# Guarding the Quality

GrainWatch™ temperature monitoring is the most effective method to ensure optimal conditions for cereals or energy raw materials, like wood pellets, stored in silos.

The system consists of strong patented sensor cables placed vertically inside the silo with special software to monitor temperature data, from any of the equipped bins, on a smartphones or tablet.

GrainWatch™ is easily installed with flexible mounting options to fit any silo on the market – old or new, concrete or steel.

All components are internationally certified for intrinsic safety, approved for use in containers with semi-explosive content.
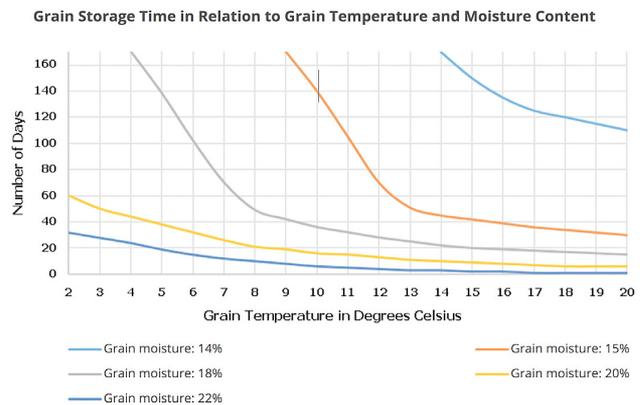
# GrainWatch™

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www.grainwatch.com

# A long-lasting investment worth making

**Grain-Watch™ temperature monitoring** is an effective method to ensure that your commodity is stored under optimal conditions by detecting "hot spots" caused by grain respiration, moisture, insect infestation, mold or fungus. Temperature probes placed inside the silo will register these hot spots and alert the supervisor to take action to avoid loss of quality or even wastage.

Considering the commercial value of the commodity stored inside silos, our temperature monitoring system is a long-lasting investment worth making. It has for two decades proved to be a vital link in the post-harvest chain and is a formal requirement in many countries.

Heat is an indicator for moisture; the moister the grain, the greater its capability to store and diffuse heat. The reference diagram shows how increased moisture and heat affect the time that grain can be stored safely. Increased kernel moisture content and high kernel temperatures drastically decrease storage time.



**Grain Storage Time in Relation to Grain Temperature and Moisture Content**

Y-axis: Number of Days (0, 20, 40, 60, 80, 100, 120, 140, 160)
X-axis: Grain Temperature in Degrees Celsius (2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20)

— Grain moisture: 14%   — Grain moisture: 15%
— Grain moisture: 18%   — Grain moisture: 20%
— Grain moisture: 22%

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**Grain-Watch™ temperature cables** (patent SE536675) are made from durable steel conduit cable and fitted with top-quality digital sensors using innovative 1-wire technology. This allows for ultra-thin, yet strong temperature cables significantly limiting the roof load. The sensors are calibrated for life, no sensor calibration or maintenance is needed – ever. Standard sensor spacing is 2m or 3m. All equipment is internationally certified according to ISO, ATEX and IECEx (ExVeritas).



### GWSL1100

Cable Ø: 9.8 mm
Lengths: 1 - 35 m
Number of sensors: ≤ 32
Sensor spacing: 2 m or 3 m (standard)
Tensile strength: ≤ 2.5 t
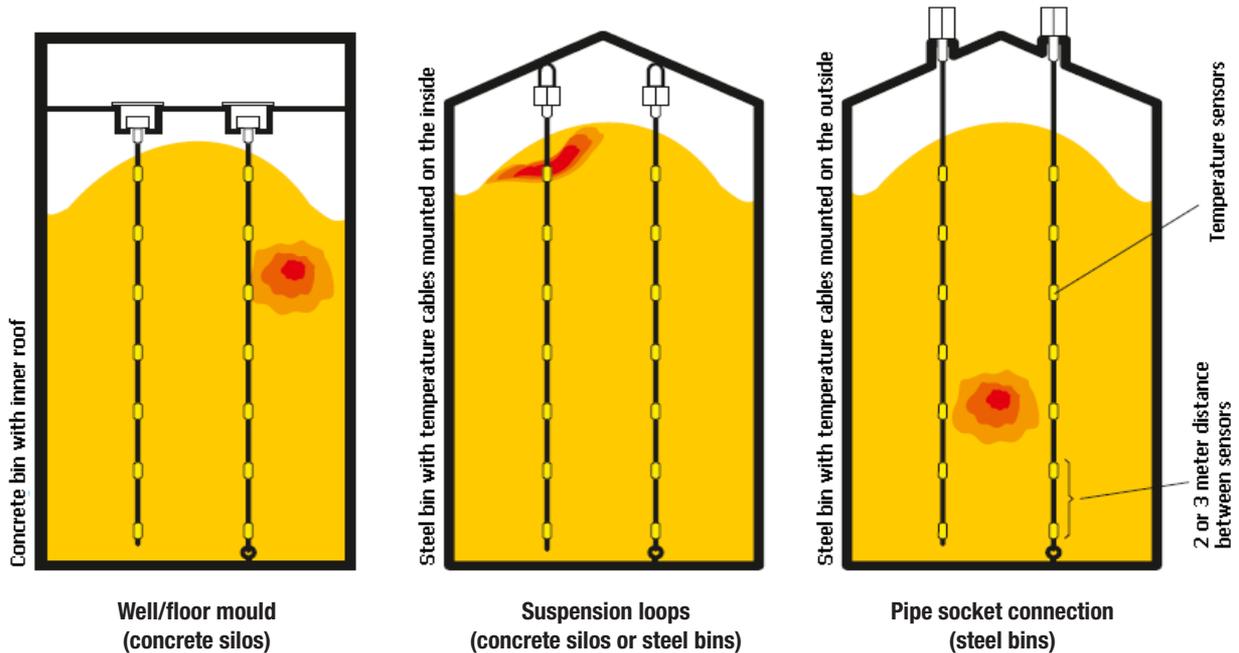Roof load during filling/emptying: 25 kg/m



