KEG SPEARS

Spear Length Guide

H3, bottom clearance and what a wrong length does inside the keg

All systems

Type A · G · M · S · D

With length table for DIN, Euro and Slim kegs



Zhejiang Aobaosi Intelligent Manufacturing Co., Ltd.
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CHAPTER 1

1. The right length

H3, total length, length to the seal and bottom clearance.

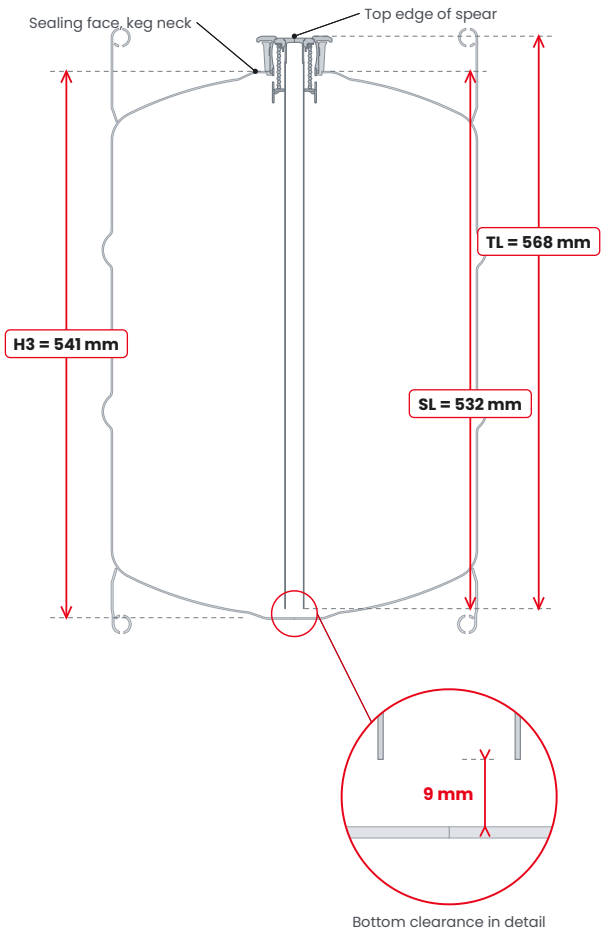
The down tube of the spear has to end just above the bottom of the keg. Only then does cleaning reach the whole keg, and only then is just a small remnant left when the keg is dispensed. Every spear length is based on the H3 dimension of the keg.

H3 **H3 dimension**
Inside height from the sealing face in the keg neck down to the bottom of the keg.

TL **Total length TL**
Overall length, from the top edge of the spear to the end of the tube. Spears are ordered by this length.

SL **Length to the seal SL**
From the sealing edge of the spear to the end of the tube.

BA **Bottom clearance**
Distance between the end of the tube and the keg bottom with the spear closed. It is fixed for each system.



DIN keg 50 l with type A spear in section. Contours of keg, neck, spear and down tube from the CAD data.

HOW TO CALCULATE

TL = H3 + system allowance

SL = H3 - bottom clearance

Example DIN keg 50 l with H3 541 mm and type A spear: TL = 541 + 27 = 568 mm · SL = 541 - 9 = 532 mm

CHAPTER 2

2. The systems at a glance

Allowance and bottom clearance for each valve system.

Allowance and bottom clearance depend on the valve system. Anyone who transfers the length of an existing spear to another system can easily be several millimetres out.

	SYSTEM	ARTICLE	TL ALLOWANCE	BOTTOM CLEARANCE	TUBE MOVES WHEN OPENED
	**A** Flat spear	JM-AX-02	+27 mm	**9 mm**	no
	**G** Triangular spear	JM-GX-02	+27 mm	**9 mm**	no
	**M** Combi spear	JM-MX-02	+21 mm	**15 mm**	yes
	**S** Sankey spear (EU Sankey)	JM-SX-02	+15 mm	**14 mm**	yes
	**D** Draft (US Sankey)	JM-D2-01	+15 mm	**14 mm**	yes

NOTE

With S, D and M the down tube is movable by design. When the coupler, filling head or cleaning head opens the valves, the tube moves down by the valve stroke. That is why the bottom clearance is larger than with A and G.

