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MARCH 2018

# IEC Stainless steel washdown motors

Uncompromized hygiene, reliability and productivity for F&B

ABB Motors and Generators, IEC Low voltage motors



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# Food and beverage

## Industry challenges

### Food safety

Many concerns with food contamination (listeria, salmonella, etc.)  
Difficulty keeping equipment clean and contamination free

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### Process reliability

Equipment failing too soon due to harsh washdown environments  
All materials do not withstand frequent sanitation

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### Energy efficiency

How to reduce overall operating costs, and match the sustainability goals?  
Electric motors account huge potential to use energy more efficiently  
Energy efficiency regulations vary depending on country and region

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# Food safety

## Hygiene design principles



Equipment must be...

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### 1. Easy to clean to a microbiological level

Constructed to ensure effective and efficient cleaning over the life of the equipment, easy to access

Cleaned in place (CIP) without dismantling any components

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### 2. Made of compatible materials

Construction materials must be completely compatible with the product, environment, cleaning and sanitizing chemicals

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### 3. Prevented from product or liquid collection

Self-draining to assure that liquid does not accumulate, pool or condense on the equipment

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# Food safety and reliability

Three factors that impact a products' washdown features

## Hygiene design principles

Meet the needs of incidental food contact?  
(material and surface finish)

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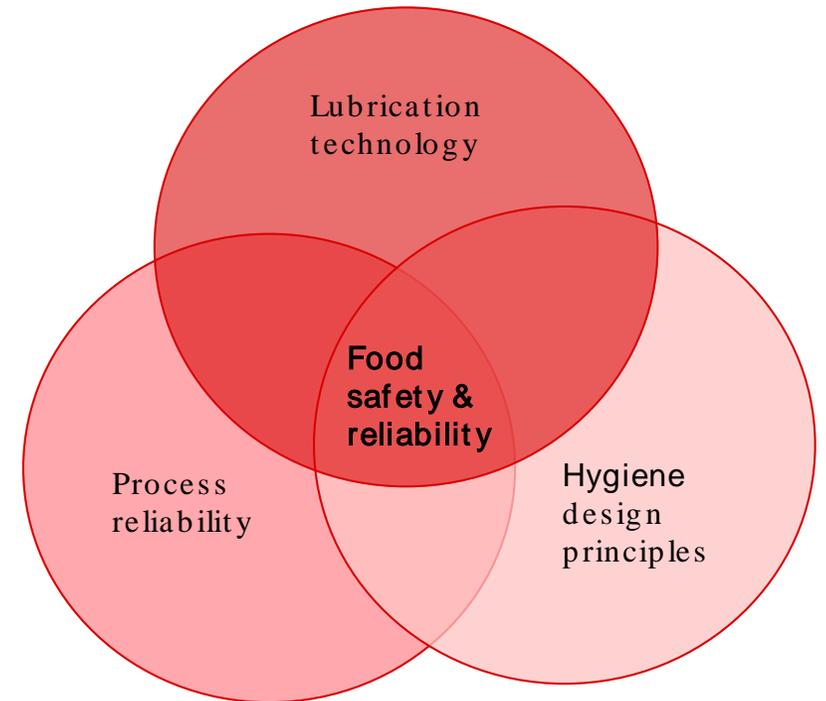
## Process reliability

Protection against spray and contaminants

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## Lubrication technology

Type of lubricant used is food safe?  
(example H1 grease)



