



EMPIRE MACHINERY - ARIZONA LAB - 1725 S. Country Club Drive Mesa, AZ 85210 USA

PHONE: 866-224-3087

Web: <https://empire.cat.com> Email: fluidslab@empire-cat.com

**FINAL DRIVE REAR
RIGHT**

**EQUIP NUM: 1901002
CAT D10R**

SERIAL NUMBER: 3KR01634

H177-55148-0583

LABEL#: 250989273

SAMPLE SHIP TIME (days) : 13

AMES CONSTRUCTION INC

LOCATION: Yavapai County,

Arizona 86305, United States

RECEIVED DATE: 28-May-25

No Action Required

**Interp By: Larry Byington
Interpreted On: 28-May-25**

NO PROBLEMS PRESENTLY ASSOCIATED WITH THIS SAMPLE. CONTINUE SAMPLING AT THE NORMAL INTERVAL.

SAMPLE INFORMATION

Sampled Date	15-May-25	18-Dec-24	05-Sep-24	23-May-24
Sample Id	H177-55148-0593	H177-54355-0649	H177-54253-0696	H160-54156-0184
Lab Date	28-May-25	20-Dec-24	09-Sep-24	04-Jun-24
Meter [Hr]	42526.8	42068.5	41628.1	41361
Comp Meter [Hr]				41361
Meter On Fluid	1165.8	707.5	267.1	280
Fluid Brand				
Fluid Weight				
Fluid Type				
Fluid Change	N	N	N	Y
Filter Change	N	N	N	U
Kidney Loop				U
Total Fluid Added	0	0	0	0

WEAR LEVELS / ADDITIVES

ELEMENTAL ANALYSIS (PPM) ASTM D6165 [OIL] / ASTM D6130 [COOLANT]		15-May-25	18-Dec-24	05-Sep-24	23-May-24
Cu	Copper	2	7	3	0
Fe	Iron	96	221	101	8
Cr	Chromium	2	3	1	0
Al	Aluminum	2	5	6	0
Pb	Lead	4	0	0	0
Sn	Tin	0	5	0	0
Si	Silicon	27	47	32	11
Na	Sodium	47	10	5	1
K	Potassium	28	4	3	2
Mo	Molybdenum	10	122	119	127
Ni	Nickel	0	4	2	0
Ag	Silver	0	0	0	0
Ti	Titanium	0	0	0	0
V	Vanadium	0	0	0	0
Mn	Manganese	1	3	1	0
Cd	Cadmium	0			
Ca	Calcium	2603	4230	3847	4414
P	Phosphorus	876	1250	1239	1089
Zn	Zinc	1125	1409	1385	1279
Mg	Magnesium		245	239	223
Ba	Barium	0	0	0	0
B	Boron	8	57	58	66

PREVIOUS SAMPLE

IRON	IS	ELEVATED,	ELEVATED,	IRON	MAY	BE	SOURCED	TO	WEAR
BRAKES,	GEARS,	SPLINES,	SHAFTS,	HOUSING,	BEARINGS...	CHROMIUM	IS		
ELEVATED,	VALUES	ARE	HIGH	FOR	HOURS	ON	OIL.	INSPECT.	ACTION
REQUIRED.									

For additional sample history, go to:

S.O.S WEB

CONDITION / CONTAMINATION

VISCOSITY (CENTISTOKES) ASTM D445		15-May-25	18-Dec-24	05-Sep-24	23-May-24
V100	Viscosity at 100 C	17.40	15.40	16.30	17.90

INFRARED (IR) ASTM E2412

ST	Soot	0	2	0	0
OXI	Oxidation	4	6	8	9
SUL	Sulfate By-Product	17	14	19	18
	Sulfur Products	17	14	19	18
NIT	Nitration	0	4	5	5

WATER

W	Water	N	N	N	N
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CLEANLINESS

PARTICLE COUNT - ISO 11171:1989 reported per ISO 4406		15-May-25	18-Dec-24	05-Sep-24	23-May-24
ISO	ISO Code Rating	23/22/15	22/20/14	23/22/17	22/21/15

