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固定式电动机消防泵应用技术规程

Technical Code for Application of Fixed Electric Motor-Driven Fire Pumps

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前言
Foreword

固定式电动机消防泵是建筑消防设施和固移结合灭火作业的核心组件，其关键性能、生产安装和维保质量效果等直接影响灭火救援工作，关乎人民群众生命和财产安全。为了加强固定式电动机消防泵的质量管理和科学应用，厘清固定式电动机消防泵全生命周期各相关方的责任，针对当前固定式电动机消防泵生产和使用领域里普遍存在的突出问题，标准编制组在市场调研、专题论证、试验验证、相关标准梳理、创新技术研发的基础上，编制本标准，以进一步推动固定式电动机消防泵的技术进步、质量提升、产业发展和实战应用，确保固定式电动机消防泵真正发挥有效作用。

Fixed Electric Motor-Driven Fire Pumps are core components of building fire protection facilities and combined fixed/mobile firefighting operations.Their key performance, production, installation,and maintenance quality directly impact firefighting and rescue effectiveness, bearing significant implications for the safety of lives and property.To strengthen the quality management and scientific application of Fixed Electric Motor-Driven Fire Pumps, and to clarify the responsibilities of relevant parties throughout their full life cycle,the Standards Drafting Group has developed this standard. This work is based on market research,specialized studies,test verification,analysis of relevant standards,and the development of innovative technologies, addressing prominent issues prevalent in the current production and usage of such pumps.The objective is to further promote technological advancement, quality improvement, industrial development, and practical application of Fixed Electric Motor-Driven Fire Pumps, ensuring they effectively fulfill their intended role.

本标准的主要技术内容是：总则、术语、生产技术要求和出厂检测、应用选型、安装与调试、日常维护管理、报废、质量事故调查等。

The main technical content of this standard comprises: General Provisions, Terminology, Production Technical Requirements and Factory Testing, Application and Selection Guidelines, Installation and Commissioning, Routine Maintenance and Management, Decommissioning and Disposal, and Quality Incident Investigation.

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General

1.0.1　为保障火灾时固定式电动机消防泵能正常运行，减少火灾危害，保护人身和财产安全，制定本规程。

To ensure the normal operation of Fixed Electric Motor-Driven Fire Pumps during fires, reduce fire hazards, and protect personal and property safety, this specification is hereby formulated.

1.0.2　本规程适用于固定式电动机消防泵技术性能及出厂检测、应用选型、安装调试、日常检测与维护、报废标准、灾后调查。

This specification applies to the technical performance and factory testing, application and selection, installation and commissioning, routine inspection and maintenance, scrapping criteria, and post-incident investigation related to Fixed Electric Motor-Driven Fire Pumps.

1.0.3　固定式电动机消防泵的应用除应符合本规程的规定外，尚应符合国家现行有关标准的规定。

The application of Fixed Electric Motor-Driven Fire Pumps, in addition to complying with the provisions of this specification, shall also comply with the provisions of relevant current national standards.

条文说明：水作为火灾扑救过程中的主要灭火剂，其供应能力直接影响灭火效果。根据相关统计数据，消火栓、自动喷水系统仍是现阶段民用建筑普遍适用的消防系统，固定式电动机消防泵、消防泵控制器是消防供水系统的心脏部件，只有心脏可靠性强，水灭火系统才可靠。由于水灭火系统平时不用，应急时需瞬间启动，在极端工况下仍需稳定运行输送消防用水，且无法通过日常使用过程来检测设备的性能指标，因此必须从生产、选型、安装、验收、维护等各环节加强管理，提高设备可靠性。

Clause Explanation: Water,as the primary extinguishing agent in the fire extinguishing process, directly affects the effectiveness of firefighting efforts. According to relevant statistical data, hydrant systems and automatic sprinkler systems remain the most commonly used fire protection systems in civil buildings at this stage. Fixed Electric Motor-Driven Fire Pumps and fire pump controllers are the heart of a fire protection water supply system, and only when these heart components are reliable can the corresponding water-based fire protection system be reliable. Since water-based fire protection systems are not used under normal conditions but need to start instantly in emergencies and to operate stably under extreme conditions to deliver fire protection water, and since their performance indicators cannot be tested through regular use, it is essential to strengthen management at all stages, including production, selection, installation, acceptance, and maintenance, to enhance the reliability of such equipment.

2 术语

Terms

2.0.1 固定式电动机消防泵 Fixed Electric Motor-Driven Fire Pumps

固定安装于专用位置，为消防水系统增加灭火用水流量、压力的离心式消防泵，采用电动机作为动力源。一般用于消火栓、自动喷水等灭火系统中。

A centrifugal fire pump installed in a dedicated location to increase the flow and pressure of water in the fire protection water system, powered by an electric motor. It is generally used in fire extinguishing systems such as hydrant systems and automatic sprinkler systems.

2.0.2 吸深 suction height

泵基准面与吸入液面之间的高度差。

Height difference between the pump reference plane and the suction liquid surface.

2.0.3 额定流量 rated flow

固定式电动机消防泵在额定转速下，满足消防使用需求的设计流量，单位 L/s。

Design flow of an Fixed Electric Motor-Driven Fire Pumps operating at its rated speed, which meets the requirements for fire protection use, measured in liters per second (L/s).

2.0.4 额定压力 rated pressur

固定式电动机消防泵在额定转速下，泵在额定流量运行时的净压力，单位 MPa。

Net pressure of an Fixed Electric Motor-Driven Fire Pumps operating at its rated speed and rated flow, measured in megapascals (MPa).

2.0.5 泵最大轴功率 pump maximum shaft power (input power)

固定式电动机消防泵在额定转速下，进口始终为正压时，泵性能曲线上出现的轴功率峰值，此峰值所对应的功率称为泵最大轴功率。

Peak shaft power value that appears on the pump performance curve when the Fixed Electric Motor-Driven Fire Pumps operates at its rated speed and the inlet is always under positive pressure, referred to as the pump maximum shaft power (input power).

2.0.6 电机额定功率 motor rated power

固定式电动机消防泵所采用的驱动电动机在其额定工作状态下运行时所能输出的机械

功率

Mechanical power output of the drive motor used in an Fixed Electric Motor-Driven Fire Pumps when it operates at its rated working conditions.

2.0.7 消防泵控制器 fire pump controller

能够根据消防系统预设的信号，联动控制固定式电动机消防泵启停，并反馈其工作状态的电气控制柜。

An electrical control cabinet that can achieve linkage control of the start and stop of fixed electric motor fire pumps based on predefined signals from the fire protection system, and provide feedback on its operational status.

3 生产技术要求及出厂检测

Technical Requirements and Factory Testing

3.1 固定式电动机消防泵的生产技术要求

Production technical requirements for Fixed Electric Motor-Driven Fire Pumps

3.1.1 关键部件的材料来源与质检记录留存不应小于 5 年。

The material sources and quality inspection records for critical components shall be retained for no less than 5 years.

条文说明：提出关键部件的材料来源与质检记录的留存要求，是为了方便发生质量问题时的责任倒查。

Clause Explanation: The requirement for retaining material sourcing histories and quality inspection records of critical components is established to facilitate accountability investigations in the event of quality incidents.

3.1.2 固定式电动机消防泵进出口的铸造法兰应符合现行国家标准《整体铸铁法兰》GB/T17241.6 的有关规定。

The cast flanges for inlet and outlet connections of Fixed Electric Motor-Driven Fire Pumps shall conform to the effective national standard GB/T 17241.6 Integral Cast Iron Flanges.

3.1.3 固定式电动机消防泵所选用的电动机性能应符合现行国家标准《旋转电机 定额和性能》GB/T755 的规定，防护等级不应低于 IP54，当安装于户外时，宜提高电机防护等级或采用户外防雨电机。

The electric motors selected for Fixed Electric Motor-Driven Fire Pumps shall comply with the performance requirements of the effective national standard GB/T 755 Rotating Electrical Machines - Rating and Performance. The minimum protection degree shall be IP54. When installed outdoors, it is recommended to enhance the motor's protection degree or utilize weather-protected type motors.

条文说明：规定了固定式电动机消防泵的防护等级，防止低防护等级的产品在潮湿泵房下内部受到潮湿气体侵入产生凝露，锈蚀部件，在火灾工况下无法启动或者启动时就由于内部绝缘问题烧机无法满足灭火需求。

Clause Explanation: This provision specifies the protection rating of Fixed Electric Motor-Driven Fire Pumps to avoid using pump products with a lower protection rating, as pump products with a lower protection rating will be easily invaded by humid air in damp pump rooms, which will cause condensation, rusting of components, and failure to start during fires or burnout due to internal insulation issues upon startup, so that fire extinguishing requirements can not be met.

3.1.4　固定式电动机消防泵的材料除应符合现行国家标准《消防泵》GB6245 的规定外，还应符合下列规定：

In addition to conforming to the effective national standard GB 6245 'Fire Pumps, the materials for Fixed Electric Motor-Driven Fire Pumps shall comply with the following additional requirements:

1　过流部分轴或轴套应采用至少为 20Cr13 不锈钢材料，不应采用镀铬、插销等工艺；

The flow passage shaft or shaft sleeve shall be made of stainless steel with a minimum grade of 20Cr13, and shall not adopt processes such as chrome plating or dowel pining;

2　水泵外壳宜为球墨铸铁；

The pump housing should be made of ductile iron;

3　叶轮宜为青铜或不锈钢；

The impeller should be made of bronze or stainless steel;

4　填料压盖、水轴承套、挡套、中间衬套、减压衬套、密封压盖、压盖螺母、叶轮螺母和放水旋塞应采用耐腐蚀性材料制成，宜采用 0Cr18Ni9 不锈钢。

Packing gland, water bearing sleeve, spacer sleeve, intermediate bushing, pressure reducing bushing, seal gland, gland nut, impeller nut, and drain plug shall be made of corrosion-resistant materials, preferably 0Cr18Ni9 stainless steel.

