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May 16th, 2023

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Bio-Energy Development

Memphis, TN

Tracy,

The following is a summary of findings from the May 2023 vibration survey that was performed on May 9th, 2023.

***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

***Hi-Speed* Industrial Service** tests and inspects industrial machinery and equipment and makes recommendations concerning maintenance and repairs based on its experience in the field of industrial repair and maintenance. The information contained herein is provided as an opinion only, not as a guaranty or warranty of the matters discussed herein.

**Defect Summary**

**PV 2115 B CLASS II**



**Observation:**

Data above is the outboard PUMP bearing horizontal. Trend data shows an increase in overall vibration. 1 x rpm vibration is dominant.

**Recommendation:**

The 1 x rpm vibration may be due to imbalance of the pump impeller. High 1 x rpm vibration may also be due to loose fasteners. For now, ensure pump fasteners are tight. We will monitor this closely next survey.

**PC 7225 B CLASS II**



**Observation:**

The data above is the outboard MOTOR bearing horizontal. Spectral data shows several harmonics of 7.265 orders of rpm. These peaks are non-synchronous to motor rpm.

**Recommendation:**

The non-synchronous peaks are very likely race defect frequencies of the motor bearings. This is our first collection of this motor; therefore, severity is unclear. We recommend preparing to swap the motor in the next few months.

**PC 2205 B CLASS II**



**Observation:**

Multi-point spectra above are the motor and pump. Notice the higher frequency peaks present in the motor data. These peaks appear to be non-synchronous and may be bearing defect frequencies.

**Recommendation:**

If this motor is being operated by a VFD, then this issue may be caused by electrical fluting into the bearing races. A grounding mechanism such as an Aegis ring installed on the motor should be installed if the motor is on a VFD. Motor may need attention in the next few months.

**PC 9701 A CLASS II**



**Observation:**

Multi-point spectra above are the motor and pump. Data shows a 1 and 2 x rpm vibration in motor and pump.

**Recommendation:**

Data suggests a possible coupling and or alignment issue. It is recommended to inspect coupling for wear and misalignment and ensure all fasteners are tight.

**PC 1001 B CLASS III**



**Observation:**

Data above is the PUMP drive end horizontal. The large peak is 5 x rpm and is likely the vane pass frequency of the pump impeller. The peaks around this peak are sidebands of 2.3 HZ.

**Recommendation:**

Data suggests a possible internal issue in the pump. Vane pass vibration is present and may indicate impeller wear or other process flow issues. Ensure pump flow is within normal parameters. Pump may need attention soon.

**Drum Circulation Pump CLASS III**



**Observation:**

Multi-point spectra above are the motor and pump. Data shows a dominant1 x rpm vibration in motor and pump.

**Recommendation:**

Data suggests a possible coupling and or alignment issue. It is recommended to inspect couplings for wear and misalignment and ensure all fasteners are tight.

 **Abbreviated Last Measurement Summary**

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 **Database: Bio Energy .rbm**

 **MEASUREMENT POINT OVERALL LEVEL HFD / VHFD**

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 **4125 B - PC 4125 B (09-May-23)**

