



RTI Laboratories
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Friday, October 18, 2019

Kyle Horne
Sprinturf
146 Fairchild Street, Suite 150
Daniel Island, SC 29492
TEL: (843) 936-6009
FAX:

RE: PFAS Analysis of Synthetic Turf Fibers

Work Order #: 1910370

Dear Kyle Horne:

There were no problems with the analytical events associated with this report unless noted in the Case Narrative.

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Quality control data is within laboratory defined or method specified acceptance limits except if noted.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

A handwritten signature in black ink, appearing to read "Lloyd Kaufman".

Lloyd Kaufman
Director of Materials Sciences

Client: Sprinturf

Project: PFAS Analysis of Synthetic Turf Fibers

Summary,

Total fluorine content was determined at 430mg/kg (ppm) which equates to 0.043% w/w

All extractable PFAS compounds were non-detect at a level of 2-4 ug/kg (ppb). Surrogate value exceedances were qualified due to non-detection of target analyte.

RTI Laboratories, Inc. - Analytical Report

WO#: 1910370

Date Reported: 10/18/2019

Revision v1

Client: Sprinturf
 Project: PFAS Analysis of Synthetic Turf Fibers
 Lab ID: 1910370-001
 Client Sample ID: Synthetic Turf Fibers

Collection Date:
 Matrix:

Analysis	Result	RL	Qual	Units	DF	Date Analyzed
Elemental Analysis by Bomb Combustion and IC		Method: ASTMD4327		SW5050		Analyst: LK
Fluorine	430	33		mg/Kg	1	10/17/2019 7:44 AM
Perfluorinated Compounds Solid Matrix LC/MS/MS		Method: EPA 537.1MOD				Analyst: DKS
1H,1H,2H,2H-Perfluorodecanesulfonate	ND	4.0		µg/Kg	1	10/18/2019 2:40 PM
1H,1H,2H,2H-Perfluorohexanesulfonate	ND	2.0		µg/Kg	1	10/18/2019 2:40 PM
1H,1H,2H,2H-Perfluorooctanesulfonate	ND	2.0		µg/Kg	1	10/18/2019 2:40 PM
HFPO-DA (GEN X)	ND	4.0		µg/Kg	1	10/18/2019 2:40 PM
N-ethyl perfluorooctanesulfonamidoacetic acid	ND	2.0		µg/Kg	1	10/18/2019 2:40 PM
N-methyl perfluorooctanesulfonamidoacetic acid	ND	2.0		µg/Kg	1	10/18/2019 2:40 PM
Perfluorobutanesulfonic acid	ND	2.0		µg/Kg	1	10/18/2019 2:40 PM
Perfluorobutanoic acid	ND	2.0		µg/Kg	1	10/18/2019 2:40 PM
Perfluorodecanesulfonate	ND	2.0		µg/Kg	1	10/18/2019 2:40 PM
Perfluorodecanoic acid	ND	2.0		µg/Kg	1	10/18/2019 2:40 PM
Perfluorododecanoic acid	ND	2.0		µg/Kg	1	10/18/2019 2:40 PM
Perfluoroheptanesulfonate	ND	2.0		µg/Kg	1	10/18/2019 2:40 PM
Perfluoroheptanoic acid	ND	2.0		µg/Kg	1	10/18/2019 2:40 PM
Perfluorohexanesulfonic acid	ND	2.0		µg/Kg	1	10/18/2019 2:40 PM
Perfluorohexanoic acid	ND	2.0		µg/Kg	1	10/18/2019 2:40 PM
Perfluoronanesulfonate	ND	2.0		µg/Kg	1	10/18/2019 2:40 PM
Perfluoronanoic acid	ND	2.0		µg/Kg	1	10/18/2019 2:40 PM
Perfluorooctanesulfonic acid	ND	2.0		µg/Kg	1	10/18/2019 2:40 PM
Perfluorooctanoic acid	ND	2.0		µg/Kg	1	10/18/2019 2:40 PM
Perfluorooctansulfonamide	ND	2.0		µg/Kg	1	10/18/2019 2:40 PM
Perfluoropentanesulfonate	ND	2.0		µg/Kg	1	10/18/2019 2:40 PM
Perfluoropentanoic acid	ND	2.0		µg/Kg	1	10/18/2019 2:40 PM
Perfluorotetradecanoic acid	ND	2.0		µg/Kg	1	10/18/2019 2:40 PM
Perfluorotridecanoic acid	ND	2.0		µg/Kg	1	10/18/2019 2:40 PM
Perfluoroundecanoic acid	ND	2.0		µg/Kg	1	10/18/2019 2:40 PM
Surr: D3-N-MeFOSAA	109	50-150		%Rec	1	10/18/2019 2:40 PM
Surr: D5-N-EtFOSAA	195	50-150	S	%Rec	1	10/18/2019 2:40 PM
Surr: M2PFTeDA	157	50-150	S	%Rec	1	10/18/2019 2:40 PM
Surr: M3 GEN X	140	50-150		%Rec	1	10/18/2019 2:40 PM
Surr: M3PFBS	110	50-150		%Rec	1	10/18/2019 2:40 PM
Surr: M3PFHxS	112	50-150		%Rec	1	10/18/2019 2:40 PM
Surr: M5PFHpA	127	50-150		%Rec	1	10/18/2019 2:40 PM
Surr: M5PFHxA	118	50-150		%Rec	1	10/18/2019 2:40 PM
Surr: M5PFPeA	118	50-150		%Rec	1	10/18/2019 2:40 PM
Surr: M6PFDA	118	50-150		%Rec	1	10/18/2019 2:40 PM
Surr: M7PFUdA	139	50-150		%Rec	1	10/18/2019 2:40 PM
Surr: M8PFOA	126	50-150		%Rec	1	10/18/2019 2:40 PM
Surr: M8PFOS	106	50-150		%Rec	1	10/18/2019 2:40 PM

