

# The **Extru-Tech**nician

## Dryer efficiency and maintenance



**EXTRU-TECH, INC.**

In the [last issue](#), we discussed some primary drying theories and [efficiencies](#). This issue, we focus our attention on maintenance and the everyday issues of keeping a dryer running for [optimal performance](#).

In the competitive world of value-added extrusion/production, all too often we get bogged down with technical terms, theories, lab analysis, charts, graphs and dialogue riddled with complicated algorithms. However, we must not overlook the simple solutions and discussions that help fix problems our customers confront on a daily basis. So, we have decided to develop a series of articles that address these issues and ensure trouble-free and efficient operations.

**continued on p. 4**

## CONTENTS

Drying efficiency  
and maintenance  
p. 1

Extru-Tech events  
p. 3

Airflow issues  
p. 5

Gas dryers vs.  
steam dryers  
p. 6

Routine dryer  
checklist  
p. 7

## Our goal: your optimum performance

We are extremely pleased to bring you the winter/spring issue of **The Extru-Technician**. Since beginning this publication, we've discovered something – we really enjoy putting this together for you. It gives those of us here at [Extru-Tech, Inc.](#) an opportunity to sit down and discuss among ourselves what we believe are the most important topics, ideas and information that will benefit you, our current and future customers.

When we sat down to discuss this issue, we realized that sometimes simple things can have a sizeable impact on your bottom line. So with that in mind, in this issue we have turned our attention to an oft-overlooked area – dryer performance and maintenance. It is a simple topic, but an important one. After all, increasing your bottom line is always a goal, and whether that goal is achieved as a result of a simple initiative or a complex one shouldn't matter.

So thank you for taking the time to read this issue. We look forward to bringing you our best thoughts, ideas and direction for success in upcoming issues.

As always, your comments and feedback mean a great deal to us, so please let us know what you think. Your input helps us with content for future issues, so speak up; we want to hear from you. Our goal is to see you achieve and maintain optimum performance.

Sincerely,

*R. Scott Krebs*

R. Scott Krebs  
Executive V.P., C.O.O.  
[Extru-Tech, Inc.](#)

Copyright 2009, Extru-Tech, Inc. All rights reserved. Copying or other usage of content from this publication is expressly forbidden without the permission of Extru-Tech, Inc., P.O. Box 8, 100 Airport Road, Sabetha, KS 66534, USA, Phone: 1.785.284.2153, Fax: +1.785.284.3143; [extru-techninc@extru-techninc.com](mailto:extru-techninc@extru-techninc.com) [www.extru-techninc.com](http://www.extru-techninc.com)

## EXTRU-TECHNICIAN

### Extru-Tech, Inc. Corporate Office

PO Box 8  
100 Airport Road  
Sabetha, KS 66534  
+1.785.284.2153 Tel  
+1.785.284.3143 Fax  
[extru-techinc@extru-techinc.com](mailto:extru-techinc@extru-techinc.com)  
[www.extru-techinc.com](http://www.extru-techinc.com)

### Extru-Tech, Inc. Administrative Staff

LaVon Wenger, President/CEO

Don Wenger,  
Executive Vice President

R. Scott Krebs,  
Executive VP/COO

### Extru-Tech, Inc. Marketing & Editorial Staff

Norm Schmitt,  
Corporate Sales Manager  
[norms@extru-techinc.com](mailto:norms@extru-techinc.com)  
+1.785.284.2153

Will Henry,  
Technical Sales Engineer  
[willh@extru-techinc.com](mailto:willh@extru-techinc.com)  
+1.785.284.2153

### A WATT/Petfood Industry Custom Publication

### Extru-Tech, Inc. Equipment Sales Staff

Bill Huseby, Director of North  
America Sales  
[billh@extru-techinc.com](mailto:billh@extru-techinc.com)  
+1.913.522.9014

Bob Annan,  
Director of European Sales  
[boba@extru-techinc.com](mailto:boba@extru-techinc.com)  
+1.785.284.2153

Oswaldo Munoz, Director of  
Latin America Sales  
[osvaldom@extru-techinc.com](mailto:osvaldom@extru-techinc.com)  
+56.2.955.25.74  
Santiago-Chile

Enzhi Michael Cheng, PhD,  
Director of Asia Sales  
[michaelc@extru-techinc.com](mailto:michaelc@extru-techinc.com)  
+1.785.285.0703

Doug Coverdale,  
Sales Engineer  
[dougc@extru-techinc.com](mailto:dougc@extru-techinc.com)  
+1.785.284.2153

### Extru-Tech, Inc. Part Sales Staff

Darryl Becker  
[darrylb@extru-techinc.com](mailto:darrylb@extru-techinc.com)  
+1.785.284.2153

Mike Dunlap,  
[miked@extru-techinc.com](mailto:miked@extru-techinc.com)  
+1.785.284.2153

## Extru-Tech Events

You can find [Extru-Tech, Inc.](http://www.extru-techinc.com) experts and personnel at these upcoming events:

**Petfood Forum 2010**, April 12-14, 2010, Hyatt Regency O'Hare Hotel, Chicago, Illinois, booth number 200. The premier event for the petfood industry offers even more learning and networking opportunities than ever. Contact: Norm Schmitt, corporate sales manager, [Extru-Tech, Inc., norms@extru-techinc.com](mailto:norms@extru-techinc.com), Tel:+1.785.284.2153.