 **OVERALL LEVEL 1 - 20 KHz**

 **MOH .020 In/Sec .065 G-s**

 **MOV .025 In/Sec .042 G-s**

 **MIH .020 In/Sec .078 G-s**

 **MIV .020 In/Sec .071 G-s**

 **MIA .013 In/Sec .061 G-s**

 **EIA .028 In/Sec .143 G-s**

 **EIH .124 In/Sec .354 G-s**

 **EIV .043 In/Sec .180 G-s**

 **EOH .035 In/Sec .186 G-s**

 **EOV .088 In/Sec .018 G-s**

 **2106 - PC 2106 (09-May-23)**

 **OVERALL LEVEL 1 - 20 KHz**

 **MOH .022 In/Sec .176 G-s**

 **MOV .040 In/Sec .219 G-s**

 **MIH .021 In/Sec .700 G-s**

 **MIV .038 In/Sec .141 G-s**

 **MIA .021 In/Sec .138 G-s**

 **EIA .027 In/Sec .112 G-s**

 **EIH .080 In/Sec .203 G-s**

 **EIV .044 In/Sec .124 G-s**

 **EOH .050 In/Sec .047 G-s**

 **EOV .041 In/Sec .018 G-s**

 **7210 B - PC 7210 B (09-May-23)**

 **OVERALL LEVEL 1 - 20 KHz**

 **MOH .046 In/Sec .191 G-s**

 **MOV .036 In/Sec .208 G-s**

 **MIH .054 In/Sec .142 G-s**

 **MIV .047 In/Sec .068 G-s**

 **MIA .032 In/Sec .082 G-s**

 **EIA .057 In/Sec .526 G-s**

 **EIH .074 In/Sec .742 G-s**

 **EIV .051 In/Sec .340 G-s**

 **EOH .098 In/Sec 1.644 G-s**

 **EOV .078 In/Sec .581 G-s**

 **7245 A - PV 7245 A (09-May-23)**

 **OVERALL LEVEL 1 - 20 KHz**

 **MOH .073 In/Sec .094 G-s**

 **MOV .208 In/Sec .294 G-s**

 **MIH .082 In/Sec .196 G-s**

 **MIV .152 In/Sec .111 G-s**

 **MIA .090 In/Sec .155 G-s**

 **EIA .116 In/Sec .604 G-s**

 **EIH .148 In/Sec 1.291 G-s**

 **EIV .259 In/Sec .498 G-s**

 **EOH .219 In/Sec 1.762 G-s**

 **EOV .209 In/Sec .351 G-s**

 **7240 A - PC 7240 A (09-May-23)**

 **OVERALL LEVEL 1 - 20 KHz**

 **MOH .038 In/Sec .127 G-s**

 **MOV .039 In/Sec .060 G-s**

 **MIH .040 In/Sec .097 G-s**

 **MIV .035 In/Sec .084 G-s**

 **MIA .014 In/Sec .108 G-s**

 **EIA .022 In/Sec .095 G-s**

 **EIH .018 In/Sec .138 G-s**

 **EIV .030 In/Sec .106 G-s**

 **EOH .012 In/Sec .250 G-s**

 **EOV .021 In/Sec .069 G-s**

 **7215 B - PC 7215 B (09-May-23)**

 **OVERALL LEVEL 1 - 20 KHz**

 **MOH .092 In/Sec .170 G-s**

 **MOV .125 In/Sec .067 G-s**

 **MIH .083 In/Sec .193 G-s**

 **MIV .129 In/Sec .052 G-s**

 **MIA .128 In/Sec .066 G-s**

 **EIA .079 In/Sec .304 G-s**

 **EIH .151 In/Sec .833 G-s**

 **EIV .177 In/Sec .425 G-s**

 **EOH .083 In/Sec .219 G-s**

 **EOV .083 In/Sec .070 G-s**

 **6110 B - PC 6110 B (09-May-23)**

 **OVERALL LEVEL 1 - 20 KHz**

 **MOH .040 In/Sec .182 G-s**

 **MOV .035 In/Sec .090 G-s**

 **MIH .036 In/Sec .207 G-s**

 **MIV .023 In/Sec .127 G-s**

 **MIA .017 In/Sec .134 G-s**

 **EIA .017 In/Sec .102 G-s**

 **EIH .022 In/Sec .215 G-s**

 **EIV .016 In/Sec .119 G-s**

 **EOH .016 In/Sec .207 G-s**

 **EOV .018 In/Sec .162 G-s**

 **6120 B - PC 6120 B (09-May-23)**

 **OVERALL LEVEL 1 - 20 KHz**

 **MOH .025 In/Sec .117 G-s**

 **MOV .025 In/Sec .103 G-s**

 **MIH .025 In/Sec .127 G-s**

 **MIV .020 In/Sec .053 G-s**

 **MIA .0099 In/Sec .061 G-s**

 **EIA .013 In/Sec .051 G-s**

 **EIH .029 In/Sec .114 G-s**

 **EIV .022 In/Sec .096 G-s**

 **EOH .026 In/Sec .141 G-s**

 **EOV .034 In/Sec .110 G-s**

 **2105 B - PC 2105 B (09-May-23)**

 **OVERALL LEVEL 1 - 20 KHz**

 **MOH .043 In/Sec .262 G-s**

 **MOV .031 In/Sec .117 G-s**

 **MIH .039 In/Sec .949 G-s**

 **MIV .034 In/Sec .211 G-s**

 **MIA .025 In/Sec .791 G-s**

 **EIA .045 In/Sec .433 G-s**

 **EIH .053 In/Sec .783 G-s**

 **EIV .046 In/Sec .492 G-s**

 **EOH .053 In/Sec .836 G-s**

 **EOV .035 In/Sec .497 G-s**

 **1621 A - PD 1621 A (09-May-23)**

 **OVERALL LEVEL 1 - 20 KHz**

 **MOH .018 In/Sec .349 G-s**

 **MOV .025 In/Sec .143 G-s**

 **MIH .0095 In/Sec .570 G-s**

 **MIV .015 In/Sec .145 G-s**

 **MIA .015 In/Sec .074 G-s**

 **EIA .012 In/Sec .042 G-s**

 **EIH .0098 In/Sec .222 G-s**

 **EIV .0088 In/Sec .070 G-s**

 **EOH .013 In/Sec .197 G-s**

 **EOV .017 In/Sec .087 G-s**

 **4410 A - PC 4410 A (09-May-23)**

 **OVERALL LEVEL 1 - 20 KHz**

 **MOH .025 In/Sec .041 G-s**

 **MOV .025 In/Sec .017 G-s**

 **MIH .025 In/Sec .065 G-s**

 **MIV .044 In/Sec .017 G-s**

 **MIA .024 In/Sec .015 G-s**

 **EIA .044 In/Sec .066 G-s**

 **EIH .048 In/Sec .219 G-s**

 **EIV .017 In/Sec .116 G-s**

 **EOH .018 In/Sec .163 G-s**

 **EOV .031 In/Sec .167 G-s**

 **2115 B - PV 2115 B (09-May-23)**

 **OVERALL LEVEL 1 - 20 KHz**

 **MOH .091 In/Sec .141 G-s**

 **MOV .168 In/Sec .130 G-s**

 **MIH .045 In/Sec .114 G-s**

 **MIV .119 In/Sec .089 G-s**

 **MIA .064 In/Sec .038 G-s**

 **EIA .074 In/Sec .359 G-s**

 **EIH .069 In/Sec .201 G-s**

 **EIV .121 In/Sec .251 G-s**

 **EOH .244 In/Sec .584 G-s**

 **EOV .086 In/Sec .185 G-s**

 **7225 B - PC 7225 B (09-May-23)**

 **OVERALL LEVEL 1 - 20 KHz**

 **MOH .134 In/Sec .823 G-s**

 **MOV .143 In/Sec .686 G-s**

 **MIH .074 In/Sec .876 G-s**

 **MIV .065 In/Sec .300 G-s**

 **MIA .089 In/Sec .325 G-s**

 **EIA .074 In/Sec .129 G-s**

 **EIH .083 In/Sec 1.147 G-s**

 **EIV .072 In/Sec .279 G-s**

 **EOH .061 In/Sec .955 G-s**

 **EOV .064 In/Sec .317 G-s**

 **2205 B - PC 2205 B (09-May-23)**

 **OVERALL LEVEL 1 - 20 KHz**

 **MOH .088 In/Sec 1.517 G-s**

 **MOV .130 In/Sec .439 G-s**

 **MIH .129 In/Sec 1.899 G-s**

 **MIV .180 In/Sec .815 G-s**

 **MIA .153 In/Sec .650 G-s**

 **EIA .080 In/Sec .391 G-s**

 **EIH .161 In/Sec .475 G-s**

 **EIV .111 In/Sec .484 G-s**

 **EOH .090 In/Sec .536 G-s**

 **EOV .090 In/Sec .414 G-s**

 **2510 B - PV 2510 B (09-May-23)**

 **OVERALL LEVEL 1 - 20 KHz**

 **MOH .141 In/Sec .120 G-s**

 **MOV .280 In/Sec .076 G-s**

 **MIH .058 In/Sec .098 G-s**

 **MIV .170 In/Sec .215 G-s**

 **MIA .071 In/Sec .189 G-s**

 **EIA .054 In/Sec .040 G-s**

 **EIH .059 In/Sec .098 G-s**

 **EIV .086 In/Sec .067 G-s**

 **EOH .104 In/Sec .100 G-s**

 **EOV .050 In/Sec .062 G-s**

 **2301 B - PC 2301 B (09-May-23)**

 **OVERALL LEVEL 1 - 20 KHz**

 **MOH .205 In/Sec .152 G-s**

 **MOV .273 In/Sec .113 G-s**

 **MIH .114 In/Sec .469 G-s**

 **MIV .139 In/Sec .155 G-s**

 **MIA .118 In/Sec .134 G-s**

 **EIA .078 In/Sec .143 G-s**

 **EIH .075 In/Sec .133 G-s**

 **EIV .099 In/Sec .106 G-s**

 **EOH .036 In/Sec .098 G-s**

 **EOV .054 In/Sec .030 G-s**

 **2310 B - PC 2310 B (09-May-23)**

 **OVERALL LEVEL 1 - 20 KHz**

 **MOH .025 In/Sec .047 G-s**

 **MOV .023 In/Sec .031 G-s**

 **MIH .032 In/Sec .036 G-s**

 **MIV .024 In/Sec .028 G-s**

 **MIA .018 In/Sec .019 G-s**

 **EIA .026 In/Sec .099 G-s**

 **EIH .038 In/Sec .132 G-s**

 **EIV .040 In/Sec .106 G-s**

 **EOH .026 In/Sec .141 G-s**

 **EOV .021 In/Sec .059 G-s**

 **4110 A - PC 4110 A (09-May-23)**

 **OVERALL LEVEL 1 - 20 KHz**

 **MOH .0090 In/Sec .048 G-s**

 **MOV .015 In/Sec .023 G-s**

 **MIH .0075 In/Sec .033 G-s**

 **MIV .0066 In/Sec .014 G-s**

 **MIA .0040 In/Sec .012 G-s**

 **EIA .0047 In/Sec .033 G-s**

 **EIH .0056 In/Sec .032 G-s**

 **EIV .0058 In/Sec .033 G-s**

 **EOH .0050 In/Sec .020 G-s**

 **EOV .0038 In/Sec .014 G-s**

 **5201 B - PC 5201 B (09-May-23)**

 **OVERALL LEVEL 1 - 20 KHz**

 **MOH .021 In/Sec 1.066 G-s**

 **MOV .041 In/Sec .289 G-s**

 **MIH .030 In/Sec .702 G-s**

 **MIV .014 In/Sec .247 G-s**

 **MIA .016 In/Sec .374 G-s**

 **EIA .026 In/Sec .066 G-s**

 **EIH .041 In/Sec .087 G-s**

 **EIV .027 In/Sec .054 G-s**

 **EOH .030 In/Sec .162 G-s**

 **EOV .021 In/Sec .101 G-s**

 **7501 A - PC 7501 A (09-May-23)**

 **OVERALL LEVEL 1 - 20 KHz**

 **MOH .022 In/Sec .216 G-s**

 **MOV .019 In/Sec .178 G-s**

 **MIH .020 In/Sec .323 G-s**

 **MIV .021 In/Sec .188 G-s**

 **MIA .0087 In/Sec .283 G-s**

 **EIA .022 In/Sec .029 G-s**

 **EIH .044 In/Sec .068 G-s**

 **EIV .045 In/Sec .028 G-s**

 **EOH .031 In/Sec .110 G-s**

 **EOV .043 In/Sec .057 G-s**

 **7506 A - PC 7506 A (09-May-23)**

 **OVERALL LEVEL 1 - 20 KHz**

 **MOH .0089 In/Sec .028 G-s**

 **MOV .0068 In/Sec .0073 G-s**

 **MIH .0083 In/Sec .037 G-s**

 **MIV .0062 In/Sec .012 G-s**

 **MIA .0039 In/Sec .016 G-s**

 **EIA .0034 In/Sec .015 G-s**

 **EIH .0041 In/Sec .022 G-s**

 **EIV .0045 In/Sec .014 G-s**

 **EOH .0038 In/Sec .013 G-s**

 **EOV .0042 In/Sec .0062 G-s**

 **1526 B - PC 1526 B (09-May-23)**

 **OVERALL LEVEL 1 - 20 KHz**

 **MOH .057 In/Sec .712 G-s**

 **MOV .091 In/Sec .323 G-s**

 **MIH .049 In/Sec .476 G-s**

 **MIV .093 In/Sec .210 G-s**

 **MIA .053 In/Sec .404 G-s**

 **EIA .018 In/Sec .023 G-s**

 **EIH .027 In/Sec .096 G-s**

 **EIV .034 In/Sec .030 G-s**

 **EOH .014 In/Sec .036 G-s**

 **EOV .023 In/Sec .102 G-s**

 **9901 B - PC 9901 B (09-May-23)**

 **OVERALL LEVEL 1 - 20 KHz**

 **MOH .045 In/Sec .250 G-s**

 **MOV .054 In/Sec .109 G-s**

 **MIH .051 In/Sec .256 G-s**

 **MIV .089 In/Sec .104 G-s**

 **MIA .030 In/Sec .175 G-s**

 **EIA .067 In/Sec .624 G-s**

 **EIH .073 In/Sec .586 G-s**

 **EIV .086 In/Sec .637 G-s**

 **EOH .099 In/Sec 2.266 G-s**

 **EOV .071 In/Sec .595 G-s**

 **4401 B - PC 4401 B (09-May-23)**

 **OVERALL LEVEL 1 - 20 KHz**

 **MOH .0087 In/Sec .019 G-s**

 **MOV .0088 In/Sec .0082 G-s**

 **MIH .010 In/Sec .027 G-s**

 **MIV .014 In/Sec .011 G-s**

 **MIA .0089 In/Sec .0046 G-s**

 **EIA .0059 In/Sec .038 G-s**

 **EIH .0088 In/Sec .037 G-s**

 **EIV .0074 In/Sec .090 G-s**

 **EOH .0047 In/Sec .047 G-s**

 **EOV .0055 In/Sec .015 G-s**

 **3110 A - PC 3110 A (09-May-23)**

 **OVERALL LEVEL 1 - 20 KHz**

 **MOH .042 In/Sec .233 G-s**

 **MOV .059 In/Sec .318 G-s**

 **MIH .039 In/Sec .346 G-s**

 **MIV .114 In/Sec .350 G-s**

 **MIA .058 In/Sec .125 G-s**

 **EIA .017 In/Sec .033 G-s**

 **EIH .016 In/Sec .070 G-s**

 **EIV .016 In/Sec .025 G-s**

 **EOH .010 In/Sec .064 G-s**

 **EOV .013 In/Sec .038 G-s**

 **4101 A - PC 4101 A (09-May-23)**

 **OVERALL LEVEL 1 - 20 KHz**

 **MOH .020 In/Sec .160 G-s**

 **MOV .021 In/Sec .027 G-s**

 **MIH .024 In/Sec .126 G-s**

 **MIV .025 In/Sec .027 G-s**

 **MIA .013 In/Sec .027 G-s**

 **EIA .039 In/Sec .023 G-s**

 **EIH .103 In/Sec .072 G-s**

 **EIV .038 In/Sec .043 G-s**

 **EOH .031 In/Sec .094 G-s**

 **EOV .043 In/Sec .035 G-s**

 **4211 A - PC 4211 A (09-May-23)**

 **OVERALL LEVEL 1 - 20 KHz**

 **MOH .025 In/Sec .111 G-s**

 **MOV .023 In/Sec .046 G-s**

 **MIH .027 In/Sec .179 G-s**

 **MIV .021 In/Sec .061 G-s**

 **MIA .012 In/Sec .033 G-s**

 **EIA .071 In/Sec .141 G-s**

 **EIH .047 In/Sec .220 G-s**

 **EIV .029 In/Sec .194 G-s**

 **EOH .024 In/Sec .483 G-s**

 **EOV .023 In/Sec .152 G-s**

 **7522 A - PC 7522 A (09-May-23)**

 **OVERALL LEVEL 1 - 20 KHz**

 **MOH .055 In/Sec .216 G-s**

 **MOV .164 In/Sec .053 G-s**

 **MIH .040 In/Sec .239 G-s**

 **MIV .117 In/Sec .062 G-s**

 **MIA .060 In/Sec .048 G-s**

 **EIA .059 In/Sec .076 G-s**

 **EIH .063 In/Sec .139 G-s**

 **EIV .124 In/Sec .070 G-s**

 **EOH .108 In/Sec .261 G-s**

 **EOV .109 In/Sec .055 G-s**

 **9520 A - PC 9520 A (09-May-23)**

 **OVERALL LEVEL 1 - 20 KHz**

 **MOH .040 In/Sec .299 G-s**

 **MOV .046 In/Sec .206 G-s**

 **MIH .046 In/Sec .562 G-s**

 **MIV .051 In/Sec .100 G-s**

 **MIA .051 In/Sec .167 G-s**

 **EIA .112 In/Sec .713 G-s**

 **EIH .121 In/Sec 2.516 G-s**

 **EIV .079 In/Sec .559 G-s**

 **EOH .104 In/Sec 2.597 G-s**

 **EOV .072 In/Sec .601 G-s**

 **9701 A - PC 9701 A (09-May-23)**

 **OVERALL LEVEL 1 - 20 KHz**

 **MOH .139 In/Sec .291 G-s**

 **MOV .212 In/Sec .324 G-s**

 **MIH .111 In/Sec .742 G-s**

 **MIV .159 In/Sec .549 G-s**

 **MIA .147 In/Sec .377 G-s**

 **EIA .127 In/Sec .238 G-s**

 **EIH .183 In/Sec .380 G-s**

 **EIV .240 In/Sec .210 G-s**

 **EOH .056 In/Sec 1.400 G-s**

 **EOV .078 In/Sec .410 G-s**

 **9621 A - PC 9621 A (09-May-23)**

 **OVERALL LEVEL 1 - 20 KHz**

 **MOH .028 In/Sec .183 G-s**

 **MOV .057 In/Sec .552 G-s**

 **MIH .022 In/Sec .220 G-s**

 **MIV .046 In/Sec .186 G-s**

 **MIA .031 In/Sec .094 G-s**

 **EIA .029 In/Sec .273 G-s**

 **EIH .031 In/Sec .581 G-s**

 **EIV .038 In/Sec .233 G-s**

 **EOH .027 In/Sec .992 G-s**

 **EOV .045 In/Sec .325 G-s**

 **1201 - PC 1201 (09-May-23)**

 **OVERALL LEVEL 1 - 20 KHz**

 **MOH .017 In/Sec .069 G-s**

 **MOV .038 In/Sec .062 G-s**

 **MIH .016 In/Sec .070 G-s**

 **MIV .050 In/Sec .036 G-s**

 **MIA .024 In/Sec .021 G-s**

 **EIA .029 In/Sec .064 G-s**

 **EIH .062 In/Sec .057 G-s**

 **EIV .042 In/Sec .059 G-s**

 **EOH .058 In/Sec .066 G-s**

 **EOV .051 In/Sec .034 G-s**

 **2101 A - PC 2101 A (09-May-23)**

 **OVERALL LEVEL 1 - 20 KHz**

 **MOH .0087 In/Sec .166 G-s**

 **MOV .015 In/Sec .042 G-s**

 **MIH .011 In/Sec .675 G-s**

 **MIV .018 In/Sec .288 G-s**

 **MIA .010 In/Sec .127 G-s**

 **EIA .0085 In/Sec .020 G-s**

 **EIH .0086 In/Sec .027 G-s**

 **EIV .0074 In/Sec .013 G-s**

 **EOH .0069 In/Sec .059 G-s**

 **EOV .0086 In/Sec .026 G-s**

 **1520 B - PC 1520 B (09-May-23)**

 **OVERALL LEVEL 1 - 20 KHz**

 **MOH .116 In/Sec .586 G-s**

 **MOV .045 In/Sec .216 G-s**

 **MIH .039 In/Sec 1.341 G-s**

 **MIV .039 In/Sec .324 G-s**

 **MIA .029 In/Sec .377 G-s**

 **EIA .027 In/Sec .740 G-s**

 **EIH .034 In/Sec 1.042 G-s**

 **EIV .041 In/Sec .416 G-s**

 **EOH .036 In/Sec 1.612 G-s**

 **EOV .043 In/Sec .755 G-s**

 **6501 A - PC 6501 A (09-May-23)**

 **OVERALL LEVEL 1 - 20 KHz**

 **MOH .048 In/Sec .055 G-s**

 **MOV .022 In/Sec .076 G-s**

 **MIH .047 In/Sec .090 G-s**

 **MIV .019 In/Sec .081 G-s**

 **MIA .011 In/Sec .016 G-s**

 **EIA .044 In/Sec .030 G-s**

 **EIH .031 In/Sec .051 G-s**

 **EIV .022 In/Sec .072 G-s**

 **EOH .044 In/Sec .038 G-s**

 **EOV .020 In/Sec .053 G-s**

 **7252 B - PC 7252 B (09-May-23)**

 **OVERALL LEVEL 1 - 20 KHz**

 **MOH .015 In/Sec .041 G-s**

 **MOV .020 In/Sec .038 G-s**

 **MIH .013 In/Sec .065 G-s**

 **MIV .015 In/Sec .042 G-s**

 **MIA .011 In/Sec .075 G-s**

 **EIA .018 In/Sec .127 G-s**

 **EIH .030 In/Sec .365 G-s**

 **EIV .027 In/Sec .113 G-s**

 **EOH .106 In/Sec .883 G-s**

 **EOV .064 In/Sec .149 G-s**

 **1301 B - PC 1301 B (09-May-23)**

 **OVERALL LEVEL 1 - 20 KHz**

 **MOH .051 In/Sec .876 G-s**

 **MOV .032 In/Sec .251 G-s**

 **MIH .031 In/Sec .463 G-s**

 **MIV .038 In/Sec .292 G-s**

 **MIA .033 In/Sec .245 G-s**

 **EIA .112 In/Sec .270 G-s**

 **EIH .094 In/Sec .255 G-s**

 **EIV .136 In/Sec .213 G-s**

 **EOH .036 In/Sec .357 G-s**

 **EOV .059 In/Sec .134 G-s**

 **4304 B - PC 4304 B (09-May-23)**

 **OVERALL LEVEL 1 - 20 KHz**

 **MOH .052 In/Sec .245 G-s**

 **MOV .042 In/Sec .118 G-s**

 **MIH .058 In/Sec .244 G-s**

 **MIV .072 In/Sec .073 G-s**

 **MIA .050 In/Sec .061 G-s**

 **EIA .023 In/Sec .265 G-s**

 **EIH .043 In/Sec .475 G-s**

 **EIV .048 In/Sec .210 G-s**

 **EOH .070 In/Sec 1.431 G-s**

 **EOV .035 In/Sec .329 G-s**

 **4300 A - PC 4300 A (09-May-23)**

 **OVERALL LEVEL 1 - 20 KHz**

 **MOH .053 In/Sec .102 G-s**

 **MOV .068 In/Sec .026 G-s**

 **MIH .045 In/Sec .102 G-s**

 **MIV .048 In/Sec .038 G-s**

 **MIA .060 In/Sec .062 G-s**

 **EIA .029 In/Sec .169 G-s**

 **EIH .032 In/Sec .193 G-s**

 **EIV .024 In/Sec .102 G-s**

 **EOH .016 In/Sec .178 G-s**

 **EOV .020 In/Sec .082 G-s**

 **1430 B - PC 1430 B (09-May-23)**

 **OVERALL LEVEL 1 - 20 KHz**

 **MOH .014 In/Sec .047 G-s**

 **MOV .011 In/Sec .059 G-s**

 **MIH .012 In/Sec .062 G-s**

 **MIV .0093 In/Sec .039 G-s**

 **MIA .0052 In/Sec .039 G-s**

 **EIA .0063 In/Sec .026 G-s**

 **EIH .011 In/Sec .081 G-s**

 **EIV .0080 In/Sec .034 G-s**

 **EOH .0095 In/Sec .059 G-s**

 **EOV .011 In/Sec .037 G-s**

 **1425 A - PC 1425 A (09-May-23)**

 **OVERALL LEVEL 1 - 20 KHz**

 **MOH .248 In/Sec .346 G-s**

 **MOV .424 In/Sec .189 G-s**

 **MIH .201 In/Sec .387 G-s**

 **MIV .275 In/Sec .132 G-s**

 **MIA .031 In/Sec .139 G-s**

 **EIA .063 In/Sec .258 G-s**

 **EIH .177 In/Sec .309 G-s**

 **EIV .270 In/Sec .155 G-s**

 **EOH .164 In/Sec .566 G-s**

 **EOV .202 In/Sec .273 G-s**

 **1001 B - PC 1001 B (09-May-23)**

 **OVERALL LEVEL 1 - 20 KHz**

 **MOH .031 In/Sec .487 G-s**

 **MOV .074 In/Sec .155 G-s**

 **MIH .041 In/Sec .649 G-s**

 **MIV .087 In/Sec .275 G-s**

 **MIA .051 In/Sec .379 G-s**

 **EIA .201 In/Sec 1.380 G-s**

 **EIH .599 In/Sec 5.200 G-s**

 **EIV .346 In/Sec 1.686 G-s**

 **EOH .227 In/Sec 4.158 