

BLUE MANTA INTERNATIONAL LIMITED

02-7500 CERTIFICATION PACKAGE

BLUE MANTA SERIAL NUMBER: BM-SP-7525

OFFICE ADDRESS:
5 KIRKTON AVENUE
PITMEDDEN ROAD INDUSTRIAL ESTATE
DYCE
ABERDEEN
AB21 0BF

BLUE MANTA CONTACT:
karin.walker@bluemanta.com

PRODUCT OVERVIEW AND SALES DRAWING

DNV CERTIFICATION

**EC DECLARATION OF CONFORMITY &
NORSOK DECLARATION OF CONFORMITY**

**OPERATING AND MAINTENANCE
INSTRUCTIONS**

MAINTENANCE HISTORY



75" Spooling Unit (02-7500)

Product Overview

Built to a very high standard in accordance with Lloyds/ DNV Standard CN-2.71 rules, the Spooler's dimensions have been optimised to handle a wide range of control line and other flexible products. This spooler is fully road and sea transportable and comes with an integral pneumatic power unit, controls, modular bases and fully certified lifting gear.

Applications:

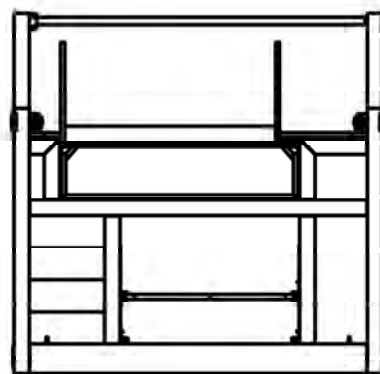
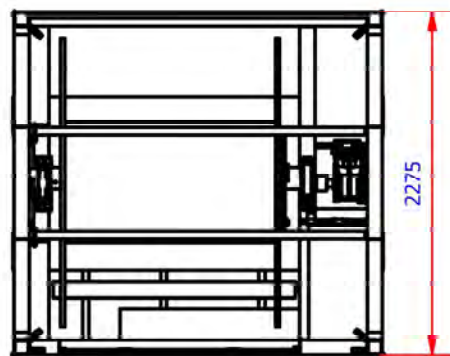
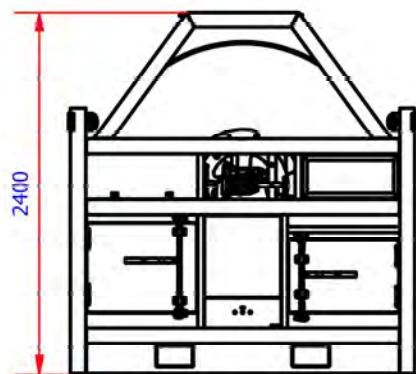
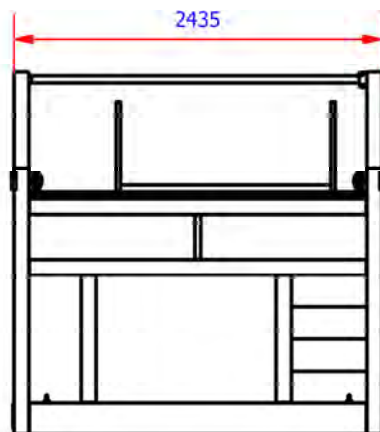
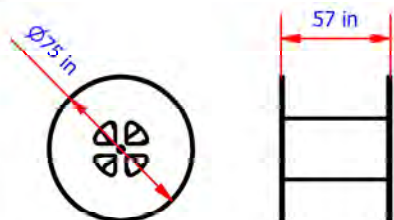
Rugged, heavy duty, high quality Spooler, engineered to ensure reliability.

It is designed to provide back tension of well control line. This is a dependable, heavy duty unit for well completion and other spooling applications.

Standard Features:

Fully guarded
Adjustable back tensioning control
Quick change out of drums
Gearbox ratios to suit application

Load capacity	Up to 9000Kgs
Tare weight	2000Kgs
Shaft diameter	3" or 4"
Max drum dimensions	75"dia x 57"wide
Hydraulic rotary	Optional Extra
Air motor	See unit file
Gearbox	See unit file
Air prep unit	Norgen
Air connection	Crowsfoot/McDonalds
Guards, protection	Fully guarded



Notes:
Built to DNV 2.7-1 Standard
Model Number: 02-7500
Tare: 2000 Kgs
SWL: 9000 Kgs
Gross: 11000 Kgs

REVISION HISTORY

REV	BY	DESCRIPTION	DATE	CHKD	APPR	EXT AP	CL APP
4	CA	Updated showcase view and sales drg to match new build of spooler	24.01.14	CA	IH	-	-
5	DB	Updated Showcase image and drawing to match new design style for spooler.	04.09.14	DB	IH		



MAX DRUM: 75" DIA X 57" W, 3" or 4" Shaft

This drawing is copyright© and is the property of Blue Manta International, and must not be reproduced or used without the express permission of Blue Manta International.

General tolerances UNO
Steel fabrications: ± 3.00mm
Machining: ± 0.25mm
Concentric: ± 0.05mm
Angular: ± 0.05mm

Machined corner radii:
Inside: ± 0.50mm UNO
Outside: ± 0.65mm UNO

Description: **75" Spooling Unit Sales**

Part no: **02-7500**

Drawing No: **BMD-283.S**

Client: **Blue Manta**

Scale: **NTS @ A4**





Firma/Company Redkon AS Org.nr.: 818745702 Plattformveien 6 4056 TANANGER Norge	Eier/Owner BLUE MANTA AS Skvadronveien 22 4050 SOLA Norge	Lokasjon/Location
SPOOLING UNIT 75"		
Eiers ID/Owner's ID BM-SP-7525 Prod. år/year 2015 Tillatt belastning /Payload 9 000Kg Lengde/Length 2435mm NDT Dato/NDT Date ET - 14.07.2026	Serienr./Serial No/Batch BM-SP-7525 Prod. iht./acc. to DNV 2.7-1, EN 12079 Egenvekt /Tare 2 000Kg Bredde/Width 2275mm	Produsent/Producer Blue Manta International Limited Sertifisert av/Certified by Lloyd`s Register EMEA - Aberdeen Total vekt/Max Gross Weight 11 000Kg Høyde/Height 2390mm
H-Shackle Green Pin Polar G-5163 WLL.8,5t		
Eiers ID/Owner's ID AJ8GP-GP8AZ (25/3-5) Prod. iht./acc. to EN 13889 Material/Material Grade 8	Serienr./Serial No/Batch AJ-AZ WLL (tonn) 8,5t DNV TA. Nr/DNV TA.No S-5623	Produsent/Producer Van Beest Antall/Quantity 3 Sertifikat nr./Certificate no. RED-287344
Chainsling 4-Leg 16mm, Grade 80, WLL.16,9t v/30° - DNVGL-ST-E271		
Serienr./Serial No/Batch MCK6764 Prod. iht./acc. to DNV 2.7-1-Type Approval Lengde / Length 4 m	Produsent/Producer Scaw Metal Group WLL (tonn) 16,9t NDT Dato/NDT Date ET - 14.07.2026	Prod. år/year 2018 Diameter/Diameter 16 mm Sertifikat nr./Certificate no. RED-213097
H-Shackle Green Pin Polar G-5163 WLL.8,5t		
Eiers ID/Owner's ID V8GP/GP8AL (25/2) Prod. iht./acc. to EN 13889 Material/Material Grade 8	Serienr./Serial No/Batch V8/AL WLL (tonn) 8,5t DNV TA. Nr/DNV TA.No S-5623	Produsent/Producer Van Beest Antall/Quantity 1 Sertifikat nr./Certificate no. RED-287345
Testet/kontrollert iht. - tested/inspected acc. to NORSOK R003	Sjekkliste/Check list	Sertifikat/Certificate ABN1405458/5
Merknader/Remarks		

Undertegnede attesterer at ovennevnte innretning med tilbehør er inspisert som angitt ovenfor etter bestemmelsene i « Forskrift om administrative ordninger § 8-7»

The signatory confirms that the above mentioned lifting appliance(s) with accessories was inspected in accordance with the regulations given in "Forskrift om administrative ordninger § 8-7»"

OK-Ingen kommentarer/No comments C-Kommentar/Comments MO-Merknad/Memorandum RC-Pålegg/Recommendation NC-Avvik (Ikke godkjent)/Non-conformity ✓ -Løst/Solved

Kontrolldato/Exam. Date 14.07.2026	Kontrolltype/Type of Examination Periodisk kontroll / Periodic control	Status OK Godkjent for bruk/Approved for use	Neste kont./Next Exam. 14.07.2027
Utført av/Done By K. Eike Kenneth Eike, Inspektør		Ansvarlig/Responsible Ø. Jacobsen Øyvind Jacobsen, Stavanger, Fagleder	

Client/Kunde Blue Manta AS			Rapport Nr: ET27601.2	
Contractor/Kontraktør			Date/Dato 14.07.2026	
Object/Objekt: 75" Spooling Unit w/chainsling			Drawing/Tegning no	
ID: BM-SP-7525, sling. MCK6764			Material Carbon (CS).	
Type of weld/ Sveis type T-forbindelse			Reinforcement/Råk høyde Normal	
Heat treat/Varmebeh. No / Nei	Surface cond. /Overflatebesk. Painted	Coating type/ Malingstype Proxy/Norsok	Thickness/Tykkelse 0-500 µm	
Examination proc/Undersøkelse pros. 103-1		Reference/Referanse NS-EN ISO 17643, DNVGL-CG-0051		
Equipment/Utstyr WeldCheck+ Model:		Type / Modell IWEL-003	Ser.no. 509541/01	
Sonde Weld probe/Sveiseprobe: Balance Built into probe		Probe no. 530841/10		
Adjustment / Instillinger Freq/Frekv: 100kHz Gain / Forsterkning 45 dB Phase / Fase 13 Hipass:DC Lopass: 30Hz				
Reference/ Referanse material Ferromag.	Crack depth / Sprekkdybde 1mm	Alarm 507438/05%	Ser.no 403641-55	
Examined for / Undersøkt for. Begge (Langsgående og tvergående)				
Extent of examination / Kontrollomfang: 100% ET of padeyes and 20% of load bearing construction. 100% ET of masterlink, transition and joining links & 10% of chain				
Result of examination / Resultat av undersøkelsen: No indications found during inspection. Accepted acc. to spec.				
Kommentar/Comments: NDT performed acc. to DNV 2.7-1				
Rep.marked/ Rep merket	Check of / Kontr.av	Enclosures / Vedlegg 0	Inspector/Inspektør Ariel Cichowski	Cert./Sert.no. 2017/ET2-0259/01
Stempel: 		Inspector / Inspektør Level 2  Ariel Cichowski		

Note: This Certificate is the standard international form as recommended by the International Labour Office in accordance with ILO Convention No. 152

SERTIFISERING · INSPEKSJON · NDT · SALG · UTLEIE
WWW.REDKON.NO T.F. 955 85 008 POST@REDKON.NO

Kunde/Client: BLUE MANTA AS

Sertifikat nr./Certificate no. : RED-213096

For prøving og undersøkelse av kjettinger, ringer, kroker, sjakler, svivler, blokker og andre løfteredskaper.

For testing and thorough examination of chains, rings, hooks, shackles, swivels, pulley blocks and other lifting accessories.



Ordrenr/Order No: 1095 Kundens ordrenr/Customer Order No: 0210

FORM. NR. 4

ID. Kjenningnr. eller merke / Distinguishing number or mark	Beskrivelse av utstyr / Description of gear	Antall / Number	Dato for prøve / Date of test	Prøvelast (tonn) / ProofLoad (tonnes)	WLL (tonn) / WLL (tonnes)
MCK5651	Chainsling 4-Leg 16mm WLL16,9t - DNVGL-ST-E271 Serienr./Serial No/Batch: MCK5651 Produsent/Producer: Scaw Metals Group Prod. år/year: 2018 Prod. iht./acc. to: DNV 2.7-1-Type Approval, NS-EN 818-4, EN 12079-2 According to drawing No. : OSWDNV43016400N Arb.vinkel/Sling leg ang. : 30° Lengde / Length : 4 mtr Material : Grade 80 Enhancement factor : 1,23 Ref. Certex Norge AS ded of conformity no. 0000478421/010/2018 Scaw metals group Org Cert no. CS18 4573 (OSWDNV430169400N) Redskapet er sammensatt av sertifiserte typegodkjente enkeltkomponenter fra produsent. / The lifting equipment consists of components approved by producer.	1	*	*	16,9

- (7) Ble redskapene undersøkt av en sakkyndig virksomhet etter prøvebelastningen og funnet å ha utholdt belastningen uten deformasjon og å være fri for brudd, brist eller andre feil? / Was the above gear examined by a competent person and found to have withstood the proof load without damage or deformation, and no fraction, cracks etc detected? **Ja/Yes**
- (8) Navn og adresse til fabrikanten eller forhandleren / Name and address of manufacturer or distributor **Scaw Metals Group**
- (9) Navn og adresse på den sakkyndige virksomhet, som utførte prøven og undersøkelsen / Name and address of manufacturer, company, association or distributor that performed the test and examination **Redkon AS
Kontinentalvelen 10
4056 TANANGER
Norway**
- (10) Den ansvarshavendes navn og stilling i ovennevnte institusjon, sakkyndig virksomhet som utførte prøven og undersøkelsen / Position of signatory that performed test and examination **Frode Austdal
Daglig leder**
- (11) Prøvene tilfredsstiller kravene i Best. nr. 522 Maskiner, vedlegg 1, Best. Nr. 703 Forskrift om utførelse av arbeid og Best. nr. 706 Forskrift om administrative ordninger. The test are in compliance with rules and regulations given in Best. nr. 522 Maskiner, Annex 1, Best. Nr. 703 Forskrift om utførelse av arbeid and Best. nr. 706 Forskrift om administrative ordninger

Jeg attesterer herved på vegne av dem som er nevnt under ovenstående nr. (8*/9*) at de ovennevnte oppgaver er riktige. / I certify on behalf of those mention above under no. (8*/9*) that information given above are correct.

26.10.2018

Frode Austdal, Daglig leder

061050



**McKinnon
Chain**



INSPECTION CERTIFICATE

acc To EN 10204 3.1

TYPE APPROVED CHAIN SLINGS FOR OFFSHORE CONTAINERS

McKinnon Chain
161 A Ning Road Duncanville
Vereeniging South Africa
PO Box 61721 Marshalltown
Gauteng, 2101, South Africa
Tel: +27 16 428-6000
Fax: +27 16 428-1089/1212/1420
E-mail: chainsec@scaw.co.za
Webster: www.scawmetals.com

Certificate Date	2018/09/14	Manufacture Date	2018/09/01	Cert no	CS18 4625
Supplied To	William Hackett Lifting Products				
Customer Order No	601249	Order Date	2018/06/07		
McKinnon Order No	844306	Ship Date	2018/09/05		
Commodity No	OSWDNV430169400NREV1	Quantity	10 Each	Serial No	MCK6764-MCK6773
Description	16 mm Grade 80 4-Legged Off-shore Container Lifting Sling				
Working Load Limit	16.9	(t) at	30	° (to vertical max) or	° (included angle)
Enhancement Factor	1.23	Reach LB (mm)	4000 (+98-4)		

Sling Components	
Component	Dimensions
MLNK	36 X 140 X 270
CPLM	26 X 80 X 130
CHNB	16 X 22.4 X 48
CPLB	20 X 50 X 110

Markings: refer to tag

Notes:

Working Load Limit = Maximum Gross Container Mass

This certificate refers to EN 818-2 and 818-4 for the chain and EN 1677-1, 2, 3, 4 for the components used in the sling assembly

The lifting set has been designed, approved, tested and certified in accordance with the following specifications / standards:

DNV Standard for Certification No 2 7-1 "Offshore Containers" (June 2013) and ISO 10855.

This certificate is based on DNV type approval no TAS0000013X

Declaration of Conformity:

Declaration of Incorporation of partly manufactured machinery refer to Directive 2006/42/EG, Annex II 1 A

Assembling instruction refer to the relevant European standard, Directive 2006/46/EG. We declare that the products as specified in this certificate, fulfils the applicable essential Health and Safety requirements of the Machinery Directive, 2006/42/EG

ISO 9001:2015 approved by SGS (Certificate 2A17209870) - Address: Harrowdene Office Park, Building 1, Western Service Road, Woodmead, Johannesburg, 2191, RSA

After treatment of sling: This certificate is only applicable to goods properly used in the condition supplied by McKinnon Chain a division of Scaw South Africa (PTY) Ltd. Further processing by, or on behalf of, the user (involving: Cold Working, Heating, Electroplating, Hot-dip Galvanizing or other treatments) is entirely the user's responsibility and invalidates This Certificate is invalidated by any alterations and/or deletion

CHEMICAL ANALYSIS OF STEEL												
Sling Component	Cast No	C	P	S	Si	Al	Cr	Ni	Mo			
MLNK	1703276	0.22	0.015	0.006	0.22	0.053	0.49	0.52	0.28			
CPLM	1802886	0.22	0.018	0.003	0.21	0.033	0.52	0.98	0.30			
CHNB	1801290	0.22	0.015	0.004	0.21	0.037	0.50	0.53	0.26			
CPLB	1703273	0.23	0.009	0.005	0.22	0.035	0.50	0.52	0.27			

IMPACT RESISTANCE (Charpy V-Notch Joule)						Test Temp	
Sling Component	Charpy Test Ref	Charpy 1	Charpy 2	Charpy 3	Average	Location	Required min ave
MLNK	1703276-0409	51 /	50 /	45 /	48.0 /	Parent / Weld	42J / 27J
CPLM	1802886-0409	66 /	59 /	65 /	64.0 /	Parent / Weld	42J / 27J
CHNB	1801290-0409	60 /	59 /	51 /	57.0 /	Parent / Weld	42J / 27J
CPLB	1703273-0409	54 /	60 /	61 /	65.0 /	Parent / Weld	42J / 27J

MECHANICAL PROPERTIES											
Sling Component	Cast No	PF kN		BF kN		Elongation (%)		Bend Deflection mm		Hardness	
		Act	Req'd	Act	Req'd	Act	Req'd	Act	Req'd	34-38 HRC	
MLNK	1703276	> 510	510	1,465	816	≥ 20	20	> 28	28	37	
CPLM	1802886	> 295	295	815	472	≥ 20	20	> 21	21	36	
CHNB	1801290	> 201	201	327	322	≥ 20	20	> 13	13	35	
CPLB	1703273	> 197	197	504	315	≥ 20	20	> 16	16	36	

Crack Detection (NDT):	Magnetics Particle Inspection - No Defects Found
Technical file compiled and certificate signed off by Z Mudau (Quality Assurance Manager)	
Company Representative: G. Katerarakis (General Manager - McKinnon Chain a division of Scaw South Africa (PTY) Ltd)	

Authorized Person	Z Mudau (QA Manager)	Signature	2018/09/14
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GEN-TST-001-F-01.01



Nr/No: 0000478421/010/2018

Produkt Sertifikat / Product Certificate

Ordrenr/Order No: 0000478421 Kundens ordrenr/Customer Order No: 1095

Kjenningnsnr. eller merke/Distinguishing mark

MCK5651, MCK6764

Antall/Number: 2

Beskrivelse av utstyr/Description of equipment**KJ SKREV 4P 16MM 4.0M DNV 2.7-1 WLL 16,9T V/30° GR8**

Produsent/Producer:

William Hackett

Prod. iht./acc. to:

DNV 2.7-1 / NS-EN 818-4 / EN 12079-2

Teknisk ansvarlig/Responsible Technical

William Hackett Chain Products Limited, - Alnwick

Aktuelle produkter leveres i samsvar med helse og sikkerhetsforskriftene i Maskindirektivet 2006/42EC Best.nr.522,vedlegg 1
Actual products comply with the health and safety requirements of the Machinery Directive 2006/42EC Best.nr.522,annex 1

Sted og dato/Place and Date:

Follestad, 24.10.2018

Sign.

Harald A. Hope, Managing Director

ABERDEEN LIFTING SERVICES LTD

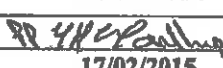


E.C. DECLARATION OF CONFORMITY

CLIENT: BLUE MANTA 6 KIRKTON AVENUE PITMEDDEN RD IND EST DYCE ABERDEEN AB21 0BF	TEST HOUSE: ABERDEEN LIFTING SERVICES LTD HOWE MOSS CRESCENT KIRKHILL IND EST ABERDEEN AB21 0GN TEL: 01224 723333 FAX: 01224 723311
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DECLARATION No.	CUSTOMER ORDER No.		REQUISITION No.	DATE
F9341-09	19845			17/02/2015
I.D. NUMBER	QTY	DESCRIPTION	WLL/ PAYLOAD	PROOF LOAD
BM-SP-7525/1	1	FOUR LEG WIRE ROPE SLING TO DNV2.7-1 (2013) & NORSOK R-002 LEGS 3.2M x 26MM DIA IWRC FITTED TO A347/31 QUAD ASSEMBLY C/W FLEMISH EYES TENSILE GRADE: 1960N/MM2	11 TONNE 0-45 DEG	17.4 TONNE PER LEG
25/2-5	4	SAFETY PIN BOW SHACKLES (POLAR)	8.5 TON	17 TON

DECLARATION: I declare that the items described above comply with all the requirements of The Machinery Directive 2006/42/EC 1ST Edition 2009.

