SUBMERSIBLE MOTORS - RANGE

4” 6” 8” 10” 12”

2-4 poles
50-60Hz

Submersible Motors

RANGE Overview

kW	0,4	0,6	0,8	1,1	1,5	2,2	2,2	3	4	5,5	7,5	9,2	11	13	15	19	22	26	30	37	45	52	55	60	67	75	83	92	110	132	150	170	185	220	260	300
HP	0,5	0,8	1	1,5	2	3	3	4	5,5	7,5	10	13	15	18	20	25	30	35	40	50	60	70	75	80	90	100	113	125	150	180	200	230	250	300	350	400

OIL FILLED

- 4" - CL - CLE 95
- 6" - CL140

WATER FILLED

- 6" - MS152
- 8" - MS201
- 10" - MS251
- 12" - MS300
- 8" - MS201 - 4 Poles
- 10" - MS251 - 4 Poles
- 12" - MS300 - 4 Poles

Oil Filled
SUBMERSIBLE MOTORS

CL - Oil Filled
SUBMERSIBLE MOTORS
4” 6”
50-60Hz

CL - Oil filled Motors

Range

Oil 4” & 6 ”

50&60 Hz

1-Phase*

3-Phase

CL Range

- Re-windable motor
- NEMA 4” & 6” coupling
- VFD use compliant
- IP68 – class F insulation
- Sing.ph PSC motor
- Vertical & Horizontal inst.
- Max water temp 35°C
- Quick connector

kW	0,4	0,6	0,8	1,1	1,5	2,2	3	4	5,5	7,5	9,2	11	13	15	19	22	26
HP	0,5	0,8	1	1,5	2	3	4	5,5	7,5	10	13	15	18	20	25	30	35

4" - CLE95 - 1 Phase

4" - CLE95 - 3 Phase

4" - **CL95** - 1 Phase

4" - **CL95** - 3 Phase

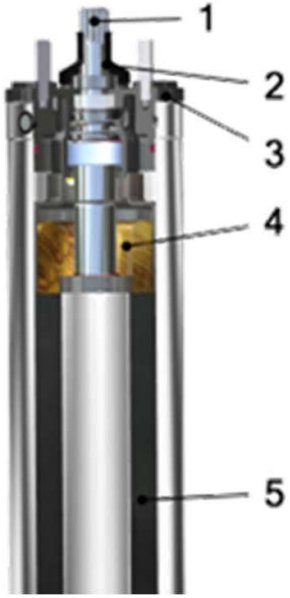
6" - CL140 - 3 Phase

**Available in opposite direction upon request*

CL - Oil filled Motors

CL Range - main features

Oil 4” & 6 ”



1. **Shaft** in Stainless Steel AISI431 (1.4057) – CLXV Shaft in Duplex Stainless Steel (shaft protrusion)

2. Triple **seal system**: bi-directional mechanical seal + radial seal + sand-guard

3. Coupling dimensions according to **NEMA** standards - Plug wire connection

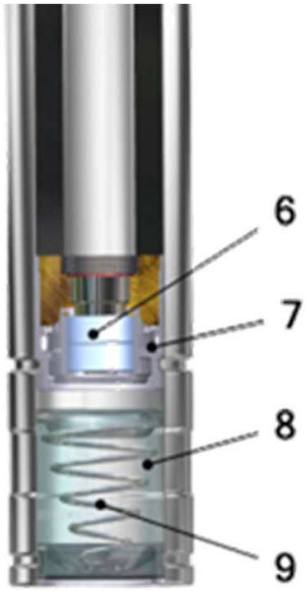
4. **Atoxic Oil** – NSF approved, FDA compliant

5. High **thermal tolerance** up to 35°C (25°C CLE) and 3~ motors suitable for VFD

CL - Oil filled Motors

CL Range - main features

Oil 4” & 6 ”



6. **Axial thrust** oversized bearings NSK or SKF, up to 6,5 kN (18 kN CL140) Double bearing comes as standard over 2,2kW (CL95).

7. Metallic thrust bearing seat

8. Compensation system: rubber membrane

9. Compensation spring for motors starting from 1,5 HP

Thrust Bearing				
CLE95	CL95	CL140	HP	kW
1,5 kN	3 kN		0,5	0,37
			0,75	0,55
			1	0,75
			1,5	1,1
			2	1,5
			3	2,2
3 kN			3	2,2
	6,5 kN		4	3
		10 kN	5,5	4
			7,5	5,5
			10	7,5
			12,5	9,2
			15	11
			17,5	13
		18 kN	20	15
			25	18,5
			30	22

CL - Oil filled Motors

Filling Oil

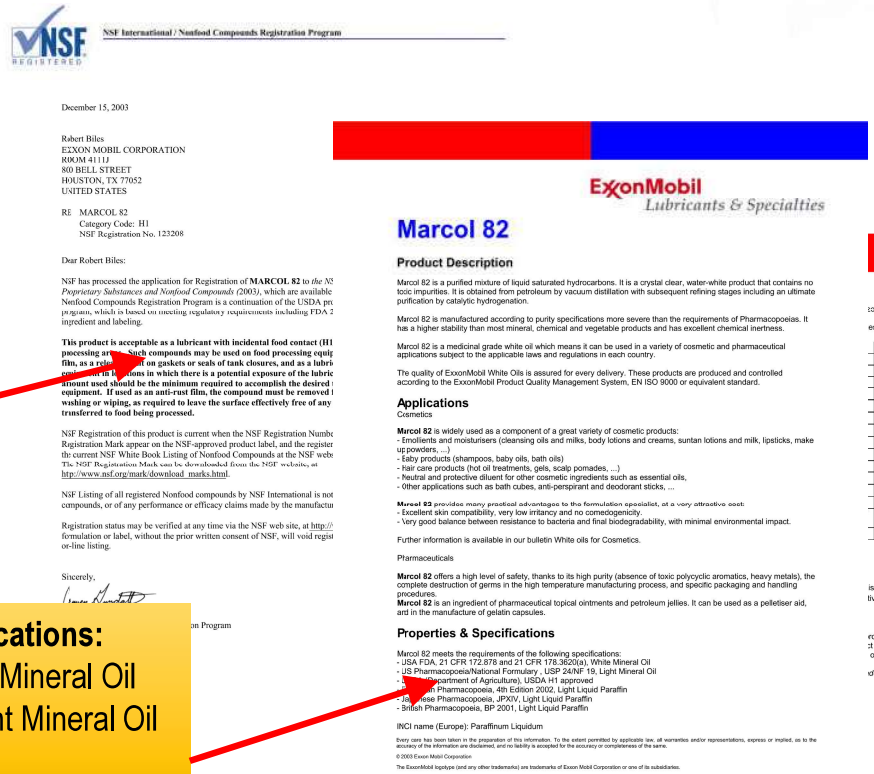
Oil 4” & 6 ”

Filling Oil NSF approved & FDA compliant

This product is **acceptable as a lubricant with incidental food contact** (H1) for use in and around food processing areas. Such compounds may be used on food processing equipment as a protective anti-rust film, as a release agent on gaskets or seals of tank closures, and as a lubricant for machine parts and equipment in locations in which there is a potential exposure of the lubricated part to food.

Marcol 82 meets the requirements of the following specifications:

- USA FDA, 21 CFR 172.878 and 21 CFR 178.3620(a), White Mineral Oil
- US Pharmacopoeia/National Formulary , USP 24/NF 19, Light Mineral Oil
- USDA (Department of Agriculture), USDA H1 approved
- European Pharmacopoeia, 4th Edition 2002, Light Liquid Paraffin
- Japanese Pharmacopoeia, JPXIV, Light Liquid Paraffin
- British Pharmacopoeia, BP 2001, Light Liquid Paraffin



NSF International / Nonfood Compounds Registration Program

December 15, 2003

Robert Biles
EXXON MOBIL CORPORATION
ROOM 41113
800 BELL STREET
HOUSTON, TX 77052
UNITED STATES

RE MARCOL 82
Category Code: H1
NSF Registration No. 123208

Dear Robert Biles:

NSF has processed the application for Registration of **MARCOL 82** to *the NS Proprietary Substances and Nonfood Compounds (2003)*, which are available Nonfood Compounds Registration Program is a continuation of the USDA pr program, which is based on meeting regulatory requirements including FDA 2 ingredient and labeling.

