Project No.S2: Setting-up of Electrical and Electronics Institute

1. Rationale

Upon the request of MOI, the Team offers for this project a detailed concept and activities of the Electrical and Electronics Institute which was recently established.

1.1 Background of the Project

In January 1998, The Government of Thailand has announced its Cabinet approval of the Industrial Restructuring Plan, proposed by the Ministry of Industry. The purpose of IRP is to cope with the Thai's economic recession through the improvement of Thai's international competitiveness and export expansion, and the "Concept for Institutional Building" is one of the means to execute IRP's Action Plans.

The Ministry of Industry consists of six departments, namely: (1) Office of the Permanent Secretary, OPS; (2) Department of Mineral Resources, DMR; (3) Department of Industrial Works, DIW; (4) Department of Industrial Promotion, DIP; (5) Thai Industrial Standards Institute, TISI; and (6) the Office of Industrial Economics, OIE. Under Ministry of Industry there are three state enterprises and seven non-profit institutes some of which including Electrical and Electronics Institute are in the process of setting up.

Although the MOI's main responsibilities are policy-making, budget distribution and monitoring, ministry has become deeply involved in service activities directly affecting the industries, such as research, inspection, testing and human resource development and training, and in turn, their main responsibilities were left behind. In order to focus on the policy-making, budget planning and distribution and monitoring, the MOI has been promoting institutional building to transfer some of their activities to those institutes.

Electrical and Electronics Institute is an independent and non-profit organization under the Industrial Development Foundation, Ministry of Industry, that was established in July, 1998. It has the objective of strengthening the competitiveness of Thailand's electrical and electronics industry in the international market. The institute is managed by an executive director reporting to the EEI board of directors, which consists of representatives from governmental, private and academic bodies. The responsibilities of the institute initially set by the board are as follows;

(1) Provides quality, safety and environmental testing for electrical and electronic products.

(2) Provides information on production technology, and trade.

(3) Coordinates and cooperates with the governmental and private sectors at both domestic and international levels to develop the industry and its related businesses as well as to improve knowledge and skills of the workforce

(4) Conducts relevant studies in order to make recommendations on policies, plans and measures for developing and solving problems of the industry.

1.2 Desires of the Electrical and Electronics Industry

The electrical and electronics industry in Thailand may be divided into four categories depending on their characters as follows;

Category A	Export oriented enterprises (assemblers 100% foreign owned)
Category B	Domestic market oriented J/V enterprises (joint venture assemblers)
Category C	Local large-size enterprises (Thai-owned assemblers and primary subcontractors)
Category D	Local SMEs (parts manufacturers)

The crisis caused companies in categories B and C to shift their target to the export market. The local SMEs in category D were not able to follow this trend. The problems of the local SMEs are summarized as follows;

- Lacking in R&D capability
- Safety standards which are equivalent to international standards are not regulated enough
- Coordination between buyers and suppliers is lacking
- Promotion of electrical and electronics industries in Thailand is lacking

The local SMEs as well as foreign and domestic assemblers who need to buy electrical and electronics parts from the local SMEs are expecting strong support from EEI. Concretely, the needs from the private sector are as follows:

(1) Product certification

(2) Safety standards development

(3) Standards accreditation

(4) Market information

(5) Calibration of testing equipment

Through the activities of EEI and strong participation of Thai's electrical and electronics industry, they will be able to gain international competitiveness and look for the export market.

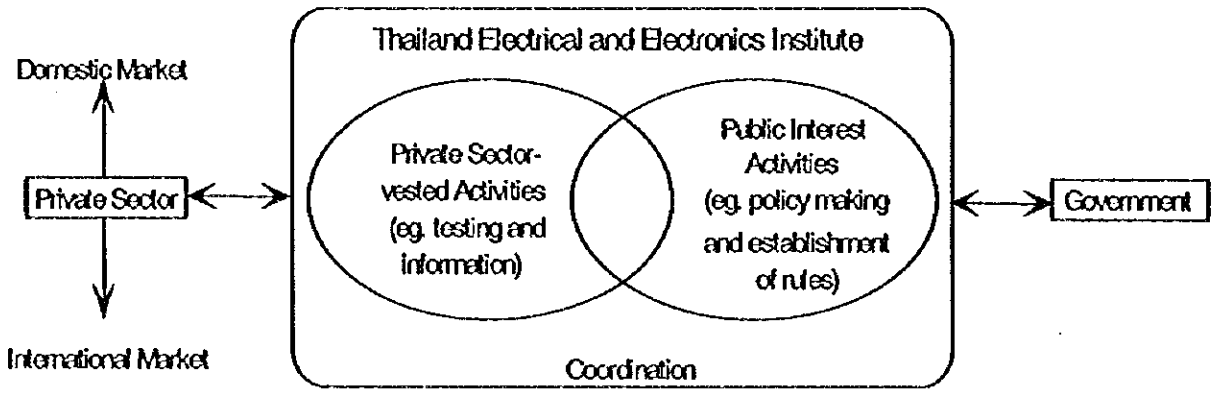
2. Purpose of the Project

The purpose of the establishing the Electrical and Electronics Institute is to meet the needs of the private sector and to support and promote its competitiveness in the domestic and international market.

3. Output of the Project

The principal mission to achieve the project purpose is to have good coordination between private sector and the government under the single umbrella of EEI.

Private Sector and the Government under the EEI Umbrella



EEI will be designed to achieve the following outputs through their activities;

3.1 Policy Making Support

In order to promote the electrical and electronics industry, the MOI needs to have done all sorts of research and survey tasks for their policy making process. EEI will execute research and survey assignments commissioned by the MOI.

3.2 Information Service

EEI provides all sorts of information such as market and technology information through their publications and data base. With this service, EEI assists the automotive industry.

3.3 Testing and Certification Services

EEI provides testing and certification services in order to contribute to the improvement of consumer protection for domestic market and to upgrade the Thailand's electrical and electronics market competitiveness.

3.4 Consultation Services

EEI transfers their proper technology, administrative and management skills in order to improve the competitiveness of automotive parts industry.

4. Project Description

This project is aimed at servicing private sector needs for testing, certification and consultation services. At the same time, the project will support the Ministry of Industry regarding strategy making for electrical and electronics industry development.

4.1 Implementing Agency

4.1.1 Implementing Agency

Electrical and Electronics Institute is the implementing agency for this project. EEI was established by the Ministry of Industry and it is an independent and non-profit organization.

4.1.2 Location

(1) Head Office: For the first year starting from May 1999

Address: Department of Industrial Work
6th Floor, Department of Industrial Building
57 Thanon Phrasumen, Phranakorn, Bangkok 10200

Expenses: rents free
furniture, water, electricity, telephone are in charge of EEIfrom the second year

Address: BSID

Expenses: initial cost for renovation
rents free

(2) Testing Center: TISI-Bampoo Testing Center

4.1.3 Government Budget Plan to EEI

For next five years including the fiscal year starting 1999, the EEI will receive a total of 100 million bahts. And this five-years budget is considered to be an initial setting-up budget. Afterward, the EEI can ask for supporting budget to compensate their additional investment and operational cost.

Together, the head office and testing center are lent by MOI free of charge.

Total of Bt 100 million for 5 years
1st Year (Oct. 1, 1999 --Sep., 2000)
Bt 14.4million
2nd Year Bt 20 million (maybe)

5. Implementation Body and Financing Source

Electrical and Electronics Institute, MOI

6. Activities

6.1 Policy Making Support

The purpose of EEI is to meet the needs of the private sector and to support and promote its competitiveness in the domestic and international market.

Based on the "Guidelines for development of Thai's Electronic Industry during 1996-2000," six strategic measures for development of the electronics industry have been set.

(1) Special zones for electronics industrial development will be considered in order to facilitate processing and trade of electronics industry.

(2) Restructuring customs duties in order to promote processing of parts and components and supporting industry, and also strengthen the capabilities of Thailand's electronic products in the world's market.

(3) Strengthen standardization of Thai's electronic industry in order to keep up with the world's standardization.

(4) Deregulate the government's approving and licensing system in order to reduce costs and times of production and trade of electronic industry.

(5) Human resources planning for electronic industry will be considered both in educational programs and training programs.

(6) Technological base planning for future development of electronics industry will be considered. Research and development activities, multinational or joint venture in research activities will be promoted.

The EEI undertakes the function of (3) and (4) above in terms of testing the conformity to standards. To reflect the private sector's demand on (3) and (4), the EEI studies the situation in Thailand and in the world to make policy recommendations in order to maintain the competitiveness of Thailand's electrical and electronic industry.

This policy making support should be contracted for and paid for by reasonable compensation by the government.

6.1.1 Electrical and Electronics Sector Studies

When asked by the government, EEI will be always prepared to offer the sectoral studies and trend, market projections and industry strategic analysis studies based on its sophisticated database.

6.1.2 Policy Recommendation Studies

The EEI will seek to fully utilize the voice and opinions from the industry, to reflect it in the policy recommendations to the government.

6.1.3 Specific Sector Studies

The EEI is capable of conducting specific sector studies such as emerging issues. Because they are close to the industry and updating their data base, they can response quickly to the issues of the industry and make recommendations to the government.

6.1.4 Standards Development with TISI

The EEI will support standards development with TISI for the electrical and electronics industry.

Industrial Product Standards ACT, B.E.2511 (1968) has been the base of industrial standards in Thailand for manufacturers and importers until now. These standards and regulations are implemented and maintained by TISI. In this Industrial Products Standards Act, B.E.2511, standards are defined as listed below.

Specifications on one or many of descriptions concerning the following;

(1) Kind, type, shape, dimension, manufacture, equipment, quality, grade, component, faculty, durability and safety of the industrial products

(2) Methods of manufacture, design, drawing, usage, material used for the industrial products and safety concerning the manufacture of the industrial products

(3) Kind, type, shape, dimension of packages or other kinds of containers including the making of packages or other kinds of containers, and methods of packing, wrapping or binding and materials used therefore

(4) Methods of experiment, analysis, comparison, examination, testing and weighing and measuring in volume and size concerning the industrial products.

Due to globalization, the world is in the process of standardization of such product standards and methods of testing due to market requirements and the EEI will follow such movement to sustain the competitiveness of the Thai electrical and electronics industry. To achieve such purpose, the EEI will work together with TISI to develop new standards.

6.2 Information Service

6.2.1 Development of Data Bank for Electrical and Electronics Companies

EEI set up and up date the following data.

<For Finished-products>

(1) Electrical and Electronic Industry Data for Finished-products

(1-1) Production Volume in Thailand & in the world (country by country) such as;

(a) Consumer electronics (including TV, radio, audio, video cassette recorder, camcorder and electronic watches)

(b) Office equipment (including copying machine, facsimiles, typing machine, calculator, computer)

(c) Telecommunications equipment (including telephones, mobile, satellite receiver)

(d) Industrial electronic equipment (including circuit breaker, switch gear, power transformer, numerical control system)

(e) Electronic parts & components (including ICs, semiconductor devices, cathode ray tube passive components, PCBs, transformer)

(1-2) Electrical and electronic manufacturers' production capacity and utilization

(1-3) Employment structure of (1-1) by category

(1-4) Sales volume in Thailand and in the world (country by country)

(1-5) Market share in Thailand by category

(2) Electrical and Electronics Company Profile

Thai and foreign companies registered in EEI should be listed.

(3) Thai and foreign companies investment trend in the electrical and electronic sector.

<For Parts-products>

(4) Based on the guidelines for development of Thailand's Electronics Industry during 1996-2000, the following were chosen as target products; 1) wafer fabrication, 2) integrated circuit design, 3) optic fiber manufacturing, 4) switching and transmission equipment for telecommunication, and 5) software industry

EEI studies the same category of finished products, such as production, production capacity and utilization, sales, employment structure, market share, company profile, investment performance etc.

(5) Information source includes the following;

Board Member of the EEI
Office of Industrial Economics, Ministry of Industry
Department of Export Promotion, Ministry of Industry
Department of Industry Promotion, Ministry of Industry
The Federation of Thai Industry
The Computer Association of Thailand
The Engineering Institute
The Telecommunication Association of Thailand

Electrical Engineering Department, Kasetsart University
Telephone Organization of Thailand
National Science and Technology Development Agency
Japanese Chamber of Commerce, Bangkok
JETRO

6.2.2 Publication of Data and Data Analysis

Based on the information collected in 4.2.1, EEI can publish data and data analyses.

6.2.3 Publication of Sector Studies

Based on the information collected in 4.2.1, EEI conducts sectoral studies as mentioned in 4.1 activities and publishes them.

6.2.4 Publication of Periodical Sector News

Based on the information collected in 4.2.1, EEI publishes its periodical sector news, distributed to EEI-registered or listed companies in return for their offering of data to EEI.

Also publication can be used for marketing and public relations on behalf of EEI activities.

6.2.5 Development of a Consults Databank

The development of a databank for consults is directly connected to the activities of 4.4, the consultation services. The EEI lists the details of consultants, including name, contact address, status, and area of skills and technics, so that the EEI can match the needs of a company with an appropriate consultants.

6.3 Testing and Certification Services

The EEI executes testing and certification services based on Thai Industrial Standards Act 1968. These activities are directly transferred from TISI. The activities cover the following areas.

6.3.1 Safety Testing and Certification of Electrical and Electronics Products and Parts Based on TISI Standards

(1) Eligible products and parts for testing and certification

(a) Electrical and Electronic Parts, such as Resistor, Condensor, Coil, Transistor, PCB, Switching, Speaker, Microphone, etc.

(b) White Electric Appliances, such as Refrigerator, Electronic Range, Cleaner, Mixer, Rice Cooker, Electric Iron etc.

(c) Home appliances, such as TV, VTR, CD, MD

(d) Telephone Equipment, Cordless Telephone

(e) Facsimile, Copy Machine and other OA machines

(f) PC and related equipment, TV Games and other electronic games

(2) Range of Testing and Certification

Heat Test
Humidity Test
Vibration Test
Shock Resistance Test
Pressure Test

(3) Related Standards in this category

TIS, JIS, IEC and other standards when requested by clients

6.3.2 Compulsory Standards Testing Based on TISI

TIS 23-2521 (1978) Ballast for fluorescent lamps

TIS 293-2526 (1983) PVC-insulated aluminum cables
TIS 366-2528 (1985) Electric iron
TIS 183-2528 (1985) Starters for fluorescent lamps
TIS 4 Part 1-2529 (1986) Incandescent lamps
TIS 10-2529 (1986) Low-voltage distribution link fuses
TIS 344-2530 (1987) Lampholders for tubular fluorescent lamps and starterholders
TIS 11-2531 (1988) PVC insulated copper cables
TIS 956-2533 (1990) Fluorescent lamps: safety requirements
TIS 934-2533 (1990) A.C. electric fans: safety requirements
TIS 870-2532 (1989) Electric stoves: open type heating elements: safety requirements

6.3.3 Voluntary Standards Test

The EEI conducts testing services for voluntary standards to satisfy the demand from private sector for their export, import and manufacturing

(1) Eligible products for testing

(a) Electric Products and Parts, such as TVs, VTRs, radios, computers and related equipment, switches, adapters, converters, connectors, etc.
(b) Low voltage electric products and parts, such as lightening equipment, electric fans, electric cords and cables, switches, sockets, plugs, hair-dryers, electric ranges, cookers, air-conditioners, etc.
(c) Telecommunication equipment and parts, such as telephone equipment, cordless telephones, etc.
(d) Information related equipment and OA equipment, such as PCs and related equipment, facsimiles, copy machines and printers, etc.

(2) Related Standards for Testing

TIS, UL, CSA, IEC, SISIR, Electric Products Safety Requirements of Japan, etc.

6.3.4 CE-Marking Test

The EEI conducts the testing services based on EU Directive, which are essential factors for CE-Marking. For example, EMC is based on 89/336 EEC (original directive and was amended 92/31 EEC and 93/68 EEC accordingly). The EEI offers testing of Module B or C of CE-Marking. Related testing for CE-Marking should be developed to support exports to European countries.

6.4 Consultation Services

6.4.1 Factory-Clinic Services

Based on the Databank for Consultants mentioned in 4.2.5, the EEI provides so-called "Factory-Clinic Services" to clients. A client or company asks for advice and improvement of a certain issue to the EEI, and the EEI defines the issues and matches the most appropriate consultant to the client. Those consultants listed in the databank are not only from or connected to Thailand but also from all over the world.

6.4.2 Intermediary Services to Other Institutes

There are seven institutes under MOI including the EEI together with other private and non-profit institutes and organizations. The EEI can share the database of those institutes and can act as an contact point in order to maximize the utilization of existing institutes.

7. Expected Benefit of the Project

The expected benefit of the project is two ways. One is that the project contributes to support Thailand electrical and electronics industry through their activities to meet the needs of private sectors and to support and promote their competitiveness in the domestic and international market. Secondly, the project contributes to the Thai Government for their policy-making on electrical and electronics industry development in Thailand.

There are some strength of this project to be successful such that (1) a huge demand is expected for the services offered by the EEI, (2) some of the equipment and machinery has already been prepared through TISI.

8. Weakness of the Project

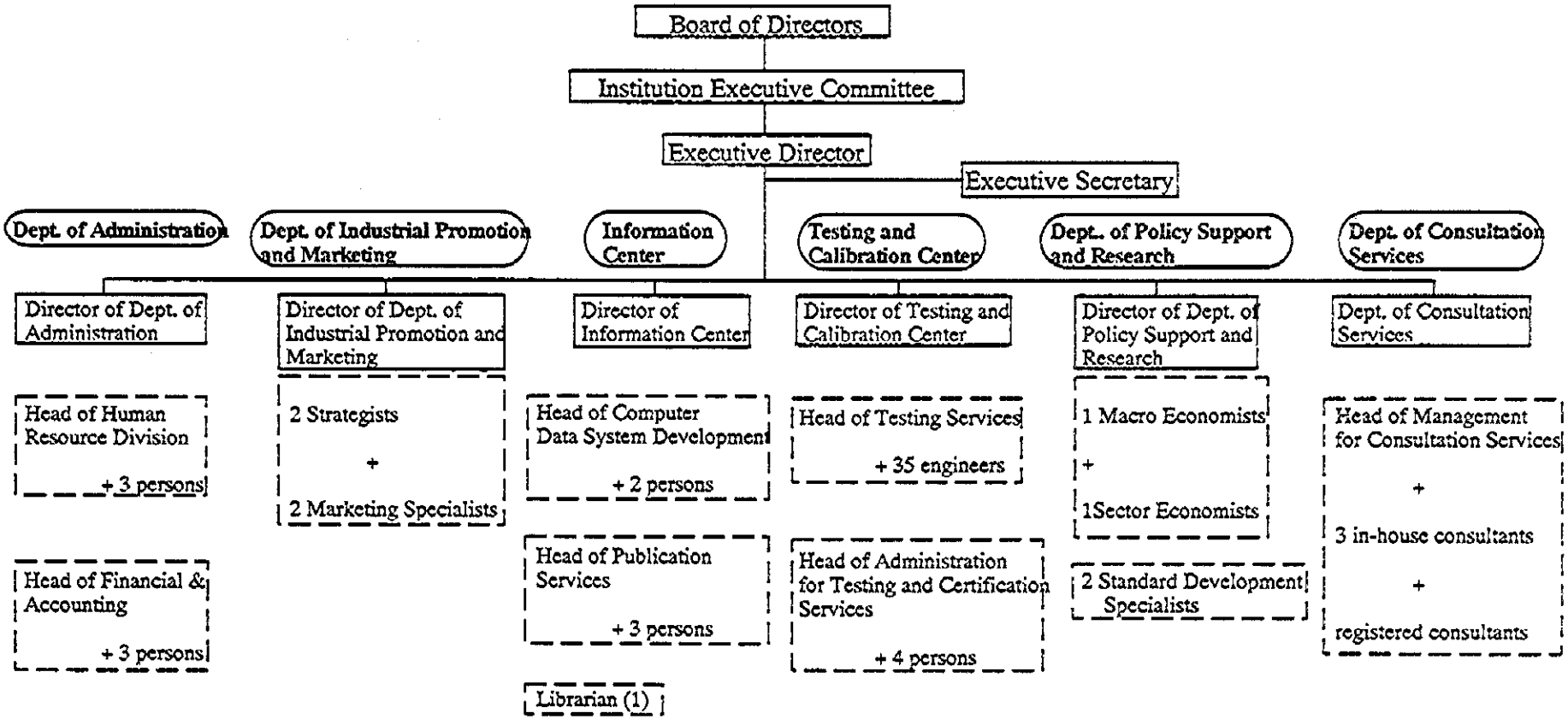
- Documentary standards (voluntary and compulsory) which are harmonized to international standards should be developed.
- A sufficient number of engineers should be well trained for testing and calibration work.