### GWSL2100

Cable Ø: 17.0 mm
Lengths: 1 - 100 m
Number of sensors: ≤ 32
Sensor spacing: 2 m or 3 m (standard)
Tensile strength: ≤ 8 t
Roof load during filling/emptying: 50 kg/m

# Process Connection

**Grain-Watch™ temperature cables** are placed into steel or concrete silos using the following process connection:

**Concrete bin with inner roof**

**Steel bin with temperature cables mounted on the inside**

**Steel bin with temperature cables mounted on the outside**

**Temperature sensors**

**2 or 3 meter distance between sensors**

**Well/floor mould
(concrete silos)**

**Suspension loops
(concrete silos or steel bins)**

**Pipe socket connection
(steel bins)**

# Temperature Cable Placement

The amount and length of the temperature cables to efficiently monitor the grain temperature depends on the dimensions (diameter, eaves height, total height) of the silos. Many silo manufacturers provide brackets for temperature cables in fixed positions in their roof assembly. Other customers prefer an individual setup. We are happy to cater to both. Our project managers use our flexible dimensioning software to make sure you get optimal coverage.

Accurate grain temperature monitoring in big silo bins requires a several temperature cables. Basically, one cable monitors a radius of 3 meters.

| Round bin, diameter in meters | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 25 | 30 | 35 | 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Round bin, diameter in feet | 20 | 25 | 32 | 40 | 45 | 52 | 60 | 65 | 80 | 100 | 120 | 135 |
| Recommended number of temp. cables | 1 | 3 | 4 | 5 | 6 | 7 | 8 | 11 | 17 | 22 | 30 | 34 |

| Square bin, side length in meters | 5 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 |
|---|---|---|---|---|---|---|---|---|---|
| Square bin, side length in feet | 16 | 20 | 25 | 32 | 40 | 45 | 52 | 60 | 65 |
| Recommended number of temp. cables | 1 | 2 | 4 | 5 | 9 | 9 | 12 | 16 | 16 |

# Additional equipment



**GWNET**

Network switch. Connects all temperature cables in one silo.



**GWAB**

Hub. Connects all GWNET:s and collects data before redirecting to PC or mobile app.

## Summary

### TEMPERATURE CABLES

Patented construction, function and design (pat. SE536675).

Top-quality digital sensors – life calibration, maintenance free.

Robust and resilient, made from durable steel conduit cable.

Thin construction for minimal roof load.

Up to 100 m length and adaptable mounting.

Resistant to high pressures and tough materials incl. coal and biomass pellets.

Custom make to fit any producer/silo.

### MONITORING

Modbus 485 protocol connects to directly to PC, hand reader or to local supervising system.

Fully compatible with our leading mobile app technology.

Software download option for local PC. Choose from 7 languages.

### OTHER ADVANTAGES

Worldwide quality certified: ISO9001:2015, ATEX and IEC/IECEx (ExVeritas).

Intrinsically safe, allowed for use in explosive atmospheres (silo bins).

Worldwide brand proven on all six continents for two decades.

Made in Sweden. Premium product from leading nation in engineering.

*Our handheld reader GW-200*