

タイ王国
工業分野振興開発計画
(裾野産業)
事前調査報告書

1993年7月

国際協力事業団

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I. 事前調査の概要

I. 事前調査の概要

1. 要請の背景・経緯

- (1) JICAはタイ政府からの要請に基づき1988年から3年間にわたり工業分野開発振興計画調査を実施し、各種産業育成プログラム（第1年次：金型、玩具、第2年次：繊維、木製家具、第3年次：プラスチック加工、陶磁器）を提言した。
- (2) また、上記調査と並行して、輸出加工区及び一般工業団地開発のためのラムチャバン工業基地開発計画調査を実施し、立地期待業種の想定、企業の選定・誘致戦略の検討、工業団地完成後の管理運営方法の提言を行った。
- (3) これら背景の中タイ政府は平成3年度案件として、4業種（自動車部品・アクセサリ、電気・電子部品、工作機械、ゴム製品）の工業分野開発振興計画延長（業種追加）を要請越したが、上記実施済調査の具体化が先決であるとして当該年度においては不採択となった。
- (4) その後本件については、平成4年度案件として再度要請があり、JICAは平成4年10月にプロジェクト選定確認調査団を派遣し、要請内容等について協議を行った。その際先方工業省より上記③の4業種の要請は2年前のものであり、事情も変化しているの
で内容検討のうえ要請業種を決定したい旨発言があった。
- (5) 平成4年12月に工業省工業振興局よりJICAタイ事務所に提出された要請内容変更書では、フェーズⅠとして5業種（自動車部品・アクセサリ、電気・電子部品、鋳造、ゴム製品、パッケージ）の概況的調査、フェーズⅡとしてその中から4業種を選定し、2業種ずつ2年間で調査を行うものであった。
- (6) JICA本部にて上記変更書を検討した結果、タイ国においては現在輸入依存体質にある裾野産業の育成が重要であると判断され、5年2月に派遣されたプロジェクト形成基礎調査団は2業種（自動車部品、電気・電子部品）の振興開発計画を提案し、タイ側もこれに概ね合意した。

2. 本計画の目的

タイ国内の裾野産業（①電気・電子機器部品、②自動車部品）の育成・振興を図るマスタープランを策定する。

3. 今次事前調査の内容

- (1) 国内事前準備
 - ・関連情報の収集

- ・ S/W及び対処方針の検討・作成

(2) 現地調査

- ・ S/Wの協議・署名
- ・ 対象産業の概要調査
- ・ 工場訪問調査
- ・ 関連情報等の収集

(3) 帰国後国内作業

- ・ 収集資料の調整
- ・ 事前調査報告書の作成

4. 団員構成

団長・総括	中井 信也 (なかいしんや)	JICA鉱工業開発調査部工業開発調査課長
技術協力行政	岡本 正弘 (おかもとまさひろ)	通産省技術協力課
調査企画	神取 真一 (かんどりしんいち)	JICA鉱工業開発調査部工業開発調査課
自動車産業	山根 一夫 (やまねかずお)	テクノコンサルタンツ (株) (役務提供コンサルタント)
電気電子産業	二宮 裕 (にのみやひろし)	富士テクノサーバイ (株) (役務提供コンサルタント)

5. 調査日程

5月27日(木) <コンサル団員>成田(11:00)⇒ バンコク(15:30) (TG641)

28日(金) <コンサル団員>工場調査

29日(土) <コンサル団員>工場調査

30日(日) <官団員>成田(11:00)⇒ バンコク(15:30) (TG641)

31日(月) <官団員> (表敬) JICA事務所、大使館、DTEC、NESDB、
工業省工業振興局(DIP)

<コンサル団員>工場調査

6月1日(火) (S/W協議) 工業省工業振興局(DIP)
(訪問) BOI

2日(水) (訪問) MIDI、TISI、TISTR

3日(木) (S/W署名) 工業省工業振興局(DIP)
(報告) JICA事務所、大使館

4日(金) バンコク(11:00) ⇄ バンコク(19:00) (TG640)

6. 主要面談者

<Ministry of Industry>

Manas Sooksmarn	Director-General, Department of Industrial Promotion(DIP)
Manu Leopairate	Inspector-General, DIP
Thamnu Vasinonta	Deputy Director-General, DIP
Padetpai Meekun-iam	Director, Planning Division, DIP
Charoon Unsuwan	Director, Industrial Service Division, DIP
Suwat Siwasaranond	Chief, Development Study Sub-Division, Planning Division, DIP
Uraiwan Chandrayu	Chief, Foreign Relations Sub-Division, Planning Division, DIP
Damri Sukhotanang	Director, MIDI
Wirat Tundechanurat	Deputy Director, MIDI
Pairoj Sanyadechakul	Director, Standards Division 1, TISI

<NESDB>

Witit Rachatatanun	Acting Director, Government & Private Cooperation Division
--------------------	--

<DTEC>

Nipon Sirivat	Director, Japan Sub-Division
Banchong Amornchewin	Official, -ditto-

稲垣 富一 J I C A派遣専門家

<BOI>

Pornpan Pookaiyaudom	Director, Planning & Development Division
----------------------	---

<TISTR>

Chumnong Hayakijkosol	Director, Industrial Metrology & Testing Service Centre
-----------------------	---

<日本国大使館>

前田 充浩 二等書記官

< J I C Aタイ事務所>

表 伸一郎 所長

浅野 寿夫 次長

石渡 徳久 所員

Ⅱ. 協議交渉内容と結果

II. 協議交渉内容と結果

1. S/W協議概要

調査団は5月31日及び6月1日にわたり工業省工業振興局において当方のS/W案に基づき説明・協議を行った。

協議の結果、当方案通りにて合意に達し、6月3日に日本側中井調査団長とタイ側 Manas 工業省工業振興局長との間で本件調査に係るS/W及び協議議事録(M/M)の署名が行われた。

なお、M/Mの主な内容は下記の通り。

(1) 両者合意事項

調査の円滑な遂行のために本件調査に係るステアリングコミッティの設置を行う。

(同コミッティのメンバーについては、M/M参照)

(2) タイ側からの要望事項

- a) 本件調査が対象とするサポーティングインダストリー（自動車部品、電気・電子部品）と関係があるとの理由で、鑄造製品を本件調査の優先製品群に含めて欲しい旨要請があり、日本側は、右要請については本格調査期間中に考察を行う旨回答した。
- b) 現地調査期間中におけるタイ側カウンターパートへの技術移転（主に調査結果の分析手法）の要請があり、日本側はこれに同意した。
- c) 本格調査団が日本にて行う調査結果の解析作業に際し、タイ側カウンターパートが On-the-job Training として参加できるような研修員受け入れの要請があり、日本側はこれを関連部署に伝える旨回答した。

(3) 日本側からの要望事項

本格調査団のタイ入国ビザ取得のための招聘状発行を依頼した。

2. 関係機関訪問

(1) DTEC

本件調査の概要説明を行ったところ、上記ステアリングコミッティへの参加希望が表明された。調査団はこの旨工業振興局へ伝える旨回答した。

(2) NESDB

本件調査の概要説明及び本格調査への協力依頼（ステアリングコミッティ参加依頼他）

をしたところ、NESDBとしても歓迎である旨発言があった。

なお、現行計画の重点課題として「地方分権政策」があげられており、主に下記の施策を検討中とのことである。

- a) 投資促進のための優遇措置の見直し (☞BOI)
- b) 地方への投資促進のための基金設立
- c) 地方の工業団地を含めたインフラ整備
- d) 企業家支援のためのIFCTによる Venture Capital 制度の設立

(3) BOI

本件調査の概要説明及び本格調査への協力依頼（ステアリングコミッティ参加依頼他）を行った。

また、本年4月から地方への投資促進及びこれに付随する優遇税制のための政策及び基準が実施されている旨説明があり、これについての資料を入手した。

なお、BOIは現在、産業の関連（Industrial Linkage）に重点を置いており、この分野での日本の協力を期待しているとの説明があった。

(4) MID I

本件調査の概要説明及びMID Iが本件調査では重要な役割を担う旨説明した。

先方からは、経済豊富な技術者の不足により工場へのコンサルタント業務が停滞しているとの説明があった。

(5) TISI、TISTR

本件調査に関し、それぞれの分野（TISI：工業標準化、TISTR：工業計量・試験）での協力を依頼した。なお、TISIでは、自動車部品及び電気・電子部品の既存標準リストを入手した。

以上

Ⅲ. タイの裾野産業育成政策

Ⅲ. タイの裾野産業育成政策

1. タイ側の裾野産業育成策

タイ側関係機関は自国の産業構造高度化のために、裾野産業の育成の必要性を強く認識しており、現在、政策、インフラ、人材確保等の総合的な投資環境整備の施策を導入しようとしているところである。

その中でも、裾野産業に対する政策的支援として、BOI（投資委員会）において以下の産業に対する投資促進のための関税等に関する優遇措置の提言を本年4月に行っており、今回実施する本調査の対象業種（自動車部品、電気・電子部品）も含まれており、興味ある取り組みと言える。

- 優先業種
- ① Agriculture and Agricultural Products
 - ② Minerals, Metals, and Ceramics
 - ③ Light Industry
 - ④ Manufacture of Metal Products, Machinery, and Transport Equipment
 - ⑤ Electronics and Electrical Industry
 - ⑥ Chemical Industry, Paper and Plastics
 - ⑦ Services and Public Utilities

タイ側においては、本調査のカウンターパートであるDIPをはじめ、NESDB（国家経済社会開発庁）等、多くの機関が裾野産業育成に携わっており、政府機関相互の連携を図り、総合的な施策展開を期待するものである。

特に、多くの関係機関の参加が予定されている本調査のステアリングコミッティの場を通じて、十分な議論を期待するものである。

2. タイに対する裾野産業育成政策

組立産業の競争力にとって、現地調達ないし近隣諸国からの調達により品質・コスト・納期面において適切な部品供給ができるかが重要であり、裾野産業育成への協力は産業構造高度化を指向するタイ政府の政策目標の一環に位置づけられるものである。

タイの裾野産業は日系企業及び地場企業が多く存在するが、特に、日系・タイ系の組立型大企業と関係のない独立系の企業が大半を占めており、そのほとんどが零細企業である。これら企業は製品も単純なものに限られ、また、納期・品質に多くの問題を抱えており、これら独立系企業の育成が課題と考えられる。

タイ政府は日本からの投資、合併、技術指導等の協力を期待しており、わが国としての協力手段としては、次のようなものと考えられる。

- ① 日本からの裾野産業の投資促進（セミナーの開催等）
- ② 日本からの専門家の派遣
（標準化の推進、品質管理の普及、知的所有権制度の確立等への支援）
- ③ 日本への研修生受け入れ
- ④ 人材育成（技術者、エンジニア等の養成）
- ⑤ 金融支援（ツーステップローンの活用等）
- ⑥ 技術開発向上のための技術協力
- ⑦ 体系的な中小企業施策の確立
- ⑧ 業界団体の育成

なお、すでに、日本からの専門家派遣、技術協力により鋳物など一部成果がみられる業種があるが、上記手段により長期的な支援が必要と考えられる。

今後の先方政府との協議の中で具体的な支援内容が明らかになると考えられるが、当面、本調査の対象業種（自動車部品、電気・電子部品）を中心に支援を推進するものと考えられる。

また、裾野産業の範囲についても、日・タイ間の確立された定義があるものではないため、どの分野を協力対象分野とするか今後の協議の中で明確にすることが求められる。

以 上

IV. SCOPE OF WORK 及び MINUTES OF MEETING

SCOPE OF WORK
FOR
THE STUDY
ON
INDUSTRIAL SECTOR DEVELOPMENT
-SUPPORTING INDUSTRIES-
IN
THE KINGDOM OF THAILAND

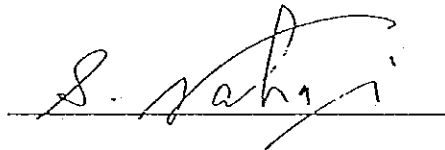
AGREED UPON BETWEEN

DEPARTMENT OF INDUSTRIAL PROMOTION,
MINISTRY OF INDUSTRY

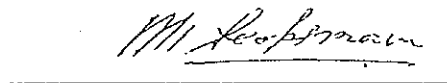
AND

JAPAN INTERNATIONAL COOPERATION AGENCY

BANGKOK, JUNE 3, 1993



SHINYA NAKAI
LEADER,
PREPARATORY STUDY TEAM,
JAPAN INTERNATIONAL
COOPERATION AGENCY



MANAS SOOKSMARN
DIRECTOR-GENERAL,
DEPARTMENT OF INDUSTRIAL
PROMOTION,
MINISTRY OF INDUSTRY

I. INTRODUCTION

In response to the request of the Government of the Kingdom of Thailand, the Government of Japan decided to conduct the Study on Industrial Sector Development -Supporting Industries- in the Kingdom of Thailand (hereinafter referred to as "the Study") in accordance with the Agreement on Technical Cooperation between the Government of Japan and the Government of the Kingdom of Thailand signed on 5th November, 1981.

Accordingly, the Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official agency responsible for the implementation of the technical cooperation programmes of the Government of Japan, will undertake the Study in close cooperation with the authorities concerned of the the Government of Kingdom of Thailand.

The present document sets forth the scope of work for the Study.

II. OBJECTIVE OF THE STUDY

The objective of the Study is to formulate a development and promotion plan for the supporting industries (parts and components manufacturers).

The Study shall cover the following two supporting industries :

- (i) auto parts industry
- (ii) electrical and electronic parts industry

III. SCOPE OF THE STUDY

The Study shall be conducted in two phases.

The present promotional policies for the supporting industries and the present status of the said supporting industries in general shall be studied in the first phase so as to select prior products.

In-depth study for the selected prior products shall be conducted in the second phase.

In order to achieve the above objective, the Study shall be conducted in accordance with the following items :

Phase I :

1. Review of existing institutional and promotional policies relevant to supporting industries development

8.7

- 1-1 Institutional set up (administrative system, policy making bodies)
- 1-2 Technical development policy (standardization and QC)
- 1-3 Financial policies (taxation system, subsidies and customs duties)
- 1-4 Investment promotion policy including technical collaboration
- 1-5 Infrastructure (industrial estate, waste water treatment plant and power supply)

2. Review on the present status of the selected supporting industries :

- 2-1 Number of enterprises by scale
- 2-2 Products of each supporting industry
- 2-3 Production volume (quantity and value)
- 2-4 Export and import volume (quantity and value)
- 2-5 Profiles of the leading enterprises
- 2-6 Supply source of parts and components used by major assembling firms (hereinafter referred to as "assemblers")

3. Selection of the prior products

Based on the review study, the prior products in the supporting industries shall be selected for the subsequent Phase II study.

Phase II:

- 1. Review of the present institutional and promotional policies towards prior products
- 2. Study on the present situations and problems hampering supply of prior products to the assemblers
 - 2-1 Management (labor management, human resources development, financial management, etc.)
 - 2-2 Manufacturing process
 - 2-3 Technical level (machinery and technical skills)
 - 2-4 Procurement of raw materials
 - 2-5 Factory management and quality control
 - 2-6 Product development and design
 - 2-7 Cost analysis
 - 2-8 Marketing
 - 2-9 Future demand forecast by the assemblers

S. J. M.

3. literary study on the market situation of the prior products in other major countries

3-1 Trends of production, import and export

3-2 Competitiveness and marketability of the Thai products

4. Formulation of a master plan for development of the supporting industries, especially for the prior products covering the recommendations concerning :

4-1 Institutional and promotional policy (e.g. financial assistance and incentives)

4-2 Technical development (e.g. technical counselling, R&D, QC, standardization, product design)

4-3 Marketing promotion

4-4 Management promotion (e.g. human resources development, labor management)

4-5 Investment promotion (e.g. joint ventures, technical licensing)

4-6 Supporting infrastructure development (e.g. industrial estate, pollution control, utilities, common service facilities)

5. Information services for promotion of investment and technical collaboration

5-1 Potential investors from Japan for the selected supporting industries/products

5-2 Potential Thai investors for the selected supporting industries/products

IV. WORK SCHEDULE

The Study will be carried out in accordance with the attached tentative work schedule.

V. REPORTS

JICA shall prepare and submit the following reports in English to the Government of Thailand.

Ten (10) copies of the Inception Report

Ten (10) copies of the Progress Report

Twenty (20) copies of the Interim Report

Thirty (30) copies of the Draft Final Report

L. S. M.

Thirty (30) copies of the Final Report

VI. UNDERTAKING BY THE GOVERNMENT OF THE KINGDOM OF THAILAND

1. The Government of the Kingdom of Thailand shall accord privileges, immunities and other benefits to the Japanese study team (hereinafter referred to as "the Team") in accordance with the Agreement on Technical Cooperation between the Government of Japan and the Government of the Kingdom of Thailand.
2. To facilitate smooth conduct of the Study, the Government of the Kingdom of Thailand shall take necessary measures :
 - 2-1 To secure safety of the Team
 - 2-2 To permit the members of the Team to enter, leave and sojourn in Thailand for the duration of their assignment therein, and exempt them from alien registration requirements and consular fees
 - 2-3 To exempt the members of the Team from taxes, duties and other charges on equipment, machinery and other materials brought into, and out of, Thailand for the conduct of the Study
 - 2-4 To exempt the members of the Team from income tax and charges of any kind imposed on, or in connection with, any emoluments or allowances paid to them for their services for the implementation of the Study
 - 2-5 To provide necessary facilities to the Team for remittance as well as utilization of the funds introduced into Thailand from Japan for the implementation of the Study
 - 2-6 To secure permission for entry into private properties or restricted areas for the conduct of the Study
 - 2-7 To secure permission for the Team to take all data and documents including photographs related to the Study out of Thailand
 - 2-8 To provide medical service as needed. (Its expenses can be charged to the members of the Team.)
3. The Government of the Kingdom of Thailand shall bear claims, if any arises against the members of the Team resulting from, occurring in the course of, or otherwise connected with the discharge of their duties in the implementation of the Study, except when such claims arise from gross negligence or willful misconduct on the part of the Team members.

S. J. M.

4. The Department of Industrial Promotion, Ministry of Industry (hereinafter referred to as "DIP"), shall act as a counterpart agency to the Team as well as the coordinating body in relation with other governmental and non-governmental organizations concerned for the smooth implementation of the Study.
5. DIP shall, at its own expenses, provide the Team with the following in cooperation with other organizations concerned :
 - 5-1 Available data and information related to the Study
 - 5-2 Counterpart personnel
 - 5-3 Suitable office space with necessary equipment
 - 5-4 Credentials or identification cards
 - 5-5 Vehicles
6. DIP shall organize the Steering Committee (hereinafter referred to as "the Committee") for the purpose of smooth and effective implementation of the Study.

The Chairman of the Committee shall be the Director-General of DIP and its secretariat shall be set up within DIP.

VII. UNDERTAKING BY JICA

For the implementation of the Study, JICA shall take the following measures :

1. To dispatch, at its own expenses, a series of study teams to the Kingdom of Thailand
2. To pursue technology transfer to the Thai counterpart personnel

VIII. OTHERS

JICA and DIP shall consult with each other in respect of any matters that arise from, or in connection with, the Study.

S. Y. M.

TENTATIVE WORK SCHEDULE

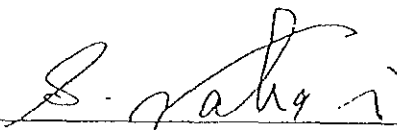
□ Work in Japan ■ Work in Thailand

Year	1993					1994												1995			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Project Month																					
Calendar Month	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
Preparatory Work in Japan	□																				
Work in Thailand	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Presentation of Inception Report	△	①		②	△ (1)			③			④		△ (2)		△ (2)						
Presentation of Progress Report								△ (1)													
Presentation of Interim Report																					
Analytical Work in Japan																					
Presentation of Draft Final Report																		△	■	⑥	
Submission of Final Report																					▲

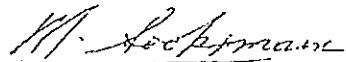
- ① Explanation & Discussion on Inception Report ③ Explanation & Discussion on Interim Report(1) ⑥ Explanation & Discussion on Draft Study on assembling firms
 ② Phase I Study ④ Phase II Study ⑤ Explanation & Discussion on Interim Report(2) Final Report

MINUTES OF MEETING
ON
THE SCOPE OF WORK
FOR
THE STUDY
ON
INDUSTRIAL SECTOR DEVELOPMENT
-SUPPORTING INDUSTRIES-
IN
THE KINGDOM OF THAILAND

Bangkok, June 3, 1993



SHINYA NAKAI
LEADER,
PREPARATORY STUDY TEAM,
JAPAN INTERNATIONAL COOPERATION
AGENCY



MANAS SOOKSMARN
DIRECTOR-GENERAL,
DEPARTMENT OF INDUSTRIAL
PROMOTION,
MINISTRY OF INDUSTRY

1) Introduction

- 1.1) The Preparatory Study Team made a visit to Thailand from May 28 to June 3, 1993 to discuss with the relevant Thai authorities the Scope of Work for the above mentioned Study.
- 1.2) In connection with the above, a meeting was held at the Department of Industrial Promotion on June 1, 1993, between the Thai officials chaired by Deputy Director-General, Mr. Thamnu Vasinonta on the Thai side, and the Preparatory Study Team headed by Mr. Shinya Nakai on the Japanese side (Attendance as in the list of Thai and Japanese delegation) to discuss the proposed Scope of Work as drafted by the Preparatory Study Team.
- 2) The Thai side requested that prior products from foundry subsector should be added, as they are related to the selected supporting industries. The Japanese side replied that the above request will be examined during the Study.
- 3) The Thai side requested to the Japanese side for the transfer of technology to the Thai counterpart personnel during the same period of time when the Study Team carries out work in Thailand (field survey). The Japanese side agreed upon the request of the Thai side.
- 4) The Thai side requested that to upgrade research and policy formulation capabilities, two fellowships should be prepared and Thai counterpart personnel be trained as on-the-job training in Japan when the study team carries out further studies in Japan. Japanese side stated that the request will be conveyed to the relevant department of JICA.
- 5) Both sides agreed that so as to keep smooth implementation of the Study in line with the National Economic and Social Development Plan, a Steering Committee is to be set up as follows :

E. V. m.

STEERING COMMITTEE

- | | |
|--|---------------------|
| 1. Director-General | Chairman |
| Department of Industrial Promotion (DIP) | |
| 2. Deputy Director-General | Vice-Chairman |
| Department of Industrial Promotion (DIP) | |
| 3. Director of Policy and Planning Division | |
| Office of the Industrial Economics, Ministry of Industry | |
| 4. Director of Planning Division | |
| Board of Investment (BOI) | |
| 5. Director of Industrial Development Division, DIP | |
| 6. Director of Metal-Working and Machinery Industries Development Institute, DIP | |
| 7. Chief of Industrial Planning Coordination Section | |
| Office of the National Economic and Social Development Board (NESDB) | |
| 8. One Representative of DTEC | |
| 9. Two Representatives of the Federation of Thai Industries | |
| 10. Two Representatives of recognized university / institute | |
| 11. Two representatives of related industrial associations | |
| 12. Director of Planning Division, DIP | Secretary |
| 13. Chief of Development Study Sub-Division, Planning Division, DIP | Assistant Secretary |
- 6) The Japanese side requested DIP to issue an invitation letter for entry visa for the members of the Study Team, who will enter Thailand by their private passports.

S. V. M.

List of Thai and Japanese Delegation

Thai Delegation

1. Mr. Thamnu Vasinonta Deputy Director-General
(Leader)
2. Mr. Padetpai Meekun-iam Director
Planning Division
3. Mr. Charoon Unsuwan Director
Industrial Service Division
4. Mr. Suwat Siwasaranond Chief, Development Study Sub-Division
Planning Division
5. Mr. Wirat Tundechanurat Chief of Research and Development
Group, MIDI
6. Mrs. Uraiwan Chandrayu Chief, Foreign Relations Sub-Division
Planning Division
7. Mr. Wirat Amornlertvit Industrial Technical Officer
Level 7, Planning Division
8. Mrs. Naruemol Suthawaree Chief of Investment Services
Sub-Division, Industrial Development
Division
9. Mrs. Nitnirun Suwannagate Chief of Project and Entrepreneurship
Development Sub-Division,
Industrial Development Division
10. Mr. Phaisit Singnoi Engineer Level 6, MIDI

Japanese Delegation

1. Mr. Shinya Nanai Director
Leader Industrial Development Study Division
Japan International Cooperation Agency
2. Mr. Masahiro Okamoto Technical Official
Technical Cooperation Policy Technical Cooperation Division
Ministry of International Trade and
Industry
3. Mr. Shinichi Kandori Project Officer
Project Planning Industrial Development Study Division
Japan International Cooperation Agency
4. Mr. Kazuo Yamane Technical Advisor
Auto Parts Industry Techno Consultants Co., Ltd.
5. Mr. Hiroshi Ninomiya Senior Engineer
Electrical&Electronic Industry Fuji Technosurvey Co., Ltd.

