



# Kest Mixer, KMS

For outstanding mixing performance in critical pharma and biotechnology applications.

DS-000002 REV E

## Kest Mixer, KMS

The Kest Mixer is a is the new generation of aseptic magnetic coupled mixers. With its aseptic design, zero particle generation and state of the art mixing performance it has become the perfect choice for critical pharma and biotech applications.

The Kest Mixer KMS range covers mixing volumes up to 200 liters. The Kest Mixer is designed for CIP/SIP applications and perfect for clean room environments.

Easy operator handling of the drive unit is secured by our patented Kest-Lock Connection.

With our advanced Speed Sensor technology, you will have a reliable process control.

The KMS drive unit is a fan less totally enclosed drive unit with a lot of built in functionality. The unique brushless DC motor has an extremely low heat generation and eliminates the need of a frequency converter to control the motor.

The Kest Mixer KMS range can be customized to perfectly fit your needs. The mixing head can be modified to optimize for full product recovery. We offer a wide range of materials, please contact your reseller for a quote.

## Kest Mixer range for various mixing applications

Kest has developed several product lines for various mixing applications and clean room needs. The KM product line was developed for a large volume range and the Rapid

Motion (RM) line for medium shear force generation. See separate data sheets on the other product lines in the Kest Mixer family or contact your reseller for more information.

# We bring flow to your mixing process

Our mixers and components have one purpose: to make your mixing process flow. 24/7. To ensure predictable and compliant results. To minimize maintenance. To minimize waste. To minimize energy use. To maximize the value created by your mixing process.



✓ **Perfect mixing result**  
After years of experience developing mixers this mixer will deliver a perfect mixing result over and over again.

✓ **ZERO particle shedding**  
The robust bearing combination of Zirconium and Sic and the fine-tuned geometry, ensures no particle generation. \*

✓ **Sustainable**  
The advanced motor boosts an impressive energy efficiency of >95%. While saving money, it also helps to reduce your carbon footprint significantly and due to low heat generation there is no need for compensating cooling - you can call it - **Green Mixing**.

✓ **Full integrity of the tank**  
The magnetic coupling between the mixing head and drive unit ensures total integrity of the tank. All tank plates are FEM analyzed according to PED & ASME.

✓ **Enhance your workplace**  
Due to the design of the drive unit it is extremely silent during operation enhancing the environment for the operators.

✓ **Mixing to the last drop**  
The wings fixed position close to the tank bottom and the possibility to run the mixer during emptying of the tank, ensures full product recovery.

✓ **Cleanroom optimized**  
The drive unit does not contain any fans that will interfere with your laminar air flow. It is totally capsuled in a smooth hygienic cover that that is easy to keep clean.

✓ **Minimal heat transfer**  
Thanks to the advanced drive unit, the energy is converted to rotation speed and a minimum result in heat. This prevents that heat is transferred into your application.

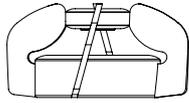
✓ **Integrated speed sensor**  
The mixer is equipped with an integrated speed sensor that measures the speed of the mixing head, that the mixing head is in place and that it rotates in the right direction.

✓ **Minimize downtime**  
The low weight of the drive unit and our patented Kest-Lock connection ensures quick disconnection from the tank plate during maintenance.



\* The external test, according to USP<788> PARTICULATE MATTER IN INJECTIONS, could not detect any particles from the bearing.

# Kest Mixer KMS, general information



**Mixing Head**

The Kest Mixer is a magnetically coupled mixer containing 4 modules, Mixing head, Male Post, Tank plate and Drive Unit.

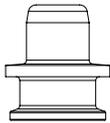
To secure the integrity of the tank, the tank plate is welded into the tank, the mixing head and drive unit couple through magnetic forces. When installing the tank plate, make sure to use our welding tool and to follow the welding guideline.

Select the appropriate model, download the Kest Mixer selection guide as a support. For complex mixing applications contact your reseller for consultation.