条文说明：因《消防泵》GB6245 中对材料材质及生产工艺没有具体规定，市场上出现一些打擦边球的产品，实际效果并不能满足性能要求。因此，对固定式电动机消防泵各部件的材料材质及生产工艺提出了具体要求，以规范生产过程。

Clause Explanation: Given that GB 6245 Fire Pumps lacks specific material specifications and manufacturing process requirements, certain products exploiting regulatory gaps have emerged in the market. These fail to meet actual performance requirements. Consequently, this standard mandates explicit material grades and manufacturing processes for all components of Fixed Electric Motor-Driven Fire Pumps to standardize production practices.

3.1.5　固定式电动机消防泵应进行连续运转试验、重复启动试验，并应符合下列规定：

Fixed Electric Motor-Driven Fire Pumps shall undergo the continuous running test and repeated start test, which shall comply with the following provisions:

1　连续运转符合现行国家标准《消防泵》GB6245 的规定；

Continuous operation shall meet the requirements specified in the effective national standard GB 6245 Fire Pumps.

2 重复启动次数不少于 5 次，试验间隔时间不应小于 10min，不应大于 15min，单次运行时应达到额定转速，且额定转速运行时长不应小于 5min；

The repeated start test shall include no fewer than 5 starts, with the interval between each start being no less than 10 min and no more than 15 min. During each run, the pump shall reach its rated speed, and the runtime at rated speed shall be no less than 5 min;

3 连续运行应在吸深 1m 情况下进行，且在 1.50 倍额定流量工况下，实际运行压力不应低于额定压力的 65%；

The continuous running test shall be conducted at a suction depth of 1 m, 1.50 times the rated flow, and an operating pressure that shall not be less than 65% of the rated pressure in practice;

4 整个连续运行或重复启动实验中泵应无异常噪音、无异常震动、无异常泄漏、能正常工作。

During the entire continuous running test or repeated start test, the pump shall operate without abnormal noise, abnormal vibration, or abnormal leakage, and shall be able to run normally.

条文说明：为验证固定式电动机消防泵在工程应用中的可靠性，通过连续运转试验及重复启动试验，检查设备在长周期停机后的启动能力以及长时运行能力。

Clause Explanation: This requirement is designed to validate the field reliability of Fixed Electric Motor-Driven Fire Pumps through continuous operation testing and repetitive starting tests, verifying both cold-start capability after extended dormancy and sustained operational capacity under prolonged service conditions.

3.1.6 固定式电动机消防泵应在进口正压下进行测试，以确定固定式电动机消防泵的最大功率需求点，该最大功率点不应大于所配置电机额定功率，且轴功率的特性应为随着流量的增加，轴功率的曲线变化趋于平直或具有逐渐下降的趋势。

Fixed Electric Motor-Driven Fire Pumps shall be tested under positive inlet pressure to determine their maximum power demand point. The maximum power demand point shall not exceed the rated power of the configured motor, and the characteristic of the shaft power shall be such that the curve changes tend to flatten or show a gradually decreasing trend as the flow increases.

条文说明：常规离心泵特性中的运行流量增大后效率降低，功率消耗增大，造成电机过载烧机，直接造成供水能力散失，固定式电动机消防泵由于在火灾运行中需要持续输送消防用水才能起到核心作用，故要求泵运行所需功率在超过额定流量运行时不得出现持续增长的趋势，流体水力性能应设计出功率所需峰值，配套电机额定功率大于该峰值功率点，避免电机烧机。

Clause Explanation: This provision specifies the operating power variation trend requirements for Fixed Electric Motor-Driven Fire Pumps. In conventional centrifugal pumps, an increase in operating flow leads to a decrease in efficiency and an increase in power consumption, which can cause motor overload and subsequent motor failure, ultimately leading to a loss of water supply capability. Fixed Electric Motor-Driven Fire Pumps must be able to continuously deliver fire protection water during fires to fulfill their critical role. Therefore, it is required that the power demand of the pump does not exhibit a continuous increasing trend when the pump operates beyond its rated flow. The hydraulic performance of the pump system shall be designed to achieve the required peak power, and the rated power of the matching motor shall be greater than this peak power to prevent motor failure.

3.1.7 铭牌信息应涵盖现行国家标准《消防泵》GB6245 要求的铭牌信息，宜采用符合 ISO/IEC 15459 标准的 MA 码，且记录原材料来源信息、生产技术标准、生产过程质量检测记录等信息。

The nameplate information shall encompass all data required by the effective national standard GB 6245 'Fire Pumps'. It is recommended to implement ISO/IEC 15459-compliant Machine-Readable Application Identifiers (MA codes), while recording material traceability data, applicable manufacturing standards, and quality inspection records from the production process.

3.1.8 生产厂家宜采用 MA 码用于固定式电动机消防泵的材料采购、生产制造、销售。

Manufacturers are recommended to use MA codes for the material procurement, production, and sales of Fixed Electric Motor-Driven Fire Pumps.

条文说明：要求使用 MA 码对生产过程进行留存记录，具有唯一性和通用性，长久可查，对产品性能保障和社会监督具有重要作用。

Clause Explanation: This provision requires using MA codes for recording the production process, ensuring uniqueness and universality and making the records permanently accessible. This plays a crucial role in ensuring product performance and facilitating social supervision.

3.2 固定式电动机消防泵的出厂检测
Factory testing of Fixed Electric Motor-Driven Fire Pumps

3.2.1 生产厂家的产品的型式检验报告应与实际生产的产品类型一致，当出现下列情形时，应重新送样检测：

The type test report of the manufacturer's products shall be consistent with the actual types of products produced. When one of the following circumstances occurs, it is imperative to resubmit samples for testing:

1 采用新工艺、技术产品和过往技术产品更替或相关产品的相关内容修订并已经执行；

When new processes, technologies, or products replace existing ones, or when relevant content related to the product has been revised and implemented;

2 产品结构、材料、工艺有改变时；

When the structure, materials, or processes of the product have been changed;

3 产品停产超过 6 个月后，恢复生产时；

When production of the product resumes after being halted for more than 6 months;

4 原检测样本为 4 年及以前生产制造产品；

When the original test samples are products manufactured 4 years ago or earlier;

5 发生产品质量缺陷问题，受到相关部门行政处罚、公告时。

When quality defects found in the product have resulted in administrative penalties or public announcements by relevant authorities.

条文说明：只有型式检验通过以后，该产品才能正式投入生产，实际生产的产品应与型式检验报告中的产品类型一致，保障产品的质量稳定。

Clause Explanation: Only after the product has successfully passed type inspections can it be formally put into production. The actual products produced shall be consistent with the product types specified in the type inspection report to ensure the stability and quality of the products.

3.2.2 生产厂家的出厂检测报告应符合下列规定。

The factory performance test report of the manufacturer shall comply with the following provisions.

1 固定式电动机消防泵应通过测试，明确泵在额定转速的±10%范围内下的流量、出口压力,并根据额定转速进行参数修正，修正参数应符合现行国家标准《消防泵》GB6245 的规定。

Fixed Electric Motor-Driven Fire Pumps shall undergo testing to quantitatively determine flow rate and discharge pressure within ±10% deviation from rated speed. Measured parameters shall be corrected to rated speed conditions, with corrected values conforming to the effective national standard GB 6245 Fire Pumps as stipulated in its performance verification clauses.

2 固定式电动机消防泵应通过测试，确定泵在 1.50 倍额定流量下的对应出口压力。

Fixed Electric Motor-Driven Fire Pumps shall be tested to determine the corresponding outlet pressure at 1.50 times the rated flow.

3 进口正压测试，确定固定式电动机消防泵的最大轴功率。

Inlet positive pressure testing shall be conducted to determine the maximum shaft power of Fixed Electric Motor-Driven Fire Pumps.

4 测试应有足够的持续时间，以获得稳定的结果和对应的测试精度。

The test duration shall be sufficient to achieve stable results and ensure the required test accuracy.

5 根据测试数据的结果检查相关产品性能应符合现行国家标准《消防泵》GB6245 的相关规定。

Product performance shall demonstrate compliance with applicable clauses of the effective national standard GB 6245 Fire Pumps through verification against test data..

6 查看电动机功率，比较测得的泵最大轴功率，应符合现行国家标准《消防泵》GB6245 的相关规定。

The motor power shall be checked, and the measured maximum shaft power of the pump shall be compared to ensure compliance with the relevant provisions of GB 6245.

7 应每月进行连续运转性能检测抽检，测试方法应按照现行国家标准《消防泵》GB6245 的规定进行，连续运转性能检测抽样率不低于上月日均生产量 5%，样本数量至少 3 台。

A sampling inspection for continuous running performance shall be conducted on a month basis, monthly sampling inspections for continuous operational performance testing shall be conducted in accordance with the effective national standard GB 6245 'Fire Pumps'. The sampling rate shall not be less than 5 percent of the average daily production volume from the preceding month, with a minimum sample size of three units.

8 出厂产品应逐台出具检测记录，应具有相关质检人员签字及结果记录，并随产品交付用户，形式内容可参考附录 A。

Each outgoing product shall be issued with a test record, which shall be signed by the relevant quality control personnel and contain the testing results. This record shall be delivered to the user along with the product.The format and content of test records shall comply with Appendix A.

