LUKOIL OIL COMPANY

PETROTEL-LUKOIL S.A.

Aprobat,
Director General Adjunct – Inginer Sef

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08 09 2015

TEMA TEHNICA
privind prezentarea ofertei tehnico-comerciale
pentru efectuarea analizelor chimice ale substantelor inregistrate REACH
de PETROTEL-LUKOIL SA

1.	Beneficiar:	PETROTEL-LUKOIL SA, Ploiesti, Romania
2.	Scopul:	Alegerea furnizorului pentru efectuarea analizelor chimice ale substantelor inregistrate REACH in vederea actualizarii dosarelor.
3.	Amplasamentul obiectivului:	Instalatiile de pe platforma PETROTEL-LUKOIL SA.
4.	Termen de prezentare a ofertei tehnico-comerciale:	15.10.2015
5.	Principalele cerinte:	5.1. Efectuarea analizelor conform anexei 1, cu mentionarea substantelor din anexa 2 si a conditiilor de prelevare –transport probe. 5.2. Prezentarea datelor obtinute conform anexei 3; rapoartele trebuie sa aiba antetul de certificare al laboratorului care efectueaza analizele.
6.	Date initiale:	6.1. Substantele ce trebuie analizate si metodele de analiza sunt prezentate in Anexa 1; 6.2. Substantele obligatoriu determinate sunt prezentate in Anexa nr 2; 6.3. Model pentru transmiterea datelor obtinute prezentat in Anexa 3.

7.	Observatii:	Rapoartele de incercare vor fi redactate in limba engleza, conform anexei 3, pe suport de hartie cu semnaturile de rigoare.

Tehnolog Sef C. Niculescu 21.09.2015

Sef Serviciu Tehnic S. Calinoiu

List of reference substances by category

Category		Standard Analytical Methods [3])		Proposed Reference substances [4]	Content of IUCLID5 Subsection 1.2	Content of IUCLID5 Subsection 1.4
		Individual Hydrocarbons or Types				
		Hydrocarbon Analysis – Gas chromatography	Hydrocarbon Type			
Gases	- fuel gases, CAS 68476-26-6, EC 270-667-2 (gaze combustibile de la 04-V7) - gases (petroleum), CAS 68477-71-4, EC 270-752-4 (fractie C4 de la CC/MTBE – PGL) - hydrocarbons C3-C4-rich, CAS 68512-91-4, EC 270-990-9 (fractie C4 de la FG – PGL) - hydrocarbons C3, CAS 68606-26-8, EC 271-735-4 (fractie C3-C3' de la CC)- 09 G-FV 139 - propane, liquefied, CAS 74-98-6, EC 200-827-9 (propan de la CC- PGL) - propene, CAS 115-07-1,EC 204-062-1 (propilena de la CC – PGL)	NF EN 27941 = ISO7941 UOP 539			• limit values (< or >) of any marker substances (see Appendix 2) • to be dertermined; work in progress • where available, identity and concentration of stabilising additive(s)	GC trace, annotated and quantified, and test conditions
Low Boiling Point Naphthas (Gasolines)	- hydrocarbons C3-C11 catalytic cracker distilates, CAS 68476-46-0, EC 270-686-6 (benzina de CC – 09-GE-13) - naphtha, full-range coker, CAS 68513-02-0, EC 270-991-4 (benzina de cocsare – 02-P80) - naphtha sweetened, CAS 64741-87-3, EC265-089-2 (benzina hidrodesulfurata-HDS-75-SO7) - naphtha hydrodesulfurized light,	Reformulyzer or multidimensional PIONA [5]. NF EN ISO 22854 = ASTM D6839 DHA: NFM 07-086 or ASTM D5134 or ASTM D6729/ ASTM D6730		•n-hexane •benzene •toluene •identified individual constituents present at 10%w/w or more[6] • n-paraffins •isoparaffins • olefins •naphthenics • aromatics	• limit values (< or >) of any marker substances (see Appendix 2) • all constituents present at 10% w/w or more • % w/w of each identified hydrocarbon class - total paraffins - total isoparaffins - total olefins - total naphthenic	•GC trace, annotated and quantified, and test conditions •Boiling point range results and method •Carbon number range and method

	CAS 64742-73-0, EC 265-178-6 (benzina de la HPM- 06-P4 benzina de la HB- baza col. 03-C2) - naphtha unsweetened, CAS 68783-12-0, EC 272-186-3 (benzina de la DA- 01-P8) - naphtha catalytic reformed, CAS 68955-35-1,EC 273-271-8 (benzina de la RC – regulator) - gasoline, CAS 86290-81-5, EC 289-220-8 (benzina component – rezervor) - naphtha isomerization, CAS 64741-70-4, EC 265-073-5 (izomerizat)					
Straight-run Gas Oils	Distillates, full range straight-run middle, CAS 68814-87-9, EC 272-341-5 (motorina de la DAV3)		IP391=EN12916 ASTM D6591 (HPLC) or ASTM D2007 (LC)[18]	**For all methods:** stabilising additive(s)[19] **Depending on the method used:** **1. For IP 391 = EN 12916** • mono-aromatic hydrocarbons • di-aromatic hydrocarbons • tri-aromatic hydrocarbons and higher • non-aromatic hydrocarbons[20] **2. For ASTM D2007** • saturate hydrocarbons • aromatic hydrocarbons • polar hydrocarbons • asphaltenes [21] • unknown constituents [22]	• limit values (< or >) of any marker substances (see Appendix 2) • % w/w of each identified hydrocarbon class - mono-, di- and tri+ aromatic hydrocarbons, or - saturate, aromatic and polar hydrocarbons • where available, identity and concentration of stabilising additive(s)	•HPLC trace, annotated and quantified, and test conditions or LC report •Boiling point range and method •Carbon number range and method
Cracked Gas Oils	- distillates light catalytic cracked, CAS 64741-59-9, EC 265-060-4 (motorina usoara de CC- 09F-VR-201) - distillates light thermal cracked, CAS 64741-82-8, EC 265-084-5		IP391=EN12916 (HPLC) or ASTM D2007(LC)[23]	**For all methods:** • stabilising additive(s)[24] **Depending on the method used:** **1. For IP 391 = EN 12916**	• limit values (< or >) of any marker substances (see Appendix 2) • % w/w of each identified hydrocarbon class - mono-, di- and tri+	•HPLC trace, annotated and quantified, and test conditions or LC report •Boiling point

