

# EBB

European Biodiesel Board

## EBB EUROPEAN BIODIESEL QUALITY REPORT (EBBQR)

Results of the second round of tests

Summer 2007

**EBB** – European Biodiesel Board



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**EBBQR**  
*2<sup>nd</sup> Round of tests*  
Summer 2007



### EBB Biodiesel Quality Report (EBBQR)

#### General Scope:

- secure that a high quality biodiesel fuel is produced and made available in the market by EBB Member companies level, specifically in the perspective of increasing from 5% to 10% the maximum FAME content in EN590
- monitor quality level attained using various kind of raw materials or blends of them ensuring that quality standard and requirements are always fulfilled
- gather and publish statistical data and reliable information about biodiesel quality from EBB members for and technical purposes.
- assess the overall European Biodiesel industry quality performances with respect to standardised quality requirements
- establish a clear and effective system providing reliable information and warranties about the quality of biodiesel marketed in Europe, serving as a reference for the other market players in the fuel sector and for public authorities



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### – EBB Biodiesel Quality Report

## Basic assumptions

- Bi-annual sampling (beginning of summer and beginning winter)
- Member Companies to send to the selected lab a sample per operating plant
- Cost to be beard by companies through EBB
- Test results from the laboratory sent to EBB Secretariat on confidential basis
- EBB Secretariat sends to the concerned Company its/their own results
- A general bi-annual statement will be published – NO per company results published
- No unexpected sampling
- EBB web-site section on European Biodiesel Quality Report



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### – EBB Biodiesel Quality Report

#### Biodiesel to be tested and parameters

- EN14214 is considered the quality reference of biodiesel.
- All the parameters of the EN14214 are analysed
- in principle there should be no additive in the sample (except for oxidising stabiliser which is admitted – and should be declared), unless the addition of the additive cannot be avoided in the normal production process (the priority is given to the gathering of samples from the usual plant production)



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- **Contract being negotiated with ASG**
  - **laboratory in Germany**

- **founded in 1992, since 1994 performed biodiesel analytical services for producers and organisations.**
- **today: leading independent institute for biofuel testing and consulting in Germany**
- **in 1998 was the first lab in Europe to obtain the EN 17025 accreditation for Biodiesel**
- **customers (users, traders, producers, car manufacturers and organisations) all over the world**
- **has been involved in setting the EN 14214 standard and to be still engaged in some CEN working groups and task forces**



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## Contract scheme

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**Main contract**

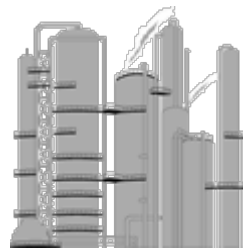
**Lab**

**Analysis report:**

**- Results for plant code**

(only EBB Secretariat can associate code and plant)

**- Statistics**



**1 month before the analysis 3 metal container sent with label and seals for anonymity. The sending bag will have all the instruction to send back the samples.**



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### Second sampling and analysis summer quality

- Start of sampling: August 2007
- Start of analysis: September 2007
- N° of samples (1x plant): 38
- Next round of analyses and sampling starting January 2008



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### Ester Content

EN 14214	> 96,5	% m/m
Min.	96,9	% m/m
Max.	99,1	% m/m
Average	98,6	% m/m
Std. Deviation	0,6	% m/m
Range 95% max	99,9	% m/m
Range 95% min	97,4	% m/m
Out of spec	0	-

**All values > 99 % rounded off 99,1 %**



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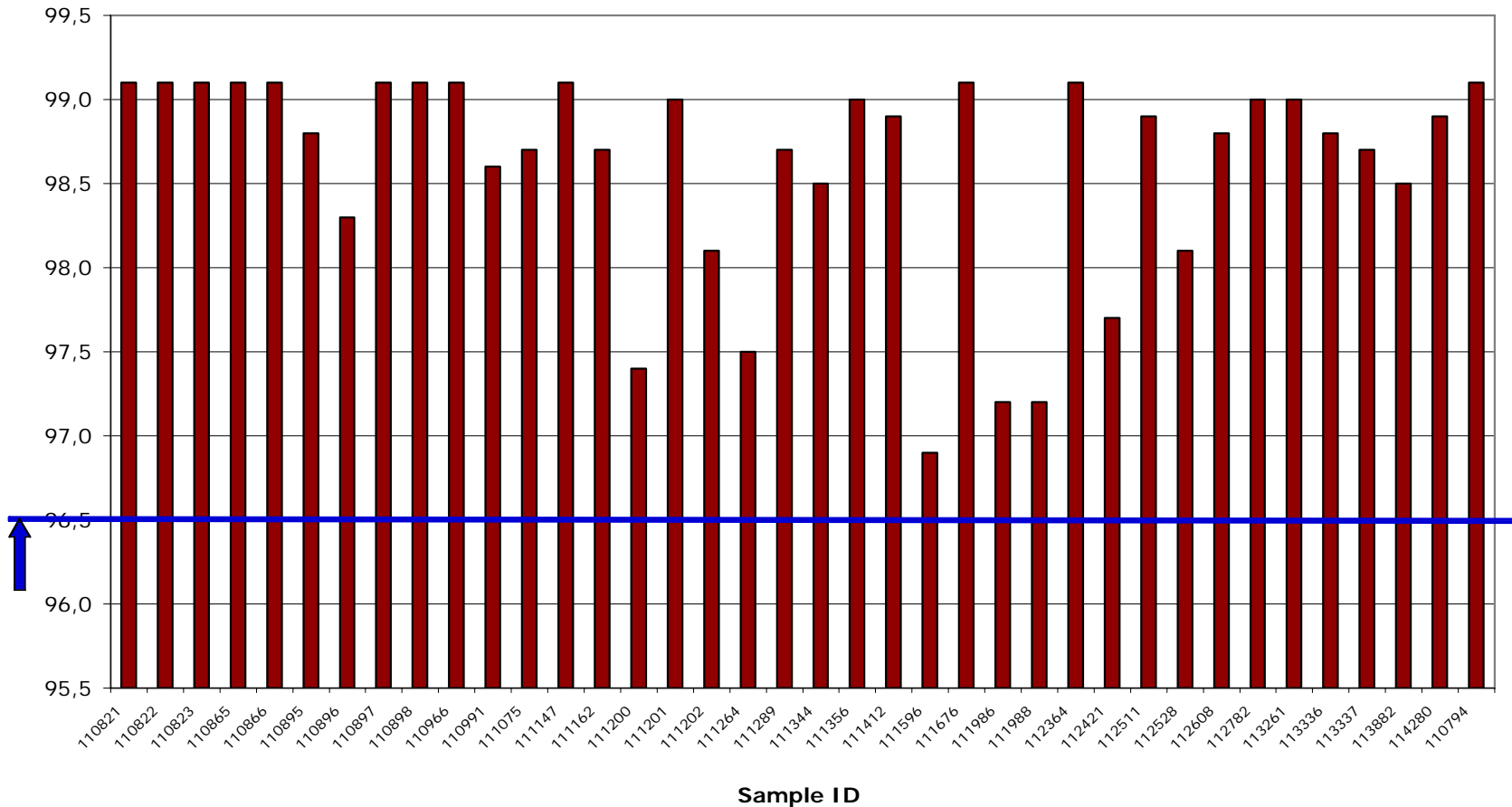




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### Ester Content



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### Density 15°C

EN 14214	860 - 900	kg/m <sup>3</sup>
Min.	879,1	kg/m <sup>3</sup>
Max.	885,6	kg/m <sup>3</sup>
Average	882,9	kg/m <sup>3</sup>
Std. Deviation	1,1	kg/m <sup>3</sup>
Range 95% max	885,2	kg/m <sup>3</sup>
Range 95% min	880,7	kg/m <sup>3</sup>
Out of spec	0	-



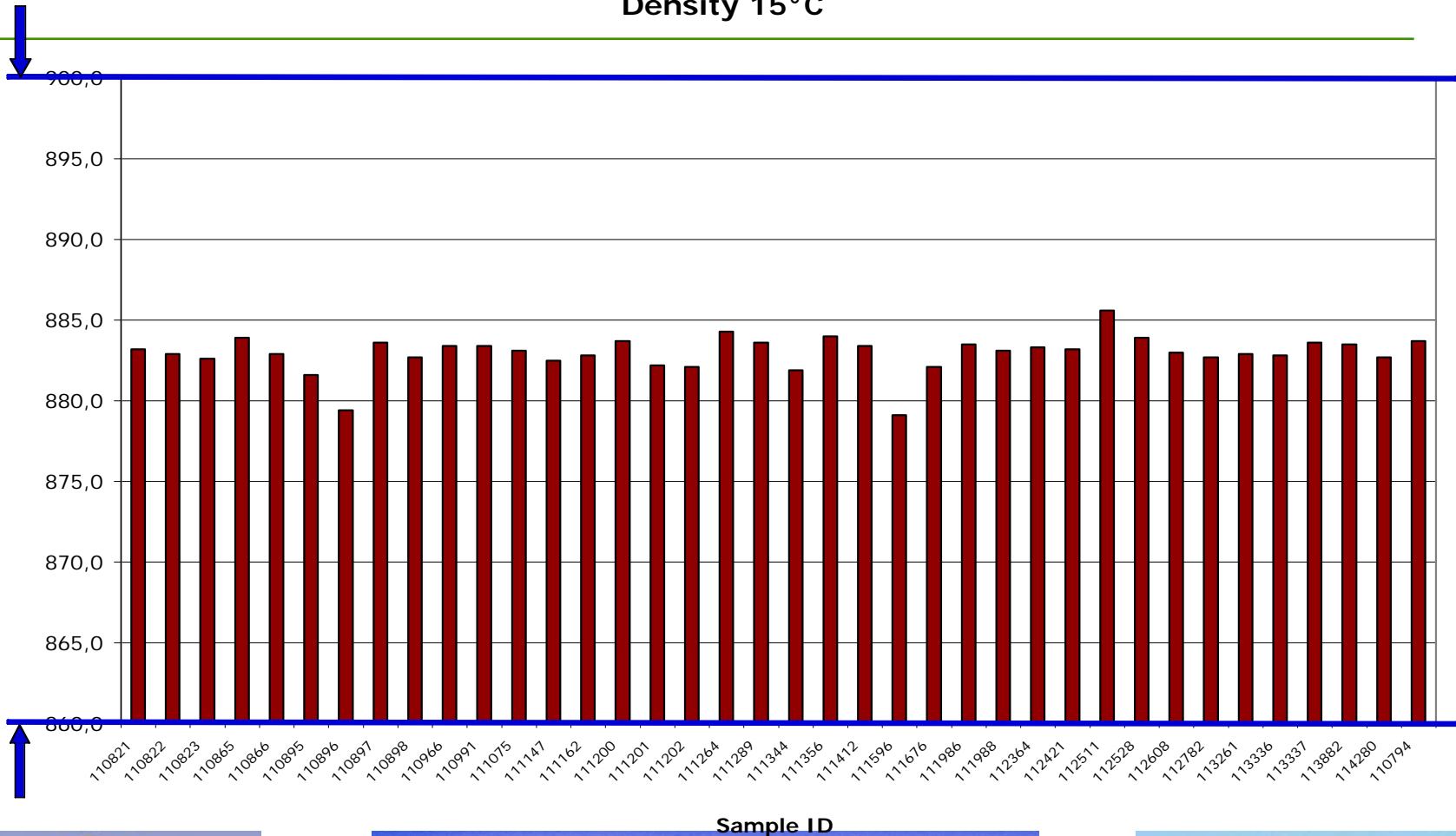
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Density 15°C



