

# Kest Mixer, KM

For outstanding mixing performance in critical pharma and biotechnology applications.

DS-00003 REV D

## Kest Mixer, KM

The Kest Mixer is a magnetic coupled mixer. With its aseptic design and excellent mixing performance it has become a popular choice for critical pharma and biotech applications.

The Kest Mixer KM range covers mixing volumes up to 22 000 litres. The Kest Mixer is designed for CIP/SIP applications.

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 Kest Mixer KM range can be customized to perfectly fit your needs. We can modify the mixing head to mix to the last drop or manufacture the parts that have media contact in specific materials, please contact your reseller for a quote.

The Kest Mixer KM range is also available in an ATEX version, see separate data sheet for more information.

## Kest Mixer range for various mixing applications

Kest has developed several product lines for various mixing applications and clean room needs. The KMS product line was developed for LAF applications 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 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.

## ✓ 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.

## ✓ 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.

## ✓ ZERO particle shedding

The robust bearing combination of Zirconium and Sic and the fine-tuned geometry, ensures no particle generation.

\*

## ✓ Mixing low level volumes

Due to the low building height of the mixer head along with a lot of wing area close to the bottom it can handle continues mixing of low levels.

## ✓ Mixing to the last drop

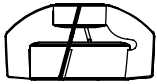
The wings fixed position close to the tank bottom and the possibility to run the mixer during emptying of the tank, ensures full product recovery.

## ✓ 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 KM, general information



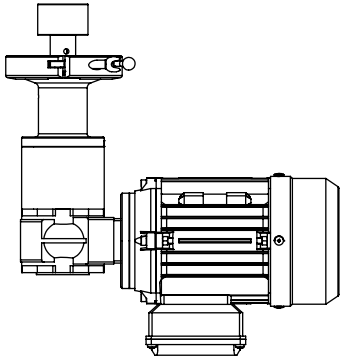
Mixing Head



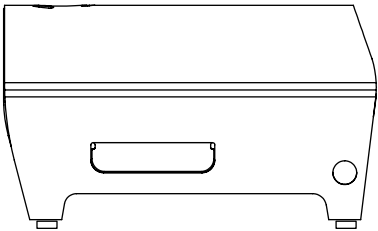
Male Post



Tank Plate



Drive Unit



Stainless steel Cover (optional)



Speed Sensor (optional)

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 couples 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, stainless steel cover or extension. You will find the order information, Ref. No., for each part in this data sheet.

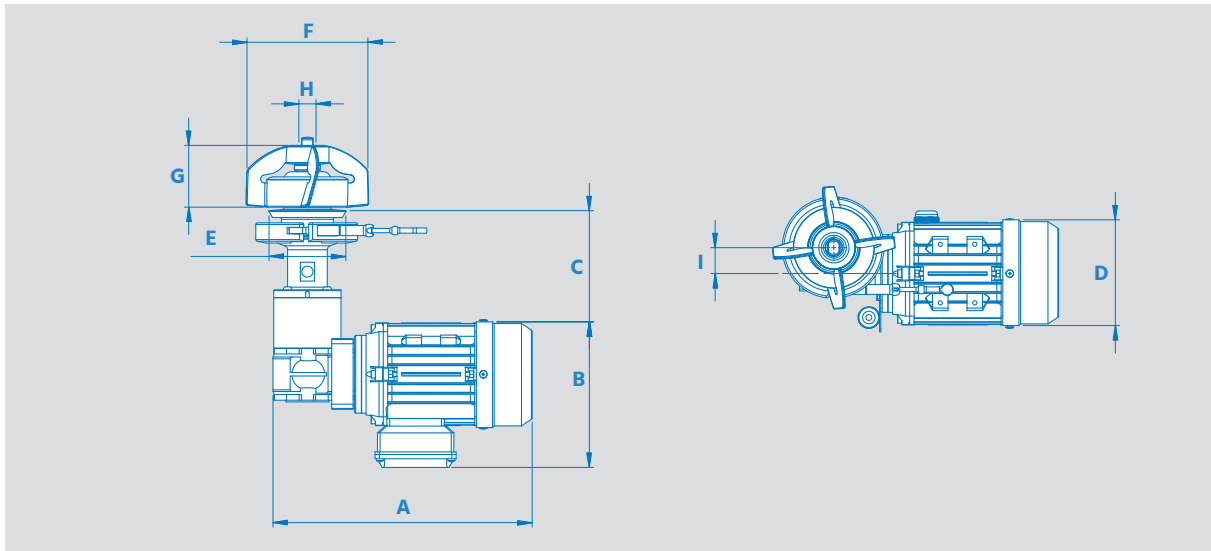


THE DRIVE UNIT IS TO BE OPERATED BY FREQUENCY CONVERTER. CONVERTER PARAMETERS TO BE VALIDATED FOR EACH PROCESS APPLICATION IN RELATION TO VOLUME, VISCOSITY ETC.



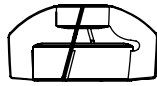
ALWAYS USE A WELDING TOOL AND FOLLOW THE WELDING GUIDE LINE WHEN INSTALLING A KEST MIXER TANK PLATE

