

Schedule of Accreditation

issued by

United Kingdom Accreditation Service

2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

 <p>1015 Accredited to ISO/IEC 17025:2005</p>	Environmental Scientifics Group Limited Trading as ESG	
	Issue No: 108 Issue date: 20 June 2017	
	ESG House Bretby Business Park Ashby Road Bretby Burton upon Trent Staffordshire DE15 0YZ	Contact: Mr A Watkinson Tel: +44 (0)1283 554400 Fax: +44 (0)1283 554422 E-Mail: accreditations@esg.co.uk Website: www.esg.co.uk
Testing performed by the Organisation at the locations specified below		

Locations covered by the organisation and their relevant activities

Laboratory locations:

Location details	Activity	Location code	
Address ESG House Bretby Business Park Ashby Road Bretby Burton upon Trent Staffs DE15 0YZ	Local contact Mr A Watkinson Tel: +44 (0)1283 554400 Fax: +44 (0)1283 554422 Email: sales@esg.co.uk	Forensics, Water Microbiology, Environmental Chemistry, Specialist Chemistry Physical Testing, Gas Analysis, Occupational Hygiene & Environmental Monitoring Analysis Support Functions: Quality Management including document control, auditing and quality control	Bretby
Address Unit 12 Moorbrook Southmead Industrial Park Didcot Oxfordshire OX11 7HP	Local contact Mr P.Duncan Tel: +44 (0)1235 750730 Fax: +44 (0)1235 750739 Email: sales@esg.co.uk	Environmental Chemistry Environmental Radiochemistry	Didcot
Address 2-8 Langlands Place Kelvin South Business Park East Kilbride G75 0YF	Local contact Mr D Hay Tel: +44 (0)7949645479 Fax: +44 (0)1355 246730 Email: sales@esg.co.uk	Atmospheric Pollutants Physical Testing Stack Emissions Testing Water Microbiology	E Kilbride
Address Unit 5 Crown Industrial Estate Kenwood Road Reddish Stockport SK5 6PH	Local contact Mr M.Woodruff Tel: +44 (0)161-443 0980 Fax: +44 (0)161-443 0989 Email: sales@esg.co.uk	Atmospheric Pollutants Physical Testing Stack Emissions Testing	Stockport



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Location details	Activity	Location code
<p>Address Unit D 2 Wilkinson Road Bankside Business Park Cirencester Gloucestershire GL7 1YT</p> <p>Local contact Dr N Ford Tel: +44 (0)1285 700593 Email: sales@esg.co.uk</p>	<p>Atmospheric Pollutants Physical Testing Stack Emissions Testing Water Microbiology, Environmental Chemistry</p>	Cirencester
<p>Address Asken Road Carcroft Doncaster DN6 8DC</p> <p>Local contact Mr W Halkett Tel: +44 (0)1302-724455 Fax: +44 (0)1302-727233 Email: sales@esg.co.uk</p>	<p>Physical Testing</p>	Carcroft
<p>Address Unit 20 Falcon Business Centre Ashton Road Romford Essex RM3 8UR</p> <p>Local contact Mr P.Jones Tel: +44 (0)1708 330760 Email: sales@esg.co.uk</p>	<p>Stack Emissions Testing</p>	Romford
<p>Address Kempston Laboratory 14 Railton Road Wolseley Business Park Kempston Bedfordshire MK42 7PN</p> <p>Local contact Ms R Batham Tel: +44 (0)1283 554 430 Email: sales@esg.co.uk</p>	<p>Gas Analysis</p>	Kempston



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Site activities performed away from the locations listed above:

Location details	Activity	Location code
Commercial and Industrial Premises	Dust Sampling	Site - Dust
Customer Sites Requiring Stack Emissions Testing	Stack Emissions Testing	Stacks
All site locations suitable for the activities listed	Sampling and on-site testing	Site - Env
Customer Sites Requiring Boiler Testing	Boiler testing	Boilers
Sites	Gas Sampling and Analysis	Site - Gas
Customer Premises	Water Sampling and Analysis	Site - Water



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DETAIL OF ACCREDITATION

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
WORKPLACE ATMOSPHERES	<u>Health and Hygiene</u> Sampling of Airborne Dust	In house method ENV/009A in accordance with MDHS 14/4	Site - Dust
	Determination of Airborne Dust	In house method ENV/054 in accordance with MDHS 14/4 by Gravimetry	East Kilbride
DRUGS (and materials suspected of containing drugs)	<u>Forensic Analysis</u> Legal classification of controlled drugs (Misuse of Drugs Act 1971)	Documented In-House method ASUS 104 using GC-MS	Bretby
	Identification of: - Amphetamine - Methamphetamine - MDA - MDMA - MDEA - MBDB - Cannabis - Cocaine - Diamorphine		
	Identification of - LSD	Documented In-House Method ASUS 603 using HPLC	
	Quantitation of: - Amphetamine - MDMA - Ketamine	Documented In-House Method ASUS 126 using GC-MS	Bretby
DRUGS	Quantitation of: - MDMA - Cannabis – THC - Cocaine - Diamorphine - Ketamine	Documented In-House Method ASUS 126 using GC-FID	Bretby
	Identification of Cannabis, cannabis resin and cannabis products	Documented in house method (FORS 204 Annex D) using – microscopy	Bretby



