

PROBLEM SUMMARY

Machine Io **MOFFMAN HFM002** Component

Hydraulic System

HOUGHTON DASCOLENE 598 DBR (--- GAL)

COMPONENT CONDITION SUMMARY





Sample Rating Trend



WEAR

RECOMMENDATION

We advise that you check all areas where contaminants can enter the system. We advise that you perform a filter service, and use off-line filtration to improve the cleanliness of the system fluid. The air breather requires service. If unrated, we recommend that you replace with a suitable micron rated and/or desiccant air breather. If rated, we recommend that you service/replace the breather. Resample in 30-45 days to monitor this situation. NOTE: Please provide information regarding reservoir capacity, filter type and micron rating with next sample. We suspect that the abnormal contaminant(s) is the result of incorrect sampling technique. DISCLAIMER: Interpretation of results is based on the sample as received from the customer. The condition of the sample and the method of sampling cannot be verified.

ul26/23

PROBLEMATIC	, IESI	RESULI	3				
Sample Status				SI	EVERE	ATTENTION	
PQ		ASTM D8184*			198	12	
Iron	ppm	ASTM D5185(m)	>20		108	A 86	
Particles >4µm		ASTM D7647	>5000	۲	164951	256	
Particles >6µm		ASTM D7647	>1300	۲	106004	73	
Particles >14µm		ASTM D7647	>160	۲	14644	10	
Particles >21µm		ASTM D7647	>40	۲	3945	4	
Particles >38µm		ASTM D7647	>10		104	0	
Oil Cleanliness		ISO 4406 (c)	>19/17/14	۲	25/24/21	15/13/10	
White Metal	scalar	Visual*	NONE		VLITE	NONE	
Debris	scalar	Visual*	NONE		LIGHT	NONE	
Visc @ 40°C	cSt	ASTM D7279(m)	17		5.6	5.0	
PrtFilter						no image	no image

Customer Id: CAM148GUE Sample No.: PC0076477 Lab Number: 02572949 Test Package: IND 2



To manage this report scan the QR code

To discuss the diagnosis or test data: Kevin Marson +1 (289)291-4644 x4644 Kevin.Marson@wearcheck.com

To change component or sample information: Gloria Gonzalez +1 (289)291-4643 x4643 gloria.gonzalez@wearcheck.com

RECOMMENDED ACTIONS								
Action	Status	Date	Done By	Description				
Change Filter			?	We advise that you perform a filter service, and use off-line filtration to improve the cleanliness of the system fluid.				
Resample			?	Resample in 30-45 days to monitor this situation.				
Alert			?	We suspect that the abnormal contaminant(s) is the result of incorrect sampling technique. DISCLAIMER: Interpretation of results is based on the sample as received from the customer. The condition of the sample and the method of sampling cannot be verified.				
Information Required			?	NOTE: Please provide information regarding reservoir capacity, filter type and micron rating with next sample.				
Check Breathers			?	The air breather requires service. If unrated, we recommend that you replace with a suitable micron rated and/or desiccant air breather. If rated, we recommend that you service/replace the breather.				
Check Dirt Access			?	We advise that you check all areas where contaminants can enter the system.				
Filter Fluid			?	We advise that you perform a filter service, and use off-line filtration to improve the cleanliness of the system fluid.				

HISTORICAL DIAGNOSIS



22 Sep 2020 Diag: Kevin Marson

Resample at the next service interval to monitor. Please submit a sample of the new (unused) oil to establish a baseline. NOTE: Please provide information regarding reservoir capacity, filter type and micron rating with next sample. Iron ppm levels are noted. The low ferrous density (PQ) index indicates the wear metal levels are due to corrosion. All other component wear rates are normal. The system cleanliness is acceptable for your target ISO 4406 cleanliness code. The system and fluid cleanliness is acceptable. The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.





OIL ANALYSIS REPORT

Sample Rating Trend

WEAR

MOFFMAN HFM002

Component Hydraulic System Fluid HOUGHTON DASCOLENE 598 DBR (--- GAL)

DIAGNOSIS

Recommendation

We advise that you check all areas where contaminants can enter the system. We advise that you perform a filter service, and use off-line filtration to improve the cleanliness of the system fluid. The air breather requires service. If unrated, we recommend that you replace with a suitable micron rated and/or desiccant air breather. If rated, we recommend that you service/replace the breather. Resample in 30-45 days to monitor this situation. NOTE: Please provide information regarding reservoir capacity, filter type and micron rating with next sample. We suspect that the abnormal contaminant(s) is the result of incorrect sampling technique. DISCLAIMER: Interpretation of results is based on the sample as received from the customer. The condition of the sample and the method of sampling cannot be verified.

📥 Wear

Light concentration of visible metal present. The high ferrous density (PQ) index indicates that abnormal wear is occurring.

Contamination

There is a high amount of particulates (2 to 100 microns in size) present in the oil. Moderate concentration of visible dirt/debris present in the oil.

