

Life Is On



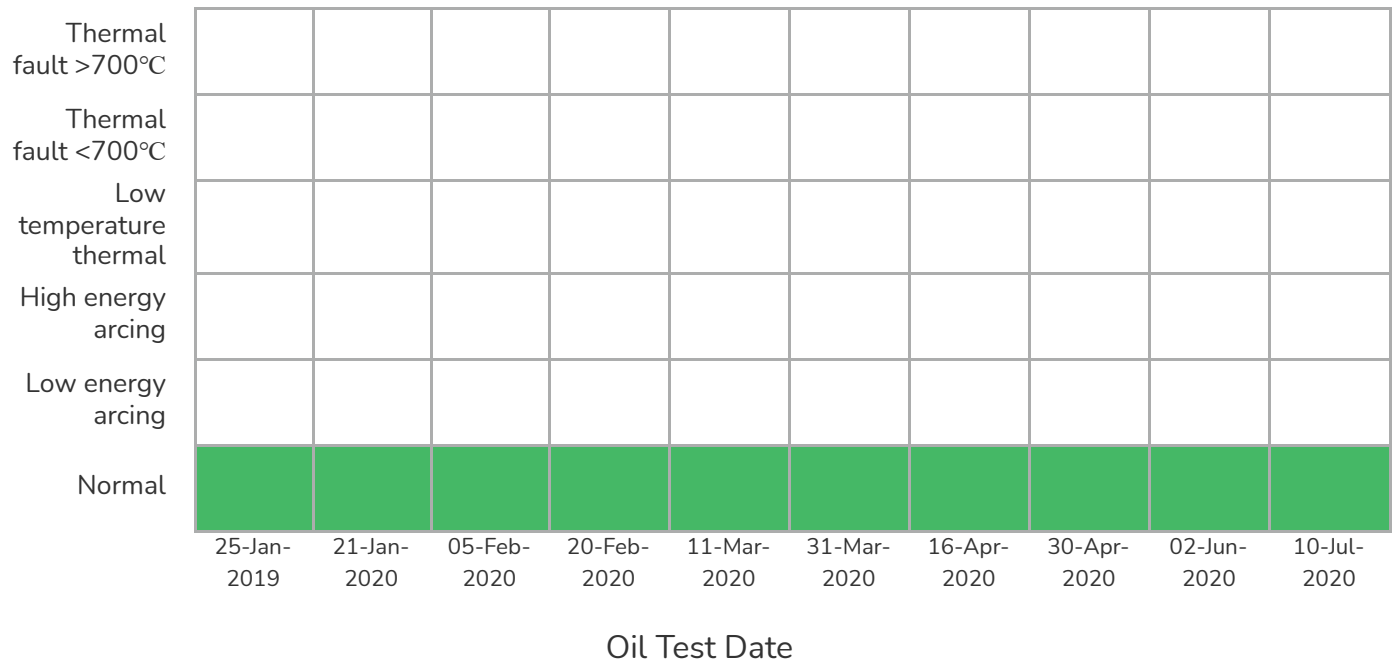
Oil Test Report Demo 198

Most Recent Oil Test Analysis: 10-Jul-2020

Gas levels indicate a likely fault. Further action and remedial work is recommended, including correlation of this analysis with other relevant tests - see IEC 60599 and IEEE C57.104.

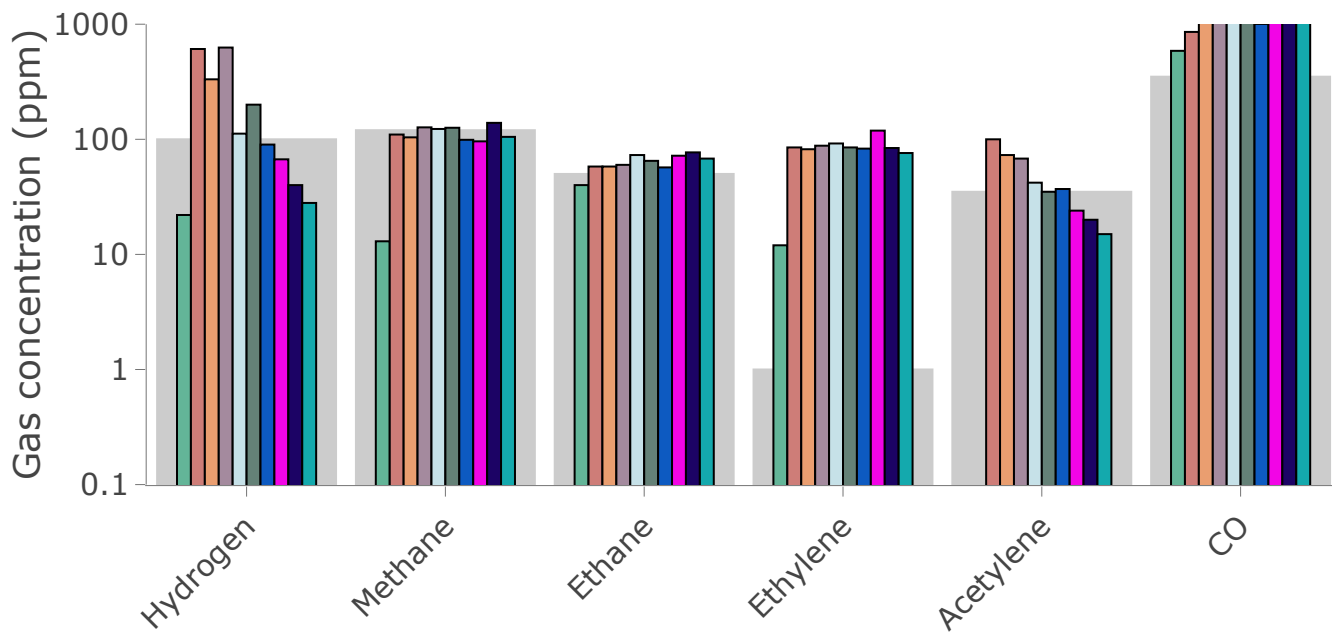
IMPORTANT: This tab provides a rudimentary analysis using the IEC and IEEE standards. The limitations described in the relevant standard apply.