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LACHRYMATORS	<u>Forensic Analysis</u> Identification of - Ortho-chlorobenzalmalonitrile (CS)	Documented in house method (FORS 223) using GCMS	Bretby
WATER Potable, Natural, and Lightly Polluted Water	<u>Microbiological Testing</u> Enumeration of Total Coliforms and <i>E coli</i>	Documented In-House Methods based on procedures in "The Microbiology of Drinking Water 2002" unless stated otherwise ENV/209 using single membrane filtration and MLGA	Bretby E Kilbride
	Confirmation of Coliforms and <i>E coli</i>	ENV/210 and ENV/208	Bretby E Kilbride
	Total Viable Counts at 22 °C, 30 °C and 37 °C	ENV/206 using pour plate method based on "The Microbiology of Drinking Water 2007"	Bretby E Kilbride
Potable and Lightly Polluted waters	Legionella	ENV/212 based on BS 6068 4.12:1998	Bretby E Kilbride
WATER Potable water (Non regulatory), Process water (including domestic hot water systems), Groundwater, Surface water, Recreational waters (swimming pools), Saline waters and Trade effluent	Enumeration of Total Coliforms and <i>E coli</i>	ENV/209 using single membrane filtration and MLGA	Cirencester
	Confirmation of Coliforms and <i>E coli</i>	ENV/210 and ENV/208	Cirencester
	Total Viable Counts at 22 °C, 30 °C and 37 °C	ENV/206 using pour plate method based on "The Microbiology of Drinking Water 2007"	Cirencester
Potable, Natural, lightly polluted waters, recreational waters, bottled water. Domestic hot water	<i>Pseudomonas Aeruginosa</i>	ENV/246 - based on The Microbiology of Drinking Water (2010) – Part 8, using membrane filtration	Bretby
Drinking water (Non regulatory), Process water, Groundwater, Surface water, and Trade effluent	<u>Chemical Testing</u> pH	Documented in house method ENV/303c	Cirencester



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Drinking water (Non regulatory), Process water, Groundwater, Surface water, and Trade effluent (cont'd)	<u>Chemical Testing</u> (cont'd)		
	Chemical oxygen Demand	Documented in house method ENV/304	Cirencester
	Solids – Suspended, settleable and rapidly settleable	Documented in house method ENV/303a	Cirencester
DNPH IMPREGNATED MATERIALS Filters, Plastic and Glass Silica Gel tubes, Impinger Solutions	Formaldehyde Acetaldehyde	ASC/SOP/201 using HPLC	Bretby
SOILS plus Sediments, Silts, Sands, and Vegetation	<u>Radiochemical Tests</u>	Documented In-House Methods	
	Gross Alpha and Beta	2005 using source preparation and proportional counting	Didcot
	<u>Isotopes:</u>		
	Sulphur-35	2111 using radiochemical separation and liquid scintillation counting	Didcot
	Plutonium-238, 239 + 240 Americium-241	2117 using radiochemical separation and Alpha Spectrometry	Didcot
	Technetium-99	2134 using radiochemical separation and liquid scintillation counting	Didcot
	Uranium-234, 235 and 238	2123 using radiochemical separation	Didcot
Soils and Sediments	Thorium 228, 230 and 232	2112 using alpha spectrometry	Didcot
ENVIRONMENTAL SAMPLES including: Soils, Sediments, Silts, Sands, Vegetation, Foodstuffs, Atmospheric Pollutants, Effluents, and Waters	Qualitative and quantitative determination of gamma-ray emitting radio isotopes	2031 (low energy), 2029 (> 120 KeV) 2152 (30 - 2000keV) using GammaTool software to correct for sample density and composition where this is sufficiently well known using Gamma-Ray Spectrometry	Didcot



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Environmental and decommissioning materials foodstuffs and feeding stuffs All Solid Combustible Materials WATERS Effluents plus Clean and Natural waters Ground water, Surface water Effluent, Landfill leachate, Saline water, Seawater, Sewage effluent, Bottled water and Drinking water Effluents Clean and Natural Waters	<u>Radiochemical Tests</u> (cont'd)	Documented In-House Methods	
	Carbon-14	2103 using pyrolysis and liquid scintillation counting	Didcot
	Total Tritium	2094	Didcot
	Alpha and Beta activity	2002 based on BS ISO 9696 for gross alpha and BS ISO 9697 for gross beta and Methods for the Examination of Waters and Associated Materials	Didcot
	Polonium-210	2082 using radiochemical separation and Alpha Spectrometry	Didcot
	Plutonium-238, 239 + 240 Americium-241 Uranium-234, 235 and 238	2116 using radiochemical separation and Alpha Spectrometry	Didcot
	Strontium-90	ANU/SOP/2105 by gas flow proportional counting	Didcot
	Thorium-228, 230 and 232	2119 using radiochemical separation and Alpha Spectrometry	Didcot
	Technetium-99	2134 using radiochemical separation and liquid scintillation counting	Didcot
	Tritium	2003 using Distillation and Liquid Scintillation Counting	Didcot
Tritium	2093 using Distillation and Liquid Scintillation Counting	Didcot	



