Report for the Periodic Monitoring of Emissions to Air

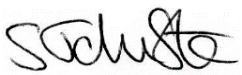
Part 1: Executive Summary

Permit Number:	EPR/BR7321IK
Report:	EEM 20 018 A21 MR v1
Operator:	Tata Steel Colors
Works:	Shotton
Plant:	Color Coat 2
Location:	No.2 Colorcoat
Stack Ref:	A21
Monitoring dates:	14th - 15th December 2020

Address: Tata Steel Group Health Safety & Environment
Unit 2
Meadowhall Business Park
Carbrook Hall Road
Sheffield
S9 2EQ

Date of Report: 16/12/2020

Report Prepared By: Simon Johnston



MCERTS Registration Number: MM 02 114

Function: MCERTS Level 2 (TEs 1, 2, 3, 4)

Report Approved By: Tom Clarkson

MCERTS Registration Number: MM 02 120

Function: MCERTS Level 2 (TEs 1, 2, 3, 4)

Objectives of Monitoring	The objective of this monitoring exercise is to assess compliance of emissions from the plant against the limits set out in the site's permit issued by Natural Resources Wales

Notes:

Use separate worksheet for additional emission points

Each emission point is identified using a unique reference number

Enter * in emission point reference column against each substance to be monitored

Substances to be monitored	Emission Point Identification
	A21
	No.2 Colorcoat
VOCs	*

Special requirements	Normal Operating Conditions

Notes:	
Emission Limit Value	The emission limit value is that stated in the permit and will be expressed as a concentration or a mass emission.
Periodic Monitoring Result	The result given is expressed in the same terms and units as the emission limit value
Uncertainty	The uncertainty associated with the quoted result is at the 95% confidence interval
Reference Conditions	All results are expressed at 273 K and 101.3kPa. The oxygen and moisture corrections are stated.
Monitoring Method Reference	The method stated is in accordance with the Environment Agency Technical Guidance Note M2, or other method approved by the Environment Agency
Accreditation for use of Method	The details indicate the accreditation for the use of the complete monitoring method, e.g.MCERTS, UKAS. If use of the method is not accredited " NA" is stated
Operating Status	The details indicate the feedstock and the loading rate of the plant during monitoring

Emission Point Reference	Substance to be Monitored	Emission Limit Value	Periodic Monitoring Result	Uncertainty	Units	Reference Conditions 273 K, 101.3 kPa	Date of Sampling	Start and End Times	Monitoring Method Reference	Accreditation for use of Method	Operating Status
A21	VOCs	20	16.6	1.16	mg/m^3	Wet, no correction for oxygen	14th - 15th December 2020	11:15 - 11:12	BS EN 12619	MCERTS	Normal Operating Conditions

Notes:	
Process Type	State whether the process is a continuous or batch process.
Process Duration	If a batch process, state the duration, frequency and details of the portion of the batch sampled. If continuous state "NA"
Fuel	If applicable, state the fuel type If not applicable state "NA"
Feedstock	State the feedstock type
Abatement	State the type and whether operational during monitoring. If not applicable state "NA"
Load	State the nomal load, throughput or rating of the plant

Emission Point Reference	Date	Process Type	Process Duration	Fuel	Feedstock *	Abatement	Load*	Comparison of Operator CEMS and Periodic Monitoring Results			
								Substance	CEMS Results	Periodic Monitoring Results	Units
A21	14th - 15th December 2020	Continuous	N/A	Natural Gas	See appendix for process information	RTO	See appendix for process information	VOCs	NA	16.6	mg/m^3

* Denotes customer supplied information

Notes:	
Substance Deviations	State any substance not monitored during the monitoring campaign, together with the reason for the omission from the monitoring campaign. If not applicable state "NA"
Monitoring Deviations	State any deviation from the standard method, the consequences, and the reason for the deviation. If not applicable state "NA"
Other Relevant Issues	State any other information relevant to the monitoring campaign. If not applicable state "NA"

Emission Point Reference	Substance Deviations	Monitoring Deviations	Other Relevant Issues
A21	NA	Only one port used for the pitot traverse, due to obstruction in line B.	Due to the large volume of VOC raw data, this is provided as a separate file (CC2 VOCs 14_15 Dec 2020.pdf)

Appendix 1: General Information

Monitoring organisation staff details
Monitoring organisation method details
Monitoring organisation equipment check list references
Diagram

Monitoring organisation staff details.

