PackAssistant: Software for fast and optimal container load planning

PACK Assistant

Leading software for container load planning with complex identical parts
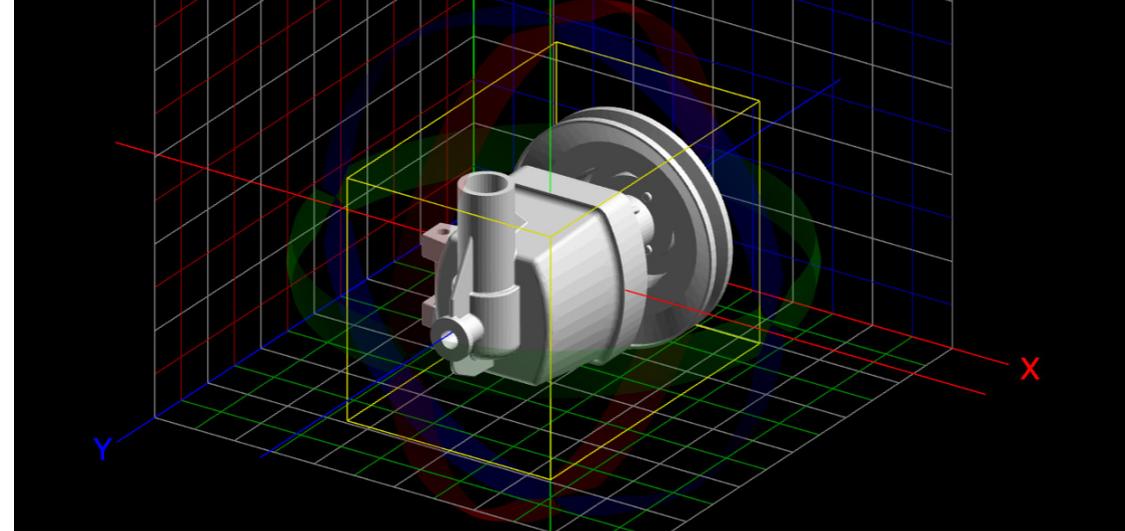
At a glance

Making the best use of container space can save transportation and storage costs. One simply needs to find the right way to arrange the objects to be packed in the available container space. Experienced packing planners usually spend a lot of time meticulously arranging and packing parts with complex shapes. Nevertheless, in most cases they will not achieve the same packing density as realized with PackAssistant.

The PackAssistant software calculates the optimal packing arrangement of identical parts in standard containers by using 3D designs (CAD). This also works for parts with complex shapes, as the software will identify and take the individual shape of the object into account.

Saving potential

PackAssistant saves time and money through

- optimal container utilization,
- avoiding time-consuming packing tests,
- allowing early-stage transport, container and storage planning, and
- providing a key support tool for the creation of quotes and tenders.

Reduction of transport costs

PackAssistant users have improved the packing density of containers by up to 25 percent. This improvement also positively affects other areas in the logistics chain: fewer containers means reduced storage space needed and lower transportation and handling costs.

Save time by improved planning

PackAssistant not only enables you to improve packing densities, but – by faster planning and due to its ease of use – it also helps you to save time.

PackAssistant needs on average 2-3 minutes for a calculation. After that you know

- the best possible container,
- the optimal container load and you receive
- a complete packing report including images.

How long do you take for all this?

- X % lower container cost
- X % lower storage cost
- X % lower transportation cost
- X % lower handling cost

Total of your cost savings?

Success stories

PackAssistant enormously simplifies the planning of logistics processes and the packing of industrial components.

AUDI AG

As one of the original development partners for PackAssistant, AUDI AG has been working with the software for many years and particularly benefits from the software's rapid calculations in its cooperation with suppliers. The enormous potential savings that can be realized through optimal packing of parts in large quantities can be seen in the case of a rear light for an automobile:

Supplier's recommendation
36 **parts** per container

↓

PackAssistant's calculation
45 **parts** per container

↓

Reduction in transportation costs
57 T € per year

KTM Power Sports AG

When setting up a production facility for the X-Bow sports car series production, KTM Power Sports AG used PackAssistant to plan container sizes and the optimal packing of 450 parts. Since neither real parts nor prototypes were available during the set-up phase, planning was carried out using CAD data for the parts. Strategic planning for the containers revolved around the future logistics processes, the flow of materials, and the production cycle within the plant.

