



Data Sheet

Silica gel desiccant

RS stock numbers 601-041, 601-057, 601-063

RS silica gel desiccant is a 99.0% pure amorphous silica in the form of hard irregular shaped crystals.

The material is designed to adsorb moisture from air, gases and liquids to prevent the relative humidity rising to a point when corrosion, fungal growth and optical smearing will occur.

In general engineering a level of greater than 50% RH (relative humidity) will encourage corrosion. At 60% RH the corrosion risk will become unacceptable on ferrous metals, particularly for prolonged exposure. 70% RH is the point at which fungal growth will occur. In many countries the RH can reach 80-100%.

Another important consideration is the temperature of the air or gas within the barrier because as it drops the humidity will rise until the air cannot maintain the vapour any longer (hence rainfall). This is vital in packaging and storage, as the original RH in a warm warehouse can suddenly rise within the packaging when the goods are stored outside in the cold.

Other sources of corrosion are items stored within a package which are hygroscopic i.e. have an affinity for water, such as, timber, paper products, natural fibres, these are called dunnage. These products will 'breathe' as the temperature fluctuates thereby liberating water vapour with the risk of condensation on packed components.

At 50% RH **RS** silica gel will adsorb 30% of its own weight in water vapour. At 80% RH it will adsorb 40% of its weight.

Its advantages over other desiccant media are:

- Greater efficiency per unit weight
- Chemical inertness - only affected by hydrofluoric acid and strong alkalis
- Ease of use in sachet form and range of sizes available.

Uses

- Packaging – During storage and transportation of electrical, electronic and mechanical components particularly ferrous metals and cupric alloys.
- In service – Within enclosures and instrumentation cases including communications.
- Adjacent to hygroscopic powders and liquids.
 - Cabling joints.
 - Ventilation systems.
 - Glazing.

Table 1 **Calculating requirements**

EQUATIONS

- W = 40 ARM + DF for tropical climates
 W = 11 ARM + DF for temperate climates
 W = 170V + DF for an hermetically sealed package

WHEN

- W = Weight in grammes of basic desiccant, (i.e. silica gel)
 A = Area in square metres of the moisture vapour barrier.
 R = Moisture vapour transmission rate of the barrier in grammes per square metre per 24 hours, measured at 90% RH and 38°C (100°F).
 M = Maximum time in months of storage.
 V = Volume of cubic metres of air inside the barrier (this is generally taken as the volume of the hermetically sealed container).
 D = Weight in grammes of blocking, cushioning and other packing material inside the barrier (including cartons, etc.).
 F = Factor, depending on type of dunnage.

Factors (F):

- 1/5 For timber of moisture content higher than 14%.
 1/8 For felt, carton board and similar packaging work.
 1/10 For plywood and timber with a moisture content less than 14%.

Table 2 Typical barrier films and their permeability

Material	*MVTR
Aluminium Foil Wrapping 0.025mm	0.5
Aluminium Foil Wrapping 0.009mm	1.0
Cellulose Films ('Cellophane')	1.5
400s MXXT Grade (Polyvinylidene Chloride Coated)	
Polyvinylidene/Polyvinyl Chloride Films 0.005cm (0.002in)	
Polyvinylidene/Polyvinyl Chloride Films 0.0013cm (0.0005in)	3.0
Polyethylene Films 0.0125cm (0.005in)	4.0
Waxed Paper (45.5kg (100lb) per dc ream)	
Polyethylene Film 0.015mm/0.003in	6.0
Cellulose Films ('Cellophane')	7.5
300s MSAT Grade (Cellulose Nitrate Coated)	
Glassine Lacquered (16kg (35lb) per dc ream)	9.0
Polyethylene Film 0.005cm (0.002in)	10.0
Polyethylene Film 0.0025cm (0.001in)	20.0
Polyethylene Coated Kraft (9kg (20lb) per dc ream)	30.0
*MVTR = moisture vapour transmission rate.	

As the **RS** silica gel does not contain an indicator it is not possible to establish when it has been saturated. Rejuvenation can take place in an oven at 90°C but again no indication of a successful result is possible.

It is also recommended that for the best results the user dries out new material for 1-2 hours at 90°C prior to use.

Further information can be obtained by reference to:

BS1133 Section 19 Use of desiccants in packaging.

BS2540 Silica Gel for use as a desiccant.