

HINGE SELECTION CHART

Selecting a hinge by door weight alone, is bad practice...

In order to ensure the correct hinge is specified, you need to understand the intended use of the building and calculate the overall door mass accordingly.

The overall door mass includes, door weight, allowances for frequency of use, excess width side loading, the inclusion of door closers and all other door hardware.

Follow the simple code of practice to correct hinge specification - if in doubt, seek assistance from the manufacturer.

CALCULATE DOOR WEIGHT TO ACTUAL DOOR MASS

Actual Door Weight	Doors with excessive width, refer to side loading calculation table	+ ?%	= Actual Door Mass
	Door closer	+20%	
	Door closer (incorporating back check or hold open facility)	+75%	
	Light usage application Extra heavy usage application	-10% +10%	

Side loading calculation table

CALCULATE EXCESSIVE DOOR WIDTH	DOOR HEIGHT (MM)	DOOR WIDTH (MM)	FACTOR	INCREASE IN DOOR MASS REQUIRED
<p>The actual door mass will require increasing by the factor calculated between the door height and the door width.</p> <p>This is calculated by dividing the door height by the door width.</p> <p>If the factor is larger than 2, there is no allowance required.</p> <p>If the factor is less than 2, the door mass is required to be increased by the value between the factor and 2, expressed as a percentage.</p> <p>Percentage examples are listed in the table to the right.</p>	2000	1000	2.00	0%
	2000	1050	1.90	+10%
	2000	1100	1.82	+18%
	2000	1150	1.74	+26%
	2000	1200	1.67	+33%
	2000	1250	1.60	+40%
	2000	1300	1.54	+46%

Door closer allowance table

DOOR CLOSER ALLOWANCE	DESCRIPTION	INCREASE REQUIRED TO ACTUAL DOOR MASS
<p>Doors fitted with an overhead door closer which incorporates either 'back check' or 'hold open' facility, should use hinges with a minimum hinge grade of 12</p> <p>Whenever door closers are fitted, the spacing of hinges changes from the standard top, middle and bottom configuration.</p> <p>Due to the additional lateral forces applied to the top of the door when door closers are fitted, 2 hinges are required at the top to accommodate the additional forces.</p> <p>Please refer to 'Hinge spacing code of practice' for guidance.</p>	Doors fitted with door closers without 'back check' or 'hold open' facility.	+20%
	Doors fitted with door closers which include either 'back check' or 'hold open' facility	+75%

Select the required Category of Use for the intended project

Grade 1 Light Duty	Grade 2 Medium Duty	Grade 3 Heavy Duty	Grade 4 Severe Duty
<p>Hinges for use on doors in housing, general living areas and in buildings where there is 'low frequency' of use, where care and attention is taken to prevent misuse and accidents.</p> <p>Eg. Domestic and offices having no access to the general public.</p>	<p>Hinges for use on doors in housing, general living areas and in buildings where there is 'medium frequency' of use, where some care and attention is taken to prevent misuse and accidents.</p> <p>Eg. Domestic and offices having limited access to the general public.</p>	<p>Hinges for use on doors in buildings where there is 'high frequency' of use in public areas where there is a high possibility of accidents and misuse.</p> <p>Eg. Public buildings, school.</p>	<p>Hinges for use on doors in public areas and subject to potentially 'high frequency' of use and abuse.</p> <p>Eg. Public areas uncontrolled main entrances.</p>
Hinge Grades 3,6 and 9	Hinge Grades 4,7 and 10	Hinge Grade 11	Hinge Grades 12,13 and 14

HINGE SPACING: CODE OF PRACTICE

BS EN 1935:2002 The hinge grades detailed in this standard are based on 3 hinges fitted to the door set

FIGURE 1

The standard practice and most common, providing maximum resistance to 'warping', hinges are spaced as shown.

