



Kenics® Static Mixers

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# Kenics Static Mixer Installation, Operation and Maintenance Manual

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Model:

**Sanitary Static Mixer**

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Unit Serial Number:

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Equipment Number:

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Manual Number:

**806**

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For Service and Information Contact:

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## 1.0 GENERAL

Your Kenics mixer / blender is a rugged piece of process mixing equipment manufactured to demanding design and quality standards. This manual has been provided to assist you in the storage, handling, installation and operation of your mixer / blender and should be reviewed carefully before removing the mixer from the package. Adherence to a very few precautions will assure a highly satisfactory installation and years of trouble free service.

The few difficulties encountered with Kenics mixers / blenders most often result from improper handling, installation, and operating procedures. The following quick check list should assist you in avoiding any difficulties:

1. Mixers / blenders should be operated within process and pressure/temperature limits specified. Consult your local representative or the factory prior to changing operating conditions.
2. Injection of side streams prior to the mixer can be very important to operation of the mixer where large viscosity, density, or volumetric differences exist. Refer to the Operation section of this manual or consult your local representative or the factory for specific recommendations.
3. Sanitary Mixers are equipped with loose, removable internal components as specified on the Equipment Order Drawing.

**Extreme care should be exercised in handling and lifting in order to avoid damage and personal injury.**

For dimensional and construction information refer to the Equipment Order Drawing supplied with you mixer.

## 2.0 INSPECTION AND/OR SHIPPING DAMAGE

Your Kenics mixer / blender was carefully packaged, crated or protected for shipment. However, upon receipt it should be carefully inspected for any shipping damage. Any damage should be reported immediately and a claim filed with the responsible carrier. Your local Chemineer Kenics representative or the factory Customer Order Service Department can assist with claims.



Shipping package contents should be inspected for conformity with your order and for proper unit quantities. Any discrepancies should be reported to the factory Customer Order Service Department within one week of receipt.

### **3.0 PACKAGING**

Your sanitary mixer / blender was sealed in plastic after electro-polishing and / or passivation procedures (depending on the governing standard).

### **4.0 STORAGE AND HANDLING**

All Kenics mixers / blenders should be stored indoors in clean, well ventilated storage areas. Care should be taken to see that excessive loads are not applied to the mixer during storage. Sealing surfaces (thread & flanges) should be protected. The original shipping container is adequate protection for most storage conditions. A rust preventative paint is applied to carbon steel external surfaces prior to shipment. For extended storage in harsh environments additional coating or protection may be required.

Mixers must be handled with appropriate care. Careless handling may result in permanent damage.

### **5.0 FIELD MODIFICATION**

No field modifications (cutting to length, addition of fittings, etc.) to Kenics mixers / blenders should be made without prior consultation with your local representative or the factory. Integrity of the mixing elements can be seriously altered without proper instructions.

### **6.0 INSTALLATION, GENERAL**

The Kenics Sanitary Mixer is designed for numerous applications in the food and pharmaceutical industries. Models have six or twelve highly polished removable elements retained by a groove located on the downstream end of the mixer housing.

Kenics mixers / blenders can be located anywhere in your piping system and may be installed vertically, horizontally, or at any intermediate angle. The mixing action produced by the mixer continues for some distance downstream, and it is desirable to leave considerable distance after the mixer to achieve maximum benefit. Where the mixer is used to achieve uniformity, such as in sampling or prior to a manifold, separation and disengagement of phases can occur. The mixer should be located no more than 1-2 pipe diameters from the desired result.

For full 3A compliance in systems that are cleaned in place (CIP), the groove retention model KMR-SAN should be installed with flow vertically downwards or with the mixer at an



angle greater than 45 degrees to the horizontal. Systems that will be cleaned out of place (COP) may be installed horizontally.

Removable element mixers / blenders should be installed with the retained end of the mixer / blender (retention groove) downstream so that the element assembly is forced onto the retention groove during normal operation. A flow decal on the mixer / blender and on the Equipment Order Drawing supplied with the mixer / blender show proper flow orientation. Vertical or inclined applications must place the retention groove at the bottom end (i.e. downward flow direction).