	COMPLETED BY:
ENGINEER.	M.MAKAR
SIGNATURE.	
DATE.	17/02/2015

NEXT INSPECTION DATE: 16/08/2015
DATE OF MANUFACTURE: 17/02/2015

CERT No: PP094474-1228



ABERDEEN LIFTING SERVICES LTD

CERTIFICATE FOR OFFSHORE CONTAINER LIFTING SLINGS

MANUFACTURER:	ABERDEEN LIFTING SERVICES LTD		ADDRESS:	HOWE MOSS CRESCENT KIRKHILL IND EST DYCE ABERDEEN, AB21 0GN
CLIENT	BLUE MANTA			
DET NORSKE VERITAS TYPE APPROVAL No:		TYPE DESIGNATION:		
S-6558		LIFTING SETS FOR OFFSHORE CONTAINERS		
DESCRIPTION OF THE SLING:		IDENTIFICATION No:		
1 x 4 LEG WIRE ROPE SLING		SLINGS: BM-SP-7525/1 SHACKLES: 25/2-5		
WORKING LOAD LIMIT (WLL)	ANGLE OF LEGS (TO VERTICAL)	DIAMETER OF SLING LEGS:	LENGTH OF LEGS:	
11 TONNE	0-45 DEG	26MM DIA IWRC	3.2 MTR	
WIRE ROPE SLINGS				
REFERENCE STANDARD:		GRADE OF WIRE ROPE	GRADE OF TERMINAL FITTINGS	
DNV2.7-1: 2013		1960N/mm ²	GRADE 80	
TESTS CARRIED OUT ON SLING:	DNV2.7-1 (2013)	TEST REPORT No:	F9341-09	
LIFTING SET COMPONENTS - (SHACKLES TO BE INCLUDED ONLY IF ASSEMBLY SECURED) (IF NEW COMPONENTS ARE INSTALLED BEFORE RE-CERTIFICATION, REFERENCE TO PREVIOUS CERTIFICATE NUMBER AND THE NEW COMPONENTS UNIQUE IDENTIFICATION MARK)				
DESCRIPTION	SUPPLIER/MANUFACTURER	IDENTIFICATION MARK	DNV TA No:	
26MM DIA IWRC WIRE ROPE	BRUNTON WOLF	UCR020		
A347/31 QUAD ASSY	CROSBY	10P, 10D	S-6401	
8.5TON SAFETY PIN BOW SHACKLES (POLAR)	VAN BEEST	(x3) AJ8, 8AZ (x1) V8, 8AL	S-5623	
THIS LIFTING SET HAS BEEN DESIGNED, APPROVED AND TESTED IN ACCORDANCE WITH DET NORSKE VERITAS STANDARD FOR CERTIFICATION No: 2.7-1 "OFFSHORE CONTAINERS (2013)"				
THIS SLING ALSO CONFORMS TO THE FOLLOWING STANDARDS(S):				
REMARKS: ALS CERT No: F9341-09				
THIS CERTIFICATE IS BASED ON DNV TYPE APPROVAL No. S-6558				
DATE: 17/02/2015 PLACE: ALS WORKSHOP NAME & TITLE: M. MAKAR <i>P. Y. Makar</i>		 MANUFACTURER NAME & ENDORSMENT		SIGNATURE:

QF48

15 10810

P.O. Box 57, 3360 AB Sliedrecht
 Industrieweg 6, 3361 HJ Sliedrecht
 The Netherlands
 Tel. +31 184 41 33 00
 Fax. +31 184 41 49 59
 email: sales@vanbeest.nl
 www.vanbeest.nl

VAN BEEST



Brierley Lifting Tackle Co
 Timmis Road, Lye
 DY9 7BQ Stourbridge, West Midlands
 United Kingdom

INSPECTION CERTIFICATE TO EN 10204 - TYPE 3.1

Number 80095893 Date 01.12.2014
 Customer no. 30191 Page 10 / 19

Our order no.	Your ref. no.
140584	9945

Qty.	Description
30	POGHMB25 G-5163, Green Pin® Polar Shackles, bow shackles with safety bolt, for use under extreme climatic conditions, to EN13889, hot dipped galvanized, grade 8, diameter bow 25 mm, diameter pin 28 mm, WLL 8.5 ton

Material properties

Line	Charge no.	Yieldpoint (N/mm2)	Tensile Strength (N/mm2)	Elong- ation (%)	Impact test type: Charpy V (Joules)					Item	Traceability
					temp (°C)	1	2	3	Avg		
1	8614030526	780	910	14	-40	109	109	118	112	Bow	AJ
2	8614050365	912	984	17	-40	95	94	97	95	Pin	AZ

Chemical composition

Line	C %	Si %	Mn %	P %	S %	Cr %	Mo %	Ni %	V %	Cu %	Al %
1	0.360	0.220	0.570	0.013	0.004	0.960	0.170	0.050		0.110	0.045
2	0.340	0.210	0.570	0.015	0.004	0.960	0.170				0.028

J.J. Vermeulen (QA-Manager)



VAN BEEST B.V., manufacturer and supplier of wire rope and chain fittings.

Registered trade marks "Green Pin" and "Excel". Member of Van Beest International.

Rekening IBAN code: NL88RABO0368343155, SWIFT/BIC code: RABONL2U

VAT number NL 0081.33.835.B01, Chamber of Commerce Rotterdam - No. 23008317. All our offers and contracts are subject to our General Conditions of Sale as registered with the District Court of Dordrecht on March 12, 2012 under number AL 6/2012.

Form : KF-10-16E

Issue date: 01.12.2014



Offshore Container Certificate

Name of Manufacturer:
Blue Manta International Limited

Address:
**Blue Manta International Limited
5 Kirkton Avenue
Pitmedden Road Industrial Estate
Aberdeen
AB21 0BF**

This is to certify that the under noted Offshore Container, which was manufactured and tested in accordance with the requirements of Lloyd's Register Group Container Certification Scheme, has been inspected and found to be in accordance with the approved drawings and the prototype container identified as follows:

Offshore Container Type Description:

75" Spooling Unit

Max. Gross Mass (Rating):

11,000 Kgs

Tare Mass:

2,000 Kgs

Payload:

9,000 Kgs

External Dimensions (LxWxH):

2435mm x 2275mm x 2390mm

Design Temperature:

Minus 20 Deg. C

Lloyd's Register Group Type Approval No.:

GB-LR 61091 02/12

Assembly Drawing No.:

BMD-283 Rev. 8

Purchaser:

Blue Manta International Limited

Container Model No.:

75" Spooling Unit / BMD-283

Manufacturer's Serial No.:

BM-SP-7525

Date of Manufacture:

01 March 2015

Specification of lifting set. This certificate is only valid when the container is fitted with approved lifting set.

Min. shackle bolt diameter:

28mm

Max. angle of legs (from vertical):

45 Deg.

Min. safety factor (against breaking):

Chain, shackles, rings, links

N/A

Wire ropes

N/A

Proof testing:

This offshore container, or another offshore container from the same fabrication series, has been subjected to the following proof test:

Manufacturer's Serial No. of container tested:

BM-SP-7525

Total test load (2.5R):

27,500 Kgs

Test date:

16 February 2015

The container also complies with the following requirements and regulations:

DNV 2.7-1:2013, EN 12079:2006, in support of IMO MSC/860 (1998) & LRCCS: 2013

Remarks:

- 1. Prototype testing performed on unit Serial Number BM-SP-7512 on 11/05/2014.**
- 2. 4 point test to 27,500 kgs / 2 point lift to 16,500 kgs / Vertical impact test to 11,000 kgs.**
- 3. Enhancement Factor 1.457.**
- 4. Lifting set excluded from Design Appraisal Document.**

Issued at **Aberdeen**

on **20 March 2015**



A G SORLEY
Surveyor to Lloyd's Register EMEA

A subsidiary of Lloyd's Register Group Limited

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0EC Declaration of Conformity

In accordance with BS EN ISO/IEC 17050-1:2010

We: **Blue Manta International**
5 Kirkton Avenue
Pitmedden Road Industrial Estate
Dyce, Aberdeen, UK
AB21 0BF

Declare that:

Equipment: 75" Spooler
Classification: Group II Category 3 G IIB T4

Serial numbers: **BM-SP-7525**

Is in accordance with the following Directives:

94/9/EC Conforms to the Essential Health and Safety Requirements of the Equipment in Explosive Atmospheres (ATEX) Directive.

2006/42/EEC Conforms to the Essential Safety Requirements of the Machinery Directive

And has been designed and manufactured to the relevant parts of the following standards:

EN 13463-1: 2009 Non – electrical equipment for use in potentially explosive atmospheres Part 1: Basic methods and requirements.

EN 13463-5: 2011 Non-electrical equipment intended for use in potentially explosive atmospheres. Protection by constructional safety 'c'

EN 15198: 2007 Methodology for risk assessment of non-electrical equipment and components for intended use in potentially explosive atmospheres.

And is compliance with the following additional standards:

DNV 2.7-1: 2006 Standard for Certification of Offshore Containers 2006
Lloyds LRCCS: 2013 Lloyds Register EMEA Container Certification Scheme 2013
EN 12079-1: 2006 Offshore Container and Associated Lifting Sets

The following ATEX certified parts are included in the assembly:

Description	Manufacturer	Type/Model	Type of protection
Air motor	Gast	6AM-NRV-22A	N/A
Gearbox	SEW Eurodrive	KA77BAM56	N/A

The following self assessed parts are included in the assembly

Description	Manufacturer	Type/Model	Ignition Risk Assessment Reference
Bearings	Arvis	70mm Split Bearing	
Pneumatic components	Norgren/Camozi Hydrasun		

Special Conditions for safe use:

1. No unauthorised modifications to be carried out without the express permission of Blue Manta International as this may invalidate ATEX certification.
2. The unit must be effectively bonded to the structure of the offshore installation.
3. The accompanying instructions contain important information for the installation, operation and maintenance of the equipment and must be adhered to.

I hereby declare that the equipment named above has been manufactured and tested and found to comply with the relevant sections of the above referenced directives and standards.

Signature:
(Responsible Person)



Name: Ally Thomson

Position: Base Manager

Date: 23.12.2014

Z-015 DECLARATION OF CONFORMITY

Z-015 DECLARATION OF CONFORMITY																																													
Supplier	ID	Type	Description																																										
Blue Manta International Ltd	BM-SP-7525	U10	Back Tension Spooling Unit																																										
This temporary/equipment is designed in accordance with NORSOK Z-015, without non-conformance ☒, with non-conformance (see list below) ☐, Date / name / company / position / signature: 05.10.21 / Mark Ritchie / Blue Manta International Ltd / Base Manager /  This container/equipment is approved for location in Ex-zone: Zone 1 ☐, Zone 2 ☒, Non-hazardous area ☐, Date / name / company / position / signature: 05.10.21 / Mark Ritchie / Blue Manta International Ltd / Base Manager /  Use of this container/this equipment requires clearance in each case (see 5.5.1) This container/equipment is CE-marked, based on the following regulations (EEA directives, enforcement date for when the regulations apply without transition period): <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 40%;">REGULATION / DIRECTIVE</th> <th style="width: 40%;">APPLICABLE DIRECTIVE</th> <th style="width: 20%;">OK</th> </tr> </thead> <tbody> <tr> <td>- Simple pressure vessels</td> <td>2014/29/EU FOR-2017-02-10-171</td> <td style="text-align: center;">☐</td> </tr> <tr> <td>- EMC</td> <td>2014/30/EU FOR-2017-10-10-1597</td> <td style="text-align: center;">☐</td> </tr> <tr> <td>- ATEX</td> <td>2014/34/EU FOR-2017-11-29-1849</td> <td style="text-align: center;">☒</td> </tr> <tr> <td>- PED</td> <td>2014/68/EU FOR-2017-10-10-1631</td> <td style="text-align: center;">☐</td> </tr> <tr> <td>- Machinery regulations</td> <td>2006/42/EF FOR-2009-05-20-544</td> <td style="text-align: center;">☒</td> </tr> </tbody> </table> Non-conformance: <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;">No.</th> <th style="width: 25%;">Reference requirement doc. (doc. no. and section)</th> <th style="width: 40%;">Description of non-conformance</th> <th style="width: 20%;">Compensating measures/remarks</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table> Restrictions or special requirements for use of container/equipment: <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;">No.</th> <th style="width: 20%;">Area of validity (see NOTE)</th> <th style="width: 40%;">Description</th> <th style="width: 25%;">Name and date (responsible person)</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>All</td> <td>No unauthorised modifications to be carried out without the express permission of Blue Manta International as this may invalidate ATEX certification</td> <td>Mark Ritchie 05.10.21</td> </tr> <tr> <td>2.</td> <td>Offshore Installation</td> <td>The unit must be effectively bonded to the structure of the offshore installation</td> <td>Mark Ritchie 05.10.21</td> </tr> <tr> <td>3.</td> <td>All</td> <td>The accompanying instructions contain important information for the installation, operation and maintenance of the equipment and must be adhered to.</td> <td>Mark Ritchie 05.10.21</td> </tr> </tbody> </table> Use of this equipment requires prior acceptance of responsible person in the company, see 5.8.3: Yes ☐, No ☒ (If Yes, please list the conditions that require prior acceptance in the remarks column) NOTE - Can for example be installation, company or all				REGULATION / DIRECTIVE	APPLICABLE DIRECTIVE	OK	- Simple pressure vessels	2014/29/EU FOR-2017-02-10-171	☐	- EMC	2014/30/EU FOR-2017-10-10-1597	☐	- ATEX	2014/34/EU FOR-2017-11-29-1849	☒	- PED	2014/68/EU FOR-2017-10-10-1631	☐	- Machinery regulations	2006/42/EF FOR-2009-05-20-544	☒	No.	Reference requirement doc. (doc. no. and section)	Description of non-conformance	Compensating measures/remarks					No.	Area of validity (see NOTE)	Description	Name and date (responsible person)	1.	All	No unauthorised modifications to be carried out without the express permission of Blue Manta International as this may invalidate ATEX certification	Mark Ritchie 05.10.21	2.	Offshore Installation	The unit must be effectively bonded to the structure of the offshore installation	Mark Ritchie 05.10.21	3.	All	The accompanying instructions contain important information for the installation, operation and maintenance of the equipment and must be adhered to.	Mark Ritchie 05.10.21
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Z-015 Data Sheet for Temporary Equipment

<u>Z-015 Data Sheet for Equipment Part 1 (always to be completed)</u>			
<u>Supplier</u>	<u>ID No</u>	<u>Type</u>	<u>Description</u>
Blue Manta International	BM-SP-7525	U10	Back Tension Spooling Unit

<u>Outer Dimensions</u> <u>(L x H x D)</u>	<u>Net Weight (kg)</u> <u>Max Weight (kg)</u>	<u>Approved for</u> <u>location in Ex Zone</u>	<u>Year of</u> <u>Manufacture</u>	<u>Latest Modification</u>
2435mm x 2390mm x 2275mm	2000kg 11000kg	Zone 2	2015	none

Manned when hooked up to Installation

Connect suitable air supply (3/4" minimum hose diameter) via either Crows foot or MacDonald connection. Depending on the connection at the back of the air connection this may have to be changed to match the connection which is being used.

Permanent ☐
 Periodic ☒
 Normally Unmanned ☐

Signature:
(Responsible Person)



Name: Mark Ritchie

Position: Base Manager

Date: 05.10.21

DATA SHEET, part 2, equipment data (relevant parts shall be completed)

Supplier	ID		Revision date
Blue Manta International Ltd	BM-SP-7525		

DIESEL ENGINE (5.3.1)

Type, manufacturer	Rated Power	Ignition source emergency shutdown (230 V)	Gas detector	Max temp for emergency shutdown
N/A	N/A	N/A	N/A	N/A
Ex-rating	Exhaust temp.	Surface temp. (max)	Combustion air inlet arrangement	Exhaust pipe
N/A	N/A	N/A	N/A	N/A
Spark arresters	Flame arresters	Over speed protection	Air dampers	
N/A	N/A	N/A	N/A	
Safety functions (stop):				
N/A				
Start system type	Cooling system type	Diesel day tank (volume)		
N/A	N/A	N/A		

COMPRESSOR (5.3.2)

Type, manufacturer	Output capacity (m ³ /h, bar)	Safety functions (stop)	Design code	Operating pressure
N/A	N/A	N/A	N/A	N/A
Type, manufacturer	Output capacity (power)	Ignition source emergency shutdown (230)	Gas detector	Monitoring and safety systems
N/A	N/A	N/A	N/A	N/A
Spark arresters				
N/A				

TANKS (5.3.3)

Type, manufacturer	Design code pressure rating	Scope of use/ restrictions	Safety valve last tested	Potential ignition sources
N/A	N/A	N/A	N/A	N/A
Temperature range				
N/A				

HIGH PRESSURE CLEANING EQUIPMENT (5.3.4)				
Type, manufacturer	Design code pressure rating	Safety valve last tested	Power supply (electrical/diesel, for diesel, see diesel engine)	Operating temperature range
N/A	N/A	N/A	N/A	N/A
Ignition source emergency shutdown (Compressor's monitoring and safety devices)				
N/A	N/A	N/A	N/A	N/A

DIESEL BURNER (5.3.5)				
Type, manufacturer	Output capacity (power)	Ignition source emergency shutdown (230 V)	Gas detector	Max temp. for emergency shutdown
N/A	N/A	N/A	N/A	N/A
Spark arresters	Flame arresters	Flame protection	Air damper	
N/A	N/A	N/A	N/A	N/A
Ex-rating	Exhaust temp. (maximum)	Surface temp. (maximum)	Combustion air duct	Exhaust duct
N/A	N/A	N/A	N/A	N/A
Safety functions (stop):				
N/A				

BOILER (5.3.5)				
Type, manufacturer	Output capacity (power)	Safety functions (stop):	Design pressure	Operating pressure
N/A	N/A	N/A	N/A	N/A
Safety valve				
N/A				

DATA SHEET, part 3, discipline data (relevant parts shall be completed)

Supplier	ID		Revision date
Blue Manta International Ltd	BM-SP-7525		

MECHANICAL (5.4.1)

Lifting devices	Fire classification	Main door (dimensions, inward or outward opening, self-closing mechanism)	Emergency exit (dimensions, inward or outward opening, self-closing mechanism)	
S/N: MCK6764 4 leg Chain Lifting Sling c/w polar shackles	N/A	N/A	N/A	

FIRE (5.4.2)

Fire alarm panel (type)	Detectors: Type, number, location	Portable fire extinguishers (number, type, size)	Room fire extinguishing system (description)	
N/A	N/A	N/A	N/A	

GAS (5.4.3)

Gas alarm panel (type)	Detectors: Type, number, location	Alarm level (LEL)	Disconnect level (LEL)	Gas type
N/A	N/A	N/A	N/A	N/A

ELECTRICAL SYSTEMS (5.4.6)				
Battery or UPS requiring special shutdown: N/A				
Electrical equipment, permanently installed consumers: N/A				
Tag	Description	Voltage, Un (V)	Current, In (A)	Power Pn (kW)

VENTILATION (5.4.7)				
Size of fan motor (W)	Air volume fan (m ³ /h)	Air changes (per hour)	Pressurization (Pa)	Shutdown in event of pressurization loss (time delayed, local alarm type)
N/A	N/A	N/A	N/A	N/A

DATA SHEET, part 4 Working Environment Area Chart (WEAC)			
Supplier	ID		Revision date
N/A			

ANNEX J
LIST OF ALL EX-APPROVED EQUIPMENT ON THE UNIT

The documentation for the temporary equipment (container or skid), shall include a list of all Ex-approved equipment on the unit, see 5.8.2.