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### Kin. Viscosity 40°C

EN 14214	3,50 - 5,00	mm <sup>2</sup> /s
Min.	4,16	mm <sup>2</sup> /s
Max.	4,91	mm <sup>2</sup> /s
Average	4,45	mm <sup>2</sup> /s
Std. Deviation	0,13	mm <sup>2</sup> /s
Range 95% max	4,70	mm <sup>2</sup> /s
Range 95% min	4,20	mm <sup>2</sup> /s
Out of spec	0	-



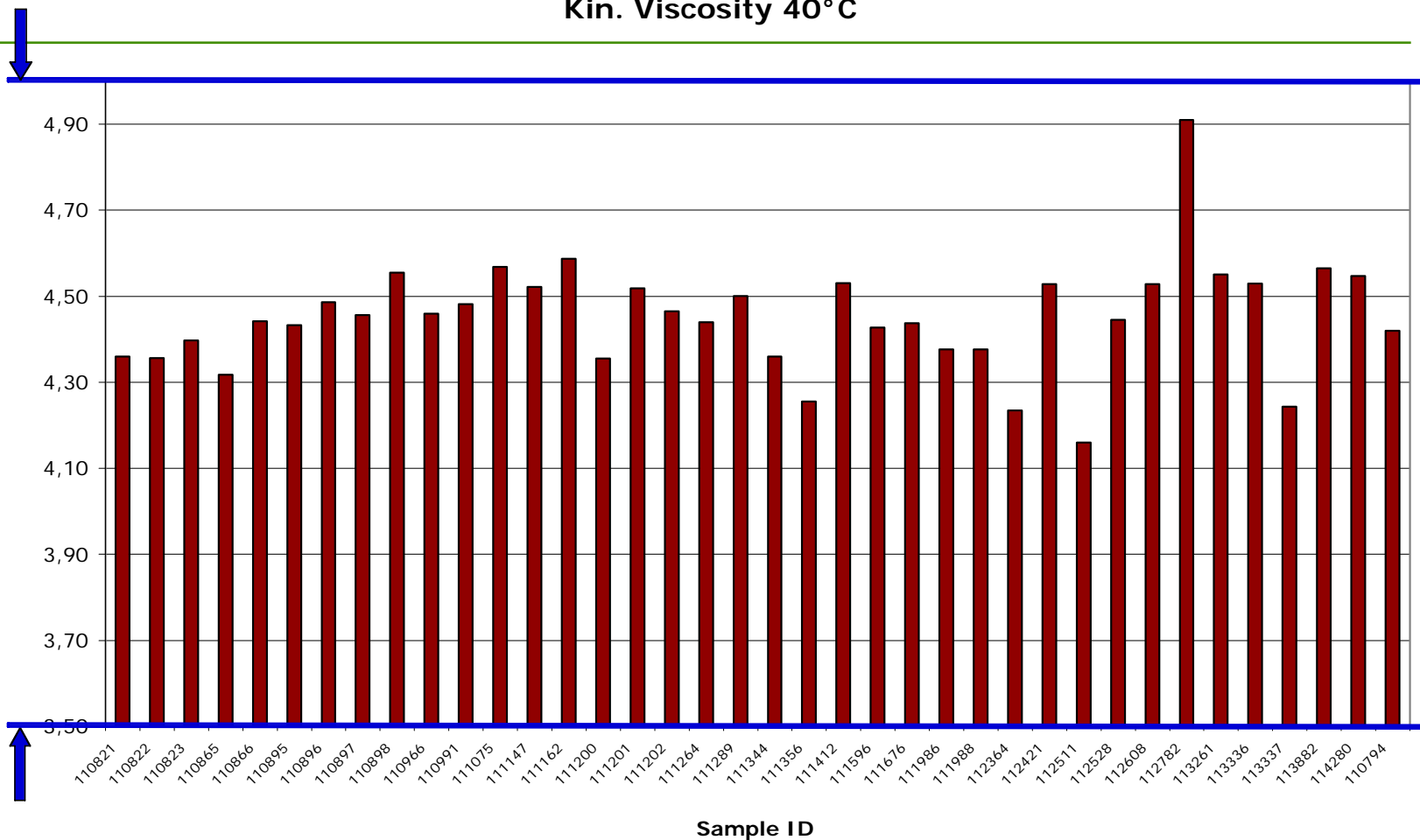
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Kin. Viscosity 40°C



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### Flash Point

EN 14214	> 120	°C
Min.	124	°C
Max.	188	°C
Average	172	°C
Std. Deviation	15	°C
Range 95% max	201	°C
Range 95% min	143	°C
Out of spec	0	-



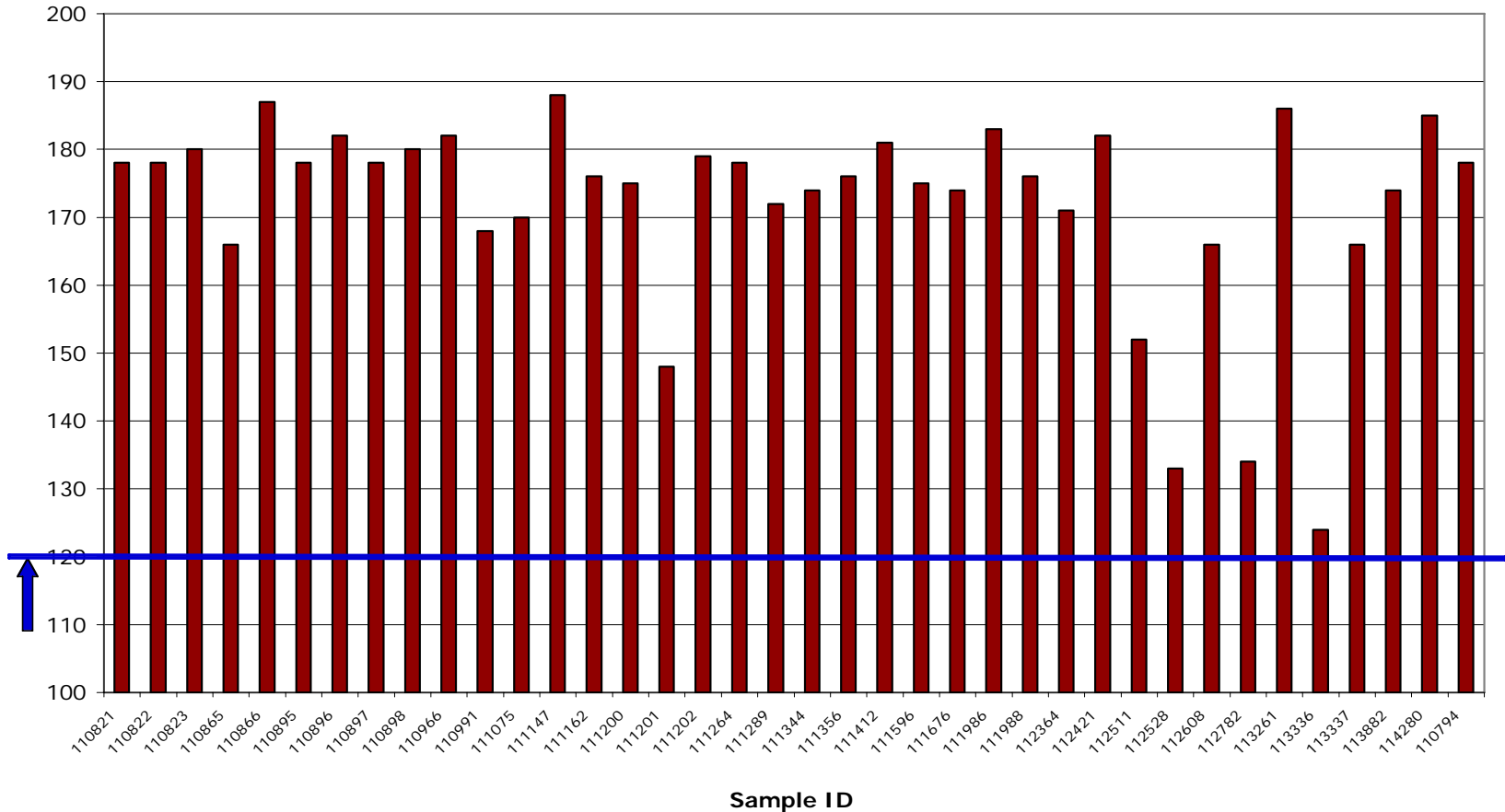
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### Flash Point



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### Sulfur content

EN 14214	< 10	mg/kg
Min.	0,9	mg/kg
Max.	16,0	mg/kg
Average	2,8	mg/kg
Std. Deviation	2,6	mg/kg
Range 95% max	8,0	mg/kg
Range 95% min	0,0	mg/kg
Out of spec	1	-