条文说明：提出出厂检测要求，是为了在生产末端严控产品的重要性能。

Clause Explanation: The factory acceptance testing requirements are established to stringently control critical performance parameters at the final manufacturing stage, ensuring conformity with design specifications prior to product release.

4 应用选型

Application and Selection

4.1 固定式电动机消防泵的应用选型

Application and selection of Fixed Electric Motor-Driven Fire Pumps

4.1.1 生产厂商应具备相关生产资质及对应的生产能力。

The manufacturer shall possess relevant production qualifications and corresponding production capabilities.

条文说明:采购固定式电动机消防泵时,应注意生产厂家的相关生产资质及对应的生产能力。因为不合理低价必然促使企业以产品质量让步为代价,一些生产厂家可能偷工减料、以次充好,给建筑工程的消防安全运行带来重大的质量隐患,必须警惕低于国标、行标的非标产品的质量风险,采购方应高度关注生产厂家的能力和信誉以及所采购产品的性状。

Clause Explanation: When procuring Fixed Electric Motor-Driven Fire Pumps, purchasers shall verify the manufacturer's production certifications and corresponding manufacturing capacity. Cost-driven compromises that sacrifice product quality must be rigorously avoided, as certain manufacturers may substitute inferior materials or compromise structural integrity - creating significant fire safety hazards in building operations. Heightened vigilance against non-standard products failing to meet GB/industry standards is imperative. Procurement entities must critically evaluate both the manufacturer's technical competence and reputation, along with the performance characteristics of procured equipment.

4.1.2 固定式电动机消防泵的选择和应用应符合下列规定:

Selection and application of Fixed Electric Motor-Driven Fire Pumps shall comply with the following provisions:

1 固定式电动机消防泵的性能应满足消防给水系统所需流量和压力的要求;

The performance of Fixed Electric Motor-Driven Fire Pumps shall meet the flow and pressure requirements for fire protection water supply systems;

2 固定式电动机消防泵所配驱动器的功率应满足所选水泵流量扬程性能曲线上任何一点运行所需功率的要求;

The power of the driver equipped for a selected Fixed Electric Motor-Driven Fire Pumps shall meet the power requirements for any point on the pump's flow-head performance curve.

1)通过轴功率计算公式,并参考生产厂商提供的产品信息,计算出所需的泵最大轴功率。轴功率按照下式计算:

The pump maximum shaft power shall be calculated using the shaft power calculation formula and by referring to the product information provided by the manufacturer.Shaft power is calculated by the following formula:

$$P=\frac{\rho gQH}{\eta}k \qquad (4.1.2\text{-}1)$$

式中：P——轴功率,单位：kW；

Formula:P:shaft power,Unit:kW;

ρ——介质密度,单位：kg/m³，此处指消防用清水，一般为1000kg/m³；

ρ:medium density,Unit:kg/m³; in this context, it refers to clear water for fire protection, typically 1,000 kg/m³;

g——重力加速度,常数,一般为9.81m/s²；

g:gravitational acceleration, a constant, typically 9.81 m/s²;

Q——计算点流量,单位：m³/h；

Q:flow at the calculation point,Unit:m³/h;

H——计算点扬程,单位：m，可使用出口压力转换；

H:head at the calculation point,Unit:m; this can be converted from the outlet pressure;

η——泵效率,%，运行在上述计算点流量、计算点扬程时泵组的效率，由生产厂商提供。

η:pump efficiency, %; the efficiency of the pump at the flow and head (at the calculation point), provided by the manufacturer.

k——余量系数，参考下表选择

k:margin coefficient, selected according to the table below

表4.1.2　余量系数

功率/kW Power/kW	<3	3~5.5	7.5~55	75~110	>110
余量系数/k Margin coefficient/k	1.7	1.5~1.3	1.15~1.1	1.08~1.05	1.05

2)轴功率计算应计算设计所需额定流量、额定压力下的轴功率、1.5倍额定流量、65%出口压力下的轴功率。

The shaft power calculation shall include the shaft power at the design rated flow and the rated pressure, as well as the shaft power at 1.5 times the rated flow and 65% of the rated outlet pressure.

3)选型计算得出的最大轴功率作为选型参考,选型确定的固定式电动机消防泵所配驱动器的功率不得小于上述计算值。

The maximum shaft power calculated from selection shall serve as a reference for model selection. The power of the driver equipped on the selected fixed electric motor-driven fire pump shall not be less than the calculated value above.

3 流量扬程性能曲线应为无驼峰、无拐点的光滑曲线，零流量时的压力不应大于设计工作压力的 140%，且宜大于设计工作压力的 120%；

The flow-head performance curve shall be a smooth curve without humps or inflection points. The pressure at zero flow shall not exceed 140% of the design operating pressure and should preferably be greater than 120% of the design operating pressure;

4 当出流量为设计流量的 150%时，其出口压力不应低于设计工作压力的 65%；

When the flow is 150% of the design flow, the outlet pressure shall not be less than 65% of the design operating pressure;

5 泵轴的密封方式和材料应满足固定式电动机消防泵在低流量时运转的要求；

The sealing method and material of the shaft of Fixed Electric Motor-Driven Fire Pumps shall meet the requirements for operation at low flow rates;

6 消防给水同一泵组的固定式电动机消防泵型号宜一致，且工作泵不宜超过 3 台；

The model of Fixed Electric Motor-Driven Fire Pumps within the same pump set for fire protection water supply shall be consistent, and the number of working pumps shall not exceed 3;

7 多台固定式电动机消防泵并联时，应校核流量叠加对消防水泵出口压力的影响。

When multiple Fixed Electric Motor-Driven Fire Pumps are connected in parallel, the effect of flow superposition on the outlet pressure of the fire pumps shall be verified.

4.1.3 固定式电动机消防泵性能应满足建筑的消防设计标准,核验产品性能中的额定流量、额定压力、泵最大轴功率、电机额定功率、承压能力应符合工程设计需求。

The performance of Fixed Electric Motor-Driven Fire Pumps shall meet the fire protection design standards for buildings. Product performance parameters such as rated flow, rated pressure, pump maximum shaft power, motor rated power,

and pressure-bearing capacity shall be verified to ensure that they conform to the engineering design requirements.

4.2 消防泵控制器的应用选型

Application and selection of fire pumps

4.2.1 消防泵控制器额定输出功率应与固定式电动机消防泵额定功率一致。

The rated output power of the fire pump controller shall match the rated power of the Fixed Electric Motor-Driven Fire Pumps.

4.2.2 消防泵控制器内部不应安装影响消防信号传输或消防联动控制的元器件、部件。

Internal components or parts that could affect the fire signal transmission or the fire protection linkage control shall not be installed inside the fire pump controller.

4.2.3 消防泵控制器应专用于控制固定式电动机消防泵，并应符合下列要求：

The fire pump controller shall be dedicated exclusively to controlling fixed electric motor-driven fire pumps and shall comply with the following requirements:

1 不应与其他负载设备的控制系统合并使用或套用、借用，其电源输出端不应连接非消防设备负载。

The control system shall not be shared with or borrowed from non-fire protection equipment loads under any circumstances. Furthermore, no non-fire protection loads shall be connected to its power output terminals.

2 不应采用较大额定输出功率消防泵控制器控制小功率固定式电动机消防泵。

Oversized fire pump controllers shall not be utilized to operate smaller-rated Fixed Electric Motor-Driven Fire Pumps. Controllers must be size-matched to the connected motor's electrical characteristics to ensure proper overload protection coordination.

条文说明：对消防泵控制器选型使用中常见的不合理现象进行的要求，杜绝消防泵控制器与其他非消防类负载共用控制线路、电源线路造成其他设备的故障影响消防设备的正常使用。较大额定输出功率消防泵控制器控制小功率固定式电动机消防泵时，由于较大额定输出功率消防泵控制器对应的监测、反馈元器件分度值较大，无法正常控制或保护对应小功率固定式电动机消防泵，该隐患存留到消防工况下，将产生的灾难性故障。

Clause Explanation: This provision addresses prevalent improper practices in fire pump controller selection and application. It strictly prohibits sharing control or power circuits between fire pump controllers and non-fire protection loads to prevent ancillary equipment failures from compromising fire system operation. Crucially, utilizing oversized controllers for smaller-rated Fixed Electric Motor-Driven Fire Pumps creates critical safety deficiencies: the

coarse resolution thresholds of monitoring/feedback components in high-capacity units cannot detect incipient faults or provide effective protection. This latent protection gap persists undetected during normal operation but manifests as catastrophic failure during fire emergencies.

4.2.4 消防泵控制器不应设置过载保护功能。

The fire pump controller shall not have an overload protection function.

4.2.5 固定式电动机消防泵不应设置自动停泵的控制功能，停泵应由具有管理权限的工作人员根据火灾扑救情况确定。

Fixed Electric Motor-Driven Fire Pumps shall not be configured with an automatic pump shutdown control function. The shutdown of fire pumps shall be determined by personnel with management authority based on the situation of fire suppression.