Site staff role:	Endorsements:	Name:	MCERTs Number:
Site Team Leader (Level 2)	TE1 TE2 TE3 TE4	Tom Clarkson	MM 02 120
Site Team Leader (Level 2)	TE1 TE2 TE3 TE4	Simon Johnston	MM 02 114

Monitoring organisation method details.

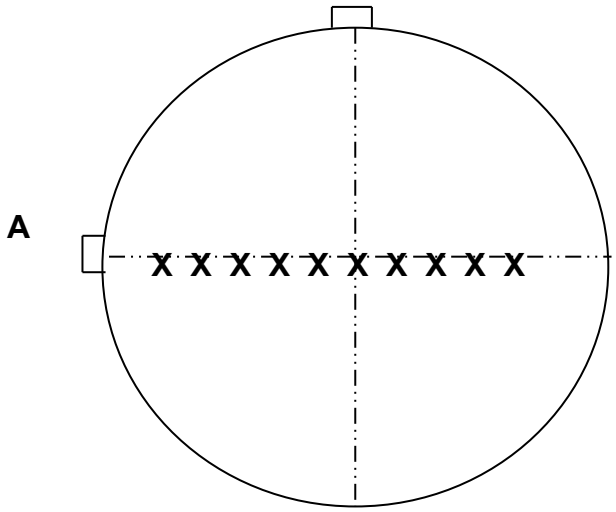
Substance to be monitored:	Group Environment Reference Method:	Monitoring Method Reference:
VOCs	ENV PES 935	BS EN 12619

Monitoring organisation equipment check list references.

Equipment description:	Group Environment Identification Number:
Sick Maihak 3006 FID	EF GA 41
Heated Lines	E HL 15
Heated Line Temperature Controller	E HLC 15b
Gas Sample Probe	E HF 06
Data Logger	EEM DL 06

Calibration / Span / Fuel gas:	Value with units:	Supplier Identification code:
Propane	101.5	233056SG

Sampling point cross section schematic *(not to scale)*



Duct diameter, cm = 225

Port	A	
Sample point	Distance into duct, cm	
1	5.5	
2	18.4	
3	32.9	
4	50.9	
5	76.9	
6	148.1	
7	174.1	
8	192.1	
9	206.6	
10	219.2	

Appendix 2: General Information

A21

Instrumental gas analyser site calibration measurements
Instrumental gas analyser results

Works: Shotton
Plant: Color Coat 2
Sample Point: No.2 Color Coat
Sample Point Reference: A21

14/12/2020
Trial: EEM/20/008
Run: Flow

Static Pressure, mmH_2O:	-9
Barometric Pressure, mm Hg:	745

Stack Diameter, (m):	2.25
Stack Dimensions, (m):	
Pitot Tube Constant:	0.84

Traverse Point No	Delta P, mmH_2O	Stack Temp ^0C	Angle of flow, °
1	2.5	218	3
2	3.0	218	4
3	3.5	219	3
4	3.5	219	0
5	2.5	220	5
6	3.0	220	7
7	4.0	222	4
8	3.5	221	3
9	4.0	220	3
10	4.0	218	2
Minimum	2.5	218	<15
Maximum	4.0	222	<15
Average	3.4	220	

Max. pitot press. =	4.0	Max. Temp.=	222
Min. pitot press. =	2.5	Min. Temp.=	218
Ratio Max:Min =	1.60 :1	Mean Temp.=	220
Acceptable Range (Based on Flow Dp)	9 :1	Acceptable Temp. Range =	244 to 195

