附錄 3.3
危險物品通識教材

第一單元——危險貨物的分類

危險貨物分類	分類/組別	危險貨物之描述
第一種「**爆炸物**」	第 1.1 組	具有整體爆炸危害的物質和物品。
	第 1.2 組	具有射出危害，但無整體爆炸危害的物質和物品。
	第 1.3 組	具有焚燒危害，以及輕微的爆破危害、或者輕微的射出危害，或者兩者皆俱，但無整體爆炸危害的物質和物品。
	第 1.4 組	不致引起重大危害的物質和物品。
	第 1.5 組	不敏感的物質但具有整體爆炸危害。
	第 1.6 組	不敏感的物品，無整體爆炸危害。
第二種「(壓縮的、液化的或受壓溶解的)**氣體**」	第 2.1 組	易燃氣體
	第 2.2 組	非易燃、非毒性氣體
	第 2.3 組	毒性氣體
第三種「易燃液體」	第I級包裝群：起沸點≦35℃ 第II級包裝群：起沸點＞35℃，閃點＜23℃ 第III級包裝群：起沸點＞35℃，23℃≦閃點≦60℃	
第四種「易燃固體」	第 4.1 組	易燃固體
	第 4.2 組	自燃物質
	第 4.3 組	遇水放出易燃氣體物質(禁水性物質)
第五種「氧化物質與有機過氧化物」	第 5.1 組	氧化物質
	第 5.2 組	有機過氧化物
第六種「毒性物質與感染性物質」	第 6.1 組	毒性物質
	第 6.2 組	感染性物質
第七種「**放射性物質**」	—	放射性物質
第八種「**腐蝕性物質**」	—	腐蝕性物質
第九種「其他危險貨物」	—	其他危險物質和物品

※ 凡是對於健康、安全、財產與環境會造成危害的物質或物品，就是危險貨物，也稱為危險物品，或簡稱為危險品。

■第一種危險貨物——爆炸物

爆炸性物質係指一種固體物質、液體物質，或此類物質之混合物，其本身會

因化學反應而產生氣體，致其溫度、壓力與速度造成周圍環境之破壞。

爆炸性物質也包括不釋放氣體之**煙火物質**；所謂煙火物質係指一種物質、或一種混合物，可以產生熱、光、聲音、氣體或煙霧之一種，或各該現象之混合效果。

分組	說　　明	舉例
第 1.1 組	具有整體爆炸危害的物質和物品。	火藥
第 1.2 組	具有射出危害，但無整體爆炸危害的物質和物品。	飛彈
第 1.3 組	具有焚燒危害，以及輕微的爆破危害或輕微的射出危害、或者兩者皆俱，但無整體爆炸危害的物質和物品。	燃燒彈
第 1.4 組	不致引起重大危害的物質和物品。	爆竹
第 1.5 組	不敏感的物質但具有整體爆炸危害。	爆破用炸藥
第 1.6 組	不敏感的物品，無整體爆炸危害。	

■第二種危險貨物——氣體

分組	組名	說　　明	舉例
第 2.1 組	易燃氣體	在 20°C及標準壓力 101.3Pa 時， • 體積 13%或以下，與空氣形成的混合物，會起火的氣體；或是 • 不論燃燒範圍的低點是多少，與空氣的燃燒級距至少為 12 個百分點的氣體。	UN1950 噴劑 Aerosols
第 2.2 組	非易燃、無毒性氣體	在 20°C及壓力不低於 200kPa 時、或是做為冷凍液體時，(1bar=100kPa) • 為窒息的；此種氣體會稀釋，或取代正常空氣中的氧氣； • 為氧化性的；此種氣體通常會供應氧氣，因而對於其他物料，會比空氣造成或提供更多的燃燒性。 • 不歸屬於其他組別的氣體。	UN1002 壓縮空氣 Air, Compressed
第 2.3 組	毒性氣體	• 已知其毒性或腐蝕性，對人體健康會導致危害的氣體；或是 • 由於其 LC_{50} 值等於或小於 5,000 ml/m^3 (ppm)，而對人體應具有毒性、或腐蝕性的氣體。	UN1062 溴甲烷 Methyl Bromide

「**噴劑**」(Aerosol)的定義是：由金屬、玻璃或塑膠製成的一種不再灌裝的容器，內含壓縮的、液化的、或壓力下溶解的氣體，含有或不含有液體、漿料或粉末，具有自我關閉之釋放裝置，可讓內容物以氣體懸浮的固態、或液態顆粒

之形態噴出，或是以泡沫、漿料或粉末之形態噴出，或是以液體或氣體之形態噴出。

■第三種危險貨物——易燃液體

分級	級　名	說　明	舉例
第I級包裝群	低閃點液體	在閉杯試驗中，起沸點≦35℃	UN1155 乙醚 Ethyl Ether B.P.= 34℃
第II級包裝群	中閃點液體	在閉杯試驗中，起沸點＞35℃，閃點＜23℃，(但不包括 23℃)	UN1294 甲苯 Toluene F.P.= 5℃
第III級包裝群	高閃點液體	在閉杯試驗中，其起沸點＞35℃，23℃≦閃點≦60℃	UN1223 煤油 Kerosene F.P.= 40℃

註：易燃液體的「**閃點**」(Flash point)是指，液體釋出的蒸氣與空氣形成一種會起火的混合物時的最低溫度。此性質可以用來衡量液體逸出包裝時，造成爆炸或起火的混合物的風險大小。

■第四種危險貨物——易燃固體、自燃物質與遇水放出易燃氣體物質

分組	組　名	說　明	舉例
第 4.1 組	易燃固體	①易燃固體(Flammable Solids)	UN1944 安全火柴
		②自反應物質 (Self-reactive Substances)	UN3226 / 2-偶氮-1-奈酚-4-磺酸鈉
		③降敏固體爆炸物 (Solid Desensitized Explosive)	UN1337 / 濕性硝化澱粉，水重量不低於 20%
		④聚合物質(Polymerizing Substance)	UN3532 /聚合物質，液體，穩定化，未另予特別指明者
第 4.2 組	自燃物質	發火物質(Pyrophoric Substances)	UN1381 白磷或黃色
		自熱物質(Self-heating Substances)	UN1362 活性碳
第 4.3 組	遇水放出易燃氣體物質(禁水性物質)		UN1418 鎂粉

第 4.1 組危險貨物「易燃固體」

①易燃固體

狹義的易燃固體是指二種物質，一種是運送狀況下的即燃(Readily Combustible)固體；另一種是會因摩擦而導致或造成起火的固體。

即燃的固體可能是粉末的物質，也可能是顆粒的或糊狀的物質。易燃性指的是，與燃燒的火柴之類的點火源短暫接觸之後，會輕易點燃，或者火焰會迅速蔓延。其危險性不僅來自火燒，還來自由於燃燒而產生的毒性物質。金屬粉末由於不易撲滅而特別危險，因為諸如二氧化碳、或水之類的正常滅火劑，不但無法撲滅，反而會增加危害。

②自反應物質(Self-reactive Substances)

自我反應物質是易於產生強烈熱量反應的物質。在正常運送情況下，自我反應物質會自行生熱，或是與空氣接觸會發熱，因而易於著火。

自我反應物質為熱量不穩定物質，即使沒有氧(空氣)的參與，也會產生強烈的放熱分解變化。

某些自我反應物質必須控制溫度。某些自我反應物質會產生爆炸式分解，尤其是在局限的空間裡。此種特性可以用添加稀釋劑，或採取適當的包裝物，而予以修正。某些自我反應物質則會猛烈燃燒。

③**降敏的固體爆炸物**：指用水或其他物質稀釋，以抑制其爆炸性之固體。

④**聚合物質**(Polymeric Substances)：物質若未穩定化，在正常的運輸狀況下，易於進行強烈的放熱反應，而導致形成大分子、或導致形成聚合物。物質在下列情況下被視為聚合物質：

(1) 當物質或混合物在將要被運輸的狀態(遞交運輸時不論有無化學穩定化)及包裝物中，其自我加速聚合溫度等於或小於 75℃；

(2)呈現大於 300 J/g 的反應熱量，且不符合第一至第八類的危險判定標準。

註：聚合物質在將要被運輸的包裝物中，若其自我加速聚合溫度等於或小於 50℃，則在運輸時必須加以溫度控制。

第 4.2 組危險貨物「自燃物質」(Spontaneously Combustible)

①發火物質(Pyrophoric Substances)：

此種物質，包括混合物或溶液(液體或固體)，即使極少的份量，與空氣接觸，也會在 5 分鐘以內點燃。

②自熱物質(Self-heating Substances)：

起火物質以外的物質，與空氣接觸時，即使沒有供給能量，也會自行加熱。此種物質只有在數以公斤、噸計的大量、或數以日、週計的長時間，才會點燃，因此被稱之為自熱物質。

第 4.3 組危險貨物「遇水放出易燃氣體物質」

如上所述，第 4.3 組危險貨物遇水會釋出易燃氣體，而與空氣形成爆炸性混合物。此混合物易於被噴濺火花的手工具、或無包裹的燈泡之類的明火所點燃。

遇水釋出易燃氣體之物質又稱為水作用的(Water-reactive)物質。我國法規亦稱做「禁水性物質」，其包裝群之分級如下所述：

• 第 I 級包裝群：

在常溫下與水猛烈作用，產生的氣體會自行點燃；或在每一分鐘期間，每公斤物質產生易燃氣體的速率等於或大於 10 公升。

• 第Ⅱ級包裝群：

在常溫下易於與水作用，每公斤物質產生易燃氣體的最大速率，每小時等於或大於 20 公升。

• 第Ⅲ級包裝群：

在常溫下與水緩慢作用，每公斤物質產生易燃氣體的最大速率，每小時大於 1 公升。

■第五種危險貨物——氧化物質與有機過氧化物

分組	組　　名	說　　明	舉例
第 5.1 組	氧化物質	本身未必自燃，但是因為釋出氧氣，或者相似的過程，會因與其他材料接觸，而增加起火的風險與可能性。	UN2984 過氧化氫溶液(8-20%)
第 5.2 組	有機過氧化物	含有－O－O－雙價結構的有機物質，可視為過氧化氫之衍生物，其中一個或兩個氫原子被有機根所取代。有機過氧化物為溫度不穩定物質，會產生放熱性自我加速分解。	UN3101 有機過氧化物，B 型態

此外，有機過氧化物可能具有下列一種或一種以上的性質：

- 易於爆炸性分解；
- 快速燃燒；
- 對衝擊或磨擦敏感；
- 與其他物質危險反應；
- 對眼睛造成傷害。

■ 第六種危險貨物——毒性物質與感染性物質

第 6.1 組危險貨物「毒性物質」

分組	組　名	說　　明	舉例
第 6.1 組	毒性物質	此項物質若吞食或吸入，或者經由皮膚接觸，會造成死亡、嚴重傷害或損壞人體健康。	UN1558 砷 Arsenic
第 6.2 組	感染性物質	此項物質包括具有生命力的微生有機物，包含細菌、病毒、病原體、寄生蟲、蕈菌，或其混種與突變之組合，已知或有理由相信對動物或人體造成疾病。	UN3291 醫療廢棄物，泛稱

★急毒吞食性(Oral)的半數致死劑量(LD_{50} 值)：

用一批年輕的成年雌、雄白鼠作食入實驗。在 14 天內，最可能造成被測試的雌、雄白鼠半數死亡的物質劑量。被測試的白鼠數目，必須足以提供統計上有意義的結果，且符合良好的藥理學常例。實驗結果是以每公斤體重所含的毫克，做為單位。

★急毒皮膚接觸性(Dermal)的半數致死劑量(LD_{50} 值)：

與白兔的裸膚接觸 24 小時。在 14 天內，最可能造成白鼠半數死亡的物質劑量。實驗結果是以每公斤體重所含的毫克，做為單位。

★急毒吸入性(Inhalation)的半數致死濃度(LC_{50} 值)：

用一批年輕的成年雌、雄白鼠持續吸入 1 小時。在 14 天內，最可能造成被測試的雌、雄白鼠半數死亡的粉塵、蒸氣或蒸氣的濃度。就粉塵與蒸氣的吸入情況而言，若合理推測在運送途中，人體可遭逢該濃度的物質，則 90%的被吸入顆粒，必須具有小於 10 微米的直徑。實驗結果，是以含有粉塵與蒸氣的每公升空氣所含的毫克，或者是以含有蒸氣的每立方米空氣所含的毫升，做為單位。

若缺乏人類經驗，則應以動物實驗所得的資料做為分組依據。動物實驗應觀察三種可能的暴露途徑，即：口服、皮膚接觸、以及粉塵、蒸氣或蒸氣的吸入。此三種實驗方式所得的結果，參照下列表格，可做包裝分組如下。

包裝群 (Packing Group)	急毒吞食性 半數致死劑量 LD_{50} (mg/kg)	急毒接觸性 半數致死劑量 LD_{50} (mg/kg)	急毒塵、霧吸入性 半數致死濃度 LC_{50} (mg/L)	急毒蒸氣 吸入性半數致死濃度 LC_{50} (mL/m^3)
第Ⅰ級	≦5	≦50	≦0.2	LC_{50}≦1,000 且 V≧10×LC_{50}
第Ⅱ級	＞5 但≦50	＞50 但≦200	＞0.2 但≦2	LC_{50}≦3,000 且 V≧LC_{50}
第Ⅲ級	＞50 但≦300	＞200 但≦1,000	＞2 但≦4	LC_{50}≦3,000 且 V≧0.2×LC_{50}

註：V 為該物質在 20℃及標準大氣壓力(**P**)下，以 mL/m^3 為單位的「飽和蒸氣濃度」(Saturated vapour concentration)。已知物質在 20℃的蒸氣壓(p)，則值可以下列公式計算：V＝p/P ×10^6 mL/m^3。

第 6.2 組危險貨物「感染性物質」

甲、感染性物質

感染性物質是指已知含有，或合理預計含有病原菌的物質。病原菌則是微生有機物(包含細菌、病毒、病原體、寄生蟲、蕈菌)，或是微生有機物的重組體(混種或突變)，或其他如普粒子(Prion)之物質，已知或有理由相信會對人體或動物造成疾病。

感染性物質必須歸類為第 6.2 組危險貨物，並依照所屬，賦予 UN2814、UN2900、UN3291 或 UN3373 等不同的聯合國(危險貨物)編號。感染性物質可分為以下型態：

(1) A 類型(Category A)

運輸時的形態，會使曝露的人類或動物造成永久性殘疾、生命危險或致命疾病的感染性物質。

對於人類造成感染的物質，其聯合國編號為 UN2814 (Infectious substance, affecting humans)；只對動物造成感染的物質，其聯合國編號為 UN2900 (Infectious substance, affecting animals)。

(2) B 類型(Category B)

不屬於 A 類型的感染性物質。除了培養物(Culture)以外，B 類型的感染性物質必須賦予 UN3373(Biological substance Category B)的聯合國(危險貨物)編號。

病原菌由於經過增殖或繁衍，成為高濃度，而造成曝露者增加感染的危險。培養物的應依照所屬，賦予 UN2814 或 UN2900 的聯合國(危險貨物)編號。

乙、生物產品

生物產品是由活有機體衍生的。此種生物產品具有特別的授權規定，依照國家主管機關的規定而製造及配送，用於預防、治療、或診斷人體與動物的疾病，或做為發展、實驗或檢驗之用。生物產品包括諸如疫苗及診斷產品的成品與未成品。

丙、基因改造的微生有機體及一般有機體

藉由基因工程，在自然情況不會發生的方式下，被故意改變基因物質的微生有機體及一般有機體。基因改造的微生有機體及一般有機體可分為以下的類屬：

不符合感染性物質定義的基因改造微生有機體，必須歸類於第九種危險貨物，並配屬聯合國(危險貨物)編號 UN3245。

丁、醫療或臨床廢棄物

含有 A 類型感染性物質或 B 類型培養中感染性物質的醫療或臨床廢棄物，應依照所屬，賦予 UN2814 或 UN2900 的聯合國(危險貨物)編號。含有 B 類型感染性物質的醫療或臨床廢棄物，應賦予 UN3291 的聯合國(危險貨物)編號。

UN3291 的「運送專用名稱」(Proper Shipping Name)共有四項：

1. Biomedical waste, n.o.s.
2. Clinical waste, unspecified, n.o.s.
3. Medical waste, n.o.s.
4. Regulated medical waste, n.o.s.

合理認定極不可能含有感染性物質的醫療或臨床廢棄物，必須賦予 UN3291 的聯合國(危險貨物)編號。

■ 第七種危險貨物——放射性物質

輻射物質是指，自發而連續地放射出某種輻射(離子輻射)的物質或物體；此輻射材料對健康有害，但卻無法為人體的任何感官(視覺、聽覺、嗅覺、觸覺)偵察到。此種輻射也可影響於其它物質(特別是未顯影的照相底片與未顯影的 X 光膠片)，而且可以被適當的儀器來偵測及衡量。

運送指數(**T.I.**)	外表面任一點最大幅射劑量(**MRL**)	級別
T.I.＝0	**MRL**≦5 μ Sv/h(0.5mrem/h)	Ⅰ-白色
0＜**T.I.**≦1	5 μ Sv/h(0.5mrem/h)≦**MRL**≦0.5mSv/h (50mrem/h)	Ⅱ-黃色
1＜**T.I.**≦10	0.5mSv/h(50mrem/h)≦**MRL**≦2mSv/h (200mrem/h)	Ⅲ-黃色
10＜**T.I.**	2mSv/h(200mrem/h)≦**MRL**≦10mSv/h (1000mrem/h)	Ⅲ-黃色且為專用

■ 第八種危險貨物——腐蝕性物質

分組	說　　明	舉例
無	經由化學作用，接觸活體組織時，會造成嚴重損壞；或是萬一洩漏，會損壞材料，或甚至摧毀其他貨品或運輸工具的物質，稱為第八種危險貨物「腐蝕性物質」。此種危險貨物可能還具有其他的危害性。	UN1830 硫酸，含酸超過 51% Sulphuric Acid with more than 51% acid

此危險種類的三級包裝群的試驗方法如下：

●第Ⅰ級包裝群(非常危險的腐蝕性物質與配製品)：

3 分鐘或 **3 分鐘**以內的暴露時間之後，在為時 **1 小時**的觀察期間，會摧毀接觸皮膚組織的完全厚度的物質。

●第Ⅱ級包裝群(呈現中度危險的腐蝕性物質與配製品)：

3 分鐘以上、**1 小時**以內的暴露時間之後，在為時 **14 日**的觀察期間，會摧毀接觸皮膚組織的完全厚度的物質。

●第Ⅲ級包裝群(呈現輕度危險的腐蝕性物質與配製品)：

○ 1 小時以上、**4 小時**以內的暴露時間之後，在為時 **14 日**的觀察期間，會摧毀接觸皮膚組織的完全厚度的物質。

◎ 判斷不會摧毀接觸皮膚組織的完全厚度，但是在一種溫度為 55℃的測試中，對於鋼或鋁表面，會造成每年超過 6.25mm 腐蝕率的物質。

■第九種危險貨物——其他危險物質和物品

分組	說　　明
無	此類物質或物體在運送途中，呈現其他類危險貨物所未涵蓋之危險。 舉例： 1. Marine pollutant 海洋污染物質 (1) 固體環境危害物質類(UN3077) (2) 液體環境危害物質類(UN3082) 2. Asbestos 石棉 3. Dioxide, solid (dry ice) 乾冰 4. Engines, internal combustion 內燃引擎 5. Lithium batteries 鋰電池

第一單元練習實作—危險貨物的分類

1. 請依照給予的危險特性，指出其所屬之危險分類或分組及該危險分類或分組之名稱。

	危險特性	危險分類 或分組	危險分類 或分組名稱
1	對於海洋生物具重大危害性		
2	危害性不大的煙火物質		
3	固態二氧化碳		
4	某物質會釋放氧氣，因而刺激其他物料之燃燒		
5	噴劑 (無其他危險性)		
6	某物質會自行發熱，或因與空氣接觸以致增加溫度而起火		
7	與活體組織接觸會造成嚴重損害的液體或固體		
8	某壓縮氣體，以某種比例與空氣混合時，會形成易燃混合物		
9	信號彈		
10	吸入、吞食或經由皮膚吸收會有危險性的液體或固體		

2. 產品之安全資料表登載不同物質之資料如下，填寫各危險分類或分組、該危險分類或分組之名稱、以及所屬之包裝等級(若有配屬)。

	危險特性	危險分類 或分組	危險分類 或分組名稱	包裝等級 (若有配屬)
1	暴露 4 分鐘後，在 35 分鐘內摧毀皮膚組織的全部厚度。			
2	此固體之半數致死劑量(皮膚接觸性)為 40 mg/kg			
3	液體的沸點為 35℃，閉杯方式測試的閃點為 25℃			

※ 危險分類英文名稱參考表

Classification Table	
Class 1	Explosives
Division 2.1	Flammable gas.
Division 2.2	Non-flammable, non-toxic gas.
Division 2.3	Toxic gas.
Class 3	Flammable Liquids
Division 4.1	Flammable solids
Division 4.2	Substances liable to spontaneous combustion.
Division 4.3	Substances which, in contact with water, emit flammable gases.
Division 5.1	Oxidizer.
Division 5.2	Organic peroxides.
Division 6.1	Toxic substances.
Division 6.2	Infectious substances.
Class 7	Radioactive Material
Class 8	Corrosives
Class 9	Miscellaneous Dangerous Goods

第二單元—危險貨物物流名詞解釋

一、包裝物(Packaging)：能夠符合《國際海運危險品章程》最低包裝規定的容器，及其達成包容功能的其他必要組件與材料。一般而言，固體危險貨物的包裝物不大於 400 公斤、液體危險貨物的包裝物不大於 450 公升。

包裝件(Package)：包裝物與內容物完成包裝的作業後的完成品。

包裝(Packing)：物質或物品包入包裹，納入包裝物或其他方式固定在包裝物的工藝與作業。

二、包裝物：(1)單一包裝物(Single Packaging)：運輸中不須任何內包裝物便能達到其包容功能的包裝物。

(2)組合包裝物(Combination Packaging)：為了運輸所做的包裝物組合，由一個或多個內包裝物固定在外包裝物中組成。

- 內包裝物(Inner Packaging)：需要一個外包裝物才能運輸的包裝物。
- 外包裝物(Outer Packaging)：對於複合包裝物與組合包裝物而言，與吸引材料與墊枕等必要組件，連同做為包容與保護內容器與內包裝物的外部保護物。
- 中包裝物(Intermediate Packaging)：置放於內包裝物與外包裝物之間的一種包裝物。

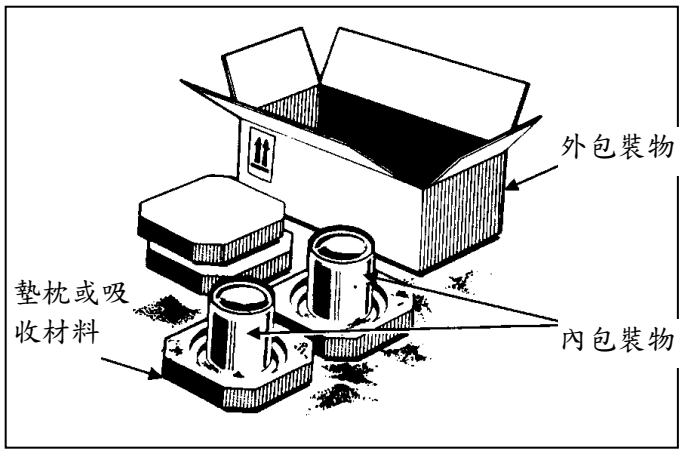


圖 1：組合包裝物實例圖

(3)複合包裝物(Composite Packaging)：由一個外包裝物與一個內容器組成，兩者形成一個整體。一旦組裝完成，此後便是整合的獨一單元，不論是灌裝、儲存、運輸或卸貨，都是一體的。

- 內容器(Inner Receptacle)：須要一個外包裝物才能達到包容功能的容器。
- 外包裝物(Outer Packaging)。

圖 2：複合包裝物實例圖

三、**合裝(Overpack)**：同一個託運人為方便作業與儲放，將一件以上的包裝件合併成為一件包裝單元。包含在合裝中的危險貨物，必須正確的包裝、標記、標示並符合《國際海運危險品章程》的所有規定。