Before installation, purge process lines to remove foreign material and debris. In most new construction or modifications to process piping, there is a high probability of foreign material within the system, which if not removed, could damage the mixer.

Sanitary Mixers are equipped with Hygienic Clamp compatible ferrules on both ends for quick and easy assembly to your piping system. These ferrules are compatible with numerous other Hygienic Clamp or Hygienic Clamp compatible ferrules and adapters. Service rating of the Sanitary Mixer is governed by the clamp used. Either the #13MHLA or the #13MHHM may be utilized.

Sanitary Hygienic Clamp, or Hygienic Clamp compatible gaskets are shown in various manufacturers' literature. Refer to your local distributor for specific material applications.

Mixer spools and internal mixers / blenders need to be installed with utmost care to reduce the possibility of scratching or deforming the surfaces in any way. Any surface deviations or gouges may disqualify the mixer from 3A® compliance.

## 7.0 MIXER DESIGN

The Kenics static mixer / blender consists of a sanitary, ferruled tube that acts as the mixer's housing and a string of highly polished internal elements to create the mixing mechanism. Standard designs are supplied with either six or twelve mixing elements in an assembly. An "element" is a 180° helicoid and an element assembly consists of alternating right and left hand helicoids. Other quantities of elements are available, however they would be custom built to the specifying engineer's limitations or mixing requirements. Consult your equipment outline drawing for the exact number of elements supplied in your mixer.



## 8.0 SIZING GUIDELINES

Mixer / blender selection and suitability is based on the fluid and hydraulic parameters of the fluid passing through the mixer. The Reynolds Number of the system is used to classify flow through the mixer. The table below lists the minimum number of elements required for a given Reynolds Number range in order to produce a homogeneous mixture at the mixer outlet.

Reynolds Number	Minimum # of Static Mixer Elements
> 5,000	2 – Elements
1,000 – 5,000	4 – Elements
100 – 1,000	6 – Elements
10 – 100	12 – Elements
< 10	18 - Elements

## 9.0 3A COMPLIANCE

The Static mixing elements and housing supplied as components are compliant with 3A® standard 35-04. Fabrication and installation of purchased Kenics 3A® compliant mixers / blenders shall meet all aspects and intent of 3A® standard 35-04. Sections D15.1.5 and D23.4.1.3 of 3A® standard 35-04 shall be abided by. If a set of Kenics 3A® compliant items are purchased and separated, it is the purchaser's responsibility to provide alternative components that are 3A® compliant. Mating components that will attach to purchased Kenics mixers must meet the requirements of 35-04 or be 3A® organization compliant. See section 12: Maintenance for cleaning requirements.

## 10.0 OPERATION

There are a few special operating instructions required with Kenics mixers / blenders. Your Kenics mixer / blender was designed based upon the flow rate specified and the most efficient performance will occur at that flow rate. The mixer, however, will accommodate wide flow variations in most processes.

The limiting factors in the pressure and temperature service of your sanitary static mixer / blender are the clamps used as connections to the remainder of the pipeline. You may consider the clamp rating to be the mixer rating. These ratings should not be exceeded. For service conditions other than the specified ratings consult your local representative or the factory.



## 11.0 MAINTENANCE

Kenics mixers require no routine maintenance other than sealing joint care typical to the rest of the piping system. The element assembly may be removed for periodic cleaning or inspection by disconnecting the adjacent upstream component, which must be as long as the mixer in order to extract the mixing element. Otherwise, both ends of the mixer must be disconnected and the mixer removed from the pipeline. For mixing applications requiring 3A ® compliance, refer to standard 35-04 for further cleaning and inspection details.

Please note the warning below.

**CAUTION**  
**THIS EQUIPMENT CONTAINS REMOVABLE**  
**INTERNAL COMPONENTS, HANDLE WITH**  
**CARE TO PREVENT DAMAGE OR INJURY.**