

## Attachment 20

### ABSORBENT, CUSHIONING, AND CLOSURE REQUIREMENTS

**A20.1. General Requirements.** Ensure all of the packaging materials are not capable of reacting adversely with the contents of the package and are noncombustible. Do not use asbestos. Ensure the absorbent materials, cushioning, and closures are the same or greater than the type and quantities specified in the applicable test report.

**A20.2. Cushioning Requirements.** Pack, secure and cushion inner packagings of combination packagings to prevent their breakage or leakage and to control their shifting within the outer packaging under conditions normally incident to transportation. Cushioning material may not be capable of reacting dangerously with the contents of the inner packagings or having its protective properties significantly weakened in the event of leakage. When overpacking individual packagings for consolidation that already meet air-eligibility requirements, secure and position the packagings against damage using appropriate means.

**A20.3. Closures.** Construct the body and closure of any packaging to be able to adequately resist the effects of temperature and vibration occurring in conditions normally incident to air transportation. Ensure inner packaging or receptacle closures of combination packages containing liquids are held securely, tightly and effectively in place by secondary means. Examples of such secondary methods include: Adhesive tape, friction sleeves, welding or soldering, locking wires, locking rings, induction heat seals, and child-resistant closures. Design the closure device so that it is unlikely that it can be incorrectly or incompletely closed. Closures requirements are as follows:

A20.3.1. Packing Group I. An inner packaging containing liquids of Packing Group I must have a secondary means of closure applied, and must be packed in accordance with A20.4.

A20.3.2. Packing Groups II and III. When a secondary means of closure cannot be applied or is impracticable to apply to an inner packaging containing liquids of Packing Groups II and III, this requirement may be satisfied by securely closing the inner packaging and placing it in a leakproof liner or bag before placing the inner packaging in its outer packaging.

**A20.4. Absorbent materials.** Comply with the specific packing instructions which may require absorbent materials for certain materials and packaging configurations. Packing Group I liquid hazardous materials of Classes 3, 4, or 8, or Divisions 5.1 or 6.1 that are packaged in combination packagings and offered for air transport in glass, earthenware, plastic, or metal inner packagings require using absorbent material as follows:

A20.4.1. Inner packagings packed in a rigid and leakproof receptacle or intermediate packaging containing sufficient absorbent material to absorb the entire contents of all inner packagings before packing the inner packaging(s) in the outer package.

A20.4.2. Absorbent material may not react dangerously with the liquid.

A20.4.3. For single or composite packagings that have met the UN packaging specification test requirements (including the hydrostatic pressure test), absorbent material is not required.

**A20.4.4.** Determining the amount of absorbent required. Absorption capacity varies based on material and design, reference absorbent specification data to determine absorption capacity for specific material used. Use **Table A20.1** as a guide to determine the amount of absorbent material required. Absorbent materials other than those listed in the table are authorized as long as they meet the absorbent requirement.

A20.4.4.1. The amounts identified in **Table A20.1** are the minimum requirements. When exact quantities of absorbent materials are not found in **Table A20.1**, make an approximation based on quantities listed.

A20.4.4.2 When the applicable test report or packing instruction identifies an amount larger than **Table A20.1**, use the larger amount.

A20.4.4.3. When placing loose-fill materials (e.g., vermiculite) into the container, consider settling of the loose-fill materials during transportation. Use enough loose-fill material, and firmly tamp to compensate for any settling that may occur.

A.20.4.5. Absorbent materials should not be used as cushioning or to secure inner packagings so as to prevent breakage or leakage, or to control inner packaging shifting within the outer packaging under conditions normally incident to transportation.

**Table A20.1. Absorbent Material Requirements.**

If each inner packaging quantity is	Then to ship, use for each inner packaging:					
	Vermiculite, Type 1 <sup>1</sup> , Grade 3 (fine), or Grade 4 (super fine)		Diatomaceous Earth		Absorbent Sheet Materials	Cellulosic particulate
	On sides	On top and bottom	On sides	On top and bottom	On sides On top and bottom	On sides On top and bottom
.50 L (1 pt)	2.5 cm (1.0 in.)	3.8 cm (1.5 in.)	5.0 cm (2.0 in.)	11.5 cm (4.5 in.)	Completely wrap each inner packaging <sup>2</sup> ; for capacity, follow manufacturer's instructions	For capacity, use manufacturer's instructions; if unknown, same as vermiculite
1.0 L (1 qt)	2.5 cm (1.0 in.)	5.0 cm (2.0 in.)	5.0 cm (2.0 in.)	14.0 cm (5.5 in.)	Completely wrap each inner packaging <sup>2</sup> ; for capacity, follow manufacturer's instructions	For capacity, use manufacturer's instructions; if unknown, same as vermiculite
2.5 L (1/2 gal)	3.8cm (1.5 in.)	5.0 cm (2.0 in.)	7.5 cm (3.0 in.)	14.0 cm (5.5 in.)	Completely wrap each inner packaging <sup>2</sup> ; for capacity, follow manufacturer's instructions	For capacity, use manufacturer's instructions; if unknown, same as vermiculite

If each inner packaging quantity is	Then to ship, use for each inner packaging:					
	Vermiculite, Type 1 <sup>1</sup> , Grade 3 (fine), or Grade 4 (super fine)		Diatomaceous Earth		Absorbent Sheet Materials	Cellulosic particulate
	On sides	On top and bottom	On sides	On top and bottom	On sides On top and bottom	On sides On top and bottom
4 L (1 gal)	3.8 cm (1.5 in.)	6.5 cm (2.5 in.)	10.0 cm (4.0 in.)	15.5 cm (6.0 in.)	Completely wrap each inner packaging <sup>2</sup> ; for capacity, follow manufacturer's instructions	For capacity, use manufacturer's instructions; if unknown, same as vermiculite
7.6 L (2 gal)	5.0 cm (2.0 in.)	10.0 cm (4.0 in.)	11.5 cm (4.5 in.)	24.0 cm (9.5 in.)	Completely wrap each inner packaging <sup>2</sup> ; for capacity, follow manufacturer's instructions	For capacity, use manufacturer's instructions; if unknown, same as vermiculite
20.0 L (5 gal)	7.5 cm (3.0 in.)	15.5 cm (6.0 in.)	15.5 cm (6.0 in.)	34.5 cm (13.5 in.)	Completely wrap each inner packaging <sup>2</sup> ; for capacity, follow manufacturer's instructions	For capacity, use manufacturer's instructions; if unknown, same as vermiculite
24.6 L (6.5 gal)	9.0 cm (3.5 in.)	16.5 cm (6.5 in.)	18.0 cm (7.0 in.)	37.0 cm (14.5 in.)	Completely wrap each inner packaging <sup>2</sup> ; for capacity, follow manufacturer's instructions	For capacity, use manufacturer's instructions; if unknown, same as vermiculite
49.3 L (13 gal)	10.0 cm (4.0 in.)	19.0 cm (7.5 in.)	20.5 cm (8.0 in.)	39.5 cm (15.5 in.)	Completely wrap each inner packaging <sup>2</sup> ; for capacity, follow manufacturer's instructions	For capacity, use manufacturer's instructions; if unknown, same as vermiculite
56.8 L (15 gal)	11.5 cm (4.5 in.)	20.5 cm (8.0 in.)	24.0 cm (9.5 in.)	46.0 cm (18.0 in.)	Completely wrap each inner packaging <sup>2</sup> ; for capacity, follow manufacturer's instructions	For capacity, use manufacturer's instructions; if unknown, same as vermiculite

