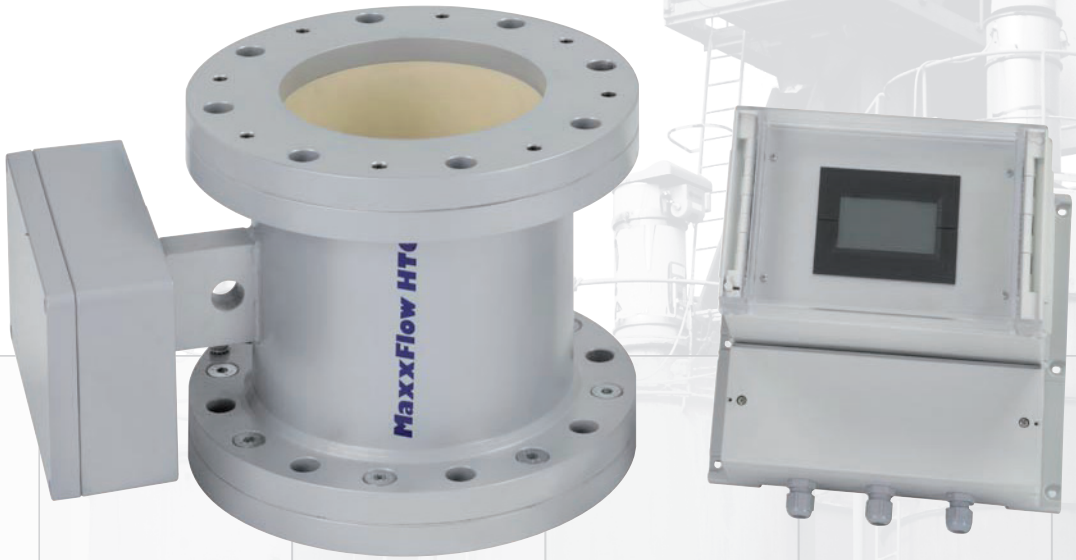
EN

GLOBAL TECHNOLOGY SYSTEMS

Manufactured by Superior with Solids SWR

MaxxFlow HTC

Flow Measurement for Dry Bulk Solids

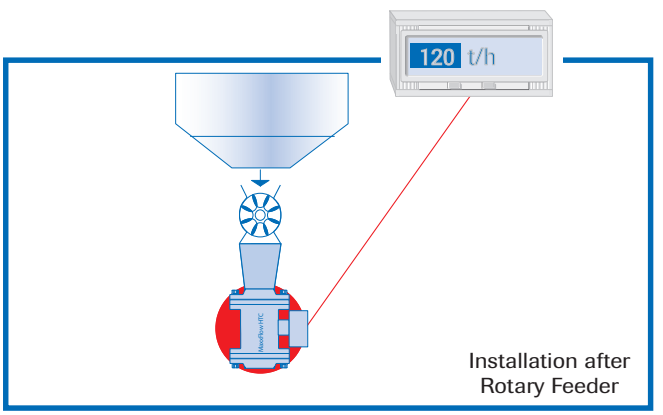


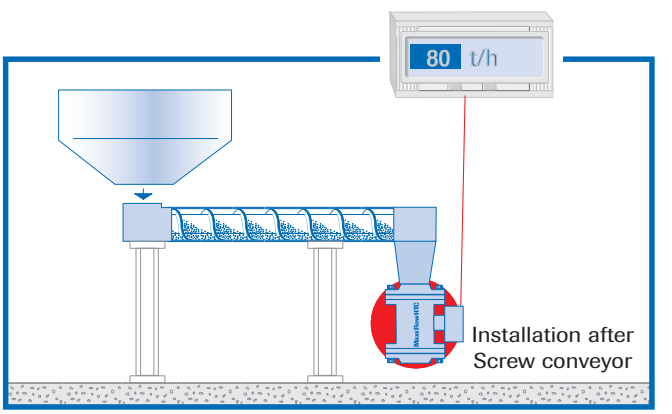
Product Information

Use

The MaxxFlow HTC was developed for the flow measurement of dry bulk solids without any moving parts. It does not require straight runs and can be mounted vertically or on an angle. It is only 12 inches in length and is very easy to install. Also, it replaces expensive and large mechanical solutions like impact flowmeters or weigh feeders.