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Rainwater	<u>Chemical Tests</u> pH and Conductivity	Documented In-House Methods ASC/SOP/109 electrochemical method	Bretby
Rainwater and Process Water	Calcium Magnesium Potassium Sodium Bromide Chloride Fluoride Nitrate Nitrite Phosphate Sulphate	ASC/SOP/106 using ion chromatography ASC/SOP/110 using ion chromatography	Bretby
WATERS plus seawater, silt, sediment, seaweed, grass, and soil	Sampling	ANU/SOP/2135	Site-Env
ENVIRONMENT ie beaches, strandlines, debris, riverbanks, and canal banks	On-site radiation monitoring	ANU/SOP/2128	Site-Env



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ATMOSPHERIC POLLUTANTS AND EFFLUENTS	<u>Chemical Tests</u>	Documented In-House Methods	
Diffusion tubes	Nitrogen dioxide	1015 using spectrophotometry	Didcot
	Sulphur Dioxide	1011 using Ion Chromatography	Didcot
Tenax ATD tubes	Benzene Toluene Ethylbenzene Ortho-Xylene Meta and para-Xylenes	ASC/SOP/211 using ATD-GCMS	Bretby
Tenax ATD tubes	Hexachlorobutadienes Pentachlorobutadienes Tetrachlorobutadienes	ASC/SOP/206 using ATD-gas chromatography mass spectrometry and flame ionisation detection	Bretby
Carbopack ATD tubes	Benzene	ASC/SOP/236 by ATD-GCMS	Bretby
ATMOSPHERIC POLLUTANTS AND EFFLUENTS - STACK GAS SAMPLES	<u>Chemical Tests</u>	Documented In-House Methods based on the following national, international and other recognised standards	
Impinger Solutions (3% hydrogen peroxide)	Bromide Chloride Phosphate Sulphate and Volume Measurement	ASC/SOP/110 using ion chromatography	Bretby
Impinger Solutions (0.1M sodium hydroxide)	Bromide Chloride Fluoride Nitrate Nitrite and Volume Measurement	ASC/SOP/110 using ion chromatography	Bretby



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ATMOSPHERIC POLLUTANTS AND EFFLUENTS - STACK GAS SAMPLES (cont'd)	<u>Chemical Tests</u> (cont'd)	Documented In-House Methods based on the following national, international and other recognised standards	
Impinger Solutions (80% IPA)	Sulphate and Volume Measurement	ASC/SOP/110 using ion chromatography	Bretby
Impinger Solutions (0.5M sulphuric acid)	Bromide Chloride Fluoride and Volume Measurement	ASC/SOP/110 using ion chromatography	Bretby
Impinger Solutions (0.1M sodium hydroxide, water or 0.5M sulphuric acid)	Hydrogen chloride, Hydrogen bromide, Hydrogen fluoride, and Volume Measurement	US EPA Method 26A using IC analysis (ASC/SOP/110)	Bretby
Impinger Solutions (3% hydrogen peroxide)	Sulphur Dioxide (by calculation) and Volume Measurement	BS EN 14791:2005 using IC analysis (ASC/SOP/ 110)	Bretby
Impinger Solutions (0.1M sodium hydroxide)	Hydrogen fluoride and Volume Measurement	BS ISO 15713:2006 (modified) using IC analysis (ASC/SOP/110)	Bretby
Impinger Solutions (process water)	Hydrogen Chloride and Volume Measurement	BS EN 1911:2010 using IC analysis (ASC/SOP110)	Bretby
Impinger Solutions (0.5M sulphuric acid)	Ammonia and Volume Measurement	BS EN 14791:2005 using Ion Chromatography method ASC/SOP/108	Bretby
Filters, filters and probe rinses (nitric acid), impinger solutions (nitric acid/hydrogen peroxide)	Trace elements As, Cd, Co, Cr, Cu, Mn, Ni, Pb, Sb, Tl, V and Volume Measurement	BS EN 14385:2004 Using HF microwave digestion followed by ICP-MS analysis (ASC/SOP/117)	Bretby
Filters, filters and probe rinses (nitric acid), impinger solutions (nitric acid/hydrogen peroxide)	Trace elements Hg, In, Pd, Pt, Sn and Volume Measurement	HF microwave digestion followed by ICP-MS (ASC/SOP/117)	Bretby
Filters, filters and probe rinses (nitric acid), impinger solutions (nitric acid/hydrogen peroxide)	Trace elements Cd, Co, Cr, Cu, Mn, Ni, Pb, V and Volume Measurement	BS EN 14385:2004 Using HF microwave digestion followed by ICP-AES analysis (ASC/SOP/117)	Bretby



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ATMOSPHERIC POLLUTANTS AND EFFLUENTS - STACK GAS SAMPLES (cont'd)	<u>Chemical Tests</u> (cont'd)	Documented In-House Methods based on the following national, international and other recognised standards	
Filters, filters and probe rinses (nitric acid), impinger solutions (nitric acid/hydrogen peroxide)	Trace elements Fe, Zn and Volume Measurement	HF microwave digestion followed by ICP-AES (ASC/SOP/117)	Bretby
Impinger Solutions (nitric acid/potassium dichromate)	Trace element Hg and Volume Measurement	BS EN 13211:2001 using CVAFS (ASC/SOP/112)	Bretby
Surface water, Ground water, Sea water, lab-made leachate and landfill leachates	Hg	BS EN 13211:2001 using CVAFS (ASC/SOP/132)	Bretby
DNPH tubes	Formaldehyde Acetaldehyde (As DNPH derivatives)	ASC/SOP/201 using HPLC	Bretby
Filter papers	Particulates (PM ₁₀ and PM _{2.5})	Documented in house method ENV/054 based on BS EN 12341 :1999 Annex C using gravimetry	East Kilbride
Dust, airborne	Dust Deposition (soiling), evaluation of	Documented in-house method AE 140 using loss of reflectance measured by Rendell Dust Meter	Cirencester



