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ABBREVIATIONS

ACGIH : American Conference of Governmental Industrial Hygienists
API : Active Pharmaceutical Ingredient
BTEXN : Benzene, Toluene, Ethylbenzene, Xylene, Naphtalene
ELISA : Enzyme Linked ImmunoSorbent Assay
EPA : Environmental Protection Agency
FPS ELSD : Federal Public Service Employment, Labour and Social Dialogue
GC-FID : Gas Chromatography Flame Ionisation Detection
GC-MS : Gas Chromatography Mass Spectrometry
GF : Glass Fiber
GW : Belgian Limit Values (Grenswaarde)
HDI : Hexamethylene diisocyanate
HPLC-DAD : High Performance Liquid Chromatography – Diode Array Detection
HPLC-FLD : High Performance Liquid Chromatography – Fluorescence Detection
HPLC-UV : High Performance Liquid Chromatography – Ultraviolet Detection
LC-MS : Liquid Chromatography Mass Spectrometry
ICP-MS : Inductively Coupled Plasma Mass Spectrometry
IOM : Institute of Occupational Medicine
IPDI : Isophorone diisocyanate
IPI : Isolated Process Intermediate
IR : Infra-red
MCE : Mixed Cellulose Ester
MDI : Diphenylmethane diisocyanate
NIOSH : National Institute for Occupational Safety and Health
OSHA : Occupational Safety & Health Administration
PAHS : Polycyclic Aromatic Hydrocarbons
PI : Phenylisocyanate
P,P' : 1-(2-Pyridyl)-Piperazine
PTFE : Polytetrafluoroethylene (Teflon)
PVC : Polyvinyl Chloride
PVDF : Polyvinylidene fluoride
TDI : Toluenediisocyanate
TGIC : Triglycidylisocyanurate
TLV : Threshold Limit Value
TRI : Triisocyanate
VOC : Volatile Organic Compound
VOCl : Volatile Chlorinated Organic Compound

This brochure is also available on our website:

<http://www.loeh.be>

1. INTRODUCTION TO THE LABORATORY AND ITS ACTIVITIES

The Laboratory for Occupational and Environmental Hygiene is part of the Environment and Health centre. This centre belongs to the Department of Public Health and Primary Care. The laboratory's activities involve:

- Measurements in occupational environments under the accreditation of the Belgian Federal Public Service Employment, Labour and Social Dialogue (FPS ELSD).
- Measurements in occupational and general environmental conditions and analysis of industrial components, beyond the accreditation of the FPS ELSD.
- Development and validation of new methods for measurement of (new) agents, in particular solvents and compounds which require special expertise (e.g. pharmaceutically active compounds).
- Scientific research related to environmental measurements, biomonitoring and health effects of volatile organic compounds.
- Analyses in the domain of biological exposure monitoring.

2. CONTACT DETAILS

2.1. ADDRESS

KU LEUVEN
LABORATORY FOR OCCUPATIONAL AND ENVIRONMENTAL HYGIENE
KAPUCIJNENVOER 35, 6th FLOOR – BOX 7001
3000 LEUVEN
BELGIUM

Tel: **(++32) (0)16-37.32.81**

Fax: (+32) (0)16-33.69.97

www.loeh.be

2.2. STAFF

For more information about analyses, sample material, services and quotations, you can always contact one of the following laboratory staff:

Peter Collaerts (peter.collaerts@kuleuven.be)

Catherina Coun (catherina.coun@kuleuven.be)

Radu Duca (radu.duca@kuleuven.be)

Katrien Poels (katrien.poels@kuleuven.be)

Karin Vranckx (karin.vranckx@kuleuven.be)

Prof. Lode Godderis

Prof. Jeroen Vanoirbeek

3. GENERAL CONDITIONS

The fees in this brochure are in Euro and exclude VAT and possible expenses for payment, for the period of **01-02-2017 to 31-01-2018**. Invoices have to be paid within 30 days.

4. ACCREDITATIONS OF THE LABORATORY

The Laboratory for Occupational and Environmental Hygiene has been granted accreditation for most of the measurements, according to Article 2 of the Belgian Royal Decree of 31st March 1992 on conditions for accreditation and according to the criteria for the equipment and operation of laboratories and services under Article 148decies 1, §6, second paragraph, of the General Regulations for Labour.

These accredited measurements include :

- Identification and determination of **187 Volatile Organic Compounds (VOCs)** including **aliphatic, aromatic and halogenated hydrocarbons, esters, ketones, glycol ethers and derivatives and alcohols** (included in NIOSH-methods 1003, 1005, 1019, 1022, 1300, 1301, 1400, 1401, 1402, 1403, 1450, 1454, 1457, 1458, 1459, 1500, 1501, 1552, 1602, 1604, 1609, 1615, 1618, 2500 en 2508) according to the PM001_VOCs method.
- Gravimetric determination of the **inhalable fraction** of dust (included in NIOSH-method 0500) with the PM004_Inhalst. method.
- Gravimetric determination of the **respirable (alveolar) fraction** of dust (included in NIOSH-method 0600) with the PM005_Inadst. method.
- Identification and determination of **isocyanate-monomers**, including **2.4-TDI, 2.6-TDI, 1.6-HDI, 4.4'-MDI, 2.4'-MDI, isophoronediiisocyanate (IPDI), phenylisocyanate (PI) and tri-isocyanate (TRI)** in the air with the PM009_Isocyanates method and PM012-Isocyanates method.
- Identification and determination of **triglycidylisocyanurate (TGIC)** in the air with the PM013_TGIC method
- Identification and determination of **aldehydes** in the air, including **formaldehyde, acetaldehyde, acrolein, furfural and glutaraldehyde** (included in NIOSH-method 2539) by method PM010_Aldehydes.
- Identification and determination of **ethylene oxide** in the air by method PM193_Ethylene oxide (active sampling on 2 big activated charcoal tubes in series) and PM015_Ethyleneoxide_3M (passive sampling on 3M 3551 monitor).
- Identification and determination of **methanol** in the air with the PM014_Methanol method.
- Identification and determination of **Active Pharmaceutical Ingredients (API) and Isolated Process Intermediates (IPI)** in the air and in swabs, according to more than 80 analysis methods, developed in-house and extensively validated (e.g. **Acetaminophen, Closantel, Domperidone, Elubiol, Fentanyl, Flunarizine, Fluspirilene, Haloperidol Decanoate, Imazalil, Ketanserine, Levocabastine HCl, Mebendazole, Miconazole, Oxatomide, Pimozide, Ribavirin, Rilpivirine, Sufentanil, Triamcinolone Acetonide, T1036, T2006,...**).

In view of the accreditation regulations, the laboratory continuously aims to develop high quality analysing methods, extensively validated by a prescribed protocol.

As an accredited laboratory, the Laboratory for Occupational and Environmental Hygiene maintains a quality system, as described in the European standard EN ISO/IEC 17025 "General requirements for the competence of testing and calibration laboratories".

