 G-s
MIH - MOTOR INBOARD HORIZONTAL	.299 In/Sec	1.398 G-s
MIV - MOTOR INBOARD VERTICAL	.181 In/Sec	1.812 G-s
MIA - MOTOR INBOARD AXIAL	.074 In/Sec	.270 G-s
EIH - EQUIPMENT INBOARD HORIZONTAL	.090 In/Sec	.159 G-s
EIV - EQUIPMENT INBOARD VERTICAL	.084 In/Sec	.274 G-s
EIA - EQUIPMENT INBOARD AXIAL	.096 In/Sec	.206 G-s
EOH - EQUIPMENT OUTBOARD HORIZONTAL	.091 In/Sec	.330 G-s
EOV - EQUIPMENT OUTBOARD VERTICAL	.107 In/Sec	.315 G-s
EOA - EQUIPMENT OUTBOARD AXIAL	.070 In/Sec	.228 G-s
EA2 - EQUIPMENT AXIAL	.073 In/Sec	.181 G-s
CTPUMP1 - COOLING TOWER PUMP 1	(30-Jun-22)	
	OVERALL LEVEL	1 - 20 KHz
MOH - MOTOR OUTBOARD HORIZONTAL	.309 In/Sec	.217 G-s
MOV - MOTOR OUTBOARD VERTICAL	.182 In/Sec	.326 G-s
MIH - MOTOR INBOARD HORIZONTAL	.160 In/Sec	.178 G-s
MIV - MOTOR INBOARD VERTICAL	.048 In/Sec	.220 G-s
MIA - MOTOR INBOARD AXIAL	.241 In/Sec	.461 G-s
CTPUMP2 - COOLING TOWER PUMP 2	(30-Jun-22)	
	OVERALL LEVEL	1 - 20 KHz
MOH - MOTOR OUTBOARD HORIZONTAL	.104 In/Sec	.472 G-s
MOV - MOTOR OUTBOARD VERTICAL	.079 In/Sec	.579 G-s
MIH - MOTOR INBOARD HORIZONTAL	.107 In/Sec	.225 G-s
MIV - MOTOR INBOARD VERTICAL	.119 In/Sec	.178 G-s
MIA - MOTOR INBOARD AXIAL	.083 In/Sec	.379 G-s

P8OVENFAN - P8 OVEN FAN	(30-Jun-22)	
	OVERALL LEVEL	1 - 20 KHz
MOH - MOTOR OUTBOARD HORIZONTAL	.243 In/Sec	.092 G-s
MOV - MOTOR OUTBOARD VERTICAL	.186 In/Sec	.053 G-s
MIH - MOTOR INBOARD HORIZONTAL	.231 In/Sec	.058 G-s
MIV - MOTOR INBOARD VERTICAL	.173 In/Sec	.052 G-s
MIA - MOTOR INBOARD AXIAL	.236 In/Sec	.063 G-s

MAINXHAUST - MAIN EXHAUST FAN	(30-Jun-22)	
	OVERALL LEVEL	1 - 20 KHz
MOH - MOTOR OUTBOARD HORIZONTAL	.314 In/Sec	.432 G-s
MOV - MOTOR OUTBOARD VERTICAL	.177 In/Sec	.301 G-s
MIH - MOTOR INBOARD HORIZONTAL	.167 In/Sec	.603 G-s
MIV - MOTOR INBOARD VERTICAL	.492 In/Sec	.443 G-s
MIA - MOTOR INBOARD AXIAL	.183 In/Sec	.354 G-s
EIH - EQUIPMENT INBOARD HORIZONTAL	.870 In/Sec	.037 G-s
EIV - EQUIPMENT INBOARD VERTICAL	.574 In/Sec	.034 G-s
EIA - EQUIPMENT INBOARD AXIAL	.248 In/Sec	.030 G-s
EOH - EQUIPMENT OUTBOARD HORIZONTAL	1.010 In/Sec	.043 G-s

