

# EUROPEAN COMMUNITIES

## Information **R + D**

SERIES: RESEARCH AND DEVELOPMENT

N° 6

### THE COMMUNITY BUREAU OF REFERENCE - BCR

#### Purpose and aims

Our present day society and economy require an increasing amount of accurate measurements for a large variety of activities. This has long been so in commerce, business, industry and science, and there is therefore a long tradition of measurement in these fields, where optimum standardization and coordination very soon proved to be absolutely essential - one need only mention the need for the introduction of the decimal system, and the internationally recognized metre, kilogram, etc.... Every problem faced by man in connection with the protection of the environment; the functional safety of industry and services in general, the threatened raw-material supplies require the accurate collection of data by means of measurement.

Therefore in developing methods of measuring the characteristics of materials and systems, optimum coordination and cooperation must be sought just as much as in pure R and D work. The provision and use of common reference materials - being well characterized materials or devices with properties certified by a recognized competent body - and reference methods in addition to standards and the statutory system of weights and measures takes on considerable importance. In particular, reference materials make it possible to test the functioning and accuracy of measuring methods and instruments and to ensure that valid comparisons can be made between results obtained in different laboratories, or even different countries.

The aims of the Community Bureau of Reference (BCR) - which was created by the Council's decision on the multiannual research programme on March 15, 1976, and which has been set up in the Commission as part of its Directorate General for Research, Science and Education in Brussels - are therefore a) the general coordination and standardization of all work in this field and b) the planned use of the resources available for R and D, so that the work is as effective as possible and - in many cases - so that it may point the way for the future.

Development work which has begun within a framework of a large number of fairly small projects, is today part of a progressively developing overall Community R and D policy.

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### General coordination and cooperation

During the period 1974/75 the interest of all the national and private centres concerned and their desire to cooperate in the very diverse and technical work carried out by the BCR became steadily more apparent, and at the present time all the major national research centres in the Member States are closely involved in the work programme of the BCR, in many different fields.

The existing national planning centres for this type of work are represented either on the Advisory Committee on Programme Management or on its subcommittees, and a large number of industrial undertakings support this work on coordination by sending qualified specialists. The technical diversity involved the setting-up at Community level as well as at national level of a whole network of laboratories and specialists cooperating with each other.

Between 500 and 600 technical advisers work inside their respective institutions for the Community Bureau of Reference, planning and coordinating the work of the specialist groups, of which there are about seventy.

In other words, according to their particular interests and technological potential, the industries and countries involved feel justified in assigning from time to time between 10 and 50 valuable specialists per country to this work. The flexibility of this ad hoc system also guarantees that at any time the work may be adapted to suit changing needs and the pressing demands of economy.

### Practical work of the Community Bureau of Reference

The following practical examples should illustrate the kind of work undertaken in the BCR. Rather than taking branches of industry or specialized technical fields as a point of departure an attempt has been made to situate the work within a more general framework:

Economical impact, safety matters, environmental protection, raw materials and energy supply, public health.

#### Economic impact

The iron and steel industry has a long tradition and a great deal of experience in the use of reference materials (RMs) and reference methods. Each stage of production is continually monitored by means of complicated automatic measuring techniques. Very often this can only be done with reference materials which are recognized by the entire industrial world. The principal manufacturers of reference materials for the iron and steel industry in the Community are the "Verein Deutscher Eisenhüttenleute", the "Institut de Recherches de la Sidérurgie Française (IRSID)" and the "British Analysed Samples Ltd". These and many European iron and steel manufacturers cooperate with the BCR in long-established European Coal and Steel Community (ECSC) working parties. Since there is this strong tradition and an important economic incentive, most of the work currently being done on iron and steel samples by the industry for the BCR programme is free of charge. Up to now four new reference materials for metallurgical coke have been developed by the BCR and are shortly to be put on the market.

In the non-ferrous sector reference samples produced by the national industries have existed for some time. On the other hand, there are practically no raw materials samples available (e.g. ore). This is where the BCR has stepped in and, in cooperation with the industries concerned, has prepared zinc, lead, copper and tin concentrates for use as reference materials (RMs). Seven such samples are now available.

Following on the investigations which were started some years ago by the now dissolved Eurisotop Office, the BCR has produced in cooperation with this Office seven samples for use in determining the oxygen content of non-ferrous metals and five others are being developed.

Measurements involving materials which will be required in the future for the rapid transmission of information (electrical conductivity at high frequencies, etc....) are used in the preparation of RMs, an area in which six European laboratories are collaborating.

#### Safety matters

Cracks and defects in workpieces can be measured and identified e.g., large nuclear reactor vessels, high pressure chemical plant etc.... by using ultrasonic and eddy current techniques.

In order to facilitate the calibration of the sensing heads of specific instruments, reference defects are built into the materials and investigated on a comparative basis by six laboratories.

The measurements of technical characteristics e.g., tensile and fracture strength of structural materials is carried out for all components which are built into machines and structures. Rapid and inexpensive monitoring of the equipment used for this purpose can be achieved with reference materials (RMs). The BCR is undertaking a comparison of measurements from various European laboratories with the aid of hundreds of control samples.

The measurement of the explosion characteristics of substances, such as oil and their derivative products is a problem which is being worked on throughout the world. In this connection the BCR is preparing RMs for flash point measurement.

#### Environmental protection

Analysis of oils from a wide range of sources is important if the origin of contamination is to be identified.

A number of national and industrial laboratories are working with the BCR in this field in order to produce RMs to calibrate all types of analytical equipment.

The measurement of lead and other poisonous metals wherever they occur i.e., in petrol, dust, foodstuffs, in the ground, in raw materials and in human beings, etc....., is now being carried out everywhere.

There is however still much confusion over methods of measurement and reference materials. The BCR has attacked this problem and the competent working parties are in the process of defining and preparing the necessary reference materials.

#### Raw materials and energy supply

Measurement of the heat losses through building materials. Five European laboratories are working under the auspices of the BCR on the production of reference materials for construction materials, namely glass, plastics and rubber with the aim of calibrating the corresponding methods of measurement for heat loss.

The measurement of frictional losses in machines is still in its infancy but is of great importance both for energy conservation and as far as safety questions are concerned. A start has been made on producing reference materials for the reliable calibration of six different material combinations which are important for the industry and are shortly to be used by 5 to 10 European laboratories for comparative measurement purposes.

Analysis of ores and geological rock samples. Public and private research institutes for the earth sciences and raw materials in the Member Countries have demonstrated an urgent need for reference materials in this field and work has already begun on producing those RMs.

#### Public health

The accuracy and comparability of clinical analysis still leaves very much to be desired. In this context great efforts have been made at both national and international levels. This is vitally important for the health and proper treatment of patients; even the economic consequences of incorrect analysis and treatment can be very extensive.

The associations in the Member Countries who have been working together under the auspices of the "International Federation for Clinical Chemistry" have already carried out a whole series of practical projects in collaboration with the BCR and new proposals to improve the situation are already being discussed. One of the most important problems is the production of new reference materials and this work is being carried out in close collaboration with the World Health Organization in Geneva.

#### Conclusion

With the given examples it has been demonstrated that a big need - on a European-wide scale - for generally accepted reference materials and methods is felt in many important domains of science and technology. The availability of new and improved reference materials will help make it possible to compare the results of measurements. This comparability and repeatability of measurement is one of the conditions necessary for a fruitful cooperation in the relevant fields and to ensure fair competition.