

**JABATAN LAUT MALAYSIA
MARINE DEPARTMENT MALAYSIA**

MALAYSIAN SHIPPING NOTICE

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Notis kepada pemilik kapal serta orang yang mempunyai kepentingan kepada kebenaran pengeluaran sijil-sijil statutory.

Notice to ship owners and persons with interest toward the delegation of statutory certification.

**IMPLEMENTATION OF THE LOAD LINES, 1966 –
INTERNATIONAL CONVENTION ON LOAD LINES,**

1. International Convention On Load Lines 1966 came into effect for Malaysia since 12th April 1971. The enforcement of the Load Lines Convention for Malaysia is done by way of the Merchant Shipping Ordinance 1952.
2. Pursuant to the above, the detail requirements and standards for the implementation of the Load Line Convention for Malaysian Ship as attached in **Appendix 1**
3. This notice is applicable throughout Malaysia and to all Malaysian ships and all ships while in Malaysian waters.

Ketua Pengarah Laut/ *Director General of Marine*
Tarikh/Date: 24 DECEMBER 2008

Appendix 1**Load Lines, 1966 - International Convention on Load Lines, 1966****Annex I - Regulations for Determining Load Lines****Chapter I - General**

The Regulations assume that the nature and stowage of the cargo, ballast, etc., are such as to secure sufficient stability of the ship and the avoidance of excessive structural stress.

The Regulations also assume that where there are international requirements relating to stability or subdivision, these requirements have been complied with

Regulation 1 - *Strength of Hull*

The Surveyor General shall satisfy itself that the general structural strength of the hull is sufficient for the draught corresponding to the freeboard assigned. Ships built and maintained in conformity with the requirements of a classification society recognized by the Surveyor General may be considered to possess adequate strength

Regulation 2 - *Application*

- (1). Ships with mechanical means of propulsion or lighters, barges or other ships without independent means of propulsion, shall be assigned freeboards in accordance with the provisions of Regulations 1-40 inclusive of this Annex.
- (2). Ships carrying timber deck cargoes may be assigned, in addition to the freeboards prescribed in paragraph (1) of this Regulation, timber freeboards in accordance with the provisions of Regulations 41-45 inclusive of this Annex.
- (3). Ships designed to carry sail, whether as the sole means of propulsion or as a supplementary means, and tugs, shall be assigned freeboards in accordance with the provisions of Regulations 1-40 inclusive of this Annex. Such additional freeboard shall be required as determined by the Surveyor General.
- (4). Ships of wood or of composite construction, or of other materials the use of which the Surveyor General has approved, or ships whose constructional features are such as to render the application of the provisions of this Annex unreasonable or impracticable, shall be assigned freeboards as determined by the Surveyor General.
- (5). Regulations 10-26 inclusive of this Annex shall apply to every ship to which a minimum freeboard is assigned. Relaxations from these requirements may be granted to a ship to which a greater than minimum freeboard is assigned on condition that the Surveyor General is satisfied with the safety conditions provided

Regulation 3 - *Definitions of Terms used in the Annexes*

- (1). *Length*. The length (L) shall be taken as 96 per cent of the total length on a waterline at 85 per cent of the least moulded depth measured from the top of the keel, or as the length from the fore side of the stem to the axis of the rudder stock on that waterline, if that be greater. In ships designed with a rake of keel the waterline on which this length is measured shall be parallel to the designed waterline.

(2). *Perpendiculars.* The forward and after perpendiculars shall be taken at the forward and after ends of the length (L). The forward perpendicular shall coincide with the foreside of the stem on the waterline on which the length is measured.

(3). *Amidships.* Amidships is at the middle of the length (L).

(4). *Breadth.* Unless expressly provided otherwise, the breadth (B) is the maximum breadth of the ship, measured amidships to the moulded line of the frame in a ship with a metal shell and to the outer surface of the hull in a ship with a shell of any other material.

(5). *Moulded Depth*

(a). The moulded depth is the vertical distance measured from the top of the keel to the top of the freeboard deck beam at side. In wood and composite ships the distance is measured from the lower edge of the keel rabbet. Where the form at the lower part of the midship section is of a hollow character, or where thick garboards are fitted, the distance is measured from the point where the line of the flat of the bottom continued inwards cuts the side of the keel.

(b). In ships having rounded gunwales, the moulded depth shall be measured to the point of intersection of the moulded lines of deck and sides the lines extending as though the gunwale were of angular design.

(c). Where the freeboard deck is stepped and the raised part of the deck extends over the point at which the moulded depth is to be determined, the moulded depth shall be measured to a line of reference extending from the lower part of the deck along a line parallel with the raised part.

(6). *Depth for Freeboard (D)*

(a). The depth for freeboard (D) is the moulded depth amidships, plus the thickness of the freeboard deck stringer plate, where fitted, plus

T (L-S)

L

if the exposed freeboard deck is sheathed,
where

T is the mean thickness of the exposed sheathing clear of deck openings, and

S is the total length of superstructures as defined in sub-paragraph (10) (d) of this Regulation.

(b). The depth for freeboard (D) in a ship having a rounded gunwale with a radius greater than 4 per cent of the breadth (B) or having topsides of unusual form is the depth for freeboard of a ship having a midship section with vertical topsides and with the same round of beam and area of topside section equal to that provided by the actual midship section.

(7). *Block Coefficient.* The block coefficient (C_b) is given by:

$$C_b = \frac{V}{L \cdot B \cdot d_1}$$

Where

V is the volume of the moulded displacement of the ship, excluding bossing, in a ship with a metal shell, and is the volume of displacement to the outer surface of the hull in a ship with a shell of any other material, both taken at a moulded draught of d_1 ; and where

d_1 is 85 per cent of the least moulded depth.

(8). *Freeboard*. The freeboard assigned is the distance measured vertically downwards amidships from the upper edge of the deck line to the upper edge of the related load line.

(9). *Freeboard Deck*. The freeboard deck is normally the uppermost complete deck exposed to weather and sea, which has permanent means of closing all openings in the weather part thereof, and below which all openings in the sides of the ship are fitted with permanent means of watertight closing. In a ship having a discontinuous freeboard deck, the lowest line of the exposed deck and the continuation of that line parallel to the upper part of the deck is taken as the freeboard deck. At the option of the owner and subject to the approval of the Surveyor General, a lower deck may be designated as the freeboard deck provided it is a complete and permanent deck continuous in a fore and aft direction at least between the machinery space and peak bulkheads and continuous athwartships. When this lower deck is stepped the lowest line of the deck and the continuation of that line parallel to the upper part of the deck is taken as the freeboard deck. When a lower deck is designated as the freeboard deck, that part of the hull which extends above the freeboard deck is treated as a superstructure so far as concerns the application of the conditions of assignment and the calculation of freeboard. It is from this deck that the freeboard is calculated.