Roger's Ratio Analysis



— Threshold not met for analysis

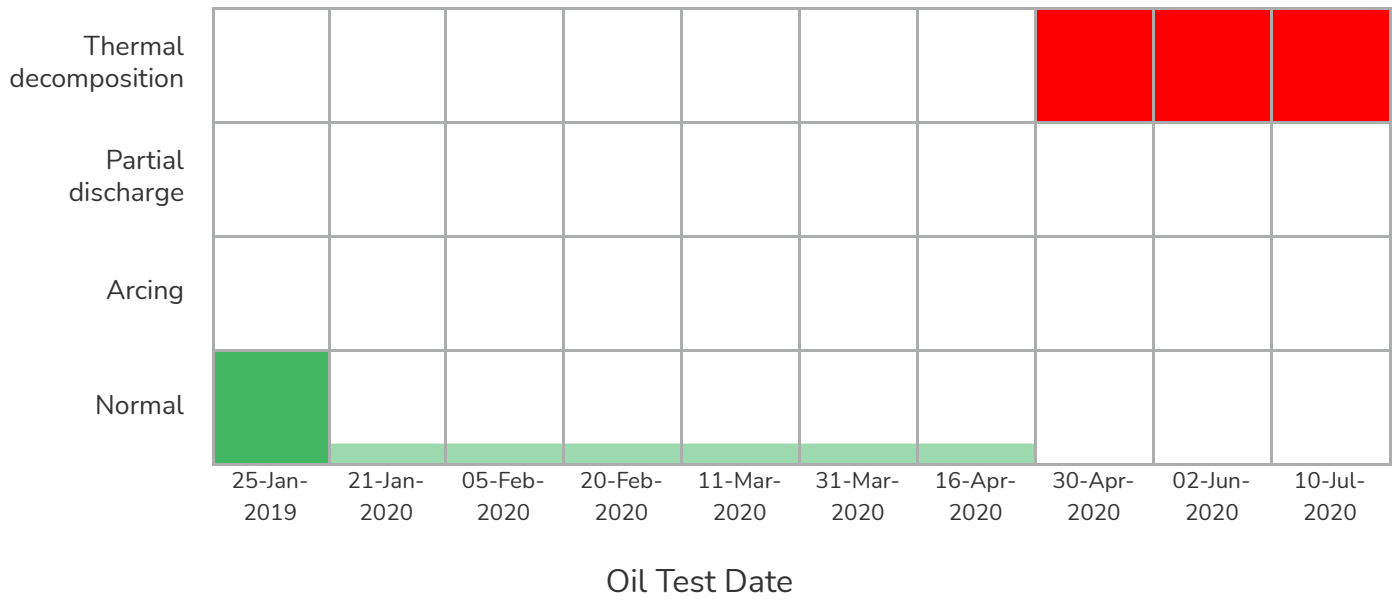
Rogers Gas Limit Analysis



- 2020-07-10
- 2020-06-02
- 2020-04-30
- 2020-04-16
- 2020-03-31
- 2020-03-11
- 2020-02-20
- 2020-02-05
- 2020-01-21
- 2019-01-25
- Gas limit for analysis

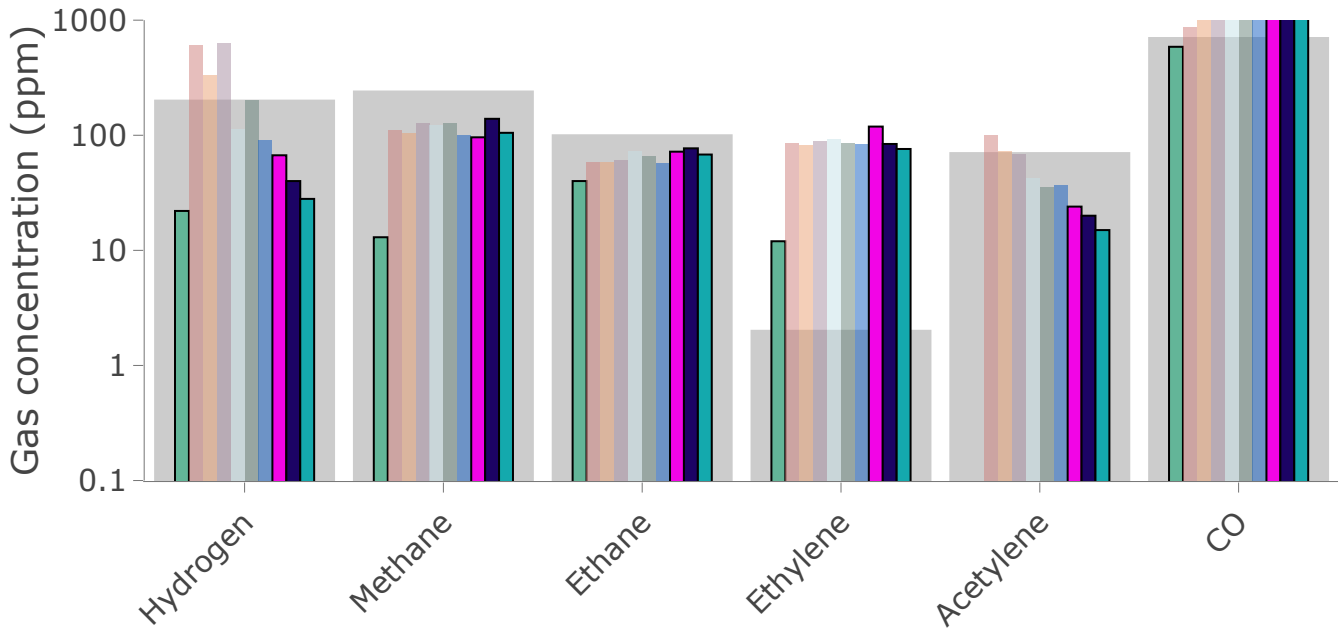
Rogers Ratio Analysis				
Test Date	Acetylene/... C2H2/C2H4	Methane/... CH4/H2	Ethylene/E... C2H4/C2H6	Result
10-Jul-2020	0.2	3.75	1.12	Normal
02-Jun-2020	0.24	3.48	1.09	Normal
30-Apr-2020	0.2	1.43	1.65	Normal
16-Apr-2020	0.45	1.1	1.46	Normal
31-Mar-2020	0.41	0.63	1.31	Normal
11-Mar-2020	0.46	1.1	1.26	Normal
20-Feb-2020	0.77	0.2	1.47	Normal
05-Feb-2020	0.89	0.31	1.41	Normal
21-Jan-2020	1.18	0.18	1.47	Normal
25-Jan-2019	0	0.59	0.3	Normal

