

Sheet No.

**AQF ME 007E** Pharmaceuticals & Cosmetics

# Determination of fluorine in toothpaste 1/2

Instruments : AQF-100  
 Method : Combustion-ion chromatography  
 Related standard :

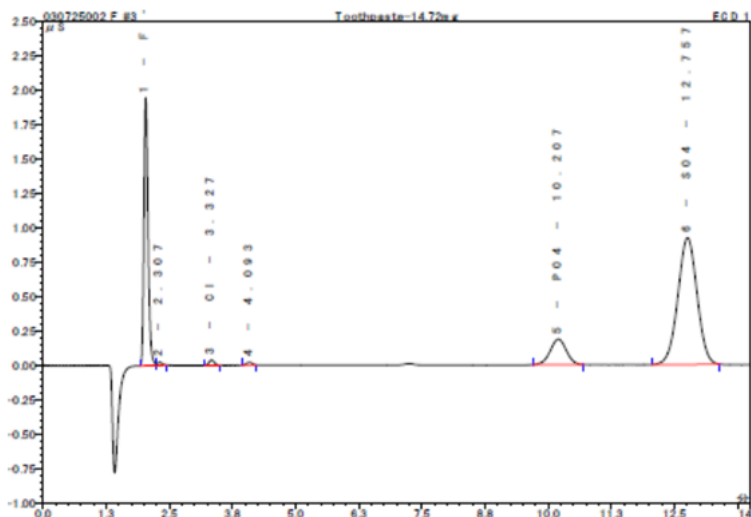
It is critically important to know the fluorine content in toothpaste as component analysis for quality control. Concentrations of fluorine, chlorine, bromine, iodine, and sulfur can be determined and accurately by using a combustion ion chromatography (CIC) system combining an Automatic Quick Furnace Model AQF-100 which safely combusts samples with an ion chromatograph.

Sample name	Toothpaste																																				
Sample status	Paste																																				
Measuring items	Fluorine (F)																																				
Measurement principle	<p>Sample is thermally decomposed in argon (Ar) atmosphere, then combusted in oxygen (O<sub>2</sub>) 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).</p> <p><b>Analyzing flow</b>                  [Sample weighing]→[Combustion]→[Collection of combustion gas]→[IC analysis]</p>																																				
Parameters	<p><b>1.AQF-100</b></p> <p style="padding-left: 40px;">Sample size : 20mg                  Sample boat : Ceramic sample boat, SXSMBS                  Additive : WO<sub>3</sub> 50mg                  Pyrolysis tube : Quartz tube filled with quartz wool                  Absorbent : 0.1% Hydrogen peroxide / water</p> <p style="padding-left: 40px;">Mode :                  Heater Temp. Inlet : 900degC                  Outlet : 1000degC                  Gas flow Ar : 200 ml/min                  O<sub>2</sub> : 400 ml/min</p> <p>GA-100      Absorbent volume : 20 ml                  Sampling loop : 20 ul                  Absorption tube : For 20 ml                  Water supply : 4                  Ar flow for water supply : 150 ml/min</p> <p>ABC-100/ASC-120S</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <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>0</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Time</td> <td>(sec)</td> <td>0</td> <td></td> <td></td> <td></td> <td></td> <td>360</td> <td>30</td> </tr> <tr> <td>Speed</td> <td>(mm/sec)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p style="text-align: right;">Ar Time 0 (sec) O<sub>2</sub> Time 600(sec)</p>			1st	2nd	3rd	4th	5th	End	Cool	Position	(mm)	0							Time	(sec)	0					360	30	Speed	(mm/sec)							
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	<p><b>2. Ion chromatograph</b></p> <p>Ion chromatograph : DIONEX DX-320          Column : DIONEX Ion Pack AG12A / Ion Pack AS12A          Eluent : 2.7mM Na<sub>2</sub>CO<sub>3</sub> / 0.3mM NaHCO<sub>3</sub>          Eluent flow : 1.50ml / min          Detector : Conductivity          Suppressor : AAES(Atlas)          Measuring time : 15min          Sampling loop : 20 ul using GA-100 sampling loop          Calibration : F Cl Br S :5ppm to 40ppm</p>				
<p>Results</p>	<p><b>Chromatogram</b></p>  <p><b>Results</b></p> <p>Fluoride in sample: Na<sub>2</sub>FPO<sub>2</sub></p> <table border="1"> <thead> <tr> <th>Indicated value (%)</th> <th>Results (%)</th> </tr> </thead> <tbody> <tr> <td>0.15</td> <td>0.142, 0.143</td> </tr> </tbody> </table>	Indicated value (%)	Results (%)	0.15	0.142, 0.143
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0.15	0.142, 0.143				
<p>Remarks</p>	<p>*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-120S.          *When ASC-120S is used, the boat to be used will be a ceramic boat, TX3SCX.</p>				

\*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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