



UNIT 1 – Classification

1.1 Classes of dangerous goods

What are the classes of dangerous goods?

Each class or division has specific criteria that are used to determine whether an article or substance belongs to that class or division. These criteria are technically detailed and classification of an item requires specialist knowledge of the criteria. These classes are:

- Class 1 — Explosives;
- Class 2 — Gases;
- Class 3 — Flammable liquids;
- Class 4 — Flammable solids; Substances liable to spontaneous combustion; Substances which in contact with water emit flammable gases;
- Class 5 — Oxidizing substances and Organic Peroxides;
- Class 6 — Toxic and infectious substances;
- Class 7 — Radioactive material;
- Class 8 — Corrosives;
- Class 9 — Miscellaneous dangerous goods & Environmentally hazardous substances

Thermo
ELECTRON CORPORATION
Environmental Instruments/Water Analysis
166 Cummings Center
Beverly, MA 01915-6199 USA
Telephone 978-232-6000

MATERIAL SAFETY DATA SHEET

I. PRODUCT IDENTIFICATION

Product Name: Corrosive Acid #Regent - 1% Sulfuric Acid	Orion No. 193630 (Part of 193023)	Effective Date: 1/1/04
Hazardous Shipments Labeling: DOT Corrosive/Sulfuric Acid UN 2796	ATA Corrosive/Sulfuric Acid UN 2796	
Prepared By: J. C. O'Malley	Title: Quality Assurance Manager	

II. HAZARDOUS INGREDIENTS (IDENTIFY INFORMATION)

Hazardous Components * Specific Chemical Identity: Common Name(s)	CAS NO.	%	OSHA PEL	ACGIH TLV	LD ₅₀ mg/Kg
Sulfuric Acid (H ₂ SO ₄)	7664-93-9	1	TWA 1 mg/m ³	TWA 1 mg/m ³	135 (UNR-MAN)
Stool CS-460 (Wetting Agent)	None Listed	<1	None Listed	None Listed	None Listed
***Deionized Water (H ₂ O)	7732-18-5	>98	None Listed	None Listed	629,000 (ORL-DOG)

III. PHYSICAL DATA

Boiling Point: 756mm Hg >100°C	Freezing Point <0°C
Specific Gravity (H ₂ O=1) 1.0	Vapor Pressure @ 20°C NA**
pH @ 25°C (1.0 - 1.5)	Solubility In Water, % by Wt @ 25°C Miscible
Volatiles % By Wt. NA	Evaporation Rate (BUTYL ACETATE = 1) NA
Vapor Density (AIR = 1) NA	
Appearance and Odor Colorless odorless liquid.	

IV. FIRE AND EXPLOSION HAZARD DATA

Flash Point (Test Method) NA	Autoignition Temperature NA
Flammable Limits in air, % by volume: Lower NA Upper NA	
Extinguishing Media: Dry chemical	
Special Fire-Fighting Procedures: Self-contained breathing apparatus should be worn	
Unusual Fire and Explosion Hazards: This solution is not combustible but will react with other chemicals (Hydroxides) and even water.	








*Chemicals which are not classified as hazardous per U.S. OSHA guidelines (29CFR Parts 1910.2 or 1910.6) or the Massachusetts Substance List (105CMR670.009 Appendix A) will not necessarily be listed on this form even though one or more may be a constituent of this product
** NA: Not available/not applicable
*** Non-hazardous component

Liability is expressly disclaimed for any loss or injury arising out of the use of this information or the use of any materials designated. Safe use of the materials is the responsibility of the user.

