Laboratory	**Solar Industries India Limited, Village-Chakdoh (Bazargaon), Dist. Nagpur, Maharashtra**	
Accreditation Standard	**ISO/IEC 17025: 2005**	
Certificate Number	**TC-7005** ***(in lieu of T-3798)***	**Page 1 of 6**
Validity	**15.02.2018 to 14.02.2020**	**Last Amended on 05.03.2018**

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

CHEMICAL TESTING

I.	**EXPLOSIVES & PYROTECHNICS**			
1.	**Explosive Chemicals & Allied Materials**			
a.	**HMX (Cyclotetramethyl enetetranitramine)**	β-HMX content By HPLC	EPA -8330B	90.00 wt % to 100 wt %
		RDX content By HPLC	EPA -8330B	0.01 wt % to 10 wt %
		Melting point	MIL-STD-650 Method 209.1	270 °C to 295 °C
		Acetone insoluble material	MIL-STD-650 Method 105.1	0 to 0.05 wt %
		Particle size	Mie Theory (Malvern)	1 µ to 1000 µ
		α HMX By FTIR	DTIC,ARL-TR-233	Qualitative
2.	**HMX Compounded Product (OCTOL)**	Appearance	Visual Examination	Qualitative
		β-HMX content By Gravimetric	MIL-0-45445B (PA) sub-para 4.5.1.1	65.0 wt % to 85.0 wt %
		TNT content By Gravimetric	MIL-0-45445B (PA) sub-para 4.5.1.2 (see 4.5.1.1)	15.0 wt % to 35.0 wt %
		Viscosity By Efflux + 85°C	MIL-STD-650 Method 212.1	4 Sec. to 15 Sec.
		Moisture content By Karl Fischer	MIL-STD-650 Method 101.4	0.01 wt % to 1.0 wt %
		Alkalinity , as Na_2CO_3	MIL-STD-650 Method 102.3	Qualitative
		Acidity , as CH_3COOH	MIL-STD-650 Method 102.3	0.01 wt % to 1.0 wt %
		Acetone insoluble	MIL-0-45445B (PA) sub-para. 4.5.4	0.01 wt % to 1.0 wt %

Pankaj Johri
Convenor

N. Venkateswaran
Program Director

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		Insoluble particles retained on ASTM sieve No. 60	MIL-0-45445B (PA) sub-para. 4.5.3	0 to 5 numbers
		Vacuum Stability (+120^{0}C,40 hours)	MIL-STD-650 Method 503.1	0.01 cm^3/g to 1.0 cm^3/g
		Melting Point for β HMX	MIL-DTL-45445C sub-para. 4.7.2	270 to 295^{0}C
		α HMX ,by FTIR	DTIC,ARL-TR-233	Qualitative
3.	**Pentaerythrite Tetranitrate (PETN)**	Melting Point	MIL-STD-650 Method 209.1	130 to 150^{0}C
		Acetone insoluble material	MIL-P-387 C sub-para.4.5.5	0.01 wt % to 1.0 wt %
		Acidity , as HNO_3	MIL-P-387 C sub-para. 4.5.6	0.01 wt % to 0.5 wt %
		Vacuum Stability (+120^{0}C, 20 hours)	MIL-STD-650 Method 503.1	0.01 cm^3/g to 5.0 cm^3/g
		Granulation passing through U. S. Standard Sieve No.	MIL-P-387 C sub-para. 4.5.8	
		Class -1 USSS 80 USSS 100 USSS 140 USSS 200		 100 % Min. 85 % Min. 55 % Max. 30 % Max.
		Class -4 USSS 30 USSS 100		 100 % Min. 5 to 20 %
4.	**HMX Compounded Product PBXN-5**	Appearance	Visual examination	Qualitative
		β-HMX content, By Gravimetric Method	MIL - E - 81111B sub-para. 4.4.4.1	94.5 wt % to 95.5 wt %
		Vitone -A content By Gravimetric Method	MIL - E - 81111B sub-para. 4.4.4.1	4.5 wt % to 5.5 wt %
		Moisture Content	MIL - STD-286 Method 101.5	0 wt % to 0.15 wt %

