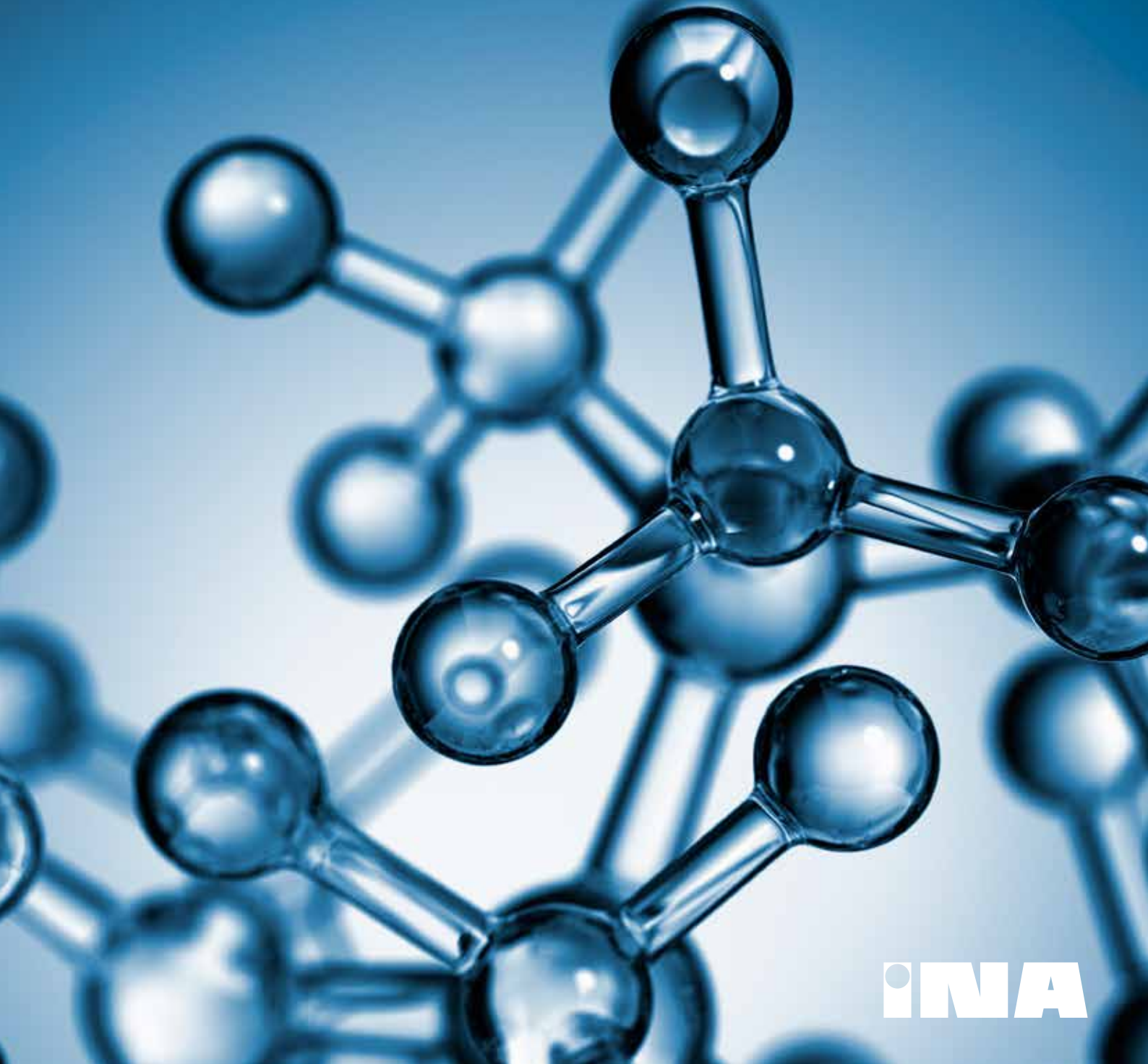




**CENTRAL TESTING LABORATORY
CATALOG**



CENTRAL TESTING LABORATORY

The Central Testing Laboratory (CTL) provides services of physical and chemical analysis of crude oils, petroleum products, biofuels, waters, soils and wastes. Thanks to its state-of-the-art analytical equipment and competent staff, each service is provided within the shortest possible time, reliably and efficiently. CTL also offers sampling services for all types of samples according to customer requirements. CTL offers professional expertise and problem solving oriented research and development studies, as well as a variety of other intellectual services.

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HISTORY OF THE CENTRAL TESTING LABORATORY

The Central Testing Laboratory started operation in the late 1960s following the establishment of the INA Institute for Research and Development and its part for laboratory research in 1967. Application of modern instrumental physical and chemical analytic techniques was driven by intensive oil and petrochemical research activities. Since then, in addition to instrumental the Laboratory has continuously applied classic analytic techniques for purposes of research; processing of crude oils, gases and gas condensates; organic and inorganic petro chemistry; geochemistry and environmental protection. Beside the support to research and processing, throughout that time the aim of the Laboratory was the improvement of standard and the application of new analytical methods and techniques by continuous technological improvements and training of employees.