	(motorina usoara de cocsare- Regulator FV 041)			• mono-aromatic hydrocarbons • di-aromatic hydrocarbons • tri-aromatic hydrocarbons and higher • non-aromatic hydrocarbons [25] **2. For ASTM D2007** • saturate hydrocarbons • aromatic hydrocarbons • polar hydrocarbons • asphaltenes [26] • unknown constituents[27]	aromatic hydrocarbons, or - saturate, aromatic and polar hydrocarbons • where available, identity and concentration of stabilising additive(s)	range and method •Carbon number range and method
Other Gas Oils	- Fuels diesel CAS 68334-30-5, EC 269-822-7 (motorina de la HPM -06-P3)		IP391= EN12916 (HPLC) or ASTM D2007 (LC) [33]	**For all methods:** • stabilising additive(s)[34] **Depending on the method used:** **1. For IP 391 = EN 12916** • mono-aromatic hydrocarbons • di-aromatic hydrocarbons • tri-aromatic hydrocarbons and higher •non-aromatic hydrocarbons [35] **2. For ASTM D2007** • saturate hydrocarbons • aromatic hydrocarbons • polar hydrocarbons • asphaltenes[36] • unknown constituents[37]	• limit values (< or >) of any marker substances (see Appendix 2) • % w/w of each identified hydrocarbon class - mono-, di- and tri+ aromatic hydrocarbons, or - saturate, aromatic and polar hydrocarbons • where available, identity and concentration of stabilising additive(s)	• HPLC trace, annotated and quantified, and test conditions or LC report • Boiling point range and method • Carbon number range and method • Viscosity results and method
Heavy Fuel Oil Components	- distillates vacuum, CAS 70592-78-8, EC 274-685-1 (distilat de vid- 01-S1C) - Distillates petroleum residues vacuum, CAS 68955-27-1, EC 273-263-4 (semigudron de la DAV3- 01-S 24)		ASTM D2007 (LC) or IP 392 = ASTM D5292 (NMR[38]) or IP391 = EN12916 (HPLC) if FBP	**For all methods:** • stabilising additive(s)[39] **Depending on the method used:** **1. For ASTM D2007** • saturate hydrocarbons	• limit values (< or >) of any marker substances (see Appendix 2) • % w/w of each identified hydrocarbon class - saturate, aromatic and polar hydrocarbons, or	• LC report or NMR spectrum, annotated and quantified, and test conditions or HPLC trace • Boiling point

	- Residues, heavy coker gas oil and vacuum gas oil, CAS 68478-17-1, EC 270-796-4 (motorina grea de cocsare – 02-FV 042) - fuel oil, residual, CAS 68476-33-5, EC 270-675-6 (combustibil de focare – rezervor)		≤400°C	• aromatic hydrocarbons • polar hydrocarbons • asphaltenes[40] • unknown constituents[41] **2. For IP 392 = ASTM D5292** • aromatic hydrocarbons • non-aromatic hydrocarbons **3. For IP 391 = EN 12916** • mono-aromatic hydrocarbons • di-aromatic hydrocarbons • tri-aromatic hydrocarbons and higher • non-aromatic hydrocarbons[42]	- aromatic and nonaromatic carbon, or - mono-, di- and tri+ aromatic hydrocarbons, or • where available, identity and concentration of stabilising additive(s)	range and method • Carbon number range and method • Viscosity results and method

[3] The methods used should be suitable for the type of product being analysed (see Appendix 2). In some cases the lighter and/or heavier members of a category may require
different or modified analytical methods.

[4] **Notes:**

- Reference substances highlighted in yellow will be provided by CONCAWE as common information. Reference substances for all the C&L markers and for all hydrocarbon classes will be included. Reference substances for constituents different from these and reported individually (i.e. constituents present at 10% w/w or more; stabilising additives) will have to be obtained from the IUCLID5 website or be created by the registrants.
- The total concentration of all reference substances will have to add up to 100%. In certain cases the concentration of the reference substances entered in subsection 1.2 will have to be net of identified constituents present at 10% w/w or more and/or marker substances. For example: The concentration of n-paraffins in a naphtha stream will have to be reported net of n-hexane and, if applicable, any other n-paraffin present at 10% or more. This will be explained in the remarks field in subsection 1.2 which is also part of the common information provided by CONCAWE.

[5] **Note:** For some substances in this category multidimensional PIONA will provide the full composition, for others, however, one of the Detailed Hydrocarbon Analysis (DHA) methods may be additionally required, or could be used on its own. The latter may be better suited to substances with a high FBP. DHA may be required to determine the concentrations of marker substances in naphthas (e.g. n-hexane).

[6] The reference substance(s) will have to be obtained from the IUCLID5 website or be created by the registrants.

[7] Use existing reference substance where stabiliser is known or create reference substance where the stabiliser is unknown.

[8] Determined as balance for arriving at a total concentration of 100%

[9] The reference substance(s) will have to be obtained from the IUCLID5 website or be created by the registrants.
[10] Use existing reference substance where stabiliser is known or create reference substance where the stabiliser is unknown.
[11] Determined as balance for arriving at a total concentration of 100%
[12] Determined as balance for arriving at a total concentration of 100%
[13] Use existing reference substance where stabiliser is known or create reference substance where the stabiliser is unknown.
[14] Determined as balance for arriving at a total concentration of 100%
[15] Determined as balance for arriving at a total concentration of 100%
[16] If the content of pentane insoluble is ≥0.1% the procedure described in Annex XI of ASTM 2007 has to be applied. If the content of pentane insoluble is <0.1% no asphaltenes need to be reported in subsection 1.2. Saturate hydrocarbons, aromatic hydrocarbons, polar hydrocarbons and unknown constituents (if any) will add up t 100%.
[17] Determined as balance for arriving at a total concentration of 100%
[18] IP 391 (HPLC) is appropriate up to a Final Boiling Point of approx 400°C, while ASTM D2007 (LC) is more appropriate for substances with an Initial Boiling Point of 260°C (or
higher) and Final Boiling Point above 400°C.
[19] Use existing reference substance where stabiliser is known or create reference substance where the stabiliser is unknown.
[20] Determined as balance for arriving at a total concentration of 100%
[21] If the content of pentane insoluble is ≥0.1% the procedure described in Annex XI of ASTM 2007 has to be applied. If the content of pentane insoluble is <0.1% no asphaltenes need to be reported in subsection 1.2. Saturate hydrocarbons, aromatic hydrocarbons, polar hydrocarbons and unknown constituents (if any) will add up t 100%.
[22] Determined as balance for arriving at a total concentration of 100%
[23] IP 391 (HPLC) is appropriate up to a Final Boiling Point of approx 400°C, while ASTM D2007 (LC) is more appropriate for substances with an Initial Boiling Point of 260°C (or higher) and Final Boiling Point above 400°C.
[24] Use existing reference substance where stabiliser is known or create reference substance where the stabiliser is unknown.
[25] Determined as balance for arriving at a total concentration of 100%
[26] If the content of pentane insoluble is ≥0.1% the procedure described in Annex XI of ASTM 2007 has to be applied. If the content of pentane insoluble is <0.1% no asphaltenes
need to be reported in subsection 1.2. Saturate hydrocarbons, aromatic hydrocarbons, polar hydrocarbons and unknown constituents (if any) will add up to 100%.
[27] Determined as balance for arriving at a total concentration of 100%
[28] IP 391 (HPLC) is appropriate up to a Final Boiling Point of approx 400°C, while ASTM D2007 (LC) is more appropriate for substances with an Initial Boiling Point of 260°C (or higher) and Final Boiling Point above 400°C.
[29] Use existing reference substance where stabiliser is known or create reference substance where the stabiliser is unknown.
[30] Determined as balance for arriving at a total concentration of 100%
[31] If the content of pentane insoluble is ≥0.1% the procedure described in Annex XI of ASTM 2007 has to be applied. If the content of pentane insoluble is <0.1% no asphaltenes need to be reported in subsection 1.2. Saturate hydrocarbons, aromatic hydrocarbons, polar hydrocarbons and unknown constituents (if any) will add up t 100%.
[32] Determined as balance for arriving at a total concentration of 100%
[33] IP 391 (HPLC) is appropriate up to a Final Boiling Point of approx 400°C, while ASTM D2007 (LC) is more appropriate for substances with an Initial Boiling Point of 260°C (or higher) and Final Boiling Point above 400°C.
[34] Use existing reference substance where stabiliser is known or create reference substance where the stabiliser is unknown.

