products. The systems are not applied to factories located outside of Malaysia.

3.3.2.2 Recommendations on restructuring the certification system

In order to clearly distinguish between the mandatory certification system and the voluntary certification systems because the two differ in objective and nature, it is proposed that adopt a safety product certification system enacted on a mandatory basis and a separate MS Mark Malaysia certification system on a voluntary basis, with the restructuring of the present system, as follows.

1) In order to make clearer that the aim of the mandatory certification system is to protect consumers' safety, the control labels presently employed should be replaced with a Safety Product Mark. Certification for use of the Safety Product Mark should be granted on a model-by model basis, using a combination of product tests and factory inspections. This new Safety Product Mark certification system should also be applied to factories abroad in future. For the time being, however, it is necessary to consider measures which will be needed to effect a transition from the present control label system.

2) A unified MS Mark system should be adopted to give assurance of product quality, in place of the present voluntary MS Mark, Certified Mark and Safety Mark certification system. Since the MS Mark and Certified Mark are based only on different types of standards, it should be easier to combine these two in the future by establishing more MS standards or adopting more foreign standards as MS standards. Moreover, since the current Safety Mark is extremely vague in status, this should also be incorporated into the new Safety Product Mark system based on the mandatory certification. The structure and certification procedures to be involved in the new MS Mark system could be the same as those used for the current systems. However it would be well to keep in view the carrying out of factory assessment based on ISO 9000 Series (or at least the securing of a ISO 9002 level) as a future task to be addressed. Also the significance of the MS Marks should be publicized overseas.

(1) Certification System for the new MS Mark

The certification system for the new MS Mark requires reformation of the existing MS Mark system within the present framework so that it can be accepted abroad. MS standards are to be applied in the certification system for the new MS Mark. If there are no applicable MS standards, foreign or international standards could be employed, but it would be necessary to adopt such standards as MS standards as

promptly as possible.

Criteria for the initial inspection of factories should be internationally acceptable. It would be ideal if the standards comply with the ISO 9000 Series but in view of the present situation of the ARQS the immediate attainment of this is considered difficult. Therefore it will be necessary to plan for a gradual transfer to such standards through staged phases.

By extending the application of this system to factories abroad, the internationalization of the system could be achieved and to this end mutual recognition with foreign testing/inspection institutes will need to be built up. SIRIM has already exchanged Memoranda of Understanding (MOU) with some foreign testing/inspection institutes, and a greater number of such arrangements can be made.

Since the certification of a product requires the tests of all items laid down in the standards, provision of testing facilities must be ensured. For those component parts which have already been certified under the present MS Mark system or on the basis of the foreign standards corresponding to MS standards, it is important that provision be made to accept the validity of such certifications in order to avoid duplication of tests accept and inspections for the new MS Mark certification.

With regard to follow-up inspections of factories abroad it is considered most efficient to carry these out by entrusting foreign testing/inspection institutes with which SIRIM has a mutual recognition relationship.

(2) Certification system for new Safety Mark

The new Safety Mark certification system should be established by law with the aim of protecting consumers' safety and with the intent to reform and enhance the existing mandatory certification system.

The products to be controlled under the new mandatory system are as follows.

1) Products subject to certification

The certification system will be for the products sold in Malaysia, both domestically produced and imported.

2) Scope of the products to be controlled under the system

In principle the products for the mandatory certification system will be general commodities (excluding special ones) widely consumed by public consumers and those that may possibly jeopardize their safety, or be used for protecting their safety, and also essential materials required for safeguarding people's living conditions. Hence the product items for the control should be selected from among those categories of product, while heeding requests of consumers and taking into consideration issues that emerge in markets.

The following items may be examples of control items:

a) Electric products: To be started with items presently by subject to control, and be expanded in future so as to cover all of electrical appliances for commercial or home uses which are to be connected to power supply. (Controlled by Department of Power Supply)

b) Automotive safety components: To be started with the components which are subject to the present control and window glass, and be expanded so as to cover all items related to safety. (Controlled by the Ministry of Transport)

c) Fire-prevention equipment: To be started with fire extinguishers and fire doors which are subject to the present control and be expanded in future by adding fire hoses and sprinklers, etc. (Controlled by the Fire Defence Agency)

d) Daily-use products: To be started with oil stoves which are subject to the present control and be expanded by adding LPG gas cylinder, toys, babywear, beds, lighters, matches, etc. (Controlled by the Ministry of Domestic Trade and Consumer Affairs)

e) Drugs and medicines: Drugs and medicines sold at drug stores. (Controlled by the Ministry of Health)

f) Cosmetics, etc.: Lipsticks, shampoo, and face powder. (Controlled by the Ministry of Health)

g) Building materials: Cement, concrete products, interior materials, etc. (Controlled by the Ministry of Housing and Local Government)

The following outlines this system in more detail by taking the example of electric appliances.

Electrical appliances which are to be connected to the domestic electric power supply are all those subject to mandatory certification, and for which there is uniform use of the new Safety Mark in place of the Control Label. Since this system is mandatory, a product which does not carry the Safety Mark can not be sold. This system will be applied to foreign manufacturers as well, so that the presently practiced consignment tests can be abolished.

The new Safety Mark system can be described in more detail as follows.

1) With the aim of safeguarding users of electric appliances from the occurrence of any of the possible dangers during use (electric shocks, fire, bodily injuries, etc.), the control is enforced under the existing regulations for electric power supply and Custom regulations, or a new regulation enacted for consumer protection if necessary.

2) All electrical appliances to be sold on the domestic market in Malaysia are to be subject to mandatory certification (i.e., both domestically produced and imported appliances) so that this will cover electric appliances for both household and office use which are to be connected to the power supply. However in order to align this with the system currently in force for the time being the control should commence with the 28 items which are currently regulated.

3) Standards to be adopted should be either those of the MS standards or standards to be newly established by the competent regulatory authority. However since the aim of the standards will be to ensure safety of electric appliances, any items in the MS standards which relate to performance of those appliances would be irrelevant. In order to distinguish the Safety Mark from the MS Mark system it may be necessary to indicate some symbol of safety standard in the standard code number like as MS-xxx (S).

4) This system should be administered by the relevant government authority, but the management of required test be entrusted to SIRIM. Under the supervision of SIRIM, the testing laboratories accredited under the SAMM may also be

authorized to undertake tests under this system.

5) This system will prohibit the sale in Malaysia of electric appliances which do not carry the new Safety Mark. Therefore domestic and foreign manufacturers of electric appliances which are sold in the Malaysian market should apply for the new Safety Mark. It will be possible for foreign manufacturers to have their import agents proceed with the application on their behalf.

6) Application and approval procedures for this certification will be as follows.

   a) An application for the new Safety Mark is to be made to SIRIM for each model of product.

   b) The application form should include the name and business address of the applicant and the name of the product in question, together with a detailed description, specifications, photographs, etc. of the electric appliance for which application is made.

   c) SIRIM will carry out an initial inspection of the applicant's factory in order to assess the organization, manufacturing processes, quality control system adopted, and testing and inspection of the applied product being carried out by the applicant. For the inspection of factories abroad, SIRIM is to entrust foreign inspection institutes with which SIRIM has exchanged MOUs for mutual recognition. Applications from foreign manufacturers will be rejected if their factories abroad are judged to be inappropriate as a result of the inspections done by such foreign inspection institutes.

   d) Testing of the applied product will be carried out by SIRIM or other laboratories accredited under the SAMM to assure its conformity to the standards, only after the applicant's factory passes the SIRIM's inspection. The testing should cover all items specified in the standards. For the products manufactured by foreign applicants at their factories abroad, the testing may be entrusted to foreign inspection institutes with which SIRIM has the MOU for mutual recognition.

   e) SIRIM will approve the products which passes the conformity tests, and then grant a license to the applicant for the use of the Safety Product Mark.

   f) The applicant will be allowed to show the Safety Product Mark on the approved product under the foregoing license.

g) The imports of electric appliances will be passed by customs only on those labeled with the Safety Product Mark.

h) For the products on which the Safety Product Mark license has been granted, SIRIM will conduct follow-up factory inspections twice a year to check any changes in the operating conditions, particularly to ensure safety of those products. For the products on which safety conditions are found inadequate, the competent regulatory authority will be take necessary actions such as recommendation for improvement, annulling of the covering contract, and/or the issuance of an order for the recall of any products which have already been sold on the Malaysian markets. For products manufactured at factories abroad, follow-up factory inspections will be entrusted to foreign inspection institutes with which SIRIM has exchanged MOUs for mutual recognition.

7) In order to ensure a stable and systematic changeover from the present Control Label and Safety Mark systems to the new Safety Product Mark system, preparations, include the improvement of testing facilities of SIRIM and other organizations. For the time being it is recommended to implement the new system in parallel with the systems currently in force and carry out a staged introduction of the new system. The issues which will need attention during such a transition stage include the following.

a) Provision for the legislation which will form the basic framework.

b) Provision for increasing the test capacity.

Details of the testing equipment which may be required in order to reinforce the testing capacity of SIRIM are given in Chapter 6. These also indicate the number of staff which will need to be recruited for testing and inspection. If there are other organizations which undertake tests, these should be accredited under the SAMM.

c) Establishment of the certification procedures for the new Safety Mark system and provision for the various forms involved.

d) Establishment of appropriate MS standards

These standards should be elaborated to be appropriate as safety standards in line with the IEC standards.

e) The establishment of mutual recognition with foreign testing and/or inspection institutes.

Further, the mandatory certification system for the new Product Safety Mark initiated for electric appliances should be extended to automotive safety components, fire fighting equipment, household items, and other important items for securing safety including building materials on a step-by-step basis.

The use of the new Safety Product Mark may differ depending on the specifications of MS standards, since there are some MS standards specify the quality of products but also safety requirements to some extent while some others specify no safety requirements. For example the MS standards for the electric appliances specify the quality of those appliances including safety (established on the basis of the BS standards in line with the IEC standards) and all of the items covered by these standards are fundamentally related to safety. The application of the new Safety Mark system to the products certified under the present product certification systems may be as follows (see Figure 3-13).

1) Case 1: Products certified on the basis of MS standards encompassing all items of requirements for safety

Those certified products would satisfy all items required for the new Safety Mark and so the MS Mark thus granted could represent the new Safety Mark. For the products certified under the present Safety Mark system, however, use should also be made of the new Safety Product Mark.

2) Case 2: Products certified on the basis of the MS standards encompassing some items of requirements for safety

For those products, the granted MS Mark could represent the new Safety Product Mark only if the products satisfy all items of requirements for safety which are not specified in the existing standards, or otherwise those products should apply for the new Safety Product Mark.

3) Case 3: Products certified on the basis of the MS standards encompassing no item of requirements for safety

Those products should be covered by the new Safety Product Mark.

3.3.2.3 Adjustment of the existing product certification system to ARQS

Many certification bodies in the world are currently seeking the way how to adjust the methods and practices for factory inspections being conducted under the product certification systems (i.e., systems in Malaysia, the MS Mark, Safety Mark and Certified Mark) so as to be compatible with the assessment of quality system based on the ISO 9000 Series (i.e., the ARQS in Malaysia).

In Malaysia both the product certification systems and the ARQS have functioned using the individual inspection or assessment methods. In future, however, there would be a need to establish assessment methods commonly applicable to these two systems. To this end the following measures are recommended.

1) In the future, factory inspection for the product certifications should include the assessment of quality systems based on ISO 9001 and ISO 9002.

2) Factories which have been registered as certified based on the ISO 9001 or ISO 9002 under the ARQS may be exempted from factory inspection when applying for product certification.

3) When the product certification is granted to the products produced at the factories registered under the ARQS, follow-up factory inspection can be carried out under the ARQS thereby omitting the inspections under the product certification systems.

4) For the factories which have already received the product certification, the assessment of quality systems based on the ISO 9001 or ISO 9002 may be carried out at the time of follow-up inspection if so requested by those firms. If the assessed factories satisfy the required conditions, those factories are registered as certified factories under the ARQS. Even in the event that the assessment judges those factories to be inappropriate in quality system, validity of the license granted to those factories under the product certification system may be extended as long as the requirements for that system are satisfied. However, for those factories that fail to satisfy the requirements for the product certification, the license would be annulled.

5) The follow-up factory inspections for the ARQS, as well as the product certification system, will be carried out three times a year. However, for the factories registered under the ARQS, the follow-up inspections for the ARQS and for the product certification system will be carried out at the same time so as to avoid a

duplication of inspection charges to be borne by the applicants. However, in the case of inspections which are conducted by SIRIM or any other agencies in accordance with the special regulations, those inspections should be carried out independently.

3.3.2.4 View on the effect of export approval scheme

The Cabinet Paper approved the implementation of an export approval scheme in order to prevent exporting sub-standard products thereby raising reputation of Made-in-Malaysia products in international markets. The rubber glove industry would be the most important for this scheme.

As the export approval scheme is to permit the export of products which meet relevant standards, it can be deemed as one type of product certification system.

The rubber glove industry, an important export industry, is characterized by the structure having about 20 large or medium manufacturers leading the industry and having a share about 80% of exports and small manufacturers (more than 100) that provide the remaining 20% of exports. Whereas there are no complaints normally filed for the products exported by those leading manufacturers, a number of complaints have been raised on the products exported from small manufacturers due to shipments that included low-grade gloves or gloves of sub-standard quality. The export approval scheme may prevent such complains.

The inspection of products would be indispensable for the export approval, since it is a product certification system. For the products produced at the factories satisfying certain conditions such as those certified as to the quality system based on the ISO 9000 Series, the inspections may be exempted for some items. In any case, however, it might not be accepted to exempt from inspection at all.

Further, this exemption from inspections may benefit only leading manufacturers, since the leading manufacturers should have passed or will pass the certification based on the ISO 9000 while it would be difficult for small manufacturers to attain such certifications in the immediate future.

Under this situation, if the export approval scheme for rubber gloves is implemented at the outset, most of small manufacturers would face difficulty, since most of them could not produce the required quality of products, while the leading manufacturers could continue to export their products. Many of the small manufacturers are engaged in manufacturing low grade products which are still accepted in export

markets. Complaints are often due not to the low grade itself but to exporting low grade products as high grade ones either due to a simple mistake or wicked intention. It seems difficult to prevent the latter-motivated exports even by use of the export approval scheme.

Further, the implementation of proposed export approval system requires grading-up of inspection capacity with resulting cost burden.

The export inspection system requires several steps to be taken for implementation. Hence the adoption of this system must be examined carefully. Likewise, the export approval scheme also involves several issues to be considered. In view of these situations, our view is that it is better to initiate self-control among the manufacturers. At the same time, it is recommended to examine the effect and practice of the export approval scheme as well as any measures to be taken for assisting the upgrading of small manufacturers more carefully.

3.3.3 Recommendations for Intensifying Implementation of Certification Systems

3.3.3.1 Weakness of the present system, and measures for enhancement

SIRIM has been making efforts to improve and enhance the product certification system to meet the objective of the system and the specific conditions of the nation. The system, however, is not without its weaknesses. These weaknesses can be analyzed and better understood by comparing the system to other, foreign systems. It is acknowledged that the JIS Mark system is the product certification system that has been implemented for guiding quality improvement of industry with greatest success. In this context comparison with the JIS Mark system would be useful for identifying any areas to be improved for enhancement of the present system.

The AROS has been established with a scheme and implementation system designed with reference given to those adopted in the UK. SIRIM has a long-term plan to adjust the methods presently used for factory inspections for the product certifications so as to make them compatible with those for the AROS and in line with ISO 9002. The assessment methods adopted for the JIS Mark certifications closely resemble those of ISO 9002. Hence, comparison of the product certification system in Malaysia is made with the JIS Mark certification system as well as the ISO 9002. The results are summarized in Table 3-23.

This comparative assessment focuses on the "Scheme of Supervision and Control" and the "Basic Factory Information Form" stipulated in the SIRIM guideline, and based on the result of the comparison, recommendations for improvement are made, regarding the assessment criteria, the qualification of auditors and the specification of duties and qualification of quality officers employed by firms.

(1) Assessment criteria

In comparison with the ISO 9002 and the JIS system, the assessment criteria used for product certification by SIRIM is more highly generalized. This may be appropriate in view of the broad range of differences in the characteristics of products to be certified. It may also be said, however, that assessment in the latter case places greater importance on use of the assessor's judgment. Specifically, moreover, the criteria are given in detail regarding the management of raw materials and parts as well as maintenance (particularly calibration of the testing equipment), but no details are given regarding the responsibilities of managers, the authority and scope of work of quality officers, education and training of employees and the reporting,

recording, documentation and filings. It is observed that the assessment criteria should be in greater detail. To this end it is recommended (1) to elaborate the assessment criteria used for product certification in line with that for the ARQS, and also (2) to include criteria for assessing the qualification of quality officers in factories, and in-house standardization of factories in order to encourage continued efforts for improvement of quality at factories even after the certification has been granted.

(2) Qualifications of quality system auditors/assessors

In both the product certification system and the quality system registration system, the role played by auditors is exceedingly important, since the certification system depends very much on the overall capability of the auditors/assessors, including their expertise, experience and character.

Since the adoption in May 1991 of ISO 10011-2, as an international standard for auditor qualifications, it has been used as the base in many countries for development and training of auditors. SIRIM is using this standard, but regarding the level of auditor candidates, whereas the ISO in principle accepts the level of junior college graduates, SIRIM requires the level of higher graduates of courses of science, engineering, manufacturing technology, architecture, maintenance, service, management or economics. As can be seen in Table 3-24, the qualifying criteria for SIRIM auditors is higher than that under the ISO standard. It is noted, however, that in training of auditor candidates, emphasis is placed on acquisition of knowledge and understanding of quality systems, auditing techniques and the management of auditing, but not for the training related to quality management. When assessment is made of the conditions of a company's quality assurance system based on ISO 9000 Series, the auditor's/assessor's expertise in quality management will be important. It is recommended to give training for auditor candidates with regard to quality management, so that more appropriate assessment can be done while encouraging the firm to make efforts for improvement of quality.

(3) Specifying the duties and qualifications of quality officers of firms

Under the present product certification system of SIRIM, factories for which the certification has been granted are obliged to post quality officers. Further in the basic factory information form which is submitted as part of the application, factories are required to indicate the qualifications and experience of the key personnel who are responsible for quality control. Thus it is made a condition that the certified factories assign such quality officers. In view of the importance of the duties

to be carried out by the quality officers, it is recommended to specify the duties and qualifying conditions of such personnel in the certified factories as a measure to support efforts to improve product quality.

3.3.3.2 Need for securing auditors/assessors and inspectors for the certification

In accordance with enhancement and promotion of standardization, the number application for ARQS and product certification is expected to increase, and the certification activities are necessary to be intensified to meet the expanding trend of the application. Hence the increase in the number of auditors/assessors is necessary accordingly.

Based on the SIRIM's corporate plan (1991–95) and taking into account tendencies that have continued through the present, projection has been made of the number of applications for the ARQS and product certification and the manpower requirements for the auditors/assessors and inspectors up to the year 2000. The result is summarized below.

(1) ARQS auditors/assessors

There are 80 factories registered under the ARQS as of May, 1992. As is shown in Table 3–25, it is forecast that there will be about 200 applications for the ARQS every year, and thereby the number of QS registered factories will increase to 500 in 1995 and thereafter to 1,300 in 2000. The assumptions are that (a) assessment is to be done by three persons and amount to six man–days, (b) one person has to work 5 days for preparatory assessment, review of documents including manuals and relevant documentation, and (c) three factory inspections are conducted annually of each registered factory, each inspection requiring one auditor for one day and another one person to work two days for documentation. It is projected, based on these assumptions, and as shown in Table 3–26, that the need for auditors will increase to 27 persons in 1995, and 56 in 2000 on the basis of 250 working days per annum. At present SIRIM has 10 qualified auditors. The above projection indicates the need to increase the number of auditors to a substantial extent in the future.

