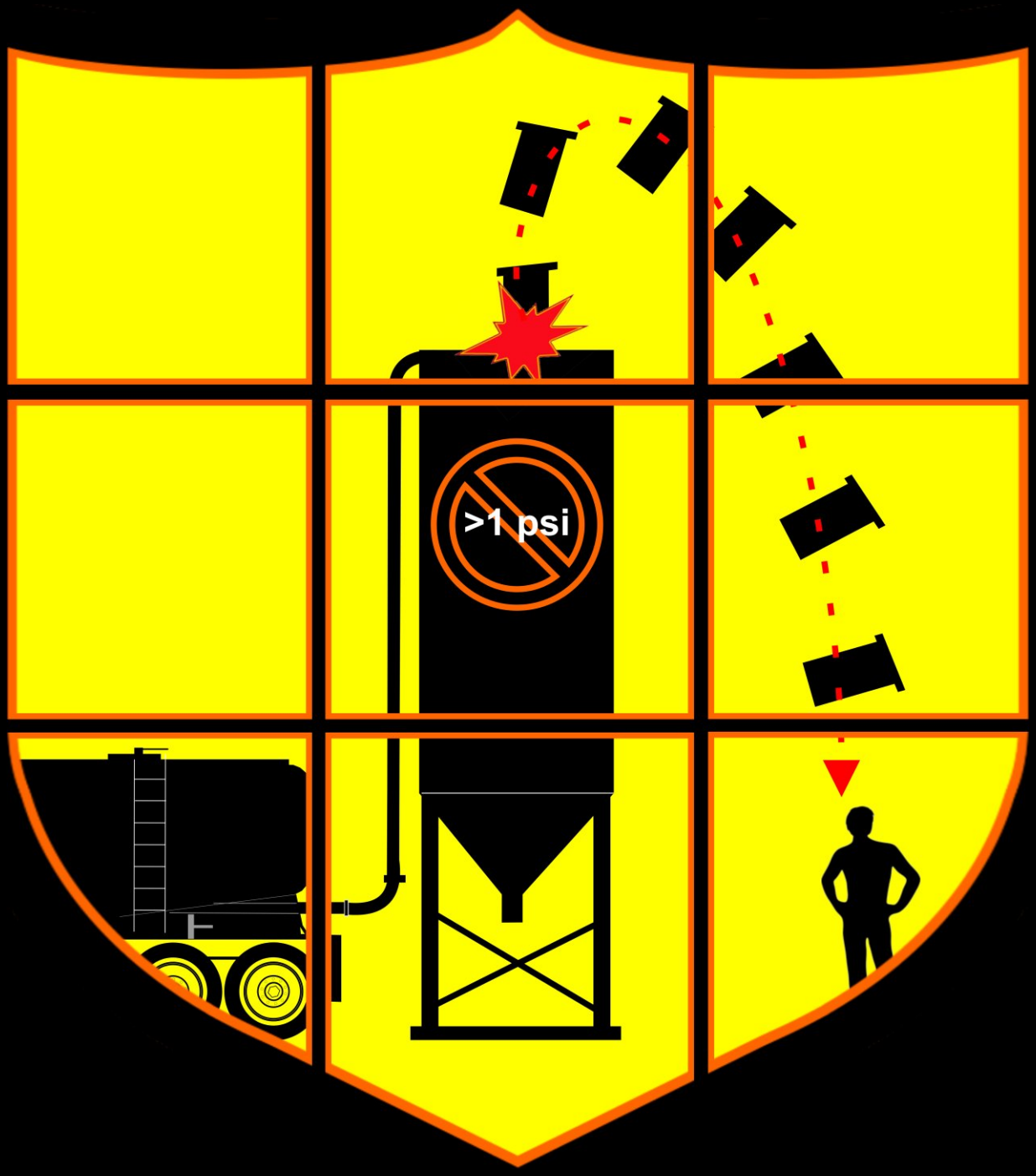
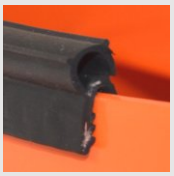


SHIELD TECHNOLOGY
SILO PROTECTION

HYCONTROL
SILO PROTECTION SOLUTIONS

SHIELD PROVIDES SILO PROTECTION



(1) VIPER seals - twin seal air spring pocket eliminates air leakage and water ingress. Easy to remove and replace, saving both time and money

(2) Easy-grip, quick-release cover retainers - no special tools required for lid removal, enabling easy inspection and cleaning on the silo-top

(3) Local Pressure Relief Valve (PRV) inspection facility - single button lifting mechanism to open the valve for cleaning and seal inspection on the silo-top

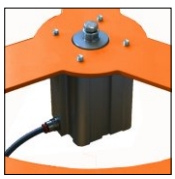
(4) Durable polypropylene weather shield to protect PRV and electronics. **(5)** Corrosion-resistant, powder-coated steel for use in all weather conditions

(6) Multi-point mounting holes for easy retrofitting to fit most popular silo process connections or (for a new install) to mount on the optional upstand unit

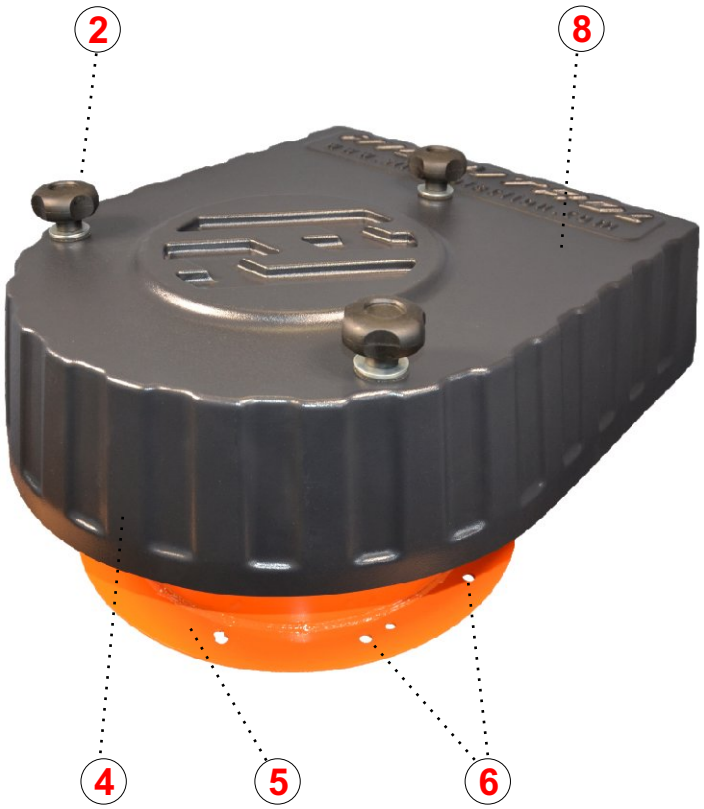
(7) High-specification pneumatic filter regulator with auto-drain feature to reduce moisture. Provides accurate compressed air control

(8) Integrated, purpose-designed silo pressure sensor with Ground Level Test capability and self-cleaning function - the patented heart of the system!

