



NM Laboratory Sdn Bhd

78 & 80, Lorong Perda Selatan 1, Bandar Perda, 14000 Bukit Mertajam, PENANG, MALAYSIA.

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TEST REPORT

To : MIROAD RUBBER INDUSTRIES SDN. BHD.

Lot 6224, Batu 17 1/2,
Jalan Air Hitam,
81400 Senai, Johor,
Malaysia.

Report No. : IP1602-0415-3

Page No : 1 of 14

Date of Issue : 14/03/2016

Attn: Ms. Xiao Qian

The following sample(s) was(were) identified by the customer as :

EPDM GRANULES

SIZE: 1-4MM

COLOR: RED (01)

Date of Sample Received : 25/02/2016

Date of Testing : 25/02/2016 to 14/03/2016

Objective :

1. Determination of Polybrominated Biphenyls (PBBs) and Polybrominated Diphenyl Ethers (PBDEs) in accordance with limits as set by RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU.
2. Determination of Phthalate in accordance to Annex XVII of REACH Regulation (EC) No. 1907/2006 (previously restricted under Directive 2005/84/EC) for above sample.
3. Determination of Polycyclic Aromatic Hydrocarbons in accordance to Specification German Commission for the Product Safety Act AfPS GS 2014:01 PAK, 2014.
4. Determination of Lead in accordance with EU Directive 2011/65/EU (RoHS).
5. To determine volatile Organic Compounds (VOCs) in sample received via equilibrium headspaces analysis at 100°C for 15 minutes by GC-MS (Based on the MS Library of NIST 2.0f version 2008).

Remark : Sampled and submitted by MIROAD RUBBER INDUSTRIES SDN. BHD.

Test Performed by : Nurul Fitriyah

**Signed for and on behalf of
NM LABORATORY SDN. BHD.**

Yeap Cheo Mooi, M.Sc., MMIC
Consulting Chemist
IKM No. M/1913/4300/2002



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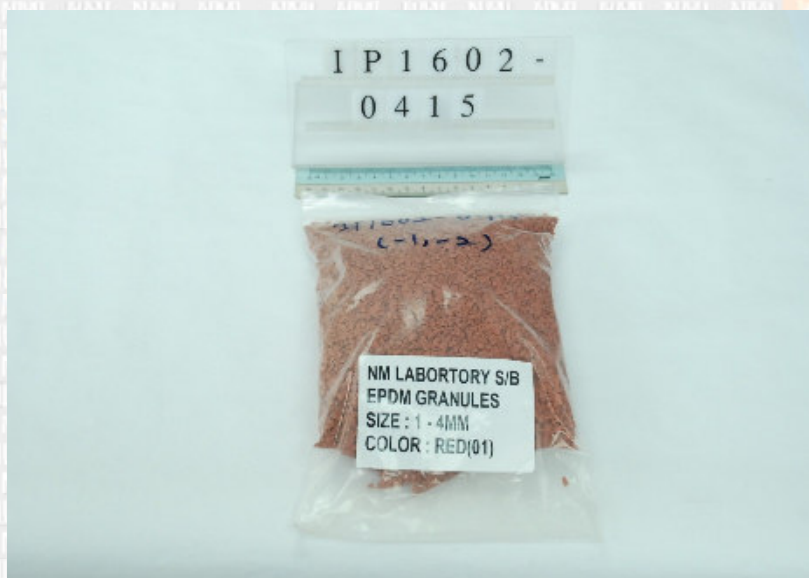
Date of Issue : 14/03/2016

Page No. : 2 of 14

Conclusion :

Test Required	Compliance
(EU) 2015/863 amending Annex II to Directive 2011/65/EU (PBB and PBDEs)	Comply
Annex XVII of REACH Regulation (EC) No. 1907/2006 (Plasticizers) (DEHP, BBP, DBP and DINP)	Not exceeded the permissible maximum concentration
DIDP, DNOP	-
Sum of 18 full PAHs	Not exceeded the maximum limit for all categories
EU Directive 2011/65/EU (RoHS) (Pb)	Comply
VOC	-