This product is acceptable as a lubricant with incidental food contact (H1 processing ar Such compounds may be used on food processing equip film, as a rele on gaskets or seals of tank closures, and as a lubri ions in which there is a potential exposure of the lubric amount used should be the minimum required to accomplish the desired equipment. If used as an anti-rust film, the compound must be removed washing or wiping, as required to leave the surface effectively free of any transferred to food being processed.

NSF Registration of this product is current when the NSF Registration Numbe Registration Mark appear on the NSF-approved product label, and the register the current NSF White Book Listing of Nonfood Compounds at the NSF web The NSF Registration Mark can be downloaded from the NSF website at http://www.nsf.org/mark/download_marks.html.

NSF Listing of all registered Nonfood compounds by NSF International is not compounds, or of any performance or efficacy claims made by the manufactu

Registration status may be verified at any time via the NSF web site, at http:// formulation or label, without the prior written consent of NSF, will void regist or-line listing.

Sincerely,

on Program

ExxonMobil
Lubricants & Specialties

Marcol 82

Product Description

Marcol 82 is a purified mixture of liquid saturated hydrocarbons. It is a crystal clear, water-white product that contains no toxic impurities. It is obtained from petroleum by vacuum distillation with subsequent refining stages including an ultimate purification by catalytic hydrogenation.

Marcol 82 is manufactured according to purity specifications more severe than the requirements of Pharmacopoeias. It has a higher stability than most mineral, chemical and vegetable products and has excellent chemical inertness.

Marcol 82 is a medicinal grade white oil which means it can be used in a variety of cosmetic and pharmaceutical applications subject to the applicable laws and regulations in each country.

The quality of ExxonMobil White Oils is assured for every delivery. These products are produced and controlled according to the ExxonMobil Product Quality Management System, EN ISO 9000 or equivalent standard.

Applications

Cosmetics

Marcol 82 is widely used as a component of a great variety of cosmetic products:
- Emollients and moisturisers (cleansing oils and milks, body lotions and creams, suntan lotions and milk, lipsticks, make up powders, ...)
- Baby products (shampoos, baby oils, bath oils)
- Hair care products (hot oil treatments, gels, scalp pomades, ...)
- Neutral and protective diluent for other cosmetic ingredients such as essential oils,
- Other applications such as bath cubes, anti-perspirant and deodorant sticks, ...

Marcol 82 provides many practical advantages to the formulation specialist, at a very attractive cost:
- Excellent skin compatibility, very low irritancy and no comedogenicity.
- Very good balance between resistance to bacteria and final biodegradability, with minimal environmental impact.

Further information is available in our bulletin White oils for Cosmetics.

Pharmaceuticals

Marcol 82 offers a high level of safety, thanks to its high purity (absence of toxic polycyclic aromatics, heavy metals), the complete destruction of germs in the high temperature manufacturing process, and specific packaging and handling procedures.
Marcol 82 is an ingredient of pharmaceutical topical ointments and petroleum jellies. It can be used as a pelletiser aid, and in the manufacture of gelatin capsules.

Properties & Specifications

Marcol 82 meets the requirements of the following specifications:
- USA FDA, 21 CFR 172.878 and 21 CFR 178.3620(a), White Mineral Oil
- US Pharmacopoeia/National Formulary , USP 24/NF 19, Light Mineral Oil
- USDA (Department of Agriculture), USDA H1 approved
- European Pharmacopoeia, 4th Edition 2002, Light Liquid Paraffin
- Japanese Pharmacopoeia, JPXIV, Light Liquid Paraffin
- British Pharmacopoeia, BP 2001, Light Liquid Paraffin

INCI name (Europe): Paraffinum Liquidum

Every care has been taken in the preparation of this information. To the extent permitted by applicable law, all warranties and/or representations, express or implied, as to the accuracy of the information are disclaimed, and no liability is accepted for the accuracy or completeness of the same.

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es and specifications may be subject to change.

Test Method	Typical	Min	Max
Visual		Clear & Bright	
Olfactory		Absent	
ASTM D 156		+ 30	
ASTM D 445		13.5	16.5
ASTM D 445	3.5		
Calculated	29		
Calculated		20	25
ASTM D 4052		843	855
ASTM D 4052		840	852
ASTM D 4052		0.844	0.856
ASTM D 97			-6
ASTM D 92		180	
ASTM D 1218		1.462	1.468
ASTM D 2140	67/33/0		
ASTM D 1533			35

is product is provided in the Material Safety Data Sheet (MSDS), available upon live or from www.ExxonMobil.com

rocess oils, waxes, bitumen and a full range of other lubricants, fuels and t your local ExxonMobil representative, or contact us at on other products.

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CL - Oil filled Motors

Versions

Oil 4”

Cast Iron

CL95-S

Brass

CL95-O-S

AISI 304

CLX95-S

AISI 316

CLXV 95

Full body AISI 316
Duplex Shaft

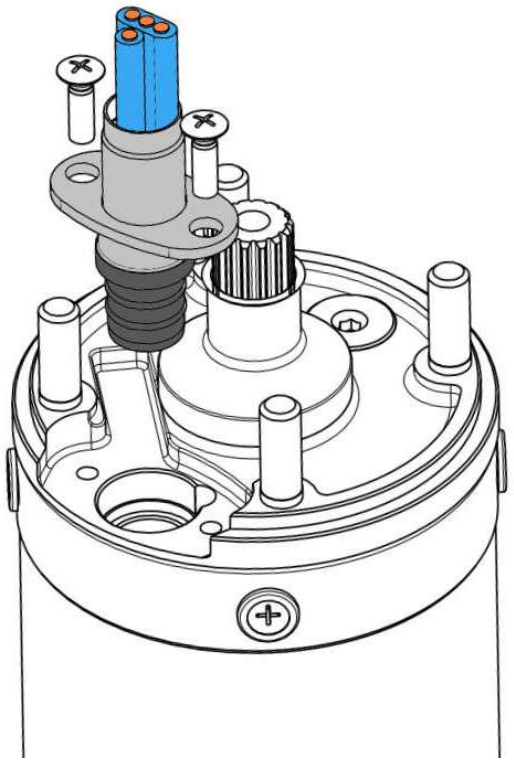
CL - Oil filled Motors

Power Connector

Oil 4”

All 4" motors are equipped with **Power connector** for:

- Easier and quicker installation
- Block oil infiltration into cable
- Quick maintainance/replacement



Cable with connector
DRINCABLE for potable water
ACS - KTW - DVGW W270 - WRAS approved

1 mm²

1,5 mm²

25m

35m

50m

50m

Attention to motor power and distance to avoid voltage drop

Water Filled
SUBMERSIBLE MOTORS

MS - Water Filled
SUBMERSIBLE MOTORS
6” 8 ” 10 ” 12 ”
50-60Hz

MS – Water filled Motors

Range

MS SERIES 6”, 8”, 10”, 12”, up to 400 HP

- Water Filled motors
- Completely Re-windable
- **PVC** winding (70°C- water up to 30°C)
- **PE+PA** winding (95°C –water up to 50°C & VFD use).
- Kingsbury Thrust Bearings – Bi-directional
- Double Mechanical Seal
- 50 Hz & 60 Hz
- 2 & 4 poles

MS – Water filled Motors

Range

kW	1,5	2,2	2,2	3	4	5,5	7,5	9,2	11	13	15	19	22	26	30	37	45	52	55	60	67	75	83	92	110	132	150	170	185	220	260	300
HP	2	3	3	4	5,5	7,5	10	13	15	18	20	25	30	35	40	50	60	70	75	80	90	100	113	125	150	180	200	230	250	300	350	400