**All values < 1 mg/kg rounded off 0,9 mg/kg**

**Test method minimal value = 3 mg/kg**



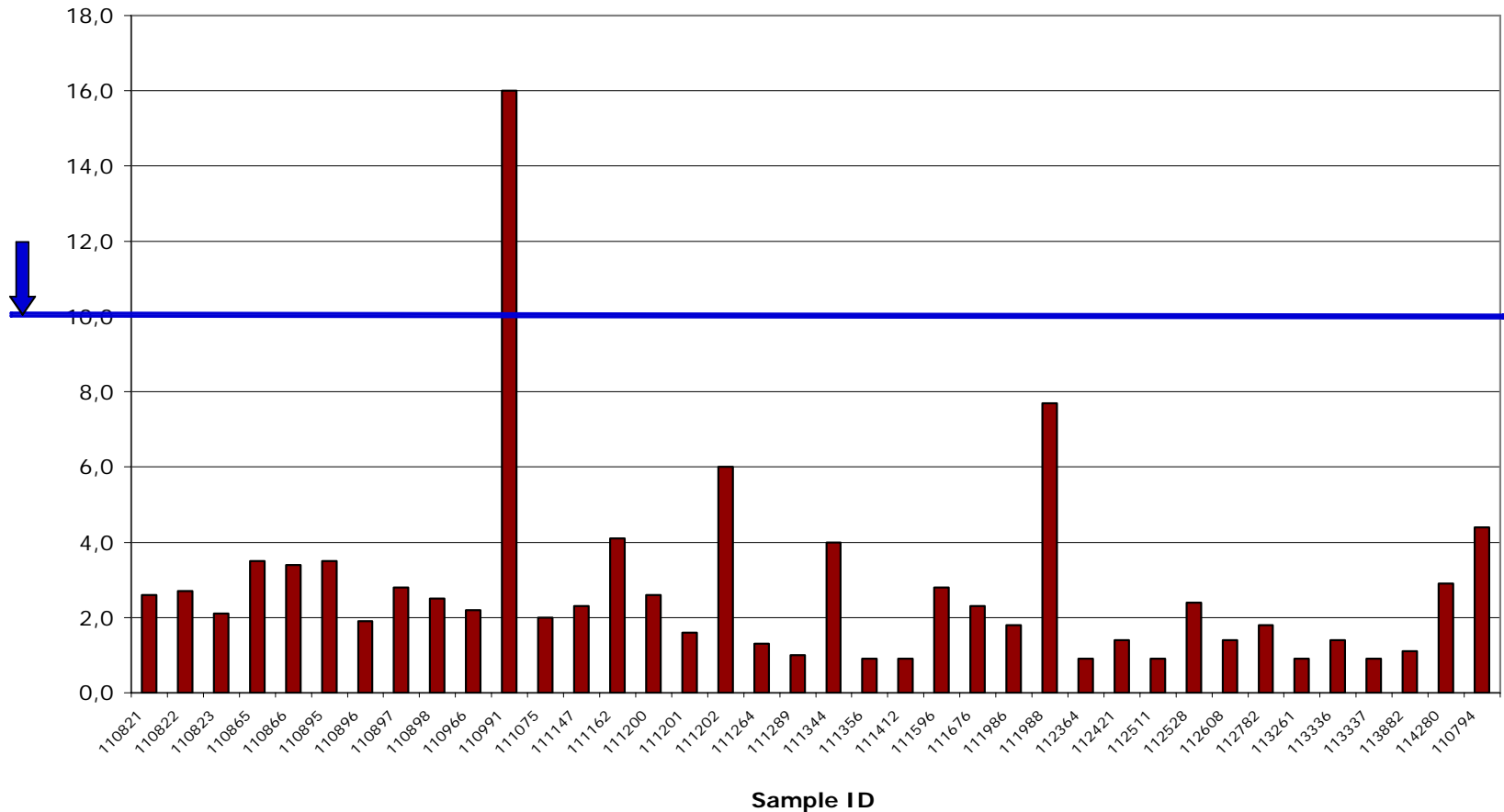
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### Sulfur Content



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### Carbon Residue (10% D.)

EN 14214	< 0,30	% m/m
Min.	0,009	% m/m
Max.	0,19	% m/m
Average	0,06	% m/m
Std. Deviation	0,05	% m/m
Range 95% max	0,15	% m/m
Range 95% min	0,00	% m/m
Out of spec	0	-

**All values < 0,01 %(m/m) rounded off 0,009 %(m/m)**



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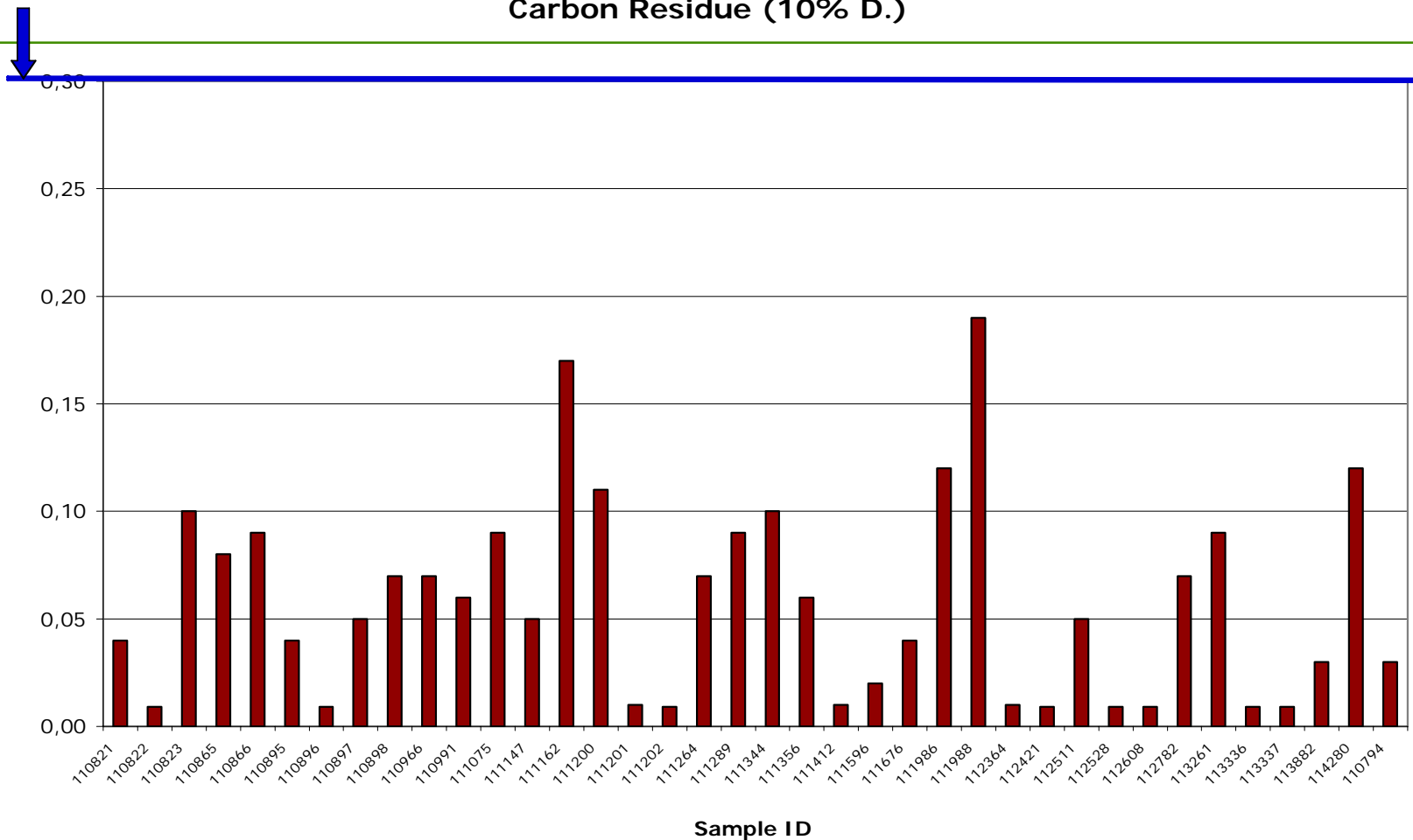




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Carbon Residue (10% D.)



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### Cetane Number

EN 14214	> 51	-
Min.	51,1	-
Max.	55,0	-
Average	52,3	-
Std. Deviation	1,0	-
Range 95% max	54,3	-
Range 95% min	50,2	-
Out of spec	0	-



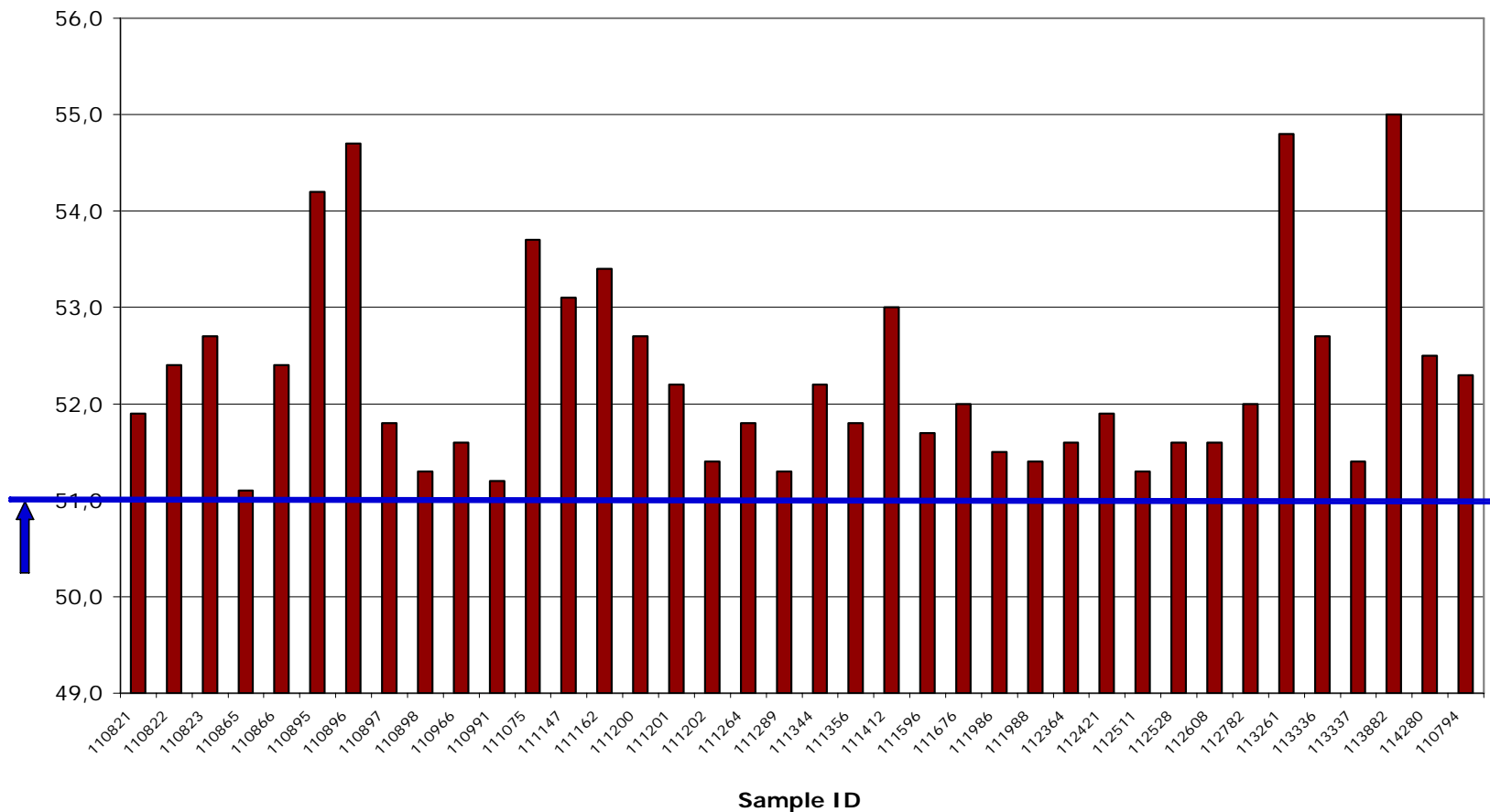
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### Cetane Number