9 Implementation Schedule

9.1 Implementation Schedule: 5-year Plan for Electrical and Electronics Institute

	5-year Plan for Electrical and Electronics Institue	1999	2000	2001	2002	2003
I.	1.1 Electrical and Electronics Sector Studies					
Policy	1.2 Policy Recommendation Studies					
Making	1.3 Specific Sector Studies					
Supprt	1.4 Standards Development with TISI					
II.	2.1 Development of Data Base for the Sector					
Information	2.2 Publication of Data and Data Analysis					
Service	2.3 Publication of Sector Studies					
	2.4 Publication of Periodical Sector News					
	2.5 Development of Data Bank for Consults					
III.	Phase-1: Using Present Facilities					
Testing and	3.1 Safety Testing and Certification of Products and Parts Based on TISI					
Certification	3.2 Compulsory Standards Testing Based on TISI					
Services	3.3 Voluntary Standards Test					
	3.4 Calibration Services					
	Phase-2					
	3.5 Acquisition of New Equipment and Machinery					
	3.6 Training for the Usage of New Equipment and Machinery					
	Phase-3: Using Present and New Facilities					
	3.7 Safety Testing and Certification of Products and Parts Based on TISI					
	3.8 Compulsory Standards Testing Based on TISI					
	3.9 Voluntary Standards Test					
	3.10 CE-Marking Test					
IV.						
Consultation	4.1 Factory Clinic Servicies					
Services	4.2 Intermediary Services to Other Institute					

9.2 Organization Chart and Human Resource Planning for Electrical & Electronics Institute (1999-2003)



10 Financial Projection

10.1 Explanatory Notes and Conditions

(A) Human Resource Planning is based on their activities and Organization Chart (in 5.3). For the Testing and Calibration Center, the number of engineers (including technicians) will be increased with escalation to the level of a reasonable number by year 2003.

(B) Salary Plan for EEI is based on the amount of per-person salary for the year of 1999 proposed by EEI.

(C) Overhead is calculated as 50% of salary and wages and includes the following;
- Overtime allowance
- Allowance for committee meetings
- Medical allowance
- Educational allowance for children

(D) For the Material Expenditure, the EEI plans a budget of 126,000 Bahts per year.

(E) For the Utilities, the EEI plans a budget of 2,340,000 Bahts per year.

(F) For the Durable Article, Land and Building, the EEI plans a budget of 500,000 Bahts per year.

(G) The Miscellaneous fee is calculated as 10% of total of Salary & Wages and Overhead & Other Expenditure.

(H) Total Operating Cost is considered to be, in turn, "Expected Income" or "Income Target". This Expected Income is divided among income generating departments in order to set a target income for their activities.

10.2 Explanatory Notes and Conditions in Detail on Income for Electrical and Electronics Institute

1. Policy Making Support - Contract research for the Government

1.1 Study projects for sub-sector, policy recommendation and specific issues I

(1) For the 1st year: 5 studies/year x 300,000 Bahts = B1,500,000/y

(2) One study shall be added annually until the 5th year

1.2 Coordination for making product standards J

(1) For the 1st year: 1 person x 8 man-months/year x B84,000 = B672,000/y

(2) Price/Unit: - three times of annual wage of B28,000-

2. Information Service

2.1 Member Fee

(1) For the 1st year: 100 companies x B20,000 = B2,000,000/y K

(3) 30 companies shall be added annually until the 5th year

* Members shall get the followings free of charge

(a) Publication of data and data analysis reports

(b) Publication of sector study reports

(c) Publication of monthly newsletters

2.2 Publication (1) Publication of Data and Data Analysis Reports L

(1) For the 1st year: 30 copies x B500/copy = B15,000/y

(2) For the 2nd year to 5th year: 20 copies are added annually

2.3 Publication (2) Publication of Sector Report M

(1) For the 1st year: 30 copies x B500/copy = B15,000/y

(2) For the 2nd year to 5th year: 20 copies are added annually

2.4 Seminar N

(1) For the 1st year: not feasible

(2) For the 2nd year: One Seminar x B200,000 = B200,000/y

(3) For the 3rd year to 5th year: Two Seminars x B200,000 = B400,000/y

3. Testing and Certification Services

3.1 Testing and Certification Services (1) O

(1) Given conditions: 1 engineer handles 76 testing
Average fee for the Testings is B9,000-
Number of engineers is based on human resource planning

(2) For the 1st year: 5 engineer x 76 testings x B9,000 = B3,420,000/y

3.2 Testing and Certification Services (2) P

(1) Given conditions: 1 engineer handles 76 testing
Average fee for the EMC Testings is B20,000-
Number of engineers is based on human resource planning

(2) For the 1st year: 2 engineer x 76 testing x B20,000 = B3,040,000/y

3.3 About Utilization Ratio: Q

- For the 1st year: Operational Ratio shall be 50% since half of the engineers and technicians shall be receiving t

raining.

- For the 2nd year to the 4th year : Operational Ratio shall be 70%, 80%, 90% consecutively.
- At the 5th year, Operational Ratio shall be 100% which is a break-even point.

4. Consulting Service (Factory Clinic Services) R

4.1 Conditions

- Two of foreign experts will visit a factory once a month spending 3 days per visit for factory clinic services.
- The two can assist 7 factories in one visit to Thailand and will continue a year for a factory or 3-day x 12-time visits for clinic.

4.2 Cost for Foreign Expert

- Remuneration: B400,000/mm x 12months/y = B4,800,000/y
- Out-of-pocket expenses: B100,000/mm x 12 months = B1,200,000/y
- Total Cost: B6,000,000/y (Cost per factory = B6,000,000/y)
- Each beneficiary factory will pay 25% of the total cost or B150,000/y and the rest shall be met by either government subsidies or foreign aid, or a combination thereof.

4.3 Income for the Institute

- 15% of the total cost or B900,000/y per pair shall be appropriated to management fee for the institute.
- For the 1st year: 3 pairs
- For the 2nd year to 5th year: 5 pairs

10.3 Explanatory Notes for Maintenance Fee for Existing Equipment and Facilities of TISI

1. Maintenance fee for existing equipment and facilities which are transferred from TISI to EEI is considered to be 10% of

their initial value.

2. Those costs should be covered by an additional government subsidy.

10.4 Explanatory Notes and Conditions on Acquisition of New Equipment for EEI

(Refer Appendix-2)

1. Total Cost for Acquisition of Equipment is 536 Million Bahts
   - 147 Million Bahts for Calibration Laboratories
   - 389 Million Bahts for Testing Laboratories

2. Necessary Equipment Amount for Calibration and Testing Laboratories are divided into following categories;

(Calibration)
- Direct Current Low Frequency
- High Frequency
- Length and Shape
- Temperature

(Testing)
- Reliability Testing
- Safety Testing
- Parts Testing
- Home Electronics Products Testing
- AV Products Testing
- Information Communication OA Testing

* For the details of acquisition of new equipment, refer to Appendix 2.

3. Priority for the Investment

(Calibration)

- Calibration services shall start from year 2000. However, since TISI's Bampoo Testing Center already does testing, EEI has to acquire the equipment for calibration services.
- Priority area for the basic calibration services shall include such as length, shape and temperature.
- Equipment for calibration services for length, shape and temperature shall be acquired in the year of 2000 at the costs of 58 and 24 million bahts respectively.
- EEI shall expand and improve calibration services in other area as a second stage. Those include Direct Current Low Frequency in 2002 and High Frequency in 2003.

(Testing)

- Testing Services shall start on the basis the existing main activities of TISI-Bampoo, which include Safety Testing, Parts Testing and Home Electronics Products Testing.
- Existing equipment in TISI have been verified and found that those equipment are concentrated in Safety Testing, Parts Testing & Products Testing.
- The priority for the acquisition of equipment for the testing services shall be invested as follows;

Year 2000	- Safety Testing
	- Parts Testing
Year 2001	-Reliability Testing
	- Home Electronics Products Testing
	- AV Products Testing in Year 2001
Year 2002	- Information Communication
	- The rest of AV Products Testing
Year 2003	- The rest of AV Products Testing

4. Planning for Acquisition of New Equipment (Refer to Appendix 2)

- Total amount of newly investment of 536 million bahts is divided by four years.

Budget for	Year 2000	107.0 million bahts
	Year 2001	141.7
	Year 2002	126.4
	Year 2003	161.0

Based on the above consideration, the following schedule was planned.

Cash Flow

PROJECTED CASH FLOW OF EEI INSTITUTE

(Unit: Million Bahts)

	Year 1 FY1999	Year 2 FY2000	Year 3 FY2001	Year 4 FY2002	Year 5 FY2003
A. Cash Inflow	44.37	172.32	214.44	206.59	249.49
A-1: Income from Operation					
(1) Policy Making Support	2.17	3.14	3.44	3.74	4.04
(2) Information Services	2.03	2.85	3.67	4.29	4.91
(3) Testing and Certification Services	5.97	11.33	17.33	24.56	31.54
(4) Consulting Services	2.70	4.50	4.50	4.50	4.50
A-2: Subsidies					
(1) Investment to Fixed Assets	0.00	107.00	142.00	126.00	161.00
(2) Assistance for Factory Clinic Services	18.00	30.00	30.00	30.00	30.00
(3) Maintenance Fee for Equipment & Facilities of TISI	13.50	13.50	13.50	13.50	13.50
B. Cash Outflow	51.45	178.77	223.19	212.74	251.62
B-1: Operating Cost					
(1) Sales and Wages	11.76	16.80	22.51	25.87	28.22
(2) Overhead and other expenses	8.19	11.47	15.18	17.37	18.90
B-2: Investment to Fixed Assets	0.00	107.00	142.00	126.00	161.00
B-3: Hiring of Thai and Foreign Consultants	18.00	30.00	30.00	30.00	30.00
B-4: Maintenance Fee for Equipment & Facilities of TISI	13.50	13.50	13.50	13.50	13.50
C. Gross Cash Surplus (Deficit) A-B	-7.08	-6.45	-8.75	-6.15	-2.13
D. Government Subsidy for Five Years	14.44	15.00	20.00	25.00	25.00
F. Net	7.36	8.55	11.25	18.85	22.87

Project Cost of EEI Institute
(Million Bahts)

	Cost Items	Cost	Remarks
A.	**Existing Facilities**		Facilities and properties transferred from TISI
A-1	Land at site	Rental at free of charge	TISI's Bampoo Testing Center
A-2	Buildings at site	Rental at free of charge	
A-3	Equipment & machinery	Rental at free of charge	See Appendix 1 (list of existing equipment & machinery)
A-4	Head quarter office	Rental at free of charge	
A-5	Maintenance fee for existing facilities	67.5	10% of A-3 (See Appendix 1); ask for government subsidy
B.	**Acquisition of New Facilities**	**593.1**	
B-1	Equipment & machinery	536	See Appendix 2 (list of additional equipment & machinery)
B-2	Office equipment	3.2	See Appendix 3
B-3	Furniture & fixture	-	See Appendix 3
B-4	Miscellaneous and contingency	53.9	10% of B-1 to B-3
C.	**Operating expenses**	**188.6**	
C-1	Salaries & wages	105.2	
C-2	Overhead	52.6	
C-3	Material Expenditure	0.6	
C-4	Utilities	11.7	
C-5	Durable Article, Land and Building	2.5	
C-6	Others	16.0	
Total Project Cost		849.2 Million Bahts	

Human Resources Plan for Electrical and Electronics Institute

		1999	2000	2001	2002	2003
Executive Director		*1*	*1*	*1*	*1*	*1*
Dept. of Administration	Director	1	1	1	1	1
	Division Head		2	2	2	2
	Officer	2	2	4	4	6
	Dept. Total	*3*	*5*	*7*	*7*	*9*
Dept. of Industrial Promotion and Marketing	Director	1	1	1	1	1
	Strategist		1	1	2	2
	Marketing specialist	1	1	2	2	2
	Dept. Total	*2*	*3*	*4*	*5*	*5*
Information Center	Director	1	1	1	1	1
	Division Head	1	2	2	2	2
	Officer		2	5	5	5
	Libralian	1	1	1	1	1
	Dept. Total	*3*	*6*	*9*	*9*	*9*
Testing and Certification Center	Director	1	1	1	1	1
	Division Head	1	2	2	2	2
	Engineer	15	20	25	30	35
	Officer	2	3	4	4	4
	Dept. Total	*19*	*26*	*32*	*37*	*42*
Dept. of Policy Support and Research	Director	1	1	1	1	1
	Economist	1	1	2	2	2
	Standard Dev. Specialist	1	2	2	2	2
	Dept. Total	*3*	*4*	*5*	*5*	*5*
Dept. of Consultation Services	Director	1	1	1	1	1
	Division Head		1	1	1	1
	In-house Consultants	2	2	3	3	3
	Dept. Total	*3*	*4*	*5*	*5*	*5*
Executive Secretary		1	1	1	1	1
Driver		1	2	2	2	2
TOTAL		36	52	66	72	79

A

Salary Plan for Electrical and Electronics Institute

*based on the amount of per-person salary for the year of 1999 proposed by EEI)

(Bahts)	1999	2000	2001	2002	2003	TOTAL	
Average/person.month	28,000	28,000	28,000	28,000	28,000		B
Average/person.year	336,000	336,000	336,000	336,000	336,000		
No. of Staffs	36	52	66	72	79		
TOTAL COST FOR HUMAN RESOURCES: (A)	12,096,000	17,472,000	22,176,000	24,192,000	26,544,000	102,480,000	

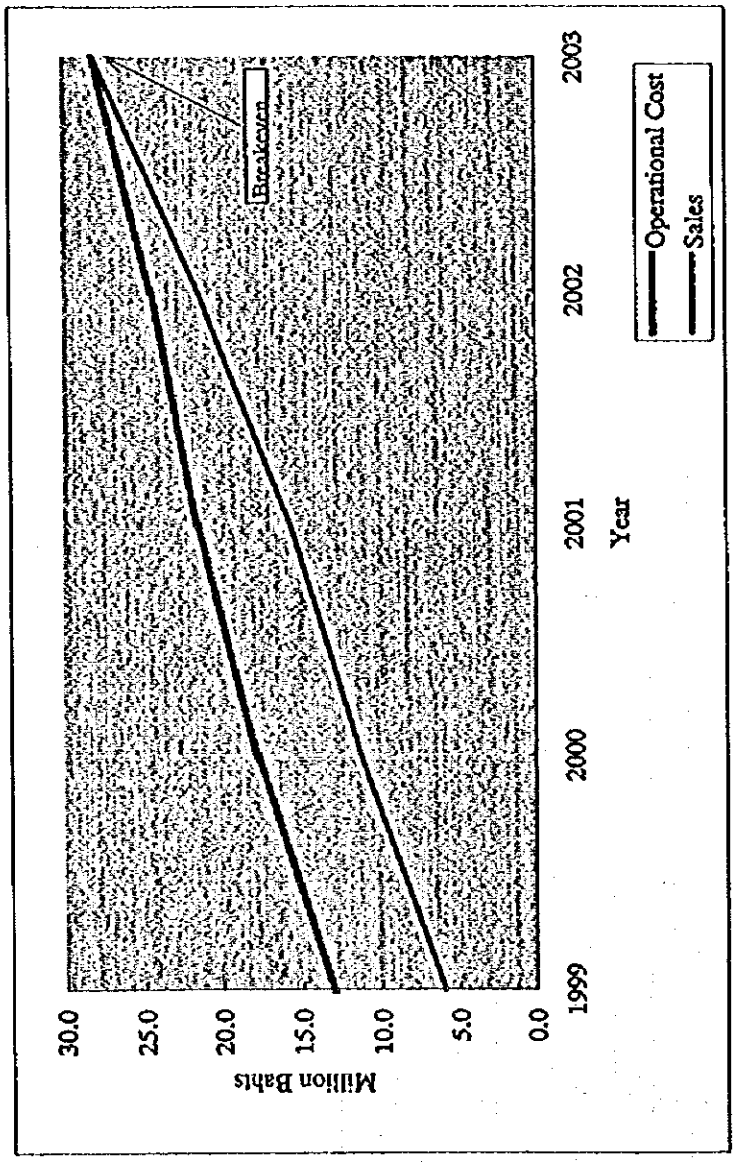
Overhead & Other Expenditures						TOTAL	
1. Overhead (A) x 50%	6,048,000	8,736,000	11,088,000	12,096,000	13,272,000	51,240,000	C
2. Material Expenditure	126,000	126,000	126,000	126,000	126,000	630,000	D
3. Public Utility Expenditure	2,340,000	2,340,000	2,340,000	2,340,000	2,340,000	11,700,000	E
4. Durable Article, Land and Building	500,000	500,000	500,000	500,000	500,000	2,500,000	F
Sub-Total (B = 1+2+3+4)	6,548,000	9,236,000	11,588,000	12,596,000	13,772,000	53,740,000	
5. Miscellaneous: (A+B) x 10%	1,864,400	2,670,800	3,376,400	3,678,800	4,031,600	15,622,000	G
TOTAL: (C)	8,412,400	11,906,800	14,964,400	16,274,800	17,803,600	69,362,000	

Total Operating Cost and Expected Income Analysis for Electrical and Electronics Institute						TOTAL	H
Total Operating Cost (A) + (C)	20,508,400	29,378,800	37,140,400	40,466,800	44,347,600	171,842,000	
Breakdown by Income Generating Department							
Dept. of Policy Support and Research	2,050,840	2,732,912	3,376,400	3,316,951	3,359,667	14,836,769	
Dept. of Information + Dept of Industrial Promotion	3,418,067	6,149,051	8,778,640	9,287,462	9,407,067	37,040,287	
Dept. of Testing and Certification Center	12,988,653	17,763,926	21,608,960	24,545,436	28,221,200	105,128,175	
Dept. of Consultation Services	2,050,840	2,732,912	3,376,400	3,316,951	3,359,667	14,836,769	

