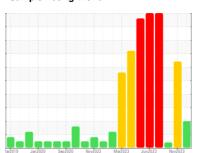


# **OIL ANALYSIS REPORT**

Sample Rating Trend



GLYCOL



Machine Id **425063-402316** 

Component

**Diesel Engine** 

PETRO CANADA DURON SHP 15W40 (--- GAL)

## DIAGNOSIS

### ▲ Recommendation

No corrective action is recommended at this time. Resample at the next service interval to monitor.

#### Wear

All component wear rates are normal.

#### Contamination

Sodium and/or potassium levels remain high. Light fuel dilution occurring. Test for glycol is negative.

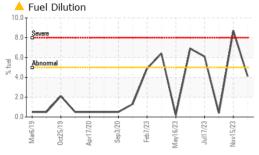
#### ▲ Fluid Condition

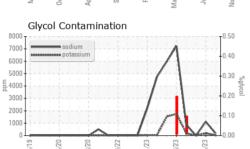
The BN result indicates that there is suitable alkalinity remaining in the oil. The condition of the oil is suitable for further service.

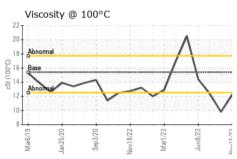
Sample Date         Client Info         24 Jan 2024         15 Nov 2023         05 Oct 2023           Machine Age         hrs         Client Info         13839         13665         13618           Oil Age         hrs         Client Info         Not Changd         Changed         Not Changd           Sample Status         Client Info         Not Changd         ATTENTION         SEVERE         ATTENTION           CONTAMINATION         method         limit/base         current         history1         history2           Water         WC Method         >0.2         NEG         NEG         NEG           WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >100         17         38         6           Chromium         ppm         ASTM D5185m         >20         <1         2         0           Nikel         ppm         ASTM D5185m         >3         0         0         <1         1         0           Alluminum         ppm         ASTM D5185m         >3         0         0         0            Capper         ppm         ASTM D5185m	GAL)		lar2019 Ja	n2020 Sep2020 N	0v2022 Mar2023 Jun2023	Nov2023	
Sample Date	SAMPLE INFOR	MATION	method	limit/base	current	history1	history2
Machine Age         hrs         Client Info         13839         13665         13618           Oil Age         hrs         Client Info         0         600         0           Oil Changed         Client Info         Not Changd         ATTENTION         SEVERE         ATTENTION           Sample Status         Tenton         Imitibase         current         history1         history2           Water         WC Method         >0.2         NEG         NEG         NEG           WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5186m         >100         17         38         6           Chromium         ppm         ASTM D5186m         >20         <1         2         0           Nickel         ppm         ASTM D5186m         >20         <1         2         0           Chromium         ppm         ASTM D5186m         >20         2         4         2         2           Lead         ppm         ASTM D5186m         >40         <1         2         0           Copper         ppm         ASTM D5186m         >40         <1         2	Sample Number		Client Info		GFL0103334	GFL0099890	GFL0095151
Oil Age         hrs         Client Info         Not Changd Not Changed         600         0           Oil Changed Sample Status         Client Info         Not Changed ATTENTION         Not Changed SEVERE         Not Changed ATTENTION           CONTAMINATION         method         limit/base         current         history1         history2           Water         WC Method         >0.2         NEG         NEG         NEG           WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >100         17         38         6           Chromium         ppm         ASTM D5185m         >20         <1         2         0           Chromium         ppm         ASTM D5185m         >20         <1         2         0           Chromium         ppm         ASTM D5185m         >20         2         4         2           Irin         ppm         ASTM D5185m         >20         2         4         2           Copper         ppm         ASTM D5185m         >330         11         36         6           Tin         ppm         ASTM D5185m         0         <1	Sample Date		Client Info		24 Jan 2024	15 Nov 2023	05 Oct 2023
Cilient Info	Machine Age	hrs	Client Info		13839	13665	13618
ATTENTION   SEVERE   ATTENTION   CONTAMINATION   method   limit/base   current   history1   history2	Oil Age	hrs	Client Info		0	600	0
Water   WC Method   So.2   NEG   NEG   NEG   NEG	Oil Changed		Client Info		Not Changd	Changed	Not Changd
Water         WC Method         >0.2         NEG         NEG         NEG           WEAR METALS         method         limit/base         current         history1         history2           Iron         ppm         ASTM D5185m         >100         17         38         6           Chromium         ppm         ASTM D5185m         >20         <1         2         0           Nickel         ppm         ASTM D5185m         >4         0         0         <1           Silver         ppm         ASTM D5185m         >3         0         0         0           Silver         ppm         ASTM D5185m         >3         0         0         0           Aluminum         ppm         ASTM D5185m         >40         <1         2         0           Copper         ppm         ASTM D5185m         >40         <1         2         0           Copper         ppm         ASTM D5185m         0         <1         <1         <1           Vanadium         ppm         ASTM D5185m         0         <1         <1         <1           Vanadium         ppm         ASTM D5185m         0         0         <1         <1	Sample Status				ATTENTION	SEVERE	ATTENTION
WEAR METALS	CONTAMINAT	ION	method	limit/base	current	history1	history2
Iron	Water		WC Method	>0.2	NEG	NEG	NEG
Chromium	WEAR METAL	S	method	limit/base	current	history1	history2
Nickel	Iron	ppm	ASTM D5185m	>100	17	38	6
Titanium	Chromium	ppm	ASTM D5185m	>20	<1	2	0