条文说明：固定式电动机消防泵已经具备无过载运行设计，消防泵控制器控制的消防泵在全流量运行中，配置的电机额定功率已经大于所需功率峰值，本质上不存在过载现象。其次在偶发的过载情况下，依靠电机使用系数和设备安全系数能够保障消防泵持续工作。在火灾扑救中，消防供水设备也不得随意停摆，设备停摆带来的生命财产损失明显大于设备损坏的损失。

Clause Explanation: Fixed Electric Motor-Driven Fire Pumps are designed with overload-proof operation. Under full-flow operation controlled by the fire pump controller, the rated power of the configured motor exceeds the peak power demand, fundamentally eliminating overload conditions. Secondly, during incidental overload events, the motor service factor and equipment safety margin ensure sustained pump operation. During firefighting operations, fire water supply equipment must not cease operation arbitrarily. The resulting loss of life and property from operational halt demonstrably exceeds the losses incurred from equipment damage.

4.2.6 消防泵控制器设置在专用消防水泵控制室时，其防护等级不应低于 IP30；与固定式电动机消防泵设置在同一空间时，其防护等级不应低于 IP55。

When the fire pump controller is installed in a dedicated fire pump control room, its protection rating shall not be lower than IP30; when it is installed in the same space as the Fixed Electric Motor-Driven Fire Pumps, its protection rating shall not be lower than IP55.

条文说明：提出不同设置场所消防泵控制器的防护等级要求，是为了防止低防护等级的产品受到潮湿气体侵入，内部凝露，锈蚀部件，在火灾工况下无法启动或者启动时，由于内部绝缘问题短路等现象发生，无法满足灭火需求。

Clause Explanation: Specifying different IP rating requirements for fire pump controllers in various installation locations aims to prevent products with low protection grades from failing due to: ingress of humid gases, internal condensation causing corrosion of components, startup failure during fire

scenarios, or short circuits caused by compromised internal insulation. Such failures would compromise fire suppression requirements.

4.3 测试管路

Test Manifold

4.3.1 固定式电动机消防泵的流量小于 20L/s、工作压力小于 0.50MPa 时，消防泵应预留测量用流量计和压力计接口，其他泵应在出口管路上设计安装测试管路。测试管路如图 4.3.1 所示。

For Fixed Electric Motor-Driven Fire Pumps with flow rates below 20 L/s and operating pressures below 0.50 MPa, instrument interfaces for flow meters and pressure gauges shall be reserved. For other fire pumps, a test manifold shall be designed and installed on the discharge line, as illustrated in Fig. 4.3.1.

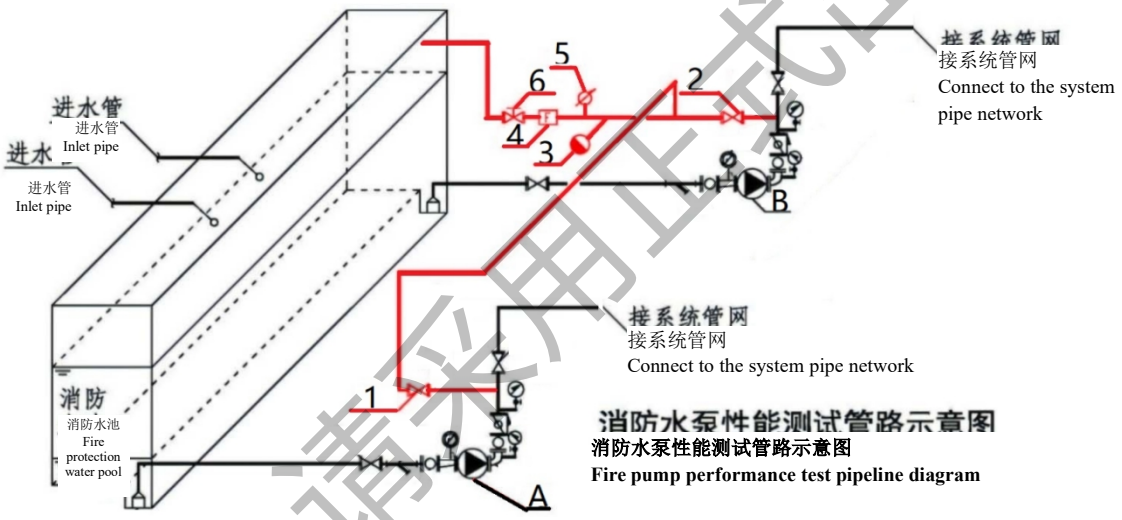

图 4.3.1 消防水泵性能测试管路示意图

Figure 4.4.1 Fire pump performance test pipeline diagram

1/2——明杆软密封闸阀；3——测试用消火栓；4——流量检测装置；5——压力检测装置；6——调节阀；A/B——固定式电动机消防泵

1/2—Rising stem soft seal gate valve; 3—Test hydrant; 4—Flow measurement device; 5—Pressure measurement device; 6—Regulating valve; A/B—Fixed Electric Motor-Driven Fire Pumps

4.3.2 消防泵流量检测装置的计量精度应为 0.4 级，最大量程的 75%应大于最大一台消防泵设计流量值的 150%；安装位置应选择距离上游大于 10 倍直管径、下游大于 5 倍直管径的位置、且无阀门及变径的管路，当所选用流量检测装置有技术要求可减少直线管路，且能保证测量精度时，可根据相关产品要求确定直线管路的长度，安装位置应能直观平视。

The measurement accuracy of the flow measurement device for fire pumps shall be Class 0.4, and 75% of its maximum range shall be greater than 150% of the design flow of the largest fire pump. The installation position of the flow measurement device shall be chosen where the distance from the upstream is greater than 10 times the pipe diameter and from the downstream is greater than 5 times the pipe diameter, and there shall be no valves or changes in pipe diameter. If the selected flow measurement device has technical requirements that allow for a reduction in the length of straight pipe sections while ensuring measurement accuracy, the length of the straight pipe sections can be determined according to the relevant product requirements. The installation position shall be visually visible at a level view.

4.3.3 消防泵压力检测装置的计量精度应为 0.5 级，最大量程的 75%应大于最大一台泵设计压力值的 165%，安装位置应能直观平视。

The measurement accuracy of the pressure measurement device for fire pumps shall be Class 0.5, and 75% of its maximum range shall be greater than 165% of the design pressure of the largest pump. The installation position shall be visually visible at a level view.

4.3.4 当多台消防泵共用测试管时，其管径应根据所有泵中的额定流量的最大值、出口压力的最大值进行校验，测试管路应根据最大额定流量的 150%、最大流速、最大出口压力要求经计算确定，但不应小于 DN100。

When multiple fire pumps share a test pipeline, the pipe diameter shall be verified based on the maximum rated flow and the maximum outlet pressure among all the pumps. The test pipeline shall be designed based on 150% of the maximum rated flow, the maximum velocity, and the maximum outlet pressure, but the diameter shall not be less than DN100.

条文说明:此条规定了固定式电动机消防泵设计安装测试管路的方式、检测性能的技术要求，并明确了设置要求。传统的消防供水管网中并未细化消防泵的现场性能检测方法，现行有关国家标准对于流量测试、测试设备的安装未明确说明。此条参考国内外有关标准，细化了管路设计方向、测试设备安装要求和使用方式，为现场检测及日后使用该系统持续检测消防泵性能提出了可靠解决方案。

Clause Explanation: This provision specifies the design and installation of test pipelines for Fixed Electric Motor-Driven Fire Pumps, the technical requirements for performance testing, and clarifies the setup requirements. Traditional fire water supply networks did not detail on-site performance testing methods for fire pumps. Current relevant national standards lack explicit explanations regarding flow rate testing and the installation of testing equipment. By referencing relevant standards both domestically and internationally, this provision refines pipeline design direction, test equipment installation requirements, and usage methods, providing reliable solutions for on-site testing and the future use of this system to continuously monitor fire pump performance.

4.3.5　测试管路的排水末端（按水流方向）应自由出流，且满足消防泵最大轴功率工况点测试要求，测试用水宜回流到消防水池。消防水泵房应采取防水淹没的技术措施，排水管道系统的设计流量应按测试管路最大小时流量计算，应为测试管路最大小时流量的 25%～30%。

The discharge end of the test pipeline (in the direction of water flow) shall be free to flow and shall meet the test requirements for the fire pump maximum shaft power operating point. The test water should preferably be returned to the fire protection water tank. Technical measures shall be taken to prevent water inundation in fire pump rooms. The design flow of the drainage piping system shall be calculated based on the maximum hourly flow of the test pipeline, and shall be 25% to 30% of the maximum hourly flow of the test pipeline.

条文说明：消防泵运行时，应对工况比较特殊，较大概率迫使消防泵需要应对较大流量的运行需求。测试消防泵性能测试点应包括零流量点、额定流量点 Qn、1.5 倍 Qn 点，其余位置按 10%-15%的设计流量间隔来测试，并记录绘制流量-压力性能曲线和流量-功率性能曲线，应符合设计要求，校核是否满足设计要求和工程需求。

Clause Explanation: When the fire pump is running, the operating conditions are quite special, which is likely to force the fire pump to meet the operational requirements of large flow rates. The performance testing points for fire pumps should include zero flow point, rated flow point Qn, and 1.5 times Qn point. Other positions should be tested at intervals of 10% -15% of the design flow rate, and the flow pressure performance curve and flow power performance curve should be recorded and drawn to meet the design requirements and verify whether they meet the design requirements and engineering needs.