Utilization Ratio for the Testing and Certification Services

Utilization Ratio	1999	2000	2001	2002	2003
10%	1,193,200	1,618,800	1,960,800	2,386,400	2,812,000
20%	2,386,400	3,237,600	3,921,600	4,772,800	5,624,000
30%	3,579,600	4,856,400	5,882,400	7,159,200	8,436,000
40%	4,772,800	6,475,200	7,843,200	9,545,600	11,248,000
50%	5,966,000	8,094,000	9,804,000	11,932,000	14,060,000
60%	7,159,200	9,712,800	11,764,800	14,318,400	16,872,000
70%	8,352,400	11,331,600	13,725,600	16,704,800	19,684,000
80%	9,545,600	12,950,400	15,686,400	19,091,200	22,496,000
90%	10,738,800	14,569,200	17,647,200	21,477,600	25,308,000
100%	11,932,000	16,188,000	19,608,000	23,864,000	28,120,000

Utilization Ratio	50%	70%	80%	90%	100%
Million Bahts	1999	2000	2001	2002	2003
Operational Cost	13.0	17.8	21.6	24.5	28.2
Sales	6.0	11.3	15.7	21.5	28.1


Million Bahts
30.0
25.0
20.0
15.0
10.0
5.0
0.0
1999
2000
2001
2002
2003
Year
Breakeven
Operational Cost
Sales

Sales Breakdown and Profit/Loss Estimates for EEI

(Bahts)	1999			2000			2001			2002			2003			*
	Unit	Price/Unit	Total	Unit	Price/Unit	Total	Unit	Price/Unit	Total	Unit	Price/Unit	Total	Unit	Price/Unit	Total	
1. Policy Making Support (Dept. of Policy Support and Research)																
1.1 Study project	5	300,000	1,500,000	6	300,000	1,800,000	7	300,000	2,100,000	8	300,000	2,400,000	9	300,000	2,700,000	I
1.2 Standards Development	1*8	84,000	672,000	2*8	84,000	1,344,000	2*8	84,000	1,344,000	2*8	84,000	1,344,000	2*8	84,000	1,344,000	J
Sub-total			2,172,000			3,144,000			3,444,000			3,744,000			4,044,000	
Operational Cost			2,050,840			2,732,912			3,376,400			3,316,951			3,359,667	
Achievement(%)			105.9			115.0			102.0			112.9			120.4	
2. Information Service (Dept. of Information Center + Dept. of Industrial Promotion and Marketing)																
2.1 Member Fee	100	20,000	2,000,000	130	20,000	2,600,000	160	20,000	3,200,000	190	20,000	3,800,000	220	20,000	4,400,000	K
2.2 Publication (1)	30	500	15,000	50	500	25,000	70	500	35,000	90	500	45,000	110	500	55,000	L
2.3 Publication (2)	30	500	15,000	50	500	25,000	70	500	35,000	90	500	45,000	110	500	55,000	M
2.4 Seminar	0	200,000	0	1	200,000	200,000	2	200,000	400,000	2	200,000	400,000	2	200,000	400,000	N
Sub-total			2,030,000			2,850,000			3,670,000			4,290,000			4,910,000	
Operational Cost			3,418,067			6,149,051			8,778,640			9,287,462			9,407,067	
Achievement(%)			59.4			46.3			41.8			46.2			52.2	
3. Testing and Calibration Services (Testing and Calibration Center)																
3.1 T/C Service (1)	13*76	9,000	8,892,000	17*76	9,000	11,628,000	22*76	9,000	15,048,000	26*76	9,000	17,784,000	30*76	9,000	20,520,000	O
3.2 T/C (2)	2*76	20,000	3,040,000	3*76	20,000	4,560,000	3*76	20,000	4,560,000	4*76	20,000	6,080,000	5*76	20,000	7,600,000	P
Sub-total			11,932,000			16,188,000			19,608,000			23,864,000			28,120,000	
Utilization Ratio & Sales		50%	5,966,000		70%	11,331,600		80%	15,686,400		90%	21,477,600		100%	28,120,000	Q
Operational Cost			12,988,653			17,763,926			21,608,960			24,545,436			28,221,200	
Achievement(%)			45.9			63.8			72.6			87.5			99.6	
4. Consulting Service (Dept. of Consultation Services)																
	3	900,000	2,700,000	5	900,000	4,500,000	5	900,000	4,500,000	5	900,000	4,500,000	5	900,000	4,500,000	R
Sub-total			2,700,000			4,500,000			4,500,000			4,500,000			4,500,000	
Operational Cost			2,050,840			2,732,912			3,376,400			3,316,951			3,359,667	
Achievement(%)			131.7			164.7			133.3			135.7			133.9	
TOTAL SALES			12,868,000			21,825,600			27,300,400			34,011,600			41,574,000	
TOTAL OPERATIONAL COST			20,508,400			29,378,800			37,140,400			40,466,800			44,347,600	
Profit/Loss (a)			-7,640,400			-7,553,200			-9,840,000			-6,455,200			-2,773,600	
Achievement(%)			62.7			74.3			73.5			84.0			93.7	
Subsidy (b)			14,436,000			15,000,000			20,000,000			25,000,000			25,000,000	
Net: (a) + (b)			6,795,600			7,446,800			10,160,000			18,544,800			22,226,400	

Appendix-1

List of Existing Equipment & Machinery at TISI-Bampoo

No.	Items	Quan-tity	Price (Baht)	Price (Yen)	Code	Registration Number	Name of Producer	Model/Size	Div. in charge	Location Room No.	Received from	Budget Year	Using Area WXL(m3)
1	Watt meter	1	11,000	33,000	60AN0620 C1.01.00	204/2	YEW	2041	1	210	JICA	2533	0.50x1.00(0.5)
2	Watt meter	1	11,000	33,000	60AN0622 C1.01.00	204/3	YEW	2041	1	212	JICA	2533	
3	Watt meter	1	11,000	33,000	60AN0621 C1.01.00a	204/4	YEW	2041	1	212	JICA	2533	
4	Watt meter	1	11,000	33,000	60AN0568 C1.01.00a	204/5	YEW	2041	1	212	JICA	2533	
5	Watt meter	1	11,000	33,000	60AN0566 C1.01.01	204/6	YEW	2041 1.5A	1	212	JICA	2533	
6	Watt meter	1	11,000	33,000	60AN0554 C1.01.01	204/7	YEW	2041 1.5A.120x10W	1	212	JICA	2533	
7	Watt meter	1	11,000	33,000	60AN0572 C1.01.01a	204/8	YEW	2041 1.5A	1	212	JICA	2533	
8	Watt meter	1	11,000	33,000	60AN0641 C1.01.01a	204/9	YEW	2041 1.5A	1	212	JICA	2533	
9	Watt meter	1	19,667	59,000	60AN0576 C1.01.02a	204/10	YEW	2041 5.25A	1	212	JICA	2533	
10	Watt meter	1	19,667	59,000	60AN0530 C1.01.02a	204/11	YEW	2041 5.25A.120x50W	1	212	JICA	2533	
11	Digital Watt meter	1	74,111	222,333	50AH0015 C1.01.03	204/12	YEW	2509 MAX 10A	1	212	JICA	2533	
12	Digital Watt meter	1	74,111	222,333	50AH0016 C1.01.03	204/13	YEW	2509 MAX 10A	1	212	JICA	2533	0.60x1.20(0.72)
13	Digital Watt meter	1	74,111	222,333	50AH0017 C1.01.03	204/14	YEW	2509 MAX 10A	1	212	JICA	2533	
14	Digital Watt meter	1	61,000	183,000	90021403 C1.02.00a	204/15	HIOKI	3161 500V.500A	1	212	JICA	2533	
15	Watt meter	1	42,000	126,000	90074239 C1.02.01	204/16	HIOKI	3184 3□ 500V.20A	1	212	JICA	2533	
16	Watt meter	1	42,000	126,000	9006776 C1.02.01a	204/17	HIOKI	3184 3□ 500V.20A	1	212	JICA	2533	

Appendix-1

No.	Items	Quan-tity	Price (Baht)	Price (Yen)	Code	Registration Number	Name of Producer	Model/Size	Div. in charge	Location Room No.	Received from	Budget Year	Using Area WXL(m3)
17	Watt-hour meter	1	35,333	106,000	90079631 C1.02.02	204/18	HIOKI	3181 1□250V.15A	1	212	JICA	2533	
18	Watt-hour meter	1	35,333	106,000	90079632 C1.02.02	204/19	HIOKI	3181	1	212	JICA	2533	
19	Watt-hour meter	1	35,333	106,000	90079633 C1.02.02	204/20	HIOKI	3181	1	212	JICA	2533	
20	Watt-hour meter	1	35,333	106,000	90079634 C1.02.02	204/21	HIOKI	3181	1	212	JICA	2533	
21	Watt-hour meter	1	35,333	106,000	90079635 C1.02.02	204/22	HIOKI	3181	1	212	JICA	2533	
22	Recorder	1	33,133	99,400	90063317 C1.02.02	436/19	HIOKI	3171	1	212	JICA	2533	
23	Recorder	1	33,133	99,400	90063326 C1.02.02	436/20	HIOKI	3171	1	212	JICA	2533	
24	Recorder	1	33,133	99,400	90063329 C1.02.02	436/21	HIOKI	3171	1	212	JICA	2533	
25	Recorder	1	33,133	99,400	90063330 C1.02.02	436/22	HIOKI	3171	1	212	JICA	2533	
26	Recorder	1	33,133	99,400	90037888 C1.02.02	436/23	HIOKI	3171	1	212	JICA	2533	
27	Digital Power Factor Meter	1	82,000	246,000	50AS0013 C1.02.04	205/2	YEW	2524 480V.,10A	1	212	JICA	2533	
28	Digital Power Factor Meter	1	82,000	246,000	50AS0014 C1.02.04	205/3	YEW	2524 480V.,10A	1	212	JICA	2533	
29	AC voltmeter	1	9,444	28,333	60AE3248 C1.03.00	427/1	YEW	2013 15,30V.	1	212	JICA	2533	
30	AC voltmeter	1	9,444	28,333	60AE3301 C1.03.00	427/2	YEW	2013 15,30V.	1	212	JICA	2533	
31	AC voltmeter	1	9,444	28,333	60AE3252 C1.03.00	427/3	YEW	2013 15,30V.	1	212	JICA	2533	
32	AC voltmeter	1	9,533	28,600	60AE3228 C1.03.01	427/4	YEW	2013 150,300V.	1	212	JICA	2533	
33	AC voltmeter	1	9,533	28,600	60AE3292 C1.03.01	427/5	YEW	2013 150,300V.	1	212	JICA	2533	
34	AC voltmeter	1	9,533	28,600	60AE3250 C1.03.01	427/6	YEW	2013 150,300V.	1	212	JICA	2533	

Appendix-1

No.	Items	Quantity	Price (Baht)	Price (Yen)	Code	Registration Number	Name of Producer	Model/Size	Div. in charge	Location Room No.	Received from	Budget Year	Using Area WXL(m3)
35	AC voltmeter	1	9,533	28,600	60AE3296 C1.03.01	427/7	YEW	2013 150,300V.	1	212	JICA	2533	
36	AC voltmeter	1	9,533	28,600	60AE3279 C1.03.01	427/8	YEW	2013 150,300V.	1	212	JICA	2533	
37	AC voltmeter	1	9,444	28,333	70AD00064 C1.03.02	427/9	YEW	2017 30,75,150,300V.	1	212	JICA	2533	
38	AC voltmeter	1	9,444	28,333	70AD0070 C1.03.02	427/10	YEW	2017 30,75,150,300V.	1	212	JICA	2533	
39	AC voltmeter	1	9,444	28,333	70AD00063 C1.03.02	427/11	YEW	2017 30,75,150,300V.	1	212	JICA	2533	
40	AC voltmeter	1	9,500	28,500	60AE3316 C1.03.03	427/12	YEW	2013 300,750V.	1	212	JICA	2533	
41	AC voltmeter	1	9,500	28,500	60AE3258 C1.03.03	427/13	YEW	2013 300,750V.	1	212	JICA	2533	
42	Electro-static voltmeter	1	27,667	83,000	60AU0018 C1.03.03	427/14	YEW	2064	1	212	JICA	2533	
43	Electro-static voltmeter	1	11,667	35,000	- C1.03.05a	427/15	YEW	2065	1	207	JICA	2533	
44	DC voltmeter	1	9,111	27,333	70AA02593 C1.04.00.1	427/16	YEW	2011 3,10,30,100V.	1	212	JICA	2533	
45	DC voltmeter	1	9,111	27,333	70AA02639 C1.04.00.1	427/17	YEW	2011 3,10,30,100V.	1	212	JICA	2533	
46	DC voltmeter	1	9,111	27,333	70AA02637 C1.04.00.1	427/18	YEW	2011 3,10,30,100V.	1	212	JICA	2533	
47	DC voltmeter	1	9,167	27,500	70AA02640 C1.04.00.2	427/19	YEW	2011	1	212	JICA	2533	
48	DC voltmeter	1	9,167	27,500	70AA02643 C1.04.00.2	427/20	YEW	2011	1	212	JICA	2533	
49	DC voltmeter	1	9,133	27,400	70AA02405 C1.04.00a	427/21	YEW	2011 30,100,300,1000V.	1	212	JICA	2533	
50	DC voltmeter	1	9,133	27,400	70AA02406 C1.04.00a	427/22	YEW	2011 30,100,300,1000V.	1	212	JICA	2533	
51	DC voltmeter	1	9,133	27,400	70AA02778 C1.04.00a	427/23	YEW	2011 30,100,300,1000V.	1	212	JICA	2533	
52	DC voltmeter	1	9,133	27,400	70AA02781 C1.04.00a	427/24	YEW	2011 30,100,300,1000V.	1	212	JICA	2533	

Appendix-1

No.	Items	Quan-tity	Price (Baht)	Price (Yen)	Code	Registration Number	Name of Producer	Model/Size	Div. in charge	Location Room No.	Received from	Budget Year	Using Area WXL(m3)
53	DC voltmeter	1	9,133	27,400	70AA02802 C1.04.00a	427/25	YEW	2011 30,100,300,1000V.	1	212	JICA	2533	
54	DC voltmeter	1	16,500	49,500	70AC00215 C1.06.00	428/1	YEW	2012 1mA~30A	1	212	JICA	2533	
55	DC voltmeter	1	16,500	49,500	70AC00219 C1.06.00	428/2	YEW	2012 50mV~1000V.	1	212	JICA	2533	
56	DC voltmeter	1	16,500	49,500	70AC00217 C1.06.00a	428/3	YEW	2012 1mA~30A	1	212	JICA	2533	
57	DC voltmeter	1	16,500	49,500	70AC00221 C1.06.00a	428/4	YEW	2012 50mV~1000V.	1	212	JICA	2533	
58	AC volt-ammeter	1	18,167	54,500	60AG0617 C1.07.00	428/5	YEW	2014 0.15A~30A 30V~750V.	1	212	JICA	2533	
			0										
59	AC volt-ammeter	1		54,500	60AG0590 C1.07.00	428/6	YEW	2014 0.15A~30A 30V~750V.	1	212	JICA	2533	
			0										
60	AC volt-ammeter	1	18,167	54,500	60AG0589 C1.07.00	428/7	YEW	2014 0.15A~30A 30V~750V.	1	212	JICA	2533	
			0										
61	AC volt-ammeter	1		54,500	60AG0585 C1.07.00	428/8	YEW	2014 0.15A~30A 30V~750V.	1	212	JICA	2533	
			0										
62	AC ammeter	1	9,867	29,600	60AE2743 C1.08.01	428/9	YEW	2013 0.1,0.2,0.5,1A	1	212	JICA	2533	
63	AC ammeter	1	9,867	29,600	60AE2754 C1.08.01	428/10	YEW	2013 0.1,0.2,0.5,1A	1	212	JICA	2533	
64	AC ammeter	1	9,867	29,600	60AE3302 C1.08.01	428/11	YEW	2013 0.1,0.2,0.5,1A	1	212	JICA	2533	
65	AC ammeter	1	9,867	29,600	60AE3313 C1.08.01	428/12	YEW	2013 0.1,0.2,0.5,1A	1	212	JICA	2533	
66	AC ammeter	1	9,867	29,600	60AE3317 C1.08.01	428/13	YEW	2013 0.1,0.2,0.5,1A	1	212	JICA	2533	
67	AC ammeter	1	9,867	29,600	60AE2928 C1.08.02	428/14	YEW	2013 0.5,1,2,5A	1	212	JICA	2533	
68	AC ammeter	1	9,867	29,600	60AE2929 C1.08.02	428/15	YEW	2013 0.5,1,2,5A	1	212	JICA	2533	

No.	Items	Quan-tity	Price (Baht)	Price (Yen)	Code	Registration Number	Name of Producer	Model/Size	Div. in charge	Location Room No.	Received from	Budget Year	Using Area WXL(m3)
69	AC ammeter	1	9,867	29,600	60AE2932 C1.08.02	428/16	YEW	2013 0.5,1,2,5A	1	212	JICA	2533	
70	AC ammeter	1	9,867	29,600	60AE2941 C1.08.02	428/17	YEW	2013 0.5,1,2,5A	1	212	JICA	2533	
71	AC ammeter	1	9,867	29,600	60AE2963 C1.08.02	428/18	YEW	2013 0.5,1,2,5A	1	212	JICA	2533	
72	AC ammeter	1	9,867	29,600	60AE2973 C1.08.02a	428/19	YEW	2013 0.5,1,2,5A	1	212	JICA	2533	
73	AC ammeter	1	9,867	29,600	60AE3299 C1.08.02a	428/20	YEW	2013 0.5,1,2,5A	1	212	JICA	2533	
74	AC ammeter	1	9,867	29,600	60AE3312 C1.08.02a	428/21	YEW	2013 0.5,1,2,5A	1	212	JICA	2533	
75	AC ammeter	1	9,867	29,600	60AE3318 C1.08.02a	428/22	YEW	2013 0.5,1,2,5A	1	212	JICA	2533	
76	AC ammeter	1	9,867	29,600	60AE3324 C1.08.02a	428/23	YEW	2013 0.5,1,2,5A	1	212	JICA	2533	
77	AC ammeter	1	9,867	29,600	60AE3249 C1.08.03	428/24	YEW	2013 2.5,10,20A	1	212	JICA	2533	
78	AC ammeter	1	9,867	29,600	60AE3294 C1.08.03	428/25	YEW	2013 2.5,10,20A	1	212	JICA	2533	
79	AC ammeter	1	9,867	29,600	60AE3308 C1.08.03	428/26	YEW	2013 2.5,10,20A	1	212	JICA	2533	
80	AC ammeter	1	9,867	29,600	60AE3320 C1.08.03	428/27	YEW	2013 2.5,10,20A	1	212	JICA	2533	
81	AC ammeter	1	9,867	29,600	60AE3314 C1.08.03	428/28	YEW	2013 2.5,10,20A	1	212	JICA	2533	
82	AC ammeter	1	9,867	29,600	60AE3285 C1.08.04	428/29	YEW	2013 10,30,100,300mA	1	212	JICA	2533	
83	AC ammeter	1	9,867	29,600	60AE3286 C1.08.04	428/30	YEW	2013 10,30,100,300mA	1	212	JICA	2533	
84	AC ammeter	1	9,867	29,600	60AE3315 C1.08.04	428/31	YEW	2013 10,30,100,300mA	1	212	JICA	2533	
85	AC ammeter	1	9,867	29,600	60AE3323 C1.08.04	428/32	YEW	2013 10,30,100,300mA	1	212	JICA	2533	
86	AC ammeter	1	9,867	29,600	60AE3326 C1.08.04	428/33	YEW	2013 10,30,100,300mA	1	212	JICA	2533	