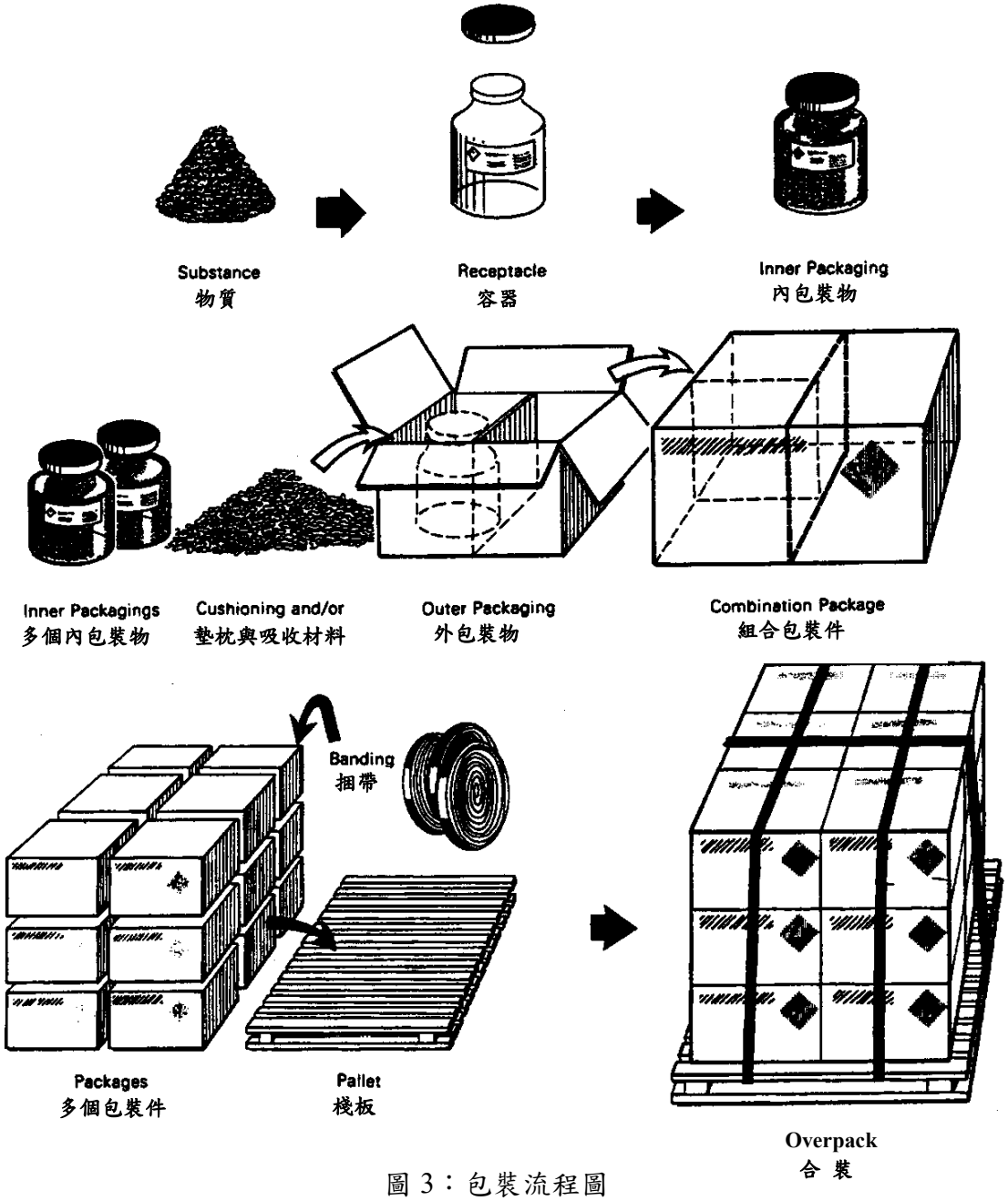


圖 3：包裝流程圖

四、中型散裝容器(Intermediate Bulk Container, IBC)：硬式或軟式包裝物，符合下列條件：

(1)其容量限制：

- 對於第Ⅱ級、第Ⅲ級包裝群的固體或液體，其容量不超過 3.0m^3 (3,000 公升)；
- 對於第 I 級包裝的固體，就軟式(Flexible)或硬式塑膠製(Rigid Plastic)、複合型(Composite)、紙板製(Fibreboard)或木製(Wooden)中型散裝櫃，其容量不超過 1.5m^3；
- 對於第 I 級包裝群的固體，就金屬製(Metal)中型散裝櫃，其容量不超過 3.0m^3；
- 對於第七種危險貨物放射性物質，其容量不超過 3.0m^3。

(2)其設計為**機械作業**之用

(3)依測試之設定，能**承受作業**與**運輸**中所產生的**壓力**。

圖 4：中型散裝容器實例圖

五、巨型包裝物(Large Packaging) ：意指含有物品或內包裝物之外包裝物，具有下列性質：

(1)其設計為機械作業之用；

(2)固體淨重超過 400 公斤、液體超過 450 公升，但其容量不超過 3.0m^3。

圖 5：巨型包裝物實例圖

六、**移動槽(Portable Tank)**：移動槽包括槽櫃(Tank Container)、公路槽車(Road Tank Vehicle)、鐵路槽車(Rail Tank Wagon)，或是固體、液體或液化氣體的貯存容器，用於運輸第二類危險貨物氣體時，其容量不少於 450 公升。

在「國際海運危險品章程」中，移動槽劃分為下列幾種型號：

- 運送第 1 類及第 3-9 類危險貨物之移動槽(T1~T22；T23：Div4.1 RSR+Div5.2)
- 運送第 2 類非冷凍液化氣體危險貨物之移動槽(T50)；
- 運送第 2 類冷凍液化氣體危險貨物之移動槽(T75)。

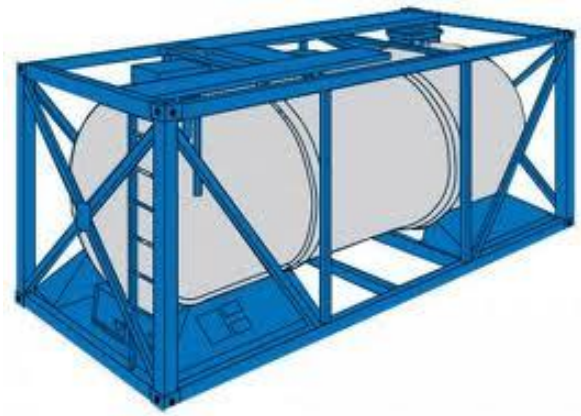


圖 7：槽櫃實例圖

- 運送非冷凍氣體之多元氣體櫃(Multi-Element Gas Container, MEGCs)；

圖 8：多元氣體移動槽實例圖

- **槽(Tank)**：意指移動槽(包含槽櫃 tank container)、公路槽車、鐵路槽車、或是指容量不小於 450 公升之盛裝固體、液體或液化氣體之容器。
- **公路槽車(Road Tank Vehicle)**：意指配備有容量大於 450 公升槽之車輛，並裝有壓力／釋放裝置。
- **車輛(Vehicle)**：指的是公路車輛(包含連結車，即拖車頭 tractor 與半車架 semi-trailer 之組合)，或是鐵路車架與車廂，每個車架(Trailer)應視為一個分別的車輛。

七、**貨物運輸單元(Cargo Transport Unit)**：意指公路貨車(Road freight Vehicle)、鐵路貨物車廂(Railway Freight Wagon)、貨物貨櫃(Freight Container)、

公路槽車(Road Tank Vehicle)、鐵路槽車(Railway Tank Wagon)、移動槽(Portable Tank)。

八、**散裝櫃(Bulk Containers)**：意指用於運輸固體物質之包容系統 Containment Systems(包括任何裏襯或塗層)，該固體物質直接與包容系統接觸，但不包括包裝物、中型散裝櫃、巨型包裝物及移動槽。

- 散裝櫃之特性如下：

1. 具備耐久之性質，因此夠堅固，適使用；
2. 特別設計以便以一種以上工具運輸貨物，中間不須再次包裝；
3. 配有裝置可以立即作業；
4. 容量不小於一立方公尺。

圖 9：散裝櫃實例圖

- **散裝櫃**包括貨櫃、離岸散裝貨櫃、吊斗、散裝桶、換體、斗槽狀櫃、輪腳貨櫃、車輛之裝貨廂房。

IMDG Code

2017 國際海運危險貨物規則訓練課程

第三單元 包裝物及IBC等規格標記

講師：施智璋

第一部分
聯合國規格包裝物標記
UN Specification Marking

包裝物外型(Type)代號

1 —圓桶(Drum)

2 —[　　](保留)

3 —角桶(Jerrican)

4 —箱(Box)

5 —袋(Bag)

6 —複合包裝物(Composite Packaging)

包裝物材料(Material)代號

A —鋼{包含所有種類及表面處理}(Steel [all types and surface treatment])

B —鋁(Aluminum)

C —天然木(Natural Wood)

D —合板(Plywood)

F —復原木材(Reconstituted Wood)

G —纖維板(Fibreboard)

包裝物材料(Material)代號

H —塑膠材料(Plastics Material)

L —紡織品(Textile)

M —紙(Paper, multiwall)

N —金屬[鋼或鋁製以外](Metal [other than steel or aluminum])

P —玻璃、瓷或陶材(Glass, Porcelain or Stoneware)

包裝物材料(Material)代號

第三部分為一位數的阿拉伯數字，表示該包裝物所屬的包裝種類內的再分類。如：

1A1

1A2

聯合國規格包裝物代號

第三部分為一位數的阿拉伯數字，表示該包裝物所屬的包裝種類內的再分類。如：

1A1——小開口，不可開蓋之鋼製圓桶

1A2

聯合國規格包裝物代號

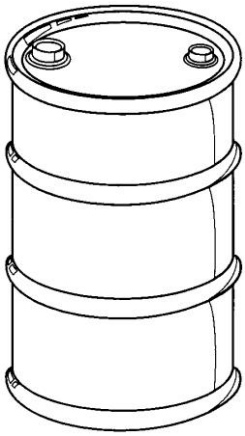
第三部分為一位數的阿拉伯數字，表示該包裝物所屬的包裝種類內的再分類。如：

1A1——小開口，不可開蓋之鋼製圓桶

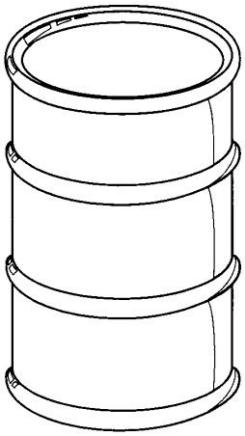
1A2——大開口，可開蓋之鋼製圓桶

不做此再分類的包裝物就沒有這個代號。

鋼製圓桶



1A1 — Steel drum of non-removable head



1A2 — Steel drum of removable head

包裝物標準規格之標示(1)

UN

4G/X35/S/17/NL/VL823

小型包裝物的標記實例

包裝物標準規格之標示(2)

1A1/Y1.4/150/17/USA/abc

小型包裝物的標記實例-1

小型包裝物的標記實例-2

IMDG Code

2017 國際海運危險品章程課程

第四單元 包裝物及 IBC之功能測試

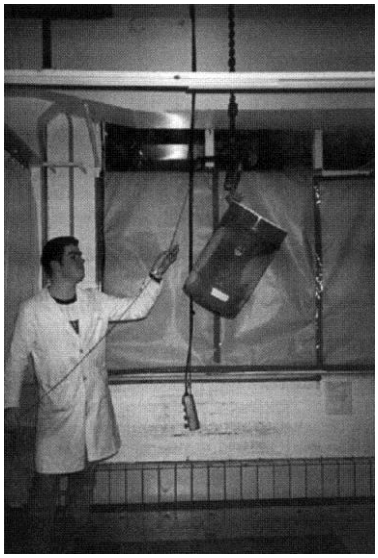
講師：施智璋

第一部分
包裝物及IBC的
功能測試
Performance Testing of Packagings and IBCs

包裝物標準規格的功能測試

固體	墜落測試 (Drop Test)	液體
	堆疊測試 (Stacking Test)	
	防漏測試 (Leakproofness Test)	
	壓力測試 (Pressure Test)	

包裝物標準規格的功能測試



1. Drop Test (墜落測試)

- **墜落高度**

第Ⅰ級包裝群： **1.8 m**
第Ⅱ級包裝群： **1.2 m**
第Ⅲ級包裝群： **0.8 m**

- **墜落方位**

(1) 桶：2 個方位
(2) 箱：5 個方位

包裝物標準規格的功能測試

2. Stack Test(堆疊測試)

- 堆疊高度

堆疊測試的最低高度(包括測試樣品本身)為3公尺。

- 測試時間

進行測試的時間為，測試樣品負擔其上所壓的重量，在常溫下維持24小時。

包裝物標準規格的功能測試

3. Hydraulic Test (水壓測試)

液體之單一包裝物(圓桶或方桶)必須能夠承受在正常運送狀況下，因為溫度變化所增生的壓力。此壓力與各別液體之蒸氣壓(Vapour pressure)有關。

4. Leakproof Test (防漏測試)

進行此測試時，將液體單一包裝物浸於水底，並連接一條氣管加壓。盛裝第Ⅰ級包裝群的單一包裝物必須能夠承受30 kPa (0.3大氣壓力)的壓力；而盛裝第Ⅱ、Ⅲ級包裝群的單一包裝物必須能夠承受20 kPa (0.2大氣壓力)的壓力。

第三、四單元練習實作—選擇正確的包裝物

1. 以單一包裝物海運運送 20 公斤之 UN1219 異丙醇(第三類，第 II 包裝等級)，下列包裝物何者為正確？

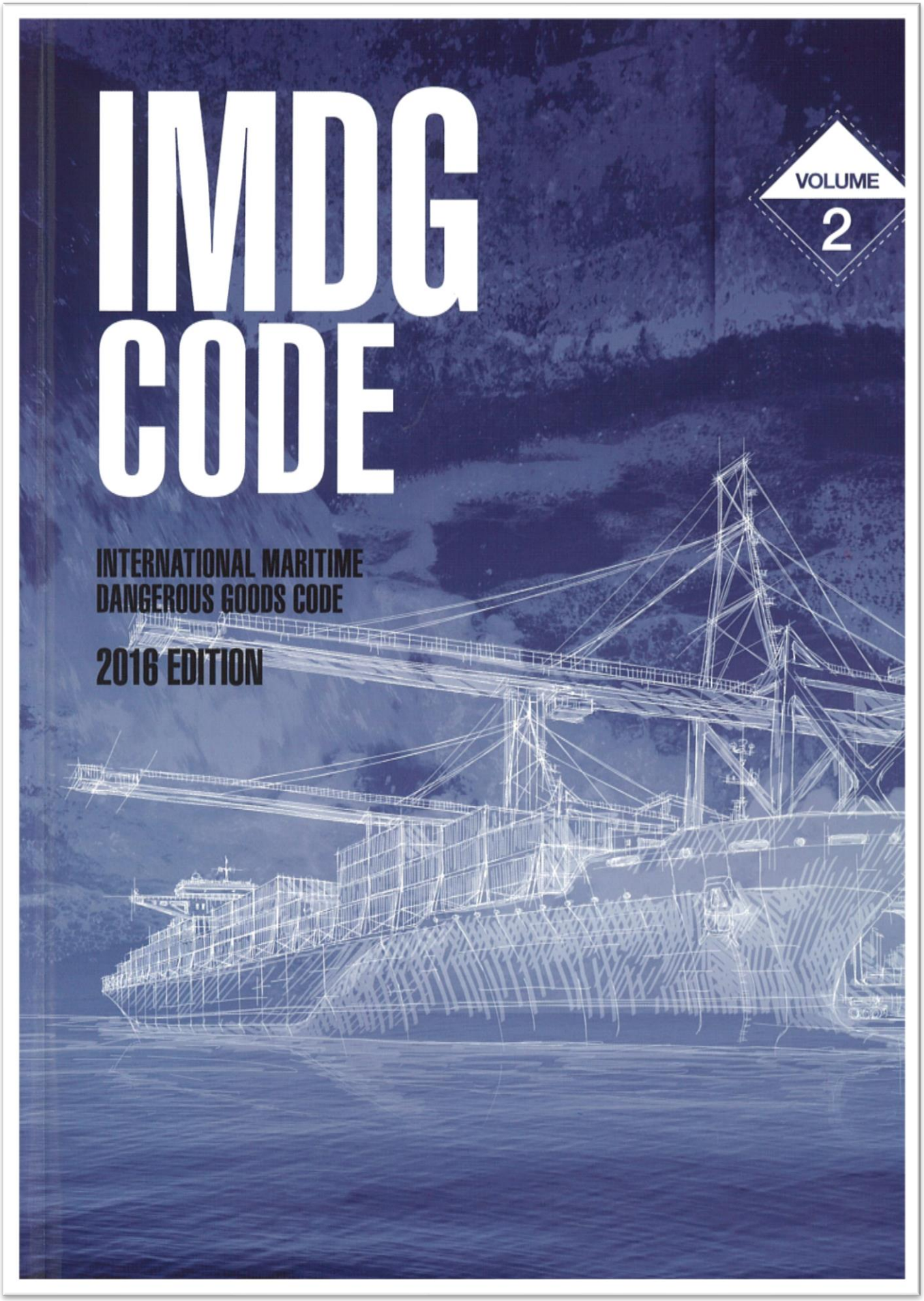
(a)  4G/Z 25/S/17/GB396

(b)  1A2/Y30/S/17/APA490

(c)  1B2/Y15/S/17/CH/1009

答案：

第五單元——危險貨物的海運包裝規定



4.1.4 List of packing instructions

4.1.4.1 Packing instructions concerning the use of packagings (except IBCs and large packagings)

P001	PACKING INSTRUCTION (LIQUIDS)			P001
The following packagings are authorized provided the general provisions of 4.1.1 and 4.1.3 are met.				
Combination packagings		Maximum capacity/net mass (see 4.1.3.3)		
Inner packagings	Outer packagings	Packing group I	Packing group II	Packing group III
Glass 10 L Plastics 30 L Metal 40 L	**Drums**			
	steel (1A1, 1A2)	75 kg	400 kg	400 kg
	aluminium (1B1, 1B2)	75 kg	400 kg	400 kg
	other metal (1N1, 1N2)	75 kg	400 kg	400 kg
	plastics (1H1, 1H2)	75 kg	400 kg	400 kg
	plywood (1D)	75 kg	400 kg	400 kg
	fibre (1G)	75 kg	400 kg	400 kg
	Boxes			
	steel (4A)	75 kg	400 kg	400 kg
	aluminium (4B)	75 kg	400 kg	400 kg
	other metal (4N)	75 kg	400 kg	400 kg
	natural wood (4C1, 4C2)	75 kg	400 kg	400 kg
	plywood (4D)	75 kg	400 kg	400 kg
	reconstituted wood (4F)	75 kg	400 kg	400 kg
	fibreboard (4G)	75 kg	400 kg	400 kg
	expanded plastics (4H1)	40 kg	60 kg	60 kg
	solid plastics (4H2)	75 kg	400 kg	400 kg
	Jerricans			
	steel (3A1, 3A2)	60 kg	120 kg	120 kg
	aluminium (3B1, 3B2)	60 kg	120 kg	120 kg
	plastics (3H1, 3H2)	30 kg	120 kg	120 kg
Single packagings				
Drums				
steel, non-removable head (1A1)		250 L	450 L	450 L
steel, removable head (1A2)		prohibited	250 L	250 L
aluminium, non-removable head (1B1)		250 L	450 L	450 L
aluminium, removable head (1B2)		prohibited	250 L	250 L
other metal, non-removable head (1N1)		250 L	450 L	450 L
other metal, removable head (1N2)		prohibited	250 L	250 L
plastics, non-removable head (1H1)		250 L*	450 L	450 L
plastics, removable head (1H2)		prohibited	250 L	250 L
Jerricans				
steel, non-removable head (3A1)		60 L	60 L	60 L
steel, removable head (3A2)		prohibited	60 L	60 L
aluminium, non-removable head (3B1)		60 L	60 L	60 L
aluminium, removable head (3B2)		prohibited	60 L	60 L
plastics, non-removable head (3H1)		60 L*	60 L	60 L
plastics, removable head (3H2)		prohibited	60 L	60 L
Composite packagings				
Plastics receptacle in steel or aluminium drum (6HA1, 6HB1)		250 L	250 L	250 L
Plastics receptacle in fibre, plastics or plywood drum (6HG1, 6HH1, 6HD1)		120 L*	250 L	250 L
Plastics receptacle in steel or aluminium crate or box or plastics receptacle in wood, plywood, fibreboard or solid plastics box (6HA2, 6HB2, 6HC, 6HD2, 6HG2 or 6HH2)		60 L*	60 L	60 L
Glass receptacle in steel, aluminium, fibre, plywood, solid plastics or expanded plastics drum (6PA1, 6PB1, 6PG1, 6PD1, 6PH1 or 6PH2) or in a steel, aluminium, wood or fibreboard box or in a wickerwork hamper (6PA2, 6PB2, 6PC, 6PG2 or 6PD2)		60 L	60 L	60 L
Pressure receptacles, provided that the general provisions of 4.1.3.6 are met				

*Not permitted for class 3, packing group I.

P001	PACKING INSTRUCTION (LIQUIDS) *(continued)*	P001

Special packing provisions:

PP1 For UN Nos. 1133, 1210, 1263 and 1866 and for adhesives, printing inks, printing ink related materials, paints, paint related materials and resin solutions which are assigned to UN 3082, metal or plastics packagings for substances of packing groups II and III in quantities of 5 L or less per packaging are not required to meet the performance tests in chapter 6.1 when transported:

(a) in palletized loads, a pallet box or a unit load device, such as individual packagings placed or stacked and secured by strapping, shrink- or stretch-wrapping or other suitable means to a pallet. For sea transport, the palletized loads, pallet boxes or unit load devices shall be firmly packed and secured in closed cargo transport units. On roll-on/roll-off ships the unit loads may be carried in vehicles other than closed vehicles provided they are securely fenced to the full height of the cargo carried; or

(b) as an inner packaging of a combination packaging with a maximum net mass of 40 kg.

PP2 For UN 3065, wooden barrels with a maximum capacity of 250 L and which do not meet the provisions of chapter 6.1 may be used.

PP4 For UN 1774, packagings shall meet the packing group II performance level.

PP5 For UN 1204, packagings shall be so constructed that explosion is not possible by reason of increased internal pressure. Gas cylinders and gas receptacles shall not be used for these substances.

PP10 For UN 1791, for packing group II, the packaging shall be vented.

PP31 For UN Nos. 1131, 1553, 1693, 1694, 1699, 1701, 2478, 2604, 2785, 3148, 3183, 3184, 3185, 3186, 3187, 3188, 3398 (PG II and III), 3399 (PG II and III), 3413 and 3414, packagings shall be hermetically sealed.

PP33 For UN 1308, for packing groups I and II, only combination packagings with a maximum gross mass of 75 kg are allowed.

PP81 For UN 1790 with more than 60% but not more than 85% hydrogen fluoride and UN 2031 with more than 55% nitric acid, the permitted use of plastics drums and jerricans as single packagings shall be two years from their date of manufacture

■ **PP93** For UN Nos. 3532 and 3534, packagings shall be designed and constructed to permit the release of gas or vapour to prevent a build-up of pressure that could rupture the packagings in the event of loss of stabilization.

P002	PACKING INSTRUCTION (SOLIDS)	P002

The following packagings are authorized provided the general provisions of 4.1.1 and 4.1.3 are met.

Combination packagings			Maximum net mass (see 4.1.3.3)		
Inner packagings		Outer packagings	Packing group I	Packing group II	Packing group III
Glass	10 kg	**Drums**			
Plastics[1]	30 kg	steel (1A1, 1A2)	125 kg	400 kg	400 kg
Metal	40 kg	aluminium (1B1, 1B2)	125 kg	400 kg	400 kg
Paper[1, 2, 3]	50 kg	other metal (1N1, 1N2)	125 kg	400 kg	400 kg
Fibre[1, 2, 3]	50 kg	plastics (1H1, 1H2)	125 kg	400 kg	400 kg
		plywood (1D)	125 kg	400 kg	400 kg
		fibre (1G)	125 kg	400 kg	400 kg
		Boxes			
		steel (4A)	125 kg	400 kg	400 kg
		aluminium (4B)	125 kg	400 kg	400 kg
		other metal (4N)	125 kg	400 kg	400 kg
		natural wood (4C1)	125 kg	400 kg	400 kg
		natural wood with sift-proof walls (4C2)	250 kg	400 kg	400 kg
		plywood (4D)	125 kg	400 kg	400 kg
		reconstituted wood (4F)	125 kg	400 kg	400 kg
		fibreboard (4G)	75 kg	400 kg	400 kg
		expanded plastics (4H1)	40 kg	60 kg	60 kg
		solid plastics (4H2)	125 kg	400 kg	400 kg
		Jerricans			
		steel (3A1, 3A2)	75 kg	120 kg	120 kg
		aluminium (3B1, 3B2)	75 kg	120 kg	120 kg
		plastics (3H1, 3H2)	75 kg	120 kg	120 kg
Single packagings					
Drums					
steel (1A1 or 1A2[4])			400 kg	400 kg	400 kg
aluminium (1B1 or 1B2[4])			400 kg	400 kg	400 kg
metal, other than steel or aluminium (1N1 or 1N2[4])			400 kg	400 kg	400 kg
plastics (1H1 or 1H2[4])			400 kg	400 kg	400 kg
fibre (1G[5])			400 kg	400 kg	400 kg
plywood (1D[5])			400 kg	400 kg	400 kg

[1] These inner packagings shall be sift-proof.