With PackAssistant it was possible to shorten the times for planning and implementing new containers by more than 50 percent: compared with the industry standard of nine to twelve months, using PackAssistant KTM needed just four months. PackAssistant enabled a comparison of different packing types and container models. The KTM planners created a concept for each part and an overall plan for using both standard and specialized containers.

Testimonials and references

(Selection)

»This software makes many things easier since we no longer need samples but can immediately carry out packing tests using the existing CAD datasets.«
Thorsten Henschel – AUDI AG

»If you look at the whole logistics chain, the container is just the beginning. Storage space can be saved, and fewer delivery cycles are needed to satisfy customer needs.«
Marco Rosensprung – GEDIA GmbH

»Only with a technology such as that offered by PackAssistant were we able to complete an optimal container planning for all 450 parts and define standardized containers.«
Franco Lanzoni – KTM Power Sports AG
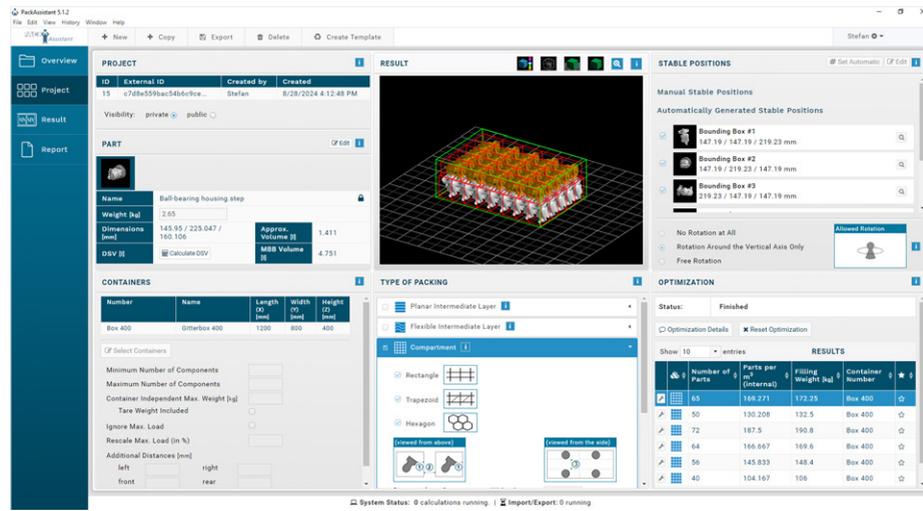
References
- AUDI AG
- BMW Group
- Continental AG
- Gedia Gebrüder Dingerkus GmbH
- KTM Power Sports AG
- Playmobil
- Renault Group
- Schleich GmbH

KTM Power Sports AG

PackAssistant – user interface

Easy and intuitive to use

- Help boxes (pop-ups) are available for all functions throughout the system.
- The user can adept the interface to choose mm/inch and g/kg/pound settings.
- Efficient and easy-to-use 3D view for displaying parts and packing results.
- PackAssistant is available in multiple languages.

Types of packaging

One software – many options

PackAssistant enables the user to handle different types of packaging explained in the following sections. In addition, parameters for customer-specific packing solutions are available:

- Possibility to select the minimum distance between parts, the container base, walls, and compartments.
- Adherence to the maximum load of the container.

- To facilitate the container's stability, it is possible to define stable positions for the parts.
- Compute the minimum volume bounding box of a single part.
- Automatic choice of an appropriate container from a list.
- Based on the 3D data, an approximated center of gravity of the part is displayed in the 3D view.
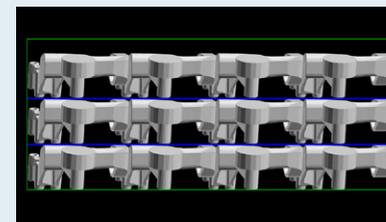
Loading with planar intermediate layers


View from the side

PackAssistant arranges the parts in layers with planar intermediate layers. The parts can be arranged in two ways: with or without overlap in the direction in which the parts will be taken out of the container. The software ensures that in either case, the arrangement of the parts is as regular as possible to allow easy loading and unloading. The exact selection of the minimum distance between the parts enables a realistic and case-specific solution.