BUSINESS POLICY

The policy and goals of the Central Testing Laboratory are aligned with the INA d.d. policies regarding compliance to the requirements of HRN EN ISO 9001 and HRN EN ISO/IEC 17025 standards, which ensure that high quality criteria are applied to:

- fulfilment of customer requirements and reliability of test results
- compliance with legislation, national regulations and corporate rules
- concern for the preservation of the quality of life and work environment
- continuous training and development of employees
- continuous improvement of the quality assurance system



QUALITY – BASIC PRINCIPLE OF CTL'S WORK



ACCREDITATION

CTL has been accredited since 2002 in accordance with the requirements of HRN EN ISO/IEC 17025 standard (Accreditation Certificate No. 1020) for the testing of liquid petroleum products and biofuels, sampling at gas stations as well as testing of water, waste, sludge and soil and sampling of waste water. CTL has been assigned accreditation with a flexible scope defined as: “The certificate holder is allowed to apply updated versions of those standards for test methods for which the year of publication is not indicated”.

CERTIFICATION

As an integral part of INA d.d., CTL has implemented and maintains the quality of operations in accordance with the requirements of the HRN EN ISO 9001 standard. This standard is applied, through an integral companywide system, to core business processes as well as to support INA d.d. management processes. In this way, INA d.d. is continuously improving business quality and the ways it is meeting the requirements and expectations of customers, owners, suppliers, business partners, the community and other stakeholders.

AUTHORIZATIONS

CTL is authorized for the following activities:

Authorization by the Ministry of Agriculture to perform activities of sampling and testing of waters (ground water, surface water and waste water): Decision on the fulfilment of specific conditions (May 11, 2015, Class: UP/I-325-01/14-01/04, valid until May 11, 2025.)

Authorization by the Ministry of Environmental and Nature Protection for carrying out professional environmental protection activities: determining the type of waste, hazardous properties of waste, as well as sampling and testing of physical and chemical properties of waste and environmental monitoring: Decision on granting approval for performing professional environmental protection activities (May 12, 2014, Class: UP/I-351-02/14-08/33, Reg. No.: 517-06-2-1-1-14-2).








LIST OF TEST METHODS

Test methods are divided by type of samples into:

1. Petroleum, petroleum products, biofuels
2. Water, soil and waste
3. Other operations and services

1. CRUDE OIL, PETROLEUM PRODUCTS, BIOFUELS

The Central Testing Laboratory is equipped for physical, chemical and microbiological analyses of crude oil, commercial petroleum products, biofuels and other hydrocarbon samples. According to customers' request, CTL can perform sampling on-site using its specially trained staff, appropriate equipment and vehicles. CTL acts as an expert body in legal proceedings at the request of customers' of analytical services. In addition, CTL develops crude oil assays (COA-s) from its own as well as from delivered feed stocks, according to customer requirements. It has a commercially available base of COA-s with more than sixty tested feed stocks.

NO.	PROPERTY	MATRIX / PRODUCT	TEST METHOD
1.	Additives - efficiency determination	petroleum products/ biofuel	In-house
3.	ARAL test	petroleum products	In-house
4.	Aromatics in heating oil	petroleum products	UOP 495
5.	Aromaticity (13C/1H NMR)	petroleum products	IP 392
6.	Aromatic hydrocarbons (NP-HPLC)	petroleum products	<ul style="list-style-type: none"> • HRN EN 12916  • ASTM D 6379 • ASTM D 6591
7.	Asphaltenes - content	crude oil / petroleum products	<ul style="list-style-type: none"> • ASTM D 6560 • IP 143
8.	Benzene content in unleaded motor gasoline	petroleum products	HRN EN 12177
9.	Benzene in motor gasoline (FTIR)	petroleum products	HRN EN 238/A1 
10.	Benzene, aromatics, olefins in motor gasoline (1H NMR)	petroleum products	In-house 
11.	Color and appearance	petroleum products	Visual
12.	cATP - determination in fuels, fuel mixtures and fuel associated water, Luminometer	petroleum products	ASTM D 7687
13.	Cellulose	biofuels	In-house
14.	Cetane index, calculated	petroleum products	HRN EN ISO 4264 
15.	Sample of known composition purity (1H NMR)	petroleum products	In-house
16.	Distillation of petroleum products at atmospheric pressure	crude oil / oil products	<ul style="list-style-type: none"> • HRN EN ISO 3405 • ASTM D 86 
17.	Distillation of petroleum products at reduced pressure	petroleum products	ASTM D 1160
18.	Vacuum distillation of crude oil and crude fractions (IBP of samples over 150 °C)	crude oil / petroleum products	ASTM D 5236
19.	True boiling point distillation of crude oil and crude oil fractions (atmospheric distillation, 15 theoretical plate column)	crude oil / petroleum products	ASTM D 2892
20.	Smoke point of kerosene and aviation turbine fuel	petroleum products	ASTM D 1322
21.	Doctor test	petroleum products	<ul style="list-style-type: none"> • HRN ISO 5275 • ASTM D 4952



