

Accreditation for hygiene tests by the German Accreditation Service



EVALUATION REPORT

**Verification of the cleanability
of the low profile scales PUA579(x)-CS/FL + optional accessories
in accordance with EHEDG-Guidelines**

Report-No. 138/21.05.2007

Firma Mettler-Toledo (Albstadt) GmbH
72458 Albstadt, Germany

The report comprises of 18 pages, including 13 illustrations.
The evaluation relate exclusively on the examined components listed in this report.
The report was performed by trained personnel working in compliance
with the EHEDG-Guidelines.

Freising-Weihenstephan, 23.07.2007



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DAR Registration No. DAP-PL-3480.00
Accreditation complying with DIN EN ISO/IEC 17025:2000 for:
"Microbiological tests for cleanable equipment used
in the food production"

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Contents

1	Task.....	2
2	Description of the low profile scales and the accessories.....	3
3	Basis for evaluation	8
4	Evaluation in accordance with EHEDG recommendation document no. 8	8
5	Result of evaluation	12
6	Summary evaluation.....	12
7	Appendix: Drawings.....	13

1 Task

Mettler-Toledo (Albstadt) GmbH, Unter dem Malesfelsen 34, D-72458 Albstadt, Germany, asked the Research Center Weihenstephan for Brewing and Food Quality (Forschungszentrum für Brau- und Lebensmittelqualität, BLQ) of the Technical University of Munich (TU München), Life and Food Science Center Weihenstephan to evaluate the hygienic design of the low profile scales belonging to the series PUA579(x)-CS/FL together with different accessories. The following models were evaluated: PUA579(x)-CS300, PUA579(x)-CS600 and PUA579(x)-FL300, PUA579(x)-FL600. Optional accessories are the ramp, the passage stop, the installation frame and the lifting device in two different designs with and without pre-load. The evaluation was carried out abiding decisively by the EHEDG-guideline no. 8 "Hygienic Equipment Design Criteria", second edition, April 2004.

The assessment was made by inspecting the low profile scales on the 21.05.2007.

2 Description of the low profile scales and the accessories

The low profile scales belonging to the series PUA579(x)-CS/FL (Fig. 1) are manufactured completely out of stainless steel and are used in the food and pharmaceutical industry. They are used in wet areas and in dry processes. A wet or dry cleaning of the scales may be therefore necessary. In both cases it is essential that the scales are completely and safely cleaned, in order to reduce the risk of product contamination.

The low profile scales in the series PUA579(x)-CS/FL consist of a large square or right-angled load plate, onto which goods are placed to be weighed. The load plate is manufactured as a single piece and its edges are bent up forming an appropriate large radius. In order to ensure its strength to carry objects supporting braces are necessary on the underside of the load plate (Fig. 2). Transverse braces are welded to the load plate. There are struts along the length of the load plate which are welded to the transverse braces. In order to prevent inward corners from forming, the struts along the length of the load plate are attached in such a way, so that openings form in the corners. The load cells are screwed to the four corners of the load plate at a large distance to each other (Fig. 3). The electrical junction box is located at one side of the load plate on one of its edges' areas. The electrical junction box is made of stainless steel. The cable duct is open and hangs loosely on the underside of the load plate and is held by the supporting brace. Furthermore four bails are attached to the unit which serve as a locking mechanism in the lifting device. The bails also act as handle bars. A passage stop can be welded on optionally. There are elongated holes on the bottom of the passage stop, so that the load plate can be cleaned and emptied. Only the top side of the load plate can come in to contact with the product, e.g. if it were to spill on it. This is a sealed stainless steel sheet with low roughness. It can be easily cleaned. Likewise the underside of the scales can also get dirty. Having the option of being able to lift the load plate, one has access to the underside of it. With its open design it is possible to quickly completely clean the low profile scales with ease.

A lifting system allows for the low lying scales to be lifted up easily and for it to be kept in an upright position safely. This is made completely of stainless steel and consists of a corner plate with a lever and a gas pressure spring. Another model (Fig. 4) has a pre-load gas pressure spring which makes it easier to lift up the scales. For this an interlock is necessary to hold down the load plate. The gas pressure spring requires H1 hydraulic oil, which is permitted to come into contact with food (food grade). All the bolts which point directly up and out to the side are hexagonal bolts. The frame is a U-pipe, which is open at the bottom. It protects the gas pressure springs once it is closed (Fig. 1 und Fig. 4), keeps the scales in an upright position and is accessible for cleaning. The interlock bar of the pre-load version is connected with a hinged joint to the frame. All crevices at the hinge are technically unavoidable. The bar itself is covered with a PVC-shell to use it by hand. This PVC-shell can be easily drawn off and exchanged if required.

The lifting mechanism shows no areas, on which residue and dirt could accumulate. In the open position it can be completely cleaned with the scales.

A ramp (Fig. 1) is available, with which goods can be driven onto the load plate. The ramp is designed to be fixed to the corner plates with bolts. The stainless steel ramp is made out of one continuous sheet, whose sides are bend up. Rounded rods made out of one material are welded on to the bottom of the ramp. The rounded rods are used to brace the ramp. The

ramp is taken off the scales during cleaning and is cleaned on both sides. There are no areas of the ramp which are difficult to clean.

Two possibilities are available to fix the scales to the ground. First four small corner plates can be screwed to the ground (Fig. 7). They are minimal in size, so that as little of the floor is covered up as possible. This makes cleaning easier. For sealing the lifting arrangement, the corner plates and the fixing plates for the ramp a set of EPDM gaskets is used. These gaskets are mounted between the frame and the ground. The fastening of the plates and the gasket is done by Highbond anchor bolts of the company Fischer, Germany. These anchors are fixed into the ground with injection concrete and tighten up the drill hole. A cap nut is used for fixing. The hexagonal bolt and nut on the upright side stops the load plate from moving about. The eccentric ring, which the load cell is placed onto, is welded on at a distance which ensures that no residue can accumulate in it.

