

### **SINGLE TYPE EXPANSION JOINT-UN TIED (MSN)**

The simplest form of expansion joint, of single bellows construction, designed to absorb all of the movements of the pipe section in which it is installed.

According to operated pressure of a device, this model is manufactured with or without the shrink ring.



### **SINGLE TYPE EXPANSION JOINT-TIED (MST)**

This model, with the tie-rod assembly, is an improvement on the Single Type Expansion Joint. This model is designed for pipelines with lateral movements.

Tie-rods are designed to sustain the thrust generated during operation.



### **UNIVERSAL TYPE EXPANSION JOINT-UN TIED (MUN)**

A universal expansion joint contains two bellows joined by a intermediate pipe for the purpose of absorbing any combination and angular rotation.

This model is used for pipelines with bigger lateral movements than the single type.



### **UNIVERSAL TYPE EXPANSION JOINT-TIED (MUT)**

This model, with a tie rod assembly, is an improvement on the un-tied universal type. The tie rod absorbs the thrust, which may damage the device.



### HINGE TYPE EXPANSION JOINT (MSH)

A hinged expansion joint contains one bellows and is designed to permit angular rotation, by the use of a pair of pins through hinge plates attached to the expansion joint ends. The hinge arms and hinge pins must be designed hinged expansion joints should be used in sets of two or three to function properly.



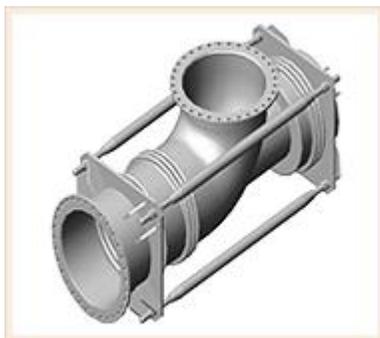
### GIMBAL TYPE EXPANSION JOINT (MSG)

A gimbal expansion joint is designed to absorb combined movements by use of two pairs of gimbal arm and gimbal pin, which restrains the thrust of the expansion joints should be used in sets of two or three to function properly just like hinged expansion joints.



### PRESSURE BALANCED TYPE EXPANSION JOINT (MSB)

If the diameter of the pipe is excessively large or high pressure is running in the pipes, anchors must be installed to restrain the thrust of the expansion joint. However when conditions would not allow the installation of anchors, this pressure balance type expansion joint has to be used. According to the location of installation, L type (MSB-Bent Pipe Balanced) or S type (MSS-Straight Pipe Balanced type) is used.



L Type Pressure Balanced Expansion Joint



S Type Pressure Balanced Expansion Joint

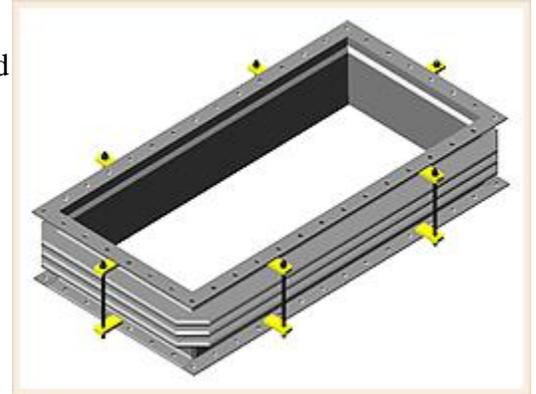


T Type Pressure Balanced Expansion Joint

### RETANGULAR TYPE EXPANSION JOINT (MSQ)

This product is designed to absorb heat expansion around large-scale rectangular line of high temperature and low pressure.

This model is also designed to absorb movements and vibration of the dust collector, the exhaust duct, and the ventilator.



### CORNER TYPE : There are five corner types :



a) Single Miter Corner



b) Round Corner

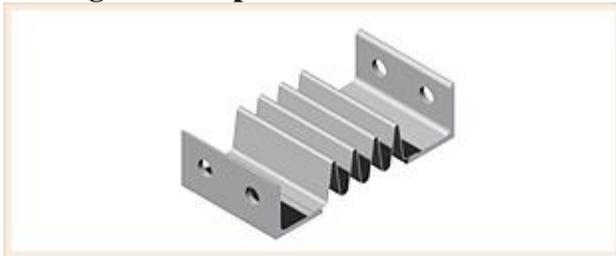


c) Double Miter Corner



d) Camera Corner

### Corrugation Shape :



"V" Profile



"U" Profile

### EXPANSION BELLOWS FOR HEAT EXCHANGER

The expansion bellows for heat exchanger is used to restrain the heat stress, which is generated by temperature difference between the heat exchanger, the bellows prevent the heat stress from reaching the body or the tube.

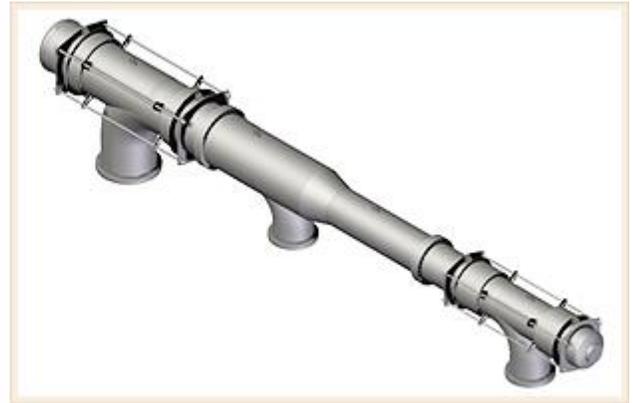


### **CROSSOVER PIPE**

For the purpose of use for transfer the steam from LP Hood where steam turbine system. And it shall have suitable flexibility due to the different thermal movement between Turbine and casing. Also it shall have stability for the steam pressure when operating.

#### **Design Condition**

- Temperature : up to 380°C
- Pressure : 10kg/cm<sup>2</sup>



### **UNDERGROUND TYPE EXPANSION JOINT**

It is built to absorb the land pressures and seismic against the duct breakage because of the ground settlements and the earthquake shocks.



### **CRYOGENIC BELLOWS FOR LNG CARRIERS**

HKR designs & manufactures a wide variety of bellows type expansion joints rating from 3/8" to unlimited size of nominal diameter in accordance with the EJA, ASME, IGC, GTT and special code required from customers. Our products for LNG Carriers are inspected and certified by Llyod's Register, ABS, DNV, BV, KR, GTT.

