



National Dredging Quality Management Program (DQM)

QUALITY ASSURANCE (QA) CHECK DESCRIPTION—ALL PLANTS

Purpose and Scope

This document is a guide for conducting annual National Dredging Quality Management Program (DQM) quality assurance (QA) checks on scows, hoppers, pipelines, and mechanical dredges.

The QA team is responsible for working with the dredger and system provider to do the following:

- Complete all required checks.
- Collect accurate data.
- Minimize operational disruptions.
- Maintain safety at all times.

There is no mandatory order for completing checks. Inspectors must consider vessel-specific conditions and apply professional judgment.

For scows and pipelines, required checks depend on the assigned profile and should be confirmed before arrival. All checks are required for hoppers and mechanical dredges.

General Notes

- Conduct checks in calm conditions when possible.
- Document environmental factors affecting accuracy.
- Record all discrepancies and corrective actions.
- Recalibrate before retesting.
- Consult senior QA staff if uncertainty exists.

Position Checks

Scow Position Check

Purpose

Verify position accuracy and track movement to and from placement areas.

Materials

- Handheld GPS or smartphone app
- DQM data stream
- Position Check Form
- Tug (if required)

Static Check

1. Allow the GPS to acquire satellites.
2. Record the GPS position near the antenna.
Note: See the DPIIP for the antenna location.
3. Record the DQM display position.
4. Enter the data and calculate the difference.
5. Record the satellite count.
6. Record the position at the opposite end of scow for the heading.

Acceptable difference: ≤ 10 ft (3 m)

Dynamic Check (If Required)

1. Secure the GPS near the antenna.
Note: See the DPIIP for the antenna location.
2. Tow the scow to the disposal area and return.
3. Compare the GPS and DQM tracks.
4. Review the data tracks inside/outside the disposal area.

Hopper, Pipeline, and Mechanical Position Check

Purpose

Verify dredge positioning accuracy.

Materials

- Handheld GPS or smartphone app
- Position Check Form

Procedure

1. Allow the GPS to acquire satellites.
2. Record the GPS position near the antenna.
Note: See the DPIIP for the antenna location.
3. Record the DQM position.
4. Enter and compare the values.
5. Record the satellite count.

Acceptable difference: ≤ 10 ft (3 m)

Hull Status Checks

Scow Hull Status

Purpose

Document the conditions triggering open/closed status.

Materials

- Camera
- QA Check spreadsheet

Procedure

Note: Take all photos from the centerline.

1. Open the doors/split hull or simulate open status by moving the sensor from the closed threshold.

2. Photograph when the status changes to open.
3. Close the doors/split hull or simulate closed status by reinstalling the sensor in the closed position.
4. Photograph when the status changes to closed.

Hopper Hull Status

Purpose

Verify hull status response.

Materials

- QA Check spreadsheet

Procedure

1. Open the doors/split hull, if practical.
2. Observe the status change on the DQM string.
3. Confirm the minimal signal delay.

Draft Sensors Check

Physical Draft Check (Scow/Hopper)

Purpose

Verify draft sensor accuracy when light and loaded.

Materials

- QA spreadsheet
- Auxiliary vessel
- Measuring tape in feet and tenths
- Radio

Procedure

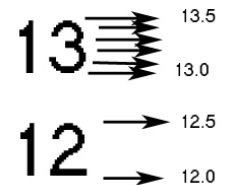
1. (Observer) Record the forward and aft draft marks from the auxiliary vessel.
2. (Onboard inspector) Record the system values.

3. Compare the averages.
4. Recalibrate if needed.

Acceptable difference: ± 0.1 ft in calm seas

How to Read Draft Marks

A draft mark is read by interpreting where the water crosses the draft mark. The height of the font used for draft marks is typically equal to one half of a foot, with the bottom of the number equal to 0 feet and the top equal to 0.5 foot. The height of the blank space between the two numbers is also 0.5 foot for a total of 1 foot of change from the bottom of one number to the bottom of the next number. In this figure, the arrow above 13.0 is 13.1 feet; the draft continues incrementing by 0.1 foot up to 13.5 feet at the top of the number.