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### Sulfated Ash

EN 14214	< 0,02	% m/m
Min.	0,0009	% m/m
Max.	0,009	% m/m
Average	0,002	% m/m
Std. Deviation	0,002	% m/m
Range 95% max	0,006	% m/m
Range 95% min	0,000	% m/m
Out of spec	0	-

**All values < 0,001 %(m/m) rounded off 0,0009 %(m/m)**



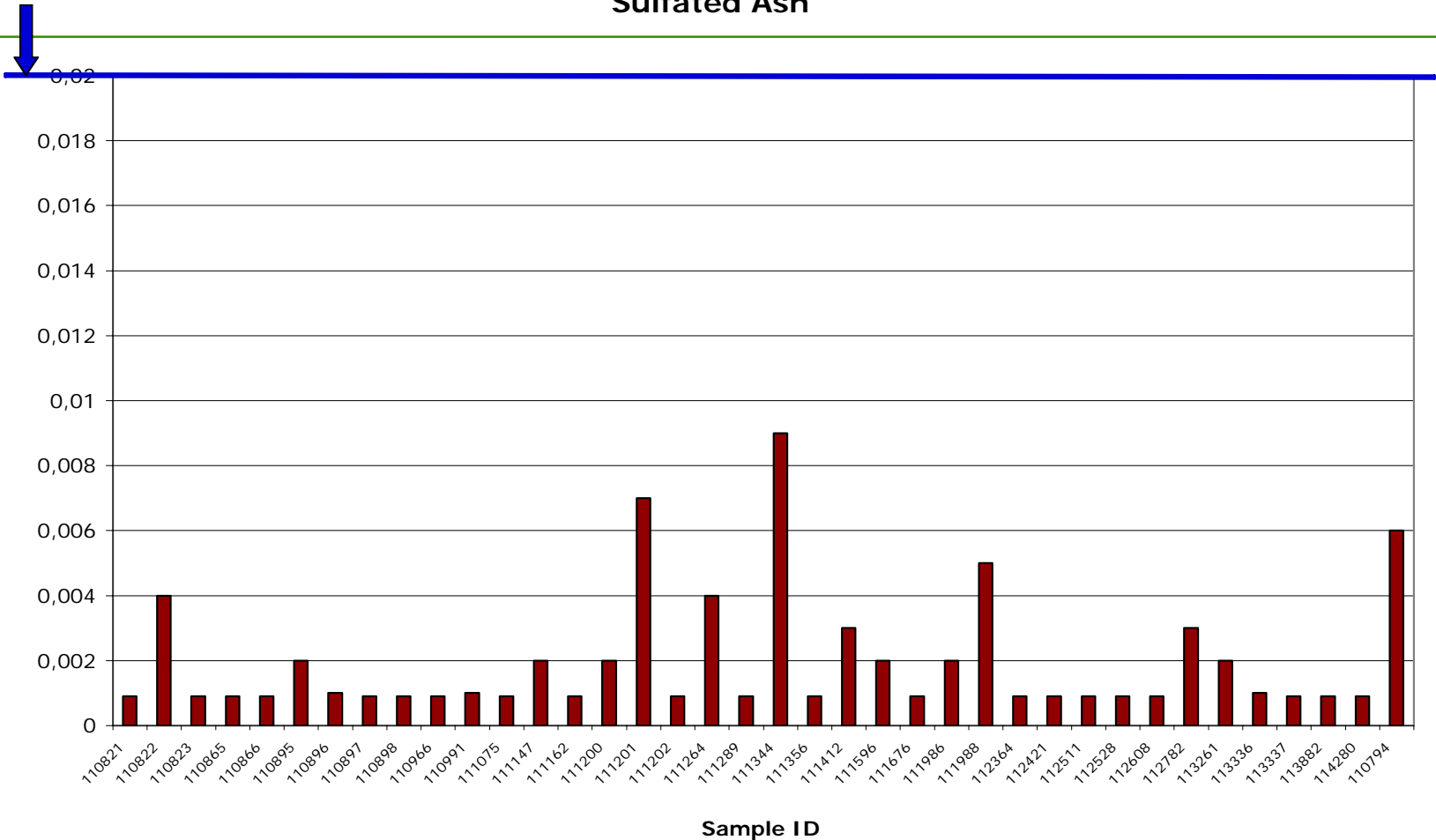
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### Sulfated Ash



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### Water Content

EN 14214	< 500	mg/kg
Min.	32	mg/kg
Max.	479	mg/kg
Average	195	mg/kg
Std. Deviation	101	mg/kg
Range 95% max	396	mg/kg
Range 95% min	0	mg/kg
Out of spec	0	-



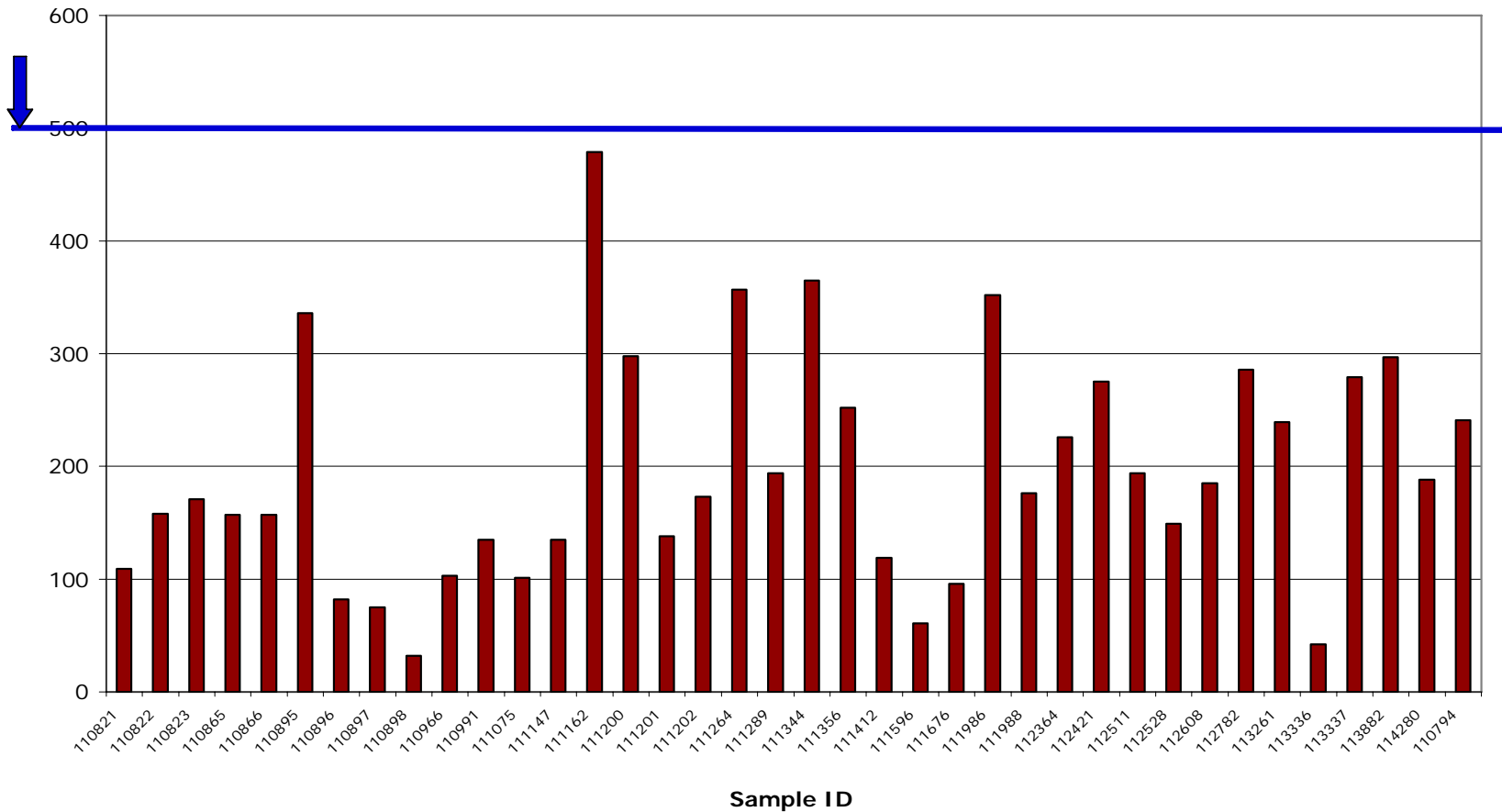
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### Water Content



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### Copper Strip Corrosion

EN 14214	Class 1	-
Min.	Class 1	-
Max.	Class 1	-
Average	Class 1	-
Std. Deviation	-	-
Range 95% max	-	-
Range 95% min	-	-
Out of spec	0	-



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### Oxidation Stability

EN 14214	> 6,0	h
Min.	1,2	h
Max.	12,4	h
Average	9,0	h
Std. Deviation	2,0	h
Range 95% max	13,0	h
Range 95% min	4,9	h
Out of spec	1	-



