CONAIR
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USERGUIDE
Form 542 2/82 FP

Dehumidifying Dryer

Model D-60

⚠ **WARNING - Reliance on this Manual Could Result in Severe Bodily Injury or Death!**

This manual is out-of-date and is provided only for its technical information, data and capacities. Portions of this manual detailing procedures or precautions in the operation, inspection, maintenance and repair of the product forming the subject matter of this manual may be inadequate, inaccurate, and/or incomplete and cannot be used, followed, or relied upon. Contact Conair at info@conairgroup.com or 1-800-654-6661 for more current information, warnings, and materials about more recent product manuals containing warnings, information, precautions, and procedures that may be more adequate than those contained in this out-of-date manual.

TABLE OF CONTENTS

D-60 DEHUMIDIFYING DRYER INSTRUCTIONS

EQUIPMENT DESCRIPTION

Conair Dehumidifying Dryers provide hot, low dewpoint air, circulated in a closed system, for fast moisture pick-up from hygroscopic plastic materials.

Drying air is passed through cartridges containing a molecular sieve desiccant where moisture is deposited. The dry air is then heated to a pre-set temperature so that air entering the drying hopper is always hot and "thirsty". Moisture picked up from the plastic material passes through a return hose from the drying hopper and once again passes through the molecular sieve desiccant.

Regeneration is accomplished by passing room air, heated to a higher temperature, through the desiccant and purging the moisture out of the system.

THE DESICCANT ASSEMBLY - See Figure 1

The "hollow core" desiccant cartridge design efficiently exposes the molecular sieve desiccant to moist air returning from the drying hopper. Water molecules in the return air are trapped in the desiccant, while low dewpoint air leaves the cartridge and enters the dryer's air heater compartment. Flowing over the heating elements, the dry air is brought back up to the selected temperature and re-enters the bottom of the drying hopper. There the heated, "thirsty" air again picks up moisture from the plastic pellets.

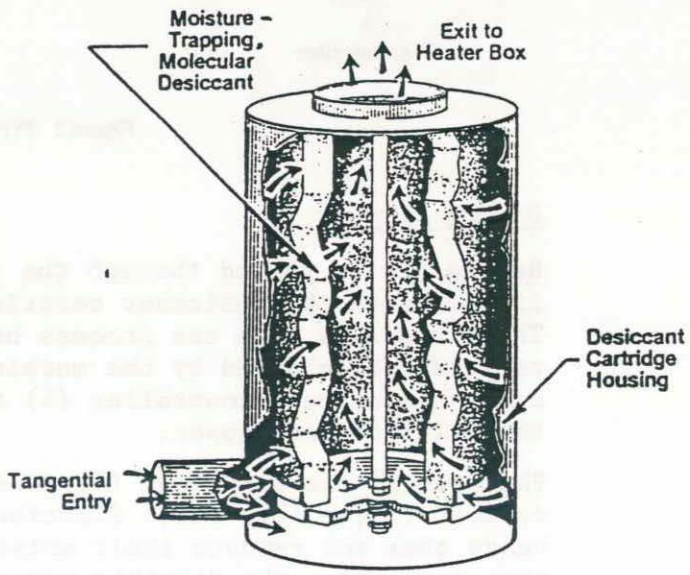

Figure 1 DESICCANT ASSEMBLY

Before a desiccant cartridge can become completely saturated with trapped moisture, it switches "off-stream" to a high-heat regeneration condition, and is prepared for its next cycle through the process air stream. The core-type design and compact size enables the cartridge to regenerate more quickly, using less power.

The dryers have been designed with a timed cycle capable of handling the worst conditions.

The desiccant has an almost unlimited life, but should it ever need replacement due to accidental contamination, cartridges may be easily replaced in less than 15 minutes. (See "Maintenance")