(10). *Superstructure*

(a). A superstructure is a decked structure on the freeboard deck, extending from side to side of the ship or with the side plating not being inboard of the shell plating more than 4 per cent of the breadth (B). A raised quarter deck is regarded as a superstructure.

(b). An enclosed superstructure is a superstructure with:

(i). enclosing bulkheads of efficient construction;

(ii). access openings, if any, in these bulkheads fitted with doors complying with the requirements of Regulation 12;

(iii). all other openings in sides or ends of the superstructure fitted with efficient weathertight means of closing.

A bridge or poop shall not be regarded as enclosed unless access is provided for the crew to reach machinery and other working spaces inside these superstructures by alternative means which are available at all times when bulkhead openings are closed.

(c). The height of a superstructure is the least vertical height measured at side from the top of the superstructure deck beams to the top of the freeboard deck beams.

(d). The length of a superstructure (S) is the mean length of the part of the superstructure which lies within the length (L).

(11). *Flush Deck Ship*. A flush deck ship is one which has no superstructure on the freeboard deck.

(12). *Weathertight*. Weathertight means that in any sea conditions water will not penetrate into the ship

Regulation 4 - Deck Line

The deck line is a horizontal line 300 millimetres (12 inches) in length and 25 millimetres (1 inch) in breadth. It shall be marked amidships on each side of the ship, and its upper edge shall normally pass through the point where the continuation outwards of the upper surface of the freeboard deck intersects the outer surface of the shell (as illustrated in Figure 1), provided that the deck line may be placed with reference to another fixed point on the ship on condition that the freeboard is correspondingly corrected. The location of the reference point and the identification of the freeboard deck shall in all cases be indicated on the International Load Line Certificate (1966).

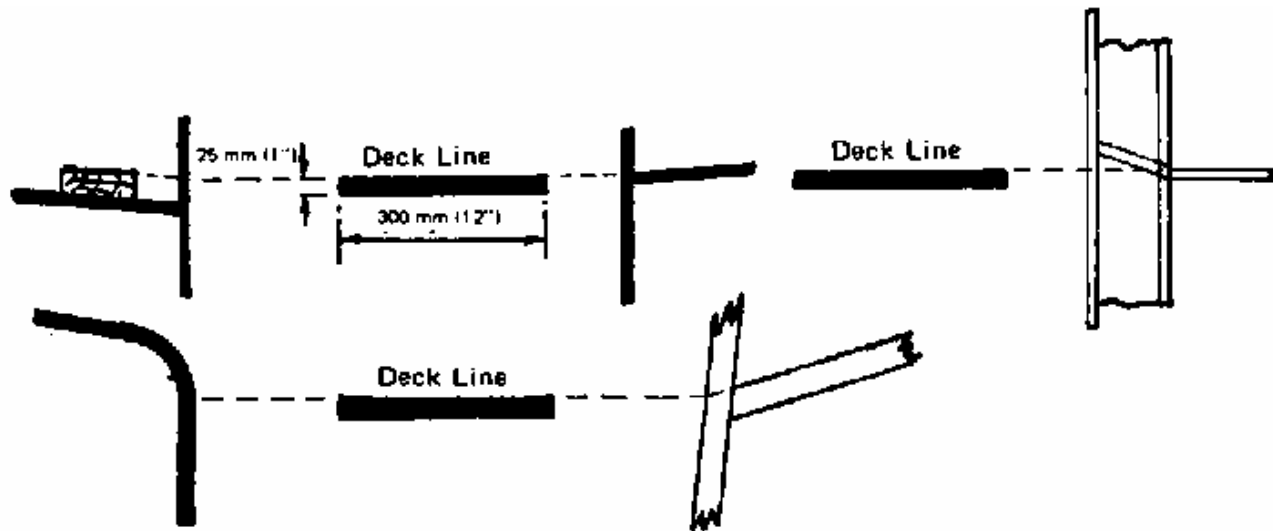


Fig. 1. Deck Line

Regulation 5 - Load Line Mark

The Load Line Mark shall consist of a ring 300 millimetres (12 inches) in outside diameter and 25 millimetres (1 inch) wide which is intersected by a horizontal line 450 millimetres (18 inches) in length and 25 millimetres (1 inch) in breadth, the upper edge of which passes through the centre of the ring. The centre of the ring shall be placed amidships and at a distance equal to the assigned summer freeboard measured vertically below the upper edge of the deck line (as illustrated in Figure 2).

