

Integrated

Series 23

BUTTWELD FITTINGS
SIZES 1/2" TO 10"

Process Solutions

WWW.MKSINST.COM



MKS Series 23 is a family of buttweld vacuum fittings manufactured by MKS Instruments, Inc. They are designed to be used in conjunction with the full line of ISO-Universal, ISO-KF and CF UHV flanges, and are easily welded to the flanges or each other during on-site installation. All components are made of type 304 stainless steel and are specifically prepared for use in high vacuum process or UHV applications.

Applications

Vacuum buttweld fittings are designed to be used in any vacuum applications where minimizing the number of sealed joints is critical.

- Semiconductor wafer fabrication areas for remote installations and below a raised floor
- Permanent house vacuum lines
- Vacuum utility lines for vacuum fixtures
- High temperature lines
- Burn box exhaust lines

Component Construction

The Series 23 components are constructed of 304 or 304L welded, drawn, and annealed stainless steel tubing. (316L is available on request.) For most vacuum process applications, this provides the best combination of the following critical features:

- Low outgassing under vacuum
- Chemically resistant
- Annealed for consistent leak free welding
- Minimized corrosion concentration points
- Good availability
- Cost consistent with the above requirements

Each component is fabricated using pulled port and 100% penetration TIG weld techniques. All welded components are leak free, carefully cleaned for high vacuum use and then packaged to remain clean until the time of installation.

Installation

Series 23 fittings are designed to be welded using techniques preferred for vacuum applications. These techniques include internal (socket type) welding and external buttwelding. The most commonly used type of weld for high vacuum applications is a TIG (Tungsten Inert Gas) fusion weld, preferably without filler rod. For the best results, remove components from packaging in clean conditions during installation. Handle the components with clean gloves and equipment in the absence of any fibers,

fingerprint oils, or other greases. If these precautions are taken, the weld is more likely to be leak free and the integrity of the vacuum surface will remain intact and ready for use.

General hints for good vacuum welds include:

1. Always start with clean and properly weld prepped components.
2. For internal welds, minimize warping by using only enough heat for 60-75% penetration.
3. For external buttwelds, make sure they are 100% penetration with no internal cracks or crevices.
4. Do not weld internally then externally around the entire circumference of the fittings.
5. Make sure there is little or no gap between pieces to be welded.
6. Ensure that all surfaces affected by the heat of the weld, especially the vacuum side, are purged properly with inert gas.

For more details on TIG and other vacuum joining methods, contact MKS in Boulder, CO.

CAD Drawings

CAD drawings for the Series 23 buttweld line can be downloaded from our website at: <https://www.mksinst.com/product/category.aspx?CategoryID=157>. From there, select the appropriate fitting and click to download the file. The drawings are available in *.DWG format and *.DXF format.

Ordering Information

To obtain delivery, technical, or applications information, contact MKS at (800) 345-1967 (US only) or (303) 449-9861. Or visit our website at www.mksinst.com.



Ordering Information

90° Elbow				in.
OD	Wall Thickness	A	Part Number	
0.50	.065	0.75	1002390050	
0.75	.065	1.13	1002390075	
1.00	.065	1.52	1002390100	
1.50	.065	2.25	1002390150	
2.00	.065	3.00	1002390200	
2.50	.065	3.75	1002390250	
3.00	.065	4.50	1002390300	
4.00	.065	6.00	1002390401	
4.00	.083	6.00	1002390400	
6.00	.083	9.00	1002390600	

45° Elbow				in.
OD	Wall Thickness	A	Part Number	
0.50	.065	0.31	1002345050	
0.75	.065	0.47	1002345075	
1.00	.065	0.62	1002345100	
1.50	.065	0.93	1002345150	
2.00	.065	1.24	1002345200	
2.50	.065	1.56	1002345250	
3.00	.065	1.86	1002345300	
4.00	.065	2.49	1002345401	
4.00	.083	2.49	1002345400	
6.00	.083	3.75	1002345600	