# Kest Mixer KM, dimensions



MODEL	A mm [in]	B mm [in]	C std (L0) / extension (L1) mm [in]	D mm [in]	E mm [in]	F mm [in]	G mm [in]	H mm [in]	I mm [in]
KM-0/3	300 [11.811]	172 [6.772]	60/120 [2.362/4.724]	123 [4.843]	55 [2.165]	82 [3.228]	33 [1.299]	12 [0.472]	30 [1.181]
KM-3/7	300 [11.811]	172 [6.772]	60/120 [2.362/4.724]	123 [4.843]	55 [2.165]	96 [3.780]	46 [1.811]	12 [0.472]	30 [1.181]
KM-7/20	300 [11.811]	172 [6.772]	60/120 [2.362/4.724]	123 [4.843]	84 [3.307]	120 [4.724]	56 [2.205]	16 [0.630]	30 [1.181]
KM-20/70	300 [11.811]	172 [6.772]	60/120 [2.362/4.724]	123 [4.843]	89 [3.504]	142 [5.591]	71 [2.795]	20 [0.787]	30 [1.181]
KM-70/120	340 [13.386]	185 [7.283]	60/120 [2.362/4.724]	138 [5.433]	99 [3.898]	160 [6.299]	71 [2.795]	20 [0.787]	45 [1.772]
KM-120/230	394 [15.512]	213 [8.386]	80/120 [2.362/4.724]	156 [6.142]	119 [4.685]	184 [7.244]	73 [2.874]	20 [0.787]	50 [1.969]
KM-230/600	394 [15.512]	213 [8.386]	80/120 [2.362/4.724]	156 [6.142]	159 [6.260]	192 [7.559]	119 [4.685]	30 [1.181]	50 [1.969]
KM-600/1300	447 [17.598]	224 [8.819]	80/135 [2.362/5.315]	171 [6.732]	239 [9.409]	220 [8.661]	150 [5.906]	30 [1.181]	63 [2.480]
KM-1300/2200	573 [22.559]	255 [10.039]	-/120 [-/4.724]	196 [7.717]	240 [9.449]	273 [10.748]	124 [4.882]	30 [1.181]	85 [3.346]

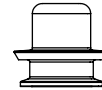
# Kest Mixer KM, specifications



Mixing Head



Male Post



Tank Plate

## MECHANICAL SPECIFICATIONS

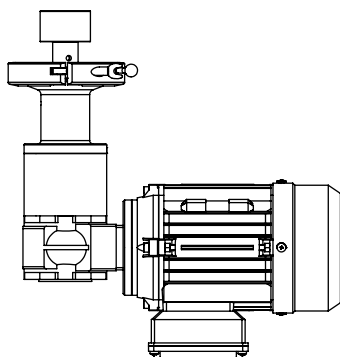
	Mixer head	Male post	Tank plate
Material grade	EN 1.4435/ASTM 316L, Silicone carbide (SiC)	Zirconium Oxide (ZrO <sub>2</sub> )	EN 1.4435/ASTM 316L
Material requirement	EN 10 272/10028-7, A479/A240 or SA479 SA240		
Documentation	Heat Certificate 3.1 acc. to EN 10 204		
Surface finish	Ra≤[0.5 μm] [20 μin] Polished - on surfaces in product contact. Mixing head Electropolished, see order information		
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 + 10 bar(g)] [-14.5 psi to 145 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 or Silicone, 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 KM, weights

MODEL	MIXING HEAD kg / [lb]	MALE POST kg / [lb]	TANK PLATE kg / [lb]	DRIVE UNIT* kg / [lb]	TOTAL* kg / [lb]
KM-0/3	0.3 / [0.7]	0.02 / [0.04]	0.2 / [0.5]	7.0 / [15.4]	7.5 / [16.5]
KM-3/7	0.5 / [1.1]	0.02 / [0.04]	0.3 / [0.7]	7.1 / [15.7]	8.0 / [17.6]
KM-7/20	1.0 / [2.2]	0.04 / [0.09]	0.5 / [1.1]	7.4 / [16.3]	9.0 / [19.8]
KM-20/70	1.5 / [3.3]	0.09 / [0.2]	0.8 / [1.8]	7.5 / [16.5]	10.0 / [22.1]
KM-70/120	2.0 / [4.4]	0.09 / [0.2]	1.1 / [2.4]	10.6 / [23.4]	14.0 / [30.9]
KM-120/230	2.1 / [4.6]	0.09 / [0.2]	1.8 / [4.0]	15.4 / [34.0]	19.5 / [43.0]
KM-230/600	4.0 / [8.8]	0.40 / [0.9]	2.5 / [5.5]	19.6 / [43.2]	26.5 / [58.4]
KM-600/1300	5.0 / [11.0]	0.40 / [0.9]	2.7 / [6.0]	24.5 / [54.0]	32.5 / [71.7]
KM-1300/2200	6.6 / [14.6]	0.40 / [0.9]	8.4 / [18.5]	45.0 / [99.2]	60.5 / [133.4]

\*Weights based on standard unit with extension, stainless steel cover is not included, small variations might occur depending on options selected

# Kest Mixer KM, Drive unit specifications



Drive Unit

MODEL	MOTOR POWER 50/60Hz [kW]	FREQUENCY [Hz]	CURRENT 230/400V [A]	GEAR BOX RATIO [i]	SPEED RANGE [RPM]
KM-0/3	0.25/0.30	50/60	1.3/0.75	1:7	50-490
KM-3/7	0.25/0.30	50/60	1.3/0.75	1:7	50-490
KM-7/20	0.25/0.30	50/60	1.3/0.75	1:7	50-490
KM-20/70	0.25/0.30	50/60	1.3/0.75	1:7	50-490
KM-70/120	0.55/0.68	50/60	2.4/1.4	1:7	50-490
KM-120/230	0.75/0.90	50/60	3.3/1.9	1:7	50-490
KM-230/600	1.10/1.30	50/60	4.7/2.7	1:7	50-490
KM-600/1300	1.50/1.80	50/60	6.2/3.6	1:7	50-490
KM-1300/2200	3.00/3.50	50/60	11.8/6.8	1:10	35-340

## DRIVE UNIT SPECIFICATIONS

Motor	CE - Standards EN60 034-1
Motor protection	One thermo element as standard
Design Temperature	[0°C to +40°C] [+32°F to +104°F]
Protection class	IP 55
Paint	The flange, motor and gearbox are painted - RAL 7015
Gear box oil	AGIP TELIUM VSF 320
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

# Kest Mixer KM, 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.

The unit consists of a sensor, that is located underneath the magnetic rotor, and a converter unit, that is located on the drive unit.

The output signal from the sensor is 1 pulse/rotation as standard.

For visual indication of the different functions there are three different LED,s located on the converter unit indicating the following functions:

- **Green LED: Power supply**
- **Yellow LED: Clockwise rotation**
- **Blue LED: Signal/Pulse**

The sensor and cable are designed for +150°C to cope with the temperatures in the tank plate during sterilization, the rest of the unit is designed for up to +40°C. The converter unit is located on the motor/gearbox.