5 安装与调试

Installation and Commissioning

5.1 现场检查

On-site inspection

5.1.1 固定式电动机消防泵、消防泵控制器施工前应进行现场检查，并应符合下列规定：

Before the installation of Fixed Electric Motor-Driven Fire Pumps and fire pump controllers, on-site inspections shall be conducted, and the following requirements shall be met:

1 应有下列文件：

The following documents shall be available:

1)《产品质量检验合格证明》

Product Quality Inspection Certificate

2)《型式检验报告》

Type Inspection Report

3)《出厂检测报告》

Factory Performance Test Report

4)《消防自愿性认证证书》

Voluntary Fire Protection Certification

5)《使用说明书》

User Manual

检查数量：全数检查

Inspection quantity: 100% inspection

检查方式：查验有关文件资料

Inspection method: review of relevant documents and records

2 固定式电动机消防泵及消防泵控制器标志应清晰，表面应无腐蚀，无明显划伤、裂痕、毛刺等机械损伤，覆盖涂层不应脱落、起泡，紧固部位应无松动。

Markings on Fixed Electric Motor-Driven Fire Pumps and fire pump controllers shall be clear; the surface shall be free from corrosion, significant scratches, cracks, burrs, or other mechanical damage; the coating shall not peel or bubble; and the fastened parts shall not be loose.

检查数量：全数检查

Inspection quantity: 100% inspection

检查方式：直观检查

Inspection method: visual inspection

5.1.2 固定式电动机消防泵、消防泵控制器安装前应对防护等级进行现场检查，并应符合下列规定：

Before the installation of Fixed Electric Motor-Driven Fire Pumps and fire pump controllers, their protection ratings shall be inspected on-site, and the following requirements shall be met:

固定式电动机消防泵防护等级不应低于 IP54；消防泵控制器设置在专用消防水泵控制室时，其防护等级不应低于 IP30，与固定式电动机消防泵设置在同一空间时，其防护等级不应低于 IP55。

The protection crating for Fixed Electric Motor-Driven Fire Pumps shall not be lower than IP54. When the fire pump controller is installed in a dedicated fire pump control room, its protection rating shall not be lower than IP30; when it is installed in the same space as the Fixed Electric Motor-Driven Fire Pumps, its protection rating shall not be lower than IP55.

检查数量：全数检查

Inspection quantity: 100% inspection

检查方式：直观检查安装

Inspection method: visual inspection during installation

5.2 安装

Installation

5.2.1 固定式电动机消防泵的安装应符合现行国家标准《消防给水及消火栓系统技术规范》GB50974 的有关规定，并应安装测试管路。

The installation of Fixed Electric Motor-Driven Fire Pumps shall comply with the relevant provisions of the current national standard GB 50974

Technical Code for Fire Protection Water Supply and Hydrant Systems, and a test manifold shall be installed.

条文说明：消防供水设备在验收过程中，会发现部分泵房内出现管路、压力表、流量计等未按要求安装的情况，无法准确对设备进行性能检测。安装测试管路，并严格按照本标准的要求执行，才能保障消防供水设备性能的准确检测。

Clause Explanation: During the acceptance inspection of fire water supply equipment, it is often found that in some pump rooms, components such as pipelines, pressure gauges, and flow meters are not installed as required, preventing the accurate measurement of equipment performance. Only by installing test pipelines and strictly adhering to the requirements of this standard can the accuracy of fire water supply equipment performance measurements be ensured.

5.2.2 消防泵控制器安装时，不应影响、破坏柜体的防护等级。

When installing a fire pump controller, it shall not affect or compromise the cabinet's protection rating.

条文说明：防护等级为 IP55 的消防控制器，其大部分为下进下出线结构，部分消防控制器在安装过程中，工人为了一时方便，会直接在柜体顶部或侧面开孔进行穿线，这会破坏柜体完整性，无法达到防护要求，后期设备在使用过程会因受潮而极易出现故障。

Clause Explanation: For fire pump controllers with an IP55 protection rating, most of them are designed with a bottom-in and bottom-out wiring structure. However, during installation, workers sometimes, for convenience, directly drill holes in the top or sides of the cabinet for wiring. This compromises the integrity of the cabinet, causing it to fail to meet the specified protection requirements. Consequently, during later use, the equipment is highly susceptible to malfunctions due to moisture ingress.

5.2.3 消防泵控制器的机械应急手动操作机构应有永久性说明中文标识，文字高度、宽度不应小于 10mm。

The mechanical emergency manual operating mechanism of the fire pump controller shall be equipped with a permanent instruction label in Chinese. The height and width of the characters shall not be less than 10 mm.

条文说明：为方便使用人员的日常使用、维保及在紧急情况下快速操作，应在明显位置配置使用、维护中文说明及中文操作说明，说明应醒目且能长久保存。

Clause Explanation: To facilitate daily use, maintenance, and rapid operation during emergencies for users, Chinese instructions for use, maintenance, and operation shall be provided in a prominent location. These instructions shall be prominent and remain legible and visible over a long period.

5.3 调试

Commissioning

5.3.1 固定式电动机消防泵、消防泵控制器安装完成后，应进行管网供水调试，最不利水点末端试水出口处动压及流量应符合设计要求。

After the installation of Fixed Electric Motor-Driven Fire Pumps and fire pump controllers, a water supply commissioning of the piping network shall be conducted. The dynamic pressure and flow at the end-of-line test outlet of the most unfavorable water point shall comply with the design requirements.

5.3.2 固定式电动机消防泵、消防泵控制器应逐台进行通电检查，并应能正常工作。

Fixed Electric Motor-Driven Fire Pumps and fire pump controllers shall be individually powered up for inspection, and they shall be able to operate normally.

条文说明：消防泵组必须设有备用泵，为防止在启动测试时忽略备用泵的存在，应逐台进行通电检查，确保所有泵都能正常工作。

Clause Explanation: A fire pump set must include a standby pump. To prevent the standby pump from being overlooked during startup testing, each pump shall be individually powered up for inspection to ensure that all the pumps can operate properly.

5.3.3 固定式电动机消防泵、消防泵控制器应进行联动测试，并应能正常工作。

Fixed Electric Motor-Driven Fire Pumps and fire pump controllers shall undergo linkage testing, and they shall be able to operate normally during the testing.

条文说明：消防水系统只是整个消防系统的一部分，在调试过程中不能只检查消防水系统能否正常联动运转，还应检查固定式电动机消防泵及消防泵控制器与其他系统之间的联动要求，并应能正常工作。

Clause Explanation: The fire protection water system is only a part of the whole fire protection system. During the commissioning process, it is not sufficient to merely check whether the fire protection water system can operate properly under normal linkage conditions. It is also necessary to verify the linkage requirements between the Fixed Electric Motor-Driven Fire Pumps and fire pump controllers and other systems, ensuring that they can operate normally.

5.3.4 固定式电动机消防泵应逐台采用测试管路进行性能检查，性能检查方法应符合下列规定：

Fixed Electric Motor-Driven Fire Pumps shall be individually tested using test pipelines for performance checks, and the methods for performance checks shall comply with the following provisions:

1 测试固定式电动机消防泵流量-压力性能曲线、流量-功率性能曲线,应符合设计要求。

The tested flow-pressure performance curves and flow-power performance curves of Fixed Electric Motor-Driven Fire Pumps shall comply with their respective design requirements.

2 逐台对固定式电动机消防泵进行全流量性能测试时，关闭其余闸阀,打开对应泵流向管路上的闸阀,手动启动固定式电动机消防泵,通过调整出口方向上调节阀的开启度完成测试，测试工况完毕后所有阀门恢复到原工作状态。

When conducting full-flow performance tests on each electric motor-driven fixed fire pump individually, close all other gate valves and open the gate valve on the pipeline corresponding to the pump's flow direction. Then, manually start the Fixed Electric Motor-Driven Fire Pumps and complete the testing by adjusting the opening degree of the regulating valve at the outlet. After the test is completed, all valves shall be returned to their respective original operating states.

3 对各固定式电动机消防泵进行测试后，详细记录相应数据，对比制造商提交材料，审核是否相符，测试记录的形式内容可参考附录 B。

After testing each Fixed Electric Motor-Driven Fire Pumps, it is necessary to keep detailed records of the corresponding data, and compare these records with the documents provided by the manufacturer to review whether they are consistent.The format and content of test records shall comply with Appendix B.

条文说明：采用测试管路对每台消防泵进行检测，其检测数据对验收、使用、报废甚至是事故追责都有很大影响，所以其数据准确性非常重要。本条文规范了对每台消防泵的测试操作流程，保障测试数据的有效性。

Clause Explanation: Testing each fire pump using test pipelines is crucial because the test data can significantly affect acceptance, use, disposal, and even accident accountability. Therefore, the accuracy of test data is extremely important. This section standardizes the test procedures for fire pumps to ensure the validity of the test data.

5.4 验收

Acceptance

5.4.1 对防护等级为 IP55 的消防泵控制器的验收应符合下列规定：

The inspection and acceptance of fire pump controllers with a protection rating of IP55 shall comply with the following provisions:

1 消防泵控制器柜体安装或紧固螺栓孔应具有相应的封堵措施；

Appropriate sealing measures shall be taken for bolt holes used for installing or mounting the fire pump controller cabinet;

2 线路连接通孔应位于柜体底部位置，并具有相应的封堵措施；

The through-holes for cable connections shall be located at the bottom of the cabinet, and corresponding sealing measures shall be taken;

3 外部显示状态信号灯或屏幕应有防护罩或封堵措施；

For external status signal lights or screens, a protective cover shall be installed or sealing measures shall be taken;

4 外部控制装置应有防护罩或封堵措施；

For external control devices, a protective cover shall be installed or sealing measures shall be taken;

5 现场检查时，柜体内部不应有任何凝露、积水情况；

During on-site inspection, there shall be no condensation or water accumulation inside the cabinet;

6 现场检查时，柜体内放置强光源，柜门闭合情况下，不应有漏光现象。

During on-site inspection, a strong light source shall be placed inside the cabinet, and when the cabinet door is closed, there shall be no light leakage.

