Emission Measurements

The Measurement Group of Pöyry Energy Oy, which is an accredited (CEN ISO/IEC 17025:2000) test laboratory T062, makes annually about 100 emission and performance tests. The accreditation is confirmed by FINAS – Finnish Accreditation Service.

The scope of accreditation comprises measurements of particle, NOx, SO_2, CO, CO_2, O_2, CxHy, HCl and HF concentrations from exhaust and stack gases as well as determination of volumetric flow and composition of flue gas.

Our international and domestic references cover most processes from power plants to industrial plants in the forest, steel and chemical industries. Below are listed the most important processes measured, test methods and customers.

Processes

PROCESS	PLANT TYPE	EMISSIONS MEASURED
Power Plants	Coal-fired boilers Natural gas-fired gas turbines and boilers Bubbling fluidized (BFB) and circulating fluidized (CFB) bed boilers fuelled with peat, wood and REF Heavy and light oil and gas-fired hot water boilers Heavy and light fuel and gas oil-fired diesel engines Heavy and light fuel oil and gas-fired gas turbines Orimulsion-fired diesel engines Oil-shale-fired boilers Blast furnace gas and coal oil fired boilers Oil refinery exhaust gas-fired boilers Bio gas and bio-oil fired engines, motors, burners and boilers Heat recovery boilers	NO_x, SO_2 and SO_3, CO, CO_2, TOC, particulates (TSP), PM10 and condensable particulates O_2, CO_2, heavy metals, PCDD/F, chlorophenoles, PAH
Pulp and Paper Industry	Recovery boiler Lime kiln Bark boilers	NO_x, SO_2, TRS, CO, particulates, PM10, PM2,5, PM1,0, O_2, CO_2, TOC, heavy metals, PCDD/F, chlorophenoles, PAH
	Odorous gas boilers Odorous gas burners	NO_x, SO_2, TRS, CO, O_2, CO_2, Malodorous sulphur compounds
	Evaporating plant Pulp mill process gases Crude tall oil acidulation plant	Malodorous sulphur compounds, VOCs
	Bleaching plants	Cl_2 and ClO_2

PROCESS	PLANT TYPE	EMISSIONS MEASURED
	Paper machines' exhaust gases Coating machines' exhaust gases Laminating machines exhaust gases	VOCs O_3 TOC, VOC
Forest Industry	Sawmill thermal treatment plant	TOC, VOC
PCC Plant	Plant manufacturing precipitated calcium carbonate (PCC)	NO_x, SO_2, TRS, CO
Cement Industry	Cement factory clinker kiln Clinker oven	NO_x, SO_2, CO, CO_2, TOC, particulate, PAH, PCDD/F, heavy metal, HCl and HF, chlorophenoles, PCBs
Polluted Soil Treatment Plant	Polluted soil system treatment by incineration	NO_x, SO_2, CO, CO_2, TOC, particulate, PAH, PCDD/F, heavy metal, HCl and HF, chlorophenoles, PCBs
Water Glass Kiln Gypsum Plate Factory	Water glass kiln fuelled with gas	Particulates, CO and NO_x
Processes Emitting VOCs	Paint factory with regenerative thermal treatment of VOCs Paint factory with catalytic burner for treatment of VOCs Paintshop Printing press Flexographic press Latex factory Pharmaceutical factory Coffee roastery Barrel washing plant Vapour Recovery Unit in oil terminal Mechanical pulp manufacturing (TMP)	VOCs, CO and NO_x VOCs
Foundry	Foundry	Particulates and heavy metals
Metal Industry	Metal treatment hydrochloric acid recovery unit, zinc and paint coating units	Particulates, HCl, Cl_2, ClO_2, VOC, NO_x, CO, heavy metals, H_2SO_4, CH_3COOH
Chemical Plant	Chemical factory exhaust gases	Cl_2, ClO_2, HCl
Pharma-ceutical Plant	Manufacturing of pharmaceutical raw materials	Ethyl chloride
Dispersion and Explosives Plant	Manufacturing of explosives, their raw materials and dispersions	NO_x, CO, CO_2, SO_2, VOC

Test Methods

Sampling	Sampling method (e.g. drying, heating, condensation) is chosen according to conditions of the gas to be measured, the used analysis method and instruments.
Analysis	Analysis method is chosen according to the information needed. Available methods are: • gas chromatography analysis of momentary samples • continuous TRS measurements with two SO_2 analysers and a converter • continuous FTIR measurements with additional gas chromatography checking to avoid misleading results of FTIR analysis • continuous NO_x measurements with chemiluminescence, FTIR or NDIR • continuous SO_2 measurements with UV-fluorescence, FTIR or NDIR • continuous CO measurements with IR, NDIR and FTIR • continuous O_2 measurements with paramagnetic or chemical cell • continuous CO_2 measurements with NDIR and FTIR • continuous VOC measurements with FID and FTIR • particulate measurements with gravimetric isokinetic device (in-stack or out-stack sampling) • particulate size distribution (PM10, PM2,5 and PM 1,0) by impactor

Standard EN 14181:2004 (QAL-2 and AST measurements)

Clients

Stora Enso Oyj, Anjalankoski, Kemi, Oulu, Kotka, Summa and Imatra Mills
Pohjalan Voima Oy, Kristiinankaupunki and Pori
Vaskiluodon Voima Oy, Vaasa and Seinäjoki
Nokian Lämpövoima Oy, Nokia and Kotka
Fortum Power and Heat Oy, Espoo, Joensuu and Uimaharju
Pori Energia Oy
UPM-Kymmene Oyj Rauma Oy
Oy Alholmens Kraft Ab
Helsinki Energia
Lappeenrannan Energia Oy
Finnsementti Oy, Lappeenranta and Parainen
Mäntän Energia Oy
Rautaruukki Oyj, Raahe
Äänevoima Oy
M-real Oyj Kirkniemi