Sample Photograph(s):



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Date of Issue : 14/03/2016

Page No. : 3 of 14

Standard Method / Equipment / Technique Description:

Method Ref.No.	Standard Method	Method Description/Title
M-1	IEC 62321 Annex A GC-MS	Determination of PBB and PBDE in polymers by GC-MS Gas Chromatography-Mass Spectrometry
M-2	USEPA Method 3540C GC-MS	Soxhlet extraction Gas Chromatography-Mass Spectrometer
M-3	AfPS GS 2014:01 GC-MS	German Commission of Product Safety Gas Chromatography-Mass Spectrometry
M-4	IEC 62321,Ed.1;Sec.8 ICP-AES	Determination of lead and cadmium in polymers by ICP-OES, ICP-MS and AAS Inductively Coupled Plasma-Atomic Emission Spectrometry
M-5	GC-MS	Head Space Gas Chromatography-Mass Spectrometry

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**Customer** : MIROAD RUBBER INDUSTRIES SDN. BHD.**Report No.** : IP1602-0415-3**Date of Issue** : 14/03/2016**Page No.** : 4 of 14**Test Results(s) : FIRE RETARDANT**

Parameter	Result	Unit	Method Ref. No	MDL; mg/kg	ROHS Limit; mg/kg
Monobromobiphenyl	ND(<5)	mg/kg	M-1	5	-
Dibromobiphenyl	ND(<5)	mg/kg	M-1	5	-
Tribromobiphenyl	ND(<5)	mg/kg	M-1	5	-
Tetrabromobiphenyl	ND(<5)	mg/kg	M-1	5	-
Pentabromobiphenyl	ND(<5)	mg/kg	M-1	5	-
Hexabromobiphenyl	ND(<5)	mg/kg	M-1	5	-
Heptabromobiphenyl	ND(<5)	mg/kg	M-1	5	-
Octabromobiphenyl	ND(<5)	mg/kg	M-1	5	-
Nonabromobiphenyl	ND(<5)	mg/kg	M-1	5	-
Decabromobiphenyl	ND(<5)	mg/kg	M-1	5	-
Sum of PBBs	-	-	-	-	1000
Monobromodiphenyl ether	ND(<5)	mg/kg	M-1	5	-
Dibromodiphenyl ether	ND(<5)	mg/kg	M-1	5	-
Tribromodiphenyl ether	ND(<5)	mg/kg	M-1	5	-
Tetrabromodiphenyl ether	ND(<5)	mg/kg	M-1	5	-
Pentabromodiphenyl ether	ND(<5)	mg/kg	M-1	5	-
Hexabromodiphenyl ether	ND(<5)	mg/kg	M-1	5	-
Heptabromodiphenyl ether	ND(<5)	mg/kg	M-1	5	-
Octabromodiphenyl ether	ND(<5)	mg/kg	M-1	5	-
Nonabromodiphenyl ether	ND(<5)	mg/kg	M-1	5	-
Decabromodiphenyl ether	ND(<5)	mg/kg	M-1	5	-
Sum of PBDEs	-	-	-	-	1000

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Date of Issue : 14/03/2016

Page No. : 5 of 14

Test Results(s) : PHTHALATES

Parameter	CAS Number	Result	Unit	Method Ref. No
Bis (2-ethylhexyl) Phthalate (as DEHP)	117-81-7	ND(<0.01)	%	M-2
Benzyl Butyl Phthalate (as BBP)	85-68-7	ND(<0.01)	%	M-2
Dibutyl Phthalate (as DBP)	84-74-2	ND(<0.01)	%	M-2
Diisononyl Phthalate (as DINP)	28553-12-0	ND(<0.01)	%	M-2
Diisodecyl Phthalate (as DIDP)	26761-40-0	ND(<0.01)	%	M-2
Di-n-octyl Phthalate (as DNOP)	117-84-0	ND(<0.01)	%	M-2
Total (DEHP + BBP + DBP + DINP + DIDP + DNOP)	-	N/A	%	-

