

**Summary Report for Individual Task**  
**551-88L-3048**  
**Troubleshoot a Purifier**  
**Status: Approved**

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DISTRIBUTION RESTRICTION: Approved for public release; distribution is unlimited.

DESTRUCTION NOTICE: None

**Condition:** Aboard a vessel, at sea, at anchor or moored alongside a pier, day or night, under all sea and weather conditions, troubleshoot an Alfa Laval purifier using the Alfa Laval trouble-tracing instructions in the System Manual. While wearing appropriate PPE, (i.e. hearing protection, Nitrile gloves, eye protection, etc..) with no injuries and/or damage to equipment.

**Standard:** The Soldier knows the troubleshooting procedures of the purifier and correctly conducts troubleshooting procedures pertaining to the Alfa Laval purifier.

**Special Condition:** None

**Special Standards:** None

**Special Equipment:**

**Safety Level:** High

**MOPP:**

<b>Task Statements</b>
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**Cue:** None

<b>DANGER</b>
None

<b>WARNING</b>
None

<b>CAUTION</b>
None

**Remarks:** None

**Notes:** None

## Performance Steps

1. Demonstrate basic knowledge for troubleshooting procedures of the purifier.

a. The following applies to troubleshooting concerning functions of the separator only. It does not include the other equipment in the processing system.

b. Always start with trouble-tracing instructions in the System Manual, and if required, continue with the instructions below. If the problem still is not solved, contact your Alfa Laval representative.

2. Demonstrate basic knowledge for troubleshooting mechanical functions of a purifier (refer to Figures 551-88L-3048\_01 thru 05).

a. The separator does not start.

(1) Possible cause.

(a) Now power supply to the motor.

(b) Bowl lock screws stopping rotation.

(2) Actions to take.

(a) Check power supply.

(b) Release the lock screws.

b. Start-up time too long.

(1) Possible cause.

(a) Brake applied.

(b) Friction pads worn or oily.

(c) Motor failure.

(d) Incorrect power supply (50 Hz instead of 60 Hz).

(e) Bearings damaged or worn.

(2) Actions to take.

(a) Release the brake.

(b) Fit new or clean the friction pads.

(c) Repair or replace the motor.

(d) Use the correct power supply.

(e) Install new bearings.

c. Starting power too low.

(1) Possible causes.

(a) Motor failure.

(b) Friction pads worn.

(c) Friction pads oily.

(2) Actions to take.

(a) Repair or replace the motor.

(b) Fit new friction pads.

(c) Clean or fit new friction pads.

d. Starting power too high.

(1) Possible causes.

(a) Bowl lock screws stopping rotation.

(b) Brake is on.

(c) Motor failure.

(d) Gear worn out.

(e) Bearing damaged or worn.

## **DANGER**

Incorrect transmission is a disintegration hazard, STOP the purifier immediately.

(f) Incorrect transmission (50 Hz gear and 60 Hz power supply).

(g) Wrong direction of rotation.

(2) Actions to take.

(a) Release the lock screws.

(b) Release the brake.

(c) Repair or replace the motor.

(d) Replace the worm wheel and worm gear.

(e) Install new bearings.

(f) STOP immediately! Install correct transmission.

\_1\_ Contact your Alfa Laval representative.

\_2\_ The bowl MUST be inspected.

(g) STOP. Adjust motor power connection.

e. Separator vibrates excessively during the starting sequence.

Note: Some vibration is normal during starting sequence when the separator passes through its critical speeds.

(1) Possible causes.

## **DANGER**

An out of balance bowl is a disintegration hazard, STOP the purifier immediately.

(a) Bowl out of balance due to:

\_1\_ Poor cleaning.

\_2\_ Incorrect assembly.

\_3\_ Too few discs.

\_4\_ Insufficiently tightened bowl hood.

\_5\_ Bowl assembled with parts from other separators.

(b) Vibration dampers in frame feet worn out.

(c) Bowl spindle bent (max. 0.15 mm).

(d) Top and/or bottom bearing damages or worn.

(e) Top bearing springs defective.

(2) Actions to take.

(a) STOP immediately! Identify and rectify cause.

(b) Fit new vibration dampers.

(c) Fit a new bowl spindle.

(d) Fit new bearings.

(e) Fit new springs.

f. Separator vibrates excessively during normal running.

(1) Possible causes.

- (a) Uneven sludge deposits in sludge space.
- (b) Bearings damaged or worn.
- (c) Vibration-damping rubber washers worn out.
- (d) Spindle top bearing spring(s) broken.