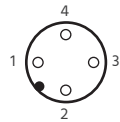
## MECHANICAL SPECIFICATIONS

	Sensor holder	Cabel	Converter housing
Material grade	POM C	5 meter, open ends	PMMA
Design Temperature	[0°C to +150°C] [+32°F to +302°F]		[0°C to +40°C] [+32°F to +104°F]
Marking	Each item is marked with article code		
Packing	Each item is sealed in vacuum plastic bag and packed in a box		
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
Protection class	IP 67 (contacts)
Connection type sensor unit	4-pole female connection, M8x1
Connection type converter unit	Input: 4-pole male connection, M8x1. Output: 4-pole male connection M12x1

Socket wiring identification



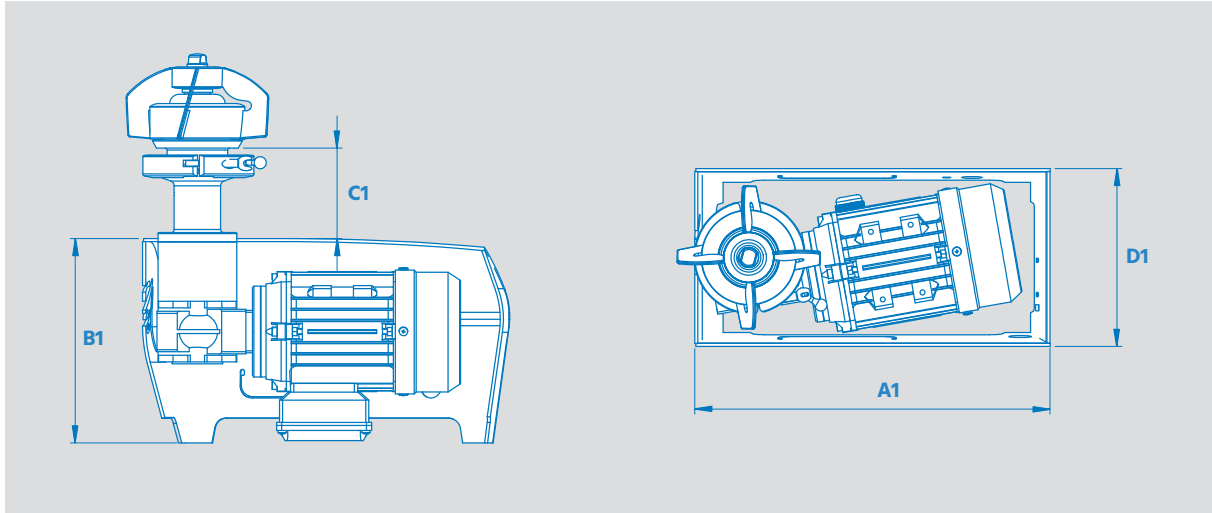
- 1 Signal: L + Power supply 8-30 VDC
- 2: + Closing contact PNP for indication of rotation
- 3: L - Negative/Ground
- 4: Pulse signal 8-30. VDC

Model	Standard pulse	Max pulses (on request)
KM-0/3	1 pulse / rotation	2 pulses / rotation
KM-3/7	1 pulse / rotation	3 pulses / rotation
KM-7/20	1 pulse / rotation	3 pulses / rotation
KM-20/70	1 pulse / rotation	4 pulses / rotation
KM-70/120	1 pulse / rotation	5 pulses / rotation
KM-120/230	1 pulse / rotation	6 pulses / rotation
KM-230/600	1 pulse / rotation	8 pulses / rotation
KM-600/1300	1 pulse / rotation	6 pulses / rotation
KM-1300/2300	1 pulse / rotation	12 pulses / rotation

# Kest Mixer KM, cover (optional)

The KM range can be equipped with a stainless-steel cover to protect the drive unit. The stainless-steel cover drastically improves the external cleanability of the drive unit.

Only drive units with extension L1 can be equipped with the stainless-steel cover.