TAG NUMBER	EQUIPMENT DESCRIPTION	APPROVED FOR ZONE	CERTIFICATE	COMMENT
6AM-NRV-22A	Gast Air Motor	Zone 2	N/A	See GAST Declaration of Conformity within NORSOK Package
KA77B R37 AM56	SEW Eurodrive Gearbox	Zone 2	N/A	See SEW Eurodrive EU Declaration of Conformity within NORSOK Package

Annex C - (Normative) - Checklist matrixes - See explanation of checklists in 5.1.3																												
Checklist matrixes			Containers														Equipment											
Type of container and equipment		Detailed requirement in clause Z-015	(A)	(B)	(C)	(E)	(G)	(I)	(J)	(L)	(M)	(N)	(O)	(P)	(Y)	(Z)	U01	U02	U03	U04	U05	U06	U07	U08	U09	U10	U08	U09
Control items			Accommodation container	Office, office bar, ROV, well service,	Workshop for hot work	Workshop for cold work	Container for diesel engine	Stores for flammable materials	Stores for non-flammable materials	Painters' workshop	Refrigeration and freezing containers	Radio and communications room	Toilet container	Electrical equipment container	Non-Ex-proof equipment container	Ex-proof equipment container	Diesel engines	Air compressors	Tanks	High pressure cleaning equipment	Steam generator	Mobile crane	Well equip., wireline, logging,	Habitat for hot work Class A	Equipment for waste handling	Pneumatic/hydraulic pump equipment etc.	Non-Ex-proof equipment on skid	Ex-proof equipment on skid
	Shall not be placed in hazardous area		X						X	X	X														X		X	
1. MECHANICAL																												
1.1	Signs tagging/labelling	5.6	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.2	Annual inspection (lifting equipment, cert.)	5.4.1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.3	Mech. cond. (lifting eyes/points, structure)	5.4.1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.4	Fire classification	5.4.1	X	X	X	X		X		X	X	X	X	X	X	X												
1.5	Air lock	5.4.1		X	X									X	X													
1.6	Self-closing doors	5.4.1	X	X	X	X	X	X	X	X	X	X	X	X	X	X												
1.7	Emergency exits	5.4.1	X	X	X	X				X		X	X											X				
1.8	Mechanical ventilation	5.4.7	X	X	X	X	X			X		X	X	X	X								X					
1.9	Noise measurement carried out (supplier)	5.4.8	X	X			X										X	X		X		X		X	X			
1.10	Antistatic equipment	5.4.10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2. FIRE, GAS AND SAFETY																												
2.1	Gas detector in air inlet	5.4.3	X	X	X	X	X			X		X	X	X	X		X	X		X	X	X	X	X				
2.2	Fire/smoke detector	5.4.2	X	X	X	X	X	X		X		X		X	X	X	X	X		X	X	X	X	X				
2.3	Fire hose	5.4.1	X																									
2.4	Portable fire extinguisher	5.4.2	X	X	X	X	X	X		X		X	X	X	X	X	X	X		X	X	X	X					
2.5	Fire damper	5.4.1	X																									
2.6	Alarm and shutdown if loss of pressurisation/ventilation	5.4.7	X	X	X	X	X			X		X	X	X	X													
2.7	Fire extinguishing system	5.4.2	X				X										X	X			X	X	X					
3. ELECTRICAL, EX/ATEX																												
3.1	Cables, glands, equipment etc.	5.4.6.1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.2	Insulation resistance - megger	5.8.1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.3	Earthing (NB bonding of structure) Write down the measurement result	5.4.6.3	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.4	Emergency lighting	5.4.6.2	X	X	X	X	X			X		X	X	X								X	X					
4. HOOK-UP TO INSTALLATION																												
4.1	Power supply (voltage, freq., plugs)	5.7	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4.2	Telephone with plug	5.7	X	X								X	X	X								X						
4.3	PA with plug	5.7	X	X	X	X				X		X	X	X								X	X					
4.4	Alarm signal to control room with plug	5.7	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X		X	X	X	X			X	X	
4.5	Shutdown (ESD) from CCR (for battery system etc.)	5.4.3 & 5.4.6.4	X	X	X		X					X		X			X					X	X			X		
5. EQUIPMENT																												
5.1	All external installation Ex-proof	5.5.1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X
5.2	All internal installation Ex-proof	5.5.1				X	X	X	X	X	X	X	X	X	X	X						X	X					
5.3	Manual emergency stop	5.4.8				X											X	X		X	X	X	X	X	X			
5.4	Manual shutdown of diesel supply	5.3.1				X											X	X		X	X	X	X					
5.5	Automatic shutdown of diesel supply	5.3.1				X											X	X		X	X	X	X					
5.6	Drip trays	5.3.1				X											X	X		X	X	X	X					
5.7	Shutoff damper in combustion air inlet	5.3.1				X											X	X		X	X	X	X					
5.8	Shutdown if loss of oil pressure	5.3.1				X											X	X		X	X	X	X					
5.9	Shutdown if high cooling water temperature	5.3.1				X											X	X		X	X	X	X					
5.10	Shutdown if overspeed	5.3.1				X											X	X		X	X	X	X					
5.11	Diesel engine approved for zone 2	5.3.1				X											X	X		X	X	X	X					
5.12	Gas detector in combustion air inlet	5.3.1				X											X	X		X	X	X	X					
5.13	Flame arrester in exhaust pipe	5.3.1				X											X	X		X	X	X	X					
5.14	Spark arrester in exhaust pipe	5.3.1				X											X	X		X	X	X	X					
5.15	Safety valve	5.3.3																X										
5.16	Flame guard	5.3.5																X										X
5.17	Low water level alarm	5.3.5																			X							
5.18	Check of limit switches	5.3.6																				X	X					
6. DOCUMENTATION																												
6.1	Lifting certificate	5.8	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
6.2	Other technical doc. (drawings, data.)	5.8	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
6.3	Certificate for equip. with special requ.	5.8	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
6.4	Maintenance programme	5.8	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
6.5	Maintenance journal	5.8	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
6.6	User manual	5.8	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

OPERATING, MAINTENANCE INSTRUCTIONS AND MAINTENANCE SCHEDULE

OPERATING INSTRUCTIONS

1. Ensure forward/reverse control is in neutral position. Not required for spring loaded controls which will revert to neutral unless held.
2. Ensure air regulator is fully out (anti-clockwise direction).
3. Remove drum lock, if fitted. (Not fitted on all Spoolers).
4. Ensure lifting set is clear of drum rotation.
5. Ensure stop button is not in depressed position.
6. Connect suitable air supply (3/4" minimum hose diameter) via either Crows foot or MacDonald connection, connection at back of air connection will have to be connected to which one is being used.
7. Engage Hex drive shaft into Main shaft (Fem Hex) via lever handle, push all the way in and secure via locking screw, May have to drive shaft forward or reverse to align with main shaft fem hex
8. Turn on air supply.
9. Position forward / reverse control in direction required, in case of spring loaded controls, handle must be held in position.
10. Increase air supply to unit via air regulator (clockwise rotation).
11. Observe movement and direction of drum.
12. Increase/decrease air flow to obtain required tension on line.
13. Reverse direction can be used for back tension using regulator to obtain correct tension on line, in the case of spring loaded controls, unit can be left in neutral.
14. In case of emergency hit stop button. Unit will cease to function until emergency stop has been reset.
15. It is recommended to observe unit at all times during operation.
16. Observe feeding of line onto drum, check for snagging.
17. When finished isolate air supply, bleed out air in system by engaging the forward/reverse lever, disconnect airline, secure drum.

MAINTENANCE INSTRUCTIONS

1. Ensure air lubricator is filled with suitable oil, we recommend Airtools 15 oil, or a fine mineral oil.
2. Ensure excess water is drained from the water trap.
3. Gear box does not require maintenance, as these are sealed units, only during major maintenance should lubrication be changed.
4. Air motor requires lubrication from lubricator; ensure lubricator is in working condition, when running there should be at least one drop every 10 -20 seconds.
5. Grease bearings depending on use, all units are greased prior to leaving Blue Manta premises, as well as all maintenance checks performed.

MAINTENANCE SCHEDULE

1. Blue Manta Spoolers and Air Motors are fully serviced and maintained at a minimum every 6 months, dependent on availability
2. Full maintenance procedures of the Air Motors are supplied in the NORSOK Pack, including manufacturer's procedure, and also a Blue Manta step by step guide, including photographs.
3. Instructions for other parts are also included in the NORSOK pack, however little or no maintenance should be required if maintenance instructions are followed as above.

MANUAL EMERGENCY SHUTDOWN PROCEDURE

INSTRUCTIONS

In the event of an emergency, **ALL** Blue Manta Spooling Units are fitted with an emergency stop button. This should be utilised if for any reason there is any unforeseen issues that arise when operating spooler or if the operator of the spooler at the time believes there is any risk to the health and safety of himself and others around, the job or the equipment.

It is recommended to man the controls of the unit at all times during operation.

The emergency stop button is supplied via a pilot air line from the main air supply to the air motor on the spooler. If at any point there is an issue please follow the below;

1. Engage the emergency stop button by pushing/hitting it **IN**.
This cuts air off to the spooler bring the spool to a halt.
2. Once issue has been resolved and it is safe to do so, **TURN** the emergency stop button and it will pop back to disengaged position.
The spooler will cease to function while the emergency stop button is engaged.



EMERGENCY STOP BUTTON



Blue Manta International Limited

5 Kirkton Avenue, Pitmedden Road Ind. Estate, Dyce, Aberdeen, AB21 0BF
Tel: 01224 775576 Email: info@bluemanta.com www.bluemanta.com

Item No.	Part No.	Item Description	Qty
1	AM7	3/4" Crows Foot (M)	1
2	3/4"OF NPT	3/4" Macdonald (F)	1
3	12CTXB	NO.12 JIC x 3/4" NPT (M) 90	1
4	12FTXB	NO.12 JIC x 3/4" NPT (M) Straight	3
5	12-8FTXB	NO.12 JIC x 1/2" NPT (M) Straight	1
6	8-8FTXB	NO.8 JIC x 1/2" NPT (M) Straight	2
7	8CTXB	NO.8 JIC x 3/8" NPT (M) 90	2
8	1/2X3/8FFB	3/8" NPT (M) x 1/2" NPT (M) BR	2
9	12-16CMTXB	NO.12 JIC x 1" NPT(M) 90	2
10	P4Q-BA13	Quick Exhaust Valve	2
11	YPS-38	3/8 NPT Exhaust	2
12	YPS-12	1/2 NPT Exhaust	2
13	2028-7876	1/8 x 8mm BSPP Stud (M) Push Fitting (Straight)	2
14	2028-8270	1/8 x 8mm BSPP Stud (M) Push Fitting 90	3
15	2028-8288	1/4 x 8mm BSPP Stud (M) Push Fitting 90	3
16	474-900	F/R Control	1
17	3042802	Emergency Stop Control	1
18	SXP9775-170-00	Air Pilot Valve	1
19	M/P19138	Base	1
20	NTM06/040B-100	6mm Nylon Tubing	
21	NTM08/060B-101	8mm Nylon Tubing	
22	N/A	Remote Kit (See Remote Kit Parts List)	1
23	BL68-801	Norgren Lubricator Set	1
24	6AM-NRV-22A	Gast Air Motor	1
25	KA77BAM56	35.20 Ratio Helical Bevel	1
26	DIN505-70M	70mm Arvis Bearing	1
27	MB6070DX	60mm Glacier Bush	1
28	M1400-0060	60mm Circlip	1
29	KEN-421-1490K	Key Steel 14mm x 9mm	1
30	253118	Canvas Bag	1
31		Endless Ratchet, 1" width x 1m length	2
32		Ratchet Strap - Tail should be 2" width x 1.5m length with 1 loop end for bolt Ratchet End 2" wide 0.6 metre, with loop end.	1
33		M12 Brass Washers	6
34		M12 Brass Nuts	4
35		50mm Brass Rod for Earth Boss	2

SERVICE & MAINTENANCE PROCEDURE FOR GAST AIR MOTOR

Although Gast have their own Operation and maintenance manual, Blue Manta have put together the following instruction guide complete with photographs to assist in the service of Gast air motors. These are only suggested guidelines and do not supersede Gast's operation and maintenance manual. Blue Manta cannot guarantee field-rebuilt product performance.

DIS-ASSEMBLY PROCEDURE

- 1) Slacken grub screw on drive coupling and remove. ([See figure 1](#)) (The drive coupling comes with the gear box and is not a part of the air motor redress kit)
- 2) Remove keyway. ([See figure 2](#))
- 3) Remove dead end cap with Philips screwdriver. ([See figure 3](#))
- 4) Remove 6 bolts using a 7/16 spanner from the dead-end plate. ([See figure 4](#))
- 5) Remove rotary assembly and dead-end plate. Blue Manta recommend doing this manually ([see figure 5, 6, 7 & 8](#)) but this can also be done using a hydraulic press:
 - To remove manually, grip the motor between your ankles and use a plastic hammer or place a piece of wood or plastic to protect the end of the shaft and hammer the end until the unit comes loose. Safely remove the vanes, vane spring and push pins. ([See figure 9](#)) Be careful not to lose any of the components and place them in a safe and clean area.
- 6) Separate the rotary assembly from the dead-end plate.
 - Place the rotary assembly in a bench vice (**DO NOT GRIP**). Open the vice far enough so that the assembly lies on top of the vice. Hold the assembly with your arm and hammer at the same time until it comes loose. ([See figure 10, 11 & 12](#))
- 7) Remove the bearing from the dead-end plate.
 - Place the dead-end plate in a bench vice (**GRIP LIGHTLY**). Use a hammer and punch to remove the bearing. Work slowly around the edge of the bearing until the bearing comes loose. ([See figure 13 & 14](#))
- 8) Remove the bearing from the body.
 - Remove three screws using a Philips screwdriver. Place the body in a vice and use a punch to remove the bearing from the other end - work around the bearing for it to slip out smoothly. ([See figure 15, 16, 17, 18 & 19](#))
- 9) Clean and inspect all parts.
 - Clean the centre holes in the rotary assembly thoroughly using a fine needle file as it is essential that the pins move backwards and forwards freely and smoothly. ([See figure 21](#))
 - Clean and emery the ends of the two shafts on the rotor assembly. ([See figure 22](#))
 - Emery all sealing surfaces both sides of the body and the dead-end plate using fine emery.
 - Clean all other parts ready for re-assembly. ([See figure 20](#)) When assembling, ensure you lubricate the components thoroughly.
DO NOT USE GREASE –preferred oil is Cengar Green Oil or a similar fine oil

ASSEMBLY PROCEDURE

- 1) Fit 4 x push pins to rotary assembly and lubricate well. Ensure none of the push pins are bent or damaged. ([See figure 23](#))
- 2) Insert rotary assembly into motor body. ([See figure 24](#))
- 3) Lubricate vanes and springs well. Insert first spring and vane. You must now install the spring and vane **opposite** the one you have just installed. Proceed to fit springs and vanes in this manner round the rotary assembly. ([See figure 25, 26, 27, 28 & 29](#))
- 4) Fit gasket and dead-end plate and ensure dowels are aligned. Ensure rotary assembly turns by hand after bolts are tightened. ([See figure 30, 31, 32 & 33](#))
- 5) Fit dead-end bearing to dead end plate. Work slowly around the edge of the bearing until the bearing is fully inserted. Ensure that the rotary assembly turns by hand. ([See figure 34, 35 & 33](#))
- 6) Fit bearing to motor body. Work slowly around the edge of the bearing until the bearing is fully inserted. Rotate rotary assembly by hand. ([See figure 36, 37 & 38](#))
- 7) If the rotary assembly does not turn or is tight to turn, you must tap the ends of rotary assembly in either direction to centralise the assembly until it turns by hand. The rotary assembly must not rub on the dead-end caps. The assembly should have slight clearance between the dead-end caps. ([See figure 39](#))
- 8) Lubricate bearings then fit dead end cap and cap seal on other end. ([See figure 40, 41, 42, 43, 44 & 45](#))
- 9) Once assembled, turn the shaft on the air motor. You should be able to rotate the air motor shaft by hand. If you are unable to turn the shaft the likelihood is that the components are either not cleaned or lubricated properly or the shaft is rubbing on the dead-end plate. The shaft must not rub on either end plate. ([See figure 46](#))

CONNECTING THE AIR MOTOR TO THE GEAR BOX

- 1) Ensure that you install the plastic gear link. The gear coupling and plastic gear link comes with the gear box and is not a part of the air motor redress kit. ([See figure 47](#))
- 2) Install the keyway and gear coupling to the air motor and make up the grub screw until it bottoms out. You should still be able to move the gear coupling. ([See figure 48](#))
- 3) To set the gear coupling, connect the air motor to the gear box ensuring that the drive coupling is far enough forward so that it meets the other gear coupling before both parts come together. Push both parts together. Carefully remove the air motor again. Lightly tap the gear coupling on the air motor back approx. 1mm using a hammer and tighten the grub screw. It is important that both gear couplings are not tight together. ([See figures 49, 50 & 51](#))
- 4) Fit the air motor to the gear box. Move the air motor backwards and forwards. You will see the shaft on the gear box move slightly. This will indicate that both gear links are properly set. Make up the bolts. ([See figure 52](#))

SERVICE PROCEDURE OF GAST AIR MOTOR

DIS-ASSEMBLY PROCEDURE

FIGURE 1



FIGURE 2



FIGURE 3



FIGURE 4



FIGURE 5



FIGURE 6



FIGURE 7



FIGURE 8



FIGURE 9



FIGURE 10



FIGURE 11



FIGURE 12



FIGURE 13



FIGURE 14



FIGURE 15



FIGURE 16



FIGURE 17



FIGURE 18



FIGURE 19



FIGURE 20



FIGURE 21



FIGURE 22



FIGURE 23



ASSEMBLY PROCEDURE

FIGURE 24



FIGURE 25



FIGURE 26

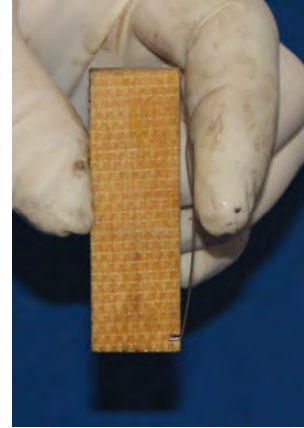


FIGURE 27

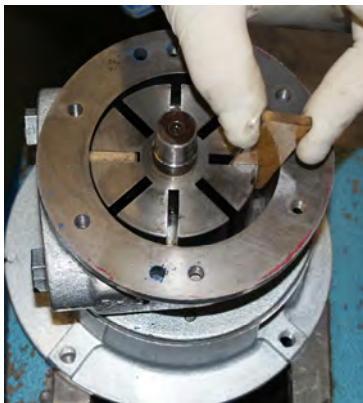


FIGURE 28

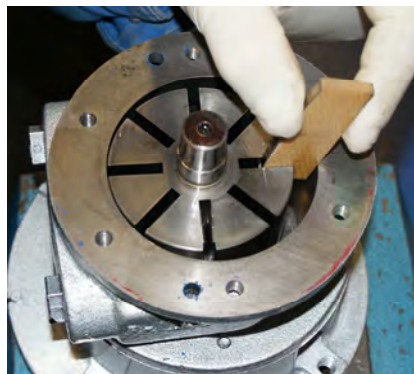


FIGURE 29

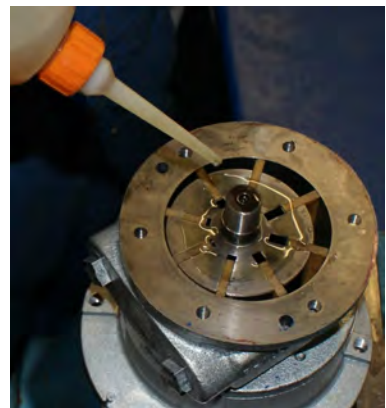


FIGURE 30



FIGURE 31



FIGURE 32



FIGURE 33



FIGURE 34



FIGURE 35



FIGURE 36



FIGURE 37



FIGURE 38



FIGURE 39



FIGURE 40



FIGURE 41

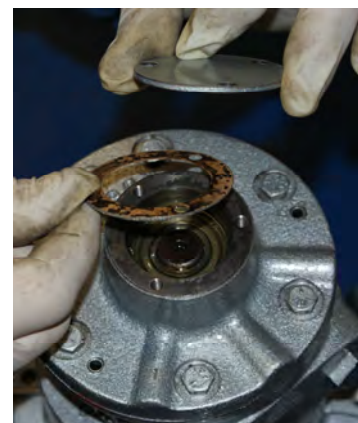


FIGURE 42



FIGURE 43



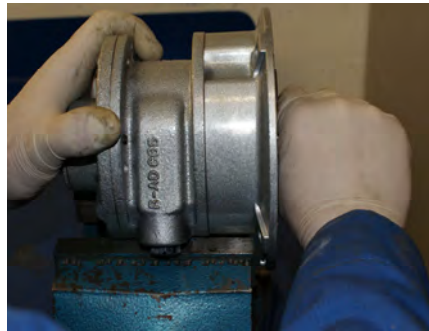
FIGURE 44



FIGURE 45



FIGURE 46



FITTING AIR MOTOR TO GEAR BOX

FIGURE 47



FIGURE 48



FIGURE 49



FIGURE 50



FIGURE 51



FIGURE 52



PART NO. 45-200 D170PL

AM SERIES LUBRICATED AIR MOTORS

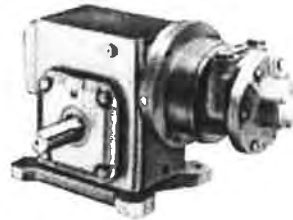
OPERATION & MAINTENANCE MANUAL



Model 2AM Shown



Model 4AM Shown



Model 6AM Shown



Model 16AM Shown

Thank you for purchasing this Gast product. It is manufactured to the highest standards using quality materials. **This manual includes general safety instructions for operation under normal conditions and for operation in hazardous conditions.** Please follow all recommended maintenance, operational and safety instructions and you will receive years of trouble free service.

IMPORTANT: PLEASE READ THIS MANUAL COMPLETELY BEFORE INSTALLING AND USING THIS MOTOR. SAVE THIS MANUAL FOR FUTURE REFERENCE AND KEEP IN THE VICINITY OF THE MOTOR.

General information

Operating Pressure Limits:

Model	Pressure
1AM	100 PSI / 7 bar
1 UP	80 PSI / 5.6 bar
2 AM	100 PSI / 7 bar
4 AM	100 PSI / 7 bar
6 AM	100 PSI / 7 bar
8 AM	100 PSI / 7 bar
16 AM	100 PSI / 7 bar

Vane Life: Depends upon speed, operating pressure and motor maintenance. In normal operating conditions inspect vanes after 5,000 to 8,000 hours of operation.

Product Use Criteria:

- Normal conditions: Operate at temperatures up to 250°F (121°C).
- Hazardous conditions: Operate at temperatures up to 104°F (40°C).
- Protect unit from dirt and moisture.
- Use ONLY compressed air to drive motor.
- Air lines connected to motor should be the same size or the next size larger than the inlet port for efficient output and speed control.
- Protect all surrounding items from exhaust air.
- Bearings are grease packed.
- Use Gast #AD220 or a detergent SAE#10 automotive engine oil for lubricating.

- Motors are to be used in commercial installations only.

 This symbol appears on labels of air motors that are designed for use in hazardous atmospheres. These air motors comply with the applicable standards and specifications and meet the requirements of the guidelines of the EC directive 94/9EC (ATEX 100a). They are intended to be used in zones 1 and 2 where explosive atmospheres are likely to occur.