Note(s) : % = Percentage by weight

Permissible maximum concentration values as stipulated in Annex XVII of REACH Regulation (EC) No. 1907/2006 (Plasticizers)- (previously restricted under Directive 2005/84/EC)

Phthalate substances	Permissible maximum concentration
Bis (2-ethylhexyl) Phthalate (as DEHP)	shall not be used as substances or as constituents of preparations, at concentrations of greater than 0.1 % by mass of the plasticized material, in toys and childcare articles.
Benzyl Butyl Phthalate (as BBP)	
Dibutyl Phthalate (as DBP)	
Diisonocyl Phthalate (as DINP)	shall not be used as substances or as constituents of preparations, at concentrations of greater than 0.1 % by mass of the plasticized material, in toys and childcare articles which can be placed in the mouth by children.

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Consulting Chemist

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**Customer** : MIROAD RUBBER INDUSTRIES SDN. BHD.**Report No.** : IP1602-0415-3**Date of Issue** : 14/03/2016**Page No.** : 6 of 14**Test Results(s)** : POLYCYCLIC AROMATIC HYDROCARBONS (PAHs)

Parameter	Result	Unit	Method Ref. No	MDL; mg/kg
Acenaphthene	ND(<0.2)	mg/kg	M-3	0.2
Acenaphthylene	ND(<0.2)	mg/kg	M-3	0.2
Anthracene	ND(<0.2)	mg/kg	M-3	0.2
Benzo(a)anthracene	ND(<0.2)	mg/kg	M-3	0.2
Benzo(a)pyrene	ND(<0.2)	mg/kg	M-3	0.2
Benzo(b)fluoranthene	ND(<0.2)	mg/kg	M-3	0.2
Benzo(e)pyrene	ND(<0.2)	mg/kg	M-3	0.2
Benzo(g,h,i)perylene	ND(<0.2)	mg/kg	M-3	0.2
Benzo(j)fluoranthene	ND(<0.2)	mg/kg	M-3	0.2
Benzo(k)fluoranthene	ND(<0.2)	mg/kg	M-3	0.2
Chrysene	ND(<0.2)	mg/kg	M-3	0.2
Dibenzo(a,h)anthracene	ND(<0.2)	mg/kg	M-3	0.2
Fluoranthene	ND(<0.2)	mg/kg	M-3	0.2
Fluorene	ND(<0.2)	mg/kg	M-3	0.2
Indeno(1,2,3-cd)pyrene	ND(<0.2)	mg/kg	M-3	0.2
Naphthalene	ND(<0.2)	mg/kg	M-3	0.2
Phenanthrene	ND(<0.2)	mg/kg	M-3	0.2
Pyrene	ND(<0.2)	mg/kg	M-3	0.2
Sum of PAH	-	-	-	-

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Report No. : IP1602-0415-3

Page No. : 7 of 14

Test Results(s) : LEAD

Parameter	Result	Unit	Method Ref. No	MDL; mg/kg	ROHS Limit; mg/kg
Lead (as Pb)	ND(<1)	mg/kg	M-4	1	1000

Note(s) : The test portion was ashed before the pre-conditioning method for Cadmium & Lead test as mentioned above.

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Report No. : IP1602-0415-3

Date of Issue : 14/03/2016

Page No. : 8 of 14

Maximum PAH levels to be complied with the materials in relevant contact/grip and operating surfaces that are to be categorized based on the results of the assessment.