(9) Integrated Pressure Relief Valve (PRV) with Ground Level Test function - cycles the valve as part of the pre-fill test routine, records PRV lifts during filling

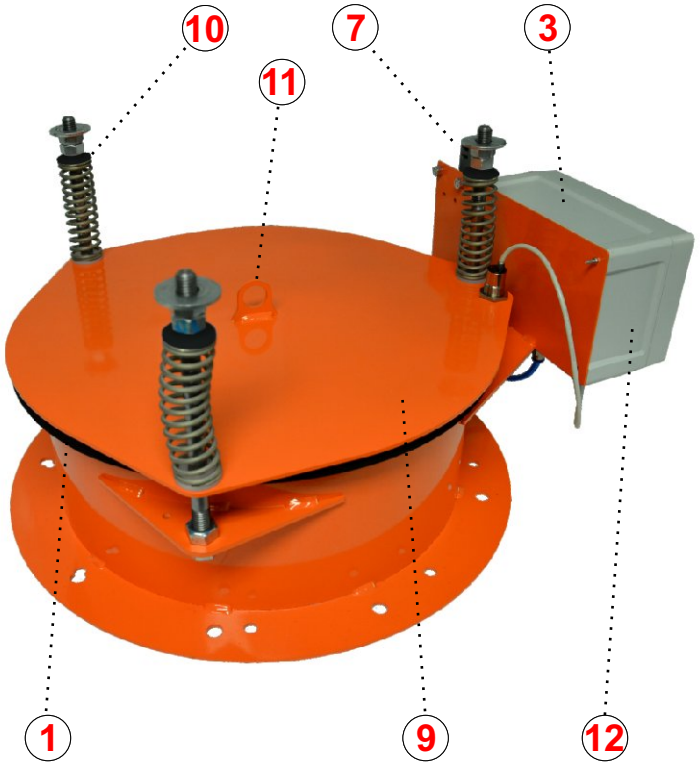


SHIELD SPS UNIT



- **THE MOST ADVANCED SILO PROTECTION SYSTEM on the market today - a new concept in silo protection from the experts in the field**
- **COMPETITIVELY PRICED, COMPREHENSIVE SYSTEM that lowers overall cost of ownership**
- **IMPROVE SITE SAFETY through reduction of working at height and silo pressurisation risk**
- **REDUCE RISK OF SILO PRESSURE DAMAGE - vessels can rupture at pressures above 1 psi**
- **COMPREHENSIVE EVENT LOGGING allows for preventative maintenance - tackling system issues before they become problems**
- **MONITOR DRIVER BEHAVIOUR AND PERFORMANCE with advanced diagnostics**

SHIELD SPS UNIT (LID REMOVED)



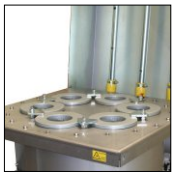
- **REDUCE MAINTENANCE and service costs with GLT - test the whole system in six seconds**
- **IMPROVE ENVIRONMENTAL CONDITIONS through large reduction of product emissions**
- **EASY-TO-USE one-key/button Ground Level Test system guarantees complete silo protection and will not allow filling unless all safety components are proven fully functional**
- **EXCEED CURRENT MPA STANDARDS - the only system available that fully complies**
- **PRESSURE AND VACUUM CONTROL - unique pressure sensor detects not only pressure but also vacuum. If this condition is detected it will fully open the valve to remove the vacuum before silo damage occurs**

Alarm/event logging with PRV lift detection enabling preventative maintenance. Driver behaviour diagnostics alert site managers to dangerous filling practices

(10) Low-friction spring guides reduce wear during testing and improve spring longevity. **(11)** Integrated PRV lift point to allow essential maintenance tests

(12) Integrated test electronics - purpose-designed and prepared for a simple installation and set-up, saving time and money

Butterfly valve at fill point will not open until all safety tests are passed. Automatic shut-off of fill pipe should pressure spike, PRV open or high-level alarm activate

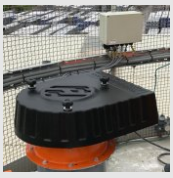


Monitors and controls air to the filter/vent unit, ensuring supply for the self-cleaning system is active and eliminating expensive compressed air wastage

Ground Level Test of the full system activated with a single key turn (with unique key) or button push on the control panel - no need to climb the silo to test!

DP Series vibrating level sensor for high-level alarm. Ground Level Test and self-cleaning function - the most reliable point switch type for solid products

Safe, low-voltage power requirements - the whole SHIELD Silo Protection System operates on a 24vDC power supply for a safer environment



UNIQUE PATENTED MODULAR DESIGN

The modular SHIELD system is a compact and efficient Silo Protection System. It can be mounted on existing PRV mounts; alternatively, upstands and mounting pods can be added to the system, for example for new silo installations. Cabling is routed to a single point, helping to **eliminate trip hazards** on top of the silo.

A

WEATHER SHIELD COVER

Made from **durable, moulded polypropylene**, the UV-stabilised weather shield cover protects the Pressure Relief Valve and electronics from the elements. The mild flexibility of the cover material means that any product ejected from the PRV should drop off the inside after it has dried, providing **self-cleaning** characteristics.

B

PRESSURE RELIEF VALVE WITH SEALING GASKET

Precision-calibrated to vent pressure in the silo when it exceeds 50 millibars / 0.75 psi - roughly the pressure it takes to inflate a child's party balloon! The valve is sealed with VIPER twin air pocket sealing and finished in corrosion-resistant epoxy paint. Also houses the silo-top electronics and air filter regulator. The PRV is **fully Ground Level Test-enabled** using a proximity switch to detect valve openings. *For further information on the SHIELD PRV please refer to page 9.*

C

(OPTIONAL) HIGH LEVEL PROBE MOUNTING POD WITH SEALING GASKET

To enable fitting of all components via a single process connection, this mounting pod has side-mounted ports for up to two high-level probes. These ports are fitted with **quick-release union connections** for easier maintenance of the level probe(s). This unit helps achieve a smaller silo-top footprint - **useful if there is limited space!**