(2) Factory inspector for the product certification

There are 845 products and 423 factories certified under the product certification system as of May, 1992. These numbers will increase owing to the promotion of the system in the future, under conditions of continued strong industrial develop–

ment. As is shown in Table 3-27, it is projected that there will be annually 200 applications for product certification and these applications will be made by 100 companies. This will increase to 1,440 products and 720 factories certified under the product certification in 1995, and further to 2,240 products and 1,120 factories in 2000.

Assuming that (a) inspections are to be done by two persons for four man-days, (b) one person has to work 4 days for preparatory inspections, review of documents including manuals and documentation, (c) three factory inspections are conducted annually on certified factories, each requiring one inspector for one day and another one person to work two days for documentation, it is projected, as shown in Table 3-28, that there will be need to have 30 inspectors in 1995 and 44 in 2000.

At present SIRIM has about 20 factory inspectors. In order to meet the above requirement, the inspectors should increase by 50% in 1995 and double in 2000 compared to the present level. The requirements of auditors/assessors and inspectors in the respective professional fields are shown in Table 3-29.

It shall be a great and important task to secure those auditors/assessors and inspectors. While best efforts be made to secure the increased number, in order to reduce the difficulty in recruiting required personnel, it is advisable to examine the possibility of establishing a registration scheme for qualified individual auditors and inspectors or establishing a professional organization for providing such services so that qualified experts can be utilized.

3.3.3.3 Training of auditors/assessors and factory inspectors

As mentioned in the previous section, training of auditors/assessors and factory inspectors is essential to enhance those human resources by recruitment of additional staff and upgrading of existing SIRIM staff. The following are recommendations for this training.

(1) Training for quality system auditors/assessors

The qualification requirements for quality system auditors/assessors should be primarily based on the "Qualification Criteria for Quality Systems Auditors" stipulated in the ISO 10011-2 guidelines. However, as these guidelines provide for only general conditions, specific conditions should be set up to meet the specific needs of Malaysia while taking the international guidelines into account.

Most of countries, therefore, has qualified their auditors/assessors based on their own standards, though these standards are based on the international standards basically. The international unification of the qualification standards is essential as the basis to materialize mutual recognition of certification systems. This issue will be discussed among the relevant countries in the international conference on performance for QS registration.

At present the qualification criteria for auditors/assessors which have been adopted by SIRIM are basically in line with the ISO standards and so the training for auditors/assessors is provided mainly in respect of the following aspects.

1) Knowledge and understanding of quality system standards.
2) Auditing techniques.
3) Auditing management.

The ISO 10011-2 guidelines stipulate no specific provision for the auditor's/assessor's expertise of quality management. However, it is recommended to add training for building up the "expertise of quality management" of candidates of auditors/assessors to the curriculum of the training to be provided for those personnel, because of the following reasons.

1) The assessment of quality systems is to assess the actual situation regarding quality management. To do this, auditors/assessors of quality systems should have adequate expertise in quality management as required for carrying out appropriate auditing and assessment of quality management adopted in factories.

2) The objective of the ARQS is to encourage the enhancement of quality assurance systems used by manufacturers as well as maintaining and upgrading product quality. Therefore, in auditing quality systems for the ARQS the auditors/assessors should not only assess whether the audited manufacturers satisfy the requirement specified in the ISO 9000, but also give appropriate guidance to those manufacturers for improvement of quality systems based on their adequate expertise of quality management.

3) There are some countries where the expertise in quality management has been adopted as one of the criteria for qualifying the authorized quality system auditors.

It is proposed to include a ten day training course for teaching the concept of quality management and basic techniques for the application of quality management.

Shown in Table 3-30 is an example of such training. Passing the examination after receiving such a course should be the condition for a quality system auditor to be qualified. (Nevertheless, any persons who have equivalent level of expertise may be entitled to take the examination without receiving the training.)

(2) Training of junior staff as future quality system auditors/assessors

Qualification for the quality system auditors/assessors who are engaged in quality system auditing for the ARQS is granted to SIRIM's professional staff who are college graduates and have passed the qualification examination. They are required to take the training course provided for those staff and also work as an assistant for the auditing for a certain period prior to taking the examination.

Most of the technical staff recruited by SIRIM are fresh graduates from university or technical college, and therefore have no expertise or experience which are required as prerequisite for taking the qualification examination for quality system auditors/assessors. In order to increase the number of qualified auditors/assessors, SIRIM should undertake intensive training programs for those staff. On-the-job training should also be provided through the follow-up factory inspections under the product certification system and follow-up factory assessment under the ARQS. A proposal of the training program for recruited junior staff is presented in Table 3-31.

The proposed program is designed with a training period of four years and three months to provide junior staff with comprehensive training to build up their experience required for taking the qualification examination. It is also proposed to give them a special seminar for the preparation for the qualification examination as part of the training program.

(3) Training of junior staff as future factory inspectors for the product certifications

In order to increase the number of factory inspectors for the product certification, SIRIM should undertake intensive training programs for junior staff who are to be engaged in factory inspection. A proposal of the training program is presented in Table 3-32.

This training program is to provide them with comprehensive training for factory inspection over a training period of two and a half years.

(4) Specifying duties and qualification of quality officers to be assigned in factories

1) Duties of quality officers to be assigned in factories

The product certification should be granted on the condition that the certified factories assign quality officers. For this end, it is recommended to indicate the duties to be undertaken by those quality officer, as follows:

a) Drawing up action plans for in-house standardization and quality management, and leading the implementation of in-house standardization and quality management based on the thus-prepared action plans.
b) Overall management with regard to the establishment of in-house standards and any revisions thereof.
c) Assessment of quality of products produced.
d) Supervision and guidance for the in-line use of in-house standardization and quality management, and necessary coordination between relevant departments.
e) Advice for solving of problems that arise in the process of in-line use of in-house standardization and quality management.
f) Training of relevant staff and operators in in-house standardization and quality management.
g) Guidance to relevant staff with regard to quality control of materials and parts procured from outside suppliers.

The following is the substance of each duty stated above.

a) Drawing up action plans for in-house standardization and quality management, and leading the implementation of in-house standardization and quality management based on the thus-prepared action plans

The in-house standards must be established as the basis for undertaking the in-house standardization and quality management. In recent years there has been substantial advancement of the in-house standardization and quality management systems in keeping with rapid innovation of technology. It is important to establish appropriate systems for in-house standardization and quality management which meet the operating conditions of the factory while ensuring continual advancement of adopted technology.

b) Overall management with regard to the establishment of in-house standards and any revisions thereof

It is common practice that an internal committee is organized for the establishment and revisions of in-house standards. The quality officer should lead this committee, particularly in coordinating drafts, directing meetings, providing minutes, following-up the required procedure after decision, and distribution and dissemination of the in-house standards to be established or revised.

c) Assessment of quality of products produced

Assessment of quality of the products produced is essential for judging the level of quality realized to meet the target set by the in-house standards and to set the target for further improvement of quality. In general, this is achieved through monitoring product quality in accordance with the product inspection standards internally established and analyzing average values and the degree of irregularity in quality. Histograms and control charts are often used for monitoring and analysis of product quality.

d) Supervision and guidance for the in-line use of in-house standardization and quality management, and necessary coordination between relevant departments

The quality officers must monitor the state of in-line use of in-house standardization and quality management with the assessment of in-line processing capacity for each product line and analysis of in-line operation and quality inspection records, and provide necessary guidance and coordination for the operation of in-line quality control and optimum application of overall quality management.

e) Solving of troubles that arise in the process of in-line use of in-house standardization and quality management

The quality officers must analyze the causes of troubles and irregularities of product quality arising in the production line, and investigate the measures for trouble-shooting, measures for preventing recurrence of those problems and necessary amendment of in-house standards to give proper guidance to the production line. Further when complaints on product quality are made by buyers or consumers, the quality officers must supervise analysis of causes of those troubles and also to examine the response to be given to clients. Particularly, the supervision must be made so as to give the response promptly.

f) Training of relevant staff and operators in in-house standardization and quality management

In-house standardization and quality management should be based on the establishment of in-house standards. It is crucial to provide relevant staff and operators with appropriate training so as to enable them to undertake in-house standardization and quality management with proper understanding of the established in-house standards. The training should be carried out in a phased program to meet the capability of those relevant staff and operators.

g) Guidance to relevant staff with regard to quality control of materials and parts procured from outside suppliers

The quality control of materials and parts procured from outside suppliers should be done through careful selection of the suppliers, investigation of ordering conditions, inspection of those materials and parts at the receiving point and proper guidance to the suppliers on quality control in their production lines.

The foregoing duties are fundamental for the quality officers required in line with the ISO 9001 and 9002.

2) Qualifications of quality officers of firms

The "Qualification Criteria for Quality Systems Auditors" stipulated in the ISO 10011-2 should be the basis for examining the qualifications of quality officers to be assigned in factories. However these standards provide the guidelines for qualifying quality system auditors who are engaged in quality system auditing of factories for quality system certification. Hence the qualification criteria as well as training items stipulated in these standards are not appropriate for quality officers to be assigned in factories. Further it may be difficult for small enterprises to have quality officers who satisfy qualification criteria stipulated in the ISO 10011-2, since only large-scale or leading medium-scale enterprises would be capable to apply the quality system based on the ISO 9000 Series.

It would be appropriate to set up qualification criteria for quality officers to be assigned in factories taking practically applicable conditions into consideration, rather than relying on the qualification criteria for quality system auditors stipulated in the ISO 10011-2. The fundamental requirements for quality officers are expertise and experience, which can be defined in greater detail as follows.

a) Expertise

1. Expertise in the manufacturing or processing technology adopted in the factory where the quality officers are assigned; it shall have been acquired through basic education and training and also gained on the job.

2. Expertise on standardization and quality management; it shall have been acquired through basic education and training and also gained on the job.

b) Experience

1. Experience in operation of the relevant manufacturing or processing.

2. Job experience in standardization and quality management.

The qualification criteria for quality officers should be defined with an appropriate combination of academic qualifications and relevant job experience. Taking into consideration its application to small and medium enterprises, it is advisable to make provision for qualifying personnel who have a certain period of job experience and have passed the qualification examination after taking a special training course even if the person lacks a relevant academic background. The following is an example of the qualification criteria for quality officers.

a) Qualification criteria for quality officers

Quality officers should (1) have adequate expertise in the technology adopted for the manufacturing or processing of the product to be certified, (2) have relevant job experience more than one year in operation of the factory, and (3) satisfy one of the following conditions.

1. University graduates who have passed courses relating to quality management and who have job experience of more than two years in the work of standardization and quality management.

2. Graduates of secondary education who have passed courses relating to quality management and who have job experience of more than four years in the work of standardization and quality management.

3. Personnel who have completed the training courses authorized by SIRIM relating to standardization and quality management and who have job experi-

ence of more than two years in the work of standardization and quality management. (For this condition, if a lower level of training is provided, the required length of job experience should be lengthened.)

b) Curriculum of the training course for quality officer

The foregoing training should comprise the curriculum for a ten-day course.

1. Industrial Standardization
2. Fundamental Principles of Quality Management
3. Data Collection
4. Data Analysis
5. Production and Interpretation of Control Charts
6. Analysis and Improvement of Production Line
7. In-line Operational Management
8. Quality Inspections
9. Fundamental Principles of In-House Standardization
10. Standardization of Products
11. Standardization of Materials and Parts
12. Standardization of Plant/Equipment Maintenance
13. Standardization of Quality Inspections
14. Standardization of Complaint Handling
15. Application of Quality Management
16. Testing (or overall viva voce examination)

(5) Specifying the assessment of in-house standardization in the factory assessment guidelines

In order to ensure that the certified factory can maintain stable production of the products in quality conforming to the applicable standards, the follow-up factory inspection should include the assessment of in-house standardization undertaken in the factory. The SIRIM's application form for product certification requires the applicants to provide descriptions of the following aspects:

1) Procedures, if any, established for calibration testing equipment.
2) Procedures, if any, established for the quality control of incoming materials/components.
3) Procedures, if any, established for in-line inspection and for testing and inspection of finished products.
4) Procedures, if any, established for handling complaints about product quality.

5) Procedures, if any, established for the recall of defect products.
6) Schedule, if any, established for maintaining the premises clean and tidy.

However there is no clear indication of what details should be described in the application form for the SIRIM's assessment. In the future there will inevitably be an increased need to align the certification system with international procedures. Therefore in order to meet this requirement while encouraging the efforts of applicants to undertake the in-house standardization for achieving improvement of product quality and productivity and cost reduction, it is recommended to specify in the application form with regard to the specific requirements for in-house standards, in-house standardization and quality management which are to be established and implemented by the applicant. The main items of these requirements for in-house standards are as follows.

Company standards to be established

1. Quality inspection of products produced, and filing of inspection records.
2. Quality inspection of the incoming materials/components, and filing of inspection records.
3. Main items and methods of in-line quality control, including specific methods for inspection applied to the products to meet particularities of quality.
4. Maintenance of plant and production equipment, and testing equipment.
5. Quality management of subcontractors or external suppliers of materials/components if any.
6. Handling of complaints about product quality, including measures for rectifying defects.
7. Internal quality auditing.

The company standards should also include procedures for periodical review of the established company standards and for publicizing those standards among staff and operators. The most important consideration for the company standards should be to stipulate details of the fundamental conditions and steps which are undertaken for ensuring the production of products that conform with the applicable national or international standards. Aspects which are not essential for ensuring this should not be stipulated in the in-house standards.

3.3.4 Recommendations on Measures to be Taken for Intensifying Implementation of Certification Systems

3.3.4.1 Main thrusts for intensifying implementation of certification systems

SIRIM has actively undertaken various measures for pursuing wider adoption of certification systems. As a result, the number of certified products and factories has increased year by year. The following are the main thrusts adopted for intensifying the implementation of the certification system in the SIRIM's Corporate Plan (1991-1995).

Strategic Thrust 2: Developing a highly proficient national measurement, standards and quality system.

This thrust calls for measures and actions to be taken to promote wider use and recognition of the certification and accreditation schemes among Malaysian industries and consumers, which include the following:

1) Setting of a target for increasing the certifications in terms of the number of firms to which the product certification has been granted.
2) Promotion of formation of an association of firms to which product certification has been granted.
3) Undertake promotion programs for dissemination of knowledge about the certification system through publicity and the provision of incentive schemes, such as:
   a) Publishing of brochures and newsletters for the standardization and quality management.
   b) Efficient utilization of the ITAF.
   c) Publishing a buyers guide to certified factories and products, and a standards directory.
   d) Radio and TV appearances on quality and standardization.
4) Establish slogans used in radio and TV
5) Conduct dialogues with industrial associations and Chamber of Commerce.
6) Establish database on performance (e.g., sales, exports and market penetration) of firms to which the product certification has been granted.

Strategic Thrust 4: Promoting transfer of technology to local industries for modernization and growth through providing small and medium enterprises with technical assistance and consultancy for improving their quality systems and productivity.

The foregoing measures and actions would have substantial effect on behalf of the certification system. In addition, as stated in the Cabinet Paper, SIRIM has a plan to promote a scheme wherein priority for procurement by the government agencies is given to the certified products.

The foregoing cover almost all conceivable measures and actions for intensifying implementation of the certification system, and therefore the key would be how to implement them in an efficient manner.

In Japan, the government has implemented programs similar to the ITAF cited in 3)-b) of Thrust 2, provision of consultancy for small and medium enterprises cited in Thrust 4 and the scheme for procurement by the government agencies giving priority to certified goods, and those programs have brought considerable results for promotion of the JIS Mark among small and medium enterprises in Japan. It is recommended that these programs be intensively undertaken in Malaysia.

For promoting diffusion of the certification system among small and medium enterprises, SIRIM should implement the foregoing programs in close cooperation with relevant ministries and institutions and also have frequent dialogues with industrial associations. These dialogues could enable SIRIM to promote its policy among industrial circles and also sound their response to the programs so that SIRIM can improve those programs.

3.3.4.2 Proposal on measures and actions to be taken for promotion and enhancement of the certification system

(1) Measures to promote greater use of Malaysian standards in procurement activities by government and public agencies

In the "Strategies to Improve Quality through Standards and Certified Products" approved by the Cabinet in October, 1991, a strategy (Strategy 3) calls for promoting greater use of Malaysian Standards in purchasing endeavors by government and public agencies. For efficient implementation of this strategy, it is proposed to undertake the following measures.

1) Organizational setup for implementation

In view of the wide range of work fields involved in the thrust 3, the degree of complexity and intricacy involved, it will be essential to have the organized coop-

eration of each related ministry and public organization so as to achieve an well-balanced implementation. To this end it will be necessary to set up a Promoting and Steering Committee composed of representatives from each of the related ministries and institutions. It is desirable that this committee be led by the representative of a Ministry which possesses coordinating functions within the government. SIRIM shall act as the Secretariat. Under the Promoting and Steering Committee there should be technical committees organized to carry out examination of technical aspects.

2) Drawing up of standard specifications for procurement by the government and public organizations

In many cases national standards do not stipulate detailed specifications of the products. However, in order to ensure the uniformity of specifications of the supplies for the government and public organizations a sufficient degree of detail must be specified to supplement the national standards. On the contrary, in some cases it will be more practical to give limitations on the types and dimensions specified in the national standards. For the products having no MS Mark, it is important to draw up standard specifications in line with the MS levels in order to promote standardization as envisaged in Strategy 3.

The standard specifications should be drawn up by SIRIM working in cooperation with the procuring organizations concerned and the relevant industrial association. The items listed in Table 3-33 are all important supplies delivered to the government and public organizations. There are a large number of daily necessities and consumables and the specification details are comparatively simple, so that the drawing up of standard specifications should also be relatively easy.

In cases where an MS standard exists but the technical levels of actual procurement specifications are lower than this equivalent MS it is desirable for the implementation of Strategy 3 that SIRIM draw up standard specifications through discussion with the procuring organization(s) concerned to find a level on which both or all parties can agree. Further, in cases where there is no MS serving as a reference, it should be judged whether the standard specification of the procuring organization can be used to draw up an MS or a standard specification.

(For reference, Annex 5 describes the standardization of supplies to government and public organizations in Japan and South Korea.)

There are firms which can not apply for product certification because there are no Malaysian Standards. To this end, government resolution should be made to give priority of supply to the government and public agencies from firms registered in accordance with the ARQS. Since there is no statement concerning such policy in the Cabinet Paper it is desirable that a Cabinet approval on this effect be secured and a statement to this effect be circulated nationally in official reports as promptly as possible. The above measures should lend considerable impetus to the effective and rapid diffusion of quality systems in line with the ISO 9000 Series among Malaysian industries.

(2) Need for securing quality system consultants

There are many companies that lack the ability to set up their own quality systems because they lack correct knowledge about quality systems based on the ISO 9000 Series. Even in the case of a very large company's advanced quality management, it is a fact that many of them find it difficult to develop a quality system for detailed areas on their own.

The contribution a consultant can make to these companies is great. It is therefore essential to have assurance that the required number of well-qualified consultants are available.

In the QSCRS, 11 companies and 18 individuals are registered, but they have not been able to catch up to demand for consulting services, so it takes a long time before a consultant can be obtained when one is needed. It is necessary to solve this problem as soon as possible.

Since such consultants (QSCRS) are linked to the activities of private sector Consulting Companies a large number of firms and individuals are expected to participate if such services are found sufficiently viable in business terms. Moreover the operation of the principle of free competition will ensure that firms will be chosen on the basis of the quality and performance of their consulting activities. However, if the available consultants do not meet with the needs of companies looking to obtain ARQS registration it will become necessary to provide additional training in such areas in order to ensure the smooth operation of the system.