Parameter	Category 1	Category 2		Category 3	
	Materials intended to be put in the mouth, or materials of toys with intended long-term skin contact (longer than 30 s)	Materials not covered by category 1, with foreseeable skin contact for longer than 30 seconds (long term skin contact) or repeated short-term skin contact ¹⁾		Materials not covered by category 1 or 2 with foreseeable skin contact up to 30 seconds (short term skin contact)	
		Toys in the scope 2009/48/EC	Other products in the scope of ProDSG	Toys in the scope of 2009/48/EC	Other products in the scope of ProDSG
Benzo[a]pyrene (mg/kg)	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo(e)pyrene (mg/kg)	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo(a)anthracene (mg/kg)	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo(b)fluoranthene (mg/kg)	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo(j)fluoranthene (mg/kg)	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo(k)fluoranthene (mg/kg)	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Chrysene (mg/kg)	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Dibenzo(a,h)anthracene (mg/kg)	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo(g,h,i)perylene (mg/kg)	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Indeno(1,2,3-cd)pyrene (mg/kg)	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Acenaphthylene (mg/kg) Acenaphthene (mg/kg) Fluorene (mg/kg) Phenanthrene (mg/kg) Pyrene (mg/kg) Anthracene (mg/kg) Fluoranthene (mg/kg)	< 1 sum	< 5 sum	< 10 sum	< 20 sum	< 50 sum
Naphthalene (mg/kg)	< 1	< 2		< 10	
Sum of 18 PAH ³ (mg/kg)	< 1	< 5	< 10	< 20	< 50

* wording "short-term repetitive skin contact" from supplement to REACH annex XVII no.50(REGULATION (EU) No 1272/2013)

Signed for and on behalf of
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**Customer** : MIROAD RUBBER INDUSTRIES SDN. BHD.**Report No.** : IP1602-0415-3**Date of Issue** : 14/03/2016**Page No.** : 9 of 14**Test Procedure:**

Approximately 5g of samples were weight into 22mL sample vial and capped it.

The prepared sample vials were ready for headspace method.

Equipment setting**GC Column - ELITE-5MS**

Length : 30m

Diameter : 0.25mm

Film thickness : 0.25µm

Headspace Condition

Oven : 100°C

Needle : 105°C

Transfer : 110°C

Inject Volume : 0.24 mL

GC Condition

Oven Temperature Programmed

Initial Temperature : 40°C for 3.0 minute

Ramp 1 : 5°C/minute to 120°C, hold 0.0 minute.

Split Ratio (n:1) : 250:1

Total GC Run Time : 20.00 minutes

MS condition

Source Temperature : 200°C

Transfer Line Temperature : 200°C

Scan Range of MS : 30-500 m/z

MS Library

NIST MS Search Version 2.0f (2008)

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**Customer** : MIROAD RUBBER INDUSTRIES SDN. BHD.**Report No.** : IP1602-0415-3**Date of Issue** : 14/03/2016**Page No.** : 10 of 14**Test Result:** VOLATILE ORGANIC COMPOUNDS (VOCs)**Composition of Each Compound detected in EPDM Granules at 100°C (% by area)**

RT; minute	Area	% by area
1.88	444189536	99.81
2.54	277320	0.06
2.77	286733	0.06
4.75	286789	0.06
TOTAL	445040377	100

Peak identification (Top 3 Hits) in EPDM Granules at 100°C

RT (min)	% by area	Hit	Compound Name	Match	Probability; %
1.88	99.81	1	tert-Butyl Alcohol	898	59.6
		2	Propane, 1-ethoxy-2-methyl-	822	7.51
		3	3-Hydroxy-3-methyl-2-butanone	813	5.45
2.54	0.06	1	1-Pentene, 2-methyl-	722	25.1
		2	Cyclobutane, ethyl-	720	23.2
		3	Cyclopropane, propyl-	714	18.2
2.77	0.06	1	Cyclopropane, propyl-	724	19.6
		2	Cyclohexane	717	15.0
		3	Cyclobutane, ethyl-	716	14.4
4.75	0.06	1	1,3,5-Cycloheptatriene	820	37.2
		2	Toluene	800	16.9
		3	Bicyclo[3.2.0]hepta-2,6-diene	785	10.3