D

(OPTIONAL) UPSTAND

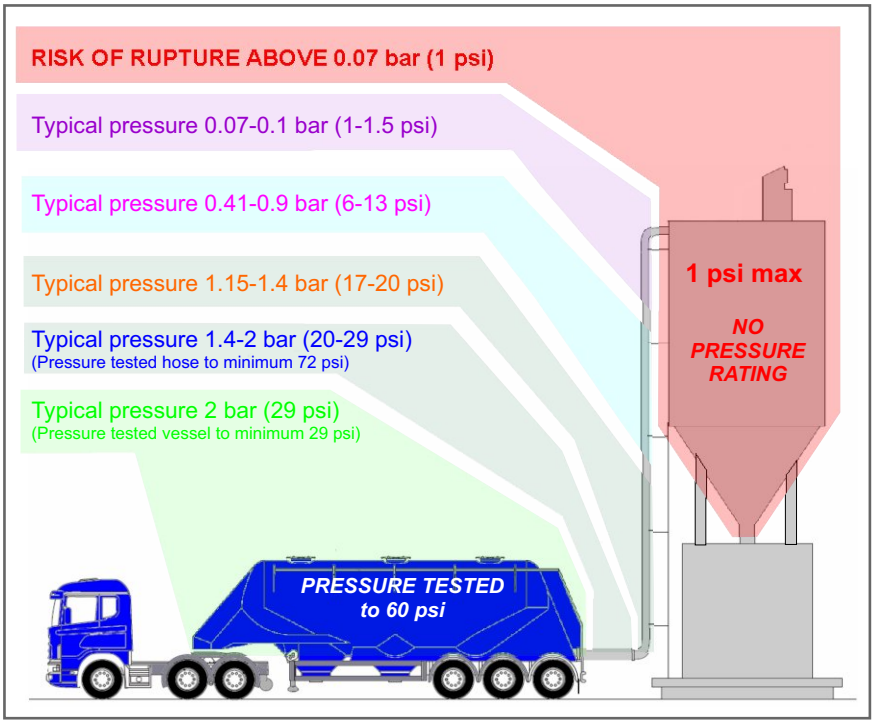
Welded directly to the silo-top, the upstand is finished in corrosion-resistant orange powder-coat paint to ensure a **long working life**. The optional mounting pod and PRV components are attached with M10 bolts.

WHY DO YOU NEED SILO PROTECTION?

Many industries handle and transport millions of tonnes of **powdered or particulate product** every year. This includes products such as cement, lime, sugar, flour, and many more. These products are mainly delivered by road tanker, and are then deposited in storage silos by fluidising the powder and blowing it in at pressure.

This pneumatic conveying operation uses pressurised air to carry the product into the silo; this air must then be vented from the vessel via a suitable filter. **There is a serious inherent risk created by delivering product like this, and that is OVER-PRESSURISATION.**

If the air used to blow the product in is not vented then the silo can easily become pressurised. As the diagram below shows, tankers are pressure vessels and the powdered product is conveyed with some force. Most silos are not tested as pressure vessels, and a small increase in the internal pressure (in fact as little as 1 psi) may be sufficient to either **rupture the silo** or **blow the filter unit off the silo roof**.




Silo bulging from pressure


Over-pressurisation venting

WITHOUT PROTECTION WHAT ARE THE RISKS?

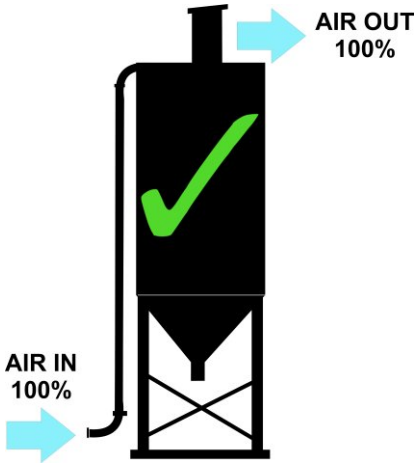
Danger to staff: **Risk of severe injury or death for personnel resulting from heavy filter units falling from great heights. There are serious health and safety implications to be considered by site operators.**

Damage to silo: **Resulting in extensive disruption and loss of production, expensive repair or even replacement of the silo or filters, as well as costly clean-up operations.**

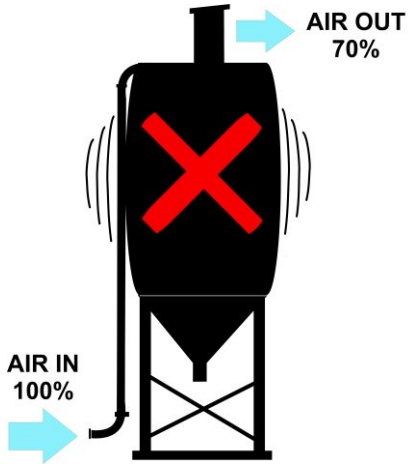
Emissions into the atmosphere: **Damage to the environment, particularly with corrosive or hazardous product - resulting in large fines, expensive clean-ups, negative publicity and damage to public image.**

Working at height: **An additional risk when dealing with silo-top equipment. Falls from height accounted for 39 UK workplace fatalities in 2013/14 alone.**

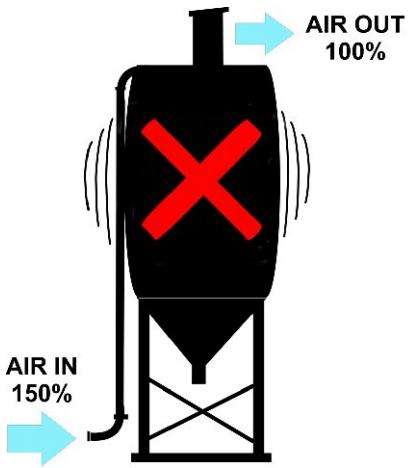
WHAT CAUSES AN OVER-PRESSURISATION RISK?



This is an example of a healthy delivery: **if air can enter a silo and exit via its venting unit without restriction then there will be no over-pressurisation issues**. Silo over-pressurisation only occurs when the volume of air entering the silo exceeds the volume air that is able to escape, as shown in the examples below.



Here, **airflow out of the filter unit is restricted**, leading to a pressure build-up during filling. Failure of the filtration system to vent air efficiently could be caused by **inadequate maintenance of safety equipment**, or by **filter blinding due to over-filling**. An increase of air pressure above 1 psi inside a silo can cause serious damage.



Here, **more air is being blown in to the silo than the system can exhaust**. This is usually caused by **uncontrolled discharge from the tanker** during filling. A tanker can offload product at 13,000 m³ per hour, but a typical silo filter can only discharge air at a maximum rate of 1,700 m³ per hour. Even a new filter cannot cope with this! Evidence suggests that this problem is far more common than previously thought, posing a severe safety risk.

HOW DO YOU SAFEGUARD AGAINST THESE RISKS?

