HI-SPEED INDUSTRIAL SERVICE

MILLINGTON, TN

April 27, 2021

Arkema

Subject: April week 3 service report

Most of the machines surveyed were found to be in good condition except for the following:

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.

This completes our assessment of your equipment for this survey. Thank you for your business and don't hesitate to call if you have any comments or questions.

Sincerely,

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Weekly Route Critical Equipment Observations

C Concentrator Vacuum Pump 2130-1
The motor has the highest vibration amplitude of about 0.174”/second velocity peak overall in the axial measurement. No immediate concerns.

Agitator, Hydrogenator C 7001-01
All vibrations are under 0.12”/second velocity peak overall. We will continue to monitor normally. No immediate issue.

A/B Concentrator Vacuum Pump 57
The pump bearings overall are 0.27”/sec peak velocity or less. We will continue to watch for changes. No immediate concerns.

Flash Vacuum Pump 2130-1
All vibrations are below 0.1”/second velocity peak overall. No reportable issues.

Air Compressor C-201
Rotor bar vibrations are normal for this motor’s history. The trend clearly shows that the vibrations vary considerably over time. We still believe these motors have possible weak rotor bar end connections that cause the vibrations to fluctuate higher due to loading. There are still blower case vibrations around 2.5-3 KHz. With a wide noise floor. The large jump in overall acceleration for the female outboard turbine shaft measurement reported last week has returned to normal. We will continue to monitor this unit closely for changes. **Rated a Class I Defect**.

Air Compressor C-202
Rotor bar vibrations are normal for this motor’s history. The trend clearly shows that the vibrations vary considerably over time. We still believe these motors have possible weak rotor bar end connections that cause the vibrations to fluctuate higher due to loading. There are still blower case vibrations around 2.5-3 KHz. With a wide noise floor. We will continue to monitor this unit for changes. **Rated a Class I Defect.**

Air Compressor C-203
Rotor bar vibrations are slightly above normal for this motor's history. The trend clearly shows that the vibrations vary considerably over time. We still believe these motors have possible weak rotor bar end connections that cause the vibrations to fluctuate higher due to loading. There are still blower case vibrations around 2.5-3 KHz. With a wide noise floor. The turbine female shaft outboard horizontal overall acceleration is near 8 g's RMS. The spectrum shows noise floor and apparent non-synchronous harmonic peaks of about 6.9 orders. We still recommend a once over on the unit and oil analysis also at this time to be prudent. This could just be normal cyclical variations in vibration but rising higher over time as components wear. **Rated a Class II Defect**.

Instrument Air Compressor
The male and female shaft vibrations still seem to show gear mesh and harmonics as well as a beat vibration occasionally. They continue to vary over time. Both shafts have between 6 and 9 g's RMS overall in the data with the male having the higher reading this survey. The dominant vibration appears to be the second gear mesh harmonic at near 2490 Hz (about 84 orders). We are still watching this unit closely and will be going forward. **Rated a Class II Defect.**

Air Compressor NASH A 201-08A
Highest vibration is still in the pump itself at 0.33"/sec velocity peak for the outboard vertical. The vibration spectrum is still dominated by a 20-order vibration, which is thought to be vane pass. **Rated a Class II Defect.**

D Hydrogenator Agitator 9002
Highest overall vibration is at 0.23"/sec velocity peak for the gearbox. Vibrations are mostly sub-synchronous to motor speed. This is still a lower amplitude for this unit. **Rated a Class I Defect.**

H2O2 Monthly Route Equipment

No immediate concern on collected equipment.

Abbreviated Last Measurement Summary

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Database: Arkema.rbm
Station: PEROXIDE
Route No. 5: ARK WK 3
Report Date: 27-Apr-21 07:07