Signed for and on behalf of
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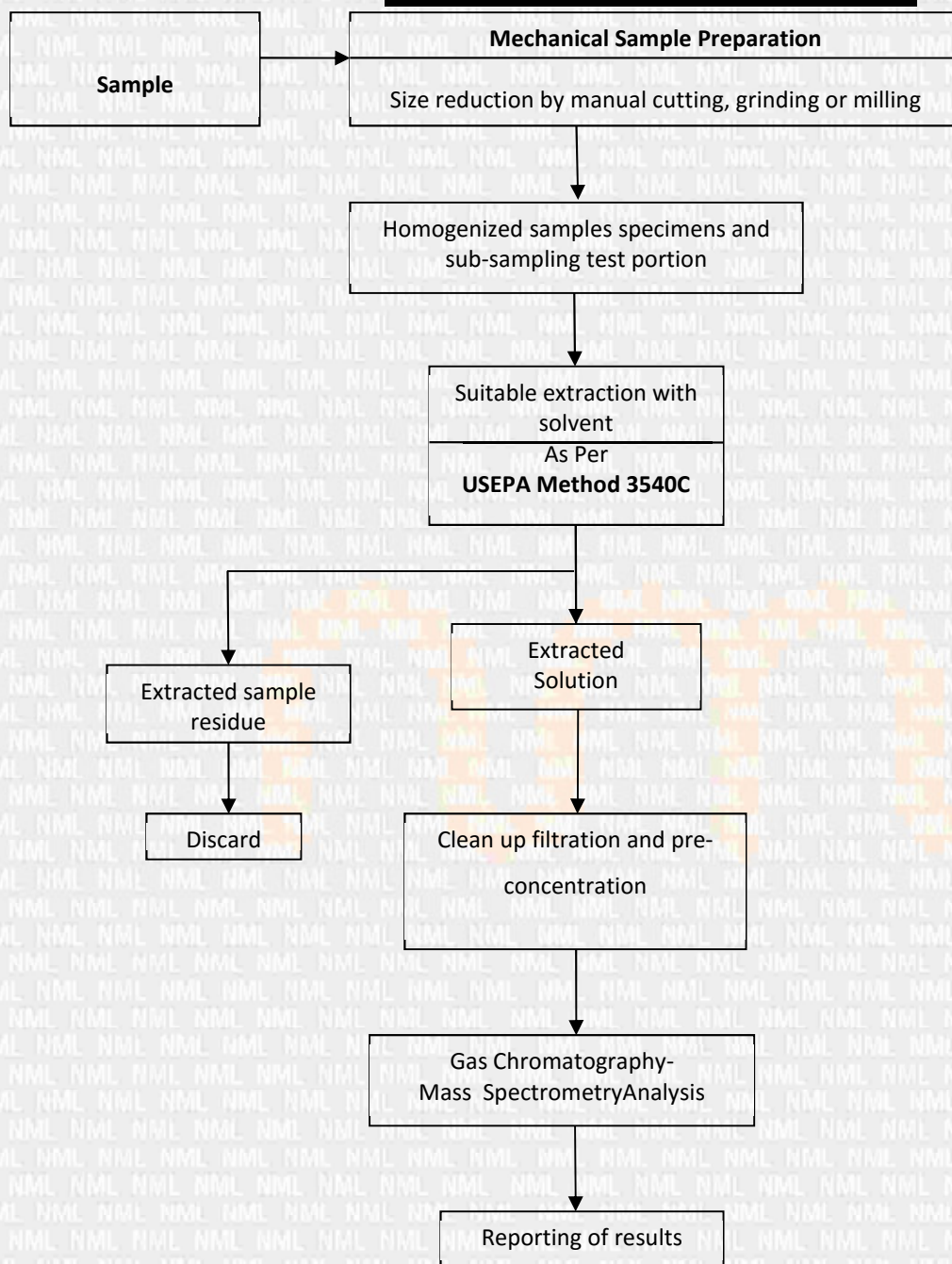
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Report No. : IP1602-0415-3

