COFFEE-TECH ENGINEERING
Advanced Roasting Systems

FZ-94

2.4 Kg
Professional Pro-Lab Roaster

User Manual
&
Safety Guide

TABLE OF CONTENTS

SPECIFICATIONS

Technical Specifications

Model FZ-94

Batch Capacity .....2.4 KG (5.3 LB)

Chaff Collector ..... Cyclone type Included

Exhaust Diameter..... 100mm (4'') in DIAMETER

Cooling blower ..... Included

Electrical Specifications

Main Current.....220-240 V

Frequency 50/60Hz

Heating Elements.....3 X 1000W

Gear Drive Motor.....0.12 HP

Gear Ratio 1:40-1:50

Cooling blower .....0.27 A

Dimensions ..... 65(w) X64 (d) X87.5 (h) /

Weight..... 65Kg/143.3 Lbs

Materials .....

- Stainless Steel
- Carbon Steel

CONGRATULATIONS ON MAKING THE RIGHT CHOICE

Thank you and congratulations for selecting one of Coffee-Tech Engineering's Professional coffee roasters. You have indeed made THE RIGHT CHOICE!

…**Because** your new coffee roaster is a professional instrument by design. Its features position it above common professional roasters. Do not be fooled by its compact size and competitive pricing; this is a professional grade unit, featuring industrial grade components of the finest quality.

…**Because** your new roaster is compact and affordable enough to satisfy the coffee enthusiast, ranging from small to medium commercial coffee shops, and will also satisfy coffee roasters who wish to take the next step towards commercial coffee roasting and wholesale.

…**Because** it is very easy to use and will produce *top quality* coffee, batch after batch, for many years to come. Although the machine is of professional, heavy-duty grade, it is almost maintenance free and will provide years of service without any expensive surprises, loss of time or headaches.

…**Because** Coffee-Tech Engineering believes that quality can and *should* be seen, felt and experienced. That is why we have spared no expense and effort to deliver you a unique product, characterized by our own stunning design, made possible only through the highest quality of finish materials – from stainless Steel, through Phenol operators and down to automotive finish lacquer.

WARRANTY

This machine is warranted by Coffee-Tech Engineering Ltd. for a one-year period. This warranty covers faulty materials and manufacturing defects, including spare parts. Coffee-Tech Engineering reserves the right to examine every part subject to the claim under this warranty. Coffee-Tech Engineering also reserves the right to ask a customer to return parts to an authorized distributor for warranty evaluation. If required, Coffee-Tech Engineering will request the customer to send the parts back to our premises for inspection. The customer will be solely responsible for shipping charges and Coffee-Tech Engineering will not accept any collect shipments. Failure to cooperate or produce needed materials for further analysis of a claim may void the claim due to lack of information and/or required parts requested.

This warranty does not apply if the machine has been improperly installed or used, or if it has been tampered with by unauthorized individuals. In any case, Coffee-Tech Engineering will not be held liable for financial or residual damage due to any breakdowns.

By accepting this user manual and reading these terms you, the customer, hereby agree to the above terms. Please retain this user manual for as long as the warranty is valid; this should be presented, in the event of failure, to:

Manufacturer Contact Information

Coffee-Tech Engineering Ltd.
Moshav Mazliach, 76836
Israel
Tel: +972.8.9254872
Fax: +972.8.9283494
: mail@coffee-tech.com
: www.coffee-tech.com