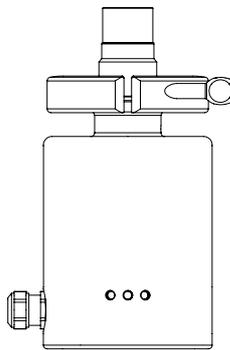
Decide upon optional drive unit features like Speed sensor, Control Unit and you will find the order information, Ref. No., for each part in this data sheet.



**Male Post**



**Tank Plate**

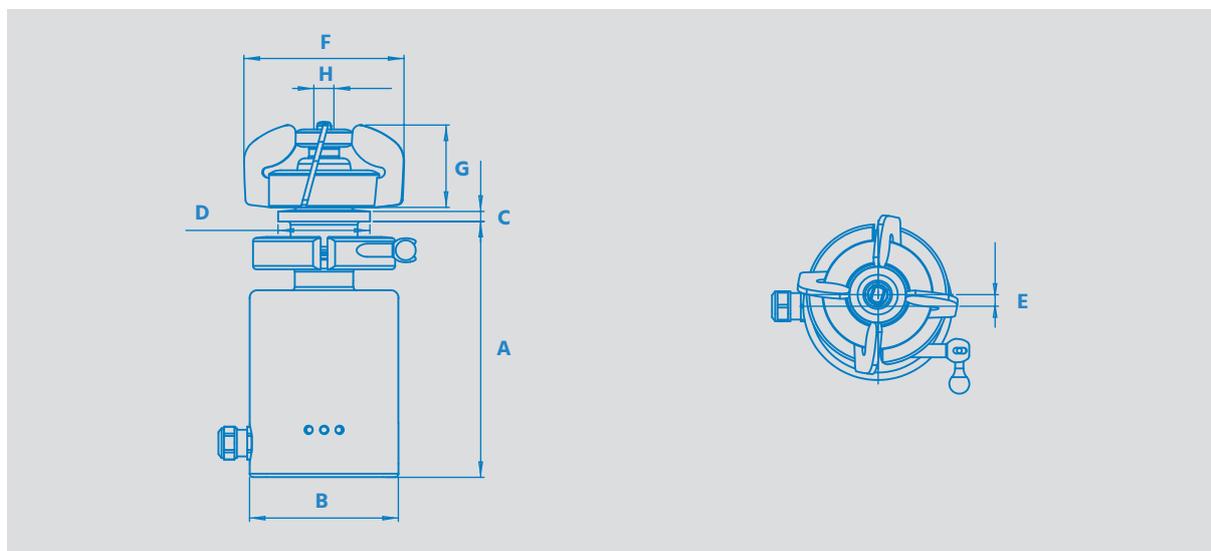


**Drive Unit**



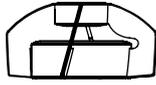
ALWAYS USE A WELDING TOOL AND FOLLOW THE WELDING GUIDE LINE WHEN INSTALLING A KEST MIXER TANK PLATE

# Kest Mixer KMS, dimensions



| MODEL    | A<br>mm<br>[in] | B<br>mm<br>[in] | C<br>mm<br>[in] | D<br>mm<br>[in] | E<br>mm<br>[in] | F<br>mm<br>[in] | G<br>mm<br>[in] | H<br>mm<br>[in] |
|----------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| KMS-0/3  | 155<br>[6.102]  | 89<br>[3.504]   | 6<br>[0.236]    | 55<br>[2.165]   | 7<br>[0.276]    | 82<br>[3.228]   | 33<br>[1.299]   | 12<br>[0.472]   |
| KMS-3/7  | 225<br>[8.858]  | 89<br>[3.504]   | 6<br>[0.236]    | 55<br>[2.165]   | 7<br>[0.276]    | 96<br>[3.780]   | 46<br>[1.811]   | 12<br>[0.472]   |
| KMS-7/20 | 241<br>[9.488]  | 89<br>[3.504]   | 6<br>[0.236]    | 84<br>[3.307]   | 7<br>[0.276]    | 120<br>[4.724]  | 56<br>[2.205]   | 16<br>[0.630]   |

