



# Food Industry

Application: Coating of sausage packaging with viscose

Viscose with a precisely set amount is sprayed into the sausage packaging. Prior to the development of MIM, measurement was performed with MIK, however MIM is a significant improved solution due to its integrated temperature measurement and easy on-site programmability.



# Food Industry



## Mechanical Engineering

„Smart milk dispensing apparatus “

Milk dispensing via scaled pulse output / PLC  
(pre-set dosing quantities via HMI)

## Beverage Industry

Industry: Viniculture

Mounting on mobile mash pumps

In fruit mash (crushed fruits), the sugar is fermented to alcohol. The mash is pumped through a filter and then low viscous quantity is detected. MIM counts the amount of juice that was pumped.



# Plant Construction for Brewery



Setting: 1 ml per pulse

MIM Pulse output at **PLC**

Repeatability is important

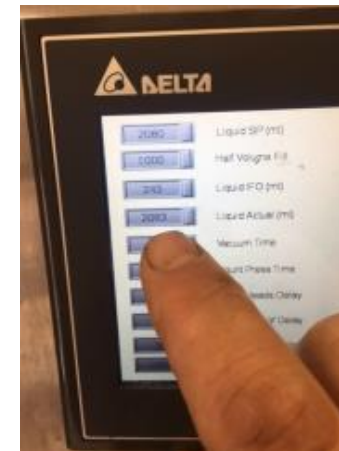
First Attempt: as shown in pic



- IMG 4507 Part Volume
- IMG 4508 Pulse Out
- IMG 4509 Pulse Volume
- IMG 4516 meter reading for 2160 batch
- IMG 4517 **PLC**-Display Pulse/ml
- IMG 4510 Pulse Volume Setting
- IMG 4511 Units: ml
- IMG 4512 Pulse Width: 3ms



IFM SM7100 supplied 1 pulse / 10 ml,  
so poor accuracy.



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# Plant Construction for Brewery



Filling: 2160 ml (6 x 360 mL / bottle) per process

Flow rate from 0 to 12 LPM (MIM-1210 ...)

(Jump, without pump, opening 6 x solenoid valves controlled by pneumatic drives)

SET	METER	ACTUAL	BOTTLE	DIFF
500ML BOTTLE 6 x 500 = 3000 SET POINT 3050 IFO = 70	3055	3006	501	49
	3053	3000	500	53
	3052	3000	500	52
	3051	2994	499	52
	3052	3006	501	46
	3055	3006	501	49
	3053	3006	501	47
				AVE $\frac{50}{3000} = 1.6\%$
355 ML BOTTLE 6 x 355 = 2130 SET POINT 2160 IFO = 70	2164	2130	355	34
	2165	2124	354	41
	2166	2130	355	36
	2158	2118	353	40
	2163	2124	354	39
	2160	2124	354	36
	2161	2130	355	31
				AVE $\frac{37}{2130} = 1.7\%$
330 ML BOTTLE 6 x 330 = 1980 TARGET 2000 IFO = 70	1998	1974	329	24
	2000	1974	329	26
	2002	1974	329	28
	2004	1974	329	30
	2005	1974	329	31
	2003	1980	330	23
	2006	1980	330	26
	2001	1974	329	27
2002	1980	330	22	
				AVE $\frac{31}{1980} = 1.6\%$



Improvement of the response time and repeat accuracy.

Attempt 2: Repeat accuracy approx. 10 ml with very good repeatability



# Plant construction (consumer goods)



Filling of liquid soap

approx. 700 cP, Range:50 LPM

Setting of Output 1: 7 ml/Puls

Upper Display: Partial counter

Lower Display: Flow



## Plant construction (water-cooled freeze-drying plants)

Vacuum concentration and freeze-drying are related processes that are used for gentle drying or preservation of thermosensitive materials.

A well-known example from the food industry is the freeze-drying of coffee to soluble coffee granules (instant coffee) and other instant powder drinks. Even fruits for cereal flakes are freeze-dried so that they retain their colour and taste. Furthermore, the method of freeze-drying is applied to herbs and spices to make them last longer, while the essential oils are retained as flavour carrier.