Clients

Power Plants

Finland	Fortum Power and Heat Oy, Espoo and Joensuu PVO-Lämpövoima Oy, Kristiinankaupunki and Pori Vaskiluodon Voima Oy, Vaasa and Seinäjoki, Nokia Lämpövoima Oy, Nokia Vantaan Energia Oy, Vantaa Mussalon Kaukolämpö Oy, Kotka UPM-Kymmene Oyj, Valkeakoski, Rauma, Lappeenranta Lahden Lämpövoima Oy, Lahti Vaasan Sähkö Oy, Vaasa Vanhan Ruukin Kiinteistöpalvelu, Karkkila Mäntän Energia Oy, Mänttä Schauman Wood Oy, Kuopio	Gasum Oy, Valkeala, Mäntsälä, Räikkölä M-real Oyj, Lohja and Simpele Kotkan Energia, Kotka Stora Enso Oyj, Kotka, Anjalankoski Tampere Power Utility, Tampere Helsingin Energia, Helsinki Neste Oil and Gas Oy, Porvoo Tervakoski Oy, Tervakoski Porvoon Energia Oy, Porvoo Keravan Energia Oy, Kerava

Alholmens Kraft Oy, Pietarsaari
Vamy Oy, Myllykoski
Metsä-Botnia Oy, Rauma
Porin Lämpövoima Oy, Pori
Pori Energia Oy, Pori
Järvi-Suomen Voima Oy, Ristiina
Turku Energia Oy, Turku
Juurakkotuli Oy, Sodankylä
Pieksämäen Energia Oy, Pieksämäki
Kumpuniemen Voima Oy, Suolahti
Etelä-Savon Energia Oy, Siekkilä
Rautaruukki Oyj, Raahe
Luvian Saha Oy, Luvia
Lapuan Saha Oy, Lapua
Ähtärin Energia ja Vesi Oy, Ähtäri

International Wärtsilä Oy, Finland – Performance tests, emission and R&D measurements for the power plants in: Aruba, Tanzania, Turkey, Honduras, Brazil, Kenya, Mexico, Guatemala, Cameroon, Italy, Sri Lanka, Dominican Republic, El Salvador, Netherlands Antilles, India, Bangladesh, Portugal, Spain, Denmark, Sudan, Senegal

El Paso Energy International, Brazil, Bangladesh and Nicaragua

Stora Enso Oyj, Spain

UPM-Kymmene Oyj, P.R. China

Foster Wheeler Oy/ Eesti Energia, Narva, Estonia
Foster Wheeler Oy, Ireland and P.R. China

Paper and Pulp Industry

Finland Stora Enso Oyj Imatra Mills, Heinola, Kemi, Kotka, Oulu, Varkaus, Pankakoski, Summa,
Enocell Oy, Uimaharju;
Kemijärven Sellu Oy, Kemijärvi;
Laminating Papers Oy Kotka,
Corenso United Oy Ltd, Varkaus and Pori

Metsä-Botnia Oy, Rauma and Kaskinen Mills
M-real Oyj, Simpele

International Billerud Karlsborg AB, Sweden
M-real Sverige AB, Husum Mill, Sweden
Korsnäs AB, Korsnäsverken, Gävle, Sweden
Södra Cell AB, Mörrum, Sweden
UPM Kymmene (UK) Ltd, Shotton Mill, UK

Plants Emitting VOCs

Finland
TL-Coating Oy, Salo
Valtra Oy, Suolahti
Punamusta Oy, Joensuu,
Eka Polymer Latex Oy, Oulu
LH-Lift Oy, Laukaa
Patria Aviation Oy and Patria Aerostructures Oy, Laukaa
Stenqvist Suomi Oy, Merikarvia
Rautaruukki Oy Ruukki Production
Kalvopakkaus Oy, Salo
Onni Forsell Oy, Rajamäki
Ekokem Oy, Jämsänkoski
Shell Oy, Helsinki, Oulu, Pori, Vaasa, Varkaus
Esso Oy, Helsinki
Fortum Oil and Gas Oy, Kemi, Kokkola, Naantali and Sköldvik
Stora Enso Oyj Publication Paper
Dynea Chemicals Oy, Kitee Mill

International Kraft Foods Sverige AB Gevaliarosteriet, Gävle, Sweden
BrØdr. Sunde A/S, Ålesund, Norway

Other

Foundry	Componenta Oyj, Karkkila Purso Oy, Ikaalinen Leinovalu Oy, Vantaa and Salo
Paint Manufacturing Plant	Teknos Oy, Helsinki Tikkurila Oy, Helsinki Ehovoc Oy, Karkkila
Dispersion and Explosives Factory	Forcit Oy, Hanko Eurenco Vihtavuori Oy, Vihtavuori
Pharmaceutical Factory	Orion-Yhtymä Oyj, Hanko and Oulu
Gypsum Plate Factory	Gyproc Oy, Kirkkonummi
Water-Glass Kiln	J.M. Huber Finland Oy, Taavetti and Hamina
Metal Treatment	OMG Kokkola Chemicals Oy, Kokkola Rautaruukki Oyj, Hämeenlinna
Cement Factory	Finnsementti Oy, Parainen, Lappeenranta Optiroc Oy, Kuusankoski
Bio Gas-Fired Burners	Metropolitan Area Co-operation Council, Helsinki
Polluted Soil Treatment System	Niska & Nyyssönen Oy, Forssa and Jyväskylä
Sewage Treatment Plant	Helsingin Vesi, Helsinki Espoon Vesi, Espoo