



July 11, 2019

Extensive scientific research has shown that low levels of materials from the perfluorooctanyl chemistry are present in the environment, including living organisms, and they persist for long periods of time. PFOS (perfluorooctanyl sulfonate), together with surfactants that degrade to PFOA (Perfluorooctanoic acid), have been used to make aqueous film forming foam (AFFF).

Novacool UEF was developed as a Fluorine free universal extinguishing foam for use at 0.5%. It is a mixture of amphoteric, nonionic, and anionic surfactants containing no perfluoroalkyl functional groups. Testing by CH2M Hill show it to be readily degradable.

We have been asked to provide supporting evidence to our claim that Novacool UEF is formulated without the use of perfluoroalkyl surfactants. Novacool UEF Samples were submitted to Eurofins Lancaster Laboratories for testing by GCMS. No perfluoroalkyl compounds were detected at or above the lower detection limits of the test. For PFOS and PFOA the lower detection limits are 10,000 ng/l [0.01 ppm] and 5000 ng/l [0.005 ppm], respectively. Had these materials been used as performance ingredients in Novacool UEF, they would have been detected at many orders of magnitude higher than the limit.

Paul H. Berger, President

The Analysis Results by Eurofins Lancaster Laboratories Environmental are on the following pages.



ANALYSIS REPORT

Prepared by:

Eurofins Lancaster Laboratories Environmental
2425 New Holland Pike
Lancaster, PA 17601

Prepared for:

Baum's Castorine Co. Inc.
200 Matthew Street
Rome NY 13440

Report Date: June 10, 2019 14:14

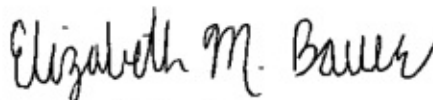
Project: Novacool UEF

Account #: 44390
Group Number: 2044938
PO Number: 010980
State of Sample Origin: NY

Electronic Copy To Baum's Castorine Co. Inc.

Attn: Paul Berger

Respectfully Submitted,



Elizabeth M. Bauer
Project Manager

(717) 556-7290

To view our laboratory's current scopes of accreditation please go to <https://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/certifications-and-accreditations-eurofins-lancaster-laboratories-environmental/> . Historical copies may be requested through your project manager.



SAMPLE INFORMATION

<u>Client Sample Description</u>	<u>Sample Collection Date/Time</u>	<u>ELLE#</u>
Novacool UEF Product Sample	05/17/2019 15:30	1062334

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

Sample Description: Novacool UEF Product Sample

Baum's Castorine Co. Inc.

