



Hengyi Industries Sdn Bhd
恒逸实业（文莱）有限公司

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Lubrication Management System



润滑管理制度



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 HENGYI	Hengyi Industries Sdn Bhd 恒逸实业（文莱）有限公司			
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1 Purpose

目的

This System is hereby formulated to reduce the wear, extend the service life and guarantee safe and stable operation of equipment.

为减少设备磨损，延长设备使用寿命，保证设备安全稳定运行，特制订本制度。

2 Scope of Application

适用范围

This System is applicable to lubrication management of rotating equipment of the Company.

本制度适用于公司转动设备的润滑管理。

3 Terms and Definitions

术语和定义

Lubrication: refers to application of lubricants between the contact surfaces of each friction pair in relative motion to form a lubrication film between the friction surfaces, separate the dry friction surfaces and convert dry friction into friction between lubricant molecules, so as to reduce friction and wear.

润滑：指在发生相对运动的各对摩擦副的接触面之间加入润滑剂，使摩擦面之间形成润滑膜，将干摩擦面分隔开来，变干摩擦为润滑剂分子之间的摩擦，以达到降低摩擦和减小磨损为目的。

4 Management Responsibilities

管理职责

4.1 Specified administrative authority

归口管理部门

4.1.1 The Equipment Management Dept. is the specified administrative authority of lubrication management, which shall be responsible for formulating the lubrication management system, organizing to solve the technical problems in lubrication management, and guiding and supervising equipment lubrication management of all departments.

机械动力部是润滑管理的归口管理部门，负责制订润滑管理制度；组织解决润滑管理中的技术问

题。指导、督促各部门设备润滑管理。

4.1.2 Review and approve the reports concerning equipment lubrication and the purchase plan of lubricating oil (grease), and be responsible for the application and promotion of advanced lubrication technologies.

审核设备润滑相关报表以及润滑油（脂）的采购计划，负责润滑先进技术的应用和推广。

4.2 Coordinated management departments

协同管理部门

4.2.1 The Materials Supply Dept. shall be responsible for the purchase management of lubricating oil (grease) and for the reserve quota of special lubricating oil (grease) for emergencies and minimum reserve quota of working oil (grease) to prevent excessive reserve or shortage.

物资装备部负责润滑油（脂）的采购管理；负责特殊润滑油（脂）的事故储备定额和常用油（脂）的最低储备定额工作，防止出现过量积存或缺油。

4.2.2 HSE Dept. shall be responsible for disposing of waste lubricating oil in accordance with the Hazardous Waste Management Regulations.

HSE 管理部负责按照危险废物管理规定处置废润滑油。

4.3 Executive departments

执行部门

4.3.1 The operation department, as the executive department of this System, shall be responsible for equipment lubrication management of the department.

运行部为本制度的执行部门，负责本部门设备润滑管理。

4.3.2 Prepare reports related to equipment lubrication, declare the annual consumption plan of lubricating oil (grease) and be responsible for the storage and use of equipment lubricating oil (grease) and recovery of waste oil (grease) for the department.

编制设备润滑相关报表，申报润滑油（脂）年度用油计划；负责本部门设备润滑用油（脂）的储存、使用和废油回收等工作。

4.3.3 Cooperate with the application and promotion of advanced lubrication technologies and solve the technical problems in lubrication management.

配合润滑先进技术的应用和推广、解决润滑管理中的技术问题。

4.3.4 The Lab Dept. shall be responsible for the analysis of lubricating oil (grease) and the input of the analysis results into the LIMIS system.

质量检验部负责润滑油（脂）的分析，并将结果输入 LIMIS 系统。

4.3.5 The Electrical Operation Dept. shall be responsible for lubrication management of grease lubricated motor bearings.

电气运行部负责脂润滑电机轴承的润滑管理。

5 Management Content

管理内容

5.1 Plan and procurement

计划与采购

5.1.1 The operation department shall report the actual consumption and year-end inventory of lubricating oil (grease) of this year in late December every year, and prepare the next annual plan of lubricating oil (grease) in the EM system which shall be approved by the Equipment Management Dept. The Materials Supply Dept. shall purchase according to the annual plan approved by the Equipment Management Dept.