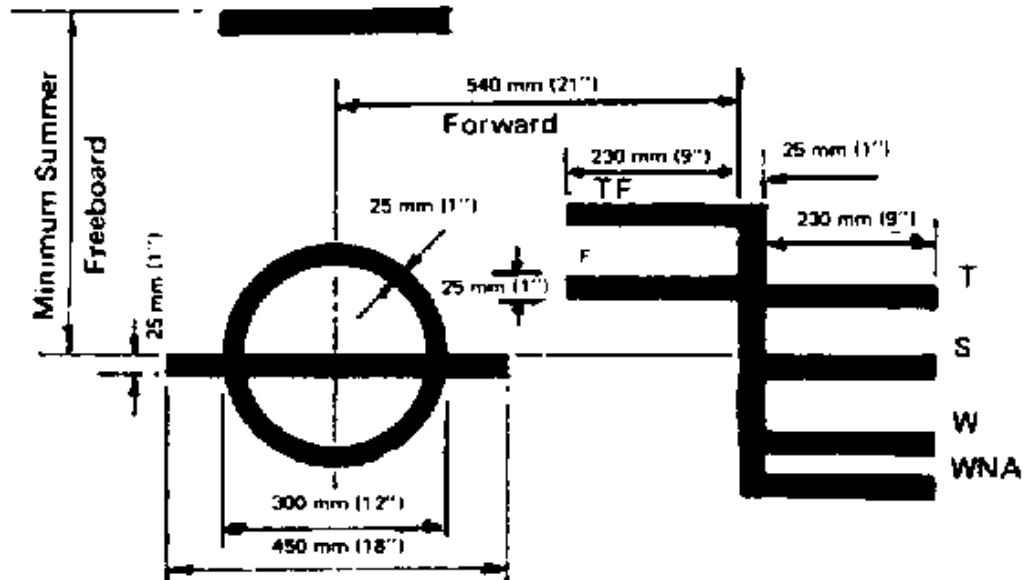


Fig. 2. Load Line Mark and lines to be used with this mark

Regulation 6 - Lines to be used with the Load Line Mark

- (1). The lines which indicate the load line assigned in accordance with these Regulations shall be horizontal lines 230 millimetres (9 inches) in length and 25 millimetres (1 inch) in breadth which extend forward of, unless expressly provided otherwise, and at right angles to, a vertical line 25 millimetres (1 inch) in breadth marked at a distance 540 millimetres (21 inches) forward of the centre of the ring (as illustrated in Figure 2).
- (2). The following load lines shall be used:
 - (a). The Summer Load Line indicated by the upper edge of the line which passes through the centre of the ring and also by a line marked S.
 - (b). The Winter Load Line indicated by the upper edge of a line marked W.
 - (c). The Winter North Atlantic Load Line indicated by the upper edge of a line marked WNA.
 - (d). The Tropical Load Line indicated by the upper edge of a line marked T.
 - (e). The Fresh Water Load Line in summer indicated by the upper edge of a line marked F. The Fresh Water Load Line in summer is marked abaft the vertical line. The difference between the Fresh Water Load Line in summer and the Summer Load Line is the allowance to be made for loading in fresh water at the other load lines.
 - (f). The Tropical Fresh Water Load Line indicated by the upper edge of a line marked TF, and marked abaft the vertical line.
- (3). If timber freeboards are assigned in accordance with these Regulations, the timber load lines shall be marked in addition to ordinary load lines. These lines shall be horizontal lines 230 millimetres (9 inches) in length and 25 millimetres (1 inch) in breadth which extend abaft unless expressly provided otherwise, and are at right angles to, a vertical line 25 millimetres (1 inch) in

breadth marked at a distance 540 millimetres (21 inches) abaft the centre of the ring (as illustrated in [Figure 3](#)).

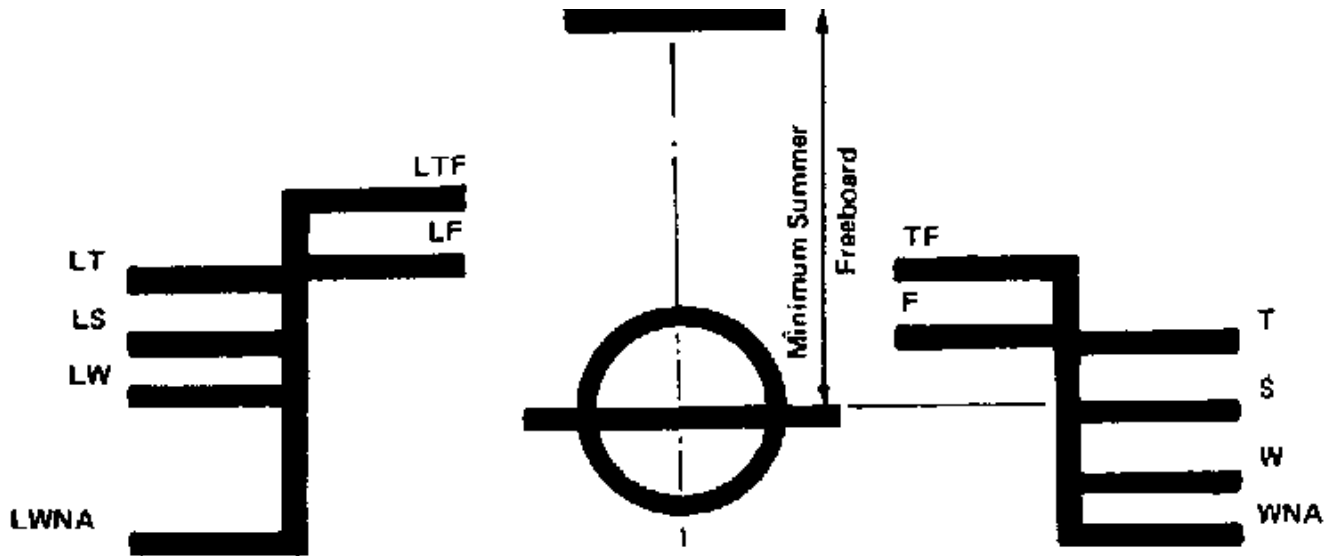


Fig. 3. Timber Load Line Mark and lines to be used with this mark

- (4). The following timber load lines shall be used:
- (a). The Summer Timber Load Line indicated by the upper edge of a line marked LS.
 - (b). The Winter Timber Load Line indicated by the upper edge of a line marked LW.
 - (c). The Winter North Atlantic Timber Load Line indicated by the upper edge of a line marked LWNA.
 - (d). The Tropical Timber Load Line indicated by the upper edge of a line marked LT.
 - (e). The Fresh Water Timber Load Line in summer indicated by the upper edge of a line marked LF and marked forward of the vertical line.
- The difference between the Fresh Water Timber Load Line in summer and the Summer Timber Load Line is the allowance to be made for loading in fresh water at the other timber load lines.
- (f). The Tropical Fresh Water Timber Load Line indicated by the upper edge of a line marked LTF and marked forward of the vertical line.
- (5). Where the characteristics of a ship or the nature of the ship's service or navigational limits make any of the seasonal lines inapplicable, these lines may be omitted.
- (6). Where a ship is assigned a greater than minimum freeboard so that the load line is marked at a position corresponding to, or lower than, the lowest seasonal load line assigned at minimum freeboard in accordance with the present Convention, only the Fresh Water Load Line need be marked.
- (7). On sailing ships only the Fresh Water Load Line and the Winter North Atlantic Load Line need be marked (as illustrated in [Figure 4](#)).

