

Instructions for using Low Relative Humidity Showcase Silica Gel Lifetime Spreadsheet

The spreadsheets will calculate the lifetime of dry normal (type I) silica gel in a showcase before it needs reconditioning. It will only be accurate below 45%.

It requires input of the following information (into blue cells)

- Initial RH of silica gel
- Specified RH (what are you controlling the case below), 30% is a suitable figure for archaeological iron, 42% for archaeological copper alloys.
- Mass of silica gel in case in kg
- Internal dimensions of the case in m.
- Air Exchange Rate of the case in /day.
- A full year's worth of room RH data at 15, 30 or 60 minute intervals. Any gaps in data or 0 should be removed (many loggers and telemetry systems add 0 to the data file if a reading is missing, excel can also be set to consider a blank cell as 0). If the room shows strong seasonal differences in RH, the data should be cut and wrapped so it starts at the approximate date the silica gel will be placed in the case.

The calculations assume the showcase is at a similar temperature to the room. If there is significant case heating (greater than room by more than 2C) then the calculations will be inaccurate. Internal and external lighting; direct sunlight (even through double blinds in some instances); equipment in or underneath the case and positioning near heaters can all cause case heating.

The RH of the dry silica gel is used as the initial RH. With sufficient drying time, well spaced gel and an oven that is not overloaded, 5% is routinely achievable.

If the showcase contains significant amounts of buffering material such as, wood products (MDF, plywood etc), fabrics, or wooden objects then the calculations will be less accurate. If the case is monitored this will show up as a significant delay in the RH dropping after adding dry silica gel (several days) and the RH not dropping to a low value.

There must be good exchange between the silica gel compartment and the display volume. Many modern designs have been found wanting in this. For a metal baseboard at least 25% of the surface needs to be covered in 8mm diameter holes or 15mm slots. If the silica gel is placed in case furniture in the display volume, they need 15mm gaps to allow the dry air to circulate.