

Applications Using Wheaton Micro Kits® with Wheaton Connections®

Abstract

Wheaton Micro Kits are used for a number of different experiments. These kits are successfully employed in both industrial and student lab settings because the apparatus is easy to assemble and use. In addition, disposable sample vials (Cat. No. 224888 or 224952) can be used as both reaction and storage vessels, reducing cleanup costs. A number of different setups are described along with the required materials.

Procedures



Reflux - Water Jacketed Condenser

Reflux type reactions may be run for periods of several hours, utilizing a reaction flask (Cat. No. 434320) and a water jacketed condenser (Cat. No. 333927). An air condenser (Cat. No. 265318) may also be used for this assembly. A drying tube having a Teflon® filter and support for the desiccant is illustrated.

Uses the following items:

Cat. No.	Description
434320	10 mL flask with 20-400 cap
125480	Wheaton Connection® 13-425 to 20-400
333927	Water Jacketed condenser, 13-425 threads
962515	Hose Connectors (2)

Optional for Drying Tube:

Cat. No.	Description
125478	Wheaton Connection® 13-425 to 13-425 finish
420836	Teflon® filter with support
265318	Air condenser/drying tube/chromatography column, 50 mm, 13-425 threads



Distillation

This is the basic setup to distill at atmospheric pressure or under vacuum. This is often referred to as "simple distillation." If "fractional distillation" is required, air condenser (Cat. No. 265318) which is packed with stainless steel or glass wool is inserted between the flask and connecting adapter.

Uses the following items:

Cat. No.	Description
434320	10 mL flask with 20-400 cap (2 required)
125480	Wheaton Connection® 13-425 to 20-400
WF033112	Connecting adapter, 13-425 screw threads
W986294NG	1 mL Graduated V Vial® with 13-425 cap O-Ring included with kit Use the open face cap to hold the thermometer (not included).
333927	Water Jacketed condenser, 13-425 threads
962515	Hose Connectors (2)
125478	Wheaton Connection® 13-425 to 13-425 finish (2)
168378	Vacuum adapter 13-425 and 20-400 connections

Optional for Vacuum Distillation:

962515	3rd Hose Connector, purchased separately (2 Hose Connectors are included in the kit)
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Steam Distillation

An external source of steam is directed to the base of the flask. This can be from an additional boiling flask or a steam line at the bench. Apparatus is useful in isolating essential oils from natural products and can be an alternative to extraction procedures. The Thermometer and Pasteur pipette (Cat. No. 357331) pictured are not included.

Uses the following items:

Cat. No.	Description
434320	10 mL flask with 20-400 cap
125480	Wheaton Connection® 13-425 to 20-400 (2 required)
110008	Claisen condenser, 13-425 threads
W986294NG	1 mL Graduated V Vial® with 13-425 cap O-Ring included with kit Use the open face cap to hold the Pasteur pipette (357331)(not included) (2 required)
WF033112	Connecting adapter, 13-425 screw threads
224952	Cap used to hold thermometer (not included)
333927	Water Jacketed condenser, 13-425 threads
962515	Hose Connectors (2)
125478	Wheaton Connection® 13-425 to 13-425 finish (3 required)
168378	Vacuum adapter 13-425 and 20-400 connections

Optional for Vacuum Distillation:

Cat. No.	Description
962515	3rd Hose Connector, purchased separately (2 Hose Connectors are included in the kit)



Short Path Distillation

Semi-micro mixtures can be distilled using the short path system illustrated. The distillation can be run at atmospheric pressure or under vacuum if necessary. Sub-boiling separations can be effected by heating up to the boiling point, and placing the receiver V Vial® in a cold bath, i.e., dry ice/acetone or liquid nitrogen.

Uses the following items:

Cat. No.	Description
434320	10 mL flask with 20-400 cap
125480	Wheaton Connection® 13-425 to 20-400 (2 required)
W986294NG	1 mL Graduated V Vial® with 13-425 cap O-Ring included with kit Use the open face cap to hold the thermometer (not included).
WF033112	Connecting adapter, 13-425 screw threads
125478	Wheaton Connection® 13-425 to 13-425 finish
168378	Vacuum adapter 13-425 and 20-400 connections
962515	Hose Connector

For Wheaton Micro Kits see pages 70-72.