Don't forget to stop by  
booth 200 at Petfood  
Forum 2010 in Chicago!

**Australasia Aquacultures 2010**, May 23-26, 2010, Hotel Grand Chancellor, Hobart Tasmania. A showcase of premium aquaculture products. "Keeping Pace with Change" - Biennial International Conference and Trade Show. Feature Presentation on "Advancements and Critical Process Management in Aquaculture Feed Extrusion" by Will Henry of [Extru-Tech, Inc.](http://www.extru-techinc.com) Contact: Will Henry, [willh@extru-techinc.com](mailto:willh@extru-techinc.com), Tel: +1.785.284.2153.



**Aqua Sur 2010**, October 20-23, 2010, Puerto Montt, Chile. One of the most important aquaculture meetings in the southern hemisphere. Contact Oswaldo Munoz, [osvaldom@extru-techinc.com](mailto:osvaldom@extru-techinc.com), Tel: +56.2.955.25.74.

## On the cover:

Routine maintenance and process checklists help keep dryers and other equipment performing at optimal levels.

Cover images by Maksym Yemelyanov, fotolia.com and L\_Avi, sxc.hu

## continued from cover

### Testing and data

Once a product is developed, testing needs to be done to run it correctly, and documentation needs to be completed for each specific product. All extruder operating data must be established for each product: feed rate, water and steam addition settings, product density, etc.

Important data for the dryer include product rate entering the dryer, product density, product size, protein and fat levels, drying temperatures for each zone (if the dryer has more than one) and retention time. All this takes some testing to establish. Once a product is established and documented, the operator will have data to refer to each time he runs product.

Now, let's look at some basic things that affect drying:

- **Drying temperature**—most petfood and aquatic foods are dried at temperatures ranging from 240-290 degrees F;
- **Retention time the product is actually in the dryer**—the longer you can keep the product in the dryer (and not stack it too deep for air to flow through the beds), the better. On [two-pass dryers](#), we recommend that

customers try not to exceed 4 inches on the first pass and 6 inches on the second pass;

- **Air velocity through the product beds**—on older [dryers](#), air velocity is fixed with a constant-speed circulation fan. On products with light densities, it becomes necessary to slow down this velocity to avoid moving the product around on the conveyor bed and creating a hole in the product bed that allows the air to short-circuit through this area;
- **Exhaust air**—too low a level of exhaust air will allow the air to become saturated and force the operator to elevate the drying temperature above the desired temperature range to drive the moisture out of the product and be able to exhaust it;
- **Product spread**—if the spreader is not adjusted and operating properly, the product can be dispersed too deep or too shallow on the ends and cause moisture variation. On larger [dryers](#) with osculating spreaders, if the conveyor travels too fast it becomes necessary to increase the speed of the osculation to get an even spread. If it is operating too slow for the conveyor speed, ridges will form as the spreader travels back and forth on the conveyor bed. This is referred to as “zing” because it looks like a “Z” as it passes back and forth, leaving ridges and low spots across the bed;
- **Dryer pans that have perforations blinded off with product buildup**—when dryer perforations are blinded off, the dryer becomes more like an oven with no air circulation, and the temperature has to be elevated to compensate. ■

# Air flow issues

**M**echanically, a [dryer](#) needs to be in good condition, with no air leaks around airlocks and all panels securely in place. Any chance for air to short-circuit around the product (rather than passing through it) will greatly increase moisture variation and lower drying efficiencies.

Every dryer—from the most basic to the most sophisticated—requires good maintenance practices to gain [efficiencies](#). Frequently, we encounter situations where the operator is required to periodically increase the drying temperatures (for no apparent reason) because he is not able to dry their product. Trays or pans that have perforated holes (especially smaller perforations) tend to build up and blind off over time (see photos). If buildup



Examples of pans that are blocked off because product fines have built up in the perforated holes.



If buildup in the holes is present, the trays need to be cleaned to gain back the air circulation that was lost.

in the holes is present, the trays need to be cleaned to gain back the air circulation that was lost. To determine if this is the case, hold a light under the tray and look down through the tray.

If product is run through the dryer too fast (short of retention time), this can also require temperature to be increased above desired levels to try to dry the product. ■

# Gas dryers vs. steam dryers

**T**he burners on a gas dryer must be kept clean and burning properly. It is recommended to have or install filters on the combustion air blower to keep the burner operating properly. The filters must be cleaned routinely. If the burner is lacking air (due to dirty filters), the flame will be orange and have long tips. If allowed to run this way long enough, the burner will be damaged. A proper flame will burn blue with only slight yellow tips, if any.

Whenever dryer temperatures are elevated, sanitation becomes an important issue. Fines buildup inside the dryer—along with too high of operating temperatures—increases the risk of a potential dryer fire.



