WHITE PAPER

SUPPLEMENTARY FEEDING OF PIGLETS WITH AUTOMATED FEEDING SYSTEMS

koudijs

Feeding *Performance*

Contents

Rob van Schie
Manager Sales

Feeding piglets with milk?
Isn't that far too expensive?

At first glance, it may seem so. But a piglet must meet several critical requirements to move through the weaning process successfully and with no setbacks. The foundation for this is, of course, the sow. She is key to raising healthy, robust piglets.

However, as a feed supplier, you can make a significant impact by optimising how and why piglets are fed alongside the sow. There are five clear objectives:

1. Learning to eat
2. Developing digestive capacity – feed structure and composition aligned with post-weaning diets
3. Learning to drink water
4. Survival – supporting or replacing sow's milk with high-quality liquid milk replacer
5. Driving extra growth – supplementing milk in liquid or dry form

The choice of prestarter and milk feeding strategy is not determined by animal performance alone. Labour availability is a critical factor as well.
On larger farms with more staff, there is a strong demand for standardised, robust and automated processes. As a result, we see a clear shift towards automated piglet feeding systems in the farrowing house.

A strong example is the DFS system, featured in this edition. It demonstrates not only the technical approach, but also provides practical insight into the financial impact of milk supplementation, how to use these solutions effectively and which performance benchmarks to target.

Enjoy reading

From start to finish: How early milk feeding affects finisher performance

Suzanne Hendrikx
Swine Specialist

To support our vision of supplementary feeding of piglets using automated feeding systems, and to substantiate its impact with data, we have conducted several large-scale trials over the past decade. In these studies, piglets were monitored from the farrowing stage through to slaughter, enabling a full evaluation of the long-term effects on performance.

Commercial farm trial (2023-2024)

During the trial, supplementary liquid milk replacer (LMR) was provided from day 4 to day 18 of age, alongside a dry prestarter from day 7 to 18 and weaning feed from day 19 to 21.
This had a significant positive effect on piglet and fattening pig performance compared with provision of only a dry prestarter and weaning feed in the farrowing pen.

Higher litter growth per day

Supplementary feeding of LMR results in 0.3 extra weaned piglet per sow, heavier piglets at weaning and a total litter weight at 21 days that was more than 5 kg higher (see Table 1).

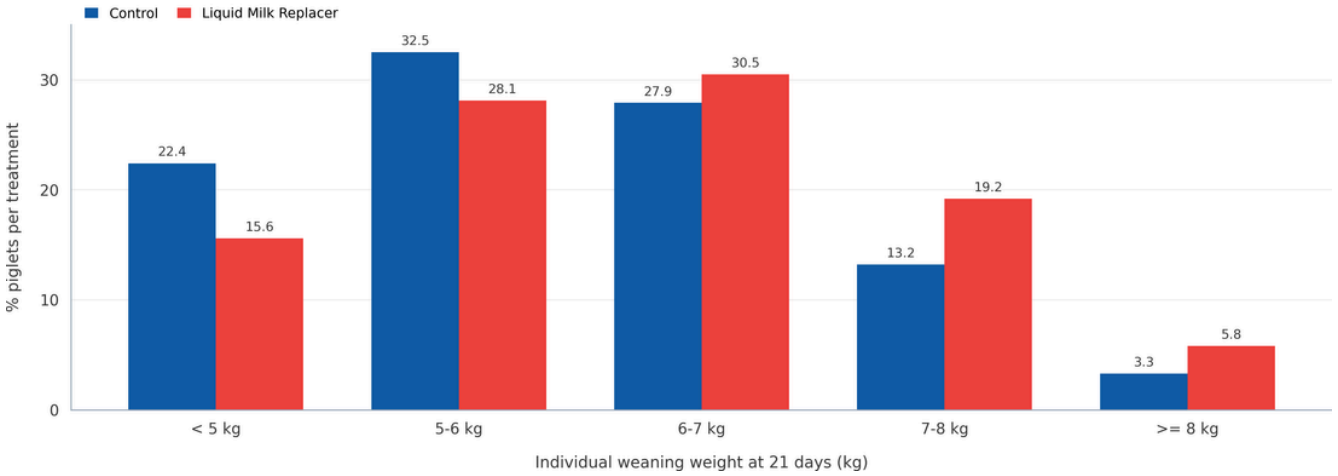
The higher weaning weight also translated into pigs being 0.85 kg heavier at 67 days of age.