The second possibility is a closed frame which must not be fixed to the ground. A rubber pad is stick on the bottom side of this installation frame to prevent slipping. This rubber pad is made of EPDM and conform to use it in contact with food. The installation frame consists of 4 single parts which can be put together. For this reason it is easy to dismantle and cleaning can be done below the frame.

The low profile scales in the series PUA(x)579-CS/FL can be assembled in many combinations. It can be supplied without or with one or tow ramps. According to this the corresponding model of the corner plates or the installation frame must be chosen. The lifting mechanism allows for the scales to be placed securely upright and be cleaned easily. If the scales has no lifting mechanism, then it must be ensured, that the scales can be put upright by hand. Otherwise it will not be possible to clean the bottom side of it.

The scales can be cleaned with commercial acids and caustic foam cleaner. Cleaning with high pressure is possible because all electrical components are dustproof and waterproof and are designed to meet the IP67 and IP68 requirements. However this is not recommended. The detached soil is spread around and will contaminate product contact areas beside the cleaning area.

The low profile scales is assigned to areas which do not directly come into contact with the products (food), as the product does not touch the scales directly. They are weighed out in packages and containers. However the surfaces can get dirty and this poses a risk of contamination for open containers of products.

The following figures show the details of the low profile scales:

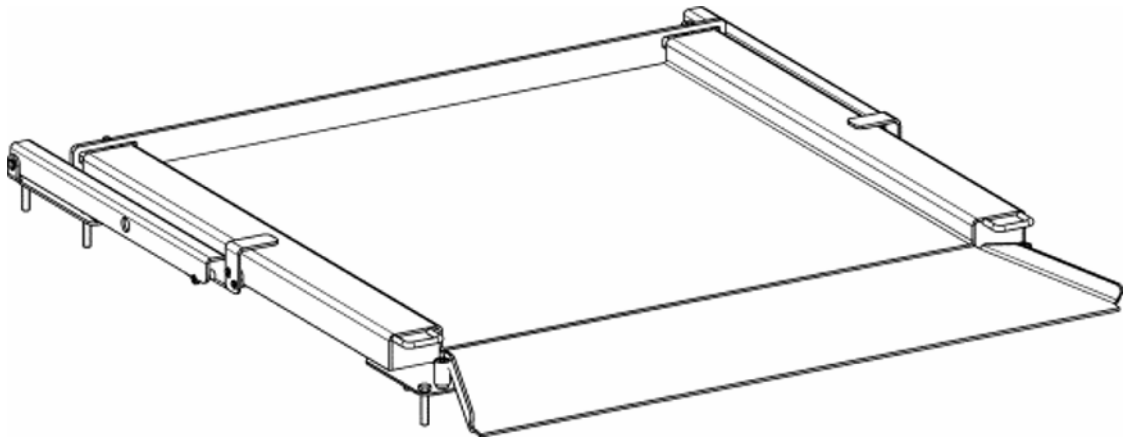


Fig. 1: Low profile scales PUA(x)579-CS/FL with lifting mechanism and ramp

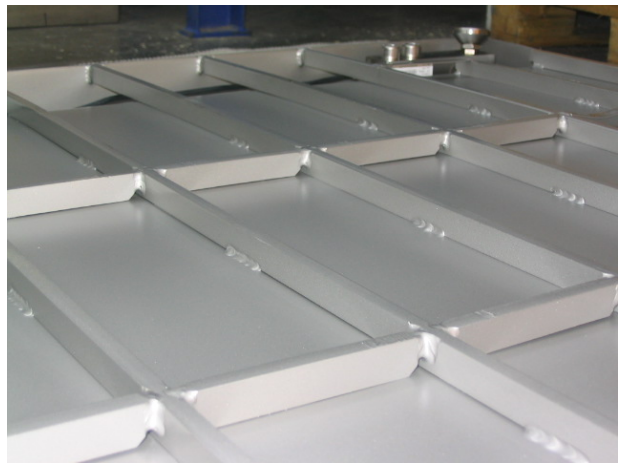


Fig. 2: The bottom side of the low profile scales, bevels in the corners

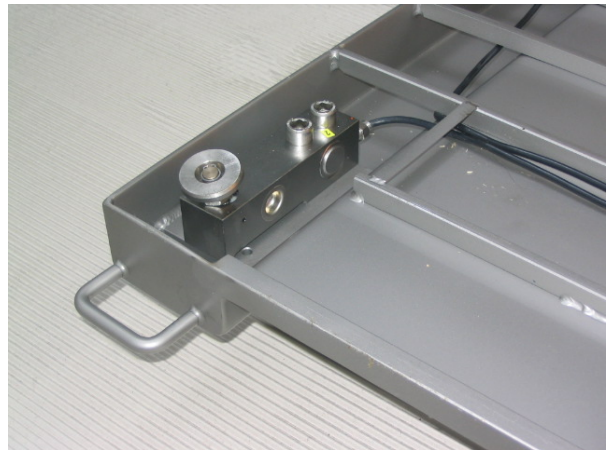


Fig. 3: The bottom side of the low profile scales, load cells and cable duct

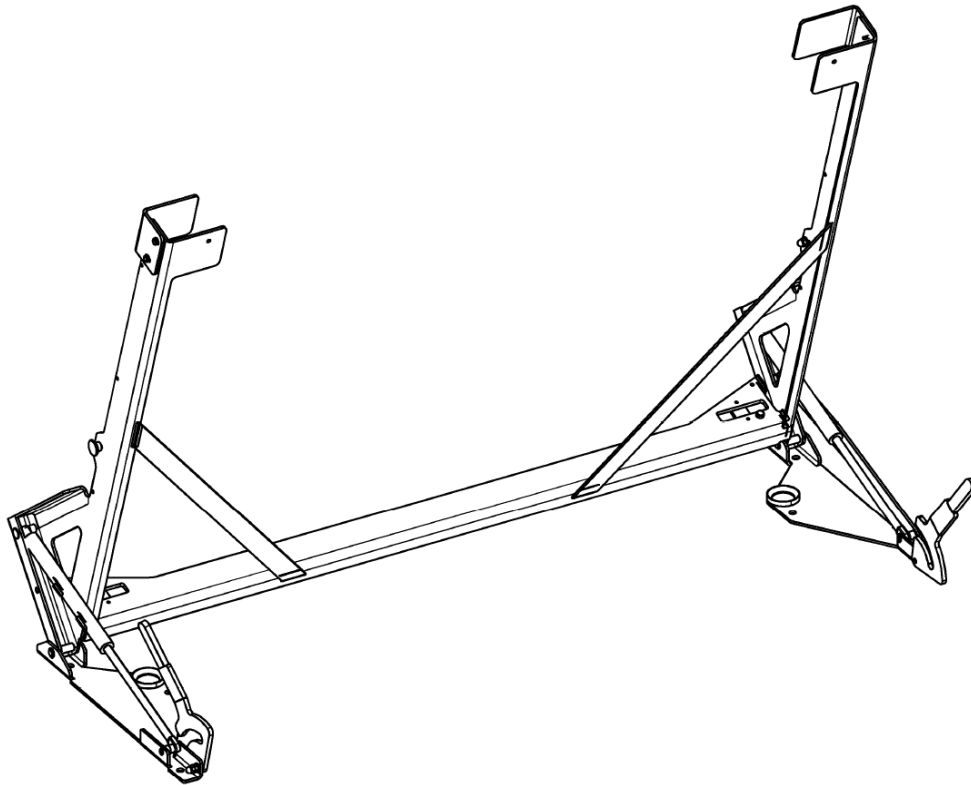


Fig. 4: Lifting mechanism with pre load and interlock bar

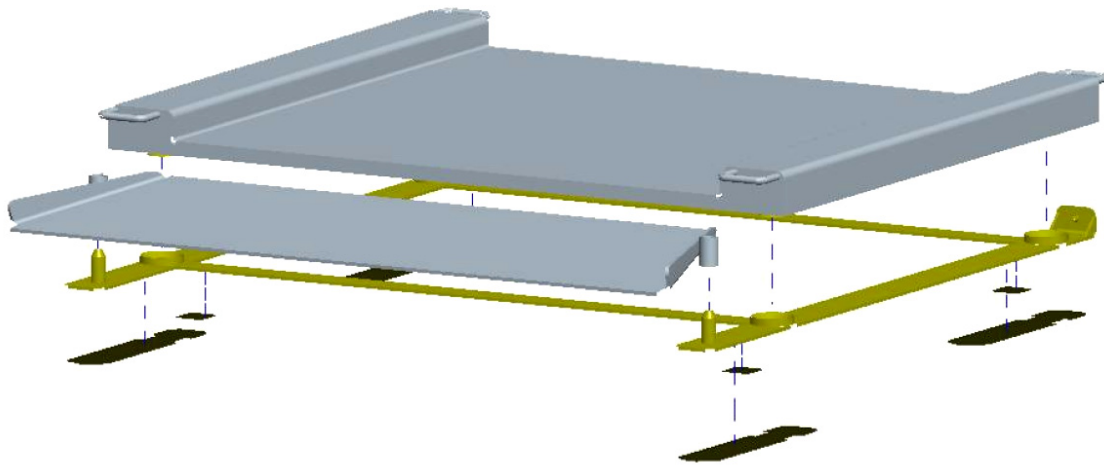


Fig. 5: Closed installation frame with rubber pads

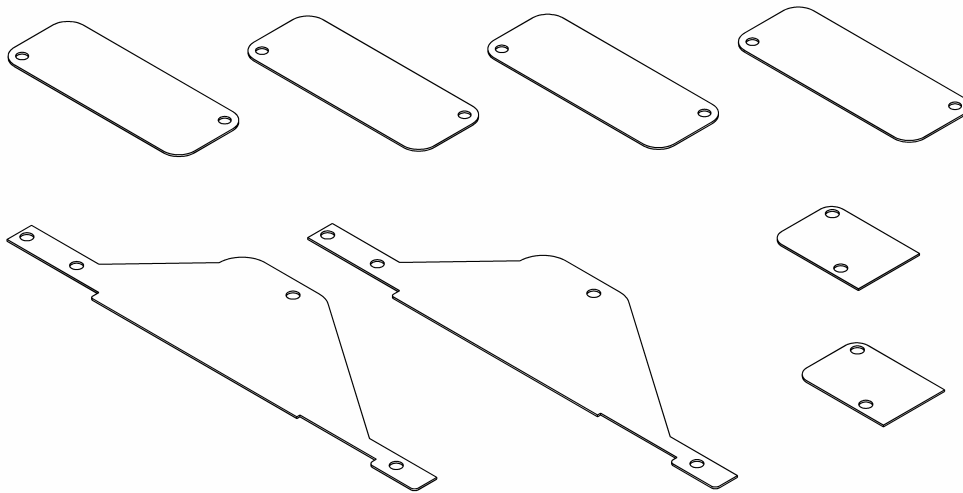


Fig. 6: Set of gaskets for the installation frame

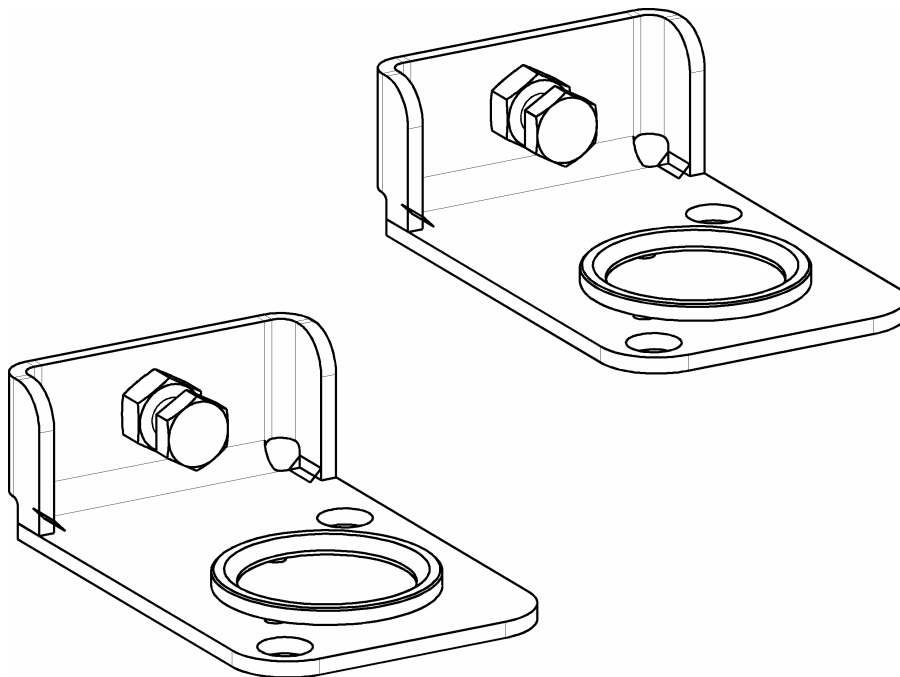


Fig. 7: Corner plates with welded on at distance eccentric rings and stop screws

3 Basis for evaluation

The scales 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 structural elements employed in the processing of food. This is important to protect consumers and to preclude the risk of infection, disease, contamination or injury, which can originate in food. Such risks must be reduced to a minimum. 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 dirt 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, also in the updated version of 2006/42/EC.

Materials – stainless steel

Requirements:

The material's surface must be corrosion-resistant, mechanically stable and non-toxic. It must be resistant to both the product and cleaning agents used under conditions of intended use. 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 contact with the product, the same requirements apply.

Evaluation:

All components in the standard model (low profile scales, lifting mechanism, ramp, corner plates and installation frame) and consist of the stainless steel alloy 1.4301. They are permitted to be used, where they could come into contact with food. Corrosion may appear and is caused by the influence of chloride solutions. This is dependant on the tem-

perature and concentration of the chloride. It has to be paid attention to with the appropriate process and cleaning conditions.

A model made out of the stainless steel alloy 1.4571 is also available optionally. It is distinguished itself by being more corrosion-resistant, especially to chloride ions.

Materials – Plastics

Requirements:

Any plastics used must be easy to clean. Various types of plastics are recommended, like PP, PVC, PC, PE, EPDM, HNBR, etc. Plastics in contact with food must have the appropriate approval.

Evaluation:

For the cables' sheathing PVC is used. Likewise is the shell of the interlock bar. PVC is resistant to common cleaning agents and cleaning methods.

For sealing the lifting mechanism, the corner plates and the fixing plates of the ramp gaskets are used. These are made of EPDM. This material of construction is as well approved for getting in contact with food and resistant to common cleaning agents.

Surfaces

All surfaces must be easy to clean and must not pose as a source of risk to foods becoming contaminated. All surfaces that come into contact with product, must be resistant to it and to the cleaning agents and disinfectants used under all conditions of intended use. The contact areas must be made out of non-absorbent materials (see materials) and must satisfy the specified requirements for roughness.

Requirements:

Product contact surfaces should have finishes characterized by a low mean roughness value 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:

All components (low profile scales, lifting mechanism, ramp, corner plates and installation frame) have a smooth stainless steel surfaces. They exhibit a sealed surface structure, which poses no problems in their ability to be cleaned. All surfaces are free of defects such as holes, scratches and crevices. The average roughness value Ra for the low profile scales and the ramp is less than 2 μm . An adequate smoothness exists in the areas which do not come into contact the product. This allows for the unit to be cleaned easily.

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 surfaced are allowed to not impede cleaning. The welded joint must not have any defects or pores and it should run in a straight line.

Evaluation:

The welding was carried out within an inert gas atmosphere applying the TIG and MAG welding methods. The welding seams are faultlessly designed and show an exemplary roughness and structure. The tarnishes in the welding seams were removed with bead blasting treatment.

The supporting braces underneath the low profile scales and the ramp are not continuously welded together. This is not possible due to technical reasons. The warping would no longer ensure a level plate. The slits which are formed by this are small and can be cleaned with an appropriate cleaning procedure.

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 less than 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 compensate any loss in cleanability.

Evaluation:

All inward corners are rounded out adequately and show no edges at all. The inward corner of the low profile scales has a radius of 5 mm and is therefore easy to clean. The right angled corners in the supporting braces at the bottom side of the load plate have been avoided with bevelled struts along the length of the load plate. All outer edges have been rounded off, so that no sharp edges exist.

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 is not allowed that water can accumulate at any area.

Evaluation:

The low profile scales has a level surface, otherwise weighing would not be possible. It is possible to place the scales in an upright position either by hand or using a lifting mechanism. This allows for an emptying (draining) of the scales to be possible. If a passage stop is welded on to the top of the scales, then it would not be possible to empty the scales in an upright position. Therefore long slits with a height of 10 mm exist (Fig. 7) and allow for the complete drainage of the scales surface.

The ramp can be removed and has no surfaces on which water can accumulate.

Water which accumulates on the level surfaces of the lifting mechanism, can flow off once the scales has been lifted up.

The corner plates have an eccentric ring, which is welded with a gap onto the corner plates (Fig. 7); this prevents the formation of puddles.

5 Result of evaluation

Basically the design of the low profile scales and all its components conform to the hygiene requirements, which were made according to the EHEDG-recommendation. The non-product contact surfaces are likewise designed and are appropriate for hygienic purposes. They also satisfy to a large extent, the requirements applicable to product-contact surfaces.