S. Y. M.

V. タイの自動車産業

V. タイの自動車産業

1. タイ国自動車産業の現状

1-1 自動車の需要と供給

タイ国は1985年以来平均して11%の経済成長を続けており、国民1人当りのGDPは1990年に1440ドルに達し毎年9%に近い伸びを見せている。これを反映して自動車の保有台数は毎年11%程度増大している。Ministry of Transport の統計によると1988年における乗用車、バス、トラックの合計登録台数は227万台であり、これをもとに推定すると、1993年にはタイ国の自動車保有台数は380万台にたっしていると考えられ、5%の廃車率を仮定し、11%の増加を考えると1993年には約60万台/年の需要が生じると考えられる。

表1. 1に示すようにタイ国での自動車の生産量は1990年に30万台/年に達しており、順調に行けば1993年には40万台/年を越えると言われている。

タイ国には日本のような定期検査制度がないので自動車は長期にわたって使用されることが多いと言われており、廃車率は低いと考えられる。更に、世界的な不況の影響で経済成長がややスローダウンしており、1993年は7~7.5%になると予想される。この様な状況を総合して考えると、自動車の需要が爆発的に増大するとは考え難いが、今後も着実に増大して行き、自動車会社の生産能力の増大が続くと考えられる。

1-2 国産化

タイ国では1962年以来政府の優遇措置のもとでノックダウン方式による自動車の組立生産が始っており、次第に部品の国産化を進めて現在に至っている。現在は次の国産化率となっている。

乗用車…54%

ピックアップ(1 ton トラック)…64%、国産エンジンの使用および強制7部品の使用トラックおよびバス—エンジン付シャーシ …40%

—同上、ウインドシールド付…45%

—同上、運転台付 …30%

この国産化率は部品調達率によって算定されており、組立費は国産化分として含まれていない。従って、次の算式がベースになっていると考えられる。

$$\text{国産化率} = \frac{\text{国産部品コスト}}{\text{輸入部品コスト (CIF + 輸入税) + 国産部品コスト}}$$

表 1. 1 タイ国自動車生産量

	CATEGORY	1980	1981	1982	1983	1984	198	1986	1987	1988	1989	1990	1991
PASSENGER CAR	1-200 cc.	2,740	3,021	1,852	272	485	671	266	42			45	35
	1-201-1,500 cc.	8,707	10,030	10,774	16,135	13,863	6,826	8,850	13,206	27,729	30,840	28,097	33,114
	1,501-1,800 cc.	7,922	9,094	7,570	11,064	15,013	13,224	8,916	9,561	14,410	11,586	16,991	20,929
	1,801-2,000 cc.	2,372	3,203	3,384	5,131	4,681	1,458	1,978	3,935	8,493	11,713	22,669	15,698
2,001 cc. up		1,700	1,302	992	1,301	2,085	1,683	1,036	2,539	3,827	4,622	5,964	7,162
Total Passenger		23,441	26,650	24,572	33,903	36,127	23,862	21,046	29,333	54,459	58,761	73,766	76,938
JEEP VAN MICRO BUS		367	146	2	2	2		504					374
BUS	10 TONS	60	44	31	37	19	16		5	60			
	10 TONS UP	1,776	442	313	379	312	294	409	363	921	829	593	1,382
TRUCK	PICK UP < 1 TON						820	775	2,209	4,930	9,585	15,667	10,518
	PICK UP 1 TON						50,414	46,115	57,492	79,651	119,348	170,059	169,940
	< 5 TONS	38,094	45,941	43,917	62,363	64,368	1,042	529	764	1,565	1,730	2,353	1,927
	5-10 TONS	5,698	6,967	4,194	6,318	4,624	3,154	2,625	4,124	5,021	5,582	10,370	8,707
10 TONS UP		4,549	6,969	4,241	6,259	5,585	2,504	2,159	3,858	7,576	17,713	32,035	13,329
Total Commercial		50,544	60,509	52,698	75,358	74,910	58,244	53,116	68,815	99,724	154,787	231,077	206,177
Total All Category		73,985	87,159	77,270	109,261	111,037	82,106	74,162	98,148	154,183	213,548	304,843	280,431

出典 : Automotive Industry Association の統計による。

表 1、2 自動車にかかる税

	Pick up エンジン付 シャーシー		軽トラック		乗 用 車			
	C K D	C B U	C K D	C B U	2400cc以下		2400cc越え	
					C K D	C B U	C K D	C B U
輸 入 関 税 (I/D) 率	20%	30%	20%	60%	20%	42%	20%	58.5%
物 品 税 率	—	—	—	—	32.5%	32.5%	38%	38%
V A T 率	7%	7%	7%	7%	7%	7%	7%	7%

(注)

(1) 物品税 = (C I F + I / D + 諸費用) × 物品税率

(2) 国内税 = 物品税の10%

(3) V A T (付加価値税) = (C I F + I / D + 諸費用 + 物品税 + 国内税) × 7%

(4) C K D : ノックダウン部品 C B U : 完成車

I / D : 輸入関税

実際の適用に当っては各部品毎に国産化率計算用パーセンテージを表にして与えており、これをもとに国産化率を算定する。

一部分の部品については強制的に国産品を使うことを義務付けられているが、G A T Tで問題視されており、強制義務を廃止する方向で検討されている。

1-3 インセンティブ

国産化率の拡大のためにはタイ国の関連産業での技術向上が必要であるが、自力での向上は短期間では困難であり、外国技術の導入に依存せざるを得ない。B O I (投資委員会) はラジエータ、燃料タンク、フィルター等のすでに国産化の進んでいる部品については地方 (Zone 3) に工場を建てる場合についてだけインセンティブ与えるのに対し、国産化の遅れているエンジン部品、トランスミッション、ブレーキ、ステアリング系、サスペンション部品

等の製造には首都圏を含むどこに工場を建設してもインセンティブを与えることとしている。

B O I が与える工場誘致のためのインセンティブの内容は

- (1) 法人税を免除
- (2) 機械設備を輸入する場合は関税を免除又は削減
- (3) 原材料を輸入する場合に関税を免除又は削減

であるが、タイ全国をバンコクを含みバンコクに近い6県 (Zone 1)、その周辺の10県 (Zone 2) それ以外の部分 (Zone 3) に分け、税を免除する期間、削減率、適用条件に差をつけている。尚、タイ国における法人税の税率は30%である (これ以外に地方税等の課税はないようである)。

新しく建設される中規模以上の工場のほとんど全部がB O I に申請してインセンティブの対象工場となっている様である。

1-4 関税および物品税

タイ国政府は、かつては輸入代替的な考え方から完成車の輸入に対してノックダウン部品の輸入に比して極めて高い関税を課して国内の自動車組立産業を保護して来た。しかし、最近次第に国際競争を重視する様になり、ノックダウン部品の輸入関税を下げると共に完成車の輸入関税を下けている。1992年1月に決められた自動車に対する関税他の税率の1部を抜粋して表1. 2に示す。

ノックダウン組立用の部品に対する輸入関税は20%であるが、完成車については30~60%の関税が課されている。又、乗用車に対しては32.5~38%の物品税が課されるので商用車に比べてかなり割高となる。

1-5 T I S 規格

自動車部品を大量生産の軌道にのせ、安全性と品質を保証した上で互換性を確保するためには部品の規格化が必要である。各自動車メーカーはそれぞれ社内規格をもっているが、これらを統合する形で我が国ではJ I S 規格が定められている。タイ国ではT I S I (タイ工業規格院) がT I S 規格を定めて、これに合格した製品にはT I S マークをつけている。

自動車部品関係のT I S はすでにエアフィルター、ラジエータ、タイヤ、ランプ等共通部品を中心として56品目について定められ、更に17品目を追加すべく準備中である。タイ国の自動車は日本メーカーの設計によるものがほとんどであるので、規格は大幅にJ I S に準拠している。

1-6 自動車 (組立) 会社

現在、タイ国でノックダウン方式による自動車の組立を行っている会社は表1. 3に示す

13社である。タイ国政府は乱立を防ぐためこれ以上組立業者を増加させない方針である。又、組立てる車種についてもできるだけ統合して、数を減したい意向である。

表1. 4にメーカー別にタイ国産自動車販売台数を示す。91年の実績では最大のトヨタが7.5万台/年で、この他に5万台/年を越える生産量をあげているのはいずれも、日産の2社だけである。これらはいずれも複数車種を生産している工場での生産台数である。自動車産業は大量生産方式によって成立しており、この程度の実績では国際競争力を得ることがかなり難しいと思われる。

自動車メーカーの中にはASEAN全体で自動車部品の数量をまとめて国際分業生産を行うことを計画しているものがあり、ASEAN諸国の政府間でこれに呼応する動きがあり、タイ国も自動車部品生産の拠点の一つになって自動車部品の輸出を行いたい考えのようである。

1-7 1 tonトラック (Pick up 1 ton)

先に表1. 1に示したように1 tonトラック (Pick up 1 ton)の生産が他の車種に比べてずば抜けて多い(60% 1991年)。1 tonトラックの輸送効率は大型トラックに比べて低く、タイ国で1 tonトラックがこの様に大量に生産されることには理解し難い面があるが、実際にタイ国の道路で1 tonトラックの使用状況をみると理由が明白になる。1 tonトラックのほとんどは荷台の上にほろ又はガラス窓付のカバー(金属製)を取付けて一種の乗用車として使用されている。

1 tonトラックがこのような普及した理由は先に述べた税制にあると考えられる。すなわち、同クラスの乗用車にかけられる32.5%の物品税が1 tonトラックでは免除されている(表1. 2参照)からである。1 tonトラックの新車販売価格は約30万バーツ(約150万円)であり、国民車的な人気がある。乗用とするための改造は自動車組立工場では実施しておらず、自動車パーツを販売している店で改造用部品を購入して取付ける仕組みとなっている。

1-8 エンジンの国産化

タイ国では機械工業が未発達で、高度な機械加工、複雑な形状のものの砂型鋳造等の技術がまだ確立されていない。このため、エンジンの製造が困難で輸入に頼らざるを得なかった。

タイ国政府はこの状況を改善するために先に述べる1 tonトラックのエンジンの国産化を推進している。このため、1 tonトラックの組立をしている企業に対しては国産エンジンの使用を義務づけ、BOIのインセンティブを受けているエンジンメーカーに対しては50%の国産化率を要求している(1993年現在)。この国産化率は毎年10%向上させ80%の国産化を達成したい意向である。

今のところ、エンジン部品のうちで、シリンダヘッド、シリンダブロック等の鋳造部品の製造が国産化率向上のための困難の一つとなっており、本格調査では鋳造の専門家による調

査と助言が行われることが望ましい。

政府は自動車エンジンの排気ガス規制をヨーロッパ（E C）並みに実施する方針であり、当然国産エンジンにも適用されることとなろう。

表 1. 3 タイ国の自動車（組立）企業

自動車（組立）会社	主要製造車種
1. Toyota motor Thailand Co., Ltd	Passenger: Corolla, Corona, Crown Pick up: Hilux
2. M.M.C. Sittipol Co., Ltd	Passenger: Lancer, Galant Pick up: L 200
3. Y.M.C. Assembly Co., Ltd	Passenger: BMW Series 3 BMW Series 5 Peugeot 405
4. Banchan General Assembly Co., Ltd	Passenger: Honda Accords Honda Civic Hyundai Holden, Opel Kadett
5. Siam Automobile Co., Ltd	Bus & Truck Passenger: Mira Bluebird, Sunny, Sentra, Cerfiro, Cedric, Suzuki Pick up: Big M
6. Sukosol and Mazda motor Industry Co., Ltd	Passenger: Mazda 323 Mazda 626

7. Thai-Swedish
Assembly Co., Ltd
Passenger: Volvo 904.
Volvo 960
Ransult R 19
Volvo R 21
8. Thonburi
Automobile
Assembly Co., Ltd
Passenger: Benz W 124
9. Thairung
Union cars
Co., Ltd
10. Honda Cars
Manufacturing
Assembly Co., Ltd
Passenger: Honda Accord
11. Thai Hino
Industing
Co., Ltd
12. Motor and Leseng
(Thailand)
Co., Ltd
13. ISUZU Motor
(Thailand)
Co., Ltd
Pick up: TER

表1. 4 自動車販売台数（メーカー別）

	81	82	83	84	85	86	87	88	89	90	91	92 (1~9)
TOYOTA	16,114	26,587	33,758	32,366	22,977	22,052	28,326	39,339	52,544	77,331	75,095	70,341
ISUZU	14,364	16,156	24,709	22,985	19,376	16,283	23,579	31,403	48,551	69,654	58,275	52,486
NISSAN	18,335	21,008	26,294	25,445	16,891	13,841	17,135	28,335	35,891	51,038	51,401	44,942
MITSUBISHI	6,972	4,785	9,318	10,035	5,926	6,608	10,101	14,344	23,856	38,112	34,455	32,597
MAZDA	7,272	6,651	7,888	7,038	5,999	7,499	6,614	8,368	12,497	19,365	12,881	13,826
HONDA	8	3	0	841	949	870	3,405	6,735	10,470	11,909	10,855	13,058
HINO	411	3,111	4,054	3,666	2,041	1,721	2,841	4,920	8,484	14,200	6,569	5,290
PEUGEOT	1,005	2,332	1,955	1,514	2,570	2,809	1,546	2,872	2,465	3,744	1,541	1,570
VOLVO	472	525	659	717	591	814	1,559	1,902	2,313	3,167	3,735	2,657
B.M.W.	1,228	1,054	736	1,690	2,170	2,767	2,129	2,124	2,341	3,189	2,110	2,946
BENZ	1,117	1,955	1,255	1,354	1,145	988	1,381	1,767	2,447	2,328	2,984	4,680
RENAULT	157	164	62	0	0	0	310	572	778	1,471	1,007	787
FORD	2,743	2,316	1,938	1,015	883	1,186	970	757	585	807	770	913
CITREON	309	207	470	520	760	580	498	332	228	200	89	36
OPEL	114	13	0	0	0	11	246	31	144	194	131	229
HOLDEN	4	0	0	177	171	113	47	418	615	481	462	138
OTHERS	5,719	5,219	5,415	4,186	2,773	1,459	810	2,261	4,034	6,872	6,200	11,100
GRAND TOTAL	76,344	91,186	118,511	113,549	85,222	79,601	101,497	146,480	208,243	304,062	268,560	257,596

出典：タイ国経済概況 1992-93年版 バンコク日本人商工会議所による。

2. 現地企業訪問調査

2-1 自動車組立会社A社

生産能力（2シフト）月産 8,320台

内1 tonトラック 6,000台／月

従業員：1,989名 内正社員 1,280名

A社は工場をバンコク市の郊外にもち、1 ton トラック（Pick up）の生産を主体としている自動車組立会社である。今のところ1 ton トラックのタイ国でのシェアでは第1位である。自動車の生産はタイ資本の自動車販売会社の委託加工という形をとっている。

工場は最近建増し（1992年6月完成）を行っており、その結果、最終組立ラインは1 ton トラック用の1ラインとその他の車種用の1ラインの2つに分れている。車体部品は一部を外注しているが、かなりの部分は自工場で製造しており、フェンダー等ごく一部を日本から輸入している。

1 ton トラック用のディーゼルエンジンはA社の子会社であるエンジン製造会社が供給している。A社の傘下にはこの他プレス加工用の金型製作を行う専門会社や自動車をタイ国の実情に合わせて設計すること等を含め技術開発を行っている会社がある。

A社の製造ラインは流れ生産方式になっており、日本式の生産管理が行われている。しかし、ロボットは全く取り入れられていない。従って、スポット溶接をすべて手作業でやっており、トランスファープレスの中間での移送も作業者がついて行っている。

A社に納入している下請業者38社について同社が行った調査では、納期通りに納入した率は平均93%であった。A社の同系列社の日本側統計では99%であり、納期遅れが日本の約7倍あることになる。又、納入された製品に不良のあった割合は平均0.17%で日本での平均0.005%に比べると34倍である。しかし、絶対値でみると許容できる水準に入っていると考えられる。

A社は下請け会社の内10～15社について（全部ではない）生産性向上、在庫低減などの指導を行っている。

A社と同系列の日本の会社の評価では現在購入している部品の価格は日本での購入価格と比較すると図2.3の様であるとしている。これによるとすでに36%の部品は日本以下の価格で入手可能である。

又、日本からの自動車部品企業の進出は表2.1に示すように合併（J/V）が48社、技術提携（TAA）が24社である。尚、国内で製品を販売するための合併は認可条件としてタイ資本が51%以上であることが求められており、合併下請企業はすべてタイ資本マジョリティの会社である。

さらに現在、自動車部品を製造している会社は日系48社、タイ系89社の合計137社あり、

その内容および技術水準は表 2. 2 に示す通りである。表では技術移転度となっているが、そのままタイ国自動車部品産業の技術水準を示すと考えてよいであろう。●印が水準が日本並みに近付いているものを示す。○印は技術移転の始まっていることを示す。

2-2 自動車部品製造会社 B 社

主要製品：自動車部品、エンジン部品

生産量：ボルト・ナット 1,000t/月、Uボルト 150t/月他

従業員：374名

内技術者は技師10人 技手 111人

B社はタイの一企業群に属するタイ資本 100%の企業で、ボルト・ナットの製造メーカーより1989年7月に分離独立した会社であり、法律上は別会社になっているがトップマネジメントは同じである。

主な製品は鍛造品で、熱間および冷間転造でボルトナットを大量に生産している。特にシャーシ取付用のUボルトの生産はシェアが大きいもようである。エンジン部品は鍛造成形によって素材を造っている。機械加工で一部精密ボルト・ナットも作っている。ボルト・ナット等にメッキするためかなり大きなメッキ設備がある。

製品の納入先は日系、日・タイ合弁会社等の自動車会社、オートバイ会社、農業用ディーゼル製造会社である。

この工場には自動車会社からの指導が徹底していて、材料在庫および仕掛品停滞が少なくて整然としている。但し、止まっている機械が多いので聞いたところ材料待ちとのことで必ずしも Just in Time はうまくいっていない。

工場敷地内に食堂 (canteen)、診療所 (clinic) 等があり、排水処理装置も設けられている。

納入先の自動車組立企業との資本的なつながりはない。納入時の自動車会社からの支払条件は納品後60日である。タイ国内で購入する原材料の支払条件も60日とのことである。原材料はかなりの部分を日本の鉄鋼メーカーから仕入れている。この日本メーカーは契約後90日の支払条件を受け入れているとのことと輸送期間を考えると公平である。納期については客先の要求で相当無理な割込みがある様である。一部在庫を持つ等して対応している。図面は客先が支給したものをもとに自社で製造図を作っている。客先との打合せはよくやっている様である。規格はT I S (タイ工業規格) と客先の規格の両方を使っている。この工場から更に下請に出しているものはない。

この工場でもほとんど自動化は行われていない。機械設備は大半が Mahajak Industry から移設されたもののようである。

工場の一部で地盤沈下のため床の修理を必要としているところがあった。沼地を埋めて造成したために地盤に問題が生じたものの様である。

この工場の見学の後、参考のためにB社が独立前に属していたC社の工場を見学した。

C社では主としてボルト・ナットおよび小ネジ類を生産している。こちらの工場はB社に比べて雑然としていて原材料在庫、仕掛け、完成品在庫がかなり目につく。

僅かに一工場を見ただけであるが、自動車組立会社の行っている指導の影響はかなり大きいと感じられた。

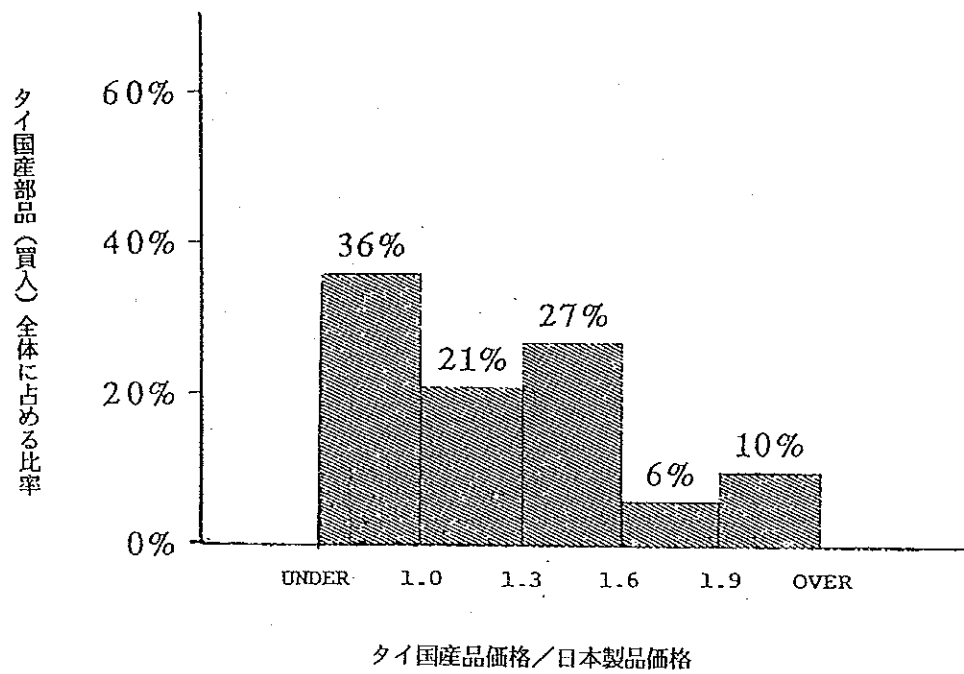


図2.3 タイ国産部品の価格

表 2. 1 自動車部品業界への日本からの進出状況

	J/V	TAA
エンジン部品	13社	0社
シャシ機能部品	14	15
プレス	3	2
プラスチック	2	1
鍛 造	1	1
AL 鋳造	2	2
ゴ ム	7	1
電 装	6	2
合 計	48	24

(注) J/V : 合併
TAA : 技術提携

表 2. 2 自動車部品製造企業の数と日本からの技術移転度

	日 系 企 業	タイ系企業	技術移転度			
			組立のみ	粗材成形	簡易加工	高度加工
エンジン部品	13社	20社	●	●	●	●
シャシ機能部品	14	22	●	●	●	○
プレス	3	11		●	●	
プラスチック	2	8		●		
鍛 造	1	3		●	●	○
鑄 造	0	4		●	●	○
AL鑄造	2	2		●	●	
ゴ ム	7	1		●		
電 装	6	9	●	●	●	●
合 計	48	89				

(注) ●印：技術がほぼ移転されている。
 ●印：不十分だが移転されている。
 ○印：移転が始められている。

VI. タイの電気・電子産業

VI. タイの電気・電子産業

1. タイの電気・電子産業の概況

1960年代に輸入代替産業として始まった電気・電子産業は、1970年代に国産化への歩みをつづけ、その後のカラーTV、エアコンなどの生産品目の追加などを経て、80年代後半には家電製品の世界への輸出拠点とも言うべき状況にまで成長して来ている。

更に、ここ五、六年の間、家電部門の他に電子部品、半導体、通信・情報関連、或いは昇降機、変圧器などの強電など、電気・電子産業の全ての部門にも日本を含む外資企業のタイへの進出が見られる。

長い歴史を持ち、今や輸出産業となった最近の家電産業の状況をタイ中央銀行、その他の資料からみると次のようになる。

- (1) ラジカセ、TV、扇風機、冷蔵庫、エアコン、電子レンジの主要6品目合計の1985年から1990年の年間成長率は105%となっている。(数量ベース) (資料1)
- (2) 国内販売動向 上記6品目の1985年から1990年までの販売の伸び率は年平均49.3%となった。1990年の販売額は210億バーツであった。この伸び率の差が単純に言えば輸出に回った事になる。(資料2)
- (3) 輸出動向 1985年の主要6品目の輸出額は1億6千9百万バーツであり、1991年の輸出額は140億3千9百万バーツである。(資料3)

別に工業省工場局の統計から見ると、家電・エレクトロニクス関連工場数は凡そ300、雇用労働者6万人、総投資額は400億バーツといわれている。更に電気機械の範囲で見ると、1984年の状況では工場数905であり、50人以上の従業員の工場数はその内98となっている。1991年の産業別工場数では電気・電子産業の工場数は7,581と推定される。因みに全工場数に対して、これは7.38%に過ぎない。精米工場が全数の50.46%を占め、その数51,834である。電気・電子関連工場の規模別分類については今回の調査では不明である。

即ち、1984年から1991年までの7年間に電子・電気関係の工場数は8.4倍に伸び、1985年から1990年までの主要家電6品目の生産の伸びも支えた事になる。(資料4、5、6)

2. 電気・電子産業のサポートインダストリーの状況

バンコク銀行調査部の調査によると、主要家電6品目の製品別輸入原料使用比率は次のようになる。

製 品	ラジカセ	白黒TV	カラーTV	扇風機	冷蔵庫	電子レンジ	エアコン
1984年	70%	80%	90%	40%	40%	—	80%
1990年	60%	65%	60%	20%	30%	50%	40%

1990年現在では、扇風機の20%を筆頭に概ね60%以下である。(資料6)

家電・エレクトロニクス産業の生産増加に呼応して電子部品の生産も本格化し始めている。タイにおける製造展開のネックであった部品の供給体制が整備される事で国産化率をあげながら生産拡大に対応する道が開けつつある。カラーブラウン管は1990年より国産化がなされており、半導体も個別半導体を中心に外資系の進出がその後相次いでいる。

しかし、部品産業が本格化しつつあるものの、主要機能部品は輸入に頼っているのが現実の姿である。

家電製品にしろ、FAX、VIDEOなどの情報関連にしろ、その構成要素は構造部品と本来機能、制御を構成する機能部品(例えばTVの場合ブラウン管、半導体、高圧トランス等々であり、冷蔵庫の場合には冷凍機、温度センサー、ドアの開閉スイッチ等々)、この二つに大別する事が出来る。

構造部品については、モールド成形品、プレス成形品、小さな機械加工品が主流を占める。これらは、どんどん国産化が進められており、その産業が伸長しつつある。

また、これらの部品を生産する為の設備は90~92年で見ると、輸入はされているが、急激に増えている訳ではない。(資料7)

逆にインジェクション用のモールド金型は激減している。これは、その製品、部品が新規のものへと変更されないのかあるいはモールド金型の国内調達が可能になって来たとも解釈される。

因みにタイの金型の業界の説明をすると(MIDI訪問の再に入手した資料から)既にTHE THAI TOOL AND DIE INDUSTRIES ASSOCIATION が結成されており、200社近くが組織化されている。加盟各社はバンコク或いはバンコク周辺に多く集まっている。その他にもワイヤーカットM/Cを2~3台持つ10名位の小企業が市周辺トンブリ、サムートプラカンに散見される。この意味ではプレスワーク用の抜き型については、或る程度のレベルまで製作可能と推定されるが、インジェクションモールド、ダイカスト、絞りを含んだ連続型などについては型の設計能力にまだ問題が有ろう。自動車用の大型の精密金型については未だ不十分との評価を下している自動車メーカーもあった。

日本の現況では金型の図面ももう必要ではなく、コストリダクションの為にCAD、CAM化される方向に向っており、この面では技術移転の難しさを示唆している。

広い意味でのサポートインダストリーの一つである金型産業の紹介をしたが、別のサポートインダストリーではプリント基板を挙げたい。後の現地企業訪問にも触れてあるが、これが国産化された事は非常に大きい。大概の製品は家電と言わず情報関連と言わず、プリント基板を使用している。但しこの基板の設計自体がそれぞれ個別の製品、メーカーごとの独自のノウハウを盛り込んだものであるから、設計、機能のチェック、信頼性の検証などに時間がかかりその為か90年~92年の輸入の統計では基板は国産化されたにもかかわらず、年々増

加を示している。

その他の機能部品としてはマイクロスイッチがある。これは基本的には半導体と同じように、大量生産をベースにして、コストを安く製品の信頼性をあげて生産されるべきもので、後に現地企業訪問調査に報告するように既にある程度のベースのあるマレーシア、シンガポールとの競争を覚悟せざるを得ない。同様に少容量のトランスも90～92年で輸入が増加しており、今後の一つの課題と思われる。その他に、本年2月のプロジェクト形成基礎調査時の2社の訪問調査にも提起された完成品、中間材、原料の輸入税率のアンバランスも今後の解決すべき課題であろう。

3. 今後の調査について

各種の統計などのまとまったデータがなく全体像をつかむのは困難であったが、種々の情報は具体的なものになればなるほど現地企業から情報を得る事ができる。更に政府系のみではなくバンコク銀行などでも調査をしており、この調査結果を訪問調査をする事はタイ側の意見として重要ではないかと思う。その他に日本人商工会議所なども有効である。今回は偶然日系企業のための訪問調査になってしまったが、他の外資系、タイオリジナルも調査すべきと思う。

私見であるが、この所の円高で日系企業が更にRESTRUCTURINGを進める可能性が強く、この動向も加えて調査する必要を強く感じた。こういった動向はBOIが一番掴んでいよう。

4. 現地企業訪問調査

4-1 バイメタルサーモスタット製造会社D社

主要製品 バイメタルサーモスタットのみ。タイの内需用として92年度で16.7%、タイの家電メーカーに納入して輸出されるものが23.3%、日本の親会社への輸出が60%になっている。(金額比)

従業員 165名(93.4 末現在)、内訳 経営者3名、マネージャー5名、監督者11名、直接作業者144名

同社の業績は創業時のロスからようやく脱却する所であり、これからの発展が期待出来る状況である。タイへの進出に際してはタイの日系家電メーカーに誘致された事もあったので現地売りは安心していただけだが、日本からの購入とは異なり、タイの同社の製品として信頼性も含めて品質認定をしてから購入という事になり、結局当初の売上げは低くなってしまった。また、輸出品を考えると日本へは電気用品取締り法に合格する必要がある、北米に対してはUL規格への合格も同社として取得しなければならなくなり、この為物量の積み増しがなかなかすすまなかった。結局両方の審査に合格し、タイ家電メーカーの認定も獲得し92年の売上に繋げる事が出来た。

国産化率；標準品で72.7%特殊品で約60%との事である。同社内で同製品のカバー(熱硬化性樹脂)のインジェクション成形とケースの自動プレス加工(型は超硬型)をしていたが、機械、型は日本から輸入である。最近タイ製の熱硬化性樹脂のモールド金型が外注にて完成しテストに入る予定との事であった。一般には熱硬化性樹脂の成形は熱可塑樹脂とは異なり、機能部品に多く使われタイでは珍しい。