Liquid Chromatograph (HPLC) – aromatics hydrocarbon types in middle distillates, Euromarker SY 124











Distillation Unit - testing of distillation characteristics of petroleum products








Distillation Unit - distillation of water samples, oil and petroleum fractions after decomposition - the determination of nitrogen by the Kjeldahl method



FTIR / Raman Spectrophotometer - FAME in diesel ; benzene in gasoline, identification of unknown samples

NO.	PROPERTY	MATRIX / PRODUCT	TEST METHOD
22.	Nitrogen - Kjeldahl - Method after mineralization with selenium	petroleum products	In-house
23.	Elementary analysis (CHN)	petroleum products	ASTM D 5291 Modification (procedure A) 
24.	Ethanol - purity	biofuels	HRN EN 15721
25.	Euro marker SY 124 (HPLC)	petroleum products	EU Reference method for the determination of the SY124 in gas oil and kerosene
26.	Hydrocarbon types in liquid petroleum products by FIA (P+N, A, O)	petroleum products	<ul style="list-style-type: none"> • ASTM D 1319 • HRN EN 15553
27.	Cold Filter Plugging Point (CFPP) - Diesel fuel	petroleum products	HRN EN 116 
28.	Physic-chemical characteristics of fuel - Petrospec method	petroleum products	In-house
29.	Phosphorus content in ethanol	biofuels	HRN EN 15487
30.	Glycerol - free and total, mono-, di- i tri- glyceride	biofuels	HRN EN 14105
31.	Group composition in secondary fractions, diesel fuel and light cyclic oil (GCxGC)	crude oil / petroleum products	In-house
32.	Density of crude petroleum and liquid petroleum products at 15 °C by hydrometer method	crude oil / petroleum products	<ul style="list-style-type: none"> • HRN EN ISO 3675 • ASTM D 1298
33.	Density – oscillating U-tube	crude oil / petroleum products	<ul style="list-style-type: none"> • HRN EN ISO 12185 • ASTM D 4052 
34.	Vapor lock index (VLI)	petroleum products	HRN EN 228 
35.	Drivability index (%mas, %vol)	petroleum products	ASTM D 4814
36.	Iodine number in FAME	biofuels	HRN EN 16300
37.	Total acidity	petroleum products / biofuels	<ul style="list-style-type: none"> • ASTM D 974 • ASTM D 1613 • ASTM D 3242  • HRN EN 14104  • HRN EN 15491 
38.	Total acidity by potentiometric titration	petroleum products / biofuels	ASTM D 664
39.	Chlorine (WDXRF)	crude oil / petroleum products	ISO 15597
40.	Chloride content in ethanol (blending component for petrol, IC)	biofuels	<ul style="list-style-type: none"> • ASTM D 7319 • ASTM D 7328 • EN 15492
41.	Coking gasoline - structural characterization (NMR)	petroleum products	In-house
42.	Carbon residue of petroleum products, Micro method	petroleum products	<ul style="list-style-type: none"> • ASTM D 4530 • HRN EN ISO 10370
43.	Corrosiveness to copper from petroleum products by copper strip test (Cu, 100°C, 2h)	petroleum products	<ul style="list-style-type: none"> • HRN EN ISO 2160 • ASTM D 130
44.	Lubricity, corrected wear scar diameter (wsd 1,4) at 60°C	petroleum products	<ul style="list-style-type: none"> • HRN EN ISO 12156-1 • ASTM D 6079
45.	Thiol mercaptan sulfur	petroleum products	ASTM D 3227 
46.	Metal content (WDXRF)	petroleum products	In-house