# Water Treatment Plant



Portable and modular test system

Tight space

Flow rate measurement after filtration, water @ 20 ° C, 0.2 bar

Order won against competitors because MIM pulse output was more stable and had small flow approx. 40 ... 150 ml / min (Picomag only from 25 LPM)



Demo

# Plant Construction (Process Industry)



Flue gas denitrification (DeNO<sub>x</sub>) by reduction. SNCR procedure (Selective non-catalytic reduction at high temperatures) and SCR (Selective catalytic reduction at low temperatures)

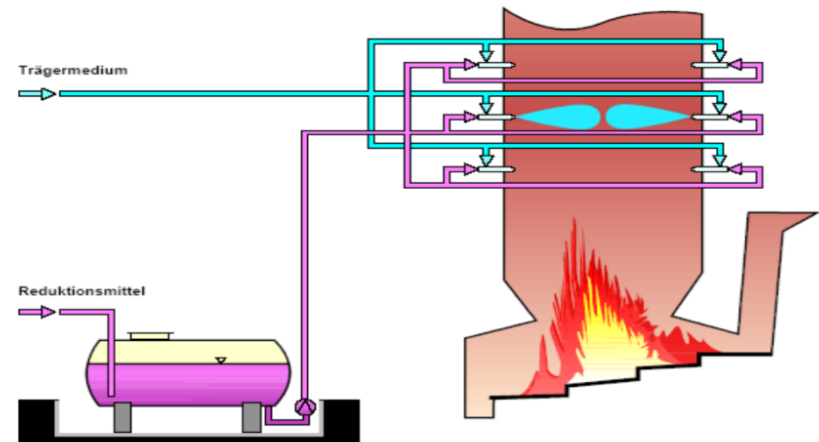
Medium: Ammonia water mixture or urea solution  
Application: Industrial plants, cement & power plants, waste incineration plants, biomass heating plants, combustion plants, gas turbines, industrial plants and internal combustion engines.

SNCR: A reducing agent, e.g. ammonia water or urea solution, is injected into the combustion gases. This injection is heavily dependent on an optimum distribution and right reaction temperatures of 900 and 1000 °C.

The sprayed amount of reducing agent is accurately measured by MIM and communicated to the controller.

Due to high temperatures, the ammonia and a large part of nitrogen oxides (NO<sub>x</sub>) converts to H<sub>2</sub>O and N<sub>2</sub>.

Part of the ammonia escapes into the atmosphere (Ammonia slip).



# Plant construction (process industry)

## Chemical Injection Skid



Application: Flue Gas detoxication in various industries e.g. Cement/ Power Plant etc.

Medium @ 40°C:

H<sub>2</sub>O+NH<sub>3</sub> 25% (NH<sub>4</sub>OH)

EPDM-seal

Battery sizing as required

Picomag replaced

Water - DUK

Ammonia – MIM

1xMIM 50 LPM

12xMIM 10 LPM





# Mechanical Engineering (Pharma)



In cooling water circuits, during CIP-cleaning or for production of Demi-Water with reverse osmosis

Batching/ Water & Chemical Consumption

Prototype Tablet Coating Machine.

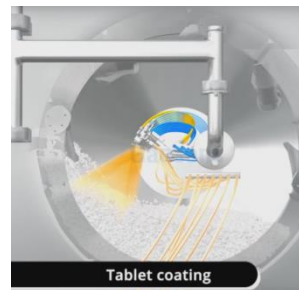
Tablet colouring by spraying chemicals

Challenge: Peristaltic pump with low pressure, less space

Installation in hoses, Flow ca. 300 ml/min

Installation MIM between Pump & Spray Nozzle

Previous method: Pump speed variation



# Metal Processing (Rolling Mill)



Production of industrial rolled products from aluminium and special alloys

Cooling water circuit of large industrial induction oven

Replacement for existing flow switches

Requirement was to measure flow consumption at same time (ca. 60 LPM)

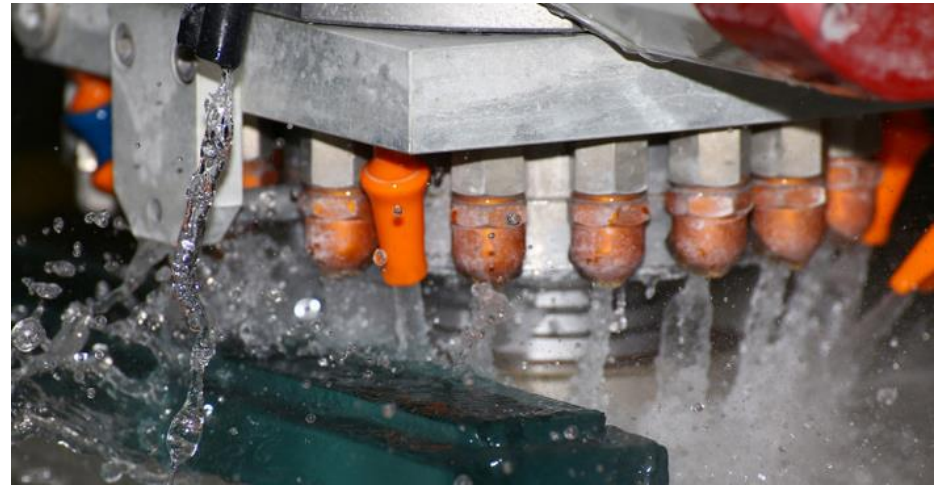
Technical space at bottom of induction oven very limited, several parallel pipes next to each other

Requirement for a compact unit with external readout and switch with no maintenance

# Glass Industry

Cooling water monitoring for glass production. Cooling water quantities are monitored and passed on to a process control system.