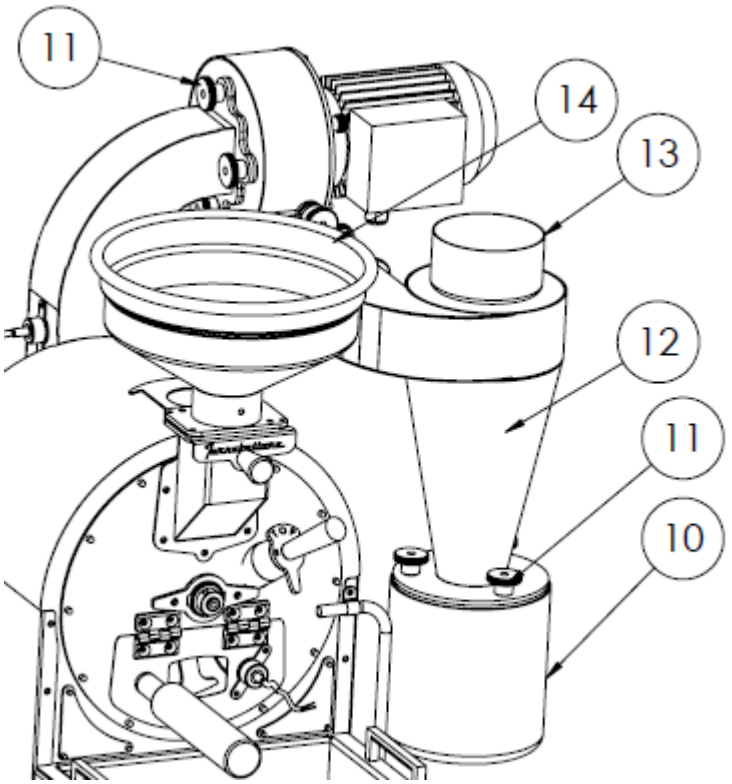
Your local Distributor

DESCRIPTION OF MACHINE PARTS

1. Silo
2. Throttle
3. Sampler
4. Airflow blower
5. Exhaust
6. Drum gate handle
7. Cooling tray
8. Side handles
9. Inspection lens

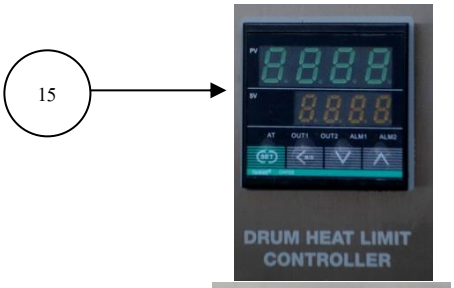
Cyclone Type Chaff Collector

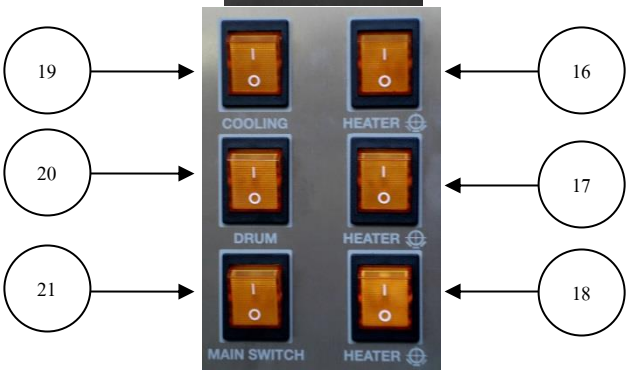
10. Chaff Collector bucket
11. Thumb nuts
12. Chaff Collector
13. Chaff collector outlet
14. Chaff Collection inlet



Control Panel

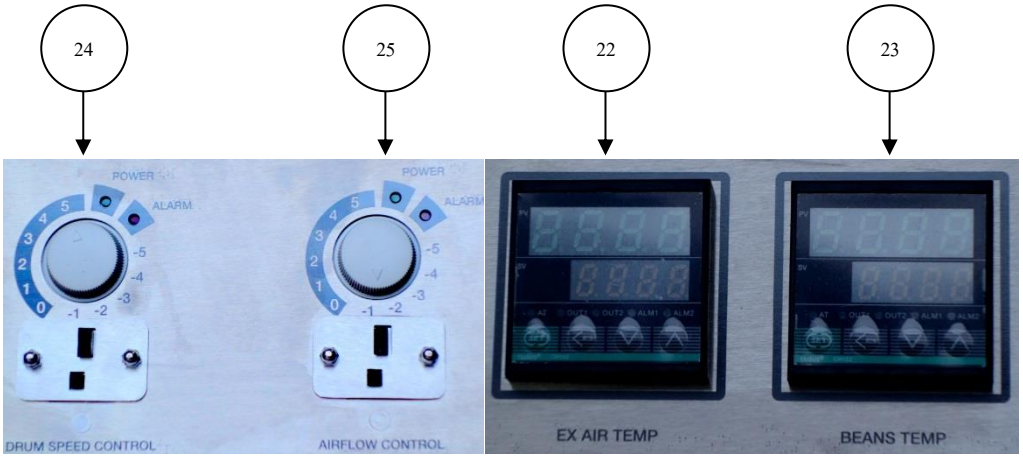
15. Temperature Controller
16. Heating 1K switch
17. Heating 1K switch
18. Heating 1K switch
19. Cooling switch
20. Drum switch
21. Main Switch