4µ	69674	27665	70335	35504
6µ	29982	7081	32896	12195
10µ	1774	559	3806	1398
14µ	260	117	994	276
18µ	86	425	425	
21µ	21µ	42	23	255
38µ	38µ	1	0	13

PARTCL VOL INDICATOR

PVI	PVI	5.66	1.69	8.64	2.71
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DEBRIS

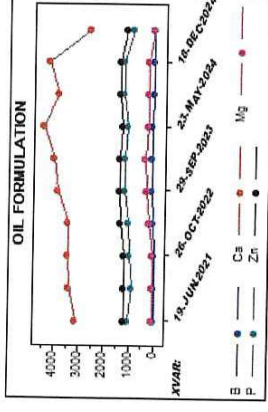
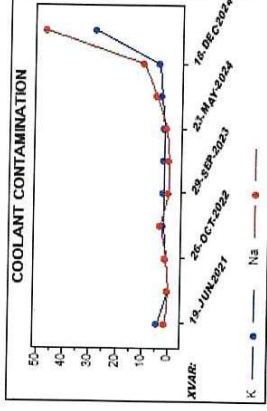
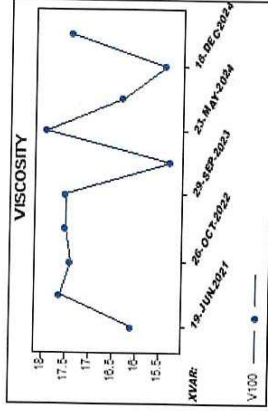
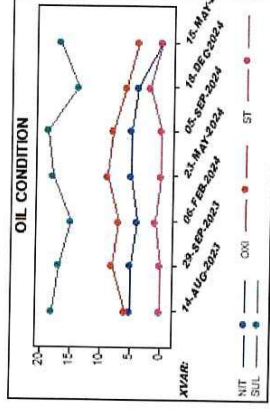
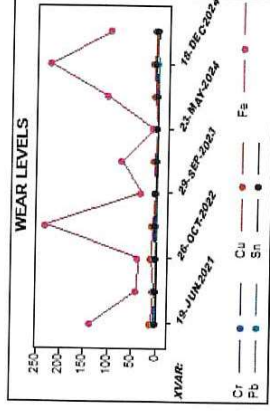
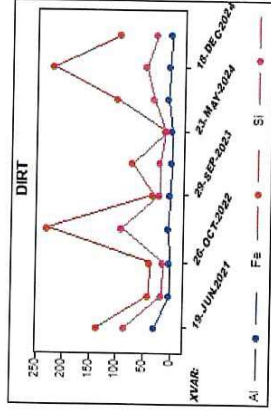
Debrt	Debris	N	N	N	N
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FINAL DRIVE REAR RIGHT
SERIAL NUMBER: 3KR01634
EQUIP NUM: 1801002
CAT D10R

H177-55149-0593



No Action Required



Report Comment

VisionLink® will be the new home for SO-SM Services fluid analysis. Begin the transition to VisionLink now - Sign up or log into vlink.com to update your settings, manage your fleet, configure your jobsites (groups), and view your samples. The ability for users to submit samples, track samples, view and graph sample history, and download reports are coming to VisionLink soon.



EMPIRE MACHINERY - ARIZONA LAB - 1725 S. Country Club Drive Mesa, AZ 85210 USA

PHONE: 866-224-3087

Web: <https://empire.cat.com> Email: fluidslab@empire-cat.com

FINAL DRIVE REAR LEFT

EQUIP NUM: 1901002

CAT D10R

SERIAL NUMBER: 3KR01634

H177-55143-0408

LABEL #: 251020637

SAMPLE SHIP TIME (days) : 8

AMES CONSTRUCTION INC

LOCATION: Yavapai County,

Arizona 86305, United States

RECEIVED DATE: 23-May-25

No Action Required

Interp By: Larry Byington
Interpreted On: 27-May-25

OIL TYPE/ GRADE MAY HAVE BEEN CHANGED - NOTE CHANGES TO VISCOSITY & METAL ADDITIVE PACKAGE. NO PROBLEMS PRESENTLY ASSOCIATED WITH THIS SAMPLE. CONTINUE SAMPLING AT THE NORMAL INTERVAL.