The Maxxflow HTC is recommended to be located after a prefeed device such as a rotary feeder, screw auger, air slide or chain/belt conveyor.



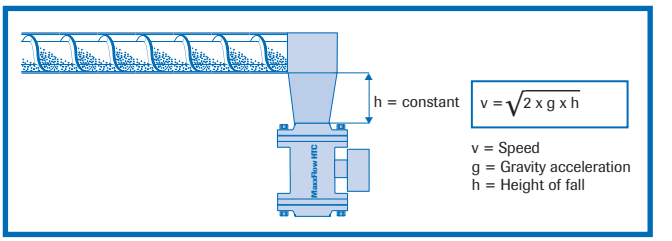


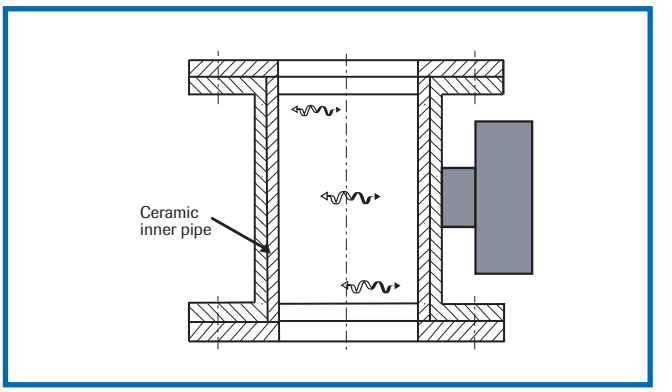
Function

After the conveyor, the material to be measured falls or slides through an inlet path and runs through the sensor. During the throughput, the MaxxFlow HTC records the material type and speed. Since the material falls from a constant height after emerging from the conveyor element, the speed of the product stream is accelerated, but is constant at the installation position of the sensor.
Due to this constant speed, the speed measurement does not need to be activated in every case, but can be calculated as a constant depending on the height of the fall. The mass flow is determined as follows:

$$Q_{(kg/s)} = K_{(lbs/ft^3)} \times v_{(ft/s)} \times A_{(ft^2)}$$

Through the input coupling of a high-frequency, electro-magnetic alternating field, a homogenous measuring field is generated in the measuring tube.
The measuring tube (interior tube of the sensor) consists of wear-resistant Al_2O_3 ceramics. Dry bulk solids inside the measuring field reduce the amplitude of the alternating field. This leads to a measuring signal that is in proportion to the concentration of the dry bulk solids in the sensor (lbs/ft^3)





If the material speed varies, for example due to a change in initial speed, then this can also be measured.
This takes place through a runtime measurement with the help of two additional electrodes behind the interior ceramics tube.