MEASUREMENT POINT	OVERALL LEVEL	HFD / VHFD	MACHINE SPEED
2130-1old - C Concentrator Vacuum Pump (23-Apr-21)			
	OVERALL LEVEL	1-20 KHz	
11	.068 In/Sec	.441 G-s	1200.0 RPM
21	.060 In/Sec	.408 G-s	
23	.174 In/Sec	.167 G-s	
71	.106 In/Sec	.697 G-s	
81	.147 In/Sec	.898 G-s	
83	.086 In/Sec	1.713 G-s	
7000-01 - AGITATOR,HYDROGENATOR C (23-Apr-21)			
	OVERALL LEVEL	1-20 KHZ	
02	.038 In/Sec	.030 G-s	45.00 RPM
03	.051 In/Sec	.059 G-s	
11	.071 In/Sec	.742 G-s	1400.0 RPM
12	.064 In/Sec	.885 G-s	
13	.091 In/Sec	.280 G-s	
21	.078 In/Sec	.532 G-s	
22	.111 In/Sec	.072 G-s	
23	.097 In/Sec	1.062 G-s	
31	.075 In/Sec	.323 G-s	
32	.085 In/Sec	.463 G-s	
33	.037 In/Sec	.184 G-s	
41	.071 In/Sec	.439 G-s	
42	.075 In/Sec	.667 G-s	
51	.064 In/Sec	.576 G-s	375.0 RPM
53	.083 In/Sec	.241 G-s	
61	.033 In/Sec	.216 G-s	
71	.050 In/Sec	.166 G-s	45.00 RPM
81	.026 In/Sec	.182 G-s	
83	.052 In/Sec	.203 G-s	
57 - A/B Concentr Vac Pmp-var RPM (23-Apr-21)			
	OVERALL LEVEL	1-20 KHz	
11	.054 In/Sec	.243 G-s	900.0 RPM
12	.073 In/Sec	.231 G-s	
21	.084 In/Sec	.241 G-s	
23	.056 In/Sec	.221 G-s	
71	.150 In/Sec	.599 G-s	
81	.267 In/Sec	.837 G-s	
83	.058 In/Sec	.902 G-s	
2130-1 - FLASH VAP VAC PUMP-var speed (23-Apr-21)			
	OVERALL LEVEL	1-20 KHz	
11	.043 In/Sec	.145 G-s	1200.0 RPM
12	.039 In/Sec	.634 G-s	

21	.040 In/Sec	.594 G-s	
22	.040 In/Sec	.296 G-s	
23	.050 In/Sec	.892 G-s	
71	.064 In/Sec	.667 G-s	
72	.071 In/Sec	.468 G-s	
81	.075 In/Sec	.327 G-s	
82	.076 In/Sec	.631 G-s	
83	.048 In/Sec	.395 G-s	

C-203 - C-203 Comp (23-Apr-21)

	OVERALL LEVEL	1-20 KHz	
11	.056 In/Sec	2.025 G-s	3588.0 RPM
12	.041 In/Sec	.966 G-s	
21	.022 In/Sec	.512 G-s	
22	.024 In/Sec	.418 G-s	
23	.019 In/Sec	.163 G-s	
	OVERALL LEVEL	1-20 KHZ	
71M	.061 In/Sec	3.576 G-s	
72M	.053 In/Sec	3.007 G-s	
73M	.067 In/Sec	5.656 G-s	
81M	.079 In/Sec	3.742 G-s	
82M	.059 In/Sec	6.626 G-s	
71F	.063 In/Sec	2.712 G-s	
72F	.054 In/Sec	1.382 G-s	
73F	.077 In/Sec	3.240 G-s	
81F	.045 In/Sec	7.519 G-s	
82F	.060 In/Sec	1.652 G-s	

C-202 - C-202 Comp (23-Apr-21)

	OVERALL LEVEL	1-20 KHz	
11	.063 In/Sec	1.999 G-s	3588.0 RPM
12	.145 In/Sec	3.199 G-s	
21	.059 In/Sec	.294 G-s	
22	.104 In/Sec	1.652 G-s	
23	.055 In/Sec	.587 G-s	
	OVERALL LEVEL	1-20 KHZ	
71M	.044 In/Sec	2.184 G-s	
72M	.045 In/Sec	2.141 G-s	
73M	.069 In/Sec	2.521 G-s	
81M	.032 In/Sec	4.856 G-s	
82M	.062 In/Sec	4.748 G-s	
71F	.035 In/Sec	2.365 G-s	
72F	.069 In/Sec	2.177 G-s	
73F	.087 In/Sec	5.448 G-s	
81F	.038 In/Sec	3.931 G-s	
82F	.053 In/Sec	1.622 G-s	

C-201 - C-201 Comp (23-Apr-21)

	OVERALL LEVEL	1-20 KHz	
11	.096 In/Sec	.472 G-s	3588.0 RPM
12	.209 In/Sec	7.911 G-s	
21	.096 In/Sec	1.492 G-s	
22	.142 In/Sec	4.853 G-s	
23	.162 In/Sec	6.131 G-s	
	OVERALL LEVEL	1-20 KHZ	
71M	.033 In/Sec	.891 G-s	
72M	.046 In/Sec	2.977 G-s	

73M	.074 In/Sec	1.841 G-s	
81M	.102 In/Sec	5.977 G-s	
82M	.048 In/Sec	2.664 G-s	
71F	.056 In/Sec	2.108 G-s	
72F	.047 In/Sec	.883 G-s	
73F	.038 In/Sec	.706 G-s	
81F	.061 In/Sec	3.133 G-s	
82F	.048 In/Sec	1.230 G-s	

new AC - INSTRUMENT AIR COMPRESSOR (23-Apr-21)

