SINOPEC

COMPILATION OF ORIGINAL EQUIPMENT MANUFACTURER (OEM) CERTIFICATIONS

INTRODUCTION

COMPANY PROFILE

Sinopec Lubricant Co., Ltd. is a subsidiary of China Petroleum & Chemical Corporation. With seven decades of development, we have only focused on one thing, namely meeting customer's lubrication demands and providing high-tech, high-quality lubrication guarantee for all industries. Sinopec Lubricant produces a series of products including engine oil, gear oil,hydraulic oil, grease, engine coolant, brake fluid, metalworking fluid, marine oil, additive, etc., comprising of 21 categories and more than 2,000 varieties of products.

Its products have been widely used in iron and steel metallurgy, coal mining, petrochemical, engineering machinery, machinery manufacturing, aerospace, shipping, power energy, cement, transportation, urban construction, data information and other industries. At present, the company has obtained more than 2,000 technical certifications from international and domestic equipment manufacturers, accumulated over 3,000 industry-wide demonstration cases, and collected used lubricant data of more than 1 million sets of end-user equipment, involving more than 1,200 varieties of key equipment in various industries, establishing a comprehensive lubrication service system for enterprises and industries.

Sinopec Lubricant is committed to helping customers achieve professional lubrication management. Through lubricant selection optimization, lubricant condition monitoring, intelligent data management and other services, we provide customers with whole-process lubrication solutions, helping them reduce equipment downtime, extend equipment service life, decrease spare parts and energy consumption, and lower maintenance and management costs, thereby achieving long-term stable operation of equipment, optimizing lubrication costs and maximizing comprehensive benefits for customers.

SINOPEC

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1





PASSENGER CARS

SINOPEC

Passenger Cars

Gasoline Engine Oil: The product line is fully equipped with a wide range of specifications, capable of meeting the market demands for ultra-high and ultra-low viscosity grades of engine oil. The products perform excellently and have obtained technical certifications from mainstream global automakers.

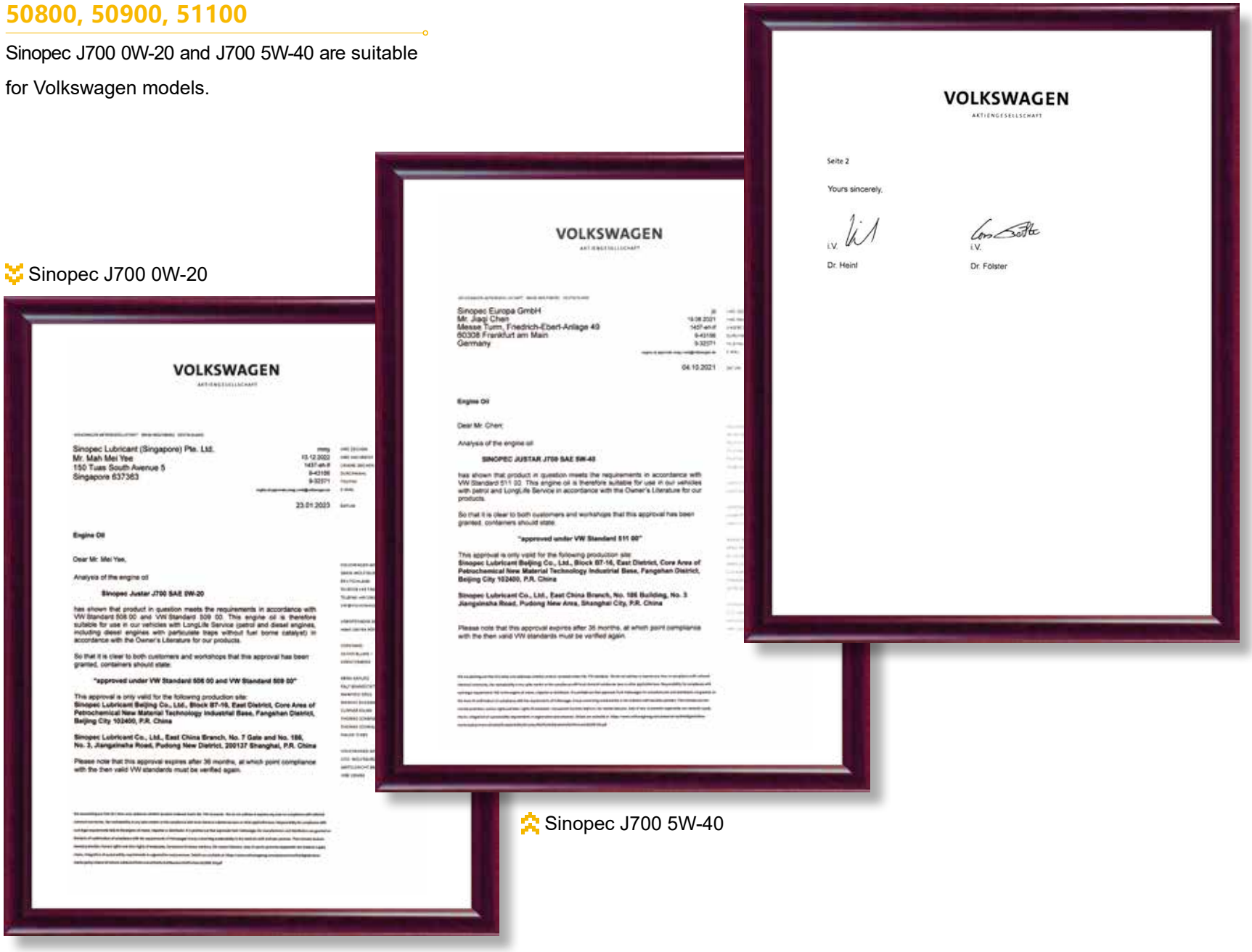
Transmission System: Our products meet the specification requirements within the automobile industry, with a complete product line that covers both initial equipment and aftermarket lubrication needs, providing comprehensive lubrication solutions for OEMs and the market.

Grease: Sinopec CVJ series has passed the OEM certification for initial equipment installation. It has formed a product line that comprehensively covers high, medium, and low grades, primarily based on lithium and polyurea.

Brake Fluid: Sinopec Lubricant Company is the earliest developer of synthetic brake fluid in China and the drafting and centralizing unit for China's national standard for brake fluid. Sinopec synthetic brake fluid product line includes the full range of DOT3, DOT4, and DOT5.1 products classified according to the U.S. Department of Transportation FMVSS No.116 standard, as well as the full range of Class3, Class4, Class5-1, Class 6, and Class 7 products according to the ISO 4925 standard.

50800, 50900, 51100

Sinopec J700 0W-20 and J700 5W-40 are suitable for Volkswagen models.





VOLKSWAGEN

Sinopec Lubricant (Singapore) Pte. Ltd.
Mrs. Mah Mei Yee
150 Tuas South Avenue 5
Singapore 637363

30.09.2022

Engine Oil

Dear Mrs. Mei Yee,

Analysis of the engine oil

Sinopec Jusitar J700 SAE 5W-40

has shown that product in question meets the requirements in accordance with VW Standard 502 00 and VW Standard 505 00. This engine oil is therefore suitable for use in our petrol and diesel engines, including engines with turbochargers, in accordance with the Owner's Literature for our products.

So that it is clear to both customers and workshops that this approval has been granted, containers should state:

"approved under VW Standard 502 00 and VW Standard 505 00"

Please note that this approval expires after 36 months, at which point compliance with the then valid VW standards must be verified again.

Yours sincerely,

i.V. Dr. Heinl

i.V. Dr. Fölster

INTERNAL

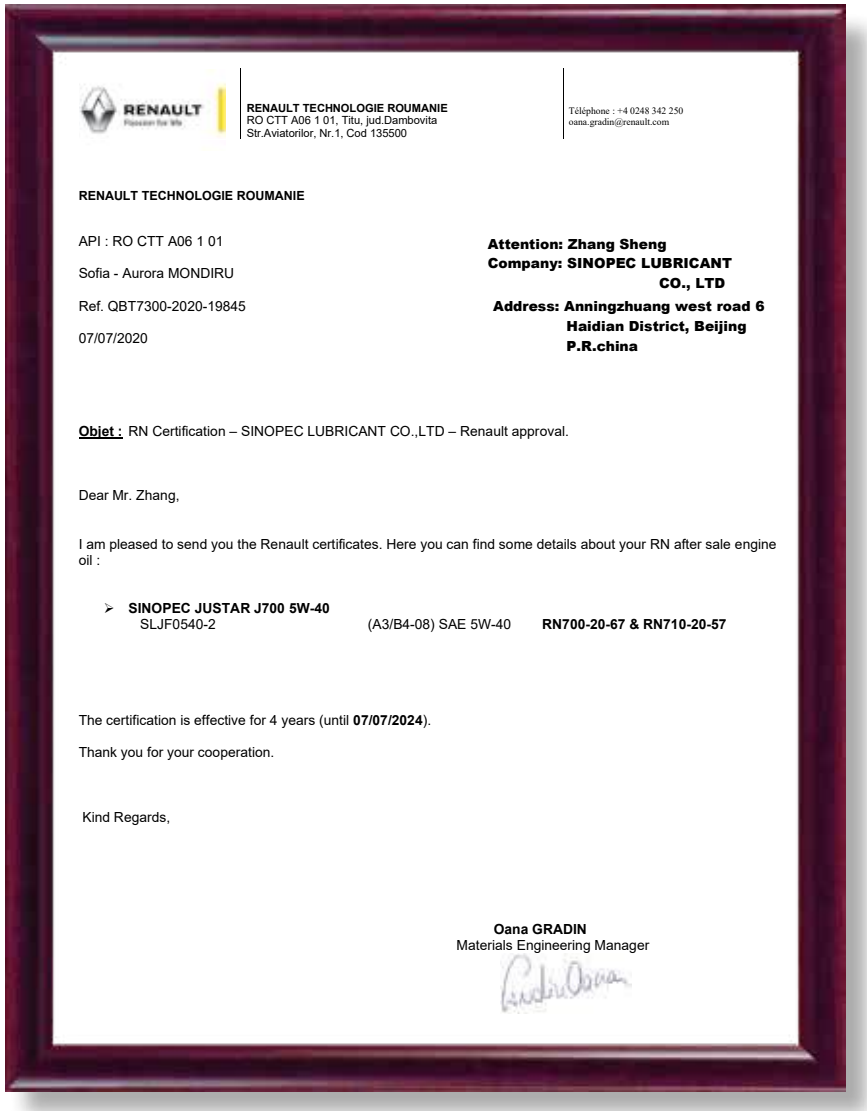
Sinopec J700 A3/B4 5W-40



Volkswagen

50200, 50500

Sinopec J700 A3/B4 5W-40 is suitable for Volkswagen models.



RENAULT

RENAULT TECHNOLOGIE ROUMANIE
RO CTT A06 1 01, Titu, jud.Dambovita
Str.Aviatorilor, Nr.1, Cod 135500

Téléphone : +4 0248 342 250
oana.gradin@renault.com

RENAULT TECHNOLOGIE ROUMANIE

API : RO CTT A06 1 01

Sofia - Aurora MONDIRU

Ref. QBT7300-2020-19845

07/07/2020

Attention: Zhang Sheng
Company: SINOPEC LUBRICANT CO., LTD
Address: Anningzhuang west road 6 Haidian District, Beijing P.R.china

Objet : RN Certification – SINOPEC LUBRICANT CO.,LTD – Renault approval.

Dear Mr. Zhang,

I am pleased to send you the Renault certificates. Here you can find some details about your RN after sale engine oil :

- **SINOPEC JUSTAR J700 5W-40**
  SLJF0540-2 (A3/B4-08) SAE 5W-40 **RN700-20-67 & RN710-20-57**

The certification is effective for 4 years (until **07/07/2024**).

Thank you for your cooperation.

Kind Regards,

Oana GRADIN
Materials Engineering Manager

Sinopec J700 5W-40

RENAULT
Passion for life

RN 0700/0710

Sinopec J700 5W-40 is suitable for Renault models.

Sinopec J700 C3 5W-30



Mercedes-Benz AG | 70546 Stuttgart

Mercedes-Benz

Lubricant Company, Sinopec Corp.
6. West Road, Anningzhuang, Haidian District
100085 BEIJING
P. R. of CHINA

Ihr Zeichen, Ihre Nachricht vom/
Your reference
26.04.2023

Unser Zeichen, unsere Nachricht vom/
Our reference number
RD/PMI-177449

Additional MB-Approval Certificate - Engine Oil - Reblend
Additional MB-Approval 229.31 for: "J700 C3 5W-30 engine oil"

Dear Sir or Madam,

The aforementioned operating fluid complies with the requirements of the Mercedes-Benz Specific
Fluids, sheet 229.31 and is therefore approved for the respective Mercedes-Benz vehicles a
application range is shown on the MB sheet and further defined on the sheet 223.2. Further req
grades, capacities, change intervals etc. must also be observed.
The following regulations apply for the MB-Approval:

- The MB-Approval comes into force on the date shown on this certificate
- The MB-Approval is only valid as long as the product name is listed on the Mercedes-Be
website https://operatingfluids.mercedes-benz.com
- Applications for renewals or new approvals etc. must be made in good time
- In addition, the regulations laid down in the current "Obligations Regarding Approval fo
contract apply.

This is an Additional MB-Certificate. It does not affect the period of validity of other certificates. T
of the relevant MB-Approval Certificate(s) and the date(s) for yearly verification(s) shall apply for
Approval Certificate. Applications for renewals or new approvals must be made on time.
This certificate is part of the relevant MB-Approval Certificate and shall be attached.

Sincerely
Mercedes-Benz AG

i.V. Fritz Kreitmann

i.V. Dr. Jochen Betsch

Mercedes-Benz AG | 70546 Stuttgart | T/P +49 711 17 0 | T/F +49 711 17 2 22 44 | dialog.mb@mercedes-benz.com | www.mercedes-b

Mercedes-Benz AG | 70546 Stuttgart

Mercedes-Benz

Lubricant Company, Sinopec Corp.
6. West Road, Anningzhuang, Haidian District
100085 BEIJING
P. R. of CHINA

Ihr Zeichen, Ihre Nachricht vom/
Your reference
26.04.2023

Unser Zeichen, unsere Nachricht vom/
Our reference number
RD/PMI-177451

Additional MB-Approval Certificate - Engine Oil - Reblend
Additional MB-Approval 229.51 for: "J700 C3 5W-30 engine oil"

Dear Sir or Madam,

The aforementioned operating fluid complies with the requirements of the Mercedes-Benz
Fluids, sheet 229.51 and is therefore approved for the respective Mercedes-Benz ve
application range is shown on the MB sheet and further defined on the sheet 223.2. Fur
grades, capacities, change intervals etc. must also be observed.
The following regulations apply for the MB-Approval:

- The MB-Approval comes into force on the date shown on this certificate
- The MB-Approval is only valid as long as the product name is listed on the Merc
website https://operatingfluids.mercedes-benz.com
- Applications for renewals or new approvals etc. must be made in good time
- In addition, the regulations laid down in the current "Obligations Regarding Ap
contract apply.

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This certificate is part of the relevant MB-Approval Certificate and shall be attached.

Sincerely
Mercedes-Benz AG

i.V. Fritz Kreitmann

i.V. Dr. Jochen Betsch

Mercedes-Benz AG | 70546 Stuttgart | T/P +49 711 17 0 | T/F +49 711 17 2 22 44 | dialog.mb@mercedes-benz.com | www

Mercedes-Benz

Lubricant Company, Sinopec Corp.
6. West Road, Anningzhuang, Haidian District
100085 BEIJING
P. R. of CHINA

MB-Approval Certificate - New Approval - Engine Oil - Reblend
MB-Approval 229.52 for: "J700 C3 5W-30 engine oil"

Dear Sir or Madam,

The aforementioned operating fluid complies with the requirements of the Mercedes-Benz Specifications for Operating Fluids, sheet 229.52 and is therefore approved for the respective Mercedes-Benz vehicles and assemblies. The application range is shown on the MB sheet and further defined on the sheet 223.2. Further requirements, e.g. SAE grades, capacities, change intervals etc. must also be observed.
The following regulations apply for the MB-Approval:

- The MB-Approval comes into force on the date shown on this certificate
- The MB-Approval will expire in 5 years at the latest
- The MB-Approval automatically terminates on expiry of the validity period at the latest
- The MB-Approval is only valid as long as the product name is listed on the Mercedes-Benz Operating Fluids website https://operatingfluids.mercedes-benz.com
- Applications for renewals or new approvals etc. must be made in good time
- In addition, the regulations laid down in the current "Obligations Regarding Approval for Operating Fluids" contract apply.

A 2-liter back-up sample of each formulation, which can be called upon by Mercedes-Benz AG at any given moment, must be retained. We will inform you of the dispatch address.

Sincerely
Mercedes-Benz AG

i.V. Fritz Kreitmann

i.V. Dr. Jochen Betsch

MB 229.31, MB 229.51

Sinopec J700 C3 5W-30 is suitable for Mercedes-Benz models.



Mercedes-Benz

Lubricant Company, Sinopec Corp.
6, West Road, Anningzhuang, Haidian District
100085 BEIJING
P. R. of CHINA

Date
06.06.2023

MB-Approval Certificate - New Approval - Engine Oil - Refilend
MB-Approval 229.71 for: "JP1 C5/SP 0W-20 engine oil"
Oil-Code: OS432385, SAE-Grade: 0W-20

Dear Sir or Madam,

The aforementioned operating fluid complies with the requirements of the Mercedes-Benz Specifications for Operating Fluids, sheet 229.71 and is therefore approved for the respective Mercedes-Benz vehicles and assemblies. The application range is shown on the MB sheet and further defined on the sheet 223.2. Further requirements, e.g. SAE grades, capacities, change intervals etc. must also be observed.
The following regulations apply for the MB-Approval:

- The MB-Approval comes into force on the date shown on this certificate
- The MB-Approval will expire in 5 years at the latest
- The MB-Approval automatically terminates on expiry of the validity period at the latest
- The MB-Approval is only valid as long as the product name is listed on the Mercedes-Benz Operating Fluids website https://operatingfluids.mercedes-benz.com
- Applications for renewals or new approvals etc. must be made in good time
- In addition, the regulations laid down in the current "Obligations Regarding Approval for Operating Fluids" contract apply.

A 2-liter back-up sample of each formulation, which can be called upon by Mercedes-Benz AG at any given moment, must be retained. We will inform you of the dispatch address.

Sincerely
Mercedes-Benz AG

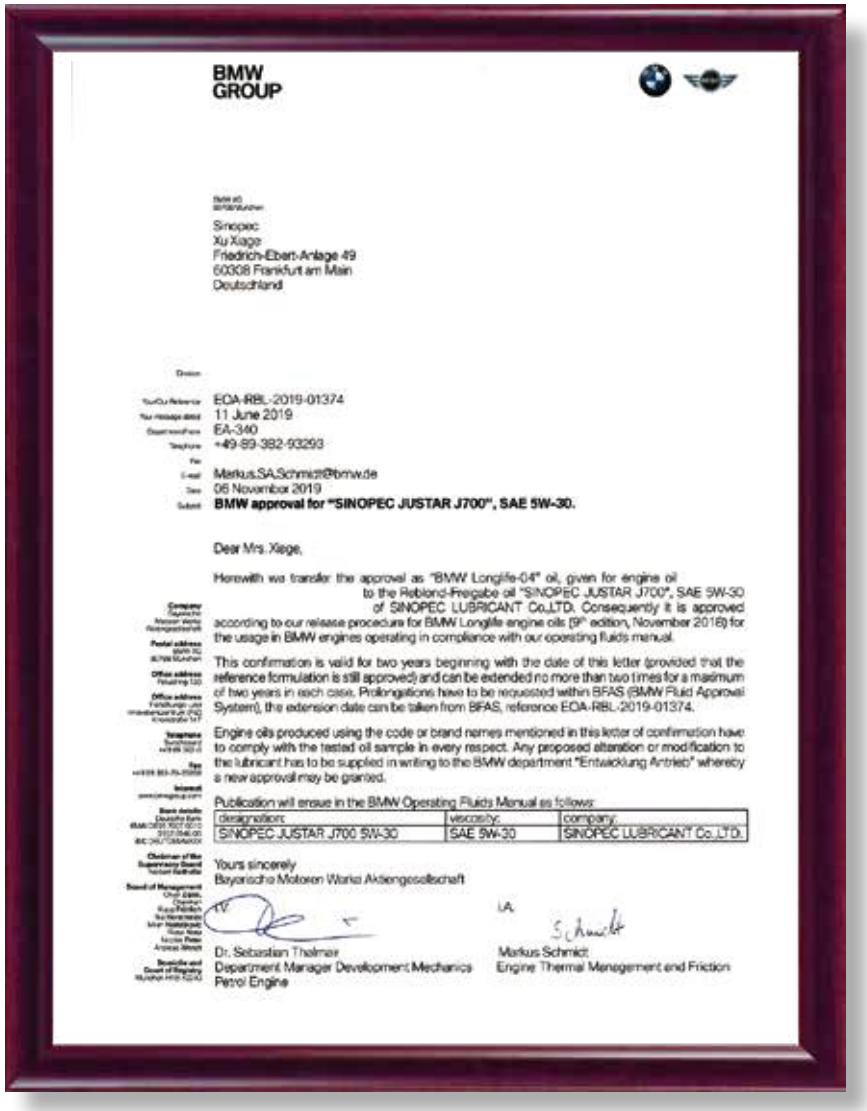
i.V. Fritz Kreitmann

i.V. Dr. Jochen Betsch

Sinopec JP1 C5/SP 0W-20

MB 229.71

Sinopec JP1 C5/SP 0W-20 is suitable for Mercedes-Benz models.



BMW GROUP

Sinopec
Xu Xiage
Friedrich-Ebert-Anlage 49
60308 Frankfurt am Main
Deutschland

EOA-RBL-2019-01374
11 June 2019
EA-340
+49-89-382-93293

Markus.SA.Schmidt@bmw.de
06 Novembox 2019
BMW approval for "SINOPEC JUSTAR J700", SAE 5W-30.

Dear Mrs. Xiage,

Herewith we transfer the approval as "BMW Longlife-04" oil, given for engine oil to the Reblond-Freigabe oil "SINOPEC JUSTAR J700", SAE 5W-30 of SINOPEC LUBRICANT Co.,LTD. Consequently it is approved according to our release procedure for BMW Longlife engine oils (9th edition, November 2018) for the usage in BMW engines operating in compliance with our operating fluids manual.

This confirmation is valid for two years beginning with the date of this letter (provided that the reference formulation is still approved) and can be extended no more than two times for a maximum of two years in each case. Prolongations have to be requested within BFAS (BMW Fluid Approval System), the extension date can be taken from BFAS, reference EOA-RBL-2019-01374.

Engine oils produced using the code or brand names mentioned in this letter of confirmation have to comply with the tested oil sample in every respect. Any proposed alteration or modification to the lubricant has to be supplied in writing to the BMW department "Entwicklung Antrieb" whereby a new approval may be granted.

Publication will ensue in the BMW Operating Fluids Manual as follows:

designation:	viscosity:	company:
SINOPEC JUSTAR J700 5W-30	SAE 5W-30	SINOPEC LUBRICANT Co.,LTD.

Yours sincerely
Bayerische Motoren Werke Aktiengesellschaft

i.A.

Dr. Sebastian Thalmer
Department Manager Development Mechanics Petrol Engine

Markus Schmidt
Engine Thermal Management and Friction

Sinopec J700 C3 5W-30

Longlife 04

Sinopec J700 C3 5W-30 is suitable for BMW models.



BMW GROUP

SINOPEC Lubricant Co.,Ltd

No.6 West Road of Anning Zhuang,Haidian District
100085 Beijing
China

EOA-RBL-2021-02125
21 May 2021
EA-340
+49-89-382-93293

Markus.SA.Schmidt@bmw.de
22 September 2021
BMW approval for "Justar J700 A3/B4 5W-40 Engine Oil", SAE 5W-40.

Herewith we transfer the approval as "BMW Longlife-01" oil, given for engine oil to the Rebland oil "Justar J700 A3/B4 5W-40 Engine Oil", SAE 5W-40 of SINOPEC Lubricant Co.,Ltd. Consequently it is approved according to our release procedure for BMW Longlife engine oils (9th edition, November 2018) for the usage in BMW engines operating in compliance with our operating fluids manual.

This confirmation is valid for two years beginning with the date of this letter (provided that the reference formulation is still approved) and can be extended no more than two times for a maximum of two years in each case. Prolongations have to be requested within BFAS (BMW Fluid Approval System), the extension date can be taken from BFAS, reference EOA-RBL-2021-02125.

Engine oils produced using the code or brand names mentioned in this letter of confirmation have to comply with the tested oil sample in every respect. Any proposed alteration or modification to the lubricant has to be supplied in writing to the BMW department "Entwicklung Antrieb" whereby a new approval may be granted.

Publication will ensue in the BMW Operating Fluids Manual as follows:

designation:	viscosity:	company:
Justar J700 A3/B4 5W-40 Engine Oil	SAE 5W-40	SINOPEC Lubricant Co.,Ltd

Yours sincerely
Bayerische Motoren Werke Aktiengesellschaft

i.V.
Dr. Sebastian Theimer
Department Manager Development Mechanics Petrol Engine

i.A.
Markus Schmidt
Required System Design, Operating Fluids

Sinopec J700 A3/B4 5W-40

Longlife 01

Sinopec J700 A3/B4 5W-40 is suitable for BMW models.



BMW GROUP

SINOPEC Lubricant Co.,Ltd
Sun Ruiyu
No.6 West Road of Anning Zhuang,Haidian District
100085 Beijing
China

EOA-R8L-2021-02219
22 July 2021
EA-340
+49-89-382-93293
Markus.SA.Schmidt@bmw.de

BMW approval for "Justar JP1 0W-30 Engine Oil", SAE 0W-30.

Dear Mr. Ruiyu,

Herewith we transfer the approval as "BMW Longlife-12 FE" oil, given for engine oil code of to the Reblend oil "Justar JP1 0W-30 Engine Oil", SAE 0W-30 of SINOPEC Lubricant Co.,Ltd. Consequently it is approved according to our release procedure for BMW Longlife engine oils (9th edition, November 2018) for the usage in BMW engines operating in compliance with our operating fluids manual.

This confirmation is valid for two years beginning with the date of this letter (provided that the reference formulation is still approved) and can be extended no more than two times for a maximum of two years in each case. Prolongations have to be requested within BFAS (BMW Fluid Approval System), the extension date can be taken from BFAS, reference EOA-R8L-2021-02219.

Engine oils produced using the code or brand names mentioned in this letter of confirmation have to comply with the tested oil sample in every respect. Any proposed alteration or modification to the lubricant has to be supplied in writing to the BMW department "Entwicklung Antrieb" whereby a new approval may be granted.

Publication will ensue in the BMW Operating Fluids Manual as follows:

designation:	viscosity:	company:
Justar JP1 0W-30 Engine Oil	SAE 0W-30	SINOPEC Lubricant Co.,Ltd

Yours sincerely
Bayerische Motoren Werke Aktiengesellschaft

i.V.
Dr. Sebastian Pfaffer
Department Manager Development Mechanics Petrol Engine

i.A.
Markus Schmidt
Required System Design, Operating Fluids

Sinopec JP1 0W-30

Longlife 12FE

Sinopec JP1 0W-30 is suitable for BMW models.

Sinopec GKN B1eS Grease



GKN B1eS 润滑脂使用证明

中国石化润滑油有限公司润滑脂分公司：

GKN B1eS 润滑脂为乘用车 CVJ 外球笼部位用脂。此产品目前已经通过上海纳铁福传动系统有限公司与 GKN 的台架测试，产品性能满足 GKN 等速万向节使用要求。目前已小批量试用。

上海纳铁福传动系统有限公司

2021 年 09 月 07 日



长城 TSCT-1 润滑脂使用说明

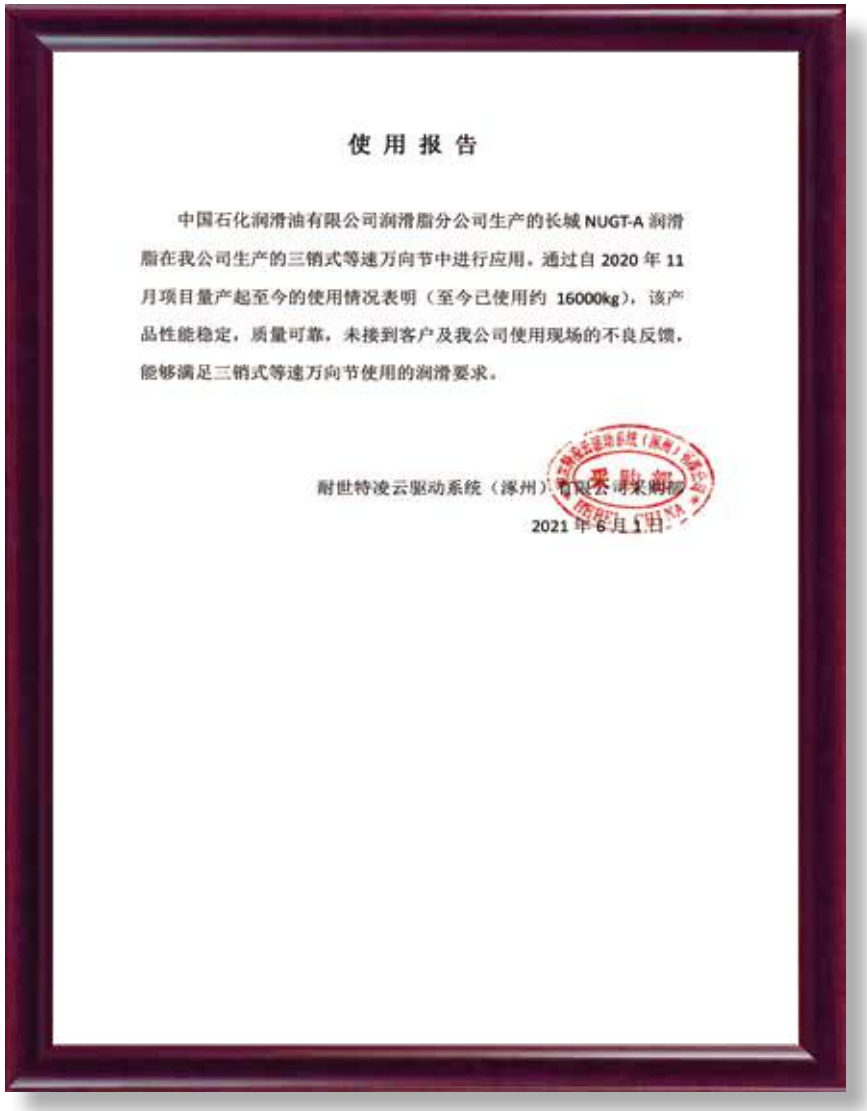
本公司使用长城 TSCT-1 润滑脂，在多款传动轴上使用，目前使用效果良好。该产品对零部件起到了很好的润滑保护作用，根据公司售后人员反应，未发现油脂失效的客户抱怨。

2014 年 4 月 21 日

Sinopec TSCT-1 Grease

Partial ball cage universal joint and partial three pin universal joint

Sinopec GKN B1eS grease meets the requirements of football cage universal joint, Sinopec TSCT-1 grease meets the requirements of three pin universal joint produced by Shanghai GKN Huayu driveline Systems Co., Ltd. (SDS)



使 用 报 告

中国石化润滑油有限公司润滑脂分公司生产的长城 NUGT-A 润滑脂在我公司生产的三销式等速万向节中进行应用，通过自 2020 年 11 月项目量产起至今的使用情况表明（至今已使用约 16000kg），该产品性能稳定，质量可靠，未接到客户及我公司使用现场的不良反馈，能够满足三销式等速万向节使用的润滑要求。

耐世特凌云驱动系统（涿州）有限公司采购部

2021 年 6 月 1 日

Sinopec NUGT-A Grease



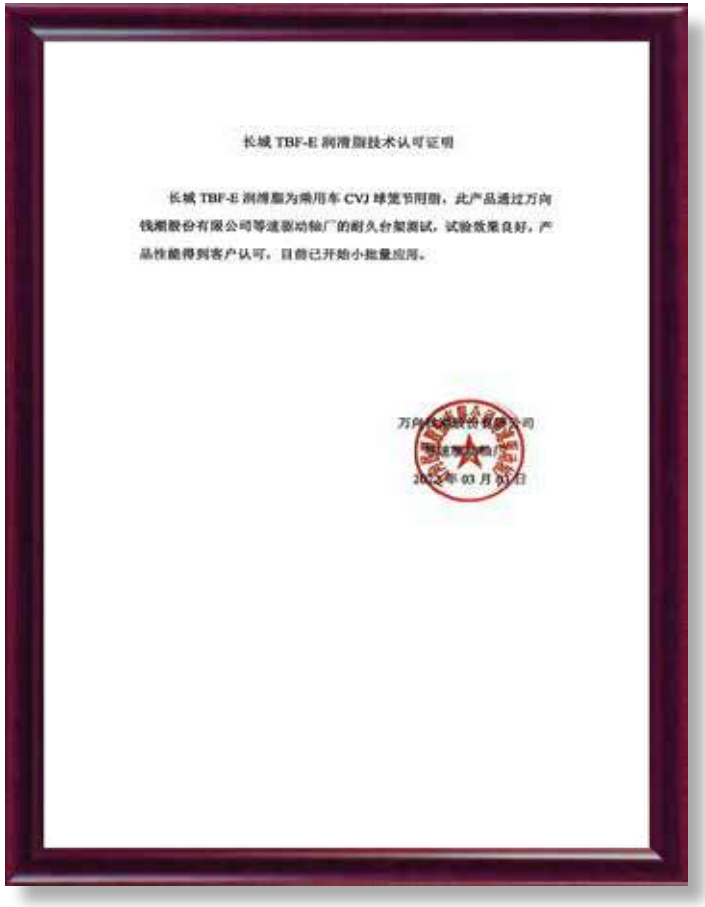
耐世特凌云

Nexteer Lingyun

Partial ball cage universal joint and partial three pin universal joint

Sinopec NUGT-A Grease meets the requirements of three pin constant velocity universal joint produced by Nexteer.

Sinopec TBF-E Grease





Sinopec TBF-F Grease

Partial ball cage universal joint and partial three pin universal joint

Sinopec TBF-E grease meets the requirements of ball cage universal joint, Sinopec TBF-F grease meets the requirements of three pin universal joint produced by Wanxiang Group.



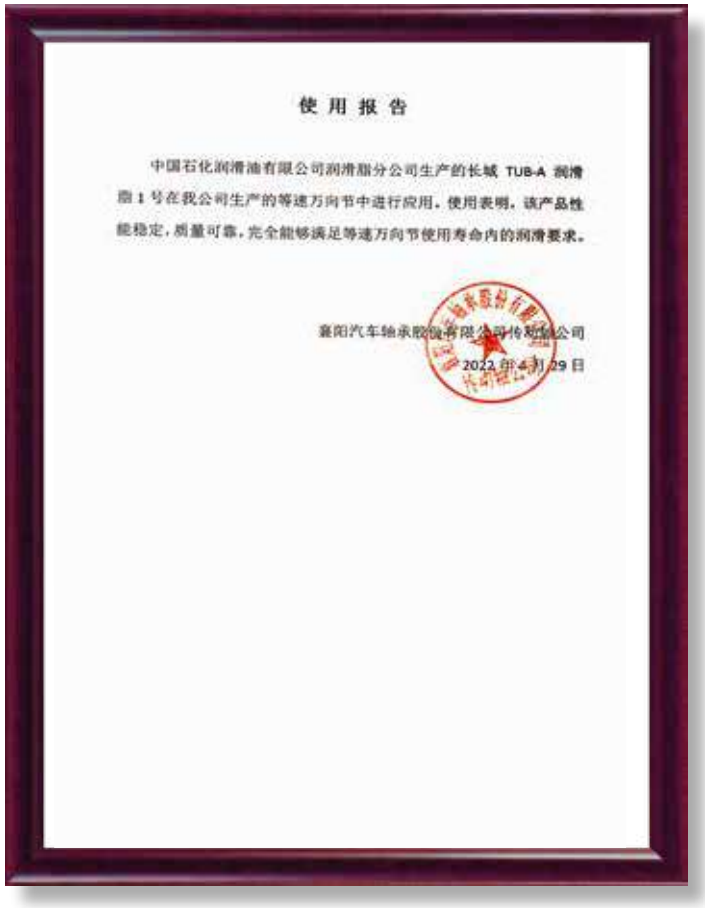
Partial ball cage universal joint

Sinopec TUB-A grease meets the requirements of ball cage universal joints produced by Zhejiang ODM Transmission Technology Co., Ltd.



Partial ball cage universal joint

Sinopec TUB-A grease meets the requirements of ball cage universal joints produced by Xiangyang Automobile Bearing Co., Ltd.



使 用 报 告

中国石化润滑油有限公司润滑脂分公司生产的长城 TUB-A 润滑脂 1 号在我公司生产的等速万向节中进行应用。使用表明，该产品性能稳定，质量可靠，完全能够满足等速万向节使用寿命内的润滑要求。

襄阳汽车轴承股份有限公司传动轴公司

2022 年 4 月 29 日



使 用 报 告

中国石化润滑油有限公司天津分公司生产的长城 TUB-A 润滑脂在我公司生产的球笼式等速万向节中进行应用。多年使用表明，该产品性能稳定，质量可靠，完全能够满足球笼式等速万向节使用寿命内的润滑要求。

杭州天力机械有限公司

2019 年 6 月 11 日

Partial ball cage universal joint

Sinopec TUB-A grease meets the requirements of ball cage universal joints produced by Hangzhou TLP machinery Co., Ltd.



长安汽车 CHANGAN

CAMA

生产性原辅材料技术认证书

Certification of Raw Material Technology in Production

认证编号：CAMA-AA-015

兹 证 明

中国石油化工股份有限公司润滑油重庆分公司：

生产的 HZY4 长城 4606 合成制动液 通过长安汽车生产性原辅材料技术认证。

认证标准：《GB12981-2003》

适用范围：长安汽车渝北工厂所产车型

制造商注册地址：重庆九龙坡区渝州路 62 号　　邮编：400039

制造商生产地址：重庆市沙坪坝区杨梨路 150 号　　邮编：400030

有效期：2011 年 10 月 18 日—2012 年 10 月 17 日

签发：　　（盖章）

重庆长安汽车股份有限公司

Chongqing Changan Automotive CO.Ltd

制证日期：2011 年 10 月 18 日

（相关约束条件见背面）

Sinopec 4606 synthetic brake fluid

长安汽车 CHANGAN

Chang'an

Sinopec 4606 synthetic brake fluid meets the requirements of ChangAn Auto and can be applied to all models.

2





COMMERCIAL VEHICLE

Commercial Vehicle

Diesel Engine Oil: The product specifications are comprehensive, covering a wide range of viscosity grades, meeting the specifications of multiple mainstream commercial vehicle manufacturers. The overall performance of the products is excellent, reaching an international advanced level.

Transmission System: The product line is complete, meeting technical specifications such as GB13895 and J2360, and has obtained technical recognition from leading OEMs. It can cover both initial equipment and aftermarket lubrication needs.

Grease: Sinopec hub bearing series grease products have passed the certifications of major hub bearing manufacturers such as Sinotruck, Fuhua, and JAC Motors. Sinopec occupy a large market share of the hub bearing initial equipment grease market and play a leading role in the development of hub bearing grease.

Brake Fluid: The product line is comprehensive, including the full range of DOT3, DOT4, and DOT5.1 products classified according to the U.S. Department of Transportation FMVSS No.116 standard, as well as the full range of Class3, Class4, Class5-1, Class 6, and Class 7 products according to the ISO4925 standard.

MB 228.51

Sinopec LT 5W-30/10W-40 meets the requirements of Mercedes-Benz.

Sinopec LT 10W-40



DAIMLER TRUCK

Daimler Truck AG, PO Box 10 01 54, 70745 Leinfelden-Echterdingen, Germany

506655-FS

Lubricant Company, Sinopec Corp.
6. West Road, Anningzhuang, Haidian District
100085 BEIJING
P. R. of CHINA

Telefon / Phone	Hauspost-Code / Internal Code
+49 7 11 84 85-0	

Ihr Zeichen, Ihre Nachricht vom / Your reference	Unser Zeichen, unsere Nachricht vom / Our reference	Name E-Mail	Datum / Date
19.07.2023	TT/XEV-506652	frs@daimlertruck.com	13.10.2023

DTFR-Certificate - New Approval - Engine Oil - Reblend
DTFR 15C110 for: "Sinopec 228.51 10W-40"

Dear Sir or Madam,

The aforementioned operating fluid complies with the requirements of the Daimler Truck Specifications for Operating Fluids, sheet DTFR 15C110 and is therefore approved for the respective Mercedes-Benz-Trucks vehicles and assemblies. The application range is shown and further defined on the sheet DTFR 15A100. Further requirements, e.g. SAE grades, capacities, change intervals etc. must also be observed.

The following regulations apply for the DTFR (Daimler Truck Fluid Release):

- The DTFR comes into force on the date shown on this certificate
- The DTFR will expire in 5 years at the latest
- The DTFR automatically terminates on expiry of the validity period at the latest
- The DTFR is only valid as long as the product name is listed in Mercedes-Benz-Truck BeVo-ONLINE: http://bevo.mercedes-benz-trucks.com
- Applications for renewals or new approvals etc. must be made in good time
- In addition, the regulations laid down in the current "Obligations Regarding Approval for Operating Fluids" contract apply.

A 2-liter back-up sample of each formulation, which can be called upon by Daimler Truck AG at any given moment, must be retained for at least 3 years. We will inform you of the dispatch address.

Sincerely
Daimler Truck AG

i.V. Gilles Fédacou i.V. Dr. Peter Kožuch

Daimler Truck AG
Sitz und Registergericht/Domicile and Court of Registry: Stuttgart, HRB-Nr./Commercial Register No.: 762884
Vorsitzender des Aufsichtsrats/Chairman of the Supervisory Board: Joe Kaeser
Vorstand/Board of Management: Martin Daum, Vorsitzender/Chairman;
Karl Deppen, Jochen Goetz, Andreas Gorbach, Jürgen Hartwig, John O'Leary, Karin Rådström, Stephan Unger

Daimler Truck AG
Fasanenweg 10
70771 Leinfelden-Echterdingen, Germany
Telefon/Phone +49 7 11 84 85-0
Telefax/Fax +49 7 11 84 85-20 00
contact@daimlertruck.com
www.daimlertruck.com

Sinopec LT 5W-30



DAIMLER TRUCK

Daimler Truck AG, PO Box 10 01 54, 70745 Leinfelden-Echterdingen, Germany

506655-FS

Lubricant Company, Sinopec Corp.
6. West Road, Anningzhuang, Haidian District
100085 BEIJING
P. R. of CHINA

Telefon / Phone	Hauspost-Code / Internal Code
+49 7 11 84 85-0	

Ihr Zeichen, Ihre Nachricht vom / Your reference	Unser Zeichen, unsere Nachricht vom / Our reference	Name E-Mail	Datum / Date
19.07.2023	TT/XEV-506655	frs@daimlertruck.com	13.10.2023

DTFR-Certificate - New Approval - Engine Oil - Reblend
DTFR 15C110 for: "Sinopec 228.51 LT 5W-30"

Dear Sir or Madam,

The aforementioned operating fluid complies with the requirements of the Daimler Truck Specifications for Operating Fluids, sheet DTFR 15C110 and is therefore approved for the respective Mercedes-Benz-Trucks vehicles and assemblies. The application range is shown and further defined on the sheet DTFR 15A100. Further requirements, e.g. SAE grades, capacities, change intervals etc. must also be observed.

The following regulations apply for the DTFR (Daimler Truck Fluid Release):

- The DTFR comes into force on the date shown on this certificate
- The DTFR will expire in 5 years at the latest
- The DTFR automatically terminates on expiry of the validity period at the latest
- The DTFR is only valid as long as the product name is listed in Mercedes-Benz-Truck BeVo-ONLINE: http://bevo.mercedes-benz-trucks.com
- Applications for renewals or new approvals etc. must be made in good time
- In addition, the regulations laid down in the current "Obligations Regarding Approval for Operating Fluids" contract apply.

A 2-liter back-up sample of each formulation, which can be called upon by Daimler Truck AG at any given moment, must be retained for at least 3 years. We will inform you of the dispatch address.

Sincerely
Daimler Truck AG

i.V. Gilles Fédacou i.V. Dr. Peter Kožuch

Daimler Truck AG
Sitz und Registergericht/Domicile and Court of Registry: Stuttgart, HRB-Nr./Commercial Register No.: 762884
Vorsitzender des Aufsichtsrats/Chairman of the Supervisory Board: Joe Kaeser
Vorstand/Board of Management: Martin Daum, Vorsitzender/Chairman;
Karl Deppen, Jochen Goetz, Andreas Gorbach, Jürgen Hartwig, John O'Leary, Karin Rådström, Stephan Unger

Daimler Truck AG
Fasanenweg 10
70771 Leinfelden-Echterdingen, Germany
Telefon/Phone +49 7 11 84 85-0
Telefax/Fax +49 7 11 84 85-20 00
contact@daimlertruck.com
www.daimlertruck.com

MB 228.3, MB 228.5

Sinopec T500 20W-50/5W-30 meets the requirements of Mercedes-Benz Commercial Vehicles.



Daimler Truck AG, PO Box 10 01 54, 70745 Leinfelden-Echterdingen, Germany

Lubricant Company, Sinopec Corp.
6. West Road, Anningzhuang, Haidian District
100085 BEIJING
P. R. of CHINA

Telefon / Phone +49 7 11 84 85-0 | Hauspost-Code / Internal Code

Ihr Zeichen, Ihre Nachricht vom / Your reference	Unser Zeichen, unsere Nachricht vom / Our reference	Name E-Mail	Datum / Date
08.08.2023	TT/XEV-507702	frs@daimlertruck.com	25.10.2023

DTFR-Certificate - New Approval - Engine Oil - Reblend
DTFR 15B120 for: "Sinopec 228.5 LT 5W-30"

Dear Sir or Madam,

The aforementioned operating fluid complies with the requirements of the Daimler Truck Specifications for Operating Fluids, sheet DTFR 15B120 and is therefore approved for the respective Mercedes-Benz-Trucks vehicles and assemblies. The application range is shown and further defined on the sheet DTFR 15A100. Further requirements, e.g. SAE grades, capacities, change intervals etc. must also be observed.

The following regulations apply for the DTFR (Daimler Truck Fluid Release):

- The DTFR comes into force on the date shown on this certificate
- The DTFR will expire in 5 years at the latest
- The DTFR automatically terminates on expiry of the validity period at the latest
- The DTFR is only valid as long as the product name is listed in Mercedes-Benz-Truck BeVo-ONLINE: http://bevo.mercedes-benz-trucks.com
- Applications for renewals or new approvals etc. must be made in good time
- In addition, the regulations laid down in the current "Obligations Regarding Approval for Operating Fluids" contract apply.

A 2-liter back-up sample of each formulation, which can be called upon by Daimler Truck AG at any given moment, must be retained for at least 3 years. We will inform you of the dispatch address.

Sincerely
Daimler Truck AG

i.V. Gilles Fédacou

i.V. Dr. Peter Kožuch

Daimler Truck AG
Sitz und Registergericht/Domicile and Court of Registry: Stuttgart, HRB-Nr./Commercial Register No.: 762884
Vorsitzender des Aufsichtsrats/Chairman of the Supervisory Board: Joe Kaeser
Vorstand/Board of Management: Martin Daum, Vorsitzender/Chairman;
Karl Deppen, Jochen Goetz, Andreas Gorbach, Jürgen Hartwig, John O'Leary, Karin Rådström, Stephan Unger

Daimler Truck AG
Fasanenweg 10
70771 Leinfelden-Echterdingen, Germany
Telefon/Phone +49 7 11 84 85-0
Telefax/Fax +49 7 11 84 85-20 00
contact@daimlertruck.com
www.daimlertruck.com

Sinopec T500 5W-30

T500 20W-50



Mercedes-Benz AG | 70546 Stuttgart

Mercedes-Benz

Lubricant Company, Sinopec Corp.
6. West Road, Anningzhuang, Haidian District
100085 BEIJING
P. R. of CHINA

T/P +49 711 17 24801
T/F +49 711 17 59756

Ihr Zeichen, Ihre Nachricht vom / Your reference	Unser Zeichen, unsere Nachricht vom / Our reference number	Date
16.08.2021	RD/PMI-153836	28.10.2021

MB-Approval Certificate - New Approval - Engine Oil - Reblend
MB-Approval 228.3 for: "Sinopec_228.3_20W-50"

Dear Sir or Madam,

The aforementioned operating fluid complies with the requirements of the Mercedes-Benz Specifications for Operating Fluids, sheet 228.3 and is therefore approved for the respective Mercedes-Benz vehicles and assemblies. The application range is shown on the MB sheet and further defined on the sheet 223.2. Further requirements, e.g. SAE grades, capacities, change intervals etc. must also be observed.
The following regulations apply for the MB-Approval:

- The MB-Approval comes into force on the date shown on this certificate
- The MB-Approval will expire in 5 years at the latest
- The MB-Approval automatically terminates on expiry of the validity period at the latest
- Applications for renewals or new approvals etc. must be made in good time
- In addition, the regulations laid down in the current "Obligations Regarding Approval for Operating Fluids" contract apply.

Sinopec_228.3_MBQL V2016.1_20W-50 is a trading product identification and as such should be used for wholesale use only and not made available to consumers. As a result Sinopec_228.3_MBQL V2016.1_20W-50 will not be listed in the Mercedes-Benz Specification for Operating Fluids (MB BeVo-ONLINE). A 2-liter back-up sample of each formulation, which can be called upon by Mercedes-Benz AG at any given moment, must be retained. We will inform you of the dispatch address.

Sincerely
Mercedes-Benz AG

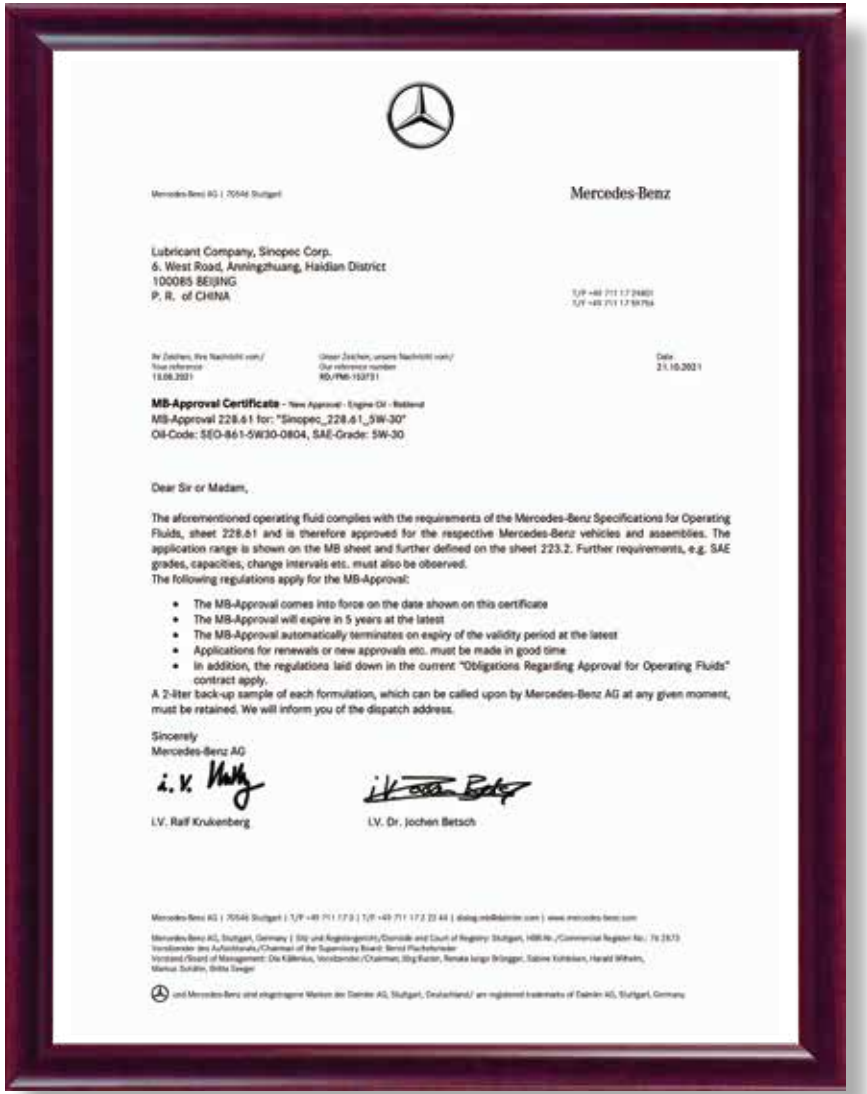
i.V. Ralf Krukenberg

i.V. Dr. Jochen Betsch

Mercedes-Benz AG | 70546 Stuttgart | T/P +49 711 17 0 | T/F +49 711 17 2 22 44 | dialog.mb@daimler.com | www.mercedes-benz.com

Mercedes-Benz AG, Stuttgart, Germany | Sitz und Registergericht/Domicile and Court of Registry: Stuttgart, HBR-Nr./Commercial Register No.: 76 2873
Vorsitzender des Aufsichtsrats/Chairman of the Supervisory Board: Bernd Pischetsrieder
Vorstand/Board of Management: Ola Källenius, Vorsitzender/Chairman; Jörg Burzer, Renata Jungo Brüngger, Sabine Kohleisen, Harald Wilhelm, Markus Schäfer, Britta Seeger

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Mercedes-Benz

Lubricant Company, Sinopec Corp.
6. West Road, Anningzhuang, Haidian District
100085 BEIJING
P. R. of CHINA

Date
21.10.2021

MB-Approval Certificate - New Approval - Engine Oil - Bobtail
MB-Approval 228.61 for: "Sinopec_228.61_5W-30"
Oil-Code: SEO-861-5W30-0804, SAE-Grade: 5W-30

Dear Sir or Madam,

The aforementioned operating fluid complies with the requirements of the Mercedes-Benz Specifications for Operating Fluids, sheet 228.61 and is therefore approved for the respective Mercedes-Benz vehicles and assemblies. The application range is shown on the MB sheet and further defined on the sheet 223.2. Further requirements, e.g. SAE grades, capacities, change intervals etc. must also be observed.
The following regulations apply for the MB-Approval:

- The MB-Approval comes into force on the date shown on this certificate
- The MB-Approval will expire in 5 years at the latest
- The MB-Approval automatically terminates on expiry of the validity period at the latest
- Applications for renewals or new approvals etc. must be made in good time
- In addition, the regulations laid down in the current "Obligations Regarding Approval for Operating Fluids" contract apply.

A 2-liter back-up sample of each formulation, which can be called upon by Mercedes-Benz AG at any given moment, must be retained. We will inform you of the dispatch address.

Sincerely
Mercedes-Benz AG

i.V. Ralf Krukenberg

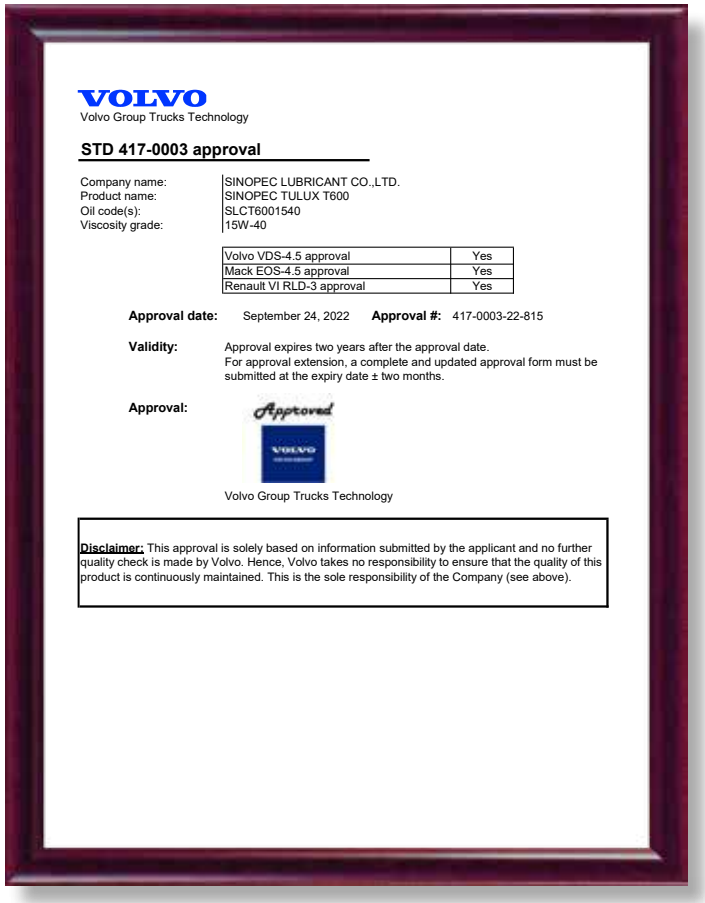
i.V. Dr. Jochen Betsch

MB228.61

Sinopec FE 5W-30 meets the requirements of Mercedes-Benz Commercial Vehicles.

VDS4.5/VDS-3, RLD-2/3

Sinopec T400 15W-40: Volvo VDS-3, Mack EO-N, Renault RLD-2.
Sinopec T600 15W-40: Volvo VDS-4.5, Mack EOS-4.5, Renault RLD-3.
Suitable for use in engines or vehicles that require the specifications of Volvo, Mack, and Renault.



VOLVO
Volvo Group Trucks Technology

STD 417-0003 approval

Company name:	SINOPEC LUBRICANT CO.,LTD.
Product name:	SINOPEC TULUX T600
Oil code(s):	SLCT6001540
Viscosity grade:	15W-40

Volvo VDS-4.5 approval	Yes
Mack EOS-4.5 approval	Yes
Renault VI RLD-3 approval	Yes

Approval date: September 24, 2022 **Approval #:** 417-0003-22-815

Validity: Approval expires two years after the approval date.
For approval extension, a complete and updated approval form must be submitted at the expiry date ± two months.

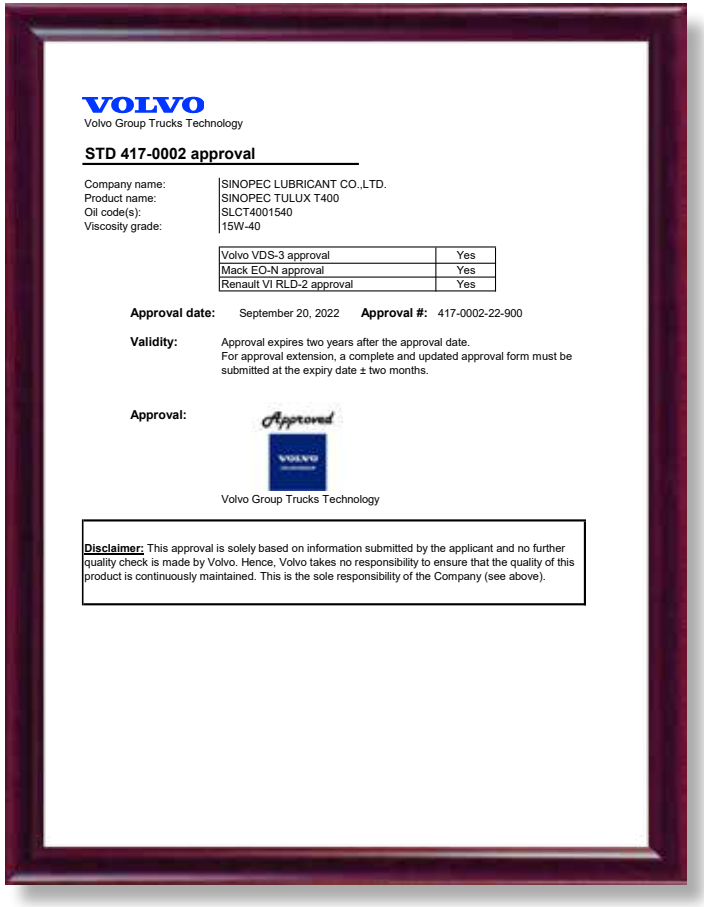
Approval: Approved

Volvo Group Trucks Technology

Disclaimer: This approval is solely based on information submitted by the applicant and no further quality check is made by Volvo. Hence, Volvo takes no responsibility to ensure that the quality of this product is continuously maintained. This is the sole responsibility of the Company (see above).

Sinopec T600 15W-40

Sinopec T400 15W-40



VOLVO
Volvo Group Trucks Technology

STD 417-0002 approval

Company name:	SINOPEC LUBRICANT CO.,LTD.
Product name:	SINOPEC TULUX T400
Oil code(s):	SLCT4001540
Viscosity grade:	15W-40

Volvo VDS-3 approval	Yes
Mack EO-N approval	Yes
Renault VI RLD-2 approval	Yes

Approval date: September 20, 2022 **Approval #:** 417-0002-22-900

Validity: Approval expires two years after the approval date.
For approval extension, a complete and updated approval form must be submitted at the expiry date ± two months.

Approval: Approved

Volvo Group Trucks Technology

Disclaimer: This approval is solely based on information submitted by the applicant and no further quality check is made by Volvo. Hence, Volvo takes no responsibility to ensure that the quality of this product is continuously maintained. This is the sole responsibility of the Company (see above).

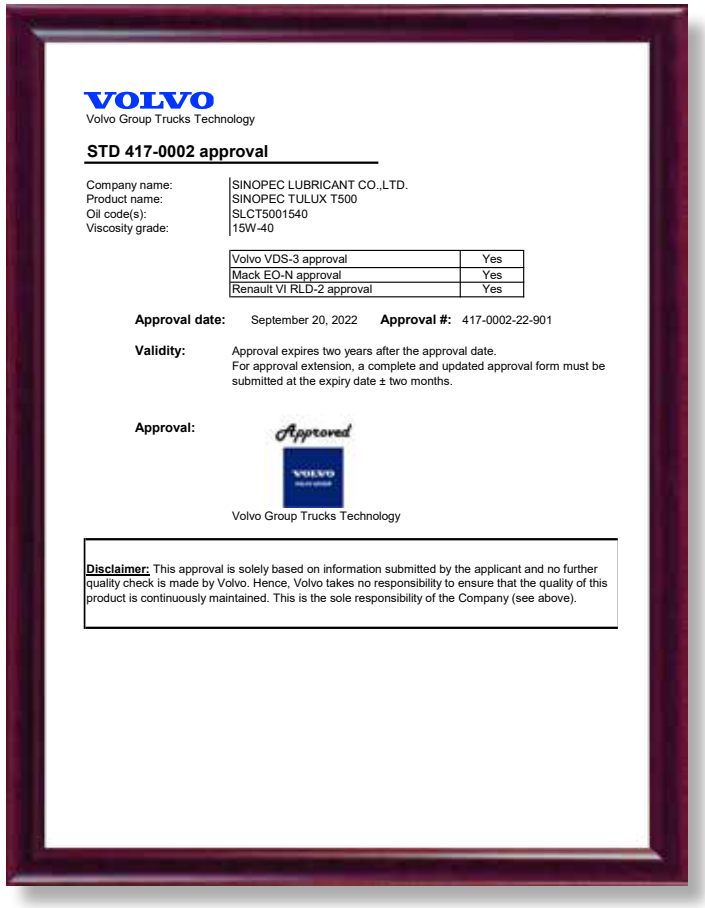
VOLVO
RENAULT
Passion for life

VDS-3, RLD2

Sinopec T500 10W-30/15W-40：Volvo VDS-3, Mack EO-N, Renault RLD-2.

Suitable for use in engines or vehicles that require the specifications of Volvo, Mack, and Renault.