ZONE1FAN - ZONE 1 SUPPLY FAN	(30-Jun-22)	
	OVERALL LEVEL	1 - 20 KHz
EIH - EQUIPMENT INBOARD HORIZONTAL	.104 In/Sec	.523 G-s
EIV - EQUIPMENT INBOARD VERTICAL	.082 In/Sec	.773 G-s
EIA - EQUIPMENT INBOARD AXIAL	.230 In/Sec	.130 G-s
EOH - EQUIPMENT OUTBOARD HORIZONTAL	.110 In/Sec	.318 G-s
EOV - EQUIPMENT OUTBOARD VERTICAL	.117 In/Sec	.166 G-s
EOA - EQUIPMENT OUTBOARD AXIAL	.167 In/Sec	.091 G-s

ZONE2FAN - ZONE 2 SUPPLY FAN	(30-Jun-22)	
	OVERALL LEVEL	1 - 20 KHz
MOH - MOTOR OUTBOARD HORIZONTAL	.175 In/Sec	.317 G-s
MOV - MOTOR OUTBOARD VERTICAL	.153 In/Sec	.132 G-s
MIH - MOTOR INBOARD HORIZONTAL	.185 In/Sec	.223 G-s
MIV - MOTOR INBOARD VERTICAL	.232 In/Sec	.244 G-s
MIA - MOTOR INBOARD AXIAL	.261 In/Sec	.117 G-s
EIH - EQUIPMENT INBOARD HORIZONTAL	.235 In/Sec	.091 G-s
EIV - EQUIPMENT INBOARD VERTICAL	.141 In/Sec	.092 G-s
EIA - EQUIPMENT INBOARD AXIAL	.270 In/Sec	.053 G-s

ZONE3FAN - ZONE 3 SUPPLY FAN	(30-Jun-22)	
	OVERALL LEVEL	1 - 20 KHz
MOH - MOTOR OUTBOARD HORIZONTAL	.448 In/Sec	.247 G-s
MOV - MOTOR OUTBOARD VERTICAL	.166 In/Sec	.311 G-s
MIH - MOTOR INBOARD HORIZONTAL	.187 In/Sec	.317 G-s
MIV - MOTOR INBOARD VERTICAL	.187 In/Sec	.511 G-s
MIA - MOTOR INBOARD AXIAL	.464 In/Sec	.106 G-s
EIH - EQUIPMENT INBOARD HORIZONTAL	.191 In/Sec	2.560 G-s
EIV - EQUIPMENT INBOARD VERTICAL	.131 In/Sec	.434 G-s
EIA - EQUIPMENT INBOARD AXIAL	.316 In/Sec	1.737 G-s
EOH - EQUIPMENT OUTBOARD HORIZONTAL	.184 In/Sec	.434 G-s
EOV - EQUIPMENT OUTBOARD VERTICAL	.105 In/Sec	.089 G-s
EOA - EQUIPMENT OUTBOARD AXIAL	.126 In/Sec	.183 G-s

ZONE4FAN - ZONE 4 SUPPLY FAN	(30-Jun-22)	
	OVERALL LEVEL	1 - 20 KHz
MOH - MOTOR OUTBOARD HORIZONTAL	.283 In/Sec	.170 G-s
MOV - MOTOR OUTBOARD VERTICAL	.316 In/Sec	.075 G-s
MIH - MOTOR INBOARD HORIZONTAL	.318 In/Sec	.339 G-s
MIV - MOTOR INBOARD VERTICAL	.367 In/Sec	.199 G-s
MIA - MOTOR INBOARD AXIAL	.403 In/Sec	.386 G-s
EIH - EQUIPMENT INBOARD HORIZONTAL	.305 In/Sec	.373 G-s
EIV - EQUIPMENT INBOARD VERTICAL	.095 In/Sec	.073 G-s
EIA - EQUIPMENT INBOARD AXIAL	.348 In/Sec	.292 G-s
EOH - EQUIPMENT OUTBOARD HORIZONTAL	.146 In/Sec	.153 G-s
EOV - EQUIPMENT OUTBOARD VERTICAL	.199 In/Sec	.269 G-s
EOA - EQUIPMENT OUTBOARD AXIAL	.187 In/Sec	.177 G-s