Loading with compartments

PackAssistant arranges the parts in layers – as before – and additionally in compartments. The software allows for standard rectangular, trapezoidal, and hexagonal compartments. With many parts, the trapezoidal compartment, in particular, provides a much higher packing density than rectangular compartments. The extra effort in the design and handling of trapezoidal compartments is minimal.
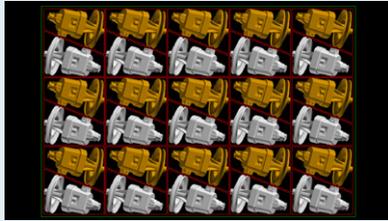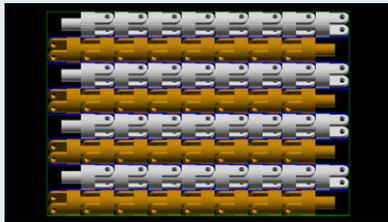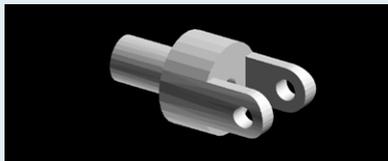

View from the top
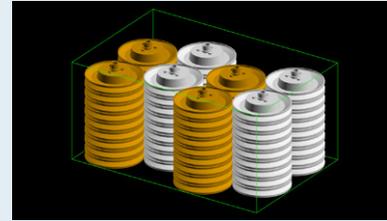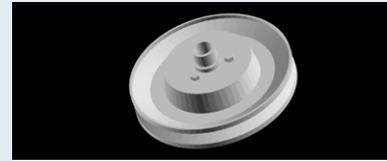
Loading in stacks

In addition to arranging objects in layers, PackAssistant can also pack them in stacks. This is particularly suitable for thin-walled objects, whereby stacking can be vertical or slanted. The example on the left shows vertical stacking.

3D view

Loading with flexible or without intermediate layers

In addition to the case of rigid dividers between layers (described above), PackAssistant can also handle the use of flexible separators. Such intermediate layers are typically foam packaging or are made from plastic foils or fleece materials, and their thickness can be specified in millimeters. Should a material thickness of zero millimeters be specified, PackAssistant will arrange the parts directly on top of one another.

View from the side
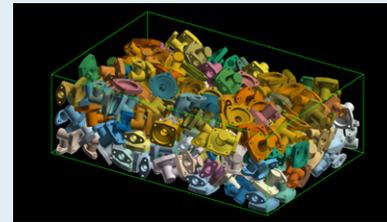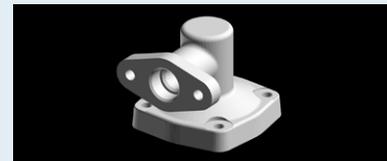
Filling with bulk goods

Small parts are often not placed into a container in an orderly fashion but are simply allowed to fall from a conveyor belt into a container. PackAssistant can estimate how many parts fit into a container by simulating the physical behavior of each part. Among other things, gravity, velocity, and collisions between the parts are simulated.


3D view

Output of results and technical specifications

Packing report and 3D CAD output

PackAssistant provides meaningful 3D images within a packing report, which, in particular, allows the ideal basis for creating specific commercial quotes. The customer can see straightaway how the objects should be arranged in the available space. Until now, this had to be done by laborious drawings or graphics.