5. LIST OF ANALYSES - FEES 2017

Component	Sampling			Analysing method	Fee (€) for 1 st sample	Fee (€) for 2 nd to 10 th sample	Fee (€) for > 10 th sample
	Medium	Air Flow (L/min)	Air-volume (L)				
Acetaldehyde [75-07-0]	Orbo-24 or analogue + blank	0.05	10	GC-FID	244.00	57.00	36.00
Acetic acid (C2) [64-19-7]	Activated charcoal tube (150 mg)	1.0	100	HPLC - UV	244.00	57.00	36.00
Acrolein (2-propenal) [107-02-8]	Orbo-24 or analogue + blank	0.05 – 0.2	50	GC-FID	244.00	57.00	36.00
Aldehydes (Package) Acetaldehyde [75-07-0] Acrolein (2-propenal) [107-02-8] Formaldehyde [50-00-0] Furfural [98-01-1] Glutaraldehyde [111-30-8]	Orbo-24 or analogue + blank	0.05 – 0.1	25	GC-FID	378.50	153.00	153.00
Ammonia (NH ₃) [7664-41-7]	Acid-treated silicagel tube	0.2	50	Colorimetry	244.00	57.00	36.00
Anesthesia gases (Package) Ethrane (enflurane) [13838-16-9] Fluothane (halothane) [151-67-7] Forene (isoflurane) [26675-46-7] Sevoflurane (sevoflurane) [28523-86-6] Desflurane (suprane) [57041-67-5]	Activated charcoal tube (150 mg)	0.1	10	GC-FID	378.50	153.00	153.00
Aniline [62-53-3]	Silicagel tube (225 mg)	0.1 – 0.2	20	GC-FID	244.00	57.00	36.00
Bromide (Br ⁻)	Orbo 53 silica geltube	0.2 – 0.5	25	Ion-specific electrode	244.00	57.00	36.00
Bromoform [75-25-2]	Activated charcoal tube (150 mg)	0.1	25	GC-FID	244.00	57.00	36.00
Butylglycidyl ether [2426-08-6]	Activated charcoal tube (150 mg)	0.05 – 0.2	10	GC-FID	244.00	57.00	36.00
Butyric acid (C4) [107-92-6]	Activated charcoal tube (150 mg)	1.0	100	HPLC - UV	244.00	57.00	36.00
Carboxylic acids (Package) Formic acid (C1) [64-18-6] Acetic acid (C2) [64-19-7] Propionic acid (C3) [79-09-4] Butyric acid (C4) [107-92-6]	Activated charcoal tube (150 mg)	1.0	100	HPLC - UV	378.50	153.00	153.00
Chloride (Cl ⁻)	Orbo 53 silica gel tube	0.2 – 0.5	25	Ion-specific electrode	244.00	57.00	36.00
Chlorine (Cl ₂) [7782-50-5]	Impigner with methyl orange solution	1.0	50	Colorimetry (within 24h)	244.00	57.00	36.00
m-Cresol (3-methylphenol)[108-39-4]	Orbo 47 tube	0.1 – 0.2	25	GC-FID	244.00	57.00	36.00
o-Cresol (2-methylphenol) [95-48-7]	Orbo 47 tube	0.1 – 0.2	25	GC-FID	244.00	57.00	36.00
p-Cresol (4-methylphenol) [106-44-5]	Orbo 47 tube	0.1 – 0.2	25	GC-FID	244.00	57.00	36.00
Cyanide (CN ⁻)	PVC-filter and bubbler with KOH solution	0.5 – 1.0	100	Ion specific electrode	244.00	57.00	36.00
Desflurane (suprane) [57041-67-5]	Activated charcoal tube (150 mg) or 3M3500 Organic Vapor Monitor	0.1	10	GC-FID	244.00	57.00	36.00
3,3'-Dichlorobenzidine [91-94-1]	GF filter and silica gel tube (225 mg)	2.0	50	HPLC-UV	244.00	57.00	36.00
Diethylene glycol monobutyl ether or (2-(2-butoxyethoxy)ethanol) (butyldiglycol) [112-34-5]	Activated charcoal tube (150 mg)	0.1	10	GC-FID	244.00	57.00	36.00
Diethylphtalate [84-66-2]	PVC filter	2.0	10	HPLC-UV	244.00	57.00	36.00
Dimethylacetamide [127-19-5]	Silica gel tube (225 mg)	1.0	50	GC-FID	244.00	57.00	36.00
Dimethylamine [124-40-3]	Silica gel tube (225 mg)	0.1 – 1.0	3 – 30	GC-MS	244.00	57.00	36.00
Dimethylformamide [68-12-2]	Silica gel tube (225 mg)	1.0	50	GC-FID	244.00	57.00	36.00
Dimethylphtalate [131-11-3]	PVC filter	2.0	10	HPLC-UV	244.00	57.00	36.00
Dimethylsulfoxide (DMSO) [67-68-5]	Activated charcoal tube (150 mg)	0.1	10	GC-FID	244.00	57.00	36.00
Diocetylphthalate [117-81-7]	PVC filter	2.0	10	HPLC-UV	244.00	57.00	36.00
2,4'-Diphenylmethane diisocyanate (2,4'-MDI) [5873-54-1]	GF filter impregnated with P,P'-reagent (25 or 37 mm)	2.0 or 1.0	50	HPLC-FLD	244.00	57.00	36.00
4,4'-Diphenylmethane diisocyanate (4,4'-MDI) [101-68-8]	GF filter impregnated with P,P'-reagent (25 or 37 mm)	2.0 or 1.0	50	HPLC-FLD	244.00	57.00	36.00

Component	Sampling			Analysing method	Fee (€) for 1 st sample	Fee (€) for 2 nd to 10 th sample	Fee (€) for > 10 th sample
	Medium	Air Flow (L/min)	Air-volume (L)				
Dipropylene glycol monomethyl ether or (methoxypropoxypropanol) [34590-94-8]	Activated charcoal tube (150 mg)	0.1	10	GC-FID	244.00	57.00	36.00
Dust : Inhalable fraction	Pre-weighted PVC filter in IOM-cassette	2.0	200	gravimetrics	38.50	38.50	38.50
Dust : Respirable fraction	Pre-weighted PVC filter in Cyclone cassette	2.2 (Higgins Dewell cyclone)	200	gravimetrics	38.50	38.50	38.50
Epichlorohydrine [106-89-8]	Activated charcoal tube (150 mg)	0.1 – 1.0	25	GC-FID	244.00	57.00	36.00
Ethane (enflurane) [13838-16-9]	Activated charcoal tube (150 mg)	0.1	10	GC-FID	244.00	57.00	36.00
Ethylenediamine [107-15-3]	Orbo 52 or SKC 226-48 tube	1.0	100	GC-FID	244.00	57.00	36.00
Ethylene glycol [107-21-1]	SKC 226-57 tube	0.5 – 2.0	30	GC-FID	244.00	57.00	36.00
Ethylene oxide [75-21-8]	2 activated charcoal tubes (600 mg) in series	0.05	10	GC-FID	244.00	57.00	36.00
Ethylene oxide [75-21-8]	3M 3551 Organic Vapor Monitor	> 4 hours		GC-FID	244.00	57.00	36.00
Ethyl lactate [687-47-8]	Activated charcoal tube (150 mg)	0.2	10	GC-FID	244.00	57.00	36.00
Fluoride (F ⁻)	Orbo 53 silica gel tube	0.2 – 0.5	50	Ion-specific electrode	244.00	57.00	36.00
Fluothane (halothane) [151-67-7]	Activated charcoal tube (150 mg)	0.1	10	GC-FID	244.00	57.00	36.00
Forene (isoflurane) [26675-46-7]	Activated charcoal tube (150 mg)	0.1	10	GC-FID	244.00	57.00	36.00
Formaldehyde [50-00-0]	Orbo-24 or analogue + blank	0.05 – 0.2	10	GC-FID	244.00	57.00	36.00
Formic Acid (C1) [64-18-6]	Activated charcoal tube (150 mg)	1.0	100	HPLC - UV	244.00	57.00	36.00
Freon 11 (trichlorofluoromethane) [75-69-4]	Activated charcoal tube (600 mg) (<u>refrigerated shipment!</u>)	0.05	10	GC-FID	244.00	57.00	36.00
Freon 113 [76-13-1]	Activated charcoal tube (150 mg)	0.05	10	GC-FID	244.00	57.00	36.00
Furfural [98-01-1]	Orbo-24 or analogue + blank or Silica gel tube (225 mg)	0.05 – 0.2 0.1 – 0.5	25 25	GC-FID GC-FID	244.00	57.00	36.00
Furfuryl alcohol [98-00-0]	Silica gel tube (225 mg)	0.01- 0.05	10	GC-FID	244.00	57.00	36.00
GC-MS screening (semi-quantitative)	Activated charcoal tube (150mg) or 3M 3500 Monitor	0.05 – 1 > 4 hours	> 10	GC-MS	378.50	153.00	153.00
Glutaraldehyde (pentanedial) [111-30-8]	Orbo-24 or analogue + blank	0.05 – 0.2	25	GC-FID	244.00	57.00	36.00
1,6-Hexamethylene diisocyanate (1,6-HDI) [822-06-0]	GF filter impregnated with P,P'-reagent (25 or 37 mm)	2.0 or 1.0	50	HPLC-FLD	244.00	57.00	36.00
Hydrazine [302-01-2]	Orbo 554 or SKC 226-53 tube	0.2	100	GC-FID	244.00	57.00	36.00
Hydrobromide (HBr) [10035-10-6]	Orbo-53 silica gel tube	0.2 – 0.5	25	Ion-specific electrode	244.00	57.00	36.00
Hydrochloride (HCl) [7647-01-0]	Orbo-53 silica gel tube	0.2 – 0.5	40	Ion-specific electrode	244.00	57.00	36.00
Hydrochromate (chromic acid) [7738-94-5]	PVC filter	2.0	200	ICP-MS	244.00	57.00	36.00
Hydrocyanide (HCN) [74-90-8]	PVC filter and bubbler with KOH-solution	0.5 – 1.0	100	Ion-specific electrode	244.00	57.00	36.00
Hydrofluoride (HF) [7664-39-3]	Orbo-53 silica gel tube	0.2 – 0.5	50	Ion-specific electrode	244.00	57.00	36.00
Hydronitrate (nitric acid) [7697-37-2]	Orbo-53 silica gel tube	0.2 – 0.5	200	Colorimetry	244.00	57.00	36.00
Hydrophosphate (phosphoric acid) [7664-38-2]	Orbo-53 silica gel tube	0.2 – 0.5	200	Colorimetry	244.00	57.00	36.00

