DLG Test Report 6321 F

PAL Bullermann GmbH

PAL-DINDOPAL 60 DDP feeding bowl for turkeys

Handling, cleaning and feed dosing

DLG FOKUS TEST

12/15 Handling, cleaning and feed dosing

Test Center
Technology and Farm Inputs

www.DLG-Test.de

Overview

The FokusTest is a small-scale DLG usability test intended to allow product differentiation and special highlighting of innovations in machinery and technical products used primarily in agriculture, forestry, horticulture, fruit cultivation and viticulture, as well as in landscape and municipal management.

This test focuses on testing a product's individual qualitative criteria, e. g. performance, fatigue strength, or quality of work.

The scope of testing can include criteria from the testing framework of a SignumTest, DLG's extensive usability test for technical products, and concludes with the publishing of a test report and the awarding of a test mark.

The DLG FokusTest "Handling, cleaning and feed dosing" includes repeated investigations at a commercial farm at different times during two fattening periods and also examines the assembly of the bowls and their cleaning.

The testing was based on the DLG testing framework for poultry feeding bowls, in the version of 1.2/2014.

Other criteria were not investigated.

Assessment – Brief Summary

The DLG FokusTest investigated the handling, cleaning properties and quality of feed dosing of the tested PAL-DINDOPAL 60 DDP feeding bowl for turkey farming.

In a practical test, the feeding bowl fulfilled the requirements well to very well with respect to the tested criteria.

Table 1:
Overview of results

Test criteria	Test result	Evaluation*
Handling		+
Bowl assembly	easy, approx. 120 s per bowl	
Handling	easy easily accessible	
Operating instructions	detailed and easy to understand	
Cleaning		+ +
Hygienic design	crown for bowl divider with few critical edges cleaning-friendly surfaces	
Ease of cleaning	easily accessible significant time saving per feeding line	
Feed dosing		+
Feed dosing	excellent automatic refilling behaviour no blockages	
Feed losses	very low	
Feed quality and contamination	good design for preventing the introduction of contamination fresh feed thanks to low fill level and automatic refilling	

* Evaluation range: + + / + / ○ / – / – – (○ = standard, N/E = not evaluated)

The Product

Manufacturer and Applicant

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Product:
PAL-DINDOPAL 60 DDP
feeding bowl for turkeys

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Description and Technical Data

PAL-DINDOPAL 60 DDP is a feeding bowl for use in turkey fattening.

According to the manufacturer's information, the polypropylene bowl was developed with smooth surfaces and a small number of corners and components in accordance with hygienic design aspects.

The feed pipe is situated directly between the divider and the adjustable head piece.

The bowls are designed for a feed pipe diameter of 60 mm.

The bowl is fitted with an automatic minimum controller which the manufacturer calls "meal system". Feed is refilled automatically, whereby an utmost possible low feed amount remains in the bowl to constantly offer fresh feed. This self-dosing function is achieved by a thread located in the dosing cone in the central pillar of the feeding bowl: the feeding bowl in use regulates the optimal feed level automatically by a clearance fit at the upper and an interference fit at the lower end of the thread as well as by small spacers at the lower end of the cone. During the housing of the animals the thread is screwed upwards. The dosing cone adjusts the bowl during the use in accordance to the animals' growth.

The feeding bowl for turkey farming of the same series PAL-DINDOPAL 60 HY features PAL's hygienic cone, which is intended to ensure that the animals stay out of the bowl and therefore improves the quality of the feed. In this test only the model for turkey fattening was examined.

All of the bowl's parts are manufactured in Germany.

Table 2:
Technical properties (measured values)

PAL-DINDOPAL 60 DDP feeding bowl for turkeys	
Weight	1454 g
Bowl diameter	470 mm
Bowl height	135 mm
Overall height	485 mm
Height beneath the pipe	365 mm