(2) Actions to take.

- (a) STOP and clean bowl.
- (b) Fit new bearings.
- (c) Fit new frame feet washers every four years.
- (d) Replace all springs.

g. Separator has an unusual smell.

(1) Possible causes.

- (a) Normal occurrence during start as the (new) friction blocks slip.
- (b) Brake is applied.
- (c) Top and/or bottom bearing overheated.

(2) Actions to take.

- (a) None.
- (b) Release the brake.
- (c) Fit new bearings.

h. Separator has an unusual noise.

(1) Possible Causes.

- (a) Oil level in oil sump is too low.
- (b) Top and/or bottom bearing damaged or worn.
- (c) Friction pads worn.

(2) Actions to take.

- (a) STOP and read oil level and add oil.
- (b) Fit new bearings.
- (c) Fit new friction pads.

i. Separator speed too high.

(1) Possible causes.

## **DANGER**

Incorrect transmission is a disintegration hazard, STOP the purifier immediately.

- (a) Incorrect transmission (50 Hz gear running on 60 Hz power supply).
- (b) Frequency of power supply too high.

(2) Actions to take.

- (a) STOP immediately! Install correct transmission.
  - \_1\_ Contact your Alfa Laval representative.
  - \_2\_ The bowl MUST be inspected.

(b) Check frequency.

j. Separator speed too low.

(1) Possible causes.

- (a) Brake is on.
- (b) Friction pads worn or oily.
- (c) Motor failure.
- (d) Top and/or bottom bearings damaged or worn.
- (e) Bearing overheated/damaged.

(2) Actions to take.

- (a) Release the brake.
- (b) Fit new friction pads or clean the old ones if they are oily.

(c) Repair or replace the motor.

(d) Fit new bearings.

(e) Fit new bearings.

k. Stopping time too long.

(1) Possible causes.

(a) Brake lining worn.

(b) Brake lining oily.

(2) Actions to take.

(a) Fit new friction pads.

(b) Clean the old ones if they are oily.

l. Water in oil sump.

(1) Possible causes.

(a) Bowl casing drain obstructed.

(b) Leakage at top bearing.

(c) Condensation.

(2) Actions to take.

(a) Clean. Change oil.

(b) Fit a new seal ring and change oil.

(c) Clean the oil sump and change oil.

m. Liquid flows through bowl casing drain.

(1) Possible causes.

(a) Broken water seal.

(b) Too high throughput.

(c) The supply of displacement/sealing water is not sufficient due to clogged strainer, kinked hose or low water pressure.

(d) Seal ring on gravity/clarifier disc defective.

(e) Bowl hood seal ring defective.

(f) Bowl speed too low.

(2) Actions to take.

(a) Stop feed and feed water to create water seal.

(b) Reduce the feed.

(c) Straighten the hose or clean the strainer.

\_1\_ Check and adjust the water pressure.

\_2\_ Water pressure must be 200-600 kPa (29-87 psi).

(d) Fit a new seal ring.

(e) Fit a new seal ring.

(f) Make sure current is on and brake is off.

\_1\_ Inspect motor.

\_2\_ Inspect power transmission.

3. Demonstrate basic knowledge for troubleshooting purification faults.

a. Unsatisfactory separation result.

(1) Possible causes.

(a) Gravity disc hole too small.

(b) Incorrect separating temperature.

(c) Throughput too high.

(d) Sludge space in bowl is filled.

(e) Disc stack clogged.

(f) Bowl speed too low.

(2) Actions to take.

(a) Use a gravity disc with a larger hole.

(b) Adjust temperature.

(c) Reduce throughput.

- (d) Empty the sludge basket in the bowl.
- (e) Clean the bowl discs.
- (f) Correct the speed. See “paragraph 2.j. Separator speed too low”.

b. Outgoing water contaminated by oil.

(1) Possible causes.

- (a) Gravity disc hole too large.
- (b) Seal ring under the gravity disc defective.

(2) Actions to take.

- (a) Use a gravity disc with a smaller hole.
- (b) Fit a new seal ring.

c. Broken water seal.

(1) Possible causes.

- (a) Gravity disc too large.
- (b) Separation temperature too low.
- (c) Throughput too high.
- (d) Sealing water volume too small.
- (e) Seal ring under gravity disc defective.
- (f) Disc stack clogged.
- (g) Bowl speed too low.
- (h) Bowl incorrectly assembled.