Control Panel Base

22. Exhaust air temperature
23. Beans temperature
24. Drum speed regulation
25. Airflow regulation



FEATURES DESCRIPTION

1. Silo - Used for loading green beans into the roaster.
2. Throttle - Pull it to insert green beans into the drum, then push it back in order to close it during roasting
3. Sampler - Used for taking samples during roasting
4. Airflow blower - Used for gas and chaff evacuation from the drum into the chaff collector.
5. Exhaust - Connects the airflow blower to the roasting drum.
6. Drum gate handle - Used to open drum, make sure drum is firmly closed while roasting
7. Cooling tray - Used for cooling the hot roasted coffee at the end of the roasting cycle
8. Side handles - Used for handling the tray and dismounting it from the machine
9. Inspection lens - Used for visual inspection of beans development while roasting – use it under ambient light and watch beans develop in size and change color to verify that roasting process is in order and to determine when it's time to end the roasting process
10. Chaff collector bucket - Used or collecting chaff while roasting
11. Thumb nuts - Used for easy and quick dismantling the bucket, the chaff collector and the airflow blower for periodical cleaning
12. Chaff collector - Used for separating chaff from smoke
13. Chaff collector outlet - Connection to duct/chimney/smoke elimination system
14. Chaff collector inlet - Connection to machine exhaust
15. Temperature controller - Provides temperature reading inside the drum while roasting and allows setting of temperature for imitating the heating elements. By using the push buttons, heating elements will shut off.
16. Heating 1K switch - Controls the 1000W heating element on the left side
17. Heating 1K switch - Controls the 1000W heating element on the middle
18. Heating 1K switch - Controls the 1000W heating element on the right side
19. Cooling switch - Activates the cooling blower located beneath the cooling tray
20. Drum switch - Activates the drum motor and airflow blower
21. Main switch - Main on/off switch
22. Exhaust air temperature - Reads the current temperature of the air in the exhaust
23. Beans temperature - Reads the temperature of the beans inside the drum
24. Drum speed regulation - Controls the speed rotation of the drum
25. Airflow regulation - Controls the speed rotation of the airflow blower thus changing the amount of air flowing threw the beans.

GENERAL WARNINGS

Important!

Please read this manual thoroughly prior to using your machine for the first time. You should also become familiar with all the machine parts, their names and locations, using the figures in this manual.

You should keep this document handy for any future reference.

This machine must only be used for its expressly intended function. Any other use should be considered improper and therefore hazardous.

This machine is intended for the sole purpose of roasting coffee beans; do not attempt to roast any other substance or food prior to consulting the manufacturer.

In any case, setup, use and operation of the machine should be performed in accordance with local health, fire, electrical and safety codes. If at any doubt, you should consult an expert on these matters prior to operating the machine for the first time.

By operating the machine you hereby agree that all above mentioned steps were performed.

Unpacking your roaster

Upon receiving your machine, please make sure that all the components listed in the enclosed Packing materials list are present and intact. Should you have any doubts, do not use it and contact our technical support department or your local distributor.

After verifying the machine's proper operation we recommend you keep all packing materials out of small children reach.

SAFETY PRECAUTIONS

Important – in case of fire inside the roaster:

- **Do not attempt to open the drum gate!**
- **Use a fire extinguisher to put out the fire from the green beans throttle! (#2)**

Installation should be carried out in compliance with all applicable regulations in force and following the instructions given by the manufacturer, and or qualified personnel on the manufacturer's behalf.

The machine must be connected to a grounded single phase outlet.