Sinopec T500 15W-40



VOLVO
Volvo Group Trucks Technology

STD 417-0002 approval

Company name:	SINOPEC LUBRICANT CO.,LTD.
Product name:	SINOPEC TULUX T500
Oil code(s):	SLCT5001540
Viscosity grade:	15W-40

Volvo VDS-3 approval	Yes
Mack EO-N approval	Yes
Renault VI RLD-2 approval	Yes

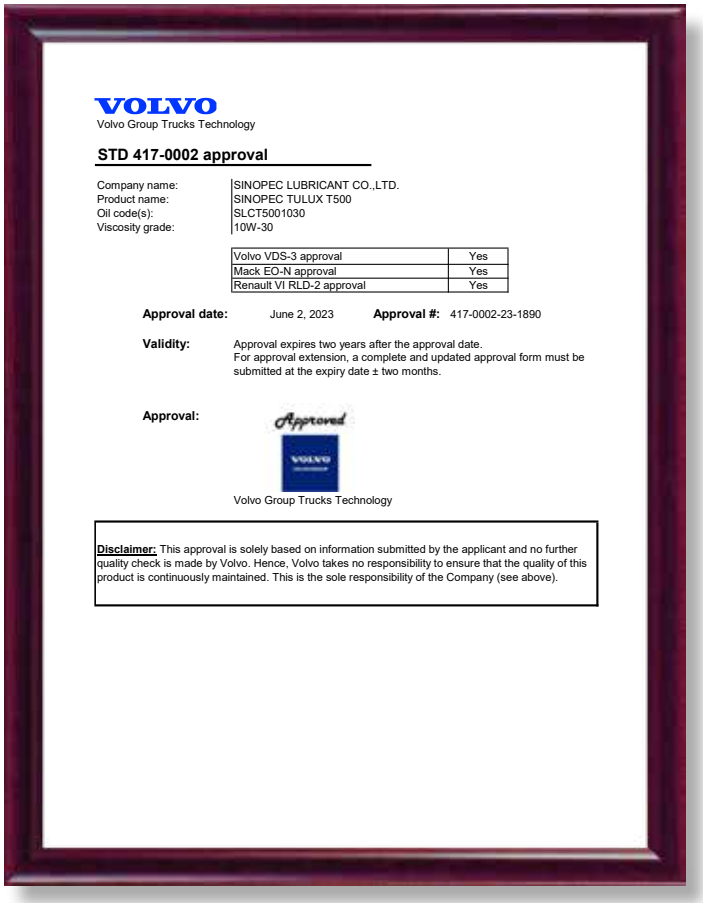
Approval date: September 20, 2022 **Approval #:** 417-0002-22-901

Validity: Approval expires two years after the approval date.
For approval extension, a complete and updated approval form must be submitted at the expiry date ± two months.

Approval: Approved

Volvo Group Trucks Technology

Disclaimer: This approval is solely based on information submitted by the applicant and no further quality check is made by Volvo. Hence, Volvo takes no responsibility to ensure that the quality of this product is continuously maintained. This is the sole responsibility of the Company (see above).



VOLVO
Volvo Group Trucks Technology

STD 417-0002 approval

Company name:	SINOPEC LUBRICANT CO.,LTD.
Product name:	SINOPEC TULUX T500
Oil code(s):	SLCT5001030
Viscosity grade:	10W-30

Volvo VDS-3 approval	Yes
Mack EO-N approval	Yes
Renault VI RLD-2 approval	Yes

Approval date: June 2, 2023 **Approval #:** 417-0002-23-1890

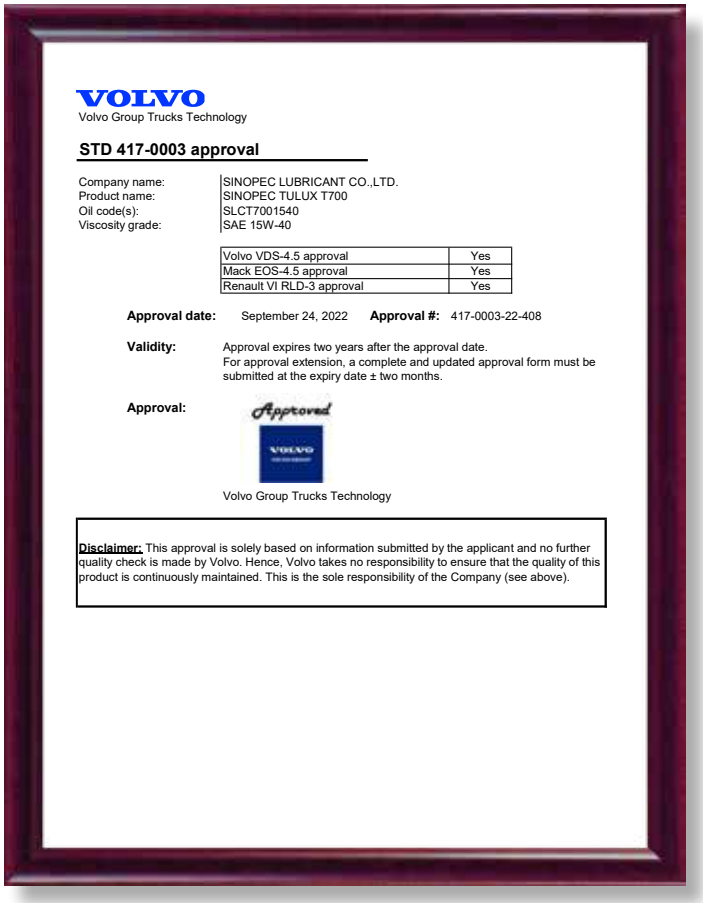
Validity: Approval expires two years after the approval date.
For approval extension, a complete and updated approval form must be submitted at the expiry date ± two months.

Approval: Approved

Volvo Group Trucks Technology

Disclaimer: This approval is solely based on information submitted by the applicant and no further quality check is made by Volvo. Hence, Volvo takes no responsibility to ensure that the quality of this product is continuously maintained. This is the sole responsibility of the Company (see above).

Sinopec T500 10W-30



VOLVO
Volvo Group Trucks Technology

STD 417-0003 approval

Company name:	SINOPEC LUBRICANT CO.,LTD.
Product name:	SINOPEC TULUX T700
Oil code(s):	SLCT7001540
Viscosity grade:	SAE 15W-40

Volvo VDS-4.5 approval	Yes
Mack EOS-4.5 approval	Yes
Renault VI RLD-3 approval	Yes

Approval date: September 24, 2022 **Approval #:** 417-0003-22-408

Validity: Approval expires two years after the approval date.
For approval extension, a complete and updated approval form must be submitted at the expiry date ± two months.

Approval: Approved

Volvo Group Trucks Technology

Disclaimer: This approval is solely based on information submitted by the applicant and no further quality check is made by Volvo. Hence, Volvo takes no responsibility to ensure that the quality of this product is continuously maintained. This is the sole responsibility of the Company (see above).

Sinopec T700 15W-40

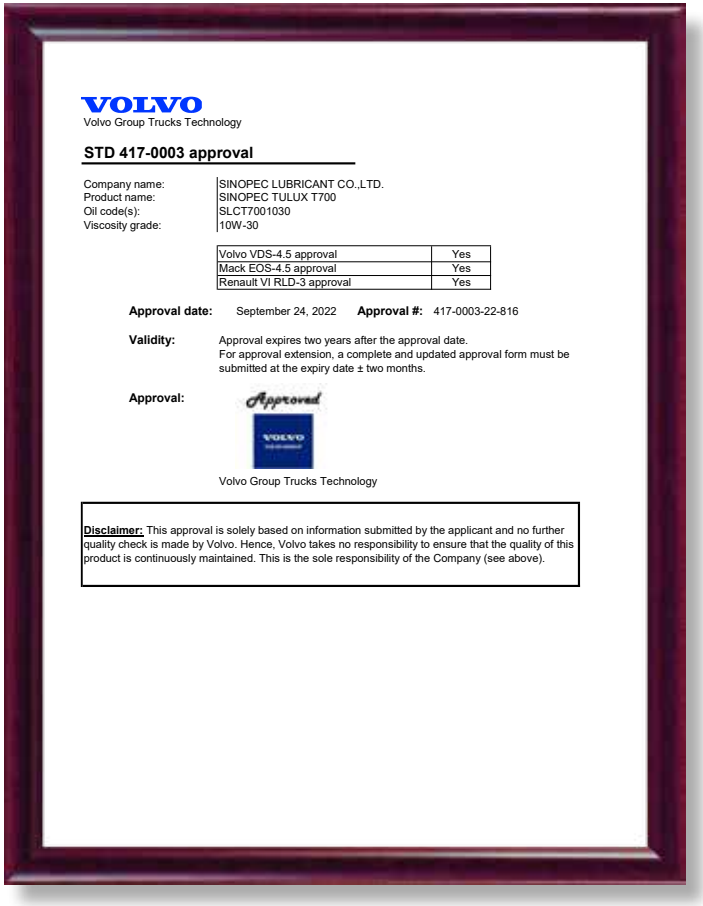
VDS4.5, RLD3

Sinopec T700 10W-30/15W-40: Volvo VDS-4.5, Mack EOS-4.5, Renault RLD-3.

Suitable for use in engines or vehicles that require the specifications of Volvo, Mack, and Renault.



Sinopec T700 10W-30



VOLVO
Volvo Group Trucks Technology

STD 417-0003 approval

Company name:	SINOPEC LUBRICANT CO.,LTD.
Product name:	SINOPEC TULUX T700
Oil code(s):	SLCT7001030
Viscosity grade:	10W-30

Volvo VDS-4.5 approval	Yes
Mack EOS-4.5 approval	Yes
Renault VI RLD-3 approval	Yes

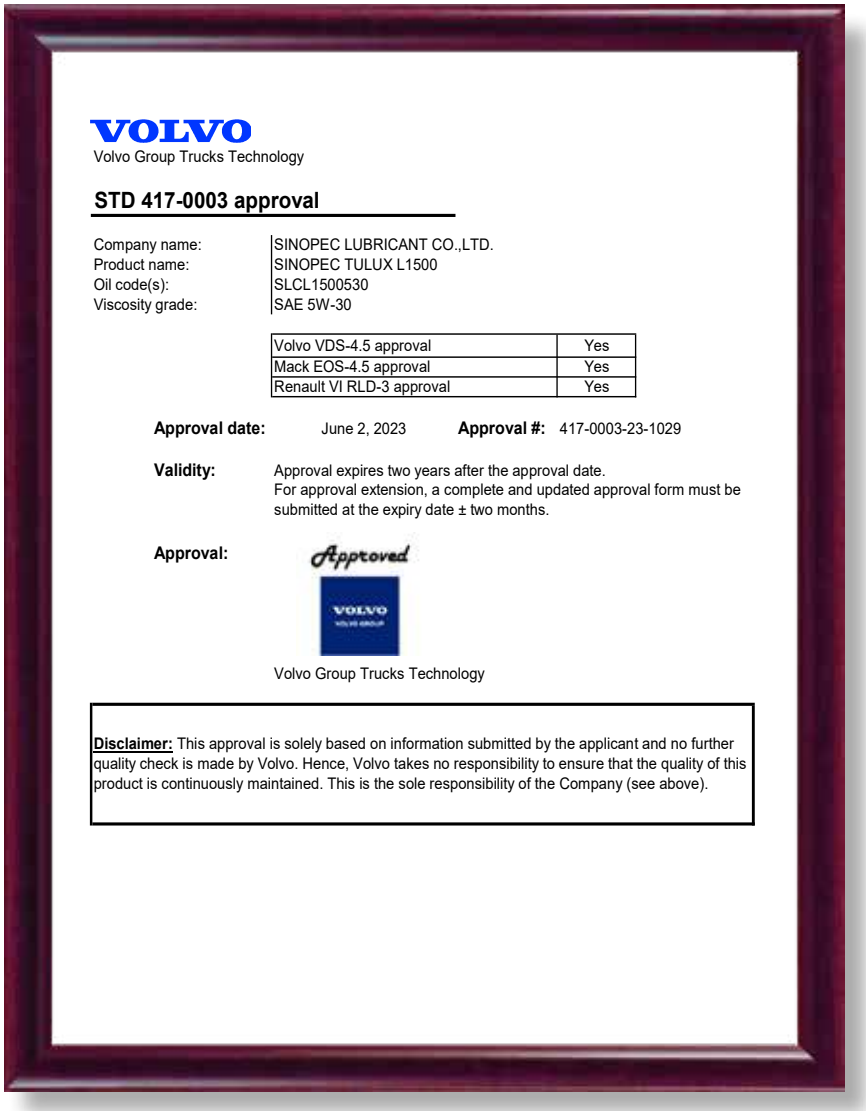
Approval date: September 24, 2022 **Approval #:** 417-0003-22-816

Validity: Approval expires two years after the approval date.
For approval extension, a complete and updated approval form must be submitted at the expiry date ± two months.

Approval: Approved

Volvo Group Trucks Technology

Disclaimer: This approval is solely based on information submitted by the applicant and no further quality check is made by Volvo. Hence, Volvo takes no responsibility to ensure that the quality of this product is continuously maintained. This is the sole responsibility of the Company (see above).



VOLVO

Volvo Group Trucks Technology

STD 417-0003 approval

Company name:	SINOPEC LUBRICANT CO.,LTD.
Product name:	SINOPEC TULUX L1500
Oil code(s):	SLCL1500530
Viscosity grade:	SAE 5W-30

Volvo VDS-4.5 approval	Yes
Mack EOS-4.5 approval	Yes
Renault VI RLD-3 approval	Yes

Approval date: June 2, 2023 **Approval #:** 417-0003-23-1029

Validity: Approval expires two years after the approval date.
For approval extension, a complete and updated approval form must be submitted at the expiry date ± two months.

Approval: Approved

VOLVO

Volvo Group Trucks Technology

Disclaimer: This approval is solely based on information submitted by the applicant and no further quality check is made by Volvo. Hence, Volvo takes no responsibility to ensure that the quality of this product is continuously maintained. This is the sole responsibility of the Company (see above).

Sinopec L1500 5W-30

VOLVO

RENAULT

Passion for life

VDS4.5, RLD3

L1500 5W-30：Volvo VDS-4.5, Mack EOS-4.5, Renault RLD-3.

Suitable for use in engines or vehicles that require the specifications of Volvo, Mack, and Renault.



MAN Truck & Bus SE

- 2 -

The manufacturer or supplier must apply for an extension of the approval in writing. The application must contain confirmation that the formulation is unchanged. In the case of rebrands a written declaration of consent from the previous supplier must be submitted as well.
If the extension is not applied for in good time within the approval period (at the latest two months prior to expiry of the approval), the supplier approval and all rebrands will be deleted from the publicly accessible service product database on the day of expiry of the approval. After expiry of the approval period the product approval can be continued only by way of a new approval procedure, for which a charge will be made.

Yours faithfully,
MAN Truck & Bus SE

i.V. Mr. Dr. Schonfeld
MAN Truck & Bus SE
Material Technologies

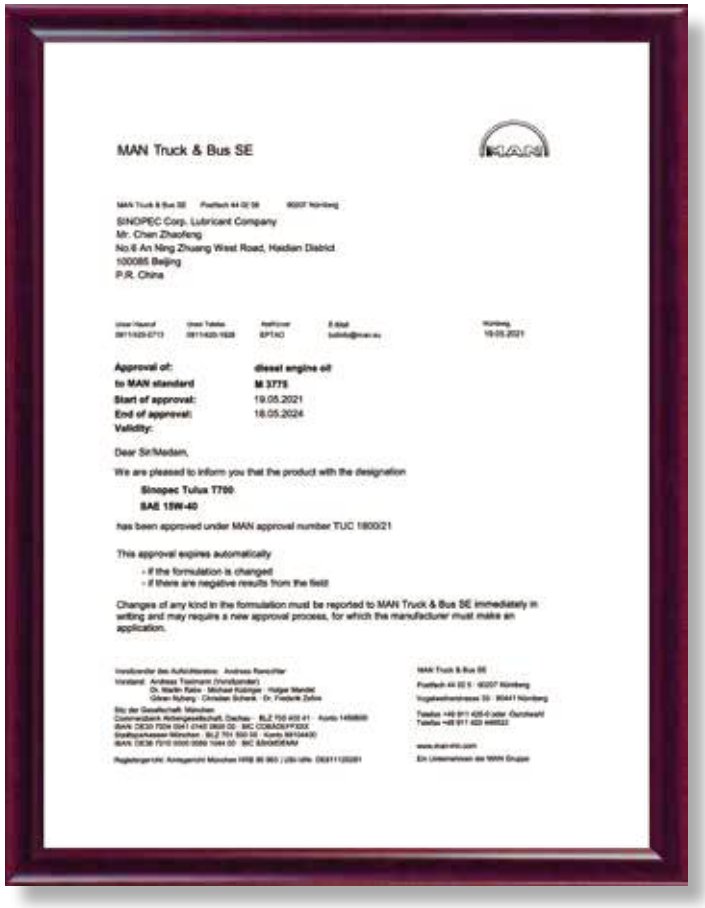
i.V. Mr. Kübler
MAN Truck & Bus SE
External Engines

M3775

Sinopec T700 15W-40 is suitable for use in MAN engines and vehicles equipped with MAN engines.

SINOPEC

Sinopec T700 15W-40



MAN Truck & Bus SE

SINOPEC Corp. Lubricant Company
Mr. Chen Zhaofeng
No.6 An Ning Zhuang West Road, Haidian District
100085 Beijing
P.R. China

Approval of: **diesel engine oil**
to MAN standard **M 3775**
Start of approval: 19.05.2021
End of approval: 18.05.2024
Validity:

Dear Sir/Madam,

We are pleased to inform you that the product with the designation

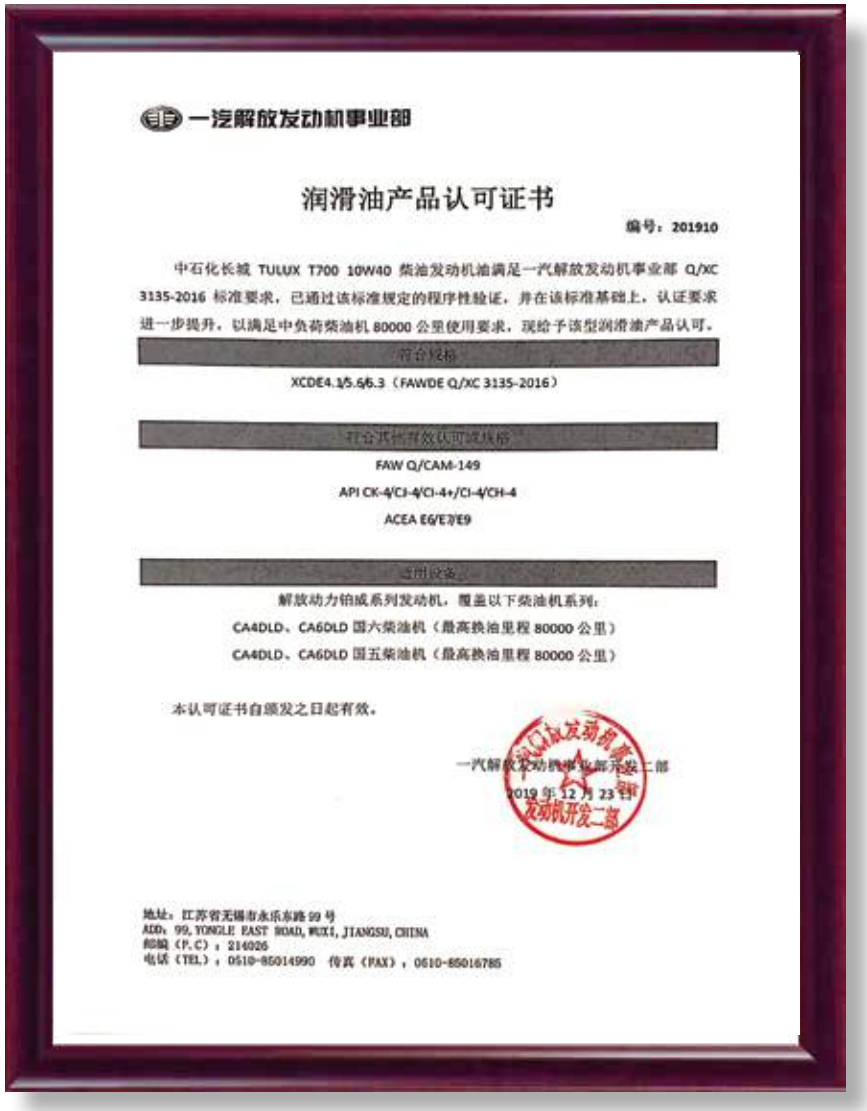
Sinopec Tulus T700
SAE 15W-40

has been approved under MAN approval number TUC 180021

This approval expires automatically

- if the formulation is changed
- if there are negative results from the field

Changes of any kind in the formulation must be reported to MAN Truck & Bus SE immediately in writing and may require a new approval process, for which the manufacturer must make an application.



一汽解放发动机事业部

润滑油产品认可证书

编号：201910

中石化长城 TULUX T700 10W40 柴油发动机油满足一汽解放发动机事业部 Q/XC 3135-2016 标准要求，已通过该标准规定的程序性验证，并在该标准基础上，认证要求进一步提升，以满足中负荷柴油机 80000 公里使用要求，现给予该型润滑油产品认可。

符合规格

XCDE4.1/5.6/6.3（FAWDE Q/XC 3135-2016）

符合其他有效认可规格

FAW Q/CAM-149

API CK-4/CJ-4/CI-4+/CI-4/CH-4

ACEA E6/E7/E9

适用设备

解放动力铂威系列发动机，覆盖以下柴油机系列：

CA4DLD、CA6DLD 国六柴油机（最高换油里程 80000 公里）

CA4DLD、CA6DLD 国五柴油机（最高换油里程 80000 公里）

本认可证书自颁发之日起有效。

一汽解放发动机事业部开发二部

2019 年 12 月 23 日

发动机开发二部

地址：江苏省无锡市永乐东路 99 号
ADD：99, YONGLE EAST ROAD, WUXI, JIANGSU, CHINA
邮编（P.C）：214026
电话（TEL）：0510-85014990 传真（FAX）：0510-85016785

Sinopec T700 10W-40



一汽解放汽车有限公司无锡柴油机厂
FAW JIEFANG AUTOMOTIVE CO.,LTD. WUXI DIESEL ENGINE WORKS

润滑油产品认可证书

编号：201601

中石化长城 E4/E7 锡柴专用长寿命柴油机油 10W-40 通过一汽解放无锡柴油机厂（FAWDE）系列台架测试和行车验证，该型号润滑油产品给予认可。

XCDE5.6 (FAWDE Q/XC 3135-2016)

FAW Q/CAM-149

ACEA E4

ACEA E7

锡柴恒威国五排放 SCR 柴油机，覆盖以下型号：

CA4DLD-ES/CA6DLD-ES/CA6DL-E5 系列

本认可证书自颁发之日起有效。

一汽解放无锡柴油机厂 研发部

2016 年 6 月 24 日

地址：江苏省无锡市永乐东路 99 号
ADD：99, YONGLE EAST ROAD, WUXI, JIANGSU, CHINA
邮编（P.C.）：214026
电话（TEL.）：0510-85014990 传真（FAX）：0510-85016785

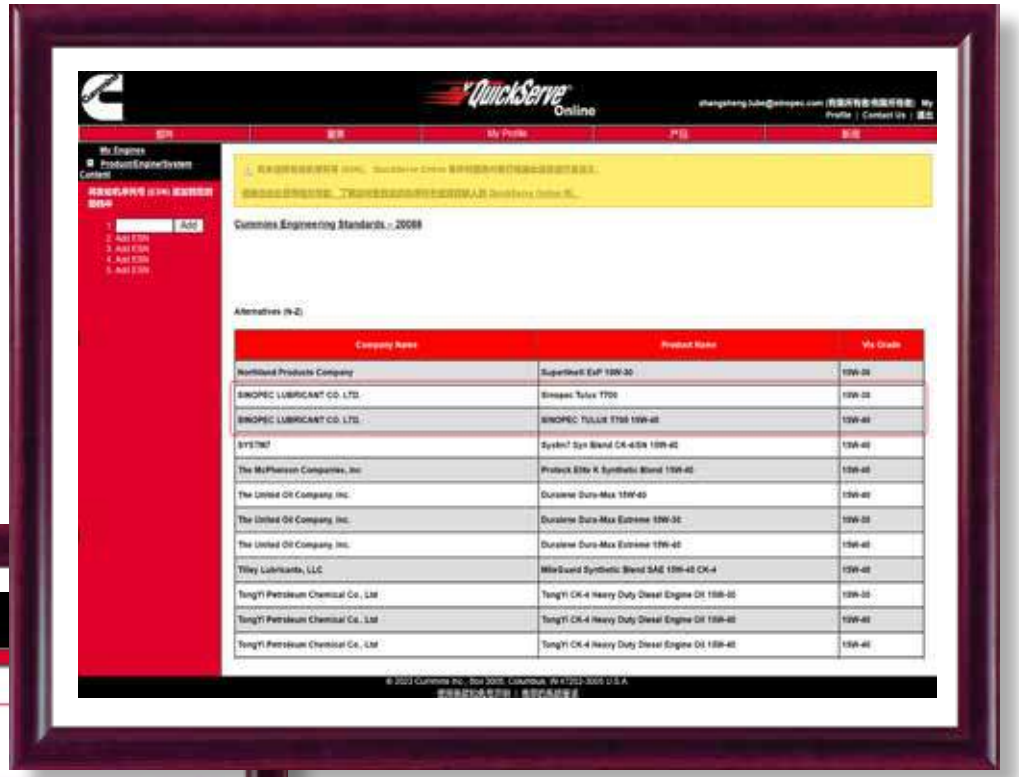
Sinopec E4/E7

FAW Jiefang Automobile

Sinopec E4/E7 and T700 10W-40

Suitable for use in FAW Jiefang Automobile vehicles.





CES 20086/20078

Sinopec T400 15W-40, T500 15W-40, T700 10W-30, T700 15W-40.

Suitable for use in Cummins engines and vehicles equipped with Cummins engines.



The engine company.

SINOPEC LUBRICANT CO., LTD
Mr. Huang Xin
No.6 West Road of Anning Zhuang
Haidian District
100085 Beijing
CHINA

Roswitha Leyendecker
Engine Oils, Fuels & Laboratory Analysis

Köln, 15.09.2020

Regarding: Your DQC III-10 LA release application

Dear Mrs. Koch,

With reference to your release application of 2020-09-07 for the engine oil

SINOPEC TULUX T700

Oil code:	SLT7002020 (05388422)
DQC class:	III-10 LA
Viscosity class:	SAE 15W-40
Sales region:	USA,Europa, Asien

we hereby grant you the non-exclusive right to use the DQC mark for identification of these lubricating oils within the scope of sale of the released lubricating oils under the conditions of our Company Standard H 0665-3 (issue: May 2018) which you have accepted without restrictions.
We recommend the claim language: Approved according DEUTZ DQC III-10 LA.

This right only becomes effective with payment of the fee of 2000 Euro.
The right according to sentence 1 of this letter expires automatically on 2023-10-31. DEUTZ's right to revoke the right at any time for good reason remains unaffected.

Kind regards

i.V. Dr.-Ing. Heiner Bolte

i.A. Roswitha Leyendecker

Sinopec T700 15W-40

SINOPEC



Deutz

Sinopec T700 15W-40 is suitable for use in Deutz engines and vehicles equipped with Deutz engines.

MTU2.1/3.1

Sinopec T500 15W-40, T700 15W-40, T700 Plus 10W-40 meet the requirements of Rolls-Royce MTU.

Sinopec T500 15W-40



Sinopec Lubricant Co., Ltd
Zhang Sheng
Anningzhuang west road 6
Hailian District, Beijing
P. R. CHINA

Contact: Ralf Höneise
e-Mail: Ralf.Hoeneise@ps.rolls-royce.com
Tel. No.: +49 7541 9057024
Date: 26 October 2023
Ref.: TQMC

Approval of Sinopec Tulux T500 15W-40: Extension

Dear Zhang Sheng,

Based on the information and test results you provided, as well as our laboratory analyses, the engine oil

Sinopec Tulux T500 15W-40 **SAE 15W-40**

which you submitted for approval meets the requirements for Oil Category 2 and is approved for use in all MTU engines (except Series 8000, 4000-03 M IMO III, 4000-04 C/R/T, 4000-05 C/G/T and M IMO III, 2000M41A IMO III, 956 TB31/32/33/34 and 1163 TB32 Genset).

The letter of approval does not cover Series 1000, 1100, 1300, 1500, 1800 engines.

The approval is valid until

October 2025.

For an extension of this approval, please inform us at least one month before expiration of the approval period.

Please note that any modification of the engine oil will invalidate the approval in accordance with our terms of approval (MTL 5044).

Yours sincerely

Rolls-Royce Solutions GmbH

i.V. Perwein i.A. Rist

Sinopec T700 15W-40



UBRICANT CO., LTD.
ng west road 6
rict, Beijing

Tel. No.: +49 7541 9050370
Date: 29 April 2022
Ref.: TQMC

Sinopec Tulux T700: Extension

ng Sheng,

e information and test results you provided, as well as our laboratory analyses,

pec Tulux T700 SAE 15W-40
Code SLCT7001540

ubmitted for approval meets the requirements for Oil Category 2.1 and is approved
mtu engines (except Series 8000, 4000-04 C/R/T, 4000-05 C/T, 956 and 1163 TB32

approval does not cover Series 1000, 1100, 1300, 1500, 1800 engines.

l is valid until

2024.

nsion of this approval, please inform us at least one month before expiration of the riod.

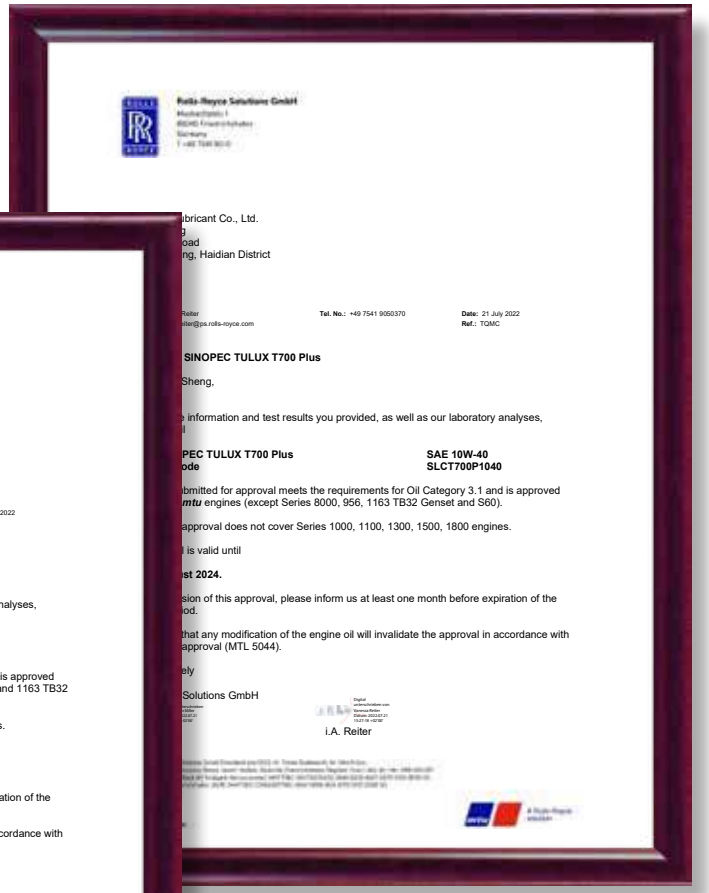
that any modification of the engine oil will invalidate the approval in accordance with approval (MTL 5044).

rely

Solutions GmbH

i.A. Reiter

Sinopec T700 PLUS 15W-40



ubricant Co., Ltd.
oad
ng, Haidian District

Reiter
Tel. No.: +49 7541 9050370
Date: 21 July 2022
Ref.: TQMC

SINOPEC TULUX T700 Plus

Sheng,

information and test results you provided, as well as our laboratory analyses,

PEC TULUX T700 Plus SAE 10W-40
ode SLCT700P1040

bmitted for approval meets the requirements for Oil Category 3.1 and is approved
mtu engines (except Series 8000, 956, 1163 TB32 Genset and S60).

approval does not cover Series 1000, 1100, 1300, 1500, 1800 engines.

l is valid until

st 2024.

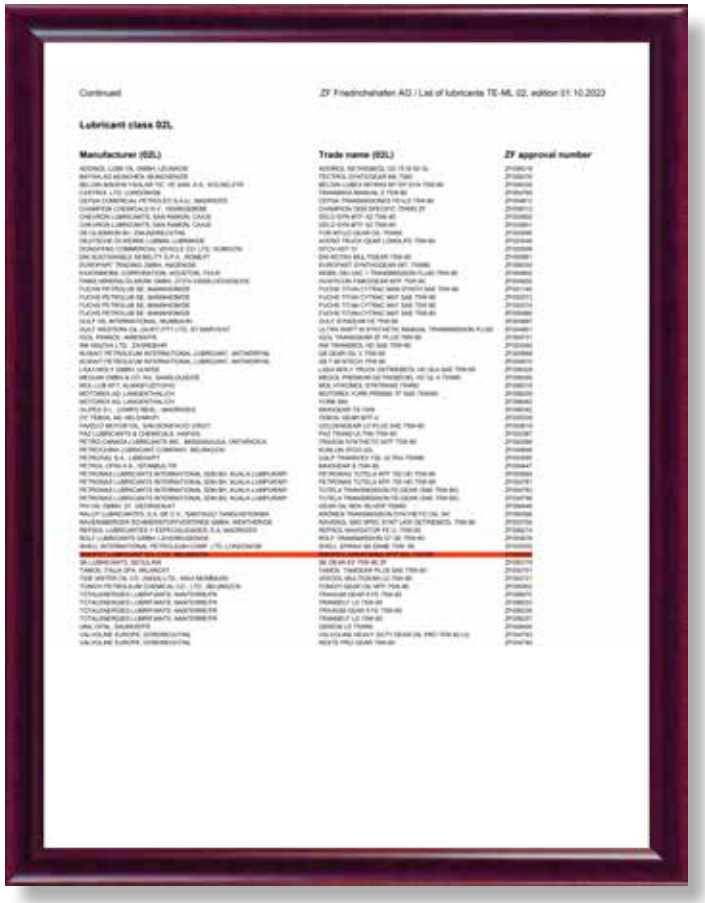
sion of this approval, please inform us at least one month before expiration of the od.

that any modification of the engine oil will invalidate the approval in accordance with approval (MTL 5044).

ely

Solutions GmbH

i.A. Reiter



Continued ZF Friedrichshafen AG / List of lubricants TE-ML 02, edition 01.10.2023

Lubricant class 02L

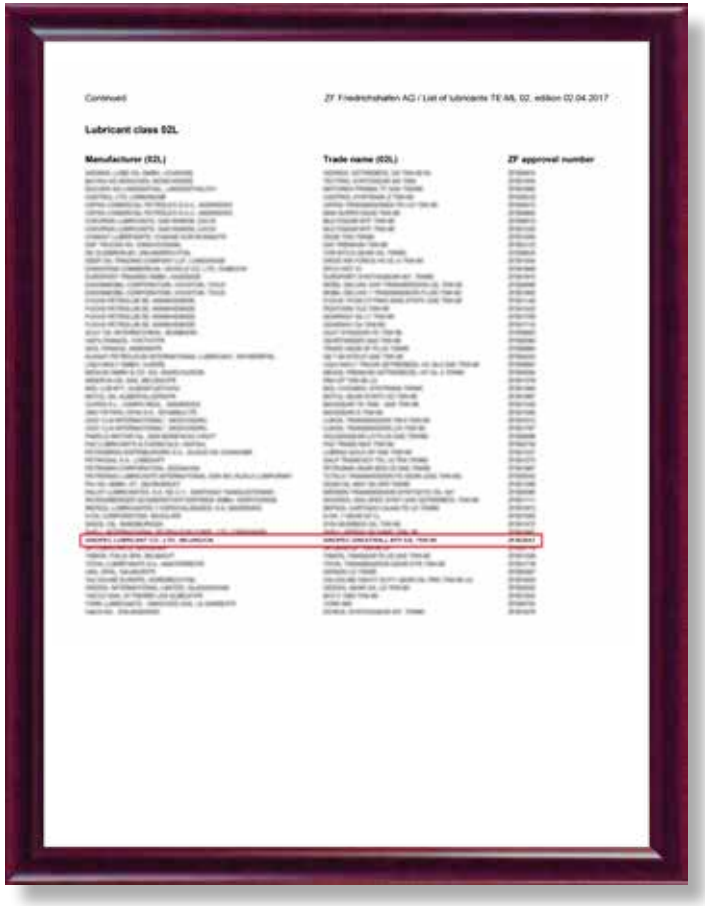
Manufacturer (02L)	Trade name (02L)	ZF approval number

Sinopec MTF 02L Transmission Fluid

SINOPEC

ZF TE-ML 12M, ZF TE-ML 02B, 17A, ZF TE-ML 02L

Sinopec MTF 02L Transmission Fluid is suitable for ZF gearbox and drive axle.



Continued ZF Friedrichshafen AG / List of lubricants TE-ML 02, edition 02.04.2017

Lubricant class 02L

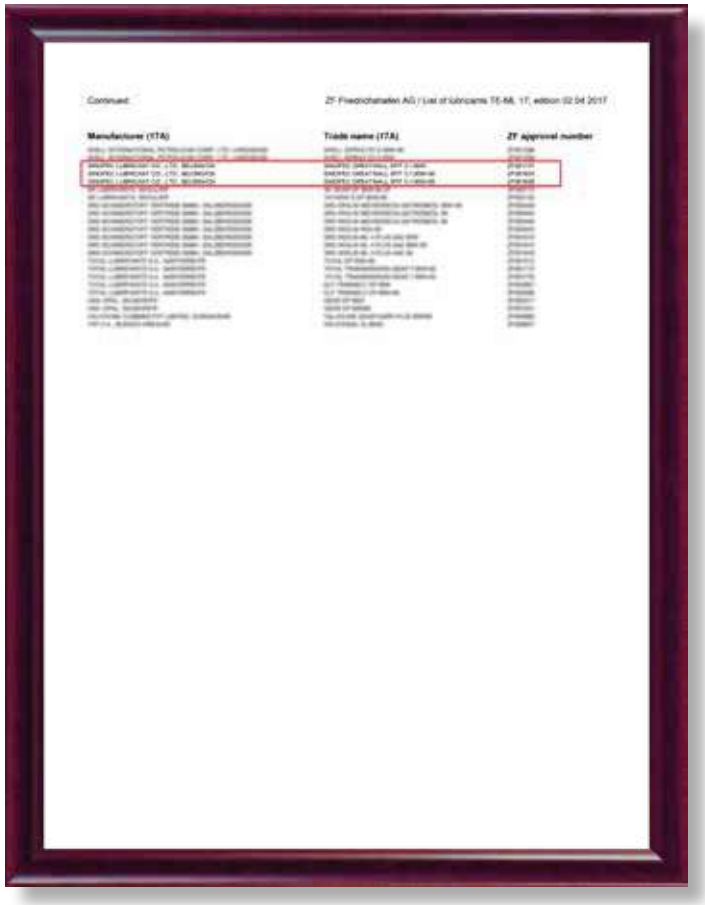
Manufacturer (02L)	Trade name (02L)	ZF approval number

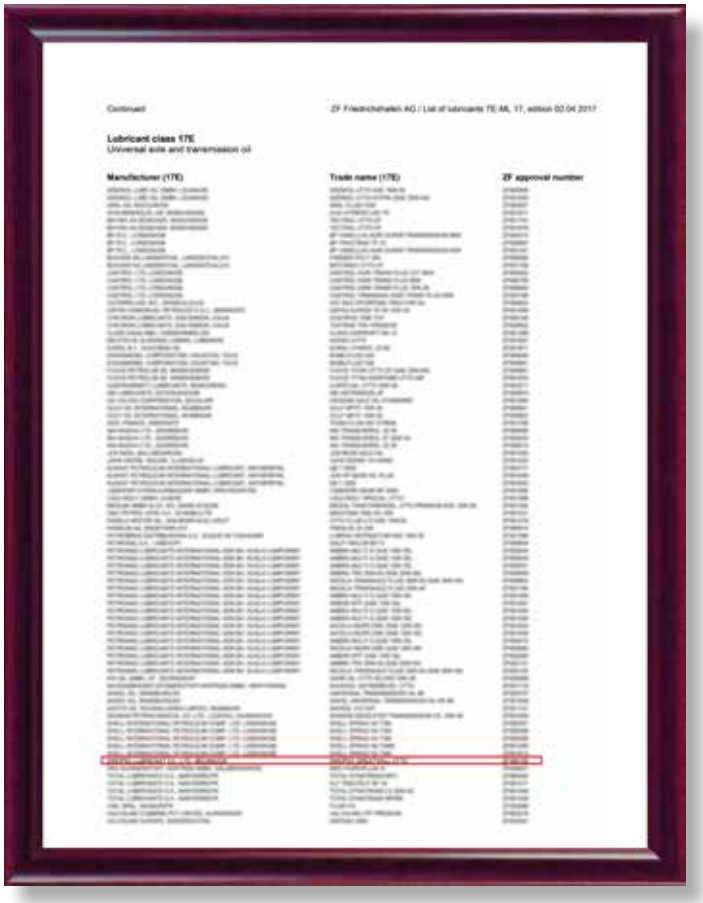
ZF TE-ML 12M, ZF TE-ML 02B, 17A, ZF TE-ML 02L

Sinopec MTF C-I, ATF HD are suitable for ZF commercial vehicle gearbox.

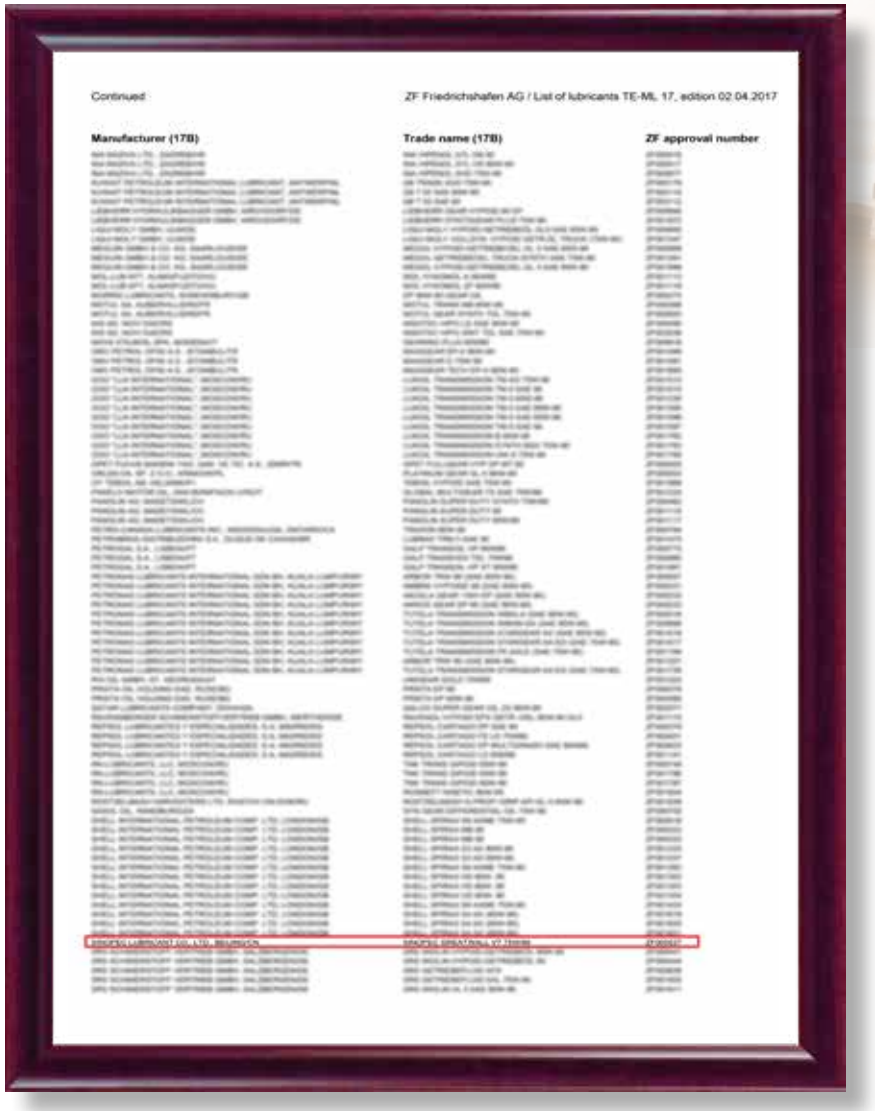
Sinopec UTTO series products are suitable for ZF agricultural machinery transmission lubrication.

Sinopec MTF C-I 80W/80W-90/85W-90





Sinopec UTTO



Continued ZF Friedrichshafen AG / List of lubricants TE-ML 17, edition 02.04.2017

Manufacturer (17B)	Trade name (17B)	ZF approval number
[illegible]	[illegible]	[illegible]
SINOPEC LUBRICANT CO., LTD. BEIJING CN	SINOPEC SINOTRANS VT 75W/90	4100037

Sinopec VT 75W/90

ZF TE-ML 12M, ZF TE-ML 02B, 17A, ZF TE-ML 02L

Sinopec VT 75W/90 is suitable for ZF non-road and rail transportation transmission lubrication.



CNHTC 中国重汽 SINOTRUK



从动桥

H153 鼓式前轴为锻造式工字梁，整体式转向节，鼓式制动器，膜片式制动气室，

可选装自调臂和自动防抱死装置(ABS)。

制动间隙（手调臂）：0.4mm～0.7mm。

润滑脂用量

- 轮毂轴承处润滑脂应使用长城 HP-R 极压复合锂基润滑脂，其余部位使用 2# 汽车通用锂基润滑脂，用量应适中，过多润滑油漏出将损坏相应件（制动块、制动盘表面、橡胶件等），安装制动气室之前，杠杆球窝处涂抹油脂。

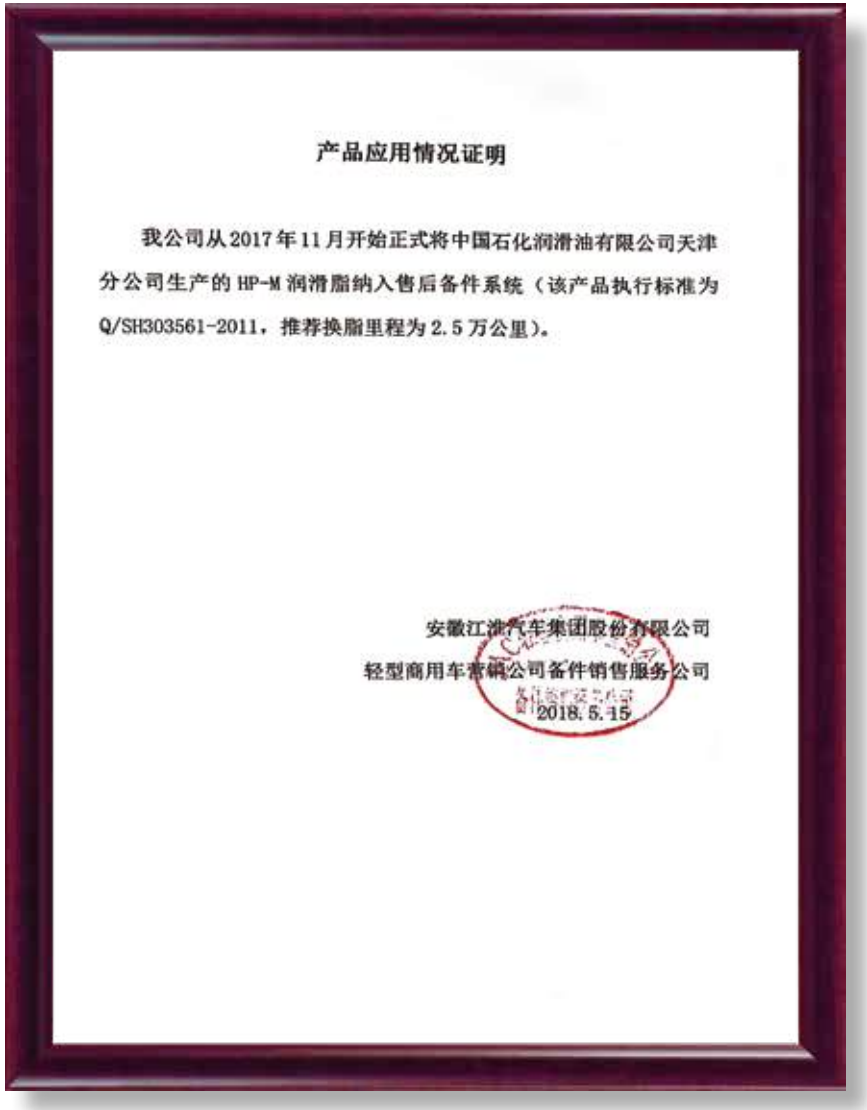
HF7/9 前轴

- 每个轮毂的润滑脂用量：轮毂内腔，两个轴承处共约 0.62kg。
- 每个制动凸轮轴和主销的润滑脂用量：约 0.38kg。
- 制动间隙调整臂等处应注满润滑脂。

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Kingpin bearing / hub bearing

Sinopec HP-R grease and automobile general lithium based grease meet the lubrication requirements of the commercial vehicle hub bearings of Sinotruck Group and can be applied to all models of its commercial vehicles.



产品应用情况证明

我公司从2017年11月开始正式将中国石化润滑油有限公司天津分公司生产的HP-M润滑脂纳入售后备件系统（该产品执行标准为Q/SH303561-2011，推荐换脂里程为2.5万公里）。

安徽江淮汽车集团股份有限公司
轻型商用车营销公司备件销售服务公司
2018.5.15

Sinope HP-M Grease

Kingpin bearing / hub bearing

Sinope HP-M Grease meets the requirements of JAC Motors.



长城润滑油 FOTON 福田汽车

长城牌系列润滑油北汽福田汽车唯一指定装填和服务站用润滑油

2003 年 11 月，北汽福田汽车有限公司与中国石化润滑油公司签署“战略合作伙伴关系协议”，中国石化润滑油公司与福田技术研究院一起针对欧曼重卡、奥铃、福田、时代、宝车、重工等车型量身打造福田汽车专用润滑油。2004 年 5 月开始北汽福田汽车有限公司从汽车的研发、生产、售后全方位使用“长城牌”润滑油，中国石化润滑油公司生产的“福田-长城”联合标识的系列润滑油是福田公司唯一指定装填和服务站用润滑油产品。

长城润滑油是中国石化旗下的唯一润滑油品牌，依托中国石化的广博资源与雄厚的科研

实力，长城润滑油拥有大量稳定并不断增长的客户群体和广阔的发展前景，以科技领先、品质卓越著称于世，被誉为中国润滑油行业的第一品牌，加入了国际润滑油行列。

长城润滑油包括内燃机润滑油、工业齿轮油、液压油、润滑脂、防冻液、刹车液、金属加工液、船用油及润滑油添加剂等 20 个种类、500 余个产品，广泛应用于航空、航天、汽车、机械、冶金、矿采、石油化工、电子等领域。更以 2003 年长城润滑油为“神舟五号”的成功飞行提供了润滑保障，2004 年，中国南极科学考查船“雪龙号”的全方位润滑保障，2008 年北京奥运会指定用润滑油，誉声海内外。

长城润滑油除满足国家标准外，还符合国际标准化组织（ISO）、美国石油学会（API）、欧洲汽车制造商协会（ACEA）等多种特殊规格标准的要求，并有多个产品通过大众、宝马、奔驰、沃尔沃、雷诺、康明斯等世界著名汽车制造商的技术认证，成为北汽福田，中国一汽，东风，上海通用，上海大众，宝钢等大型集团公司的首选专用油品。

福田公司建议顾客在保养和维修时使用福田公司指定的“福田-长城”联合商标并有福田仿伪标识的系列专用润滑油，如顾客选择使用其它品牌的润滑油等于自动放弃福田公司对汽车润滑质量保证的承诺。

推荐使用产品系列：

1	柴油机油：	20W/50CF-4	15W/40CF-4、10W/30CF-4	4	自动传动液：ATF-III
	包装形式：	4L、18L			包装形式：1L、18L
2	合成汽车制动液：DOT3			5	防冻液（-40℃）
	包装形式：	1L			包装形式：4kg、6kg
3	重负荷车辆齿轮油：85W/90、80W/90			6	玻璃清洗剂(-35℃)
	包装形式：1.8L、2.5L、3.5L、4.0L、4.5L、18L				包装形式：1L、1.8L

SINOPEC



FOTON 福田汽车

Foton Motor

Sinopec DOT3 products meet the requirements of Foton Motor and can be applied to all of its models.

3





CONSTRUCTION MACHINERY

SINOPEC

Construction Machinery

Sinopec's hydraulic oil, gear oil, diesel engine oil, and grease exhibit excellent performance. They can meet the filling and after-sales needs of construction machinery, providing superior lubrication protection for cvonstruction machinery equipment. These products have obtained technical certifications from leading companies in the industry, such as Sany, XCMG, and Zoomlion, and are widely used in the construction machinery industry.



三一重机有限公司
技术认可书

中国石化润滑油有限公司：

三一重机有限公司使用中国石化润滑油有限公司长城 AE-S 46 液压油在三一重机不同型号的挖掘机上开展了多台车的应用试验。最长监测时间超过 5000 小时。试验分析结果表明，该油品具有良好的氧化安定性及抗磨耐久性等综合性能，经三一重机有限公司论证，贵司生产的 AE-S 46 液压油，可以满足我公司生产的挖掘机对液压油的技术要求，特给予技术认可。

三一重机有限公司
2020年11月



三一重装有限公司

长城润滑油产品使用认可证明

中国石化润滑油有限公司：

我司与中国石化润滑油有限公司 2016 年开始建立了合作关系，通过长时间的实验跟踪，中国石化“长城”牌润滑油品全线产品应用于三一重装旗下各个挖掘机机型，前装及售后所有润滑产品在设备运行中性能表现优良，具体主用产品如下表：

设备种类	用油部位	润滑油分类	中国石化长城润滑油产品
挖掘机等	液压系统	液压油	长城 AE-S46 液压油
			长城 AE46 液压油
			长城卓力 L-HV32 低温液压油
	传动系统	工业齿轮油	长城 L-CKD 220 重负荷工业齿轮油
			长城 L-CKD 320 重负荷工业齿轮
	轴承等	润滑脂	长城 2 号锂基脂
			长城 3 号通用锂基脂

特此证明！

三一重装有限公司
2019 年 8 月

Sany

Sinopec's AE, AE-S, L-HV hydraulic oils, L-CKD industrial gear oil, and general lithium base grease meet the usage requirements of Sany Heavy Machinery.

山河智能



长城润滑油产品使用认可证明

中国石化润滑油有限公司：

我司与中国石化润滑油有限公司在 2018 年开始就建立了合作关系，通过论证和使用跟踪，中国石化“长城”牌润滑油品全线产品应用于山河智能生产的挖掘机械、桩工机械、凿岩机械等设备的控装用油，在设备运行中性能表现优良。具体主用产品如下表：

设备种类	用油部位	润滑油分类	中国石化润滑油产品
挖掘机械、桩工机械、凿岩设备等	液压油系统	液压油	长城 AE-K 高清液压油（46、68）
	发动机	柴油机油	长城 CF-4 (15W/40)柴油机油
			长城 CH-4(15W/40)柴油机油
	传动系统	车辆齿轮油	长城 80W/90 GL-5 重负荷车辆齿轮
	冷却系统	冷却液	长城 FD-2# 发动机冷却液
	润滑脂	润滑脂	长城 2 号二硫化钼锂基脂

特此证明。

山河智能装备股份有限公司（章）

2019 年 7 月

山河智能装备股份有限公司
技术认可证书

石化润滑油有限公司：

根据双方签订的《山河智能挖掘机高效液压油行车试验备忘具体要求，

山河智能装备股份有限公司使用中石化长城 AE-M46 高效液在山河智能 SWE 33SF 型号的挖掘机上进行了严格的标准试工作效率测试，工作内容涉及挖掘工况和装车工况。通过每班工作效率（tons/八）及每小时工作效率（tons/h）的试验统计分析和充分论证，山河智能 SWE 33SF 挖掘机在使用长-M46 液压油与市售 L-HM46 抗磨液压油时相比，达到工作效率高 10%的预期目标，特给予技术认可。

山河智能装备股份有限公司试验中心

2017 年 12 月 5 日

山河智能装备股份有限公司
技术认可证书

滑油有限公司：

双方签订的《AE-M 液压油行车试验技术协议》的具体

智能装备股份有限公司使用中石化长城 AE-M 46 高效河智能 SWE385ES 型号的挖掘机上开展了多台车的应长监测时间超过 4000 小时。试验分析结果表明，中E-M 46 高效液压油具有良好的粘温性、氧化安定性、等综合性能，长城 AE-M 46 高效液压油可以满足我公掘机对液压油的技术要求，特给予技术认可。

山河智能装备股份有限公司试验中心

2017 年 12 月 5 日

Sunward

Sinopec AE-K, AE-M, CF-4, CH-4, GL-5, etc. meet the requirements of Sunward Engineering Machinery.



产品认可说明

经过论证，中国石化润滑油有限公司生产的 AE 46 抗磨液压油产品可以满足徐工港口机械的工况用油要求，徐工港口机械有限公司认可中国石化润滑油有限公司 AE 46 抗磨液压油，同意对该产品进行采购并在港机设备进行装填应用。

徐工港口机械有限公司



XCMG XCT25L5汽车起重机维护与保养手册

表2-2 国内外同类油料型号对照表

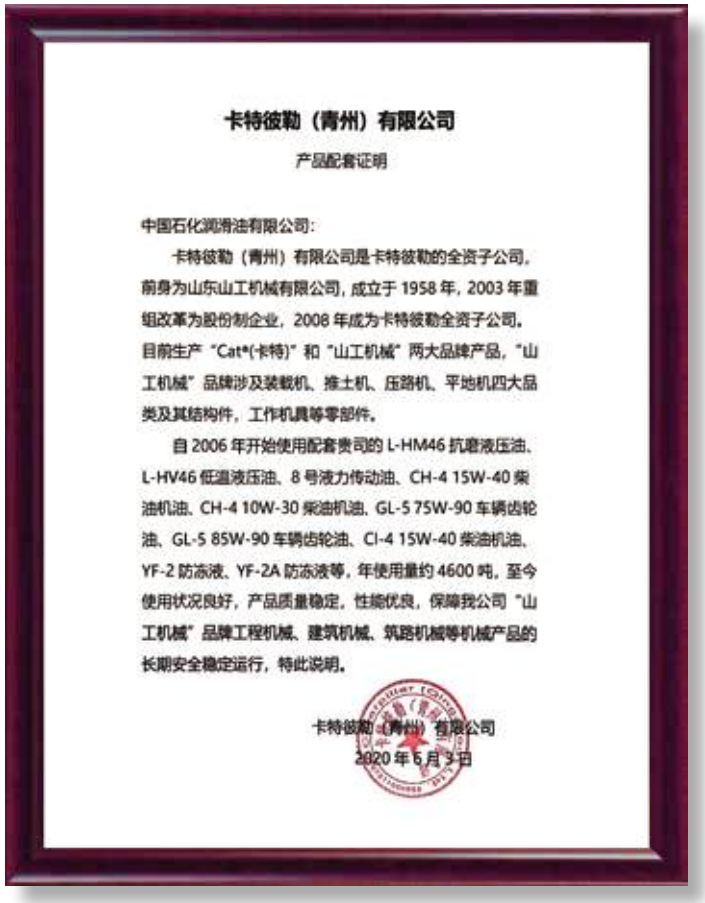
分类	发动机油	转向系统	变速箱、分动箱、车桥		回转减速机	液压系统	
名称	柴油机油	通平油	中负荷车辆齿轮油	重负荷车辆齿轮油	工业齿轮油	液压油	
中石油	CH-4	L-TSA32	GL-4	GL-5	L-CKD220、L-CKD320	AE46	——
中石化						——	XA130
MOBIL	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
SHELL	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
CALTEX	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
CASTROL	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
TOTAL	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
BP	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

注：润油选用轻柴油0#、10#、-10#、-20#、-35#；

轴承、滑块、回转支承、钢丝绳、吊臂铰点、变幅铰点等润滑点用极压锂基脂。

XCMG Port Machinery

Sinopec AE, CH-4, GL-4/GL-5, L-CKD, L-TSA, etc. meet the requirements for the use of XCMG port machinery.



卡特彼勒（青州）有限公司

产品配套证明

中国石化润滑油有限公司：

卡特彼勒（青州）有限公司是卡特彼勒的全资子公司。前身为山东山工机械有限公司，成立于 1958 年，2003 年重组改革为股份制企业，2008 年成为卡特彼勒全资子公司。目前生产 "Cat®(卡特)" 和 "山工机械" 两大品牌产品，"山工机械" 品牌涉及装载机、推土机、压路机、平地机四大品类及其结构件，工作机具等零部件。

自 2006 年开始使用配套贵司的 L-HM46 抗磨液压油、L-HV46 低温液压油、8 号液力传动油、CH-4 15W-40 柴油机油、CH-4 10W-30 柴油机油、GL-5 75W-90 车辆齿轮油、GL-5 85W-90 车辆齿轮油、CI-4 15W-40 柴油机油、YF-2 防冻液、YF-2A 防冻液等，年使用量约 4600 吨，至今使用状况良好，产品质量稳定，性能优良，保障我公司 "山工机械" 品牌工程机械、建筑机械、筑路机械等机械产品的长期安全稳定运行，特此说明。

卡特彼勒（青州）有限公司

2020 年 5 月 3 日

Caterpillar (Qingzhou)

Sinopec L-HM, L-HV hydraulic oil, hydraulic transmission oil, etc. meet the usage requirements of Caterpillar (Qingzhou).

CATERPILLAR

SINOPEC

LonKing (Shanghai)

Sinopec AE-S and AE-K hydraulic oils meet the requirements of LonKing (Shanghai) excavators.



龙工（上海）挖掘机制造有限公司

技术认可证明

中国石化润滑油有限公司：

龙工（上海）挖掘机制造有限公司使用中国石化润滑油有限公司长城 AE-S46 及 AE-K46 液压油在我公司生产的不同型号的挖掘机上开展了多台车的应用试验，最长监测时间超过 2000h。经过定期取样跟踪，试验分析结果表明中国石化长城 AE-S46 及 AE-K46 液压油具有良好的抗氧化性、抗腐蚀性、抗磨性、耐久性等综合性能。经龙工（上海）挖掘机制造有限公司论证，贵司生产的 AE-S46 及 AE-K46 液压油可以满足我公司生产的挖掘机对液压油的技术要求，特给予技术认可。

龙工（上海）挖掘机制造有限公司

2021 年 4 月 16 日

Weichai Lovol

Sinopec AE-S hydraulic oil meets the usage requirements of Weichai Lovol.