(2) Actions to take.

- (a) Use a gravity disc with a smaller hole.
- (b) Increase temperature.
- (c) Reduce throughput.
- (d) Supply more water.

- (e) Fit a new seal ring.
- (f) Clean the bowl discs.
- (g) Correct the speed. See “paragraph 2.j. Separator speed too low”.
- (h) Examine and make correct.

4. Demonstrate basic knowledge for troubleshooting clarification faults.

a. Unsatisfactory separation result.

(1) Possible causes.

- (a) Separating temperature too low.
- (b) Throughput too high.
- (c) Feed oil contains water.
- (d) Disc stack clogged.
- (e) Sludge space in bowl filled.
- (f) Bowl speed too low.

(2) Actions to take.

- (a) Adjust temperature.
- (b) Reduce throughput.
- (c) Re-assemble and operate the separator as a purifier.
- (d) Clean the bowl discs.
- (e) Empty the sludge basket.
- (f) Correct the speed. See “paragraph 2.j. Separator speed too low”.

b. Oil discharge through water outlet.

(1) Possible causes.

- (a) Valve(s) in outlet line closed.
- (b) Disc stack clogged.
- (c) Seal ring under gravity disc is defective.
- (d) Bowl incorrectly assembled.

(2) Actions to take.

(a) Open the valve(s) and adjust to normal back pressure.

(b) Clean the bowl discs.

(c) Fit a new seal ring.

(d) Examine and make correct.