Component	Sampling			Analysing method	Fee (€) for 1 st sample	Fee (€) for 2 nd to 10 th sample	Fee (€) for > 10 th sample
	Medium	Air Flow (L/min)	Air-volume (L)				
Isocyanates (Package) 2.4-TDI (Toluenediisocyanate) [584-84-9] 2.6-TDI (Toluenediisocyanate) [91-08-7] 1.6-HDI (Hexamethylenediisocyanate) [822-06-0] 4.4'-MDI (Diphenylmethanediisocyanate) [101-68-8] 2.4'-MDI (Diphenylmethanediisocyanate) [5873-54-1] IPDI (Isophoronediiisocyanate) [4098-71-9] PI (Phenylisocyanate) [103-71-9] TRI (Tri-isocyanate) [-]	GF filter impregnated with P,P'-reagent (25 or 37 mm)	2.0 or 1.0	50	HPLC-FLD			
1 compound					244.00	57.00	36.00
2 compounds					274.00	87.00	66.00
3 compounds					304.00	117.00	96.00
4 compounds					334.00	147.00	126.00
5 compounds					364.00	177.00	156.00
6 compounds					394.00	207.00	186.00
7 compounds					424.00	237.00	216.00
8 compounds					454.00	267.00	246.00
Isophorone diisocyanate (IPDI) [4098-71-9]	GF filter impregnated with P,P'-reagent (25 or 37 mm)	2.0 or 1.0	50	HPLC-FLD	244.00	57.00	36.00
Metals : Aluminium (Al), Antimony (Sb), Arsenic (As), Barium (Ba), Beryllium (Be), Bismuth (Bi), Cadmium (Cd), Calcium (Ca), Chromium (Cr), Cobalt (Co), Iron (Fe), Indium (In), Potassium (K), Copper (Cu), Lanthanum (La), Lithium (Li), Lead (Pb), Magnesium (Mg), Manganese (Mn), Molybdenum (Mo), Sodium (Na), Nickel (Ni), Selenium (Se), Silicon (Si), Strontium (Sr), Thallium (Tl), Tin (Sn), Titanium (Ti), Vanadium (V), Tungsten (W), Silver (Ag), Zinc (Zn)	PVC filter in IOM-cassette (on inhalable fraction of dust) or PVC filter in cyclone cassette (on respirable fraction of dust)	2.0 2.2 (Higgins Dewell cyclone)	200 200	ICP-MS ICP-MS	46.50 (1 st metal) 30.50 (2 nd metal on the same sample)	46.50 (1 st metal) 30.50 (2 nd metal on the same sample)	46.50 (1 st metal) 30.50 (2 nd metal on the same sample)
Methanol [67-56-1]	2 big silica gel tubes (450 mg) in series	0.1 – 0.2	10	GC-FID	244.00	57.00	36.00
Mineral oil mist [8012-95-1] exploratory research of oil, inclusive report (once per oil)				GC-FID	348.00 (per oil)	-	-
Mineral oil mist and – vapour [8012-95-1]	GF-filter and activated charcoal tube in series	1.0	200	GC-FID	244.00	57.00	36.00
Mouse Urine Protein (MUP)	PTFE filter (1 µm) in IOM-cassette	2.0	960	ELISA	244.00	57.00	36.00
Nicotine [54-11-5]	Nicotine tube (Orbo 613) (refrigerated shipment !)	0.1 - 1	10	GC-MS	244.00	57.00	36.00
PAHs (Polycyclic Aromatic hydrocarbons) : acenaphthene, acenaphthylene, anthracene, benz[a]anthracene, benzo[b]fluoranthene, benzo[k]-fluoranthene, benzo[ghi]perylene, benzo[a]pyrene, chrysene, dibenz[a,h]anthracene, fenantrene, fluoranthene, fluorene, indeno[1,2,3-cd]pyrene, naphthalene, pyrene	PTFE filter and Orbo 43 tube in series	1.0 - 2.0	> 200	GC-MS	378.50	153.00	153.00
Pentachlorophenol [87-86-5]	2 Orbo 47 tubes, GF filter	0.1 – 1.0	50	HPLC-UV	244.00	57.00	36.00
Phenol [108-95-2]	Orbo 47 tube	0.1 – 0.2	25	GC-FID	244.00	57.00	36.00
Phenols (Package) Phenol [108-95-2] m-Cresol (3-methylphenol) [108-39-4] o-Cresol (2-methylphenol) [95-48-7] p-Cresol (4-methylphenol) [106-44-5]	Orbo 47 tube	0.1 – 0.2	25	GC-FID	378.50	153.00	153.00
Phenylisocyanate (PI) [103-71-9]	GF filter impregnated with P,P'-reagent (25 or 37 mm)	2.0 or 1.0	50	HPLC-FLD	244.00	57.00	36.00
Phosphorus trichloride [7719-12-2]	Bubbler with water	0.05 – 0.2	50	Colorimetry	244.00	57.00	36.00
Phtalic acid anhydride [85-44-9]	PVC filter	2.0	100	HPLC-UV	244.00	57.00	36.00

Component	Sampling			Analysing method	Fee (€) for 1 st sample	Fee (€) for 2 nd to 10 th sample	Fee (€) for > 10 th sample
	Medium	Air Flow (L/min)	Air-volume (L)				
Potassium hydroxide (KOH) [1310-58-3]	Impigner with HCl-solution (0.01N)	1.0	100	ICP-MS	46.50	30.50	30.50
Propionic Acid (C3) [79-09-4]	Activated charcoal tube (150 mg)	1.0	100	HPLC - UV	244.00	57.00	36.00
Propylbromide (1-bromopropane) [106-94-5]	Activated charcoal tube (150 mg)	0.05 – 0.2	> 10	GC-FID	244.00	57.00	36.00
Propyleneglycol [57-55-6]	SKC 226-57 tube	0.5 – 2.0	30	GC-FID	244.00	57.00	36.00
1,2-Propyleneoxide [75-56-9]	2 activated charcoal tubes (150 mg) in series (refrigerated shipment !)	0.05 – 0.2	10	GC-FID	244.00	57.00	36.00
Pyridine [110-86-1]	Activated charcoal tube (150 mg)	0.1 – 1.0	10	GC-FID	244.00	57.00	36.00
Rat Urine Protein (RUP)	PTFE filter (1 µm) in IOM-cassette	2.0	960	ELISA	244.00	57.00	36.00
Sevoflurane (sevorane) [28523-86-6]	Activated charcoal tube (150 mg) or 3M 3500 Monitor	0.1	10	GC-FID	244.00	57.00	36.00
Sodium hydroxide (NaOH) [1310-73-2]	Impigner with HCl-solution (0.01N)	1.0	100	ICP-MS	46.50	30.50	30.50
2,4-Toluenediisocyanate (2,4-TDI) [584-84-9]	GF filter impregnated with P,P'- reagent (25 or 37 mm)	2.0 or 1.0	50	HPLC-FLD	244.00	57.00	36.00
2,6-Toluenediisocyanate (2,6-TDI) [91-08-7]	GF filter impregnated with P,P'- reagent (25 or 37 mm)	2.0 or 1.0	50	HPLC-FLD	244.00	57.00	36.00
Total hydrocarbon content, supplementary to the VOC-analysis	Activated charcoal tube (150 mg) or 3M 3500 Organic Vapor Monitor			GC-FID	19.50	19.50	19.50
Tributyl phosphate [126-73-8]	MCE filter, possibly 2x	2.0	100	GC-FID	244.00	57.00	36.00
Tri-isocyanate (TRI) [-]	GF filter impregnated with P,P'- reagent (25 or 37 mm)	2.0 or 1.0	50	HPLC-FLD	244.00	57.00	36.00
Triglycidyl Isocyanurate (TGIC) [2451-62-9]	Silanised GF filter in IOM-cassette	2.0	240	HPLC-UV	244.00	57.00	36.00
Vinylchloride [75-01-4]	2 activated charcoal tubes (150 mg) in series (refrigerated shipment !)	0.05	10	GC-FID	244.00	57.00	36.00
VOC-analysis (187 compounds : see Annex 1,2)							
BTEXN package-analysis (7 compounds : see Annex 3,4)							
VOCI package-analysis (11 compounds : see Annex 3,4)							
Industrial environment (mg/m ³)	Activated charcoal tube (150 or 600 mg) or 3M 3500 organic vapor monitor	0.05 – 0.2 > 4 hours	> 10	GC-FID GC-FID	83.00 57.00	83.00 57.00	83.00 57.00
Environment- or background air sample (µg/m ³)	Activated charcoal tube (150 or 600 mg) or 3M 3500 organic vapor monitor or Radiello Sampler (type 130 and 123-1)	1.0 > 4 hours > 8 hours	>100	GC-FID GC-FID GC-FID	112.50 83.00 83.00	112.50 83.00 83.00	112.50 83.00 83.00
Air sample, delivered in synthetic bag (qualitative reporting)				GC-FID	112.50	112.50	112.50
Mix of solvents or organic products (% w/v - % w/w)				GC-FID	83.00	83.00	83.00
Aqueous sample (qualitative reporting) - identification				GC-FID	83.00	83.00	83.00
Aqueous sample (semi-quantitative reporting % w/v) – per compound				GC-FID	244.00	57.00	36.00
Permea-Tec™ patch (NEW !)				GC-FID	83.00	83.00	83.00

⁽¹⁾ On condition that composition and type of the samples are the same as those of the first sample

