



D12W - SOS Services Laboratory 2818 Mid Valley Drive De Pere, WI 54115 USA

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ENGINE

D12W-55035-0204

SHOP JOB NUM : ms43226

SAMPLE SHIP TIME (days) : 7

M & D TRUCK & EQUIP

SALES LLC

RECEIVED DATE: 04-Feb-25

EQUIP NUM: RAZ10875

CAT 323

No Action Required

SERIAL NUMBER: RAZ10875

Interp By: Linda Lovejoy

Interpreted On: 04-Feb-25

READINGS APPEAR TO BE NORMAL. CONTINUE SAMPLING AT THE NORMAL INTERVAL. OIL AND FILTER CHANGE NOTED.

SAMPLE INFORMATION

	28-Jan-25	22-Oct-24	21-May-24	06-Oct-23
Sampled Date	28-Jan-25	22-Oct-24	21-May-24	06-Oct-23
Sample Id	D12W-55035-0204	D12W-54297-0023	D12W-54157-0153	D12W-53282-0025
Lab Date	04-Feb-25	23-Oct-24	05-Jun-24	09-Oct-23
Meter [Hr]	2764	2724.0	2437.0	2224.0
Comp Meter [Hr]	2764		2437.0	
Meter On Fluid	327.0	287.0	213.0	255.0
Fluid Brand	CAT	CAT	CAT	VALVOLINE
Fluid Weight	10W-30	10W-30	10W-30	5W-40
Fluid Type				
Fluid Change	Y	N	Y	Y
Filter Change	Y	N	Y	Y
PM Level		250	500	250
Total Fluid Added	0	0	0	0

PREVIOUS SAMPLE

READINGS APPEAR TO BE NORMAL. CONTINUE SAMPLING AT THE NORMAL INTERVAL.

For additional sample history, go to: S.O.S WEB

CONDITION / CONTAMINATION

	28-Jan-25	22-Oct-24	21-May-24	06-Oct-23
VISCOSITY (CENTISTOKES) ASTM D445				
V100	Viscosity at 100 C	10.78	10.99	10.84
				11.19

INFRARED (UFM) ASTM E2412

	28-Jan-25	22-Oct-24	21-May-24	06-Oct-23
ST	Soot	1	5	5
				7
OXI	Oxidation	21	20	20
				21
SUL	Sulfate By-Product	23	22	22
				23
	Sulfur Products	23	22	22
				23
NIT	Nitration	0	6	6
				7

WEAR LEVELS / ADDITIVES

28-Jan-25 22-Oct-24 21-May-24 06-Oct-23

ELEMENTAL ANALYSIS (PPM) ASTM D6185 [OIL] / ASTM D6130 [COOLANT]

	28-Jan-25	22-Oct-24	21-May-24	06-Oct-23
Cu	Copper	1	1	1
				1
Fe	Iron	21	12	9
				21
Cr	Chromium	1	1	1
				1
Al	Aluminum	12	7	8
				13
Pb	Lead	0	0	0
				0
Sn	Tin	0	0	0
				0
Si	Silicon	5	4	4
				4
Na	Sodium	1	2	2
				1
K	Potassium	1	1	2
				3
Mo	Molybdenum	40	42	44
				41
Ni	Nickel	1	1	1
				1
Ag	Silver	0	0	0
				0
Ti	Titanium	0	0	0
				0
V	Vanadium	0	0	0
				0
Mn	Manganese	0	0	0
				0
Cd	Cadmium	0	0	0
				0
Ca	Calcium	1699	1914	1964
				1862
P	Phosphorus	968	1086	1022
				903
Zn	Zinc	1194	1309	1310
				1261
Mg	Magnesium	528	583	608
				615
Ba	Barium	0	0	0
				0
B	Boron	48	51	63

