United States Coast Guard
Maintenance and Logistics Command, Atlantic (MLCA)

MLCA NAVAL ENGINEERING DIRECTIVE (MLCA NED) – 5735-01

INSPECTION AND TEST PROCEDURE FOR BUOY CHAIN WINCH MODEL CW-1 ONBOARD WLM 551 THROUGH 564 AND WLB 201-215

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ABSTRACT

This directive covers the inspection and testing of the Buoy Chain Winch Model CW-1 onboard Coast Guard Cutters WLM 551-564 and WLB 201-215. The procedures listed here are based upon guidance of the United States Coast Guard Naval Engineering Manual, COMDTINST M9000.6, manufacturers' recommendations and other noted references.

FEEDBACK & UPDATES

The latest version of this document is available at:

http://www.uscg.mil/mlclant/VDiv/specs/default.htm

Beneficial comments, recommendations, additions, deletions and other pertinent data which may be of use to improve this document can be provided via the same website.

REVISION RECORD

Revision Date	Summary Of Changes	INITIALS
7/22/05	Initial Release	JW

REFERENCES

The following references were used to develop and/or are cited in this document.

A. Naval Engineering Manual (COMDTINST M9000.6)

B. Technical Publication for Buoy Chain Model CW-1

C. Coast Guard Maintenance and Logistics Command Atlantic (MLCA), Standard Specification 5000_STD, 2004 Edition, Auxiliary Machinery Systems

Personnel

The roles of operator, rigger, and inspector are designated as follows: the operator shall operate the system as specified, the rigger shall perform all necessary tasks to facilitate the specified operation, and the inspector shall perform all specified inspections and verifications. A repair facility may be required to fill one or more of these three roles, and shall perform each task assigned. The following bullet styles denote:

- An operational task that shall be performed by one or more operators or a rigging task shall be performed by one or more riggers, as applicable.

☐ An inspection or verification that shall be performed by one or more inspectors.

Required Test Weights

Static Load Test Weight: 24,750 (+1,238 -0) pounds

Rated Load Test Weight: 16,500 (+0 -825) pounds

Emergency Brake Release Test Weight: 5,000 (+0 -250) pounds

Part 1. Visual Inspection.

Visually inspect the following components for corrosion, wear, or damage and determine that the system is safe to handle weights.

1.1 Load-Bearing Machinery and Structure:

☐ Wire rope assembly.

☐ Wire rope attachment points.

☐ Port and Stbd frame assemblies.

☐ Level wind arm assembly.

☐ Level wind hydraulic cylinder assembly.

☐ Hydraulic motor foundation and fasteners.

☐ Pillow blocks, shim plates, and fasteners.

☐ Bull and pinion gears.

☐ Foundation bolts.

☐ Level wind roller chock.

☐ Ratchet/pawl assembly.

1.2 Hydraulic Components:

☐ Motor and manifold.

☐ Brake assembly.

☐ Isolation valves.

☐ All hoses and piping/tube.

☐ Brake release hand pump.

☐ Directional control valves.

1.3 Miscellaneous Electrical and Mechanical Components:

☐ Winch payout/inhaul joystick.

☐ Heater and heater control.

☐ 24 volt power supply.

☐ All electrical cabling.

☐ Electrical connection boxes.

☐ Level wind arm joy stick.

☐ Electronics cabinet.

☐ Heater fan.

Part 2. No-Load Operational Test.

2.1 No-Load Operational Test:

- Secure the wire rope and any attachments to the buoy chain winch drum prior to operation to allow full rotation of the drum.

- Operate the buoy chain winch through its full range of motion for a minimum of 5 minutes.

2.1.1 Verify all components listed below are in working order and further verify that the system is safe to handle test weights.

☐ Control Power Available On/Off Switch.

☐ Winch Power On/Off.

☐ Cabinet Heater On/Off.

☐ Winch payout/inhaul joystick.