- Air supply, directional control valve and pressure regulator should be selected based upon the air consumption of the motor.



A Unit of **DEX** Corporation

ISO 9001 & 14001 CERTIFIED

www.gastmfg.com

Your safety and the safety of others is extremely important.

We have provided many important safety messages in this manual and on your product. Always read and obey all safety messages.



This is the safety alert symbol. This symbol alerts you to hazards that can kill or hurt you and others. The safety alert symbol and the words "DANGER" and "WARNING" will precede all safety messages. These words mean:

DANGER

You will be killed or seriously injured if you don't follow instructions.

WARNING

You can be killed or seriously injured if you don't follow instructions.

All safety messages will identify the hazard, tell you how to reduce the chance of injury, and tell you what can happen if the safety instructions are not followed.

CODE SYMBOLS



Hazard. Possible consequences: death or severe injuries.



Hazardous situation. Possible consequences: slight or mild injuries.



Dangerous situation. Possible consequences: damage to the drive or the environment.



Important instructions on protection against explosion.



Application tips and useful information.

Improper environment, installation and operation can result in severe personal injury and/or damage to property.

Qualified personnel must perform all work to assemble, install, operate, maintain and repair air motor.

Qualified personnel must follow:

- These instructions and the warning and information labels on the motor.
- All other drive configuration documents, startup instructions and circuit diagrams.
- The system specific legal regulations and requirements.
- The current applicable national and regional specifications regarding explosion protection, safety and accident prevention.



Complete the following checklist prior to starting installation in a hazardous area. All actions must be completed in accordance with ATEX 100a.

Checklist for installation in hazardous areas:

- Read air motor label to check that motor has been designed for use in a hazardous application:
 - Hazardous zone
 - Hazardous category
 - Equipment group
 - Temperature class
 - Maximum surface temperatures
- Example:
Model designation: 1UP-NRV-10
Year manufactured: 2003
Gast Mfg. Corp.
II 2GD c T5 *
Benton Harbor, MI USA
Telephone: 269.926.6171
- * Legend:
 - II Equipment group II
 - 2 Equipment category 2
 - G Gas atmospheres
 - D Dust atmospheres
 - c Constructional safety
 - T5 Max. surface temp. 212°F/100°C
- Check the site environment for potentially explosive oils, acids, gases, vapors or radiation
- Check the ambient temperature of the site and the ability to maintain proper ambient temperature.
Ambient range:
Normal conditions: 34°F/1°C to 250°F/121°C
Hazardous conditions: 34°F/1°C to 104°F/40°C
- Check the site to make sure that the air motor will be adequately ventilated and that there is no external heat input (e.g. couplings). The cooling air may not exceed 104°F/40°C.
- Check that products to be driven by the air motor meet ATEX approval.
- Check that the air motor is not damaged.

INSTALLATION

Correct installation is your responsibility. Make sure you have the proper installation conditions.



WARNING

Injury Hazard

Install proper guards around output shaft as needed.

Air stream from product may contain solid or liquid materials that can result in eye or skin damage.

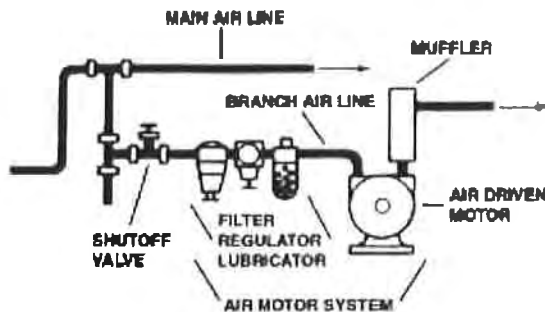
Wear eye protection when installing this product.

Failure to follow these instructions can result in serious injury or property damage.

Mounting

This product can be installed in any orientation. Mount the motor to a solid metal base plate that is mounted to a stable, rigid operating surface. Use shock mounts to reduce noise and vibration. Install a pressure regulator or simple shut-off valve to control motor.

Connection



Check the direction of the motor airflow. A single rotation motor will operate properly only in one direction. Single rotation motors require a sound absorber to be connected to the air port. Remove the plastic shipping plugs from the ports. Save plugs for future use during shutdown.

Install a 5-micron filter in the air line before the connection to the motor. Next install an air pressure regulator to control motor speed and torque.

An automatic air line lubricator should be installed in the air line as close as possible and no more than 18 inches (1/2 meter) from the air motor. Install the lubricator level with or above the air motor so that the oil mist will blow directly into or fall down into the motor.

Fill the oil reservoir to the proper level with Gast #AD220 or SAE 10W high detergent or non-detergent motor oil. For food processing applications, White Rex 425 food grade motor oil is FDA approved. Adjust lubricator to feed 1 drop of oil for every 50 CFM of air while the unit is running, or 1 drop of oil per continuous minute of run time. Do Not overfeed oil or exhaust air may become contaminated.

Clean the compressed air connection with low pressure air to remove any dirt from the line before connecting to the ports.

Use the proper sized fasteners. For the most efficient output and control of speed, use air lines that are the same size as the motor inlet port if the connection is less than 7 feet (2 meters). For longer connections, use the next pipe size larger than the motor intake port. Connect lines to motor in the proper direction.

A reversible motor will work equally well in both directions. Connect a 4-way valve with piping to both air ports of motor to make reversing possible. Connect the sound absorber on the exhaust air port or valve connection.

Do not add any thrust to the end or side of the shaft when making connections.



Do not use a hammer on the shaft or connections.



Lubricating the drive shaft will make assembly easier. Use a puller for removal of pulleys, couplings and pinions on the motor shaft. Check that the tension on the belt pulley matches the manufacturer's specifications. Do not exceed the maximum radial and axial forces on the shaft. If the motor shaft is connected to the part to be driven without a coupling, check that the radial offset and axial force effect will not cause problems.



Use only belts with < 10⁹ electrical leakage resistance to prevent static electrical problems.

Accessories

A muffler is shipped with the air motor (except 16AM) but is not installed. Consult your Gast Distributor/Representative for additional filter recommendations. Install a moisture trap and 5 micron filter in the air line ahead of motor.

Air consumption data at various speeds and pressures are available from your Gast Distributor/Representative or the factory.

OPERATION



WARNING

Injury Hazard

Air stream from product may contain solid or liquid material that can result in eye or skin damage.

Do Not use combustible gases to drive this motor.

Wear hearing protection. Sound level from motor may exceed 85 db(A).

Failure to follow these instructions can result in eye injury or other serious injury.

Check all connections before starting motor. It is your responsibility to operate this product at recommended speeds, loads and room ambient temperatures. Do not run the motor at high speeds with no load. This will result in excessive internal heat that may cause motor damage.

The starting torque is less than the running torque. The starting torque will vary depending upon the position of the vanes when stopped in relation to the air intake port.

Use a pressure regulator and/or simple shut-off valve to regulate the motor's speed and torque. This will provide the required power and will conserve air. Open the air supply valve to the motor. Set the pressure or flow rate to the required speed or torque. Adjust the lubricator to feed one drop of oil for every 50-75 CFM (1.5-2 M³ per minute) of air moving through motor. Check the oil level daily. The gear reducer does not need lubrication.



Operate the motor for approximately 2 hours at the maximum desired load. Measure the surface temperature of the motor on the casting opposite the pipe ports. The maximum surface temperature listed on the motor is for normal environmental and installation conditions. For most air motors, the maximum surface temperature should not exceed 203°F/95°C. Do not continue to operate the motor if the measured surface temperature exceeds temperature listed on the motor. If your measured temperature does exceed listed value, consult with your Gast Distributor/Representative for a recommendation.

MAINTENANCE



WARNING

Injury Hazard

Disconnect air supply and vent all air lines.

Wear eye protection when flushing this product.

Air stream from product may contain solid or liquid material that can result in eye or skin damage.

Flush this product in a well ventilated area.

Do Not use kerosene or other combustible solvents to flush this product.

Failure to follow these instructions can result in eye injury or other serious injury.

It is your responsibility to regularly inspect and make necessary repairs to this product in order to maintain proper operation.

Lubrication

Use Gast #AD220 or a detergent SAE #10 automotive engine oil for lubricating. Lubricating is necessary to prevent rust on all moving parts. Excessive moisture in air line may cause rust or ice to form in the muffler when air expands as it passes through the motor. Install a moisture separator in the air line and an after cooler between compressor and air receiver to help prevent moisture problems.

Manual Lubrication

Shut the air motor down and oil after every 8 hours of operation. Add 10-20 drops of oil to the air motor intake port.

Automatic Lubrication

Adjust inline oiler to feed 1 drop of oil per minute for high speed or continuous duty usage. Do Not overfeed oil or exhaust air may become contaminated.

Check intake and exhaust filters after first 500 hours of operation. Clean filters and determine how frequently filters should be checked during future operation. This one procedure will help assure the motor's performance and service life.

Flushing

Flushing this product to remove excessive dirt, foreign particles, moisture or oil that occurs in the operating environment will help to maintain proper vane performance. Flush the motor if it is operating slowly or inefficiently.

Use only Gast #AH255B Flushing Solvent. DO NOT use kerosene or ANY other combustible solvents to flush this product.

1. Disconnect air line and muffler.
2. Add flushing solvent directly into motor. If using liquid solvent, pour several tablespoons directly into the intake port. If using Gast #AH255B, spray solvent for 5-10 seconds into intake port.
3. Rotate the shaft by hand in both directions for a few minutes.
4. **You must wear eye protection for this step.** Cover exhaust with a cloth and reconnect the air line.
5. Restart the motor at a low pressure of approximately 10 PSI/0.7 bar until there is no trace of solvent in the exhaust air.
6. Listen for changes in the sound of the motor. If motor sounds smooth, you are finished. If motor does not sound like it is running smoothly, installing a service kit will be required (See "Service Kit Installation").

Check that all external accessories such as relief valves or gauges are attached and are not damaged before operating product.

Cleaning sound absorber

1. Remove the sound absorber.
2. Clean the felt filter.
3. **You must wear eye protection for this step.** Lubricate motor with 3-4 drops of oil.
4. Check the air compressor.
5. Listen for changes in the sound of the motor. If motor sounds smooth, you are finished. If motor does not sound like it running smoothly, installing a service kit will be required (See "Service Kit Installation").

Shutdown

It is your responsibility to follow proper shutdown procedures to prevent product damage.

1. Turn off air intake supply.
2. Disconnect air supply and vent all air lines.
3. Disconnect air lines.
4. Remove air motor from connecting machinery.
5. Remove the muffler.
6.   **Wear eye protection. Keep away from air stream.** Use clean, dry air to remove condensation from the inlet port of the motor.
7. Lubricate motor with a small amount of oil into the intake port. Rotate shaft by hand several times to distribute oil.
8. Plug or cap each port.
9. Coat output shaft with oil or grease.
10. Store motor in a dry environment.

SERVICE KIT INSTALLATION

Gast will NOT guarantee field-rebuilt product performance. For performance guarantee, the product must be returned to a Gast Authorized Service Facility.

Service Kit contents vary. Most contain vanes, end cap gasket, body gasket, bearings and a muffler element or felt.

Major and Minor Rebuilds

Tool kits which include a more in-depth rebuild manual are available through your Gast Distributor/Representative. These kits include the tools required to remove and reassemble end plates, bearings and shaft seals, and to set the proper end clearance. The rebuild manual also includes step by step instructions, including illustrations, to help achieve a successful rebuild. Gast Manufacturing, Inc. highly recommends using the air motor rebuild manual and tool kit when attempting a minor or major rebuild to your Gast air motor.

Minor Rebuild:

1. Remove the end cap.
2. Remove dead end plate bolts.
3. Remove dead end plate. (Use factory issued tool, do not use screwdriver to remove the end plate.)
4. Remove the dowel pins from the body and push back into end plate until flush or just below the machined surface of the end plate.
5. Remove vanes.
6. Clean parts. Check for scoring on the end plate and rotor assembly. If scoring exists, send unit to a Gast authorized service facility.
7. **Lubricated models only:** Lightly oil and reinstall vanes.
8. Place the proper end plate gasket on the end plate. If the original is damaged, replace with a new one supplied in the Service Kit.
9. Place the dead end plate on the body.
10. Press the bearing onto the shaft using a factory supplied bearing pusher.
11. Tap dowel pins into body and install end plate bolts. Tighten bolts to 75-100 in-lbs.
12. Set end clearance as required by model:
1AM-4AM and NL22-NL52 models - use the bearing taper from kit to lightly tap on inner race of the dead end bearing to free up and center the rotor in the body.
6AM-8AM models - lightly strike the drive end shaft with a soft hammer to push the rotor away from the drive end plate. The rotor must NOT rub on either end plate.
13. Reattach end cap.
14. **If the air motor is lubricated,** apply a few drops of Gast #AD220 lubricant into ports. Rotate shaft by hand for a few rotations.

Major Rebuild:

1. Remove the end cap.
2. Remove dead end plate bolts.
3. Remove dead end plate. (Use factory issued tool, do not use screwdriver to remove the end plate.)
4. Remove the dowel pins from the body and push back into end plate until flush or just below the machined surface of the dead end plate.
5. Remove rotor using an arbor press.

6. Remove vanes and ejection mechanism if reversible. (Ejection mechanisms may consist of vane springs, pins, caps or cam rings.)
7. Remove shaft seal and bearings from drive end plate and bearing from dead end plate. (Use factory issued tool.)
8. Do Not remove drive end plate bolts or drive end plate.
9. Clean parts. Check for scoring on the end plates and rotor assembly. If scoring exists, send unit to a Gast Authorized Service Facility.
10. **For reversible models only:**
1AM and 1UP models - place a new cam ring between the rotor and the drive end plate.
2AM and 4AM models - place springs and caps in rotor.
6AM, 8AM and 16AM models - install push pins.
11. Place the drive shaft of the rotor assembly through the drive end plate. Press the drive bearing onto the drive shaft using a factory supplied bearing pusher.
12. Using the bearing taper from the Tool Kit, lightly tap on inner race of the drive end bearing to snug up rotor to drive end plate.
13. Install new vanes as required by model:
All single rotation units - the angle cuts on the vane face to center of the rotor.
Reversible units 2AM and 4AM - the notch on vane faces to center of the rotor.
6AM, 8AM and 16AM models - install the vane spring lip into the notch at one end of the vane and place in rotor vane slot with spring facing pushpin.
14. Place the proper end plate gasket on the body of dead end. If the original is damaged, replace with a new one supplied in the service kit. If your air motor uses O-rings, place the new O-rings in the body groove. Some models do not use end plate gaskets or O-rings.
15. Place the dead end plate on the body.
16. Install the dead end bearing and press into place with bearing pusher tool from tool kit.
17. Install the dowel pins.
18. Fully tighten the remaining bolts to 75-100 in-lbs.
19. Set end clearance as required by model:
1AM-4AM and NL22-NL52 models - use the bearing taper from the Tool Kit and lightly tap on the inner race of the dead end bearing to free up and center the rotor in the body.
6AM-8AM models - lightly strike the drive end shaft with a soft hammer to push the rotor away from the drive end plate. The rotor must NOT rub on either end plate.
20. Apply a small amount of grease to bearing seal and install the drive end bearing seal by pressing flush with bearing pushing tool from Tool Kit.
21. Reattach end cap.
22. **If the air motor is lubricated,** apply a few drops of Gast #AD220 lubricant into ports and rotate shaft by hand for a few rotations.

Clearances

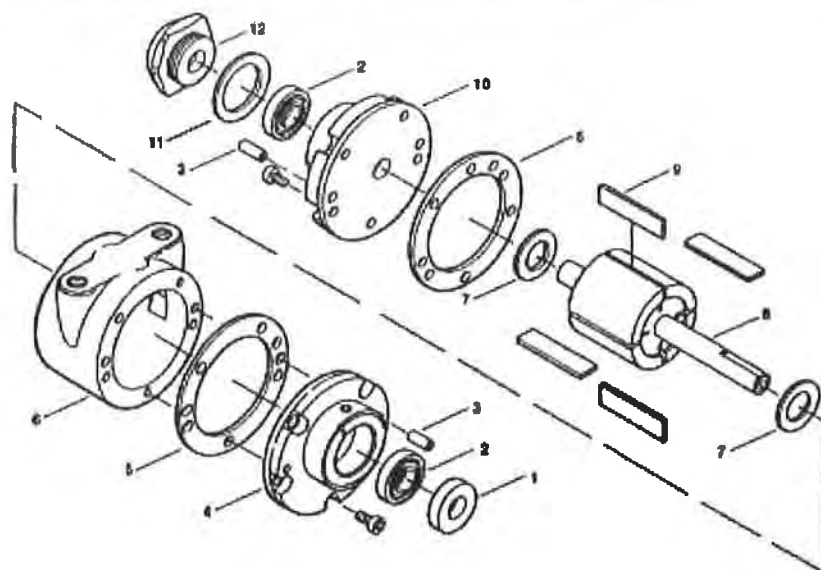
Model	Total End Clearance In./mm	Top Clearance In./mm
1AM/1UP	0.0020/0.0508	0.0015/0.0381
2AM	0.0025/0.0635	0.0015/0.0381
2AM*	0.0025/0.0635	0.0025/0.0635
4AM	0.0035/0.0889	0.0015/0.0381
4AM*	0.0035/0.0889	0.0025/0.0635
6AM	0.0035/0.0889	0.0015/0.0381
8AM	0.0048/0.1219	0.0015/0.0381
16AM	0.0060/0.1524	0.0015/0.0381
* Models with the last three digits greater than 500 (i.e. 2AM XXX-501)		



Disposal (Please note current regulations)

Parts of the air motor or air powered gear motor, shafts, cast iron or aluminum castings, gear wheels as well as rolling contact bearings may be recycled as scrap metal.

EXPLODED PRODUCT VIEW, PARTS & ORDERING INFORMATION 1AM/1UP SERIES



1AM SERIES

REF#	DESCRIPTION	QTY	1AM-NCC-12	1AM-NCW-14	1AM-NRV-39A	1AM-NRV-56	1AM-NRV-60	1AM-NRV-63A
1 Δ	SEAL	1	AC190A	AC190A	AC190A	AC190A	AC190A	AC190A
2 Δ	BEARING	2	AG549	AG549	AG549	AG549	AG549	AG549
3	DOWEL PIN	4	D324A	D324A	D324A	D324A	D324A	D324A
4	DRIVE END PLATE	1	AC537	AC539	AC520	AC520D	AC520D	AC520
5 ΔΔ	SHIMS	2	AC527B	AC527B	AC527B	AC527B	AC527B	AC527B
6	BODY	1	AC521	AC521	AC191	AC191	AC191	AC191
7	CAM RING	2			AC195	AC195	AC195	AC195
8	ROTOR ASSEMBLY	1	AC524	AC536	AC193	AC187	AC607	AC193B
9 Δ	VANE	4 8	AC205A	AC205A	AC259A	AC259A	AC259A	AC259A
10	DEAD END PLATE	1	AC536	AC540	AC192	AC192	AC192	AC192
11 Δ	END CAP GASKET	1	AC229	AC229	AC229	AC229	AC229	AC229
12	DEAD END CAP	1	AC228A	AC228A	AC228A	AC228A	AC228A	AC228A
*** Δ	MUFFLER	1	AF350	AF350	AF350	AF350	AF350	AF350
***	FOAM	1	AG896	AG896	AG896	AG896	AG896	AG896
***	SERVICE KIT	1	K200	K200	K201	K201	K278	K278

1UP SERIES

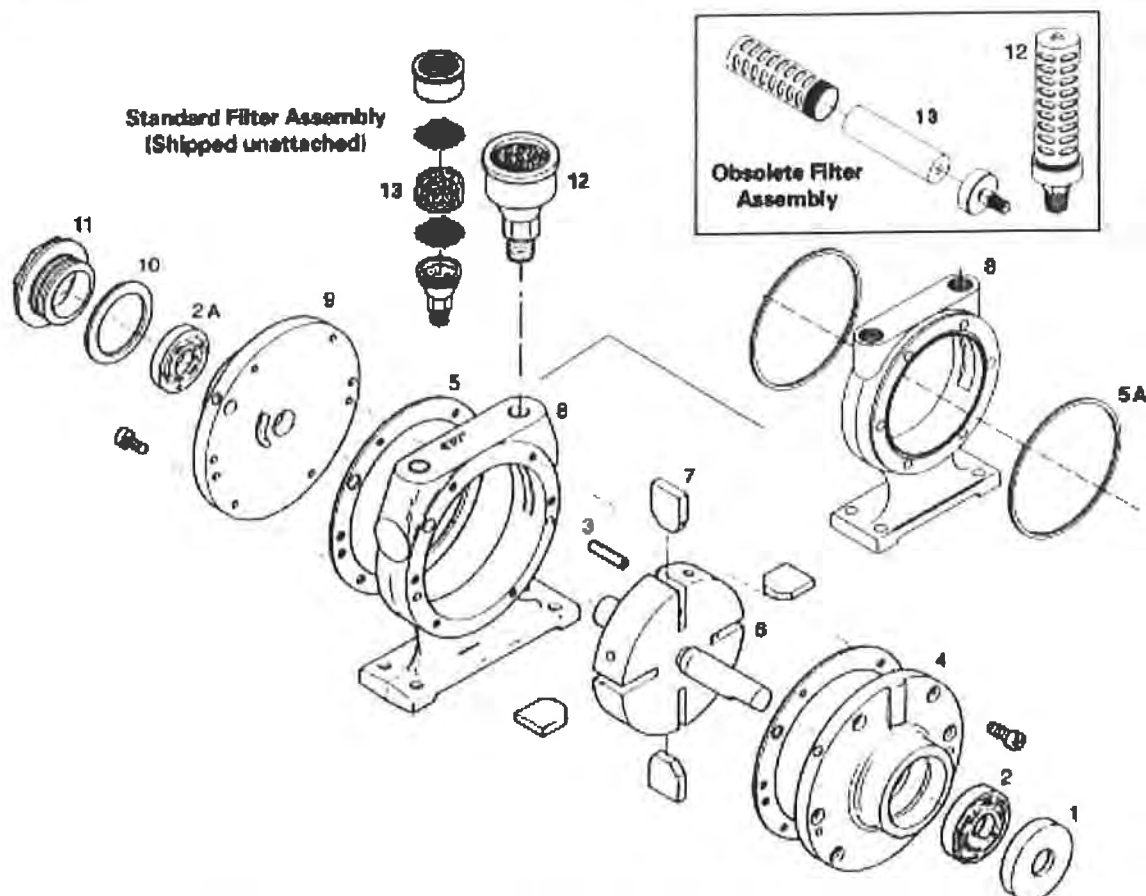
REF#	DESCRIPTION	QTY	1UP-NCC-1A	1UP-NCW-2A	1UP-NRV-3A	1UP-NRV-4	1UP-NRV-10	1UP-NRV-11
1 Δ	SEAL	1	AC190A	AC190A	AC190A	AC190A	AC190A	AC190A
2 Δ	BEARING	2	AG549	AG549	AG549	AG549	AG549	AG549
3	DOWEL PIN	4	D324A	D324A	D324A	D324A	D324A	D324A
4	DRIVE END PLATE	1	AC616	AC520B	AC520	AC520D	AC520	AC520D
5 ΔΔ	SHIMS	2	AC527B	AC527B	AC527B	AC527B	AC527B	AC527B
6	BODY	1	AE899	AE899	AE898	AE898	AE898	AE898
7	CAM RING	2			AC195	AC195	AC195	AC195
8	ROTOR ASSEMBLY	1	AE896	AE895	AE897	AFT46	AE319	AE333
9 Δ	VANE	4 8	AE893	AE893	AE894	AE894	AE894	AE894
10	DEAD END PLATE	1	AC617	AC192A	AC192	AC192	AC192	AC192
11 Δ	END CAP GASKET	1	AC229	AC229	AC229	AC229	AC229	AC229
12	DEAD END CAP	1	AC228A	AC228A	AC228A	AC228A	AC228A	AC228A
*** Δ	MUFFLER	1	AF350	AF350	AF350	AF350	AF350	AF350
***	FOAM	1	AG896	AG896	AG896	AG896	AG896	AG896
***	SERVICE KIT	1	K285	K285	K286	K288	K298	K298

*** Item not shown.

Δ Denotes parts included in the Service Kit.