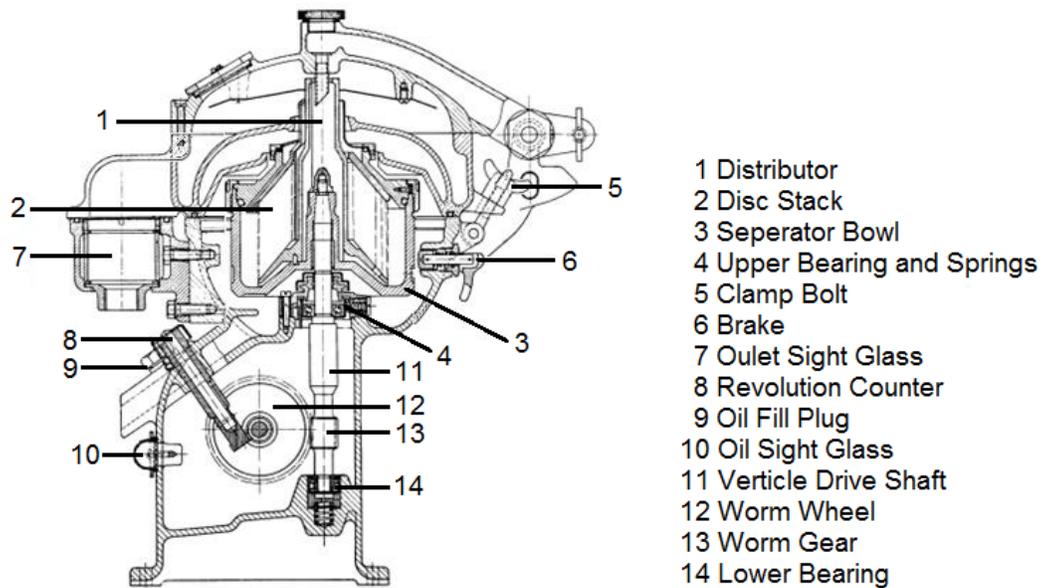


Figure 551-88L-3048\_01  
Separator cross section

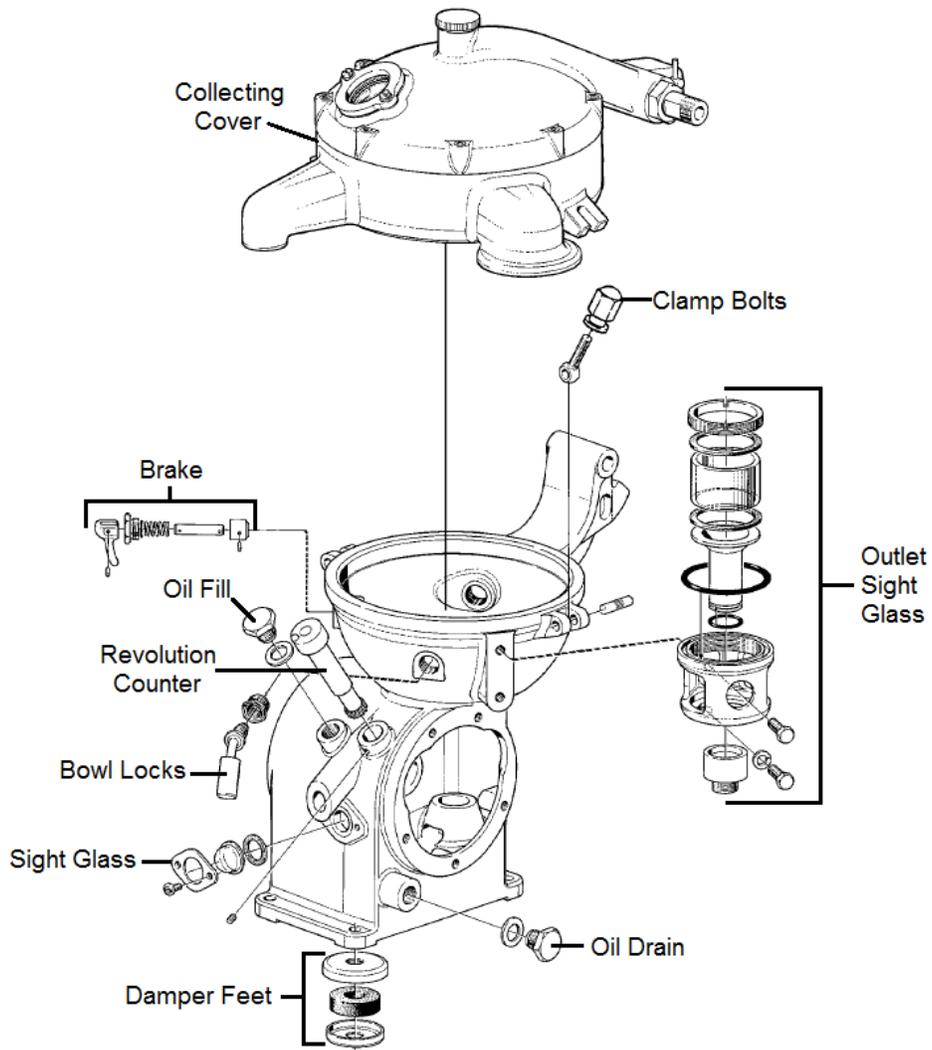


Figure 551-88L-3048\_02  
Separator exploded view

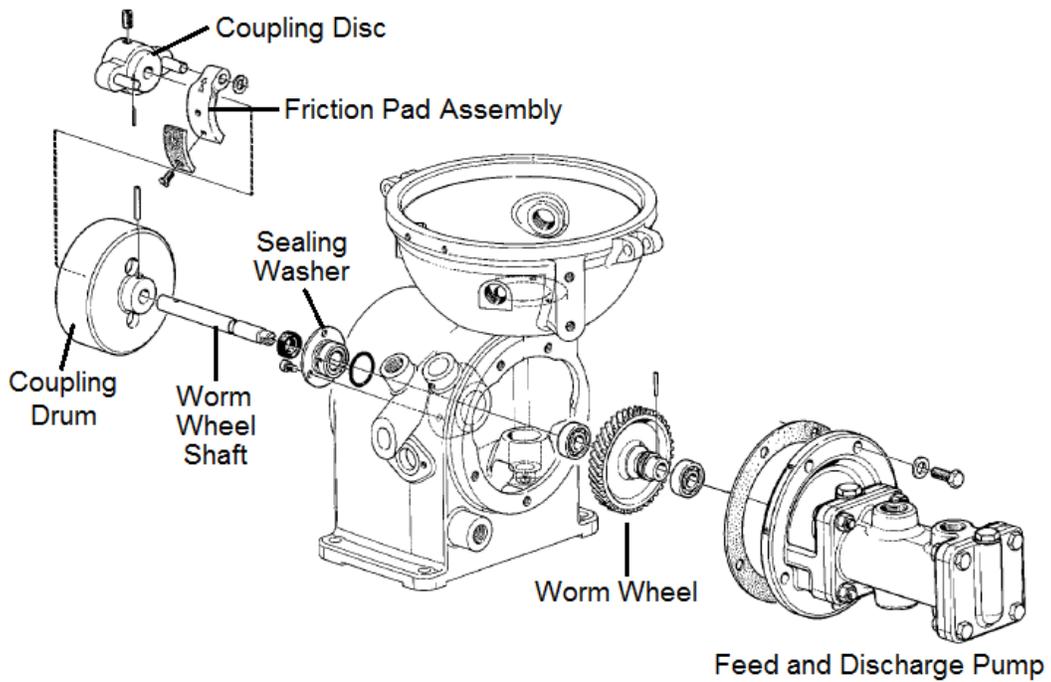


Figure 551-88L-3048\_03

Inlet and outlet pump

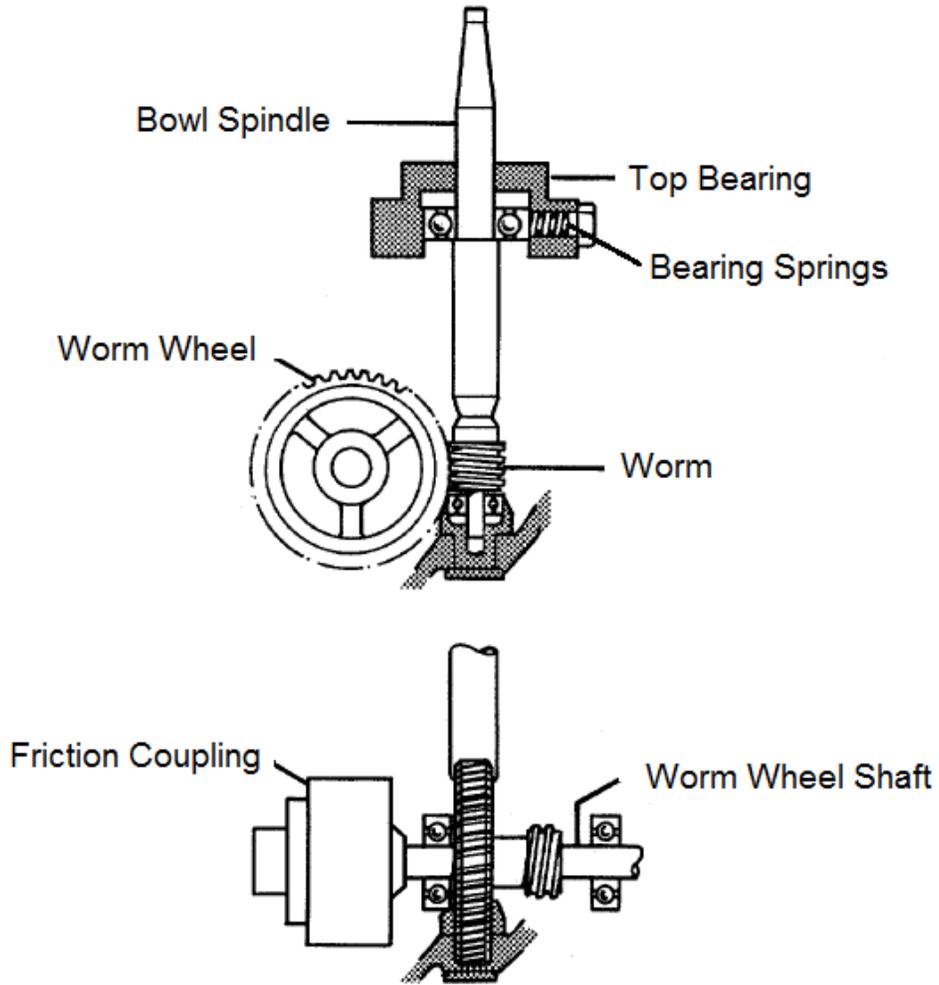


Figure 551-88L-3048\_04  
Verticle drive assembly

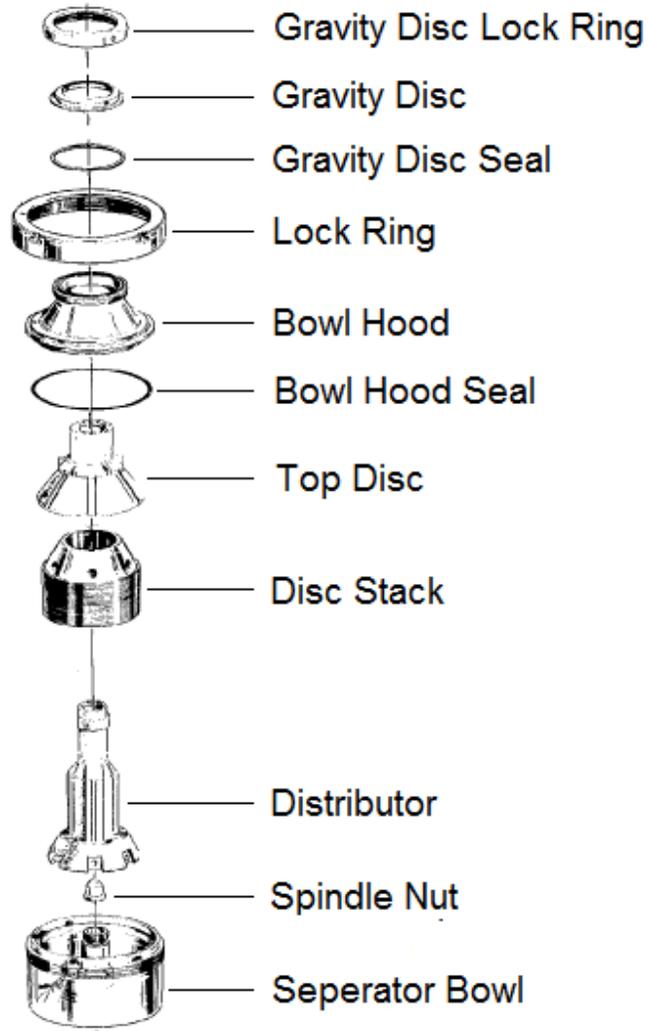


Figure 551-88L-3048\_05  
Separator bowl assembly

(Asterisks indicates a leader performance step.)

**Evaluation Preparation:** None

PERFORMANCE MEASURES	GO	NO-GO	N/A
1. Demonstrated basic knowledge for troubleshooting procedures of the purifier.			
2. Demonstrated basic knowledge for troubleshooting mechanical functions of a purifier.			
a. The separator does not start.			
b. Start-up time too long.			
c. Starting power too low.			
d. Starting power too high.			
e. Separator vibrates excessively during the starting sequence.			
f. Separator vibrates excessively during normal running.			
g. Separator has an unusual smell.			
h. Separator has an unusual noise.			