# Kest Mixer KM, specifications



Mixing Head



Male Post



Tank Plate

## MECHANICAL SPECIFICATIONS

|                       | Mixer head  | Male post              | Tank plate          |
|-----------------------|---|------------------------|---------------------|
| Material grade        | EN 1.4435/ASTM 316L, Silicone carbide (SiC)   | Zirconium Oxide (ZrO2) | EN 1.4435/ASTM 316L |
| Material requirement  | EN 10 272/10028-7, A479/A240 or SA479 SA240   |                        |                     |
| Documentation         | Heat Certificate 3.1 acc. to EN 10 204  |                        |                     |
| Surface finish        | Ra≤0.5 µm on surfaces in product contact  |                        |                     |
| Design Temperature    | [0°C to +150°C] [+32°F to +302°F]   |                        |                     |
| Operating temperature | [0°C to +135°C] [+32°F to +275°F]   |                        |                     |
| Design Pressure       | [-1 bar(g) to + 7 bar(g)] [-14.5 psi to +101.5 psi]   |                        |                     |
| pH range              | 1-14  |                        |                     |
| Marking               | Head and Bearing is marked with ID No. Tank plate is marked with material grade and heat number |                        |                     |
| Packing               | Each item is sealed in vacuum plastic bag, labelled with article code and packed in a box       |                        |                     |
| Male bearing sealing  | EPDM, Silicone or Kalrez, approved acc. FDA regulation CFR 177.2600, USP Class VI               |                        |                     |
| Quality Assurance     | Each product is controlled and tested acc. to Kest Technology quality assurance system          |                        |                     |

# Kest Mixer KMS, weights

| MODEL    | MIXING HEAD<br>kg / [lb] | MALE POST<br>kg / [lb] | TANK PLATE<br>kg / [lb] | DRIVE UNIT*<br>kg / [lb] | TOTAL*<br>kg / [lb] |
|----------|--------------------------|------------------------|-------------------------|--------------------------|---------------------|
| KMS-0/3  | 0.3 / [0.7]              | 0.02 / [0.04]          | 0.2 / [0.5]             | 2.5 / [5.5]              | 3.0 / [6.6]         |
| KMS-3/7  | 0.5 / [1.1]              | 0.02 / [0.04]          | 0.3 / [0.7]             | 3.0 / [6.6]              | 3.8 / [8.4]         |
| KMS-7/20 | 1.0 / [2.2]              | 0.04 / [0.09]          | 0.5 / [1.1]             | 3.5 / [7.7]              | 5.0 / [11.0]        |

\*Weights based on standard unit with Speed Sensor, small variations might occur depending on options selected.

# Kest Mixer KMS, Drive unit specifications

| MODEL    | MOTOR POWER [W] | VOLTAGE DC [V] | CURRENT [A] | GEAR BOX RATIO [1] | SPEED RANGE [RPM] |
|----------|-----------------|----------------|-------------|--------------------|-------------------|
| KMS-0/3  | 63              | 24             | 3.5         | -                  | 50-680            |
| KMS-3/7  | 63              | 24             | 3.5         | 1:6                | 50-490            |
| KMS-7/20 | 63              | 24             | 3.5         | 1:6                | 50-490            |

## DRIVE UNIT SPECIFICATIONS

|                    |  |
|--------------------|--|
| Motor              | Brushless DC   |
| Design Temperature | [0°C to +40°C] [+32°F to +104°F]   |
| Protection class   | IP 65  |
| Capsulation        | EN 1.4404, Ra < 0.8 µm   |
| Cable              | 3 meter multi wire, open cable end (see drive unit terminal connection configuration)  |
| LED on housing     | Yellow: Rotation, Green: Power, Blue: Pulse  |
| Marking            | Each item is marked with article code  |
| Packing            | Each item is sealed in plastic bag, labelled with article code and packed in a box     |
| Quality Assurance  | Each product is controlled and tested acc. to Kest Technology quality assurance system |