For safety reasons, it is not advisable to use breakout boxes, A/C railways, and/or patch cords. Should any of these be required, use only products complying with the safety rules in your area, being careful not to exceed the load limit in current value (watts/amperes).

If any switch, cable or any other electrical component become damaged or suspected to be damaged, immediately discontinue the use of this machine and contact either manufacturer or local distributor.

There are no user serviceable parts inside this machine. The removal of any panel or outer shell is strictly forbidden. Failure to comply may result in severe injury. This machine can be effectively treated by qualified personnel only.

Never put your hands or any other object inside the roasting drum. Any such treatment should only be performed by a qualified personnel and while the machine is unplugged.

Never leave the machine to operate without supervision.

During operation, some outer panels (marked appropriately) become hot and should not be touched.

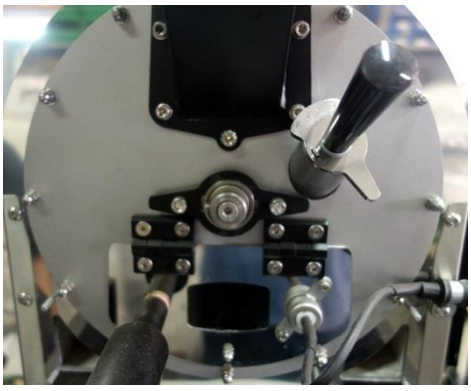
Please note that the final product exiting the drum is extremely hot. Take care not to touch it with your bare hands!

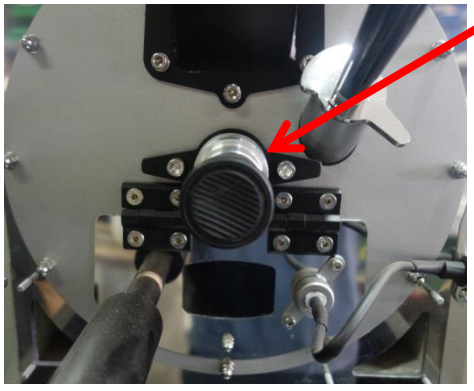
Before carrying out any service, cleaning or maintenance operation on the machine, turn off the MAIN switch and unplug it from the AC outlet.

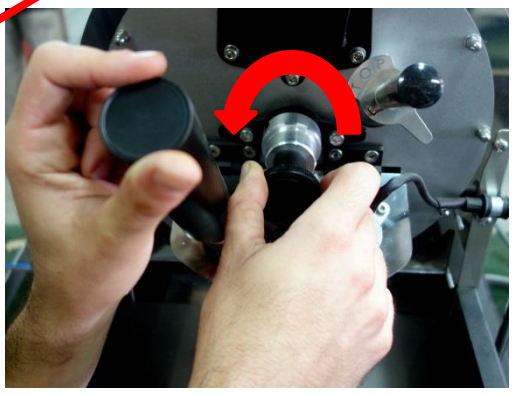
Since this is an electrical machine, generating extreme levels of heat, follow the important safety precautions listed below:

- Do not touch the machine with wet hands and/or feet;
- Do not operate the machine barefoot;
- Do not dip the machine into water for cleaning, or for any other purpose.
- Do not use patch cords in rooms used as bathrooms or have any other form of water flowing in them.
- When unplugging the machine, hold only the connector, then pull it out of the AC receptacle; DO NOT pull by the cord.
- The machine is intended for use in weather controlled environments only; it should not be operated in extreme humidity or in the presence of, or in direct contact with rain, snow or water leaks.
- Any person operating the machine should have sufficient knowledge of the dangers involved in operating an electrical appliance. Children should be kept away and must not be allowed to operate the machine.
- In any case of disability/handicap, please consult with a qualified physician and use sensible judgment prior to operating the machine.

In case drum stops turning you can manually spin the drum for beans evacuation; use the manual crank as shown







INSTALLATION

We recommend preparing the following connections prior to machine installation at the pre-established place where it is intended to operate.

Power Supply

The power supply AC receptacle should be pre-set at a distance not exceeding 20" (50cm) from the counter top. In addition, we recommend installing a thermal magnetic differential breaker suited to the machine's power input and, in any case, having an electrical rating no lower than 20A.
Power supply, load limiting and installation should conform to the local electrical code in your state/area.

