



16 MONTH FIELD TEST FOR GRAIN STORAGE SPOILAGE AND PRODUCT RETENTION IN A HOT AND HUMID TEXAS CLIMATE

This report represents the results of an extensive and actual real-world test to determine if the 360 "Tunnel Series" multi patented venting system could effectively reduce grain spoilage over an extended period in environmentally hostile conditions. It was to be a "worst case scenario" to show what the limits of our products capabilities were. We told John from the beginning that we believed this was pushing the limits of what we thought our product would be capable of (since feed and grain are moisture laden products to begin with) and we would like to have results documented whether good or bad.

In the interest of full disclosure:

All text in this report is unredacted and in John's own words (even a final email). There may be some slight errors in grammar or spelling, but we feel it is important to print everything as received and not twist words to influence results.

John also paid the going rate for his vents as any normal retail customer would. He has not been paid for his reports but did them as a service to others who have similar problems and are looking for realistic solutions. After going through the first 4 seasons and experiencing no grain loss and significant heat dissipation, we asked John to install our prototype solar fan system to see if it might make a difference in heat dissipation. Results into the second year of testing showed that grain loss was still zero and unaffected, and heat and humidity remained at acceptable levels and were relatively the same with or without fan power.

Accompanying documents show the entire data collected with emphasis on climate conditions such as time intervals, variations in daily heat and humidity and an overall synopsis of the conclusion.

Prepared by:
Bob Cravens
President - 360 Products North America Inc.

> On Aug 24, 2020, at 1:48 PM, Bob Cravens wrote:

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> Good day John

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> Beautiful weather here in Oregon this year and as always I'm sure gonna hate to see it end. Covid sure screwed things up but at least I enjoyed being home more than ever before.

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> I wanted to thank you again for all the input you've given us through the past year and a half. It has made it so easy to help other people look at results from the field and not just our R&D results.

> I just have a couple of questions when I do this report that I would like to be accurate on from your perspective.

> 1. Have you had any grain loss since these went on your container yet?

> 2. Did the fans make any significant difference that you can tell?

> 3. What would you say your average grain loss was before the vents went on?

> 4. All of the data from you seems to point the temperatures and fume mitigation have been tolerable all the way through compared to what they were.

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> That's about it. I just wanted to make sure I wasn't putting information out there that wasn't true to what you experienced.

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> I will wait until I hear from you before I start this report.

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> Bob

>

> Sent from my iPhone

The following page represents our last emails regarding testing. We felt all bases had been covered, grain loss had been contained, heat and humidity dissipation were more than acceptable, and we could conclude our experiment.

We have copied the emails exactly as written and received and have changed no spelling or grammar.

Sent: Tue, Aug 25, 2020 6:14 am
Subject: Re: Test results complete

Bob,

This is great timing because I just used my last 1 ton sack of feed. Here are the answers to your questions:

> 1. Have you had any grain loss since these went on your container yet?

Since using your venting system I have not suffered any feed loss! This is a miracle because my losses were substantial prior to the installation of your systems.

> 2. Did the fans make any significant difference that you can tell?

This is hard to tell since the system was working well before. I have to believe it has helped because it is moving so much air even with out the wind. For example we have had 2 weeks here of extreme heat with very little wind. It is great knowing that the system is pulling air through even without the wind.

> 3. What would you say your average grain loss was before the vents went on?

My container holds 18 tons of feed (18 one ton sacks). Prior to the installation of your system when I would get the the back half of the sacks I was experiencing as much as 30% loss. This was caused by extreme heat and condensation falling from the roof. Your system has virtually eliminated this condition.

> 4. All of the data from you seems to point the temperatures and fume mitigation have been tolerable all the way through compared to what they were.

Absolutely 100% correct. Prior to the installation of your system the heat and noxious fumes inside the container was unbearable. Just to go in and recover feed the doors had to be opened and vented out for some time before it was safe to go in. Now I'm in and out even during the hottest days (100+) without issue.

Bob, thank you again for a wonderful, affordable product that works!!!

