Laboratory	**Economic Explosives Limited, Village Sawanga, P. O. Shiva, Tahsil & District – Nagpur, Maharashtra**
Accreditation Standard	**ISO/IEC 17025: 2005**
Certificate Number	**TC-7062** ***(In lieu of T-3826)*** **Page 1 of 25**
Validity	**01.03.2018 to 29.02.2020** **Last Amended on 22.03.2018**

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

CHEMICALTESTING

I.	**EXPLOSIVES & PYROTECHNICS**			
A.	**Explosive chemicals & Allied chemicals**			
1.	**Red Lead**	Purity (as Pb_3O_4)	IS 8063, APPENDIX (A-6)	50% to 100%
		Sieve Size passing through 350 BSS	IS 8063, APPENDIX (A-4)	50% to 100%
		Volatile Matter	IS 8063, APPENDIX (A-2)	0 to 10%
		Bulk Density	IS 7886, APPENDIX (A-6)	0 to 10 g/cc
		Average Particle Size	IS 8063, APPENDIX (A-5)	0 to 10 µm
2.	**Lead Chromate**	Moisture (Volatile matter)	IS 7602, APPENDIX (A-2)	0 to 10%
		Purity (Chromate as Lead chromate)	IS 7602, APPENDIX (A-7)	50% to100%
		Chlorides (as Cl)	IS 7602, APPENDIX (A-4)	0 to 10%
		Matter Soluble in water	IS 7602, APPENDIX (A-3)	0 to 25%
		pH of aq. Solution	IS 7602, APPENDIX (A-11)	0 to 14
		Average Particle Size	IS 7602, APPENDIX (A-10)	0 to 10 µm
		Bulk Density	IS 7886, APPENDIX (A-6)	0 to 10 g/cc
		Sieve size passing through 350 BSS	IS 7602, APPENDIX (A-9)	50% to 100%
3.	**Antimony Trisulphide (ATS)**	Volatile Matter	IS 5731, APPENDIX (A-2)	0 to 10%
		Bulk Density	IS 7886, APPENDIX (A-6)	0 to 10 g/cc
		Total Combined Antimony (as Sb)	IS 5731, APPENDIX (A-5)	50% to 100%
		Sieve size passing through 350 BSS	IS 7886, APPENDIX (A-7)	50% to 100%
		Antimony oxide (as Sb_2O_3)	IS 5731, APPENDIX (A-6)	0 to 25%
4.	**Aluminium Powder**	Volatile Matter	IS 438, APPENDIX (C)	0 to 10%
		Apparent Density	IS 438, APPENDIX (L)	0 to 10 g/cc

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		Purity (as Al)	VOGEL`S QUANTITATIVE CHEMICAL ANALYSIS, PAGE NO. 446 & 447	50% to 100%
		Sieve size passing through 100 BSS	IS 7886, APPENDIX (A-7)	50% to 100%
5.	**Cuprous Oxide**	Moisture	JSG 0112, METHOD NO. 1(a)	0 to 10%
		Total copper (as Cu)	IS 1682, APPENDIX (A)	50% to 100%
		Total soluble alkali (as Na_2CO_3)	IS 1682, APPENDIX (B)	0 to 25%
		Total soluble chloride (as NaCl)	IS 1682, APPENDIX (C)	0 to 10%
6.	**Zirconium**	Volatile matter	IS 12437, APPENDIX (A-3)	0 to 10%
		Apparent Density	IS 12437, APPENDEX (A-6)	0 to 10 g/cc
		Purity (as Zr)	IS 12437, APPENDIX (A-2)	50% to 100%
7.	**Potassium Perchlorate**	Moisture content	IS 13524, APPENDIX (A-3)	0 to 10%
		Matter insoluble in water	IS 13524, APPENDIX (A-4)	0 to 25%
		Chlorides (as Cl)	IS 13524, APPENDIX (A-5)	0 to 10%
		Sulphates (as SO_4)	IS 13524, APPENDIX (A-6)	0 to 10%
		pH of 5% aqueous extract	IS 13524, APPENDIX (A-9)	1% to 14%
		Purity (as $KClO_4$)	IS 13524, APPENDIX (A-2)	50% to 100%
		Sieve size retained on 125 micron IS sieve (i.e. 120 BSS),	IS 13524, APPENDIX (A-10)	0 to 50%
		Sieve size retained on 90 micron IS sieve (i.e. 170 BSS)	IS 13524, APPENDIX (A-10)	0 to 50%
8.	**Lead Ferrocyanide (LFCN)**	Volatile matter	IND/ME/769, APPENDIX (A)	0 to 10%
		Matter soluble in water	IND/ME/769, APPENDIX (B)	0 to 10%
		Lead content	IND/ME/769, APPENDIX (C)	50% to 100%
		Iron content	IND/ME/769, APPENDIX (D)	0 to 50%
		Purity (as Lead Ferrocyanide)	IND/ME/769, APPENDIX (E)	50% to 100%
		Sieve size retained on 53 micron (ie.300 BSS)	IND/ME/769, APPENDIX (F)	50% to100%
9.	**Lead dioxide**	Volatile matter	IS 8063, APPENDIX (A-2)	0 to 10%
		Purity (as PbO_2)	IS 8063, APPENDIX (A-6)	70% to 100%