6. LIST OF ANALYSES OF PHARMACEUTICAL COMPOUNDS – FEES 2017

API / IPI	Sample name		Analysing method	Fee (€) for 1 st sample	Fee (€) for 2 nd to 10 th sample	Fee (€) for > 10 th sample
	Filter type *	Air flow (L/min)				
Abiraterone Acetate	Teflon filter (5 µm) <u>(refrigerated shipment !)</u>	2.0	LC-MS	244.00	57.00	36.00
Acetaminophen	Teflon filter (5 µm)	2.0	HPLC-DAD	244.00	57.00	36.00
Acetaminophen (Paracetamol) as surrogate for eg. Containment tests	Teflon filter (5 µm) <u>(refrigerated shipment !)</u>	2.0	LC-MS	244.00	57.00	36.00
Alfentanil / Alfentanil HCl	GF filter Wipe sample	2.0 -	GC-MS	244.00	57.00	36.00
Azaconazole (Rodewod)	GF filter	2.0	GC-MS	244.00	57.00	36.00
Azaperone	GF filter	2.0	GC-MS	244.00	57.00	36.00
Bromperidol	GF filter	2.0	GC-MS	244.00	57.00	36.00
Bromperidol Decanoate	Teflon filter (5 µm)	2.0	LC-MS	244.00	57.00	36.00
Buprenorphine	GF filter	2.0	HPLC-DAD	244.00	57.00	36.00
Ceftibiprole Medocaril (BAL5788)	Teflon filter (5 µm) <u>(refrigerated shipment !)</u>	2.0	HPLC-DAD	244.00	57.00	36.00
Cinnarizine	Nylon filter (5 µm)	2.0	GC-MS	244.00	57.00	36.00
Cisapride	Teflon filter (5 µm)	2.0	HPLC-DAD	244.00	57.00	36.00
Clazuril	Teflon filter (5 µm)	2.0	LC-MS	244.00	57.00	36.00
Clonixin	Teflon filter (5 µm)	2.0	HPLC-DAD	244.00	57.00	36.00
Clozantel	Teflon filter (5 µm)	2.0	HPLC-DAD	244.00	57.00	36.00
Clozantel Sodium	Teflon filter (5 µm)	2.0	HPLC-DAD	244.00	57.00	36.00
Cyclophosphamide	Wipe sample	-	LC-MS	244.00	57.00	36.00
Decitabine (Dacogen)	Teflon filter (5 µm) <u>(refrigerated shipment !)</u>	2.0	LC-MS	244.00	57.00	36.00
Diclazuril	GF filter	2.0	HPLC-DAD	244.00	57.00	36.00
Domperidone	Acid coated GF filter	2.0	HPLC-DAD	244.00	57.00	36.00
Elubiol	Teflon filter (5 µm)	2.0	HPLC-DAD	244.00	57.00	36.00
Etomidate / Etomidate HCl	Nylon filter (5 µm)	2.0	GC-MS	244.00	57.00	36.00
Fentanyl / Fentanyl Citrate	GF filter Wipe sample	2.0 -	GC-MS	244.00	57.00	36.00
Flubendazole	GF filter	2.0	HPLC-DAD	244.00	57.00	36.00
FGFRI	PVC filter (with support pad)	2.0	LC-MS	244.00	57.00	36.00
Flunarizine HCl	Teflon filter (5 µm)	2.0	GC-MS	244.00	57.00	36.00
Fluspirilene	Teflon filter (5 µm) <u>(refrigerated shipment !)</u>	2.0	LC-MS	244.00	57.00	36.00
Gainer (ARN509) (Apalutamide)	Teflon filter (5 µm)	2.0	LC-MS	244.00	57.00	36.00
Galantamine HBr	GF filter	2.0	GC-MS	244.00	57.00	36.00
Haloperidol	GF filter	2.0	GC-MS	244.00	57.00	36.00
Haloperidol Decanoate	Teflon filter (5 µm)	2.0	LC-MS	244.00	57.00	36.00
Ibuprofen	Teflon filter (5 µm)	2.0	HPLC-DAD	244.00	57.00	36.00
Imazalil (Enilconazole)	Teflon filter (5 µm) <u>(refrigerated shipment !)</u>	2.0	HPLC-DAD	244.00	57.00	36.00
Imazalil sulfate (Enilconazole sulfate)	Teflon filter (5 µm)	2.0	HPLC-DAD	244.00	57.00	36.00
Iphosphamide	Wipe sample	-	GC-MS	244.00	57.00	36.00
Isoconazole	GF filter	2.0	LC-MS	244.00	57.00	36.00
Isoconazole Nitrate	GF filter	2.0	LC-MS	244.00	57.00	36.00
Itraconazole	GF filter	2.0	HPLC-DAD	244.00	57.00	36.00
Ketanserin	GF filter	2.0	HPLC-DAD	244.00	57.00	36.00
Ketanserin Tartrate	Teflon filter (5 µm)	2.0	LC-MS	244.00	57.00	36.00
Ketoconazole	Teflon filter (5 µm)	2.0	HPLC-DAD	244.00	57.00	36.00
Levocabastine / Levocabastine HCl	GF filter	2.0	GC-MS	244.00	57.00	36.00

API / IPI	Sample name		Analysing method	Fee (€) for 1 st sample	Fee (€) for 2 nd to 10 th sample	Fee (€) for > 10 th sample
	Filter type *	Air flow (L/min)				
Loperamide HCl	GF filter	2.0	HPLC-DAD	244.00	57.00	36.00
Loperamide Oxide	Teflon filter (5 µm) (refrigerated shipment !)	2.0	HPLC-DAD	244.00	57.00	36.00
Mebendazole	Teflon filter (5 µm)	2.0	LC-MS	244.00	57.00	36.00
Miconazole	GF filter	2.0	LC-MS	244.00	57.00	36.00
Miconazole Nitrate	GF filter	2.0	HPLC-DAD	244.00	57.00	36.00
Mitratapid	Teflon filter (5 µm)	2.0	LC-MS	244.00	57.00	36.00
Nebivolol HCl	Nylon filter (5 µm)	2.0	HPLC-FLD	244.00	57.00	36.00
Oxatomide	Teflon filter (5 µm)	2.0	HPLC-DAD	244.00	57.00	36.00
Oxatomide Hydrate	Teflon filter (5 µm)	2.0	HPLC-DAD	244.00	57.00	36.00
Paliperidone	Teflon filter (5 µm) (refrigerated shipment !)	2.0	LC-MS	244.00	57.00	36.00
Paliperidone Palmitate	PVDF filter	2.0	LC-MS	244.00	57.00	36.00
Parconazole HCl	GF filter	2.0	LC-MS	244.00	57.00	36.00
Pimozide	GF filter	2.0	HPLC-FLD	244.00	57.00	36.00
Pipamperone HCl	Teflon filter (5 µm)	2.0	LC-MS	244.00	57.00	36.00
Piritramide	Teflon filter (5 µm)	2.0	GC-MS	244.00	57.00	36.00
Prasterone Acetate (T8506)	Teflon filter (5 µm)	2.0	GC-MS	244.00	57.00	36.00
Prednisolone	Teflon filter (5 µm)	2.0	LC-MS	244.00	57.00	36.00
Prednisolone Acetate	GF filter (refrigerated shipment !)	2.0	HPLC-DAD	244.00	57.00	36.00
Prucalopride Succinate	GF filter	2.0	HPLC-DAD	244.00	57.00	36.00
Ribavirin	GF filter	2.0	HPLC-DAD	244.00	57.00	36.00
Rilpivirine (TMC 278)	GF filter	2.0	LC-MS	244.00	57.00	36.00
Rilpivirine HCl	GF filter	2.0	LC-MS	244.00	57.00	36.00
Risperidone	Nylon filter (5 µm)	2.0	HPLC-DAD	244.00	57.00	36.00
Screening for the presence of (active) components	Wipe sample	-	GC-MS	244.00	57.00	36.00
SGLT2	GF filter	2.0	HPLC-DAD	244.00	57.00	36.00
Sufentanil / Sufentanil Citrate	GF filter Wipe sample	2.0 -	GC-MS	244.00	57.00	36.00
T1036	Teflon filter (5 µm) (refrigerated shipment !)	2.0	GC-MS	244.00	57.00	36.00
T1250	Teflon filter (5 µm) (refrigerated shipment !)	2.0	LC-MS	244.00	57.00	36.00
T1333	GF filter	2.0	LC-MS	244.00	57.00	36.00
T1345	Teflon filter (5 µm) (refrigerated shipment !)	2.0	LC-MS	244.00	57.00	36.00
T1484	Teflon filter (5 µm)	2.0	LC-MS	244.00	57.00	36.00
T2006	Teflon filter (5 µm) (refrigerated shipment !)	2.0	LC-MS	244.00	57.00	36.00
T2019	Nylon filter (5 µm)	2.0	GC-MS	244.00	57.00	36.00
T2026	Nylon filter (5 µm) (refrigerated shipment !)	2.0	GC-MS	244.00	57.00	36.00
T2713	Teflon filter (5 µm) (refrigerated shipment !)	2.0	LC-MS	244.00	57.00	36.00
T824	GF filter	2.0	GC-MS	244.00	57.00	36.00
Telaprevir (Vertex)	Teflon filter (5 µm)	2.0	HPLC-DAD	244.00	57.00	36.00
Tetrahydrozoline HCl	Teflon filter (5 µm)	2.0	LC-MS	244.00	57.00	36.00
TIC1097	Nylon filter (5 µm)	2.0	HPLC-DAD	244.00	57.00	36.00
Tipifarnib (Triple 7)	GF filter	2.0	HPLC-DAD	244.00	57.00	36.00
TMC114 Ethanolate	Teflon filter (5 µm)	2.0	HPLC-DAD	244.00	57.00	36.00
TMC125 (Etravirine)	GF filter	2.0	HPLC-DAD	244.00	57.00	36.00

API / IPI	Sample name		Analysing method	Fee (€) for 1 st sample	Fee (€) for 2 nd to 10 th sample	Fee (€) for > 10 th sample
	Filter type *	Air flow (L/min)				
TMC207	Teflon filter (5 µm)	2.0	LC-MS	244.00	57.00	36.00
TMC435350 (Orange)	Teflon filter (5 µm)	2.0	HPLC-DAD	244.00	57.00	36.00
Triamcinolone Acetonide	GF filter (<u>refrigerated shipment !</u>)	2.0	LC-MS	244.00	57.00	36.00
Velcade (Bortezomib)	Teflon filter (5 µm) (<u>filters have to be desorbed immediately after sampling</u>)	2.0	LC-MS	244.00	57.00	36.00

* For air sampling of APIs and IPIs, an IOM-sampler with an IOM-cassette (25 mm) needs to be used. Please use the proper filter type.