## Drive unit, terminal connection (standard)

| TERMINAL ID | COLOUR / BASIC CONNECTION | DESCRIPTION                                 | TYPICAL FUNCTION                        |
|-------------|---------------------------|---|---|
| X1:1        | Blue / Yes                | Supply ground                               | - Ground                                |
| X1:2        | Brown / Yes               | Logic supply voltage                        | + 24VDC                                 |
| X2:1        | Purple / Yes              | Logic ground                                | - Ground                                |
| X2:2        | Black / Yes               | Control input C - hardware enable           | + 24VDC closing switch (rotation start) |
| X3:1        | - / -                     | -   | -                                       |
| X3:2        | Pink / Yes                | 0...10V - Speed control set value input     | 0-10V variable speed control            |
| X4:1        | Grey / If required        | 10V DC output                               | 10V supply for speed control            |
| X4:2        | White / If required       | 0...10V - analog speed value output         | For converter or display                |
| X5:1        | Red / Yes                 | Speed sensor pulse signal (PNP)             | For pulse converter or display          |
| X5:2        | Orange / If required      | 24V PNP closing contact rotation indication | PLC                                     |

If you have chosen to run the mixer with the Kest control unit the wiring on the motor terminal needs to be changed according to table Drive unit, terminal connection (Control Unit Mixer - CUM).

# Drive unit, terminal connection (Control Unit Mixer - CUM)

| TERMINAL ID | COLOUR / BASIC CONNECTION | DESCRIPTION                                 | TYPICAL FUNCTION                        |
|-------------|---------------------------|---|---|
| X1:1        | Blue / Yes                | Supply ground                               | - Ground                                |
| X1:2        | Brown / Yes               | Logic supply voltage                        | + 24VDC                                 |
| X2:1        | Purple / Yes              | Logic ground                                | - Ground                                |
| X2:2        | Black / Yes               | Control input C - hardware enable           | + 24VDC closing switch (rotation start) |
| X3:1        | Gray / Yes                | Motor Speed puls to control unit            | Pulse                                   |
| X3:2        | Pink / Yes                | 0...10V - Speed control set value input     | 0-10V variable speed control            |
| X4:1        | White / If required       | 10V DC output                               | 10V supply for speed control            |
| X4:2        | - / -                     | -   | -                                       |
| X5:1        | Red / Yes                 | Speed sensor pulse signal (PNP)             | For pulse converter or display          |
| X5:2        | Orange / If required      | 24V PNP closing contact rotation indication | PLC                                     |

## Kest Mixer KMS, Speed Sensor (optional)

The Kest Mixer speed sensor unit is a integrated sensor system that enables secure verification of the actual rotation of the mixer head.

An integrated function in the Kest Mixers speed sensor also verifies that the mixer head is in place in the tank and that it is rotating in the correct direction, "clockwise".

The unit consists of a sensor, that is located underneath the magnetic rotor, and a converter unit integrated in the drive unit circuit board.

The output signal from the sensor is 1 pulse/rotation as standard, 1 pulse/magnet can be delivered upon request.

For visual indication of the different functions, the speed sensor is connected to the LED's located on the drive unit enclosure:

- **Yellow LED: Rotation (steady light)**
- **Green LED: Power (steady light)**
- **Blue LED: Pulse (pulsing light)**

The sensor and cable are designed for +150°C to withstand the temperatures in the tank plate during sterilization.

### MECHANICAL SPECIFICATIONS

|                    | Sensor holder  | Cabeling   |
|--------------------|--|------------|
| Material grade     | POM C  | Teflon-FEP |
| Design Temperature | [0°C to +150°C] [+32°F to +302°F]  |            |
| Packing            | The Speed sensor is installed on the drive unit before delivery                        |            |
| Quality Assurance  | Each product is controlled and tested acc. to Kest Technology quality assurance system |            |

### Electrical Specifications

|               |   |  |
|---------------|---|--|
| Type          | Hall effect switch, PNP closing circuit |  |
| Voltage       | 8-30 V DC                               |  |
| Rated Current | 200 mA                                  |  |

| Model    | Standard puls     | Max pulses (on request) |
|----------|-------------------|-------------------------|
| KMS-0/3  | 1 puls / rotation | 2 pulses / rotation     |
| KMS-3/7  | 1 puls / rotation | 3 pulses / rotation     |
| KMS-7/20 | 1 puls / rotation | 3 pulses / rotation     |

# KMS, Control Unit Mixer, CUM (optional)

The Kest control unit is developed for the KMS DC drive units to control and monitor the rotation speed of the mixer.

