HI-SPEED INDUSTRIAL SERVICE

MILLINGTON, TN

March 22, 2021

Arkema

Subject: March 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,

David W. Shook
Senior Reliability Specialists
Hi-Speed Industrial Service
dshook@gohispeed.com

7030 Ryburn Drive
Millington, TN 38053
P. 901-873-5300
F. 901-873-5301

Weekly Route Critical Equipment Observations

C Concentrator Vacuum Pump 2130-1
The motor and pump still have the same vibration amplitude of about 0.165"/second velocity peak overall. No immediate concerns.

Agitator, Hydrogenator C 7001-01
All vibrations are under 0.115"/second velocity peak overall. We will continue to monitor normally. No immediate issue.

A/B Concentrator Vacuum Pump 57
The outboard pump bearing overall is 0.341"/sec peak velocity, with a dominant vibration at 16 orders, which is most likely vane pass. We will continue to watch for changes. **Rated a Class I Defect.**

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 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. We will continue to monitor this unit for changes. **Rated a Class I Defect**.

Air Compressor C-202
Rotor bar vibrations are low 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 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. **Rated a Class I 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 7 and 9 g's RMS overall in the data. The dominant vibration appears to be the second gear mesh harmonic at near 2500 Hz. We are still watching this unit closely and will be going forward. **Rated a Class I Defect for now.**

Air Compressor NASH A 201-08A
Highest vibration is still in the pump itself at 0.295"/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 I Defect.**

D Hydrogenator Agitator 9002-10
Highest overall vibration is at 0.258"/sec velocity peak for the gearbox. Vibrations are mostly sub-synchronous in nature. This is lower for this unit. We will watch carefully during the next few surveys. **Rated a Class I Defect.**

H2O2 Monthly Route Equipment

Cooling tower pumps
No issues

Abbreviated Last Measurement Summary
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Database: Arkema.rbm
Station: PEROXIDE
Route No. 5: ARK WK 3
Report Date: 22-Mar-21 15:20

MEASUREMENT POINT	OVERALL LEVEL	HFD / VHFD	MACHINE SPEED
2130-1old - C Concentrator Vacuum Pump (22-Mar-21)			
	OVERALL LEVEL	1-20 KHz	
11	.067 In/Sec	.608 G-s	1200.0 RPM
21	.069 In/Sec	.458 G-s	
23	.155 In/Sec	.189 G-s	
71	.126 In/Sec	.975 G-s	
81	.165 In/Sec	.676 G-s	
83	.082 In/Sec	1.368 G-s	
7000-01 - AGITATOR,HYDROGENATOR C (22-Mar-21)			
	OVERALL LEVEL	1-20 KHZ	
02	.040 In/Sec	.0053 G-s	45.00 RPM
03	.053 In/Sec	.017 G-s	

11	.071 In/Sec	1.085 G-s	1400.0 RPM
12	.076 In/Sec	.641 G-s	
13	.081 In/Sec	.292 G-s	
21	.082 In/Sec	.832 G-s	
22	.115 In/Sec	.146 G-s	
23	.079 In/Sec	.681 G-s	
31	.102 In/Sec	.617 G-s	
32	.072 In/Sec	.545 G-s	
33	.048 In/Sec	.273 G-s	
41	.093 In/Sec	.604 G-s	
42	.069 In/Sec	.903 G-s	
51	.072 In/Sec	.415 G-s	375.0 RPM
53	.079 In/Sec	.268 G-s	
61	.053 In/Sec	.372 G-s	
71	.046 In/Sec	.261 G-s	45.00 RPM
81	.033 In/Sec	.230 G-s	
83	.050 In/Sec	.308 G-s	

57 - A/B Concentr Vac Pmp-var RPM (22-Mar-21)

	OVERALL LEVEL	1-20 KHz	
11	.049 In/Sec	.100 G-s	900.0 RPM
12	.061 In/Sec	.263 G-s	
21	.077 In/Sec	.147 G-s	
23	.072 In/Sec	.097 G-s	
71	.153 In/Sec	.534 G-s	
81	.341 In/Sec	.443 G-s	
83	.039 In/Sec	.544 G-s	

2130-1 - FLASH VAP VAC PUMP-var speed (22-Mar-21)