7. LIST OF ANALYSES BIOMONITORING – FEES 2017

Analysis in urine	Fee (€) per sample	Exposure to
Acetone	14.04	Acetone, Isopropanol
Aluminum (Al)	33.36	Aluminum (Al)
p-Aminophenol	13.04	Aniline
Antimony (Sb)	32.45	Antimony (Sb)
Inorganic Arsenic (As)	28.15	Arsenic (As)
Arsenic (As)	28.15	Arsenic (As)
Barium (Ba)	42.65	Barium (Ba)
Beryllium (Be)	35.47	Beryllium (Be)
Bismuth (Bi)	42.65	Bismuth (Bi)
Butanol	14.04	Butanol
Butoxy acetic acid	21.09	2-Butoxyethanol (butyl cellosolve)
Cadmium (Cd)	30.91	Cadmium (Cd)
Chromium (Cr)	30.36	Chromium (Cr)
Cobalt (Co)	30.36	Cobalt (Co)
Copper (Cu)	17.15	Copper (Cu)
Cotinine	244.00 (1 st sample) 57.00 (2 nd to 10 th sample) 36.00 (> 10 th sample)	Nicotine
Creatinine	3.15	-
o-Cresol	61.49	Toluene
Cyclohexanol	66.18	Cyclohexane
Cyclophosphamide	244.00 (1 st sample) 57.00 (2 nd to 10 th sample) 36.00 (> 10 th sample)	Cyclophosphamide
d-Ala	31.15	Lead
Dimethylbenzoic acids	51.74	Trimethylbenzenes
Ethanol	26.15	Ethanol
Ethoxy acetic acid	21.09	2-Ethoxyethanol (ethyl cellosolve)
Fluor (F)	10.48	Fluorides (F)
Formic acid	14.04	Methanol, Aceton, Formaldehyde
2,5-Hexanedione	22.58	Hexane
2-Hexanol	14.04	Hexane
Hippuric acid	10.48	Toluene
1-Hydroxypyrene	38.35	PAHs (Polycyclic Aromatic Hydrocarbons)
Isopropanol	14.04	Isopropanol
Lead (Pb)	20.98	Lead (Pb)

Aalysis in urine	Fee (€) per sample	Exposure to
Mandelic acid	10.48	Styrene, Ethylbenzene
Manganese (Mn)	30.36	Manganese (Mn)
Mercury (Hg)	26.92	Inorganic mercury (Hg)
Methanol	23.05	Methanol
Methoxy acetic acid	21.09	2-Methoxyethanol (methyl cellosolve)
S-methylcysteine	26.92	Methylbromide, Methylchloride
Methylenedianiline (MDA)	31.61	Methylenedianiline (MDA), Methylene diphenyl diisocyanate (MDI)
Methylethylketone	20.66	Methylethylketone
N-methylformamide	21.15	Dimethylformamide
Methylhippuric acid	10.48	Xylene
Molybdenum (Mb)	31.15	Molybdenum (Mb)
Muconic acid	21.09	Benzene
Nickel (Ni)	26.92	Nickel (Ni)
Oxalic acid	31.15	Ethylene glycol
Phenol	10.48	Benzene, Phenol
S-Phenylmercapturic acid (SPMA)	35.00	Benzene
Phenylpropanol	16.33	Isopropylbenzene
Phosphor (P)	6.27	Phosphor (P)
Selenium (Se)	28.41	Selenium (Se)
TCA and TCE (trichloro acetic acid and trichloroethanol)	26.00	Trichloroethylene
Tetrahydrofuran	26.03	Tetrahydrofuran
Thallium (Tl)	30.36	Thallium (Tl)
Thiocyanate	14.04	Cyanides, aliphatic nitriles
TTCA (2-Thioxothiazolidine-4-carboxylic acid)	31.30	CS ₂ (carbondisulfide)
Tin (Sn)	38.47	Tin (Sn)
Toluene diamine (TDA)	32.15	Toluene diisocyanate (TDI)
Vanadium (V)	30.36	Vanadium (V)
Zinc (Zn)	15.09	Zinc (Zn)

For more information on sampling time and -medium, please visit our website www.loeh.be

8. LIST OF MATERIALS FOR MEASUREMENTS AND OTHER SERVICES – FEES 2017

Material / services	Fee (€)
Rent fee per pump per day (including calibration before and after)	31.50*
Rent fee per pump per day (including calibration before and after), without subsequent analysis	93.00*
Calibration client pump	17.00
Activated charcoal tube 150 mg (SKC 226-01), Lot 2000	2.00
Activated charcoal tube 600 mg (SKC 226-09), Lot 2000	4.70
Aldehyde tube (Orbo 24 or analogue)	8.00
Inorganic acid tube (Orbo 53)	4.70
Ethylene diamine tube (Orbo 52)	4.70
Ethylene glycol tube (SKC 226-57)	32.00
Hydrazine tube (Orbo 554)	5.30
Nicotine tube (Orbo 613)	3.00
PAH tube (Orbo 43)	5.50
Phenol tube (Orbo 47)	4.50
Silicagel tube 225 mg (SKC 226-10)	3.20
Silicagel tube 450 mg (SKC 226-10-04)	6.00
Acid-treated silicagel tube	7.50
3M 3500 Organic Vapor Monitor	21.00
3M 3551 Organic Vapor Monitor (ethyleneoxide)	35.00
Glass Fiber Filter for IOM-cassette (25 mm)	0.80
GF filter impregnated with P,P'-reagent (25 or 37 mm) (isocyanates)	4.00
MCE-filter for IOM-cassette (25 mm)	2.10
Nylon-filter for IOM-cassette (25 mm)	1.00
PVC-filter for IOM or cyclone cassette (25 mm)	4.50
Teflon (PTFE)-filter for IOM-cassette (25 mm)	4.50
Silanised GF filter for IOM-cassette (25 mm)	5.80
Acid-coated GF-filter for IOM-cassette (25 mm)	4.00
IOM-cassette (25 mm) (without filter)	5.50
Cyclone-cassette (25 mm) (without filter)	10.00
Three-piece cassette (37mm) (without filter) (isocyanates)	4.00
TLV-booklet (ACGIH)	60.00
Measurement on-site, per half day (shipment costs not included)	414.00
Consultancy fee per hour	103.50

* If a reservation is cancelled, less than 3 days before the agreed lease date, a fee for a 1 day lease will be charged.

Sampling equipment that will be used for analysis in the laboratory will be delivered at cost price or leased at a cost per day by a fee per day. If **activated charcoal tubes** are used, the tubes delivered by the laboratory are preferred, because these have been tested per lot on e.g. adsorption and desorption properties. Using these tubes guarantees accurate quantitative results. **Filters** (25 mm) are always delivered in **IOM-cassettes** or **cyclone-cassettes**. These cassettes are charged as well. **IOM-samplers** and **cyclones** are leased for free, provided they will be returned to the laboratory within the agreed period and provided samples are delivered to the laboratory for analysis. Extra costs will be charged if material needs to be delivered by a courier. Prices of sampling equipment can

change without preceding notification. For measurements on-site, calibration of pumps or other services concerning occupational hygiene measurements, please contact the laboratory.

9. GENERAL INFORMATION REGARDING MEASUREMENT TECHNIQUES AND METHODS

9.1. VOC-SCREENING ASSAY FOR VOLATILE ORGANIC COMPOUNDS (VOCs)

The screening assay for volatile organic compounds (VOC) is aimed at detection, identification and quantification of organic solvents in air samples taken on activated charcoal (air-pumped tube, passive diffusion type monitor) or in solvent mixtures and viscous samples (e.g. ink, paint, coating, glue, varnish). A list of compounds that can be analyzed in this screening assay is presented in **Annex 1**. Each individual sample is assayed systematically for the presence or absence of the compounds listed in **Annex 1**. For air-pumped activated charcoal tubes, both individual sections of each tube are analyzed separately. All identified compounds are subsequently quantified, provided that all essential calculation factors are available. Additional compounds (not listed in **Annex 1**) detected in the samples during the assay will be reported as non-identified compounds.

Optimum air pump flow and sampling time to be applied for this measurement procedure on the one hand depend on the nature of the expected contaminants and their anticipated airborne concentrations, as well as on general environmental conditions (e.g. relative humidity). On the other hand, air sampling should be performed during a period which is representative of the worker's exposure pattern. When sampling is performed using a passive diffusion type monitor, a minimum air sampling period of 4 hours is recommended. For samples taken with the pumped activated charcoal tube procedure, a minimum air volume of 10L is generally required. For sampling very volatile organic compounds, exceptionally, either a shorter duration of sampling or a limited volume of sampled air is recommended (see also **Annex 1**). For long-term measurements (4 tot 8 hours) a pump flow of 50-200 ml/min is generally adequate, while for short-term and peak sampling (15 min) an air flow of 1 L/min is commonly applied.

The screening assay for VOCs, when applied on air samples taken in the scope of industrial and occupational hygiene monitoring practices, will generate results of airborne concentrations of the contaminants identified generally expressed in mg/m³. This reporting limit can be lowered to less than 1/100 of the assigned Threshold Limit Value (TLV) of a specific compound, provided that an adequately high volume of air is sampled (more details are given in **Annex 2**.)

The VOC-screening assay is also applicable to air samples taken in the scope of general area or environmental monitoring. The concentrations of the contaminants identified will then be reported in µg/m³. In order to achieve this lower quantification and reporting limit, an adequately high volume of air (> 100L) must be sampled.

Sampling on activated charcoal tubes, the VOC-analysis always involves extensive qualitative and quantitative screening on both sections of the tube.

Concentrations of components in product analysis reports are given in weight or volume percentages.

The screening assay for VOCs is based on integrated validated analyzing methods as published by NIOSH, OSHA and EPA (see also **Annex 2**).

Analytical data generated during the screening assay for VOCs can additionally be transformed into a semi-quantitative determination of total airborne hydrocarbon concentrations. Total hydrocarbon concentrations will be calculated by means of average conversion and calculation factors depending on the nature of the hydrocarbon compounds.

Determination of total hydrocarbon content is available on request for the same price as charged for a corresponding VOC analysis.

