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|  | <b>Accreditation Criteria for Inspection of<br/>Electrical Equipment and Installations in<br/>Potentially Explosive Atmospheres</b> | <b>G-24/01<br/>Issue Date: 08/07/08<br/>Rev No: 00</b> |
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## 1.0 Introduction

- 1.1 This document has been produced by the Pakistan National Accreditation Council (PNAC) in conjunction with the PNAC Sectoral Committee for Inspection Bodies. It provides guidance to those requirements in ISO/IEC 17020 and Agreement between PNAC & IBs (F-01/13) that need interpretation when applied by Inspection Bodies carrying out Inspection of Electrical Equipment and Installations in Potentially Explosive Atmospheres. It does not cover all of the requirements of ISO/IEC 17020-*General criteria for the operation of various types of bodies performing inspection* and Agreement between PNAC & IBs (F-01/13). Inspection Bodies are reminded of the need to comply with all of the requirements in these documents. Appeals concerning interpretation will be considered in accordance with the PNAC Appeals Procedure. Other PNAC documents may be referred to where relevant.
- 1.2 For the purposes of this publication the term 'Inspection Body' shall be taken to mean an accredited Inspection Body.


## 2 Inspection services covered ISO/IEC 17020

### 2.1 Scope

- 2.1.1 This publication details the requirements for inspection bodies undertaking the inspection of electrical systems, in the field identified in Sub-clause 2.1.2 of this document. The inspection is to ensure, as far as reasonably practicable, the detection of potential and actual defects, particularly those which may be a cause of danger or injury to persons or damage to property. It is also to ascertain if the electrical system meets relevant statutory requirements, national or international standards, approved codes of practice or guidance and similar documents.
- 2.1.2 (a) This publication is specific to the requirements of inspection bodies who undertake the inspection of Electrical Equipment and Installations in Potentially Explosive Atmospheres.
- (b) This publication is applicable to electrical equipment and installations operating at all voltages. The equipment and/or installation may be permanent, temporary, portable, transportable or hand held.
- (c) This publication is also applicable to equipment and parts of an installation which are not located within the potentially explosive atmosphere but perform a control, safety or monitoring function in accordance with the protective concept if they contribute to the safe working of such equipment, e.g. start restrict relays required for EEx 'e' motor protection.

## 3 Independence, impartiality and integrity (ISO/IEC 17020 Clause 4)

- 3.1 Inspection bodies operating as Type A, B or C bodies as defined in ISO/IEC 17020 may be accredited for inspecting electrical systems provided that they meet the requirements of ISO/IEC 17020 and this publication.

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### 3.2 *Independence*

- 3.2.1 To ensure the independence of inspection work, the reporting chain for inspection shall be separable from that of any other work undertaken.
- 3.2.2 A Type C inspection body which undertakes installation, maintenance or remedial work in conjunction with inspections shall have clearly documented procedures for each activity and shall establish adequate safeguards to ensure the integrity of the inspections. Such safeguards may include the use of alternative inspection and maintenance staff and the independent auditing of inspection work.

## **4 Organization, management and supervision (ISO/IEC 17020 Sub-clause 6.4)**

- 4.1 The following requirements shall apply:


For the inspection of electrical systems covered by this publication the requirements for supervision shown in Appendix 1 shall apply.

- 4.2 The technical manager in charge of, and having overall responsibility for, an inspection body seeking accreditation is to be of Category 1 status and be directly employed by the inspection body.
- 4.3 For effective supervision, the technical manager may delegate supervisory responsibilities to locally appointed managers.
- 4.4 In addition to management personnel there will be requirements for personnel working on site who are qualified at lower levels but who have the ability to undertake inspection tasks and duties at the level assigned to them.
- 4.5 Where sub-contracted service providers are required they shall be able to demonstrate their technical competence and ability to undertake the required tasks to the satisfaction of the technical manager.

## **5.0 Personnel Qualification & Compétence (ISO/IEC Sub-clause 8.0)**

- 5.1 The Inspection Body shall have sufficient number of permanent management personnel of Graduate Engineer as defined by the Pakistan Engineering Council or equivalent level (e.g. appropriate degree with relevant experience) with at least 4 years experience. They should have experience in the combined or single activities with design, manufacture, inspection, operation or maintenance of the specific inspection field and their parts with the technical knowledge to make professional judgments on the range of safety related problems likely to arise from the accredited scope of inspection.
- 5.2 Qualification categories:

**Category 1.** Graduate Engineer holding membership of Pakistan Engineering Council (PEC) with at least 4 years experience in a relevant engineering discipline of which at least two years shall have been spent working within an engineering discipline associated with Inspection of Electrical Equipment and Installations in Potentially Explosive Atmospheres.

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**Category 2.** Bachelor of technology from respective Board of Technical Education with at least 5 years experience in a relevant engineering discipline of which at least two years shall have been spent working within an engineering discipline associated with Inspection of Electrical Equipment and Installations in Potentially Explosive Atmospheres.

**Category 3.** Person having three years diploma of Associate Engineers as defined by PEC with at least 6 years of experience in a relevant engineering discipline of which at least three years shall have been spent working in an engineering discipline associated with Inspection of Electrical Equipment and Installations in Potentially Explosive Atmospheres.

**Category 4.** Person having two years vocational technical training as defined by PEC with at least 7 years of experience in a relevant engineering discipline of which at least three years shall have been spent working in an engineering discipline associated with Inspection of Electrical Equipment and Installations in Potentially Explosive Atmospheres.