Page No. : 11 of 14

Flow chart for USEPA Method 3540C



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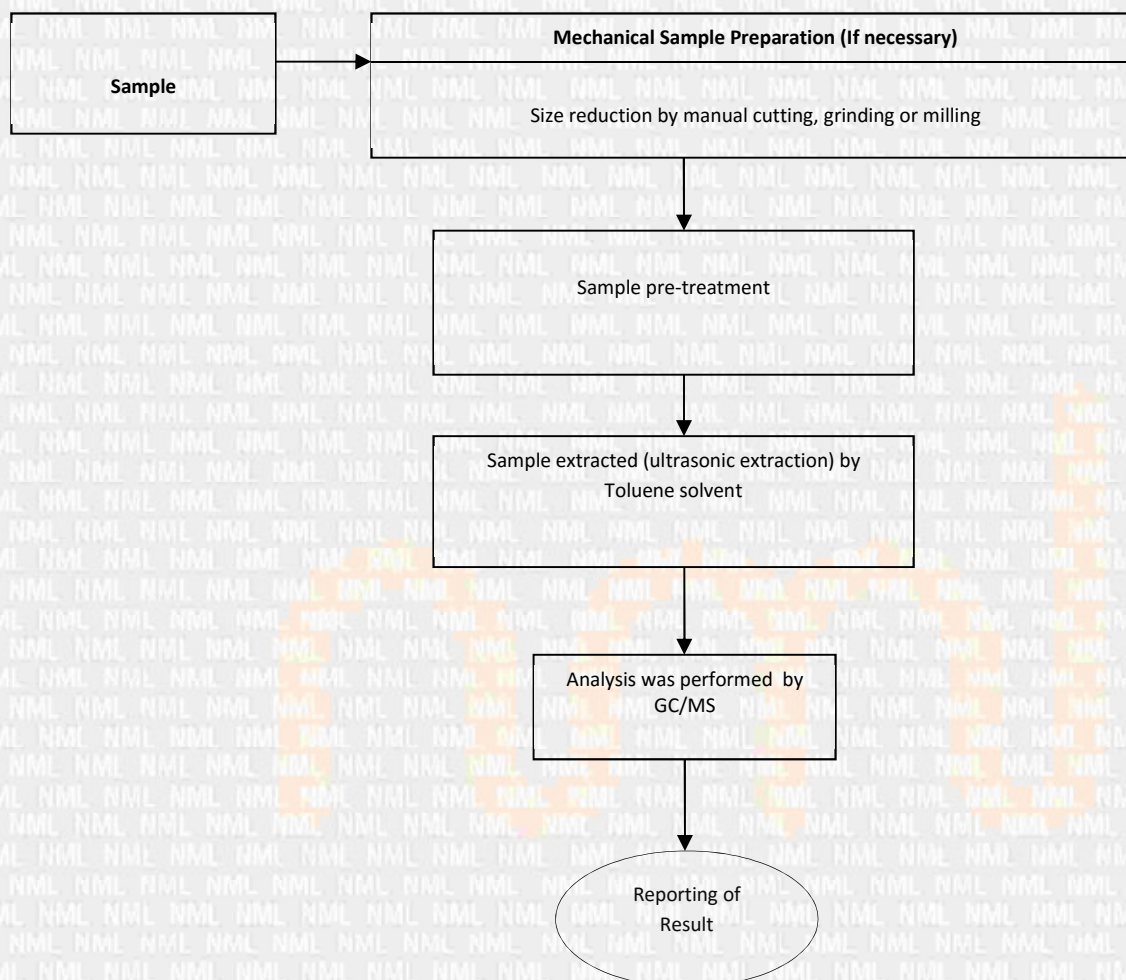
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Report No. : IP1602-0415-3

