TECHNISCHE UNIVERSITÄT MÜNCHEN
WEIHENSTEPHAN

**Lehrstuhl für Maschinen- und Apparatekunde**

Am Forum 2, 85350 Freising

**Accreditation for hygiene testing by German Accreditation Council**

# EVALUATION REPORT

## Verification of the cleanability of the platform line PBA430/430x in accordance with EHEDG-guidelines

***Report-no. 109/19.01.2006***

Firma Mettler-Toledo (Albstadt) GmbH
72458 Albstadt

The report is comprised of 11 pages, including 4 illustrations.
The evaluation pertains exclusively to the tested components mentioned in this report.
The appraisal was performed by trained personnel working in accordance with the EHEDG-guidelines.

Freising-Weihenstephan, 01. March 2006

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**„microbiological-hygiene testing of food-processing machines and apparatus“**

**Content**



## 1. STATEMENT OF PURPOSE

The company Mettler-Toledo (Albstadt) GmbH, Unter dem Malesfelsen 34, D-72458 Albstadt, Germany, commissioned the Lehrstuhl für Maschinen- und Apparatekunde (Chair of Process Engineering of Disperse Systems), University of Technology of Munich, in Weihenstephan, to evaluate the hygienic design of the platform line PBA430/430x. The evaluation was performed in instrumental application of EHEDG-guideline No. 8 “Hygienic Equipment Design Criteria”, second edition, April 2004.

This report is an amplification of report no. 78/29.01.2004 about square platforms.

## 2. DESCRIPTION OF THE PLATFORM LINE

The platform line PBA430/430x is characterized by an especially easy-to-clean and robust construction. It is mainly used in the wet environment of the food industry. The ability to clean easily is made possible by an open and accessible construction. The platforms consist of a base built of two frames with a load cell lying in-between, and a load plate. The platform line PBA430/430x is available in eight different sizes (229x229 mm, 240x300 mm, 300x400 mm, 305x305 mm, 400x500 mm, 457x457 mm, 500x650 mm and 600x800 mm). The construction is identical in principle, although the form of the frames differs in accordance with size and load capacity. The platform consists entirely of stainless steel with partly-electropolished surfaces.

Since the platforms are used exclusively in open processes, e.g. meat, fish and dairy industries, the only surface to come in contact with the product is the load plate. The optional operation terminal is not within the subject-matter of this evaluation. The base of the platform is located outside the product-contact area, so it need not meet the same strict requirements concerning cleanability as the areas of product-contact.

In the following illustrations (Fig. 1 – 4), all parts and the construction of the platform line are shown in four different sizes.

All four variants consist of a base frame and a load frame. With the 229x229 mm and the 240x300 mm size, the frames consist of stainless steel sheet metal with accordant laser-cut openings. Similar in design is the square size platform 305x305 mm. By edge folding and the V-shaped opening the base area is easy accessible. The other three sizes, 400x500 mm, 457x457 mm and 600x800 mm, have welded frame constructions. The openings in the sheet metals and the construction of the frames enable an easy and thorough cleaning. There are no recesses and cavities in which soil might accumulate. The material used in this case is stainless steel alloy 1.4301. The strain gauge load cell is bolted together between the base frame and the load frame. The load cell, made of fully-welded stainless steel 1.4548, is hermetically sealed and complies with IP68 protection.