Appendix-1

No.	Items	Quan-tity	Price (Baht)	Price (Yen)	Code	Registration Number	Name of Producer	Model/Size	Div. in charge	Location Room No.	Received from	Budget Year	Using Area WXL(m3)
87	DC voltmeter	1	7,933	23,800	70AA02614 C1.09.01	428/34	YEW	2011 10,30,100,300mA	1	212	JICA	2533	
88	DC voltmeter	1	7,933	23,800	70AA02574 C1.09.01	428/35	YEW	2011 10,30,100,300mA	1	212	JICA	2533	
89	DC voltmeter	1	7,933	23,800	70AA02613 C1.09.01	428/36	YEW	2011 10,30,100,300mA	1	212	JICA	2533	
90	DC voltmeter	1	7,933	23,800	70AA02572 C1.09.00	428/37	YEW	2011 10,30,100,300mA	1	212	JICA	2533	
91	DC voltmeter	1	7,933	23,800	70AA02573 C1.09.01	428/38	YEW	2011 10.30.100.300mA	1	212	JICA	2533	
92	DC voltmeter	1	7,933	23,800	70AA02820 C1.09.02	428/39	YEW	2011 0.1.0.3.1.3A	1	212	JICA	2533	
93	DC voltmeter	1	7,933	23,800	70AA02828 C1.09.02	428/40	YEW	2011 0.1.0.3.1.3A	1	212	JICA	2533	
94	DC voltmeter	1	7,933	23,800	70AA02823 C1.09.02	428/41	YEW	2011 0.1.0.3.1.3A	1	212	JICA	2533	
95	DC voltmeter	1	7,933	23,800	70AA02829 C1.09.02	428/42	YEW	2011 0.1.0.3.1.3A	1	212	JICA	2533	
96	DC voltmeter	1	7,933	23,800	70AA02830 C1.09.02	428/43	YEW	2011 0.1.0.3.1.3A	1	212	JICA	2533	
97	DC voltmeter	1	7,933	23,800	70AA02758 C1.09.03	428/44	YEW	2011 1,3,10,30A	1	212	JICA	2533	
98	DC voltmeter	1	7,933	23,800	70AA02771 C1.09.03	428/45	YEW	2011 1,3,10,30A	1	212	JICA	2533	
99	DC voltmeter	1	7,933	23,800	70AA02770 C1.09.03	428/46	YEW	2011 1,3,10,30A	1	212	JICA	2533	
100	DC voltmeter	1	7,933	23,800	70AA02756 C1.09.03	428/47	YEW	2011 1,3,10,30A	1	212	JICA	2533	
101	DC voltmeter	1	7,933	23,800	70AA02762 C1.09.03	428/48	YEW	2011 1,3,10,30A	1	212	JICA	2533	
102	DC voltmeter	1	7,800	23,400	70AA02768 C1.09.03a	428/49	YEW	2011 1,3,10,30A	1	212	JICA	2533	
103	DC voltmeter	1	7,800	23,400	70AA02749 C1.09.03a	428/50	YEW	2011 1,3,10,30A	1	212	JICA	2533	
104	DC voltmeter	1	7,800	23,400	70AA02764 C1.09.03a	428/51	YEW	2011 1,3,10,30A	1	212	JICA	2533	

No.	Items	Quan-tity	Price (Baht)	Price (Yen)	Code	Registration Number	Name of Producer	Model/Size	Div. in charge	Location Room No.	Received from	Budget Year	Using Area WXL(m3)
105	DC voltmeter	1	7,800	23,400	70AA02773 C1.09.03a	428/52	YEW	2011 1,3,10,30A	1	212	JICA	2533	
106	DC voltmeter	1	7,800	23,400	70AA02799 C1.09.03a	428/53	YEW	2011 1,3,10,30A	1	212	JICA	2533	
107	Thermo-couple type ammeter	1	35,000	105,000	60AJ00164 C1.10.01	428/54	YEW	2016 5,10,20,50mA	1	212	JICA	2533	
108	Thermo-couple type ammeter	1	35,000	105,000	60AJ00191 C1.10.02	428/55	YEW	2016 20,50,100,200mA	1	211	JICA	2533	
109	Thermo-couple type ammeter	1	35,000	105,000	60AJ0134 C1.10.03	428/56	YEW	2016 100,200,500,1000mA	1	212	JICA	2533	
110	Thermo-couple type ammeter	1	35,000	105,000	60AJ0168 M1.03.01	428/57	YEW	2016 5,10,20,50mA	1	207	JICA	2533	
111	Thermo-couple type ammeter	1	35,000	105,000	60AJ0092 M1.03.02	428/58	YEW	2016	1	207	JICA	2533	
112	Thermo-couple type ammeter	1	35,000	105,000	60AJ0169 M1.03.03	428/59	YEW	2016	1	207	JICA	2533	
113	Thermo-couple type ammeter	1	34,167	102,500	60AJ0152 C1.10.04	428/60	YEW	2016 15,30,75,150V	1	212	JICA	2533	
114	Thermo-couple type ammeter	1	34,167	102,500	60AJ0139 C1.10.04	428/61	YEW	2016 15,30,75,150V	1	212	JICA	2533	
115	Digital AC meter	1	412,000	1,236,000	50AU0449 C1.11.00	429/1	YEW	2533	1	212	JICA	2533	
116	Digital AC meter	1	412,000	1,236,000	50AU0451 C1.11.00	429/2	YEW	2533	1	212	JICA	2533	
117	Digital AC meter	1	412,000	1,236,000	90022026 C1.11.01	429/3	HIOKI	3191	1	212	JICA	2533	
118	Digital AC meter	1	412,000	1,236,000	90022027 C1.11.01a	429/4	HIOKI	3191	1	212	JICA	2533	
119	Digital AC meter	1	412,000	1,236,000	90022028 C1.11.02	429/5	HIOKI	3191	1	212	JICA	2533	
120	Digital AC meter	1	223,500	670,500	030146A122 C1.12.00	429/6	NATIONAL	VP-2710A	1	212	JICA	2533	
121	Digital multimeter	1	223,500	670,500	030147A122 C1.11.00	429/7	NATIONAL	VP-2710A	1	212	JICA	2533	
122	Digital multimeter	1	21,167	63,500	99AH0076 C1.03.00	429/8	YEW	7542	1	212	JICA	2533	

Appendix-1

No.	Items	Quantity	Price (Baht)	Price (Yen)	Code	Registration Number	Name of Producer	Model/Size	Div. in charge	Location Room No.	Received from	Budget Year	Using Area WXL(m3)
123	Digital multimeter	1	21,167	63,500	99AM0189	429/9	YEW	7542	1	212	JICA	2533	
124	Clamp multimeter	1	2,333	7,000	0B0270	429/10	HIOKI	3128	1	212	JICA	2533	
125	Clamp multimeter	1	2,333	7,000	0C0153 C1.14.00a	429/11	HIOKI	3128	1	219	JICA	2533	
126	Digital circuit tester	1	4,000	12,000	89223804 C1.15.00	375/2	HIOKI	3231	1	212	JICA	2533	
127	Digital circuit tester	1	4,000	12,000	89223810 C1.15.00	375/3	HIOKI	3231	1	114	JICA	2533	
128	Digital circuit tester	1	4,000	12,000	90017723 C1.15.00	375/4	HIOKI	3231	1	219	JICA	2533	
129	Digital circuit tester	1	4,000	12,000	89223817 C1.15.00	375/5	HIOKI	3231	1	207	JICA	2533	
130	Digital circuit tester	1	4,000	12,000	89223822 C1.15.00	375/6	HIOKI	3231	1	207	JICA	2533	
131	Digital circuit tester	1	4,000	12,000	90059270 C1.15.00a	375/7	HIOKI	3231	1	212	JICA	2533	
132	Digital circuit tester	1	4,000	12,000	90008245 C1.15.00a	375/8	HIOKI	3231	1	212	JICA	2533	
133	Digital multimeter	1	4,000	12,000	90017724 C1.15.00a	375/9	HIOKI	3231	1	212	JICA	2533	
134	Digital multimeter	1	4,000	12,000	90059276 C1.15.00a	375/10	HIOKI	3231	1	212	JICA	2533	
135	Digital multimeter	1	4,000	12,000	90059276 C1.15.00a	375/11	HIOKI	3231	1	212	JICA	2533	
136	Capacitance motor	1	183,000	549,000	463419 C1.16.00	430/1	ANDO	AG-4304	1	212	JICA	2533	
137	Wheatstone bridge	1	94,000	282,000	50FC0024 C2.01.00	202/2	YEW	2768	1	108	JICA	2533	
138	Wheatstone bridge	1	94,000	282,000	50FC0026 M1.04.00	202/3	YEW	2768	1	207	JICA	2533	
139	Double bridge	1	131,333	394,000	50ES0037 C2.02.00	202/4	YEW	2752	1	207	JICA	2533	
140	Double bridge	1	148,000	444,000	50ES0039 M1.06.00	202/5	YEW	2752	1	108	JICA	2533	

No.	Items	Quan-tity	Price (Baht)	Price (Yen)	Code	Registration Number	Name of Producer	Model/Size	Div. in charge	Location Room No.	Received from	Budget Year	Using Area WXL(m3)
141	Electronic golvanometer	1	76,667	230,000	50EC0045 C2.03.00	431/1	YEW	2709	1	207	JICA	2533	
142	Electronic golvanometer	1	80,333	241,000	50EC0039 M1.05.00	431/2	YEW	2709	1	207	JICA	2533	
143	Decade resistance box: lowZ	1	54,583	163,750	50FT0308	432/1-1	YEW	2793	1	108	JICA	2533	
144	Decade resistance box: lowZ	1	54,583	163,750	50FT0304	432/1-2	YEW	2793	1	108	JICA	2533	
145	Decade resistance box: lowZ	1	54,583	163,750	50FT0302	432/1-3	YEW	2793	1	108	JICA	2533	
146	Decade resistance box: lowZ	1	54,583	163,750	50FT0306	432/1-4	YEW	2793	1	108	JICA	2533	
147	Decade resistance box: lowZ	1	54,667	164,000	50FT0307 M1.07.00	432/2	YEW	2793	1	207	JICA	2533	
148	Decade resistance box: HighZ	1	88,667	266,000	50FT1088 C2.05.00	432/3-1	YEW	2793	1	108	JICA	2533	
149	Decade resistance box: HighZ	1	88,667	266,000	50FT1086 C2.05.00	432/3-2	YEW	2793	1	108	JICA	2533	
150	Decade resistance box: HighZ	1	88,667	266,000	50FT1085 C2.05.00	432/3-3	YEW	2793	1	108	JICA	2533	
151	Decade resistance box: HighZ	1	88,667	266,000	50FT1054 C2.05.00	432/3-4	YEW	2793	1	108	JICA	2533	
152	Resistors for discharge test	1	54,500	163,500	- C2.06.00	433/1-1	TAIYOO KEIKI	-	1	212	JICA	2533	
153	Resistors for discharge test	1	54,500	163,500	- C2.06.00	433/1-2	TAIYOO KEIKI	-	1	212	JICA	2533	
154	Rheostat	1	9,000	27,000	89804 C2.07.00	433/2	OGAWA SEIKI	OSK-10244	1	212	JICA	2533	
155	Rheostat	1	9,000	27,000	89805 C2.07.00	433/3	OGAWA SEIKI	OSK-10244	1	212	JICA	2533	
156	Switch resistance tester	1	71,833	215,500	041680B122 C2.08.00	202/6	NATIONAL	VP-2811A	1	212	JICA	2533	
157	Switch resistance tester	1	71,833	215,500	041681B122 C2.08.00	202/7	NATIONAL	VP-2811A	1	212	JICA	2533	
158	Oscilloscope	1	84,778	254,333	040167E125 C3.01.00.1	434/1-1	NATIONAL	VP-5566A	1	211	JICA	2533	

Appendix-1

No.	Items	Quantity	Price (Baht)	Price (Yen)	Code	Registration Number	Name of Producer	Model/Size	Div. in charge	Location Room No.	Received from	Budget Year	Using Area WXL(m3)
159	Oscilloscope	1	84,778	254,333	040152E125 C3.01.00.1	434/1-2	NATIONAL	VP-5566A	1	211	JICA	2533	
160	Oscilloscope	1	84,778	254,333	03136E125 C3.01.00.1	434/1-3	NATIONAL	VP-5566A	1	211	JICA	2533	
161	Oscilloscope	1	84,778	254,333	030123E125 C3.01.00.1	434/1-4	NATIONAL	VP-5566A	1	211	JICA	2533	
162	Oscilloscope	1	84,778	254,333	030133E125 C3.01.00.1	434/1-5	NATIONAL	VP-5566A	1	211	JICA	2533	
163	Oscilloscope	1	84,778	254,333	040154E125 C3.01.00.1	434/1-6	NATIONAL	VP-5566A	1	211	JICA	2533	
164	Storage oscilloscope	1	173,667	521,000	21171109 C3.02.00	434/2	IWATSU	MS-5311	1	211	JICA	2533	
165	Storage oscilloscope	1	173,667	521,000	2171110 C3.02.00a	434/3	IWATSU	MS-5311	1	211	JICA	2533	
166	Frequency meter	1	14,167	42,500	70AF00111 C3.03.00	435/1.1	YEW	2038	1	212	JICA	2533	
167	Frequency meter	1	14,167	42,500	70AF00087 C3.03.00	435/1.2	YEW	2038	1	212	JICA	2533	
168	Frequency meter	1	14,000	42,000	60AS0016 C3.03.01	435/2	YEW	2038	1	212	JICA	2533	
169	Frequency meter	1	14,000	42,000	60AS0015 C3.03.02	435/3	YEW	2038	1	212	JICA	2533	
170	Stop clock	1	7,800	23,400	902970 C4.04.00	40/15	SEIKO	S-111	1	211	JICA	2533	
171	Stop clock	1	7,800	23,400	902220 C4.04.00	40/16	SEIKO	S-112	1	211	JICA	2533	
172	Stop clock	1	7,800	23,400	902235 C4.04.00	40/17	SEIKO	S-113	1	211	JICA	2533	
173	Stop clock	1	7,800	23,400	902235 C4.04.00	40/18	SEIKO	S-114	1	211	JICA	2533	
174	Stop clock	1	7,800	23,400	- C4.04.00	40/19	SEIKO	S-115	1	211	JICA	2533	
175	Digital stroboscope	1	71,667	215,000	0017231 C4.05.00	245/6	SUGAWARA	OSK-4795	1	211	JICA	2533	
176	Digital stroboscope	1	71,667	215,000	0017232 C4.05.00	245/7	SUGAWARA	OSK-4795	1	211	JICA	2533	

Appendix-1

No.	Items	Quantity	Price (Baht)	Price (Yen)	Code	Registration Number	Name of Producer	Model/Size	Div. in charge	Location Room No.	Received from	Budget Year	Using Area WXL(m3)
177	Digital thermometer	1	113,833	341,500	50CC0015 C5.01.00	254/2.1-1	YEW	2571	1	211	JICA	2533	
178	Digital thermometer	1	113,833	341,500	50CC1016 C5.01.00	254/2.1-2	YEW	2571	1	211	JICA	2533	
179	30 point selector	1	39,667	119,000	50GJ0017 C5.01.00	254/2.2-1	YEW	2815	1	211	JICA	2533	
180	30 point selector	1	39,667	119,000	50GJ0019 C5.01.00	254/2.2-2	YEW	2815	1	211	JICA	2533	
181	Hybrid recorder	1	254,667	764,000	40SB0130 C5.02.00.1	436/1	YEW	3081	1	211	JICA	2533	0.44x0.37(0.16)
182	Hybrid recorder	1	254,667	764,000	40SB0131 C5.02.00.2	436/2	YEW	3081	1	212	JICA	2533	
183	Hybrid recorder	1	230,389	691,167	40RA0198 C5.03.00	436/3	YEW	3087	1	113	JICA	2533	
184	Hybrid recorder	1	230,389	691,167	40RA0197 C5.03.00	436/4	YEW	3087	1	207	JICA	2533	
185	Hybrid recorder	1	230,389	691,167	40RA0195 C5.03.00	436/5	YEW	3087	1	208	JICA	2533	0.32x0.34(0.10)
186	Hybrid recorder	1	230,389	691,167	40RA0196 C5.03.00	436/6	YEW	3087	1	212	JICA	2533	
187	Hybrid recorder	1	230,389	691,167	40RA0193 C5.03.00	436/7	YEW	3087	1	212	JICA	2533	0.32x0.35(0.11)
188	Hybrid recorder	1	230,389	691,167	40RA0194 C5.03.00	436/8	YEW	3087	1	114	JICA	2533	
189	Pocket thermometer	1 1 1 1 1	14,533 14,533 14,533 14,533 14,533	43,600 43,600 43,600 43,600 43,600	TIS070/01 TIS070/02 TIS070/03 TIS070/04 TIS070/05 C5.05.00	254/3	YEW	2542	1	211	JICA	2533	
190	Flat bed recorder	1	137,833	413,500	DA4117PS C6.01.00	436/9	TOA DEMPA	FBR-253A	1	210	JICA	2533	
191	Flat bed recorder	1	137,833	413,500	DA4127PS C6.01.00	436/10	TOA DEMPA	FBR-253A	1	211	JICA	2533	
192	Flat bed recorder	1	137,833	413,500	DA4137PS C6.01.00	436/11	TOA DEMPA	FBR-253A	1	211	JICA	2533	

Appendix-1

No.	Items	Quantity	Price (Baht)	Price (Yen)	Code	Registration Number	Name of Producer	Model/Size	Div. in charge	Location Room No.	Received from	Budget Year	Using Area WXL(m3)
193	Flat bed recorder	1	137,833	413,500	DA4387QS C6.01.00	436/12	TOA DEMPA	FBR-253A	1	211	JICA	2533	
194	X-Y recorder	1	137,667	413,000	0040281 C6.02.00	436/13	GRAPHTECH	WX-1200	1	211	JICA	2533	
195	X-Y recorder	1	137,667	413,000	0040282 C6.02.00	436/14	GRAPHTECH	WX-1201	1	211	JICA	2533	
196	X-Y recorder	1	137,667	413,000	0040496 C6.03.00	436/15	GRAPHTECH	WX-2300-2Z	1	211	JICA	2533	
197	X-Y recorder	1	137,667	413,000	0040497 C6.03.00	436/16	GRAPHTECH	WX-2300-2Z	1	211	JICA	2533	
198	X-Y recorder	1	137,667	413,000	0040482 C6.04.00	436/17	GRAPHTECH	WX-2400-2Z	1	211	JICA	2533	
199	X-Y recorder	1	137,667	413,000	0040483 C6.04.00	436/18	GRAPHTECH	WX-2400-2Z	1	211	JICA	2533	
200	AC single phase voltage regulator	1	145,667	437,000	C00202 C7.00.00.1	437/1	MATSUNAGA	TA-229	1	211	JICA	2533	
201	AC single phase voltage regulator	1	145,667	437,000	C00201 C7.01.00.1	437/2	MATSUNAGA	TA-229	1	211	JICA	2533	0.50x0.60(0.3)
202	AC single phase voltage regulator	1	145,555	436,666	C00203 C7.01.00.2	437/3	MATSUNAGA	TA-2245	1	210	JICA	2533	0.50x0.80(0.40)
203	AC single phase voltage regulator	1	145,555	436,666	C00202 C7.01.00.2	437/4	MATSUNAGA	TA-2245	1	207	JICA	2533	
204	AC single phase voltage regulator	1	145,555	436,666	C000201 C7.00.00.2	437/5	MATSUNAGA	TA-2245	1	212	JICA	2533	0.50x0.60(0.3)
205	AC single phase voltage regulator	1	145,667	437,000	C00201 C7.01.00.3	437/6	MATSUNAGA	TA-229-V	1	207	JICA	2533	0.50x0.60(0.3)
206	AC three phase voltage regulator	1	441,667	1,325,000	00201 C7.02.00	437/7	MATSUNAGA	TA3-10-380G	1	212	JICA	2533	0.60x0.70(0.42)
207	DC power supply source	1	100,000	300,000	12989011 C7.03.01.1	424/3-1	TAKASAGO	GP035-50	1	212	JICA	2533	
208	DC power supply source	1	100,000	300,000	12989012 C7.03.01.1	424/3-2	TAKASAGO	GP035-50	1	212	JICA	2533	
209	DC power supply source	1	100,000	300,000	12989013 C7.03.01.1	424/4-1	TAKASAGO	GP035-50	1	212	JICA	2533	
210	DC power supply source	1	100,000	300,000	12989014 C7.03.01.1	424/4-2	TAKASAGO	GP035-50	1	212	JICA	2533	