		Control	LMR	Difference	Significance
# sows		233	247	–	Ns
Ø parity		3,7	3,8	–	Ns
# born piglets		17,13	17,05	–	Ns
# live born piglets		16,09	16,26	–	Ns
# piglets d4		14,73	14,85	0,33	Ns
Weaned per sow		13,70	14,03	0,33	P < 0,01
Litter weight at day 4	Kg	27,7	28,4	–	P < 0,01
Litter weight at weaning, d21	Kg	80,12	85,27	5,15	P < 0,01
Litter growth per day	Kg/day	3,10	3,40	0,30	P < 0,01
Weaning weight per piglet	Kg	5,86	6,14	0,28	P < 0,01
Weight at 67 days	Kg	24,46	25,31	0,85	P < 0,01

Table 1
Results additional feeding LMR versus control (only dry feeding) from day 4 until day 21 of age on piglet performances.

Heavier and more uniform piglets

By individually weighing all piglets, the weaning weight distribution was determined. Compared to the control group, the LMR group had a higher weaning weight and fewer piglets with a weaning weight below 6 kg (see graph 1 on page 5). In addition, the weaning weight distribution was reduced, resulting in more uniform piglets when supplemented with LMR.



Graph 1 Weaning weights distribution day 21 of weaning, control versus supplementary liquid milk replacer group

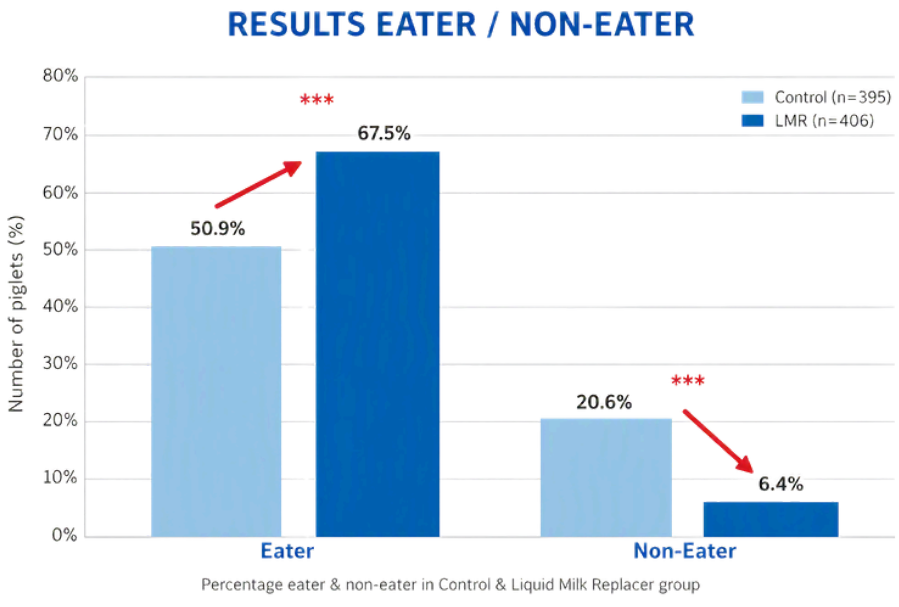
Impact of supplementary feeding of liquid milk replacers (LMR) on the number of eaters and non-eaters

During the commercial farm trial (2023-2024), eaters and non-eaters of the weaning diet were determined by scoring individual rectal swabs at day 21. Rectal swabs were collected from one control group and one LMR group, resulting in a total of 805 samples.

All rectal swabs were scored and classified by a single person as eater (light brown/brown coloured manure with structure); non-eater (light yellow coloured manure with smooth structure); or doubtful (no manure on the swab or manure with an intermediate colour and structure).

