



September 13, 2021

Arkema

Subject: September week 1 service report

Critical equipment and monthly equipment with issues are discussed in this report.

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

H2O2 Weekly Route Critical Equipment Observations

C Concentrator Vacuum Pump 2130-1

The motor has the highest vibration amplitude of about 0.18"/second velocity peak overall in the outboard axial measurement. Vibration still consists of multiple low amplitude shaft speed harmonics.

Rated a Class I Defect.

Agitator, Hydrogenator C 7001-01

Data shows all vibrations are below 0.1"/second velocity peak overall. No immediate concern.

A/B Concentrator Vacuum Pump 57

The unit vibration overall is 0.37"/sec peak velocity for the outboard pump bearing and is dominated by a 16 order vibration which we believe to be vane pass. We will continue to watch for changes. **Rated a Class I Defect.**

Flash Vacuum Pump 2130-1

Data shows all vibrations are under 0.1"/second velocity peak overall. No issues of note.

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. Overall acceleration is 4.1 g's RMS at 1 point. Synchronous and non-synchronous harmonic vibration peaks are evident in the data. All 3 compressors have the same non-synchronous peaks but vary in amplitude. We will continue to monitor this unit closely 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. Overall acceleration is 3.5 g's RMS at 1 point. **Rated a Class I Defect.**

Air Compressor C-203

Rotor bar vibrations are low for this motor's history and could indicate higher loading. 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. Overall acceleration is 3.5 g's RMS at 1 point. **Rated a Class I Defect.**

Instrument Air Compressor

The unit pad is covered with an extremely slippery oily slimy mixture that prevented safe data collection.

Air Compressor NASH A 201-08A

Vibrations are still lower at 0.2"/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

Highest overall vibration is at 0.24"/sec velocity peak for the gearbox output top horizontal. 2 dominant vibrations are sub-synchronous to motor speed at about 9 Hz and a 10.5 orders. peak and harmonic. There appears to be a resonance, and the amplitude changes over time, but does not seem to be periodic. The others are most likely the number of pinion teeth (14 teeth and the input gear mesh) and the first harmonic of gear mesh. Ensure all fasteners are at proper torque values and inspect support structures for any signs of stress cracks, broken welds, or metal fatigue. **Rated a Class I Defect now.**

Centac Compressor

The unit was not in operation during the survey.

H2O2 Monthly Route Equipment

ABC Sec Filter Feed Pump North 2130-6

Vibration data for the pump horizontal shows multiple low level shaft speed harmonics with a slight elevated noise floor in the frequency spectrum. We suspect slight looseness in the bearing fits and cavitation. Ensure the pump bearings are lubricated and that the pump is operating properly. **Rated a Class I Defect.**

Middle Oxidizer Feed Pump 9001-2

Data for the pump shows a large increase in vibration at shaft speed. The amplitude is only 0.18"/second velocity peak, but it doubled since the last data in August. Inspect all fasteners, and the coupling. The impeller could be worn also. **Rated a Class I Defect.**

Abbreviated Last Measurement Summary

Database: Arkema.rbm
Station: PEROXIDE
Route No. 3: ARK WK 1
Report Date: 14-Sep-21 07:06

MEASUREMENT POINT	OVERALL LEVEL	HFD / VHFD	MACHINE SPEED
-----	-----	-----	-----
2130-1old - C Concentrator Vacuum Pump		(13-Sep-21)	
	OVERALL LEVEL	1-20 KHz	
11	.065 In/Sec	.353 G-s	1200.0 RPM
21	.059 In/Sec	.453 G-s	
23	.185 In/Sec	.139 G-s	
71	.129 In/Sec	.905 G-s	
81	.155 In/Sec	.600 G-s	
83	.091 In/Sec	1.418 G-s	
7000-01 - AGITATOR, HYDROGENATOR C		(13-Sep-21)	
	OVERALL LEVEL	1-20 KHz	
02	.036 In/Sec	.047 G-s	45.00 RPM
03	.044 In/Sec	.017 G-s	
11	.071 In/Sec	.735 G-s	1400.0 RPM
12	.066 In/Sec	.634 G-s	
13	.090 In/Sec	.242 G-s	
21	.076 In/Sec	.331 G-s	
22	.116 In/Sec	.142 G-s	
23	.092 In/Sec	.770 G-s	
31	.073 In/Sec	.499 G-s	
32	.070 In/Sec	.464 G-s	
33	.048 In/Sec	.239 G-s	
41	.075 In/Sec	.560 G-s	
42	.073 In/Sec	.563 G-s	
51	.070 In/Sec	.352 G-s	375.0 RPM
53	.080 In/Sec	.237 G-s	
61	.041 In/Sec	.165 G-s	
71	.051 In/Sec	.494 G-s	45.00 RPM
81	.019 In/Sec	.167 G-s	
83	.048 In/Sec	.302 G-s	
57 - A/B Concentr Vac Pmp-var RPM		(13-Sep-21)	
	OVERALL LEVEL	1-20 KHz	
11	.057 In/Sec	.194 G-s	900.0 RPM
12	.064 In/Sec	.322 G-s	
21	.070 In/Sec	.197 G-s	
23	.062 In/Sec	.191 G-s	
71	.147 In/Sec	.454 G-s	
81	.377 In/Sec	.973 G-s	
83	.085 In/Sec	.874 G-s	
2130-1 - FLASH VAP VAC PUMP-var speed		(13-Sep-21)	
	OVERALL LEVEL	1-20 KHz	
11	.047 In/Sec	.097 G-s	1200.0 RPM
12	.033 In/Sec	.567 G-s	

