

Section 1: PRODUCT AND COMPANY IDENTIFICATION

Imperial Sugar Company P.O. Box 9 Sugar Land, TX 77487-0009 www.imperialsugar.com (Brands: Imperial Sugar, Dixie Crystals, Holly Sugar, Colonial and Evercane)	Imperial Sugar Company: (800) 727-8427 Plant Emergency: (281) 491-9181 (8am to 5pm, Central Time Zone, Monday to Friday)
Product Name: Powdered Sugar Trade Names/Synonyms: Confectioner's Sugar, Fondant & Icing Sugar, Powdered Sugar NF, 4X, 6X, 10X, 12X Powdered Sugar	Issue Date: 10/01/2009 Supersedes Date: January 2008

Section 2: HAZARDS IDENTIFICATION - WARNING

WARNING! MAY FORM COMBUSTIBLE DUST CONCENTRATIONS IN AIR

Explosion: This material is friable and can create small dust particles during any handling, processing, and transfer operations. This material can form explosible dust/air suspensions that are ignitable under some conditions. Dust accumulations should be avoided to prevent secondary dust explosions.

Fire: Sugar is a combustible material and could contribute to a fire, once started and, therefore, normal fire prevention practices should be followed.

Effects of Overexposure: Prolonged exposure to nuisance dust could result in temporary, reversible respiratory irritation. Prolonged contact may cause skin sensitization or inflammation (reddening, scaling, or itching). No other effects have been reported in humans.

This product does not contain any carcinogens or potential carcinogens as listed by OSHA, IARC or NTP.

Section 3: COMPOSITION/INFORMATION ON INGREDIENTS

<u>Component</u>	<u>CAS No.</u>	<u>% by Wt.</u>
Pulverized Sucrose	57-50-1	96-97%
Pulverized Corn Starch	9005-25-8	3-5% (to retard lumping)

Sucrose: β -D-fructofuranosyl- α -D-glucopyranoside; Corn starch: 27/73 Amylose/Amylopectin

Formula: Sucrose, $C_{12}H_{22}O_{11}$; Corn Starch, $(C_6H_{10}O_5)_x$

Chemical Family: Carbohydrates

Description: Odorless, hygroscopic, dry, fine white powder with a sweet taste

Melting Point: 365°F (185°C)

Bulk Density: 24 to 45 Lbs./Cu.Ft.

Solubility in Water: 200 gm per 100 ml @ 20°C

Percent Moisture by Weight: 0.50

Section 4: FIRST AID MEASURES

Emergency and First Aid Procedures:

Ingestion: If swallowed in large amounts and the person is conscious, immediately give large amounts water. Get medical attention.

Inhalation: If a person inhales a large amount of sugar dust, move the exposed person to fresh air. Get medical attention.

Eye Contact: Wash the affected area with large amounts of water for at least 15 minutes and obtain medical attention.

Skin Contact: Wash the affected area with large amounts of water for 15 minutes.

Section 5: FIRE FIGHTING MEASURES

This material can form explosible dust/air suspensions that are ignitable under some conditions. Dust accumulations should be avoided to prevent secondary dust explosions. **Avoid generating dust; fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source, is a potential dust explosion hazard.** Refer to NFPA 61 for procedures regarding fire and explosion hazards relating to sugar dust.

Suitable Extinguishing Media: Class A stored-pressure wet-water or water-mist extinguishers or extinguishing media that are appropriate for the surrounding fire and materials.

Unsuitable Extinguishing Media: Avoid use of pressurized dry-chemical extinguishers on powdered materials to prevent dust suspensions and dust explosion hazards. Hose streams should be used with great care to avoid creating dust clouds. Fog nozzles should be used.

Section 6: ACCIDENTAL RELEASE MEASURES

Methods for Clean-Up: Airborne sugar dust may form explosible dust clouds and dust accumulations should be avoided to prevent secondary dust explosions. Sugar dust can accumulate on floors, equipment, and overhead structural members and can become airborne, and accordingly must be removed concurrently with operations. **Avoid dispersal of dust in the air (i.e., clearing dust surfaces with compressed air). Non-sparking tools should be used.** Sugar dust should not be allowed to accumulate in quantities that when suspended could create an atmosphere above the Minimum Explosible Concentration (MEC) of 50 to 60 g/m³. Spills should be cleaned up and dust accumulations should be removed promptly. Surfaces should be cleaned in a manner that minimizes the generation of dust clouds. Refer to NFPA 61 for procedures regarding fire and explosion hazards relating to sugar dust.