50&60 Hz

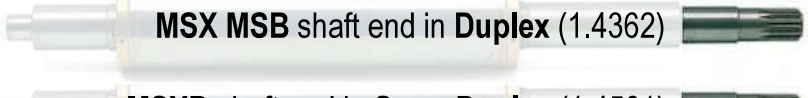
- **6" - MS152**
- **8" - MS201**
- **10" - MS251**
- **12" - MS300**
- **8" - MS201** - 4 Poles
- **10" - MS251** - 4 Poles
- **12" - MS300** - 4 Poles

MS – Water filled Motors

Technical Construction

MS - Shaft in SS **AISI 431** (1.4057)

MSX MSB shaft end in **Duplex** (1.4362)

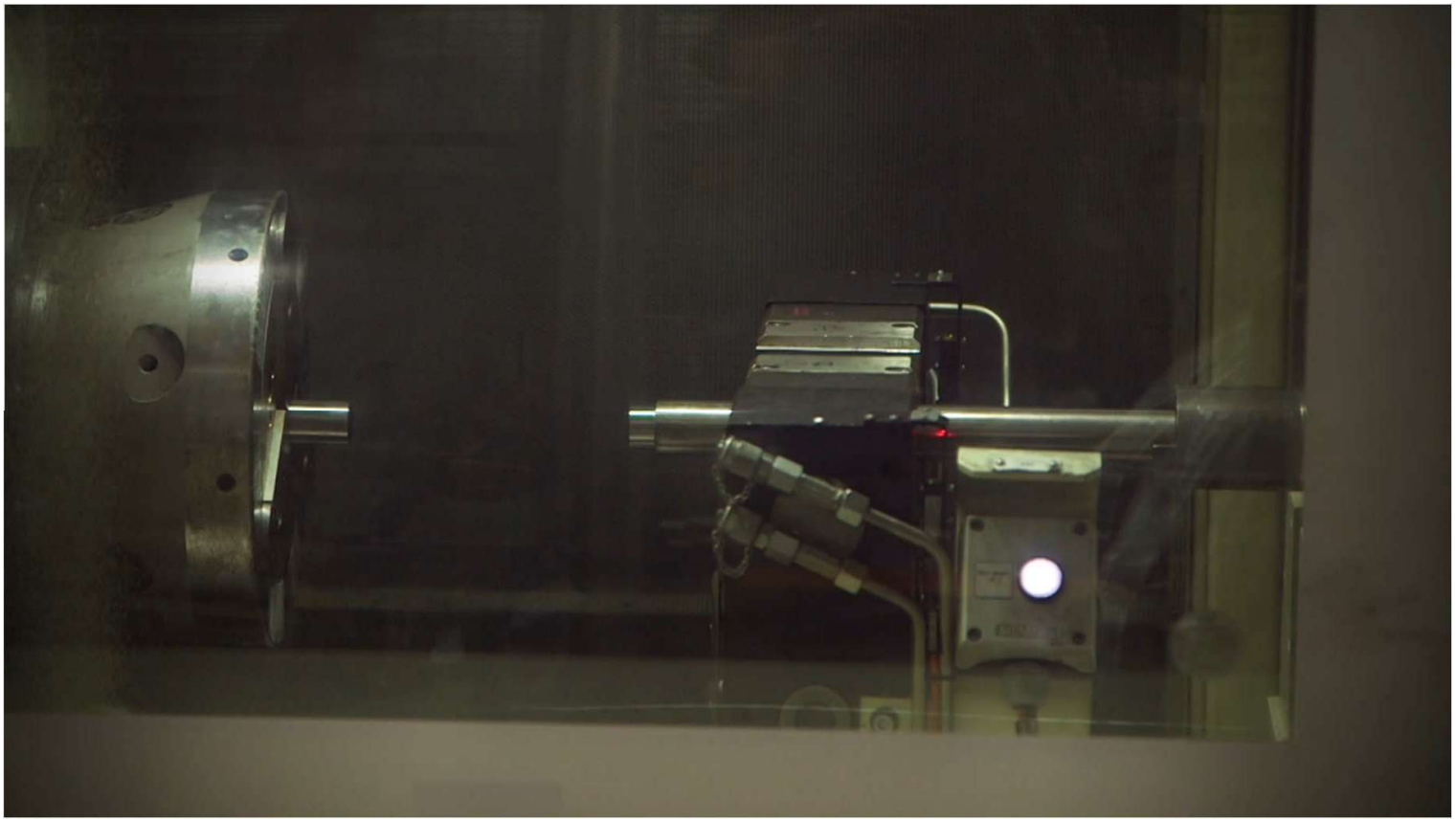


MSXD shaft end in **SuperDuplex** (1.4501)

Q1VEFF Mechanical Seal on 6" – 8"
Q1U3EGG Mechanical Seal on 10" – 12"

Thrust Bearing					
MS152	MS201	MS251	MS300	HP	kW
10 kN				2	1,5
				3	2,2
				4	3
				5,5	4
				7,5	5,5
				10	7,5
				13	9,2
				15	11
	45 kN			18	13
18 kN				20	15
				30	22
				40	30
				60	45
				80	60
		70 kN		100	75
				150	110
			70 kN	200	150
				250	185
				300	220
				350	260
				400	300

Shaft
Friction welding



MS – Water filled Motors

Special Versions

Available in different metallurgies:

- CAST IRON EN-GJL-250
- SS AISI 316
- BRONZE G-CuSn10
- DUPLEX SS

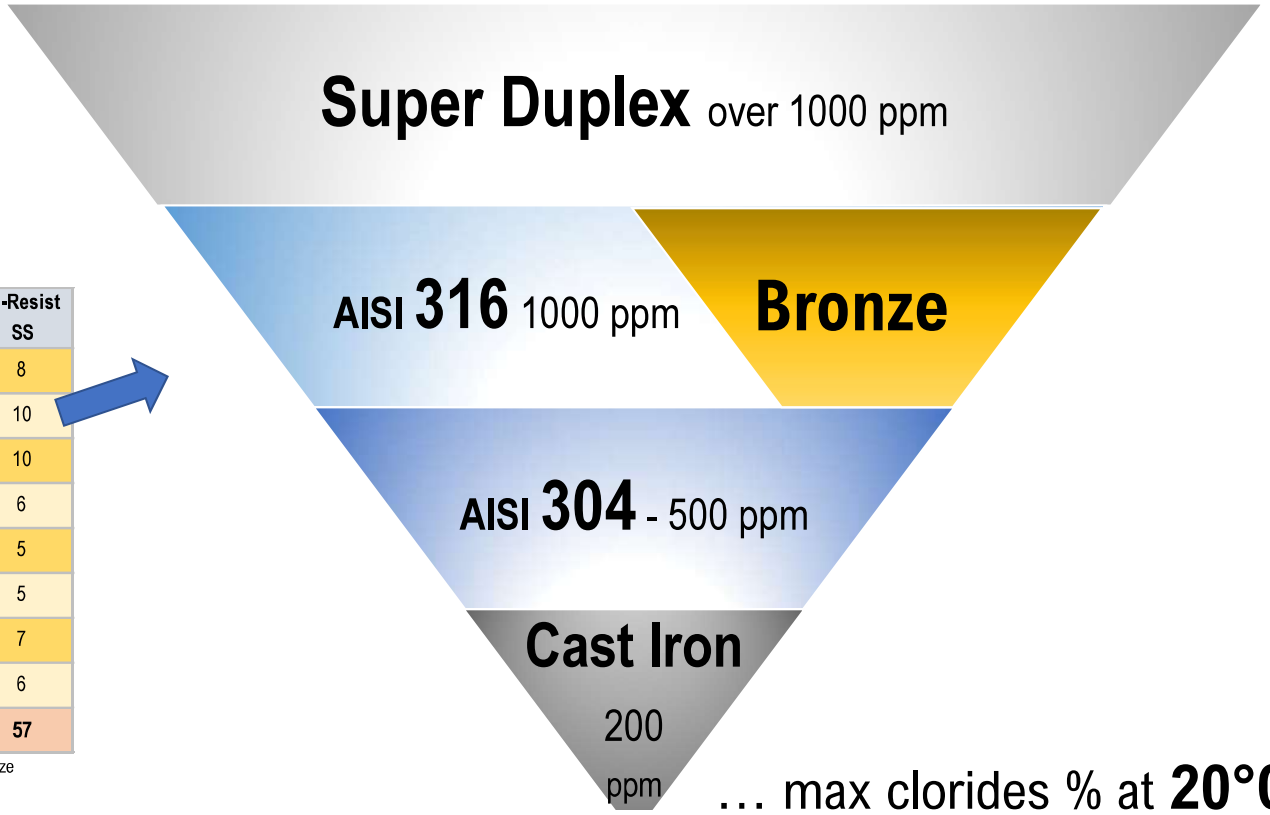
… Super Duplex SS (PREN > 40)

Metallurgies
Corrosion strenght

Attention: temperature affects very much the metal alloy strenght to corrosion.