作業速度、熟練度；相当の速さであり、B-75より早めの作業を女子が主体に作業している。熟練は90年4月の立ち上がり時のデータによると8作業日位にて通常のレベルになっている程で、その習熟度は早い。

作業者の定着度；月に3%程度が入れ替わっているとの事でこれにはマネージャー、スタッフも含まれる。この工場団地内での移動が多い。

生産管理；標準品で12部品であり内3部品が輸入であり、日々管理である。

品質管理；生産管理の場合と同様で日々管理を実行、日々の直行率で両者を兼ねて管理している。工程数も少ないので目下これで十分との事である。

コストリダクション；現状の円高では材料仕入れなど円の問題が多いのでバイメタルの材料などはヨーロッパ製の物を考えており、既にテストを実施している。これで材料比率を下げて行く計画がある。

その他；製品の拡大についてはどうかとの質問をした。例えば接点の信頼性は同じ筈なので電気・電子製品に多用される各種スイッチなどはAIT社での可能性はどうかとの質問にたいしては、現在その種の日本ブランドの機能部品はシンガポールから輸入されており、価

格的には日本から輸入する場合の80～90%の価格で、投資の償却を考えると、数量が少ないのでコスト的には対抗出来ないのではないかと返事がかえって来た。

(5) 所感

家電製品のコンポネントの1例として、非常に簡単な構造であるサーモスイッチのメーカーとして訪問した。

*93年2月のプロジェクト形成基礎調査時と同様のタイの税制の問題が出て来ており、相当の改善が必要と予想される。

*品質管理面は日本からシステムごとTRANSFERの場合は比較的楽であるが、タイの地場工場が品質管理を採用して行くには相当の困難が予想される。

*所謂構造部品の国産化は相当程度可能でありプレス加工、モールド加工用の金型類もタイ国内での調達が可能になって来た。但し金型の設計になると自社を除いてはまだ問題なしとしない。同社のタイ国産モールド金型は型図面を日本より持参している。

*もし、スイッチ等の機能部品を国産化していくならば、シンガポール等とコスト競争の問題がある。1988年以来の輸出の急増はあるも、まだ市場規模も小さく、尚且つ種類も多く、製作ロットがまとまらず標準化などがされればよいが、さもなければ投資と償却のバランスがとれない。

4-2 総合電機製品製造会社E社

従業員 : 3,213人 93年3月30日現在

主要製品 : 出資各社の製造品目があり、情報処理関連機器、通信機器および光学機器関連部品、機械加工部品

a事業部 ラインプリンターヘッド、コイル、通信モジュール、機械加工。

b事業部 ステッパーモーター、ロータリートランスフォーマー、HDD ヘッド、ノイズフィルター、フェライトコア

c事業部 シリアルプリンター（現在唯一の完成品）、プリンターヘッド、P C B、

d事業部 カメラシャッター、マイクロモーター、HDD Hヘッドスタック。

輸出先 ドイツ、フランス、オーストリア、日本、韓国、台湾、香港、シンガポール、マレーシア。

同社は外国資本 100%のタイ法人として発足、出資4社がそれぞれの事業部という形で運営しており、非常に珍しいケースである。大体一の工場建物（1階平面で 7,200㎡）に一の事業部が入り、2階建ての場合もある。基本的には各社が日本に於いて外注に出していた工程を含めて多くはSUB ASSYの段階で出荷をしている。

従って、同じ場所に於いての生産が可能となり、若いタイ女性作業者の故に能率は上がり、品質も向上したという実績があった。

しかし、ここ2、3年の上記関連の市場は世界的に不況の状態であり、従業員も一時4千人を越した規模が新規採用を控えて、退社もあり現状の規模に落ちついている。同時に工場内も機種の入替え、減産による規模の縮小などで広いスペースが空いている。

100%外国資本故に厳しいBOIの国内販売条件がついていると予想されるが、必ずしもそうではなくものによっては70~90%の輸出が義務付けられている。

国産化率：まだ一般的には低いのが実情であるが、例えばc事業部のシリアルプリンターなどはカバー類などを内製化した為に、この部分のコストが60%に下がり、結果として35%の国産化率となった。説明によるとタイ国内の同業他社では50~60%であり、あるメーカーは98%を国産化しているとの説明があった。

もう一つの例としてb事業部のロータリートランスフォーマー（写真3）はそのフェライトの部分の内製化し、従来月200万台を7、8月より280万台に増進する予定との事である。

物量不足対策としてはタイ国内の同種のメーカーの加工外注を引き受けているのが目立つ。c事業部のPCB生産ラインでは日本メーカーのSMD部品の自動供給、半田付けを大量に作業していたが、部品は全部社給を受けていて、プリント基板はタイ国産のものとの事で、これは大きな発見であった。香港、台湾の基板メーカーが最近進出し、5層、6層程度のもので製作可能との説明を受けた。電子産業の一つのキーコンポーネントがここ2年位の間に基礎を作りつつある訳である。

PCB生産ラインでは不可欠のものであったフロンも既に代替品に切替え終了していた。

同様の動機で機械加工の建屋も現在70%が加工外注を引き受けており、例えば型、材料社給を受け、モールド成形のみを引き受けているという状態であった。

この機械加工工場は設備のみで約20億円の投資をしているとの説明で自動プレス、モールド機械、CNC工作機械、計測設備、型、じぐ用設備など多彩である。

生産管理は同社得意のEDPK化されたシステムを採用しており、品質管理は各事業部の個性にあったものをそれぞれ実施しているのを見受けた。

コストリダクションは目下物量の不足に悩んでいるが内製化を主体に進める段階である。これによって大幅なリダクションが期待出来よう。但し投資と物量のバランスをみながらとの事であった。当然の事と言えよう。

その他として同社独自の奨学金制度が下記の通り存在している。

富士通アジア奨学金制度 各国から1名ホノルルの学校へ留学

経団連スカラシップ タイ東北部の中高校生158名が受給

FTCスカラシップ 1991年より、スタッフ、テクニシャンを対象に、年間2名
に対して2年間夜間大学の学費を支給

また、社内活動として高信頼性運動、環境整備運動を各事業部共通に社内活動を推進している。

(所感)

*同社は現在の製品構成から言えば、所謂電気・電子産業のサポートインダストリーの範疇に入るものがほとんどであり、その点で非常に興味があった。但し親企業は通信情報関連、カメラの製品群であり、特に技術革新の激しい分野である。

タイの産業が現状の家電範囲を主体に進むのか、新たにこの種の分野にまで拡張していくのかは明確に判断出来ないが、円高などを考慮して後者と仮定すると、製品技術の革新とそれをフォローして行くべき製造技術の革新が必要になり、その面でのサポートインダストリーは更に多岐に亘る必要がある。

また、構造部品にプレス品、ダイカスト品、モールド品といえども現状よりも更に一段と高精度を追求する事が不可欠である。

*ここ2～3年の間に電気・電子のサポートインダストリーに広範囲にわたって外資系メーカーを主体に展開され始めた感が強い。そのよい例がプリント基板である。87年頃の私の調査ではタイ国内からの入手は不可能であった。またプリンターの例に見る如く、間接的な情報であるが他メーカーの国産化率は相当高くなっている。

以上

資料リスト

- 1 PRODUCTION OF ELECTRIC AND ELECTRONIC BANK OF THAIAND
- 2 SALES OF ELECTRIC AND ELECTRONIC PRODUCTS BANK OF THAIAND
- 3 VOLUME AND VALUE OF ELECTRIC AND ELECTRONIC PRODUCTS EXPORT
CUSTOMS DEPARTMENT
- 4 従業員規模別、業種別登録工場数（全国、1984年）
バンコク日本人商工会議所発行〔タイの中小企業〕
- 5 産業別工場数－1991 バンコク日本人商工会議所発行〔タイ経済概況〕
- 6 タイの家電・エレクトロニクス産業の動向－その1
バンコクの“時事速報” 31 JUL 1992
- 7 IMPORT ELECTRIC AND ELECTRONIC PARTS DIP
- 8 工業省工場管理局産業分類とタイ国標準産業分類
（今後の調査の便の為） バンコク日本人商工会議所発行〔タイの中小企業〕

Production of Electric and Electronic Products									
ปริมาณการผลิตเครื่องใช้ไฟฟ้าและอิเล็กทรอนิกส์ในบ้าน									
Volume, Set									
ปริมาณ : เครื่อง									
	Radio เครื่องรับวิทยุ	เครื่องรับโทรทัศน์ขาวดำ	Color T.V. เครื่องรับโทรทัศน์โทรทัศน์สี	Total รวม	Electric Pdn เครื่องใช้ไฟฟ้า	ตู้เย็น Refrigerator	Air Conditioner อากาศ	Microwave เครื่องไมโครเวฟ	Total รวม
1985	337,472	81,149	335,300	467,449	465,949	286,931	43,900	-	1,612,501
2523	372,976	74,752	412,123	487,575	533,521	295,501	33,730	-	1,735,155
1986	635,795	98,182	512,216	610,333	1,012,489	403,545	52,513	-	2,726,745
2531	835,389	117,480	756,460	873,940	1,411,672	560,349	95,195	434,000	4,283,240
1987	1,016,720	107,949	1,339,095	1,447,045	2,035,397	747,531	111,130	578,939	6,033,122
2532	1,307,400	102,000	2,459,050	2,552,450	2,752,150	904,100	123,000	1,237,700	6,506,600

ที่มา : ธนาคารแห่งประเทศไทย
Source: Bank of Thailand

Sales of Electric and Electronic Products

ปริมาณการขายรายเครื่องใช้ไฟฟ้าและอิเล็กทรอนิกส์ในบ้าน

Volume: Set
ปริมาณ : เครื่อง

	Radio เครื่องรับ วิทยุแทป	Black เครื่องรับ โทรทัศน์ White T.V.ขาวดำ	Color เครื่องรับ T.V.สี โทรทัศน์สี	Total รวม	Electric พัดลม Fan ไฟฟ้า	Refrigerator ตู้เย็น	Air เครื่องปรับอากาศ	เตาอบ Microwave ไมโครเวฟ	Total รวม
1985	265,127	97,264	379,932	477,196	471,399	276,660	33,260	-	1,623,633
2526	322,222	87,744	386,308	267,877	485,879	266,487	30,880	-	1,623,633
1986	673,143	81,372	436,658	513,030	541,879	289,032	34,350	-	2,055,433
1987	323,678	24,251	436,658	289,032	323,678	289,032	34,350	-	2,055,433
2530	528,327	155,765	556,378	712,143	778,664	370,490	36,697	-	2,426,521
1988	695,129	93,107	679,665	777,772	792,573	440,842	64,169	-	2,770,176
2531	833,389	129,120	732,448	833,389	833,389	440,842	64,169	-	2,770,176
1989	704,137	103,587	764,020	867,607	853,391	549,373	71,693	5,050	2,071,171
2532	1,012,770	103,587	764,020	867,607	853,391	549,373	71,693	5,050	2,071,171
1990	930,100	101,700	931,000	1,022,700	1,173,150	722,800	79,750	10,400	3,993,900
2533	1,347,400	101,700	931,000	1,022,700	1,173,150	722,800	79,750	10,400	3,993,900

ที่มา : ธนาคารแห่งประเทศไทย

Source : Bank of Thailand

Volume and Value of Electric and Electronic Products Export

ปริมาณและมูลค่าการส่งออกเครื่องใช้ไฟฟ้าและอิเล็กทรอนิกส์ในบ้าน

Volume: Set
ปริมาณ : เครื่อง
Value: Million Ba
มูลค่า : ล้านบาท

	เครื่องรับวิทยุประเภท	เครื่องรับโทรทัศน์ T.V.			มูลค่าไฟฟ้า	เครื่องปรับอากาศ	ตู้เย็น	เครื่องปรับอากาศ Air Conditioning	เตาอบ Microwave	รวม Total
	ขาวดำ - White	สี - Colour	รวม - Total							
1985 2528 - ปริมาณ - มูลค่า	47,153 21.6	2,662 13.4	7,104 21.6	207,079 30.1	5,327 22.1	12,570 73.7	- -	- -	- -	279,228 169.1
1986 2529 - ปริมาณ - มูลค่า	10,255 15.0	1,381 7.0	11,636 24.3	450,534 74.9	11,052 44.9	7,318 65.9	- -	- -	- -	459,849 225.0
1987 2530 - ปริมาณ - มูลค่า	39,318 30.2	5,907 30.0	18,603 52.7	235,664 126.9	39,344 153.4	13,950 92.3	- -	- -	- -	343,912 460.5
1988 2531 - ปริมาณ - มูลค่า	114,920 31.6	62,757 203.2	81,312 242.7	1,407,351 735.0	129,732 591.0	149,399 363.5	47,642 1,390.0	- -	- -	2,352,356 3,353.8
1989 2532 - ปริมาณ - มูลค่า	706,576 607.3	9,579 19.1	535,062 1,856.8	1,803,954 1,059.6	193,833 1,000.6	50,751 330.3	1,060,245 2,600.9	- -	- -	4,345,321 7,459.5
1990 2533 - ปริมาณ - มูลค่า	678,567 727.5	9,292 15.3	1,597,685 6,488.6	3,027,231 1,683.4	212,534 1,270.7	247,348 1,474.8	1,092,011 2,394.4	- -	- -	6,811,456 14,039.4
1991 2534 - ปริมาณ - มูลค่า	379,036 400.0	5,140 7.2	1,530,537 6,278.1	1,744,032 960.9	251,253 1,455.2	374,449 2,204.6	699,914 1,426.5	- -	- -	4,979,231 12,705.3

ที่มา : กรมศุลกากร

Source: Customs Department

〈付表4〉 従業員規模別、業種別登録工場数（全国、1984年）

資料4

業種名 \ 規模	- 9	10- 19	20-29	30-49	50-99	100 - 149	150 - 199	200 - 299	300 -	合 計
食 料 品	5,270	1,664	431	287	200	76	34	43	71	8,076
飲 料	78	45	5	12	9	18	6	10	9	192
タ バ コ	64	70	51	52	36	15	7	19	17	331
繊維・衣類	552	821	404	456	259	109	38	44	130	2,813
皮革製品	161	47	24	26	7	4	2	4	3	278
履 物	107	74	10	10	6	4	0	2	7	220
木材・木製品	1,774	584	209	224	184	42	17	12	7	3,053
家具・建具	695	280	68	51	39	3	6	5	4	1,151
紙・紙加工品	279	72	24	22	23	11	5	8	8	452
出版・印刷	1,604	293	75	52	24	7	5	5	7	2,072
産業化学	46	31	19	14	16	4	1	4	6	141
その他の化学	347	183	84	83	64	20	11	7	8	807
石油精製	0	0	0	0	0	0	1	1	2	4
石油・石炭製品	10	2	4	3	5	0	0	1	0	25
ゴム製品	401	136	53	60	50	26	14	12	13	765
プラスチック	930	311	75	76	35	14	4	6	3	1,454
陶 磁 器	58	57	39	33	30	5	5	4	6	237
ガラス製品	4	7	5	10	9	3	1	0	6	45
窯業・土石	779	392	98	61	70	22	10	9	8	1,455
基礎鉄鋼	29	38	31	24	26	9	9	2	7	175
非鉄金属	194	68	20	14	7	4	1	2	2	312
金属製品	3,651	617	179	119	80	25	15	10	20	4,716
一般機械	4,206	546	149	81	58	14	3	4	5	5,056
電気機械	524	162	64	57	49	19	7	12	11	905
輸送機械	1,644	300	85	78	58	19	12	15	22	2,233
（自動車修理）	1,747	293	58	36	36	3	1	5	2	2,181
精密機械	31	19	6	3	4	2	1	2	2	70
そ の 他	157	132	38	30	20	6	7	6	1	397
製造業合計	25,342	7,250	2,308	1,974	1,404	484	223	254	387	39,626
その他の産業	680	236	93	61	54	9	13	6	6	1,158
合 計	26,022	7,486	2,401	2,035	1,458	493	236	260	393	40,784

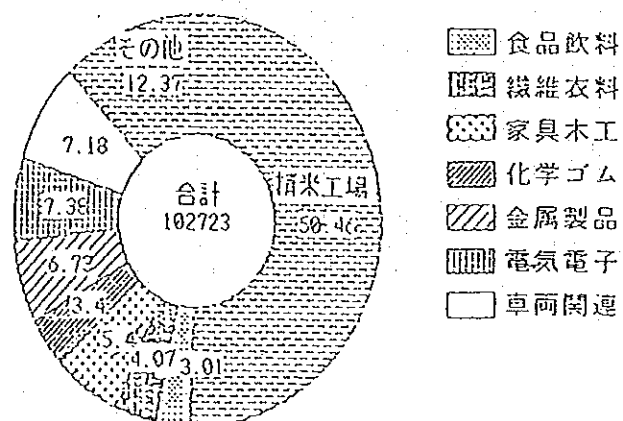
注：「自動車修理」は「輸送機械」の外数である（以下、各付表とも同じ）。

資 料：工業省工場管理局

「タイ国の中小企業」日本人商工会議所発行

産業別工場数－1991

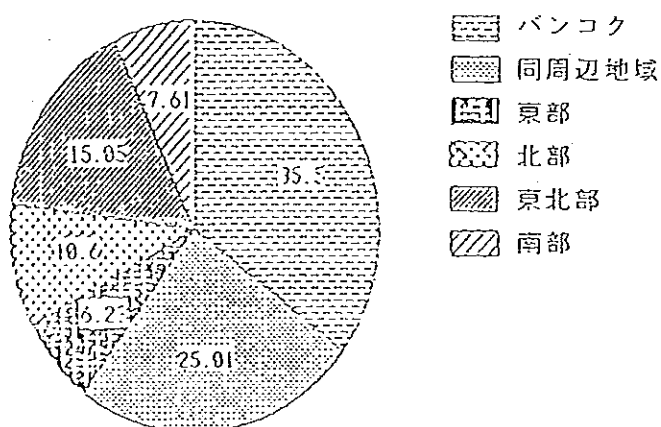
(単位：パーセント)



出所：工業省工場局

地域別工場分布－1991

(単位：パーセント)



出所：工業省工場局

「タイ国経済概況」(1992～93年版)

〔タイの家電・エレクトロニクス産業の動向＝その1〕

◎主要家電、エレクトロニクス製品の生産は過去5年間の5.26倍

＝バンコク銀行調査部調べ＝

バンコク銀行調査部発行の最新号「調査月報4月号」はタイ国の家電、エレクトロニクス産業の動向をまとめており、そのなかで家電、エレクトロニクス産業は年々高い成長率を示しており、1992年も前年比20%の伸び率が期待できるとしている。同レポート概況は次のとおり。

▲概況

タイの家庭電気製品を含むエレクトロニクス産業は30年の歴史を持っている。当初、政府の輸入代替産業育成の方針で部品の組立からはじまったが、現在では、国内で部品を生産、完成品は輸出している。

▲製品別輸入原料使用比率(%)

製 品	1984年	1990年
ラジカセ	70	60
白黒テレビ	80	65
カラーテレビ	90	60
扇風機	40	20
冷蔵庫	40	30
電子レンジ	-	50
エアコン	80	40
平 均	66.7	46.4

過去3～4年間に日本のほか、新興工業国である韓国、台湾、香港及びシンガポールからの投資で生産工場が設立され同工業は急成長した。対タイ投資の背景にはそれぞれの自国内での問題点、例えば、生産コスト高、環境に関する規定がよりきびしくなった、このほかタイの労働賃金が安い、安定した政治、経済情勢、特にタイ政府による民間投資の促進策などによる。1991年末現在の工場局の統計によると、家電・エレクトロニクス関連工場は300、雇用労働者6万人、投資総額約400億バーツ。盤銀調査部

は家庭電気製品として大きなシェアを占めているラジカセ、テレビ、扇風機、冷蔵庫、エアコンと電子レンジの生産、輸出は今後も高い成長率を示すものとみている。

▲生産高

①ラジカセ＝内外の需要増にささえられ1985年の35万7,000台が1990年には130万台となり、年間平均成長率は31%。1991年において生産高が多かったのはアサヒエレクトロニクス社で年産250万台であった。

②テレビ受像機＝1985～1990年に700万台、生産の90%はカラーテレビで、これに反比例して白黒テレビが減産。カラーテレビの生産能力は1985年の39万台から1990年は246万台となり、年間平均成長率は58%。外国市場の需要は2倍以上にふえている。21メーカーの生産能力が年に350万台。また、白黒の生産高の多いテレビ組立メーカーはCOLD STAR社。カラーテレビ組立はTCE TELEVISION社。

③扇風機＝1985年の50万台が1990年に 276万台に増え、平均の成長率は年間44%、1988年から50%以上。ほとんどの扇風機生産はシーリング扇風機、次にテーブルスタンドとフロアスタンド扇風機。メーカー12社の生産能力は年間270万台。最大手はC. E. I. 社、ついで三菱電機。

④冷蔵庫＝1985年27万台が1990年に90万台。平均増加率は年に28%。1987年から1988年にかけての伸び率は37%。1990年における 6 大手メーカーの年産能力は116万3,600台。最大手はサンヨー社で1991年約80万台。ついで日立と三菱電機。

以上

<Import> Electric and Electronic Parts

資料 7

	'92		'91		'90	
	Quantity	Value	Quantity	Value	Quantity	Value
1. 8452100001 Forging of OIC Stamping Machines (Including Presses, and Hammers For working metal)	1, 836	460, 512, 831	89	47, 937, 523	2, 114	642, 723, 323
2. 8477100004 Injection Moulding Machines, For Working Rubber or Plastics or For The Manufacture of Products From Molds For Rubber or Plastics	4, 544	2, 363, 362, 457	7, 724	2, 158, 355, 367	2, 588	2, 054, 169, 409
3. 8480710007 Injection or Compression Types Molds For Rubber or Plastics non Injection or Compression Types	17, 041	1, 630, 140, 357	16, 546	1, 227, 905, 699	67, 770	256, 281, 865
4. 848079004 Injection or Compression Types Molds For Rubber or Plastics non Injection or Compression Types	686, 896	703, 931, 139	167, 361	440, 943, 509	749, 621	554, 886, 107
5. 8504320005 Other Transformers Having A Power Handling Capacity 1-16 KVA	17, 225, 876	463, 654, 712	12, 850, 944	355, 443, 567	7, 341, 368	301, 811, 685
6. 8504310004 Other Transformers Having A Power Handling Capacity 1 KVA	27, 038, 709	915, 562, 598	27, 398, 436	759, 793, 724	17, 869, 731	667, 903, 439
7. 8534000084 Printed Circuits	300, 358, 298	3, 294, 464, 823	264, 796, 471	2, 842, 602, 234	191, 455, 779	1, 506, 301, 708
8. 8544110004 Insulated winding copper wire(Kg)	3, 197, 353	574, 781, 072	4, 704, 220	414, 174, 451	2, 065, 158	213, 129, 501
9. 8544190108 Insulated winding Alumi(Kg)	38, 695	34, 446, 114	175, 120	26, 239, 794	186, 352	29, 619, 010
10. 8544190905 Insulated winding wire(Kg)	955, 064	291, 251, 684	1, 151, 924	321, 856, 111	665, 400	250, 905, 870
11. 8544200000 Co-Axial Cbldc and other co-axial Electric conductors	1, 061, 177	199, 268, 714	1, 131, 220	234, 391, 647	1, 587, 825	278, 749, 630
12. 5544410005 Electric conductors Fitted With Conductors, For A Voltage 80-V(kg)	676, 019	329, 357, 776	676, 188	148, 420, 756	863, 655	158, 494, 309
13. 8544510007 Electric conductors Fitted With Conductors, For A Voltage 80-1000 V (kg)	2, 412, 427	1, 149, 233, 455	3, 991, 832	1, 056, 181, 920	3, 707, 159	739, 400, 941

工業省工場管理局産業分類とタイ国標準産業分類

1. 製造業

タイ国標準産業 分類コード	業 種 名	工場管理局コード
311, 312	食料品	2, 4, 5, 6, 7, 8, 9 (9(1)を除く) 10, 11, 12, 13, 14, 15
313	飲 料	16, 17, 18, 19, 20
314	タバコ	1, 21
321	織 維	22, 23, 24, 25, 26, 27
322	衣 類	28
323	皮革・皮革製品	29, 30, 31, 32
324	履 物	33
331	木材・木製品	34, 35, 36
332	家具, 建具 (金属製品を除く)	37
341	紙, 紙加工品	38, 39, 40
342	出版, 印刷	41
351	産業化学製品	42, 43, 44
352	その他の化学製品	45, 46, 47, 48
353	石油精製	49
354	石油, 石炭製品	50
355	ゴム, ゴム製品	51, 52
356	プラスチック製品	53
361	陶磁器	54
362	ガラス製品	55
369	その他の非金属鉱物製品	56, 57, 58
371	基礎鉄鋼製品	59
372	非鉄金属	60
381	金属製品	61, 62, 63, 64

(注) 9(1): 精米業

「タイ国の中小企業」日本人商工会議所発行

VII. 資 料

1. 原要請書
2. 要請内容変更書
3. 投資促進のための関連政策
4. 事前調査質問票及び回答

1. Terms of Reference
(原 要 請 書)

Project Title : The Study on Industrial Sector,
Development in the Kingdom of Thailand
Extension of the ongoing ISD Project

Requesting Agency : Department of Industrial Promotion,
Ministry of Industry

Proposed Source of Assistance : The Government of Japan

1. Background Information and Justification

1.1 It is a credible recognition that for a healthy development of the Thai economy, efforts to enhance and increase manufactured export by means of strengthening industries is most vital. To attain the increased manufactured export, it is indispensable to strengthen and improve export-oriented industries. To this aim, the government agencies concerned with industrial policy and industrial promotion have to have appropriate promotional measures based on a consistent industrial policy.

At the same time, it goes without saying that the private sector have to endeavor to upgrade the production and marketing while they should be fully aware of the situation of the world market and competing countries.

1.2 One logical method of attaining this goal will be to select potential industry sub-sectors and formulate the action and strategy-oriented development plans which are geared towards export promotion for each sector and have them implemented.

At the same time the promotion of foreign direct investment can be considered a very useful and effective tool for the development of the export-oriented industry.

1.3 The Department of Industrial Promotion, Ministry of Industry, fully recognizing the necessity of such activities, requested cooperation from the Japanese government through the Department of Technical and Economic Cooperation. JICA dispatched a contact mission in September 1986. Upon the agreement on the framework of technical cooperation, two short-term experts were dispatched for six months beginning from February 1987. They prepared for the subsequent study. Then JICA sent a Scope-of-Work Preliminary Survey Mission to Thailand in August 1987 to deliberate with the Thai government on the industries and

products to be studied. The project was named The Study on Industrial Sector Development. Six industrial sub-sectors decided on as a result of the deliberation, and the period of study was planned to be three years. The actual study started in early 1988 by the JICA study team in cooperation with Department of Industrial Promotion.

1.4 Since the project necessarily covers broad areas and this means that various Ministries and Departments of Thai government should be involved, The Department of Industrial Promotion took the initiative to form a steering committee comprising representatives from all concerned agencies including the Federation of Thai Industries. The committee, chaired by the Director General of the Department of Industrial Promotion, consists of members from Department of Industrial promotion, Board of Investment, NESDB and Department of Export Promotion. The role of the Steering Committee is to monitor the progress of the project and coordinate all the activities of the project. The Planning Division of the Department of Industrial Promotion has been playing a central role in the implementation of the project including the role of Secretariat to the Steering Committee. The committee has been functioning very well so far in fulfilling its role.