SAMPLE INFORMATION

Sampled Date	15-May-25	18-Dec-24	05-Sep-24	23-May-24
Sample Id	H177-55143-0408	H177-54355-0648	H177-54253-0695	H160-54156-0185
Lab Date	23-May-25	20-Dec-24	09-Sep-24	04-Jun-24
Meter [Hr]	42526.8	42068.5	41619	41361
Comp Meter [Hr]		707.5	258	1235
Meter On Fluid	1165.8			
Fluid Brand				
Fluid Weight				
Fluid Type	N	N	N	Y
Filter Change	N	N	N	N
Kidney Loop	0	0	0	U
Total Fluid Added				0

WEAR LEVELS / ADDITIVES

15-May-25 18-Dec-24 05-Sep-24 23-May-24

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

Cu	1	3	2	1
Fe	38	20	8	9
Cr	1	1	0	0
Al	4	0	1	0
Pb	0	0	0	0
Sn	1	5	0	0
Si	34	13	11	13
Na	4	8	5	3
K	3	3	2	3
Mo	6	145	128	160
Ni	1	3	1	1
Ag	0	0	0	0
Ti	0	0	0	0
V	0	0	0	0
Mn	1	0	0	0
Cd	0			
Ca	2984	4555	3796	4564
P	1019	1313	1181	1133
Zn	1198	1469	1331	1371
Mg	32	249	228	278
Ba	0	0	0	0
B	6	66	61	75

PREVIOUS SAMPLE

NO	PROBLEMS	PRESENTLY	ASSOCIATED	WITH	THIS	SAMPLE:	CONTINUE
SAMPLING AT THE NORMAL INTERVAL							

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

CONDITION / CONTAMINATION

	15-May-25	18-Dec-24	05-Sep-24	23-May-24
VISCOSITY (CENTISTOKES) ASTM D445				
V100	17.80	15.40	16.30	16.40
Viscosity at 100 C				

INFRARED (UFM) ASTM E2412

ST	Soot	0	1	0	0
OXI	Oxidation	4	7	7	8
SUL	Sulfate By-Product	14	15	19	18
	Sulfur Products	14	15	19	18
NIT	Nitration	0	4	5	5

WATER

W	Water	N	N	N	N
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CLEANLINESS

15-May-25 18-Dec-24 05-Sep-24 23-May-24

PARTICLE COUNT - ISO 11171:1998 reported per ISO 4406

ISO	ISO Code Rating	23/21/16	23/20/13	21/19/14	22/20/14
4µ	4µ	60892	41144	19409	29770
6µ	6µ	18403	7512	3450	6611
10µ	10µ	2007	444	569	690
14µ	14µ	538	71	159	150
18µ	18µ	213	67		
21µ	21µ	115	12	40	31
38µ	38µ	5	0	3	2

PARTCL VOL INDICATOR

PVI	PVI	5.24	2.08	1.49	1.84
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DEBRIS

