CONVERSION TABLES

To convert	From	To	Multiply by	
Distance:	mil	micron	25	(25,4 is the correct value, but rounded in this book)
	micron	mill	0.04	(0.0394 is the correct value, but rounded in this book)
	inches	centimetre (cm)	2.54	
	centimetre (cm)	inches	0.3937	
	feet	metre	0.3048	
	metre	feet	3.2808	
	yards	metre	0.9144	
	metre	yards	1.0936	
	nautical mile	km	1.853	
	km	nautical mile	0.5396	
Area:	sq.ft.	sq. metre (m^2)	0.0929	
	sq.metre (m^2)	sq.ft.	10.764	
Volume:	US gallon	litre	3.785	
	litre	US gallon	0.264	
	Imp. gallon	litre	4.55	
	litre	Imp. gallon	0.22	
	litre	cu.ft.	0.0353	
	cu.ft.	litre	28.32	
Area/Volume:	m^2/litre	sq.ft./US gallon	40.74	
	sq.ft./US gallon	m^2/litre	0.0245	
	m^2/litre	sq.ft./Imp. gallon	48.93	
	sq.ft./Imp. gallon	m^2/liter	0.0204	
Weight:	lbs	kg	0.4536	
	kg	lbs	2.2046	
Density:	kg/litre	lbs/US gallon	8.344	
	lbs/US gallon	kg/litre	0.1198	
V.O.C.:	g/litre	lbs/US gallon	0.0083	
Pressure:	atm.	bar	1.013	
	atm.	kp/cm^2	1.033	
	atm.	p.s.i.	14.70	
	bar	atm.	0.987	
	bar	kp/cm^2	1.02	
	bar	p.s.i.	14.50	
	kp/cm^2	atm.	0.968	
	kp/cm^2	bar	0.981	
	kp/cm^2	p.s.i.	14.22	
	kp/cm^2	MPa	0.098	
	p.s.i.	atm.	0.068	
	p.s.i.	bar	0.069	
	p.s.i.	kp/cm^2	0.07	

Notes:

- atm. is the so called physical atmosphere (the pressure of 760 mm mercury). The technical atmosphere, at, is identical to kp/cm2.
- 1 bar = 10^5 Pa (Pascal) = 10^5 Newton/m^2.
- MPa = MegaPascal = 10^6 Pascal = MegaNewton/m^2.
- The so-called **k**ilogram **f**orces/cm^2 is considered equal to Kp/cm^2.

To convert	From	To	Calculate
Temperature:	Celcius Fahrenheit	Fahrenheit Celcius	(9/5 x °C) + 32 5/9 x (°F - 32)
Film thickness: (micron)	Wet	Dry	
	Dry	Wet	

wft = wet film thickness, dft = dry film thickness, VS% = Volume Solids

CALCULATION OF

Theoretical Spreading Rate (on completely smooth surface)

Theoretical Paint Consumption (on completely smooth surface)

In litre =

In US gallon =

Practical consumption:

The practical consumption is influenced by i) simple losses, by ii) additional consumption to fill up the "dead volume" of the surface roughness, but especially iii) by the "waviness" of the paint surface. However, the term "loss factor" is still used in parallel with the term "consumption factor" to describe a relationship between the theoretical, calculated consumption and a practical either observed de-factor consumption or an "aimed at" consumption.

Practical consumption =

However, as

Consumption factor = (z = "loss" = simple loss + dead volume loss + waviness loss)

and

theoretical spreading rate =

the practical consumption could be written as

where it is very important to use the **"loss"**for z and **not** the consumption factor.

FORMULAS FOR ESTIMATING SURFACE AREAS OF SHIPS

Bottom (incl. boottop): A = ((2 x d) + B) x Lpp x P

where

d = draught maximum	(as per Lloyd's)
B = breadth extreme	(as per Lloyd's)
Lpp = length betw. perpendiculars	(as per Lloyd's)

P = 0.90 for big tankers, 0.85 for bulk carriers, 0.70-0.75 for dry cargo liners

or

A = Lpp x (Bm + 2 x D) x

where

D = mean draft at paint line (m)
Bm = breath moulded (m)
Lpp = length between perpendiculars
V = displacement (cubic metre) corresponding to the draft