90° Elbow with Tangents					in.
OD	Wall Thickness	A	B	Part Number	
0.75	.065	1.42	0.29	1002390WT075	
1.00	.065	2.06	0.56	1002390WT100	
1.50	.065	2.94	0.69	1002390WT150	
2.00	.065	4.06	1.06	1002390WT200	
2.50	.065	5.19	1.44	1002390WT250	
3.00	.065	6.31	1.81	1002390WT300	
4.00	.065	8.31	2.31	1002390WT401	
4.00	.083	8.31	2.31	1002390WT400	
6.00	.083	12.60	3.60*	1002390WT600	

45° Elbow with Tangents					in.
OD	Wall Thickness	A	B	Part Number	
0.75	.065	0.76	0.30	1002345WT075	
1.00	.065	1.19	0.56	1002345WT100	
1.50	.065	1.63	0.69	1002345WT150	
2.00	.065	2.31	1.07	1002345WT200	
2.50	.065	3.00	1.44	1002345WT250	
3.00	.065	3.69	1.82	1002345WT300	
4.00	.065	4.81	2.33	1002345WT401	
4.00	.083	4.81	2.33	1002345WT400	
6.00	.083	7.33	3.60	1002345WT600	

Add "MP" to the part number for mechanically polished fittings, e.g., 1002345WT100MP.
 All elbows have an industry standard radius of 1.5 times the OD.
 *Tangents are welded on.



4-Way Cross				in.
	OD	Wall Thickness	A	Part Number
	0.50	.065	0.75	100234X050
	0.75	.065	1.88	100234X075
	1.00	.065	1.88	100234X100
	1.50	.065	2.25	100234X150
	2.00	.065	3.00	100234X200
	2.50	.065	3.00	100234X250
	3.00	.065	3.25	100234X300
	4.00	.065	3.88	100234X400
	6.00	.083	5.00	100234X600

Tee				in.
	OD	Wall Thickness	A	Part Number
	0.50	.065	0.75	10023T050
	0.75	.065	1.88	10023T075
	1.00	.065	1.88	10023T100
	1.50	.065	2.25	10023T150
	2.00	.065	3.00	10023T200
	2.50	.065	3.00	10023T250
	3.00	.065	3.25	10023T300
	4.00	.065	3.88	10023T400
	6.00	.083	5.00	10023T600

Reducing Tee					in.	
	OD	Wall Thickness		A	B	Part Number
		W1	W2			
	1.00 x 0.50	.065	.065	1.88	1.00	10023100RT050
	1.00 x 0.75	.065	.065	1.88	2.00	10023100RT075
	1.50 x 0.50	.065	.065	2.25	1.25	10023150RT050
	1.50 x 0.75	.065	.065	2.25	2.25	10023150RT075
	1.50 x 1.00	.065	.065	2.25	2.25	10023150RT100
	2.00 x 0.50	.065	.065	3.00	1.50	10023200RT050
	2.00 x 0.75	.065	.065	3.00	2.50	10023200RT075
	2.00 x 1.00	.065	.065	3.00	2.50	10023200RT100
	2.00 x 1.50	.065	.065	3.00	2.50	10023200RT150
	2.50 x 0.75	.065	.065	3.00	2.75	10023250RT075
	2.50 x 1.50	.065	.065	3.00	2.75	10023250RT150
	2.50 x 2.00	.065	.065	3.00	3.25	10023250RT200
	3.00 x 0.75	.065	.065	3.25	3.00	10023300RT075
	3.00 x 1.50	.065	.065	3.25	3.00	10023300RT150
	3.00 x 2.00	.065	.065	3.25	3.50	10023300RT200
	3.00 x 2.50	.065	.065	3.25	3.25	10023300RT250
	4.00 x 0.75	.065	.065	3.88	3.50	10023400RT075
	4.00 x 1.50	.065	.065	3.88	3.50	10023400RT150
4.00 x 2.00	.065	.065	3.88	3.50	10023400RT200	
6.00 x 0.75	.083	.065	5.00	4.50	10023600RT075	
6.00 x 1.50	.083	.065	5.00	4.50	10023600RT150	
6.00 x 4.00	.083	.083	5.00	4.88	10023600RT400	



