World Best Metal Bellows

KSM

KSM Corporation

Ferrotec GmbH, Seerosenstrasse 1, 72669 Unterensingen

World Best Welded Metal Bellows

KSM Corporation has successfully developed manufacturing of welded metal bellows, a field that was designated as a critical development area by South Korea's Department of Science and Technology, and has localized the production of this key commodity which previously was entirely dependent on foreign imports.
KSM Corporation has expanded its expertise and reputation to become a world leader in welded metal bellows, obtaining top level quality certifications in numerous industries, and becoming a key strategic OEM supplier to major semiconductor tool manufacturers around the world.

We, at KSM Corporation, will always set customer satisfaction as our #1 priority, with the latest in technological developments, and outstanding reliability and quality of our products. KSM Corporation will continue to lead the way into the future as the world's best welded metal bellows manufacturer.

KSM HISTORY

1979. 02	Founded KSM, Started Mechanical Seal business
1983. 10	Built a Factory in Gimpo
1986. 12	Q-Class Ⅱ certificate from KEPCO
1990. 01	Established Joint-venture with Durametallic USA
1999. 05	ISO 9001 Certificate
2000. 02	Established KSM USA Office
2001. 08	AMAT "Preferred Supplier", Novellus/ Brooks Automation/ Varian Certificates
2002. 08	Built new Factory in Songmari (latest building)
2004. 05	Established KSM Component
2007. 06	Established KSM Japan Co., Ltd
2008. 09	AS9100 & TS16949 Certificate

KSM 2nd Factory

KSM 3rd Factory

KSM Bellows Advantage

KSM Bellows Advantage On-line manufacturing system control Bellows design considering desired life, operating conditions, temperature, corrosion, pressure, and size restrictions.
Proprietary engineering program based on extensive experience and knowledge.
Abundant manufacturing capacity for mass production items with short lead times.

" The manufacturing system implemented at KSM is highly productive and lean, allowing us to provide outstanding quality, cost, and delivery to our valued customers "

KSM Welded Metal Bellows are used in the following diverse fields.