Calibration

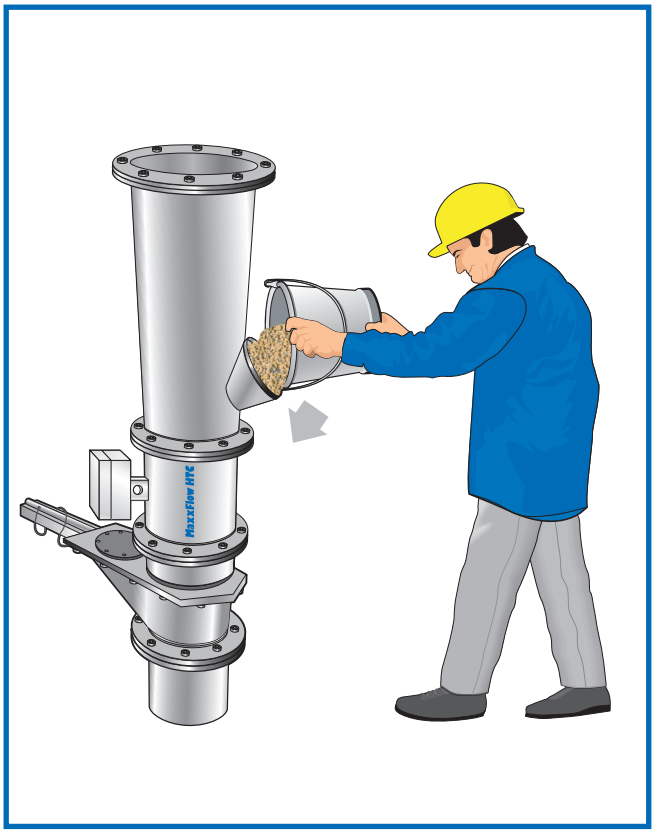
The recording of the speed is in every case independent of the type of the dry bulk solids that are to be measured, since they can either be calculated or based on a runtime measurement. Thus the speed measurement requires no calibration.

This makes a new and simple type of calibration possible:
A material sample (approx. 2.64 gal = sensor volume) can be poured into the sensor via a filling nozzle in the inlet path above the sensor.

There is a knife-gate below the sensor that is closed for the calibration. If the sensor is completely full, then the measured density value must correspond to the bulk density of the material.

This bulk density (set point) can simply be determined as a gram per liter weight and entered in the evaluation unit (full calibration). Even with large product flows, the measurement is completely calibrated with a material sample of only about 2.64 gal.

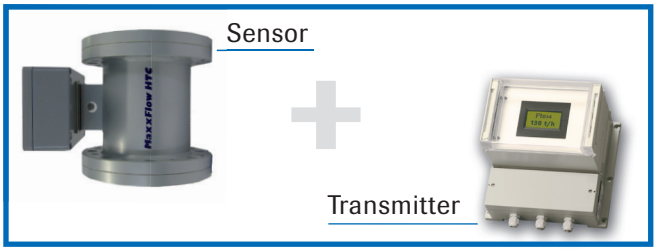
Material drop-tests using calibration points during a running process are thus a thing of the past.
The handling of several tons of material as a reference therefore is no longer necessary.



System

A complete measuring station consists of these components:

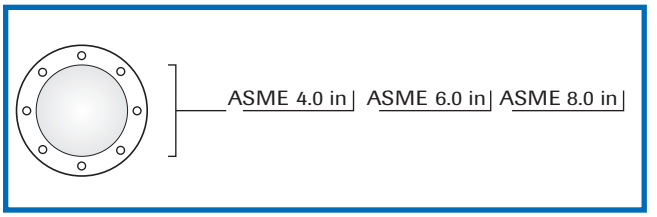
- MaxxFlow HTC Sensor (Spool piece)
- MFE100 Transmitter (Wall mount or DIN-rail)
- Optional AirPurge Assembly (Recommended for potential build-up)

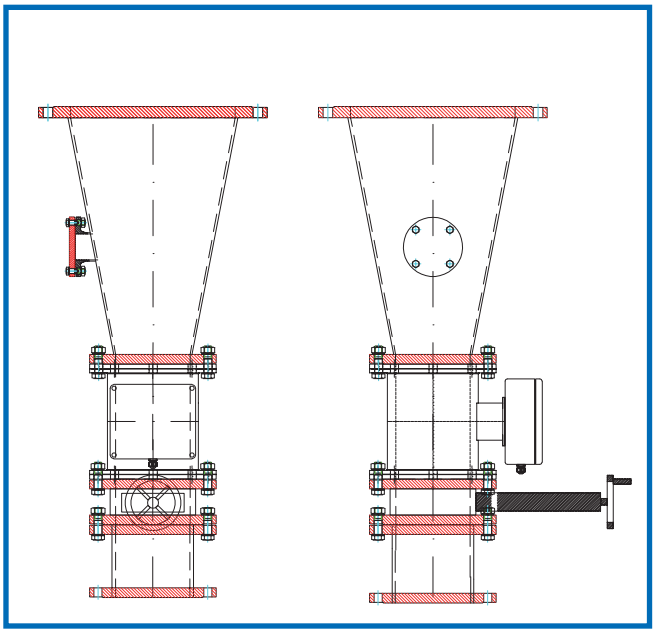


The measuring sensor is available in sizes 4”, 6” or 8” diameters with ASME Flanges.