Stack Velocity (actual) m/s (wet)	8.17
Mean Stack Temperature, ^oC	220
Stack Velocity (STP) Nm/s (wet)	4.43
Stack Velocity (STP) Nm/s (dry)	4.31
Stack Area, m^2	3.98
Stack Gas Volume Flow Rate (actual). m^3/s (wet)	32.50
Stack Gas Volume Flow Rate (STP) wet. Nm^3/s (wet)	17.64
Stack Gas Volume Flow Rate (STP) dry. Nm^3/s (dry)	17.15
Stack Pressure, mm Hg	744

Gas Data

Oxygen %	19.4
CO_2 %	1.4
CO %	
Moisture %	2.8

Oxygen Correction

Required Correction Value	0
Oxygen Factor	1.000
Enter 0 if correction is not required	0

Gas Calculations

Gas Molecular Mass (Stack) kg/kmol (wet)	28.692
Gas Density (Stack) kg/m^3 STP (wet)	0.695

Gas Calibration and Data Logging Record Sheet

Date:	14th - 15th December 2020	**Sample Point:**	No.2 Colorcoat	**Run:**	VOCs
Works:	Shotton	**Sample Point Reference Number:**	A21	**Operators:**	TC/DW
Plant:	Color Coat 2	**Trial Number:**	EEM/20/018		

Gas Species	Cylinder ID No.	Value	Gas Species	Cylinder ID	Value
Propane	233056SG	101.5	Nitrogen		

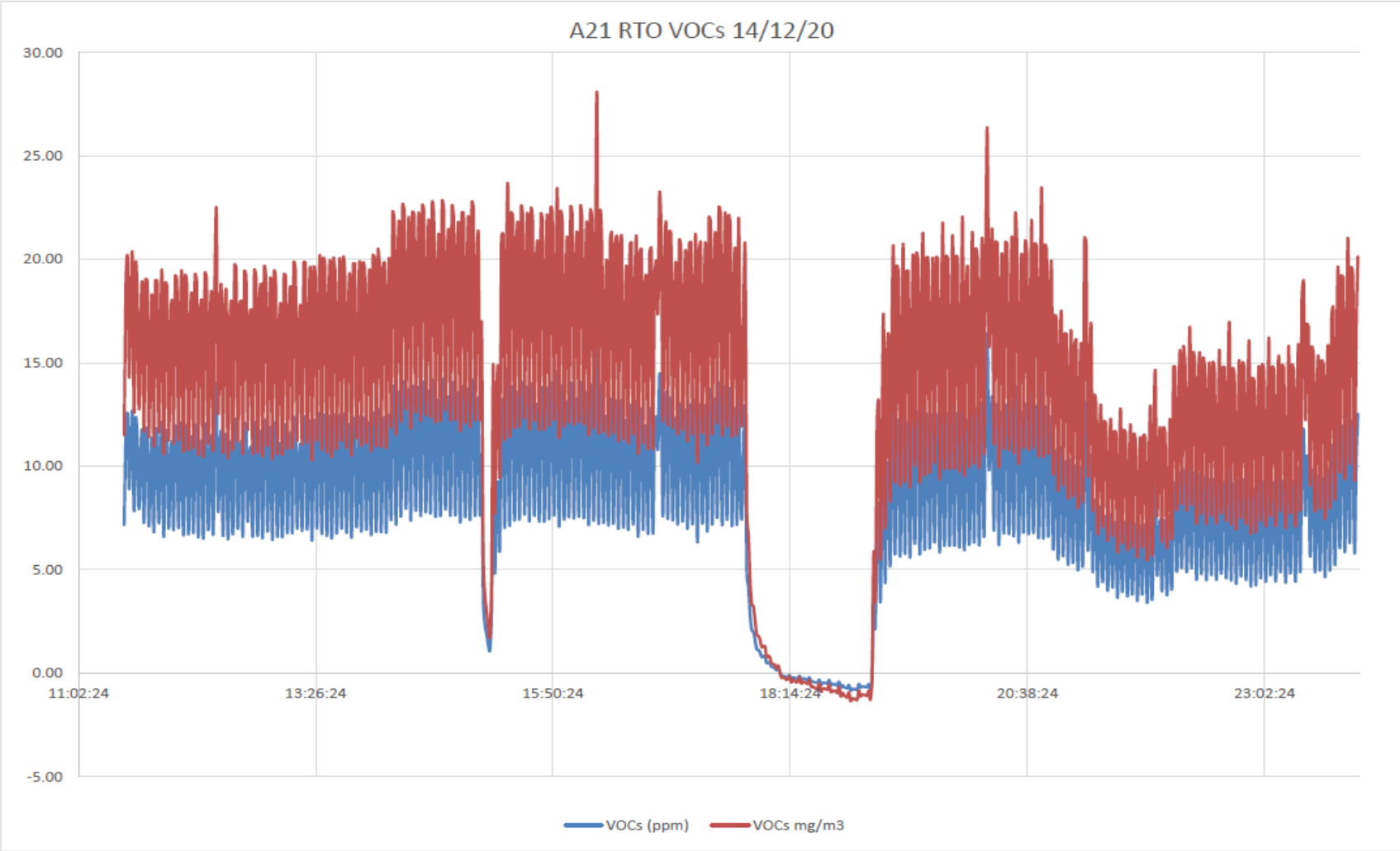
Calibration Set (Pre - run)					
Time	14/12/2020 11:15				
	Analyser Range	**Low Calibration**	**High Calibration**	**Low Check**	**Logger Channel**
VOCs	100	0.0	101.5	0.0	
Leak Check	✓			**Ambient Temp. °C**	9