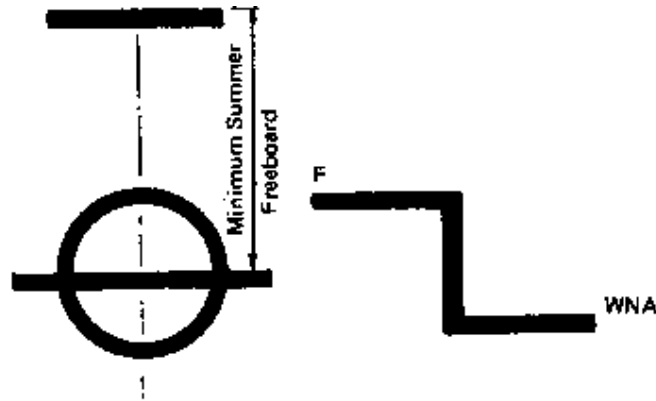


Fig. 4. Load Line Mark on sailing ships and lines to be used with this mark

- (8). Where a Winter North Atlantic Load Line is identical with the Winter Load Line corresponding to the same vertical line, this load line shall be marked W.
- (9). Additional load lines required by other international conventions in force may be marked at right angles to and abaft the vertical line specified in paragraph (1) of this Regulation.

Regulation 7 - Mark of Assigning Authority

The mark of the Authority by whom the load lines are assigned may be indicated alongside the load line ring above the horizontal line which passes through the centre of the ring, or above and below it. This mark shall consist of not more than four initials to identify the Authority's name, each measuring approximately 115 millimetres (4½ inches) in height and 75 millimetres (3 inches) in width

Regulation 8 - Details of Marking

The ring, lines and letters shall be painted in white or yellow on a dark ground or in black on a light ground. They shall also be permanently marked on the sides of the ships to the satisfaction of the Surveyor General. The marks shall be plainly visible and, if necessary, special arrangements shall be made for this purpose

Regulation 9 - Verification of Marks

The International Load Line Certificate (1966) shall not be delivered to the ship until the authorized officer or surveyor has certified that the marks are correctly and permanently indicated on the ship's sides

Chapter II - Conditions of Assignment of Freeboard

Regulation 10 - Information to be supplied to the Master

- (1). The master of every new ship shall be supplied with sufficient information, in an approved form, to enable him to arrange for the loading and ballasting of his ship in such a way as to avoid the creation of any unacceptable stresses in the ship's structure, provided that this requirement need not apply to any particular length, design or class of ship where the Surveyor General considers it to be unnecessary.

- (2). The master of every new ship which is not already provided with stability information under an international convention for the safety of life at sea in force shall be supplied with sufficient information in an approved form to give him guidance as to the stability of the ship under varying conditions of service, and a copy shall be furnished to the Surveyor General

Regulation 11 - *Superstructure End Bulkheads*

Bulkheads at exposed ends of enclosed superstructures shall be of efficient construction and shall be to the satisfaction of the Surveyor General

Regulation 12 - *Doors*

- (1). All access openings in bulkheads at ends of enclosed superstructures shall be fitted with doors of steel or other equivalent material, permanently and strongly attached to the bulkhead, and framed, stiffened and fitted so that the whole structure is of equivalent strength to the unpierced bulkhead and weathertight when closed. The means for securing these doors weathertight shall consist of gaskets and clamping devices or other equivalent means and shall be permanently attached to the bulkhead or to the doors themselves, and the doors shall be so arranged that they can be operated from both sides of the bulkhead.
- (2). Except as otherwise provided in these Regulations, the height of the sills of access openings in bulkheads at ends of enclosed superstructures shall be at least 380 millimetres (15 inches) above the deck

Regulation 13 - *Position of Hatchways, Doorways and Ventilators*

For the purpose of the Regulations, two positions of hatchways, doorways and ventilators are defined as follows:

Position 1 - Upon exposed freeboard and raised quarter decks, and upon exposed superstructure decks situated forward of a point located a quarter of the ship's length from the forward perpendicular.

Position 2 - Upon exposed superstructure decks situated abaft a quarter of the ship's length from the forward perpendicular

Regulation 14 - *Cargo and other Hatchways*

- (1). The construction and the means for securing the weathertightness of cargo and other hatchways in positions 1 and 2 shall be at least equivalent to the requirements of Regulations 15 and 16 of this Annex.
- (2). Coamings and hatchway covers to exposed hatchways on decks above the superstructure deck shall comply with the requirements of the Surveyor General

Regulation 15 - *Hatchways closed by Portable Covers and secured Weathertight by Tarpaulins and Battening Devices*

Hatchway Coamings

- (1). The coamings of hatchways closed by portable covers secured weathertight by tarpaulins and battening devices shall be of substantial construction, and their height above the deck shall be at least as follows:

600 millimetres (23½ inches) if in position 1.

450 millimetres (17½ inches) if in position 2.

Hatchway Covers

- (2). The width of each bearing surface for hatchway covers shall be at least 65 millimetres (2½ inches).
- (3). Where covers are made of wood, the finished thickness shall be at least 60 millimetres (2 inches) in association with a span of not more than 1.5 metres (4.9 feet).
- (4). Where covers are made of mild steel the strength shall be calculated with assumed loads not less than 1.75 metric tons per square metre (358 pounds per square foot) on hatchways in position 1, and not less than 1.30 metric tons per square metre (266 pounds per square foot) on hatchways in position 2, and the product of the maximum stress thus calculated and the factor 4.25 shall not exceed the minimum ultimate strength of the material. They shall be so designed as to limit the deflection to not more than 0.0028 times the span under these loads.
- (5). The assumed loads on hatchways in position 1 may be reduced to 1 metric ton per square metre (205 pounds per square foot) for ships of 24 metres (79 feet) in length and shall be not less than 1.75 metric tons per square metre (358 pounds per square foot) for ships of 100 metres (328 feet) in length. The corresponding loads on hatchways in position 2 may be reduced to 0.75 metric tons per square metre (154 pounds per square foot) and 1.30 metric tons per square metre (266 pounds per square foot) respectively. In all cases values at intermediate lengths shall be obtained by linear interpolation.

Portable Beams

- (6). Where portable beams for supporting hatchway covers are made of mild steel the strength shall be calculated with assumed loads not less than 1.75 metric tons per square metre (358 pounds per square foot) on hatchways in position 1 and not less than 1.30 metric tons per square metre (266 pounds per square foot) on hatchways in position 2 and the product of the maximum stress thus calculated and the factor 5 shall not exceed the minimum ultimate strength of the material. They shall be so designed as to limit the deflection to not more than 0.0022 times the span under these loads. For ships of not more than 100 metres (328 feet) in length the requirements of paragraph (5) of this Regulation are applicable.