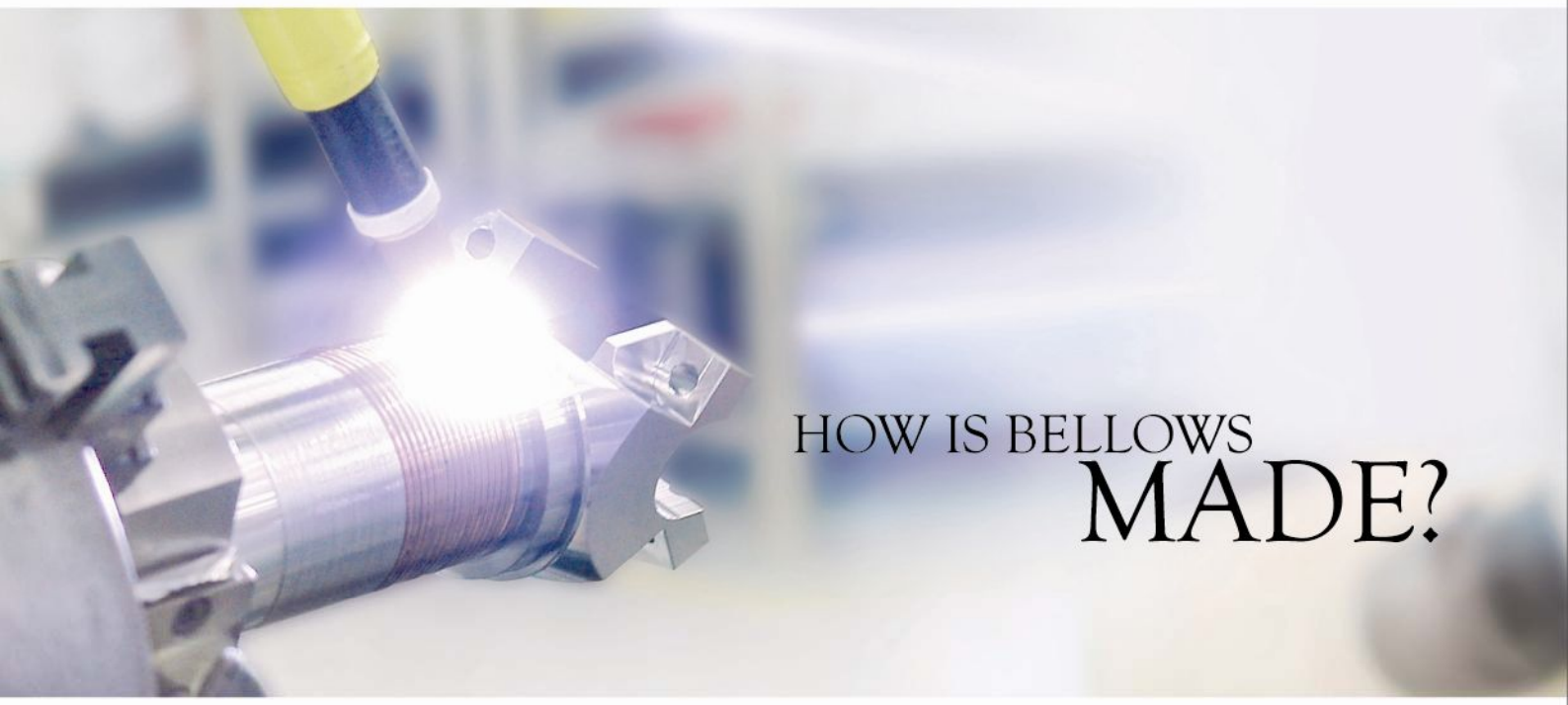
- Semiconductor Tools
- FPD Manufacturing Tools
- Aerospace
- Automotive
- UHV Components
- Vacuum valves
- Medical
- Armaments
- Rapid Transit Rail systems

TS 16949

AS 9100

ISO 9001

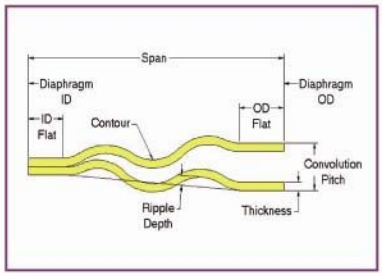
AMAT Quality QFM Certification



1.Technology : Bellows Design

Finite Element Analysis software using proprietary developed models generate S-N curves which allows accurate prediction of expected bellows cycle life.
KSM has developed a design program that leverages the lexicon of knowledge and experience gained by our engineers over the years. This design program allows us to arrive at a reliable design for most applications very quickly.

>> FEA



>> Convolution Geometery

>> Material

Material	Temperature (Celsius)	Feature	Heat Resistance	Strength	Corrosion Resistance
		Austenitic Stainless Steel			
SUS316L	-251~426	Widely common material widely used under relatively high temperatures. The additon of molybdenum increases the resistance to attack by most chemicals	B	B	B+
		Precipitation Stainless Steel			
AM-350	-73~426	High strength and excellent weldability along with corrosion resistance. Two times the strength of 304S.S. or 316S.S	B	A+	B
		Nickel Base Corrosion Resistance Alloys			
Hastelloy C-276	-251~537	Widely used in the severest environment encountered in the chemical process. Good high temperature strength and moderate oxidation resistance.	A	A	A
Inconel 625	-251~815	Excellent resistance to oxidation and corrosion over a broad range of corrosive conditions including chemical process application. High tensile, creep and rupture strength	A	A	A
Haynes 242	-251~698	Resistance to high temperature fluorine and fluoride environments and good oxidation resistance	A	A+	A+

A+: Excellent A: Good B+: Far B: Acceptable C: Poor

2. Manufacturing

KSM boasts the most advanced and largest capacity in the world for welded metal bellows manufacturing.