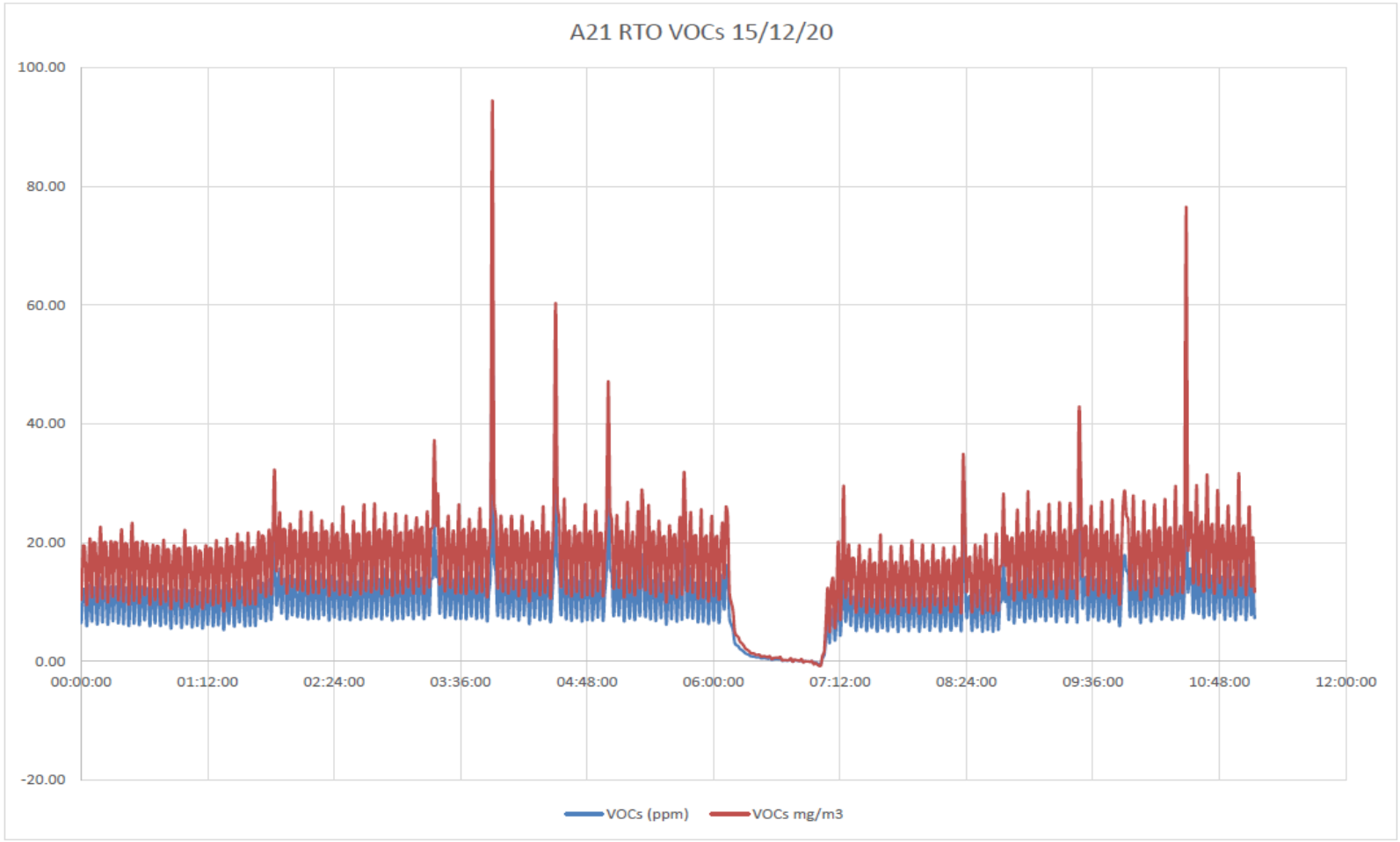
Full System Check			
	Zero System Check	**Cal. System**	**T90% Time**
VOCs	0.00	101.70	23.00
Heated Line Temp. °C	180		
Gas Conditioner Temp. °C	NA		