In the group of piglets that were supplementary fed LMR, 67.5% had eaten before weaning and 6.4% had not (see Graph 2). In the control group, 50.9% of the piglets had eaten and 20.6% had not. It should be noted that these results were measured at 21 days of age.

For the remaining piglets, it could not be determined whether they had eaten or not.



Graph 2 Percentage eater & non-eater in Control and Liquid Milk Replacer (LMR) group

Carry-over effect of supplementary LMR on fattening pig performance

Increased weaning weight, more uniform piglets, and a higher proportion of piglets classified as "eaters" prior to weaning result in a positive carry-over effect on fattening pig performance.
On average, pigs that received supplementary LMR started the fattening period at a significantly higher body weight and at a younger age (-0.5 day) compared with the control group (see Table 2).

PENS	#	CONTROL 104		LMR 131			
		means	stderr	means	stderr	difference	P value
Start weight	kg	23.8	0.26	24.8	0.24	1.0	<0.001
Final weight	kg	126.2	0.66	126.2	0.60	0.0	ns
Feed intake	kg/d	2.26	0.01	2.30	0.01	0.0	<0.05
Daily gain	g/d	1009	6.20	1018	5.60	9	ns
Feed conversion	g/g	2.25	0.01	2.26	0.01	0.01	ns
Start age	d	67.3	0.53	66.8	0.44	-0.5	<0.05
Delivery age	d	169.6	0.61	166.3	0.51	-3.3	<0.001

Table 2 Fattening pig results of pigs supplementary fed LMR and control group

In the finisher stage, performance is influenced by multiple variables, which can reduce or neutralise the impact of differences observed up to 67 days of age. As pigs on the commercial farm are sent to the slaughterhouse at a fixed target weight, the final slaughter weight was similar between treatment groups. However, pigs in the LMR group reached the target slaughter weight approximately 3 days earlier than those in the control group (see Table 2).

What makes a good milk

Rob van Schie
Manager Sales

The quality of milk replacer is determined by three factors: The correct nutritional composition, aligned with the animal's needs; Product consistency and the correct application.
When these three elements are in balance, reliable and economic performance can be achieved.

A complete range

A complete milk replacer concept for a feed supplier consists of up to three types of milk:

1. Milk that fully replaces sow's milk from 48 hours after birth
2. Milk that is used alongside sow's milk from day 2, or replaces it from day 4–5
3. Milk that can also be fed in dry form

When your customers use automated feeding systems in the farrowing house, prestarters and weaner feeds must be suitable for this purpose. Feeds must remain pumpable and not sink / no sedimitation. Even in the latest cup systems, specialised prestarters and weaner feeds can be used
(see article on page 10).

1. Nutritional choices aligned with the animal

The composition of milk is directly linked to its intended use.
In practice, there are two main approaches:

Piglet survival

When milk replacer largely or completely replaces sow's milk shortly after birth:

- Raw materials must be digestible for piglets from 48 hours after birth
- Intake and therefore palatability and product consistency
- The product must remain well in solution
- The product must remain stable for sufficient time after mixing

Additional growth and uniformity

When milk replacer is used in addition to sow's milk:

- Focus on growth and uniform litters
- There is more scope for plant-based raw materials
- Feed costs are lower
- The choice of raw materials follows the objective of the product.

2. Product consistency

To achieve a good balance between quality and cost, milk replacer is partly composed of by-products.
This offers several advantages:

- Economically attractive of dairy processing
- Nutritionally valuable ingredients
- Efficient use of raw materials (circular)

The challenge lies in selection and control:

- Not every by-product is suitable
- Variable raw materials lead to variation in:
    - Nutritional value
    - Solubility
    - Technical performance

Consistent results require control of both the quality and availability of raw materials.
Small, variable streams cause unwanted fluctuations and should be avoided.

3. Application and advice determine the result

The use of milk replacer ultimately determines the economic and technical outcome.