# Food safety

## Hygiene design principles



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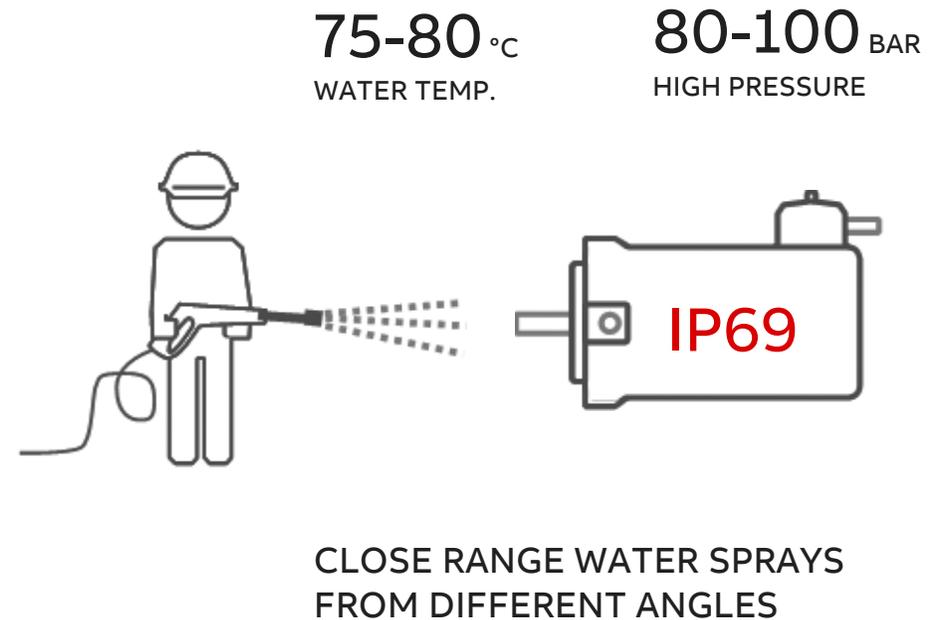
# Process reliability

Why to choose a washdown motor?

Food processing environment with frequent sanitation exposes electric motors to many risks

- Surface corrosion, bearing failures due to grease washout, electrical failures

A stainless steel washdown motor can prevent these failures and avoid unwanted interruptions in the process



Ultimate protection for very harsh environments and sanitation needs

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# Lubrication technology

The lubricant types in food-grade applications are broken into categories based on the likelihood they will contact food

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## H1 lubricants

Food-grade lubricants used in food processing environments where there is some possibility of **incidental food contact**

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## H2 lubricants

Lubricants used on equipment and machine parts in locations where there **is no possibility** that the lubricant or lubricated surface contacts food

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## H3 lubricants

Also known as soluble or edible oil, are used to clean and prevent rust on hooks, trolleys and similar equipment. Not suitable for food contact.

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**EHEDG clearly promotes the use of H1 lubricants in food production**

# Low voltage motors for food and beverage industry

## Key issues

### Food safety

- Uncompromized hygiene solution with stainless steel motors

### Productivity

- Reliable products in harsh conditions reducing downtime
- High efficiency motors IE3

### Products

IEC Stainless steel encapsulated motors  
0,37 – 7,5 kW for washdown environments

Paint free solutions and other F&B specific modifications to increase food safety & reliability

Wide range of standard industrial motors and motors for explosive atmosphere.

Washdown  
High hygiene zone



Mixed  
Splash zone



Dry zone or explosive  
atmosphere



ABB motor portfolio offers right product for every food processing zone to maximize food safety and reliability.

# IEC Stainless steel encapsulated motors

Scope for the first sales release

**Available March 2018**

Frame sizes 80 - 100

- 2 – 6 pole, 0,375 – 3 kW
- Insulation class F / temperature rise class F
- Frame sizes 80-90 IC410 (TENV), frame size 100 IC411 (TEFC)
- Frame sizes 80-90 B14, B5 mounting, frame size 100 B3, B14, B5 mountings
- IE3 both 50 and 60 Hz
- Voltage code S (230 / 400 V)
  - Same motor rated also 460 V @ 60 Hz
- Include VC436, PTC- thermistors 3 in series 150 °C, in stator winding
- Available from stock only (CSE)

