THE APPLICATION OF ROSETTANET XML SCHEMA FOR THAI AUTOMOTIVE INDUSTRY

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THE APPLICATION OF ROSETTANET XML SCHEMA FOR THAI AUTOMOTIVE INDUSTRY

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ABSTRACT

The RosettaNet is a data exchange standard that provides business processes and formats for business documents in XML Schema form to standardize data exchange between several trading partners. Moreover, the RosettaNet standard provides basic security for the exchange of data. This thesis proposes an analytical framework to apply the RosettaNet standard for the Thai automotive industry. Each automotive company communicates with a large number of component manufacturers, so data exchange among them is very complicated. This thesis proposes four steps to apply the RosettaNet standard. First, business processes and business documents from the case study were gathered. Second, the business processes of the case study were analyzed in order to identify data exchange between trading partners. Third, a flowchart for Partner Interface Processes (PIPs) of the RosettaNet standard was created. Finally, data elements of PIPs from the third step in the XML Schema form were compared and selected according to the business documents of the case study. The results show some business constraints from sourcing to delivery in business processes and data elements. Some business processes, e.g., authority approval and restriction of supplier selection, need to be modified. There are four applicable PIPs from six PIPs within the RosettaNet standard. They are Order Management (cluster 3) and Inventory Management (cluster 4). For data elements, less than five percent of PIP3A4 and PIP3A8, sixteen percent of PIP4A2, and approximately forty percent of PIP3A9 can be applied to this case study. Therefore, RosettaNet is a good prototype for data exchange for the Thai automotive industry.

KEY WORDS: ROSETTANET/ AUTOMOTIVE INDUSTRY/ PIP/ XML SCHEMA

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การประยุกต์ใช้มาตรฐานโรเซ็ตตาเน็ตเอ็กซ์เอ็มแอลสกีมาสำหรับอุตสาหกรรมยานยนต์ ประเทศไทย
THE APPLICATION OF ROSETTANET XML SCHEMA FOR THAI AUTOMOTIVE INDUSTRY

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บทคัดย่อ

โรเซ็ตตาเน็ตเป็นมาตรฐานการแลกเปลี่ยนข้อมูลที่มีการจัดเตรียมในส่วนของกระบวนการทางธุรกิจและ โครงสร้างของเอกสารทางธุรกิจในรูปแบบเอ็กซ์เอ็มแอลสกีมาไว้เพื่อเป็นมาตรฐานสำหรับการแลกเปลี่ยนข้อมูลระหว่างหุ้นส่วนทางการค้า นอกจากนี้มาตรฐานโรเซ็ตตาเน็ตยังจัดเตรียมความปลอดภัยพื้นฐานในการแลกเปลี่ยนข้อมูลไว้ให้อีกด้วย งานวิจัยฉบับนี้เสนอขอบข่ายการวิเคราะห์เพื่อประยุกต์ใช้มาตรฐานโรเซ็ตตาเน็ตสำหรับอุตสาหกรรมยานยนต์ในประเทศไทย แต่ละบริษัทยานยนต์มีการติดต่อสื่อสารกับผู้ผลิตชิ้นส่วนยานยนต์จำนวนมาก ดังนั้นการแลกเปลี่ยนข้อมูลระหว่างกันถือเป็นสิ่งที่ยุ่งยาก งานวิจัยนี้เสนอสี่ขั้นตอนในการประยุกต์ใช้มาตรฐานโรเซ็ตตาเน็ต ขั้นตอนแรกคือการเก็บรวบรวมกระบวนการทางธุรกิจและเอกสารทางธุรกิจจากกรณีศึกษา ขั้นตอนที่สองทำการวิเคราะห์กระบวนการทางธุรกิจของกรณีศึกษาเพื่อแสดงให้เห็นการแลกเปลี่ยนข้อมูลระหว่างหุ้นส่วนทางการค้า ขั้นตอนที่สามนำพิพของมาตรฐานโรเซ็ตตาเน็ตมาเปรียบเทียบกับกระบวนการทางธุรกิจที่ได้จากขั้นตอนที่สอง ขั้นตอนสุดท้ายคือนำโครงสร้างเอกสารในรูปแบบเอ็กซ์เอ็มแอลสกีมาของพิพมาเปรียบเทียบและเลือกอิลิเมนท์ตามเอกสารทางธุรกิจของกรณีศึกษา ซึ่งผลลัพธ์ที่ได้แสดงถึงข้อจำกัดทางธุรกิจตั้งแต่การจัดหาวัตถุดิบจนถึงการส่งสินค้าในส่วนของกระบวนการทางธุรกิจและอิลิเมนท์ สำหรับกระบวนการทางธุรกิจนั้นต้องมีการปรับเปลี่ยนในส่วนของการอนุมัติของผู้มีอำนาจ และข้อจำกัดในการเลือกผู้จัดหาวัตถุดิบโดยมีสี่พิพจากคลัสเตอร์ที่สามและสี่ที่สามารถประยุกต์ใช้ได้จากทั้งหมดหกพิพ สำหรับอิลิเมนท์ที่สามารถนำมาใช้ได้นั้น พิพสามเอสี่และพิพสามเอแปดมีจำนวนน้อยกว่าร้อยละห้า พิพสี่เอสองมีจำนวนร้อยละสิบหก และพิพสามเอเก้ามีจำนวนประมาณร้อยละสี่สิบ ดังนั้นมาตรฐานโรเซ็ตตาเน็ตเป็นต้นแบบที่ดีสำหรับการแลกเปลี่ยนข้อมูลของอุตสาหกรรมยานยนต์ ประเทศไทย

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CHAPTER I
INTRODUCTION

1.1 Background and Problem Statement

The Thai automotive industry is an industry considering to be "Potential industries of Thailand". It has high attractiveness and competitiveness because its productions have high potential and very high demand within the world market as shown in Figure 1.1. "Detroit of Asia" is a target of government for the Thai automotive industry development. Ministry of Industry developed the master plan for the Thai automotive industry to achieve the aim which emphasizes the development of automobile and component industry concurrently and supporting of each other in order to create the added value for the Thai economy. The Thai automotive industry has produced cars as one of top twenty in the world as shown in Table 1.1. [24, 31, 34]
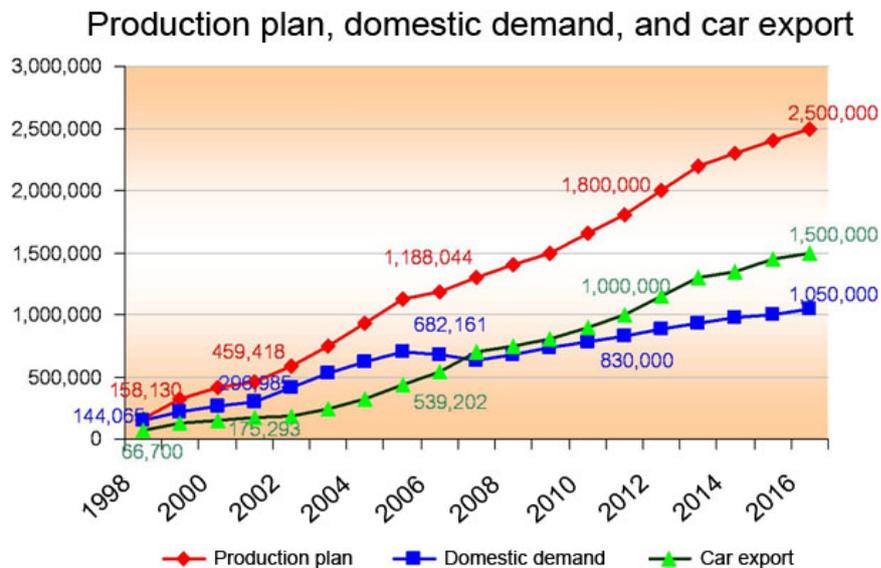
Figure 1.1 The increment of production plan, domestic demand, and car export in 1998-2016 [31]

The graph in Figure 1.1 presents the high quantity of production plan, domestic demand, and car export in each year from 1998 to 2016. The number of domestic demand is a little higher than car export from 1998 to 2007. Since 2008 to 2016, the number of car export is a little higher than domestic demand.

Table 1.1 Top twenty of 2009 car production statistics [24]

Number	Country	Total of car production
1	China	13,790,994
2	Japan	7,934,516
3	USA	5,711,823
4	Germany	5,209,857
5	South Korea	3,512,926
6	Brazil	3,182,617
7	India	2,632,694
8	Spain	2,170,078
9	France	2,049,762
10	Mexico	1,557,290
11	Canada	1,489,651
12	UK	1,090,139
13	Czech Rep.	974,569
14	Thailand	968,305
15	Poland	879,186
16	Turkey	869,605
17	Italy	843,239
18	Iran	752,310
19	Russia	722,431
20	Belgium	522,810

Table 1.1 shows the top twenty of car production number in 2009. Thailand is ranked the fourteen. There are four countries in the Asia who are

producing car more than Thailand. As the mention above, if the Thai automotive industry needs to be the "Detroit of Asia", it must create the competitive advantages. It must develop the quality of product such as decrease the duration of production process and cost of product and service, increase satisfaction of customers for more competition capability.

The core activities of the Thai automotive industry structure that are related directly to production include two clusters as follows: [35]

- Car maker is one who specifies the policy and strategy on competition with others for all component manufacturers. Some automotive components are manufactured by this cluster.

- Component manufacturer is one who produces components of automobile. It can classify as tier according to the structure of production as follows:

  ▪ First–tier supplier produces the components for car maker cluster directly. The company must have the capability to produce the standard components as car maker required.

  ▪ Second–tier supplier produces the components for the first–tier supplier.

  ▪ Third–tier supplier produces the components for the second–tier supplier.

In addition, there are supporting activities which include three main groups. The first group is upstream industry that produces raw materials such as iron, glass, and leather etc. The second group is services industry which takes the service duty in diverse type such as distribution services and finance services. Finally, the last group is the policy and support organization which comprises of three sectors. The first sector is government sector who specifies the policies of nation. The second sector is Thailand Automotive Institute and producer association who have duty to create the cooperation between government sector and private sector and also with private sector themselves. The last sector is the educational institute, technical institute, and also research institute which have duty to study new knowledge for development of automotive industry.

Each automotive company communicates with a large number of component manufacturers because a car is composed of more than 15,000 automotive

components. So, information technology (IT) has become a central role that forces companies to exchange electronic data through the Internet. Electronic data exchange will be faster and more efficient than using telephones, faxes, and e-mails.

Nowadays, electronic data exchange is continually developed in the business world. There are various standards of electronic data exchange that affect companies in the Thai automotive industry to see the importance of IT and try to develop the system in order to create the opportunities of competition. EDI (Electronic Data Interchange) standard is taken in some companies, in minority group. Most of them are only used to exchange data between car maker and the first-tier supplier because EDI is suitable for large business because of its expense. In addition, electronic data exchange in the Thai automotive industry is used in the low level.