	OVERALL LEVEL	1-20 KHz	
11	.051 In/Sec	.299 G-s	1200.0 RPM
12	.037 In/Sec	.500 G-s	
21	.043 In/Sec	.709 G-s	
22	.054 In/Sec	.859 G-s	
23	.059 In/Sec	1.229 G-s	
71	.072 In/Sec	.485 G-s	
72	.078 In/Sec	.520 G-s	
81	.077 In/Sec	.389 G-s	
82	.084 In/Sec	.560 G-s	
83	.049 In/Sec	.423 G-s	

C-203 - C-203 Comp (22-Mar-21)

	OVERALL LEVEL	1-20 KHz	
11	.065 In/Sec	2.517 G-s	3588.0 RPM
12	.095 In/Sec	3.040 G-s	
21	.085 In/Sec	3.538 G-s	
22	.103 In/Sec	3.095 G-s	
23	.030 In/Sec	1.073 G-s	
	OVERALL LEVEL	1-20 KHZ	
71M	.045 In/Sec	1.984 G-s	
72M	.044 In/Sec	1.481 G-s	
73M	.066 In/Sec	3.780 G-s	
81M	.071 In/Sec	4.152 G-s	
82M	.057 In/Sec	5.198 G-s	
71F	.064 In/Sec	1.906 G-s	
72F	.073 In/Sec	2.323 G-s	
73F	.076 In/Sec	3.109 G-s	

	81F	.055 In/Sec	2.689 G-s	
	82F	.061 In/Sec	1.545 G-s	
C-202	- C-202 Comp		(22-Mar-21)	
		OVERALL LEVEL	1-20 KHz	
	11	.075 In/Sec	2.337 G-s	3588.0 RPM
	12	.117 In/Sec	.438 G-s	
	21	.067 In/Sec	.325 G-s	
	22	.132 In/Sec	4.309 G-s	
	23	.055 In/Sec	.729 G-s	
		OVERALL LEVEL	1-20 KHZ	
	71M	.052 In/Sec	2.214 G-s	
	72M	.057 In/Sec	1.651 G-s	
	73M	.088 In/Sec	1.658 G-s	
	81M	.064 In/Sec	4.369 G-s	
	82M	.068 In/Sec	3.495 G-s	
	71F	.052 In/Sec	2.085 G-s	
	72F	.068 In/Sec	1.032 G-s	
	73F	.065 In/Sec	2.790 G-s	
	81F	.047 In/Sec	1.799 G-s	
	82F	.063 In/Sec	1.590 G-s	
C-201	- C-201 Comp		(22-Mar-21)	
		OVERALL LEVEL	1-20 KHz	
	11	.103 In/Sec	2.334 G-s	3588.0 RPM
	12	.112 In/Sec	2.636 G-s	
	21	.101 In/Sec	1.315 G-s	
	22	.046 In/Sec	.499 G-s	
	23	.091 In/Sec	3.476 G-s	
		OVERALL LEVEL	1-20 KHZ	
	71M	.052 In/Sec	2.287 G-s	
	72M	.053 In/Sec	2.282 G-s	
	73M	.074 In/Sec	2.528 G-s	
	81M	.080 In/Sec	3.830 G-s	
	82M	.048 In/Sec	1.496 G-s	
	71F	.054 In/Sec	3.712 G-s	
	72F	.053 In/Sec	1.437 G-s	
	73F	.070 In/Sec	3.032 G-s	
	81F	.042 In/Sec	5.903 G-s	
	82F	.065 In/Sec	2.531 G-s	
new AC	- INSTRUMENT AIR COMPRESSOR		(22-Mar-21)	
		OVERALL LEVEL	1-20 KHz	
	11	.121 In/Sec	.832 G-s	1780.0 RPM
	12	.108 In/Sec	.820 G-s	
	13	.065 In/Sec	.198 G-s	
	21	.148 In/Sec	.911 G-s	
	22	.049 In/Sec	.620 G-s	
	23	.086 In/Sec	.904 G-s	
		OVERALL LEVEL	1-20 KHZ	
	71F	.207 In/Sec	7.695 G-s	
	72F	.152 In/Sec	3.085 G-s	
	73F	.159 In/Sec	3.629 G-s	
	81F	.135 In/Sec	2.629 G-s	
	82F	.248 In/Sec	7.330 G-s	
	83F	.170 In/Sec	4.063 G-s	
	71M	.146 In/Sec	7.000 G-s	