Doernenburg Ratio Analysis



— Threshold not met for analysis

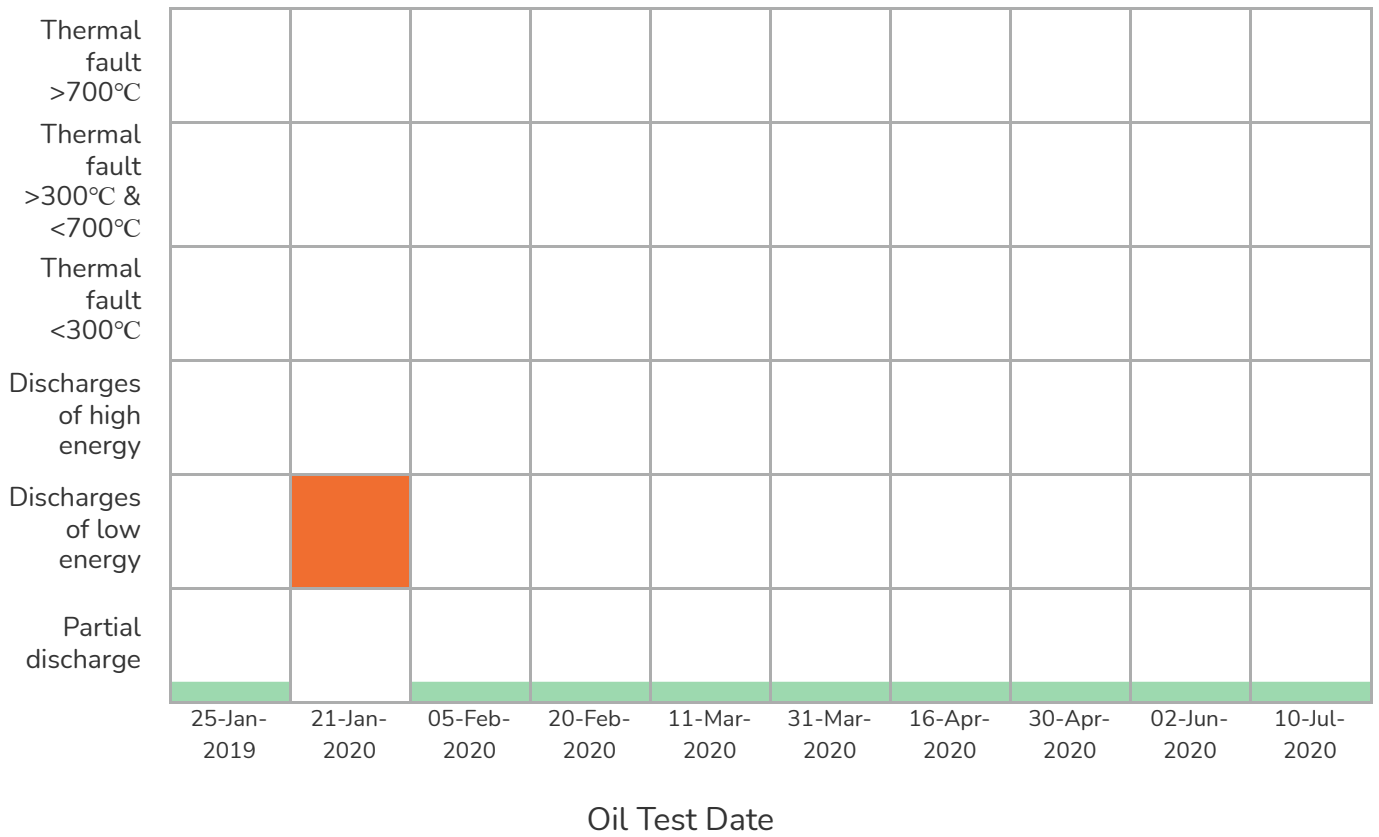
Doernenburg Gas Limit Analysis



- 2020-07-10
- 2020-04-30
- 2020-03-31
- 2020-02-20
- 2020-01-21
- Gas limit for analysis
- 2020-06-02
- 2020-04-16
- 2020-03-11
- 2020-02-05
- 2019-01-25

Doernenburg Ratio Analysis					
Test Date	Methane/... CH ₄ /H ₂	Acetylene... C ₂ H ₂ /C ₂ H ₄	Acetylene... C ₂ H ₂ /CH ₄	Ethane/Ac... C ₂ H ₆ /C ₂ H ₂	Result
10-Jul-2020	3.75	0.2	0.14	-	Thermal decomposition
02-Jun-2020	3.48	0.24	0.14	-	Thermal decomposition
30-Apr-2020	1.43	0.2	0.25	-	Thermal decomposition
16-Apr-2020	1.1	0.45	0.37	-	-
31-Mar-2020	0.63	0.41	0.28	-	-
11-Mar-2020	1.1	0.46	0.34	-	-
20-Feb-2020	0.2	0.77	0.54	-	-
05-Feb-2020	0.31	0.89	0.7	-	-
21-Jan-2020	0.18	1.18	0.91	-	-
25-Jan-2019	0.59	0	0	-	Normal

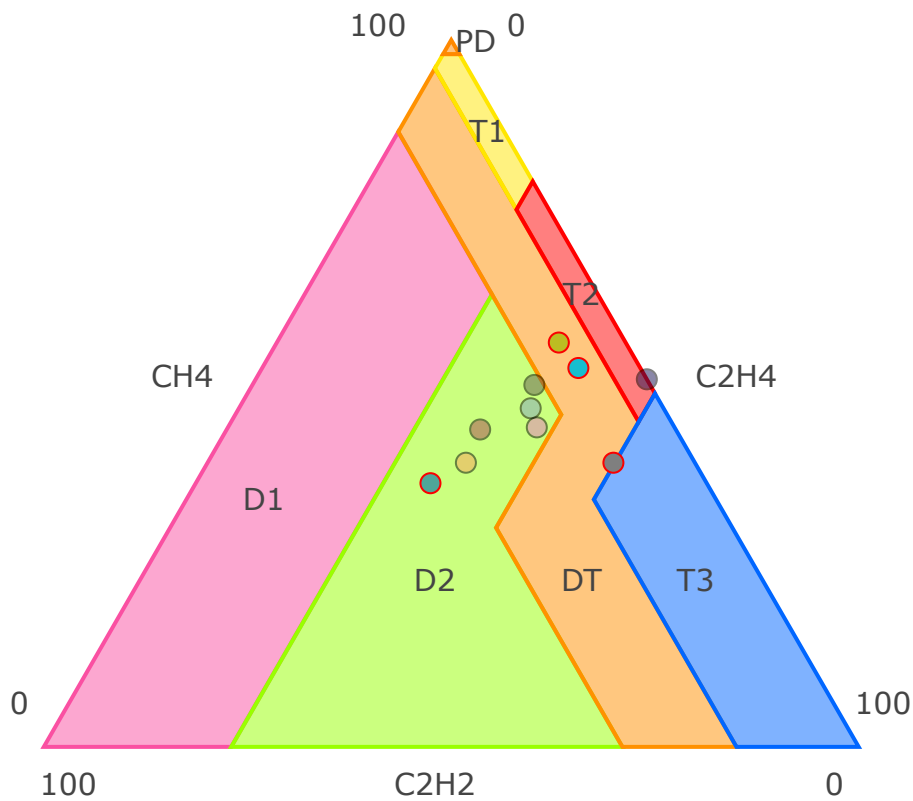
IEC Ratio Analysis



— Threshold not met for analysis

IEC Ratio Analysis				
Test Date	Acetylene/... C ₂ H ₂ /C ₂ H ₄	Methane/... CH ₄ /H ₂	Ethylene/E... C ₂ H ₄ /C ₂ H ₆	Result
10-Jul-2020	0.2	3.75	1.12	-
02-Jun-2020	0.24	3.48	1.09	-
30-Apr-2020	0.2	1.43	1.65	-
16-Apr-2020	0.45	1.1	1.46	-
31-Mar-2020	0.41	0.63	1.31	-
11-Mar-2020	0.46	1.1	1.26	-
20-Feb-2020	0.77	0.2	1.47	-
05-Feb-2020	0.89	0.31	1.41	-
21-Jan-2020	1.18	0.18	1.47	Discharges of low energy
25-Jan-2019	0	0.59	0.3	-

Duval Triangle 1



● 2019-01-25 ● 2020-01-21 ● 2020-02-05 ● 2020-02-20 ● 2020-03-11
 ● 2020-03-31 ● 2020-04-16 ● 2020-04-30 ● 2020-06-02 ● 2020-07-10

* Red outline indicates a fault was detected, faded with no outline indicates trace gas results only.