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ATMOSPHERIC POLLUTANTS	<u>Physical Testing</u>	Documented In-House Methods based on the following national, international and other recognised standards	
Filter papers and rinse solutions	Weighing of Particulate Matter	BS EN 13284-1:2002 BS ISO 9096:2003 (AE 106)	E Kilbride Stockport Cirencester
	Weighing of Particulate Matter <10 micron (PM ₁₀ and PM _{2.5})	BS EN ISO 23210:2009 (AE 106)	E Kilbride Stockport Cirencester
Testing of Stack Emissions to Atmosphere	<u>Sampling with Subsequent analysis by an ISO/IEC 17025 Accredited Laboratory</u>	National, European, International and Environment Agency specified standards including MIDs and Documented In-House work instructions to meet the requirements of the Environment Agency (MCERTS) Performance Standard and DD CEN/TS 15675:2007/ BS EN 15259:2007	
	Iodine and Fluorine	US EPA Method 26/26A (AE 114)	Stacks
	Oxides of Nitrogen	US EPA Method 7D (AE 139)	Stacks
	<u>Sampling and On-Line analysis</u>		
	Tar Fume, Bitumen Fume, and Oil Mist	Documented in-house methods TP105 & TP106 based on BS EN 13284-1 :2002	Stacks
	Formaldehyde	US EPA Method 316 (AE 114)	Stacks



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Testing of Stack Emissions to Atmosphere (cont'd)	<u>Sampling with Subsequent analysis by an ISO/IEC 17025 Accredited Laboratory (cont'd)</u>	National, European, International and Environment Agency specified standards including MIDs and Documented In-House work instructions to meet the requirements of the Environment Agency (MCERTS) Performance Standard and DD CEN/TS 15675:2007/ BS EN 15259:2007	
	Total Particulate Matter	BS EN 13284-1:2002 (AE 104)	Stacks
	Particulate Matter <10 micron (PM ₁₀ and PM _{2.5})	BS EN ISO 23210:2009 (AE 137)	Stacks
	Hydrogen Chloride	BS EN 1911:2010 (AE 111)	Stacks
	Hydrogen Fluoride	BS ISO 15713:2006 (AE 113)	Stacks
	Halides and Halogens: Hydrogen Bromide Hydrogen Iodide Chlorine Bromine	US EPA Methods 26 and 26A (AE 114)	Stacks
	Hydrogen Cyanide Total Cyanide	US EPA OTM 29 (AE 133)	Stacks
	Isocyanates	US EPA CTM 036 (AE 116)	Stacks
	Metals	BS EN 14385:2004 (AE 108)	Stacks
	Mercury	BS EN 13211:2001 (AE 107)	Stacks
	Hexavalent Chromium (Cr ⁺⁶)	US EPA Method 0061 (AE 148)	Stacks
Odour	BS EN 13725 :2003 (AE 142)	Stacks	



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Testing of Stack Emissions to Atmosphere (cont'd)	<u>Sampling with Subsequent analysis by an ISO/IEC 17025 Accredited Laboratory (cont'd)</u>	National, European, International and Environment Agency specified standards including MIDs and Documented In-House work instructions to meet the requirements of the Environment Agency (MCERTS) Performance Standard and DD CEN/TS 15675:2007/ BS EN 15259:2007 (cont'd)	
	Dioxins and Furans	BS EN 1948-1:2006 (AE 109)	Stacks
	Dioxin-like Polychlorinated Biphenyls (PCB's)	BS EN 1948-4:2010 (AE 109)	Stacks
	Polycyclic Aromatic Hydrocarbons (PAH's)	BS ISO 11338-1:2003 (AE 110)	Stacks
	Sulphur Dioxide	BS EN 14791:2005 (AE 112)	Stacks
	Sulphur Trioxide and Sulphuric Acid Mist	US EPA Method 8 (AE 114)	Stacks
	Speciated VOC's (carbon and other suitable tubes) (direct sampling of dry stacks and dynamic dilution sampling of hot wet stacks) Mercaptans Amines and Amides Phenols Cresols Carboxylic Acids Aldehydes Formaldehyde	PD CEN/TS 13649:2014 (AE 118)	Stacks
	Methanol (direct sampling of dry stacks and dynamic dilution sampling of hot wet stacks)	PC CEN/TS 13649:2014 (AE 118)	Stacks
	Ammonia	BS EN 14791:2005 (AE 115)	Stacks