RTI Laboratories, Inc. - Analytical Report

WO#: 1910370

Date Reported: 10/18/2019

Revision v1

Client: Sprinturf
Project: PFAS Analysis of Synthetic Turf Fibers
Lab ID: 1910370-001
Client Sample ID: Synthetic Turf Fibers

Collection Date:

Matrix:

Analysis	Result	RL	Qual	Units	DF	Date Analyzed
Surr: M9PFNA	134	50-150		%Rec	1	10/18/2019 2:40 PM
Surr: MFPBA	122	50-150		%Rec	1	10/18/2019 2:40 PM
Surr: MPFDoA	148	50-150		%Rec	1	10/18/2019 2:40 PM

RTI Laboratories, Inc. - QC SUMMARY REPORT

WO#: 1910370

Date Reported: 10/18/2019

Revision v1

Client: Sprinturf

Project: PFAS Analysis of Synthetic Turf Fibers

Batch ID: 50391

Sample ID: MB-50391	Samp Type: MBLK	Test Code: EPA_537-Mod-S-I	Units: µg/Kg	Prep Date: 10/16/2019	RunNo: 114332
Client ID: PBS	Batch ID: 50391	TestNo: EPA_537-Mod		Analysis Date: 10/18/2019	SeqNo: 2230600

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Value	%RPD	RPDLimit	Qual
1H,1H,2H,2H-Perfluorodecanesulfonate	ND	4.0									
1H,1H,2H,2H-Perfluorohexanesulfonate	ND	2.0									
1H,1H,2H,2H-Perfluorooctanesulfonate	ND	2.0									
HFPO-DA (GEN X)	ND	4.0									
N-ethyl perfluorooctanesulfonamidoacetic acid	ND	2.0									
N-methyl perfluorooctanesulfonamidoacetic acid	ND	2.0									
Perfluorobutanesulfonic acid	ND	2.0									
Perfluorobutanoic acid	ND	2.0									
Perfluorodecanesulfonate	ND	2.0									
Perfluorodecanoic acid	ND	2.0									
Perfluorododecanoic acid	ND	2.0									
Perfluoroheptanesulfonate	ND	2.0									
Perfluoroheptanoic acid	ND	2.0									
Perfluorohexanesulfonic acid	ND	2.0									
Perfluorohexanoic acid	ND	2.0									
Perfluorononanesulfonate	ND	2.0									
Perfluorononanoic acid	ND	2.0									
Perfluorooctanesulfonic acid	ND	2.0									
Perfluorooctanoic acid	ND	2.0									
Perfluorooctansulfonamide	ND	2.0									
Perfluoropentanesulfonate	ND	2.0									
Perfluoropentanoic acid	ND	2.0									
Perfluorotetradecanoic acid	ND	2.0									
Perfluorotridecanoic acid	ND	2.0									
Perfluoroundecanoic acid	ND	2.0									
Surr: D3-N-MeFOSAA	13		9.891		130	50	150				
Surr: D5-N-EtFOSAA	13		9.891		133	50	150				