Dry milk, a simple solution

Beside the traditional milkpowder which has to be fed liquid we developed a milk which can be fed also dry

- Limited labour: dry milk is simple and efficient
- Focus on feed intake: stimulates early intake

The latest techniques in liquid feeding

- New cup systems make liquid feeding possible without manual labour
- Combining with a liquid prestarter increases efficiency

The best product, when used incorrectly, delivers poor results. This certainly applies to milk.

Switch on time

Better piglets with less milk?

Every piglet must learn to digest, eat and drink water before weaning. It is therefore essential that each animal consumes sufficient (dry) feed, alongside both milk replacer and sow's milk. Switch on time from milk replacer to a follow-up product is essential; this is better for the piglet and more economical. See page 10 for practical guidelines on transition points.

More piglets weaned through smart early feeding

A two-phase approach to maximising intake and gut development

Lia Hoving
Manager Nutrition and Support

Two Phases Define Success in the Farrowing house

Our practical on-farm application for supplementary feeding, based on research, comes down to two critical phases, with each phase having its own distinct purpose in piglet (gut) development:

- Phase 1: Day 0–14 – stimulating intake
- Phase 2: Day 14 to weaning – develop digestive capacity.

Phase 1 (Day 0–14): Driving Early Feed Intake

The first week of life determines how many piglets within a litter start eating. Early supplementation of feed (from day 2–4) significantly increases total feed intake in the farrowing crate. This effect is driven by:

- Higher intake per piglet
- A larger proportion of piglets starting to eat

Not All Piglets Start Eating

Feed form, composition and management directly influence how many piglets consume feed before weaning. Milk-based products clearly increase the proportion of piglets eating, both pre- and post-weaning. One of the key objectives during the first two weeks is therefore to maximise the number of piglets that start eating voluntarily.

The commercial farm trial described on pages 4–5 clearly demonstrated that supplementary liquid milk replacer increases the proportion of piglets consuming feed before weaning while reducing the number of non-eaters. These findings underline the importance of maximising feed intake during Phase 1 and support the use of milk-based feeding strategies to stimulate early intake and facilitate a smoother transition towards solid feed.

Target Intake in Phase 1

Aim for 80–160 g of milk powder per piglet during the first 14 days.
At this level, it can be assumed that the maximum number of piglets is consuming sufficient feed.
Higher and lower intakes require evaluation of underlying causes.

Start early with the right feed and feed form - tips and tricks

Day and placement

- Introduce open, round feeders between day 2 and 4 or open cups
- Position them close to the sow's head and the piglets' drinker
- Refill with fresh product at least twice daily (portion size is important, better small fresh portions multiple times)

Feed form matters

- Mash is consumed more quickly than pellets
- Liquid feed is consumed more quickly than dry feed
- Piglets consume more milk and/or liquid prestarter than dry prestarter

However, liquid feeding is not always the optimal solution. The choice depends on:

- Labour availability
- Level of automation
- Weaning age
- Health status (e.g. diarrhoea risk)
- Production goals (e.g. supplementing sow milk)

Phase 2 (Day 14–Weaning): Developing the Digestive System

This phase focuses on two objectives:

- Maintaining the value of the strong start
- Developing digestive capacity

Maintain Intake During Transition

The investment in high-quality milk or prestarter must not be lost due to feed transitions.

For the right transition we advise:

- Continue first prestarter or dry milk until intake reaches ≥20 g/piglet/day
- Only switch to weaner feed above ≥30 g/piglet/day
- Ensure intake in week 4 doubles compared to total intake in the first 21 days