1.5 So far studies on sub-sectors of mold & die, toy, wooden furniture and textile & garments have been completed. The study on the sub-sectors of plastic and ceramic products are under way and will be completed by September 1990. The studies of the first four sectors were judged and determined to be very informative and useful to all the concerned agencies. (See attached A) And some of the recommendation of the study report has been utilized and implemented. Thus the Steering Committee meeting on May 9, 1990 unanimously decided to request the extension of the project for two more years.

1.5 Under these circumstances, the Department of Industrial promotion with the agreement and back-up of the Steering Committee would like the project of the Study on Industrial Sector Development to be extended. The extension period will be two years and the number of sub-sectors to be studied will be four. The sub-sectors to be studied were decided by the consensus of the Steering Committee in the meeting which held in early June, 1990.

2. Details of the Project

2.1 Programme Goal

The study on industrial sector development is intended for

- development of export-oriented industry and supporting industry
- promotion of foreign direct investment and technical collaboration
- expansion of industrial production and domestic employment
- expansion of overseas markets for Thai products

2.2 Project Objectives

The primary objectives of the study are to study the present situation of the selected priority subsector/products with emphasis on export, to formulate development and promotion plan for the subsector/products, and to provide information related to enterprises intending direct investment and technical collaboration.

The secondary objective is to upgrade the research skills of the technical officers of the Department of Industrial

Promotion, both in the Planning Division and in the relevant sectoral divisions.

2.3 Project Outputs

Four reports on comprehensive and effective development and promotion plans to be used as guidance for the development of four specific industries in the future.

2.4 Project Activity

The project will be executed, along the "Joint Study" format with the following elements:

- (1) Review of existing promotion policy relevant to the subsector(s)
- (2) Study on the selected priority subsector
 - a. survey on present condition of the priority subsector
 - b. formulation of development and promotion plan of the priority subsector
- (3) Study on appropriate directions and opportunities for direct investment and technical collaboration

2.5 Project Workplan

The study will be executed in 4 selected priority subsectors during the period of 2 years, Two priority subsectors will be selected for the study each year.

Tentative Priority Subsectors

1. Auto Parts and Accessories
2. Electrical and Electronic Products
3. Machine Tools (for metalworking and woodworking)
4. Rubber Products

Schedule of the Project

1. Four (4) priority subsectors to be covered by the project will be selected before the project starts
2. Duration of the in-depth study for the 4 subsectors will be for 2 years

Workplan for each subsector is divided into 7 steps as follows:

1. Preparatory work
2. Presentation of Inception Report
3. Field work
4. Presentation of the progress report
5. Desk work

6. Presentation of Draft Final Report

7. Submission of Final Report

2.6 Target Groups

Small and medium-scale enterprises in each of the four selected subsectors

2.7 Duration of the project

Approximately 2 years beginning in October 1991

2.3 Project Site(s)

The study team will be based in Bangkok with a lot of travel around the country while some part of the study will be undertaken in Japan.

3. Details of the Implementing/Operating Agency

3.1 Institutional Framework

In order to achieve the objectives of the study on industrial sector development, the project will be under supervision of the Planning Division, Department of Industrial Promotion. (See attachment I)

3.2 Staff/Personnel Participating in Project Implementation

Government

- Director of Planning Division (Project Director)
- Head of Survey and Research Sub-division
- 1 Economist
- 1 Engineer
- Economists/Engineers as required for specific subsectors

4. Assistance Requested

4.1 Experts

Field of Operation/ Activity	Total		1991		1992	
	No.	m/m	No.	m/m	No.	m/m
1. Study team	11	7	11	3.5	(11)	3.5
2. Long-term Consultant	1	24	1	12	(1)	12
Total	12	31	12	15.5	(12)	15.5

4.1.1 Justification for Requesting Experts

The study on Industrial Sector Development Project is expected to continue for 2 years and 2 priority subsectors will be studied each year. During the project period the Japanese study team consisting of experts in various fields will frequently visit Thailand but may not stay in Thailand throughout the period because part of the study has to be undertaken in Japan.

We believe that a long term expert will be needed in order to facilitate the smooth implementation of the project, to prepare for and follow-up the study and at the same time, to undertake a field study while a study team is in Thailand.

4.1.2 Job Description of Each Expert Study Team Requested

(1) The study team

The job description of the study team members will be similar to those of the present team members. Each expert as a member of the study team has to fulfill duties assigned, while they join in the aforementioned preparatory work, field work, desk work and presentation of the reports at each stage of the progress of the study. The reports to be presented are as follows:

1. Inception Report at the beginning of field work
2. Progress Report at the end of the field work
3. Draft Final Report within 5.5 months after completion of the field work
4. Final Report within 2 months after receipt of comments on the Draft Final Report

(2) One long-term expert

The long-term expert is to work for ISD Project in the same manner as in the present on-going project with the following specific responsibilities.

- (a) To prepare for and follow-up the study by collecting and analyzing data while the study team is not in Thailand.
- (b) To undertake a field study as a member of the study team is in Thailand
- (c) To train the counterparts by transferring the expertise on study techniques including data collection and analysis

4.1.3 Qualification

The personal organization of the study team should be similar to that of the recent study team under the on going ISD program. The study team must consist of experts who have adequate overseas experience with good command of English and are knowledgeable and competent in the following fields :

1. export/import promotion
2. industrial promotion
3. management engineering
4. industrial engineering of the sub-sectors concerned

Long-Term Expert

Qualification for the expert is the same as in the present ongoing project, including in particular

- 5-10 years' experience in project feasibility studies including data collection and analysis.
- good command of English
- skills and experience in transferring know-how
- age between 40 - 50 years old.

4.2 Fellowships

Field of Study/Training	Total		1991		1992	
	No.	m/m	No.	m/m	No.	m/m
Study Tour	4	6	2	1.5	2	1.5
Total	4	6	2	1.5	2	1.5

Attachment I

Department of Industrial Promotion

Office of the Secretary	Industrial Productivity Division	Industrial Service Institute	Northern Industrial Promotion Centre
Planning Division	Thai handicraft Promotion Division	Textile Industry Division	Northeastern Industrial Promotion Center
The Study on Industrial Sector Devel- opment Project		Cottage Industries Division	Southern Industrial Promotion Center
Small Industries Finance Project			Eastern Industrial Promotion Center
Small Industrial Finance Office			Western Industrial Promotion Center

2. 要請内容変更書



No. 0603/ + 089

Department of Industrial Promotion,
Ministry of Industry,
Rama VI Road, Bangkok 10400,
Thailand.

4/ December B.E. 2535 (1992)

Dear Mr. Abe,

Re: The Project Study on Industrial Sector Development
in the Kingdom of Thailand (ISD-Project)

With reference to the discussion on Evaluation of ISD-Project during the visit of the Project Formulation Survey Team led by Mr. K. Takeda at the Department of Industrial Promotion (DIP) on 16 October 1992, some highlight issues such as subsectors to be studied, period of the project, methodology of study were raised over the discussion. Therefore, we have revised some important points in the request as follows:

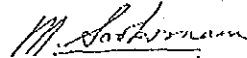
1. The Study is divided into two phases: the phase I study-Selection of Priority Subsectors, since the packaging industry is introduced and the foundry industry is to replace machine tools, and the phases II study- In-depth Study for Selected Subsectors (four subsectors for two years).
2. The period of the project is from 1993 to 1994.

3./....

3. It is also to change in the request item 4.2 Fellowships from "Study Tour" to "On the Job Training", and we have already enclosed herewith the revised request.

Your favourable consideration and kind cooperation to this request would be highly appreciated.

Yours sincerely,



MR. MANAS SOOKSMARN
DIRECTOR GENERAL

Mr. Nobuji Abe,
Japan International Cooperation Agency (JICA)
Thailand Office
1674/1 New Petchburi Road Bangkok 10310,
Thailand.

Project Title: The Study on Industrial Sector Development in the Kingdom of
Thailand

Extension of the ISD Project

Requesting Agency: Department of Industrial Promotion, Ministry of Industry

Proposed Source of Assistance: The Government of Japan

1. Background Information and Justification

1.1 - 1.5

-ditto-

1.6 Under these circumstances, the Department of Industrial Promotion with
.....-ditto-..... The extension period will be two
(2) years and the number of proposed sub-sectors to be studied will be
five. The sub-sectors to be studied were decided by the consensus of the
Steering Committee.

2. Details of the Project

2.1 - 2.3

-ditto-

2.4 Project Activity

The Project will be executed along the "Joint Study" format with the
following elements:

Phase I Study

- (1) Survey on present conditions of the proposed subsectors
- (2) Study on selection of the priority subsectors

Phase II Study

- (3) Review of existing promotion policy relevant to the selected
subsectors

(4) Study on formulation of development and promotion plan for the selected priority subsectors

(5) Study on appropriate directions and opportunities for direct investment and technical collaboration

2.5 Project Workplan

The Study will be executed in the following manner:

Phase I Study: Selection of Priority Subsectors

During the Phase I, the following tentative subsectors will be studied and the four (4) priority subsectors will be selected out of them before the full-scale study starts:

1. Auto Parts and Accessories
2. Electrical and Electronics Products
3. Foundry
4. Rubber Products, and
5. Packaging

Phase II Study: In-depth Study for Selected Subsectors

Based on the Phase I study, the in-depth study for the selected priority subsectors will be undertaken.

Duration of the Phase I and Phase II for the four (4) subsectors will be for two (2) years, two (2) subsectors for each year.

Workplan for each subsectors is divided into seven (7) steps as follows:

-ditto-

2.6 Target Groups

Small and Medium-scale enterprises in each of the four (4) subsectors

2.7 Duration of the Project

Approximately two (2) years beginning in June 1993.

2.8 Project Site (s)

-ditto-

3. Details of the Implementating/Operating Agency.

3.1 - 3.2

-ditto-

4. Assistance Requested

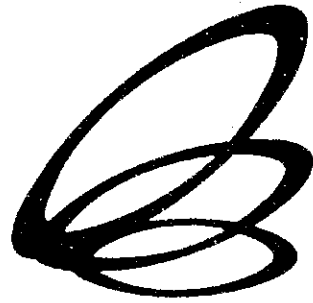
4.1 Experts

Field of Operation/Activity	Total		1993		1994	
	No.	m/m	No.	m/m	No.	m/m
1. Study team	11	7	11	3.5	(11)	3.5
2. Long-term Consultant	1	24	1	12	(1)	12
Total	12	31	12	15.5	(12)	15.5

4.2 Fellowships

Field of Study/Training	Total		1993		1994	
	No.	m/m	No.	m/m	No.	m/m
1. On the Job Training	4	6	2	1.5	2	1.5
Total	4	6	2	1.5	2	1.5

3. 投資促進のための関連政策



Board of Investment Announcement

No. 1/1993 : Policies and Criteria for Investment Promotion

No. 2/1993 : List of Activities Eligible for Investment Promotion

Board of Investment Announcement No. 1/1993
on
Policies and Criteria for Investment Promotion

*(this announcement supersedes BOI Announcement No. 1/1992
and should be read in conjunction with BOI Announcement No. 2/1993,
the List of Activities Eligible for Investment Promotion)*

In order to support and follow the National Economic and Social Development Plan and the government's policies, the Board of Investment has updated the policies and criteria for granting investment promotion and providing tax incentives as follows:

1. Legal Aspects

Under the Investment Promotion Act of 1977, the Board of Investment may approve the promotion of investment projects in the agriculture, animal husbandry, fishery, mineral exploration and mining, manufacturing, and service sectors when it considers that the products, commodities or services:

- 1.1 are either unavailable or insufficiently available in Thailand or are produced by an outdated process;
- 1.2 are important and beneficial to the country's economic and social development, and to national security; or
- 1.3 are economically and technologically appropriate, and have adequate preventive measures against damage to the environment.

2. Policy Aspects

Under the Investment Promotion Act of 1977, the Board of Investment maintains a policy of giving special consideration to investment projects which:

- 2.1 locate operations in provincial areas;
- 2.2 establish or develop industries which form the base for further stages of industrial development;
- 2.3 develop public utilities and basic infrastructure;
- 2.4 conserve natural resources and reduce environmental problems;
- 2.5 conserve energy or replace imported energy supplies;
- 2.6 contribute to technological development; and
- 2.7 significantly strengthen the balance of payments.

3. Criteria for Project Approval

In determining the economic and technological suitability of a project for which investment promotion is requested, the Board uses the following criteria:

- 3.1 For a project with investment capital (excluding the cost of land and working capital) not exceeding 200 million baht, the following criteria are used:
 - 1. The value added is not less than 20% of sales revenue, except projects which export at least 80% of total sales, or use domestic agricultural products as raw materials, or involve conserving, restoring or developing natural resources and the environment;
 - 2. Registered capital of a newly established project amounts to at least 20% of total investment. For expansion projects, the proportion of registered capital to total investment is considered on a case by case basis;
 - 3. Modern machinery and production processes and new equipment are used. In cases where an older process is to be used, its efficiency must be certified by a reliable institution, and the Board must approve its installation;
 - 4. Adequate environmental protection systems are installed.
- 3.2 For a project with investment capital (excluding the cost of land and working capital) over 200 million baht, criteria under 3.1 are used together with the following additional considerations:
 - 1. The impact of the project on its own industry and related industries;
 - 2. The impact on government revenue and any additional burden to the government in relation to the project;
 - 3. The effects on consumers;
 - 4. The contribution to technological development.
- 3.3 For a project with investment capital (excluding the cost of land and working capital) over 500 million baht, a feasibility study must be submitted.

4. Criteria for Joint Ventures

When considering approval of foreign investment in a wholly foreign-owned project, or foreign equity participation in a joint-venture project to which investment promotion has been granted, the Board utilizes the following criteria:

- 4.1 For investment projects in agriculture, animal husbandry, fishery, mineral exploration and mining, or in the service sector, Thai nationals must hold not less than 51% of the registered capital. However, for projects with investment capital (excluding the cost of land and working capital) over 1,000 million baht, foreign investors may initially hold a majority or all of the shares, but Thai nationals must acquire at least 51% of the shares within 5 years of starting operations.

- 4.2 For manufacturing projects, if the production is mainly for the domestic market, Thai nationals are required to own shares totalling not less than 51% of the registered capital, except projects located in Zone 3 in which case foreign ownership will be considered by the Board on a case-by-case basis.
- 4.3 Where at least 50% of total sales is for export, foreign investors may hold a majority of the shares, and where at least 80% of total sales is to be exported, they may hold all the shares.
- 4.4 During the Seventh Development Plan period (1992-1996) the foreign ownership requirement for projects in the following areas will be established by the responsible ministries on a case-by-case basis and the Board itself will not consider the foreign ownership issue:
 - 1. Development of transportation systems;
 - 2. Public utilities;
 - 3. Environmental conservation and restoration;
 - 4. Direct involvement in technological development.

5. Investment Promotion Zones (see map below)

All provinces throughout the country, as well as Laem Chabang Industrial Estate, except Bangkok, Samut Prakan, Samut Sakhon, Pathum Thani, Nonthaburi, Nakhon Pathom, Samut Songkhram, Ratchaburi, Kanchanaburi, Suphanburi, Angthong, Ayutthaya, Saraburi, Nakhon Nayok, Chachoengsao and Chonburi, are designated as Investment Promotion Zones.

6. Criteria for Granting Tax and Duty Privileges for Promoted Projects

- 6.1 Projects located in Bangkok, Samut Prakan, Samut Sakhon, Pathum Thani, Nonthaburi and Nakhon Pathom, (Zone 1)
 - 6.1.1 No tax exemption or reduction on machinery, except projects which export not less than 80% of total sales or locate their factories in industrial estates or promoted industrial zones. Such projects will receive a 50% import duty reduction on machinery which is not included in the tariff reduction notification of the Ministry of Finance (Notification No. C 13/2533) and is subject to import duty greater than or equal to 10%.
 - 6.1.2 No corporate income tax exemption, except for projects which export not less than 80% of total sales and locate their factories in industrial estates or promoted industrial zones, in which case a three year exemption will be granted.
 - 6.1.3 Exemption of import duty on raw or essential materials used in export products for a period of one year for projects exporting at least 30% of total sales.
- 6.2 Projects located in Samut Songkhram, Ratchaburi, Kanchanaburi, Suphanburi, Angthong, Ayutthaya, Saraburi, Nakhon Nayok, Chachoengsao and Chonburi (Zone 2)
 - 6.2.1 50% import duty reduction on machinery which is not included in the tariff reduction notification of the Ministry of Finance (Notification No. C 13/2533) and which is subject to import duty greater than or equal to 10%.
 - 6.2.2 Corporate income tax exemption for 3 years, extendable up to 7 years, for projects which locate their factories in industrial estates or promoted industrial zones.
 - 6.2.3 Exemption of import duty on raw or essential materials used in export products for a period of one year for projects exporting at least 30% of total sales.
- 6.3 The remaining Provinces plus Laem Chabang Industrial Estate (Investment Promotion Zones or Zone 3)
 - 6.3.1 Exemption of import duty on machinery.
 - 6.3.2 Corporate income tax exemption for 8 years.
 - 6.3.3 Exemption of import duty on raw or essential materials used in export products for a period of 5 years for projects exporting at least 30% of total sales.
 - 6.3.4 75% reduction of import duty on raw and essential materials used in production for domestic sales for five years, renewable on an annual basis, provided that raw or essential materials comparable in quality are not being produced or are not originating within the Kingdom in sufficient quantity to be acquired for use in such activity.

6.3.5 Special privileges are granted as follows:

1. Reduction of corporate income tax by 50% for 5 years after the exemption period;
2. Double deduction from taxable income of water, electricity, and transport costs for 10 years from the date of first sales;
3. Deduction from net profit of 25% of the costs of installation or construction of the project's infrastructure facilities.

7. Priority Activities

7.1 The Board has identified projects in the following five areas to be priority activities:

1. Basic transportation systems;
2. Public utilities;
3. Environmental protection and/or restoration;
4. Direct involvement in technological development; and
5. Basic industries.

7.2 Such projects will receive the following privileges:

1. Corporate income tax exemption for 8 years, regardless of location.
2. 50% import duty reduction on machinery which is not included in the tariff reduction notification of the Ministry of Finance (Notification No. C 13/2533) and which is subject to import duty greater than or equal to 10% for projects located in Zones 1 or 2.
3. Import duty exemption on machinery for projects located in Zone 3.

8. Criteria for Factory Relocation

In order to encourage industrial development in the regional area, the Board will grant promotion status to existing activities, which may or may not have been promoted, if they relocate from the central to the regional areas.

The following criteria will be used:

- 8.1 The operations must be relocated from Zone 1 to Zone 2, or from Zones 1 or 2 to Zone 3.
- 8.2 The type of activity and size of investment must be in accordance with those specified by the Board in the Investment Promotion List.

- 8.3 Criteria for factory relocation:
- 8.3.1 For projects facing environmental problems and required by the Ministry of Industry to relocate:
1. The factory must relocate to an industrial estate or promoted industrial zone.
 2. The former factory must be closed down and all machinery moved to the new location. The new factory must be ready for operation within 2 years of receiving the promotion certificate.
- 8.3.2 For other types of operation:
1. The existing operation must employ not fewer than 100 people.
 2. Main production machinery must be moved to the new location, and the new factory must start operating within 2 years of receiving the promotion certificate.
- 8.4 Relocating operations will receive the standard non-tax privileges, and tax privileges as follows:
- 8.4.1 For factories which relocate to Zone 2, except for activities specified in the Investment Promotion List as not being eligible for corporate income tax exemption:
1. Corporate income tax exemption for a period of 3 years.
 2. Corporate income tax exemption for a period of 7 years if they relocate to industrial estates or promoted industrial zones.
- 8.4.2 For factories which relocate to Zone 3, except for activities specified in the Investment Promotion List as not being eligible for corporate income tax exemption:
1. Corporate income tax exemption for 8 years.
 2. Reduction of corporate income tax by 50% for 5 years after the initial exemption period.
 3. Double deduction from taxable income of water, electricity and transport costs for 10 years.
 4. Deduction from net profit of 25% of the costs of installation or construction of the project's infrastructure facilities.
- 8.4.3 The income tax holiday period will start from the day of the first revenue received from the relocated activities.
- 8.5 Applications for relocation must be submitted to the Office of the Board of Investment.

9. Criteria for Granting Promotional Privileges for Research and Development

In order to support the advancement of production technology, the improvement of product quality, and the development of new products, the Board will grant additional privileges to promoted projects which invest in research and development activities.

The following criteria will be used:

- 9.1 The corporate income tax exemption period will be extended for 3 more years. However, when combined with the existing corporate income tax exemption period, the total period cannot exceed 8 years.
- 9.2 The promoted projects are required to make an additional investment in research and development activities equivalent to the value of the additional income tax exempted.
- 9.3 Machinery and equipment used in research and development activities must be approved by the Board.
- 9.4 The number of qualified Thai personnel in research and development activities must be approved by the Board.
- 9.5 The promoted projects can import machinery and equipment for research and development activities for a period of 8 years, beginning from the arrival date of the first shipment.

10. Exemptions

The Board of Investment will follow the above general criteria in considering and approving investment promotion and tax privileges, except in the following cases:

- 10.1 When different tax privileges have been specified to a particular type of activity (see BOI Announcement No. 2/1993).
- 10.2 When applicants submit an investment project between April 1, 1993 and June 30, 1993 and choose to be considered under the previous list of Activities Eligible for Promotion, in which case the former Criteria for Providing Tax Privileges will apply (see BOI Announcement No. 1/ 1992).
- 10.3 When the Board considers that special factors apply.

This announcement is effective for applications submitted from April 1, 1993. Projects that have already been approved for investment promotion, but have not yet used their tax privileges as of April 1, 1993, are eligible to apply for additional privileges under sections 6 and 7 of this announcement.

Given on April 9, 1993

Chuan Leekpai, Prime Minister of Thailand and
Chairman of the Board of Investment

Board of Investment Announcement No. 2/1993
on
List of Activities Eligible for Investment Promotion

*(this announcement supersedes the previous eligibility list
and should be read in conjunction with BOI Announcement No. 1/1993,
the Policies and Criteria for Investment Promotion)*

In order to categorize activities eligible for promotion according to the Thailand Standard Industrial Classification (TSIC), national economic and social development policies, and international trade and investment agreements, the Board of Investment, under Section 16, Paragraph 2 of the Investment Promotion Act B.E. 2520, has revised the categories and conditions of activities eligible for promotion as follows:

1. Under Section 7 of this announcement, all previous Board of Investment Announcements on Type, Size and Conditions of Activities Eligible for Promotion, and on Activities Suspended from the Investment Promotion List are revoked.
2. Activities in the list attached to this announcement are eligible for investment promotion.
3. Promoted projects must comply with the conditions specified for each type of activity.
4. A minimum level of investment capital (excluding the cost of land and working capital) of one million baht is applied to all types of activities eligible for promotion.
5. In order to support export-oriented investment, activities which are required to locate in Zone 3 according to this announcement will be allowed to locate in industrial estates or promoted industrial zones in Zone 2 under the following conditions:
 - 5.1 The project must export not less than 80% of total sales.
 - 5.2 Applications for promotion must be submitted by the end of the year 2001.
6. The Board may temporarily or permanently suspend activities in the Investment Promotion List attached to this announcement at any time if it considers that promotion is no longer needed; or the Board may add new activities to the list if it considers that such activities should be promoted.

List of Activities Eligible for Investment Promotion, Announcement No. 2/1993

7. The new list of activities under this announcement is effective for applications submitted from April 1, 1993. However, between April 1, 1993 and June 30, 1993, applicants may apply for promotion under the previous List of Activities Eligible for Promotion, in which case the former Criteria for Providing Tax Privileges will apply (see BOI Announcement No. 1/1992).
8. Projects that have already been approved for investment promotion, but have not yet used their tax privileges as of April 1, 1993 can reapply under the new Investment Promotion List and follow the new conditions specified therein.

Given on April 9, 1993

Chuan Leekpai, Prime Minister of Thailand and
Chairman of the Board of Investment

Note: The revised eligibility list is attached and is classified under the following broad headings:

1. Agriculture and Agricultural Products
2. Minerals, Metals, and Ceramics
3. Light Industry
4. Manufacture of Metal Products, Machinery, and Transport Equipment
5. Electronics and Electrical Industry
6. Chemical Industry, Paper and Plastics
7. Services and Public Utilities

1. Agriculture and Agricultural Products

1.1 Plant propagation (11191)

No conditions.

1.2 Production of silk worm eggs and silk worm farming (11192)

No conditions.

1.3 Silk production (32111)

No conditions.

1.4 Livestock propagation (11199)

No conditions.

1.5 Livestock raising (11140)

No conditions.

1.6 Slaughtering (31111)

1. *A modern slaughterhouse which meets the standards set by the Ministry of Agriculture and Cooperatives must be established.*
2. *There must be a freezing room of a size appropriate to the project.*
3. *Must be located in Zone 2 or 3.*

1.7 Tanneries, leather finishing, fur dressing or hair processing (32310)

Must be located in Zone 3.

1.8 Food manufacturing except carbonated drinks (31112, 31119, 31131, 31139, 31141, 31149, 31219, 31340)

Must be located in Zone 3.

1.9 Production of milk or dairy products (31121, 31122)

1. *Must use local fresh fluid milk in proportions as set by the Board.*
2. *Must be located in Zone 2 or 3.*

1.10 Manufacture of oils or fats from plants or animals (31151)

Must be located in Zone 3.

1.11 Manufacture of margarine (31152)

Must be located in Zone 3.

1.12 Manufacture of modified starch (31169)

Must be located in Zone 3.

1.13 Manufacture of cocoa or chocolate (31190)

Must be located in Zone 3.

1.14 Manufacture of L-Lysine from tapioca (35111)

Must be located in Zone 3.

1.15 Manufacture of monosodium glutamate monohydrate (31213)

Must be located in Zone 3.

1.16 Manufacture of animal feeds (31220)

Must be located in Zone 3.

1.17 Manufacture of board from wood by-products or plants (33112)

Must be located in Zone 2 or 3.

1.18 Manufacture of tires and tubes for automobiles (35510)

Must be located in Zone 3.

1.19 Manufacture of rubber products (35591, 35599)

Must be located in Zone 3.

1.20 Manufacture of furniture, fixtures, or flooring from rubber wood (33201)

Must be located in Zone 3.

1.21 Modern packaging and storage of fresh plants, vegetables, fruit or flowers (71912)

No conditions.

1.22 Crop drying and silo facilities (71920)

No conditions.

1.23 Grading facility for agricultural products (11209)

No conditions.

1.24 Deep sea fishing (13010)

No conditions.

2. Minerals, Metals, and Ceramics

2.1 Mineral ore prospecting (83242)

No conditions.

2.2 Smelting (37110, 37120, 37200)

Must be located in Zone 2 or 3.

2.3 Mining or ore dressing excluding tin (21000, 23010, 23022, 23029, 29013, 29021, 29029)

Mining license from the Department of Mineral Resources must be acquired before receiving promotional certificates.

2.4 Marble or granite mining (29011)

Mining license from the Department of Mineral Resources must be acquired before receiving promotional certificates.

2.5 Processing of marble or granite (36999)

Must be located in Zone 2 or 3.

2.6 Manufacture of ceramic products (pottery) (36100)

- Porcelain
- Stone ware
- Bone china

Must be located in Zone 3.

2.7 Manufacture of glass or glass products (36200)

Must be located in Zone 3.

2.8 Manufacture of hot or cold rolled stainless steel sheets or coils (37110)

No conditions.

2.9 Manufacture of steel plates (37110)

No conditions.

2.10 Manufacture of steel structures (37110)

Must be located in Zone 3.

2.11 Manufacture of seamless steel tubes or pipes (37110)

No conditions.