Working environment

Due to the extreme heat generated in the roasting process, the area where the machine is operated should be clearly marked. If possible, prevent any unauthorized personnel from accessing the machine.

Both surface and surrounding area should be composed of non-flammable material. In any case, the minimum distance between machine's sides and the nearest object or surface should be not lower than 3.3ft (1.0m).

Working environment should be well lit and clear of any obstacle or hazardous materials. Working environment should contain smoke exhaust venting method, conforming to your local health, fire and safety codes. This includes (but not limited to) the presence of a fire extinguisher.

Machine placement and first operation

Never leave the machine to operate without supervision.
Place the machine so that its rear end is facing a wall.

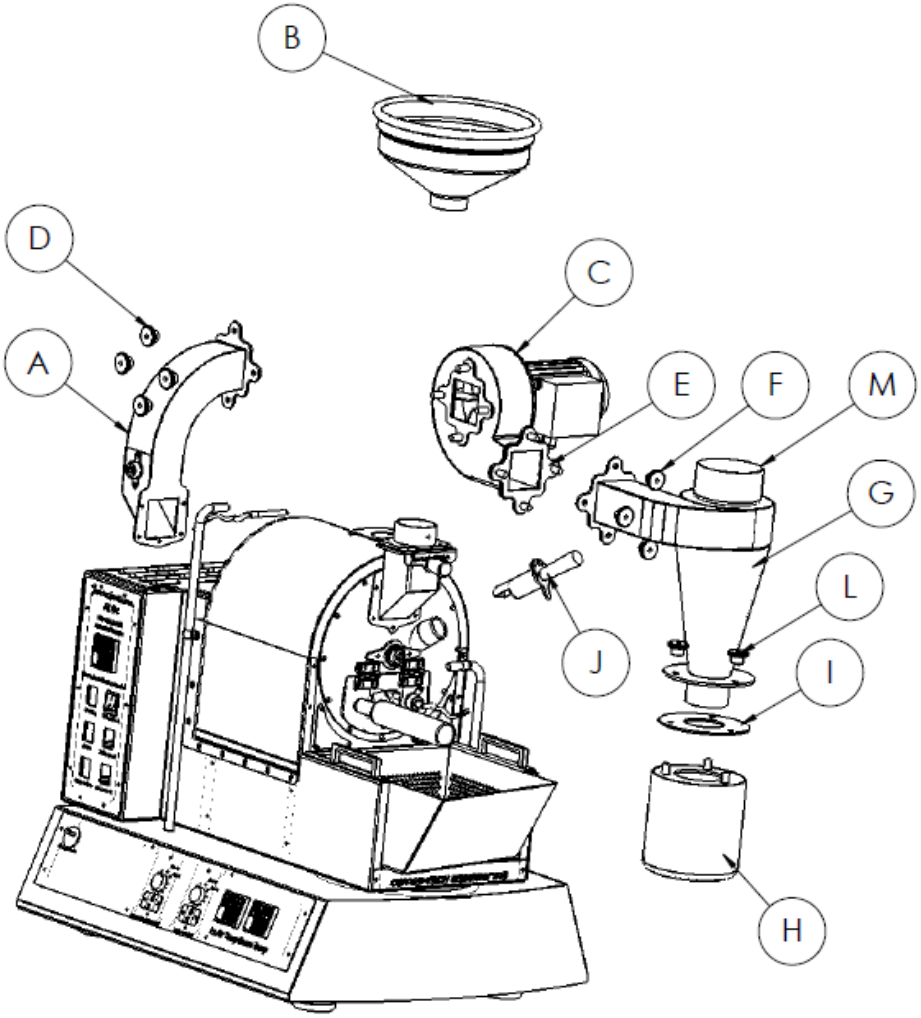
(If your machine has the optional roasting cart, you may disregard the following).
The machine should be installed on a hard, steady surface (such as a counter), away from running water or leaks (see Safety Precautions, page 9).

The machine's cooling and exhaust pipes should be connected to a chimney or other smoke vent system. Vent pipe connection should be made using the adapters provided with this machine.