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		Sieve Size retained on 325 BSS	IS 8063, APPENDIX (A-4)	0 to 50%
		Bulk Density	IS 7886, APPENDIX (A-6)	0 to 10 g/cc
		Average Particle Size	IS 8063, APPENDIX (A-5)	0 to 10 µm
		Water soluble salts	MIL-L-376C, METHOD NO. 4.2.4.2	0 to 10%
		Alkalinity (as Na_2CO_3)	MIL-L-376C, METHOD NO. 4.2.4.4	0 to 10%
10.	**Silicon Powder**	Volatile matter	IS 7886, APPENDIX (A-2)	0 to 10%
		Bulk Density	IS 7886, APPENDIX (A-6)	0 to 10 g/cc
		Average Particle Size	IS 7886, APPENDIX (A-8)	0 to 10 µm
		pH of water extract	JSG 0112, METHOD NO. 5 (b)	0 to 14
		Matter soluble in water	JSG 0112, METHOD NO. 3	0 to 10%
		Iron compound (as Fe)	JSS 9630-01, APPENDIX (C)	0 to 10%
		Sieve size retained on 90 micron IS sieve	JSG 0112, METHOD NO. 18	0 to 50%
		Sieve size retained on 63 micron IS sieve	JSG 0112, METHOD NO. 18	0 to 50%
11.	**Potassium Nitrate**	Hygroscopicity	IS 301, APPENDIX (B-2)	0 to 25%
		Purity (as KNO_3)	IS 5194, APPENDIX (B-16)	50% to 100%
		Matter insoluble in water	IS 301, APPENDIX (B-3)	0 to 10%
		Chloride (as KCl)	IS 301, APPENDIX (B-9)	0 to 10%
		Perchlorate (as $KClO_4$)	IS 301, APPENDIX (B-11)	0 to 10%
		Sulphates (as K_2SO_4)	IS 301, APPENDIX (B-12)	0 to 10%
12.	**Sulfur**	Moisture	IS 6655, METHOD NO. 3.2	0 to 15%
		Purity (as Sulfur)	IS 6655, METHOD NO. 3.1.1	50% to 100%
		Acidity (as H_2SO_4)	IS 6655, METHOD NO. 3.4	0 to 10%
		Ash content	IS 6655, METHOD NO. 3.3	0 to 20%
13.	**Charcoal**	Moisture	IS 13522, APPENDIX (A-3)	0 to 20%
		Volatile matter	IS 1350 (Part I), METHOD NO. 7.4	1% to 30%

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		Ash content	IS 13522, APPENDIX (A-4)	0 to 25%
		Fixed carbon content	IS 13522, APPENDIX (A-7)	1% to 100%
		Bulk density	IS 13522, APPENDIX (A-8)	0 to 10 g/cc
14.	**Barium nitrate**	Moisture	IS 4396, APPENDIX (A-3)	0 to 10%
		Purity as Barium nitrate	IS 4396, APPENDIX (A-15)	50% to 100%
		Total matter insoluble in water	IS 4396, APPENDIX (A-4)	0 to 20%
		Organic matter insoluble in water	IS 4396, APPENDIX (A-4)	0 to 10%
		Hygroscopicity	IS 4396, APPENDIX (A-5)	0 to 20%
		Grit content	IS 4396, APPENDIX (A-6)	0 to 10%
		pH of 5% solution	IS 4396, APPENDIX (A-7)	0 to 14
		Chloride (as NaCl)	IS 4396, APPENDIX (A-8)	0 to 10%
		Chlorate	IS 4396, APPENDIX (A-9)	Qualitative
		Nitrite (as KNO_2)	IS 4396, APPENDIX (A-10)	0 to 10%
15.	**Barium chromate**	Volatile matter	IS 7886, APPENDIX (A-2)	0 to 10%
		Matter soluble in water	IS 7886, APPENDIX (A-3)	0 to 10%
		Water soluble chloride (as Cl)	IS 7886, APPENDIX (A-4)	0 to 10%
		Moisture re-absorption	IS 7886, APPENDIX (A-5)	0 to 10%
		Bulk density	IS 7886, APPENDIX (A-6)	0 to 10 g/cc
		Average particle size	IS 7886, APPENDIX (A-8)	0 to 10 µm
		Sieve size retained on 45 micron	IS 7886, APPENDIX (A-7)	0 to 50%
		Purity (as BaO)	IS 7886, APPENDIX (A-9)	50% to 100%
		Purity (as CrO_3)	IS 7886, APPENDIX (A-9)	0 to 50%
		Purity (as $BaCrO_4$)	IS 7886, APPENDIX (A-9)	50% to 100%
		Apparent density	IS 7886, APPENDIX (A-10)	0 to 10 g/cc
16.	**Boron**	Volatile matter	DEF. STAND. 13-128, METHOD NO. A.4	0 to 10%
		Sieve size retained on 0.063 micron IS sieve	DEF. STAND. 13-128, METHOD NO. A.12	0 to 25%
17.	**Ammonium Perchlorate**	Purity	ERDL/TRIM/PROP/RM/1 APPENDIX-RM/1/I.	80% to 100%
		Chlorides (calculated as NH_4Cl)	ERDL/TRIM/PROP/RM/1 APPENDIX-RM/1/II.	0 to 0.5%

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		Chlorates (calculated as $NaClO_3$)	ERDL/TRIM/PROP/RM/1 APPENDIX-RM/1/III.	0 to 0.2%
		Bromates, (calculated as $NaBrO_3$)	ERDL/TRIM/PROP/RM/1 APPENDIX-RM/1/IV.	0 to 0.1%
		Sulphate, (calculated as $(NH_4)_2SO_4$)	ERDL/TRIM/PROP/RM/1 APPENDIX-RM/1/VI.	0 to 0.5%
		Sulphate ash	ERDL/TRIM/PROP/RM/1 APPENDIX-RM/1/V.	0 to 1.0%
		Water insoluble matter	ERDL/TRIM/PROP/RM/1 APPENDIX-RM/1/VII.	0 to 0.25%
		Surface moisture content	HEMRL/SRP/PINAKA-MK-II/TOT/2014/01, ANNEXURE-III, 3	0 to 0.4%
		Total moisture Content	ERDL/TRIM/PROP/RM/1 APPENDIX-RM/1/VIII.	0.001% to 1.0%
		pH	ERDL/TRIM/PROP/RM/1 APPENDIX-RM/1/-IX.	3% to 7%
		Sieve size -300µ+150µ(52BSS+100BSS)	ERDL/TRIM/PROP/RM/1 APPENDIX-RM/1/-X.	70% to 100%
		Sieve size- 150µ+105µ(100BSS+150BSS)	ERDL/TRIM/PROP/RM/1 APPENDIX-RM/1/-X.	0 to 25%
		Sieve size -105µ (-150BSS)	ERDL/TRIM/PROP/RM/1 APPENDIX-RM/1/-X.	0 to 5%
18.	**Aluminium powder**	Assay (Free metallic aluminium)	ERDL/TRIM/PROP/RM/2/ VOGEL ANALYSIS BOOK, APPENDIX-RM/2/III	80% to 100%
		Volatile Matter content	ERDL/TRIM/PROP/RM/2 APPENDIX-RM/2/II	0 to 0.5%
		Average particle size	ERDL/TRIM/PROP/RM/2 APPENDIX-RM/2/V	10 µm to 35 µm
		Matter soluble in Ether	ERDL/TRIM/PROP/RM/2 APPENDIX-RM/2/I	0 to 1.5%
		Apparent Density	ERDL/TRIM/PROP/RM/2 APPENDIX-RM/2/IV	0.5 g/ml to 5 g/ml