OPERATIONAL SEQUENCE

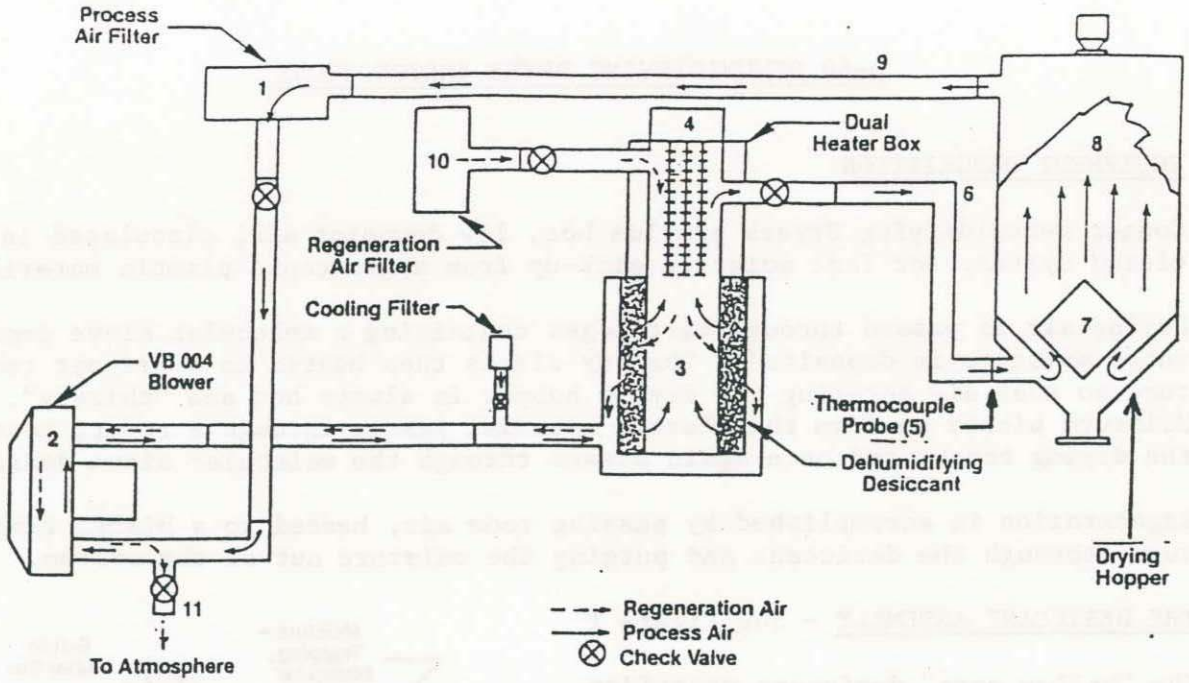

Figure 2 TYPICAL AIR FLOW PATTERN

Drying Circuit

Return air is pulled through the process filter (1) by the blower (2) and delivered into the desiccant cartridge (3), where it is thoroughly dehumidified. Then it passes into the process heater (4), where the air is heated to the temperature selected by the machine operator on the control panel. A solid state temperature controller (5) assures heating to the proper temperature at the inlet of the hopper.

The process flexible hose (6) conducts the air into the drying hopper to the deflector cone (7), which distributes the flow evenly through the pellets (8), heats them and removes their moisture content. The moisture bearing air is then drawn into the flexible return hose (9), and the entire cycle is repeated.

Process Temperature

The process temperature is monitored and controlled at this inlet of the hopper. If a thermometer is used it will be noted that during the regeneration/cooling cycle the process temperature will be reduced. This has no effect on the drying process. The temperature will come back up to process temperature once the dryer switches to the process cycle.

Regeneration Circuit

As the desiccant tank approaches saturation the dryer switches from process cycle to regeneration cycle to purge the desiccant. At this time the blower will reverse rotation, temporarily shutting off air flow to the drying hopper.

The blower (2) draws air through a filter (10) and over the heater element (4) where it is brought to a very high temperature. The heater air flows through the "wet" cartridge (3) and purges it of moisture. The moist air is then blown through the exhaust (11) and out of the system. (For summer operation, or operation in air conditioned rooms, the exhaust air may be exhausted outdoors. However, care should be taken that the vent is large enough and does not restrict air flow.)

Cooling Circuit

Immediately following regeneration, the fresh cartridge must be cooled before switching to process cycle. This is accomplished by de-energizing the heaters and continuing to run the blower passing cool air through the desiccant.

VERY IMPORTANT: The air filters assure that only clean air flows through the drying circuit. Fines carried in the return air stream may eventually clog the filter, which can decrease efficiency. Check filters frequently and clean as necessary (see "Maintenance).

Timing Cycle

Although the timing cycle is preset at the factory, it may be necessary to re-adjust the timer cams if they are tampered with. The following instructions indicate the proper cam positioning.

The dryer has a complete cycle time of 72 minutes, which breaks down into three separate cycles as follows:

Process Cycle	- 55 minutes
Regeneration Cycle	- 6 minutes
Cooling Cycle	- 11 minutes

It is important that the timing of the different cycles is not tampered with in order to insure proper regeneration and processing conditions.

Should it be necessary to readjust these cycles, the cams should be set as close as possible by following the instructions in Fig. (3). After this, the dryer should be run through the complete regeneration and cooling cycle in order to insure the proper adjustments. Further adjustments can be made if necessary. It is not necessary to run through the process cycle; if the regeneration and cooling cycle have been properly adjusted, the process cycle will automatically be adjusted.