On request the components inlet path (between conveyor element and sensor) and gate valve (for calibration) can also be configured and supplied. The transmitter is connected to the sensor using 4-wired, shielded cable.

The maximum distance between measuring feeder and transmitter is 1000 ft.





Configuration

For the configuration of the sensor, the knowledge of the maximum volume flow is fundamentally important in order to configure the measuring point in such a way that the dry bulk solids can flow through the sensor unhindered and the product flow is not influenced.

The diagrams in figure 1 to 3 show the maximum conveyable volume depending on material speed for the three sensor sizes 4.0 in, 6.0 in and 8.0 in.

The sensor cross-section in both cases is filled to 50 %.

Example:

If the max. mass flow amounts to 80 t/h, and if the material has a bulk density of 0.8 t/m³, then the maximum volume flow amounts to 100 m³/h.

When using a MaxxFlow HTC 6.0 in, a speed of approx. 3 m/s would be necessary.

When using a MaxxFlow HTC 8.0 in, a speed of approx. 1.7 m/s will be required.

Figure 4 shows inlet transition height vs. velocity (speed of fall).

Please consult GTS, Inc. to review your application and determine the best Maxxflow HTC size and recommended transition height.

Bulk density, Flow range (minimum, normal and maximum), moisture, and Drop Height (vertical height from the prefeed device to the top of the MaxxFlow HTC flange) are used to calculate overall Product Concentration. Ideally, we want a range from 10% to 50%, but can measure down to a minimum of 2%.

The AirFlange Assembly Kit is highly recommended for potential material build-up inside the spool piece. This allows high pressure air to purge the inside at user-defined time increments and durations.