ZONE5FAN - ZONE 5 SUPPLY FAN (30-Jun-22)

	OVERALL LEVEL	1 - 20 KHz
MOH - MOTOR OUTBOARD HORIZONTAL	.151 In/Sec	.292 G-s
MOV - MOTOR OUTBOARD VERTICAL	.083 In/Sec	.105 G-s
MIH - MOTOR INBOARD HORIZONTAL	.118 In/Sec	.102 G-s
MIV - MOTOR INBOARD VERTICAL	.114 In/Sec	.212 G-s
MIA - MOTOR INBOARD AXIAL	.200 In/Sec	.144 G-s
EIH - EQUIPMENT INBOARD HORIZONTAL	.116 In/Sec	.459 G-s
EIV - EQUIPMENT INBOARD VERTICAL	.076 In/Sec	1.939 G-s
EIA - EQUIPMENT INBOARD AXIAL	.191 In/Sec	1.209 G-s

ZONE6FAN - ZONE 6 SUPPLY FAN (30-Jun-22)

	OVERALL LEVEL	1 - 20 KHz
MOH - MOTOR OUTBOARD HORIZONTAL	.204 In/Sec	.074 G-s
MOV - MOTOR OUTBOARD VERTICAL	.399 In/Sec	.066 G-s
MIH - MOTOR INBOARD HORIZONTAL	.166 In/Sec	.058 G-s
MIV - MOTOR INBOARD VERTICAL	.337 In/Sec	.052 G-s
MIA - MOTOR INBOARD AXIAL	.234 In/Sec	.017 G-s
EIH - EQUIPMENT INBOARD HORIZONTAL	.183 In/Sec	.376 G-s
EIV - EQUIPMENT INBOARD VERTICAL	.225 In/Sec	.686 G-s
EIA - EQUIPMENT INBOARD AXIAL	.237 In/Sec	.101 G-s
EOH - EQUIPMENT OUTBOARD HORIZONTAL	.267 In/Sec	.139 G-s
EOV - EQUIPMENT OUTBOARD VERTICAL	.321 In/Sec	.0042 G-s

COOLFAN B - COOLING FAN B (30-Jun-22)

	OVERALL LEVEL	1 - 20 KHz
MOH - MOTOR OUTBOARD HORIZONTAL	.141 In/Sec	.537 G-s
MOV - MOTOR OUTBOARD VERTICAL	.184 In/Sec	.483 G-s
MIH - MOTOR INBOARD HORIZONTAL	.167 In/Sec	.995 G-s
MIV - MOTOR INBOARD VERTICAL	.203 In/Sec	.791 G-s
MIA - MOTOR INBOARD AXIAL	.295 In/Sec	.242 G-s
EIH - EQUIPMENT INBOARD HORIZONTAL	.194 In/Sec	1.733 G-s
EIV - EQUIPMENT INBOARD VERTICAL	.406 In/Sec	.333 G-s
EIA - EQUIPMENT INBOARD AXIAL	.263 In/Sec	.584 G-s
EOH - EQUIPMENT OUTBOARD HORIZONTAL	.176 In/Sec	.289 G-s
EOV - EQUIPMENT OUTBOARD VERTICAL	.200 In/Sec	.347 G-s
EOA - EQUIPMENT OUTBOARD AXIAL	.243 In/Sec	.233 G-s

EXHAUSTFAN - EXHAUST FAN (30-Jun-22)