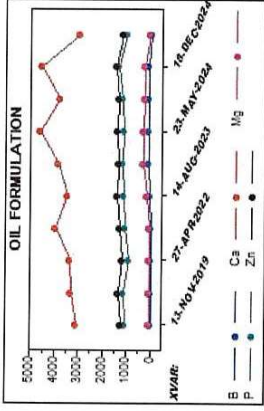
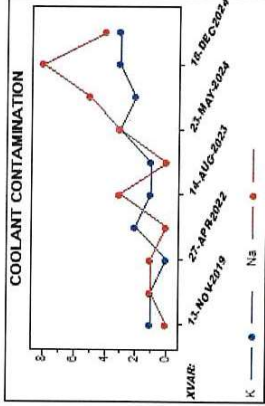
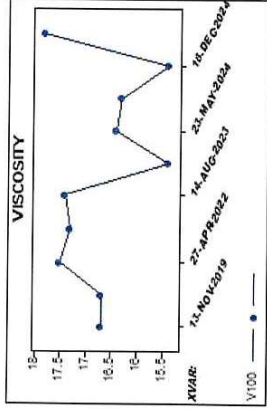
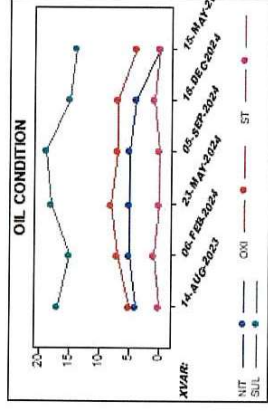
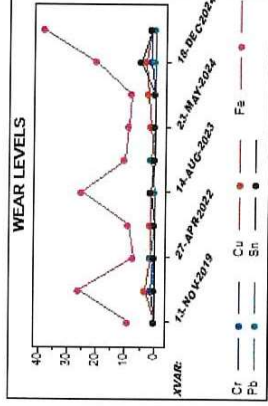
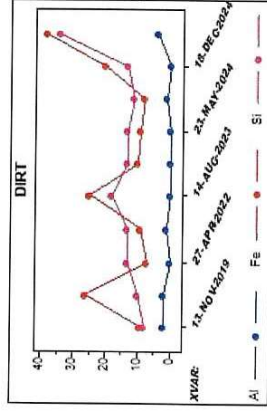
Debr	Debris	N	N	N	N
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FINAL DRIVE REAR LEFT
SERIAL NUMBER: 3KR01634
EQUIP NUM: 1901002
CAT D10R

H177-55143-0408



No Action Required



Report Comment

VisionLink® will be the new home for S-O-SSM Services fluid analysis. Begin the transition to VisionLink now - Sign up or log into vlcatt.com to update your settings, manage your fleet, configure your jobsites (groups), and view your samples. The ability for users to submit samples, track samples, view and graph sample history, and download reports are coming to VisionLink soon.



EMPIRE MACHINERY - ARIZONA LAB - 1725 S. Country Club Drive Mesa, AZ 85210 USA

TRANSMISSION POWER
SHIFT

H177-55148-0590

LABEL#: 251018287

SAMPLE SHIP TIME (days) : 13

AMES CONSTRUCTION INC

LOCATION: Yavapai County,

Arizona 86305, United States

RECEIVED DATE: 28-May-25

EQUIP NUM: 1901002
CAT D10R

No Action Required

PHONE: 866-224-3087

Web: <https://empire.cat.com> Email: fluidslab@empire-cat.com

SERIAL NUMBER: 3KR01634

Interp By: Larry Byington
Interpreted On: 28-May-25

COPPER IS ELEVATED, COPPER ALONE USUALLY INDICATES COOLER CORE LEACHING AND IS NOT NORMALLY WEAR OF BRONZE / BRASS PARTS. ALL OTHER RESULTS APPEAR TO BE NORMAL. NO ACTION REQUIRED.

SAMPLE INFORMATION

Sampled Date	15-May-25	05-Sep-24	10-Jun-21
Sample Id	H177-55148-0590	H177-54355-0646	E250-51196-3011
Lab Date	28-May-25	20-Dec-24	15-Jul-21
Meter [Hr]	42526.8	42068.5	39382
Comp Meter [Hr]	3144.8	2686.5	39382
Meter On Fluid			
Fluid Brand			
Fluid Weight			
Fluid Type	N	N	
Fluid Change	Y	Y	
Filter Change			
Kidney Loop			
Total Fluid Added	0	0	0

WEAR LEVELS / ADDITIVES

15-May-25 18-Dec-24 05-Sep-24 10-Jun-21

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

Cu	Copper	32	133	115	106
Fe	Iron	20	27	17	16
Cr	Chromium	0	1	0	0
Al	Aluminum	1	1	2	2
Pb	Lead	0	1	0	1
Sn	Tin	0	4	2	1
Si	Silicon	9	11	13	9
Na	Sodium	10	8	6	5
K	Potassium	4	2	2	2
Mo	Molybdenum	13	18	13	1
Ni	Nickel	0	1	0	0
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	2687	3502	2908	3016
P	Phosphorus	907	1150	1003	1067
Zn	Zinc	1231	1339	1212	1240
Mg	Magnesium	30	55	42	22
Ba	Barium	0	0	0	0
B	Boron	9	12	9	2