Surr: M2PFTeDA	19		9.891		194	50	150				S
Surr: M3 GEN X	13		9.891		133	50	150				

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Date Reported: 10/18/2019

Revision v1

Client: Sprinturf

Project: PFAS Analysis of Synthetic Turf Fibers

Batch ID: 50391

Sample ID: MB-50391	Samp Type: MBLK	Test Code: EPA_537-Mod-S-I	Units: µg/Kg	Prep Date: 10/16/2019	RunNo: 114332						
Client ID: PBS	Batch ID: 50391	TestNo: EPA_537-Mod		Analysis Date: 10/18/2019	SeqNo: 2230600						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Value	%RPD	RPDLimit	Qual
Surr: M3PFBS	14		9.891		141	50	150				
Surr: M3PFHxS	13		9.891		130	50	150				
Surr: M5PFHpA	14		9.891		146	50	150				
Surr: M5PFHxA	14		9.891		140	50	150				
Surr: M5PFPeA	14		9.891		144	50	150				
Surr: M6PFDA	16		9.891		162	50	150				S
Surr: M7PFUdA	17		9.891		174	50	150				S
Surr: M8PFOA	15		9.891		153	50	150				S
Surr: M8PFOS	13		9.891		136	50	150				
Surr: M9PFNA	15		9.891		152	50	150				S
Surr: MFPBA	11		9.891		113	50	150				
Surr: MPFDoA	17		9.891		174	50	150				S

Sample ID: LCS-50391	Samp Type: LCS	Test Code: EPA_537-Mod-S-I	Units: µg/Kg	Prep Date: 10/16/2019	RunNo: 114332						
Client ID: LCSS	Batch ID: 50391	TestNo: EPA_537-Mod		Analysis Date: 10/18/2019	SeqNo: 2230601						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Value	%RPD	RPDLimit	Qual
1H,1H,2H,2H-Perfluorodecanesulfonate	9.3	4.0	9.930	0	94.0	70	130				
1H,1H,2H,2H-Perfluorohexanesulfonate	8.2	2.0	9.930	0	83.0	70	130				
1H,1H,2H,2H-Perfluorooctanesulfonate	12	2.0	9.930	0	121	70	130				
HFPO-DA (GEN X)	8.2	4.0	9.930	0	83.0	70	130				
N-ethyl perfluorooctanesulfonamidoacetic acid	7.7	2.0	9.930	0	78.0	70	130				
N-methyl perfluorooctanesulfonamidoacetic acid	12	2.0	9.930	0	117	70	130				
Perfluorobutanesulfonic acid	6.6	2.0	9.930	0	66.0	70	130				S
Perfluorobutanoic acid	6.9	2.0	9.930	0	69.0	70	130				S
Perfluorodecanesulfonate	7.6	2.0	9.930	0	77.0	70	130				
Perfluorodecanoic acid	7.4	2.0	9.930	0	75.0	70	130				
Perfluorododecanoic acid	7.5	2.0	9.930	0	76.0	70	130				
Perfluoroheptanesulfonate	7.2	2.0	9.930	0	73.0	70	130				