The RosettaNet is a data exchange standard that provides business processes and structures of business documents in XML Schema form to standardize data exchange between several trading partners. It sends data through the Internet which can communicate around the world. It can exchange data between the organizations that have different internal information system by using the same standard of data format as shown in Figure 1.2.
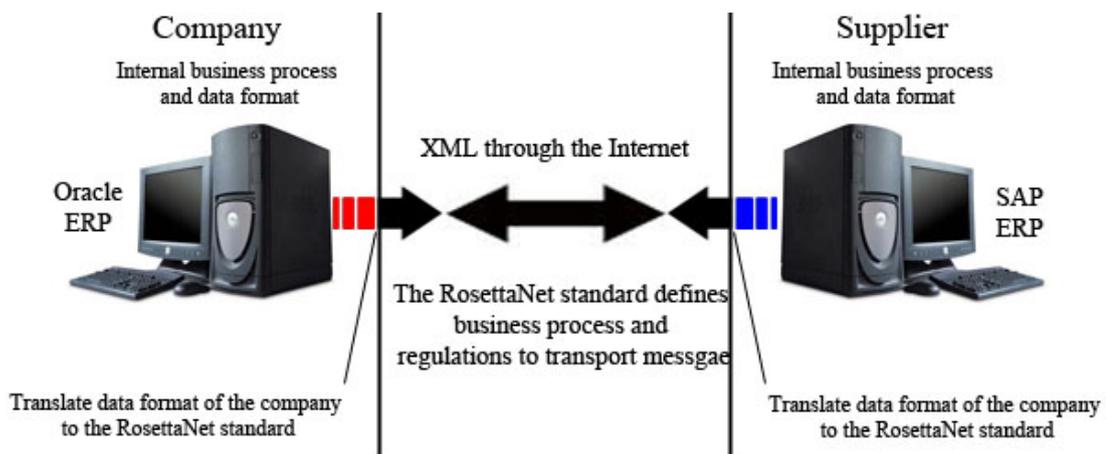
Figure 1.2 Data exchange between companies and suppliers by using the RosettaNet standard

Figure 1.2 shows the difference of internal business processes and information system between a company and a supplier. The company uses Oracle

which is ERP (Enterprise Resource Planning) software package, while SAP (System Application Products) which is ERP software package is used in the supplier company. When both companies want to exchange data with each other, they have to change the format of data in their internal information systems to the format of the RosettaNet standard. After that, data will be sent through the Internet by XML according to business process and other regulations of the RosettaNet standard.

From distinctive point of the RosettaNet standard, it has been implemented in many computer and electronic companies because they communicate with a lot of suppliers. Their products are manufactured by many parts. This characteristic is same as automotive industry. So, this research will propose the analytical framework to apply the RosettaNet standard for the Thai automotive industry.

1.2   Objectives

1.2.1   To analyze business processes and structures of business documents for the RosettaNet standard.

1.2.2   To apply the RosettaNet standard for the component manufacturer of the Thai automotive industry.

1.2.3   To evaluate security services provided in the RosettaNet standard.

1.3   Scope of work

1.3.1   This research studies particular group of automobile companies only.

1.3.2   This research studies particular business processes between first-tier supplier and second-tier supplier only.

1.3.3   This research studies particular business processes from sourcing to delivering.

1.3.4   This research studies particular security standard that relates to the RosettaNet standard.

1.4 Outcome

1.4.1   The analytical framework for the application of the RosettaNet standard.

1.4.2   The structures of business documents in XML Schema form of the RosettaNet standard according to the business documents of the case study.

1.4.3   The survey of security standard in the RosettaNet standard.

CHAPTER II
LITERATURE REVIEW

This chapter mentions the theories that are related to this research. It consists of five main parts. First, it was the primary information of data exchange standard. It included RosettaNet, EDI (Electronic Data Interchange) and ebXML (electronic business eXtensible Markup Language). Second, it described security for data exchange. Then, XML (eXtensible Markup Language) for business document was explained. Then, the basic information of the RosettaNet standard was described. Finally, related researches in the area of the RosettaNet standard were provided at the end of the chapter.

2.1 Data Exchange Standard

Data exchange standard basically included set of definitions called data dictionary and business process to exchange data between trading partners. However, the framework of standard depends on each standard. In this section, some well-known data exchange standards were explained as follows:

2.1.1 RosettaNet

The RosettaNet standard was developed by the cooperation that consists of more than 40 companies in high technology industry in 1998 at Silicon Valley city of United States. Then, other companies from various industries had joined the group such as companies from computer industry, electronic component manufacturer industry, and telecommunication industry etc. RosettaNet is a non-profit organization. It is a part of GS1 Global to develop and promote an open standard on electronic commerce. To emphasize the management of supply chain is the main purpose of the RosettaNet standard, it provides business processes, structures of business documents, and regulations to exchange data between the trading partners for more efficiency of

communication. Furthermore, the RosettaNet standard is based on XML. It sends business information through the Internet. [9, 30]

RosettaNet organization was established in Thailand on September 30th, 2005. NECTEC (National Electronics and Computer Technology Center) realized advantages of the RosettaNet standard for Thai SMEs because it is going to increase efficiency of business process and competition ability, and decrease gab of technology between international companies. Moreover, it was emphasized on the high technology industry and the automotive industry. [30]

2.1.2   EDI

EDI is abbreviation of Electronic Data Interchange. It is used as wide concept including traditional VAN-EDI and Internet EDI. [4]

Traditional VAN-EDI was defined by UN/EDIFACT (United Nation Standard Messages Directory for Electronic Data Interchange for Administration, Commerce and Transport) to exchange electronic business information in 1996. [30]

It is computer-to-computer data exchange between trading partners by standard data formats without intervention from human. It is used for routine business data such as purchase order etc. [3]

Business information must be exchanged through specific network called VAN (Value Added Network) between two trading partners. VAN prepares the communication process between two trading partners. They operate like a mailbox scenario. When a trading partner sends a transaction to a VAN, the VAN will keep the transaction in the mailbox of a receiver. After that, the receiver will connect to the VAN, pick up some transactions, and send anything that may need to send. It is very similar to email, but it is used for structured standardized data. There are several benefits of traditional VEN-EDI as follows: [3]

2.1.2.1   Speed: Business data can directly exchange from one computer to another computer in a moment.

2.1.2.2   Accuracy: Errors are reduced because of no human intervention. Error rates from entering data are between 0.5 – 3%.

2.1.2.3   Simplicity: EDI standards specify the format.

2.1.2.4 Security: It is difficult to lose information by data transport through EDI. EDI can be accessed only by authorized users. EDI data cannot be easily changed by unauthorized users. It is also not subject to computer virus.

Then, the Internet EDI has debut. It is EDI that use internet network. It has been developed to reduce operating cost of VAN network. From Internet EDI, Web-EDI that based on Internet EDI has emerged. The cost of Web-EDI implement is not expensive, but it has some problems. The first problem is difficult to make interoperability because screen format is fixed by each system. The second problem is EDI data of Web-EDI is difficult to automatically connect to the backend system because it uses HTML. So, XML based Internet EDI or called XML/EDI was developed to solve these problems.

XML/EDI is an Internet EDI which business documents are in XML format. Industry-standard business documents can be used widely from the past because business document are converted into XML for several applications in each industry.

Collaboration XML/EDI has begun after XML/EDI. It targets to make standardization of business process between enterprises by real-time transaction.

2.1.3 ebXML

ebXML is abbreviation of electronic business eXtensible Markup Language which was developed by the cooperation between two organizations: The first organization was UN/CEFACT (The United Nations Center for Trade Facilitation and Electronic Business) which drove the policy and technology development of business connection and electronic business. The second was OASIS (The Organization for the Advancement of Structured Information Standard) created and administrated the standard for interoperation of different information system. [30]

ebXML technical architecture can be divided into five modules: [26]

2.1.3.1 Business Process Specifications

It describes business process procedure of organization for collaboration between two trading partners. It defines roles, relationships and responsibilities.

2.1.3.2   Partner Profile and Agreement

▪ Collaboration Protocol Profile (CPP) provides all necessary information that is business capabilities, role, delivery channels and transport protocols, packing way, and security of trading partner. CPP is stored in ebXML registry. The information in CPP can be searched by trading partner for decision which organization has capabilities to conduct e-business.

▪ Collaboration Protocol Agreement (CPA) is a contract for both trading partners in business collaboration.

2.1.3.3   Registry and Repository

▪ An ebXML registry serves the index and application gateway for interact of trading partners with the repository.

▪ Repository provides trading partners with the shared business semantics.

2.1.3.4   Core Component

A core component is used to define business information in exchanged document between trading partners.

2.1.3.5   Messaging Service

The ebXML message service is designed to work within the overall context of the ebXML initiative.

There are four guideline steps to perform electronic business with ebXML as illustrated in Figure 2.1.
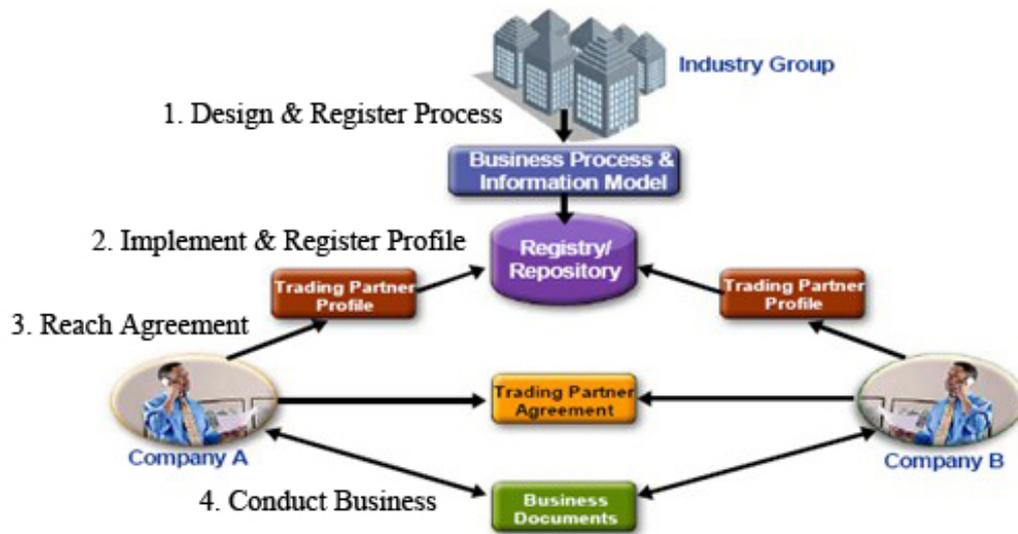
Figure 2.1 Four steps for ebXML [25]

Step 1: Design and register process

Trading partners design business process and register to the repository.

Step 2: Implement and register profile

Trading partners implement and register CPP to the repository.

Step 3: Reach agreement

The two trading partners register CPA to the repository.

Step 4: Conduct business

The two trading partners perform electronic business by ebXML.