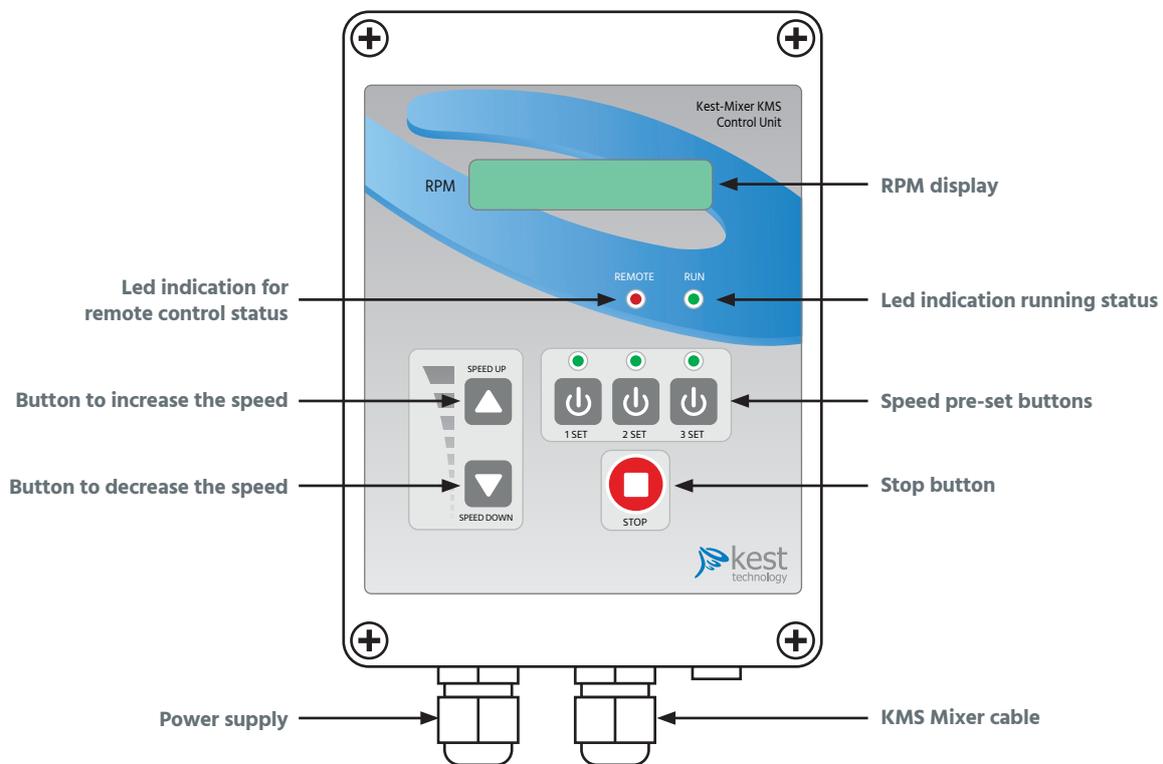
The Kest control unit is powered with 100-240 VAC at 50-60Hz that is transformed to 24 VDC, feeding the mixer.

The three pre-set buttons is used as quick buttons to set a certain speed value, each can be programmed to a specific RPM.

The unit is pre-programmed with ramping parameters for acceleration and deceleration to prevent the mixer from damage.

The display shows the rotation speed of the mixer and the target speed value. The display is also used when programming the pre-set buttons and for delivering error messages.

If you have selected the speed sensor option, the control unit will measure the actual speed of the mixing head in the tank and it will give you a warning if you forgot to install the mixing head.