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Testing of Stack Emissions to Atmosphere (cont'd)	<u>Sampling with Subsequent analysis by an ISO/IEC 17025 Accredited Laboratory (cont'd)</u>	National, European, International and Environment Agency specified standards including MIDs and Documented In-House work instructions to meet the requirements of the Environment Agency (MCERTS) Performance Standard and DD CEN/TS 15675:2007/ BS EN 15259:2007 (cont'd)	
	Hydrogen Sulphide	US EPA Method 11 (AE 132)	Stacks
	<u>Sampling and On-Site analysis</u>		
	Water Vapour	BS EN 14790:2005 (AE 105)	Stacks
	<u>Sampling and On-Line analysis</u>		
	Pressure, Temperature and Velocity (Point Velocity Method)	BS EN 16911-1:2013 (Method AE154 using differential pressure device (pitot tube) method)	Stacks
	Pressure, Temperature and Velocity (Point Velocity Method)	BS EN 16911-1:2013 (excluding specific requirements and guidance in MID 116911-1) (Method AE 154 using differential pressure device (pitot tube) method)	Stacks
	Water Vapour*	EA TGN M22 (AE 063, AE 145 - Validated FTIR analyser)	Stacks
Ammonia*	EA TGN M22 (AE 063, AE 145 - FTIR analyser)	Stacks	
Hydrogen Chloride*	EA TGN M22 (AE 063, AE 145 - Validated FTIR analyser)	Stacks	



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Testing of Stack Emissions to Atmosphere (cont'd)	<u>Sampling and On-Line analysis</u> (cont'd)	National, European, International and Environment Agency specified standards including MIDs and Documented In-House work instructions to meet the requirements of the Environment Agency (MCERTS) Performance Standard and DD CEN/TS 15675:2007/ BS EN 15259:2007 (cont'd)	
	Hydrogen Fluoride*	EA TGN M22 (AE 063, AE 145 - FTIR analyser)	Stacks
	Carbon Dioxide*	ISO 12039:2001 (AE 102 NDIR analyser) EA TGN M22 (AE 063, AE 145 - FTIR analyser)	Stacks
	Carbon Monoxide*	BS EN 15058:2006 (AE 102 - NDIR analyser) EA TGN M22 (AE 063, AE 145 - Validated FTIR analyser)	Stacks
	Nitrogen Monoxide (NO)*	BS EN 14792:2005 (AE 102- Chemiluminescence analyser) EA TGN M22 (AE 063, AE 145 - Validated FTIR analyser)	Stacks
	Nitrogen Dioxide (NO ₂)*	BS EN 14792:2005 (AE 102 - Chemiluminescence analyser) EA TGN M22 (AE 063, AE 145 - Validated FTIR analyser)	Stacks
	Oxides of Nitrogen (NO _x)*	BS EN 14792:2005 (AE 102 - Chemiluminescence analyser) EA TGN M22 (AE 063, AE 145 - Validated FTIR analyser)	Stacks



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	Nitrous Oxide (N ₂ O)*	EA TGN M22 (AE 063, AE 145 - FTIR analyser)	Stacks
	Sulphur Dioxide*	EA TGN M21 (AE 102- NDIR analyser) EA TGN M22 (AE 063, AE 145 - FTIR analyser)	Stacks
	Methanol*	EA TGN M22 (AE 063, AE 145 - FTIR analyser)	Stacks
	Ammonia*	EA TGN M22 (AE 063, AE 145 - FTIR analyser)	Stacks
	Sulphur Hexafluoride*	EA TGN M22 (AE 063, AE 145 - FTIR analyser)	Stacks
	Oxygen*	BS EN 14789:2005 (AE 102- Paramagnetic analyser) (AE 102 - Validated Zirconium cell analyser)	Stacks
Total Gaseous Organic Carbon* (TOC/VOC) (0 to 1000 mg/m ³)	BS EN 12619:2013 (AE 102 - FID analyser)	Stacks	



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Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
Testing of Stack Emissions to Atmosphere (cont'd)	<p><u>Sampling and On-Line analysis</u> (cont'd)</p> <p><i>Halides and Halogens</i> <i>Speciated VOCs</i> <i>Other inorganic gases</i></p> <p><i>The organisation holds a flexible scope of accreditation for these tests. Please contact the organisation for details of the individual gaseous compounds they can sample and analyse to this method.</i></p>	<p>National, European, International and Environment Agency specified standards including MIDs and Documented In-House work instructions to meet the requirements of the Environment Agency (MCERTS) Performance Standard and DD CEN/TS 15675:2007/ BS EN 15259:2007 (cont'd)</p> <p>EA TGN M22 (AE 063, AE 145 - FTIR analyser)</p>	

* - The scale range of the analyser used for this test must be that detailed on its current MCERTS certificate or a range validated by the organisation to meet MCERTS requirements.

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Stack Emissions - Continuous Emissions Monitoring Systems (CEMS)	QAL 2 and the Annual Surveillance Test (AST) for CEMS	Documented in-house procedure AE 063 to meet the requirements of BS EN 14181:2014, Environment Agency MID 14181 (TGN M20 Annex A) and other requirements of the Environment Agency (MCERTS) Performance Standard and DD CEN/TS 15675:2007/ BS EN 15259:2007	Stacks
Testing of Stack Emissions to Atmosphere	<u>Sampling with subsequent analysis by an ISO/IEC 17025 Accredited Laboratory</u>	National, European, International and Irish Environmental Protection Agency specified standards and Documented In-House work instructions to meet the requirements of Irish Environmental Protection Agency Publications AG1 and AG2 and DD CEN/TS 15675:2007/ IS EN 15259:2007	
	Total Particulate Matter	IS EN 13284-1:2002 including Environment Agency (England) MID 13284-1 (AE 104)	Stacks
	Particulate Matter <10 micron (PM ₁₀ and PM _{2.5})	IS EN ISO 23210:2009 (AE 137)	Stacks
	Particulate size fractionation	IS EN ISO 23210:2009 (AE 136)	Stacks
	Hydrogen Chloride	IS EN 1911-2010 (AE 111)	Stacks
	Total Acids	IS EN 1911-2010 (AE 111)	Stacks
	Sulphur Dioxide	IS EN 14791:2005 (AE 112)	Stacks
	Ammonia	IS EN 14791:2005 (AE 115)	Stacks