This section presents basic scenario of ebXML performing as shown in Figure 2.2 [12]
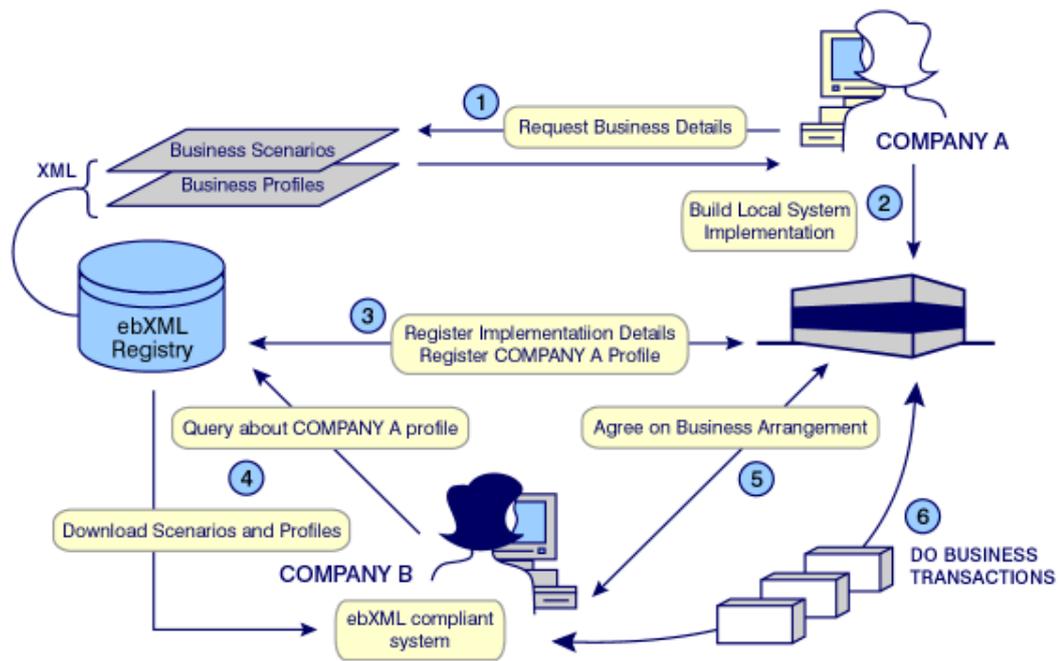
Figure 2.2 Overview of ebXML interaction scenario between two trading partners
[12]

- Company A requests business details from the ebXML registry.

- Company A considers to implement a local ebXML compliant application.

- Company A creates and registers CPP in registry.

- Company B queries CPP from the ebXML registry in order to determine who is compatible. When Company B decides to perform business with Company A, Company B will study possibility from CPP.

- Company B communicates with Company A directly and sends CPA for agreement on business arrangement to Company A.

- Two companies can begin to exchange business documents according to ebXML follow the business processes defined in the CPA.

ebXML was created for SMEs. It is the open standard structure which based on XML. It is used for data exchange that is secure and has the same format for every trading partner in global e-business. [9]

After studying each data exchange standard, the similarity and the difference among them can be analyzed as Table 2.1

Table 2.1 The comparison of data exchange standards [4, 5, 30]

	RosettaNet	Traditional VAN-EDI	XML/EDI	Collaboration XML/EDI	ebXML
Start year	1998	1996	1999	2000	1999
Original Objective	To develop open e-business standard for collabora-tion between trading partners	To replace the exchange of paper document	To solve the problems of traditional VAN-EDI about inter-operability	To improve XML/EDI by standardize electronically business process	To provide an open XML – based for inter-operable business
Business process	Partner Interface Process (PIP)	Uniform Rules of Conduct for Interchange of Trade Data by Tele-transmission (UNCID)	-	Japan Electronics and Information Technology Industries Association Business Process (JEITA BP)	Unified Modeling Methodo-logy (UMM)

Table 2.1 The comparison of data exchange standards (Continues) [4, 5, 30]

	RosettaNet	**Traditional VAN-EDI**	**XML/EDI**	**Collaboration XML/EDI**	**ebXML**
Data element	RosettaNet Business Dictionary (RNBD)	United Nations Trade Data Interchange Directory (UNTDID)	-	JEITA Data Element	Core component (CC)
Message schema	XML	EDIFACT	XML	XML	XML
Messaging service	RosettaNet Imple-mentation Framework (RNIF)	-	-	Message Service (MS)	Message Service (MS)
Network for data exchange	Internet	VAN	Internet	Internet	Internet
Technical Partner Agree-ment	RosettaNet TPA	-	-	Collaboration Protocol Profile and Agreement (CPPA)	Collabora-tion Protocol Profile and Agreement (CPPA)
Operation	Real-time	Batch	Real-time	Real-time	Real-time

From this table, EDI is suitable for large company because of the high investment for data transfer through VAN. In addition, it is more difficult to implement than XML of RosettaNet standard because data of EDI is in form of EDIFACT which is hard to understand and develop for user. XML/EDI does not

define business process and data element, so it is difficult to exchange data between trading partners. In the part of Technical Partner Agreement, ebXML and Collaboration XML/EDI have to define the agreement of electronic business process between trading partners and each other through CPPA. In this case, a disadvantage happens because the company that has more power to bargain may specify business process and structure of business document itself. This reason affects SMEs because they have to open the agreement.

Moreover, the RosettaNet standard provides business processes and structures of business documents to standardize data exchange between trading partners. Therefore, the company can make business transaction of the same business activity in the same process with all trading partners. ebXML is a standard of data exchange that has only guideline of business process and structure of business document. So, business processes and structures of business documents depend on the agreement between two trading partners. For this case study, the company must provide many business processes and many business document structures, because it communicates with more than one hundred trading partners. For this reason, it is inconvenient to exchange data between several trading partners.

2.2 Security for Data Exchange

The RosettaNet standard is used to exchange business data through the Internet, so the security of data transaction is necessarily required. Accuracy, privacy, reliability of data is needed by each trading partner. This section describes the security issues that relate to the RosettaNet standard.

2.2.1   Security Services [22]

Message-level   security   includes   authentication,   authorization, confidentiality, integrity, and non-repudiation. Message-level security shares many of the same mechanisms for handling security such as digital signature, data encryption, and hash function. These five security services can cover the security of message exchange.

2.2.1.1   Authentication is the assurance that the sender is the one who it claims to be.

2.2.1.2   Authorization is the assurance that only authorized users can use resource.

2.2.1.3   Confidentiality is the protection of data from an unauthorized person over a period of time.

2.2.1.4   Integrity is the assurance that the messages are received as sent without modification, insertion, deletion, duplication, reordering, or replay.

2.2.1.5   Non-repudiation is the prevention to against denial from both senders and receivers.

2.2.2   Security Mechanisms [22]

Security services are implemented by security mechanisms to counter security attacks. X.800 Recommendation defines security mechanisms that are implemented in protocol layer. This part specially describes the security mechanisms that relate to the RosettaNet standard.

2.2.2.1   Digital Signature

Digital signature is the additional data that allows a recipient to prove the source and the owner of data. The purpose of a digital signature is to guarantee that the individual message sender is really who he/she claims to be.

2.2.2.2   Encryption

Encryption is the process of transformation from plaintext which is an original message to ciphertext which is the coded message.

2.2.2.3   Hash Function

A hash function is a mathematical function that converts any arbitrary length of data into a fixed-size message called a message fingerprint of message digest. A single integer may serve as an index to an array. The values that are returned by a hash function are called hash values, hash codes, hash sums, checksums or simply hashes.

Hash functions are related to checksums, check digits, fingerprints, randomization functions, error correcting codes, and cryptographic hash

functions. Although these concepts overlap to some scopes, each concept has its own requirements and is differently designed and optimized.

2.2.3   Terminology of Security

This part describes terminologies of security that are used in the RosettaNet standard.

2.2.3.1   Certification Authority (CA) is an agency that manage the issuance of certificates and serves as the electronic notary to verify their worth and integrity. There are several companies that provide CA services. There are many Internet-based CAs such as VeriSign, GTE, and U.S. Postal Service. [22, 29]

2.2.3.2   Multipurpose Internet Mail Extensions (MIME) is an extension to the RFC 822 that address some problems of Simple Mail Transfer Protocol (SMTP). RFC 822 defines a format of text message that are the standard for Internet-based text mail message. The content includes a set of header fields (the header) and text (the body) to be delivered to the recipient. [22]

2.2.3.3   Secure/Multipurpose   Internet   Mail   Extension (S/MIME) enhances a security of the MIME that provides encryption and authentication through digital signatures. [29]

2.2.3.4   Secure Socket Layer (SSL) is a protocol that was developed to provide communication security between Web browser and Web servers. SSL provides server authentication, data integrity, and client authentication. The SSL connection is a transportation that provides a suitable type of service. Every connection is associated with one session. SSL session is established and maintained for the duration of the secure communication between client and server. [16, 22]

2.2.3.5   Secure Hash Algorithm (SHA-1) that was developed by the National Institute of Standards and Technology (NIST) is based on the MD4 algorithm. This algorithm takes an input message with a maximum length of less than 264 bits and produces a 160-bit message digest as an output. [22]

2.2.3.6   Message-digest algorithm (MD5) was developed by Ron Rivest. MD5 was the most widely used secure hash algorithm. This algorithm takes a message of arbitrary length as input and creates a 128-bit message digest as an output. The input is processed in 512-bit block. [22]

2.3   XML for Business Document

2.3.1   XML

XML is abbreviation of eXtensible Markup Language which was publicized by W3C (World Wide Web Consortium). Markup language is the language that uses to define the meaning of document or data. Almost of them is used in the form of tag to describe the format or characteristic of data. The important language of markup language is GML (Generalized Markup Language) which leads the user to create own tag in order to explain document. It was created by IBM in 1969. Then, SGML (Standard Generalized Markup Language) became the new standard in 1986 which had the basic from GML language. On the other hand, SGML has to have DTD (Document Type Definition) to define the document structure for SGML document utilization. SGML was developed later and became HyperText Markup Language (HTML) and eXtensible Markup Language (XML). [33]

2.3.2   General property of XML [33]

XML was developed and taken both the ability to define the document structure of SGML and capability to work on internet of HTML. However, it is not necessary for XML to have DTD as SGML.

XML is a language that users have to create the tag to explain data by themselves. It is different from HTML that has the specification tag to use automatically.

Well-formed is creation of document that has the correct format according to grammar of that language. It is necessary property for XML and cannot be lack because it makes the XML parser creation easily. Moreover, every XML parser is going to work only with XML document which has the property as mention. If XML document lack of this property, it will be error immediately.

Valid is another property of XML document. It identifies that XML document has the format like the structure that was specified before. There are two popular ways to specify structure that are DTD and XML schema

2.3.3   The syntax rules of XML [28]

2.3.3.1   XML element

An XML element is everything from (including) the start tag to (including) the end tag. An element can comprise of other elements, simple text and attributes.