Ordering Information

Concentric Reducer				in.
	OD	Wall Thickness	A	Part Number
	1.00 x 0.75	.065	1.37	10023100CR075
	1.50 x 0.75	.065	2.38	10023150CR075
	1.50 x 1.00	.065	2.38	10023150CR100
	2.00 x 1.00	.065	2.38	10023200CR100
	2.00 x 1.50	.065	2.38	10023200CR150
	2.50 x 1.50	.065	2.38	10023250CR150
	2.50 x 2.00	.065	2.38	10023250CR200
	3.00 x 1.50	.065	3.63	10023300CR150
	3.00 x 2.00	.065	3.63	10023300CR200
	3.00 x 2.50	.065	3.63	10023300CR250
	4.00 x 2.00	.065	3.63	10023400CR200
	4.00 x 2.50	.065	3.63	10023400CR250
	4.00 x 3.00	.065	3.63	10023400CR300
	6.00 x 3.00	.065	9.00	10023600CR300
6.00 x 4.00	.083	9.00	10023600CR400	

End Cap				in.
	OD	Wall Thickness	A	Part Number
	0.50	.065	0.25	10023C050
	0.75	.065	0.31	10023C075
	1.00	.065	0.38	10023C100
	1.50	.065	0.50	10023C150
	2.00	.065	0.75	10023C200
	2.50	.065	1.00	10023C250
	3.00	.065	1.25	10023C300
	4.00	.065	1.50	10023C400

Tubing			in.
	OD	Wall Thickness	Part Number
	0.50	.065	100314300
	0.75	.065	100314301
	1.00	.065	100314303
	1.50	.065	100314305
	2.00	.065	100314306
	2.50	.065	100764506
	3.00	.065	100764508
	4.00	.065	100764510
	4.00	.083	100764511
	6.00	.083	100764516
	8.00	.120	100764520
10.00	.125	100764525	

*Price per 10 foot length of tube



Numerical Listing

10023100CR075	Concentric Reducer	1.0 x .75	10023300RT075	Reducing Tee	3.0 x 0.75
10023100RT050	Reducing Tee	1.0 x 0.50	10023300RT100	Reducing Tee	3.0 x 1.00
10023100RT075	Reducing Tee	1.0 x 0.75	10023300RT150	Reducing Tee	3.0 x 1.50
10023150CR075	Concentric Reducer	1.5 x .75	10023300RT200	Reducing Tee	3.0 x 2.00
10023150CR100	Concentric Reducer	1.5 x 1.0	10023300RT250	Reducing Tee	3.0 x 2.50
10023150RT050	Reducing	1.5 x 0.50	10023400CR200	Concentric Reducer	4.0 x 2.0
10023150RT075	Reducing	1.5 x 0.75	10023400CR250	Concentric Reducer	4.0 x 2.5
10023150RT100	Reducing	1.5 x 1.00	10023400CR300	Concentric Reducer	4.0 x 3.0
10023200CR100	Concentric Reducer	2.0 x 1.0	10023400RT075	Reducing Tee	4.0 x 0.75
10023200CR150	Concentric Reducer	2.0 x 1.5	10023400RT100	Reducing Tee	4.0 x 1.00
10023200RT050	Reducing Tee	2.0 x 0.50	10023400RT150	Reducing Tee	4.0 x 1.50
10023200RT075	Reducing Tee	2.0 x 0.75	10023400RT200	Reducing Tee	4.0 x 2.0
10023200RT100	Reducing Tee	2.0 x 1.00	1002345050	45° Elbow	0.50"
10023200RT150	Reducing Tee	2.0 x 1.50	1002345075	45° Elbow	0.75"
10023250CR150	Concentric Reducer	2.5 x 1.5	1002345100	45° Elbow	1.00"
10023250CR200	Concentric Reducer	2.5 x 2.0	1002345150	45° Elbow	1.50"
10023250RT075	Reducing Tee	2.5 x 0.75	1002345200	45° Elbow	2.00"
10023250RT150	Reducing Tee	2.5 x 1.50	1002345250	45° Elbow	2.50"
10023250RT200	Reducing Tee	2.5 x 2.00	1002345300	45° Elbow	3.00"
10023300CR150	Concentric Reducer	3.0 x 1.5	1002345400	45° Elbow	4.00"
10023300CR200	Concentric Reducer	3.0 x 2.0	1002345401	45° Elbow	4.00"
10023300CR250	Concentric Reducer	3.0 x 2.5	1002345600	45° Elbow	6.00"