[2] These inner packagings shall not be used when the substances being transported may become liquid during transport.

[3] Paper and fibre inner packagings shall not be used for substances of packing group I.

[4] These packagings shall not be used for substances of packing group I that may become liquid during transport (see 4.1.3.4).

[5] These packagings shall not be used when the substances being transported may become liquid during transport (see 4.1.3.4).

P002	PACKING INSTRUCTION (SOLIDS) *(continued)*			P002
The following packagings are authorized provided the general provisions of 4.1.1 and 4.1.3 are met.				
	Maximum net mass (see 4.1.3.3)			
Single packagings *(continued)*	**Packing group I**	**Packing group II**	**Packing group III**	
Jerricans				
steel (3A1 or 3A2[4])	120 kg	120 kg	120 kg	
aluminium (3B1 or 3B2[4])	120 kg	120 kg	120 kg	
plastics (3H1 or 3H2[4])	120 kg	120 kg	120 kg	
Boxes				
steel (4A)[5]	Not allowed	400 kg	400 kg	
aluminium (4B)[5]	Not allowed	400 kg	400 kg	
other metal (4N)[5]	Not allowed	400 kg	400 kg	
natural wood (4C1)[5]	Not allowed	400 kg	400 kg	
natural wood with sift-proof walls (4C2)[5]	Not allowed	400 kg	400 kg	
plywood (4D)[5]	Not allowed	400 kg	400 kg	
reconstituted wood (4F)[5]	Not allowed	400 kg	400 kg	
fibreboard (4G)[5]	Not allowed	400 kg	400 kg	
solid plastics (4H2)[5]	Not allowed	400 kg	400 kg	
Bags				
bags (5H3, 5H4, 5L3, 5M2)[5]	Not allowed	50 kg	50 kg	
Composite packagings				
Plastics receptacle in steel, aluminium, plywood, fibre or plastics drum (6HA1, 6HB1, 6HG1[5], 6HD1[5], or 6HH1)	400 kg	400 kg	400 kg	
Plastics receptacle in steel or aluminium crate or box, wooden box, plywood box, fibreboard box or solid plastics box (6HA2, 6HB2, 6HC, 6HD2[5], 6HG2[5] or 6HH2)	75 kg	75 kg	75 kg	
Glass receptacle in steel, aluminium, plywood or fibre drum (6PA1, 6PB1, 6PD1[5] or 6PG1[5]) or in steel, aluminium, wood, or fibreboard box or in wickerwork hamper (6PA2, 6PB2, 6PC, 6PG2[5] or 6PD2[5]) or in solid or expanded plastics packaging (6PH2 or 6PH1[5])	75 kg	75 kg	75 kg	
[4] These packagings shall not be used for substances of packing group I that may become liquid during transport (see 4.1.3.4).				
[5] These packagings shall not be used when the substances being transported may become liquid during transport (see 4.1.3.4).				
Pressure receptacles, provided that the general provisions of 4.1.3.6 are met.				

Special packing provisions:

PP7 For UN 2000, celluloid may be transported unpacked on pallets, wrapped in plastic film and secured by appropriate means, such as steel bands, as a single commodity in closed cargo transport units. Each pallet shall not exceed 1000 kg.

PP8 For UN 2002, packagings shall be so constructed that explosion is not possible by reason of increased internal pressure. Gas cylinders and gas receptacles shall not be used for these substances.

PP9 For UN Nos. 3175, 3243 and 3244, packagings shall conform to a design type that has passed a leakproofness test at the packing group II performance level. For UN 3175 the leakproofness test is not required when the liquids are fully absorbed in solid material contained in sealed bags.

PP11 For UN 1309, packing group III, and UN Nos. 1361 and 1362, 5M1 bags are allowed if they are overpacked in plastic bags and are wrapped in shrink or stretch wrap on pallets.

PP12 For UN Nos. 1361, 2213 and 3077, 5H1, 5L1 and 5M1 bags are allowed when transported in closed cargo transport units.

PP13 For articles classified under UN 2870, only combination packagings meeting the packing group I performance level are authorized.

PP14 For UN Nos. 2211, 2698 and 3314, packagings are not required to meet the performance tests in chapter 6.1.

PP15 For UN Nos. 1324 and 2623, packagings shall meet the packing group III performance level.

PP20 For UN 2217, any sift-proof, tearproof receptacle may be used.

PP30 For UN 2471, paper or fibre inner packagings are not permitted.

PP31 For UN Nos. 1362, 1463, 1565, 1575, 1626, 1680, 1689, 1698, 1868, 1889, 1932, 2471, 2545, 2546, 2881, 3048, 3088, 3170, 3174, 3181, 3182, 3189, 3190, 3205, 3206, 3341, 3342, 3448, 3449 and 3450, packagings shall be hermetically sealed.

PP34 For UN 2969 (as whole beans), 5H1, 5L1 and 5M1 bags are permitted.

PP37 For UN Nos. 2590 and 2212, 5M1 bags are permitted. All bags of any type shall be transported in closed cargo transport units or be placed in closed rigid overpacks.

PP38 For UN 1309, bags are permitted only in closed cargo transport units or as unit loads.

PP84 For UN 1057, rigid outer packagings meeting the packing group II performance level shall be used. The packagings shall be designed and constructed and arranged to prevent movement, inadvertent ignition of the devices or inadvertent release of flammable gas or liquid.

PP85 For UN Nos. 1748, 2208, 2880, 3485, 3486 and 3487, bags are not allowed.

■ **PP92** For UN Nos. 3531 and 3533, packagings shall be designed and constructed to permit the release of gas or vapour to prevent a build-up of pressure that could rupture the packagings in the event of loss of stabilization.

■ **PP100** For UN numbers 1309, 1323, 1333, 1376, 1435, 1449, 1457, 1472, 1476, 1483, 1509, 1516, 1567, 1869, 2210, 2858, 2878, 2968, 3089, 3096 and 3125, flexible, fibreboard or wooden packagings shall be sift-proof and water-resistant or shall be fitted with a sift-proof and water-resistant liner.

4

IBC06	PACKING INSTRUCTION	IBC06
The following IBCs are authorized, provided the general provisions of 4.1.1, 4.1.2 and 4.1.3 are met: (1) Metal (11A, 11B, 11N, 21A, 21B, 21N, 31A, 31B and 31N); (2) Rigid plastics (11H1, 11H2, 21H1, 21H2, 31H1 and 31H2); (3) Composite (11HZ1, 11HZ2, 21HZ1, 21HZ2 and 31HZ1).		
Additional provision: Where the solid may become liquid during transport see 4.1.3.4.		
Special packing provisions: B1 For packing group I substances, IBCs shall be carried in closed cargo transport units or in freight containers/vehicles, which shall have rigid sides or fences at least to the height of the IBC. B12 For UN 2907, IBCs shall meet the packing group II performance level. IBCs meeting the test criteria of packing group I shall not be used. △ B21 For solid substances in IBCs other than metal or rigid plastics IBCs, the IBCs shall be carried in closed cargo transport units or in freight containers/vehicles, which shall have rigid sides or fences at least to the height of the IBC.		

IBC07	PACKING INSTRUCTION	IBC07
The following IBCs are authorized, provided the general provisions of 4.1.1, 4.1.2 and 4.1.3 are met: (1) Metal (11A, 11B, 11N, 21A, 21B, 21N, 31A, 31B and 31N); (2) Rigid plastics (11H1, 11H2, 21H1, 21H2, 31H1 and 31H2); (3) Composite (11HZ1, 11HZ2, 21HZ1, 21HZ2 and 31HZ1); (4) Wooden (11C, 11D and 11F).		
Additional provisions: 1 Where the solid may become liquid during transport see 4.1.3.4. 2 Liners of wooden IBCs shall be sift-proof.		
Special packing provisions: B1 For packing group I substances, IBCs shall be carried in closed cargo transport units or in freight containers/vehicles, which shall have rigid sides or fences at least to the height of the IBC. ■ B4 Flexible, fibreboard or wooden IBCs shall be sift-proof and water-resistant or shall be fitted with a sift-proof and water-resistant liner. ⊗ ■ B18 For UN Nos. 3531 and 3533, IBCs shall be designed and constructed to permit the release of gas or vapour to prevent a build-up of pressure that could rupture the IBCs in the event of loss of stabilization. △ B21 For solid substances in IBCs other than metal or rigid plastics IBCs, the IBCs shall be carried in closed cargo transport units or in freight containers/vehicles, which shall have rigid sides or fences at least to the height of the IBC.		

IBC08	PACKING INSTRUCTION	IBC08
The following IBCs are authorized, provided the general provisions of 4.1.1, 4.1.2 and 4.1.3 are met: (1) Metal (11A, 11B, 11N, 21A, 21B, 21N, 31A, 31B and 31N); (2) Rigid plastics (11H1, 11H2, 21H1, 21H2, 31H1 and 31H2); (3) Composite (11HZ1, 11HZ2, 21HZ, 21HZ2 and 31HZ1); (4) Fibreboard (11G); (5) Wooden (11C, 11D and 11F); (6) Flexible (13H1, 13H2, 13H3, 13H4, 13H5, 13L1, 13L2, 13L3, 13L4, 13M1 or 13M2).		
Additional provisions: Where the solid may become liquid during transport see 4.1.3.4.		
Special packing provisions: B3 Flexible IBCs shall be sift-proof and water-resistant or shall be fitted with a sift-proof and water-resistant liner. B4 Flexible, fibreboard or wooden IBCs shall be sift-proof and water-resistant or shall be fitted with a sift-proof and water-resistant liner. B6 For UN Nos. 1327, 1363, 1364, 1365, 1386, 1408, 1841, 2211, 2217, 2793 and 3314, IBCs are not required to meet the IBC testing provisions of chapter 6.5. △ B21 For substances, UN Nos. 1374 and 2590 in IBCs other than metal or rigid plastics IBCs, the IBCs shall be carried in closed cargo transport units or in freight containers/vehicles, which shall have rigid sides or fences at least to the height of the IBC.		

IBC99	PACKING INSTRUCTION	IBC99
Only IBCs which are approved for these goods by the competent authority may be used (see 4.1.3.7). A copy of the competent authority approval shall accompany each consignment or the transport document shall include an indication that the packaging was approved by the competent authority.		

4

LP101	PACKING INSTRUCTION	LP101
The following packagings are authorized, provided the general provisions of 4.1.1 and 4.1.3 and special provisions of 4.1.5 are met.		
Inner packagings	**Intermediate packagings**	**Large packagings**
Not necessary	*Not necessary*	Steel (50A) Aluminium (50B) Metal other than steel or aluminium (50N) Rigid plastics (50H) Natural wood (50C) Plywood (50D) Reconstituted wood (50F) Rigid fibreboard (50G)
Special packing provision: △ **L1** For UN Nos. 0006, 0009, 0010, 0015, 0016, 0018, 0019, 0034, 0035, 0038, 0039, 0048, 0056, 0137, 0138, 0168, 0169, 0171, 0181, 0182, 0183, 0186, 0221, 0243, 0244, 0245, 0246, 0254, 0280, 0281, 0286, 0287, 0297, 0299, 0300, 0301, 0303, 0321, 0328, 0329, 0344, 0345, 0346, 0347, 0362, 0363, 0370, 0412, 0424, 0425, 0434, 0435, 0436, 0437, 0438, 0451, 0488, 0502 and 0510: Large and robust explosives articles, normally intended for military use, without their means of initiation or with their means of initiation containing at least two effective protective features, may be transported unpackaged. When such articles have propelling charges or are self-propelled, their ignition systems shall be protected against stimuli encountered during normal conditions of transport. A negative result in Test Series 4 on an unpackaged article indicates that the article can be considered for transport unpackaged. Such unpackaged articles may be fixed to cradles or contained in crates or other suitable handling devices.		

LP102	PACKING INSTRUCTION	LP102
The following packagings are authorized, provided the general provisions of 4.1.1 and 4.1.3 and special provisions of 4.1.5 are met.		
Inner packagings	**Intermediate packagings**	**Outer packagings**
Bags water-resistant **Receptacles** fibreboard metal plastics wood **Sheets** fibreboard, corrugated **Tubes** fibreboard	*Not necessary*	Steel (50A) Aluminium (50B) Metal other than steel or aluminium (50N) Rigid plastics (50H) Natural wood (50C) Plywood (50D) Reconstituted wood (50F) Rigid fibreboard (50G)

■

LP200	PACKING INSTRUCTION	LP200
This instruction applies to UN No. 1950.		
The following large packagings are authorized for aerosols, provided that the general provisions of 4.1.1 and 4.1.3 are met: Rigid large packagings conforming to the packing group II performance level, made of: steel (50A); aluminium (50B); metal other than steel or aluminium (50N); rigid plastics (50H); natural wood (50C); plywood (50D); reconstituted wood (50F); rigid fibreboard (50G).		
Special packing provision: **L2** The large packagings shall be designed and constructed to prevent dangerous movement of the aerosols and inadvertent discharge during normal conditions of transport. For waste aerosols transported in accordance with special provision 327, the large packagings shall have a means of retaining any free liquid that might escape during transport, e.g. absorbent material. The large packagings shall be adequately ventilated to prevent the creation of a flammable atmosphere and the build-up of pressure.		

4

4.2.5.2.6 *Portable tank instructions*

Portable tank instructions specify the provisions applicable to a portable tank when used for the transport of specific substances. Portable tank instructions T1 to T22 specify the applicable minimum test pressure, the minimum shell thickness (in mm of reference steel), and the pressure relief and bottom-opening provisions.

T1 – T22	PORTABLE TANK INSTRUCTIONS			T1 – T22
These portable tank instructions apply to liquid and solid substances of class 1 and classes 3 to 9. The general provisions of section 4.2.1 and the requirements of section 6.7.2 shall be met.				
Portable tank instruction	**Minimum test pressure (bar)**	**Minimum shell thickness (in mm – reference steel) (see 6.7.2.4)**	**Pressure relief provisions[a] (see 6.7.2.8)**	**Bottom opening provisions[b] (see 6.7.2.6)**
T1	1.5	See 6.7.2.4.2	Normal	See 6.7.2.6.2
T2	1.5	See 6.7.2.4.2	Normal	See 6.7.2.6.3
T3	2.65	See 6.7.2.4.2	Normal	See 6.7.2.6.2
T4	2.65	See 6.7.2.4.2	Normal	See 6.7.2.6.3
T5	2.65	See 6.7.2.4.2	See 6.7.2.8.3	Not allowed
T6	4	See 6.7.2.4.2	Normal	See 6.7.2.6.2
T7	4	See 6.7.2.4.2	Normal	See 6.7.2.6.3
T8	4	See 6.7.2.4.2	Normal	Not allowed
T9	4	6 mm	Normal	Not allowed
T10	4	6 mm	See 6.7.2.8.3	Not allowed
T11	6	See 6.7.2.4.2	Normal	See 6.7.2.6.3
T12	6	See 6.7.2.4.2	See 6.7.2.8.3	See 6.7.2.6.3
T13	6	6 mm	Normal	Not allowed
T14	6	6 mm	See 6.7.2.8.3	Not allowed
T15	10	See 6.7.2.4.2	Normal	See 6.7.2.6.3
T16	10	See 6.7.2.4.2	See 6.7.2.8.3	See 6.7.2.6.3
T17	10	6 mm	Normal	See 6.7.2.6.3
T18	10	6 mm	See 6.7.2.8.3	See 6.7.2.6.3
T19	10	6 mm	See 6.7.2.8.3	Not allowed
T20	10	8 mm	See 6.7.2.8.3	Not allowed
T21	10	10 mm	Normal	Not allowed
T22	10	10 mm	See 6.7.2.8.3	Not allowed

[a] When the word "Normal" is indicated, all the provisions of 6.7.2.8 apply except for 6.7.2.8.3.

[b] When this column indicates "not allowed", bottom openings are not permitted when the substance to be transported is a liquid (see 6.7.2.6.1). When the substance to be transported is a solid at all temperatures encountered under normal conditions of transport, bottom openings conforming to the provisions of 6.7.2.6.2 are authorized.

T50	PORTABLE TANK INSTRUCTION *(continued)*				T50
UN No.	Non-refrigerated liquefied gases	Maximum allowable working pressure (bar) Small; Bare; Sunshield; Insulated respectively[a]	Openings below liquid level	Pressure relief provisions[b] (see 6.7.3.7)	Maximum filling ratio (kg/L)
3318	Ammonia solution, relative density less than 0.880 at 15°C in water, with more than 50% ammonia	See MAWP definition in 6.7.3.1	Allowed	See 6.7.3.7.3	See 4.2.2.7
3337	Refrigerant gas R 404A	31.6 28.3 25.3 22.5	Allowed	Normal	0.82
3338	Refrigerant gas R 407A	31.3 28.1 25.1 22.4	Allowed	Normal	0.94
3339	Refrigerant gas R 407B	33.0 29.6 26.5 23.6	Allowed	Normal	0.93
3340	Refrigerant gas R 407C	29.9 26.8 23.9 21.3	Allowed	Normal	0.95
3500	Chemical under pressure, n.o.s.	See MAWP definition in 6.7.3.1	Allowed	See 6.7.3.7.3	TP4[c]
3501	Chemical under pressure, flammable, n.o.s.	See MAWP definition in 6.7.3.1	Allowed	See 6.7.3.7.3	TP4[c]
3502	Chemical under pressure, toxic, n.o.s.	See MAWP definition in 6.7.3.1	Allowed	See 6.7.3.7.3	TP4[c]
3503	Chemical under pressure, corrosive, n.o.s.	See MAWP definition in 6.7.3.1	Allowed	See 6.7.3.7.3	TP4[c]
3504	Chemical under pressure, flammable, toxic, n.o.s.	See MAWP definition in 6.7.3.1	Allowed	See 6.7.3.7.3	TP4[c]
3505	Chemical under pressure, flammable, corrosive, n.o.s.	See MAWP definition in 6.7.3.1	Allowed	See 6.7.3.7.3	TP4[c]

[a] "Small" means tanks having a shell with a diameter of 1.5 metres or less; "Bare" means tanks having a shell with a diameter of more than 1.5 metres without insulation or sun shield (see 6.7.3.2.12); "Sunshield" means tanks having a shell with a diameter of more than 1.5 metres with sun shield (see 6.7.3.2.12); "Insulated" means tanks having a shell with a diameter of more than 1.5 metres with insulation (see 6.7.3.2.12); (See definition of "Design reference temperature" in 6.7.3.1).

[b] The word "Normal" in the pressure relief column indicates that a frangible disc as specified in 6.7.3.7.3 is not required.

[c] For UN Nos. 3500, 3501, 3502, 3503, 3504 and 3505, the degree of filling shall be considered instead of the maximum filling ratio.

T75	PORTABLE TANK INSTRUCTION	T75
This portable tank instruction applies to refrigerated liquefied gases. The general provisions of 4.2.3 and 6.7.4 shall be met.		

4.2.5.3 Portable tank special provisions

Portable tank special provisions are assigned to certain substances to indicate provisions which are in addition to or in lieu of those provided by the portable tank instructions or the provisions in chapter 6.7. Portable tank special provisions are identified by an alpha-numeric designation beginning with the letters "TP" (tank provision) and are assigned to specific substances in column 14 of the Dangerous Goods List in chapter 3.2. The following is a list of the portable tank special provisions:

TP1 The degree of filling prescribed in 4.2.1.9.2 shall not be exceeded.

TP2 The degree of filling prescribed in 4.2.1.9.3 shall not be exceeded.

TP3 The maximum degree of filling (in %) for solids transported above their melting points and for elevated temperature liquids shall be determined in accordance with 4.2.1.9.5.

TP4 The degree of filling shall not exceed 90% or, alternatively, any other value approved by the competent authority (see 4.2.1.16.2).

TP5 The degree of filling prescribed in 4.2.3.6 shall be met.

TP6 To prevent the tank bursting in any event, including fire engulfment, it shall be provided with pressure-relief devices which are adequate in relation to the capacity of the tank and to the nature of the substance transported. The device shall also be compatible with the substance.

TP7 Air shall be eliminated from the vapour space by nitrogen or other means.

TP8 The test pressure for the portable tank may be reduced to 1.5 bar when the flashpoint of the substances transported is greater than 0°C.

TP9 A substance under this description shall only be transported in a portable tank under an approval granted by the competent authority.

TP10 A lead lining, not less than 5 mm thick, which shall be tested annually, or another suitable lining material approved by the competent authority is required.

TP11 [Reserved]

TP12 [Reserved]

TP13 Self-contained breathing apparatus shall be provided when this substance is transported, unless no self-contained breathing apparatus, as required by SOLAS regulation II-2/19 (II-2/54), is on board.

TP14 [Reserved]

TP15 [Reserved]

TP16 The tank shall be fitted with a special device to prevent under-pressure and excess pressure during normal transport conditions. This device shall be approved by the competent authority. Pressure-relief provisions are as indicated in 6.7.2.8.3 to prevent crystallization of the product in the pressure-relief valve.

TP17 Only inorganic non-combustible materials shall be used for thermal insulation of the tank.

TP18 Temperature shall be maintained between 18°C and 40°C. Portable tanks containing solidified methacrylic acid shall not be reheated during transport.

TP19 The calculated shell thickness shall be increased by 3 mm. Shell thickness shall be verified ultrasonically at intervals midway between periodic hydraulic tests.

TP20 This substance shall only be transported in insulated tanks under a nitrogen blanket.

TP21 The shell thickness shall be not less than 8 mm. Tanks shall be hydraulically tested and internally inspected at intervals not exceeding 2.5 years.

TP22 Lubricant for joints or other devices shall be oxygen-compatible.

△ TP23 [Reserved]

TP24 The portable tank may be fitted with a device located, under maximum filling conditions, in the vapour space of the shell to prevent the build-up of excess pressure due to the slow decomposition of the substance transported. This device shall also prevent an unacceptable amount of leakage of liquid in the case of overturning or entry of foreign matter into the tank. This device shall be approved by the competent authority or its authorized body.

TP25 Sulphur trioxide 99.95% pure and above may be transported in tanks without an inhibitor provided that it is maintained at a temperature equal to or above 32.5°C.

TP26 When transported under heated conditions, the heating device shall be fitted outside the shell. For UN 3176, this provision only applies when the substance reacts dangerously with water.

TP27 A portable tank having a minimum test pressure of 4 bar may be used if it is shown that a test pressure of 4 bar or less is acceptable according to the test pressure definition in 6.7.2.1.

TP28 A portable tank having a minimum test pressure of 2.65 bar may be used if it is shown that a test pressure of 2.65 bar or less is acceptable according to the test pressure definition in 6.7.2.1.

TP29 A portable tank having a minimum test pressure of 1.5 bar may be used if it is shown that a test pressure of 1.5 bar or less is acceptable according to the test pressure definition in 6.7.2.1.

TP30 This substance shall be transported in insulated tanks.

TP31 This substance shall be transported in tanks in solid state.

TP32 For UN Nos. 0331, 0332 and 3375, portable tanks may be used subject to the following conditions:

.1 To avoid unnecessary confinement, each portable tank constructed of metal shall be fitted with a pressure relief device that may be of the re-closing spring-loaded type, a frangible disc or a fusible element. The set-to-discharge or burst pressure, as applicable, shall not be greater than 2.65 bar for portable tanks with minimum test pressures greater than 4 bar.

.2 For UN 3375 only, suitability for transport in tanks shall be demonstrated. One method to evaluate this suitability is test 8 (d) in Test Series 8 (see Manual of Tests and Criteria, part 1, subsection 18.7).

Chapter 3.3

Special provisions applicable to certain substances, materials or articles

△ 3.3.1 When column 6 of the Dangerous Goods List indicates that a special provision is relevant to a dangerous good, the meaning and requirement(s) of that special provision are as set out below. Where a special provision includes a requirement for package marking, the provisions of 5.2.1.2.1 to .4 shall be met. If the required mark is in the form of specific wording indicated in quotation marks, such as "Damaged Lithium Batteries", the size of the mark shall be at least 12 mm, unless otherwise indicated in the special provision or elsewhere in this Code.

16 Samples of new or existing explosive substances or articles may be transported as directed by the competent authority for purposes including: testing, classification, research and development, quality control, or as a commercial sample. Explosive samples which are not wetted or desensitized shall be limited to 10 kg in small packages as specified by the competent authority. Explosive samples which are wetted or desensitized shall be limited to 25 kg.

23 Even though this substance has a flammability hazard, it only exhibits such hazard under extreme fire conditions in confined areas.

26 This substance is not permitted for transport in portable tanks, or intermediate bulk containers with a capacity exceeding 450 L, due to the potential initiation of an explosion when transported in large volumes.

