Levelling elements
Hygienic Design

STANDARD MACHINE ELEMENTS WORLDWIDE

elesa®

HYGIENIC DESIGN

Maximum hygiene is a fundamental requirement, not only where food is produced. Hygiene also plays an increasing role in other industrial areas, from the pharmaceutical industry to the manufacture of paints and dyes. Nowadays a major issue is the manufacture of products without added preservatives or with as few added preservatives as possible while still achieving a long shelf life. However, this can only be achieved in a production environment in which all risks of contamination with microorganisms or dirt are excluded. For plant construction, this means that all components, elements, as well as surfaces, must be designed accordingly. Contaminants must not accumulate and must be easy to remove.

WHY HYGIENIC DESIGN?

In the food industry, medical technology and the pharmaceutical industry, product safety and consumer protection are becoming increasingly important. Due to their specific properties, standard parts in Hygienic Design can assist the production process in these sensitive areas and facilitate the manufacture of products with a long shelf life, which are free from preservatives.

ADVANTAGES

Less and shorter cleaning work (this can be up to 25% of the production time), therefore
- more time available for production
- less fresh water consumption
- lower energy consumption
- less cleaning agent required
- less production of waste water
- lower total costs and saving of resources

LEGAL BASIS

EN 1672-2:2009 “FOOD MACHINERY”

Machines must be able to be cleaned, i.e. they must be designed and constructed so that dirt can be removed with the recommended cleaning methods.

MACHINERY DIRECTIVE 2006/42/EC

Machines must be designed so that materials can be easily and fully cleaned before each use and no risk of infections or illness is created.

DIN EN ISO 14519:2008-07

Hygiene requirements for the design of machines

DIN EN 1672:2009-07

Food machinery – General design principles – Part 2

DESIGN REQUIREMENTS

MATERIAL

- Non-rusting Stainless Steels
- FDA and EU compliant plastics and elastomers

SURFACES

- Surfaces must be able to be cleaned
- Steps due to appliance configurations which are not aligned must be avoided
- Seals must be designed so that no gaps occur
- O-ring grooves must be hygienically designed
- Contact with the product to be manufactured must be ruled out
- Corners should preferably have a radius of 6 mm or more

DESIGN / GEOMETRY

The interior and exterior areas of all appliances, components or piping must be self-draining or be able to be drained and easy to clean.

SURFACE PROPERTIES AND ROUGHNESS

Easy to clean with Ra < 0.8 µm

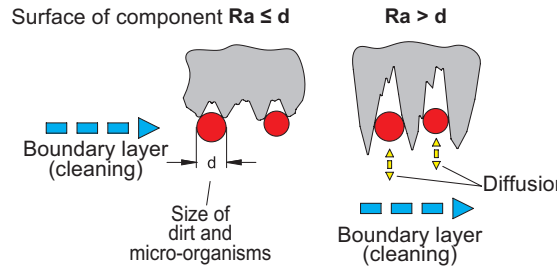
DESIGN PRINCIPLES

EHEDG - European Hygienic Engineering & Design Group

Non-profit European consortium of machine and food manufacturers as well their suppliers, research institutes, universities and government health agencies

3-A Sanitary Standard, Inc.

Non-profit and independent association in the USA - three interest groups: public and governmental health agencies, machine and food manufacturers



SEALS

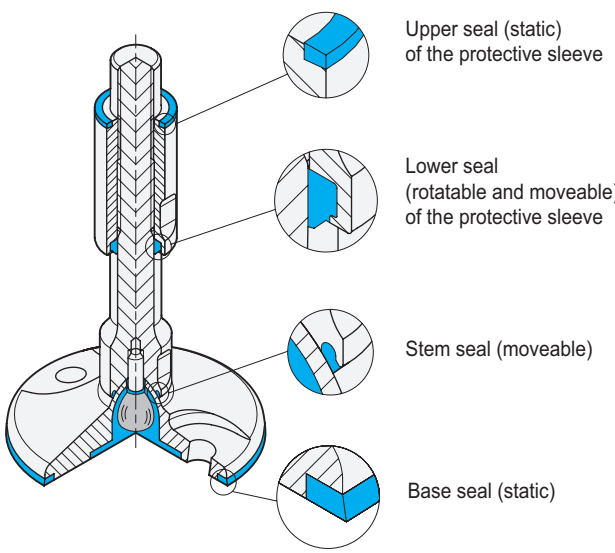
For the standard parts which are listed in Hygienic Design, the seals have the central function of protecting dead spaces, gaps and cracks from the penetration of cleaning fluids or product residues.