Pontoon Covers

- (7). Where pontoon covers used in place of portable beams and covers are made of mild steel the strength shall be calculated with the assumed loads given in paragraph (4) of this Regulation, and the product of the maximum stress thus calculated and the factor 5 shall not exceed the minimum ultimate strength of the material. They shall be so designed as to limit the deflection to not more than 0.0022 times the span. Mild steel plating forming the tops of covers shall be not less in thickness than one per cent of the spacing of stiffeners or 6 millimetres (0.24 inches) if that be greater. For ships of not more than 100 metres (328 feet) in length the requirements of paragraph (5) of this Regulation are applicable.
- (8). The strength and stiffness of covers made of materials other than mild steel shall be equivalent to those of mild steel to the satisfaction of the Surveyor General.

Carriers or Sockets

- (9). Carriers or sockets for portable beams shall be of substantial construction, and shall provide means for the efficient fitting and securing of the beams. Where rolling types of beams are used, the arrangements shall ensure that the beams remain properly in position when the hatchway is closed.

Cleats

- (10). Cleats shall be set to fit the taper of the wedges. They shall be at least 65 millimetres (2½ inches) wide and spaced not more than 600 millimetres (23½ inches) centre to centre; the cleats along each side or end shall be not more than 150 millimetres (6 inches) from the hatch corners.

Battens and Wedges

- (11). Battens and wedges shall be efficient and in good condition. Wedges shall be of tough wood or other equivalent material. They shall have a taper of not more than 1 in 6 and shall be not less than 13 millimetres (½ inch) thick at the toes.

Tarpaulins

- (12). At least two layers of tarpaulin in good condition shall be provided for each hatchway in position 1 or 2. The tarpaulins shall be waterproof and of ample strength. They shall be of a material of at least an approved standard weight and quality.

Security of Hatchway Covers

- (13). For all hatchways in position 1 or 2 steel bars or other equivalent means shall be provided in order efficiently and independently to secure each section of hatchway covers after the tarpaulins are battened down. Hatchway covers of more than 1.5 metres (4.9 feet) in length shall be secured by at least two such securing appliances.

Regulation 16 - Hatchways closed by Weathertight Covers of Steel or other equivalent material fitted with Gaskets and Clamping Devices

Hatchway Coamings

- (1). At positions 1 and 2 the height above the deck of hatchway coamings fitted with weathertight hatch covers of steel or other equivalent material fitted with gaskets and clamping devices shall be as specified in Regulation 15 (1). The height of these coamings may be reduced, or the coamings omitted entirely, on condition that the Surveyor General is satisfied that the safety of the ship is not thereby impaired in any sea conditions. Where coamings are provided they shall be of substantial construction.

Weathertight Covers

- (2). Where weathertight covers are of mild steel the strength shall be calculated with assumed loads not less than 1.75 metric tons per square metre (358 pounds per square foot) on hatchways in position 1, and not less than 1.30 metric tons per square metre (266 pounds per square foot) on hatchways in position 2, and the product of the maximum stress thus calculated and the factor of 4.25 shall not exceed the minimum ultimate strength of the material. They shall be so designed as to limit the deflection to not more than 0.0028 times the span under these loads. Mild steel plating forming the tops of covers shall be not less in thickness than one per cent of the spacing of stiffeners or 6 millimetres (0.24 inches) if that be

greater. The provisions of Regulation 15 (5) are applicable for ships of not more than 100 metres (328 feet) in length.

- (3). The strength and stiffness of covers made of materials other than mild steel shall be equivalent to those of mild steel to the satisfaction of the Surveyor General.

Means for Securing Weathertightness

- (4). The means for securing and maintaining weathertightness shall be to the satisfaction of the Surveyor General. The arrangements shall ensure that the tightness can be maintained in any sea conditions, and for this purpose tests for tightness shall be required at the initial survey, and may be required at periodical surveys and at annual inspections or at more frequent intervals

Regulation 17 - Machinery Space Openings

- (1). Machinery space openings in position 1 or 2 shall be properly framed and efficiently enclosed by steel casings of ample strength, and where the casings are not protected by other structures their strength shall be specially considered. Access openings in such casings shall be fitted with doors complying with the requirements of Regulation 12 (1), the sills of which shall be at least 600 millimetres (23½ inches) above the deck if in position 1, and at least 380 millimetres (15 inches) above the deck if in position 2. Other openings in such casings shall be fitted with equivalent covers, permanently attached in their proper positions.
- (2). Coamings of any fiddley, funnel or machinery space ventilator in an exposed position on the freeboard or superstructure deck shall be as high above the deck as is reasonable and practicable. Fiddley openings shall be fitted with strong covers of steel or other equivalent material permanently attached in their proper positions and capable of being secured weathertight.

Regulation 18 - Miscellaneous Openings in Freeboard and Superstructure Decks

- (1). Manholes and flush scuttles in position 1 or 2 or within superstructures other than enclosed superstructures shall be closed by substantial covers capable of being made watertight. Unless secured by closely spaced bolts, the covers shall be permanently attached.
- (2). Openings in freeboard decks other than hatchways, machinery space openings, manholes and flush scuttles shall be protected by an enclosed superstructure, or by a deckhouse or companionway of equivalent strength and weathertightness. Any such opening in an exposed superstructure deck or in the top of a deckhouse on the freeboard deck which gives access to a space below the freeboard deck or a space within an enclosed superstructure shall be protected by an efficient deckhouse or companionway. Doorways in such deckhouses or companionways shall be fitted with doors complying with the requirements of Regulation 12 (1).
- (3). In position 1 the height above the deck of sills to the doorways in companionways shall be at least 600 millimetres (23½ inches). In position 2 it shall be at least 380 millimetres (15 inches).

Regulation 19 - Ventilators

- (1). Ventilators in position 1 or 2 to spaces below freeboard decks or decks of enclosed superstructures shall have coamings of steel or other equivalent material, substantially constructed and efficiently connected to the deck. Where the coaming of any ventilator exceeds 900 millimetres (35½ inches) in height it shall be specially supported.