28 This substance may be transported under the provisions of class 4.1 only if it is so packaged that the percentage of diluent will not fall below that stated, at any time during transport (see 2.4.2.4).

29 The packages, including bales, are exempt from labelling provided that they are marked with the appropriate class (e.g. "class 4.2"). Packages, with the exception of bales, shall also display the proper shipping name and the UN number of the substance that they contain in accordance with 5.2.1. In any case, the packages, including bales, are exempt from class marking provided that they are loaded in a cargo transport unit and that they contain goods to which only one UN number has been assigned. The cargo transport units in which the packages, including bales, are loaded shall display any relevant labels, placards and marks in accordance with chapter 5.3.

32 When in any other form, this substance is not subject to the provisions of this Code.

37 When coated, this substance is not subject to the provisions of this Code.

38 This substance, when it contains not more than 0.1% calcium carbide, is not subject to the provisions of this Code.

39 This substance, when it contains less than 30% or not less than 90% silicon, is not subject to the provisions of this Code.

43 When offered for transport as pesticides, these substances shall be transported under the relevant pesticide entry and in accordance with the relevant pesticide provisions (see 2.6.2.3 and 2.6.2.4).

45 Antimony sulphides and oxides which contain not more than 0.5% of arsenic, calculated on the total mass, are not subject to the provisions of this Code.

47 Ferricyanides and ferrocyanides are not subject to the provisions of this Code.

59 These substances, when they contain not more than 50% magnesium, are not subject to the provisions of this Code.

61 The technical name, which shall supplement the proper shipping name, shall be the ISO common name, or other name listed in *The WHO Recommended Classification of Pesticides by Hazard and Guidelines to Classification* or the name of the active substance (see also 3.1.2.8.1.1).

62 This substance, when it contains not more than 4% sodium hydroxide, is not subject to the provisions of this Code.

63 The division of class 2 and the subsidiary risks depend on the nature of the contents of the aerosol dispenser. The following provisions shall apply:

.1 Class 2.1 applies if the contents include 85% by mass or more flammable components and the chemical heat of combustion is 30 kJ/g or more;

3

.2 Class 2.2 applies if the contents contain 1% by mass or less flammable components and the heat of combustion is less than 20 kJ/g.

.3 Otherwise the product shall be classified as tested by the tests described in the Manual of Tests and Criteria, part III, section 31. Extremely flammable and flammable aerosols shall be classified in class 2.1; non-flammable in class 2.2;

.4 Gases of class 2.3 shall not be used as a propellant in an aerosol dispenser;

.5 Where the contents other than the propellant of aerosol dispensers to be ejected are classified as class 6.1 packing groups II or III or class 8 packing groups II or III, the aerosol shall have a subsidiary risk of class 6.1 or class 8;

.6 Aerosols with contents meeting the criteria for packing group I for toxicity or corrosivity shall be prohibited from transport;

.7 Except for consignments transported in limited quantities (see chapter 3.4), packages containing aerosols shall bear labels for the primary risk and for the subsidiary risk(s), if any.

Flammable components are flammable liquids, flammable solids or flammable gases and gas mixtures as defined in notes 1 to 3 of subsection 31.1.3 of part III of the Manual of Tests and Criteria. This designation does not cover pyrophoric, self-heating or water-reactive substances. The chemical heat of combustion shall be determined by one of the following methods: ASTM D 240, ISO/FDIS 13943:1999 (E/F) 86.1 to 86.3 or NFPA 30B.

65 Hydrogen peroxide aqueous solutions with less than 8% hydrogen peroxide are not subject to the provisions of this Code.

66 Cinnabar is not subject to the provisions of this Code.

76 The transport of this substance shall be prohibited except with special authorization granted by the competent authority of the country concerned.

105 Nitrocellulose meeting the descriptions of UN 2556 or UN 2557 may be classified in class 4.1.

113 The transport of chemically unstable mixtures is prohibited.

117 Only regulated when transported by sea.

119 Refrigerating machines and refrigerating-machinery components including machines or other appliances which have been designed for the specific purpose of keeping food or other items at a low temperature in an internal compartment, and air-conditioning units. Refrigerating machines and refrigerating-machine components are not subject to the provisions of this Code if they contain less than 12 kg of gas in class 2.2 or less than 12 L of ammonia solution (UN 2672).

122 The subsidiary risk(s), the control and emergency temperatures, if any, and the generic entry number for each of the currently assigned organic peroxide formulations are given in 2.5.3.2.4, 4.1.4.2 packing instruction IBC520 and 4.2.5.2.6 portable tank instruction T23.

127 Other inert material or inert material mixture may be used at the discretion of the competent authority, provided this inert material has identical phlegmatizing properties.

131 The phlegmatized substance shall be significantly less sensitive than dry PETN.

133 If over-confined in packagings, this substance may exhibit explosive behaviour. Packagings authorized under packing instruction P409 are intended to prevent over-confinement. When a packaging other than those prescribed under packing instruction P409 is authorized by the competent authority of the country of origin in accordance with 4.1.3.7, the package shall bear an "EXPLOSIVE" subsidiary risk label (Model No. 1, see 5.2.2.2.2) unless the competent authority of the country of origin has permitted this label to be dispensed with for the specific packaging employed because test data have proved that the substance in this packaging does not exhibit explosive behaviour (see 5.4.1.5.5.1). The provisions of 7.2.3.3, 7.1.3.1 and 7.1.4.4 shall also be considered.

135 The dihydrated sodium salt of dichloroisocyanuric acid does not meet the criteria for inclusion in class 5.1 and is not subject to the provisions of this Code unless meeting the criteria for inclusion in another class or division.

138 *p*-Bromobenzyl cyanide is not subject to the provisions of this Code.

141 Products which have undergone sufficient heat treatment so that they present no hazard during transport are not subject to the provisions of this Code.

142 Solvent-extracted soya bean meal containing not more than 1.5% oil and 11% moisture, being substantially free from flammable solvents, which is accompanied by a certificate from the shipper stating that the substance, as offered for shipment, meets this requirement is not subject to the provisions of this Code.

144 An aqueous solution containing not more than 24% alcohol by volume is not subject to the provisions of this Code.

145 Alcoholic beverages of packing group III, when transported in receptacles of 250 L or less, are not subject to the provisions of this Code.

152 The classification of this substance will vary with particle size and packaging, but borderlines have not been experimentally determined. Appropriate classifications shall be made as required by 2.1.3.

153 This entry applies only if it is demonstrated, on the basis of tests, that the substance, when in contact with water, is not combustible nor shows a tendency to auto-ignition and that the mixture of gases evolved is not flammable.

163 A substance specifically listed by name in the Dangerous Goods List shall not be transported under this entry. Materials transported under this entry may contain 20% or less nitrocellulose provided the nitrocellulose contains not more than 12.6% nitrogen (by dry mass).

168 Asbestos which is immersed or fixed in a natural or artificial binder (such as cement, plastics, asphalt, resins or mineral ore) in such a way that no escape of hazardous quantities of respirable asbestos fibres can occur during transport is not subject to the provisions of this Code. Manufactured articles containing asbestos and not meeting this provision are nevertheless not subject to the provisions of this Code when packaged so that no escape of hazardous quantities of respirable asbestos fibres can occur during transport.

169 Phthalic anhydride in the solid state and tetrahydrophthalic anhydride, with not more than 0.05% maleic anhydride, are not subject to the provisions of this Code. Phthalic anhydride molten at a temperature above its flashpoint, with not more than 0.05% maleic anhydride, shall be classified under UN 3256.

172 Where a radioactive material has (a) subsidiary risk(s):

.1 The substance shall be allocated to packing group I, II or III, if appropriate, by application of the packing group criteria provided in part 2 corresponding to the nature of the predominant subsidiary risk;

.2 Packages shall be labelled with subsidiary risk labels corresponding to each subsidiary risk exhibited by the material; corresponding placards shall be affixed to cargo transport units in accordance with the relevant provisions of 5.3.1;

.3 For the purposes of documentation and package marking, the proper shipping name shall be supplemented with the name of the constituents which most predominantly contribute to this (these) subsidiary risk(s) and which shall be enclosed in parenthesis;

.4 The dangerous goods transport document shall indicate the subsidiary class or division and, where assigned, the packing group as required by 5.4.1.4.1.4 and 5.4.1.4.1.5.

For packing, see also 4.1.9.1.5.

177 Barium sulphate is not subject to the provisions of this Code.

178 This entry shall be used only when no other appropriate entry exists in the list, and only with the approval of the competent authority of the country of origin.

181 Packages containing this type of substance shall bear the "EXPLOSIVE" subsidiary risk label (Model No. 1, see 5.2.2.2.2) unless the competent authority of the country of origin has permitted this label to be dispensed with for the specific packaging employed because test data have proved that the substance in this packaging does not exhibit explosive behaviour (see 5.4.1.5.5.1). The provisions of 7.2.3.3 shall also be considered.

182 The group of alkali metals includes lithium, sodium, potassium, rubidium and caesium.

183 The group of alkaline earth metals includes magnesium, calcium, strontium and barium.

186 In determining the ammonium nitrate content, all nitrate ions for which a molecular equivalent of ammonium ions is present in the mixture shall be calculated as ammonium nitrate.

188 Cells and batteries offered for transport are not subject to other provisions of this Code if they meet the following:

.1 For a lithium metal or lithium alloy cell, the lithium content is not more than 1 g, and for a lithium-ion cell, the watt-hour rating is not more than 20 Wh;

.2 For a lithium metal or lithium alloy battery, the aggregate lithium content is not more than 2 g, and for a lithium-ion battery, the watt-hour rating is not more than 100 Wh. Lithium-ion batteries subject to this provision shall be marked with the watt-hour rating on the outside case, except those manufactured before 1 January 2009;

.3 Each cell or battery meets the provisions of 2.9.4.1 and 2.9.4.5;

.4 Cells and batteries, except when installed in equipment, shall be packed in inner packagings that completely enclose the cell or battery. Cells and batteries shall be protected so as to prevent short circuits. This includes protection against contact with conductive materials within the same packaging that could lead to a short circuit. The inner packagings shall be packed in strong outer packagings which conform to the provisions of 4.1.1.1, 4.1.1.2, and 4.1.1.5.

.5 Cells and batteries when installed in equipment shall be protected from damage and short circuit, and the equipment shall be equipped with an effective means of preventing accidental activation. This requirement does not apply to devices which are intentionally active in transport (radio frequency identification (RFID) transmitters, watches, sensors, etc.) and which are not capable of generating a dangerous evolution of heat. When batteries are installed in equipment, the equipment shall be packed in strong outer packagings constructed of suitable material of adequate strength and design in relation to the packaging's capacity and its intended use unless the battery is afforded equivalent protection by the equipment in which it is contained.

△ .6 Each package shall be marked with the appropriate lithium battery mark, as illustrated in 5.2.1.10;

Note: The provisions concerning marking in special provision 188 of amendment 37-14 of the Code may continue to be applied until 31 December 2018.

This requirement does not apply to:

.1 packages containing only button cell batteries installed in equipment (including circuit boards); and

.2 packages containing no more than four cells or two batteries installed in equipment, where there are not more than two packages in the consignment.

⊗

△ .7 Except when batteries are installed in equipment, each package shall be capable of withstanding a 1.2 m drop test in any orientation without damage to cells or batteries contained therein, without shifting of the contents so as to allow battery to battery (or cell to cell) contact and without release of contents; and

△ .8 Except when batteries are installed in or packed with equipment, packages shall not exceed 30 kg gross mass.

As used above and elsewhere in this Code, "lithium content" means the mass of lithium in the anode of a lithium metal or lithium alloy cell.

Separate entries exist for lithium metal batteries and lithium ion batteries to facilitate the transport of these batteries for specific modes of transport and to enable the application of different emergency response actions.

■ A single cell battery as defined in part III, subsection 38.3.2.3 of the Manual of Tests and Criteria is considered a "cell" and shall be transported according to the requirements for "cells" for the purpose of this special provision.

190 Aerosol dispensers shall be provided with protection against inadvertent discharge. Aerosols with a capacity not exceeding 50 mL containing only non-toxic constituents are not subject to the provisions of this Code.

191 Receptacles with a capacity not exceeding 50 mL containing only non-toxic constituents are not subject to the provisions of this Code.

193 This entry may only be used for uniform ammonium nitrate based fertilizer mixtures of the nitrogen, phosphate or potash type, containing not more than 70% ammonium nitrate and not more than 0.4% total combustible/organic material calculated as carbon or with not more than 45% ammonium nitrate and unrestricted combustible material. Fertilizers within these composition limits are not subject to the provisions of this Code when shown by a Trough Test (see Manual of Tests and Criteria, part III, subsection 38.2) that they are not liable to self-sustaining decomposition.

194 The control and emergency temperatures, if any, and the generic entry number for each of the currently assigned self-reactive substances are given in 2.4.2.3.2.3.

195 For certain organic peroxides types B or C, a smaller packaging than that allowed by packing methods OP5 or OP6 respectively has to be used (see 4.1.7 and 2.5.3.2.4).

196 Formulations which, in laboratory testing, neither detonate in the cavitated state nor deflagrate, which show no effect when heated under confinement and which exhibit no explosive power may be transported under this entry. The formulation must also be thermally stable (i.e. the SADT is 60°C or higher for a 50 kg package). Formulations not meeting these criteria shall be transported under the provisions of class 5.2 (see 2.5.3.2.4).

198 Nitrocellulose solutions containing not more than 20% nitrocellulose may be transported as paint, perfumery products or printing ink, as applicable. See UN Nos. 1210, 1263, 1266, 3066, 3469 and 3470.

199 Lead compounds which, when mixed in a ratio of 1:1000 with 0.07M hydrochloric acid and stirred for one hour at a temperature of 23°C ± 2°C, exhibit a solubility of 5% or less (see ISO 3711:1990, *Lead chromate pigments and lead chromate-molybdate pigments – Specifications and methods of test*) are considered insoluble and are not subject to the provisions of this Code unless they meet the criteria for inclusion in another hazard class.

272 This substance shall not be transported under the provisions of class 4.1 unless specifically authorized by the competent authority (see UN 0143 or UN 0150 as appropriate).

273 Maneb and maneb preparations stabilized against self-heating need not be classified in class 4.2 when it can be demonstrated by testing that a cubic volume of 1 m^3 of substance does not self-ignite and that the temperature at the centre of the sample does not exceed 200°C when the sample is maintained at a temperature of not less than 75°C ± 2°C for a period of 24 hours.

274 For the purposes of documentation and package marking, the proper shipping name shall be supplemented with the technical name (see 3.1.2.8.1).

277 For aerosols or receptacles containing toxic substances, the limited quantity value is 120 mL. For all other aerosols or receptacles, the limited quantity value is 1,000 mL.

278 These substances shall not be classified and transported unless authorized by the competent authority on the basis of results from series 2 tests and series 6(c) tests of part I of the Manual of Tests and Criteria on packages as prepared for transport (see 2.1.3.1). The competent authority shall assign the packing group on the basis of the chapter 2.3 criteria and the package type used for the series 6(c) tests.

279 The substance is assigned to this classification or packing group based on human experience rather than the strict application of classification criteria set out in this Code.

280 This entry applies to safety devices for vehicles, vessels or aircraft, e.g. air bag inflators, air bag modules, seat-belt pretensioners, and pyromechanical devices, which contain dangerous goods of class 1 or of other classes, when transported as component parts and if these articles as presented for transport have been tested in accordance with test series 6(c) of part I of the Manual of Tests and Criteria, with no explosion of the device, no fragmentation of device casing or pressure receptacle, and no projection hazard nor thermal effect which would significantly hinder fire-fighting or emergency response efforts in the immediate vicinity. This entry does not apply to life-saving appliances described in special provision 296 (UN Nos. 2990 and 3072).

281 Transport of hay, straw or bhusa when wet, damp or contaminated with oil is prohibited and when not wet or contaminated with oil is subject to the provisions of this Code.

283 Articles, containing gas, intended to function as shock absorbers, including impact-energy-absorbing devices or pneumatic springs, are not subject to the provisions of this Code provided:

.1 each article has a gas space capacity not exceeding 1.6 L and a charge pressure not exceeding 280 bar where the product of the capacity (litres) and charge pressure (bar) does not exceed 80 (i.e. 0.5 L gas space and 160 bar charge pressure, 1 L gas space and 80 bar charge pressure, 1.6 L gas space and 50 bar charge pressure, 0.28 L gas space and 280 bar charge pressure);

.2 each article has a minimum burst pressure of 4 times the charge pressure at 20°C for products not exceeding 0.5 L gas space capacity and 5 times charge pressure for products greater than 0.5 L gas space capacity;

.3 each article is manufactured from material which will not fragment upon rupture;

.4 each article is manufactured in accordance with a quality-assurance standard acceptable to the competent authority; and

.5 the design type has been subjected to a fire test demonstrating that pressure in the article is relieved by means of a fire-degradable seal or other pressure relief device, such that the article will not fragment and that the article does not rocket.

284 An oxygen generator, chemical, containing oxidizing substances shall meet the following conditions:

.1 the generator, when containing an explosive device, shall only be transported under this entry when excluded from class 1 in accordance with 2.1.3 of this Code;

.2 the generator, without its packaging, shall be capable of withstanding a 1.8 m drop test onto a rigid, non-resilient, flat and horizontal surface, in the position most likely to cause damage, without loss of its contents and without actuation; and

.3 when the generator is equipped with an actuating device, it shall have at least two positive means of preventing unintentional actuation.

286 Nitrocellulose membrane filters covered by this entry, each with a mass not exceeding 0.5 g, are not subject to the provisions of this Code when contained individually in an article or a sealed packet.

288 These substances shall not be classified and transported unless authorized by the competent authority on the basis of results from series 2 tests and series 6(c) tests of part I of the Manual of Tests and Criteria on packages as prepared for transport (see 2.1.3).

289 Safety devices, electrically initiated and safety devices, pyrotechnic installed in vehicles, vessels or aircraft or in completed components such as steering columns, door panels, seats, etc., are not subject to the provisions of this Code.

第六單元—有限數量及例外數量

3

Chapter 3.4

Dangerous goods packed in limited quantities

3.4.1 General

3.4.1.1 This chapter provides the provisions applicable to the transport of dangerous goods of certain classes packed in limited quantities. The applicable quantity limit for the inner packaging or article is specified for each substance in column 7a of the Dangerous Goods List of chapter 3.2. In addition, the quantity "0" has been indicated in this column for each entry not permitted to be transported in accordance with this chapter.

3.4.1.2 Limited quantities of dangerous goods packed in such limited quantities, meeting the provisions of this chapter, are not subject to any other provisions of this Code except the relevant provisions of:

.1 Part 1, chapters 1.1, 1.2 and 1.3;

.2 Part 2;

.3 Part 3, chapters 3.1, 3.2, 3.3;

.4 Part 4, 4.1.1.1, 4.1.1.2 and 4.1.1.4 to 4.1.1.8;

.5 Part 5, 5.1.1 except 5.1.1.4, 5.1.2.3, 5.2.1.7, 5.2.1.9, 5.3.2.4, and chapter 5.4;

.6 Part 6, construction requirements of 6.1.4, 6.2.1.2 and 6.2.4;

.7 Part 7, 7.1.3.2, 7.6.3.1 and 7.3 except 7.3.3.15 and 7.3.4.1.

3.4.2 Packing

3.4.2.1 Dangerous goods shall be packed only in inner packagings placed in suitable outer packagings. Intermediate packagings may be used. In addition, for articles of division 1.4, compatibility group S, the provisions of section 4.1.5 shall be fully complied with. The use of inner packagings is not necessary for the transport of articles such as aerosols or "receptacles, small, containing gas". The total gross mass of the package shall not exceed 30 kg.

3.4.2.2 Except for articles of division 1.4, compatibility group S, shrink-wrapped or stretch-wrapped trays meeting the conditions of 4.1.1.1, 4.1.1.2 and 4.1.1.4 to 4.1.1.8 are acceptable as outer packagings for articles or inner packagings containing dangerous goods transported in accordance with this chapter. Inner packagings that are liable to break or be easily punctured, such as those made of glass, porcelain, stoneware or certain plastics, shall be placed in suitable intermediate packagings meeting the provisions of 4.1.1.1, 4.1.1.2 and 4.1.1.4 to 4.1.1.8, and be so designed that they meet the construction requirements of 6.1.4. The total gross mass of the package shall not exceed 20 kg.

3.4.2.3 Liquid goods of class 8, packing group II in glass, porcelain or stoneware inner packagings shall be enclosed in a compatible and rigid intermediate packaging.

3.4.3 Stowage

Dangerous goods packed in limited quantity are allocated stowage category A as defined in 7.1.3.2. The other stowage provisions indicated in column 16a of the Dangerous Goods List are not applicable.

3.4.4 Segregation

3.4.4.1 Different dangerous substances in limited quantities may be packed in the same outer packaging, provided:

.1 the substances comply with the provisions of 7.2.6.1; and

.2 the segregation provisions of chapter 7.2, including the segregation provisions in column 16b of the Dangerous Goods List, are taken into account. However, notwithstanding the individual provisions specified in the Dangerous Goods List, substances in packing group III within the same class may be packed together subject to compliance with 3.4.4.1.1 of the IMDG Code. The following statement shall be included in the transport document: "Transport in accordance with 3.4.4.1.2 of the IMDG Code" (see 5.4.1.5.2.2).

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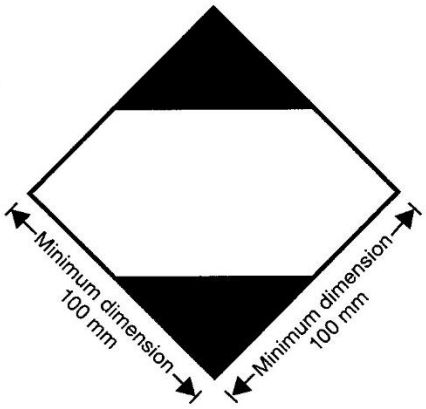
3.4.4.2 The segregation provisions of chapter 7.2 to 7.7 including the segregation provisions in column 16b of the Dangerous Goods List are not applicable for packagings containing dangerous goods in limited quantities or in relation to other dangerous goods. However, articles of division 1.4, compatibility group S shall not be stowed in the same compartment or hold, or cargo transport unit with dangerous goods of class 1 of compatibility groups A and L.

3.4.5 Marking and placarding

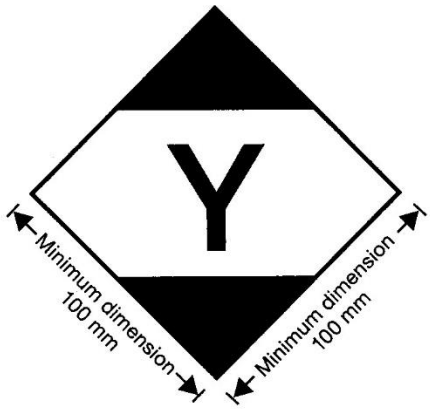
△ 3.4.5.1 Except for air transport, packages containing dangerous goods in limited quantities shall bear the mark shown below:



Mark for packages containing limited quantities

The mark shall be readily visible, legible and able to withstand open weather exposure without a substantial reduction in effectiveness. The mark shall be in the form of a square set at an angle of 45° (diamond-shaped). The top and bottom portions and the surrounding line shall be black. The centre area shall be white or a suitable contrasting background. The minimum dimensions shall be 100 mm × 100 mm and the minimum width of the line forming the diamond shall be 2 mm. Where dimensions are not specified, all features shall be in approximate proportion to those shown. If the size of the package so requires, the minimum outer dimensions shown above may be reduced to be not less than 50 mm × 50 mm provided the mark remains clearly visible. The minimum width of the line forming the diamond may be reduced to a minimum of 1 mm.

△ 3.4.5.2 Packages containing dangerous goods packed in conformity with the provisions of part 3, chapter 4 of the ICAO *Technical Instructions for the Safe Transport of Dangerous Goods by Air* may bear the mark shown below to certify conformity with these provisions:



Mark for packages containing limited quantities conforming to part 3, chapter 4 of the ICAO *Technical Instructions for the Safe Transport of Dangerous Goods by Air*

The mark shall be readily visible, legible and able to withstand open weather exposure without a substantial reduction in effectiveness. The mark shall be in the form of a square set at an angle of 45° (diamond-shaped). The top and bottom portions and the surrounding line shall be black. The centre area shall be white or a suitable contrasting background. The minimum dimensions shall be 100 mm × 100 mm and the minimum width of the line forming the diamond shall be 2 mm. The symbol "Y" shall be placed in the centre of the mark and shall be clearly visible. Where dimensions are not specified, all features shall be in approximate proportion to those shown. If the size of the package so requires, the minimum outer dimensions shown

above may be reduced to be not less than 50 mm × 50 mm provided the mark remains clearly visible. The minimum width of the line forming the diamond may be reduced to a minimum of 1 mm. The symbol "Y" shall remain in approximate proportion to that shown above.