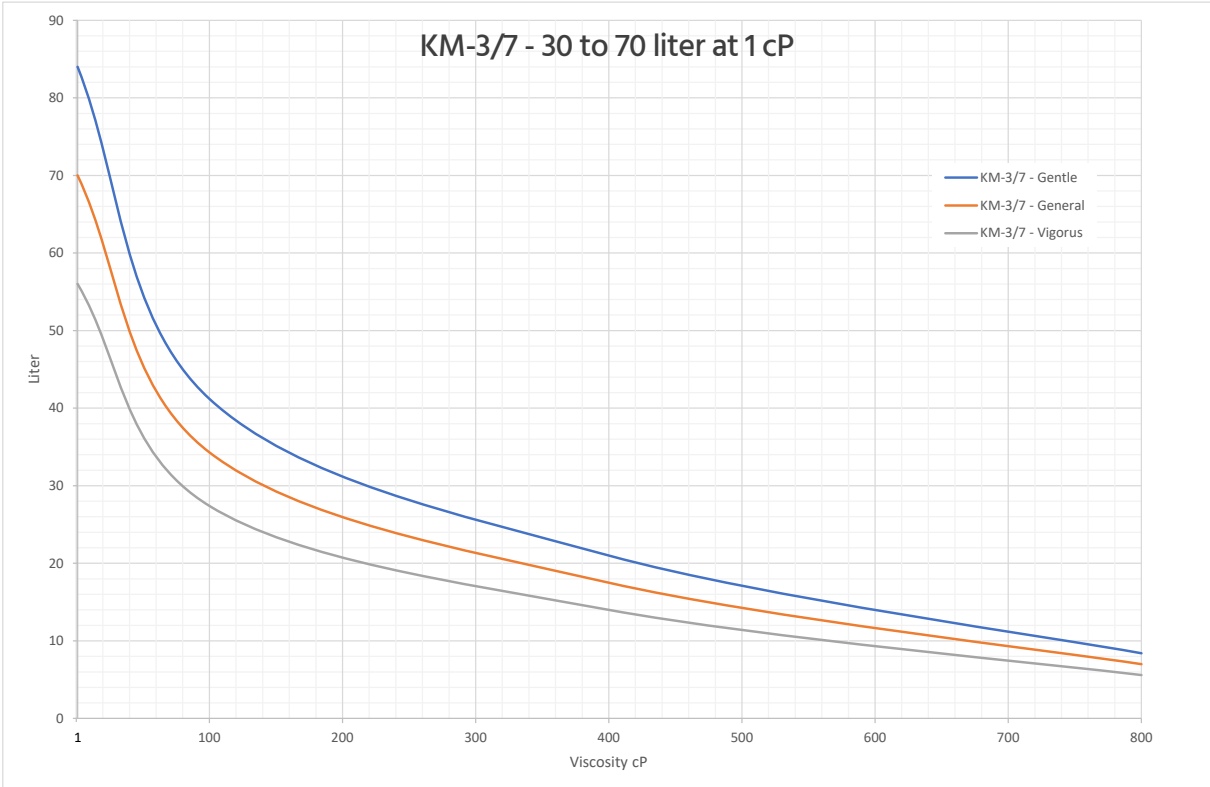
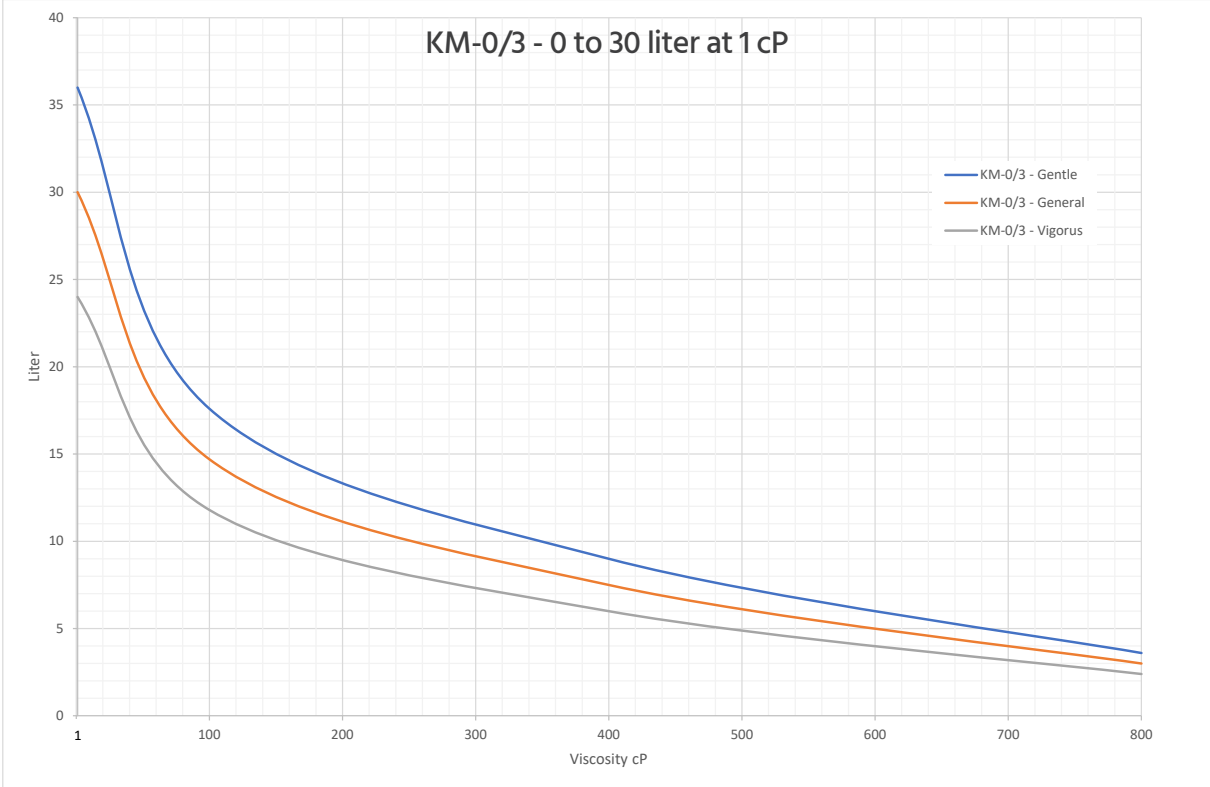
MODEL	A1 mm [in]	B1 mm [in]	C1* mm [in]	D1 mm [in]
KM-0/3	352 [13.858]	205 [8.071]	100 [3.937]	176 [6.929]
KM-3/7	352 [13.858]	205 [8.071]	100 [3.937]	176 [6.929]
KM-7/20	352 [13.858]	205 [8.071]	100 [3.937]	176 [6.929]
KM-20/70	352 [13.858]	205 [8.071]	100 [3.937]	176 [6.929]
KM-70/120	385 [15.157]	225 [8.858]	100 [3.937]	176 [6.929]
KM-120/230	438 [17.244]	240 [9.449]	100 [3.937]	202 [7.953]
KM-230/600	438 [17.244]	240 [9.449]	100 [3.937]	222 [8.740]
KM-600/1300	492 [19.370]	255 [10.039]	120 [4.724]	222 [8.740]
KM-1300/2200	633 [24.921]	305 [12.008]	100 [3.937]	260 [10.236]