6 Summary evaluation

The subject appraisal shows that the low profile scales belonging to the series PUA579(x)-CS300, PUA579(x)-CS600, PUA579(x)-FL300 and PUA579(x)-FL600 and the optional components ramp, passage stop, lifting mechanism corner plates and installation frame, which were submitted by the company Mettler Toledo GmbH, Albstadt, Germany, meet the requirements for easy cleanability (Hygienic Design Criteria). The underlying EHEDG document no. 8 is state-of-the-art.

7 Appendix: Drawings

Pos.	Menge	Benennung	Werkstoff	Masse	kg
21	1	Stechbare Rampe	Mat. 1.4301		
20	1	Grundplatte Rampe-PUA Links	Mat. 1.4301		
19	1	Grundplatte Rampe-PUA rechts	Mat. 1.4301		
18	10	6kl.Schr. DIN933-M6x30-A2-70			
17	1	PUA-CS / FL	w.St.Nr. 1.4.301		
16	1	Anschlusskasten Metallisch	Mat. 1.4301		
15	8	Zyl.Schr. DIN912-M8x30-A2-70			
14	1	Hebevorrichtung kompl.	Mat. 1.4301		
13	2	Gasfeder 550N bis Durchfahrbreite 850mm	Mat. 1.4301		
12	1	Buegel rechts	Bleeh 5mm Mat. 1.4301		
11	1	Buegel Links	Rel 15 DIN 668 Mat. 1.4301		
10	4	Buchse	Rel. 8 mm DIN668 Mat. 1.4301		
9	2	Welle	Rel. 8 mm DIN668 Mat. 1.4301		
8	2	Welle	Rel. 8 mm DIN668 Mat. 1.4301		
7	2	Bolzen 14mm	Rel. 14mm Mat. 1.4301		
6	8	Sicherungs- DIN974-Bx8-B-A2			
5	4	Sicherungs- DIN974-1x4-A2			
4	4	Scheibe DIN925-5.3-16OHV-A4			
3	2	6kl.Schr. DIN933-M6x30-A2-70			
2	4	6kl.Schr. DIN933-M5x2-B-B-A2A			
1	12				

Überflächeneigenschaften	Benennung	Maßstab	Masse
		1:10	
		Werkstoff/Abtrag:	

Refer to protection notice ISO 18016
Hinweis auf Schutzzeichen ISO 18016

Benennung:	Expositionszeichnung
PUA(x)-CS/FL + Hebevorrichtung + Auffahrrampe	
Teil- / Artikelnummer:	
METTLER TOLEDO	
Mettler-Toledo (Albstadt) GmbH	
D-72458 Albstadt	
Modell: CHEG 1 Design	
Bl. 1	
von 1	

Fig. 8: Blown-up drawing of the low profile scales PUA(x)-SC/FL with lifting mechanism, ramp and corner plates