3.4.5.3 Multimodal recognition of marks

△ 3.4.5.3.1 Packages containing dangerous goods bearing the mark shown in 3.4.5.2 with or without the additional labels and marks for air transport shall be deemed to meet the provisions of section 3.4.2 and need not bear the mark shown in 3.4.5.1.

△ 3.4.5.3.2 Packages containing dangerous goods in limited quantities bearing the mark shown in 3.4.5.1 and conforming with the provisions of the ICAO *Technical Instructions for the Safe Transport of Dangerous Goods by Air*, including all necessary marks and labels specified in parts 5 and 6, shall be deemed to meet the provisions of section 3.4.1 as appropriate and of section 3.4.2.

△ 3.4.5.4 When packages containing dangerous goods packed in limited quantities are placed in an overpack or in a unit load, the overpack or the unit load shall be marked with the mark required by this chapter unless the marks representative of all dangerous goods in the overpack or the unit load are visible. In addition, an overpack shall be marked with the word "OVERPACK" unless marks representative of all dangerous goods, as required by this chapter, in the overpack are visible. The lettering of the "OVERPACK" mark shall be at least 12 mm high. The other provisions of 5.1.2.1 apply only if other dangerous goods which are not packed in limited quantities are contained in the overpack or in a unit load and only in relation to these other dangerous goods.

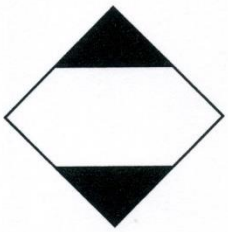
3.4.5.5 Placarding and marking of cargo transport units

3.4.5.5.1 Cargo transport units containing dangerous goods packed in limited quantities with no other dangerous goods shall not be placarded nor marked according to 5.3.2.0 and 5.3.2.1. However, they shall be suitably marked on the exterior with the mark in 3.4.5.5.4.

3.4.5.5.2 Cargo transport units containing dangerous goods and dangerous goods packed in limited quantities shall be placarded and marked according to the provisions applicable to the dangerous goods which are not packed in limited quantities. However, if no placard or mark is required for the dangerous goods not packed in limited quantities, the cargo transport units shall be marked with the mark in 3.4.5.5.4.

3.4.5.5.3 [Reserved]

△ 3.4.5.5.4 When required in 3.4.5.5.1 or 3.4.5.5.2, the following mark shall be affixed on cargo transport units:



The marking shall be readily visible, legible and be such that this information will still be identifiable on cargo transport units surviving at least three months' immersion in the sea. In considering suitable marking methods, account shall be taken of ease with which the surface of the cargo transport unit can be marked. The top and bottom portions and the surrounding line shall be black. The centre area shall be white or a suitable contrasting background. The minimum dimensions shall be of 250 mm × 250 mm in locations indicated in 5.3.1.1.4.1.

3.4.6 Documentation

3.4.6.1 In addition to the provisions for documentation specified in chapter 5.4, the words "limited quantity" or "LTD QTY" shall be included on the dangerous goods declaration together with the description of the shipment.

3

Chapter 3.5

Dangerous goods packed in excepted quantities

3.5.1 Excepted quantities

3.5.1.1 Excepted quantities of dangerous goods of certain classes, other than articles, meeting the provisions of this chapter, are not subject to any other provisions of this Code except for:

.1 The training provisions in chapter 1.3;

.2 The classification procedures and packing group criteria in Part 2, Classification;

.3 The packaging provisions of 4.1.1.1, 4.1.1.2, 4.1.1.4, 4.1.1.4.1 and 4.1.1.6 in Part 4; and

.4 The provisions for documentation specified in chapter 5.4.

Note: In the case of radioactive material, the provisions for radioactive material in excepted packages in 1.5.1.5 apply.

3.5.1.2 Dangerous goods which may be carried as excepted quantities in accordance with the provisions of this chapter are shown in column 7b of the Dangerous Goods List by means of an alphanumeric code as follows:

Code	Maximum net quantity per inner packaging (in grams for solids and mL for liquids and gases)	Maximum net quantity per outer packaging (in grams for solids and mL for liquids and gases, or sum of grams and mL in the case of mixed packaging)
E0	Not permitted as excepted quantity	
E1	30	1,000
E2	30	500
E3	30	300
E4	1	500
E5	1	300

For gases, the volume indicated for inner packagings refers to the water capacity of the inner receptacle and the volume indicated for outer packagings refers to the combined water capacity of all inner packagings within a single outer packaging.

3.5.1.3 Where dangerous goods in excepted quantities for which different codes are assigned are packaged together, the total quantity per outer packaging shall be limited to that corresponding to the most restrictive code.

3.5.1.4 Excepted quantities of dangerous goods assigned to codes E1, E2, E4 and E5 are not subject to the provisions of this Code provided that:

.1 The maximum net quantity of material per inner packaging is limited to 1 mL for liquids and gases and 1 g for solids;

.2 The provisions of 3.5.2 are met, except that an intermediate packaging is not required if the inner packagings are securely packed in an outer packaging with cushioning material in such a way that, under normal conditions of transport, they cannot break, be punctured, or leak their contents; and for liquid dangerous goods, the outer packaging contains sufficient absorbent material to absorb the entire contents of the inner packagings;

.3 The provisions of 3.5.3 are complied with; and

.4 The maximum net quantity of dangerous goods per outer packaging does not exceed 100 g for solids or 100 mL for liquids and gases.

3.5.2 Packagings

3.5.2.1 Packagings used for the transport of dangerous goods in excepted quantities shall be in compliance with the following:

.1 There shall be an inner packaging and each inner packaging shall be constructed of plastic (when used for liquid dangerous goods it shall have a thickness of not less than 0.2 mm), or of glass, porcelain, stoneware, earthenware or metal (see also 4.1.1.2) and the closure of each inner packaging shall be held securely in place with wire, tape or other positive means; any receptacle having a neck with moulded screw threads shall have a leakproof threaded-type cap. The closure shall be resistant to the contents;

△ .2 Each inner packaging shall be securely packed in an intermediate packaging with cushioning material in such a way that, under normal conditions of transport, they cannot break, be punctured or leak their contents. For liquid dangerous goods, the intermediate or outer packaging shall contain sufficient absorbent material to absorb the entire contents of the inner packagings. When placed in the intermediate packaging, the absorbent material may be the cushioning material. Dangerous goods shall not react dangerously with cushioning, absorbent material and packaging material or reduce the integrity or function of the materials. Regardless of its orientation, the package shall completely contain the contents in case of breakage or leakage;

.3 The intermediate packaging shall be securely packed in a strong, rigid outer packaging (wooden, fibre-board or other equally strong material);

.4 Each package type shall be in compliance with the provisions in 3.5.3;

△ .5 Each package shall be of such a size that there is adequate space to apply all necessary marks; and

.6 Overpacks may be used and may also contain packages of dangerous goods or goods not subject to the provisions of this Code.

3.5.3 Tests for packages

3.5.3.1 The complete package as prepared for transport, with inner packagings filled to not less than 95% of their capacity for solids or 98% for liquids, shall be capable of withstanding, as demonstrated by testing which is appropriately documented, without breakage or leakage of any inner packaging and without significant reduction in effectiveness:

.1 Drops onto a rigid, non-resilient flat and horizontal surface from a height of 1.8 m:

(i) Where the sample is in the shape of a box, it shall be dropped in each of the following orientations:

- flat on the base;
- flat on the top;
- flat on the longest side;
- flat on the shortest side;
- on a corner

(ii) Where the sample is in the shape of a drum, it shall be dropped in each of the following orientations:

- diagonally on the top chime, with the centre of gravity directly above the point of impact;
- diagonally on the base chime;
- flat on the side.

Note: Each of the above drops may be performed on different but identical packages.

.2 A force applied to the top surface for a duration of 24 h, equivalent to the total weight of identical packages if stacked to a height of 3 m (including the sample).

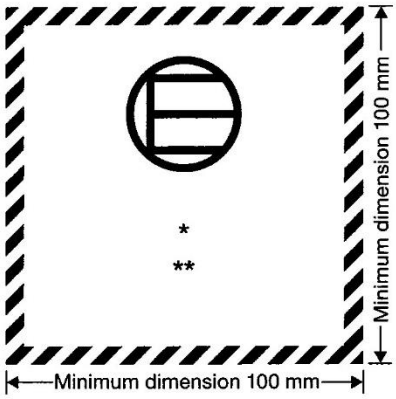
3.5.3.2 For the purposes of testing, the substances to be transported in the packaging may be replaced by other substances except where this would invalidate the results of the tests. For solids, when another substance is used, it shall have the same physical characteristics (mass, grain size, etc.) as the substance to be carried. In the drop tests for liquids, when another substance is used, its relative density (specific gravity) and viscosity shall be similar to those of the substance to be transported.

3.5.4 Marking of packages

3.5.4.1 Packages containing excepted quantities of dangerous goods prepared in accordance with this chapter shall be durably and legibly marked with the mark shown below. The primary hazard class of each of the dangerous goods contained in the package shall be shown in the mark. Where the name of the consignor or consignee is not shown elsewhere on the package, this information shall be included within the mark.

3

△ 3.5.4.2



Excepted quantities mark

* The class or, when assigned, the division number(s) shall be shown in this location.
** The name of the consignor or of the consignee shall be shown in this location if not shown elsewhere on the package.

The mark shall be in the form of a square. The hatching and symbol shall be of the same colour, black or red, on white or suitable contrasting background. The minimum dimensions shall be 100 mm × 100 mm. Where dimensions are not specified, all features shall be in approximate proportion to those shown.

△ 3.5.4.3 When packages containing dangerous goods packed in excepted quantities are placed in an overpack or in a unit load, the overpack or the unit load shall be marked with the mark required by this chapter unless the marks representative of all dangerous goods in the overpack or the unit load are visible. In addition, an overpack shall be marked with the word "OVERPACK" unless marks representative of all dangerous goods, as required by this chapter, in the overpack are visible. The lettering of the "OVERPACK" mark shall be at least 12 mm high. The other provisions of 5.1.2.1 apply only if other dangerous goods which are not packed in excepted quantities are contained in the overpack or in a unit load and only in relation to these other dangerous goods.

3.5.5 Maximum number of packages in any cargo transport unit

3.5.5.1 The number of packages containing dangerous goods packed in excepted quantities in any cargo transport unit shall not exceed 1000.

3.5.6 Documentation

3.5.6.1 In addition to the provisions for documentation specified in chapter 5.4, the words "dangerous goods in excepted quantities" and the number of packages shall be included on the dangerous goods declaration together with the description of the shipment.

3.5.7 Stowage

3.5.7.1 Dangerous goods packed in excepted quantity are allocated stowage category A as defined in 7.1.3.2. The other stowage provisions indicated in column 16a of the Dangerous Goods List are not applicable.

3.5.8 Segregation

3.5.8.1 The segregation provisions of chapters 7.2 to 7.7, including the segregation provisions in column 16b of the Dangerous Goods List, are not applicable for packagings containing dangerous goods packed in excepted quantities or in relation to other dangerous goods.

3.5.8.2 The segregation provisions of chapters 7.2 to 7.7, including the segregation provisions in column 16b of the Dangerous Goods List, are not applicable for different dangerous goods in excepted quantities in the same outer packaging provided that they do not react dangerously with each other (see 4.1.1.6).

第五、六單元練習實作—海運的包裝規定

1. UN3080 的運輸專用名稱為：

_____

2. 下列危險貨物之包裝等級(Packing Group)為何？

(a) Propane:

_____

(b) Resin solution:

_____

3. 填寫表格內之空格：

將託運之產品為 UN 1296 TRIETHYLAMINE

	包裝物之最大容量	
	內包裝物 Inner packaging	外包裝物 Outer packaging
以聯合國規格包裝物包裝 in UN packaging	塑膠材質 Plastics:	纖維板箱 Fibreboard box:
以有限樹量方式包裝 as Limited Quantity		

4. 下列何者被視為高嚴重性危險貨物(High consequence dangerous goods)？(請在方框內打勾)

- ☐ portable tank with 4000 L of UN 1202 Diesel Oil (class 3, pack group III)
- ☐ portable tank with 4000 L of UN 1203 Gasoline (class 3, pack group II)
- ☐ toxic substances in pack group II (class 6.1)
- ☐ UN 0336 Explosives (class 1, division 1.4)
- ☐ toxic gases (class 2.3)

IMDG Code

2016 國際海運危險貨物規則課程

第七單元 危險貨物的標記、標示與標牌

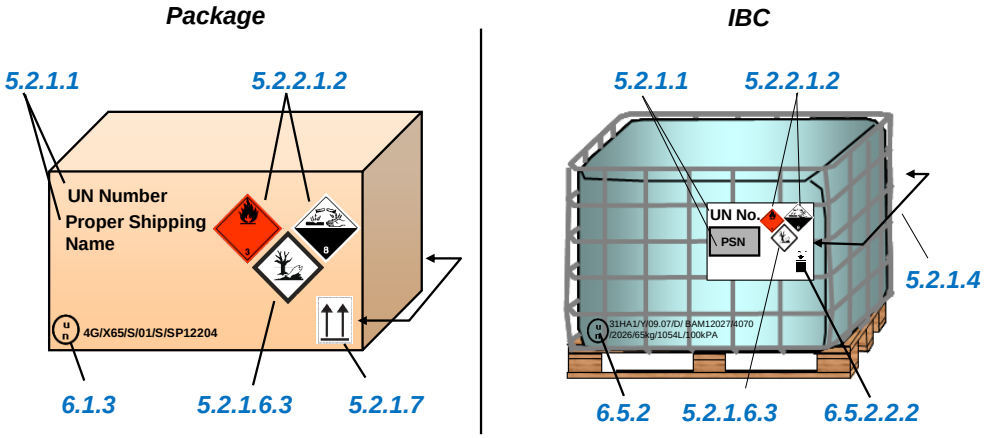
講師：施智璋

Model Course 1.10 Slide 5.1　IMDG Code Part 5

Marking and labelling of packages

5.2 IMDG

Summary of marking and labelling



Model Course 1.10 Slide 5.6　IMDG Code Part 5

包裝物的標記與標示

5.2 IMDG

Typical marking and labelling 典型的標記與標示

Each package shall be marked with: 標記

- "**UN" + UN-number**
- **Proper Shipping Name**

Each package shall be labelled with: 標示

- **Danger class label** (10×10 cm) for the primary and subsidiary risk(s)

***Note!* –** IBC with a volume over 450 l shall be marked and labelled on two opposite sides *(5.2.1.4)*

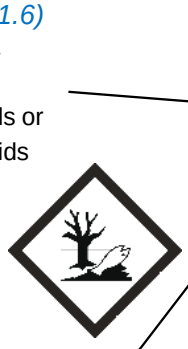
包裝物的標記與標示

5.2 IMDG

Special marking and labelling provisions 特殊的標記與標示

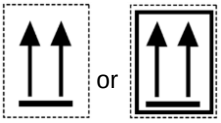
Marine pollutant mark: *(5.2.1.6)*

except packages containing inner packagings with:
- contents of 5 l or less for liquids or
- contents of 5 kg or less for solids



Orientation arrows: *(5.2.1.7)*

labelled on two opposite sides on
- Combination packagings with inner packages containing liquid
- Single packagings with vents
- Cryogenic receptacles



Marking and labelling of packages

5.2 IMDG

Example of marine pollutant mark

Model Course 1.10 Slide 5.9　　IMDG Code Part 5

包裝物的標記與標示

5.2 IMDG

General provisions 一般規定

- Labels shall be located on the same surface of the package near the PSN *(5.2.2.1.6.1)*
- Primary and subsidiary risk labels are located next to each other *(5.2.2.1.6.3)*
- IBCs > 450 l shall be marked on two opposite sides *(5.2.2.1.7)*
- Surviving at least three months immersion at sea *(5.2.2.2.1.7)*

Model Course 1.10 Slide 5.10　　IMDG Code Part 5

包裝物的標記與標示

5.2 IMDG

Minimum size 最小字體

New in Amdt 36-12

Minimum size of the height of the UN Number *(5.2.1.1)*

•Package > 30 litres or 30 kg: 12 mm

•Packages > 5 litres or 5 kg: 6 mm

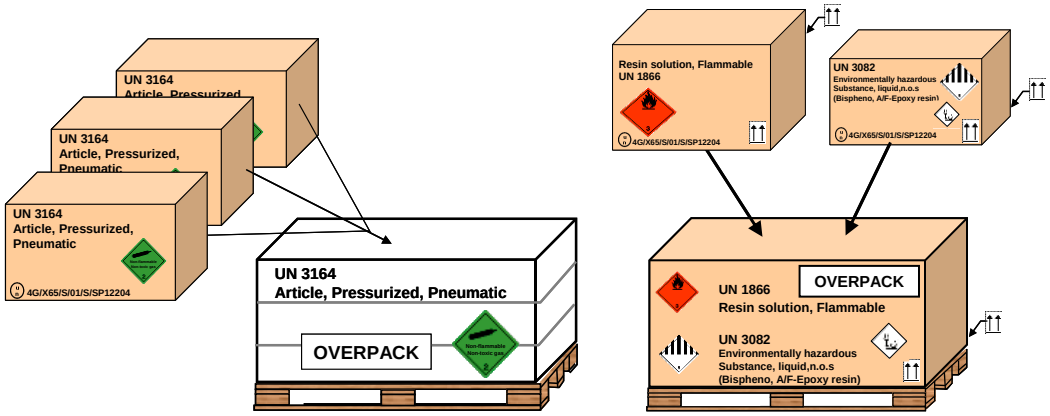
•Packages < 5 litres or 5 kg:
Appropriate size for the package

Model Course 1.10 Slide 5.11　　IMDG Code Part 5　　IMO INTERNATIONAL MARITIME ORGANIZATION

General Provisions

5.1.2 IMDG

Examples of OVERPACK

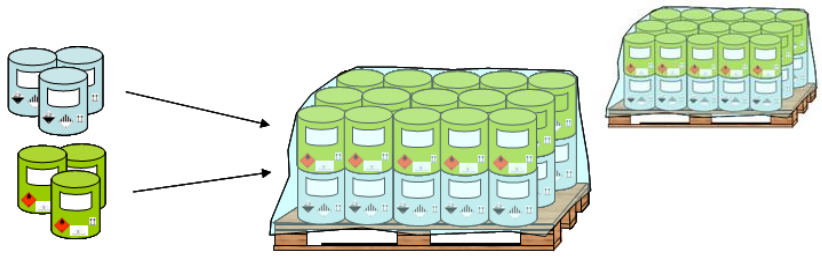


Model Course 1.10 Slide 5.3　　IMDG Code Part 5　　IMO INTERNATIONAL MARITIME ORGANIZATION

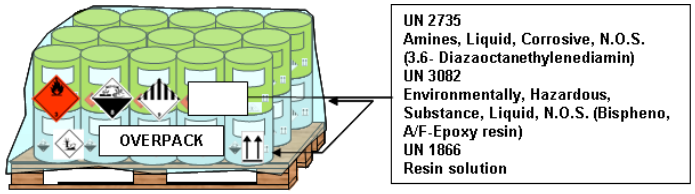
General Provisions

5.1.2 IMDG

Examples of OVERPACK



Example of marking and labelling of OVERPACK:

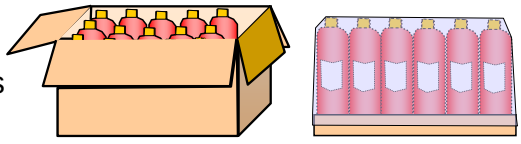


Limited Quantity 有限數量

3.4 IMDG

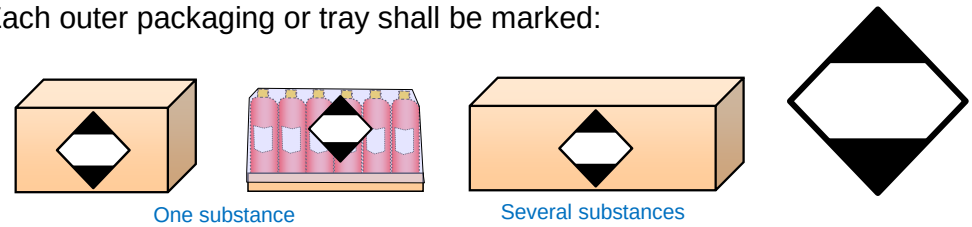
Two alternatives of packaging:

- Combination packaging
- Shrink- or stretch-wrapped trays



Max 30 kg　　Max 20 kg

Each outer packaging or tray shall be marked:



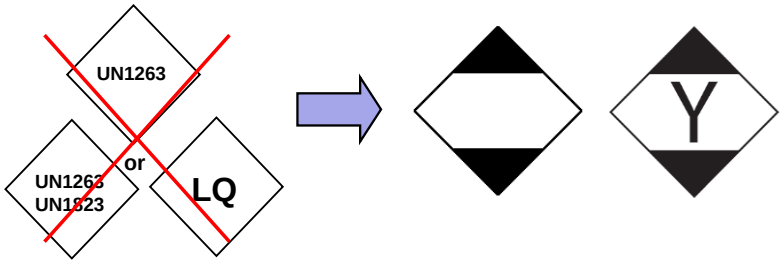
One substance　　Several substances

Note – the packages have NOT to be marked with PSN or labelled with marine pollutant mark!