Silver	Nickel	ppm	ASTM D5185m	>4	0	0	<1
Aluminum         ppm         ASTM D5185m         >20         2         4         2           Lead         ppm         ASTM D5185m         >40         <1	Titanium	ppm	ASTM D5185m		<1	<1	0
Lead         ppm         ASTM D5185m         >40         <1         2         0           Copper         ppm         ASTM D5185m         >330         11         36         6           Tin         ppm         ASTM D5185m         >15         0         <1         <1           Vanadium         ppm         ASTM D5185m         0         <1         0           Cadmium         ppm         ASTM D5185m         0         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         0         37         20         390           Barium         ppm         ASTM D5185m         0         0         0         1           Molybdenum         ppm         ASTM D5185m         0         41         1         <1           Magnesium         ppm         ASTM D5185m         0         <1         1         <1         <1           Calcium         ppm         ASTM D5185m         100         529         861         815           Calcium         ppm         ASTM D5185m         150         786         803         850	Silver	ppm	ASTM D5185m	>3	0	0	0
Copper         ppm         ASTM D5185m         >330         11         36         6           Tin         ppm         ASTM D5185m         >15         0         <1	Aluminum	ppm	ASTM D5185m	>20	2	4	2
Tin ppm ASTM D5185m >15 0 <1 <1 <1	Lead	ppm	ASTM D5185m	>40	<1	2	0
Vanadium         ppm         ASTM D5185m         0         <1         0           Cadmium         ppm         ASTM D5185m         0         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         0         37         20         390           Barium         ppm         ASTM D5185m         0         0         0         1           Molybdenum         ppm         ASTM D5185m         60         54         102         144           Manganese         ppm         ASTM D5185m         0         <1         1         <1           Magnesium         ppm         ASTM D5185m         1010         529         861         815           Calcium         ppm         ASTM D5185m         1070         1530         958         1582           Phosphorus         ppm         ASTM D5185m         1270         920         1100         1043           Sulfur         ppm         ASTM D5185m         2060         2475         2623         3253           CONTAMINANTS         method         limit/base         current         history1	Copper	ppm	ASTM D5185m	>330	11	36	6
Cadmium         ppm         ASTM D5185m         0         0         0           ADDITIVES         method         limit/base         current         history1         history2           Boron         ppm         ASTM D5185m         0         37         20         390           Barium         ppm         ASTM D5185m         0         0         0         1           Molybdenum         ppm         ASTM D5185m         60         54         102         144           Manganese         ppm         ASTM D5185m         0         <1	Tin	ppm	ASTM D5185m	>15	0	<1	<1
ADDITIVES	Vanadium	ppm	ASTM D5185m		0	<1	0
Boron ppm ASTM D5185m 0 0 0 1  Molybdenum ppm ASTM D5185m 0 0 0 1  Molybdenum ppm ASTM D5185m 60 54 102 1444  Manganese ppm ASTM D5185m 0 <1 1 1  Magnesium ppm ASTM D5185m 1010 529 861 815  Calcium ppm ASTM D5185m 1070 1530 958 1582  Phosphorus ppm ASTM D5185m 1150 786 803 850  Zinc ppm ASTM D5185m 1270 920 1100 1043  Sulfur ppm ASTM D5185m 2060 2475 2623 3253  CONTAMINANTS method limit/base current history1 history2  Silicon ppm ASTM D5185m > 20 24	Cadmium	ppm	ASTM D5185m		0	0	0
Barium         ppm         ASTM D5185m         0         0         0         1           Molybdenum         ppm         ASTM D5185m         60         54         102         144           Manganese         ppm         ASTM D5185m         0         <1	ADDITIVES		method	limit/base	current	history1	history2
Molybdenum         ppm         ASTM D5185m         60         54         102         144           Manganese         ppm         ASTM D5185m         0         <1         1         <1           Magnesium         ppm         ASTM D5185m         1010         529         861         815           Calcium         ppm         ASTM D5185m         1070         1530         958         1582           Phosphorus         ppm         ASTM D5185m         1150         786         803         850           Zinc         ppm         ASTM D5185m         1270         920         1100         1043           Sulfur         ppm         ASTM D5185m         2060         2475         2623         3253           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         9         30         8           Sodium         ppm         ASTM D5185m         >20         24         188         8           Fuel         %         ASTM D5185m         >20         24         188         8           Fuel         %         ASTM D3524	Boron	ppm	ASTM D5185m	0	37	20	390
Manganese         ppm         ASTM D5185m         0         <1         1         <1           Magnesium         ppm         ASTM D5185m         1010         529         861         815           Calcium         ppm         ASTM D5185m         1070         1530         958         1582           Phosphorus         ppm         ASTM D5185m         1070         786         803         850           Zinc         ppm         ASTM D5185m         1270         920         1100         1043           Sulfur         ppm         ASTM D5185m         2060         2475         2623         3253           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         9         4         30         8           Sodium         ppm         ASTM D5185m         >20         24         188         8           Fuel         %         ASTM D3185m         >20         24         188         8           Fuel         %         ASTM D324         >5         4.1         8.7         0.4           Glycol         %         *ASTM	Barium	ppm	ASTM D5185m	0	0	0	1