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		Iron content	HEMRL/SRP/122 mm ERR/PD/2015/01, 5.1.23	0 to 2%
19.	**Ferric oxide (Iron(iii)Oxide)**	Iron (as Fe_2O_3)	ERDL/TRIM/PROP/RM/3, APPENDIX-RM/3/III	80% to 100%
		Moisture content	ERDL/TRIM/PROP/RM/3, APPENDIX-RM/3/I	0 to 2%
		Average particle size	ERDL/TRIM/PROP/RM/3, APPENDIX-RM/3/VI	0.01 µm to 10 µm
		Calcination Loss	ERDL/TRIM/PROP/RM/3, APPENDIX-RM/3/II	0 to 4%
		Acidity (as Sulphuric acid)	ERDL/TRIM/PROP/RM/3, APPENDIX-RM/3/IV	0 to 2%
		Matter insoluble in 6N HCl	ERDL/TRIM/PROP/RM/3, APPENDIX-RM/3/V	0 to 5%
20.	**Toluene diisocyanate (TDI)**	Assay	ERDL/TRIM/PROP/RM/6, APPENDIX-RM/6/I	80% to 100%
		Specific gravity at 25 °C	ERDL/TRIM/PROP/RM/6, APPENDIX-RM/6/III	1.15% to 1.30%
		Refractive index at 25 °C	ERDL/TRIM/PROP/RM/6, APPENDIX-RM/6/IV	1.550% to 1.580%
21.	**Hydroxyl Terminated Polybutadiene (HTPB)**	Hydroxyl value	HEMRL/TRIM/PROP/RM/4, APPENDIX-RM/4[R]/I	30 mg KOH/g to 80 mg KOH/g
		Acid value	HEMRL/TRIM/PROP/RM/4, APPENDIX-RM/4[R]/II	0 to 5 mg KOH/g
		Viscosity at 30 °C	HEMRL/TRIM/PROP/RM/4, APPENDIX-RM/4[R]/IV	3000 cP to 8000 cP
		Viscosity at 60 °C	HEMRL/TRIM/PROP/RM/4, APPENDIX-RM/4[R]/IV	500 cP to 2000 cP
		Specific Gravity at 30 °C	HEMRL/TRIM/PROP/RM/4, APPENDIX-RM/4[R]/V	0.8 to 1.0
		Moisture Content	HEMRL/TRIM/PROP/RM/4, APPENDIX-RM/4[R]/VI	0 to 0.5%
		Volatile matter content	HEMRL/TRIM/PROP/RM/4, APPENDIX-RM/4[R]/III	0 to 2%

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		Appearance	HEMRL/SRP/PINAKA-MK-II/TOT/2014/01, ANNEXURE-II, 1	Qualitative (Colourless)
		Molecular weight (VPO)	HEMRL/TRIM/PROP/RM/4, APPENDIX-RM/4[R]/VII	1500 to 3500
		Intrinsic Viscosity	HEMRL/TRIM/PROP/RM/4, APPENDIX-RM/4[R]/IX	0.05 dl/g to 0.3 dl/g
22.	**Dioctyl adipate (DOA)**	Saponification number	ERDL/TRIM/PROP/RM/5, APPENDIX-RM/5/III	280 mg KOH/g to 320 mg KOH/g
		Acid value	ERDL/TRIM/PROP/RM/5, APPENDIX-RM/5/IV	0 to 1 mg KOH/g
		Specific Gravity at 20 °C	ERDL/TRIM/PROP/RM/5, APPENDIX-RM/5/I	0.8% to 1%
		Refractive Index at 20 °C	ERDL/TRIM/PROP/RM/5, APPENDIX-RM/5/V	1.43% to 1.46%
		Specific Gravity at 30 ºC	HEMRL/SRP/PINAKA-MK-II/TOT/2014/01. ANNEXURE-III, 6	0.8% to 1%
		Refractive index at 30 ºC	ERDL/TRIM/PROP/RM/5, APPENDIX-RM/5/V	1.4% to 1.5%
		Volatile Matter	HEMRL/SRP/PINAKA-MK-II/TOT/2014/01, ANNEXURE-III, 8	0 to 5%
		Viscosity at 30 ± 1 °C	ERDL/TRIM/PROP/RM/5, APPENDIX-RM/5/II	2 cP to 30 cP
23.	**Mat-O-Bond**	Hydroxyl value	ERDL/TRIM/PROP/RM/7, APPENDIX-RM/7/I	250 mg KOH/g to 450 mg KOH/g
		Acid value	ERDL/TRIM/PROP/RM/7, APPENDIX-RM/7/II	0.1 mg KOH/g to 25 mg KOH/g
		Moisture content	ERDL/TRIM/PROP/RM/7, APPENDIX-RM/7/IV	0 to 5%
		Volatile matter content	ERDL/TRIM/PROP/RM/7, APPENDIX-RM/7/III	0 to 5%
24.	**Lecithin**	Lecithin content	ERDL/TRIM/PROP/RM/8, APPENDIX-RM/8/VI	80% to 100%

