



Analytical Testing Report

Indalloy 241

Report Number: R-20180302-009

Prepared for:

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P.O. #: N/A

March 16, 2018

NSL Analytical Services, Inc.
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Cleveland, Ohio 44128
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**Tests
Requested:**

- European Directive 2015/863/EU Amending 2011 / 65 / EU Annex II (RoHS; Recasting 2001 / 95 / EC: Cadmium, Lead, Mercury, Hexavalent Chromium, Polybromobiphenyl (PBB), and Polybromodiphenylether (PBDE), (DIBP, DBP, BBP, DEHP) content.
- Antimony, Beryllium and Arsenic Content
- Total Halogen Content
- DnOP, DINP, DIDP, DnHP



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Project Definition and Scope

European Directive 2015/863/EU Amending 2011 / 65 / EU Annex II (RoHS; Recasting 2001 / 95 / EC:

Cadmium, Lead, Mercury, Hexavalent Chromium, Polybromobiphenyl (PBB), and Polybromodiphenylether (PBDE) content.

Antimony, Beryllium, Arsenic Content, Total Halogen content.

DIBP, DBP, BBP, DEHP, DnOP, DINP, DIDP, DnHP content.

Sample Identification

The sample was received on March 2nd, 2018 and is labeled as indicated below.

Sample Number	Client Label
S-180302-013	Indalloy 241

Method

With reference to IEC 62321:2008: Chromium (VI) analysis was conducted by UV-Visible Spectroscopy.

With reference to IEC 62321-6: 2015: PBB, PBDE analysis was conducted by Gas Chromatography – Mass Spectrometry (GC-MS).

With reference to IEC 62321-4: 2013: Mercury analysis was conducted by Inductively Coupled Plasma-Optical Emission Spectroscopy (ICP-OES).

With reference to IEC 62321-5: 2013: Lead, Cadmium and Chromium analysis was conducted by Inductively Coupled Plasma - Mass Spectrometry (ICP-MS).

Antimony, Beryllium and Arsenic analysis was conducted by Inductively Coupled Plasma - Mass Spectrometry (ICP-MS).

With reference to IEC62321-3-2: 2013, BS EN 14582, ASTM D 7359: Halogen analysis was conducted by Ion Chromatography and SIE.

With reference to IEC62321-8 and CPSC-CH-C1001-09.3: DIBP, DBP, BBP, DEHP, DnOP, DINP, DIDP, DnHP were analyzed by Gas Chromatography – Mass Spectrometry (GC-MS).

Results, Opinions, and Interpretations

Table 1: RoHS Results

Test Item	Results (mg/kg) Sample # S-180302-013	Detection Limit (mg/kg)	Reference Limit (mg/kg)
Lead (Pb)	140	5	1000
Cadmium	ND	5	100
Chromium	ND	5	
Hexavalent Chromium (Cr(VI))	ND ²	1	1000
Mercury (Hg)	ND	5	1000
Sum of PBBs	ND ³	300	1000
Monobromobiphenyl	ND ³	100	-
Dibromobiphenyl	ND ³	100	-
Tribromobiphenyl	ND ³	10	-
Tetrabromobiphenyl	ND ³	10	-
Pentabromobiphenyl	ND ³	10	-
Hexabromobiphenyl	ND ³	10	-
Heptabromobiphenyl	ND ³	10	-
Octabromobiphenyl	ND ³	10	-
Nonabromobiphenyl	ND ³	10	-
Decabromobiphenyl	ND ³	10	-
Sum of PBDEs	ND ³	300	1000
Monobromodiphenyl ether	ND ³	100	-
Dibromodiphenyl ether	ND ³	10	-
Tribromodiphenyl ether	ND ³	10	-
Tetrabromodiphenyl ether	ND ³	10	-
Pentabromodiphenyl ether	ND ³	10	-
Hexabromodiphenyl ether	ND ³	10	-
Heptabromodiphenyl ether	ND ³	10	-
Octabromodiphenyl ether	ND ³	10	-
Nonabromodiphenyl ether	ND ³	50	-
Decabromodiphenyl ether	ND ³	100	-

Note: ND = Not Detected

Note: mg/kg = ppm

Note: ND² = Total Chromium analysis by ICP-MS was not detected in the submitted samples. Therefore, Hexavalent Chromium determination by UV-Visible spectroscopy was not performed.