PREVIOUS SAMPLE

COPPER IS ELEVATED, COPPER ALONE USUALLY INDICATES COOLER CORE LEACHING AND IS NOT NORMALLY WEAR OF BRONZE / BRASS PARTS. NO ACTION REQUIRED.

For additional sample history, go to:

S.O.S WEB

CONDITION / CONTAMINATION

15-May-25 18-Dec-24 05-Sep-24 10-Jun-21

VISCOSITY (CENTISTOKES) / ASTM D445

V100	Viscosity at 100 C	11.50	11.40	11.30	11.2
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INFRARED (UFM) ASTM E2412

ST	Soot	0	1	0	0
OXI	Oxidation	4	4	5	4
SUL	Sulfate By-Product	14	14	18	18
	Sulfur Products	14	14	18	18
NIT	Nitration	0	4	5	5

WATER

W	Water	N	N	N	N
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ANTIFREEZE

A	Antifreeze	N	N	N	N
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CLEANLINESS

15-May-25 18-Dec-24 05-Sep-24 10-Jun-21

PARTICLE COUNT - ISO 11171:1989 reported per ISO 4406

ISO	ISO Code Rating	23/21/14	23/22/16	23/20/13	23/22/20
4µ	4µ	77623	66466	45411	45890
6µ	6µ	18076	30852	6079	30269
10µ	10µ	684	4061	211	15489
14µ	14µ	110	472	73	8722
18µ	18µ			45	5910
21µ	21µ			34	4621
38µ	38µ	26	47	16	965
50µ	50µ	1	1		386

PARTCL VOL INDICATOR

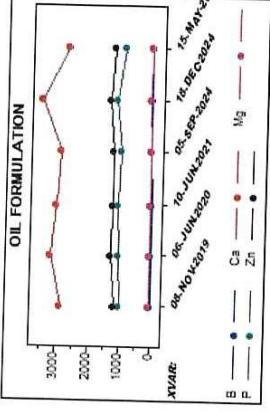
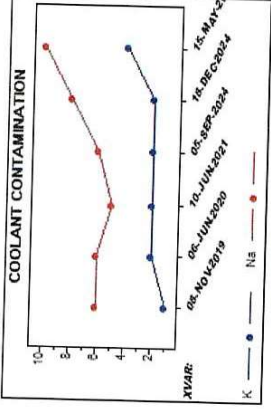
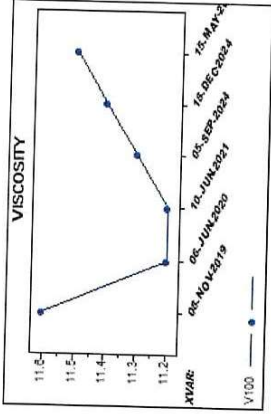
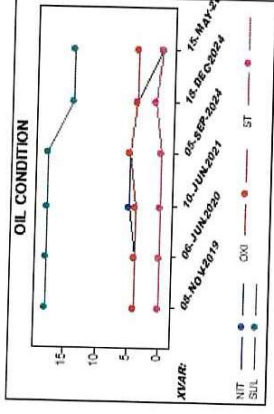
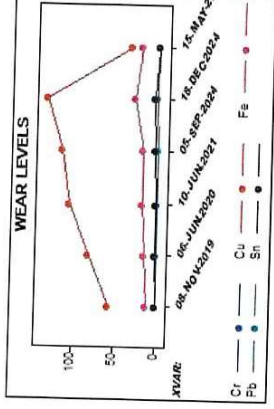
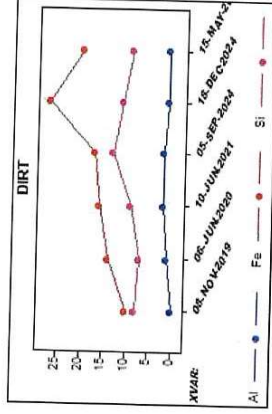
PVI	PVI	4.21	6.07	4.28
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TRANSMISSION POWER SHIFT
SERIAL NUMBER: 3KR01634
EQUIP NUM: 1901002
CAT D10R