**Category 5.** Person having three years apprenticeship training as defined by PEC with at least 9 years of experience in a relevant engineering discipline of which at least 5 years shall have been spent working in an engineering discipline associated with Inspection of Electrical Equipment and Installations in Potentially Explosive Atmospheres.

**Category 6.** Person employed prior to the date of application for accreditation in the inspection of pressure systems with less than tradesman's apprenticeship but having minimum Matriculation qualification with a minimum of 10 years spent working with an industry associated with relevant field of inspection and has general knowledge of relevant field of inspection and its operating environment.

*Note 1: All qualifications shall be from Higher Education Commission (HEC), Inter Board Committee Chairman (IBCC) & Board of Technical Education approved Universities, Colleges & Institutes.*

*Note 2: The person from category 1-6 shall have training on the relevant standard including the ISO/IEC 17020.*

## **6 Training (ISO/IEC 17020 Sub-clause 8.2)**


6.1 The Inspection Body shall ensure that each member of the inspection staff receives training and can demonstrate a working knowledge of:

- (a) the relevant type(s) of electrical system(s) including construction, inspection, testing, operation, maintenance, significance of defects and typical problem areas;
- (b) where relevant, any associated areas of technology;

## **7 Equipment (ISO/IEC 17020 Clauses 9.7 and 9.8)**

7.1 (a) Inspection and test equipment used during an inspection shall be suitable for the hazardous area in which it is intended to be used.

- (b) The use of equipment not specifically designed for the hazardous area shall not be authorized unless or until the location where it is to be used has been declared non-hazardous.

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## **8 Inspection methods and procedures (ISO/IEC 17020 Clause 10)**

- 8.1 (a) The inspection body shall make it clear, to those seeking the inspection body's services, where there may be the need to close down or otherwise de-energise and isolate equipment in order to complete the inspection. The implications of such action shall be considered by the inspection body and owner/operator/user.
- (b) The inspection body shall co-operate with the equipment/installation owner/operator/user to ensure that inspections cause the minimum of disruption.
- 8.2 Inspection staff shall comply with any regulatory or local requirements relating to such procedures as Permits to Work, Sanctions to/for Test and other access control procedures appropriate to the operating needs and safety requirements.
- 8.3 In particular with Type C inspection bodies, where inspection duties may run concurrently with other duties, for example maintenance work, work being undertaken shall not extend beyond that covered by permits to work (or similar documents). If permit extensions are deemed necessary, authorization shall be obtained in writing prior to undertaking the work.

## **9 Records (ISO/IEC 17020 Clause 12)**


- 9.1 Where integral recording facilities in inspection or test equipment are used, the data shall be transferred in a readily accessible form to a permanent site at frequent intervals.

## **10 Reporting (ISO/IEC 17020 Clause 13)**

- 10.1 The following requirements shall apply:  
Where inspections cannot be completed due to unavailability or non-access to any part of the installation, plant or equipment under inspection these limitations should be stated in the report.
- 10.2 Where maintenance, remedial or installation work is undertaken concurrently with inspection work, the associated inspection report shall clearly define the work associated with inspection and testing in a manner of sufficient accuracy for meaningful audit trails.

## **REFERENCES**

- ISO/IEC 17020, General Criteria for the Operation of Various Types of Bodies Performing Inspection
- IAF/ILAC-A4: 2004, Guidance on the Application of ISO/IEC 17020

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Appendix 1

### **LEVELS OF SUPERVISION**

Regular documented meetings of inspection personnel with their management shall be conducted to resolve specific issues and to review work undertaken.


In the Levels described below, ‘Supervisor’ means a more qualified and/or experienced technical person, however named. Direct Contact means on the job contact at the site of operation.

**Level A: Occasional** Formal, direct contact to review work with Supervisor at least annually. More frequent direct contact with Supervisor may be necessary. Authoritative technical support from personnel of Category 1 or 2 to be readily available.

**Level B: Infrequent** Direct contact with Supervisor at least every 3 months. Access to supervision and technically authoritative support to be available as needed.

**Level C: Frequent** Direct contact with Supervisor at least weekly. Authoritative technical support from Category 1 or 2 personnel.

**Level D: Constant** Direct daily contact with Supervisor at site of operation. Authoritative technical support from Category 1 or 2 personnel to be readily available.

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Appendix 2

**CONSTRAINTS PLACED ON ACTIVITIES**

Inspection personnel shall restrict their tasks to those within the bounds of their authorization and responsibilities.

Safety access documents, such as Permits to Work, are required before certain tasks in potentially explosive atmospheres are undertaken. Only when these have been authorized by the responsible person, can relevant work be undertaken, All their requirements, including signing off on completion, shall be strictly adhered to.

Inspection activities or tests, shall be in accordance with relevant Standards, Codes of Practice, Performance Specifications, and related National Statutory legislation.

Inspection staff must not:

- (a) become involved with technology outside their field of declared competence other than when in consultation with, and acting with the approval of, competent persons.
- (b) carry out any repairs to equipment or to initiate changes to operating parameters unless it is in accordance with their assigned duties.
- (c) authorize or undertake any remedial action beyond their authorization. Where such action is believed to be required but is outside their authorization, inspection staff should consult with authorized responsible persons who shall authorize any agreed requirements in writing.

*Note*

If the intent is to inspect equipment located where the risk is not from petroleum or gaseous products and may be from combustible dusts, evidence of knowledge of the dangers arising from these materials will be required.