



Novec™

Engineered Fluid HFE-7100

Instruction Sheet

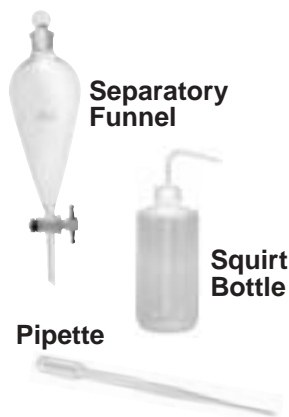
for mixing 3M™ Novec™
Engineered Fluid HFE-7100
with Ninhydrin or DFO

Procedure for mixing a working solution of ninhydrin in 3M™ Novec™ Engineered Fluid HFE-7100

IMPORTANT: Before mixing products, please read the current Material Safety Data Sheets (MSDS) and precautionary information on the product packages. Follow all applicable directions and precautions.

When measuring, transferring or dissolving components of the mixture, we recommend using indirect, vented chemical splash goggles to protect eyes from contact and natural rubber or polyvinylchloride gloves to prevent skin contact. Discard and reglove if components or mixture actually contact the gloves.

Use adequate ventilation and appropriate respiratory protection when mixing products. See MSDS for products being mixed for additional information.



Use the procedure described below, substituting the proper amounts of each component for your respective working solution batch size.

	Standard Formulation	Sample Formulation
Ninhydrin	5 g	1 g
Absolute ethanol	45 ml	9 ml
ACS grade ethyl acetate	2 ml	0.5 ml
Laboratory grade, glacial acetic acid	5 ml	1 ml
Novec fluid HFE-7100	1 L (1000 ml)	200 ml

1. In a 250 ml beaker, dissolve 5 grams Ninhydrin crystals in 45 ml ethanol.
2. Add 2 ml ethyl acetate.
3. Add 5 ml acetic acid.
4. Continue mixing until all the Ninhydrin has dissolved into solution.
5. Transfer this “stock solution” to a one liter beaker.
6. Stir in one liter of Novec fluid HFE-7100. Mix until a milky yellow solution is formed.
7. Cover and allow the solution to settle for approximately 30 minutes. A thin, oily-looking film may form on the top of the solution. This film consists of water, excess ethanol and ninhydrin and must be removed prior to use. The film can be removed by any of the following procedures:
 - a. If available, process the working solution through a **separatory funnel**. Again, allow the solution to settle for at least 30 minutes. Drain the bottom phase into a squirt bottle or storage container. Stop draining when the separate, clear-looking solution nears the bottom of the funnel, or approximately 50-100 ml of solution remains in the funnel. This remaining solution should be discarded in a proper waste container for flammable solvents as it consists of undissolved ethanol, water and ninhydrin.
 - b. If a separatory funnel is not available, use a **pipette** to skim the oily film from the top, again discarding the waste in a proper waste receptacle.
 - c. If neither a separatory funnel nor pipette is available, simply transfer the solution into a **squirt bottle**. This will help ensure a clean solution. When the solution level is below the straw in the squirt bottle, discard the remaining solution in a proper waste receptacle.
8. When not in use, protect from direct light to preserve the shelf life of the solution.

Procedure for mixing a working solution of DFO with 3M™ Novec™ Engineered Fluid HFE-7100

IMPORTANT: Before mixing products, please read the current Material Safety Data Sheets (MSDS) and precautionary information on the product packages. Follow all applicable directions and precautions.

When measuring, transferring or dissolving components of the mixture, we recommend using indirect, vented chemical splash goggles to protect eyes from contact and natural rubber or polyvinylchloride gloves to prevent skin contact. Discard and reglove if components or mixture actually contact the gloves.

Use adequate ventilation and appropriate respiratory protection when mixing products. See MSDS for products being mixed for additional information.

Use the procedure described below, substituting the proper amounts of each component for your respective working solution batch size.

	Standard Formulation	Sample Formulation
DFO	0.25 g	0.05 g
Laboratory grade methanol	40 ml	9 ml
Laboratory grade glacial acetic acid	20 ml	4 ml
Novec fluid HFE-7100	940 ml	200 ml

- In a 250 ml beaker, dissolve 0.25 grams DFO in 40 ml of methanol.
- Add 20 ml acetic acid.
- Continue mixing until all the DFO has dissolved into solution.
- Transfer this “stock solution” to a one liter beaker.
- Stir in 940 ml of Novec fluid HFE-7100.
- Cover and allow the solution to settle for approximately 30 minutes. A thin, oily-looking film may form on the top of the solution. This film consists of water, excess methanol and DFO and must be removed prior to use. This oily film can be removed by any of the following procedures:
 - If available, process the working solution through a **separatory funnel**. Again, allow the solution to settle for at least 30 minutes. Drain the bottom phase into a squirt bottle or storage container. Stop draining when the separate, clear-looking solution nears the bottom of the funnel, or approximately 50-100 ml of solution remains in the funnel. This remaining solution should be discarded in a proper waste container for flammable solvents as it consists of undissolved ethanol, water and DFO.
 - If a separatory funnel is not available, use a **pipette** to skim the oily film from the top, again discarding the waste in a proper waste receptacle.
 - If neither a separatory funnel nor pipette is available, simply transfer the solution into a **squirt bottle**. This will help ensure a clean solution. When the solution level is below the straw in the squirt bottle, discard the remaining solution in a proper waste receptacle.
- When not in use, protect from direct light to preserve the shelf life of the solution.

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