Project Name: Novacool UEF

ELLE Sample #: G5 1062334

ELLE Group #: 2044938

Matrix: Misc Organic

Submission Date/Time: 05/21/2019 09:50

Collection Date/Time: 05/17/2019 15:30

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation	Dilution Factor
LC/MS/MS Miscellaneous		EPA 537 Version 1.1 Modified	ng/l	ng/l	
14473	10:2Fluorotelomersulfonic acid	120226-60-0	< 15,000	15,000	10
14473	4:2-Fluorotelomersulfonic acid	757124-72-4	< 15,000	15,000	10
14473	6:2-Fluorotelomersulfonic acid	27619-97-2	< 10,000	10,000	10
14473	8:2-Fluorotelomersulfonic acid	39108-34-4	< 30,000	30,000	10
14473	NEtFOSAA	2991-50-6	< 15,000	15,000	10
	NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.				
14473	NEtPFOSA	4151-50-2	< 45,000	45,000	10
	NEtPFOSA is the acronym for N-ethylperfluoro-1-octanesulfonamide				
14473	NEtPFOSAE	1691-99-2	< 15,000	15,000	10
	NEtPFOSAE is the acronym for 2-(N-ethylperfluoro-1-octanesulfonamido)-ethanol				
14473	NMeFOSAA	2355-31-9	< 15,000	15,000	10
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.				
14473	NMePFOSA	31506-32-8	< 45,000	45,000	10
	NMePFOSA is the acronym for N-methylperfluoro-1-octanesulfonamide				
14473	NMePFOSAE	24448-09-7	< 15,000	15,000	10
	NMePFOSAE is the acronym for 2-(N-methylperfluoro-1-octanesulfonamido)-ethanol				
14473	Perfluorobutanesulfonic acid	375-73-5	< 5,000	5,000	10
14473	Perfluorobutanoic acid	375-22-4	< 30,000	30,000	10
14473	Perfluorodecanesulfonic acid	335-77-3	< 10,000	10,000	10
14473	Perfluorodecanoic acid	335-76-2	< 10,000	10,000	10
14473	Perfluorododecanesulfonic acid	79780-39-5	< 5,000	5,000	10
14473	Perfluorododecanoic acid	307-55-1	< 10,000	10,000	10
14473	Perfluoroheptanesulfonic acid	375-92-8	< 10,000	10,000	10
14473	Perfluoroheptanoic acid	375-85-9	< 5,000	5,000	10
14473	Perfluorohexadecanoic acid	67905-19-5	< 5,000	5,000	10
14473	Perfluorohexanesulfonic acid	355-46-4	< 10,000	10,000	10
14473	Perfluorohexanoic acid	307-24-4	< 10,000	10,000	10
14473	Perfluorononanesulfonic acid	68259-12-1	< 10,000	10,000	10
14473	Perfluorononanoic acid	375-95-1	< 10,000	10,000	10
14473	Perfluorooctadecanoic acid	16517-11-6	< 10,000	10,000	10
14473	Perfluorooctanesulfonamide	754-91-6	< 15,000	15,000	10
14473	Perfluorooctanesulfonic acid	1763-23-1	< 10,000	10,000	10
14473	Perfluorooctanoic acid	335-67-1	< 5,000	5,000	10
14473	Perfluoropentanesulfonate	2706-91-4	< 10,000	10,000	10
14473	Perfluoropentanoic acid	2706-90-3	< 30,000	30,000	10
14473	Perfluorotetradecanoic acid	376-06-7	< 5,000	5,000	10
14473	Perfluorotridecanoic acid	72629-94-8	< 5,000	5,000	10
14473	Perfluoroundecanoic acid	2058-94-8	< 10,000	10,000	10

Reporting limits were raised due to interference from the sample matrix.

The recovery for sample injection standard peak areas and several extraction standards is outside of QC acceptance limits as noted on the QC Summary due to the matrix of the sample.

Target analytes were outside of QC acceptance limits as noted on the QC Summary in the Laboratory Control Spike(s) associated with this

Sample Description: Novacool UEF Product Sample

Baum's Castorine Co. Inc.
ELLE Sample #: G5 1062334
ELLE Group #: 2044938
Matrix: Misc Organic

Project Name: Novacool UEF

Submission Date/Time: 05/21/2019 09:50
Collection Date/Time: 05/17/2019 15:30

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Limit of Quantitation	Dilution Factor
	sample.				

Sample Comments

State of New York Certification No. 10670

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14473	32 PFAS in Product	EPA 537 Version 1.1 Modified	1	19151013	06/05/2019 17:07	Jason W Knight	10
14091	PFAS Water Prep	EPA 537 Version 1.1 Modified	1	19151013	05/31/2019 12:10	Robert Brown	1

Quality Control Summary

Client Name: Baum's Castorine Co. Inc.
Reported: 06/10/2019 14:14

Group Number: 2044938

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

All Inorganic Initial Calibration and Continuing Calibration Blanks met acceptable method criteria unless otherwise noted on the Analysis Report.