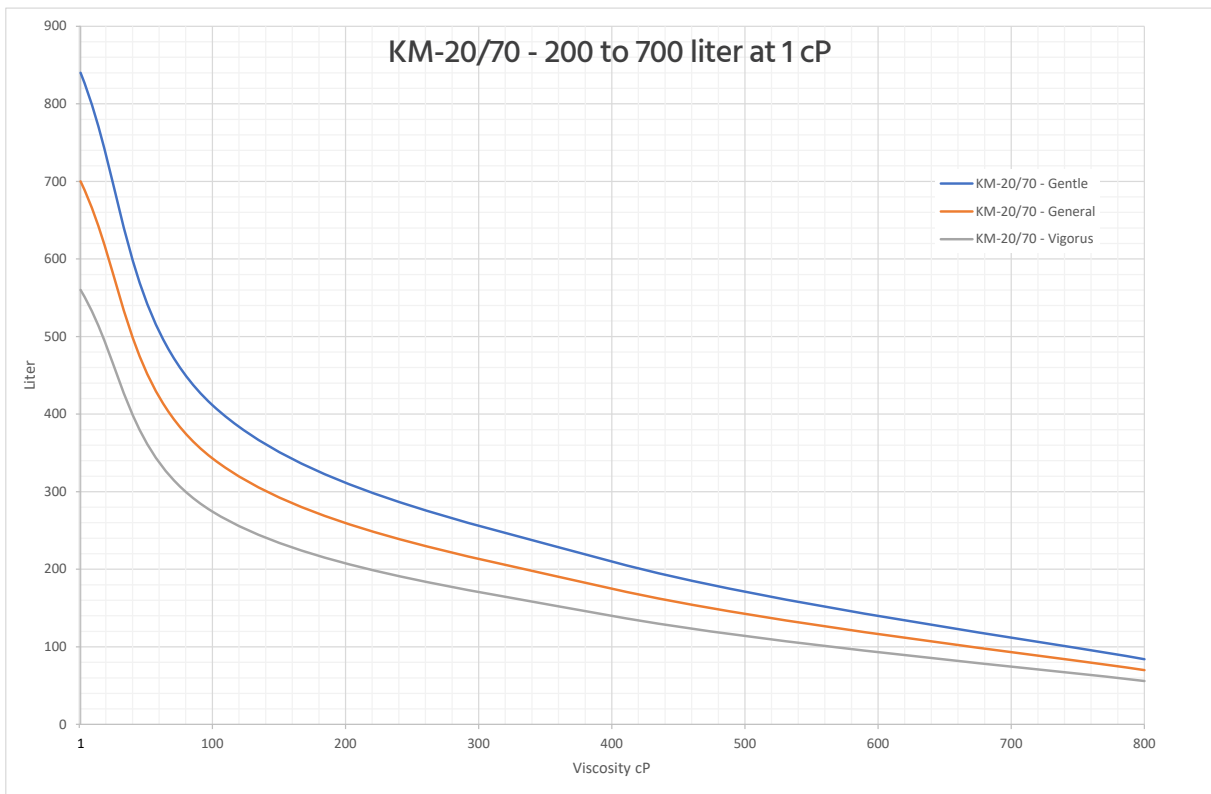
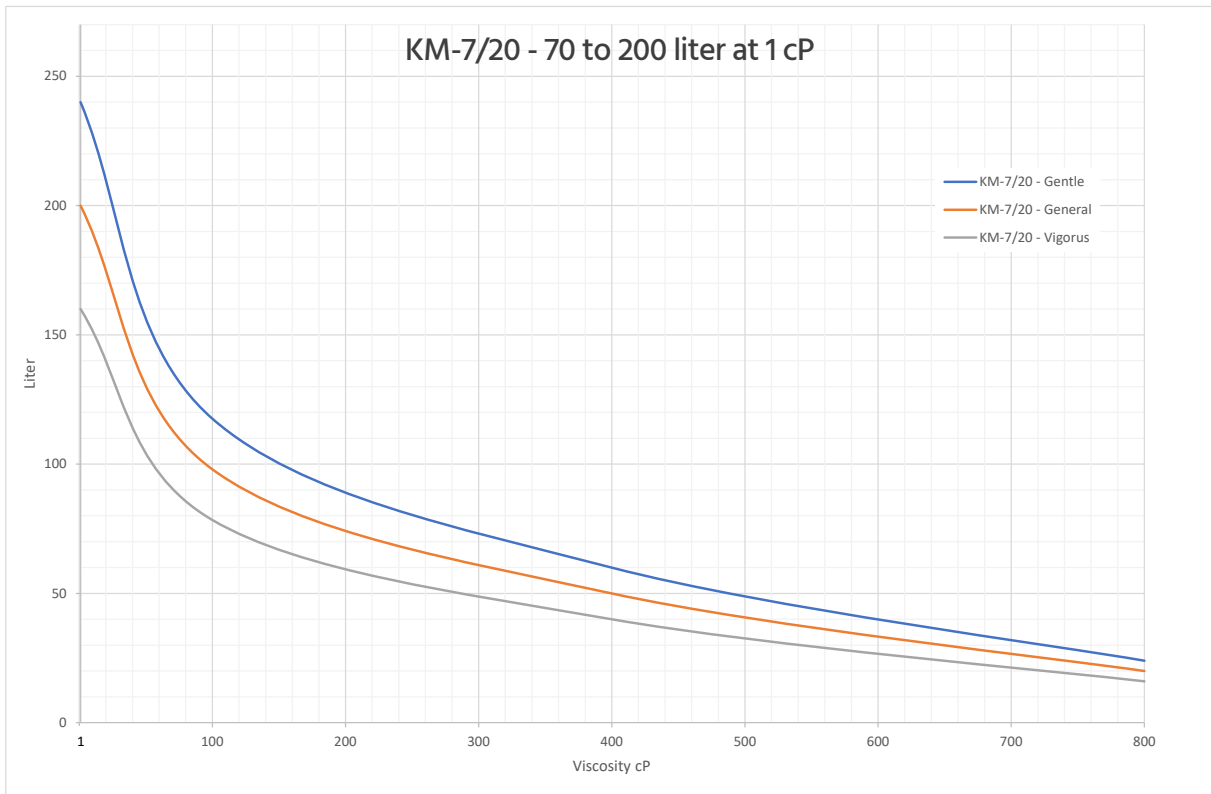
\*Cover only available on drive unit with extension