2.3.3.2   XML naming rules

Denomination of XML element has the regulations as follows:

- Names have to begin by letter or the underscore (_) only;

- Names can be able to contain letter, number, full stop (.), dash (-) and underscore (_) only;

- Names have the property of case sensitive;

- The first three letter of name cannot be xml, XML, Xml etc.;

- Names cannot contain spaces.

2.3.3.3   XML documents must have a root element

XML documents must have only one root element. This element covers all other elements. All elements can have text content and attributes.

2.3.3.4   All XML elements must have a closing tag

Opening tag and closing tag must be corresponding, but closing tag must have slash in front of the tag name such as <title>RosettaNet</title> etc.

2.3.3.5   XML tags are case sensitive

XML tags are case sensitive that mean uppercase is different from lowercase. For the example, <title>, <Title>, and <TITLE> are the different tag.

2.3.3.6   XML elements must be properly nested

All elements must be properly nested within each other. For the example, <thesis><author>J.Surawanya</thesis></author> is incorrect form because the <author> element is opened inside the <thesis> element, so it must be closed inside the <thesis> element as <thesis><author>J.Surawanya </author></thesis>.

2.3.3.7   Entity reference in XML

There are five preserved characters of XML language which use to define the structure of language. If it is necessary to use these characters, they will be defined in the form of entity reference as shown in Table 2.2.

Table 2.2 Entity references in XML [28]

<	<	less than
>	>	greater than
&	&	ampersand
'	'	apostrophe
"	"	quotation mark

For the example, <title>RosettaNet & ebXML</title> has to write to be <title>RosettaNet & ebXML</title>.

2.3.3.8   Comments in XML

Comments in XML use <!--This is a comment-->.

2.3.3.9   XML attribute

XML attribute provides additional information such as <thesis id="123456">RosettaNet</thesis>. The "id" attribute provides additional information of the "thesis" element.

2.3.3.10 Value of XML attribute must be in double quote or single quote such as <thesis id="123456"/> or <thesis id='123456'/>.

Although document structure specification is not necessary for XML language, but user should specify document structure in order to inform the element of XML document, what type of attribute is in each element, and what the value of element and attribute can be etc. There are two methods to specify the document structure as follows: [33]

• DTD (Document Type Definition) which inherits from SGML become one part of XML 1.0 of W3C.

• XML Schema which is newer than DTD is the standard of W3C.

RosettaNet is the standard that was developed from the basic of XML. Moreover, it also has document structure specification. At beginning, DTD method was taken. And then, it was changed to XML Schema few years ago, because DTD method has different syntax from XML. For this reason, users have to learn more, so it will be possibly better if the required document and document structure use the same syntax. Furthermore, DTD has limitation about type of data, and it cannot define type or value of data. XML Schema has the same syntax with XML which is more convenient to use.

2.3.4   XML Schema

XML Schema is a method to specify the structure of the XML document. It became the standard of W3C around the middle year of 2001. XML Schema has more qualification than DTD. It knows more than forty-one types of data. Moreover, user can specify the format of data themselves, create new data type by reference from primitive data, assign the amount and sequence of child elements. The most important property is name space which is the new useful idea to develop XML. [35]

This section is going to describe the basic qualification of XML schema as follows: [27]

2.3.4.1   Element of XML Schema can be divided into two types as follows:

• Simple Type is the element that does not contain other elements. It is possible to separate into two types. The first type is primitive data–type which is primitive data. The second type is derived data–type which stretched from primitive data–type. String, Boolean, date, float, and double are primitive data-type that are used frequently. It has declaration format as follows:

 <xs:element name="*name of element*" type="*type of data*"/>.

XML Schema has a lot of data types. The data types that are used regularly are xs:string, xs:decimal, xs:integer, xs:Boolean, xs:date, and xs:time.

• Complex Type is the element that consists of attribute or element inside such as

<xs:complexType name="*name of element*" >

```
<xs:sequence>
        <xs:element name="name of element" type="type of data"/>
        <xs:element name="name of element" type="type of data"/>

                            .

                            .

</xs:sequence>
        <xs:attribute name="name of attribute" type="type of data"/>
</xs:complexType>
```

2.3.4.2   Namespace uses to protect confusion of using element from different file that has different process of working but has the same name and type of element. Actually, namespace is only supposed name which is either in the form of URL (Uniform Resource Locator) or URN (Uniform Resource Name). Namespace has to define in the form of prefix by putting it in the front and separate by : (colon) which is available to notify prefix and namespace as xmlns:*prefix*="*name of namespace*".

2.3.4.3   The <schema> element is the root element of every XML Schema.

2.3.4.4   Default and Fixed value for Simple Type element

- Default is automatically assigned to the element that is not specified by other value. It has declaration format as follows:

<xs:element name="*name of element*" type="*type of data*" default="*default value*"/>.

- Fixed is automatically assigned to the element and cannot specify another value. It has declaration format as follows:

<xs:element name="*name of element*" type="*type of data*" fixed="*fixed value*"/>.

2.3.4.5   Attribute is always declared as follows:

<xs:attribute name="*name of attribute*" type="*type of data*"/>

Besides, there are three related attributes as follows:

- Use is the requirement definition of attribute which consists of *require* means "must have", *optional* means "have or not", and *prohibited* means "must not have". It has declaration format as follows:

<xs:element name="*name of element*" type="*type of data*" use="*require/ optional/ prohibited*"/>.

- Default is automatically assigned to the attribute that is not specified by other value. It has declaration format as follows:

<xs:attribute name="*name of attribute*" type="*type of data*" default="*default value*"/>.

- Fixed is automatically assigned to the attribute and cannot specify another value. It has declaration format as follows:

<xs:attribute name="*name of attribute*" type="*type of data*" fixed="*fixed value*"/>.

2.3.4.6 Order indicators are used to define the order of elements.

- All specifies that the child elements can occur in any order, and they can occur only once. It has declaration format as follows:

<xs:complexType name="*name of element*" >

    <xs:all>

        <xs:element name="*name of element*" type="*type of data*"/>

        <xs:element name="*name of element*" type="*type of data*"/>

    </xs:all>

</xs:complexType>

- Choice specifies that either one child element or another can occur. It has declaration format as follows:

<xs:complexType name="*name of element*" >

    <xs:choice>

        <xs:element name="*name of element*" type="*type of data*"/>

        <xs:element name="*name of element*" type="*type of data*"/>

    </xs:choice>

</xs:complexType>

- Sequence specifies that the child elements must occur in a specific order. It has declaration format as follows:

<xs:complexType name="*name of element*" >

    <xs:sequence>

        <xs:element name="*name of element*" type="*type of data*"/>

        <xs:element name="*name of element*" type="*type of data*"/>

    </xs:sequence>

</xs:complexType>

2.3.4.7   Occurrence indicators are use to defined how often each element can occur

• maxOccurs specifies the maximum of element occurrence. It has declaration format as follows:

<xs:element name="*name of element*" type="*type of data*" maxOccurs="*number of times*"/>

• minOccurs specifies the minimum of element occurrence. It has declaration format as follows:

<xs:element name="*name of element*" type="*type of data*" minOccurs="*number of times*"/>

If there is not any definition both of them, the default value will be one or none. maxOccurs = "unbounded" will be used in the case that is unlimited occurrence.

2.4   RosettaNet

2.4.1   The structure of the RosettaNet standard

The RosettaNet standard has three main compositions as follows:

2.4.1.1   Partner Interface Process (PIP)

PIPs indicate the detail of business processes as illustrated in Figure 2.3 and structures of business documents to use for data exchange between trading partners in each business activity.
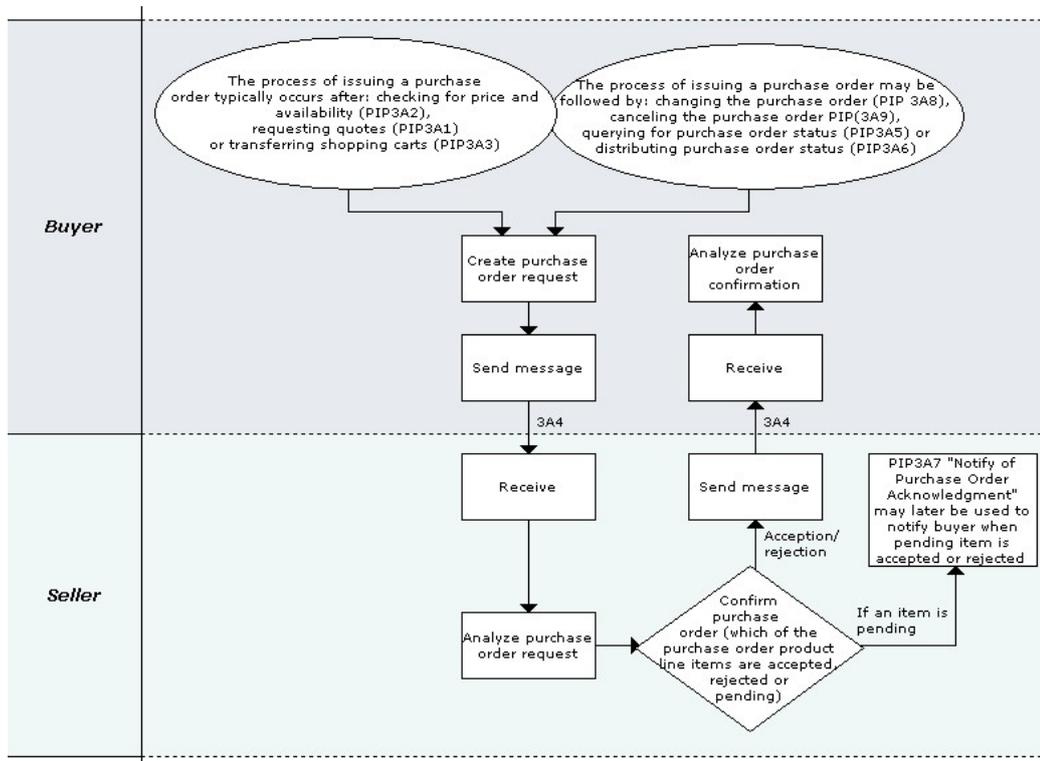
Figure 2.3 The examples of business processes of purchase order request and

confirmation [17]

Figure 2.3 shows business processes which consist of sending purchase order request and receiving purchase order confirmation. They correspond to PIP 3A4 of the RosettaNet standard. This business process typically occurs after PIP 3A2, PIP 3A1 or PIP 3A3. Moreover, PIP 3A8, PIP 3A9, PIP 3A5 or PIP 3A6 may be occurred after PIP 3A4.

At the beginning, a buyer is going to create purchase order request and send it to a seller by PIP 3A4. When the seller receives it, he is going to analyze and send it back to the buyer by PIP 3A4. It can be accepted or rejected. After that, the buyer will analyze PIP 3A4 again. On the other hand, if the item that is requested is pending, PIP 3A7 will be sent later to notify the buyer that pending item is accepted or rejected.