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Testing of Stack Emissions to Atmosphere (cont'd)	<u>Sampling with subsequent analysis by an ISO/IEC 17025 Accredited Laboratory (cont'd)</u>	National, European, International and Irish Environmental Protection Agency specified standards and Documented In-House work instructions to meet the requirements of Irish Environmental Protection Agency Publications AG1 and AG2 and DD CEN/TS 15675:2007/ IS EN 15259:2007	
	Hydrogen Fluoride	IS ISO 15713:2006 including Environment Agency (England) MID 15713 (AE 113)	Stacks
	<u>Halides and Halogens</u> Excluding: Hydrogen Chloride Hydrogen Fluoride	US EPA Methods 26 and 26a (AE 114)	Stacks
	Metals	IS EN 14385:2004 including Environment Agency (England) MID 14385 (AE 108)	Stacks
	Mercury	IS EN 13211:2001 including Environment Agency (England) MID 14385 (AE 107)	Stacks
	Odour	IS EN 13725 :2003 2006 including Environment Agency (England) MID 13725 (AE 142)	Stacks
	Dioxins and Furans	IS EN 1948-1:2006 2006 including Environment Agency (England) MID 1948 (AE 109)	Stacks
Dioxin-like Polychlorinated Biphenyls (PCBs)	IS EN 1948-4:2010 including Environment Agency (England) MID 1948 (AE 109)	Stacks	



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Testing of Stack Emissions to Atmosphere (cont'd)	<u>Sampling with subsequent analysis by an ISO/IEC 17025 Accredited Laboratory (cont'd)</u>	National, European, International and Irish Environmental Protection Agency specified standards and Documented In-House work instructions to meet the requirements of Irish Environmental Protection Agency Publications AG1 and AG2 and DD CEN/TS 15675:2007/ IS EN 15259:2007	
	Polycyclic Aromatic Hydrocarbons (PAH's)	IS ISO 11338-1:2003 (AE 110)	Stacks
	Speciated VOC's (carbon and other suitable tubes) (direct sampling of dry stacks and dynamic dilution sampling of hot wet stacks) Amines and Amides Phenols and Cresols Aldehydes	PD CEN/TS 13649:2014 (AE 118)	Stacks
	Hydrogen sulphide	US EPA Method 11 (AE 132)	Stacks
	Formaldehyde	US EPA Method 316 (AE 114)	Stacks
	<u>Sampling and On-Site analysis</u>		
	Water Vapour	IS EN 14790:2005 (AE 105)	Stacks
	<u>Sampling and On-Line analysis</u>		
	Carbon Dioxide†	ISO 12039:2001 (AE 102 NDIR analyser)	Stacks
	Carbon Monoxide†	IS EN 15058:2006 (AE 102 - NDIR analyser)	Stacks
Nitrogen Monoxide (NO)†	IS EN 14792:2005 (AE 102- Chemiluminescence analyser)	Stacks	



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Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
Testing of Stack Emissions to Atmosphere (cont'd)	<u>Sampling and On-Line analysis</u> (cont'd)	National, European, International and Irish Environmental Protection Agency specified standards and Documented In-House work instructions to meet the requirements of Irish Environmental Protection Agency Publications AG1 and AG2 and DD CEN/TS 15675:2007/ IS EN 15259:2007	
	Nitrogen Dioxide (NO ₂)†	IS EN 14792:2005 (AE 102 - Chemiluminescence analyser)	Stacks
	Oxides of Nitrogen (NO _x)†	IS EN 14792:2005 (AE 102 - Chemiluminescence analyser)	Stacks
	Oxygen†	IS EN 14789:2005 (AE 102- Paramagnetic analyser) (AE 102 - Validated Zirconium cell analyser)	Stacks
	Total Gaseous Organic Carbon† (TOC/VOC) (0 to 1000 mg/m ³)	IS EN 12619:2013 (AE 102 - FID analyser)	Stacks
	Pressure, Temperature and Velocity (Point Velocity Method)	IS EN 16911-1:2013 including Environment Agency (England) MID 116911-1 (Method AE 154 using differential pressure device (pitot tube) method)	Stacks
	Pressure, Temperature and Velocity (Point Velocity Method)	IS EN 16911-1:2013 (Method AE 154 using differential pressure device (pitot tube) method)	Stacks

† - The scale range of the analyser used for this test must meet the specific requirements specified in the Irish Environmental Protection Agency document "AG2 Index of Preferred Methods".