LOVOL



雷沃挖掘机行车验证说明

中国石化润滑油有限公司生产的 AE-S 46 液压油，通过对雷沃已完成 2000 小时的 6 台 FR370E、FR220E、FR480E 等型号挖掘机行车跟踪分析，其黏度保持能力、黏温性能、抗磨性能等表现良好，满足设备的用油要求。经论证，结合 2000 小时各项指标，长城 AE-S 46 液压油可满足雷沃挖掘机 5000 小时换油周期的用油要求。

雷沃工程机械集团有限公司技术研究院

技术研究院



ZOOMLION 中联重科高空作业机械公司 版本：第1版

表 5-2 液压油技术参数

液压油黏度和温度限制

正确使用液压油，请注意对应的油液粘度和温度限制。在正常的工况下，推荐的油液温度应该控制在30℃到60℃。油液温度会影响油液的粘度和油膜厚度。高的油温将降低润滑效果和元件的寿命。高的温度也会缩短油封和其它橡胶元件的寿命，同时油液也会蒸发和氧化。

机器在出厂时根据客户要求添加相应型号的液压油，当机器的工作环境温度变化超出液压油工作范围时，请根据实际情况及时更换其他合适型号的液压油。基于设备的零部件安全与工作效率考虑，建议设备启动温度高于选用的液压油倾点温度25℃。

液压油的更换

我们建议机器所使用的液压油更换时间如下：

a) 首次更换：调试后运行 500 个小时；

b) 第二次和以后的更换：2000 个小时工作时间或一年一次。

以上的推荐值适合于大多数应用，较高的温度和压力将会加速油液的失效，所以应该更早更换液压油。如果系统负载较小，换油的时间可以延长。

机器在出厂时液压油清洁度为 NAS9（ISO4406 18/15），机器的正常运行要求液压油清洁度不低于 NAS10（ISO4406 19/16）。我们建议液压油每间隔 6 个月检查一次，到了需要换油的时间，至少进行油液取样一次，多次更好，取样可以进行液压油制造商处或有资质的第三方检测机构进行分析，并判断是否仍然可用。

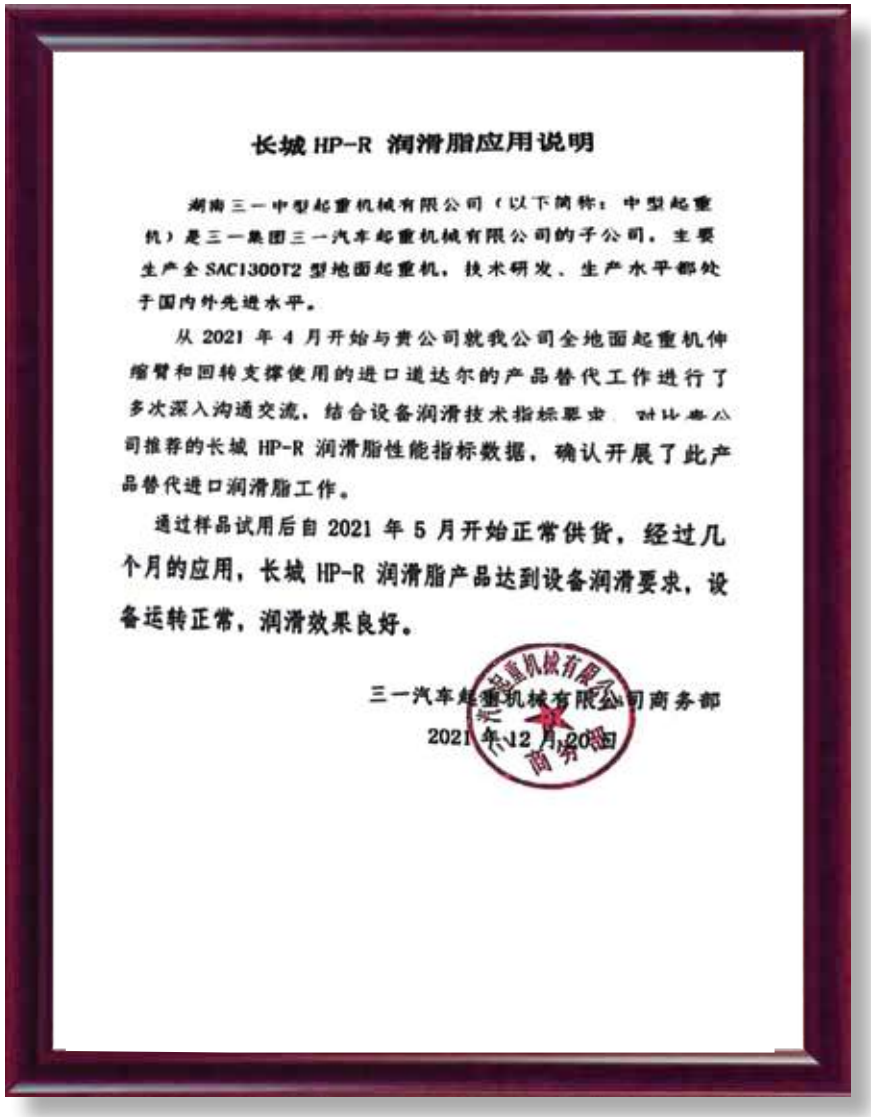
回油过滤器滤芯的更换

回油过滤器滤芯建议每1000小时或一年更换一次，以先到者为准。工作良好的回油过滤器滤芯对机器的性能及使用寿命至关重要。脏的或堵塞的过滤器可能影响机器性能，若持续使用将导致零件的损坏。恶劣的环境和严苛的工况下，应增加过滤器检查和滤芯更换频次。

ZOOMLION

Zoomlion

Sinopec L-HV low-temperature hydraulic oil and 4632 Ester Based Fire Resistant Hydraulic Oil meet the usage requirements of Zoomlion.



长城 HP-R 润滑脂应用说明

湖南三一中型起重机械有限公司（以下简称：中型起重机）是三一集团三一汽车起重机械有限公司的子公司，主要生产全 SAC1300T2 型地面起重机，技术研发、生产水平都处于国内外先进水平。

从 2021 年 4 月开始与贵公司就我公司全地面起重机伸缩臂和回转支撑使用的进口道达尔的产品替代工作进行了多次深入沟通交流，结合设备润滑技术指标要求，对比贵公司推荐的长城 HP-R 润滑脂性能指标数据，确认开展了此产品替代进口润滑脂工作。

通过样品试用后自 2021 年 5 月开始正常供货，经过几个月的应用，长城 HP-R 润滑脂产品达到设备润滑要求，设备运转正常，润滑效果良好。

三一汽车起重机械有限公司商务部

2021 年 12 月 20 日

SINOPEC



SANY®

Crane STC250/STC120/STC350, etc

Sinopec HP-R grease meets the lubrication requirements of cranes manufactured by Sany Machinery and can be applied to all models of Sany cranes.

4





SHIPPING

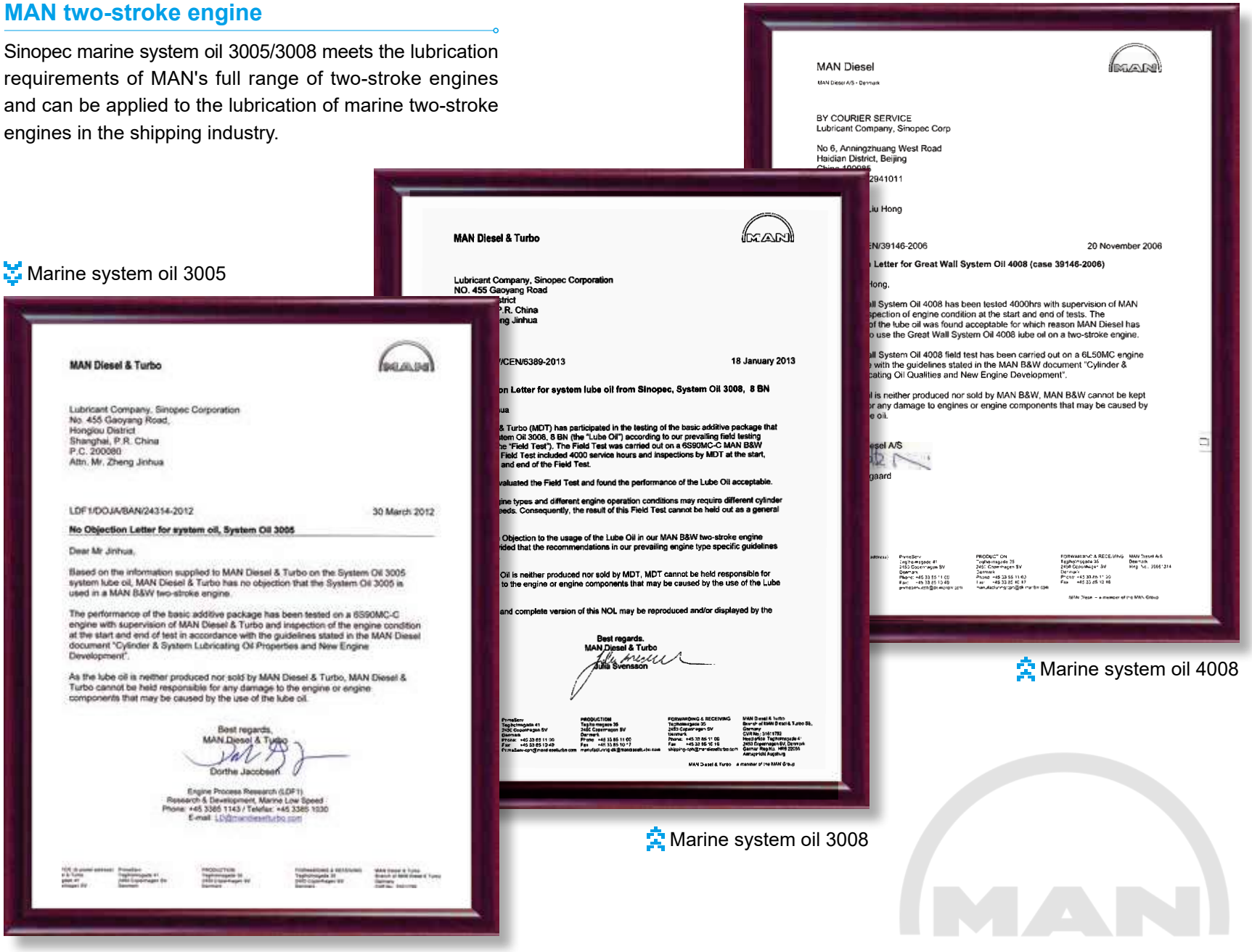
SINOPEC

Shipping

Sinopec has a complete product line of marine engine oil, with performance reaching the international advanced level, which can meet the oil needs of all marine engines in the current market. Full coverage of international and domestic certifications, maintaining the top market share in China for twelve consecutive years. It is the only company in China that has obtained the international highest performance level MAN Cat II certification for 40BN cylinder oil, and also the only company in China that has obtained MAN certification for its full range of medium speed engine oil products.

MAN two-stroke engine

Sinopec marine system oil 3005/3008 meets the lubrication requirements of MAN's full range of two-stroke engines and can be applied to the lubrication of marine two-stroke engines in the shipping industry.



MAN Diesel

BY COURIER SERVICE
Lubricant Company, Sinopec Corp

No 6, Anningzhuang West Road
Haidian District, Beijing

Liu Hong

20 November 2006

Letter for Great Wall System Oil 4008 (case 39146-2006)

Marine system oil 4008

MAN Diesel & Turbo

Lubricant Company, Sinopec Corporation
NO. 455 Gaoyang Road

18 January 2013

Letter for system lube oil from Sinopec, System Oil 3008, 8 BN

Best regards.
MAN Diesel & Turbo
Julia Svensson

Marine system oil 3008

Marine system oil 3005

MAN Diesel & Turbo

Lubricant Company, Sinopec Corporation
No. 455 Gaoyang Road,
Hongkou District
Shanghai, P.R. China
P.C. 200080
Attn. Mr. Zheng Jinhua

LDF1/DOJA/BAN/24314-2012 30 March 2012

No Objection Letter for system oil, System Oil 3005

Dear Mr Jinhua,

Based on the information supplied to MAN Diesel & Turbo on the System Oil 3005 system lube oil, MAN Diesel & Turbo has no objection that the System Oil 3005 is used in a MAN B&W two-stroke engine.

The performance of the basic additive package has been tested on a 6S90MC-C engine with supervision of MAN Diesel & Turbo and inspection of the engine condition at the start and end of test in accordance with the guidelines stated in the MAN Diesel document "Cylinder & System Lubricating Oil Properties and New Engine Development".

As the lube oil is neither produced nor sold by MAN Diesel & Turbo, MAN Diesel & Turbo cannot be held responsible for any damage to the engine or engine components that may be caused by the use of the lube oil.

Best regards,
MAN Diesel & Turbo

Dorthe Jacobsen
Engine Process Research (LDF1)
Research & Development, Marine Low Speed
Phone: +45 3385 1143 / Telefax: +45 3385 1030
E-mail: LDF@mandieselturbo.com



Read-Across No Objection Letter

P.P. Winterthur Gas & Diesel AG, PO Box 414, CH-8401 Winterthur

SINOPEC Lubricant Co., Ltd.
Mrs. Yang Huiqing
455 Gaoyang Road
Hongkou district
Shanghai, P.C.: 200080
P.R. China

Winterthur, 19. August 2021

Read-Across No Objection Letter: SINOPEC Marine System Oil 3005 (BN5, SAE 30)

The **Sinopec** system oil **Marine System Oil 3005**, blended with **API group I base oil**, has satisfactorily completed a lube oil quality survey (LOQuS) test. Based upon the results of the test and a previous satisfactorily completed **4'000 hours** validation test of a lubricating oil mixed with the identical additive package, treat rate, base oil group and thickener on-board the vessel **Xin Ping Yang (IMO 9198329)**, fitted with a **7RTA84T** engine, Winterthur Gas & Diesel (WinGD) has no objection to the use of the mentioned lubricating oil in WinGD X, WinGD X-DF, WinGD RT-flex, WinGD RT-flex-DF, Wärtsilä RTA, Wärtsilä RT-flex and Wärtsilä X engines as well as in Sulzer 2-stroke engines.

Sinopec assumes all responsibility for the performance of the mentioned product in service in the mentioned engine types to the exclusion of any liability of WinGD and companies belonging to the WinGD group. **Sinopec** along with other possible manufacturers and distributors of the mentioned product shall indemnify, compensate and hold harmless WinGD and companies belonging to the WinGD group from and against any claims, damages and losses caused by the mentioned product. The application must comply with WinGD's lubricating oil requirements and recommendations. Lubricants should be used as recommended in the WinGD Operation Manuals, Technical Bulletins and other guidelines issued by WinGD.

Sinopec undertakes to inform the undersigned representatives of any subsequent changes in the formulation of the mentioned product. This **Read-Across No Objection Letter is valid for a period of two years** from the date of issue and may be re-issued and extended if satisfactory field performance is proven during the two-year period.

Yours sincerely,

Roger Mäder
Senior Team Leader Tribology Fuels & Lubricants
Winterthur Gas & Diesel Ltd.

Konrad Räss
Head Customer Operation Support
Winterthur Gas & Diesel Ltd.

Winterthur Gas & Diesel Ltd.
Winterthur Gas & Diesel AG.
Winterthur Gas & Diesel S.A.

Schützenstrasse 3
PO Box 414, CH-8401
Winterthur, Switzerland

Tel. +41 (0)52 264 8844
Fax +41 (0)52 264 8866

WIN GD
Winterthur Gas & Diesel

Marine system oil 3005

WIN GD
Winterthur Gas & Diesel

WinGD two-stroke engine

Sinopec marine system oil 3005/3008 meets the lubrication requirements of WinGD full range of two-stroke engines.

SINOPEC



Marine system oil 3008



Read-Across No Objection Letter

P.P. Winterthur Gas & Diesel AG, PO Box 414, CH-8401 Winterthur

SINOPEC Lubricant Co., Ltd.
Mrs. Yang Huiqing
455 Gaoyang Road
Hongkou district
Shanghai, P.C.: 200080
P.R. China

Winterthur, 19. August 2021

Read-Across No Objection Letter: SINOPEC Marine System Oil 3008 (BN8, SAE 30)

The **Sinopec** system oil **Marine System Oil 3008**, blended with **API group I base oil**, has satisfactorily completed a lube oil quality survey (LOQuS) test. Based upon the results of the test and a previous satisfactorily completed **4'000 hours** validation test of a lubricating oil mixed with the identical additive package, treat rate, base oil group and thickener on-board the vessel **Xin Ping Yang (IMO 9198329)**, fitted with a **7RTA84T** engine, Winterthur Gas & Diesel (WinGD) has no objection to the use of the mentioned lubricating oil in WinGD X, WinGD X-DF, WinGD RT-flex, WinGD RT-flex-DF, Wärtsilä RTA, Wärtsilä RT-flex and Wärtsilä X engines as well as in Sulzer 2-stroke engines.

Sinopec assumes all responsibility for the performance of the mentioned product in service in the mentioned engine types to the exclusion of any liability of WinGD and companies belonging to the WinGD group. **Sinopec** along with other possible manufacturers and distributors of the mentioned product shall indemnify, compensate and hold harmless WinGD and companies belonging to the WinGD group from and against any claims, damages and losses caused by the mentioned product. The application must comply with WinGD's lubricating oil requirements and recommendations. Lubricants should be used as recommended in the WinGD Operation Manuals, Technical Bulletins and other guidelines issued by WinGD.

Sinopec undertakes to inform the undersigned representatives of any subsequent changes in the formulation of the mentioned product. This **Read-Across No Objection Letter is valid for a period of two years** from the date of issue and may be re-issued and extended if satisfactory field performance is proven during the two-year period.

Yours sincerely,

Roger Mäder
Senior Team Leader Tribology Fuels & Lubricants
Winterthur Gas & Diesel Ltd.

Konrad Räss
Head Customer Operation Support
Winterthur Gas & Diesel Ltd.

Winterthur Gas & Diesel Ltd.
Winterthur Gas & Diesel AG.
Winterthur Gas & Diesel S.A.

Schützenstrasse 3
PO Box 414, CH-8401
Winterthur, Switzerland

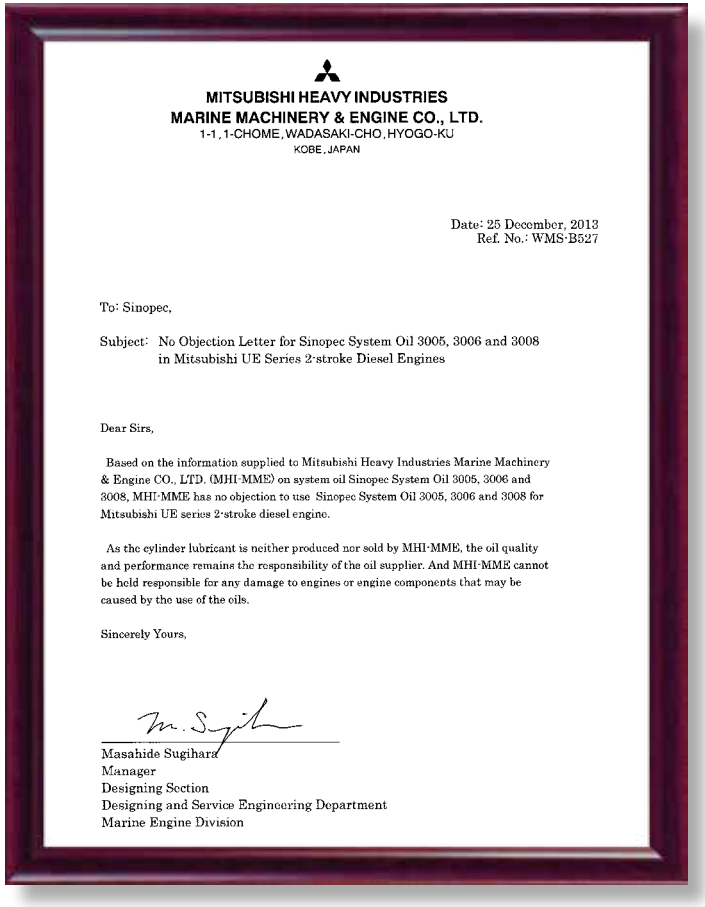
Tel. +41 (0)52 264 8844
Fax +41 (0)52 264 8866

WIN GD
Winterthur Gas & Diesel

J-ENG two-stroke engine

Sinopec marine system oil 3005/3008 meets the lubrication requirements of J-ENG full range of two-stroke engines.

Marine system oil 3005/3008



MITSUBISHI HEAVY INDUSTRIES
MARINE MACHINERY & ENGINE CO., LTD.
1-1, 1-CHOME, WADASAKI-CHO, HYOGO-KU
KOBE, JAPAN

Date: 25 December, 2013
Ref. No.: WMS-B527

To: Sinopec,

Subject: No Objection Letter for Sinopec System Oil 3005, 3006 and 3008 in Mitsubishi UE Series 2-stroke Diesel Engines

Dear Sirs,

Based on the information supplied to Mitsubishi Heavy Industries Marine Machinery & Engine CO., LTD. (MHI-MME) on system oil Sinopec System Oil 3005, 3006 and 3008, MHI-MME has no objection to use Sinopec System Oil 3005, 3006 and 3008 for Mitsubishi UE series 2-stroke diesel engine.

As the cylinder lubricant is neither produced nor sold by MHI-MME, the oil quality and performance remains the responsibility of the oil supplier. And MHI-MME cannot be held responsible for any damage to engines or engine components that may be caused by the use of the oils.

Sincerely Yours,

Masahide Sugihara
Manager
Designing Section
Designing and Service Engineering Department
Marine Engine Division



KEMEL

12th Jun. 2014

Seal Compatibility Test

The material compatibility of KEMEL regular fluoro-elastomer with a new lubricants was evaluated.

1. Tested Lubricant
Name SINOPEC CORP. MARINE SYSTEM OIL 3005

2. Test Result
Immersion Test : Passed

3. Conclusion
The following lubricants are acceptable.
- MARINE SYSTEM OIL 3005

Iwao Matsuoka
Manager, Technical Department

Koichi Saito
Engineer, Technical Department

KEMEL KEMEL COMPANY

Marine system oil 3005

KEMEL stern shaft

Sinopec Marine System Oil 3005 meets KEMEL full range of stern shaft lubrication requirements and can be applied to the lubrication of ship stern shaft devices in the shipping industry.



MAN Diesel & Turbo

SINOPEC Lubricant Co., Ltd
No. 455 Gaoyang Road,
Hongkou District
Shanghai, China
Att.: Xu Li

EEEDF4/JUSV/CEN/37750-2017 4 July 2017

No Objection Letter: Cylinder Lube Oil from Sinopec, SINOPEC Marine Cylinder Oil 5017, 17 BN, SAE 50

Dear Xu Li

MAN Diesel & Turbo has participated in the testing of the basic additive package that is part of **SINOPEC Marine Cylinder Oil 5017**, 17 BN, SAE 50 (the "Lube Oil") according to our prevailing field testing procedure (the "Field Test"). The Field Test was performed on a MAN B&W mark 9, 6 cylinder, 35 centimetre bore engine. The field test included 500 testing hours and inspections at start, intermediate and end of the test.

MAN Diesel & Turbo has evaluated the Field Test and found the performance of the Lube Oil acceptable. Different engine types and different engine operation conditions may require different cylinder lubrication feed rates and or oil type. Consequently, the result of this Field Test cannot be held out as a general statement.

MAN Diesel & Turbo has No Objection to the usage of the Lube Oil in our MAN B&W two-stroke engine designs provided that the recommendations in our prevailing engine-type specific guidelines are followed.

Engine-type specific guidelines, engine-design, operation pattern, legislation and economic conditions all influence the lubrication in a direct or indirect way and they are all subjected to changes. As a consequence, MAN Diesel & Turbo reserves the right to revise or withdraw the No Objection to the usage of the Lube Oil if the usage of the Lube Oil is deemed to not be applicable for all or certain engines types.

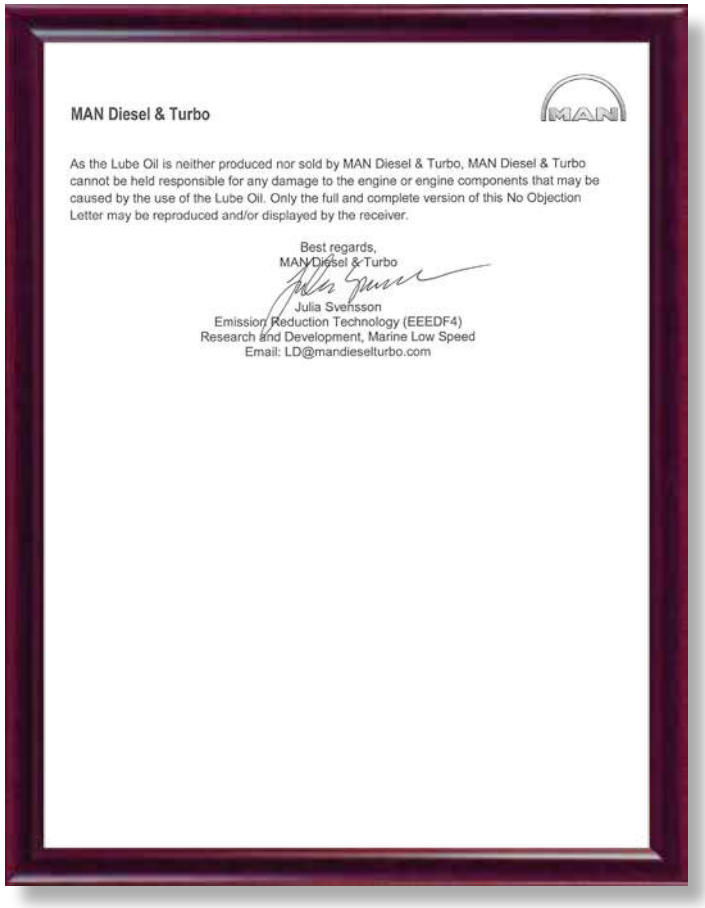
Quality assurance and monitoring of product performance are important. We expect that Sinopec has processes in order to assure that the quality of the product is acceptable and suitable for its intended use.

Marine cylinder oil 5017

MAN Category I

Sinopec Marine Cylinder Oil 5017 meets MAN Category I requirements and can be used for cylinder lubrication in marine two-stroke engines in the shipping industry.

SINOPEC



MAN Diesel & Turbo

As the Lube Oil is neither produced nor sold by MAN Diesel & Turbo, MAN Diesel & Turbo cannot be held responsible for any damage to the engine or engine components that may be caused by the use of the Lube Oil. Only the full and complete version of this No Objection Letter may be reproduced and/or displayed by the receiver.

Best regards,
MAN Diesel & Turbo

Julia Svensson
Emission Reduction Technology (EEEDF4)
Research and Development, Marine Low Speed
Email: LD@mandieselturbo.com

MAN Category I

Sinopec Marine Cylinder Oil 5040/5040N meets MAN Category I requirements and can be used for cylinder lubrication in marine two-stroke engines in the shipping industry.

Marine Cylinder Oil 5040



MAN Energy Solutions

MAN Energy Solutions, 2450 Copenhagen, Denmark

Sinopec Lubricant Co., Ltd
455 Gaoyang Road
Hongkou District
Shanghai, PC 200080
P.R. China
Email: yanghq.lube@sinopec.com
Att.: Ms. Yang Huiqing

Copenhagen, 15 June 2022

EEDF1/JUSV
Case no: 20445-2022

No Objection Letter for cylinder oil Sinopec Marine Cylinder Oil 5040, 40 BN, SAE 50 from Sinopec

Dear Ms. Yang Huiqing,

This letter replaces the letter with case no: 26581-2019.

MAN Energy Solutions (MAN ES) has participated in the testing of the basic additive package that is part of **Sinopec Marine Cylinder Oil 5040**, 40 BN, SAE 50 (the "Lube Oil") in 2018-2019 according to our prevailing field testing procedure (the "Field Test"). The Field Test was performed on a 7G80ME-C Mk 9.2 MAN B&W two-stroke engine on low sulphur fuel oil. The Field Test included 4300 service hours and inspections by MAN ES at the start and the end of test.

MAN ES has evaluated the Field Test and lab data and found the performance of the Lube Oil acceptable. Different engine types and different engine operation conditions may require different cylinder lubrication feed rates and or oil type. Consequently, the result of this Field Test cannot be held out as a general statement.

MAN ES has No Objection to the usage of the Lube Oil in our MAN B&W two-stroke engine designs provided that the recommendations in our prevailing engine-type specific guidelines are followed.

This No Objection is valid three years from date, that is until **1 July 2025**. Before the period is ended Sinopec can apply for a renewal of the No Objection.

Engine-type specific guidelines, engine-design, operation pattern, legislation and economic conditions all influence the lubrication in a direct or indirect way and they are all subjected to changes. As a consequence, MAN ES reserves the right to revise or withdraw the No Objection to the usage of the Lube Oil if the usage of the Lube Oil is deemed to not be applicable for all or certain engines types.

Quality assurance and monitoring of product performance are important. We expect that Sinopec has processes in order to assure that the quality of the product is acceptable and suitable for its intended use.

MAN Energy Solutions
Teglholmsgade 41
2450 Copenhagen SV
Denmark
P +45 33 85 11 00
F +45 33 85 10 30
info-cph@man-es.com
www.man-es.com

MAN PrimeServ
Teglholmsgade 41
2450 Copenhagen SV
Denmark
P +45 33 85 11 00
F +45 33 85 10 49
PrimeServ-cph@man-es.com

PRODUCTION
Teglholmsgade 35
2450 Copenhagen SV
Denmark
P +45 33 85 11 00
F +45 33 85 10 17
manufacturing-dk@man-es.com

FORWARDING & RECEIVING
Teglholmsgade 35
2450 Copenhagen SV
Denmark
P +45 33 85 11 00
F +45 33 85 10 16
shipping-cph@man-es.com

MAN Energy Solutions
Branch of MAN Energy Solutions SE,
Germany
CVR No.: 31611792
Head office: Teglholmsgade 41
2450 Copenhagen SV
Denmark
German Reg.No.: HRB 22056
Amtsgericht Augsburg

Page 1 of 2



MAN Energy Solutions

As the Lube Oil is neither produced nor sold by MAN ES, MAN ES cannot be held responsible for any damage to the engine or engine components that may be caused by the use of the Lube Oil. Only the full and complete version of this No Objection Letter may be reproduced and/or displayed by the receiver.

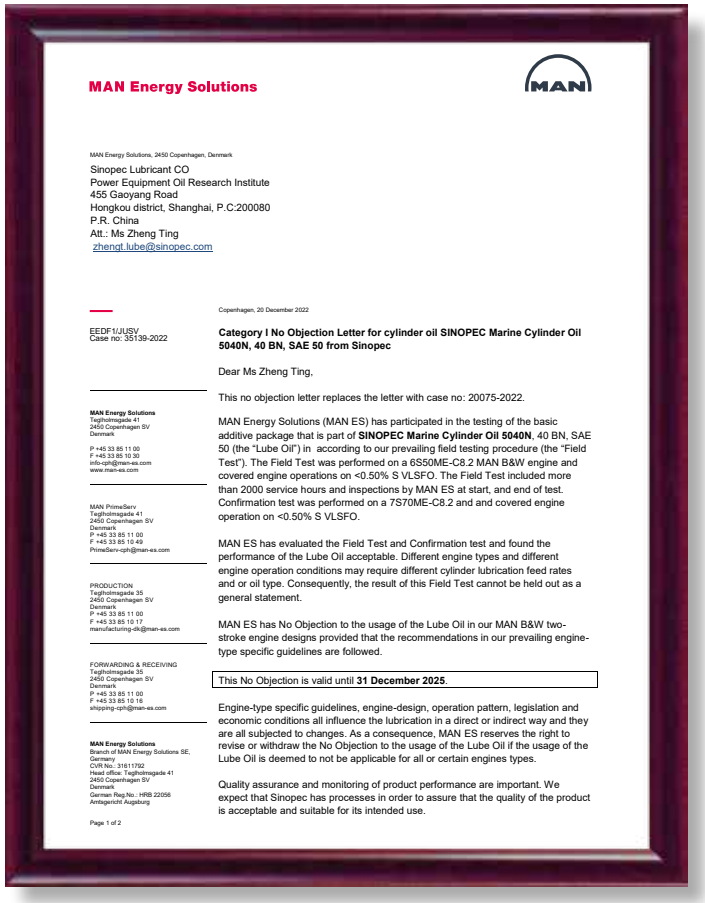
Best regards,
MAN Energy Solutions

Julia Svensson
Engine Process Research, Fuel & Lube (EEDF1)
Research and Development, Marine Low Speed
Email: RDCPH@man-es.com

Page 2 of 2

SINOPEC





MAN Energy Solutions

MAN Energy Solutions, 2450 Copenhagen, Denmark

Sinopec Lubricant CO
Power Equipment Oil Research Institute
455 Gaoyang Road
Hongkou district, Shanghai, P.C:200080
P.R. China
Att.: Ms Zheng Ting
zhengt.lube@sinopec.com

EEDF1/JUSV
Case no: 35139-2022

MAN Energy Solutions
Teglholmsgade 41
2450 Copenhagen SV
Denmark

P +45 33 85 11 00
F +45 33 85 10 30
info-cph@man-es.com
www.man-es.com

MAN PrimeServ
Teglholmsgade 41
2450 Copenhagen SV
Denmark
P +45 33 85 11 00
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P +45 33 85 11 00
F +45 33 85 10 17
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FORWARDING & RECEIVING
Teglholmsgade 35
2450 Copenhagen SV
Denmark
P +45 33 85 11 00
F +45 33 85 10 16
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Branch of MAN Energy Solutions SE,
Germany
CVR No.: 31611792
Head office: Teglholmsgade 41
2450 Copenhagen SV
Denmark
German Reg.No.: HRB 22056
Amtsgericht Augsburg

Page 1 of 2

Copenhagen, 20 December 2022

Category I No Objection Letter for cylinder oil SINOPEC Marine Cylinder Oil 5040N, 40 BN, SAE 50 from Sinopec

Dear Ms Zheng Ting,

This no objection letter replaces the letter with case no: 20075-2022.

MAN Energy Solutions (MAN ES) has participated in the testing of the basic additive package that is part of **SINOPEC Marine Cylinder Oil 5040N**, 40 BN, SAE 50 (the "Lube Oil") in according to our prevailing field testing procedure (the "Field Test"). The Field Test was performed on a 6S50ME-C8.2 MAN B&W engine and covered engine operations on <0.50% S VLSFO. The Field Test included more than 2000 service hours and inspections by MAN ES at start, and end of test. Confirmation test was performed on a 7S70ME-C8.2 and and covered engine operation on <0.50% S VLSFO.

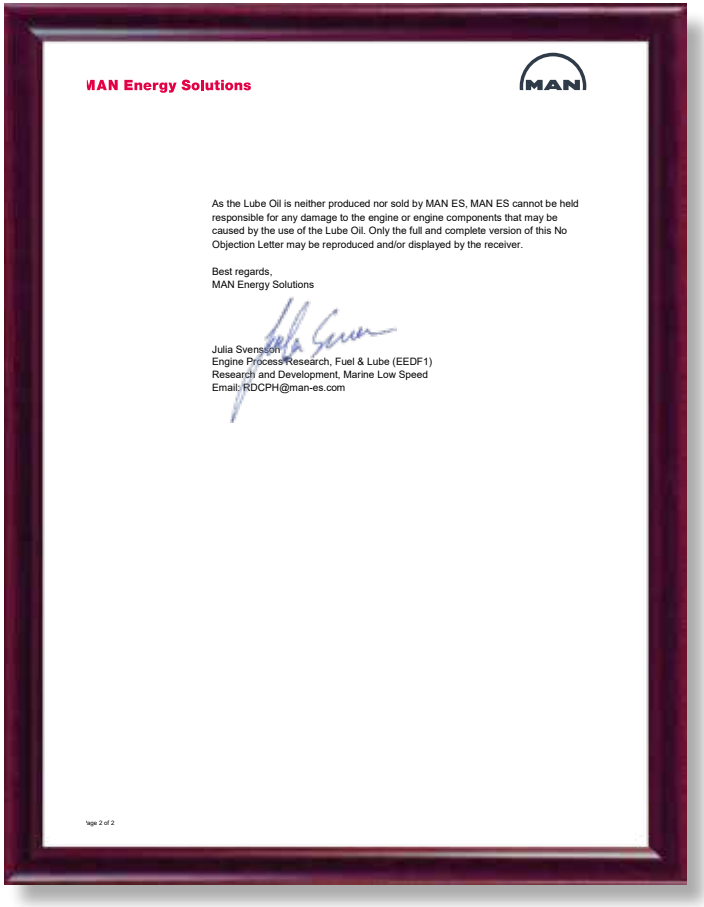
MAN ES has evaluated the Field Test and Confirmation test and found the performance of the Lube Oil acceptable. Different engine types and different engine operation conditions may require different cylinder lubrication feed rates and or oil type. Consequently, the result of this Field Test cannot be held out as a general statement.

MAN ES has No Objection to the usage of the Lube Oil in our MAN B&W two-stroke engine designs provided that the recommendations in our prevailing engine-type specific guidelines are followed.

This No Objection is valid until **31 December 2025**.

Engine-type specific guidelines, engine-design, operation pattern, legislation and economic conditions all influence the lubrication in a direct or indirect way and they are all subjected to changes. As a consequence, MAN ES reserves the right to revise or withdraw the No Objection to the usage of the Lube Oil if the usage of the Lube Oil is deemed to not be applicable for all or certain engines types.

Quality assurance and monitoring of product performance are important. We expect that Sinopec has processes in order to assure that the quality of the product is acceptable and suitable for its intended use.



MAN Energy Solutions

As the Lube Oil is neither produced nor sold by MAN ES, MAN ES cannot be held responsible for any damage to the engine or engine components that may be caused by the use of the Lube Oil. Only the full and complete version of this No Objection Letter may be reproduced and/or displayed by the receiver.

Best regards,
MAN Energy Solutions

Julia Svensson
Engine Process Research, Fuel & Lube (EEDF1)
Research and Development, Marine Low Speed
Email: RDCPH@man-es.com

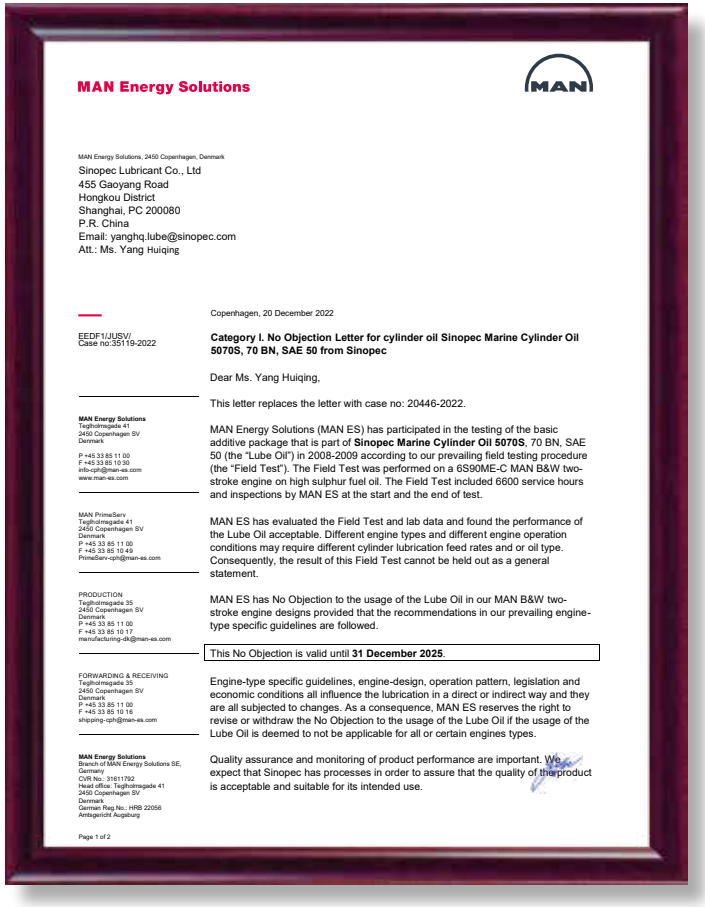
Page 2 of 2

Marine Cylinder Oil 5040N

MAN Category I

Sinopec Marine Cylinder Oil 5070S/5070N meets MAN Category I requirements and can be used for cylinder lubrication in marine two-stroke engines in the shipping industry.

Marine Cylinder Oil 5070S



MAN Energy Solutions

MAN Energy Solutions, 2450 Copenhagen, Denmark

Sinopec Lubricant Co., Ltd
455 Gaoyang Road
Hongkou District
Shanghai, PC 200080
P.R. China
Email: yanghq.lube@sinopec.com
Att.: Ms. Yang Huiqing

Copenhagen, 20 December 2022

EEDF1/JUSV/
Case no:35119-2022

Category I. No Objection Letter for cylinder oil Sinopec Marine Cylinder Oil 5070S, 70 BN, SAE 50 from Sinopec

Dear Ms. Yang Huiqing,

This letter replaces the letter with case no: 20446-2022.

MAN Energy Solutions (MAN ES) has participated in the testing of the basic additive package that is part of **Sinopec Marine Cylinder Oil 5070S**, 70 BN, SAE 50 (the "Lube Oil") in 2008-2009 according to our prevailing field testing procedure (the "Field Test"). The Field Test was performed on a 6S90ME-C MAN B&W two-stroke engine on high sulphur fuel oil. The Field Test included 6600 service hours and inspections by MAN ES at the start and the end of test.

MAN ES has evaluated the Field Test and lab data and found the performance of the Lube Oil acceptable. Different engine types and different engine operation conditions may require different cylinder lubrication feed rates and or oil type. Consequently, the result of this Field Test cannot be held out as a general statement.

MAN ES has No Objection to the usage of the Lube Oil in our MAN B&W two-stroke engine designs provided that the recommendations in our prevailing engine-type specific guidelines are followed.

This No Objection is valid until **31 December 2025**.

Engine-type specific guidelines, engine-design, operation pattern, legislation and economic conditions all influence the lubrication in a direct or indirect way and they are all subjected to changes. As a consequence, MAN ES reserves the right to revise or withdraw the No Objection to the usage of the Lube Oil if the usage of the Lube Oil is deemed to not be applicable for all or certain engines types.

Quality assurance and monitoring of product performance are important. We expect that Sinopec has processes in order to assure that the quality of the product is acceptable and suitable for its intended use.

MAN Energy Solutions
Teglholmsgade 41
2450 Copenhagen SV
Denmark
P +45 33 85 11 00
F +45 33 85 10 30
info-cph@man-es.com
www.man-es.com

MAN PrimeServ
Teglholmsgade 41
2450 Copenhagen SV
Denmark
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F +45 33 85 10 49
PrimeServ-cph@man-es.com

PRODUCTION
Teglholmsgade 35
2450 Copenhagen SV
Denmark
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FORWARDING & RECEIVING
Teglholmsgade 35
2450 Copenhagen SV
Denmark
P +45 33 85 11 00
F +45 33 85 10 16
shipping-cph@man-es.com

MAN Energy Solutions
Branch of MAN Energy Solutions SE, Germany
CVR No.: 31611792
Head office: Teglholmsgade 41
2450 Copenhagen SV
Denmark
German Reg.No.: HRB 22056
Amtsgericht Augsburg

Page 1 of 2



MAN Energy Solutions

As the Lube Oil is neither produced nor sold by MAN ES, MAN ES cannot be held responsible for any damage to the engine or engine components that may be caused by the use of the Lube Oil. Only the full and complete version of this No Objection Letter may be reproduced and/or displayed by the receiver.

Best regards,
MAN Energy Solutions

Julia Svensson
Engine Process Research, Fuel & Lube (EEDF1)
Research and Development, Marine Low Speed
Email: RDCPH@man-es.com

SINOPEC



MAN Diesel & Turbo

SINOPEC Lubricant Co., Ltd
No. 455 Gaoyang Road,
Hongkou District
Shanghai, China
Att.: Xu Li

EEEDF4/JUSV/CEN/42597-2017 14 August 2017

No Objection Letter: Cylinder Lube Oil from Sinopec, SINOPEC MARINE CYLINDER OIL 5070N, 70 BN, SAE 50

Dear Xu Li

MAN Diesel & Turbo has participated in the testing of the basic additive package that is part of **SINOPEC MARINE CYLINDER OIL 5070N**, 70 BN, SAE 50 (the "Lube Oil") according to our prevailing field testing procedure (the "Field Test"). The Field Test was performed on a 12K98MC-C MAN B&W engine. The Field Test included more than 4000 service hours and inspections by MAN Diesel & Turbo at the start, intermediate and the end of test.

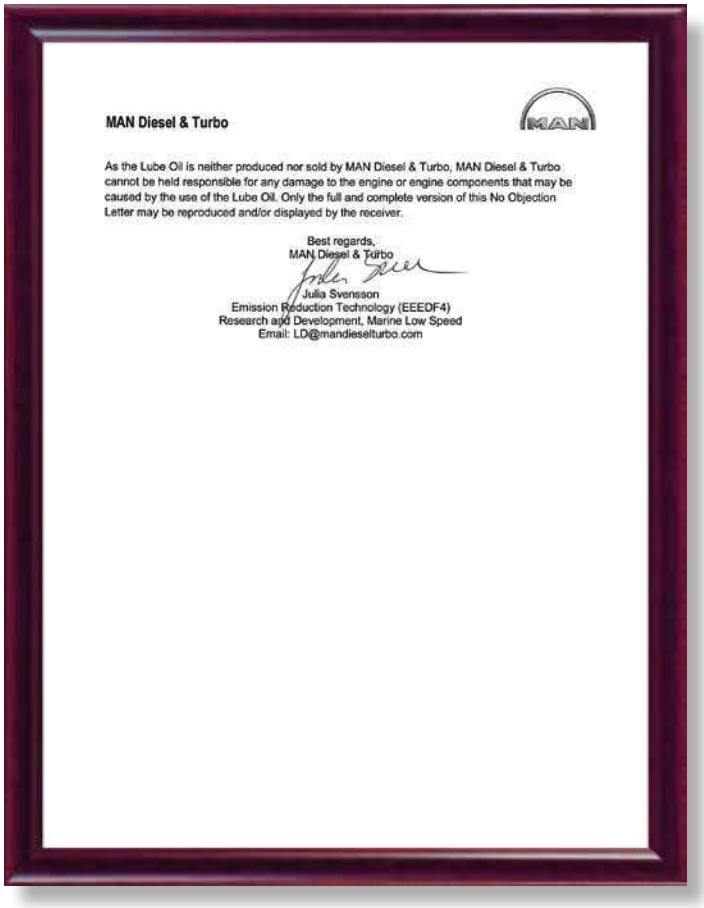
MAN Diesel & Turbo has evaluated the Field Test and found the performance of the Lube Oil acceptable. Different engine types and different engine operation conditions may require different cylinder lubrication feed rates and or oil type. Consequently, the result of this Field Test cannot be held out as a general statement.

MAN Diesel & Turbo has No Objection to the usage of the Lube Oil in our MAN B&W two-stroke engine designs provided that the recommendations in our prevailing engine-type specific guidelines are followed.

Engine-type specific guidelines, engine-design, operation pattern, legislation and economic conditions all influence the lubrication in a direct or indirect way and they are all subjected to changes. As a consequence, MAN Diesel & Turbo reserves the right to revise or withdraw the No Objection to the usage of the Lube Oil if the usage of the Lube Oil is deemed to not be applicable for all or certain engines types.

Quality assurance and monitoring of product performance are important. We expect that Sinopec as processes in order to assure that the quality of the product is acceptable and suitable for its intended use.

Marine Cylinder Oil 5070N



MAN Diesel & Turbo

As the Lube Oil is neither produced nor sold by MAN Diesel & Turbo, MAN Diesel & Turbo cannot be held responsible for any damage to the engine or engine components that may be caused by the use of the Lube Oil. Only the full and complete version of this No Objection Letter may be reproduced and/or displayed by the receiver.

Best regards,
MAN Diesel & Turbo

Julia Svensson
Emission Reduction Technology (EEEDF4)
Research and Development, Marine Low Speed
Email: LD@mandieselturbo.com

MAN Category I

Sinopec Marine Cylinder Oil 50100N/50140 meets MAN Category I requirements and can be used for cylinder lubrication in marine two-stroke engines in the shipping industry.

Marine Cylinder Oil 50100N



MAN Diesel & Turbo

SINOPEC Lubricant Co., Ltd
No. 455 Gaoyang Road,
Hongkou District
Shanghai, China
Att.: Xu Li

EEEDF4/JUSV/CEN/42598-2017 14 August 2017

No Objection Letter: Cylinder Lube Oil from Sinopec, SINOPEC MARINE CYLINDER OIL 50100N, 100 BN, SAE 50

Dear Xu Li

MAN Diesel & Turbo has participated in the testing of the basic additive package that is part of **SINOPEC MARINE CYLINDER OIL 50100N**, 100 BN, SAE 50 (the "Lube Oil") according to our prevailing field testing procedure (the "Field Test"). The Field Test was performed on a 5S60ME-C mark 8 MAN B&W engine. The Field Test included more than 1000 service hours and inspections by MAN Diesel & Turbo at the start, intermediate and the end of test.

MAN Diesel & Turbo has evaluated the Field Test and found the performance of the Lube Oil acceptable. Different engine types and different engine operation conditions may require different cylinder lubrication feed rates and or oil type. Consequently, the result of this Field Test cannot be held out as a general statement.

MAN Diesel & Turbo has No Objection to the usage of the Lube Oil in our MAN B&W two-stroke engine designs provided that the recommendations in our prevailing engine-type specific guidelines are followed.

Engine-type specific guidelines, engine-design, operation pattern, legislation and economic conditions all influence the lubrication in a direct or indirect way and they are all subjected to changes. As a consequence, MAN Diesel & Turbo reserves the right to revise or withdraw the No Objection to the usage of the Lube Oil if the usage of the Lube Oil is deemed to not be applicable for all or certain engines types.

Quality assurance and monitoring of product performance are important. We expect that Sinopec as processes in order to assure that the quality of the product is acceptable and suitable for its intended use.

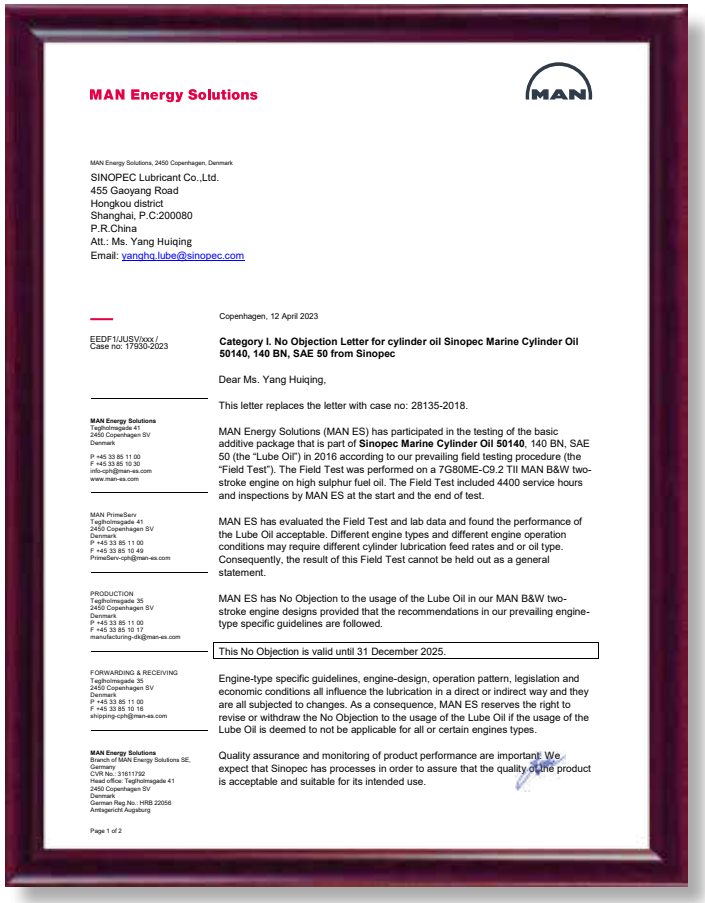


MAN Diesel & Turbo

As the Lube Oil is neither produced nor sold by MAN Diesel & Turbo, MAN Diesel & Turbo cannot be held responsible for any damage to the engine or engine components that may be caused by the use of the Lube Oil. Only the full and complete version of this No Objection Letter may be reproduced and/or displayed by the receiver.

Best regards,
MAN Diesel & Turbo

Julia Svensson
Emission Reduction Technology (EEEDF4)
Research and Development, Marine Low Speed
Email: LD@mandieselturbo.com



MAN Energy Solutions

MAN Energy Solutions, 2450 Copenhagen, Denmark

SINOPEC Lubricant Co.,Ltd.
455 Gaoyang Road
Hongkou district
Shanghai, P.C.200080
P.R.China
Att.: Ms. Yang Huiqing
Email: yanghq.lube@sinopec.com

Copenhagen, 12 April 2023

EEDF1/JUSV/xxx /
Case no: 17930-2023

Category I. No Objection Letter for cylinder oil Sinopec Marine Cylinder Oil 50140, 140 BN, SAE 50 from Sinopec

Dear Ms. Yang Huiqing,

This letter replaces the letter with case no: 28135-2018.

MAN Energy Solutions (MAN ES) has participated in the testing of the basic additive package that is part of **Sinopec Marine Cylinder Oil 50140**, 140 BN, SAE 50 (the "Lube Oil") in 2016 according to our prevailing field testing procedure (the "Field Test"). The Field Test was performed on a 7G80ME-C9.2 TII MAN B&W two-stroke engine on high sulphur fuel oil. The Field Test included 4400 service hours and inspections by MAN ES at the start and the end of test.

MAN ES has evaluated the Field Test and lab data and found the performance of the Lube Oil acceptable. Different engine types and different engine operation conditions may require different cylinder lubrication feed rates and or oil type. Consequently, the result of this Field Test cannot be held out as a general statement.

MAN ES has No Objection to the usage of the Lube Oil in our MAN B&W two-stroke engine designs provided that the recommendations in our prevailing engine-type specific guidelines are followed.

This No Objection is valid until 31 December 2025.

Engine-type specific guidelines, engine-design, operation pattern, legislation and economic conditions all influence the lubrication in a direct or indirect way and they are all subjected to changes. As a consequence, MAN ES reserves the right to revise or withdraw the No Objection to the usage of the Lube Oil if the usage of the Lube Oil is deemed to not be applicable for all or certain engines types.

Quality assurance and monitoring of product performance are important. We expect that Sinopec has processes in order to assure that the quality of the product is acceptable and suitable for its intended use.

MAN Energy Solutions
Teglholmsgade 41
2450 Copenhagen SV
Denmark
P +45 33 85 11 00
F +45 33 85 10 30
info-cph@man-es.com
www.man-es.com

MAN PrimeServ
Teglholmsgade 41
2450 Copenhagen SV
Denmark
P +45 33 85 11 00
F +45 33 85 10 49
PrimeServ-cph@man-es.com

PRODUCTION
Teglholmsgade 35
2450 Copenhagen SV
Denmark
P +45 33 85 11 00
F +45 33 85 10 17
manufacturing-dk@man-es.com

FORWARDING & RECEIVING
Teglholmsgade 35
2450 Copenhagen SV
Denmark
P +45 33 85 11 00
F +45 33 85 10 16
shipping-cph@man-es.com

MAN Energy Solutions
Branch of MAN Energy Solutions SE,
Germany
CVR No.: 31611792
Head office: Teglholmsgade 41
2450 Copenhagen SV
Denmark
German Reg.No.: HRB 22056
Amtsgericht Augsburg

Marine Cylinder Oil 50140



MAN Energy Solutions

As the Lube Oil is neither produced nor sold by MAN ES, MAN ES cannot be held responsible for any damage to the engine or engine components that may be caused by the use of the Lube Oil. Only the full and complete version of this No Objection Letter may be reproduced and/or displayed by the receiver.

Best regards,
MAN Energy Solutions

Julia Svensson
Engine Process Research, Fuel & Lube (EEDF1)
Research and Development, Marine Low Speed
Email: RDCPH@man-es.com

SINOPEC

MAN Category II

Sinopec Marine Cylinder Oil 5040N (II) /50100 meets MAN Category II requirements and can be used for cylinder lubrication in marine two-stroke engines in the shipping industry.

Marine Cylinder Oil 5040N(II)



MAN Energy Solutions

MAN Energy Solutions, 2450 Copenhagen, Denmark

Sinopec Lubricant Co., Ltd
455 Gaoyang Road
Hongkou District
Shanghai, PC 200080
P.R. China
Email: yanghq.lube@sinopec.com
Att.: Ms. Yang Huiqing

Copenhagen, 20 October 2022

EEDF1/JUJSV/
Case no: [80534-2022]

No Objection Letter for Category II cylinder oil Sinopec Marine Cylinder Oil 5040N(II), 40 BN, SAE 50 from Sinopec

Dear Ms. Yang Huiqing,

Sinopec Marine Cylinder Oil 5040N(II) is granted a category II (Cat. II) status.

Cat. II cylinder oils have excellent overall performance with a special focus on cleaning ability. Cat. II cylinder oils are applicable for all engines types and recommended for MAN B&W two-stroke engines Mark 9 and higher.

MAN Energy Solutions (MAN ES) has participated in the testing of **Sinopec Marine Cylinder Oil 5040N(II)**, 40 BN, SAE 50 (the "Lube Oil") in 2021-2022 according to our prevailing field testing procedure (the "Field Test"). The Field Tests were performed on MAN B&W engines: 6G60ME-C9.5 (< 0.5% S VLSFO, 2000h) and 7G80ME-C9.5 (< 0.5% S VLSFO, 2000h). Inspections were made by MAN ES at start and end of the tests.

MAN ES has evaluated the Field Tests and laboratory data and found the performance of the Lube Oil acceptable.

Different engine types and different engine operation conditions may require different cylinder lubrication feed rates and or oil type. Consequently, the result of this Field Test cannot be held out as a general statement.

MAN ES has No Objection to the usage of the Lube Oil in our MAN B&W two-stroke engine designs provided that the recommendations in our prevailing engine-type specific guidelines are followed.

This No Objection is valid three years from date, that is until 1 November 2025. Before the period is ended **Sinopec** can apply for a renewal of the No Objection.

Engine-type specific guidelines, engine-design, operation pattern, legislation and economic conditions all influence the lubrication in a direct or indirect way and they are all subjected to changes. As a consequence, MAN ES reserves the right to revise or withdraw the No Objection to the usage of the Lube Oil if the usage of the Lube Oil is deemed to not be applicable for all or certain engines types.

MAN Energy Solutions
Teglholmsgade 41
2450 Copenhagen SV
Denmark
P +45 33 85 11 00
F +45 33 85 10 30
info-cph@man-es.com
www.man-es.com

MAN PrimeServ
Teglholmsgade 41
2450 Copenhagen SV
Denmark
P +45 33 85 11 00
F +45 33 85 10 49
PrimeServ-cph@man-es.com

PRODUCTION
Teglholmsgade 35
2450 Copenhagen SV
Denmark
P +45 33 85 11 00
F +45 33 85 10 17
manufacturing-dk@man-es.com

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Teglholmsgade 35
2450 Copenhagen SV
Denmark
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F +45 33 85 10 16
shipping-cph@man-es.com

MAN Energy Solutions
Branch of MAN Energy Solutions SE, Germany
CVR No.: 31611792
Head office: Teglholmsgade 41
2450 Copenhagen SV
Denmark
German Reg.No.: HRB 22056
Amtsgericht Augsburg

Page 1 of 2



MAN Energy Solutions

Quality assurance and monitoring of product performance are important. We expect that **Sinopec** has processes in order to assure that the quality of the product is acceptable and suitable for its intended use.

As the Lube Oil is neither produced nor sold by MAN ES, MAN ES cannot be held responsible for any damage to the engine or engine components that may be caused by the use of the Lube Oil. Only the full and complete version of this No Objection Letter may be reproduced and/or displayed by the receiver.

Best regards,
MAN Energy Solutions

Julia Svensson
Engine Process Research, Fuel & Lube (EEDF1)
Research and Development, Marine Low Speed
Email: RDCPH@man-es.com

SINOPEC



MAN Energy Solutions

MAN Energy Solutions, 2450 Copenhagen, Denmark

SINOPEC Lubricant Co.,Ltd.
455 Gaoyang Road
Hongkou district
Shanghai, P.C:200080
P.R.China
Att.: Ms. Yang Huiqing
Email: yanghq.lube@sinopec.com

Copenhagen, 21 September

EDF1/JUSV/
Case no.18089-2023

Category II. No Objection Letter for cylinder oil Sinopec Marine Cylinder Oil 50100, 100 BN, SAE 50 from Sinopec

Dear Ms. Yang Huiqing,

This No objection Letter (NOL) supersedes the NOL with case no: 14916-2020.

MAN Energy Solutions (MAN ES) has participated in the testing of the basic additive package that is part of **Sinopec Marine Cylinder Oil 50100**, 100 BN, SAE 50 (the "Lube Oil") in 2013 according to our prevailing field testing procedure (the "Field Test"). The Field Test was performed on a 6S80ME-C9.1 MAN B&W engine on high sulphur fuel. The Field Test included more than 1000 service hours and inspections by MAN ES at start and end of test.

MAN ES has evaluated the Field Test, laboratory data and service experience and found the performance of the Lube Oil acceptable.

Different engine types and different engine operation conditions may require different cylinder lubrication feed rates and or oil type. Consequently, the result of this Field Test cannot be held out as a general statement.

MAN ES has No Objection to the usage of the Lube Oil in our MAN B&W two-stroke engine designs provided that the recommendations in our prevailing engine-type specific guidelines are followed.

This No Objection is valid three years from date, that is until 1 October 2026. Before the period is ended Sinopec can apply for a renewal of the No Objection.

Engine-type specific guidelines, engine-design, operation pattern, legislation and economic conditions all influence the lubrication in a direct or indirect way and they are all subjected to changes. As a consequence, MAN ES reserves the right to revise or withdraw the No Objection to the usage of the Lube Oil if the usage of the Lube Oil is deemed to not be applicable for all or certain engines types.

Quality assurance and monitoring of product performance are important. We expect that Sinopec has processes in order to assure that the quality of the product is acceptable and suitable for its intended use.

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2450 Copenhagen SV
Denmark

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F +45 33 85 10 30
info-cph@man-es.com
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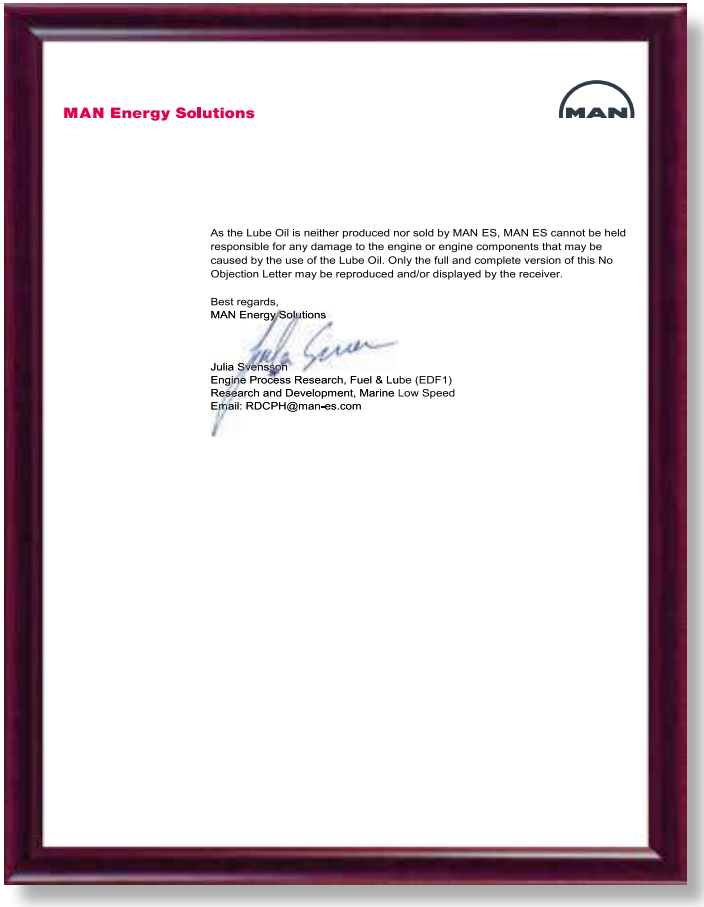
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Denmark
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2450 Copenhagen SV
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Teglholmsgade 35
2450 Copenhagen SV
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shipping-cph@man-es.com

MAN Energy Solutions
Branch of MAN Energy Solutions SE,
Germany
CVR No.: 31611792
Head office: Teglholmsgade 41
2450 Copenhagen SV
Denmark
German Reg.No.: HRB 22056
Amtsgericht Augsburg

Marine Cylinder Oil 50100



MAN Energy Solutions

As the Lube Oil is neither produced nor sold by MAN ES, MAN ES cannot be held responsible for any damage to the engine or engine components that may be caused by the use of the Lube Oil. Only the full and complete version of this No Objection Letter may be reproduced and/or displayed by the receiver.