- (2). Ventilators passing through superstructures other than enclosed superstructures shall have substantially constructed coamings of steel or other equivalent material at the freeboard deck.
- (3). Ventilators in position 1 the coamings of which extend to more than 4.5 metres (14.8 feet) above the deck, and in position 2 the coamings of which extend to more than 2.3 metres (7.5 feet) above the deck, need not be fitted with closing arrangements unless specifically required by the Surveyor General.
- (4). Except as provided in paragraph (3) of this Regulation ventilator openings shall be provided with efficient weathertight closing appliances. In ships of not more than 100 metres (328 feet) in length the closing appliances shall be permanently attached; where not so provided in other ships, they shall be conveniently stowed near the ventilators to which they are to be fitted. Ventilators in position 1 shall have coamings of a height of at least 900 millimetres (35½ inches) above the deck; in position 2 the coamings shall be of a height at least 760 millimetres (30 inches) above the deck.
- (5). In exposed positions, the height of coamings may be required to be increased to the satisfaction of the Surveyor General

Regulation 20 - Air Pipes

Where air pipes to ballast and other tanks extend above the freeboard or superstructure decks, the exposed parts of the pipes shall be of substantial construction; the height from the deck to the point where water may have access below shall be at least 760 millimetres (30 inches) on the freeboard deck and 450 millimetres (17½ inches) on the superstructure deck. Where these heights may interfere with the working of the ship, a lower height may be approved, provided the Surveyor General is satisfied that the closing arrangements and other circumstances justify a lower height. Satisfactory means permanently attached, shall be provided for closing the openings of the air pipes

Regulation 21 - Cargo Ports and other similar Openings

- (1). Cargo ports and other similar openings in the sides of ships below the freeboard deck shall be fitted with doors so designed as to ensure watertightness and structural integrity commensurate with the surrounding shell plating. The number of such openings shall be the minimum compatible with the design and proper working of the ship.
- (2). Unless permitted by the Surveyor General, the lower edge of such openings shall not be below a line drawn parallel to the freeboard deck at side, which has at its lowest point the upper edge of the uppermost load line.

Regulation 22 - Scuppers, Inlets and Discharges

- (1). Discharges led through the shell either from spaces below the freeboard deck or from within superstructures and deckhouses on the freeboard deck fitted with doors complying with the requirements of Regulation 12 shall be fitted with efficient and accessible means for preventing water from passing inboard. Normally each separate discharge shall have one automatic non-return valve with a positive means of closing it from a position above the freeboard deck. Where, however, the vertical distance from the summer load waterline to the inboard end of the discharge pipe exceeds 0.01 L, the discharge may have two automatic non-return valves without positive means of closing, provided that the inboard valve is always accessible for examination under service conditions; where that vertical distance exceeds 0.02 L a single automatic non-return valve without positive means of closing may be accepted subject to the

approval of the Surveyor General. The means for operating the positive action valve shall be readily accessible and provided with an indicator showing whether the valve is open or closed.

- (2). In manned machinery spaces main and auxiliary sea inlets and discharges in connexion with the operation of machinery may be controlled locally. The controls shall be readily accessible and shall be provided with indicators showing whether the valves are open or closed.
- (3). Scuppers and discharge pipes originating at any level and penetrating the shell either more than 450 millimetres (17½ inches) below the freeboard deck or less than 600 millimetres (23½ inches) above the summer load waterline shall be provided with a non-return valve at the shell. This valve, unless required by paragraph (1), may be omitted if the piping is of substantial thickness.
- (4). Scuppers leading from superstructures or deckhouses not fitted with doors complying with the requirements of Regulation 12 shall be led overboard.
- (5). All valves and shell fittings required by this Regulation shall be of steel, bronze or other approved ductile material. Valves of ordinary cast iron or similar material are not acceptable. All pipes to which this Regulation refers shall be of steel or other equivalent material to the satisfaction of the Surveyor General.

Regulation 23 - Side Scuttles

- (1). Side scuttles to spaces below the freeboard deck or to spaces within enclosed superstructures shall be fitted with efficient hinged inside deadlights arranged so that they can be effectively closed and secured watertight.
- (2). No side scuttle shall be fitted in a position so that its sill is below a line drawn parallel to the freeboard deck at side and having its lowest point 2.5 per cent of the breadth (B) above the load waterline, or 500 millimetres (19½ inches), whichever is the greater distance.
- (3). The side scuttles, together with their glasses, if fitted, and deadlights, shall be of substantial and approved construction

Regulation 24 - Freeing Ports

- (1). Where bulwarks on the weather portions of freeboard or superstructure decks form wells, ample provision shall be made for rapidly freeing the decks of water and for draining them. Except as provided in paragraphs (2) and (3) of this Regulation, the minimum freeing port area (A) on each side of the ship for each well on the freeboard deck shall be that given by the following formulae in cases where the sheer in way of the well is standard or greater than standard. The minimum area for each well on superstructure decks shall be one-half of the area given by the formulae.

Where the length of bulwark (ℓ) in the well is 20 metres or less

$$A = 0.7 + 0.035 \ell \quad \text{square metres}$$

where ℓ exceeds 20 metres

$$A = 0.7\ell \quad \text{square metres}$$

ℓ need in no case be taken as greater than 0.7 L.

If the bulwark is more than 1.2 metres in average height the required area shall be increased by 0.004 square metres per metre of length of well for each 0.1 metre difference in height. If the bulwark is less than 0.9 metre in average height, the required area may be decreased by 0.004 square metres per metre of length of well for each 0.1 metre difference in height.

Or,

where the length of bulwark (ℓ) in the well is 66 feet or less

$$A = 7.6 + 0.115 \ell \quad \text{square feet}$$

where ℓ exceeds 66 feet

$$A = 0.23 \ell \quad \text{square feet.}$$

ℓ need in no case be taken as greater than 0.7 L.

If the bulwark is more than 3.9 feet in average height the required area shall be increased by 0.04 square feet per foot of length of well for each foot difference in height. If the bulwark is less than 3 feet in average height, the required area may be decreased by 0.04 square feet per foot of length for each foot difference in height.

- (2). In ships with no sheer the calculated area shall be increased by 50 per cent. Where the sheer is less than the standard the percentage shall be obtained by interpolation.
- (3). Where a ship is fitted with a trunk which does not comply with the requirements of Regulation 36 (1) (e) or where continuous or substantially continuous hatchway side coamings are fitted between detached superstructures the minimum area of the freeing port openings shall be calculated from the following table:

BREADTH OF HATCHWAY OR TRUNK IN RELATION TO THE BREADTH OF SHIP	AREA OF FREEING PORTS IN RELATION TO THE TOTAL AREA OF THE BULWARKS
40% or less	20%
75% or more	10%

The area of freeing ports at intermediate breadths shall be obtained by linear interpolation.