72M	.172 In/Sec	8.831 G-s		
73M	.140 In/Sec	3.920 G-s		
81M	.134 In/Sec	3.855 G-s		
82M	.249 In/Sec	6.365 G-s		
83M	.230 In/Sec	7.325 G-s		

201-08A - COMPRESSOR,NASH A 201-08A (22-Mar-21)

	OVERALL LEVEL	1-20 KHz	
11	.066 In/Sec	.154 G-s	506.3 RPM
12	.076 In/Sec	.269 G-s	
13	.134 In/Sec	.081 G-s	
21	.092 In/Sec	.081 G-s	
22	.103 In/Sec	.114 G-s	
23	.150 In/Sec	.075 G-s	
71	.161 In/Sec	.825 G-s	
72	.259 In/Sec	.952 G-s	
73	.160 In/Sec	.232 G-s	
81	.189 In/Sec	.306 G-s	
82	.295 In/Sec	.232 G-s	
83	.166 In/Sec	.232 G-s	

9002-10 - D-HYDROGENATOR AGITATOR (22-Mar-21)

	OVERALL LEVEL	1-20 KHz	
11	.086 In/Sec	.050 G-s	1185.0 RPM
21	.069 In/Sec	.110 G-s	
23	.053 In/Sec	.044 G-s	
	OVERALL LEVEL	1-20 KHZ	
31	.208 In/Sec	.693 G-s	
31L	.207 In/Sec	.647 G-s	
	OVERALL LEVEL	1-20 KHz	
51	.226 In/Sec	.125 G-s	
51L	.255 In/Sec	.141 G-s	100.0 RPM
52	.258 In/Sec	.254 G-s	
52L	.252 In/Sec	.237 G-s	
53	.112 In/Sec	.635 G-s	
53L	.047 In/Sec	.695 G-s	
61	.146 In/Sec	.103 G-s	
61L	.175 In/Sec	.095 G-s	
81	.032 In/Sec	.020 G-s	
82	.037 In/Sec	.033 G-s	
83	.029 In/Sec	.144 G-s	

530-02 - PUMP,N.COOLING TWR,MIDDLE (22-Mar-21)

	OVERALL LEVEL	1-20 KHz	
11	.151 In/Sec	.335 G-s	1780.0 RPM
12	.150 In/Sec	.413 G-s	

530-03 - PUMP,N.COOLING TWR,SOUTH (22-Mar-21)

	OVERALL LEVEL	1-20 KHz	
11	.112 In/Sec	.639 G-s	1780.0 RPM
12	.199 In/Sec	.331 G-s	

548-7 - IRON-FREE H2O BOOSTER PUMP (22-Mar-21)

	OVERALL LEVEL	1-20 KHz	
11	.019 In/Sec	.361 G-s	1800.0 RPM
21	.044 In/Sec	.549 G-s	
23	.062 In/Sec	.326 G-s	

	71	.041 In/Sec	.140 G-s	
	72	.029 In/Sec	.091 G-s	
SCT-1	- SOUTH CT PUMP - EAST		(22-Mar-21)	
		OVERALL LEVEL	1-20 KHz	
	11	.047 In/Sec	.534 G-s	1800.0 RPM
	21	.040 In/Sec	.959 G-s	
	23	.046 In/Sec	.213 G-s	
	71	.120 In/Sec	.518 G-s	
	72	.116 In/Sec	.849 G-s	
SCT-2	- SOUTH CT PUMP - MID		(22-Mar-21)	
		OVERALL LEVEL	1-20 KHz	
	11	.037 In/Sec	.616 G-s	1800.0 RPM
	21	.044 In/Sec	.825 G-s	
	23	.078 In/Sec	.254 G-s	
	71	.130 In/Sec	.658 G-s	
	72	.135 In/Sec	.534 G-s	
SCT-3	- SOUTH CT PUMP - WEST		(22-Mar-21)	
		OVERALL LEVEL	1-20 KHz	
	11	.032 In/Sec	.805 G-s	1800.0 RPM
	21	.042 In/Sec	.188 G-s	
	23	.069 In/Sec	.380 G-s	
	71	.165 In/Sec	.449 G-s	
	72	.117 In/Sec	.702 G-s	

Clarification Of Vibration Units:

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