Method Blank

Analysis Name	Result ng/l	LOQ ng/l
Batch number: 19151013	Sample number(s): 1062334	
10:2Fluorotelomersulfonic acid	< 1,500	1,500
4:2-Fluorotelomersulfonic acid	< 1,500	1,500
6:2-Fluorotelomersulfonic acid	< 1,000	1,000
8:2-Fluorotelomersulfonic acid	< 3,000	3,000
NEtFOSAA	< 1,500	1,500
NEtPFOSA	< 4,500	4,500
NEtPFOSAE	< 1,500	1,500
NMeFOSAA	< 1,500	1,500
NMePFOSA	< 4,500	4,500
NMePFOSAE	< 1,500	1,500
Perfluorobutanesulfonic acid	< 500	500
Perfluorobutanoic acid	< 3,000	3,000
Perfluorodecanesulfonic acid	< 1,000	1,000
Perfluorodecanoic acid	< 1,000	1,000
Perfluorododecanesulfonic acid	< 500	500
Perfluorododecanoic acid	< 1,000	1,000
Perfluoroheptanesulfonic acid	< 1,000	1,000
Perfluoroheptanoic acid	< 500	500
Perfluorohexadecanoic acid	< 500	500
Perfluorohexanesulfonic acid	< 1,000	1,000
Perfluorohexanoic acid	< 1,000	1,000
Perfluorononanesulfonic acid	< 1,000	1,000
Perfluorononanoic acid	< 1,000	1,000
Perfluorooctadecanoic acid	< 1,000	1,000
Perfluorooctanesulfonamide	< 1,500	1,500
Perfluorooctanesulfonic acid	< 1,000	1,000
Perfluorooctanoic acid	< 500	500
Perfluoropentanesulfonate	< 1,000	1,000
Perfluoropentanoic acid	< 3,000	3,000
Perfluorotetradecanoic acid	< 500	500
Perfluorotridecanoic acid	< 500	500
Perfluoroundecanoic acid	< 1,000	1,000

LCS/LCSD

*- Outside of specification

- (1) The result for one or both determinations was less than five times the LOQ.
- (2) The unspiked result was more than four times the spike added.

Quality Control Summary

Client Name: Baum's Castorine Co. Inc.
Reported: 06/10/2019 14:14

Group Number: 2044938

LCS/LCSD

Analysis Name	LCS Spike Added ng/l	LCS Conc ng/l	LCSD Spike Added ng/l	LCSD Conc ng/l	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: 19151013	Sample number(s): 1062334								
10:2Fluorotelomersulfonic acid	3856	4205.1	3856	4042.04	109	105	49-186	4	30
4:2-Fluorotelomersulfonic acid	3736	3528.35	3736	3839.41	94	103	82-152	8	30
6:2-Fluorotelomersulfonic acid	3792	4039.56	3792	4165.05	107	110	66-155	3	30
8:2-Fluorotelomersulfonic acid	3832	4098.38	3832	4287.92	107	112	66-148	5	30
NEtFOSAA	1360	1536.53	1360	1470.31	113	108	55-169	4	30
NEtPFOSA	1360	1500.08	1360	< 4,500	110	0*	70-130	200*	30
NEtPFOSAE	1360	1774.37	1360	1774.99	130	131*	70-130	0	30
NMeFOSAA	1360	1533.14	1360	1269.87	113	93	44-147	19	30
NMePFOSA	1360	< 4,500	1360	< 4,500	0*	0*	70-130	0	30
NMePFOSAE	1360	1431.57	1360	1271.67	105	94	70-130	12	30
Perfluorobutanesulfonic acid	1204	1370.73	1204	1355.04	114	113	73-128	1	30
Perfluorobutanoic acid	1360	2793.07	1360	2482.96	205*	183*	74-142	12	30
Perfluorodecanesulfonic acid	1310	1464.94	1310	1584.46	112	121	60-135	8	30
Perfluorodecanoic acid	1360	1584.73	1360	1596.73	117	117	69-148	1	30
Perfluorododecanesulfonic acid	1316	1591.64	1316	1325.4	121	101	70-130	18	30
Perfluorododecanoic acid	1360	1522.3	1360	1466.36	112	108	75-136	4	30
Perfluoroheptanesulfonic acid	1294	1424.98	1294	1491.28	110	115	64-135	5	30
Perfluoroheptanoic acid	1360	1838.86	1360	1585.27	135	117	76-140	15	30
Perfluorohexadecanoic acid	1360	1625.96	1360	1734.28	120	128	21-151	6	30
Perfluorohexanesulfonic acid	1286	1332.36	1286	1379.36	104	107	71-131	3	30
Perfluorohexanoic acid	1360	1690.25	1360	1748.13	124	129	75-135	3	30
Perfluorononanesulfonic acid	1306	1555.94	1306	1490.93	119	114	66-133	4	30
Perfluorononanoic acid	1360	1615.99	1360	1647.5	119	121	72-148	2	30
Perfluorooctadecanoic acid	1360	1565.22	1360	1654.11	115	122	70-130	6	30
Perfluorooctanesulfonamide	1360	1322.97	1360	1498.2	97	110	65-164	12	30
Perfluorooctanesulfonic acid	1300	1427.45	1300	1292.11	110	99	67-138	10	30
Perfluorooctanoic acid	1360	1753.08	1360	1771.63	129	130	72-138	1	30
Perfluoropentanesulfonate	1276	1425.64	1276	1323.57	112	104	76-127	7	30
Perfluoropentanoic acid	1360	1530.02	1360	1566.84	113	115	74-134	2	30
Perfluorotetradecanoic acid	1360	1558.48	1360	1571.58	115	116	74-135	1	30
Perfluorotridecanoic acid	1360	1525.12	1360	1482.18	112	109	61-145	3	30
Perfluoroundecanoic acid	1360	1508.58	1360	1572.17	111	116	75-146	4	30