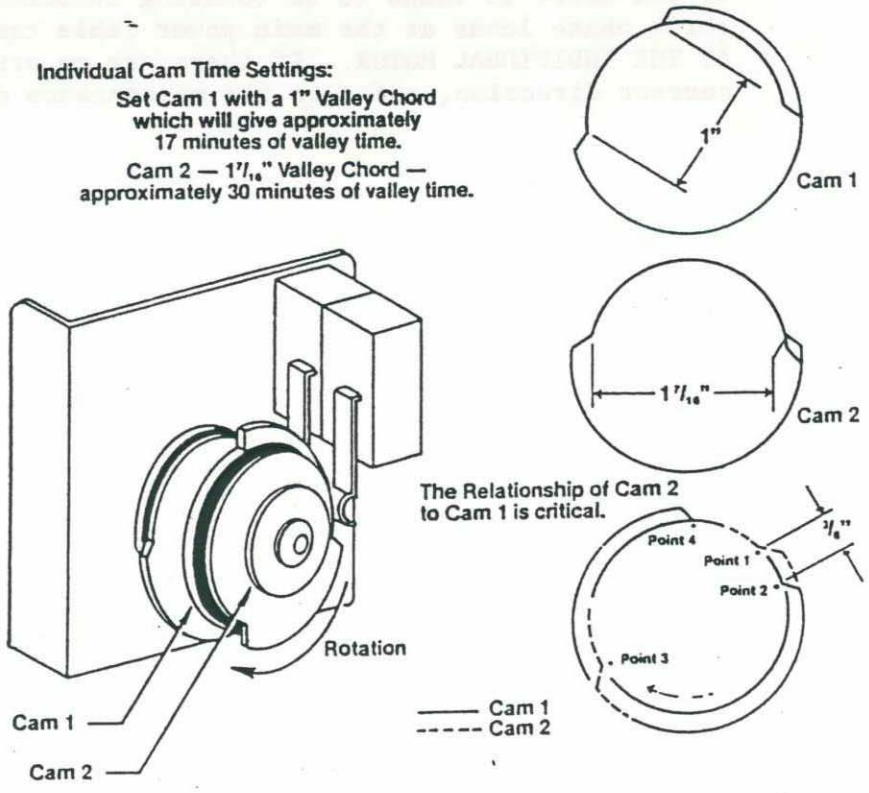

Figure 3 TIMER: 2 CAM — RAYCHRON 72 Min.

ELECTRICAL INFORMATION

The appropriate wiring diagram for your model of dryer is included in the back cover of this manual. It provides complete details on wiring and an electrical parts list.

15 feet of power cable less plug is supplied with each dryer. Make sure your dryer is connected to the correct voltage. Verify voltage by checking the name plate on side of control box. All units are pre-wired at the factory for service on one voltage only:

DO NOT ATTEMPT TO ALTER VOLTAGE CONNECTIONS!

Blower Rotation

Most dryer models now have arrows on the motor housings indicating correct direction of rotation during process cycle. Simply "jog" the machine by pushing the "START" button and then immediately pushing the "STOP" button. Observe direction of rotation by viewing cooling fins on the end of the motor as it comes to a stop. It is important that the process cycle light on front of control box is energized at the same time the blower is rotating in the process cycle as described above.

Direction may also be determined by checking the direction of air flow through process outlet and return inlet. During process cycle there should be a positive pressure at the outlet as well as the process light being energized.

If the motor is found to be rotating incorrectly, simply reverse any two of the three phase leads at the main power cable connection. DO NOT CHANGE CONNECTIONS AT THE INDIVIDUAL MOTOR. If there are no arrows on the motor housing indicating correct direction, refer to the maintenance check list under "Blower Rotation".

INSTALLATION

Dryer

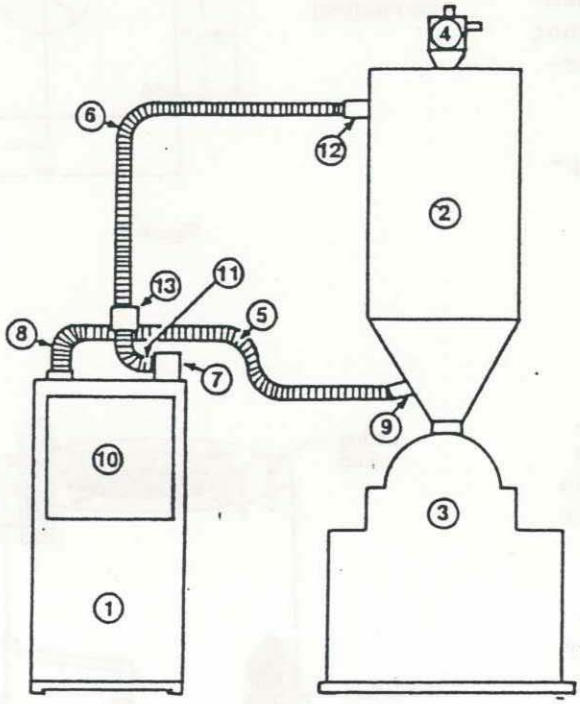

Figure 4 TYPICAL DRYER INSTALLATION

The dryer should be located as close to the hopper as possible (no more than 10 feet away) to reduce heat loss and energy consumption. The front of the control panel and the process filter should be easily accessible.