If the services offered by consultants do not meet the demands and needs of firms dissatisfaction with this gap will take the form of complaints. Further, such a gap would be obvious when the SIRIM conducts its assessment of the quality management systems of firms.

If such a gap is confirmed to exist then SIRIM could organize short training courses which would explain how to interpret the ISO 9000 Series and point out noteworthy aspects of this series. Participation in such courses should be made compulsory for registered consultants. Moreover, the annulment of registration should be considered for unprincipled consultants.

(3) The establishment of a consultant company linked to the SIRIM

It is quite natural that a large body of know-how concerning the application of ARQS registration should have been built up in SIRIM through its activities as the implementing agency of the ARQS. Therefore if SIRIM itself were to carry out consulting activities for the ARQS it would greatly facilitate the firms' ARQS application, but this is obviously not directly possible since SIRIM is the institution which grants the ARQS certification. An alternative would be the founding of a consultant company related to the institutions granting the certification in the manner practiced in Great Britain or Singapore. If such a consultant company were to be established the following points would need to be kept in mind.

a) The consultant would need to be completely independent in organizational and financial aspects.
b) SIRIM would not be permitted for any reason to reveal to the aforesaid consultant data or information which had been obtained via the ARQS assessment.
c) SIRIM would treat the aforesaid consultant on a par with other consultants and in no way accord any preferential treatment.
d) The fact that this consultant was linked to SIRIM would not be advertised.

If such a consultant company were to be set up whatever limits might be imposed given a general relation with SIRIM everybody would expect to obtain the certification without any problems by using its services. Therefore, a precondition to the establishment of such a service would be a thorough survey and the understanding of related parties.

3.3.5 Mutual Recognition of Certification Systems

Amidst the worldwide increase in adoption of assessment and registration system of QS in accordance with the ISO 9000 Series, a movement toward bilateral and multilateral mutual recognition of others' systems has emerged. It is no easy affair to attain full, mutual recognition. Even if the technical content of assessment by certification institutions, and it is confirmed that there is adequate technical reliabil-

ity, it is necessary also to consider also policy- and economic-related matters. However, it is needless to say that as a basic condition for mutual recognition, the system for assessment of the quality system of factories, concerning which SIRIM and the British Standards Institute have signed a memorandum, is the first step toward it. It would be effective, for the time being, if more memoranda such as this one were to be signed with institutions outside Malaysia, as a means of progressing toward establishing such recognition and eventually reducing expenses while improving efficiency. It is likely that regional or international meetings are going to be held, for the purpose of establishing the preconditions for mutual recognition, and it is hoped that Malaysia will participate in them.

Table 3-1 Technical Committees under Various ISCs (1)

STANCO

A Food and Agricultural ISC	B Chemical and Pharmaceutical ISC	C Consumer Products ISC	D Building & Civil Engineering ISC	E Electrotechnical ISC	F Mechanical ISC	G Information Technology ISC
1. Fruits - fresh & processed	1. Paints, solvents and allied products	1. Matches, lighters and allied products	1. Household fittings and building accessories	1. Electrical installation protection and insulation practices	1. Tools and metal testing (in recess)	WG1: Vocabulary
2. Vegetables - fresh & processed	2. Fertilizers	2. Rubber & rubber products (Excluding footwear)	2. Cement & concrete	2. Generation, conversions, transformation and storage of electrical energy	2. Fasteners - pipes fittings, flanges and valves (in recess)	WG2: Telecommunication and information exchange between & interconnection of IT equipment
3. Poultry & meat products - fresh & processed	3. Pesticides and growth regulants and related products	3. Plastic products	3. Iron and steel products	3. Electrical switch gears, control gears and wiring accessories	3. Welding	WG3: Software development and system documentation & languages
4. Marine foods - fresh and processed	4. Chemicals	4. Soaps and detergents	4. Bricks & tiles	4. Household appliances	4. Industrial machinery, parts and vehicles (in recess)	WG4: Flexible magnetic media for digital data exchange, representation of data elements & optical disk cartridges for information exchange
5. Beverages and beverage products (alcoholic and non-alcoholic)	5. Adhesive and adhesive products	5. Textiles and textile products	5. Soil, mineral aggregate and foundation	5. Lighting, lamps and accessories	5. Fire prevention and protection	WG5: Identification cards and related services & common security techniques
6. Raw rubber & latex	6. Wood preservatives	6. Yarns, threads and twines	6. Plastic products (Construction)	6. Cable & cable accessories	6. Gas cylinders, accessories and appliances	WG6: Text and office & office equipment
7. Starch, cereals & related products	7. Metals, ores & allied products	7. Glossary of textile terms	7. Timber & timber products	7. Glossary of electronic & electrical engineering terms	7. Mining (in recess)	WG7: Information retrieval, transfer and management for the open systems interconnection (OSI)
8. Oils and fats	8. Petroleum and petroleum products	8. Batik (in recess)	8. Building services	8. Electric components	8. Tubular framed equipment & bed-sheets for hospitals (in recess)	WG8: Computer graphics
9. Tobacco & tobacco products	9. Rocks and clays and their products	9. Toys and playground equipment	9. Fibre reinforced products	9. Electrical electronic equipment	9. Rubber tires	WG9: Electronic data interchange
10. Sweeteners and related products	10. Household insecticides	10. Paper, paper products and stationery	10. Structural use of concrete	10. SWG on safety of laboratories electrical aspects	10. Packaging	WG10: Character sets and information coding
11. Animal feeds and feedstuffs	11. Code of practice for safety in laboratories	11. Footwear	11. Code of practice for facilities for disabled people to building		11. Freight containers	WG11: Microprocessor systems
12. Dairy products	12. SWG on guidelines for industrial radiation sterilization of disposable medical products	12. SWG on portable ladders	12. Modular coordination in buildings (in recess)		12. Quality assurance	WG12: Geographical information systems
13. Sauces	13. SWG on 'floor varnish'	13. SWG on high-resilience PU foam	13. Concrete products		13. TC on automotive components	
	14. Bitumen products					

Table 3-1 Technical Committees under Various ISCs (2)

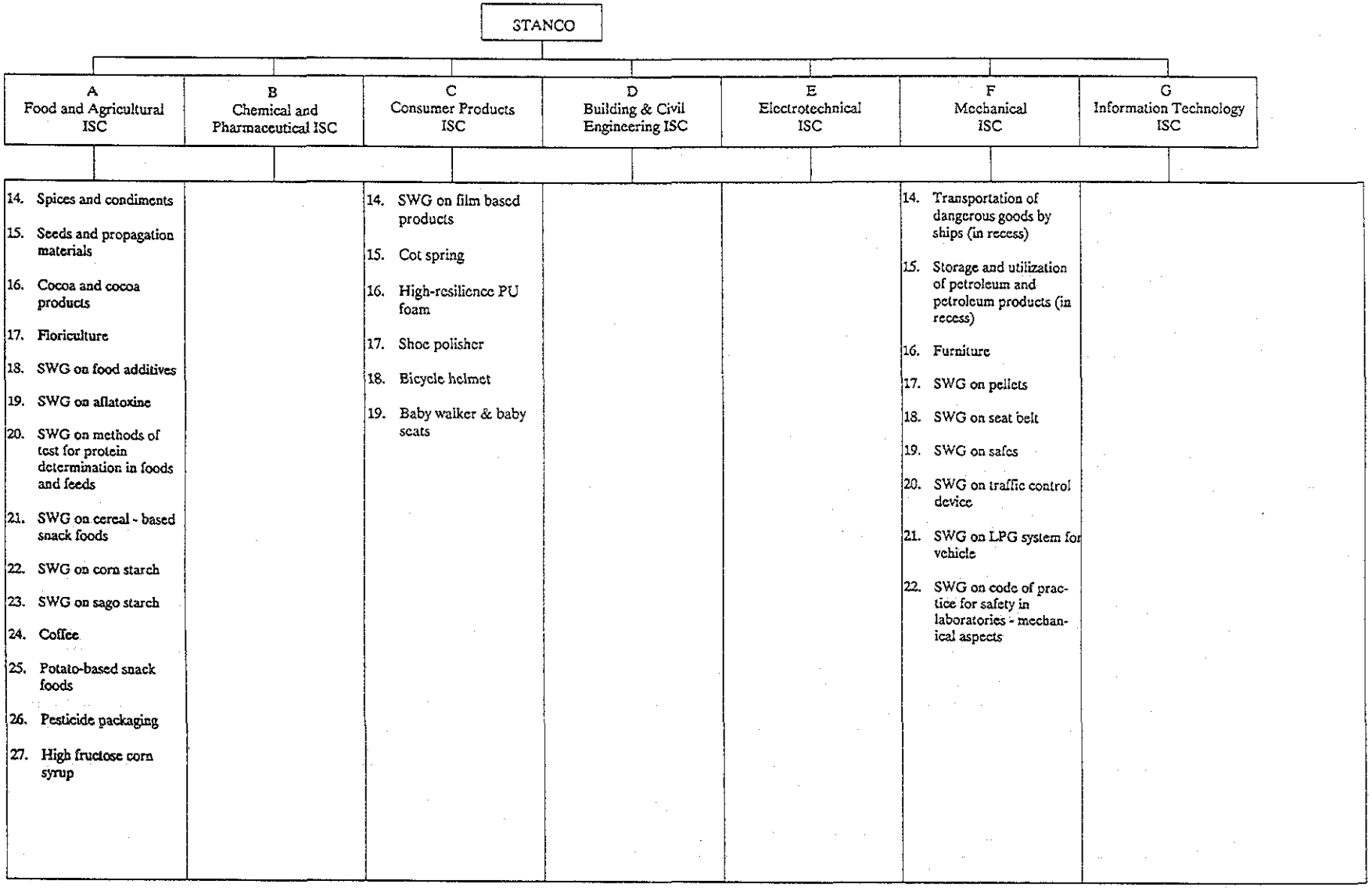


Table 3-2 CRITERIA FOR EVALUATION OF PRIORITY ON PROPOSED STANDARD WORK ITEM

Criteria	Max.Points
1. International Exchange of Goods (Export)	10
2. Safety, Health and Consumer Protection	10
3. Promotion and Development of Technology and Technique in Small- and Medium-scale Industries	10
4. Certification	8
5. Development of Information and Communicational Technology	8
6. Needs of Large Purchasers e.g. Treasury, MINDEF	8

Source: SIRIM

Table 3-3 EVALUATION RESULTS OF SAMPLE PROJECTS

Criteria	Points for Projects			
	(1)	(2)	(3)	(4)
1. International Exchange of Goods	7	–	2	10
2. Development of SMI	7	10	–	10
3. Certification	8	6	8	–
4. Safety, Health and Consumer Protection	8	–	2	7
5. Development of Information and Communicational Technology	–	–	–	8
6. Needs of Large Purchasers	7	–	6	–
Total	37	16	18	35

Source: SIRIM

Table 3-4 DIVISION AND NUMBER OF JIS

JIS Division \ JIS Number		00 to 09	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 99
A.	Civil Engineering & Architecture	General	Test and Inspection	Design and Plan		Accommodation and Fixture	Material and Fittings		Execution	Working Machine and Appliance	Miscelaneous
B.	Mechanical Engineering	General	Machine and Parts			Tool, Jig and Implements		Machine Tool	Measuring and Calculating Machine and Appliances, Machine for Physics	General Machine	
C.	Electronic and Electrical Engineering	General	Measuring and Testing Machine and Appliance	Material	Electric Wire, Cable and Electric Line Apparatus	Electric Machine and Appliance	Communication Machine and Appliance		Vacuum Tube, Lamp Bulb	Illumination Appliance, Wiring Appliance, Battery	Electric Application Machine and Appliance
D.	Automotive Engineering	General	Method of Test and Inspection	Common Parts	Motors and Engines	Chassis, Car Bodies	Electric System, Instrument	Special Car, Construction Machine		Repair, Control, Test and Inspection Appliance	Bicycles
E.	Railway Engineering		Track General	Electric Car Line and Substation	Signalling and Safety Appliance	Rolling Shock General	Motive Power (Rolling Stock)		Railway Carriage and Waggons	Industrial Vehicles	Cable Cars
F.	Shipbuilding	General	Hull Parts			Engine Parts				Electric Parts	
G.	Ferrous Materials & Metallurgy	General	Analysis Method	Raw Materials	Carbon Steel	Alloy Steel	Cast Steel and Cast Iron				Miscellaneous
H.	Non-Ferrous Metals & Metallurgy	General	Analysis Method	Raw Materials	Copper and Copper Alloy	Other Metal than Copper and its Alloy	Casting	Secondary Products		Processing Method and Appliance	Miscellaneous
K.	Chemical Engineering	General	Monomer Chemicals, Manure, etc.	Fuel Lubricating Oil, Petroleum Product, Fuel Gas and Tar Products, etc.	Oil-Cake, Perfume	Raw Materials of Dyestuff, Dyestuff and Explosive	Pigment, Paint, Copying Material	Rubber, Plastics, Leather	Photography Senstive Materials	Reagent	
L.	Textile Engineering	General	Test and Inspection	Thread	Woven Fabric, Braided Goods	Textile Product	Yarn Reeling Machine	Textile Machine, Braiding Machine	Dyeing Finishing Machine		
M.	Mining	General	Exploration	Mining		Dressing Coal, Dressing		Transportation	Safety Item	Mine Products	
P.	Pulp & Paper	General		Pulp	Paper		Paper Goods			Test and Measurement	Miscellaneous
R.	Ceramics	General	Pottery Ware	Refractories	Glass and Mineral Fibrous Goods	Enamel Wares	Cement Goods	Abrasives and Overwares	Carbons	Special Ceramic Wares	Miscellaneous
S.	Domestic Wares		Furniture and Household Wares	Table Wares and Kitchen Wares	Other Household Wares	Vanity Wares and Personal Accessories	Footwear	Stationery and Office Wares	Sporting Utensil	Amusement Utensil and Musical Instruments	Miscellaneous
T.	Medical Equipment & Safety Appliances	General	Medical Electric Machine and Appliance	General Surgical Machine and Appliance (Knives, Bar and Scissors)	(Needles Tubes and Syringes)	(Suture, Meter and Optical Instrument)	Dental Machine and Appliance	Dental Material	Medical Equipment and Apparatus	Safety for Working	Other Medical Appliance and Sanitation Goods
W.	Aircraft & Aviation	General	Material for Aircraft, Standard Parts	Hull		Engine	Propeller	Measuring Instrument	Radio Communication Apparatus	Ground Facilities	Miscellaneous
X.	Information Processing	General	Method of Test and Inspection		Programming Languages	Business Graph, Japanese Languages, Documents Interchanges	OSI and LAN, Data Transmission	Output Machines and Devices, Data Mediums			OCR, POS, etc
Z.	Miscellanea Packing Welding Radioactivity	Packaging and Packing	Container, Material and Packaging Method	Miscellaneous Testing Method, Powder Metallurgy, Foundry Sand, Fungal Resistance Test	Welding	Radioactivity		Micro-graphics		Standards, Generals, Miscelaneous	Shop Management

Source: Japan Standards Association

Table 3-5 ANNUAL RECORD OF MS STANDARDS FORMULATED, REVISED AND WITHDRAWN

Year	Formulated		Revised		Withdrawn	
	Annual	Accumu.	Annual	Accumu.	Annual	Accumu.
1968					1	1
1969	1	1				
1970		1				
1971	33	34	1	1	14	15
1972	40	74		1	4	19
1973	159	233		1	19	38
1974	59	292	1	2	9	47
1975	86	378		2	15	62
1976	165	543	1	3	16	78
1977	58	601		3	3	81
1978	49	650		3	3	84
1979	46	696		3	1	85
1980	78	774		3	2	87
1981	90	864	5	8	1	88
1982	61	925	3	11		
1983	93	1,018	12	23	2	90
1984	115	1,133	12	35	1	91
1985	86	1,219	8	43		
1986	120	1,339	17	60		
1987	74	1,413	19	79		
1988	34	1,447	16	95		
1989	68	1,515	25	120		
1990	26	1,541	6	126	5	96
1991	103	1,644	23	149	133	229

Source: SIRIM

Table 3-6 NUMBER OF FOREIGN EQUIVALENT STANDARDS

Year	ISO		BS		AS		JIS		Total	
	Number	Accumulated Number	Number	Accumulated Number	Number	Accumulated Number	Number	Accumulated Number	Number	Accumulated Number
1980			20	20			1	1	21	21
1981					1	1			1	22
1982	5	5			1	2			6	28
1984			2	22					2	30
1986	3	18			1	3			14	44
1987	6	24	2	24	2	5	3	4	13	57
1988	6	30	2	26			2	6	10	67
1989	9	39	20	46	2	7	4	10	35	102
1990	1	40	5	51	1	8			7	109
1991	36	76	45	96	7	15	4	14	92	201
Total	76	76	96	96	15	15	14	14	201	201

Notes: ISO: International Organization for Standardization
BS: British Standards
AS: Australian Standards
JIS: Japanese Industrial Standards

Source: SIRIM

Table 3-7 SEMINARS HELD RELATING TO STANDARDIZATION

Seminar	Location	Period
ISO 9000-Introduction & Documentation	SIRIM HQ	Mar., Sep.
ISO 9000-Assessors/Lead Assessors Training Course	SIRIM HQ	Mar., Sep.
Course on Accreditation on Testing Labratories and Calibration Centres	SIRIM HQ	Apr., Sep.
Course on Documentation of Laboratory Quality System	SIRIM HQ	May, Oct.
Course on Conduct of Internal Quality Audits on Testing/Calibration Laboratories	SIRIM HQ	May, Oct.
Measurement Technology Seminar	*Johor Bahru* Penang SIRIM HQ	Mar. May Jun.
Measurement Technology Malaysia '92 Conference and Exhibition	Kuala Lumpur	Sep.15-17

Source: SIRIM

Table 3-8 JAPANESE INDUSTRIAL STANDARDS FORMULATED, REVISED, AND WITHDRAWN SINCE 1949

Year	Newly Formulated		Revised		Confirmed	Withdrawn	Total
	No.	Accumu.	No.	Accumu.	No.	No.	No.
1949	187	187	1	1	0	0	187
1950	867	1,054	11	12	0	2	1,052
1951	698	1,752	42	54	0	4	1,746
1952	778	2,530	71	125	117	15	2,509
1953	690	3,220	476	601	365	51	3,148
1954	450	3,670	418	1,019	351	34	3,564
1955	416	4,086	547	1,566	567	32	3,948
1956	406	4,492	763	2,329	833	86	4,268
1957	352	4,844	624	2,953	656	59	4,561
1958	375	5,219	634	3,587	890	111	4,825
1959	337	5,556	680	4,267	1,140	88	5,074
1960	321	5,877	1,015	5,282	621	140	5,255
1961	406	6,283	367	5,649	1,242	110	5,551
1962	350	6,633	350	5,999	1,114	70	5,831
1963	317	6,950	504	6,503	1,147	74	6,074
1964	277	7,227	285	6,788	2,336	100	6,251
1965	221	7,448	382	7,170	1,009	50	6,422
1966	230	7,678	341	7,511	1,744	18	6,634
1967	164	7,842	201	7,712	1,946	117	6,681
1968	226	8,068	691	8,403	1,670	84	6,823
1969	179	8,247	370	8,773	1,679	89	6,913
1970	234	8,481	441	9,214	2,353	151	6,996
1971	209	8,690	429	9,643	1,756	77	7,128
1972	179	8,869	457	10,100	1,347	58	7,249
1973	154	9,023	306	10,406	2,515	26	7,377
1974	220	9,243	623	11,029	1,953	46	7,551
1975	230	9,473	1,213	12,242	2,000	103	7,678
1976	143	9,616	1,159	13,401	792	122	7,699
1977	113	9,729	754	14,155	1,430	125	7,687
1978	188	9,917	909	15,064	2,479	131	7,744
1979	134	10,051	616	15,680	1,983	232	7,646
1980	132	10,183	398	16,078	440	107	7,671
1981	137	10,320	404	16,482	53	55	7,753
1982	156	10,476	399	16,881	767	57	7,852
1983	130	10,606	394	17,275	2,022	87	7,895
1984	160	10,766	370	17,645	1,387	124	7,931
1985	124	10,890	349	17,994	1,020	77	7,978
1986	193	11,083	344	18,338	766	61	8,110
1987	197	11,280	481	18,819	1,018	84	8,223
1988	196	11,476	496	19,315	1,401	131	8,288
1989	180	11,656	434	19,749	1,002	54	8,414
1990	174	11,830	402	20,151	606	211	8,377
1991	147	11,977	446	20,597	932	165	8,359
Total	11,977		20,597		49,433	9,618	–

