Liquid Filling Systems
For
Medical Marijuana Manufacturing
&
Cannabis dispensaries
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The RoboCap Series by ATG Pharma

Many marijuana medical manufactures and cannabis dispensaries are short on space. The series have a small foot print requiring two small desks. The electrical requirements 110v single phase are standard to most building or retail spaces. An air compressor is required that can deliver 80 psi @ two cfm available at most big box retailers or industrial supply outlets.

The system is easy to understand and operate but if any problems arise support is always available from our Indianapolis factory or manufacturing plant in Toronto.

As manufacturing requirements expand the ATG RoboCAP series can expand keeping pace with increased demand.

Capsule filling, capsule banding, small container filling, capping, labeling, formulation and process design all from STI and ATG Pharma.
RoboCAP Filling System Series:
Components included in all RoboCap systems.

1. Manual Capsule Filling unit (MF)
2. Liquid Dispensing Controller
3. 316L Stainless Steel Dispensing Valve
4. Filter/Regulator with Dryer for Pressure Vessel
5. 316L Stainless Steel Bulk Product Pressure Vessel
6. Silicone product and air lines with spares
Description of Common Components to all RoboCAP Filling systems

1. The RoboCAP MF series comes with a manual filler. It is used to separate the capsule bodies from caps. The bodies are dropped into a tray that holds 100 or 300 bodies. The tray is placed on the filling platform. After the filling cycle is complete the tray is returned to the MF for closing. The system includes one set of capsule size change parts sizes 00 to 4. The MF can also be used as a powder filler.

2. The electronic controller adjusts the amount of product that flows into the dispensing valve. Volume is controlled by time (.01 to 31 seconds). The controller regulates the amount of air pressure to the dispensing valve. Time and air pressure control the volume in the capsule.

3. The liquid dispenser is made of 316 SS and dispenses the liquid into the capsule body. The volume is controlled by the controller (described above). On the RoboCAP ML only a foot peddle initiates the fill. The operator positions the capsule tray under the filling head for each unfilled capsule until all the capsules are filled. The RoboCAP fills each capsule in the tray by the action of the robotic arm.

4. The Filter/Regulator and dryer control the amount of air pressure going from the compressor to the product tank. The filter and dryer assure the air is clean and dry.

5. The product tank is made of 316 SS with a matte finish outside. It has a sealed lid with tricclover sanitary connections for the air lines. Tank sizes available are 1, 2, 3, 5 & 10 gallon. Jacketed tanks are also available for heating and maintain heat throughout the filling process. Product mixers are also available.
RoboCAP ML-1 Manual Filling System

• The ML-1 Manual Filling System comes with one dispensing head.
• A foot peddle cycles the fill as the operator moves the tray from one capsule to the next until the tray of capsules are all filled.
• Included is a 100 cap MF with two filling trays.
• Output is 800 caps per hour (cph).

Dimensions: 375x375x250 mm
Weight: 15 kg
**RoboCAP RL-200 Series**

- The RL-200 series comes with one or two dispensing valves which automatically fills each capsule in the tray.
- Included is a 100 cap MF with two filling trays.
- Output is 1,400 to 4,500 caps per hour (cph) depended on the number of filling heads, viscosity and capsule size.

Dimensions:  385 x 370 x 500 mm  
Weight:  35kg
RoboCAP RL-300 Series

- The RL-300 series comes with one, two or four dispensing valves.
- Included is a 300 cap MF with two filling trays.
- Output is 3,000 to 11,000 caps per hour (cph) dependent on number of filling heads, viscosity and capsule size.

Dimensions: 485 x 500 x 590 mm
Weight: 45kg
Band no Band

The question that most often arises in capsule filling cannabis and related oils is banding. Will the product leak through the seam of the capsule where the body and cap overlap? The answer and solution can be found in testing, formulation and or banding machines.

There is a simple stability test used to determine if the oil without additives will leak. This test will help determine the need of banding or special packaging requirements.

Line a cookie sheet with brown Kraft paper. Place several hundred filled capsules on the cookie sheet. Over a period of several days agitate the capsules by moving them gently with a utensil or shake the cookie sheet. Warm an oven to ~95 degrees and place the cookie sheet in the over for ~30 minutes. Repeat several times over the duration of the test.
Band no Band

The brown Kraft paper will show the slightest leak. If a leak appears either adding additives or banding will be required to assure a quality product.

Formulators will determine the excipients required to create a solution when heated in a tank and dispensed into the capsule the solution will solidify and not require a bander. However, a heated tank with an agitator will be needed. The formulator must determine if there will be any affect to the potency of efficacy of the product by adding excipients.

The formulation should be tested to assure that over time and exposure to heat, for example if product is left in a car on a hot day, the formulation will not become fluid and leak. Though there are capsules designed for liquid filling it has been our experience most oils will leak over time without proper formulation or banding.
Band no Band

An alternative to formulation and banding is how the product is packaged. Most cannabis products sold in a dispensary are sold as a unit dose or several units. If this is the case than the capsules can be massed produced and stored either in Vial Trays (below left) that will hold up to 100 filled un-banded caps with the body of the cap down. Or the caps can be stored in a chiller (refrigerator) on either cookie sheets or Vial Trays.
Band no Band

Un-banded capsules can be put into single dose plastic packaging cylinders (see examples below) for selling to end users. With flat bottom down and a snap shut closure top the capsule will remain upright. An arrow pointing up should be placed on the cylinder with instructions to keep the package upright and not left in a hot area. The downside is many consumers do not read or follow instructions. This increases the risk of leaking an possible product compromise but, banding will not be required.
STI Capsule Banders

STI manufactures several different banders with varying capacities and automation. The most popular for Medical Marijuana Manufactures are completely automatic systems. More popular for Cannabis Dispensaries is the Lab-Top Bander, our simplest least expensive system.