Plug the machine's AC cord into the AC outlet using the proper approved plug in your country.

Assembling your roaster

- Assemble the 4 legs (**K)** to the roaster's base.
- Place the cooling tray (**N**) in its place.
- Connect the exhaust (**A**) to the machine and tighten the 5 thumb nuts. Note that the gasket is placed between the exhaust and the roaster.
- Connect the blower (**C**) to the exhaust. Note that the gasket is placed on the exhaust outlet flange. Tighten the 4 thumb nuts (**D**).
- Connect the chaff collector (**G**) to the blower flange (**E**). Note that the gasket is placed on the blower flange and tighten the 4 thumb nuts (**F**).
- Connect the bucket (**H**) to the chaff collector. Note that the gasket (**I**) is between the bucket and the chaff collector and tighten the 3 thumb nuts (**L**).
- Place the sampler (**J**) in its housing. Make sure that the "TOP" engraving points upwards during roasting.
- Connect the silo (**B**) to its holder. Use a screwdriver and 8mm wrench to tighten the screw in front of the silo holder.
- Connect the cyclone outlet (**M**) to a duct, chimney or smoke elimination system. **Use only non-flammable materials!**
- For the main chimney use double-walled stainless steel tube 4" inner diameter.



OPERATION

Switch on the machine by operating the side panel control switches in the following order:
* Take care not to exceed the maximum allowed weight (see Specifications, page 3).
** Factory recommended settings can be viewed at the end of this user manual

1. Main Switch (21)
2. Drum switch (20)
3. Turn on Heating 1K, Heating 2K and/or heating 3K (16, 17, 18) – according to batch capacity determine whether to use all three heating elements or less for roasting. In general, all three elements should be used while roasting a full batch.
4. Drum heat limit controller (15) – Set the controller to the desired temperature; once desired temperature is reached insert green beans into drum by sliding drum feed throttle (2) open. Once all green coffee has entered the drum close drum feed throttle fully.
5. You may decide to divide the roasting process into a few stages, like drying and achieving uniform color of the entire batch, before entering into the **final stage** (when heating elements are shut off during or after 1st crack but the beans are still inside the spinning drum). Take a close look at the Pyrex lens in order to follow the change in color uniformity and raise temperature accordingly by scales of 10-20 degrees at the time, allowing time for the beans to absorb the energy. Running too fast with the temperature may result in an uneven roast or conduction burnt marks (called tipping or scorching) on the bean's surface. The same symptom may occur when inserting green beans into too hot a drum. The drum heat limit controller (15) automatically shuts down the heating elements when set temperature is reached.
6. As the beans reach the desired color and development, closely monitor the beans using the sampler (4) and by viewing them through the Inspection lens (9)
7. When reaching 1st crack you may decide to turn off all, or some, of the heating elements in order to achieve better control over the final stage of roasting and prevent the beans from burning out; this can be done also in order to prolong the duration between 1st and 2nd crack (if reached) by turning off only one or two of the heating elements.
8. Just before dropping the beans into the cooling tray turn on the outer cooling switch (19).

All switches have an illuminated indicator light during the "on" position.

Set the sampler in place. Make sure the pointing plate is pointing towards the ground. This is the sampler's roasting position which maintains an empty Drum sample until a sample needs to be collected.

Airflow blower control

The airflow blower speed can be regulated by the frequency inverter (25):

- Turn the dial clockwise for increasing the blower's speed
- Turn the dial counter-clockwise for decreasing the blower's speed (turning the dial all the way to this direction will stop the blower totally).

Drum speed control

The drum speed can be regulated by the frequency inverter (24):

- Turn the dial clockwise for increasing the drum's speed
- Turn the dial counter-clockwise for decreasing the drum's speed (turning the dial all the way to this direction will stop the drum totally).

Let the roasting cycle begin…

With suitable ambient lighting, you should be able to monitor the condition of the roasted bean color through the glass inspection lens (5).
At this stage you may decide to set your high set temperature to stop the heaters, usually at first crack, then allowing the roasted beans to continue by the inertia as well as with the heat produced as a result of the chemical reaction.