NO.	PROPERTY	MATRIX / PRODUCT	TEST METHOD
47.	Metal content, semi quantitative (WDXRF)	petroleum products	In-house
48.	Fatty acid methyl esters (FAME)	biofuels	HRN EN 14103
49.	Methanol content in FAME	biofuels	DIN EN 14110
50.	Fatty acid methyl esters (FAME) in middle distillates (FTIR)	petroleum products	HRN EN 14078 
51.	Fatty acid methyl esters (FAME) in jet fuel (GC/MS)	petroleum products	IP 585
52.	The method of counting live bacteria and fungi in liquid fuels – method of filtering and growing	petroleum products	ASTM D 6974
53.	Particulate matter (Millipore lab.)	petroleum products	ASTM D 5452
54.	Particulate contaminant (Line sampling)	petroleum products	ASTM D 2276
55.	Water separation characteristics (MSEP)	petroleum products	ASTM D 3948
56.	Motor gasoline – structural composition (1H NMR)	petroleum products	In-house
57.	MTBE purity	petroleum products	In-house
58.	Crude dewatering with demulsifier	crude oil	In-house
59.	Oxidation stability, Rancimat test	petroleum products / biofuels	HRN EN 15751 
60.	Research octane number of catalytic reforming gasoline (1H NMR)	petroleum products	In-house
61.	Research octane number of FCC gasoline (1H NMR)	petroleum products	In-house
62.	Research octane number of coking gasoline (1H NMR)	petroleum products	In-house
63.	Research octane number of FCC gasoline (GC)	petroleum products	In-house
64.	Research octane number of coking gasoline (GC)	petroleum products	In-house
65.	Olefins in petroleum products (HPLC)	petroleum products	In-house
66.	Low lead contents in gasoline (XRF)	petroleum products	HRN EN 13723
67.	The organic oxygen compounds and total organically bound oxygen (GC)	petroleum products	HRN EN 13132 
68.	Ash content, oxide	crude oil / petroleum products	HRN EN ISO 6245
69.	Ash content, sulphate	petroleum products	HRN ISO 3987
70.	pHe	biofuels	<ul style="list-style-type: none"> • ASTM D 6423 • HRN EN 15490
71.	Flash point (PM)	petroleum products	<ul style="list-style-type: none"> • HRN EN ISO 2719 (Procedure A) • ASTM D 93 
72.	Flash point (TAG)	petroleum products	ASTM D 56 
73.	Flash and fire points (COC)	petroleum products	<ul style="list-style-type: none"> • HRN EN ISO 2592 • ASTM D 92
74.	Blue dye in Euro diesel Blue – qualitative (UV/VIS)	petroleum products	In-house
75.	Individual and group composition of gasoline and fractions (GC)	petroleum products	<ul style="list-style-type: none"> • In-house • ASTM D 6729
76.	Polycyclic aromatic hydrocarbons in diesel fuel (UV)	petroleum products	In-house
77.	PCB (Polychlorinated biphenyls) in fuel, waste and transformer oils (GC)	petroleum products	<ul style="list-style-type: none"> • HRN EN 12766-1 • HRN EN 15308
78.	Straight run gasoline - composition (paraffin, naphthenic, aromatics) (1H NMR)	petroleum products	In-house



The only one NMR spectrometer in MOL Group and the only one in Croatia with the ability to analyze both liquid and solid samples. It has frequently been used to analyze crude oils, petroleum fractions and products, monitoring of esterification reaction, determination of research octane number and analyzing of additives, asphaltene structure and origin.



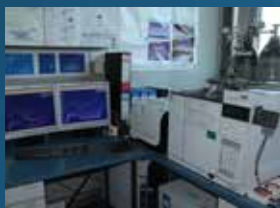
The Pensky–Martens closed-cup flash-point test









Wavelength dispersive X-ray fluorescence spectrophotometer (WDX) - sulfur in oil and petroleum products, chlorine, lead, vanadium, nickel, scanning of solid and liquid samples for the presence of metals





Units for testing of low-temperature properties of petroleum products - filterability, cloud point, pour point



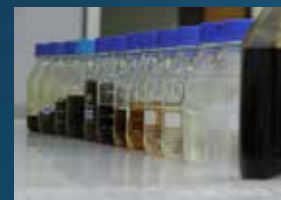
Comprehensive GCxGC System – group composition in secondary fractions, diesel fuel and light cyclic oil