Clamp the process air flexible hose (5) to the dry air outlet (9). Clamp the other end of the hose to the dry air inlet at the bottom of the drying hopper (10).

Install the return air flexible hose (6) between the return air outlet on top of the drying hopper (13) and the return air inlet on the dryer (12).

Do not allow either of the flexible hoses to crimp or kink. If the hoses are too long, cut them to fit. Also, it is advisable to support long sections of hose where possible by tying to overhead structural members.

Prior to installing the drying hopper, an adapter plate must be fitted to the throat of the process machine. (This plate may have been provided with the hopper if ordered that way.) Figure 5 shows the relative dimensions of the plate. If you cannot fabricate the adapter plate yourself, or have it done locally, send Conair a template of the throat and we will make the adapter plate (price on request).

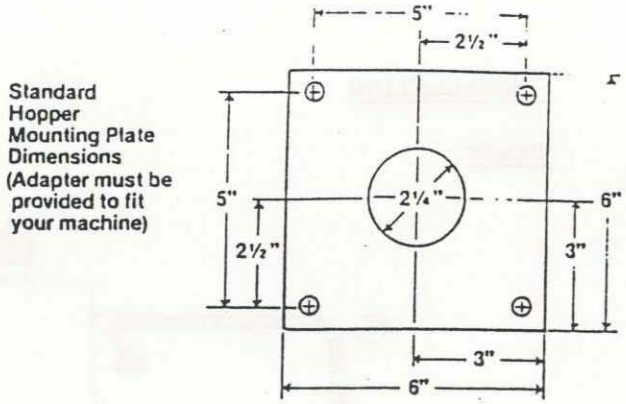

Figure 5

Drying Hopper

NOTE: Before installing hopper, check inside carefully for parts which may have been placed inside for shipping. Check also for air inlet and outlet obstructions. Inspect screen cone, and clean hopper thoroughly to remove rust prohibitor and any dirt which may have accumulated during shipping.

1. Bolt adapter plate to throat of molding machine.

2. Bolt hopper to adapter plate.

3. Attach vacuum loader to top of hopper, using clamping lugs provided. It is not necessary to drill holes in the top of the hopper. If loader flange does not rest flat on top of hopper, provide gasketing to prevent air loss.

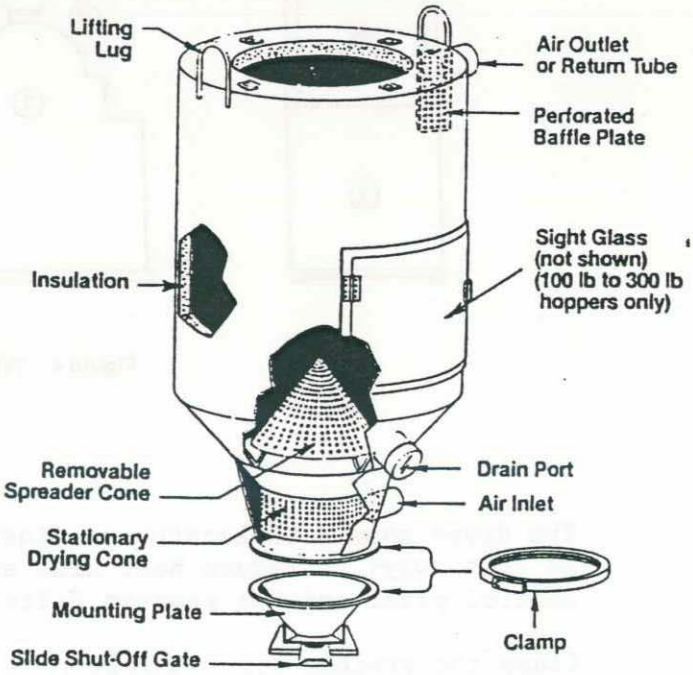

Figure 6 DRYING HOPPER

Dryer Start-up

1. Adjust temperature control on panel to the proper drying temperature for the material being processed.

2. Turn main disconnect switch to "ON" position.

3. Push "START" button.

Dryer Start-up (continued)

Check for proper blower rotation (see "ELECTRICAL INFORMATION").

NOTE: A "cold" dryer may take up to 72 minutes to reach full operating capacity. If the unit has not been used in some time, allow sufficient time for warm-up.

Also, if the dryer has just been installed or has not been operated for a long period of time, the desiccant tank may have reached moisture equilibrium with the surrounding air, in which case it is conceivable that you could actually add moisture to the resin which is being dried. In order to avoid this, the desiccant cartridge should be regenerated by turning the machine on while connected to the hopper (without any material in it) and let it run "close-looped" for approximately 72 minutes. During this period, the process controller should be turned down to 100°F. At this point, load the hopper and start drying. Be sure to set the controller at the proper drying temperature.

