

Laboratory **Quality Control & Research Laboratory, Rare Earths Division, IREL (India) Limited, Udyogamandal, Kochi, Kerala**

Accreditation Standard **ISO/IEC 17025: 2005**

Certificate Number **TC-6900**

Page 1 of 4

Validity **14.06.2019 to 06.02.2020**

Last Amended on --

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
-----	----------------------------	-------------------------	-------------------------------------------------------------	----------------------------------------

**CHEMICAL TESTING**

<b>1.</b>	<b>INDUSTRIAL &amp; FINE CHEMICALS</b>			
<b>1.</b>	<b>Rare Earths Compounds</b>			
<b>a.</b>	<b>Lanthanum Carbonate</b>	Total Rare Earth Oxide (TREO)	SOP No. IRE/RED/LMS/SOP/01 (Gravimetry) Issue No. 01, Issue date: 01-10-2015	55 % to 70 %
		Lanthanum as La <sub>2</sub> O <sub>3</sub> on TREO basis (By difference)	SOP No. IRE/RED/LMS/SOP/04 Issue No. 01, Issue date: 01-10-2015	99.5 % to 99.99 %
		Cerium as CeO <sub>2</sub> on TREO basis	(ICP AES)	0.01 % to 0.25 %
		Praseodymium as Pr <sub>6</sub> O <sub>11</sub> on TREO basis		0.004 % to 0.08 %
		Neodymium as Nd <sub>2</sub> O <sub>3</sub> on TREO basis		0.001 % to 0.05 %
		Lead as PbO on TREO basis	SOP No. IRE/RED/LMS/SOP/03 Issue No. 01, Issue date: 01-10-2015	0.5 mg/kg to 50 mg/kg
		Iron as Fe <sub>2</sub> O <sub>3</sub> on TREO basis	(AAS)	15 mg/kg to 400 mg/kg
		Sodium as Na <sub>2</sub> O on TREO basis		15 mg/kg to 400 mg/kg
		Calcium as CaO on TREO basis		50 mg/kg to 1700 mg/kg
		Magnesium as MgO on TREO basis		2 mg/kg to 50 mg/kg
<b>2.</b>	<b>Cerium Carbonate</b>	Total Rare Earth Oxide (TREO)	SOP No. IRE/RED/LMS/SOP/01 Issue No. 01, Issue date: 01-10-2015 (Gravimetry)	50 % to 66 %

Laboratory **Quality Control & Research Laboratory, Rare Earths Division, IREL (India) Limited, Udyogamandal, Kochi, Kerala**

Accreditation Standard **ISO/IEC 17025: 2005**

Certificate Number **TC-6900**

Page 2 of 4

Validity **14.06.2019 to 06.02.2020**

Last Amended on --

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		Cerium as CeO <sub>2</sub> on TREO basis (By Difference)	SOP No. IRE/RED/LMS/SOP/04 Issue No. 01, Issue date: 01-10-2015 (ICP AES)	97.0 % to 99.9 %
		Lanthanum as La <sub>2</sub> O <sub>3</sub> on TREO basis		0.04 % to 0.30 %
		Praseodymium as Pr <sub>6</sub> O <sub>11</sub> on TREO basis		0.03 % to 2.0 %
		Neodymium as Nd <sub>2</sub> O <sub>3</sub> on TREO basis		0.05 % to 0.40 %
		Lead as PbO on TREO basis	SOP No. IRE/RED/LMS/SOP/03 Issue No. 01, Issue date: 01-10-2015 (AAS)	0.5 mg/kg to 20 mg/kg
		Iron as Fe <sub>2</sub> O <sub>3</sub> on TREO basis		35 mg/kg to 800 mg/kg
		Sodium as Na <sub>2</sub> O on TREO basis		10 mg/kg to 500 mg/kg
		Calcium as CaO on TREO basis		10 mg/kg to 250 mg/kg
		Magnesium as MgO on TREO basis		1 mg/kg 40 mg/kg
3.	Neodymium - Praseodymium - Oxalate	Total Rare Earth Oxide (TREO)	SOP No. IRE/RED/LMS/SOP/01 Issue No. 01, Issue date: 01-10-2015 (Gravimetry)	35 % to 45 %
4.	Neodymium Praseodymium Oxide	Total Rare Earth Oxide (TREO)	SOP No. IRE/RED/LMS/SOP/01 Issue No. 01, Issue date: 01-10-2015 (Gravimetry)	98 % to 99.99 %
		Praseodymium Oxide as Pr <sub>6</sub> O <sub>11</sub> on TREO basis	SOP No. IRE/RED/LMS/SOP/02 Issue No. 01, Issue date: 01-10-2015 (UV-VIS Spectrophotometry)	15.0 % to 25.0 %
		Neodymium Oxide as Nd <sub>2</sub> O <sub>3</sub> on TREO basis		75 % to 85 %