Corrosion	Ni-Al Br	Duplex SS	Super Duplex SS	316 SS	Superaustenitic SS	Ni-Resist SS
General	9	10	10	10	10	8
Pitting	10	5	9	4	9	10
Crevice	8	4	8	3	8	10
Erosion	8	10	10	10	10	6
Cavitation	8	8	8	8	8	5
Stress	10	9	9	8	8	5
Polluted Sea Water	4	5	9	4	9	7
Fatigue	9	9	9	6	6	6
TOTAL SCORE	66	60	72	53	68	57

source: Dr J W Oldfield and Dr G L Masters, Collation of Data Comparing Properties of Aluminium Bronze With Cast Stainless Steels and Ni-Resist in Offshore Sea Water Environments 1996



MS – Water filled Motors

Motor Windings

PVC winding
70°C insulation
Suitable for water up to 30°C

PE+PA winding
95°C insulation
Suitable for water up to 50°C
Suitable for VFD use

VOLTAGE FLUCTUATION

MAX TOLERANCE

CL95	+6 -6 %
CL140	+6 -10 %
MS-all	+10 -10 %

MAX TOLERANCE
to guarantee performance and efficiency:
+5 -5 % (IEC 60034)

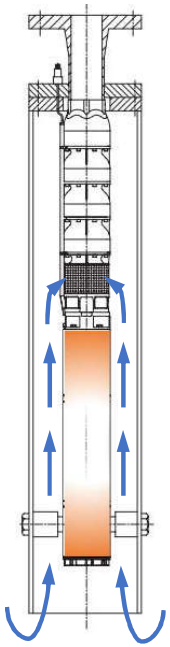
STAR-DELTA
Submersible motors can be ordered with double cable exit (open windings)
In order to be started with star-delta method

MS – Water filled Motors

Max cooling water temperature

Based on **winding** (PVC or PE+PA) and **water speed** MS motors can cope with higher temperatures

SAER supplies cooling shell in different material



Motore Motor Эл/дв	Potenza nominale Rated power - Мощность (kW) - (кВт)	Massima temperatura dell'acqua di raffreddamento Max cooling water temperature Макс.температура охлаждающей жидкости					
		0,1≤ V≤0,5 (m/s)		0,5≤ V≤1 (m/s)		V≥1 (m/s)	
		Standard	PE+PA	Standard	PE+PA	Standard	PE+PA
6" MS152	≤ 9,2	35	**55**	40	**60**	**45**	**65**
	11 ÷ 26	30	**45**	35	**50**	40	**55**
	30	25	40	30	**45**	35	**50**
	37	\	40	\	**45**	\	**50**
	45	\	30	\	35	\	40
8" MS201	≤ 75	30	**45**	35	**50**	40	**55**
	83 ÷ 92	25	40	30	**45**	35	**50**
	110	\	40	\	**45**	\	**50**
10" MS251	75 ÷ 110	30	**45**	35	**50**	40	**55**
	132 ÷ 150	25	40	30	**45**	**45**	**50**
	170 ÷ 185	15	35	20	40	25	**45**
12" MS300	150 ÷ 185	\	35	\	40	\	**45**
	220 ÷ 300	\	30	\	35	\	40

Accessories

COOLING SHROUD

Cooling water flow must be

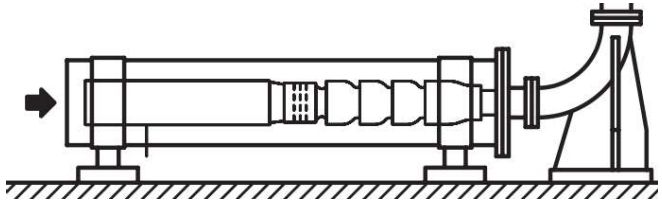
0.15 m/s min

3 m/s max

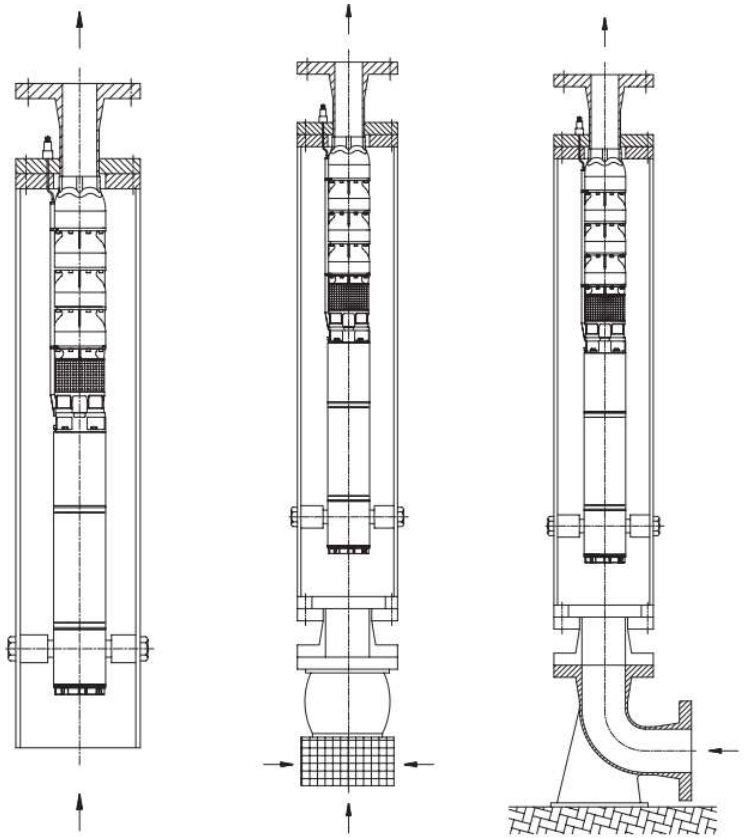
in order to secure proper cooling to the motor

$$v = \frac{Q\ x\ 354}{(D^2 - d^2)}$$

v = water speed (m/s)
Q = flow at DP (m3/h)
D = shroud inner diameter (mm)
d = motor outer diameter (mm)



TYPE **3A**



TYPE **1A** TYPE **1B** TYPE **1C**

6” Submersible Motors

Oil and Water filled - comparison

MS WATER FILLED RE-WINDABLE

Winding: Copper winding with PVC or PE+PA insulation

Filling: mono-propylene glycole and water.