Limited Quantity 有限數量

3.4 IMDG

- A new mark for LQ in IMDG Amdt 35-10
- Harmonised mark for all modes of transport. The only difference is the 'air' mark has "Y" in the centre of the mark.
- The label is voluntary from 2011 and will be compulsory 1st January 2012 but for road transport not until 1st July 2015

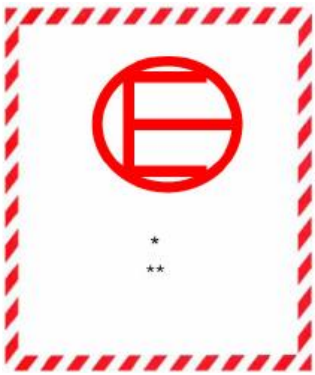


Excepted quantity 例外數量

3.5 IMDG

New in Amdt 34-08:

- New exception – excepted quantity (compare with IATA/DGR)
- Small quantities indicated in column 7b in DGL by a code E0-E5
- Special packaging, marking, labelling and documentation provisions
- Stowage as category A
- No segregation limits

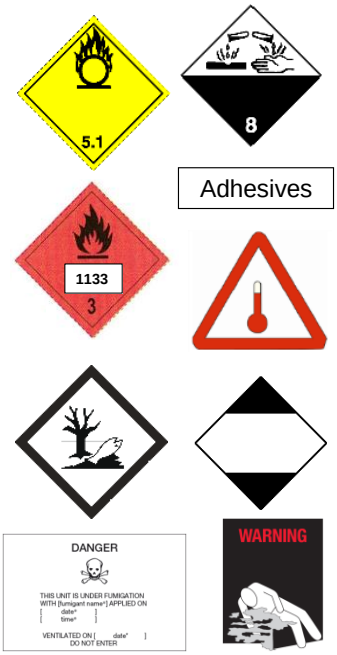


貨物運輸單元的標牌與標記

5.3 IMDG

Content Chapter 5.3

- Placarding *(5.3.1)*
- Marking *(5.3.2)*
  - Proper Shipping Name *(5.3.2.0)*
  - UN Numbers *(5.3.2.1)*
  - Elevated temperature substances *(5.3.2.2)*
  - Marine pollutant mark *(5.3.2.3)*
  - Limited quantities *(5.3.2.4/3.4.5.5)*
  - Fumigate units *(5.5.2)*
  - Risk of asphyxiation *(5.5.3)* **new in Amdt 36-12**



貨物運輸單元的標牌

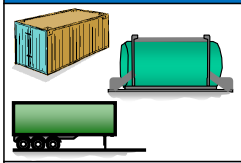
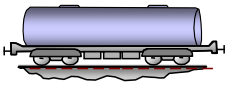
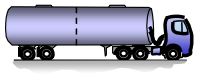
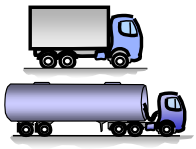
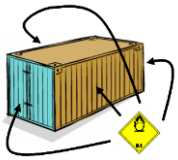
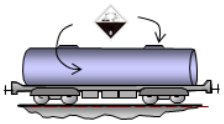
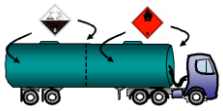
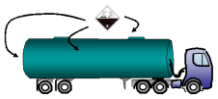
5.3.1.1 IMDG

Placarding provisions:

- Size: 250 × 250 mm
- Dangerous goods risk (class) is warned by markings
- Markings withstand **3 months** immersion
- Markings is removed when **CTU** is emptied
- Placards not required:
  - Explosives Division **1.4**, compatibility **S**
  - Limited quantities
  - Excepted quantities
  - For mixed class 1 placard required for highest risk only
  - If subsidiary risk is not indicated by primary placard, additional placards required

貨物運輸單元的標牌

5.3.1.1 IMDG

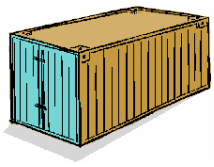
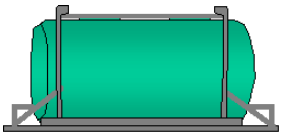
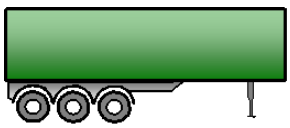
Freight container Portable tank Semi-trailer	Railway wagon Tank wagon	Multiple-compartment tank	Any other CTU
			
Each side and each end	At least on each side	Each side at compartment	At least on each side and back
			

Model Course 1.10 Slide 5.17　　IMDG Code Part 5

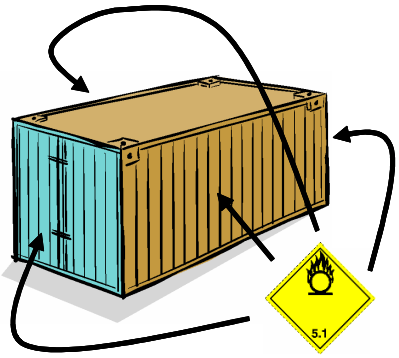
貨物運輸單元的標牌

5.3.1.1.4 IMDG

Freight container/Portable tank/Semi-trailer

On each side and each end

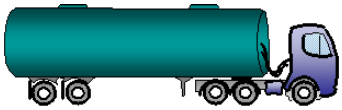


Model Course 1.10 Slide 5.18　　IMDG Code Part 5

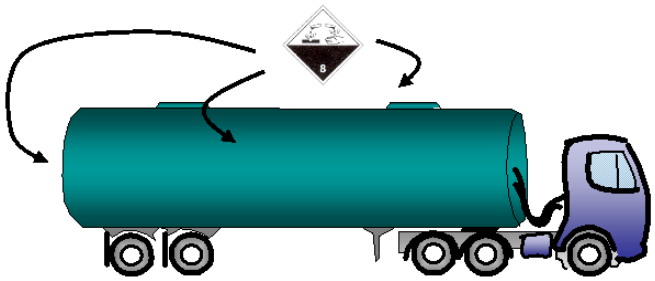
貨物運輸單元的標牌

5.3.1.1.4
IMDG

Any other cargo transport unit



At least on both sides and on the back of the unit



Model Course 1.10 Slide 5.20　　IMDG Code Part 5

貨物運輸單元的標記

5.3.2.0
IMDG

Proper Shipping Name - Examples

Marking of PSN:

Model Course 1.10 Slide 5.22　　IMDG Code Part 5

貨物運輸單元的標記

5.3.2.1 IMDG

UN Number

Marking of UN Number:

Except for goods in class 1, UN Number shall be displayed on:

-Tank transports
-Bulk containers
-Packed goods of a single UN Number only exceeding 4000 kg

or

1133

Model Course 1.10 Slide 5.23　IMDG Code Part 5

貨物運輸單元的標記

5.3.2.1 IMDG

UN Number - Examples

Marking of UN Number:

or

Model Course 1.10 Slide 5.24　IMDG Code Part 5

貨物運輸單元的標記

5.3.2.1 IMDG

UN Number - Examples

Marking of UN Number:

Model Course 1.10 Slide 5.25　IMDG Code Part 5

貨物運輸單元的標記

5.3.2.2 IMDG

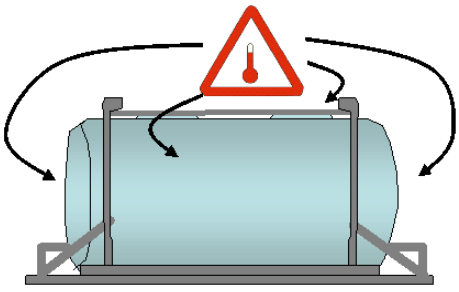
Elevated temperature substances

Marking of elevated temperature substances:

On each side and each end of a tank with substances transported in:

-Liquid state exceeding 100º and

-Solid state exceeding 240º



Model Course 1.10 Slide 5.26　IMDG Code Part 5

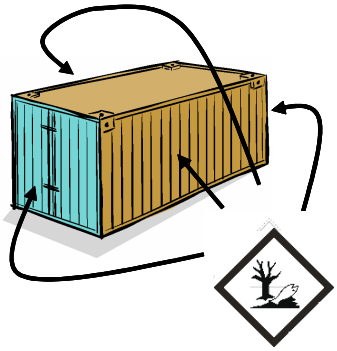
貨物運輸單元的標記

5.3.2.3 IMDG

Marine Pollutant mark

Marking of marine pollutants:

- In the same locations as placards



Note - CTUs containing packages with marine pollutants not required to be marked (inner packaging < 5 l) must be marked with the marine pollutant mark

貨物運輸單元的標記

5.3.2.3 IMDG

Marine pollutant mark - Examples

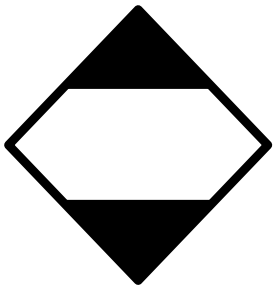
貨物運輸單元的標記

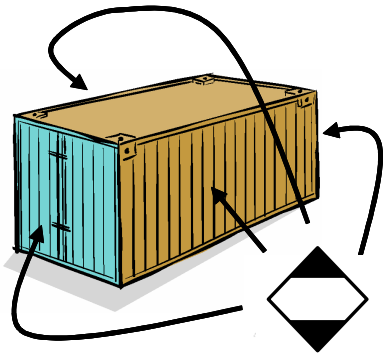
5.3.2.4 IMDG

Limited quantities

Marking of CTUs containing limited quantities only:

"Limited quantity mark" in the same positions as placards





Model Course 1.10 Slide 5.29　　IMDG Code Part 5　　IMO INTERNATIONAL MARITIME ORGANIZATION

貨物運輸單元的標記

5.3.2.3 IMDG

Limited quantity - Example

Model Course 1.10 Slide 5.30　　IMDG Code Part 5　　IMO INTERNATIONAL MARITIME ORGANIZATION

貨物運輸單元的標牌與標記

5.3 IMDG

Examples 不良案例

Examples of no good placarding and marking:

Model Course 1.10 Slide 5.31　　IMDG Code Part 5　　IMO INTERNATIONAL MARITIME ORGANIZATION

第八單元——危險貨物的申報

Chapter 5.4

Documentation

Note 1 The provisions of this Code do not preclude the use of electronic data processing (EDP) and electronic data interchange (EDI) transmission techniques as an alternative to paper documentation. All references to "dangerous goods transport document" in this chapter also include provision of the required information by use of EDP and EDI transmission techniques.

Note 2 When dangerous goods are offered for transport, similar documents to those required for other categories of goods have to be prepared. The form of these documents, the particulars to be entered on them and the obligations they entail may be fixed by international conventions applying to certain modes of transport and by national legislation.

Note 3 One of the primary requirements of a transport document for dangerous goods is to convey the fundamental information relative to the hazards of the goods. It is, therefore, necessary to include certain basic information on the document for a consignment of dangerous goods unless otherwise exempted or required in this Code.

Note 4 In addition to the provisions of this chapter, other elements of information may be required by the competent authority.

Note 5 In addition to the provisions of this chapter other additional information may be included. However, this information shall not:

.1 divert attention from the safety information required by this chapter or by the competent authority;

.2 contradict the safety information required by this chapter or by the competent authority; or

.3 duplicate information already provided.

5.4.1 Dangerous goods transport information

5.4.1.1 General

5.4.1.1.1 Except as otherwise provided, the consignor who offers dangerous goods for transport shall give to the carrier the information applicable to those dangerous goods, including any additional information and documentation as specified in this Code. This information may be provided on a dangerous goods transport document or, with the agreement of the carrier, by EDP or EDI techniques.

5.4.1.1.2 When the dangerous goods transport information is given to the carrier by EDP or EDI techniques, the consignor shall be able to produce the information without delay as a paper document, with the information in the sequence required by this chapter.

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5.4.1.2 Form of the transport document

5.4.1.2.1 A dangerous goods transport document may be in any form, provided it contains all of the information required by the provisions of this Code.

5.4.1.2.2 If both dangerous and non-dangerous goods are listed in one document, the dangerous goods shall be listed first, or otherwise be emphasized.

5.4.1.2.3 ***Continuation page***

A dangerous goods transport document may consist of more than one page, provided pages are consecutively numbered.

5.4.1.2.4 The information on a dangerous goods transport document shall be easy to identify, legible and durable.

5.4.1.2.5 *Example of a dangerous goods transport document*

The form shown in figure 5.4.5 is an example of a dangerous goods transport document.*

5.4.1.3 Consignor, consignee and date

The name and address of the consignor and the consignee of the dangerous goods shall be included on the dangerous goods transport document. The date the dangerous goods transport document or an electronic copy of it was prepared or given to the initial carrier shall be included.

5.4.1.4 Information required on the dangerous goods transport document

5.4.1.4.1 *Dangerous goods description*

The dangerous goods transport document shall contain the following information for each dangerous substance, material or article offered for transport:

.1 the UN number preceded by the letters "UN";

.2 the proper shipping name, as determined according to 3.1.2, including the technical name enclosed in parenthesis, as applicable (see 3.1.2.8);

.3 the primary hazard class or, when assigned, the division of the goods, including, for class 1, the compatibility group letter. The words "Class" or "Division" may be included preceding the primary hazard class or division numbers;

.4 subsidiary hazard class or division number(s) corresponding to the subsidiary risk label(s) required to be applied, when assigned, shall be entered following the primary hazard class or division and shall be enclosed in parenthesis. The words "Class" or "Division" may be included preceding the subsidiary hazard class or division numbers;

.5 where assigned, the packing group for the substance or article, which may be preceded by "PG" (e.g."PG II").

5.4.1.4.2 *Sequence of the dangerous goods description*

The five elements of the dangerous goods description specified in 5.4.1.4.1 shall be shown in the order listed above (i.e. .1, .2, .3, .4, and .5) with no information interspersed, except as provided in this Code. Unless permitted or required by this Code, additional information shall be placed after the dangerous goods description.

5.4.1.4.3 *Information which supplements the proper shipping name in the dangerous goods description*

The proper shipping name (see 3.1.2) in the dangerous goods description shall be supplemented as follows:

.1 *Technical names for "n.o.s." and other generic descriptions*: proper shipping names that are assigned special provision 274 or 318 in column 6 of the Dangerous Goods List shall be supplemented with their technical or chemical group names as described in 3.1.2.8.

.2 *Empty uncleaned packagings, bulk containers and tanks*: Empty means of containment (including packagings, IBCs, bulk containers, portable tanks, road tank vehicles and railway tank wagons) which contain the residue of dangerous goods of classes other than class 7 shall be described as such by, for example, placing the words "EMPTY UNCLEANED" or "RESIDUE LAST CONTAINED" before or after the dangerous goods description specified in 5.4.1.4.1.1 to .5.

.3 *Wastes*: For waste dangerous goods (other than radioactive wastes) which are being transported for disposal, or for processing for disposal, the proper shipping name shall be preceded by the word "WASTE", unless this is already a part of the proper shipping name.

.4 *Elevated temperature substances*: If the proper shipping name of a substance which is transported or offered for transport in a liquid state at a temperature equal to or exceeding 100°C, or in a solid state at a temperature equal to or exceeding 240°C, does not convey the elevated temperature condition (for example, by using the term "MOLTEN" or "ELEVATED TEMPERATURE" as part of the proper shipping name), the word "HOT" shall immediately precede the proper shipping name.

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* For standardized formats, see also the relevant recommendations of the UNECE United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT), in particular Recommendation No. 1 (United Nations Layout Key for Trade Documents) (ECE/TRADE/137, edition 81.3), UN Layout Key for Trade Documents – Guidelines for Applications (ECE/TRADE/270, edition 2002), Revised Recommendation No. 11 (Documentary Aspects of the International Transport of Dangerous Goods) (ECE/TRADE/C/CEFACT/2008/8) and Recommendation No. 22 (Layout Key for Standard Consignment Instructions) (ECE/TRADE/168, edition 1989). Refer also to the UN/CEFACT Summary of Trade Facilitation Recommendations (ECE/TRADE/346, edition 2006) and the United Nations Trade Data Elements Directory (UNTDED) (ECE/TRADE/362, edition 2005).

.5 *Marine pollutants:* Except as provided in 2.10.2.7, if the goods to be transported are marine pollutants, the goods shall be identified as "MARINE POLLUTANT", and for generic or "not otherwise specified" (N.O.S.) entries the proper shipping name shall be supplemented with the recognized chemical name of the marine pollutant (see 3.1.2.9). The term "MARINE POLLUTANT" may be supplemented with the term "ENVIRONMENTALLY HAZARDOUS".

.6 *Flashpoint:* If the dangerous goods to be transported have a flashpoint of 60°C or below (in °C closed-cup (c.c.)), the minimum flashpoint shall be indicated. Because of the presence of impurities, the flashpoint may be lower or higher than the reference temperature indicated in the Dangerous Goods List for the substance. For class 5.2 organic peroxides which are also flammable, the flashpoint need not be declared.

5.4.1.4.4 ***Examples of dangerous goods descriptions:***

UN 1098, ALLYL ALCOHOL 6.1 (3) I (21°C c.c.)

UN 1098, ALLYL ALCOHOL, class 6.1, (class 3), PG I, (21°C c.c.)

UN 1092, Acrolein, stabilized, class 6.1 (3), PG I, (–24°C c.c.), MARINE POLLUTANT/ENVIRONMENTALLY HAZARDOUS

UN 2761, Organochlorine pesticide, solid, toxic, (Aldrin 19%), class 6.1, PG III, MARINE POLLUTANT

5.4.1.5 **Information required in addition to the dangerous goods description**

In addition to the dangerous goods description, the following information shall be included after the dangerous goods description on the dangerous goods transport document.

5.4.1.5.1 ***Total quantity of dangerous goods***

Except for empty uncleaned packagings, the total quantity of dangerous goods covered by the description (by volume or mass as appropriate) of each item of dangerous goods bearing a different proper shipping name, UN number or packing group shall be included. For class 1 dangerous goods, the quantity shall be the net explosive mass. For dangerous goods transported in salvage packagings, an estimate of the quantity of dangerous goods shall be given. The number and kind (e.g. drum, box, etc.) of packages shall also be indicated. UN packaging codes may only be used to supplement the description of the kind of package (e.g. one box (4G)). Abbreviations may be used to specify the unit of measurement for the total quantity.

Note: The number, type and capacity of each inner packaging within the outer packaging of a combination packaging is not required to be indicated.

5.4.1.5.2 ***Limited quantities***

5.4.1.5.2.1 When dangerous goods are transported according to the exceptions for dangerous goods packed in limited quantities provided for in column 7a of the Dangerous Goods List and chapter 3.4, the words "limited quantity" or "LTD QTY" shall be included.

5.4.1.5.2.2 Where a shipment is offered in accordance with 3.4.4.1.2, the following statement shall be included in the transport document: "Transport in accordance with 3.4.4.1.2 of the IMDG Code".

5.4.1.5.3 ***Salvage packagings and salvage pressure receptacles***

For dangerous goods transported in salvage packagings or salvage pressure receptacles, the words "SALVAGE PACKAGING" or "SALVAGE PRESSURE RECEPTACLE" shall be included.

5.4.1.5.4 ***Substances stabilized by temperature control***

If the word "STABILIZED" is part of the proper shipping name (see also 3.1.2.6), when stabilization is by means of temperature control, the control and emergency temperatures (see 7.3.7.2) shall be indicated in the transport document, as follows:

"Control temperature: ... °C Emergency temperature: ... °C".

△ 5.4.1.5.5 ***Self-reactive substances, polymerizing substances and organic peroxides***

For self-reactive substances and polymerizing substances of class 4.1 and for organic peroxides which require temperature control during transport, the control and emergency temperatures (see 7.3.7.2) shall be indicated on the dangerous goods transport document, as follows:

"Control temperature: ... °C Emergency temperature: ... °C".

5.4.1.5.5.1 When, for certain self-reactive substances and polymerizing substances of class 4.1 and organic peroxides of class 5.2, the competent authority has permitted the "EXPLOSIVE" subsidiary risk label (model No. 1) to be dispensed with for the specific package, a statement to this effect shall be included.

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5.4.1.5.5.2 When organic peroxides and self-reactive substances are transported under conditions where approval is required (for organic peroxides, see 2.5.3.2.5, 4.1.7.2.2, 4.2.1.13.1 and 4.2.1.13.3; for self-reactive substances, see 2.4.2.3.2.4 and 4.1.7.2.2), a statement to this effect shall be included in the dangerous goods transport document. A copy of the classification approval and conditions of transport for non-listed organic peroxides and self-reactive substances shall be attached to the dangerous goods transport document.

5.4.1.5.5.3 When a sample of an organic peroxide (see 2.5.3.2.5.1) or a self-reactive substance (see 2.4.2.3.2.4.2) is transported, a statement to this effect shall be included in the dangerous goods transport document.

5.4.1.5.6 *Infectious substances*

The full address of the consignee shall be shown on the document, together with the name of a responsible person and his telephone number.

5.4.1.5.7 *Radioactive material*

5.4.1.5.7.1 The following information shall be included for each consignment of class 7 material, as applicable, in the order given:

.1 the name or symbol of each radionuclide or, for mixtures of radionuclides, an appropriate general description or a list of the most restrictive nuclides;

.2 a description of the physical and chemical form of the material, or a notation that the material is special form radioactive material or low dispersible radioactive material. A generic chemical description is acceptable for chemical form;

.3 the maximum activity of the radioactive contents during transport expressed in units of becquerels (Bq) with an appropriate SI prefix symbol (see 1.2.2.1). For fissile material, the mass of fissile material (or mass of each fissile nuclide for mixtures when appropriate) in units of grams (g), or appropriate multiples thereof, may be used in place of activity;

.4 the category of the package, i.e. I – WHITE, II – YELLOW, III – YELLOW;

.5 the transport index (categories II – YELLOW and III – YELLOW only);

.6 for fissile material:

.1 shipped under one exception of 2.7.2.3.5.1 to 2.7.2.3.5.6, reference to that paragraph;

.2 shipped under 2.7.2.3.5.1 to 2.7.2.3.5.5, the total mass of fissile nuclides;

.3 contained in a package for which one of 6.4.11.2 (a) to (c) or 6.4.11.3 is applied, reference to that paragraph;

.4 the criticality safety index, where applicable.

.7 the identification mark for each competent authority certificate of approval (special form radioactive material, low dispersible radioactive material, fissile material excepted under 2.7.2.3.5.6, special arrangement, package design, or shipment) applicable to the consignment;

.8 for consignments of more than one package, the information contained in 5.4.1.4.1.1 to .3 and 5.4.1.5.7.1.1 to .7 shall be given for each package. For packages in an overpack, freight container, or conveyance, a detailed statement of the contents of each package within the overpack, freight container, or conveyance and, where appropriate, of each overpack, freight container, or conveyance shall be included. If packages are to be removed from the overpack, freight container, or conveyance at a point of intermediate unloading, appropriate transport documents shall be made available;

.9 where a consignment is required to be shipped under exclusive use, the statement "EXCLUSIVE USE SHIPMENT"; and

.10 for LSA-II, LSA-III, SCO-I and SCO-II, the total activity of the consignment as a multiple of A_2. For radioactive material for which the A_2 value is unlimited, the multiple of A_2 shall be zero.

5.4.1.5.7.2 The transport document shall include a statement regarding actions, if any, that are required to be taken by the carrier. The statement shall be in the languages deemed necessary by the carrier or the authorities concerned, and shall include at least the following points:

.1 supplementary requirements for loading, stowage, transport, handling and unloading of the package, overpack or freight container, including any special stowage provisions for the safe dissipation of heat (see 7.1.4.5.2), or a statement that no such requirements are necessary;

.2 restrictions on the mode of transport or conveyance and any necessary routeing instructions;

.3 emergency arrangements appropriate to the consignment.

5.4.1.5.7.3 In all cases of international transport of packages requiring competent authority approval of design or shipment, for which different approval types apply in the different countries concerned by the shipment, the UN number and proper shipping name required in 5.4.1.4.1 shall be in accordance with the certificate of the country of origin of design.

5.4.1.5.7.4 The applicable competent authority certificates need not necessarily accompany the consignment. The consignor shall make them available to the carrier(s) before loading and unloading.

5.4.1.5.8 *Aerosols*

If the capacity of an aerosol is above 1000 mL, this shall be declared in the transport document.

5.4.1.5.9 *Explosives*

The following information shall be included for each consignment of class 1 goods, as applicable:

.1 Entries have been included for "SUBSTANCES, EXPLOSIVE, N.O.S.", "ARTICLES, EXPLOSIVE, N.O.S.", and "COMPONENTS, EXPLOSIVE TRAIN, N.O.S.". When a specific entry does not exist, the competent authority of the country of origin shall use the entry appropriate to the hazard division and compatibility group. The transport document shall contain the statement: "Transport under this entry approved by the competent authority of ..." followed by the State's distinguishing sign for motor vehicles in international traffic of the country of the competent authority.

.2 The transport of explosive substances for which a minimum water or phlegmatizer content is specified in the individual entry is prohibited when containing less water or phlegmatizer than the specified minimum. Such substances shall only be transported with special authorization granted by the competent authority of the country of origin. The transport document shall contain the statement "Transport under this entry approved by the competent authority of ..." followed by the State's distinguishing sign for motor vehicles in international traffic of the country of the competent authority.

.3 When explosive substances or articles are packaged "as approved by the competent authority", the transport document shall contain the statement "Packaging approved by the competent authority of ..." followed by the State's distinguishing sign for motor vehicles in international traffic of the country of the competent authority.

.4 There are some hazards which are not indicated by the hazard division and compatibility group of a substance. The shipper shall provide an indication of any such hazards on the dangerous goods documentation.

5.4.1.5.10 *Viscous substances*

When viscous substances are transported in accordance with 2.3.2.5, the following statement shall be included in the transport document: "Transport in accordance with 2.3.2.5 of the IMDG Code.".

5.4.1.5.11 *Special provisions for segregation*

5.4.1.5.11.1 For substances, mixtures, solutions or preparations classified under N.O.S. entries not included in the segregation groups listed in 3.1.4.4 but belonging, in the opinion of the consignor, to one of these groups (see 3.1.4.2), the appropriate segregation group name preceded by the phrase "IMDG Code segregation group" shall be included in the transport document after the dangerous goods description. For example:

"UN 1760 CORROSIVE LIQUID, N.O.S. (Phosphoric acid, acetic acid) 8 III IMDG Code segregation group 1 – Acids".

5.4.1.5.11.2 When substances are loaded together in a cargo transport unit in accordance with 7.2.6.3, the following statement shall be included in the transport document: "Transport in accordance with 7.2.6.3 of the IMDG Code".

5.4.1.5.11.3 When acid and alkali substances of class 8 are transported in the same cargo transport unit, whether in the same packaging or not, in accordance with 7.2.6.4, the following statement shall be included in the transport document: "Transport in accordance with 7.2.6.4 of the IMDG Code".

5.4.1.5.12 *Transport of solid dangerous goods in bulk containers*

For bulk containers other than freight containers, the following statement shall be included on the transport document (see 6.9.4.6):

"Bulk container BK(*x*) approved by the competent authority of ..."

Note: "(*x*)" shall be replaced with "1" or "2", as appropriate.

5.4.1.5.13 *Transport of IBCs or portable tanks after the date of expiry of the last periodic test or inspection*

For transport in accordance with 4.1.2.2.2.2, 6.7.2.19.6.2, 6.7.3.15.6.2 or 6.7.4.14.6.2, a statement to this effect shall be included in the transport document, as follows: "Transport in accordance with 4.1.2.2.2.2", "Transport in accordance with 6.7.2.19.6.2", "Transport in accordance with 6.7.3.15.6.2" or "Transport in accordance with 6.7.4.14.6.2" as appropriate.

5.4.1.5.14 ***Dangerous goods in excepted quantities***

5.4.1.5.14.1 When dangerous goods are transported according to the exceptions for dangerous goods packed in excepted quantities provided for in column 7b of the Dangerous Goods List and chapter 3.5, the words "dangerous goods in excepted quantities" shall be included.

5.4.1.5.15 ***Firework classification reference***

When fireworks of UN Nos. 0333, 0334, 0335, 0336 and 0337 are transported, the dangerous goods transport document shall include a classification reference(s) issued by the competent authority.

The classification reference(s) shall consist of the competent authority's state, indicated by the distinguishing sign for motor vehicles in international traffic, the competent authority identification and a unique serial reference. Examples of such classification references are:

- GB/HSE123456
- D/BAM1234
- USA EX20091234.

■ 5.4.1.5.16 ***Classification where new data is available (see 2.0.0.2)***

For transport in accordance with 2.0.0.2, a statement to this effect shall be included in the transport document, as follows "Classified in accordance with 2.0.0.2".