2.4.1.2   RosettaNet business dictionary (RNBD)

It defines vocabularies to use in business documents. They were defined by the RosettaNet standard for accuracy and understanding the data that

are exchanged between trading partners, because each company uses the different data name in the business documents. It may lead the confusion, if the data is exchanged. Table 2.3 and Table 2.4 show the example of business dictionary and codes that are used in the business document respectively.

Table 2.3 The examples of dictionary of business data entities [19]

Name	Definition
AccountDescription	The collection of business properties that describes a customer or a supplier account.
ContactInformation	The collection of business properties that provides communication and address information to contact a person or an organization.
PartnerIdentification	The collection of business properties that uses to identify a business partner.
Quantity	The collection of business properties that describes a measurable feature of a product or a component.
ReceiptInformation	The collection of business properties that describes the receipt of a delivery of a quantity of a product.
ShipDate	The collection of business properties that identifies a constraint when the products may be shipped.
TaxSummary	The collection of business properties that describes the total tax information for local, regional, or national taxing authority.

Table 2.4 The examples of code for defining a measure of product [17]

Name	Definition
BOT	Bottle.
CEM	Centimeter.
COT	Container.
DOZ	Dozen.
KIG	Kilogram.

2.4.1.3   RosettaNet Implementation Framework (RNIF)

It provides the PIP transfer, routing, packaging, security, and business signals.

This research studies the part of PIP because it is the main composition of the RosettaNet standard. Application of the standard means to the unity; therefore, it is going to study business process and business document for the same alignment of business operation. The RNBD is also studied because it is used to create the structure of business document in XML Schema according to the RosettaNet standard. The RNIF is studied because of security for data exchange.

2.4.2   PIP of the RosettaNet standard

PIP is the most important part of the RosettaNet standard. It consists of detail of business process between trading partners, step of business process, role of each trading partner, business document that happens during the business operation, regulation of work, structure of business document based on XML, and detail of document structure that composes of diagram and vocabularies explanation in each document structure.

There are seven clusters of the RosettaNet standard (not include Cluster 0) which can be divided by character of business operation in supply chain. Each cluster consists of segment that includes the related and continued PIP as follows: [18]

Cluster 0: RosettaNet Support

This cluster provides administrative and testing.

Segment 0A: Administrative

PIP0A1: Notification of Failure

Segment 0C: Testing

PIP0C1: Asynchronous Test Notification

PIP0C2: Asynchronous Test Request / Confirmation

PIP0C3: Synchronous Test Notification

PIP0C4: Synchronous Test Query / Response

Cluster 1: Partner Product and Service Review

This cluster uses to collect, maintain and distribute data in order to develop detail of trading partner history and products.

Segment 1A: Partner Review

PIP1A1: Request Account Setup

PIP1A2: Maintain Account

Cluster 2: Product Information

This cluster enables distribution and periodic update of product and detailed design information, including product change notices and product technical specifications.

Segment 2A: Preparation for Distribution

PIP2A1: Distribute Product Catalog Information

PIP2A3: Query Marketing Information

PIP2A4: Query Sales Promotion & Rebate Information

PIP2A6: Query Product Lifecycle Information

PIP2A7: Query Product Discontinuation Information

PIP2A9: Query Technical Product Information

PIP2A10: Distribute Design Engineering Information

PIP2A12: Distribute Product Master

PIP2A13: Distribute Material Composition Information

PIP2A15: Request Material Composition Information

PIP2A16: Distribute Engineering Information Inquiry

PIP2A17: Notify of Certificate of Analysis

PIP2A18: Notify of Certificate of Analysis Response

Segment 2B: Product Change Notification

PIP2B1: Change Basic Product Information

PIP2B2: Change Marketing Information

PIP2B3: Change Sales Promotion & Rebate Information

PIP2B4: Change Product Technical Information

PIP2B5: Change Product Lifecycle Information

PIP2B7: Notify of Product Change

PIP2B8: Notify of Product Change Query

PIP2B9: Notify of Product Change Acceptance

Segment 2C: Product Design Information

PIP2C1: Distribute Engineering Change Status

PIP2C2: Request Engineering Change

PIP2C3: Distribute Engineering Change Response

PIP2C4: Request Engineering Change Approval

PIP2C5: Notify of Engineering Change Order

PIP2C6: Notify of Engineering Change Implementation Plan

PIP2C7: Request Bill of Material

PIP2C8: Notify of Bill of Material

PIP2C9: Request Approved Manufacturer List

PIP2C10: Notify of Approved Manufacturer List

Cluster 3: Order Management

This cluster supports full order management area from price and delivery quoting through purchase order initiation, status reporting, and management. Order invoicing, payment and discrepancy notification are also supported by this cluster.

Segment 3A: Quote and Order Entry

PIP3A1: Request Quote

PIP3A2: Request Price and Availability

PIP3A3: Request Shopping Cart Transfer

PIP3A4: Request Purchase Order

PIP3A5: Query Order Status

PIP3A6: Distribute Order Status

PIP3A7: Notify of Purchase Order Update

PIP3A8: Request Purchase Order Change

PIP3A9: Request Purchase Order Cancellation

PIP3A10: Notify of Quote Acknowledgment

PIP3A13: Notify of Purchase Order Information

PIP3A14: Distribute Planned Order

Segment 3B: Transportation and Distribution

PIP3B1: Distribute Transportation Projection

PIP3B2: Notify of Advance Shipment

PIP3B3: Distribute Shipment Status

PIP3B4: Query Shipment Status

PIP3B5: Request Shipment Change

PIP3B6: Notify of Shipments Tendered

PIP3B11: Notify of Shipping Order

PIP3B12: Request Shipping Order

PIP3B13: Notify of Shipping Order Confirmation

PIP3B14: Request Shipping Order Cancellation

PIP3B18: Notify of Shipment Documentation

Segment 3C: Returns and Finance

PIP3C1: Return Product

PIP3C2: Request Financing Approval

PIP3C3: Notify of Invoice

PIP3C4: Notify of Invoice Reject

PIP3C5: Notify of Billing Statement

PIP3C6: Notify of Remittance Advice

PIP3C7: Notify of Self-Billing Invoice

Cluster 4: Inventory Management

This cluster enables inventory management, including collaboration of trading partners, replenishment, price protection, reporting and allocation of constrained product.

Segment 4A: Collaborative Forecasting

PIP4A1: Notify of Strategic Forecast

PIP4A2: Notify of Embedded Release Forecast

PIP4A3: Notify of Threshold Release Forecast

PIP4A4: Notify of Planning Release Forecast

PIP4A5: Notify of Forecast Reply

PIP4A6: Notify of Forecasting Exception

Segment 4B: Inventory Allocation

PIP4B2: Notify of Shipment Receipt

PIP4B3: Notify of Consumption

Segment 4C: Inventory Reporting

PIP4C1: Distribute Inventory Report

Segment 4D: Inventory Replenishment

PIP4D1: Notify of Material Release

Segment 4E: Sales Reporting

PIP4E1: Notify of Sales Report

PIP4E2: Notify of Sales Report Acknowledgement

Cluster 5: Marketing Information Management

This cluster provides the sale information, including opportunity status.

Segment 5C: Design Win Management (Electronic Components)

PIP5C1: Distribute Product List

PIP5C2: Request Design Registration

PIP5C3: Create Design Win

PIP5C4: Distribute Registration Status

PIP5C5: Query Registration Status

Segment 5D: Ship from Stock and Debit (Electronic Components)

PIP5D1: Request Ship from Stock and Debit Authorization

PIP5D2: Notify of Blanket Ship from Stock and Debit
Authorization

PIP5D3: Distribute Open Ship from Stock and Debit
Authorization Status

PIP5D4: Query Ship from Stock and Debit Authorization

Status

PIP5D5: Create Ship from Stock and Debit Claim Status

PIP5D6: Notify of Ship from Stock and Debit Claim Status

Cluster 6: Service and Support

This cluster provides post-sale technical support, warranty service and asset management capabilities.

Segment 6A: Provide and Administer Warranties, Service Packages, and Contract Services

PIP6A1: Notify of Service Contract Request

PIP6A2: Notify of Service Contract Reply

Segment 6C: Technical Support and Service Management

PIP6C1: Query Service Entitlement

PIP6C2: Request Warranty Claim

PIP6C3: Notify of Case Request

PIP6C4: Notify of Case Confirmation

Cluster 7: Manufacturing

This cluster enables the data exchange of design, manufacturing configuration, manufacturing process, manufacturing quality and other information for support the "Virtual Manufacturing" environment.

Segment 7B: Manage Manufacturing WO and WIP

PIP7B1: Distribute Work in Process

PIP7B2: Query Work in Process

PIP7B5: Notify of Manufacturing Work Order

PIP7B6: Notify of Manufacturing Work Order Reply

Segment 7C: Distribute Product Quality Event Data

PIP7C6: Distribute Product Quality Event Data

PIP7C7: Notify of Semiconductor Test Data

PIP7C8: Notify of Semiconductor Process Data

2.4.3 RosettaNet Business Message Overview [20]

This section introduces the basic structure and components of the RosettaNet business message.
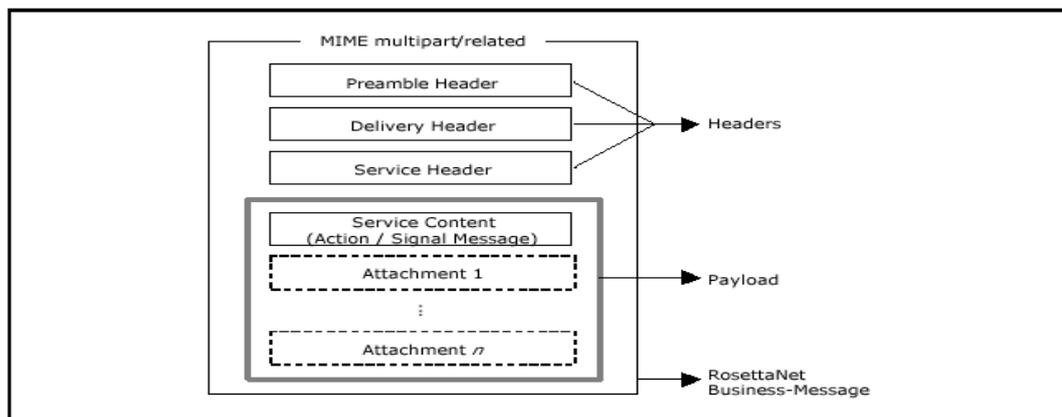
Figure 2.4 Parts of a RosettaNet Business Message [20]

A RosettaNet business message always contains a preamble header, a delivery header, a service header, and a service content. Service content composes of an action message or a signal message. If service content is an action message, one or more attachments may be included. The headers and service content are merged together by using a MIME multipart/related. A RosettaNet business message can optionally have digital signatures. RNIF 2.0 uses the S/MIME mechanism.

- Header structure describes the various headers that are sent with a RosettaNet business message.