Appendix-1

No.	Items	Quantity	Price (Baht)	Price (Yen)	Code	Registration Number	Name of Producer	Model/Size	Div. in charge	Location Room No.	Received from	Budget Year	Using Area WXL(m3)
211	DC power supply source	1	109,667	329,000	17989018 C7.03.01.2	424/5	TAKASAGO	GPO250-10R	1	211	JICA	2533	0.45x0.50(0.22)
212	DC power supply source	1	109,667	329,000	C7.03.01a	424/6	TAKASAGO	GPO250-10R	1	212	JICA	2533	
213	DC power supply source	1	109,667	329,000	C7.03.01a	424/7	TAKASAGO	GPO250-10R	1	212	JICA	2533	
214	DC power supply source	1	109,667	329,000	20289042 C7.03.02	424/8	TAKASAGO	GPO650-05R	1	113	JICA	2533	
215	DC power supply source	1	21,333	64,000	11989303 C7.04.01.1	424/9	TAKASAGO	GPO35-5	1	212	JICA	2533	
216	DC power supply source	1	21,333	64,000	11989304 C7.04.01.2	424/10	TAKASAGO	GPO35-5	1	212	JICA	2533	
217	DC power supply source	1	21,333	64,000	11989305 C7.04.01.2	424/11	TAKASAGO	GPO35-5	1	212	JICA	2533	
218	DC power supply source	1	21,333	64,000	11989306 C7.04.01.3	424/12	TAKASAGO	GPO35-5	1	207	JICA	2533	
219	DC power supply source	1	21,333	64,000	11989309 C7.04.01.3	424/13	TAKASAGO	GPO35-5	1	207	JICA	2533	
220	DC power supply source	1	450,667	1,352,000	2890577 C7.05.02	424/14	TAKASAGO	GPO35-200R	1	211	JICA	2533	0.50x0.62(0.31)
221	Variable AC source	1	411,000	1,233,000	C7.05.00.1	424/15	TAKASAGO	AA330F	1	212	JICA	2533	
222	Variable AC source	1	411,000	1,233,000	48489053 C7.05.00.2	424/16	TAKASAGO	AA2000F	1	114	JICA	2533	0.50x0.60(0.3)
223	Variable AC source	1	411,000	1,233,000	2890568 C7.05.00.3	424/17	TAKASAGO	AA5000	1	211	JICA	2533	0.50x0.60(0.3)
224	Variable AC source	1	543,000	1,629,000	00201 C7.06.00	424/18	MATSUNAGA	SVC-22136	1	113	JICA	2533	0.50x0.70(0.42)
225	High voltage testing device Control board	1	2,959,333	8,878,000	C7.07.00	438/1 438/1-1	OGAWA SEIKI	OSK6593	1	108	JICA	2533	4.00x4.50(18)
226	Impluse generator	1			C7.07.00	438/1-2	TTC	-	1	108	JICA	2533	
227	Digital storageoscilloscope	1			BOZ0866	438/1-3	TEKTRONIX	2221	1	108	JICA	2533	
228	Oscilloscope camera	1			016-0359	438/1-4	TEKTRONIX	C-5C	1	108	JICA	2533	

Appendix-1

No.	Items	Quantity	Price (Baht)	Price (Yen)	Code	Registration Number	Name of Producer	Model/Size	Div. in charge	Location Room No.	Received from	Budget Year	Using Area WXL(m3)
229	High voltage power supply unit	1	31,167	93,500	No.1 C7.08.00	424/19-1	OGAWA SEIKI	OSK11912	1	212	JICA	2533	
230	High voltage power supply unit	1	31,167	93,500	No.2 C7.08.00	424/19-2	OGAWA SEIKI	OSK11912	1	212	JICA	2533	
231	Step-up transformer	1	124,667	374,000	7686 C7.10.00	439/1	OGAWA SEIKI	OSK10235	1	212	JICA	2533	0.50x0.50(0.25)
232	Step-down transformer	1	27,333	82,000	1059 C7.11.00	439/2	MATSUNAGA	WTC-4KB	1	212	JICA	2533	
233	Step-down transformer	1	27,333	82,000	1060 C7.11.00	439/3	MATSUNAGA	WTC-4KB	1	212	JICA	2533	
234	Step-down transformer	1	27,333	82,000	1061 C7.11.00a	439/4	MATSUNAGA	WTC-4KB	1	212	JICA	2533	
235	Insulation transformer	1	1,667	5,000	1027 C7.12.00.1	439/5	MATSUNAGA	WTC-1K 1□ Max4.5A	1	211	JICA	2533	
236	Insulation transformer	1	1,667	5,000	1031 C7.12.00.1	439/6	MATSUNAGA	WTC-1K 1□ Max4.5A	1	211	JICA	2533	
237	Insulation transformer	1	1,667	5,000	1034 C7.12.00.1	439/7	MATSUNAGA	WTC-1K 1□ Max4.5A	1	211	JICA	2533	
238	Insulation transformer	1	1,667	5,000	1036 C7.12.00.2	439/8	MATSUNAGA	WTC-1K 1	1	212	JICA	2533	
239	Insulation transformer	1	1,667	5,000	1033 C7.12.00.2	439/9	MATSUNAGA	WTC-1K 1	1	211	JICA	2533	
240	Insulation transformer	1	1,667	5,000	1030 C7.12.00.2	439/10	MATSUNAGA	WTC-1K 1	1	211	JICA	2533	
241	Insulation transformer	1	1,667	5,000	1029 C7.12.00.3	439/11	MATSUNAGA	WTC-1K 1□ Max4.5A	1	212	JICA	2533	
242	Insulation transformer	1	1,667	5,000	1032 C7.12.00.4	439/12	MATSUNAGA	WTC-1K	1	114	JICA	2533	
243	Insulation transformer	1	1,667	5,000	1028 C7.12.00.5	439/13	MATSUNAGA	WTC-1K	1	211	JICA	2533	
244	Insulation transformer	1	1,667	5,000	C7.12.00.6	439/14	MATSUNAGA	WTC-1K	1	202	JICA	2533	
245	Current transformer	1	21,167	63,500	No.1 C7.13.00.1	439/15	TAKASAGO	-	1	212	JICA	2533	
246	Current transformer	1	21,167	63,500	No.2 C7.13.00.1	439/16	TAKASAGO	-	1	212	JICA	2533	

No.	Items	Quantity	Price (Baht)	Price (Yen)	Code	Registration Number	Name of Producer	Model/Size	Div. in charge	Location Room No.	Received from	Budget Year	Using Area WXL(m3)
247	Current transformer	1	21,167	63,500	11875 C7.13.00.2	439/17	YEW	2243-00	1	212	JICA	2533	
248	Current transformer	1	21,167	63,500	00876 C7.13.00.2	439/18	YEW	2243-00	1	212	JICA	2533	
249	Current transformer	1	21,167	63,500	00879 C7.13.00.2	439/19	YEW	2243-00	1	212	JICA	2533	
250	Current transformer	1	21,167	63,500	00882 C7.13.00.2	439/20	YEW	2243-00	1	212	JICA	2533	
251	Current transformer	1	21,167	63,500	10249 C7.13.00.3	439/21	YEW	2241-00	1	212	JICA	2533	
252	Current transformer	1	21,167	63,500	10261 C7.13.00.3	439/22	YEW	2241-00	1	212	JICA	2533	
253	Current transformer	1	21,167	63,500	10269 C7.13.00.3	439/23	YEW	2241-00	1	212	JICA	2533	
254	Current transformer	1	21,167	63,500	10257 C7.13.00.3	439/24	YEW	2241-00	1	212	JICA	2533	
255	Filament heating transformer	1	93,333	280,000	1038 C7.14.00	439/25	MATSUNAGA	WTC-30	1	212	JICA	2533	
256	Filament heating transformer	1	93,333	280,000	1037 C7.14.00	439/26	MATSUNAGA	WTC-30	1	212	JICA	2533	
257	Volt slider	1	10,500	31,500	B00203 C7.15.01.1	440/1	MATSUNAGA	SD264.5-J	1	212	JICA	2533	
258	Volt slider	1	10,500	31,500	B00201 C7.15.01.1	440/2	MATSUNAGA	SD264.5-J	1	212	JICA	2533	
259	Volt slider	1	10,556	31,667	B00205 C7.15.01.2	440/3	MATSUNAGA	SD264.5-J	1	211	JICA	2533	
260	Volt slider	1	10,222	30,667	B00202 C7.15.01.2	440/4	MATSUNAGA	SD264.5-J	1	211	JICA	2533	
261	Volt slider	1	10,556	31,667	B00204 C7.15.01.2	440/5	MATSUNAGA	SD264.5-J	1	211	JICA	2533	
262	Volt slider	1	10,500	31,500	KF863 C7.15.02.1	440/6	MATSUNAGA	SD269-J	1	211	JICA	2533	0.26x0.23(0.59)
263	Volt slider	1	10,500	31,500	KF864 C7.15.02.1	440/7	MATSUNAGA	SAT-2010SP	1	211	JICA	2533	
264	Volt slider	1	10,500	31,500	KF865 C7.15.02.2	440/8	MATSUNAGA	SD269-J	1	212	JICA	2533	0.25x0.25(0.6)

Appendix-1

No.	Items	Quantity	Price (Baht)	Price (Yen)	Code	Registration Number	Name of Producer	Model/Size	Div. in charge	Location Room No.	Received from	Budget Year	Using Area WXL(m3)
265	Volt slider	1	10,500	31,500	KF862 C7.15.02.2	440/9	MATSUNAGA	SD269-J	1	212	JICA	2533	
266	Volt slider	1	10,500	31,500	KF860 C7.15.03	440/10	MATSUNAGA	SD2627.3-J	1	212	JICA	2533	
267	Volt slider	1	10,500	31,500	KF861 C7.15.03	440/11	MATSUNAGA	OSK10234-10	1	212	JICA	2533	
268	Volt slider	1	10,667	32,000	K00201 C7.15.04	440/12	MATSUNAGA	S3-402.6-G	1	212	JICA	2533	
269	Volt slider	1	10,667	32,000	K00201 C7.15.05	440/13	MATSUNAGA	S3-405.2-G	1	212	JICA	2533	
270	Volt slider	1	10,667	32,000	KF859 C7.15.06	440/14	MATSUNAGA	S3-4015.2-G	1	212	JICA	2533	
271	Megaohm tester	1	7,333	22,000	70LC01562 C7.16.00.1	441/1	YEW	3213	1	212	JICA	2533	
272	Megaohm tester	1	7,333	22,000	70LC01563 C7.16.00.2	441/2	YEW	3213	1	108	JICA	2533	
273	Insulation+breakdown tester	1	52,333	157,000	29120706 C7.17.00.1	442/1	KIKUSUI	TOS8700	1	207	JICA	2533	1.00x1.00(1)
274	Insulation+breakdown tester	1	52,333	157,000	29120707 C7.17.00.2	442/2	KIKUSUI	TOS8700	1	108	JICA	2533	
275	Insulation+breakdown tester	1	52,333	157,000	10018607 C7.17.00.3	442/3	KIKUSUI	TOS8650	1	212	JICA	2533	
276	Insulation+breakdown tester	1	52,333	157,000	10018609 C7.17.00.4	442/4	KIKUSUI	TOS8650	1	207	JICA	2533	
277	Insulation+breakdown tester	1	52,333	157,000	10018608 C7.17.00.5	442/5	KIKUSUI	TOS8650	1	208	JICA	2533	0.60x1.20(0.72)
278	Insulation resistance meter	1	138,000	414,000	05791802 C7.18.00.1	202/8	ANDO	HR-4G	1	207	JICA	2533	0.45x0.90(0.40)
279	Insulation resistance meter	1	138,000	414,000	05791801 C7.18.00.1	202/9	ANDO	HR-4G	1	207	JICA	2533	
280	Insulation resistance meter	1	138,000	414,000	CE2797QZ C7.18.01.1	202/10	TOA DEMPA	SM-10E	1	211	JICA	2533	
281	Insulation resistance meter	1	138,000	414,000	CE2807QZ C7.18.01.1	202/11	TOA DEMPA	SM-10E	1	211	JICA	2533	
282	High frequency breakdown tester	1	260,333	781,000	14N1269 C7.19.00	435/4	TOKYO SEIDEN	OSK10231-SP	1	212	JICA	2533	0.43x0.40(0.17)

Appendix-1

No.	Items	Quan-tity	Price (Baht)	Price (Yen)	Code	Registration Number	Name of Producer	Model/Size	Div. in charge	Location Room No.	Received from	Budget Year	Using Area WXL(m3)
283	Sparktester	1	623,000	1,869,000	5822 C7.20.00	443/1	YASUDA SEIKI	160(YST-1)	1	108	JICA	2533	1.00x4.00(4)

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Appendix-1

List of Existing Equipment & Machinery at TISI-Bampoo

No.	Items	Quan-tity	Price (Baht)	Price (Yen)	Code	Registration Number	Name of Producer	Model/Size	Div. in charge	Location Room No.	Received from	Budget Year	Using Area WXL(m3)
284	Tracking resistance tester	1	411,333	1,234,000	A31310A040 C7.20.01	444/2	TOKYO SEIDEN	OSK10229-A-SP	1	208	JICA	2533	0.45x0.52(0.23)
285	Arc resistance tester	1	466,000	1,398,000	KG3935-1-2 C7.20.02	445/1	TOKYO SEIDEN	OSK10229-C-SP	1	211	JICA	2533	0.62x0.62(0.38)
286	Leakage current taster	1	43,000	129,000	No.1 C7.21.00	446/1	SIMPSON	229-2	1	212	JICA	2533	
287	Leakage current taster	1	43,000	129,000	No.2 C7.21.00	446/2	SIMPSON	229-2	1	212	JICA	2533	
288	Leakage current taster	1	43,000	129,000	No.3 C7.21.00	446/3	SIMPSON	229-2	1	212	JICA	2533	
289	Leakage current taster	1	43,000	129,000	No.4 C7.21.00	446/4	SIMPSON	229-2	1	212	JICA	2533	
290	Earth continuity tester	1	43,667	131,000	10020411 C7.22.00	447/1	KIKUSUI	TOS 6100	1	212	JICA	2533	
291	Earth continuity tester	1	43,667	131,000	10020412 C7.22.00	447/2	KIKUSUI	TOS 6100	1	212	JICA	2533	
292	Safety test tool kit (not perfect)	8	279,000	837,000	Ca.01.00	448			1		JICA	2533	
293	1. Spring impact test hammer	1			9003087.19 Ca.01.00	448/1-1	EXCEL	CB-1	1	212	JICA	2533	
294	2. Push pull gauge	1			9004109.11 Ca.01.00	448/1-2	EXCEL	CB-1	1	212	JICA	2533	
295	3.1. Test finger	1			- Ca.01.00	448/1-3	EXCEL	CB-1	1	212	JICA	2533	
296	3.2. Test finger	1			- Ca.01.00	448/1-4	EXCEL	CB-1	1	212	JICA	2533	
297	3.3. Test finger	1			- Ca.01.00	448/1-5	EXCEL	CB-1	1	212	JICA	2533	
298	3.4. Test finger	1			- Ca.01.00	448/1-6	EXCEL	CB-1	1	212	JICA	2533	
299	4. Test pin	1			- Ca.01.00	448/1-7	EXCEL	CB-1	1	212	JICA	2533	
300	5. Ball pressure	1			- Ca.01.00	448/1-8	EXCEL	CB-1	1	212	JICA	2533	

Appendix-1

No.	Items	Quantity	Price (Baht)	Price (Yen)	Code	Registration Number	Name of Producer	Model/Size	Div. in charge	Location Room No.	Received from	Budget Year	Using Area WXL(m3)
301	6. Sharp edge tester	1			- Ca.01.00	448/1-9	EXCEL	CB-1	1	212	JICA	2533	
302	7.1. Steel sphere	1			- Ca.01.00	448/1-10	EXCEL	CB-1	1	212	JICA	2533	
303	7.2. Steel sphere	1			- Ca.01.00	448/1-11	EXCEL	CB-1	1	212	JICA	2533	
304	8. IS gauge	1			- Ca.01.00	448/1-12	EXCEL	CB-1	1	212	JICA	2533	
305	Safety test tool kit	1	221,333	664,000	Ca.02.00	448/3			1	212	JICA	2533	
306	1. Spring impact test hammer	1			- Ca.02.00	448/3.1	EXCEL	CB-2	1	212	JICA	2533	
307	2. Push pull gauge	1			- Ca.02.00	448/3.2	EXCEL	CB-2	1	212	JICA	2533	
308	3.1. Test finger	1			- Ca.02.00	448/3.3	EXCEL	CB-2	1	212	JICA	2533	
309	3.2. Test finger	1			- Ca.02.00	448/3.4	EXCEL	CB-2	1	212	JICA	2533	
310	4. Test pin	1			- Ca.02.00	448/3.5	EXCEL	CB-2	1	212	JICA	2533	
311	5. Steelshere	1			- Ca.02.00	448/3.6	EXCEL	CB-2	1	212	JICA	2533	
312	6. IS gauge	1			- Ca.02.00	448/3.7	EXCEL	CB-2	1	212	JICA	2533	
313	Standard Lamp caps and holders for dimension testing	1	4,149,667	12,449,000	Ca.05.00	449/1		CB-2	1	212	JICA	2533	
314	1. Gauge for the slots in lampholder B 15	1			- Ca.05.00	449/1.1	DAIICHI SOKUHAN	7006-13	1	212	JICA	2533	
315	2. Gauge for the slots in lampholder B22	1			- Ca.05.00	449/1.2	DAIICHI SOKUHAN	7006-13	1	212	JICA	2533	
316	3. Plug gauge for E27 lampholder for testing contact making	1			- Ca.05.00	449/1.3	DAIICHI SOKUHAN	7006-21-3	1	212	JICA	2533	

