

Conservation By Design Limited



CONSERVATION BY DESIGN LIMITED

Timecare Works
5 Singer Way
Woburn Rd Ind. Estate
Kempston
Bedford
MK42 7AW
Great Britain

Tel: (01234) 853555
Fax: (01234) 852334
Email info@conservation-by-design.co.uk
Web: <http://www.conservation-by-design.co.uk>

Self – Indicating Orange-Green Silica Gel – MS/0G

Description

Silica Gel is a highly porous form of amorphous silica, it absorbs water into its pores by physical means without any chemical change and is the ideal desiccant in the museum environment or on the archaeological dig site for use within storage containers, display cases and packing boxes.

Composition

Unlike the former blue - pink self-indicating Silica Gel our new Orange - Green Self Indicating Silica gel beads are non toxic and safe to handle. The Orange-Green beads are impregnated with an organic indicator (0.2 %max) indicating compound enabling the beads to change from a deep orange in the activated (dry) condition to a dark green when saturated with water. The narrow pore beaded variety of silica gel creates almost no dust during use making it a more preferable and practical monitoring product in any display or storage environment.

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Specification	
Moisture content at 145 degrees C	2.0 maximum
Adsorption Capacity -	
20% RH, 25 degrees C	8.0% w/w
35% RH, 25 degrees C	12.0% w/w
50% RH, 25 degrees C	20.0% w/w
Bulk Density	700 – 750 grams/litre
Particle Size	2 to 5mm
BET surface area	>600m ² /g
Pore Volume	0.35 – 0.45 ml/g
Average pore diameter	20-30 A
pH (10% aqueous solution)	1.8 – 2.2
Odour	None

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Chemical Composition	
Silica SiO ₂	98.0% w/w approx
Humidity Indicator (Methyl Violet)	00.2% w/w approx

Users Guide

When saturated with moisture vapour Orange-Green Silica Gel remains a dry , free flowing beaded solid.

Orange-Green Silica Gel can absorb up to 40% of its own weight, of water, it is chemically inert, non-flammable, almost completely dust free and most importantly non-toxic.

As a rough guide, 5 gms of Orange-Green Silica Gel will treat approximately one cubic foot of display area. |

We recommended that when opening containers of Orange-Green (Orange-White or original Blue-Pink) that the Silica Gel beads / granules / sachets are removed quickly to avoid any remainder in the container absorbing water vapour from the atmosphere arid promptly positioned appropriately within the designated treatment / display area.

Regeneration

To regenerate, exhausted Orange-Green Silica Gel should be heated to between 105 DC and 110 DC 5. (Orange-White and original Blue varieties may require a slight increase in temperature to around 120 DC, see data sheets for colour change details) resulting in a colour change from a dark green to deep orange.

When regenerated, allow the beads to cool slightly (encourage the moisture that has been driven out to ~ disperse - to prevent it from being immediately re-adsorbed) before storing in an airtight container until required for use. Regeneration can be repeated many times before the beads / crystals become unstable, because the colour change is no longer apparent. Even the Silica Gel will continue to adsorb moisture though.

It is possible to dry silica gel in a microwave oven. First remove all other items from the microwave, then heat the granules for around 5 minutes (or until the beads / crystals have returned to their original colour) opening the door from time to time to let the water vapour out and to allow the granules to

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cool down before reheating again. Continue this process until the granules turn back to their original deep orange status.

When regenerating self-indicating sachets use on the minimum heat required to return the beads or crystals to their original colour, this will prevent the sachet material deteriorating. Regenerating heat-sealed sachets can cause the seals to fail. When regenerating try to place the sachets such that air can circulate around them, on shelves rather than trays, and such that they do not touch the sides or base of the oven. Store in an airtight container after regeneration.

After regeneration thoroughly clean the microwave prior to re-use and so as to eradicate any left over odour thoroughly air it out.

Health and Safety

Please read the appropriate version of our Material Safety Sheet for either the Orange - Green, Orange - White or traditional Blue - Pink Silica Gel products prior to use, there may be subtle changes between the Orange - Green and Orange to White grades and wider implications if the original Blue - Pink

(now deemed toxic) grade is used. We recommend that the MSDS sheet is therefore checked prior to use.

Silica Gel is very adsorbent and may have a drying effect on skin and eyes, those with particularly sensitive skin may therefore prefer to wear gloves when handling. Amorphous Silica is chemically and biologically inert.

MSDS : SILICA GEL (Orange-Green beads)

I. Identification of Substance / preparation Orange to Green self indicating bead.

Company identification:

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2. Chemical composition

Amorphous silica with indicator

Silica: 98.2% CAS No 7631-86-9

Activated co louring agent: 0.2% max.

3. Hazards Identification

This product is very adsorbent and may have a drying effect on skin and eyes. Exposure to any dust could be harmful. *Evolves* heat on contact with water.