G-s**

 **EOV .216 In/Sec .773 G-s**

 **1001 - PC 1001 A (09-May-23)**

 **OVERALL LEVEL 1 - 20 KHz**

 **MOH .032 In/Sec .381 G-s**

 **MOV .038 In/Sec .075 G-s**

 **MIH .038 In/Sec .365 G-s**

 **MIV .059 In/Sec .127 G-s**

 **MIA .034 In/Sec .163 G-s**

 **EIA .056 In/Sec .201 G-s**

 **EIH .124 In/Sec .618 G-s**

 **EIV .116 In/Sec .367 G-s**

 **EOH .124 In/Sec .507 G-s**

 **EOV .120 In/Sec .114 G-s**

 **INFLUENT - DAF INFULENT (09-May-23)**

 **OVERALL LEVEL 1 - 20 KHz**

 **MOH .093 In/Sec .134 G-s**

 **MOV .072 In/Sec .186 G-s**

 **MIH .079 In/Sec .122 G-s**

 **MIV .048 In/Sec .088 G-s**

 **MIA .036 In/Sec .051 G-s**

 **EIA .032 In/Sec .043 G-s**

 **EIH .070 In/Sec .046 G-s**

 **EIV .105 In/Sec .054 G-s**

 **EOH .083 In/Sec .020 G-s**

 **EOV .119 In/Sec .016 G-s**

 **CIRC PUMP - DRUM CIRCULATION PUMP (09-May-23)**

 **OVERALL LEVEL 1 - 20 KHz**

 **MOH .593 In/Sec .360 G-s**

 **MOV .324 In/Sec .038 G-s**

 **MIH .160 In/Sec .150 G-s**

 **MIV .199 In/Sec .027 G-s**

 **MIA .550 In/Sec .020 G-s**

 **EIA .327 In/Sec .040 G-s**

 **EIH .227 In/Sec .075 G-s**

 **EIV .115 In/Sec .045 G-s**

 **EOH .382 In/Sec .044 G-s**

 **EOV .193 In/Sec .017 G-s**

 **EFFULENT - DAF EFFULENT (09-May-23)**

 **OVERALL LEVEL 1 - 20 KHz**

 **MOH .040 In/Sec .085 G-s**

 **MOV .099 In/Sec .177 G-s**

 **MIH .032 In/Sec .126 G-s**

 **MIV .160 In/Sec .499 G-s**

 **MIA .050 In/Sec .138 G-s**

 **EIA .112 In/Sec .283 G-s**

 **EIH .054 In/Sec .213 G-s**

 **EIV .385 In/Sec .987 G-s**

 **EOH .073 In/Sec .143 G-s**

 **EOV .372 In/Sec .987 G-s**

 **CHILLER1 - CHILLER 1 (15-May-23)**

 **OVERALL LEVEL 1 - 20 KHz**

 **MOH .053 In/Sec .988 G-s**

 **MOV .062 In/Sec .648 G-s**

 **MIH .034 In/Sec .669 G-s**

 **MIV .043 In/Sec .313 G-s**

 **MIA .027 In/Sec .169 G-s**

 **EIA .025 In/Sec .127 G-s**

 **EIH .030 In/Sec .693 G-s**

 **EIV .030 In/Sec .134 G-s**

 **CHILLER2 - CHILLER 2 (15-May-23)**

 **OVERALL LEVEL 1 - 20 KHz**

 **MOH .053 In/Sec .629 G-s**

 **MOV .100 In/Sec .533 G-s**

 **MIH .034 In/Sec .546 G-s**

 **MIV .086 In/Sec .247 G-s**

 **MIA .041 In/Sec .135 G-s**

 **EIA .037 In/Sec .102 G-s**

 **EIH .053 In/Sec .949 G-s**

 **EIV .036 In/Sec .106 G-s**

**-------------------------------------------------------------------------------**

 **Clarification Of Vibration Units:**

 **Acc --> G-s RMS**

 **Vel --> In/Sec PK**

As always, it has been a pleasure to serve Bio-Energy Memphis, TN. If there are any comments or questions, do not hesitate to contact us.

Sincerely,

****

**ISO Certified Vibration Analyst, Category III**





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