Dryer Shut-down

In order to take the "Heat Edge" off of the heater box before shutting the dryer off, the controller should be turned down to approximately 100°F for 5 minutes before pushing the stop button.

There is a high temperature switch located in the heater box, which, if exposed to an elevated temperature, will shut the dryer down. Should the dryer be shut down in the middle of a regeneration cycle of a high temperature process cycle, this switch may open up. If this occurs, the dryer cannot be started again until the thermal switch has cooled down.

MAINTENANCE

Filters

The process, regeneration and cooling filters serve to protect the desiccant from contamination by dirt, dust and fines. If contamination occurs, drying efficiency will be severly diminished. Therefore, it is very important that the filter canister be cleaned at regular intervals. Length of time between cleanings will depend on the type of granulate being processed and the working environment, but typical intervals range from three to fourteen days.

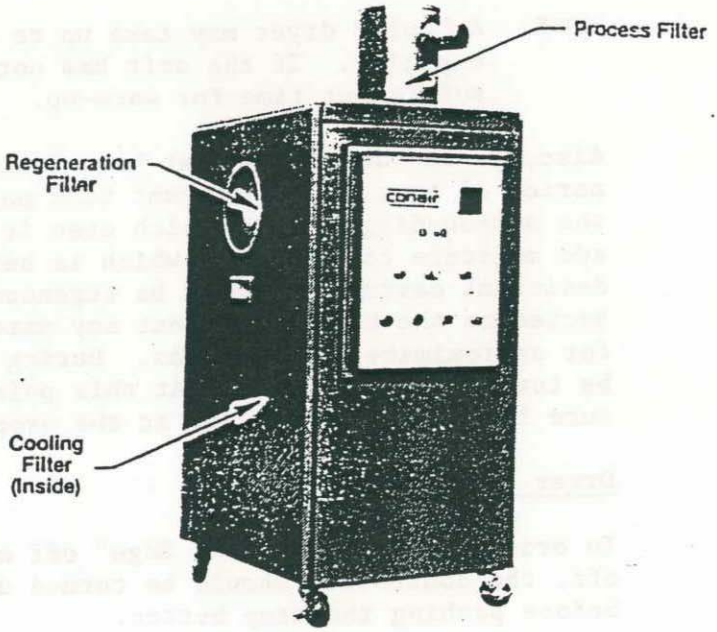

Figure 7

When the plastic material being processed contains a large proportion of dust and fines, an optional auxiliary filter is recommended.

To Clean Filters:

Process Filters

First, shut down dryer. This must be done so that dirt and humidity are not drawn into the drying circuit. Then, remove filter housing from top of dryer and slide out filter cartridge. Use compressed air to blow the dirt and fines out. Always blow from inside-out. Make sure filter is properly seated.

Regeneration and Cooling Filters

These filters should be cleaned in a similar manner as the process filters.

NOTE: During cleaning, check carefully for holes and tears in filter paper. If defects are found, replace old filter with new one before placing dryer back into operation. New filter cartridges may be ordered from Conair.

Contamination is the principal cause of desiccant failure; if the desiccant cartridge should become contaminated, drying efficiency will be reduced.

Desiccant Cartridge Replacement (See Figure 1)

The desiccant cartridge is located below the heater box in the desiccant cartridge housing. Remove the 6 hex bolts which join the heater box and the desiccant cartridge housing. Remove the heater box and swing it to the side (as electrical connections permit). The desiccant cartridge will now lift up out of its housing. Install new tank and reverse above procedure to re-assemble.