[35] Determined as balance for arriving at a total concentration of 100%
[36] If the content of pentane insoluble is ≥0.1% the procedure described in Annex XI of ASTM 2007 has to be applied. If the content of pentane insoluble is <0.1% no asphaltenes need to be reported in subsection 1.2. Saturate hydrocarbons, aromatic hydrocarbons, polar hydrocarbons and unknown constituents (if any) will add up t 100%.
[37] Determined as balance for arriving at a total concentration of 100%
[38] NMR spectrum provides concentrations in mol % which have to be transformed in % w/w.
[39] Use existing reference substance where stabiliser is known or create reference substance where the stabiliser is unknown.
[40] If the content of pentane insoluble is ≥0.1%, which is possible if not likely for substances in this category, the procedure described in Annex XI of ASTM 2007 has to be applied. If the content of pentane insoluble is <0.1% no asphaltenes need to be reported in subsection 1.2. Saturate hydrocarbons, aromatic hydrocarbons, polar hydrocarbons and unknown
constituents (if any) will add up to 100%.
[41] Determined as balance for arriving at a total concentration of 100%
[42] Determined as balance for arriving at a total concentration of 100%
[43] NMR spectrum provides concentrations in mol % which have to be transformed in % w/w.
[44] Use existing reference substance where stabiliser is known or create reference substance where the stabiliser is unknown.
[45] If the content of pentane insoluble is ≥0.1% the procedure described in Annex XI of ASTM 2007 has to be applied. If the content of pentane insoluble is <0.1% no asphaltenes need to be reported in subsection 1.2. Saturate hydrocarbons, aromatic hydrocarbons, polar hydrocarbons and unknown constituents (if any) will add up t 100%.
[46] Determined as balance for arriving at a total concentration of 100%
[47] Use existing reference substance where stabiliser is known or create reference substance where the stabiliser is unknown.
[48] Determined as balance for arriving at a total concentration of 100%

Constituents in petroleum substances relevant to hazard classification and PBT assessment, presented by category

Notes:

- The following table applies to Petroleum UVCB substances.
- For the footnotes in the following table please see the bottom of the table.

Category/Standalone substances	Constituents typically relevant to hazard classification (threshold concentration indicated in brackets [1])		Constituents relevant to PBT assessment (must be included when present at concentrations greater than 0.1%[1])
	Dangerous Substances Directive (DSD)	Classification, Labelling & Packaging Regulation (CLP)	
Petroleum Gases Note: This is still work in progress. The carbon number ranges of some petroleum gases include C6 or C7. Benzene and possibly n-hexane could therefore also influence classification. In any event, the analytical method (GC) allows to identify and to quantify their presence.	1,3-butadiene (0.1%)	1,3-butadiene (0.1%)	None
Low Boiling Point Naphthas (Gasolines) [2, 3]	Benzene (0.1%) Toluene (5 %) n-Hexane (5 %)	Benzene (0.1%) Toluene (3 %) n-Hexane (3 %)	None
Straight-run Gas Oils [3, 4]	None	None	None
Cracked Gas Oils [3, 4, 5]	None	None	None
Other Gas Oils [3, 4, 5]	None	None	None
Heavy Fuel Oil Components	None	None	None

Footnotes in the table above:

[1] Concentrations are expressed as % weight/weight.

[2] For all members of this category, the overall viscosity of the substance is less than 7cSt measured at 40°C for DSD (and less than 20.5 cSt for CLP), resulting in classification for aspiration hazard.
[3] In addition to chemical constituents, for this category the flash point of the substance may also need to be considered for flammability hazard classification.
[4] In addition to chemical constituents, for this category the overall viscosity of the substance also needs to be considered for hazard classification (when less than 7cSt for DSD and less than 20.5 cSt for CLP, always measured at 40°C).
[5] For this category of gas oils Note H applies and these gas oils may be classified as R45 (or R40) unless Note N applies. For example, hydrotreated gas oil in the 'other gas oils' group derived from a non-carcinogenic Straight Run Gas Oil
would not be classified as carcinogenic as Note N applies.

Appendix 3

Firm Stamp

Substance Analytical Composition

Site of production	PETROTEL – LUKOIL SA
Sample name	
Date of report	
CAS Number	
EC Number	
Laboratory	

Signed……..

Title……

1. Basic PhysChem data

Carbon Range	
Boiling Point Range	
Physical Form	
Viscosity	
Density	
Vapour Pressure	
Flash Point	
Flammability	
Explosive Properties	
Self-Ignition Temp	
Partition coefficient n-Octanol / Water	
Stabilisers	

Example For Reference Only

2. Detailed analytical composition.

Please highlight compositional components ≥ 10% wt and Classification drivers (benzene, toluene, n-hexane and 1,3 butadiene) ≥ 0.1 % wt or %v for Gases.
All constituents present at more than 0.1% w/w must be added in the table above. Results shall be expressed in % w/w.
Numbering of constituents and retention times (RT) should allow peak identification in chromatogram.

Table 1 Naphtha example

peak #	Compounds	RT (min)	% (w/w)
1	Cyclopentane-Ethyl	26.72	0.117
2	Cyclohexane-Methyl + cyclopentane-cis-1,2-diMe	25.71	0.830
3	Heptane	24.04	2.681
4	Cyclopentane-1-trans-2-Dimethyl	22.89	1.736
5	Pentane-3-Ethyl	22.78	0.340
6	Cyclopentane-1-trans-3-Dimethyl	22.65	1.303
7	Cyclopentane-1-cis-3-Dimethyl	22.41	1.673
8	Hexane-3-Methyl	21.93	5.758
9	Cyclopentane-1-1-Dimethyl	21.48	1.032
10	Pentane-2-3-Dimethyl	21.30	2.037
11	Hexane-2-Methyl	21.19	7.279
12	Cyclohexane	20.33	11.511
13	Pentane-3-3-Dimethyl	20.00	1.460
14	Benzene	19.50	8.723
15	Butane-2-2-3-Trimethyl	18.29	0.334
16	Pentane-2-4-Dimethyl	17.91	2.802
17	Cyclopentane-Methyl (+ pentane,2,2-diMe)	17.60	27.673
18	Hexane	15.47	13.566
19	Pentane 3-Methyl	14.08	3.779
20	Pentane-2-Methyl	13.07	3.424
21	Butane-2-3-Dimethyl	12.75	0.963
22	Cyclopentane	12.61	0.402

3. Global composition per family and carbon numbers

Table 2 Naphtha example

	nPar	iPar	Napht	Olef	Arom	Unknown	> naphtalene	total
Total	16,33	28,29	46,36	0,08	8,84	0,02	0,089	100,00
C1	0,00	0,00	0,00	0,00	0,00	0,00		
C2	0,00	0,00	0,00	0,00	0,00	0,00		
C3	0,00	0,00	0,00	0,00	0,00	0,00		
C4	0,01	0,01	0,00	0,00	0,00	0,00		
C5	0,04	0,06	0,40	0,02	0,00	0,00		
C6	13,57	8,19	39,18	0,04	8,72	0,00		
C7	2,68	20,01	6,69	0,00	0,04	0,00		
C8	0,01	0,02	0,08	0,00	0,03	0,00		
C9	0,01	0,00	0,00	0,00	0,03	0,00		
C10	0,00	0,00	0,00	0,01	0,01	0,00		
C11	0,00	0,00	0,00	0,00	0,00	0,00		
Unknown	0,00	0,00	0,00	0,00	0,00	0,02		
> naphtalene							0,089	

4. Analytical method

The sample has been analysed according to an internal method referencing ASTM EN or IP Standard method: This method is a gas chromatography with a flame ionisation detector (FID). The identification of constituents has been performed by comparison with reference substances or by coupling gas chromatography with mass spectrometry.