What “too long” and “too short” mean in this guide

SYSTEM	TOO LONG	CORRECT	TOO SHORT
A · G	3 mm	**9 mm**	15 mm
S · D	8 mm	**14 mm**	20 mm
M	9 mm	**15 mm**	21 mm

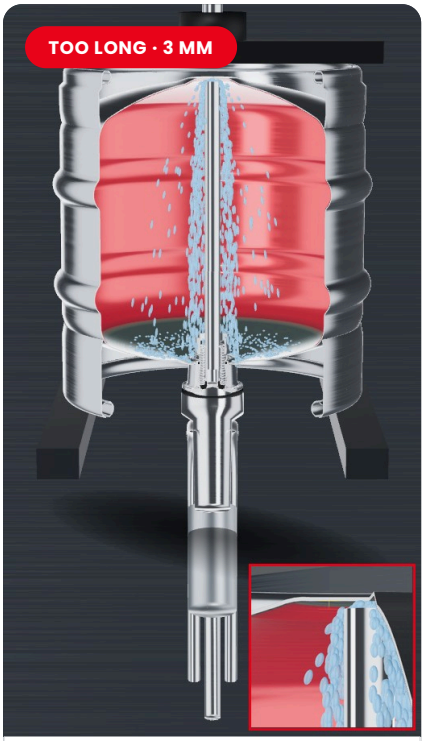
The examples on the following pages show a down tube that is 6 mm too long or 6 mm too short. Each figure is the distance between the end of the tube and the keg bottom with the spear closed.

CHAPTER 3

3. Cleaning

What the length of the down tube does in the keg washer.

During cleaning the keg is upside down. The media are shot through the down tube against the keg bottom, spread out there and run down the whole inner wall as a film. Whether this works depends on the gap between the end of the tube and the keg bottom.



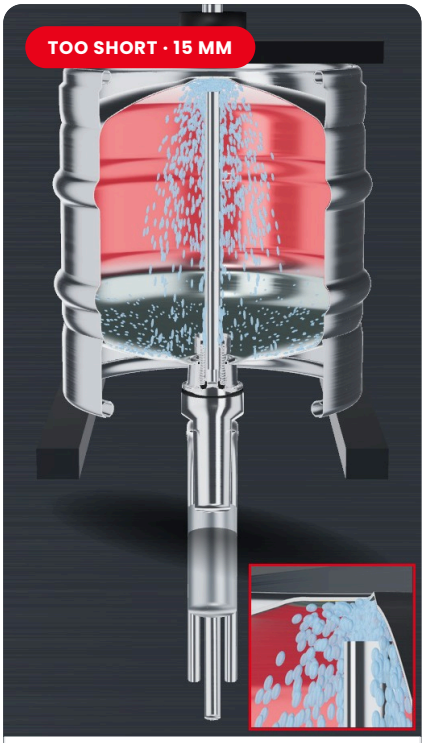
Wash shadow

The gap to the keg bottom is too narrow. The jet cannot spread and falls back in the middle. Shoulder and wall stay in the wash shadow.



Fully cleaned

The high-pressure jet hits the keg bottom, spreads out and runs down the whole wall as a film. At low pressure the medium runs down the outside of the down tube.



Wash shadow

The jet breaks up on its long way to the keg bottom and falls back in the middle instead of reaching the walls.

Shown: DIN keg 30 l with type A flat spear, pre-rinse at high pressure. Areas marked red were not reached by the cleaning film. The magnifier shows the gap at the keg bottom. Geometry from the CAD data, flow shown schematically.

CHAPTER 4

4. Dispensing

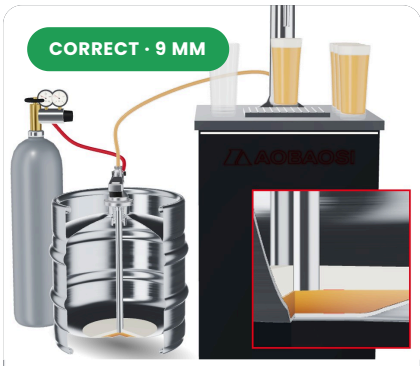
What the length of the down tube does when the beer is served.