Heating Elements

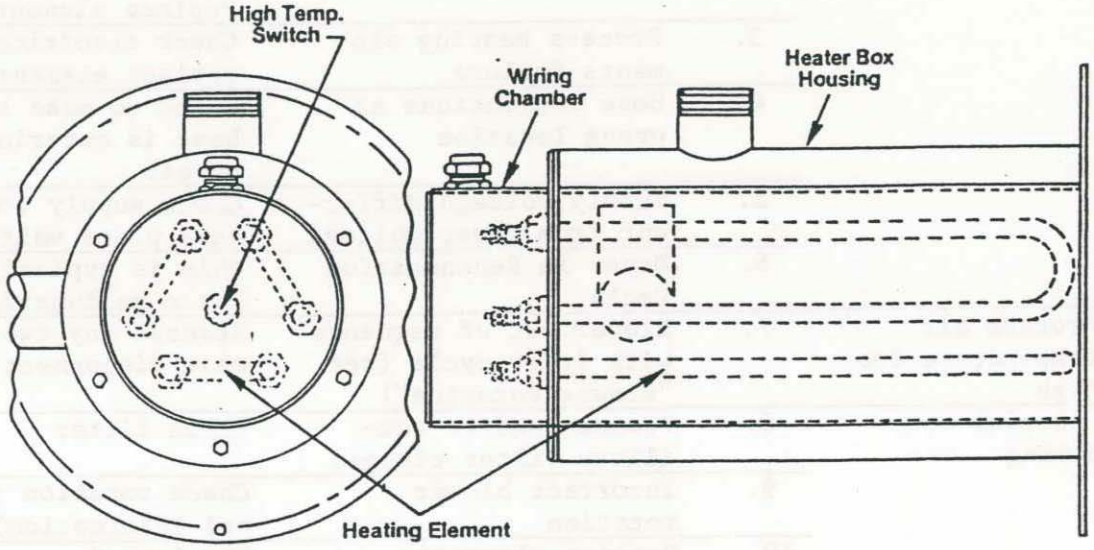

Figure 8 HEATER BOX ASSEMBLY

The heating elements in your Conair dryer require no routine maintenance. After a very long term of service, however, elements may eventually require replacement. Should the elements need replaced care should be taken in rewiring the new elements the same as the defective ones.

Caution: Before servicing dryer be sure to switch main disconnect to "OFF" position.

Lubrication

All motors are lubricated for life, and require no lubrication.

Check Valve Maintenance

The check valves used in the dryer do not require any regular maintenance, but if it becomes necessary to remove them, care should be taken when they are re-installed, in order that the valve is positioned in such a fashion that the check plate will swing straight down. If the valve is tilted, there is the possibility of binding.

TROUBLESHOOTING

DIFFICULTY	ITEM NO.	PROBABLE CAUSE	CORRECTIVE ACTION
Process air temperature too low.	1.	Incorrect temperature selected on control panel	Dial in correct temperature
	2.	Controller malfunction	Check electrical connections; replace elements if necessary
	3.	Process heating elements failure	Check electrical connections; replace elements if necessary
	4.	Hose connections at wrong location	Check to make sure delivery hose is entering bottom of hopper
	5.	Supply voltage different from dryer voltage	Check supply voltage against name plate voltage
	6.	Dryer in Regeneration Cycle	This is typical of this dryer. Not a malfunction.
Process air temperature too high	7.	Blower out of sequence with dryer cycle (see "Blower Rotation")	Reverse any two leads at main disconnect
Material not drying	8.	Process and/or auxiliary filter clogged	Clean filter
	9.	Incorrect blower rotation	Check rotation (See Electrical Information)
	10.	Heating elements inoperative	See Item 3
	11.	Elevated return temperature	Check return temperature, should be 125° - 130°F (see High Temp Dryer Instructions)
	12.	Material residence time in hopper too short	Drying hopper too small for material being processed; replace with larger model (See Drying Data Sheet 935)
	13.	Moist room air leaking into dry process air	Check all hose connections and tighten if required. Check hoses for cracks; replace as necessary. Check filter covers for tightness; secure
	14.	Desiccant contaminated	Replace desiccant cartridge (See "Maintenance")
Premature blower failure	15.	High return temperature	Use Aftercooler
	16.	Cooling filter plugged	Clean filter

MAINTENANCE CHECK LIST FOR DRYERS

Important points which should be checked on a periodic basis:

Air Circuits

1. Are the hoses in good condition:
2. Do all the hoses have a proper fit on the dryer and hopper?
3. Are all the gaskets in place and in good condition (on drying hoppers and on filters)?
4. Are all the hoses properly connected, not only externally but also internally?

It is important to maintain a "closed loop" system in order to avoid high moisture-laden ambient air from entering the system and prematurely loading the desiccant tank. Under operating conditions, normally the return dew-points will be between 0°F and +20°F with a closed system. Under these same conditions, the ambient dewpoint may be +65°F.

Filter condition

(Dryer must be shut off prior to removal of filters to avoid drawing fines and/or dust into blowers and desiccant tanks.)

1. Are the process filters clean and sealing properly?
2. Is the regeneration filter clean?
3. Is the cooling filter clean?

In order to have the amount of air flow necessary for proper regeneration and processing, the filters must be relatively clean. Cleaning of the filter should be done quite frequently when first installed until some logical cleaning schedule can be determined, depending on such variables as rates of material being processed, fines in the material, and amount of regrind material being used with virgin.

Regeneration Temperature

In order to get the proper temperature profile across the desiccant tank, we need to have an inlet temperature of 425°F. This, in conjunction with the proper air flow, are the two main points for adequate regeneration. Check the heater element amperage (check electrical diagram for specifications on your particular model):

HEATERS	BLOWER
L1_____	T1_____
L2_____	T2_____
L3_____	T3_____

Tanks must be packed properly using the correct procedure and desiccant. Proper drying may be negated by using incorrect packing procedure or desiccant. Conair has a trade-in exchange program for routing replacement of tanks - call Conair Parts Department toll free at 800-458-1960 for details.