WATER

	28-Jan-25	22-Oct-24	21-May-24	06-Oct-23
W	Water	N	N	N
				N

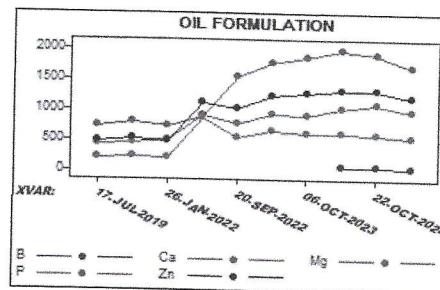
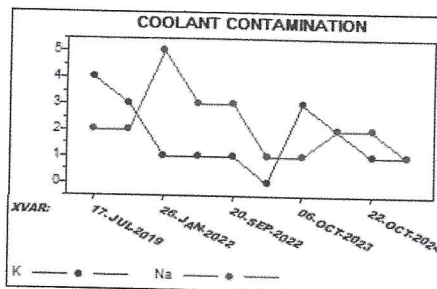
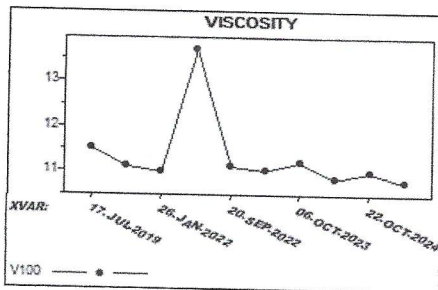
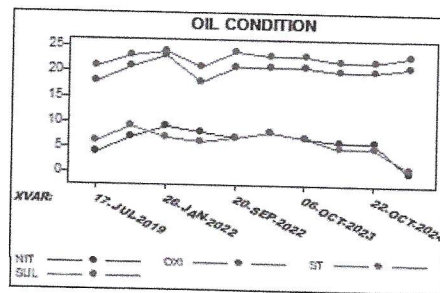
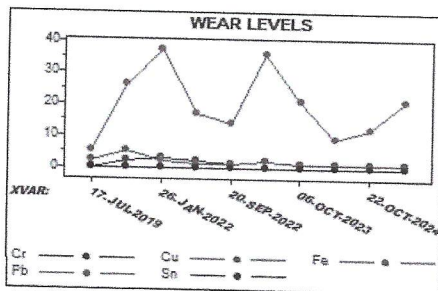
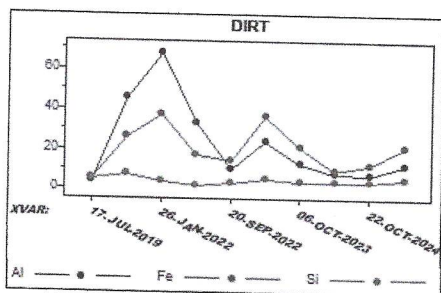
ANTIFREEZE

	28-Jan-25	22-Oct-24	21-May-24	06-Oct-23
A	Antifreeze	N	N	N
				N

FUEL

	28-Jan-25	22-Oct-24	21-May-24	06-Oct-23
F	Fuel	N	N	N
				N

Notice: This analysis is intended as an aid in predicting mechanical wear. No guarantee, expressed or implied, is made against failure of this piece of equipment or component thereof.



Report Comment

Our method for Infrared analysis has changed to comply with Caterpillar test methods. A new trend will need to be established for this testing. Manage your fleet and access sample reports at any time – visit <https://vl.cat.com> to learn more.

FINAL DRIVE REAR LEFT

D12W-55035-0347

SHOP JOB NUM : ms43226

SAMPLE SHIP TIME (days) : 7

M & D TRUCK & EQUIP

SALES LLC

RECEIVED DATE: 04-Feb-25

EQUIP NUM: RAZ10875

CAT 323

No Action Required

SERIAL NUMBER: RAZ10875

Interp By: Linda Lovejoy

Interpreted On: 04-Feb-25

READINGS APPEAR TO BE NORMAL. CONTINUE SAMPLING AT THE NORMAL INTERVAL.