For this, a defined pre-tension or pressing of the seals and lower seal is necessary for a reliable and permanent seal in the installed condition. Within the Hygienic Design product family, seal installation spaces and seal cross sections are calculated and designed with simulation software, so that the necessary surface compression is achieved on installation and the seal material is not subjected to excess pressure.

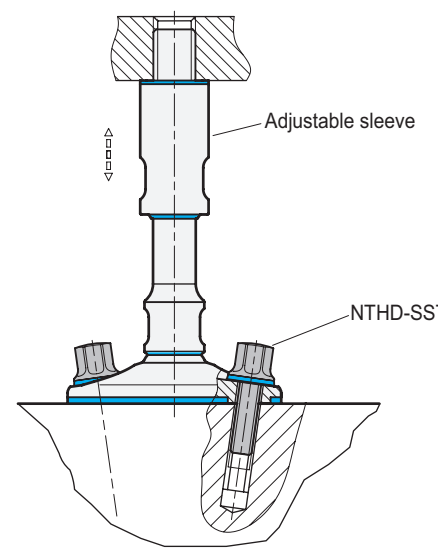
A fundamental differentiation can be made between static and moving seals.

- **Static seals.** The pressure is achieved by tightening. It should be ensured that all surfaces which make contact with the ring have a surface finish of at least Ra 0.8 µm.
- **Moving seals**. They are designed to allow adjustment in both height and angle, ensuring a gap-free, pre-tensioned seal.

With the example of a LMHD.F levelling elements-Hygienic Design, the illustrated design shows how the various seal configurations can be designed.



Mounting example



MATERIAL
Fine turned AISI 304 stainless steel.

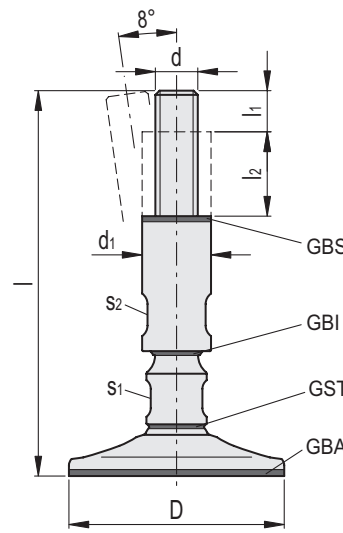
UPPER SEAL OF THE PROTECTIVE SLEEVE (GBS)
NBR synthetic rubber hardness 70 +/-5 Shore A, blue colour, in compliance with FDA.

LOWER SEAL OF THE PROTECTIVE SLEEVE (GBI)
Polyurethane elastomer TPU hardness 95 +/-5 Shore A, blue colour, in compliance with FDA.

STEM SEAL (GST)
H-NBR synthetic rubber hardness 85 +/-5 Shore A, blue colour, in compliance with FDA.

BASE SEAL (GBA)
Silicone hardness 85 +/-5 Shore A, blue colour, in compliance with FDA.

FEATURES AND APPLICATIONS
LMHD levelling elements are intended for use in environments where high hygiene is required.
The surface beneath the support base is protected by seals that prevent dirt from entering when the levelling element is pressed by the weight of the equipment.
The adjustable protective sleeve, which covers the threaded part of the stem, is provided both at the top and bottom with a protective seal, as well as the base of the threaded stem. These seals prevent access to dirt inside the coupling between the threaded stud and the adjustable protective sleeve.
The finish quality of stainless steel parts prevents dirt adhering and facilitates cleaning.
The static load values in the table below are the result of laboratory tests in which the load has been applied perpendicularly to the base. Such values have to be considered as purely indicative and must be verified under the specific conditions of use.
Under common working conditions, side or angular loading increases the stress on the levelling element and reduces its carrying capacity.
It's the user's responsibility to determine, case by case, whether the product is suitable for the intended use.