Best regards,
MAN Energy Solutions

Julia Svensson
Engine Process Research, Fuel & Lube (EDF1)
Research and Development, Marine Low Speed
Email: RDCPH@man-es.com



Read-Across No Objection Letter

P.P. Winterthur Gas & Diesel AG, PO Box 414, CH-8401 Winterthur

SINOPEC Lubricant Co., Ltd.
Mrs. Yang Huiqing
455 Gaoyang Road
Hongkou district
Shanghai, P.C.: 200080
P.R. China

Winterthur, 2. October 2023

Read-Across No Objection Letter: Sinopec Marine Cylinder Oil 5040N (BN40, SAE 50)

The **Sinopec** cylinder oil **Cylinder Oil 5040N**, blended with **API group I base oil and bright stock thickener**, has completed a lube oil quality survey (LOQuS) test. Based upon the results of the test and a previous satisfactorily completed **4'000 hours** validation test of a lubricating oil mixed with the identical additive package, treat rate, base oil group and thickener on-board the vessel **Li Dian 7 (IMO 9729867),** fitted with a **6RT-flex48T-D** engine, Winterthur Gas & Diesel (WinGD) has no objection to the use of the mentioned lubricating oil in WinGD X, WinGD X-DF, WinGD RT-flex, WinGD RT-flex-DF, Wärtsilä RTA, Wärtsilä RT-flex and Wärtsilä X engines as well as in Sulzer 2-stroke engines operating on fuels with a sulphur content in the range of **0.00<S<1.50 % m/m**.

Sinopec assumes all responsibility for the performance of the mentioned product in service in the mentioned engine types to the exclusion of any liability of WinGD and companies belonging to the WinGD group. **Sinopec** along with other possible manufacturers and distributors of the mentioned product shall indemnify, compensate and hold harmless WinGD and companies belonging to the WinGD group from and against any claims, damages and losses caused by the mentioned product. The application must comply with WinGD's lubricating oil requirements and recommendations. Lubricants should be used as recommended in the WinGD Operation Manuals, Technical Bulletins and other guidelines issued by WinGD.

Sinopec undertakes to inform the undersigned representatives of any subsequent changes in the formulation of the mentioned product. This **Read-Across No Objection Letter is valid for a period of two years** from the date of issue and may be re-issued and extended if satisfactory field performance is proven during the two-year period.

Yours sincerely,

Roger Mäder
Senior Team Leader Tribology Fuels & Lubricants
Winterthur Gas & Diesel Ltd.

Konrad Räss
Head Customer Operation Support
Winterthur Gas & Diesel Ltd.

Winterthur Gas & Diesel Ltd.
Winterthur Gas & Diesel AG.
Winterthur Gas & Diesel S.A.

Schützenstrasse 3
PO Box 414, CH-8401
Winterthur, Switzerland

Tel. +41 (0)52 264 8844
Fax +41 (0)52 264 8866

WIN GD
Winterthur Gas & Diesel

Marine Cylinder Oil 5040N

WinGD two-stroke engines.

Sinopec Marine Cylinder Oil 5040N meets the lubrication requirements of WinGD full range of two-stroke engines.



Read-Across No Objection Letter

P.P. Winterthur Gas & Diesel AG, PO Box 414, CH-8401 Winterthur

SINOPEC Lubricant Co., Ltd.
Mrs. Yang Huiqing
455 Gaoyang Road
Hongkou district
Shanghai, P.C.: 200080
P.R. China

Winterthur, 11. December 2023

Read-Across No Objection Letter: Sinopec Marine Cylinder Oil 5070S (BN70, SAE 50)

The **Sinopec** cylinder oil **Marine Cylinder Oil 5070S,** blended with **API group I base oil** and **bright stock thickener**, has satisfactorily completed a lube oil quality survey (LOQuS) test. Based upon the results of the test and a previous satisfactorily completed **4'000 hours** validation test of a lubricating oil mixed with the identical additive package, treat rate, base oil group and thickener on-board the vessel **Nysted Maersk (IMO 9220897),** fitted with a **7RTA84C-U** engine, Winterthur Gas & Diesel (WinGD) has no objection to the use of the mentioned lubricating oil in WinGD X, WinGD X-DF, WinGD RT-flex, WinGD RT-flex-DF, Wärtsilä RTA, Wärtsilä RT-flex and Wärtsilä X engines as well as in Sulzer 2-stroke engines operating on fuels with a sulphur content in the range of **0.10<S<2.00 % m/m**.

Sinopec assumes all responsibility for the performance of the mentioned product in service in the mentioned engine types to the exclusion of any liability of WinGD and companies belonging to the WinGD group. **Sinopec** along with other possible manufacturers and distributors of the mentioned product shall indemnify, compensate and hold harmless WinGD and companies belonging to the WinGD group from and against any claims, damages and losses caused by the mentioned product. The application must comply with WinGD's lubricating oil requirements and recommendations. Lubricants should be used as recommended in the WinGD Operation Manuals, Technical Bulletins and other guidelines issued by WinGD.

Sinopec undertakes to inform the undersigned representatives of any subsequent changes in the formulation of the mentioned product. This **Read-Across No Objection Letter is valid for a period of two years** from the date of issue and may be re-issued and extended if satisfactory field performance is proven during the two-year period.

Yours sincerely,

Roger Mäder
Senior Team Leader Tribology Fuels & Lubricants
Winterthur Gas & Diesel Ltd.

Konrad Räss
Head Customer Operation Support
Winterthur Gas & Diesel Ltd.

Winterthur Gas & Diesel Ltd.
Winterthur Gas & Diesel AG.
Winterthur Gas & Diesel S.A.
Schützenstrasse 3
PO Box 414, CH-8401
Winterthur, Switzerland
Tel. +41 (0)52 264 8844
Fax +41 (0)52 264 8866

Sinopec Marine Cylinder Oil 5070S

SINOPEC

WinGD two-stroke engines

Sinopec Marine Cylinder Oil 5070S meets the lubrication requirements of WinGD full range of two-stroke engines.



Read-Across No Objection Letter

P.P. Winterthur Gas & Diesel AG, PO Box 414, CH-8401 Winterthur

SINOPEC Lubricant Co., Ltd.
Mrs. Yang Huiqing
455 Gaoyang Road
Hongkou district
Shanghai, P.C.: 200080
P.R. China

Winterthur, 11. December 2023

Read-Across No Objection Letter: Sinopec Marine Cylinder Oil 50100 (BN100, SAE 50)

The **Sinopec** cylinder oil **Marine Cylinder Oil 50100,** blended with **API group I base oil and bright stock thickener**, has satisfactorily completed a lube oil quality survey (LOQuS) test. Based upon the results of the test and a previous satisfactorily completed **4'000 hours** validation test of a lubricating oil mixed with the identical additive package, treat rate, base oil group and thickener on-board the vessel **Eugen Maersk (IMO 9321550),** fitted with a **14RT-flex96C-B** engine, Winterthur Gas & Diesel (WinGD) has no objection to the use of the mentioned lubricating oil in WinGD X, WinGD X-DF, WinGD RT-flex, WinGD RT-flex-DF, Wärtsilä RTA, Wärtsilä RT-flex and Wärtsilä X engines as well as in Sulzer 2-stroke engines operating on fuels with a sulphur content in the range of **1.50<S<3.00 % m/m**.

Sinopec assumes all responsibility for the performance of the mentioned product in service in the mentioned engine types to the exclusion of any liability of WinGD and companies belonging to the WinGD group. **Sinopec** along with other possible manufacturers and distributors of the mentioned product shall indemnify, compensate and hold harmless WinGD and companies belonging to the WinGD group from and against any claims, damages and losses caused by the mentioned product. The application must comply with WinGD's lubricating oil requirements and recommendations. Lubricants should be used as recommended in the WinGD Operation Manuals, Technical Bulletins and other guidelines issued by WinGD.

Sinopec undertakes to inform the undersigned representatives of any subsequent changes in the formulation of the mentioned product. This **Read-Across No Objection Letter is valid for a period of two years** from the date of issue and may be re-issued and extended if satisfactory field performance is proven during the two-year period.

Yours sincerely,

Roger Mäder
Senior Team Leader Tribology Fuels & Lubricants
Winterthur Gas & Diesel Ltd.

Konrad Räss
Head Customer Operation Support
Winterthur Gas & Diesel Ltd.

Winterthur Gas & Diesel Ltd.
Winterthur Gas & Diesel AG.
Winterthur Gas & Diesel S.A.

Schützenstrasse 3
PO Box 414, CH-8401
Winterthur, Switzerland

Tel. +41 (0)52 264 8844
Fax +41 (0)52 264 8866

WIN GD
Winterthur Gas & Diesel

Marine Cylinder Oil 50100

WinGD two-stroke engines

Sinopec Marine Cylinder Oil 50100 meets the lubrication requirements of WinGD full range of two-stroke engines.



Read-Across No Objection Letter

P.P. Winterthur Gas & Diesel AG, PO Box 414, CH-8401 Winterthur

SINOPEC Lubricant Co., Ltd.
Mrs. Yang Huiqing
455 Gaoyang Road
Hongkou district
Shanghai, P.C.: 200080
P.R. China

Winterthur, 7. February 2023

Read-Across No Objection Letter: Sinopec Cylinder Oil 50100N (BN100, SAE 50)

The **Sinopec** cylinder oil **Cylinder Oil 50100N**, blended with **API group I base oil and bright stock thickener**, has completed a lube oil quality survey (LOQuS) test. Based upon the results of the test and a previous satisfactorily completed **4'000 hours** validation test of a lubricating oil mixed with the identical additive package, treat rate, base oil group and thickener on-board a vessel, fitted with a **7RT-flex82T (DB 25190)** engine, Winterthur Gas & Diesel (WinGD) has no objection to the use of the mentioned lubricating oil in WinGD X, WinGD X-DF, WinGD RT-flex, WinGD RT-flex-DF, Wärtsilä RTA, Wärtsilä RT-flex and Wärtsilä X engines as well as in Sulzer 2-stroke engines operating on fuels with a sulphur content in the range of **1.50<S<3.00 % m/m**.

Sinopec assumes all responsibility for the performance of the mentioned product in service in the mentioned engine types to the exclusion of any liability of WinGD and companies belonging to the WinGD group. **Sinopec** along with other possible manufacturers and distributors of the mentioned product shall indemnify, compensate and hold harmless WinGD and companies belonging to the WinGD group from and against any claims, damages and losses caused by the mentioned product. The application must comply with WinGD's lubricating oil requirements and recommendations. Lubricants should be used as recommended in the WinGD Operation Manuals, Technical Bulletins and other guidelines issued by WinGD.

Sinopec undertakes to inform the undersigned representatives of any subsequent changes in the formulation of the mentioned product. This **Read-Across No Objection Letter is valid for a period of two years** from the date of issue and may be re-issued and extended if satisfactory field performance is proven during the two-year period.

Yours sincerely,

Roger Mäder
Senior Team Leader Tribology Fuels & Lubricants
Winterthur Gas & Diesel Ltd.

Konrad Räss
Head Customer Operation Support
Winterthur Gas & Diesel Ltd.

Winterthur Gas & Diesel Ltd.
Winterthur Gas & Diesel AG.
Winterthur Gas & Diesel S.A.

Schützenstrasse 3
PO Box 414, CH-8401
Winterthur, Switzerland

Tel. +41 (0)52 264 8844
Fax +41 (0)52 264 8866

WIN GD
Winterthur Gas & Diesel

Marine Cylinder Oil 50100N

WIN GD
Winterthur Gas & Diesel



Marine Cylinder Oil 50140N



Read-Across No Objection Letter

P.P. Winterthur Gas & Diesel AG, PO Box 414, CH-8401 Winterthur

SINOPEC Lubricant Co., Ltd.
Mrs. Yang Huiqing
455 Gaoyang Road
Hongkou district
Shanghai, P.C.: 200080
P.R. China

Winterthur, 12. April 2023

Read-Across No Objection Letter: Sinopec MARINE CYLINDER OIL 50140N (BN140, SAE 50)

The **Sinopec** cylinder oil **MARINE CYLINDER OIL 50140N**, blended with **API group I base oil and bright stock thickener**, has completed a lube oil quality survey (LOQuS) test. Based upon the results of the test and a previous satisfactorily completed **4'000 hours** validation test of a lubricating oil mixed with the identical additive package, treat rate, base oil group and thickener on-board a vessel, fitted with a **6X72 (DB 25360)** engine, Winterthur Gas & Diesel (WinGD) has no objection to the use of the mentioned lubricating oil in WinGD X, WinGD X-DF, WinGD RT-flex, WinGD RT-flex-DF, Wärtsilä RTA, Wärtsilä RT-flex and Wärtsilä X engines as well as in Sulzer 2-stroke engines operating on fuels with a sulphur content in the range of **1.50<S<3.50 % m/m**.

Sinopec assumes all responsibility for the performance of the mentioned product in service in the mentioned engine types to the exclusion of any liability of WinGD and companies belonging to the WinGD group. **Sinopec** along with other possible manufacturers and distributors of the mentioned product shall indemnify, compensate and hold harmless WinGD and companies belonging to the WinGD group from and against any claims, damages and losses caused by the mentioned product. The application must comply with WinGD's lubricating oil requirements and recommendations. Lubricants should be used as recommended in the WinGD Operation Manuals, Technical Bulletins and other guidelines issued by WinGD.

Sinopec undertakes to inform the undersigned representatives of any subsequent changes in the formulation of the mentioned product. This **Read-Across No Objection Letter is valid for a period of two years** from the date of issue and may be re-issued and extended if satisfactory field performance is proven during the two-year period.

Yours sincerely,

Roger Mäder
Senior Team Leader Tribology Fuels & Lubricants
Winterthur Gas & Diesel Ltd.

Konrad Räss
Head Customer Operation Support
Winterthur Gas & Diesel Ltd.

Winterthur Gas & Diesel Ltd.
Winterthur Gas & Diesel AG.
Winterthur Gas & Diesel S.A.

Schützenstrasse 3
PO Box 414, CH-8401
Winterthur, Switzerland

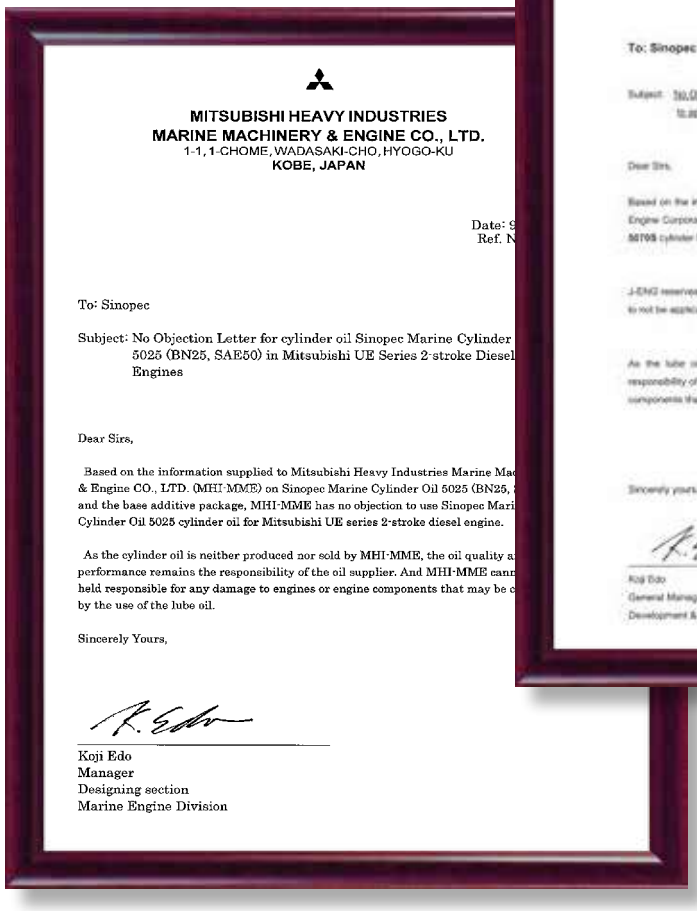
Tel. +41 (0)52 264 8844
Fax +41 (0)52 264 8866

WIN GD
Winterthur Gas & Diesel

J-ENG two-stroke engines.

Sinopec Marine Cylinder Oil 5025/5070S/50100 meets the lubrication requirements of J-ENG full range of two-stroke engines.

Marine Cylinder Oil 5025



MITSUBISHI HEAVY INDUSTRIES
MARINE MACHINERY & ENGINE CO., LTD.
1-1, 1-CHOME, WADASAKI-CHO, HYOGO-KU
KOBE, JAPAN

To: Sinopec

Subject: No Objection Letter for cylinder oil Sinopec Marine Cylinder 5025 (BN25, SAE50) in Mitsubishi UE Series 2-stroke Diesel Engines

Dear Sirs,

Based on the information supplied to Mitsubishi Heavy Industries Marine Mac & Engine CO., LTD. (MHI-MME) on Sinopec Marine Cylinder Oil 5025 (BN25, and the base additive package, MHI-MME has no objection to use Sinopec Mari Cylinder Oil 5025 cylinder oil for Mitsubishi UE series 2-stroke diesel engine.

As the cylinder oil is neither produced nor sold by MHI-MME, the oil quality a performance remains the responsibility of the oil supplier. And MHI-MME cann held responsible for any damage to engines or engine components that may be c by the use of the lube oil.

Sincerely Yours,

Koji Edo
Manager
Designing section
Marine Engine Division

Marine Cylinder Oil 5070S



J-ENG
Japan Engine Corporation

To: Sinopec

Subject: No Objection Letter for cylinder oil Sinopec Marine Cylinder Oil 5070S (BN70 to apply J-ENG UE Series 2-stroke Diesel Engines

Dear Sirs,

Based on the information of Sinopec Marine Cylinder Oil 5070S (new formulation 201 Engine Corporation (J-ENG) on 20 April 2018, J-ENG has no objection to use Sinopec 5070S cylinder lubricating oil for J-ENG UE series 2-stroke diesel engine.

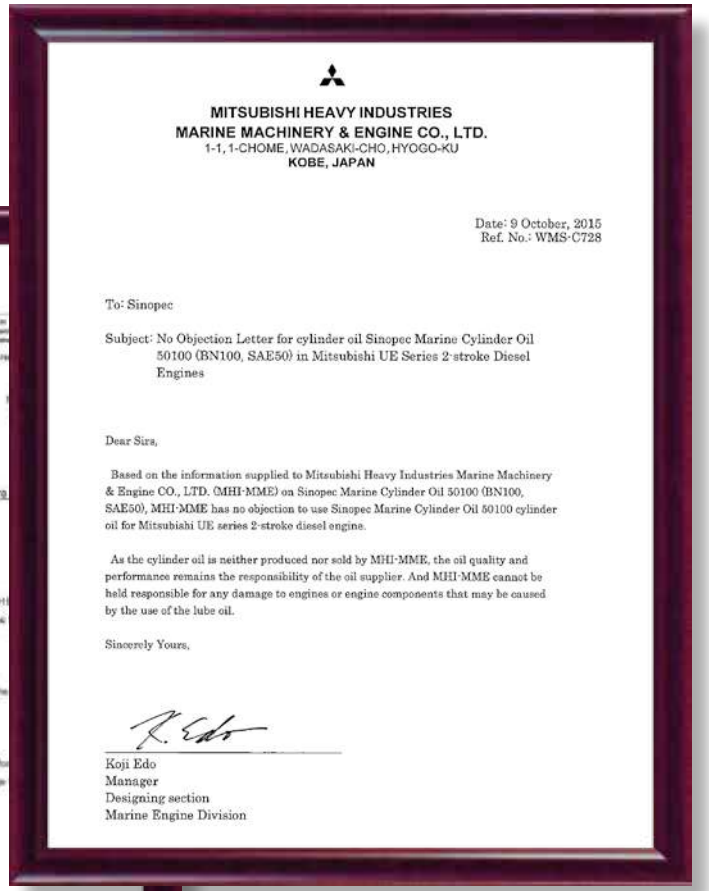
J-ENG reserves the right to revise or withdraw this No Objection Letter, if the usage of the is not be applicable for UE engine.

As the lube oil is neither produced nor sold by J-ENG, the oil quality and perfo responsibility of the oil supplier. And J-ENG cannot be held responsible for any damage components that may be caused by the use of the lube oil.

Sincerely yours,

Koji Edo
General Manager
Development & Design Department

Marine Cylinder Oil 50100



MITSUBISHI HEAVY INDUSTRIES
MARINE MACHINERY & ENGINE CO., LTD.
1-1, 1-CHOME, WADASAKI-CHO, HYOGO-KU
KOBE, JAPAN

Date: 9 October, 2015
Ref. No.: WMS-C728

To: Sinopec

Subject: No Objection Letter for cylinder oil Sinopec Marine Cylinder Oil 50100 (BN100, SAE50) in Mitsubishi UE Series 2-stroke Diesel Engines

Dear Sirs,

Based on the information supplied to Mitsubishi Heavy Industries Marine Machinery & Engine CO., LTD. (MHI-MME) on Sinopec Marine Cylinder Oil 50100 (BN100, SAE50), MHI-MME has no objection to use Sinopec Marine Cylinder Oil 50100 cylinder oil for Mitsubishi UE series 2-stroke diesel engine.

As the cylinder oil is neither produced nor sold by MHI-MME, the oil quality and performance remains the responsibility of the oil supplier. And MHI-MME cannot be held responsible for any damage to engines or engine components that may be caused by the use of the lube oil.

Sincerely Yours,

Koji Edo
Manager
Designing section
Marine Engine Division



Read-Across No Objection Letter

P.P. Winterthur Gas & Diesel AG, PO Box 414, CH-8401 Winterthur

SINOPEC Lubricant Co., Ltd.
Mrs. Yang Huiqing
455 Gaoyang Road
Hongkou district
Shanghai, P.C.: 200080
P.R. China

Winterthur, 11. December 2023

Read-Across No Objection Letter: Sinopec Marine Cylinder Oil 5070S (BN70, SAE 50)

The **Sinopec** cylinder oil **Marine Cylinder Oil 5070S,** blended with **API group I base oil** and **bright stock thickener**, has satisfactorily completed a lube oil quality survey (LOQuS) test. Based upon the results of the test and a previous satisfactorily completed **4'000 hours** validation test of a lubricating oil mixed with the identical additive package, treat rate, base oil group and thickener on-board the vessel **Nysted Maersk (IMO 9220897),** fitted with a **7RTA84C-U** engine, Winterthur Gas & Diesel (WinGD) has no objection to the use of the mentioned lubricating oil in WinGD X, WinGD X-DF, WinGD RT-flex, WinGD RT-flex-DF, Wärtsilä RTA, Wärtsilä RT-flex and Wärtsilä X engines as well as in Sulzer 2-stroke engines operating on fuels with a sulphur content in the range of **0.10<S<2.00 % m/m**.

Sinopec assumes all responsibility for the performance of the mentioned product in service in the mentioned engine types to the exclusion of any liability of WinGD and companies belonging to the WinGD group. **Sinopec** along with other possible manufacturers and distributors of the mentioned product shall indemnify, compensate and hold harmless WinGD and companies belonging to the WinGD group from and against any claims, damages and losses caused by the mentioned product. The application must comply with WinGD's lubricating oil requirements and recommendations. Lubricants should be used as recommended in the WinGD Operation Manuals, Technical Bulletins and other guidelines issued by WinGD.

Sinopec undertakes to inform the undersigned representatives of any subsequent changes in the formulation of the mentioned product. This **Read-Across No Objection Letter is valid for a period of two years** from the date of issue and may be re-issued and extended if satisfactory field performance is proven during the two-year period.

Yours sincerely,

Roger Mäder
Senior Team Leader Tribology Fuels & Lubricants
Winterthur Gas & Diesel Ltd.

Konrad Räss
Head Customer Operation Support
Winterthur Gas & Diesel Ltd.

Winterthur Gas & Diesel Ltd.
Winterthur Gas & Diesel AG.
Winterthur Gas & Diesel S.A.

Schützenstrasse 3
PO Box 414, CH-8401
Winterthur, Switzerland

Tel. +41 (0)52 264 8844
Fax +41 (0)52 264 8866

WIN GD
Winterthur Gas & Diesel

Marine Trunk Piston Engine Oil 3020/4020/3030/4030/3040/4040/3050/4050

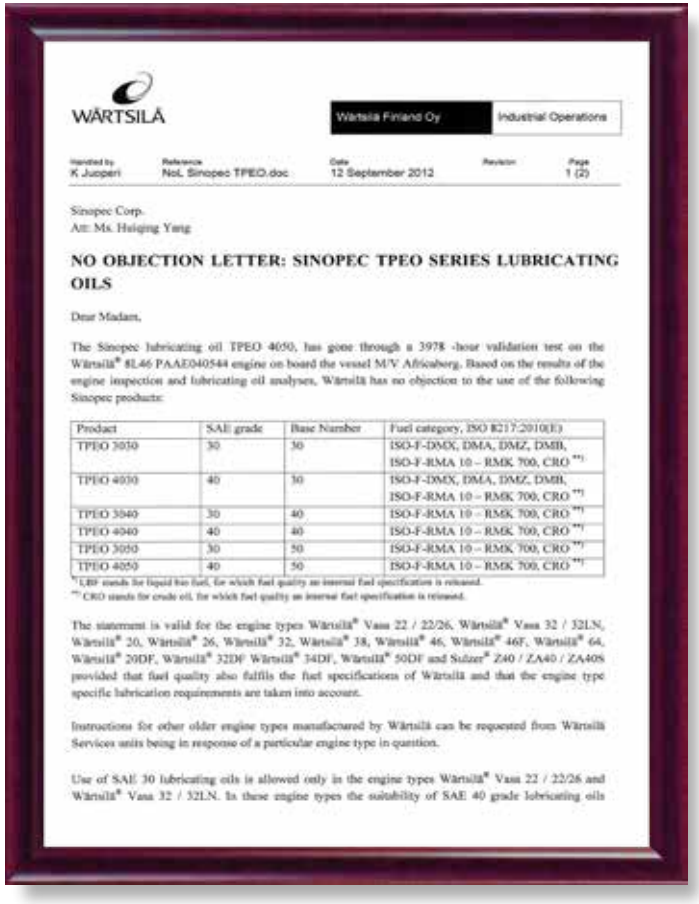
SINOPEC

MAN four stroke engines

Marine Trunk Piston Engine Oil 3020/4020/3030/4030/3040/4040/3050/4050 meet the lubrication requirements of MAN full range of four stroke engines and can be used for cylinder and crankcase lubrication of marine four stroke engines in the shipping industry.

Marine Trunk Piston Engine Oil

3030/4030/3040/4040/3050/4050



WÄRTSILÄ

Wärtsilä Finland Oy | Industrial Operations

Handled by: K Juoperi | Reference: NoL Sinopec TPEO.doc | Date: 12 September 2012 | Revision: | Page: 1 (2)

Sinopec Corp.
Att: Ms. Huiqing Yang

NO OBJECTION LETTER: SINOPEC TPEO SERIES LUBRICATING OILS

Dear Madam,

The Sinopec lubricating oil TPEO 4050, has gone through a 3978 -hour validation test on the Wärtsilä® 8L46 PAAE040544 engine on board the vessel M/V Africaberg. Based on the results of the engine inspection and lubricating oil analyses, Wärtsilä has no objection to the use of the following Sinopec products:

Product	SAE grade	Base Number	Fuel category, ISO 8217:2010(E)
TPEO 3030	30	30	ISO-F-DMX, DMA, DMZ, DMB, ISO-F-RMA 10 – RMK 700, CRO **)
TPEO 4030	40	30	ISO-F-DMX, DMA, DMZ, DMB, ISO-F-RMA 10 – RMK 700, CRO **)
TPEO 3040	30	40	ISO-F-RMA 10 – RMK 700, CRO **)
TPEO 4040	40	40	ISO-F-RMA 10 – RMK 700, CRO **)
TPEO 3050	30	50	ISO-F-RMA 10 – RMK 700, CRO **)
TPEO 4050	40	50	ISO-F-RMA 10 – RMK 700, CRO **)

* LBF stands for liquid bio fuel, for which fuel quality an internal fuel specification is released.
** CRO stands for crude oil, for which fuel quality an internal fuel specification is released.

The statement is valid for the engine types Wärtsilä® Vasa 22 / 22/26, Wärtsilä® Vasa 32 / 32LN, Wärtsilä® 20, Wärtsilä® 26, Wärtsilä® 32, Wärtsilä® 38, Wärtsilä® 46, Wärtsilä® 46F, Wärtsilä® 64, Wärtsilä® 20DF, Wärtsilä® 32DF Wärtsilä® 34DF, Wärtsilä® 50DF and Sulzer® Z40 / ZA40 / ZA40S provided that fuel quality also fulfils the fuel specifications of Wärtsilä and that the engine type specific lubrication requirements are taken into account.

Instructions for other older engine types manufactured by Wärtsilä can be requested from Wärtsilä Services units being in response of a particular engine type in question.

Use of SAE 30 lubricating oils is allowed only in the engine types Wärtsilä® Vasa 22 / 22/26 and Wärtsilä® Vasa 32 / 32LN. In these engine types the suitability of SAE 40 grade lubricating oils



WÄRTSILÄ

Wärtsilä Finland Oy | Industrial Operations

Handled by: K Juoperi | Reference: NoL Sinopec TPEO.doc | Date: 12 September 2012 | Revision: | Page: 2 (2)

depends on the capacity of the lubricating oil cooler used in the installation.

In the engine types Wärtsilä® Vasa 32, Wärtsilä® 20, Wärtsilä® 26, Wärtsilä® 32, Wärtsilä® 38, Wärtsilä® 46, Wärtsilä® 46F and Wärtsilä® 64 the use of BN 50-55 lubricants in heavy fuel installations is recommended in the first place, especially if fuel sulphur content is above 2,0 % mass. BN 40 lubricants can be used as well as if experience shows that the lubricating oil BN equilibrium remains at an acceptable level. BN 30 lubricants are recommended to be used only in special cases. Concerning the engine type Sulzer Z40 / ZA40 / ZA40S the use of BN 50-55 lubricating oils is recommended only in the engines being equipped with piston skirt lubrication and having the anti-polishing rings installed.

In the first place on distillate fuel operation BN 10 – 20 lubricating oils are recommended to be used, but the use of BN 30 lubricating oils is also allowed.

These lubricating oils will be included in Wärtsilä's list of lubricating oils having passed Wärtsilä's lubrication oil testing criteria.

Sinopec Corp. undertakes all responsibility for the performance of the lubricating oils in service of the above mentioned engine types to the exclusion of any liability of any Wärtsilä company belonging to Wärtsilä group. Sinopec Corp. along with other possible manufacturers and distributors of the products in question shall indemnify, compensate and hold harmless Wärtsilä and companies belonging to Wärtsilä group from and against any claims, damages and losses caused by the lubricating oils in question.

Sinopec Corp. undertakes to inform the undersigned / responsible representatives of Wärtsilä of any subsequent changes in the formulation of the lubricating oil brands in question.

Yours faithfully,

Wärtsilä Finland Oy
Industrial Operations / R&D

Kai Juoperi
Manager, Engine Fluids

Stefan Saario
General Manager, T & P Expertise

Wartsila Vasa 22/ 22/26, Vasa 32/ 32LN, Wartsila 20/26/32/38/46/46F/64/20DF/32 DF/34DF/50DF, Sulzer Z40/ZA40/ZA40S four stroke engines

Marine Trunk Piston Engine Oil 3030/4030/3040/4040/3050/4050meet the lubrication requirements of Wartsila four stroke engines.


DAIHATSU

1st April, 2014

LETTER OF NO OBJECTION - SINOPEC PRODUCT LINE

The Purpose of this document is to provide SINOPEC CORP. with a Letter of No Objection regarding the use of the SINOPEC product line in DAIHATSU engines.

Class II - SINOPEC TPEO 4012 (SAE 40, 12 mgKOH/g)
SINOPEC TPEO 3012 (SAE 30, 12 mgKOH/g), when ambient temp is <20°C

SINOPEC TPEO 4015 (SAE 40, 15 mgKOH/g)
SINOPEC TPEO 3015 (SAE 30, 15 mgKOH/g), when ambient temp is <20°C

Class III - SINOPEC TPEO 4020 (SAE 40, 20 mgKOH/g)
SINOPEC TPEO 3020 (SAE 30, 20 mgKOH/g), when ambient temp is <20°C

It is mutually understood that any changes in the formulation would necessitate a new Letter of No Objection to be issued following prerequisite certification steps as outlined by DAIHATSU.

It is further understood that all liability for the performance of the product and any associated cost that could result, are undertaken by SINOPEC CORP. DAIHATSU assumes no responsibility for any damage that was caused by the use of the lubricating oil.

Yours Sincerely,

Shiro Asai
Technical Department 1
Engine Design Group
DAIHATSU DIESEL MFG. CO., LTD.

Masaru Takeuchi
Manager
Technical Department 1
Engine Design Group
DAIHATSU DIESEL MFG. CO., LTD.

Marine Trunk Piston Engine Oil 3012/4012/3015/4015 /3020/4020

DAIHATSU four stroke engines

Marine Trunk Piston Engine Oil 3012/4012/3015/4015 /3020/4020/3030/4030/3040/4040 meet the lubrication requirements of DAIHATSU four stroke engines.


DAIHATSU

Mr. Yang Hui Qing
Department Chief
Engine Oil Department
SINOPEC CORP.
No.455 Gaoyang Road,
Hongkou District,
Shanghai P.R.China

21st September, 2012

LETTER OF NO OBJECTION - SINOPEC PRODUCT LINE

The Purpose of this document is to provide SINOPEC CORP. with a Letter of No Objection regarding the use of the SINOPEC product line in DAIHATSU engines.

Class III - SINOPEC TPEO 4030 (SAE 40, 30 mgKOH/g)
SINOPEC TPEO 3030 (SAE 30, 30 mgKOH/g), when ambient temp is <20°C

Class IV - SINOPEC TPEO 4030 (SAE 40, 30 mgKOH/g)
SINOPEC TPEO 3030 (SAE 30, 30 mgKOH/g), when ambient temp is <20°C

Class V - SINOPEC TPEO 4030 (SAE 40, 30 mgKOH/g)
SINOPEC TPEO 4040 (SAE 40, 40 mgKOH/g)
SINOPEC TPEO 3030 (SAE 30, 30 mgKOH/g), when ambient temp is <20°C
SINOPEC TPEO 3040 (SAE 30, 40 mgKOH/g), when ambient temp is <20°C

It is mutually understood that any changes in the formulation would necessitate a new Letter of No Objection to be issued following prerequisite certification steps as outlined by DAIHATSU.

It is further understood that all liability for the performance of the product and any associated cost that could result, are undertaken by SINOPEC CORP. DAIHATSU assumes no responsibility for any damage that was caused by the use of the lubricating oil.

Yours Sincerely,

Kohei Shoji
Engine Design Section
Technical Department
DAIHATSU DIESEL MFG. CO., LTD.

Masaru Takeuchi
Manager of Engine Design Section
Technical Department
DAIHATSU DIESEL MFG. CO., LTD.

Marine Trunk Piston Engine Oil 3030/4030/3040/4040

YANMAR four stroke engines

Marine Trunk Piston Engine Oil 3012/4012/3015/4015/3030/4030/3040/4040 meet the lubrication requirements of YANMAR four stroke engines.

Marine Trunk Piston Engine Oil 3012/4012/3015/4015



YANMAR

27th Feb, 2014

Master Hou Zhong Miao
Engin Oil Department
Deputy Department Chief
Senior Engineer
Shanghai Reserch &
Department Center
Lubricant Company
SINOPEC Corp.

Letter of No Objection – SINOPEC

The purpose of this document is to provide SINOPEC with a Letter of No Objection regarding the use of the SINOPEC grade range in Yanmar engines.

Fuel Oil Spec. Division	M.D.O/M.G.O
Sulfur content (mass %)	1.5 or less
SINOPEC	#30:SINOPEC TPEO 3012 SINOPEC TPEO 3015 #40:SINOPEC TPEO 4012 SINOPEC TPEO 4015

Only the Yanmar Amagasaki Plant production organization applies.

It is mutually understood that any changes in the formulation would necessitate a new Letter of No Objection to be issued following prerequisite certification steps as outlined by Yanmar.

It is further understood that all liability for the performance of the product and any associated costs that could result, are undertaken by SINOPEC. Yanmar assumes no responsibility for any damage that was caused by the use of the lubricating oil.

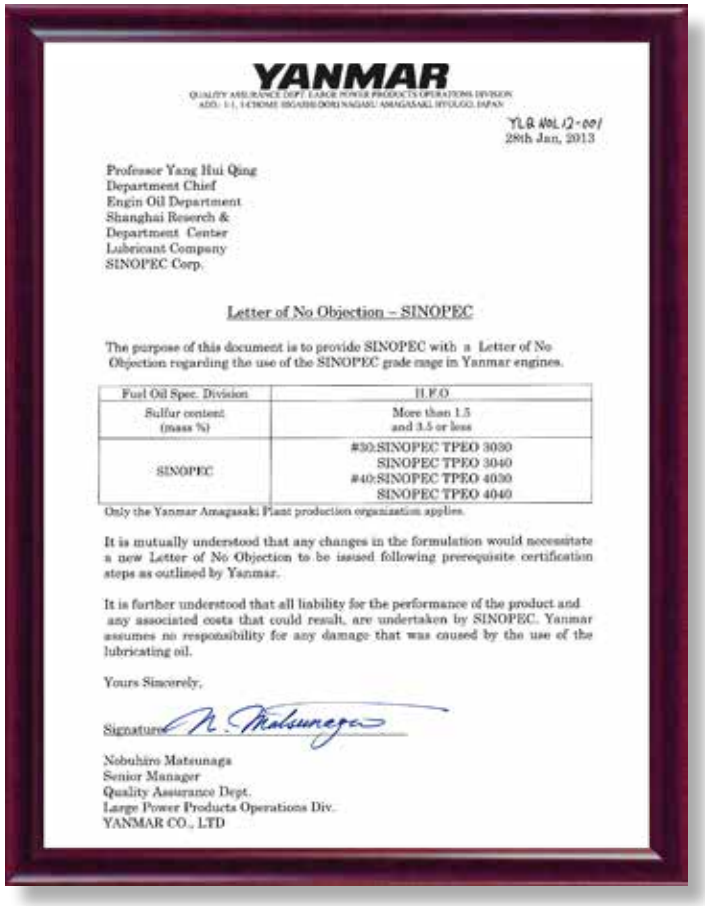
Yours Sincerely,

Signature

Nobuhiro Matsunaga
Senior Manager
Quality Assurance Dept.
Large Power Products Operations Div.
YANMAR CO., LTD

YANMAR CO., LTD.

Marine Trunk Piston Engine Oil 3030/4030/3040/4040



YANMAR

QUALITY ASSURANCE DEPT. LARGE POWER PRODUCTS OPERATIONS DIVISION
ADD: 1-1, 1-CHOME HIGASHI-DORI NAGASU AMAGASAKI HYOGO, JAPAN

YLQ #0L12-001
28th Jan, 2013

Professor Yang Hui Qing
Department Chief
Engin Oil Department
Shanghai Reserch &
Department Center
Lubricant Company
SINOPEC Corp.

Letter of No Objection – SINOPEC

The purpose of this document is to provide SINOPEC with a Letter of No Objection regarding the use of the SINOPEC grade range in Yanmar engines.

Fuel Oil Spec. Division	H.F.O
Sulfur content (mass %)	More than 1.5 and 3.5 or less
SINOPEC	#30:SINOPEC TPEO 3030 SINOPEC TPEO 3040 #40:SINOPEC TPEO 4030 SINOPEC TPEO 4040

Only the Yanmar Amagasaki Plant production organization applies.

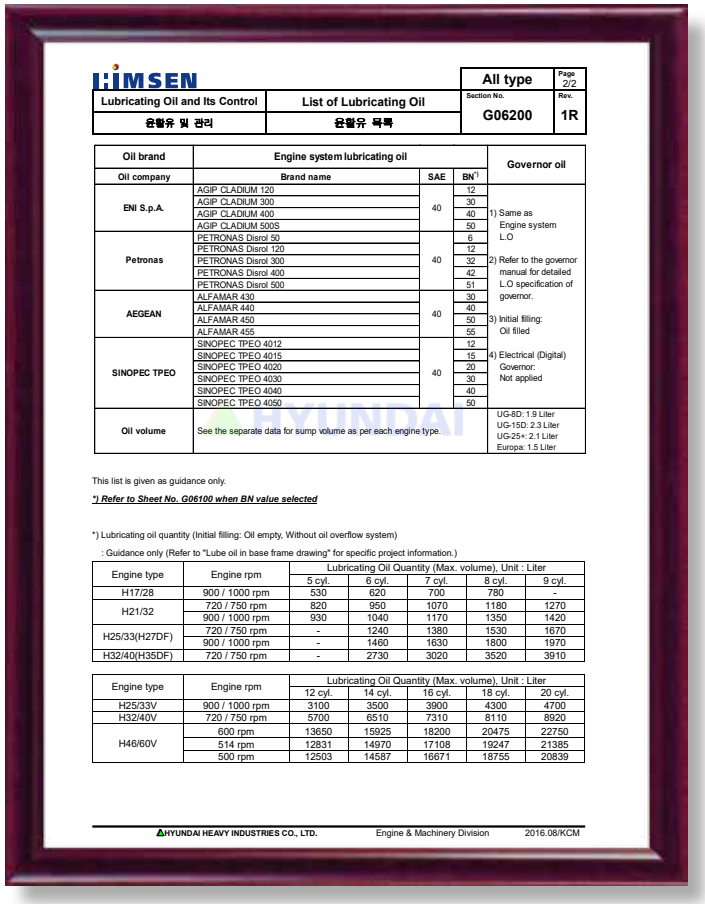
It is mutually understood that any changes in the formulation would necessitate a new Letter of No Objection to be issued following prerequisite certification steps as outlined by Yanmar.

It is further understood that all liability for the performance of the product and any associated costs that could result, are undertaken by SINOPEC. Yanmar assumes no responsibility for any damage that was caused by the use of the lubricating oil.

Yours Sincerely,

Signature

Nobuhiro Matsunaga
Senior Manager
Quality Assurance Dept.
Large Power Products Operations Div.
YANMAR CO., LTD



HIMSEN

Lubricating Oil and Its Control	List of Lubricating Oil	All type	Page 2/2
윤활유 및 관리	윤활유 목록	Section No. G06200	Rev. 1R

Oil brand	Engine system lubricating oil			Governor oil
Oil company	Brand name	SAE	BN*1	
ENI S.p.A.	AGIP CLADIUM 120	40	12	1) Same as Engine system L.O 2) Refer to the governor manual for detailed L.O specification of governor. 3) Initial filling: Oil filled 4) Electrical (Digital) Governor: Not applied
	AGIP CLADIUM 300		30	
	AGIP CLADIUM 400		40	
	AGIP CLADIUM 500S		50	
Petronas	PETRONAS Disrol 50	40	6	
	PETRONAS Disrol 120		12	
	PETRONAS Disrol 300		32	
	PETRONAS Disrol 400		42	
	PETRONAS Disrol 500		51	
AEGEAN	ALFAMAR 430	40	30	
	ALFAMAR 440		40	
	ALFAMAR 450		50	
	ALFAMAR 455		55	
SINOPEC TPEO	SINOPEC TPEO 4012	40	12	
	SINOPEC TPEO 4015		15	
	SINOPEC TPEO 4020		20	
	SINOPEC TPEO 4030		30	
	SINOPEC TPEO 4040		40	
	SINOPEC TPEO 4050		50	
Oil volume	See the separate data for sump volume as per each engine type.			UG-8D: 1.9 Liter UG-15D: 2.3 Liter UG-25+: 2.1 Liter Europa: 1.5 Liter

This list is given as guidance only.

**) Refer to Sheet No. G06100 when BN value selected*

*) Lubricating oil quantity (Initial filling: Oil empty, Without oil overflow system)

: Guidance only (Refer to "Lube oil in base frame drawing" for specific project information.)

Engine type	Engine rpm	Lubricating Oil Quantity (Max. volume), Unit : Liter				
		5 cyl.	6 cyl.	7 cyl.	8 cyl.	9 cyl.
H17/28	900 / 1000 rpm	530	620	700	780	-
H21/32	720 / 750 rpm	820	950	1070	1180	1270
	900 / 1000 rpm	930	1040	1170	1350	1420
H25/33(H27DF)	720 / 750 rpm	-	1240	1380	1530	1670
	900 / 1000 rpm	-	1460	1630	1800	1970
H32/40(H35DF)	720 / 750 rpm	-	2730	3020	3520	3910

Engine type	Engine rpm	Lubricating Oil Quantity (Max. volume), Unit : Liter				
		12 cyl.	14 cyl.	16 cyl.	18 cyl.	20 cyl.
H25/33V	900 / 1000 rpm	3100	3500	3900	4300	4700
H32/40V	720 / 750 rpm	5700	6510	7310	8110	8920
H46/60V	600 rpm	13650	15925	18200	20475	22750
	514 rpm	12831	14970	17108	19247	21385
	500 rpm	12503	14587	16671	18755	20839

HYUNDAI HEAVY INDUSTRIES CO., LTD. Engine & Machinery Division 2016.08/KCM

Marine Trunk Piston Engine Oil
4012/4015/4020/4030/4040/4050

HIMSEN four stroke engines

Marine Trunk Piston Engine Oil 4012/4015/4020/4030/4040/4050 meet the lubrication requirements of HIMSEN full range of four stroke engines.

SINOPEC

Cat-Mak four stroke engines

Marine Trunk Piston Engine Oil 4012/4020/4030/4040 meet the lubrication requirements of Cat-Mak full range of four stroke engines.

Marine Trunk Piston Engine Oil 4012/4020/4030/4040



CATERPILLAR®

Caterpillar Motoren GmbH & Co. KG

Copies to:

Shanghai R&D Center, Lubricant Company, Sinopec Corp.
Mrs. Huiqing Yang
453 Gaoyang Road
Hongkou District,
Shanghai
China
P.C. 200080

Your Reference
Meeting Oct2012

Our Reference
ltts

Telephone 24157 Kiel
Direct dialling 31.1.13
+49 (0) 431 3995-3793
Fax 3995-5793 or 3995-
E-mail Rautenstrauch_malke@CAT.com

Dear Mrs. Huiqing Yang

This is to confirm that the lubricating oil SINOPEC TPEO 4012 and TPEO 4020 are free for use in CAT MaK engines working on destillate fuel and SINOPEC TPEO 4030 and TPEO 4040 are free for use in CAT MaK engines working on HFO-fuel.

Best regards,

Caterpillar Motoren GmbH & Co. KG

Shipping

Marine Trunk Piston Engine Oil 4040



KEMEL

21st Nov. 2014

Seal Compatibility Test

The material compatibility of KEMEL regular fluoro-elastomer with a new lubricants was evaluated

1. Tested Lubricant
   Name SINOPEC CORP. TPEO 4040

2. Test Result
   Immersion Test : Passed

3. Conclusion
   The following lubricants are acceptable.
   - TPEO 4040

Iwao Matsuoka
Manager, Technical Department

Kenichi Saito
Engineer, Technical Department



KEMEL

21st Nov. 2014

Seal Compatibility Test

The material compatibility of KEMEL regular fluoro-elastomer with a new lubricants was evaluated

1. Tested Lubricant
   Name SINOPEC CORP. TPEO 4030

2. Test Result
   Immersion Test : Passed

3. Conclusion
   The following lubricants are acceptable.
   - TPEO 4030

Iwao Matsuoka
Manager, Technical Department

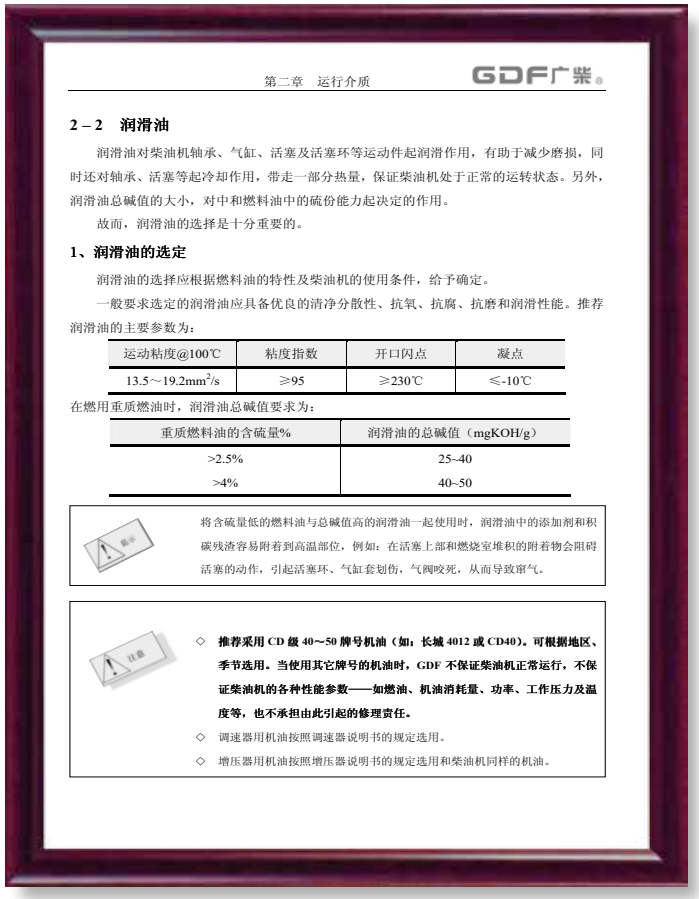
Kenichi Saito
Engineer, Technical Department

KEMEL KEMEL COMPANY
EAGLE INDUSTRY CO.,LTD.

Marine Trunk Piston Engine Oil 4030

KEMEL stern shaft

Marine Trunk Piston Engine Oil 4030/4040 meets KEMEL full range of stern shaft lubrication requirements and can be applied to the lubrication of ship stern shaft devices in the shipping industry.



第二章　运行介质　GDF广柴

2－2　润滑油

润滑油对柴油机轴承、气缸、活塞及活塞环等运动件起润滑作用，有助于减少磨损，同时还对轴承、活塞等起冷却作用，带走一部分热量，保证柴油机处于正常的运转状态。另外，润滑油总碱值的大小，对中和燃料油中的硫份能力起决定的作用。

故而，润滑油的选择是十分重要的。

1、润滑油的选定

润滑油的选择应根据燃料油的特性及柴油机的使用条件，给予确定。

一般要求选定的润滑油应具备优良的清净分散性、抗氧、抗腐、抗磨和润滑性能。推荐润滑油的主要参数为：

运动粘度@100℃	粘度指数	开口闪点	凝点
13.5～19.2mm²/s	≥95	≥230℃	≤-10℃

在燃用重质燃油时，润滑油总碱值要求为：

重质燃料油的含硫量%	润滑油的总碱值（mgKOH/g）
>2.5%	25~40
>4%	40~50

将含硫量低的燃料油与总碱值高的润滑油一起使用时，润滑油中的添加剂和积碳残渣容易附着到高温部位，例如：在活塞上部和燃烧室堆积的附着物会阻碍活塞的动作，引起活塞环、气缸套划伤，气阀咬死，从而导致窜气。

- **推荐采用 CD 级 40～50 牌号机油（如：长城 4012 或 CD40）。可根据地区、季节选用。当使用其它牌号的机油时，GDF 不保证柴油机正常运行，不保证柴油机的各种性能参数——如燃油、机油消耗量、功率、工作压力及温度等，也不承担由此引起的修理责任。**
- 调速器用机油按照调速器说明书的规定选用。
- 增压器用机油按照增压器说明书的规定选用和柴油机同样的机油。

Guangzhou diesel engine factory Co.,Ltd (GDF) G26 series diesel engine-Marine Trunk Piston Engine Oil 4012.

GDF G26/230/320 series four stroke engines

Marine Trunk Piston Engine Oil 4012/4030 meets GDF four stroke engines lubrication requirements.

SINOPEC

GDF 230 series diesel engine-Marine Trunk Piston Engine Oil 4030



GDF广柴。230 柴油机燃用重油须知

b) 非常好的热稳定性，

c) 在一定的温度范围内，有良好的清净、分散功能，

d) 良好的抗水解功能和除水性能。

下列规格的润滑油可满足 230 柴油机燃用 180cSt/50℃重油

厂　家		SINOPEC（长城）	壳牌 ELF	壳牌 SHELL	美　孚
牌　号		船用中速机油 4030	AURELIA 4030	ARGINA T40	特种 430
*SAE 等级		40	40	40	40
15℃时密度	kg/m³	910.4	920	916	910
40℃时运动粘度	mm²/s	142.9	140	139	143
100℃时运动粘度	mm²/s	14.7	14	14.4	13.5～15.3
开杯闪点	℃	256	230	252	256
倾点	℃	-18	-15	-18	-9
*总碱值(T.B.N)mgKOH/g		32.5	30	30	30

注意：上表中加“*”号为必须保证的数值项。

当已选定某个厂家的润滑油时，应向供油商提出定期取样化验等技术服务的要求。

当选用其它厂家的润滑油时，其总碱值（T.B.N）和碱值持续能力必须达到表中以及 2.1 条款中综合性能的保证值的要求。否则，因使用不良的润滑油而导致不善而引起的气缸套、活塞环、气阀等零件的异常磨损，本厂不承担责任。

2.2 润滑油的更换

润滑油更换周期取决于润滑油的质量，也受柴油机润滑系统油量、运行条件、润滑油消耗、润滑油管理以及柴油机维护情况的影响。应定期对润滑油作化验以决定是否需要更换。下表给出 30/40 润滑油每个指标规定的最大或最小警告值：

水分	%	>0.3
氧化物试验		正
粘度	40℃	+30%
粘度	100℃	1 级 SAE
闪点	℃	<100
总碱值	（T.B.N）	<15
不溶物	%	>2

3-2

GDF 320 series diesel engine-Marine Trunk Piston Engine Oil 4030



GDF广柴 320 柴油机燃用重油须知

下列规格的润滑油可满足 320 柴油机燃用 180cSt/50℃重油

厂家		长城 SINOPEC	埃尔夫 ELF	壳牌 SHELL	美孚
规格		船用中速机油 4030	AURELIA 4030	ARGINA T40	非特 430
*SAE 等级		40	40	40	40
15℃时密度	kg/m³	910.4	920	916	910
40℃时运动粘度	mm²/s	142.9	140	139	143
100℃时运动粘度	mm²/s	14.7	14	14.4	13.5～15.3
开杯闪点	℃	256	230	252	256
倾点	℃	-18	-15	-18	-9
*总碱值(T.B.N)	mgKOH/g	32.5	30	30	30

注意：上表中加“*”号为必须保证的数值项。

当已选定某个厂家的润滑油时，应向供油商提出定期取样化验等技术服务的要求。

当选用其它厂家的润滑油时，其总碱值（T.B.N）和碱值持续能力必须达到表中以及 2.1 条款中综合性能的保证值的要求。否则，因使用不当的润滑油或管理不善而引起的气缸套、活塞环、气阀等零件的异常磨损，本厂不承担责任。

2.2 润滑油的更换

润滑油更换周期取决于润滑油的质量，也受柴油机润滑系统油量、运行条件、润滑油消耗、润滑油管理以及柴油机维护情况的影响。应定期对润滑油作化验以决定是否需要更换。下表给出 30/40 润滑油每个指标规定的最大或最小警告值：

水分	%	>0.3
氧化物试验		正
粘度	40℃	+30%
粘度	100℃	1 级 SAE
闪点	℃	<100
总碱值	（T.B.N）	<15
不溶物	%	>2

润滑油总碱值<15 时，必须添加新油提高总碱值，否则会对气缸套、活塞环等零件造成严重腐蚀磨损。

更换润滑油的品种时，失效油必须排除干净，不要混用，循环油路应仔细清洗，禁止使用棉纱和布条进行清洗。机座中沉积的油泥应予清除。注入机座的润滑油必须经过细网过滤。



GDF广柴 G32 柴油机燃用重油须知 G32.000XZ 共 23 页 第 4 页

下列规格的润滑油可满足 G32 柴油机燃用 180cSt/50℃、380cSt/50℃重油

厂家	SINOPEC（长城）			
规格	船用中速机油 4030			
*SAE 等级	40			
15℃时密度 kg/m³	910.4			
40℃时运动粘度 mm²/s	142.9			
100℃时运动粘度 mm²/s	14.7			
开杯闪点 ℃	256			
倾点 ℃	-18			
*总碱值(T.B.N) mgKOH/g	32.5			

注意：上表中加“*”号为必须保证的数值项。

当已选定某个厂家的润滑油时，应向供油商提出定期取样化验等技术服务的要求。

当选用其它厂家的润滑油时，其总碱值（T.B.N）和碱值持续能力必须达到表中以及 2.1 条款中综合性能的保证值的要求。否则，因使用不当的润滑油或管理不善而引起的气缸套、活塞环、气阀等零件的异常磨损，本厂不承担责任。

2.2 润滑油的更换

润滑油更换周期取决于润滑油的质量，也受柴油机润滑系统油量、运行条件、润滑油消耗、润滑油管理以及柴油机维护情况的影响。应定期对润滑油作化验以决定是否需要更换。下表给出润滑油每个指标规定的最大或最小警告值：

水分	%	>0.3
氧化物试验		正
粘度	40℃	+30%
粘度	100℃	1 级 SAE
闪点	℃	<100
总碱值	（T.B.N）	<15
不溶物	%	>2

润滑油总碱值<15 时，必须添加新油提高总碱值，否则会对活塞环、气缸套等零件造成严重腐蚀磨损。

更换润滑油的品种时，失效油必须排除干净，不要混用，循环油路应仔细清洗，禁止使用棉纱和布条进行清洗。机座中沉积的油泥应予清除。注入机座的润滑油必须

Trunk Piston Engine Oil 4030



CS21 使用维护手册		
燃料油、润滑油、冷却水 共 3 页 （第 1 页）	润滑油	文档编号：200.02 版本：01

润滑油对柴油机轴承、气缸、活塞及活塞环等运动件起润滑作用，有助于减少磨损，同时还对轴承、活塞等起冷却作用，带走一部分热量，保证柴油机处于正常的运转状态。另外，润滑油总碱值的大小，对中和燃料油中的硫化物起决定的作用。因此，应综合考虑抗磨特性、承载能力、抗氧化性、中和能力及总碱值等各项指标进行选择润滑油。

1. 润滑油的选定

润滑油的选择应根据燃料油的特性及柴油机的使用条件给予确定。

一般要求选定的润滑油应具备优良的清净分散性、抗氧、抗腐、抗磨和润滑性能。推荐润滑油的主要技术参数为：

黏度等级	运动粘度@100℃	粘度指数	开口闪点	倾点
SAE40	12.5～16.3mm^2/s	≥95	≥225℃	≤ -9℃

润滑油总碱值要求为：

燃油规格	含硫量	润滑油总碱值要求（mgKOH/g）	推荐滑油牌号
（GB 252-2011）船用柴油 -10# 轻柴油，0#轻柴油	≤0.035%	10~15	长城船用中速机油 4012； 昆仑 DCB4015
GB/T17411-2012(ISO-8217-2010) 船用馏分燃料油 DMZ 、DMA	≤1.5%	15~20	
GB/T17411-2012(ISO-8217-2010) 船用馏分燃料油 DMB	≤2.0%	15-30	
GB/T17411-2012(ISO-8217-2010)	≤3.5%	30~55	
船用残渣燃料油 RMA10、RMB30、RMD80、RME180、REG180			

Trunk Piston Engine Oil 4012

SMDERI CS 21 four stroke engines

GDF G26/230/320 series four stroke engines.

SINOPEC

CSSC 390 four stroke engines

GDF G26/230/320 series four stroke engines.

Trunk Piston Engine Oil 4012



中船动力研究院有限公司

长城中速机油船舶试验记录报告

200小时零部件检查情况的说明汇总：

试验结束后对A1、B1缸进行拆检，检查活塞头表面无异常，并对其表面进行清除积碳，凸轮箱内部检查凸轮运转气及燃油凸轮表面光滑，无拉毛擦伤现象，检查随动臂滚轮及燃油泵滚轮表面完好，无裂纹、拉毛、点蚀现象，随动轴倒角处无裂纹。

曲柄箱内部清洁检查无异常，清除所有曲柄箱油迹，缸盖检查，各排气阀工作面与气阀座贴合状态良好，气缸套内部明磨纹清晰，无异常杂质和较深的窜气拉痕。

齿轮箱内部检查无异常，齿轮表面完好无磕碰，缺口。

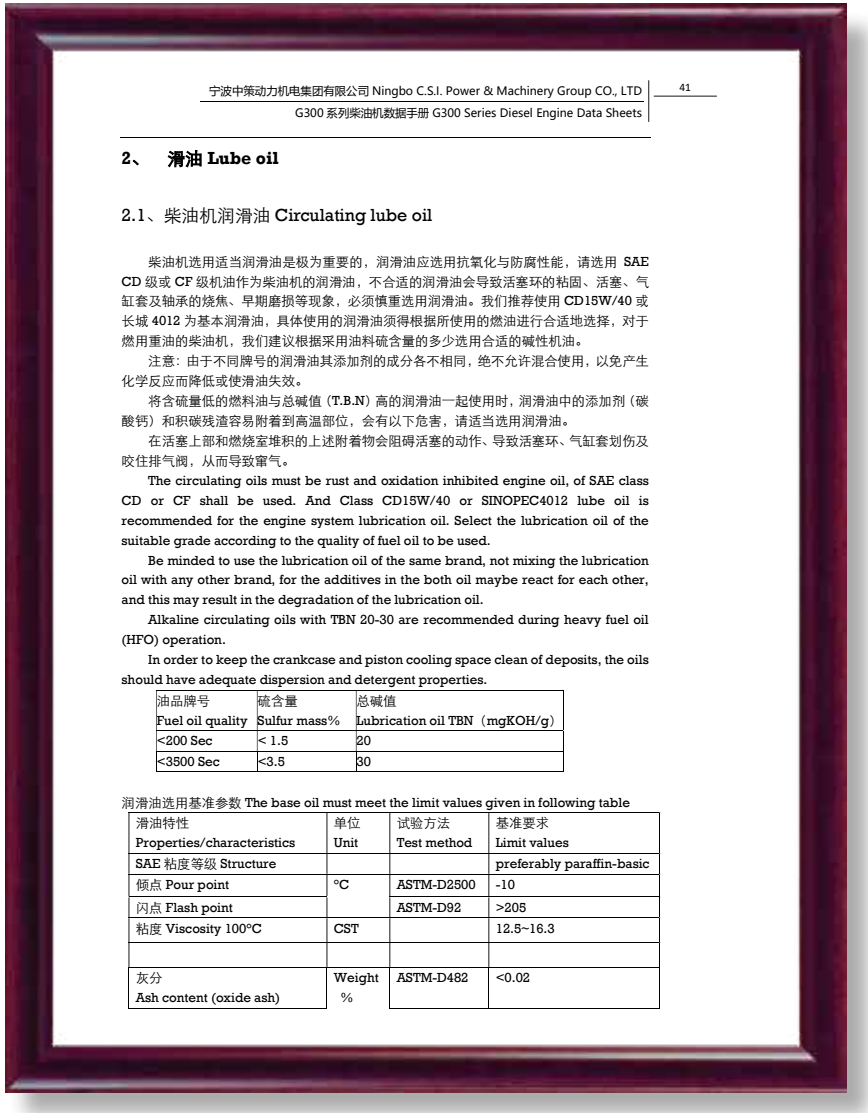
400小时零部件检查情况的说明汇总：

试验结束后对A1、B1缸进行拆检，检查活塞头表面无异常，活塞裙垂痕存在上下细线，部分位置镀层薄，露出底层金属光泽，部分位置存在上下棱线，有手感，活塞环搭口无异常缺损，表面无异常刮痕，活塞槽内部与活塞销接触面有细线，轻微手感，与连杆小端接触位置存在摩擦光面，且边角位置存在轻微磨损，小端衬套两侧有受力磨损痕迹，活塞销表面有细纹无手感，结合台用油监控结果分析，在前，后200小时的发动机试验中均出现黏度偏低的现象，滑油黏度降低将导致摩擦副表面油膜强度不够，经400小时的运行，从而导致了轻微的磨损。

凸轮箱内部检查发现凸轮边，排气及燃油凸轮表面光滑，无拉毛擦伤现象，检查随动臂滚轮及燃油泵滚轮表面完好，无裂纹、拉毛、点蚀现象，随动轴倒角处无裂纹。曲柄箱内部清洁检查无异常，清除所有曲柄箱油迹，缸盖检查，杆固积碳少量堆积，各排气阀工作面与气阀座贴合状态良好，气缸套内壁轻微泛黄，用磨线清晰，无异常杂质和较深的窜气拉痕，摇臂检查无异常，轴承无异常磨损，齿轮箱内部检查无异常，齿轮表面完好无磕碰，缺口。

结论：

经前，后200小时的发动机试验，长城市售中速机油4012和[illegible]4012在性能上基本相当，体现出良好的清净性、分散性，抗氧性等[illegible]长城市售中速机油4012和长城新一代中速机油4012对发动机起[illegible]作用。



2、 滑油 Lube oil

2.1、柴油机润滑油 Circulating lube oil

柴油机选用适当润滑油是极为重要的，润滑油应选用抗氧化与防腐性能，请选用 SAE CD 级或 CF 级机油作为柴油机的润滑油，不合适的润滑油会导致活塞环的粘固、活塞、气缸套及轴承的烧焦、早期磨损等现象，必须慎重选用润滑油。我们推荐使用 CD15W/40 或长城 4012 为基本润滑油，具体使用的润滑油须得根据所使用的燃油进行合适地选择，对于燃用重油的柴油机，我们建议根据采用油料硫含量的多少选用合适的碱性机油。

注意：由于不同牌号的润滑油其添加剂的成分各不相同，绝不允许混合使用，以免产生化学反应而降低或使滑油失效。

将含硫量低的燃料油与总碱值（T.B.N）高的润滑油一起使用时，润滑油中的添加剂（碳酸钙）和积碳残渣容易附着到高温部位，会有以下危害，请适当选用润滑油。

在活塞上部和燃烧室堆积的上述附着物会阻碍活塞的动作、导致活塞环、气缸套划伤及咬住排气阀，从而导致窜气。

The circulating oils must be rust and oxidation inhibited engine oil, of SAE class CD or CF shall be used. And Class CD15W/40 or SINOPEC4012 lube oil is recommended for the engine system lubrication oil. Select the lubrication oil of the suitable grade according to the quality of fuel oil to be used.