Document No. 210548-001
Rev. G
Printed in U.S.A.
Form MSDS1192






1.2 COMPLETE LIST OF CLASSES AND DIVISIONS

Hazard label 危險性標籤	Name/Division Cargo IMP Code 名稱/類別 貨運標準代碼	Description 描述	Comments and/or Examples 例子
Class 1 Explosives			
	Division 1.1 REX 1.1 項	Articles and substances having a mass explosion hazard 係指具有整體爆炸危險性的物品和物質（整體爆炸是指實際上瞬間影響到幾乎全部載荷的爆炸）。	<p>THESE EXPLOSIVES ARE NORMALLY FORBIDDEN FOR CARRIAGE BY AIR e.g. TNT, Dynamite or Torpedoes</p> <p>炸藥通常被禁止使用空運，例如TNT、炸藥或魚雷等。</p>
	Division 1.2 REX 1.2 項	Articles and substances having a projection hazard 係指具有噴射危險性而無整體爆炸危險性的物品和物質。	
	Division 1.3 REX RCX RGX 1.3 項	Articles and substances having a minor blast or projection hazard 係指具有起火危險性和輕微的爆炸危險性或輕微的噴射危險性，或兩者兼而有之，但無整體爆炸危險性的物品和物質。	
	Division 1.4 REX 1.4 項	Articles and substances which present no significant hazard 係指無顯著危險性的物品和物質。	
	Division 1.5 REX 1.5 項	Very insensitive substances which have a mass explosion hazard 係指具有整體爆炸性，但非常不敏感以致在正常運輸條件下引發或由燃燒轉為爆炸的可能性非常小的物質。	
	Division 1.6 1.6 項	Extremely insensitive articles which do not have a mass explosion index 係指無整體爆炸危險性的極不敏感物品。	
	RXB, RXC, RXD, RXE, RXG		







			e.g. Distress signals, Fuse igniters 配裝組的劃分是根據《規則》表3.1A。
Note: Goods of Class 1 are assigned to one of six divisions AND to one of 13 compatibility groups which identify the kinds of explosive articles and substances that are deemed compatible.			
	RXS	Articles and substances which present no significant hazard. Effect from accidental functioning is confined within the package 係指無顯著危險性的物品和物質。發生意外的影響主要限於包裝本身。	e.g. Ammunition for hand weapon, for signal, Safety Fuses, some types of Fireworks, etc. 由組件所產的附作用引起的爆炸信號彈、導火線、某些類型煙花等。
Class 2 Gases			
	Division 2.1 Flammable Gas RFG 易燃氣體類別 2.1	Any gas which, when mixed with air in certain proportions, forms a flammable mixture. 與空氣混合，可燃幅度至少為12個百分點的氣體。	e.g. Butane, Hydrogen, Propane, Acetylene, Lighters 丁烷、氫、丙烷、乙炔、打火機
	Division 2.2 Non-flammable non-toxic gas RNG RCL 不易燃，無毒的壓縮氣體類別 2.2	Any non-flammable, non-toxic gas or low temperature liquefied gas. 非易燃無毒氣體。	e.g. Carbon dioxide, Neon, Fire extinguisher, liquefied Nitrogen or Helium 二氧化碳、氖、滅火器或低溫液化氣體例如液化氮氣或氬氣。
	Division 2.3 Toxic Gas RPG 有毒氣體類別 2.3	Gases known to be toxic or corrosive to humans and known to pose a health risk. 已知具有的毒性或腐蝕性強到對人的健康造成危害的氣體。	Most toxic gases are forbidden for carriage by air; some are permitted, e.g. aerosols of low toxicity, tear gas devices. 具毒性或腐蝕性，對人的健康造成危險的氣體多數毒氣被禁止為使用空運；有些被允許，例如低毒性噴霧劑，催淚彈等設備。
Class 3 – Flammable Liquid			
	Class 3 Flammable Liquid RFL 易燃液體	Any liquid having a closed cup flash point of 60.°C or below (DGR Appendix A) 易燃液體是指在閉杯試驗中溫度不超60.°C) 或以下。	e.g. Paints, alcohols, some adhesives, acetone, petrol, etc. 某些油漆、油漆、酒精、某些膠黏劑、丙酮、汽油等。



