GUARDIAN BUREAU OF SHIPPING

M/V

Tonnage Measurement (ITC-69)

Tartous 2002-05-09

Naval Architect

CONTENTS

SHIP'S SPECIFICATIONS

Name of Vessel:	
Type of Vessel:	
Port of Registry:	
Call Sign:	
Year of Built:	
Builders:	
Place of Built:	
Classification Society:	
Length O.A.:	
Length B.P.:	
Breadth Mld.:	
Depth Mid:	
Draught Summer Mid:	
Gross Tonnage	
Net Tonnage	
Number of Passengers	

A. INTERNATIONAL CONFERENCE ON TONNAGE MEASUREMENT OF SHIPS, 1969

General
Recognizing that the establishment of a universal system of tonnage measurement for ships engaged on international voyages should constitute an important contribution to maritime transport, a Conference was held in London from 27 May to 23 June 1969, upon the invitation of the Inter-Governmental Maritime Consultative Organization, for the purpose of drawing up an International Convention on Tonnage Measurement of Ships.

B. REGULATIONS FOR DETERMINING GROSS AND NET TONNAGES OF SHIPS

Regulation 1
General

1) The tonnage of a ship shall consist of gross tonnage (GRT) and net tonnage (NT).
2) The gross tonnage and the net tonnage shall be determined in accordance with the provisions of these Regulations.
3) The gross tonnage and the net tonnage of novel types of craft whose constructional features are such as to render the application of the provisions of these Regulations unreasonable or impracticable shall be as determined by the Administration. Where the tonnage is so determined, the Administration shall communicate to the Organization details of the method used for that purpose, for circulation to the Contracting Governments for their information.

Regulation 2
Definitions of Terms used in the Annexes

1) Upper Deck
The upper deck is the uppermost complete deck exposed to weather and sea, which has permanent means of weather tight closing of 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 stepped upper deck, the lowest line of the exposed deck and the continuation of that line parallel to the upper part of the deck are taken as the upper deck.

2) Moulded Depth
   a) The moulded depth is the vertical distance measured from the top of the keel to the underside of the upper deck 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 mid-ship 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 the deck and side shell plating, the lines extending as though the gunwales were of angular design
   c) Where the upper 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.

3) Breadth
The breadth 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.

4) Enclosed Spaces
Enclosed spaces are all those spaces, which are bounded by the ship's hull, by fixed or portable partitions or bulkheads, by decks or coverings other than permanent or movable awnings. No break in a deck, nor any opening in the ship's hull, in a deck or in a covering of

a space, or in the partitions or bulkheads of a space, nor the absence of a partition or bulkhead, shall preclude a space from being included in the enclosed space.

5) Excluded Spaces

Notwithstanding the provisions of paragraph (4) of this Regulation, the spaces referred to in subparagraphs (a) to (e) inclusive of this paragraph shall be called excluded spaces and shall not be included in the volume of enclosed spaces, except that any such space which fulfils at least one of the following three conditions shall be treated as an enclosed space:

- The space is fitted with shelves or other means for securing cargo or stores;
- The openings are fitted with any means of closure;
- The construction provides any possibility of such openings being closed:

a) (i) A space within an erection opposite an end opening extending from deck to deck except for a curtain plate of a depth not exceeding by more than 25 millimeters (one inch) the depth of the adjoining deck beams, such opening having a breadth equal to or greater than 90 per cent of the breadth of the deck at the line of the opening of the space. This provision shall be applied so as to exclude from the enclosed spaces only the space between the actual end opening and a line drawn parallel to the line or face of the opening at a distance from the opening equal to one half of the width of the deck at the line of the opening (Figure I in Appendix 1).

a) (ii) Should the width of the space-because of any arrangement except by convergence of the outside plating, become less than 90 per cent of the breadth of the deck, only the space between the line of the opening and a parallel line drawn through the point where the athwartships width of the space becomes equal to, or less than, 90 per cent of the breadth of the deck shall be excluded from the volume of enclosed spaces (Figures 2, 3 and 4 in Appendix 1).

a) (iii) Where an interval which is completely open except for bulwarks or open rails separates any two spaces, the exclusion of one or both of which is permitted under sub-paragraphs (a) (i) and/or (a) (ii), such exclusion shall not apply if the separation between the two spaces is less than the least half breadth of the deck in way of the separation (Figures 5 and6in Appendix 1).