Appendix-1

No.	Items	Quantity	Price (Baht)	Price (Yen)	Code	Registration Number	Name of Producer	Model/Size	Div. in charge	Location Room No.	Received from	Budget Year	Using Area WXL(m3)
317	4. Plug gauge for E27 lamphoder for testing protection	1			- Ca.05.00	449/1.4	DAIICHI SOKUHAN	7006-22A-3	1	212	JICA	2533	
318	5. Plug gauge for E27 lampholder for testing contact	1			- Ca.05.00	449/1.5	DAIICHI SOKUHAN	7006-22-3	1	212	JICA	2533	
319	6. Plug gauge for E40 lampholderr for testing contact	1			- Ca.05.00	449/1.6	DAIICHI SOKUHAN	7006-23-2	1	212	JICA	2533	
320	7. Plug gauge for E40 lampholder for testing contact	1			- Ca.05.00	449/1.7	DAIICHI SOKUHAN	7006-24-2	1	212	JICA	2533	
321	8. "GO" plug gauge for screw threads of lampholder E40 accidental contact	1			- Ca.05.00	449/1.8	DAIICHI SOKUHAN	7006-25-4	1	212	JICA	2533	
322	9. "GO" plug gauge for screw threads of lampholder E27	1			- Ca.05.00	449/1.9	DAIICHI SOKUHAN	7006-25A-1	1	212	JICA	2533	
323	10. "NOT GO" plug gauge for screw threads oflampholder E27	1			- Ca.05.00	449/1.10	DAIICHI SOKUHAN	7006-26-2	1	212	JICA	2533	
324	11. "NOT GO" plug gauge for screw threads of lampholder E40	1			- Ca.05.00	449/1.11	DAIICHI SOKUHAN	7006-26-2	1	212	JICA	2533	
325	12. "GO" Gauge for dimension "S1" of E27 Cap on finished lamp	1			- Ca.05.00	449/1.12	DAIICHI SOKUHAN	7006-27B-1	1	212	JICA	2533	
326	13. "GO" Gauge for dimension "S1" of E27 Cap on finished lamp	1			- Ca.05.00	449/1.13	DAIICHI SOKUHAN	7006-27C-1	1	212	JICA	2533	
327	14. "NOT GO" Gauge for E27 Cap on finished lamp	1			- Ca.05.00	449/1.14	DAIICHI SOKUHAN	7006-28A-1	1	212	JICA	2533	
328	15. "NOT GO" Gauge for E40 cap on finished lamp	1			- Ca.05.00	449/1.15	DAIICHI SOKUHAN	7006-28-4	1	212	JICA	2533	

Appendix-1

No.	Items	Quantity	Price (Baht)	Price (Yen)	Code	Registration Number	Name of Producer	Model/Size	Div. in charge	Location Room No.	Received from	Budget Year	Using Area WXL(m3)
329	16. G13 "GO" and "NOT GO" Gauge for BI-PIN cap G13: NOT for use on finished lamp	1			- Ca.05.00	449/1.16	DAIICHI SOKUHAN	7006-44-3	1	212	JICA	2533	
330	17. "GO" Gauge for BI-PIN cap G13 on finished lamp				- Ca.05.00	449/1.17	DAIICHI SOKUHAN	7006-45-3	1	212	JICA	2533	
331	18. "GO" and "NOT GO" Gauge for BI-PIN cap G5: NOT for use on finished lamp	1			- Ca.05.00	449/1.18	DAIICHI SOKUHAN	7006-46-2	1	212	JICA	2533	
332	19. "GO" Gauge for BI-PIN cap G5 on finished lamp	1			- Ca.05.00	449/1.19	DAIICHI SOKUHAN	7006-46A-2	1	212	JICA	2533	
333	20. Plug gauge for inflexible lampholder G5 for testing contact making	1			- Ca.05.00	449/1.20	DAIICHI SOKUHAN	7006-47A-1	1	212	JICA	2533	
334	21. Gauge for finished lamp fitted with E27 cap for testing contact	1			- Ca.05.00	449/1.21	DAIICHI SOKUHAN	7006-50-1	1	212	JICA	2533	
335	22. Gauge for finished lamp fitted with E27 cap for testing protection against accidental contact	1			- Ca.05.00	449/1.22	DAIICHI SOKUHAN	7006-51-1	1	212	JICA	2533	
336	23. Gauge for finished lamp fitted with E27 cap for testing protection against accidental contact	1			- Ca.05.00	449/1.23	DAIICHI SOKUHAN	7006-51A-1	1	212	JICA	2533	
337	24. Gauge for finished lamp fitted with E40 Cap for testing contact	1			- Ca.05.00	449/1.24	DAIICHI SOKUHAN	7006-51-1	1	212	JICA	2533	
338	25. Gauge for finished lamp fitted with E40 cap for testing protection against accidental contact	1			- Ca.05.00	449/1.25	DAIICHI SOKUHAN	7006-53-1	1	212	JICA	2533	

Appendix-1

No.	Items	Quan-tity	Price (Baht)	Price (Yen)	Code	Registration Number	Name of Producer	Model/Size	Div. in charge	Location Room No.	Received from	Budget Year	Using Area WXL(m3)
339	26. Plug gauge for inflexible lampholder G13 for testing contact making	1			- Ca.05.00	449/1.26	DAIICHI SOKUHAN	7006-60A-1	1	212	JICA	2533	
340	Enamal wire testing	1	249,333	748,000	5815 Ca.09.00	450/1	YASUDA SEIKI	553	1	212	JICA	2533	
341	Card flexing tester	1	1,385,333	4,156,000	Ca.10.00a	460/1	-	-	1	113	JICA	2533	1.00x1.00(1)
342	1. Captyre cord flexing tester	1			44860 Ca.10.00a	460/1.1	EVERTRON	-	1	113	JICA	2533	
343	2. Load box	1			44861 Ca.10.00a	460/1.2	EVERTRON	-	1	113	JICA	2533	0.70x1.80(1.26)
344	Cord bending fatique tester	1	467,333	1,402,000	Ca.10.00b	460/2	TESTER SANGYO	BE-801-M	1	113	JICA	2533	0.67x179(1.19)
345	Triple parallel plate plastometer	1	628,333	1,885,000	12290 7600 Ca.11.00	461/1	TOYO SEIKI	534W-3	1	113	JICA	2533	
346	Tumble barrel	1	162,000	486,000	Ca.12.00	462/1	TAIYO KEIKI	-	1	113	JICA	2533	0.60x1(0.6)
347	Test table for heating test	1	18,667	56,000	Ca.13.00	463/1	TAIYO KEIKI	-	1	212	JICA	2533	
348	Hot mandrel heat resistance tester (not function)	1	757,667	2,273,000	9004109.1 Ca.14.00	464/1	EXCEL	T-01.05	1	208	JICA	2533	0.90x1.80(1.62)
349	V-belt electrical resistance measurment stand	1	127,667	383,000	CA.21.00	465/1	TAIYO KEIKI	-	1	212	JICA	2533	
350	Flamability tester	1	680,667	2,042,000	LAMABILIT E1.08.02	466/1	EXCEL	BT-1500A	1	208	JICA	2533	1.00x3.50(3.5)
352	Flux meter	1	30,333	91,000	50KR0335 G1.06.00	468/1	YEW	3254	1	212	JICA	2533	
353	Lux meter	1	9,667	29,000	60BH0260 G1.07.00	469/1	YEW	3281	1	212	JICA	2533	
354	Photometric intergrating sphere	1	9,775,000	29,325,000	G1.08.00	470/1	-	-	1	213	JICA	2533	4.0x6.00(24)
355	1. Intergrating	1		-	- G1.08.00	470/1.1	TOSHIBA	A	1	213	JICA	2533	

Appendix-1

No.	Items	Quan-tity	Price (Baht)	Price (Yen)	Code	Registration Number	Name of Producer	Model/Size	Div. in charge	Location Room No.	Received from	Budget Year	Using Area WXL(m3)
356	2. Measuring rack for incandescent lamp	1		-	- G1.08.00	470/1.2	TOSHIBA	A	1	213	JICA	2533	
357	3. Measuring rack for fluorescent	1		-	- G1.08.00	470/1.3	TOSHIBA	A	1	213	JICA	2533	
358	4. Computer	1			- G1.08.00	154/101	TOSHIBA	J-3100GX	1	213	JICA	2533	
359	5. Printer	1			- G1.08.00	425/35	TOSHIBA	PWS5267A	1	213	JICA	2533	
360	Photometric Bench (Problem with Air conditioner / high ambient temp.)	1	3,398,333	10,195,000	C-90A-02 G1.09.00	471/1		-	1	213	JICA	2533	2.00x4.50(9)
361	1. Bench 4 meters	1			- G1.09.00	-	TOSHIBA	-	1	213	JICA	2533	
362	2. Lamp Fixing Stand	1			- G1.09.00	-	TOSHIBA	-	1	213	JICA	2533	
363	3. Shad	1			- G1.09.01	-	TOSHIBA	-	1	213	JICA	2533	
364	4. Photo Receiver	1			- G1.09.01	-	TOSHIBA	-	1	213	JICA	2533	
365	Digital Photometer	1	132,000	396,000	B092820 G1.15.00.1	470/2	TEKTRONIX	J16	1	213	JICA	2533	
366	Colorimetry	1	6,130,333	18,391,000	G1.16.00	472/1			1	213	JICA	2533	2.00x3.00(6)
367	1. Colorimetry Set	1			G1.16.00	472/1-1	TOSHIBA	-	1	213	JICA	2533	
368	2. Lighting Table	1			G1.16.00	472/1-2	TOSHIBA		1	213	JICA	2533	
369	3. Computer	1			G1.16.00	154/102	TOSHIBA		1	213	JICA	2533	
370	4. Printer	1			G1.16.00	425/36	TOSHIBA	PWS5267A	1	213	JICA	2533	
371	5. Standard Lamps of Colour Temp	1			G1.16.00		TOSHIBA	B	1	213	JICA	2533	
372	Lamp Chamber tester	1	451,667	1,355,000	G1.19.00	473/1	TAIYO KEIKI		1	212	JICA	2533	1.20x1.20(1.44)

Appendix-1

No.	Items	Quan-tity	Price (Baht)	Price (Yen)	Code	Registration Number	Name of Producer	Model/Size	Div. in charge	Location Room No.	Received from	Budget Year	Using Area WXL(m3)
373	Life Test Rack for Candescent Lamp	1	588.667	1,766.000	C-90A-04 G1.20.00	474/1-1	TOSHIBA	-	1	113	JICA	2533	0.50x2.00(1)
374	Life Test Rack for Fluorescent Lamp	1	946.333	2,839.000	C-90A-05 G1.21.00	474/1-2	TOSHIBA	-	1	113	JICA	2533	0.50x1.50(0.75)
375	Life Test Rack for Fluorescent Lamp	1	956.333	2,869.000	- G1.21.00	474/1-3	TOSHIBA	-	1	113	JICA	2533	0.50x1.20(0.6)
376	Testing Circuits for Fluorescent Lamp	1	794.333	2,383.000	C-90A-07 G1.22.00	475/1	TOSHIBA	-	1	212	JICA	2533	0.78x1.82(1.41)
377	Testing Cirucuits for Incandescent lamp	1	56.000	168.000	G1.23.01	475/2	TAIYO KEIKI		1	212	JICA	2533	
378	AM/FM Signal Generator	1	246.500	739.500	033718C126 Lo.01.00	476/1	NATIONAL	VP-8179B10	1	211	JICA	2533	
379	AM/FM Signal Generator	1	246.500	739.500	023693C126 Lo.01.00	476/2	NATIONAL	VP-8179B10	1	211	JICA	2533	
380	Stereo Signal Generator	1	123.000	369.000	041862B122	477/1	NATIONAL	VP-7635A	1	211	JICA	2533	
381	Audio Signal Generator	1	82.500	247.500	C80419E Lo.03.00	478/1	TOA DEMPA	CRS-121A	1	211	JICA	2533	
382	Audio Signal Generator	1	82.500	247.500	C80416E Lo.03.00	478/2	TOA DEMPA	CRS-121A	1	211	JICA	2533	
383	Furction Generator	1	77.667	233.000	042191E122 Lo.04.00	479/1	NATIONAL	VP-7420A	1	211	JICA	2533	
384	Electronic Voltmeter	1	34.133	102.400	131361 Lo.05.00	427/26	NF	M-174B	1	211	JICA	2533	
385	Electronic Voltmeter	1	34.133	102.400	131362 Lo.05.00	427/27	NF	M-174B	1	211	JICA	2533	
386	Electronic Voltmeter	1	34.133	102.400	131363 Lo.05.00	427/28	NF	M-174B	1	211	JICA	2533	
387	Electronic Voltmeter	1	34.133	102.400	131364 Lo.05.00	427/29	NF	M-174B	1	211	JICA	2533	
388	Electronic Voltmeter	1	34.133	102.400	49090585 Lo.06.00	427/30	NF	M-174B	1	211	JICA	2533	
389	Frequency Counter	1	16.500	49.500	49090586 Lo.06.00	435/5	KIKUSUI	FC01130	1	211	JICA	2533	
390	Frequency Counter	1	16.500	49.500	49090587 Lo.06.00	435/6	KIKUSUI	FC01130	1	211	JICA	2533	

Appendix-1

No.	Items	Quan-tity	Price (Baht)	Price (Yen)	Code	Registration Number	Name of Producer	Model/Size	Div. in charge	Location Room No.	Received from	Budget Year	Using Area WXL(m3)
391	Audio Analyzer	1	358,333	1,075,000	041479D122 Lo.07.00	480/1	NATIONAL	VP-7722A	1	211	JICA	2533	
392	Audio Analyzer	1	358,333	1,075,000	041482D122 Lo.07.00	480/2	NATIONAL	VP-7722A	1	211	JICA	2533	
393	Wow Flutter Meter	1	38,333	115,000	291036369	481/1	KIKUSUI	677D	1	211	JICA	2533	
394	Wow Flutter Meter	1	38,333	115,000	29103659	481/2	KIKUSUI	677D	1	211	JICA	2533	
395	Oscilloscope	1	169,667	509,000	10040225 Lo.09.00	434/4	KIKUSUI	COM7200A	1	211	JICA	2533	
396	DC Power Supply	1	29,417	88,250	11989310 Lo.11.00	424/20	TAKASAGO	GP035-5	1	211	JICA	2533	
397	DC Power Supply	1	29,417	88,250	11989311 Lo.11.00	424/21	TAKASAGO	GP035-5	1	211	JICA	2533	
398	DC Power Supply	1	29,417	88,250	11989312 Lo.11.00	424/22	TAKASAGO	GP035-5	1	211	JICA	2533	
399	DC Power Supply	1	29,417	88,250	11989313 Lo.11.00	424/23	TAKASAGO	GP035-5	1	211	JICA	2533	
400	Field Strength Meter	1	164,000	492,000	M53464 Lo.12.00	482/1	ANRITSU	M-262F	1	211	JICA	2533	1.00x2.00(2)
401	FM Detecter	1	229,667	689,000	M27367 Lo.13.00	483/1	ANRITSU	MS-618	1	211	JICA	2533	
402	Shield Room	1	691,333	2,074,000	Lo.14.00		Nippon shield	AIR-23-WS	1	211	JICA	2533	
403	Dummy Antena	1	20,333	61,000	031390A122 Lo.15.00.1	277/15	NATIONAL	VQ-085C	1	211	JICA	2533	
404	DC Volt-ammeter	1	16,333	49,000	70AC00212 M1.01.00a	427/31	YEW	2012	1	211	JICA	2533	
405	AC Volt-ammeter	1	18,000	54,000	60AG0579 M1.02.00	427/32	YEW	2014	1	207	JICA	2533	
406	DC Voltage/current Standard	1	73,667	221,000	50BE0348 M1.08.00	427/33	YEW	2554	1	207	JICA	2533	
407	AC Voltage/current Standard	1	291,333	874,000	50AZ0105 M1.09.00	427/34	YEW	2558	1	207	JICA	2533	
408	Temperature oven	1	263,333	790,000	PHL-T468/40 E1.04.00	484/1	TAKAHUGI	9078	1	207	JICA	2533	

Appendix-1

No.	Items	Quan-tity	Price (Baht)	Price (Yen)	Code	Registration Number	Name of Producer	Model/Size	Div. in charge	Location Room No.	Received from	Budget Year	Using Area WXL(m3)
409	Anemometer	1	15,000	45,000	Bo.01.00	485/1	OGAWA SEIKI	DA-1	1	113	JICA	2533	
410	Anemometer	1	15,000	45,000	Bo.01.00	485/2	OGAWA SEIKI	DA-2	1	113	JICA	2533	
411	Heating Efficiency Test Stand	1	149,667	449,000	Bo.03.00	463/2	TAIYO KEIKI	-	1	212	JICA	2533	
412	Mechanical Endurances Test for speed Regulator: Rotary Type	1	1,090,333	3,271,000	Bo.05.01	486/1	TAIYO KEIKI	-	1	316-4	JICA	2533	1.00X2.00 (2)
413	Mechanical Endorances Test for Speed Regulator: Push Type	1	934,667	2,804,000	Bo.05.02	486/2	TAIYO KEIKI	-	1	212	JICA	2533	
414	Microphone: 1 inch	1	80,000	240,000	1503165 G2.01.00	54/101	B+K	4145	1	217	JICA	2533	
415	Microphone: 1 inch	1	80,000	240,000	1503185 G2.01.00	54/102	B+K	4145	1	217	JICA	2533	
416	Microphone:□"inch	1	39,000	117,000	1517929	54/103	B+K	4133	1	217	JICA	2533	
417	Microphone:□"inch	1	39,000	117,000	1517931	54/104	B+K	4133	1	217	JICA	2533	
418	Pre-amplifier	1	53,500	160,500	G2.03.00	54/105	B+K	26395	1	217	JICA	2533	
419	Pre-amplifier	1	53,500	160,500	G2.03.00	54/106	B+K	26395	1	217	JICA	2533	
420	Measuring Amplifier	1	655,000	1,965,000	1537483 G2.07.00	54/107	B+K	2636	1	217	JICA	2533	
421	Sine wave Generator	1	492,333	1,477,000	1501442 G2.08.00	54/108	B+K	1051	1	217	JICA	2533	
422	Level Recorder	1	950,000	2,850,000	1470478 G2.09.00	54/109	B+K	2307	1	217	JICA	2533	
423	Band Pass Filter	1	502,667	1,508,000	1536706 G2.10.00	54/110	B+K	1617	1	217	JICA	2533	
424	Power Amplifier	1	140,000	420,000	1517549 G2.11.00	54/111	B+K	2706	1	217	JICA	2533	
425	Sound Level Meter	1	95,667	287,000	10300134 G2.12.01.02	54/112-1	RION	NA-29E	1	217	JICA	2533	

