

## Seven Tips on Working with Capsules

1. *Packaging of Empty Capsules*
2. *Transportation of Empty Capsules*
3. *Inspection of Capsules on Receipt*
4. *Warehousing / Storage*
5. *Capsule Filling*
6. *Packaging of Filled Capsules*

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### Introduction:

This technical note has been prepared to assist you in using any size of empty hard gelatin capsule. Empty Hard Gelatin Capsules are shipped with moisture content between 13-15%. It is important that this moisture content is maintained and exposure to high temperatures or cycling between high/low temperatures is avoided. When capsules are empty (unfilled) they are most susceptible to damage as the capsule walls are unsupported and there is a tremendous volume of air contained inside the capsule that can extract or release moisture from the capsule walls. Once the capsule is filled the walls are supported and the air inside the capsule is essentially eliminated. Thus, the sensitivity of capsules to environmental conditions is reduced.

***The major cause of customer problems with capsules is improper conditions during storage and filling or inadequate final packaging.***

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### 1. Packaging Of Empty Capsules:

To protect empty hard gelatin capsules from exposure to large variations in the surrounding relative humidity, they are packed in food grade anti-static plastic bags inside heavy-duty corrugated cartons.

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### 2. Transportation of Empty Capsules:

Care must be taken during transportation to ensure no damage to capsules.

- ✓ Do not leave shipments on a loading dock or in a truck.
- ✓ Ensure your customs broker is aware that capsules are heat sensitive and can arrange pre-clearance of the capsules through customs.

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### 3. Inspection of Capsules on Receipt:

Inspect your shipment on arrival. The following are examples of heat damage during transportation:

- ✓ Capsules are smaller in size (average length less than lower tolerance limit) or vary in size.
- ✓ Capsules are stuck together in lumps and do not come apart.
- ✓ Capsules are brittle or shatter very easily during handling or filling.
- ✓ Capsules are severely distorted in shape.
- ✓ Capsule cap is stuck to body and resists separation.

***Contact your supplier immediately if you observe the above.***

## 4. Warehousing/Storage:

If the proper storage conditions are observed, empty hard gelatin capsules may be stored for several years. Storage conditions are given in the table below:

	Min.	Ideal	Max.
Relative Humidity	40%	50%	60%
Temperature	15 C	20 C	27 C
	60 F	68 F	75 F

- ✓ Store capsules away from direct sunlight (e.g. windows and skylights) as it will raise the surface temperature of a carton.
- ✓ Store capsules away from hot water/air radiators, hot water pipes and steam pipes.
- ✓ Store capsules on pallets off the ground.
- ✓ Store capsules away from potential sources of water condensation e.g. under water pipes.
- ✓ Do not store empty capsules in freezers.

The effect of prolonged storage (over a few days) in areas outside the recommended conditions may cause the damage indicated in the table below:

Damage to Capsule	Probable Cause	Capsule Moisture
Softening and loss of shape	Storage at high RH	Increased
Difficult to separate; lumps of capsules; visible condensation on surface of bag; some capsules slightly reduced in size	High temperature or temperature cycling during storage.	Decreased
Capsules shatter when pressure applied; all capsules slightly reduced in size.	Storage at low RH	Decreased

## 5. Capsule Filling:

Optimum filling conditions are between 20-25 C (68-75F) and 45% to 55% Relative Humidity to maintain 13-15% moisture content of capsules.

Filling Problem	Environmental Cause	Solution
Capsules soft or sticky; denting during locking.	High temp, RH or both.	Air Condition & De-Humidify
Capsules cling to each other or plastic surfaces due to static electricity.	RH below 40%	Humidify
Capsules crack or shatter when pressure applied.	RH below 40%	Humidify

To reduce the temperature or RH, use an air conditioner or dehumidifier (residential or commercial). You may need to use a dehumidifier in addition to an air conditioner depending on the amount of moisture removal required to reduce the RH.

To increase RH, we recommend using a humidifier.

Capsules can be used outside these conditions but within the normal storage conditions. Keep only the minimum level of stock open to the atmosphere (one bag) and for a maximum of 1-2 hours.

- ✓ Keep empty and filled capsules covered when not being filled to minimize moisture loss.
- ✓ Seal or tie bags containing empty capsules during shift breaks or at the end of shifts.
- ✓ Store filled capsules in plastic drums with lids until they are packed in final container.

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## 6. Packaging of Filled Capsules:

- ✓ Always protect capsules from moisture loss or gain by using at least one layer of plastic packaging e.g. bag, bottle, blister pack, etc.
- ✓ Do not use desiccants or other moisture absorbers as these absorb moisture from the capsule shell leading to brittleness.
- ✓ Eliminate unnecessary headspace in the package. However, avoid the use of excess cotton and do not use cotton treated with furfural (interacts with the gelatin shell).
- ✓ If you pack in bottles and have reports of capsule breakage, add a sheet of corrugated cardboard between the bottle and the bottom of the outer carton to act as a cushion.