■ Partial discharges of corona type

■ Discharges of low energy or partial discharges of sparking type

■ Discharges of high energy

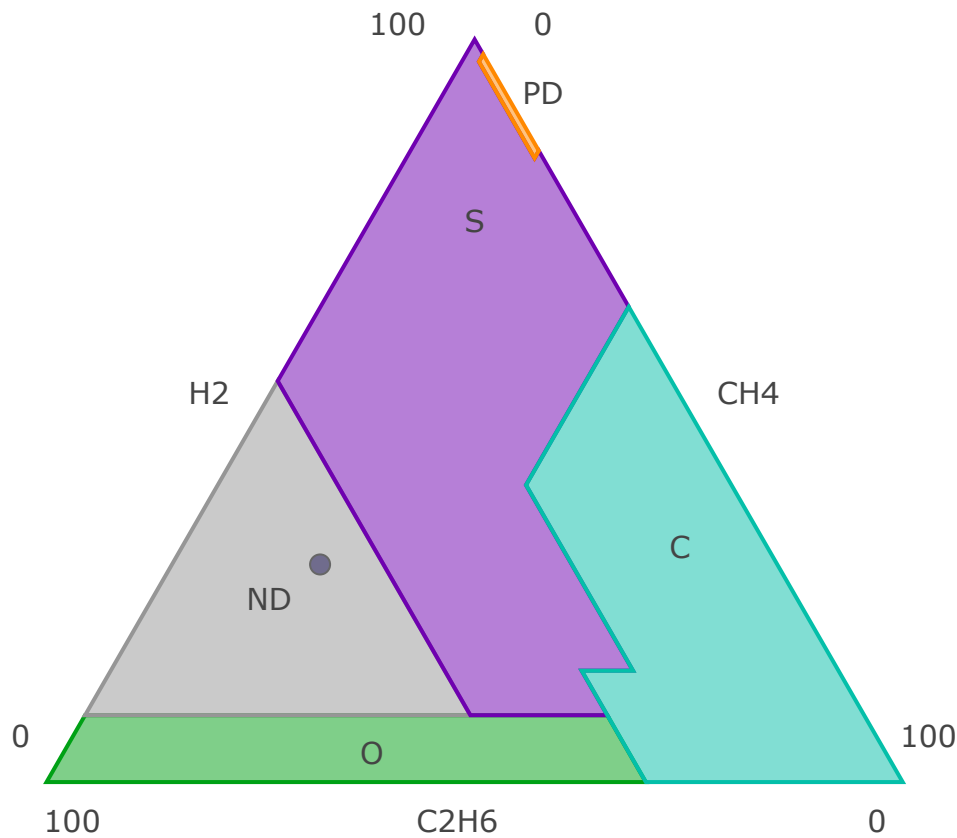
■ Discharges of energy + thermal fault

■ Thermal fault <300°C

■ Thermal fault >300°C & <700°C

■ Thermal fault >700°C

Duval Triangle 4



● 2019-01-25

* Red outline indicates a fault was detected, faded with no outline indicates trace gas results only.