Determination of total hydrocarbon content can also be requested supplementary to a VOC analysis, for a low additional cost.

9.2. DUST AND METAL ANALYSIS

Sampling to define the inhalable dust fraction is performed with an IOM-sampler containing an IOM-cassette fitted with a PVC-filter, pre-weighted in the laboratory. After sampling, the filter unit will be reweighted and -if so requested- metal determination can be performed on the same filter. A list of possible metal determinations can be found on page 7: "List of analyses – fees 2017". Sampling with an IOM-sampler requires an airflow of **2 L/min**. The total sampling volume required is at least **200 L**.

Sampling to define the respirable dust fraction is performed by a cyclone containing a cyclone cassette with PVC-filter, pre-weighted in the laboratory. The required air sampling flow is specific for the combination of cyclone and filter (Higgins Dewell cyclone of SKC **2.2 L/min**). Options for determining metals are the same as those for the inhalable dust fraction.

9.3. GC-MS ANALYSIS

The laboratory uses the Gas chromatograph-Mass spectrometric method (GC-MS) for the semi-quantitative screening of organic compounds in an air sample and for product identification. This GC-MS analysis covers the range of very volatile (cfr. list of VOC-analysis compounds) to semi-volatile compounds (molecular weight comparable to that of higher polycyclic aromatic hydrocarbons). GC-MS analysis can be performed in addition to VOC analysis. For more information on this analysis, please contact the laboratory.

9.4. MINERAL OIL MIST ANALYSIS

To measure vapor and mist of mineral oil, the laboratory uses a glass fiber filter in combination with an active charcoal tube. The components on both media are analysed with GC-FID. This method is more specific and more sensitive than IR-spectrometrics. However, not all oils are suitable for gas chromatographic analysis. It is therefore strongly recommended to send a sample of the pure oil for testing, before air samples are taken. The oil is then tested for several specific parameters such as concentration range, linearity and detection limit. The test sample should be pure oil, not a solution or emulsion.

9.5. PHARMACEUTICAL COMPOUNDS (API / IPI)

The laboratory has several measuring methods for the determination of Active Pharmaceutical Ingredients (API) and Isolated Process Intermediate products (IPI) in the air. For a few APIs, determination methods in fluids (urine, plasma) are also possible. Most of the methods have been developed and extensively validated at the laboratory.

The list of APIs and IPIs that can be analysed at the laboratory can be found on page 9. The list further specifies measurements such as filter type, recommended pump flow, analysing method and price per analysis.

9.6. OTHER ANALYSES

For compounds that are not on the list of the VOC-analysis, a more specific measuring and analysing method is recommended in most of the cases. Please consult the "List of analyses – fees 2017" on page 5 for all the available analyses. It also provides more specific information such as sampling medium, recommended pump flow, sampling time and sampling volume, analysing method and price per analysis. For strongly related compounds such as polycyclic aromatic hydrocarbons (PAH), a package fee is given. This fee includes

analysis of all individual compounds in the package. Analysing one or a few compounds in the package is also possible, for a fee per compound. Please consult the list for more information.

For compounds not mentioned in the list, please contact the laboratory for further information on analysing options, fees, etc...

9.7. DEVELOPMENT AND VALIDATION OF NEW METHODS

On request, the laboratory can develop and validate a new measuring method for the determination of a VOC, an API or an IPI in the air (or in swabs). This development can be restricted or extended, according to the availability of a referential method and depending on the parameters which must be validated. Please contact the laboratory for a detailed quotation with an accurate description of all the scheduled activities.

Annex 1 : List of compounds (with CAS-number) determined in VOC-analysis

Hydrocarbons :		Halogenated compounds :	Miscellaneous :
<u>n-pentane [109-66-0] *</u>	<u>benzene [71-43-2] *</u>	<u>methylene chloride [75-09-2] * **</u>	<u>tetrahydrofuran [109-99-9] *</u>
<u>2-methylbutane [78-78-4]</u>	<u>toluene [108-88-3] *</u>	<u>chloroform [67-66-3] *</u>	<u>2-methyltetrahydrofuran [96-47-9]</u>
<u>2,3-dimethylbutane [79-29-8]</u>	<u>ethylbenzene [100-41-4] *</u>	<u>tetrachloromethane [56-23-5] *</u>	<u>1,4-dioxane [123-91-1] *</u>
<u>2-methylpentane [107-83-5] *</u>	1,2-diethylbenzene [135-01-3]	<u>1,1-dichloroethane [75-34-3]</u>	<u>acetonitrile [75-05-8] *</u>
<u>3-methylpentane [96-14-0] *</u>	1,3-diethylbenzene [141-93-5]	<u>1,2-dichloroethane [107-06-2] *</u>	<u>acrylonitrile [107-13-1] *</u>
<u>cyclopentane [287-92-3]</u>	<u>styrene [100-42-5] *</u>	<u>trans-1,2-dichloroethene [156-60-5]</u>	<u>gamma-butyrolactone [96-48-0]</u>
<u>methylcyclopentane [96-37-7] *</u>	n-propylbenzene [103-65-1] *	<u>cis-1,2-dichloroethene [156-59-2]</u>	
<u>n-hexane [110-54-3] *</u>	<u>cumene [98-82-8] *</u>	<u>1,1,1-trichloroethane [71-55-6] *</u>	Ketones :
<u>cyclohexane [110-82-7] *</u>	<u>alfa-methylstyrene [98-83-9]</u>	<u>1,1,2-trichloroethane [79-00-5]</u>	<u>acetone [67-64-1] *</u>
1-hexene [592-41-6]	n-butylbenzene [104-51-8]	<u>1,1,2,2-tetrachloroethane [79-34-5]</u>	<u>methyl ethyl ketone [78-93-3] *</u>
<u>cyclohexene [110-83-8]</u>	iso-butylbenzene [538-93-2]	pentachloroethane [76-01-7]	<u>methyl-n-butyl ketone [591-78-6]</u>
<u>n-heptane [142-82-5] *</u>	sec-butylbenzene [135-98-8]	<u>trichloroethylene [79-01-6] *</u>	<u>methyl-iso-butyl ketone [108-10-1] *</u>
2,2,3-tri-methylbutane [464-06-2]	tert-butylbenzene [98-06-6]	<u>tetrachloroethylene [127-18-4] *</u>	<u>methyl-iso-amyl ketone [110-12-3]</u>
2,2-dimethylpentane [590-35-2]	<u>m-xylene [108-38-3] *</u>	iso-propylchloride [75-29-6]	ethyl-n-pentyl ketone [106-68-3]
2,3-dimethylpentane [565-59-3]	<u>p-xylene [106-42-3] *</u>	1,2,3-trichloropropane [96-18-4]	di-n-propyl ketone [123-19-3]
2,4-dimethylpentane [108-08-7]	<u>o-xylene [95-47-6] *</u>		di-iso-propyl ketone [565-80-0]
2-methylhexane [591-76-4]	2-ethyltoluene [611-14-3]	<u>mono-chlorobenzene [108-90-7] *</u>	<u>di-iso-butyl ketone [108-83-8]</u>
3-methylhexane [589-34-4]	3-ethyltoluene [620-14-4]	<u>benzylchloride [100-44-7]</u>	<u>cyclohexanone [108-94-1] *</u>
<u>methylcyclohexane [108-87-2] *</u>	4-ethyltoluene [622-96-8]	<u>benzylidenechloride [98-87-3]</u>	<u>isophorone [78-59-1]</u>
<u>n-octane [111-65-9] *</u>	p-cymene [99-87-6]	<u>p-dichlorobenzene [106-46-7] *</u>	<u>mesityloxide [141-79-7]</u>
iso-octane [540-84-1] *	<u>4-tert-butyltoluene [98-51-1]</u>	<u>o-dichlorobenzene [95-50-1]</u>	diacetone alcohol [123-42-2] *
2,3,4-tri-methylpentane [565-75-3]	1,3-di-iso-propylbenzene [99-62-7]	m-dichlorobenzene [541-73-1]	acetophenone [98-86-2]
2,3-di-methylhexane [584-94-1]	1,4-di-iso-propylbenzene [100-18-5]	1,2,3-trichlorobenzene [87-61-6]	1-methyl-2-pyrrolidone [872-50-4]
3,4-di-methylhexane [583-48-2]	<u>mesitylene [108-67-8]</u>		cyclopentanone [120-92-3]
2,5-di-methylhexane [592-13-2]	1,2,3-tri-methylbenzene [526-73-8]	1,2-dibromoethane [106-93-4]	2-methylcyclohexanone [583-60-8]
2,2,5-tri-methylhexane [3522-94-9]	1,2,4-tri-methylbenzene [95-63-6] *	1-bromo-3-chloropropane [109-70-6]	3-methylcyclohexanone [591-24-2]
2-methylheptane [592-27-8]	1,2,3,4-tetra-methylbenzene [488-23-3]	2-bromoethylbenzene [103-63-9]	4-methylcyclohexanone [589-92-4]
3-methylheptane [589-81-1]	1,2,3,5-tetra-methylbenzene [527-53-7]	1-bromo-4-fluorobenzene (460-00-4)	
4-methylheptane [589-53-7]	tetralin [119-64-2]	methyl iodide [74-88-4]	
<u>n-nonane [111-84-2] *</u>	<u>naphtalene [91-20-3] *</u>		
4-methylnonane [17301-94-9]			
<u>n-decane [124-18-5] *</u>		Alcohols :	Esters :
n-undecane [1120-21-4] *		<u>ethanol [64-17-5] *</u>	methyl formate [107-31-3]
<u>n-dodecane [112-40-3] *</u>		n-propanol [71-23-8]	<u>ethylformate [109-94-4]</u>
n-tridecane [629-50-5]		<u>iso-propanol [67-63-0] *</u>	n-propyl formate [110-74-7]
n-tetradecane [629-59-4]		1-butanol [71-36-3] *	<u>methyl acetate [79-20-9] *</u>
n-pentadecane [629-62-9]		2-butanol [78-92-2] *	<u>ethyl acetate [141-78-6] *</u>
n-hexadecane [544-76-3]		iso-butanol [78-83-1] *	<u>vinyl acetate [108-05-4]</u>
limonene [5989-27-5] *		<u>tert-butanol [75-65-0] *</u>	<u>n-propyl acetate [109-60-4] *</u>
cis-decalin [493-01-6]		3-pentanol [584-02-1]	<u>iso-propyl acetate [108-21-4] *</u>
trans-decalin [493-02-7]		iso-amyl alcohol [123-51-3]	<u>n-butyl acetate [123-86-4] *</u>
		tert-amyl alcohol [75-85-4]	
		cyclohexanol [108-93-0] *	
		<u>methyl-iso-butylcarbinol [108-11-2]</u>	
		benzylalcohol [100-51-6] *	
		allylalcohol [107-18-6]	
Glycol ethers and derivates :		Ethers :	
ethylene glycol monomethyl ether (2-methoxyethanol) [109-86-4] *		<u>diethylether [60-29-7] *</u>	<u>iso-butyl acetate [110-19-0] *</u>
ethylene glycol monoethyl ether (2-ethoxyethanol) [110-80-5] *		<u>di-iso-propylether [108-20-3]</u>	<u>tert-butyl acetate [540-88-5]</u>
<u>ethylene glycol mono-iso-propyl ether (iso-propoxyethanol) [109-59-1]</u>		<u>tert-butylmethylether [1634-04-4] *</u>	<u>n-amyl acetate [628-63-7] *</u>
ethylene glycol monopropyl ether (2-propoxyethanol) [2807-30-9]		dibutylether [142-96-1]	<u>iso-amyl acetate [123-92-2]</u>
ethylene glycol monobutyl ether (2-butoxyethanol) [111-76-2] *			benzyl acetate [140-11-4]
ethylene glycol dimethyl ether (dimethylglycol) [110-71-4]			ethyl propionate [105-37-3]
ethylene glycol diethyl ether (diethylglycol) [629-14-1]			n-propyl propionate [106-36-5]
<u>ethylene glycol monomethyl ether acetate (methyl glycol acetate) [110-49-6] *</u>			methylbutyrate [623-42-7]
ethylene glycol monoethyl ether acetate (ethyl glycol acetate) [111-15-9] *			ethyl butyrate [105-54-4]
<u>ethylene glycol monobutyl ether acetate (butyl glycol acetate) [112-07-2] *</u>			methyl acrylate [96-33-3]
ethylene glycol acetate [542-59-6]			<u>ethyl acrylate [140-88-5]</u>
ethylene glycol diacetate [111-55-7]			<u>butyl acrylate [141-32-2]</u>
diethylene glycol diethyl ether (diethyl diglycol) [112-36-7]			<u>methyl metacrylate [80-62-6] *</u>
<u>propylene glycol monomethyl ether (1-methoxy-2-propanol) [107-98-2] *</u>			ethyl metacrylate [97-63-2]
propylene glycol monoethyl ether (1-ethoxy-2-propanol) [1569-02-4]			butyl metacrylate [97-88-1]
<u>propylene glycol monomethyl ether acetate (1-methoxy-2-propanol acetate) [108-65-6] *</u>			iso-butyl metacrylate [97-86-9]
propylene glycol monoethyl ether acetate (1-ethoxy-2-propanol acetate) [98516-30-4]			dimethyl succinate [106-65-0]
ethylene glycol monohexylether (hexylcellosolve) [112-25-4]			dimethyl glutarate [1119-40-0]
			dimethyl adipate [627-93-0]