运行部于每年 12 月下旬上报本年度润滑油（脂）实际消耗量及年终库存量，并在 EM 系统中编制润滑油（脂）下一年度计划，由机械动力部负责审批。物资装备部根据机械动力部审批的年度计划进行采购。

5.1.2 For working oil products, the lubricating oil (grease) requisition plan of the next month shall be reported in the EM system before the 25th day of each month; For non-working oil products, the requisition plan shall be reported 1 month in advance.

对于常用油品，每月 25 日前在 EM 系统中上报下月润滑油（脂）领用计划；对于不常用油品，应提前 1 个月上报领用计划。

5.1.3 Working oil products include L-DAB100 and L-DAB150 reciprocating compressor oil, L-TSA32, L-TSA46 and L-TSA68 anti-rust turbine oil, L-HM32, L-HM46 and L-HM68 anti-wear hydraulic oil, L-CKD150, L-CKD220 and L-CKD320 industrial closed gear oil, 2# and 3# lithium-based grease and 10# industrial white oil. Others are not commonly used.

常用油品种类为：L-DAB100 往复压缩机油、L-DAB150 往复压缩机油、L-TSA32 防锈汽轮机油、L-TSA46 防锈汽轮机油、L-TSA68 防锈汽轮机油、L-HM32 抗磨液压油、L-HM46 抗磨液压油、L-HM68 抗磨液压油、L-CKD150 工业闭式齿轮油、L-CKD220 工业闭式齿轮油、L-CKD320 工业闭式齿轮油等；2#、3# 锂基脂、10# 工业白油，其余为不常用油。

5.2 Storage and issuing

储存和发放

5.2.1 The lubricating oil (grease) of the operation department shall be properly stored and kept and not be piled up in the open air. Also, reserve for more than 30 days shall be kept and shall be kept on the site for no more than one year.

运行部润滑油（脂）应妥善储存保管，不得露天堆放，并保持 30 天以上的润滑油（脂）储备量，现场储存时间不得超过一年。

5.2.2 The lubricating oil depot of the operation department shall be rain-proof, sun-proof, dust-proof, dry, clean and well ventilated, and provided with adequate fire-fighting facilities;

Lubricating oil (grease) shall be provided with a qualified label, indicating the brand name of oil (grease), and different brands of lubricating oil (grease) shall be stored separately. The storage life of the oil (grease) is one year as indicated on the certificate.

运行部润滑油库应防雨、防晒、防尘、干燥清洁、通风良好，并有完善的消防设施；润滑油（脂）要有合格标签，注明油（脂）牌号，不同牌号的润滑油（脂）要分别储存，不得混装或混合堆放；合格证保存期为一年。

5.2.3 Lubricating oil (grease) in the warehouse of the Materials Supply Dept. shall be stored by categories and specifications. Each category shall be equipped with an oil (grease) label, indicating the name and brand of the oil (grease), time when the oil (grease) is put into the warehouse and quality identification time. The shelf life of the certificate is one year. The storage life of the oil (grease) is one year as indicated on the certificate.

物资装备部储存库房中的润滑油（脂），应按种类、规格分类存放，每类要有油（脂）标签，注明油（脂）名称、牌号、入库时间及质量鉴定时间；合格证保存期为一年。

5.2.4 The Materials Supply Dept. shall sample the newly warehoused lubricating oil and conduct routine analysis to ensure the oil is qualified. Copies of the qualification certificate of each batch of oil (indicating the oil delivery time) shall be given to the receiving department together with the oil. The operation department shall have the right to request the Materials Supply Dept. to spot check the quality of the new oil and also have the right to reject the unqualified oil.

物资装备部应对每种新入库润滑油进行采样及常规项目分析，确保入库新油质量合格，每批次油的合格证复印件（注明送油时间）在发放时一起给领用部门；运行部在领用时，有权要求物资装备部对新油质量进行抽检，对抽检不合格的油有权拒收。

5.2.5 The Materials Supply Dept. shall entrust the Lab Dept. to sample and analyze the lubricating oil that has been stored for more than one year upon delivery to the warehouse for viscosity, flash point and acid value. Unqualified oil as per the analysis shall be treated as waste oil and not be used while qualified oil shall be verified by the Equipment Management Dept. and issued to the receiving department together with the analysis sheet.