RTI Laboratories, Inc. - QC SUMMARY REPORT

WO#: 1910370

Date Reported: 10/18/2019

Revision v1

Client: Sprinturf

Project: PFAS Analysis of Synthetic Turf Fibers

Batch ID: 50391

Sample ID: LCS-50391	Samp Type: LCS	Test Code: EPA_537-Mod-S-I	Units: µg/Kg	Prep Date: 10/16/2019	RunNo: 114332
Client ID: LCSS	Batch ID: 50391	TestNo: EPA_537-Mod		Analysis Date: 10/18/2019	SeqNo: 2230601

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Value	%RPD	RPDLimit	Qual
Perfluoroheptanoic acid	7.2	2.0	9.930	0	73.0	70	130				
Perfluorohexanesulfonic acid	7.9	2.0	9.930	0	80.0	70	130				
Perfluorohexanoic acid	6.6	2.0	9.930	0	66.0	70	130				S
Perfluorononanesulfonate	7.1	2.0	9.930	0	72.0	70	130				
Perfluorononanoic acid	7.2	2.0	9.930	0	73.0	70	130				
Perfluorooctanesulfonic acid	7.1	2.0	9.930	0	71.0	70	130				
Perfluorooctanoic acid	6.9	2.0	9.930	0	69.0	70	130				S
Perfluorooctansulfonamide	9.8	2.0	9.930	0	99.0	70	130				
Perfluoropentanesulfonate	6.8	2.0	9.930	0	68.0	70	130				S
Perfluoropentanoic acid	7.7	2.0	9.930	0	78.0	70	130				
Perfluorotetradecanoic acid	7.2	2.0	9.930	0	73.0	70	130				
Perfluorotridecanoic acid	7.1	2.0	9.930	0	71.0	70	130				
Perfluoroundecanoic acid	7.8	2.0	9.930	0	79.0	70	130				
Surr: D3-N-MeFOSAA	11		9.930		109	50	150				
Surr: D5-N-EtFOSAA	13		9.930		128	50	150				
Surr: M2PFTeDA	18		9.930		186	50	150				S
Surr: M3 GEN X	13		9.930		127	50	150				
Surr: M3PFBS	13		9.930		132	50	150				
Surr: M3PFHxS	13		9.930		126	50	150				
Surr: M5PFHpA	13		9.930		130	50	150				
Surr: M5PFHxA	14		9.930		137	50	150				
Surr: M5PFPeA	14		9.930		138	50	150				
Surr: M6PFDA	15		9.930		152	50	150				S
Surr: M7PFUdA	14		9.930		141	50	150				
Surr: M8PFOA	15		9.930		149	50	150				
Surr: M8PFOS	14		9.930		137	50	150				
Surr: M9PFNA	14		9.930		143	50	150				
Surr: MFPBA	12		9.930		120	50	150				
Surr: MPFDoA	17		9.930		168	50	150				S