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		Acid value	ERDL/TRIM/PROP/RM/8, APPENDIX-RM/8/IV	0 to 35 mg KOH/g
		Viscosity at 25 °C	ERDL/TRIM/PROP/RM/8, APPENDIX-RM/8/II	10 poise to 500 poise
		Moisture content	ERDL/TRIM/PROP/RM/8, APPENDIX-RM/8/I	0 to 5%
		Benzene insoluble matter	ERDL/TRIM/PROP/RM/8, APPENDIX-RM/8/III	0 to 3%
		Acetone insoluble matter	ERDL/TRIM/PROP/RM/8, APPENDIX-RM/8/Vi	20% to 90%
25.	**Ferric Acetylacetonate (FeAA)**	Iron (as Fe)	ERDL/TRIM/PROP/RM/9, APPENDIX-RM/9/I	10% to 50%
		Melting Point	ERDL/TRIM/PROP/RM/9, APPENDIX-RM/9/III	1651°C to 190°C
		Volatile matter	ERDL/TRIM/PROP/RM/9, APPENDIX-RM/9/II	0 to 2%
26.	**Pyrogallol**	Melting point	ERDL/TRIM/PROP/RM/10, APPENDIX-RM/10/II	120°C to 140°C
		Assay	ERDL/TRIM/PROP/RM/10, APPENDIX-RM/10/I	80% to 100%
27.	**1,4 Butanediol**	Hydroxyl value	HEMRL/AK/BST/PROP/RM 1,APPENDIX-I.	800 mg KOH/g to 1500 mg KOH/g
		Moisture Content	HEMRL/AK/BST/PROP/RM 1,APPENDIX-II	0 to 1%
		Refractive Index at 30 °C	HEMRL/AK/BST/PROP/RM 1,APPENDIX-IV	1.43% to 1.46%
		Specific Gravity at 30 °C	HEMRL/AK/BST/PROP/RM 1,APPENDIX-III	0.95% to 1.20%
28.	**HardnerEH411 /Equivalent**	Appearance	HEMRL/TRIM/PROP/IM/15	Qualitative
		Viscosity at 25 °C	HEMRL/TRIM/PROP/IM/ 15, APPENDIX-IM/15/II	10000 cP to 30000 cP
		Specific gravity at 25 °C	HEMRL/TRIM/PROP/IM/ 15, APPENDIX-IM/15/I	0.90 to 1.20

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		Amine value	HEMRL/TRIM/PROP/IM/ 15,APPENDIX-IM/15/III	250 mg KOH/g to 450 mg KOH/g
29.	**DobeckotE4 Resin/ Yuvapoxy7/ Equivalent**	Colour and Appearance	HEMRL/TRIM/PROP/IM/14	Qualitative
		Viscosity at 25 °C	HEMRL/TRIM/PROP/IM/14 ,APPENDIX-IM/14/II	10000 cP to 50000 cP
		Volatile matter content	HEMRL/TRIM/PROP/IM/14 ,APPENDIX-IM/14/IV	0 to 5%
		Epoxide Equivalent	HEMRL/TRIM/PROP/IM/14, APPENDIX-IM/14/III	300 g/eq to 500 g/eq
		Specific gravity at 25 ºC	HEMRL/TRIM/PROP/IM/14, APPENDIX-IM/14/I	1.07% to 1.25%
30.	**Diluent C / Equivalent**	Colour and Appearance	HEMRL/TRIM/PROP/IM/16	Qualitative
		Specific gravity at 25 °C	HEMRL/TRIM/PROP/IM/16, APPENDIX-IM/16/I	0.92% to 1.20%
		Epoxide Equivalent	HEMRL/TRIM/PROP/IM/16, APPENDIX-IM/16/II	400 g/eq to 800 g/eq
		Viscosity at 25 °C	HEMRL/TRIM/PROP/IM/16, APPENDIX-IM/16.IV	10 cP to 1000 cP
		Volatile matter content	HEMRL/TRIM/PROP/IM/16, APPENDIX-IM/16/III	0 to 5%
31.	**Antimony Trioxide**	Appearance	HEMRL/TRIM/PROP/IM/17	Qualitative
		Volatile matter content	HEMRL/TRIM/PROP/IM/17, APPENDIX-IM/17/I	0 to 2%
		Purity (as Sb_2O_3)	HEMRL/TRIM/PROP/IM/17, APPENDIX-IM/17/III	80% to 100%
		Alkalinity/Acidity	HEMRL/TRIM/PROP/IM/17, APPENDIX-IM/17/II	0 to 1%
32.	**Toluene diisocynate**	Hydrolysable chlorine	ERDL/TRIM/PROP/RM/6, APPENDIX-II	0 to 0.5%
33.	**Trimethylol propane**	Appearance	HEMRL/SRP/PINAKA-MK-II/TOT/2014/01	Qualitative
		Hydroxyl Value	HEMRL/AK/BST/PROP/ RM1, APPENDIX-I.	1000 mgKOH/g to 1400 mgKOH/g