物资装备部对入库后储存时间超过 1 年的润滑油，在发放前必须委托质量检验部进行抽样分析，主要分析项目：粘度、闪点、酸值。分析不合格的按废油处理，严禁使用；分析合格的由机械动力部确认，与分析单同时发放给用油部门。

5.3 Usage

使用

5.3.1 The operation department shall request for oil as per the oil types specified in the "Five Fixations" for Pump Equipment Lubrication. When the oil (grease) type need to be changed, the influencing factors shall be identified and the "Application for Change of Lubricating Oil Type" shall be filled in and submitted to the Equipment Management Dept. for review.

运行部应严格按《机泵设备润滑“五定表”》规定的用油品种领用；需要变更润滑油（脂）品种时，

应识别影响因素并填写“润滑油种变更申请单”，报机械动力部审核。

5.3.2 Five fixations for lubrication

润滑五定

5.3.2.1 The five fixations for lubrication include fixed person, fixed point, fixed quality, fixed quantity and fixed time as follows:

润滑五定（即定人、定点、定质、定量、定时）的内容为：

(1) Fixed person: The lubrication point of each set of equipment shall be in the charge of a fixed person responsible for oil adding and replacement.

定人：每台设备的润滑点都有固定的加、换油负责人。

(2) Fixed point: Oil shall be injected from the lubrication point as specified by the "Five Fixations" for Pump Equipment Lubrication.

定点：按《机泵设备润滑“五定表”》规定的润滑点注油。

(3) Fixed quality: Oil shall be of the type and brand as specified by the "Five Fixations" for Pump Equipment Lubrication.

定质：按《机泵设备润滑“五定表”》规定的润滑油（脂）品种、牌号注油。

(4) Fixed amount: Oil shall be injected as per the amount as specified by the "Five Fixations" for Pump Equipment Lubrication.

定量：按《机泵设备润滑“五定表”》规定的注油量注油。

(5) Timing: Add and change oil according to the time specified in "Five Fixed Tables for Lubrication of Machine and Pump Equipment", and record the oil addition and change in SAP system within one week.

定时：按《机泵设备润滑“五定表”》规定的时间加换油，一周内把加换油记录在 SAP 系统中。

Note: for the equipment with fully closed bearing and requiring no external grease adding, the "five fixations" for lubrication can be reduced to "three fixations", i.e.: fixed person, fixed point and fixed quality.

注：针对采用全封闭轴承，无需外部加脂的设备，润滑“五定”内容仅包括定人、定点、定质。

5.3.2.2 The "Five Fixations" for Pump Equipment Lubrication shall be prepared as follows:

《机泵设备润滑“五定表”》编制要求如下：

(1) For oil lubrication, the column of the person in charge of the oil adding and replacement can be filled with "outdoor operator", the column of adding cycle with "as per the oil level", and the column of oil amount as "appropriate". The column of oil replacement cycle shall be filled with "as per the analysis" for periodic analysis when the oil replacement cycle is no more than 180 days. For equipment with special requirements, the column of oil replacement cycle shall be filled with as per the equipment instructions.

对于油润滑，加、换油负责人一栏可统一填写为“外操”；加油周期填写为“视油位”；加油量填写为“适量”；换油周期不大于 180 天，做定期分析的换油周期填写为“视分析”，有特殊要求的设备，

原则上按设备使用说明书要求填写换油周期。

(2) For grease lubrication, the column of person in charge of adding and changing oil can be uniformly filled as "maintenance personnel"; Among them, the electric operation department is responsible for the motor bearing, and the operation department of other grease lubrication parts can entrust the equipment maintenance department; The oiling cycle is not more than one month. After the oiling and changing are completed within one week at the beginning of each month (postponed in case of holidays), the oiling and changing records in SAP shall be completed before the 10th of the following month; Fill in the fatliquoring amount as "overflow"; The oil change cycle is synchronized with the maintenance.

对于脂润滑，加、换油负责人一栏可统一填写为“维修人员”；其中电机轴承由电气运行部负责，其它脂润滑部位运行部可委托设备检修部；加脂周期不大于 1 个月，当月完成加换油后，次月 10 日前完成 SAP 中加换油记录；加脂量填写为“溢出”；换油周期与检修同步。

(3) The oil quantity to be added or replaced shall be quantified.