b) A space under an overhead deck covering open to the sea and weather, having no other connection on the exposed sides with the body of the ship than the stanchions necessary for its support. In such a space, open rails or a bulwark and curtain plate may be fitted or stanchions fitted at the ship's side, provided that the distance between the top of the rails or the bulwark and the curtain plate is not less than 0.75 meters (2.5 feet) or one-third of the height of the space, whichever is the greater (Figure 7 in Appendix 1).

c) A space in a side-to-side erection directly in way of opposite side openings not less in height than 0.75 meters (2.5 feet) or one-third of the height of the erection, whichever is the greater. If the opening in such an erection is provided on one side only, the space to be exclude from the volume of enclosed spaces, shall be limited inboard from the opening to a maximum of one-half of the breadth of the deck in way of the opening (Figure 8 in Appendix 1).

d) A space in an erection immediately below an uncovered opening in the deck overhead, provided that such an opening is exposed to the weather and the space excluded from enclosed spaces is limited to the area of the opening (Figure 9 in Appendix 1)

e) A recess in the boundary bulkhead of an erection which is exposed to the weather and the opening of which extends from deck to deck without means of closing, provided that the interior width is not greater than the

width at the entrance and its extension into the erection is not greater than twice the width of its entrance (Figure 10 in Appendix 1).

6) Passenger
A passenger is every person other than:
a) the master and the members of the crew or other persons employed or engaged in any capacity on board a ship on the business of that ship; and
b) a child under one year of age.

7) Cargo Spaces
Cargo spaces to be included in the computation of net tonnage are enclosed spaces appropriated for the transport of cargo which is to be discharged from the ship, provided that such spaces have been included in the computation of gross tonnage. Such cargo spaces shall be certified by permanent marking with the letters CC (cargo compartment) to be so positioned that they are readily visible and not to be less than 100 millimeters (4 inches) in height.

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

Regulation 3
Gross Tonnage

The gross tonnage (GT) of a ship shall be determined by the following formula: $GT=K_1V$ where:

V= Total volume of all enclosed spaces of the ship in cubic meters,
$K_1 = 0.2 + 0.02 \log_{10} V$ (or as tabulated in Appendix 2).

Regulation 4
Net Tonnage

1) The net tonnage (NT) of a ship shall be determined by the following formula:

$$NT = K_2 V_c (4d/3D)^2 + K_3 (N_1 + N_2/10)$$

in which formula:

a) the factor $(4d/3D)^2$ shall not be taken as greater than unity;
b) the term $K_2V_c(4d/3D)^2$ shall not be taken as less than 0.25 GT; and
c) NT shall not be taken as less than 0.30 GT,
and in which:

V_c = total volume of cargo spaces in cubic meters,
$K_2 = 0.2 + 0.02 \log_{10} V_c$ (or as tabulated in Appendix 2),
$K_3 = 1.25 (GT + 10,000) /10,000$,
D = moulded depth amidships in meters as defined in Regulation 2 (2),
d = moulded draught amidships in meters as defined in paragraph (2) of this Regulation,
N_1 = number of passengers in cabins with not more than 8 berths,
N_2 = number of other passengers,
$N_1 + N_2$ = total number of passengers the ship is permitted to carry as indicated in the ship's
Passenger certificate; when $N_1 + N_2$ is less than 13, N_1 and N_2 shall be taken as zero,
GT = gross tonnage of the ship as determined in accordance with the provisions of Regulation 3.

2) The moulded draught (d) referred to in paragraph (1) of this Regulation shall be one of the following draughts:

a) for ships to which the International Convention on Load Lines in force applies, the draught corresponding to the Summer Load Line (other than timber load lines) assigned in accordance with that Convention;
b) for passenger ships, the draught corresponding to the deepest subdivision load line assigned in accordance with the International Convention for the Safety of Life at Sea in force or
c) for ships to which the International Convention on Load Lines does not apply but which have been assigned a load line in compliance with national requirements, the draught corresponding to the summer load line so assigned;
d) for ships to which no load line has been assigned but the draught of which is restricted in compliance with national requirements, the maximum permitted draught;
e) for other ships, 75 per cent of the moulded depth amidships as defined in Regulation 2 (2).

Regulation 5
Change of Net Tonnage

1) When the characteristics of a ship, such as V. V_c, d, N_1 or N_2 as defined in Regulations 3 and 4, are altered and where such an alteration results in an increase in its net tonnage as determined in accordance with the provisions of Regulation 4, the net tonnage of the ship corresponding to the new characteristics shall be determined and shall be applied without delay.