NO.	PROPERTY	MATRIX / PRODUCT	TEST METHOD
79.	Degradation products in used engine oils (FTIR)	petroleum products	ASTM E2412
80.	Sediments in middle distillates	petroleum products / biofuels	HRN EN 12662
81.	Separation and isolation of a group of aromatic compounds (semi-preparative NP-HPLC)	petroleum products	In-house
82.	Separation and isolation of the saturated, aromatic and polar hydrocarbons (semi-preparative NP-HPLC)	petroleum products	In-house
83.	Simulated distillation	crude oil / petroleum products	• ASTM D 6352 • ASTM D 2887 (extended)
84.	Simulated distillation (MAT test)	crude oil / petroleum products	ASTM D 2887
85.	Existent gum content	petroleum products	• HRN EN ISO 6246 • ASTM D 381 
86.	Gas chromatography – chromatogram (GCxGC)	crude oil / petroleum products	In-house
87.	Gas chromatography – chromatogram and interpretation (GCxGC)	crude oil / petroleum products	In-house
88.	Gasoline – structural composition (1H NMR)	petroleum products	In-house
89.	Middle distillates – structural composition (1H NMR)	petroleum products	In-house
90.	Dry residue in ethanol, gravimetric	biofuels	HRN EN 15691
91.	Sulphate content in ethanol, blending component for petrol (IC)	biofuels	• ASTM D 7319 • ASTM D 7328 • EN 15492
92.	Total sulphur content (UVF)	petroleum products	HRN EN ISO 20846 
93.	Total sulphur content (WDXRF)	petroleum products	HRN EN ISO 20884 ASTM D 2622 HRN EN ISO 14596
94.	Sulphur, microculometry	petroleum products	• HRN DIN 51400-2 • HRN DIN 51400-7
95.	Sulphur compounds - individual in light cyclic oil (GC/PFPD)	petroleum products	In-house
96.	Sulphur compounds in petroleum fractions (GC/PFPD)	petroleum products	In-house
97.	Pour point of petroleum products	crude oil / petroleum products	ASTM D 5950 
98.	Compatibility test of crude and heavy crude products	crude oil / petroleum products	In-house
99.	Vapor pressure (Reid method)	petroleum products	• HRN ISO 3007 • ASTM D 323
100.	Vapor pressure of petroleum products (Mini method)	petroleum products	• HRN EN 13016-1 • ASTM D 5191 
101.	Sampling	petroleum products	HRN EN 14275  HRN EN ISO 3170
102.	Sampling of liquid fuels for microbiological testing	petroleum products	ASTM D 7464
103.	Viscosity dynamic and density of liquids by Stabinger viscometer, calculation of kinematic viscosity	petroleum products	ASTM D7042 
104.	Viscosity kinematic of transparent and opaque liquids, calculation of dynamic viscosity	petroleum products	• HRN EN ISO 3104 • ASTM D 445
105.	Polyunsaturated (≥ 4) double bonds (GC)	biofuels	HRN EN 15779
106.	Water content in fuel oil	petroleum products	• HRN ISO 3734 • ASTM D 1796

107.	Water and sediments, visual	petroleum products	Visual
108.	Water content in crude oil and petroleum products	crude oil / petroleum products	<ul style="list-style-type: none"> • HRN ISO 3733 • ASTM D 95 • HRN EN ISO 12937 • HRN EN 15489
109.	Electrical conductivity	biofuels	HRN EN 15938
110.	Electrical conductivity of aviation and distillate fuels	petroleum products	<ul style="list-style-type: none"> • HRN ISO 6297 • ASTM D 2624 
111.	Freezing point of aviation fuels	petroleum products	ASTM D 2386 
112.	Cloud point	petroleum products	ASTM D 5771
113.	Mercury (PSA)	crude oil / petroleum products	In-house
114.	Lignine	biofuels	In-house
115.	Microwave digestion	crude oil/petroleum product	In-house
116.	Heat of combustion (Bomb Calorimeter)	petroleum product	ASTM D 240
117.	Heat of combustion	petroleum product (JET A-1)	ASTM D 3338
118.	Heat of combustion	petroleum product (heating oil,diesel,biofuels)	ISO 8217
119.	Heat of combustion	petroleum product (heating oil, diesel)	ASTM D 4868
120.	Moisture content	biofuels	SIS-CEN/TS 14774-2 SIS-CEN/TS 14774-3



Diesel fuel lubricity test



2. WATERS, SOIL AND WASTE

CTL offers services of physical, chemical and microbiological testing of ground waters, wastewaters, surface waters, process waters, formation waters, drilling waters, geothermal waters and other water based samples. Testing of wastewaters is performed on the basis of customer's wastewater discharge licence. In addition, the Laboratory performs tests on the effectiveness of scale inhibitors and biocides and water testing in order to identify the origin of water in fuel tanks, based on customer complaints.

The Laboratory performs analysis of wastes for the needs of permanent disposal, thermal processing and physical-chemical treatment. Waste testing services are provided for the needs of waste owners (industry, utility companies, private companies) who are obliged to dispose of waste through authorized waste disposal companies. Additional waste tests may be performed at customer request.

The Laboratory performs determination of basic set of parameters and determines pollution by hydrocarbons in soil samples.

Trained employees can perform sampling of all types of waters, wastes, sludge and soils at customer request and according to current EU standards.