Molecular Distillation

Claisen adapter (Cat. No. 110008) is inverted and can be used for bulb-to-bulb distillations. The mixture to be separated is placed in a 4 mL vial (Cat. No. 224952) and assembled as shown. The vial is heated but not to the boiling point and condensation promoted by reducing the temperature of the receiver. A small Dewar flask with dry ice/alcohol or liquid nitrogen is used on the receiver side. The thermometer pictured is not included with the kit.

Uses the following items:

Cat. No.	Description
110008	Claisen adapter
224952	4 mL vial with 13-425 cap
125478	Wheaton Connection® 13-425 to 13-425 thread (2 required)
W986294NG	1 mL Graduated V Vial® with 13-425 cap O-ring included with kit
WF033112	Connecting adapter, 13-425 screw threads



Micro Reaction/Concentration Apparatus

Small quantities of reactant can be added to the boiling flask using a syringe (not included). Solvent vapors are condensed and collected in the receiver flask. This operation is similar to a rotary evaporator.

Uses the following items:

Cat. No.	Description
W986294NG	1 mL Graduated V Vial® with 13-425 cap
125478	Wheaton Connection®, 13-425 to 13-425 (3 required)
434320	10 mL flask with 20-400 cap
125480	Wheaton Connection®, 13-425 to 20-400
333927	Water jacketed condenser, 13-425 connection
962515	Hose connectors, 13-425 connection (2 required)

Optional for Drying Tube:

Cat. No.	Description
125478	Wheaton Connection®, 13-425 to 13-425
265318	Air condenser/drying tube/column 13-425 connections
420836	Teflon® filter with support (holds desiccant)



Hickman Type Distillation

This classic design is well suited for simple microscale type distillations. The Hickman still has features that make it a good choice for substances having different boiling points. Unlike reflux type reactions, the condensate does not return to the flask; it is retained in the alembic portion of the still. An air condenser may be attached to the upper section to increase the area for condensation if needed.

Uses the following items:

Cat. No.	Description
W986299NG	5 mL Graduated V Vial® with 20-400 cap
125480	Wheaton Connection® 13-425 to 20-400
620189	Hickman still, 13-425 and 20-400 connections Cap from 986299 to hold thermometer O-ring to hold thermometer (thermometer not included)



Micro Concentration

Concentration of solute may be done within the V Vial®, avoiding a transfer. Connect the vacuum adapter (Cat. No. 168378) with a connector and attach hose connectors as shown. Introduce nitrogen or argon through the uppermost fitting and use the other fitting for venting. Solvent can be recovered if PTFE tubing is coiled within an ice bath.

Uses the following items:

Cat. No.	Description
W986294NG	1 mL Graduated V Vial® with 13-25 cap
125480	Wheaton Connection® 13-425 to 20-400
168378	Vacuum adapter with 13-425 and 20-400 threads
962515	Hose Connectors, 13-425 threads (2 required)



Micro Centrifuge Vial/Micro Freeze Dry Unit/ Micro Reflux - volumes less than 1.0 mL

Micro product V Vial® is used with an air condenser (Cat. No. 265318 or 265320) with connector (Cat. No. 125478) and magnetic stirrer to react and condense the solvent in the extended upper portion of the vial. Biological products may be attached to the freeze dryer if the Teflon®; support and filter (Cat. No. 420836) are used within the connection. Small volumes can be centrifuged within the vial if necessary.

Uses the following items:

Cat. No.	Description
W986294NG	1 mL Graduated V Vial®
125478	Wheaton Connection®, 13-425 to 13-425
265318	Air condenser/drying tube/column, 50 mm, 13-425 connection
265320	Air condenser/drying tube/column, 100 mm, 13-425 connection

Optional for Freeze Drying:

Cat. No.	Description
420836	Teflon® filter with support cap from 986294