John



Photo submitted by John Harper



2 YEAR UPDATE

2 full years of testing showed grain loss was effectively cut from 20-30% to 0% at any given time. Timeline of data is covered below to show performance in seasonal temperature and humidity variance. Moisture readings have been consistent at 14% per bag.

Early Spring 2019

Prior to installing the 360 Passive vent system:

- Outside container temp was 46° F, 41% humidity
- Inside container – 52° F, 82% humidity
- Note: The humidity had reached as high as 93% inside the container

After installation of 360 passive vent system:

Measurement 1:

Outside Container: 62° F, 78% humidity

Inside Container: 74° F, 46% humidity

Measurement 2:

Outside Container: 73° F, 77% humidity

Inside Container: 89° F, 39% humidity

Measurement 3:

Outside Container: 73° F, 86% humidity

Inside Container: 76° F, 63% humidity

****Measurement 4:**

Will be covered at the end of this testing report

Measurement 5:

Outside Container: 55° F, 99% humidity

Inside Container: 57° F, 69% humidity

Measurement 6:

Outside Container: 68° F, 72% humidity

Inside Container: 82° F, 39% humidity

Measurement 7:

Outside: 53° F, 46% humidity

Inside Container: 65° F, 43% humidity

April 22, 2019**Measurement 8:**

Outside: 75° F, 70% humidity

Inside Container: 94° F, 36% humidity

May 17, 2019**Measurement 9:**

Outside: 80° F, 76% humidity

Inside Container: 98° F, 40% humidity

Comments: "Another good reading and the feed looks good. I really think this is helping." ~John

May 20, 2019**Measurement 10:**

Outside: 85° F, 74% humidity

Inside Container: 99° F, 45% humidity

Comments: "Here is another good reading from today. I have also attached a picture of the inside of my container so you can see the sacks of feed." ~John



June 20, 2019

Measurement 11:

Outside: 90° F, 67% humidity

Inside Container: 110° F, 35% humidity

July 5, 2019

Measurement 12:

More good readings.

Outside: 92° F, 64% humidity

Inside Container: 111° F, 36% humidity

August 1, 2019

Measurement 13:

Outside: 93° F, 63% humidity

Inside Container: 116° F, 34% humidity

Comments: "Every time I walk into my container now, I just smile that I'm not being overwhelmed with toxic fumes!" ~John

August 13, 2019

Measurement 14:

Outside: 99° F, 47% humidity

Inside Container: 118° F, 33% humidity

August 27, 2019

Measurement 15:

Outside: 95° F, 56% humidity

Inside Container: 114° F, 36% humidity

Comments: "I can't explain what a difference your product has made for my container. On a day like yesterday with high heat and humidity the inside of that container would normally be unbearable. Thousands of pounds of feed, a sealed container, high heat and humidity created toxic fumes that were overwhelming. Your venting system has corrected these issues and now my container is comfortable to enter even on these extreme days. Thank you for a great product!" ~John

Measurement 16:

Outside: 76° F, 97% humidity

Inside Container: 75° F, 77% humidity

Updated March 2020: "There is still no noticeable moisture forming inside the container as seasonal readings continue." ~John

Updated April 2, 2020: John will provide more details related to heat dissipation in the coming months. Refer back to this post for up-to-date information.

July 24, 2020

Measurement 17:

Outside: 86° F, 43% humidity

Inside Container: 97° F, 52% humidity

August 31, 2020

Experiment Conclusion

Note: Periodic updates with John continued until April 26th, 2023 to see if results were continuous as he cycled through several containers full of grain. Results were always positive and grain moisture was recorded between 13.5 and 14% on average. No grain loss was experienced for the 4 year test period.

****Notes:** Measurement 4 was taken on a day/night temperature swing of over 50° F (80° + day and a drop to 30° at night) with very little noticeable wind present. Some moisture formed on the top inside edges of the ceiling. This is the worst-case scenario for all passive vents. None will perform well in this condition although the 360 system will continue to create a minor air exchange situation, regardless of outside wind velocity.

We hope this information is of use to you in looking at your own container situation. This is an idea of what to expect given the variances of climate conditions that mother nature throws at us. We also appreciate the feedback of our customers like John and encourage you to contact us with your questions and concerns.

- Bob Cravens and the Team at 360 Products