Note: Number of JIS formulated during 1949 and 1954 includes insertion 1,268 from JES.
Source: Japan Standards Association

Table 3-9 JAPANESE INDUSTRIAL STANDARDS FORMULATED, REVISED, AND WITHDRAWN DURING THE FISCAL YEAR 1991

JIS Divisions	Number of JIS Newly Formulated	Number of JIS Revised	Number of JIS Withdrawn	JIS in Force as of Mar. 31, 1992	Ratio (%)
A. Civil Engineering and Architecture	11	33	11	532	6
B. Mechanical Engineering	15	58	2	1,313	16
C. Electronic and Electrical Engineering	12	91	43	792	9
D. Automotive Engineerin	3	13	3	343	4
E. Railway Engineering	0	22	3	218	3
F. Shipbuilding	4	5	0	532	6
G. Ferrous Materials and Metallurgy	2	25	5	321	4
H. Non-Ferrous Metals and Metallurgy	11	12	1	393	5
K. Chemical Engineering	22	31	7	1,561	19
L. Textile Engineering	6	55	8	308	4
M. Mining	0	4	9	211	3
P. Pulp and Paper	0	1	0	95	1
R. Ceramics	2	24	8	241	3
S. Domestic Wares	6	22	38	237	3
T. Medical Equipment and Safety Appliances	5	9	1	290	3
W. Aircraft and Aviation	6	0	19	94	1
X. Information Processing	21	8	5	191	2
Z. Miscellanea (Packing, Welding, Radioactivity)	21	33	2	687	8
Total	147	446	165	8,359	100

Table 3-10 NUMBER OF STANDARDS OF MS AND JIS/JAS

MS			JIS & JAS		
a. Building & Civil Engineering	154	9%	A. Civil Engineering & Architecture	532	11%
b. Electro-technical	219	13%	C. Electronic & Electrical Engineering	792	16%
c. Mechanical	231	14%	B. Mechanical Engineering	1,313	26%
d. Foodstuffs & Agriculture	240	15%	JAS Agricultural Stuff	393	8%
e. Chemical & Pharmaceutical	502	30%	K. Chemical Engineering	1,561	31%
f. Consumer Products	286	17%	S. Domestic Wares	237	5%
g. Information Technology	19	1%	X. Information Processing	191	4%
Total	1,651	100%	Total	5,019	100%

Sources: MS: SIRIM JIS/JAS: Japan Standards Association

Table 3-11 CRITERIA FOR DIFFERENTIATION OF JIS AND JASO

1. In the automobile sector basic thinking follows the same lines as in our general model; standards are classified into in-house standards, group standards and national standards and to realize the most effective standardization results these must be closely linked and harmonized. The JIS and JASO work together in accordance with the above thinking.

Naturally the Automobile Technical Association actively participates in the JIS standard drafting commissioned by the Industrial Technical Academy. Further those JASO developed independently by the Automobile Technical Association which are considered appropriate are made into JIS, and every opportunity is taken to propose such JIS creations which reinforce the JIS framework.

2. Criteria for Differentiation of JIS and JASO

2.1 Items suited as JIS, are items mentioned in (1) below which satisfy the conditions laid down in (2) below

(1) Standard aspects which require JIS definition

(a) The terminology, codes, labeling methods, installation details, operating direction of basic or *fundamental chassis structures.*

(b) Testing and measuring methods used to evaluate the performance of automobiles, their equipment and functional parts or products related to automobiles.

(c) The required quality parameters (including form and dimensions) of interchangeable automobile parts which need quality guarantees.

(d) The required quality parameters (including form and dimensions) of parts used widely in other sectors as well as in the automobile industry.

(e) The required quality parameters (not including form or dimensions) of parts required by automobile users or repair shops in order to assure the safety and public hygiene.

(f) Required quality parameters, testing methods and measuring methods for materials.

(2) Additional Conditions for JIS definition

(a) Standardization will be further promoted by the use of these standards outside of the automobile sector.

(b) It is expected that fundamental modifications will not be required in the immediate future.

(c) The standard details match the required conditions for JIS.

(d) The standard is close to international standards in terms of the levels established.

2.2 Items which can be Defined as JIS in some cases

These are parts which do not fall under any of the above groups but which can be considered for promotion JIS especially in the case of JASO meeting the following conditions,

(a) Promotion to JIS is highly likely in the case of items required by society at large or which are emphasized in national policies.

(b) Those items where it is judged appropriate for the sector to employ the JIS marking system.

(c) Items requiring the additional authority of JIS for the reasons of export overseas or internal legal regulations.

2.3 Items Appropriate for JASO Definition

Are items which do no meet with the conditions laid down in section 2 above, and in particular it is advisable for standards to be defined by JASO even if they meet with the conditions laid down in 2.1(1) above if the following conditions are also true.

(a) Standard aspects of the existing JIS specifically limited to use in the automobile sector which are to be even further limited to the automobile sector over and above the JIS limitation.

(b) Standard aspects which are to be limited, modified or added as particularly for automobile use over and above the existing JIS specifically limiting to use to the automobile sector.

(c) Those which are in the stages of technical development or which require a trial period, and for which JIS definition is considered premature.

(d) Those standards which do not have uniformity in present conditions and where implementation of standard definition will require a certain amount of time (this is also true in the case of the introduction into the country of international standards).

Source: JSAE

Table 3-12 ELECTRIC PRODUCTS MANDATORY CERTIFICATION ITEMS AND APPLICABLE STANDARD

Items	Applicable Standard
1. Plug tops and multiway adaptors	MS 589: 1987
2. Switches	MS 616: 1990
3. Socket outlets	MS 589: 1987
4. Lampholders	BS 5042: Pt.4: 73
5. Ceiling roses	MS 770: 1982
6. Bayonet caps	MS 769: 1982
7. Fluorescent lamp fittings excluding tubes if imported separately	MS 619: Pt.1: Sec.1 to 15: 1982
8. Capacitors for fluorescent lamps	MS 279: 1983
9. Ballast for fluorescent lamps	MS 141: 1973
10. Circuit breakers including current-operated earth leakage	MS 1139: 1989
Circuit breakers and miniature circuit breakers	BS 3871: 1965
11. Instantaneous water heater including heating elements if imported separately	MS 472: Pt.3: Sec.3.1: 1986
12. Hand operated hair dryers	BS 3456: Pt.3: Sec.3.13
13. Table lamps having accessible metal parts	MS 619: Pt.2: 1983
14. Electric kettles including heating elements if imported separately	MS 472: Pt.3: Sec.3.1: 1986
15. Electric smoothing iron	MS 619: Pt.2
16. Electric shavers	BS 3456: Pt.3: Sec.3.15
17. Food mixers/blenders	BS 3456: Pt.3: Sec.3.12
18. Immersion water heaters and including storage water heaters	BS 3456: Pt.101 & 102: Sec.102.21
19. Hi Fi sets	MS 72: 1983
20. Mosquito matt vaporizers	BS 3456: Pt.101 & 102
21. Toasters	MS 742: Pt.1: 1976 & Pt.2: Sec.2.2: 1977
22. Table fans	MS 139: 1973
23. Televisions	MS 72: 1983
24. Vacuum cleaners	MS 72: 1973
25. Video players	MS 72: 1973
26. Washing machines	BS 3456: Pt.102: Sec.102.7: 1988
27. Refrigerators	BS 3456: Pt.102: Sec.102.24: 1984
28. Rice cookers	MS 472: Pt.2: Sec.2.9: 1983 & Pt.1: 1976

Source: SIRIM

Table 3-13 AUTOMOBILE SAFETY PARTS MANDATORY CERTIFICATION ITEMS AND APPLICABLE STANDARD

	Items	Applicable Standard
1.	Protective helmets for motorcyclists	MS 1: 1969
2.	Safety seat belt for motorists	MS 1175: 1989
3.	LPG fuel systems in internal combustion engines	MS 775: 1982

Source: SIRIM

Table 3-14 TREND OF PRODUCT CERTIFICATION

	1989	1990	1991	1992 (As of May)	1992 (Projected)
Accumulated Number of Licenses Issued	679	735	823	845	886
Accumulated Number of License Approved Factories	340	386	417	423	450

Source: SIRIM

Table 3-15 NUMBER OF ISSUED LICENSES BY INDUSTRY

	No. of Issue	Ratio (%)
Electric/Electronic	268	32
Machinery Industry	143	17
Civil Engineering	173	20
Chemical/Agriculture	186	22
Food	66	8
Medicines	9	1
Total	845	100

Source: SIRIM

Table 3-16 NUMBER OF LICENSES ISSUED UNDER MANDATORY CERTIFICATION

	No. of Issue	Ratio (%)*
Electric/Electronic	226	84.33
Machinery Industry	34	23.78
Civil Engineering	13	7.51
Chemical/Agriculture	0	0.00
Food	0	0.00
Medicines	0	0.00
Total	273	32.31

Note: * Ratio shows % of the number of licenses issued under mandatory certification against total number of licenses issued, including those under voluntary certification given in Table 3-15.

Source: SIRIM

Table 3-17 NUMBER OF ISSUED LICENSES BY AREA

	No. of Issue	Ratio (%)
Kelantan	5	0.59
Perlis	4	0.47
Kedah	17	2.01
Penang	89	10.53
Terengganu	3	0.36
Perak	77	9.11
Pahang	11	1.30
Selangor	394	46.63
W.P.	94	11.12
N.S.	12	1.42
Melaka	6	0.71
Johor	96	11.36
Sabah	8	0.95
Sarawak	29	3.43
Total	845	100.00

Source: SIRIM

Table 3-18 INSPECTION FOR FOREIGN AGENCIES (PROJECTED)

	1990	1991	1992	1993	1994	1995
Number of Factories	28	153	174	180	190	200

Source: SIRIM

Table 3-19 NUMBER OF JIS MARK LICENSE APPROVED FACTORIES BY INDUSTRY

Sectors	1965		1975		1988	
	Number	%	Number	%	Number	%
A. Civil Engineering & Architecture	1,523	17.8	4,789	39.3	8,945	56.0
B. Mechanical Engineering	1,189	13.9	1,093	9.0	974	6.1
C. Electronic & Electrical Engineering	898	10.5	1,089	8.9	1,112	7.0
D. Automotive Engineering	262	3.1	327	2.7	259	1.6
E. Railway Engineering	95	1.1	69	0.6	47	0.3
F. Shipbuilding	7	*	3	*	2	*
G. Ferrous Materials & Metallurgy	783	9.1	1,013	8.3	1,034	6.5
H. Non-ferrous Materials & Metallurgy	131	1.5	327	2.7	394	2.5
K. Chemical Engineering	1,418	16.5	1,358	11.1	1,253	7.8
L. Textile Engineering	323	3.8	244	2.0	181	1.1
M. Mining	78	0.9	68	0.6	23	0.1
P. Pulp & Paper	65	0.8	58	0.5	75	0.5
R. Ceramics	472	5.5	416	3.4	399	2.5
S. Domestic Wares	740	8.6	749	6.1	672	4.2
T. Medical Equipment & Safety Appliances	15	0.2	53	0.4	80	0.5
W. Aircraft & Aviation	11	0.1	2	*	1	*
X. Information Processing	–	–	–	–	2	*
Z. Miscellaneous	564	6.6	531	4.4	520	3.3
Total	8,574	100.0	12,189	100.0	15,973	100.0

Notes: 1) Mark * devites less than 0.1%.
2) The above figures show only the number of licenses issued by the Ministry of Industry.

Source: AIST

Table 3-20 TREND OF ASSESSMENT AND REGISTRATION OF QUALITY SYSTEM (ARQS)

	1988	1989	1990	1991	1992 (End-May)
Number of Factories	5	10	11	36	18
Accumulated No.	5	15	26	62	80

Source: SIRIM

Table 3-21 REGIONAL DISTRIBUTION OF REGISTERED FIRMS UNDER ARQS

Region	No. of Factories	Ratio (%)
North	14	17.5
Central	35	43.8
South	19	23.7
East Coast	3	3.8
East Malaysia	9	11.2
Total	80	100.0

Source: SIRIM

Table 3-22 DISTRIBUTION OF REGISTERED FIRMS UNDER ARQS BY INDUSTRY

Industry	No. of Factories	Ratio (%)
Civil Engineering & Architecture	7	8.8
Electronic and Electrical Engineering	12	15.0
Mechanical and Automotive Engineering	26	32.5
Chemical, Plastics Processing	26	32.5
Services	1	1.2
Food & Agriculture	8	10.0
Total	80	100.0

Source: SIRIM

Table 3-23 COMPARISON OF ISO 9002, THE JIS MARK AND SIRIM PRODUCT CERTIFICATION SYSTEMS (1)

		ISO/JIS	SIRIM Product Certification System
4	Quality System Requirement		
4.1	Managers responsibilty		
4.1.1	Quality policy	1. ISO: Requires records to be made throughout the company. JIS: Unit of factory is acceptable.	Requires preparation of a qulaity program for products to be certified.
4.1.2	Organization		
(1)	Responsibility and authority	1. ISO: Treated as "responsibility, authority and interaction". JIS: "Responsibility and authority" are regulated but interaction is not.	Company's organization chart to be affixed.
(2)	Verification resources and personnel	1. ISO: Indicates assignments of experienced persons. JIS: Indicates experience of entire factory. 2. ISO: Design review required for design and also installation and after-service. JIS: Nothing required.	1. Requires experienced personnel as quality officers. 2. Quality supervision is recorded, but nothing about the pointing of the supervisors.
(3)	Management representative	1. ISO: Comprehensive expression, as "Requirements for International Standards". JIS: Specific Regulation for job descriptions.	No requirements of assigning a quality officer who has responsibility for the final product.
4.1.3	Management reviews	1. ISO: Clearly stated. JIS: Comprehensively stated (Implementation equal to ISO).	Review is regulated, but not of the interval between reviews or keeping of records of reviews.
4.2	Quality system	1. ISO: Comprehensively expressed as "Requirements for international standards". JIS: Not individually regulated. 2. ISO: Design included. JIS: Design not regulated.	Included within quality control but there is no expression of establishment of quality systems.
4.3	Contract review	1. JIS: No applicable regulation. (In case of certification according to a national standard confirmation of contract review can be dispensed with.)	Not regulalted (Same as at left).
4.4	Document control		
4.4.1	Document approval and issue	1. ISO: Design related documents are subject to approval. JIS: No regulation of design-related documents. 2. JIS: Comprehensively expressed.	Notification to SIRIM needed at time of change, otherwise no special regulation.
4.4.2	Document changes/notification	1. ISO: Contents of regulation are concrete. JIS: Comprehensively expressed.	Same as above.

Table 3-23 COMPARISON OF ISO 9002, THE JIS MARK AND SIRIM PRODUCT CERTIFICATION SYSTEMS (2)

		ISO/JIS	SIRIM Product Certification System
4.5	Purchasing	1. ISO: Dirstinction is made between materials and outside orders. JIS: Outside orders are forbidden for some processes. 2. ISO: Mention is made of preliminary evaluation of vendors. 3. JIS: Contents of purchase order not indicated. 4. JIS: No Regulations .	Detailed regulations regarding acceptance of raw materials but nothing is written regarding evaluation of subcontractors.
4.6	Purchaser-supplied product	Nothing comparable.	Specifically regulated upon purchasing of raw material.
4.7	Product identification and traceability	Nothing comparable.	Regulated as a Scheme of Supervision and Control.
4.8	Process control	1. ISO: Equipment can be installed on the basis of judgement by the supplier. JIS: Equipment name specified. 2. JIS: No regulation concerning installation process. 3. JIS: No distinction between general/specific processes.	Comprehensive regulations as implementation of quality control according to Scheme of Supervision and Control, and Basic Factory Informatin Form.
4.9	Inspections and testing	1. JIS: No regulation when using goods brought in under emergency conditions.	Included in Scheme of Supervision and Control and Basic Factory Information From. No specific regulations of acceptance inspection.
4.10	Inspection, measuring and testing equipment	1. ISO: Details a – j. JIS: Comprehensive and long-term (equipment selection criteria indicated).	Regulation in Scheme of Supervision and Control.
4.11	Inspection and test status	1. JIS: Comprehensively expressed (in practice equal to ISO).	Same as above.
4.12	Control of non-conforming products	1. JIS: Same as above.	Same as above.
4.13	Corrective action	Nothing comparable.	Same as above. More comprehensively expressed than in ISO.
4.14	Handling, storage, packaging & delivery	1. JIS: No regulation regarding delivery.	Treated in Scheme of Supervision and Control; there are questions regarding storage and packaging. Nothing recorded for delivery.
4.15	Quality records	1. ISO: More concretely expressed than in JIS.	Regulated in Scheme of Supervision and Control.
4.16	Internal quality audits	1. JIS: Done through in-house rules.	There is an item on conditions of inplementation of quality control in the Basic Factory Information Form.
4.17	Training	1. ISO: Requires certification of qualification of persons engaged in specific lines of work.	Rules require to assign an experienced employee to posts of quality officers.
4.18	Statistical method	Nothing comparable.	Covered by the item for quality control implementation in the Basic Factory Infromation Form.