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		Explosion Temperature, (Min.)	MIL-STD-650 Method 506.1	225 °C
		Granulation Pass through	MIL-STD-650 Method 204.1	
		i) US Sieve No. 4		100 %
		ii) US Sieve No. 20		50 % to 100 %
		iii) Sieve No. 40		0 to 2 %
		Iv) Sieve No. 50		0 to 5 %
		Vacuum Stability (120°C, 48 Hrs.)	MIL-STD-650 Method 503.1.1	0 to 0.5 wt %
5.	**HMX Compounded Product SOKFOL (OKFOL -02)**	Appearance	Visual Examination	Qualitative
		Weight percentage of OCTOGEN	MIL-STD-650 Method 108.1	96.0 wt % to 97.0 wt %
		Weight percentage of Ceresin Wax	MIL-STD-650 Method 108.1	3.0 wt % to 4.0 wt %
		Weight Percentage of Moisture	MIL-STD-650 Method 101.5	0 to 0.1 wt %
		Weight Percentage of Insoluble substance in Benzene and Acetone	MIL-STD-650 Method 105.1	0 to 0.25 wt %
		Weight Percentage of Acidity	MIL-STD-650 Method 102.1	0 to 0.03 wt %
6.	**HMX Compounded Product SOMA**	Appearance	Visual Examination	Qualitative
		Weight percentage of OCTOGEN	MIL-STD-650 Method 108.1	96.8 wt % to 98.3 wt %
		Weight Percentage of Graphite	MIL-STD-650 Method 108.1	0.3 wt % to 0.6 wt %
		Weight Percentage of Ceresin Wax	MIL-STD-650 Method 108.1	1.4 wt % to 2.6 wt %
		Weight Percentage of (Moisture & Volatile substance)	MIL-STD-650 Method 101.5	0 wt % to 0.1wt %
		Acidity, as CH_3COOH	MIL-STD-650, Method 102.1	0 to 0.03 wt %

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
7.	**Cyclotrimethylene trinitramine (RDX)**	Melting Point	MIL-DTL-398 D Test para 4.7.1	190 ºC
		Insoluble particles retained on sieve USS 60, Numbers of Particle	MIL-DTL-398 D Test para 4.7.2	0 to 5 numbers
		Total Acetone Insoluble Materials	MIL-DTL-398 D Test para 4.7.3	0 to 0.05 wt %
		Acidity	MIL-DTL-398 D Test para 4.7.5	0 to 0.02 wt %
		HMX content	EPA -8330B	4.0 wt % to 17.0 wt %
		RDX content	EPA -8330B	Remainder
		Impact Sensitivity, BAM Test Apparatus	MIL-STD-1751A Method 1015	33 cm
8.	**RDX Compounded Product (A5)**	RDX content	MIL-DTL- 14970D Test para 4.6.1	98.5 wt % to 99.0 wt %
		Stearic Acid		1.0 wt % to 1.5 wt %
		Insoluble particles No. Particles retained on USSS 40, Max.	MIL-DTL- 14970D Test para 4.6.2	0
		Insoluble particles No. Particles retained on USSS 60, Max.	MIL-DTL- 14970D Test para 4.6.2	0 to 5 numbers
		Moisture	MIL-DTL- 14970D Test para 4.6.3	0 wt % to 0.1 wt %
		Bulk Density, (Min.)	MIL-DTL- 14970D Test para 4.6.5	0.95 g/cc
		Granulation Passing through- i) USSS 12, Min. ii) USSS 200, Max.	MIL-DTL- 14970D Test para 4.6.6	99.0 % 2.4 %
9.	**RDX Compounded Product (Dentex)**	Appearance	Visual Examination	Qualitative
		RDX Content	ERDL/HE I/PS/137	46.5 wt % to 50.5 wt %
		TNT Content		33.0 wt % to 35 wt %
		Paraffin Wax	ERDL/HE I/PS/137	0.8 wt % to 1.2 wt %