Page No. : 12 of 14

Flow chart for AfPS GS 2014:01 PAK



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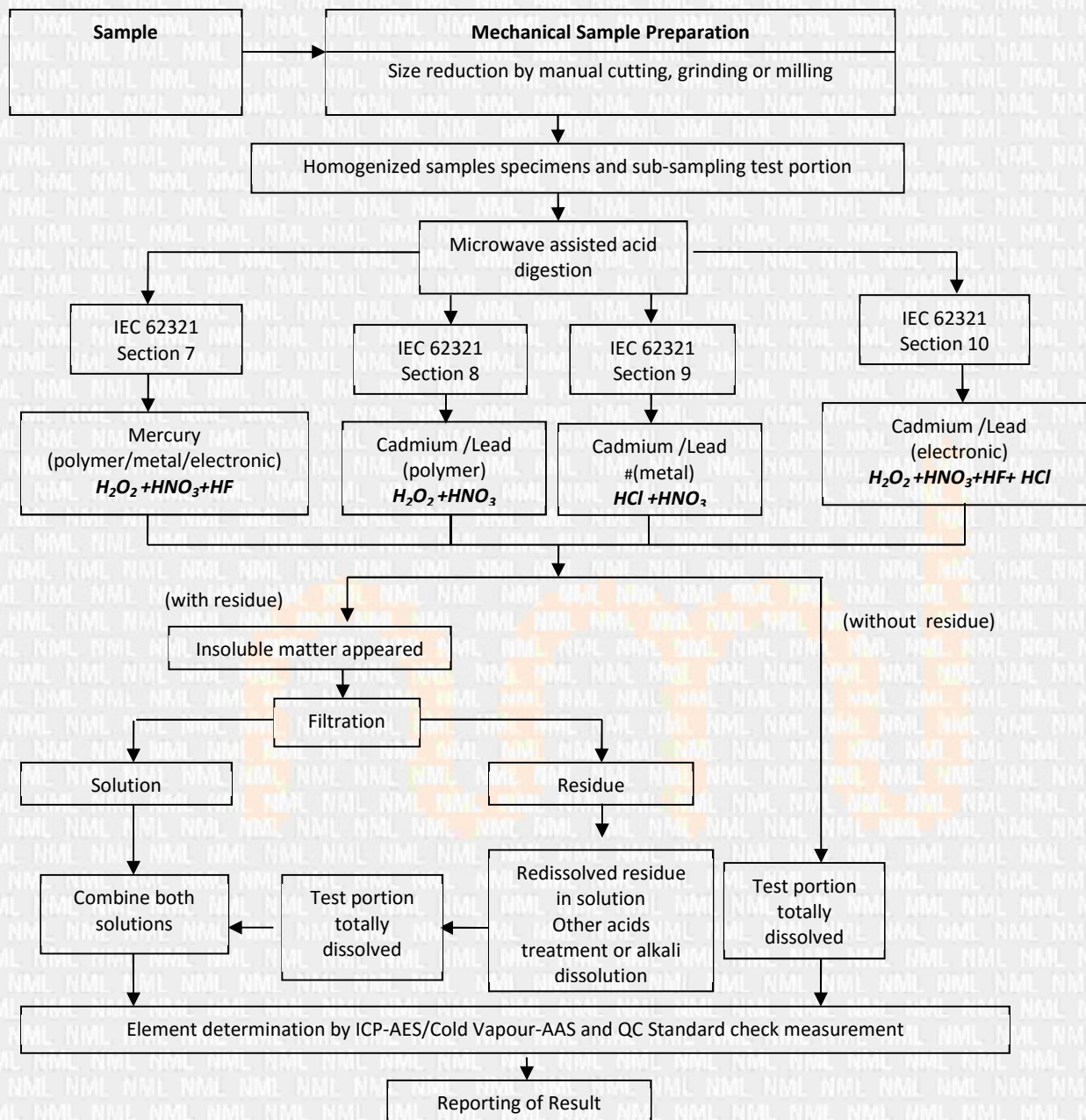
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Report No. : IP1602-0415-3

Date of Issue : 14/03/2016

Page No. : 13 of 14

Flow chart for method IEC 62321



#	Type of Sample	Acid Mixture
	Common method of sample digestion	2HCL + HNO ₃
	Sample contains Sn	3 HCL + 1 HNO ₃
	Sample contains Zr, Hf, Ti, Ta, Nb or W	1 HNO ₃ + 3HF