The obvious way to safeguard a silo is to ensure that a silo protection system is in place, which will monitor pressure and level in the silo. **But a comprehensive silo protection system can do so much more than that.** Before you choose your system, consider if it is capable of telling you what is wrong with it? How can you test it is functioning correctly? And furthermore, ask if it can protect your site and staff from all of the following problems and risks:

SILO RUPTURE

BLOCKED PRV

FILTER BLOW-OFF

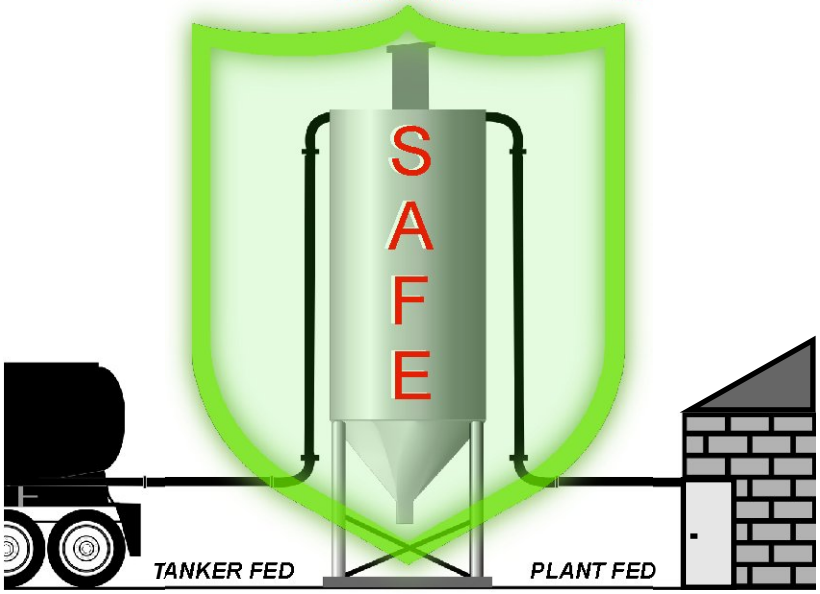
SILO OVERFILLING

BLOCKED FILTER

ENVIRONMENT ISSUES

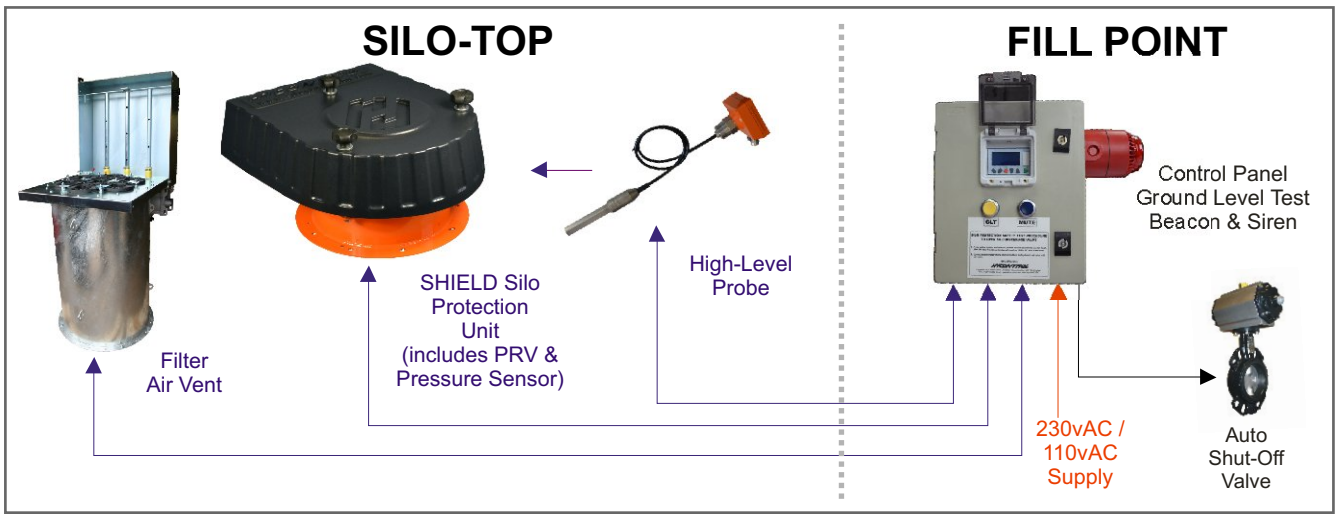
POOR MAINTENANCE

DISCHARGE TOO HIGH



WORKING AT HEIGHT

ESSENTIAL COMPONENTS FOR SILO PROTECTION



Hycontrol's new SHIELD Silo Protection System is the most advanced SPS on the market today and is the result of decades of silo pressure technology expertise. With a compact, all-in-one design that can be retrofitted to almost any silo and utilising state-of-the-art pressure monitoring/control equipment that features Hycontrol's pioneering Ground Level Test facility, the **SHIELD SPS** represents a technological pinnacle from the experts in silo protection.

GROUND LEVEL TESTING REDUCES RISK

Guidelines published by the **Mineral Products Association** (MPA, the trade body for the UK's aggregates, cement and concrete industries) state that silo-top safety equipment should be tested to ensure it operates correctly. **Historically this has not been possible** unless the equipment were to be removed from the silo. This has always been deemed impracticable, **leading to maintenance of this equipment being largely neglected.**

Even when testing is carried out, the fact that safety equipment is mounted on the silo roof means that working at height in all weather conditions is unavoidable - vastly increasing the danger of accidents resulting from slips, trips and falls. Working at height poses a significant risk to site staff and should be avoided if possible.

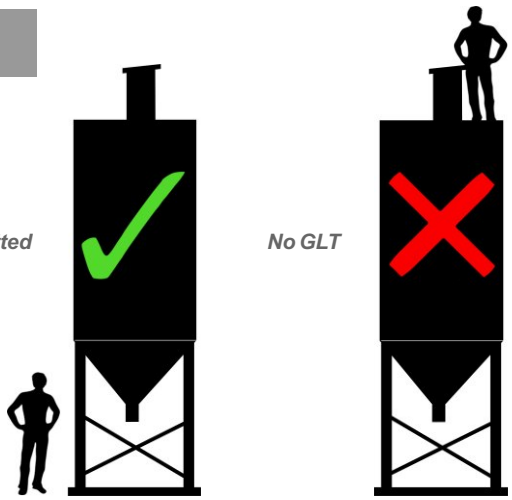
New technology now allows for complete functional testing of these devices *in situ*. Hycontrol's one-key or one-button **Ground Level Testing** (GLT) innovation now means safety equipment can be tested with both feet on the ground, in complete safety, and all in a **six-second time frame!**

ADVANTAGES OF SHIELD GLT

REDUCES:
Overspills
Filter and silo damage
Product loss
Maintenance costs
Working at height

AVOIDS:
Staff injuries
Costly repairs
Expensive clean-ups
Dangerous situations

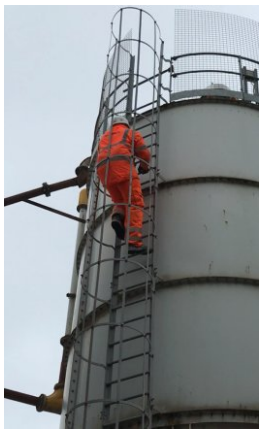
PROVIDES:
A safer working environment
Peace of mind



As part of Hycontrol's compact, integrated **SHIELD Silo Protection System**, the Ground Level Testing function enables site operators to fully test vital safety equipment and to guarantee all the components of their safety system are working before each and every delivery takes place. The test is activated by a single key-turn or button-push on the SPS control panel, which is usually located at the fill point. The system will **not** permit a fill to take place until a test has been performed. The Hycontrol GLT is unique because it fully tests the operation of the pressure sensor, level sensor and PRV, as well as checking the compressed air supply to the filter self-cleaning mechanism.