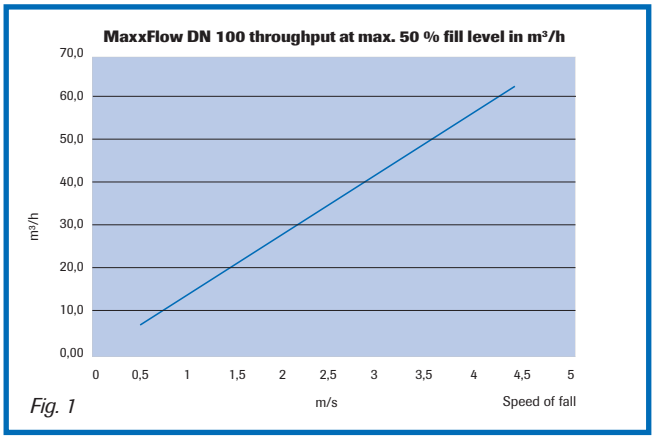


Fig. 1

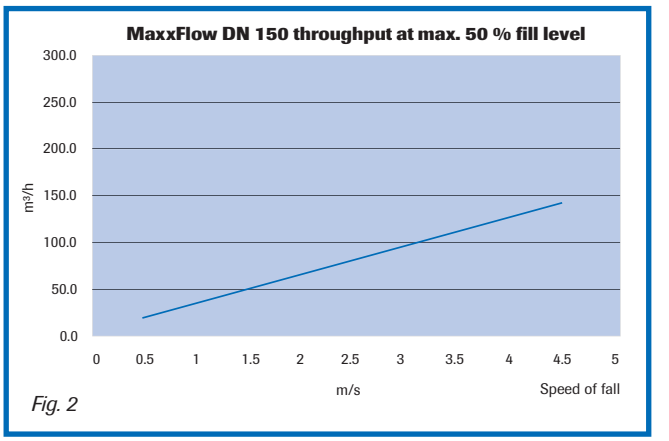


Fig. 2

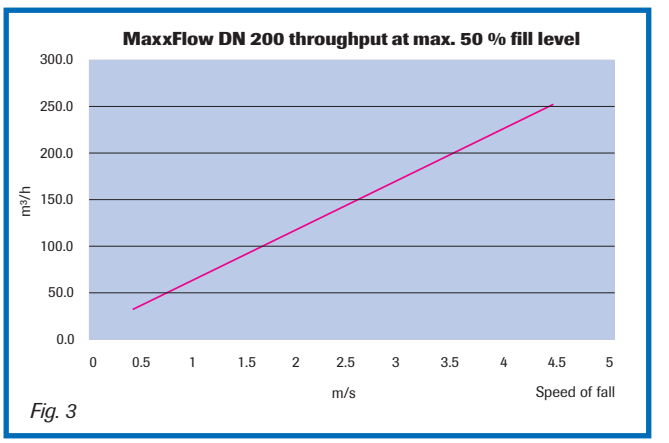


Fig. 3

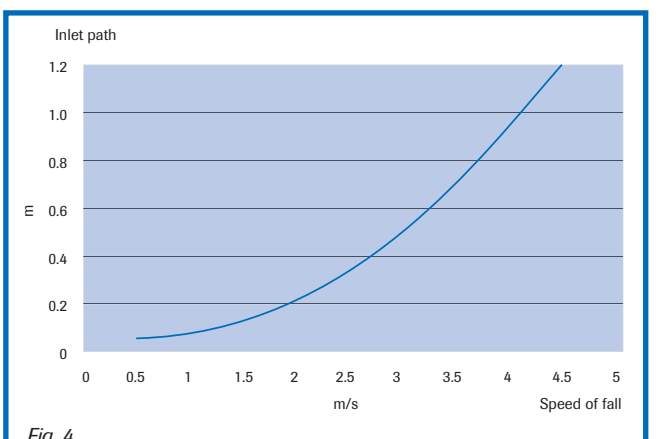


Fig. 4

A MaxxFlow HTC can be used for many different applications from process flow to truck & railcar loadouts. Extremely large flow rates can be handled by extending the transition inlet path to increase the velocity and reduce product concentration.

Caution must be used to ensure the transition inlet path has an angle of 60 degrees or greater. This guarantees a flawless product flow without plugging.

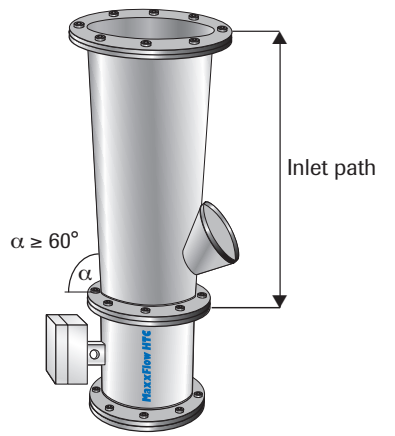
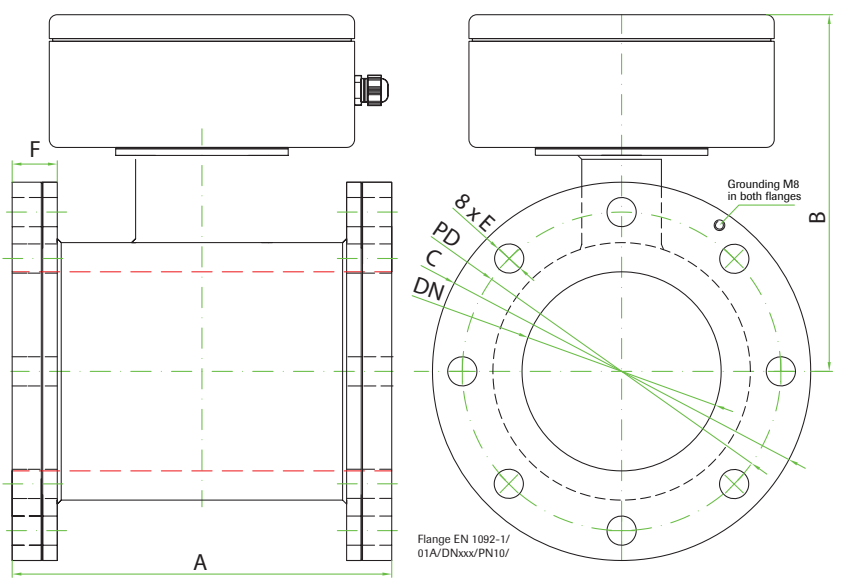