2) A ship to which load lines referred to in sub-paragraphs (2) (a) and (2) (b) of Regulation 4 are concurrently assigned shall be given only one net tonnage as determined in accordance with the provisions of Regulation 4 and that tonnage shall be the tonnage applicable to the appropriate assigned load line for the trade in which the ship is engaged.

3) When the characteristics of a ship such as V, V_c, d, N_1 or N_2 as defined in Regulations 3 and 4 are altered or when the appropriate assigned load line referred to in paragraph (2) of this Regulation is altered due to the change of the trade in which the ship is engaged, and where such an alteration results in a decrease in its net tonnage as determined in accordance with the provisions of Regulation 4, a new International Tonnage Certificate (1969) incorporating the net tonnage so determined shall not be issued until twelve months have elapsed from the date on which the current Certificate was issued; provided that this requirement shall not apply:
   a) if the ship is transferred to the flag of another Stale, or
   b) if the ship undergoes alterations or modifications which are deemed by the Administration to be of a major character, such as the removal of a superstructure which requires an alteration of the assigned load line, or
   c) to passenger ships which are employed in the carriage of large numbers of un-berthed passengers in special trades, such, for example, as the pilgrim trade.

Regulation 6
Calculation of Volumes

1) All volumes included in the calculation of gross and net tonnage shall be measured, irrespective of the fitting of insulation or the like, to the inner side of the shell or structural boundary plating in ships constructed of metal, and to the outer surface of the shell or to the inner side of structural boundary surfaces in ships constructed of any other material.

2) Volumes of appendages shall be included in the total volume.

3) Volumes of spaces open to the sea may be excluded from the total volume.

Regulation 7
Measurement and Calculation

1) All measurement used in the calculation of volumes shall be taken to the nearest centimeter or one-twentieth of a foot.

2) The volumes shall be calculated by generally accepted methods for the space concerned and with accuracy acceptable to the Administration.

3) The calculation shall be sufficiently detailed to permit easy checking.

TM 5/ Circ. 5, dated 5 June 1994 (supersede TM. 5/ Circ. 3, dated 5 July 1990—item 3.2.2 added):

Special Types of Ships

1. Livestock Carriers

1.1 Livestock Carriers are most often converted ships. Above the existing upper deck, one or more decks are constructed. Between these decks, the livestock corrals and their associated spaces are arranged, separated by, for example, railings, fences or gangways. The corrals are open to the air.

1.2 Stanchions, fences and railings to keep livestock in the corrals are “other means of securing cargo” according to regulation 2(5).

1.3 In applying the provisions of the 1969 Tonnage Convention, livestock structures should be included in the gross tonnage.

C. CALCULATION OF TOTAL VOLUME

1. Volume of each compartment

Name of space	Location	Length	Moulded Volume
Under Main Deck			
Above Main Deck			
Cargo space No 1			
Cargo space No 2			
Cargo space No 3			
F'cstle			
Superstructure			

Total volume of enclosed spaces is: V_{TOTAL} = 6,417.656 m^3

2. Volume of Cargo compartments

Name of space	Location	Length	Moulded Volume
Cargo Space No. 1 (above main deck)			
Cargo Space No. 2 (above main deck)			
Cargo Space No. 3 (above main deck)			
Cargo Space No. 4 (tank top)			
Cargo Space No. 5 (tween deck)			

Total volume of Cargo spaces is: V_c = 4,540.682 m^3

D. DETAILED CALCULATIONS

1. Gross Tonnage (ANNEX I / Reg. 3)

V = 6,417.656 m^3 (Total volume of enclosed spaces)
$K_1 = 0.2 + 0.02 \log_{10} V$ or by linear interpolation on table in Appendix 2
K_1=0.27614

GRT = K_1V = 0.27614 * 6,417.656

GRT =1,772.171

2. Net Tonnage (ANNEX I / Reg. 4)

The volume of cargo spaces (V_c) is 4,540.682 m^3

The net tonnage (NT) of a ship shall be determined by the following formula:
$NT = K_2 Vc\ (4d/3D)^2 + K_3 (N_1 + N_2/10)$,
V_c= total volume of cargo spaces in cubic meters, = 4,540.682 m^3
$K_2 = 0.2 + 0.02 \log_1 oVc$ (or as tabulated in Appendix 2), = 0.27308
$K_3 = 1.25\ (GT + 10,000)\ /10,000$, = 1.4715
D = moulded depth amidships in meters as defined in Regulation 2 (2), = 6.21 m
d = moulded draught amidships in meters as defined in paragraph (2) of this Regulation, = 4.02 m
N_1 = number of passengers in cabins with not more than 8 berths, =0
N_2 = number of other passengers, =0
$N_1 + N_2$ = total number of passengers the ship is permitted to carry as indicated in the ship's
Passenger certificate; when $N_1 + N_2$ is less than 13, N_1 and N_2 shall be taken as zero,