加换油量应具体量化。

5.3.3 The operation department shall complete the revision of the "Five Fixations" for Pump Equipment Lubrication by January every year according to the change of equipment and submit to the Equipment Management Dept. for approval. For the sporadically updated or new equipment, the "Five Fixations" for Pump Equipment Lubrication shall be prepared and submitted to the Equipment Management Dept. for approval two weeks before the equipment is put into operation.

运行部根据设备变更情况，于每年 1 月份完成《机泵设备润滑“五定表”》的修订，并报机械动力部审批；对于零星更新或新增设备，在设备投运前两周制订《机泵设备润滑“五定表”》，并报机械动力部审批。

5.3.4 Appliance and oil station management 器具和油站管理

5.3.4.1 The lubricating oil depot shall be equipped with nameplates, and explosion-proof lamps and ventilation facilities inside.

润滑油库应设置铭牌；内部应设置防爆灯具、通风设施。

5.3.4.2 The operation department shall provide complete lubricating oil (grease) appliances of uniform specifications according to the type of lubricating oil (grease), including oil barrel, fixed oil drum, oil pump, oil pail (pot), hand oil can, filter funnel, oil pan, three-stage filter screen, grease drum and grease gun.

运行部按润滑油（脂）的品种成套配备统一规格的润滑油（脂）器具。基本器具有：领油大桶、固定油桶、油抽子、提油桶（壶）、手油壶、过滤漏斗、接油盘、三级滤网、油脂桶、油脂枪等。

5.3.4.3 The lubrication appliance shall be clearly marked with oil type and brand and special appliances shall be used for special purpose. The appliance shall be neatly arranged by categories and specifications, cleaned regularly, kept clean and intact, and included in the shift

hand-over and take-over.

润滑器具应清晰标记油种牌号，专具专用；器具应按种类规格摆放整齐，定期清扫，保持清洁完好，并纳入交接班内容。

5.3.4.4 Lubricating oil must go through "three-stage filtration" before use. See figure 1 for the schematic diagram of "three-stage filtration" for equipment lubrication.