FIGURE 2

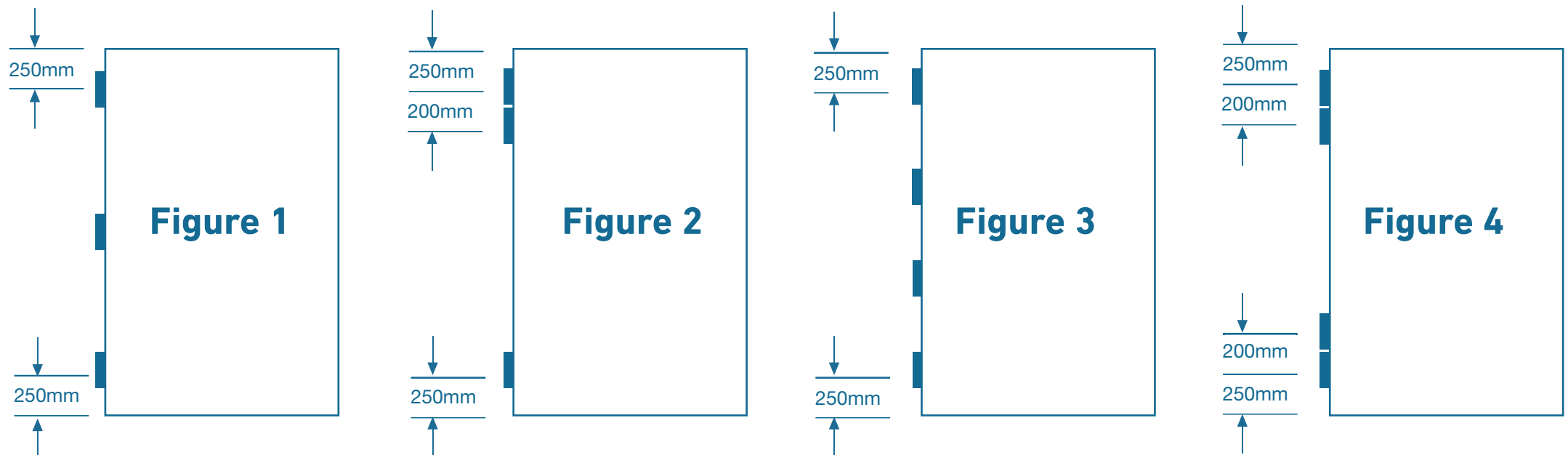
Where overhead door closers are used, additional lateral forces are applied to the top hinge. Whilst this is taken into consideration within the design calculation, to reduce the lateral force on the top hinge, it is recommended that the hinges are spaced as shown.

FIGURE 3

Where the door width is more than 1000mm or the door mass exceeds that allowed for 3 hinges, additional hinges can be fitted. Equal spacing shown provides maximum resistance to 'warping', Based on 4 hinges, the design door mass can be calculated as per 'side load calculation' table before determining the suitable grade of hinge.

FIGURE 4

Where overhead door closers are used within the example illustrated in figure 3, due to the increased lateral forces created by the closer on the top hinge, it is recommended that the hinges are spaced as shown.



HINGE GRADE TABLE

Having established the final design 'door mass' and the 'category of use', refer to the hinge grade table below to determine the required hinge grade.

The relevant grades given are based on 3 hinges being fitted to the door as illustrated in figure 1 of the 'hinge spacing code of practice'.

First digit			Second digit		Third digit		Fourth digit	Fifth digit	Sixth digit	Seventh digit	Eighth digit
Category of use			Durability test cycles		Test/Design door mass		Fire/smoke suitability	Safety	Corrosion resistance	Security	Hinge grade
Duty	Grade	For use on	Grade	No. of test cycles	Grades Available	Mass kg	Grades Available	Grades Available	Grades Available	Grades Available	Grade
Light	1	Door	4	25,000	1	20	0 or 1	1	0,1,2,3,4	0 or 1	3
Medium	2	Door	7	200,000	1	20	0 or 1	1	0,1,2,3,4	0 or 1	4
Light	1	Door	4	25,000	2	40	0 or 1	1	0,1,2,3,4	0 or 1	6
Medium	2	Door	7	200,000	2	40	0 or 1	1	0,1,2,3,4	0 or 1	7
Light	1	Door	4	25,000	3	60	0 or 1	1	0,1,2,3,4	0 or 1	9
Medium	2	Door	7	200,000	3	60	0 or 1	1	0,1,2,3,4	0 or 1	10
Heavy	3	Door	7	200,000	4	80	0 or 1	1	0,1,2,3,4	0 or 1	11
Severe	4	Door	7	200,000	5	100	0 or 1	1	0,1,2,3,4	0 or 1	12
Severe	4	Door	7	200,000	6	120	0 or 1	1	0,1,2,3,4	0 or 1	13
Severe	4	Door	7	200,000	7	160	0 or 1	1	0,1,2,3,4	0 or 1	14

The total hinge grade range is from 1 to 14 for doors and windows within the summary classification table of BS EN 1935:2002

The above table covers the classification for door hinge range only.