H177-55148-0590



No Action Required



Report Comment

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EMPIRE MACHINERY - ARIZONA LAB - 1725 S. Country Club Drive Mesa, AZ 85210 USA

HYDRAULIC SYSTEM

EQUIP NUM: 1901002

CAT D10R

H177-55143-0407

LABEL#: 250986654

SAMPLE SHIP TIME (days) : 8

AMES CONSTRUCTION INC

LOCATION: Yavapai County,

Arizona 86305, United States

RECEIVED DATE: 23-May-25



Monitor Compartment

SILICON / ALUMINUM ARE ELEVATED. INSPECT FOR DIRT ENTRY / REPAIR AS NECESSARY. CHROMIUM IS ELEVATED.
INDICATES POSSIBLE CYLINDER / PUMP WEAR. MONITOR COMPARTMENT. INSPECT CYLINDER WIPER SEALS / BREATHERS.

Interp By: Larry Byington
Interpreted On: 23-May-25

PHONE: 866-224-3087

Web: <https://empire.cat.com> Email: fluidslab@empire-cat.com

SERIAL NUMBER: 3KR01634

SAMPLE INFORMATION

Sampled Date	15-May-25	18-Dec-24	05-Sep-24	06-Feb-24
Sample Id	H177-55143-0407	H177-54355-0647	H177-54253-0693	H160-54046-0620
Lab Date	23-May-25	20-Dec-24	09-Sep-24	15-Feb-24
Meter [Hr]	42526.8	42068.5	41628.1	41081
Comp Meter [Hr]	42526.8	42068.5	41628.1	41081
Meter On Fluid				
Fluid Brand				
Fluid Weight				
Fluid Type	N	N	N	N
Fluid Change	Y	Y	Y	Y
Filter Change				
Total Fluid Added	0	0	0	0
Kidney Loop				
Total Fluid Added				

WEAR LEVELS / ADDITIVES

ELEMENTAL ANALYSIS (PPM ASTM D5185 [OIL] / ASTM D8130 [COOLANT])				
	15-May-25	18-Dec-24	05-Sep-24	06-Feb-24

Cu	7	5	11	14
Fe	28	15	21	23
Cr	5	1	1	2
Al	27	12	18	14
Pb	0	0	1	1
Sn	1	3	0	0
Si	72	43	47	36
Na	0	6	7	5
K	4	6	7	5
Mo	8	8	11	12
Ni	1	0	0	0
Ag	0	0	0	0
Ti	1	1	1	1
V	0	0	0	0
Mn	1	0	0	0
Cd	0	0	0	0
Ca	2894	2784	2483	2761
P	982	979	986	931
Zn	1173	1152	1174	1183
Mg	52	56	121	167
Ba	0	0	0	0
B	9	9	14	22

PREVIOUS SAMPLE

SILICON / ALUMINUM ARE ELEVATED. INSPECT FOR DIRT ENTRY / REPAIR AS NECESSARY. INSPECT CYLINDER WIPER SEALS / BREATHERS. PARTICLE COUNT IS ELEVATED. INSPECT FILTER (S). MONITOR COMPARTMENT.