Advantages:
- Motor fully repairable (motor replacement - not frequent)
- Water infiltration – no problem
- Heavy duty construction (kingsbury thrust bearing)
- Wide range of sizes and metallurgies

Disadvantages:
- Re-winding needs expert operator

PE+PA wire (polyethylene with sheathing of polyamide)

CL OIL FILLED RE-WINDABLE

Winding: enamelled copper wire (same as surface motors)

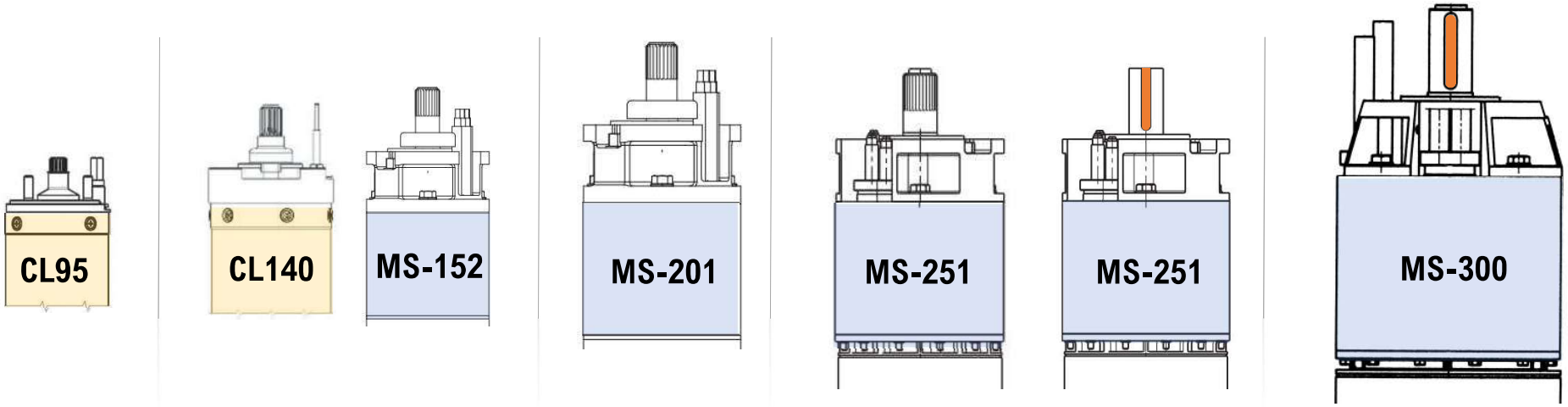
Filling: non-toxic oil (FDA approved) suitable for potable water

Advantages:
- Class F winding
- Motor fully repairable (same rewinding as normal el. motor)
- Commercial bearing for axial thrust
- Good price

Disadvantages:
- Often oil is not desirable for potable applications – non-toxic
- Water leaking will be a problem
- Standard applications
- Limited range and metallurgies

Coupling

Standards



4"	6"	8"	10"	12"
NEMA 4"	**NEMA 6"**	**NEMA 8"**		
ANSI B92.1. cl-5	ANSI B92.1. cl-5	ANSI B92.1. cl-5	ANSI B92.1.1970	
Z 14	**Z 15**	**Z 23**	**Z 30 / key**	**key**

VFD – inverter control

Reccomandations

Windings

- Water filled MS motors require PE+PA windings
- CL Oil filled are suitable

Max frequency NOT over motor rated frequency

Min frequency enough to guarantee water cooling of 0,1 m/s and NOT below 30Hz in order not to damage thrust bearing.

Start/stop ramp around 4 seconds (0 – 30Hz)

Max frequency variations per minute 8

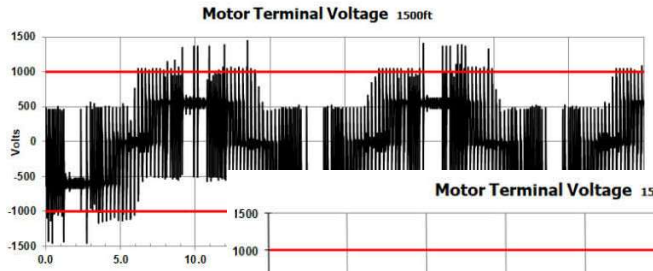
Please refer to User Manual for reference

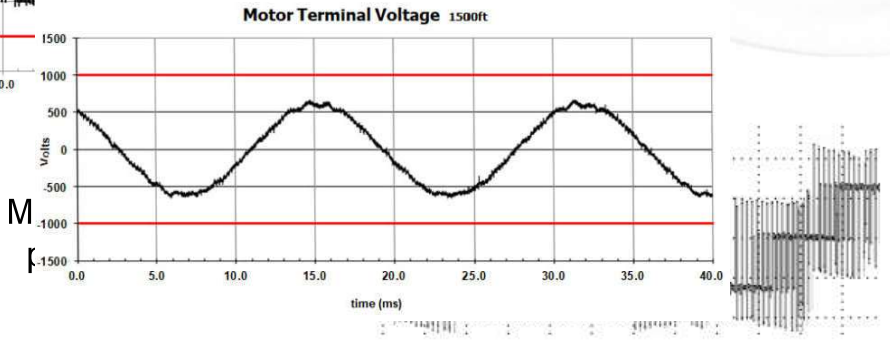
VFD – inverter control

Sine Wave Filter

Motors controlled by VFD are subjected to higher stresses and losses and become especially vulnerable to premature failure when the cable lengths between VFD and motor are long.

Inverter output **Sine wave filters** improve **voltage quality.**

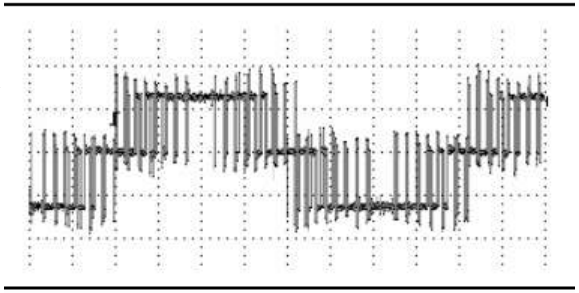




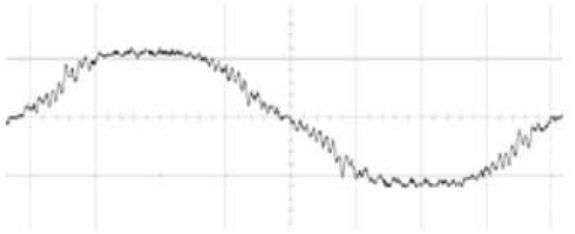
Filters and cable length
Applications in water can cause bigger stress on the windings and the motor insulation than applications in the air.

Tables of max cable lengths in VFD documentation are not valid for submersible motors.

Traditional dv/dt Filter
Marginal protection



Sine Wave dv/dt Filter
Good and adequate motor protection



Motor	Cable length ≤ 20 m				Cable length > 20 m			
	Insulation	*Filter*	*Upeakmax*	*Max.dU/ dt*	*Insulation*	*Filter*	*Upeakmax*	*Max.dU / dt*
CL95, CL140	standard	None	850 V	2000 V/µs	standard	Sine wave filter	850 V	2000 V/µs
6" MS < 30kW	PE + PA	None	850 V	500 V/µs	PE +PA	Sine wave filter	850 V	500 V/µs
6"-8"-10"-12"MS	PE + PA	Sine wave filter	850 V	500 V/µs	PE +PA	Sine wave filter	850 V	500 V/µs

Filters must be sine wave type. Traditional du / dt filters are not effective in the protection of the submersible motors.
Please consult the inverter supplier for more information.

Cable sizing

Reccomandations

Proper sizing ensures a suitable power supply to motor (voltage and current)

Parameters to consider:

Joule law
the passage of an electric current through a conductor produces heat

Installation details

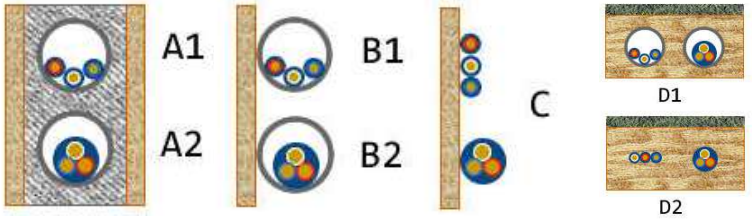
- Line rated voltage
- Type of starting
- Motor max current
- Motor power factor (cosφ)
- Distance to panel

Cable type

- Conductor material
- Single/multi core
- Insulation material

Cable installation

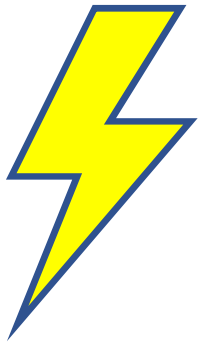
- Installation method (laying conditions)
- Ambient/soil temp
- Fluid temp
- Cable grouping/spacing
- IEC inst. Ref methods



Cable sizing

Ampacity and temperature

Ampacity
is the maximum current carrying capacities of a cable. This table apply for room temperatures of 30°C.



