



GAP-0700 Plasticizer

Description 3M™ Glycidyl Azide Polymer GAP-0700 plasticizer is an energetic, non-functional plasticizer for energetic formulations.

Applications This material, because of its compatibility with 3M GAP polyol and reduced hazards characteristics relative to the usual nitrate ester plasticizers, is a logical candidate ingredient for energetic formulations which need a plasticizer to improve processing, mechanical properties and low temperature strain capability. Potential applications are in solid rocket propellants, explosives and pyrotechnics. 3M GAP plasticizer may be particularly useful in formulating high energy propellants that are safer to store and handle, and in gas generators for gun propellants and airbag inflators.

Typical Properties	Appearance	Yellow to amber liquid
	Viscosity (at 25°C)	140 cps
Not for specification purposes	Density	1.25 g/ml
	OH number	1.1
	Molecular weight	700
	Water content	0.05%
	Heat of formation	+33 Kcal/mole (estimated)
	Elemental composition	
	Nitrogen	42.3%
	Carbon	36.3%
	Oxygen	16.1%
	Hydrogen	5.3%
	Thermogravimetric analysis (5 mg, 20°C/min)	No appreciable weight loss to over 200°C. Onset of decomposition at 240°C
Weight loss (TGA @ 150°C, 70-130 min), %	0.4	
Solubility	Most organic solvents	

Hazardous Properties

3M GAP-0700 is classified by the Department of Transportation as “Propellant, Liquid, UN 0495” and assigned EX-9201194 on the basis of the following test results:

Impact test (Bureau of Explosives)0/10 at 80 inch-pound neat
0/10 at 80 inch-pound on filter paper

Friction test (Bureau of Explosives).....0/6 at 360N

Unconfined burnSample burned through in 12 seconds,
#8 blasting capNeat materials did not react.
Cotton soaked material did not react.

Thermal stability.....Pass, no reaction at 75°C for 48 hrs.

Mixtures of 3M™ GAP-0700 with other materials may have a much higher sensitivity than the pure material and it is critical that any such mixture be characterized for hazardous properties before any significant quantities are mixed.

Product Safety and Handling

3M GAP-0700 must be handled and stored in accordance with the regulations prescribed by the Bureau of Alcohol, Tobacco and Firearms and/or the Department of Defense as applicable to the user’s facility.

3M recommends storage at room temperature, and indications that shelf life of 3M GAP-0700 plasticizer in the original unopened containers is at least two years.

GAP has been found to pick up moisture from the atmosphere, and this moisture may interfere from the NCO-OH curing reaction. If the container has been left open for a time, it may be necessary, before use, to dry the 3M GAP by agitated vacuum drying or by sparging with dry nitrogen at slightly elevated temperatures (60-70°C).

The results of toxicity testing on 3M GAP indicate that it is practically non-toxic by ingestion, non-irritating to the eyes and slightly irritating to the skin. Please refer to the Material Safety Data Sheet for further details.

Disposal

Testing of a solution of 40% 3M GAP in ethyl acetate indicates that the solution may be shipped as a “flammable liquid” material in DOT-approved packaging. This solution may be destroyed in an approved incinerator.

3M Corporate Headquarters

3M Specialty Materials
3M Center, Building 223-6S-04
St. Paul, MN 55144-1000
800 367 8905
800 810 8514 (Fax)

Important Notice to Purchaser: The information in this publication is based on tests that we believe are reliable. Your results may vary due to differences in test types and conditions. You must evaluate and determine whether the product is suitable for your intended application. Since conditions of product use are outside of our control and vary widely, the following is made in lieu of all express or implied warranties (including the warranties of merchantability or fitness for a particular purpose): 3M’s only obligation and your only remedy is replacement of product that is shown to be defective when you receive it. In no case will 3M be liable for any special, incidental, or consequential damages based on breach of warranty or contract, negligence, strict tort, or any other theory.



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St. Paul, MN 55144-1000