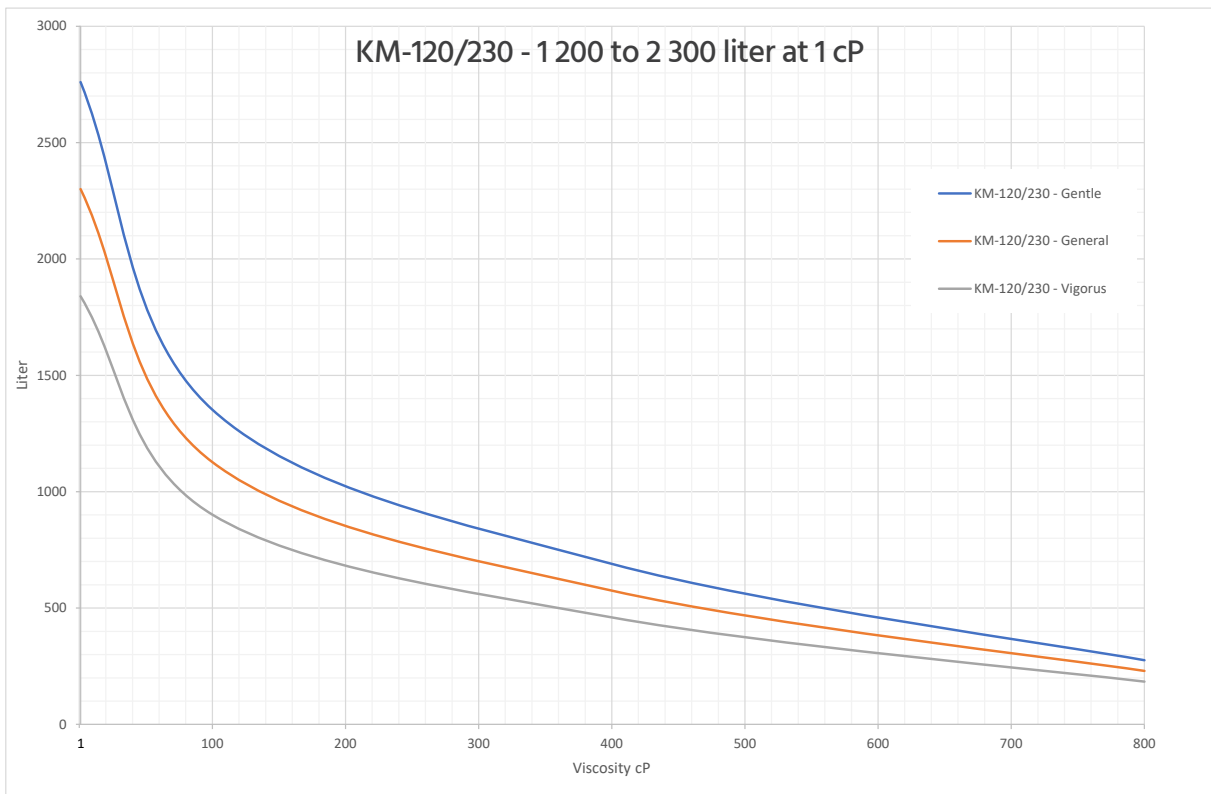
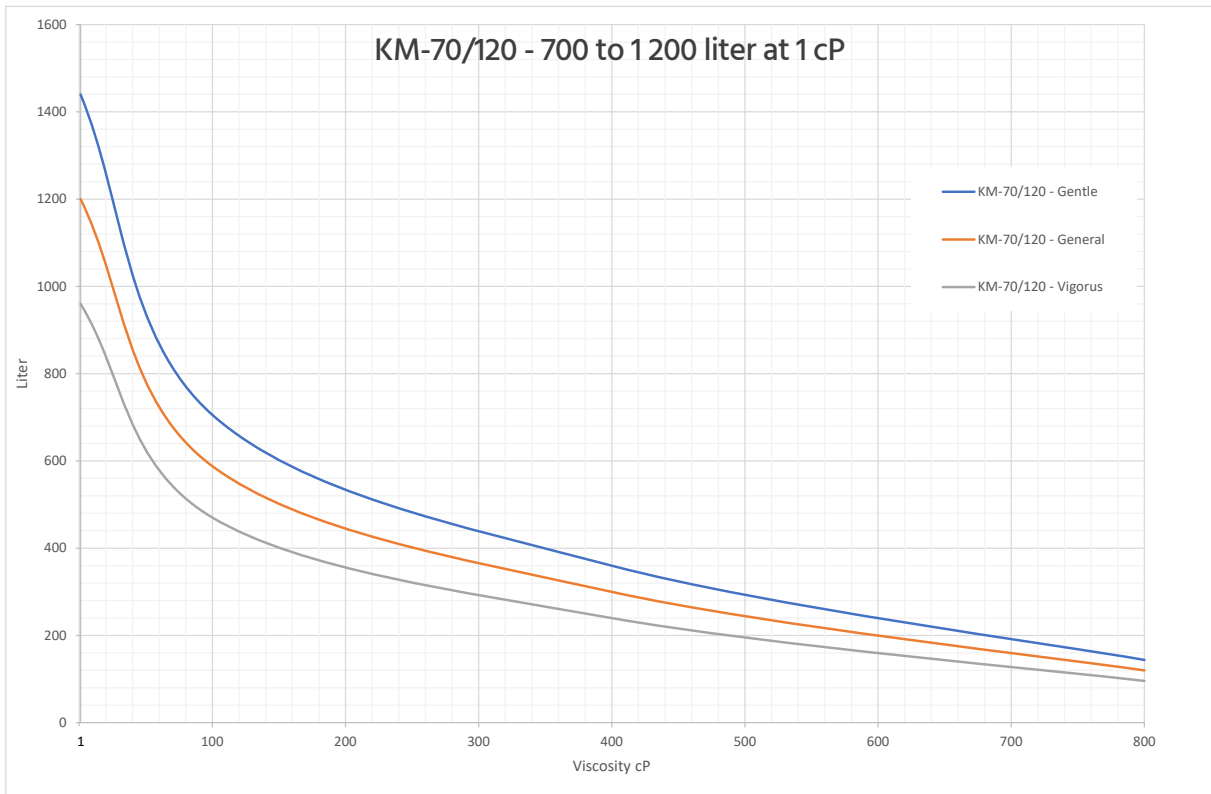