21	.039 In/Sec	.879 G-s	
22	.043 In/Sec	.657 G-s	
23	.055 In/Sec	.639 G-s	
71	.058 In/Sec	.402 G-s	
72	.068 In/Sec	.443 G-s	
81	.086 In/Sec	.400 G-s	
82	.069 In/Sec	.597 G-s	
83	.053 In/Sec	.731 G-s	
236-06	- HYDRO FD PUMP N 236-06 -2FLR (13-Sep-21)		
	OVERALL LEVEL	1-20 KHz	
11	.102 In/Sec	.083 G-s	3600.0 RPM
21	.059 In/Sec	.259 G-s	
2130-6	- ABC SEC FILT FEED PUMP-NORTH (13-Sep-21)		
	OVERALL LEVEL	1-20 KHz	
11	.039 In/Sec	.643 G-s	1800.0 RPM
21	.038 In/Sec	.583 G-s	
23	.063 In/Sec	.303 G-s	
71	.182 In/Sec	1.159 G-s	
72	.126 In/Sec	1.127 G-s	
9001-1	- EAST OXIDIZER FEED PUMP (13-Sep-21)		
	OVERALL LEVEL	1-20 KHz	
11	.049 In/Sec	.325 G-s	1800.0 RPM
21	.071 In/Sec	.401 G-s	
23	.065 In/Sec	.104 G-s	
71	.137 In/Sec	.580 G-s	
72	.141 In/Sec	.263 G-s	
9001-2	- MIDDLE OXIDIZER FEED PUMP (13-Sep-21)		
	OVERALL LEVEL	1-20 KHz	
11	.052 In/Sec	.788 G-s	1800.0 RPM
21	.048 In/Sec	.493 G-s	
23	.050 In/Sec	.298 G-s	
71	.181 In/Sec	.260 G-s	
72	.181 In/Sec	.307 G-s	
7016-11	- WEST OXIDIZER FEED PUMP (13-Sep-21)		
	OVERALL LEVEL	1-20 KHz	
11	.025 In/Sec	.485 G-s	1800.0 RPM
21	.023 In/Sec	.917 G-s	
23	.017 In/Sec	.274 G-s	
71	.093 In/Sec	.510 G-s	
72	.071 In/Sec	.845 G-s	
234-01	- CHILL WATER PUMP 234-01 (13-Sep-21)		
	OVERALL LEVEL	1-20 KHz	
11	.045 In/Sec	.696 G-s	1790.0 RPM
21	.043 In/Sec	1.034 G-s	
23	.107 In/Sec		
71	.081 In/Sec	.203 G-s	
72	.090 In/Sec	.214 G-s	
C-203	- C-203 Comp (13-Sep-21)		
	OVERALL LEVEL	1-20 KHz	
11	.028 In/Sec	.182 G-s	3588.0 RPM

12	.023 In/Sec	.539 G-s	
21	.024 In/Sec	.587 G-s	
22	.025 In/Sec	.581 G-s	
23	.027 In/Sec	.511 G-s	
	OVERALL LEVEL	1-20 KHZ	
71M	.025 In/Sec	.263 G-s	
72M	.033 In/Sec	.728 G-s	
73M	.062 In/Sec	1.803 G-s	
81M	.035 In/Sec	2.579 G-s	
82M	.051 In/Sec	3.509 G-s	
71F	.040 In/Sec	1.892 G-s	
72F	.032 In/Sec	.659 G-s	
73F	.075 In/Sec	2.385 G-s	
81F	.032 In/Sec	.924 G-s	
82F	.028 In/Sec	.366 G-s	
9000-01 - D HYDROGENATOR FD PUMP- WEST (13-Sep-21)			
	OVERALL LEVEL	1-20 KHZ	
11	.061 In/Sec	.220 G-s	1800.0 RPM
21	.058 In/Sec	.182 G-s	
23	.034 In/Sec	.387 G-s	
71	.114 In/Sec	.500 G-s	
72	.127 In/Sec	.561 G-s	
236-04A - HYDROGNTOR PRECOOLER FD PUMP (13-Sep-21)			
	OVERALL LEVEL	1-20 KHZ	
11	.042 In/Sec	.204 G-s	1800.0 RPM
21	.062 In/Sec	.470 G-s	
23	.038 In/Sec	.882 G-s	
71	.133 In/Sec	.288 G-s	
72	.058 In/Sec	.231 G-s	
C-202 - C-202 Comp (13-Sep-21)			
	OVERALL LEVEL	1-20 KHZ	
11	.045 In/Sec	.457 G-s	3588.0 RPM
12	.110 In/Sec	.362 G-s	
21	.057 In/Sec	.401 G-s	
22	.100 In/Sec	.762 G-s	
23	.046 In/Sec	.457 G-s	
	OVERALL LEVEL	1-20 KHZ	
71M	.036 In/Sec	3.800 G-s	
72M	.045 In/Sec	1.063 G-s	
73M	.062 In/Sec	1.433 G-s	
81M	.031 In/Sec	1.967 G-s	
82M	.054 In/Sec	3.450 G-s	
71F	.034 In/Sec	1.422 G-s	
72F	.054 In/Sec	1.173 G-s	
73F	.050 In/Sec	2.069 G-s	
81F	.032 In/Sec	1.813 G-s	
82F	.046 In/Sec	1.137 G-s	
C-201 - C-201 Comp (13-Sep-21)			
	OVERALL LEVEL	1-20 KHZ	
11	.104 In/Sec	1.150 G-s	3588.0 RPM
12	.085 In/Sec	1.852 G-s	
21	.085 In/Sec	1.116 G-s	
22	.057 In/Sec	.048 G-s	