i. Separator speed too high.			
j. Separator speed too low.			
k. Stopping time too long.			
l. Water in oil sump.			
m. Liquid flows through bowl casing drain.			
3. Demonstrated basic knowledge for troubleshooting purification faults.			
a. Unsatisfactory separation result.			
b. Outgoing water contaminated by oil.			
c. Broken water seal.			
4. Demonstrated basic knowledge for troubleshooting clarification faults.			
a. Unsatisfactory separation result.			
b. Oil discharge through water outlet.			

**Supporting Reference(s):**

Step Number	Reference ID	Reference Name	Required	Primary
	TM 55-1915-224-24&P	UNIT, INTERMEDIATE DIRECT SUPPORT AND INTERMEDIATE GENERAL SUPPORT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST) FOR LUBE OIL/FUEL OIL PURIFIER MODEL NUMBER MAB103B-24, P/N MAB 103B-2	No	No

**Environment:** None

**Safety:** In a training environment, leaders must perform a risk assessment in accordance with FM 5-19, Composite Risk Management. Leaders will complete a DA Form 7566 COMPOSITE RISK MANAGEMENT WORKSHEET during the planning and completion of each task and sub-task by assessing mission, enemy, terrain and weather, troops and support available-time available and civil considerations, (METT-TC). Note: During MOPP training, leaders must ensure personnel are monitored for potential heat injury. Local policies and procedures must be followed during times of increased heat category in order to avoid heat related injury. Consider the MOPP work/rest cycles and water replacement guidelines IAW FM 3-11.4, NBC Protection, FM 3-11.5, CBRN Decontamination.

**Prerequisite Individual Tasks :** None

**Supporting Individual Tasks :**

Task Number	Title	Proponent	Status
551-88L-2043	Maintain a Purifier	551 - Transportation (Individual)	Approved

**Supported Individual Tasks :**

Task Number	Title	Proponent	Status
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551-88L-2043	Maintain a Purifier	551 - Transportation (Individual)	Approved
551-88L-1027	Demonstrate Basic Knowledge of a Purifier	551 - Transportation (Individual)	Analysis

**Supported Collective Tasks :**

<b>Task Number</b>	<b>Title</b>	<b>Proponent</b>	<b>Status</b>
N/A	N/A	Not Selected	Obsolete