Performing these tests **reduces maintenance levels** significantly and provides a **safer working environment** for site operators**.** When a SHIELD SPS passes these tests, site staff can be confident that filters are not at risk from blinding and pressure build-up, product is safe from overfilling wastage, and pollution risks are being negated.

To ensure your safety system is fully operational it must be regularly tested!



PRESSURE IS THE MAJOR PROBLEM - NOT LEVEL!

There is a common misconception that the biggest risk to silos comes from overfilling. This is simply not the case. This confusion may arise because LAPCC permits focus on level when the real issue is pressure. The damage that can be caused by over-pressurising a silo far outstrips the problems of overfilling. Whilst overfilling can result in environmental issues the most significant risk it causes is the 'blinding' of the filter unit, which will prevent air escaping during the filling procedure and OVER-PRESSURISE the vessel. Therefore, whilst overfilling is an important consideration, in order of magnitude the risks of over-pressurisation far outweigh it.

OVERFILLING WILL NOT CAUSE A FILTER TO BLOW OFF

The greatest risk to a silo when filling is pressure build-up, which creates serious safety issues and can cause major damage. Pressures above 1 psi may be sufficient to rupture the silo or even eject the filter unit from the silo-top. Therefore, the pressure sensor must be regularly tested to make sure it is functioning correctly. Until very recently all pressure sensors on silos would need to be removed to be checked, realistically meaning long periods of neglect.

Now, at the heart of the **SHIELD SPS**, Hycontrol introduces the integrated **FLEX502 pressure sensor**. This is a purpose-designed, Ground Level Test-enabled silo pressure sensor that **self-cleans**, is **fail-safe** and can **self-test** over its full operating range to provide a **100% fully operational guarantee.**

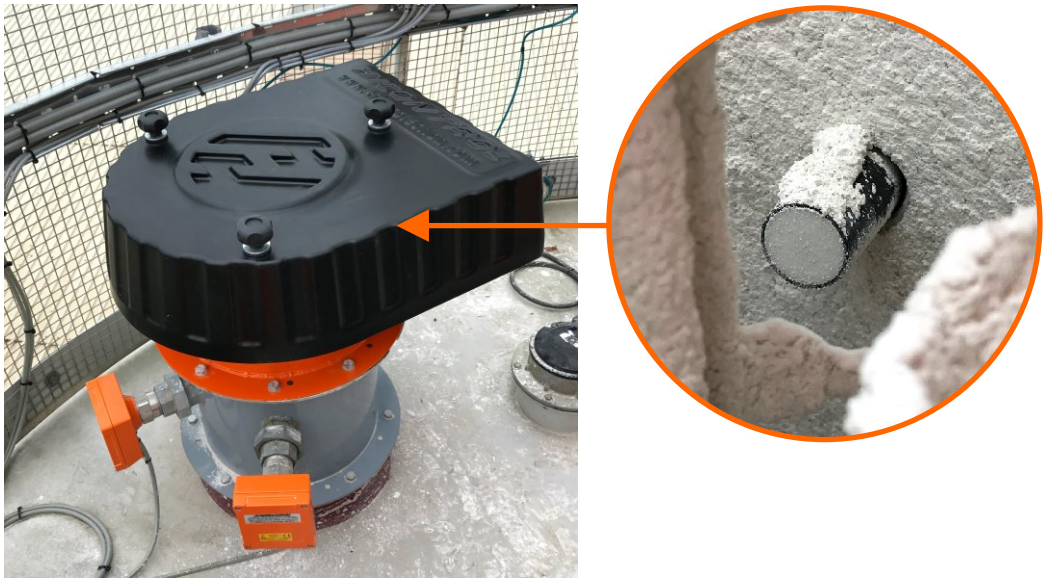
INTEGRATED FLEX502 GLT PRESSURE SENSOR

The **patented** sensor monitors pressure in the silo and transmits it to the control panel, where control actions and alarm signals can be initiated; for example, a pressure increase signal would cause the discharge valve in the fill pipe to close, preventing the tanker from over-pressurising the silo.

There are **no moving parts or flexible rubber diaphragms** to wear out, and its **corrosion-resistant** construction ensures reliability. The sensor is **purpose-designed** to withstand the dusty, aggressive environment inside a silo and performs the following functions:

- **Detect if it is damaged or blocked**
- **Self-clean before and after every delivery**
- **Confirm the air supply to the filter venting unit**
- **Test operation over the full working range**
- **Test set point of 40 millibar (0.6 psi)**
- **Test integrity over full range: 0-100 mbar (0-1.5 psi)**

Hycontrol manufactures the **only** pressure sensors on the market that can carry out the above essential test functions in order to guarantee operational performance. These functions are part of the Ground Level Test facility, done prior to every fill, to ensure the primary safety element of the SPS is working correctly and it is therefore safe to begin unloading of the tanker. **After a successful test the inlet valve will open for 90 minutes, after which it will close. It will not re-open until the test is run again.**



__Left:__ a clear illustration of the effectiveness of the FLEX502's self-cleaning operation.

*This SHIELD unit has been in operation for several months. As we can see, whilst powdered product has coated the interior of the mounting pod, **the sensor head remains clear of build-up.***

*The self-cleaning action means **the pressure sensor will continue to function correctly**, in spite of the product build-up that surrounds it.*

INTEGRATED TESTABLE PRESSURE RELIEF VALVE

The **Pressure Relief Valve (PRV)** is the last line of defence for a silo, there to vent pressure in an emergency **should the Silo Protection System fail**. The PRV component of the Hycontrol SHIELD is fitted with a GLT module that provides a complete lift test before each delivery, ensuring the valve is operational and is not congested, jammed, rusted shut, or the spring carriers siezed.

A Pressure Relief Valve should **rarely need to open** if the protection system is functioning correctly. However, in an emergency, the SHIELD PRV is calibrated to protect the silo by venting any pressure above 50 millibars (0.75 psi).

Testing of PRVs is recognised as best practice and is a requirement of MPA guidance. It is essential because for the majority of its lifetime a valve should rarely be operated. It should be cycled periodically and tested to check it lifts correctly. It's good practice (and common sense) to ensure springs have not seized or clogged and the valve seat is not stuck down with dried product.

Hycontrol Pressure Relief Valves with Ground Level Test facility allow a working pressure test without removal from the silo. This reduces the length of a full test cycle from around two hours* to just six seconds!