The factor $(4d/3D)^2$ shall not be taken as greater than unity;
$(4d/3D)^2$ =(4*402/3 *6.21)= 0.745

The term $K_3 (N_1 + N_2/10)$ =0
The term $K_2 V_c\ (4d/3D)^2$ shall not be taken as less than 0.25 GT; and
NT shall not be taken as less than 0.30 GT,

$NT = K_2 V_c\ (4d/3D)^2$= 0.27308*4540.682*0.745 = 923.77 > 0.25 GRT and 0.3 GRT

NT =923.77

APPENDIX I
Figures referred to in Regulation 2 (5)

In the following figures:

O = excluded space
C = enclosed space
I = space to be considered as an enclosed space Hatched in parts to be included as enclosed spaces
B = breadth of the deck in way of the opening.
In ships with rounded gunwales the breadth is measured as indicated in Figure 11

Reg. 2(5)(a)(i)

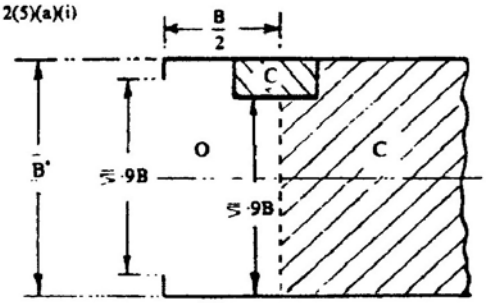

Fig. 1

Reg. 2(5)(a)(ii)

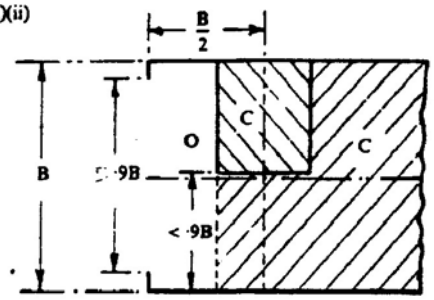

Fig. 2

Reg. 2(5)(a)(ii)

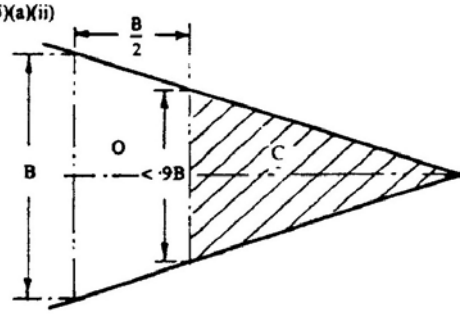

Fig. 3

Reg. 2(5)(a)(ii)

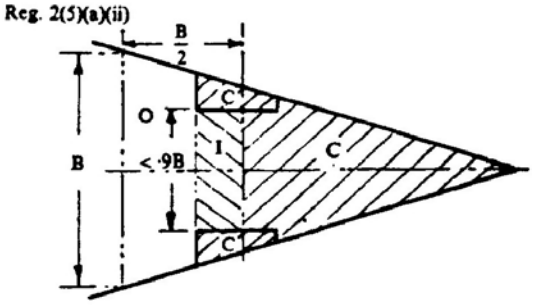

Fig. 4

Reg. 2(5)(a)(iii)

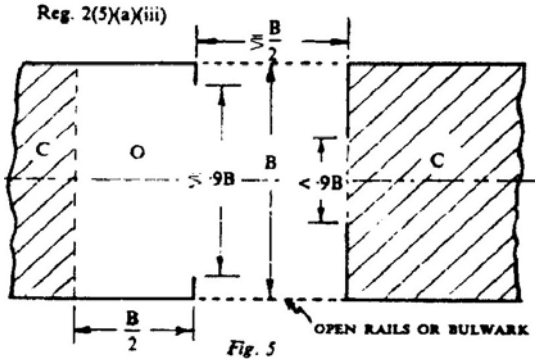

Fig. 5

Reg. 2(5)(a)(iii)