Blower Rotation

The rotation is merely checked by determining whether the pressure at the inlet of process filter is negative at the same the process light is energized on the front of the control panel. If there is no air flow, this would indicate the regeneration mode and the regeneration/cooling cycle light on the front of the control panel should be energized. Should the rotation be incorrect, simply reverse any two (2) of the three (3) power leads.

Voltage

1. Does line voltage agree with name plate voltage?
2. Is voltage in secondary side of transformer wired for 115 volt?

Return Line Air Temperature

What is the return air line temperature from the top of the drying hopper to the dryer? This temperature should not exceed 130-140°F. It may be necessary to use a return air line cooler (consult Conair).

This check list is a general guideline for servicing the automatic dehumidifying dryers manufactured by Conair. Understanding the basic points which are outlined should make the troubleshooting and maintenance of the dryer easier.

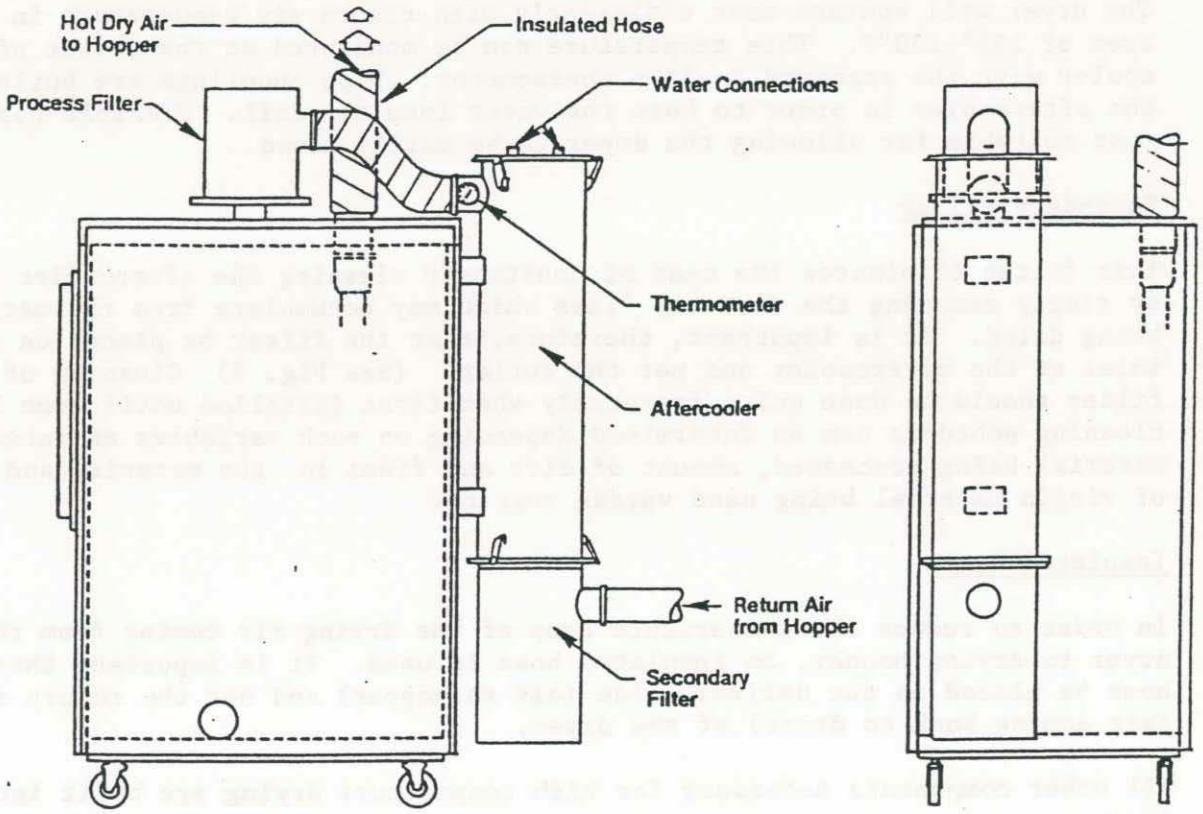

Figure 9 HIGH TEMPERATURE ARRANGEMENT

GENERAL

Essentially, the high temperature dryer is the same as the standard dryer with the exceptions of several auxiliary parts necessary to properly handle the higher temperature. These auxiliary parts will be discussed in further detail in the following paragraphs.

The high temperature dryer is intended to be used in applications where the drying temperatures range from 150°F to 350°F. Higher temperature ranges can be achieved. To do this, consult Conair for proper sizing.