Capsule banding requires a machine to apply a band around the capsule cut line (the seam where the cap ends at the body). The banding solution is made of the same material as the capsule (Gelatin or HPMC veggie based). The gelatin solution requires preparation prior to banding needing to be heated and mixed. Many use a simple crock pot others use more sophisticated means. The veggie based banding solution does not require heating while mixing.

After the solution is applied to the capsule it must dry in ambient conditions to properly cure. The banding environment should be 72 degrees +/- 15 degrees. The relative humidity should be 53% +/- 15%.

If environmental conditions stray to far from the mean it will compromise the integrity of the band. These conditions can be met by banding in a small enclosed room or area and employing the use of a humidifier or de-humidifier.
STI Lab-Top Bander

- Small bench top design
- Operator loads capsules on carrier slats (need pic of slats). The slats automatically move over rotating solution application wheels applying the solution.
- Dual application wheels apply 2 bands for a robust seal. After banding the slats are put on the drying rack for curing. One operator can produce 100 to 200 caps per hour.
- Higher output can be achieved by adding more operators and slats. Max output with 4 operators and 12 slats is 800 to 1,000 cph.
- The machine comes with 6 slats in any capsule size combination.
- Power required is 110v single phase.

Dimensions: 776 x 305, 305 mm
Weight: 21kg
BANDING OPTIONS

A Medical Marijuana or Cannabis dispensary decides to purchase the Robo LiCap 201 and a Lab Top Bander. The 201 has a max output of 1,400 cph. The Bander has an output of 100 to 200 cph using one operator and six slats. The RoboCAP will out produce the Lab-Top Bander by a considerable margin. Several solutions follow.

The Lab-Top Bander output can be increased by adding operators, slats and some simple tools. With 3 to 4 operators and 12 (total) slats, vial holders and racks the output can increased up to 800 to 1,000 caps per hour. Also, one band can be applied but the seal must be tested (as outlined previously). Applying one band will increase the output even more. A simple process design shows the placement of operators, tools and flow. There are many approaches, this is one.

This process will allow the output of the bander to come close to the output of the RoboCAP. To equal the output of both machines slow the RoboCAP to match the Lab-Top Bander.

There is a window of time between capsule filling and banding before the capsule begins to leak. The time available will be determined by the leak test described earlier. Close the window by chilling the filled but un-banded capsules or put them in a vial holder (cap body down) until the bander is ready.
Process Design: Banding for increased output using Lab-Top Bander & 12 slats

1. Load filled capsules onto slats: (table 1)
2. Stage loaded slats
3. Band slats: (table 2)
4. Transfer slats to vial holders: (table 3)
5. Place vial holders on racks and stack racks as needed: (table 3)
6. Return empty slats to table 1
Banding Solutions

The drawback of increasing staff to increase the output of the bander is costly. There is a solution that will eliminate the need to increase the output of the Lab-Top Bander.

View the filling and banding operations as two different inventory systems. The RoboCAP can be used to make a large un-banded unfinished inventory of different batches. Use the vial trays or chiller for storing un-banded capsules as discussed previously.

Utilize the Lab-Top Bander as a finished goods inventory system. Band only the capsules that are forecast to be sold in a day, two days or a week. Whatever amount can be processed by one operator in several hours. Remember, banding solution has to mixed and heated or just mixed but it does take time and needs to be considered as part of the finished goods process.
Robo Vial Filler (VF) for Tinctures, Vials and Small Containers

• The Robo VF robotically fills vials, tinctures and other small containers.
• The systems can be made with 1, 2 or 4 filling heads.
• The container holding fixture is made to the specs of the container. The system comes with 2 holding fixtures.
• The fill volume is determined by adjusting the time and pressure using the controller and the robotic arm does the rest.

Dimensions: 485 x 500 x 590 mm
Weight: 45kg
Robo VF small container filling

ATG and STI have designed the Robo Vial Filler (VF) for many different size containers. The system can be programmed to fill any number of containers. Fixtures are made to the size of the container so the filling head will always move to the correct center of the container for each size being filled. The Controller stores each XYZ coordinates and the operator adjusts the fill volume using the same time and pressure techniques as the RoboCAP. The process follows:

• The fill volume is determined by adjusting time and pressure
• Operator loads empty containers into holding fixture
• Operator places fixture on filling platform using locator
• Operator selects correct program
• The Robo VF fills all containers in the fixture automatically
• The fixture is moved to capping and labeling. STI can assist in finding the correct capping and labeling machines to meet the requirements of the containers, batch sizes and available space.
STI Filling & Banding: Greater Automation

As the Medical Marijuana and Cannabis industries grow so will the need for processing with greater automation. STI has solutions for this growth.

The Lab-Cap 3000 Capsule Filler combined with the STI Lab-Top Bander is a solution to automation. Using one to two operators these bench top machines can operate in tandem for a full shift.
STI Filling and Banding: Large Batch Sizes

The Medical Marijuanna Manufacturer may find the STI LF10 capsule filler and the STI CF15 capsule bander will keep pace with an ever growing demand. With two operators these machines working in tandem have the capability to produce up to 90,000 finished banded capsules per shift.