Code	Description	D	d	d1	l	l1	l2	s1	s2	Static load [N]	⚖
406101	LMHD.80-SST-M16x175	80	M16	28	175	19	35	18	22	30000	183
406106	LMHD.80-SST-M16x225	80	M16	28	225	19	35	18	22	30000	183
406111	LMHD.80-SST-M20x185	80	M20	32	185	24	35	24	27	47000	220
406116	LMHD.80-SST-M20x235	80	M20	32	235	24	35	24	27	47000	220
406121	LMHD.80-SST-M24x185	80	M24	36	185	29	35	24	30	67000	252
406126	LMHD.80-SST-M24x235	80	M24	36	235	29	35	24	30	67000	252
406131	LMHD.100-SST-M16x175	100	M16	28	175	19	35	18	22	30000	183
406136	LMHD.100-SST-M16x225	100	M16	28	225	19	35	18	22	30000	183
406141	LMHD.100-SST-M20x185	100	M20	32	185	24	35	24	27	47000	220
406146	LMHD.100-SST-M20x235	100	M20	32	235	24	35	24	27	47000	220
406151	LMHD.100-SST-M24x185	100	M24	36	185	29	35	24	30	67000	252
406156	LMHD.100-SST-M24x235	100	M24	36	235	29	35	24	30	67000	252
406161	LMHD.120-SST-M16x175	120	M16	28	175	19	35	18	22	30000	183
406166	LMHD.120-SST-M16x225	120	M16	28	225	19	35	18	22	30000	183
406171	LMHD.120-SST-M20x185	120	M20	32	185	24	35	24	27	47000	220
406176	LMHD.120-SST-M20x235	120	M20	32	235	24	35	24	27	47000	220
406181	LMHD.120-SST-M24x185	120	M24	36	185	29	35	24	30	67000	252
406186	LMHD.120-SST-M24x235	120	M24	36	235	29	35	24	30	67000	252

MATERIAL
Fine turned AISI 304 stainless steel.

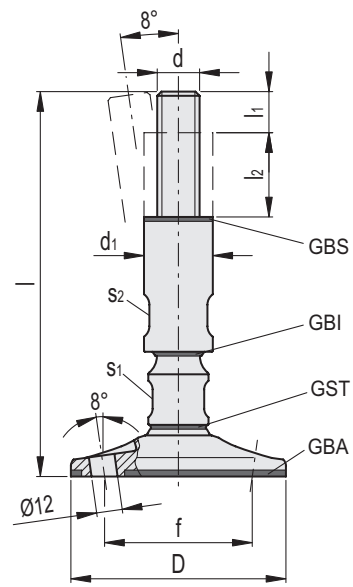
UPPER SEAL OF THE PROTECTIVE SLEEVE (GBS)
NBR synthetic rubber hardness 70 +/-5 Shore A, blue colour, in compliance with FDA.

LOWER SEAL OF THE PROTECTIVE SLEEVE (GBI)
Polyurethane elastomer TPU hardness 95 +/-5 Shore A, blue colour, in compliance with FDA.

STEM SEAL (GST)
H-NBR synthetic rubber hardness 85 +/-5 Shore A, blue colour, in compliance with FDA.

BASE SEAL (GBA)
Silicone hardness 85 +/-5 Shore A, blue colour, in compliance with FDA.

FEATURES AND APPLICATIONS
LMHD.F levelling elements for ground mounting are intended for use in environments where high hygiene is required and are certified according to EHEDG guidelines.
The surface beneath the base is protected by seals that prevent dirt from entering, when the levelling element is mounted onto the supporting floor with screws through the holes provided in the element itself. The mounting and correct positioning of the holes is therefore essential for the sealing of the various seals.
For optimum mounting of the levelling element NTHD-SST screws are required.
The adjustable protective sleeve, which covers the threaded part of the stem, is provided both at the top and bottom with a protective seal, as well as the base of the threaded stem. These seals prevent access to dirt inside the coupling between the threaded stud and the adjustable protective sleeve.
The finish quality of stainless steel parts prevents dirt adhering and facilitates cleaning.
The static load values in the table below are the result of laboratory tests in which the load has been applied perpendicularly to the base. Such values have to be considered as purely indicative and must be verified under the specific conditions of use.
Under common working conditions, side or angular loading increases the stress on the levelling element and reduces its carrying capacity.
It's the user's responsibility to determine, case by case, whether the product is suitable for the intended use.