Chromatography conditions: Naphtha example

- Chromatograph: HP6890
- Capillary column: PONA non-polar (50m/0.2mm/0.5µ).
- Injection volume: 1µl
- Column flow: 0.6 ml/min (constant flow)
- Injector: 250°C, split ratio: 333
- Program: Isotherm 25°C during 10 minutes
  Than from 25°C to 250°C in 2.5°C/minutes
  Than from 250°C to 300°C in 10°C/minutes
  Than isotherm 300°C during 25 minutes
- Detector FID : - Temperature : 250°C
  - Air flow : 450 ml/minutes
  - H2 flow : 40 ml/minutes
  - make-up flow + column: 45 ml/minutes

Example For Reference Only

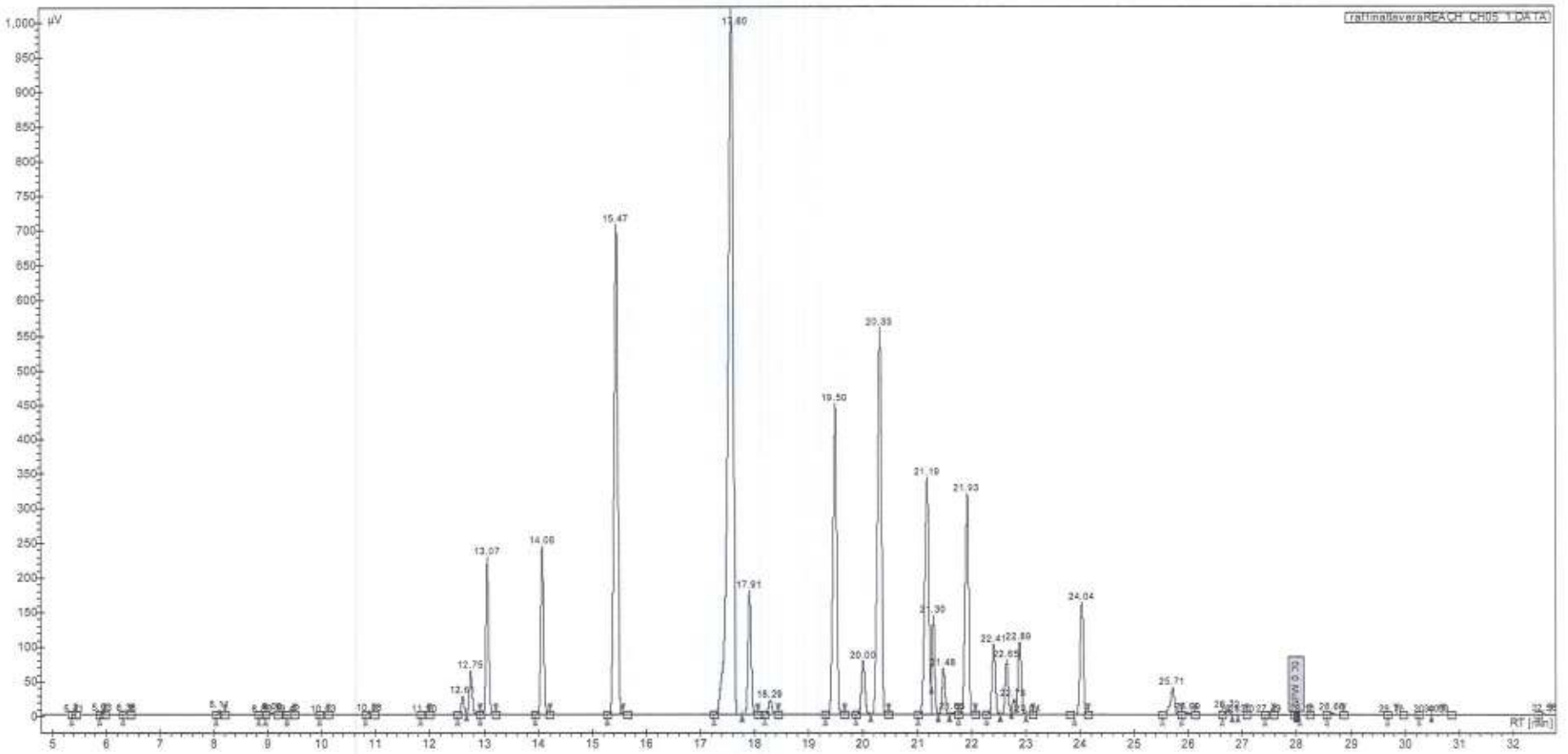
Mass spectrometry conditions: Naphtha example

- Chromatograph: HP6890
- Capillary column: PONA non-polar (50m/0.2mm/0.5µ).
- Injection volume: 1ul
- Column flow: 0.5 ml/min (cst flow)
- Injector: 250°C, split ratio: 201
- Program: Isotherm 25°C during 10 minutes
  Then from 25°C to 250°C in 2.5°C/minutes
  Then from 250°C to 300°C in 10°C/minutes
  Then isotherm 300°C during 25 minutes
- Mass detection: - Mass scanning 26-500; electronic impact (70eV)
  - MS Quad Temperature 150°C
  - MS Source Temperature 230°C
  - Transfer-line temperature 280°C

