THE SMART CHOICE TO PROTECT YOUR VALUABLE FEED

SILOSTOP®
PROVEN BY SCIENCE  PREFERRED BY FARMERS™
Silostop's specifically engineered oxygen barrier film has been scientifically proven to protect forage and grains from oxygen — **over 60 times more than traditional plastic covers.**

Applied immediately after harvest and packing, Silostop barrier film blocks oxygen from penetrating, allowing high quality fermentation of the feed and reducing surface spoilage of the pile or bunker.

Use of Silostop results in minimal feed loss, and in turn, protects and returns producer investments in feed inputs on dairy operations.

Spoilage fed to a dairy herd results in depressed dry matter intake, potential rumen damage, and deprives cows of essential nutrients needed for milk production.

Healthy rumen function begins with feed that provides energy, protein, minerals and vitamins — all of which are protected when you use Silostop.

With less spoiled feed to pitch you can save labor and time that can be utilized in other areas of your operation.

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**Paul Natzke**
Owner and Feed Manager
Wayside Dairy, Wayside, WI
Milks 1,425 cows

"Silostop is a ‘sleep good at night’ product. I don’t worry about my forages after I put it on my bunkers. Once it’s on there — we’re sealed, we’re good."
The most critical factor in maintaining high-quality silage and minimizing dry matter loss is the control of oxygen exposure.

**When oxygen interacts with your silage it does two things:**

1. **Plant Cell Respiration**
   
   \[ C_6H_{12}O_6 + 6 O_2 \rightarrow 6 CO_2 + 6 H_2O \]

   Converts the good sugars in your bunkers into carbon dioxide and water. This loss in carbon, escaping into the air, results in measurable dry matter loss.

2. **Aerobic Deterioration**

   Encourages growth of yeasts which use sugars and lactic acid in the silage and increases pH levels.

   Increased mold and undesirable bacterial growth.

   Risk of mycotoxins.
“We’ve tried products that don’t work, but Silostop was one that we tried and it was a benefit for the farm. The biggest difference we’ve seen is in the amount of spoilage in the stack. It basically saved us 4-6 inches on our pile. That ends up a lot of tons by the time you’re done with a stack of silage.”

FLOYD BORK
General Manager
Badger Creek and Quail Ridge Dairy, CO

Milks 4,100 cows

All plastic covering is not created equal. In fact, two different brands of plastic covers placed side by side may look identical. However, beyond what the naked eye can see, each plastic is composed of a specific blend of ingredients.

The unique composition of Silostop clear barrier film has been independently proven to be at least 60 times more effective.

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**Dry Matter Loss/Shrink**
- Conversion of nutrients to carbon dioxide (Invisible Loss)
- Spoilage (Visible Loss)

**Poor Quality Silage**
- Lower Sugar & Starch Levels
- Increased pH Levels
- Mold Growth & Mycotoxin Formation

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**Oxygen Transmission Rate (OTR) Comparison**

<table>
<thead>
<tr>
<th>SAMPLE</th>
<th>THICKNESS</th>
<th>OTR ASTM D3985 CM/MMO/24H 100% O&lt;sub&gt;2&lt;/sub&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conventional White/Black cover</td>
<td>5 mil</td>
<td>1811</td>
</tr>
<tr>
<td>Silostop Clear 2-Step</td>
<td>1.8 mil</td>
<td>30</td>
</tr>
<tr>
<td>Silostop 1-Step White/Black cover</td>
<td>4.5 mil</td>
<td>10</td>
</tr>
</tbody>
</table>

Source: Michigan State University

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**Dry Matter Loss**

**Silostop**
- Less than 10% loss

**Standard Silo, Plastic Covering**
- 20% loss

**No Covering**
- 50% loss
Silostop is the only oxygen barrier film proven in independent and university research trials to demonstrate superior performance over traditional plastic covers.

Research confirms the superiority of Silostop compared to regular plastic covers.

Silostop Reduces Dry Matter Loss and Visible Surface Spoilage Versus a Standard Plastic Cover

Reduction in DM loss (reduction in shrink) compared with standard plastic

Reduced surface spoilage in both corn silage and HM corn

Virtually no visible discoloration or surface spoilage in Silostop sealed bunkers

Visible mold and aerobic spoilage in regular plastic sealed bunkers, particularly in top 12 inches of corn silage

Better fermentation profiles, with lower pH values and higher concentrations of lactic acid

TABLE 1: Comparison of 6-mil plastic cover and Silostop on pH, fermentation profile, estimated loss of organic matter (OM), and ash content at 0 to 18 inches from the surface at 240 days post-filling.