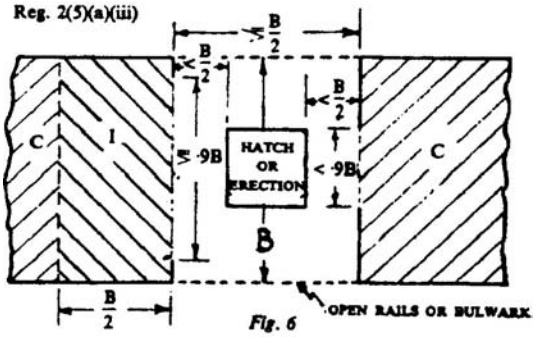

Fig. 6

Reg. 2(5)(b)

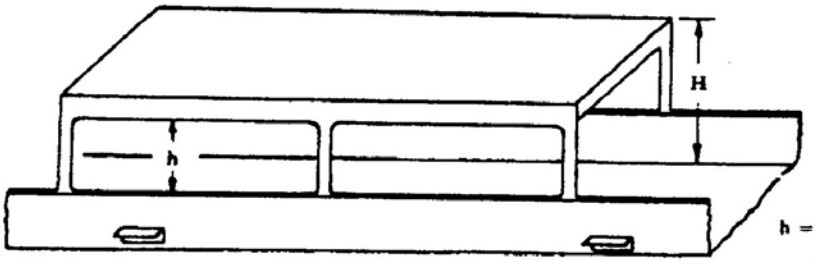

Fig. 7

Reg. 2(5)(c)

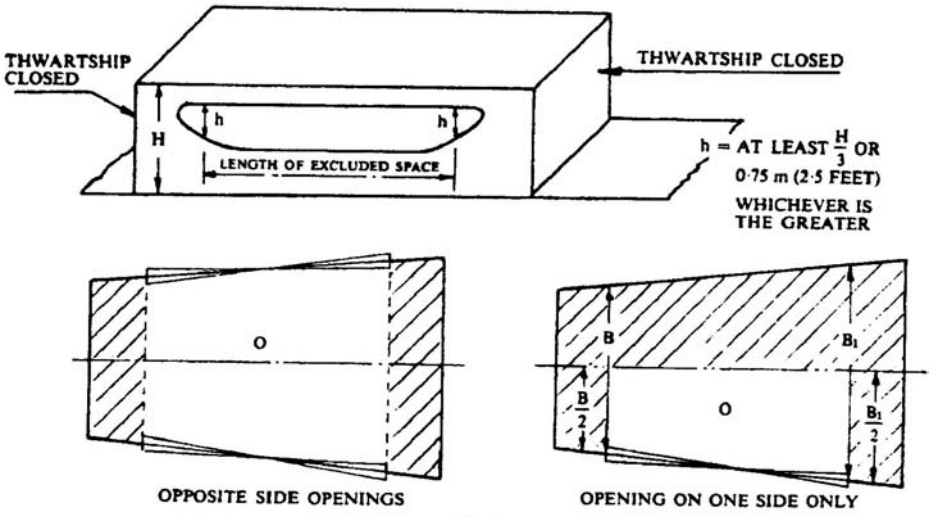

Fig. 8

Reg. 2(5)(d)

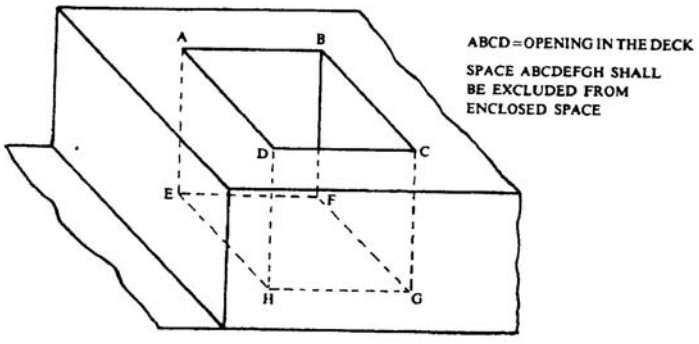

Fig. 9

Reg. 2(5)(e)