Laboratory **Quality Control & Research Laboratory, Rare Earths Division, IREL (India) Limited, Udyogamandal, Kochi, Kerala**

Accreditation Standard **ISO/IEC 17025: 2005**

Certificate Number **TC-6900**

Page 3 of 4

Validity **14.06.2019 to 06.02.2020**

Last Amended on --

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		Lanthanum as La <sub>2</sub> O <sub>3</sub> on TREO basis	SOP No. IRE/RED/LMS/SOP/04 Issue no. 01, Issue date: 01-10-2015 (ICP AES)	0.01 % to 0.30 %
		Cerium as CeO <sub>2</sub> on TREO basis		0.008 % to 1.0 %
		Samarium as Sm <sub>2</sub> O <sub>3</sub> on TREO basis		0.008 % to 1.0 %
		Lead as PbO on TREO basis	SOP No. IRE/RED/LMS/SOP/03 Issue No. 01, Issue date: 01-10-2015 (AAS)	0.1 mg/kg to 25 mg/kg
		Iron as Fe <sub>2</sub> O <sub>3</sub> on TREO basis		10 mg/kg to 250 mg/kg
		Sodium as Na <sub>2</sub> O on TREO basis		5 mg/kg to 150 mg/kg
		Calcium as CaO on TREO basis		10 mg/kg to 150 mg/kg
		Magnesium as MgO on TREO basis		0.5 mg/kg to 50 mg/kg
5.	<b>Samarium Oxalate</b>	Total Rare Earth Oxide (TREO)	SOP No. IRE/RED/LMS/SOP/01 Issue No. 01, Issue date: 01-10-2015 (Gravimetry)	30 % to 45 %
6.	<b>Samarium Oxide</b>	Total Rare Earth Oxide (TREO)	SOP No. IRE/RED/LMS/SOP/01 Issue No. 01, Issue date: 01-10-2015 (Gravimetry)	98 % to 99.9 %
		Samarium as Sm <sub>2</sub> O <sub>3</sub> on TREO basis (By difference)	SOP No. IRE/RED/LMS/SOP/04 Issue No. 01, Issue date: 01-10-2015 (ICP AES)	98.5 % to 99.9 %
		Neodymium as Nd <sub>2</sub> O <sub>3</sub> on TREO basis		0.05 % to 0.35 %
		Europium as Eu <sub>2</sub> O <sub>3</sub> on TREO basis		0.05 % to 1.00 %
		Gadolinium as Gd <sub>2</sub> O <sub>3</sub> on TREO basis		0.05 % to 1.0 %

**Laboratory**                      **Quality Control & Research Laboratory, Rare Earths Division, IREL (India) Limited, Udyogamandal, Kochi, Kerala**

**Accreditation Standard**    **ISO/IEC 17025: 2005**

**Certificate Number**        **TC-6900**

**Page 4 of 4**

**Validity**                        **14.06.2019 to 06.02.2020**

**Last Amended on --**

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		Lead as PbO on TREO basis	SOP No. IRE/RED/LMS/SOP/03 Issue No. 01, Issue date: 01-10-2015 (AAS)	0.5 mg/kg to 50 mg/kg
		Iron as Fe <sub>2</sub> O <sub>3</sub> on TREO basis		20 mg/kg to 350 mg/kg
		Sodium as Na <sub>2</sub> O on TREO basis		50 mg/kg to 500 mg/kg
		Calcium as CaO on TREO basis		2 mg/kg to 150 mg/kg
		Magnesium as MgO on TREO basis		1 mg/kg to 50 mg/kg

---

**Pankaj Goyal**  
Convenor

---

**Jitendra B. Vispute**  
Program Manager