The American Boat & Yacht Council, Inc.

ABYC

Setting Standards for Safer Boating

ABYC Website: www.abycinc.org

3069 Solomons Island Road
Edgewater, MD 21037
(410) 956-1050 ph. (410) 956-2737 fax

E-mail: info@abycinc.org

ABYC technical board rules provide that all reports, including standards and technical information reports, are advisory only. Their use is entirely voluntary. They are believed to represent, as of the date of publication, the consensus of knowledgeable persons, currently active in the field of small craft, on performance objectives that contribute to small boat safety.

The American Boat & Yacht Council assumes no responsibility whatsoever for the use of, or failure to use, standards or technical information reports promulgated by it, their adaptation to any processes of a user, or any consequences flowing therefrom.

Prospective users of the standards and technical information reports are responsible for protecting themselves against liability for infringement of patents.

The American Boat & Yacht Council standards and technical information reports are guides to achieving a specific level of design or performance, and are not intended to preclude attainment of desired results by other means.

ABYC reviews each standard or technical report at least every five years at which time it may be reaffirmed, revised , or cancelled. ABYC invites your written comments and suggestions via our website.

Reaffirmed 7/03

P-21 MANUAL HYDRAULIC STEERING SYSTEMS

Table of Contents

21.1 PURPOSE 1

21.2 SCOPE 1

21.3 REFERENCED ORGANIZATIONS 1

21.4 DEFINITIONS 1

21.5 GENERAL REQUIREMENTS 2

21.6 REQUIREMENTS - MATERIALS 3

21.7 REQUIREMENTS - OUTBOARD ENGINES AND STERNDRIVES 3

21.8 REQUIREMENTS - STEERING SYSTEM 4

21.9 REQUIREMENTS - INSTALLATION 4

21.10 REQUIREMENTS - BOAT STEERING SYSTEM TESTING 5

P-21 APPENDIX 11

P-21 MANUAL HYDRAULIC STEERING SYSTEMS

Based on ABYC's assessment of the existing technology, and the problems associated with achieving the goals of this standard, ABYC recommends compliance with this standard for all boats, associated equipment, and systems manufactured after July 31, 2004.

21.1 *PURPOSE*

This standard is a guide for the design, construction, and installation for remote manual hydraulic steering systems, and the major components thereof.

21.2 *SCOPE*

21.2.1 This standard applies to remote manual hydraulic steering systems used with single and twin engine installations of outboard engines over 20 horsepower per outboard engine, inboard, sterndrive, and water jet drives.

21.2.1.1 The outboard engine steering system requirements are for the following two types of steering systems with respect to the attachment at the reaction end:

21.2.1.1.1 engine mounted steering systems, and

21.2.1.1.2 boat mounted steering systems.

NOTE: There may be circumstances where interference between the engine pan and the steering system would preclude compliance with this standard's requirements with respect to the clearance between the pan and the steering system, during some combinations of trim and tilt, for outboard engines designed before August 1, 2000.

21.3 *REFERENCED ORGANIZATIONS*

ABYC - American Boat & Yacht Council, Inc., 3069 Solomons Island Road, Edgewater, MD 21037-1416. Phone: (410) 956-1050. Fax: (410) 956-2737. Web site: www.abycinc.org

CFR - Code of Federal Regulations. May be obtained from the U.S. Coast Guard, 2100 Second St. S.W., Washington, DC 20593. Phone: (202) 593-0001 or from the U.S. Government Printing Office Bookstore: http://bookstore.gpo.gov. Also available from ABYC in *Rules and Regulations for Small Craft*.

SAE - Society Of Automotive Engineers, 4000 Commonwealth Drive, Warrendale, PA 15096 Phone: (412) 776-4841. Fax: (724) 776-0750. Web site: www.sae.org

21.4 *DEFINITIONS*

For the purposes of this standard, the following definitions apply.

Boat mounted steering system - A steering system in which the reactionary forces of the output hydraulic steering device are resisted by the boat.

Burst pressure - The pressure at which the system exceeds the ultimate strength of the weakest hydraulic component resulting in a release of hydraulic fluid.

Component interface - A point in the steering system where a connection is made between components that are not supplied as part of the same assembly kit, e.g., if oil lines are not shipped as part of the steering kit, there is an interface between the helm and oil lines, and between the output device and oil lines. An interface may be mechanical or hydraulic.

a. hydraulic interface - An interface between two or more hydraulic components where force and motion are transmitted by hydraulic fluid.

b. mechanical interface - An interface where force and motion are transmitted mechanically.

Drag link (also known as link rod) - A device in an engine mounted steering system by which the linear force of the output ram is transmitted to the engine steering arm.

Helm displacement - Output volume of hydraulic fluid moved per helm revolution.

Hydraulic helm - A mechanism, exclusive of the steering wheel or other means, through which operator input force is converted to hydraulic pressure and flow.

Minimum retained system performance - System capability after test(s) such that at least 90% of the engine steering arm travel normally available each side of the mid-position may be attained by exertion of no more than 20 foot-pounds (27 Newton-meters) of torque at the helm through the wheel or other normal control. This criterion does not define steering system performance while a boat is underway, but is intended to provide quantitative limits for design and testing purposes.

Engine mounted steering system - A steering system in which the reactionary forces of the output hydraulic steering device are resisted by the propulsion device.

Operating temperature range - The operating temperature ranges are as follows:

a. normal temperature range - -4°F (-20°C) to 140°F (60°C) - Locations outside of spaces in which engine exhaust lines or other high heat sources are installed.

b. high temperature range - -4°F (-20°C) to 185°F (85°C) Locations inside spaces in which engine exhaust lines or other high heat sources are installed.