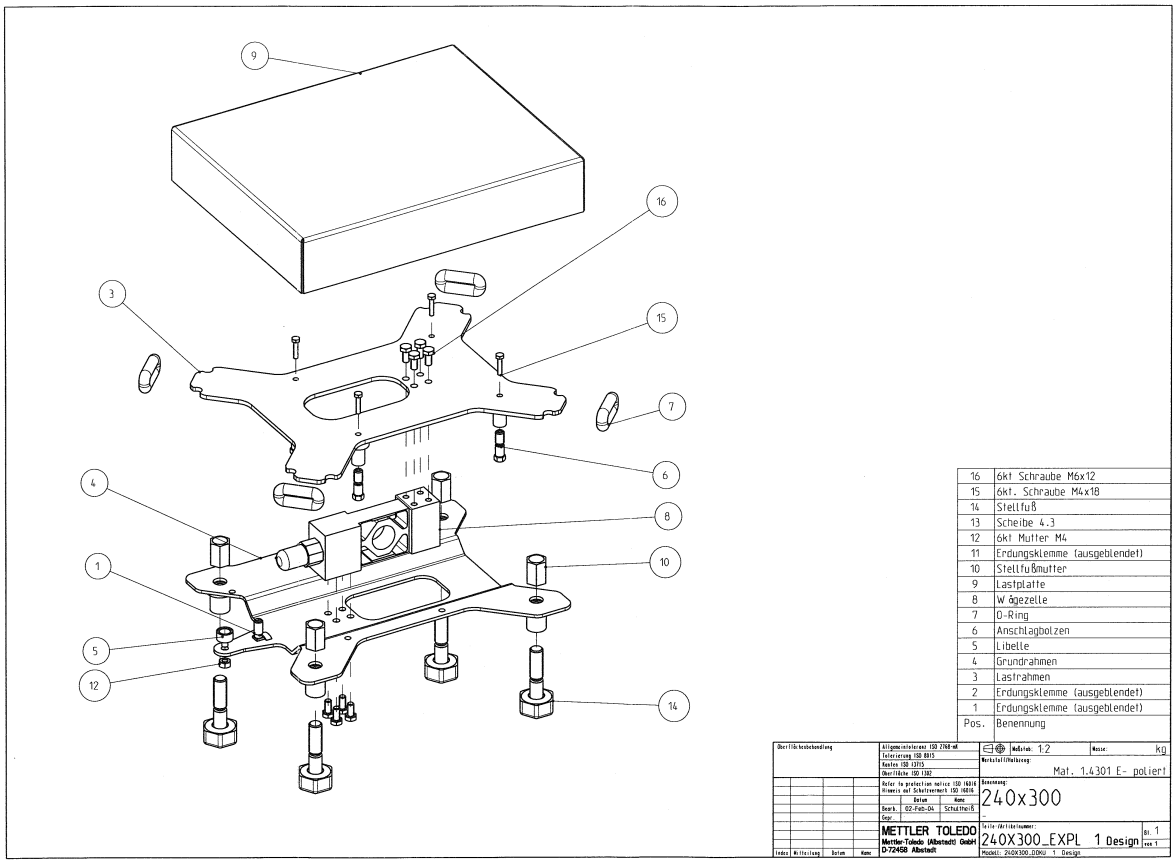


Fig. 1: platform of the size 240x300 mm

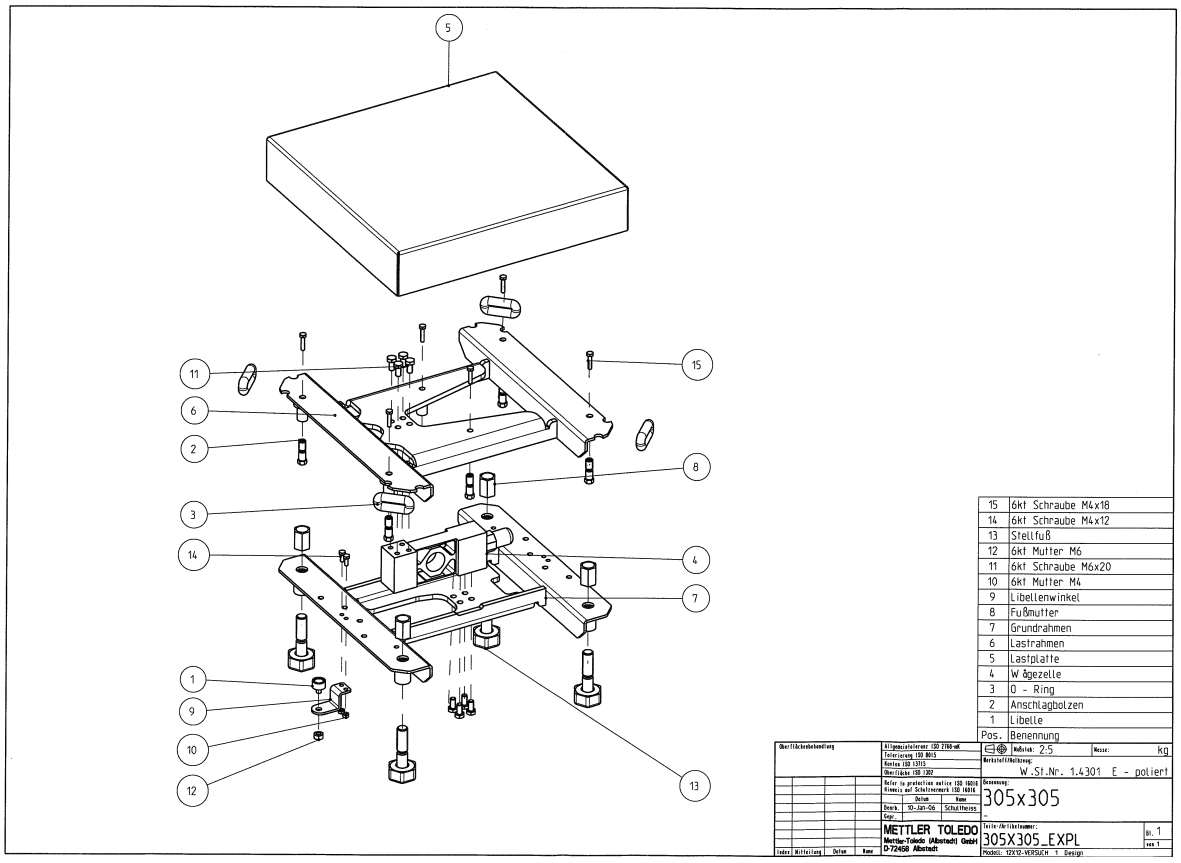


Fig. 2: platform of the size 305x305 mm

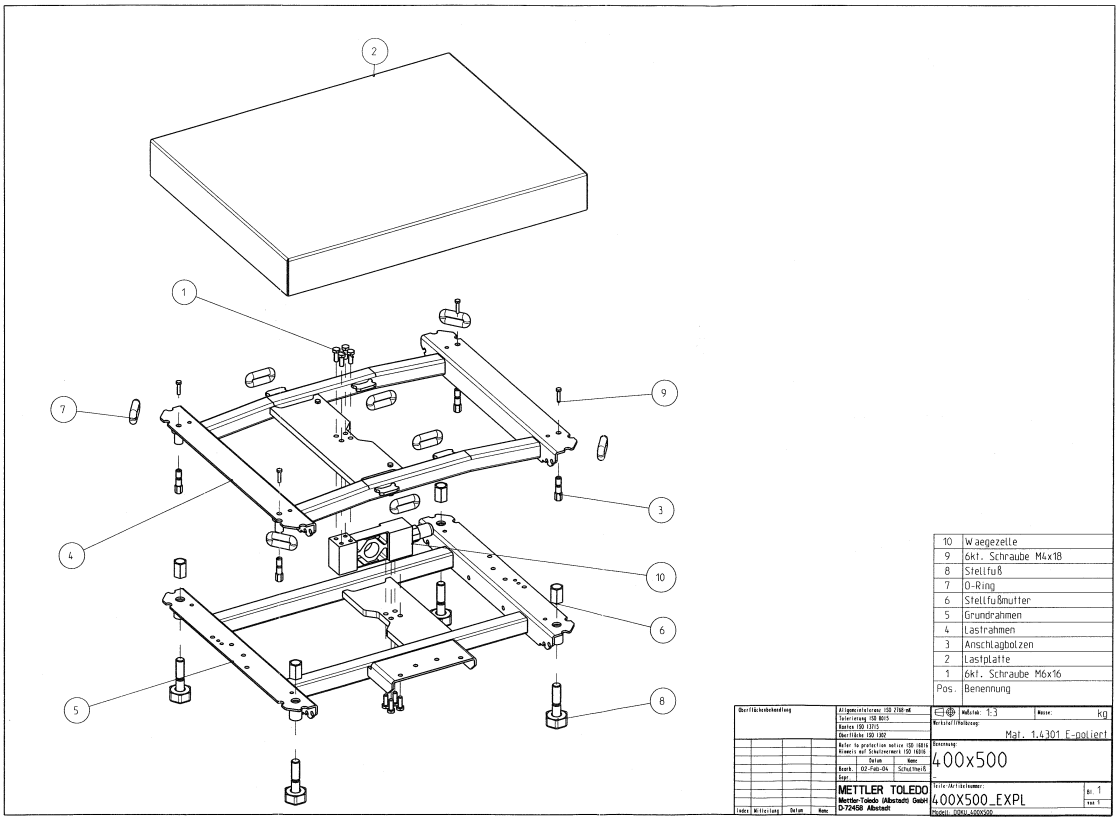


Fig. 3: platform of the size 400x500 mm

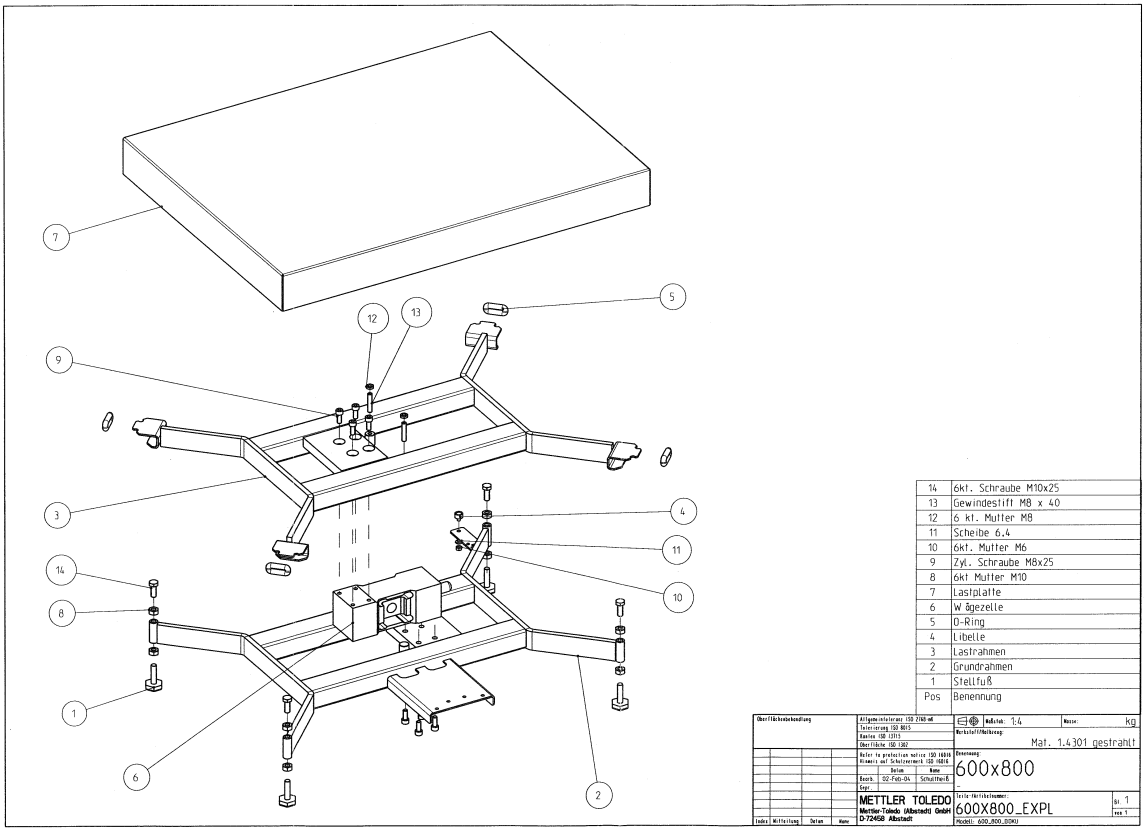


Fig. 4: platform of the size 600x800 mm

The load plate is classified as the product-contact area. It consists of brushed stainless steel 1.4571 (Ra < 0,8 µm) with pulled-down side faces, which are welded together from behind in the corners and slurred from outside. On the far pulled-down sides product residues can drain unhampered onto the floor. At the same time, this form guarantees a splash-guard for the base frame.
The platforms are adjusted by four leveling-feet. They are made of blue plastic (TPE [thermoplastic elastomer] 80 GRD) which is strongly connected with a setscrew. The leveling foot has a slightly-curved surface, allowing the self-drainage of liquid. For height adjustment, the leveling-feet are being turned into a hexagon nut with enclosed head on top of the base frame. The level (stainless steel / glass), which is essential for adjustment, is attached with screws to the base plate.