5. Chromatogram Naphtha example

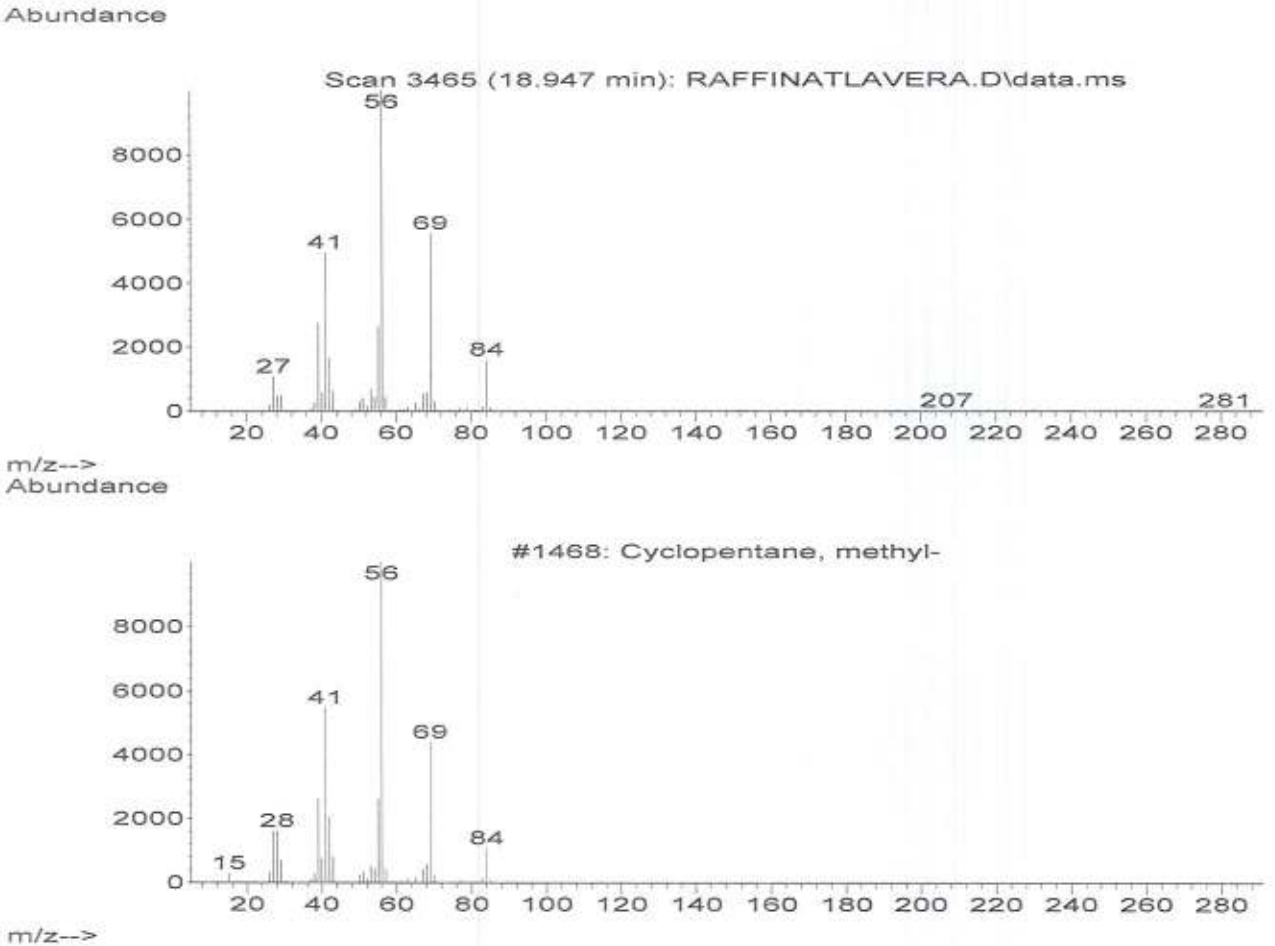
The chromatogram must include an overview of major compounds. Selection of the adequate time window is important. Peaks must be marked with identification numbers of constituents and retention time noted in table 1

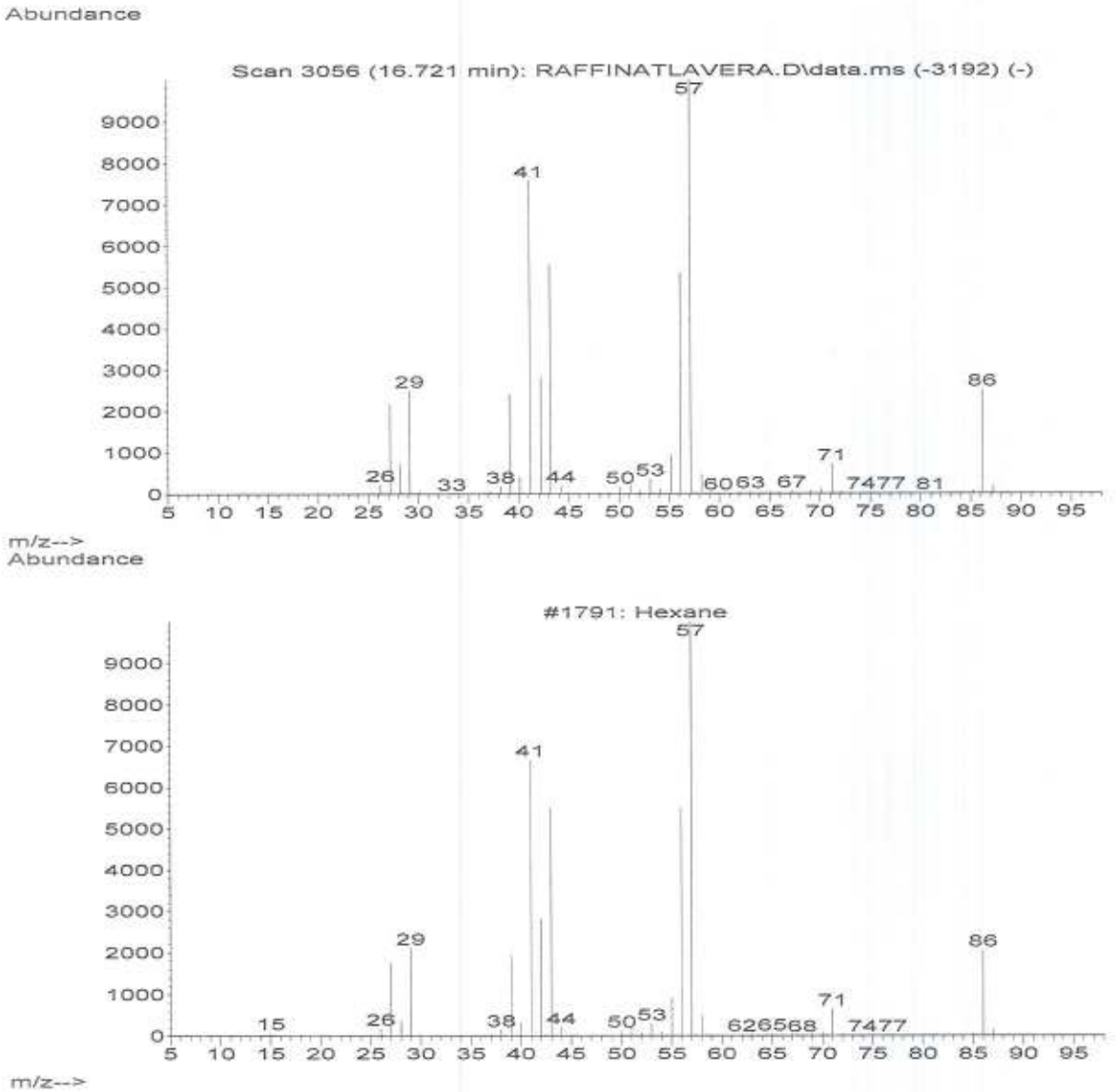
Figure 1:



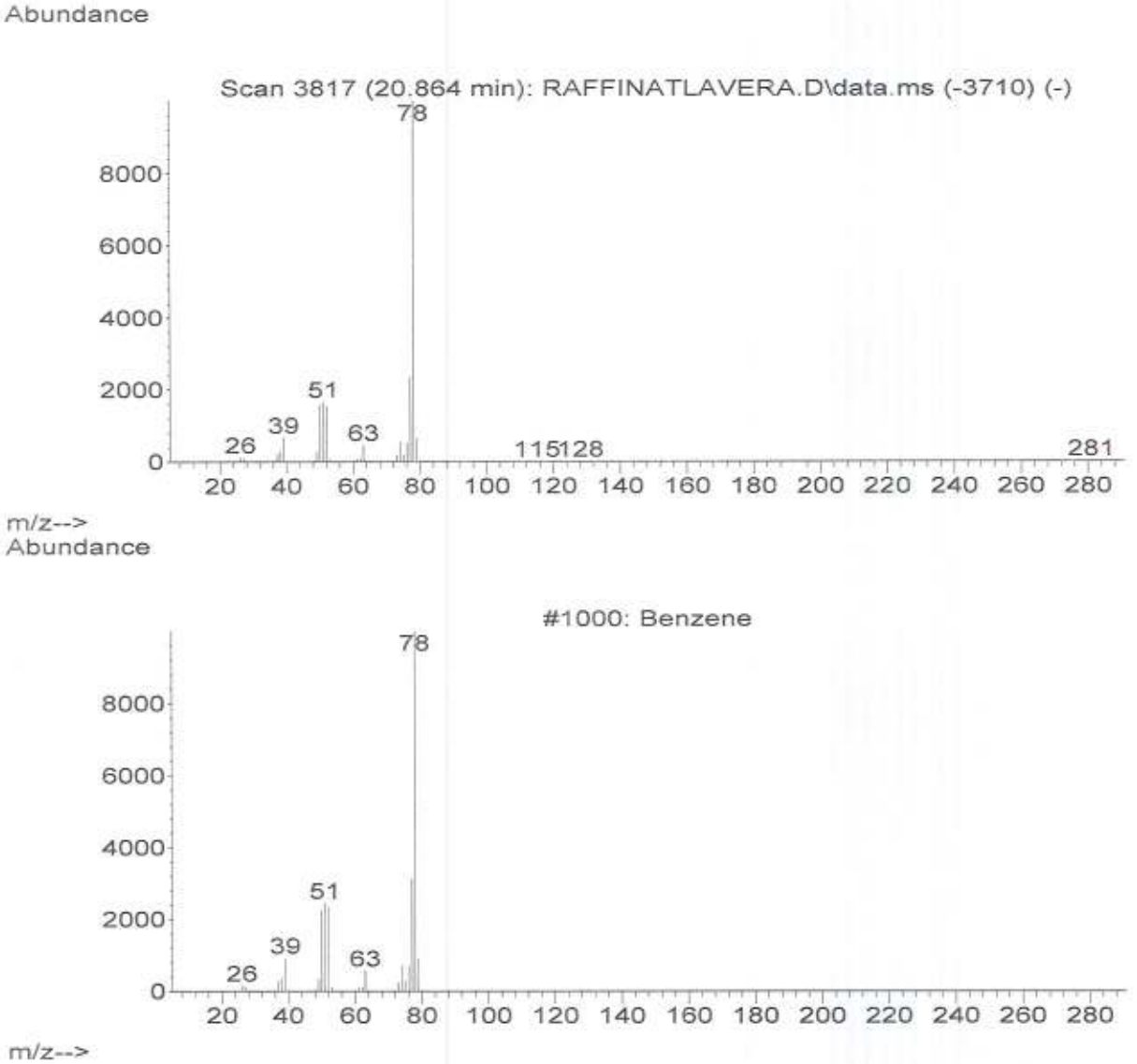
6. Mass spectrometry Naphtha example

The aim of presenting the mass spectrum is to illustrate interpretation of results for peak identification. The main mass spectrum shall be shown with the optimum library comparison.
For UVCB's only (Unknown, of Variable Composition, or of Biological Origin i.e. refinery streams), if the number of constituents is too high, only present spectra for components greater than 5%.

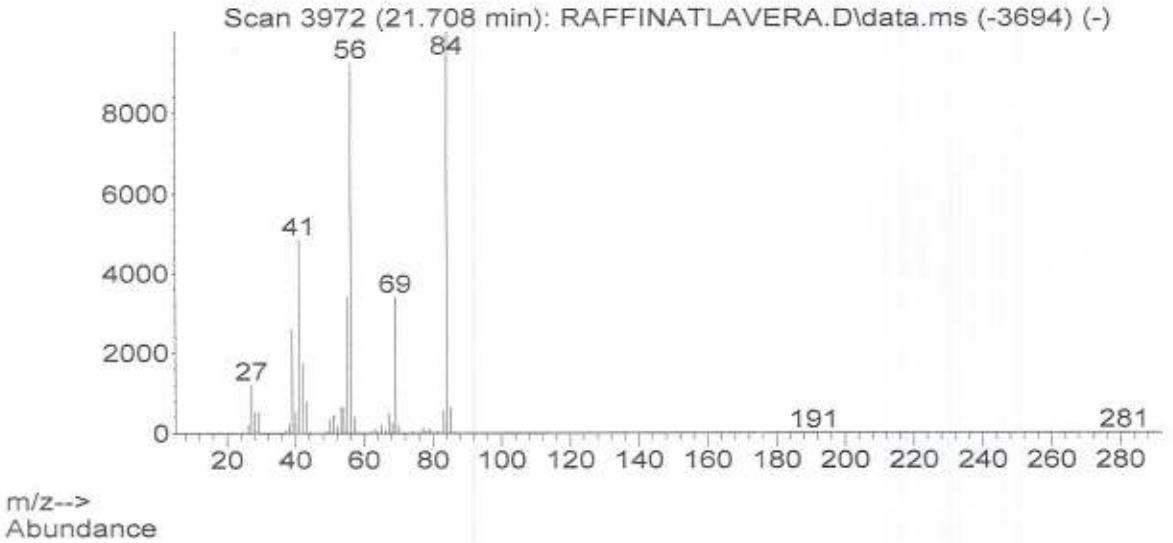


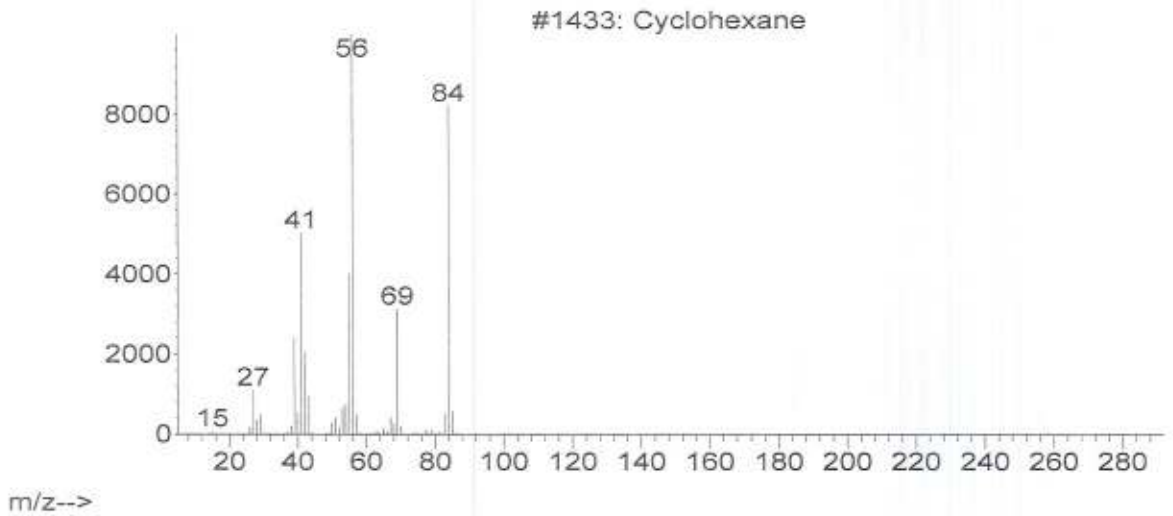

Abundance
Scan 3056 (16.721 min): RAFFINATLAVERA.D\data.ms (-3192) (-)
m/z-->
Abundance
#1791: Hexane
m/z-->