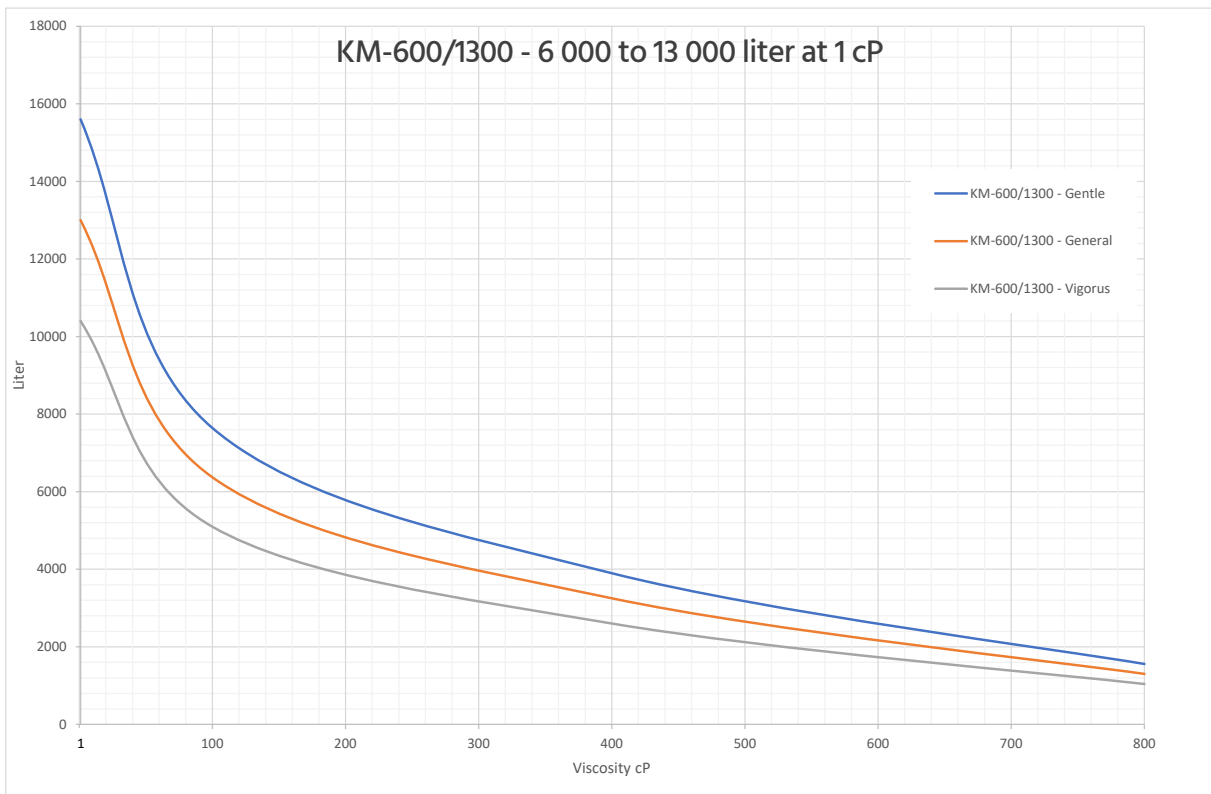
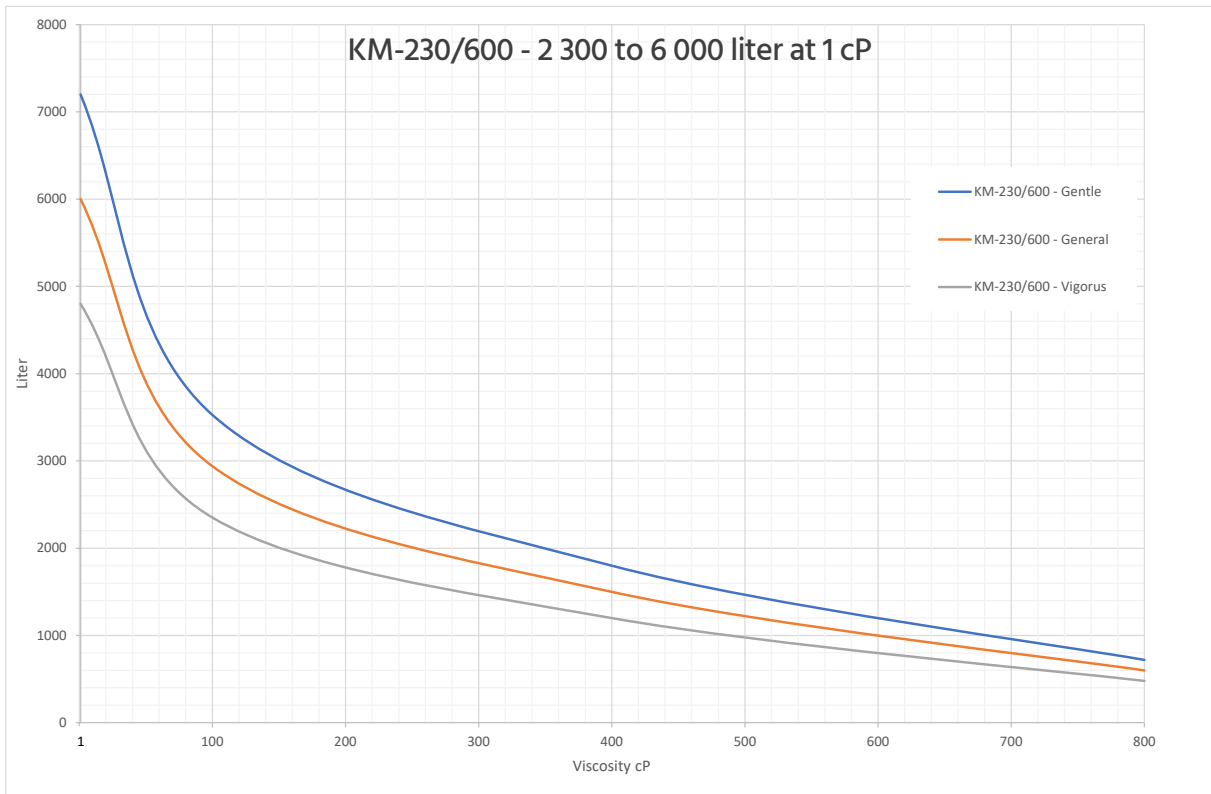
# Selection guide