Note: ND³ = Total Bromine by Ion Chromatography was determined to be < 250 ppm, therefore PBB and PBDE analysis by Gas Chromatography – Mass Spectrometry was not performed.

Table 2: Antimony, Beryllium and Arsenic Content

Test Item	Results (mg/kg)	Detection Limit (mg/kg)
	Sample # S-180302-013	
Antimony (Sb)	110	5
Beryllium (Be)	ND	5
Arsenic (As)	ND	5

Table 3: Halogen Content

Test Item	Results (mg/kg)	Detection Limit (mg/kg)
	Sample # S-180302-013	
Chlorine (Cl)	ND	10
Bromine (Br)	ND	10
Fluorine (F)	ND	10
Iodine (I)	ND	10

Table 4: Phthalates Results

Test Item	Results (mg/kg)	Detection Limit (mg/kg)	Reference Limit (mg/kg)
	Sample # S-180302-013		
DIBP	ND	100	
DBP	ND	100	1000
BBP	ND	100	1000
DEHP	ND	200	1000
DnOP	ND	100	1000
DINP	ND	500	1000
DIDP	ND	500	1000
DnHP	ND	100	

Note: ND = Not Detected Note: mg/kg = ppm

If you have any questions regarding these results, please contact us.

Report Prepared By: Roxanne Skinner



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Process Flow – Analytical Methods for Chemical Analysis