2.12 Manufacture of seamless or semi-seamless (inside bleed) stainless steel tubes or pipes (37110)

No conditions.

2.13 Manufacture of steel tubes or pipes (37110)

Must be located in Zone 3.

2.14 Manufacture of coated steel sheets or coils, excluding electro-galvanized steel sheets or coils (37110)

Must be located in Zone 3.

2.15 Manufacture of steel wire rods, steel wire, round bars, shafting bars or steel billets (37110)

Must be located in Zone 3.

2.16 Manufacture of steel round bars or deformed bars (37110)

Must be located in Zone 3.

2.17 Manufacture of iron and steel casting (37120)

Must be located in Zone 3, except manufacturing with a modern induction furnace which can be located in Zone 1 or 2.

2.18 Manufacture of forged steel parts (37120)

No conditions.

2.19 Manufacture of sintered products (37110, 37200)

No conditions.

2.20 Non-ferrous metal smelting (37200)

Must be located in Zone 2 or 3.

2.21 Manufacture of ferro-alloy products (37200)

Must be located in Zone 3.

2.22 Rolling, drawing, casting, cutting or forging of non-ferrous metals (37200)

Must be located in Zone 3.

2.23 Prefabricated housing or parts (39090)

Must be located in Zone 2 or 3.

3. Light Industry

3.1 Yarn spinning (32113, 32119)

Must be located in Zone 3.

3.2 Weaving or knitting (32115, 32190)

Must be located in Zone 3.

3.3 Textile printing (32117)

No conditions.

3.4 Textile bleaching, dyeing, printing and finishing (32118)

No conditions.

3.5 Manufacture of household textiles or textile products (32120)

Must be located in Zone 3.

3.6 Manufacture of garments (32201, 32202, 32209)

Must be located in Zone 3.

3.7 Manufacture of labels (32209)

Must be located in Zone 3.

3.8 Manufacture of carpets (32140)

Must be located in Zone 3.

3.9 Manufacture of fishing nets (32150)

Must be located in Zone 3.

3.10 Manufacture of products of leather or artificial leather (32330)

Must be located in Zone 3.

3.11 Manufacture of furniture or fixtures, except primarily of wood or metal (33201)

Must be located in Zone 3.

3.12 Manufacture of footwear or parts

- Manufacture of rubber footwear or parts (35592)
- Manufacture of plastic footwear or parts (35609)
- Manufacture of other footwear or parts (32400)

Must be located in Zone 3.

3.13 Cutting or polishing of gem stones (39011)

Must be located in Zone 2 or 3 or promoted gemstone and jewelry industry center.

3.14 Manufacture of jewelry (39012)

Must be located in Zone 2 or 3 or a promoted gemstone and jewelry industry center.

3.15 Manufacture of musical instruments (39020)

Must be located in Zone 2 or 3.

3.16 Manufacture of sports equipment (39030)

Must be located in Zone 2 or 3.

3.17 Manufacture of sand paper (39090)

Must be located in Zone 3.

3.18 Manufacture of wax paper (39090)

Must be located in Zone 3.

3.19 Manufacture of sanitary napkins (39090)

Must be located in Zone 3.

3.20 Manufacture of toys

- Manufacture of plastic toys (35609)
- Manufacture of toys made of other materials (39090)
- Manufacture of electronic toys or electronic games (39090)

Must be located in Zone 3.

3.21 Manufacture of jewelry boxes or packaging (39090)

Must be located in Zone 3.

3.22 Zipper manufacture (39090)

Must be located in Zone 3.

3.23 Glove manufacture except rubber gloves (39090) <i>Must be located in Zone 3.</i>	4.5 Manufacture of boilers (38130) <i>Must be located in Zone 2 or 3.</i>
3.24 Manufacture of socks or stockings (39090) <i>Must be located in Zone 3.</i>	4.6 Manufacture of metal containers (38191) <i>Must be located in Zone 3.</i>
3.25 Artificial flowers, trees or other artificial goods (39090) <i>Must be located in Zone 3.</i>	4.7 Manufacture of metal wire or wire products (38192) <i>Must be located in Zone 3.</i>
3.26 Production of lenses or spectacles or parts (38500) <i>Must be located in Zone 3.</i>	4.8 Manufacture of fabricated metal products, including metal parts for automotive and electronic products (38199) <i>Must be located in Zone 2 or 3.</i>
3.27 Manufacture of medical supplies or medical equipment (38500, 39090) <i>No conditions.</i>	4.9 Manufacture of agricultural machinery or equipment (38220) <i>Must be located in Zone 2 or 3.</i>
3.28 Manufacture of scientific equipment (38500) <i>No conditions.</i>	4.10 Manufacture of wood or metal-working machinery or tools (machine tools) (38230) <i>Must be located in Zone 2 or 3.</i>
3.29 Manufacture of stationery or educational equipment or parts (39090) <i>Must be located in Zone 3.</i>	4.11 Manufacture of industrial machinery or equipment (38240, 38299) <i>Must be located in Zone 2 or 3.</i>
3.30 Umbrella manufacture except those made from parchment ("sa" paper) (39090) <i>Must be located in Zone 2 or 3.</i>	4.12 Production of oil drilling platforms (38240) <i>Must be located in Zone 2 or 3.</i>
4. Manufacture of Metal Products, Machinery, and Transport Equipment	4.13 Manufacture of office, computing or accounting machinery (non-electronic) (38250) <i>Must be located in Zone 2 or 3.</i>
4.1 Manufacture of hand tools (38110) <i>Must be located in Zone 2 or 3.</i>	4.14 Manufacture of water pumps (38299) <i>Must be located in Zone 2 or 3.</i>
4.2 Manufacture of razor blades or handles (38110) <i>Must be located in Zone 2 or 3.</i>	4.15 Manufacture of air or gas compressors (38299) <i>Must be located in Zone 2 or 3, except manufacture of air or gas compressors under 4 horse-power which must be located in Zone 3.</i>
4.3 Manufacture of furniture and parts primarily of metal (38120) <i>Must be located in Zone 2 or 3.</i>	
4.4 Manufacture of structural metal products (38130) <i>Must be located in Zone 3.</i>	

4.16 Manufacture of fire extinguishing apparatus, equipment or parts (38299)

Must be located in Zone 2 or 3.

4.17 Building or repairing of steel ships of not less than 500 gross tons (38411)

1. Projects located in Zone 1 or 2

1.1 50% import duty reduction on machinery which is not included in the tariff reduction notification of the Ministry of Finance (Notification No. C 13/2533) and is subject to import duty greater than or equal to 10%.

1.2 Corporate income tax exemption for 3 years for projects located in Zone 1 and 5 years for those located in Zone 2.

2. Projects located in Zone 3

2.1 Exemption of import duty on machinery.

2.2 Corporate income tax exemption for 8 years.

4.18 Building of other ships except wooden or steel ships (38413, 35599)

1. Projects located in Zone 1 or 2

1.1 50% import duty reduction on machinery which is not included in the tariff reduction notification of the Ministry of Finance (Notification No. C 13/2533) and is subject to import duty greater than or equal to 10%.

1.2 Corporate income tax exemption for 3 years for projects located in Zone 1 and 5 years for those located in Zone 2.

2. Projects located in Zone 3

2.1 Exemption of import duty on machinery.

2.2 Corporate income tax exemption for 8 years.

4.19 Manufacture of railroad equipment and electric trains (38420)

No conditions.

4.20 Manufacture or repair of aircraft (38450)

1. Projects located in Zone 1 or 2

50% import duty reduction on machinery which is not included in the tariff reduction notification of the Ministry of Finance (Notification No. C 13/2533) and is subject to import duty greater than or equal to 10%.

2. Projects located in Zone 3

Exemption of import duty on machinery.

3. Corporate income tax exemption for 8 years, regardless of location.

4.21 Manufacture or repair of aircraft parts (38450)

No conditions.

4.22 Manufacture, repair, maintenance and refurbishing of containers (38191)

Must be located in Zone 2 or 3.

4.23 Manufacture of engine parts, transmissions, brakes, steering or suspension systems (38439)

No conditions.

4.24 Manufacture of vehicle parts (38430, 38432, 38439, 38440)

- Bicycle parts
- Radiators
- Fuel tanks
- Filters
- Air filters
- Oil and fuel filters
- Wiring harnesses
- Gaskets
- Leaf springs

Must be located in Zone 3.

4.25 Manufacture of other vehicle parts (38431, 38432, 38439, 38440)

Must be located in Zone 2 or 3.

5. Electronics and Electrical Industry

5.1 Manufacture of electrical industrial machinery or apparatus (38310)

Must be located in Zone 2 or 3 except that manufacture of electric motors below 11 horsepower or transformers must be in Zone 3.

5.2 Manufacture of electrical products

- Manufacture of household appliances (38291)
- Manufacture of air conditioners (38292)
- Manufacture of electrical appliances or housewares (38330)

Must be located in Zone 3.

5.3 Manufacture of electric lamps (38393)

Must be located in Zone 3.

5.4 Manufacture of batteries or cells (38392)

Must be located in Zone 3.

5.5 Manufacture of electrical equipment (38399)

Must be located in Zone 2 or 3.

5.6 Manufacture of electronic products

1. Manufacture of office, computing or accounting machinery (38250)

- Calculators
- Computers
- Office automation machines for word processing, desktop publishing, photocopying or electronic typewriters

Must be located in Zone 2 or 3.

2. Manufacture of household machinery and appliances (38291)

- Microwave ovens
- Other personal electronic appliances

Must be located in Zone 3.

3. Manufacture of industrial automation equipment (38310)

- Electronic temperature controls
- Robotics
- Machine vision devices
- Material handling equipment

Must be located in Zone 2 or 3.

4. Manufacture of radio, television or telecommunication equipment and apparatus (38320)

- Televisions
- Video cassette recorders and players
- Videodisc systems
- Videotext systems
- Satellite earth stations
- Radios
- Car radios
- Radio-tape recorders and players
- Audio systems
- Compact disc players
- Digital audio tape players
- Home intercom systems

- Radio equipment, including mobile radio equipment, amateur radio equipment, citizens' band transceivers, microwave communication equipment, broadcast systems, or paging systems
- Radar
- Telecommunications equipment, including voice switching systems, telegraph carrier equipment, telephones, or cellular telephone
- Fiber-optic communication systems
- Data-communication equipment
- Television broadcasting equipment
- Facsimile machines

Must be located in Zone 2 or 3 except manufacture of televisions, video cassette recorders and players, radios, car radios, radio-tape recorders and players, audio systems, compact disk players, or digital audio tape players which must be in Zone 3.

5. Manufacture of professional and scientific measuring and controlling equipment not elsewhere classified, and of photographic and optical goods (38500)

- Intrusion alarms
- Emergency alarms
- Video cameras
- Electronic cameras
- Watches and clocks
- Home lighting and appliance controllers
- Testing, measuring and analyzing equipment
- Power supplies for electronics uses
- Nuclear electronic equipment
- Medical electronic equipment, including diagnostic equipment, therapeutic equipment, surgical and medical instruments, patient monitoring equipment
- Lasers

Must be located in Zone 2 or 3.

6. Manufacture of electronic musical instruments (39020)

Must be located in Zone 2 or 3.

5.7 Manufacture of parts or supplies used for electronic apparatuses

1. Manufacture of radio, television and telecommunication equipment or supplies (38320)
 - Diodes
 - Transistors
 - Thyristors
 - Integrated circuits
 - Opto-electronic devices
 - Wafers
 - Resistors
 - Capacitors
 - Relays
 - Switches and keyboards
 - Magnetic components, including telescopic antenna, transformers lower than 1 KVA., coils or other magnetic components
 - Transducers
 - Quartz crystals
 - Passive filters and networks, including electro-mechanical filters, RFI and EMI filters, RC networks, delay lines, attenuators
 - Connectors
 - Printed circuit boards
 - Plugs and sockets
 - Acoustic parts, including microphones, ear-phones, loudspeakers and accessories, head-phones, cartridges or others
 - Micro-motors
 - Electronic tubes
 - Microwave telecommunication components, including microwave switches and ferrite devices
 - Computer components, including storage equipment, optical discs, terminals, keyboards, printers, computer communication equipment
 - Electronic subassemblies, including printed circuit board assemblies or electro-mechanical subassemblies

No conditions, except that, color television picture tubes of 12 to 27 inches must be wholly exported. This exception is valid until January 21, 1995.

5.8 Manufacture of insulated wires and cables (38391)

Must be located in Zone 3.

5.9 Manufacture of flat, shielded, coaxial or signal cables (38391)

No conditions.

6. Chemical Industry, Paper and Plastics

6.1 Manufacture of basic chemicals (35111)

1. Industrial gases
 - Argon
 - Chlorine
 - Hydrogen
 - Oxygen
 - Nitrogen
 - Carbon dioxide
 - Nitrous oxide
2. Oxide compounds
 - Aluminum oxide
 - Calcium oxide
 - Hydrogen peroxide
 - Silicon dioxide
 - Zinc oxide
3. Inorganic acids
 - Sulfuric acid
 - Hydrochloric acid
4. Inorganic bases
 - Aluminum hydroxide
 - Magnesium hydroxide
 - Sodium hydroxide
 - Potassium hydroxide
5. Salts
 - Aluminum sulphate
 - Alum
 - Ammonium sulphate
 - Ammonium bicarbonate
 - Calcium carbonate
 - Calcium chloride
 - Magnesium chloride
 - Potassium bicarbonate
 - Sodium chloride
 - Sodium hypochlorite
 - Sodium phosphates
 - Sodium silicate
6. Organic chemicals
 - Ethyl alcohol
 - Hexa-hydric alcohols (sorbitol)
 - Polyether polyols
 - Acetic acid
 - Citric acid
 - Formaldehyde
 - Chlorinated paraffins
 - Glutamic acid

Must be located in Zone 3.

6.2 Manufacture of other basic industrial chemicals (35111)

No conditions.

6.3 Manufacture of soft gelatin capsules (35111)

Must be located in Zone 3.

6.4 Manufacture of fertilizers (35120)

No conditions.

6.5 Manufacture of petrochemical products (35130)

A special promotion announcement will be issued.

6.6 Manufacture of petroleum products (35400)

A special promotion announcement will be issued.

6.7 Manufacture of artificial or synthetic fibers (35130)

Must be located in Zone 2 or 3.

6.8 Manufacture of pigments or similar products (35210)

Must be located in Zone 3.

6.9 Manufacture of pharmaceutical product ingredients (35220)

Must be located in Zone 2 or 3.

6.10 Manufacture of pesticides, herbicides, fungicides or insecticides (35299)

Must be located in Zone 3.

6.11 Manufacture of other chemical products (35299)

Must be located in Zone 2 or 3.

6.12 Manufacture of plastic or plastic-coated products (35601, 35609)

Must be located in Zone 3.

6.13 Manufacture of paper (34111)

Must be located in Zone 3.

6.14 Manufacture of pulp (34111)

Must be located in Zone 2 or 3.

6.15 Manufacture of paper containers or boxes (34120)

Must be located in Zone 2 or 3.

6.16 Manufacture of articles made of fiber, pulp, paper, or paperboard (34190)

Must be located in Zone 3.

7. Services and Public Utilities

7.1 Production of electric or steam power (41011, 41020)

Must be approved by the concerned government agencies.

7.2 Water works or supply for industrial uses (42000)

Must be approved by the concerned government agencies.

7.3 Concession roads (50102)

Must be approved by the concerned government agencies.

7.4 Mass transit systems (71110, 71139)

Must be approved by the concerned government agencies.

7.5 Communication services via satellite (72000)

1. Must be approved by the concerned government agencies.

2. Only non-tax privileges will be granted.

7.6 Telephone services (72002)

1. Must be approved by the concerned government agencies.

2. Only non-tax privileges will be granted.

7.7 Pipeline transport (71139)

1. *Must be approved by the concerned government agencies.*
2. For projects located in Zone 1 or 2
50% import duty reduction on machinery which is not included in the tariff reduction notification of the Ministry of Finance (Notification No. C 13/2533) and which is subject to import duty greater than or equal to 10%.
3. For projects located in Zone 3
Exemption of import duty on machinery.
4. Corporate income tax exemption for 8 years, regardless of location.

7.8 Cable car services (71139)

Must be approved by the concerned government agencies.

7.9 International maritime transportation (71210)

1. 50% import duty reduction on machinery which is not included in the tariff reduction notification of the Ministry of Finance (Notification No. C 13/2533) and which is subject to import duty greater than or equal to 10%.
2. Corporate income tax exemption for 8 years.

7.10 Loading/unloading facilities for sea transport (71230)

No conditions.

7.11 Container yards (71912)

Must be approved by the concerned government agencies.

7.12 Ferryboat or high-powered ship services (71210)

1. 50% import duty reduction on machinery which is not included in the tariff reduction notification of the Ministry of Finance (Notification No. C 13/2533) and which is subject to import duty greater than or equal to 10%.
2. Corporate income tax exemption for 5 years.

7.13 Tourist promotion services

- Tour boats (71210)
- Yacht renting (71210)
- Ocean marina with boarding rooms and tourist facilities (63201, 71210, 71230)
- Scuba diving services with lodging (63201)

For tour boats and yacht renting

1. 50% import duty reduction on machinery which is not included in the tariff reduction notification of the Ministry of Finance (Notification No. C 13/2533) and which is subject to import duty greater than or equal to 10%.
2. Corporate income tax exemption for 5 years.

For yacht renting

- *Must have not fewer than 10 yachts for renting.*

7.14 Air transportation services (71310)

1. *Must be approved by the concerned government agencies.*
2. 50% import duty reduction on machinery which is not included in the tariff reduction notification of the Ministry of Finance (Notification No. C 13/11 % 11'11*+ (fch is subject to import duty greater than or equal to 10%.
3. Corporate income tax exemption for 5 years.

7.15 Commercial airports (71320)

Must be approved by the concerned government agencies.

7.16 Hotels (63201)

1. *Must be located in Zone 2 or 3. Hotels in Phuket province, Pattaya city, Sugai Kolok district, Hat Yai district and Chiang Mai central district will not be promoted.*
2. *Must have not fewer than 100 rooms.*
3. Projects located in Zone 2 will be granted only 50% import duty reduction on machinery which is not included in the tariff reduction notification of the Ministry of Finance (Notification No. C 13/2533) and which is subject to import duty greater than or equal to 10%.
4. Projects located in Zone 3 will be granted only import duty exemption on machinery.

7.17 Medium or low income housing (83101)

1. Must provide not fewer than 150 housing units for projects in Zone 1 and 75 units for projects in Zone 2 and 3.
2. Minimum area per unit is 31 square meters.
3. Sales prices per unit must not exceed 600,000 baht (including land price).
4. Construction blueprints must be approved by the Board.
5. Must receive building permits under the Building Control Act B.E. 2522 or other relevant laws.
6. For projects located in Zone 1 and 2
Corporate income tax exemption for 5 years.
7. For projects located in Zone 3
Corporate income tax exemption for 8 years.
8. Tax privileges on machinery will not be granted.

7.18 Industrial zones (83101)

1. Minimum area of 500 rai, except projects located in Bangkok and Samut Prakan will not be promoted.
2. Not less than 60% and not more than 75% of the zone area must be used for factories.
3. Other details involving the project:
 - 3.1 Minimum road standards:
 1. 2-way main roads: minimum 18 meters wide, of which not less than 12 meters is for traffic, with a shoulder of 3 meters on each side.
 - 1-way main roads: minimum 13 meters wide, of which not less than 7 meters is for traffic, with a shoulder of 3 meters on each side.
 2. Secondary roads: minimum 8.5 meters for traffic, with a shoulder of 2 meters on each side.
 - 3.2 Sewage and waste water disposal: A waste water treatment plant must be set up as approved by the Board. Sewage and waste water drainage systems must be separated.
 - 3.3 Refuse disposal: Refuse storage and incineration areas must be sufficient with suitable refuse collection methods.
 - 3.4 Estate usage: Factories must be kept apart from residential and other business areas.
 - 3.5 Environmental protection: To prevent factories which generate smoke and malodor from being located in the industrial zones, factories in the industrial zones must be approved by the Board.

- 3.6 Public utilities: The supply of water, electricity, telephones and post offices must be adequate.
- 3.7 Time constraints: Within 2 years of the date of issue of the promotion certificate, 25% of the total land area must be developed with full public services and utilities.

7.19 Agricultural export zone (83101)

1. Minimum project area of 500 rai.
2. The project must be located in areas approved by the Board and not located where construction is prohibited by the Government nor where it will contradict town planning laws.
3. Of the total project area, not more than 60% can be devoted to processing agricultural exports, not more than 15% to residential areas and other business purposes, and not more than 25% for public services and utilities. The processing areas must be separated from residential and business areas.
4. Services and facilities such as water, electricity and communication systems must be adequate for the demand in the zone. A Board-approved central service unit for agricultural exports must be set up within the zone.
5. Minimum road standards are as follows:
 - 5.1 2-way main roads: minimum 18 meters wide, of which not less than 12 meters is for traffic, with a shoulder of 3 meters on each side.
 - 1-way main roads: minimum 13 meters wide, of which not less than 7 meters is for traffic, with a shoulder of 3 meters on each side.
 - 5.2 Secondary roads: minimum of 8.5 meters for traffic, with a shoulder of 2 meters on each side.
6. The main roads must be built to connect with state highways or to a port in order to facilitate transportation with the approval of the government agencies concerned.
7. Sufficient facilities must be installed to prevent any environmental damage.
8. Public services and utilities in the project must be properly maintained.
9. Within 2 years of the date of issue of the promotion certificate, 25% of the total land area must be developed with full public services and utilities.

7.20 Gemstone or jewelry industrial center (83101)

1. Minimum area of 100 rai.
2. At least 40% of the area must be designated for gemstone or jewelry manufacturing.
3. Must provide an area for gemstone or jewelry trading.
4. Must provide an adequate security system.
5. Must include a convention center, exhibition hall and business center.
6. Must have adequate parking facilities.
7. For projects located in Zone 1 or 2
50% import duty reduction on machinery which is not included in the tariff reduction notification of the Ministry of Finance (Notification No. C 13/2533) and which is subject to import duty greater than or equal to 10%.
8. For projects located in Zone 3
Exemption of import duty on machinery.
9. Corporate income tax exemption will be granted for 5 years, regardless of location.

7.21 Flatted factory (83101)

1. In Zone 1, the flatted factory must be located in an industrial estate or a promoted industrial zone.
2. The construction blueprints must be approved by the Board.
3. The area used for the factory building must not exceed 70% of the total area.
4. The building must not exceed 12 floors.
5. The factory must be constructed in accordance with the factory and construction control laws.
6. Adequate water treatment systems must be installed or the water treatment system of the industrial estate or the promoted industrial zone must be used.
7. Refuse storage and incineration areas must be adequate with suitable refuse collection methods.
8. Environment damage or any possible danger or disturbance to residential areas must be prevented and controlled.
9. Parking facilities, canteens and external truck loading facilities must be provided.
10. Activities which use large amount of water, create significant vibration and involve inflammable processes must obtain approval from the Board prior to rental.
11. Adequate public utilities, including electricity, water, telephones and post office services must be provided.

12. For projects located in Zone 1 or 2
50% import duty reduction on machinery which is not included in the tariff reduction notification of the Ministry of Finance (Notification No. C 13/2533) and which is subject to import duty greater than or equal to 10%.
13. For projects located in Zone 3
Exemption of import duty on machinery.
14. Corporate income tax exemption will be granted for 5 years, regardless of location.

7.22 Convention hall (83101)

1. Minimum capacity of 2000 seats.
2. Convention hall facilities and equipment must be approved by the Board.
3. The construction blueprints must be approved by the Board.
4. For projects located in Zone 1 or 2
50% import duty reduction on machinery which is not included in the tariff reduction notification of the Ministry of Finance (Notification No. C 13/2533) and which is subject to import duty greater than or equal to 10%.
5. Projects located in Zone 3
Exemption of import duty on machinery.
6. Corporate income tax exemption will be granted for 8 years, regardless of location.

7.23 International trade exhibition center (83101)

1. Minimum project area of 50 rai, with minimum exhibition area of 30,000 square meters, of which 24,000 square meters must be indoors. There must be at least one exhibition building with minimum area of 10,000 square meters.
2. The following facilities must be provided:
 - 2.1 The parking area must be at least double the size of the exhibition area and not less than 60,000 square meters.
 - 2.2 Each hall must have a meeting room.
3. The purchase, sale and delivery of products are prohibited in the exhibition hall, except for exhibitions which meet the criteria of the Department of Export Promotion or the Office of the BOI.
4. For projects located in Zone 1 or 2
50% import duty reduction on machinery which is not included in the tariff reduction notification of the Ministry of Finance (Notification No. C 13/2533) and which is subject to import duty greater than or equal to 10%.

<p>5. <u>For projects located in Zone 3</u> Exemption of import duty on machinery.</p> <p>6. Corporate income tax exemption will be granted for 8 years, regardless of location.</p> <p>7.24 Warehousing (71920)</p> <p><i>No conditions.</i></p> <p>7.25 Cold storage (71920)</p> <p><i>No conditions.</i></p> <p>7.26 Disinfection services for products or produce (93319)</p> <p><i>No conditions.</i></p> <p>7.27 Infrastructure and services for aquaculture (95999)</p> <p><i>No conditions.</i></p> <p>7.28 Research and development (83242)</p> <p>1. <u>For projects located in Zone 1 or 2</u> 50% import duty reduction on machinery which is not included in the tariff reduction notification of the Ministry of Finance (Notification No. C 13/2533) and which is subject to import duty greater than or equal to 10%.</p> <p>2. <u>For projects located in Zone 3</u> Exemption of import duty on machinery.</p> <p>3. Corporate income tax exemption will be granted for 8 years, regardless of location.</p> <p>7.29 Refuse, industrial waste, or water disposal services (92000)</p> <p>1. Must be approved by the concerned government agencies.</p> <p>2. <u>For projects located in Zone 1 or 2</u> 50% import duty reduction on machinery which is not included in the tariff reduction notification of the Ministry of Finance (Notification No. C 13/2533) and which is subject to import duty greater than or equal to 10%.</p> <p>3. <u>For projects located in Zone 3</u> Exemption of import duty on machinery.</p> <p>4. Corporate income tax exemption will be granted for 8 years, regardless of location.</p>	<p>7.30 Transportation of hazardous chemicals (92000)</p> <p>1. Must be approved by the concerned government agencies.</p> <p>2. <u>For projects located in Zone 1 or 2</u> 50% import duty reduction on machinery which is not included in the tariff reduction notification of the Ministry of Finance (Notification No. C 13/2533) and which is subject to import duty greater than or equal to 10%.</p> <p>3. <u>Projects located in Zone 3</u> Exemption of import duty on machinery.</p> <p>4. Corporate income tax exemption will be granted for 8 years, regardless of location.</p> <p>7.31 Educational institutes or vocational training centers (93131, 93139, 93141, 93150)</p> <p>1. Teaching must be provided in subjects related to industrial technology, engineering, science and technology.</p> <p>2. The number of the enrolled students in industrial technology, engineering, science and technology must not be less than 50% of total enrollment.</p> <p>3. Must be approved by the concerned government agencies.</p> <p>4. <u>For projects located in Zone 1 or 2</u> 50% import duty reduction on machinery which is not included in the tariff reduction notification of the Ministry of Finance (Notification No. C 13/2533) and which is subject to import duty greater than or equal to 10%.</p> <p>5. <u>For projects located in Zone 3</u> Exemption of import duty on machinery.</p> <p>6. Corporate income tax exemption will be granted for 8 years, regardless of location.</p>
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7.32 Hospitals (93311)

1. Projects located in Bangkok must have not less than 50 beds, while those located in other provinces must have not less than 25 beds.
2. There must be at least 2 ambulances for projects located in Bangkok and 1 for those located in other provinces.
3. Must have rooms for examining out-patients, pharmacy, x-ray, surgical operations, laboratory, storage of files and registration, emergency, mortuary, kitchen, laundry, accommodation for nurses and hospital's workers.
4. For a 2-story building or more, an elevator that can carry a bed or wheel-chair must be provided.
5. There must be adequate and convenient parking space.
6. For projects located in Bangkok
Corporate income tax exemption will not be granted.
For projects located in other provinces
Corporate income tax exemption will be granted for 5 years.
7. For projects located in Zone 1 or 2
50% import duty reduction on machinery which is not included in the tariff reduction notification of the Ministry of Finance (Notification No. C 13/2533) and which is subject to import duty greater than or equal to 10%.
8. For projects located in Zone 3
Exemption of import duty on machinery.