☐ Level wind arm joystick.

☐ Power On indicator light.

☐ Heater On indicator light.

☐ Control Power Available indicator light.

2.1.2 Perform the following checks while operating the buoy chain winch and level wind arm.

- Rotate the winch in the pay-out direction at full speed.

☐ Verify that it takes 28 ± 2 seconds for the drum to make 1 complete revolution.

- Rotate the winch in the in-haul direction at full speed.

☐ Verify that it takes 28 ± 2 seconds for the drum to make 1 complete revolution.

- Rotate the winch in both directions at varying speeds for 5 minutes, stopping and starting several times.

☐ Verify the hydraulic brake sets and releases properly without overheating.

☐ Verify that there is no unusual or excessive noise, vibration, or binding.

☐ Verify proper alignment between the bull and pinion gears.

☐ For future reference, note how the alignment between the bull and pinion gear affect the amount of noise and vibration emitted from the winch.

- Extend and retract the level wind cylinder through it's full range of motion.

☐ Verify that there is no excessive or unusual noise, vibration, or binding.

- Engage and disengage the ratchet pawl mechanism.

☐ Verify that the ratchet pawl mechanism functions freely with no binding. Verify the pawl engages the slots in the ratchet ring properly.

Part 3. Buoy Chain Winch Weight Test.

3.1 Static Load Test:

WARNING!

Do not attempt to operate the winch with the static load applied.

- Reeve the winch wire rope and buoy chain through the level wind roller chock, the hydraulic chain stopper sheave, and off the side of the buoy deck.

NOTICE!

The level wind hydraulic cylinder should be positioned somewhere between fully extended and fully retracted during the static load test to verify that the piston and rod seals are not leaking.

- Extend or retract the level wind arm hydraulic cylinder, as required, so that hydraulic fluid is supporting the piston in lieu of the piston being hard up against the cap or rod end of the cylinder.

☐ Verify that there are at least 5 complete dead turns of wire rope on the winch drum.

- Suspend a test weight of **24,750 (+1,238 -0) pounds** from the winch wire rope using external means.

- Leave the test weight suspended from the winch for 10 minutes.

☐ Verify that the hydraulic brake does not slip.

☐ Verify that the level wind arm does not drift or leak.

- Remove the test weight from the winch.

☐ Verify no damage or deformation to the winch attachment points (load-bearing fasteners and welds).

☐ Verify no damage or deformation to the wire rope and end fittings.

3.2 Rated Load Test:

- Reeve the winch wire rope and buoy chain through the level wind roller chock, the hydraulic chain stopper sheave, and off the side of the buoy deck.

- Suspend a test weight of **16,500 (+0 -825) pounds** from the buoy chain winch.

- Raise and lower the test weight through 10 complete cycles, and through as large a hoisting range as practicable.

☐ Verify that no unusual noise or vibration is emitted from the winch.

- Stop and hold the test weight for 15 seconds once in the up direction, then once in the down direction. Do this at least once during 3 of the 10 cycles.

☐ Verify that the hoist brake stops and controls the test weight with no slippage or overheating.

- Remove the test weight from the winch.

☐ Verify no damage or deformation to the winch attachment points (load-bearing fasteners and welds).

☐ Verify no damage or deformation to the wire rope assembly.

3.3 Emergency Brake Release Test:

- Suspend a test weight of **5000 (+0 -250) pounds** from the buoy chain winch.

- Release the brake using the hydraulic hand pump, allowing the winch to pay out manually.

☐ Verify that the load is controllable and that the hand pump and valves function properly.

- Remove the test weight from the winch.

☐ Verify no damage or deformation to the winch attachment points (load-bearing fasteners and welds).

☐ Verify no damage or deformation to the wire rope assembly.

Part 4. Label plates and test reports.

- Document the satisfactory completion of the procedure by fabricating and installing a label plate and submitting a report as specified in MLCA Std Spec 5000_STD.