ICP-OES spectrophotometer – metals and cations in water, waste and degraded samples

















Ion Chromatograph (IC) – anions and cations in water and water solution of soil and waste



Gas Chromatograph (GC) – hydrocarbon oil index

NO.	PROPERTY	MATRIX / PRODUCT	TEST METHOD
1.	Acute toxicity with luminescent bacteria (<i>Vibro fischeri</i> NRRL-B-11177)	water	ISO 11348-1
2.	Alkalinity (p-, m-)	water	In-house
3.	Aluminum (ICP)	water	HRN EN ISO 11885 
4.	Ammonium	water	In-house
5.	Ammonium dissolved in water (IC)	water	HRN EN ISO 14911
6.	Anion-active detergent	water	HRN EN 903 
7.	Antimony (ICP)	water / elute	In-house
8.	Aromatic hydrocarbon (BTX) in water (GC)	water	ISO 11423-2
9.	Arsenic (ICP)	water / elute	In-house
10.	Copper (ICP)	water / elute	HRN EN ISO 11885 
11.	Barium (ICP)	water / elute	HRN EN ISO 11885 
12.	Biochemical oxygen demand	water	• HRN EN 1899-1 • HRN EN 1899-2 
13.	Boron (ICP)	water	HRN EN ISO 11885
14.	Enumeration of aerobic bacteria (22°C, 37°C)	water	ISO 6222
15.	Enumeration of <i>Escherichia coli</i>	water	HRN EN ISO 9308-1
16.	Enumeration of fecal coliforms	water	HRN EN ISO 9308-1
17.	Enumeration of total coliforms	water	HRN EN ISO 9308-1
18.	Bromide dissolved in water (IC)	water	HRN EN ISO 10304-1
19.	Zinc (ICP)	water / elute	HRN EN ISO 11885 
20.	<i>Clostridium perfringens</i>	water	ISO 6461/1
21.	Heat of combustion (Bomb Calorimeter)	waste	ASTM D 240
22.	Nitrogen - total	water	HRN ISO 5663+(NO ₂ -N+NO ₃ -N)
23.	Nitrogen - Kjeldahl - Method after mineralization with selenium	water	HRN ISO 25663 
24.	Elementary analysis - CHN	waste	Modified ASTM D 5291 (procedure A)
25.	Phenol index - 4-Aminoantipyrine spectrometric methods after distillation	water	HRN ISO 6439 A 
26.	Filtration characteristics of water (Membrane filter test)	water	In-house
27.	Fluoride dissolved in water (IC)	water	HRN EN ISO 10304-1

NO.	PROPERTY	MATRIX / PRODUCT	TEST METHOD
28.	Phosphate dissolved in water (IC)	water	HRN EN ISO 10304-1
29.	Phosphorus - total in water (UV-VIS)	water	HRN EN ISO 6878
30.	Phosphorus (ICP)	water	HRN EN ISO 11885
31.	Loss of ignition (550 °C)	waste / sludge / sediment	• HRN EN 12879 • HRN EN 15169
32.	Formation water density	water	ASTM D 1429-13
33.	Bicarbonate	water	In-house
34.	Corrosively index	water	Calculation
35.	Stability index (Ryznar 20 °C)	water	In-house
36.	Saturation index (Langelier, Stiff)	water	In-house
37.	Intestinal enterococci	water	ISO 7899-2
38.	Biocide efficiency testing	water	In-house
39.	Scale-inhibitor efficiency testing	water	• In-house • NACE Standard TM0374
40.	Appearance	waste	Visual
41.	Appearance, color, odor	water	Visual
42.	Cadmium (ICP)	water / elute	HRN EN ISO 11885 
43.	Calcium (ICP)	water	HRN EN ISO 11885 
44.	Calcium dissolved in water	water	HRN EN ISO 14911
45.	Calcium hardness	water	HRN EN ISO 11885
46.	Potassium (ICP)	water	HRN EN ISO 11885 
47.	Potassium dissolved in water (IC)	water	HRN EN ISO 14911
48.	Carbonate	water	HRN EN ISO 9963-1 (Calculation: Mache- rey-Nagel equation)
49.	Carbonate in the soil, gravimetric	soil	In-house
50.	Carbonate in the soil, volumetric	soil	HRN EN ISO 10693
51.	Cation-active detergent	water	In-house
52.	Chemical oxygen demand	water	HRN ISO 15705 
53.	Oxygen dissolved - Iodometric method	water	HRN EN 25813 
54.	Classification of formation waters (Palmer, Stiff, Tickle)	water	Calculation
55.	Chlorine - wave dispersive X-Ray	waste	ISO 15597
56.	Chlorides – Mohr	water	HRN ISO 9297 
57.	Chloride dissolved in water (IC)	water	HRN EN ISO 10304-1 
58.	Cobalt (ICP)	water	HRN EN ISO 11885 
59.	Tin (ICP)	water	HRN EN ISO 11885
60.	Chromium, total (ICP)	water / elute	HRN EN ISO 11885
61.	Yeast and mold	water	In-house 
62.	Lithium (ICP)	water	HRN EN ISO 11885 
63.	Lithium dissolved in water (IC)	water	HRN EN ISO 14911
64.	Magnesium (ICP)	water	HRN EN ISO 11885 
65.	Magnesium dissolved in water (IC)	water	HRN EN ISO 14911
66.	Magnesium hardness	water	HRN EN ISO 11885
67.	Manganese (ICP)	water	HRN EN ISO 11885 
68.	Metals review (WDXRF)	waste	In-house
69.	Molybdenum (ICP)	water / elute	HRN EN ISO 11885 
70.	Sodium (ICP)	water	HRN EN ISO 11885 






