AUXILIARY EQUIPMENT

The auxiliary equipment necessary for high temperature drying includes:

Aftercooler

Utilizing tap or tower water in the range of 55°-70°F, we cool the return air from hopper to an acceptable level before introducing it back into the desiccant tank where moisture is removed from the cool air. In a few cases where

material rates are low, it may be necessary to use 40°F coolant temperatures supplied by a chiller in order to lower the high return temperatures. In any case, the flow rates of the cooling agent will range from 1 to 3 GPM. The dryer will operate most efficiently with return air temperature in the area of 125°-130°F. This temperature can be monitored at the outlet of aftercooler with the standard in-line thermometer. Pipe couplings are built into the aftercooler in order to hose the water into the coil. Flexible hoses are most suitable for allowing the dryer to be easily moved.

Secondary Filter

This filter eliminates the need of constantly cleaning the aftercooler coils by simply removing the dirt and fines which may accumulate from the material being dried. It is important, therefore, that the filter be placed on the inlet of the aftercooler and not the outlet. (See Fig. 9) Cleaning of the filter should be done quite frequently when first installed until some logical cleaning schedule can be determined depending on such variables as rates of material being processed, amount of dirt and fines in ths material and amount of virgin material being used versus regrind.

Insulated Hose

In order to reduce the temperature drop of the drying air coming from the dryer to drying hopper, an insulated hose is used. It is important that this hose be placed on the delivery side (air to hopper) and not the return side (air coming back to dryer) of the dryer.

All other components necessary for high temperature drying are built into the dryer.

OPERATION

Because of the higher temperature, prolonged periods of residence time in drying hopper at high temperature should be avoided. If it is necessary to stop the operation for some time, the temperature should be lowered in order to avoid bridging (material becoming soft and tacky and sticking together, not allowing an even flow in hopper).

This information is supplied in conjunction with the standard instruction manual. The basic operating sequence and electrical data has already been covered in the standard manual.

We're Here to Help

Conair has made the largest investment in customer support in the plastics industry. Our service experts are available to help with any problem you might have installing and operating your equipment. Your Conair sales representative also can help analyze the nature of your problem, assuring that it did not result from misapplication or improper use.

How to Contact Customer Service

To contact Customer Service personnel, call:

From outside the United States, call: 814-437-6861

You can commission Conair service personnel to provide on-site service by contacting the Customer Service Department. Standard rates include an on-site hourly rate, with a one-day minimum plus expenses.

Before You Call ...

If you do have a problem, please complete the following checklist before calling Conair:

- ❒ Make sure you have all model, serial and parts list numbers for your particular equipment. Service personnel will need this information to assist you.
- ❒ Make sure power is supplied to the equipment.
- ❒ Make sure that all connectors and wires within and between control systems and related components have been installed correctly.
- ❒ Check the troubleshooting guide of this manual for a solution.
- ❒ Thoroughly examine the instruction manual(s) for associated equipment, especially controls. Each manual may have its own troubleshooting guide to help you.
- ❒ Check that the equipment has been operated as described in this manual.
- ❒ Check accompanying schematic drawings for information on special considerations.

Additional manuals and prints for your Conair equipment may be ordered through the Customer Service or Parts Departments for a nominal fee.

Equipment Guarantee

Conair guarantees the machinery and equipment on this order, for a period as defined in the quotation from date of shipment, against defects in material and workmanship under the normal use and service for which it was recommended (except for parts that are typically replaced after normal usage, such as filters, liner plates, etc.). Conair's guarantee is limited to replacing, at our option, the part or parts determined by us to be defective after examination. The customer assumes the cost of transportation of the part or parts to and from the factory.

Performance Warranty

Conair warrants that this equipment will perform at or above the ratings stated in specific quotations covering the equipment or as detailed in engineering specifications, provided the equipment is applied, installed, operated and maintained in the recommended manner as outlined in our quotation or specifications.

Should performance not meet warranted levels, Conair at its discretion will exercise one of the following options:

- Inspect the equipment and perform alterations or adjustments to satisfy performance claims. (Charges for such inspections and corrections will be waived unless failure to meet warranty is due to misapplication, improper installation, poor maintenance practices or improper operation.)
- Replace the original equipment with other Conair equipment that will meet original performance claims at no extra cost to the customer.
- Refund the invoiced cost to the customer. Credit is subject to prior notice by the customer at which time a Return Goods Authorization Number (RGA) will be issued by Conair's Service Department. Returned equipment must be well crated and in proper operating condition, including all parts. Returns must be prepaid.

Purchaser must notify Conair in writing of any claim and provide a customer receipt and other evidence that a claim is being made.

Warranty Limitations

Except for the Equipment Guarantee and Performance Warranty stated above, Conair disclaims all other warranties with respect to the equipment, express or implied, arising by operation of law, course of dealing, usage of trade or otherwise, including but not limited to the implied warranties of merchantability and fitness for a particular purpose.