DNV·GL

RULES FOR CLASSIFICATION

High speed and light craft

Edition December 2015

Part 5 Ship types

Chapter 1 Passenger craft

DNV GL AS

FOREWORD

DNV GL rules for classification contain procedural and technical requirements related to obtaining and retaining a class certificate. The rules represent all requirements adopted by the Society as basis for classification.

Any comments may be sent by e-mail to *rules@dnvgl.com*

CURRENT – CHANGES

This is a new document.

The rules enter into force 1 July 2016.

CONTENTS

SECTION 1 GENERAL REQUIREMENTS

1 Classification

1.1 Class notation

1.1.1 High speed and light craft built in compliance with relevant requirements in the following may be given class notation:

Passenger craft

1.1.2 In addition to requirements given in Pt.1, Pt.2, Pt.3, and Pt.4 of the rules the requirements in this section are aimed at a level of relevant technical standard appropriate for the issue of high speed craft safety certificates in accordance with the *International Code of Safety for High-Speed Craft*, 2000.

1.1.3 For the application of these rules, wherever the term *Administration* is quoted, this shall be read as Society.

1.2 Application

1.2.1 The requirements given in this section of the rules apply to craft which carries more than 12 passengers.

Passenger is defined as every person other than:

.1 the master and members of the crew or other persons employed or engaged in any capacity on board a craft on the business of that craft; and
.2 a child under one year of age.

(2000 HSC Code 1.4.39)

1.2.2 The requirements in this section of the rules apply to *passenger craft which do not proceed in the course of their voyage more than 4 hours at operational speed from a place of refuge when fully laden*.

(2000 HSC Code 1.3.2.1)

The requirements may also be applied for more extended service upon acceptance by the flag state of the craft.

1.2.3 The technical requirements to the craft is dependant on the number of passengers. Craft carrying not more than 450 passengers shall be in compliance with the 2000 HSC Code category A craft, while craft carrying more than 450 passengers shall be in compliance with category B craft.

Guidance note:

Category A craft is any high-speed passenger craft:

.1 operating on a route where it has been demonstrated to the satisfaction of the flag and port states that there is a high probability that, in the event of an evacuation at any point of the route, all passengers and crew can be rescued safely within the least of:

- *the time to prevent persons in survival craft from exposure causing hypothermia in the worst intended condition,*
- *the time appropriate with respect to environmental conditions and geographical features of the route, or*
- *4 hours; and*

.2 carrying not more than 450 passengers.

(2000 HSC Code 1.4.10)

Category B craft is any high-speed craft, other than a category A craft, with machinery and safety systems arranged such that, in the event of damage disabling any essential machinery and safety systems in one compartment, the craft retains the capability to navigate safely.

(2000 HSC Code 1.4.11)

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2 Documentation

2.1 General

2.1.1 Documentation shall be submitted as required by Table 1.

Table 1 Documentation requirements

Object	*Documentation type*	*Additional description*	*Info*
Propulsion and steering arrangements, general	Z071 – Failure mode and effect analysis	The FMEA should follow guidelines in HSC Code Annex 4 and should include at least: — machinery systems and associated controls — directional control system — stabilization system — integrated control and monitoring system — electrical system. For Category B Passenger Craft, the FMEA shall take into consideration fire and flooding in one compartment (except in bridge) as a single failure scenario.	AP
	Z030 - Arrangement plan		FI
Operation	Z222 – Vessel operation manual	The contents may be modified in relation to the type of craft and the contents of other manuals (for instance the stability manual).	FI
Damage stability	B070 – Preliminary damage stability calculation		AP
	B030 – Internal watertight integrity plan		FI
	B130 – Final damage stability		AP
AP = For approval; FI = For information ACO = As carried out; L = Local handling; R = On request; TA = Covered by type approval; VS = Vessel specific			

Guidance note:

Details of the damage stability documentation are given in DNVGL-CG-0157

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For general requirements to documentation, including definition of the info codes, see SHIP Pt.1 Ch.3 Sec.2.
For a full definition of the documentation types, see SHIP Pt.1 Ch.3 Sec.3.