Counter



UV/VIS spectrophotometer – anionic and cationic detergents, iron (bivalent), determination of plant available phosphorus from the soil



NO.	PROPERTY	MATRIX / PRODUCT	TEST METHOD
71.	Sodium dissolved in water (IC)	water	HRN EN ISO 14911
72.	Non-ionic detergents	water	In-house
73.	Total and composite alkalinity of water	water	• HRN EN ISO 9963-1 • ASTM D 1067
74.	Nickel (ICP)	water / elute	HRN EN ISO 11885 
75.	Nitrate dissolved in water (IC)	water	HRN EN ISO 10304-1 
76.	Nitrite dissolved in water (IC)	water	HRN EN ISO 10304-1
77.	Determination of plant available phosphorus from the soil	soil	• In-house • HRN EN ISO 11885 • AL-method (Egner i sur., 1960.)
78.	Determination of plant available potassium from the soil	soil	• HRN EN ISO 11885 • AL-method (Egner i sur., 1960.)
79.	Lead (WDXRF)	waste / soil	HRN EN 13723
80.	Lead (ICP)	water / elute	HRN EN ISO 11885 
81.	Organic carbon (humus content) in the soil	soil	Tjurin method (Škorić, 1982.)
82.	Total organic carbon (TOC)	water / elute	HRN EN 1484 
83.	Dissolved organic carbon (DOC)	water / elute	HRN EN 1484 
84.	Total dissolved solids, dried (180 °C)	water / elute	Std. Methods for Examination of Water and Wastewater, 22nd, 2540C 
85.	Total dissolved mineral content - total mineralization	water	In-house
86.	Ash content (oxidized)	waste	HRN EN ISO 6245
87.	Permanganate index - water	water	In-house
88.	pH value	water / elute	HRN ISO 10523 
89.	pH value	sludge	HRN EN 12176
90.	pH value	soil	HRN ISO 10390
91.	Flash point (TAG)	waste	ASTM D 56
92.	Flash and fire points (COC)	waste	• HRN EN ISO 2592 • ASTM D 92
93.	Polychlorinated biphenyls (PCB)	waste	• HRN EN 12766-1 • HRN EN 15308
94.	Origin of the pollution (GC)	water	In-house
95.	Elute preparation	waste / soil	• HRN EN 12457-4:2005 • HRN EN 12457-2:2005
96.	Sample preparation for heavy-metal determination (solid material)	waste / catalyst / residue / soil / biofuels	In-house
97.	Pseudomonas aeruginosa	water	ISO 16266
98.	Reaction with water	waste	-
99.	Salinity	water	HRN ISO 9297 HRN EN ISO 11885
100.	Salmonella species, filtration	water	In-house
101.	Selenium (ICP)	water / elute	In-house
102.	Silica (ICP)	water	HRN EN ISO 11885
103.	Silver (ICP)	water	HRN EN ISO 11885 
104.	Strontium (ICP)	water	HRN EN ISO 11885 
105.	Dry residue (105 °C)	water	Std. Methods for Examination of Water and Wastewater, 22nd, 2540B 

NO.	PROPERTY	MATRIX / PRODUCT	TEST METHOD
106.	Dry residue and water content (105 °C)	sludge / waste / soil	• HRN EN 12880 • HRN EN 14346 • HRN EN 11465 
107.	Sulphate	water	HRN ISO 9280
108.	Sulphate dissolved in water	water	HRN EN ISO 10304-1 
109.	Sulphate-reducing bacteria	water	Std. Methods for Examination of Water and Wastewater, 22nd, Parts 500, 501
110.	Sulfide	water	In-house
111.	Sulphite - reducing bacteria (Clostridia)	water	ISO 6461/1 
112.	Sulphur (ICP)	water	HRN EN ISO 11885
113.	Suspended solids	water	HRN EN 872 
114.	Settleable matter	water	Std. Methods for Examination of Water and Wastewater, 22nd, 2540F
115.	Temperature	water	Std. Methods for Examination of Water and Wastewater, 21st, 2005, 2550B
116.	Temperature	waste	Std. Methods for Examination of Water and Wastewater, 21st, 2005, 2550B
117.	Titanium (ICP)	water	HRN EN ISO 11885
118.	Total hardness (Ca + Mg) (IC)	water	In-house
119.	Total hardness (Ca + Mg) (ICP)	water	HRN EN ISO 11885
120.	Total hardness	water	Calculation
121.	Carbon dioxide (dissolved)	water	Standard Methods for the Examination of Water and Wastewater, 22nd Ed, 4500-CO2 C
122.	Oil and grease, total (TOG)	water / elute	Standard Methods for the Examination of Water and Wastewater, HEM, 22nd Ed, 5520B 
123.	Oil and grease, total (TOG)	soil / waste	SOXTEC - Standard Methods for the Examination of Water and Wastewater, HEM, 22nd, 5520D
124.	Sampling	waste water	HRN ISO 5667-10 
125.	Sampling	waste / sludge	HRI CEN/TR 15310-2:2008
126.	Sampling	soil	HRN ISO 10381
127.	Sampling	water	• HRN ISO 5667-11 • HRN ISO 5667-6
128.	Vanadium (ICP)	water	• HRN EN ISO 11885 
129.	Water and sediments	waste	Visual
130.	Hydrogen sulphide (dissolved)	water	In-house
131.	Electrical conductivity	water / elute	HRN EN 27888 
132.	Iron bacteria	water	Std. Methods for Examination of Water and Wastewater, 22nd, Parts 500, 501
133.	Iron (bivalent)	water	HRN ISO 6332
134.	Iron (trivalent)	water	HRN EN ISO 11885 + HRN ISO 6332 / calcul.
135.	Iron, total (ICP)	water	HRN EN ISO 11885 
136.	Mercury (total)	water / elute	In-house



