THE ROLE OF ASTA AS THE UNITED KINGDOM CERTIFICATION BODY

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DEVELOPMENT OF ASTA   The Association of Short-Circuit Testing Authorities (internationally known as ASTA) was formed in 1938 by the co-operation of the four major switchgear testing stations then operating in the U.K. Since then, ASTA has grown to 22 Members grouped into four Classes, namely

Class 1	Members able to type test and certify up to 1,000 volts a.c.
Class 11	Members able to type test and certify at rated voltages above 1,000 volts a.c.
Class 111	Open to the statutory Electricity Supply Authorities in the U.K.
Class 1V	Open to other corporate bodies operating short-circuit and/or type testing stations and electricity generation, transmission and distribution authorities and such other users of equipment as the ASTA Council may admit into membership.

The entry of the U.K. into the European Economic Community and the issue by the EEC Commission in 1973 of the Low Voltage Directive has presented ASTA with new responsibilities. In order to implement the requirements of the Low Voltage Directive, H.M. Government has nominated four authorised certification and approvals bodies, one of which is ASTA with particular responsibilities for low voltage switchgear and controlgear generally. Of some relevance to this Conference is that part of the scope of ASTA nomination embracing fuses and fuse-links.

FUNCTIONS   ASTA provides a comprehensive certification service within its allocated field to industry. Originally, the Certificate of Short-Circuit Rating was the only certificate available to a product which had been successfully tested to the short-circuit requirements of a relevant Standard and/or ASTA Rules. Now, ASTA provides four additional kinds of certificates. These are:

Certificate of Making and Breaking Capacity Ratings for apparatus such as contactors, motor starters and airbreak switches, etc. on which a successful series of proving tests have been made in accordance with a Standard.

Certificate of Type Tests for apparatus on which a complete series of type tests has been made in accordance with its relevant Standard.

Certificate of Complete Compliance for apparatus on which all the specified inspections, checks and type tests have been successfully completed for the appropriate Standard.

Certificate of Supplementary Tests for apparatus on which successful tests have been made supplementary to those for one of the above Certificates.

The Authors are members of the ASTA Technical Committee.

Members of ASTA operate approved and accredited testing and inspection facilities not only under conditions of confidentiality but also functioning in accordance with harmonised procedures. Agreed interpretations of Standards when necessary are issued under ASTA Instruction to Testing Stations and in parallel these are injected into the various standards making committees in the activities of which ASTA maintains an active participation.

In 1961, the first major link with an organisation outside the U.K. took place. This was with PEHLA, an association of owners of testing stations in the Federal Republic of Germany organised similarly to ASTA. Several years later a further link was established separately with KEMA of the Netherlands. Subsequently these lead to the formation in 1969 of an international collaboration known as Short-Circuit Testing Liaison (STL).

Now, STL embraces additionally CESI of Italy, an association of the national supply authority and manufacturers in France known as ESEF and a similar organisation within Scandinavia called SATS. The recently formed STL of U.S.A. is at present associated in the collaboration. Members of STL are agreed to the uniform interpretation of IEC Standards applicable to the high voltage sector and for which harmonisation is achieved by means of STL Guides to the interpretation of various IEC documents. Other objectives include the uniform presentation of test results and Certificate front sheets, the harmonisation of measuring techniques with minimum limits of accuracies acceptable and the methods employed in performing the type tests specified.

TESTING TECHNIQUES Over the years testing and certification techniques have been developed to enable uniform interpretations and consistent testing conditions in all the laboratories coming within the aegis of ASTA. As may be inferred from the development of ASTA, such developments have occurred mainly with respect to short-circuit tests but with changing circumstances in recent years have been extended to cover other type tests.