23	.081 In/Sec	2.301 G-s
	OVERALL LEVEL	1-20 KHZ
71M	.044 In/Sec	2.198 G-s
72M	.043 In/Sec	2.053 G-s
73M	.066 In/Sec	2.626 G-s
81M	.088 In/Sec	4.106 G-s
82M	.050 In/Sec	1.871 G-s
71F	.054 In/Sec	2.504 G-s
72F	.042 In/Sec	1.261 G-s
73F	.039 In/Sec	1.363 G-s
81F	.052 In/Sec	2.701 G-s
82F	.042 In/Sec	1.523 G-s

new AC	- INSTRUMENT AIR COMPRESSOR	(13-Sep-21)	
	OVERALL LEVEL	1-20 KHZ	
* 11	.121 In/Sec	.825 G-s	1780.0 RPM
* 12	.097 In/Sec	.679 G-s	
* 13	.059 In/Sec	.434 G-s	
* 21	.142 In/Sec	1.558 G-s	
* 22	.074 In/Sec	.868 G-s	
* 23	.049 In/Sec	.414 G-s	
	OVERALL LEVEL	1-20 KHZ	
* 71F	.117 In/Sec	7.788 G-s	
* 72F	.128 In/Sec	4.174 G-s	
* 73F	.282 In/Sec	2.483 G-s	
* 81F	.315 In/Sec	11.28 G-s	
* 82F	.311 In/Sec	13.15 G-s	
* 83F	.143 In/Sec	3.039 G-s	
71M	.115 In/Sec	6.427 G-s	
72M	.125 In/Sec	4.128 G-s	
73M	.108 In/Sec	5.032 G-s	
81M	.142 In/Sec	3.660 G-s	
82M	.189 In/Sec	3.068 G-s	
83M	.182 In/Sec	3.277 G-s	

201-08A	- COMPRESSOR, NASH A 201-08A	(13-Sep-21)	
	OVERALL LEVEL	1-20 KHZ	
11	.044 In/Sec	.070 G-s	506.3 RPM
12	.052 In/Sec	.107 G-s	
13	.096 In/Sec	.129 G-s	
21	.048 In/Sec	.057 G-s	
22	.056 In/Sec	.080 G-s	
23	.077 In/Sec	.086 G-s	
71	.122 In/Sec	1.062 G-s	
72	.167 In/Sec	.956 G-s	
73	.121 In/Sec	.063 G-s	
81	.120 In/Sec	.407 G-s	
82	.203 In/Sec	.293 G-s	
83	.113 In/Sec	.193 G-s	

9002-10	- D-HYDROGENATOR AGITATOR	(13-Sep-21)	
	OVERALL LEVEL	1-20 KHZ	
11	.088 In/Sec	.101 G-s	1185.0 RPM
21	.071 In/Sec	.130 G-s	
23	.051 In/Sec	.036 G-s	
	OVERALL LEVEL	1-20 KHZ	
31	.211 In/Sec	.901 G-s	

31L	.238 In/Sec	.986 G-s	
	OVERALL LEVEL	1-20 KHz	
51	.189 In/Sec	.177 G-s	
51L	.186 In/Sec	.185 G-s	100.0 RPM
52	.237 In/Sec	.251 G-s	
52L	.235 In/Sec	.287 G-s	
53	.101 In/Sec	.460 G-s	
53L	.037 In/Sec	.467 G-s	
61	.140 In/Sec	.139 G-s	
61L	.179 In/Sec	.134 G-s	
81	.035 In/Sec	.049 G-s	
82	.039 In/Sec	.059 G-s	
83	.023 In/Sec	.150 G-s	

Clarification Of Vibration Units:

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

* - Indicates Data Has Date/Time Different From Machine Date/Time