TOC-L+TNM-L – total and dissolved organic carbon, total nitrogen in water



AMA Mercury Analyser – mercury in water, solid and organic samples

NO.	PROPERTY	MATRIX / PRODUCT	TEST METHOD
137.	Mercury (total)	waste	In-house
138.	Total nitrogen	water	HRN EN 12260:2008
139.	Odour	water / waste /sediment / soil	Organoleptic
140.	Mineral oil (TPH), extraction + GC	water / waste	In-house

3. OTHER ACTIVITIES AND SERVICES

CTL carries out specific analyses of various products, forensic examinations and identification of unknown components and samples. It provides services for development of expertise, problem solving oriented R&D studies, analytical reports according to valid Authorizations issued by State Authorities and others.

NO.	PROPERTY	MATRIX / PRODUCT	TEST METHOD
1.	Mono-, di- and tri-ethylene glycol (GC)	chemicals	In-house
2.	Functional group distribution in hydrocarbon mixture by ¹ H NMR	organic samples	In-house
3.	Sample of known composition purity (¹ H NMR)	organic samples	In-house
4.	Glycols - preparation for ICP analysis	chemicals	In-house
5.	Identification and analysis of unknown samples (FTIR)	organic and inorganic samples	In-house
6.	Identification of the compounds and mixtures of unknown composition (¹ H/ ¹³ C NMR)	organic samples	In-house
7.	Identification of the compounds and mixtures of unknown composition (¹ H/ ¹³ C NMR)	petroleum products / crude oil / waste / soil / chemicals / polymer / biofuels	In-house
8.	Xylene purity (GC)	chemicals	In-house
9.	Solvent purity (GC)	chemicals	In-house
10.	Screening of unknown sample on metal presence (WDXRF)	organic samples / waste	In-house
11.	Polymer molecular mass distribution	polymer	ASTM D 5296
12.	Normal paraffin distribution (GC)	organic samples	In-house
13.	Determination of pore volume distribution on catalyst and other porous material	catalyst	<ul style="list-style-type: none"> • mod ASTM D 3663 • mod. ISO 9277
14.	GC/MS- chromatogram (Total ion current)	organic samples	In-house
15.	Gas chromatography - chromatogram	organic samples	In-house
16.	Solid state NMR spectra with interpretation	organic samples	In-house
17.	2D NMR spectra with interpretation	Crude oil/ petroleum products/ waste / soil / chemicals / polymers / biofuels	In-house
18.	Determination of specific area on catalyst and other porous material	catalyst	<ul style="list-style-type: none"> • mod ASTM D 3663 • mod. ISO 9277
19.	Determination of specific area and pore volume or pore size distribution on catalyst and other porous material	catalyst	<ul style="list-style-type: none"> • mod ASTM D 3663 • mod. ISO 9277
20.	Determination of specific area, pore volume and pore size distribution on catalyst and other porous material	catalyst	<ul style="list-style-type: none"> • mod ASTM D 3663 • mod. ISO 9277
21.	Micro activity test of FCC catalyts with gas product analysis (MAT)	catalyst	mod. ASTM D 3907
22.	Determination of pore volume on catalyst and other porous material	catalyst	<ul style="list-style-type: none"> • mod ASTM D 3663 • mod. ISO 9277
23.	IR spectra	organic	In-house
24.	UV/VIS spectra	organic	In-house



Gas chromatography/Mass spectrometer system (GC/MS) – chromatogram - total ion current



MAT -Micro activity test of FCC catalyts with gas product analysis

NOTE

Methods accredited according to HRN EN ISO/IEC 17025 are marked with the symbol of the Croatian Accreditation Agency



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