

Exercise code: DC-1
Exercise type: Individual – Design Exercise
Exercise title: Concorde cabin window

Exercise Assignment:

The figure on the other side of the paper shows the front view, section and the detailed view of the passenger cabin window on a Concorde airplane.

1. Make a CAD assembly drawing in 3rd angle projection. Drawing must be in scale. Required dimensions should be obtained by measurements and reengineering the drawing on the next page. In the drawing indicate following design features:
 - a. Which of the two window panels normally carries the internal cabin pressure load?
 - b. Which window panel acts as a heat shield?
 - c. Identify 4 rubber seals in the design. Which seals serve to maintain cabin pressure?
 - d. Why flat glass is used?
 - e. Why the window is relatively small in area?
 - f. By what means the window is prevented from misting up?
 - g. How the window panel unit is removed from the fuselage structure for maintenance?
2. Write down the need that the design of this cabin window satisfies.
3. Write down constraints that might be used in the design process of this window.
4. Specify criteria and weightings, which might be used for evaluation of the optimal design.

Concorde cabin window facts:

The windows are designed with panels, which can be easily removed and consist of:

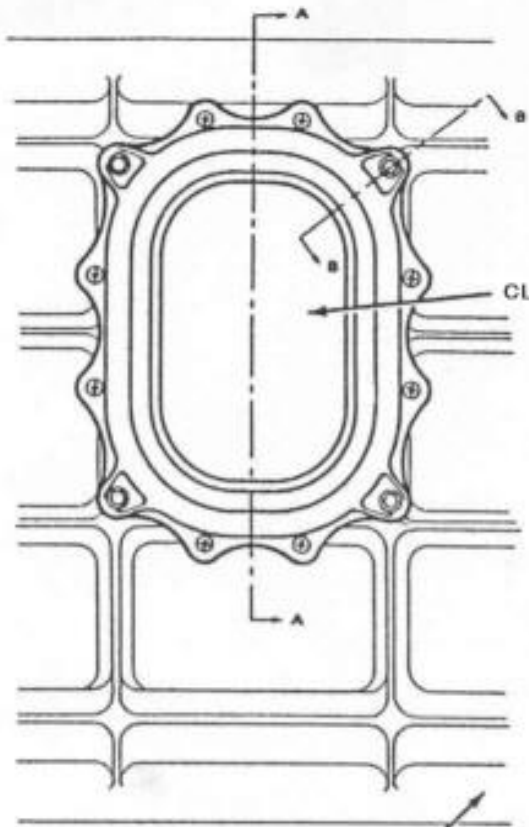
- An inside panel which takes the cabin pressure. *These are made from two chemically toughened panels of glass separated by a layer of plastic in order to give fail-safe characteristics.*
- An outside panel, which acts as a heat shield. *In cruise flight the fuselage skin temperature is 92°C. These panels of semi toughened glass can withstand the cabin pressure for a certain length of time on their own. This therefore adds a further fail-safe feature.*
- The space between panels is ventilated to atmosphere through a desiccator system.
- The window carrying units are flat and are assembled in flat-machined panels extending along the most of the fuselage.
- The area of each window opening in the structure is 1.5 dm². *This is designed to limit to an acceptable value the cabin decompression in the event of a complete window failure.*
- The inside panels are protected by a transparent plastic 'scratch' panel which is part of the cabin interior trim.

Exercise tips:

Always read exercise assignment carefully and act accordingly.

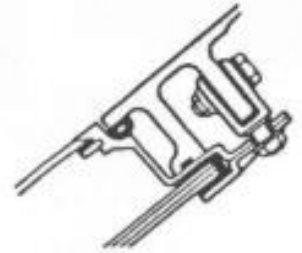
This is CAD exercise. Arrange drawings neatly and ensure that all letters and lines are made according to BS8888. The answers to the questions should be on the same A3 sheet as the assembly drawing. Use "City A3 –V2004 Template" file for you drawing.

Submit the AutoCAD A3 drawing file on Moodle in week 3 (check the deadline on web). Ensure the name, group and other relevant data are correctly filled in the title block.

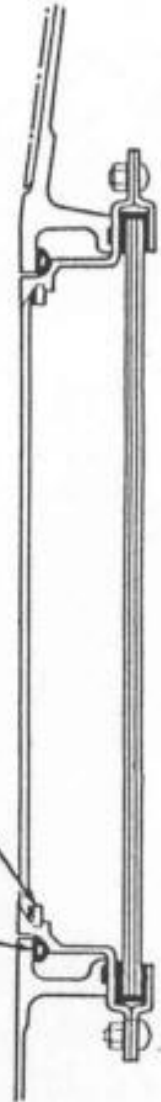


CLEAR OPENING (102x160mm)

MACHINED SKIN PANEL



SECTION B-B
DETAIL THROUGH WINDOW MOUNTING



INSOARD →

SECTION A-A

CIRCLIPS HOLDING THERMAL SHIELD

WATER TIGHT SEAL