润滑油在使用前必须经过“三级过滤”，设备润滑“三级过滤”示意图见图 1。

5.3.4.5 Filter precision: the first-stage strainer is 60-mesh, the second is 80-mesh, and the third is 100-mesh.

滤网过滤精度：一级为 60 目，二级为 80 目，三级为 100 目。

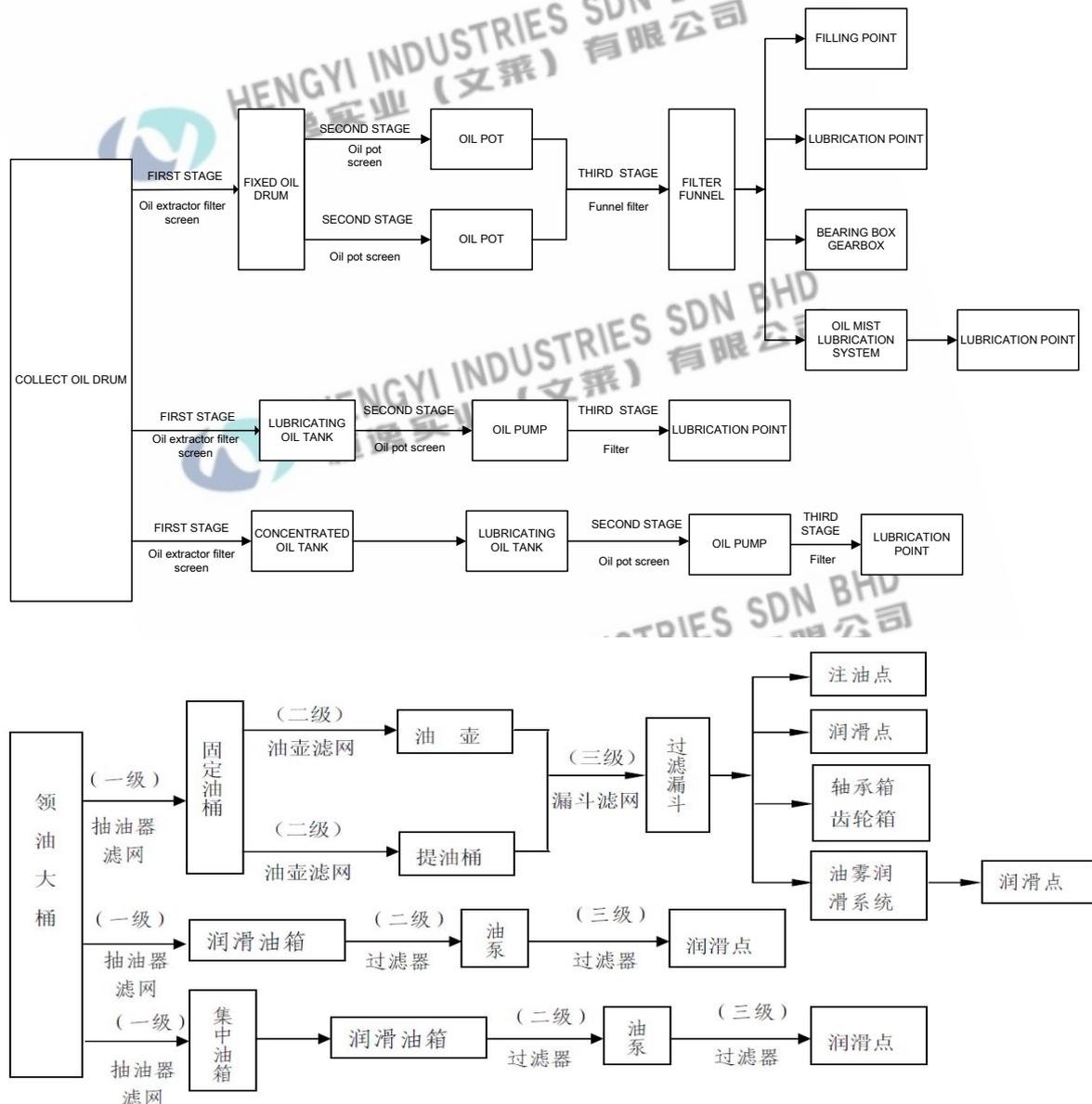


Figure 1 Schematic diagram of "three-stage filtration" for equipment lubrication

图 1 设备润滑“三级过滤”示意图

5.3.5 Lubricating oil analysis

润滑油分析

5.3.5.1 The Lab Dept. shall prepare the analysis plan and complete the analysis task on time according to the lubricating oil analysis list and frequency issued by the Equipment Management Dept.

质量检验部根据机械动力部下达的润滑油分析清单及分析频次，编制分析计划并按时完成分析任务。

5.3.5.2 The quality analysis department is responsible for sending the sampling bottles to the operation department and retrieving them for analysis, and the operation department is responsible for sampling; The quality analysis department must sign the handover with the operation department when sending and taking lubricating oil sampling bottles, and it is forbidden to use irregular sampling bottles; The quality analysis department shall input the analysis results into LIMIS system within 7 days, and the equipment personnel of the operation department shall confirm the analysis results.

质量检验部负责将采样瓶送至运行部并取回分析，运行部负责采样；质量检验部在送、取润滑油采样瓶时，禁止使用非正规采样瓶；质量检验部应在 7 天之内把分析结果输入 LIMIS 系统中，运行部设备人员应对分析结果进行确认。

5.3.5.3 The monthly sampling shall be performed every 30 days with a deviation of no more than 3 working days. The quarterly sampling shall be conducted every 90 days with a deviation of more than 10 days.

月度采样的时间间隔为 30 天，前后偏差不超过 3 个工作日；季度采样的时间间隔为 90 天，前后偏差不超过 10 天。

5.3.5.4 The routine analysis items of lubricating oil include viscosity, acid value, flash point, water content and impurity. The machine (pump) unit with an independent lubricating oil system shall be comprehensively analyzed after overhaul or one month before shutdown for maintenance, including viscosity, flash point, acid value, water content, elemental spectral analysis, anti-emulsification and anti-oxidation. If the oil is analyzed to be unqualified, the operation department shall report to the Equipment Management Dept., make a replacement plan, and analyze the cause.