SECTION 2 PASSENGER ACCOMMODATION

1 Passenger and crew accommodation

1.1 Arrangement

1.1.1 Passenger and crew accommodation shall be designed and arranged so as to protect the occupants from unfavourable environmental conditions and to minimize the risk of injury to occupants during normal and emergency conditions.

1.1.2 Spaces accessible to passengers shall not contain controls, electrical equipment, high temperature parts and pipelines, rotating assemblies or other items from which injury to passengers could result, unless such items are adequately shielded, isolated, or otherwise protected.

1.1.3 Passenger accommodation shall not contain operating controls unless the operating controls are so protected and located that their operation by a crew member is unlikely to be impeded by passengers during normal and emergency conditions of operation.

1.1.4 Adequate means to notify passengers to be seated shall be provided. Normally an intercom-system is required.

1.2 Number of passengers

1.2.1 The number of passengers used for the maximum loading condition of the craft shall be established from the number of permanent seats onboard.

1.2.2 For high speed light craft only seats of aircraft type should be counted.

For light craft even other types of seats may be used if this is found acceptable when the risk of injuries on passengers in the event of collision is found acceptable.

1.3 Windows

1.3.1 Windows in passenger and crew accommodation shall be made of material which will not break into dangerous fragments if fractured. For strength of windows, see Pt.3 Ch.6 Sec.3 [7].

2 Seat construction

2.1 Seats

2.1.1 A seat shall be provided for each passenger and crew member that the high speed and light craft is certified to carry.

2.1.2 Sleeping seats of aircraft type may be used. No sleeping berth accommodation shall be provided for the passengers. No sleeping berth accommodation shall be provided for the crew unless a comprehensive review of the fire safety measures and evacuation procedures has been made.

2.1.3 Seats shall be of a form and design such as to minimize the possibility of injury and to avoid trapping of the occupants particularly in emergency conditions. Dangerous projections and hard edges shall be eliminated.

2.1.4 Adjustable, folding or rotatable seats, if fitted, shall be provided with locking mechanisms which shall be designed so as to lock automatic in either the stowed or ready positions when the control is released.

2.1.5 Seats shall not move or distort under normal service conditions. They may, however, distort under abnormal loads, in which case the risk of injury to occupants or persons thrown against them shall be minimized.

2.1.6 The installation of seats shall be such as to allow adequate access to any part of the accommodation space. In particular, they shall not obstruct access to, or use of, any essential or emergency equipment or required means of escape.

2.2 Safety belts

2.2.1 Onboard high speed craft safety belts shall be provided for all seats from which the craft may be operated.

2.2.2 The need to provide safety belts for other persons on board the craft having regard to other protection and the accelerations likely to be experienced shall be examined. For high speed craft seats facing towards solid bulkheads or other constructions which may cause injuries in case of collision shall be arranged with safety belts.

2.2.3 Safety belts, when correctly adjusted, shall prevent the wearer's trunk from coming into contact with potentially dangerous objects under normal and emergency conditions.

2.2.4 Safety belts and their attachments shall be sufficiently strong to withstand the loads likely to arise due to a collision.

2.3 Accelerations

2.3.1 High speed craft which may be exposed to acceleration levels which may cause injuries on passengers, shall have the possibility to measure the acceleration level onboard.

Craft with design collision level above 12G is also to have arrangements to monitor vertical acceleration level in service.

3 Baggage, store and cargo compartments

3.1 Arrangement

3.1.1 Provision shall be made to prevent shifting of baggage, store and cargo compartment contents, having due regard to occupied compartments and accelerations likely to arise. If safeguarding by positioning is not practicable, an adequate means of restraint for the baggage, stores and cargo shall be provided.

3.1.2 Controls, electric equipment, high temperature parts, pipelines or other items, the damage or failure of which could affect the safe operation of the craft, shall not be located in baggage, store and cargo compartments unless such items are adequately protected so that they cannot be damaged or, where applicable, operated inadvertently by loading, unloading or by movement of the contents of the compartment.

3.1.3 Loading limits, if necessary, shall be durably marked in those compartments.

3.1.4 Having regard to the purpose of the craft, the closures of the exterior openings of the luggage and cargo compartments as well as special category spaces shall be appropriately weathertight.

