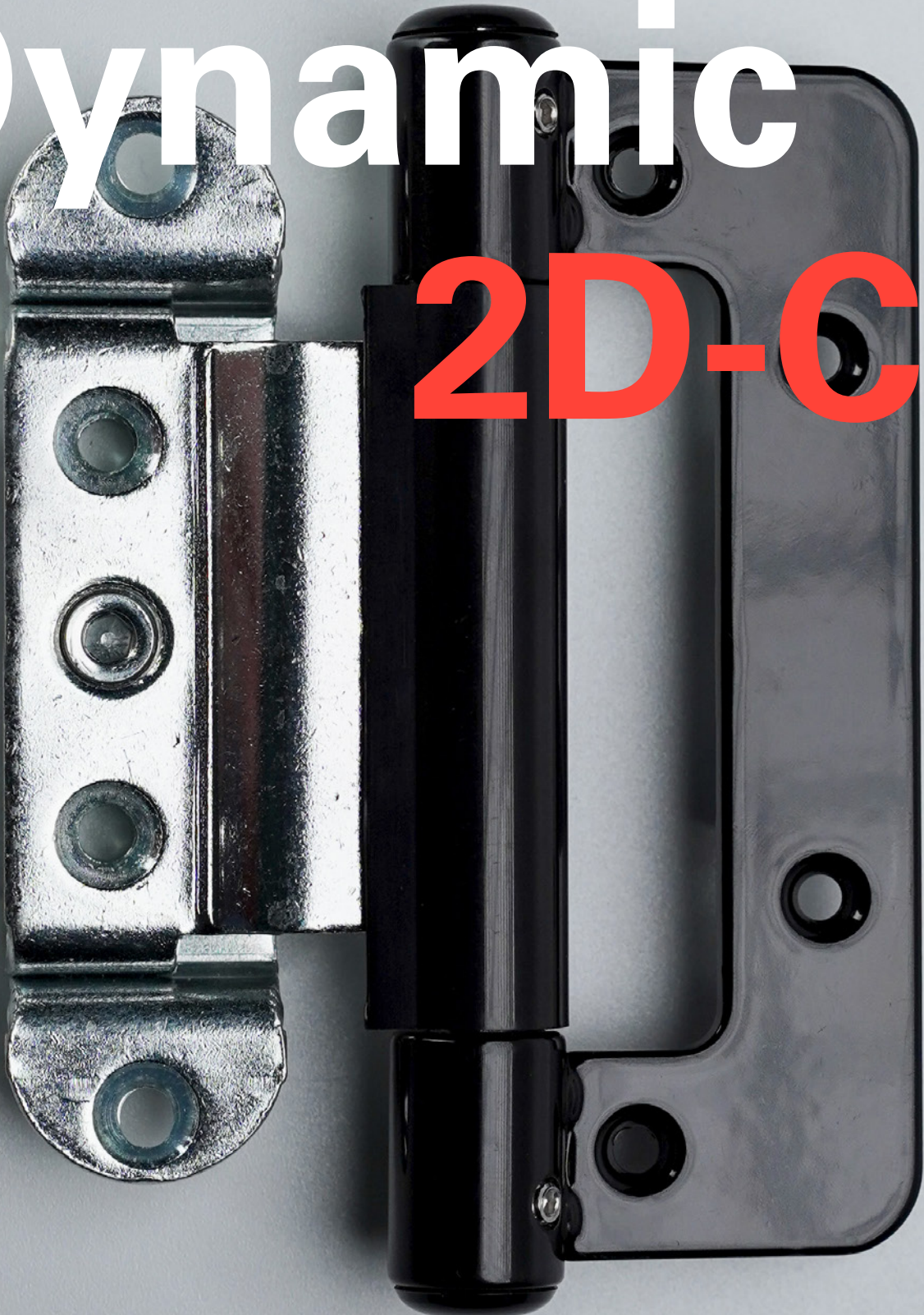SFS

Dynamic
2D-C

Technical information
Load values for single-axis hinges

The load values declared in the diagram are based on dynamic tests carried out according to RAL regulations (Appendix A). Where the test could not be carried out, the value has been calculated by taking into account the increased stress caused by the larger dimensions of the door.