Type of cable	Rated cross-section mm²	Max. cable capacity 1 lines A	2 lines A	4 lines A	Resistance * R Ω/Km	Reatance X Ω/Km
Quadripole	1,5	24	21	19	16,17	0,168
Quadripole	2,5	33	29	26	9,70	0,155
Quadripole	4	45	40	36	6,02	0,143
Quadripole	6	58	51	46	4,01	0,135
Quadripole	10	80	70	64	2,32	0,119
Quadripole	16	107	94	86	1,47	0,112
Quadripole	25	141	124	113	0,949	0,106
Quadripole	35	176	155	141	0,674	0,101
Unipolar	50	216	190	173	0,469	0,0779
Unipolar	70	279	246	223	0,331	0,0751
Unipolar	95	342	301	274	0,251	0,0762
Unipolar	120	400	352	320	0,196	0,0740
Unipolar	150	464	408	371	0,153	0,0745
Unipolar	185	533	469	426	0,129	0,0742
Unipolar	240	634	558	507	0,0974	0,0752

*Resistance is calculated at 75°C of inside temperature

For different room temperatures maximum current carrying capacity of the cable must be corrected with a coefficient indicated

AMBIENT TEMPERATURE	CORRECTION FACTOR
10	1,22
15	1,17
20	1,12
25	1,06
30	1
35	0,94
40	0,87
45	0,79
50	0,71
55	0,61
60	0,50

Cable sizing

Voltage Drop

Cable choice has to guarantee
max voltage drop of **3%**
for correct motor operating

DOL starting

$$\Delta V\% = 0{,}173 \cdot I \cdot L \cdot (R \cdot \cos\varphi + X \cdot \operatorname{sen}\varphi) / V$$

Star/delta starting

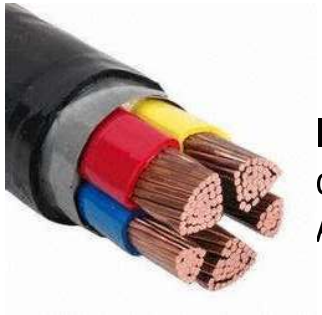
$$\Delta V\% = 0{,}116 \cdot I \cdot L \cdot (R \cdot \cos\varphi + X \cdot \operatorname{sen}\varphi) / V$$

I = rated current in Amperes
L = length of line in metres
cosφ = power factor
R, X = resistance and reactance of cable in ohms/metre
V = input voltage

Several website give support in calculating
Ampacity and **Volt drop**

Cable sizing

Quick reference table



In order to simplify cable sizing SAER submersible pump catalog offers sizing tables quick reference.
According to starting method (DOL or Star-delta).

The following tables define the maximum length of the cables depending on the power of the motors, input voltage, size of the cables.
Room temperature: **30°C**
Cable internal temperature: **75°C**
Max. voltage drop: **5%**

Example – DOL starting:

Potenza nominale / Rated poxer of motor / Potencia nominal / Puissance nominale du moteur / Nennleistung / Potência nominal		Tensione nominale / Rated voltage / Tencion nominal / Tension nominale / Nennspannung / Tensão nominal	Corrente nominale / Rated current / Corriente nominal / Courant nominal / Nennstrom / Corrente nominal	Sezione del cavo (mm²) - Cavi quadripolari / Cable section (mm²) - Quadripolar cables / Seccion del cable (mm²) - Cables cuadripolares / Section du câble (mm²) - Câbles quadripolaires / Kabelschnitt (mm²) - Vierpolige Kabel / Secção do cabo (em mm²) - Cabos quadripolares				Sezione del cavo (mm²) - Cavi unipolari / Cable section (mm²) - Unipolar cables / Seccion del cable (mm²) - Cables unipolares / Section du câble (mm²) - Câbles unipolaires / Kabelschnitt (mm²) - Einpolige Kabel / Secção do cabo (em mm²) - Cabos unipolares							Cable section (mm²) - (Unipolar cables - 2 lines in parallel) / Seccion del cable (mm²) - (Cables unipolares - 2 lineas en paralelo) / Section du câble (mm²) - (Câbles unipolaires - 2 lignes en parallèle) / Kabelschnitt (mm²) - (Einpolige Kabel - 2 lineen in parallel) / Secção do cabo (em mm²) - (Cabos unipolares - 2 linhas em paralelo)					
HP	kW	V	A	10	16	25	35	50	70	95	120	150	185	240	2x50	2x70	2x95	2x120	2x150	2x185
50	37	220	135	-	-	55*	75	107	147	186	230	273	313	386	214	294	373	460		
		240	124	-	-	65*	90	128	175	222	273	325	373	459	255	350	444			
		380	78	69*	108	163	225	320	439											
		400	74	77*	119	181	249	355	486											
		415	71	82*	128	195	268	382												
60	45	220	162	-	-	-	62*	89	122	154	190	227	260	320	177	243	309	381	453	
		240	149	-	-	-	74*	106	145	184	226	270	309	381	211	290	367	453		
		380	94	-	89*	135	186	264	363	461										
		400	89	-	98*	149	206	293	402											
		415	86	-	106*	161	222	315	433											

Installation form

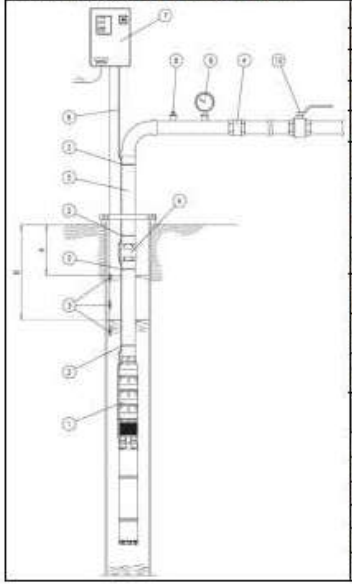
Reccomandations

INSTALLATION FORM

To be completed and kept for future references

Very useful in requesting assistance.

INSTALLATION			
Duty point: Flow:		Head:	
Date of installation:		Operation time:	Hours
Incoming voltage:	V	Motor insulation resistance	Mohm
Running Amps:	A		
Max. temperature of the pumped liquid:			°C



Well/casing diameter			mm
Pipe diameter			mm
Pipe material			
Nr. of Sticks of pipe			
Static water level			m
Dynamic water level			m
Spring assist check valves (number, meters and types)	1	m	type
	2	m	type
	3	m	type
Pump inlet setting			m
Flow sleeve diameter (if present)			mm
Case ends	1 from	m to	m
	2 from	m to	m
Well depth			m

1	Electric submersible pump	2	Cable holder clamps
3	Level probes	4	Check valve
5	Pipe	6	Cable
7	Control box	8	Priming air valve
9	Manometer	10	Gate valve
A	Static level	B	Dynamic level

Notes:

Re-windable vs Encapsulated

Differences

Re-windable

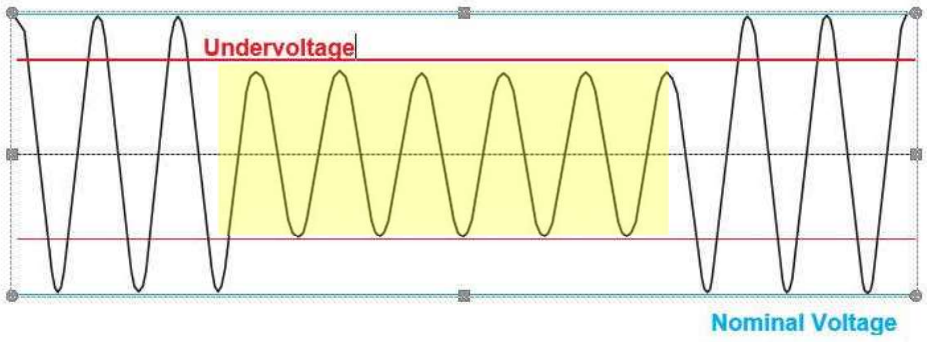
Re-windable motors offer as name says, the possibility to repair. Re-winding a motor is quite accurate operation and requires full access to stator caves to ease wire introduction.

