

No 6753/GAP/PV
SECTION-GAP
DATE- 23/03/2026

Subject: Providing data regarding “manufacturing Technology & Testing Facility” for SDOTE case of ‘Carbamite’.

Ref: (i) Letter No. 3210/Gen/PV/M1, PV direct dated-11/03/2026
(ii) Specification JSS 6810-125 : 2020 (Fourth Revision) Testing Method.
(iii) No.01/Gap/PV Dt: 23//03/2026

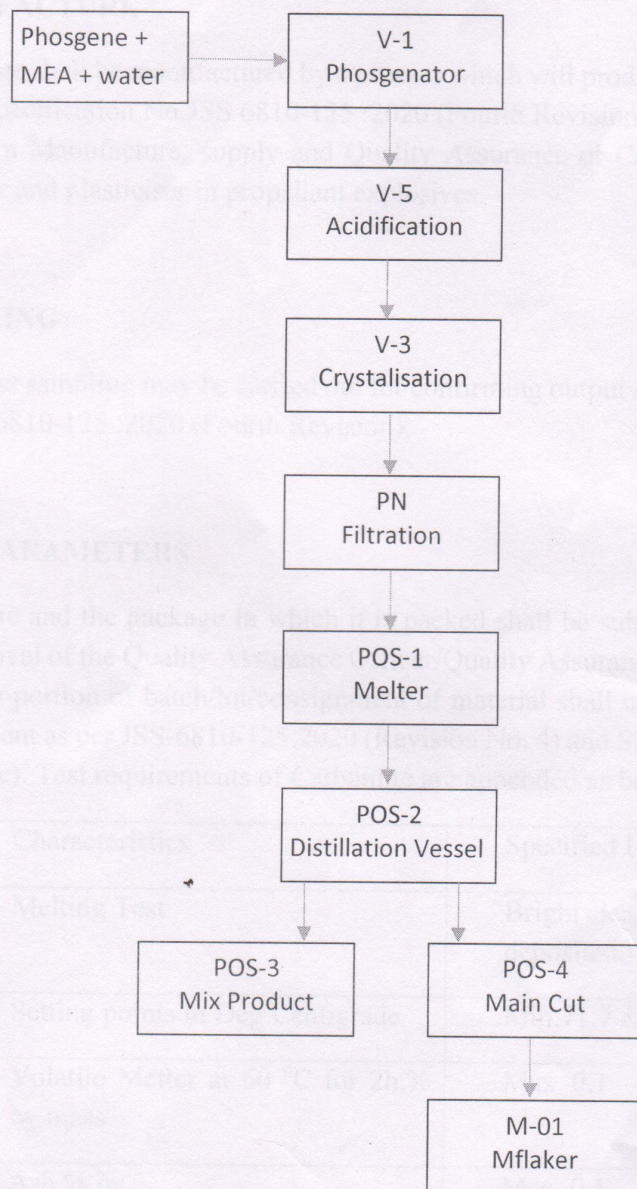
II. **Manufacturing** – Carbamite is manufactured by process of Phosgenation, Acidification, Crystallisation, Filtration of Mixer of Phosgene, Monoethanolamine(MEA) and Water Mixer.

Minimum Machines/equipment required for manufacturing of Carbamite to provide OFI requirement (approx. 15 MT/ Y) is appended as below:

SL NO	DESCRIPTION OF MACHINERY	QTY	MOC	CAPACITY	ESSENTIAL (E)/ DESIRABLE (D)
1	MIXER	02 NOS	HIGH TEMP. CYLINDRI -CAL NICKEL REACTOR	2.0 KL	E
2	PHOSGENATOR	02 NOS		2.0 KL	E
3	SCUBBERS	02 NOS		3.0 KL	E
4	CRYSTALYSER	01 NO		2.0 KL	E
5	FILTER	01 NO		3.5 KL	E
6	MELTER	01 NO		2.0 KL	E
7	DISTILATION VESSEL	01 NO	-----	350 KGS/HR	E
8	GRINDER	01 NO	-----	300 KGS/HR	E

Brief manufacturing process description:

Flow Diagram:



MATERIAL

The Material shall consist essentially of Diethyl Urea, $\text{CO}(\text{NC}_2\text{H}_5\text{C}_6\text{H}_5)_2$, and shall not be darker than pale buff in colour. It may be supplied in the form of powder or flakes as specified in the contract. It shall be free from grit, visible impurities and foreign matter. The material may be dyed if required by the contract.

MANUFACTURE

Carbamite shall be manufactured by a process which will produce the product conforming to this specification No.JSS 6810-125 :2020 (Fourth Revision) This specification is meant to govern Manufacture, supply and Quality Assurance of Carbamite suitable for use as stabiliser and plasticiser in propellant explosives.

SAMPLING

In process sampling may be carried out for confirming output / product as per specification No.JSS 6810-125 :2020 (Fourth Revision).

TEST PARAMETERS

Carbamite and the package in which it is packed shall be subject to inspection by and to the approval of the Quality Assurance Officer/Quality Assurance Authority. Samples taken from any portion of batch/lot/consignment of material shall confirm to the following test requirement as per JSS-6810-125:2020 (Revision No. 4) and SLM 14001.6.1/6.2/6.3(Ethyl Centralite). Test requirements of Carbamite are appended as below:

Sl.No.	Characteristics	Specified Limit
1.	Melting Test	Bright clear liquid free from scum and deposited.
2.	Setting points in Deg Centigrade	Min.71.7 & Max. 72.5
3.	Volatile Matter at 60 °C for 2h,% by mass	Max. 0.1
4.	Ash % by	Max. 0.1
5.	Primary amines calculated as Aniline, % by mass	Max. 0.03
6.	Secondary Amines calculated as Aniline,% by mass.	Max. 0.1
7.	Tertiary Amines calculated as Di-ethyl aniline % by	Max. 0.05
8.	Acidity calculated as Hydrochloric acid ,% by mass	Max. 0.004

9.	Hydrolysable chlorine compounds calculated as Chlorine ,% by mass	Max. 0.01
Size Requirement		
10.	Powder	All to pass(600 micrometer IS Sieve)
11.	Flakes	All to pass 6.3 mm IS sieve and thickness of flakes shall be 0.63 mm Max.

Testing Facility –

The following test equipment are Essential/Desirable for testing of Carbamite.

Sl. No.	EQUIPMENT	CAPACITY	ESSENTIAL (E)/DISIRABLE (D)
1.	TEST TUBES	2.5 X 15 cm	E
2.	WIRE STIRRER	----	E
3.	HOT PLATE	RANGE AMBIENT TO 300°C	E
4.	THERMOMETER	100°C	E
5.	OVEN	250°C	E
6.	FLATE BOTTOM GLASS DISH (With glass cover)	DIA 60 X 30mm	E
7.	MUFFUL FURNESS	1000°C	E
8.	CRUCIBLE	---	E
9.	SILICA OR PORCELAIN	---	E
10.	DESICATOR	---	E
11.	GLASS BEAKER	500ml	E
12.	FILTER PAPER	---	E
13.	CONICAL FLASK	500ml	E

14.	MEASURING CYLINDER	500ml	E
15.	SEPARATING FUNNEL	---	E
16.	PIPPETE	--	E
17.	TERTIARY AMINE + NESSLER TUBES	2X100 cm ³	E
18.	HYDROLYSABLE COMPOUNDS	---	E
19.	DISTILLED WATER	---	E
20.	SIEVE	600mm IS Sieve	E
21.	FLAKES	6.3mm IS Sieve	E

Manufacturing - Carbohydrate is manufactured by process of Phosgenation.