Calibration Check (Post – run)				
Time / Date	15/12/2020 11:12			
	Analyser Range	**Low Check**	**High Check**	**Intermediate Check (If applicable)**
VOCs	100	-0.80	102.60	N/A
Heated Line Temp. °C	180			
Gas Conditioner Temp. °C	NA			

Sample run accepted and calibrations within tolerance? YES

Signed by (on site): S. Johnston **Date:** 14th - 15th December 2020


A21 RTO VOCs 14/12/20
30.00
25.00
20.00
15.00
10.00
5.00
0.00
-5.00
11:02:24
13:26:24
15:50:24
18:14:24
20:38:24
23:02:24
VOCs (ppm)
VOCs mg/m3


A21 RTO VOCs 15/12/20
100.00
80.00
60.00
40.00
20.00
0.00
-20.00
00:00:00
01:12:00
02:24:00
03:36:00
04:48:00
06:00:00
07:12:00
08:24:00
09:36:00
10:48:00
12:00:00
VOCs (ppm)
VOCs mg/m3

Appendix 3: General Information

A21

Uncertainty Calculations
Process information

VOC Uncertainty

Enter values into yellow cells. Instrument is selected from Drop Down list.

Instrument	Sick FID
Studied Concentration (mg/m^3)	16.6
Studied Concentration (mg/m^3) - Ref O_2	16.6

Cal Gas Conc ppm	101.5
Cal Gas Conc mg/m^3	163
Emission Limit Value	20

Calculated Value

Calculated Value

Input Data as Required

Taken From Data

Measurement Range (ppm)	0-100

Sampling Parameters to be met	Requirement Met?
Response Time < 200s	Yes
Operating temperature (5 - 35°C)	Yes
Atmospheric pressure (700 - 1240 mbar)	Yes
Relative Humidity (10 - 90%, non condensing)	Yes
Altitude (< 2000 m)	Yes
Zero Drift < 2% of FSD (<5% Corrected)	Yes
Span Drift <2% of FSD (<5% Corrected)	Yes