Be minded to use the lubrication oil of the same brand, not mixing the lubrication oil with any other brand, for the additives in the both oil maybe react for each other, and this may result in the degradation of the lubrication oil.

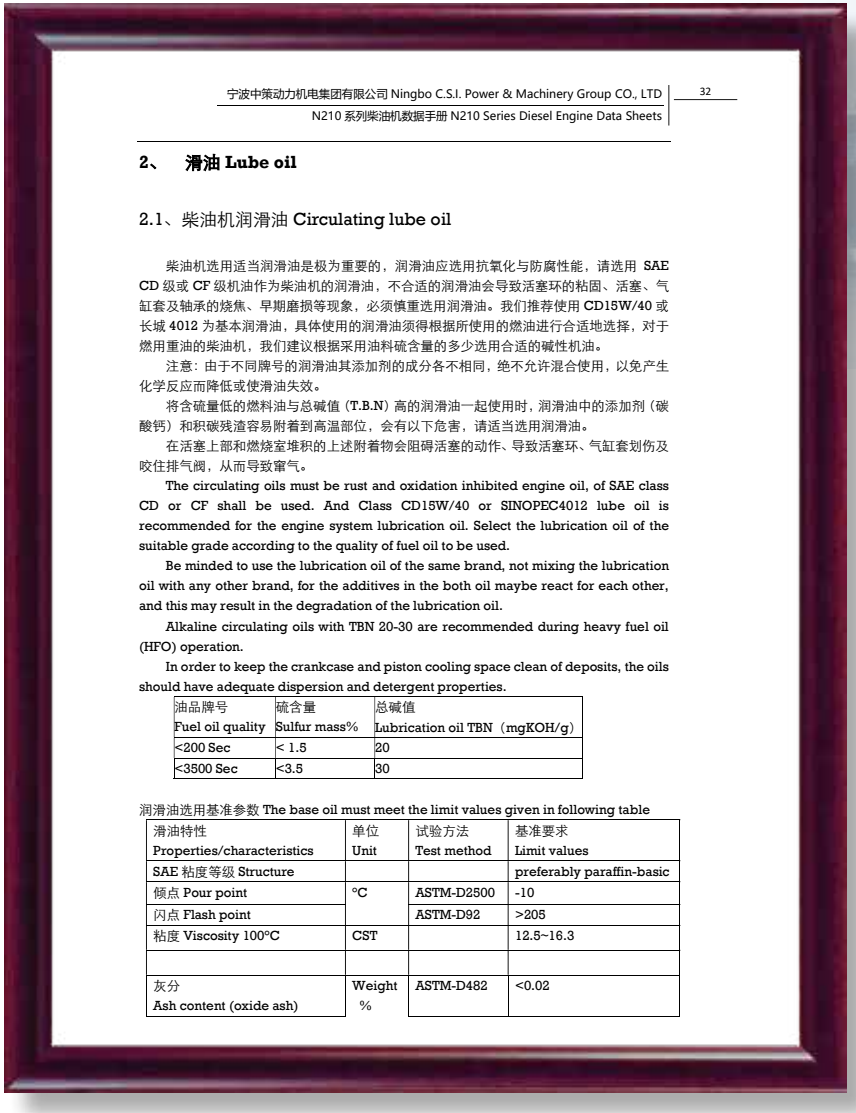
Alkaline circulating oils with TBN 20-30 are recommended during heavy fuel oil (HFO) operation.

In order to keep the crankcase and piston cooling space clean of deposits, the oils should have adequate dispersion and detergent properties.

油品牌号 Fuel oil quality	硫含量 Sulfur mass%	总碱值 Lubrication oil TBN（mgKOH/g）
<200 Sec	< 1.5	20
<3500 Sec	<3.5	30

润滑油选用基准参数 The base oil must meet the limit values given in following table

滑油特性 Properties/characteristics	单位 Unit	试验方法 Test method	基准要求 Limit values
SAE 粘度等级 Structure			preferably paraffin-basic
倾点 Pour point	°C	ASTM-D2500	-10
闪点 Flash point		ASTM-D92	>205
粘度 Viscosity 100°C	CST		12.5~16.3
灰分 Ash content (oxide ash)	Weight %	ASTM-D482	<0.02



2、 滑油 Lube oil

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柴油机选用适当润滑油是极为重要的，润滑油应选用抗氧化与防腐性能，请选用 SAE CD 级或 CF 级机油作为柴油机的润滑油，不合适的润滑油会导致活塞环的粘固、活塞、气缸套及轴承的烧焦、早期磨损等现象，必须慎重选用润滑油。我们推荐使用 CD15W/40 或长城 4012 为基本润滑油，具体使用的润滑油须得根据所使用的燃油进行合适地选择，对于燃用重油的柴油机，我们建议根据采用油料硫含量的多少选用合适的碱性机油。

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将含硫量低的燃料油与总碱值（T.B.N）高的润滑油一起使用时，润滑油中的添加剂（碳酸钙）和积碳残渣容易附着到高温部位，会有以下危害，请适当选用润滑油。

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Alkaline circulating oils with TBN 20-30 are recommended during heavy fuel oil (HFO) operation.

In order to keep the crankcase and piston cooling space clean of deposits, the oils should have adequate dispersion and detergent properties.

油品牌号 Fuel oil quality	硫含量 Sulfur mass%	总碱值 Lubrication oil TBN（mgKOH/g）
<200 Sec	< 1.5	20
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滑油特性 Properties/characteristics	单位 Unit	试验方法 Test method	基准要求 Limit values
SAE 粘度等级 Structure			preferably paraffin-basic
倾点 Pour point	°C	ASTM-D2500	-10
闪点 Flash point		ASTM-D92	>205
粘度 Viscosity 100°C	CST		12.5~16.3
灰分 Ash content (oxide ash)	Weight %	ASTM-D482	<0.02

Ningbo C.S.I. Power & Machinery Group Co., Ltd.

N210-Trunk Piston Engine Oil 4012

5





METALLURGY

SINOPEC

Metallurgy

Sinopec Lubricant Co., Ltd. has established long-term cooperation with metallurgical equipment manufacturers. Currently, 72 metallurgical lubricants are included in the Danieli Equipment Lubrication Manual, and 30 products have obtained technical certifications such as SMS group and CFHI from leading metallurgical equipment manufacturing enterprises, promoting the standardized application of metallurgical lubricants and improving the lubrication level of metallurgical equipment.

32 types of Sinopec lubricating grease including MEP, MCT-A, MCR-A, etc

Complex EP, CMA-K, GRK-F Grease meet the requirements of SMS GP0G-20 and GP00G-20 and can be applied to non-closed gear.

MEP, THT-A, and Super Grease meet the requirements of SMS KP2K-20 and can be applied to extreme pressure anti-wear and water-resistant lubrication.

BLC-C, MCC-P, MCT-A, MCL-P Grease meet the requirements of SMS K2N-30, can be applied to high-temperature lubrication.

GRK-C, BLR-D, WPG-A, MCR-B Grease meet the requirements of SMS Paste and can be applied to extreme pressure and anti-wear.

MCT-A, MCT-G, MCL-O, MCC-T Grease meet the requirements of SMS KHC2K and can be applied to high-temperature lubrication.

Super Grease and BLR-D Grease meet the requirements of SMS KP2N-10 and can be applied to high-temperature, extreme pressure anti-wear, and water-resistant lubrication.

BLR-D, MCR-A, MCL-L, THT-A Grease meet the requirements of SMS KP2N-20 and can be applied to low temperature, extreme pressure anti-wear, and water resistance lubrication.

MEP, THT-A, Super Grease, TBL-D, BLC-A Grease meet the requirements of SMS KP2K and can be applied to extreme pressure anti-wear and water-resistant lubrication.

REP, MCC-E, MCC-A, MCC-D Grease meet the requirements of SMS KP2G-20 and can be applied to extreme pressure, anti-wear, and water resistance lubrication.

BLR-D, MCT-G, bearing grease meets the requirements of SMS KP3K-20 and can be applied to extreme pressure, anti-wear, and water resistance lubrication.

BLC-D, HSC, and BLU-K Grease meet the requirements of the SMS K3K-20 and can be applied to non-extreme pressure lubrication.

GRK-C, GRK-E, GRK-F, and GRK-A Grease meet the requirements of SMS OGPF 00N-10 and can be applied to high-temperature open gears.



Januar 2018

SMS group

Betriebsmittel
Schmierfett
Lieferanten und Produkte

SN 180-1
Beiblatt 1

ICS 75.100

Ersatz für
SN 180-1 Bbl1:2017-10

Dieses Beiblatt enthält als Information zur SN 180-1 eine Zuordnung verschiedener Lieferanten und deren Produkte zu den in der SN 180-1:2017-10 getroffenen Auswahl von Schmierfetten aber keine zusätzlich genormten Festlegungen.

Die in Tabelle 1 bis Tabelle 3 aufgelisteten Produkte erfüllen die Mindestanforderungen der DIN 51502:1990-08 bzw. die Anforderungen aller in der SN 180-1 entsprechend aufgeführten Normen.
Die Übersicht dient ausschließlich als Hilfsmittel zur Auswahl eines geeigneten Produktes. Eine Prüfung über die Verwendbarkeit des ausgewählten Produktes ist für den jeweiligen Anwendungsfall durchzuführen. Wichtige Kriterien können hier z.B. die Grundölart, Grundölviskosität oder Hafteigenschaften des jeweiligen Produkts darstellen.
Die Einteilung erfolgte durch die Lieferanten selbst. SMS group kann keine Garantie für die Richtigkeit dieser Zuordnung geben.

Gemäß SN 180-1:2017-10 muss bei Anlieferung des Produkts das Sicherheitsdatenblatt des jeweiligen Herstellers beiliegen. Um Gefährdungen für Mensch und Umwelt zu vermeiden, sind die in den Sicherheitsdatenblättern vorgeschriebenen Handhabungen und Regeln vom Anwender unbedingt einzuhalten.

Seitenanzahl 4



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SN 180-1 Bbl.1:2018-01

Tabelle 1 – Lieferanten und Produkte (1 von 3)

Schmierstoff nach DIN 51502:1990-08	GP00-20 GP000-20	KP2K-20	K2K-20	Paste *)	KHC2K
Schmierstoff-Nr. *	1	2	3	4	5
Typischer Anwendungsfall	Zahnkupplungen	Wälz- und Gleitlager	Wälz- und Gleitlager	Gleitflächen, Zahnkupplungen	Exzenterschnecken für CI-Getriebe
AEGON	Lamo Grill GLS FP High-Lub LT 0 EP Lamo Hi 4 N EP Renolit GA 2300	High-Lub LT 2 EP Renolux M 27 Ha Berulub BLT 41 High-Lub TA 67 400 HD	Renolux CA 2 + EP	Renolit CPK 12 Renolit MO High-Lub F4 00 MO Renolux PBC 42 +	Renolux PA 28 HC 2
BP www.bp.de	BP verwendet global die Marke Castrol				
Castrol www.castrol.com	Tribol GR 100-0 PD Spheerol EPL 0 Tribol GR 100-00 PD	Spheerol EPL 2 Tribol GR 4020/220-2 PD	Molub-Alloy 880/460-2 EB (MPI 5N-40) Tribol GR 70 2 HT 4020 2G	Molub-Alloy Paste PL Molub-Alloy Paste PJ	Spheerol L0 2 Spheerol SY 2202
Chevron Chevron, Caltex, Texaco, Havoline www.chevron.com	Lithofrig Grease Multifak EP 0 Multifak EP 00	Delo Grease MM EP 2 Delo Starplex EP 2 Multifak EP 1 Regalia EP 2	Delo Grease 400 EP 2 Tarpaulin CX EP 3 Delo Grease 918 Delo Grease 519 EP 2	Lagoa Grease 0102	High Temp Premium 2
DOW CORNING www.dowcorning.com	MOLYPROTEC Longterm 00	MOLYPROTEC Longterm 2 plus	MOLYPROTEC SLIDING MOLYPROTEC HP 870	MOLYPROTEC 0704	MOLYPROTEC CL000 MOLYPROTEC CL2000
FUCHS www.fuchs.com	Renolit CX-EP 0 Renolit LST 00 +	Renolit FEP 2 Renolit LA-PEP 2	Renolit CX-TC 20 Renolit PU Fit 300 Renolit ST 4 MY 2 + Renolit HLP-L 20 EP	Renolit Paste PM	-
Klüber www.kluber.com	Centoplex 0 EP Klübersynth BE 00-142 Klübersynth UE 39-750 N	Centoplex 2 EP Klübertec BE 31-142 SYNCHROTEMP DH 461 / 462	Klübersynth BE 41-132 Klübersynth HB 74-401 SYNCHROTEMP DH 461 / 462	Klüberpaste AG 11 462 N62 Klüberlub KE 39-602 Wolfrascal C	Klübersynth BE 00-142 Klübersynth HBK 74-401 Klübersynth UE 74-401 Klübersynth EM 94-102
Lubcon www.lubcon.com	POLYFLEX EP 0 160 POLYFLEX EP 00 160	POLYFLEX EP 2 160	SYNTHESO D 0 240 POLYFLEX PU 2 460	-	SYNTHESO D 0 220
Mobil www.exxonmobil.com	Mobilith SHC 007	Mobilgrease XHP 222 Mobilgrease XHP 222 Mobilith SHC 220	Mobilith SHC 220	Mobilith SHC 100 special	-
Quaker www.quakerchem.com	Quakerlub CL0(00)/CL00E	Quakerlub KRONA EP 2 Quakerlub EPB 2 Quakerlub CS 2202 EPE Quakerlub CS 4010 EP	Quakerlub 3201 Quakerlub LRA 4525-EPE Quakerlub LR 4515-EP HT	Quakerpaste NC Quakbrizole Abrasiva Super	Quakerlub LS 4010 EP
Shell www.shell.de	Shell Gadus S2 V220 00	Shell Gadus S2 V220C 2 Shell Gadus S2 V220 2	Shell Gadus S2 V100 2	-	Shell Gadus S2 V100 2
Sinopec www.sinopec.com	SINOPEC Complex GP 0 SINOPEC CMA # 0 SINOPEC CMA-F 00	SINOPEC 4EP 2 SINOPEC CMA# 2 SINOPEC TnT-A 2 SINOPEC Super Grease 2	SINOPEC BLC-C 2 SINOPEC MCC-P 2 SINOPEC MCC-A 2 SINOPEC MCC-P 2	SINOPEC GRK-C 0 SINOPEC BLR-D 2 SINOPEC MCC-A 0 SINOPEC MCH-B 2	SINOPEC MCT-A 2 SINOPEC MCT-C 2 SINOPEC MCL-C 2 SINOPEC MCC-1 2
SKF www.skf.com	MCG 1 (000/0.0)	LGMA 2 (MTM-35) LGHB 2 (KTZA-2N)	LGHP 2 (KZA-4N)	LGHF 4E	-

*) SME group specific
**) Ersetzbar durch DIN 51502:1990-08
***) Synthetischer Schmierstoff, nicht mit Mineralöl mischen
****) Dieses Fett ist, abhängig von der Betriebstemperatur, für Lebensdauerschmierung, als Zeitfett bei Einsatzschmierung und für lange Schmierintervalle geeignet

Seite 3
SN 180-1 Bbl.1:2018-01

Tabelle 2 - Lieferanten und Produkte (2 von 3)

	KP2N-10	KP2N-20	KP2K	KP2G-20
	6	7	8	9
	Führungen in Präzisionstech	Große Wälzlager	Schulz/Führung an Kugelumlaufspindeln	Schlossersteuerung Wälzlager
	High-Lub LT 2 EP 460	High-Lub LT4 00 High-Lub LT4 00 460 4G+ High-Lub LT4 00 MO+ Renolux PBC 42 +	High-Lub LT 2 EP +	High-Lub LT 2 EP + Renolux M 21 MH + Renolux M 21 HBT + High-Lub LT4 00 460 4G+
BP www.bp.de	BP verwendet global die Marke Castrol			
Castrol www.castrol.com	Molub-Alloy 777 2 HL (MP 2N-2G) Molub-Alloy 777 2 EN (MP 2N-2G) Molub-Alloy 880/460-2 EB (MPI 2N-2G)	Tribol GR 4020/100-2 Tribol GR 4020/460-2 Molub-Alloy 880/460-2 EB (MPI 2N-2G)	Molub-Alloy 936/680-2 NC (MPI 1N-2G) Tribol GR 660-2 PD	Spheerol EPL 2 Tribol GR 100-2 PD Tribol GR 4020/220-2 PD
Chevron Chevron, Caltex, Texaco, Havoline www.chevron.com	Delo Grease EP 2 Timaron SYN EP	Delo Grease EP 2 Starplex EP 2	Delo Grease 600 EP 2 Starplex EP 2	Delo Grease 600 EP 2 Multifak EP 2
DOW CORNING www.dowcorning.com	-	-	MOLYPROTEC Multilub MOLYPROTEC 902 Plus (Feststoffanteil)	MOLYPROTEC Longterm 00 (Farbeschlaemfrei)
FUCHS www.fuchs.com	Renolit FEP 2 Renolit LA-PEP 2	Renolit FEP 2 Renolit LA-PEP 2	Renolit FEP 2 Renolit LA-PEP 2	Renolit FEP 2 Renolit LA-PEP 2
Klüber www.kluber.com	Klübersynth BE 46-132 Klüberlub BC 41-1501 -	Klüberlub BE 41-132 Klüberlub BE 46-1500 -	Klüberlub BE 52-132 Klüberlub BE 71-461 Klüberpaste HC 71-461	Centoplex 2 EP Klübersynth UH 64-152 Klüberlub BW 52-142
Lubcon www.lubcon.com	TURMOFLEX EP 2 160	TURMOFLEX EP 2 160	POLYFLEX EP 2 160	POLYFLEX EP 2 160
Mobil www.exxonmobil.com	Mobilith SHC 100 special Mobilgrease XHP 222	Mobilgrease XHP 222	Mobilith SHC 100 special	Mobilith SHC 100 special Mobilgrease XHP 222 Mobilgrease XHP 462
Quaker www.quakerchem.com	Quakerlub CS 4010 EP	Quakerlub CS 4010 EP	Quakerlub EPX 2 Quakerlub 429 NA 2 EP Quakerlub LR 4010 EPE	Quakerlub Molub 00 4000 EP Quakerlub EPB 2 Quakerlub HRKW 2 EP
Shell www.shell.de	Shell Gadus S2 V220C 2	Shell Gadus S2 V220C 2	Shell Gadus S2 V220C 2 Shell Gadus S2 V220 2	Shell Gadus S2 V220C 2 Shell Gadus S2 V220 2
Sinopec www.sinopec.com	SINOPEC Super Grease 2 SINOPEC BLR-D 2	SINOPEC BLR-D 2 SINOPEC MCH-A 2 SINOPEC MCL-A 2 SINOPEC SHC 46 2	SINOPEC Super Grease 2 SINOPEC MCT-A 2 SINOPEC TNL-D 2 SINOPEC MCH-A 2	SINOPEC 4EP 2 SINOPEC MCCC SINOPEC MCH-A 0 SINOPEC MCC-D 2
SKF www.skf.com	LGMA 2 (MTM-35) LGHB 2 (KTZA-2N)	LGHP 2 (KZA-4N)	LGEV 2 (KTZA 4E)	LGMA 2 (MTM-35) LGHB 2 (KTZA-2N)

Tabelle 3 - Lieferanten und Produkte (3 von 3)

KP00K	KP3K-20	K2K	OGPF 00N-10
30	31	32	33
Führungen an Gewichtsausgleich	Wälz- und Gleitlager	Wälzlager an Elektromotoren	Offene Großgetrieben, Vorgegebene Gewerkschnieckpresse
High-Lub LT 2 EP High-Lub LM 2 EP	High-Lub LT 2 EP High-Lub FA-EP 2 Renolux FE 18 EP	High-Lub L2 High-Lub FA-EP 2 Renolux FE 18 EP	Renolit GA 600 Renolit GA 900 Renolit GA 2000 +
BP verwendet global die Marke Castrol			
-	Spheerol EPL 2	Spheerol AP 3	Molub-Alloy OG 636 BF Heavy (OGPF 0G-10) Molub-Alloy OG 37 636 00 (OGPF 0-000-00)
Multifak EP 00	Starplex EP 2	Multifak Premium 2 Staroles EP 2	Tivertalit NL EP 00000 Tivertalit NL HV 0
-	-	-	-
-	Renolit LS-PEP 2	Renolit GP 3	-
-	LENZOFLEX 2 Klübersynth BE 31-502 PETAMO GHY 443	Klüberpaste BEM 41-132 PETAMO GHY 133 N PETAMO GHY 443	Unifloscon C 00, 2000 Ultra Klüberbutter LG 39-750 N Klüberfluid C-P 2 Ultra
POLYFLEX EP 00 160	POLYFLEX EP 2 160	POLYFLEX DPTM6/M 2 160	CARBOFLEX OG 00-2000 HD CARBOFLEX OG 0-690 HD
Mobilux EP 2	Mobil Polyrex EM 103 Mobil Unirex N3	Mobilgear DDL 007
Quakerlub EPX 2	Quakerlub ASTERLUB 3 Quakerlub VITALIA EP Quakerlub EPX 2	Quakerlub ALC 00 HV
-	-	Shell Gadus S2 V100 3	Shell Gadus S2 OGPF 000
SINOPEC BLR-D 2 SINOPEC MCT-D 2 SINOPEC Roll Bearing Grease 2	SINOPEC BLC-D 2 SINOPEC HSC 1 SINOPEC BLU-A	SINOPEC GRK-C 00 SINOPEC GRK-Z 00 SINOPEC GRK-F 00 SINOPEC GRK-A 00
-	-	LGMT 3 (KXK-3G)	-



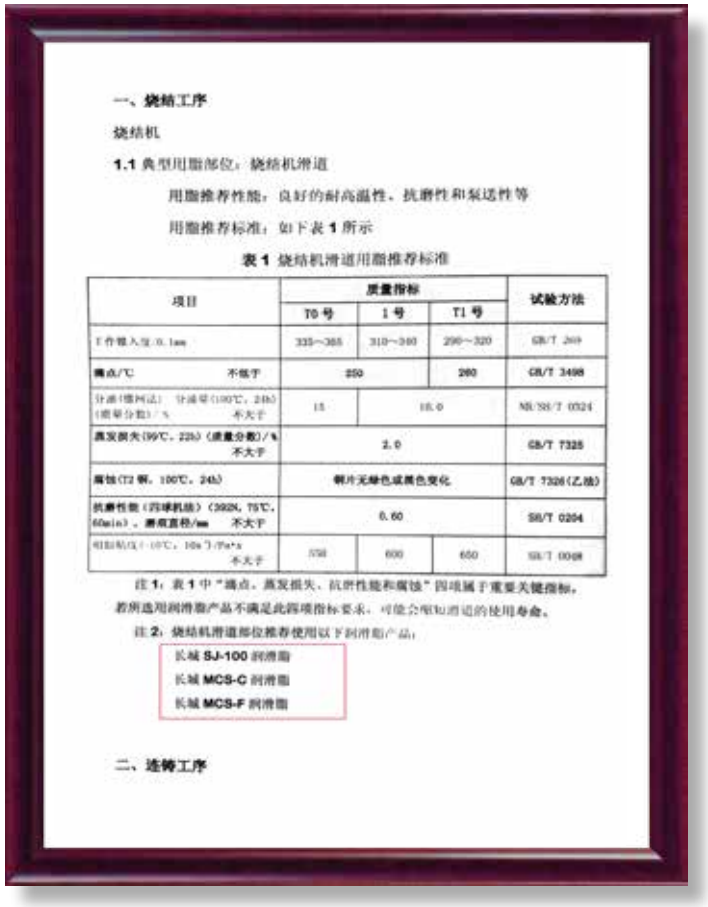
SJ series, MCC series, roller grease, Super Grease, MCR-A, etc.

SJ-100, MCS-F, MCL-C, EMALUBE EP Grease meet the requirements of CFHI sintering machines and can be used for lubrication of sintering machine slides.

EMALUBE-L, JZ EP A, JZ EP D, Emma EP, MCC-A, MCC-D, MCC-E, JJ CC, FPNR Grease meet the requirements of CFHI continuous casting machines and can be used for lubrication of the large ladle rotary table, sector section, and conveyor roller of continuous casting machines.

Super Grease 1A, Super Grease 1B, MCR-A, Super CR, JZ EP A Grease meet the requirements of CFHI rolling mill and can be applied to lubricate the working roll bearings of the rolling mill.

中国一重
CFHI



一、烧结工序

烧结机

1.1 典型用脂部位：烧结机滑道

用脂推荐性能：良好的耐高温性、抗磨性和泵送性等

用脂推荐标准：如下表 1 所示

表 1 烧结机滑道用脂推荐标准

项目	质量指标			试验方法
	T0 号	1 号	T1 号	
工作锥入度/0.1mm	355～385	310～340	290～320	GB/T 269
滴点/℃ 不低于	250		260	GB/T 3498
分油(锥网法) 分油量(100℃，24h)(质量分数)/% 不大于	15	10.0		SH/SR/T 0324
蒸发损失(99℃，22h)(质量分数)/% 不大于	2.0			GB/T 7325
腐蚀(T2 铜，100℃，24h)	铜片无绿色或黑色变化			GB/T 7326(乙法)
抗磨性能(四球机法)(392N，75℃，60min)，磨痕直径/mm 不大于	0.60			SH/T 0204
相似粘度(-10℃，10s⁻¹)/Pa·s 不大于	550	600	650	SH/T 0048

注 1：表 1 中“滴点、蒸发损失、抗磨性能和腐蚀”四项属于重要关键指标，若所选用润滑脂产品不满足此四项指标要求，可能会缩短滑道的使用寿命。

注 2：烧结机滑道部位推荐使用以下润滑脂产品：

长城 SJ-100 润滑脂
长城 MCS-C 润滑脂
长城 MCS-F 润滑脂

二、连铸工序

Sinopec SJ-100 Grease, MCS-C/F Grease

Sinopec JZ EP A Grease, MCC-A/D/F Grease



连铸机

2.1 典型用脂部位：连铸机扇形段和输送辊道轴承

用脂推荐性能：良好的耐高温性、抗水性和泵送性等

用脂推荐标准：如下表 2 所示

表 2 连铸机扇形段和输送辊道轴承用脂推荐标准

项目	质量指标			试验方法
	T0 号	1 号	T1 号	
工作锥入度/0.1mm	355～385	310～340	290～320	GB/T 269
滴点/℃ 不低于	250		260	GB/T 3498
分油(锥网法) 分油量(100℃，24h)(质量分数)/% 不大于	15	10.0		SH/SR/T 0324
蒸发损失(99℃，22h)(质量分数)/% 不大于	2.0			GB/T 7325
腐蚀(T2 铜，100℃，24h)	铜片无绿色或黑色变化			GB/T 7326(乙法)
防腐蚀性(52℃，48h)	合格			GB/T 5018
水淋损失(38℃，1h)(质量分数)/% 不大于	15		10	SH/T 0109
相似粘度(-10℃，10s⁻¹)/Pa·s 不大于	550	600	650	SH/T 0048

注 1：表 2 中“滴点、蒸发损失、防腐蚀性和腐蚀”四项属于重要关键指标，若所选用润滑脂产品不满足此四项指标要求，可能会导致连铸机扇形段和输送辊道轴承的损坏率偏高。

注 2：连铸机扇形段和输送辊道轴承推荐使用以下润滑脂产品：

长城 MCC-D 润滑脂　长城 JZ EP A 聚脲润滑脂
长城 MCC-A 润滑脂　长城 MCC-F 润滑脂

2.2 典型用脂部位：连铸机大包回转台轴承等

用脂推荐性能：良好的极压抗磨性和泵送性等



北京首钢股份有限公司

炼钢作业部扇形段润滑脂升级

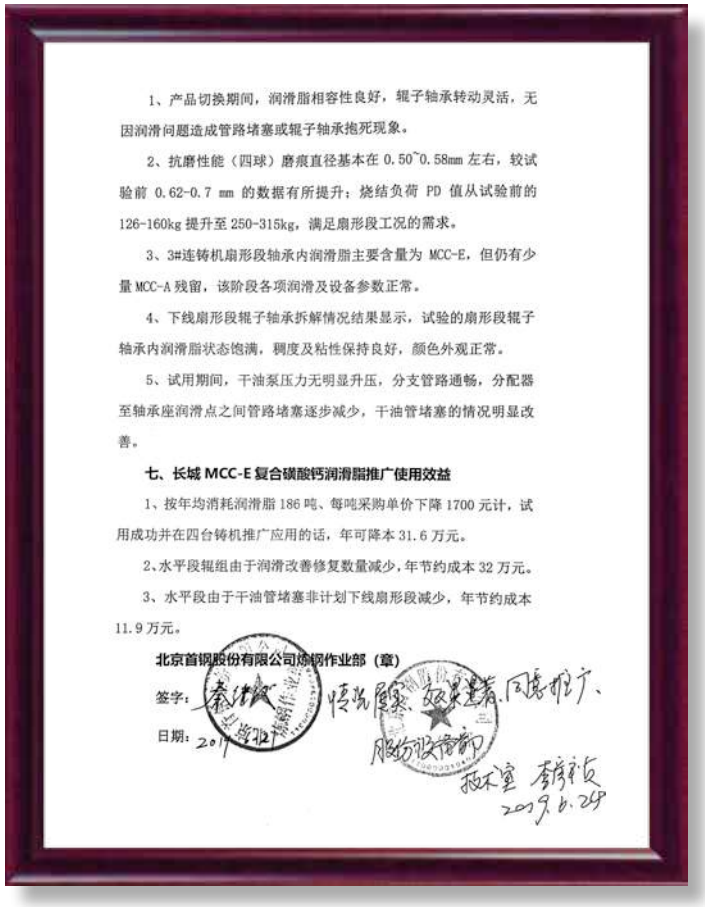
试用情况报告

质量监督部门：北京首钢股份有限公司设备部

试 用 部 门：北京首钢股份有限公司炼钢作业部

合 作 单 位：中国石化润滑油有限公司天津分公司

使 用 日 期：2019-6-10



1、产品切换期间，润滑脂相容性良好，辊子轴承转动灵活，无因润滑问题造成管路堵塞或辊子轴承抱死现象。

2、抗磨性能（四球）磨痕直径基本在 0.50~0.58mm 左右，较试验前 0.62-0.7 mm 的数据有所提升；烧结负荷 PD 值从试验前的 126-160kg 提升至 250-315kg，满足扇形段工况的需求。

3、3#连铸机扇形段轴承内润滑脂主要含量为 MCC-E，但仍有少量 MCC-A 残留，该阶段各项润滑及设备参数正常。

4、下线扇形段辊子轴承拆解情况结果显示，试验的扇形段辊子轴承内润滑脂状态饱满，稠度及粘性保持良好，颜色外观正常。

5、试用期间，干油泵压力无明显升压，分支管路通畅，分配器至轴承座润滑点之间管路堵塞逐步减少，干油管堵塞的情况明显改善。

七、长城 MCC-E 复合磺酸钙润滑脂推广使用效益

1、按年均消耗润滑脂 186 吨、每吨采购单价下降 1700 元计，试用成功并在四台铸机推广应用的话，年可降本 31.6 万元。

2、水平段辊组由于润滑改善修复数量减少，年节约成本 32 万元。

3、水平段由于干油管堵塞非计划下线扇形段减少，年节约成本 11.9 万元。

北京首钢股份有限公司炼钢作业部（章）

签字：

日期：2019.6.29

Sinopec MCC-E Grease

Sinopec MCC-E Grease meets the requirements of Shougang Group's continuous casting machine and can be applied for lubrication of the large package turntable, sector section, and conveyor roller of the continuous casting machine.

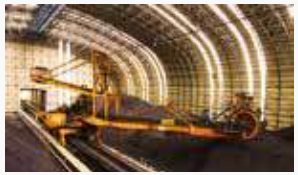


DANIELI

72 metallurgical lubricants are included in the Danieli Equipment Lubrication Manual, meet the lubrication requirements of various models of Danieli equipment.

6





COAL INDUSTRY

SINOPEC

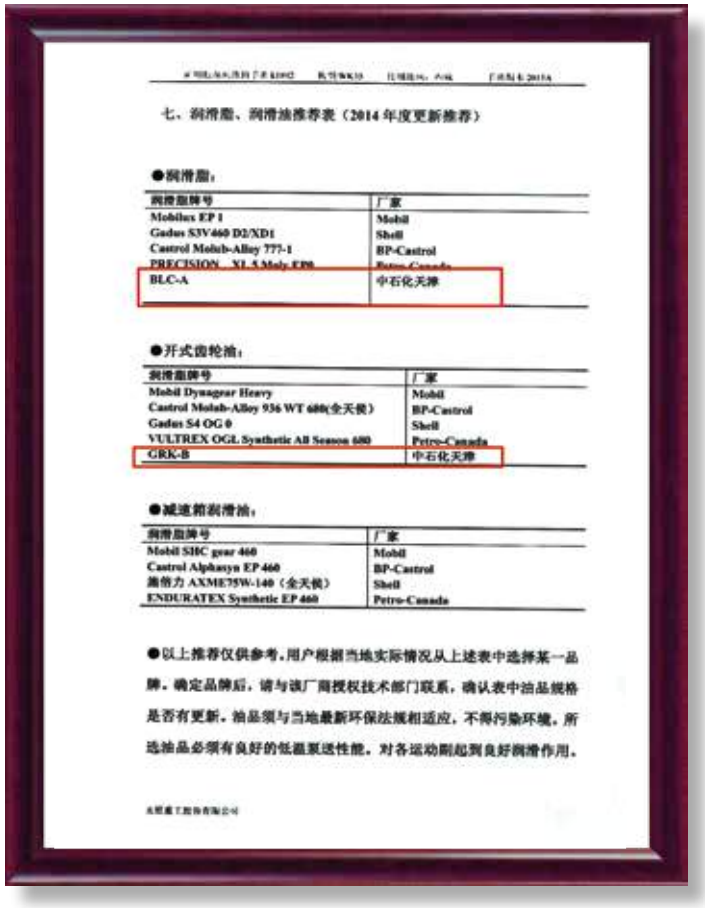
Coal industry

Sinopec lubricants have the OEM certification of leading enterprises in the coal industry such as Aikoff and China Coal Group, which can provide excellent lubrication protection for equipment in the coal industry. Sinopec lubricants are widely used in large energy companies such as CHN Energy, China Huaneng Group and China Coal Group.

WK-35, WK-55

Sinopec BLC-A and GRK-A/B Grease meet the requirements of Taiyuan Heavy Industry WK-35/55 electric shevel.

Sinopec BLC-A, GRK-B Grease



七、润滑脂、润滑油推荐表（2014年度更新推荐）

●润滑脂：

润滑脂牌号	厂家
Mobilux EP 1	Mobil
Gadus S3V460 D2/XD1	Shell
Castrol Molub-Alloy 777-1	BP-Castrol
PRECISION XL 3 Moly EP0	Petro-Canada
BLC-A	中石化天津

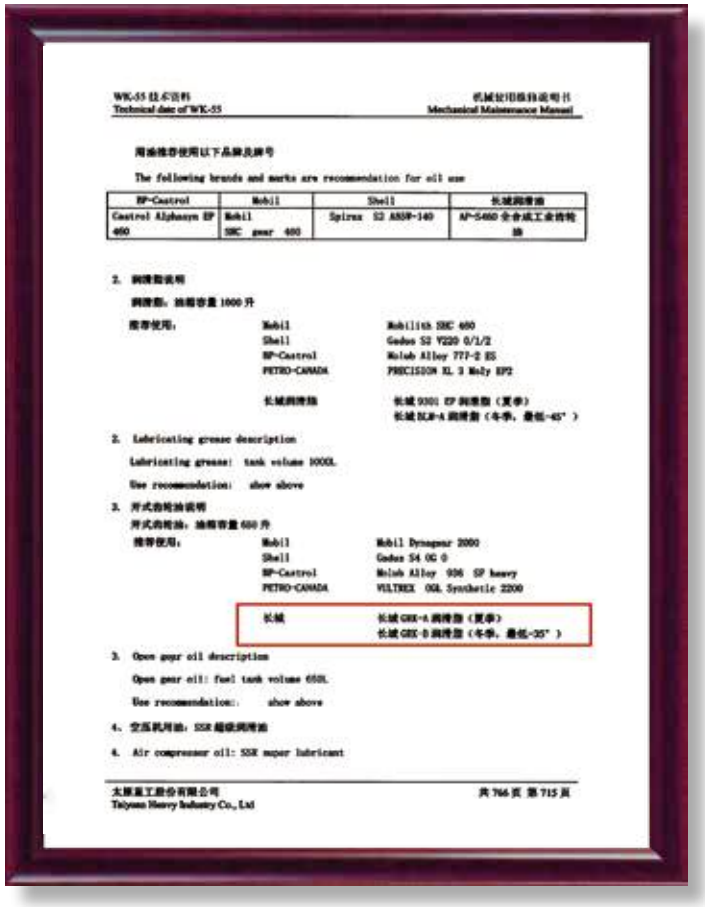
●开式齿轮油：

润滑脂牌号	厂家
Mobil Dynagear Heavy	Mobil
Castrol Molub-Alloy 936 WT 680(全天候)	BP-Castrol
Gadus S4 OG 0	Shell
VULTREX OGL Synthetic All Season 680	Petro-Canada
GRK-B	中石化天津

●减速箱润滑油：

润滑脂牌号	厂家
Mobil SHC gear 460	Mobil
Castrol Alphasyn EP 460	BP-Castrol
施倍力 AXME75W-140（全天候）	Shell
ENDURATEX Synthetic EP 460	Petro-Canada

●以上推荐仅供参考。用户根据当地实际情况从上述表中选择某一品牌。确定品牌后，请与该厂商授权技术部门联系，确认表中油品规格是否有更新。油品须与当地最新环保法规相适应，不得污染环境。所选油品必须有良好的低温泵送性能。对各运动副起到良好润滑作用。



WK-55 技术资料 Technical data of WK-55

机械使用维修说明书 Mechanical Maintenance Manual

用油推荐使用以下品牌及牌号

The following brands and marks are recommendation for oil use

BP-Castrol	Mobil	Shell	长城润滑油
Castrol Alphasyn EP 460	Mobil SHC gear 460	Spirax S2 ASEP-140	AP-S460 全合成工业齿轮油

2. 润滑脂说明

润滑脂：油箱容量 1000 升

推荐使用：	Mobil	Mobilith SHC 460
	Shell	Gadus S2 V220 0/1/2
	BP-Castrol	Molub Alloy 777-2 ES
	PETRO-CANADA	PRECISION XL 3 Moly EP2
	长城润滑脂	长城 9001 EP 润滑脂（夏季） 长城 SLR-4 润滑脂（冬季，最低-45°）

2. Lubricating grease description

Lubricating grease: tank volume 1000L

Use recommendation: show above

3. 开式齿轮油说明

开式齿轮油：油箱容量 680 升

推荐使用：	Mobil	Mobil Dynagear 2000
	Shell	Gadus S4 OG 0
	BP-Castrol	Molub Alloy 936 SP heavy
	PETRO-CANADA	VULTREX OGL Synthetic 2200
	长城	长城 GRK-A 润滑脂（夏季） 长城 GRK-B 润滑脂（冬季，最低-35°）

3. Open gear oil description

Open gear oil: fuel tank volume 650L

Use recommendation: show above

4. 空压机用油：SSR 超级润滑油

4. Air compressor oil: SSR super lubricant

太原重工股份有限公司 Taiyuan Heavy Industry Co., Ltd

共 766 页 第 715 页

Sinopec GRK-AB Grease

TZ 太原重工股份

WK-20, WK-35, WK-55

Sinopec GRK-A/B Grease meets the requirements of Shenhua Group WK-20/35/55 electric shovel.



长城 GRK-A/B 润滑脂在黑岱沟露天煤矿
使用情况说明

中国石化润滑油有限公司天津分公司：

贵公司提供的长城 GRK-A/B 润滑脂，该系列产品于 2018 年 8 月至 2019 年 3 月在我公司黑岱沟露天煤矿 wk-20、wk-35、wk-55 电铲进行了使用，产品具有良好的极压性、泵送性、粘附性和防锈性，在约半年的试用期内，电铲推压齿轮及回转齿轮表面油膜丰富，油脂流失少，取样所检测铁含量较少，润滑脂对电铲开式齿轮进行了有效的润滑与防护，满足我公司对电铲开式齿轮润滑脂的要求，我公司将在 wk-20、wk-35 电铲上继续使用长城 GRK-A/B 润滑脂，并在 wk-55 电铲上推广使用。

神华准能集团机电管理部
2019 年 3 月 28 日

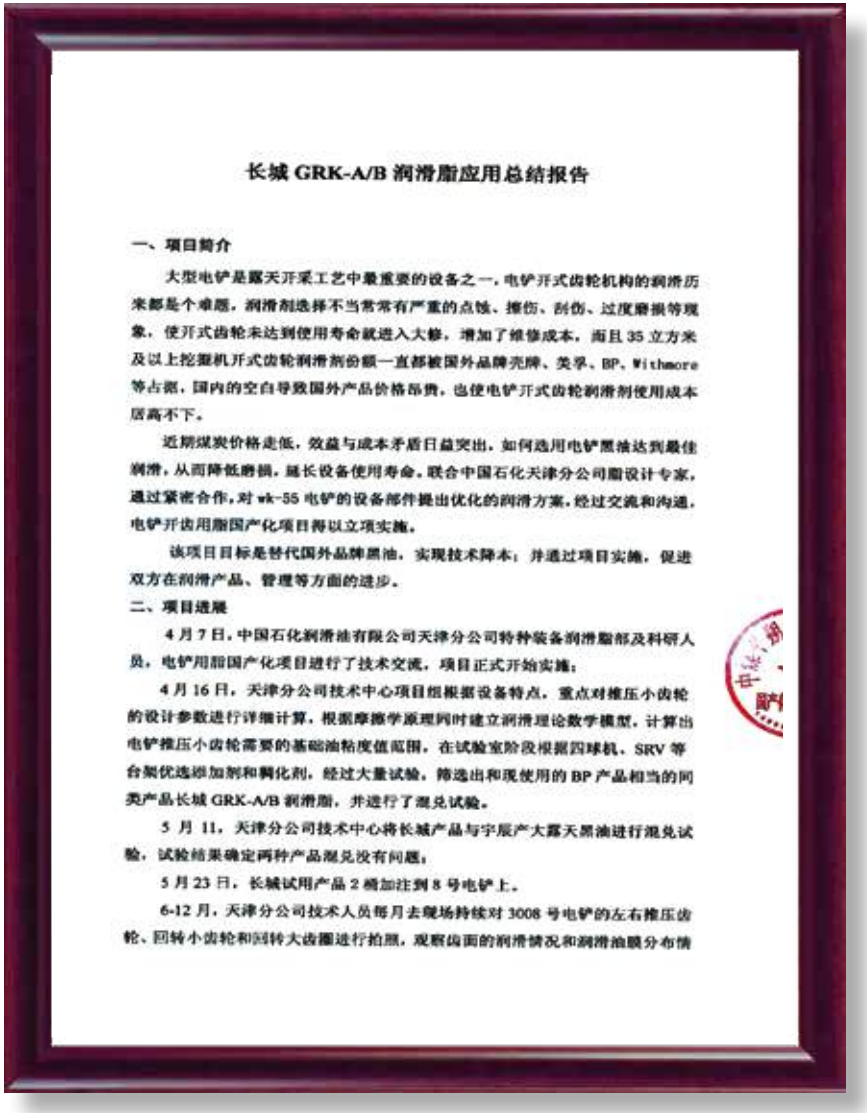


长城 GRK-A 润滑脂、长城 GRK-B 润滑脂（ZN）
在 WK-55 电铲使用情况说明

中国石化润滑油有限公司润滑脂分公司：

贵公司提供的长城 GRK-A 润滑脂、长城 GRK-B 润滑脂（ZN），该系列产品于 2019 年 3 月至 2020 年 2 月在我公司黑岱沟露天煤矿 WK-55 电铲进行使用，产品具有良好的极压性、泵送性、粘附性和防锈性，在约一年的试用期内，电铲推压齿轮及回转齿轮表面油膜丰富，油脂流失少，取样所检测的铁含量较少，产品对电铲开式齿轮进行了有效的润滑与防护，满足我公司对电铲开式齿轮润滑脂的要求。

神华准能[illegible]有限责任公司
机电管理部
2020 年 3 月 26 日



长城 GRK-A/B 润滑脂应用总结报告

一、项目简介

大型电铲是露天开采工艺中最重要的设备之一，电铲开式齿轮机构的润滑历来都是个难题，润滑剂选择不当常常有严重的点蚀、擦伤、刮伤、过度磨损等现象，使开式齿轮未达到使用寿命就进入大修，增加了维修成本，而且 35 立方米及以上挖掘机开式齿轮润滑剂份额一直都被国外品牌壳牌、美孚、BP、Withmore 等占据，国内的空白导致国外产品价格昂贵，也使电铲开式齿轮润滑剂使用成本居高不下。

近期煤炭价格走低，效益与成本矛盾日益突出，如何选用电铲黑油达到最佳润滑，从而降低磨损，延长设备使用寿命。联合中国石化天津分公司脂设计专家，通过紧密合作，对 wk-55 电铲的设备部件提出优化的润滑方案，经过交流和沟通，电铲开齿用脂国产化项目得以立项实施。

该项目目标是替代国外品牌黑油，实现技术降本；并通过项目实施，促进双方在润滑产品、管理等方面的进步。

二、项目进展

4 月 7 日，中国石化润滑油有限公司天津分公司特种装备润滑脂部及科研人员，电铲用脂国产化项目进行了技术交流，项目正式开始实施；

4 月 16 日，天津分公司技术中心项目组根据设备特点，重点对推压小齿轮的设计参数进行详细计算，根据摩擦学原理同时建立润滑理论数学模型，计算出电铲推压小齿轮需要的基础油粘度值范围，在试验室阶段根据四球机、SRV 等台架优选添加剂和稠化剂，经过大量试验，筛选出和现使用的 BP 产品相当的同类产品长城 GRK-A/B 润滑脂，并进行了混兑试验。

5 月 11，天津分公司技术中心将长城产品与宇辰产大露天黑油进行混兑试验，试验结果确定两种产品混兑没有问题；

5 月 23 日，长城试用产品 2 桶加注到 8 号电铲上。

6-12 月，天津分公司技术人员每月去现场持续对 3008 号电铲的左右推压齿轮、回转小齿轮和回转大齿圈进行拍照，观察齿面的润滑情况和润滑油膜分布情



况，并取样进行金属含量分析，同时记录电铲的运行时间、停机时间、环境温度和喷射间隔等数据，与相同工况的 3009 和 3011 电铲的润滑情况进行对比。

12 月份，3009 号 WK-55 电铲也成功切换试用 GRK-A 0 号润滑脂，目前使用正常。

2016 年 1 月，冬季产品长城 GRK-B 润滑脂 000 号在露天矿 3008、3009 号电铲开始切换应用。

2016 年 2~3 月，天津分公司技术人员去现场对 3008、3009 号电铲的左右推压齿轮、回转小齿轮和回转大齿圈进行拍照，观察冬季产品的齿面润滑情况和润滑油膜分布情况，并取样进行金属含量分析，并与相同工况的 3011 号 PH4100XPC 电铲的润滑情况进行对比。

2016 年 4 月，完成长城 GRK 润滑脂整个试验过程，并总结完成应用报告。

三、应用过程总结

根据齿面润滑情况等信息，项目相关人员一致认为：

（1） 润滑脂在齿面分布均匀，粘附性满足应用要求，齿轮表面未见异常变化；

（2） 应用以来，润滑脂的泵送性能良好，满足泵送要求；

（3） 从金属含量监测并结合齿面变化情况来看，使用长城产品后，推压齿轮、回转齿轮取脂的铁含量明显降低，有效降低齿轮磨损，产品的极压抗磨性能，润滑性能满足要求；

（4） 从现在的应用效果来看，长城 GRK 润滑脂可以满足 WK-55 电铲的苛刻润滑要求 。

长城 GRK 润滑脂在 WK-55 电铲（3008）上面使用已经将近 5000 多小时，注脂间隔达到 15 分钟，根据跟踪 wk-55 齿面的拍照定位工作判断油膜分布情况，同时结合取样分析铁元素含量在正常合理区间波动，我们认为长城 GRK 系列润滑脂使用效果良好，可以满足电铲的苛刻工况要求，与国外产品相当，可以推广应用于 WK-55 电铲、PH4100XPC 及同类型电铲开式齿轮系统润滑。

中国[illegible]集团有限公司国产化办公室

2016 年 5 月

WK-55

Sinopec GRK-A/B Grease meets the requirements of China coal Group WK-55 electric shovel.

SF31904

Sinopec BLM-A, MEP, HP-R, and Taibo Grease meet the requirements of XEMC SF31904 mining dump truck.



SF31904 型 108 t 电动轮自卸车使用说明书 OES. 406. 2207 第 2 版

序号	轴承型号	每台用量	使用部位	制造厂	备注
10	LL493649/LL493610	2	电动轮	SKF	
11	LL493649/LL493610	2	电动轮	SKF	
12	312934/DF	6	电动轮		
13	NN3120K/W33	6	电动轮		
14	40104	1	转向机		
15	320468	2	前车轮	SKF	
16	320468	2	前车轮	SKF	
17	639085	2	动力架		关节轴承
18	GE100ES	2	举升架		关节轴承
19	GE120ES	2	举升架		关节轴承
20	GE120ES-2RS	2	横向稳定杆		关节轴承外球
21	GE90ES-2RS	2	动力架		关节轴承外环
22	GE90ES-2RS	2	横拉杆		关节轴承外环
23	2CC140-00	1	中引推杆		关节轴承
24	9Z160-B	2	电动轮电机		
25	32224	2	电动轮电机		
26	6414	2	轴端机		
27	320	1	主泵电机		

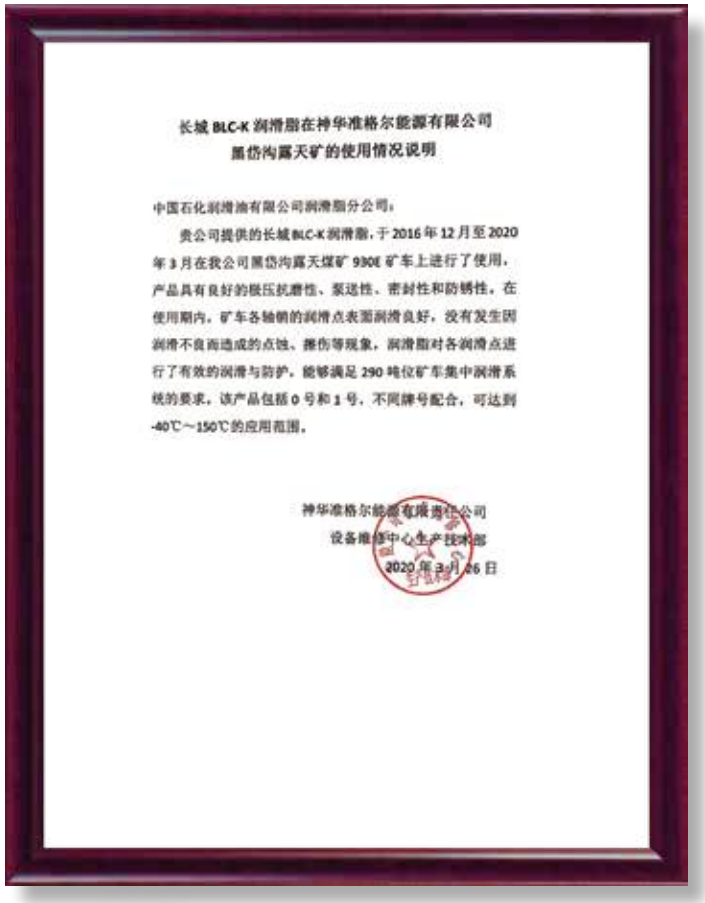
5.3 润滑油、液压油及燃油用油表（见表 20）

表 20 润滑油、液压油及燃油用油表

序号	使用部位	名称及牌号	产地
1	油气悬架	8 号液力传动油	上海、兰州炼油厂
2	转向及举升油缸	8 号液力传动油	上海、兰州炼油厂
3	制动系	8 号液力传动油	上海、兰州炼油厂
4	柴油机润滑油	SAE15W/40（API CF-4/SG 或以上等级）	
5	后桥轮边减速器	以 -5 至负荷车辆高驾油 (-5～45)℃ 使用 75W (-5～30)℃ 使用 80W/90 (-5～25)℃ 使用 90 (20～45)℃ 使用 85W/140	
6	柴油机燃油	夏季，可选用 0 号柴油 冬季，可选用-20 号 -35 号柴油	
7	集中润滑系统	冬季，长城 BLM-A 润滑脂 夏季，长城 MEP 润滑脂	中石化润滑油天津分公司
8	前轮毂轴承	长城 HP-R 润滑脂	
9	发电机及电动轮轴承	长城 泰博润滑脂	

设计 校对 编制 审下

湘潭电机股份有限公司 第 100 页 共 100 页



长城 BLC-K 润滑脂在神华准格尔能源有限公司
黑岱沟露天矿的使用情况说明

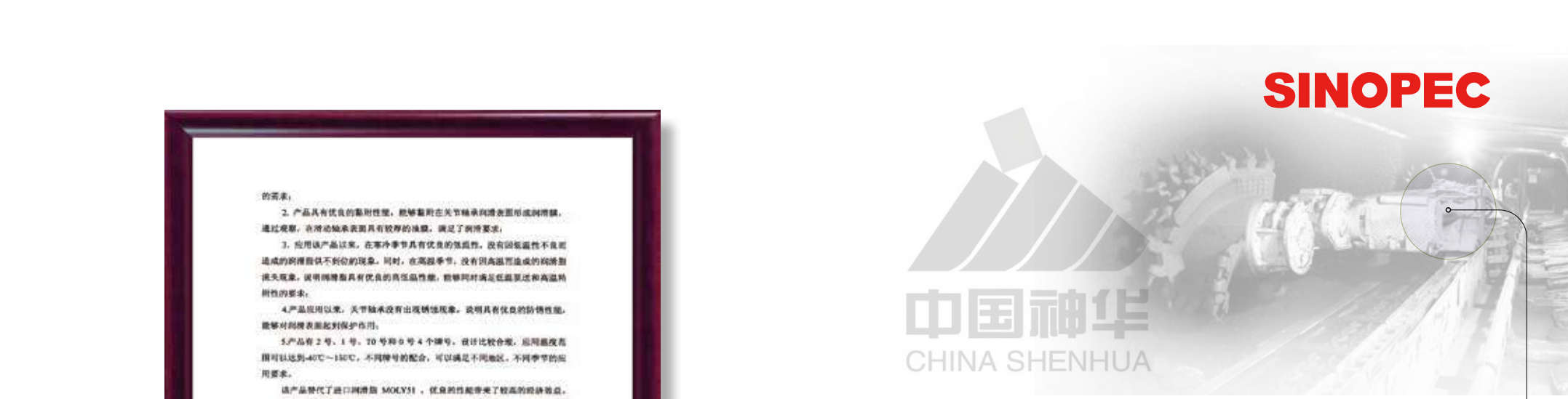
中国石化润滑油有限公司润滑脂分公司：

贵公司提供的长城 BLC-K 润滑脂，于 2016 年 12 月至 2020 年 3 月在我公司黑岱沟露天煤矿 930E 矿车上进行了使用，产品具有良好的极压抗磨性、泵送性、密封性和防锈性，在使用期内，矿车各轴销的润滑点表面润滑良好，没有发生因润滑不良而造成的点蚀、擦伤等现象，润滑脂对各润滑点进行了有效的润滑与防护，能够满足 290 吨位矿车集中润滑系统的要求，该产品包括 0 号和 1 号，不同牌号配合，可达到 -40℃～150℃的应用范围。

神华准格尔能源有限责任公司
设备维修中心生产技术部
2020 年 3 月 26 日

Komatsu 930E

Sinopec BLC-K Grease meets the requirements of Shenhua Group mining dump truck.





的需求；

2. 产品具有优良的黏附性能，能够黏附在关节轴承润滑表面形成润滑膜，通过观察，在滑动轴承表面具有较厚的油膜，满足了润滑要求；

3. 应用该产品以来，在寒冷季节具有优良的泵送性，没有因低温性不良而造成的润滑脂供不到位的现象。同时，在高温季节，没有因高温而造成的润滑脂流失现象，说明润滑脂具有优良的高低温性能，能够同时满足低温泵送和高温黏附性的要求；

4.产品应用以来，关节轴承没有出现锈蚀现象，说明具有优良的防锈性能，能够对润滑表面起到保护作用；

5.产品有 2 号、1 号、10 号和 0 号 4 个牌号，级计比较合理，应用温度范围可以达到-40℃～150℃，不同牌号的配合，可以满足不同地区、不同季节的应用要求。

该产品替代了进口润滑脂 MOLY51 ，优良的性能带来了较高的经济效益，产品供应方应后应继续保持津江 BLC-A 润滑脂产品性能的稳定性，以长期满足矿用汽车的常规应用工况。

附：津江 BLC-A 润滑脂简介

神华北电胜利能源有限公司露天煤矿

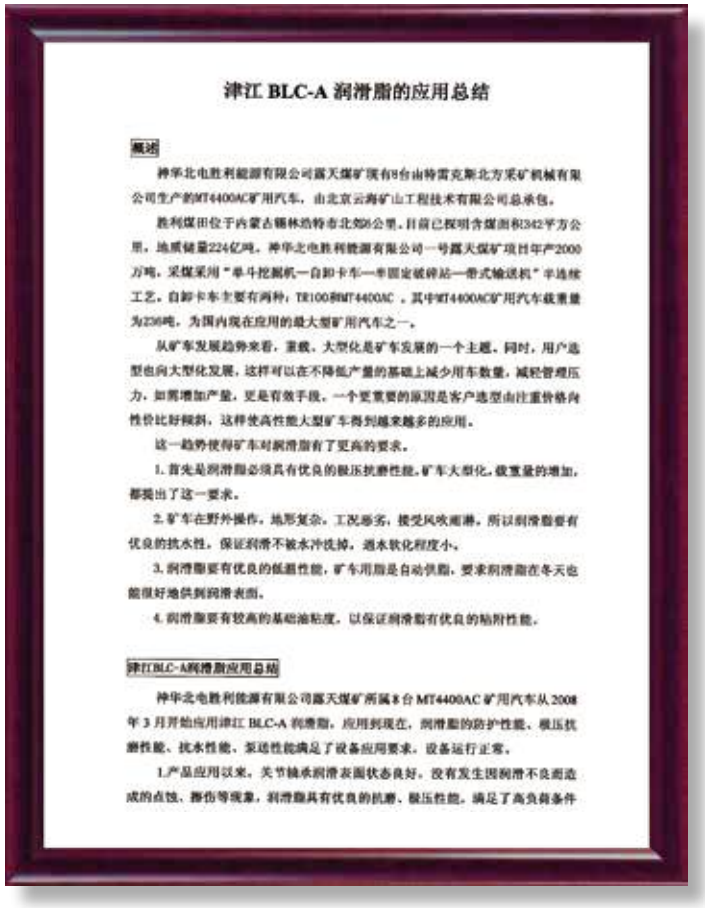
北京云海矿山工程技术有限公司

年 月 日

云海矿业

TEREX, MT4400AC, Komatsu 830E, Northern Heavy Industries NTE 240

Sinopec BLC-A Grease meets the requirements of Komatsu 830E mining dump truck and can be used for Komatsu 685E/730E/830E/930E mining dump truck.