Section 7: HANDLING AND STORAGE

Precautions to be taken in Handling and Storing: Airborne sugar dust may form explosible dust clouds. **To minimize dust generation and accumulation, spills should be cleaned up, and, dust accumulations should be removed promptly.**

Other precautions: Provide adequate (local exhaust) ventilation to prevent the spread of dust clouds. **Dry powders can build static electricity charges when subjected to the friction of transfer and mixing operations. Provide adequate precautions, such as electrical grounding and bonding, or inert atmospheres.** Avoid all potential ignition sources including smoking, open flames, static electricity and sparks in areas where airborne sugar dust may be possible. Ensure that electrical equipment meets the Class II, Group G classification for sugar-handling areas, particularly where dusts having average particle sizes less than 400 microns could be released or could accumulate.

Employ effective housekeeping practices and exhaust ventilation, electrostatic grounding of all metal equipment and operators, management of electrical devices, maintenance of mechanical equipment (e.g. mills, rotary valves, screw feeders, conveyors, and elevators), and explosion protection and isolation provisions in accord with accepted engineering practices in any process capable of generating dust.

Refer to applicable NFPA standards including:

NFPA 61 "Standard for the Prevention of Fires and Dust Explosions in Agricultural and Food Products Facilities"	NFPA 101 "Life Safety Code"
NFPA 68 "Guide for Venting of Deflagrations"	NFPA 654 "Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids"
NFPA 69 "Standard on Explosion Prevention Systems"	NFPA 2112 "Standard on Flame-Resistant Garments for Protection of Industrial Personnel Against Flash Fire"
NFPA 70 "National Electrical Code (NEC)"	NFPA 2113 "Standard on Selection, Care, Use, and Maintenance of Flame-Resistant Garments for Protection of Industrial Personnel Against Flash Fire"
NFPA 77 "Recommended Practice on Static Electricity"	
NFPA 499 "Recommended Practice for the Classification of Combustible Dusts and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas"	

Seek expert advice regarding dust cloud explosion prevention and protection measures.

Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Limits: OSHA PEL = 15 mg/m³ (Total Dust), 5 mg/m³ (Respirable Dust)
ACGIH TLV = As Sucrose, 10 mg/m³, 3 mg/m³ (Respirable Dust);
A4 – Not classified as a human carcinogen
NIOSH REL = TWA 10 mg/m³ (Total Dust), TWA 5 mg/m³ (Respirable Dust)
LD₅₀ = 29.7 g/kg (oral, rat), 14.0 g/kg (mouse)

Establish and maintain good housekeeping practices. Follow dust control practices outlined in NFPA 61, "Standard for the Prevention of Fires and Dust Explosions in Agricultural and Food Processing Facilities." Accumulated dust on floors, structural members, and other surfaces should be removed concurrently with operations.

Respiratory Protection: Local exhaust ventilation or other site specific engineering controls are recommended if visible dust emissions are present. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details. If dusty conditions exist, wear appropriate respiratory protection based on an industrial hygiene exposure monitoring assessment until engineering controls reduce dust concentrations to an acceptable level. If the exposure limit is exceeded and engineering controls are not feasible, a half-face elastomeric respirator (with NIOSH type N95 filters or better) or NIOSH approved disposable particulate respirator (filtering facepiece or dust mask) may be worn for up to ten times the exposure limit. A full-face elastomeric respirator (with NIOSH type N100 filters) may be worn up to 50 times the exposure limit. If oil particles are present or suspected to be present, use a NIOSH type R100 or P100 filter. For emergencies or instances where the exposure levels are not known, use a full-face positive-pressure, air-supplied respirator. Air-purifying respirators do not protect workers in oxygen-deficient atmospheres. If employees are required to wear respirators, they should be included in a written respirator program, trained in the use of respirators, medically qualified to wear respirators, and fit-tested to ensure proper fit of the respirator worn.