Table 3-24 CRITERIA FOR SIRIM INSPECTOR

Criteria	ISO	SIRIM
Level of Education	- Completed tertiary education	- Completed higher education in the fields of: Science Engineering Technology Manufacturing Construction Maintenance Services Administration Economics
Training	- Knowledge and understanding of the standards - Assessment techniques - Managing an audit	- Same as ISO
Experiences		
Auditor Candidate	- Minimum of four years full time working experiences - At least two years of quality assurance acitivities	- Same as ISO
Trainee Auditor	- A minimum of 4 audits for a total of 20 days	
Auditor		- Those who are qualified for above conditions.
Lead Auditor	- At least 3 complete audits as a qualified auditor	- Same as ISO
Personal Attributes	- Qualification with: React with sensitivity to audit is performed. Perform audit process Commit full attention and support React effectively in stressful situations Arrive at acceptable conclusion Remain true to a conclusion	- Same as ISO

Source: SIRIM

Table 3-25 PROJECTED NUMBER OF APPLICATION, APPROVAL AND LICENSES ISSUED (ARQS)

	1992	1993	1994	1995	1996	1997	1998	1999	2000
No. of Application	100	200	200	200	200	200	200	200	200
No. of Approval Granted	*40*	*80*	*160*	*160*	*160*	*160*	*160*	*160*	*160*
No. of Licenses Issued (Accumu.)	100	180	340	500	600	820	980	1,140	1,300

Note: Estimated by JICA Team

Table 3-26 REQUIRED NUMBER OF QS AUDITORS

	1992	1993	1994	1995	1996	1997	1998	1999	2000
No. of Auditors	6	11	22	27	33	39	45	50	56

Note: Estimated by JICA Team

Table 3-27 PROJECTED NUMBER OF APPLICATION, APPROVAL AND LICENSES ISSUED (PRODUCT CERTIFICATION)

	1992	1993	1994	1995	1996	1997	1998	1999	2000
No. of Application									
– Product Certification	*200*	*200*	*200*	*200*	*200*	*200*	*200*	*200*	*200*
– Factories	100	100	100	100	100	100	100	100	100
No. of Approval Granted	40	80	160	160	160	160	160	160	160
– Product Certification	160	160	160	160	160	160	160	160	160
– Factories	80	80	80	80	80	80	80	80	80
Accumulated No.									
– Product Certification	960	1,120	1,280	1,440	1,600	1,760	1,920	2,080	2,240
– Factories	480	560	640	720	800	880	960	1,040	1,120

Note: Estimated by JICA Team

Table 3-28 REQUIRED NUMBER OF FACTORY INSPECTORS

	1992	1993	1994	1995	1996	1997	1998	1999	2000
No. of Inspectors	21	24	27	30	33	35	38	41	44

Note: Estimated by JICA Team

Table 3-29 REQUIRED NUMBER OF FACTORY INSPECTORS BY PROFESSIONAL FIELD

	1992	1993	1994	1995	1996	1997	1998	1999	2000
No. of Inspectors	21	24	27	30	33	35	38	41	44
Electric Engineering	7	8	9	10	11	12	13	14	15
Machinery	4	5	5	6	6	6	7	7	8
Civil Engineering	5	5	6	7	7	8	8	9	9
Chemical Engineering	5	6	6	7	8	8	9	10	10
Food Processing	2	2	3	3	3	3	4	4	4
Medical Engineering	1	1	1	1	1	1	1	1	1
Total	24	27	30	34	36	38	42	45	47

Note: Estimated by JICA Team

Table 3-30 QUALITY MANAGEMENT TRAINING COURSE FOR QUALITY SYSTEM AUDITORS (PROPOSED)

1st Day	Industry Standardization	Basic of Quality Management (1)
2nd day	Basic of Quality Management (2) Collection of Data	Analysis of Data (1) Exercise
3rd Day	Analysis of Data (2)	Analysis of Data (3) Exercise
4th Day	How to make and observe Control Chart (1)	How to make and observe Control Chart (2) Exercise
5th Day	Analysis and Improvement of Manufacturing Process	How to make and observe Control Chart (3) Exercise
6th Day	Process Control	Inspection and Sampling Test (1)
7th Day	Inspection and Sampling Test (2)	Summary of In-house Standardization
8th Day	Theory of In-house Standardization	Theory of In-house Standardization (3)
9th Day	Promotion of TQC Activity (1)	Promotion of TQC Activity (2) (QC Circle)
10th Day	Case Study	Preparation for Application for Registration Written Exercise

Table 3-31 TRAINING PROGRAM FOR NEWLY RECRUITED PERSONNEL (AUDITORS/ASSESSORS)

First Year	Training I (3 months)	Education and training focusing on the ARQS system, outline of the Certification System, Approval procedures, general aspects of the SIRIM's role, SIRIM philosophy, inspection etiquette, practical aspects of factory inspection. In conjunction with the above evaluation of candidate suitability is to be carried out.
	Training II (3 months)	Trainees will participate in the follow up inspections forming part of the product Certification System under the supervision of experienced factory inspectors. This course aims at achieving an understanding of the main points of factory inspection.
	Training III (3 months)	Trainees will carry out the follow up inspections forming part of the Certification System under the supervision of experienced factory assessors. The aim of the course is the assimilation of factory inspection expertise.
	Training IV (3 months)	Trainees will carry out certification tests of finished products under the supervision of experienced testing personnel at the Technical Service Division. The aim f the course is to gain understanding of actual product testing and through this to grasp the detailed aspects of product standards.
Second Year	Field Training I (6 months)	Trainees will carry out the follow up inspections forming part of the Product Certification Systems by themselves.
	Training V (3 months)	Trainees will participate in the follow up inspections forming part of the ARQS System under the supervision of experienced factory assessors. This course aims at achieving an understanding of the main points of factory assessment.
	Training VI (3 months)	Trainees will carry out the follow up inspections forming part of the ARQS System under the supervision of experienced factory assessors. The aim of the course is the assimilation of factory assessment expertise.
Third Year	Field Training II (6 months)	Trainees will carry out the follow up inspections forming part of the ARQS System by themselves.
	Training VII (3 months)	Trainees will participate in the initial factory assessment forming part of the Product Certification system under the supervision of experienced factory assessors The aim of the course is to gain an understanding of the main points of such factory assessment.
	Training VIII (3 months)	Trainees will carry out the initial inspections forming part of the Product Certification System under the supervision of experienced factory assessors. The aim of the course is the assimilation of factory assessment expertise.
Forth Year	Field Training III (6 months)	Trainees will carry out the initial factory inspections forming part of the Product Certification System as one of members of inspection team.
	Training IX (3 months)	Trainees will carry out the factory assessment inspections forming part of the ARQS system under the supervision of experienced factory assessors. The aim of this course is to assimilate the expertise of such factory assessment.
	Training V (3 months)	Trainees sill carry out the initial factory inspection part of the ARQS System as one of members of inspection team.

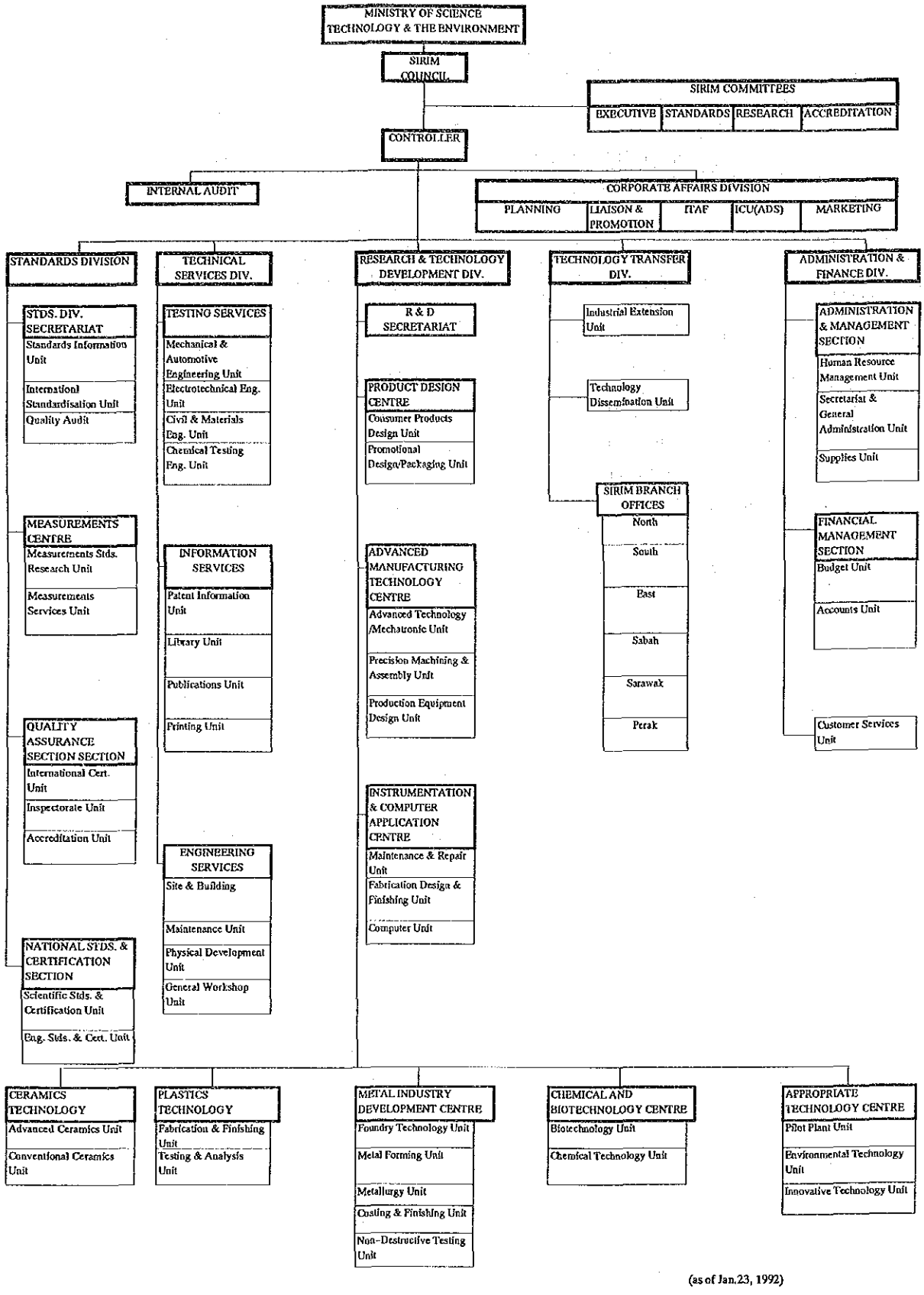
Table 3-32 TRAINING PROGRAM FOR NEWLY RECRUITED PERSONNEL (FACTORY INSPECTORS)

First Year	Training I (3 months)	Education and training focusing on the AROS system, outline of the Certification System, Approval procedures, general aspects of the SIRIM's role, SIRIM philosophy, inspection etiquette, practical aspects of factory inspection. In conjunction with the above evaluation of candidate suitability is to be carried out.
	Training II (3 months)	Trainees will participate in the follow up inspections forming part of the Product Certification System under the supervision of experienced factory inspectors. This course aims at achieving an understanding of the main points of factory inspecting.
	Training III (3 months)	Trainees will carry out the follow up inspections forming part of the Product Certification system under the supervision of experienced factory inspectors. The aim of the course is the assimilation of factory inspection expertise.
	Training IV (3 months)	Trainees will carry out certification tests of finished products under the supervision of experienced testing personnel at the technical services division. The aim of the course is to gain understanding of actual product testing and through this to grasp the detailed aspects of product standards.
Second Year	Field Training I (6 months)	Trainees will carry out the follow up inspections forming part of the Product Certification Systems by themselves.
	Training V (3 months)	Trainees will participate in the initial factory inspections forming part of the Product Certification system under the supervision of experienced factory inspectors. This course aims at achieving an understanding of the main points of factory inspection.
	Training IV (3 months)	Trainees will carry out the initial factory inspections forming part of the Product Certification system under the supervision of experienced factory inspectors. The aim of the course is the assimilation of factory inspection expertise.
Third Year	Field Training II (6 months)	Trainees will carry out the initial factory inspections forming part of the Product Certification System as one of members of inspection team.

Table 3-33 MAJOR ITEMS DELIVERED TO THE GOVERNMENT AND PUBLIC ORGANIZATIONS

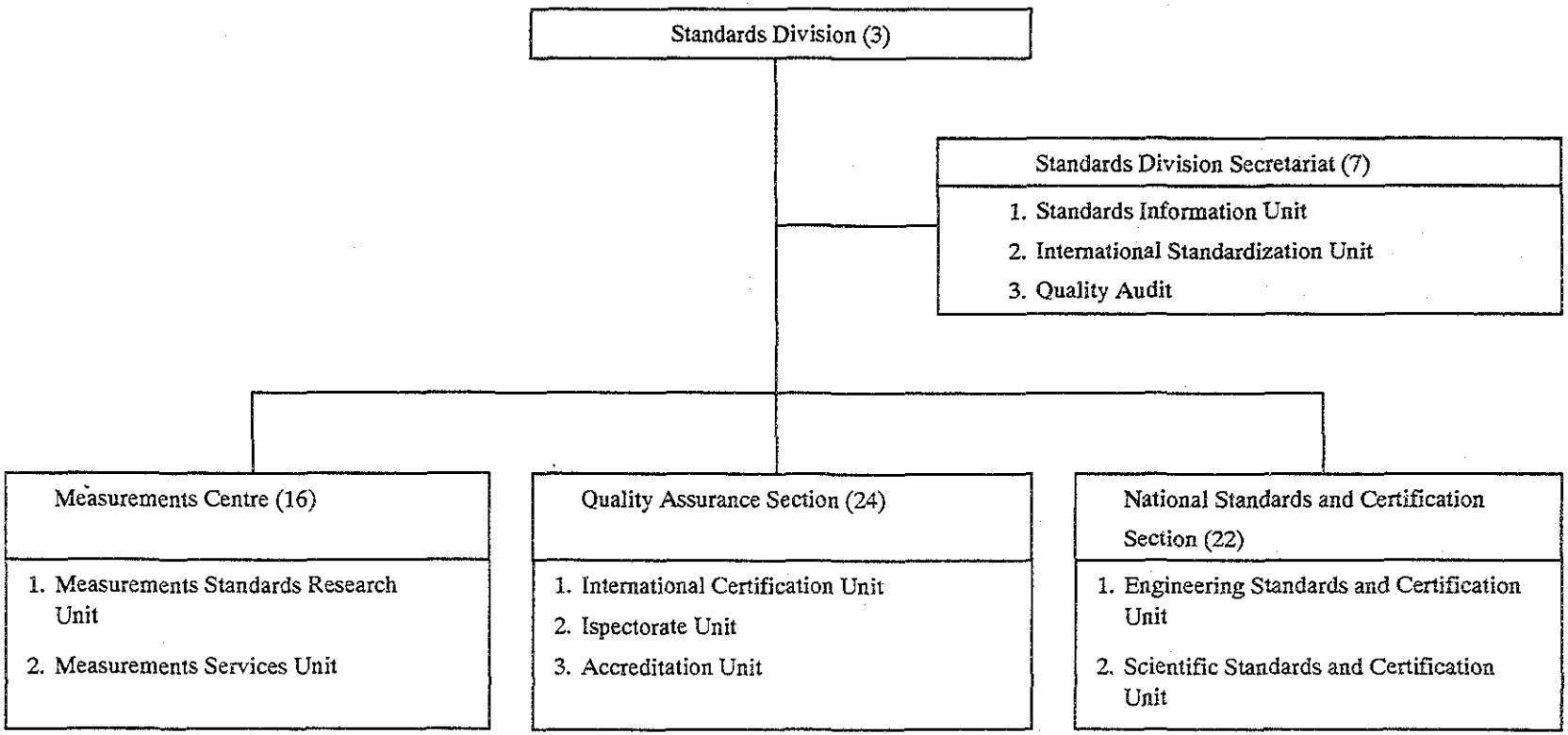
Office Table (Steel)	Security Helmet
Office Chair (Steel)	Safety Vehicle Helmet
Office Filing Cabinet (Steel)	Loading Safety Helmet
Office Book Shelf (Steel)	Electricity Safety Helmet
Office Rocker (Steel)	Ruled Paper
Office Card Cabinet (Steel)	Envelopes
Fireproofing Safe and Filing Cabinet	Toilet Paper
Book Shelf (Steel)	Stapler
Bicycle	Stapler Cartridges
Office Furniture (Wood)	Glue for Office Use
Blackboard (Wood)	Office Sheets

Figure 3-1 SIRIM ORGANIZATION CHART



(as of Jan.23, 1992)

Figure 3–2 ORGANIZATION CHART OF THE STANDARDS DIVISION OF SIRIM



Note: Figures in the parentheses show the number of senior staff, 1992.