条文说明：为防止验收人员不了解 IP55 防护要求，无法进行有效验收，本条文明确了防护等级为 IP55 的消防控制器应检查的项目，准确判断防护等级是否达标，保障设备能够正常运行。

Clause Explanation: To prevent acceptance personnel from being familiar with the IP55 protection requirements and thus unable to conduct effective acceptance, this section specifies the items that shall be checked for fire pump controllers with an IP55 protection rating. This ensures that you can accurately judge whether the protection rating meet the standard and whether the equipment can operate properly.

5.4.2 对消防泵控制器内部断路器的验收应符合下列规定：

The inspection and acceptance of the internal circuit breakers within fire pump controllers shall comply with the following provisions:

1 应采用符合现行有关国家标准的定型产品；

Standardized products compliant with current relevant national standards shall be used;

2 断路器脱扣方式应为单独电磁脱扣，不应为复合式脱扣、分励脱扣、热脱扣；

The tripping method of the circuit breaker shall be separate electromagnetic tripping and shall not be composite tripping, shunt tripping, or thermal tripping;

3　断路器额定电流不应小于所控制固定式电动机消防泵的额定工作电流。

The rated current of a circuit breaker shall not be less than the rated operating current of the Fixed Electric Motor-Driven Fire Pumps it controls.

条文说明:消防控制器内部的断路器不应设置过载保护功能,因此要采用单独电磁脱扣方式。还应满足115%额定电流下运行30min，150%额定电流下运行1min的抗过流能力要求，因此其额定电流不应小于其控制的固定式电动机消防泵的额定工作电流。

Clause Explanation: The circuit breakers inside the fire pump controller shall not incorporate overload protection functionality; therefore, the separate electromagnetic tripping method shall be selected. Each circuit breaker shall also be able to withstand 115% of its rated current for 30 min and 150% of its rated current for 1 min. Therefore, its rated current shall not be less than the rated operating current of the fixed electric motor fire pump it controls.

5.4.3　对固定式电动机消防泵抗腐蚀、抗压的验收应符合下列规定：

The inspection and acceptance of the corrosion resistance and pressure resistance for Fixed Electric Motor-Driven Fire Pumps shall comply with the following provisions:

1　检查《型式检验报告》、《出厂检测报告》中对于泵体过流部分轴、叶轮的材质说明，应符合抗腐蚀要求；

Inspect the material descriptions for the shaft and impeller in the pump's flow path in the Type Inspection Report and Factory Performance Test Report to ensure they meet the corrosion resistance requirements;

2　检查固定式电动机消防泵的泵体不应有裂纹、孔洞、结疤。

Inspect the body of Fixed Electric Motor-Driven Fire Pumps to ensure there are no cracks, holes, or blemishes.

5.4.4　对固定式电动机消防泵运行中泵的最大轴功率的验收应符合下列规定：

The maximum shaft power of Fixed Electric Motor-Driven Fire Pumps during operation shall comply with the following provisions:

1　查阅《型式检验报告》或《出厂检测报告》中1.5倍额定流量下的测试记录，最大轴功率不应超过该固定式电动机消防泵配置电机的额定功率；

Check the test records about 1.5 times the rated flow from the Type Inspection Report or Factory Performance Test Report. The maximum shaft power of an Fixed Electric Motor-Driven Fire Pumps shall not exceed the rated power of the motor configured for the pump;

2　固定式电动机消防泵试运行时不应出现过热或烧电机现象。

During the trial operation of an Fixed Electric Motor-Driven Fire Pumps, there shall be no overheating or motor burnout.

5.4.5 对固定式电动机消防泵 1.5 倍流量运行时出口压力的验收应符合下列规定：

The inspection and acceptance of the discharge pressure under 150% rated flow operating conditions for Fixed Electric Motor-Driven Fire Pumps shall comply with the following provisions:

查阅《型式检验报告》、《出厂检测报告》、《消防泵性能调试、验收测试记录》中关于流量、压力的测试记录，1.5 倍额定流量下运行时出口压力不应小于 0.65 倍额定压力。

Check the flow and pressure test records in the Type Test Report,Factory Performance Test Report, and Fire Pump Performance Commissioning & Acceptance Test Records. During operation at 1.5 times rated flow, the discharge pressure shall not be less than 0.65 times the rated pressure.

5.4.6 对固定式电动机消防泵满足工程设计要求的验收应符合下列规定：

The inspection and acceptance verifying that Fixed Electric Motor-Driven Fire Pumps conform to the specific engineering design requirements shall comply with the following provisions:

1 固定式电动机消防泵铭牌载明的额定流量、额定压力应满足工程设计需求；

The rated flow and rated pressure specified on the nameplate of the Fixed Electric Motor-Driven Fire Pumps shall meet the engineering design requirements;

2 固定式电动机消防泵的轴功率极值不大于电机额定功率。

the maximum shaft power of the Fixed Electric Motor-Driven Fire Pumps shall not exceed the rated power of the motor configured for the pump.

条文说明：明确了针对固定式电动机消防泵外观、材质、承压、性能、铭牌的验收检查条例，应符合《型式检验报告》或《出厂检测报告》、《消防泵性能调试、验收测试记录》中的数据要求。

Clause Explanation: The acceptance inspection criteria for the appearance, material, pressure resistance, performance, and nameplate of Fixed Electric Motor-Driven Fire Pumps are clearly defined here. These inspected aspects shall comply with the data requirements specified in the Type Test Report,Factory Performance Test Report, and Fire Pump Performance Commissioning & Acceptance Test Records.

6 日常维护管理

Daily Maintenance Management

6.0.1 固定式电动机消防泵、消防泵控制器应进行专业维护。

Fixed Electric Motor-Driven Fire Pumps and fire pump controllers shall be maintained professionally.

条文说明：固定式电动机消防泵、消防泵控制器的维修、维护应由专业机构执行，该机构包括不限于相关产品的供应商、生产厂家等。固定式电动机消防泵、消防泵控制器产品是专业设计于灭火工况下使用的产品，需要专业技术人员维护才可保障在火灾特殊工况下仍然符合原始技术设计的性能。

Clause Explanation: This provision specifies that the maintenance and repair of Fixed Electric Motor-Driven Fire Pumps and fire pump controllers shall be performed by professional institutions, which may include, but are not limited to, suppliers and manufacturers of these products. Fixed Electric Motor-Driven Fire Pumps and fire pump controllers are specially designed for use in fire extinguishing conditions. They require maintenance by professional technicians to ensure that they still meet their original technical design performance requirements under special conditions like fire.

6.0.2 固定式电动机消防泵、消防泵控制器发生故障，需要停水维修，应经单位消防安全管理人批准；维修时，应临场看护、采取相应防范措施。

If an Fixed Electric Motor-Driven Fire Pumps or a fire pump controller fails and requires shutdown for maintenance, it shall be approved by the unit's fire safety manager. During maintenance, it is necessary to provide on-site supervision and take appropriate preventive measures.

6.0.3 维护管理内容及周期应符合表 6.0.3 的规定：

The scope and frequency of maintenance shall comply with the requirements specified in Table 6.0.3:

表 6.0.3 维护管理内容及周期

Table 6.0.3 Maintenance Scope and Frequency

检查周期 Inspection Frequency	检查项目 Inspection Item
经常 Often	在冬季每天应对消防储水设施进行室内温度和水温检测，当结冰或室内温度低于 5℃时，应采取不结冰、室温不低于 5℃的措施。 During winter, daily inspections shall be conducted to measure indoor air temperature and water temperature of fire protection

	water storage facilities. If ice formation occurs or indoor temperature drops below

续表 6.0.3　维护管理内容及周期

Table 6.0.3　Maintenance Scope and Frequency

	5℃, safeguards shall be implemented to prevent freezing and maintain ambient temperature at or above 5℃.
日 Daily	查看泵和阀门的标志，应清晰可辨，标识磨灭应及时修补。 Inspect the markings on pumps and valves to ensure they are clear and legible. If the markings are worn or illegible, promptly repair or replace them.
	观察阀杆及手轮位置，应处于最大开度位置。 Observe the position of the valve stem and handwheel to ensure that they are in the fully open position.
	查看泵体，泵体应无破裂，出现裂纹泵体应及时更换。 Inspect the pump body; it shall be free from cracks. If any cracks are found, replace the pump body promptly.
	查看泵体与电机连接处，应无渗漏或仅有微量泄露。 Inspect the connection between the pump body and the motor; there shall be no leakage or only a minimal amount of leakage.
	检查消防启动旋钮应处于自动状态，电源指示应正常，处于常亮状态。 Inspect the fire start knob; it shall be in the automatic position. The power indicator shall be normal and remain lit.
周 Weekly	转动阀门手轮检查，应运行正常。 Operate the valve handwheel to check; it shall function normally.
	查看消防泵控制器内元器件，应无脱落、松动，元器件表面、柜内内部无凝露、无积水。 Inspect the components inside the fire pump controller; they shall be securely attached with no loosening or falling off. The surfaces of the components and the interior of the cabinet shall be free of condensation and standing water.
	查看内部电触点位置，接点位置应无发黑、烧熔情况。 Inspect the internal electrical contact points; they shall show no signs of blackening or melting.
	查看各电缆连接线，绝缘层应无损伤。 Inspect all cable connections; their insulation layer shall be free of damage.
	使用消防泵控制器启动水泵，查看运行情况。配置自动巡检控制器的固定式电动机消防泵，应查阅巡检记录。 Use the fire pump controller to start the pump and observe its operation. For Fixed Electric Motor-Driven Fire Pumps equipped with an automatic inspection controller, the inspection records shall be checked.
月 Monthly	检查管道有无机械损伤、油漆脱落、锈蚀等，管道固定是否牢固，发现问题应及时处理。 Check the pipes for any mechanical damage, paint peeling, rust, or other issues. Ensure that the pipes are securely fixed. Any problems found shall be addressed promptly.