To enable a more realistic visualization of the results, you can also store the 3D data for the containers.
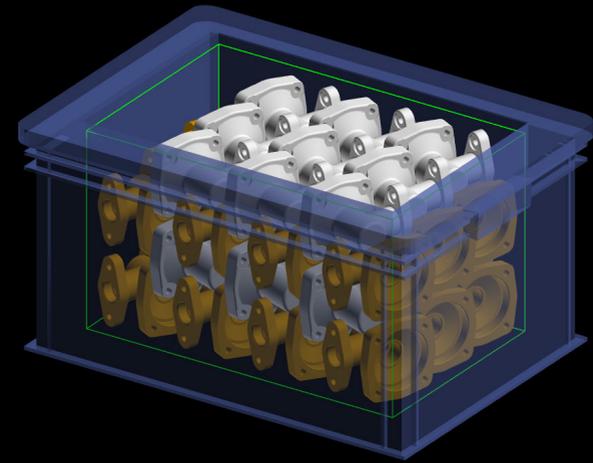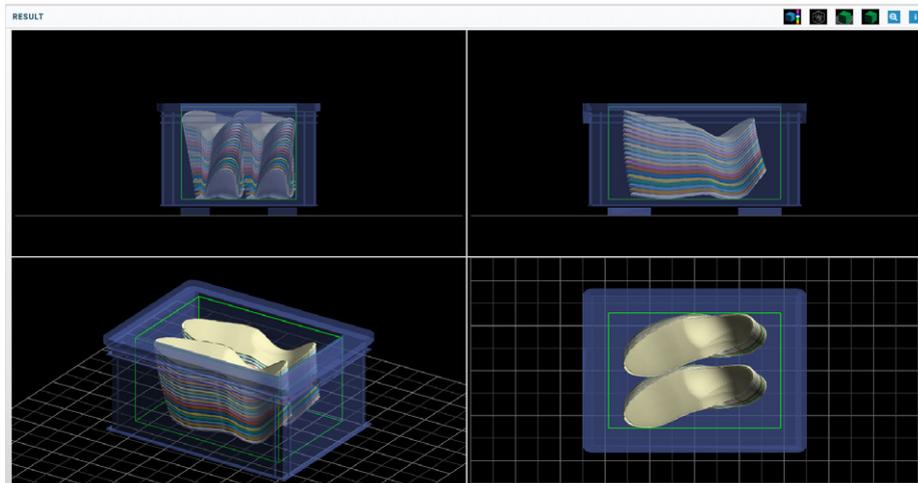
This allows calculated results to be displayed directly in the container, making the packer's work easier. The container model offers a flexible transparency setting so that the full view of the result is not obscured.

Additionally, the results can be exported as CAD datasets in the formats JT, STEP, and VRML. This allows a more descriptive representation of the packing arrangement to be created, which can, if desired, also be included in the packing report.

With a 3D viewer software that is independent of PackAssistant, you can create individual sections and views of the packing arrangement.

Technical specifications

- PackAssistant is offered as a floating license.
- FlexNet Publisher is used for software licensing.
- PackAssistant runs on any standard PC with Windows.
- The parts can be imported in any of the following formats: JT (*.jt), STEP (*.stp, *.step), IGES (*.igs, *.iges), VRML (*.wrl) and STL (*.stl).
- Results can be exported as packing reports in Microsoft Excel/Word or as CAD data in the formats JT, STEP and VRML.

Left Sheet — Coversheet

	A	B	C	D	E	F
1	**Packing Report Created by**				**PackAssistant 5.1.2**	
2						
3	**Project**					
4	External ID	43d7f5440d0e42ae993087fea756dc36				
5	Date	8/28/2024 11:12:34 AM			Length Unit	[mm]
6	Planner	Stefan			Weight Unit	[kg]
7	Division				Volume Unit	[l]
	Phone				Type of Packing	Planar Intermediate Layer
8						
9	Fax				Thickness of Intermediate Layer	3
10	Email				Component Distance	-
11						
12	**Part**					
13	Name	Transmission Support.wrl				
14	File	Transmission Support.wrl				
15		Dimensions (File)			Weight	0,42
16	Length	258,091			Minimal Box Volume	6,346
17	Width	268,768			DSV	
18	Height	218,699			Approximate Volume	1,634
19						
20	**Container**					
21	Name	Test Container			Max. Load	0
22	Number	Test			Tare Weight	0
23		The weight of the empty container (tare) is not defined!				
24		Internal Dimensions	External Dimensions		Additional Distances	
25	Length	1050		left / right	0	0
26	Width	700		front / rear	0	0
27	Height	650		top / bottom	0	0
28	Volume	477,75				
29						
30	**Result**					
31	External ID	f1123117295946c6afaac61b038fc9b6				
32	Number of Components	96			Result Dimensions	
33	Number of Layers / Stacks	6			Length	908,737
34	Number of Layer / Stack Types	1			Width	691,302
35	Max. Used Part Rotations per Layer / Stack Type	2			Height	600,595
36	Total Weight	40,32			Filling Weight	40,32
37		Components per m³	Volume Utilization	DSVR		
38	Internal Dimensions	200,942	0,328			
39	External Dimensions					
40						
41						

Coversheet | Layer or Stack Type

Packing reports are generated as Microsoft Excel / Word documents. The templates for the packing instructions can be customized to the requirements of each company.