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		Acid Value	HEMRL/SRP/PINAKA-MK-II/TOT/2014/01, ANNEXURE-III	0 to 5 mgKOH/g
		Moisture Content	HEMRL/AK/BST/PROP/ RM1, APPENDIX-II	0 to 5%
34.	**Magnesium Powder Gr. IV**	Sieve size < 210 µm	IS 2307, ANNEX A (Clause 4.2)	80% to 100%
		Sieve size > 150 µm		0 to 20%
		Sieve size < 63 µm		0 to 30%
		Apparent Density	IS 2307, ANNEX B (Clause 4.3)	0.3 g/ml to 0.8 g/ml
		Moisture	IS 2307, ANNEX C	0 to 1%
		Magnesium (as Mg)	DRDL/TSQD/AK/023 Rev2	80% to 100%
35.	**Magnesium Powder Gr. V**	Sieve size < 75 µm	IS 2307, ANNEX A (Clause 4.2)	80% to 100%
		Sieve size < 63 µm		60% to 100%
		Moisture	IS 2307, ANNEX C	0% to 1%
		Apparent Density	IS 2307, ANNEX B (Clause 4.3)	0.5 g/ml to 0.9 g/ml
		Magnesium (as Mg)	DRDL/TSQD/AK/023 Rev2, ANNEXURE II	80% to 100%
36.	**Sodium Nitrate**	Purity	IS 12681, ANNEX A (Clause 2.2), A-2	80% to 100%
		Moisture & Volatile matter content	IS 12681, ANNEURE A (Clause 2.2), A-3	0 to 5%
37.	**Naphthalene**	Crystallizing point	IS : 539, APPENDIX A	70 ºC to 90 ºC
38.	**Adipic Acid**	Assay	ERDL/TRIM/PROP/RM/11, APPENDIX-RM/11/I	80% to 100%
		Melting point	ERDL/TRIM/PROP/RM/11, APPENDIX-RM/11/II	140 ºC to 160 ºC
		Ash content	ERDL/TRIM/PROP/RM/11, APPENDIX-RM/11/III	0 to 1%
		Loss on drying	ERDL/TRIM/PROP/RM/11, APPENDIX-RM/11/IV	0 to 3%
39.	**Tartaric acid**	Melting point	ERDL/TRIM/PROP/RM/12, APPENDIX-RM/12/I	160 °C to 180 °C

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		Loss on drying	ERDL/TRIM/PROP/RM/12, APPENDIX-RM/12/II	0 to 3%
		Tartaric acid content	ERDL/TRIM/PROP/RM/12, APPENDIX-RM/12/III	80% to 100%
		Ash	ERDL/TRIM/PROP/RM/12, APPENDIX-RM/12/IV	0 to 1%
40.	**Methanol**	Specific gravity at 27 °C	IS : 517, 6 of IS : 82	0.70 °C to 0.85 °C
		Alkalinity (as NH_3)	IS : 517, APPENDIX B	0 to 1%
		Acidity (as acetic acid)	IS : 517, APPENDIX B	0 to 1%
		Moisture content	IS : 517	0 to 2%
41.	**Methyl aziridinyl phosphine oxide**	Reactive Imine	ERDL/TRIM/PROP/RM/13, APPENDIX-RM/13/III	70% to 100%
		Refractive Index at 25 °C	ERDL/TRIM/PROP/RM/13, APPENDIX-RM/13/I	1.40% to 1.55%
		Specific gravity at 25 °C	ERDL/TRIM/PROP/RM/13, APPENDIX-RM/13/II	0.90% to 1.20%
		Moisture Content	ERDL/TRIM/PROP/RM/13, APPENDIX-RM/13/IV	0 to 5%
		Methanol Insoluble	ERDL/TRIM/PROP/RM/13, APPENDIX-RM/13/V	0 to 2%
42.	**Potassium Picrate**	Moisture	MIL-P-10830 (ORD), METHOD NO. 4.4	0 to 10%
		Water insoluble matter	MIL-P-10830 (ORD), METHOD NO. 4.5	0 to 25%
		pH of water extract	MIL-P-10830 (ORD), METHOD NO. 4.8	0 to 14
		Purity (as Potassium picrate)	MIL-P-10830 (ORD), METHOD NO. 4.9.2	50% to 100%
43.	**Penta Erythritol Tetranitrate**	Appearance	JSS 1376-06	Qualitative
		Volatile matter	JSS 1376-06, APPENDIX(B)	0 to 20%
		Melting point	JSS 1376-06, APPENDIX(C)	0 to 500 °C
		Total insoluble matter in acetone	JSS 1376-06, APPENDIX (D)	0 to 20%

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		Inorganic matter insoluble in acetone	JSS 1376-06, APPENDIX (D)	0 to 20%
		Gritty particle retained on 125 micrometer IS sieve	JSS 1376-06, APPENDIX (D)	0 to 50%
		pH of water extract	JSG 0112, METHOD NO. (5b)	0 to 14
		Nitrogen content	JSS 1376-06, APPENDIX (G)	1% to 25%
		Matter retained on 850 micrometer IS sieve	JSS 1376-06, APPENDIX (H)	0 to 25%
		Matter passing through 150 micrometer IS sieve	JSS 1376-06, APPENDIX (H)	0 to 100%
		Matter passing through 300 micrometer IS sieve	JSS 1376-06, APPENDIX (H)	50% to 100%
44.	**Gun powder**	Moisture content	JSS 1376-05, APPENDIX (B)	0 to 20%
		Chloride (as Cl)	IS 6609 (Part I), METHOD NO. 2.13	0 to 10%
		Chloride (as KCl)	JSS 1376-05, APPENDIX (C)	0 to 10%
		Sulphates (as K_2SO_4)	JSS 1376-05, APPENDIX (D)	0 to 10%
		Acidity (as H_2SO_4)	JSS 1376-05, APPENDIX (G)	0 to 10%
		Total chlorine (as $KClO_4$)	JSS 1376-05, APPENDIX (E)	0 to 10%
		Mass of residue on flashing	JSS 1376-05, APPENDIX (H)	0 to 25%
		Hygroscopicity	JSS 1376-05, APPENDIX (K)	0 to 20%
		Composition analysis: (i) Potassium nitrate content	JSS 1376-05, APPENDIX (P)	50% to 100%
		(ii) Charcoal content	JSS 1376-05, APPENDIX (P)	0 to 50%