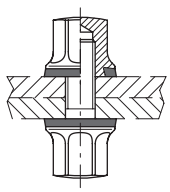
Code	Description	D	d	d1	l	l1	l2	f	s1	s2	Static load [N]	⚖
406231	LMHD.F-100-SST-M16x175	100	M16	28	175	19	35	69	18	22	30000	183
406236	LMHD.F-100-SST-M16x225	100	M16	28	225	19	35	69	18	22	30000	183
406241	LMHD.F-100-SST-M20x185	100	M20	32	185	24	35	69	24	27	47000	220
406246	LMHD.F-100-SST-M20x235	100	M20	32	235	24	35	69	24	27	47000	220
406251	LMHD.F-100-SST-M24x185	100	M24	36	185	29	35	69	24	30	67000	252
406256	LMHD.F-100-SST-M24x235	100	M24	36	235	29	35	69	24	30	67000	252
406261	LMHD.F-120-SST-M16x175	120	M16	28	175	19	35	89	18	22	30000	183
406266	LMHD.F-120-SST-M16x225	120	M16	28	225	19	35	89	18	22	30000	183
406271	LMHD.F-120-SST-M20x185	120	M20	32	185	24	35	89	24	27	47000	220
406276	LMHD.F-120-SST-M20x235	120	M20	32	235	24	35	89	24	27	47000	220
406281	LMHD.F-120-SST-M24x185	120	M24	36	185	29	35	89	24	30	67000	252
406286	LMHD.F-120-SST-M24x235	120	M24	36	235	29	35	89	24	30	67000	252

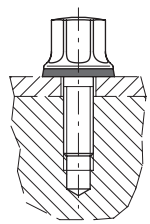
MATERIAL
AISI 316L stainless steel.

PACKING SEAL
H-NBR synthetic rubber hardness 85 +/-5 Shore A, blue colour, in compliance with FDA.

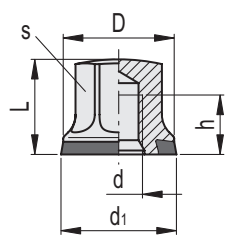
STANDARD EXECUTIONS
- **NTHD-SST-MT**: threaded blind hole, matte finish.
- **NTHD-SST-PL**: threaded blind hole, mirror polished finish (RA < O,8µ).
- **NTHD-SST-p-MT**: threaded screw, matte finish.
- **NTHD-SST-p-PL**: threaded screw, mirror polished finish (RA < O,8µ).

FEATURES AND APPLICATIONS
NTHD-SST screws and nuts are accessories for mounting the levelling elements used in environments where high hygiene is required.
The special packing seal prevents access of dirt from the outside environment.
The finish quality, as well as the large angular rays and the absence of recesses, prevents dirt adherence and makes it easy to clean.





NTHD-SST-MT
NTHD-SST-PL



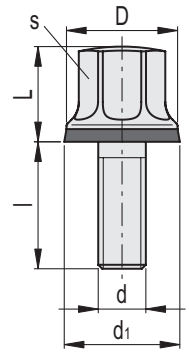
NTHD-SST-MT

Code	Description	D	d	d1	L	h	s
321101	NTHD-SST-M5-MT	12	M5	12.8	10	6	8
321111	NTHD-SST-M6-MT	14	M6	14.8	12	7.5	10
321121	NTHD-SST-M8-MT	18	M8	18.8	14.5	9.5	13
321131	NTHD-SST-M10-MT	21	M10	21.8	18	12	16

NTHD-SST-PL

Code	Description	D	d	d1	L	h	s
321106	NTHD-SST-M5-PL	12	M5	12.8	10	6	8
321116	NTHD-SST-M6-PL	14	M6	14.8	12	7.5	10
321126	NTHD-SST-M8-PL	18	M8	18.8	14.5	9.5	13
321136	NTHD-SST-M10-PL	21	M10	21.8	18	12	16