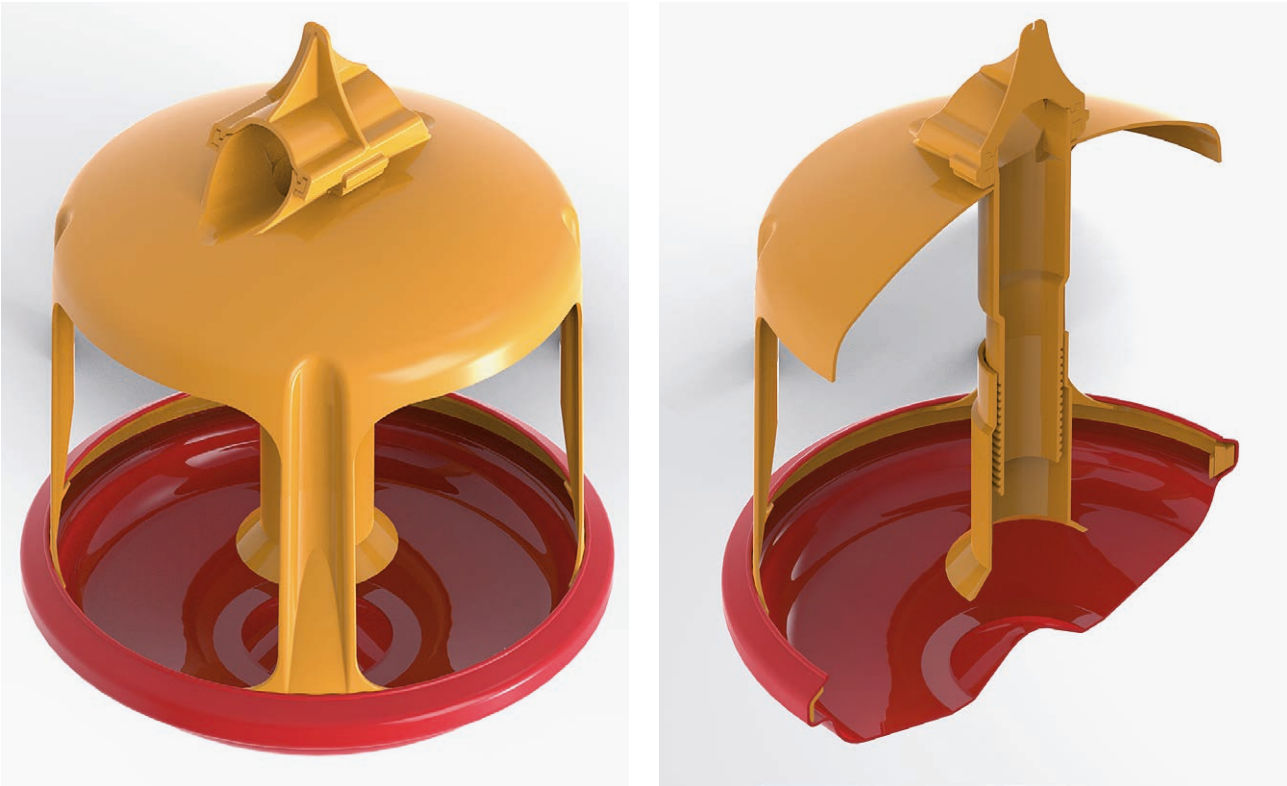

Figure 2:
Structure of the PAL-DINDOPAL 60 DDP feeding bowl (left) and cross section (right)

The Method

The test criteria were investigated in a practical test at a turkey farm.

Testing took place at a commercial farm in North Rhine-Westphalia at various phases of two fattening periods. The 120 x 25 m turkey house sheltered 8,350 Big 6 fattening turkeys during the trial period on straw, with an age of 34 days at the beginning of a batch until reaching a final weight of 21 kg. The poults were raised at the same farm. There was a total of 224 feeding bowls on the two feeding lines, each with two parallel drinking lines. Based on these figures, each feeding bowl supplied approximately 37 turkeys. The birds were fed pelleted complete turkey fattening feed ad libitum. The distance from the feeding line to the floor was adjusted manually by the bird keeper depending on the birds' growth.

Several feeding bowls of the tested type were installed and investigated in comparison with the existing technology.

Handling

The handling is evaluated according to several subcriteria. All phases were evaluated, from assembly to use in feeding and finally through to cleaning.

Evaluation criteria included the time taken, the use of necessary aids and the simplicity of installation. The operating instructions were also examined.

The handling of the bowls for the bird keeper was assessed and also examined and evaluated by the tester at each visit. At the same time the bird keeper and the veterinarian were asked for their assessment of the bowls when operating them during the trial period. This also included questions on all relevant points, such as accessibility for people and birds, feed quality, feed contamination, feed dosing, hygiene, maintenance requirements, and whether they would install the bowls again or recommend them.

Technology must not result in injuries of the birds. For this reason, assessments of the plumage were carried out in form of spot checks of the herd. Furthermore, direct observations were carried out focusing on the question whether the birds were able to reach the feed or whether problems were obviously occurring with regard to feed intake.

Cleaning

Good feed hygiene also relies on the feeding bowls being easy to clean. It must be possible to clean the bowls completely in a simple and labour-saving manner without causing material damages. Therefore, the bowls' hygienic design was evaluated: material selection, hygienic surface design and potentially inaccessible geometry. During practical use, an evaluation of cleaning was performed by the tester, the bird keeper and a professional cleaning firm. The main criteria were accessibility, cleaning quality and comfort.