Figure 3-3 PROCEDURE FOR STANDARDS DEVELOPMENT

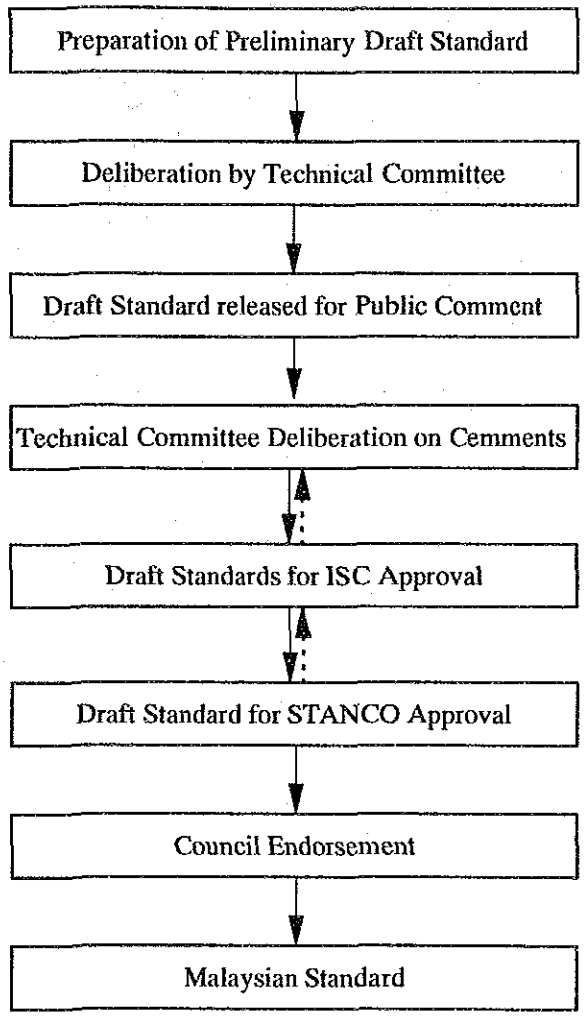


Figure 3–4 COMPOSITION OF TECHNICAL COMMITTEES

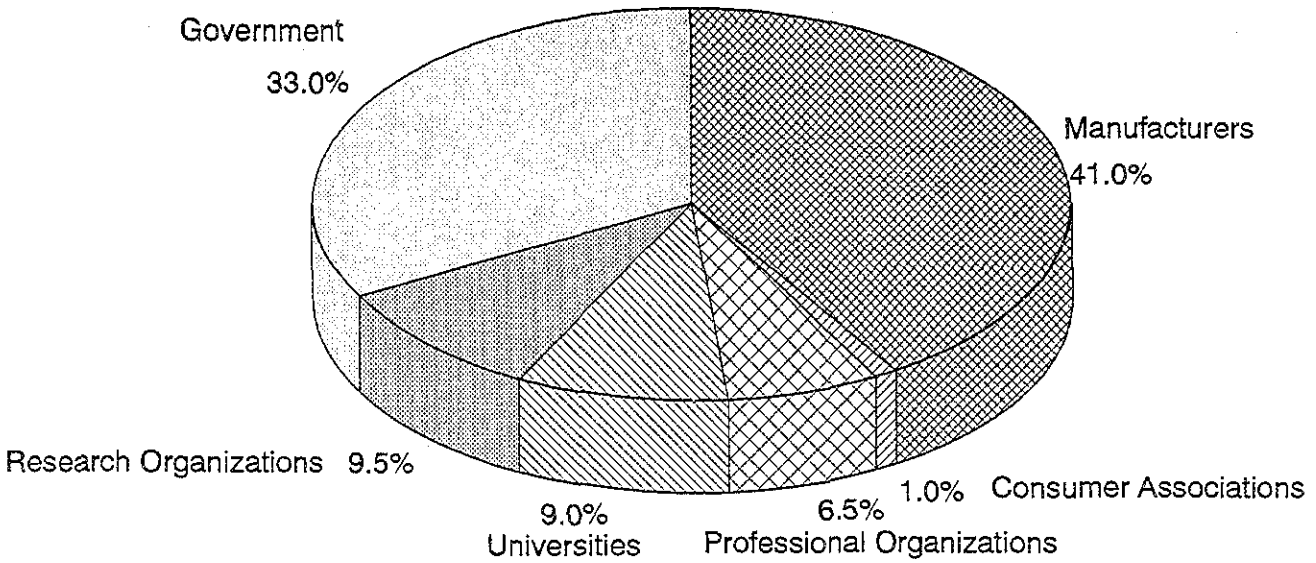


Figure 3–5 NUMBER OF FORMULATED AND REVISED MS STANDARDS

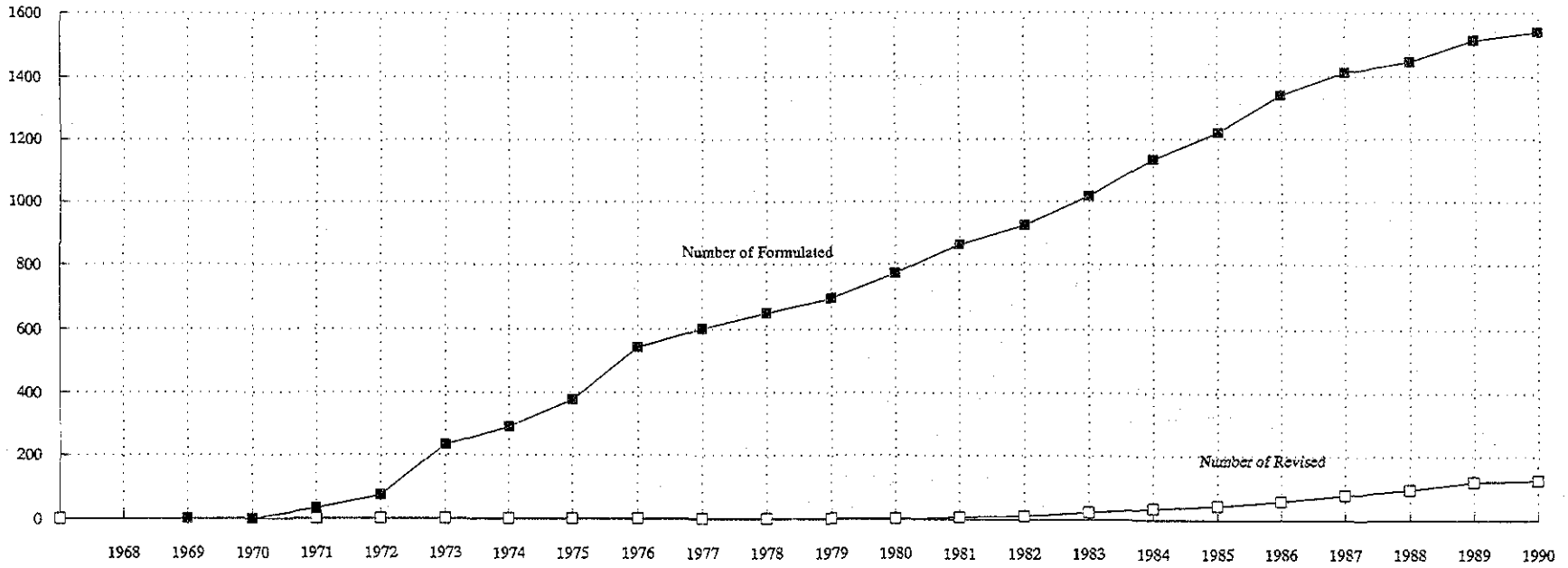


Figure 3-6 NUMBER OF FORMULATED AND REVISED JIS

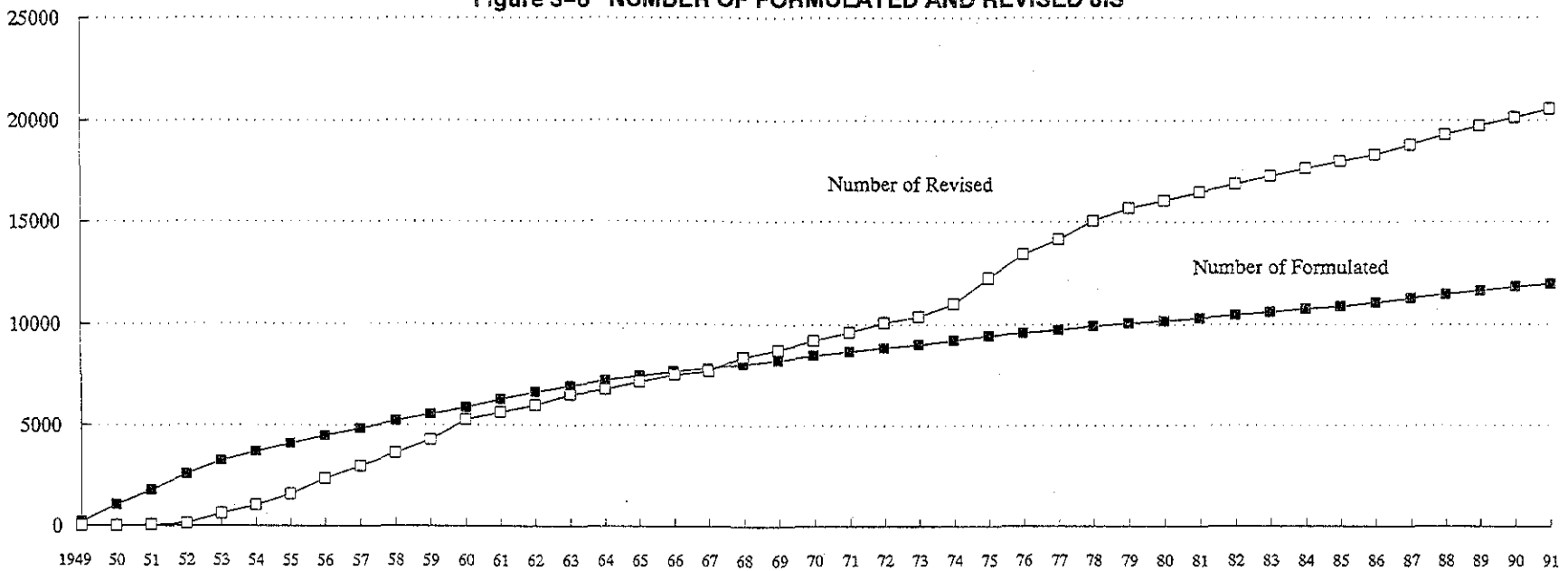


Figure 3-7 CLASSIFICATION OF MS STANDARD

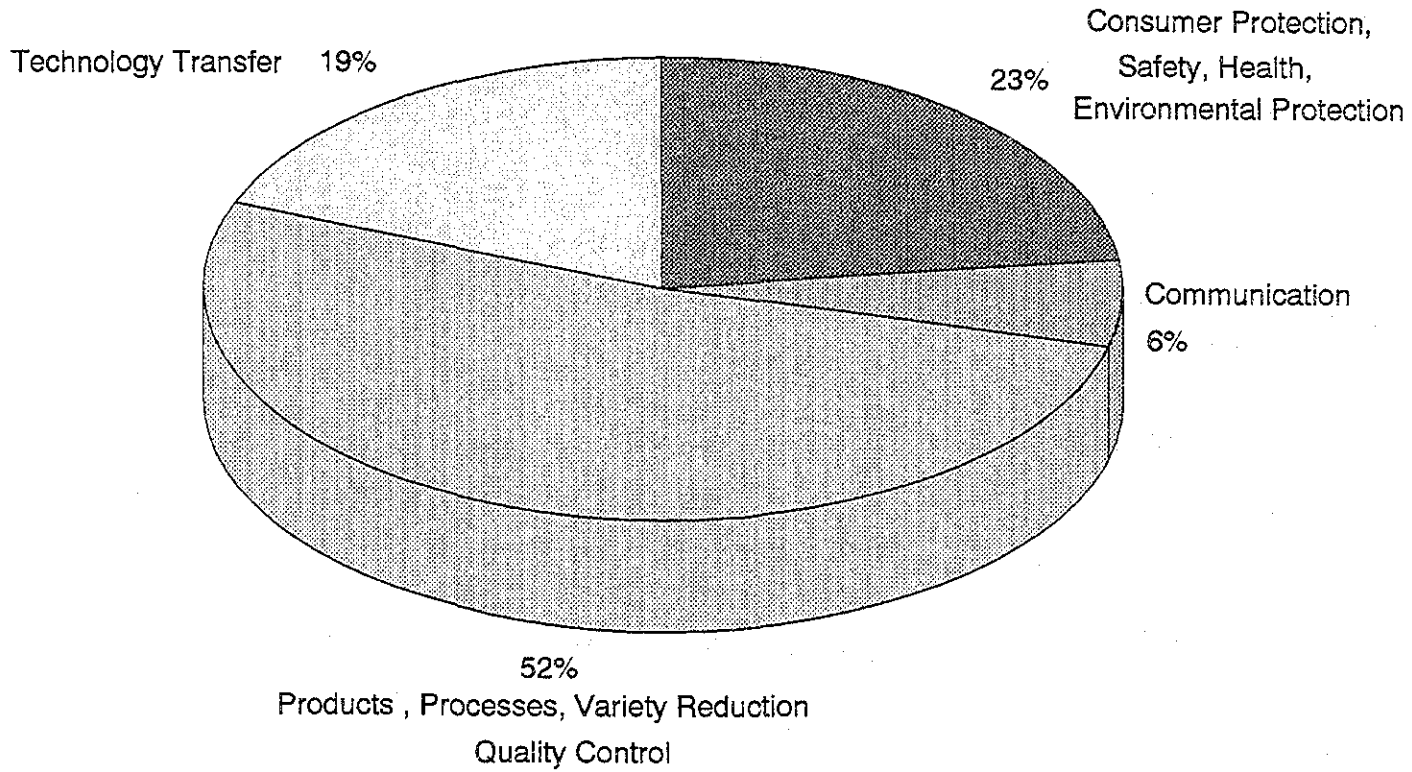


Figure 3-8 ORGANIZATION OF JISC

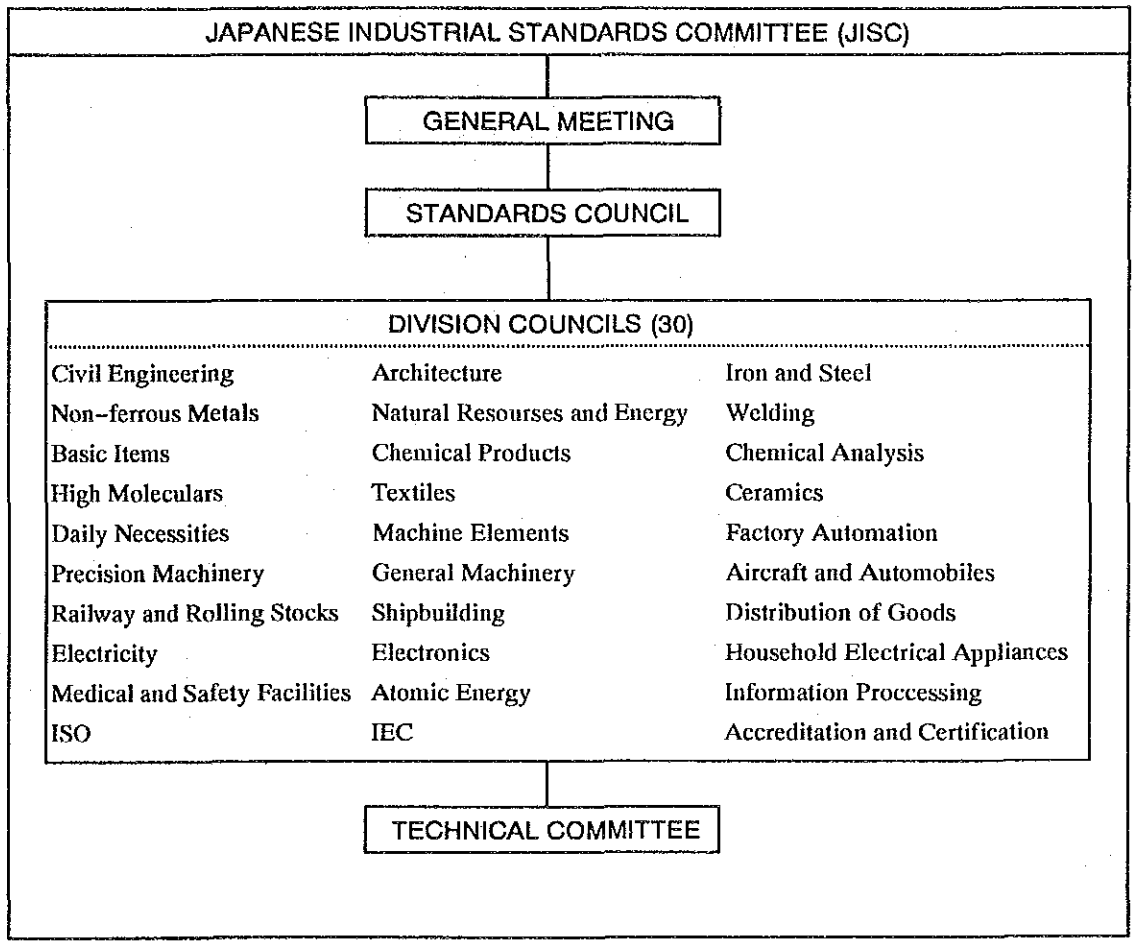


Figure 3-9 SYSTEM OF STANDARDIZATION ACTIVITIES

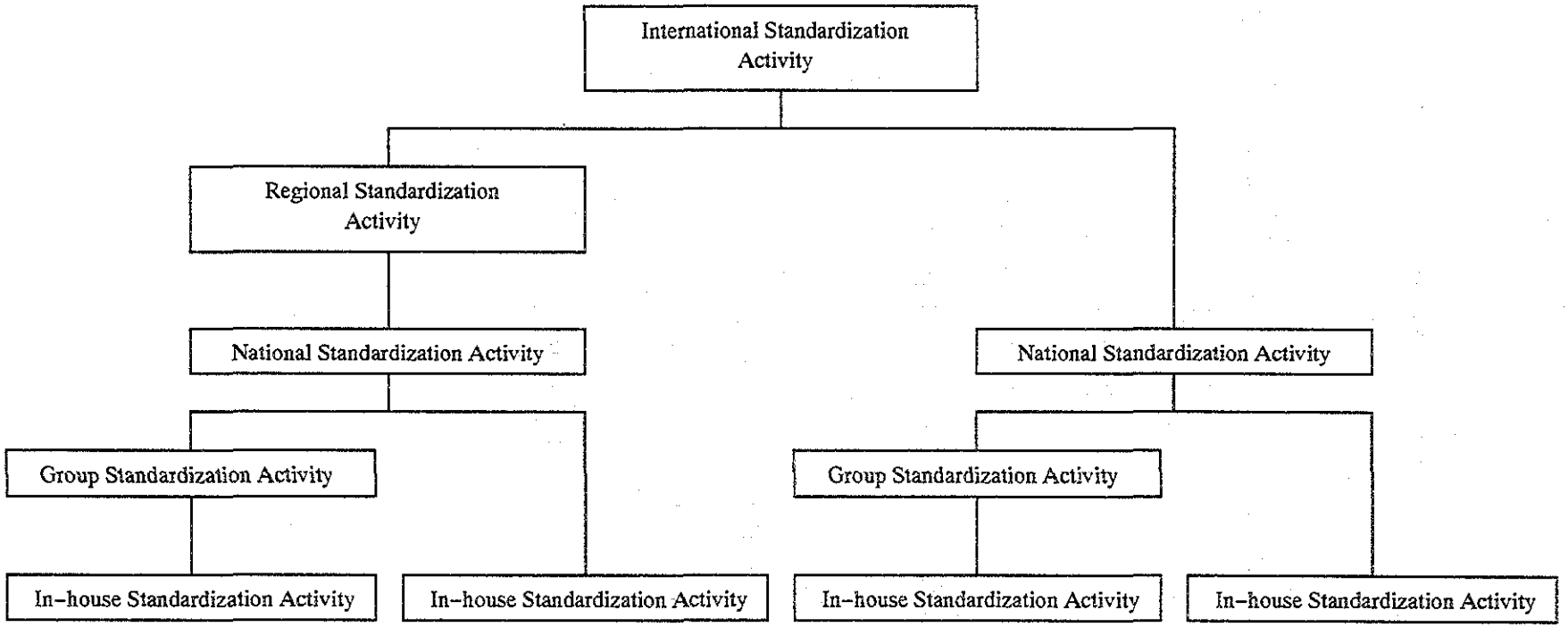


Figure 3-10 APPLICATION PROCEDURE FLOWCHART OF VOLUNTARY PRODUCT CERTIFICATION

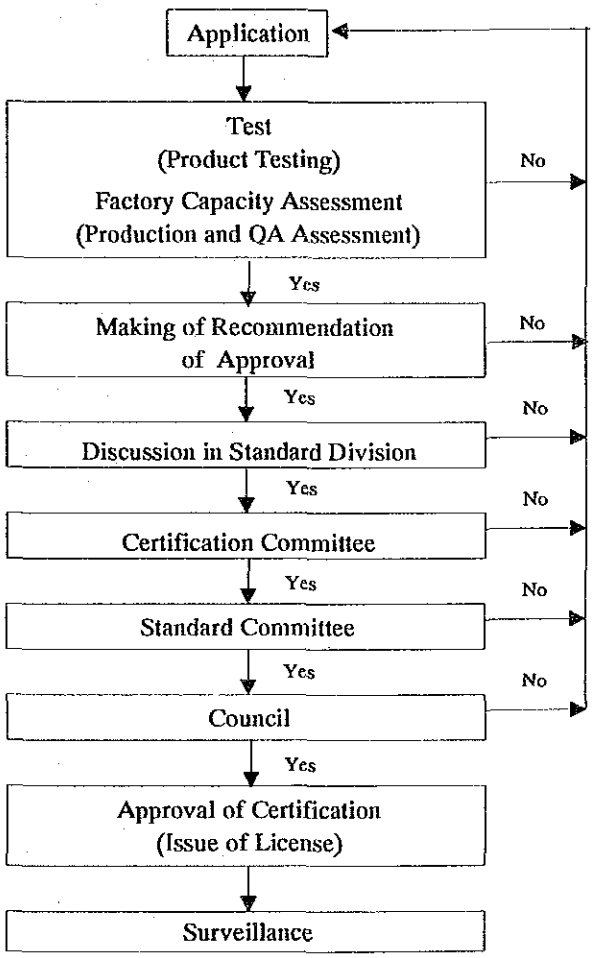


Figure 3-11 SIRIM PRODUCT CERTIFICATION MARK

MS...

The MS mark is to be used for a product certified by SIRIM complying with an MS and an acceptable quality system. The Malaysian standard number and year have to be stated.

BS...

The Certified Mark is to be used for a product certified by SIRIM complying with a foreign standard and an acceptable quality system. The foreign standard number and year have to be stated.

MS...

The Safety Mark is to be used for a product certified by SIRIM complying with a Malaysian Safety Standard and an acceptable quality system. The Malaysian Safety Standard number and year have to be stated.

Figure 3-12 CONTROL LABEL

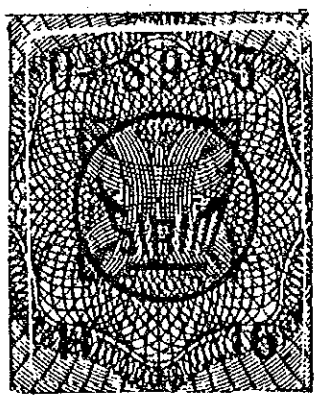
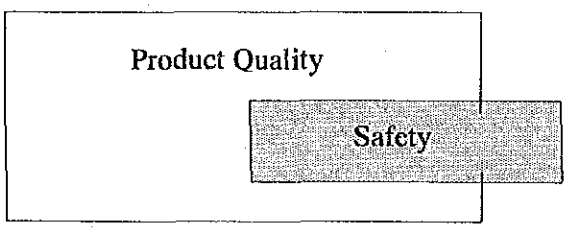


Figure 3-13 INTERRELATION OF MS AND NEW SAFETY PRODUCT MARK

Case 1: MS standards encompassing all items of requirements for safety

Case 2: MS standards encompassing some items of requirements for safety



Case 3: MS standards encompassing no item of requirements for safety

4. Enhancement of Testing and Metrology in relation to Industrial Standardization

4.1 Testing and Inspection System

4.1.1 Outline of Current Testing and Inspection Systems

SIRIM is the implementing body for the testing and inspection systems for industrial products relevant to the certification system, except for the three fields entrusted to the Rubber Research Institute of Malaysia (RRIM) for the testing of rubber and rubber products, the Palm Oil Research Institute of Malaysia (PORIM) for the testing of palm oil and palm oil products and the Forestry Research Institute of Malaysia (FRIM) for the testing of agricultural products. In addition to carrying out testing and inspection relevant to the certification system these institutions also undertake contract testing on the basis of requests made by manufacturing firms and other enterprises.