The SHIELD valve is sealed with **VIPER seals** - a twin seal air pocket strip which connects around the lip of the valve. This new design helps to eliminate air leakage and reduce water and dirt ingress, keeping the valve clean. Furthermore, it is simple to remove and replace the sealant strip, saving time and money on maintenance costs over conventional gaskets.

estimated time to remove valve from silo, bench-test, and re-connect it

- **Lift point set at 50 milibar (0.75 psi)**
- **Quick and easy seal replacement**
- **Long-life, low-friction spring guides**
- **Ground Level Test facility**
- **Integrated testing lift point for maintenance**
- **Corrosion-resistant powder-coated steel**
- **High flow rate to relieve uncontrolled discharge from tanker blow-in - up to 13,000 m³ per hour**
- **Pressure and vacuum relief with the valve fully opening under this condition**

UNTESTED PRVs CREATE A SERIOUS RISK

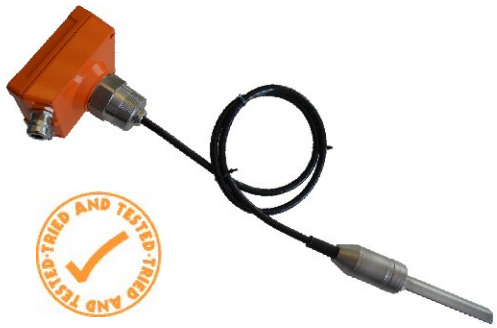
Sites that do not (or cannot) test their PRVs or otherwise neglect their maintenance are at serious risk of over-pressurisation caused by PRV blockage. Many service companies frequently do little more than dust the lid. As these photos show, it is easy for PRVs to become blocked with product, meaning they will not function in an emergency.



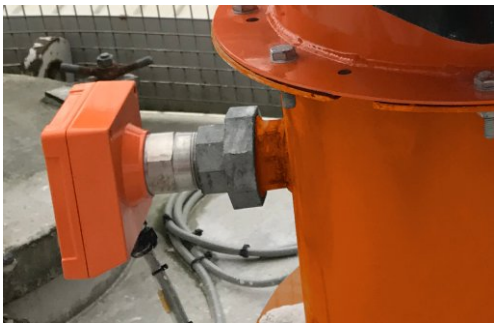



DP SERIES VIBRATING HIGH-LEVEL SENSOR

The DP Series diamond point high-level sensor is an essential component of the SHIELD Silo Protection System. The sensor is a point switch device that detects when product in the silo has reached a maximum safe level (typically at around 90% of full capacity) and then activates an alarm.



Many vibrating 'twin fork' designs suffer from bridging whereby product gets jammed between the forks causing false alarms. **The unique single diamond blade shape of the DP Series is immune to this problem.** The vibrating knife blade is in fact two blades, one with another inside. This provides excellent sensitivity for light materials whilst strengthening the design.



Diamond point vibrating technology is unaffected by changes in temperature, pressure, and humidity, and is unaffected by material changes (including dielectric constant). The probes require no calibration and the design has a self-cleaning effect. **The probes are GLT-enabled and are given a full-function test along with all the other critical safety components.**

There are several other technologies available for silo high-level alarms - rotary paddles are an extremely common choice, in spite of their technical limitations and propensity to break. However, following decades of experience Hycontrol recommends that **vibrating probes** have proven the most reliable for solids and powders.

- **No maintenance required**
- **No calibration required**
- **Higher sensitivity than paddle switches**
- **No risk of probe carving out hollow in material**
- **Reduced risk of probes bending**
- **No moving parts**
- **Self-cleaning effect from probe vibration**
- **Fully integrates with SHIELD Silo Protection System**

Traditional vibrating forks commonly suffer from product bridging, leading to false signals. The DP Series overcomes bridging issues by mounting the second vibrating blade internally (as shown in the left image). This also makes a ***stronger design*** *that is extremely sensitive to light products.*

Historically, ***paddle switches*** *have been commonly used for silo level monitoring because they are cheap, but the fact is that technology has improved and become more reliable.*

Paddle switches ***offer little protection*** *if the motor wears out or the blade breaks. It is not possible to ground level test paddle switches without installing elaborate mechanisms which in fact increase the amount of maintenance required. For these reasons paddle switches are* ***NOT recommended*** *by Hycontrol.*

AUTO SHUT-OFF CONTROL PANEL

The control panel provides the essential logic functions which complete the SHIELD Silo Protection System, controlling the advanced silo technology as well as providing preventative maintenance and diagnostic features.

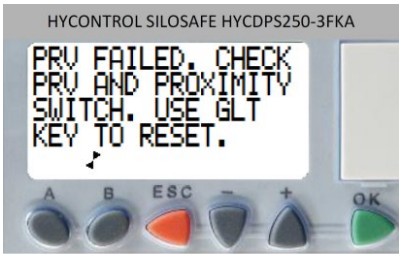
- **Pressure, level, and PRV testing (essential functions)**
- **Silo fill auto shut-off control**
- **Record the most recent over-pressure incident (time/date stamped)**
- **Record the number of events of PRV opening (time/date stamped)**
- **Record the number of high level events (time/date stamped)**
- **Filter ON/OFF output option**
- **Air supply monitoring alarm option**
- **Ethernet connection option**
- **Simple to operate and diagnose issues**

ADVANCED DIAGNOSTICS AND PREDICTIVE MAINTENANCE

The system controls the inlet valve to prevent over-pressurisation and overfilling of the silo, with **sirens and beacons** to warn of any issues. If a problem arises during the Ground Level Test procedure the information is displayed on the panel screen, as shown in the examples below:

The above screen displays that this silo has had four events of over-pressurisation, and that the last event was on 16th June 2017 at 11:18

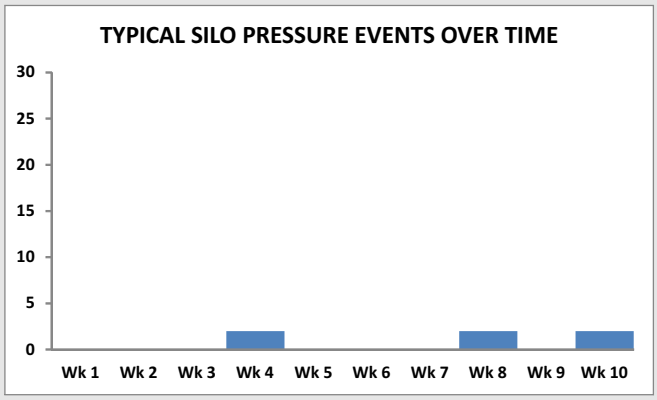
The above screen displays that this silo has passed the GLT and everything is working OK, the inlet valve is now open and will close in 90 minutes



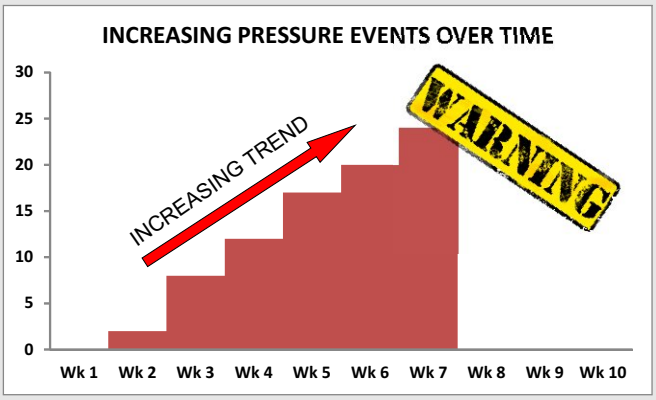
This silo has failed the Ground Level Test due to a problem with the PRV. This requires investigation before the inlet valve will open!