One such example of the unification of testing techniques is the verification that the device being tested is that which it is claimed to be by the manufacturer. Identification is a particular problem with cartridge-type fuse-links especially as each individual device cannot be inspected thoroughly before test; some of the most important detail information is, of course, either destroyed or changed in form by the operation of the fuse-link. To overcome this, all fuse-links supplied as a batch by a manufacturer are checked for cold resistance prior to test. Additionally, particularly in relation to high voltage fuse-links, X-ray records may be taken. From this complete batch, random samples are selected to be carefully taken apart for the component parts to be compared in all respects with the detail design data supplied by the manufacturer. Having established that the drawings truly represent the samples being tested, the design data together with the resistance figures and X-ray records are lodged with the testing laboratory.

Perhaps the single most important technique, however, which has been evolved is the prescribing of the accuracy of electrical measurements taken during testing. No British or European Standard lays down the accuracy to which electrical measurements shall be made other than a broad statement which appears in one or two documents that an accuracy of ±5% should be achieved. Building from this statement, ASTA has established comprehensive guidance to testing laboratories laying down the limits of uncertainty for all devices used for the purpose of measurement.

Fundamentally, all parts of the measurement chain contributes to the overall uncertainty of the system. Thus, the characteristics of the signal sensor or transducer, means of transmission, signal processor, recording and finally the quality of the analysis of the recording all have a part to play in establishing the overall accuracy to be achieved.

The word "accuracy" when applied to measurements associated with high speed electrical phenomena does not mean very much unless qualified in relation to the parameter being measured. For example, a specific measurement taken of, say, cut-off current of a fuse-link using oscillographic recording equipment (which is the most common form of recording in current use) entails the knowledge of the frequency performance of the transducer and the frequency response, linearity alignment and sensitivity together with the accuracy and linearity of the time base or time marker of the oscillographic equipment. Such facets involve the historical knowledge of the equipment in use and consequently recommended calibration intervals for the various types of equipment in use at the present time are laid down.

NEW REQUIREMENTS . With the advent of new Standards and the updating of existing Standards, requirements are now being specified that present increased difficulties to test plants which were originally designed to carry out only short-circuit tests.

Some years ago, the existing ASTA Testing Stations were augmented with additional laboratory facilities to enable complete type test certification to be offered to manufacturers of a wide range of electrical equipment. Since modern application requirements for fuse protection demand more accurate specifying of their performance characteristics, recently revised Standards reflect such requirements and now tests are included which are beyond the normal facilities currently available.

An example of one problem at present occupying the attention of fuse manufacturers and testing stations is the testing of both high and low voltage fuses at low values of overcurrent at rated voltage. Such tests raise problems in that the total operating time of the fuse can be of the order of some thousands of seconds and particularly as the tests are required to performed at power factors about 0.5 difficulties of power generation and energy dissipation become considerable.

Overcurrent tests at rated voltage or more have traditionally been undertaken at short-circuit testing laboratories but these, although capable of providing the very high values of output energy required, are without exception only short time rated both as regards to generator output and energy dissipation. This means that, except for the lower current ratings of fuse-links, other means of achieving the test requirement must be adopted. In view of these considerations, both IEC and British Standards permit such tests to be performed on a two part basis where the fuse is preheated at the required test current at low voltage for the major period of the test, the circuit being changed over to another source capable of supplying the required test current at full test voltage shortly before the fuse starts to arc. The principal difficulty in performing such a test is the determination of the instant suitable for the change-over such that the current at full test voltage may be reliably determined but yet not so far in advance of the start of arcing that the time rating of the source of supply is likely to be exceeded.

Thus, different or improved or even more sophisticated testing facilities are often required to satisfy the demands of new specifications. Both processes are continuous.

With certification for complete compliance, most searching and detailed work in relation to procedural requirements is being undertaken and the future promises much effort in this direction. From the more practical aspects of measurement, the fast growing instrument field is already giving new forms of recording and analysis as tools for the testing engineer. In some areas, the direct analysis of transient phenomena by digital means is a reality and may be accepted eventually by those who need an analogue "picture" to satisfy themselves that the event follows an already established and recognisable pattern.

RESPONSIBILITIES & ACCEPTANCE The fundamental objectives of the Low Voltage Directive are to achieve safety in all electrical equipment whether intended for the low voltage industrial or consumer markets and to remove barriers to trade caused by variations in national regulations. Such legislation, of course, ensures attainment of these objectives by defining enforceable safety requirements.