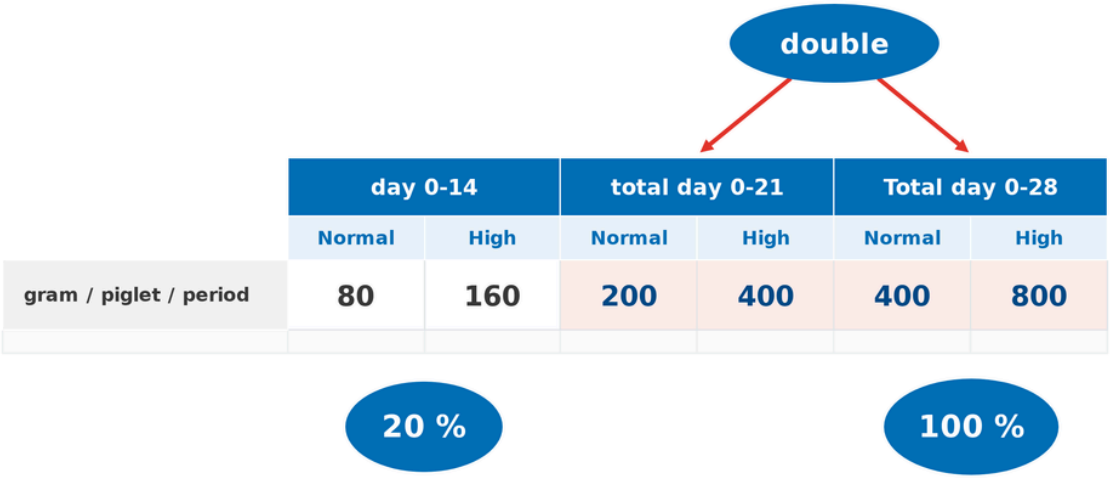


Figure 1 shows our recommended intakes throughout the two phases

Training the Gut for Post-Weaning Performance

Piglets must develop their digestive system before weaning. This requires:

- Early exposure to ingredients present in post-weaning diets
- Fibre sources that stimulate gut and stomach development
- Activation of peristalsis and gut activity

A complete Feeding Strategy

A complete portfolio should include:

- Liquid milk replacers
- Dry milk products
- Prestarter/weaning feeds (dry and porridge)

Our (dry) prestarter feeds fed from day 14 to weaning do just that. Do not introduce these feeds too early, as they are less palatable than luxurious milk-based products.

Based on the requirements of your farm, you can choose the right type of feed. Dry milk, for example, is especially relevant for large farms with labour constraints, combining the benefits of milk with easier management.


"Not every pig has the same start.
What matters is the right
nutrition at the right time".

High-quality milk and dairy-based solutions from Andel

"For carefree piglet rearing, a consistent and user-friendly, high-quality product is essential."
Bram Bronsvoort
Swine Specialist

At our specialised pig feed factory in Andel, we deliver flexible and reliable milk and dairy-based solutions that support optimal piglet performance. "In this factory, we can process a wide range of raw materials and produce in line with our customers' specific needs," says Bram Bronsvoort, Swine Specialist at Koudijs. This enables customers to benefit from consistent, tailored products that match their production goals and market demand.

Specialised line for milk and dairy products

The milk line has been expanded with several (large) raw material silos, along with associated weighing systems and flexible BigBag weighers. The raw material silos are designed to handle materials with more challenging flow characteristics. All of this is linked to our standalone milk and dairy line, where we apply a very specific mixing process to create a perfectly homogeneous product. This mixing process makes it possible to blend high amounts of oils and liquids while still producing a perfectly mixed product.

The quality of these products must be beyond question. Of course, it starts with the raw materials, but the production process is equally important. The milk and dairy line is completely separated from the other production lines, which eliminates cross-contamination and allows us to fully optimise this line for the production of dairy products. Products produced on this line can be used in all kinds of automatic liquid feeding systems such as cups, Nutrix, Automix, and other comparable systems.

The importance of high-quality, consistent, and user-friendly milk products

The continuously increasing numbers of piglets, combined with the desire to raise piglets as healthily as possible, without the use of medications, have a strong impact on the demand for supplementing piglets with milk and adding dairy products to feeds for the youngest piglets.
There is also a clear demand for customer-specific blends and piglet milks. The new line is perfectly equipped for this, offering suitable dairy blends for the production of your piglet feeds, as well as complete piglet milks ranging from top milk, which can be safely fed from day 2, to dry milks.
We can also efficiently produce simpler formulations, cost-effective products, and small batches with short lead times.