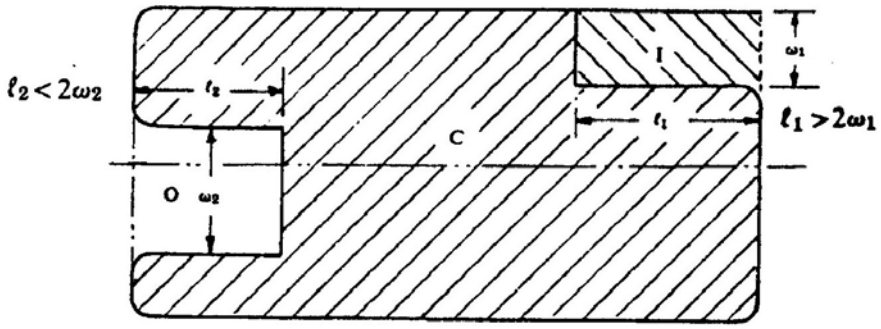

Fig. 10

SHIPS WITH ROUNDED GUNWALES

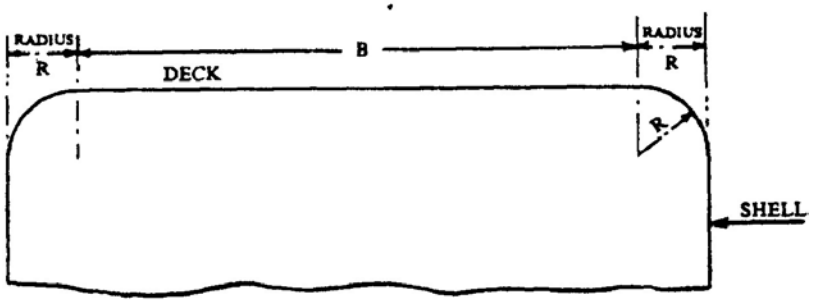

Fig. 11

APPENDIX 2
COEFFICIENTS K1 AND K2 REFERRED TO
IN REGULATIONS 3 AND 4(1)
V or V_c = Volume in cubic meters

V or V_c	K_1 or K_2	V or V_c	K_1 or k_2	V or V_c	K_1 or K_2	V or V_c	K_1 or K_2
10	0.2200	45000	0.2931	330000	0.3104	670000	0.3165
20	0.2260	50000	0.2940	340000	0.3106	680000	0.3166
30	0.2295	55000	0.2948	350000	0.3109	690000	0.3168
40	0.2320	60000	0.2956	360000	0.3111	700000	0.3169
50	0.2340	65000	0.2963	370000	0.3114	710000	0.3170
60	0.2356	70000	0.2969	380000	0.3116	720000	0.3171
70	0.2369	75000	0.2975	390000	0.3118	730000	0.3173
80	0.2381	80000	0.2981	400000	0.3120	740000	0.3174
90	0.2391	85000	0.2986	410000	0.3123	750000	0.3175
100	0.2400	90000	0.2991	420000	0.3125	760000	0.3176
200	0.2460	95000	0.2996	430000	0.3127	770000	0.3177
300	0.2495	100000	0.3000	440000	0.3129	780000	0.3178
400	0.2520	110000	0.3008	450000	0.3131	790000	0.3180
500	0.2540	120000	0.3016	460000	0.3133	800000	0.3181
600	0.2556	130000	0.3023	470000	0.3134	810000	0.3182
700	0.2569	140000	0.3029	480000	0.3136	820000	0.3183
800	0.2581	150000	0.3035	490000	0.3138	830000	0.3184
900	0.2591	160000	0.3041	500000	0.3140	840000	0.3185
1000	0.2600	170000	0.3046	510000	0.3142	850000	0.3186
2000	0.2660	180000	0.3051	520000	0.3143	860000	0.3187
3000	0.2695	190000	0-3056	530000	0.3145	870000	0.3188
4000	0.2720	200000	0.3060	540000	0.3146	880000	0.3189
5000	0.2740	210000	0.3064	550000	0.3148	890000	0.3190
6000	0.2756	220000	0.3068	560000	0.3150	900000	0.3191
7000	0.2769	230000	0.3072	570000	0.3151	910000	0.3192
8000	0.2781	240000	0.3076	580000	0.3153	920000	0.3193
9000	0.2791	250000	0.3080	590000	0.3154	930000	0.3194
10000	0.2800	260000	0.3083	600000	0.3156	940000	0.3195
15000	0.2835	270000	0.3086	610000	0.3157	950000	0.3196
20000	0.2860	280000	0.3089	620000	0.3158	960000	0.3196
25000	0.2880	290000	0.3092	630000	0.3160	970000	0.3197
30000	0.2895	300000	0.3095	640000	0.3161	980000	0.3198
35000	0.2909	310000	0.3098	650000	0.3163	990000	0.3199
40000	0.2920	320000	0.3101	660000	0.3164	1000000	0.3200

Coefficients K_1 or K_2 at intermediate values of V or V_c, shall be obtained by linear interpolation