■ Partial discharges of corona type

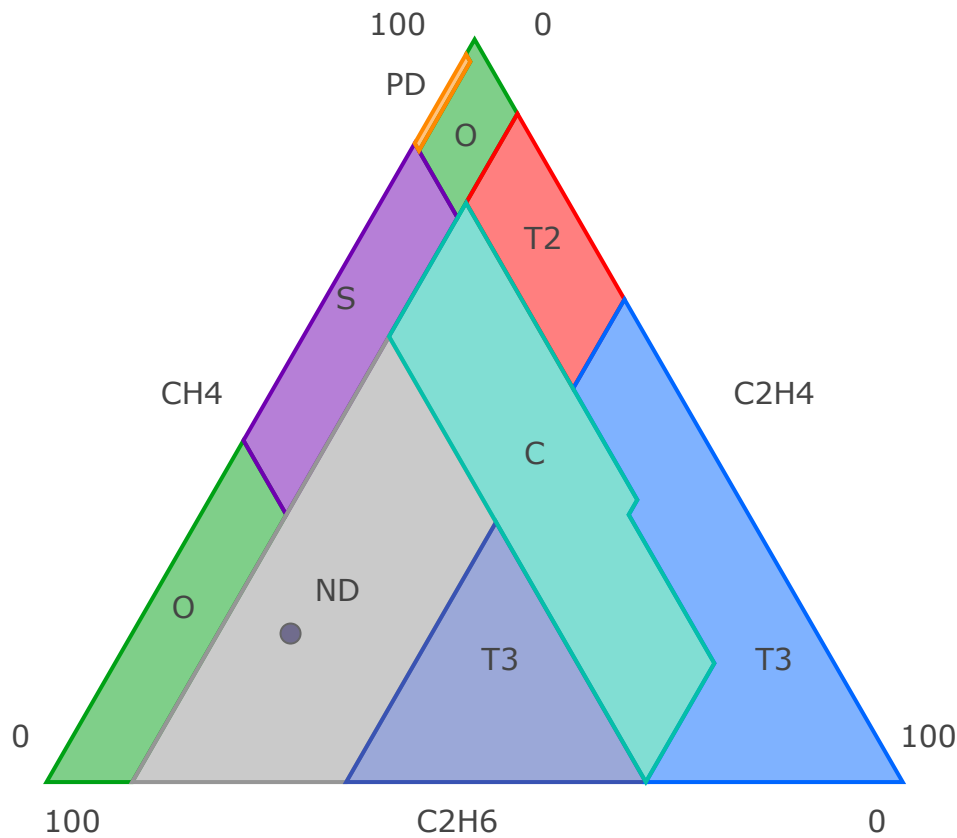
■ Stray gassing <200°C

■ Possible paper carbonization

■ Overheating <250°C without carbonization of paper

■ Not determined or decided

Duval Triangle 5

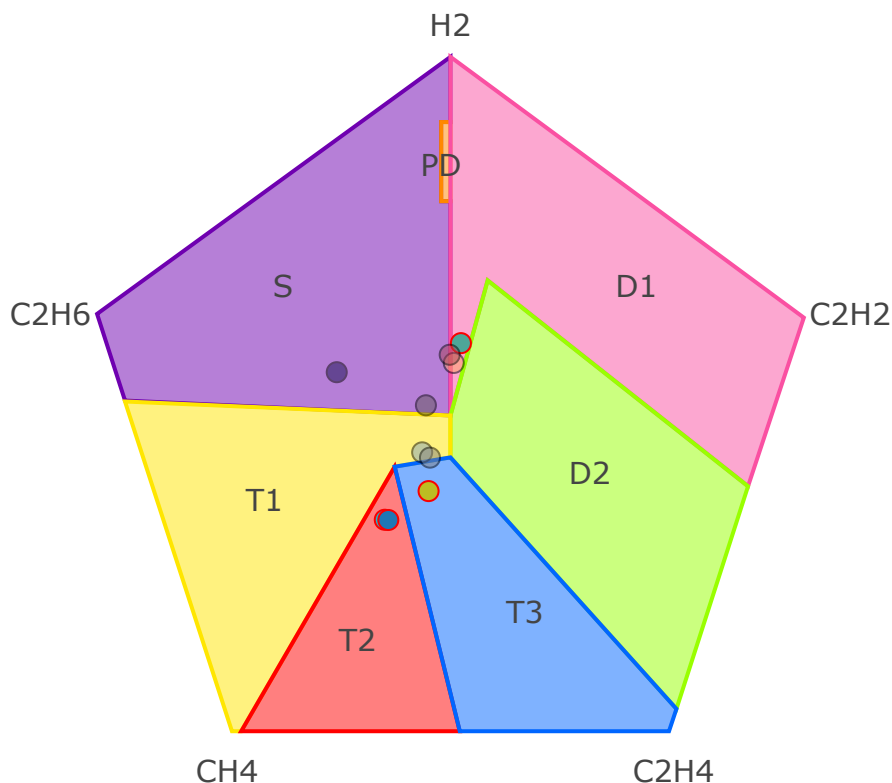


● 2019-01-25

* Red outline indicates a fault was detected, faded with no outline indicates trace gas results only.

- Partial discharges of corona type
- Thermal fault >300°C & <700°C
- Thermal fault >700°C
- Stray gassing <200°C
- Possible paper carbonization
- Overheating <250°C without carbonization of paper
- Not determined or decided

Duval Pentagon 1



● 2019-01-25	● 2020-01-21	● 2020-02-05	● 2020-02-20	● 2020-03-11
● 2020-03-31	● 2020-04-16	● 2020-04-30	● 2020-06-02	● 2020-07-10

* Red outline indicates a fault was detected, faded with no outline indicates trace gas results only.

■ Partial discharges of corona type

■ Discharges of low energy or partial discharges of sparking type

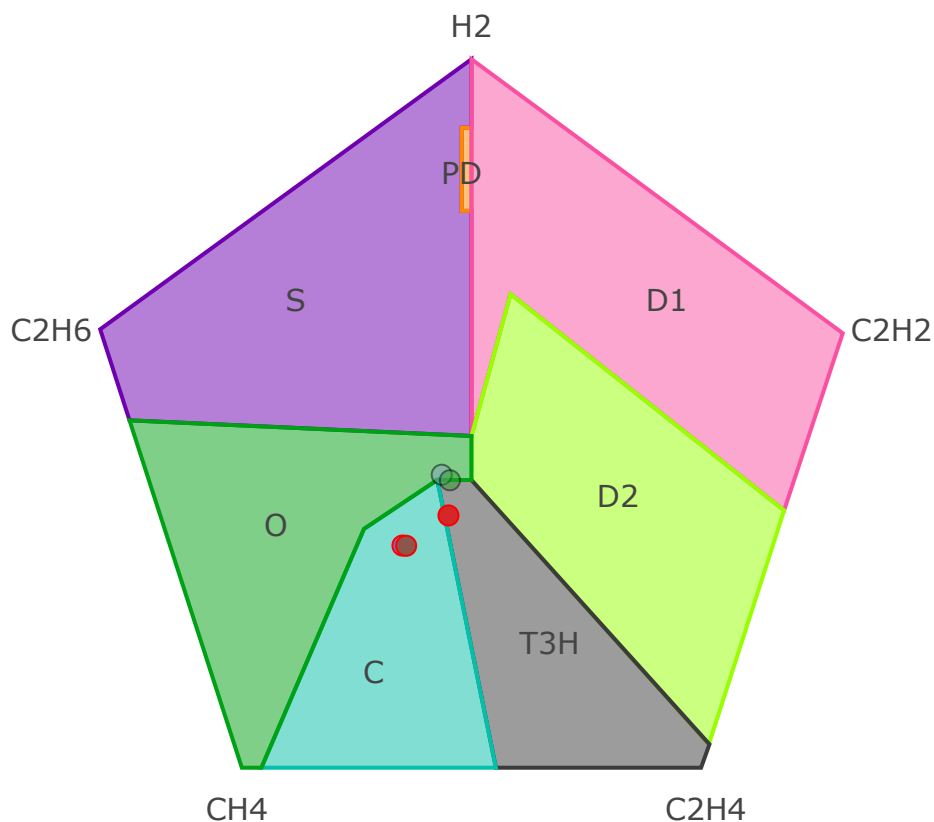
■ Discharges of high energy

■ Thermal fault >300°C & <700°C

■ Thermal fault >700°C

■ Stray gassing <200°C

Duval Pentagon 2



● 2020-03-11
 ● 2020-04-16
 ● 2020-04-30
 ● 2020-06-02
 ● 2020-07-10

* Red outline indicates a fault was detected, faded with no outline indicates trace gas results only.

