

*Engineering Control Center (ECC)* means the centralized engineering control, monitoring, and communications location.

*Failsafe* means that upon failure or malfunction of a component, subsystem, or system, the output automatically reverts to a pre-determined design state of least critical consequence. Typical failsafe states are listed in Table 62.10-1(a).

TABLE 62.10-1(a)—TYPICAL FAILSAFE STATES

System or component	Preferred failsafe state
Cooling water valve .....	As is or open.
Alarm system .....	Annunciate.
Safety system .....	Shut down, limited, or as is & alarm.
Burner valve .....	Closed.
Propulsion speed control .....	As is.
Feedwater valve .....	As is or open.
Controllable pitch propeller ..	As is.
Propulsion safety trip .....	As is & alarm.
Fuel tank valve .....	See §56.50-60(d).

*Flooding safety* refers to flooding detection, watertight integrity, and dewatering systems.

*Independent* refers to equipment arranged to perform its required function regardless of the state of operation, or failure, of other equipment.

*Limit control* means a function of an automatic control system to restrict operation to a specified operating range or sequence without stopping the machinery.

*Local control* means operator control from a location where the equipment and its output can be directly manipulated and observed, e.g., at the switchboard, motor controller, propulsion engine, or other equipment.

*Manual control* means operation by direct or power-assisted operator intervention.

*Monitor* means the use of direct observation, instrumentation, alarms, or a combination of these to determine equipment operation.

*Remote control* means non-local automatic or manual control.

*Safety trip control system* means a manually or automatically operated system that rapidly shuts down another system or subsystem.

*System* means a grouping or arrangement of elements that interact to perform a specific function and typically includes the following, as applicable:

- A fuel or power source.

- Power conversion elements.
- Control elements.
- Power transmission elements.
- Instrumentation.
- Safety control elements.
- Conditioning elements.

*Vital system or equipment* is essential to the safety of the vessel, its passengers and crew. This typically includes, but is not limited to, the following:

Fire detection, alarm, and extinguishing systems.

Flooding safety systems.

Ship service and emergency electrical generators, switchgear, and motor control circuits serving vital electrical loads.

The emergency equipment and systems listed in §112.15 of this chapter.

Propulsion systems, including those provided to meet §58.01-35.

Steering systems.

**Subpart 62.15—Equivalents**

**§ 62.15-1 Conditions under which equivalents may be used.**

(a) The Coast Guard accepts a substitute or alternate for the requirements of this part if it provides an equivalent level of safety and reliability. Demonstration of functional equivalence must include comparison of a qualitative failure analysis based on the requirements of this part with a comparable analysis of the proposed substitute or alternate.

**Subpart 62.20—Plan Submittal**

**§ 62.20-1 Plans for approval.**

(a) The following plans must be submitted to the Coast Guard for approval in accordance with § 50.20-5 and § 50.20-10 of this chapter:

- (1) A general arrangement plan of control and monitoring equipment, control locations, and the systems served.
- (2) Control and monitoring console, panel, and enclosure layouts.
- (3) Schematic or logic diagrams including functional relationships, a written description of operation, and sequences of events for all modes of operation.

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(4) A description of control or monitoring system connections to non-vital systems.

(5) A description of programable features.

(6) A description of built-in test features and diagnostics.

(7) Design Verification and Periodic Safety test procedures described in subpart 61.40 of this chapter.

(8) Control system normal and emergency operating instructions.

**§ 62.20-3 Plans for information.**

(a) One copy of the following plans must be submitted to the Officer in Charge, Marine Inspection, for use in the evaluation of automated systems provided to replace specific personnel or to reduce overall crew requirements:

(1) Proposed manning, crew organization and utilization, including routine maintenance, all operational evolutions, and emergencies.

(2) A planned maintenance program for all vital systems.

(b) One copy of a qualitative failure analysis must be submitted in accordance with § 50.20-5 of this chapter for the following:

(1) Propulsion controls.

(2) Microprocessor-based system hardware.

(3) Safety controls.

(4) Automated electric power management.

(5) Automation required to be independent that is not physically separate.

(6) Any other automation that, in the judgement of the Commandant, potentially constitutes a safety hazard to the vessel or personnel in case of failure.

NOTE: The qualitative failure analysis is intended to assist in evaluating the safety and reliability of the design. It should be conducted to a level of detail necessary to demonstrate compliance with applicable requirements and should follow standard qualitative analysis procedures. Assumptions, operating conditions considered, failures considered, cause and effect relationships, how failures are detected by the crew, alternatives available to the crew, and possible design verification tests necessary should be included. Questions regarding failure analysis should be referred to the Marine Safety Center at an early stage of design.

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**§ 62.20-5 Self-certification.**

(a) The designer or manufacturer of an automated system shall certify to the Coast Guard, in writing, that the automation is designed to meet the environmental design standards of § 62.25-30. Plan review, shipboard testing, or independent testing to these standards is not required.

(b) [Reserved]

NOTE: Self-certification should normally accompany plan submittal.

**Subpart 62.25—General Requirements for All Automated Vital Systems**

**§ 62.25-1 General.**

(a) Vital systems that are automatically or remotely controlled must be provided with—

(1) An effective primary control system;

(2) A manual alternate control system;

(3) A safety control system, if required by § 62.25-15;

(4) Instrumentation to monitor system parameters necessary for the safe and effective operation of the system; and

(5) An alarm system if instrumentation is not continuously monitored or is inappropriate for detection of a failure or unsafe condition.

(b) Automation systems or subsystems that control or monitor more than one safety control, interlock, or operating sequence must perform all assigned tasks continuously, i.e., the detection of unsafe conditions must not prevent control or monitoring of other conditions.

(c) Vital control and alarm system consoles and similar enclosures that rely upon forced cooling for proper system operation must meet section 41.23.2 of the American Bureau of Shipping's "Rules for Building and Classing Steel Vessels."

**§ 62.25-5 All control systems.**

(a) Controls for engines and turbines equipped with jacking or turning gear must meet section 41.21.4 of the American Bureau of Shipping's "Rules for Building and Classing Steel Vessels."