



A NEW GRAINPRO PRODUCT:

‘TRANSAFELINER’™

A gas- and watertight liner for “transit fumigation” of shipping containers and prevention of condensation

Shipping containers containing costly commodities are moving world wide from one climate to another. While they are on the move the ambient climate conditions change whereas the commodity inside the container can become infested or suffer from changes in moisture content due to the changes in the ambient conditions.

GrainPro’s TranSafeliner™ provides protection against moisture ingress and condensation and simultaneously enables environmentally friendly fumigation of the commodity transported, thus ensuring arrival of the commodity to destination without infestation and without condensation or moisture ingress.

Fumigation:

The gas tight TranSafeliner™ is an efficient gas barrier for O₂ and CO₂. Once the container is loaded either manually, by forklift or in bulk, the commodity stored will either generate its own “modified atmosphere” or in certain cases and under specific conditions, insertion of CO₂ into the TranSafeliner™ may be required.

While the container is shipped fumigation will take place and on arrival the TranSafeliner™ may be opened, without the risk of any hazardous gas to operators or personnel. TranSafeliner™ is an ideal solution for organic commodities.

Self generated modified atmospheres by insect infestation

Many commodities such as grains, beans and pulses contain large populations of insects, even when fumigated. The usual exposure times in commercial fumigation are too short to kill insect pupae, larvae and eggs, which easily hatch in the commodity during a journey lasting several weeks. Commodity traders face embarrassing situations when fumigation was supposedly performed at origin and at arrival visible infestation was observed resulting in complaints and claims.

Given the heat and moisture levels in shipping containers, the “hidden” insect population will rapidly develop. While doing so inside the gastight TranSafeliner™ this population will cause rapid depletion of O₂ and a sharp increase in CO₂, thus controlling and killing itself.

This “hermetic” storage principle is successfully applied in other GrainPro products for many years.

Self generated modified atmosphere by commodity respiration

Commodities with a high fat and oil content will rapidly generate high CO₂ concentrations, especially when exposed to heat and when having an above equilibrium moisture content (as often occurs in commercial situations). For instance cocoabeans of 7.5% M.C. will develop rapidly CO₂ levels of 40-50% in a few days, especially at high temperatures prevailing in shipping containers. The modified atmosphere will control all levels of infestation and ensure arrival of the container to destination without infestation.

The result of the self generated modified atmosphere can be easily checked on arrival of the container with the help of a GrainPro Oxygen Analyzer; thus this “double check” ensures that the insect population in the container has been effectively controlled.

Prevention of Condensation

During transport condensation may occur as a result of enhanced convection currents prevailing inside the container due to the heat gradient that develops between the top and the wall-floor sections of the container.

Excess of moisture is converted into water droplets at the roof of the container and drips on the surface of the shipped commodity as well along the walls of the container, causing damage to the commodity

Condensation is prevented by use of the TranSafeliner™. This “sleeve” made of 100µ multilayer PE/PA prevents translocation of moisture from the commodity into the container atmosphere and prevents the ingress of any moisture.

After loading, the liner is left loose and tight to the bags. In a normally loaded container there is always a space of at least 10-20 cm (4-8”) between the roof and the bags. This is the headspace layer of air that remains under the influence of convection currents enhanced by temperature gradients. The worst cases of condensation occur when the containers are exposed to the sun reaching container roof temperatures of 40-50°C and more during the day and cooling to 15-20°C during the night. These temperature variations significantly enhance air movement by convection currents that cause translocation of moisture from the unprotected commodity (without sleeve) on the roof of the container.

The most dangerous situation is when a heated headspace of 40°C or more absorbs moisture from the commodity.. There is a tendency of that headspace air to equilibrate to the same relative humidity as of the commodity. At 40°C and 70% RH the absolute water content of air is 36 g water/kg air while when it cools to 20°C it is only 10 g/kg air.

The difference is deposited on the container roof translocated there by convection air currents, and then on the commodity. When this heated headspace is isolated from the

commodity, meaning having no supply of water; its water content remains no more than 14 g/kg. This moisture depleted atmosphere is achieved by the isolating effect of the TranSafeliner™ that renders temperature gradients at the headspace of the container harmless. **When there is no source of water supply there is no condensation.**

Installation

- By using a strong fan causing the liner to be stuck to the container wall
- Using cable ties and tape to hang the liner to the loops at the top corners of the container. While loading the liner is pulled from the loops and will remain loose on top of the commodity.

After loading the opening of the TranSafeliner™ is stretched horizontally and subsequently sealed with a special gas tight tape provided with the tape.

Reusable and recyclable

TranSafeliners™ are made of recyclable plastics and can be reused as long as undamaged.

Small punctures can be repaired with the special tape.

Specification of gas barrier:

		Test method	Units	Values
Thickness			micron	100
Weight			gr / m ²	97.5
Tensile strength at break	MD	ASTM D-882	MPa	38.0
	TD	“	MPa	38.0
Elongation at break	MD	“	%	500
	TD	“	%	540
Dart drop		ASTM D-709	gr.	800
Haze		ASTM –1003	%	17
Clarity		"	%	86
C.O.F – in-in (static/dynamic)		Inclined plane		0.45 / 0.4
Oxygen permeability –		ASTM D3985	cc/m ² /day	52

25°C , dry				
WVTR (Water vapor) 38° C , 90% rh				5.5

Delivered in following sizes:

Item no.	length /cm	Perimeter/cm	Thickness in μ	Weight in kg
GPP TSL 20	1000	1000	100	
GPP TSL 40	1600	1000	100	

A kit of TSL contains liner, sealing tape, set of cable ties and installation instructions.

Option 1 : installation of liner using a fan:



Figure 1. Laying the liner inside the container.



Figure 2. Positioning blower 5 meters away from container



Figure 3. Blown up TSL inside the container.



Figure 4. Testing accessibility of fork lift.

Option 2: installation with rings



Figure 5. Attaching the ring



Figure 6. Fastening the ring to the container loop.



Figure 7. Installed



Figure 8. Installed

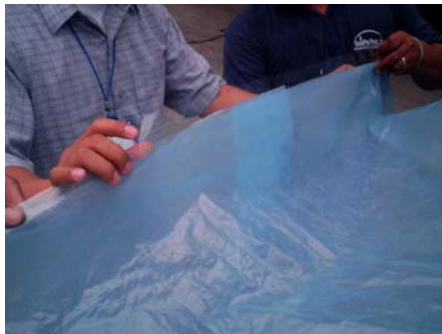


Figure 9 Sealing of TSL with special tape



Figure 10 Before closing the container.

For further inquiries and sales, please contact your nearest GrainPro representative or contact:

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