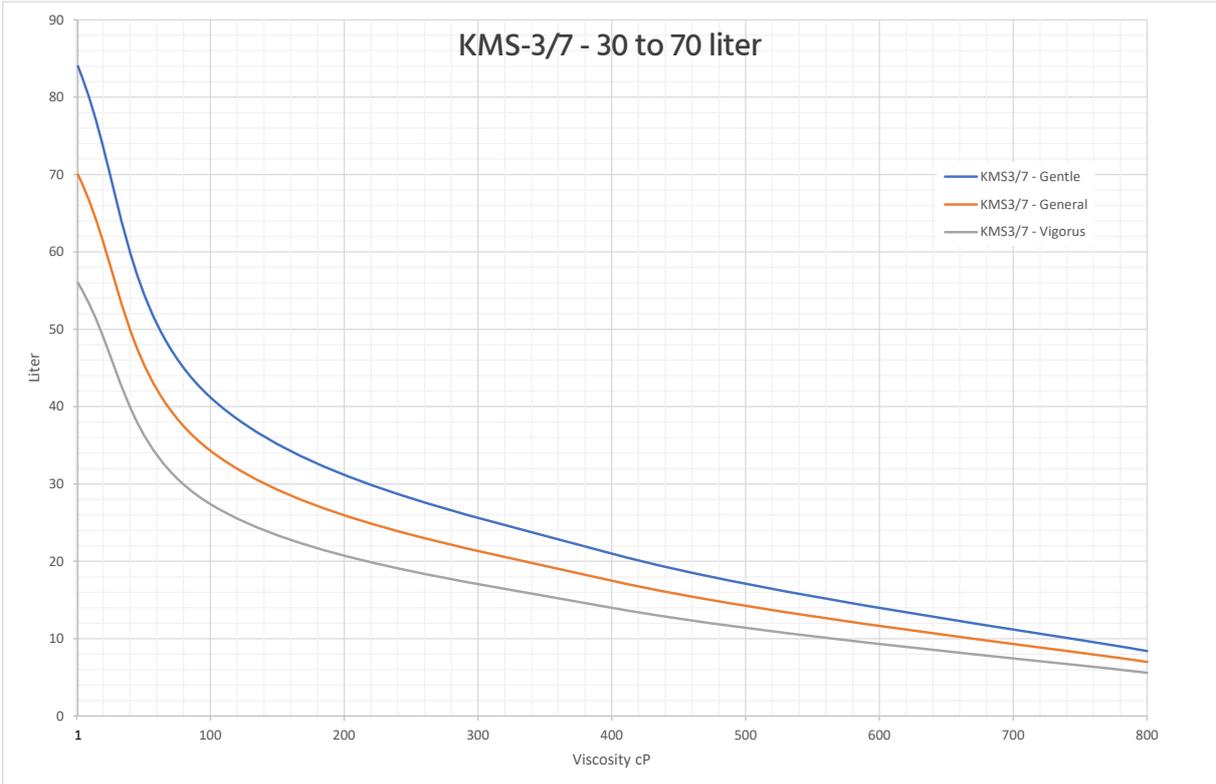
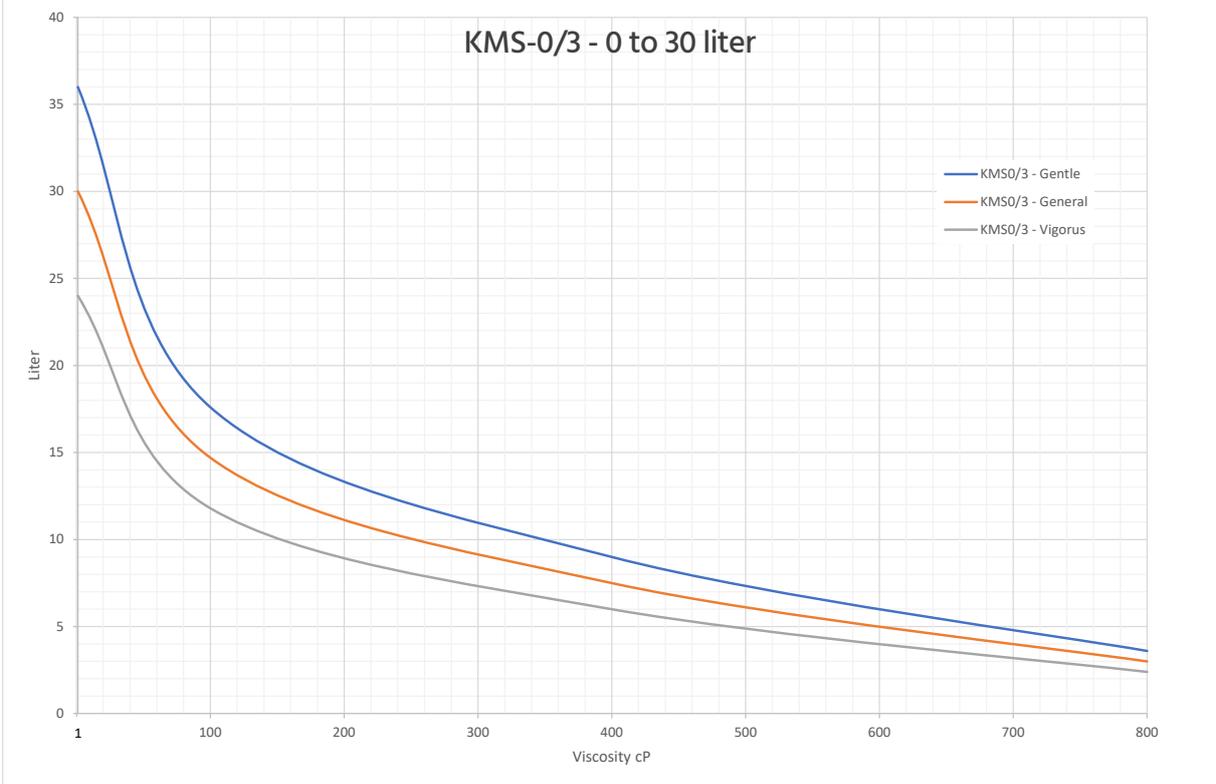