Appendix-1

No.	Items	Quan-tity	Price (Baht)	Price (Yen)	Code	Registration Number	Name of Producer	Model/Size	Div. in charge	Location Room No.	Received from	Budget Year	Using Area WXL(m3)
426	Sound Level Meter	1	95,667	287,000	10300133 G2.12.01.02	54/112-2	RION	NA-29E	1	217	JICA	2533	
427	Sound Level Meter	1	95,667	287,000	66106401 G2.12.01.02	54/112-3	RION	NA-20	1	217	JICA	2533	
428	Sound Level Meter	1	95,667	287,000	66106402 G2.12.01.02	54/112-4	RION	NA-20	1	215	JICA	2533	
429	Sound Level Meter	1	191,333	574,000	93017 G2.12.01.02	54/112-5	RION	CP-10	1	215	JICA	2533	
430	Sound Level Meter	1	191,333	574,000	930178 G2.12.01.02	54/112-6	RION	NC-11	1	215	JICA	2533	
431	Level Recorder	1	115,333	346,000	82302730 G2.13.00	54/113	RION	LR-04	1	215	JICA	2533	
432	Level Recorder	1	115,333	346,000	82302731 G2.13.00	54/114	RION	LR-04	1	215	JICA	2533	
433	Piston phone	1	71,667	215,000	00402445 G2.14.00	54/115	RION	NC-72	1	215	JICA	2533	
434	Anechoic Room	1	15,545,000	46,635,000	G2.03.00	54/116			1	215	JICA	2533	
435	1. Speaker	1			-	54/116.1	TANNOY	LYNX	1	215	JICA	2533	
436	1. Speaker	1			-	54/116.2	TANNOY	LYNX	1	215	JICA	2533	
437	2. Speaker	1			-	54/116.3	TANNOY	LYNX	1	215	JICA	2533	
438	Calorimeter Room	1	43,556,667	130,670,000	Bo.02.00	487/1	OHNISHI	-	1	219	JICA	2533	
	-Calorimeter Control panel	1											
	-Control Peanel	1											
439	1. Computer	1			2804A11356	154/100	Hewlett Packard	9122C	1	219	JICA	2533	
	-Moniter	1			8911K01650 Bo.02.00			35731B					
440	2. Printer	1			2646J10282 Bo.02.00	425/34	Hewlett Packard	41031A	1	219	JICA	2533	

Appendix-1

No.	Items	Quantity	Price (Baht)	Price (Yen)	Code	Registration Number	Name of Producer	Model/Size	Div. in charge	Location Room No.	Received from	Budget Year	Using Area WXL(m3)
441	3. UPS	1			Bo.02.00	426/20	YAMABISHI	1000HF	1	219	JICA	2533	
442	4. 4.1 Cyclometric Box	1			Bo.02.00	487/1.1	CHINO	-	1	219	JICA	2533	
443	4.2 Cyclometric Box	1			Bo.02.00	487/1.2	CHINO	-	1	219	JICA	2533	
444	3. Pressure Equilizer	1			Bo.02.00	487/1.3	AENIX	WH-0535	1	219	JICA	2533	
445	4. Pressure Equilizer	1			Bo.02.00	487/1.4	AENIX	WH-0535	1	219	JICA	2533	
446	4.5 Scanner for Thermocouple	1			Bo.02.00	487/1.5	YOKOGAWA	388262	1	219	JICA	2533	
447	4.6 Electronic Balance	1			Bo.02.00	487/1.6	AND	-	1	219	JICA	2533	
448	4.7 Electronic Balance	1			Bo.02.00	487/1.7	AND	-	1	219	JICA	2533	
449	4.8 Water Pump	1			Bo.02.00 9000188	487/1.8	HITACHI	W-P80F	1	219	JICA	2533	
450	4.9 Water Pump	1			Bo.02.00 9000203	487/1.9	HITACHI	W-P80F	1	219	JICA	2533	
451	4.10 Chiller Unit	1			Bo.02.00 7154232	487/1.10.1	HITACHI	RCU5Y	1	219	JICA	2533	
452	4.11 Chiller Unit	1			Bo.02.00 7154333	487/1.10.2	HITACHI	RCU5Y	1	219	JICA	2533	
453	4.12 Distiller	1			Bo.02.00	487/1.11		-	1	219	JICA	2533	
454	4.13 Water Pump	1			Bo.02.00	487/1.12	HITACHI	WT-K200F	1	219	JICA	2533	
455	4.14 Air Compressure	1			Bo.02.00 RH631622	487/1.13	HITACHI	WT-K200F 0.75P-9.5V	1	219	JICA	2533	
456	4.15 Cooling Town	1			Bo.02.00	487/1.14	Shinwa Sangyo	MXC-P50AS	1	219	JICA	2533	
457	4.16 Refrigerator	1			Bo.02.00 U21900446	487/1.15	HITACHI	30 3H2-AW	1	219	JICA	2533	
458	4.17 Refrigerator	1			Bo.02.00 U21900448	487/1.16	HITACHI	30 3H2-AW	1	219	JICA	2533	

Appendix-1

No.	Items	Quan-tity	Price (Baht)	Price (Yen)	Code	Registration Number	Name of Producer	Model/Size	Div. in charge	Location Room No.	Received from	Budget Year	Using Area WXL(m3)
459	4.18 Refrigerator	1			Bo.02.00 U21900449	487/1.17	HITACHI	30 3H2-AW	1	219	JICA	2533	
460	4.19 Refrigerator	1			Bo.02.00 2190447	487/1.18	HITACHI	30 3H2-AW	1	219	JICA	2533	
461	4.20 Refrigerator	1			Bo.02.00 U2190445	487/1.19	HITACHI	30 3H2-AW	1	219	JICA	2533	
462	Safety test tool kit (not perfect)	8	279.000	837.000	CA.01.00a	448/2	-	-	1	212	JICA	2533	
463	1. Spring impact test hammer	1			9003087.13 CA.01.00a	448/2.1	EXCEL	CB-1	1	212	JICA	2533	
464	2. Push pull gauge	1			- CA.01.00a	448/2.2	EXCEL	CB-1	1	212	JICA	2533	
465	3. Test finger	1			- CA.01.00a	448/2.3	EXCEL	CB-1	1	212	JICA	2533	
466	4. Test pin	1			- CA.01.00a	448/2.4	EXCEL	CB-1	1	212	JICA	2533	
467	5. Ball pressure	1			- CA.01.00a	448/2.5	EXCEL	CB-1	1	212	JICA	2533	
468	6. Sharp edge tester	1			- CA.01.00a	448/2.6	EXCEL	CB-1	1	212	JICA	2533	

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Appendix-1

List of Existing Equipment & Machinery at TISI-Bampoo

No.	Items	Quan-tity	Price (Baht)	Price (Yen)	Code	Registration Number	Name of Producer	Model/Size	Div. in charge	Location Room No.	Received from	Budget Year	Using Area WXL(m3)
469	7. Steel sphere	1			- CA.01.00a	448/2.7	EXCEL	CB-1	1	212	JICA	2535	
470	8. IS gauge	1			- CA.01.00a	448/2.8	EXCEL	CB-1	1	212	JICA	2535	
471	Lux meter	1	46,700		62BK0110	275/2	YOKOGAWA	3286-1992	1	213	THAI	2535	
472		1	17,976		-	423/1	YOKOGAWA	H-12	1	219	THAI	2535	
473		1	17,976		-	423/2	YOKOGAWA	H-12	1	219	THAI	2535	
474		1			6237HCV4191 23442601N133	154/86	COMPAQ	3/25 S	1	212	THAI	2535	
475		1			6237HCV4138	154/87	COMPAQ	3/25 S	1	212	THAI	2535	
476	IEC impact hammer	1	160,000	480,000	CA.03.00	448/1.1	EXCEL	F22.50	1	212	JICA	2535	
477	Testing Circuit of starter	1	713,333	2,140,000	CA.24.00	552/1	Precision		1	211	JICA	2535	0.78x1.82(1.41)
478	Gauges of starter	1	163,333	490,000	CA.25.00	553/1			1	211	JICA	2535	
479	Torque meter (fluorescent lamp)	1	60,000	180,000	00490G	219/3	TONICHI	2-TM 50	1	212	JICA	2535	
480	PRINTER	1			53B0017333	425/7	EPSON	LQ-1170	1	212	THAI	2535	
481	PRINTER	1			53B0018749	425/8	EPSON	LQ-1170	1	212	THAI	2535	
482		1			Ca.22.00	492/1		-	1	212	THAI	2535	0.72x0.76(0.54)
483		1				413/2		-	1	113	THAI	2535	0.70x1.80(1.26)
484	Water activity	1	1,065		-	455/1		Rotronic DT 1.	1	219	THAI	2536	
485	Stabilizer	1			90803	427/35	Stavol Matsunaga	TSA-1020F	1	212	THAI	2536	0.50x0.80(0.4)

Appendix-1

No.	Items	Quan-tity	Price (Baht)	Price (Yen)	Code	Registration Number	Name of Producer	Model/Size	Div. in charge	Location Room No.	Received from	Budget Year	Using Area WXL(m3)
486		1	22,149		-	182/3	IWATA CSP	SPC-1SP.B.	1	207	THAI	2536	0.50x1.00(0.5)
487		1	6,597		-	330/2	JETWELD	-	1	219	THAI	2536	0.50x0.50(0.25)
488		1	1,575		-	458/1	IMPERIAL	496-CD	1	219	THAI	2536	
489		1	31,500		-	100/3	MARVAC	B-30	1	219	THAI	2536	
490		1	4,083		-	248/11	GALCO	FRIOGAS 22	1	219	THAI	2536	
491		1	4,083		-	248/12	GALCO	FRIOGAS 22	1	219	THAI	2536	
492		1	9,270		-	459/1	IMPERIAL	-	1	219	THAI	2536	
493	GO/contact gauge (not complete)	1	51,520	224,000	CA-28.00	449/2			1	212	JICA	2536	
494	Grip for torque test of incandescent lamps	1	113,850	495,000	G1.24.00	559/1			1	212	JICA	2536	
495	Fault condition test apparatus	1	106,950	465,000	CA.30.00	560/1			1	207	JICA	2536	0.70x1.00(0.7)
496	Impact tester	1	50,000		CA.27.00	561/1			1	211	JICA	2536	1.26x0.55(0.69)
497	Glow-wire test apparatus	1	805,000	3,500,000	CA.29.00	562/1	HITACHI	HAT-214	1	211	JICA	2536	0.72x0.75(0.54)
498		1	13,289	-	301560	490/1	CIGWELD	COMET 5000/3000 Kpa	1	219	THAI	2536	
499	TOP LOAD	1	50,000		0255-35	72/27	Transmate	EDI-302	1	219	THAI	2537	
500		1	16,146	-	-	245/8	-	-	1	219	THAI	2537	
501		1	10,000		H2GB600388	200/10	SAMSUNG	CVM4787	1	212	THAI	2537	
502		1	172,100		203441	254/5	MINOLTA	CL-100	1	310	THAI	2537	

Appendix-1

No.	Items	Quan-tity	Price (Baht)	Price (Yen)	Code	Registration Number	Name of Producer	Model/Size	Div. in charge	Location Room No.	Received from	Budget Year	Using Area WXL(m3)
503	UPS	1	20,000		-	426/28	-	-	1	212	THAI	2537	
504		1	158,360		-	474/2	TOSHIBA	-	1	113	THAI	2537	0.60x2.00(1.2)
505		1	69,229		GL059400557	154/119	SOCOS	486 DX2-66 CM-1448	1	212	THAI	2537	
506		1	4,250		-	2.6/296	-	-	1	211	THAI	2537	
507		1	10,433		53FR7069	433/3	YOKOGAWA	2791	1	212	THAI	2537	
508		1	10,433		-	433/4	YOKOGAWA	OSK-10244	1	212	THAI	2537	
509		1	1,928		100487	440/15	MATSUWAGA	TSB-5M	1	212	THAI	2537	
510		1	1,928		-	440/16	MATSUWAGA	TSB-5M	1	212	THAI	2537	
511		1	1,928		100517	440/17	MATSUWAGA	TSB-5M	1	212	THAI	2537	
512		1	8,988		-	446/5	SIMPSON	229-2	1	212	THAI	2537	
513		1	8,988		-	446/6	SIMPSON	229-2	1	212	THAI	2537	
514		1	50,932		-	219/3	TOHNICHI	-	1	212	THAI	2537	
515		1	17,816		-	510/1	ADVANTEST	-	1	213	THAI	2537	
516		1	17,816		-	510/2	-	-	1	213	THAI	2537	
517		1	17,816		-	510/3	-	-	1	213	THAI	2537	
518		1	662,150		-	441/3	SCKEN	-	1	114	THAI	2537	
519		1	78,645		-	441/4	HIOKT	-	1	212	THAI	2537	0.90x1.50(1.35)
520	UPS	1	9,600		-	426/49	APC	Back-ups 600 I	1	212	THAI	2537	

Appendix-1

No.	Items	Quantity	Price (Baht)	Price (Yen)	Code	Registration Number	Name of Producer	Model/Size	Div. in charge	Location Room No.	Received from	Budget Year	Using Area WXL(m3)
521		1	735,946		13002181	484/2	TAKASUGI	PR-1 ST 9028	1	212	THAI	2537	0.78x0.96(0.74)
522		1	63,130		-	6/259	-	-	1	208	THAI	2537	
523		1			-	484/3	-	-	1	208	THAI	2537	0.45x0.70(0.31)
524	Probe	1	8,276	36,000	12391-2	566/1	TOKYO DENPA	PTY 124 H	1	219	JICA	2537	
525	Anemometer	1	45,517	198,000	541016	542/1	KANOMAX	MODEL24-6111	1	219	JICA	2537	
526		1	64,368	280,000	36A1655	455/3	COSMO	DM3500	1	219	JICA	2537	
527		1	88,506	385,000	263	567/1	YAMATO	DZ-41	1	207	JICA	2537	
528	(Ventilated Psychrometer) (Mitsubishi Daiya Brand Room air conditioners fo model) 1. (SRC 502L)	1 1	30,344.83 17,315	132,000 75,320	94166 SRK12791472 SRC471500033	254/9 6/280	YOSHINO KEIKI MITSUBISHI	SY-1D 1540BTU(CL)	1 1	219 219	JICA JICA	2537	
529	2. SRK 324K-W (SRC 204)	1	11,122	48,380	SRK22840037 SRC26700327	6/281	MITSUBISHI	9560BTU(CL) 12970BTU(HP)	1	219	JICA	2537	
530	3. SRK 205-W (SRC 204)	1	11,122	48,380	SRK33800025 SRC365208805	6/282	MITSUBISHI	6140BTU(CL) 8530BTU(HP)	1	219	JICA	2537	
531	4.WV183 C-W	1	10,503	45,690	314402392R	6/283	MITSUBISHI	5460BTU	1	219	JICA	2537	
532	5. SRK 253 CENF-W (SRC 253 CENF)	1	6,897	30,000	RW4002A033	6/284	MITSUBISHI	7500BTU	1	219	JICA	2537	
533	6. SRK 186-W (SRC 186)	1	6,460	28,100	RC0003A706	6/285	MITSUBISHI	5460BTU(CL)	1	219	JICA	2537	
534	Circulator Cooling	1	114,483	498,000	308555	532/1	YAMATO	BL-51	1	219	JICA	2537	0.40x0.52(0.20)
535	Quartx Thermometer	1	459,310	1,998,000	12391 12392	254/7	TOKYO DENPA	DMT-610B	1	219	JICA	2537	
536		1	9,500		-	523/1	PATTANA ENG.	-	1	201	THAI	2538	

Appendix-1

No.	Items	Quantity	Price (Baht)	Price (Yen)	Code	Registration Number	Name of Producer	Model/Size	Div. in charge	Location Room No.	Received from	Budget Year	Using Area WXL(m3)
537		1	46,500		-	524/1	PATTANA ENG.	-	1	211	THAI	2538	
538		1	2,429		-	290/2	-	-	1	219	THAI	2538	
539		1	2,270		-	290/3	IMPERIAL EASTMAN	432-CM	1	219	THAI	2538	
540		1	32,849		-	527/1	-	-	1	107	THAI	2538	
541		1	48,021		94010401 Ca.35.00	416/2	MECMESIN tokyo testing	AFG 50N	1	211	THAI	2538	
542		1	73,500		-	199/3	-	-	1	113	THAI	2538	
543		1	85,000		-	535/1	-	-	1	113	THAI	2538	
544		1	618,246		Ca..41.00	191/2	sidumt	95-181	1	207	THAI	2538	1.00x1.00(1)
545		1	2,290,000		-	536/1	PATTANA ENG.	-	1	207	THAI	2538	
546	1 KVA	1	5,564		-	440/19	-	-	1	212	THAI	2539	
547	1 KVA	1	5,564		-	440/20	-	-	1	212	THAI	2539	
548	2 KVA	1	10,272		-	440/21	-	-	1	212	THAI	2539	
549	2 KVA	1	10,272		-	440/22	-	-	1	212	THAI	2539	
550	2 KVA	1	10,272		-	440/23	-	-	1	212	THAI	2539	
551	2 KVA	1	10,272		-	440/24	-	-	1	212	THAI	2539	
552		1	15,300		-	125/3	-	-	1	212	THAI	2539	0.35x0.35(0.12)
553	MITUTOYO	1	2,630		-	349/3	-	-	1	212	THAI	2539	
554	MITUTOYO	1	2,630		-	349/4	-	-	1	212	THAI	2539	

Appendix-1

No.	Items	Quantity	Price (Baht)	Price (Yen)	Code	Registration Number	Name of Producer	Model/Size	Div. in charge	Location Room No.	Received from	Budget Year	Using Area WXL(m3)
555	MITUTOYO	1	10,101		0014601	149/5	Mitutoyo	CD-6"C(500-17)	1	212	THAI	2539	
556	MITUTOYO	1	10,101		0014602	149/6	Mitutoyo	CD-6"C	1	212	THAI	2539	
557	MITUTOYO	1	13,501		6201014	348/9	Mitutoyo	293-421-20	1	212	THAI	2539	
558	MITUTOYO	1	13,501		6201800	348/10	-	293-421-20	1	212	THAI	2539	
559					-	575/1		-	1	212	THAI	2539	0.80x1.80(1.44)
560		1 1		-	SG70301538 KR65285164	154/236	HEWLETT PAKARD HP HEWLETT PAKARD HP	VL4 5/133 M 1280 D 2811	1	212	THAI	2540	0.80x1.50(1.2)
561		1 2		-	SG70301398 KR65285527	154/243	HEWLETT PAKARD HP HEWLETT PAKARD HP	VL4 5/133 M 1280 D 2812	1	212	THAI	2540	0.80x1.50(1.2)
562		1	9,000		L 094153	245/11	DIGITAL DIGICO	SB-15	1	219	THAI	2540	
563		1	60,000		53767	580/1	WAP POWER-CLASS	9900	1	219	THAI	2540	
564		1	1,239,863		8466	484/5	Gallenkamp	HCC110.CF4J 1x1x0.8	1	212	THAI	2540	1.32x1.95(2.57)
565		1	174,410	-	4110026	439/27			1	8	THAI	2541	8
566		1	320,000	-	-	439/27			1	108	THAI	2538	2.00x4.00(6)
567		1							1	113	THAI	2541	0.42x1.00(0.42)
568		1							1	113	THAI	2541	0.42x1.00(0.42)
569		1	83,333	250,000					1	113	THAI	2541	0.60x1.50(0.9)
570		1	83,333	250,000					1	113	THAI	2541	0.60x1.50(0.9)

Appendix-1

No.	Items	Quan-tity	Price (Baht)	Price (Yen)	Code	Registration Number	Name of Producer	Model/Size	Div. in charge	Location Room No.	Received from	Budget Year	Using Area WXL(m3)
				10,771,270									

Appendix-2(1)

Cost for New Equipment

(Million Bahts, 1B=3yen)

			Yen	Amount	Investment Year	
Calibration	Direct Current Low Frequency	A	119	39.7	2002	
	High Frequency	B	76	25.3	2003	
	Length,Shape	C	174	58.0	2000	
	Temperature	D	71	23.7	2000	
	Sub-Total		440	146.7		
Testing Laboratory	Reliability Testing	E	200	66.7	2001	
	Safety Testing	F	31	10.3	2000	
	Parts Testing	G	45	15.0	2000	
	Home Electronics Products Testing	H	75	25.0	2001	
	AV Products Testing	I	707	235.7	2001-2003	2001/2002=150Each
	Information Comunication OA Testing	J	110	36.7	2002	
	Sub-Total		1168	389.3		