Magnesium         ppm         ASTM D5185m         1010         529         861         815           Calcium         ppm         ASTM D5185m         1070         1530         958         1582           Phosphorus         ppm         ASTM D5185m         1150         786         803         850           Zinc         ppm         ASTM D5185m         1270         920         1100         1043           Sulfur         ppm         ASTM D5185m         2060         2475         2623         3253           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         9         △ 30         8           Sodium         ppm         ASTM D5185m         >25         9         △ 30         8           Sodium         ppm         ASTM D5185m         >20         24         △ 188         8           Fuel         %         ASTM D3185m         >20         24         △ 188         8           Fuel         %         ASTM D324         >5         △ 4.1         ♠ 8.7         0.4           Glycol         %         *ASTM D7844 <t< td=""><td>Molybdenum</td><td>ppm</td><td>ASTM D5185m</td><td>60</td><th>54</th><td>102</td><td>144</td></t<>	Molybdenum	ppm	ASTM D5185m	60	54	102	144
Calcium         ppm         ASTM D5185m         1070         1530         958         1582           Phosphorus         ppm         ASTM D5185m         1150         786         803         850           Zinc         ppm         ASTM D5185m         1270         920         1100         1043           Sulfur         ppm         ASTM D5185m         2060         2475         2623         3253           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         9         30         8           Sodium         ppm         ASTM D5185m         >25         9         30         8           Sodium         ppm         ASTM D5185m         >20         24         188         8           Fuel         %         ASTM D3524         >5         4.1         8.7         0.4           Glycol         %         *ASTM D3982         NEG         0.0         0.0           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3 <td< td=""><td>Manganese</td><td>ppm</td><td>ASTM D5185m</td><td>0</td><th>&lt;1</th><td>1</td><td>&lt;1</td></td<>	Manganese	ppm	ASTM D5185m	0	<1	1	<1
Phosphorus         ppm         ASTM D5185m         1150         786         803         850           Zinc         ppm         ASTM D5185m         1270         920         1100         1043           Sulfur         ppm         ASTM D5185m         2060         2475         2623         3253           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         9         30         8           Sodium         ppm         ASTM D5185m         >25         9         30         8           Sodium         ppm         ASTM D5185m         >20         24         188         8           Fuel         %         ASTM D5185m         >20         24         188         8           Fuel         %         ASTM D324         >5         4.1         8.7         0.4           Glycol         %         *ASTM D2982         NEG         0.0         0.0           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7624         >20         9.8	Magnesium	ppm	ASTM D5185m	1010	529	861	815
Zinc         ppm         ASTM D5185m         1270         920         1100         1043           Sulfur         ppm         ASTM D5185m         2060         2475         2623         3253           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         9         30         8           Sodium         ppm         ASTM D5185m         >25         9         30         8           Sodium         ppm         ASTM D5185m         >20         24         188         8           Fuel         %         ASTM D3524         >5         4.1         8.7         0.4           Glycol         %         *ASTM D3524         >5         4.1         8.7         0.4           Glycol         %         *ASTM D2982         NEG         0.0         0.0           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7624         >20         9.8         13.8         6.8           Sulfation         Abs/.1mm         *ASTM D7415         >30         2	Calcium	ppm	ASTM D5185m	1070	1530	958	1582
Sulfur         ppm         ASTM D5185m         2060         2475         2623         3253           CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         9         30         8           Sodium         ppm         ASTM D5185m         >25         9         30         8           Potassium         ppm         ASTM D5185m         >20         24         188         8           Fuel         %         ASTM D3524         >5         4.1         8.7         0.4           Glycol         %         *ASTM D2982         NEG         0.0         0.0           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.5         1         0.1           Nitration         Abs/cm         *ASTM D7624         >20         9.8         13.8         6.8           Sulfation         Abs/.1mm         *ASTM D7415         >30         20.7         23.7         23.7           FLUID DEGRADATION         method         limit/base         current <td>Phosphorus</td> <td>ppm</td> <td>ASTM D5185m</td> <td>1150</td> <th>786</th> <td>803</td> <td>850</td>	Phosphorus	ppm	ASTM D5185m	1150	786	803	850
CONTAMINANTS         method         limit/base         current         history1         history2           Silicon         ppm         ASTM D5185m         >25         9         30         8           Sodium         ppm         ASTM D5185m         ▲ 184         1110         0           Potassium         ppm         ASTM D5185m         >20         24         ▲ 188         8           Fuel         %         ASTM D3524         >5         ▲ 4.1         ● 8.7         0.4           Glycol         %         *ASTM D2982         NEG         0.0         0.0           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.5         1         0.1           Nitration         Abs/cm         *ASTM D7624         >20         9.8         13.8         6.8           Sulfation         Abs/.1mm         *ASTM D7415         >30         20.7         23.7         23.7           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         1	Zinc	ppm	ASTM D5185m	1270	920	1100	1043