When dispensing, CO_2 pushes the beer up through the down tube. The end of the tube decides how far the keg can be emptied and how smoothly the beer flows.



Foam

The beer has to pass through a very narrow gap. The flow becomes fast and uneven and the beer foams. Often only foam comes out, or nothing at all.



Empty except for the puddle

The beer is drawn off down to the end of the tube. Only the puddle in the keg bottom remains.



Beer left behind

The tube ends too high. Considerably more beer stays below the end of the tube in every keg.

Beer left per keg with a down tube 6 mm too short

KEG	SYSTEM	LEFT, CORRECT	LEFT, TOO SHORT	MORE PER KEG	PER 1,000 KEGS
DIN keg 30 l	A · G	62 ml	197 ml	**+135 ml**	**135 l**
DIN keg 30 l	S · D	169 ml	376 ml	**+207 ml**	**207 l**
DIN keg 30 l	M	197 ml	419 ml	**+222 ml**	**222 l**
DIN keg 50 l	A · G	59 ml	184 ml	**+125 ml**	**125 l**
DIN keg 50 l	S · D	157 ml	348 ml	**+191 ml**	**191 l**
DIN keg 50 l	M	184 ml	388 ml	**+204 ml**	**204 l**

Remaining volume = volume below the end of the tube, calculated from the CAD inner contour of the kegs (check: 30.0 l and 50.0 l total volume). Without wall film and foam. How much a tube that is too long costs through foaming depends on pressure, temperature and the line; there is no fixed figure for it.

CHAPTER 5

5. S, D and M: the tube moves

Why a spear that is too long presses on the keg bottom with these systems.

With the S, D and M systems the down tube is movable by design. As soon as the spear is opened, it moves down by the valve stroke.

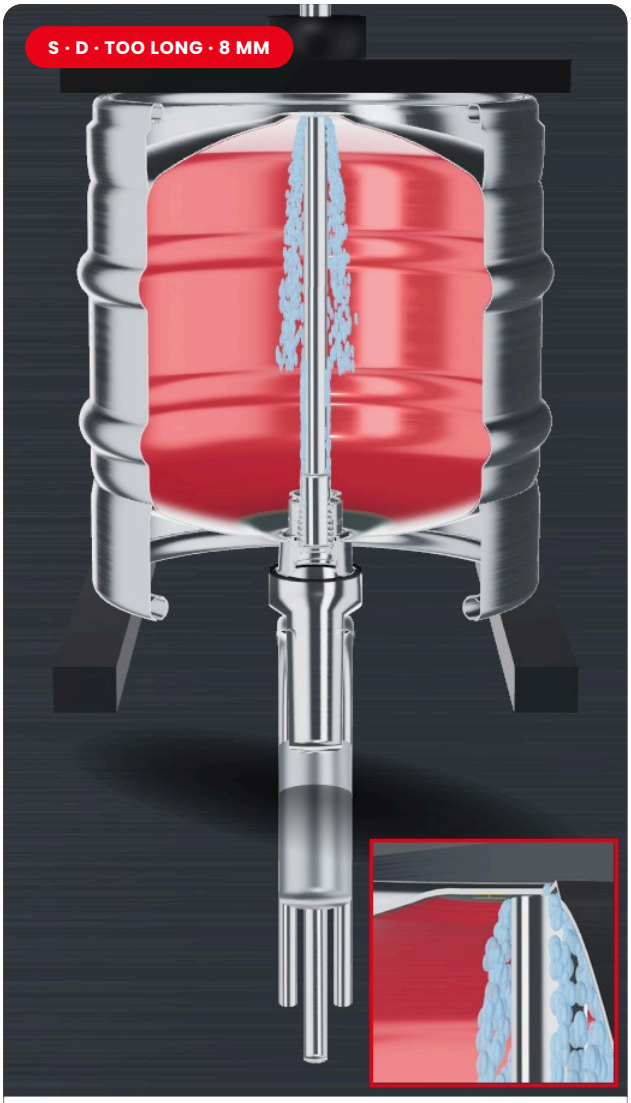
This happens at the coupler just as at the cleaning and filling head in the brewery, so with every filling of the keg. During cleaning it is around 7 mm. That is why the set bottom clearance is larger with these systems than with A and G: 14 mm for S and D, 15 mm for M.