SAMPLE INFORMATION

	28-Jan-25	21-May-24	21-Apr-23	08-Jul-22
Sampled Date	28-Jan-25	21-May-24	21-Apr-23	08-Jul-22
Sample Id	D12W-55035-0347	D12W-54157-0194	D12W-53116-0186	D12W-52192-0368
Lab Date	04-Feb-25	05-Jun-24	26-Apr-23	11-Jul-22
Meter [Hr]	2764	2437.0	1969.0	1561.0
Comp Meter [Hr]	2764			
Meter On Fluid	795.0	468.0	513.0	105.0
Fluid Brand	CAT	CAT	SHELL	SHELL
Fluid Weight	10W	10W	40	40
Fluid Type				
Fluid Change	N	N	Y	U
Filter Change	N	NA	N	U
PM Level		500		1000
Total Fluid Added	0	0	0	0

PREVIOUS SAMPLE

OIL TYPE/ GRADE HAS BEEN CHANGED - NOTE CHANGES TO VISCOSITY & METAL ADDITIVE PACKAGE. OTHER READINGS APPEAR TO BE NORMAL. CONTINUE SAMPLING AT THE NORMAL INTERVAL.

For additional sample history, go to: S.O.S WEB

CONDITION / CONTAMINATION

		28-Jan-25	21-May-24	21-Apr-23	08-Jul-22
VISCOSITY (CENTISTOKES) ASTM D445					
V100	Viscosity at 100 C	17.48	17.60	14.33	14.01

INFRARED (UFM) ASTM E2412

		28-Jan-25	21-May-24	21-Apr-23	08-Jul-22
ST	Soot	0	2	4	4
OXI	Oxidation	10	10	50	49
SUL	Sulfate By-Product	21	20	44	44
	Sulfur Products	21	20	44	44
NIT	Nitration	0	4	4	4

WATER

		28-Jan-25	21-May-24	21-Apr-23	08-Jul-22
W	Water	N	N	N	N

CLEANLINESS

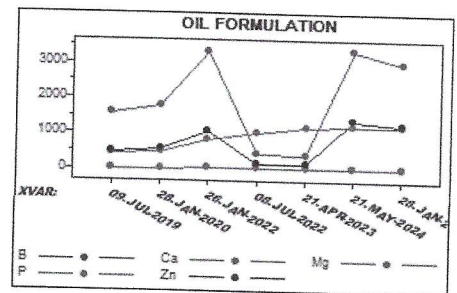
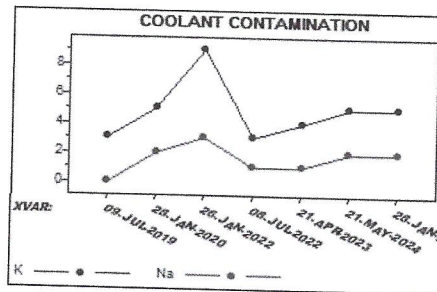
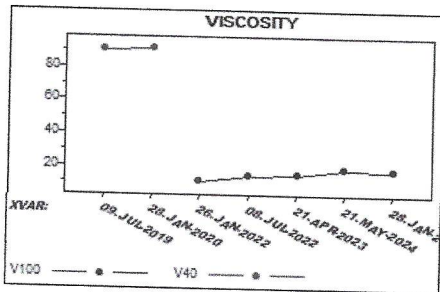
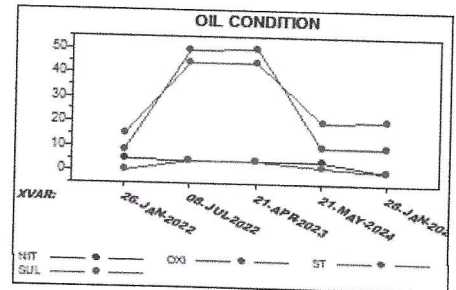
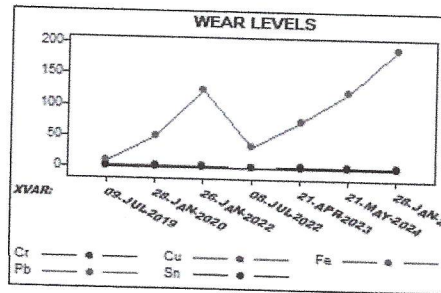
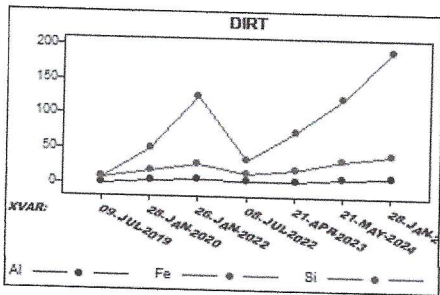
		28-Jan-25	21-May-24	21-Apr-23	08-Jul-22
PARTICLE COUNT - ISO 11171:1999 reported per ISO 4406					
ISO	ISO Code Rating	X	X	X	X