Automatic feeding in practice: Results from a sow farm

Sow producers are constantly looking for ways to improve the economic and labour efficiency of their farms. One such operation is Genfeld End GbR, located in Schwalmtal in the Lower Rhine region. For almost a year now, Thomas Genfeld has been using the cup system developed by DFS (Dutch Feed System). Together with his parents and one external employee, he runs, as the third generation, a farm with 400 sows, complete piglet rearing and 1,500 finishing places. The farm covers 23 hectares of arable land. Feed for sows and piglets is produced on the farm, while finisher feed is purchased. We asked Mr Genfeld about his experiences with the DFS cup system.

Mr Genfeld, you were looking for an automatic feeding system for suckling piglets. Why did you decide to choose the DFS cup system?

In terms of genetics, we use DanBred and therefore have a correspondingly high number of live-born piglets. Until a year ago, we used nursery sows for compensation, with all the problems associated with that. Pregnancy performance suffered and sow places were also blocked, of course. The workload involved in distributing piglet milk twice a day in the farrowing house using watering cans over the troughs was also under review, and the quality of the milk, if it stood for half a day, was also not optimal.

We also observed that the stronger piglets were often the first to access the fresh piglet milk, not necessarily those that needed it most. For us, the decisive factor was the mixing and distribution offered by the DFS system. With older systems, we saw that large quantities often have to be mixed, not so with the DFS system. Because the mixing quantities are smaller, we always have fresh milk available for the piglets. For us, it was therefore important that with a suckling period of 21 days and the high number of live-born piglets, we no longer have to keep nursery sows, can leave the piglets with the sow, and can handle the required piglet milk and prestarter without any problems from a labour perspective.

The system is easy to operate and cleaning is automatic. Using the system is simple, even on farms that work with external labour. The DFS system fulfils all these criteria. We viewed the system in operation beforehand and we were convinced. The subsequent installation on our farm also went smoothly, the training was good, and we are completely satisfied.

You have now been using the DFS system for one year. What experiences have you had since then, and can you provide concrete figures yet?

As I mentioned, we have completely dispensed with nurse sows. Time pressure in the barn has decreased. We also no longer have fixed times at which we have to distribute milk in the barn again, for example at weekends. This represents a clear reduction in labour and we enjoy it.

Because all piglets can access the cups at any time, the litters are more uniform. When we previously offered milk by hand, the larger piglets often came first and displaced the smaller ones. Now it is different: fresh milk/prestarter is available at all times. When smaller piglets cannot find a teat, they go to the cups and drink there. Previously, we had to do much more sorting. Today, we may have to do it once and later, if necessary, by size.

Piglet losses have been reduced from 12.6% to 9.8%, weaning weight has increased by 300 to 400 g, and we have fewer small piglets. We now wean 36.36 piglets per sow per year, previously that figure was 33.25 piglets. Another effect is that we were able to increase the number of live-born piglets per year from 38.05 to 40.31.

Would you choose the DFS system again today?

From my side, a very clear yes. We have better management in the barn, and the system supports the human element. We now only need to initiate the cleaning process and refill the prestarter. Both can be smoothly integrated into our daily work routine. If piglet producers want higher performance, with reduced losses and increased weaning weights, I can only recommend the DFS system. Especially with today's high-performance genetics and the large number of live-born piglets, it is almost indispensable, because what is missed at the beginning often cannot be corrected later.

Based on this data and your practical experience, would you recommend the system to others?

I would not want to do without it anymore, especially not with my genetics. On the one hand, it is less labour-intensive, and on the other, it is economically efficient. Weaning weight of the piglets and prestarter intake are higher.

I can wean without any problems after 21 days. Smaller piglets in particular lag behind less because they can also drink milk/prestarter via the cups.

We leave the smaller piglets in the farrowing house for a few more days, without a sow, and they receive milk via the cups. We have a consumption of 700 to 720 g of milk powder per piglet.

You reported that you have recently changed something in your operation. What does this involve?