- (4). In ships having superstructures which are open at either or both ends, adequate provision for freeing the space within such superstructures shall be provided to the satisfaction of the Surveyor General.
- (5). The lower edges of the freeing ports shall be as near the deck as practicable. Two-thirds of the freeing port area required shall be provided in the half of the well nearest the lowest point of the sheer curve.
- (6). All such openings in the bulwarks shall be protected by rails or bars spaced approximately 230 millimetres (9 inches) apart. If shutters are fitted to freeing ports, ample clearance shall be provided to prevent jamming. Hinges shall have pins or bearings of non-corrodible material. If shutters are fitted with securing appliances, these appliances shall be of approved construction

Regulation 25 - Protection of the Crew

- (1). The strength of the deckhouses used for the accommodation of the crew shall be to the satisfaction of the Surveyor General.

- (2). Efficient guard rails or bulwarks shall be fitted on all exposed parts of the freeboard and superstructure decks. The height of the bulwarks or guard rails shall be at least 1 metre (39½ inches) from the deck, provided that where this height would interfere with the normal operation of the ship, a lesser height may be approved if the Surveyor General is satisfied that adequate protection is provided.
- (3). The opening below the lowest course of the guard rails shall not exceed 230 millimetres (9 inches). The other courses shall be not more than 380 millimetres (15 inches) apart. In the case of ships with rounded gunwales the guard rail supports shall be placed on the flat of the deck.
- (4). Satisfactory means (in the form of guard rails, life lines, gangways or underdeck passages etc.) shall be provided for the protection of the crew in getting to and from their quarters, the machinery space and all other parts used in the necessary work of the ship.
- (5). Deck cargo carried on any ship shall be so stowed that any opening which is in way of the cargo and which gives access to and from the crew's quarters, the machinery space and all other parts used in the necessary work of the ship, can be properly closed and secured against the admission of water. Effective protection for the crew in the form of guard rails or life lines shall be provided above the deck cargo if there is no convenient passage on or below the deck of the ship

Regulation 26 - *Special Conditions of Assignment for Type 'A' Ships*

Machinery Casings

- (1). Machinery casings on Type 'A' ships as defined in Regulation 27 shall be protected by an enclosed poop or bridge of at least standard height, or by a deckhouse of equal height and equivalent strength, provided that machinery casings may be exposed if there are no openings giving direct access from the freeboard deck to the machinery space. A door complying with the requirements of Regulation 12 may, however, be permitted in the machinery casing, provided that it leads to a space or passageway which is as strongly constructed as the casing and is separated from the stairway to the engine room by a second weathertight door of steel or other equivalent material.

Gangway and Access

- (2). An efficiently constructed fore and aft permanent gangway of sufficient strength shall be fitted on Type 'A' ships at the level of the superstructure deck between the poop and the midship bridge or deckhouse where fitted, or equivalent means of access shall be provided to carry out the purpose of the gangway, such as passages below deck. Elsewhere, and on Type 'A' ships without a midship bridge, arrangements to the satisfaction of the Surveyor General shall be provided to safeguard the crew in reaching all parts used in the necessary work of the ship.
- (3). Safe and satisfactory access from the gangway level shall be available between separate crew accommodations and also between crew accommodations and the machinery space.

Hatchways

- (4). Exposed hatchways on the freeboard and forecastle decks or on the tops of expansion trunks on Type 'A' ships shall be provided with efficient watertight covers of steel or other equivalent material.

Freeing Arrangements

- (5). Type 'A' ships with bulwarks shall have open rails fitted for at least half the length of the exposed parts of the weather deck or other effective freeing arrangements. The upper edge of the sheer strake shall be kept as low as practicable.
- (6). Where superstructures are connected by trunks, open rails shall be fitted for the whole length of the exposed parts of the freeboard deck

Chapter III - Freeboards

Regulation 27 - *Types of Ships*

- (1). For the purposes of freeboard computation ships shall be divided into Type 'A' and Type 'B'.

Type 'A' ships

- (2). A Type 'A' ship is one which is designed to carry only liquid cargoes in bulk, and in which cargo tanks have only small access openings closed by watertight gasketed covers of steel or equivalent material.

Such a ship necessarily has the following inherent features:

- (a). high integrity of the exposed deck; and
 - (b). high degree of safety against flooding, resulting from the low permeability of loaded cargo spaces and the degree of subdivision usually provided.
- (3). A Type 'A' ship, if over 150 metres (492 feet) in length, and designed to have empty compartments when loaded to its summer load waterline, shall be able to withstand the flooding of any one of these empty compartments at an assumed permeability of 0.95, and remain afloat in a condition of equilibrium considered to be satisfactory by the Surveyor General. In such a ship, if over 225 metres (738 feet) in length, the machinery space shall be treated as a floodable compartment but with a permeability of 0.85.

For the guidance of Surveyor General the following limits may be regarded as satisfactory:

- (a). the final waterline after flooding is below the lower edge of any opening through which progressive flooding may take place;
 - (b). the maximum angle of heel due to unsymmetrical flooding is of the order of 15 degrees;
 - (c). the metacentric height in the flooded condition is positive.
- (4). A Type 'A' ship shall be assigned a freeboard not less than that based on Table A of Regulation 28.

Type 'B' ships

- (5). All ships which do not come within the provisions regarding Type 'A' ships in paragraphs (2) and (3) of this Regulation shall be considered as Type 'B' ships.
- (6). Type 'B' ships, which in position 1 have hatchways fitted with hatch covers complying with the requirements of Regulation 15 (7) or 16 shall, except as provided in paragraphs (7) to (10) inclusive of this Regulation, be assigned freeboards based on Table B of Regulation 28.

- (7). Any Type 'B' ships of over 100 metres (328 feet) in length may be assigned freeboards less than those required under paragraph (6) of this Regulation provided that, in relation to the amount of reduction granted, the Surveyor General is satisfied that:
- (a). the measures provided for the protection of the crew are adequate;
 - (b). the freeing arrangements are adequate;
 - (c). the covers in positions 1 and 2 comply with the provisions of Regulation 16 and have adequate strength, special care being given to their sealing and securing arrangements;
 - (d). the ship, when loaded to its summer load waterline, will remain afloat in a satisfactory condition of equilibrium after flooding of any single damaged compartment at an assumed permeability of 0.95 excluding the machinery space; and
 - (e). in such a ship, if over 225 metres (738 feet) in length, the machinery space shall be treated as a floodable compartment but with a permeability of 0.85.

For the guidance of Surveyor General in applying sub-paragraphs (d) and (e) of this paragraph the limits given in sub-paragraphs (3) (a), (b) and (c) may be regarded as satisfactory.