■ Partial discharges of corona type

■ Discharges of low energy or partial discharges of sparking type

■ Discharges of high energy

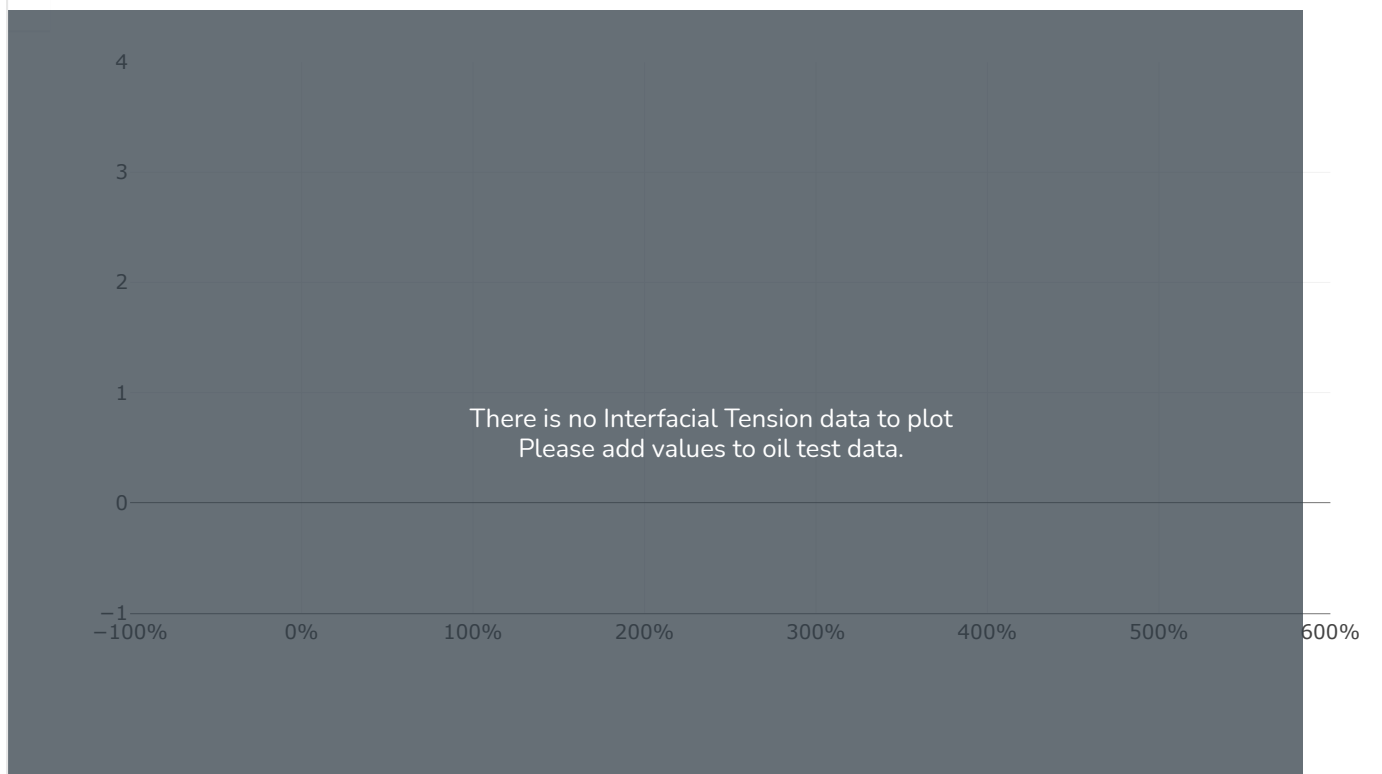
■ Thermal fault T3 in mineral oil only

■ Stray gassing <200°C

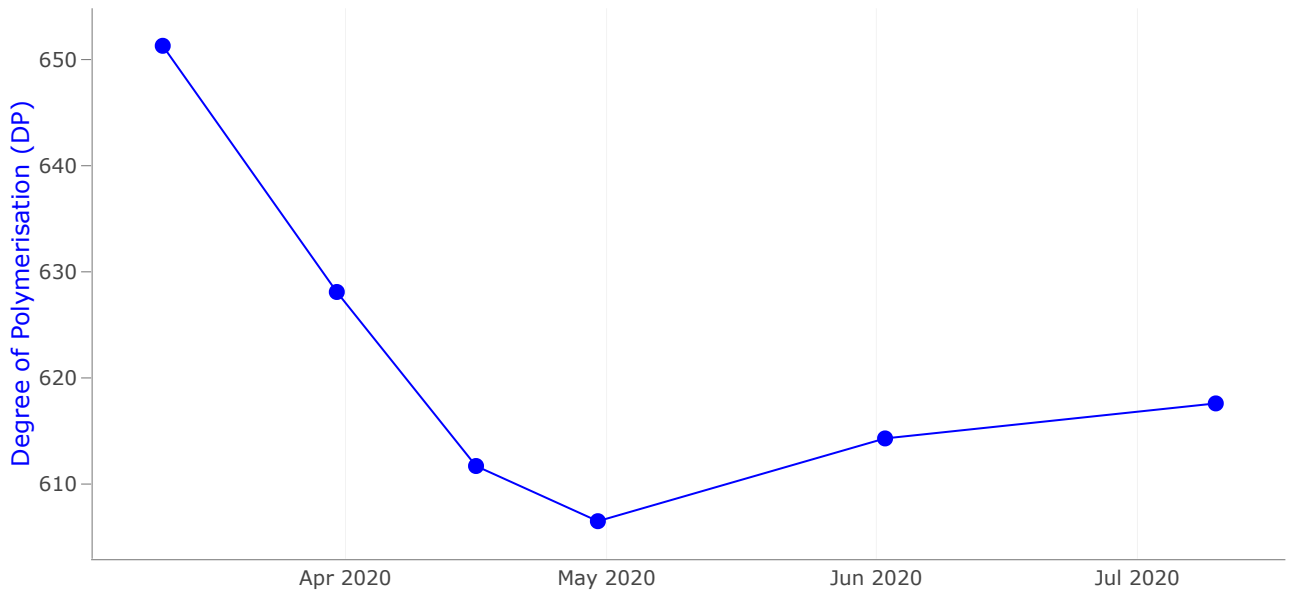
■ Possible paper carbonization

■ Overheating <250°C without carbonization of paper

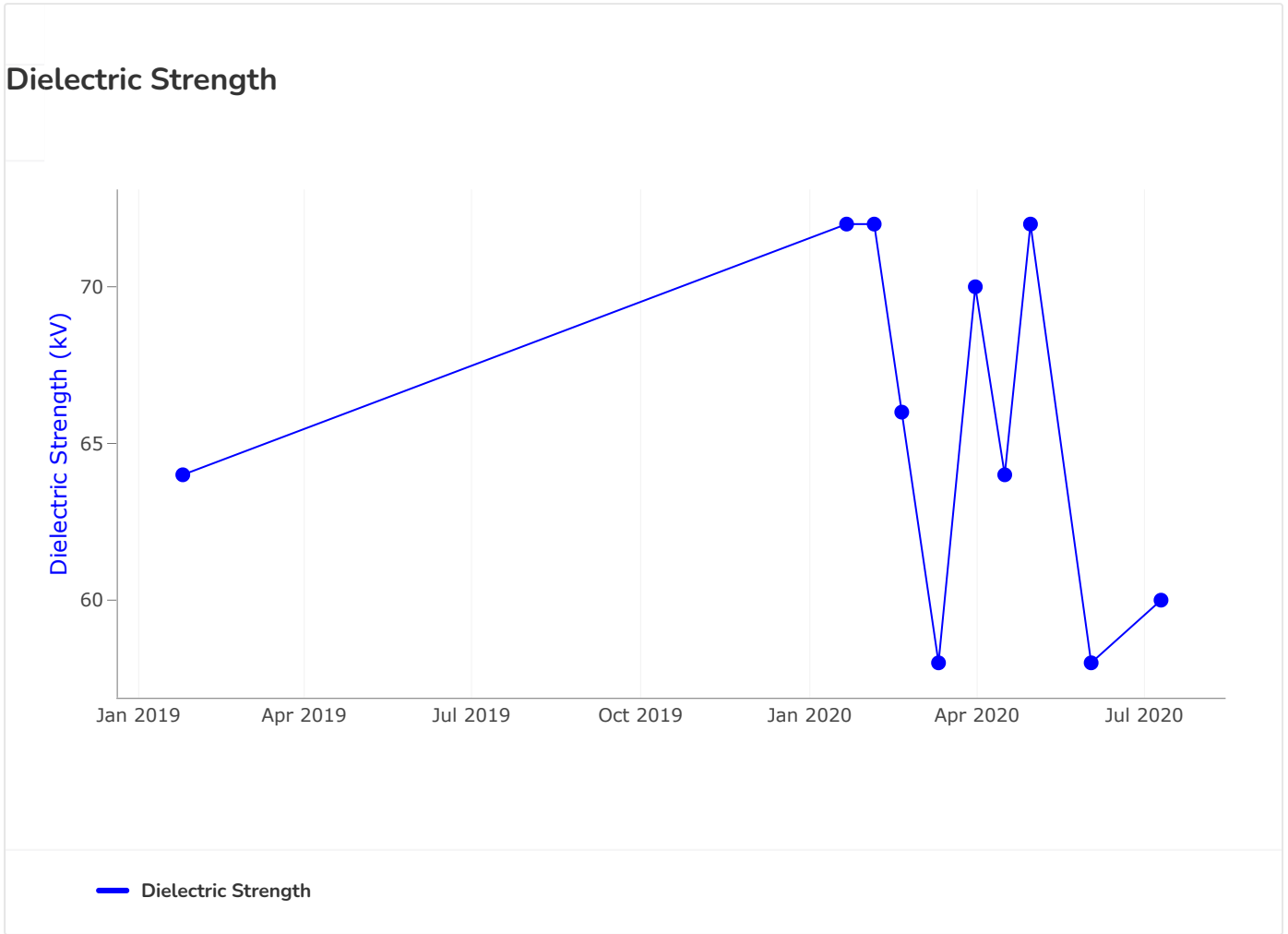
Interfacial Tension

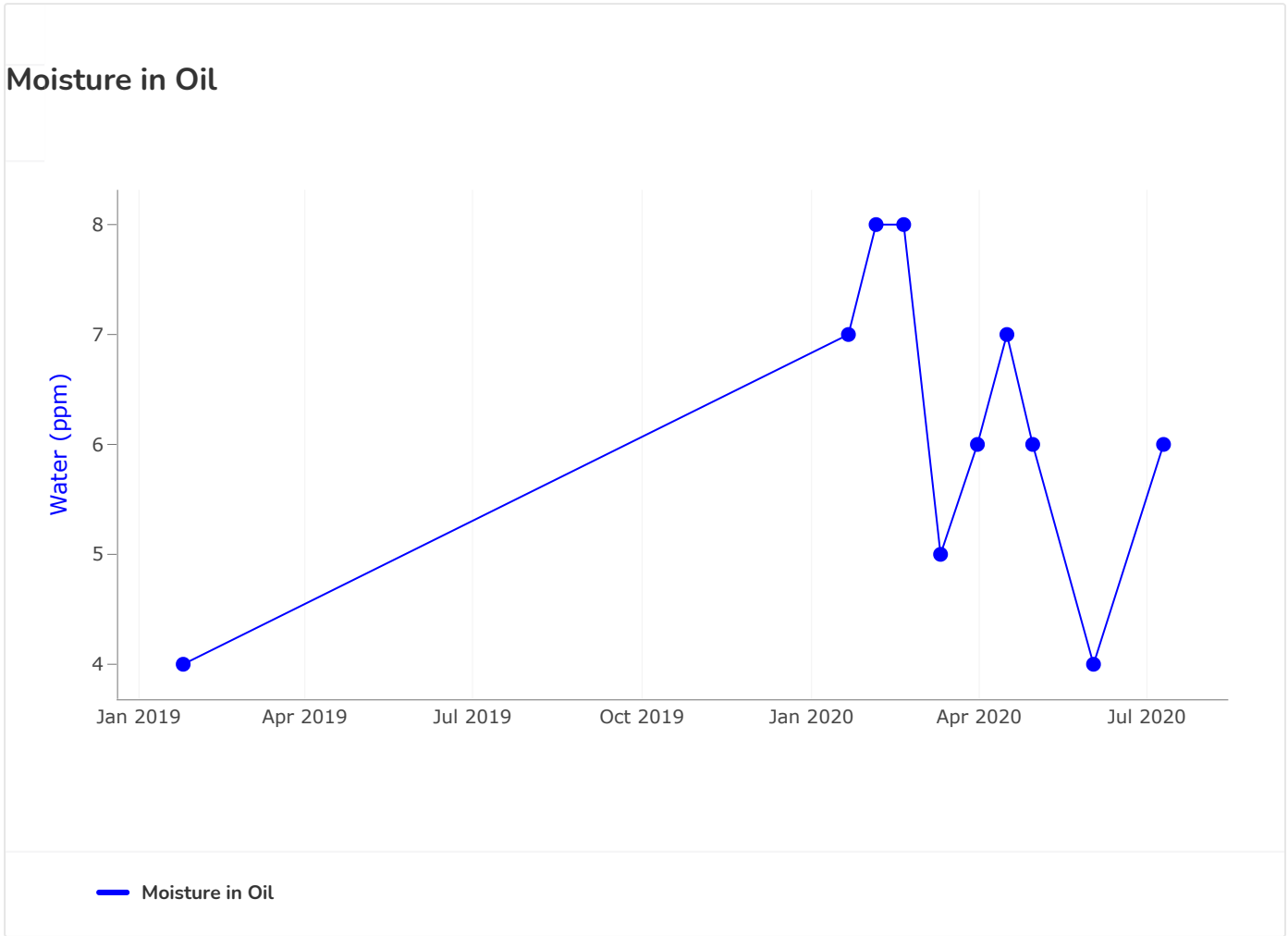


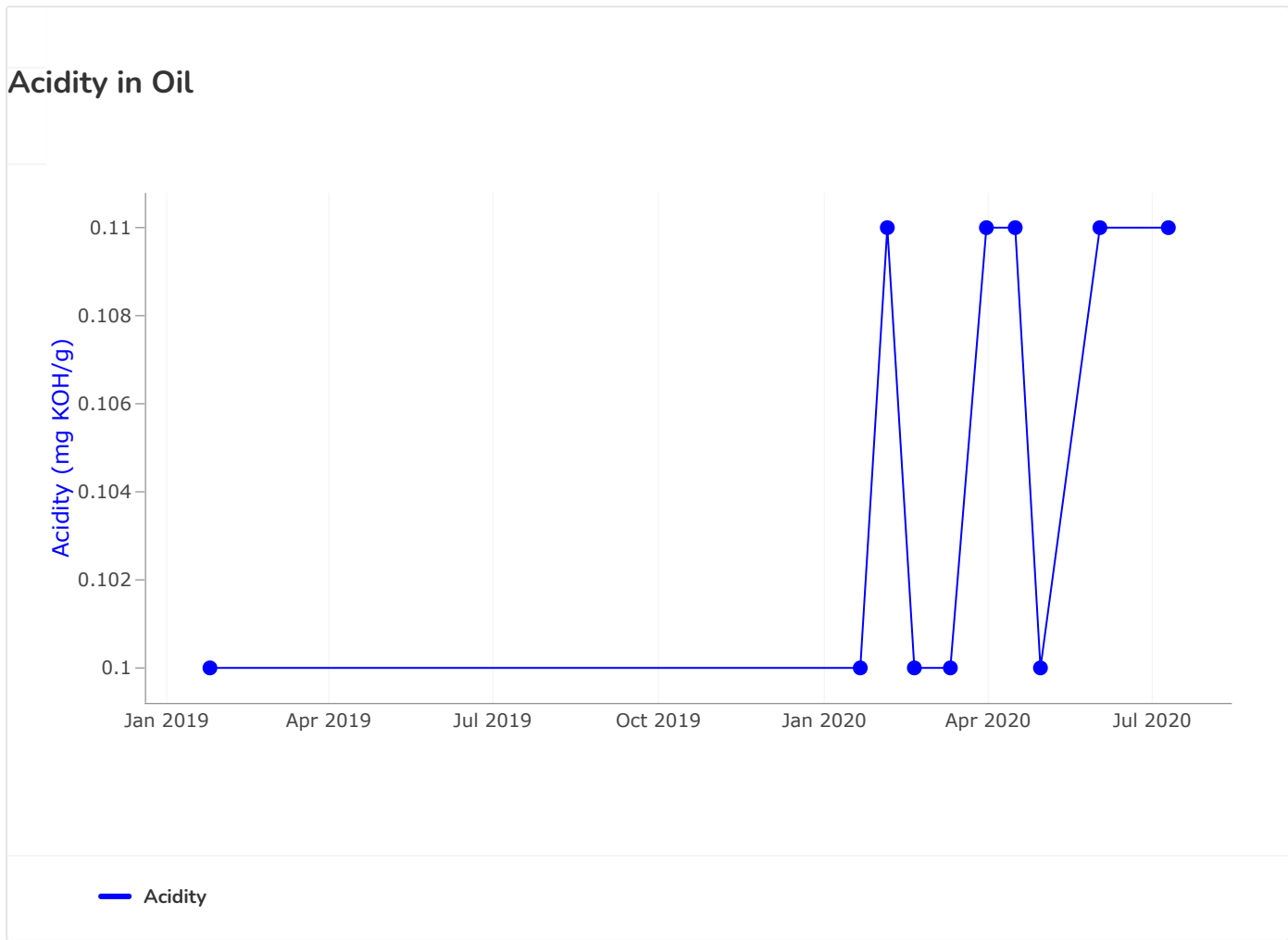
Depolymerization by Furans



— Depolymerization by Furans







IEEE Individual Gas Limits Analysis

Test Date	Hydrogen H ₂ ppm	Oxygen O ₂ ppm	Nitrogen N ₂ ppm	Methane CH ₄ ppm	Carbon Mon. CO ppm	Carbon Dio. CO ₂ ppm	Ethylene C ₂ H ₄ ppm	Ethane C ₂ H ₆ ppm	Acetylene C ₂ H ₂ ppm	Total Combur Gases ppm	Moisture ppm	Dielectric kV	Acidity mg KOH/g oil	Interfacial Tension mN/m
