

APPLICATIONS OF XRF IN THE ALUMINUM INDUSTRY

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X-ray fluorescence has been used in the aluminum industry since the beginning of the 1950's. Initial applications involved predominantly raw materials such as bauxite. During the last few decades XRF expanded to every stage of aluminum production and today it is a mature and recognized analytical technique. XRF is applied routinely in bauxite exploration and exploitation, alumina production by the Bayer process, electrolysis (alumina reduction) and metal fabrication processes. Early sample preparation methods employed ground specimen that was next briquetted with a binder. Later, sample fusion proved to be the most practical choice for selected materials resulting in much improved accuracy of analysis and allowing process control.

Typical XRF applications in the aluminum industry at present are listed in Table below.

<i>TYPE OF MATRIX</i>	<i>ANALYTICAL PROGRAM</i>	<i>NUMBER OF ELEMENTS</i>
<i>LIQUID</i>	Used Oil	7
<i>P</i>	Bauxite	16
	Red mud & Clay	17
	Refractories	16
<i>O</i>	Alumina	15
	Noval	9
<i>W</i>	AlF ₃	7
	Fluorspar (CaF ₂)	7
<i>D</i>	Pitch	12
	Green Coke	8
<i>E</i>	Calcined Coke	8
	Metallurgical Coke	6
	Anode Buts	6
<i>R</i>	Bath Electrolyte	12
	Cryolite	10
	Cast Iron	7
<i>METAL</i>	Aluminum Alloys	24

Of the many materials analyzed by XRF, a few very characteristic for the aluminum industry will be discussed in more detail and impact of the analytical information on a specific industrial process will be presented.