WEAR LEVELS / ADDITIVES

28-Jan-25 21-May-24 21-Apr-23 08-Jul-22

ELEMENTAL ANALYSIS (PPM) ASTM D5185 [OIL] / ASTM D6130 [COOLANT]

		28-Jan-25	21-May-24	21-Apr-23	08-Jul-22
Cu	Copper	0	0	0	0
Fe	Iron	191	122	75	34
Cr	Chromium	1	1	1	0
Al	Aluminum	10	7	4	4
Pb	Lead	0	0	0	0
Sn	Tin	0	0	0	0
Si	Silicon	42	34	19	14
Na	Sodium	2	2	1	1
K	Potassium	5	5	4	3
Mo	Molybdenum	0	0	1	1
Ni	Nickel	0	0		
Ag	Silver	0	0		
Ti	Titanium	1	0		
V	Vanadium	0	0		
Mn	Manganese	2	1		
Cd	Cadmium	0	0		
Ca	Calcium	3010	3333	391	437
P	Phosphorus	1220	1215	1166	1011
Zn	Zinc	1252	1377	140	147
Mg	Magnesium	17	16	24	19
Ba	Barium	1	1		
B	Boron	44	46		



Report Comment

Our method for Infrared analysis has changed to comply with Caterpillar test methods. A new trend will need to be established for this testing. Manage your fleet and access sample reports at any time – visit <https://vl.cat.com> to learn more.

SWING DRIVE

EQUIP NUM: RAZ10875

SERIAL NUMBER: RAZ10875

D12W-55035-0358

SHOP JOB NUM : ms43226

SAMPLE SHIP TIME (days) : 7

M & D TRUCK & EQUIP

SALES LLC

RECEIVED DATE: 04-Feb-25

CAT 323

No Action Required

READINGS APPEAR TO BE NORMAL. CONTINUE SAMPLING AT THE NORMAL INTERVAL. OIL CHANGE NOTED.

Interp By: Linda Lovejoy
Interpreted On: 05-Feb-25

SAMPLE INFORMATION

	28-Jan-25	21-Apr-23	08-Jul-22	26-Jan-22
Sampled Date	28-Jan-25	21-Apr-23	08-Jul-22	26-Jan-22
Sample Id	D12W-55035-0358	D12W-53116-0180	D12W-52192-0371	D12W-52038-0341
Lab Date	04-Feb-25	26-Apr-23	11-Jul-22	07-Feb-22
Meter [Hr]	2764	1969.0	1561.0	1456
Comp Meter [Hr]	2764			1456
Meter On Fluid	795.0	1969.0	1561.0	1456
Fluid Brand	SHELL	SHELL	SHELL	SHELL
Fluid Weight	10W	10W	10W	10W
Fluid Type				
Fluid Change	Y	Y	U	U
Filter Change	N	N	U	U
PM Level			1000	
Total Fluid Added	0	0	0	0

PREVIOUS SAMPLE

READINGS APPEAR TO BE NORMAL. CONTINUE SAMPLING AT THE NORMAL INTERVAL. OIL CHANGE NOTED.