	检查紧固螺栓、螺母是否松动，应及时加固。 Check the tightening bolts and nuts for any looseness and tighten them as necessary.

续表 6.0.3　维护管理内容及周期

Table 6.0.3　Maintenance Scope and Frequency

	每月手动启动固定式电动机消防泵不少于 2 次，检查能否正常启动。 Manually start the Fixed Electric Motor-Driven Fire Pumps at least twice a month to check if it can start normally.
	启动固定式电动机消防泵检查反馈信号有否正常，出口管路压力是否上升，固定式电动机消防泵的电机转动是否正常。电机有无发热等状况。轴与电机、连接部件是否有松动、锈蚀、变形、发热。运行时间一般不少于 5 分钟。 Start the Fixed Electric Motor-Driven Fire Pumps to check whether the feedback signals are normal, whether the outlet pipe pressure increases, and whether its motor runs normally. Check whether the motor is overheating or showing any other abnormal conditions. Inspect the shaft, motor, and connecting components for any looseness, rust, deformation, or overheating. The running time shall generally be no less than 5 min.
	检查固定式电动机消防泵出口管路上安装的压力表是否变形、水泵启动后动作是否正常。 Inspect the pressure gauge installed on the outlet pipe of the Fixed Electric Motor-Driven Fire Pumps to ensure it is not deformed and that it functions normally after the pump is started.
	检查消防泵控制器有无变形、损伤、腐蚀。 Check the fire pump controller for any deformation, damage, or corrosion.
	检查消防泵控制器电气原理图及操作说明是否齐全。 Check if the electrical schematic diagram and operating instructions for the fire pump controller are complete.
	检查电压、电流表的指标是否在规定的范围内，开关、旋钮、按键是否有变形、损伤；标志是否脱落、各指示灯是否正常，出现异常应处理。 Inspect the voltage and current meters to ensure their readings are within the specified range. Check that switches, knobs, and buttons are not deformed or damaged. Ensure that labels are not missing and that all indicator lights are functioning normally. Any abnormalities found shall be addressed promptly.
	模拟主泵故障，查看自动切换后动备用泵情况，同时查看仪表及指示灯显示是否正常。 Simulate a main pump failure and check the operation of the backup pump after automatic switching. At the same time, verify that the instruments and indicator lights display normally.
季 Quarterly	检查并清理管道过滤功能组件 Inspect and clean the pipeline filter assemblies.
年 Annually	对固定式电动机消防泵的电动机轴承润滑油补充，转动转轴，检查旋转是否正常。

	Supplement the motor bearings of the Fixed Electric Motor-Driven Fire Pumps with lubricating oil. Turn the shaft and check if its rotation is normal.
	使用测试管路对固定式电动机消防泵进行逐台性能测试，检查是否正常 Conduct individual performance tests on Fixed Electric Motor-Driven Fire Pumps using a test pipeline and check if they operate normally.

条文说明：明确年度、季度、月度、日度维护管理的要点，可有效保障固定式电动机消防泵、消防泵控制器产品的性能问题在各阶段的维护检查中能被及时发现。按照维护隐患程度进行分类，低隐患性检查划分为年度维护检查，中隐患划分为季度维护检查，较高隐患划分为月度维护检查，高隐患划分为日度维护检查。通过周期维护管理，发掘隐患，铲除隐患，保障设备的可靠性。

Clause Explanation: Defining the key points for annual, quarterly, monthly, and daily maintenance management can effectively ensure that performance issues with Fixed Electric Motor-Driven Fire Pumps and fire pump controller products are promptly identified during inspections at each stage. Maintenance inspections are categorized based on the level of potential hazard: Low-hazard inspections are classified as annual maintenance checks; Medium-hazard as quarterly; Relatively High-hazard as monthly; and High-hazard as daily. Through periodic maintenance management, potential hazards are uncovered and eliminated, ensuring the equipment's long-term operational reliability.

7 报废

Scrapping Criteria

7.0.1 固定式电动机消防泵、消防泵控制器出现以下现象时应报废：

Fixed Electric Motor-Driven Fire Pumps and fire pump controllers shall be scrapped under any of the following circumstances:

1 整体结构出现变形、损坏，无法正常运转时；

The overall structure is deformed or damaged, and the pump is unable to operate normally;

2 固定式电动机消防泵运行时电机发热严重，经过维修后无法达到正常运转需求时；

When the Fixed Electric Motor-Driven Fire Pumps runs, the motor overheats severely, and the motor cannot meet normal operational requirements even after being repaired;

3 在额定流量工况下，固定式电动机消防泵出口压力低于额定压力，经维修仍小于额定压力时；

When the Fixed Electric Motor-Driven Fire Pumps operates at rate flow, the outlet pressure of the pump is below its rated pressure, and the outlet pressure remains below its rated pressure even after repair;

4 在 1.5 倍额定流量工况下，出口压力不能满足不小于 0.65 倍额定压力，经维修仍小于 0.65 倍额定压力时；

When the Fixed Electric Motor-Driven Fire Pumps operates at 1.5 times the rated flow, the outlet pressure of the pump is less than 0.65 times the rated pressure, and the outlet pressure remains less than 0.65 times the rated pressure even after repair;

5 维修电机、叶轮、泵体、泵盖时，原制造商、生产厂无法提供适配部件，且与其他单位提供部件不适配时；

When repairing the motor, impeller, pump body, or pump cover, the original manufacturer or production factory cannot provide compatible parts, and parts from other sources are also incompatible;

6 消防泵控制器无法按照联动控制要求实现正常运转时。

The fire pump controller fails to operate normally according to the linkage control requirements.

条文说明：提出了固定式电动机消防泵、消防泵控制器在重大故障、重大性能偏差或维修造价极高的情况下的报废要求。条文中列举的情况已经影响设备正常运转，或已经无法修复，或持续使用无法满足消防供水要求，维修时间成本较高，在长周期维修中设备离线较长，影响建筑消防安全。

Clause Explanation: This section stipulates the decommissioning requirements for Fixed Electric Motor-Driven Fire Pumps and fire pump controllers in the event of major failures, significant performance deviations, or prohibitively high repair costs. The conditions enumerated herein indicate that the equipment is already impaired in normal operation, is irreparable, or can no longer meet fire water supply demands despite continued use; furthermore, the associated repair time and costs are excessive, and the extended offline period during lengthy repairs compromises building fire safety.

7.0.2 报废的固定式电动机消防泵、消防泵控制器，应及时更换符合本标准要求的产品。

Decommissioned Fixed Electric Motor-Driven Fire Pumps and fire pump controllers shall be promptly replaced with products compliant with the requirements of this standard.

8 质量事故调查

Quality Accident Investigation

8.0.1 生产厂家的相关生产过程应接受公众监督，应公开固定式电动机消防泵、消防泵控制器销售、安装、使用、监督单位等信息。

The relevant manufacturing processes of the manufacturer shall be subject to public oversight; information regarding the sales, installation, operation, and supervising entities of Fixed Electric Motor-Driven Fire Pumps and fire pump controllers shall be made publicly available.

条文说明：固定式电动机消防泵及消防泵控制器属于通用型机械设备，其生产组装过程并没有涉及到企业机密，因此应允许外部监督。

Clause Explanation: Fixed Electric Motor-Driven Fire Pumps and fire pump controllers belong to general-purpose mechanical equipment. Their production and assembly processes do not involve corporate secrets; therefore, external supervision shall be allowed.

8.0.2 火灾时，消火栓系统、自动喷水灭火系统供水异常或未供水、固定式电动机消防泵未启动，灾后应向有关主管部门报告，并配合有关主管部门针对固定式电动机消防泵是否满足相关规范要求进行灾后调查。

In the event of a fire, if the hydrant system and automatic sprinkler system is abnormal or fails to supply water, or if the Fixed Electric Motor-Driven Fire Pumps fails to start, a report shall be made to the relevant authorities after the incident. Cooperation with the authorities is required to conduct a post-incident investigation to determine whether the fixed electric motor fire pump meets the relevant standards and regulations.

条文说明：固定式电动机消防泵及消防泵控制器属于消火栓系统、自动喷水灭火系统的心脏部件，设备是否正常运转直接决定了初期火灾能否迅速扑灭。若因质量问题导致设备无法正常启动运行，进而引起火灾蔓延造成更大损失，生产厂家有无可推卸的责任。因此当发现设备异常，无法正常供水的情况，应立即向有关部门报告。

Clause Explanation: Fixed Electric Motor-Driven Fire Pumps and fire pump controllers are heart components of hydrant systems and automatic sprinkler systems. The normal operation of the equipment directly determines whether initial fires can be quickly extinguished. If quality issues cause the equipment to fail to start or operate properly, leading to the spread of the fire and greater losses, the manufacturer bears inescapable responsibility. Therefore, if the equipment is found to be abnormal and unable to supply water normally, immediate reporting to the relevant departments is required.