*- Outside of specification

- (1) The result for one or both determinations was less than five times the LOQ.
- (2) The unspiked result was more than four times the spike added.

Quality Control Summary

Client Name: Baum's Castorine Co. Inc.
Reported: 06/10/2019 14:14

Group Number: 2044938

Labeled Isotope Quality Control

Labeled isotope recoveries which are outside of the QC window are confirmed unless otherwise noted on the analysis report.

Analysis Name: 32 PFAS in Product
Batch number: 19151013

	13C4-PFBA	13C5-PFPeA	13C3-PFBS	13C2-4:2-FTS	13C5-PFHxA	13C3-PFHxS
1062334	77	77	73	248*	229*	188*
Blank	90	86	87	97	91	84
LCS	95	93	91	108	96	99
LCSD	85	86	84	94	88	88
Limits:	33-123	31-157	26-148	21-182	35-138	34-126
	13C4-PFHpA	13C2-6:2-FTS	13C8-PFOA	13C8-PFOS	13C9-PFNA	13C6-PFDA
1062334	161*	957*	82	77	67	74
Blank	91	94	89	85	86	93
LCS	95	98	96	98	106	99
LCSD	89	89	88	88	84	90
Limits:	35-126	32-170	48-122	50-121	41-144	47-125
	13C2-8:2-FTS	d3-NMeFOSAA	13C7-PFUnDA	d5-NEIFOSAA	13C2-PFDoDA	13C2-PFTeDA
1062334	84	231*	388*	334*	483*	645*
Blank	101	106	96	102	96	87
LCS	107	113	108	115	103	100
LCSD	91	122	102	113	102	90
Limits:	27-164	30-127	30-128	30-142	39-130	26-119
	13C8-PFOSA	d7-NMePFOSAE	d3-NMePFOSA	d9-NEIPFOSAE	d5-NEIPFOSA	
1062334	61	383*	337*	502*	630*	
Blank	111	36	49	39	44	
LCS	111	45	49	48	40	
LCSD	103	51	56	51	52	
Limits:	11-127	10-128	10-104	10-121	10-106	

*- Outside of specification

- (1) The result for one or both determinations was less than five times the LOQ.
- (2) The unspiked result was more than four times the spike added.



Client: Baum's Castorine Co. Inc.