<table>
<thead>
<tr>
<th>Item</th>
<th>CORN SILAGE</th>
<th>HM CORN</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Standard Plastic</td>
<td>Silostop</td>
</tr>
<tr>
<td>DM content, %</td>
<td>29.2</td>
<td>31.6</td>
</tr>
<tr>
<td>pH</td>
<td>4.28</td>
<td>3.78</td>
</tr>
<tr>
<td>Estimated OM loss</td>
<td>34.8</td>
<td>17.8</td>
</tr>
</tbody>
</table>

1 Estimated loss of OM, calculated from ash using the equations described by Dickerson et al. (1992a)
2 Ash content of the pre-ensiled samples were 7.6% for the corn silage & 1.8% for HM corn

Sealing Strategies for Bunker Silos and Drive-over Piles
LARRY L. BERGER1 and KEITH K. BOLSEN21 Professor, University of Illinois; 2Professor Emeritus, Kansas State University Proceedings Silage for Dairy Farms: Growing, Harvesting, Storing, and Feeding, NRAES Publ.181. Ithaca, NY
“I heard about Silostop and then reviewed the university research. With Silostop the top layer of my silage has little to no spoilage and I won’t feed poor quality silage to my cows. As a result, I’ve seen fewer health problems and hospital cases in the herd.”

KIM KOEHN
Manager
High Plains Dairy LLC, Plains, KS
Milks 3,850 cows

A Single and Double Layer of Standard Covers is No Match for Silostop’s Oxygen Barrier Benefits

Loss of DM tended to be lower for Silostop than for either single or double layers of regular plastic

There was no visible top surface mold on the silos covered with Silostop

The percentage of inedible silage was markedly lower for Silostop than for both single plastic and double plastic

TABLE 2: A single layer of Silostop can reduce surface mold and has the potential to reduce total dry matter loss during ensilage compared to single and double layer application of a standard plastic cover.

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Item</td>
<td>Total DM ensiled (kg)</td>
<td>Total DM at end of storage period (kg)</td>
<td>Loss of DM (%)</td>
</tr>
<tr>
<td></td>
<td>8.45</td>
<td>7.23a</td>
<td>14.4</td>
</tr>
<tr>
<td></td>
<td>8.72</td>
<td>7.63a</td>
<td>12.5</td>
</tr>
<tr>
<td></td>
<td>8.82</td>
<td>8.17a</td>
<td>7.37</td>
</tr>
<tr>
<td></td>
<td>15.3a</td>
<td>9.30a</td>
<td>0.00b</td>
</tr>
<tr>
<td></td>
<td>20.1a</td>
<td>14.0a</td>
<td>3.50b</td>
</tr>
</tbody>
</table>

Means with different superscripts are different (P<0.05)

Silostop Preserves Forage Quality Over a Standard Cover

Higher nutritional quality

Lower NDF and ADF concentrations and high starch content

Reduced organic matter (OM) loss on the top and sides of piles

Better fermentation profiles

Lower pH values and higher concentrations of lactic acid

TABLE 3: Effect of standard plastic cover and Silostop on fermentation, nutritional quality and estimated mean loss of OM between 0 and 45 cm from the surface at 200 days post filling.

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>DM, g/kg</td>
<td>297</td>
<td>312</td>
<td>252</td>
<td>315</td>
</tr>
<tr>
<td>pH</td>
<td>4.46</td>
<td>3.80</td>
<td>4.97</td>
<td>3.84</td>
</tr>
<tr>
<td>Estimated OM loss, g/kg</td>
<td>401.2</td>
<td>318.2</td>
<td>378.2</td>
<td>241.8</td>
</tr>
<tr>
<td>NDF</td>
<td>513.3</td>
<td>480.8</td>
<td>557.7</td>
<td>461.3</td>
</tr>
<tr>
<td>ADF</td>
<td>320.3</td>
<td>298.0</td>
<td>354.3</td>
<td>288.0</td>
</tr>
<tr>
<td>Starch</td>
<td>224</td>
<td>298.0</td>
<td>153</td>
<td>251</td>
</tr>
<tr>
<td>Ash</td>
<td>52.7</td>
<td>45.2</td>
<td>57.7</td>
<td>45.7</td>
</tr>
<tr>
<td>Lactic acid</td>
<td>21.0</td>
<td>34.2</td>
<td>13.2</td>
<td>38.7</td>
</tr>
<tr>
<td>Acetic acid</td>
<td>32.7</td>
<td>51.6</td>
<td>21.5</td>
<td>26.4</td>
</tr>
</tbody>
</table>

Effect of triple co-extruded film (TCF) on losses during the ensilage of ryegrass.


Effect of triple co-extruded film (TCF) on losses during the ensilage of ryegrass.

**Silostop Clear 2-Step Oxygen Barrier Film**
- Thin, 1.8 mil, impermeable film prevents oxygen entry
- Lightweight, strong and easy-to-use
- Cost-effective, with minimal silage loss
- Clings to the contours of the silage surface
- Very ‘forgiving’ in less than ideal situations
- Silostop Clear 2-Step Oxygen Barrier film must be protected from sunlight with a second layer that provides UV light protection (e.g., Using Silostop Anti-UV Nets or regular silage covers).

**Silostop White-on-Black 1-Step Oxygen Barrier Cover**
- 4.5 mil, silage cover
- Strong and easy-to-use
- Combines patented oxygen barrier within a traditional white-on-black cover, with UV light protection
- Convenient, one-step coverage
RELY ON THE SILOSTOP PRODUCT SYSTEM

Silostop offers a complete line of products to address specific forage management needs.