Class 4 Flammable solids			
	<p>Division 4.1 Flammable solid, Self reactive substances, Polymerizing substances and Desensitized explosive RFS 易燃固體類別。 自反應物質，聚合物質和脫敏炸藥4.1</p>	<p>Any solids material, which is readily combustible, or may cause or contribute to fire through friction or undergo a strong exothermic reaction. Desensitized explosives if not fully diluted may explode 易燃固體，指在正常運輸條件下，易於燃燒的固體和摩擦可能起火的固體；自身反應物質是指容易發生激烈放熱分解的物質；鹹敏的爆炸品是指不充分稀釋就可能爆炸的物質。</p>	<p>e.g. Matches, Sulphur, Celluloid, Nitronaphthalene. Note: some are self-reactive. 火柴、硫磺、明膠、硝基。 注：某些是自我反應物質。</p>
	<p>Division 4.2 Spontaneously Combustible RSC 自燃物品類別 4.2</p>	<p>Such substances are liable to spontaneous heating or to heating up in contact with air and then liable to catch fire. 自然物質係指在正常運輸條件下能自發放熱，或接觸空氣能夠放熱；並隨後起火的物質。</p>	<p>e.g. White or Yellow phosphorous, Magnesium diamide. 白色或黃色磷、鎂聯氨。</p>
	<p>Division 4.3 Dangerous When Wet RFW 遇濕易燃物品類別 4.3</p>	<p>Substances, which by interaction with water, are liable to become spontaneously flammable or give off flammable gases. 與水接觸釋放出易燃氣體（遇濕危險）的物質。這種物質與水反應自燃或產生足以構成危險數量的易燃氣體。</p>	<p>e.g. Calcium carbide, sodium. 鈣碳化物、鈉。</p>


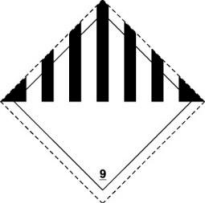



Class 5 Oxidizing substance; organic peroxide			
	Division 5.1 Oxidizer ROX 氧化劑類別 5.1	A substance that yields oxygen readily to stimulate the combustion of other materials. 氧化劑是指本身未必燃燒，但通常因放出氧可能引起或促使其他物質燃燒的物質。這類物質可能含在一種物品內。	e.g. Ammonium nitrate fertilizer, calcium chlorate, bleaches. 硝酸銨肥料、鈣氯酸鹽、漂白劑。
	Division 5.2 Organic Peroxide ROP 有機過氧化物 類別 5.2	An organic material (liquid or solid) that can be ignited readily by external flame and then burns with an accelerating rate: some substances react dangerously with others 有機過氧化物遇熱不穩定，它可以放熱並因而加速自身的分解。此外，它們還可能與其他物質發危險的反應。	e.g. tert-Butyl hydroperoxide, as listed in Appendix C of the DGR 丁基過氧化氫，被列出在《規則》附錄C。
Class 6 Toxic (Poisonous) and Infectious Substances			
	Division 6.1 Toxic Substance RPB 毒性物質類別 6.1	Liquids or solids, which are dangerous if inhaled, swallowed or absorbed through the skin. 6.1項毒性物質係指在吞食、吸入或皮膚接觸後，可能造成死亡或嚴重受傷或損害人的健康的物質。	e.g. Arsenic, Nicotine, Cyanide, Pesticide, Strychnine. Some are totally forbidden, e.g. Bromoacetone. 砷、尼古丁、氰化物、殺蟲劑、馬錢子鹼。
	Division 6.2 Infectious Substance RIS 感染物質類別 6.2	Substances which are known or reasonably expected to contain pathogens and cause disease in humans or in animals 指那些已知含有或有理由認為含有病原體的物質。病原體是指會使人類或動物感染疾病的微生物（包括細菌、病毒、立克次氏體、寄生蟲、真菌）或其他媒介物，例如朊毒體。	e.g. Virus, Bacteria, such as HIV (AIDS), Rabies, some diagnostic specimens and Medical and Clinical waste. 病毒、細菌，例如HIV (愛滋病)、狂犬病、某些診療樣品和臨床與醫療廢棄物。