Range will be extended up to frame size 132 in Q3/2018

## Technical data

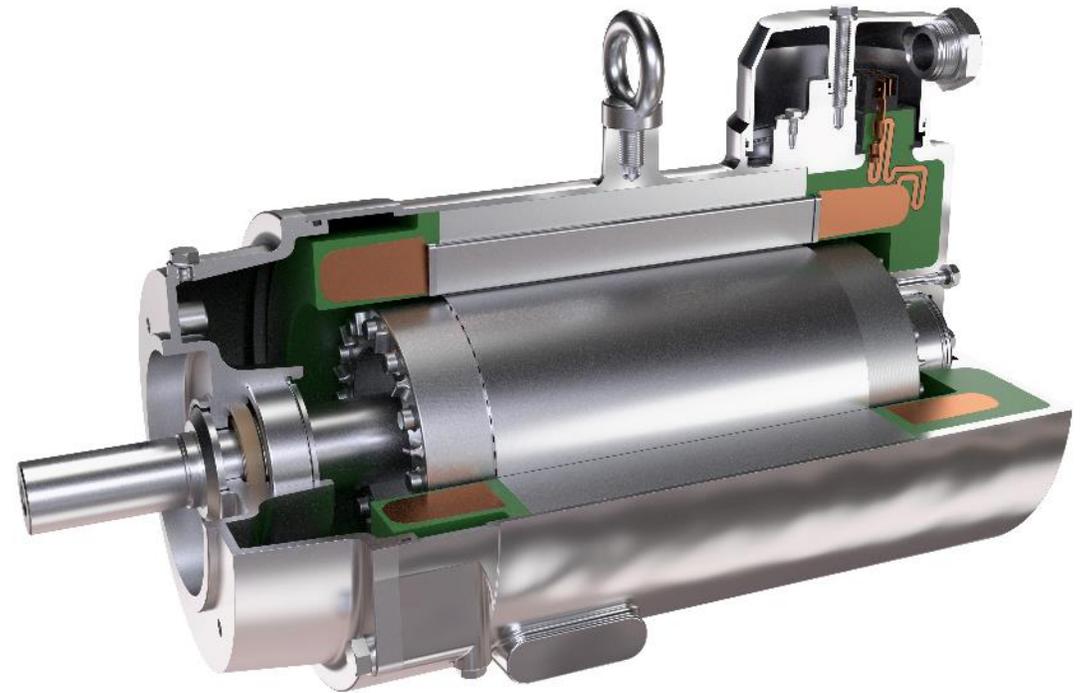
IEC Stainless steel encapsulated motors

Output kW	Motor type	Product code	Cooling method	Speed r/min	Efficiency IEC60034-30- 1; 2014			Power factor cos φ	Current		Torque		Moment of inertia J=1/4 GD <sup>2</sup> kgm <sup>2</sup>	Weight kg	Sound pressure level L <sub>w</sub> dB	
					Full load 100%	3/4 load 75%	1/2 load 50%		I <sub>n</sub> A	I <sub>Δ</sub> / I <sub>n</sub>	T <sub>n</sub> Nm	T <sub>Δ</sub> / T <sub>n</sub>				T <sub>Δ</sub> /T <sub>n</sub>
3000 r/min = 2 poles																
400 V 50 Hz																
CENELEC design																
0,55	M3MA 90MA2	3CMA09L310→B	K410	2800	80,5	79,9	79,7	0,89	1,11	7,5	1,81	2,3	3,8	0,0034	23	50
0,75	M3MA 90MB2	3CMA09L320→B	K410	2801	84,6	84,7	82,3	0,88	1,45	7,7	2,48	2,3	3,7	0,00330	23	47
1,1	M3MA 90MC2	3CMA09L330→B	K410	2827	83,2	86,6	82,1	0,80	2,12	7,9	3,64	2,4	3,8	0,00328	23	47
1,5	M3MA 90MA2	3CMA09L310→B	K410	2803	88,3	89,0	88,2	0,91	2,71	8,7	4,93	2,6	4,3	0,0354	52	44
2,2	M3MA 90MB2	3CMA09L320→B	K410	2821	89,8	90,2	89,3	0,89	4,0	10,8	7,19	3,4	5,3	0,0354	52	44
3	M3MA 100LA2	3CMA10L310→B	K411	2905	88,9	89,2	87,8	0,87	5,34	9,1	9,96	2,7	4,3	0,0131	60,5	62
1500 r/min = 4 poles																
400 V 50 Hz																
CENELEC design																
0,37	M3MA 80MA4	3CMA08L2310→B	K410	1456	81,3	79,4	74,0	0,68	0,98	7,6	2,47	3,9	5,4	0,0049	23	50
0,55	M3MA 80MB4	3CMA08L2320→B	K410	1443	83,5	82,7	79,4	0,77	1,23	6,3	3,64	2,6	3,9	0,0059	23	50
0,75	M3MA 80MC4	3CMA08L2330→B	K410	1436	83,4	82,6	79,0	0,76	1,7	7,5	5,0	3,4	4,5	0,0067	23	50
1,1	M3MA 90MA4	3CMA09L2310→B	K410	1444	84,6	85,1	83,5	0,84	2,2	7,0	7,3	2,3	3,6	0,0375	48	44
1,5	M3MA 90MB4	3CMA09L2320→B	K410	1437	86,5	87,5	86,9	0,87	2,8	6,5	9,97	1,9	3,2	0,0138	52	44
2,2	M3MA 100LA4	3CMA10L2310→B	K411	1461	88,0	87,4	85,1	0,68	5,36	8,7	14,4	2,7	5,2	0,0178	57	62
3	M3MA 100LB4	3CMA10L2320→B	K411	1465	88,3	87,8	85,5	0,67	7,24	9,0	19,6	2,8	4,9	0,0178	57	62
1000 r/min = 6 poles																
400 V 50 Hz																
CENELEC design																
0,37	M3MA 90MA6	3CMA09L3310→B	K410	960	78,7	76,9	71,3	0,68	1,15	5,4	3,73	2,7	3,9	0,0129	23	47
0,55	M3MA 90MB6	3CMA09L3320→B	K410	959	80,9	80,0	76,3	0,67	1,46	5,3	5,48	2,1	3,3	0,0117	48	44
0,75	M3MA 90MC6	3CMA09L3330→B	K410	964	83,1	82,1	78,4	0,64	2,02	5,4	7,43	2,1	3,4	0,014	52	44
1,1	M3MA 90MA6	3CMA09L3310→B	K410	959	82,5	81,9	78,8	0,65	2,91	5,4	11,0	2,1	3,4	0,014	52	44
1,5	M3MA 100LA6	3CMA10L3310→B	K411	977	88,6	88,0	85,5	0,64	3,8	6,7	14,7	1,8	4,0	0,0181	58	62