Bildquelle: Umwelt Bundesamt



# Construction

For an automatic concrete mixer, defined amounts of water must be added. Dosing takes place directly at MIM, which switches a valve when the target quantity is reached.

Bildquelle: <http://de.wrbmjnzy.com/concrete-trucks/fully-automated-mobile-truck-mounted-concrete.html>



# Automotive



## Cooling in the production of carbon fibres

In the production of carbon fibres, continuous filaments of raw material (polyacrylonitrile) pass through a long kiln system, where the fibres are carbonated at temperatures of 1300 to 1800 °C in a pyrolysis process.

In order to cool the furnace system, cooling elements streamed with water, are mounted on all sides.

In our customer's case, there are 124 cooling elements on one section of the furnace. Previously, the flow rates at the cooling elements were monitored by means of variable area flowmeters. We convinced the customer to use MIM instead of variable area flow meter. In addition to flow rate, the device also displays the temperature of medium.

In a comparison test against a competitor (IFM), our MIM prevailed. Initially, the customer wanted to use SWK devices. We expect the commissioning of MIM G 3/4 ", 0.1 ... 25 l / min in Q4 / 2019.

Cameras were not allowed in the production so photos are not available.

Beispielfoto (Quelle: <http://www.elgcf.com>)

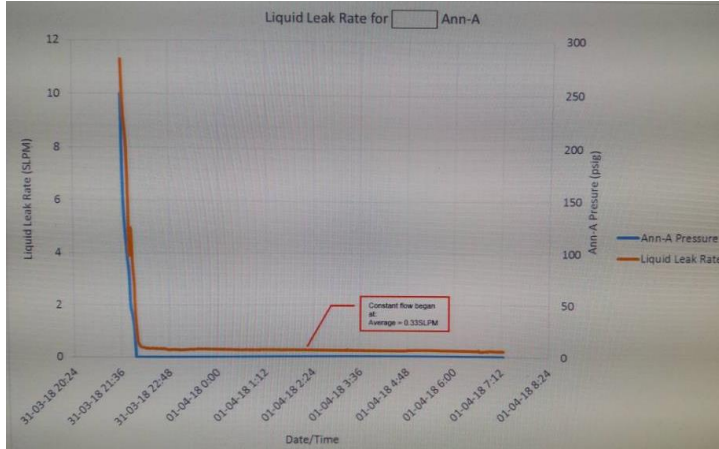




# Oil and Gas



Application: Water leakage in portable System



Customer is inspection company for inspection in refineries / oil and gas. The portable system is used for water leak measurement.

Advantage: compact and robust



# Chemical Industry



## Monitoring the addition of a biocide

A biocide solution (Bronopol, 2-bromo-2-nitro-1,3-propanediol) for disinfection or to avoid the formation of algae and other organisms is introduced into a line system by means of a pump.

The flow rates are between 4.2 ... 6.0 l/h at a maximum pressure of 12 bar.

The relatively high pressure is required to overcome the resistance of a check valve so that the backflow into the Bronopol line from the under-treatment pipeline can be prevented.

The flow is monitored with a MIM G ½ ", 0.04 ... 10 l/min.



# Chemical Industry



## Dosing during the filling of antifreeze at filling services

Filling service is a process in which private entrepreneurs or companies outsource the bottling, labelling and packaging of their product to another company.

At a chemical plant, filling of automotive antifreeze was being done for VW. VW had complained differences in the filling quantities of the containers during an audit.

### Product (water, ethanol, surfactant mixture)

Density:	0.833 ... 0.843 kg/m <sup>3</sup>
Filling quantity:	838 ... 848 g (for 1 l bottle) 419 ... 429 g (for 0.5 l bottle)
Accuracy:	+/- 2g (0.5% to 0.9% of the dosing value)

During sucking, air may enter into the cylinder under certain circumstances due to leaks in the piston plunger, resulting in different filling quantities.