For additional sample history, go to: S.O.S WEB

CONDITION / CONTAMINATION

	28-Jan-25	21-Apr-23	08-Jul-22	26-Jan-22
VISCOSITY (CENTISTOKES) ASTM D445				
V100 Viscosity at 100 C	15.59	9.926	7.132	10.56

INFRARED (UFM) ASTM E2412

	28-Jan-25	21-Apr-23	08-Jul-22	26-Jan-22
ST Soot	0	2	2	0
OXI Oxidation	3	4	6	8
SUL Sulfate By-Product	17	15	14	14
Sulfur Products	17	15	14	14
NIT Nitration	0	4	4	5

WEAR LEVELS / ADDITIVES

28-Jan-25 21-Apr-23 08-Jul-22 26-Jan-22

ELEMENTAL ANALYSIS (PPM) ASTM D5185 [OIL] / ASTM D6130 [COOLANT]

	28-Jan-25	21-Apr-23	08-Jul-22	26-Jan-22
Cu Copper	0	0	0	0
Fe Iron	46	53	43	129
Cr Chromium	0	0	0	1
Al Aluminum	1	1	2	1
Pb Lead	0	0	0	0
Sn Tin	0	0	0	0
Si Silicon	5	7	8	9
Na Sodium	2	2	2	3
K Potassium	1	2	1	2
Mo Molybdenum	5	17	2	4
Ni Nickel	0			
Ag Silver	0			
Ti Titanium	0			
V Vanadium	0			
Mn Manganese	0			
Cd Cadmium	0			
Ca Calcium	3924	3229	3413	1693
P Phosphorus	1364	977	852	537
Zn Zinc	1604	1339	1078	551
Mg Magnesium	21	54	15	9
Ba Barium	0			
B Boron	2			

WATER

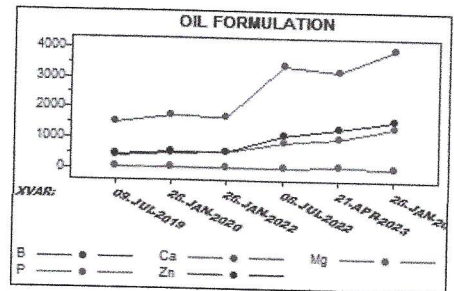
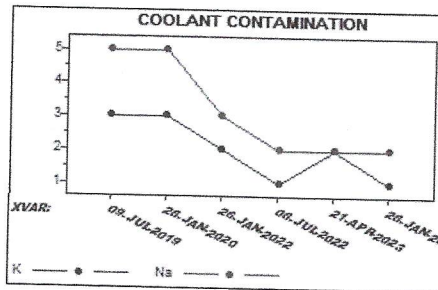
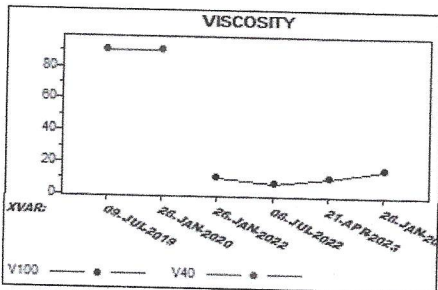
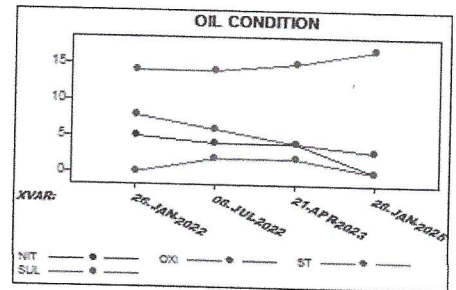
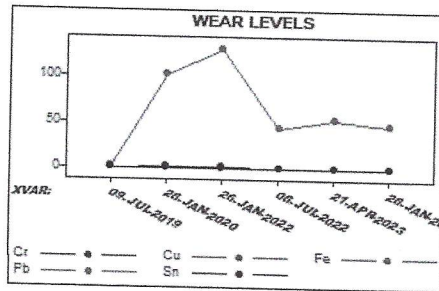
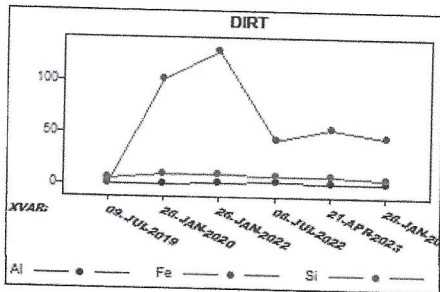
	28-Jan-25	21-Apr-23	08-Jul-22	26-Jan-22
W Water	N	N	N	N