The essential prerequisites to reach the declared maximum performance are:

- professional installation of the hinges, their accessories and the door itself
- stability and correct positioning of the door-set/windows

Highly non-standard applications or stress caused by external devices may require in-depth analysis and different applications from what is shown in the diagrams.

Purely as a non-exhaustive example, several factors are listed below that must be taken into consideration for the correct sizing of the application:

- Very high frequency of use (public buildings: hospitals, schools, nurseries, etc).
- Presence of obstacles blocking the opening and/or closing of the door (door-stoppers, etc) or which cause a leverage effect on the hinge itself.
- Presence of automatic opening/closing mechanisms: spring or pneumatic mechanical actuators. (Appendix B)
- Very high door-set/windows (higher than 2000 mm)
- Type of material on the door-set/windows (wood, PVC, aluminium, etc)
- Extreme weather conditions expected for certain environments
- Opening direction: inward or outward
- Use of hinges on security doors
- Use of hinges on fire doors

Depending on the application, special care should also be taken when choosing the type of hinge to use and with the correct positioning of the hinges themselves.

A standard application provided with 2 hinges (figure 1) is for a door 2000 mm or less in height and 1000 mm or less in width.
For some application it is standard practice to apply an additional hinge at the center of the door to ensure adequate compression and prevent deflection of the profile.
This is also required in all cases where the door-set/windows are particularly high (higher than 2000 mm).
However, for the purposes of the load bearing calculations as per the RAL-GZ 607/8, the load bearing capacity of this central hinge is not considered.

On the other hand, in all cases that require a higher load capacity, the additional hinge should be placed at the point of greatest stress (figure 2 and figure 3).
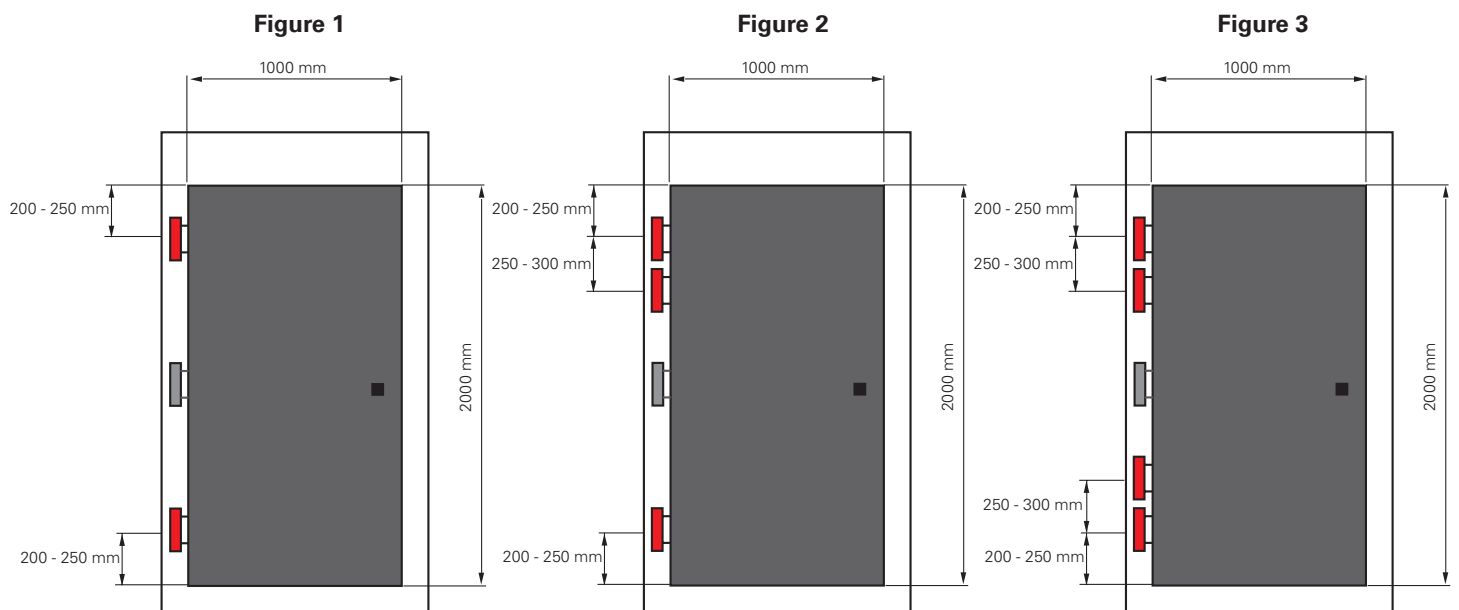
In particular, in all cases that require the use of a third hinge due to load capacity issues, this hinge must be positioned close to the top hinge (figure 2).