	OVERALL LEVEL	1 - 20 KHz
MOH - MOTOR OUTBOARD HORIZONTAL	.324 In/Sec	.098 G-s
MOV - MOTOR OUTBOARD VERTICAL	.219 In/Sec	.120 G-s
MIH - MOTOR INBOARD HORIZONTAL	.305 In/Sec	.186 G-s
MIV - MOTOR INBOARD VERTICAL	.287 In/Sec	.169 G-s
MIA - MOTOR INBOARD AXIAL	.403 In/Sec	.052 G-s

COOLFAN A - COOLING FAN A (30-Jun-22)

	OVERALL LEVEL	1 - 20 KHz
MOH - MOTOR OUTBOARD HORIZONTAL	.113 In/Sec	.188 G-s
MOV - MOTOR OUTBOARD VERTICAL	.324 In/Sec	.154 G-s
MIH - MOTOR INBOARD HORIZONTAL	.119 In/Sec	.096 G-s
MIV - MOTOR INBOARD VERTICAL	.309 In/Sec	.105 G-s
MIA - MOTOR INBOARD AXIAL	.190 In/Sec	.084 G-s
EIH - EQUIPMENT INBOARD HORIZONTAL	.129 In/Sec	.242 G-s
EIV - EQUIPMENT INBOARD VERTICAL	.080 In/Sec	.181 G-s
EIA - EQUIPMENT INBOARD AXIAL	.154 In/Sec	.113 G-s
EOH - EQUIPMENT OUTBOARD HORIZONTAL	.119 In/Sec	.228 G-s
EOV - EQUIPMENT OUTBOARD VERTICAL	.152 In/Sec	.066 G-s
EOA - EQUIPMENT OUTBOARD AXIAL	.176 In/Sec	.052 G-s

ALNESNCBLW - A LINE SPENCER BLOWER (30-Jun-22)

	OVERALL LEVEL	1 - 20 KHz
MOH - MOTOR OUTBOARD HORIZONTAL	.098 In/Sec	.099 G-s
MOV - MOTOR OUTBOARD VERTICAL	.077 In/Sec	.139 G-s
MIV - MOTOR INBOARD VERTICAL	.053 In/Sec	.127 G-s
MIA - MOTOR INBOARD AXIAL	.192 In/Sec	.106 G-s

CLNESNCBLW - C LINE SPENCER BLOWER (30-Jun-22)

	OVERALL LEVEL	1 - 20 KHz
MOH - MOTOR OUTBOARD HORIZONTAL	.173 In/Sec	.080 G-s
MOV - MOTOR OUTBOARD VERTICAL	.052 In/Sec	.168 G-s

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   MIV - MOTOR INBOARD VERTICAL                  .031 In/Sec       .250 G-s
   MIA - MOTOR INBOARD AXIAL                     .087 In/Sec       .127 G-s

   DLNESNCBLW - D LINE SPENCER BLOWER          (30-Jun-22)
                                                OVERALL LEVEL     1 - 20 KHz
   MOH - MOTOR OUTBOARD HORIZONTAL               .275 In/Sec       .097 G-s
   MOV - MOTOR OUTBOARD VERTICAL                 .201 In/Sec       .074 G-s
   MIH - MOTOR INBOARD HORIZONTAL                .187 In/Sec       .114 G-s
   MIV - MOTOR INBOARD VERTICAL                  .176 In/Sec       .078 G-s
   MIA - MOTOR INBOARD AXIAL                     .320 In/Sec       .044 G-s

-------------------------------------------------------------------------------
   Clarification Of Vibration Units:
      Acc       -->  G-s      RMS
      Vel       -->  In/Sec   PK
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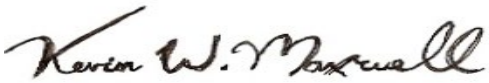
As always, it has been a pleasure to serve Sonoco. If there are any comments or questions, do not hesitate to contact us.

Sincerely,



ISO Certified Vibration Analyst, Category III

HI-SPEED INDUSTRIAL SERVICE

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