润滑油常规分析项目为：粘度、酸值、闪点、水份、杂质五项；具有独立润滑油系统的机（泵）组，在大修后或装置停工检修前一个月，需进行全分析，包含粘度、闪点、酸值、水份、元素光谱分析、抗乳化、抗氧化性等。分析不合格时，运行部应报告机械动力部，做好置换或更换计划，并进行原因分析。

5.3.5.5 The newly received lubricating oil must be provided with a copy of the analysis certificate, or re-sampling is necessary for analysis.

新领的润滑油必须有分析合格证书复印件，如缺少必须重新采样分析。

5.3.5.6 After the maintenance of the machine (pump) unit with an independent lubricating oil system, the lubricating oil system shall circulate for more than 4 hours and cannot be put into operation until it is analyzed to be qualified. The oil tank shall be dehydrated at least once a

week. Dehydration and inspection are necessary upon each oiling, and records shall be made also. If the water content in the oil tank is high in normal operation, the cause shall be found and the dehydration frequency shall be increased.

具有独立润滑油系统的机（泵）组检修后，润滑油系统应循环 4 小时以上，分析合格后方可试车投用。油箱每周应不少于一次脱水检查，每次加油后应进行脱水检查，并做好记录；正常运行中发现油箱含水量多时，应查找原因并增加脱水频次。

5.3.6 Lubricating oil (grease) adding and replacement standards

加换润滑油（脂）标准

See Appendix 1 for lubricating oil (grease) adding and replacement standards

加换润滑油（脂）标准见附件 1

5.4 Waste assessment and disposal

判废及处置

5.4.1 Oil that meets one of the following conditions shall be deemed as waste: (1) it is unqualified as per analysis and unable to reach the standard through measures such as heating, filtration and dehydration; (2) its color obviously changes after long-term use; (3) it is from pump maintenance, regular oil replacement or other circumstances and unserviceable.

符合下列条件之一者为废油：分析不合格，无法通过加热、过滤、脱水等措施达到标准的；长期使用颜色明显变色的；机泵检修、定期换油或其他情况更换下来无法利用的。

5.4.2 If the quantity for one replacement exceeds 1000kg, the "Application for Waste Assessment of Lubricating Oil" shall be filled in, in writing, and submitted to the Equipment Management Dept. for approval after being reviewed and approved by the director of the operation department.

润滑油更换数量一次超过 1000kg 的，应书面填写“润滑油判废申请单”，经运行部主管领导审核同意后报机械动力部审批。

5.4.3 During the overhaul, the operation department shall actively re-use the oil withdrawn from each machine (pump) and pay attention to the recovery and treatment of waste oil. It is strictly prohibited to pour or discharge the waste oil into the storm drain system.

大修期间，各机（泵）退出的油品，运行部应积极做好再利用工作，同时应重视废润滑油回收与处理工作，严禁将废油品倒入或排入雨水沟系统内。

5.5 Lubrication file

润滑档案

5.5.1 The equipment with an independent oil station shall be provided with a dependent lubrication file, covering lubrication card, oil addition and replacement situation, treatment

measures for unqualified oil as per analysis, change of oil type and renovation of lubrication system.

具有独立油站的设备应单独建立润滑档案，润滑档案的内容应包括：润滑卡片、加换油情况、油质分析异常时的处理措施、油种变更、润滑系统改造等。

5.5.2 Lubrication files shall not be established for equipment without an independent oil station, but the lubrication data shall be registered in the equipment file.

无独立油站的设备不单独建立润滑档案，但应在设备档案中登记润滑资料。

5.5.3 Equipment lubrication, upon completion, shall be timely recorded in the EM system.

设备润滑作业完成后，应及时在设备 EM 系统中记录。

6 Inspection and Supervision

检查与监督

The Equipment Management Dept. shall supervise, inspect and assess the lubrication management of the operation department.