This is an example of a burner (taken apart) that was run without a filter over a long period.

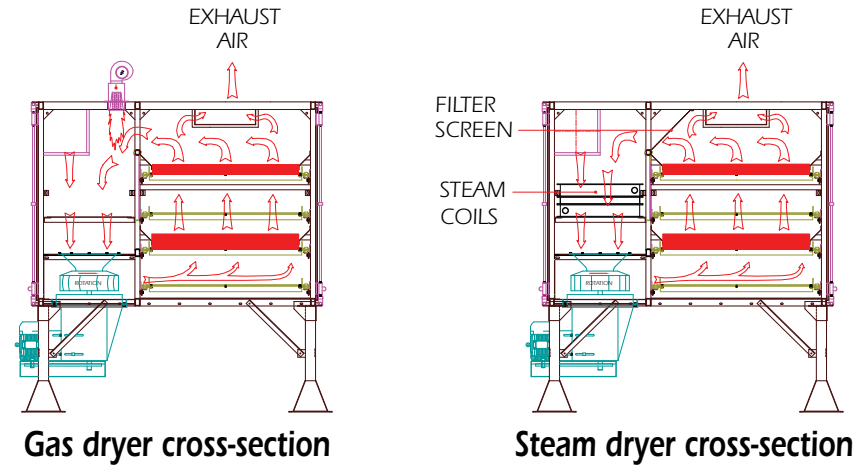


Figure 1. Cross sections of gas and steam dryers

In a steam dryer, air has to pass through the filter screen and steam coils.

Steam dryers are used in countries where natural gas or LP gas is not available or is cost prohibitive; they require more cleaning and maintenance than gas dryers. In addition to fines buildup in the dryer pans, filter screens prior to the steam coils (as well as the steam coils themselves) also accumulate buildup, which restricts air flow and reduces the drying efficiency. Filter screens must be cleaned routinely or the dryer capacity will be drastically reduced.

Figure 1 shows cross sections of typical gas and steam dryers. As the diagram depicts, in a steam dryer, air has to pass through the filter screen and steam coils. ■

# Routine dryer checklist

To ensure your [dryer](#) is operating efficiently—or if you are troubleshooting a problem—check the following:

- 1. Dryer pans**—are they plugged?
- 2. Spreader operation:**
  - Are both edges even?
  - Is the chain tight and all linkages in sound condition?
- 3. Operation**—what are the bed depths and retention time?
- 4. Operation temperatures**—check to ensure these are correct.
- 5. Air flow**—measure this and air saturation levels:
  - **Gas dryers**—check burner conditions: Is the flame blue? If there are filters on the combustion air blowers, are they clean?
  - **Steam dryers**—check the condition of the steam coils: Are the filters clean? Are the coils clean? Can the desired operating temperature be reached?
- 6. Panels and airlocks**—are all panels and airlocks securely in place?
- 7. Fans**—check rotations. Are all belts in good condition and properly tensioned? Is there any excessive vibration?



© Ewa Walicka. fotolia.com

- 8. Ducting and dampers**—are they all in good condition?
- 9. Performance**—have you experienced any noticeable changes in dryer performance?

## Look to ETI for support

At [Extru-Tech, Inc.](#) (ETI), we're all about [service and support](#). Our expert technicians and service staff can help you establish



checklists and maintenance protocols to ensure your dryer and other equipment runs at optimal performance levels, with minimal downtime. Don't hesitate to contact us for all your drying process and equipment needs. ■

## Impact of Process Hardware on Petfood Safety coming in the next issue of

The **Extru-Technician**

### Learn about:

- Sanitary Downspout
- Sanitary Base – easy to clean, reduce build-up
- Sanitary Dryer Design
- Proper Waste Recovery.

Watch for the issue in your inbox later this year!

If you don't already subscribe to *The Extru-Technician*, [sign up](#) for free!

Would you like to have  
The **Extru-Technician**  
delivered directly to your inbox?

[Click here](#) to reach our online subscription page.

If you know someone who would benefit from a subscription to  
**The Extru-Technician**, feel free to pass this link along to them!





# Drying Profitability.

Superior finished product with energy consumption reduced up to 20%.

Industry leading AirFlow II technology literally smashed dryer efficiency standards when introduced. This exclusive technology simply operates at the highest efficiency today. Efficiencies accomplished through the ability to independently manage air flows and temperatures within each dryer zone have taken product quality to levels that benefit customers in every corner of the world.

How we manage energy today will determine the kind of world we live in tomorrow. What started as pure innovation at Extru-Tech has grown into dryer/cooler technology that an entire industry now uses to gauge efficiency. Now that's innovation driven by Extru-Tech.



## Corporate Office

P.O. Box 8 • 100 Airport Road • Sabetha, KS 66534, USA

Phone: 785-284-2153 • Fax: 785-284-3143

[extru-techinc@extru-techinc.com](mailto:extru-techinc@extru-techinc.com) • [www.extru-techinc.com](http://www.extru-techinc.com)