Number of hinges to use

If the application also involves a very high door, it is best to install a fourth hinge in the centre in order to compress the gasket.

If installing 3 load bearing hinges for the load is not enough, a fourth hinge can be applied. This hinge must be positioned close to the bottom hinge (symmetrical configuration - figure 3).
If the application also involves a very high door, it is best to install a fifth hinge in the centre in order to compress the gasket.

Figure 1

1000 mm

200 - 250 mm

2000 mm

200 - 250 mm

Figure 2

1000 mm

200 - 250 mm

250 - 300 mm

2000 mm

200 - 250 mm

Figure 3

1000 mm

200 - 250 mm

250 - 300 mm

2000 mm

250 - 300 mm

200 - 250 mm

- Standard RAL application with 2 hinges
- Standard application with 3 hinges
- Standard application with 4 hinges

➜ Load bearing

➜ For compression purposes only
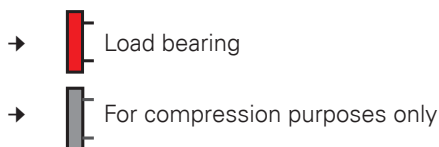
The information in this document should be considered for non-exhaustive description purposes only, so if you have any doubts about the correct application, you should contact SFS for technical in-depth technical analysis and for help choosing the most appropriate configuration.

Number of hinges to use

Appendix A

RAL regulations require:

- Door width of 1000 mm
- 200,000 openings at 90°
- Opening speed between 420 and 540 cycles per hour.

The axial and tangential reduction, between 10,000 and 200,000 cycles, must be below 2 mm.
The functionality of the hinges must be guaranteed at the end of the test.
The door must be able to be closed if it is shut from an angle of 15°.

At the end of the test, an additional load is also applied in two steps:

1) Load of 1000 N with the door positioned at 45° for 2.5 minutes.
2) Load of 1000 N with the door positioned at 90° for 2.5 minutes. At the end of the additional load test, the door must close properly (the closing position must not be exceeded) and the permissible reduction values are also those provided at the end of the previous test (200,000 cycles).

