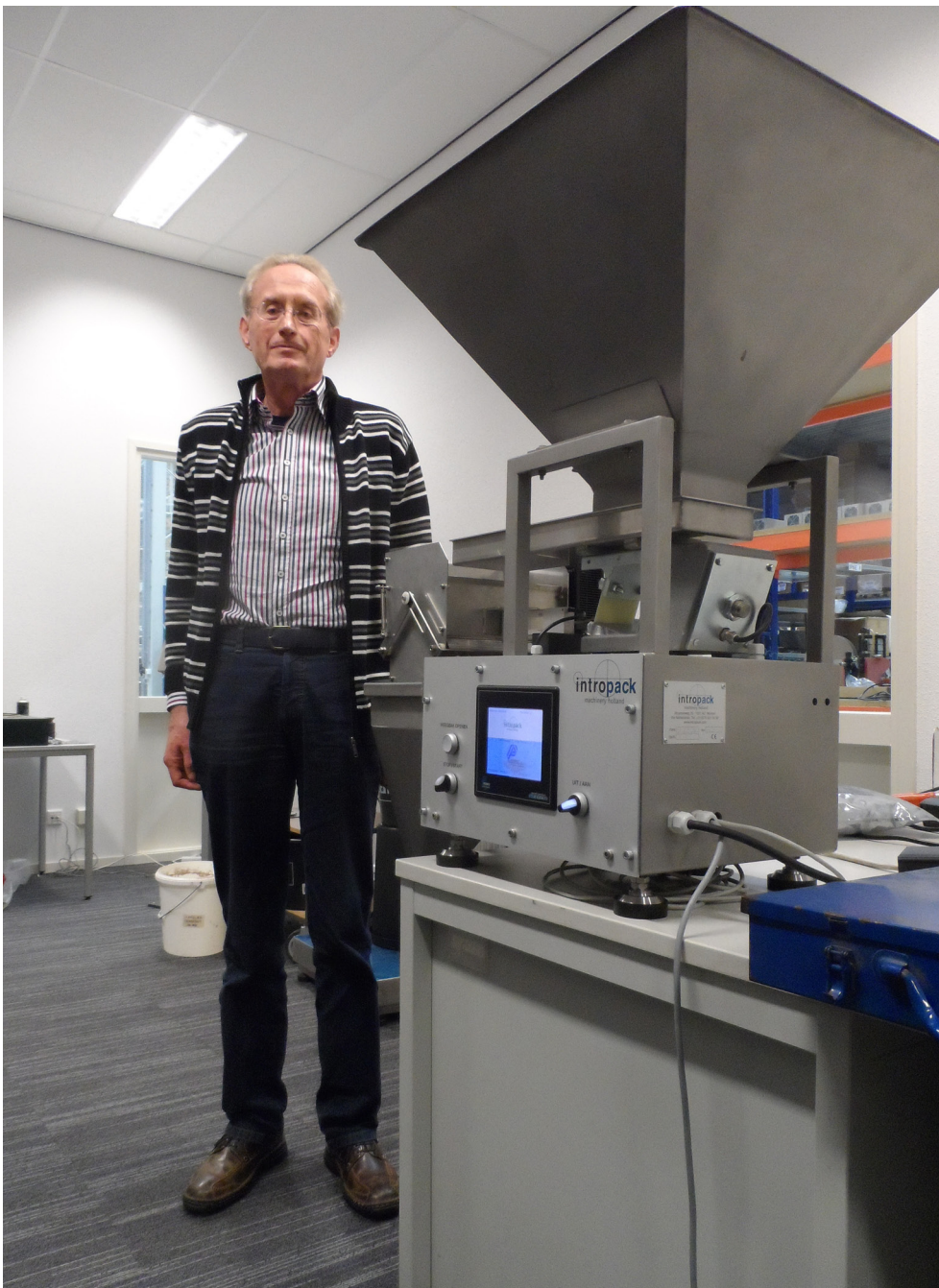


Legislation for filling

Speed of weighing systems increased substantially

Tekst: Norbert van der Werff Foto's PENKO, Norbert van der Werff



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An electric toy train in the premises of PENKO Engineering, a producer of weighing equipment, highlights the principle. The locomotive drives over a load cell after which the display shows in different colours if the train is too light or not. Is that the case, than the locomotive will be fly shunted. The principle is valid for food products too, but faster. The weighing system can perform up to 1600 measurements per second.

The regulations for filling of liquids and solids are different. "A good thing, just try to count plain flour", says Vincent van der Wel of PENKO, a company developing systems for weighing of consumer packages as well as large containers for business-to business. Under its customers in the food industry PENKO counts processors of cocoa, nuts, eggs, fish and fresh fruit. For the company, located in Ede (NL) van der Wel is responsible for the publicity and takes care for the internal education of new employees. Moreover he is president of the Society of Suppliers of Weighing (VLW) equipment in the Netherlands and vice-president of the European umbrella organization CECIP.