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		(iii) Sulphur content	JSS 1376-05, APPENDIX (P)	0 to 50%
		Absolute density	IS 6609 (PART I), METHOD NO. 2.10	0 to 10 g/cc
		Sieve size passing through 8 BSS (2 mm) IS sieve	JSS 1376-05, APPENDIX (M)	50% to 100%
		Sieve size retained on 16 BSS (1 mm) , IS sieve	JSS 1376-05, APPENDIX (M)	50% to 100%
B.	**Initiators & Intiator compositions**			
1.	**Lead styphanate**	Moisture	JSS 1375-06, APPENDIX (A)	0 to 20%
		Bulk density	JSS 1375-06, APPENDIX (J)	0 to 10 g/cc
		Lead content	JSS 1375-06, APPENDIX (C)	1% to 75%
		Lead styphnate content	JSS 1375-06, APPENDIX (B)	50% to 100%
		Acidity of aqueous extract as (HNO_3)	JSS 1375-06, APPENDIX (D)	0 to 10%
		Matter insoluble in Ammonium acetate	JSS 1375-06, APPENDIX (E)	0 to 25%
2.	**Lead azide**	Moisture content	JSS 1376-09, APPENDIX (A)	0 to 10%
		Purity (as Lead azide)	JSS 1376-09, APPENDIX (B)	50% to 100%
		pH of water extract	JSS 1376-09, APPENDIX (C)	0 to 14
		Matter insoluble in HNO_3	JSS 1376-09, APPENDIX (D)	0 to 20%
		Gritty matter	JSS 1376-09, APPENDIX (D)	0 to 10%
		Bulk density	JSS 1376-09, APPENDIX (G)	0 to 10 g/cc

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		Compound of metal other than Lead as sulphate	JSS 1376-09, APPENDIX (E)	0 to 10%
3.	**Tetrazene**	Moisture	JSS 1376-08, APPENDIX (A)	0 to 20%
		pH of water extract	JSS 1376-08, APPENDIX (E)	0 to 14
		Chloride (as NaCl)	JSS 1376-08, APPENDIX (C)	0 to 10%
		Sulphate (as Na_2SO_4)	JSS 1376-08, APPENDIX (D)	0 to 10%
		Settling test	JSS 1376-08, APPENDIX (J)	0 to 25 volume in ml
		Total insoluble matter in water	JSS 1376-08, APPENDIX (F)	0 to 10%
		Gritty matter	JSS 1376-08, APPENDIX (F)	0 to 10%
		Nitrate (as $NaNO_3$)	JSS 1376-08, APPENDIX (G)	0 to 25%
4.	**Lead Dinitro Resorcinate**	Visual examination	DEF. STAND 13-161	Qualitative
		Volatile matter	DEF. STAND 13-161, APPENDIX (A-5)	0 to 20%
		Total Dinitro-resorcinol	DEF. STAND 13-161, APPENDIX (A-9)	0 to 100%
		Total Lead (as Pb)	DEF. STAND 13-161, APPENDIX (A-7)	0 to 100%
		pH of aqueous suspension	DEF. STAND 13-161, APPENDIX (A-11)	0 to 14
		Apparent density	DEF. STAND 13-161, APPENDIX (A-13)	0 to 10 g/cc
		Solubility in alcohol	JSS 9330-03, APPENDIX (D)	Qualitative
		Solubility in water	JSS 9330-03, APPENDIX (A)	Qualitative

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
5.	**Composition L mix**	Moisture	IND/ME/1019 (Prov), METHOD NO. 7.3	0 to 10%
		Ratio analysis (i) Lead Dinitro resorcinol content	IND/ME/1019 (Prov), METHOD NO. 7.4.2	0 to 100%
		(ii) Barium nitrate content	IND/ME/1019 (Prov), METHOD NO. 7.4.4	0 to 100%
		(iii) Tetrazene content	IND/ME/1019 (Prov), METHOD NO. 7.4.3	0 to 50%
6.	**Initiatory composition (ASA)**	Volatile Matter	DEF STAND. 13-502, APPENDIX (A-5)	0 to 10%
		Ratio analysis (i) Dextrinated Lead azide content	DEF STAND. 13-502, APPENDIX (A-6)	0 to 100%
		(ii) Lead styphnate content	DEF STAND. 13-502, APPENDIX (A-6)	0 to 50%
		(iii) Aluminium content	DEF STAND. 13-502, APPENDIX (A-6)	0 to 50%
7.	**Composition Primary Mix-Type A, B & C**	Moisture	IND/ME/874(a) (Prov), APPENDIX (A)	0 to 10%
		Ratio analysis (i) Lead azide content	IND/ME/874(a) (Prov), APPENDIX (B)	0 to 75%
		(ii) Lead styphnate content	IND/ME/874(a) (Prov), APPENDIX (B)	
		(iii) Antimony trisulfide content	IND/ME/874(a) (Prov), APPENDIX (B)	0 to 50%
		(iv) Barium nitrate content	IND/ME/874(a) (Prov), APPENDIX (B)	0 to 50%
		(v) Tetrazene content	IND/ME/874(a) (Prov), APPENDIX (B)	0 to 50%
C.	**PYROTECHNICS**			
1.	**Composition CU1**	Volatile matter (Moisture)	IND/ME/820(PROV), METHOD NO. 1 (a)	0 to 10%

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		Ratio analysis (i) Red Lead content	IND/ME/950(A)(PROV), APPENDIX (B)	0 to 100%
		(ii) Zirconium content	IND/ME/950(A)(PROV), APPENDIX (B)	0 to 50%
		(iii) Binder content (APC-217)	IND/ME/950(A)(PROV), APPENDIX (B)	0 to 50 Part
2.	**Composition II & III**	Moisture	JSS 1376-05, APPENDIX (B)	0 to 10%
		Ratio analysis (i) Potassium nitrate content	JSS 1376-05, APPENDIX (P)	50% to 100%
		(ii) Sulfur content	JSS 1376-05, APPENDIX (P)	0 to 50%
		(iii) Charcoal content	JSS 1376-05, APPENDIX (P)	0 to 50%
3.	**Composition ME 412**	Moisture	IND/ME/820 (PROV), METHOD NO. 1 (a)	0 to 10%
		Ratio analysis (i) Barium chromate content	IND/ME/820 (PROV), APPENDIX (C)	50% to 100%
		(ii) Potassium perchlorate content	IND/ME/820 (PROV), APPENDIX (C)	0 to 50%
		(iii) Antimony trisulfide content	IND/ME/820 (PROV), APPENDIX (C)	0 to 50%
		(iv) Binder content (APC-217)	IND/ME/820 (PROV), APPENDIX (C)	0 to 50 Part
D.	**Pyro Igniters& Detonators**			
1.	**Pyro Igniters**	Visual checks	CQA(A) DOC No. : TSS4/04/AT/SUP/PAR dated 18 June 2014	Igniter should comply with the appearance, marking and dimensions as per DRG given by vendor.
		Immunity to static charge	CQA(A) DOC No. : TSS4/04/AT/SUP/PAR dated 18 June 2014	Electric Igniter should not actuate during the discharging of the