Yes, until three weeks ago, the piglets received prestarter until Sunday, i.e. until one day before weaning on Monday. We are now testing the effects of cutting off prestarter via the cups from Thursday onwards, i.e. four days before weaning. We want them to eat more prestarter. In fact, we have established that in this period until weaning, the piglets do not drink more milk from the sow, but compensate for the milk loss by consuming more prestarter.

The smaller piglets which, as I mentioned we keep in the farrowing house for a few more days, only receive milk via the cups again on Monday. They immediately return to the cups. We see hardly any negative effects on the smaller piglets, but major advantages because the piglets consume significantly more prestarter. The change has not been in place for long; we will see whether it remains.

About Dutch Feed Systems

Dutch Feed Systems (DFS) is a Dutch specialist in automated feeding solutions for piglets from birth to weaning. Through innovative feeding systems, DFS helps pig producers improve piglet health, growth, litter uniformity, and labour efficiency by providing a continuous supply of small, fresh feed portions. A key innovation is the DFS Instamix system, which automatically prepares and dispenses fresh feed throughout the day. Detailed information about this system can be found on page 18.

For more information, visit **DFS website**.

DFS
DUTCH FEED SYSTEMS

DFS Instamix: an innovative, practical and labour-saving milk feeding system

Dutch Feed Systems (DFS) focuses on stimulating young piglets to eat and digest feed at an early age. Using an advanced cup feeding system, the intestinal microbiota of piglets is trained during the suckling period to consume supplementary feed. This creates a smoother weaning process. Research consistently shows that investing in young piglets has a highly positive effect on their development, growth, and overall health.

Due to the increasing number of piglets born per litter, supplementary feeding during the suckling period has become essential. This improves piglet quality, increases litter uniformity, and significantly reduces piglet mortality. However, supplementary feeding is labour-intensive, particularly at a time when labour is both scarce and expensive. As part of its triangle concept of advice, nutrition, and technology, DFS developed the Automix cup feeding system in 2018. Today, more than 300 systems are successfully operating in practice. Every litre of milk is prepared fresh automatically and delivered to the piglets through a durable piping system, the well-known yellow cups, and advanced nipples. The system also features automatic cleaning.

Economic Return

An investment in the innovative DFS Cup System delivers not only improved job satisfaction but also an attractive financial return. Various studies have shown that increasing feed intake by piglets before weaning contributes to a higher weaning weight and, consequently, improved performance throughout the production cycle. As a rule of thumb, each additional kilogram of weaning weight is associated with approximately 10 kilograms of additional slaughter weight. Combined with an improved production cycle index, reduced labour requirements, more uniform piglet growth and more efficient farm management, these benefits can result in a return on investment (ROI) within 30 months under most commercial production conditions.