Further, laboratories in the private sector also carry out testing on a request basis. Manufacturing factories also carry out in-house inspections, and consignment tests are carried out in laboratories which have been accredited in accordance with the SAMM Laboratory Accreditation Scheme.

(1) Testing and inspection of the MS Mark certification system

When an application for the product certification is made on a product under the MS Mark certification system, SIRIM carries out testing and inspection to confirm conformity of the applied product to required standards. These testing and inspection activities include an initial inspection of the factory manufacturing the candidate product in order to ensure a stable production of the product meeting the standards, follow-up inspections of the certified factory periodically carried out after granting a license to use the MS Mark to check appropriateness of quality control applied to the production, and testing of sample pieces of the product collected during the follow-up inspections carried out in order to make a cross check on testing capability of the factory.

(2) Testing and inspection system under mandatory certification system

Under the mandatory certification system, SIRIM undertakes testing for confirmation of conformity of products and also consignment tests.

(3) Testing system for research and development

In principle, R&D activities for product development should be carried out by the firms which manufacture the various products concerned. However, since such activities require a large amount of repeated investment, firms which can undertake R&D are limited. Hence there are many nations where the government provide technical and financial assistance for R&D activities undertaken by private firms, particularly on themes fundamentally essential for industrial development.

In Malaysia SIRIM, RRIM, PORIM, and other public institutions undertake research and development. SIRIM has eight technical centers established for various industrial fields, and carries out joint R&D projects with private firms or other public institutions, while providing technical assistance, consultation, and training to industries. SIRIM also undertakes contract tests in response to requests made by enterprises.

(4) Laboratory accreditation scheme

In November 1991 SAMM (Skim Akreditasi Makmal Malaysia, or Laboratory Accreditation Scheme of Malaysia) was founded with the aim of accrediting laboratories and thereby authorizing the tests conducted by those laboratories. SIRIM is the implementing body for this system.

There were several laboratory accreditation schemes operated by different institutions respectively under ISO Guideline No.25 or other bases. In August 1990, the government decided to establish a national laboratory accreditation scheme, under which the existing laboratories accredited under other schemes were to be re-assessed in line with the ISO 25 and then accredited as SAMM laboratories. At present, there are 8 laboratories accredited under the SAMM (chemical; 6, mechanical; 1, calibration; 1).

4.1.2 Laboratory Accreditation Scheme

4.1.2.1 International trend for laboratory accreditation systems

(1) Objective of laboratory accreditation

It is essential that the laboratories carrying out tests on finished products, parts and materials carry these out correctly and present accurate data as results. Whether the laboratory doing the testing is an independent institution or the in-house laboratory

of a manufacturer, the testing must be carried out from a rigorously neutral and impartial position to provide accurate test data without any preconceptions. Only such data can serve as an effective basis for an accurate and just evaluation of the product tested, so that product improvement can be carried out and the reliability of the product demonstrated to clients and buyers of the product. Since the basis of product certification is accurate testing and the subsequent just evaluation of the product concerned, the reliability and wider acceptance of the certification system depends on the accuracy of testing.

Assurance of the accuracy of testing is indispensable to product improvement as well as the product certification system. Thus for accreditation of laboratories, assessment should be carried out on those laboratories, particularly on management, ownership and legal status of the laboratories, adequacy of engineers and testing equipment and other fundamental aspects in order to judge whether the accuracy and reliability of tests can be assured.

(2) Outline of accreditation schemes in foreign countries

The international standards for such accreditation are drawn up by ILAC (International Laboratory Accreditation Conference) and ISO (the International Organization for Standardization). Such laboratory accreditation systems in individual nations include the NAMAS (National Measurement Accreditation Service) in the UK, the RNE (The National Testing Network) in France, NATA (the National Association of Testing Authorities) in Australia, TELARC (the Testing Laboratory Accreditation Council) in New Zealand, NAVLAP (National Voluntary Laboratory Accreditation Programme) in the USA. In Asia the HOKLAS (Hong Kong Laboratory Accreditation Scheme) and SINGLAS (Singapore Laboratory Accreditation Scheme) are representative schemes.

As accurate test data can only be obtained with the various types of measuring equipment available, the calibration of such equipment is an essential aspect of testing. Almost all of the Laboratory Accreditation Schemes include the accreditation of calibration laboratories.

NAMAS in the UK, as an example, was formed in 1985 through the merging of the two systems of NATLAS (the National Testing Laboratory Accreditation Scheme) founded in 1981 with the BCS (the British Calibration Service) originally begun in 1966, and it is under the control of the National Physical Laboratory (NPL) of the Ministry of International Trade and Commerce in the UK. As of 1990, NAMAS had accredited about 850 testing laboratories and about 300 calibration laboratories

totaling about 1,150 laboratories accredited.

(3) Accreditation standard under the ISO

It is essential to set up the criteria forming the basis for assessing laboratories to be accredited. The ISO has provided guidelines for the General Requirements for the Competence of Calibration and Testing Laboratories in the ISO/IEC Guide 25 (1990). The ISO/IEC Guide 25 specifies the assessment guidelines for laboratory accreditation comprising the following items.

0 Introduction
1 Scope
2 Reference
3 Definitions
4 Organization and management
5 Quality system, audit and review
6 Personnel
7 Accommodation and environment
8 Equipment and reference materials
9 Measurement traceability and calibration
10 Calibration and test methods
11 Handling of calibration and test items
12 Records
13 Certificates and reports
14 Sub-contracting of calibration or testing
15 Outside support services and supplies
16 Complaints

As can be seen from the above, the guidelines call for the assessment of various aspects for the accreditation of laboratories.

4.1.2.2 Laboratory accreditation schemes in Malaysia

(1) Outline of the schemes

1) SIRIM's laboratory accreditation scheme

SIRIM started a laboratory accreditation scheme named the SIRIM Laboratory Accreditation Scheme (SILAS) in June, 1987. The aim of this scheme is as follows:

a) To grant formal recognition to laboratories with proven capability and competence in specific fields of testing.

b) To encourage the establishment and development of competent testing laboratories.
c) To promote the acceptance of tests performed by accredited laboratories so as to facilitate trade and commerce.
d) To upgrade the status and standard of testing laboratories thereby enhancing the quality and reputation of Made-in-Malaysia goods in domestic and overseas markets.

SILAS applied ISO Guide 25 (1982) as the standard for laboratory accreditation. There were eight laboratories accredited under this scheme, which were then accredited under the SAMM.

2) Other laboratory accreditation schemes

Besides the SILAS, other accreditation schemes exist for the fields of rubber and chemicals. There are a number of laboratories accredited under these schemes.

a) Accreditation scheme for testing laboratories of rubber and relevant materials

The Rubber Research Institute of Malaysia (RRIM) has been implementing an accreditation scheme for testing laboratories relevant to SMR (Standard Malaysian Rubber) since 1965. There are 48 laboratories accredited under this scheme as of 1992.

b) Accreditation scheme for testing laboratories of chemicals and relevant materials

The Institute Kimia Malaysia (IKM) implements another accreditation scheme for chemical testing laboratories. There are 46 laboratories accredited under the IKM' accreditation scheme as of 1991.

(2) SAMM (Skim Akreditasi Makmal Malaysia: Laboratory Accreditation Scheme of Malaysia)

SAMM was started in November 1991 as a national accreditation scheme unifying several accreditation schemes which had been carried out by different institutions. The aim of this scheme is as follows:

1) To unify all existing laboratory accreditation schemes in the country.
2) To grant formal recognition to laboratories with proven capability and competence in specific fields of calibration/testing.

3) To reduce, and eventually eliminate, the practice of multiple assessment on laboratories.
4) To upgrade the status and standard of calibration and testing laboratories in the country.
5) To promote the acceptance, both in Malaysia and overseas, of calibration/tests performed by SAMM-accredited laboratories.
6) To enhance the quality, acceptability and reputation of Made-in-Malaysia goods in domestic and overseas markets.

SAMM adopts the ISO Guide 25 (1990) as its standard for accreditation. Since SILAS also used the same ISO Guide, SAMM automatically accredited the laboratories previously accredited under SILAS. Laboratories accredited under other accreditation schemes are accredited under SAMM subject to re-assessment in compliance to the ISO Guide 25.

The SAMM scheme confines the scope of accreditation to the following fields, though the range of areas covered is planned to be extended in the future.

Testing:	Chemistry
	Biological
	Mechanical
	Electrical
	Fire testing
	Non-destructive testing (NDT)
Calibration:	Heat and temperature measurement
	Electrical measurement
	Mechanical, mass and force measurement
	Flow, pressure, viscosity and density measurement
	Length and dimension measurement

There are eight laboratories accredited under the SAMM as of January, 1992. Accreditation of testing laboratories is granted by specifying the areas and products to be tested, testing methods applied and standards used, while in the case of calibration laboratories this is by specifying the areas for calibration services, devices to be calibrated, calibration scope and tolerance of measurement.

1) Role of SIRIM (Accreditation Unit) in SAMM

SIRIM is the implementing body for SAMM, and in SIRIM the Accreditation Unit of the Quality Assurance Section of the Standard Division is responsible for the accreditation work under this scheme. The main functions of the Accreditation Unit consist of the operation of the laboratory accreditation scheme and the administration of the consultant registration scheme. SIRIM has a plan to implement an accreditation scheme for certification agencies which is similar to the NACCB in the UK. When this scheme is implemented in the future, it will also be carried out by the Accreditation Unit.

The Accreditation Unit has about seven staff members and these carry out the assessment of laboratories. The Accreditation Unit is the secretariat of SAMM, and this unit publishes and issues a large amount of documentation for the advertising and diffusion of SAMM.

2) Laboratory assessors

The assessors carrying out laboratory assessment for accreditation under SAMM are required to pass a qualification examination after attending seminars for laboratory assessors held either by NAMAS in the UK or NATA in Australia. At present there are 25 qualified laboratory assessors in SIRIM while there are six qualified laboratory assessors working outside of SIRIM. Further the Accreditation Unit also holds its own in-house seminars within SIRIM in order to increase the number of qualified assessors.

4.1.2.3 Recommendations for enhancement of the SAMM laboratory accreditation scheme

It is only a few years since SAMM was designated as the national laboratory accreditation scheme in Malaysia. It is likely that laboratories which apply for accreditation under this scheme will increase year after year. It is recommended that the following measures be taken into consideration for enhancement of this scheme.

(1) Administration of SAMM by an agency independent from SIRIM

SIRIM is mandated for the administration of SAMM. However, since SAMM is the national laboratory accreditation scheme and SIRIM is one of the laboratories to be accredited under SAMM, an agency independent from SIRIM should be appointed for the administration of SAMM.

(2) Promotion of incorporation of other laboratory accreditation schemes into SAMM

Several schemes for laboratory accreditation schemes were implemented individually by SIRIM, RRIM, PORIM and IKM before SAMM was started. Some of the schemes have been incorporated into SAMM and the laboratories previously accredited under those schemes have been re-accredited in accordance with the assessment standards set in SAMM (ISO/IEC Guide 25). It is recommended to take such steps with regard to the other remaining schemes so that SAMM can be implemented as the sole national accreditation scheme for laboratories.

(3) Authorization of testing reports issued by accredited laboratories for application to the product certification

Most of the testing laboratories accredited under SAMM are in-house laboratories of manufacturing factories, and these laboratories' testing services to outside clients are limited because of limited testing capacity. When a product certification for a product is applied for, an authorized test report of the product is required for the certification. Under the product certification system, test reports authorized for the certification are those issued by the laboratories which the implementing agency of the product certification system has accredited or those issued by the laboratory which the certification agency itself operates.

It is likely that the demand for product testing will increase with the increasing number of applications for product certification as the product certification system becomes more popular. To meet this increasing demand, a useful measure would be to accept test reports, issued by the relevant laboratories accredited under SAMM, by the product certification systems, with authorizing it in the respective system.

(4) International recognition of accredited laboratories

There is a world wide trend for the increase of testing laboratory accreditation schemes like SAMM, based on the international accreditation standards. SAMM could contribute to reducing applicants' costs for product certification through avoiding duplication of required testings. A current task is to unify the accreditation of laboratories under SAMM, but a future task will be to promote international recognition of the testing laboratories accredited under SAMM. As more manufacturers apply for the product certification in foreign countries along with increasing overseas production or export of their products, there is an increasing need for internationalization of the laboratory accreditation schemes implemented in the

individual countries as well as international recognition of those schemes.

For the mutual recognition of laboratory accreditation schemes between two countries, there would be three alternative ways as follows:

1) To promote mutual recognition of the testing laboratory accreditation schemes

   This is to conclude an agreement among the implementing agencies of the laboratory accreditation schemes in relevant foreign countries for mutual recognition of these accreditation schemes thereby mutually accepting test reports issued by testing laboratories accredited under the respective accreditation schemes. It must be noted, however, that there are not many cases which have been realized, although this is an ideal arrangement, because of difficulty in adjusting different practices applied by these agencies for laboratory assessment and also different levels of their assessment capabilities.

2) To promote mutual recognition directly between a Malaysian accredited laboratory and that in a foreign country

   This is to conclude an agreement between a accredited laboratory in Malaysia and that in relevant foreign country for mutual recognition of test reports issued by these laboratories. Expansion of these arrangements to form international networks of testing laboratories, will bring about virtually the same effect as mutual recognition among laboratory accreditation schemes. In fact, there are a number of foreign laboratories with such arrangements with accredited laboratories in other countries.

3) To promote Malaysian laboratories to apply for accreditation in foreign countries

   This is to have Malaysian laboratories accredited under the SAMM as well as the accreditation schemes in relevant foreign countries thereby forming international networks of testing laboratories.

4.1.3 Testing Capacity

4.1.3.1 Testing capacity of SIRIM laboratories

(1) Outline

The sections of SIRIM responsible for the implementation of tests is the Testing Services Section of the Technical Services Division. The Testing Services Section is made up of four units, namely the Mechanical and Automotive Engineering Testing Unit, the Electro-technical Testing Unit, the Civil Engineering and Building Materials Testing Unit and the Chemical Testing Unit, which carry out tests in their respective fields. Also each unit has special laboratories for the different areas of testing involved in their field. The organizational structure of Technical Services Division is shown in Figure 4-1.

Besides the above laboratories, the Northern Branch Office of SIRIM in Penang possesses an Electrical Product Laboratory and the Sarawak Branch Office of SIRIM in Kuching has a Ceramic Centre, while the Southern Branch Office of SIRIM in Johor Bahru recently opened a new Electric Product Laboratory. Details of these laboratories are given below.

(2) The Mechanical and Automotive Engineering Testing Unit of the Testing Services Section

This unit carries out tests on automotive, automotive parts, kerosene stoves, helmets,etc.

1) Vehicle Inspection and Performance Testing Laboratory, and Emission and Engine Performance Testing Laboratory

The Vehicle Inspection and Performance Testing Laboratory and Emission and Engine Performance Testing Laboratory were founded in November 1991 with a grant aid of equipment to a total of M$300,000 under the assistance program GTZ (the German Agency for Technical Cooperation) started in 1986. Functions of this unit are as follows:

a) A type testing station for motor vehicles in accordance with the proposed requirements of the Type Approval System under the Road Transport Act 1987.
b) An independent (third party) test station open to interested persons or organizations.

c) A model station for regular motor vehicle inspection.
d) A training centre.

At present automobile inspections are not implemented, but the Ministry of Transport has proposed that such inspections should be carried out and it is expected that implementation will start in the near future.

In the event of the automobile inspection system being implemented, automobile testing centers will need to be established in each region as there will be a huge number of automobiles to be inspected even if the system is implemented in a stage-wise program. The present Vehicle Inspection and Performance Testing Laboratory was established to act as a model laboratory well equipped with adequate facilities to carry out the required automobile inspections.

2) Physical and Dynamic Testing Laboratory

This SIRIM laboratory carries out the tests for mandatory certification on the following automobile parts which are regulated in accordance with the Road Transport Act administered by the Ministry of Transport.

a) Protective helmets in accordance with the Motor Cycles (Safety Helmet) Rules, 1973.
b) Seat belts in accordance with the Motor Vehicles (Safety Seat Belt) Rules, 1978.
c) Liquefied Petroleum Gas Fuel Systems in accordance with the Motor Vehicles (Construction, Equipment and Use); (Use of Liquefied Petroleum Gas Fuel Systems in Motor Vehicle) Rules, 1982.

3) Petroleum and Gas Appliances Testing Laboratory

The Petroleum and Gas Appliances Testing Laboratory carries out tests on kerosene stoves which are regulated by the Enforcement Division of the Ministry of Domestic Trade and Consumer Affairs. These tests are carried out in accordance with the Trade Descriptions Order 1991; Marking of Non-pressure Kerosene Stoves.

This testing unit has adequate testing capacity to carry out the required inspection on automobiles, as well as tests on helmets and kerosene stoves for mandatory certification.

However, the testing laboratory in this unit can only carry out limited items of testing for other products and parts due to the limited types of testing equipment installed, and further these are unable to carry out high precision testing because of outdated testing equipment. There is an urgent need to upgrade and expand these testing laboratories.

The laboratory has an adequate number of experienced technical staff. In the future, however, the number of staff should be increased to meet the increasing demand for testing.

(3) Testing Services Section: Electro-technical Testing Unit

This unit is composed of six laboratories which carry out testing on electric appliances for the product certification under the MS Mark, Certified Mark and Safety Mark certification schemes and the mandatory certification system. Contract tests on electric appliances are also carried out in these laboratories on the basis of requests made by private firms.

1) Industrial Appliances and Accessory Laboratories I and II

These laboratories carry out tests on switches, socket outlets, fuses, electrical wiring, cords, circuit breakers, wiring devices, etc.

2) Domestic Appliances and Accessory Laboratories I and II

These laboratories carry out tests on ventilation hoods, washing machines, refrigerators, electrical batteries, water coolers, instantaneous water heaters, clothes dryers, humidifiers, rice cookers, toasters, electric shavers, vacuum cleaners, battery chargers, electric pots, electric mosquito coil vaporizers, electric dish washer, etc.

3) Electronic and Component Laboratory

This laboratory carries out tests on dimmer switches, TVs, radio cassette recorders, VTRs, hair dryers, mixers, electric kettles, electric irons, insulating transformers, etc.

4) Lamp and Components Laboratory

This laboratory carries out tests on inverter for lamps, roof-type receptacles, starter holders, glow starters, condensers, etc.

The above laboratories can not carry out tests on all items specified in applicable MS standards because of the lack of testing equipment. For example inadequacy of testing capacity is evident for electronic appliances. There are more than 100 testing items in the 20 clauses of the MS 72 - "Safety Requirements for Mains Operated Electronic and Related Apparatus for Household and Similar General Use". However, the existing laboratories can not carry out tests to measure the level of X-ray emissions from cathode ray tubes, softening point of materials, tests on switches for television, or destruction tests on cathode ray tubes, etc.

SIRIM envisages having these laboratories accredited by the Canadian Standards Association (CSA) in Canada. To this end the upgrading and expansion of testing equipment would be required.

It is observed that the staff assigned in these laboratories are working to a maximum possible extent in view of about 1,000 testings annually carried out by about 40 persons of staff, averaging about 25 testings per staff member. The average testing time required to complete one testing is about six weeks. It appears to be slightly longer but still comparable to an international level. This implies that the staff have an acceptable level of technical capabilities.