7.33 Thai motion picture production or related services (94110)

1. The film must not be less than 35 mm with soundtrack and must not be less than 80 minutes in duration.
2. For production purposes, the following main machinery must be acquired: camera and lenses, stands and tripods, motor zooms, cranes, dollies and lighting.
3. For support services, the following main machinery must be acquired: film processor, film printer, film splicer, magnetic recorder, film color analyzer, optical film printer and film projector.
4. The project will only receive 50% import duty reduction on machinery which is not included in the tariff reduction notification of the Ministry of Finance (Notification No. C 13/2533) and which is subject to import duty greater than or equal to 10%.

4. 事前調査質問票及びその回答

Questionnaire for the Preparatory Study

Auto Parts :

To Government:

1. Program of Nationalization and its result.
2. Program of 1 ton truck engine development and its result.
3. Current Statistics on:
 - Production of automobiles
 - Importation of automobiles
 - Importation of auto-parts
 - Registration of automobiles (Total number of cars operating in Thailand)

If possible for the period of current 5 years or longer and classified by types or categories of car.

4. List of automobile assemblers with statistics of current production.
5. Current custom duty on automobiles, auto parts and accessories. And import restriction, if any.
6. Incentives and/or support by the Government to assemblers, engine manufacturers and/or auto parts makers.

To Automobile Assembler:

1. Outline of the company (Annual report or balance sheet, if available) and main products.
2. Items of imported parts and their supplier.

3. Supplier of domestic made parts
4. Evaluation of domestic made parts on quality, delivery and price.
5. Support to the domestic supplier (financially and/or technically).

To Auto Parts Manufacture:

1. Outline of the company (Balance sheet, if available) and main products.
2. Ordering form by the automobile assembler;
 - Payment term
 - Drawing supply
 - Material supply
 - Term of delivery
 - Quality requirement (Inspection)
3. Standardization of the parts by the government and by the assembler.
4. Subcontractors to the auto parts maker.

To National Technical Institutes:

1. Standardization of auto parts.
2. Standardization of automobile and engine test procedure.
3. Technical assistance to auto-parts manufacturers
 - Actual performance
 - Potential area

Questionnaire

Electrical and electronic parts

To Government

1. Program of Nationalization and its result.
2. Current Statistics on:
 - a. Production and importation of printed circuit boards and etching machines for printed circuit boards.
 - b. Production and importation of small capacity transformers and winding machines for small capacity transformers.
 - c. Production and importation of wire and cableharness and machines for wire and cableharness.
 - d. Production and importation of connectors and machines for connectors.
 - e. Production and importation of diecastings and diecasting moulds for electrical and electronic parts.
 - f. Production and importation of stamping dies for electrical and electronic parts.
 - g. Production and importation of moulds for electrical and electronic parts.
 - h. Production and importation of injection-moulded plastic parts for electric and electronic parts.
- If possible for the period of current 5 years or longer.
3. Incentive and/or support by the Government to above-mentioned producers.
4. Education and popularization of quality control technique.
5. Education and popularization of production control technique.

To Electric and electronic parts producers.

1. Outline of the company (Annual report or balance sheet, if available) and main customers.
2. Items of imported parts and supplier.

3. Supplier of domestic made parts.
4. Evaluation of domestic made parts on quality, delivery and price.
5. System for quality control.

To National Technical Institute

1. Technical assistance to electric and electronic parts producers.
2. Education and popularization of quality control technique.
3. Education and popularization of production control technique.

A. 国産化計画に対する回答

1. Program of Nationalization and its result

- At the time being the Government is not permitted to establish new automobile assembler (passenger car) but for the existing factors can be expanded.
- Local content
 - * for passenger car - not less than 54%
 - * for small truck (pick up) - have to use engine produced in Thailand & 7 items of compelled local content
 - * for large truck and bus can be classified :-

Chassis with engine	not less than 40%
Chassis with wind shield	not less than 45%
Chassis with cab	not less than 30%
 - * for motor cycle not less than 70%
- Passenger car with engine less than 2,300 c.c. can be imported to Thailand freely

2. Program of 1 ton truck engine development and its result

- Local content of 1 ton truck engine
 - for factories being promoted by BOI
 - 50% and it will be increased 10% per year till 80% ~~per year~~
 - for factories not promoted by BOI
 - 35% and it will be increased 5% per year till 6% ~~per year~~

B. エンジン国産化率計算用部品別パーセンテージ表

NO.	MAJOR GROUP	COMPONENTS	GIVEN PERCENTAGE
1.	CYLINDER HEAD	1. HEAD, CYLINDER	9.70
		2. GASKET, CYLINDER HEAD	0.39
		3. BOLT, CYLINDER HEAD	0.35
		4. COVER, CYLINDER HEAD	1.26
		5. GASKET, CYLINDER HEAD COVER	0.21
		6. CAP, OIL FILLER	0.08
		7. OTHERS	0.44
		SUB TOTAL	12.43
2.	CYLINDER BLOCK	1. BLOCK, CYLINDER	9.05
		2. OTHERS	1.85
		SUB TOTAL	10.90
3.	OIL LEVEL GAUGE	1. GAUGE, OIL LEVEL	0.09
		2. OTHERS	0.17
		SUB TOTAL	0.26
4.	OIL PAN	1. PAN, OIL W/GASKER	1.68
		2. OTHERS	0.18
		SUB TOTAL	1.86
5.	MAIN BEARING SET	1. MAIN BEARING SET	0.56
		SUB TOTAL	0.56
6.	TIMING MECHANISM COVER	1. COVER, TIMING MECHANISM	0.77
		2. GASKET, COVER	0.03
		3. SEAL, OIL	0.07
		4. OTHERS	0.73
		SUB TOTAL	1.65
7.	PISTON	1. PISTON & PIN	4.10
		2. RING SET, PISTON	1.31
		SUB TOTAL	5.41

NO.	MAJOR GROUP	COMPONENTS	GIVEN PERCENTAGE
8.	CONNECTING ROD	1. ROD, CONNECTION	3.88
		2. BEARING SET, CONNECTING ROD	0.20
		3. OTHERS	0.06
		SUB TOTAL	4.14
9.	CRANKSHAFT	1. CRANKSHAFT	4.04
		2. PULLEY, CRANKSHAFT	0.74
		3. OTHERS	0.90
		SUB TOTAL	5.68
10.	FLYWHEEL	1. FLYWHEEL	1.56
		2. RING GEAR, FLYWHEEL	0.39
		3. OTHERS	0.36
		SUB TOTAL	2.31
11.	TIMING MECHANISM	1. GEAR OR SPROCKET, CRANKSHAFT	0.15
		2. CHAIN OR BELT	0.57
		3. GEAR OR SPROCKET, CAMSHAFT	0.39
		4. CHAIN OR BELT TENSIONER	0.33
		5. OTHERS	0.17
		SUB TOTAL	1.61
12.	CAMSHAFT	1. CAMSHAFT	2.65
		2. OTHERS	0.07
		SUB TOTAL	2.72
13.	VALVE SYSTEM	1. VALVE, INTAKE	0.81
		2. VALVE, EXHAUST	1.61
		3. SPRING, VALVE	0.45
		4. RETAINER, VALVE SPRING	0.37
		5. LOCK, VALVE SPRING	0.04
		6. OTHERS	5.70
		SUB TOTAL	8.98

NO.	MAJOR GROUP	COMPONENTS	GIVEN PERCENTAGE
14.	INTAKE MANIFOLD	1. MANIFOLD, INTAKE	2.76
		2. GASKET, INTAKE MANIFOLD	0.04
		3. OTHERS	0.38
		SUB TOTAL	3.18
15.	AIR CLEANER	1. CLEANER ASSY, AIR W/ELEMENT	2.66
		2. OTHERS	0.28
		SUB TOTAL	2.94
16.	EXHAUST MANIFOLD	1. MANIFOLD, EXHAUST	1.87
		2. GASKET	0.20
		3. OTHERS	0.25
		SUB TOTAL	2.32
17.	OIL PUMP	1. PUMP, OIL L/STRAINER	1.27
		2. OTHERS	0.36
		SUB TOTAL	1.63
18.	SUCTION STRAINER	1. STRAINER, OIL SET	0.36
		SUB TOTAL	0.36
19.	OIL FILTER	1. FILTER, ASSY OIL	0.46
		2. OTHERS	0.04
		SUB TOTAL	0.50
20.	FUEL FILTER	1. FILTER, FUEL W/ELEMENT	0.32
		SUB TOTAL	0.32
21.	FUEL SYSTEM	1. CARBURETOR	3.73
		2. FUEL PUMP	0.94
		3. FUEL PIPE	0.12
		4. OTHERS	0.26
		SUB TOTAL	10.10

NO.	MAJOR GROUP	COMPONENTS	GIVEN PERCENTAGE
22.	IGNITION SYSTEM	1. SPARK PLUG	0.16
		2. DISTRIBUTOR ASSY	3.14
		3. H/T CABLE	0.94
		4. OTHERS	0.31
		SUB TOTAL	4.57
23.	COOLING SYSTEM	1. PUMP, WATER	1.29
		2. INLET, WATER	0.35
		3. OUTLET, WATER	0.53
		4. THERMOSTAT	0.20
		5. FAN & OTHERS	0.99
		SUB TOTAL	3.36
24.	ELECTRICAL PARTS	1. STARTER	4.44
		2. ALTERNATOR W/REGULATOR	5.03
		3. SWITCH, OIL PRESSURE	0.16
		4. GAUGE, WATER TEMP SENSOR	0.18
		5. OTHERS	0.12
		SUB TOTAL	9.93
25.	GENERATOR SUPPORT	1. BRACKET, GENERATOR	0.33
		2. ADJUST BAR, GENERATOR	0.11
		3. V-BELT SET	0.32
		4. OTHERS	0.03
		SUB TOTAL	0.77
26.	BREATHER	1. VENTILATOR	0.12
		2. OTHERS	0.48
		SUB TOTAL	0.60
27.	ENGINE MOUNTING	1. BRACKET, ENGINE MOUNTING	0.84
		2. OTHERS	0.07
		SUB TOTAL	0.91
		GRAND TOTAL	100.00

NO.	MAJOR GROUP	COMPONENTS	GIVEN PERCENTAGE
1.	CYLINDER HEAD	1. HEAD CYLINDER	5.76
		2. GASKET CYLINDER HEAD	0.45
		3. BOLT, CYLINDER HEAD	0.36
		4. COVER, CYLINDER HEAD	1.03
		5. GASKET, CYLINDER HEAD COVER	0.21
		6. CAP, OIL FILLER	0.02
		7. OTHERS	1.28
		SUB TOTAL	9.11
2.	CYLINDER BLOCK	1. BLOCK CYLINDER	11.23
		2. OTHERS	3.25
		SUB TOTAL	14.48
3.	OIL LEVEL GAUGE	1. GAUGE, OIL LEVEL	0.10
		2. GUIDE, OIL LEVEL GAUGE	0.11
		3. OTHERS	0.02
		SUB TOTAL	0.23
4.	OIL PAN	1. PAN, OIL	0.99
		2. GASKET, OIL PAN	0.08
		3. OTHERS	0.14
		SUB TOTAL	1.21
5.	MAIN BEARING SET	1. MAIN BEARING SET	0.44
		SUB TOTAL	0.44
6.	TIMING MECHANISM COVER	1. COVER, TIMING MECHANISM	1.72
		2. GASKET, COVER	0.07
		3. SEAL, OIL	0.07
		4. OTHERS	0.30
		SUB TOTAL	2.16

NO.	MAJOR GROUP	COMPONENTS	GIVEN PERCENTAGE
7.	PISTON	1. PISTON	2.87
		2. RING SET, PISTON	1.08
		3. PIN, PISTON	0.26
		4. OTHERS	0.01
		SUB TOTAL	4.22
8.	CONNECTING ROD	1. ROD, CONNECTION	2.94
		2. BEARING SET, CONNECTING ROD	0.15
		3. OTHERS	0.26
		SUB TOTAL	3.35
9.	CRANKSHAFT	1. CRANKSHAFT	6.36
		2. PULLEY, CRANKSHAFT	0.94
		3. OTHERS	0.06
		SUB TOTAL	7.36
10.	FLYWHEEL	1. FLYWHEEL	2.16
		2. RING GEAR, FLYWHEEL	0.76
		3. OTHERS	0.07
		SUB TOTAL	2.99
11.	TIMING MECHANISM	1. GEAR OR PULLEY, CRANKSHAFT	0.20
		2. GEAR OR PULLEY, INJ PUMP DRIVE	0.29
		3. GEAR OR PULLEY, CAMSHAFT	0.20
		4. GEAR OR PULLEY, IDLE	0.67
		5. OTHERS	0.56
		SUB TOTAL	1.92
12.	CAMSHAFT	1. CAMSHAFT	1.77
		2. OTHERS	0.14
		SUB TOTAL	1.91

NO.	MAJOR GROUP	COMPONENTS	GIVEN PERCENTAGE
13.	VALVE SYSTEM	1. VALVE, INTAKE	0.47
		2. VALVE, EXHAUST	0.17
		3. SPRING, VALVE	0.17
		4. RETAINER, VALVE SPRING	0.07
		5. LOCK, VALVE SPRING	0.07
		6. SEAL, VALVE STEM OIL	0.17
		7. ARM, VALVE ROCKER	1.12
		8. OTHERS	1.00
		SUB TOTAL	4.20
14.	INTAKE MANIFOLD	1. MANIFOLD, INTAKE	1.20
		2. GASKET, INTAKE MANIFOLD	0.09
		3. PIPE, INTAKE	0.50
		4. OTHERS	0.25
		SUB TOTAL	2.00
15.	AIR CLEANER	1. HOUSING W/ELEMENT	1.68
		2. OTHERS	0.32
		SUB TOTAL	2.00
16.	EXHAUST MANIFOLD	1. GASKET	0.09
		2. MANIFOLD	1.00
		3. OTHERS	0.09
		SUB TOTAL	1.18
17.	OIL PUMP	1. PUMP ASSY, OIL	0.96
		SUB TOTAL	0.96
18.	SUCTION STRAINER	1. STRAINER, OIL & OTHERS	0.45
		SUB TOTAL	0.45
19.	OIL FILTER	1. FILTER, OIL ASSY	1.41
		SUB TOTAL	1.41

NO.	MAJOR GROUP	COMPONENTS	GIVEN PERCENTAGE
20.	OIL COOLER	1. COOLER, OIL	1.57
		2. CASE, OIL COOLER	0.67
		3. OTHERS	0.43
		SUB TOTAL	2.67
21.	FUEL FILTER	1. FILTER, FUEL W/ELEMENT	0.86
		2. OTHERS	0.11
		SUB TOTAL	0.97
22.	FUEL INJECTION PUMP	1. PUMP, INJECTION	13.55
		2. OTHERS	0.24
		SUB TOTAL	13.79
23.	NOZZLE & NOZZLE HOLDER	1. NOZZLE & HOLDER SET	3.57
		2. OTHERS	0.55
		SUB TOTAL	3.92
24.	FUEL PIPE & HOSE SET.	1. FUEL PIPE & HOSE SET.	0.16
		SUB TOTAL	0.16
25.	FUEL INJECTION PIPE	1. PIPE, INJECTION	0.57
		2. OTHERS	0.09
		SUB TOTAL	0.66
26.	FUEL RETURN PIPE	1. PIPE & HOSE SET	0.22
		SUB TOTAL	0.22
27.	COOLANT PUMP	1. PUMP, COOLANT	0.93
		2. PULLEY, COOLANT PUMP	0.79
		3. OTHERS	0.18
		SUB TOTAL	1.90

	MAJOR GROUP	COMPONENTS	GIVEN PERCENTAGE
28.	COOLING FAN	1. FAN, COOLING 2. OTHERS	0.55 0.01
		SUB TOTAL	0.56
29.	THERMOSTAT	1. THERMOSTAT 2. CASE, THERMOSTAT 3. OTHERS	0.14 0.25 0.19
		SUB TOTAL	0.58
30.	ELECTRICAL PARTS	1. STARTER 2. ALTERNATOR W/VACUUM PUMP, W/REGULATOR 3. SWITCH, OIL PRESSURE 4. GAUGE, COOLANT TEMP, SENSOR 5. OTHERS	5.01 5.44 0.07 0.10 0.10
		SUB TOTAL	10.72
31.	BREATHER	1. VENTILATOR & SEGS 2. OTHERS	0.13 0.06
		SUB TOTAL	0.19
32.	GENERATOR SUPPORT	1. BRACKET, GENERATOR 2. ADJUST BAR, GENERATOR 3. V-BELT SET 4. OTHERS	0.50 0.05 0.22 0.32
		SUB TOTAL	1.09
33.	ENGINE MOUNTING	1. BRACKET, ENGINE MOUNTING 2. OTHERS	0.67 0.39
		SUB TOTAL	0.96
		GRAND TOTAL	100.00

C. 部品分類表

บัญชีรายการส่วนประกอบและอุปกรณ์ผลิตในประเทศสำหรับรถยนต์บรรทุกขนาดเล็ก
(แนบท้ายประกาศกระทรวงอุตสาหกรรม เรื่อง นโยบายอุตสาหกรรมประกอบรถยนต์บรรทุกขนาดเล็ก
ฉบับลงวันที่ 3 พฤษภาคม พ.ศ. 2534)

MAJOR GROUP	SUB-GROUP	COMPONENT/PART	REMARK
A. ENGINE 1. Base Engine	A.1.1 Cylinder Head	A.1.1.1 Engine Assy (Assy Charge)	เฉพาะการประกอบที่ กระทรวงอุตสาหกรรม กำหนดหรือให้รอบ
A. ENGINE 2. Lubricating	A.2.1 Oil Pump and Oil Suction Strainer	A.2.1.1 Pump Assy Oil Set	
A. ENGINE 3. Fuel System	A.3.2 Fuel Filter	A.3.2.1 Housing Fuel Filter	
		A.3.2.2 Element	
		A.3.2.3 Bracket and Hose	
A. ENGINE 4. Cooling System	A.4.1 Water Pump	A.4.1.3 V - belt Set	
A. ENGINE 5. Electrical Parts	A.5.1 Generator	A.5.1.1 Generator Assy with Bracket & Spacer	
		A.5.1.2 Cable Generator Ground	
		A.5.1.3 Regulator	
		A.5.1.4 Distributor	
		A.5.1.5 Ignition Coil	
		A.5.1.6 Spark Plug	
	A.5.2 Starter Motor	A.5.2.1 Starter Assy	
	A.5.3 Switch and Gauge	A.5.3.3 Cord Spark Plug Set	

MAJOR GROUP	SUB-GROUP	COMPONENT/PART	REMARK
A. ENGINE 6. Air Intake System	A.6.1 Cleaner Assy Air	A.6.1.2 Element	
B. CHASSIS 1. Fuel Tank	B.1.1 Fuel Tank Assy	B.1.1.1 Tank Body Upper and Lower w/FILTER	
	B.1.2 Tank Support	B.1.2.1 Support Fuel Tank	
	B.1.3 Fuel Pipe & Hose	B.1.3.1 Fuel Pipe	
		B.1.3.2 Fuel Hose	
B. CHASSIS 2. Radiator	B.2.1 Core Assy Rad.	B.2.1.1 Radiator Assy	
		B.2.1.2 Radiator Cap	
	B.2.2 Bracket Radiator	B.2.2.1 Bracket, Radiator	
		B.2.2.2 Cushion Rubber	
	B.2.3 Hose and Shroud Fan	B.2.3.1 Hose	
		B.2.3.2 Shroud Fan	
B. CHASSIS 3. Exhaust System	B.3.1 Muffler and Pipe	B.3.1.1 Muffler Assy	
		B.3.1.2 Pipe	
		B.3.1.3 Bracket, Hanger, Cushion and etc.	
B. CHASSIS 4. Battery Setting	B.4.1 Battery	B.4.1.1 Battery	
		B.4.1.2 Bracket Battery Setting	
		B.4.1.3 Cover Battery	

MAJOR GROUP	SUB-GROUP	COMPONENT/PART	REMARK
8. CHASSIS 5. Electrical Parts	8.5.1 Cable and Wiring	8.5.1.1 Cable Battery to Starter	
		8.5.1.2 Cable Battery to Ground	
		8.5.1.3 Harness Wiring Set	
	8.5.2 Lamp	8.5.2.2 Lamp Assy Tail	
		8.5.2.3 Lamp Assy Direction Signal	
		8.5.2.5 Lamp Assy Licence	
		8.5.2.6 Lamp Assy Back Up	
	8.5.4 Wiper and Washer	8.5.4.1 Motor Assy Wiper	
		8.5.4.4 Tank Washer Set with Nozzle	
	8.5.5 Horn, Switch and Relay	8.5.5.1 Horn Assy	
		8.5.5.9 Block Assy Fuse	
9. CHASSIS 6. Clutch	8.6.1 Disc and Cover	8.6.1.1 Disc Assy Clutch	
	8.6.2 Clutch Control	8.6.2.4 Pedal Clutch	
		8.6.2.5 Pipe Hydraulic	มีคัตวาล์ว
		8.6.2.8 Clutch Cable	
8. CHASSIS 7. Transmission	8.7.1 Transmission	8.7.1.1 Transmission Assy (Assy Charge)	เฉพาะการประกอบ กระบวนกลไกสำหรับ กำหนดหรือได้เฉพาะ

MAJOR GROUP	SUB-GROUP	COMPONENT/PART	REMARK
B. CHASSIS 9. Service Brake	B.9.2 Service Brake Control	B.9.2.1 Pipe Hydraulic	ไม่มีรายการ
		B.9.2.4 Pedal Brake	
B. CHASSIS 10. Parking Brake	B.10.1 Brake Assy Parking	B.10.1.1 Cable Assy Parking Brake	
		B.10.1.2 Lever and Bracket Parking Brake	
B. CHASSIS 11. Frame	B.11.1 Frame & Cross	B.11.1.2 Member Cross	ไม่มีรายการ Frame Chassis
		B.11.2.3 Gusset and Stiffener	ไม่มีรายการ Frame Chassis
	B.11.2 Bracket & Shaft	B.11.2.1 Bracket Spring	
		B.11.2.3 Bracket Engine Mounting	
		B.11.2.5 Hook	
	B.11.3 Bumper & Acc.	B.11.3.1 Bumper Front, Rear with Bracket	
	B.11.4 Cap Mounting and Acc.	B.11.4.1 Bracket Cap Hinge	ไม่มีรายการ Member Assy Cab Front และไม่มีรายการ Frame Chassis
		B.11.4.2 Member Assy Cab Rear	ไม่มีรายการ Frame Chassis
		B.11.4.3 Mounting Cab Rear	ไม่มีรายการ Frame Chassis

MAJOR GROUP	SUB-GROUP	COMPONENT/PART	REMARK
CHASSIS 11. Frame	B.11.1 Frame & Cross	B.11.1.1 Member Side Frame B.11.1.2 Member Cross B.11.1.3 Gusset and Stiffener	มีทั้งแบบ Monocoque และแบบ Chassis Frame 40 มม. ความหนา 1 มม. ความหนา 1 มม.
	B.11.4 Cab Mounting and Acc.	B.11.4.1 Bracket Cab Hinge B.11.4.2 Member Assy Cab Rear B.11.4.3 Mounting Cab Rear	
12. Floor	C.1.1 Floor	C.1.1.2 Floor Part C.1.1.3 Protector and Fender Panel	
B. CHASSIS 12. Front Suspension	B.12.1 Spring Front	B.12.1.1 Spring front	มีทั้งแบบ Leaf Spring และ Coil Spring
		B.12.1.5 Shock Absorber	
B. CHASSIS 13. Rear Suspension	B.13.1 Spring Rear	B.13.1.1 Spring Rear	
		B.13.1.2 Spring Pin	
		B.13.1.3 Bracket Rear Spring	
		B.13.1.4 U-bolt	
		B.13.1.5 Shock Absorber	
		B.13.1.6 Bracket Shock Absorber	
		B.13.1.7 Spacer, Pad and Bumper	มีทั้งแบบ Bumper
B. CHASSIS 14. Wheel & Tire	B.14.1 Wheel	B.14.1.1 (1) Wheel	
		(2) Wheel Nut	
		B.14.1.2 Cap Wheel	
		B.14.1.3 Tire with Tube	

MAJOR GROUP	SUB-GROUP	COMPONENT/PART	REMARK
B. CHASSIS 15. Cable Speedometer	B.15.1 Cable Speedometer	B.15.1.1 Cable Speedometer with Bracket	
B. CHASSIS 16. Engine Control	B.16.1 Accelerator Control	B.16.1.1 Pedal Accelerator Control	
B. CHASSIS 18. Front Axle and Wheel Brake	B.18.1 Front Axle	B.18.1.1 Front Axle Assy (Assy Charge)	1. ตรวจสอบสภาพของ อุปกรณ์และชิ้นส่วน ที่เกี่ยวข้อง
		B.18.1.2 Front Axle Member	2. ตรวจสอบ Member Cross, Front Suspension
		B.18.1.7 Drum Brake	3. ตรวจสอบ Disc Brake
		B.18.1.10 Pipe Oil	4. ตรวจสอบและเติมน้ำมัน
		B.18.1.11 Front Stabilizer	
B. CHASSIS 19. Rear Axle and Wheel	B.19.1 Rear Axle	B.19.1.1 Rear Axle Assy (Assy Charge)	1. ตรวจสอบสภาพของ อุปกรณ์และชิ้นส่วน ที่เกี่ยวข้อง
		B.19.1.3 Hub Rear Axle	
	B.19.2 Differential Carrier	B.19.2.8 Drum Brake B.19.2.11 Pipe Oil	2. ตรวจสอบและเติมน้ำมัน
B. CHASSIS 20. Tool	B.20.1 Tool	B.20.1.1 General Tool	3. ตรวจสอบ Hydraulic Jack
		B.20.1.2 Tool Box	

MAJOR GROUP	SUB-GROUP	COMPONENT/PART	REMARK
B. CHASSIS 21. Paint	B.21.1 Paint	B.21.1.1 Paint	
C. CAB 1. Floor	C.1.1 Floor	C.1.1.1 Floor Assy (Assy Charge)	ประกอบชิ้นส่วน ของตัวถัง รถบรรทุก
		C.1.1.2 Floor Part	ชิ้นส่วนประกอบ Frame Chassis
	C.1.2 Accessory floor	C.1.2.1 Step Assy	ประกอบชิ้นส่วน Kickings Plate และ Scuff Plate
		C.1.2.2 Plate Splash	
		C.1.2.3 Insulator Floor	
		C.1.2.4 Mat and Carpet	
C. CAB 2. Front Construction	C.2.1 Front Construction	C.2.1.1 Front Construction (Assy Charge)	ประกอบชิ้นส่วน ของตัวถังรถบรรทุก ด้านหน้า
		C.2.1.2 Front Panel Parts	ชิ้นส่วนประกอบ ของตัวถังรถบรรทุก
		C.2.1.3 Inner Panel and Acc.	ประกอบชิ้นส่วน Fire Wall
	C.2.2 Accessory Inner	C.2.2.1 Glass Front	
		C.2.2.2 Weatherstrip Front	
		C.2.2.5 Inside Mirror Assy	
		C.2.2.6 Sunvisor Assy	

MAJOR GROUP	SUB-GROUP	COMPONENT/PART	REMARK
.. CAB 5. Paint	C.5.1 Paint	C.5.1.1 Paint	
D. Additional Components for Bonnet type Cab.	D.1.1 Body	D.1.1.1 Front Fender	ถังค้ำเคาะ Fender Liner พนัก Fender Panel
		D.1.1.2 Front Hood	ถังค้ำเคาะ Bonnet Panel, Bonnet Frame Hinge & Bar.

