



**USP Glycerin, 99.7%, Kosher/FCC
(Excipient/Food Use)
ADM Product 051000**

| <u>Specification</u> | <u>Limit</u> | <u>Unit</u> | <u>Method</u> |
|---|-------------------|-------------|---------------|
| Assay | 99.0 - 101.0 | % | ADM PL4 |
| Purity | 99.7 Min | % | ADM PL4 |
| Specific Gravity @ 25 °C | 1.259 Min | | FCC |
| Identification A (FTIR) | Pass | | USP |
| Identification B (Limit DEG/EG) | 0.10 Max DEG & EG | % | USP |
| Identification C (GC) | Pass | % | USP |
| Related Compounds | | | |
| Individual Impurities | 0.1 Max | % | USP |
| Total Impurities | 1.0 Max | % | USP |
| Water | 0.3 Max | % | USP |
| Color | 10 Max | Pt-Co | ADM PL4 |
| Chlorides | 0.001 Max | % | USP |
| Sulfates | 0.002 Max | % | USP |
| Chlorinated Compounds | 0.003 Max | % | USP |
| Heavy Metals | 5 Max | ppm | USP |
| Lead | 1 Max | ppm | FCC |
| Readily Carbonizable Substances | Pass | | FCC |
| Residue on Ignition | 0.01 Max | % | USP |
| Fatty Acids & Esters (ml 0.5N NaOH) | 1 Max | ml | USP |
| Appearance, clear, free of suspended matter | Pass | | ADM PL4 |

Product Guarantees: This product complies with all USP and FCC specifications for excipient and food uses

Residual Solvents – product complies with USP <467> Residual Solvents



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Revised Date 21 August 2013 CM



August 21, 2013

Ms. Jennifer Briscoe
Hydrite Chemical Co.

Dear Ms. Briscoe,

Regarding your recent inquiry into test methods utilized to test our USP Glycerin (Excipient), 99.7%, Kosher, FCC Grade product, ADM assures performance of all tests necessary to ensure conformance of the product with all indicated specifications. Where multiple monographs list the same or similar test, either both methods are run, or the tighter of the two specifications is applied to assure product compliance. Specifically, to your concerns regarding the FCC color method versus the limit listed on the ADM sales specification, and the differences in the Fatty Acids and Esters tests listed in the USP and FCC monographs, the following considerations were applied.

ADM has a color specification set forth as 10 Pt.-Co. maximum. Color testing to this limit is performed in accordance with ISO 6271-2:2004, *Clear liquids – Estimation of colour by the platinum-cobalt scale*. We have performed comparison testing between this method and the FCC color method and have determined that the ADM specification of 10 Pt.-Co. presents a tighter color specification than the FCC color test. Based on this determination, ADM utilizes the ISO method listed above to assure conformance to all color specifications.

The USP and FCC both list Fatty Acids and Esters tests in their monographs. Based on the acceptance criteria listed for both methods, ADM has determined that the limits are equivalent and either method is acceptable to determine conformance to both the USP and FCC monographs. ADM performs the USP method to determine conformance.

If there are any questions or concerns with the information above, please do not hesitate to let me know.

Sincerely,

Chad Minks
Manager, Quality & Technical Services
ADM Evolution Chemicals