Numerical Listing

1002345WT075	45° Elbow w/ Tangents	0.75"	1002390WT075	90° Elbow w/ Tangents	0.75"
1002345WT100	45° Elbow w/ Tangents	1.00"	1002390WT100	90° Elbow w/ Tangents	1.00"
1002345WT150	45° Elbow w/ Tangents	1.50"	1002390WT150	90° Elbow w/ Tangents	1.50"
1002345WT200	45° Elbow w/ Tangents	2.00"	1002390WT200	90° Elbow w/ Tangents	2.00"
1002345WT250	45° Elbow w/ Tangents	2.50"	1002390WT250	90° Elbow w/ Tangents	2.50"
1002345WT300	45° Elbow w/ Tangents	3.00"	1002390WT300	90° Elbow w/ Tangents	3.00"
1002345WT400	45° Elbow w/ Tangents	4.00"	1002390WT400	90° Elbow w/ Tangents	4.00"
1002345WT401	45° Elbow w/ Tangents	4.00"	1002390WT401	90° Elbow w/ Tangents	4.00"
1002345WT600	45° Elbow w/ Tangents	6.00"	1002390WT600	90° Elbow w/ Tangents	6.00"
100234X050	4-Way Cross, Butt weld	0.50"	10023C050	End Cap	0.50"
100234X075	4-Way Cross, Butt weld	0.75"	10023C075	End Cap	0.75"
100234X100	4-Way Cross, Butt weld	1.00"	10023C100	End Cap	1.00"
100234X150	4-Way Cross, Butt weld	1.50"	10023C150	End Cap	1.50"
100234X200	4-Way Cross, Butt weld	2.00"	10023C200	End Cap	2.00"
100234X250	4-Way Cross, Butt weld	2.50"	10023C250	End Cap	2.50"
100234X300	4-Way Cross, Butt weld	3.00"	10023C300	End Cap	3.00"
100234X400	4-Way Cross, Butt weld	4.00"	10023C400	End Cap	4.00"
100234X600	4-Way Cross, Butt weld	6.00"			
10023600CR300	Concentric Reducer	6.0 x 3.0	10023T050	Tee	0.50"
10023600CR400	Concentric Reducer	6.0 x 4.0	10023T075	Tee	0.75"
			10023T100	Tee	1.00"
			10023T150	Tee	1.50"
10023600RT075	Reducing Tee	6.0 x 0.75	10023T200	Tee	2.00"
10023600RT150	Reducing Tee Reducing	6.0 x 1.50	10023T250	Tee	2.50"
10023600RT400	Tee	6.0 x 4.00	10023T300	Tee	3.00"
			10023T400	Tee	4.00"
			10023T600	Tee	6.00"
1002390050	90° Elbow	0.50"	100314300	Tubing/per 10 foot	0.50"
1002390075	90° Elbow	0.75"	100314301	Tubing/per 10 foot	0.75"
1002390100	90° Elbow	1.00"	100314303	Tubing/per 10 foot	1.00"
1002390150	90° Elbow	1.50"	100314305	Tubing/per 10 foot	1.50"
1002390200	90° Elbow	2.00"	100314306	Tubing/per 10 foot	2.00"
1002390250	90° Elbow	2.50"	100764506	Tubing/per 10 foot	2.50"
1002390300	90° Elbow	3.00"	100764508	Tubing/per 10 foot	3.00"
1002390400	90° Elbow	4.00"	100764510	Tubing/per 10 foot	4.00"
1002390401	90° Elbow	4.00"	100764511	Tubing/per 10 foot	4.00"
1002390600	90° Elbow	6.00"	100764516	Tubing/per 10 foot	6.00"
			100764520	Tubing/per 10 foot	8.00"
			100764525	Tubing/per 10 foot	10.00"



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