The system will time / date stamp the last high pressure event, last high level event and the last PRV lift, and count the number of times each occurs. **This is important for preventative maintenance purposes.** For example, if the number of pressure events is high this indicates possible filter problems or that tanker discharges are uncontrolled - issues that need to be addressed urgently!

If a high level warning is activated the inlet valve will close after **30 seconds,** but in the case of a high pressure alarm it will close **immediately**. This is because pressure during a delivery can 'spike' almost instantaneously, so an automatic shut-off is essential to protect the silo - simply put, human reactions are too slow to respond to this in time.



Logging events allows users to assess pressure events over time in order to spot issues. A log like the one above typically indicates a healthy system with the occasional, non-patterned lift event; these events will most likely be caused by uncontrolled tanker discharge, which will still need to be monitored. Regular occurrences of this should be a cause for concern.



An event log like the one above shows continuous, escalating pressure events in high numbers, indicating that there is a serious pressure problem in this silo which must be investigated urgently. An event log like this betrays a serious safety risk arising from either uncontrolled tanker discharge or poor filtration. These issues must be addressed ASAP.

ADVANCED DIAGNOSTICS & TESTING CASE STUDY

A typical Hycontrol service callout has highlighted the vital role that a fully-testable Silo Protection System plays in spotting maintenance issues before they become major problems. The callout came from a concrete block plant that was already using Hycontrol's SPS on the cement silo and had also replaced the dust filter unit a few months previously as part of their regular service routine. However, whilst the safety equipment was passing the pre-delivery tests, during filling the pressure alarm was regularly triggering, according to the system logged data.

Naturally, the site safety manager was concerned by this, presuming the filter was OK as it had recently been changed. Hycontrol were asked to investigate the issue. The system was found to be in good working order, with the pressure sensor operating within the correct range and the PRV opening and closing correctly during the test cycle. This indicated to the diagnostic engineers that **the safety system was not at fault**, pointing instead to an issue with pressure exiting the silo system.

Upon investigating the condition of the filter the engineers discovered that the diagnostic information from the Silo Protection System was correct. One of the solenoid valves controlling air-flow to the reverse jet cleaning nozzles over the filter cartridges had failed. Three of the units' seven cartridges were not receiving any air-flow during the filter self-cleaning process and were now totally blocked with product (*see illustrations **A** and **B** below*). This meant a 43% reduction in airflow out of the unit. As a result, trapped air was building up inside the silo, triggering the SPS over-pressurisation shut-down in order to prevent disaster!

A

B

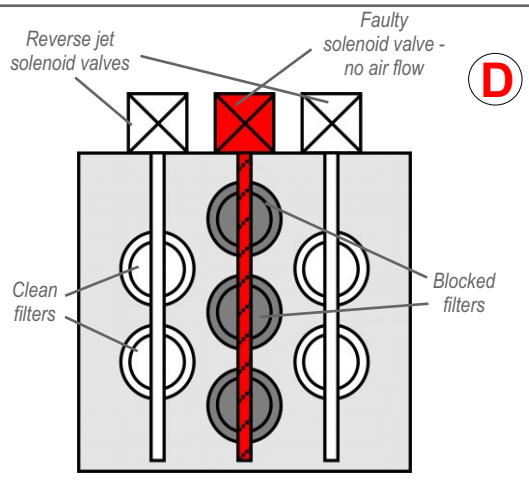
From the images above and below, it is easy to identify how the central row of filter cartridges had become severely blocked compared to the neighbouring cartridges which were still receiving the cleaning air-jets (*see illustrations **C** and **D** below*). By the systems' log of over-pressurisation events, service engineers were able to quickly pinpoint the issue with the filter vent unit and rectify it before it became a major problem for the site.

This example highlights that, even on a site with a regular maintenance schedule that replaced the filter cartridges only weeks before, **a potentially disastrous situation can quickly emerge**. A problem as seemingly simple as blocked filters can rapidly deteriorate into a potentially dangerous over-pressurisation situation.

For further case studies, photos and silo advice, please visit www.siloprotection.com

C

D



Top view of filter unit

INLET VALVE AND CONTROLLER

To control inflow from the tanker and seal off the silo should a pressure event occur, SHIELD SPS utilises a **failsafe 4" butterfly valve** with a normally closed, spring return operation. This **only opens once all safety equipment has been checked** by the GLT, and automatically closes again after 90 minutes.

The butterfly valve has the option to be controlled by a **tamper-proof solenoid** to prevent manual overrides or bypasses, ensuring GLT alarms cannot be ignored and must be resolved before filling takes place. **The valve will remain closed in all other circumstances.**

HYVENT FILTER VENTING UNIT

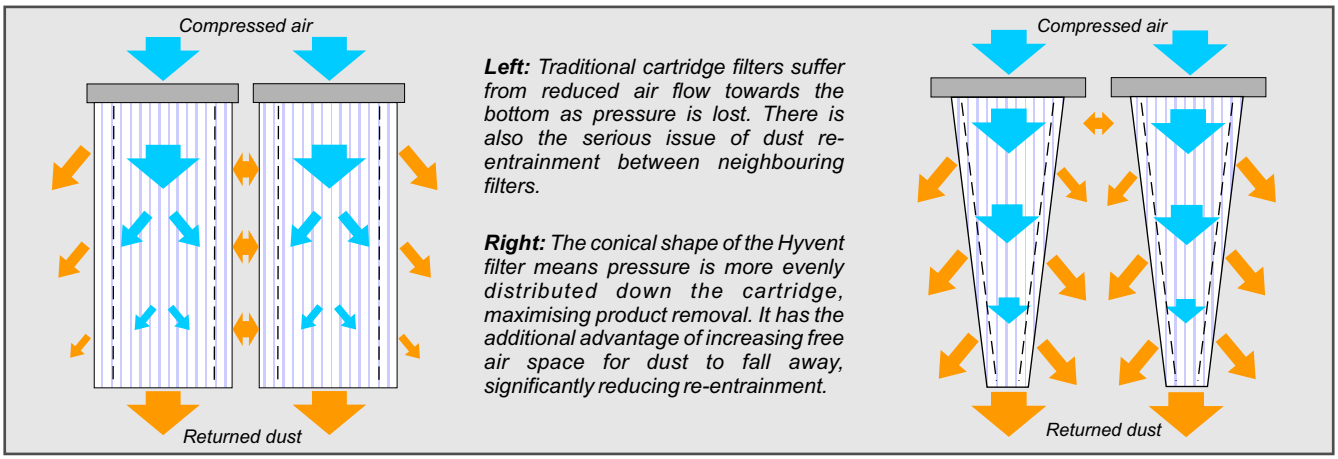
Hycontrol's Hyvent dust collector and filter unit is specifically designed to vent silos during the filling process without allowing valuable powdered product to escape. Product is filtered from the air during both the conveying period and the air surge at the end of the cycle. The filter is self-maintaining, returning product back into the silo via an automatic reverse-jet pulse cleaning system which utilises compressed air.