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
				capacitor 0 to 500 Pico farad charged upto a 100 kV. A) Between the shorted wires and body. B) Between shorted wires through a resistance of 0 to 50 kilo ohm which is connected to the article in series
		Length	CQA(A) DOC No. : TSS4/04/AT/SUP/PAR dated 18 June 2014	0 to 1000 mm
		Outer diameter	CQA(A) DOC No. : TSS4/04/AT/SUP/PAR dated 18 June 2014	0 to 1000 mm
		Wire length	CQA(A) DOC No. : TSS4/04/AT/SUP/PAR dated 18 June 2014	1 to 1000 mm
		Electrical Resistance test	CQA(A) DOC No. : TSS4/04/AT/SUP/PAR dated 18 June 2014	0 to 100 ohms
		Insulation Resistance	CQA(A) DOC No. : TSS4/04/AT/SUP/PAR dated 18 June 2014	When direct current of 0 to 1000 V is applied between lead wires and body for 1 min., the insulation resistance should not be less than 1000 MΩ
		Insulation Strength/ Breakdown voltage test	CQA(A) DOC No. : TSS4/04/AT/SUP/PAR dated 18 June 2014	When a 0 to 1000 volts AC with frequency 50 Hz and a circuit current of 0 to

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
				100 mA is applied between shorted lead and the body for a period of one minute, the igniter should sustain without any insulation breaks and surface overlapping
		Jolting followed by resistance	CQA(A) DOC No. : TSS4/04/AT/SUP/PAR dated 18 June 2014	Electrical Igniter should withstand without activation and design damages to the effect of Jolting. Place the Igniters inside the fixture in three different positions (1) Wires placing to the bottom (2) Wires placing to the top (3) Wires inside position Duration: 0 to 10 hrs. Height of drop : 0 to 10 meter No. of falls: 0 to 250 per minutes.
		Vibration Test (Longitudinal load / Transverse load)	CQA(A) DOC No. : TSS4/04/AT/SUP/PAR dated 18 June 2014	Electrical Igniter should withstand without actuation and design damages. Place the Igniters in the fixture (1) Placing the wires

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
				to the top position. (2) Place the wires to the side position. And apply the conditions Frequency : 0 to 2000 Hz Acceleration : 0 to 30 g Duration : 0 to 10 hrs along axis
		Water immersion test	CQA(A) DOC No. : TSS4/04/AT/SUP/PAR dated 18 June 2014	Igniter should be kept at underwater 0 to 5 m depth for 0 to 10 hrs.
		Safe flow current	CQA(A) DOC No. : TSS4/04/AT/SUP/PAR dated 18 June 2014	Igniter should not get actuated if a direct current of 0 to 1000 mA is transmitted for a period of 0to 15 min.
		Actuation time test	CQA(A) DOC No. : TSS4/04/AT/SUP/PAR dated 18 June 2014	0 to 9999 ms
		Functioning test	CQA(A) DOC No. : TSS4/04/AT/SUP/PAR dated 18 June 2014	Igniters should be kept at 0 to-70 ^{0}C for 0 to 48 hrs. Igniters should get actuated without failure, when a current of 0 to 10 amp is applied and a pressure of 180 to 390 kg f/cm^2 to be generated in a volume of 1cm^3.

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
				Igniters should be kept at 0 to + 70 ^{0}C for 0 to 48 hrs. Igniters should get actuated without failure, when a current of 0 to 10 amp is applied and a pressure of 180 to 390 kg f/cm^2 to be generated in a volume of 1cm^3.
2.	**Detonator**	Length	JSG 0102 (14P, 15P, 17P)	0 to 1000 mm
		Outer diameter	JSG 0102(14P, 15P, 17P)	0 to 1000 mm
		Bridge wire Resistance	IS 6609 (III), Method No. 2.7.1	0 to 100 ohms
		No fire & all fire current test	IS 6609 (III), Method No. 2.8	NFC: 0 to 1000 mA for 0 to 10 min. AFC : 0 to 10000 mA between 0 to 60 s
		Witness plate dent test	IS 6609 (III), Method No. 2.6	Dent in 0 to 10 mm thick aluminum plate.
		Jolting test	IS 6609 (III), Method No. 2.4	Electrical detonator should withstand without activation and design damages to the effect of Jolting by applying the following test condition. Height of jolt : 0 to 1000 mm No. of Jolt : 0 to 250 Jolts/Minute Duration : 0 to 120 minutes

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		Drop test	IS 6609 (III), Method No. 2.2	0 to 10 m
		Water Resistance test	IS 6609 (III), Method No. 2.1	The Detonator should give satisfactory performance on firing after keeping the detonator under water at 0 to 10 kg/cm^2 for 0 to 10 hrs.
E.	**Composite propellant**			
1.	**Composite Propellant**	Burn rate at 10 to 150 kg/cm^2 on strand	HEMRL/SRP/PINAKA-MK-II/TOT/2014/01,ANNEXURE-III,13-(PAGE NO 94) HEMRL/PINAKA/PORP/1, ANNEXURE-III E/e-(PAGE NO 420) DRDL/;TSQD/AK/022 Rev 2, APPENDIX A/II/vii-(PAGE NO.55) RT/RRM/PRO	1 mm/s to 40 mm/s
		Calorimetric value	HEMRL/PINAKA/PORP/1, ANNEXURE-III B DRDL/;TSQD/AK/022 Rev 2, APPENDIX A/II (ii) RT/RRM/PRO	500 Cal/g to 5000 Cal/g
		Burn rate at 20 to 130 kg/cm^2 on BEM (Ballistic Evaluation Motor)	HEMRL/PINAKA/PORP/1, Annexure-III E DRDL/TSQD/AK/022 Rev 2, APPENDIX A (Vii) HEMRL/SRP/PINAKA-MK-II/TOT/2014/01 ANNEXURE-III,16	2 mm/s to 30 mm/s