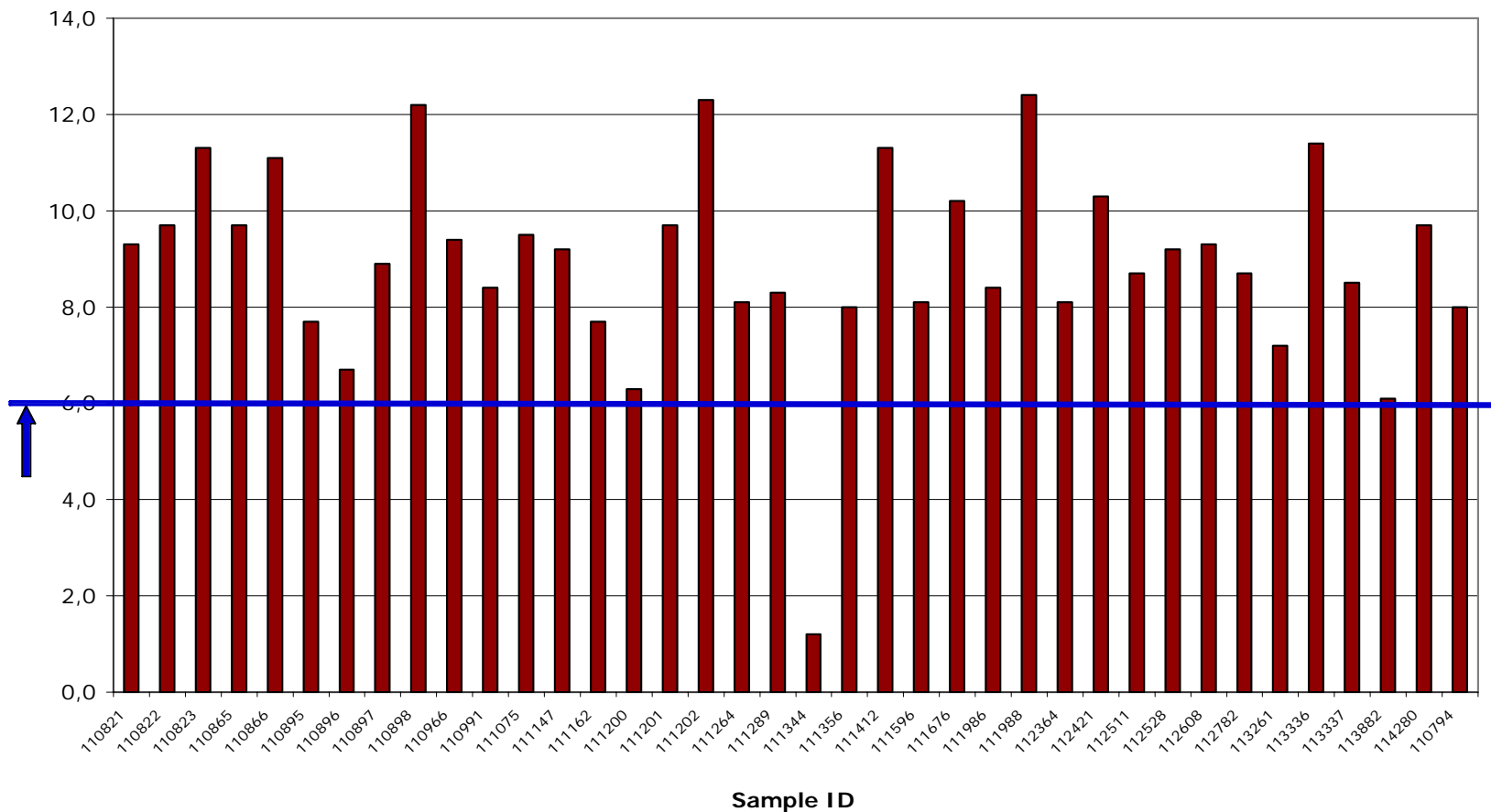
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### Oxidation Stability



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### Acid Number

EN 14214	< 0,50	mg KOH/g
Min.	0,088	mg KOH/g
Max.	0,534	mg KOH/g
Average	0,282	mg KOH/g
Std. Deviation	0,129	mg KOH/g
Range 95% max	0,539	mg KOH/g
Range 95% min	0,024	mg KOH/g
Out of spec	2	-



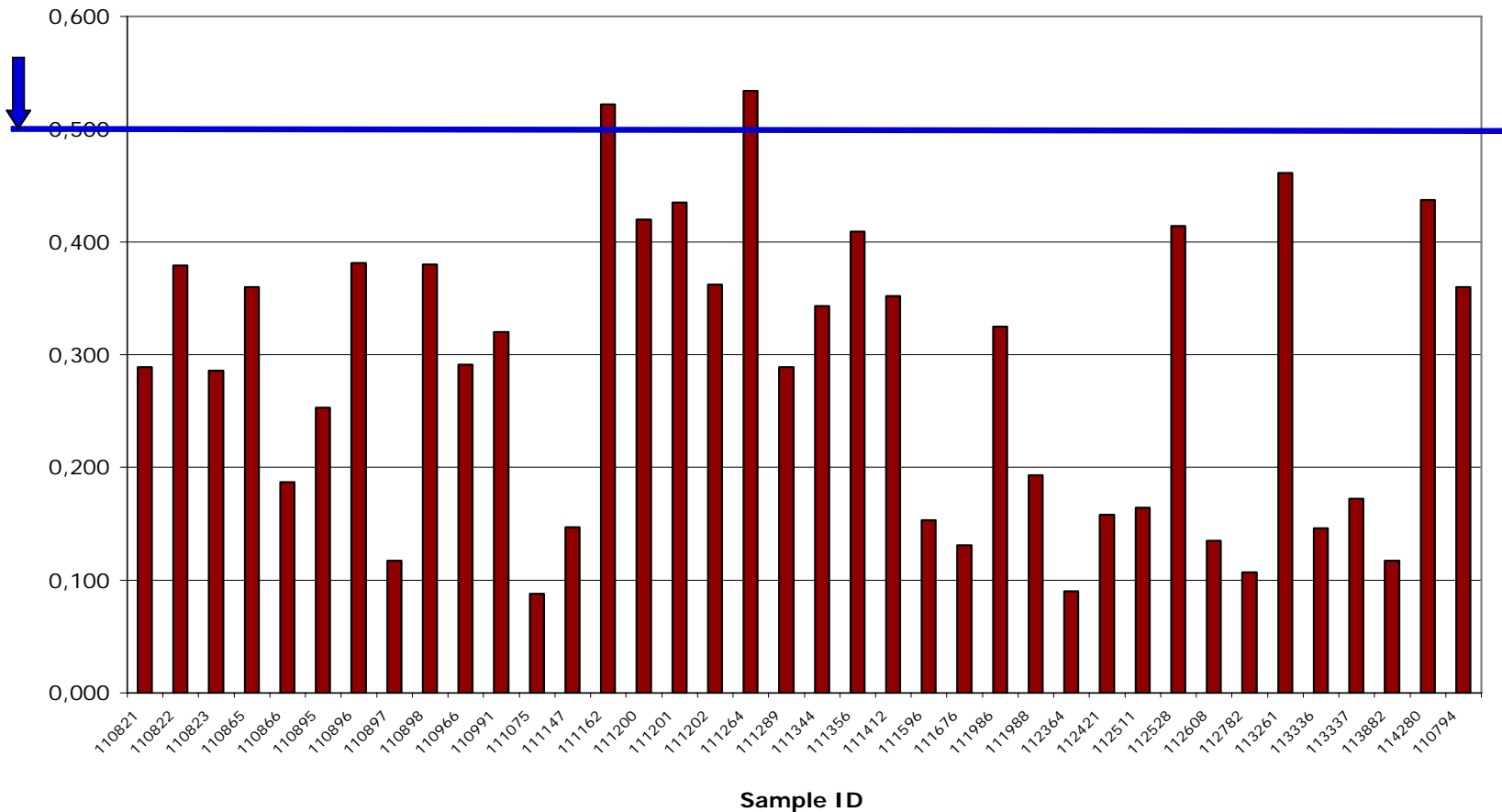
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Acid Number



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### Iodine Value

EN 14214	< 120	g Iodine/100 g
Min.	85	g Iodine/100 g
Max.	133	g Iodine/100 g
Average	111	g Iodine/100 g
Std. Deviation	8	g Iodine/100 g
Range 95% max	128	g Iodine/100 g
Range 95% min	94	g Iodine/100 g
Out of spec	1	-



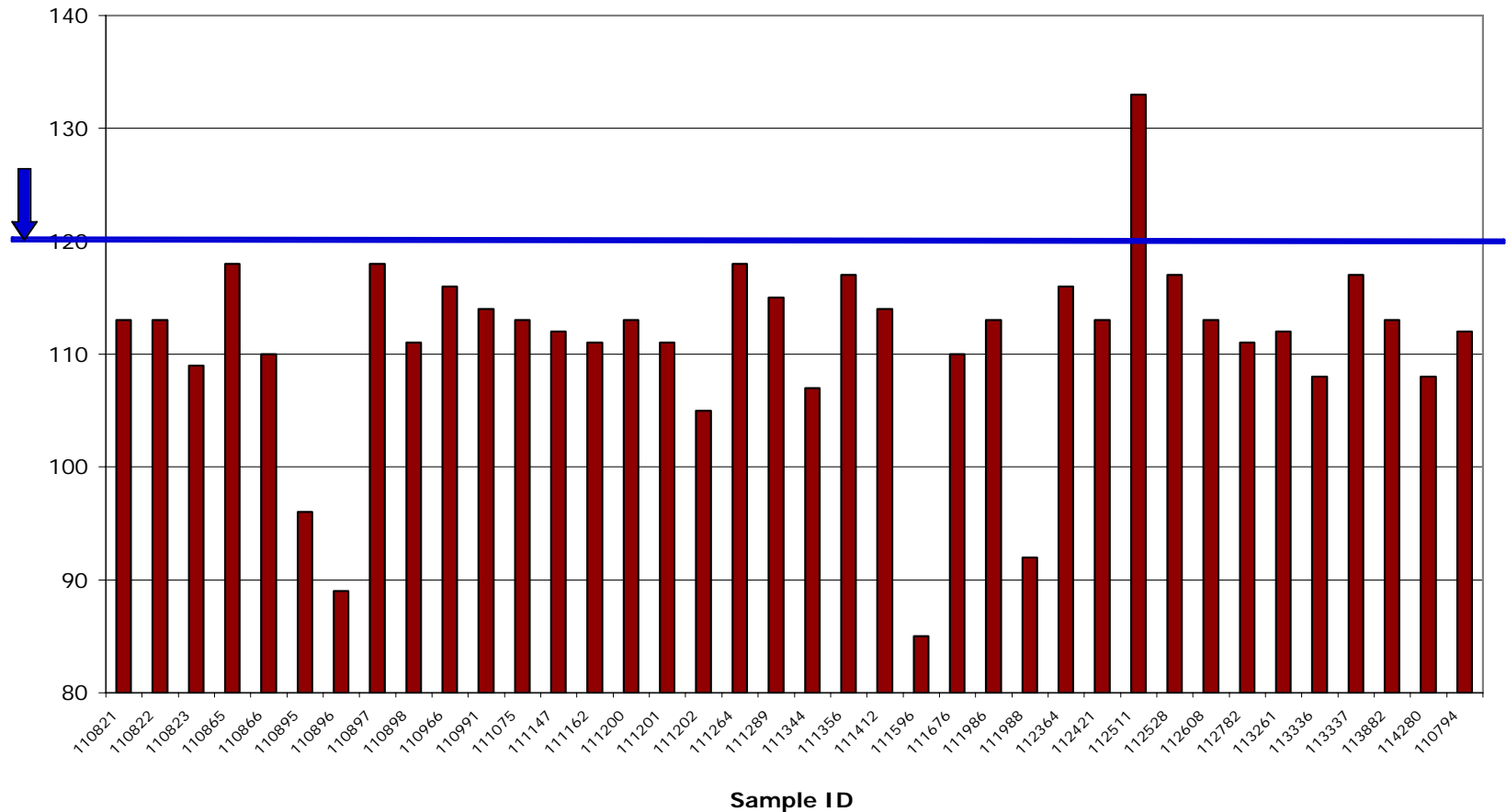
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### Iodine Value