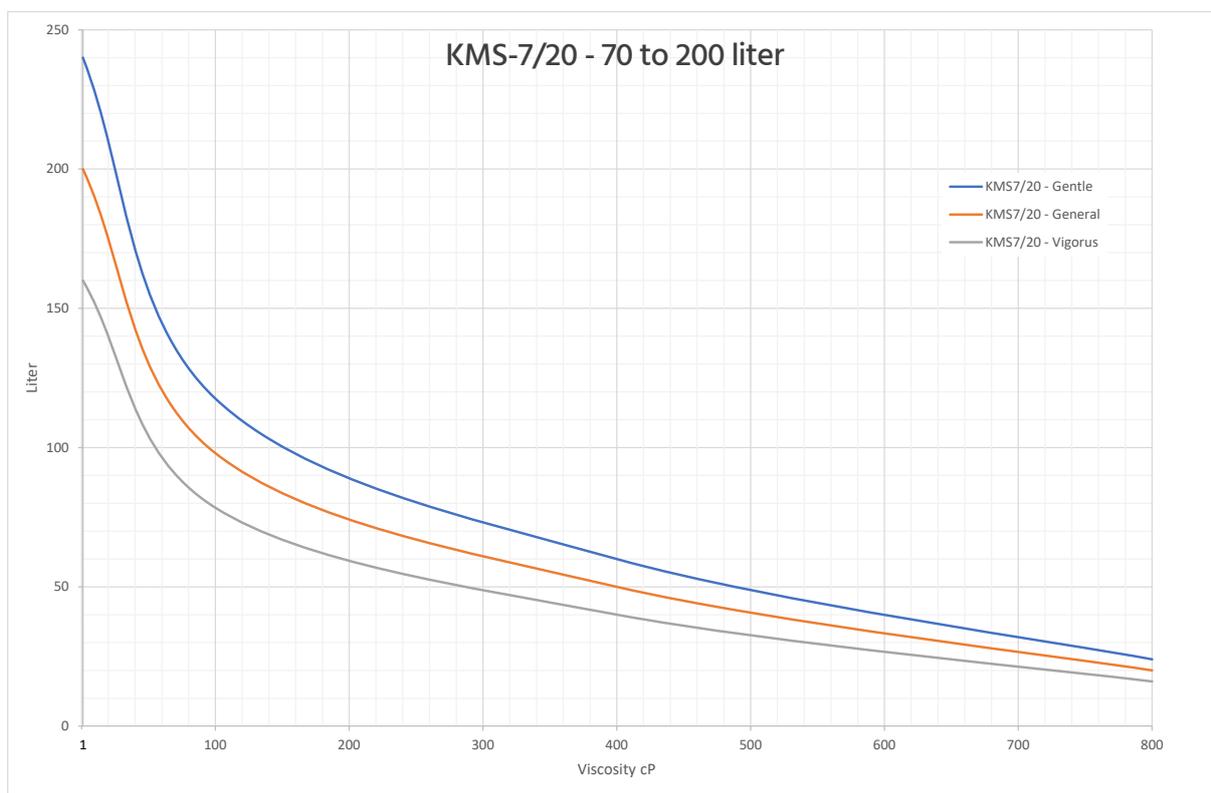
## SPECIFICATIONS

| Cabinet                   |  |
|---------------------------|--|
| Material grade            | Grey ABS   |
| Measurement (HxWxD) mm    | 175 x 125 x 75 mm [6.890 x 4.921 x 2.953 in]   |
| Design Temperature        | [0°C to +40°C] [+32°F to +104°F]   |
| Packing                   | Each item is sealed in plastic bag, labelled with article code and packed in a box     |
| Quality Assurance         | Each product is controlled and tested acc. to Kest Technology quality assurance system |
| Electrical Specifications |  |
| Power supply              | 100 - 240 VAC / 50-60 Hz   |
| Effect                    | 30 W   |
| Protection class          | IP40   |

# Selection guide

The mixer is selected after volume and desired mixing type based on the viscosity of the media. The different mixer sizes are targeting a specific volume range based on viscosity of 1 cP. Depending on the viscosity you might need to go for a larger size even if you are in the target volume. The characteristics of the General, Gentle and Vigorous mixing is subjective and built on experience. See example in the end of the selection guide on how to select correct mixer size.





## Example:

You want to select a mixer that shall generate General mixing

The max mixing volume is 30 liters

The viscosity of the media is 100 cP.

KMS0/3 has the range of 0-30 liter at 1 cP, but since the viscosity is 100 cP the capacity for General mixing is decreased to around 15 liters, see KMS0/3 graph at 100cP, orange line.

The next size is KMS-3/7 with a range of 30-70 liter at 1 cP. That mixer can handle 34 liters of media at viscosity 100 cP, see KMS-3/7 graph at 100cP, orange line.