4 Deck, floors and railings

4.1 Deck

4.1.1 On high speed craft passengers shall not be carried on open deck unless provided with passenger seats and shielded from wind.

4.1.2 Open decks which are not intended for passenger transport and doors leading to such decks shall be marked with signboards restricting passengers to be on deck at sea.

4.1.3 Decks, walkways, stairs etc. which are intended for passenger transport shall be of non skid type. Indoor floors may have carpets.

4.2 Railings

4.2.1 All passenger accommodations, passenger decks etc. shall be surrounded by adequate railing of minimum 1 000 mm height.

4.2.2 Entrances, stairs, gangways etc. shall have handholds on both sides.

SECTION 3 INTACT AND DAMAGE STABILITY

1 Requirements

1.1 General

1.1.1 The requirements of 2000 HSC Code 2.6 (including Annex 7 and 8, as applicable) and 2.10-2.13 shall be complied with in addition to the stability requirements for the assignment of the main class.

1.2 External watertight integrity

1.2.1 All external openings submerged in the equilibrium position at intermediate or final stages after damage, based on assumptions in [1.1], shall be of watertight closing and shall comply with [1.3].

1.2.2 All external openings submerged within the minimum residual range beyond the maximum equilibrium position after damage shall be fitted with closing appliances at least of weathertight standard.

1.3 Internal watertight integrity

1.3.1 The requirements of the 2000 HSC Code 2.2.2.2 apply.

1.3.2 Pipes, ducts etc. shall, to the extent possible, be positioned outside the damage penetration zone. Small pipes through which progressive flooding may not occur may be located within the damage penetration zone.

1.4 Surveys

1.4.1 Internal watertight integrity survey

The scope of the survey shall be as follows:

— the internal watertight integrity plan shall be verified as internal watertight subdivision, position and type of internal closing appliances as well as any applicable alarms, indicators, remote controls and signboards of these
— any pipes, ducts and tunnels in the damage penetration zone shall be verified as being in accordance with the plan.

1.4.2 Additional requirements are given in the 2000 HSC Code Ch.2.14.

SECTION 4 ELECTRICAL INSTALLATIONS

1 Requirements

1.1 General

1.1.1 *Separation and duplication of electrical supply should be provided for duplicated consumers of essential services. During normal operation the systems may be connected to the same power-bus, but facilities for easy separation should be provided. Each system should be able to supply all equipment necessary to maintain the control of propulsion, steering, stabilizing, navigation, lighting and ventilation, and allow starting of the largest essential electric motor at any load. Automatic load-dependent disconnection of non-essential consumers may be allowed.*

(2000 HSC Code 12.7.1)

1.2 Emergency and transitional source of electrical power

1.2.1 *Where the main source of electrical power is located in two or more compartments which are not contiguous, each of which has its own self-contained systems, including power distribution and control systems, completely independent of each other and such that a fire or other casualty in any one of the spaces will not affect the power distribution from the others, or to the services required by 12.7.3 of the HSC Code* ([1.2.2]) *or 12.7.4 of the HSC Code* ([1.2.3]), *the requirements of 12.3.1, 12.3.2 and 12.3.4 of the HSC Code* (SHIP Pt.4 Ch.8) *may be considered satisfied without an additional emergency source of electrical power, provided that:*

.1 *there is at least one generating set, meeting the requirements of 12.3.12 of the HSC Code*(SHIP Pt.4 Ch.8) *and of sufficient capacity to meet the requirements of 12.7.3* ([1.2.2]) *or 12.7.4 of the HSC Code* ([1.2.3]) *in each of at least two non-contiguous spaces;*

.2 *the arrangements required by .1 in each such space are equivalent to those required by 12.3.6.1 , 12.3.7 to 12.3.11 and 12.4 of the HSC Code* (SHIP Pt.4 Ch.8) *so that a source of electrical power is available at all times to the services required by 12.7.3* ([1.2.2]) *or 12.7.4 of the HSC Code* ([1.2.3]); *and:*