Novacool UEF

Delivery and Receipt Information

Delivery Method:	<u>UPS</u>	Arrival Timestamp:	<u>05/21/2019 9:50</u>
Number of Packages:	<u>1</u>	Number of Projects:	<u>1</u>
State/Province of Origin:	<u>NY</u>		

Arrival Condition Summary

Shipping Container Sealed:	Yes	Sample IDs on COC match Containers:	Yes
Custody Seal Present:	Yes	Sample Date/Times match COC:	Yes
Custody Seal Intact:	Yes	VOA Vial Headspace \geq 6mm:	N/A
Samples Chilled:	Yes	Total Trip Blank Qty:	0
Paperwork Enclosed:	Yes	Air Quality Samples Present:	No
Samples Intact:	Yes		
Missing Samples:	No		
Extra Samples:	No		
Discrepancy in Container Qty on COC:	Yes		

Unpacked by Katie Hartlove (2114) at 12:27 on 05/21/2019

Samples Chilled Details: Novacool UEF

Thermometer Types: DT = Digital (Temp. Bottle) IR = Infrared (Surface Temp) All Temperatures in °C.

<u>Cooler #</u>	<u>Thermometer ID</u>	<u>Corrected Temp</u>	<u>Therm. Type</u>	<u>Ice Type</u>	<u>Ice Present?</u>	<u>Ice Container</u>	<u>Elevated Temp?</u>
1	DT42-01	2.8	DT	Wet	N	Bagged	N

Container Quantity Discrepancy Details: Novacool UEF

<u>Sample ID on COC</u>	<u>Container Qty. Received</u>	<u>Container Qty. on COC</u>	<u>Comments</u>
Novacool UEF	2	1	

Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

BMQL	Below Minimum Quantitation Level	mL	milliliter(s)
C	degrees Celsius	MPN	Most Probable Number
cfu	colony forming units	N.D.	non-detect
CP Units	cobalt-chloroplatinate units	ng	nanogram(s)
F	degrees Fahrenheit	NTU	nephelometric turbidity units
g	gram(s)	pg/L	picogram/liter
IU	International Units	RL	Reporting Limit
kg	kilogram(s)	TNTC	Too Numerous To Count
L	liter(s)	µg	microgram(s)
lb.	pound(s)	µL	microliter(s)
m3	cubic meter(s)	umhos/cm	micromhos/cm
meq	milliequivalents	MCL	Maximum Contamination Limit
mg	milligram(s)		
<	less than		
>	greater than		
ppm	parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg) or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter per liter of gas.		
ppb	parts per billion		
Dry weight basis	Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.		

Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff.

This report shall not be reproduced except in full, without the written approval of the laboratory.

Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as "analyze immediately" are not performed within 15 minutes.

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Data Qualifiers

Qualifier	Definition
C	Result confirmed by reanalysis
D1	Indicates for dual column analyses that the result is reported from column 1
D2	Indicates for dual column analyses that the result is reported from column 2
E	Concentration exceeds the calibration range
K1	Initial Calibration Blank is above the QC limit and the sample result is ND
K2	Continuing Calibration Blank is above the QC limit and the sample result is ND
K3	Initial Calibration Verification is above the QC limit and the sample result is ND
K4	Continuing Calibration Verification is above the QC limit and the sample result is ND
J (or G, I, X)	Estimated value \geq the Method Detection Limit (MDL or DL) and $<$ the Limit of Quantitation (LOQ or RL)
P	Concentration difference between the primary and confirmation column $>40\%$. The lower result is reported.
P^	Concentration difference between the primary and confirmation column $> 40\%$. The higher result is reported.
U	Analyte was not detected at the value indicated
V	Concentration difference between the primary and confirmation column $>100\%$. The reporting limit is raised due to this disparity and evident interference.
W	The dissolved oxygen uptake for the unseeded blank is greater than 0.20 mg/L.
Z	Laboratory Defined - see analysis report

Additional Organic and Inorganic CLP qualifiers may be used with Form 1 reports as defined by the CLP methods. Qualifiers specific to Dioxin/Furans and PCB Congeners are detailed on the individual Analysis Report.