The overall purpose of these headers is for the receiver to be able to identify the message as a RosettaNet business message, the context of the message, and the sender for authentication and authorization.

- Preamble header is used to identify the standard and the standard version which the message structure is compliant. All RosettaNet messages must have a preamble header.

- Delivery header is added as a separate MIME part to specify route and message instance information. This information is separated from the service header to allow access to the information when the service header is encrypted.

- Service header is used to provide the process context for a message. It also provides information about whether the message is a test message or a production message.

- Payload components consist of the service content and attachments as required.

The payload is the exact business content that describes the service header. The service header format is fixed and independent of payload. The service content of the payload is based on the specific business content which depends on the PIP type and instance. The attachments are also dynamic per instance of the business message.

- Service content contains business content that is XML format. PIPs must identify which are the allowed standards body (ies) that can supply content in the given PIP.

- Handling attachments might be required in some documents that are essentially support business documents. Attachments cannot be XML documents. Some examples of attachments include word documents, gif images, pdf files, tif images. The Content-ID of the attachment is also listed in the service header's manifest element.

2.4.4   Security of the RosettaNet standard [20]

The RNIF specifies the transfer and security level protocols and the format of the RosettaNet business messages that are exchanged through the network applications. Figure 2.5 shows the RosettaNet network application protocol stack when exchanges RosettaNet business messages.
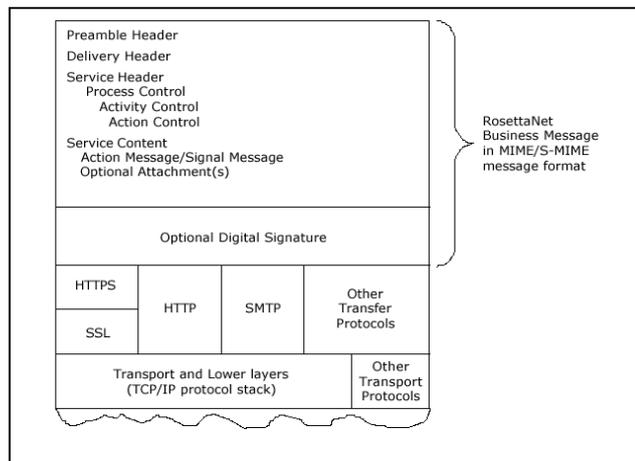
Figure 2.5 Network Application Model of the RosettaNet standard [20]

This section explains the concepts of authentication, authorization, confidential, integrity, and non-repudiation within the RNIF 2.0 as follows:

2.4.4.1   Authentication

Authentication within the RNIF 2.0 is responsibility to make sure that the sender of a RosettaNet business message is who the sender claims to be. This requires to append digital signature of the sender in the message. In RNIF 2.0, a RosettaNet business message uses digital signature that conforms to the S/MIME IETF (RFC 2311) specification.

The PIP specifications specify that the exchanged message must have digital signature. The receiver authenticates the message from the sender by using the S/MIME and PKCS mechanisms verify the digital signatures.

A security mechanism of authentication is provided by digital signature. The sender encrypts a message with his/her private key, and the receiver can authenticate the message sender by decrypting the message with the sender's public key.

2.4.4.2   Authorization

Authorization is responsibility to make sure that the sender of a RosettaNet business message is authorized to send the message to the receiver. The requirement of authorization in PIP is specified in the PIP specification. The trading partners must agree between themselves about digital certificates that will be used to

sign the exchanged messages. Each exchanged message must have digital signature by using the S/MIME mechanism in RNIF 2.0 as described previously.

Authorization has two steps to process. The first step is responsibility to make sure that the sender (as identified in the delivery and service headers) is authorized to send the message (PIP). The second step is responsibility to make sure that the organization of the sender (as identified by the digital signature on the message) is authorized to send the message.

2.4.4.3 Confidential

Confidential is the prevention of data from unauthorized persons. It can be achieved by using encryption mechanisms. RNIF 2.0 recommends to use S/MIME to security bind the service content and also the service header.

2.4.4.4 Integrity

Integrity is the assurance that the messages are received as sent without modification by unauthorized users. The RosettaNet standard uses SHA-1 to verify the message integrity.

2.4.4.5 Non-Repudiation

Non-Repudiation is responsibility to make sure that the sender cannot deny a message sending. At the same time, the receiver cannot also deny a message receiving. Non-Repudiation can be divided as:

- Non-Repudiation of origin and content

The origin of trading partner of the RosettaNet business message must make digital signature on the message following the S/MIME mechanism.

The receiver of trading partner of the RosettaNet business message must store the message in an original form for an agreed period of time (three to seven years).

The purpose of this is to prevent denying of the initiate trading partner that originated the contents of the business document.

- Non-Repudiation of receipt

A signed receipt-acknowledgment signal must be sent when the receiver received the RosettaNet business message. The acknowledgment message must be digitally signed and must also include an MD5 or

SHA-1 digest of the message. The trading partner that receives the acknowledgment must store the receipt and original message in an original form for an agreed period of time (three to seven years). This can help the system to prevent denying of the receiver trading partner that received the business document.

2.4.5   The situation of the RosettaNet standard today [21]

The RosettaNet standard has been continually evolved to promote collaboration and efficient global business. It is developed by users for users to increase speed, efficiency and reliability, enable greater collaboration and improve communication between trading partners. It has been implemented by more than 500 companies around the world that consisted of various size of company, from small companies to huge global enterprises. The examples of well-known companies that have adopted the RosettaNet standard are Intel, Microsoft, Oracle, and Cisco.

The RosettaNet has three levels of membership. First, they are RosettaNet Global Council Members who are industry leaders. They contribute the strategic objectives of the RosettaNet standard and the direction to solve crucial industry challenges. They have the opportunity to initiate and sponsor new RosettaNet programs, vote the privileges of the standard, and have the ability to participate on multiple Global Councils at a discounted fee. Second, they are Global Partners who prepare to develop an e-business strategy and plan to deploy effective business processes with trading partners. They participate in the development of new RosettaNet standard, access to the exclusive section of the RosettaNet website, join live web broadcasts, networking opportunities and implementation support, gain quarterly maintenance requests for both DTD PIP (Document Type Definition Partner Interface Process) and XSD PIP (XML Schema Partner Interface Process), obtain help desk support, and access to the B2B Learning Center of the RosettaNet. Last, they are Regional Partners who have local initiatives in specific countries to understand legislations, regional issues of implementation. They can access to regional consortium knowledge, expertise, services, and support resources. They can attend specific events of their regions with user group meetings in their area. Local price of products and services are also available through the Regional Partners Affiliate office

of the RosettaNet. The Regional Partners Affiliate office consists of Australia, China, Japan, Korea, Malaysia, Philippines, Singapore, Taiwan, and Thailand.

More than 500 companies represent 1 trillion in annual revenues when have participated in the RosettaNet. These companies realize the critical importance of applying the open-platform standard that enable their company to conduct business with more effectively, and more trading partners.

2.5   Related Researches

In this part, related researches can be classified into two groups. First, the researches about data exchange standard consist of research number 2.5.1-2.5.9. Second, the researches about data exchange security include the research number 2.5.10-2.5.11.

2.5.1   Jouni Kauremaa, Juha-Miikka Nurmilaakso, and Kari Tanskanen have studied "E-business enabled operational linkages: The role of RosettaNet in integrating the telecommunications supply chain" in 2009.

This study evaluated the effectiveness of RosettaNet in integrating the telecommunications supply chain. They made empirical observations in in-depth case study about e-business standard. They studied what RosettaNet can and cannot do in integration supply chain at the business level. They conducted a dyadic in-depth evaluation of supply process between a focal company in telecommunication industry in Europe and its customer. The main data of this study was gathered through semi-structure interview. They discovered that RosettaNet standard alone was insufficient for creating system-to-system integration which benefited both trading partners in the dyadic level. It depends on each perspectives of trading partner. [8]

2.5.2   Fenareti Lampathaki, Spiros Mouzakitis, George Gionis, Yannis Charalabidis, and Dimitris Askounis have studied "Business to Business interoperability: A current review of XML data integration standard" in 2009.

This study proposed a multi-facet classification mechanism for taxonomy of XML data standards. The XML data standards in industry that were contained in the evaluation framework were namely xCBL, eBIS-XML, OAGIS, UBL, XBRL and xCBL. There were twelve identified facets for taxonomy evaluation for XML data standards. Each facet described specific characteristics of a standard about methodological and consistent way that facilitated the organization. The objective of taxonomy is standards analysis in order to conclude about the most appropriate standard according to each business model. This study discovered that the different standards and technologies for data modeling still existed. There was no single standard that had all elements for interactions in every environment. The important issue for business was the standard that fit for business circumstance. The purpose of multi-faceted taxonomy provided information on incorporating for the first time aspects such as integrated management of enterprise and data models, cross country support, capability with other standards etc. [10]

2.5.3   Alain Yee-Loong Chong and Keng-Boon Ooi have studied "Adoption of interorganizational system standards in supply chains: An empirical analysis of RosettaNet standards" in 2008.

This study demonstrated the factors that affected the RosettaNet standard adoption. They used questionnaire as the main tool for data collection and focused on electrical and electronics (E&E) in Malaysia. There were four factors in this study as follow:

1. Partners' power was about bargain power that organization had over trading partners;

2. Governments' influence included IT infrastructure investment, support of IT adoption, and government promotions;

3. Trust was the expectation that the trading partner can be reliable and honest;

4. Product characteristics that had high volume and frequency, and were complicated to build were use in the study.

The purpose of this study was to find out the determinants for the adoption of RosettaNet standard in E&E companies in Malaysia. The four factors that

mentioned above were independent variables, and the dependent variable was RosettaNet standard adoption. This study used binary logistic regression analysis. The result showed that partners' power, product characteristics and trust had a positive effect on RosettaNet standard adoption. Product characteristics which were more complicated to build required collaboration in design, research, and development. Organizations who adopted RosettaNet standard trusted their suppliers or customers to share information. Organizations who adopted RosettaNet standard have been influenced from organization that had more bargaining power. Governments' influence was not significant, because many organizations have not still acquired the grants. Moreover, organization concerned about relationship creation between trading partners before RosettaNet adoption. [2]

   2.5.4   Somjit Art-in et al. have developed "The project of data connection standard in supply chain and logistics management: a case study of motorcycle component industry" in 2008.

        This project emphasized the system development for data connection between motorcycle component manufacturers according to RosettaNet standard. They created business documents according to RosettaNet standard and made data exchange between client and server by web service technology. Finally, this project can be a prototype system that supported global standard for data exchange. [32]

   2.5.5   Juha-Miikka Nurmilaakso has studied "Adoption of e-business functions and migration from EDI-based to XML-based e-business frameworks in supply chain integration" in 2008.