- In house stamping and die cutting with comprehensive list of existing dies for stamping of bellows diaphragms.
- Fully automated welding machines
  : Reliability and repeatability afforded by fully maintained state of the art equipment yields superior quality and productivity.
- All manufacturing processes from cleaning and welding through final inspection is contained within a class 1000 certified clean room.
- On-line manufacturing system control minimizes operator errors.
- Real-time visibility and communication between operators and management allows for utmost in productivity.

>> Material

>> Press

>> Cleaning

<< ID Welding

<< OD Welding

<< He Leak test

End Flange Welding → Final inspection → Shipping

3. Quality Assurance

- Detailed design review ⇨Process inspection for every manufacturing step ⇨First article reliability test
- Double leak check
- KSM QA System keeps meticulous track of data from every manufacturing process, and allows for outstanding traceability of all types of parts, from prototypes through mass production, using our data management system

>> Poka-Yoke

>> Inspection

WHAT IS KSM PRODUCT?

Semiconductor Bellows

KSM has become a trusted strategic partner and a valued supplier (in many cases being a single source vendor) to all of the major semiconductor tool manufacturers in the USand around the world. By being our most critical reviewers ourselves, we are constantly improving our quality and manufacturing systems, while at the same time obtaining customer feedback through periodic audits and visits. Many of our customer's feedback and suggestions for improvement are directly implemented. KSM has thus been recognized as providing the highest quality products in the world.

- Supplies tens of thousands of different custom bellow parts that are used in a wide spectrum of semiconductor processes (CVD, PVD, Implanter, Etch etc).
- Highest quality bellows supplied at competitive prices.
- Mass production capability with rigorous inventory control allows us to meet customer's delivery goals.
- Over the years, KSM has been recognized as an Approved Supplier, a Preferred Supplier, and a Certified Supplier for Applied Materials.

LCD Manufacturing Tools and UHV Large Bellows

Bellows for LCD manufacturing tools and large UHV applications require special consideration for installation and operating orientation. KSM takes into consideration all predictable movements, and worst case conditions that are specific to large size bellows to provide an ideal solution for our customers.

- Testing facilities matched to accurately reflect operating conditions.
- Sizes as large as 500 mm ID diameter.

>> Vacuum Robot Bellows

Vacuum Robot Bellows

OD=Ø500~Ø650, ID=Ø410~v530, Stroke=1100mm~600mm
with High cycle application

Develop pantograph for complementing bellows performance
Improve welding method for large size bellows.

LCD Manufacturing Tool Bellows

Design for squirm and buckling that may occur due to lateral offsets and external vacuum conditions typically seen in this application.

>> LCD Manufacturing Tool Bellows

Valve Bellows

- High temperature
- Pressure variation
- High cycle life

>> Gate Valve Bellows

>> Angle Valve Bellows

>> Valve Bellows

Special Bellows: Rapid Transit Rail Bellows

– Conservator

: Fluid Level Sensing Metal Bellows.

Special Bellows

Aerospace

Fuel control bellows, pressure sensing bellows (evacuated bellows), flexible couplings for aerospace applications are designed and manufactured according to each specific application's requirement.

Medical

Expansion reservoir bellows for CT scanners, and implantable drug delivery bellows.

Automotive

Damper bellows for fuel injection pump

>> Medical Bellows

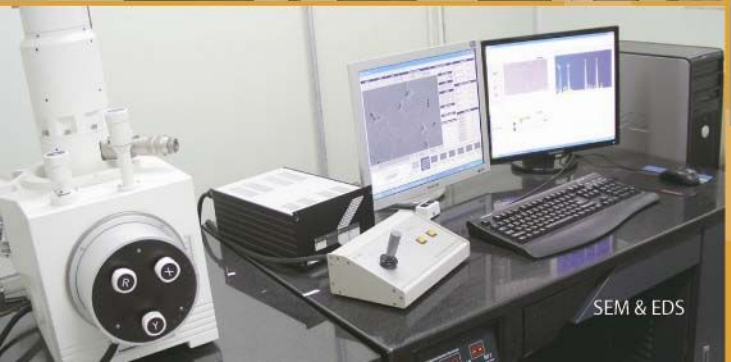
Bellows Sub-Assembly

KSM Component, a subsidiary of KSM Corporation, manufactures bellows related sub-assemblies. Composed of specialists with great technical expertise and experience, KSM Component is able to provide our customers with new product development and refurbishment of heater assemblies, slit valve assemblies, lift assemblies etc.