SAER offers the **winding kit** or, in alternative, the motor stator fully winded for an easy and quick repair.

Voltage fluctuation

Voltage fluctations increase electrical current and therefore inner temperature. Should it protract in duration, windings will damage.

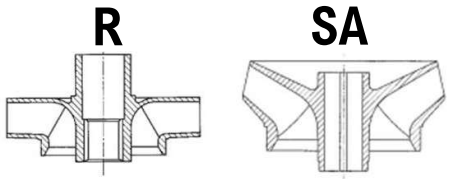
Re-windable motors, repairable, are preferable to ***incapsulated*** which have to be totally replaced.

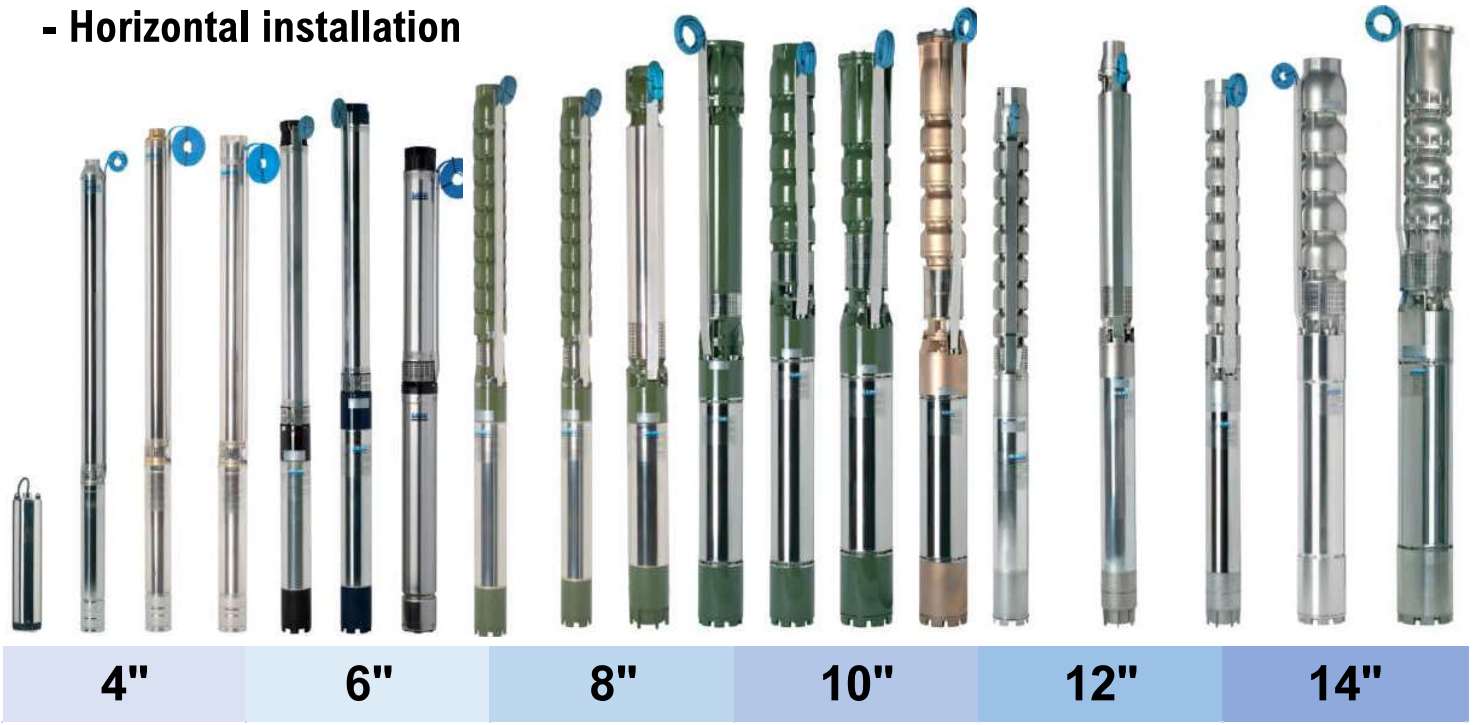


SUBMERSIBLE BORE-HOLE

RANGE

- Wide range 4” 6” 8” 10” 12” 14”
- Quality components
- Metallurgies available
- Horizontal installation



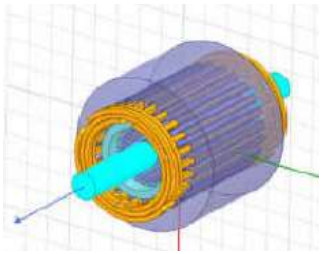


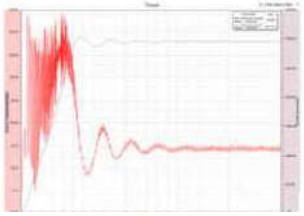
100% SAER MANUFACTURING

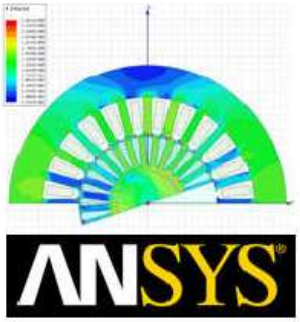
Bore-hole pump Range	
Q max	700 m^3/h
H max	860 m
P_2 max	300 kW
Metallurgies	
Cast Iron	
Bronze	
AISI 316	
Super Duplex	

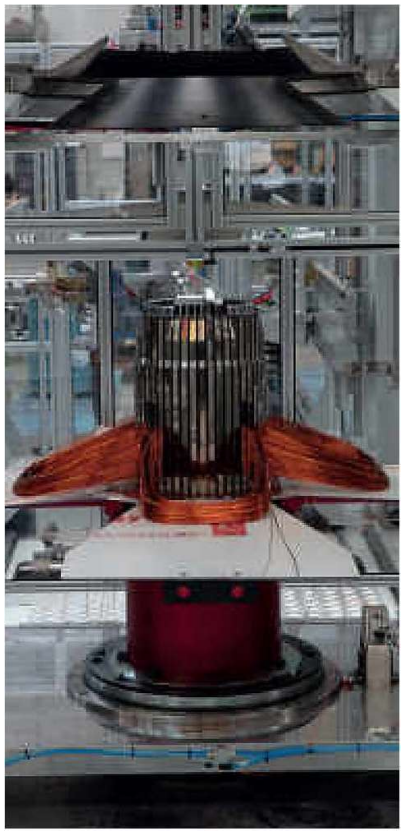
SAER Motor production

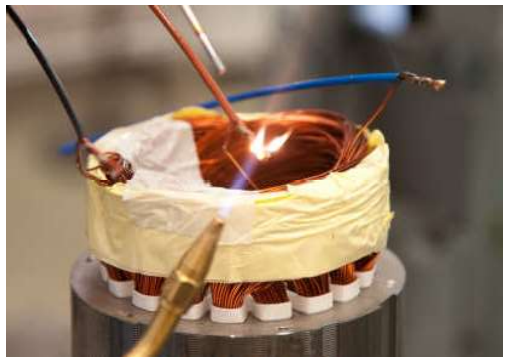
3D Design & Simulation - Production - Test











MT2 – MT4

SURFACE MOTORS 2/4 POLES – B3 B5

50-60Hz
2/4 poles
IE1 IE2 IE3 IE4

SAER

Manufactures **Surface motors:**

- TEFC Normalized IEC 60034
- 50 – 60 Hz
- 2 and 4 poles
- 0,18 – 110 kW
- Mountings (EN 50347): **B3 B5 B14 B35**
- Efficiency class (IEC 60034-30): **IE1, 2, 3, 4**
- Single phase 1~ and three phases 3~

