

# Residue free storage for potatoes and onions

**Fifteen years ago in England,  
a vision was created:  
storage without chemicals  
for potatoes and onions.**

A group of dedicated growers spent 6 years learning, testing, and perfecting new storage techniques with ethylene gas.

Since 2003, the experience and patented storage methods of Restrain Company Ltd remain unrivalled. In 2008 Restrain ethylene received approval for use on organic potatoes and onions during storage.

Today Restrain is used on over 30 countries and in the 2012/2013 season over 500 generators were supplied. The use of Restrain allows both potato and onion growers to take advantage of the higher value, late season market without jeopardising crop quality, operator safety or consumer confidence.

## How does it work?

The Restrain system is quick and simple to install, requiring no store modification. A Restrain Generator is factory preset to maintain the required low level of ethylene concentration inside your cold store during the storage period.

The ethylene gas is produced from sustainable pure sugar based ethanol. The catalyst converts, in situ the required ethylene concentration, measured and regulated by the Restrain Sensor. The dynamic nature of ethylene means the gas is evenly distributed through the store within 30 minutes.



Health and Safety  
Executive

**“the use of cylinders of pure ethylene  
should be vigorously discouraged.  
Ethylene generators or ethylene  
cartridges are the preferred options  
to avoid gas explosions”**





For a 360° view visit  
[www.restrain.eu.com](http://www.restrain.eu.com)

### Awards

**2012** Potato Europe Gold Medal Award  
for Sustainable Production Techniques

**2009** Potato Europe Innovation Award

**2006** Queens Award for Enterprise: Innovation

**2004** Royal Agricultural Society of England's  
New Machinery Award



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# Restrain



Anti-sprouting for  
**potatoes**



Anti-sprouting for  
**onions**



Increase yields for  
**seed potatoes**

**Residue free** storage for potatoes and onions



## Anti-sprouting for potatoes

The 'Slow Start' protocol developed by the Restrain Company Ltd, ensures a gradual build up of ethylene into your potato store. A specific low level concentration of ethylene gas is then maintained throughout the storage period.

The natural ethylene gas suppresses cell elongation: this we call anti-sprout control. The dynamic gas spreads through the entire crop, no matter if you store in bulk, boxes or bags.

This combined with respiration rate testing and CO<sub>2</sub> management, alongside the experience of treating over 3 million tonnes of potatoes, is all part of the service.



✓ Crop safe ✓ Operator safe ✓ Store safe ✓ Consumer safe ✓ Plug & play installation

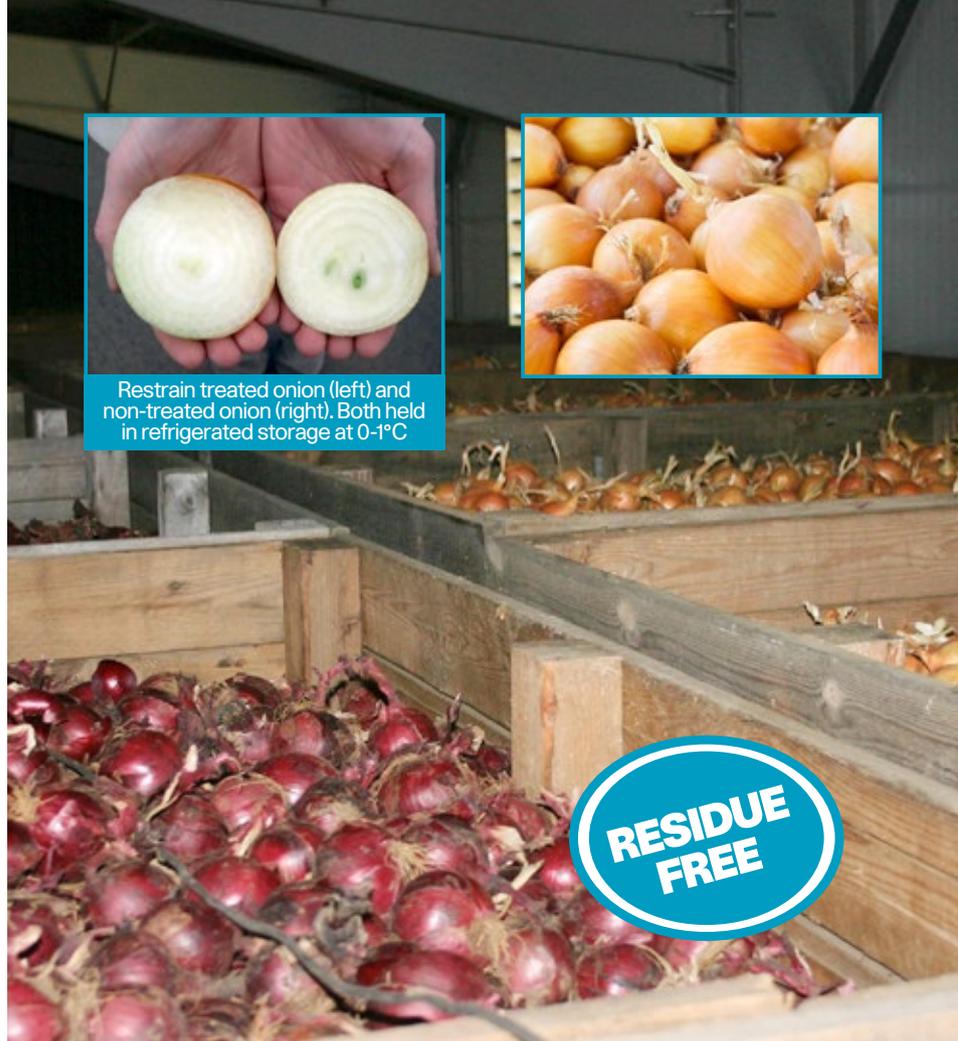
## Anti-sprouting for onions

The whole concept of reducing sprouting in onions is based on maintaining a low level of ethylene gas during the storage period. The Restrain Generator accurately produces the required level of natural ethylene gas throughout the whole storage periods in stores from 300 to 5000 tonnes.

The gas naturally disperses through the whole store so every onion is treated. By blocking cell elongation in the onion bulb anti-sprout control is achieved.



Restrain treated onion (left) and non-treated onion (right). Both held in refrigerated storage at 0-1°C



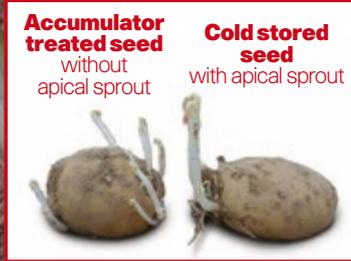
# Increase yields for **seed potatoes**

The unique accumulator storage process incorporates ethylene concentrations with modified temperatures to increase the number of sprouts that will produce more tubers.

Replicated trials have shown that stem numbers are typically increased by 40%, resulting in up to 20% more tubers in salad varieties such as Maris Peer and Charlotte.

Accumulator treated seed is recommended for growers producing;

- ✓ **seed for seed**
- ✓ **seed for baby potatoes**



**RESIDUE  
FREE**

✓ **Organic approved** ✓ **Safe and reliable** ✓ **Less management time** ✓ **Easy to use**