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### Linolenic Acid Content

EN 14214	< 12	% m/m
Min.	0,7	% m/m
Max.	9,5	% m/m
Average	7,2	% m/m
Std. Deviation	2,1	% m/m
Range 95% max	11,5	% m/m
Range 95% min	3,0	% m/m
Out of spec	0	-



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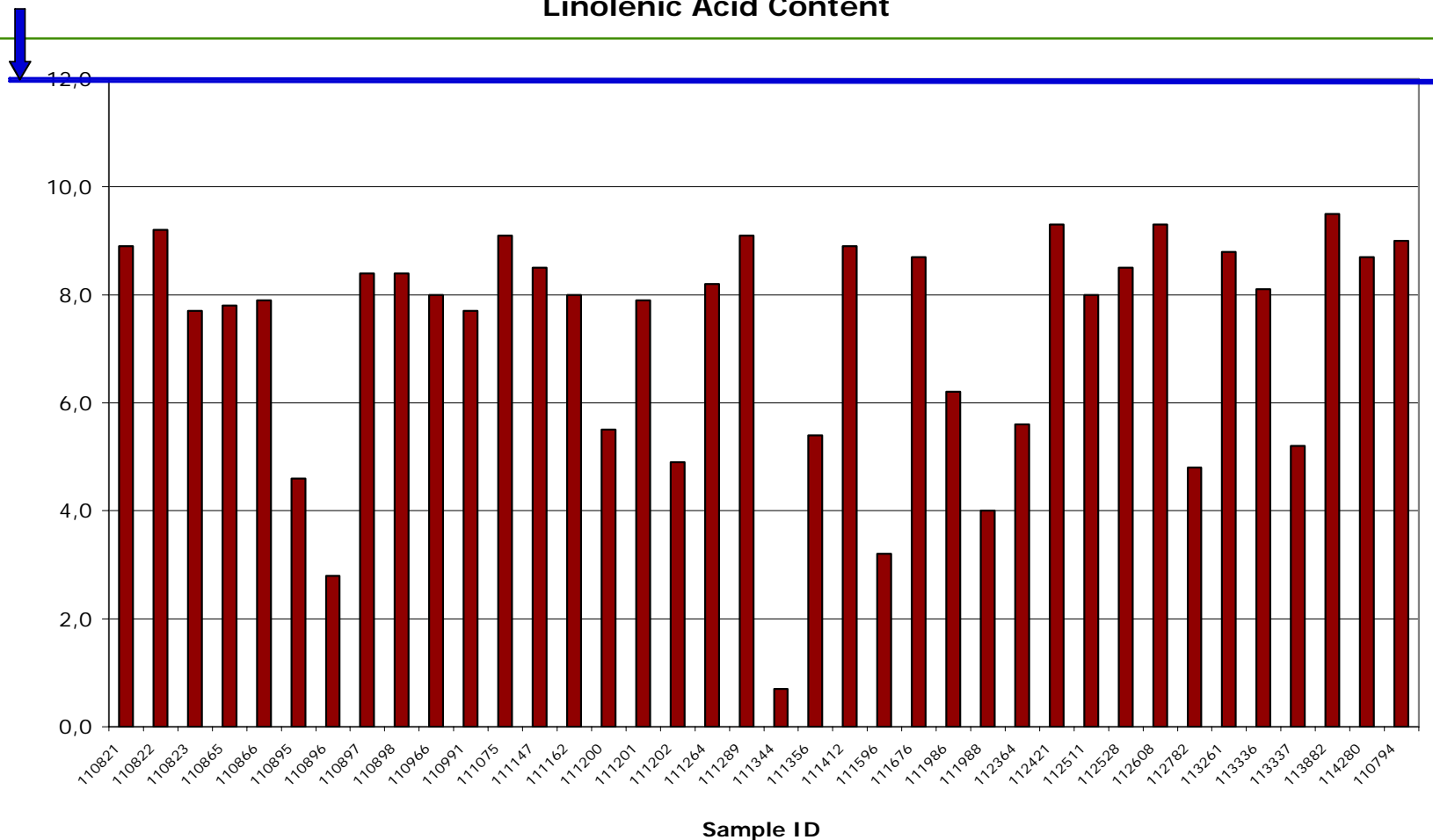




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Linolenic Acid Content



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### Methanol Content

EN 14214	< 0,20	% m/m
Min.	0,009	% m/m
Max.	0,200	% m/m
Average	0,033	% m/m
Std. Deviation	0,039	% m/m
Range 95% max	0,110	% m/m
Range 95% min	0,000	% m/m
Out of spec	0	-

**All values < 0,01 %(m/m) rounded off 0,009 %(m/m)**



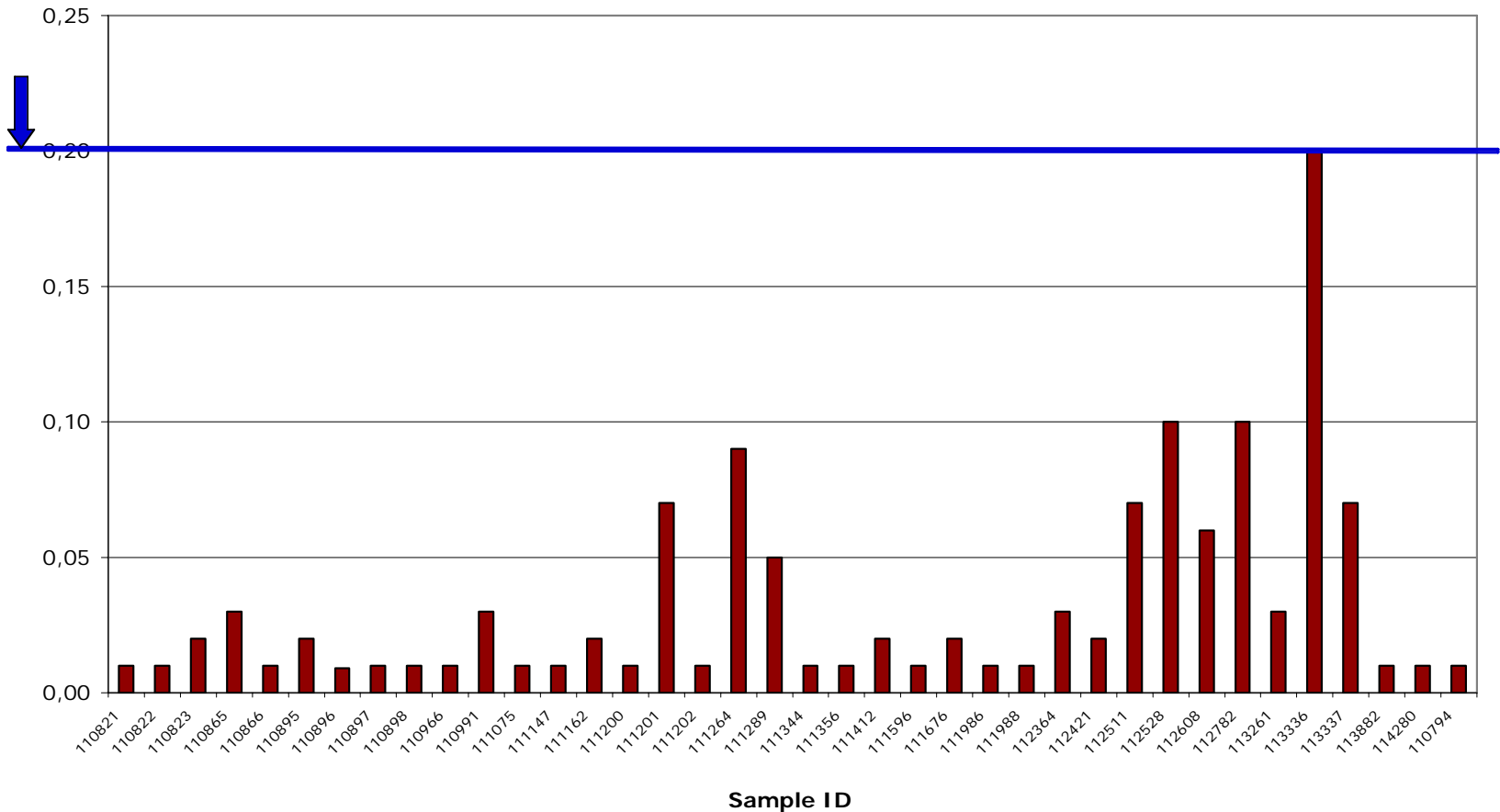
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### Methanol Content



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### Free Glycerol

EN 14214	< 0,020	% m/m
Min.	0,009	% m/m
Max.	0,010	% m/m
Average	0,010	% m/m
Std. Deviation	0,001	% m/m
Range 95% max	0,011	% m/m
Range 95% min	0,009	% m/m
Out of spec	0	-