**For this application you need the KMS-3/7 mixer.**

For higher viscosities you might need to go up several sizes to find a mixer that with the sufficient capacity.

## Test center

Mixing can be simple and complex, this selection guide sizes the mixer to the correct capacity. Mixing performance can be affected by many different factors, if you need support with your mixing application, we have long experience and a great test centre. Do not hesitate to contact us with your mixing application.

## Kest Mixer KMS, Ref.No list

| MODEL    | MIXING HEAD | MALE BEARING | TANK PLATE |
|----------|-------------|--------------|------------|
| KMS-0/3  | 100433      | 100562       | 100383     |
| KMS-3/7  | 100559      | 100562       | 100625     |
| KMS-7/20 | 101273      | 101530       | 100647     |

## Kest Mixer KMS, drive unit - Ref.No list

| MODEL    | STANDARD DRIVE UNIT | STANDARD DRIVE UNIT WITH SPEED SENSOR |
|----------|---------------------|---------------------------------------|
| KMS-0/3  | 101081              | 100434                                |
| KMS-3/7  | 101607              | 101091                                |
| KMS-7/20 | 101642              | 100990                                |

## Kest Mixer KMS, options - Ref.No list

| MODEL    | CONTROL CABINET | ATTRACTOR* | MULTI TOOL* | WELDING TOOL |
|----------|-----------------|------------|-------------|--------------|
| KMS-0/3  | 100669          | 101620     | 101006      | 100446       |
| KMS-3/7  | 100669          | 101620     | 101006      | 100923       |
| KMS-7/20 | 102373          | 101436     | 101342      | 100802       |

\*See separate data sheet



kest