Feed dosing

The available quantities of feed in all bowls were weighed. Since the bowls are filled automatically to a specified level for the purpose of ad lib feeding, the refilling features were examined along with the feed quantities in the bowls. These investigations focused on the speed of refilling and lack of blockages. This is closely connected to the feed losses, which were checked visually and evaluated in comparison with the bowls of the reference technology. In addition to the bowls' design, the feed quality was assessed by examining the feed and the bowl itself for contamination. This was done by direct comparison with the existing technology through visual assessment and by laboratory examination of feed samples from the individual bowls with regard to the chemical feed parameters of dry matter and crude ash content, as well as the microbiological quality.

Handling

Bowl assembly

Throughout Germany, the feeding system is assembled by the company's own technicians according to the manufacturer's instructions. In addition to installing the bowls, assembly also includes installing the feeding lines and feed distribution units. Comprehensible operating instructions were available for the installation of the bowls. This test only assessed the assembly of the feeding bowls themselves.

The feeding bowls were changed from the matching feed pipe without problems within approximately two or three minutes per bowl, having spent approximately half of the measured time dismantling the old bowl. Attaching the new bowl by the company's representative took between 45 and 120 seconds. The only tool needed was a screwdriver or a light rubber mallet for pushing together the head piece and the feed cone part. A simple plug cap is used to connect the feed plate to the bowl. This was considered as an advantage in comparison to the existing technology.

Assembly could therefore be carried out very easily by one person in a short time without further auxiliary equipment.

Handling for humans and animals

The bowl was well-manufactured and exhibited no sharp edges or manufacturing marks. There was no apparent risk of injury to either birds or humans. No technology-related damage was observed on the birds or their plumage during the assessments carried out as spot checks. 90 % of the assessed plumage were in perfect shape and without defects (rating score 0). The other approximately 10 % of the spot check were rated into rating score 1 showing one or two small defects in the plumage. These did not directly result from the feeding bowl.

The bowl's cone is narrow enough to allow sufficient food to trickle out, but at the same time to stop birds becoming wedged in the cone. There were no incidents of birds getting caught in or on the bowl during the investigation period.

The bowl is readily accessible and very easy to operate. No maintenance was required during fattening. It was only necessary to adjust the height in line with the birds' development. This, however, is an aspect of the overall feeding system and not of the bowl itself.

The birds accepted the PALDINDOPAL 60 DDP feeding bowl without problems. At the beginning of the fattening period the birds often entered the bowls and used them as sleeping areas, but they rarely defecated into the feed. Later it is no more possible to enter the bowl due to the birds' size.

One key factor for achieving an optimum eating height in the course of fattening is the adjustment of the feeding lines, which must be adjusted and readjusted manually by the bird keeper. Achieving an optimised setting is therefore also a question of good bird observation and good management.

The bowl separator divides the rim into four openings with a width of 21 cm each. At the beginning of the fattening several turkeys used the same opening (Figure 3). Hardly any repression or other aggressive behaviour occurred at the feeding bowls. The birds generally did not change bowls during a "meal".

No differences could be identified between the bowl types during the direct observations carried out as spot checks.

Evaluation "Handling" +
Simple, easily accessible

Figure 3:
Double use of the divider at the beginning of the fattening batch

Cleaning

The following cleaning process was performed at the trial farm:

- Emptying the turkey house
- Dung removal and sweeping
- Soaking
  - for approx. 12 hours with water from the municipal supply using a stationary spray system
  - with a professional barn-cleaning service provider:
    - Pre-cleaning of ceiling, exhaust ducts, heating system, walls, floor, drinking and feeding places
    - Foaming the surfaces with an acid or alkaline detergent (alternating) with an exposure time of approx. 20 to 30 minutes
    - Rinsing with high pressure cleaner:
    - Drinking / feeding lines, spray systems: once from the bottom and once from the top
    - Floor and walls twice
    - Thorough rinsing of the floor
- Disinfection
  - Drinking line: disinfection via the medication dispenser into the water supply
  - Drinking / feeding lines outside: foam disinfection with disinfectant based on iodine using a high pressure cleaner
  - Rest of the building: spraying of QAC based disinfectant

Both the farmer and especially the professional barn-cleaner praised and highlighted the good cleaning quality, as well as the accessibility due to the small number of parts. Although the feed plates need to be dismantled and washed individually, alike with other systems, the cleaning in general was evaluated as being very simple and quick. The cleaning and disinfecting process at the farm took 9.5 hours per building. According to the professional barn-cleaner, the use of the tested feeding bowls might result in a time saving of approximately 30 minutes per feeding line.

Hygienic design

Polypropylene is a typical plastic material for this application, as it is known to be very durable and resistant to common cleaning agents and disinfectants. The smooth, round surfaces on the cone, feed plate and rim, with very few corners and edges, reduce the adhesion of dirt. At the same time, geometries of this kind are easy to clean.