**All values < 0,01 %(m/m) rounded off 0,009 %(m/m)**



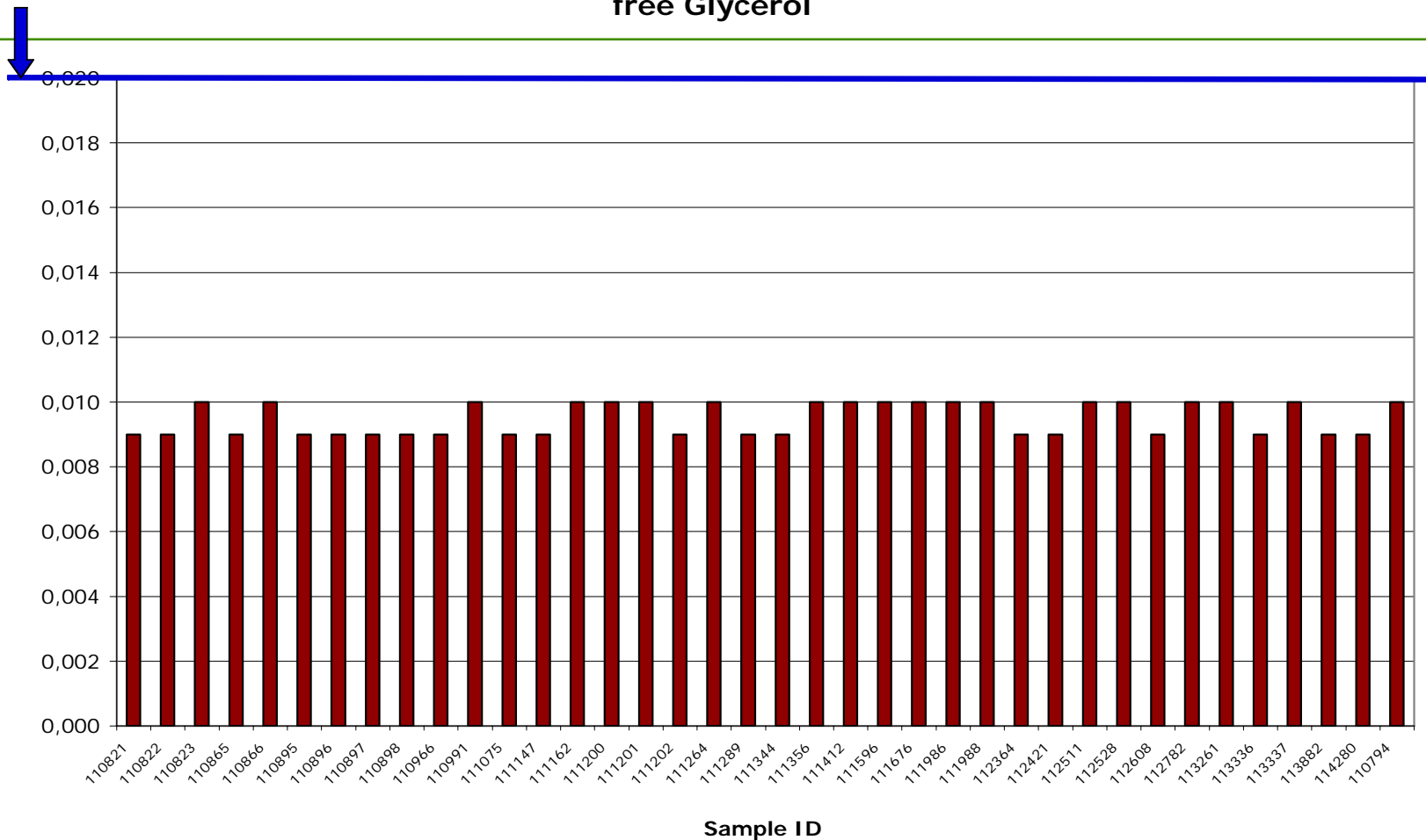
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free Glycerol



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### Mono - Di - Triglyceride

	Monoglycerides	Diglycerides	Triglycerides	
EN 14214	< 0,80	< 0,20	< 0,20	% (m/m)
Min.	0,07	0,009	0,009	% (m/m)
Max.	0,82	0,20	0,15	% (m/m)
Average	0,46	0,10	0,04	% (m/m)
Std. Deviation	0,19	0,04	0,05	% (m/m)
Range 95% max	0,84	0,18	0,14	% (m/m)
Range 95% min	0,07	0,01	0,00	% (m/m)
Out of spec	1	0	0	-

**All values < 0,01 %(m/m) rounded off 0,009 %(m/m)**



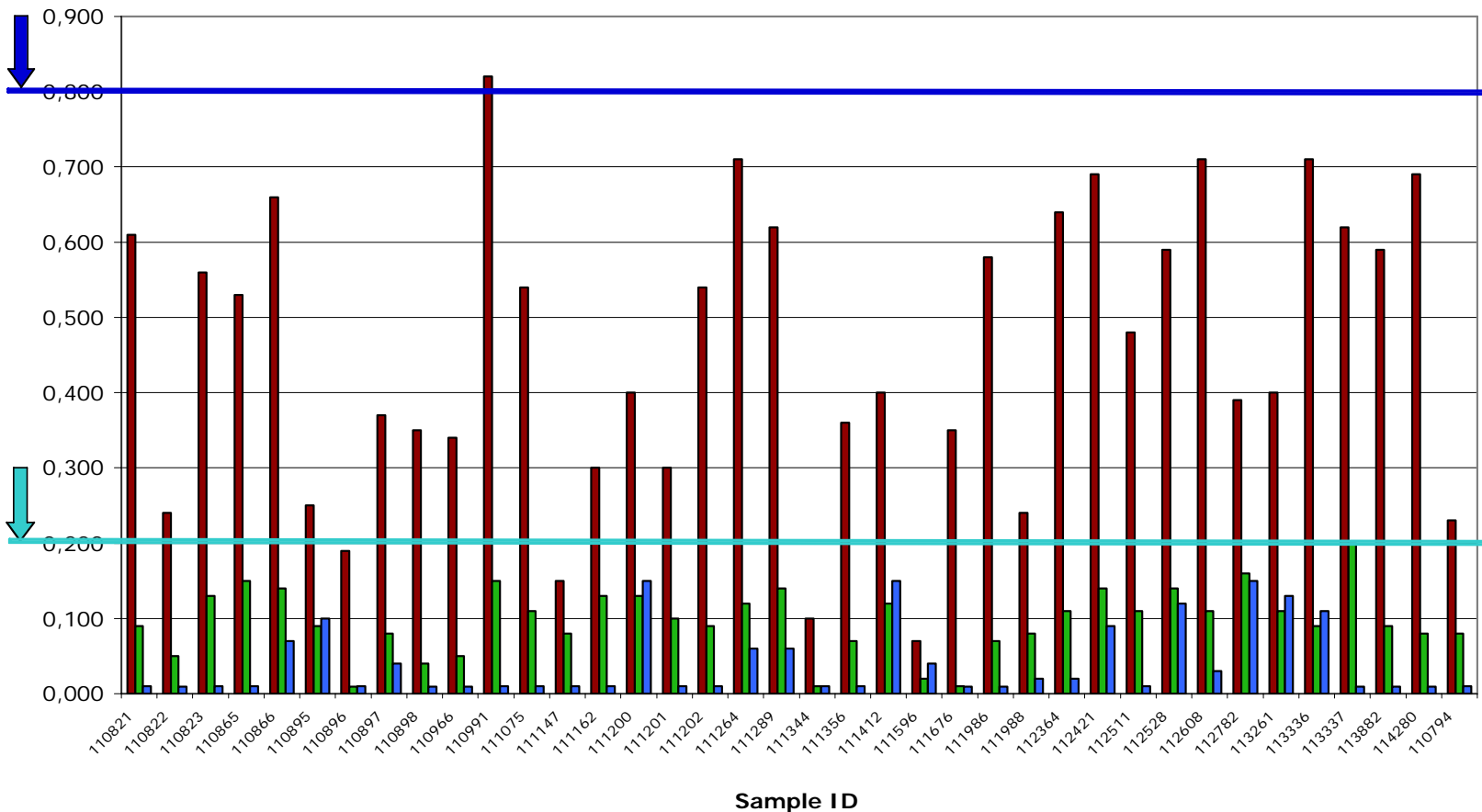
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### Mono - Di - Tri Glyceride Content



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### Total Glycerol Content

EN 14214	< 0,25	% m/m
Min.	0,030	% m/m
Max.	0,240	% m/m
Average	0,139	% m/m
Std. Deviation	0,055	% m/m
Range 95% max	0,249	% m/m
Range 95% min	0,030	% m/m
Out of spec	0	-



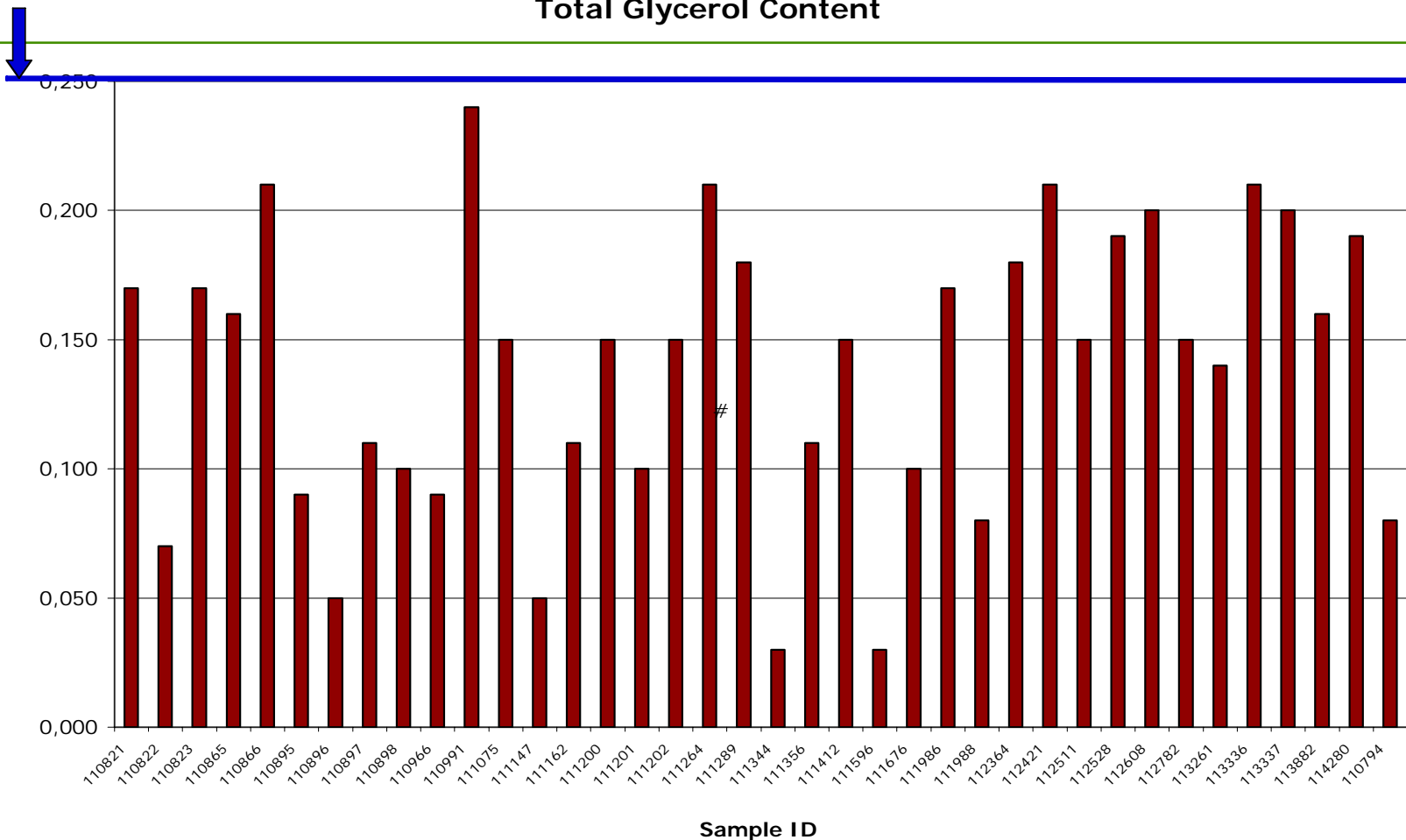
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Total Glycerol Content