Class 7 Radioactive Material			
	<p>Class 7 Radioactive Material Category I - White RRW 放射性類別7項別 I</p>	<p>Radioactive materials with low radiation level on the package surface. No transport index indicated. 放射性物質係指所含放射性核素的活度濃度和托運貨總活度均超過規定數值的任何物質。</p>	
	<p>Class 7 Radioactive Material Category II - Yellow RRW 放射性類別7項別 II黃色</p>	<p>Radiation level higher than Category I and a transport index not exceeding 1. 放射性物質活度高於類別 I, 運輸指數不超過1。</p>	<p>e.g. Radionuclides or isotopes for medical or industrial purposes, such as Cobalt 60, Caesium 131 and Iodine 132. 放射性核素或核素用於醫療或工業目的, 例如: 鈷60、銫131和碘132。</p>
	<p>Class 7 Radioactive Material Category III - Yellow RRW 放射性類別7項別 III 黃色</p>	<p>Radiation level higher than Category II and/or a transport index exceeding 1 but not more than 10. 放射性物質活度高於類別 II, 運輸指數介符1與10之間。</p>	
	<p>Class 7 Radioactive Material Fissile Criticality Safety Index 裂變物質 臨界安全指數</p>	<p>Criticality Safety Index labels must be used in addition to the appropriate radioactive labels to provide control over accumulation of packages or overpacks containing fissile material. 除放射性物質標籤外臨界安全指數標籤也必須貼上, 以控制包裝及合成包裝含有裂變物質的份量。</p>	<p>e.g. Fissile material: Uranium 233 and 235, Plutonium 239 and 241. 裂變物質, 例如: 鈾233及235、</p>



Class 8 Corrosive			
	<p>Class 8 Corrosive Material RCM 腐蝕性物質類別 Miscellaneous Dangerous Substances and Articles, Including Environmentally Hazardous Substances</p>	<p>A liquid or solid that will cause severe damage when in contact with living tissue or, in the case of leakage will materially damage or even destroy other goods or the means of transport. 腐蝕性物質是通過化學作用在接觸生物組織時會造成嚴重損傷、或在滲漏時會嚴重損害甚至毀壞其他貨物或運輸工具的物質。</p>	<p>e.g. Battery acids, sulphuric and other acids, sodium hydroxide, potassium hydroxide, Mercury 電池酸、硫酸和其他酸、氫氧化鈉、氫氧化鉀、水銀。</p>
Class 9 Miscellaneous Dangerous Substances and Articles, Including Environmentally Hazardous Substances			
	<p>Class 9 Miscellaneous dangerous goods, Environmentally hazardous substances RMD 雜項物質類別。 環境有害物質 9</p>	<p>Any substance which presents a danger during air transportation that is not covered by other classes. These include Aviation regulated solids or liquids, where materials may have irritating, noxious or other properties which could cause extreme annoyance or discomfort to crew members preventing them from performing their duties 第9類物質和物品是指在空運過程中存在的不屬於其他類別危險性的危險物質和物品。 這些物質包括航空管制的固體和液體，具有麻痺性、有害性刺激性或其他性質，一旦溢出能引起機組人員極度煩躁或不適以致不能正常履行職責。</p>	<p>e.g. Asbestos, Garlic Oil, Life Rafts, Internal Combustion Engines. 石棉、大蒜油、救生器材、內燃引擎。</p>
	<p>Lithium Ion Batteries Lithium Metal Batteries 鋰離子電池 鋰金屬電池 RLI/RLM</p>		



	<p>Carbon dioxide, solid (Dry Ice) ICE 固態二氧化碳 (乾冰)</p>	<p>Carbon dioxide, solid (dry ice) has a temperature of -79°C. On sublimation it produces a gas heavier than air which in an enclosed area and in large quantities can lead to suffocation. 溫度極低(-79°C左右), 當固態二氧化碳直接轉變成為氣體二氧化碳時, 因氣體較空氣重而取代了空氣, 所以在密閉空間能造成窒息。</p>	
--	--	---	--