ΔΔ Parts listed are for stock models manufactured prior to 1998. For specific OEM models, please consult the factory. When corresponding about or ordering parts, please give complete model and serial numbers. Exploded views are shown for reference only. Units may vary depending upon specific model.

EXPLODED PRODUCT VIEW, PARTS & ORDERING INFORMATION 2AM SERIES



2AM SERIES

REF#	DESCRIPTION	QTY	2AM-FCC-1	2AM-NCW-7A	2AM-FCW-13	2AM-NCC-16	2AM-NCC-43A	2AM-ACC-88 METRIC
1 Δ	SHAFT SEAL	1	AA466B	AA466B	AA466B	AA466B	B2328	B2328
2 Δ	DRIVE END BEARING	1	AA299J	AA299J	AA299J	AA299J	AB519	AB519
2A Δ	DEAD END BEARING	1	AA299J	AA299J	AA299J	AA299J	AA299J	AA299J
3	DOWEL PIN	4	AB162	AB162	AB162	AB162	AB162C	AB162C
4	DRIVE END PLATE	1	AC720	AC726	AC722	AC724	AG708	AK425A
5 Δ **	SHIMS	2	B330	B330	B330	B330	B330	B330
6	ROTOR ASSEMBLY	1	AA470A	AA489A	AA489A	AA470A	AM449A	AM449B
7 Δ	VANE	4	AA13B	AA13B	AA13B	AA13B	AA13B	AA13B
8	BODY	1	AA477	AA467	AA477	AA467	AA467	AA467F
9	DEAD END PLATE	1	AC721	AC723	AC723	AC721	AC721	AB622N
10 Δ	END CAP GASKET	1	AA46	AA46	AA46	AA46	AA46	AA46
11	END CAP	1	AM307D	AM307D	AM307D	AM307D	AM307D	AM307D
12	MUFFLER ASSEMBLY	1	AL445	AL445	AL445	AL445	AL445	AL445
13	MUFFLER FELT	1	AC983	AC983	AC983	AC983	AC983	AC983
***	SERVICE KIT	1	K202	K202	K202	K202	K203A	K203A

*** Item not shown.

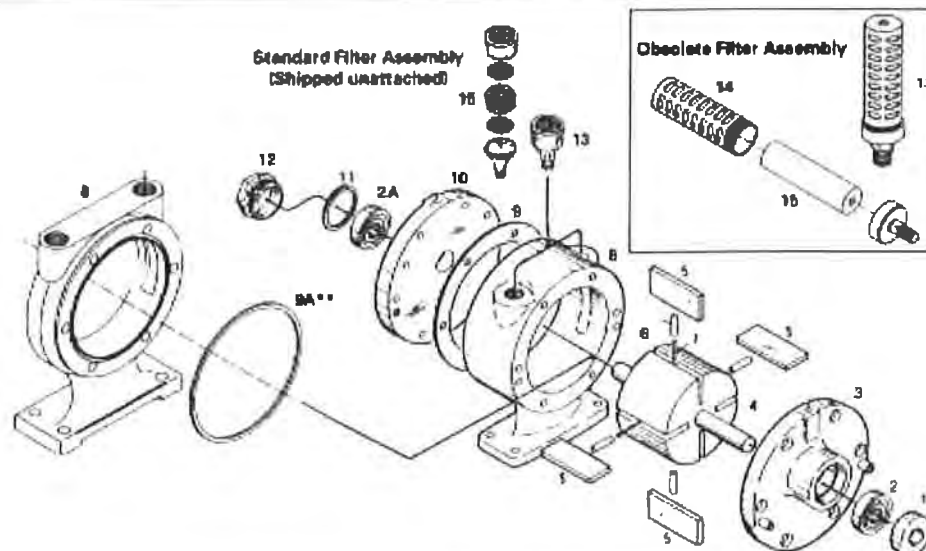
** #AL484 (5A) O-ring replaces shim on some models.

Δ Denotes parts included in the Service Kit.

For specific OEM models, please consult the factory.

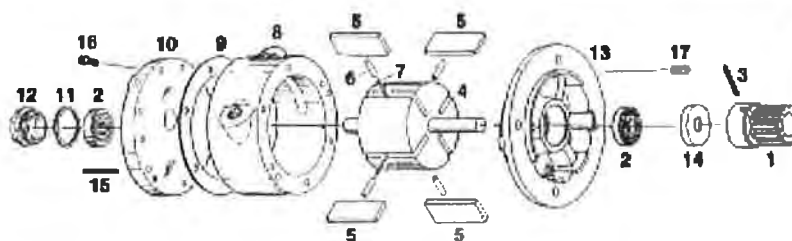
When corresponding about or ordering parts, please give complete model and serial numbers.
Exploded views are shown for reference only. Units may vary depending upon specific model.

EXPLODED PRODUCT VIEWS, PARTS & ORDERING INFORMATION 4AM SERIES



4AM SERIES

REF#	DESCRIPTION	QTY	4AM-FRV-13C	4AM-NRV-22B	4AM-FRV-24	4AM-NRV-50C	4AM-NRV-54A	4AM-NRV-70C	4AM-ARV-119 METRIC	4AM-ARV-120 METRIC
1 Δ	SHAFT SEAL	1	AC466B	AC466B	NAS2	B2328	AA466B	B2328	B2328	B2328
2 Δ	DRIVE END BEARING	1	AA289J	AA289J	AA289J	AB519	AA289J	AB519	AB519	AB519
2A Δ	DEAD END BEARING	1	AA289J	AA289J	AA289J	AA289J	AA289J	AA289J	AA289J	AA289J
3	DRIVE END PLATE	1	AC727	AC665	AC727	AG707	AC665	AG707	AK425A	AK425A
4	ROTOR ASSEMBLY	1	AB617	AB617	AM428	AM455A	AM411	AM319A	AM455C	AM455B
5 Δ	VANE	4	AB876	AB876	AB876	AB876	AB876	AB876	AB876	AB876
6 Δ	PUSH PINS	4	AM467	AM467	AM467	AM467	AM467	AM467	AM467	AM467
7 Δ	VANE SPRING	2	AM466	AM466	AM466	AM466	AM466	AM466	AM466	AM466
8	BODY	1	AM425	AM410	AM425	AM410	AM410	AM410	AM410M	AM410M
9 Δ **	SHIMS	2	B330	B330	B330	B330	B330	B330	B330	B330
10	DEAD END PLATE	1	AC728	AC728	AC727	AC728	AC728	AC728	AB622M	AB622M
11 Δ	END CAP GASKET	1	AA46	AA46		AA46	AA46	AA46	AA46	AA46
12	DEAD END CAP	1	AM307D	AM307D		AM307D	AM307D	AM307D	AM307D	AM307D
13	MUFFLER ASSEMBLY	1	AL445	AL445	AL445	AL445	AL445	AL445	AL445	AL445
14 Δ	MUFFLER CARTRIDGE	1	AL458	AL458	AL458	AL458	AL458	AL458	AL458	AL458
15 Δ	MUFFLER FELT	1	AC983	AC983	AC983	AC983	AC983	AC983	AC983	AC983
***	SERVICE KIT	1	K205	K205	K205G	K206A	K279	K280A	K206C	K206B

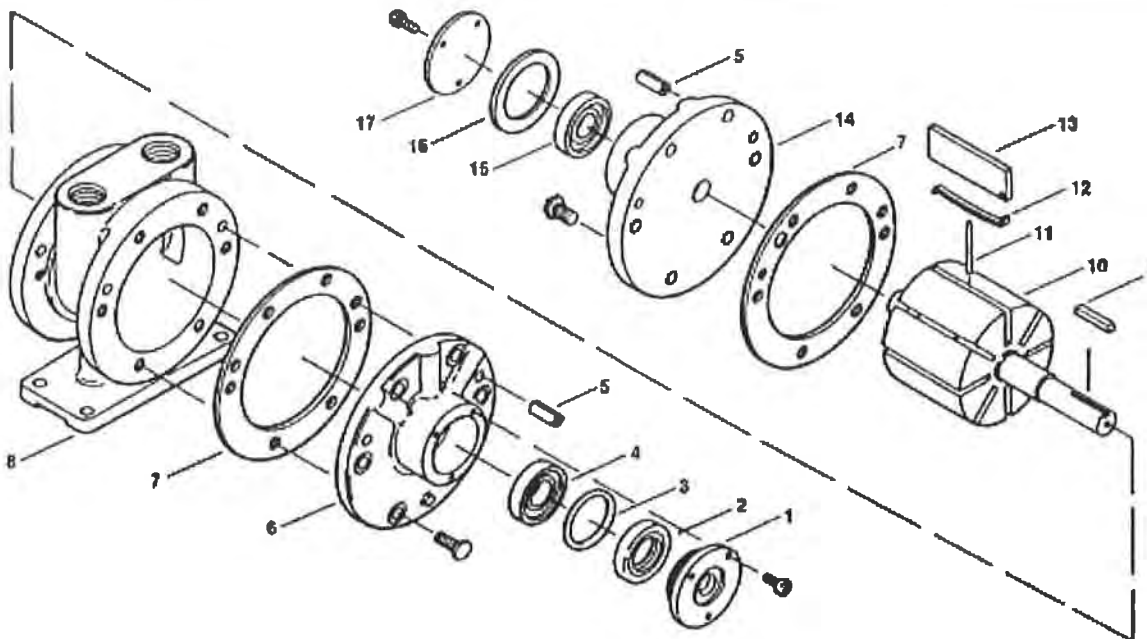


*** Item not shown.
 ** #AL484 (9A) O-ring replaces shim on some models.
 Δ Denotes parts included in the Service Kit.
 For specific OEM models, please consult the factory.
 When corresponding about or ordering parts,
 please give complete model and serial numbers.
 Exploded views are shown for reference only.
 Units may vary depending upon specific model.

4AM SERIES

REF#	DESCRIPTION	QTY	4AM-RV-75
1	GEAR STD.	1	AA294
2 Δ	BEARING	2	AA289J
3	PIN	1	AA297
4	ROTOR	1	AA293
5 Δ	VANE	4	AB876
6 Δ	SPRING PIN	4	AM467
7 Δ	SPRINGS	2	AM466
8	BODY	1	AM410
9 Δ	SHIMS	2	B330
10	DEAD END PLATE	1	AC728
11 Δ	END CAP GASKET	1	AA46
12	END CAP	1	AM307D
13	DRIVE END PLATE	1	AA424
14	SEAL	1	AA466B
15	DOWEL PINS	4	AB162
16	1/4-28 x .50 PFHMS	6	BB631
17	1/4-28 x .625 SHCS	6	BB634
***	SERVICE KIT	1	K205

EXPLODED PRODUCT VIEW, PARTS & ORDERING INFORMATION 6AM SERIES



6AM SERIES

REF#	DESCRIPTION	QTY	6AM-FRV-5A	6AM-NRV-7A	6AM-NRV-22A NEMA	6AM-FRV-23A	6AM-ARV-54	6AM-ARV-55	6AM-NRV-11A
1	DRIVE END CAP	1	AD642A	AD642A	AD642A	AD642A	AC988	AC988	AD642A
2 Δ	SHAFT SEAL	1	AC849	AC849	AC849	AC849	AK423	AK423	AC849
3 Δ	O-RING	1	AD649	AD649	AD649	AD649	AC989	AC989	AD649
4 Δ	DRIVE END BEARING	1	AD638A	AD638A	AD638A	AD638A	AC894B	AC894B	AD638A
5	DOWEL PIN	4	AB162	AB162	AB162C	AB162	AB162C	AB162C	AB162C
6	DRIVE END PLATE	1	AD651	AD666	AD667	AD651	AK424	AK424	AD667
7 Δ	BODY GASKET	2	AD641	AD641	AD641	AD641	AD641	AD641	AD641
8	BODY	1	AD650A	AD665	AD665	AD650A	AD665D	AD665D	AD665
9	KEY	1	AB136	AB136	AB136	AB136	AK422	AK422	AB136
10	ROTOR ASSEMBLY	1	AD652	AD652	AC398	AC779	AD648E	AD648D	AD648
11 Δ	PUSH PIN	2	AD655A	AD655A			AD655A		AD655A
		4			AD655A	AD655A		AD655A	
12 Δ	VANE SPRING	4	AD692	AD692			AD692		AD692
		8			AD692	AD692		AD692	
13 Δ	VANE	4	AD691	AD691			AD691		AD691
		8			AD691	AD691		AD691	
14	DEAD END PLATE	1	AD651	AD651	AD651	AD651	AD651	AD651	AD651
15 Δ	DEAD END BEARING	1	AB519	AB519	AB519	AB519	AB519	AB519	AB519
16 Δ	END CAP GASKET	1	AD644	AD644	AD644	AD644	AD644	AD644	AD644
17	DEAD END CAP	1	AD643	AD643	AD643	AD643	AD643	AD643	AD643
***	MUFFLER ASSEMBLY	1	AC990	AC990	AC990	AC990	AC990	AC990	AC990
***	MUFFLER FELT	1	AC993	AC993	AC993	AC993	AC993	AC993	AC993
***	SERVICE KIT	1	K208	K208	K281	K281	K281A	K281B	K208

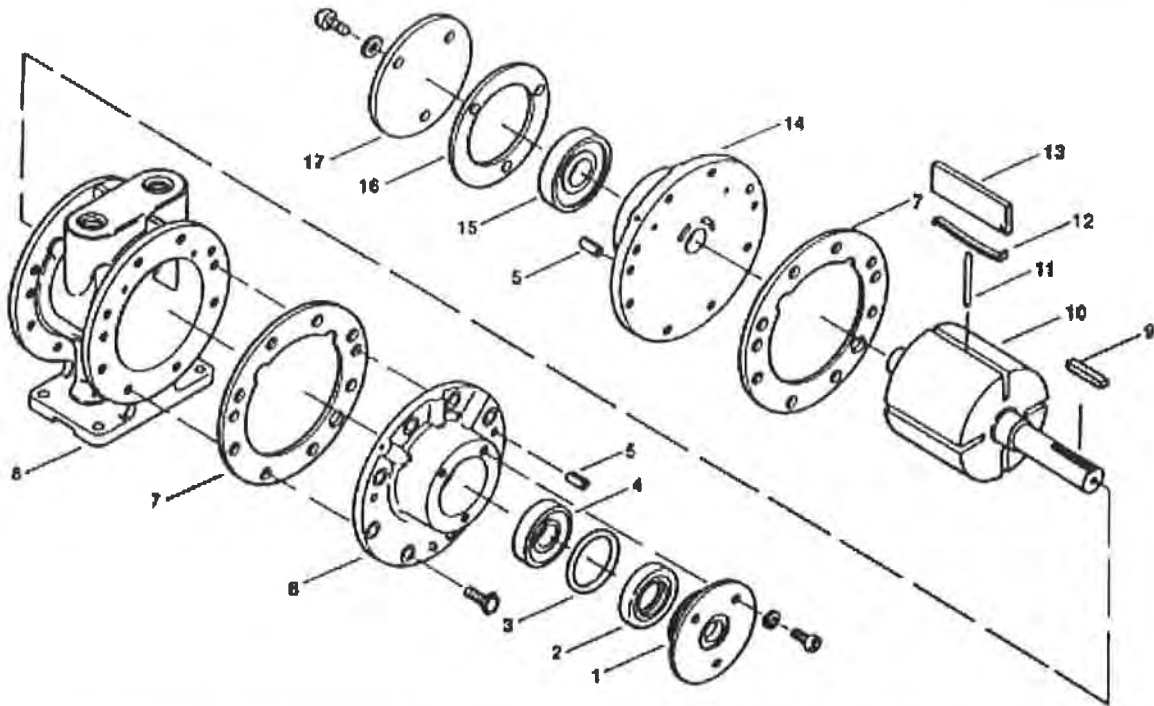
*** Item not shown.

Δ Denotes parts included in the Service Kit.

For specific OEM models, please consult the factory.

When corresponding about or ordering parts, please give complete model and serial numbers.
Exploded views are shown for reference only. Units may vary depending upon specific model.

EXPLODED PRODUCT VIEW, PARTS & ORDERING INFORMATION 8AM SERIES



8AM SERIES

REF#	DESCRIPTION	QTY	8AM-FRV-2B	8AM-NRV-5B	8AM-NRV-28A	8AM-FRV-30A	8AM-NRV-32A	8AM-NRV-42A	8AM-ARV-70 METRIC	8AM-ARV-71 METRIC
1	DRIVE END CAP	1	AC835A	AC835A	AC888	AC835A	AC888	AC835A	AC888	AC888
2 Δ	SHAFT SEAL	1	AC839	AC839	AB936	AC839	AB935	AC839	AK420	AK420
3 Δ	O-RING	1	AC808	AC808	AC989	AC808	AC989	AC808	AC989	AC989
4 Δ	DRIVE END BEARING	1	AA735B	AA735B	AB927	AA735B	AB927	AA735B	AB927	AB927
5	DOWEL PIN	4	AB162	AB162	AB162	AB162	AB162	AB162	AB162	AB162
6	DRIVE END PLATE	2	AC964	AC963	AC965	AC964	AC965	AC963	AK421	AK421
7 Δ	BODY GASKET	2	AC888	AC888	AC888	AC888	AC888	AC888	AC888	AC888
8	BODY	1	AC877A	AC878C	AC878C	AC877A	AC878C	AC878C	AC878G	AC878G
9	KEY	1	AB136D	AB136D	AB136D	AB136D	AB136D	AB136D	AK668	AK668
10	ROTOR ASSEMBLY	1	AC977	AC977	AC986	AC977A	AC986A	AC977A	AC986D	AC986C
11 Δ	PUSH PIN	2	AC879	AC879	AC879				AC879	
		4				AC879	AC879	AC879		AC879
12 Δ	VANE SPRING	4	AC817	AC817	AC817				AC817	
		8				AC817	AC817	AC817		AC817
13 Δ	VANE	4	AC816	AC816	AC816				AC816	
		8				AC816	AC816	AC816		AC816
14	DEAD END PLATE	1	AC964	AC964	AC964	AC964	AC964	AC964	AC964	AC964
15 Δ	DEAD END BEARING	1	AC894B	AC894B	AC894B	AC894B	AC894B	AC894B	AC894B	AC894B
16 Δ	END CAP GASKET	1	AC837	AC837	AC837	AC837	AC837	AC837	AC837	AC837
17	DEAD END CAP	1	AC836	AC836	AC836	AC836	AC836	AC836	AC836	AC836
***	MUFFLER ASSEMBLY	1	AC990	AC990	AC990	AC990	AC990	AC990	AC990	AC990
***	MUFFLER FELT	1	AC993	AC993	AC993	AC993	AC993	AC993	AC993	AC993
***	SERVICE KIT	1	K210	K210	K211	K283	K282	K283	K282A	K282B

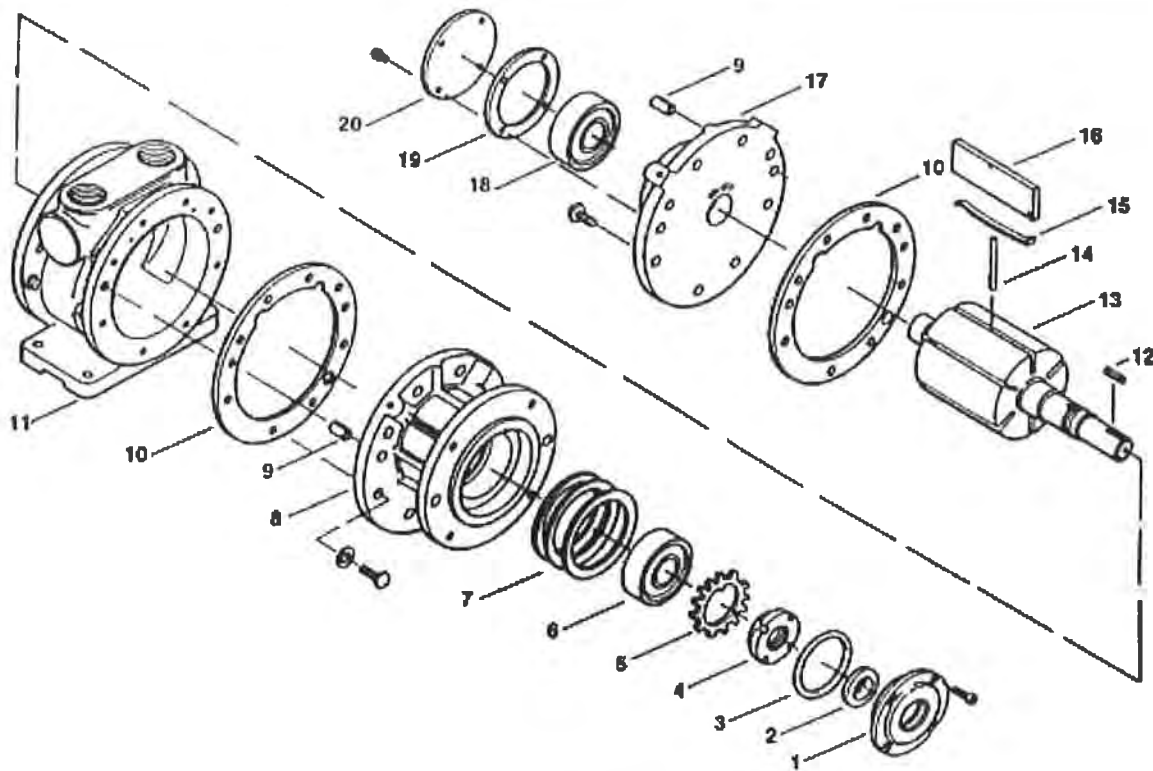
*** Item not shown.