RTI Laboratories, Inc. - QC SUMMARY REPORT

WO#: 1910370

Date Reported: 10/18/2019

Revision v1

Client: Sprinturf

Project: PFAS Analysis of Synthetic Turf Fibers

Batch ID: 50391

Sample ID:	LCSD-50391	Samp Type:	LCSD	Test Code:	EPA_537- Mod-S-I	Units:	µg/Kg	Prep Date:	10/16/2019	RunNo:	114332
Client ID:	LCSS02	Batch ID:	50391	TestNo:	EPA_537- Mod			Analysis Date:	10/18/2019	SeqNo:	2230602
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Value	%RPD	RPDLimit	Qual
1H,1H,2H,2H-Perfluorodecanesulfonate	12	4.0	9.881	0	122	70	130	9.335	25.4	30	
1H,1H,2H,2H-Perfluorohexanesulfonate	7.4	2.0	9.881	0	75.0	70	130	8.242	10.6	30	
1H,1H,2H,2H-Perfluorooctanesulfonate	11	2.0	9.881	0	115	70	130	12.02	5.58	30	
HFPO-DA (GEN X)	8.3	4.0	9.881	0	84.0	70	130	8.242	0.702	30	
N-ethyl perfluorooctanesulfonamidoacetic acid	8.9	2.0	9.881	0	90.0	70	130	7.746	13.8	30	
N-methyl perfluorooctanesulfonamidoacetic acid	9.8	2.0	9.881	0	99.0	70	130	11.62	17.2	30	
Perfluorobutanesulfonic acid	6.7	2.0	9.881	0	68.0	70	130	6.554	2.49	30	S
Perfluorobutanoic acid	7.3	2.0	9.881	0	74.0	70	130	6.852	6.50	30	
Perfluorodecanesulfonate	7.3	2.0	9.881	0	74.0	70	130	7.646	4.47	30	
Perfluorodecanoic acid	7.6	2.0	9.881	0	77.0	70	130	7.448	2.14	30	
Perfluorododecanoic acid	7.4	2.0	9.881	0	75.0	70	130	7.547	1.82	30	
Perfluoroheptanesulfonate	7.7	2.0	9.881	0	78.0	70	130	7.249	6.13	30	
Perfluoroheptanoic acid	7.4	2.0	9.881	0	75.0	70	130	7.249	2.21	30	
Perfluorohexanesulfonic acid	7.9	2.0	9.881	0	80.0	70	130	7.944	0.495	30	
Perfluorohexanoic acid	6.4	2.0	9.881	0	65.0	70	130	6.554	2.02	30	S
Perfluorononanesulfonate	7.5	2.0	9.881	0	76.0	70	130	7.150	4.91	30	
Perfluorononanoic acid	7.6	2.0	9.881	0	77.0	70	130	7.249	4.84	30	
Perfluorooctanesulfonic acid	7.1	2.0	9.881	0	72.0	70	130	7.051	0.903	30	
Perfluorooctanoic acid	7.5	2.0	9.881	0	76.0	70	130	6.852	9.16	30	
Perfluorooctansulfonamide	8.5	2.0	9.881	0	86.0	70	130	9.831	14.5	30	
Perfluoropentanesulfonate	7.1	2.0	9.881	0	72.0	70	130	6.753	5.22	30	
Perfluoropentanoic acid	7.8	2.0	9.881	0	79.0	70	130	7.746	0.779	30	
Perfluorotetradecanoic acid	8.1	2.0	9.881	0	82.0	70	130	7.249	11.1	30	
Perfluorotridecanoic acid	7.3	2.0	9.881	0	74.0	70	130	7.051	3.64	30	
Perfluoroundecanoic acid	6.8	2.0	9.881	0	69.0	70	130	7.845	14.0	30	S
Surr: D3-N-MeFOSAA	13		9.881		136	50	150		0	30	
Surr: D5-N-EtFOSAA	14		9.881		139	50	150		0	30	
Surr: M2PFTeDA	20		9.881		201	50	150		0	30	S
Surr: M3 GEN X	13		9.881		134	50	150		0	30	

RTI Laboratories, Inc. - QC SUMMARY REPORT

WO#: 1910370

Date Reported: 10/18/2019

Revision v1

Client: Sprinturf

Project: PFAS Analysis of Synthetic Turf Fibers

Batch ID: 50391

Sample ID: LCSD-50391	Samp Type: LCSD	Test Code: EPA_537-Mod-S-I	Units: µg/Kg	Prep Date: 10/16/2019	RunNo: 114332
Client ID: LCSS02	Batch ID: 50391	TestNo: EPA_537-Mod		Analysis Date: 10/18/2019	SeqNo: 2230602