Fluid Condition

Viscosity of sample indicates oil is within ISO 5 range, advise investigate. The AN level is acceptable for this fluid.



		method	11111/0430	current	Thistory I	riistor y Z
Sample Number		Client Info		PC0076477	PC0022865	
Sample Date		Client Info		26 Jul 2023	22 Sep 2020	
Machine Age	hrs	Client Info		0	0	
Oil Age	hrs	Client Info		1440	0	
Oil Changed		Client Info		Filtered	N/A	
Sample Status				SEVERE	ATTENTION	
WEAR METAI	S	method	limit/base	current	historv1	historv2
				109	12	
Iron	nnm	ASTM D5185(m)	>20	A 108	86	
Chromium	ppm	ΔSTM D5185(m)	>10	1	<u> </u>	
Nickel	nnm	ASTM D5185(m)	>10	0	0	
Titanium	nom	ASTM D5185(m)	210	0	0	
Silver	ppm	ASTM D5185(m)		د د1	<1	
Aluminum	ppm	ASTM D5185(m)	>10	<1	<1	
Lead	mag	ASTM D5185(m)	>10	<1	<1	
Copper	maa	ASTM D5185(m)	>75	8	10	
Tin	mag	ASTM D5185(m)	>10	<1	<1	
Antimony	maa	ASTM D5185(m)		0	<1	
Vanadium	mag	ASTM D5185(m)		0	0	
Beryllium	ppm	ASTM D5185(m)		0	0	
Cadmium	ppm	ASTM D5185(m)		0	0	
			line it //s a a a			biotory ()
		method	limit/hase	current	history1	
ADDITIVES		method	limit/base	current	history1	nistoryz
Boron	ppm	ASTM D5185(m)	limit/base	6	history1 4	
Boron Barium	ppm ppm	ASTM D5185(m) ASTM D5185(m)	IImirbase	6 0	4 0	
Boron Barium Molybdenum	ppm ppm ppm	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	limit/base	6 0 0	4 0 0	
Boron Barium Molybdenum Manganese	ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)		6 0 0 12	history1 4 0 0 15	
Boron Barium Molybdenum Manganese Magnesium	ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)		6 0 0 12 <1	history1 4 0 0 15 <1	
Boron Barium Molybdenum Manganese Magnesium Calcium	ppm ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)		6 0 0 12 <1 2	history1 4 0 0 15 <1	
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus	ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)		6 0 0 12 <1 2 537	history1 4 0 0 15 <1	
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Suffur	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)		Current 6 0 12 <1 2 537 13 240	nistory1 4 0 15 <1	
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium	ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)		Current 6 0 12 <1 2 537 13 340	Nistory1 4 0 15 <1	
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium	ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m)		Current 6 0 12 <1 2 537 13 340 <1	History1 4 0 15 <1 6 405 15 224 <1	History2
Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m) ASTM D5185(m)	limit/base	6 0 12 <1 2 537 13 340 <1 current	history1 4 0 15 <1 6 405 15 224 <1 history1	history2
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	Method ASTM D5185(m)	limit/base >20	6 0 12 <1 2 537 13 340 <1 current 3	history1 4 0 15 <1	history2
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	Method ASTM D5185(m)	limit/base	6 0 12 <1 2 537 13 340 <1 current 3 <1	history1 4 0 15 <1	history2
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	Method ASTM D5185(m)	limit/base >20 >20	6 0 12 <1 2 537 13 340 <1 Current 3 <1 3 <1 3 <1	history1 4 0 15 <1 6 405 15 224 <1 history1 <1 0 1 0 1 0 1	history2
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium FLUID CLEAN	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D5185(m)	limit/base >20 >20 limit/base	6 0 12 <1 2 537 13 340 <1 current 3 <1 <1 <1 <1 current 3 <1 current	history1 4 0 15 <1	history2
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium FLUID CLEAN Particles >4um	ppm ppm ppm ppm ppm ppm ppm ppm ppm ypm y	method ASTM D5185(m) ASTM D5185(m)	limit/base >20 ≥20 limit/base >5000	6 0 12 <1 2 537 13 340 <1 current 3 <1 2 11 0 <1 current 3 <1 <1 1 <1 164951	history1 4 0 15 <1	history2
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium FLUID CLEAN Particles >6µm	ppm ppm ppm ppm ppm ppm ppm ppm ppm ypm y	ASTM D5185(m) ASTM D5185(m)	limit/base >20 >20 imit/base >5000 >1300	6 0 12 <1 2 537 13 340 <1 current 3 <1 current 3 <1 1 1 1 1 1 164951 106004	history1 4 0 15 <1	history2
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium FLUID CLEAN Particles >6µm Particles >14µm	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D7647 ASTM D7647	limit/base >20 >20 limit/base >20 limit/base >5000 >1300 >160	6 0 12 <1 2 537 13 340 <1 current 3 <1 current 3 <1 106004 14644	history1 4 0 15 <1	history2
ADDITIVES Boron Barium Molybdenum Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium FLUID CLEAN Particles >4µm Particles >6µm Particles >14µm Particles >21µm	ppm ppm ppm ppm ppm ppm ppm ppm ppm ppm	ASTM D5185(m) ASTM D7647 ASTM D7647 ASTM D7647	limit/base >20 >20 limit/base >5000 >1300 >160 >40	6 0 12 <1 2 537 13 340 <1 current 3 <1 current 164951 106004 14644 3945	history1 4 0 15 <1	Inisiony2 Inisiony2
ADDITIVES Boron Barium Molybdenum Manganese Magnesium Calcium Phosphorus Zinc Sulfur Lithium CONTAMINAN Silicon Sodium Potassium FLUID CLEAN Particles >4µm Particles >54µm Particles >14µm Particles >21µm Particles >38µm	ppm ppm ppm ppm ppm ppm ppm ppm ppm ypm y	ASTM D5185(m) ASTM D7647 ASTM D7647 ASTM D7647 ASTM D7647	limit/base >20 >20 limit/base >5000 >1300 >160 >40 >10	6 0 12 <1 2 537 13 340 <1 Current 3 <1 Current 3 <1 Current 164951 106004 14644 3945 104	history1 4 0 15 <1 6 405 15 224 <1 history1 <1 0 1 bistory1 256 73 10 4 0	Inisiony2 Inisiony2