Figure 5

Advantages

- no mechanical moving parts
- no obstacles in the cross-section
- independent of the sensor orientation (vertical or inclined)
- no straight run requirement
- simple to install
- simple to retrofit
- dust proof (all enclosed)
- no load cells or LVDT
- abrasion-resistant ceramic liner
- maximum material temperature 300 °F
- maximum pressure 10 bar
- food grade safe and EX versions

Dimensions

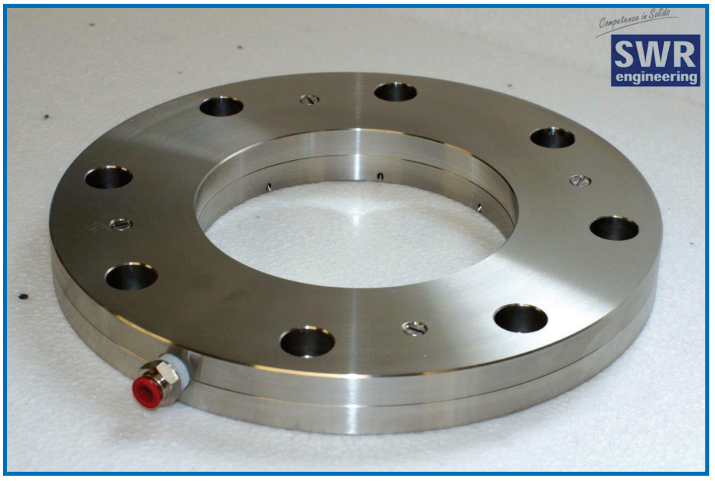


DN (ASME)	A	B	C	PD	E	F
100 (4")	220	250	220	180	18	31
150 (6")	290	269	285	240	22	36
200 (8")	310	294	340	295	22	23.5

Technical Data

Sensor	
Housing	Steel St52, powder-coated (optional stainless steel 1.4571) NW 4.0"/6.0"/8.0" ASME 150lbs, Flange according EN 1092-1/PN10
Inner pipe	Ceramic Al_2O_3
Protection category	NEMA 4X (IP 65)
Operating temperature	Sensor pipe: -4 … +248 °F Optional HT: -4 … +300 °F Sensor electronic: 32 … + 140 °F
Max. working pressure	1 bar, optional 10 bar
Working frequency	88 kHz
Transmitting power	Max. 2 mW
Weight	Depending on model
Accuracy	± 1-3 % (application dependent)

Transmitter	
Power supply	110 / 240 V AC, 50 Hz, 24 V DC
Power consumption	20 W / 24 VA
Protection category	NEMA 4X (IP 65)
Operating temperature	14 … +113 °F
Dimensions	258 x 237 x 174 mm (W x H x D)
Weight	Approx. 5.51 lbs
Cable glands	3 x M16 (4.5-10 mm Ø)
Terminal clamp wire size	0.2-2.5 mm² [AWG 24-14]
Current output signal	2 x 4 … 20 mA (0 …20 mA), load < 500 Ω
Alarm output Error output	Relay with toggle switch - max. 250 V AC, 1 A
Data backup	Flash memory
Impulse output	Open collector - max. 30 V, 20 mA
RS 485 interface	ModBus



Optional AirFlange
Available in Mild Steel or Stainless Steel

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