.3 *the generator sets referred to in .1 and their self-contained systems are installed such that one of them remains operable after damage or flooding in any one compartment.*

(2000 HSC Code 12.7.2)

1.2.2 *For category A craft, the emergency source of power should be capable of supplying simultaneously the following services:*

.1 *for a period of 5 h emergency lighting:*
.1.1 *at the stowage positions of life-saving appliances;*
.1.2 *at all escape routes such as alleyways, stairways, exits from accommodation and service spaces, embarkation points, etc.;*
.1.3 *in the public spaces;*
.1.4 *in the machinery spaces and main emergency generating spaces including their control positions;*
.1.5 *in control stations;*
.1.6 *at the stowage positions for firemen's outfits; and*
.1.7 *at the steering gear;*
.2 *for a period of 5 h:*
.2.1 *main navigation lights, except for "not under command" lights;*
.2.2 *electrical internal communication equipment for announcements for passengers and crew required during evacuation;*
.2.3 *fire detection and general alarm system and manual fire alarms; and*

.2.4 *remote control devices of fire-extinguishing systems, if electrical;*
.3 *for a period of 4 h of intermittent operation:*
.3.1 *the daylight signalling lamps, if they have no independent supply from their own accumulator battery; and*
.3.2 *the craft's whistle, if electrically driven;*
.4 *for a period of 5 h:*
.4.1 *craft radio facilities and other loads as set out in 14.12.2 of the HSC Codeand*
.4.2 *essential electrically powered instruments and controls for propulsion machinery, if alternate sources of power are not available for such devices;*
.5 *for a period of 12 h, the "not under command" lights; and*
.6 *for a period of 10 min:*
.6.1 *power drives for directional control devices including those required to direct thrust forward and astern, unless there is a manual alternative acceptable to the Administration as complying with 5.2.3 of the HSC Code* (SHIP Pt.4 Ch.10).

(2000 HSC Code 12.7.3)

1.2.3 *For category B craft, the electrical power available should be sufficient to supply all those services that are essential for safety in an emergency, due regard being paid to such services as may have to be operated simultaneously. The emergency source of electrical power should be capable, having regard to starting currents and the transitory nature of certain loads, of supplying simultaneously at least the following services for the periods specified hereinafter, if they depend upon an electrical source for their operation:*

.1 *for a period of 12 h, emergency lighting:*
.1.1 *at the stowage positions of life-saving appliances;*
.1.2 *at all escape routes, such as alley ways, stairways, exits from accommodation and service spaces, embarkation points, etc.;*
.1.3 *in the passenger compartments;*
.1.4 *in the machinery spaces and main emergency generating spaces including their control positions;*
.1.5 *in control stations;*
.1.6 *at the stowage positions for firemen's outfits; and*
.1.7 *at the steering gear.*
.2 *for a period of 12 h:*
.2.1 *the navigation lights and other lights required by the International Regulations for Preventing Collisions at Sea in force;*
.2.2 *electrical internal communication equipment for announcements for passengers and crew required during evacuation;*
.2.3 *fire detection and general alarm system and manual fire alarms; and*
.2.4 *remote control devices of fire-extinguishing systems, if electrical;*
.3 *for a period of 4 h on intermittent operation:*
.3.1 *the daylight signalling lamps, if they have no independent supply from their own accumulator battery; and*
.3.2 *the craft's whistle, if electrically driven;*
.4 *for a period of 12 h:*
.4.1 *the navigational equipment as required by chapter 13 of the HSC CodeWhere such provision is unreasonable or impracticable, the Administration may waive this requirement for craft of less than 5,000 tons gross tonnage;*
.4.2 *essential electrically powered instruments and controls for propulsion machinery, if alternate sources of power not available for such devices;*
.4.3 *one of the fire pumps required by 7.7.5 of the HSC Code* (Pt.4 Ch.11 App.A [7.4].1);
.4.4 *the sprinkler pump and drencher pump, if fitted;*
.4.5 *the emergency bilge pump and all the equipment essential for the operation of electrically powered remote controlled bilge valves as required by chapter 10 of the HSC Code* (Pt.4 Ch.6); *and*
.4.6 *craft radio facilities and other loads as set out in 14.12.2 of the HSC Code*);
.5 *for a period of 30 min, any watertight doors, required by chapter 2 of the HSC Code* (Pt.3 Ch.6) *to be power operated, together with their indicators and warning signals;*

.6 *for a period of 10 min, power drives for directional control devices including those required to direct thrust forward and astern, unless there is a manual alternative acceptable to the Administration as complying with 5.2.3 of the HSC Code* (SHIP Pt.4 Ch.10).