>> Pin Lift Assembly

>> Pedestal Lift Assembly

>> Spindle Assembly



KSM has obtained AS 9100 and TS 16949 certification to fully support our customers in the aerospace and automotive industries. In addition, KSM's continued research in those fields will ensure the most advanced technological solutions for our customers.

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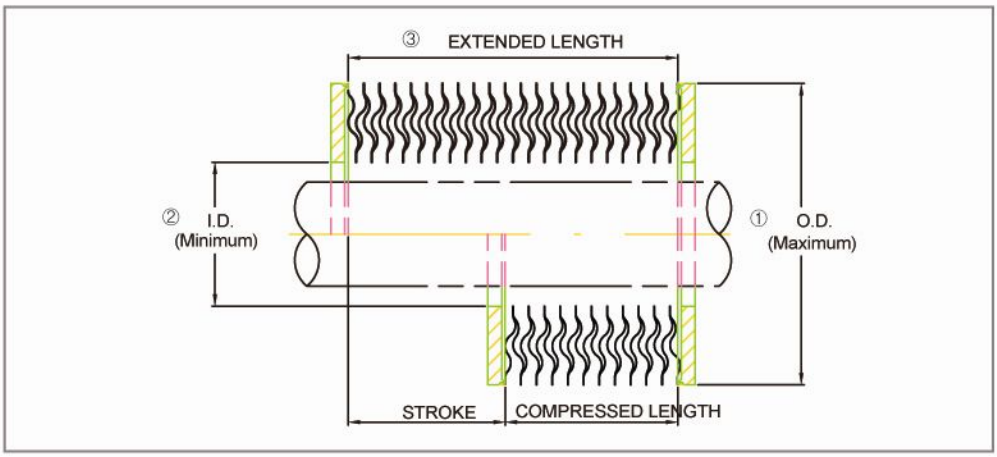
KSM Bellows Design Request



① Bellows Capsule Maximum O.D. : _____ mm

② Bellows Capsule Minimum I.D. : _____ mm

③ Extended Length : _____ mm ④ Compressed Length : _____ mm

⑤ Stroke(EL~CL) : _____ mm ⑥ Install length : _____ mm

⑦ Life Cycle : _____ cycle

⑧ Vacuum Side : Inside _____ kg/cm² , Outside _____ kg/cm²

⑨ Temperature : _____ deg C

⑩ Gas or Fluid : _____

⑪ Leak Rate : _____ STD cc/sec He

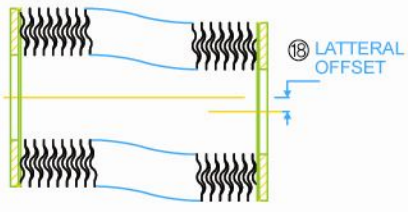
⑫ Bellows Capsule Material : _____

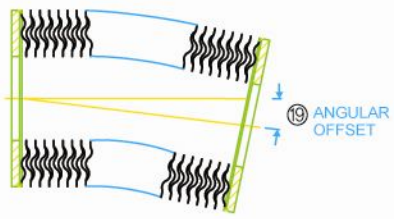
⑬ Flange material : _____ ⑭ Spring rate : _____ /mm

⑮ Shaft size : _____

⑯ Installation : Vertical( ) Horizonal( )

⑰ Process or equipment : _____





⑱ Lateral Offset : _____ mm (or _____ °)

⑲ Angular Offset : _____ mm (or _____ °)

memo

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