NTHD-SST-p-MT
NTHD-SST-p-PL



NTHD-SST-p-MT

INOX STAINLESS STEEL

Code	Description	D	d	d1	L	l	s
321141	NTHD-SST-p-M5x10-MT	12	M5	12.8	10	10	8
321151	NTHD-SST-p-M5x16-MT	12	M5	12.8	10	16	8
321161	NTHD-SST-p-M5x20-MT	12	M5	12.8	10	20	8
321171	NTHD-SST-p-M6x12-MT	14	M6	14.8	12	12	10
321181	NTHD-SST-p-M6x16-MT	14	M6	14.8	12	16	10
321191	NTHD-SST-p-M6x20-MT	14	M6	14.8	12	20	10
321201	NTHD-SST-p-M6x25-MT	14	M6	14.8	12	25	10
321211	NTHD-SST-p-M6x30-MT	14	M6	14.8	12	30	10
321221	NTHD-SST-p-M8x16-MT	18	M8	18.8	14.5	16	13
321231	NTHD-SST-p-M8x20-MT	18	M8	18.8	14.5	20	13
321241	NTHD-SST-p-M8x25-MT	18	M8	18.8	14.5	25	13
321251	NTHD-SST-p-M8x30-MT	18	M8	18.8	14.5	30	13
321261	NTHD-SST-p-M8x40-MT	18	M8	18.8	14.5	40	13
321271	NTHD-SST-p-M10x20-MT	21	M10	21.8	18	20	16
321281	NTHD-SST-p-M10x25-MT	21	M10	21.8	18	25	16
321291	NTHD-SST-p-M10x30-MT	21	M10	21.8	18	30	16
321301	NTHD-SST-p-M10x40-MT	21	M10	21.8	18	40	16
321311	NTHD-SST-p-M10x50-MT	21	M10	21.8	18	50	16

NTHD-SST-p-PL

INOX STAINLESS STEEL

Code	Description	D	d	d1	L	l	s
321146	NTHD-SST-p-M5x10-PL	12	M5	12.8	10	10	8
321156	NTHD-SST-p-M5x16-PL	12	M5	12.8	10	16	8
321166	NTHD-SST-p-M5x20-PL	12	M5	12.8	10	20	8
321176	NTHD-SST-p-M6x12-PL	14	M6	14.8	12	12	10
321186	NTHD-SST-p-M6x16-PL	14	M6	14.8	12	16	10
321196	NTHD-SST-p-M6x20-PL	14	M6	14.8	12	20	10
321206	NTHD-SST-p-M6x25-PL	14	M6	14.8	12	25	10
321216	NTHD-SST-p-M6x30-PL	14	M6	14.8	12	30	10
321226	NTHD-SST-p-M8x16-PL	18	M8	18.8	14.5	16	13
321236	NTHD-SST-p-M8x20-PL	18	M8	18.8	14.5	20	13
321246	NTHD-SST-p-M8x25-PL	18	M8	18.8	14.5	25	13
321256	NTHD-SST-p-M8x30-PL	18	M8	18.8	14.5	30	13
321266	NTHD-SST-p-M8x40-PL	18	M8	18.8	14.5	40	13
321276	NTHD-SST-p-M10x20-PL	21	M10	21.8	18	20	16
321286	NTHD-SST-p-M10x25-PL	21	M10	21.8	18	25	16
321296	NTHD-SST-p-M10x30-PL	21	M10	21.8	18	30	16
321306	NTHD-SST-p-M10x40-PL	21	M10	21.8	18	40	16
321316	NTHD-SST-p-M10x50-PL	21	M10	21.8	18	50	16

ELESA. More and more...

ELESA (UK) LTD
26 Moorlands Estate
Metheringham
Lincolnshire LN4 3HX
phone +44 (0) 1526 322670
fax +44 (0) 1526 322669
sales@elesa.co.uk

elesa.com

Printed in Italy
ZDEPLEVELHDENG17UK

MIX
Paper from responsible sources
FSC® C003498
FSC
www.fsc.org