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Value	%RPD	RPDLimit	Qual
Surr: M3PFBS	15		9.881		151	50	150		0	30	S
Surr: M3PFHxS	14		9.881		146	50	150		0	30	
Surr: M5PFHpA	15		9.881		147	50	150		0	30	
Surr: M5PFHxA	15		9.881		149	50	150		0	30	
Surr: M5PFPeA	15		9.881		153	50	150		0	30	S
Surr: M6PFDA	17		9.881		168	50	150		0	30	S
Surr: M7PFUdA	18		9.881		179	50	150		0	30	S
Surr: M8PFOA	16		9.881		163	50	150		0	30	S
Surr: M8PFOS	15		9.881		149	50	150		0	30	
Surr: M9PFNA	16		9.881		159	50	150		0	30	S
Surr: MFPBA	13		9.881		132	50	150		0	30	
Surr: MPFDoA	19		9.881		192	50	150		0	30	S

DEFINITIONS:

DF: Dilution factor; the dilution factor applied to the prepared sample.

DUP: Duplicate; aliquots of a sample taken from the same container under laboratory conditions and processed and analyzed independently, used to calculate Precision (%RPD).

LCS: Laboratory Control Sample; prepared by adding a known amount of target analytes to a specified amount of clean matrix and prepared with the batch of samples, used to calculate Accuracy (%REC).

LCSD: A duplicate LCS sample, used to calculate both Accuracy (%REC) and Precision (%RPD)

MBLK: Method Blank; a sample of similar matrix that does not contain target analytes or interference that may impact the analytical results and is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedure, used to assess and verify that the analytical process is free of contamination.

MDL: Method Detection Limit; The lowest concentration of analyte that can be detected by the method in the applicable matrix.

Mg/Kg or mg/L: Units of part per million (PPM) – milligram per Kilogram (W/W) or milligram per Liter (W/V).

MS: Matrix Spike; prepared by adding a known amount of target analytes to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available, used to calculate Accuracy (%REC)

MSD: A duplicate MS sample, used to calculate both Accuracy (%REC) and Precision (%RPD)

% REC: Percent Recovery of a known spike (SPK); a measure of accuracy expressed as a percentage of a measured (recovered) concentration compared to the known concentration (SPK) added to the sample. This is compared to the Low Limit and High Limit.

% RPD: Relative Percent Difference; a measure of precision expressed as a percentage of the difference between two duplicates relative to the average concentration. This is compared to the RPD Limit.

PL: Permit limit;; Not included on all reports. Used primarily for wastewater discharge permits.

PQL: Practical Quantitation Limit; The lowest verified limit to which data is quantified without qualifications. Analyte concentrations below PQL are reported either as ND or as a number with a "J" qualifier.

Qual: Qualifier that applies to the analyte reported

RL: Reporting Limit: See PQL

SPK: Spike; used in the QC section for both SPK Value and SPK Ref Val

Ug/Kg or ug/L: Units of part per billion (PPB) – microgram per Kilogram (W/W) or microgram per Liter (W/V).

QUALIFIERS:

*X: Reported value exceeds the maximum allowed concentration by regulation or permit

B: Analyte detected in the associated Method Blank at a concentration > RL.

E: Analyte concentration reported that exceeds the upper calibration standard. Greater uncertainty is associated with this result and data should be considered estimated.

H: Holding time for preparation or analysis has been exceeded

J: Analyte concentration is reported, and is less than the PQL and greater than or equal to the established MDL. Greater uncertainty is associated with this result and data reported is estimated. These analytes are not routinely reviewed nor narrated as to their potential for being laboratory artifacts.

M: Manual Integration used to determine area response

ND: Analyte concentration is less than the Reporting Limit.

P: Second column RPD exceeds 40%

R: % RPD exceeds control limits

S: % REC exceeds control limits

T: MBLK result is greater than 1/2 of the LOQ

U: The analyte concentration is less than the DL.