津江 BLC-A 润滑脂的应用总结

概述

神华北电胜利能源有限公司露天煤矿现有8台由特雷克斯北方采矿机械有限公司生产的MT4400AC矿用汽车，由北京云海矿山工程技术有限公司总承包。

胜利煤田位于内蒙古锡林浩特市北郊6公里。目前已探明含煤面积342平方公里，地质储量224亿吨。神华北电胜利能源有限公司一号露天煤矿项目年产2000万吨。采煤采用“单斗挖掘机—自卸卡车—半固定破碎站—带式输送机”半连续工艺。自卸卡车主要有两种：TR100和MT4400AC 。其中MT4400AC矿用汽车载重量为236吨，为国内现在应用的最大型矿用汽车之一。

从矿车发展趋势来看，重载、大型化是矿车发展的一个主题。同时，用户选型也向大型化发展，这样可以在不降低产量的基础上减少用车数量，减轻管理压力，如需增加产量，更是有效手段。一个更重要的原因是客户选型由注重价格向性价比好倾斜，这样优良性能大型矿车得到越来越多的应用。

这一趋势使得矿车对润滑脂有了更高的要求。

1. 首先是润滑脂必须具有优良的极压抗磨性能。矿车大型化，载重量的增加，都提出了这一要求。

2. 矿车在野外操作，地形复杂，工况恶劣，接受风吹雨淋。所以润滑脂要有优良的抗水性，保证润滑不被水冲洗掉，遇水软化程度小。

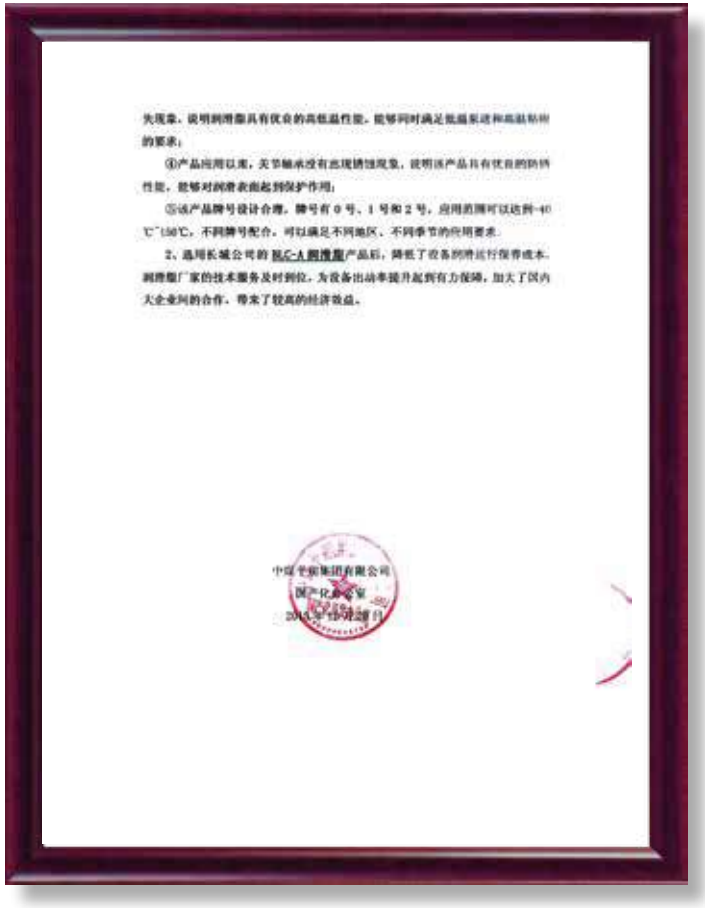
3. 润滑脂要有优良的低温性能，矿车用脂是自动供脂，要求润滑脂在冬天也能很好地供到润滑表面。

4. 润滑脂要有较高的基础油粘度，以保证润滑脂有优良的粘附性能。

津江BLC-A润滑脂应用总结

神华北电胜利能源有限公司露天煤矿所属8台MT4400AC矿用汽车从2008年3月开始应用津江 BLC-A 润滑脂，应用到现在，润滑脂的防护性能、极压抗磨性能、抗水性能、泵送性能满足了设备应用要求。设备运行正常。

1.产品应用以来，关节轴承润滑表面状态良好，没有发生因润滑不良而造成的点蚀、擦伤等现象，润滑脂具有优良的抗磨、极压性能，满足了高负荷条件



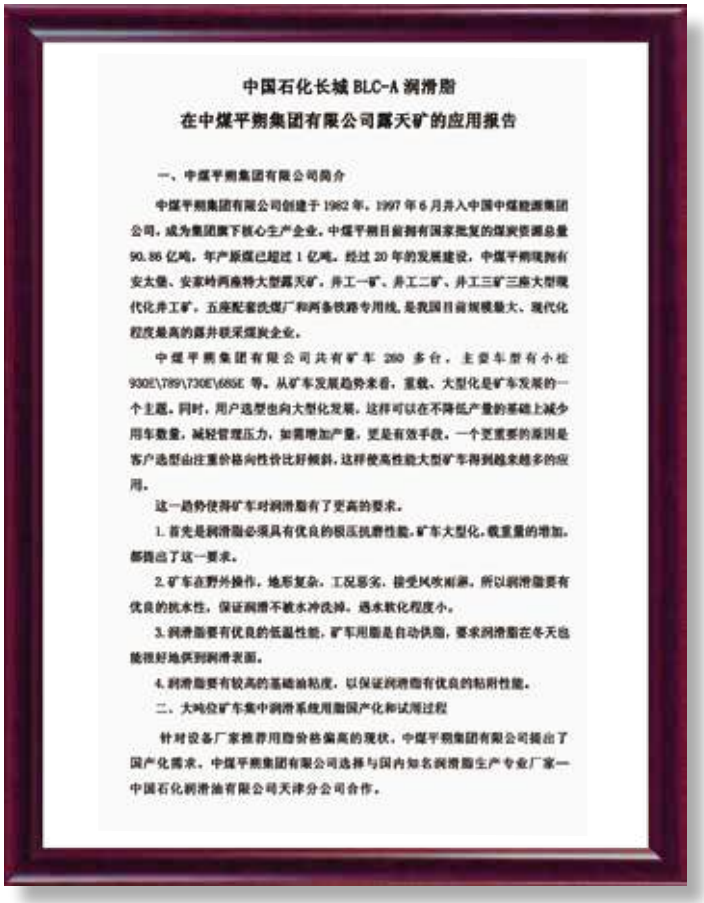
失现象，说明润滑脂具有优良的高低温性能，能够同时满足低温泵送和高温粘附的要求；

④产品应用以来，关节轴承没有出现锈蚀现象，说明该产品具有优良的防锈性能，能够对润滑表面起到保护作用；

⑤该产品牌号设计合理，牌号有 0 号、1 号和 2 号，应用范围可以达到-40℃~160℃，不同牌号配合，可以满足不同地区、不同季节的应用要求。

2、选用长城公司的 BLC-A 润滑脂产品后，降低了设备的维运行保养成本，润滑脂厂家的技术服务及时到位，为设备出动率提升起到有力保障，加大了国内大企业间的合作，带来了较高的经济效益。

中煤平朔集团有限公司
国产化办公室
2014 年 11 月 11 日



中国石化长城 BLC-A 润滑脂
在中煤平朔集团有限公司露天矿的应用报告

一、中煤平朔集团有限公司简介

中煤平朔集团有限公司创建于 1982 年，1997 年 6 月并入中国中煤能源集团公司，成为集团旗下核心生产企业。中煤平朔目前拥有国家批复的煤炭资源总量 90.86 亿吨，年产原煤已超过 1 亿吨。经过 20 年的发展建设，中煤平朔现拥有安太堡、安家岭两座特大型露天矿，井工一矿、井工二矿、井工三矿三座大型现代化井工矿，五座配套洗煤厂和两条铁路专用线，是我国目前规模最大、现代化程度最高的露井联采煤炭企业。

中煤平朔集团有限公司共有矿车 260 多台，主要车型有小松 930E\789\730E\685E 等。从矿车发展趋势来看，重载、大型化是矿车发展的一个主题。同时，用户选型也向大型化发展，这样可以在不降低产量的基础上减少用车数量，减轻管理压力，如需增加产量，更是有效手段，一个更重要的原因是客户选型由注重价格向性价比好倾斜，这样使高性能大型矿车得到越来越多的应用。

这一趋势使得矿车对润滑脂有了更高的要求。

1. 首先是润滑脂必须具有优良的极压抗磨性能。矿车大型化，载重量的增加，都提出了这一要求。

2. 矿车在野外操作，地形复杂，工况恶劣，接受风吹雨淋，所以润滑脂要有优良的抗水性，保证润滑不被水冲洗掉，遇水软化程度小。

3. 润滑脂要有优良的低温性能，矿车用脂是自动供脂，要求润滑脂在冬天也能很好地供到润滑表面。

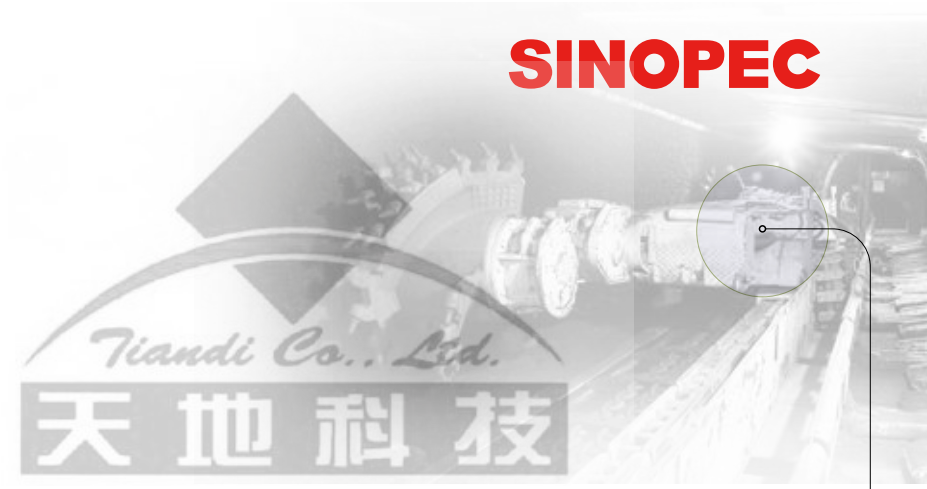
4. 润滑脂要有较高的基础油粘度，以保证润滑脂有优良的粘附性能。

二、大吨位矿车集中润滑系统用脂国产化和试用过程

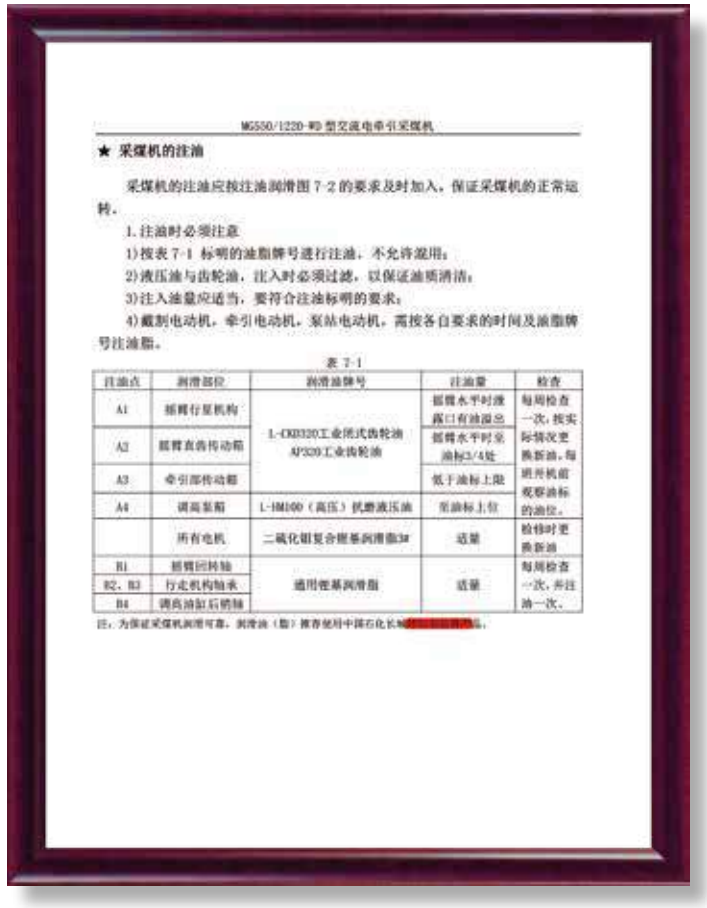
针对设备厂家推荐用脂价格偏高的现状，中煤平朔集团有限公司提出了国产化需求，中煤平朔集团有限公司选择与国内知名润滑脂生产专业厂家—中国石化润滑油有限公司天津分公司合作。

Komatsu 685E, Komatsu 730E, Komatsu 930E

Sinopec BLC-A Grease meets the requirements of China Coal Group.







MG550/1220-WD 型交流电牵引采煤机

★ 采煤机的注油

采煤机的注油应按注油润滑图 7-2 的要求及时加入，保证采煤机的正常运转。

1. 注油时必须注意

1）按表 7-1 标明的油脂牌号进行注油，不允许混用；

2）液压油与齿轮油，注入时必须过滤，以保证油质清洁；

3）注入油量应适当，要符合注油标明的要求；

4）截割电动机，牵引电动机，泵站电动机，需按各自要求的时间及油脂牌号注油脂。

表 7-1

注油点	润滑部位	润滑油牌号	注油量	检查
A1	摇臂行星机构	L-CKD320工业闭式齿轮油 AP320工业齿轮油	摇臂水平时液面口有油溢出	每周检查一次，按实际情况更换新油，每班开机前观察油标的油位。
A2	摇臂直齿传动箱		摇臂水平时呈油标3/4处	
A3	牵引部传动箱		低于油标上限	
A4	调高泵箱	L-HM100（高压）抗磨液压油	至油标上位	
	所有电机	二硫化钼复合锂基润滑脂3#	适量	检修时更换新油
B1	摇臂回转轴	通用锂基润滑脂	适量	每周检查一次，并注油一次。
B2、B3	行走机构轴承			
B4	调高油缸后销轴			

注：为保证采煤机润滑可靠，润滑油（脂）推荐使用中国石化长城[redacted]。

MG550/1220

AP gear oil and L-HM hydraulic oil have been included in the manual of mining machines such as MG200/446-WD1, and the main models are fully covered.

MQC—75 型清仓机

使 用 说 明 书

执行标准：MT/T238.3-2006 及
Q/TSY001-2008

中煤科工集团唐山研究院有限公司

二〇一五年五月



6 结构与功能

6.1 控装部

控装部采用可螺旋集流装置和下链刮板机运输作为装载机构，可输送各种状态的煤泥，对粘性比较大的煤泥和松散物料均能适应，集流装置悬臂可升降，集流范围大，效率高。其结构主要由驱动部、链传动（刮板）和可螺旋给煤器等组成。它是清仓机工作的第一步骤。其工作原理为：驱动部由液压马达驱动主链轮转动，由双排滚环链带动螺旋给煤轮轴旋转。控制煤泥并使煤泥挤到轮轴中间，刮环链上装有刮板，将煤泥刮运到料斗里，完成控装工作。为了适应煤泥厚度的变化，控装部可上下移动（由升降油缸推拉完成）。螺旋给煤器由左、右螺旋组成，输送槽带由两段组成，在下井时可折开，在主动链轮两侧设有张紧螺杆，可根据需要调整工作中链条的松紧程度。

6.2 装运系统

主要功能：将煤泥由管道输送到指定的地点。

装运系统主要由一个料斗、两个液压缸与活塞、两个料缸与活塞、换向摆缸、换向 S 形管阀等组成。该装运系统主要由一个料斗、两个液压缸与活塞、两个料缸与活塞、换向摆缸、换向 S 形管阀等组成。该装运系统采用的分配阀为 S 形管阀，因其几何形状为直线和弧线的圆滑过渡，各处断面均为圆形，所以物料流通畅通，流动阻力小，而且由于其具有较小的惯性力和微有力的换向驱动油缸，因而使得其换向速度性高且噪声小。

工作原理：由控装部采集的煤泥进入料斗后，S 形管阀在摆动油缸的作用下左右摆动，交替地与两个料缸对接进行装运。接通的料缸则排料，未接通的料缸就进料。料缸中的煤泥在压力的作用下将煤泥输出。活塞油缸驱动交替往复运动（一个推物料，另外一个吸物料），由于两个缸交替进料和出料，因而能连续稳定的排料，将煤泥通过管路输送到指定地点。

6.3 行走部

行走部是清仓机行走的执行机构，也是整机联接支撑的基础，主要由履带、张紧机构，机架和支撑板组成，两条履带分别由两个 YQM42-2.5 液压马达独立驱动，履带与履带架为滑动接触，履带架上设有两槽导向，防止脱轨。

履带由履带板、履带轴和张紧构成。

张紧机构由导向轮、张紧螺母、张紧轴、轴、轴套和浮动密封等组成，它是履带的张紧装置，按照张紧螺母要求，旋转顶于机架固定板上的张紧螺母，使张紧轴轴向移动，带动导向轮伸出，以张紧履带轨。

机架的两侧是履带架体，中间用两个内径为 φ160 的钢管子焊接而成，其内部贯通，构成油泵站油箱的一部分。

支撑板焊接在机架上，用于支撑控装部的尾部。

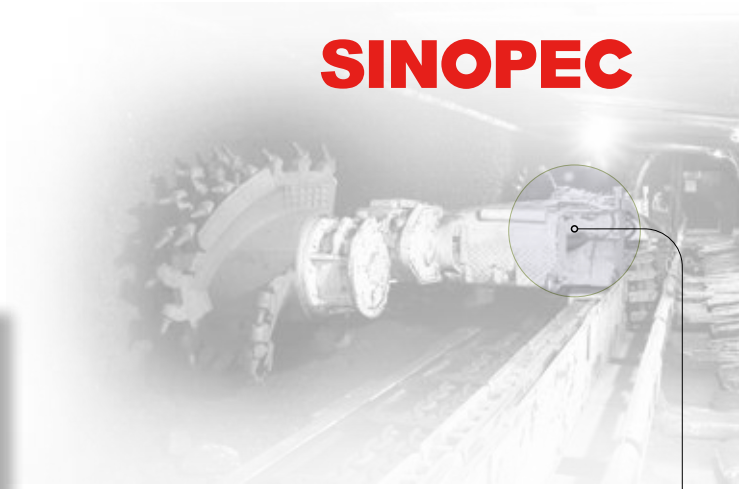
6.4 液压系统(XXX 号抗磨液压油（推荐品种：长城、昆仑、克鲁、美孚）)

清仓机为全液压驱动，整个系统采用开式回路，液压系统从功能上分为两大回路，一是装运油路（输送煤泥油路）、二是负载反馈式比例多路阀组成的油路（行走等功能油路）。液压系统见图 2，液压系统元部件见表 1 所示。

Sinopec L-HM Hydraulic Oil

MQC-75 cleaning machine, EBH200 tunneling machine

Sinopec anti-wear hydraulic oil and industrial gear oil meet the requirements of CCTEG.



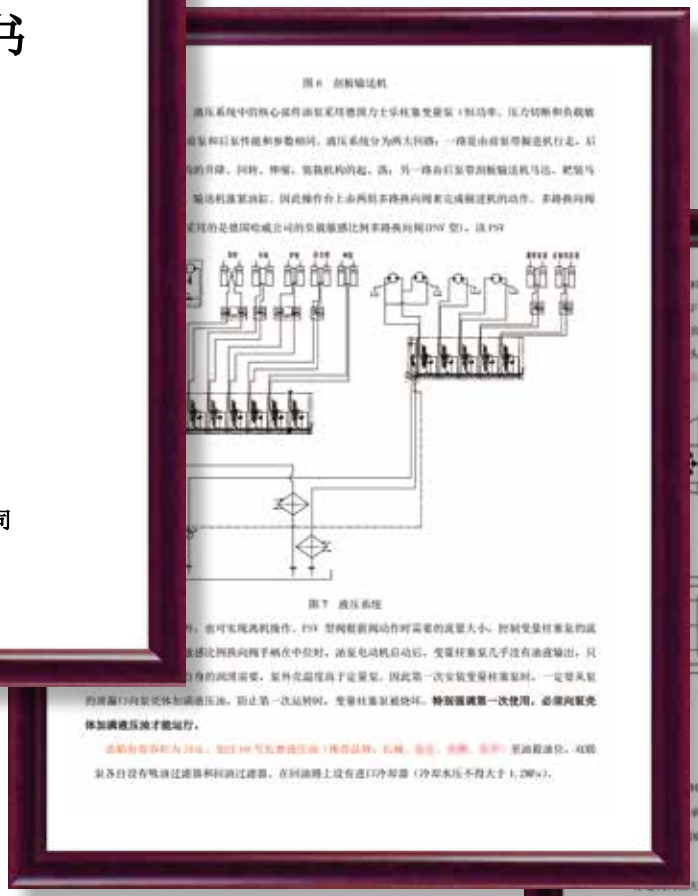
EBH200 型掘进机

使 用 说 明 书

执行标准：MT/T238.2-2008
MT/T238.3-2006
Q/TSY002-2012

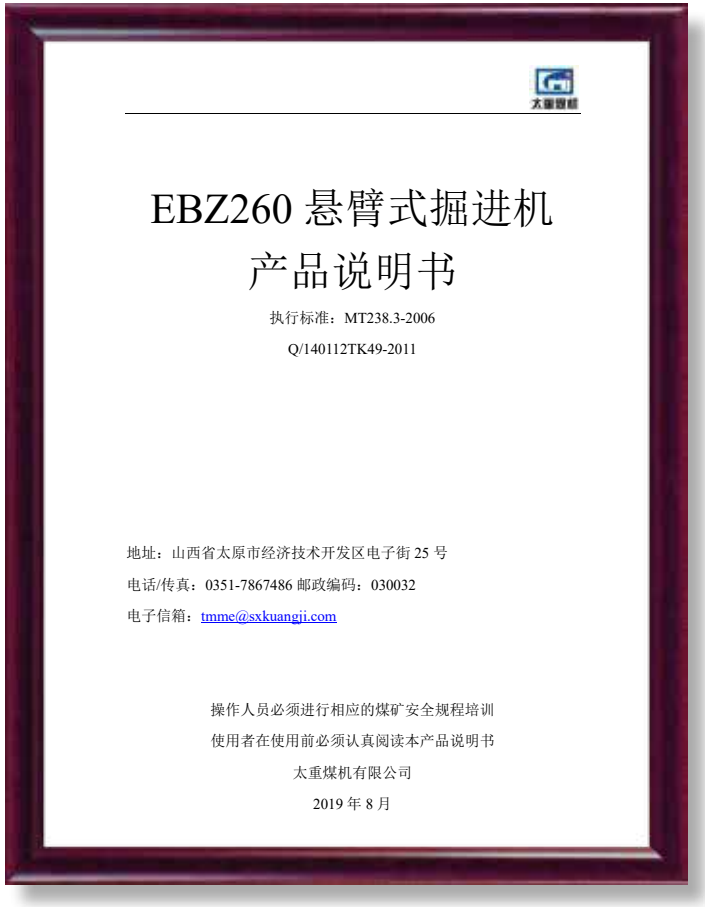
中煤科工集团唐山研究院有限公司

二〇一七年五月





Sinopec anti-wear hydraulic oil and industrial gear oil



EBZ260 悬臂式掘进机
产品说明书

执行标准：MT238.3-2006

Q/140112TK49-2011

地址：山西省太原市经济技术开发区电子街 25 号

电话/传真：0351-7867486 邮政编码：030032

电子信箱：tmme@sxkuangji.com

操作人员必须进行相应的煤矿安全规程培训

使用者在使用前必须认真阅读本产品说明书

太重煤机有限公司

2019 年 8 月



7. 掘进机配套油品

掘进机的注油应按第三章各主要部件的具体要求分别及时加入，保证掘进机的正常运转，推荐使用长效润滑油，对应油品牌号见表 7-1，注油时必须注意：

表 7-1 油品推荐表

序号	SINOPEC/ Great Wall	[illegible]	[illegible]	[illegible]
1	220 号重负荷工业齿轮油 L－CKD220 或 AP 220	[illegible]	[illegible]	[illegible]
2	68 号抗磨液压油 L－HM68	[illegible]	[illegible]	[illegible]

警告：

7.1 注意事项

——请在 5~40℃的周围温度范围内使用，超出上述温度范围可能引发设备故障。

——除了前页给油一览表所示给油部位以外，滑动部位、链条、螺纹等处也须适当地进行给油。

——开动压力机前，必须确认规定的给油，给脂部位已妥善给油，才能进行运转。

7.2 油液系统的使用与维护

——开展必要的油液监测工作，关注系统运行过程中油液性能的变化，建议参照液压油，工业齿轮油等换油指标（见表 7-3~表 7-4）确定是否更换系统运行使用的油液。

——控制液压油和汽轮机油油液中污染物，确保系统运行过程中油液清洁度满足规定要求，达不到规定要求时，应及时采用所需要的过滤装置对油液进行净化处理，确保系统油液清洁度等级满足要求。

——控制油液中的水分含量，建议关注油箱中底部水分富集的情况，定期适当的排除油箱底部的水分。

——液压系统正常工作对油液清洁度要求见下表，建议根据设备的实际情况确保系统油液清洁度满足规定的要求。

EBZ260

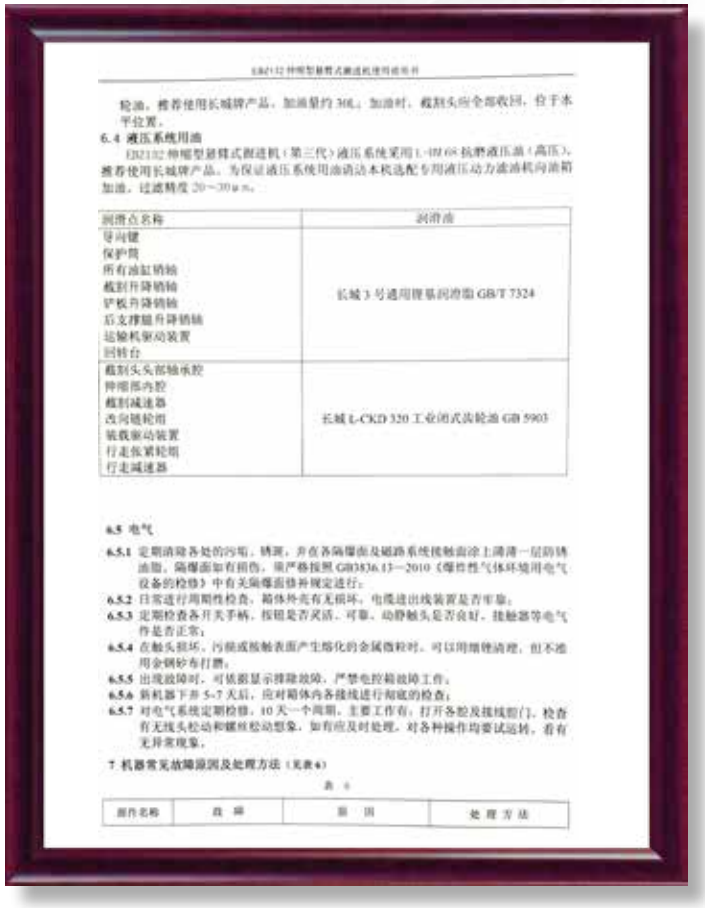
Sinopec AP-S has been included in the manual of Taiyuan Heavy Machinery Group electric shovels, L-HM anti-wear hydraulic oil was written into the manual of Taiyuan Heavy Machinery Group's mainstream tunneling machine.



EBZ132

Sinopec's general lithium grease and L-CKD gear oil have been included in the instruction manual for mainstream series tunneling machines of Xi'an coal mining machinery Co., Ltd.





轮油，推荐使用长城牌产品，加油量约 30L，加油时，截割头应全部收回，位于水平位置。

6.4 液压系统用油

EBZ132 伸缩型悬臂式掘进机（第三代）液压系统采用 L-HM 68 抗磨液压油（高压），推荐使用长城牌产品。为保证液压系统用油洁净本机选配专用液压动力滤油机向油箱加油，过滤精度 20～30μm。

润滑点名称	润滑油
导向键 保护筒 所有油缸销轴 截割升降销轴 铲板升降销轴 后支撑腿升降销轴 运输机驱动装置 回转台	长城 3 号通用锂基润滑脂 GB/T 7324
截割头头部轴承腔 伸缩部内腔 截割减速器 齿间链轮组 装载驱动装置 行走张紧轮组 行走减速器	长城 L-CKD 320 工业闭式齿轮油 GB 5903

6.5 电气

6.5.1 定期清除各处的污垢、锈斑，并在各隔爆面及磁路系统接触面涂上薄薄一层防锈油脂。隔爆面如有损伤，须严格按照 GB3836.13—2010《爆炸性气体环境用电气设备的检修》中有关隔爆面修补规定进行；

6.5.2 日常进行周期性检查，箱体外壳有无损坏，电缆进出线装置是否牢靠；

6.5.3 定期检查各开关手柄，按钮是否灵活、可靠，动静触头是否良好，接触器等电气件是否正常；

6.5.4 在触头损坏、污损或接触表面产生熔化的金属微粒时，可以用细锉清理，但不准用金钢砂布打磨；

6.5.5 出现故障时，可依据显示排除故障，严禁电控箱故障工作；

6.5.6 新机器下井 5-7 天后，应对箱体内各接线进行彻底的检查；

6.5.7 对电气系统定期检修，10 天一个周期，主要工作有：打开各腔及接线腔门，检查有无线头松动和螺丝松动现象，如有应及时处理，对各种操作均要试运转，看有无异常现象。

7 机器常见故障原因及处理方法（见表 4）

表 4

部件名称	故 障	原 因	处 理 方 法



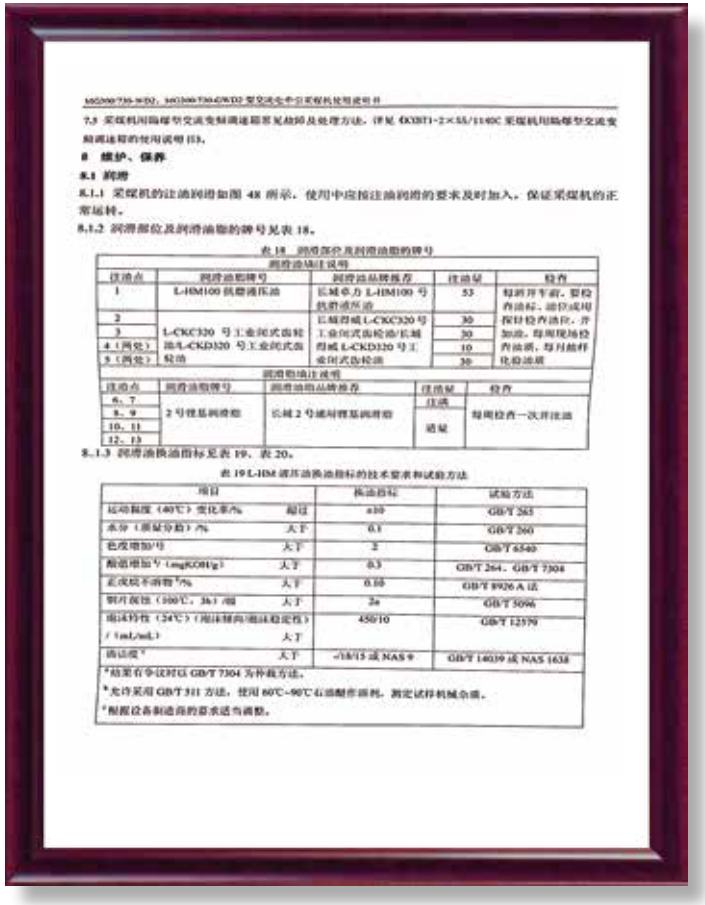
MG300/730-WD2、MG300/730-GWD2 型

交流电牵引采煤机

执行标准：MT/T81-1998
MT/T82-1998
Q/CL 90-2018

使用说明书

上海创力集团股份有限公司
Shanghai Chuangli Mining Equipment Co.,Ltd.
2018 年 3 月



7.3 采煤机用隔爆型交流变频调速箱常见故障及处理方法，详见《XBT1-2×55/1140C 采煤机用隔爆型交流变频调速箱的使用说明书》。

8 维护、保养

8.1 润滑

8.1.1 采煤机的注油润滑如图 48 所示，使用中应按注油润滑的要求及时加入，保证采煤机的正常运转。

8.1.2 润滑部位及润滑油脂的牌号见表 18。

表 18 润滑部位及润滑油脂的牌号

润滑油项注说明				
注油点	润滑油脂牌号	润滑油品牌推荐	注油量	检查
1	L-HM100 抗磨液压油	长城华力 L-HM100 号抗磨液压油	53	每班开车前，要检查油标，油位或用探针检查油位，并加油，每周现场检查油质，每月抽样化验油质
2	L-CKC320 号工业闭式齿轮油/L-CKD320 号工业闭式齿轮油	长城得威 L-CKC320 号工业闭式齿轮油/长城得威 L-CKD320 号工业闭式齿轮油	30	
3			30	
4（两处）			10	
5（两处）	锂基		30	

润滑脂项注说明				
注油点	润滑油脂牌号	润滑油品牌推荐	注油量	检查
6、7	2 号锂基润滑脂	长城 2 号通用锂基润滑脂	注满	每周检查一次并注油
8、9				
10、11			适量	
12、13				

8.1.3 润滑油换油指标见表 19、表 20。

表 19 L-HM 液压油换油指标的技术要求和试验方法

项目		换油指标	试验方法
运动粘度（40℃）变化率/%	超过	±10	GB/T 265
水分（质量分数）/%	大于	0.1	GB/T 260
色度增加/号	大于	2	GB/T 6540
酸值增加[a]/（mgKOH/g）	大于	0.3	GB/T 264、GB/T 7304
正戊烷不溶物[b]/%	大于	0.10	GB/T 8926 A 法
铜片腐蚀（100℃，3h）/级	大于	2a	GB/T 5096
泡沫特性（24℃）（泡沫倾向/泡沫稳定性）/（mL/mL）	大于	450/10	GB/T 12579
清洁度[c]	大于	-/18/15 或 NAS 9	GB/T 14039 或 NAS 1638

[a]结果有争议时以 GB/T 7304 为仲裁方法。

[b]允许采用 GB/T 311 方法，使用 60℃~90℃石油醚作溶剂，测定试样机械杂质。

[c]根据设备制造商的要求适当调整。

CHUANGLI

Sinopec L-HM hydraulic oil, l-CKC/CKD gear oil, lithium grease, etc. have been included in the instructions of Shanghai Chuangli mainstream Shearers.



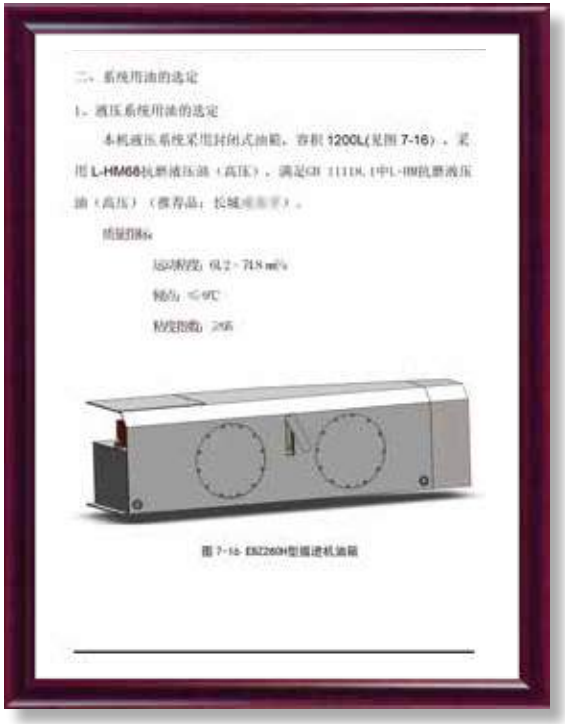
长城工业齿轮油认可证书

中国石化润滑油有限公司：

贵公司生产的长城 AP 工业齿轮油已通过本公司的技术认可，产品质量满足相关技术规范要求，可以作为本公司生产的刮板输送机减速机用油，特此证明。

山西煤矿机械制造股份有限公司技术中心

2019 年 [illegible] 月 15 日



二、系统用油的选定

1、液压系统用油的选定

本机液压系统采用封闭式油箱，容积 1200L(见图 7-16)，采用 L-HM68抗磨液压油（高压），满足GB 11118.1中L-HM抗磨液压油（高压）（推荐品：长城[illegible]）。

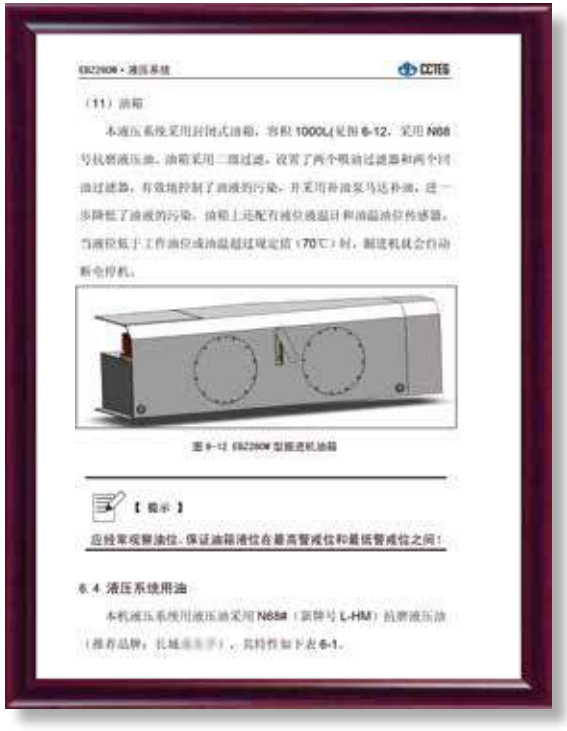
质量指标：

运动粘度(40℃)：61.2～74.8 mm²/s

倾点：≤-9℃

粘度指数：≥95

图 7-16 EKZ260H型输进机油箱



EKZ260H · 液压系统

（11）油箱

本液压系统采用封闭式油箱，容积 1000L(见图 6-12)，采用 N68 号抗磨液压油。油箱采用二级过滤，设置了两个吸油过滤器和两个回油过滤器，有效地控制了油液的污染，并采用补油泵马达补油，进一步降低了油液的污染。油箱上还配有液位液温计和油温油位传感器，当液位低于工作油位或油温超过规定值（70℃）时，输送机就会自动断电停机。

图 6-12 EKZ260W 型输进机油箱

【提示】

应经常观察油位，保证油箱液位在最高警戒位和最低警戒位之间！

6.4 液压系统用油

本机液压系统用液压油采用 N68#（新牌号 L-HM）抗磨液压油（推荐品牌：长城[illegible]），其特性如下表 6-1。

SXSMJ

Sinopec AP industrial gear oil and L-HM anti-wear hydraulic oil have obtained technical certification of scraper conveyor from Shanxi Coal Mining Machinery Manufacturing Co., Ltd.

7





POWER INDUSTRY

SINOPEC

Power Industry

Sinopec has a complete product line of turbine oil, ranking first in the market share of China's power industry. Synchronized technological development with international power generation OEMs such as GE, Siemens, Mitsubishi, as well as domestic OEMs such as Dongfang Turbine, Shanghai Electric. It is the first enterprise in China to obtain Mitsubishi Electric's full range of specification certifications. The application of nuclear power has achieved the "Five Firsts", including China's first nuclear power plant, China's first "Hualong One", overseas's first "Hualong One", the world's first fourth generation nuclear power, and China's first demonstration fast reactor nuclear power.

Sinopec Transformer Oil has obtained all certifications from the top ten equipment manufacturers of transformers and has passed audits by ABB and SIEMENS.

GE—L-TSA



ALSTOM

Power Turbo-Systems

Zehnder Stefan
Alstom
Brown Boveri Strasse 7
5401 Baden
Switzerland

10. December 2004

To
Karen Grenoble
Ethyl Petroleum Additives, Inc
500 Spring Street, P.O Box 2158
Richmond VA 23218-2158
United States of America

Subject: Confirmation for the lube oil Great Wall S-TLV 32

Dear Mrs. Grenoble

We are pleased to inform you, that we will add the lube oil Great Wall S-TLV 32 as recommended lube oil for ALSTOM turbines, in the next edition (U) of our specification HTGD 90117.
We will add the lube oil as follow on to the proved list.

Brand Name	Designation
Great Wall Lubricant Company, Sinopec (no EP additive)	**Great Wall Turbine Oil 32**

Thank you for your confidence.

Yours truly

Stefan Zehnder

Enclosure: Test Report

GE—L-TSA46



ALSTOM

Power Turbo-Systems

Zehnder Stefan
Alstom
Brown Boveri Strasse 7
5401 Baden
Switzerland

12. November 2008

To
Mr. Zhang Chunhui
Lubricant Company, Sinopec Corp.
No. 6 West road of Anning Zhuang
Haidian district, Beijing
China 100085

Subject: Approval of the turbine oil

Dear Mr. Zhang Chunhui

We are pleased to inform you, that the lube oil **Greatwall Weiyue Premium TSA Turbine Oil 46** from the company **Lubricant Company Sinopec** meets the requirements of the ALSTOM specification HTGD 90117 (Lubricating and Control Oils for Turbines).
The above-mentioned oil will be included as a tested and recommended lubricant for ALSTOM turbines in the next edition of our specification HTGD 90117V. The oil will be listed as follow:

Brand Name	Designation	Date of last oil test	With EP additive
Lubricant Company Sinopec	**Greatwall Weiyue Premium TSA Turbine Oil 46**	**Oct. 2008**	**no**

The lube oil can be used by now, on ALSTOM Gas- and Steam turbine units.

Thank you for your confidence.

Kind regards

Stefan Zehnder
For Steam Turbines

Enclosure: Test report No. 201176

HTGD 90117 V0001 AD

Sinopec L-TSA, TSA/LF, TSE/LF, AT-GS, and AT-GS turbine oils meet the GE HTGD 90117 V0001 AD certification requirements and can be used in equipment such as steam turbines, gas turbines, and gas steam combined cycle units in the power industry.



ALSTOM

Power Turbo-Systems

Zehnder Stefan
Alstom
Brown Boveri Strasse 7
5401 Baden
Switzerland

29. January 2009

To
Mr. Tassilo Habereder
Ciba Spezialitätenchemie
Process & Lubricant Add
Klybeckstrasse 141
4057 Basel
Switzerland

Subject: Approval of the turbine oil

Dear Mr. Habereder

We are pleased to inform you that the lube oil:
- Sinopec Great Wall Weiyue TSA/LF 46
- Sinopec Great Wall Weiyue TSE/LF 46

meets the requirements of the ALSTOM specification HTGD 90117 (Lubr
Control Oils for Turbines)
The above-mentioned oil will be included as a tested and recommended l
ALSTOM turbines in the next edition of our specification HTGD 90117W. Th
listed as follow:

Brand Name	Designation	Date of last oil test	With
Sinopec	**Sinopec Great Wall Weiyue TSA/LF 46**	**January 2009**	**No**
Sinopec	**Sinopec Great Wall Weiyue TSE/LF 46**	**January 2009**	**Yes**

The lube oil can be used by now, on ALSTOM Gas- and Steam turbine units.

As agreed, the cost for lube oil testing in our Laboratory will be Euro 13988
After transferring the invoiced amount, we will send the final test report.

Thank you for your confidence.

Kind regards

Stefan Zehnder
For Steam Turbines

Enclosure: Invoice 24143602

GE—L-TSA/LF 46



GE Steam Power
www.ge.com

March 2022

Shixiong Wu
SINOPEC LUBRICANT CO.,LTD
No.455 Gaoyang Road,
Hongkou District, Shanghai 200137 P.R.China

Approval of turbine lubricating oil
Dear Shixiong Wu,

We are pleased to inform you that the lube oil AT-GS32 meet the requirem
specification HTGD 90117 (Lubricating and Control Oils).

The above-mentioned oil will be included as a tested and recommended lu
turbines in the next edition of our specification HTGD 90117. The oil will b

Brand name	Designation	Date of last te
Sinopec	AT-GS32	December 2021

The lube oil can be used by now, on GE Steam Power turbine units.

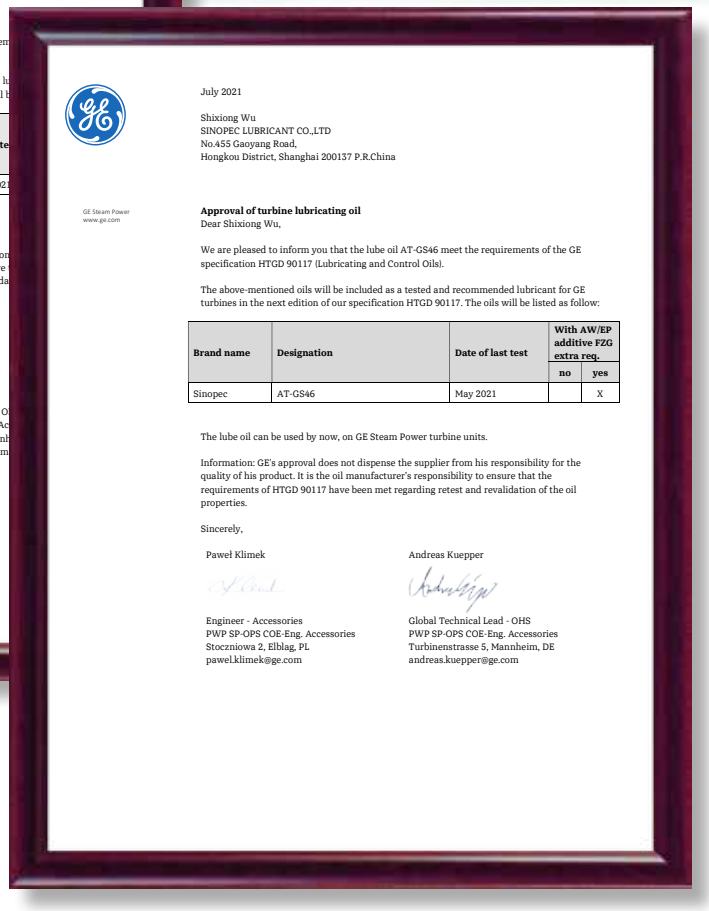
Information: GE's approval does not dispense the supplier from his respon
quality of his product. It is the oil manufacturer's responsibility to ensure
requirements of HTGD 90117 have been met regarding retest and revalida
properties.

Sincerely,

Bogusław Milan
Engineer - Accessories
PWP SP-OPS COE-Eng. Accessories
Stoczniowa 2, Elblag, PL
boguslaw.milan@ge.com

Andreas Kuepper
Global Technical Lead - O
PWP SP-OPS COE-Eng. Ac
Turbinenstrasse 5, Mannh
andreas.kuepper@ge.com

GE—AT-GS32



GE Steam Power
www.ge.com

July 2021

Shixiong Wu
SINOPEC LUBRICANT CO.,LTD
No.455 Gaoyang Road,
Hongkou District, Shanghai 200137 P.R.China

Approval of turbine lubricating oil
Dear Shixiong Wu,

We are pleased to inform you that the lube oil AT-GS46 meet the requirements of the GE specification HTGD 90117 (Lubricating and Control Oils).

The above-mentioned oils will be included as a tested and recommended lubricant for GE turbines in the next edition of our specification HTGD 90117. The oils will be listed as follow:

Brand name	Designation	Date of last test	With AW/EP additive FZG extra req.	
			no	yes
Sinopec	AT-GS46	May 2021		X

The lube oil can be used by now, on GE Steam Power turbine units.

Information: GE's approval does not dispense the supplier from his responsibility for the quality of his product. It is the oil manufacturer's responsibility to ensure that the requirements of HTGD 90117 have been met regarding retest and revalidation of the oil properties.

Sincerely,

Paweł Klimek
Engineer - Accessories
PWP SP-OPS COE-Eng. Accessories
Stoczniowa 2, Elblag, PL
pawel.klimek@ge.com

Andreas Kuepper
Global Technical Lead - OHS
PWP SP-OPS COE-Eng. Accessories
Turbinenstrasse 5, Mannheim, DE
andreas.kuepper@ge.com

GE—AT-GS46

ALSTOM

TLV901304/901305

Sinopec L-TSA, TSA/LF, TSE/LF, AT-GS, and AT turbine oils meet the Siemens TLV901304/901305 certification requirements and can be used in equipment such as steam turbines, gas turbines, and gas steam combined cycle units in the power industry.

Siemens—L-TSA32, 46



SIEMENS

Energy

Afton Chemical GmbH
Dr. Mernolt Schulte
Stresemannring 3
20251 Hamburg

Name Dr. Ludger Quick
Department E F PR PI T M 2

Telephone +49 (208) 456-2953
Fax +49 (208) 456-2139
Mobile +49 (173) 7058293
E-mail ludger.quick@siemens.com

Our reference PIT/2013/126
Date April 16, 2013

Turbine Oil Approval according to Siemens TLV 901304
"SINOPEC Greatwall Weiyue L-TSA 32 (Grade A)" and "SINOPEC Greatwall Weiyue L-TSA 46 (Grade A)"

Dear Mr. Schulte,

We carried out approval testing on the products "SINOPEC Greatwall Weiyue L-TSA 32 (Grade A)" and "SINOPEC Greatwall Weiyue L-TSA 46 (Grade A)" according to Siemens turbine oil specifications TLV 901304. The results are in accordance with this specification. They are listed in the enclosed test certificates.

Herewith we give the formal approval for "SINOPEC Greatwall Weiyue L-TSA 32 (Grade A)" and "SINOPEC Greatwall Weiyue L-TSA 46 (Grade A)" for use in Siemens turbosets without gearbox. The products will be published in the corresponding list of approved turbine oils.

Sincerely yours,

Dr. Ludger Quick

Enclosure
2 Test Certificates

Siemens AG
Energy Sector: Management: Wolfgang Dehen
Fossil Power Generation Division: Management: Michael Suess
Products: Management: Roland Fischer

Mellinghofer Str. 55
45473 Muelheim an der Ruhr
Germany

Tel.: +49 (208) 456 0
Fax: +49 (208) 456 2400



SIEMENS

Energy

Siemens AG, E F PR PI T TM 2, Mellinghofer Str. 55,
45473 Muelheim an der Ruhr

Ms Yi Meirong
Lubricant Company, Sinopec Corp.
No.455 Gaoyang Road, Hongkou District
Shanghai P.R.China
P.C.:200080

Name Dr. Ludger Quick
Department E F PR PI T TM 2

Telephone +49 (208) 456-2953
Fax +49 (208) 456-2139
Mobile +49 (173) 7058293
E-mail ludger.quick@siemens.com

Our reference PIT/2010/126
Date May 21, 2010

Turbine Oil Approval according to Siemens TLV 901304
Sinopec Greatwall Weiyue Long Life Turbine Oil TSA/LF 46
Sinopec Greatwall Weiyue Long Life EP Turbine Oil TSE/LF 46

Dear Ms. Meirong,

We carried out approval testing on your products "Sinopec Greatwall Weiyue Long Life Turbine Oil TSA/LF 46" and "Sinopec Greatwall Weiyue Long Life EP Turbine Oil TSE/LF 46" according to Siemens turbine oil specification TLV 901304. The results are in accordance with this specification. They are listed in the enclosed test certificate.

Herewith we give the formal approval for "Sinopec Greatwall Weiyue Long Life Turbine Oil TSA/LF 46" for use in Siemens turbosets without gearbox and for "Sinopec Greatwall Weiyue Long Life EP Turbine Oil TSE/LF 46" for use in Siemens turbosets with and without gearbox. The products will be published in the list of approved turbine oils.

Sincerely yours,

Quick Ludger

Dr. Ludger Quick

Enclosure
Test Certificates

Siemens AG
Energy Sector: Management: Wolfgang Dehen
Fossil Power Generation Division: Management: Michael Suess
Products: Management: Roland Fischer

Mellinghofer Str. 55
45473 Muelheim an der Ruhr
Germany

Tel.: +49 (208) 456 0
Fax: +49 (208) 456 2400

Siemens Aktiengesellschaft: Chairman of the Supervisory Board: Gerhard Cromme;
Managing Board: Peter Loescher, Chairman, President and Chief Executive Officer; Wolfgang Dehen, Heinrich Hiesinger,
Joe Kaeser, Barbara Kux, Hermann Requardt, Siegfried Russwurm, Peter Y. Solmssen
Registered offices: Berlin and Munich, Germany; Commercial registries: Berlin Charlottenburg, HRB 12300, Munich, HRB 6684
WEEE-Reg.-No. DE 23691322

SCF 11/2008 V08.12

Page 1 of 1

Siemens—TSA/LF46, TSE/LF46



List of approved turbine oils according to TLV 9013 05 — page 3 of 4
Liste der freigegebenen Turbinenöle nach TLV 9013 05 — *Seite 3 von 4*
Issue: February 2015 / *Ausgabe: Februar 2015*

manufacturer / supplier *Hersteller / Lieferant*	product name *Produktbezeichnung*	ISO VG class *ISO VG-Klasse*	for turbosets with gearbox *für Turbosätze mit Getriebe*
Orlen Oil	Turbinex YG 32	32	x
Orlen Oil	Turbinex YG 46	46	x
Orlen Oil	Turbinex YG Premium 32	32	x
Orlen Oil	Turbinex YG Premium 46	46	x
Pan Lubricants & Chemicals	PAZ Perfect HPT 46	46	x
Pertamina	Pertamina Turbolube 32	32	x
Pertamina	Pertamina Turbolube 46	46	x
Petro-Canada Lubricants	Turbofilo 32	32	
Petro-Canada Lubricants	Turbofilo 46	46	
Petro-Canada Lubricants	Turbofilo XL 32	32	
Petro-Canada Lubricants	Turbofilo XL 46	46	
Petro-Canada Lubricants	Turbofilo EP 32	32	x
Petro-Canada Lubricants	Turbofilo EP 46	46	x
Petrochina	KunLun KTL Turbine Oil 32	32	
Petrochina	KunLun KTL Turbine Oil 46	46	
Petrochina	KunLun KTL EP 32	32	x
Petrochina	KunLun KTL EP 46	46	x
Petrochina	Turbine Oil KTG/S 32	32	x
Petrochina	Turbine Oil KTG/S 46	46	x
Petromin Corporation	Turbocompressor Oil 32	32	x
Petromin Corporation	Turbocompressor Oil 46	46	x
Petronas	Petronas Jentera'n HC Extra 32	32	
Petronas	Petronas Jentera'n HC Extra 46	46	x
Phillips 66	Diamond Clean™ Turbine Oil 32	32	
Phillips 66	Diamond Clean™ Anti Turbine Oil 32	32	x
Phillips 66	Turbine Oil 32	32	
Phillips 66	Turbine Oil 46	46	
Phillips 66	Ultra Clean Turbine Oil 32	32	
Phillips 66	Ultra Clean Turbine Oil 46	46	
Prista Oil	Prista tps 32	32	
Prista Oil	Prista tps 46	46	
Raj Petro Specialities	Kyros Super Turbo S 32	32	x
Raj Petro Specialities	Kyros Super Turbo S 46	46	x
Royal Mfg Co	Citrin AS Turbine Oil 32	32	
Royal Mfg Co	Citrin AS Turbine Oil 46	46	
Sinopec Corp.	Sinopec Greatwall Gas Turbine Oil 32	32	x
Sinopec Corp.	Sinopec Greatwall Gas Turbine Oil 46	46	x
Sinopec Corp.	Sinopec Greatwall Turbine Oil TSA/LF 32	32	
Sinopec Corp.	Sinopec Greatwall Turbine Oil TSA/LF 46	46	
Sinopec Corp.	Sinopec Greatwall Turbine Oil TSE/LF 32	32	x
Sinopec Corp.	Sinopec Greatwall Turbine Oil TSE/LF 46	46	x
Shell	Shell Turbo Oil CC 32	32	x
Shell	Shell Turbo Oil CC 46	46	x
Shell	Shell Turbo Oil T 32	32	
Shell	Shell Turbo Oil T 46	46	
Shell	Shell Turbo Oil GT 32	32	
Shell	Shell Turbo Oil GT 46	46	
Shell	Shell Turbo Oil GT-EP 32	32	x

Siemens AG · Power and Gas Division

Siemens—TSA/LF32, TSA/LF46, TSE/LF32, TSE/LF46

Siemens—TSA/LF32



SIEMENS **Energy**

Siemens AG, E F PR PI T M 2, Mellinghofer Str. 55, 45473 Muelheim an der Ruhr

Sinopec Corp.
Mr. Wei Chuanliang
Director of R&D (Shanghai)
No. 455 Gaoyang Road
Shanghai, China
200080

Name Dr. Ludger Quick
Department E F PR PI T M 2

Telephone +49 (208) 456-2953
Fax +49 (208) 456-2139
Mobile +49 (173) 7058293
E-mail ludger.quick@siemens.com

Your letter of PIT/2012/297b
Date October 16, 2012

Turbine Oil Approval according to Siemens TLV 901305
"Sinopec Greatwall Long Life Turbine Oil TSA/LF 32"
"Sinopec Greatwall Gas Turbine Oil 32"
"Sinopec Greatwall Gas Turbine Oil 46"

Dear Mr. Chuanliang,

We carried out approval testing on the products "Sinopec Greatwall Long Life Turbine Oil TSA/LF 32", "Sinopec Greatwall Gas Turbine Oil 32", "Sinopec Greatwall Gas Turbine Oil 46" according to Siemens turbine oil specifications TLV 901305. The results are in accordance with this specification. They are listed in the enclosed test certificates.

Herewith we give the formal approval for "Sinopec Greatwall Long Life Turbine Oil TSA/LF 32" for use in Siemens turbosets without gearbox. Furthermore we give the formal approval for "Sinopec Greatwall Gas Turbine Oil 32" and "Sinopec Greatwall Gas Turbine Oil 46" for use in Siemens turbosets with and without gearbox.

The products will be published in the corresponding list of approved turbine oils.

Sincerely yours,

Quick Ludger

Dr. Ludger Quick

Enclosure
3 Test Certificates

Siemens AG
Energy Sector; Management: Michael Suess
Fossil Power Generation Division; Management: Roland Fischer
Products; Management: Thierry Toupin

Mellinghofer Str. 55
45473 Muelheim an der Ruhr
Germany

Tel.: +49 (208) 456 0
Fax: +49 (208) 456 2400

Siemens Aktiengesellschaft: Chairman of the Supervisory Board: Gerhard Cromme;
Managing Board: Peter Loescher, Chairman, President and Chief Executive Officer; Roland Busch, Brigitte Ederer, Klaus Helmrich, Joe Kaeser, Barbara Kux, Hermann Requardt, Siegfried Russwurm, Peter Y. Solmssen, Michael Suess
Registered offices: Berlin and Munich, Germany; Commercial registries: Berlin Charlottenburg, HRB 12300, Munich, HRB 6684
WEEE-Reg.-No. DE 23691322

SCF 04/2011 V08.12

Page 1 of 1

Siemens—AT46



SIEMENS

Siemens AG, Mellinghofer Str. 55, 45473 Muelheim an der Ruhr, Germany

Sinopec Lubricant CO.,Ltd
Mrs. Wenxiu Xie
Industrial Lube Oil Department Product Engineer
No.455 Gaoyang Road
Hongkou district
Shanghai
China

Name Dr. Ludger Quick
Department GP PGO PR R&D TEST MAT MLH

Phone +49 (173) 7058293
Fax
Mobile +49 (173) 7058293
Mail ludger.quick@siemens.com

Your letter of
Our reference TEST MLH/2019/214D

Date 2019-09-20

Turbine Oil Approval according to Siemens TLV 901305
"Sinopec AT 46"

Dear Mrs. Wenxiu Xie,

For the product "Sinopec AT 46" we have carried out approval tests according to the Siemens turbine oil specification TLV 901305. The results are in accordance with this specification.

We hereby formally grant approval for the product "Sinopec AT 46" for use in Siemens turbosets with and without gearbox. The product is published in the corresponding list of approved turbine oils.

Sincerely yours,

Dr. Ludger Quick

Enclosure
Test Certificate

Siemens AG
Gas and Power; Management: Lisa Davis
Power Generation Operations; Management: Willibald Meixner

Mellinghofer Str. 55
45473 Muelheim an der Ruhr
Germany

Tel.: +49 (208) 456 0

Siemens Aktiengesellschaft; Chairman of the Supervisory Board: Jim Hagemann Snabe;
Managing Board: Joe Kaeser, Chairman, President and Chief Executive Officer; Roland Busch, Lisa Davis, Klaus Helmrich, Janina Kugel, Cedrik Neike, Michael Sen, Ralf P. Thomas
Registered offices: Berlin and Munich, Germany; Commercial registries: Berlin Charlottenburg, HRB 12300, Munich, HRB 6684
WEEE-Reg.-No. DE 23691322

SCFWeb V1.06

Page 1 of 1

Siemens—AT32



SIEMENS

Siemens AG, Mellinghofer Str. 55, 45473 Muelheim an der Ruhr, Germany

Sinopec Lubricant CO.,Ltd
Mrs. Wenxiu Xie
Industrial Lube Oil Department Product Engineer
No.455 Gaoyang Road
Hongkou district
Shanghai
China

Name Dr. Ludger Quick
Department GP PGO PR R&D TEST MAT MLH

Phone +49 (173) 7058293
Fax
Mobile +49 (173) 7058293
Mail ludger.quick@siemens.com

Your letter of
Our reference TEST MLH/2019/214B

Date 2019-09-20

Turbine Oil Approval according to Siemens TLV 901305
"Sinopec AT 32"

Dear Mrs. Wenxiu Xie,

For the product "Sinopec AT 32" we have carried out approval tests according to the Siemens turbine oil specification TLV 901305. The results are in accordance with this specification.

We hereby formally grant approval for the product "Sinopec AT 32" for use in Siemens turbosets with and without gearbox. The product is published in the corresponding list of approved turbine oils.

Sincerely yours,

Dr. Ludger Quick

Enclosure
Test Certificate

Siemens AG
Gas and Power; Management: Lisa Davis
Power Generation Operations; Management: Willibald Meixner

Mellinghofer Str. 55
45473 Muelheim an der Ruhr
Germany

Tel.: +49 (208) 456 0

Siemens Aktiengesellschaft; Chairman of the Supervisory Board: Jim Hagemann Snabe;
Managing Board: Joe Kaeser, Chairman, President and Chief Executive Officer; Roland Busch, Lisa Davis, Klaus Helmrich, Janina Kugel, Cedrik Neike, Michael Sen, Ralf P. Thomas
Registered offices: Berlin and Munich, Germany; Commercial registries: Berlin Charlottenburg, HRB 12300, Munich, HRB 6684
WEEE-Reg.-No. DE 23691322

SCFWeb V1.06

Page 1 of 1

SIEMENS



TOSHIBA

MSG-GMZ-GNRL-0001 Rev0

2nd of September, 2019

Qualification of Lubricants

for Steam Turbines

This qualification certifies that the lubricants listed hereunder meet the specification and are applicable to Steam Turbine supplied by Toshiba Corporation and Toshiba Energy Systems & Solutions Corporation based on the attached oil characteristics.

1. Manufacturer: SINOPEC LUBRICANT CO., LTD.
2. Brand Name: Turbine Oil AT 32

Remarks: This qualification is valid unless the Manufacturer changes manufacturing method and/or materials, additives those may affect the characteristics submitted attached herein.

TOSHIBA ENERGY SYSTEMS & SOLUTIONS CORPORATION
POWER SYSTEM DIVISION
PLANT ENGINEERING DEPARTMENT

Title: Senior Manager
Name: Toshihisa Kiyokuni

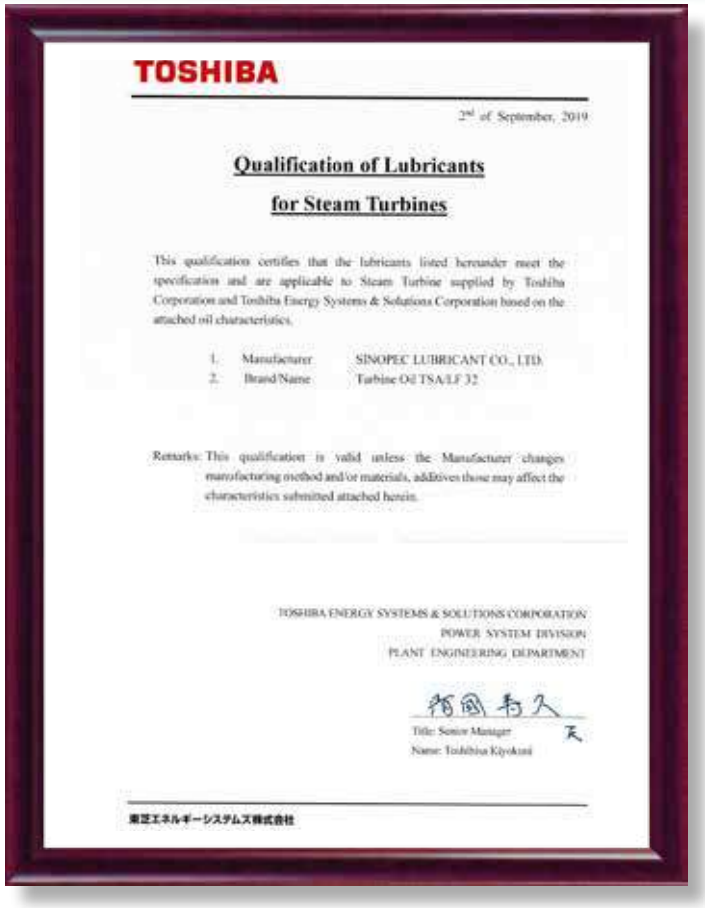
東芝エネルギーシステムズ株式会社

Toshiba—AT32

MSG-GMZ-GNRL-0002 Rev0

Sinopec TSA/LF and AT turbine oils meet the technical specification certification of Toshiba MSG-MZ-GNRL-0002 and can be applied to steam turbine equipment in the power industry.

Toshiba—TSA/LF32



TOSHIBA

2nd of September, 2019

Qualification of Lubricants

for Steam Turbines

This qualification certifies that the lubricants listed hereunder meet the specification and are applicable to Steam Turbine supplied by Toshiba Corporation and Toshiba Energy Systems & Solutions Corporation based on the attached oil characteristics.

1. Manufacturer: SINOPEC LUBRICANT CO., LTD.
2. Brand Name: Turbine Oil TSA/LF 32

Remarks: This qualification is valid unless the Manufacturer changes manufacturing method and/or materials, additives those may affect the characteristics submitted attached herein.