机械动力部负责对运行部润滑管理工作进行监督检查并考核。

7 Associated Procedures and Records

关联程序和记录

7.1 Associated procedures

关联程序

7.1.1 Lubricating Oil Requisition Procedures HYBN-T2-07-0007-2024-2

润滑油领用程序 HYBN-T2-07-0007-2024-2

7.1.2 Lubricating Oil Analysis Management Procedures HYBN-T2-07-0008-2024-2

润滑油分析管理程序 HYBN-T2-07-0008-2024-2

7.1.3 Waste Assessment and Disposal Management Procedures of Lubricating Oil

HYBN-T2-07-0009-2024-2

润滑油判废及处置管理程序 HYBN-T2-07-0009-2024-2

7.1.4 "Five Fixations" Management Procedures for Equipment Lubrication

HYBN-T2-07-0010-2024-2

设备润滑五定管理程序 HYBN-T2-07-0010-2024-2

7.1.5 Three-stage Filtration Management Procedures for Equipment Lubrication

HYBN-T2-07-0011-2024-2

设备润滑三级过滤管理程序 HYBN-T2-07-0011-2024-2

7.1.6 Equipment Lubrication Inspection Procedures HYBN-T2-07-0012-2024-2

设备润滑检查程序 HYBN-T2-07-0012-2024-2

7.2 Associated records

关联记录

7.2.1 Application for Change of Lubricating Oil Type (HYBN-T6-07-0059-001-2018)

润滑油种变更申请单 HYBN-T6-07-0059-001-2018

7.2.2 "Five Fixations" for Pump Equipment Lubrication (HYBN-T6-07-0060-001-2018)

机泵设备润滑“五定”表 HYBN-T6-07-0060-001-2018

7.2.3 Annual Plan of Lubricating Oil (Grease) (HYBN-T6-07-0061-001-2018)

润滑油（脂）年度计划表 HYBN-T6-07-0061-001-2018

7.2.4 Requisition Plan of Lubricating Oil (Grease) (HYBN-T6-07-0062-001-2018)

润滑油（脂）领用计划表 HYBN-T6-07-0062-001-2018

7.2.5 Application for Waste Assessment of Lubricating Oil (Grease) (HYBN-T6-07-0063-001-2018)

润滑油（脂）判废申请表 HYBN-T6-07-0063-001-2018

8 Supplementary Rules

附则

8.1 This System is under the jurisdiction of Equipment Management Dept.

本制度由机械动力部归口管理。

8.2 This System is drafted by Equipment Management Dept.

本制度起草部门：机械动力部。

8.3 Equipment Management Dept. is responsible for the interpretation of this System.

本制度解释权归机械动力部拥有。

8.4 Revision, preparation and approval of this System are shown in Table 1:

本制度版本编制和审批情况见表 1:

Table 1 Revision, preparation and approval of document

表 1 文件版本编制和审批情况

2	2024-04-01	Li Tao 李涛	Zhao Tingyun 赵挺云	Xu Ye 徐野	Chen Liancai 陈连财
Revision 版本	Issued date 颁布日期	Prepared by 编制人	Reviewed by 审核人	Authorized by 审定人	Approved by 批准人

9 Appendices

附件

Appendix 1: Lubricating oil (grease) adding and replacement standards

附件 1: 加换润滑油（脂）标准

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附件 1:

Lubricating oil (grease) adding and replacement standards**加换润滑油（脂）标准**

1 Lubricating oil (grease) adding standards

加润滑油（脂）标准

1.1 Oil adding shall follow the oil level indication if any. When oil level indication is not available, the following standards shall be followed:

有油位刻度线时，加油以刻度线为准；无刻度线时按下述标准执行：

1.1.1 Circulating lubrication: oil shall be added to the specified liquid level of the tank and the oil cooler shall have an oil temperature of no more than 49°C at the outlet.

循环润滑：油箱油位应加至规定液位，油冷器出口油温不应超过 49°C。

1.1.2 Oil ring lubrication: the oil level shall be kept at D/4 when the inner diameter of oil ring is D=25 ~ 40mm, D/5 when the inner diameter is D=45 ~ 60mm and D/6 when the inner diameter is D=70 ~ 130mm.