MEC	71	80	90	100	112	132	160	180	200	225	250	280
IP	54*		55									
	*IP55 on request											

SAER
Motor factory

SAER MOTOR DIVISION
S. Giacomo, RE,
Italy

MS MOTOR WINDING

MADE IN ITALY Motors
Certificate of Origin on request

Accessories

Control Panels & thermal sensors

SAER

Offers a wide range of **control panel** for submersible and surface motors:

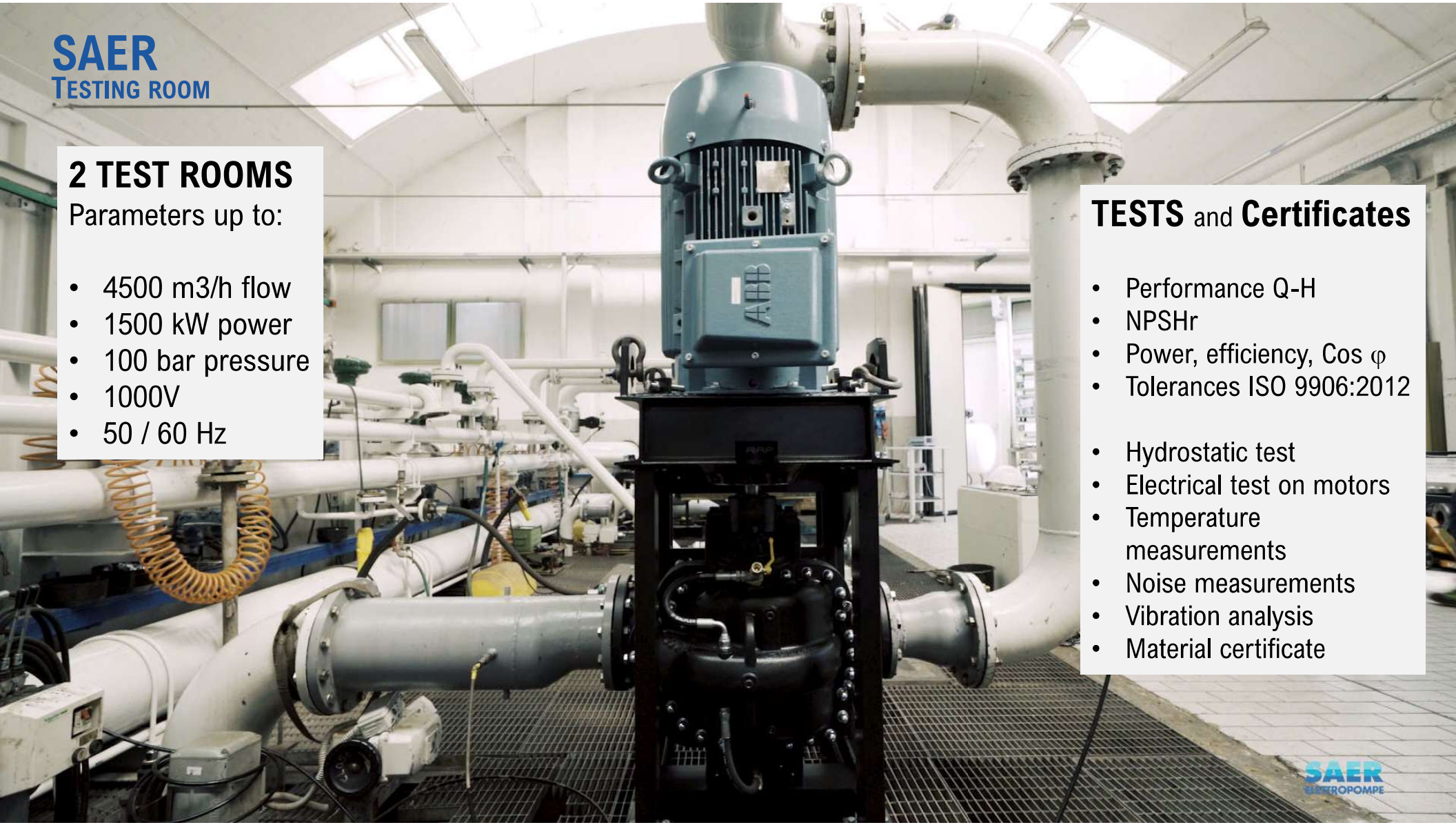
- Direct start (electromechanical or electronic)
- Star-delta
- Impedance start
- Soft start
- Inverter (VFD)

As well as **thermal sensors**

- PTC
- PT100
- anti-condensation heaters

(to be requested at order confirmation)

SAER
TESTING ROOM



2 TEST ROOMS
Parameters up to:

- 4500 m3/h flow
- 1500 kW power
- 100 bar pressure
- 1000V
- 50 / 60 Hz

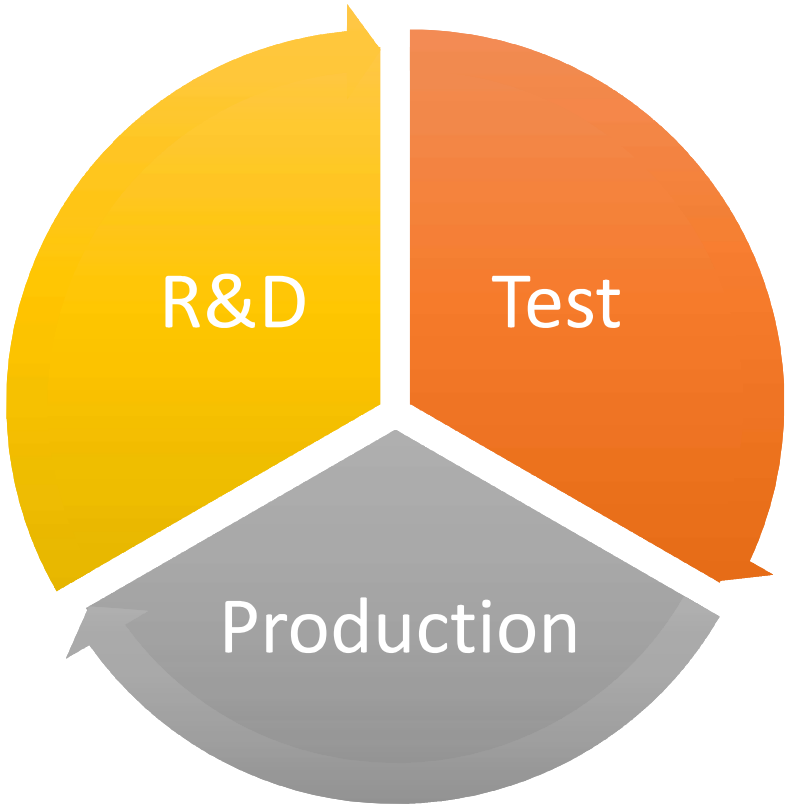
TESTS and Certificates

- Performance Q-H
- NPSHr
- Power, efficiency, Cos φ
- Tolerances ISO 9906:2012

- Hydrostatic test
- Electrical test on motors
- Temperature measurements
- Noise measurements
- Vibration analysis
- Material certificate

SAER
100% Quality Control Process

The control of whole process
design to final tests
confers to SAER products
Top reliability & longest life span



Stock
QUICK DELIVERY

Large stock of

- **Pumps**
- **Parts**
- **Motors**

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About Us Cable Plastics References Contact

Prysmian Group NSW

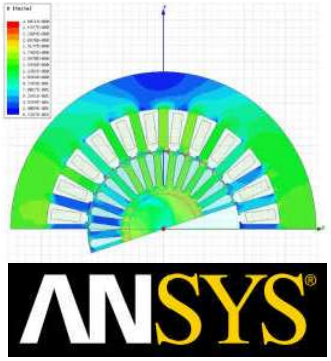
Winding Wires for Submersible Motors

Winding Wires for Submersible Motors

European supplier for submersible motor wires

SAER ELETTROPOMPE

https://www.nsw.com/en/Cable/Winding-Wires



Thank you for kind attention

SAER®
ELETTROPOMPE