For additional sample history, go to:

S.O.S WEB

CONDITION / CONTAMINATION

VISCOSITY (CENTISTOKES) ASTM D445				
V100	15-May-25	18-Dec-24	05-Sep-24	06-Feb-24
Viscosity at 100 C	6.700	6.800	6.700	6.600

INFRARED (UFM) ASTM E2412

ST	Soot	0	2	0	0
OXI	Oxidation	4	4	7	8
SUL	Sulfate By-Product	17	12	20	19
	Sulfur Products	17	12	20	19
NIT	Nitration	0	4	4	4

WATER

W	Water	N	N	N	N
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ANTIFREEZE

A	Antifreeze	N	N	N	N
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CLEANLINESS

PARTICLE COUNT - ISO 11171:1989 reported per ISO 4408				
ISO	ISO Code Rating	15-May-25	18-Dec-24	05-Sep-24
4µ	4µ	22/18/11	22/20/14	22/19/12
6µ	6µ	22/204	30770	28432
10µ	10µ	2112	7259	2603
14µ	14µ	84	491	164
18µ	18µ	16	84	35
21µ	21µ	7	11	14
38µ	38µ	3	0	1
PARTCL VOL INDICATOR				
PVI	PVI	1.00	1.74	1.26
				2.18

SERIAL NUMBER: 3KR01634

EQUIP NUM: 1901002

CAT D10R

H177-55143-0407



Monitor Compartment

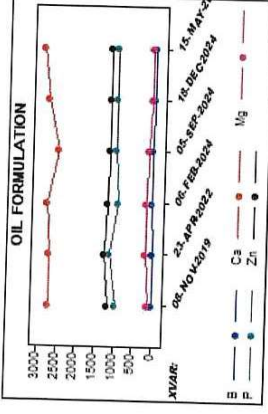
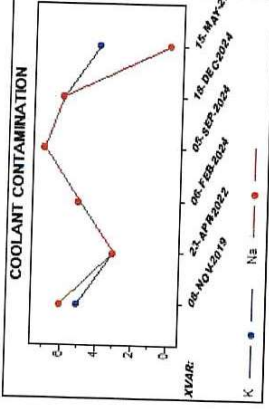
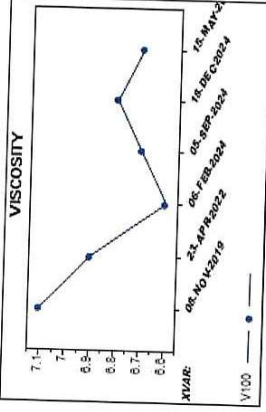
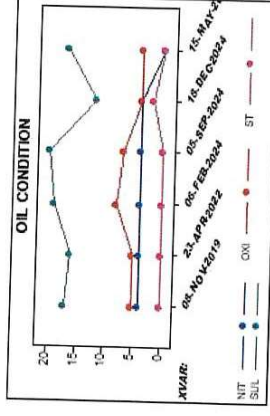
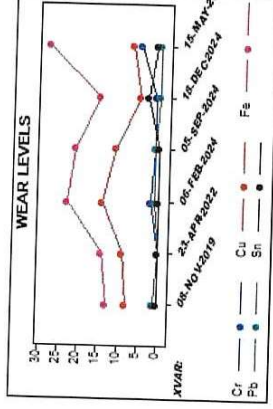
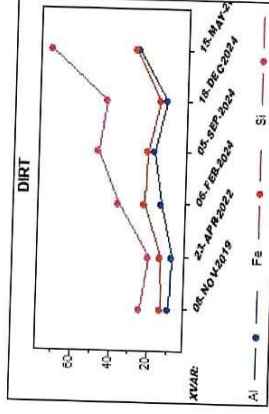
SAMPLE INFORMATION

Sampled Date	Sample Id	Lab Date	Meter [Hr]	Comp Meter [Hr]	Meter On Fluid	Fluid Breed
15-May-25	H177-551143-0407	23-May-25	42526.8	42526.8	42526.8	
18-Dec-24	H177-54355-0647	20-Dec-24	42068.5	42068.5	42068.5	
05-Sep-24	H177-54253-0693	09-Sep-24	41628.1	41628.1	41628.1	
06-Feb-24	H160-54046-0620	15-Feb-24	41081	41081	41081	

	N	N	N
Fluid Change	Y	Y	Y
Filter Change	Y	Y	Y
Kidney Loop			
Total Fluid Added	0	0	0

DEBRIS

Debris	Debris	N	N	N	N



Report Comment

Report Comment

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