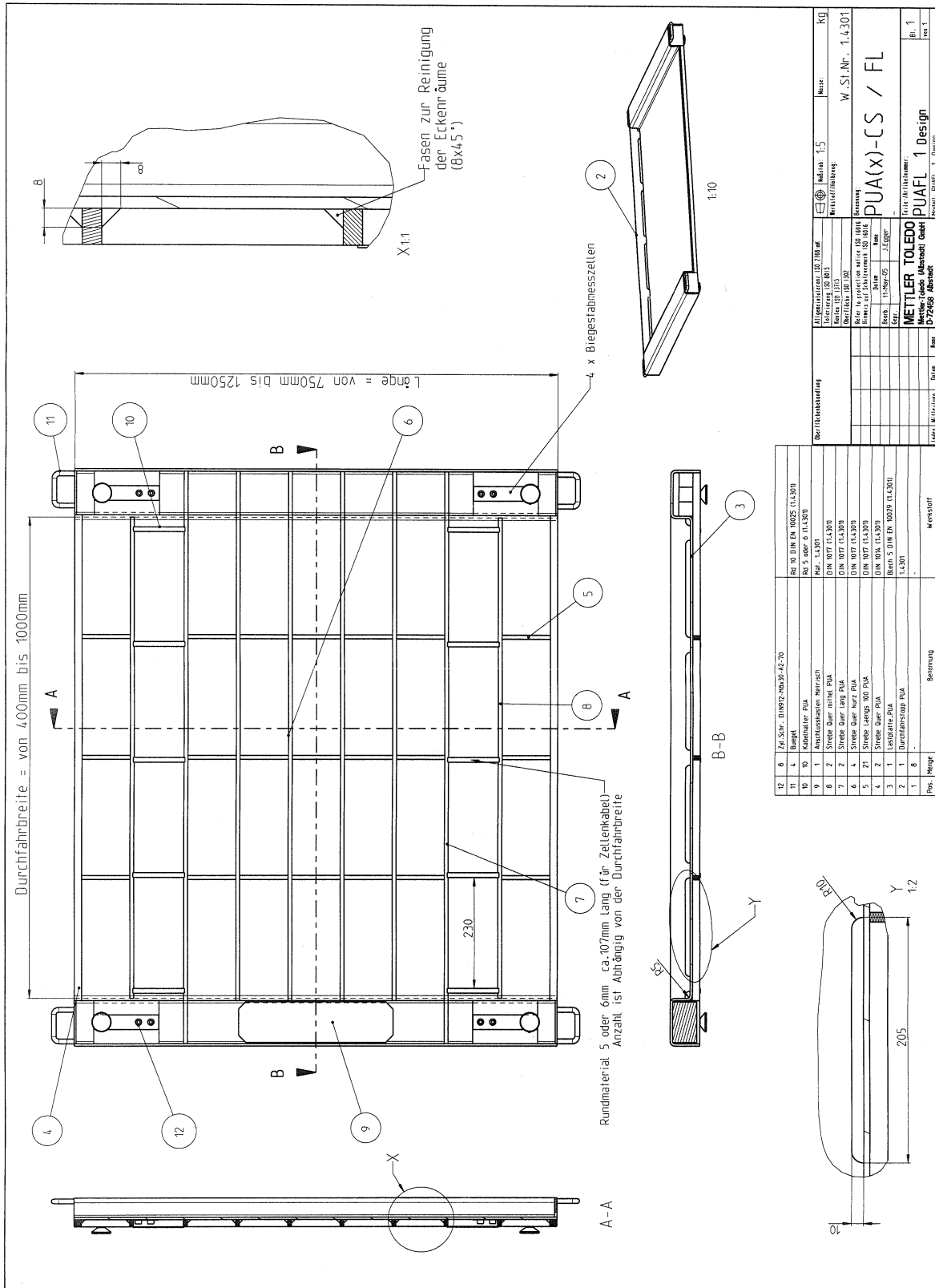
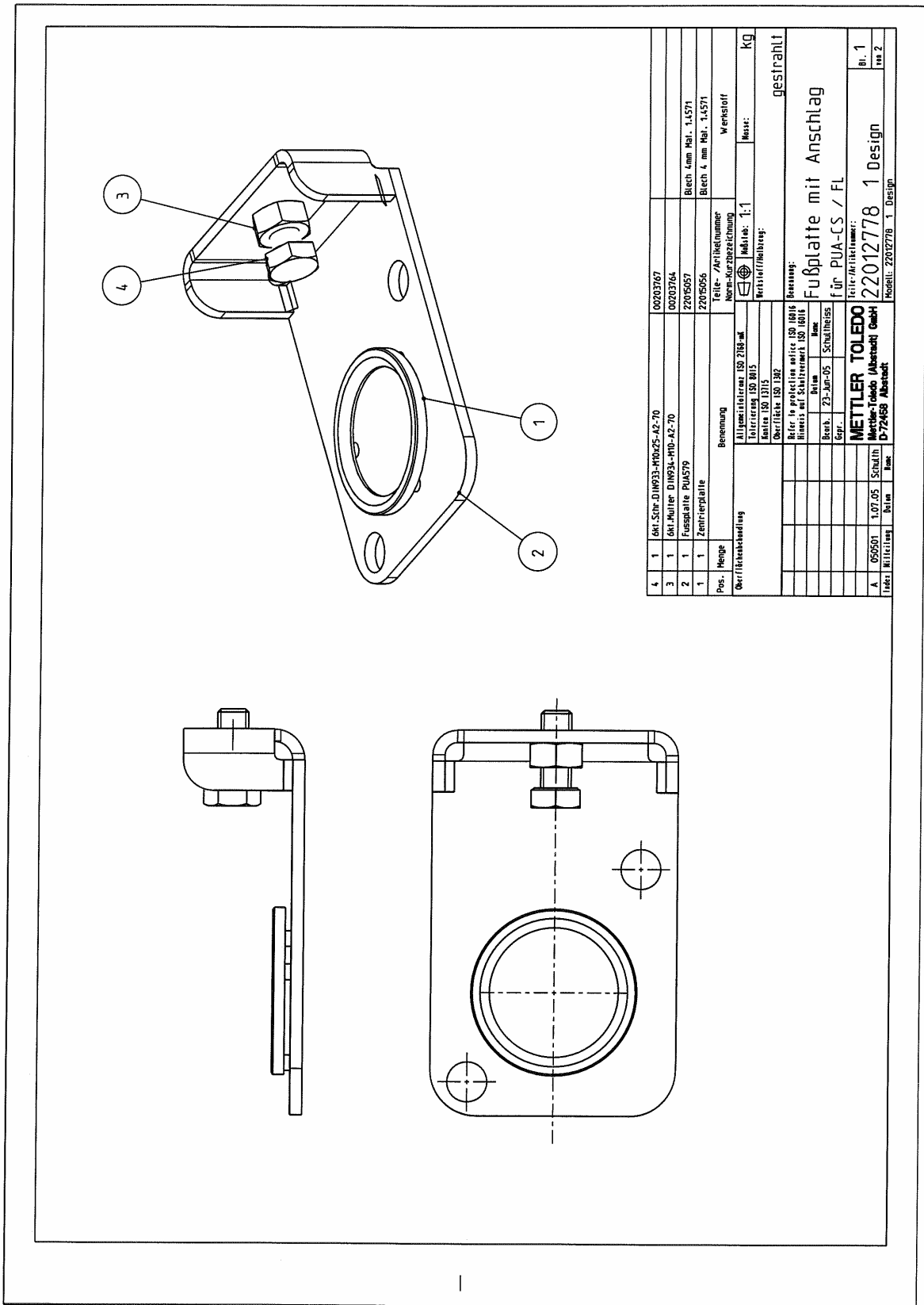