Δ Denotes parts included in the Service Kit.

For specific OEM models, please consult the factory.

When corresponding about or ordering parts, please give complete model and serial numbers.
Exploded views are shown for reference only. Units may vary depending upon specific model.

EXPLODED PRODUCT VIEW, PARTS & ORDERING INFORMATION 16AM SERIES



16AM SERIES

REF#	DESCRIPTION	QTY	16AM-FCC-2	16AM-FRV-2	16AM-FRV-13	16AM-FCW-
28						
1	DRIVE END CAP	1	AD816	AD816	AD816	AD816
2 Δ	SEAL	1	AC627	AC627	AC627	AC627
3 Δ	O-RING	1	AD823	AD823	AD823	AD823
4	LOCKNUT	1	AD784	AD784	AD784	AD784
5 Δ	LOCKWASHER	1	AD712	AD712	AD712	AD712
6 Δ	DRIVE END BEARING	1	AB777A	AB777A	AB777A	AB777A
7	SPACER		AD786	AD786	AD786	AD786
8	DRIVE END PLATE	1	AD771A	AD820A	AC323	
9	DOWEL PIN	4	AB162A	AB162A	AB162A	AB162A
10 Δ	SPACER GASKET	2	AD788	AD788	AD788	
11	BODY	1	AD770	AD819	AD819	AD770B
12	DRIVE KEY	1	AC628	AC628	AB136D	AC628
13	ROTOR ASSEMBLY	1	AD775	AD784	AE807	
14 Δ	PUSH PIN	3		AD822	AD822	
15 Δ	VANE SPRING	6		AD796A	AD796A	
16 Δ	VANE	6	AD781	AD795	AD795	AD781
17	DEAD END PLATE	1	AD773A	AD821A	AD821A	
18	DEAD END BEARING	1	AD802	AD802	AD802	AD802
19	END CAP GASKET	1	AG406	AG406	AG406	AG406
20	DEAD END CAP	1	AG405	AG405	AD405	AG405
***	SERVICE KIT	1	K212	K213	K213	K212

*** Item not shown.

Δ Denotes parts included in the Service Kit.

For specific OEM models, please consult the factory.

When corresponding about or ordering parts, please give complete model and serial numbers.
Exploded views are shown for reference only. Units may vary depending upon specific model.

STANDARD & WORM GEAR REDUCERS - OPERATING AND MAINTENANCE INSTRUCTIONS

General Information:

The product nameplate specifies all information required when ordering parts or requests for information. The type of lubricant required for unit is also specified on the nameplate.

Product Use Criteria:

- All worm gear reducers require that the air motor be mounted so that the inlet and exhaust ports are at a 90° angle to the centerline of the reducer output shaft.
- Gear reducers are NOT self-locking. If a brake is required for safety, as in the case of air pressure failure, etc., contact your Gast Distributor/Representative.
- Worm gear reducers are shipped with a plug in the top pipe plug. The plug must be removed and the breather plug installed for proper operation.
- Operating an air motor without venting will create internal pressure build-up which can damage the internal parts of the gear reducer.
- Check the oil level in units which have been stored or not operated for a period of time.
- Gear motors require proper lubrication. Insufficient oil level can cause loss of performance, damage or failure of the gear reducer.

Gear Reducer Specifications

Model	GR11	GR20	GR25
Speed Range (Reducer Output Shaft)	33.3 to 400 RPM	30 to 300 RPM	20 to 200 RPM
Gear Reduction	15:1	10:1	15:1
Maximum Allowable End Thrust With Zero Overhung Load. (Reducer Output Shaft)	100 lbs/45,4 kg	200 lbs/90,8 kg @300 RPM to 800 lbs/363,2 kg at 30 RPM	250 lbs/113,5 kg at 200 RPM to 800 lbs/363,2 kg at 20 RPM
Maximum Allowable Overhung Load With Zero End Thrust. (Reducer Output Shaft)	100 lbs/45,4 kg at 333 RPM to 200 lbs/90,8 kg at 33.3 RPM	200 lbs/90,8 kg at 300 RPM to 600 lbs/272,4 kg at 30 RPM	200 lbs/90,8 kg at 200 RPM to 600 lbs/272,4 kg at 20 RPM
Lubrication	Use a 300 ssu at 100°F/38°C turbine quality lubricant – Gast #AG292A, Gulf Harmony 53, Shell Tellus 33, Socony DTE heavy medium or Humble Nuto 53. For horizontal operation , remove both plugs and add oil to top hole until other hole overflows. For vertical operation , fill to overflow point of upper most hole.		

Worm Gear Reducer Series A-F

Gear Reducer Specifications

All output shafts are in the standard location.

Model	Air Motor	Ratio
AG803	4AM	20:1
AG805	4AM	40:1
AG807	4AM	60:1
AG809	6AM	10:1
AG811	6AM	20:1
AG816	8AM	20:1

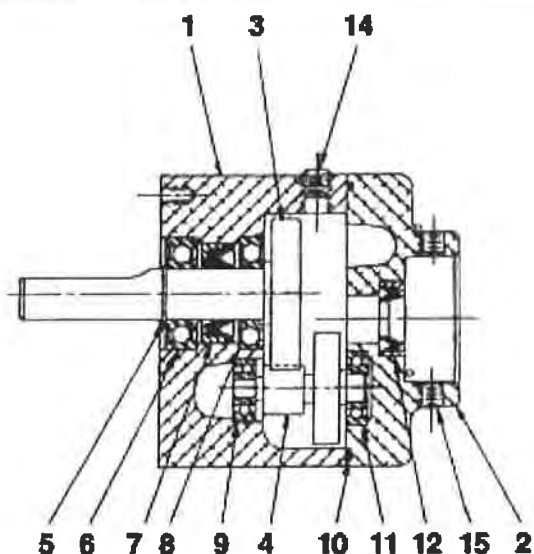
Service, Parts or Repair

For service, parts or repair of the worm gear reducer, contact the manufacturer listed on the nameplate.

Change output shaft direction

1. Remove drain plug and drain oil from unit.
2. Remove end cover and seal cage cap screws. While supporting output shaft, remove end cover and shims from unit. Keep shims with cover.
3. Remove output shaft and seal cage together from extension side. Keep shims with seal cage.
4. Insert seal cage, shims and sub-assembly into housing from the side opposite from which they were removed.
5. Insert seal cage cap screws and tighten with light pressure.
6. Assemble end cover with shims. Insert end cover cap screws and tighten with light pressure.
7. Turn high speed shaft in both directions to check that gear train is running freely.
8. Cross-tighten seal cage and end cover cap screws.

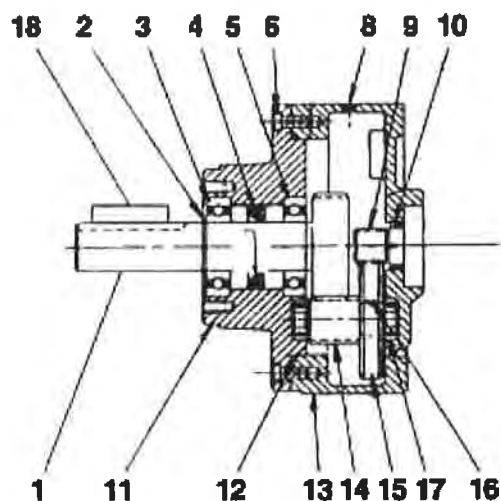
EXPLODED PRODUCT VIEWS, PARTS & ORDERING INFORMATION



GR11 SERIES

REF#	DESCRIPTION	QTY	PART NO.
1	GEAR HOUSING	1	AC737
2	GEAR HOUSING COVER	1	AC736
3	GEAR SHAFT	1	AC739
4	CLUSTER GEAR	1	AC738
5	SNAP-RING	1	AE189
6	BEARING	1	AE196A
7	SEAL	1	AA517A
8	BEARING	1	AA498
9	BEARING	1	AE195
10	O-RING	1	AD823
11	BEARING	1	AE197
12	SEAL	1	AA623D
13	SCREWS	4	BB542
14	PIPE PLUG	2	BA500
15	SET SCREW	2	BB626
***	DOWEL PIN	2	AE882

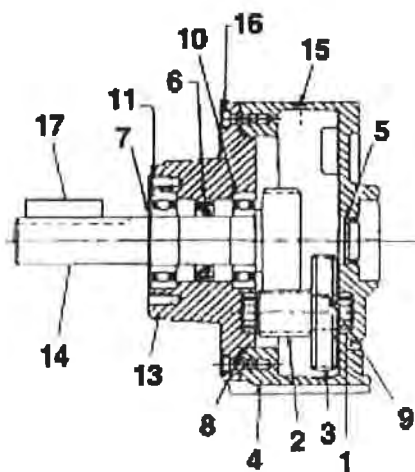
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GR20 SERIES

REF#	DESCRIPTION	QTY	PART NO.
1	GEAR SHAFT - OUTPUT	1	AE848
2	RETAINING RING	1	AE853
3	BEARING	1	AE858
4	OIL SEAL	1	AE852
5	BEARING	1	AE857
6	SCREW	6	BB652
***	DOWEL PIN	2	AF482
8	MAGNETIC DRAIN PLUG	2	AH471
9	GEAR - INPUT	1	AA294
10	OIL SEAL	1	AE851
11	HOUSING COVER	1	AE849
12	O-RING	1	AE854
13	GEAR HOUSING	1	AE850
14	GEAR SHAFT	1	AE845
15	GEAR - INTERMEDIATE	1	AE846
16	KEY	1	AE855
17	BEARING	2	AG549
18	KEY	1	AC628

*** Item not shown.



GR25 SERIES

REF#	DESCRIPTION	QTY	PART NO.
1	BEARING	2	AG549
2	GEAR SHAFT	1	AE845
3	GEAR INTERMEDIATE	1	AE846
4	GEAR HOUSING	1	AE850
5	SEAL	1	AE851
6	SEAL	1	AE852
7	RETAINING RING	1	AE853
8	O-RING	1	AE854
9	KEY	1	AE855
10	BEARING	1	AE857
11	BEARING	1	AE858
***	DOWEL PIN	2	AF482
13	HOUSING COVER	1	AH278
14	GEAR SHAFT - OUTPUT	1	AH279
15	MAGNETIC DRAIN PLUG	2	AH471
16	SCREWS	6	BB652
17	KEY	1	AC628

Konformitätserklärung

Declaration of Conformity

(im Sinne der Richtlinie 94/9/EG, Anhang VIII)
(according to EC Directive 94/9/EC, Appendix VIII)

GAST, 2300 M 139, Benton Harbor
Michigan, USA, erklärt in alleiniger Verantwortung, dass die im Folgenden
aufgelisteten Druckluftmotoren der Kategorie 2G und 2D, auf die sich
diese Erklärung bezieht, übereinstimmen mit der

*declares in sole responsibility that the Air motors in category 2G and 2D
that are listed below and that are subject to this declaration are meeting
the requirements set forth in*

Richtlinie 94/9/EG / Directive 94/9/EC
Motortypen / Motor types:

1AM-NCC-11	1UP-NRV-3A	2AM-NCW-72	4AM-NRV-130C	6AM-FRV-17A*	6AM-NRV-82
1AM-NCC-12	1UP-NRV-3B	2AM-NCW-7A	4AM-NRV-131	6AM-FRV-23A	6AM-NRV-9B
1AM-NCC-15A		2AM-NCW-7B	4AM-NRV-133	6AM-FRV-5	6AM-FRV-73
1AM-NCC-15B	2AM-ACC-88	2AM-NCW-7G	4AM-NRV-143	6AM-FRV-5A	
1AM-NCC-59A	2AM-ACC-88A	2AM-NCW-82SSA	4AM-NRV-147	6AM-FRV-62	1AM-NRV-58-GR11
1AM-NCC-59B	2AM-ACC-91	2AM-NCW-86	4AM-NRV-150	6AM-FRV-71	1AM-NRV-60-GR11
1AM-NCC-65	2AM-ARV-92	2AM-NCW-97	4AM-NRV-153	6AM-FRV-81	1AM-NRV-80-GR11A
1AM-NCC-88	2AM-ARV-93	2AM-NRV-104	4AM-NRV-155	6AM-NCC-28	1UP-NRV-11-GR11
1AM-NCC-95	2AM-FCC-1	2AM-NRV-89	4AM-NRV-156	6AM-NCW-9A	1UP-NRV-16-GR11
1AM-NCC-96	2AM-FCC-107	2AM-NRV-90	4AM-NRV-157	6AM-NRV-11	1UP-NRV-21-GR11C
1AM-NCW-100	2AM-FCC-1B	2AM-NCW-82	4AM-NRV-159	6AM-NRV-11A	1UP-NRV-24-GR11
1AM-NCW-101	2AM-FCC-21		4AM-NRV-160	6AM-NRV-11D	1UP-NRV-29-GR11
1AM-NCW-14	2AM-FCC-25	4AM-ARV-119	4AM-NRV-161	6AM-NRV-16	1UP-NRV-4-GR11
1AM-NCW-14C	2AM-FCW-13	4AM-ARV-119A	4AM-NRV-162	6AM-NRV-22A	4AM-RV-127-GR20
1AM-NCW-57	2AM-FCW-13A	4AM-ARV-120	4AM-NRV-164	6AM-NRV-251	4AM-RV-75-GR20
1AM-NRV-105SS	2AM-FRV-109	4AM-ARV-121	4AM-NRV-164A	6AM-NRV-27	4AM-RV-75-GR25
1AM-NRV-39A	2AM-NCC-102SS	4AM-ARV-154	4AM-NRV-165	6AM-NRV-29A	NL22-NCC-5-GR11
1AM-NRV-39C	2AM-NCC-106	4AM-FRV-13A	4AM-NRV-200SS	6AM-NRV-34	
1AM-NRV-39SS	2AM-NCC-106A	4AM-FRV-13C	4AM-NRV-201SS	6AM-NRV-47	
1AM-NRV-56	2AM-NCC-16	4AM-FRV-13G	4AM-NRV-21A	6AM-NRV-47A	
1AM-NRV-60	2AM-NCC-16A	4AM-FRV-13H	4AM-NRV-22A	6AM-NRV-53	
1AM-NRV-63A	2AM-NCC-16B	4AM-FRV-13J	4AM-NRV-22B	6AM-NRV-53A	
1AM-NRV-7SS	2AM-NCC-16D	4AM-FRV-142	4AM-NRV-22D	6AM-NRV-57	
1AM-NRV-82	2AM-NCC-16F	4AM-FRV-142A	4AM-NRV-22F	6AM-NRV-58	
	2AM-NCC-16G	4AM-FRV-145	4AM-NRV-22G	6AM-NRV-60	
1UP-NRV-4	2AM-NCC-40A	4AM-FRV-158	4AM-NRV-50C	6AM-NRV-63	
1UP-NCC-13	2AM-NCC-40B	4AM-FRV-24	4AM-NRV-50H	6AM-NRV-66	
1UP-NCC-14	2AM-NCC-43A	4AM-FRV-51	4AM-NRV-50L	6AM-NRV-67	
1UP-NCC-1A	2AM-NCC-43B	4AM-FRV-58C	4AM-NRV-54	6AM-NRV-68	
1UP-NCC-20	2AM-NCC-43C	4AM-FRV-63	4AM-NRV-54A	6AM-NRV-72	
1UP-NCC-30	2AM-NCC-6	4AM-FRV-63A	4AM-NRV-54B	6AM-NRV-72A	
1UP-NCW-22	2AM-NCC-66	4AM-NRV-109	4AM-NRV-5E	6AM-NRV-75	
1UP-NCW-251	2AM-NCC-74	4AM-NRV-113	4AM-NRV-50M	6AM-NRV-76	
1UP-NCW-2A	2AM-NCC-75A	4AM-NRV-115	4AM-NRV-70C	6AM-NRV-7A	
1UP-NCW-32	2AM-NCC-76	4AM-NRV-122	4AM-NRV-92	6AM-NRV-7B	
1UP-NCW-5	2AM-NCC-78	4AM-NRV-128		6AM-NRV-7C	
1UP-NRV-10	2AM-NCC-85	4AM-NRV-130	6AM-ARV-54	6AM-NRV-7D	
1UP-NRV-11	2AM-NCC-96	4AM-NRV-130A	6AM-ARV-55	6AM-NRV-7E	
1UP-NRV-15	2AM-NCW-108	4AM-NRV-130B	6AM-FRV-17		

8AM-ARV-70
8AM-ARV-71
8AM-FCC-11A
8AM-FRV-2A
8AM-FRV-2B
8AM-FRV-30A
8AM-FRV-40
8AM-FRV-61
8AM-FRV-75
8AM-FRV-78
8AM-NCC-54
8AM-NCC-68
8AM-NRV-17
8AM-NRV-28A

8AM-NRV-29
8AM-NRV-32A
8AM-NRV-39
8AM-NRV-42A
8AM-NRV-43
8AM-NRV-45
8AM-NRV-55
8AM-NRV-5B
8AM-NRV-73
8AM-NRV-76
8AM-NRV-79
8AM-NRV-80
8AM-RV-50
8AM-RV-50A

16AM-FCC-1
16AM-FCC-26
16AM-FCW-28
16AM-FRV-13
16AM-FRV-13A
16AM-FRV-19
16AM-FRV-2
16AM-FRV-251
16AM-FRV-252
16AM-FRV-27
16AM-FRV-32
16AM-FRV-33

NL22-FCW-4
NL22-NCC-1
NL22-NCC-5
NL22-NCW-2

NL32-NCC-1
NL32-NCC-19
NL32-NCC-23
NL32-NCC-251
NL32-NCC-5
NL32-NCC-7
NL32-NCW-2

NL42-NCC-1
NL42-NCC-251
NL42-NCC-5
NL42-NCC-7
NL42-NCW-2
NL42-NCW-252
NL42-NCW-6

NL52-NCC-1
NL52-NCC-3
NL52-NCW-2
NL52-NCW-4

Angewandte Norm: DIN EN 1127-1:2011, DIN EN 13463-1:2009, DIN EN 13463-5: 2011
Applicable standard: DIN EN 1127-1:2011, DIN EN 13463-1:2009, DIN EN 13463-5: 2011

Die Produkte sind mit folgender Kennzeichnung versehen:
The products are marked with the following characteristics:

 II 2 GDC T4 +1°C < Ta < +40°C

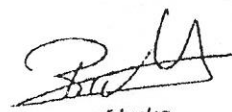
GAST hinterlegt die gemäß 94/9/EG Anhang VIII geforderten Unterlagen bei benannter Stelle:
SIRA Certification Service, EU-Kennnummer 0518

GAST will archive the documents required according to 94/9/EC Appendix VIII at the following location: SIRA Certification Service, EC Code 0518:

GAST / JUN-AIR, Benton Harbor, Michigan USA

November 6, 2013

Ort und Datum der Ausstellung
Place and date of issue


Raouf Luka
Assessing Engineer

EU Declaration of Conformity

SEW
EURODRIVE

Translation of the original text

900610410/EN

SEW-EURODRIVE GmbH & Co. KG

Ernst-Blickle-Straße 42, D-76646 Bruchsal

declares under sole responsibility that the following products

Gear units of the series

R..
F..
K..
S..
W..

optionally with mount-on components of the series

AM..
AQ..
AL..
AD..
AR..

variant

/II2GD

category

2G
2D

Designation

II 2GD c,k T3/T200°C or
II 2GD c,k T3/T200°C X
II 2GD c,k IIB T3/T200°C or
II 2GD c,k IIB T3/T200°C X
II 2GD c,k T4/T120°C or
II 2GD c,k T4/T120°C X
II 2GD c,k IIB T4/T120°C or
II 2GD c,k IIB T4/T120°C X
II 2GD c,k T5/T100°C or
II 2GD c,k T5/T100°C X
II 2GD c,k IIB T5/T100°C or
II 2GD c,k IIB T5/T100°C X
II 2GD c,k T6/T85°C or
II 2GD c,k T6/T85°C X
II 2GD c,k IIB T6/T85°C or
II 2GD c,k IIB T6/T85°C X

are in conformity with

ATEX directive

94/9/EC (valid until April 19, 2016)
2014/34/EU (valid as of April 20, 2016)
(L 96, 29.03.2014, 309-356)

2)
2)

Applied harmonized standards:

EN 13463-1:2009
EN 13463-5:2011
EN 13463-8:2003
EN 60529:1991/A1:2000/A2:2013

2) SEW-EURODRIVE lodges the documents required by 94/9/EC or 2014/34/EU, appendix VIII, with the notified body: FSA GmbH, EU ID No.: 0588

Bruchsal

18.04.2016

Place

Date

Johann Soder

Managing Director Technology

a) b)

- a) Authorized representative for issuing this declaration on behalf of the manufacturer
b) Authorized representative for compiling the technical documents

EU Declaration of Conformity

SEW
EURODRIVE

Translation of the original text

900580410/EN

SEW-EURODRIVE GmbH & Co. KG

Ernst-Blickle-Straße 42, D-76646 Bruchsal

declares under sole responsibility that the following products

Gear units of the series

R..
F..
K..
S..
W..

