



Application manus® award - prime example

1. Description of the application

- **Name and function:** What is the name of your system/machine/project and what is its function?

The VeraPack Pro 5000 is a fully automatic high-speed filling and packaging system for liquid and viscous food products in the dairy and beverage industry. The system ensures precise feeding of the containers, carries out volumetric dosing of products such as yoghurt or quark via a rotating filling carousel and subsequently seals them hygienically.

In the downstream process step, an integrated robot gripper arm bundles the filled cups and automatically places them into shipping boxes. To meet the highest hygiene and HACCP standards, the entire line is designed for daily aggressive CIP (clean in place) cleaning with hot alkalis and acids. It guarantees uninterrupted 24/7 operation by completely eliminating lubricant contamination in the product area and minimising maintenance-related downtime.

- **Industry and environment:** In which industry is your solution used and what are its specific challenges for bearing technology?

In the food and packaging industry. Specific challenges: daily high-pressure cleaning with cleaning agents (alkalis/acids, pH 2 to 12), high humidity, temperatures from 4°C to 80°C in addition to the strict requirement for FDA/EU 10/2011 conformity (absolutely lubrication-free operation in the product area).

Bearing points: At which precise points of the application are the products from the polymer bearing technology used?* (e.g. plain bearings, linear plain bearings, pillow block, flanged and spherical bearings, 3D-printed plain bearings, plain bearings made of bar stock. Please state the part numbers.)

- **Vertical guide of the filling carousel (main drive):**
Use of cylindrical linear plain bearings (Part No. A180SM-3034-20) made of iglidur® A180 for guiding the vertical lifting rods.
- **Conveyor belt format adjustment:**
Use of FDA-compliant drylin® R solid plastic linear plain bearings made of iglidur® A160 (Part No. RA160M-01-16) on the stainless-steel round shafts of the width adjustment.
- **Pivot arm articulation points:**
Turned special bushings in the main pivot points of the locking and gripper unit, individually manufactured from iglidur® A180 solid rods (Part No. SFRA180-3000).
- **Cup gripper:**
Additively manufactured linear plain bearings with integrated rinsing channels directly on the cup gripper, printed from the optically detectable, food- and temperature-resistant iglidur® I151-PF filament (Part No. I151-PF-0175-0750).



2. Conditions of use and challenge

- **Technical parameters:** Under which conditions do the bearings operate? (Please provide data on load, speed, cycles, service life and environmental influences such as dirt, temperature, chemicals etc.).

Daily cleaning cycle (CIP) with highly concentrated hot acids and alkali. Direct exposure to liquid and viscous dairy products in the filling area.

- **Vertical guide:** Dynamic radial loads of up to 800N per bearing point at approx. 120 strokes/minute.
 - **Format adjustment:** High static holding forces and radial loads during vibration-intensive system operation on 16mm stainless-steel shafts.
 - **Gripper unit:** High-frequency pivoting movements in 24/7 multi-shift operation.
 - **Temperature:** Continuous process operation at +4°C to +20°C. Short-term temperature load during cleaning processes with hot rinsing agents of up to +80°C.
 - **Service life and cycles:** Designed for maintenance-free 24/7 continuous operation with over 15 million stroke cycles per year as well as regular format adjustments.
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- **The risk without polymer bearings:** What technical and/or economic requirements were you facing with regard to the bearing (what would have been the consequence if you had not found an optimal bearing solution - e.g. high maintenance costs, downtime, failures, amount of lubricant)?

Before the conversion, stainless-steel rolling bearings posed the constant risk of grease leaking into the filling zone (risk of product contamination and expensive recall campaigns). Washed-out grease also led to dry operation, seizing and unplanned system failures. This would have led to downtime costs of approx. €1,200 per hour.

- **Previous/alternative solution:** What have you used so far or which alternatives (e.g. metal bearings) were up for debate? Why did you end up choosing igus polymer bearing technology? What were the deciding advantages compared to alternative solutions?

Previously, sealed stainless-steel ball bearings with H1 special grease (food-grade lubricant) were used. Expensive hybrid ceramic bearings were considered as an alternative. igus's decisive advantage: igus polymer bearings offer 100% lubrication-free operation, direct FDA approval of the material, complete corrosion resistance against CIP chemicals and a drastically longer service life in wet areas.

3. Other igus products used

- Which other igus products do you use? Where are they used? (e.g. energy chains, ball bearings, linear guides, 3D-printed components, etc.)

- TH3 energy chains for the aseptic guiding of compressed-air and sensor cables in hygiene areas.
- xiros® plastic ball bearings in the guide rollers of the labelling machine.



4. Specific added value and quantifiable benefit

Please quantify the benefit as precisely as possible (*figures, data, facts per machine/year*):

- **Cost-effectiveness and costs (in € per year):** What technical or economic benefit has the use of the polymer bearing achieved (*e.g. reduction in component costs, elimination of lubricant costs, reduction in assembly effort*)?
 - **Components and lubricant:** Elimination of annual costs of approx. €850 for expensive H1 special lubricants and seal kits per system.
 - **Process and assembly costs:** No more manual lubrication intervals necessary. Avoiding monthly relubrication work saves €1,440 per year in maintenance costs (2 hours per month and machine otherwise spent on a technician).
- **Sustainability, resource and energy efficiency:** Were there any ecological benefits from using the bearings in addition to the economic and technical effects (*e.g. litres of grease/oil saved per year, annual CO₂ reduction, weight and energy savings as well as further resource savings*)?
 - **Grease-free:** Savings of 12l of special grease per machine and year, which requires no disposal and does not end up in the wastewater/cleaning solution.
 - **Weight and energy:** By using lightweight polymer bearings on the moving gripper arms, the mass was reduced by 3%, which lowered the power consumption of the servo drives by approx. 200kWh/year.
- **Productivity, reliability & maintenance:** Has the performance of the system/machine improved (*e.g. reduced downtimes, maintenance-free operation, higher cycle times/throughput, longer service life per year*)?
 - **Downtime reduction:** Avoidance of an average of 18 hours of unplanned system downtime per year due to seized bearings. This corresponds to savings of in total approx. €21,600 per year.
 - **Overall equipment effectiveness:** Increase in equipment availability by 3.8%.
 - **Maintenance-free operation:** 100% maintenance-free bearing points in the machine housing.

5. Co-operation with igus

- **Information source:** How did you become aware of the igus solution?

☒ Website



- ☐ Catalogue
- ☒ Sales representative

- **Engineering and service:** Did igus support you in the development process and if so, how?

- ☒ In person
- ☐ Chat
- ☐ Online CAD tools
- ☐ service life calculation
- ☐ Feasibility tests
- ☐ Free samples
- ☐ Prototyping
- ☐ Configuration tools

- How did you become aware of the manus® competition?

- ☐ Search engines
- ☒ Press
- ☐ Trade shows
- ☐ Advertisement
- ☒ E-mail
- ☐ Colleagues
- ☐ Other

Upload files

Application photos, videos or sketches (at most 1GB/50 files) Please upload any supporting material (images, drawings, videos) here as JPEG, PNG or MP4 for your participating documents. The more media you send, the clearer the concept is for the judges who rate your application.*