## 3. BASIS FOR EVALUATION

The scale's hygienic design was evaluated in accordance with guideline no. 8 "Hygienic Design Criteria", second edition April 2004 of the European Hygienic Engineering & Design Group (EHEDG). These hygiene criteria were developed as a joint effort by mechanical-engineering and food-processing experts. The requirements are regarded to be state-of-the-art and are essential for the hygienic design of apparatus and equipment used in the processing of food. This is important to protect consumers and to avoid any risk of infection, sickness or contagion, which can originate in food. Such risks must be reduced to a minimum if they are not to avoid. The hygienic design principles must be applied especially to surfaces which come into contact with the product being made. All other areas and added on components, which do not come into contact with the product, must be designed and built in a certain way. They must prevent moisture and soil from accumulating and must prevent vermin from nesting. It must be possible to easily clean, monitor and maintain these areas and added on components.

## 4. EVALUATION IN ACCORDANCE WITH EHEDG RECOMMENDATION DOCUMENT NO. 8

### General

Principally the requirements of the EHEDG guideline “Hygienic Equipment Design Criteria”, 2004, encompass the provisions of both the European standard DIN EN 1672-2: 2005, DIN EN ISO 14159: 2004 and the European council directive for machinery 98/37/EC.

### Materials – stainless steel

***Requirements:***

The used material must be corrosion-resistant, mechanically stable and non-toxic. It must be resistant to both the product and cleaning agents used during normal operating conditions. Product-contact surfaces should preferably be made of austenitic stainless steel belonging to the AISI 300 series (e.g. 304, 316, 316L). The corresponding German alloys have the material standards 1.4301, 1.4401 or 1.4404 respectively. Castings should be made with the appropriate grade of stainless steel with analogous properties.
For areas which do not come into direct food contact, the same requirements apply.

***Evaluation:***

Material 1.4571 (accordant to AISI no. 316 Ti) used for the product-contact area is in conformance with the EHEDG-recommendation.
The non-product-contact area consists of the material 1.4301. Corrosion caused by the influence of chlorine solution may appear. Still, this material is permitted to be used in the product area.

### Materials – plastics

***Requirements:***

Any plastics used must be easy to clean. Various types of plastics are recommended, like PP, PVC, PC, PE, etc. Plastics in contact with food must have the appropriate approval.
This also applies when using elastomers. If the elastomer comes into direct food contact, it must comply with the FDA CFR code. The following types of elastomers

are recommended to be used in the food industry: EPDM, FKM, HNBR, VMQ, FFKM, etc.

***Evaluation:***

Within the product-contact area no plastics and elastomers are used.
Within the non-product-contact area, plastics are used for the coating of the strain gauge load cell cable, the leveling feet and for the mounting of the load plate. The strain gauge load cell cable is coated with the plastic Polyurethane (PU). The leveling feet are made of thermoplastic elastomer (TPE). The four O-rings for the mounting of the load plate are made of Nitrile-Butadiene-Rubber (NBR).
All of these plastics are permitted to be used in the product area and exhibit smooth, sealed, and therefore easy-to-clean surfaces.