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POLLUTANTS and EFFLUENTS: ATMOSPHERIC Passive dust samples from deposit and directional dust gauges and monitors	<u>Physical Tests</u>		
	Dust deposition rate	Documented In-House Method FD01 based on BS 1747:Part 1:1969(91) BS 1747:Part 5:1972(91) BS 872:2005	Bretby
Rainwater	Soiling	Documented In-House Method FD05 based on Beaman & Kingsbury Reflectometer Method	Bretby
	<u>Chemical Tests</u>		
	pH Electrical Conductivity (Dissolved Solids)	Documented In-House Method FD03 based on BS 2690:Part 109:1984(89) BS 6068:Section 2.35:1993 and ISO 7888	Bretby
POLLUTANTS: ATMOSPHERIC Dust samples collected by pumped systems	<u>Health and Hygiene</u>		
	<u>Analysis</u>		
	Mass of respirable airborne dust (Coal mines)	Documented in House Method MORD 1 based on MDHS14/4 (gravimetric) and The Coal Mines Control of Inhaleable Dust Regulations 2007	Bretby
Filter samples	Mass of total and respirable dust	Documented In-House Method MORD 2 based on MDHS 14/4 (gravimetric)	Bretby
	Mass of total inhalable dust and particulate matter	Documented In-House Method MORD 2 based on MDHS 14/4	Bretby
	<u>Chemical Tests</u>		
	Mass of welding fume	Documented In-House Method MORD 2 based on BS EN ISO 10882-1:2001	Bretby



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Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
POLLUTANTS: ATMOSPHERIC (cont'd)	<u>Health and Hygiene (cont'd)</u>		
	<u>Chemical Tests (cont'd)</u>		
Filter samples (cont'd)	Quartz in respirable dust	Documented In-House Method MDRQC1 using FTIR spectrometry based on MDHS 101, February 2005	Bretby
ATMOSPHERIC POLLUTANTS AND EFFLUENTS - STACK GAS SAMPLES	<u>Chemical Tests</u>	Documented In-House Methods based on the following national, international and other recognised standards	
Filters Probe and impinger rinses (toluene, acetone and water) XAD-2 resin trap	Polychlorinated biphenyls (PCBs): PCB # 77 PCB # 81 PCB #105 PCB #114 PCB #118 PCB #123 PCB #126 PCB #156 PCB #157 PCB #167 PCB #169 PCB #189	BS EN 1948-4:2010 and A1:2013 Extraction followed by HRGCMS analysis (ASC/SOP/239 / HR-GCMS)	Bretby
Filters Probe and impinger rinses (toluene, acetone and water) XAD-2 resin trap	Poly Chlorinated Dibenzo-p-Dioxins (PCDD): 2,3,7,8-TCDD 1,2,3,7,8-PeCDD 1,2,3,6,7,8-HxCDD 1,2,3,4,7,8-HxCDD 1,2,3,7,8,9-HxCDD 1,2,3,4,6,7,8-HpCDD OCDD	BS EN 1948-2:2006 and BS EN 1948-3:2006 Extraction followed by HRGCMS analysis (ASC/SOP/239 / HR-GCMS)	Bretby



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ATMOSPHERIC POLLUTANTS AND EFFLUENTS - STACK GAS SAMPLES (cont'd)	<u>Chemical Tests</u> (cont'd) Poly Chlorinated Dibenzo Furans (PCDF): 2,3,7,8-TCDF 1,2,3,7,8-PeCDF 2,3,4,7,8-PeCDF 1,2,3,4,7,8-HxCDF 1,2,3,6,7,8-HxCDF 2,3,4,6,7,8-HxCDF 1,2,3,7,8,9-HxCDF 1,2,3,4,6,7,8-HpCDF 1,2,3,4,7,8,9-HpCDF OCDF	Documented In-House Methods based on the following national, international and other recognised standards	Bretby
Filters Probe and impinger rinses (toluene, acetone and water) XAD-2 resin trap	Polychlorinated biphenyls (PCBs): PCB # 77 PCB # 81 PCB #105 PCB #114 PCB #118 PCB #123 PCB #126 PCB #156 PCB #157 PCB #167 PCB #169 PCB #189	US EPA Method 23 Extraction followed by HRGCMS analysis (ASC/SOP/239 / HR-GCMS)	Bretby
Filters Probe and impinger rinses (toluene, acetone and water) XAD-2 resin trap	Poly Chlorinated Dibenzo-p-Dioxins (PCDD): 2,3,7,8-TCDD 1,2,3,7,8-PeCDD 1,2,3,6,7,8-HxCDD 1,2,3,4,7,8-HxCDD 1,2,3,7,8,9-HxCDD 1,2,3,4,6,7,8-HpCDD OCDD	US EPA Method 23 Extraction followed by HRGCMS analysis (ASC/SOP/239 / HR-GCMS)	Bretby