CLEANLINESS

28-Jan-25 21-Apr-23 08-Jul-22 26-Jan-22

PARTICLE COUNT - ISO 11171:1999 reported per ISO 4406

	28-Jan-25	21-Apr-23	08-Jul-22	26-Jan-22
ISO ISO Code Rating	X	X	X	X



Report Comment

Our method for Infrared analysis has changed to comply with Caterpillar test methods. A new trend will need to be established for this testing. Manage your fleet and access sample reports at any time – visit <https://vi.cat.com> to learn more.

FINAL DRIVE REAR

RIGHT

D12W-55035-0377

SHOP JOB NUM : ms43226

SAMPLE SHIP TIME (days) : 7

M & D TRUCK & EQUIP

SALES LLC

RECEIVED DATE: 04-Feb-25

EQUIP NUM: RAZ10875

CAT 323

SERIAL NUMBER: RAZ10875

 **No Action Required**

READINGS APPEAR TO BE NORMAL. CONTINUE SAMPLING AT THE NORMAL INTERVAL.

Interp By: Linda Lovejoy
Interpreted On: 05-Feb-25

SAMPLE INFORMATION

	28-Jan-25	21-May-24	21-Apr-23	08-Jul-22
Sampled Date	28-Jan-25	21-May-24	21-Apr-23	08-Jul-22
Sample Id	D12W-55035-0377	D12W-54157-0206	D12W-53116-0185	D12W-52192-0366
Lab Date	04-Feb-25	05-Jun-24	26-Apr-23	11-Jul-22
Meter [Hr]	2764	2437.0	1969.0	1561.0
Comp Meter [Hr]	2764			
Meter On Fluid	795.0	468.0	513.0	105.0
Fluid Brand	CAT	CAT	SHELL	SHELL
Fluid Weight	10W	10W	40	40
Fluid Type				
Fluid Change	N	N	Y	U
Filter Change	N	NA	N	U
PM Level		500		1000
Total Fluid Added	0	0	0	0

PREVIOUS SAMPLE

OIL TYPE/ GRADE HAS BEEN CHANGED - NOTE CHANGES TO VISCOSITY & METAL ADDITIVE PACKAGE. OTHER READINGS APPEAR TO BE NORMAL. CONTINUE SAMPLING AT THE NORMAL INTERVAL.

For additional sample history, go to: S.O.S WEB

CONDITION / CONTAMINATION

	28-Jan-25	21-May-24	21-Apr-23	08-Jul-22
VISCOSITY (CENTISTOKES) ASTM D446				
V100 Viscosity at 100 C	17.72	18.35	14.15	14.26

INFRARED (UFM) ASTM E2412

	28-Jan-25	21-May-24	21-Apr-23	08-Jul-22
ST Soot	0	2	4	4
OXI Oxidation	9	9	48	51
SUL Sulfate By-Product	21	20	43	45
Sulfur Products	21	20	43	45
NIT Nitration	0	4	4	4