In order to satisfy Article 10 of the Directive, member countries of the Community must signify compliance with the Directive by providing, in descending order of merit, safety marks, certificates or simply declarations of conformity by the manufacturer.

The four Bodies nominated by H.M. Government have been authorised to grant marks and issue certificates in accordance with the provisions of Article 10. Furthermore, they may give an opinion under Article 9 and make a Report under Article 8 if called upon to do so within the scope of their respective product responsibilities. To provide a forum for matters of common interest, the four nominated Bodies have voluntarily formed the Confederation of British Electrotechnical Approvals Bodies which now has direct representation on the CENELEC Marks Committee.

Included in the list of products allocated to ASTA are circuit breakers, fuses and fuse-links as previously mentioned, fuse boards, switches, isolators, fuse-switch combinations, transformers and reactors.

The most significant feature lies in the stipulation that no product may be put on the market within the Community unless it satisfies fundamental safety requirements which may be demonstrated by compliance with a British or IEC Standard acceptable to the importing country or more desirable with a CENELEC harmonised standard published under national procedures and therefore acceptable to all members of the Community.

MANUFACTURERS' OPTIONS The manufacturer may invoke the right conveyed by the Low Voltage Directive to declare that his products conform with good safety practices in force in the Community. More acceptable in substantiation is the claim of compliance with a national standard. Better still is the enhanced position attained by the successful testing of his product by an impartial national organisation to gain one of its certificates.

With particular reference to ASTA, its Certificate of Complete Compliance is of paramount value since it not only provides verification of all the requirements of the relevant Standard but imparts the added assurance that the manufacturer is making his products precisely as that which has been certified.

For equipments within the scope of the Low Voltage Directive, the use of an approvals mark is inevitably the best means of indicating compliance which furthermore is supported by an ongoing quality assurance control surveillance scheme providing the basis for a successful marketing policy.

Where the appropriate British Standard has also been harmonised through the CENELEC procedures and a mark subsequently issued, the product may be freely marketed within the Community with virtually no risk of challenge since the provisions concerning safety are thereby shown to be in compliance with the Directive.

ASTA MARKING SCHEME To complete the service which industry will eventually desire and to provide for all requirements of the Low Voltage Directive, ASTA is introducing its Marking Scheme based upon the successful compliance of all requirements specified in a British Standard as for the Certificate of Complete Compliance which is supported by an independent quality assurance or surveillance procedure.

Two methods of surveillance are being employed, namely factory based and market based, depending upon the nature of the product. The principles adopted are mainly Part 2 of BS 5179: 1974 Guide to the Operation and Evaluation of Quality Assurance Systems.

Safety and reliability are also criteria of the ASTA Marking Scheme in addition to compliance with an approved Standard. For many products, however, performance requirements are intermingled with safety aspects to such extents that separate identification often becomes impracticable. Other factors, such as installation, usage and maintenance remain the responsibility of either or both the manufacturer and user; these kind of factors are therefore outside the scope of the ASTA Mark.

REFERENCES

1 The Low Voltage Directive (OJ 26.3.73) Electrical Equipment designed for use between certain voltage limits. 73/23/EEC of 19.2.73

2 Low Voltage Directive - The Facts by R. Winckler, J. Cassassolles and D. Verdiani

3 Consumer Protection Act 1961. The Electrical Equipment (Safety) Regulations 1975

4 Administrative Guidance on the Electrical Equipment (Safety) Regulations issued by the Department of Prices and Consumer Protection

5 Health and Safety at Work etc. Act 1974

6 BS 5179: 1974 Guide to the Operation and Evaluation of Quality Assurance Systems

7 ASTA Test Instructions 1974

8 ASTA Publication No.5 1975 Rules governing the composition of ASTA Certificates, ASTA Test Reports and Reports of Performance

9 Draft STL Guide on Measurements

10 Draft ASTA Marking Scheme and Regulations