For sampling procedures using the **3M @ 3500 Organic Vapor Monitor** type, compounds listed and underlined can be quantified in the VOC-analysis, as all essential calculation factors (i.e. sampling rate, extraction recovery) are made available by 3M @. For other compounds, some of these necessary calculation factors are lacking for the sampling and extraction system used and hence results are expressed in a semi-quantitative way (ranges) (for more details on these ranges : see Annex 2).

* For sampling procedures using **Radiello Diffusive Samplers** (type 130 and 123-1), compounds listed with an asterisk (*) can be quantified in the VOC-analysis, as all essential calculation factors (i.e. sampling rate, extraction recovery) are available. For other compounds, some of these necessary calculation factors are lacking for the sampling and extraction system used and hence results are expressed in a semi-quantitative way (ranges) (for more details on these ranges : see Annex 2).

** The NIOSH 1005 analytical method recommends limiting the total volume of air sampled to 2.5 L at ambient concentrations as high as 1737 mg/m³ (500 ppm).

Annex 2 : Additional information concerning VOC-analysis

Analytical methodology:

Test: Measurement of volatile organic compounds (VOCs). Sampling has not been performed by the laboratory.

Scope: The VOC-analysis aims to identify and quantify organic solvents in air samples, taken on activated charcoal, in solvent mixtures or in viscous samples. The identity of compounds that can be determined in this analysis is listed in Annex 1. Each individual sample is assayed systematically for the presence or absence of the compounds listed in Annex 1. All identified compounds are subsequently quantified, provided that all essential calculation factors are available. Additional compounds (not listed in Annex 1) detected in the samples during the assay will be reported as non-identified compounds.

Certification: The Laboratory for Occupational and Environmental Hygiene has been granted formal accreditation according to the Belgian Royal Decree of 31 March 1992, for the measurement of 187 volatile organic compounds (listed in Annex 1) as detailed in the laboratory's sampling and analyzing method PM001_VOCs (formal certification published most recently on 6 December 2016).

Reference methods: NIOSH methods:
 1500, 1501, 1552 aliphatic and aromatic hydrocarbons
 1003, 1005, 1019, 1022 chlorinated hydrocarbons
 1300, 1301, 1400, 1401, 1402, 1403, 1450, 1454, 1457, 1458, 1459, 1602, 1604, 1609, 1615, 1618, 2500, 2508 polar compounds

Description: Prior to analysis, samples are extracted with an appropriate volume of carbon disulfide (CS₂). A small aliquot of each extract is analyzed using gas chromatography with flame ionisation detection (GC-FID). Each sample is injected simultaneously on two capillary analytical columns (60 m) with unique stationary phases. Organic compounds present in the sample are identified on the basis of a unique set of relative retention times (RRTs), specific for each product. Quantification of the identified compounds is based on a specific relative response factor (RRF) for each compound, a unique parameter determined and updated on a regular basis by validated laboratory tests. In the ultimate quantitative result, essential compound specific calculation factors (e.g. extraction recovery) and general sampling parameters (e.g. sampling volume) are incorporated.
 The CS₂ extraction recovery for each compound is pre-assayed in a relevant concentration range using a pre-defined type and lot of activated charcoal tubes (type NIOSH SKC 100/50 mg, Lot 2000 at present). These activated charcoal tubes can be purchased from the laboratory.

Provision: For samples taken on activated charcoal tubes, the reported airborne concentrations are based on the calculation factors determined by the laboratory for the pre-specified type of activated charcoal tubes (type NIOSH SKC 100/50 mg, Lot 2000 at present) and are valid subject to correctness of the sampling data and conditions communicated by the client.
 For samples taken on diffusion type monitors, the reported airborne concentrations are valid subject to correctness of the sampling data communicated by the client and subject to the availability and accuracy of all necessary calculation factors to be communicated by the manufacturer of the monitor.

Limit Values: TLVs are the 2016 Threshold Limit Values published by ACGIH. GWs are the Belgian limit values (Royal Decree of 9 March 2014).

Reporting Limit: For occupational hygiene samples, the reporting limit of the assay is set at 1 mg/m³ -or 1/100 TLV for those compounds assigned a TLV below 100 mg/m³- provided that an air volume of at least 10L is sampled.
 Exceptions to this general reporting limit are specified as follows, again provided that an air volume of at least 10L is sampled: acrylonitrile (0,80 mg/m³), allyl alcohol (0,12 mg/m³), benzene (0,05 mg/m³), benzylchloride (0,07 mg/m³), chloroform (0,69 mg/m³), 2-ethoxyethanol (0,69 mg/m³), ethyl acrylate (0,40 mg/m³), gamma-butyrolactone (1,3 mg/m³), 2-methoxyethanol (3,3 mg/m³), methyl acrylate (0,18 mg/m³), methylformate (1,1 mg/m³), methylglycolacetate (0,20 mg/m³), methyl iodide (0,72 mg/m³), tetrachloromethane (0,9 mg/m³), 1,1,2,2-tetrachloroethane (0,29 mg/m³) and 1-methyl-2-pyrrolidone (2,9 mg/m³)
 For solvent mixtures or viscous samples, the reporting limit is set at 0,1% w/v or 0,1% w/w.

Detection Limit: The pure analytical limit of detection is compound-specific, approximating < 0.5 - 5 µg per ml extract.
 An exception to this general limit of detection is the compound 1-methyl-2-pyrrolidone (29 µg/ml).

Measurement uncertainty: The global measurement uncertainty, including the error on the active sampling procedure –which is assumed to be one of the more significant errors in the global measurement protocol-, is estimated to be 10%. As a consequence, the pure analytical error is well below 10%.