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
II.	**PAPER & PULP**			
1.	**Paper, White Fine Ammunition**	Moisture	IS 1060 (Part 1), CLAUSE 9	0 to 25%
		pH of water extract	IS 1060 (Part 1), CLAUSE 10	0 to 14
		Water soluble chloride (as NaCl)	JSG 0114, METHOD NO. 7	0 to 25%
		Water soluble sulphate (as Na_2SO_4)	IS 1060 (Part 2), Clause 18	0 to 25%
		Fatty and /or similar acid (as Oleic acid)	IS 1060 (Part 2), Clause 19	0 to 25%
		Ash on incineration	IS 1060 (Part 1), Clause 11	0 to 25%
		Lead content (as Pb)	IS 1060 (Part 2), Clause 16	0 to 25%
III.	**LAC & LAC PRODUCTS**			
1.	**APC-217**	pH of Water extract	JSG 0112, METHOD NO. (5B)	0 to 14
		Kinematic viscosity	JSS 8010-42, APPENDIX (D) & BROOKFIELD DIGITAL VISCOMETER METHOD MANUAL NO.M07-022-C0711	1 to 250 x 10^{-6} m^2/s
		Surface dry	IS 101-Part 3: SEC. 1	0 to 100
		Hard dry	IS 101-Part 3: SEC. 1	0 to 100
		Finish	IS 101-Part 3: SEC. 4	Qualitative
2.	**Adhesive shellac**	Total non volatile matter	JSS 8010-63, APPENDIX (A)	0 to 50%
		Ash content	JSS 8010-63, APPENDIX (B)	0 to 20%
		Iodine value	JSS 8010-63, APPENDIX (C)	0 to 25%

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		Adhesion & Finish	JSS 8010-63, APPENDIX (D)	Qualitative
		Shellac conformity test	JSS 8010-63, APPENDIX (E)	Qualitative

Laboratory	**Economic Explosives Limited, Village Sawanga, P. O. Shiva, Tahsil & District – Nagpur, Maharashtra**		
Accreditation Standard	**ISO/IEC 17025: 2005**		
Certificate Number	**TC-7062** ***(In lieu of T-3826)***	**Page 24 of 25**	
Validity	**01.03.2018 to 29.02.2020**	**Last Amended on 22.03.2018**	

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

MECHANICAL TESTING

I.	**PROPERTIES OF POWDER METALLURGICAL PRODUCTS**			
1.	**Explosive & Pyrotechnics (Composite Propellant)**	Density	HEMRL/PINAKA/PORP/1, ANNEXURE-III AHEMRL/SPR/PINAKA MK-II/TOT/2014/01, ANNEXURE-III-(12) DRDL/;TSQD/AK/022 Rev2, APPENDIX A/II-(i) RT/RM/PRO	1 g/cc to 2.5 g/cc
		Youngs Modulus	HEMRL/SRP/PINAKA-MK-II/TOT/2014/01, ANNEXURE-III, 14-(PAGE NO.96) DRDL/;TSQD/AK/022 Rev2, APPENDIX A/II/iii-(PAGE NO.43) RT/RRM/PRO HEMRL/PINAKA/PORP/1, ANNEXURE-III C/4 (PAGE NO 408-409)	5 kg/cm^2 to 500 kg/cm^2
		Tensile	HEMRL/PINAKA/PORP/1, ANNEXURE-III C/FIG-1 DRDL/;TSQD/AK/022 Rev2, APPENDIX A/II (iii) HEMRL/SRP/PINAKA-MK-II/TOT/2014/01, ANNEXURE-III, 14RT/RRM/PRO	1 kg/cm^2 to 100 kg/cm^2
		Elongation	HEMRL/PINAKA/PORP/1, ANNEXURE-III C-(4) DRDL/;TSQD/AK/022 Rev2, APPENDIX A/II (iii)	2% to 200%

Pankaj Johri
Convenor

Avijit Das
Program Director

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
			HEMRL/SRP/PINAKA-MK-II/TOT/2014/01, ANNEXURE-III, (14) RT/RRM/PRO	
		X-ray test	HEMRL/PINAKA/PORP/1, Annexure-V (4.5), HEMRL/SRP/PINAKA-MK-II/TOT/2014/01 (6.2) DRDL/TSQD/AK/022 Rev2, (10.3) DRDL/TSQD/AK/023 Rev2,CHAPTER (15.2.3) RT/RRM/PRO (2.3.1)	No voids, cracks / Debonding
		'η' Value	DRDL/TSQD/AK/022Rev2, APPENDIX A (Vii) HEMRL/SRP/PINAKA-MK-II/TOT/2014/01 ANNEXURE-III, 13	0.1 Strand to 1.0 Strand
		Compressive strength	DRDL/TSQD/AK/022 Rev2, APPENDIX A (iv)	5 kg/cm^2 to100 kg/cm^2
		Compression	DRDL/TSQD/AK/022 Rev2, APPENDIX A (iv)	5% to 100%
		Compressive modulus	DRDL/TSQD/AK/022 Rev2, APPENDIX A (iv)	100 kg/cm^2 to 1200 kg/cm^2
II.	**PAPER & PAPER PRODUCTS**			
1.	**Paper, White Fine Ammunition**	Substance	IS 1060 (PART 1), CLAUSE 6	0 to 250 g/m^2
		Thickness	IS 1060 (PART 1), CLAUSE 7	0 to 10 mm
		Bursting strength	IS 1060 (PART 1), CLAUSE 12.6	0 to 500 KPa