ISO 4406 (c) >19/17/14 **25/24/21**

Oil Cleanliness

15/13/10



OIL ANALYSIS REPORT

491,520 T	т26	FLUID DEGRA	DATION	method	limit/base	e current	history1	history2
122,880 Severe	-24	Acid Number (AN)	mg KOH/g	ASTM D974*		0.14	0.10	
7,680 Abnormal	20	VISUAL		method	limit/base	e current	history1	history2
1,920 32 480		White Metal	scalar	Visual*	NONE		NONE	
ti 120-	14	Yellow Metal	scalar	Visual*	NONE	NONE	NONE	
ag 30-	+12	Precipitate	scalar	Visual*	NONE	NONE	NONE	
≓ 8 1		Silt	scalar	Visual*	NONE	VLITE	NONE	
	N ^o 6	Debris	scalar	Visual*	NONE	🔺 LIGHT	NONE	
4μ 6μ	14μ 21μ 38μ 71μ	Sand/Dirt	scalar	Visual*	NONE	NONE	NONE	
200k -		Appearance	scalar	Visual*	NORML	NORML	NORML	
4μm		Odor	scalar	Visual*	NORML	NORML	NORML	
E 150k - 14μm		Emulsified Water	scalar	Visual*	>0.1	NEG	NEG	
90 100k		Free Water	scalar	Visual*		NEG	NEG	
	THE REAL PROPERTY NAMES AND DESCRIPTION OF THE PARTY OF T	FLUID PROPE	ERTIES	method	limit/base	e current	history1	history2
Abnored	ARAB AND TO CARDON AND THE OWNER OF THE OWNER	Visc @ 40°C	cSt	ASTM D7279(m)	17	5.6	5.0	
0k		Visc @ 100°C	cSt	ASTM D7279(m)		1.9	1.7	
Sep 22	20 11 12	SAMPLE IMA	GES	method	limit/base	e current	history1	history2
🔺 Viscosity @ 40°	C					10		
20 Abnormal		Calar					-	
18 Base		COIOI						no image
© 14							Contraction of the local division of the loc	
0 0 12- #								
3 10		Bottom					4	no image
6 -								
4	2	3				CERTIFICATION DE CAM		
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63		PrtFilter					no image	no image
▲ PQ								
Severe								
200 + 0								
150-								
100 - Abnormal								
50-								
		_						
	503	r r						
Sep	3							
🔺 Ferrous Alloys								
120 iron 1								
100 - chromium								
80-								
ā 60-								
40								
20 -								
0 Linning 10	Ê	3						
Sep 22/								
	Laboratory Sample No. Laboratory Sample No. Lab Number Unique Number Test Package To discuss this sample report Test denoted (*) outside scop	: WearCheck - C8-1 : PC0076477 : 02572949 rr : 5618000 e : IND 2 (Additional Test ; contact Customer Serve e of accreditation, (m) r	175 Apple Received Diagnose Diagnost ts: Bottom, E vice at 1-8 method mc	by Line, Bur 2 : 28 2 : 01 2 : 01	lington, ON Jul 2023 Aug 2023 vin Marson s, FilterPatch, 1. ested at exte	L7L 5H9 KV100, PQ, PrtFilter ernal lab.	C 148 , VI) Contact: stu.burbidge(: (AMTAC MFG 3 ARROW RD GUELPH, ON CA N1K 1T4 : Stu Burbidge @linamar.com 519)780-2270
	Validity of results and interpre	etation are based on the	sample a	nd informatio	on as suppli	ied.	F: (*	519)780-2274

Report Id: CAM148GUE [WCAMIS] 02572949 (Generated: 08/01/2023 15:07:10) Rev: 1

Contact/Location: Stu Burbidge - CAM148GUE