        This study had two main factors which were organization and technology for explanation of the e-business adoption and the migration from EDI-based to XML-based. The data in this study came from companies in European countries by using survey. The independent variables of adoption and migration were size, scope and skills that were factors of organization. EIS (Enterprise information system), EDI, VANEDI, InternetEDI, XML, and others were factors of technology. The dependent variable of migration model was migration variable. The adoption variable was not only a dependent variable in the adoption model but also an independent variable as

factor of technology in migration model. This study discovered firstly that the organization scope, EIS and standard of data exchange influenced positively the e-business adoption in supply chain integration. And then, firm size, skills, and e-business function positively effected on the e-business migration from EDI-based to XML-based in supply chain integration. Finally, factors of technology were important role for adoption, while factors of organization were significant for migration. [13]

2.5.6 Juha-Miikka Nurmilaakso has studied "EDI, XML and e-business frameworks: A survey" in 2008.

This study was based on exploration rather than hypotheses test. It surveyed about using EDI-based and XML-based e-business frameworks. There are two important results after comparing the use of EDI-based and XML-based e-business frameworks in European companies. Firstly, the EDI-based formats have retained a strong position in cross-industry-document e-business frameworks, while XML-based formats have achieved in cross-industry-process and have gained a footing in industry-specific e-business frameworks. Secondly, the use of XML-based e-business frameworks has increased more than EDI-based e-business frameworks in 2004. XML-based e-business framework was widely used in new market economies, whereas EDI-based e-business framework was still used in the old market economies. In addition, XML-based e-business frameworks had important advantages over EDI-based e-business frameworks. [14]

2.5.7 Juha-Miikka Nurmilaakso, Paavo Kotinurmi, and Hannu Laesvouri have studied "XML-based e-business frameworks and standardization" in 2006.

This study analyzed the properties and standardizations of XML-based e-business frameworks. This analysis was based on twelve famous XML-based e-business frameworks that were BPEL, BPML, CIDX, cXML, ebXML, OAGIS, papiNet, PIDX, RosettaNet, UBL, xCBL and XPDL. They had analyzed the literature to define key variables and possible values. Three variables were defined for the properties of the e-business frameworks as business document, business processes, and messaging. Four variables were defined for the standardization as industry, drivers,

organization, and openness. The result of this study focused on the commonalities, differences, and regularities between e-business frameworks and standardizations. Their analysis showed two commonalities. The majority group of XML-based e-business frameworks was standardized in formal organizations. Moreover, all e-business frameworks were limited open. The most extreme competition between e-business frameworks was the business document and the least extreme was messaging. Finally, they showed two regularities. Cross-industry e-business frameworks were less inclusive than industry-specific e-business framework. Vendors drive the standardization of cross-industry e-business frameworks, while users drove the standardization of industry-specific e-business framework. [15]

2.5.8   Yu-Hui Tao, Tzung-Pei Hong, and Sheng-I Sun have studied "An XML implementation process model for enterprise application" in 2004.

This study proposed an XML implementation process model for integration into enterprise applications in order to support Taiwan's Mechanical Industry Research Laboratories (MIRL)-Manufacturing Execution System (MES) for enterprise applications integration for producing the data exchange specification. RosettaNet standard of data exchange for the inter-organization data exchange was also include in this study. There were seven steps in this process model, but only the analysis-and-design step related to XML for use in the inter-organizational data exchange. In process analysis and design phase, they conducted XML document analysis and design for both internal and external needs based on requirement analysis. A process model for integration XML into enterprise applications had been created in this study. In addition, it can be replaced or modified according to RosettaNet standard. [23]

2.5.9   Intel Information Technology has studied "Automating with RosettaNet: An Intel case study of order-to-payment automation in the Asia Pacific region" in 2004.

Intel has adopted the RosettaNet standard to conduct business-to-business transactions with an Intel distributor in the Asia Pacific region called WPG (the World Peace Group). They have automated many manual processes of order management.

They committed to implement PIPs in order management cluster for ERP system-to-system integration because their previous transaction processes which included fax, e-mail, telephone, web site, EDI were slow and did not have efficiency sufficiently. In this project, Intel and WPG made business process re-engineering to automate information flow for order-to-payment process. After re-engineering business processes and implementing PIPs, Intel and WPG have reduced manual intervention and delay, gained efficiency as measured by data processing turnaround in order-to-payment process, and improved data processing and response time. [6]

Table 2.5 Summary of related researches about data exchange standard [2, 6, 8, 10, 13, 14, 15, 23, 32]

Authors	Methodology	Specification	Result
Jouni Kaure-maa et al.	Semi-structure interview	Telecommunication industry in Europe	RosettaNet standard alone was insufficient for creating system-to-system integration. It depended on each perspective of trading partner.
Fenareti Lampa-thaki et al.	Analysis (comparing various XML data standard)	The XML data standards in industry that are contained in the evaluation framework are namely xCBL, eBIS-XML, OAGIS, UBL, XBRL and xCBL.	There was no single standard that had all elements for interactions in every environment. The important issue for business was the standard that fit for business circumstance.

Table 2.5 Summary of related researches about data exchange standard [2, 6, 8, 10, 13, 14, 15, 23, 32] (Continues)

Authors	Methodology	Specification	Result
Juha-Miikka Nurmil-aakso et al.	Analysis (comparing various famous XML-based framework)	Twelve famous XML-based e-business frameworks are BPEL, BPML, CIDX, cXML, ebXML, OAGIS, papiNet, PIDX, RosettaNet, UBL, xCBL and XPDL.	The most extreme competition between e-business frameworks was the business document, and the least extreme was messaging.
Yu-Hui Tao et al.	Analysis (development data exchange model)	Taiwan's Mechanical Industry Research Laboratories (MIRL) - Manufacturing Execution System (MES)	A process model for integration XML into enterprise applications had been created, and it could be replaced or modified according to RosettaNet standard.
Alian Yee-Loong et al.	Questionnaire (using binary logistic regression analysis)	Electrical and Electronics (E&E) in Malaysia	Partners' power, products characteristics and trust had a positive effect on RosettaNet standard adoption, while governments' influence was not significant.
Somjit Art-in et al.	Application (system development)	Thai motorcycle component manufacturers	A prototype system for supporting global standard of data exchange for motorcycle component manufacturers

Table 2.5 Summary of related researches about data exchange standard [2, 6, 8, 10, 13, 14, 15, 23, 32] (Continues)

Authors	Methodology	Specification	Result
Intel Informa-tion Techno-logy	Application (business process re-engineering according to RosettaNet standard in the area of order management)	Intel with an Intel distributor in the Asia Pacific region called WPG (the World Peace Group)	Automated processes of order management by using PIPs in order management cluster for ERP system-to-system integration
Juha-Miikka Nurmil-aakso	Survey	European companies	The organization scope, EIS and standard of data exchange influenced positively the e-business adoption in supply chain integration. Firm size, skills, and e-business function positively effected on the e-business migration from EDI-based to XML-based in supply chain integration.
Juha-Miikka Nurmil-aakso	Survey	European companies	XML-based e-business framework was widely used in new market economies, whereas EDI-based e-business framework was still used in the old market economies.

Table 2.5 shows that all related researches of data exchange standard can be divided into five groups according to research methodology as follows: interview consists of the research of Jouni Kauremaa et al.; analysis consists of the researches of Fenareti Lampathaki et al., Juha-Miikka Nurmilaakso et al., and Yu-Hui Tao et al.; questionnaire consists of the research of Alain Yee-Loong Chong et al.; application consists of the researches of Somjit Art-in et al. and Intel Information Technology; finally, survey consists of the researches of Juha-Miikka Nurmilaakso.

Studying all related researches finds that this research is classified in the group of RosettaNet standard application in industry section. It is similar to the research of Somjit Art-in et al. that applied RosettaNet standard for motorcycle component industry. The result was a prototype which could exchange data between client and server by using web service technology. Moreover, it is also similar to Intel that applied RosettaNet standard to exchange data with trading partners in the part of order-to-payment by business process re-engineering. However, this research is different from two researches that it emphasizes business document structure analysis.

2.5.10 Jingwei Liu, Rong Sun, Weidong Kou, and Xi Sun have studied "The security analyses of RosettaNet in Grid" in 2006.

This study presented an e-commerce application that based on the RosettaNet standard over the Grid infrastructure including the improvement of the RosettaNet security in the Grid environment. In Grid Security Infrastructure (GSI), the security strategies focus on security authentication, security identity's discrimination, communication encrypt, and security authorization and single sign-on. They presented the combination of the powerful security of the RosettaNet standard and the Grid. The Grid environment uses the SSL protocol to guarantee the security of transport layer so the RosettaNet standard must not focus on the transport layer protocol. The single sign-on of the Grid environment can improve the efficiency of the RosettaNet standard by using an authentication center-user-proxy in order to authenticate the user with several users. The Grid environment use Multipart/signed, Application/pkcs7-mime and Enveloped-data styles of S/MIME to make digital signature and envelop message. In the transmission process, RNIF of the RosettaNet standard use the digital certificate that accordance with S/MIME certificate handling. [11]

2.5.11 Ruey Kei Chiu and Shiao-Ping Yu have studied "A study on building of a common gateway for secure exchange and transmission of electronic business message" in 2007.

This study presented a common gateway to secure message exchange between organizations. The common gateway is created to conform to the RosettaNet standard. This common gateway is built and installed to integrate the back-end information system to conduct the message exchange with trading partners. The system structure of the common gateway can be divided into four levels. First, message transmission level focuses on the implementation of SMTP service with S/MIME to conduct the business transmission and exchange. Second, XML document conversion level has three main components. The first component is the data conversion from non-XML document to XML-format document. The second component is certification and analysis the accuracy of XML format. The third component is conversion each XML document that is from a trading partner into a readable output by using XSL. Third, Database storage and retrieval level provides the data management and maintains different intermediary data stores between two communication levels. Finally, integrated interface level interface the back-end information system with the XML document transfer level. The value of this study is the common gateway that can make low cost, high efficiency, and high security of message exchange. [1]

Table 2.6 The security comparison of the RosettaNet standard and related researches [1, 7, 11]

Security		RosettaNet	Related researches	
Security Service	Security Mechanism		Jingwei Liu et al.	Ruey Kei Chiu et al.
Authentication	Digital signature/ Hash Function	RNIF uses the digital signatures and the digital certificates. For transfer protocol level, it uses SSL, and HTTP client authentication.	Every user or service need to be identified by an authentication certificate. Moreover, it uses digital signature, SSL and an "authentication center-user-proxy" is introduced for RNIF.	It uses S/MIME Hash Authentication.
Authorization	Digital Signature	Digital signatures and digital certificates are specified in the service header.	It uses S/MIME.	None

Table 2.6 The security comparison of the RosettaNet standard and related researches [1, 7, 11] (Continues)

Security		RosettaNet	Related researches	
Security Service	Security Mechanism		Jingwei Liu et al.	Ruey Kei Chiu et al.
Confidentiality	Encryption	It uses S/MIME-based mechanism, encryption of the payload. Moreover, it has optionally encryption of the service header.	It uses the combination of the public key technique with the symmetric encryption technique.	None
Integrity	Hash Function	It uses SHA-1.	It uses SHA-1.	It uses Message Integrity Check.
Non-Repudiation	Digital Signature	It uses S/MIME-based mechanism. Non-repudiation of message origin and content uses the digital signature on the business message with S/MIME, MD5 or SHA-1.	It uses S/MIME.	None

Table 2.6 The security comparison of the RosettaNet standard and related researches (Continues)

Security		RosettaNet	Related researches	
Security Service	Security Mechanism		Jingwei Liu et al.	Ruey Kei Chiu et al.
Non-Repudiation	Digital Signature	Non-repudiation of receipt uses the digital signature on the receipt acknowledgement with MD5 or SHA-1 digest for the received message. The partners must also store the messages for an agreed period of time.	It uses S/MIME.	None

From Table 2.6, the research of Jingwei Liu et al. consists of the RosettaNet standard. The research of Jingwei Liu et al. has studied the RosettaNet standard in Grid infrastructure, so the basic security services are from the RosettaNet standard. They have only proposed the concept of authentication center-user-proxy in order to enhance convenience and safety of system login for the RosettaNet standard.