Example For Reference Only

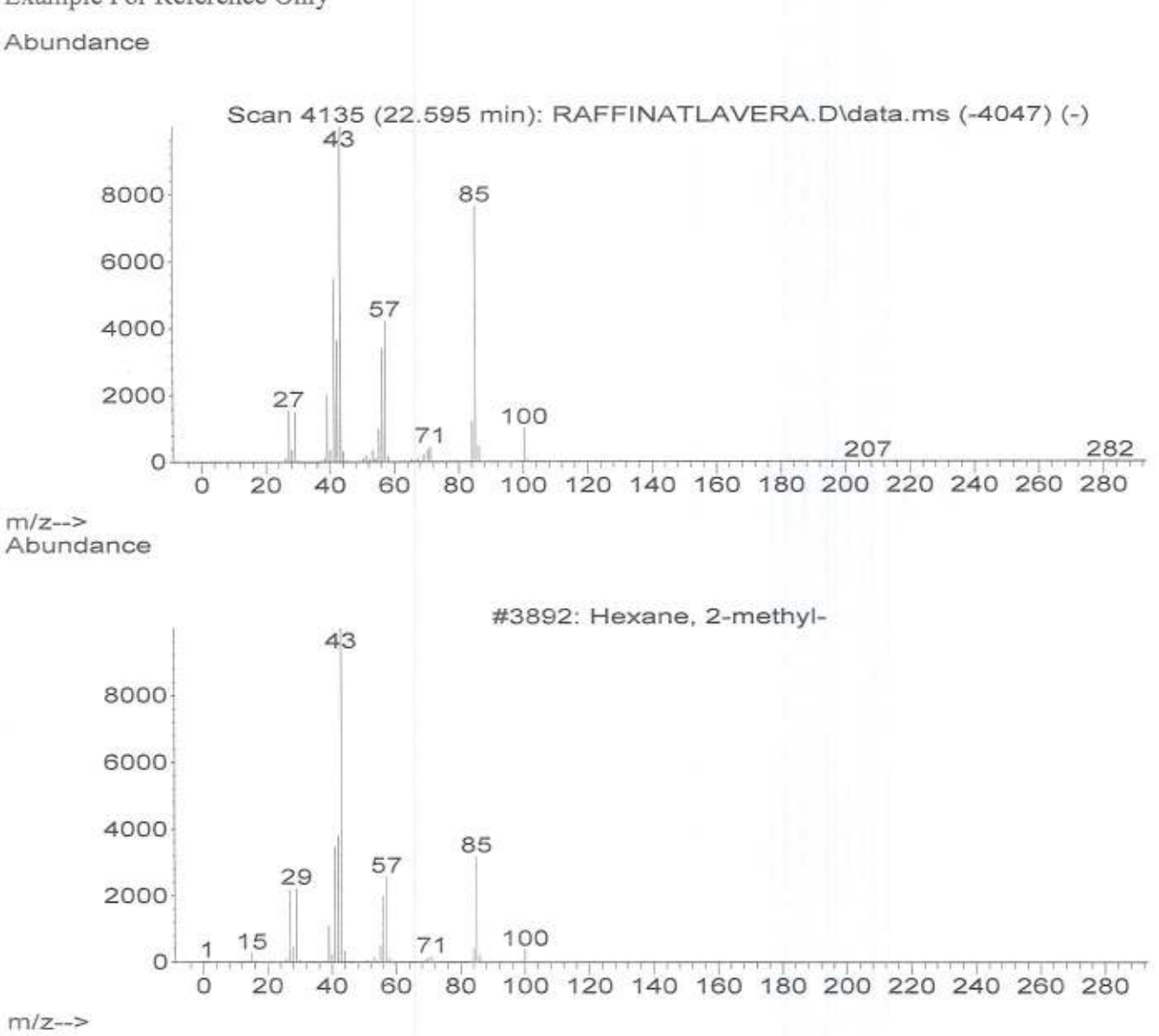


Example For Reference Only



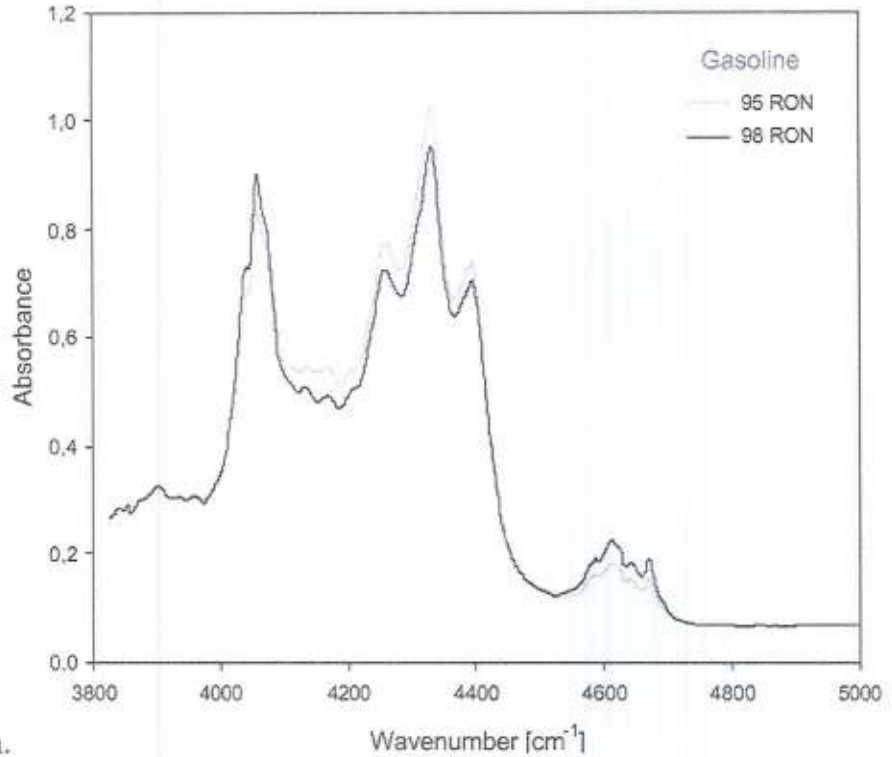


Example For Reference Only



7. IR, UV

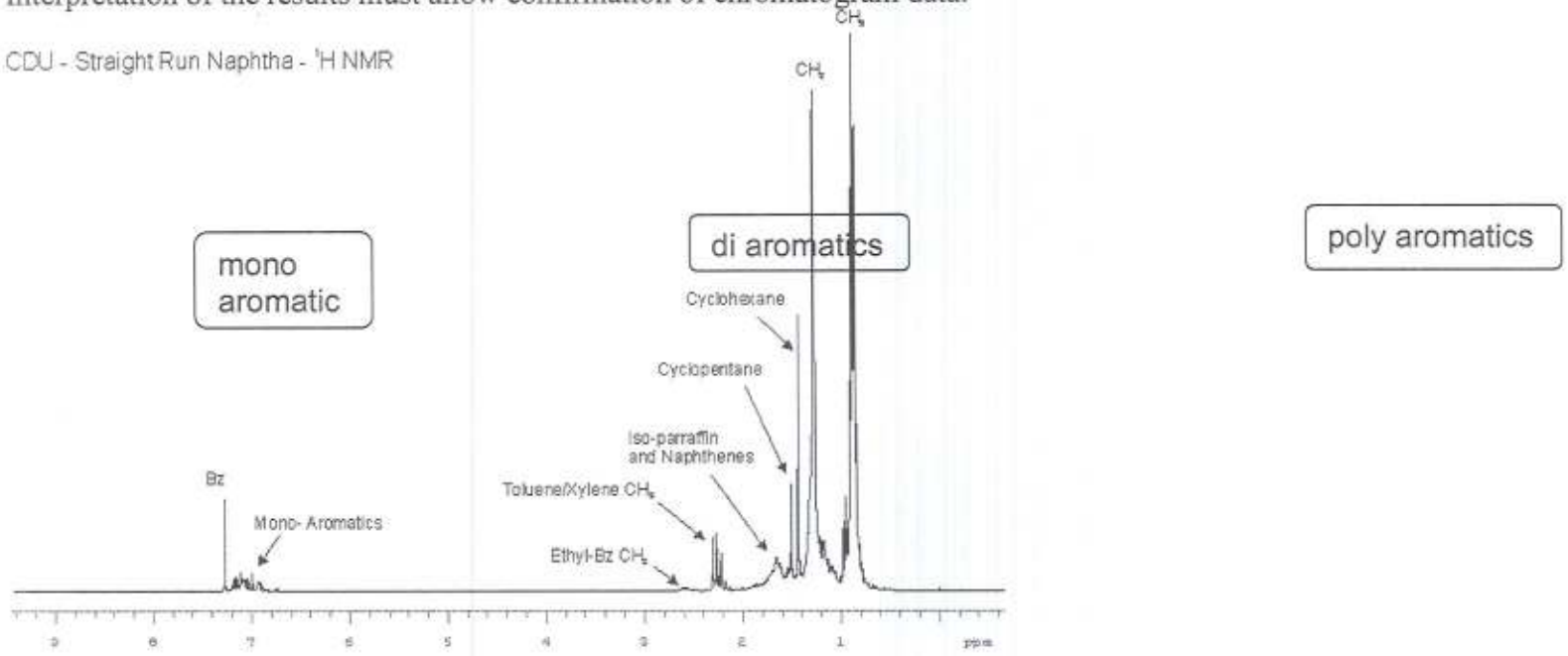
Method information and spectrum must be added. Interpretation of the results must allow confirmation of chromatogram data.



Example of IR spectrum.

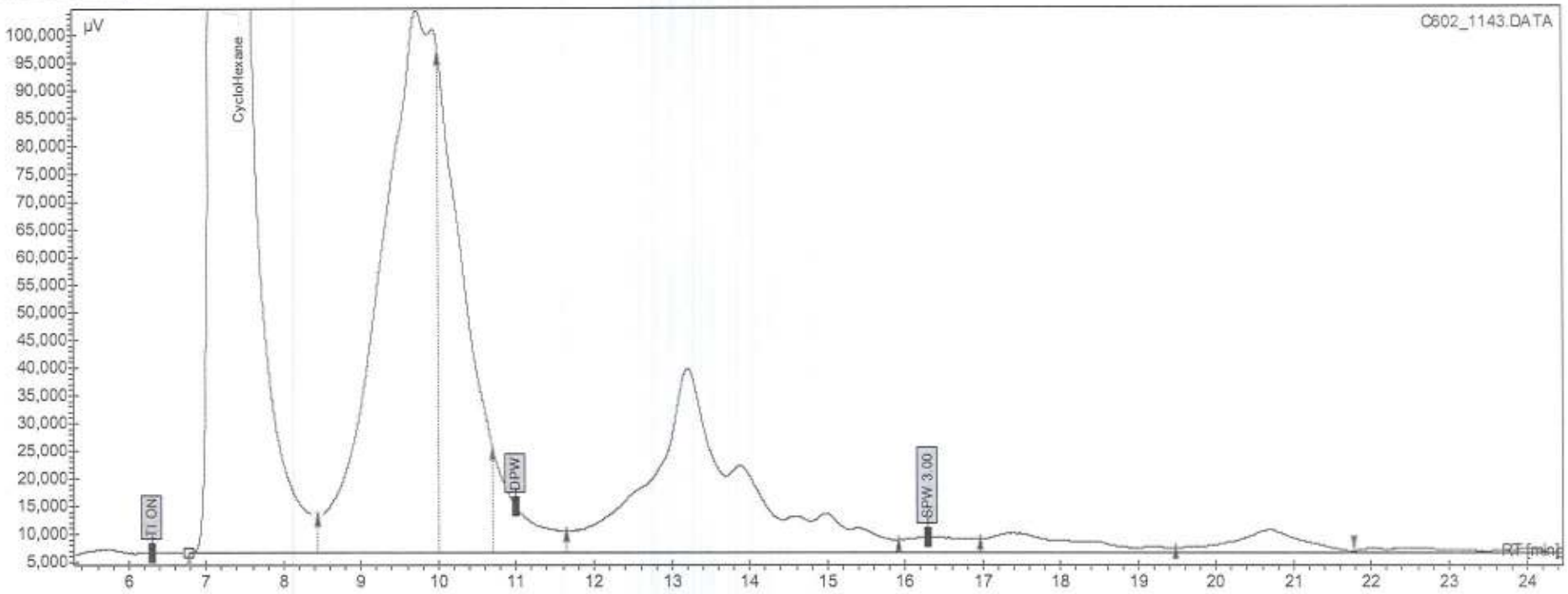
8. NMR

Method information and spectrum must be added.
Interpretation of the results must allow confirmation of chromatogram data.



9. HPLC

Method information and spectrum must be added.
Interpretation of the results must allow confirmation of chromatogram data.
See below for Example of UV spectrum for Gas Oil example.
Gas Oil HPLC Example



	Name	Area [µV.min]	groupe_quantite ['%wt]
1	PHA total Poly+Diaromatiques	56934	6.2
2	Diaromatiques	52296.6	5.8
3	PolyAromatiques	4637.5	0.4
4	Monoaromatiques	119666.7	3.9
Total		233534.7	