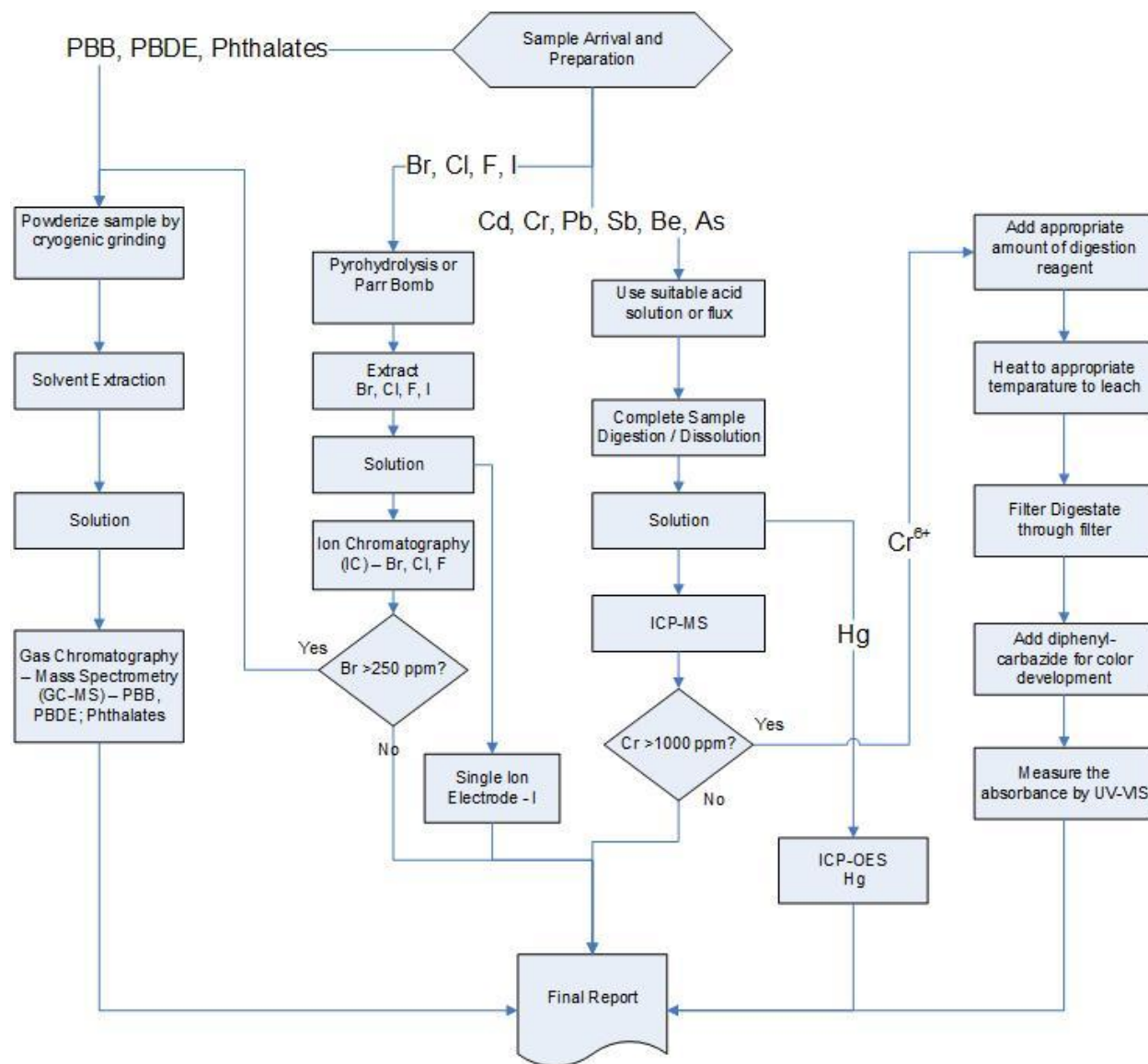


Photo: Sample # S-180302-013

Indium - SERVICE REQUEST FORM
Restricted Substance Testing for E&E Products CONTRACT REVIEW

Request Service: 3 days; Client Requesting NSL Service
 Rush Service: 2 day; 3 day 16/18 16/22

Company Name: INDIUM CORPORATION OF AMERICA
 Invoice: Address: 1676 Lincoln Ave. Report: Address: Same as billing address
 P. O. Box 269
 Utica, New York 13503
 Contact Name: Quan Sheng
 Telephone: 315-853-4900 ext. 7663
 Email: qsheng@indium.com X Ready for testing

Sample Information
 Sample Description: Indalloy 241 PO #: SP19543 Location: BPD
 Color: Yellow Sample/Style No: Yellow
 Special Instructions: Powder Composition: Sn95.5/Ag3.8/Cu0.7 Contain Br: No
 Photo of material not the jar.

Re-test Sample: If yes, provide previous report number:

NSL Service(s) Required: Please check appropriate line(s) below:
 (Analyze the submitted sample(s) per NSL Quote #108243 Revision 2)

☒ **RoHS: Full Package IEC 62321** ☒ **Phthalates: DEHP, DBP, DINP, DIDP, DNOP, BBP, DIBP, DnHP**
☐ Cadmium (Cd) ☐ HBCD
☐ Lead (Pb) ☐ High Concentration ☐ XRF Testing (please list substances)
☐ Low Concentration ☐ PFOS/PFOA
☐ Mercury (Hg) ☐ Packaging Test: ☐ TPCH (packaging): Pb, Cd, Hg, Cr VI
☐ PBBs and PBDEs ☐ Halogens:
☒ Chromium VI (Cr VI) ☒ Chlorine (Cl) ☒ Bromine (Br)
☒ Antimony ☒ Beryllium ☒ Arsenic ☒ Iodine (I) ☒ Fluorine (F)

☐ Other tests (please specify Analyte/Method):

☒ Photos Required ☒ Flow Chart ☒ Other Reporting Instruction: No result Conclusion on Report
 Cover Page

NSL Customer Service Representative: NSL Sales Contact:
 NSL Analytical Services Inc. ☐ Return Sample Immediately; If return please
 4450 Cranwood Parkway provide shipping account number.
 Cleveland, OH 44128 ☒ Destroy/Dispose Sample after 90 days
 Phone: 1-216-438-5200
 Fax: 1-216-438-5050

Client Confirmation: We confirm that the above information is complete and understand that the
 performances of the services described are governed by NSL General Conditions of Service.
 Authorized Signature: Quan Sheng Date: 3/16/2018

#241
95.5Sn/3.8Ag
0.7Cu Indalloy 241
241BPD 236