This filter unit features the latest technology in **conical-shaped** filter design. This patented cone shape provides **outstanding cleaning efficiency** while enabling maximum airflow through the unit, and has the added benefit of **increased life** for the cartridges. The filter has a **rugged weatherproof construction** and is built for safe and simple maintenance.

Hyvent has been designed to the latest guidance from the Mineral Products Association (MPA) and to meet HSE guidelines on the prevention of over–pressurisation of storage silos during deliveries. It **complies fully** with environmental emission standards and is capable of filtering all types of powders.

- **Features the latest in conical-shaped filter design technology**
- **Outstanding cleaning efficiency while enabling maximum airflow**
- **Increased cartridge life compared to old-style models**
- **Weatherproof construction built for safe and simple maintenance**

The conical cartridges offer several advantages over traditional models due to their compact design, higher filtration efficiency and superior pre-separation of dusts. The inner core of the elements are also tapered, enhancing the effectiveness of the air jet and giving a more even clean over the length of the cartridge. As shown below, this unique design means that **82%** of the area at the inlet chamber of the filter unit is free, as opposed to a typical 59% when using cylindrical elements. This results in lower upward air velocities at this point, increasing dust separation. These features mean the filters have a **longer** functional life and offer a **higher** consistency of performance.



INSTALLATION SITE SURVEYS

Before designing and installing your silo system, we carry out a **detailed installation site survey** with you. We discuss the ins and outs of your daily site routine and consider any relevant legislation to help ensure that you remain compliant.

By also choosing a scheduled support plan from Hycontrol, you'll have peace of mind knowing not only that you have support in an emergency, but you have a team working regularly to ensure risks are reduced.

ORGANISED SUPPORT AND SERVICE

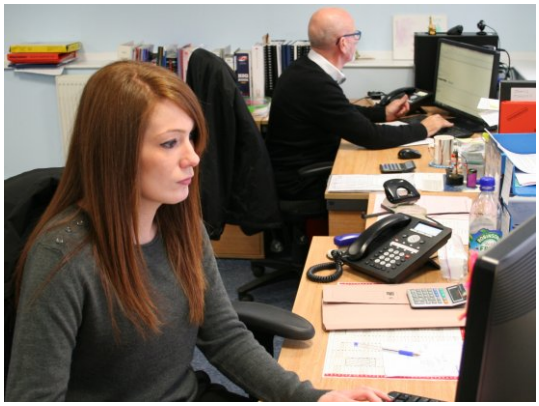
Hycontrol's scheduled support service means you no longer have to concern yourself with arranging maintenance of your system. **Our team keep detailed records and will contact you when your service is due**, making sure to give you plenty of notice to ensure your equipment is serviced with the minimum of disruption to your site.

We will also remind you to arrange any plant hire, cherry pickers etc. that may be required for when our team arrives so there are no delays or issues prior to them starting.

TAILOR-MADE SUPPORT PACKAGES

Our service engineers comprehensively check every aspect of your silo or tank level system - from top to bottom. That's why we have a **checklist of over SIXTY critical items** to inspect when servicing Silo Protection or Bitumen Overfill Safety Systems.

Hycontrol will retain detailed information and drawings of your equipment. This means if one of our engineers visits your site or if you're telephoning our office-based technical support, we'll have the information we need to hand.



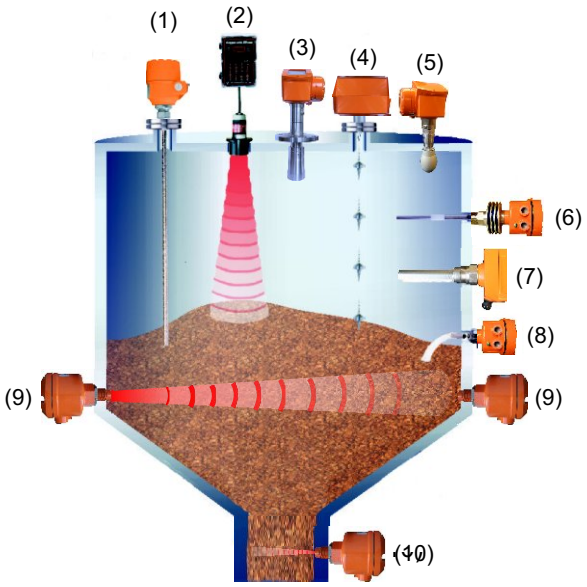
TRAINED, COMPETENT ENGINEERS

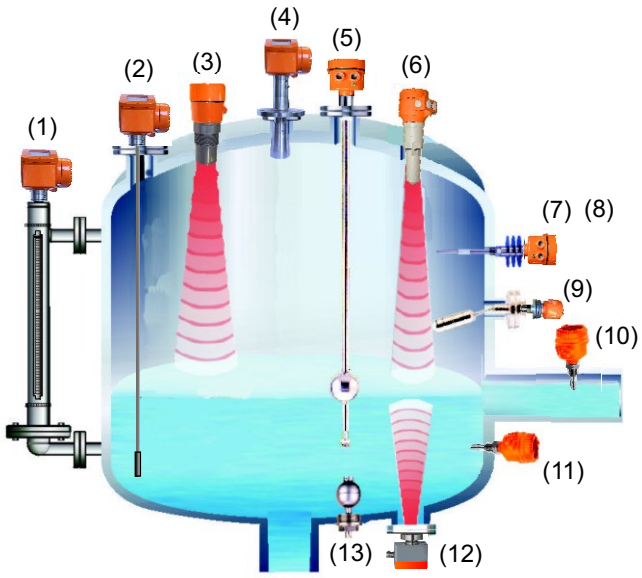
Our engineers have all received **extensive** training, with qualifications including MPQC, SPA quarry passport, IPAF, MEWP, harness licences and ATEX awareness certification, as well as BTEC HNC in Electrical & Electronic Engineering and C&G 2365, 2330 and 2360.

Furthermore, our teams undergo regular in-house training to keep up to date with the latest product innovations and industry regulations.

HYCONTROL SPS CUSTOMERS

HYCONTROL LEVEL TECHNOLOGIES





Product Range for Solids:

(1) TDR Radar for Solids
(2) 2-Wire Ultrasonic Transmitter
(3) FMCW 2-Wire Radar (Horn)
(4) Continuous Servo Level Indicator
(5) FMCW 2-Wire Radar (Drop)
(6) Capacitance Level Switch
(7) Vibrating Probe Level Switch
(8) Rotating Paddle Level switch
(9) Microwave Level Switch
(10) Doppler Flow Switch

Product Range for Liquids:

(1) Bypass Level Indicator with Radar
(2) TDR Radar for Liquids
(3) 2 Wire Ultrasonic Transmitter
(4) FMCW Radar 2-Wire (Horn)
(5) Magnetic Float Switches
(6) FMCW 2-Wire Radar (Cone)
(7) Foam Level Switch
(8) Capacitance Level Switch
(9) RF Admittance Level Switch
(10) Side-Mounted 316 SS Float Switch
(11) Tuning Fork Level Switch
(12) Ultrasonic Through Wall
(13) Mini Magnetic Float Level Switch

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