# IEC Stainless steel encapsulated motors

## Motors in brief

Output	0.37 to 7.5 kW, 2-6 poles
Voltage/frequency	230-690 V, 50/60 Hz
Mounting	B14, B5, B3
Ambient temperature	-15°C - + 40°C
Cooling	TENV up to 90 frame TEFC 100-132 frames
Efficiency	IE3
Protection	IP69
Insulation/Temp rise	F / F
Certification	CE, cUL, CCC
MEPS	EU MEPS, IHP, AU MEPS, China Energy Label



# IEC Stainless steel encapsulated motors

Designed for ultimate reliability in extreme conditions

Squirrel cage rotor technology for IE3 efficiency

Heat stabilized bearings with H1 food grade grease

Stainless steel gamma ring seal for the first barrier to water jets

Drain water large channels guarantee effective and easy cleaning

Rotatable terminal box cover allows to adjust cable exit in all directions. Once defined, by tightening the central screw the position is fixed for the whole operating lifetime

Windings encapsulated with epoxy resin under vacuum: environmental protection against water and humidity; improve heat transfer from hotspot in coil ends. Excellent insulation

EHEDG compliant internal Radial seal for the third barrier to water

Heat stabilized bearings with H1 food grade grease

One single central screw to fix the terminal box cover

Suitable for cable gland and various types of IP69 connectors

Universal and quick internal connection system with Faston plugs

Stainless steel AISI 304 frame and hygienic design

Water drain holes suitable for horizontal and vertical mounting. For horizontal mounting 4x90 different orientations of the terminal box are possible

# IEC Stainless steel encapsulated motors

## Mounting arrangements

### Frame sizes

### Flange mounted B14

### Flange mounted B5

### Foot mounted B3

IEC 80-90  
TENV without cooling fan



IEC 100  
TEFC with cooling fan



# IEC Stainless steel encapsulated motors

## Checklist for selecting stainless steel motors



Designed according to hygienic principles

Withstand harsh washdown conditions and high humidity

Compatible with clean-in methods to reduce cleaning times

Smooth, self-draining housing



IP69 ingress protection

Superior and essential for providing effective sealing



No cooling fan

Non-ventilated design = easy to clean, do not harbor dirt



Food-grade lubricant

H1 rated lubricants maximize food safety and avoid potential contamination



Encapsulated windings

Ensures a longer lifetime in humid conditions and therefore helps to reduce the total cost of ownership.



# IEC Stainless steel encapsulated motors

Perfect solution for food and beverage industries

## Food safety and reliability

IP69 protection	Withstands extreme washdown situations
Encapsulated windings	Long lifetime in extreme humid conditions
H1 food grade grease	Safe operation in food processing environment
TENV cooling	Very easy to clean
IE3 efficiency	Lower operation costs and lower surface temperature

## Flexibility

0.37 to 7.5 kW, 2-6 poles	
230-690 V, 50/60 Hz	For export machinery
B14, B5, B3 mounting	Fits for every application



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# How can we help you in your challenges?

We are constantly developing our product portfolio...

How can we further you and your customers?

[Visit our web site for IEC low voltage motors for Food and beverage](#)



**ABB**