	Start	Finish	Difference
Zero drift	0	-0.8	0.8
Span Drift	101.7	102.6	-0.9

	Min	Max	Difference
Amospheric Pressure	745	748	0.3999
Ambient Temperature	281	281	0
Site Voltage	105	115	10
Sample Gas Pressure	200	200	0

Test Duration	1437	Mins
Sample Frequency	1	Mins
Number of Samples	1437	

Selected Performance Characteristic	Value of Performance Characteristic		
	Numerical	%	Conversion Factor
Response Time	2	0.02	1.61
Lack of Fit	0.3	0.3	1.61
Zero Drift	0.8	0.005	1.61
Span drift	-0.9	-0.006	1.61
Sensitivity to Atmospheric Pressure	0.5	0.5	0.32
Sensitivity to Sample Gas Pressure	0.5	0.5	0.00
Temperature Dependence	-0.240	-0.240	1.61
Voltage Supply	0.5	0.5	0.80
Interferants	0.250	0.250	1.61
Repeatability Standard Deviation at Zero	0.06	0.06	1.61
Repeatability Standard Deviation at Span	0.06	0.06	1.61
Uncertainty of Calibration Gas	2	2	0.02
Loss in sample line (Leaks)	2	2	0.02

Measurement Performance related to stationary conditions			
Performance Characteristic	Uncertainty Quantity	U	U^2
Response Time	$U_{response}$	0.019	0.000
Lack of Fit	U_{Fit}	0.278	0.077
Zero Drift	$U_{dr,\ 0}$	0.005	0.000
Span drift	$U_{dr,\ sp}$	-0.005	0.000
Sensitivity to Atmospheric Pressure	U_{Atmos}	0.093	0.009
Sensitivity to Sample Gas Pressure	U_{spress}	0.000	0.000
Temperature Dependence	U_{temp}	-0.223	0.050
Voltage Supply	$U_{Voltage}$	0.232	0.054
Interferants	$U_{Interference}$	0.232	0.054
Repeatability Standard Deviation at Zero	$U_{SD,\ 0}$	0.096	0.009
Repeatability Standard Deviation at Span	$U_{SD,\ sp}$	0.000	0.009
Uncertainty of Calibration Gas	$U_{Calibration\ gas}$	0.192	0.037
Loss in sample line (Leaks)	$U_{Losses,\ leak}$	0.192	0.037

Correction for reference conditions		
	O2, %	Moisture %
Reference	20.90	0.00
Measured	20.90	0.00
Uncert	0.17	0.50
Factors	1.00	1.00
Uncertainty in Factor	0.00	0.01
Correction Factor	**1.00**	
Uncertainty Factor	**0.01**	

Measurement Uncertainty at	16.6	mg/m^3	
U_{tot}	0.58		
U_{tot} Expanded	1.16	mg/m^3	
$U_{tot}^{/c}$	7.0	% of measured value	
Pass	5.8	Yes	<30% Relative at the daily ELV

Measurement Uncertainty at (Ref O_2)	16.6	mg/m^3	
U_{tot}	0.59		
U_{tot} Expanded	1.17	mg/m^3	
$U_{tot}^{/c}$	7.0	% of measured value	
Pass	5.9	Yes	