Optionally with mount-on components of the AR..
series

AM..
AQ..
AL..
AD..

variant

/II3GD

category

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3D

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II 3GD c,k T3/T200°C or
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II 3GD c,k IIB T4/T120°C or
II 3GD c,k IIB T4/T120°C X
II 3GD c, k T5/T100°C
or II 3GD c, k T5/T100°C X
II 3GD c,k IIB T5/T100°C or
II 3GD c,k IIB T5/T100°C X
II 3GD c, k T6/T85°C
or II 3GD c, k T6/T85°C X
II 3GD c,k IIB T6/T85°C or
II 3GD c,k IIB T6/T85°C X

are in conformity with

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94/9/EC (valid until April 19, 2016)
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SEW
EURODRIVE

Assembly and Operating Instructions



Gear unit series R..7, F..7, K..7, K..9, S..7, SPIROPLAN® W

6 Inspection/maintenance

6.1 General information

Observe the following notes regarding inspection/maintenance work at the gear unit:

▲ WARNING



Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

- Disconnect the gearmotor from the power supply before you start working on the unit.
- Prevent the gearmotor from starting up unintentionally (for example, by locking the key switch or removing the fuses from the current supply).

▲ WARNING



Risk of injury if preloaded shaft connections are loosened.

Severe or fatal injuries.

- Before releasing any shaft connections, make sure there is no active torsional torque present that could lead to tension within the system.

▲ WARNING



Risk of burns due to hot gear unit and hot gear unit oil.

Severe injuries

- Let the gear unit cool down before you start working on it.
- Carefully remove the oil level plug and the oil drain plug.

NOTICE

Loss of lubricant qualities due to filling of wrong gear unit oil.

Damage to the gear unit

- Do not mix different synthetic lubricants and do not mix synthetic and mineral lubricants.
- As standard lubricant use mineral oil.

NOTICE

Ingression of water at the sealing lip of the oil seal due to cleaning the gear unit with a high-pressure cleaning device.

Damage to oil seals

- Do not clean the variable-speed gear unit with a high-pressure cleaning device.

6.2 Wearing parts

Gearing	If the SEW-EURODRIVE design criteria and the intervals for inspection and maintenance are observed, the gearing components are wear-free after the run-in period. The worm gearing is an exception from this for constructional reasons. The amount of material abrasion on the worm gear tooth flanks varies depending on the operating conditions. The main influencing factors are: • Speed • Load • Operating temperature • Lubricant (type, viscosity, additives, pollution) • Operating frequency For information on the worm gearing service life under certain operating conditions, contact SEW-EURODRIVE.
Rolling bearing	Rolling bearing, adapter and input shaft assembly have a limited service life, even under ideal operating conditions. This nominal bearing service life is a solely statistical value. The actual service life of an individual bearing may deviate greatly from this value. The main influencing factors are: • Speed • Equivalent bearing load • Operating temperature • Lubricant (type, viscosity, additives, pollution) • Lubricant supply of the bearing • Misalignment under operating load Therefore the rolling bearings must be inspected regularly. Note the respective inspection and maintenance intervals in chapters Inspection/maintenance intervals (→ 92), Lubricant change intervals (→ 93), Maintenance of AL/AM/AQ./EWH adapter (→ 93) and AD input shaft assembly maintenance (→ 94). For information on the nominal bearing service life under certain operating conditions, contact SEW-EURODRIVE.
Lubricants	Lubricants are subject to aging. Their service life is limited depending on the load conditions. The service life significantly depends on the oil operating temperature. The dependency of lubricant change intervals and operating temperature is depicted in the figure in chapter Lubricant change intervals (→ 93).
Oil seals	Oil seals are contact seals that are used to seal unit housings at emerging elements, such as shafts, from the environment. Oil seals are wear parts with a service life that is influenced by various factors, such as: • Shaft speed and circumferential velocity at the sealing lip • Ambient conditions (temperature, dust, humidity, pressure, chemicals, radiation) • Lubricant (type, viscosity, additives, pollution) • Surface quality of the sealing • Lubricant supply of the sealing • Oil seal material

6.3 Inspection/maintenance intervals

The following gear units are lubricated for life:

- Helical gear units R07, R17, R27
- Parallel-shaft helical gear unit F27
- SPIROPLAN® gear units

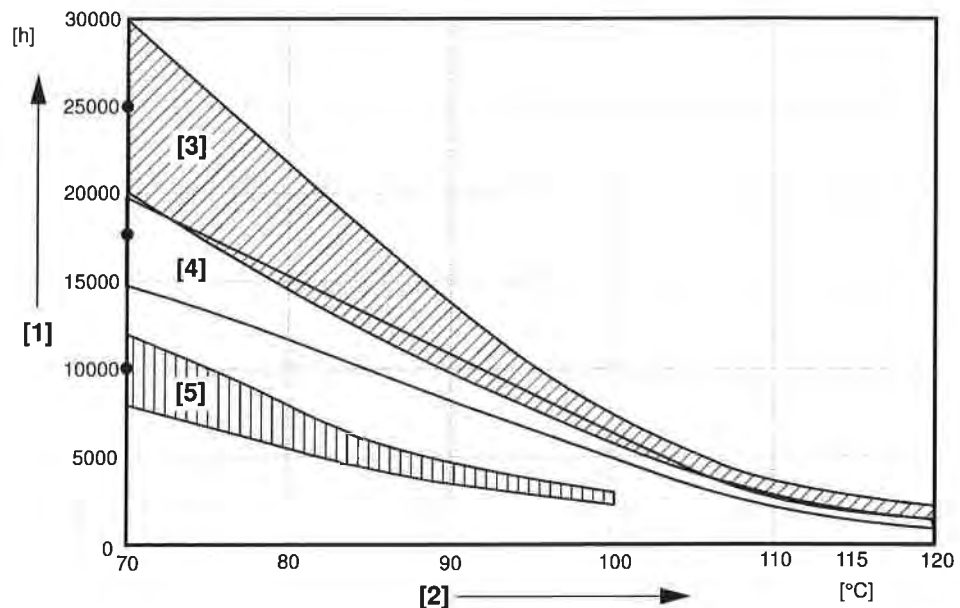
If necessary touch up or renew the surface protection/ corrosion protection coating.

The following table lists the obligatory intervals and the corresponding measures:

Time interval	What to do?
• Every 3000 hours of operation, at least every 6 months	• Check oil and oil level • Check running noise for possible bearing damage • Visual inspection of the seals for leakage • For gear units with a torque arm: Check and replace the rubber buffers, if necessary
• Depending on the operating conditions (see illustration below), every 3 years at the latest • according to oil temperature	• Change mineral oil • Replace rolling bearing grease (recommendation) • Replace oil seal (do not install it in the same track)
• Depending on the operating conditions (see illustration below), every 5 years at the latest • according to oil temperature	• Change synthetic oil • Replace rolling bearing grease (recommendation) • Replace oil seal (do not install it in the same track)
• Varying (depending on external factors)	• Touch up or renew the surfaces/anti-corrosion coating

6.4 Lubricant change intervals

The following image depicts the change intervals for standard gear units under normal ambient conditions. In case of special designs under severe/aggressive ambient conditions change the lubricant more frequently.



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- [1] Operating hours
- [2] Sustained oil bath temperature
- [3] CLP PG
- [4] CLP HC / HCE (food grade lubricants for the food industry)
- [5] CLP / HLP / E (lubricants made of biodegradable oils for agriculture, forestry, and water management)

6.5 Maintenance of AL/AM/AQ./EWH adapter

The following table lists the obligatory intervals and the corresponding measures:

Time interval	What to do?
Every 3000 hours of operation, at least every 6 months	- Check the running noises to detect possible bearing damage. - Visually check the adapter for leakage.
After 10000 operating hours	- Check the rotational clearance. - Visual check the cam ring (AM, EWH) or coupling ring (AQ., AL). - Change the bearing grease. - Change the oil seal. Do not mount it in the same track.

6.6 AD input shaft assembly maintenance

The following table lists the obligatory intervals and the corresponding measures:

Time interval	What to do?
• Every 3000 hours of operation, at least every 6 months	• Check the running noises to detect possible bearing damage. • Visually check the adapter for leakage.
• After 10000 operating hours	• Change the bearing grease. • Change the oil seal. Do not mount it in the same track.

6.7 Inspection/maintenance for the gear unit

6.7.1 Checking the oil level and changing the oil

The procedure when checking the oil level and changing the oil depends on gear unit type, size and mounting position. Determine the key letter (A, B, C, D or E) in the following table in regard of gear unit type and size. The key letter indicates the procedure for the respective gear unit, that can be found in the second table.

Gear unit type	Size	Code letter for chapter "Checking the oil level and changing the oil"					
		M1	M2	M3	M4	M5	M6
R	R..07 – 27	B					
	R..37 / R..67	A					
	R..47 / R..57	A				B	A
	R..77 – 167	A					
	RX..57– 107	A					
F	F..27	B					
	F..37 – 157	A					
K	K..19 / K..29	C					
	K..39 / K49	A					
	K..37 – 187	A					
S	S..37	C					
	S..47 – 97	A					
W	W..10 – 30	B					
	W..37 – 47	D			E	D	

Code letter	Chapter "Checking the oil level and changing the oil"	Reference
A:	- Helical gear units... - Parallel-shaft helical gear units... - Helical-bevel gear unit ...K..39 / K..49, K..37 – 187 - Helical-worm gear units... S..47 – 97 With oil level plug	(→ 96)
B:	- Helical gear units... - Parallel-shaft helical gear units... - SPIROPLAN® gear units... Without oil level plug, with cover plate	(→ 98)
C:	- Helical-worm gear units S..37 - Helical-bevel gear units K..19 / K..29 Without oil level plug, without cover plate	(→ 102)
D:	SPIROPLAN® W..37 / W..47 In mounting positions M1, M2, M3, M5, M6 with oil level plug	(→ 105)

Code letter	Chapter "Checking the oil level and changing the oil"	Reference
E:	SPIROPLAN® W..37 / W..47... In mounting position M4 without oil level plug and cover plate	(→ 107)

For notes on the mounting positions, refer to chapter "Mounting Positions (→ 110)".

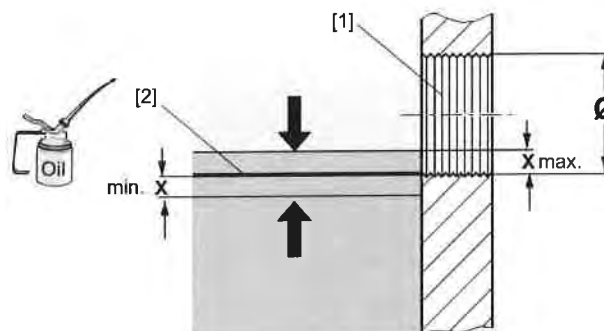
You cannot check the oil level of gear units in pivoted mounting position. The gear units are delivered with the correct oil level. Observe the designations and fill quantities on the nameplate if you have to change the oil.

6.7.2 A: Helical, parallel-shaft helical, helical-bevel and helical-worm gear units with oil level plug

Checking the oil level at the oil level plug

Proceed as follows to check the oil level of the gear unit:

1. Observe the notes in chapter "Information on gear unit inspection/maintenance" (→ 88).
2. Determine the position of the oil level plug and the breather valve using the mounting position sheets. See chapter "Mounting positions" (→ 110).
3. Place a container underneath the oil level plug.
4. Slowly remove the oil level plug. Small amounts of oil may leak out as the permitted maximum oil level is higher than the lower edge of the oil level bore.
5. Check the oil level according to the following figure and the corresponding table.



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- [1] Oil level bore
[2] Ideal oil level
- X min/max oil level

Ø oil level bore	Approved oil level fluctuation x mm
M10 x 1	1.5
M12 x 1.5	2
M22 x 1.5	3
M33 x 2	4
M42 x 2	5

6. Proceed as follows if the oil level is too low:

- Fill in fresh oil of the same type (contact SEW-EURODRIVE if necessary) via the breather bore, up to the lower edge of the oil level bore.
- Re-insert the breather valve.

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7. Screw in the oil level plug again.

Checking the oil via the oil drain plug

Proceed as follows to check the gear unit oil:

1. Observe the notes in section "Information on gear unit inspection/maintenance" (→ 88).
2. Determine the position of the oil drain plug using the mounting position sheets. See chapter "Mounting positions" (→ 110).
3. Remove a little oil from the oil drain plug.
4. Check the oil consistency:
 - Viscosity
 - If you can see that the oil is heavily contaminated, SEW-EURODRIVE recommends to change the oil even if this is outside the service intervals specified in "Inspection and maintenance intervals" (→ 92).
5. Check the oil level. See section "Checking the oil level via the oil level plug" (→ 96).

Changing the oil via the oil drain plug and the breather valve

▲ WARNING



Risk of burns due to hot gear unit and hot gear unit oil.

Severe injuries.

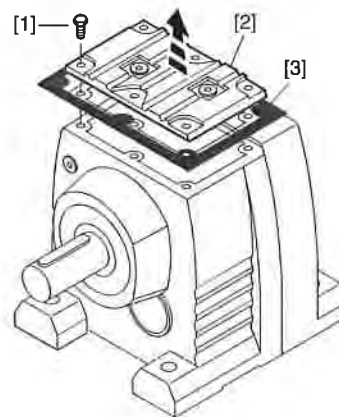
- Let the gear unit cool down before you start working on it. Due to the better flowability, the gear unit oil should still be warm so that the gear unit can be drained best.
1. Observe the notes in chapter "Information on gear unit inspection/maintenance" (→ 88).
 2. Determine the position of the oil drain plug, the oil level plug and the breather valve using the mounting position sheets. See chapter "Mounting positions" (→ 110).
 3. Place a container underneath the oil drain plug.
 4. Remove the oil level plug, the breather valve and the oil drain plug.
 5. Drain the oil completely.
 6. Re-insert the oil drain plug.
 7. Fill in fresh oil of the same type (contact SEW-EURODRIVE if necessary) via the breather bore. Do not mix different synthetic lubricant.
 - Observe the oil quantity according to the specifications on the nameplate or according to the mounting position. See chapter "Lubricant fill quantities".
 - Check the oil level at the oil level plug.
 8. Re-insert the oil level plug and the breather valve.

6.7.3 B: Helical, parallel shaft helical, SPIROPLAN® gear units without oil level plug with cover plate

Checking the oil level via the cover plate

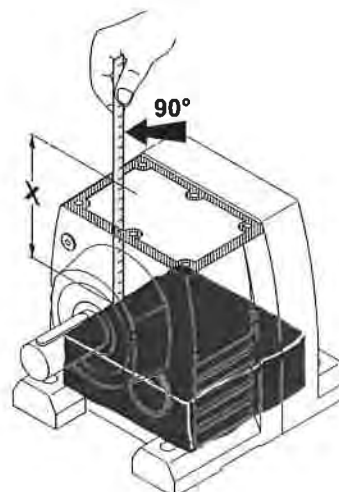
For gear units without oil level bore, the oil level is checked via the cover plate opening. Proceed as follows:

1. Observe the notes in section "Information on gear unit inspection/maintenance" (→ 88).
2. To position the cover plate on the top, place the gear unit in the following mounting position:
 - R07 - R57 in M1 mounting position
 - F27 in M3 mounting position
 - W10 - W30 in M1 mounting position
3. Loosen the screws [1] of the cover plate [2] and remove the cover plate [2] and the corresponding gasket [3] (see following figure).



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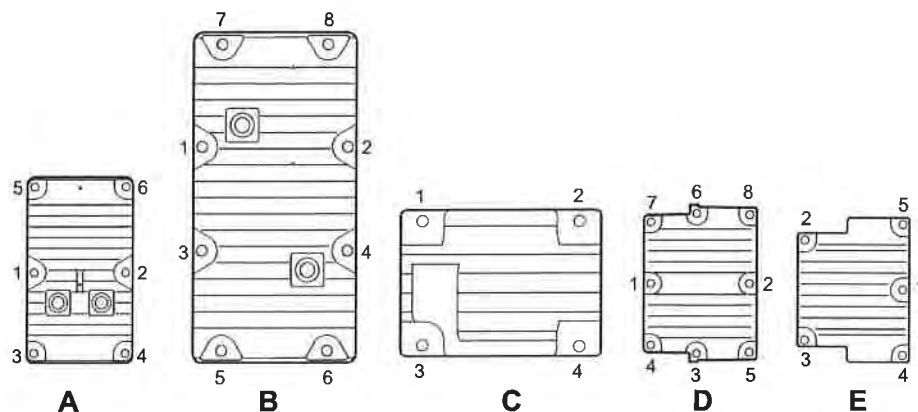
4. Determine the vertical distance "x" between oil level and sealing surface of the gear unit housing (see following figure).



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- Screw on the cover plate. Tighten the cover plate screw connections working from the inside to the outside. Tighten the cover plate screw connections in the sequence depicted in the following figure. Tighten the cover plate screw connections with the specified tightening torque according to the following table. Repeat the tightening procedure until the screws are properly tightened. To avoid damaging the cover plate, use only impulse wrenches or torque wrenches. Do not use impact screwdrivers.



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Gear unit type	Figure	Retaining thread	Tightening torque T_N Nm	Minimum tightening torque T_{min} Nm
R/RF07	E	M5	6	4
R/RF17/27	D	M6	11	7
R/RF47/57	A			
F27	B			
W10	C	M5	6	4
W20	C	M6	11	7
W30	A			

Checking the oil via cover plate

Proceed as follows to check the gear unit oil:

- Observe the notes in chapter "Information on gear unit inspection/maintenance" (→ 88).
- Open the cover plate of the gear unit according to section "Checking the oil level via the cover plate" (→ 98).
- Take an oil sample via the cover plate opening.
- Check the oil consistency.
 - Viscosity
 - If you can see that the oil is heavily contaminated, SEW-EURODRIVE recommends to change the oil even if this is outside the service intervals specified in "Inspection and maintenance intervals" (→ 95).
- Check the oil level. See section "Checking the oil level via the cover plate" (→ 98).

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6. Screw on the cover plate. Observe the order and the tightening torques according to section "Checking the oil level via the cover plate".

Changing the oil via the cover plate

▲ WARNING



Risk of burns due to hot gear unit and hot gear unit oil.

Severe injuries.

- Let the gear unit cool down before you start working on it. Due to the better flowability, the gear unit oil should still be warm so that the gear unit can be drained best.
1. Observe the notes in chapter "Information on gear unit inspection/maintenance" (→ 88).
 2. Open the cover plate of the gear unit according to chapter "Checking the oil level via the cover plate".
 3. Completely drain the oil into a container via the cover plate opening.
 4. Fill in fresh oil of the same type (contact SEW-EURODRIVE if necessary) via the cover plate. Do not mix different synthetic lubricants.
 - Pour in the oil as specified on the nameplate or in accordance with the mounting position. See chapter "Lubricant fill quantities".
 5. Check the oil level.
 6. Screw on the cover plate. Observe the order and the tightening torques according to chapter "Checking the oil level via the cover plate" (→ 98).

6.7.4 C: Helical-worm gear units S..37 and helical-bevel gear units K..19/K..29 without oil level plug and cover plate

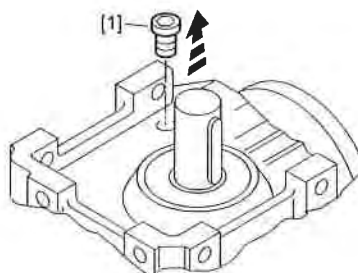
Checking the oil level via screw plug

The gear units S..37, K..19, and K..29 are not equipped with an oil level plug or a cover plate. This is why the oil level is checked via the control bore.