When beans color nears the desired tone, use the Drum sample pullout (3) to pull out the sample from the drum without disturbing the roasting cycle.

The correct way to sample the beans using the Drum sampler is:

1. Turn the Drum sample pullout handle 180 degrees from its roasting position (see above);
2. Pull the Drum sample pullout out – be careful not to twist it during this process.
3. Pour the sampled beans onto a clean white plate;
4. Inspect the beans with the bare eye (in adequate lighting) for color and size/volume development.
5. Re-insert the Drum sample pullout back into its sleeve;
6. Should you decide to re-insert the sampled beans into the roasting drum, you may do so through the silo and throttle.

After dropping the beans into the cooling tray (7) and cooling them sufficiently lift the tray using the side handles (9) and pour the beans into an appropriate, clean and dry food-grade container or best if use Coffee-tech's shop silos. Replace the cooling tray in its appropriate place in the machine.

If no further roasting is desired, you may shut down the machine in the following order:

1. Turn off all switches.
2. The machine is now shut down.

CLEANING

General machine cleaning

Normal daily cleaning is done with a dry 2" paint brush and a regular household vacuum cleaner.
Thorough cleaning is performed using a soft cloth and stainless steel or windows cleaning agent. The cleaning agent should not be applied directly onto the machine, but to the cloth.
The recommended material for cleaning the machine outside and inside including the duct piping is **GREEN CLEAN** sourced at coffee-tech.

Beans Tray

Oil residues from coffee beans are in general, less hazardous then cleaning detergents or moisture, so…
The cooling pan should be cleaned only when necessary, using cleaning **GREEN CLEAN.**
Never replace a wet cooling pan in the machine.

Roasting Drum

Never attempt to clean the roasting drum; do not spray any materials or water into the roasting drum

Chaff collector

Chaff collection bucket MUST be cleaned every 5 roasting cycles. In any case, chaff amount in bucket should not exceed more than 1/3 of the bucket's height. This is not a hygienic recommendation but a SAFETY precaution!

Chaff collector cleaning is performed by manually unscrewing the three thumb nuts (13), which hold the chaff collector bucket (14) in place and visually inspecting for any chaff leftovers. If required, use a vacuum cleaner, not your hands, to collect chaff.

Machine exhaust pipes

Exhaust pipes should be cleaned approximately 100 cycles. Pipes discussed are:

1. Exhaust (5) - Connects the airflow blower to the roasting drum.
2. Chaff collector (12) - Used for separating chaff from smoke
3. Chaff collector bucket (10) - Used or collecting chaff while roasting

The exhaust pipes are cleaned by mechanical rubbing the inside of these pipes using a scraper & suitable rounded metal brush.

The machines piping and entire cyclone may be overnight in **GREEN CLEAN,** than rubbed and rinsed with water.

Recommended material for chimney is double walled stainless steel, either 4" or 6" – depending on chimney's length. If chimney is longer than 20 ft., hose should be 6".

MAINTENANCE

Through proper use and care, Coffee-Tech Engineering's roasters do not require ANY periodic maintenance.

FZ-94 Factory Suggested Settings

The FZ-94 pro-lab roaster presents a wide spectrum of roasting capabilities. By controlling individual heating elements, drum speed and airflow you can experiment and experience different thermal treatments. Conduction and convection can be emphasized or balanced by varying the featured controls.

The FZ-94 offers maximum control over the roast process and because of this fact we strongly recommend that you take time to learn and understand the various controls and their effect on the roast development.

Our company's recommended settings for start are:

Drum speed: 0.5

Airflow: -1

Beans insert temperature 155c

After dropping beans into drum:

Set drum temperature to 190

Shut off all heating elements during or after 1st crack (you should be able to hear 1st crack) and monitor batch by using the trier (sampler) until beans evacuation into the cooling tray.

Gradually increasing drum speed and airflow during or after 1st crack is recommended as a starting point but not mandatory.

These are our initial suggested settings for any single origin and/or blend; with time and following trial and error, cupping sessions etc. you will reach, by yourself, the optimal profiles for your coffees.

The final result is in one place only – in the cup.