Laboratory	**Solar Industries India Limited, Village-Chakdoh (Bazargaon), Dist. Nagpur, Maharashtra**	
Accreditation Standard	**ISO/IEC 17025: 2005**	
Certificate Number	**TC-7005** ***(in lieu of T-3798)***	**Page 5 of 6**
Validity	**15.02.2018 to 14.02.2020**	**Last Amended on 05.03.2018**

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		Aluminum Content	ERDL/HE I/PS/137	16.5 wt % to 19.5 wt %
		Volatile Matter	ERDL/HE I/PS/137	0 to 0.1 wt %
		Density, (Min.)	MIL-STD-650 Method 201.2	1.72 g/ml
10.	**RDX Compounded Product (Torpex)**	RDX Content		22.8 wt % to 25.8 wt %
		TNT Content		51.3 wt % to 53.3 wt %
		Paraffin Wax		3.0 wt % to 3.3 wt %
		Aluminum Content		22.8 wt % to 25.8 wt %
		Volatile matter	ERDL/HE I/PS/137 Appendix 1 , Clause No. 1	0 to 0.1wt %
		Density	MIL-STD-650 , Method 201.2	1.5 g/cc to 1.8 g/cc
11.	**RDX Compounded Product (CH - 6)**	RDX Content	MIL-C-21723B sub-para 4.6.1.1	97.0 wt % to 98.0 wt %
		Calcium Stearate	MIL-C-21723B sub-para 4.6.1.2	1.35 wt % to 1.65 wt %
		PIB	MIL-C-21723B sub-para 4.6.1.3	0.40 wt % to 0.60 wt %
		Graphite Content	MIL-C-21723B sub-para 4.6.1.4	0.40 wt % to 0.60 wt %
		Moisture	MIL-C-21723B sub-para 4.6.2	0 to 0.2 wt %
		Granulation, Passing through i) USSS 30, Min. ii) USSS 100, Max.	MIL-C-21723B sub-para 4.6.3	 70 % 25 %
		Acid/ Alkali Content i) No NaOH ii) NaOH added	MIL-C-21723B sub-para 4.6.4	Colorless /Pink Color
12.	**RDX Compounded Product (RDX : TNT- 60 : 40-B)**	Appearance	Visual Examination	Qualitative
		RDX Content	MIL-C- 401E Test para 4.4.1	57.5 wt % to 61.5 wt %
		TNT Content	MIL-C- 401E Test para 4.4.1	37.5 wt % to 41.5 wt %

Pankaj Johri
Convenor

N. Venkateswaran
Program Director

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		Bees Wax	MIL-C- 401E Test para 4.4.1	0.7 wt % to 1.3 wt %
		Insoluble particles retained on USSS no.60	MIL-STD-650 Method 106.1	0 to 5 numbers
13.	**Trinitrotoluene (TNT) Type- I**	Form	MIL-DTL-248D W/Amendment 1 sub- para 4.4.1.1	Flake or Crystalline
		Color	MIL-DTL-248D W/Amendment 1 (FED-STD-595)	No darker than Colour No. 30257
		Solidification Point (Min.)	MIL-STD-650 Method 210.1	80.20 ºC
		Moisture	MIL-STD-650 Method 101.4	0 to 0.10 wt %
		Acidity , (as H_2SO_4)	MIL-DTL-248 D W/Amendment 1 sub- para 4.4.4	0 to 0.02 wt %
		Alkalinity	MIL-DTL-248 D W/Amendment 1 sub- para 4.4.5	None
		Insoluble Matter	MIL-STD-650 Method 105.1	0 to 0.05 wt %
		Sodium content	MIL-DTL-248 D W/Amendment 1 sub- para 4.4.7	0 to 0.001 wt %
		Thickness of Flake i) Average	MIL-DTL-248 D W/Amendment 1 sub- para 4.4.8	0 to 0.025 inch
		ii) Individual		0 to 0.04 inch