1. Observe the notes in chapter "Information on gear unit inspection/maintenance" (→ 88).
2. Place the gear unit in the mounting position stated in the following table. Thus the control bore always points upwards.

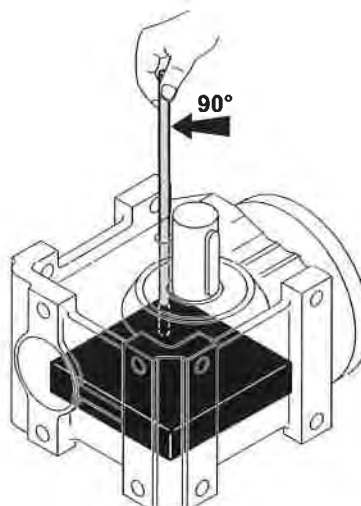
Gear unit	Mounting position
S..37	M5/M6
K19/29	M6

3. Remove the screw plug [1] as shown in the following figure.



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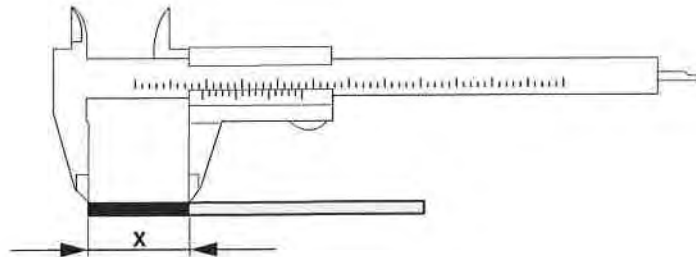
4. Insert the dipstick vertically via the control bore all the way to the bottom of the gear unit housing. Vertically pull the dipstick out of the control bore, as shown in the following figure.



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- Determine the size of the section "x" of the dipstick covered with lubricant using a slide-gauge as depicted in the following figure.



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- Compare the determined value "x" to the min. value depending on the mounting position specified in the following table. Correct the fill level if required.

Gear unit type	Oil level = wetted section x [mm] of the dipstick					
	Mounting position					
	M1	M2	M3	M4	M5	M6
K..19	33 ± 1	33 ± 1	33 ± 1	35 ± 1	33 ± 1	33 ± 1
K..29	50 ± 1	50 ± 1	50 ± 1	63 ± 1	50 ± 1	50 ± 1
S..37	10 ± 1	24 ± 1	34 ± 1	37 ± 1	24 ± 1	24 ± 1

- Re-insert and tighten the screw plug.

Checking the oil via the screw plug

- Observe the notes in chapter "Information on gear unit inspection/maintenance" (→ 88).
- Open the screw plug of the gear unit according to section "Checking the oil level via screw plug".
- Take an oil sample via the screw plug bore.
- Check the oil consistency.
 - Viscosity
 - If you can see that the oil is heavily contaminated, SEW-EURODRIVE recommends to change the oil even if this is outside the service intervals specified in "Inspection and maintenance intervals" (→ 92).
- Check the oil level. See previous section.
- Re-insert and tighten the screw plug.

Changing the oil via the screw plug

▲ WARNING

Risk of burns due to hot gear unit and hot gear unit oil.

Severe injuries.

- Let the gear unit cool down before you start working on it. Due to the better flowability, the gear unit oil should still be warm so that the gear unit can be drained best.

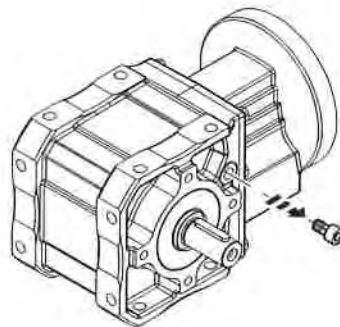


6.7.5 D: SPIROPLAN® W..37/W..47 in mounting position M1, M2, M3, M5, M6 with oil level plug

Checking the oil level at the oil level plug

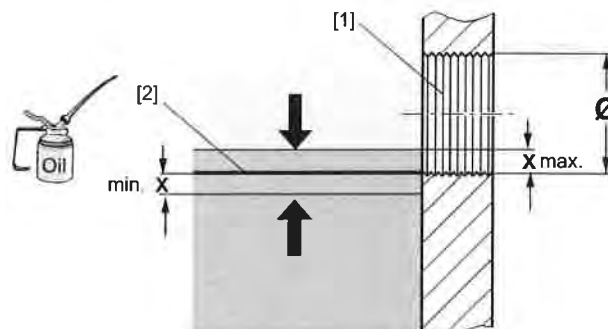
Proceed as follows to check the oil level of the gear unit:

1. Observe the notes in chapter "Information on gear unit inspection/maintenance" (→ 88).
2. Set up the gear unit in M1 mounting position.
3. Slowly remove the oil level plug (see following figure). Small amounts of oil may leak out.



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4. Check the oil level according to the following figure.



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[1] Oil level bore

[2] Ideal oil level

Ø oil level bore	Fluctuation x for minimum and maximum fill level in mm
M10 x 1	1.5

5. In case the oil level is too low, fill in fresh oil of the same type (contact SEW-EURODRIVE if necessary) via the oil level bore, up to the lower edge of the oil level bore.
6. Screw in the oil level plug again.

Checking the oil level at the oil level plug

Proceed as follows to check the oil of the gear unit:

1. Observe the notes in chapter "Information on gear unit inspection/maintenance" (→ 88).
2. Remove some oil at the oil level plug.

3. Check the oil consistency.
 - Viscosity
 - If you can see that the oil is heavily contaminated, SEW-EURODRIVE recommends to change the oil even if this is outside the service intervals specified in "Inspection and maintenance intervals" (→ 92).
4. Check the oil level. See previous section.

Changing the oil at the oil level plug

▲ WARNING



Risk of burns due to hot gear unit and hot gear unit oil.

Severe injuries.

- Let the gear unit cool down before you start working on it. Due to the better flowability, the gear unit oil should still be warm so that the gear unit can be drained best.

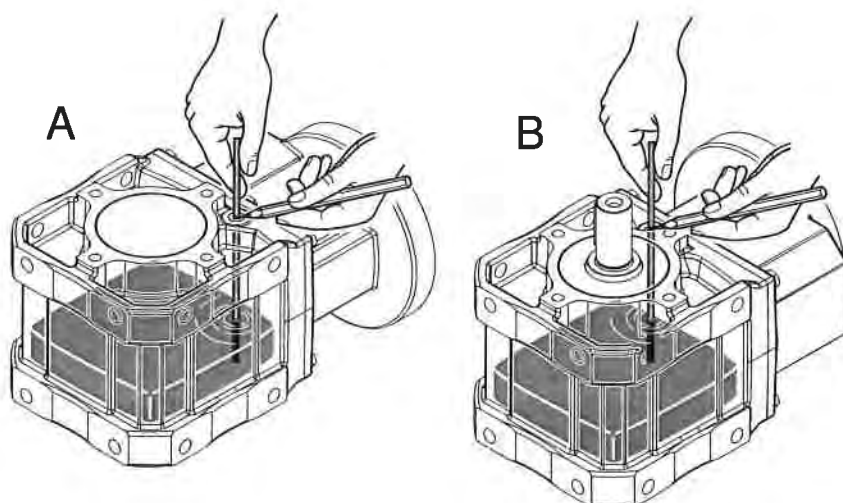
1. Observe the notes in chapter "Information on gear unit inspection/maintenance" (→ 88).
2. Set up the gear unit in M5 or M6 mounting position. See chapter "Mounting positions" (→ 110).
3. Place a container underneath the oil level plug.
4. Remove the oil level plugs on the A and B-side of the gear unit.
5. Drain the oil completely.
6. Re-insert the lower oil level plug.
7. Fill in fresh oil of the same type (contact SEW-EURODRIVE if necessary) via the upper oil level plug. Do not mix different synthetic lubricants.
 - Observe the oil quantity according to the specifications on the nameplate or according to the mounting position. See chapter "Lubricant fill quantities".
 - Check the oil level according to chapter "Checking the oil level via oil level plug".
8. Re-insert the upper oil level plug.

6.7.6 E: SPIROPLAN® W..37 / W..47 in mounting position M4 without oil level plug and cover plate

Checking the oil level via screw plug

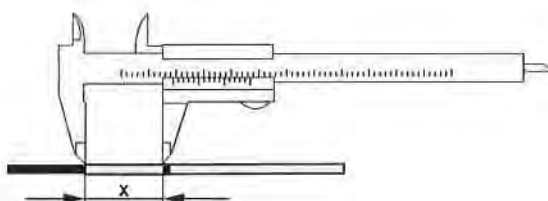
The W37 / W47 gear units are not equipped with an oil level plug or a cover plate. This is why the oil level is checked via the control bore.

1. Observe the notes in chapter "Information on gear unit inspection/maintenance" (→ 88).
2. Set up the gear unit in M5 or M6 mounting position. See chapter "Mounting positions" (→ 110).
3. Remove the screw plug.
4. Insert the dipstick vertically via the control bore all the way to the bottom of the gear unit housing. Mark the point on the dipstick where it exits the gear unit. Pull out the dipstick vertically (see following figure).



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5. Determine the section "x" between the wetted part and the marking using a caliper (see following figure).



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6. Compare the determined value "x" to the min. value depending on the mounting position specified in the following table. Correct the fill level if required.

Gear unit type	Oil level = wetted section x mm of the dipstick	
	Mounting position during check	
	M5 Lying on the A-side	M6 Lying on the B-side
W37 in M4 mounting position	37 ± 1	29 ± 1

Gear unit type	Oil level = wetted section x mm of the dipstick	
	Mounting position during check	
	M5 Lying on the A-side	M6 Lying on the B-side
W47 in M4 mounting position	41 ± 1	30 ± 1

7. Re-insert and tighten the screw plug.

Checking the oil via the screw plug

Proceed as follows to check the oil of the gear unit:

1. Observe the notes in chapter "Information on gear unit inspection/maintenance" (→ 88).
2. Remove a little oil at the oil screw plug.
3. Check the oil consistency:
 - Viscosity
 - If you can see that the oil is heavily contaminated, SEW-EURODRIVE recommends to change the oil even if this is outside the service intervals specified in "Inspection and maintenance intervals" (→ 92).
4. Check the oil level. See previous section.

Changing the oil via the screw plug



▲ WARNING

Risk of burns due to hot gear unit and hot gear unit oil.

Severe injuries.

- Let the gear unit cool down before you start working on it. Due to the better flowability, the gear unit oil should still be warm so that the gear unit can be drained best.

1. Observe the notes in chapter "Information on gear unit inspection/maintenance" (→ 88).
2. Set up the gear unit in M5 or M6 mounting position. See chapter "Mounting positions" (→ 110).
3. Place a container underneath the screw plug.
4. Remove the screw plugs on the A and B-side of the gear unit.
5. Drain the oil completely.
6. Re-insert the lower screw plug.
7. Fill in fresh oil of the same type (contact SEW-EURODRIVE if necessary) via the upper screw plug. Do not mix different synthetic lubricants.
 - For the required oil quantity, refer to the nameplate or chapter "Lubricant fill quantities".
 - Check the oil level according to chapter "Checking the oil level via oil level plug".
8. Re-insert the upper screw plug.

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6.7.7 Replacing the oil seal

NOTICE

Damage to oil seal when mounted below 0 °C.

Damage to oil seal.

- Store oil seals at ambient temperatures over 0 °C.
- If necessary, heat the oil seal before mounting it.

Proceed as follows:

1. Ensure that there is a sufficient grease reservoir between the dust lip and sealing lip, depending on the gear unit design.
2. If you use double oil seals, the space has to be filled with grease for one third.

6.7.8 Painting the gear unit

NOTICE

Ingress of paint at breather valve and sealing lips of the oil seal during painting or repainting of the gear unit.

Damage to oil seal and breather valve.

- Thoroughly cover the breather valve and sealing lip of the oil seals with strips prior to painting.
- Remove the strips after painting.

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Pneumatic tool oil Luna AIRTOIL 15 155300106, 0205, 0304

Last changed: 21/10/2014

Replaces date: 09/05/2012

Internal No. 155300106

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Trade name Pneumatic tool oil Luna AIRTOIL 15 155300106, 0205, 0304

1.2. Relevant identified uses of the substance or mixture and uses advised against

RECOMMENDED USES: Lubricant

1.3. Details of the supplier of the safety data sheet

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

DPD Classification: Xn; R65

CLP Classification: Asp. Tox. 1; H304

Most serious harmful effects:: May be fatal if swallowed and enters airways.

2.2. Label elements



Signal word: None

EC-Label: No

COMPOSITION

VITOLJA, HÖGRAFFINERAD MINERALOLJA (100 %)

H-phrases

H304 May be fatal if swallowed and enters airways.

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SUPPLEMENTAL HAZARD INFORMATION (EU)

Risk of aspiration with chemical pneumonia.

2.3. Other hazards

OTHER HAZARDS

Not known

SECTION 3: Composition/information on ingredients

3.2. Mixtures

Ingredient name	Reg. no.	EC No.	CAS No.	Conc. (wt%)	DPD-Classification	CLP-classification
VITOLJA, HÖGRAFFINERAD MINERALOLJA		232-455-8	8042-47-5	100 %	R65	Asp. Tox. 1 H304

Full text of R-, H- and EUH-phrases: see section 16.

The EUH hazard statements mentioned in CLP-classification are only label elements.

SECTION 4: First aid measures

4.1. Description of first aid measures

INHALATION

Provide rest, warmth and fresh air. Rinse nose, mouth and throat with water. Get medical attention if any discomfort continues.

INGESTION

DO NOT INDUCE VOMITING! Contact physician.

SKIN

Wash skin with soap and water. Remove contaminated clothing. Get medical attention if any discomfort continues. Immediate hospital care if the product has been forced through the skin at high pressure.

EYES

Rinse with water. Get medical attention if any discomfort continues.

4.2. Most important symptoms and effects, both acute and delayed

MOST IMPORTANT SYMPTOMS AND EFFECTS, BOTH ACUTE AND DELAYED

Aspiration during vomiting or ingestion may cause chemical pneumonia. Pulmonary oedema may appear several hours/days after exposure.

4.3. Indication of any immediate medical attention and special treatment needed

INDICATION OF ANY IMMEDIATE MEDICAL ATTENTION AND SPECIAL TREATMENT NEEDED

Treat symptomatically.

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SECTION 5: Firefighting measures

5.1. Extinguishing media

SUITABLE EXTINGUISHING MEDIA:

Fire may be extinguished using powder, foam or carbon dioxide (CO₂).

UNSUITABLE EXTINGUISHING MEDIA

Do not use water.

5.2. Special hazards arising from the substance or mixture

SPECIAL HAZARDS

Evolves combustible gases if heated. In the event of a fire, irritating smoke is formed. Carbon monoxide may be formed in the event of incomplete combustion.

5.3. Advice for firefighters

ADVICE FOR FIREFIGHTERS

Wear suitable respiratory protection.

OTHER INFORMATION

Only trained personnel may undertake fire fighting in enclosed spaces. Containers close to fire should be removed immediately or cooled with water.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

PERSONAL PRECAUTIONS

Bank in the discharge. Use personal protective equipment.

6.2. Environmental precautions

ENVIRONMENTAL PRECAUTIONS

Prevent discharges into the sewage system, watercourses or lakes.

6.3. Methods and material for containment and cleaning up

METHODS AND MATERIAL

Prevent dispersion through damming with sand, earth or other suitable material. Wipe away or soak up with an absorbent material. Immediately inform the authorities if the emission reaches the sewage system and watercourses. Inform the emergency service in the event of major spillage. Treat as dangerous waste. In the event of spillage into water: Enclose by booms and pump out as much as possible, collect minor quantities, e.g. in bark, and remove immediately.

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6.4. Reference to other sections

REFERENCES

Waste management see section 13

SECTION 7: Handling and storage

7.1. Precautions for safe handling

7.1. PRECAUTIONS FOR SAFE HANDLING

Avoid spillage. Avoid inhaling vapour/aerosol/mist.

7.2. Conditions for safe storage, including any incompatibilities

7.3. Specific end use(s)

7.3. SPECIFIC END USE(S)

Remains and waste must be treated as dangerous waste.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

LEGAL BASIS

AFS 2011:18

Occupational exposure limits

Ingredient name	CAS No.	Range	ppm	mg/m3	Year	Remarks
VITOLJA, HÖGRAFFINERAD MINERALOLJA	8042-47-5	15 min.		3		
VITOLJA, HÖGRAFFINERAD MINERALOLJA	8042-47-5	8 h		1		

R=Toxic for reproduction, H=Skin absorption, K=Carcinogenic, A=Sensitising, T=Upper limit, M=Mutagenic

BIOLOGICAL THRESHOLD VALUES

Contains mineral oil for which a threshold value for oil mist must be applied.

8.2. Exposure controls

APPROPRIATE ENGINEERING CONTROLS

Good personal hygiene is important. Use only in well-ventilated areas. Remove contaminated clothing. Do not put polluted rags in your pockets. Use suitable protective gloves, protective goggles and protective clothes if there is risk of direct contact or splashing.

EYE PROTECTION

Use eye protection.

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SKIN PROTECTION

Apron.

HAND PROTECTION

Protective gloves (nitrile rubber, fluorocarbon rubber).

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

STATE	Liquid.
COLOUR	Transparent liquid.
ODOUR	Mild.
SOLUBILITY	Organic solvents.
SOLUBILITY IN WATER	The product has limited solubility in water.

Parameter	Value/unit	Method/reference	Observation
pH (concentrate)	No data		
pH (solution for use)	No data		
Melting point	No data		
Freezing point	No data		
Initial boiling point and boiling range	No data		
Flash point	> 170 °C		1)
Evaporation rate	No data		
Flammability (solid, gas)	No data		
Flammability limits	No data		
Explosion limits	No data		
Vapour pressure	No data		
Vapour density	No data		
Relative density	No data		
Partition coefficient	No data		
Auto-ignition temperature	No data		
Decomposition temperature	No data		
Viscosity	~ 15 mm ² /s	40°C	2)

9.2. Other information

Parameter	Value/unit	Method/reference	Observation
Density	~ 849 kg/m ³	15°C	3)

Note no.	Comments
1	NOT TRANSLATED
2	NOT TRANSLATED
3	NOT TRANSLATED

SECTION 10: Stability and reactivity

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10.1. Reactivity

10.1. REACTIVITY

No information available

10.2. Chemical stability

10.2. CHEMICAL STABILITY

Stable.

10.3. Possibility of hazardous reactions

10.3. POSSIBILITY OF HAZARDOUS REACTIONS

Reacts with strong oxidants.

10.4. Conditions to avoid

10.4. CONDITIONS TO AVOID

Strong oxidizing agent.

10.5. Incompatible materials

10.5. INCOMPATIBLE MATERIALS

Not known

10.6. Hazardous decomposition products

10.6. HAZARDOUS DECOMPOSITION PRODUCTS

At a fire or strong heat, carbon monoxide (CO) is formed

SECTION 11: Toxicological information

11.1. Information on toxicological effects

ACUTE TOXICITY - ORAL

Aspiration during vomiting or ingestion may cause chemical pneumonia.

ACUTE TOXICITY - DERMAL

Product that has come under the skin at high pressure may cause extensive subcutaneous necrosis.

ACUTE TOXICITY - INHALATION

Oil mist may irritate the respiratory organs.

SKIN CORROSION/IRRITATION

Protracted or repeated contact in combination with poor hygiene may cause skin problems in the form of skin inflammation (dermatitis), eczema and oil acne. Used oils may contain contaminants hazardous to health. Mineral oil that has entered under the skin at high pressure may cause extensive subcutaneous necrosis.

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SERIOUS EYE DAMAGE/EYE IRRITATION

May cause discomfort.

ASPIRATION HAZARD

Risk of aspiration with chemical pneumonia.

SECTION 12: Ecological information

12.1. Toxicity

ACUTE AQUATIC TEST RESULTS

Not known

ECOTOXICITY

Not known

12.2. Persistence and degradability

PERSISTENCE AND DEGRADABILITY

The principal constituents are expected to be biodegradable. Slowly biodegradable.

12.3. Bioaccumulative potential

BIOACCUMULATIVE POTENTIAL

Contains component/components that can be bioaccumulated.

12.4. Mobility in soil

MOBILITY

Low solubility in water. The product floats on water. Contains components that strongly adsorb earth particles.

12.5. Results of PBT and vPvB assessment

RESULTS OF PBT AND VPVB ASSESSMENT

No information available

12.6. Other adverse effects

OTHER EFFECTS

Forms an oil film on water surfaces that may harm aquatic organisms and may disturb the transport of oxygen at the air/water interface.

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SECTION 13: Disposal considerations

13.1. Waste treatment methods

GENERAL REGULATIONS

Treat as dangerous waste. May only be transported by a contractor with a special licence.

CATEGORY OF WASTE

EWC 13 02 05

SECTION 14: Transport information

Classified as Dangerous Goods: **No**

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SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

OTHER REGULATORY INFORMATION

The CLP Regulation (1272/2008) SFS 2001:1063 AFS 2011:18

15.2. Chemical safety assessment

SECTION 16: Other information

LIST OF RELEVANT R-PHRASES

R65	Harmful: may cause lung damage if swallowed.
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LIST OF RELEVANT H-STATEMENTS

H304	May be fatal if swallowed and enters airways.
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