Guidelines for the right application of plastic hinges

The following guidelines help you to choose the convenient type and the right number of hinges according to the door to be hinged. Technical designers should consider the values **Er, Ea, E90** reported in the table of every plastic hinge. Maximum working load **(Er, Ea, E90)** is the value at which elastic deformation remains neglectable during functioning. Load at breakage **(Rr, Ra, R90)** should be used for safety verification, if required. In case of use of CFN. and CFO. hinges, considering the geometry and the structure of such elements, **E90** value is not to be taken into consideration. So the conditions here under reported, where **E90** appears, are not valid.

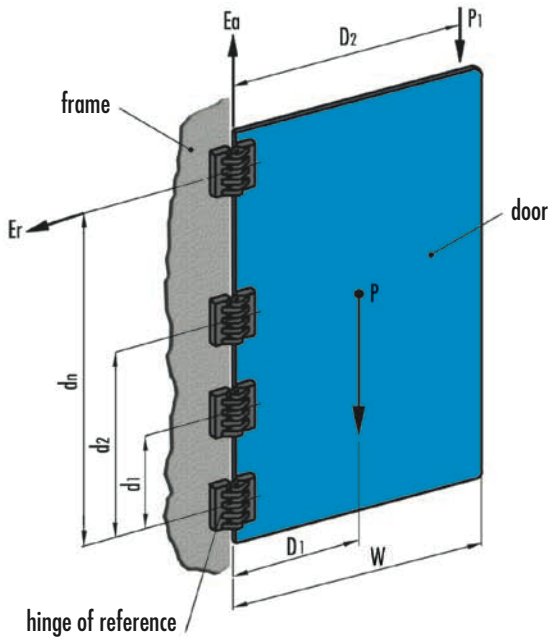
Hinged door on a vertical axis

These are the three conditions to be verified:

$[(P \cdot D_1)+(P_1 \cdot D_2)] / D_3 \leq Er$ with closed door

$(P+P_1) / N \leq Ea$

$[(P \cdot D_1)+(P_1 \cdot D_2)] / D_3 \leq E90$ with 90° open door (*)



P = weight of the door [Newton]
P_1 = additional extra load applied (if any) [Newton]
N = number of hinges
W = width of the door
D_1 = distance [metres] between the centre of gravity of the door and the hinge axis. In normal conditions D1 = W/2
D_2 = distance [metres] between the hinge axis and additional extra load application point
D_3 = sum of the distances [metres] of all the hinges from the hinge of reference (D3 = d1+d2+...+dn). In case of only two hinges assembled D3 is simply the distance between them.

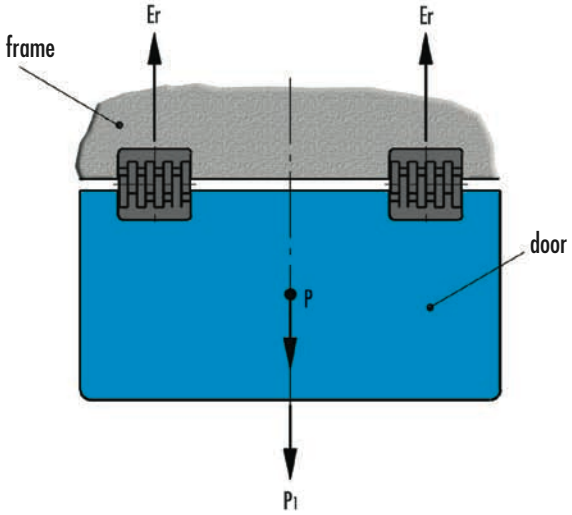
Hinged door on a horizontal axis

These are the two conditions to be verified:

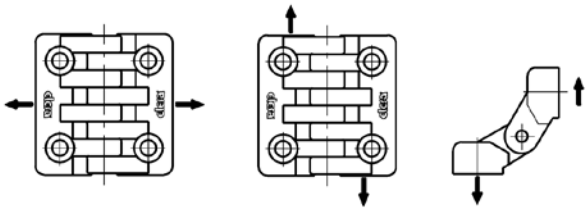
$(P+P_1) / N \leq Er$ with closed door

$(P+P_1) / 2N \leq E90$ with 90° open door (*)

(in the case of balanced additional extra load on the door)



Er = maximum working radial load of the hinge [Newton]
Ea = maximum working axial load of the hinge [Newton]
E90 = maximum working load with 90° open door hinge [Newton] (*).



Radial strength | Axial strength | 90° Angled strength

EXAMPLE

P = 10 Kg = **98 N** (10•9.81) weight of the door
P_1 = 5 Kg = **49 N** (5•9.81) weight of the additional extra load applied (for example: handle + lock + machine control panel fitted onto the door)
N = **2** (start evaluating two hinges)
W = 1.6 m width of the door
D_1 = W/2 = 1.6/2 = **0.8 m** distance between the centre of gravity of the door and the hinge axis.
D_2 = **1.2 m** distance between the hinge axis and additional extra load application point
D_3 = **1.8 m** (the example shows only the distance between the two assembled hinges).

$[(P \cdot D_1) + (P_1 \cdot D_2)]/D_3 \leq Er$ with closed door
$[(98 \cdot 0.8)+(49 \cdot 1.2)]/1.8 =$ **76 N ≤ Er**

$(P+P_1)/N \leq Ea$
$(98+49)/2 =$ **73.5 N ≤ Ea**

$[(P \cdot D_1) + (P_1 \cdot D_2)]/D_3 \leq E90$ with 90° open door
$[(98 \cdot 0.8)+(49 \cdot 1.2)]/1.8 =$ **76 N ≤ E90 (*)**

SUGGESTIONS FOR DRILLING FITTING HOLES

The proper application of hinges with moulded-in studs or bushings requires a drilling on the mounting wall with diameter not wider than 0.5 mm of the major diameter of the assembling screw in order to guarantee an adequate shoulder of the metal insert on the wall itself.

NOTES

All the values reported in the tables are the result of tests carried out in our laboratories under controlled temperature and humidity (23° C - 50% RH) in given conditions of use and for a relatively limited time. The technical designer should consider to use an adequate safety factor for particularly heavy conditions of use.
(*) Not valid for CFN. and CFO. series.