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ATMOSPHERIC POLLUTANTS AND EFFLUENTS - STACK GAS SAMPLES (cont'd)	<u>Chemical Tests</u> (cont'd)	Documented In-House Methods based on the following national, international and other recognised standards	
Soils and Ashes	Polychlorinated biphenyls (PCBs): PCB # 77 PCB # 81 PCB #105 PCB #114 PCB #118 PCB #123+108+107 PCB #126 PCB #156 PCB #157 PCB #167 PCB #169 PCB #189	Solvent extraction followed by HRGC-MS analysis (ASC/SOP/240/ HR-GCMS)	Bretby
Soils and Ashes	Poly Chlorinated Dibenzo-p-Dioxins (PCDD) and Poly Chlorinated Dibenzo Furans (PCDF): 2,3,7,8-TCDF 1,2,3,7,8-PeCDF 2,3,4,7,8-PeCDF 1,2,3,4,7,8-HxCDF 1,2,3,6,7,8-HxCDF 2,3,4,6,7,8-HxCDF 1,2,3,7,8,9-HxCDF 1,2,3,4,6,7,8-HpCDF 1,2,3,4,7,8,9-HpCDF ODCF 2,3,7,8-TCDD 1,2,3,7,8-PeCDD 1,2,3,4,7,8-HxCDD 1,2,3,6,7,8-HxCDD 1,2,3,7,8,9-HxCDD 1,2,3,4,6,7,8-HpCDD OCDD	Solvent extraction followed by HRGC-MS analysis (ASC/SOP/240/ HR-GCMS)	Bretby



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<p>ATMOSPHERIC POLLUTANTS AND EFFLUENTS - STACK GAS SAMPLES (cont'd)</p> <p>Filters Probe and impinger rinses (toluene, acetone and water) XAD-2 resin trap</p>	<p><u>Chemical Tests (cont'd)</u></p> <p>Poly Chlorinated Dibenzo Furans (PCDF): 2,3,7,8-TCDF 1,2,3,7,8-PeCDF 2,3,4,7,8-PeCDF 1,2,3,4,7,8-HxCDF 1,2,3,6,7,8-HxCDF 2,3,4,6,7,8-HxCDF 1,2,3,7,8,9-HxCDF 1,2,3,4,6,7,8-HpCDF 1,2,3,4,7,8,9-HpCDF OCDF</p>	<p>Documented In-House Methods based on the following national, international and other recognised standards</p> <p>US EPA Method 23 Extraction followed by HRGCMS analysis (ASC/SOP/239 / HR-GCMS)</p>	Bretby
<p>DUST and PARTICULATES</p> <p>Dust Gauges, Occupational Dust and Environmental Deposits</p>	<p><u>Qualitative Characterisation</u></p> <p>Qualitative analysis in order to differentiate Silica, Coal, General dirt (Aluminosilicates), Calcium Minerals, Fly-ash, Partially combusted carbonaceous materials, plant/animal fragments</p>	<p>Documented In-House Method using SEM/EDS, No SEMDG7</p>	Bretby
<p>AMBIENT AIR</p>	<p><u>Chemical Analysis</u></p> <p>Carbon dioxide Carbon monoxide Oxygen Methane Nitrogen (by difference)</p>	<p>Documented In-House Method using non-dispersive infra-red and paramagnetic analysers (GAS01)</p>	Bretby



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GAS SAMPLES Including: LANDFILL GAS NATURAL GAS DRAINED GAS	<u>Chemical Analysis</u>		
	Carbon dioxide Carbon monoxide Oxygen Methane Nitrogen (by difference)	Documented In-House Method using non-dispersive infra-red and paramagnetic analysers (GAS01)	Bretby
	Carbon Dioxide Hydrogen Helium Methane Nitrogen Oxygen	Documented In-House Methods using gas chromatography with conductivity flame ionisation detector (GAS09)	Bretby
	Methane Ethane Propane Butane Pentane Hexane Heptane Octane	Documented In-House Methods using gas chromatography flame-ionisation detector (GAS03)	Bretby
	Gross and Net Calorific Value for C ₁ to C ₈ Hydrocarbons	(GAS03 Calculated value)	Bretby
LANDFILL GAS	<u>Sampling and Analysis</u>		
	Trace components Bulk gases monitoring	Documented In-House Method (GAS14) based on Environment Agency publication LFTGN 04 using adsorbent tube and Tedlar bag	Site - Gas
	Surface methane emissions monitoring	Method using Flux Box and portable FID analyser (GAS14 LFTGN07)	Site - Gas
	Walkover survey (ppm to %)	GAS14 using portable Flame Ionisation Detector (FID)	Site - Gas



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LANDFILL GAS (cont'd)	<u>Chemical Analysis</u> Carbon dioxide Helium Hydrogen Methane Nitrogen Oxygen	Documented In-House Method using gas chromatography with thermal conductivity and flame ionisation detectors (GAS09)	Bretby
WASTE WATERS Groundwater, Surface water, Fresh water, Leachate (from landfill), Trade effluent (to controlled water)	<u>Sampling</u> "Spot" sampling of Lakes, streams, rivers, groundwaters and waste waters <u>Analysis</u> pH Conductivity Dissolved Oxygen Turbidity Temperature	Documented In-House Method GAS16 Documented In-House Method GAS16	Site - Water Site - Water
WASTE WATERS Trade effluent to controlled water and sewer Untreated sewage Treated sewage effluent	<u>Sampling</u> For: Chemical Testing	Documented In-House Method to meet the requirements of the Environment Agency MCERTS Performance Standard - sampling and chemical testing of untreated sewage, sewage effluent and trade effluent Method GAS 16 using manual spot sampling	Site - Water Site - Water
Trade effluent to controlled water and sewer	<u>Chemical Testing</u> pH Conductivity Temperature	Documented In-House Method GAS16	Site - Water
END			