WATER

	28-Jan-25	21-May-24	21-Apr-23	08-Jul-22
W Water	N	N	N	N

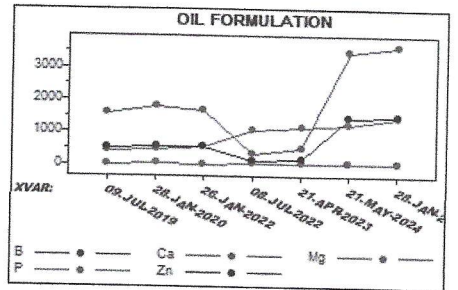
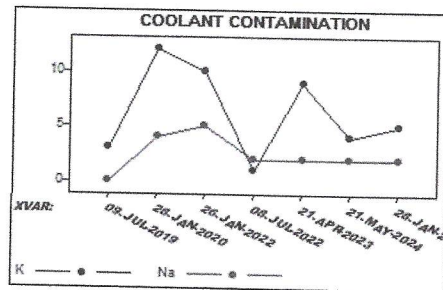
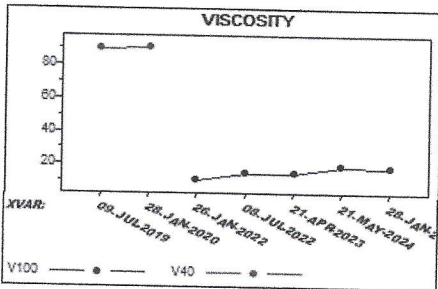
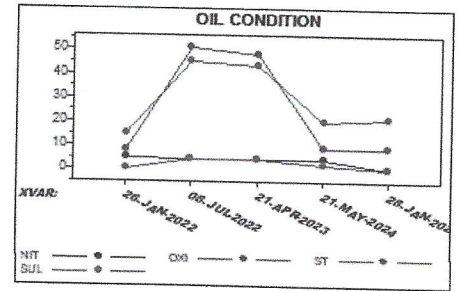
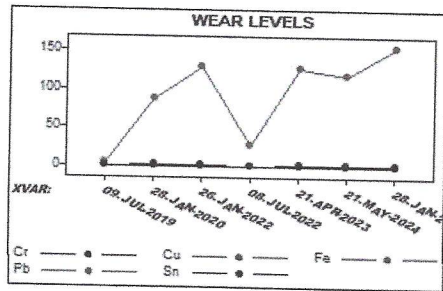
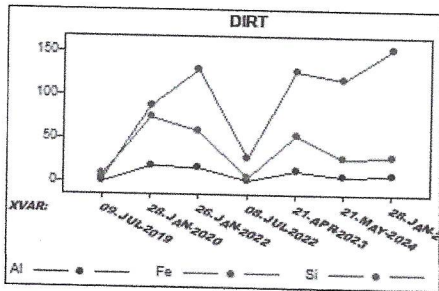
CLEANLINESS

	28-Jan-25	21-May-24	21-Apr-23	08-Jul-22
PARTICLE COUNT - ISO 11171:1999 reported per ISO 4406				
ISO ISO Code Rating	X	X	X	X

WEAR LEVELS / ADDITIVES

ELEMENTAL ANALYSIS (PPM) ASTM D5185 [OIL] / ASTM D6130 [COOLANT]

	28-Jan-25	21-May-24	21-Apr-23	08-Jul-22
Cu Copper	0	0	0	0
Fe Iron	153	118	127	27
Cr Chromium	1	1	1	0
Al Aluminum	7	6	12	1
Pb Lead	0	0	0	0
Sn Tin	0	0	0	0
Si Silicon	29	27	53	5
Na Sodium	2	2	2	2
K Potassium	5	4	9	1
Mo Molybdenum	0	0	1	1
Ni Nickel	0	0		
Ag Silver	0	0		
Ti Titanium	0	0		
V Vanadium	0	0		
Mn Manganese	1	1		
Cd Cadmium	0	0		
Ca Calcium	3606	3473	513	349
P Phosphorus	1428	1233	1162	1061
Zn Zinc	1479	1429	155	117
Mg Magnesium	17	16	29	19
Ba Barium	1	1		
B Boron	47	43		



Report Comment

Our method for Infrared analysis has changed to comply with Caterpillar test methods. A new trend will need to be established for this testing. Manage your fleet and access sample reports at any time – visit <https://vl.cat.com> to learn more.

HYDRAULIC SYSTEM

EQUIP NUM: RAZ10875

SERIAL NUMBER: RAZ10875

D12W-55035-0674

SHOP JOB NUM : ms43226

SAMPLE SHIP TIME (days) : 7

M & D TRUCK & EQUIP

SALES LLC

RECEIVED DATE: 04-Feb-25

CAT 323

No Action Required

READINGS APPEAR TO BE NORMAL. CONTINUE SAMPLING AT THE NORMAL INTERVAL.