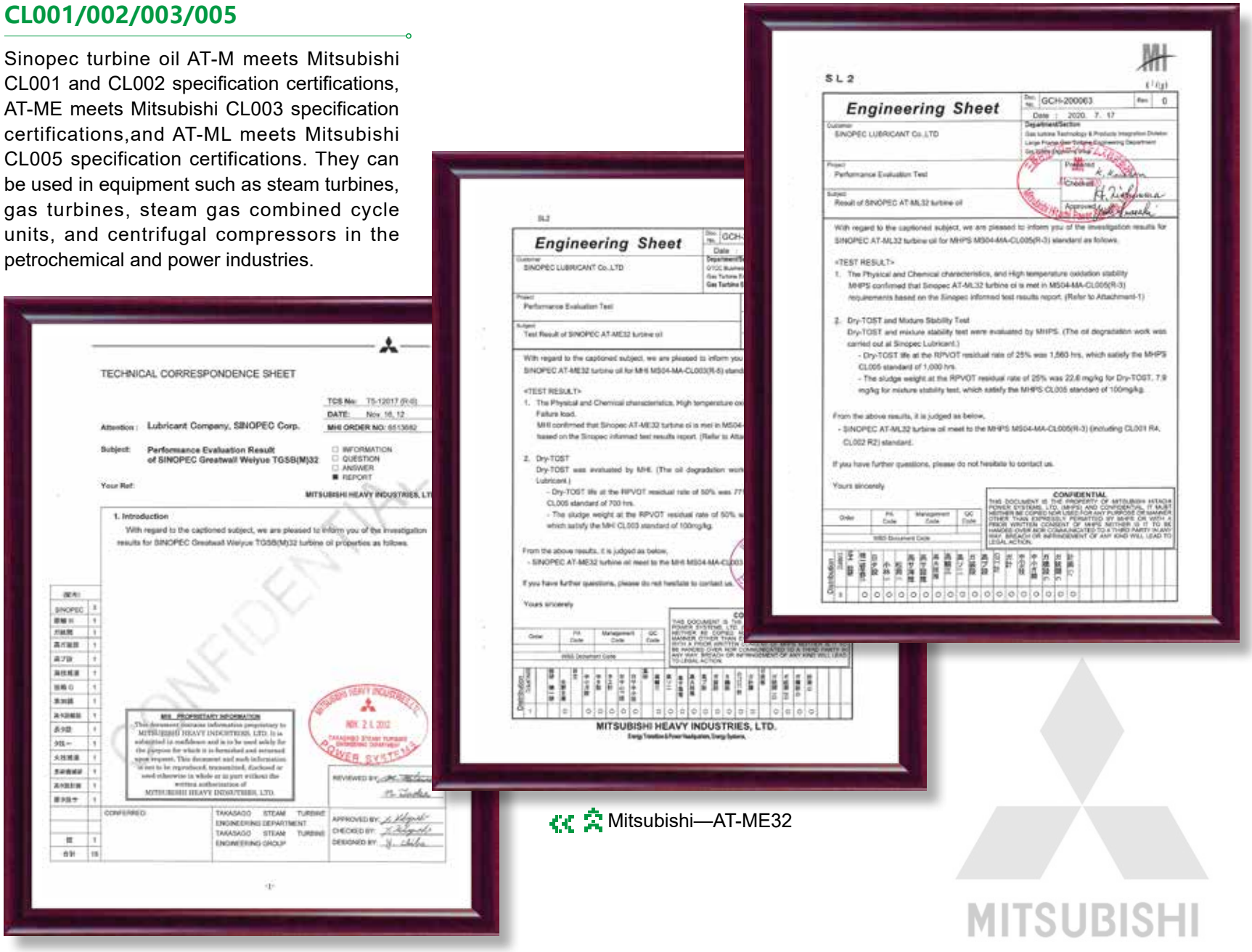
TOSHIBA ENERGY SYSTEMS & SOLUTIONS CORPORATION
POWER SYSTEM DIVISION
PLANT ENGINEERING DEPARTMENT

Title: Senior Manager
Name: Toshihisa Kiyokuni

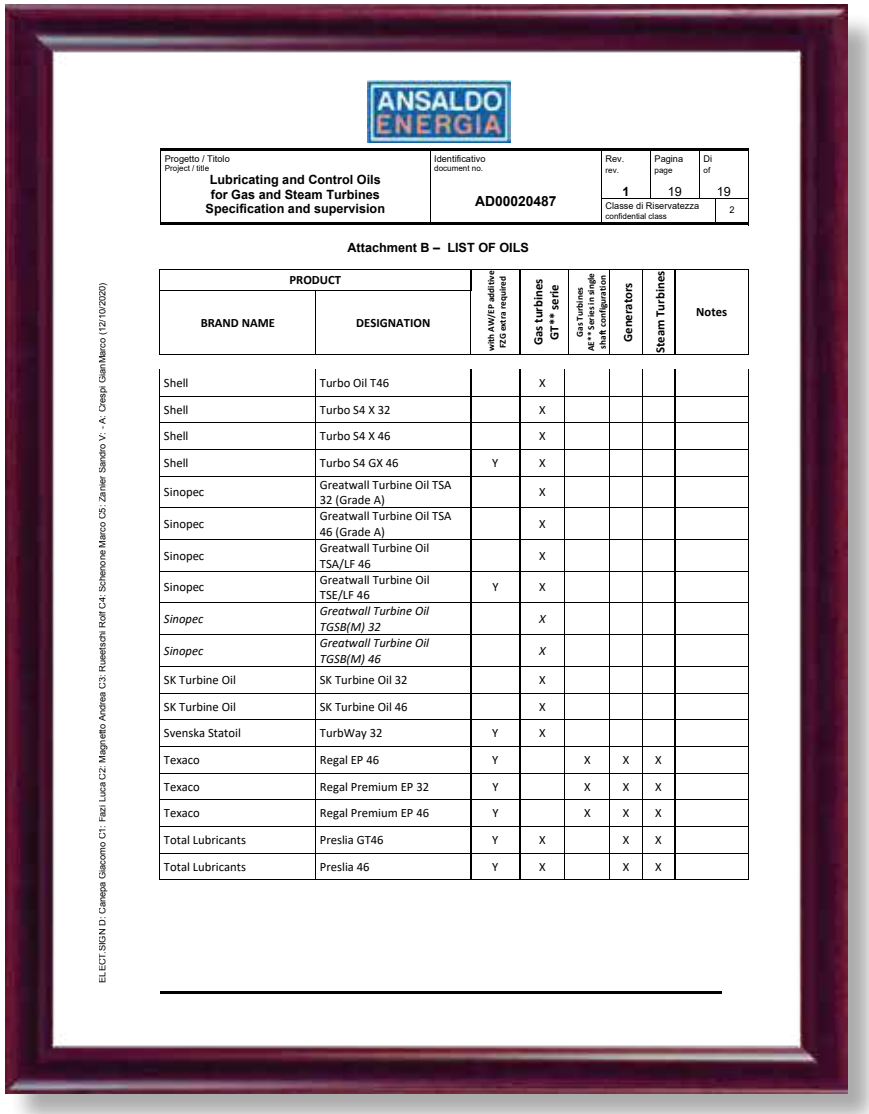
東芝エネルギーシステムズ株式会社

CL001/002/003/005

Sinopec turbine oil AT-M meets Mitsubishi CL001 and CL002 specification certifications, AT-ME meets Mitsubishi CL003 specification certifications,and AT-ML meets Mitsubishi CL005 specification certifications. They can be used in equipment such as steam turbines, gas turbines, steam gas combined cycle units, and centrifugal compressors in the petrochemical and power industries.



Mitsubishi—AT-ME32



ANSALDO ENERGIA

Progetto / Titolo Project / title	Identificativo document no.	Rev. rev.	Pagina page	Di of
Lubricating and Control Oils for Gas and Steam Turbines Specification and supervision	**AD00020487**	**1**	**19**	**19**
		Classe di Riservatezza confidential class		**2**

Attachment B – LIST OF OILS

PRODUCT		with AW/EP additive FZG oetra required	Gas turbines GT** serie	Gas Turbines AE** Heavy duty single shaft configuration	Generators	Steam Turbines	Notes
BRAND NAME	**DESIGNATION**						
Shell	Turbo Oil T46		X				
Shell	Turbo S4 X 32		X				
Shell	Turbo S4 X 46		X				
Shell	Turbo S4 GX 46	Y	X				
Sinopec	Greatwall Turbine Oil TSA 32 (Grade A)		X				
Sinopec	Greatwall Turbine Oil TSA 46 (Grade A)		X				
Sinopec	Greatwall Turbine Oil TSA/LF 46		X				
Sinopec	Greatwall Turbine Oil TSE/LF 46	Y	X				
Sinopec	*Greatwall Turbine Oil TGSB(M) 32*		*X*				
Sinopec	*Greatwall Turbine Oil TGSB(M) 46*		*X*				
SK Turbine Oil	SK Turbine Oil 32		X				
SK Turbine Oil	SK Turbine Oil 46		X				
Svenska Statoil	TurbWay 32	Y	X				
Texaco	Regal EP 46	Y		X	X	X	
Texaco	Regal Premium EP 32	Y		X	X	X	
Texaco	Regal Premium EP 46	Y		X	X	X	
Total Lubricants	Preslia GT46	Y	X		X	X	
Total Lubricants	Preslia 46	Y	X		X	X	

ELECT.SIGN D: Carnepa Giacomo C1: Fazi Luca C2: Magnetto Andrea C3: Ruedisch Rolf C4: Scherrone Marco C5: Zanier Sandro V.: A. Crespi GianMarco (12/10/2020)

Ansaldo—TSA/LF46, TSE/LF32, 46, AT-M32, 46

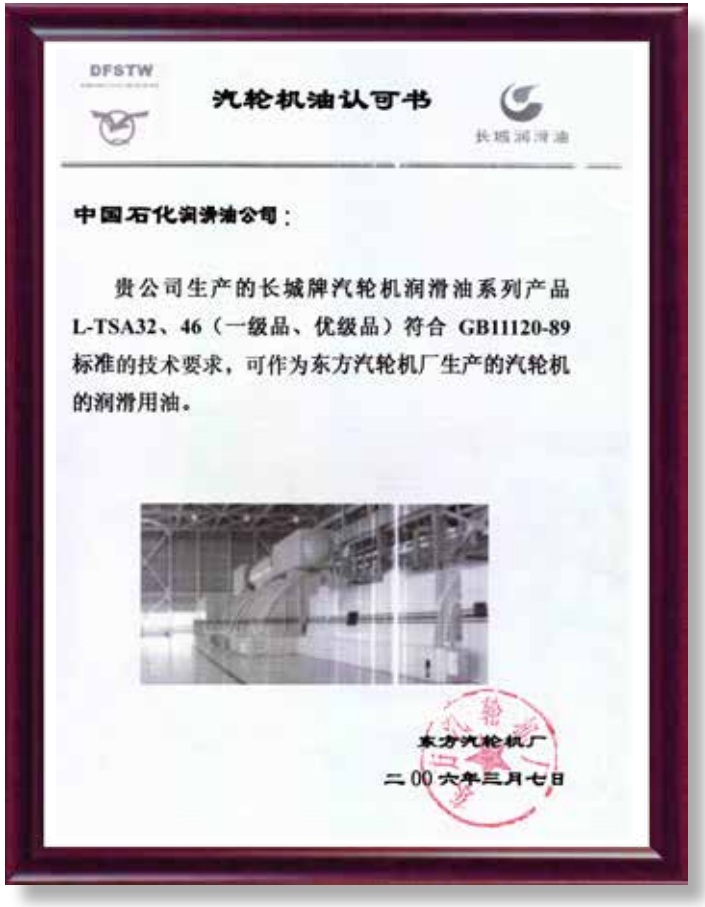
AD00020487 TGO2-0171-E00000/F

Sinopec turbine oil TSA/LF, TSE/LF, AT-M meet Ansaldo D00020487, TGO2-0171-E00000/F specification certification and can be applied to equipment such as gas turbines and gas steam combined cycle units in the power industry.

GB11120, Quoting Mitsubishi specifications

Sinopec L-TSA turbine oil has obtained technical recognition from Dongfang Turbine Co., Ltd. and can be applied to steam turbines, gas turbines, and steam gas combined cycle equipment in the power industry.

Dongfang Turbine Co., Ltd. —L-TSA32, 46


DFSTW

汽轮机油认可书

长城润滑油

中国石化润滑油公司：

贵公司生产的长城牌汽轮机润滑油系列产品L-TSA32、46（一级品、优级品）符合 GB11120-89 标准的技术要求，可作为东方汽轮机厂生产的汽轮机的润滑用油。

东方汽轮机厂

二00六年三月七日


上海电气

认可证书

Certification

中国石化润滑油公司：

Lubricant Company, Sinopec Corp.:

长城牌 L-TSA 系列产品，TSA/LF、TSE/LF 长寿命汽轮机油系列产品，满足上海电气电站设备有限公司上海汽轮机厂生产的汽轮机的使用要求。

Sinopec L-TSA series and TSA/LF, TSE/LF series turbine oils meet the requirements of turbosets produced by Shanghai Electric.

其中 L-TSA 系列产品和 TSA/LF 系列产品可以用于无齿轮减速箱的汽轮机中；TSE/LF 系列产品可以用于带或不带齿轮减速箱的汽轮机中。

Herewith we give the formal approval for "Sinopec L-TSA series, TSA/LF series" for use in Shanghai Electric turbosets without gearbox and for "Sinopec TSE/LF series" for use in Shanghai Electric turbosets with and without gearbox.

上海电气电站设备有限公司上海汽轮机厂
设计研究所

Shanghai Electric Power Generation Equipment Co.Ltd.
Shanghai Turbine Works
Design&Research Institute
2010.07.15

上海电气 -L-TSA(A 级), TSA/LF, TSE/LF 系列

上海电气 SHANGHAI ELECTRIC

GB11120, Quoting Siemens and Ansaldo specifications

Sinopec turbine oil L-TSA, TSA/LF, TSE/LF have obtained technical recognition from Shanghai Electric.



汽轮机油认可书

长城润滑油

中国石化润滑油公司：

贵公司生产的长城牌汽轮机润滑油系列产品 L-TSA32、46（一级品、优级品）符合 GB11120-89 标准的技术要求，可作为南京汽轮电机集团公司生产的汽轮机的推荐润滑用油。

南京汽轮电机集团公司

二00六年三月二十二日

Nanjing Turbine &Electric Machinery (Group) Co., Ltd)—-L-TSA32, 46

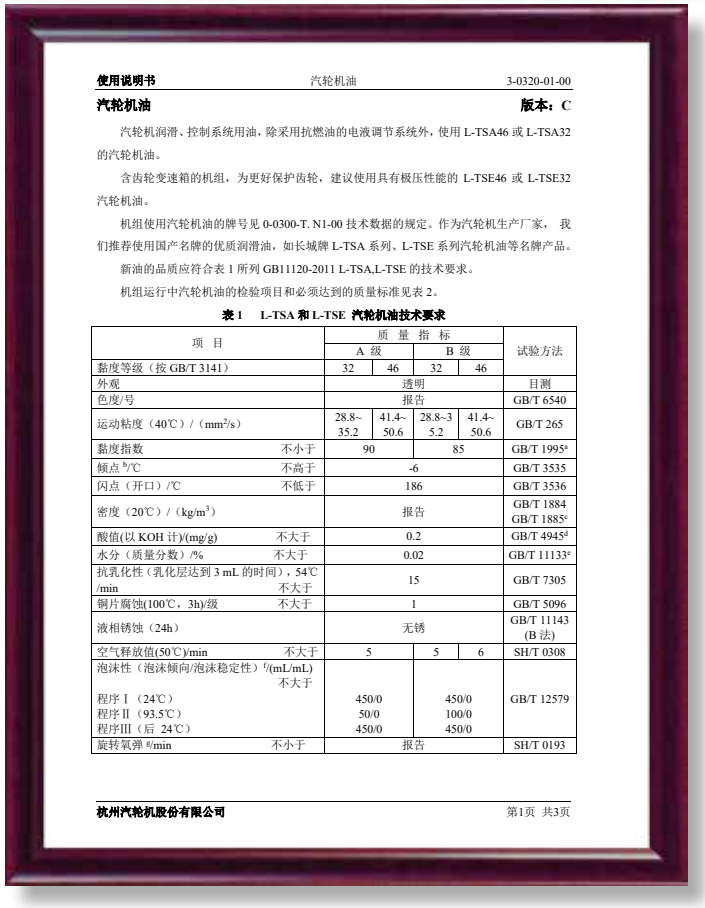
GB11120, Quoting GE specifications

Sinopec turbine oil L-TSA have obtained technical recognition from Nanjing Turbine &Electric Machinery (Group) Co., Ltd.

SINOPEC

L-TSA and L-TSE series products are included in the device manual of Hangzhou Turbine Power Group Co., Ltd. (HTC).

Hangzhou Turbine Power Group Co., Ltd. —L-TSA, L-TSE



使用说明书　汽轮机油　3-0320-01-00

汽轮机油　**版本：C**

汽轮机润滑、控制系统用油，除采用抗燃油的电液调节系统外，使用 L-TSA46 或 L-TSA32 的汽轮机油。

含齿轮变速箱的机组，为更好保护齿轮，建议使用具有极压性能的 L-TSE46 或 L-TSE32 汽轮机油。

机组使用汽轮机油的牌号见 0-0300-T. N1-00 技术数据的规定。作为汽轮机生产厂家，我们推荐使用国产名牌的优质润滑油，如长城牌 L-TSA 系列、L-TSE 系列汽轮机油等名牌产品。

新油的品质应符合表 1 所列 GB11120-2011 L-TSA,L-TSE 的技术要求。

机组运行中汽轮机油的检验项目和必须达到的质量标准见表 2。

表 1　L-TSA 和 L-TSE 汽轮机油技术要求

项　目	质　量　指　标				试验方法
	A 级		B 级		
黏度等级（按 GB/T 3141）	32	46	32	46	
外观	透明				目测
色度/号	报告				GB/T 6540
运动粘度（40℃）/（mm^2/s）	28.8~35.2	41.4~50.6	28.8~35.2	41.4~50.6	GB/T 265
黏度指数　不小于	90		85		GB/T 1995[a]
倾点[b]/℃　不高于	-6				GB/T 3535
闪点（开口）/℃　不低于	186				GB/T 3536
密度（20℃）/（kg/m^3）	报告				GB/T 1884 GB/T 1885[c]
酸值(以 KOH 计)/(mg/g)　不大于	0.2				GB/T 4945[d]
水分（质量分数）/%　不大于	0.02				GB/T 11133[e]
抗乳化性（乳化层达到 3 mL 的时间），54℃ /min　不大于	15				GB/T 7305
铜片腐蚀(100℃，3h)/级　不大于	1				GB/T 5096
液相锈蚀（24h）	无锈				GB/T 11143 (B 法)
空气释放值(50℃)/min　不大于	5		5	6	SH/T 0308
泡沫性（泡沫倾向/泡沫稳定性）[f]/(mL/mL)　不大于					
程序Ⅰ（24℃）	450/0		450/0		GB/T 12579
程序Ⅱ（93.5℃）	50/0		100/0		
程序Ⅲ（后 24℃）	450/0		450/0		
旋转氧弹 [g]/min　不小于	报告				SH/T 0193

杭州汽轮机股份有限公司　第1页 共3页

GB11120

L-TSA turbine oil has obtained technical certification from Voith Hydro Equipment Co., Ltd. and can be widely used in water turbine equipment in the hydropower industry.

Voith Hydro Equipment Co., Ltd. —TSA/46



VOITH 认可证书

Certification

中国石化润滑油有限公司：

Sinopec Lubricant Co.,Ltd.：

贵公司生产的"长城牌"L-TSA46汽轮机油（A级）符合GB11120-2011规格要求，已在江西洪屏、巴基斯坦塔贝拉等水电站中福伊特生产的水轮机上使用，使用效果良好。长城L-TSA46汽轮机油（A级）符合上海福伊特水电设备有限公司水轮机组的运行要求。

Sinopec L-TSA 46 turbine oils meet the specification of GB11120-2011(ISO 8068-2006). The products have been used on the hydroturbine units produced by VOITH in Hong Ping (China) & Tarbela (Pakistan) Hydropower station and got good applied results. Herewith Sinopec L-TSA46 turbine oil meet the requirements of hydroturbine produced by VOITH.

上海福伊特水电设备有限公司

Voith hydro equipment co., LTD., Shanghai

2017 年 9 月 18 日



ZHEFU HYDROPOWER EQUIPMENT

认可证书

Certification

中国石化润滑油有限公司：

SinopecLubricant Co.,Ltd.：

长城牌 L-TSA 汽轮机油系列产品，TSA/LF 长寿命汽轮机油系列产品，满足我厂生产的水轮机组的使用要求,可以用于我厂水轮机组上。

Sinopec GreatwallL-TSA and TSA/LF turbine oilsseriesmeet the requirements of hydropower unitsproducedby our company，and can be used on them.

浙江富春江水电设备有限公司

Zhejiang Fuchunjiang Hydropower Equipment Co.,Ltd.

2016 年 5 月 10 日

Zhejiang Fuchunjiang Hydropower Equipment Co., Ltd—-L-TSA, TSA/LF

GB11120

The L-TSA TSA/LF series products have obtained technical certification from Zhejiang Fuchunjiang Hydropower Equipment Co., Ltd.



汽轮机油认可证书

中国石化润滑油有限公司：

贵公司生产的长城牌 L-TSA 汽轮机油（A 级）系列产品符合 GB11120-2011 规格要求，可作为中国长江动力集团有限公司生产的火力发电机组和水力发电机组的推荐润滑用油。

中国长江动力集团有限公司

2014年 8月 26日

China Chang Jiang Energy Corporation—-L-TSA

中国航天 中国长江动力集团有限公司 CHINA CHANG JIANG ENERGY CORPORATION

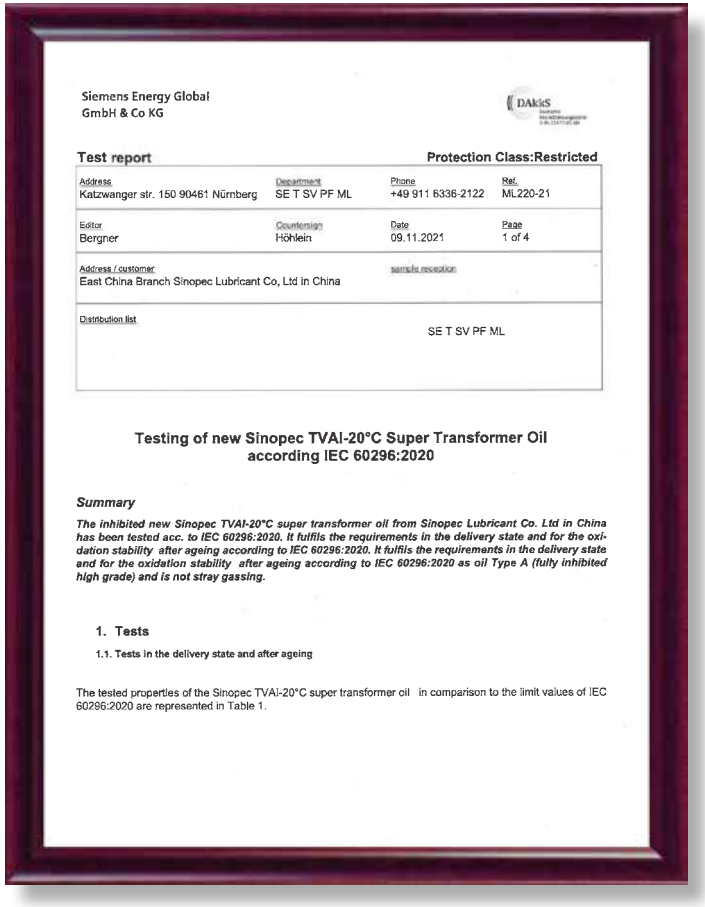
GB11120

Sinopec L-TSA series products have obtained technical certification from China Chang Jiang Energy Corporation.

IEC 60296:2020

Sinopec TVAI-20℃ Super Insulated Transformer Oil meets the Siemens IEC 60296:2020 specification requirements and can be applied to oil immersed transformers in the power industry.

Sinopec TVAI-20℃ Super Insulated Transformer Oil



Siemens Energy Global
GmbH & Co KG

DAkkS

Test report **Protection Class:Restricted**

Address	Department	Phone	Ref.
Katzwanger str. 150 90461 Nürnberg	SE T SV PF ML	+49 911 6336-2122	ML220-21
Editor	**Countersign**	**Date**	**Page**
Bergner	Höhlein	09.11.2021	1 of 4
Address / customer		**sample reception**	
East China Branch Sinopec Lubricant Co, Ltd in China			
Distribution list		SE T SV PF ML	

Testing of new Sinopec TVAI-20°C Super Transformer Oil according IEC 60296:2020

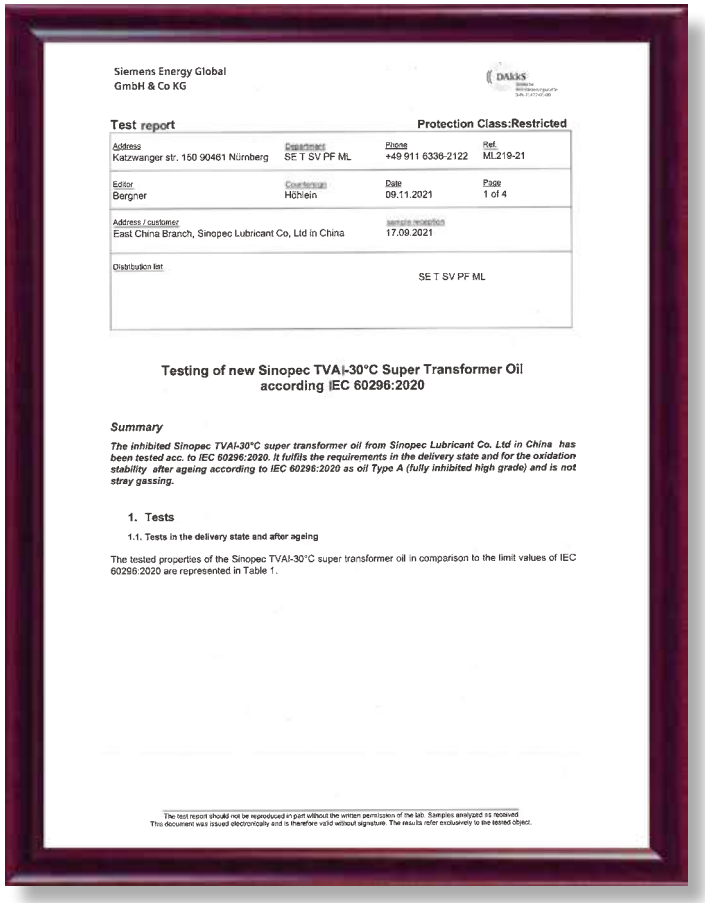
Summary

The inhibited new Sinopec TVAI-20°C super transformer oil from Sinopec Lubricant Co. Ltd in China has been tested acc. to IEC 60296:2020. It fulfils the requirements in the delivery state and for the oxidation stability after ageing according to IEC 60296:2020. It fulfils the requirements in the delivery state and for the oxidation stability after ageing according to IEC 60296:2020 as oil Type A (fully inhibited high grade) and is not stray gassing.

1. Tests

1.1. Tests in the delivery state and after ageing

The tested properties of the Sinopec TVAI-20°C super transformer oil in comparison to the limit values of IEC 60296:2020 are represented in Table 1.



Siemens Energy Global
GmbH & Co KG

DAkkS

Test report **Protection Class:Restricted**

Address	Department	Phone	Ref.
Katzwanger str. 150 90461 Nürnberg	SE T SV PF ML	+49 911 6336-2122	ML219-21
Editor	**Countersign**	**Date**	**Page**
Bergner	Höhlein	09.11.2021	1 of 4
Address / customer		**sample reception**	
East China Branch, Sinopec Lubricant Co, Ltd in China		17.09.2021	
Distribution list		SE T SV PF ML	

Testing of new Sinopec TVAI-30°C Super Transformer Oil according IEC 60296:2020

Summary

The inhibited Sinopec TVAI-30°C super transformer oil from Sinopec Lubricant Co. Ltd in China has been tested acc. to IEC 60296:2020. It fulfils the requirements in the delivery state and for the oxidation stability after ageing according to IEC 60296:2020 as oil Type A (fully inhibited high grade) and is not stray gassing.

1. Tests

1.1. Tests in the delivery state and after ageing

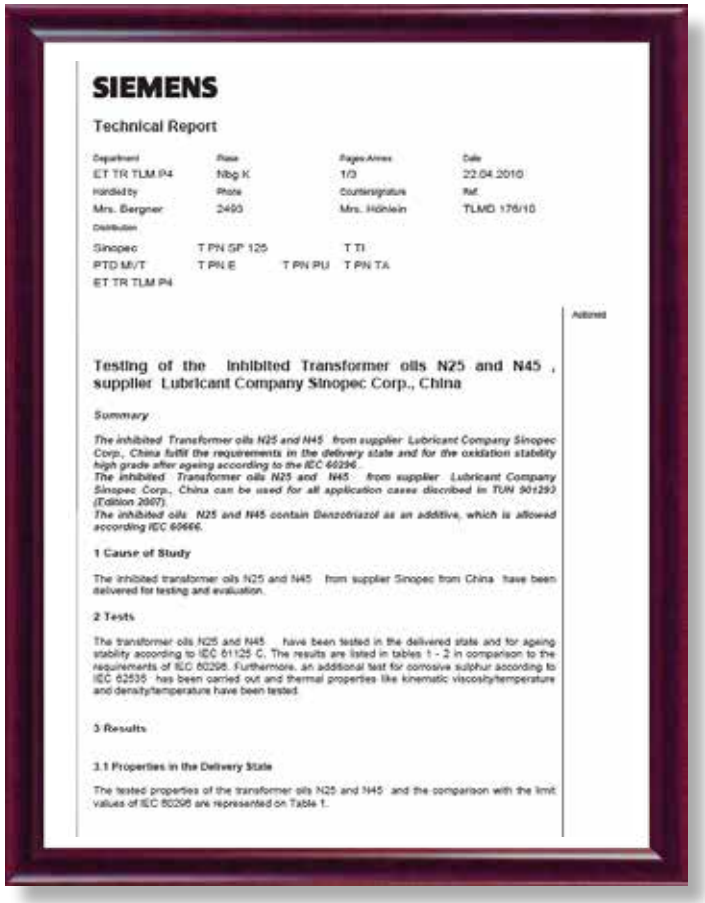
The tested properties of the Sinopec TVAI-30°C super transformer oil in comparison to the limit values of IEC 60296:2020 are represented in Table 1.

The test report should not be reproduced in part without the written permission of the lab. Samples analyzed as received
This document was issued electronically and is therefore valid without signature. The results refer exclusively to the tested object.

Sinopec TVAI-30℃ Super Insulated Transformer Oil

IEC 60296:2020

Sinopec TVAI-30℃ Super Insulated Transformer Oil meets the Siemens IEC 60296:2020 specification requirements and can be applied to oil immersed transformers in the power industry.



SIEMENS

Technical Report

Department	Place	Pages/Annex	Date
ET TR TLM P4	Nbg K	1/3	22.04.2010
Handled by	Phone	Countersignature	Ref.
Mrs. Bergner	2493	Mrs. Höhlein	TLMD 176/10

Distribution

Sinopec T PN SP 125 T TI
PTD M/T T PN E T PN PU T PN TA
ET TR TLM P4

Actioned

Testing of the Inhibited Transformer oils N25 and N45 , supplier Lubricant Company Sinopec Corp., China

Summary

The inhibited Transformer oils N25 and N45 from supplier Lubricant Company Sinopec Corp., China fulfil the requirements in the delivery state and for the oxidation stability high grade after ageing according to the IEC 60296.
The inhibited Transformer oils N25 and N45 from supplier Lubricant Company Sinopec Corp., China can be used for all application cases discribed in TUN 901293 (Edition 2007).
The inhibited oils N25 and N45 contain Benzotriazol as an additive, which is allowed according IEC 60666.

1 Cause of Study

The inhibited transformer oils N25 and N45 from supplier Sinopec from China have been delivered for testing and evaluation.

2 Tests

The transformer oils N25 and N45 have been tested in the delivered state and for ageing stability according to IEC 61125 C. The results are listed in tables 1 - 2 in comparison to the requirements of IEC 60296. Furthermore, an additional test for corrosive sulphur according to IEC 62535 has been carried out and thermal properties like kinematic viscosity/temperature and density/temperature have been tested.

3 Results

3.1 Properties in the Delivery State

The tested properties of the transformer oils N25 and N45 and the comparison with the limit values of IEC 60296 are represented on Table 1.

Sinopec 25#, 45# Inhibited Transformer oils

IEC 60296:2012

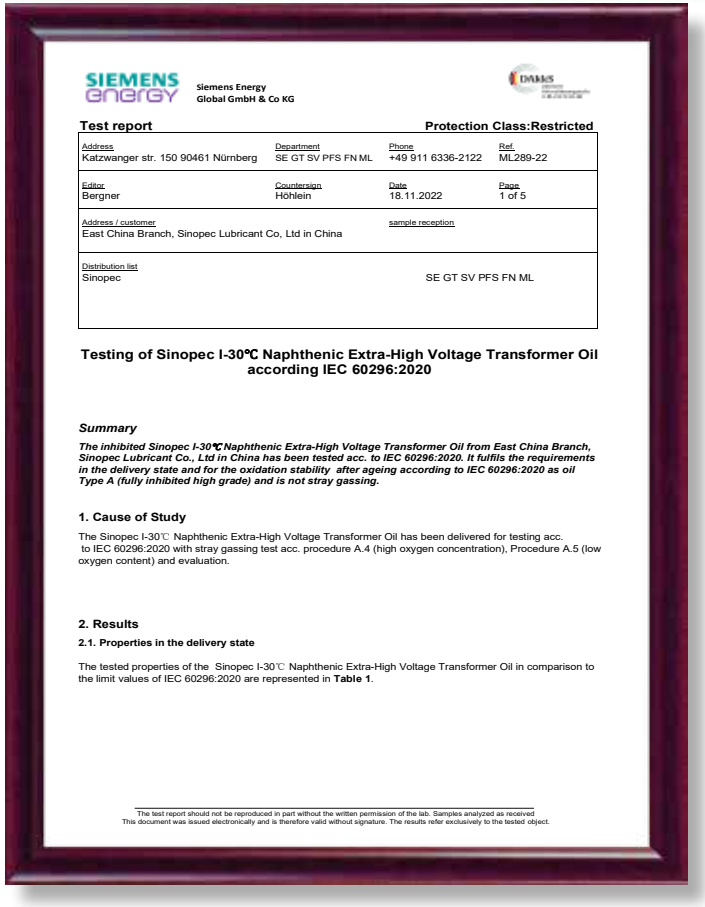
Sinopec 25#, 45# Inhibited Transformer oils meet the Siemens IEC 60296:2012 specification requirements and can be applied to oil immersed transformers in the power industry.

SINOPEC

IEC 60296:2020

I-30℃ Naphthenic Extra-high voltage Transformer Oil meets the Siemens IEC 60296:2020 specification requirements and can be applied to oil immersed transformers in the power industry.

Sinopec I-30℃ Naphthenic Extra-high voltage Transformer Oil



SIEMENS energy Siemens Energy Global GmbH & Co KG

DAkkS

Test report **Protection Class:Restricted**

Address	Department	Phone	Ref.
Katzwanger str. 150 90461 Nürnberg	SE GT SV PFS FN ML	+49 911 6336-2122	ML289-22
Editor	**Countersign**	**Date**	**Page**
Bergner	Höhlein	18.11.2022	1 of 5
Address / customer		**sample reception**	
East China Branch, Sinopec Lubricant Co, Ltd in China			
Distribution list			
Sinopec		SE GT SV PFS FN ML	

Testing of Sinopec I-30℃ Naphthenic Extra-High Voltage Transformer Oil according IEC 60296:2020

Summary

The inhibited Sinopec I-30℃ Naphthenic Extra-High Voltage Transformer Oil from East China Branch, Sinopec Lubricant Co., Ltd in China has been tested acc. to IEC 60296:2020. It fulfils the requirements in the delivery state and for the oxidation stability after ageing according to IEC 60296:2020 as oil Type A (fully inhibited high grade) and is not stray gassing.

1. Cause of Study

The Sinopec I-30℃ Naphthenic Extra-High Voltage Transformer Oil has been delivered for testing acc. to IEC 60296:2020 with stray gassing test acc. procedure A.4 (high oxygen concentration), Procedure A.5 (low oxygen content) and evaluation.

2. Results

2.1. Properties in the delivery state

The tested properties of the Sinopec I-30℃ Naphthenic Extra-High Voltage Transformer Oil in comparison to the limit values of IEC 60296:2020 are represented in **Table 1**.

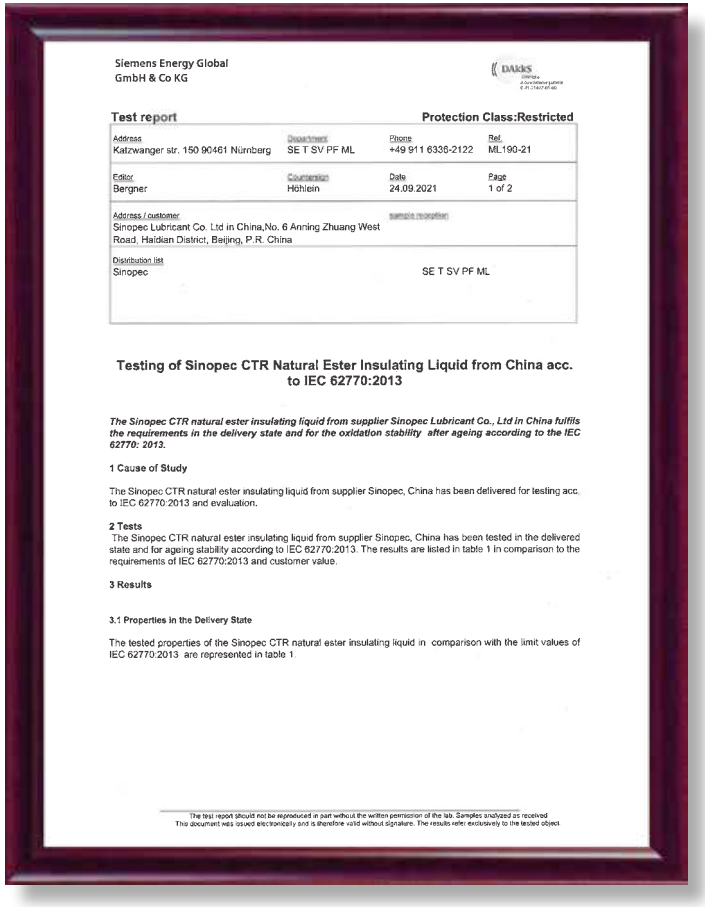
The test report should not be reproduced in part without the written permission of the lab. Samples analyzed as received
This document was issued electronically and is therefore valid without signature. The results refer exclusively to the tested object.

IEC 62770:2013

Sinopec CTR natural esters insulating oil meets the Siemens IEC 62770:2013 specification requirements and can be applied to oil immersed transformers in the power industry.

SIEMENS

Sinopec CTR natural esters insulating oil



Siemens Energy Global
GmbH & Co KG

Test report **Protection Class:Restricted**

Address	Department	Phone	Ref.
Katzwanger str. 150 90461 Nürnberg	SE T SV PF ML	+49 911 6336-2122	ML190-21
Editor	Countersign	Date	Page
Bergner	Höhlein	24.09.2021	1 of 2

Address / customer
Sinopec Lubricant Co. Ltd in China,No. 6 Anning Zhuang West Road, Haidian District, Beijing, P.R. China

sample reception

Distribution list
Sinopec

SE T SV PF ML

Testing of Sinopec CTR Natural Ester Insulating Liquid from China acc. to IEC 62770:2013

The Sinopec CTR natural ester insulating liquid from supplier Sinopec Lubricant Co., Ltd in China fulfils the requirements in the delivery state and for the oxidation stability after ageing according to the IEC 62770: 2013.

1 Cause of Study

The Sinopec CTR natural ester insulating liquid from supplier Sinopec, China has been delivered for testing acc. to IEC 62770:2013 and evaluation.

2 Tests

The Sinopec CTR natural ester insulating liquid from supplier Sinopec, China has been tested in the delivered state and for ageing stability according to IEC 62770:2013. The results are listed in table 1 in comparison to the requirements of IEC 62770:2013 and customer value.

3 Results

3.1 Properties in the Delivery State

The tested properties of the Sinopec CTR natural ester insulating liquid in comparison with the limit values of IEC 62770:2013 are represented in table 1.

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This document was issued electronically and is therefore valid without signature. The results refer exclusively to the tested object

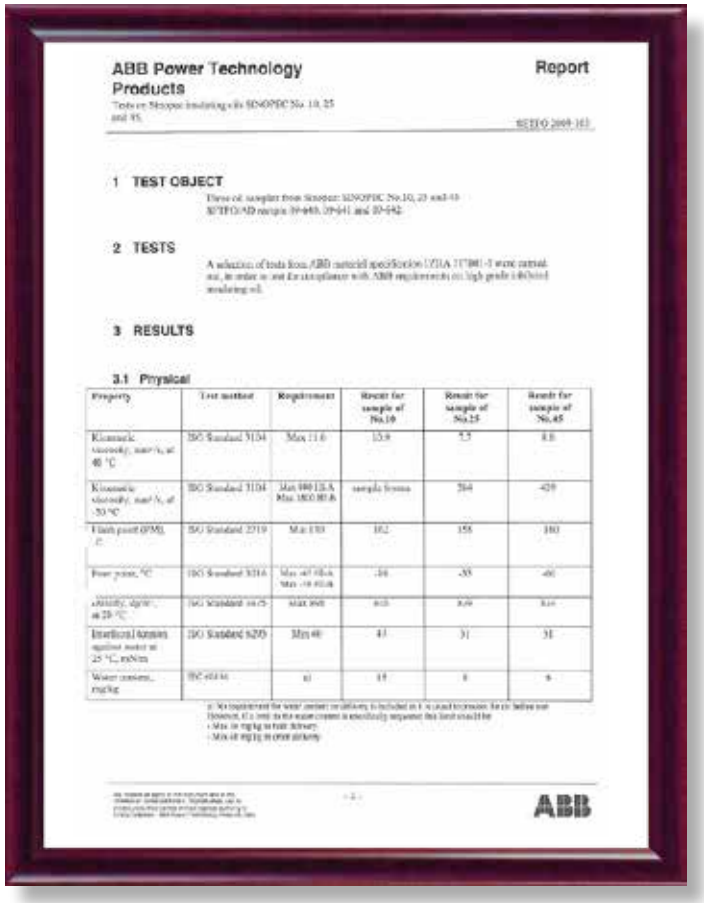


ABB Power Technology Products

Report

1 TEST OBJECT

2 TESTS

3 RESULTS

3.1 Physical

Property	Test method	Requirement	Result for sample of No.10	Result for sample of No.25	Result for sample of No.45
Kinematic viscosity, mm²/s, at 40 °C	ISO Standard 3104	Max 11.0	10.9	9.5	8.6
Kinematic viscosity, mm²/s, at -30 °C	ISO Standard 3104	Max 800 (1) A Max 1800 (1) B	sample frozen	564	429
Flash point (PM), °C	ISO Standard 2719	Min 250	302	288	280
Pour point, °C	ISO Standard 3016	Max -45 (1) A Max -36 (1) B	-39	-39	-40
Density, g/cm³, at 20 °C	ISO Standard 3675	0.905 - 0.965	0.93	0.94	0.95
Interfacial tension against water at 25 °C, mN/m	ISO Standard 6295	Min 40	43	31	31
Water content, mg/kg	IEC 60814	60	19	8	6

a) No requirement for water content on delivery is included in 1 a, since it is unrealistic for it to be below 60. However, if it were to be the water content is anecdotally required this limit would be
- Max. 60 mg/kg in bulk delivery
- Max. 40 mg/kg in drum delivery

ABB

Sinopec 10#, 25#, 45# insulating oils

1ZBA117001-10

Sinopec 10#, 25#, 45#insulating oils meet the ABB 1ZBA117001-10 specification requirements and can be applied to oil immersed transformers in the power industry.



Rev_ind.	Revision	Appd.	Date
A	New	Jimi Liu	2008-09-18
B	产品标记和技术要求更新	Jimi Liu	2013-01-05
C	增加中石化变压器油	Victor Ye	2017-08-07

1. **变压器油应符合但不局限于以下标准:**
   Transformer oil shall be complied with but not be restricted by the following standards:
   IEC 60296-2012 Fluids for electrotechnical applications –Unused mineral insulating oils for transformers and switchgear
   GB2536-2011 变压器和开关用的未使用过的矿物绝缘油

2. **变压器油应满足 1ZBA117001-10 的技术要求**
   The transfomer oil shall be meet ABB document 1ZBA117001-10 " material specification for mineral oil ".

3. **变压器油必须是 1ZBA1170-001 "Insulating oils approved for use in power transformers and reactors" 中 "3 APPROVED OILS" 列表中的牌号，不在列表中的油牌号应慎用，客户指定变压器油时可以向 ABB 专家寻求支持。**

4. **产品标记**
   Product Identification

   4.1 国产油按新国标 GB2536-2011 进行产品标记
   包括：品种代号-最低冷态投运温度-产品名称-标准号
   1）品种代号
   U：不含抗氧化剂 Uninhibited，T：含微量抗氧化剂 Trace inhibited，I：含抗氧化剂 Inhibited
   2）最低冷态投运温度
   0°C，-10°C，-20°C，-30°C，-40°C
   3）产品名称，包括变压器油（通用）和变压器油（特殊）两种，两者主要区别是：特殊型的总硫含量和糠醛含量低些，氧化安定性有差别。详细参数见 GB2536-2011。
   4）标准号 GB2536-2011（基于 IEC60296-2003）
   例如：I-20°C 变压器油（特殊）GB2536

Based on	Reg. No.	Title	
Prepared: Kelvin He 2017-08-07	Responsible department: ZTE	未使用过的变压器矿物绝缘油 Unused Mineral Insulating Oils for Transformers (Standard Purchasing Drawing)	
Approved: Victor Ye 2017-08-07	Take over department		Language: cn/en
Revision: C			Page
ABB ZhongShanTransformers		Document No.: 1ZKZ117001	

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1ZBA117001-10

Sinopec I-10℃ , I-40℃ transformer oils meet the ABB 1ZBA117001-10 specification requirements and can be applied to oil immersed transformers in the power industry.



4.2 进口油按 IEC60296-2012 进行产品标记
包括：产品名称-品种代号-最低冷态投运温度
1）产品代号
Transformer oil
2）品种代号
U：不含抗氧化剂 Uninhibited，T：含微量抗氧化剂 Trace inhibited，I：含抗氧化剂 Inhibited
3）最低冷态投运温度
0°C，-20°C，-30°C，-40°C
例如：Transformer oil I-30°C

5. 中山 ABB 常用变压器油：
Normal transformer oil of ABB Zhongshan:
5.1 散装交货 For bulk supply:

材料号 Article no.	供应商 Supplier	产品名称 Trade name	产品标记 Product identification	技术标准 Technical standard
1ZKZ117001-A	克拉玛依（中国石油）	Kl25I	I-20°C 变压器油（特殊）GB2536	GB2536-2011
1ZKZ117001-B	克拉玛依（中国石油）	Kl45I	I-30°C 变压器油（特殊）GB2536	GB2536-2011
1ZKZ117001-C	Nynas	Nytro Libra	Transformer oil U -30°C	IEC 60296-2012
1ZKZ117001-D	Nynas	Nytro Gemini X	Transformer oil I -30°C	IEC 60296-2012
1ZKZ117001-J	中国石化	Sinopec I-10° C	I-10° C 变压器油（特殊）GB2536	GB2536-2011
1ZKZ117001-K	中国石化	Sinopec I-40° C	I-40° C 变压器油（特殊）GB2536	GB2536-2011

Prepared: Kelvin He 2017-08-07	Responsible department: ZTE	未使用过的变压器矿物绝缘油 Unused Mineral Insulating Oils for Transformers (Standard Purchasing Drawing)	
Approved: Victor Ye 2017-08-07			Language: cn/en
Revision: C			Page
ABB ZhongShanTransformers		Document No.: 1ZKZ117001	

Sinopec TVAI-20℃ Super Insulated Transformer Oil



TOGETHER WE POWER THE WORLD SM

The World Leader in Diagnostic Instruments and Knowledge Services for Electric Power

STATEMENT OF COMPLIANCE
SAMPLE OF MINERAL INSULATING OIL

This is to certify that:

Sinopec TVAI-20℃ Super Transformer Oil
ELECTRICAL INSULATING OIL SAMPLE
(Doble Laboratory Report 258870)
Purchase Order Number SPPT21-409-10

Was fully tested in accordance with:

IEC 60296:2020

"Fluids for electrotechnical applications-Mineral insulating oils for electrical equipment ", Table 3– General specifications, Type A (fully inhibited high grade oils)

COMPLIANCE: The sample of electrical insulating oil submitted by East China Branch, Sinopec Lubricant Co., Ltd.fully complied with the above referenced specification as referenced in Doble Engineering Report 258870.

Date: January 19, 2022

Chase Turner

Chase Turner

Laboratory Quality Analyst
Doble Engineering Company
2200 Gateway Centre Boulevard Suite 207
Morrisville, NC 27560 USA

Page 1 of 5
Doble Engineering Company, 123 Felton Street, Marlborough, MA 01752 USA Tel +1 617 926 4900 Fax +1 617 926 0528 www.doble.com



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STATEMENT OF COMPLIANCE
SAMPLE OF MINERAL INSULATING OIL

This is to certify that:

Sinopec TVAI -30 °C Super Transformer Oil
ELECTRICAL INSULATING OIL SAMPLE
(Doble Laboratory Report 258867)
Purchase Order Number SPPT21-409-07

Was fully tested in accordance with:

IEC 60296:2020

"Fluids for electrotechnical applications-Mineral insulating oils for electrical equipment ", Table 3– General specifications, Type A (fully inhibited high grade oils)

COMPLIANCE: The sample of electrical insulating oil submitted by East China Branch, Sinopec Lubricant Co. , Ltd. fully complied with the above referenced specification as referenced in Doble Engineering Report 258867

Date: January 18, 2022

Zach Holland

Manager, Insulating Materials Laboratory
Doble Engineering Company
2200 Gateway Centre Boulevard Suite 207
Morrisville, NC 27560 USA

Page 1 of 5
Doble Engineering Company, 123 Felton Street, Marlborough, MA 01752 USA Tel +1 617 926 4900 Fax +1 617 926 0528 www.doble.com

Sinopec TVAI-30℃ Super Insulated Transformer Oil

IEC 60296:2020

Sinopec Super Insulated Transformer Oil and I-30 ℃ cycloalkyl high-voltage transformer oil meet the technical requirements of IEC 60296:2020 and obtained DOBLE technology certification. They can be applied to oil immersed transformers in the power industry.



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STATEMENT OF COMPLIANCE OR NONCOMPLIANCE
SAMPLE OF MINERAL INSULATING OIL

This is to certify that:

Sinopec TVAI-40°C Super Transformer Oil
ELECTRICAL INSULATING OIL SAMPLE
(Doble Laboratory Report 258869)
Purchase Order Number SPPT21-409-06

Was fully tested in accordance with:

IEC 60296:2020

"Fluids for electrotechnical applications-Mineral insulating oils for electrical equipment ", Table 3– General specifications, Type A (fully inhibited high grade oils)

COMPLIANCE: The sample of electrical insulating oil submitted by East China Branch, Sinopec Lubricant Co., Ltd. fully complied with the above referenced specification as referenced in Doble Engineering Report 258869.

Date: 1/27/2022

Chase Turner

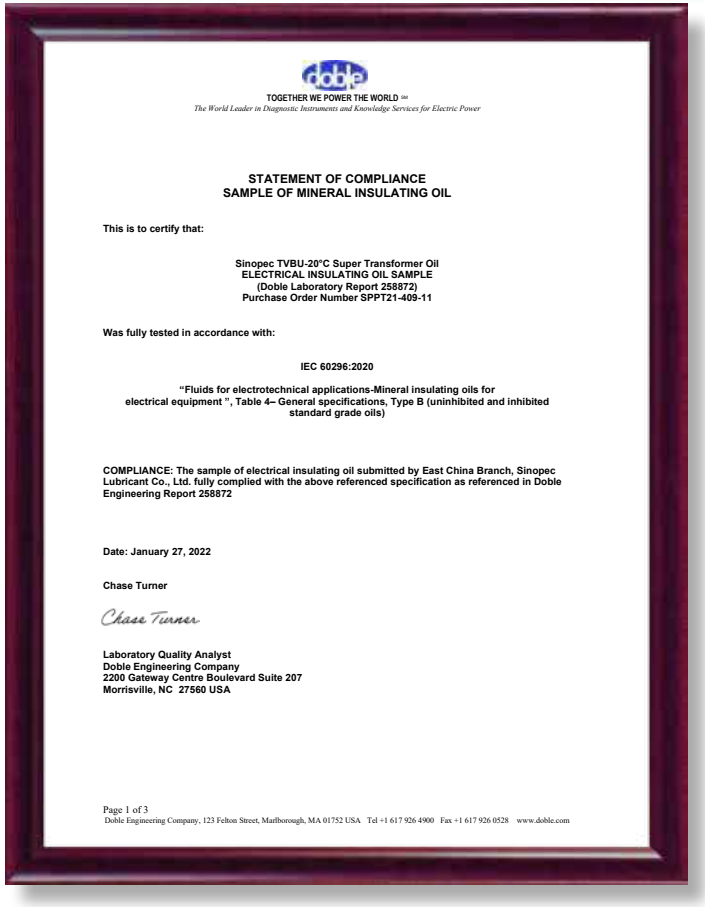
Chase Turner

Laboratory Quality Analyst
Doble Engineering Company
2200 Gateway Centre Boulevard Suite 207
Morrisville, NC 27560 USA

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Sinopec TVAI-40°C Super Insulated Transformer Oil

Sinopec TVBU-20°C Super Insulated Transformer Oil



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STATEMENT OF COMPLIANCE
SAMPLE OF MINERAL INSULATING OIL

This is to certify that:

Sinopec TVBU-20°C Super Transformer Oil
ELECTRICAL INSULATING OIL SAMPLE
(Doble Laboratory Report 258872)
Purchase Order Number SPPT21-409-11

Was fully tested in accordance with:

IEC 60296:2020

"Fluids for electrotechnical applications-Mineral insulating oils for electrical equipment ", Table 4– General specifications, Type B (uninhibited and inhibited standard grade oils)

COMPLIANCE: The sample of electrical insulating oil submitted by East China Branch, Sinopec Lubricant Co., Ltd. fully complied with the above referenced specification as referenced in Doble Engineering Report 258872

Date: January 27, 2022

Chase Turner

Chase Turner

Laboratory Quality Analyst
Doble Engineering Company
2200 Gateway Centre Boulevard Suite 207
Morrisville, NC 27560 USA

Page 1 of 3
Doble Engineering Company, 123 Felton Street, Marlborough, MA 01752 USA Tel +1 617 926 4900 Fax +1 617 926 0528 www.doble.com

Sinopec TVBU-30℃ Super Insulated Transformer Oil



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STATEMENT OF COMPLIANCE
SAMPLE OF MINERAL INSULATING OIL

This is to certify that:

Sinopec TVBU-30℃ Super Insulated Transformer Oil
ELECTRICAL INSULATING OIL SAMPLE
(Doble Laboratory Report 274934)
Purchase Order Number SPPT22-508-02

Was fully tested in accordance with:

IEC 60296:2020

"Fluids for electrotechnical applications-Mineral insulating oils for electrical equipment ", Table 4– General specifications, Type B (uninhibited and in standard grade oils)

COMPLIANCE: The sample of electrical insulating oil submitted by East China Branch, Lubricant Co., Ltd fully complied with the above referenced specification as referenced Engineering Report 274934

Date: December 19, 2022

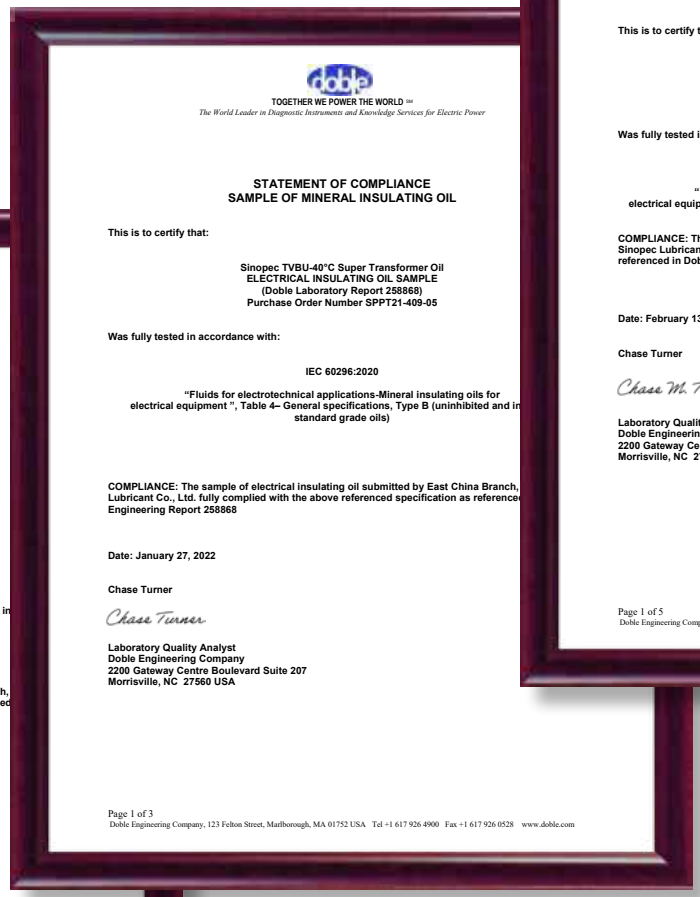
Chase Turner

Chase M. Turner

Laboratory Quality Analyst
Doble Engineering Company
2200 Gateway Centre Boulevard Suite 207
Morrisville, NC 27560 USA

Page 1 of 3
Doble Engineering Company, 123 Felton Street, Marlborough, MA 01752 USA Tel +1 617 926 4900 Fax +1 617 926 0528 www.doble.com

Sinopec TVBU-40℃ Super Insulated Transformer Oil



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STATEMENT OF COMPLIANCE
SAMPLE OF MINERAL INSULATING OIL

This is to certify that:

Sinopec TVBU-40°C Super Transformer Oil
ELECTRICAL INSULATING OIL SAMPLE
(Doble Laboratory Report 258868)
Purchase Order Number SPPT21-409-05

Was fully tested in accordance with:

IEC 60296:2020

"Fluids for electrotechnical applications-Mineral insulating oils for electrical equipment ", Table 4– General specifications, Type B (uninhibited and in standard grade oils)

COMPLIANCE: The sample of electrical insulating oil submitted by East China Branch, Lubricant Co., Ltd. fully complied with the above referenced specification as reference Engineering Report 258868

Date: January 27, 2022

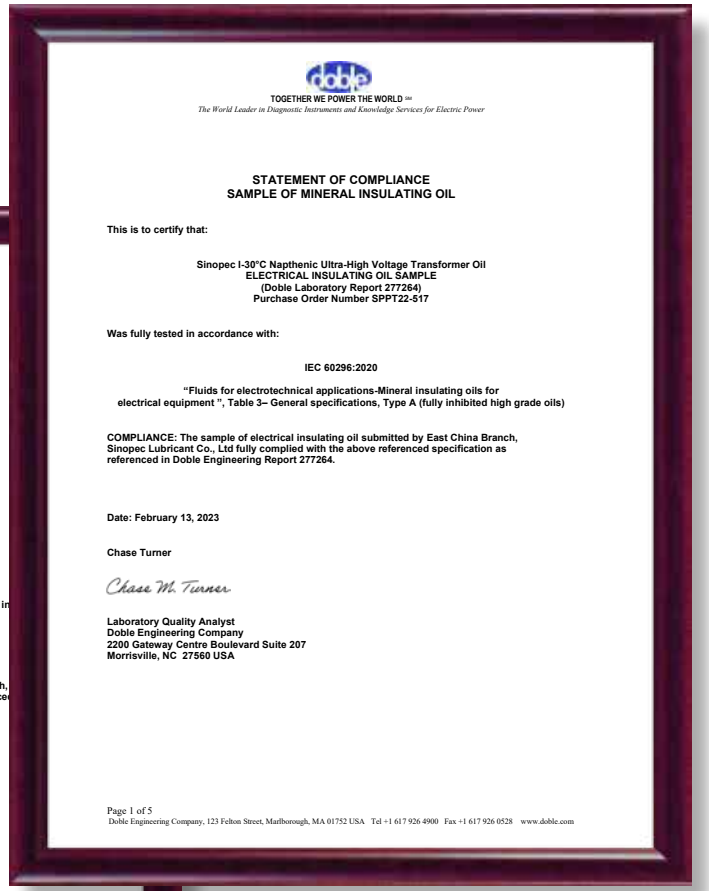
Chase Turner

Chase Turner

Laboratory Quality Analyst
Doble Engineering Company
2200 Gateway Centre Boulevard Suite 207
Morrisville, NC 27560 USA

Page 1 of 3
Doble Engineering Company, 123 Felton Street, Marlborough, MA 01752 USA Tel +1 617 926 4900 Fax +1 617 926 0528 www.doble.com

Sinopec I-30℃ Naphthenic Ultra -high voltage Transformer Oil



TOGETHER WE POWER THE WORLD SM
The World Leader in Diagnostic Instruments and Knowledge Services for Electric Power

STATEMENT OF COMPLIANCE
SAMPLE OF MINERAL INSULATING OIL

This is to certify that:

Sinopec I-30°C Napthenic Ultra-High Voltage Transformer Oil
ELECTRICAL INSULATING OIL SAMPLE
(Doble Laboratory Report 277264)
Purchase Order Number SPPT22-517

Was fully tested in accordance with:

IEC 60296:2020

"Fluids for electrotechnical applications-Mineral insulating oils for electrical equipment ", Table 3– General specifications, Type A (fully inhibited high grade oils)

COMPLIANCE: The sample of electrical insulating oil submitted by East China Branch, Sinopec Lubricant Co., Ltd fully complied with the above referenced specification as referenced in Doble Engineering Report 277264.

Date: February 13, 2023

Chase Turner

Chase M. Turner

Laboratory Quality Analyst
Doble Engineering Company
2200 Gateway Centre Boulevard Suite 207
Morrisville, NC 27560 USA

Page 1 of 5
Doble Engineering Company, 123 Felton Street, Marlborough, MA 01752 USA Tel +1 617 926 4900 Fax +1 617 926 0528 www.doble.com



CHNT 正泰

产品认可书

中国石油化工股份有限公司润滑油分公司：

我公司使用贵公司生产的长城 25 号变压器油（特殊）产品进行应用试验，试验结果表明产品质量符合我公司变压器用油质量要求，可作为我公司生产的 500 kV 变压器指定用油货源之一。

正泰电气股份有限公司

2009 年 12 月 [illegible] 日

I-10℃ transformer oil (special)

GB 2536-2011

Sinopec I-10 ℃ transformer oil (special), I-10℃ transformer oil (general), I-40℃ transformer oil (general), U-40℃ super insulated transformer oil, CTR natural ester transformer oil meet the technical requirements of Chint Electric and can be applied to oil immersed transformers in the power industry.