Silicon         ppm         ASTM D5185m         >25         9         △ 30         8           Sodium         ppm         ASTM D5185m         △ 184         △ 1110         0           Potassium         ppm         ASTM D5185m         >20         24         △ 188         8           Fuel         %         ASTM D3524         >5         △ 4.1         ♠ 8.7         0.4           Glycol         %         *ASTM D2982         NEG         0.0         0.0           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.5         1         0.1           Nitration         Abs/cm         *ASTM D7624         >20         9.8         13.8         6.8           Sulfation         Abs/.1mm         *ASTM D7415         >30         20.7         23.7         23.7           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         17.7         22.5         19.4	Sulfur	ppm	ASTM D5185m	2060	2475	2623	3253
Sodium         ppm         ASTM D5185m         ▲ 184         ▲ 1110         0           Potassium         ppm         ASTM D5185m         >20         24         ▲ 188         8           Fuel         %         ASTM D3524         >5         ▲ 4.1         ● 8.7         0.4           Glycol         %         *ASTM D2982         NEG         0.0         0.0           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.5         1         0.1           Nitration         Abs/cm         *ASTM D7624         >20         9.8         13.8         6.8           Sulfation         Abs/.1mm         *ASTM D7415         >30         20.7         23.7         23.7           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         17.7         22.5         19.4	CONTAMINAN	ITS	method	limit/base	current	history1	history2
Potassium         ppm         ASTM D5185m         >20         24         ▲ 188         8           Fuel         %         ASTM D3524         >5         ▲ 4.1         ● 8.7         0.4           Glycol         %         *ASTM D2982         NEG         0.0         0.0           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.5         1         0.1           Nitration         Abs/cm         *ASTM D7624         >20         9.8         13.8         6.8           Sulfation         Abs/.1mm         *ASTM D7415         >30         20.7         23.7         23.7           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         17.7         22.5         19.4	Silicon	ppm	ASTM D5185m	>25	9	<b>△</b> 30	8
Fuel         %         ASTM D3524         >5         ▲ 4.1         ● 8.7         0.4           Glycol         %         *ASTM D2982         NEG         0.0         0.0           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.5         1         0.1           Nitration         Abs/cm         *ASTM D7624         >20         9.8         13.8         6.8           Sulfation         Abs/.1mm         *ASTM D7415         >30         20.7         23.7         23.7           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         17.7         22.5         19.4	Sodium	ppm	ASTM D5185m		<b>184</b>	<u></u> 1110	0
Glycol         %         *ASTM D2982         NEG         0.0         0.0           INFRA-RED         method         limit/base         current         history1         history2           Soot %         %         *ASTM D7844         >3         0.5         1         0.1           Nitration         Abs/cm         *ASTM D7624         >20         9.8         13.8         6.8           Sulfation         Abs/.1mm         *ASTM D7415         >30         20.7         23.7         23.7           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         17.7         22.5         19.4	Potassium	ppm	ASTM D5185m	>20	24	<u> </u>	8
INFRA-RED	Fuel	%	ASTM D3524	>5	<b>4.1</b>	● 8.7	0.4
Soot %         %         *ASTM D7844         >3         0.5         1         0.1           Nitration         Abs/cm         *ASTM D7624         >20         9.8         13.8         6.8           Sulfation         Abs/.1mm         *ASTM D7415         >30         20.7         23.7         23.7           FLUID DEGRADATION method limit/base current history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         17.7         22.5         19.4	Glycol	%	*ASTM D2982		NEG	0.0	0.0
Nitration         Abs/cm         *ASTM D7624         >20         9.8         13.8         6.8           Sulfation         Abs/.1mm         *ASTM D7415         >30         20.7         23.7         23.7           FLUID DEGRADATION method limit/base current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         17.7         22.5         19.4	INFRA-RED		method	limit/base	current	history1	history2
Sulfation         Abs/.1mm         *ASTM D7415         >30         20.7         23.7         23.7           FLUID DEGRADATION         method         limit/base         current         history1         history2           Oxidation         Abs/.1mm         *ASTM D7414         >25         17.7         22.5         19.4	Soot %	%	*ASTM D7844	>3	0.5	1	0.1
FLUID DEGRADATION method limit/base current history1 history2 Oxidation Abs/.1mm *ASTM D7414 >25 17.7 22.5 19.4	Nitration	Abs/cm	*ASTM D7624	>20	9.8	13.8	6.8
Oxidation	Sulfation	Abs/.1mm	*ASTM D7415	>30	20.7	23.7	23.7
	FLUID DEGRAI	NOITAC	method	limit/base	current	history1	history2
Base Number (BN)         mg KOH/g         ASTM D2896         9.8         7.5         9.6         8.5	Oxidation	Abs/.1mm	*ASTM D7414	>25	17.7	22.5	19.4
	Base Number (BN)	mg KOH/g	ASTM D2896	9.8	7.5	9.6	8.5