Particularly worthy of note is PAL's new bracket for attaching the bowl to the feed pipe. The head piece completely surrounds the pipe and has only a small number of openings and cavities that could allow dirt to adhere between the pipe and the bowl mounting. As the feeding bowls are usually only washed, without being removed completely, the new design has considerably reduced the risk of dirt and germs. Despite the new design, a complete cleaning could only be executed by a complete dismantling of the bowl from the feeding line. However, the test proved that the residues below the head piece were very little and consisted mainly from metal abrasion of the feeding line (Figure 4). Except very small amounts of dust no feed remains were observed in the critical area below the head piece, compared with the reference bowls.

Evaluation "Cleaning" + +

Easy cleaning and hygiene due to hygienic design

Feed dosing

The feed amounts in the bowls were weighed in different bowls at the beginning of the fattening (50 days of age). The tested PAL-DINDOPAL 60 DDP bowls contained between 369 and 578 g of feed. On average each bowl was filled with less than 500 g of feed. When moving the spindle manually, approx. 350 g of feed trickled out during one turn.

The excellent and very rapid refilling characteristics rule out any risk of the birds being provided with too little feed because of the automatic fill level. The replacement feed trickles out of the space inside the cone very quickly, as soon as the fill level falls (Figure 5).

No clogging of the outlet gap or wedging of the pellets was observed at any point. The automatic fill controller of all bowls worked perfectly during the trial period.

Figure 4:
Remaining contamination on the pipe after cleaning (left) and below the head piece (top)

Figure 5:
Automatic refilling of the feed

The bowls are firmly attached to the feed pipe. As a result, the bowls mirror the slight oscillating movements of the feeding line. Part of the feed therefore trickles towards the lower side: this is usually the side at which the birds are currently eating. This effect is normal with this technology and did not seem to affect the feeding behaviour.

Feed losses

The majority of feed losses usually occurs at the beginning of the fattening period. So that the small birds can reach the feed easily, the feeding line must be set to a very low height. This results in a higher motivation for the poults to climb into the bowl, scratch in the feed or misuse it as a sleeping area.

During the test the birds entered the bowls occasionally at the beginning of the fattening run. From the midpoint of fattening onwards, the bowl's construction with the central cone and the birds' size make it almost impossible to enter the bowl.

The low fill height and the raised rim of the feed plate of 135 mm offered adequate protection against feed losses – even if the birds scratch in the feed. Only little feed was lost in the litter below the bowl at the beginning of fattening. The feed losses can therefore be evaluated as very low.

Feed quality and contamination

The raised rim of the feed plate with a height of 135 mm does not only prevent feed losses, but also reduces contamination in the bowl. Although straw introduction was observed in the trial period, at the beginning of the fattening period faecal residues or other solid matter were rarely observed. In the bowls next to the entrance door, generally more straw was introduced into the bowls due to the increased activity of the birds. The bird keeper uses a leaf blower from time to time to eliminate the straw from the bowls.

The poults only entered the bowls at the beginning phase of fattening. This has already been described in the section "Feed losses".

The smaller amounts in the feeding bowl meant comparatively fresher food was always available for the birds, as described under "Feed dosing".

The design of the feed plate tapering to the centre avoids the accumulation of older feed at the bowl's rim. If the fill level is too low, feed remains and fresh feed are mixed directly.

Feed samples from the tested and reference bowls as well as a sample from the feed storage container located at the start of the feeding line in the turkey house were subject to laboratory investigations. The crude ash content was recorded as a tracer for possible contamination with dirt. There was no significant difference in the crude ash content of these samples. A light, but insignificant increase of the dry matter was observed. Process-related differences were identified between the microbial counts in the indicative laboratory investigations and the feeding line. However, they tended to be lower in the tested PAL-DINDOPAL 60 DDP feeding bowls than in the reference bowls.

Evaluation "Feed dosing" +

Low feed amounts, good automatic refilling characteristics, little feed losses

Summary

This DLG FokusTest investigated the handling, cleaning properties and feed dosing of the tested PAL-DINDOPAL 60 DDP feeding bowl for turkey fattening.

In a practical test, the feeding bowl fulfilled the requirements well to very well with respect to the tested criteria. In the survey the bird keeper confirmed that he would again consider to buy and use the bowls upon an upcoming investment decision.

Further Information

Further test results on housing equipment are available for download at: **http://www.dlg.org/fuetterung.html**
The relevant DLG committees have published various instruction leaflets on the topic of poultry. These instructions are available free of charge in PDF format at: **www.dlg.org/merkblaetter.html**

Test execution

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DLG Testing Framework

DLG test specification
"Poultry feeding bowls",
version 1.2/2014

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