Investment Amount	Category		Amount	
Year 2000	Length,Shape,Teperature-Calibration	C,D	321	107.0
	Safety Testing, Parts Testing	F,G		
2001	Reliability Testing	E	425	141.7
	Home Eletronics Products Testing	H		
	AV Products Testing	I		
2002	Direct Current Low Frequency Calibration	A	379	126.3
	Information Communication OA Testing	J		
	AV Products Testing	I		
2003	High Frequency Calibration	B	483	161
	AV Products Testing	I		

List of New Equipment and Machinery

Calibration Laboratory	Direct Current Low Frequency	A
	High Frequency	B
	Length,Shape	C
	Temperature	D

Testing Laboratory	Reliability Testing	E
	Safety Testing	F
	Parts Testing	G
	Home Electronics Products Testing	H
	AV Products Testing	I
	Information Comunication OA Testing	J

		MillionYen Amount	Existing Equipment in TISI	No.
Category A (Direct Current and Low Frequency) Calibration	Standard Voltage Generator			
	Standard Voltage Potentiometer			
	Calibrator			
	Alternating Current Measurement Standard			
	Atemating and Direct Current Comparator			
	Potentiometer			
	Direct Current Nanovolt Calibrator			
	High Voltage Divider			
	Digital High Voltmeter			
	Alternating Current Digital High Voltmeter			
	Direct Current High Voltage Power Supply			
	Alternating Current High Voltage Power Supply			
	Electric Power Converter			
	Phase Shifter			
	Alternating Current Standard Voltage & Current Generator			
	Digital Power Meter			
	Digital Power Factor Meter			
	Calibrator			
	Precise Resistance Measurement Equipment			

	Standard Resistor		
	Standard Decade Divider		
	Digital High Resistance Meter		
	Standard Resistor		
	Standard Resistor		
	Standard Resistor		
	Standards Capacitor		
	Standards Capacitor		
	Standards Capacitor		
	Standards Capacitor		
	Standard Inductor		
	Decade Inductor		
	Precision Capacitance Measurements System		
	Precision LCR Meter		
	Q Meter		
	Q Standard		
	Standard Magnet		
	Weak Magnetic Field Standard		
	Gauss Meter		
	Cable Measurement Jig		
	Sub-Total	119	

Category B High Frequency Calibration	Attenuation Quantity Calibrating Apparatus	
	Standard Attenuator	
	Standard Attenuator	
	Variable Resistance Attenuator	
	VHF Attenuator	
	Calibration Receiver	
	Power Meter Calibrating System	
	Power Meter	
	RF Voltmeter	
	Video Noise Meter Calibrating System	
	Signal Generator	
	Signal Generator	
	TV Signal Generator	
	Distortion Meter	
	Standard Termination	
	Standard Miss-Match	
	Slotedline	
	VSWR Meter	
	Laser Power Standard	
	He-Ne-Laser	
	GPS Receiving Equipment	
	Rubidium Frequency Standard	
	Frequency Comparator	
	Microwave Counter	
	Electronic Counter	
	Modulation Analyzer	
	Spectral Network Analyzer	
	Side Band Analyzer	
	FM Calibrator	
	Quartz Timer	
	Wow Flutter Jitter Calibrator	
	CD Jitter Meter Calibrator	
	VTR Jitter Meter Calibrator	
	Cable, Measurement Jig	
	Sub-Total	76

Category C Length, Shape Calibration	Gage Block Automatic Checker
	Length Measuring Machine
	Electric Micro Meter
	Dial Gage Automatic Checker
	00 Class Gage Block
	Thin Gage Block
	0 Class Gage Block
	Caliper Checker
	Linear Height
	Precision Check Master
	Glass Scale 250 mm
	Glass Scale 50mm to 300 mm
	All-around Microscope
	Square
	Ostium Caliber Measure
	Magnification Calibrator
	Laser Micrometer
	Precision Plain Form Squares
	Precision Blade Form Squares
	Optical Flat
	Ring Gage
	Three Wires for Thread Measurement Gage
	Cylindrical Standard Master
	Roundness Glass Master
	Roundness Measuring Machine
	Roundness Magnification Standard Fragment
	Cylindrical Squares
	Cylindrical Master
	Cylindrical Test Bar 30X 150mm
	Cylindrical Test Bar 30X 300mm
	Mini Level 150 mm
	MDC Measurement System
	Precise Stone Surface Plate
	Surface Roughness Standard Fragment
	Sine Bar

	Plain-Shaped Spirit Level	
	4-right-angle master	
	Surface Roughness Measuring Instrument	
	Three Dimensional Measuring Instrument	
	Sub-Total	174
Category D Temperature Calibration	Fixed Point of Temperature,Silve,Tin and Zinc	
	Water Triple Point Equipment	
	Automatic Calibration Apparatus of thermocouple and Platinum Resistance	
	Hot Thermocouple Automatic Calibrating Apparatus	
	Standard Thermocouple	
	Standard Platinum Resistance Bulb	
	Liquid Layer Agitator	
	Digital Thermometer	
	Zero Con	
	Blackbody Furnace	
	Radiation Thermometer	
	Surface Termperature Calibrating Apparatus	
	Calibrating Apparatus of Temperature of Soldering Iron Tip	
	Sub-Total	71
Category E Reliability Testing (Testing)	Thermostat +40-500 C	
	High Low Termperature Thermostat -85 to + 180C	
	Fixed Temperature and Fixed Humidity Chamber -40 to +150 C	
	Pressure Cooker	
	Dewfall Cycle Testing Device Hot Side, Cold Side	
	Thermal-Shock Test Machine Gaseous System	
	Thermal-Shock Test Machine Liquid System	
	Vibration Test Machine	
	Shock Testor	
	Direct Current Stabilization Power Supply for hot load test and humid test	
	Decompression Testing Machine	
	Leakage Tester	
	Gas Corrosion Testing Machine	
	Saltwater Spray Testing Machine	
	Sub-Total	200

			Existing Equipment in TISI	No.
Category F Safety Testing	Burning Testing Device Vertical Burning Testing of 20 mm			
	Burning Testing Device V-0,V-1, V-2			
	Burning Testing Device Combustibility Testing Condenser			
	Burning Testing Device High Voltage Parts IC Burning Test			
	Life Test Equipment			
	Inner Flamer Tester			
	High-Voltage-Resistance Testing Machine		High Voltage Testing Device	1
	Serge Generator			
	Tester of Static Electricity Tolerance Degree			
	Pressure-Resistance Insulation Testing Device			
	Leakage Current Meter			
	Thermograph			
	Digital Wattmeter			
	Digital Volt Meter		Electronic Voltmeter	46
	High Frequency Wattmeter			
	Drop Test Equipment			
	Sub-Total	31		
Category G Parts Testing (Testing)	Wire Cable Test Equipment		Flexing Tester on Electrical Machinery Part	9
	Fuse Testing Device			
	Wiring Appliance Testing Machine		Glow-Wire Test Apparatus	41
	Small Transformer For Discharge			
	Ballast Set Tester For Discharge			
	Motor Testing Device			
	Sub-Total	45		
Category H Home Electronics Products Testing	Voltmeter		AC Voltmeter,Variable AC Source	3,8,13,14,26,27,28,42,52,53
	Ammeter		Termo-Couple Type Ammeter,AC Ammeter	44,50
	Wattmeter		Watt Meter,Digital Watt Meter	43,51
	Digital Power Meter			
	Multiple Wattmeter			
	Insulation Voltage Set Tester		Insulation Resistance Meter	11,12,15,16,17,49
	Leakage Current Meter			
	High Frequency Wattmeter		High Frequency Breakdown Tester	33

	Thermometer	
	Thermograph	
	Cleaner Suction Tester	
	Tester of Washer Cleaning Degree	
	Air-Conditioner Ability Lab	
	Thermograph	
	Sub-Total	75

Category I AV Products Testing Machine (Testing) = Difficult	**Television Receiver Characteristic Test Instrument JIS Testi**	20
	VTR Characteristic Test Instrument	20
	Radio Characteristic Test Instrument	5
	Magnetic Tape Recorder Characteristic Test Instrument	5
	CD Characteristic Test Instrument	10
	MD Characteristic Test Instrument	5
	DVD Characteristic Test Instrument	20
	Audience Room 32 m2 , Interior Construction	5
	Shield Room 32 m2, Upholstery Construction Set	10
	EMC Evaluation Room	80
	TEM Cell 1 GHz	5
	Life Test Room 32m2	7
	CRT Destruction Strength Testing Device	5
	Television Camera Set Tester	10
	Video Camera Set Tester	10
	Transmission Machine Set for TV, PAL NTSC SECAM	80
	AV cost of Construction, Electric Wave Anechoic Chamber of 1	400
	AV cost of Construction Shield Room	10
	Sub-Total	707

Category J Communication Information Product Testing	Telephone Characteristic Test Instrument	
	Cordless Telephone Characteristic Test Instrument	
	Transceiver Charateristic Test Instrument	
	Carrying Telephone Characteristic Test Instrument	
	Facsimile Characteristic Test Instrument Resolution	
	Copier Characteristic Test Instrument Resolution, Concentration	
	Sub-Total	110

Appendix-3: List of Office Equipment, Furniture & Fixture for EEI

No.	Items	Quantity	Price/Unit (Baht)	Amount (Baht)
1	Car for Exectutive Director	1	1,200,000	1,200,000
2	Office Car	3	900,000	2,700,000
3	Table and chair for Director of Institute	1	15,000	15,000
4	Table and Chair for Director of Division	6	12,000	72,000
5	Table and Chair for Officer	75	7,000	525,000
6	Table and Chair for Meeting Room	10	5,000	50,000
7	Cabinet for Documents	20	3,500	70,000
8	Copy Machine	1	90,000	90,000
9	Personal Computer	8	40,000	320,000
10	Printer	6	20,000	120,000
11	Table and Chair for Computer work	8	3,500	28,000
12	Projector which use for computer	1	250,000	250,000
13	Facsimile Machine	2	34,000	68,000
14	Telephone Machine	20	1,500	30,000
15	Mobile Phone	4	30,000	120,000
16	Air Condition for Office	15	35,000	525,000
17	Air Condition for Testing/Calibration Labo.	20	35,000	700,000
18	Electrical Typewriter	1	34,000	34,000
19	Telephone Box, Line Box, and Equipment	-	260,000	260,000
20	Place Decoration Fee	400/m^2	5,000	2,000,000
	TOTAL			9,177,000

Project No. S3: SIC - Tool and Mold Technology Development Project

This is not an entirely new project, as it has already been discussed by JICA with the BSID as a possible project qualifying for technical cooperation. Inclusion of this project will significantly contribute to the BSID effort at promoting supporting industry. Particularly noteworthy is the horizontal assistance it will give to the work of the new strategic Institutes for the automotive and electric/electronic parts industries.

1. Rationale

1.1 Background of the Project

The JICA report, "Study on Industrial sector development -- Supporting Industry -- in the Kingdom of Thailand," (March 1995) recommended organizational reforms in order for the DIP to better promote SMEs. Reforms were made in 1996, including creation of the BSID. The Metalworking and Machinery Industry Development Institute (MIDI) was then placed under the management of the BSID. This Institute had been founded in 1985 with grant aid cooperation from Japan.

The JICA study team at that time suggested in its report that MIDI be made into a full-fledged entity for providing technical support to support industry by inclusion in it of functions related to plastics processing. In conjunction with that, the New Energy and Industrial Technology Development Organization (NEDO), of Japan, provided plastic injection machinery and related technical services to BSID in 1997. Subsequently, in July 1999 JICA signed a memorandum of agreement with DIP for the supply of technical cooperation for transfer of technology elated to tools and molds. By these steps, BSID acquired the wide span of technical capability needed basic production technology in the metalworking, machinery, and plastics forming industries.

1.2 Rationale

Thailand faces the need to make additional progress in import substitution, as the ratio of imported parts in both the automotive and electric/electronic industries is still high. This has acquired even greater urgency as a consequence of the shift to export markets by assemblers who have experienced a collapse or great drop in domestic demand for their finished products as one effect of the 1997 crisis. Requirements related to cost, quality, delivery and development are appreciably higher for export markets as compared to the domestic market. Moreover, for the Thai parts industry as a whole the need to improve development ability has been identified as an especially important need.

It is said that product quality is determined to the extent of 70% by the quality of the mold or die used to make it. Efforts at improving competitiveness are not always best when companies rely on imported mold and molds for precision parts, as is the case in developing countries in general. Weakness in the ability to make tools and molds is one basic constraint to improvement of competitiveness of developing country manufacturers. It is necessary to realize accelerated improvement of the ability to design parts and to design the molds and molds needed to make them, so that productivity can be enhanced and reject rates can be reduced. Without possession of tool and die technology, we cannot expect much development of the R&D related technology in a given country.

This project therefore seeks to improve the technical capabilities of BSID staff and to supply them with the plastic mold technology that they need in order to assist manufacturers. It is anticipated that subsequently it will be possible to produce domestically tools and molds of superior quality, enabling more effective production of parts on the basis of improved competitiveness.

2. Overall Goal and Project Purpose

2.1 Overall Goal

The Thai plastic toll and mold industries are to be made internationally competitive so as to provide assembly industries in Thailand with high quality tools and molds.

2.2 Purpose

Technical capability of BSID is to be upgraded to enable it to offer quality services for the Thai plastic tool and mold industries.

3. Target Group of the Project

The target group of the SIC project is initially the Thai counterparts of BSID and is then to be expanded to the plastic tool and mold industries in Thailand.

4. Output of the Project

(1) An operation system of the SIC project is prepared.
(2) The machinery and equipment of the SIC project are installed as originally planned.
(3) The counterpart personnel are trained to provide technical guidance to Thai plastic tool and mold industry.
(4) Technical training and seminars.
(5) Trail services information supply and advisory services to the target industries.
(6) Samples of tools and molds are produced.

5. Activities

(1) Allocate necessary personnel.
(2) Formulate plans of activities.
(3) Plan budget and execute properly.
(4) Establish and operate management system.
(5) Make and implement facility refurbishment plan,
Provide and install necessary machinery and equipment,
Operate and maintain the machinery and equipment properly,
Prepare Technical Cooperation Program,
Implement technology transfer,
Monitor and evaluate the result of technology transfer to the C/P
(6) Plan, implement and monitor technical training and seminars.

(7) Plan, trail technical information and advisory services; collect and compile technical information and materials, implement trial technical information and advisory services; monitor same.
(8) Plan, implement and monitor a trial prototyping service.

6. Project Description

6.1 Site of the Project

A building named the Supporting Industries Center ("SIC") is now under construction next to the existing BSID building. The building of SIC will be completed by the end of January 2000, as a core facility for the activities of BSID's supporting industries promotion. General Administration Section, Subcontracting Promotion Division, Plastic and Electronic Components Industries Division and Packaging Division of BSID are supposed to move to the new SIC building. The site for the Project should be the existing Workshop A; the address is Soi Treemtri, Rama IV Rd., Klongtoey, Bangkok 10110.

It is expected that at the SIC the Thai Automotive Institute and the Electric and Electronics Institute also will be operational in the very near future. The cost of erecting buildings for the Institutes will be borne by the Thai Government.

6.2 Supply of the Equipment

JICA is expected to provide the following items, at the cost of about ¥270 million. The equipment to be supplied by BSID also will come from Japan.

1)	CAD/CAM system network station	:	1 set
2)	Wire-cut EDM	:	1
3)	CNC vertical machinery center	:	1
4)	Electric discharge machine	:	1
5)	Small hole drilling machine	:	1
6)	Polishing equipment	:	1
7)	Profile grinder	:	1
8)	Large size injection machine	:	1
9)	Tools, tools and jigs, measuring equipment, accessories, etc.		

6.3 Expatriates and Counterparts

To implement the transfer of technology from the latter half of 1999 to the latter half of 2004 (five years) JICA will dispatch to BSID the following experts: chief advisor, coordinator, mold designer, mold processing expert, and mold assembling and trial shot expert, other experts in the specific fields of technology may be dispatched.

BSID counterpart personnel are to be as follows:

	1998		1999		2000 – 2005
	Preliminary	First Supplementary	Second Supplementary	Implementation Study	
Mold Design	5	(1) 6	(-3) 3	(0) 3	(0) 3
NC Programming	-	(0) -	(3) 3	(1) 4	(0) 4
Mold Processing	6	(1) 7	(-3) 4	(2) 6	(0) 6
Mold Assembling and Trial Shot	-	(0) -	(3) 3	(1) 4	(0) 4
Networking	-	(0) -	(1) 1	(0) 1	(0) 1
Additional C/P	- -	- -	(4) 4	(-4) -	(0) -
Total	(0) 11	(2) 13	(5) 18	(0) 18	(0) 18

Notes:
1. The chart above only covers the technical counterparts.
2. The numbers in brackets show the increment and decrement of the counterparts as requested by the Team.

6.4 Fields of Technology Transfer

Mold Design
NC Programming
Mold Processing
Mold Assembling and Trial Shot
Networking

6.5 Methodology of Technology Transfer

Considering the routine work of the counterparts as well as effectiveness of the technology transfer, in addition to daily on-the-job training, that a certain time for the technology transfer should be secured at least two or three times a week. In case of the dispatch of short-term experts, the time allocation of the counterparts to the project would be made in a flexible manner to make the best use of the dispatched experts.

The detailed schedules are to be finalized by six months from the commencement of the project, by consultation between those concerned.

The provisional allocation of time for the technology transfer is that 30% of the time is for lectures using the case study method, while the rest is for hands-on training with the factory visits every week at the initial stage of the project.

The counterparts would be divided into groups in accordance with the progress of the technology transfer. Every person will be somehow responsible and specialized at least one target product.

6.6 Budget for the Project

SIC Construction – Thai Government (Unit: Million Bahts)

1997	:	9.6
1998	:	34.0
1999	:	54.9
2000	:	35.0
Total		133.5

Note: Budget of procurement of machinery and equipment is unknown.

JICA Cooperation – Grant (Unit: Million Yen)

Machinery and equipment	:	270
Expatriates and expenses	:	480
Total		750

7. Weakness and Strength of the Project

7.1 Weakness

(1) The transfer of technology may not be as successful as planned if the counterparts assigned by MIDI leave MIDI during or after the project.

(2) It is not certain at this time whether the plastic formers and mold-making companies have a high level of interest in the services BSID proposes to provide.

7.2 Strength

(1) The SIC has within its organization two institutes, for automotive and electric/electronic parts suppliers, making it easier for SIC to function as a linkage between industries.

(2) By means of this project the BSID will acquire essentially all the technical service capability needed for the metalworking and plastics forming SIs. In fact as well as name these supporting industries will function as a one-stop service center.

8. Expected Benefit of the Project

Thailand's supporting industries face a threat to their survival unless they acquire international competitiveness. Overcoming problems related to tools and mold technology will be a significant help in promoting the industry's further development.

9. Success Indicators of the Project

(1) The level of satisfaction of present and former service beneficiaries, and level of satisfaction of industries – Verifiable by questionnaire to and interview with related industries.

(2) Number of newly improved services and the target group – Verifiable by BSID records.