4. First Aid Measures

1. After inhalation: remove to fresh air, keep warm and at rest. Obtain medical attention if symptoms develop.
2. After skin contact: wash with water, if skin irritation persists seek medical advice.
3. After eye contact: flush with water, if irritation persists seek medical advice.
4. 4.After ingestion: *give* water to drink, seek medial advice. Do not induce vomiting.

5. Fire Fighting Measures.

1. Products of combustion: NONE.
2. Fire fighting procedures/extinguishing media: not applicable, inorganic compound, not combustible.



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**Material Safety Data Sheet
Silica Gel (MS/O)**

Identification of Substance / preparation

Silica Gel ORANGE Self-Indicating.

Company details: as per letterhead above.

2. Chemical composition

Synthetic, amorphous silica impregnated with iron compounds.

Silica 93%

CAS No : 7631-86-9

EINECS : 231-545-4

Iron Compounds 5%

3- Hazards Identification

The product is very adsorbent and may have a drying effect on skin and eyes. Sensitization of skin and respiratory system possible.

Exposure to dust could be harmful. Evolves heat on contact with water.

4. First Aid Measures

1. After Inhalation: remove to fresh air. Keep warm and at rest. Obtain medical attention if symptoms develop.
2. After skin contact: wash with water, if skin irritation persists seek medical advice.
3. After eye contact: flush with water / if irritation persists seek medical advice.
4. After ingestion: give water to drink, seek medical advice. Do not induce vomiting-

5. Fire Fighting Measures

1. Products of combustion: NONE
2. Fire fighting procedures / extinguishing media: not applicable unused material will not burn.

6. Accidental Release Measures

1. Personal Protection: respiratory protection if dusty, eye and hand protection.
2. Methods for cleaning up: sweep up, or preferably vacuum up and collect in a suitable container for recovery or disposal. Avoid raising dust.

7. Handling and Storage

1. Precautions during handling: avoid raising dust, vacuum up dust sources prevent static electric sparks.
2. Precautions during storage: store in sealed containers in a dry place.

6. Accidental Release Measures

1. Personal Protection: respiratory protection if dusty with eye and hand protection as appropriate.
2. Methods of cleaning up : sweep up, or preferably vacuum up and collect in suitable container for recovery or disposal. Avoid raising dust. Material in bead format is slippery.

7. Handling and Storage

1. Handling: avoid raising dust, vacuum up dust sources, prevent static electric sparks. Material may be slippery in bead form.
2. Storage: store in sealed containers in a dry place.

8. Exposure Controls / Personal Protection

I. General -

1. respiratory: effective dust mask
2. hand: protective gloves
3. eye: goggles, safety glasses
4. skin: overall

Exposure Limits -

Silica amorphous:

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UK EH40 : OES	8 hr TWA	6 mg / m ³	total inhalation dust
UK EH40 : OES	8 hr TWA	2.4 mg / m ³	respirable dust
ACGEH : TLV	8 hr TWA	10 mg / m ³	

Activity agent: ACGIH : 8 hr TW A 0.5,g / m³ ~o

9. Physical and Chemical Properties

Appearance	- Orange beads - Turn green on adsorption of water.
Odour	- None,
pH	- 2-10 (5%w/w suspension in water)
Solubility	- less 1% in water and solvents ,
Flammability/ Flash point	- Not applicable

10. Stability and Reactivity

Stability - stable, hygroscopic

Conditions / materials to avoid - evolves heat in contact with water. - avoid temperatures in excess of 150 °c Hazardous decomposition products - no data available.

11. Toxicological information

Acute Toxicity :

Silica, amorphous - Oral, LD50 >15,000 mg / kg, rat

Effects of exposure:

Eyes - dust may cause irritation

Skin - heat may be evolved, when in contact with water may have a drying effect.

Carcinogenicity - Amorphous silica is not classified as carcinogenic to humans

12. Ecological/Biological Information

Amorphous Silica is chemically and biologically inert, it is not degradable. By its insolubility in water there

is a separation at every filtration and sedimentation process.

13. Disposal Considerations

Disposal according to national and local regulations.

This material is not classified as hazardous waste under the EEC Directive 91 / 689. This material is not classified as special waste under the UK Special Waste Regulations 1996 and can be disposed of by landfill at an approved site.

14. Transport Information

Not dangerous goods according to the transport regulations of UK road, RID-ADR, IMO, MARPOL, ICAO. Not classified as dangerous goods under the United Nations Transport Regulations. No special packaging requirements.

15. Regulatory Information

EC classification: This product is not classified as dangerous.

S phrases: Handle in accordance with good industrial hygiene and safety practices. Avoid inhalation of dust.

This information is given in good faith and is based on information supplied by the manufacturer of this material. For user information please consult the data sheet. February 2003.