Right Sheet — Layer or Stack Type

	A	B	C	D	E	F
1						
2	**Layer / Stack Type:**	1		**of:**	1	
3						
4	Number of Layers / Stacks	6		Layer / Stack Thickness	97,599	
5	Components for Layer / Stack Type	96		Compartment Shape	-	
6	Components per Layer / Stack	16		Compartment Geometry	-	-
7	Number of Part Rotations	2		Compartment Thickness	-	
8				Distance to Compartment	-	
9						
10	**Front View**			**Side View**		

26	**Top View**	**Detail View**

Coversheet | Layer or Stack Type

Detailed images make it easy for the user to put the suggested packing instructions into practice.

Add-on module for automation

PackAssistant accepts data from other programs via a new interface so that projects can be created and their optimization started in an automated manner. This facilitates a more effective integration into the company's business processes and results in a faster workflow. The creation and optimization of projects via the automation interface takes place without user interaction or additional waiting times. Furthermore, there is no limitation on the number of projects that can be created and optimized via the add-on module.

## The add-on module can be used in two ways:

- **Excel Add-In:** Part of the add-on module is an Excel add-in. This allows projects created in Excel to be sent to PackAssistant and to have the optimization started. After the optimization has finished, the best result for each project will be sent back to PackAssistant for further processing.

- **Direct use of the interface:** The add-on module uses a standardized and widely used text format (JSON) for data exchange between PackAssistant and other software applications used within the company. The standardized exchange format makes it possible to connect all software applications to PackAssistant that allow external programs to be called. The corresponding application must be configured accordingly and, if necessary, extended by an interface connection. The Excel Add-In is an example of such a connection to the interface.

Requirements:

1. Requires PackAssistant version 5.0.0
2. Separate license for the use of the add-on module (already included in the corporate license)

1. Create multiple projects in Excel or connect your application (CAD, PLM, etc.) to PackAssistant
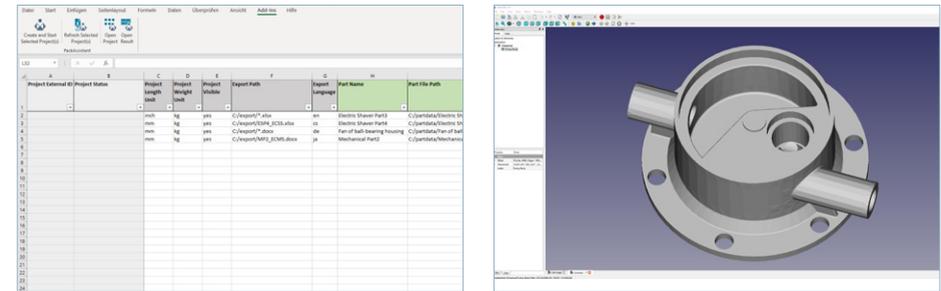
2. PackAssistant optimizes all projects automatically

3. PackAssistant displays the results and sends them back to Excel or your application
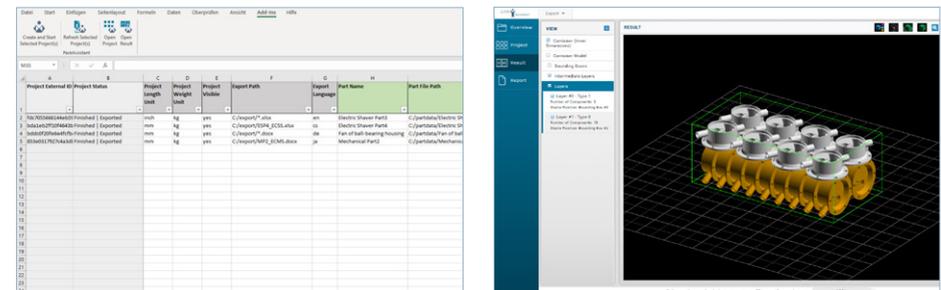
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Fraunhofer Institute for
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Computing SCAI
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scapos AG
Schloss Birlinghoven 1
53757 Sankt Augustin
Germany

Schloss Birlinghoven 1
53757 Sankt Augustin
Germany
www.scai.fraunhofer.com

Phone +49 2241 14-4403
www.scapos.com

Contact and further informationen

www.packassistant.com
info@packassistant.de