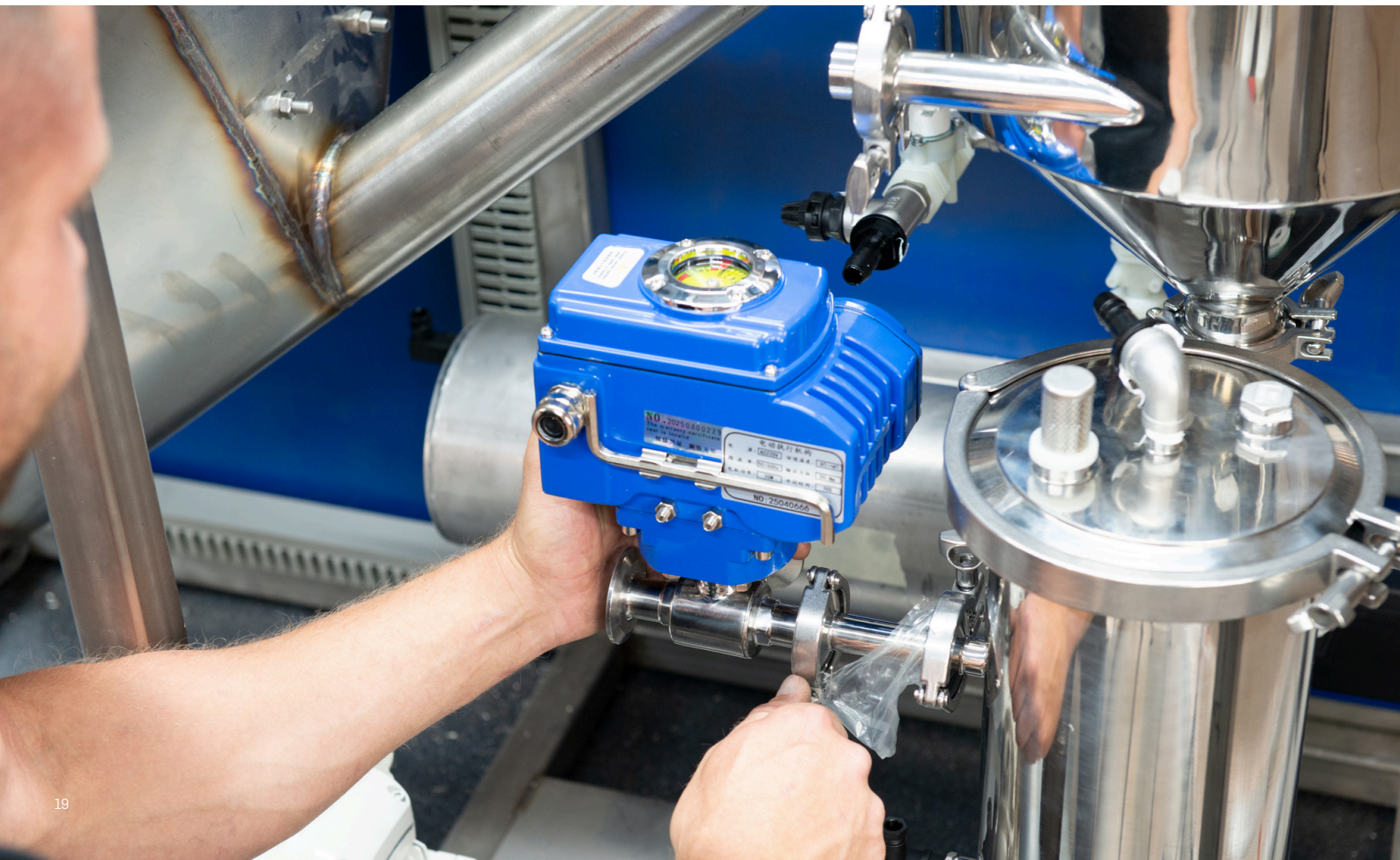
Proven Technology

Over the years, the DFS Automix has proven itself as a reliable and effective automatic mixing and feeding system. With the DFS Instamix, Dutch Feed Systems builds on this proven technology. The most important development is a more versatile feeding package, enabling the system to mix and pump feeds containing more conventional raw materials and larger particle sizes without difficulty. In collaboration with several feed manufacturers, various feeding concepts have been developed that can be fully tailored to the needs and preferences of pig producers. These feeding concepts have already demonstrated their value in practice. As a result, the Instamix is a flexible system that is ready for the challenges of today and tomorrow.

DFS Connect

Technological development has naturally not stood still. During the development of the Instamix, significant attention was given to user-friendliness, operational reliability, and ease of maintenance. Many service activities have been made more accessible, reducing users' dependence on service technicians. In addition, every Instamix is connected to DFS Connect. Through this online portal, the machine is monitored 24/7, while hour counters and portion counters provide valuable information on the condition of wear parts. This increases predictability and allows maintenance tasks to be scheduled in a timely manner. Besides machine status information, DFS Connect also provides practical instructions and solutions for possible alerts and notifications.

The DFS Instamix has been available on the market since January 2025, the innovative system is manufactured entirely in-house. Today, approximately 50 systems are operating successfully in practice. Experience shows that the Instamix is the logical next step in automatic feed mixing and feeding. Thanks to its advanced technology, maintenance-friendly design, and increased flexibility in feed selection, the system offers more possibilities than ever before while maintaining ease of use. As a result, the Instamix helps pig producers work more efficiently and reduce their dependence on labour without compromising feeding quality.



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