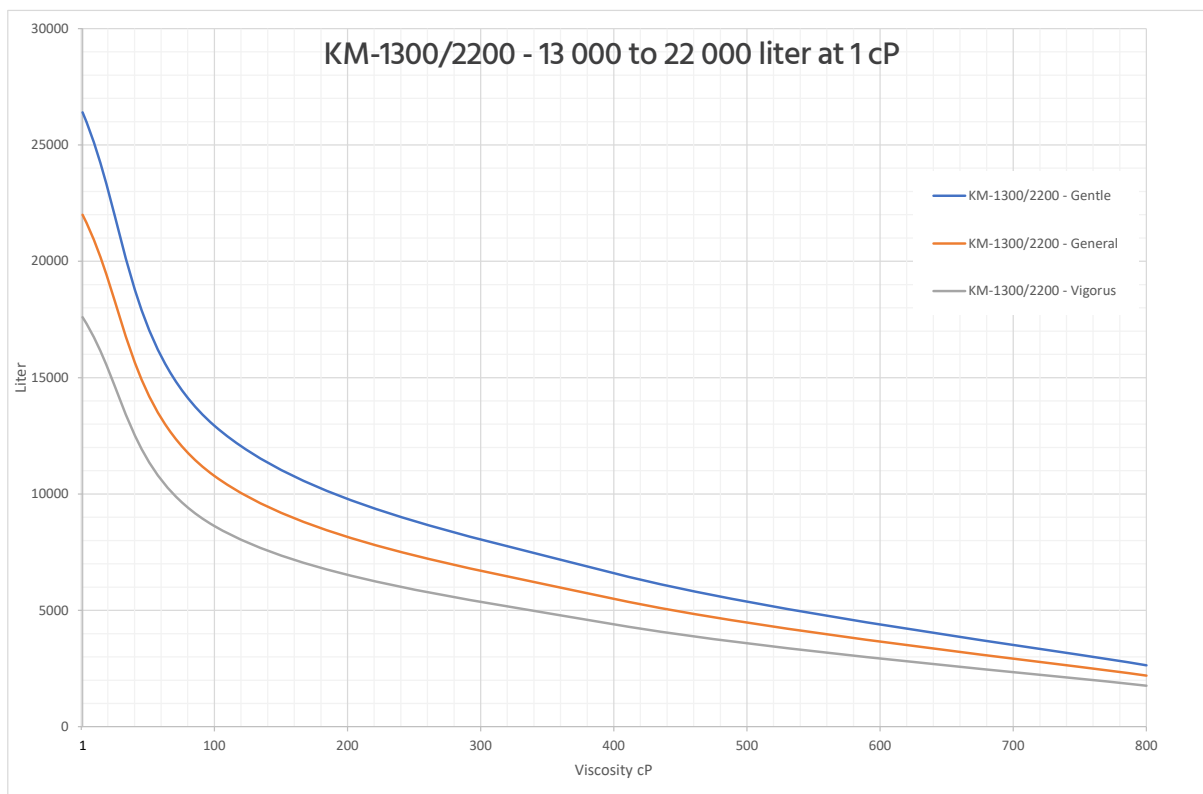
The mixer is selected after volume and desired mixing type based on the viscosity of the media. The different mixer sizes are targeting a specific volume range based on viscosity of 1 cP. Depending on the viscosity you might need to go for a larger size even if you are in the target volume. The characteristics 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 500 liters

The viscosity of the media is 100 cP.

Start with the mixer graph that has the correct range at 1 cP, KM20/70 has the range of 200 to 700 liter at 1 cP. Look at the graph at 100cP (on the horizontal axis) and follow it up to the orange line (General mixing) and read the value of the vertical axis to find out what the maximum mixing volume is at viscosity 100 cP.

In this case it is 340 Liter, go to the next size KM70/120 and check the maximum mixing volume in the same way. KM70/120 has the maximum mixing volume of 590 liter at 100 cp, this is enough for the application.

**For this application you need the KM-70/120 mixer.**

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

Gentle mixing and Vigorous mixing are variations of the General mixing, for support contact your local distributor or Kest.

## 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 an inhouse fully equipped test center. Do not hesitate to contact us with your mixing application.

# Kest Mixer KM - Order information

## Kest Mixer KM, Ref. No. list

MODEL	MIXING HEAD	MIXING HEAD ELECTRO POLISHED	MALE POST	TANK PLATE
KM-0/3	100433	102440	100562	100383
KM-3/7	100559	102441	100562	100625
KM-7/20	101273	102442	101530	100647
KM-20/70	100451	102443	100415	100396
KM-70/120	100650	102444	100415	102629
KM-120/230	100713	102445	100415	102637
KM-230/600	100442	102446	101817	100537
KM-600/1300	100544	102447	101817	100794
KM-1300/2200	101291	102448	101817	101292

## Drive unit - Ref. No. list

MODEL	STANDARD (L0)	STANDARD (L0) + SPEED SENSOR	EXTENSION (L1)	EXTENSION (L1) + SPEED SENSOR
KM-0/3	102182	102183	102184	102185
KM-3/7	102187	102189	102190	102191
KM-7/20	102194	102195	102196	102197
KM-20/70	102200	102201	102202	102203
KM-70/120	102206	102207	102208	102209
KM-120/230	102212	102213	102214	102215
KM-230/600	102218	102219	102220	102221
KM-600/1300	102224	102225	102226	102227
KM-1300/2200	-	-	102230	102231

## Options & Tools - Ref. No. list

MODEL	STAINLESS STEEL COVER	ATTRACTOR*	MULTI TOOL*	WELDING TOOL
KM-0/3	101070	101620	101006	100446
KM-3/7	101070	101620	101006	100923
KM-7/20	101070	101436	101342	100802
KM-20/70	101070	100571	100655	100802
KM-70/120	101071	-	100655	100780
KM-120/230	101072	-	100655	100717
KM-230/600	101072	-	101010	100800
KM-600/1300	101073	-	-	100717
KM-1300/2200	101589	-	-	101300

\*See separate data sheet



kest