■ 5.4.1.5.17 ***Transport of UN Nos. 3528, 3529 and 3530***

For transport of UN Nos. 3528, 3529 and 3530, the transport document shall contain the following additional statement "Transport in accordance with special provision 363".

5.4.1.6 Certification

5.4.1.6.1 The dangerous goods transport document shall include a certification or declaration that the consignment is acceptable for transport and that the goods are properly packaged, marked and labelled, and in proper condition for transport in accordance with the applicable regulations. The text for this certification is:

> "I hereby declare that the contents of this consignment are fully and accurately described above/below* by the proper shipping name, and are classified, packaged, marked and labelled/placarded, and are in all respects in proper condition for transport according to applicable international and national government regulations."

The certification shall be signed and dated by the consignor. Facsimile signatures are acceptable where applicable laws and regulations recognize the legal validity of facsimile signatures.

5.4.1.6.2 If the dangerous goods documentation is presented to the carrier by means of EDP or EDI transmission techniques, the signature(s) may be electronic signature(s) or may be replaced by the name(s) (in capitals) of the person authorized to sign.

5.4.1.6.3 When the dangerous goods transport information is given to a carrier by EDP or EDI techniques and subsequently the dangerous goods are transferred to a carrier that requires a paper dangerous goods transport document, the carrier shall ensure that the paper document indicates "Original received electronically" and the name of the signatory shall be shown in capital letters.

5.4.2 Container/vehicle packing certificate

5.4.2.1 When dangerous goods are packed or loaded into any container† or vehicle, those responsible for packing the container or vehicle shall provide a "container/vehicle packing certificate" specifying the container/vehicle identification number(s) and certifying that the operation has been carried out in accordance with the following conditions:

.1 The container/vehicle was clean, dry and apparently fit to receive the goods;

.2 Packages which need to be segregated in accordance with applicable segregation requirements have not been packed together onto or in the container/vehicle (unless approved by the competent authority concerned in accordance with 7.3.4.1);

.3 All packages have been externally inspected for damage, and only sound packages have been loaded;

* As appropriate.

† See definition of "freight container" in 1.2.1.

.4 Drums have been stowed in an upright position, unless otherwise authorized by the competent authority, and all goods have been properly loaded and, where necessary, adequately braced with securing material to suit the mode(s)* of transport for the intended journey;

.5 Goods loaded in bulk have been evenly distributed within the container/vehicle;

.6 For consignments including goods of class 1 other than division 1.4, the container/vehicle is structurally serviceable in accordance with 7.1.2;

.7 The container/vehicle and packages are properly marked, labelled and placarded, as appropriate;

.8 When substances presenting a risk of asphyxiation are used for cooling or conditioning purposes (such as dry ice (UN 1845) or nitrogen, refrigerated liquid (UN 1977) or argon, refrigerated liquid (UN 1951)), the container/vehicle is externally marked in accordance with 5.5.3.6; and

.9 A dangerous goods transport document, as indicated in 5.4.1, has been received for each dangerous goods consignment loaded in the container/vehicle.

Note: The container/vehicle packing certificate is not required for portable tanks.

5.4.2.2 The information required in the dangerous goods transport document and the container/vehicle packing certificate may be incorporated into a single document; if not, these documents shall be attached one to the other. If the information is incorporated into a single document, the document shall include a signed declaration such as "It is declared that the packing of the goods into the container/vehicle has been carried out in accordance with the applicable provisions". This declaration shall be dated and the person signing this declaration shall be identified on the document. Facsimile signatures are acceptable where applicable laws and regulations recognize the legal validity of facsimile signatures.

5.4.2.3 If the container/vehicle packing certificate is presented to the carrier by means of EDP or EDI transmission techniques, the signature(s) may be electronic signature(s) or may be replaced by the name(s) (in capitals) of the person authorized to sign.

5.4.2.4 When the container/vehicle packing certificate is given to a carrier by EDP or EDI techniques and subsequently the dangerous goods are transferred to a carrier that requires a paper container/vehicle packing certificate, the carrier shall ensure that the paper document indicates "Original received electronically" and the name of the signatory shall be shown in capital letters.

5.4.3 Documentation required aboard the ship

5.4.3.1 Each ship carrying dangerous goods and marine pollutants shall have a special list, manifest† or stowage plan setting out, in accordance with regulation VII/ 4.2 of SOLAS, as amended, and with regulation 4.2 of Annex III of MARPOL, the dangerous goods and marine pollutants and the location thereof. This special list or manifest shall be based on the documentation and certification required in this Code. It shall contain in addition to the information in 5.4.1.4, 5.4.1.5 and, for UN 3359, in 5.5.2.4.1.1, the stowage location and the total quantity of dangerous goods and marine pollutants. A detailed stowage plan, which identifies by class and sets out the location of all dangerous goods and marine pollutants, may be used in place of such special list or manifest. A copy of one of these documents shall be made available before departure to the person or organization designated by the port State authority.

5.4.3.2 **Emergency response information**

5.4.3.2.1 For consignments of dangerous goods, appropriate information shall be immediately available at all times for use in emergency response to accidents and incidents involving dangerous goods in transport. The information shall be available away from packages containing the dangerous goods and immediately accessible in the event of an incident. Methods of compliance include:

.1 appropriate entries in the special list, manifest or dangerous goods declaration; or

.2 provision of a separate document such as a safety data sheet; or

.3 provision of separate documentation, such as the *Emergency Response Procedures for Ships Carrying Dangerous Goods (EmS Guide)* for use in conjunction with the transport document and the *Medical First Aid Guide for Use in Accidents Involving Dangerous Goods* (MFAG).

5.4.4 Other required information and documentation

5.4.4.1 In certain circumstances, special certificates or other documents are required such as:

△ * See CTU Code.

† Refer to Amendments to the annex to the Convention on facilitation of international maritime traffic, 1965 (resolution FAL.10(35), adopted on 16 January 2009).

.1 a weathering certificate; as required in the individual entries of the Dangerous Goods List;

.2 a certificate exempting a substance, material or article from the provisions of the IMDG Code (such as, see individual entries for charcoal, fishmeal, seedcake);

.3 for new self-reactive substances and organic peroxides or new formulation of currently assigned self-reactive substances and organic peroxides, a statement by the competent authority of the country of origin of the approved classification and conditions of transport.

5.4.5 Multimodal Dangerous Goods Form

5.4.5.1 This form meets the requirements of SOLAS, chapter VII, regulation 4, MARPOL, Annex III, regulation 4 and the provisions of this chapter. The information required by the provisions of this chapter is mandatory; however, the layout of this form is not mandatory.

MULTIMODAL DANGEROUS GOODS FORM

This form may be used as a dangerous goods declaration as it meets the requirements of SOLAS, chapter VII, regulation 4; MARPOL, Annex III, regulation 4.

1 Shipper/Consignor/Sender		2 Transport document number		
		3 Page 1 of pages	4 Shipper's reference	
			5 Freight forwarder's reference	
6 Consignee		7 Carrier (to be completed by the carrier)		
		SHIPPER'S DECLARATION I hereby declare that the contents of this consignment are fully and accurately described below by the proper shipping name, and are classified, packaged, marked and labelled/placarded and are in all respects in proper condition for transport according to the applicable international and national governmental regulations.		
8 This shipment is within the limitations prescribed for: (Delete non-applicable) PASSENGER AND CARGO AIRCRAFT / CARGO AIRCRAFT ONLY		9 Additional handling information		
10 Vessel/flight No. and date	11 Port/place of loading			
12 Port/place of discharge	13 Destination			
14 Shipping marks	Number and kind of packages; description of goods*	Gross mass (kg)	Net mass (kg)	Cube (m^3)
15 Container identification No./ vehicle registration No.	16 Seal number(s)	17 Container/vehicle size and type	18 Tare mass (kg)	19 Total gross mass (including tare) (kg)
CONTAINER/VEHICLE PACKING CERTIFICATE I hereby declare that the goods described above have been packed/ loaded into the container/vehicle identified above in accordance with the applicable provisions.† **MUST BE COMPLETED AND SIGNED FOR ALL CONTAINER/ VEHICLE LOADS BY PERSON RESPONSIBLE FOR PACKING/ LOADING**		21 RECEIVING ORGANISATION RECEIPT Received the above number of packages/containers/trailers in apparent good order and condition, unless stated hereon: RECEIVING ORGANISATION REMARKS:		
20 Name of company		Haulier's name Vehicle registration No.	22 Name of company (OF SHIPPER PREPARING THIS NOTE)	
Name/status of declarant		Signature and date	Name/status of declarant	
Place and date			Place and date	
Signature of declarant		DRIVER'S SIGNATURE	Signature of declarant	

* **DANGEROUS GOODS:**
You must specify: UN No., proper shipping name, hazard class, packing group (where assigned), marine pollutant and observe the mandatory requirements under applicable national and international governmental regulations. For the purposes of the IMDG Code, see 5.4.1.4.

† For the purposes of the IMDG Code, see 5.4.2.

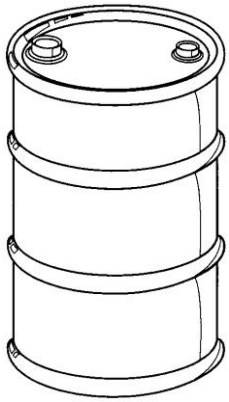
5.4.6 Retention of dangerous goods transport information

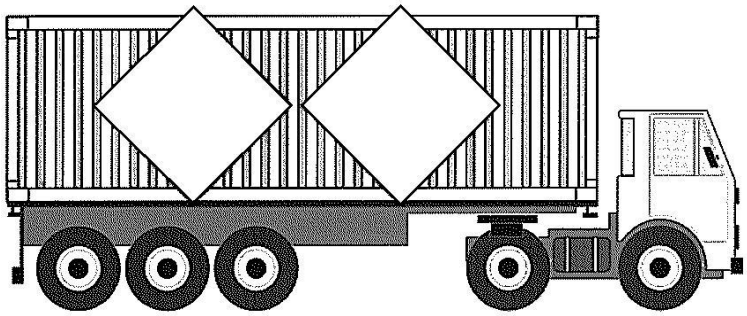
5.4.6.1 The consignor and the carrier shall retain a copy of the dangerous goods transport document and additional information and documentation as specified in this Code, for a minimum period of three months.

5.4.6.2 When the documents are kept electronically or in a computer system, the consignor and the carrier shall be able to reproduce them in a printed form.

第七、八單元練習實作—危險貨物的標記、標示、標牌及申報

1. 今有 16,000 公升產品 UN1296 要以海運運送。廠商出貨時，先將產品分裝在 80 個聯合國規格鋼製圓桶內，然後裝置在一個 20 呎貨櫃內交運。請將包裝物及貨物運輸單元依照國際海運危險品章程規定，加做標記、標示及標牌。





2.
3. 以下頁表格，填寫上述貨件之申報單。

Multimodal Dangerous Goods Form

This form may be used as a dangerous goods declaration as it meets the requirements of SOLAS, chapter VII, regulation 4; MARPOL, Annex III, regulation 4.

1 Shipper/Consignor/Sender		2 Transport document number	
		3 Page 1 of pages	4 Shipper's reference
			5 Freight forwarder's reference
6 Consignee		7 Carrier (to be completed by the carrier)	
		SHIPPER'S DECLARATION I hereby declare that the contents of this consignment are fully and accurately described below by the Proper Shipping Name, and are classified, packaged, marked and labelled/ placarded and are in all respects in proper condition for transport according to the applicable international and national government regulations.	
8 This shipment is within the limitations prescribed for: (Delete non-applicable) PASSENGER AND CARGO AIRCRAFT / CARGO AIRCRAFT ONLY		9 Additional handling information	
10 Vessel/flight No. and date	11 Port/place of loading		
12 Port/place of discharge	13 Destination		

14 Shipping marks (m3)	*Number and kind of packages; description of goods*	Gross mass(kg)	Net mass(kg)	Cube

15 Container identification No./vehicle registration No.	16 Seal number(s)	17 Container/vehicle size & type	18 Tare mass (kg)	19 Total gross mass (including tare)(kg)

CONTAINER/VEHICLE PACKING CERTIFICATE† hereby declare that the goods described above have been packed/ loaded into the container/vehicle identified above in accordance with the applicable provisions. † MUST BE COMPLETED AND SIGNED FOR ALL CONTAINER/ VEHICLE LOADS BY PERSON RESPONSIBLE FOR PACKING/ LOADING	21 RECEIVING ORGANIZATION RECEIPT Received the above number of packages/containers/trailers in apparent good order and condition, unless stated hereon: RECEIVING ORGANIZATION REMARKS:	
20 Name of company	Haulier's name Vehicle reg. no.	22 Name of company (OF SHIPPER PREPARING THIS NOTE)
Name/status of declarant	Signature and date	Name/status of declarant
Place and date		Place and date
Signature of declarant	DRIVER'S SIGNATURE	Signature of declarant

*__DANGEROUS GOODS:__

You must specify: UN No., Proper Shipping Name, hazard class, packing group, (where assigned) marine pollutant and observe the mandatory requirements under applicable national and international government regulations. For the purposes of the IMDG Code see 5.4.1.4

†For the purpose of the IMDG Code, see 5.4.2

IMDG Code

2017 國際海運危險品章程課程

第九單元

國際海運危險貨物積載與隔離

講師：施智璋

第一節 積載

Stowage

一般積載規定
General Stowage Requirements

Stowage ***under deck*** is recommended wherever possible because of the advantages it offers in terms of **protection**, whilst ***on deck*** stowage is prescribed in cases where **constant supervision** and/or **ready accessibility** is required or there is a significant risk of the formation of explosive gas mixture, the development of highly toxic vapor or unobserved corrosion of the ship.

7.1.3

一般積載規定

Two groupings for stowage recommendations:

Cargo ship

- ***Class 1 (except 1.4 S packed in limited quantity)*: up to 12 passengers**
- ***Classes 2-9 (including 1.4 S packed in limited quantity)*: not more than 25 passengers, or 1 passenger per 3 meters of overall length**

Passenger ship

Number of passengers above is exceeded

7.1.3.1

積載規定

積載類型：第1類危險貨物(1.4S 之有限數量除外)

Category	Ship	On deck	Under deck
01	Cargo	○ (in closed CTU)	○
	Passenger	○ (in closed CTU)	○
02	Cargo	○ (in closed CTU)	○
	Passenger	○ (in closed CTU)	○(in closed CTU)
03	Cargo	○ (in closed CTU)	○
	Passenger	Prohibited (except complying 7.1.4.4.5)	
04	Cargo	○ (in closed CTU)	○ (in closed CTU)
	Passenger	Prohibited (except complying 7.1.4.4.5)	
05	Cargo	○ (in closed CTU)	×
	Passenger	Prohibited (except complying 7.1.4.4.5)	

7.1.3.2

積載規定

積載類型：第2-9類危險貨物及1.4S 之有限數量

Category	Ship	On deck	Under deck
A	Cargo	○	○
	Passenger	○	○
B	Cargo	○	○
	Passenger	○	×
C	Cargo	○	×
	Passenger	○	×
D	Cargo	○	×
	Passenger	Prohibited	Prohibited
E	Cargo	○	○
	Passenger	Prohibited	Prohibited

第二節 隔離
Segregation

7.2

隔離規定

Chapter 7.2 – Segregation

- 7.2.1 Introduction
- 7.2.2 Definitions
- 7.2.3 Segregation provisions
- 7.2.4 Segregation table
- 7.2.5 Segregation groups
- 7.2.6 Special segregation provisions and exemptions
- 7.2.7 Segregation of goods of class 1

7.2.2.2

隔離規定

定義

Segregation terms

.1 “Away from”

.2 “Separated from”

.3 “Separated by complete compartment or hold from”

.4 “Separated longitudinally by an intervening complete compartment or hold from”

7.2.3

隔離規定

一般及特殊規定

- **General provisions**
  Segregation table 7.2.4

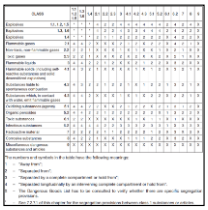
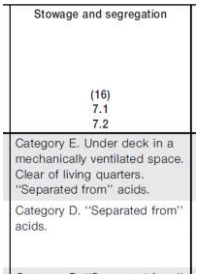


Table 7.2.4

- **Particular provisions**
  Column 16b in DGL (e.g. ”Away from acid”)
  Segregation groups in section 3.1.4, volume 2

Also subsidiary risks shall be taken into consideration and the most stringent combination shall be chosen *(7.2.3.4)*



DGL column16b

7.2.4

隔離規定

一般危險貨物隔離表

CLASS		1.1 1.2 1.5	1.3 1.6	1.4	2.1	2.2	2.3	3	4.1	4.2	4.3	5.1	5.2	6.1	6.2	7	8	9
Explosives	1.1, 1.2, 1.5	*	*	*	4	2	2	4	4	4	4	4	4	2	4	2	4	X
Explosives	1.3, 1.6	*	*	*	4	2	2	4	3	3	4	4	4	2	4	2	2	X
Explosives	1.4	*	*	*	2	1	1	2	2	2	2	2	2	X	4	2	2	X
Flammable gases	2.1	4	4	2	X	X	X	2	1	2	X	2	2	X	4	2	1	X
Non-toxic, non-flammable gases	2.2	2	2	1	X	X	X	1	X	1	X	X	1	X	2	1	X	X
Toxic gases	2.3	2	2	1	X	X	X	2	X	2	X	X	2	X	2	1	X	X
Flammable liquids	3	4	4	2	2	1	2	X	X	2	1	2	2	X	3	2	X	X
Flammable solids (including self-reactive substances and solid desensitized explosives)	4.1	4	3	2	1	X	X	X	X	1	X	1	2	X	3	2	1	X
Substances liable to spontaneous combustion	4.2	4	3	2	2	1	2	2	1	X	1	2	2	1	3	2	1	X
Substances which, in contact with water, emit flammable gases	4.3	4	4	2	X	X	X	1	X	1	X	2	2	X	2	2	1	X
Oxidizing substances (agents)	5.1	4	4	2	2	X	X	2	1	2	2	X	2	1	3	1	2	X
Organic peroxides	5.2	4	4	2	2	1	2	2	2	2	2	2	X	1	3	2	2	X
Toxic substances	6.1	2	2	X	X	X	X	X	1	X	1	1	1	X	1	X	X	X
Infectious substances	6.2	4	4	4	4	2	2	3	3	3	2	3	3	1	X	3	3	X
Radioactive material	7	2	2	2	2	1	1	2	2	2	2	1	2	X	3	X	2	X
Corrosive substances	8	4	2	2	1	X	X	X	1	1	1	2	2	X	3	2	X	X
Miscellaneous dangerous substances and articles	9	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

The numbers and symbols in the table have the following meanings:

1 – "Away from";
2 – "Separated from";
3 – "Separated by a complete compartment or hold from";
4 – "Separated longitudinally by an intervening complete compartment or hold from".
X – The Dangerous Goods List has to be consulted to verify whether there are specific segregation provisions.
* – See 7.2.7.1 of this chapter for the segregation provisions between class 1 substances or articles.

7.2.5

隔離規定

隔離群組

Dangerous goods having certain similar chemical properties is grouped together, see section 3.1.4.4.

1. *Acids*
2. *Ammonium compounds*
3. *Bromates*
4. *Chlorates*
5. *Chlorites*
6. *Cyanides*
7. *Heavy metals and their salts*
8. *Hypochlorites*
9. *Lead and its compounds*
10. *Liquid halogenated hydrocarbons*
11. *Mercury and mercury compounds*
12. *Nitrites and their mixtures*
13. *Perchlorates*
14. *Permanganates*
15. *Powered metals*
16. *Peroxides*
17. *Azides*
18. *Alkalis*

7.2

隔離規定

隔離練習

Question

Could UN 1824 *(Sodium hydroxide solution)* be stowed in the same container as UN 3264 *(Corrosive Liquid, Acidic, Inorganic N.O.S)* ?

3.1.4.4

隔離規定

隔離群組1—酸類

3.1.4.4 The following segregation groups are identified.

1. Acids

1052 Hydrogen fluoride, anhydrous
1182 Ethyl chloroformate
…
3264 Corrosive liquid, acidic, inorganic, n.o.s.
...
3472 Crotonic acid, solid
3498 Iodine monochloride, liquid

7.2

隔離規定

隔離練習

Question

Could UN 1824 *(Sodium hydroxide solution)* be stowed in the same container as UN 3264 *(Corrosive Liquid, Acidic, Inorganic N.O.S)* ?

Answer

No - UN 1824 has Segregation Code SG35 in column 16b of the Dangerous Good List which stands for "Separated from acids" and UN 3264 is classified into segregation group as "acid" in section 3.1.4.4.

7.2.6

隔離規定

特殊隔離規定及豁免

- **Dangerous goods of the same class** ***(7.2.6.1)***
- **"Segregation as for class…" in DGL column 16b** ***(7.2.6.2)***
- **Exemptions** ***(7.2.6.3 and 7.2.6.4)***

Table 1

UN	Proper Shipping Name	Class	Subsidiary risk(s)	Packing group
2014	HYDROGEN PEROXIDE, AQUEOUS SOLUTION with not less than 20% but not more than 60% hydrogen peroxide (stabilized as necessary)	5.1	8	II
2984	HYDROGEN PEROXIDE, AQUEOUS SOLUTION with not less than 8% but less than 20% hydrogen peroxide (stabilized as necessary)	5.1		III
3105	ORGANIC PEROXIDE TYPE D, LIQUID (peroxyacetic acid, type D, stabilized)	5.2	8	
3107	ORGANIC PEROXIDE TYPE E, LIQUID (peroxyacetic acid, type E, stabilized)	5.2	8	
3109	ORGANIC PEROXIDE TYPE F, LIQUID (peroxyacetic acid, type F, stabilized)	5.2	8	
3149	HYDROGEN PEROXIDE AND PEROXYACETIC ACID, MIXTURE with acid(s), water and not more than 5% peroxyacetic acid, STABILIZED	5.1	8	II

Table 2

UN	Proper Shipping Name	Class	Subsidiary risk(s)	Packing group
1295	TRICHLOROSILANE	4.3	3/8	I
1818	SILICON TETRACHLORIDE	8	–	II
2189	DICHLOROSILANE	2.3	2.1/8	–

7.2.7

隔離規定

第1類危險貨物隔離規定

- **Segregation between goods of class 1** *(7.2.7.1)*

Compatibility group	A	B	C	D	E	F	G	H	J	K	L	N	S
A	X												
B		X											X
C			X	X^6	X^6		X^1					X^4	X
D			X^6	X	X^6		X^1					X^4	X
E			X^6	X^6	X		X^1					X^4	X
F						X							X
G			X^1	X^1	X^1		X						X
H								X					X
J									X				X
K										X			X
L											X^2		
N			X^4	X^4	X^4							X^3	X^5
S		X	X	X	X	X	X	X	X	X		X^5	X

- **Segregation from goods of other classes** *(7.2.7.2)*

SPECIALTY INC. 知性國際事業有限公司

第十四單元 海運作業規定　17

Provisions Concerning Transport Operations

Consigning operations

IMDG chapter 7.3

18

7.3

Consigning Operations

Chapter 7.3 – Consigning Operations

- 7.3.1 Introduction
- 7.3.2 General Provisions for CTUs
- 7.3.3 Packing of CTUs
- 7.3.4 Segregations provisions within CTUs
- 7.3.5 Tracking and monitoring equipment
- 7.3.6 Opening and unloading CTUs
- 7.3.7 CTUs under temperature control
- 7.3.8 Loading of CTUs on board ships

DG SPECIALTY INC. 知性國際事業有限公司

第十四單元 海運作業規定 19

7.3.3

Consigning Operations

Packing of CTUs

- **Inspect the interior and exterior of CTU prior loading**
- **No damaged, leaking or sifting packages shall be packed into a CTU**
- **Drums shall be stowed in an upright position**
- **Packages and articles shall be secured by suitable means**

Detailed provisions and instruction are found in IMO/ILO/UNECE Guidelines for Packing of CTUs *(see Supplement)*

SPECIALTY INC. 知性國際事業有限公司

第十四單元 海運作業規定 20

7.3.4

Consigning Operations

Segregation provisions within CTUs

- **Segregation provisions within CTUs *(7.3.4.1)***
- **Segregation in relation to foodstuffs *(7.3.4.2)***

Foodstuff shall not be transport in the same CTU with:

- **Classes 2.3, 6.1, 6.2 and 7**
- **Goods with reference in column 16 of the DGL**

Foodstuff not loaded within 3 m from:

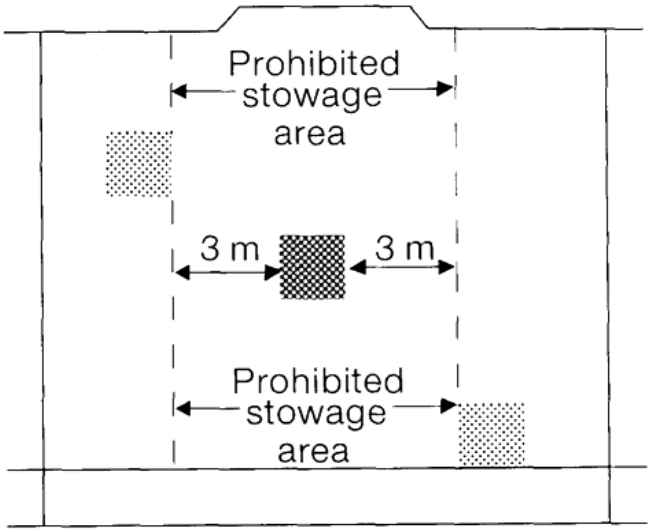
- **PG III of classes 6.1 and 8;**
- **PG II of class 8; and**
- **PG III with a subsidiary risk of classes 6.1 or 8; and**
- **Goods having a reference to 7.3.4.2.2 in column 16 of the DGL**

7.6.3.2

General Cargo Ships

Definition of segregation terms - packages

***.1 – Away from* 遠離**

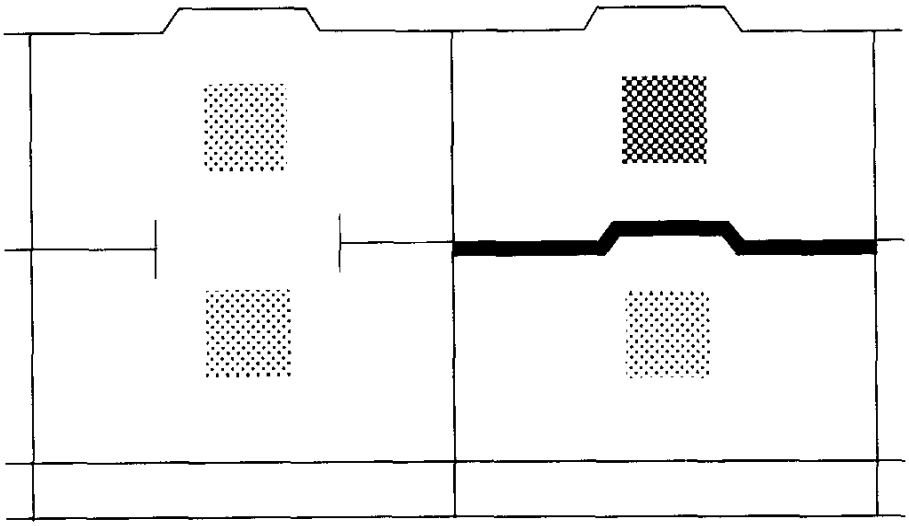


7.6.3.2

General Cargo Ships

Definition of segregation terms - packages

.2 – Separated from 隔開

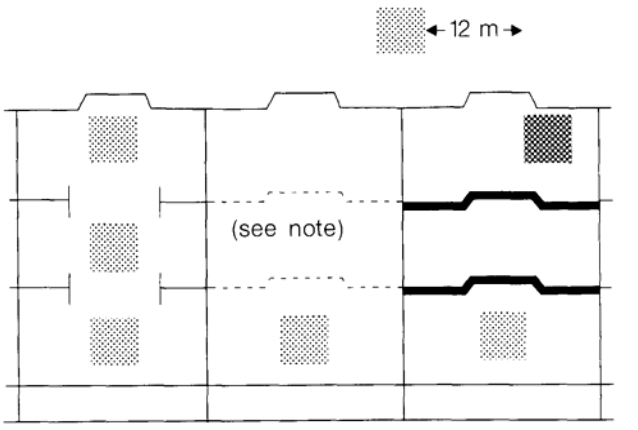


7.6.3.2

General Cargo Ships

Definition of segregation terms - packages

.3 – Separated by a complete compartment or hold from 全艙隔開



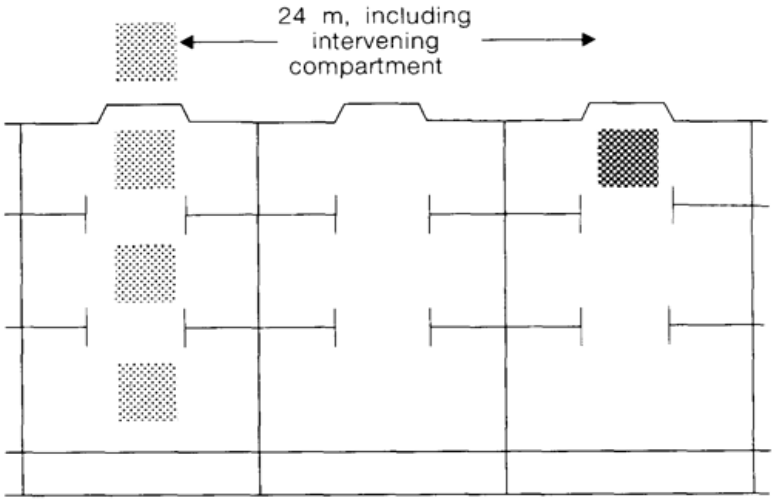
Note: One of the two decks must be resistant to fire and to liquid.

7.6.3.2

General Cargo Ships

Definition of segregation terms - packages

.4 – Separated longitudinally by an intervening complete compartment or hold from 縱向全艙隔開



第十單元——危險貨物的緊急應變(地面事故)

DG Emergency Response Chart(Ground Incident)

危險種類	危險貨物	危險性敘述	立即採取措施 （輕微洩露並接觸到其他貨物時）
1.3C, **1.3G**	爆炸物	起火及小量爆發危害，或者帶有小量發射危害	通知消防單位救火
1.4B, **1.4C,** **1.4D,** **1.4E,** **1.4G**		起火，但無其他危害	
1.4S	爆炸物(安全)	小量起火危害	
2.1 **2.2**	易燃物 非易燃、無毒性氣體 超低溫液體	洩露時會點火 高壓氣瓶會爆破 超低溫冷凍	通知消防單位戒備起火 撤離貨物-清出空間
2.3	毒性氣體	高壓氣瓶會爆破以及吸入毒性	至少保持 25 公尺距離
3	易燃液體	釋出易燃蒸氣	通知消防單位戒備起火
4.1 **4.2** **4.3**	易燃固體 起火物質 與水作用物質	燃燒或助燃 與空氣接觸會點火 與水接觸會點火	無論如何，不得使用水滅火
5.1 **5.2**	氧化物質 有機過氧化物	接觸可燃物會點火 與其他物質起劇烈反應	通知消防單位戒備起火 不要用水滅火
6.1	毒性物質	吞入、吸入或與皮膚接觸會造成危害	隔離該區域 取得專業的協助 不得觸碰
6.2	感染性物質	對人與動物造成疾病	至少保持 25 公尺距離
7 第Ⅰ級 **7 第Ⅱ級** **7 第Ⅲ級**	放射性物料	輻射危害，並傷害健康	
8	腐蝕性物質	對皮膚與金屬具危險性	通知消防單位戒備起火 避免與皮膚接觸
9	聚合珠 乾冰 其他危險貨物	散出少量易燃氣體 造成低溫冷凍或窒息 其他危險性	避免與皮膚接觸 無立措施之必要

附錄一——爆炸物之相容群(Compatibility Group)

相容群	所屬之物質和物品的說明	包含的危險分組
A	一級爆炸性物質 Primary explosive substances	1.1
B	含有一級爆炸性物質，而不含有兩種或兩種以上有效保險裝置(Features)的物品。爆破用雷管、爆破與起爆的雷管組件，Cap-Type 等諸如此類的物品，雖然不含一級炸藥，也包括在此相容群。 Articles containing a primary explosive substances and not containing two or more effective protective features, Some articles, such as detonators for blasting , detonators assemblies for blasting and primers, cap type, are included, even though they do not contain primary explosives	1.1；1.2；1.4
C	發射性爆炸物(Propellant Explosive)，或其他爆燃性爆炸物質，或含有這些物質的物品。 Propellant explosive substances or other deflagrating explosive substances or article containing such explosive substances.	1.1；1.2；1.3；1.4
D	二級爆轟性物，黑火藥，或含有二級爆轟性物質的物品，無引發裝置或發射藥；或者是，含有一級爆炸性物質並具有兩種或兩種以上有效保險裝置的物品。 Secondary detonating explosive substances or black powder or article containing a secondary detonating explosive substances, in each case without means of initiation and without a propelling charge, or article containing a primary explosive substances and containing two or more effective protective features.	1.1；1.2；1.4；1.5
E	含有二級爆轟性物質的物品，無引發裝置，且帶有發射藥(但非含有易燃液體或膠體或自燃液體)。 Article containing a secondary detonating explosive substances, without means of initiation, with a propelling charge (other than one containing a flammable liquid or gel or hypergolic liquids) or without a propelling charge	1.1；1.2；1.4
F	含有二級爆轟性物質的物品，具有引發裝置，不論帶有或不帶有發射藥(但非含有易燃液體或膠體或自燃液體)。 Article containing a secondary detonating explosive substances with its means of initiation with a propelling charge (other than one containing a flammable liquid or gel or hypergolic liquids) or without a propelling charge	1.1；1.2；1.3；1.4

相容群	所屬之物質和物品的說明	包含的危險分組
G	煙火物質或含有煙火物質的物品；以及既含有一種爆炸性物質，又含有一種照明、燃燒、催淚或煙霧物質的物品(但不是與水起作用的物品，也不是含有白磷、磷化物、自燃物質、易燃液體或膠體、或自燃 Hypergolic 液體的物品)。 Pyrotechnic substances, or article containing a pyrotechnic substance, or article containing both an explosive substance and an illuminating, incendiary, tear-or smoke-producing substance (other than a water-activated article or one containing white phosphorus, phosphides, a pyrophoric substance, a flammable liquid or gel or hypergolic liquids)	1.1；1.2；1.3；1.4
H	含有一種爆炸性物質，以及白磷的物品。 Article containing both an explosive substance and white phosphorus	1.2；1.3
J	含有一種爆炸性物質，以及易燃液體或膠體的物品 Article containing both an explosive substance and a flammable liquid or gel	1.1；1.2；1.3
K	含有一種爆炸性物質，以及一種毒性化學劑的物品 Article containing both an explosive substance and a toxic chemical agent	1.2；1.3
L	爆炸性物質，或含有爆炸性物質、並且具有特殊危險(例如，由於具有與水起作用的性質、或存有自燃液體、磷化物或發火物質)，類型之間需要彼此隔離的物品。 Explosive substance or article containing an explosive substance and presenting a special risk (e.g. due to water-activation or presence of hypergolic liquids, phosphides or a pyrophoric substance) and needing isolation of each type	1.1；1.2；1.3
N	只含有極端不敏感爆轟物質的物品 Article containing only extremely insensitive detonating substance	1.6
S	經過包裝物或設計的物質或物品，除非包裝物因火燒受損，否則其因意外觸發而引起的危害效應，只是局限在包裝物內。即使包裝物因火燒受損，所有，爆破與射出的效應，也不會妨礙包裝物鄰近的救火行動，或其他緊急應變的努力。 Substance or article so packed or designed that any hazardous effects arising from accidental functioning are confined within the package unless the package has been degraded by fire, in which case all blast or projection effects are limited to the extent that they do not significantly hinder or prohibit fire fighting or other emergency response efforts in the immediate vicinity of the package.	1.4

附錄二——高嚴重性危險貨物

Class	Division	High Consequence Dangerous Goods
Class 1	Division 1.1	Explosives
Class 1	Division 1.2	Explosives
Class 1	Division 1.3	Compatibility group C explosives
Class 1	Division 1.4	UN No.: 0104, 0237, 0255, 0267, 0289, 0361, 0365, 0366, 0440, 0441, 0455, 0456 and 0500.
Class 1	Division 1.5	Explosives
Class 2	Division 2.1	Flammable gases in quantities greater than 3,000L in a road tank vehicle, a railway tank wagon or a portable tank.
Class 2	Division 2.3	Toxic gases
Class 3		Flammable liquid of **packing group I and II** in quantities greater than 3,000L in a road tank vehicle, a railway tank wagon or a portable tank.
Class 3		Liquid desensitized explosives.
Class 4	Division 4.1	Solid desensitized explosives.
Class 4	Division 4.2	Goods of **packing group I** in quantities greater than 3,000 kg or 3,000L in a road tank vehicle, a railway tank wagon, a portable tank or a bulk container.
Class 4	Division 4.3	Goods of **packing group I** in quantities greater than 3,000 kg or 3,000L in a road tank vehicle, a railway tank wagon, a portable tank or a bulk container.
Class 5	Division 5.1	Oxidizing liquid of **packing group I** in quantities greater than 3,000L in a road tank vehicle, a railway tank wagon or a portable tank.
Class 5	Division 5.1	Perchlorates, ammonium nitrate, ammonium nitrate fertilizer and ammonium nitrate emulsion or suspensions or gels in quantities greater than 3,000 kg or 3,000L in a road tank vehicle, a railway tank wagon, a portable tank or a bulk container.
Class 6	Division 6.1	Toxic substances of **packing group I**.
Class 6	Division 6.2	Infectious substance of **Category A** (UN2814 and UN2900).
Class 8		Corrosive substances of **packing group I** in quantities greater than 3,000 kg or 3,000L in a road tank vehicle, a railway tank wagon, a portable tank or a bulk container.

附錄三——危險貨物的隔離表

(7.2.4 Segregation Table)

CLASS		1.1 1.2 1.5	1.3 1.6	1.4	2.1	2.2	2.3	3	4.1	4.2	4.3	5.1	5.2	6.1	6.2	7	8	9
Explosives	1.1, 1.2, 1.5	*	*	*	4	2	2	4	4	4	4	4	4	2	4	2	4	X
Explosives	1.3, 1.6	*	*	*	4	2	2	4	3	3	4	4	4	2	4	2	2	X
Explosives	1.4	*	*	*	2	1	1	2	2	2	2	2	2	X	4	2	2	X
Flammable gases	2.1	4	4	2	X	X	X	2	1	2	2	2	2	X	4	2	1	X
Non-toxic, non-flammable gases	2.2	2	2	1	X	X	X	1	X	1	X	X	1	X	2	1	X	X
Toxic gases	2.3	2	2	1	X	X	X	2	X	2	X	X	2	X	2	1	X	X
Flammable liquids	3	4	4	2	2	1	2	X	X	2	2	2	2	X	3	2	X	X
Flammable solids (including self-reactive substances and solid desensitized explosives)	4.1	4	3	2	1	X	X	X	X	1	X	1	2	X	3	2	1	X
Substances liable to spontaneous combustion	4.2	4	3	2	2	1	2	2	1	X	1	2	2	1	3	2	1	X
Substances which, in contact with water, emit flammable gases	4.3	4	4	2	2	X	X	2	X	1	X	2	2	X	2	2	1	X
Oxidizing substances (agents)	5.1	4	4	2	2	X	X	2	1	2	2	X	2	1	3	1	2	X
Organic peroxides	5.2	4	4	2	2	1	2	2	2	2	2	2	X	1	3	2	2	X
Toxic substances	6.1	2	2	X	X	X	X	X	X	1	X	1	1	X	1	X	X	X
Infectious substances	6.2	4	4	4	4	2	2	3	3	3	2	3	3	1	X	3	3	X
Radioactive material	7	2	2	2	2	1	1	2	2	2	2	1	2	X	3	X	2	X
Corrosive substances	8	4	2	2	1	X	X	X	1	1	1	2	2	X	3	2	X	X
Miscellaneous dangerous substances and articles	9	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

The numbers and symbols in the table have the following meanings:

1 – "away from"

2 – "separated from"

3 – "separated by a complete compartment or hold from"

4 – "separated longitudinally by an intervening complete compartment or hold from"

X – the Dangerous Goods List has to be consulted to verify whether there are specific segregation provisions

* – see 7.2.7.1 of this chapter for the segregation provisions between class 1 substances or articles

7.3.3.6 Packages containing dangerous goods and unpackaged dangerous articles shall be secured by suitable means capable of restraining the goods (such as fastening straps, sliding slatboards, adjustable brackets) in the cargo transport unit in a manner that will prevent any movement during transport which would change the orientation of the packages or cause them to be damaged. When dangerous goods are transported with other goods (e.g. heavy machinery or crates), all goods shall be securely fixed or packed in the cargo transport units so as to prevent the release of dangerous goods. Movement of packages may also be prevented by filling any voids by the use of dunnage or by blocking and bracing. Where restraints such as banding or straps are used, these shall not be over-tightened to cause damage or deformation of the package or the securing points (such as D-rings) within the cargo transport unit. The packages shall be packed in such a way that there will be a minimum likelihood of damage to fittings during transport. Such fittings on packages shall be adequately protected. Where restraints such as banding or straps with integral container fittings are used, care should be taken to ensure that the Maximum Securing Load (*MSL*) of the fittings is not exceeded.

7.3.3.7 Packages shall not be stacked unless designed for that purpose. Where packages of different stacking designs are to be loaded together, consideration shall be given to their compatibility for stacking with each other. Where necessary, stacked packages shall be prevented from damaging the package below by the use of load bearing devices.

7.3.3.8 Cargo shall be entirely contained within the cargo transport unit without overhang or projections. Oversized machinery (such as tractors and vehicles) may overhang or project outside of the cargo transport unit provided that the dangerous goods integral to the machinery cannot leak or spill outside of the cargo transport unit.

7.3.3.9 During loading and unloading, packages containing dangerous goods shall be protected from being damaged. Particular attention shall be paid to the handling of packages during their preparation for transport, the type of cargo transport unit to be used for their carriage and to the method of loading or unloading, so that accidental damage is not caused through dragging or mishandling. Packages that appear to be leaking or damaged so that the contents may escape shall not be accepted for transport. If a package is found to be damaged so that the contents leak, the damaged package shall not be transported but moved to a safe place in accordance with instructions given by a competent authority or a designated responsible person who is familiar with the dangerous goods, the risks involved and the measures that should be taken in an emergency.

Note 1: Additional operational requirements for the transport of packagings and IBCs are provided in the special packing provisions for packagings and IBCs (see chapter 4.1).

△ 7.3.3.10 When a dangerous goods consignment forms only part of the load of a cargo transport unit, it should, whenever possible, be packed adjacent to the doors with marks and labels visible, so as to be accessible in the event of an emergency or to facilitate inspection.

7.3.3.11 If the doors of a cargo transport unit are locked, the means of locking shall be such that, in cases of emergency, the doors can be opened without delay.

7.3.3.12 When venting is required, venting devices shall be kept clear and operable.

△ 7.3.3.13 Cargo transport units containing dangerous goods shall be marked and placarded according to chapter 5.3. Irrelevant marks, labels, placards, orange panels, signs and marine pollutant marks shall be removed, masked or otherwise obliterated before packing a cargo transport unit.

△ 7.3.3.14 Cargo transport units shall be packed so that the cargo is uniformly distributed consistent with the CTU Code.

7.3.3.15 If goods of class 1 are packed, the cargo transport unit shall comply with the definition in 7.1.2 for closed cargo transport unit for class 1.

7.3.3.16 If goods of class 7 are packed, the transport index and, if applicable, the criticality safety index, shall be limited according to 7.1.4.5.3.

7.3.3.17 Those responsible for the packing of dangerous goods into a cargo transport unit shall provide a "container/vehicle packing certificate" (see 5.4.2). This document is not required for tanks.

7.3.3.18 Flexible bulk containers are not allowed to be transported in cargo transport units (see 4.3.4).

7.3.4 Segregation provisions within cargo transport units

7.3.4.1 Dangerous goods which have to be segregated from each other according to the provisions in chapter 7.2 shall not be transported in the same cargo transport unit with the exception of dangerous goods which shall be segregated "away from" each other which may be transported in the same cargo transport unit with the approval of the competent authority. In such cases an equivalent standard of safety shall be maintained.

附錄四——危險貨物的隔離代號

■ 7.2.8 Segregation codes

The segregation codes given in column 16b of the Dangerous Goods List are as specified below:

Segregation code	Description
SG1	For packages carrying a subsidiary risk of class 1, segregation as for class 1, division 1.3.
SG2	Segregation as for class 1.2G.
SG3	Segregation as for class 1.3G.
SG4	Segregation as for class 2.1.
SG5	Segregation as for class 3.
SG6	Segregation as for class 5.1.
SG7	Stow "away from" class 3.
SG8	Stow "away from" class 4.1.
SG9	Stow "away from" class 4.3.
SG10	Stow "away from" class 5.1.
SG11	Stow "away from" class 6.2.
SG12	Stow "away from" class 7.
SG13	Stow "away from" class 8.
SG14	Stow "separated from" class 1 except for division 1.4S.
SG15	Stow "separated from" class 3.
SG16	Stow "separated from" class 4.1.
SG17	Stow "separated from" class 5.1.
SG18	Stow "separated from" class 6.2.
SG19	Stow "separated from" class 7.
SG20	Stow "away from" acids.
SG21	Stow "away from" alkalis.
SG22	Stow "away from" ammonium salts.
SG23	Stow "away from" animal or vegetable oils.
SG24	Stow "away from" azides.
SG25	Stow "separated from" goods of classes 2.1 and 3.
SG26	In addition: from goods of classes 2.1 and 3 when stowed on deck of a containership a minimum distance of two container spaces athwartship shall be maintained, when stowed on ro-ro ships a distance of 6 m athwartship shall be maintained.
SG27	Stow "away from" explosives containing chlorates or perchlorates.
SG28	Stow "away from" ammonium compounds and explosives containing ammonium compounds or salts.
SG29	Segregation from foodstuffs as in 7.3.4.2.2, 7.6.3.1.2 or 7.7.3.7.
SG30	Stow "away from" heavy metals and their salts.
SG31	Stow "away from" lead and its compounds.
SG32	Stow "away from" liquid halogenated hydrocarbons.
SG33	Stow "away from" powdered metals.
SG34	When containing ammonium compounds, "away from" chlorates or perchlorates and explosives containing chlorates or perchlorates.
SG35	Stow "separated from" acids.
SG36	Stow "separated from" alkalis.
SG37	Stow "separated from" ammonia.
SG38	Stow "separated from" ammonium compounds.
SG39	Stow "separated from" ammonium compounds other than AMMONIUM PERSULPHATE (UN 1444).

Segregation code	Description
SG40	Stow "separated from" ammonium compounds other than mixtures of ammonium persulphates and/or potassium persulphates and/or sodium persulphates.
SG41	Stow "separated from" animal or vegetable oil.
SG42	Stow "separated from" bromates.
SG43	Stow "separated from" bromine.
SG44	Stow "separated from" CARBON TETRACHLORIDE (UN 1846).
SG45	Stow "separated from" chlorates.
SG46	Stow "separated from" chlorine.
SG47	Stow "separated from" chlorites.
SG48	Stow "separated from" combustible material (particularly liquids). Combustible material does not include packing materials or dunnage.
SG49	Stow "separated from" cyanides.
SG50	Segregation from foodstuffs as in 7.3.4.2.1, 7.6.3.1.2 or 7.7.3.6.
SG51	Stow "separated from" hypochlorites.
SG52	Stow "separated from" iron oxide.
SG53	Stow "separated from" liquid organic substances.
SG54	Stow "separated from" mercury and mercury compounds.
SG55	Stow "separated from" mercury salts.
SG56	Stow "separated from" nitrites.
SG57	Stow "separated from" odour-absorbing cargoes.
SG58	Stow "separated from" perchlorates.
SG59	Stow "separated from" permanganates.
SG60	Stow "separated from" peroxides.
SG61	Stow "separated from" powdered metals.
SG62	Stow "separated from" sulphur.
SG63	Stow "separated longitudinally by an intervening complete compartment or hold from" class 1.
SG64	[Reserved]
SG65	Stow "separated by a complete compartment or hold from" class 1 except for division 1.4.
SG66	[Reserved]
SG67	Stow "separated from" division 1.4 and "separated longitudinally by an intervening complete compartment of hold from" divisions 1.1, 1.2, 1.3, 1.5 and 1.6 except from explosives of compatibility group J.
SG68	If flashpoint 60°C c.c. or below, segregation as for class 3 but "away from" class 4.1.
SG69	For AEROSOLS with a maximum capacity of 1 L: segregation as for class 9. Stow "separated from" class 1 except for division 1.4. For AEROSOLS with a capacity above 1 L: segregation as for the appropriate subdivision of class 2. For WASTE AEROSOLS: segregation as for the appropriate subdivision of class 2.
SG70	For arsenic sulphides, "separated from" acids.
SG71	Within the appliance, to the extent that the dangerous goods are integral parts of the complete life-saving appliance, there is no need to apply the provisions on segregation of substances in chapter 7.2.
SG72	See 7.2.6.3.2.
SG73	[Reserved]
SG 74	Segregation as for 1.4G.
SG 75	Stow "separated from" strong acids.