10-Jul-2020	28	4445	83705	105	1107	9779	76	68	15	1399	6	60	0.11	
02-Jun-2020	40	4621	89466	139	1202	10088	84	77	20	1562	4	58	0.11	
30-Apr-2020	67	7434	99488	96	1244	10008	119	72	24	1622	6	72	0.1	
16-Apr-2020	90	9523	95770	99	1006	8683	83	57	37	1372	7	64	0.11	
31-Mar-2020	200	9149	97986	126	1188	9719	85	65	35	1699	6	70	0.11	
11-Mar-2020	112	7735	98910	123	1184	9883	92	73	42	1626	5	58	0.1	
20-Feb-2020	627	9380	95160	127	1118	8721	88	60	68	2088	8	66	0.1	
05-Feb-2020	332	9287	96161	104	1062	8189	82	58	73	1711	8	72	0.11	
21-Jan-2020	609	12147	91347	110	857	6844	85	58	100	1819	7	72	0.1	
25-Jan-2019	22	15821	95605	13	587	6452	12	40	0	674	4	64	0.1	
Conditions														
Condition 1	100			120	350	2500	50	65	1	720				
Condition 2				101-200	361-470	3501-10000	51-100	66-100	2-6	721-1000				

IEEE Relative Limits Analysis										
Test Date	Carbon Mon. CO	Hydrogen H ₂	Methane CH ₄	Ethane C ₂ H ₆	Ethylene C ₂ H ₄	Acetylene C ₂ H ₂	Primary possible fault	Secondary possible fault		
10-Jul-2020	78	1	7	4	5	1	Overheated Cellulose	-		
02-Jun-2020	76	2	8	4	5	1	Overheated Cellulose	-		
30-Apr-2020	77	4	5	4	7	1	Overheated Cellulose	-		
16-Apr-2020	73	6	7	4	6	2	Overheated Cellulose	-		
31-Mar-2020	70	11	7	3	5	2	Overheated Cellulose	-		
11-Mar-2020	73	6	7	4	5	2	Overheated Cellulose	-		
20-Feb-2020	53	30	6	2	4	3	Overheated Cellulose	Partial Discharge in Oil		
05-Feb-2020	61	19	6	3	4	4	Overheated Cellulose	Partial Discharge in Oil		
21-Jan-2020	47	33	6	3	4	5	Overheated Cellulose	Partial Discharge in Oil		
25-Jan-2019	86	3	1	5	1	0	Overheated Cellulose	-		
Fault Types										
Overheated Oil										
Overheated Cellulose										
Partial Discharge in Oil										
<div style="display: flex; justify-content: space-between;"> 2 16 19 63 </div>										
<div style="display: flex; justify-content: space-between;"> 85 13 1 1 </div>										