

Best practice

# Minebea Intec stepped in when China changed its policy on charging for heating consumption



*When the Chinese government decided to charge its citizens for heating on a consumption basis, the National Institute of Metrology in Beijing was required to find a solution.*

## Key facts

The National Institute of Metrology in Beijing was faced with the task of laying the foundations for documenting the hot water consumption of individual users. The new calibration system was to employ flow and temperature to determine usage. A precise weighing solution for different capacities was successfully implemented.

## Application

Minebea Intec developed a weighing solution with high-resolution scales for the measurement of water mass, with capacities of 60 kg, 600 kg and 6,000 kg.

## Products

- IS digital weighing platform with IP67 rating
- Weight indicators Combics 3 with IP69K rating

## Customer benefits

- High level of accuracy
- High IP rating for rough operating environments
- +/-2 d repeatability
- Quick and easy built-in calibration and adjustment feature/function

## Customer

The National Institute of Metrology in Beijing is China's technical centre of legal metrology. It was founded in 1955 as a non-profit institution with the purpose of providing accurate, reliable and traceable measurements to support China's economic growth and social sustainability.



## Project goal and implementation

In 2010, the Chinese government adopted new criteria to calculate utility bills, moving away from using the surface area of dwellings to instead charge on a hot water consumption basis.

For that purpose, 20 million RMB (about €2.5 million) was invested for the construction of a 1,800 m<sup>2</sup> laboratory. The National Institute of Metrology (NIM) was appointed to oversee the development of a suitable infrastructure that would lead to the installation of three million water meters every year.

Since water would reach the homes already heated, the calibration system would have to analyse flow and temperature to determine energy consumption, while keeping uncertainty below 0.1% and supporting a maximum flow rate of up to 600 m<sup>3</sup>/h.

The most accurate way to analyse water flow is by determining mass. Therefore NIM approached Minebea Intec for the supply of high-resolution scales with the following requirements:

- Three capacities of 60 kg, 600 kg and 6,000 kg
- Excellent repeatability and linearity
- Accuracy better than 0.01%



Combics 3 weight indicators' large displays provide excellent visible readout even in unfavourable conditions

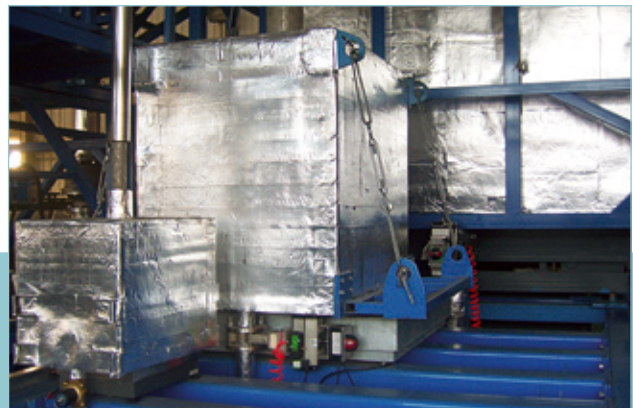
- Resolution higher than 120,000 d
- High IP ratings for adverse environment conditions
- Digital displays with inherent abilities to reduce communication interference

The solution Minebea Intec proposed was the range of high-resolution scales with IS weighing platforms, which is based on Electromagnetic Force Compensation Technology (EMFC). With EMFC, the weighing platform is connected to a lever with a coil (with current flowing through it) floating inside of a permanent magnet. Whenever a weight is placed on the scale, the

lever moves and the increase of current in the coil generates a compensating magnetic force to maintain its initial position. The amount of generated force (the increase of the current in the coil) then translates into a weight readout.

The scales were built with high-quality stainless steel with IP67 ratings and were connected to a series of Combics 3 weight indicators equipped with an IP69K rating and RS485 serial interface. They also allowed for repeatability of +/-2 d, and a quick and easy built-in calibration and adjustment of the weighing system without weights.

This approach resulted in much more accurate weight readouts, with a resolution of 600,000 d, which was well above the 120,000 d required by the customer.



The IS weighing platforms are easily integrated in the customer's application

*"The new facilities open a window on heat meter calibration, whilst also modelling the fantastic quality of Minebea Intec's products."*

Mr Zhang Lihe  
National Institute of Metrology (NIM), Beijing



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