Appendix B

Ref. Standard EN 1935 Appendix E (notice)
Door-closing systems increase the load on hinges as well as wear and tear.
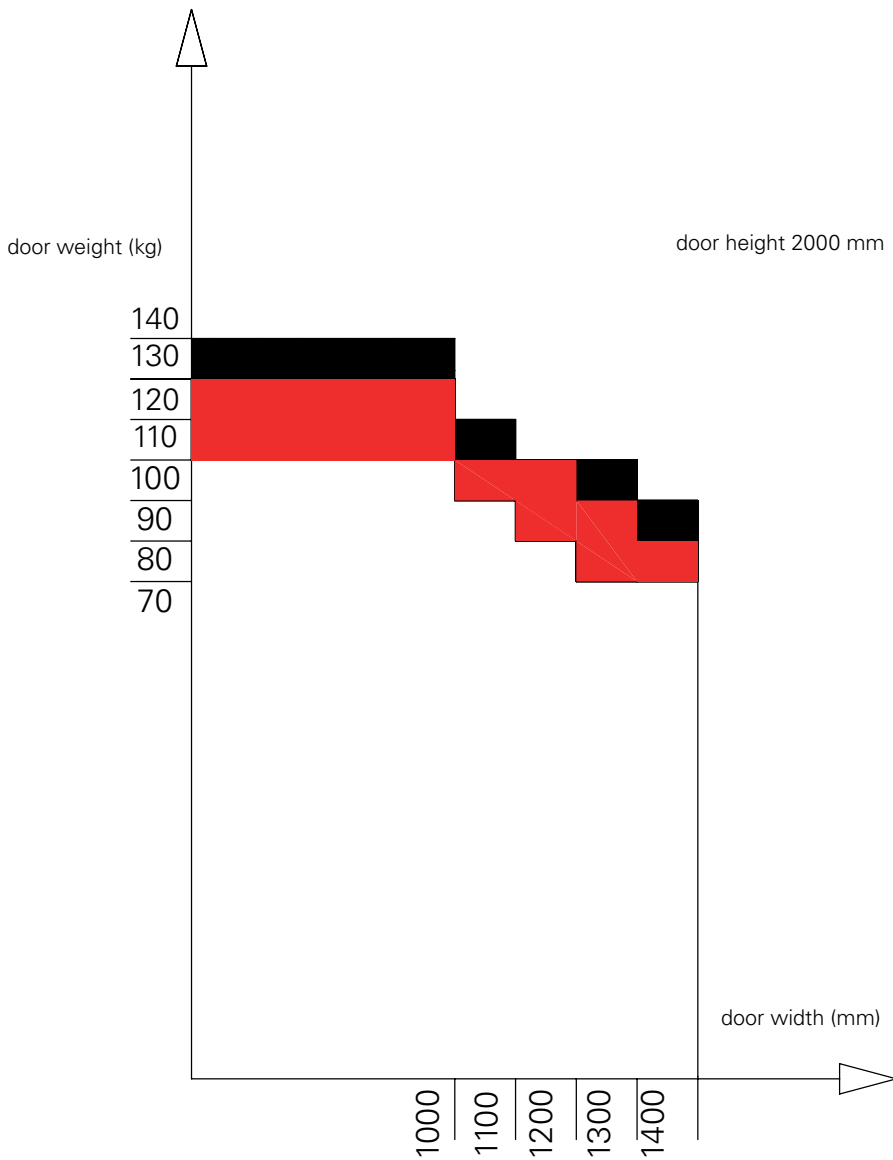For applications with a door closer without backcheck, you should increase the actual weight of the door by 20%. For applications with a door closer with backcheck, you should increase the actual weight of the door by 75%.
Any door-closing systems that include fixed opening mechanisms or with closing backcheck through a leverage effect can cause significantly greater stress on hinges and the relative fittings. This increase often depends on the type of door-closing mechanism installed.