油环带油润滑：当油环内径 D=25~40mm 时，油位高度应保持在 D/4；当油环内径 D=45~60mm 时，油位高度应保持在 D/5；当油环内径 D=70~130mm 时，油位高度应保持在 D/6。

1.1.3 Submerged lubrication: the oil level shall be at the upper edge of the lower ball of the bearing or immerse the ball in case of $n < 1500\text{r.p.m}$, above the center of the lower ball but not immerse the upper edge of the ball in case of $3000\text{r.p.m} \geq n \geq 1500\text{r.p.m}$, and below the center of the lower ball but not lower than the lower edge of the ball in case of $n > 3000\text{r.p.m}$.

浸油润滑：当 $n < 1500\text{r.p.m}$ 时，油位在轴承下部滚珠的上缘或浸没滚珠；当 $3000\text{r.p.m} \geq n \geq 1500\text{r.p.m}$ 时，油位在轴承下部滚珠中心以上，但不得浸没滚珠上缘；当 $n > 3000\text{r.p.m}$ 时，油位在轴承下部滚珠中心以下，但不得低于滚珠下缘；

1.1.4 Lubrication of reducer: the oil level shall be 2 ~ 3 times the height of the lower tooth of the higher gear pair for lubrication of a reducer with spur or helical gears. The oil shall submerge the full tooth width of one gear for lubrication of a reducer with bevel gears. The oil level shall be 2 ~ 3 times the height of the worm gear when the worm is above the worm gear for lubrication of a reducer with worm gears. The oil shall immerse the height of worm thread when the worm is below or on the side of the worm gear.

减速机的润滑：当为正斜齿轮减速机时，油面应浸没高齿轮副低齿高的 2~3 倍；当为伞形齿轮减速机时，油面应浸没其中一个齿轮的全齿宽；当为蜗轮蜗杆减速时，若蜗杆在蜗轮上方时，则油面应浸没蜗轮齿高的 2~3 倍；若蜗杆在蜗轮下方或侧面时，则油位应浸没蜗杆螺纹高度。

1.1.5 Forced lubrication: the oil level standard shall be determined according to the shop instructions of the equipment or after actual calibration.

强制润滑：应按设备出厂说明书或实际标定后确定油位标准。

1.1.6 Lubrication with grease: the amount of grease added shall be 1/2 of the volume of the

bearing box in case of $n \leq 3000$ r.p.m, and $1/3$ in case of $n > 3000$ r.p.m.

脂润滑：当 $n \leq 3000$ r.p.m 时，加脂量为轴承箱容积的 $1/2$ ；当 $n > 3000$ r.p.m 时，加脂量为轴承箱容积的 $1/3$ 。

2 Lubricating oil (grease) replacement standards

更换润滑油（脂）标准

2.1 The lubricating oil (grease) in use, if visually checked to meet one of the following conditions, shall be replaced: the lubricating oil becomes black obviously after continuous use for more than five years; the lubricating oil (grease) is seriously emulsified; the lubricating grease becomes dry and hard or contains visible solids.

对在用润滑油（脂）经目测检查，凡符合下列条件之一者，应置换或更换：润滑油连续使用时间超过五年且外观颜色明显变黑；润滑油（脂）乳化严重；润滑脂变干变硬或有明显可见的固体颗粒。

2.2 The lubricating oil in use requiring routine analysis only, if meeting one of the following conditions, shall be partially replaced with new oil: the viscosity change exceeds 10% of the viscosity grade of the lubricating oil; the acid value exceeds 10% of the standard; the variation range of flash point exceeds 10% of the standard; the content of Equipment Management impurities is higher than 0.1% or many granular impurities are found in the oil although the content of Equipment Management impurities is no more than 0.1%; the water content is higher than 0.1%.

对只做常规分析的在用润滑油，凡符合下列条件之一者，应部分置换或更换新油：粘度变化超过润滑油粘度等级的 10%；酸值超过标准的 10%；闪点变化范围超过标准的 10%；机械杂质高于 0.1% 或机械杂质含量虽未超过 0.1%，但油中有较多的颗粒状杂质；水含量高于 0.1%。

2.3 The lubricating oil in use requiring unconventional analysis, the Equipment Management Dept. and the operation department shall jointly determined whether replacement is necessary based on relevant standards.

对于需再做非常规分析的在用润滑油，由机械动力部与运行部参照相关标准共同判定。