Other Protective Clothing or Equipment: Protective clothing and gloves are not required for ordinary operations but may be desirable from a sanitation aspect. Eye protection is recommended to avoid eye irritation. Where dusty conditions are unavoidable, flame-resistant, antistatic outer clothing and conductive shoes should be worn and used.

It is recommended that all dust control equipment such as local exhaust ventilation and material transport systems involved in handling of this product contain explosion relief vents or an explosion suppression system or an oxygen-deficient environment. Ensure that dust-handling systems (such as exhaust ducts, dust collectors, vessels, and processing equipment) are designed in a manner to prevent the escape of dust into the work area. Use only appropriately classified electrical equipment and appropriately rated powered industrial trucks.

Section 9: PHYSICAL AND CHEMICAL PROPERTIES

The following guidance is given concerning the properties and usage of powdered sugar:

PROPERTY [and approximate values]	FINE ^a FRACTION [100% smaller than 75 microns]	COARSE ^b FRACTION [50% larger than 60 microns]
Minimum Ignition Energy [MIE]	7.5 millijoules	15 millijoules
Minimum Ignition Temperature [MIT]	390 °C	390 °C
Minimum Explosible Concentration [MEC]	55 g./cu.m.	55 g./cu.m.
Maximum Explosion Pressure [Pmax]	7.7 barg; 112 psig	7.7 barg; 112 psig
Deflagration Index [Kst]	125 bar-m/sec.	125 bar-m/sec.

NOTES:

a – Locations where the fine-fraction data would be applicable: within dry dust collectors; for accumulations on elevated surfaces; in exhaust-ventilation ducts; in downlegs of bucket elevators; in dilute-phase pneumatic conveyors; in head spaces in blenders and mixers; in trucks and railcars during loading; in bags, drums, FIBCs, bins, and silos during filling.

b – Locations where the coarse-fraction data may be applicable: during bottom unloading from trucks and railcars; during dumping from hoppers, bins, bags, and FIBCs; on belt conveyors; in screw conveyors; in dense-phase pneumatic conveyors; and in elevator buckets.

a and b – Locations where intermediate values of the data could be applicable, depending on the dispersability or stickiness of the materials and the extent of segregation of the fine and coarse fractions: in rotary driers and coolers; in mixers, blenders, and tumblers; and at transitions between conveying systems, such as belt conveyors, bucket elevators, screw conveyors, and chutes.

Caution: Dust cloud explosion properties are very dependent on particle properties such as average particle size, particle-size distribution, particle shape, and moisture content. Therefore, if the as-received physical or chemical properties are modified by the user – during handling or processing – and if such dusts are accumulated in cyclones or dust collectors, it is important that explosibility data be obtained from tests on representative samples of the modified material.

Section 10: STABILITY AND REACTIVITY

Stability: Stable under normal temperatures and pressures.

Conditions to Avoid: Keep away from heat, sparks and flames.

Incompatible Materials (Materials to Avoid): Strong oxidizers, such as potassium permanganate, potassium chlorate, potassium nitrate, potassium perchlorate, and nitric acid. Strongly hydrophilic liquids such as sulfuric acid can release carbon monoxide upon contact with sugar. Carbon dioxide, flammable aldehyde, and carbon monoxide may form when heated to decomposition, or heated with strong, concentrated alkalis. This is an exothermic reaction.

Hazardous Decomposition Products: Thermal decomposition, at temperatures in excess of 365°F, may release flammable gases and acrid fumes and smoke, including aldehydes, carbon monoxide, carbon dioxide, and steam. If confined, the decomposition gases can exert considerable pressure.

Polymerization: Will not occur.

Section 11: TOXICOLOGY INFORMATION**ACUTE EFFECTS**

Oral LD₅₀ = 29.7 g/kg (rat), 14.0 g/kg (mouse)

Section 12: ECOLOGICAL INFORMATION

No applicable information available.

Section 13: DISPOSAL CONSIDERATIONS

Dispose of spilled material using "Current Good Manufacturing Practices" as permitted by federal, state and local regulations or return to manufacturer for total reprocessing.

Section 14: TRANSPORTATION INFORMATION

Transport in accordance with local, state, and federal regulations.

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