Technical information
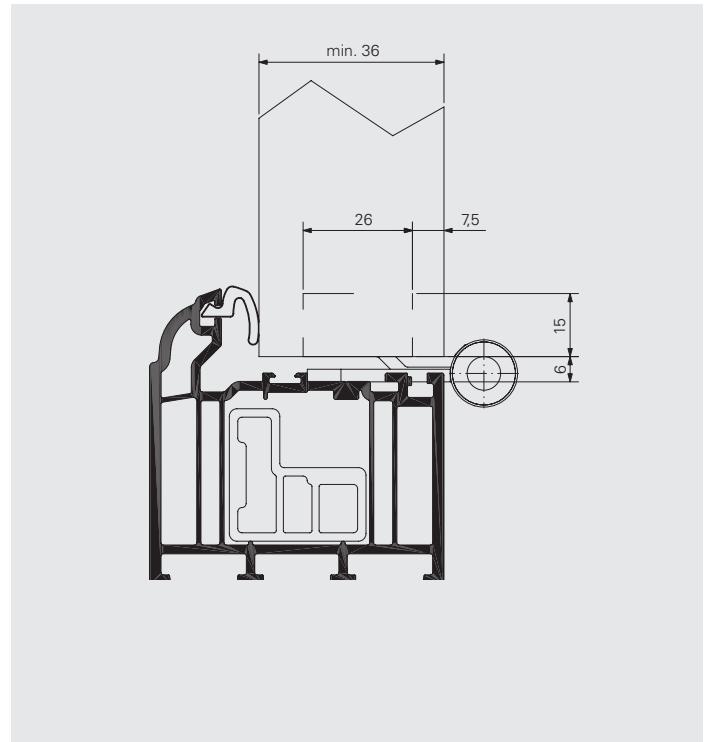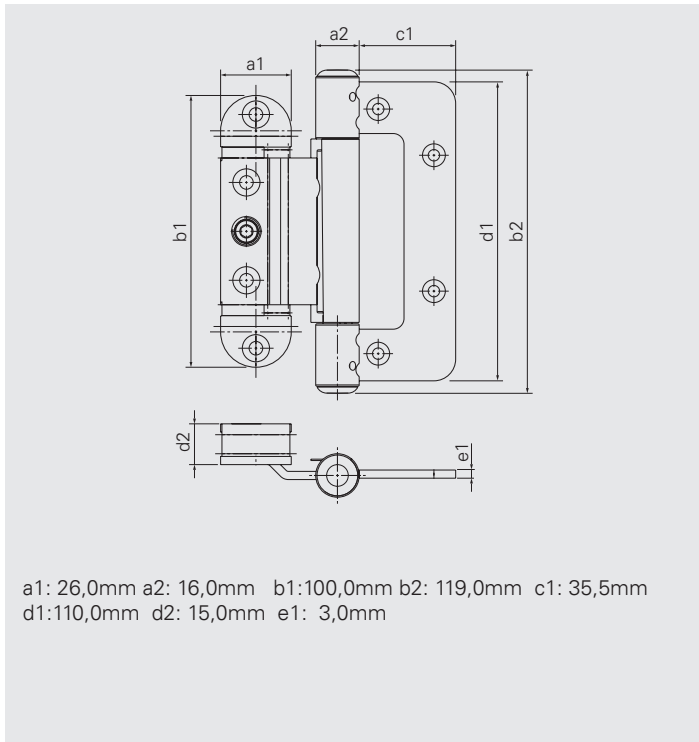# Load capacity values of hinge
Dynamic 2D-C-003

door weight (kg)

door height 2000 mm

140
130
120
110
100
90
80
70

door width (mm)

1000
1100
1200
1300
1400

Applied hinges:

2 — Figure 1 → For some application it is standard practice to apply an additional hinge at the center of the door to ensure adequate compression and prevent deflection of the profile. This is also required in all cases where the door-set/ windows are particularly high (higher than 2000). However, for the purposes of the load bearing calculations as per the RAL-GZ 607/8, the load bearing capacity of this central hinge is not considered.

3 — Figure 2

4 — Figure 3

D2DC-16-003
Dynamic 2D-C

a1: 26,0mm a2: 16,0mm   b1:100,0mm b2: 119,0mm   c1: 35,5mm
d1:110,0mm d2: 15,0mm   e1: 3,0mm

Load capacity with 2 hinges according to RAL-GZ 607/8 200'000 cycles
100 kg

Raw Material
Steel

Surface treatment	Corrosion resistance of the base metal substrate in accordance to standard UNI EN 1670 [1]
Zinc coated min 5μ + Polyester min 100/120μ (Powder coated)	min. 1000 hours (class 5)

[1] Corrosion of the base metal substrate should not be confused with surface corrosion of its finish. In the case of steel substrates, corrosion is rust of a reddish brown appearance. Corrosion of aluminium or zinc alloy substances is white and corrosion of brass or bronze substrates is green.

Designation according to standards EN 1935

3	7	4	0	1	*	0	11

* see corrosion resistance