- Currently about 30 l / min are filled
- The passage time of a funnel at the filling tube is +/- 3s (exact time can be determined)

# Chemical Industry



Supply line from  
container on first floor  
↓



Reservoir under  
the bottling plant

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# Chemical Industry



Filling the funnels

Pistons press a defined cylinder content into rotating funnels

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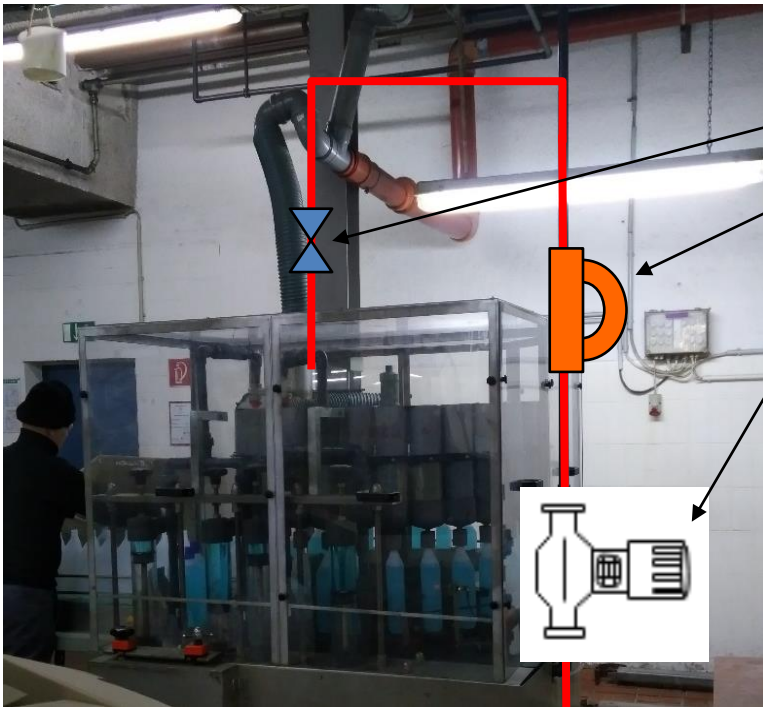
# Chemical Industry



Replacement of cylinder / piston dosage with:

- Control Valve
- KOBOLD Flow Meter (MIM)
- Adjustable Pump

Flow measurement as well as the entire control loop now has a sufficiently accurate reproducibility.



# Chemical Industry



Dosing is now carried out via dosing function of MIM.  
Initially there were difficulties with the "reset time" of the dosing function, which has since been changed.



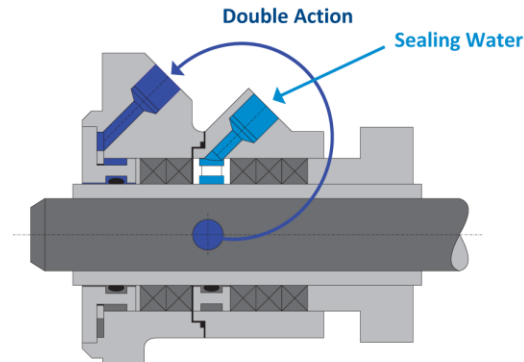


# Auxiliary Circuits in Process Industry

Seal water amount of pump slide ring seals to ensure seal functionality

Challenge:

Hermetical separation of Mediums from waste/ seal water  
compact



## Automobile

Engine test benches

Water+Glycol Mixture up to +125°C



# Agriculture



## Well water

In order to control the extraction and application of well water for irrigation of green areas, the flow rate is determined.

Since the capacity of the well can be influenced by fluctuating groundwater levels and by the extraction at several extracting points, a time-controlled control is not possible here.

Irrigation is automatically stopped by a signal from the MIM after a certain volume has been drawn.

**MIM G 1", 0,4...100 l/min**



# Agriculture

Water + Neem Oil (ca. 50%) as additive in Plant Fertiliser

The Indian Govt. has made it statutory for fertilizer companies to produce Urea coated with Neem oil to avail subsidies.

Neem leaves are ground to a pulp & oil extracted from it. It is then mixed in water & sprayed on the Urea powder.

Neem oil coating on Urea helps the farmers in drastically reducing the use of insecticides & pesticides due to the natural inherent qualities of Neem.

Due to this it saves the cost of insecticides / pesticides for farmers & leads them closer to bio agriculture protecting the environment & health.

**Neem Oil Coating On Urea Fertilizer**  
Spraying Systems India Private Limited | Peenya, Bengaluru

2008+ MODULAR SPRAY SYSTEM:  
NEEM OIL COATING ON UREA FERTILIZER

IMPROVE PERFORMANCE & LOWER COSTS  
WITH PRECISION SPRAY CONTROL.

**Spraying Systems Co.**  
Experts in Spray Technology

# Laboratory / Testing Institutes



Customer:

Water consumption measurement  
by washing machines's and dishwasher's  
manufacturer.

Flow rate: 0.04...10 l/min,

Temp: 20 °C, 80~100 °C

Pressure: 1~2 bar



# Glass Industry

Flow and Temperature in Cooling Water Circuits



# Water Filtration

Industrial Application – MIM as Prototype in RD