The relevant calculations may be based upon the following main assumptions:

- the vertical extent of damage is equal to the depth of the ship;
 - the penetration of damage is not more than B/5;
 - no main transverse bulkhead is damaged;
 - the height of the centre of gravity above the base line is assessed allowing for homogeneous loading of cargo holds, and for 50 per cent of the designed capacity of consumable fluids and stores, etc.
- (8). In calculating the freeboards for Type 'B' ships which comply with the requirements of paragraph (7) of this Regulation, the values from Table B of Regulation 28 shall not be reduced by more than 60 per cent of the difference between the 'B' and 'A' tabular values for the appropriate ship lengths.
- (9). The reduction in tabular freeboard allowed under paragraph (8) of this Regulation may be increased up to the total difference between the values in Table A and those in Table B of Regulation 28 on condition that the ship complies with the requirements of Regulation 26 (1), (2), (3), (5) and (6), as if it were a Type 'A' ship, and further complies with the provisions of paragraph (7) (a) to (d) inclusive of this Regulation except that the reference in sub-paragraph (d) to the flooding of any single damaged compartment shall be treated as a reference to the flooding of any two adjacent fore and aft compartments, neither of which is the machinery space. Also any such ship of over 225 metres (738 feet) in length, when loaded to its summer load waterline, shall remain afloat in a satisfactory condition of equilibrium after flooding of the machinery space, taken alone, at an assumed permeability of 0.85.
- (10). Type 'B' ships, which in position 1 have hatchways fitted with hatch covers which comply with the requirements of Regulation 15, other than paragraph (7), shall be assigned freeboards based upon the values given in Table B of Regulation 28 increased by the values given in the following table:

Freeboard increase over tabular freeboard for Type 'B' ships, for ships with hatch covers not complying with Regulation 15(7) or 16

Length of ship (metres)	Freeboard increase (milli-metres)	Length of ship (metres)	Freeboard increase (milli-metres)	Length of ship (metres)	Freeboard increase (milli-metres)
108 and below	50	139	175	170	290
109	52	140	181	171	292
110	55	141	186	172	294
111	57	142	191	173	297
112	59	143	196	174	299
113	62	144	201	175	301
114	64	145	206	176	304
115	68	146	210	177	306
116	70	147	215	178	308
117	73	148	219	179	311
118	76	149	224	180	313
119	80	150	228	181	315
120	84	151	232	182	318
121	87	152	236	183	320
122	91	153	240	184	322
123	95	154	244	185	325
124	99	155	247	186	327
125	103	156	251	187	329
126	108	157	254	188	332
127	112	158	258	189	334
128	116	159	261	190	336
129	121	160	264	191	339
130	126	161	267	192	341
131	131	162	270	193	343
132	136	163	273	194	346
133	142	164	275	195	348
134	147	165	278	196	350
135	153	166	280	197	353

136	159	167	283	198	355
137	164	168	285	199	357
138	170	169	287	200	358

Freeboards at intermediate lengths of ship shall be obtained by linear interpolation.

Ships above 200 metres in length shall be dealt with by the Surveyor General.

Freeboard increase over tabular freeboard for Type 'B' ships, for ships with hatch covers not complying with Regulation 15(7) or 16

Length of ship (feet)	Freeboard increase (inches)	Length of ship (feet)	Freeboard increase (inches)
350 and below	2.0	510	9.6
360	2.3	520	10.0
370	2.6	530	10.4
380	2.9	540	10.7
390	3.3	550	11.0
400	3.7	560	11.4
410	4.2	570	11.8
420	4.7	580	12.1
430	5.2	590	12.5
440	5.8	600	12.8
450	6.4	610	13.1
460	7.0	620	13.4
470	7.6	630	12.6
480	8.2	640	13.9
490	8.7	650	14.1
500	9.2	660	14.3

Freeboards at intermediate lengths of ship shall be obtained by linear interpolation.

Ships above 660 feet in length shall be dealt with by the Surveyor General.

(11). A lighter, barge or other ship without independent means of propulsion shall be assigned a freeboard in accordance with the provisions of these Regulations. However, in the case of barges which are unmanned the requirements of Regulations 25, 26 (2) and (3) and 39 shall not apply. Such unmanned barges which have on the freeboard deck only small access openings closed by watertight gasketed covers of steel or equivalent material may be

assigned freeboards 25 per cent less than those calculated in accordance with these Regulations

Regulation 28 - Freeboard Tables

(1) Type 'A' Ships

The tabular freeboard for Type 'A' ships shall be determined from the following table:

Table A Freeboard Table for Type 'A' Ships

Length of ship (metres)	Freeboard (milli-metres)	Length of ship (metres)	Freeboard (milli-metres)	Length of ship (metres)	Freeboard (milli-metres)
24	200	138	1770	252	3024
25	208	139	1787	253	3030
26	217	140	1803	254	3036
27	225	141	1820	255	3042
28	233	142	1837	256	3048
29	242	143	1853	257	3054
30	250	144	1870	258	3060
31	258	145	1886	259	3066
32	267	146	1903	260	3072
33	275	147	1919	261	3078
34	283	148	1935	262	3084
35	292	149	1952	263	3089
36	300	150	1968	264	3095
37	308	151	1984	265	3101
38	316	152	2000	266	3106
39	325	153	2016	267	3112
40	334	154	2032	268	3117
41	344	155	2048	269	3123
42	354	156	2064	270	3128
43	364	157	2080	271	3133
44	374	158	2096	272	3138

45	385	159	2111	273	3143
46	396	160	2126	274	3148
47	408	161	2141	275	3153
48	420	162	2155	276	3158
49	432	163	2169	277	3163
50	443	164	2184	278	3167
51	455	165	2198	279	3172
52	467	166	2212	280	3176
53	478	167	2226	281	3181
54	490	168	2240	282	3185
55	503	169	2254	283	3189
56	516	170	2268	284	3194
57	530	171	2281	285	3198
58	544	172	2294	286	3202
59	559	173	2307	287	3207
60	573	174	2320	288	3211
61	587	175	2332	289	3215
62	600	176	2345	290	3220
63	613	177	2357	291	3224
64	626	178	2369	292	3228
65	639	179	2381	293	3233
66	653	180	2393	294	3237
67	666	181	2405	295	3241
68	680	182	2416	296	3246
69	693	183	2428	297	3250
70	706	184	2440	298	3254
71	420	185	2451	299	2358
72	733	186	2463	300	3262