STITCH DATE	STITCH TIME	COMMENT	BATCH	MATERIAL	SREFT		COLOUR	Prod	GAUGE	WIDTH	SPEED
16/12/2020	05:58:34		7838450000		10257667	6621	ANTHRACITE	Lg/ss	0.475	1250	82.8
16/12/2020	05:48:34		7707350210	LEADER					0	0	72.7
16/12/2020	05:02:38		5248450000		10255945	6621	ANTHRACITE	Lg/ss	0.675	1250	75.2
16/12/2020	04:35:48		6328452000		10256221	6621	ANTHRACITE	Lg/ss	0.5	1250	95
16/12/2020	04:07:48		6328451000		10256221	6621	ANTHRACITE	Lg/ss	0.5	1250	94.8
16/12/2020	03:18:45		1548450000		10255945	6621	ANTHRACITE	Lg/ss	0.675	1250	75
16/12/2020	02:29:43		4438450000		10260096	6621	ANTHRACITE	Lg/ss	0.675	1250	75
16/12/2020	02:06:23		3048450000		10255692	3705	OCEAN BLUE	Lg/ss	0.675	1250	75
16/12/2020	01:19:53		6948450000		10255692	3705	OCEAN BLUE	Lg/ss	0.675	1250	75.1
16/12/2020	00:19:44		6587450000		10256474	6401	MERLIN GREY	Lg/ss	0.42	1220	95
15/12/2020	23:16:24		3758450000		10256474	6401	MERLIN GREY	Lg/ss	0.42	1220	95
15/12/2020	22:24:30		5008450000		10257652	6401	MERLIN GREY	Lg/ss	0.5	1220	95
15/12/2020	21:29:29		7157450000		10256490	6401	MERLIN GREY	Lg/ss	0.5	1235	94.9
15/12/2020	20:42:38		7276450000		10257653	1627	AZTEC YELLOW	Lg/ss	0.675	1250	75.1
15/12/2020	20:15:11		4247450000		10256404	6401	MERLIN GREY	Lg/ss	0.5	1235	94.9
15/12/2020	19:48:52		4247450000		10256404	6401	MERLIN GREY	Lg/ss	0.5	1235	94.9
15/12/2020	18:03:22		4002353000	LEADER					0.679	1255	80.2
15/12/2020	17:15:59		6518450000		10256405	6401	MERLIN GREY	Lg/ss	0.675	1230	76.4
15/12/2020	16:26:50		2618450000		10256405	6401	MERLIN GREY	Lg/ss	0.675	1230	75
15/12/2020	15:42:00		3628450000		10259055	6401	MERLIN GREY	Lg/ss	0.85	1250	60
15/12/2020	14:54:39		3076450000		10255969	1061	TANGERINE ORANGE	Lg/ss	0.675	1250	75
15/12/2020	14:06:17	LB	5276450000		10255969	1061	TANGERINE ORANGE	Lg/ss	0.675	1250	75
15/12/2020	13:40:27		1846450000		10259548	6692	DUNLUCE GREY	Lg/ss	0.595	1165	80.1
15/12/2020	13:30:00		SOLT-TEST						0	0	0
15/12/2020	12:46:13		2797450000		10259542	6692	DUNLUCE GREY	Lg/ss	0.465	1165	95
15/12/2020	11:42:49		5097450000		10259540	6692	DUNLUCE GREY	Lg/ss	0.42	1208	95
15/12/2020	11:18:36		4488451000		10259540	6692	DUNLUCE GREY	Lg/ss	0.42	1208	95
15/12/2020	10:49:00		4488453000		10259540	6692	DUNLUCE GREY	Lg/ss	0.42	1208	95
15/12/2020	09:45:33		9097450000		10259540	6692	DUNLUCE GREY	Lg/ss	0.42	1208	95
15/12/2020	08:41:12	QN	4818450000		10259540	6692	DUNLUCE GREY	Lg/ss	0.42	1208	94.8
15/12/2020	08:40:00		SOLT-TEST						0	0	0
15/12/2020	07:49:37		1248450000		10255818	6692	DUNLUCE GREY	Lg/ss	0.595	1208	80
15/12/2020	06:11:49		2248450000		10255818	6692	DUNLUCE GREY	Lg/ss	0.595	1208	80
15/12/2020	06:05:33		3945355000	LEADER					0	0	84.3
15/12/2020	05:09:43		6098450000		10259730	6692	DUNLUCE GREY	Lg/ss	0.465	1208	95