Liquids don't have to be weighted, according to the law they are sold on volume, van der Wel teaches. Doing so the volume must be recalculated to the volume at 20 Centigrade. "A strange measure. Beer and soda one doesn't drink at that temperature..." Should filling



and selling be on weight, than a recalculation is not necessary. There are no rounding errors too. These are some decimal places, but on a year's production it makes a difference. When weighing one counts in fact molecules, so that's always correct. "The means for measuring weight are covered by the Measurement Instruments Directive, are controlled and checked by market surveillance but strange enough this all is not valid for volume."

Deviation

The maximum permissible error for fillers on weight is established in the Measurement Instruments Directive (MID) 2014/32/EU. The permissible error depends of the mass (m) of the fill. Opposite to the size of the fill the deviation as a percentage decreases. In the directive is chosen for an alternation between a deviation in percentage and in units of mass. That's why there is no difference at the transition between two classes. See the first two lines of the table, 7,2 percent of 50 grams, the limit value of the class, is as a matter of fact exactly 3,6 grams.

Value of the permass, m (g), of the fills	Maximum permissible deviation of each average fill from the for class X(1)
$m \leq 50$	7,2 %
$50 < m \leq 100$	3,6 g
$100 < m \leq 200$	3,6 %
$200 < m \leq 300$	7,2 g
$300 < m \leq 500$	2,4 %
$500 < m \leq 1\ 000$	12 g
$1\ 000 < m \leq 10\ 000$	1,2 %
$10\ 000 < m \leq 15\ 000$	120 g
$15\ 000 < m$	0,8 %

The calculated deviation of each fill from the average may be adjusted to take account for the effect of

material particle sizes. This is important because of bigger products, such as potatoes, one piece more or less has an immediate effect on the mass in the package.

E-mark

In the de processing industry small packages, < 10 kg, can be filled in accordance with the e-mark. That means the average of a production run, by example of an hour, at least is the declared number of grams. As permissible errors the grams mentioned in the table above are applicable. Apart of that for 2,5 percent of the packages the deviation may be bigger than the value in the table (so for small packages of 50 g grams with 7,2 percent). In no case however the deviation of the quantity in the package may deviate with more than twice the permissible error (so for the mentioned small packages below 50 grams minus 14,4 percent). As a matter of course these deviations can occur by a limited number of packages because otherwise for the complete batch the average will not be met. Companies, not using the e-mark for filling, have to make sure in any package at least the weight, stated on the package, is present. So they cannot make use of the average value. Another advantage of the utilisation of the e-mark is the products can be exported without control on the borders to other EU member countries. Disadvantages are there as well. An approval for the e-mark must be requested from a notified body, by example for the Netherlands NMI-Certin, and an extensive administration for control by the authorities is required. Maintaining this administration is, according to van der Wel, made easy by the modern equipment, capturing all measurement data automatically.

More measurements per second

The deviations are as well influenced by the characteristics of the product. "When there is a lump in the flour, it drops in one move in the package". The speed, used for filling, is of importance. When the supply speed increases, without measuring more frequently, the accuracy decreases. According to van der Wel the speed of weighing systems increased the recent years robust from 250 up to 1600 mea-

Marketsurveillance

During recent years the food processing industry has been frightened by fraud. The users of weighing equipment behave themselves decently according to van der Wel. This might be related to the market surveillance by Verispect, commissioned by the government, which in his opinion works well. Weighing equipment has to be calibrated and stamped during completion; the supplier as well the buyer must look after that. Verispect checks equipment in use. According to van der Wel that happens once every four years. PENKO calibrates the weighing systems of its customers every year after which the equipment is marked with a sticker. When market surveillance encounters such a sticker shortly thereafter, the can decide to renounce further inspection. PENKO has to perform a proper administration. Apart of that Verispect checks at random PENKO's judgment.

surements per second, what offers more accurate control. The instrumentation reacts within 0,6 milliseconds (0,0006 seconds). Van der Wel expects this will improve in the future. PENKO advises by high speeds to use direct current instead of alternative current for the control circuit, because switching off must happen exactly on time. When there are differences in the timing for closing the valve, different quantities of product enter the package.

Electronics

According to van der Wel the load cell has no wear and tear as it doesn't possess moving parts. "The load cell almost lives forever. Only when substantially overloaded or by welding operations in the neighbourhood the load cell becomes unreliable. Wear and tear takes place in the mechanical part of the filling machine and then filling becomes less accurate. These parts can be replaced." The electronics have a life time of at least 10 years. After that period repair is not attractive from a financial point of view and it makes sense to buy a new version, van der Wel advises. Moreover new electronics are much more user friendly with a touch screen avoiding going through the entire menu.