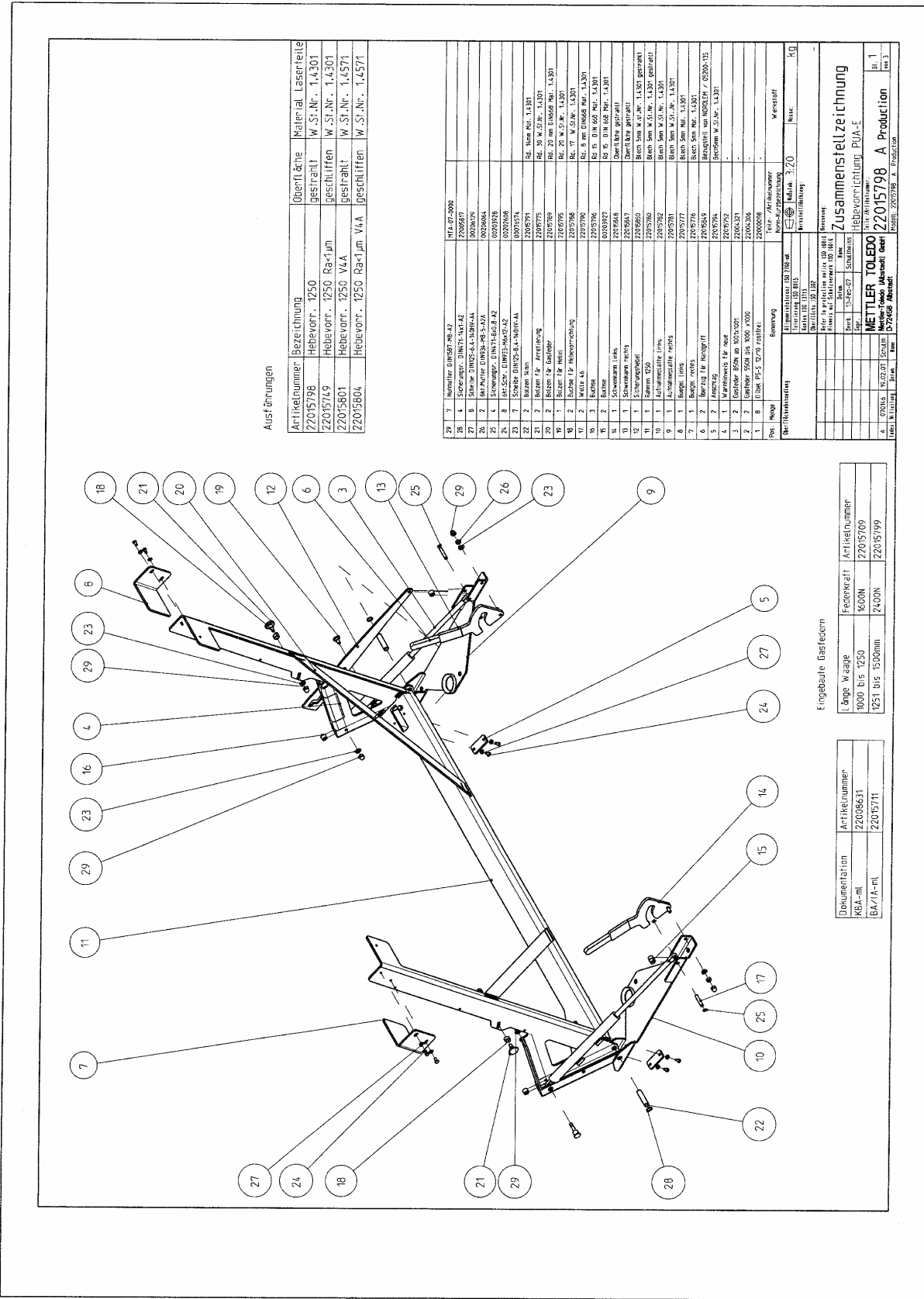