The existing equipment installed in these laboratories are inadequate to carry out tests on all items specified in the applicable standards. If these laboratories are upgraded to a level that can carry out tests on all required items, the demand for testings would increase. In order to cope with increased demand for testings, it is essential for SIRIM to take necessary steps for upgrading technical capability of staff as well as recruiting more staff.

The building space of the laboratories is insufficient for installing more equipment for the expansion of facilities.

(4) Testing Services Section: Civil Engineering and Building Materials Testing Unit

The Civil Engineering and Building Materials Testing Unit carries out various tests on concrete, steel bars and other building materials, on fire fighting equipment, automobile seat belts, etc. These tests are carried out in accordance with the MS

standards and foreign standards such as BS (British Standard), JIS (Japanese Industrial Standard) ASTM (American Society of Testing and Materials), for the product certification under the MS Mark and Certified Mark certification schemes as well as the mandatory certification system for vehicle safety parts and also for fire fighting equipment. These laboratories also carry out contract tests on those products and parts on the basis of request made by private firms.

1) Fire Testing Laboratory

All fire-fighting equipment and devices are subject to mandatory certification which is regulated by the Fire Service Department of the Ministry of Housing and Local Government (MHLG) in accordance with the Fire Service Act, 1988. Among those items, SIRIM carries out tests on fire extinguisher containers, while tests on fire doors are undertaken by the Forestry Research Institute of Malaysia (FRIM).

2) Concrete and Structure Testing Laboratory

This laboratory has staff of five who carry out tests on cement, concrete, panels, etc. in accordance with the BS and JIS standards.

3) Material Science Laboratory and Construction Material Laboratory

These laboratories carry out tests on steel bars for reinforced concrete, tiles, etc.

The above laboratories are unable to carry out testing of safety glass due to the lack of testing equipment, although this product is subject to mandatory certification. Further, the laboratories are also inadequate to carry out tests on all items specified in the standards for the MS Mark certification.

This unit, comprised of approximately 20 staff members, annually carried out about 650 testings averaging 35 testings per staff member. In view of this achievement, it is observed that the staff are adequate in terms of number and capabilities to carry out the present job volume. However, it is likely that the demand for testing will increase if the laboratories are reinforced. To meet increased demand for testing, it is essential to take necessary steps for upgrading the capability of staff as well as recruiting more staff.

The building space of this laboratory is inadequate for the expansion of facilities.

(5) Testing Services Section: Chemical Testing Unit

This unit consists of a Food/Microbiology Laboratory, an Agriculture/Domestic Laboratory, an Industrial Products Laboratory, a Water/Pharmaceutical Laboratory and a Surface Coating/Textile Laboratory. The unit carries out a wide range of analysis and testing to cover foodstuffs, agricultural products, chemical fertilizers, detergents, alloys, paper and pulp products, textile products, paints, battery fillings, etc.

These tests are carried out in accordance with the MS standards, BS standards, ASTM standards, and Food Regulations of the Ministry of Health, etc.

These laboratories are capable of carrying out the analysis and testing as required by applicable standards.

(6) SIRIM Northern Branch in Penang

The Northern Branch Office of SIRIM located at Penang has a 12 person staff. The main activities of this branch are as follows:

1) Calibration services on measuring devices for electrical quantity.
2) Consignment tests of electric appliances under the mandatory certification system.
3) Follow-up inspections of certified factories.
4) Information services.

The laboratory set up at this branch is only equipped with facilities to carry out consignment tests for electric appliances, and therefore there is no facility available for carrying out tests for product certification on all items specified in the standards as well as contract tests for private firms.

Construction work is underway for the expansion of testing capacity which is scheduled to be completed by the end of 1992.

(7) SIRIM Southern Branch in Johor Bahru

The Southern Branch Office of SIRIM located in Johor Bahru has a staff of four. The main activities of this branch are as follows:

1) Consignment tests of electric appliances under the mandatory certification system.
2) Follow-up inspections of certified factories.
3) Information services.

This branch has no facility to provide calibration services, and therefore undertakes only liaison services to clients concerning the calibration services which are provided by the head office of SIRIM. SIRIM has a plan to set up a calibration laboratory for electrical measurement at this branch and also at the Northern Branch Office.

(8) SIRIM Sarawak Branch in Kuching

The SIRIM Sarawak Branch located in Kuching has a staff of five. The main activities of this branch are as follows:

1) Follow-up factory inspections of certified factories.
2) Information services.
3) Technical guidance to the regional ceramic industry.

At present the branch office has no testing laboratory, but SIRIM has a plan to set up a testing laboratory at this branch for tests on safety of electric appliances, construction materials and ceramics and also a calibration laboratory to provide calibration services for volume, mass and electrical measurements.

(9) SIRIM's laboratories for research and development

The research and development of products is basically a task which is to be carried out by the manufacturing industries themselves. However, one of the initial aims of the SIRIM at its founding was to provide technical support for such research and development. RRIM and PORIM also provide technical assistance to research and development in a similar way in their respective fields.

In contrast with testing carried out for product certification, tests carried out for research and development are extremely diverse in nature since an evaluation of the particularities and performance of the product over a wide range of aspects is needed. The Research and Technology Development Division of SIRIM is responsible for the areas of production technology, materials development (metals, plastics, ceramics), chemical technology, processing technology, industrial bio-chemistry, design, electronics technology and instrumentation. SIRIM has set up several

R&D centers to cover each of the above fields and these centers carry out contract research for private industries.

(10) Assessment of the testing capacity of SIRIM

This section summarizes the assessment on the testing capacity of SIRIM. However given the difference in nature between tests carried out for the certification and those for research and development, this assessment is only made on the SIRIM's testing capacity relevant to the certification system.

1) Performance of testing and personnel for testing

The performance of tests carried out by SIRIM over the last three years are shown below.

1989	about 2,300 testings
1990	about 2,600 testings
1991	about 3,150 testings

The number of testings have been increasing annually with increases in all fields.

On the other hand, the number of personnel has remained almost unchanged for the last three years at about 135 personnel, although the number of testings carried out has substantially increased. This implies that the testing efficiency has improved with the upgrading of testing techniques and testing experience of staff.

2) Testing equipment available

Since SIRIM is responsible for activities covering almost the entire range of industrial products it is difficult to judge exactly how much equipment would represent an optimum provision. If adequacy of SIRIM equipment is evaluated on the basis of the testing for the mandatory certification system there is the shortage of certain equipment which are required for carrying out tests on some items specified in the standards.

In connection with the problem of not being able to perform certain tests, there are also certain problems in the testing work done for consignment tests and in view of these problems there is some doubt about the efficacy of tests for the mandatory certification system.

Further, it is increasingly necessary to set up testing laboratories at the branch offices, because testing demand is increasing in these regions with the development of regional industry.

3) Management of laboratories

SIRIM applies a sectional budgeting system for the Technical Services Section, with the operation costs being met by government subsidy. The funding for investments involved in the replacement and reinforcement of equipment and facilities is in principle totally met by the government grant. Revenues accruing in the form of the test fees collected from external clients are pooled as SIRIM revenue (the SIRIM reserve) and SIRIM may allocate this reserved fund for investments subject to approval of competent authorities.

The following shows the percentage of revenue accruing from test fees against the operation costs of the laboratories.

1987	46%
1988	54%
1989	55%
1990	62%
1991	62%

Replacement and reinforcement of testing equipment should be financed with government grant, since this requires a large amount of investment. It is desirable, however, that the operation costs can be covered with the revenue accruing from test fees. The above figures reveal that the operation costs can be covered by the revenue to a fairly considerable extent, but there is still room for further improvement.

4.1.3.2 Testing capacities of the SAMM accredited laboratories

(1) Overview

There are eight laboratories which have been accredited under the SAMM. The overview of these laboratories is summarized below (for details, see Annex 3).

1) Celcure Chemicals (M) Sdn. Bhd. (Accreditation No.001)

Celcure Chemicals is a manufacturer of wood preservative agents, and has a factory in Kuala Lumpur. The SAMM accreditation has been granted to a laboratory set up in this factory.

This laboratory is equipped with limited facilities and undertakes tests only for internal use. Hence no testing service is available for outside clients under the MS Mark certification system.

2) Cement Industries (Sabah) Sdn. Bhd. (Accreditation No.003)

This company is a manufacturer of cement, concrete and gypsum, with a factory in Kota Kinabalu, Sabah. The factory has a laboratory accredited under the SAMM.

The facilities of this laboratory are limited to undertake only internal tests. No testing service is available for outside clients under the MS Mark certification system.

3) Fedmas Assay Office Sdn. Bhd. (Accreditation No.004)

The Fedmas Assay Office manages a laboratory for analyzing the purity of gold which is located in Penang. The laboratory was founded for the use of members of the Federation of Goldsmiths and Jewelers' Associations in 1987, and it is exclusively limited to members.

This laboratory is confined only to the analysis of gold purity, and therefore no testing service is available for other clients under the MS Mark certification system.

4) Koppers-Hickson Chemicals (M) Sdn. Bhd. (Accreditation No.005)

The Koppers-Hickson Chemicals is a wood preservative manufacturer, and has a factory in Penang. The factory has a laboratory accredited under the SAMM.

5) Nusantara Technologies Sdn. Bhd. (Accreditation No.006)

Nusantara Technologies Sdn. Bhd. is as a joint venture with Singapore founded in 1989, and has a laboratory in Kuala Lumpur which has been accredited under

the SAMM. It is engaged in calibration services in the fields of pressure and length.

6) Physical Testing Laboratory, Rubber Technology Centre (Accreditation No.008)

The Physical Testing Laboratory is a laboratory set up in the Rubber Technology Centre of RRIM. Details of this laboratory are shown in the latter part.

7) Ancom Berhad (Accreditation No.009)

Ancom Berhad is a manufacturer of wood preservative agents, and has a factory in Selangor.

This laboratory is equipped with limited testing facilities and therefore carries out only internal tests. No testing service is available for outside clients under the MS Mark certification system.

8) Laporte Chemicals (M) Sdn. Bhd. (Accreditation No.010)

The Laporte Chemicals is an affiliate of Laporte, a British company, and its main office is located in Selangor It is a trading house, but has a chemical laboratory which provides testing services to clients. This laboratory is a SAMM accredited laboratory.

The analytical equipment of the laboratory is limited and since general testing services are not provided it can not be anticipated that this laboratory will be able to contribute to the MS Mark certification system for the time being.

A classification of the SAMM accredited laboratories shows that there are six laboratories concerned with chemical analysis as against one which carries out machinery testing and one which carries out physical property calibration (length). There is a concentration on chemical analysis in the testing carried out. Further, RRIM also operates a laboratory accreditation scheme and 48 laboratories have been accredited under this scheme. Re-accreditation for these in accordance with the ISO Guide 25 under the SAMM is scheduled to take place.

(2) Testing capacity of the SAMM accredited laboratories

Assessment of the testing capacity is made on seven testing laboratories out of the eight SAMM accredited laboratories listed above, excluding one calibration labora-

tory, particularly taking into account the availability of those laboratories for tests which have to be carried out under the MS Mark certification system and the mandatory certification system.

Table 4-1 summarizes the testing areas covered and the location of the laboratories. It is obvious that the number of accredited laboratories is insufficient to meet the testing demand.

RRIM mainly undertakes tests on rubber and rubber products, while managing an accreditation scheme for laboratories in the field of rubber testing. The RRIM accreditation scheme has been well implemented, bringing about a substantial contribution to the MS Mark certification system in this field.

In the mechanical field there is only one accredited laboratory which undertakes tests on cement. Moreover as this is located in Sabah, no testing service is available for clients in Peninsular Malaysia.

There are no laboratories at all which undertake mechanical testing on other products, and this causes constraints in expanding the MS Mark certification system and the mandatory certification system.

In the chemical field there are four accredited laboratories carrying out analysis of wood preservative agents. These laboratories are in-house laboratories set up in the factories manufacturing wood preservative agents, most of which have a license of MS Mark certifications. However, these laboratories do not provide any testing service for outside clients. There are no accredited laboratories for other chemical products or electric appliances.

There are no SAMM accredited testing laboratories, as reviewed above, which can provide testing services to outside clients as required under the MS Mark certification system and the mandatory certification system. The accredited testing laboratories for rubber and rubber products function well to provide testing services to outside clients as required by relevant industries, but these services only result in a limited contribution to the MS Mark certification and the mandatory certification system.

Under this situation, only the SIRIM laboratories can undertake the testings for the product certification systems.

4.1.3.3 Palm Oil Research Institute of Malaysia (PORIM)

PORIM was founded in 1979 under the Palm Oil Research and Development Act enacted in that year. PORIM is a public research institute administered by the Ministry of Primary Industries.

PORIM has the following functions.

1. Research and development on technology concerning the manufacturing, refining, processing, storing and transport of palm oil and palm oil products and also on utilization of those products.
2. Development of new products relevant to palm oil.
3. Promoting the use of palm oil and palm oil products through conducting surveys, collecting and providing information concerning palm oil, palm oil products, other plant oils and animal oils to provide such information.
4. Conducting joint research and development of palm oil and palm oil products in Malaysia and abroad.

Figure 4–2 illustrates the organization of PORIM. PORIM has a staff of about 600 employees.

In addition to the above functions, PORIM has satisfactorily performed testings for product certification and implementation of the factory certification scheme in the palm oil and palm oil product sectors.

1) Standards

PORIM draws up standards concerning palm oil which are adopted as MS standards in accordance with the procedures for standard establishment administered by SIRIM.

2) Factory certification

Palm oil is made from oil palm, including plantation, milling, refining and chemical processing. PORIM organizes and administers a Certificate of Competence Scheme (COC) for the factories engaged in these processes. About 90% of the factories in this sector have obtained this certificate, and there are two factories registered under the ARQS and three factories in the process of preparing to apply.

PORIM carries out follow-up inspections of certified factories once a year. In these follow-up factory inspections the manufacturing processes are checked and advice on improvements is given if any problems or irregularities are discovered. However, no penalties are administered.

3) Tests

Analysis of chemical components is the main form of testing carried out on palm oil, and each factory performs its own tests to assure that the desired component mixture is achieved in the production of palm oil. Therefore, the tests carried out by PORIM are effected as a cross check on the tests carried out by the individual factories. Since a huge number of tests are required, PORIM uses a number of automatic measuring devices such as gas chromatographs. PORIM's laboratory also has a set of equipment for carrying out analysis of components of palm oil products in response to requests made by private firms.

In addition to the operation manuals of testing equipment, manuals of testing procedures are available. These manuals contribute greatly to the standardization of work and to the upgrading of staff's testing capabilities.

PORIM charges test fees at a rate set around 1/4 of the testing costs incurred, but in addition collects some contributions paid by relevant manufacturers in proportion to their amount of output. Hence PORIM can manage the laboratory with adequate financial resources accruing from these revenues.

The product certification on palm oil and palm oil products is basically granted under the MS Mark certification system. In addition to this, some producers request SIRIM to issue a certain form of certificate to assure the quality of their products to meet the buyer's requirements as designated their supply contracts. In this event SIRIM carries out the test and certification in a respective form to meet individual requirements.

4) Testing capacity

PORIM has adequate capacity to carry out tests on palm oil and palm oil products. However, it has no excess capacity for undertaking tests or chemical analysis on other products for the MS Mark and other product certification systems.

4.1.3.4 Rubber Research Institute of Malaysia (RRIM)

RRIM was founded in 1925 as a public research institute with the aim of the research and development of technology concerning rubber plantations, methods and tools for collecting rubber latex and other relevant technologies, and this institute is under the control of the Ministry of Primary Industries. RRIM has implemented the Standard Malaysian Rubber Scheme since 1965, providing technical assistance for improvements in the processing and packaging of rubber. It also carries out research on consumer trends with a view to promoting the development of the rubber-related industry since 1972. Further the Rubber Technology Centre (RTC) was set up within the RRIM in 1976 in order to provide various technical assistance for strengthening the rubber product manufacturing sector.

The testing capacity of the RRIM, particularly RTC is summarized below.

1) Standards

RRIM draws up standards related to rubber and rubber products which are adopted as MS standards in accordance with the procedures for standard establishment administered by SIRIM. The relevant standards are MS 297 (Specification for Raw Natural Rubber) for grading rubber, and MS 113 (Specification for Rubber Condoms) and MS 1155 (Specification for Rubber Examination Gloves) for the rubber products.

2) Tests

The Physical Testing Laboratory of the RTC is a SAMM accredited laboratory. The laboratory is well managed in compliance with the ISO Guide 25.

The testing areas accredited under the SAMM are those on rubber and rubber products, rubber bearings, rubber gloves for laboratory and medical uses, rubber gloves for home uses and industrial uses, and rubber condoms.

The laboratory can also carry out tests on automobile tires.

The main equipment of the RTC is shown in Table 4-2. The RTC has developed special testing equipment to be used for testing rubber and rubber products, and has been promoting the use of such equipment at outside testing laboratories.

3) Laboratory accreditation scheme

RRIM, and in particular RTC implements the accreditation scheme for testing laboratories relevant to the rubber industry. This scheme was started before SAMM.

At present, there are 48 laboratories which have been accredited by the RRIM, including laboratories set up in factories. As SAMM was started as a national accreditation scheme, it has been decided to re-accredit these 48 laboratories under SAMM. This work is undertaken by SIRIM with assistance of RRIM's staff as required.

4) Testing capacity

The RTC's testing capacity is adequate to carry out tests on rubber and rubber products under the MS Mark certification system. Further, the testing equipment of the Centre has some excess capacity to carry out tests on some other products.

4.1.3.5 Testing institutions other than the above

The IKM, as mentioned earlier, implements its own accreditation scheme for chemical testing laboratories. Besides the laboratories accredited under this scheme, there are some private companies which provide testing services on a commercial basis.

(1) Testing laboratories accredited by the IKM

The IKM is an association of qualified chemists who are ranked in different classes in accordance with their qualifications and experience.

IKM implements its own laboratory accreditation scheme. Laboratories applying for accreditation under this scheme are assessed with the criteria set by IKM. It is required that the laboratory be managed by a qualified chemist who meets the specific qualifications set by the IKM. There were 46 accredited laboratories as of 1991. These laboratories will be re-accredited under SAMM after 1993. A list of the IKM accredited laboratories is shown in Table 4-3.

(2) Private testing service companies

There are a few private testing service companies. Some of these companies are outlined below.

1) Scientific Testing and Analytical Laboratory (M) Sdn. Bhd.

The Scientific Testing and Analytical Laboratory is one of three Malaysian affiliates of the SGS Group which is a multinational inspection company, and carries out chemical analysis of foodstuffs and safety tests on toys. These tests are carried out on request from manufacturers or by contract with the government agencies in the case of export cargo to Indonesia or to the Philippines. The laboratory has a staff of eight personnel, including six persons in charge of testing work.

The main devices installed in the laboratory are an atomic absorption spectrophotometer, a gas chromatograph and an infrared spectrophotometer.

The laboratory has been accredited by IKM and PORIM, and has applied for accreditation under SAMM. The test data produced at this laboratory is also cross checked with test data of other SGS laboratories as necessary.

The other two SGS affiliate laboratories in Malaysia with about 200 inspection staff in total carry out mineral analysis, freight cargo consignment tests, petroleum analysis and non destructive tests. The main business of these three SGS affiliates is tests and inspections.

2) Syarikat Sebangun Sdn. Bhd.

Syarikat Sebangun is a testing service company with a staff of seven personnel located in Kuching and engaged in analysis tests of metals, alloys, soils, and water analysis.

The main devices installed in the laboratory are an atomic absorption spectrophotometer, an infrared spectrophotometer and electronic balances. It has been accredited by the IKM.

There are a few well equipped laboratories, as reviewed above, in addition to the SAMM accredited laboratories. It is important to increase the SAMM accredited laboratories to support SIRIM's testings for the MS Mark certification.