I-10 ℃ transformer oil (general), I-40 ℃ transformer oil (general)



CHNT 正泰

产品认可书

中国石油化工股份有限公司润滑油分公司：

我公司使用贵公司生产的长城 25 号变压器油、长城 45 号变压器油产品质量稳定可靠，符合我公司变压器用油质量要求，可作为我公司生产的 110kV－220 kV 变压器指定用油货源之一。

正泰电气股份有限公司

2008 年 9 月 9 日



正泰电气股份有限公司 SHENTAI

CHINT Electric CO.,LTD

长城 U-40℃超级绝缘变压器油技术认可

中国石化润滑油有限公司：

我公司从 2017 年开始采购贵公司 IEC60296：2012 标准的长城 U-40℃超级绝缘变压器油，用于本公司出口到东南亚、拉美等地区的 220kV 及以下油浸式变压器中。

贵公司的变压器油填装到变压器，经系列检测检验和客户运行反馈，数据显示变压器油的性能稳定，符合我们用油要求，证明中国石化长城变压器油的产品质量可靠。

特此提供技术认可证书。认可中国石化长城 U-40℃超级绝缘变压器油的产品技术。

正泰电气股份有限公司

2018 年 3 月 30 日

IEC 60296:2012

U-40 ℃ super insulated transformer oil



正泰电气股份有限公司 SHENTAI
CHINT Electric CO.,LTD

长城U-40℃超级绝缘变压器油技术认可

中国石化润滑油有限公司：

我公司从 2017 年开始采购贵公司 IEC60296：2012 标准的长城 U-40℃超级绝缘变压器油，用于本公司出口到东南亚、拉美等地区的 220kV 及以下油浸式变压器中。

贵公司的变压器油填装到变压器，经系列检测检验和客户运行反馈，数据显示变压器油的性能稳定，符合我们用油要求，证明中国石化长城变压器油的产品质量可靠。

特此提供技术认可证书。认可中国石化长城 U-40℃超级绝缘变压器油的产品技术。

正泰电气股份有限公司
2018年3月30日

IEC 62770:2013

CTR natural ester transformer oil

IEC 62770:2013

I-10 ℃ transformer oil (general)



CHNT 正泰

产品认可书

中国石油化工股份有限公司润滑油分公司：

我公司使用贵公司生产的长城 25 号变压器油、长城 45 号变压器油产品质量稳定可靠，符合我公司变压器用油质量要求，可作为我公司生产的 110kV－220 kV 变压器指定用油货源之一。

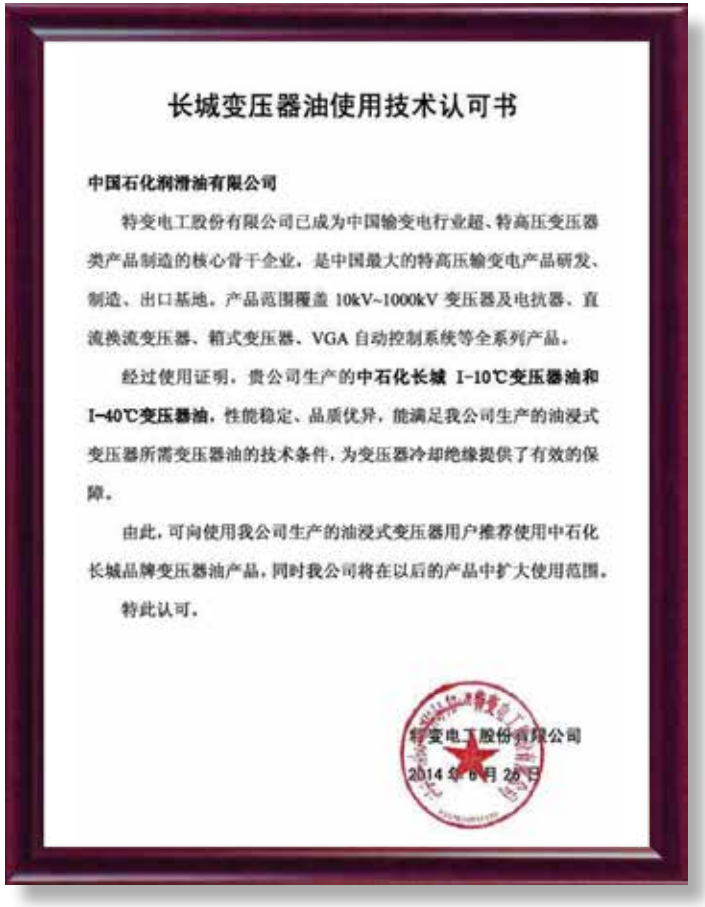
正泰电气股份有限公司
2008 年 9 月 9 日

GB 2536-2011

Sinopec I-10℃ transformer oil (general) , I-40℃ transformer oil (general) meet the technical requirements of TBEA Co., Ltd.

TBEA Co., Ltd.

—I-10 ℃ transformer oil (general) , I-40℃ transformer



长城变压器油使用技术认可书

中国石化润滑油有限公司

特变电工股份有限公司已成为中国输变电行业超、特高压变压器类产品制造的核心骨干企业，是中国最大的特高压输变电产品研发、制造、出口基地。产品范围覆盖 10kV~1000kV 变压器及电抗器、直流换流变压器、箱式变压器、VGA 自动控制系统等全系列产品。

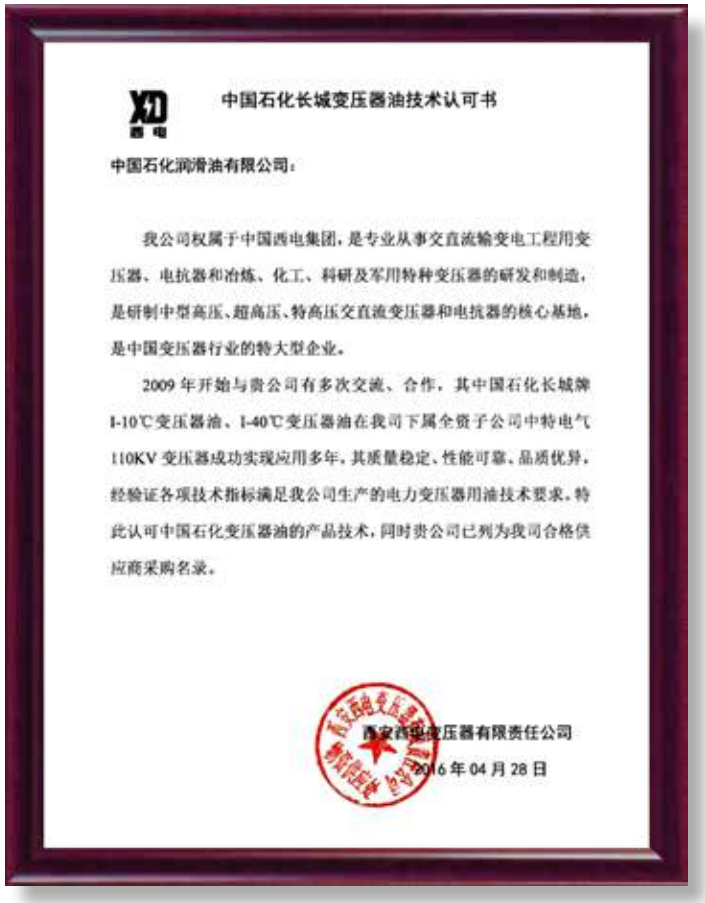
经过使用证明，贵公司生产的**中石化长城 I-10℃变压器油和 I-40℃变压器油**，性能稳定、品质优异，能满足我公司生产的油浸式变压器所需变压器油的技术条件，为变压器冷却绝缘提供了有效的保障。

由此，可向使用我公司生产的油浸式变压器用户推荐使用中石化长城品牌变压器油产品，同时我公司将在以后的产品中扩大使用范围。

特此认可。

特变电工股份有限公司

2014 年 6 月 20 日



中国石化长城变压器油技术认可书

中国石化润滑油有限公司：

我公司权属于中国西电集团，是专业从事交直流输变电工程用变压器、电抗器和冶炼、化工、科研及军用特种变压器的研发和制造，是研制中型高压、超高压、特高压交直流变压器和电抗器的核心基地，是中国变压器行业的特大型企业。

2009 年开始与贵公司有多次交流、合作，其中国石化长城牌 I-10℃变压器油、I-40℃变压器油在我司下属全资子公司中特电气 110KV 变压器成功实现应用多年，其质量稳定、性能可靠、品质优异，经验证各项技术指标满足我公司生产的电力变压器用油技术要求，特此认可中国石化变压器油的产品技术，同时贵公司已列为我司合格供应商采购名录。

西安西电变压器有限责任公司

2016 年 04 月 28 日

China XD Group Co., Ltd.— I-10 ℃ transformer oil (general), I-40 ℃ transformer oil (general)

GB 2536-2011

Sinopec I-10℃ transformer oil (general) , I-40℃ transformer oil (general) meet the technical requirements of China XD Group Co., Ltd.



长城 I-10℃变压器油（通用）使用技术认可书

中国石化润滑油有限公司：

经过多年的使用，贵公司生产的中国石化长城 I-10℃变压器油（通用）（原 25 号变压器油），性能稳定、品质优异，能满足我司电力变压器用油技术条件所需，为变压器冷却、绝缘提供了有效的保障。为此，向使用我公司的变压器用户推荐使用中国石化长城变压器油系列产品。同时，将 I-10℃变压器油（通用）作为我公司变压器的绝缘用油。

特此认可。

江苏华鹏变压器有限公司

2016.04.28

Huapeng Transformer Co., Ltd.

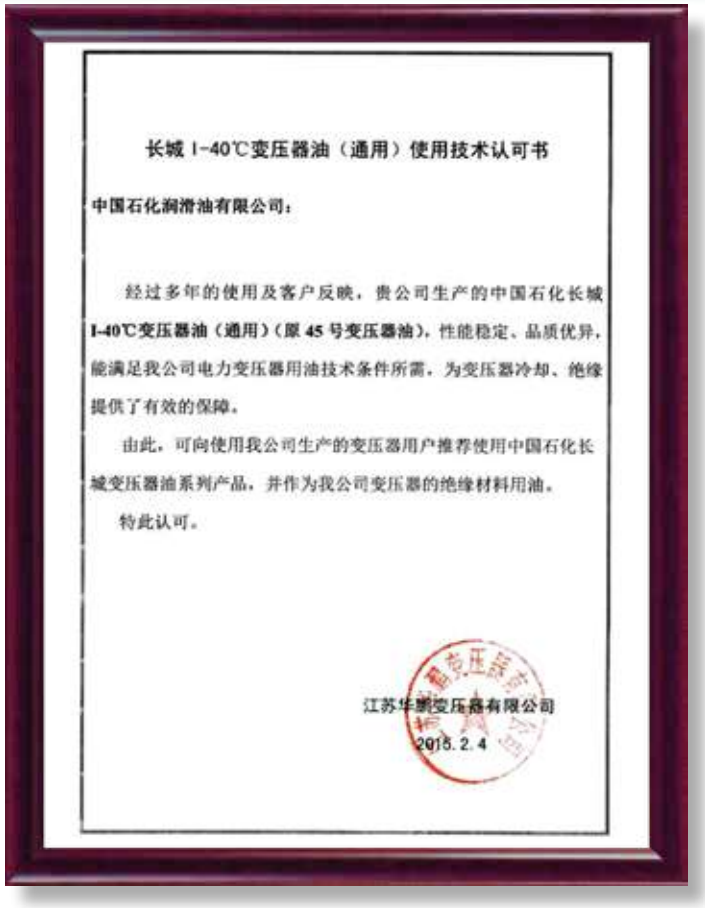
—I-10 ℃ transformer oil (general)

GB 2536-2011

Sinopec I-10 ℃ transformer oil (general) , I-40℃ transformer oil (general) meet the technical requirements of Huapeng Transformer Co., Ltd.

Huapeng Transformer Co., Ltd.

—I-40 ℃ transformer oil (general)



长城 I-40℃变压器油（通用）使用技术认可书

中国石化润滑油有限公司：

经过多年的使用及客户反映，贵公司生产的中国石化长城 I-40℃变压器油（通用）（原 45 号变压器油），性能稳定、品质优异，能满足我公司电力变压器用油技术条件所需，为变压器冷却、绝缘提供了有效的保障。

由此，可向使用我公司生产的变压器用户推荐使用中国石化长城变压器油系列产品，并作为我公司变压器的绝缘材料用油。

特此认可。

江苏华鹏变压器有限公司

2015.2.4

GB 2536-2011

Sinopec I-10℃ transformer oil (general) , I-40 ℃ transformer oil (special) meet the technical requirements of Baoding Tianwei Baobian Electric Co., Ltd.

I-10 ℃ transformer oil (general)



长城 I-10℃变压器油（通用）使用技术认可书

中国石油化工股份有限公司润滑油分公司：

天威保变（合肥）变压器有限公司是保定天威集团在中国南方设立的大型变压器园区，其变压器产品覆盖 110kV—800kV 电压等级。公司通过了质量管理体系、环境管理体系和职业健康安全管理体系的三位一体认证，检测中心通过了国家 CNAS 认可。

贵公司生产的中国石化长城 **I-10℃变压器油（通用）**，经过我司 2013 年度的部分产品使用，其油品性能稳定，能满足我公司部分电力变压器产品用油的技术条件所需，为变压器冷却绝缘提供了有效的保障。由此，我公司将在后续的产品中适时扩大使用范围。

特此认可。

天威保变（合肥）变压器有限公司



保定天威保变电气股份有限公司
Baoding Tianwei Baobian Electric Co.,Ltd

检测结果确认证书

中国石化润滑油有限公司：

2018 年对贵公司 I-40℃变压器油（特殊）组织了来样检测，其结果符合 GB 2536 标准要求，特此证明。

保定天威保变电气股份有限公司
质量保证部
2018 年 10 月 25 日

I-40 ℃ transformer oil (special)

天威集团
TIANWEI GROUP



中电电气集团
China Electric Equipment Group

CEEG

长城变压器油技术认可

中国石化润滑油有限公司：

我公司从2008年开始使用长城I-10℃变压器油（通用）和长城I-40℃变压器油（通用），从原来用于低电压等级配电变压器，到后续应用电压等级升高，客户运行数据反馈产品质量稳定可靠，多年来从未出现任何质量问题。符合公司变压器油技术要求。

特此提供技术认可证书。认可中国石化长城变压器油的产品技术。

江苏中[illegible]配电设备有限公司

2019年1月20日

SINOPEC

Power Industry

CEEG® SST

GB 2536-2011

Sinopec I-10℃ transformer oil (general), I-40 ℃ transformer oil (general) meet the technical requirements of China Electric Equipment Group.

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PETROCHEMICAL

SINOPEC

Petrochemical

Sinopec has a rich product line of synthetic compressor oil, covering different types of base oils such as PAO, ester type, ether ester type, etc. and has a wide range of applications in industries such as metallurgy, cement, and petrochemicals.

Burckhardt

Sinopec 4511 ethylene compressor oil meets the Burckhardt pumping test requirements and is suitable for lubrication and sealing of the cylinder and packing of Burckhardt ultra-high pressure ethylene compressors.



Burckhardt

Sinopec 4511-1 ethylene compressor oil meets the Burckhardt pumping test requirements and is suitable for lubrication and sealing of the cylinder and packing of Burckhardt ultra-high pressure ethylene compressors.




Burckhardt Compression
Sinopec Lubricant Co., Ltd.
Synthetic Lubes Branch
Mr. Lu Hai
529 Xiangfu Road
Daduku District
Chongqing 400039
China
Sept 15th, 2022
SINOPEC 4526(220)A - suitability for use in ethylene hypercompressor
On request of the oil manufacturer, Burckhardt Compression AG tested the compressor
Sinopec 4526(220)A
with regard to its suitability as cylinder lubricant for Burckhardt Compression AG second
compressors.
Typical physical properties (at atmospherical pressure):
Kinematic viscosity: 210 mm²/s @ 40 °C
20.2 mm²/s @ 100 °C
Density: 870 kg/m³ @ 20 °C
Sinopec 4526(220)A is a white oil based lubricant formulated for use in hyper compress
polyethylene production. It contains a viscosifier, antiwear agent (certain acid) and an a
Base oil and all additives are food grade approved.
The test is based on measurements performed by Burckhardt Compression A
manufacturer's data.
This certification covers only the pumpability of the oil in question, depending up
properties as basic viscosity and the dependence of the viscosity on temperature and p
statement is made concerning the lubrication properties or other relevant prop
compatibility with seals and other materials or compatibility with the process gases ar
used in the process downstream.
Burckhardt Compression
This certification covers the lubricating oil in question formulated to the specifications valid a
date of issue. In case of changes in specification which go beyond minor corrections in amou
type of additives etc. , in particular changes of the type of base oil, a new certification is require
Owing to the tested parameters, Burckhardt Compression AG is in a position to release the ab
mentioned lubricant for application with Burckhardt Compression AG hypercompressors under
following conditions:
For cylinder lubrication of secondary compressors equipped with "CH" lubrication pumps in
pressure polyethylene processes for production of Low Density Polyethylene (LDPE) for a g
speed of 164 rpm up to a maximum final process pressure of
2620 bar at a minimum oil temperature of 70 °C
2220 bar at a minimum oil temperature of 66 °C
1890 bar at a minimum oil temperature of 65 °C
Minimum oil temperature: lubrication system heated to the temperature stated between suction
of high pressure pump and cylinder oil inlet.
Conclusive proof of suitability regarding the lubricity of the oil in question can only be produce
long-standing experience of the process operator under equivalent process conditions.
Another important property, the solubility of the process gas in the lubricant (and vice versa) u
process pressure, is not covered by this document.
Yours sincerely
Dr. Roland Agrier
Head of Global Engineering
i. A. Ulrich Burdorf
R&D Expert, Tribology
Burckhardt Compression
Synthetic Lubricant Oil and Grease Branch,
Sinopec Lubricant Co.Ltd.,
62, Yushou Road, Jiulongpo District,
Chongqing,China. Zip code: 400039
P.R. China
May 9th, 2017.
Sinopec ethylene compressor oil 4526 suitability for use in ethylene Hypercompressors
On request of the oil manufacturer, Burckhardt Compression AG tested the compressor lubricant
Sinopec ethylene compressor oil 4526
with regard to its suitability as cylinder lubricant for Burckhardt Compression AG secondary
compressors.
Typical physical properties (at atmospherical pressure):
Kinematic viscosity: 248 mm²/s @ 40 °C
24 mm²/s @ 100 °C
Sinopec ethylene compressor oil 4526 is a blend of Hydrocarbon and additives (viscosity
improver, antioxidant) formulated for use in hyper compressors.
The test is based on measurements performed by Burckhardt Compression AG and on
manufacturer's data.
This certification covers only the pumpability of the oil in question, depending upon physical
properties as basic viscosity and the dependence of the viscosity on temperature and pressure. No
statement is made concerning the lubrication properties or other relevant properties, e.g.
compatibility with seals and other materials or compatibility with the process gases and catalysts
used in the process downstream.
This certification covers the lubricating oil in question formulated to the specifications valid at the
date of issue. In case of changes in specification which go beyond minor corrections in amount or
type of additives etc., in particular changes of the type of base oil, a new certification is required.
Owing to the tested parameters, Burckhardt Compression AG is in a position to release the above-
mentioned lubricant for application with Burckhardt Compression AG hypercompressors under the
following conditions:



Burckhardt Compression

For cylinder lubrication of secondary compressors equipped with "CH" lubrication pumps in high pressure polyethylene processes for production of Low Density Polyethylene (LDPE) for a **pump speed of 164 rpm** up to a maximum final process pressure of

1996 bar	at a minimum oil temperature of	35 °C
2735 bar	at a minimum oil temperature of	50 °C
3751 bar	at a minimum oil temperature of	70 °C

Minimum oil temperature: lubrication system heated to the temperature stated between suction side of high pressure pump and cylinder oil inlet.

Conclusive proof of suitability regarding the lubricity of the oil in question can only be produced by long-standing experience of the process operator under equivalent process conditions.

Another important property, the solubility of the process gas in the lubricant (and vice versa) under process pressure, is not covered by this document.

Yours sincerely

ppa. Franziska Maywald
Head of Global Engineering

I.A. Dr. Ricardo Cruz
Research Engineer

Burckhardt

Sinopec 4526 ethylene compressor oil meets the Burckhardt pumping test requirements and is suitable for lubrication and sealing of the cylinder and packing of Burckhardt ultra-high pressure ethylene compressors.

Burckhardt (250rpm)

Sinopec 4526 ethylene compressor oil meets the Burckhardt pumping test requirements.



Burckhardt Compression

For cylinder lubrication of secondary compressors equipped with "CH" lubrication pumps in high pressure polyethylene processes for production of Low Density Polyethylene (LDPE) for a **pump speed of 250 rpm** up to a maximum final process pressure of

1924 bar	at a minimum oil temperature of	35 °C
2686 bar	at a minimum oil temperature of	50 °C
3702 bar	at a minimum oil temperature of	70 °C

Minimum oil temperature: lubrication system heated to the temperature stated between suction side of high pressure pump and cylinder oil inlet.

Conclusive proof of suitability regarding the lubricity of the oil in question can only be produced by long-standing experience of the process operator under equivalent process conditions.

Another important property, the solubility of the process gas in the lubricant (and vice versa) under process pressure, is not covered by this document.

Yours sincerely

ppa. Franziska Maywald
Head of Global Engineering

I.A. Dr. Ricardo Cruz
Research Engineer

9





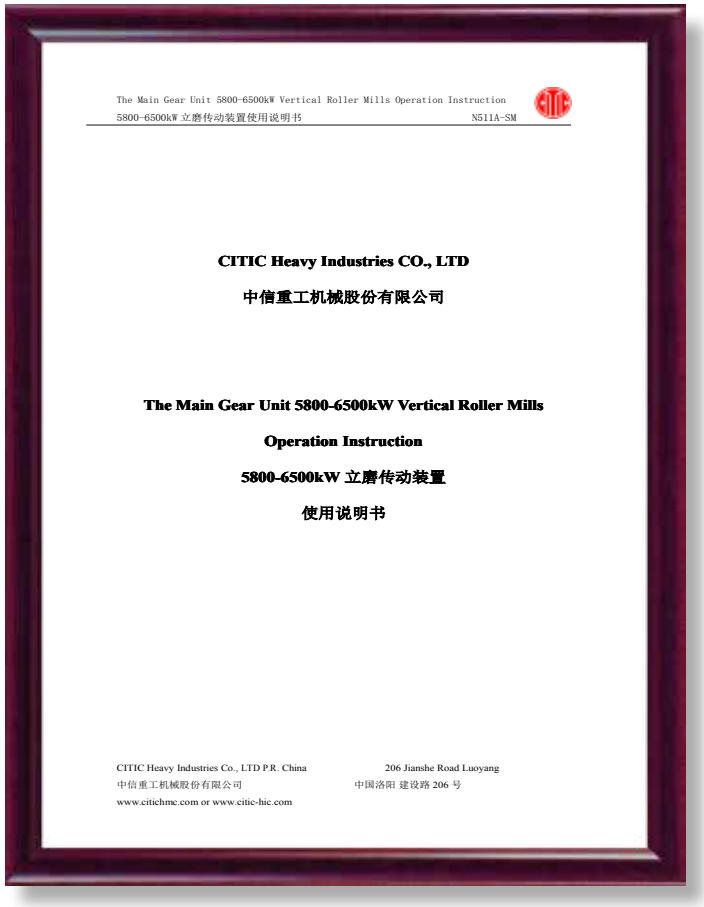
CEMENT

SINOPEC

Cement

Sinopec Industrial Gear Oils have OEM technology certifications from CITIC, Loesche, etc, which can provide excellent lubrication protection for gear transmission devices in the cement industry. They are widely used in vertical mills and roller presses in cement enterprises such as Conch Cement.





CITIC N511A-SM vertical mill

Sinopec AP and AP-S industrial gear oils meet the requirements of CITIC and can be used in its N511A-SM and other vertical mill models.



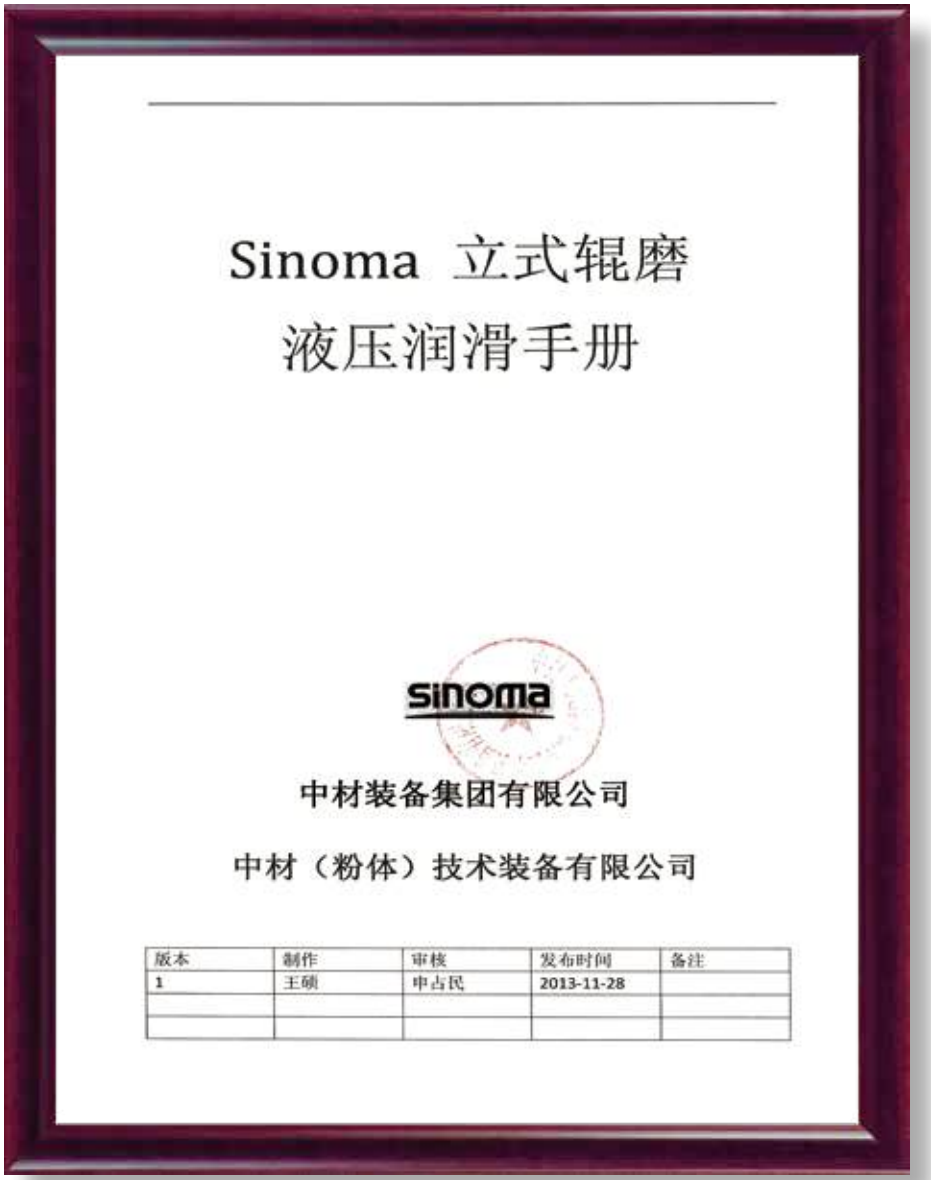
Sinoma 立式辊磨机润滑油表（不包括减速机）：矿物油，合成油，液压油

文件	160-00001-RH	
日期/版本	2013-11-28	REV1
制作：	申占民 第 123 页	共 页

润滑油	润滑油代码	粘 ISO-VG 40℃ mm2/s	Mobil	Castrol 嘉实多	长城	FUCHS	KLÜBER LUBRICATION	Shell
PAO 合成油 L-CKT150	A1	VG150	Mobil SHC 629	Optigear Synthetic PD 150	得威 AP-S 150 工业齿轮油	RENOLIN UNISYN CLP 150	KLUEBERSYNTH GEM 4-150 N	Omala S4 GX 150
PAO 合成油 L-CKT220	A2	VG220	Mobil SHC 630	Optigear Synthetic PD 220	得威 AP-S 220 工业齿轮油	RENOLIN UNISYN CLP 220	KLUEBERSYNTH GEM 4-220 N	Omala S4 GX 220
PAO 合成油 L-CKT320	A3	VG320	Mobil SHC 632	Optigear Synthetic PD 320	得威 AP-S 320 工业齿轮油	RENOLIN UNISYN CLP 320	KLUEBERSYNTH GEM 4-320 N	Omala S4 GX 320
PAO 合成油 L-CKT460	A4	VG460	Mobil SHC 634	Optigear Synthetic PD 460	得威 AP-S 460 工业齿轮油	RENOLIN UNISYN CLP 460	KLUEBERSYNTH GEM 4-460 N	Omala S4 GX 460
PAO 合成油 L-CKT680	A5	VG680	Mobil SHC 636	Optigear Synthetic PD 680	得威 AP-S 680 工业齿轮油	RENOLIN UNISYN CLP 680	KLUEBERSYNTH GEM 4-680 N	Omala S4 GX 680
矿物液压油 L-HM46	H1	VG46	Mobil DTE 25	Hyspin AWS 46	卓力 L-HM 46 抗磨液压油（高压）	RENOLIN B 46	KLUEBERSUMMIT TM 15/PS 150	Tellus S2 M 46
矿物液压油 L-HM68	H2	VG68	Mobil DTE 26	Hyspin AWS 68	卓力 L-HM 68 抗磨液压油（高压）	RENOLIN B 68	KLUEBERSUMMIT TM 20/PS 200	Tellus S2 M 68
矿物液压油 L-HS46	H3		Mobil DTE 10 Excel 46		卓力 L-H V 低温液压油 46	RENOLIN B HVI 46		Tellus S2 V 46
矿物液压油 L-HS68	H4		Mobil DTE 10 Excel 68		卓力 L-H V 低温液压油 68	RENOLIN B HVI 68		Tellus S2 V 68
合成液压油 L-HS46	H5	VG46	Mobil SHC 525	Alphasyn T 46	卓力 L-HS 46 超低温液压油		KLUEBERSUMMIT SB 46	Tellus S4 ME 46
合成液压油 L-HS68	H6	VG68	Mobil SHC 526	Alphasyn T 68	卓力 L-HS 68 超低温液压油		KLUEBERSUMMIT SB 68	Tellus S4 ME 68

Sinoma

Sinopec AP-S gear oil, L-HM, and L-HS hydraulic oil can be used for Sinoma's full range of vertical mills, including raw material mills, clinker mills, and slag mills.



Sinoma 立式辊磨
液压润滑手册

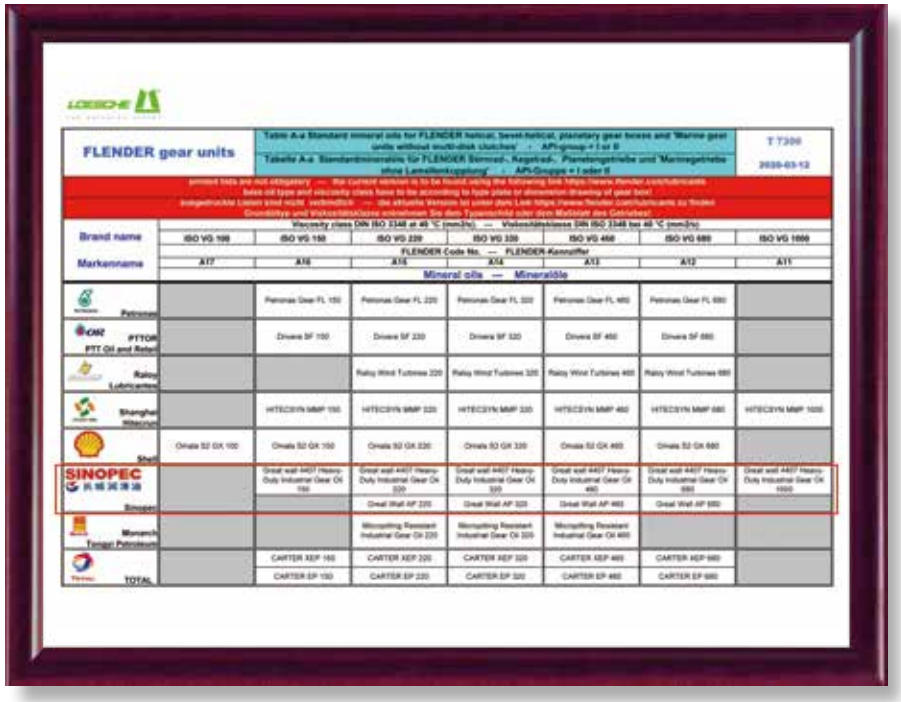
sinoma

中材装备集团有限公司

中材（粉体）技术装备有限公司

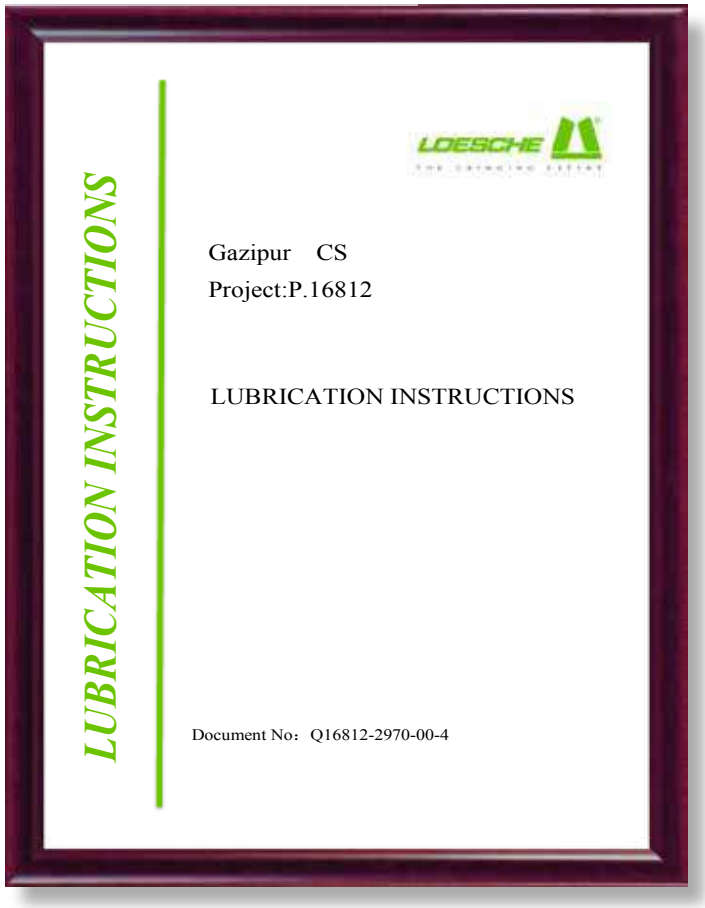
版本	制作	审核	发布时间	备注
1	王硕	申占民	2013-11-28	

sinoma



SINOPEC

LOESCHE
THE GRINDING EXPERT



Loesche

Sinopec AP gear oil meets Loesche's requirements and can be applied to its planetary gearboxes and marine gear units without multi plate clutches.

10





GENERAL INDUSTRY

SINOPEC

General Industry

Sinopec Industrial Gear Oil has OEM certifications from leading companies such as Flender, SEW, and Nanjing High Speed Gear Manufacturing Co., Ltd., and can be widely used in various industrial gearboxes.

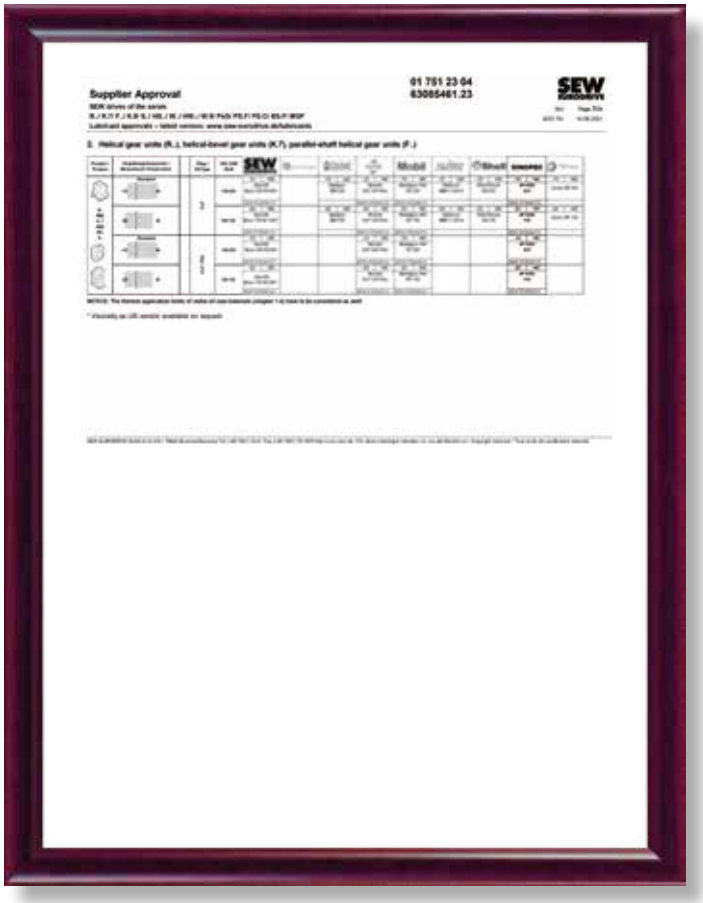
Flender

Sinopec's AP and AP-S products meet Flender's requirements and can be applied to its planetary gearboxes.





FLENDER


Supplier Approval

01 751 23 04
63085461.23

SEW EURODRIVE

Sinopec AP-SGO150/220

SEW

Sinopec AP-SGO and AP-S products meet SEW requirements and can be applied to its R, K7, F, IG X series helical/bevel gearboxes, S (HS) series worm gearboxes, and PS C. IG P, XP, P-X series planetary gearboxes.

Sinopec AP-S

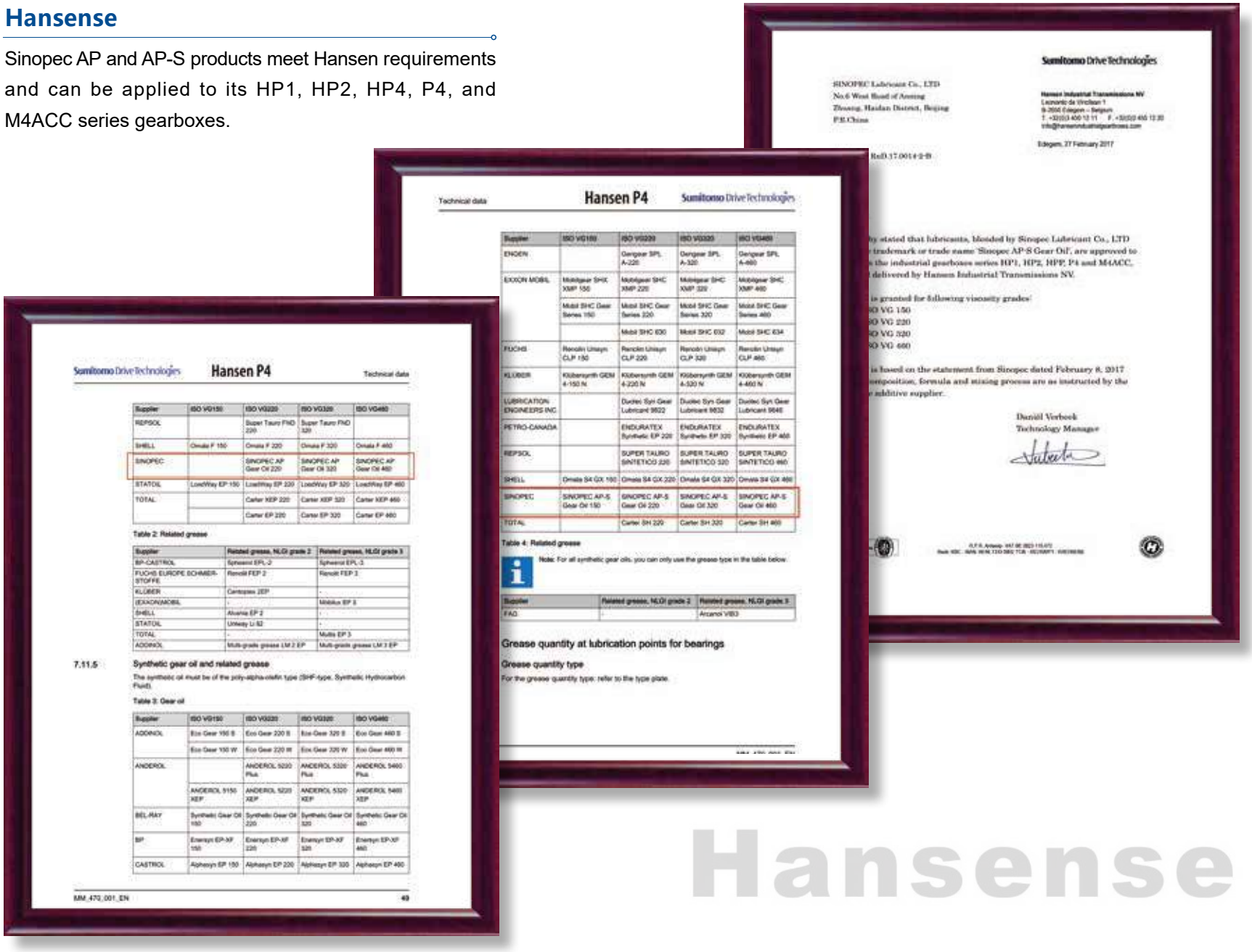

Supplier Approval

01 751 27 04
63085461.27

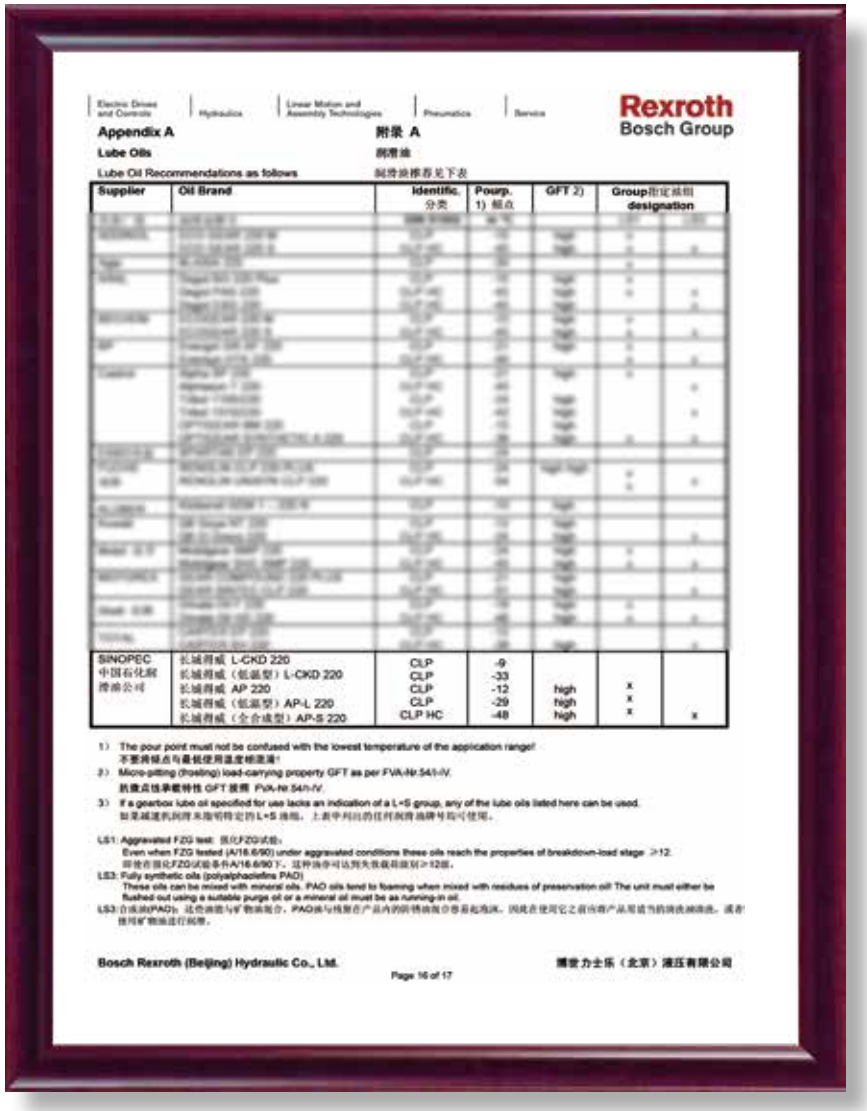
SEW EURODRIVE

Hansense

Sinopec AP and AP-S products meet Hansen requirements and can be applied to its HP1, HP2, HP4, P4, and M4ACC series gearboxes.



Hansense



Electric Drives and Controls | Hydraulics | Linear Motion and Assembly Technologies | Pneumatics | Service

Rexroth
Bosch Group

Appendix A 附录 A

Lube Oils 润滑油

Lube Oil Recommendations as follows 润滑油推荐见下表

Supplier	Oil Brand	Identific. 分类	Pourp. 1) 倾点	GFT 2)	Group 指定油组 designation	
SINOPEC 中国石化润滑油公司	长城得威 L-CKD 220	CLP	-9			
	长城得威（低温型）L-CKD 220	CLP	-33			
	长城得威 AP 220	CLP	-12	high	x	
	长城得威（低温型）AP-L 220	CLP	-29	high	x	
	长城得威（全合成型）AP-S 220	CLP HC	-48	high		x

1) The pour point must not be confused with the lowest temperature of the application range!
不要将倾点与最低使用温度相混淆!

2) Micro-pitting (frosting) load-carrying property GFT as per FVA-Nr.54/I-IV.
抗微点蚀承载特性 GFT 按照 FVA-Nr.54/I-IV.

3) If a gearbox lube oil specified for use lacks an indication of a L+S group, any of the lube oils listed here can be used.
如果减速机润滑未指明特定的 L+S 油组，上表中列出的任何润滑油牌号均可使用。

LS1: Aggravated FZG test: 强化FZG试验。
Even when FZG tested (A/16.6/90) under aggravated conditions these oils reach the properties of breakdown-load stage ≥12.
即使在强化FZG试验条件A/16.6/90下，这种油也可达到失效载荷级别≥12级。

LS3: Fully synthetic oils (polyalphaolefins PAO)
These oils can be mixed with mineral oils. PAO oils tend to foaming when mixed with residues of preservation oil! The unit must either be flushed out using a suitable purge oil or a mineral oil must be as running-in oil.
LS3:合成油(PAO)：这些油能与矿物油混合，PAO油与残留在产品内的防锈油混合容易起泡沫。因此在使用它之前应将产品用适当的清洗油清洗，或者使用矿物油进行润滑。

Bosch Rexroth (Beijing) Hydraulic Co., Ltd. 博世力士乐（北京）液压有限公司

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Sinopec L-CKD 220, AP 220, AP-L 220, AP-S 220

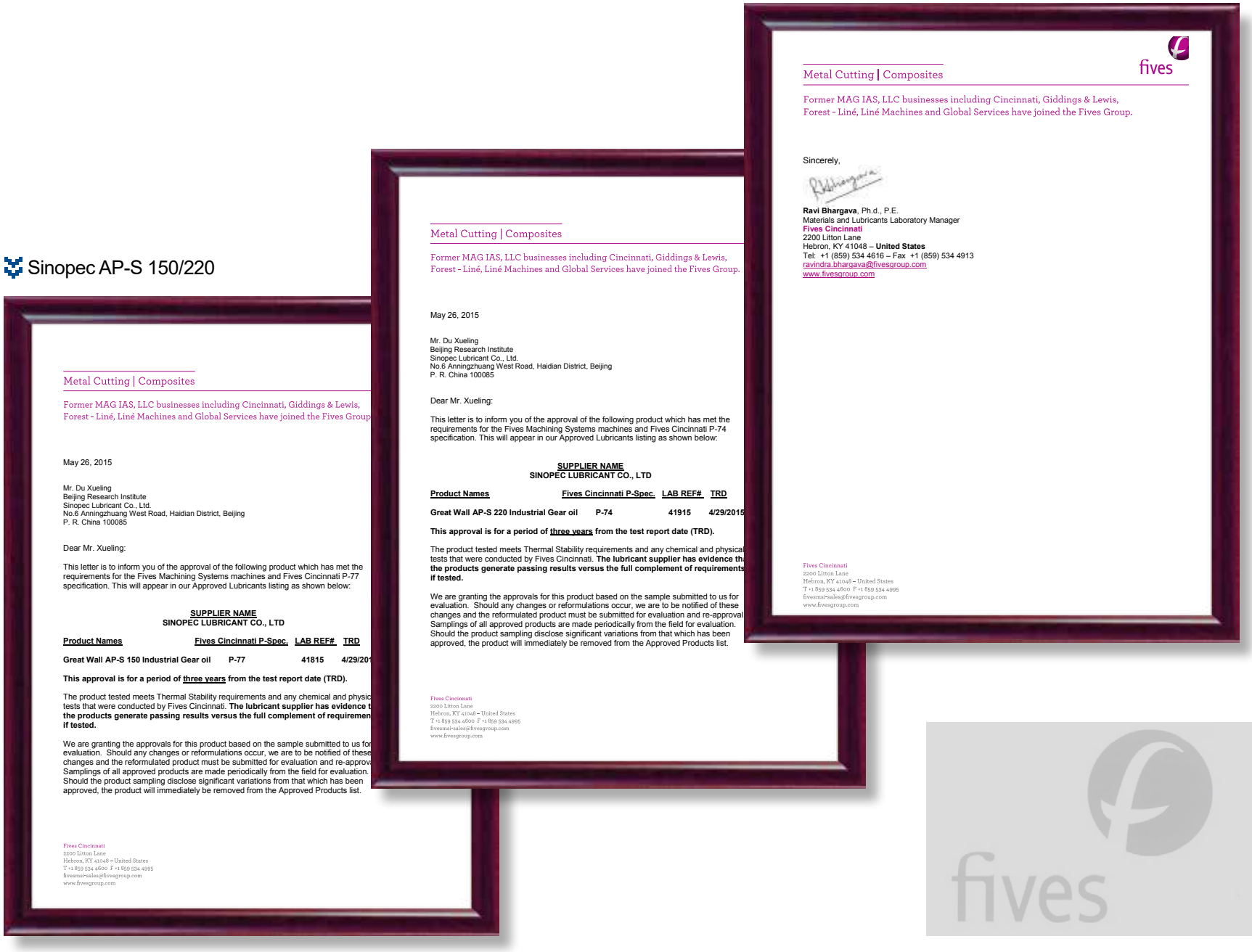
SINOPEC

BOSCH

BOSCH

Sinopec L-CKD, AP, AP-L, AP-S products meet Bosch Rexroth's requirements and can be applied to their gearboxes.

Sinopec AP-S 150/220



Metal Cutting | Composites

Former MAG IAS, LLC businesses including Cincinnati, Giddings & Lewis, Forest - Liné, Liné Machines and Global Services have joined the Fives Group.

May 26, 2015

Mr. Du Xueling
Beijing Research Institute
Sinopec Lubricant Co., Ltd.
No.6 Anningzhuang West Road, Haidian District, Beijing
P. R. China 100085

Dear Mr. Xueling:

This letter is to inform you of the approval of the following product which has met the requirements for the Fives Machining Systems machines and Fives Cincinnati P-74 specification. This will appear in our Approved Lubricants listing as shown below:

SUPPLIER NAME
SINOPEC LUBRICANT CO., LTD

Product Names	Fives Cincinnati P-Spec.	LAB REF#	TRD
Great Wall AP-S 220 Industrial Gear oil	P-74	41915	4/29/2015

This approval is for a period of three years from the test report date (TRD).

The product tested meets Thermal Stability requirements and any chemical and physical tests that were conducted by Fives Cincinnati. **The lubricant supplier has evidence th the products generate passing results versus the full complement of requirements if tested.**

We are granting the approvals for this product based on the sample submitted to us for evaluation. Should any changes or reformulations occur, we are to be notified of these changes and the reformulated product must be submitted for evaluation and re-approval. Samplings of all approved products are made periodically from the field for evaluation. Should the product sampling disclose significant variations from that which has been approved, the product will immediately be removed from the Approved Products list.

Fives Cincinnati
2200 Litton Lane
Hebron, KY 41048 – United States
T +1 859 534 4600 F +1 859 534 4995
fivesmsi-sales@fivesgroup.com
www.fivesgroup.com

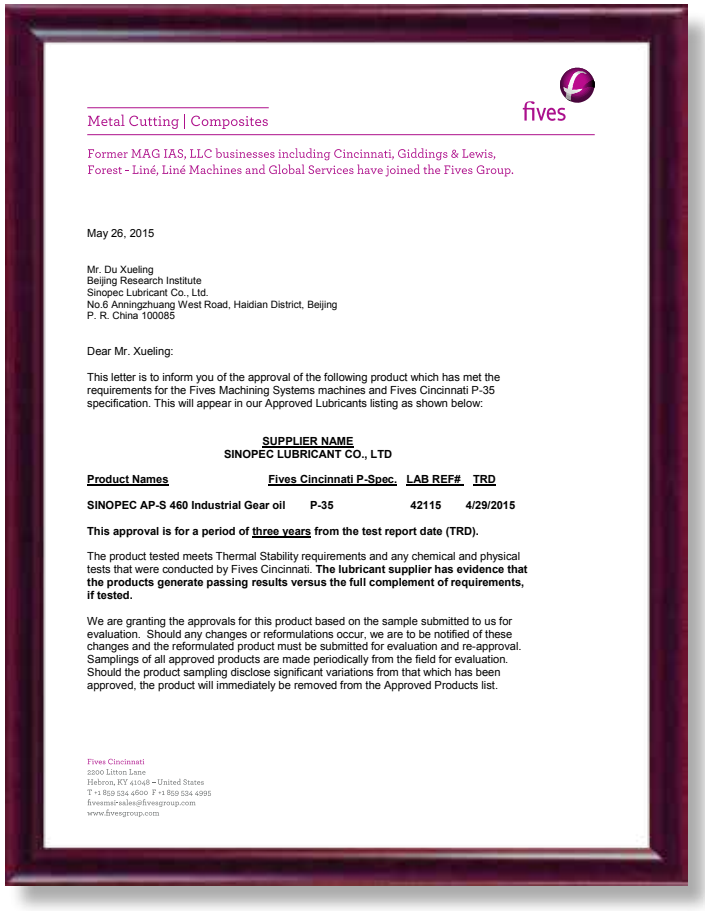
Metal Cutting | Composites

Former MAG IAS, LLC businesses including Cincinnati, Giddings & Lewis, Forest - Liné, Liné Machines and Global Services have joined the Fives Group.

Sincerely,

Ravi Bhargava, Ph.d., P.E.
Materials and Lubricants Laboratory Manager
Fives Cincinnati
2200 Litton Lane
Hebron, KY 41048 – **United States**
Tel: +1 (859) 534 4616 – Fax +1 (859) 534 4913
ravindra.bhargava@fivesgroup.com
www.fivesgroup.com

Fives Cincinnati
2200 Litton Lane
Hebron, KY 41048 – United States
T +1 859 534 4600 F +1 859 534 4995
fivesmsi-sales@fivesgroup.com
www.fivesgroup.com



Metal Cutting | Composites

fives

Former MAG IAS, LLC businesses including Cincinnati, Giddings & Lewis,
Forest - Liné, Liné Machines and Global Services have joined the Fives Group.

May 26, 2015

Mr. Du Xueling
Beijing Research Institute
Sinopec Lubricant Co., Ltd.
No.6 Anningzhuang West Road, Haidian District, Beijing
P. R. China 100085

Dear Mr. Xueling:

This letter is to inform you of the approval of the following product which has met the requirements for the Fives Machining Systems machines and Fives Cincinnati P-35 specification. This will appear in our Approved Lubricants listing as shown below:

SUPPLIER NAME
SINOPEC LUBRICANT CO., LTD

Product Names	Fives Cincinnati P-Spec.	LAB REF#	TRD
SINOPEC AP-S 460 Industrial Gear oil	P-35	42115	4/29/2015

This approval is for a period of three years from the test report date (TRD).

The product tested meets Thermal Stability requirements and any chemical and physical tests that were conducted by Fives Cincinnati. **The lubricant supplier has evidence that the products generate passing results versus the full complement of requirements, if tested.**

We are granting the approvals for this product based on the sample submitted to us for evaluation. Should any changes or reformulations occur, we are to be notified of these changes and the reformulated product must be submitted for evaluation and re-approval. Samplings of all approved products are made periodically from the field for evaluation. Should the product sampling disclose significant variations from that which has been approved, the product will immediately be removed from the Approved Products list.

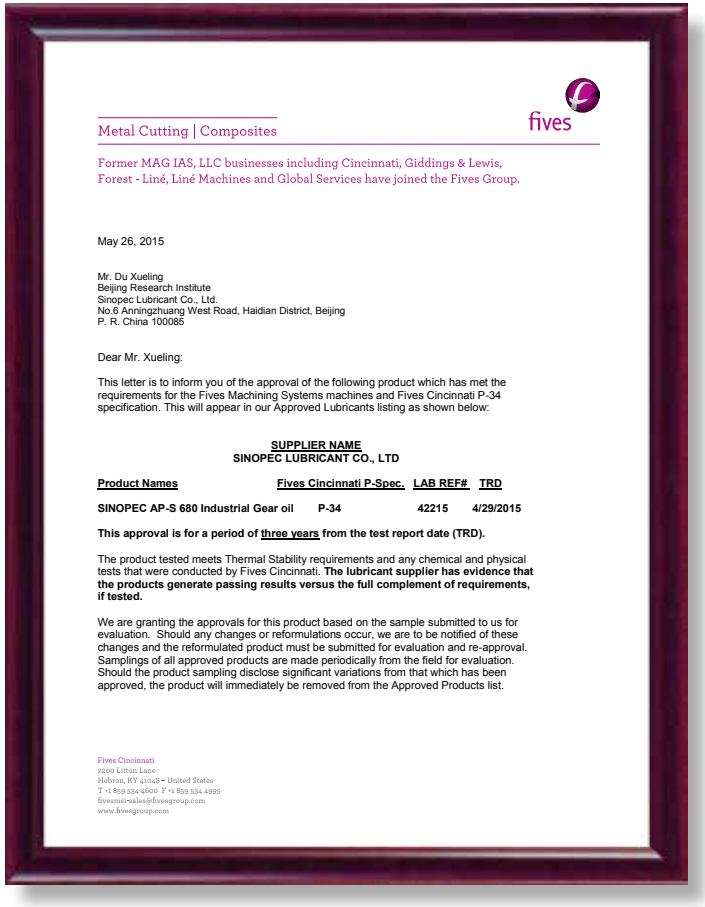
Fives Cincinnati
2200 Litton Lane
Hebron, KY 41048 – United States
T +1 859 534 4600 F +1 859 534 4995
fivesmsi-sales@fivesgroup.com
www.fivesgroup.com

fives

Sinopec AP-S products meet CINCINNATI requirements and can be applied to its gearboxes.

SINOPEC

Sinopec AP-S 460



Metal Cutting | Composites

fives

Former MAG IAS, LLC businesses including Cincinnati, Giddings & Lewis,
Forest - Liné, Liné Machines and Global Services have joined the Fives Group.

May 26, 2015

Mr. Du Xueling
Beijing Research Institute
Sinopec Lubricant Co., Ltd.
No.6 Anningzhuang West Road, Haidian District, Beijing
P. R. China 100085

Dear Mr. Xueling:

This letter is to inform you of the approval of the following product which has met the requirements for the Fives Machining Systems machines and Fives Cincinnati P-34 specification. This will appear in our Approved Lubricants listing as shown below:

SUPPLIER NAME
SINOPEC LUBRICANT CO., LTD

Product Names	Fives Cincinnati P-Spec.	LAB REF#	TRD
SINOPEC AP-S 680 Industrial Gear oil	P-34	42215	4/29/2015

This approval is for a period of three years from the test report date (TRD).

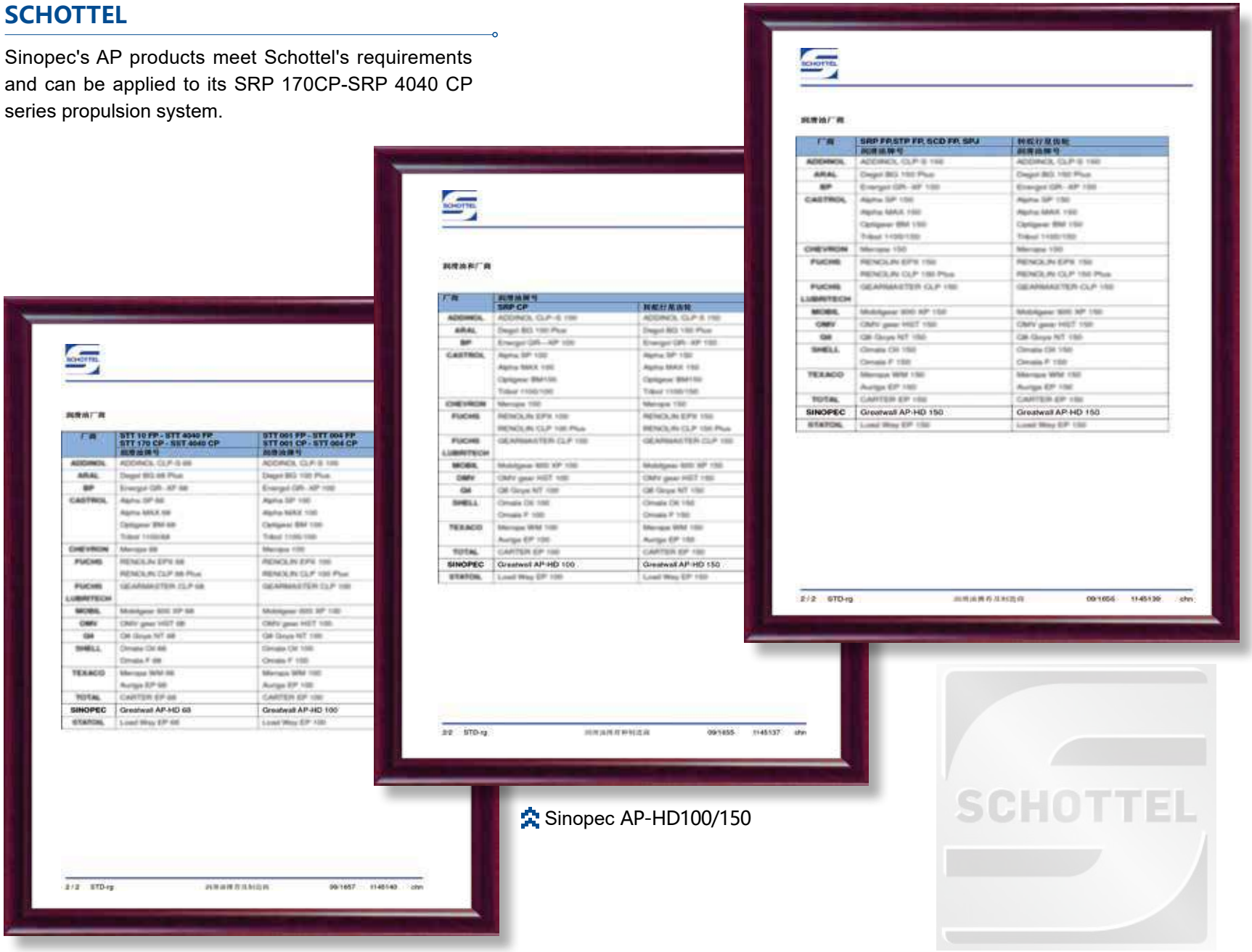
The product tested meets Thermal Stability requirements and any chemical and physical tests that were conducted by Fives Cincinnati. **The lubricant supplier has evidence that the products generate passing results versus the full complement of requirements, if tested.**

We are granting the approvals for this product based on the sample submitted to us for evaluation. Should any changes or reformulations occur, we are to be notified of these changes and the reformulated product must be submitted for evaluation and re-approval. Samplings of all approved products are made periodically from the field for evaluation. Should the product sampling disclose significant variations from that which has been approved, the product will immediately be removed from the Approved Products list.

Fives Cincinnati
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Hebron, KY 41048 – United States
T +1 859 534 4600 F +1 859 534 4995
fivesmsi-sales@fivesgroup.com
www.fivesgroup.com

SCHOTTEL

Sinopec's AP products meet Schottel's requirements and can be applied to its SRP 170CP-SRP 4040 CP series propulsion system.



Sinopec AP-HD100/150



Sinopec AP-HD 320

SINOPEC

CQ.GEARBOX

Sinopec AP-S and AP-L products meet the requirements of Chongqing Gearbox Co., Ltd. and can be applied to its JLW, JLP, JGW series reducers.

LUBRICATION MANAGEMENT EXPERTS BY YOUR SIDE



SINOPEC LUBRICANT CO.,LTD.

Address: No. 6 Anningzhuang West Road, Haidian District, Beijing, PRC

Website: www.sinolube.com

Hotline: 95388-3