	OVERALL LEVEL	1-20 KHz	
11	.144 In/Sec	1.192 G-s	1780.0 RPM
12	.106 In/Sec	.821 G-s	
13	.059 In/Sec	.481 G-s	
21	.133 In/Sec	.458 G-s	
22	.074 In/Sec	.495 G-s	
23	.062 In/Sec	.221 G-s	
	OVERALL LEVEL	1-20 KHZ	
71F	.246 In/Sec	9.545 G-s	
72F	.213 In/Sec	7.376 G-s	
73F	.179 In/Sec	4.159 G-s	
81F	.155 In/Sec	3.811 G-s	
82F	.237 In/Sec	7.195 G-s	
83F	.183 In/Sec	3.877 G-s	
71M	.120 In/Sec	6.375 G-s	
72M	.173 In/Sec	6.126 G-s	
73M	.147 In/Sec	5.389 G-s	
81M	.270 In/Sec	8.171 G-s	
82M	.263 In/Sec	8.751 G-s	
83M	.206 In/Sec	5.692 G-s	

201-08A - COMPRESSOR,NASH A 201-08A (23-Apr-21)

	OVERALL LEVEL	1-20 KHz	
11	.081 In/Sec	.113 G-s	506.3 RPM
12	.077 In/Sec	.179 G-s	
13	.155 In/Sec	.065 G-s	
21	.084 In/Sec	.125 G-s	
22	.110 In/Sec	.178 G-s	
23	.147 In/Sec	.100 G-s	
71	.160 In/Sec	.867 G-s	
72	.272 In/Sec	.958 G-s	
73	.134 In/Sec	.533 G-s	
81	.175 In/Sec	.325 G-s	
82	.332 In/Sec	.278 G-s	
83	.164 In/Sec	.293 G-s	

9002-10 - D-HYDROGENATOR AGITATOR (23-Apr-21)

	OVERALL LEVEL	1-20 KHz	
11	.068 In/Sec	.065 G-s	1185.0 RPM
21	.061 In/Sec	.117 G-s	
23	.039 In/Sec	.036 G-s	
	OVERALL LEVEL	1-20 KHZ	
31	.182 In/Sec	.774 G-s	
31L	.205 In/Sec	.866 G-s	
	OVERALL LEVEL	1-20 KHz	
51	.213 In/Sec	.159 G-s	
51L	.222 In/Sec	.161 G-s	100.0 RPM

52	.208 In/Sec	.253 G-s	
52L	.230 In/Sec	.276 G-s	
53	.139 In/Sec	.500 G-s	
53L	.034 In/Sec	.466 G-s	
61	.198 In/Sec	.101 G-s	
61L	.172 In/Sec	.109 G-s	
81	.031 In/Sec	.035 G-s	
82	.038 In/Sec	.040 G-s	

530-02 - PUMP,N.COOLING TWR,MIDDLE (23-Apr-21)

	OVERALL LEVEL	1-20 KHz	
11	.110 In/Sec	.406 G-s	1780.0 RPM
12	.122 In/Sec	.501 G-s	

530-03 - PUMP,N.COOLING TWR,SOUTH (23-Apr-21)

	OVERALL LEVEL	1-20 KHz	
11	.099 In/Sec	.540 G-s	1780.0 RPM
12	.154 In/Sec	.464 G-s	

548-7 - IRON-FREE H2O BOOSTER PUMP (23-Apr-21)

	OVERALL LEVEL	1-20 KHz	
11	.055 In/Sec	.301 G-s	1800.0 RPM
21	.040 In/Sec	.527 G-s	
23	.063 In/Sec	.279 G-s	
71	.132 In/Sec	.237 G-s	
72	.073 In/Sec	.254 G-s	

SCT-1 - SOUTH CT PUMP - EAST (23-Apr-21)

	OVERALL LEVEL	1-20 KHz	
11	.033 In/Sec	1.334 G-s	1800.0 RPM
21	.044 In/Sec	.654 G-s	
23	.083 In/Sec	.261 G-s	
71	.157 In/Sec	1.062 G-s	
72	.143 In/Sec	.934 G-s	

SCT-2 - SOUTH CT PUMP - MID (23-Apr-21)

	OVERALL LEVEL	1-20 KHz	
11	.036 In/Sec	.083 G-s	1800.0 RPM
21	.045 In/Sec	1.010 G-s	
23	.095 In/Sec	.095 G-s	
71	.160 In/Sec	.829 G-s	
72	.143 In/Sec	1.128 G-s	

SCT-3 - SOUTH CT PUMP - WEST (23-Apr-21)

	OVERALL LEVEL	1-20 KHz	
11	.027 In/Sec	.713 G-s	1800.0 RPM
21	.048 In/Sec	.624 G-s	
23	.076 In/Sec	.309 G-s	
71	.190 In/Sec	.685 G-s	
72	.182 In/Sec	.452 G-s	

Clarification Of Vibration Units:

Acc	-->	G-s	PK
Vel	-->	In/Sec	PK