Silostop Gravel Bags
- Built for long life
- Specifically designed for superior bunker sealing
- Convenient and easy to handle
- Fill with pea sized round stone to allow for water drainage
- Standard gravel bags reduce need for tires and seal edges and seams of bunker
- Face gravel bags designed to seal the feed face, during feed out

Silostop Protective Nets
- Strong, long-lasting protection for silage covers with a woven structure allowing for wind to pass through without lifting.
- Nets help prevent physical damage caused by birds, rodents or hail.
  
  **Open Net**
  - Light passes through, so they can be used over any UV light protected film
  - Open Bag Nets protect silage bags from physical damage

  **Anti-UV Net**
  - Protects from UV light when combined with Silostop Clear 2-Step film
FREQUENTLY ASKED QUESTIONS

“We’ve seen a 100% improvement in the feed quality of the top layer of our bunker since using Silostop. The quality of our feed starts at the bottom of the bunker and goes all the way through to the top.”

DIRK APPEL
Owner and Feed Manager
Spruce Lanes Dairies Ltd., Alberta, Canada
Milks 240 cows

Return on Investment

What kind of ROI can I expect? There are many variables from operation to operation, and from crop to crop. Using data available from university research and on-farm experience, the following return on investment can be achieved with Silostop.

<table>
<thead>
<tr>
<th>Financial Benefit</th>
<th>Additional Net Value of Silage (After Silostop Cost)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Reduction in dry matter loss</td>
<td>1.20 $/ton</td>
</tr>
<tr>
<td>2. Improved surface quality</td>
<td>1.30 $/ton</td>
</tr>
<tr>
<td>Total</td>
<td>2.50 $/ton</td>
</tr>
<tr>
<td>ROI &gt; 6:1</td>
<td></td>
</tr>
</tbody>
</table>

Labor Benefit

1. Reduced time placing tires
2. Reduced labor if spoilage is removed

Ask your Silostop representative to learn more about how Silostop can benefit your bottom line.

Oxygen Barrier Protection

Aren’t all thin, clear films the same? No. Differences between plastic films are not visible to the eye, but are proven in oxygen barrier lab test results; oxygen barrier capabilities can only be measured in a standard lab test conducted by experienced personnel. Levels of oxygen barrier protection achieved by thin film varies from little barrier to nearly 100 percent barrier protection.

Does my feed need the level of oxygen barrier that Silostop provides? Silostop protects the value of feed and delivers benefits — like reduced dry matter loss and decreased spoilage. Silostop has been extensively researched and proven by a number of universities internationally. Silostop reduces the dry matter loss in the outer 1.5 to 3 feet of silage by 50 percent or more compared to regular bunker covers. Research using films with a lower level of oxygen barrier has shown that they offer some benefit, but not to the extent that Silostop delivers.

What is the difference between Clear 2-Step Film and White-on-Black 1-Step approaches? Both systems provide the same level of oxygen barrier protection for feed, provided perfect conditions are met. Because silage production is rarely perfect, the use of the Clear 2-Step system is recommended. This system provides more consistent results in most farm situations. The thin film provides greater oxygen barrier protection while forming to the surface of the silage. This provides a tighter seal from air that might leak in from the edges. In addition, when two layers of film are used, the overlaps can be staggered to minimize susceptible oxygen entry points.

Protective Nets

Why use protective nets and gravel bags? Protective nets offer protection from physical damage such as birds, rodents and hail. Nets allow wind to pass through and do not “billow”, therefore helping to eliminate tires when combined with Silostop film. Gravel bags provide a better seal than tires, as well as a more concentrated weight that helps to prevent oxygen from entering near the edges.

Can I just use a net to replace tires on my bunker? Tires provide a weight of around 4 lbs (64 oz) per square foot to the sheet and surface of the silage and help keep the plastic cover in contact with the feed. Nets are sometimes utilized to replace tires on bunkers, but only weigh a maximum of 1oz per square foot. They do not provide sufficient weight to replace that of tires. The result can be feed with inconsistent quality and in many cases of poorer quality.
Application

Do you have any application tips? Yes; application tips are included in the Silostop Quick Start Guide packaged with every roll of Silostop. The guide also can be downloaded from our website at www.silostop.com.

Can I walk on the thin clear film? Yes; Silostop plastic films can be walked on. Because of the high quality of raw materials used to manufacture Silostop, our films are more resistant to damage than regular films of the same or greater thickness. The clear, thin film can be walked on as you would with regular silage plastic covering.

Is it difficult and time consuming to cover with two sheets of plastic? No. Applying two layers of plastic protection does not take much more time than applying one layer.

What about when dealing with wind?
To cover in windy conditions, try to cover early in the morning before the wind has started blowing. When unfolding the film, hold it low and only fasten it on one edge. Holding and fixing one edge allows the wind to blow the film out. Strategic weights can be applied if required while the second cover is opened out over the top.