รายการส่วนประกอบและอุปกรณ์เครื่องยนต์
รายการที่กำหนดให้ใช้ สำหรับรถยนต์บรรทุกขนาดใหญ่และรถแทรกเตอร์

MAJOR GROUP	SUB-GROUP	COMPONENT/PART	REMARK
A. ENGINE 1. Base Engine	A.1.1 Cylinder Head	A.1.1.2 Cylinder Head	
		A.1.1.3 Cover Cylinder Head	
		A.1.1.4 Gasket Cylinder Head	
	A.1.2 Crankcase	A.1.2.1 Cylinder Block	
		A.1.2.2 Oil Pan	
		A.1.2.3 Housing Flywheel	
		A.1.2.4 Cover Assy Timing Gear and Sprocket	
		A.1.2.5 Housing Assy Clutch	
	A.1.3 Main Moving Parts	A.1.3.1 Piston and Ring Set	
		A.1.3.2 Pin Piston	
		A.1.3.3 Rod Assy Connecting	
		A.1.3.4 Crank Shaft and Main Bearing	
		A.1.3.5 Pulley Assy Crankshaft with Oil Seal	
		A.1.3.6 Flywheel	
		A.1.3.7 Gear Flywheel	
		A.1.3.8 Shaft Idle Gear	
		A.1.3.9 Camshaft	
	A.1.4 Valve Intake & Exhaust System	A.1.4.1 Valve Set with Rocker Arm	
		A.1.4.2 Manifold Intake	
		A.1.4.3 Manifold Exhaust	
		A.1.4.4 Gasket	
A. ENGINE 2. Lubricating	A.2.1 Oil Pump and Oil Suction Strainer	A.2.1.2 Filter Cartridge	

MAJOR GROUP	SUB-GROUP	COMPONENT/PART	REMARK
A. ENGINE 3. Fuel System	A.3.1 Carburetor and Pump	A.3.1.1 Carburetor Set	
		A.3.1.2 Pump Fuel	
A. ENGINE 4. Cooling System	A.4.1 Water Pump	A.4.1.1 Pump Assy Cooling with Gasket	
		A.4.1.2 Pulley Cooling Pump	
		A.4.1.4 Fan	
	A.4.2 Coolant Intake	A.4.2.1 Pipe Coolant Intake	
		A.4.2.2 Hose Coolant	
A. ENGINE 5. Electrical Parts	A.5.3 Switch and Gauge	A.5.3.1 Switch Oil Pressure	
		A.5.3.2 Resistor Assy	
A. ENGINE 6. Air Intake System	A.6.1 Cleaner Assy Air	A.6.1.1 Housing Assy Cleaner	
		A.6.1.3 Hose Air Intake	
		A.6.1.4 Bracket Air Intake	
B. CHASSIS 1. Fuel Tank	B.1.1 Fuel Tank Assy	B.1.1.2 Cap Assy Fuel	
		B.1.1.3 Gauge Fuel Tank with Acc.	
	B.1.2 Tank Support	B.1.2.2 Band, Seat Fuel Tank	
B. CHASSIS 2. Radiator	B.2.3 Hose and Shroud Fan	B.2.3.3 Reserve Assy Tank with Hose	

MAJOR GROUP	SUB-GROUP	COMPONENT/PART	REMARK
B. CHASSIS 5. Electrical Parts	B.5.2 Lamp	B.5.2.1 Lamp Assy Head	
		B.5.2.4 Lamp Assy Fog	
	B.5.3 Meter and Speedometer	B.5.3.1 Speedometer Assy	
		B.5.3.2 Meter Assy Combination	
	B.5.4 Wiper and Washer	B.5.4.2 Link Assy Wiper Arm	
		B.5.4.3 Blade Wiper	
	B.5.5 Horn, Switch and Relay	B.5.5.2 Switch Lighting	
		B.5.5.3 Switch Hazard	
		B.5.5.4 Switch Fog Lamp	
		B.5.5.5 Switch Assy Wiper	
		B.5.5.6 Relay Starter	
		B.5.5.7 Relay Horn	
		B.5.5.8 Flasher Unit	
B. CHASSIS 6. Clutch	B.6.1 Disc and Cover	B.6.1.2 Pressure Plate and Spring	
	B.6.2 Clutch Control	B.6.2.1 Bearing Clutch with Sleeve, Yoke, Shaft	
		B.6.2.2 Cylinder Assy Clutch with Bracket	
		B.6.2.3 Cylinder Assy Master	
		B.6.2.6 Hose Hydraulic	
		B.6.2.7 Reservoir Assy Oil	
B. CHASSIS 7. Transmission	B.7.1 Transmission	B.7.1.2 Case Transmission	
		B.7.1.3 Cover Transmission	
		B.7.1.4 Shaft Transmission	
		B.7.1.5 Gear Transmission	
		B.7.1.6 Bearing and etc.	

MAJOR GROUP	SUB-GROUP	COMPONENT/PART	REMARK
	B.7.2 Transmission Control	B.7.2.1 Fork Shift, Lever Gear	
		B.7.2.2 Rod Link	
B. CHASSIS 8. Propeller Shaft	B.8.1 Shaft Assy Propeller	B.8.1.1 Shaft Assy Propeller	
		B.8.1.2 Yoke Assy and Spider	
		B.8.1.3 Bearing and Coupling flange Yoke	
		B.8.1.4 Rubber and Holder Centre	
B. CHASSIS 9. Service Brake	B.9.1 Hydromaster & Acc.	B.9.1.1 Housing, Diagram and Spring	
		B.9.1.2 Tank Vacuum with Bracket	
	B.9.2 Service Brake Control	B.9.2.2 Cylinder Master Brake	
		B.9.2.3 Hose	
		B.9.2.5 Reservoir Assy Tank	
B. CHASSIS 11. Frame	B.11.1 Frame & Cross	B.11.1.1 Member Side Frame	บังคับเฉพาะรถรุ่น Frame Chassis
	B.11.2 Bracket & Shaft	B.11.2.2 Bracket Shock - absorber	
		B.11.2.4 Stopper Bumper	
	B.11.3 Bumper & Acc.	B.11.3.2 Bumper Rear	
		B.11.3.3 Bumper Bracket	

MAJOR GROUP	SUB-GROUP	COMPONENT/PART	REMARK
B. CHASSIS 12. Front Suspension	B.12.1 Spring Front	B.12.1.2 Spring Pin	
		B.12.1.3 Shackle Spring	
		B.12.1.4 U-bolts	
		B.12.1.6 Bracket Shock Absorber	
		B.12.1.7 Spacer, Pad and Bumper	မာရ်ဘီယာ Bump
		B.12.1.8 Bushing Strut Bar	
B. CHASSIS 16. Engine Control	B.16.1 Accelerator Control	B.16.1.2 Cable and Knob	
B. CHASSIS 17. Steering	B.17.1 Steering and Steer- ing Control	B.17.1.1 Gear Steering	
		B.17.1.2 Housing Steering	
		B.17.1.3 Link Assy Steering	
		B.17.1.4 Spider, Yoke and Shaft	
		B.17.1.5 Column Steering	
		B.17.1.6 Wheel Steering	
		B.17.1.7 Power Steering	
B. CHASSIS 18. Front Axle and Wheel Brake	B.18.1 Front Axle	B.18.1.3 Pin King and Arm Knuckle	
		B.18.1.4 Rod Steering Tie	
		B.18.1.5 Knuckle Assy Steering	
		B.18.1.6 Hub Wheel	
		B.18.1.8 Shoe and Plate Brake	
		B.18.1.9 Cylinder Wheel Brake	

MAJOR GROUP	SUB-GROUP	COMPONENT/PART	REMARK
S. CHASSIS 19. Rear Axle and Wheel	B.19.1 Rear Axle	B.19.1.2 Housing Assy Rear Axle	
		B.19.1.4 Shaft Rear Axle	
	B.19.2 Differen- tial Carrier	B.19.2.1 Housing Carrier Differential	
		B.19.2.2 Gear Assy Spiral Bevel	
		B.19.2.3 Retainer Oil Seal	
		B.19.2.4 Flange Assy	
		B.19.2.5 Case Sub-assy Differential	
		B.19.2.6 Spider Differential	
		B.19.2.7 Bearing Gear Differential	
		B.19.2.9 Plate, Shoe Assy Sake	
		B.19.2.10 Cylinder Assy Wheel Sake	
C. CAB 1. Floor	C.1.1 Floor	C.1.1.3 Protector and Fender Panel	
C. CAB 2. Front Construction	C.2.2 Accessory Inner	C.2.2.3 Instrument Panel C.2.2.4 Grille Mark and Ornament	

รายการส่วนประกอบและอุปกรณ์ที่กำหนดให้ใช้สำหรับ ระบบการขับเคลื่อนขนาดเล็กเครื่องยนต์ดีเซล

MAJOR GROUP	SUB-GROUP	COMPONENT/PART	REMARK
A. ENGINE 1. Base Engine	A.1.1 Cylinder Head	A.1.1.1 Engine Assy (Assy Charge)	เฉพาะการประกอบที่ กระรวงอุตสาหกรรม กำหนดหรือเห็นชอบ
	A.1.4 Valve Intake and Exhaust System	A.1.4.3 Manifold Exhaust	
A. ENGINE 2. Lubricating	A.2.1 Oil Pump and Suction Strainer	A.2.1.1 Pump Assy Oil Set	บังคับเฉพาะ Oil Filter
A. ENGINE 3. Fuel System	A.3.2.1 Fuel Filter	A.3.2.1 Housing Fuel Filter	
		A.3.2.2 Element	
		A.3.2.3 Bracket and Hose	
A. ENGINE 4. Cooling System	A.4.1 Coolant Pump	A.4.1.3 V - belt Set	
	A.4.2 Coolant Intake Pipe and Hose	A.4.2.1 Pipe Coolant Intake	
		A.4.2.2 Hose Coolant	

MAJOR GROUP	SUB-GROUP	COMPONENT/PART	REMARK
A. ENGINE 5. Electrical Parts	A.5.1 Generator	A.5.1.1 Generator Assy w/Bracket & Spacer	
		A.5.1.2 Cable Generator Ground	
		A.5.1.3 Regulator	
	A.5.2 Starter	A.5.2.1 Starter Assy	
A. ENGINE 6. Air Intake System	A.6.1 Cleaner Assy Air	A.6.1.1 Housing Assy Cleaner	
		A.6.1.2 Element	
		A.6.1.4 Bracket Air Intake	
B. CHASSIS 1. Fuel Tank	B.1.1 Fuel Tank Assy	B.1.1.1 Tank Body Upper & Lower w/Filler	
	B.1.2 Tank Support	B.1.2.2 Support Fuel Tank	
		B.1.2.2 Band, Seat Fuel Tank	
	B.1.3 Fuel Pipe & Hose	B.1.3.1 Fuel Pipe	
		B.1.3.2 Fuel Hose	
B. CHASSIS 2. Radiator	B.2.1 Core Assy Rad.	B.2.1.1 Radiator Assy	
		B.2.1.2 Radiator Cap	
	B.2.2 Bracket Radiator	B.2.2.1 Bracket Radiator	
		B.2.2.2 Cushion Rubber	
	B.2.3 Hose and Shroud Fan	B.2.3.1 Hose	
		B.2.3.2 Shroud Fan	

MAJOR GROUP	SUB-GROUP	COMPONENT/PART	REMARK
B. CHASSIS 3. Exhaust System	B.3.1 Muffler and Pipe	B.3.1.1 Muffler Assy	
		B.3.1.2 Pipe	
		B.3.1.3 Bracket, Hanger, Cushion and etc.	
B. CHASSIS 4. Battery Setting	B.4.1 Battery	B.4.1.1 Battery	
		B.4.1.2 Bracket Battery Setting	
		B.4.1.3 Cover Battery	
B. CHASSIS 5. Electrical Parts	B.5.1 Cable and Wiring	B.5.1.1 Cable Battery to Starter	
		B.5.1.2 Cable Battery to Ground	
		B.5.1.4 Harness Wiring Set	
	B.5.2 Lamp	B.5.2.2 Lamp Assy Tail	
		B.5.2.3 Lamp Assy Direction Signal	
		B.5.2.5 Lamp Assy License	
		B.5.2.6 Lamp Assy Back Up	
	B.5.4 Wiper and Washer	B.5.4.1 Motor Assy Wiper	
		B.5.4.4 Tank Washer Set with Nozzle	
	B.5.5 Horn Switch and Relay	B.5.5.1 Horn Assy	
		B.5.5.10 Block Assy Fuse	

MAJOR GROUP	SUB-GROUP	COMPONENT/PART	REMARK
B. CHASSIS 6. Clutch	B.6.1 Disc and Cover	B.6.1.1 Disc Assy Clutch	
	B.6.2 Clutch Control	B.6.2.4 Pedal Clutch	
		B.6.2.5 Pipe Hydraulic	มีถังเก็บเฉพาะท่อไฮดรอลิก
		B.6.2.8 Clutch Cable	
B. CHASSIS 7. Transmission	B.7.1 Transmis- sion	B.7.1.1 Trensmission Assy (Assy Charge)	เฉพาะการประกอบ กระโหลกชุดสำหรับ กำหนดเกียร์ให้ตรง
B. CHASSIS 9. Service Brake	B.9.1 Hydromaster & Acc.	B.9.1.2 Tank Vacuum with Bracket	
	B.9.2 Service Brake Control	B.9.2.1 Pipe Hydraulic	มีถังเก็บเฉพาะท่อไฮดรอลิก
		B.9.2.4 Pedal Brake	
B. CHASSIS 10. Parking Brake	B.10.1 Brake Assy Parking	B.10.1.1 Drum Brake .	
		B.10.1.3 Cable Assy Parking Brake	
		B.10.1.4 Lever and Bracket Parking Brake	

MAJOR GROUP	SUB-GROUP	COMPONENT/PART	REMARK
B. CHASSIS 11. Frame	B.11.1 Frame & Cross	B.11.1.2 Member Cross	ชิ้นส่วนประกอบโครงรถ Frame Chassis
		B.11.1.3 Gusset and Stiffener	ชิ้นส่วนประกอบโครงรถ Frame Chassis
	B.11.2 Bracket & Shaft	B.11.2.1 Bracket Spring	
		B.11.2.2 Bracket Shock-absorber	
		B.11.2.3 Bracket Engine Mounting	
		B.11.2.6 Hook	
	B.11.3 Bumper and Acc.	B.11.3.1 Bumper front, Rear with Bracket	
	B.11.4 Cap Mounting & Acc.	B.11.4.1 Bracket Cap Hinge	ชิ้นส่วนประกอบ Member Assy Cab Front และชิ้นส่วนประกอบโครงรถ Frame Chassis
		B.11.4.2 Member Assy Cab Rear	ชิ้นส่วนประกอบโครงรถ Frame Chassis
		B.11.4.3 Mounting Cab Rear	ชิ้นส่วนประกอบโครงรถ Frame Chassis

MAJOR GROUP	SUB-GROUP	COMPONENT/PART	REMARK
B. CHASSIS 11. Frame	B.11.1 Frame & Cross	B.11.1.1 Member Side Frame B.11.1.2 Member Cross B.11.1.3 Gusset and Stiffener	มีทั้งแบบรถสี่ล้อ และแบบ Monocoque โดยทั่วไปรถบรรทุก จะรับน้ำหนัก ประมาณ 40 ตัน , มีการออกแบบโครงสร้าง ต่างกัน
	B.11.4 Cab Mounting & Acc.	B.11.4.1 Bracket Cab Hinge B.11.4.2 Member Assy Cab Rear B.11.4.3 Mounting Cab Rear	
C. CAB 1. Floor	C.1.1 Floor	C.1.1.2 Floor Part C.1.1.3 Protector and Fender Panel	
B. CHASSIS 12. Front Suspension	B.12.1 Spring Front	B.12.1.1 Spring Front	มีทั้งแบบ Leaf Spring และ Coil Spring
		B.12.1.5 Shock Absorber	
		B.12.1.6 Spanner, Pad and Bumper	มีทั้งแบบ Bump
		B.12.1.8 Bushing Strut Bar	
		B.12.1.9 Stabilizer	
B. CHASSIS 13. Rear Suspension	B.13.1 Spring Rear	B.13.1.1 Spring Rear	
		B.13.1.2 Spring Pin	
		B.13.1.3 Bracket Rear Spring	

MAJOR GROUP	SUB-GROUP	COMPONENT/PART	REMARK
		8.13.1.4 U-bolt	
		8.13.1.5 Shock Absorber	
		8.13.1.6 Bracket Shock Absorber	
		8.13.1.7 Spacer, Pad and Bumper	ถังน้ำมัน Bumper
8. CHASSIS 14. Wheel & Tire	8.14.1 Wheel	8.14.1.1 (1) Wheel	
		(2) Wheel Nut	
		8.14.1.2 Step Wheel	ล้อหน้า Wheel Cap
		8.14.1.3 Tire with Tube	
8. CHASSIS 15. Cable Speedometer	8.15.1 Cable Speedometer	8.15.1.1 Cable Speedometer with Bracket	
8. CHASSIS 16 Engine Control	8.16.1 Accelerator Control	8.16.1.1 Pedal Accelerator Control	
8. CHASSIS 18. Front Axle & Wheel Brake	8.18.1 Front Axle	8.18.1.1 Front Axle Assy (Assy Charge)	เช็คการประกอบที่ กระพวงล้อสำหรับ กำหนดล้อเส้นขอบ

MAJOR GROUP	SUB-GROUP	COMPONENT/PART	REMARK
		B.18.1.2 I - beam Front Axle	ชิ้นงานถึง Member Cross, Front Suspension
		B.18.1.7 Drum Brake	รวม Disc Brake
		B.18.1.10 Pipe Oil	ยังค้ำเฉพาะท่อโลหะ
B. CHASSIS 19. Rear Axle and Wheel	B.19.1 Rear Axle	B.19.1.1 Rear Axle Assy (Assy Charge)	เฉพาะการประกอบ กระพวงชุดสำหรับ กำหนดหรือเพิ่มเติม
		B.19.2.8 Drum Brake	
	B.19.2 Differential Carrier	B.19.2.11 Pipe Oil	ยังค้ำเฉพาะท่อโลหะ
B. CHASSIS 20. Tool	B.20.1 Tool	B.20.1.1 General Tool	ยกเว้น Hydraul Jack
		B.20.1.2 Tool Box	
B. CHASSIS 21. Paint	B.21.1 Paint	B.21.1.1 Paint	
C. CAB 1. Floor	C.1.1 Floor	C.1.1.1 Floor Assy (Assy Charge)	เฉพาะการประกอบ กระพวงชุดสำหรับ กำหนดหรือเพิ่มเติม
		C.1.1.2 Floor Part	ยังค้ำเฉพาะรถแบบ Frame Chassis

MAJOR GROUP	SUB-GROUP	COMPONENT/PART	REMARK
	C.1.2 Accessory Floor	C.1.2.1 Step Assy	หมายถึง Kicking Plate หรือ Scuff Plate
		C.1.2.2 Plate Splash	
		C.1.2.3 Insulator Floor	
		C.1.2.4 Mat and Carpet	
		C.1.2.5 Guide Air Intake	
C. CAB 2. Front Construction	C.2.1 Front Construction	C.2.1.1 Front Construction (Assy Charge)	เนื่องจากประกอบที่กระทรวงอุตสาหกรรมกำหนดให้เรียบร้อย
		C.2.1.2 Front Panel Parts	ใช้ค่าในอนุกรมการวัด 40 ของเวลาที่ทั้งหมด
		C.2.1.3 Inner Panel and Acc.	หมายถึง Fire Wall
	C.2.2 Accessory Inner	C.2.2.1 Glass Front	
		C.2.2.2 Weatherstrip front	
		C.2.2.5 Mirror Assy	
		C.2.2.6 Sunvisor Assy	
		C.2.2.7 Fender Back Mirror	
C. CAB 5. Paint	C.5.1 Paint	C.5.1.1 Paint	

MAJOR GROUP	SUB-GROUP	COMPONENT/PART	REMARK
D. Additional Components for Bonnet Type Cab	D.1.1 Body	D.1.1.1 Front Fender	มีทั้ง Liner และ Fender Panel
		D.1.1.2 Front Hood	มีทั้ง Liner และ Bonnet Panel, Bonnet Frame, Hinge & Bar

รายการอะไหล่เครื่องยนต์และอุปกรณ์เสริม
รายการอะไหล่เครื่องยนต์และอุปกรณ์เสริม

MAJOR GROUP	SUB-GROUP	COMPONENT/PART	REMARK
A. ENGINE 1. Base Engine	A.1.1 Cylinder Head	A.1.1.2 Cylinder Head	
		A.1.1.3 Cover Cylinder Head	
		A.1.1.4 Gasket Cylinder Head	
	A.1.2 Crankcase	A.1.2.1 Cylinder Block	
		A.1.2.2 Liner Cylinder	
		A.1.2.3 Oil Pan	
		A.1.2.4 Housing Flywheel	
		A.1.2.5 Cover Assy Timing Gear and Bracket	
		A.1.2.6 Housing Assy Clutch	
	A.1.3 Main Moving Parts	A.1.3.1 Piston and Ring Set	
		A.1.3.2 Pin Piston	
		A.1.3.3 Rod Assy Connecting	
		A.1.3.4 Crank Shaft and Main Bearing	
		A.1.3.5 Pulley Assy Crankshaft w/Oil Seal	
		A.1.3.6 Flywheel	
		A.1.3.7 Gear Flywheel	
		A.1.3.8 Shaft Idle Gear	
		A.1.3.9 Camshaft	
	A.1.4 Valve Intake and Exhaust System	A.1.4.1 Valve Set with Rocker Arm	
		A.1.4.2 Manifold Intake	
		A.1.4.4 Gasket	

MAJOR GROUP	SUB-GROUP	COMPONENT/PART	REMARK
A. ENGINE 2. Lubricating	A.2.2 Oil Cooling	A.2.2.1 Cooler Assy Oil Set	
A. ENGINE 3. Fuel System	A.3.1 Fuel Injection	A.3.1.1 Pump Assy Injection	
		A.3.1.2 Nozzle Holder and Nozzle	
		A.3.1.3 Pipe Injection Set	
		A.3.1.4 Bracket with Shaft and Gear	
A. ENGINE 4. Cooling System	A.4.1 Coolant Pump	A.4.1.1 Pump Assy Cooling with Gasket	
		A.4.1.2 Pulley Cooling Pump	
		A.4.1.4 Fan	
A. ENGINE 5. Electrical Parts	A.5.3 Switch and Gauge	A.5.3.1 Switch Oil Pressure	
A. ENGINE 6. Air Intake System	A.6.1 Cleaner Assy Air	A.6.1.3 Hose Air Intake	
B. CHASSIS 1. Fuel Tank	B.1.1 Fuel Tank Assy	B.1.1.2 Gap Assy Fuel	
		B.1.1.3 Gauge Fuel Tank with Acc.	