Fig. 9: Bottom view of the low profile scales PUA(x)579-CS/FL



4	1	ØH-Schr-DIN933-M10x25-A2-70	00203767
3	1	ØH-Mutter DIN934-M10-A2-70	00203764
2	1	Fussplatte PUA579	22075057
1	1	Zentrierplatte	22075056
Pos.	Menge	Benennung	Teile- / Artikelnummer
Überflächenbehandlung			Norm-Kurzbezeichnung
			Mäße: 1:1
			Recht/Multiview:
			kg
			gestrahlt
Messung: Fußplatte mit Anschlag für PUA-CS / FL			
Referenznormen: Refer. in protection suite ISO 18116 Hinweis auf Schutznorm ISO 18111 Fertigung ISO 9015 Oberflächen ISO 1292 Zeich. 23-Jun-05 - Schweißens-			
Teilenummer: METTLER TOLEDO Mettler-Toledo (Abstrakt) GmbH D-72458 Albstadt			
A	05601	1.07.05	Schultz
Teil	Mitteilung	Datum	Umk.
			Bl. 1
			von 2

Fig. 10: Corner plate with stopper for the low profile scales PUA(x)579-CS/FL



Ausführungen

Artikelnummer	Bezeichnung	Oberfläche	Material
22015798	Hebevorr. 1250	gestrahlt	W. St. Nr. 1.4301
22015749	Hebevorr. 1250 Ra<4µm	geschliffen	W. St. Nr. 1.4301
22015601	Hebevorr. 1250 V4A	gestrahlt	W. St. Nr. 1.4571
22015604	Hebevorr. 1250 Ra<4µm V4A	geschliffen	W. St. Nr. 1.4571