Boottop: A = 2 x h x (Lpp + 0.5 x B)

where

h = width of boottop	(to be informed by owner)
Lpp = length betw. perpendiculars	(as per Lloyd's)
B = breadth extreme	(as per Lloyd's)

Topsides: A = 2 x H x (Loa + 0.5 x B)

where

H = height of topsides (depth - draught)	(as per Lloyd's)
Loa = length over all	(as per Lloyd's)
B = breadth extreme	(as per Lloyd's)

Weather Decks incl. upper decks on superstructure, foundation, hatches and top of deck houses: A = Loa x B x N

where

Loa = length over all (as per Lloyd's)
B = breadth extreme (as per Lloyd's)
N = 0.91 for big tankers and bulk carriers,
0.88 for cargo liners, 0.84 for coasters, etc.

(accuracy depends on your choice of N which indicates the actual area in relation to its circumscribed rectangular)

ESTIMATING SIZE OF SURFACES:

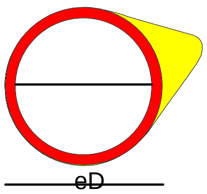
Plates:

Plate thickness mm	sq.m/ ton
1	254.5
2	127.2
3	84.8
4	63.6
5	50.9
6	42.4
7	36.4
8	31.8
9	28.3
10	25.4
11	23.1
12	21.2
13	19.6
14	18.2
15	17.0

Plate thickness mm	sq.m/ ton
16	15.9
17	15.0
18	14.1
19	13.4
20	12.7
21	12.1
22	11.6
23	11.1
24	10.6
25	10.2
26	9.8
27	9.4
28	9.1
29	8.8
30	8.5

The indicated values are for **both** sides. If one side only, reduce by half.

Pipes:



Exterior area (sq.m/m):

pi x eD

pi = 3.14

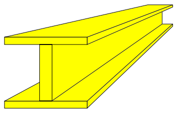
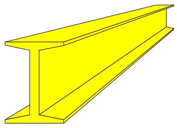
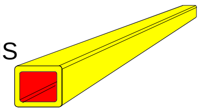
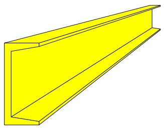
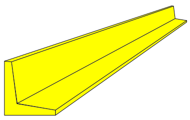
eD = exterior diameter in metres

Interior area (sq.m/m):

pi x iD

pi = 3.14
iD = interior diameter in metres

ESTIMATING SIZE OF SURFACES - BEAMS AND PROFILES, examples:

Disignation/ shape	Size	Weight kg/m	Surface area sq.m/m	sq.m/ton
HEB 	100	20.4	0.57	27.8
	160	42.6	0.92	21.5
	220	71.5	1.27	17.8
	280	103.0	1.62	15.7
	360	142.0	1.85	13.0
	600	212.0	2.32	10.9
INP 	80	5.94	0.30	51.2
	140	14.3	0.50	35.1
	200	26.2	0.71	27.1
	260	41.9	0.91	21.6
	340	68.0	1.15	16.9
	400	92.4	1.33	14.4
RHS 	20x20	1.1	0.08	70.8
	30x30	1.8	0.12	68.6
	40x40	2.4	0.16	67.2
	60x60	3.6	0.24	66.0
	80x80	7.3	0.32	44.1
UNP 	30	4.3	0.17	40.7
	50	5.6	0.23	41.5
	80	8.6	0.31	36.1
	180	22.0	0.61	27.8
	280	41.8	0.89	21.3
	400	71.8	1.18	16.4
	20x3	0.88	0.08	87.5
	25x4	1.5	0.10	66.9
	30x4	1.8	0.12	65.2
	40x4	2.4	0.16	64.1
	50x6	4.5	0.19	43.4
	50x9	6.5	0.19	30.0
	75x7	7.9	0.29	36.7
	75x10	11.1	0.29	26.2
	100x10	15.1	0.39	25.8
	100x16	23.2	0.39	16.8
	150x15	33.8	0.59	17.3

In the case of the HEB beam, the first illustration, height and breadth are equal up to the size of 280. The "size" is the height and equal to the profile number.

In the case of the INP beam, the "size" is the height and equal to the profile number.

In the case of the UNP beam, the "size" is the height and equal to the profile number.

In the case of the v-profile, the two flanges are reckoned equal, the second digit being the thickness of the steel.