MAJOR GROUP	SUB-GROUP	COMPONENT/PART	REMARK
B. CHASSIS 2. Radiator	B.2.3 Hose and Shroud Fan	B.2.3.3 Reserve Assy Tank with Hose	
B. CHASSIS 5. Electrical Parts	B.5.2 Lamp	B.5.2.1 Lamp Assy Head	
		B.5.2.4 Lamp Assy Fog	
	B.5.3 Meter and Speedometer	B.5.3.1 Speedometer Assy or Tachometer	
		B.5.3.2 Meter Assy Combination	
	B.5.4 Wiper and Washer	B.5.4.2 Link Assy Wiper Arm	
		B.5.4.3 Blade Wiper	
	B.5.5 Horn Switch and Relay	B.5.5.2 Switch Lighting	
		B.5.5.3 Switch Hazard	
		B.5.5.4 Switch Fog Lamp	
		B.5.5.5 Switch Assy Wiper	
		B.5.5.6 Switch Exhaust Brake	
		B.5.5.7 Relay Starten	
		B.5.5.8 Relay Horn	
		B.5.5.9 Flasher Unit	
B. CHASSIS 6. Clutch	B.6.1 Disc and Cover	B.6.1.2 Pressure Plate and Spring	

MAJOR GROUP	SUB-GROUP	COMPONENT/PART	REMARK
	8.6.2 Clutch Control	8.6.2.1 Bearing Clutch with Sleeve, Yoke, Shaft	
		8.6.2.2 Cylinder Assy Clutch with Bracket	
		8.6.2.3 Cylinder Assy Master	
		8.6.2.6 Hose Hydraulic	มีก้านควบคุมคลัทช์
		8.6.2.7 Reservoir Assy Oil	
B. CHASSIS 7. Transmission	8.7.1 Transmis- sion	8.7.1.2 Case Transmission	
		8.7.1.3 Cover Transmission	
		8.7.1.4 Shaft Transmission	
		8.7.1.5 Gear Transmission	
		8.7.1.6 Bearing and ect.	
	8.7.2 Transmis- sion Control	8.7.2.1 Fork Shift, Lever Seat	
		8.7.2.2 Rod Link	
B. CHASSIS 8. Propeller Shaft	8.8.1 Shaft Assy Propeller	8.8.1.1 Shaft Assy Propeller	
		8.8.1.2 Yoke Assy and Spider	
		8.8.1.3 Bearing and Coupling Flange Yoke	
		8.8.1.4 Rubber and Holder Centre	
B. CHASSIS 9. Service Brake	8.9.1 Hydromas- ter & Acc.	8.9.1.1 Housing, Diagram and Spring	

MAJOR GROUP	SUB-GROUP	COMPONENT/PART	REMARK
	B.9.2 Service Brake Control	B.9.2.2 Cylinder Master Brake	
		B.9.2.3 Hose	
		B.9.2.5 Reservoir Assy Tank	
B. CHASSIS 10. Parking Brake	B.10.1 Brake Assy Parking	B.10.1.2 Lining and Shoe	
B. CHASSIS 11. Frame	B.11.1 Frame & Cross	B.11.1.1 Member Side Frame	REPAIR/REPLACE FRAME CHASSIS
		B.11.2.4 Stopper Bumper	
		B.11.2.5 Bracket Trunnion	
		B.11.2.7 Shaft Trunnion	
B. CHASSIS 12. Front Suspension	B.12.1 Spring Front	B.12.1.2 Spring Pin	
		B.12.1.3 Shackle Spring	
		B.12.1.4 U-bolt	
		B.12.1.6 Bracket Shock Absorber	
B. CHASSIS 16. Engine Control	B.16.1 Accelerator Control	B.16.1.2 Cable and Knob	
B. CHASSIS 17. Steering	B.17.1 Steering and Steering Control	B.17.1.1 Gear Steering	
		B.17.1.2 Housing Steering	

MAJOR GROUP	SUB-GROUP	COMPONENT/PART	REMARK
		B.17.1.3 Link Assy Steering	
		B.17.1.4 Spider, Yoke and Shaft	
		B.17.1.5 Column Steering	
		B.17.1.6 Wheel Steering	
B. CHASSIS 18. Front Axle & Wheel Brake	B.18.1 Front Axle	B.18.1.3 Pin King and Arm Knuckle	
		B.18.1.4 Rod Steering Tie	
		B.18.1.5 Knuckle Assy Steering	
		B.18.1.6 Hub Wheel	
		B.18.1.8 Shoe and Plate Brake	
		B.18.1.9 Cylinder Wheel Brake	
B. CHASSIS 19. Rear Axle and Wheel	B.19.1 Rear Axle (Fr.)	B.19.1.2 Housing Assy Rear Axle	
		B.19.1.3 Arm Rear Axle	
		B.19.1.4 Shaft Rear Axle	
	B.19.2 Differen- tial Carrier	B.19.2.1 Housing Carrier Differential	
		B.19.2.2 Gear Assy Spiral Bevel	
		B.19.2.3 Retainer Oil Seal	
		B.19.2.4 Flange Assy	
		B.19.2.5 Case Sub-assy, . Differential	

MAJOR GROUP	SUB-GROUP	COMPONENT/PART	REMARK
		8.19.2.6 Spider Differential	
		8.19.2.7 Bearing Gear Differential	
		8.19.2.9 Plate, Shoe Assy Brake	
		8.19.2.10 Cylinder Assy Wheel Brake	
C. CAB 1. Floor	C.1.1 Floor	C.1.1.3 Protector and Fender Panel	
C. CAB 2. Front Construction	C.2.2 Accessory Inner	C.2.2.3 Instrument Panel	
		C.2.2.4 Grille Mark and Liner	

D. T I S I 規格表自動車部品

Development of Standards for Automobile and Components

Page 1

AUTOMOBILE

	TIS	TC	STEP
A. Standard published			
1. Air filter for internal combustion engine	788-1988	152	20
2. Alternators for automobiles	772-1988	530	20
3. Automobile radiators	388-1982	267	20
4. Automobile seats	896-1989	527	20
5. Automobile tyres : Part 1 Performance and testing	367 Part 1-1989	87	20
6. Automobile tyres : Part 2 Dimension and load capacity	367 Part 2-1989	87	20
7. Automobile windshield wiper motors	709-1987	517	20
8. Automotive V-belts	811-1988	134	20
9. Automotive lamps	687-1987	396	20
10. Automotive lead-acid storage batteries	6-1982	3	20
11. Automotive nitrocellulose lacquer : primer surface or surface	609-1986	433	20
12. Automotive nitrocellulose lacquer : top coat	608-1986	433	20
13. Automotive nitrocellulose lacquer thinner	520-1984	379	20
# 14. Automotive safety glasses : laminated safety glass	196-1976	165	20(07)
# 15. Automotive safety glasses : tempered safety glass	197-1978	165	20(07)
# 16. Automotive safety glasses : zone tempered safety glass	198-1976	165	20(07)
17. Automotive wheels : Aluminium alloy	908-1989	13	20
18. Automotive wheels : Steel	869-1989	513	20
19. Body parts of passenger cars	813-1988	532	20
20. Brake drums	823-1988	552	20
21. Brake lining for automobiles	97-1974	95	20
22. Clutch discs for automobiles	708-1987	533	20
23. Clutch facings for automobiles	212-1977	214	20
24. Cooling fan	978-1990	556	20
25. Cylinder head gaskets for automobile engines	722-1987	511	20
26. Distributors for automobiles	657-1986	512	20
27. Door weather strips for automobile	800-1988	521	20
28. Electric horns for automobiles and motorcycles	771-1988	542	20
29. Exhaust system for automobile	340-1985	293	20
30. Filter for lubricating oil	872-1989	152	20

	TIS	TC	STEP
31. Fuel tank for passenger cars	830-1988	534	20
32. Fuel tank guage	806-1988	529	20
33. Head restraints for automobile occupants	714-1987	514	20
34. High voltage cables for automobiles	117-1980	88	20
35. High voltage resistance cables for automobiles	119-1980	88	20
36. Hydraulic brake hose for automobile and motorcycle : rubber	839-1989	518	20
37. Ignition coils	807-1988	395	20
38. Leaf springs	93-1989	29	20
39. Liquefied petroleum gas cylinder for internal combustion engines	370-1981	26	20
40. Low voltage cables for automobiles	118-1979	88	20
41. Magnetic switches of starting motors for automobiles	762-1988	547	20
# 42. Methods of sampling and testing for automotives safety glasses	195-1978	165	20(07)
43. Pantograph screw jack for automobile	693-1987	526	20
44. Rearview mirror	954-1990	506	20
45. Rubber hose for coolant system	658-1986	469	20
46. Seat belt for automobiles	721-1987	516	20
47. Shock absorber	853-1989	346	20
48. Sleeve type half bearing for automobile engines	790-1988	466	20
49. Spark plugs	231-1985	215	20
50. Stabilizer bar for automobile	944-1990	543	20
51. Starter motors for automobiles	666-1987	512	20
52. Tubes of automobile tyres	651-1986	87	20
53. Valves for internal combustion engines	690-1987	492	20
54. Weather strips for automobile	697-1987	521	20
55. White body coatings of passenger cars	786-1988	550	20
56. White body of passenger cars	814-1988	532	20
B. Drafts under preparation			
1. Automobile rubber mats	947-1990	610	19
2. Door hinge		655	09
3. Engine control cable		546	09
4. Engine mounting with bracket			05
5. Fuel filter for diesel engine		152	06

	TIS	TC	STEP
6. Fuel filter for gasoline engine		152	03
7. Fuel pipe and lubricating oil pipe		518	03
8. Hydraulic brake hose for road vehicles : metal		518	03
9. Hydraulic pipe and connection for dump truck		528	03
10. Liquefied petroleum gas vaporizer regulator for internal combustion engines		452	14
11. Parking brake			03
12. Pneumatic brake hose for automobile			
13. Radiator cap			03
14. Suspension spring for automobile		475	19
15. Test method for fuel filter for diesel engine			
16. Test method for fuel filter for gasoline engine			
17. Valve spring		475	03

MOTORCYCLE

	TIS	TC	STEP
A. Standard published			
1. Motorcycle battery	719-1987	296	20
2. Motorcycle chain wheels	472-1983	255	20
3. Motorcycle chains	334-1980	255	20
4. Motorcycle exhaust muffler	341-1985	293	20
5. Motorcycle rubber inner tubes	683-1987	316	20
6. Motorcycle spoke rims	306-1979	255	20
7. Motorcycle spokes	324-1979	255	20
8. Motorcycle tyres	682-1985	316	20
B. Drafts under preparation			
1. Control cable for motorcycle		255	09
2. Fuel tank for motorcycle		255	03

E. T I S I 規格表自動車排気規制

EMISSION STANDARD

STANDARD	REFERENCE
1. TIS 1085 GASOLINE ENGINED VEHICLES:SAFETY REQUIREMENTS; EMISSION FROM ENGINE	ECE R 15-04
2. TIS 1105 MOTORCYCLES:SAFETY REQUIREMENTS; EMISSION FROM ENGINE, LEVEL 1	ECE R 40-00
3. TIS 1120 GASOLINE ENGINED VEHICLES:SAFETY REQUIREMENTS; EMISSION FROM ENGINE, LEVEL 2.	ECE R 83 Approval B
4. TIS 1140 LIGHT DUTY DIESEL ENGINED VEHICLES:SAFETY REQUIREMENTS; EMISSION FROM ENGINE, LEVEL 1	ECE R 83 Approval C
5. GASOLINE ENGINED VEHICLES:SAFETY REQUIREMENTS; EMISSION FROM ENGINE, LEVEL 3	91/441/EEC
6. LIGHT DUTY DIESEL ENGINED VEHICLES:SAFETY REQUIREMENTS,EMISSION LEVEL 2	91/441/EEC
7. HEAVY DUTY DIESEL ENGINED VEHICLES:SAFETY REQUIREMENTS,EMISSION FROM ENGINE, LEVEL 1	ECE R 49-01
8. HEAVY DUTY DIESEL ENGINED VEHICLES:SAFETY REQUIREMENTS, EMISSION LEVEL 2	91/542(A)/EEC
9. HEAVY DUTY DIESEL ENGINED VEHICLES:SAFETY REQUIREMENT, EMISSION LEVEL 3	91/541(B)/EEC
10. MOTORCYCLES: SAFETY REQUIREMENTS; EMISSION FROM ENGINE, LEVEL 2	ECE R 40-01
11. MOTORCYCLES: SAFETY REQUIREMENTS; EMISSION FROM ENGINE, LEVEL 3	CNS 11386

F. T I S I 規格表電子部品

Electronics Standards

1. Published in the Government Gazette

- 1.1 Lead-acid batteries for automobiles (TIS 6-2524)
- 1.2 Containers for lead-acid batteries (TIS 7-2513)
- 1.3 Dry cells (TIS 96-2528)
- 1.4 Colour coding for resistors and capacitors (TIS 266-2521)
- 1.5 Miniature fuses:Fuse links (TIS 526-2527)
- 1.6 Miniature fuses:Fuse holders (TIS 527-2527)
- 1.7 Separators for lead-acid batteries (TIS 567-2528)
- 1.8 Thai character codes for computers (TIS 620-2533)
- 1.9 Copper-clad laminated sheet for printed circuits:Phenolic cellulose paper (TIS 703-2530)
- 1.10 Copper-clad laminated sheet for printed circuits:Epoxide cellulose paper (TIS 704-2530)
- 1.11 Copper-clad laminated sheet for printed circuits:Epoxide woven glass fabric (TIS 705-2530)
- 1.12 Stationary lead-acid batteries (TIS 718-2530)
- 1.13 Motorcycle batteries (TIS 719-2530)
- 1.14 Aluminium electrolytic capacitors for electronic equipment(TIS 767-2
- 1.15 Layout of Thai character keys on computer keyboards (TIS 820-2531)
- 1.16 A.C. electronic ballasts for tubular fluorescent lamps (TIS 885-2532
- 1.17 Recommendation for Thai combined character codes and symbols for line graphics for dot-matrix printers (TIS 988-2533)
- 1.18 6-bit teletype codes (TIS 1074-2535)
- 1.19 Conversion between computer codes and 6-bit teletype codes(TIS1075-
- 1.20 Province identification codes for data interchange (TIS 1099-2535)

- 1.21 Radio frequency coaxial cables (TIS 1100-2535)
- 1.22 Self-contained emergency lighting luminaires (TIS 1102-2535)
- 1.23 Aerials for the reception of radio and television broadcasting in the frequency range of 30 MHz to 1 GHz (TIS 1109-2535)
- 1.24 Representation of dates and times (TIS 1111-2535)

2. In the process of drafting

- 2.1 Mains operated electronic and related apparatus for household and similar general use: Safety requirements (TC 639)
- 2.2 Tumbler dryers: Safety requirements (TC 755)
- 2.3 Uninterruptible power systems (TC 713)
- 2.4 Self-commutated inverters (TC 713)
- 2.5 Battery chargers (TC 713)
- 2.6 Digital integrated circuits (TC 759)
- 2.7 Resistors: Fixed wire wound resistors
- 2.8 Resistors: Test methods
- 2.89 Diodes
- 2.10 Sound system equipment: Audio amplifiers
- 2.811 Transistors
- 2.12 Organization codes for data interchange (TC 536)
- 2.103 Thai language software standard: Input/Output method (TC 536)
- 2.14 District identification codes for data interchange (TC 536)
- 2.15 Layout of Thai character keys on computer keyboards (1st revision) (TC 536)
- 2.16 Power supplies: Plug-in type

G. TISI 規格表電氣部品

Electrical Standards

1. Published in the Government Gazette

ลำดับ No	เลข TIS	ชื่อมาตรฐาน (ภาษาไทย) THAI	ชื่อมาตรฐาน (ภาษาอังกฤษ) ENGLISH
1.	4-2529 <i>Part 4</i>	หลอดไส้	INCANDESCENT LAMPS
2.	4-2530	วิธีวัดอุณหภูมิที่ขั้วหลอดไส้	METHOD OF MEASUREMENT OF LAMP CAP TEMPERATURE RISE
3.	7-2510	แบตเตอรี่รับแบตเตอรี่ถั่ว	BATTERY CONTAINERS
4.	10-2520	ฟิวส์แรงดันต่ำ	LOW VOLTAGE DISTRIBUTION LINK FUSES
5.	11-2518	สายไฟหุ้มฉนวนพลาสติก กลมแบนสำหรับเดินภายในอาคาร	PVC-INSULATED CABLES AND FLEXIBLE CORDS
6.	23-2521	บัลลาสต์สำหรับหลอดฟลูออโร เรสเซนต์	BALLAST FOR FLUORESCENT LAMPS
7.	25-2516	ขั้วรับหลอดไส้ : แบบไขว่	LAMP HOLDERS : BAYONET TYPES
8.	64-2517	ลวดนำไฟฟ้าทองแดงรีดแข็ง สำหรับสายส่งกำลังเหนือดิน	HARD DRAWN COPPER CONDUCTOR FOR OVERHEAD LINES
9.	82-2527	ลวดทองแดงเคลือบฟอสไฟต์ ไวไฟหุ้มฉนวน	POLYVINYL FORMAL ENAMELLED ROUND COPPER WIRES
10.	86-2517	สายนำไฟฟ้าอะลูมิเนียมที่เคลือบ เคลือบกันเหล็ก	ALUMINIUM CONDUCTORS STEEL REINFORCED
11.	92-2530	พัดลมไฟฟ้ากระแสสลับชนิดตั้ง โต๊ะ	A.C. ELECTRIC TABLE TYPE FANS

ลำดับ No.	มอก. TIS	ชื่อมาตรฐาน (ภาษาไทย) THAI	ชื่อมาตรฐาน (ภาษาอังกฤษ) ENGLISH
12.	96-2528	แบตเตอรี่แห้ง (แบบคล็องช์) : 1	DRY CELLS AND BATTERIES (CLECLANCHE TYPE)
13.	127-2530	พัดลมไฟฟ้ากระแสสลับชนิดตั้ง พื้น	A.C. ELECTRIC PEDESTAL TYPE FANS
14.	166-2535	ปลั๊กเสียบและเต้ารับไฟฟ้า สำหรับใช้งานกับสายไฟฟ้าที่มี 1 และ 2	PLUGS AND SOCKET-OUTLETS
15.	174-2535	ลวดทองแดงเคลือบดินเคลือบโพลี ยูรีเทน	POLYURETHANE ENAMELLED ROUND COPPER WIRES
16.	183-2528	ตัวนำไฟฟ้าสำหรับหลอดฟลูออโร โรสโคป	STARTERS FOR FLUORESCENT LAMPS
17.	191-2531	ตัวเก็บประจุสำหรับใช้ในวงจร หลอดฟลูออโรโรสโคปและ หลอดปล่อยประจุอื่น	CAPACITORS FOR USE IN TUBULAR FLUORESCENT AND DISCHARGE LAMP CIRCUITS
18.	205-2530	พัดลมไฟฟ้ากระแสสลับชนิด พานแปดใบ	A.C. ELECTRIC CEILING TYPE FANS
19.	209-2520	เตาไฟฟ้าชนิดทำความร้อน แบบเปิด	ELECTRIC STOVES: OPEN TYPE HEATING ELEMENTS
20.	226-2520	ลวดทองแดงเคลือบดินเคลือบ โพลีเอสเตอร์	POLYESTER ENAMELLED ROUND COPPER WIRES
21.	227-2520	ลูกถ้วยค้ำ - เบอร์ซีเลน	SPOGL-TYPE PORCELAIN INSULATORS
22.	236-2533	หลอดฟลูออโรโรสโคป	FLUORESCENT LAMP
23.	266-2521	การหำรหัสสำหรับตัวต้านทาน และกระเป๋าคอนดิวเซอร์	MARKING CODES FOR RESISTORS AND CAPACITORS
24.	279-2525	ลูกถ้วยค้ำตรง : เบอร์ซีเลน	PIN-TYPE PORCELAIN INSULATORS
25.	280-2529	ลูกถ้วยยึดโยง : เบอร์ซีเลน	STRAIN-TYPE PORCELAIN INSULATORS

ลำดับ No	มอก. TIS	ชื่อมาตรฐาน (ภาษาไทย) TITL	ชื่อมาตรฐาน (ภาษาอังกฤษ) ENGLISH
26.	292-2526	สายไฟฟ้าอะลูมิเนียมเคลือบด้วย ฉนวนโพลีไวนิลคลอไรด์	PVC-INSULATED ALUMINIUM CABLES
27.	299-2525	ลวดทองแดง เคลือบชั้นเคลือบ ฉนวนโพลีเอสเตอร์-อิมิด	POLYESTER-IMIDE ENAMELLED ROUND COPPER WIRES
28.	308-2522	ทองแดงสำหรับจุดประสงค์ทางไฟฟ้า : ลวดกลม	COPPER FOR ELECTRICAL PURPOSES : ROUND WIRE
29.	326-2525	ลูกถ้วยยึดสาย : เซรามิก	PORCELAIN WIREHOLDERS
30.	344-2530	ขั้วรับหลอดหลอดฟลูออโรสเซสเซ และ ขั้วรับหลอดฟลูออโรสเซสเซ	LAMP HOLDERS FOR TUBULAR FLUORESCENT LAMPS AND STARTER HOLDERS
31.	354-2528	ลูกถ้วยแขวน : เซรามิก	SUSPENSION-TYPE PORCELAIN INSULATORS
32.	355-2526	ก้านเหล็กสำหรับลูกถ้วยก้านเหล็ก	FERROUS PIN FOR PIN-TYPE PORCELAIN INSULATORS
33.	366-2528	เหล็กไฟฟ้า	ELECTRIC IRON
34.	384-2525	หม้อแปลงไฟฟ้ากำลัง	Power Transformers
35.	386-2524	เทปใช้ในงานไฟฟ้า : พลาสติกไวนิล โพลีไวนิลคลอไรด์	PRESSURE-SENSITIVE ADHESIVE TAPE FOR ELECTRICAL PURPOSES : PLASTICIZED POLYVINYL CHLORIDE
36.	406-2525	อะลูมิเนียมและอะลูมิเนียมเจือ สำหรับจุดประสงค์ทางไฟฟ้า : คุณสมบัติทั่วไป	ALUMINIUM AND ALUMINIUM ALLOYS FOR ELECTRICAL PURPOSES : GENERAL PROPERTIES
37.	407-2525	อะลูมิเนียมและอะลูมิเนียมเจือ สำหรับจุดประสงค์ทางไฟฟ้า : เส้นกลม	ALUMINIUM AND ALUMINIUM ALLOYS FOR ELECTRICAL PURPOSES : ROUND ROD

ลำดับ NO	มอก. TIS	ชื่อมาตรฐาน (ภาษาไทย) -THAI	ชื่อมาตรฐาน (ภาษาอังกฤษ) -ENGLISH
38.	408-2525	ทองแดงสำหรับจุดประสงค์ทาง ไฟฟ้า : เส้นและแท่ง	COPPER FOR ELECTRICAL PURPOSES : ROD AND BAR
39.	116-2525	การจัดประเภทของวัสดุฉนวน ไฟฟ้า	THE CLASSIFICATION OF ELECTRICAL INSULATING MATERIALS
40.	448-2525	สายไฟฟ้าเชื่อม	WELDING CABLES
41.	454-2526	หม้อแปลงไฟฟ้ามีวักย	SAFETY ISOLATING TRANSFORMERS
42.	455-2526	ตู้เย็นสำหรับใช้ในบ้าน	HOUSEHOLD REFRIGERATORS
43.	490-2526	เข็มขัดรัดสายไฟฟ้า	LINK CLIPS FOR ELECTRICAL WIRING
44.	506-2527	ฟิวส์สำหรับใช้ในตู้ผู้อาศัยและ งานที่คล้ายคลึงกัน : ตัวฟิวส์	FUSES FOR DOMESTIC AND SIMILAR PURPOSES : FUSE-LINK
45.	507-2527	ฟิวส์สำหรับใช้ในตู้ผู้อาศัยและ งานที่คล้ายคลึงกัน : ตัวยึดฟิวส์	FUSES FOR DOMESTIC AND SIMILAR PURPOSES : FUSE HOLDER
46.	513-2527	การจัดระดับชั้นการป้องกันของ เปลือกหุ้มบริกหหไฟฟ้า	CLASSIFICATION OF DEGREES OF PROTECTION PROVIDED BY ENCLOSURES
47.	526-2527	ฟิวส์ขนาดเล็ก : ตัวฟิวส์	MINIATURE FUSES : FUSE-LINK
48.	527-2527	ฟิวส์ขนาดเล็ก : ตัวยึดฟิวส์	MINIATURE FUSES : FUSE HOLDERS
49.	563-2528	ลูกถ้วยแขวน : แก้วเหนียว	SUSPENSION-TYPE TOUGHENED GLASS INSULATORS
50.	567-2528	แผ่นกั้นเบตเตอรี่ชนิดตะกั่ว-กรด	SEPARATORS FOR LEAD-ACID BATTERIES

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51.	572-2528	พัดลมไฟฟ้ากระแสสลับชนิดสาย รอบตัว	A.C.ELECTRIC DOUBLE- OSCILLATING TYPE FANS
52.	673-2530	บัลลาสต์สำหรับหลอดไอปรอท ความดันสูง	BALLASTS FOR HIGH PRESSURE MERCURY VAPOUR LAMPs
53.	683-2530	หลอดไฟฟ้าสำหรับรถยนต์	AUTOMOTIVE LAMPs
54.	706-2530	สวิตช์ใบมีดมีฝาครอบ	KNIFE SWITCHES WITH COVER
55.	710-2530	พัดลมไฟฟ้ากระแสสลับชนิด ระบายอากาศ	A.C.ELECTRIC VENTILATING TYPE FANS
56.	718-2530	แบตเตอรี่ชนิดตะกั่ว-กรด ใช้ประจำที่	STATIONARY LEAD ACID STORAGE BATTERIES
57.	719-2530	แบตเตอรี่รถจักรยานยนต์	MOTORCYCLE BATTERIES
58.	725-2530	สายไฟฟ้าอะลูมิเนียมเจือดี เกลียวเปลือย	ALUMINIUM ALLOY STRANDED CONDUCTORS
59.	819-2531	ขั้วรับหลอดไฟฟ้าแบบเกลียว	LAMP HOLDERS : EDISON SCREW TYPE
60.	824-2531	สวิตช์ไฟฟ้า	ELECTRICAL SWITCHES
61.	838-2531	สายไฟฟ้าสำหรับวงจรควบคุม	CONTROL CABLE
62.	861-2532	การทำเครื่องหมายตัวนำหุ้ม ฉนวน	MARKING OF INSULATED CONDUCTORS
63.	867-2532	มอเตอร์เหนี่ยวนำสามเฟส	THREE-PHASE INDUCTION MOTOR
64.	868-2532	เครื่องกำเนิดไฟฟ้ากระแสสลับ (ไม่รวมต้นกำลัง)	ALTERNATING CURRENT GENERATORS (EXCLUDING PRIME MOVERS)
65.	870-2532	เตาไฟฟ้าชนิดทำความร้อน แบบเปลือยเฉพาะด้านความ	ELECTRIC STOVES, OPEN TYPE HEATING ELEMENTS :

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		ปลอดภัย	SAFETY REQUIREMENTS
66.	902-2532	ดวงโคมไฟฟ้าติดประจำที่สำหรับ จุดประสงค์ทั่วไป	FIXED GENERAL PURPOSE LUMINAIRES
67.	903-2532	ดวงโคมไฟฟ้าฝัง	RECESSED LUMINAIRES
68.	904-2532	ดวงโคมไฟฟ้าสำหรับให้แสง สว่างบนถนน	LUMINAIRES FOR ROAD AND STREET LIGHTING
69.	905-2532	ดวงโคมไฟฟ้าเคลื่อนย้ายได้ สำหรับจุดประสงค์ทั่วไป	PORTABLE GENERAL PURPOSE LUMINAIRES
70.	906-2532	ดวงโคมสาดแสง	FLOODLIGHTS
71.	907-2532	ดวงโคมมือถือ	HANDLAMPS
72.	909-2532	เครื่องตัดวงจรกระแสไฟฟ้า รั่วลงดิน	CURRENT-OPERATED EARTH-LEAKAGE CIRCUIT BREAKERS
73.	934-2533	พัดลมไฟฟ้ากระแสสลับ เฉพาะ ด้านความปลอดภัย	A.C.ELECTRIC FANS : SAFETY REQUIREMENTS
74.	955-2533	สายไฟฟ้าทองแดงหุ้มด้วยยาง : สายอ่อนดัด	RUBBER INSULATED COPPER CABLES : BRAIDED CORDS
75.	956-2533	หลอดฟลูออเรสเซนต์ เฉพาะ ด้านความปลอดภัย	FLUORESCENT LAMPS : SAFETY REQUIREMENTS
76.	1030-2534	มาตรพลังงานไฟฟ้า เฉพาะ ด้านความปลอดภัย	ALTERNATING CURRENT WATTHOUR METERS : SAFETY REQUIREMENTS
77.	1039-2534	หม้อหุงข้าวไฟฟ้า	ELECTRIC RICE COOKERS
78.	1077-2535	ลูกถ้วยแข่ง : พอร์ซเลน	LINE-POST TYPE PORCELAIN INSULATORS

2. Drafts under preparation

No.	THAI	ENGLISH
1	ขั้วรับหลอดไฟฟ้าแบบไขว เฉพาะ ด้านความปลอดภัย	SAFETY STANDARD FOR LAMPHOLDERS: BAYONET TYPES
2	ขั้วรับหลอดไฟฟ้าแบบเกลียว เฉพาะ ด้านความปลอดภัย	SAFETY STANDARD FOR LAMPHOLDERS: EDISON SCREW TYPES
3	ความปลอดภัยของเครื่องใช้ไฟฟ้า	SAFETY STANDARD FOR ELECTRICAL APPLIANCES
4	เตารีดไฟฟ้าเฉพาะด้านความปลอดภัย	SAFETY STANDARD FOR ELECTRIC IRONS
5	ลูกถ้วยแท่งกานตรง : พอร์ซเลน	PIN-TYPE PORCELAIN INSULATORS
6	มาตรพลังงานไฟฟ้า	ALTERNATING CURRENT WATTHOUR METERS
7	หลอดไฟฟ้าเฉพาะด้านความปลอดภัย	SAFETY STANDARD FOR INCANDESCENT LAMPS
8	สัญลักษณ์ของแบบชนิดของการนำและ การจัดระเบียบในการติดตั้งเครื่อง จักรกลไฟฟ้า	SYMBOLS FOR TYPES OF CONSTRUCTION AND MOUNTING ARRANGEMENTS FOR ROTATING ELECTRICAL MACHINERY
9	เครื่องเชื่อมอาร์กไฟฟ้าเฉพาะด้าน ความปลอดภัย	ELECTRIC ARC WELDING MACHINES: SAFETY REQUIREMENTS
10	เต้าเสียบและเต้ารับไฟฟ้าสำหรับใช้ ในที่อยู่อาศัยและงานทั่วไปที่มีจุดประสงค์ คล้ายกัน	PLUGS AND SOCKET OUTLETS FOR DOMESTIC AND GENERAL ELECTRICAL USE
11	เต้าเสียบและเต้ารับและคู่เต้าต่อไฟฟ้า สำหรับใช้ในงานอุตสาหกรรม	PLUG AND SOCKET OUTLETS FOR INDUSTRIAL USE
12	กระติกน้ำร้อนไฟฟ้า	ELECTRIC POTS

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