

Sheet No.

AQF RE 031E Oil

Determination of fluorine, chlorine and sulfur in RDF (Refuse Derived Fuel)

1/2

Instruments : AQF-2100H System, HF-210, GA-210, ABC-210/ ASC-240S

Method : Combustion-ion chromatography

Related standard :

RDF is a solid fuel which is made from combustible refuse discharged from households. As it is used as fuel for power generation or boilers, it is critically important to know the halogen and sulfur content. Concentrations of fluorine, chlorine, bromine, iodine, and sulfur can be determined and accurately by using a combustion ion chromatography (CIC) system combining an Automatic Quick Furnace Model AQF-2100H which safely combusts samples with an ion chromatograph.

Sample name	RDF																																				
Sample status																																					
Measuring items	Fluorine (F), Chlorine (Cl), Sulfur (S)																																				
Measurement principle	Sample is thermally decomposed in argon (Ar) atmosphere, then combusted in oxygen (O ₂) atmosphere. Halogens in the sample are converted to hydrogen halide and halogen gas and sulfur turns into sulfur oxide. These components are collected into absorbing solution and converted to halide ion and sulfate ion. The resulting solution is analyzed by injecting into an ion chromatograph (IC). Analyzing flow [Sample weighing]→[Combustion]→[Collection of combustion gas]→[IC analysis]																																				
Parameters	<p>1. AQF-2100H</p> <p>Sample size : 15 to 20mg Sample boat : Quartz sample boat, TX2SBT Additive : None Pyrolysis tube : Quartz tube filled with quartz wool Absorbent : 90ppm Hydrogen peroxide / water Mode : Constant volume mode</p> <p>HF-210 Heater Temp. Inlet : 900degC Outlet : 1000degC Gas flow Ar : 200 ml/min O₂ : 400 ml/min</p> <p>GA-210 Absorbent volume : 10 ml Sampling loop : 100 ul Absorption tube : For 10 ml Water supply : 2 Ar flow for water supply : 100 ml/min</p> <p>ABC-210/ASC-240S</p> <table border="1"> <thead> <tr> <th></th> <th></th> <th>1st</th> <th>2nd</th> <th>3rd</th> <th>4th</th> <th>5th</th> <th>End</th> <th>Cool</th> </tr> </thead> <tbody> <tr> <td>Position</td> <td>(mm)</td> <td>130</td> <td>160</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Time</td> <td>(sec)</td> <td>90</td> <td>90</td> <td></td> <td></td> <td></td> <td>90</td> <td>60</td> </tr> <tr> <td>Speed</td> <td>(mm/sec)</td> <td>20</td> <td>0.12</td> <td></td> <td></td> <td></td> <td>20</td> <td>40</td> </tr> </tbody> </table> <p style="text-align: right;">Ar Time 0 (sec) O₂ Time 300(sec)</p>			1st	2nd	3rd	4th	5th	End	Cool	Position	(mm)	130	160						Time	(sec)	90	90				90	60	Speed	(mm/sec)	20	0.12				20	40
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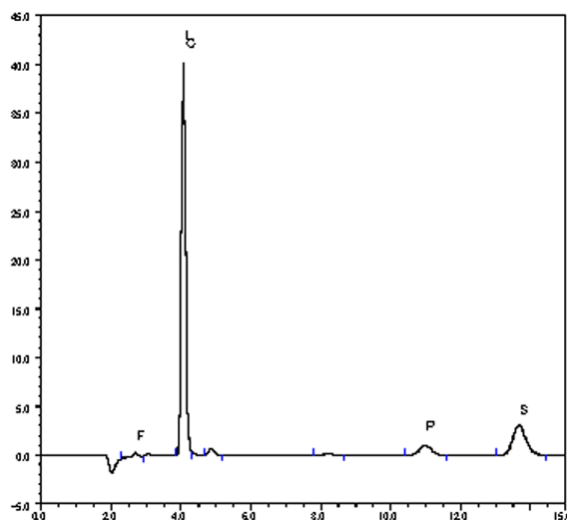
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2. Ion chromatograph

Ion chromatograph : DIONEX ICS-1500
 Column : 60sec
 Eluent : 15min
 Eluent flow : DIONEX Ion Pack AG12A / Ion Pack AS12A
 Detector : ASRS-4-mm
 Suppressor : 23mA
 Measuring time : 1.50ml / min
 Sampling loop : 2.7mM Na₂CO₃ / 0.3mM NaHCO₃
 Calibration : F Cl Br S ; 0.1ppm
 : F Cl Br S ; 1.0ppm
 : F Cl Br S ; 5.0ppm

Results

Chromatogram



Results

No.	F(ppm)	Cl(ppm)	S(ppm)
1	53.0	7080	937
2	54.9	7350	943
3	60.1	8120	907
Average	56.0	7510	929

Remarks

*Handling of reagents: Confirm labels and safety data sheets of reagents and handle them with enough care.
 *Automation is possible by using an Automatic Sample Changer, ASC-240S.
 When ASC-240S is used, the boat to be used will be a ceramic boat, TX3SCX.

*This application sheet is provided as reference, and does not assure the measurement results. Please consider analysis environment, external factors and sample nature for optimal conditions before the measurement.

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