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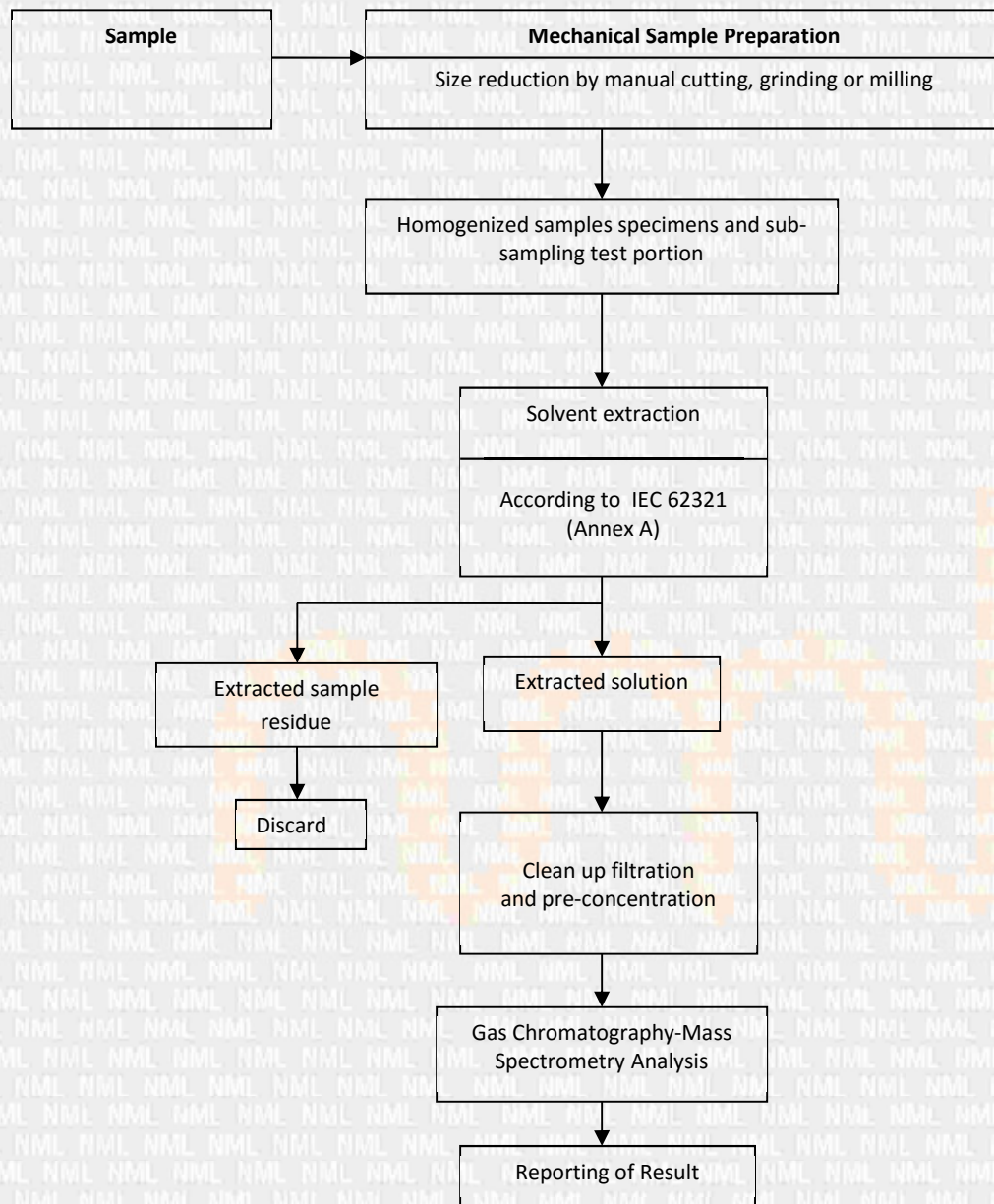
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Report No. : IP1602-0415-3

Page No. : 14 of 14

Flow chart for method IEC 62321



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- End of Report -



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2. This report / certificate is not a certificate of quality. The result(s) of testing / analysis performed by NML is applicable to the particular sample(s) received at the time of testing / analysis. They do not indicate or imply that NML approves, recommends or endorses the manufacturers or suppliers or users of products and it shall not be used to imply product certification.
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6. The integrity of the sample(s) and results(s) are dependent on the quality of sampling. The result(s) apply only to the actual sample(s) tested. Some methods may be modified to accommodate transportation and treatment. Sample(s), if drawn for analysis, will not be retained by the NML for more than one month, except with special instruction from customer.
7. NML shall be held harmless from any liability arising out of the use of such test / analysis result(s).
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