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### Phosphorus Content

EN 14214	< 10	mg/kg
Min.	0,49	mg/kg
Max.	2,8	mg/kg
Average	0,6	mg/kg
Std. Deviation	0,6	mg/kg
Range 95% max	1,8	mg/kg
Range 95% min	0,0	mg/kg
Out of spec	0	-

**All values < 0,5 mg/kg rounded off 0,49 mg/kg**

**Test method minimal value = 4 mg/kg**



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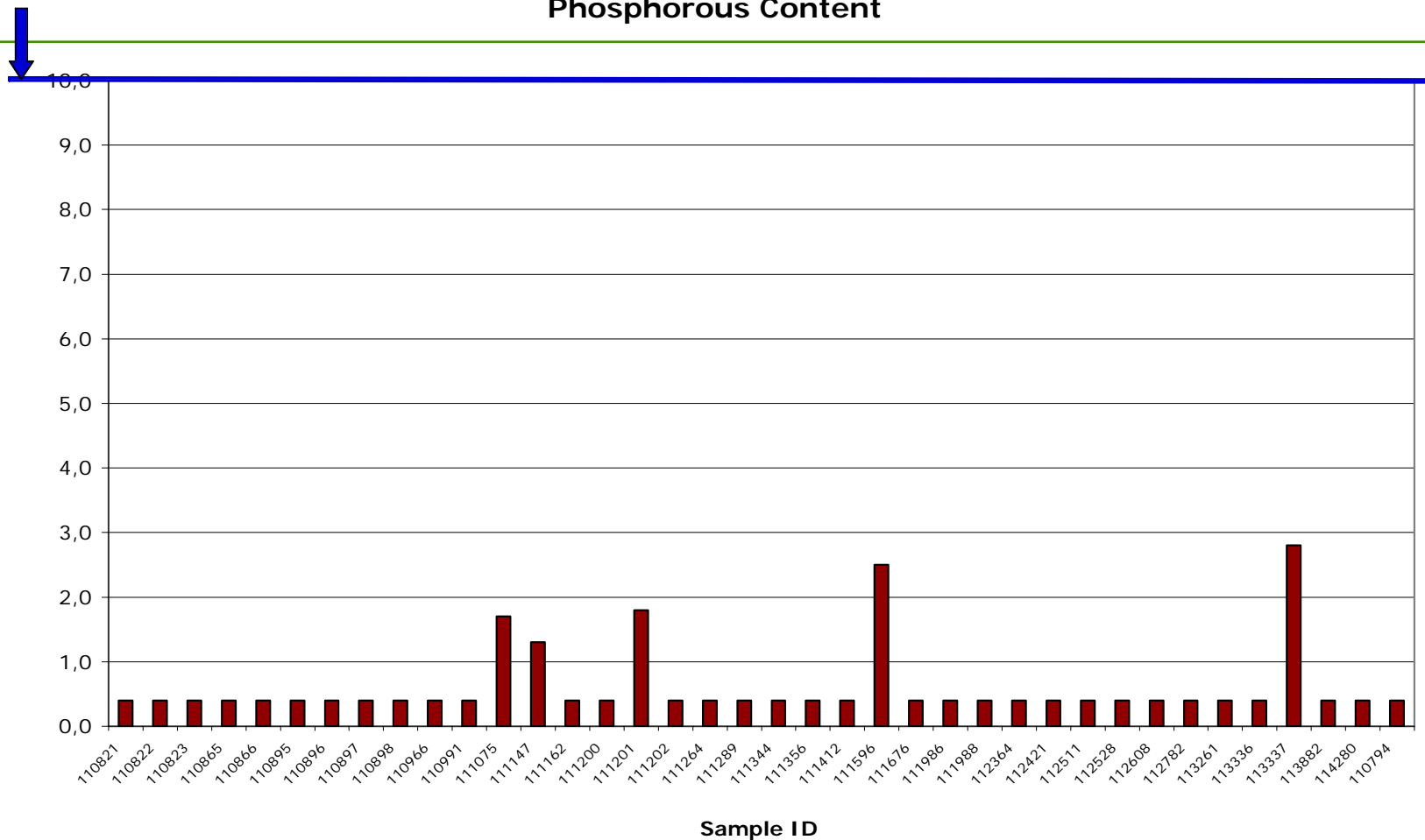




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### Phosphorous Content



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### Metals I (Na + K) and Metals II (Ca + Mg) Content

	Metals I (Na + K)	Metals II (Ca + Mg)	
EN 14214	< 5,0	< 5,0	mg/kg
Min.	0,49	0,49	mg/kg
Max.	4,2	4,4	mg/kg
Average	1,0	0,5	mg/kg
Std. Deviation	1,0	0,6	mg/kg
Range 95% max	3,0	1,8	mg/kg
Range 95% min	0,0	0,0	mg/kg
Out of spec	0	0	-

**All values < 0,5 mg/kg rounded off 0,49 mg/kg**



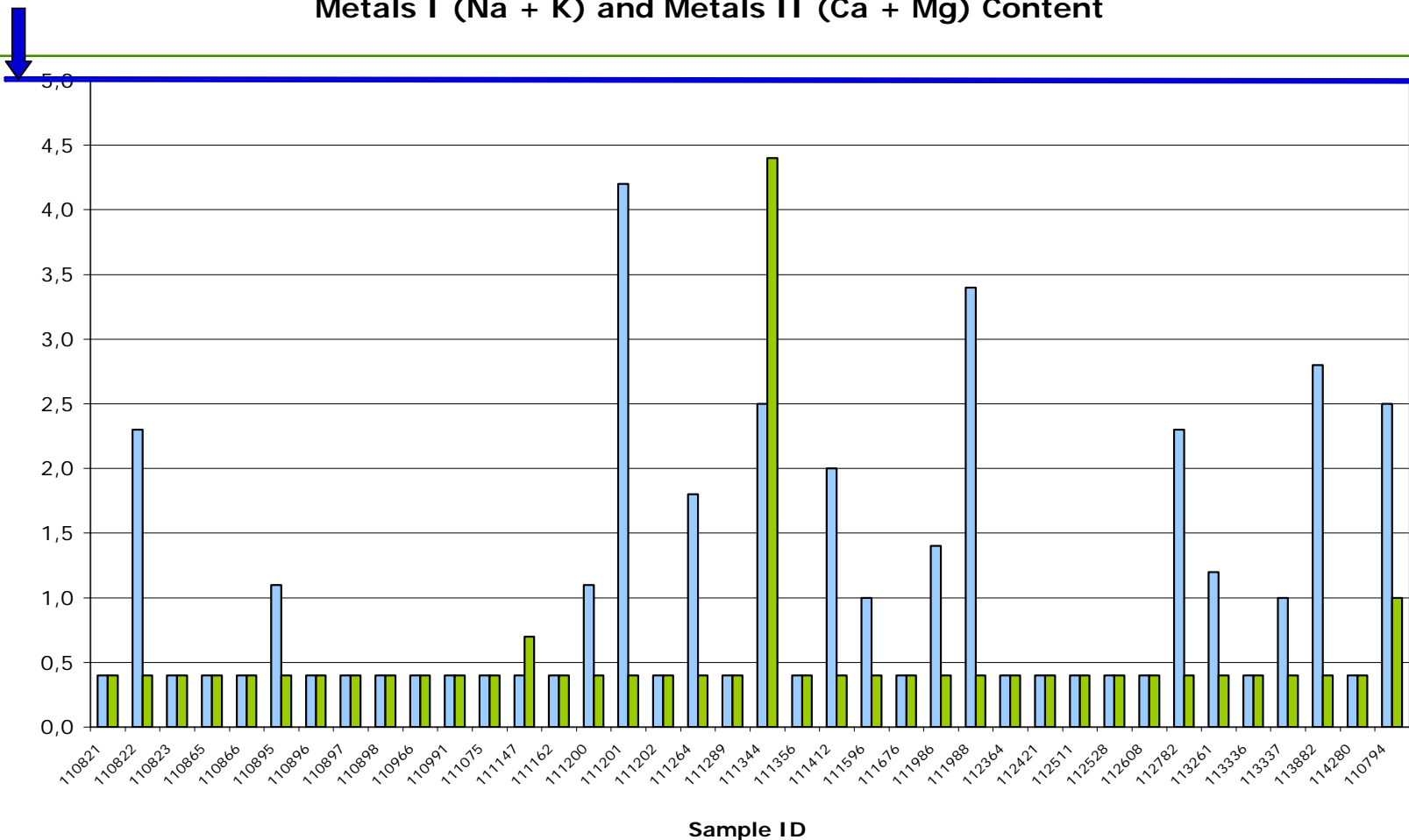
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Metals I (Na + K) and Metals II (Ca + Mg) Content



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### Second sampling and analysis summer quality 2007

#### Final General Comments

EBB members' production (38 plants monitored) is well within the EN14214 limits with 4 border-line samples on only one parameter and 1 sample out of EN14214 with one or more parameters. The 95% range show the respect of the EN14214 and the good quality achieved from the European producers.

**The results which are not in range (borderline or out of spec) with respect to the EN14214 concern:**

**Production parameters:**

- 1 result (very poor) for the oxidation stability
- 2 results for acid number (border line)
- 1 result for Monoglyceride (conversion)

**Other problems (internal logistic, cleaning, previous cargo, etc):**

- 1 results with respect to the sulphur content parameter
- Total contamination: reproducibility doesn't allow any consideration on the results.



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