Interp By: Tessa Goosman

Interpreted On: 05-Feb-25

SAMPLE INFORMATION

	28-Jan-25	21-May-24	06-Oct-23	21-Apr-23
Sampled Date	28-Jan-25	21-May-24	06-Oct-23	21-Apr-23
Sample Id	D12W-55035-0674	D12W-54157-0323	D12W-53282-0285	D12W-53116-0119
Lab Date	04-Feb-25	05-Jun-24	09-Oct-23	26-Apr-23
Meter [Hr]	2764	2437.0	2224.0	1969.0
Comp Meter [Hr]	2764			
Meter On Fluid	2764.0	2437.0	2224.0	1969.0
Fluid Brand	CAT	CAT		
Fluid Weight	10W	10W		
Fluid Type				
Fluid Change	N	N	N	N
Filter Change	N	N	N	N
PM Level		500	250	
Total Fluid Added	0	0	0	0

PREVIOUS SAMPLE

LPD (LARGE PARTICLE DETECTION) READING EXCEEDS RECOMMENDED CLEANLINESS LEVEL. OTHER READINGS APPEAR TO BE NORMAL. INSTALL A NEW FILTER TO LOWER ISO CODE AND THEN CONTINUE TO SAMPLE.

For additional sample history, go to:

S.O.S WEB

CONDITION / CONTAMINATION

	28-Jan-25	21-May-24	06-Oct-23	21-Apr-23
VISCOSITY (CENTISTOKES) ASTM D445				
V100 Viscosity at 100 C	6.481	6.473	6.637	6.517

INFRARED (UFM) ASTM E2412

	28-Jan-25	21-May-24	06-Oct-23	21-Apr-23
ST Soot	0	2	1	1
OXI Oxidation	4	4	4	4
SUL Sulfate By-Product	13	13	13	13
Sulfur Products	13	13	13	13
NIT Nitration	0	2	2	2

WATER

	28-Jan-25	21-May-24	06-Oct-23	21-Apr-23
W Water	N	N	N	N

ANTIFREEZE

	28-Jan-25	21-May-24	06-Oct-23	21-Apr-23
A Antifreeze	N	N	N	N

CLEANLINESS

	28-Jan-25	21-May-24	06-Oct-23	21-Apr-23
PARTICLE COUNT - ISO 11171:1999 reported per ISO 4406				
ISO ISO Code Rating	19/18/15	21/20/15	17/15/12	21/18/13
4µ 4µ	4817	17087	1159	12572
6µ 6µ	1899	5117	290	1332
10µ 10µ	649	1052		221
14µ 14µ	315	229	32	68
18µ 18µ	194	89		29
21µ 21µ	139	44		17
38µ 38µ	18	6		2
50µ 50µ	7	3		1

WEAR LEVELS / ADDITIVES

	28-Jan-25	21-May-24	06-Oct-23	21-Apr-23
ELEMENTAL ANALYSIS (PPM) ASTM D5185 [OIL] / ASTM D6130 [COOLANT]				
Cu Copper	9	9	8	9
Fe Iron	11	11	9	9
Cr Chromium	0	0	0	0
Al Aluminum	1	0	1	1
Pb Lead	1	1	1	1
Sn Tin	0	0	0	0
Si Silicon	2	1	1	0
Na Sodium	1	2	0	1
K Potassium	2	2	0	2
Mo Molybdenum	1	1	1	1
Ni Nickel	0	0		
Ag Silver	0	0		
Ti Titanium	0	0		
V Vanadium	0	0		
Mn Manganese	0	0		
Cd Cadmium	0	0		
Ca Calcium	178	181	175	186
P Phosphorus	673	640	659	729
Zn Zinc	895	910	898	971
Mg Magnesium	8	7	8	6
Ba Barium	1	1		
B Boron	2	2		

HYDRAULIC SYSTEM

SERIAL NUMBER: RAZ10875

EQUIP NUM: RAZ10875

CAT 323

D12W-55035-0674



No Action Required

Report Comment

Our method for Infrared analysis has changed to comply with Caterpillar test methods. A new trend will need to be established for this testing. Manage your fleet and access sample reports at any time – visit <https://vl.cat.com> to learn more.