Ranges: The assay result of compounds for which essential calculation factors are not available and, in addition, the results of non-identified compounds, are reported in a semi-quantitative way, indicated by the following ranges:

Code	Occupational Hygiene sample (>10L)	Environmental sample (>100L)	Solvent mixture or viscous sample
-	< 1 mg/m ³ en > 1/100 TLV	< 1 µg/m ³	< 1 % w/v of w/w
+	1 - 10 mg/m ³	1 - 10 µg/m ³	1 – 10 % w/v of w/w
++	10 - 100 mg/m ³	10 - 100 µg/m ³	10 – 100 % w/v of w/w
+++	> 100 mg/m ³	> 100 µg/m ³	

Validity: The analytical results reported following the above-mentioned assay, involve solely the sample object indicated in the respective report. This report should always be added, complete and indicating the original pagination, when further processing the analytical results. In the event of the assay of samples taken by the client or its representative, the laboratory holds sole responsibility for the accurate analysis of the samples provided.

Annex 3 : Package-analysis BTEXN and/or Package-analysis VOCI - List of compounds (with CAS-number) :

Package BTEXN :

benzene [71-43-2] *
toluene [108-88-3] *
ethylbenzene [100-41-4] *
m-xylene [108-38-3] *
p-xylene [106-42-3] *
o-xylene [95-47-6] *
naphtalene [91-20-3] *

Package VOCI :

methylene chloride [75-09-2] * **
chloroform [67-66-3] *
tetrachloromethane [56-23-5] *
1,1-dichloroethane [75-34-3]
1,2-dichloroethane [107-06-2] *
1,1,1-trichloroethane [71-55-6] *
1,1,2-trichloroethane [79-00-5]
trichloroethylene [79-01-6] *
tetrachloroethylene [127-18-4] *
trans-1,2-dichloroethene [156-60-5]
cis-1,2-dichloroethene [156-59-2]

For sampling procedures using the **3M ® 3500 Organic Vapor Monitor** type, compounds listed and underlined can be quantified, as all essential calculation factors (i.e. sampling rate, extraction recovery) are made available by 3M ®. For other compounds, some of these necessary calculation factors are lacking for the sampling and extraction system used and hence results are expressed in a semi-quantitative way (ranges) (for more details on these ranges : see Annex 4).

* For sampling procedures using **Radiello Diffusive Samplers** (type 130 and 123-1), compounds listed with an asterisk (*) can be quantified, as all essential calculation factors (i.e. sampling rate, extraction recovery) are available. For other compounds, some of these necessary calculation factors are lacking for the sampling and extraction system used and hence results are expressed in a semi-quantitative way (ranges) (for more details on these ranges : see Annex 4).

** The NIOSH 1005 analytical method recommends limiting the total volume of air sampled to 2.5 L at ambient concentrations as high as 1737 mg/m³ (500 ppm).

Annex 4 : Package-analysis BTEXN and/or Package-analysis VOCI - Additional information

Analytical methodology:

Test: Package-analysis BTEXN and/or Package-analysis VOCI. Sampling has not been performed by the laboratory.

Scope: The VOC-analysis aims to identify and quantify organic solvents in air samples, taken on activated charcoal, in solvent mixtures or in viscous samples. The identity of compounds that can be determined in this analysis is listed in annex. Each individual sample is assayed systematically for the presence or absence of the compounds listed in annex. All identified compounds are subsequently quantified, provided that all essential calculation factors are available. Additional compounds (not listed in annex) detected in the samples during the assay will be reported as non-identified compounds.

Certification: The Laboratory for Occupational and Environmental Hygiene has been granted formal accreditation according to the Belgian Royal Decree of 31 March 1992, for the measurement of 187 volatile organic compounds (listed in Annex 1) as detailed in the laboratory's sampling and analyzing method PM001_VOCs (formal certification published most recently on 6 December 2016).

Reference methods: NIOSH methods:
1500, 1501, 1552 aliphatic and aromatic hydrocarbons
1003, 1005, 1019, 1022 chlorinated hydrocarbons

Description: Prior to analysis, samples are extracted with an appropriate volume of carbon disulfide (CS₂). A small aliquot of each extract is analyzed using gas chromatography with flame ionisation detection (GC-FID). Each sample is injected simultaneously on two capillary analytical columns (60 m) with unique stationary phases. Organic compounds present in the sample are identified on the basis of a unique set of relative retention times (RRTs), specific for each product. Quantification of the identified compounds is based on a specific relative response factor (RRF) for each compound, a unique parameter determined and updated on a regular basis by validated laboratory tests. In the ultimate quantitative result, essential compound specific calculation factors (e.g. extraction recovery) and general sampling parameters (e.g. sampling volume) are incorporated.
The CS₂ extraction recovery for each compound is pre-assayed in a relevant concentration range using a pre-defined type and lot of activated charcoal tubes (type NIOSH SKC 100/50 mg, Lot 2000 at present). These activated charcoal tubes can be purchased from the laboratory.

Provision: For samples taken on activated charcoal tubes, the reported airborne concentrations are based on the calculation factors determined by the laboratory for the pre-specified type of activated charcoal tubes (type NIOSH SKC 100/50 mg, Lot 2000 at present) and are valid subject to correctness of the sampling data and conditions communicated by the client.
For samples taken on diffusion type monitors, the reported airborne concentrations are valid subject to correctness of the sampling data communicated by the client and subject to the availability and accuracy of all necessary calculation factors to be communicated by the manufacturer of the monitor.

Limit Values: TLVs are the 2016 Threshold Limit Values published by ACGIH. GWs are the Belgian limit values (Royal Decree of 9 March 2014).

Reporting Limit: For occupational hygiene samples, the reporting limit of the assay is set at 1 mg/m³ -or 1/100 TLV for those compounds assigned a TLV below 100 mg/m³- provided that an air volume of at least 10L is sampled.
Exceptions to this general reporting limit are specified as follows, again provided that an air volume of at least 10L is sampled: benzene (0,05 mg/m³), chloroform (0,69 mg/m³) and tetrachloromethane (0,9 mg/m³).
For solvent mixtures or viscous samples, the reporting limit is set at 0,1% w/v or 0,1% w/w.

Detection Limit: The pure analytical limit of detection is compound-specific, approximating < 0.5 - 5 µg per ml extract.

Measurement uncertainty: The global measurement uncertainty, including the error on the active sampling procedure –which is assumed to be one of the more significant errors in the global measurement protocol-, is estimated to be 10%. As a consequence, the pure analytical error is well below 10%.

Ranges: The assay result of compounds for which essential calculation factors are not available and, in addition, the results of non-identified compounds, are reported in a semi-quantitative way, indicated by the following ranges:

Code	Occupational Hygiene sample (>10L)	Environmental sample (>100L)	Solvent mixture or viscous sample
-	< 1 mg/m ³ en > 1/100 TLV	< 1 µg/m ³	< 1 % w/v of w/w
+	1 - 10 mg/m ³	1 - 10 µg/m ³	1 – 10 % w/v of w/w
++	10 - 100 mg/m ³	10 - 100 µg/m ³	10 – 100 % w/v of w/w
+++	> 100 mg/m ³	> 100 µg/m ³	

Validity: The analytical results reported following the above-mentioned assay, involve solely the sample object indicated in the respective report. This report should always be added, complete and indicating the original pagination, when further processing the analytical results.
In the event of the assay of samples taken by the client or its representative, the laboratory holds sole responsibility for the accurate analysis of the samples provided.

Annex 5 : Analysis request form for air- and product analysis



Environment and Health

Laboratory for Occupational and Environmental Hygiene

Kapucijnenvoer 35, 6th floor – box 7001

B-3000 Leuven (Belgium)

www.loeh.be

Tel: +32 16-37.32.81

Fax: +32 16-33.69.97

Analysis request form for air- and product analysis

Data provided by the applicant

1. Identification details :

<u>Reporting data:</u>	<u>Invoice-data</u> ⁽¹⁾
Applicant (company):	Company:
Contact:	Contact:
Address:	Address:
Tel:	Tel:
Fax:	Fax:
e-mail adress:	
Y/ref:	Y/ref:

2. Type of analysis requested :

<input type="checkbox"/> VOC-analysis ⁽²⁾ :	<input type="checkbox"/> mg/m ³	<input type="checkbox"/> µg/m ³
<input type="checkbox"/> Dust ⁽²⁾ :	<input type="checkbox"/> Metal ⁽²⁾ :	
<input type="checkbox"/> Pharmaceutical compound (API / IPI) ⁽²⁾ :		
<input type="checkbox"/> GC-MS-analysis ⁽²⁾ :		
<input type="checkbox"/> Other analyses ⁽²⁾ :		

3. Information about the samples:

N° sample	Pump-n°.	Date	Volume (L)	Time (min)	Place	Expected compounds:

⁽¹⁾ Preferably, the invoice address is the same as the reporting adress. If not, please specify.

⁽²⁾ Please specify if necessary.

Annex 6: Closing days of the laboratory

Thursday February 2, 2017 (KU Leuven Patron Saint's Day)

Monday April 17, 2017 (Easter Monday)

Monday May 1, 2017 (Labour Day)

Thursday May 25, 2017 (Ascension Day)

Monday June 5, 2017 (Whit Monday)

Tuesday July 11, 2017 (Holiday Flemish Community)

Friday July 21, 2017 (National holiday)

Tuesday August 15, 2017 (Ascension Day)

Monday September 4, 2017 (Leuven Fair)

Wednesday November 1, 2017 (All Saints Day)

Thursday November 2, 2017 (All Souls Day)

Christmas holidays from Monday December 25, 2017 till Monday January 1, 2018