**Surfaces**

Surfaces must be easy to clean and not constitute a source of danger by allowing the contamination of food. All surfaces that come in contact with the product must remain stable upon exposure to either the product or the detergent or disinfectant under all operating conditions. All product-contact surfaces must be made of non-absorbent material (see “Materials”) and satisfy the specified requirements for roughness.

***Requirements:***

Product contact surfaces should have finishes characterized by a low mean roughness value (Ra) less than 0.8 µm. Non-product contact surfaces must be smooth enough to ensure easy cleaning.
All surfaces must be free of defects such as holes, scratches and crevices.

***Evaluation:***

The surface roughness of the product-contact area, i.e. of the load plate (brushed surface, measured Ra-value: 0.5 µm), is far below the EHEDG-recommended maximum. Furthermore, the surface on the entire area is free of surface defects. The surface is sealed and smooth.
The non-product-contact area is, due to the construction of its frame, open and unobstructed (upon removal of the load plate) and is therefore easy to clean. Optionally, an electropolished surface with a very low roughness value is available.

## Welded joints

***Requirements:***

Metal-metal contacts must be continuously welded together, making sure that there are no crevices. The welding process should take place within an inert gas atmosphere. If the welding seam shows major unevenness or tarnishes an after-treatment will be necessary. While welding, no edges or unlevelled surfaces are allowed to not impede cleaning.
Weld seams in the non-product-contact areas also should be continuous and smooth enough to ensure a proper cleaning.

***Evaluation:***

The side walls of the load plate are interiorly welded and additionally slurred outside. With that, the surface is levelled and therefore easily to be cleaned.
The weld seams of the frame construction show a low, consistent shingle type structure, which allows a reliable cleaning. By after treatment of an electro polish flat surfaces are generated.

## Geometrical proportions

## Rounding

***Requirements:***

Inside corners should preferably be rounded out to a radius of 6 mm or more. The minimum radius is 3 mm. Sharp corners with an angle of < 90° must be avoided. In the event that sharp corners cannot be avoided, or that a radius of less than 3 mm must be accepted, the design characteristics must be such as to compensate for the accompanying loss of cleanability.

***Evaluation:***

The product-contact area has no inside corners. All outside edges are rounded to avoid sharp corners or edges. With this, the EHEDG-recommendations are met.

## Self-drainage

***Requirements:***

Each piece of equipment must be designed for self-drainage once it is in its installed state. Consequently, horizontal surfaces must be avoided. Instead, care

must be taken to provide for an inclination towards one side. It may accumulate in no place water.

***Evaluation:***

For functional reasons, the load plate can not be inclined. It is absolutely flat, and does not have any concave areas. However, a self-draining can occur upon removal of the load plate.

The frames also do not show any recesses, in which residues might accumulate. The flat areas are reduced to a minimum. The frame construction of the size 400x500 mm has an inclination on the longitudinal sides, so that here a self-draining of the liquid is possible. Because of the open frame construction, the strain gauge load cell is publicly accessible and only buried through the little area of the screw connection.

## 5. RESULTS OF EVALUATION

Basically, the design of the product-contact components (load plate) are hygienic conform according to the EHEDG-recommendation.

The non-product-contact surfaces are likewise of a design appropriate for hygienic purposes and also satisfy, to a major extent, the requirements applicable to product-contact surfaces.

## 6. SUMMARY EVALUATION

The subject appraisal shows that the platform line PBA430/430x supplied by Mettler Toledo (Albstadt) GmbH, Albstadt, Germany, meets the hygienic requirements for easy cleanability (Hygienic Design Criteria). The underlying EHEDG document no. 8 reflects current state-of-the-art.

The product-contact area (load plate) is designed for easy cleaning and complies with the hygiene requirements. The non-product-contact frame construction also satisfies food-processing requirements with respect to the materials used. The scale’s base frame is of open design and easy to clean upon removal of the load plate. All electrical components are dust tight and waterproof in the sense of IP68 protection.