(2000 HSC Code 12.7.4)

1.2.4 *The transitional source of emergency electrical power required by paragraph 12.3.6.1.3 of the HSC Code*(SHIP Pt.4 Ch.8) *may consist of an accumulator battery suitably located for use in an emergency which should operate without recharging while maintaining the voltage of the battery throughout the discharge period within 12% above or below its nominal voltage and be of sufficient capacity and so arranged as to supply automatically in the event of failure of either the main or emergency source of electrical power at least the following services, if they depend upon an electrical source for their operation:*

.1 *for a period of 30 min, the load specified in 12.7.3.1, .2 and .3 of the HSC Code* ([1.2.2].1, [1.2.2].2 and [1.2.2].3, respectively), *or in 12.7.4.1, .2 and .3 of the HSC Code* ([1.2.3].1, [1.2.3].2 and [1.2.3].3, respectively); *and*

.2 *with respect to the watertight doors:*

.2.1 *power to operate the watertight doors, but not necessarily simultaneously, unless an independent temporary source of stored energy is provided. The power source should have sufficient capacity to operate each door at least three times, i.e. closed - open - closed, against an adverse list of 15 ; and*

.2.2 *power to the control, indication and alarm circuits for the watertight doors for half an hour.*

(2000 HSC Code 12.7.5)

1.2.5 *The requirements of 12.7.5 of the HSC Code* ([1.2.4]) *may be considered satisfied without the installation of a transitional source of emergency electrical power if each of the services required by that paragraph has independent supplies, for the period specified, from accumulator batteries suitably located for use in an emergency. The supply of emergency power to the instruments and controls of the propulsion and direction systems should be uninterruptible.*

(2000 HSC Code 12.7.6)

1.2.6 *In category A craft having limited public spaces, emergency lighting fittings of the type described in 12.7.9.1 of the HSC Code* ([1.2.8].1) *as meeting the requirements of 12.7.3.1* ([1.2.2].1) *and 12.7.5.1 of the HSC Code* ([1.2.4].1) *may be accepted, provided that an adequate standard of safety is attained*.

(2000 HSC Code 12.7.7)

1.2.7 *Provision should be made for the periodic testing of the complete emergency system including the emergency consumers required by 12.7.3* ([1.2.2]) *or 12.7.4* ([1.2.3]) *and 12.7.5 of the HSC Code* ([1.2.4]), *and should include the testing of automatic starting arrangements.*

(2000 HSC Code 12.7.8)

1.2.8 *In addition to the emergency lighting required by 12.7.3.1, 12.7.4.1 and 12.7.5.1 of the HSC Code* ([1.2.2].1, [1.2.3].1 and [1.2.4].1, respectively) *on every craft with special category spaces:*

.1 *all passenger public spaces and alleyways should be provided with supplementary electric lighting that can operate for at least 3 h when all other sources of electric power have failed and under any condition of heel. The illumination provided should be such that the approach to the means of escape can be readily seen. The source of power for the supplementary lighting should consist of accumulator batteries located within the lighting units that are continuously charged, where practicable, from the emergency switchboard. Alternatively, any other means of lighting, which is at least as effective, may be accepted by the Administration.*

The supplementary lighting should be such that any failure of the lamp will be immediately apparent. Any accumulator battery provided should be replaced at intervals having regard to the specified service life in the ambient condition that it is subject to in service; and

.2 a portable rechargeable battery operated lamp should be provided in every crew space alleyway, recreational space and every working space which is normally occupied unless supplementary emergency lighting, as required by .1, is provided.