8.0.3 设备出现下列情形时，应将产品单独检测以确定是否符合相关标准规定：

Under any of the following circumstances, the product shall be tested separately to determine whether it meets the relevant standard requirements:

1 消防泵所用材料及材质不符合《消防泵》GB6245 要求的；

The materials used in the fire pump do not meet the requirements of GB 6245 Fire pumps;

2 泵体破裂或产生裂纹；

The pump body is cracked or has developed cracks;

3 泵配置电动机出现未过火，出现部件发黑、烧熔的烧机现象；

The electric motor of the pump has not caught fire, but there is a burnout phenomenon with components turning black and melted;

4 消防泵控制器内部元器件未过火，出现部件发黑、烧熔的烧机现象；

The internal components of the fire pump controller have not caught fire, but there is a burnout phenomenon with some parts turning black and melted;

5 灾后现场核验泵性能，出现额定流量、额定压力、1.5 倍额定流量工况不达相关规范要求；

During the post-incident field inspection of pump performance, it is found that the pump's performance under the following operating conditions does not meet the relevant regulatory requirements: rated flow, rated pressure, and 1.5 times the rated flow;

6 灾后核验消防泵控制器性能，出现无法自动或手动切换主备电源、无法联动启动、非人为控制停机断电。

During the post-incident verification of the performance of the fire pump controller, issues such as inability to automatically or manually switch between the main and backup power supplies, inability to initiate linkage startup, and unintentional shutdown or power outage are observed.

出现上述情况之一，就属于质量事故，应按照法定程序追责。

Any of the aforementioned situations constitutes a quality accident, and accountability shall be pursued according to legal procedures if any such situation occurs.

条文说明：凡是产品质量不符合国标规范而引发的事故，都应追究生产厂家的责任。但因使用过程中不确定因素较多而难以定责，因此列出上诉 6 条明确质量问题点，出现这些问题就属于质量事故，应按照法定程序追责。

Clause Explanation: For any accidents caused by products not meeting national standards, the responsibility of the corresponding manufacturer shall be pursued. However, due to the numerous uncertain factors during use, it is difficult to determine liability after an incident. Therefore, the above 6 points are listed

to clearly specify quality issues. Any of these issues constitutes a quality accident, and accountability shall be pursued according to legal procedures if any such issue occurs.

8.0.4 质量事故调查时，生产厂家应配合出示下列文件：

During quality incident investigations, the manufacturer shall cooperate by presenting the following documents as required:

1 《产品质量检验合格证明》；

Product Quality Inspection Certificate;

2 《型式检验报告》；

Type Inspection Report;

3 《出厂检测报告》；

Factory Performance Test Report;

4 《消防自愿性认证证书》；

Voluntary Fire Protection Certification;

5 《使用说明书》；

User Manual;

6 维护管理检查记录。

Maintenance and management inspection records.

条文说明：出示上述文件，是质量事故调查的重要依据。

Clause Explanation: The presentation of these documents serves as a critical basis for quality incident investigations.

附录

Annex

附录表 A 《出厂检测报告》

Annex Table A 《Factory Performance Test Report》

<table>
<tr><td colspan="5">出厂检测报告
Factory Performance Test Report</td></tr>
<tr><td>制造单位名称
Manufacturer name</td><td colspan="4"></td></tr>
<tr><td>产品型号
Product model</td><td colspan="4"></td></tr>
<tr><td>产品编号
Product No.</td><td colspan="4"></td></tr>
<tr><td>出厂序号及出厂日期
Factory serial number and date of manufacture</td><td colspan="4"></td></tr>
<tr><td>执行标准
Executive standard</td><td colspan="4">GB6245-2025</td></tr>
<tr><td colspan="5">产品技术参数
Product technical parameters</td></tr>
<tr><td>额定流量
Rated flow
（L/s）</td><td>额定压力
Rated pressure
（MPa）</td><td>额定功率
Rated power
（kW）</td><td colspan="2">防护等级
Protection rating</td></tr>
<tr><td></td><td></td><td></td><td colspan="2"></td></tr>
<tr><td>检测项目
Inspection item</td><td colspan="2">检测要求
Inspection requirements</td><td>结果记录
Result records</td><td>检验员
Inspector</td></tr>
<tr><td>整机结构检查
Inspection of complete machine structure</td><td colspan="2">目视检查结构形式、紧固件、自锁装置是否完好
Visually inspect the structural form, fasteners, and self-locking devices to ensure they are intact</td><td></td><td></td></tr>
<tr><td>材料检查
Inspection of materials</td><td colspan="2">检查材质记录、装配记录列明的部件是否符合要求
Check whether the components listed in the material records and assembly records meet the requirements</td><td></td><td></td></tr>
<tr><td>静水压强检查
Static water pressure test</td><td colspan="2">检查测试记录，是否符合要求
Check the test records to ensure the test results meet the requirements</td><td></td><td></td></tr>
</table>

需附录表 A 《出厂检测报告》

Annex Table A 《Factory Performance Test Report》

性能检查 Performance test	进行性能测试并记录数据 Conduct performance tests and record the test data	零流量压力(Mpa) Pressure at zero flow (MPa)		
		额定流量(L/s) Rated flow (L/s)		
		额定压力(Mpa) Rated pressure (MPa)		
		1.5 流量压力(Mpa) Pressure at 1.5 times the rated flow (MPa)		
		额定转速(r/min) Rated speed (r/min)		
		最大轴功率(kW) Maximum shaft power (kW)		
检验结论 Test conclusion				
检测日期 Test date				

附录表 B 《固定式电动机消防泵性能调试、验收测试报告》

Annex Table B Fixed Electric Motor-Driven Fire Pumps Commissioning & Acceptance Test Records

固定式电动机消防泵性能调试、验收测试报告 Fixed Electric Motor-Driven Fire Pumps Commissioning & Acceptance Test Records			
使用单位名称 User unit name			
使用单位地址 User unit address			
检测验收单位 Inspection and acceptance unit			
设备位置 Equipment location			
设备型号 Equipment model			
设备技术参数 Equipment technical parameters			
生产制造单位 Production and manufacturing unit			
生产日期 Date of manufacture			
设备编号\用途 Equipment No.\purpose	额定流量(L/s) Rated flow (L/s)	额定压力(Mpa) Rated pressure (MPa)	额定功率(kW) Rated power (kW)
现场性能测试情况 On-site performance test situation			
流量(L/s) Flow (L/s)		压力(Mpa) Pressure (MPa)	

需附录表 B 《固定式电动机消防泵性能调试、验收测试报告》

Annex Table B Fixed Electric Motor-Driven Fire Pumps Commissioning & Acceptance Test Records

测试结论 Test conclusion	
测试人员 Tester	
测试日期 Test date	
备注： Remarks: 1.性能测试点应包括固定式电动机消防泵零流量点、额定流量点 Qn、1.5Qn 点，其余位置按 10%-15%的设计流量间隔来测试 1. Performance test points shall include the zero flow point, rated flow point (Qn), and 1.5Qn point, and the remaining test points shall be selected at 10% to 15% intervals of the design flow 2.测试结果与该设备生产制造单位出示的出厂检测记录中的额定流量点 Qn、1.5Qn 点流量压力参数误差 5%以内则判断为合格，否则为不合格 2. The test results are considered qualified if the flow pressure parameters at the rated flow point Qn and the 1.5Qn flow point are within 5% of the values provided in the factory test records by the production and manufacturing unit. Otherwise, the results are considered unqualified	

引用标准名录

List of Normative References

《消防泵》 GB 6245

GB 6245 Fire pumps

《消防给水及消火栓系统技术规范》GB 50974

GB 50974 Technical code for fire protection water supply and hydrant systems

《消防联动控制系统》GB 16806

GB 16806 Automatic control system for fire protection

《19S204-1 消防专用水泵选用及安装(一)》19S204-1

19S204-1 Selection and installation of special water pumps for fire protection (I)

《建筑设计防火规范》GB 50016

GB 50016 Code for fire protection design of buildings

《自动喷水灭火系统设计规范》GB 50084

GB 50084 Code for design of sprinkler systems

《火灾自动报警系统设计规范》GB 50116

GB 50116 Code for design of automatic fire alarm systems

《民用建筑电气设计标准》GB 51348

GB 51348 Standard for electrical design of civil buildings

《机械振动 恒态（刚性）转子平衡品质要求 第 1 部分》GB/T 9239.1

GB/T 9239.1 Mechanical vibration — Balance quality requirements for rotors in a constant (rigid) state — Part 1: Specification and verification of balance tolerances

《旋转电机　定额和性能》GB/T 755

GB/T 755 Rotating electrical machines — Rating and performance

《三相异步电动机实验方法》GB 1032

GB 1032 Test procedures for three-phase induction motors

《交流低压电机散嵌绕组匝间绝缘　第 1 部分：试验方法》GB 22719.1

GB 22719.1 Interturn insulation of random-wound winding for AC low-voltage electrical machines — Part 1: Test methods

《回转动力泵　水力性能验收试验　1 级、2 级和 3 级》GB/T 3216

GB/T 3216 Rotodynamic pumps — Hydraulic performance acceptance tests — Grades 1, 2 and 3

《给水排水管道工程施工及验收规范》GB 50268

GB 50268 Code for construction and acceptance of water and sewerage pipeline works

《FM Global 财产防损数据册 消防系统的检查、测试与维护》FMDS 0281

FMDS 0281 FM Global Property loss prevention data sheets — Fire protection system inspection, testing, and maintenance

《FM Global 财产防损数据册 固定式电动机消防泵》FMDS 0307

FMDS 0307 FM Global Property loss prevention data sheet — Fixed Electric Motor-Driven Fire Pumps

《消防服务用离心固定泵》UL448

UL448 Centrifugal stationary pumps for fire-protection service