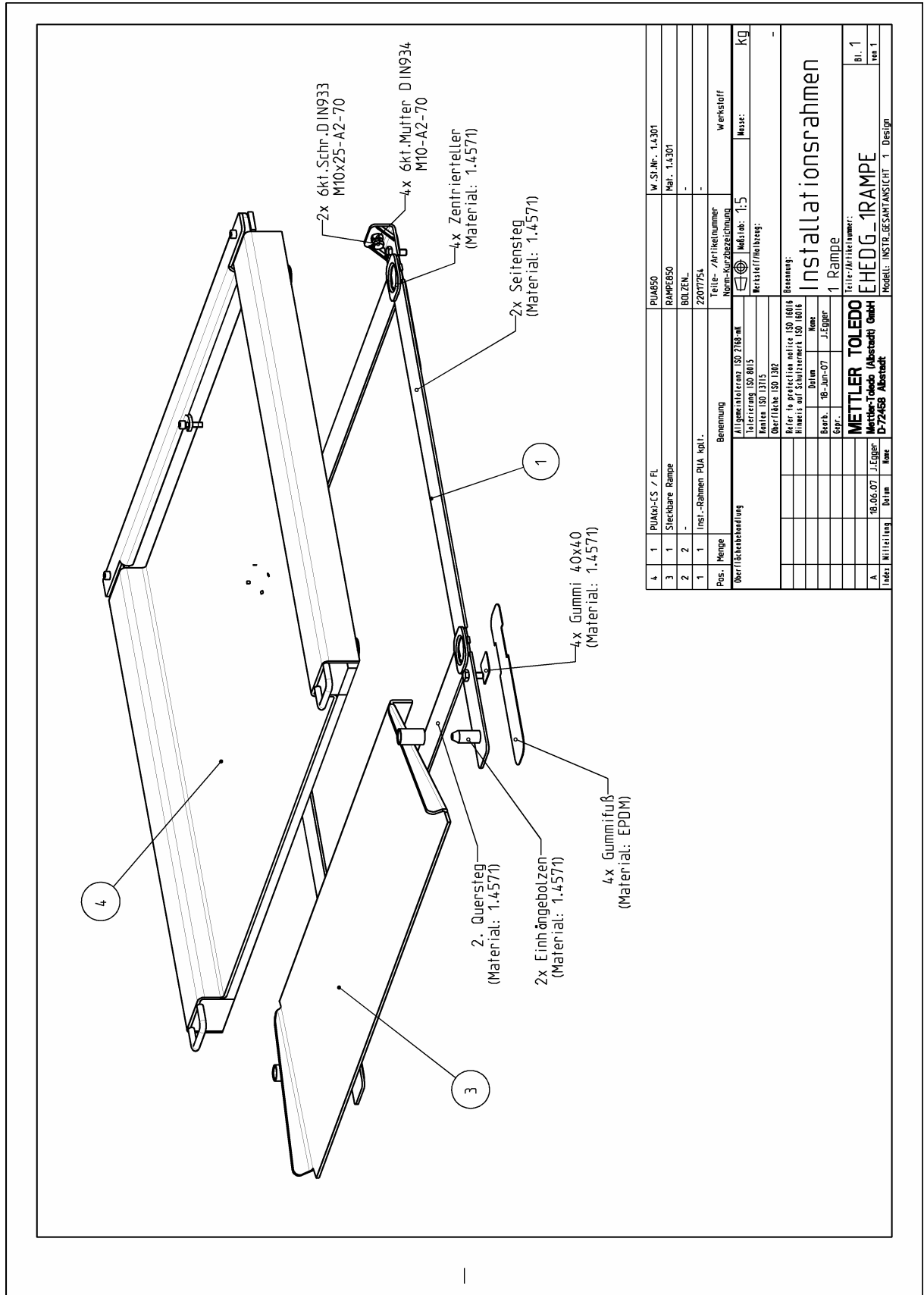
29	7	Nummer D1MSF-R6-AZ	MFL-GT-5000
28	4	Scheitel D1MSF-R6-AZ	2205537
27	8	Stange D1MS-GA-1500RA	0003099
26	2	Roller D1MS-98-500	0020804
25	2	Roller D1MS-98-500	0020805
24	8	Stange D1MS-GA-1500RA	0003099
23	7	Scheitel D1MS-GA-1500RA	0007074
22	2	Becken V4A	2205791
21	2	Becken für Antriebsrolle	2205795
20	2	Becken für Handrolle	2205789
19	1	Becken für Handrolle	2205795
18	2	Becken für Handverstellung	2205798
17	2	Welle 48	2205796
16	2	Welle 48	2205796
15	2	Stromabnehmer	2205803
14	1	Stromabnehmer rechts	2205803
13	1	Stromabnehmer links	2205803
12	1	Stromabnehmer	2205803
11	1	Rahmen 1250	2205780
10	1	Aufhängemuffe links	2205782
9	1	Aufhängemuffe rechts	2205781
8	1	Becken links	2205777
7	1	Becken rechts	2205776
6	1	Handrolle für Handverstellung	2205805
5	2	Motor	2205752
4	1	Motor für Handverstellung	2205752
3	2	Gasteder 5000 bis 1000 x100	2206321
2	2	Gasteder 5000 bis 1000 x100	2206320
1	8	Ubol PS-5 12/10 zerlegt	2200436
Pos. Menge			
Reinigungs- / Wartungsmittel			
Reinigung			
Werkstoff			
Reparatur			
Zusammenbau			
Montage			
Verpackung			
Transport			
Lagerung			
Abfallentsorgung			
Anmerkungen			

Artikelnr.	Bezeichnung	Material
22015798	Hebevorr. 1250	gestrahlt
22015749	Hebevorr. 1250 Ra<4µm	geschliffen
22015601	Hebevorr. 1250 V4A	gestrahlt
22015604	Hebevorr. 1250 Ra<4µm V4A	geschliffen

Artikelnr.	Bezeichnung	Material
22015798	Hebevorr. 1250	gestrahlt
22015749	Hebevorr. 1250 Ra<4µm	geschliffen
22015601	Hebevorr. 1250 V4A	gestrahlt
22015604	Hebevorr. 1250 Ra<4µm V4A	geschliffen

Artikelnr.	Bezeichnung	Material
22015798	Hebevorr. 1250	gestrahlt
22015749	Hebevorr. 1250 Ra<4µm	geschliffen
22015601	Hebevorr. 1250 V4A	gestrahlt
22015604	Hebevorr. 1250 Ra<4µm V4A	geschliffen

Fig. 11: Lifting mechanisms with pre-load and interlock bar



4	1	PUA(x)CS / FL	PUA850	W. St.Nr. 1.4301
3	1	Steckbare Rampe	RAMPE850	Mpl. 1.4301
2	2	-	BOLZEN	-
1	1	Inst.-Rahmen PUA 850	22097754	-
Pos.	Menge	Benennung	Teil-/Artikelnummer	Werkstoff
Oberflächeneinfügung		Aluminiumlegierung ISO 2188-ml	Norm-Größenbezeichnung	
		Verbreitung ISO 8015	⊗ Maßstab: 1:5	Maße: kg
		Oberfläch ISO 1312	⊗	
Refer to protection notice ISO 16816 in case of Schrittmotor ISO 16816				
		Beerb. 18-Jun-07	J.-Eigler	
		Gepr.		
Besetzung:				
1 Installationrahmen				
1 Rampe				
Teil-/Artikelnummer:				
Mettler-Toledo (Abschnitt) GmbH				
D-72468 Albstadt				
A	18.06.07	J.-Eigler		Bl. 1
Teil-/Mittelstück	Datum	Name		von 1

Fig. 12: Installation frame and low profile scales PUA(x)579-CS/FL with ramp