15/12/2020	04:40:00		SOLT-TEST						0	0	0
15/12/2020	04:11:23		5888450000		10259730	6692	DUNLUCE GREY	Lg/ss	0.465	1208	95
15/12/2020	03:27:44		5997450000		10259730	6692	DUNLUCE GREY	Lg/ss	0.465	1208	95
15/12/2020	02:28:30		1888450000		10259730	6692	DUNLUCE GREY	Lg/ss	0.465	1208	95
15/12/2020	01:31:55		5328450000		10259730	6692	DUNLUCE GREY	Lg/ss	0.465	1208	94.6
15/12/2020	00:33:57		8798450000		10256038	2500	JUNIPER GREEN	Lg/ss	0.48	1178	90
14/12/2020	23:35:56		2848450000		10255886	2500	JUNIPER GREEN	Lg/ss	0.475	1220	89.9
14/12/2020	22:47:30		5937450000		10256275	2500	JUNIPER GREEN	Lg/ss	0.675	1220	75
14/12/2020	22:00:00		SOLT-TEST						0	0	0
14/12/2020	21:57:16		5316450000		10256858	2500	JUNIPER GREEN	Lg/ss	0.675	1220	75
14/12/2020	21:11:29		1828450000		10260117	2500	JUNIPER GREEN	Lg/ss	0.85	1220	58.3
14/12/2020	20:48:18		9458450000		10256841	2500	JUNIPER GREEN	Lg/ss	0.675	1230	75
14/12/2020	19:55:44		8865450000		10258176	2500	JUNIPER GREEN	Lg/ss	0.5	1235	90
14/12/2020	19:00:02		9186450000		10256141	2500	JUNIPER GREEN	Lg/ss	0.5	1250	90
14/12/2020	17:44:07		4002353000	LEADER					0.679	1255	84.1
14/12/2020	17:14:31	QN-DG	7218450000		10256848	2500	JUNIPER GREEN	Lg/ss	0.475	1250	89.1
14/12/2020	16:14:42		2127450000		10256212	6456	GRAPHITE 81S	EGP	0.45	1250	90
14/12/2020	15:10:52		9887450000		10259541	6400	G/WING GREY	Lg/ss	0.42	1208	95
14/12/2020	14:03:03	QN-DG	3097450000		10259541	6400	G/WING GREY	Lg/ss	0.42	1208	94.6
14/12/2020	13:18:44		5856450000		10259543	6400	G/WING GREY	Lg/ss	0.465	1165	90
14/12/2020	12:27:31		1898452000		10255937	6400	G/WING GREY	Lg/ss	0.48	1178	90
14/12/2020	11:34:16		4288450000		10255937	6400	G/WING GREY	Lg/ss	0.48	1178	90
14/12/2020	11:04:44		9798450000		10255937	6400	G/WING GREY	Lg/ss	0.48	1178	90
14/12/2020	10:45:00		SOLT-TEST						0	0	0
14/12/2020	10:36:42		9798450000		10255937	6400	G/WING GREY	Lg/ss	0.48	1178	90
14/12/2020	09:45:30		2298452000		10255937	6400	G/WING GREY	Lg/ss	0.48	1178	90
14/12/2020	09:03:48		6598450000		10255937	6400	G/WING GREY	Lg/ss	0.48	1178	89.5
14/12/2020	08:02:28		9038450000		10259541	6400	G/WING GREY	Lg/ss	0.42	1208	95
14/12/2020	05:51:20		1567450000		10259541	6400	G/WING GREY	Lg/ss	0.42	1208	95
14/12/2020	05:44:02		4019253100	LEADER					0.679	1250	87.1
14/12/2020	04:42:30		2048450000		10259541	6400	G/WING GREY	Lg/ss	0.42	1208	95
14/12/2020	03:40:29		3538450000		10259541	6400	G/WING GREY	Lg/ss	0.42	1208	96.4
14/12/2020	02:46:00		SOLT-TEST						0	0	0
14/12/2020	02:37:49		1538450000		10259541	6400	G/WING GREY	Lg/ss	0.42	1208	95
14/12/2020	01:39:11		1048450000		10259552	2835	NIGHTSHADE GREEN R6007	Lg/ss	0.465	1208	95
14/12/2020	00:36:18		2538450000		10259541	6400	G/WING GREY	Lg/ss	0.42	1208	95