Notes

- This check should be made both when the hopper/scow is light and when it is loaded to verify accuracy throughout the working range of the draft sensor.
- During the check, the hopper/scow should lie in relatively calm seas to minimize wave-induced measurement errors.
- The field team may need to use available resources to perform this check in varying conditions. Common modifications to this process include the following:
 - Using a tape measure to measure down to the water surface when draft marks are obscured or access is limited.
 - Using remote access software to view DQM system readings without boarding the vessel.
 - Referencing the naval architect's drawings and physical reference points on the vessel when draft marks are unreliable.

Simulated Draft Check

Purpose

Verify sensor accuracy using simulated depth.

Materials

- Sealed pipe (10–15 feet in length)
- Measuring tape
- Water source

Procedure

1. Record the initial draft.
2. Track the vessel changes.
3. Remove and mark the sensor cable.
4. Fill the pipe vertically.
5. Record the air reading.
6. Lower the sensor in 5-foot increments.
7. Verify the readings.
8. Recalibrate if needed.
9. Reinstall and confirm the accuracy.

Ullage Check (Scow/Hopper)

Purpose

Verify bin ullage sensor accuracy.

Materials

- QA spreadsheet
- Weighted ullage tape

Procedure

1. Review the DPIIP reference point.
2. Ensure a uniform surface.
3. Take fore/aft soundings.
4. Record the manual readings.

5. Record the system values.
6. Compare the results.
7. Load the bin and repeat.

Acceptable difference: ± 0.1 ft

Hopper Draghead Depth Check

Purpose

Verify the draghead depth sensors.

Materials

- Depth Check Form
- Marked tape/chain
- Radio

Procedure

1. Attach the measuring line, and note the offset from the attachment point to the draghead heel.
2. Lower the draghead to the waterline.
3. Note the manual depth.
4. Record the DQM value.
5. Repeat at three depths.

Acceptable difference: ≤ 0.5 ft

Pipeline Suction Mouth Depth Check

Purpose

Verify the ladder/suction mouth depth sensors.

Materials

- Pipeline QA spreadsheet
- Marked tape/chain
- Radio

Procedure

1. Attach the measuring line.
2. Lower the ladder to the waterline.
3. Note the depth.
4. Record the DQM value.
5. Repeat at three depths.

Acceptable difference: ≤ 0.5 ft

Pipeline Velocity Check

Dye Test

Purpose

Verify velocity instrumentation accuracy.

Materials

- Velocity Check Form
- EPA-approved dye
- Stopwatch
- Radio

Procedure

1. Run the pump with clear water.
2. Stabilize the RPM and flow.
3. Inject dye and start the timer.
4. Monitor the velocity.
5. Stop the timer at outfall.
6. Calculate and compare the velocity.
7. Test multiple times and speeds for accuracy.

Portable Doppler Flow Meter

Purpose

Verify velocity instrumentation accuracy.

Materials

- Portable doppler meter

Procedure

1. Clamp the ultrasonic sensor on the outside of the pipe.
2. Verify the on-pipe diameter on the handheld unit.
3. Run the pump with clear water.
4. Stabilize the RPM and flow.
5. Monitor the velocity.

Mechanical Dredge Depth and Position Checks

Bucket/Grab Depth Check

Purpose

Verify the accuracy of the bucket or clamshell depth sensors.

Materials

- Mechanical QA spreadsheet
- Marked sounding line or tape
- Radio

Procedure

1. Lower the bucket to a known depth.
2. Measure the waterline to the bucket reference point.
3. Record the manual depth.
4. Record the DQM depth.

5. Repeat at three operating depths.

Acceptable difference: ≤ 0.5 ft

Bucket Position Check

Purpose

Verify the bucket-positioning sensors/offsets.

Materials

- Mechanical QA spreadsheet
- Measuring tape or laser rangefinder
- Reference drawings (if available)

Procedure

1. Position the boom at known angles.
2. Measure the physical position of the bucket to the vessel GPS.
3. Record the system values.
4. Compare the results.