CAUTION

If the spear is clearly too long, the end of the tube touches down on the keg bottom when the spear opens and is pressed against it.

- Pressure marks and scoring in the keg bottom. Deposits and microorganisms adhere there more easily, and cleaning reaches them less well.
- Mechanical damage to the keg bottom itself.
- Burrs and sharp edges at the end of the spear tube.

We have seen such marks on keg bottoms very clearly. So order the spear length according to the measured inside height H3 and with the bottom clearance of the system concerned.



Type S Sankey spear, 6 mm too long, during cleaning: the opened spear lowers the down tube and the gap to the keg bottom almost closes. The magnifier shows the end of the tube.

CHAPTER 6

6. Our spear lengths

Standard lengths of types A and S and a length table for all systems.

Standard lengths, types A and S

A Flat spear · Bottom clearance 9 mm

TL	SL	H3	FITS
323	287	296	DIN keg 25 l, Euro keg 30 l
368	332	341	DIN keg 30 l
531	495	504	Slim keg 20 l
535	499	508	Slim keg 20 l
568	532	541	DIN keg 50 l

S Sankey spear (EU Sankey) · Bottom clearance 14 mm

TL	SL	H3	FITS
311	282	296	DIN keg 25 l, Euro keg 30 l
356	327	341	DIN keg 30 l
519	490	504	Slim keg 20 l
523	494	508	Slim keg 20 l
556	527	541	DIN keg 50 l

Types D, G and M and special lengths are available on request.

Length table for common kegs (mm)

KEG	H3 (MM)	A · G TL / SL	S · D TL / SL	M TL / SL
DIN keg 15 l	196	**223** / 187	**211** / 182	**217** / 181
DIN keg 20 l	246	**273** / 237	**261** / 232	**267** / 231
DIN keg 25 l	296	**323** / 287	**311** / 282	**317** / 281
DIN keg 30 l	341	**368** / 332	**356** / 327	**362** / 326
DIN keg 50 l	541	**568** / 532	**556** / 527	**562** / 526
Euro keg 16 l	193	**220** / 184	**208** / 179	**214** / 178
Euro keg 20 l	213	**240** / 204	**228** / 199	**234** / 198
Euro keg 25 l	256	**283** / 247	**271** / 242	**277** / 241
Euro keg 30 l	296	**323** / 287	**311** / 282	**317** / 281
Euro keg 50 l	461	**488** / 452	**476** / 447	**482** / 446
Slim keg 20 l	501	**528** / 492	**516** / 487	**522** / 486
Slim keg 20 l	504	**531** / 495	**519** / 490	**525** / 489
Slim keg 20 l	508	**535** / 499	**523** / 494	**529** / 493

Bold: total length TL, which is used for ordering. Followed by the length to the seal SL. H3 values for DIN and Euro kegs according to catalogue data of a European manufacturer. Depending on manufacturer and year of manufacture they can differ by a few millimetres.

CHAPTER 7

7. Measuring H3 and ordering

Four steps to the right spear length.

The tables apply to kegs with the H3 values listed. For kegs of unknown origin, or when every millimetre counts, it is best to measure H3 yourself.

1 **Prepare the keg**
Remove the spear. The keg must be empty and stand upright.

2 **Measure H3**
Measure with a measuring rod through the neck down to the keg bottom, starting from the sealing face of the neck.

3 **Identify the system**
A, G, M, S or D. The system gives the allowance and the bottom clearance.

4 **Calculate the length and order**
TL = H3 + allowance. Spears are ordered by the total length TL.

NOTE

H3 values vary by a few millimetres depending on manufacturer and year of manufacture. With mixed keg fleets, measure several kegs.

Calculate the spear length online

The calculator on our website works out the total length and the length to the seal for DIN, Euro and Slim kegs, or for your own dimension.

aobaosi.tech/en/spear-length-calculator.html

Special lengths and special versions

With our own drop forge at the plant, we also make spears to your specification, for example in special lengths or with a short thread. All from a single source.

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Keg necks · Keg spears · Keg couplers

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