(2000 HSC Code 12.7.9)

1.2.9 *Distribution systems should be so arranged that fire in any main vertical zone will not interfere with services essential for safety in any other such zone. This requirement will be met if main and emergency feeders passing through any such zone are separated both vertically and horizontally as widely as is practicable.*

(2000 HSC Code 12.7.10)

SECTION 5 MACHINERY AND SYSTEMS

1 Requirements for machinery

1.1 Independent means of propulsion for category B craft

1.1.1 *Category B craft should be provided with at least two independent means of propulsion so that the failure of one engine or its support systems would not cause the failure of the other engine or engine systems and with additional machinery controls in or close to the machinery space.*

(2000 HSC Code 9.7)

1.2 Means for return to a port of refuge for category B craft

1.2.1 *Category B craft should be capable of maintaining the essential machinery and control so that, in the event of fire and other casualties in any one compartment on board, the craft can return to a port of refuge under its own power.*

(2000 HSC Code 9.8)

1.3 Location of machinery, control and electric equipment

1.3.1

Machinery auxiliaries, control and electric equipment location serving independent system shall not be placed in the same fire zone.

2 Bilge pump and drainage systems

2.1 Bilge pumping and drainage systems

2.1.1 *For category B craft at least three and for category A craft at least two power bilge pumps should be fitted connected to the bilge main, one of which may be driven by the propulsion machinery. Alternatively, the arrangement may be in accordance with the requirements of 10.3.14 of the HSC Code* (Pt.4 Ch.6 Sec.4 [1.1]).

(2000 HSC Code 10.9.1)

2.1.2 *The arrangements should be such that at least one power bilge pump should be available for use in all flooding conditions which the craft is required to withstand as follows:*

.1 = *one of the required bilge pumps should be an emergency pump of a reliable submersible type having an emergency source of power; or*

.2 = *the bilge pumps and their sources of power should be so distributed throughout the length of the craft that at least one pump in an undamaged compartment will be available.*

(2000 HSC Code 10.9.2)

2.1.3 *On multihull craft, each hull should be provided with at least two bilge pumps.*

(2000 HSC Code 10.9.3)

2.1.4 *Distribution boxes, cocks and valves in connection with the bilge pumping system should be so arranged that, in the event of flooding, one of the bilge pumps may be operative in any compartment. In*

addition, damage to a pump or its pipe connecting to the bilge main should not put the bilge system out of action. When, in addition to the main bilge pumping system, an emergency bilge pumping system is provided, it should be independent of the main system and so arranged that a pump is capable of operating in any compartment under flooding conditions as specified in 10.3.3 of the HSC Code (Pt.4 Ch.6 Sec.4 [1.1]).*In that case only the valves necessary for the operation of the emergency system need be capable of being operated from above the datum.*

(2000 HSC Code 10.9.4)

2.1.5 *All cocks and valves referred to in 10.9.4 of the HSC Code* ([2.1.4]) *which can be operated from above the datum should have their controls at their place of operation clearly marked and should be provided with means to indicate whether they are open or closed.*

(2000 HSC Code 10.9.5)

SECTION 6 CONTROL AND MONITORING

1 General requirements

1.1 General

1.1.1 For instrumentation and automation, including computer based control and monitoring, the requirements of in this chapter are additional to those given in SHIP Pt.4 Ch.9 and SHIP Pt.4 Ch.10.

2 System design

2.1 General

2.1.1 *For category B craft, remote control systems for propulsion machinery and directional control should be equipped with back-up systems controllable from the operating compartment.*
(2000 HSC Code 11.2.4)

2.1.2 *Category B craft should be provided with at least two independent means of propulsion so that the failure of one engine or its support systems would not cause the failure of the other engine or engine systems and with additional machinery controls in or close to the machinery space* (local control system).
(2000 HSC Code 9.7)

DNV GL

Driven by our purpose of safeguarding life, property and the environment, DNV GL enables organizations to advance the safety and sustainability of their business. We provide classification and technical assurance along with software and independent expert advisory services to the maritime, oil and gas, and energy industries. We also provide certification services to customers across a wide range of industries. Operating in more than 100 countries, our 16 000 professionals are dedicated to helping our customers make the world safer, smarter and greener.

SAFER, SMARTER, GREENER