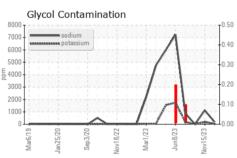


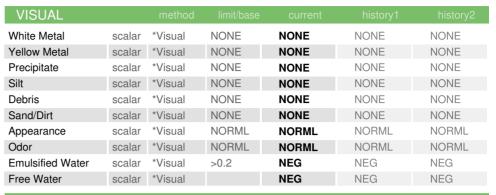
## **OIL ANALYSIS REPORT**





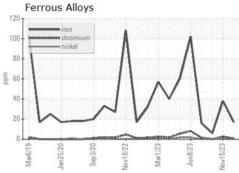


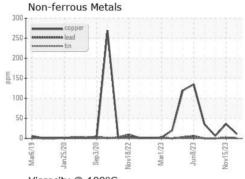


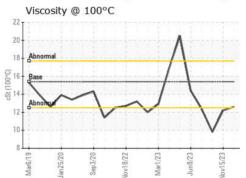


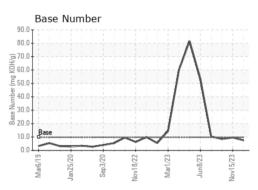
FLUID FNOF		memod			HISTORY	riistory
Visc @ 100°C	cSt	ASTM D445	15.4	12.6	<u> </u>	<b>9.8</b>

#### **GRAPHS**













Certificate L2367

Laboratory Sample No. Lab Number **Unique Number** 

: GFL0103334 : 06072524 : 10849201

: WearCheck USA - 501 Madison Ave., Cary, NC 27513 Recieved : 29 Jan 2024

: 31 Jan 2024 Diagnosed Diagnostician : Jonathan Hester

**Test Package**: FLEET (Additional Tests: Glycol, PercentFuel) To discuss this sample report, contact Customer Service at 1-800-237-1369.

\* - Denotes test methods that are outside of the ISO 17025 scope of accreditation. Statements of conformity to specifications are based on the simple acceptance decision rule (JCGM 106:2012)

GFL Environmental - 836 - Kansas City Hauling

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