

The Q Value

Packing Different Classes of DGs into One Outer Package

Section 5.0.2.11 of the IATA DGR

An outer packaging may contain more than one item of dangerous goods or other goods provided that:

- (a) The dangerous goods *do not* react dangerously with each other and cause:
 - Combustion and/or evolution of considerable heat;
 - Evolution of flammable, toxic or asphyxiant gases;
 - The formation of corrosive substances; or
 - The formation of unstable substances
- (b) The dangerous goods do not require segregation according to **Table 9.3.A**, except as otherwise provided for in the Regulations;
- (c) An outer packaging containing Division 6.2 (Infectious Substances) may contain material for refrigeration or freezing or packaging material such as absorbent material as provided in Packing Instruction 602;
- (d) The inner packaging used for each item of dangerous goods and the quantity contained therein complies with the relevant part of the packing instruction applicable to that item;
- (e) The outer packagings used are permitted by all the packing instructions applicable to each item of dangerous goods;
- (f) The package as prepared for shipment meets the specification performance tests for the most restrictive packing group of a substance or article contained in the package;
- (g) The quantities of different dangerous goods contained in one outer packaging must be such that “Q” does not exceed the value of 1, where “Q” is calculated using the following formula:

$$Q = \frac{n_1}{M_1} + \frac{n_2}{M_2} + \frac{n_3}{M_3} \quad (\text{see example over page})$$

where n_1, n_2 etc. are the net quantities per package of the different dangerous goods, and M_1, M_2 , etc. are the maximum net quantities per package for these different dangerous goods according to the List of Dangerous Goods, for passenger or cargo aircraft, as applicable; and

- (h) The following dangerous goods do not need to be taken into account in the calculation of the “Q” value:
 - Carbon dioxide, solid (dry ice) UN 1845;
 - Those where Columns H, J and L of the List of Dangerous Goods indicate “No Limit”;
 - Those with the same UN number, packing group and physical state (ie. solid or liquid), provided they are the only dangerous goods in the package, and the total net quantity does not exceed the maximum net quantity shown in the List of Dangerous Goods.

Note 1: For packages containing radioactive material see Subsection 10.5.

Note 2: The calculated “Q” value must be rounded up to one decimal place and entered on the Shipper’s Declaration (see 8.1.6.9.2(f)).

Examples

1. See Figure 8.1.H - p.598 IATA DGR – Completed Shipper's Declaration

A shipper wishes to send the following substances in one outer package:

UN2339 – 2-Bromobutane, Class 3, PG II	2 L using PI 305
UN2653 – Benzyl iodide, Class 6.1, PG II	2 L using PI 609
UN2049 – Diethylbenzene, Class 3, PG III	5 L using PI 309

$$Q = \frac{n_1}{M_1} + \frac{n_2}{M_2} + \frac{n_3}{M_3}$$

$$Q = \frac{2 \text{ L}}{5 \text{ L}} + \frac{2 \text{ L}}{5 \text{ L}} + \frac{5 \text{ L}}{60 \text{ L}}$$

We need to get the same common denominator (ie. 60), so multiply the first two fractions by 12 each:

$$Q = \frac{24}{60} + \frac{24}{60} + \frac{5}{60} = \frac{53}{60} = 0.8833333 = 0.9$$

Q Value must: be rounded up to 1 decimal place
be less than or equal to 1
be entered on the Shipper's Declaration

2. A shipper wishes to send the following substances in one outer package, using the provisions of Limited Quantities:

UN3066 – Paint related material, Class 8, PG II	400 mL using PI Y808
UN1266 – Perfumery products, Class 3, PG II	300 mL using PI Y305

$$Q = \frac{n_1}{M_1} + \frac{n_2}{M_2}$$

$$Q = \frac{400}{500} + \frac{300}{1000}$$

We need to get the same common denominator (ie. 1000), so multiply the first fraction by 2:

$$Q = \frac{800}{1000} + \frac{300}{1000} = \frac{1100}{1000} = 1.1 \quad (\text{Cannot be done as is more than 1})$$