In the authentication part, the research of Jingwei Liu et al. and the RosettaNet standard have digital signature and SSL. For the research of Ruey Kei Chiu et al., it has S/MIME that is similar to the RosettaNet standard and Hash authentication. The RosettNet standard has specially digital certificate to make trust between trading partners.

In authorization part, the RosettaNet standard and the research of Jingwei Liu et al. define it in the service header that is the part of sending message. It also has digital signature and digital certificate. The research of Ruey Kei Chiu et al. does not have this security service.

In confidentiality part, the RosettaNet standard and the research of Jingwei Liu et al. has S/MIME that provides message encryption of payload part. And, it can encrypt service header in additional case. The research of Ruey Kei Chiu et al. does not have this security service.

In integrity part, the RosettaNet standard and the research of Jingwei Liu et al. use SHA-1 that is based on Hash function, while the research of Ruey Kei Chiu et al. does not have this security service.

In non-repudiation part, the RosettaNet standard and the research of Jingwei Liu et al. use S/MIME, MD5, or SHA-1 including digital signature while the research of Ruey Kei Chiu et al. does not have this security service.

From the comparison of message exchange security between the RosettaNet standard and related researches, the RosettaNet standard has all basic security services. So, the organization that applies the RosettaNet standard can trust in the security of business message exchange. The RosettaNet standard can add authentication center-user-proxy that is the concept of Jingwei Liu et al. It makes single sign-on that the user input password only once to access the system until out of time.

CHAPTER III
MATERIALS AND METHODS

This chapter is going to explain about tools which are used in this research. In addition, steps of the work from the beginning to the end are discussed in this chapter.

3.1 Materials

The data which gathered from the company will be analyzed and created as business process diagram and structure of electronic business document by using program as follow:

A. Microsoft Office Visio 2007 is used to create the business process diagrams.

B. Altova XMLSpy 2008 Enterprise is used to create the structure of electronic business document in XML Schema form.

This research selects Microsoft Office Visio to draw swimlane because it has the graphic diagrams that are categorized clearly. It can use the template named Cross Functional Flowchart to create swimlane easily. Moreover, the swimlane diagram which is the output is arranged and clear.

Altova XMLSpy is selected to analyze XML Schema in this research because it is XML editor for modeling, editing, transforming, and debugging XML-related technologies. Moreover, it has both text view and graphic view that are comfortable and easy to analyze XML Schema.

3.2 Methods

This research applies the RosettaNet standard which has already explained the detail in chapter 2 for the Thai automotive industry. All of working processes will be described as follows:

3.2.1 Data gathering

Business processes and business documents that are gathered come from 2 sources as follows:

3.2.1.1 Primary data

Primary data in this research comes from interview of personnel in the case study company who relate to the business operation in the scope of this research. All of them are from planning department and purchasing department.

The questions in this interview have main issues about business process and data exchange between the company and his suppliers. Record sound is used in this interview and transferred to letters for accuracy and completion.

3.2.1.2 Secondary data

Secondary data comes from the business documents that are forecast report and purchase order. They are shown in appendix A.

3.2.2 Business process analysis

After data gathering, these data will be created the business process diagrams by using tool called "swimlane". Swimlane is a diagram that shows steps of business processes, and responsibilities of each trading partner. Swimlane is displayed in the form of picture that can understand clearly and easily.

3.2.3 Business process mapping with the RosettaNet standard

When the swimlanes of business processes are complete, They will be mapped with the business processes of the RosettaNet standard in order to check that each step of business process from the first step match with what PIP in the RosettaNet standard. The result of this process will be taken to be the prototype of the application. The example of result can be shown as Figure 3.1 and 3.2.
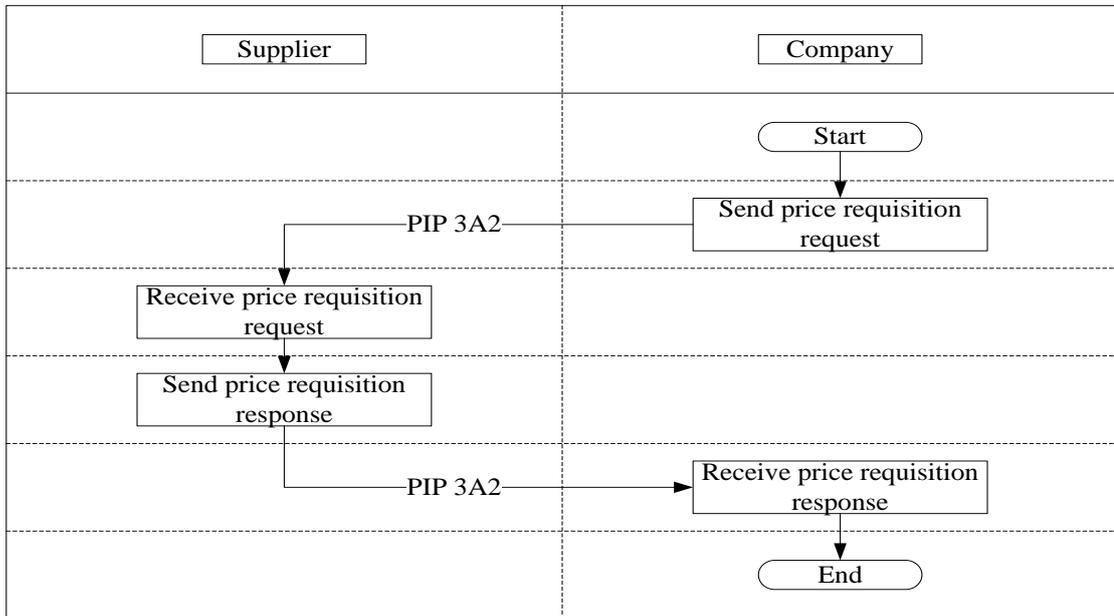
Figure 3.1 Business process mapping on price requisition request and response of the
company with PIP3A2 of the RosettaNet standard

Figure 3.1 demonstrates business process which relates to two trading partners that are the case study company and its supplier. The company is going to send price requisition request for price requisition. It will be used to decide and choose a supplier. Firstly, the company will send the price requisition request to the supplier. After the supplier received the price requisition request, the price requisition will be sent back. In this process, it can map with PIP 3A2 of the RosettaNet standard. Finally, XML Schema of PIP 3A2 is used to apply later.
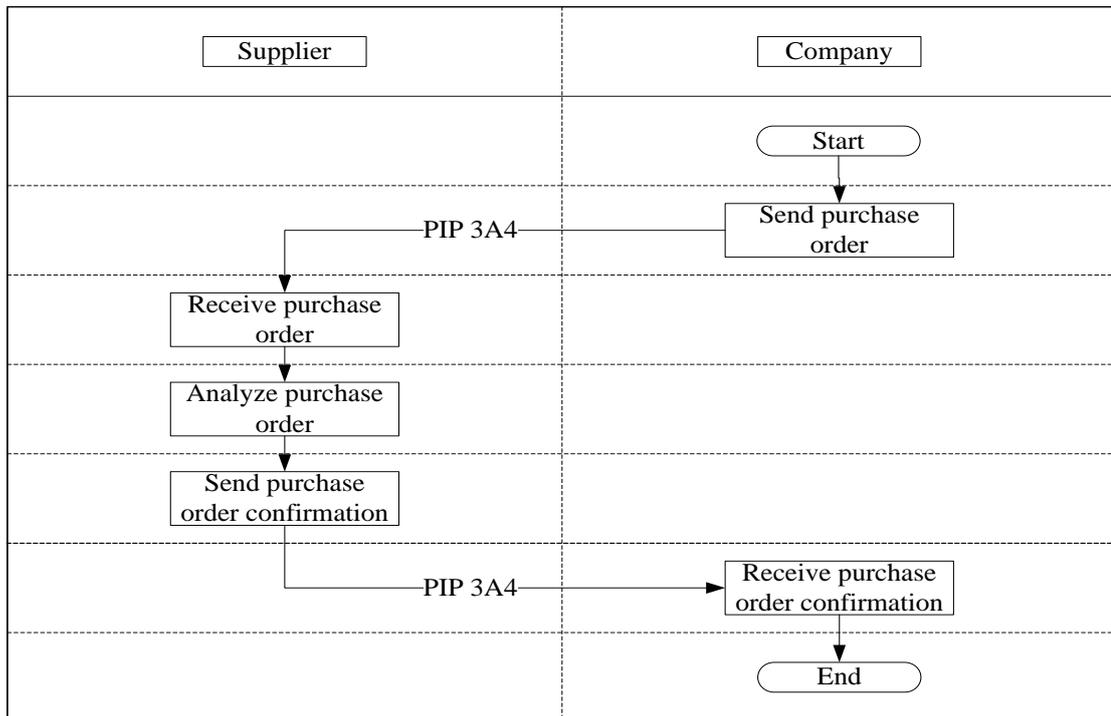
Figure 3.2 Business process mapping on sending purchase order and receiving
purchase order confirmation of the company with PIP3A4 of the RosettaNet standard

Figure 3.2 demonstrates business process which relates to two trading
partners that are the case study company and its supplier. The company is going to
send purchase order to order raw material from the chosen supplier. Firstly, the
company will send purchase order to the supplier. After the supplier received purchase
order, it will analyze data according to purchase order that raw material is available to
send back to the company or not. And then, purchase order confirmation will be send
back to the company to inform the company that supplier is capable to send product as
required. In this process, it can map with PIP 3A4 of the RosettaNet standard. Finally,
XML Schema of PIP 3A4 is used to apply later.

3.2.4   Business document structure analysis

XML Schema is necessary to exchange data between trading partners that
use XML document. It is going to identify the structure of XML document which
make the same understanding of each trading partner which refers to the meaning of

each tag. Moreover, it is easier to implement the system when XML Schema is utilized. Each trading partner can independently implement the system by himself, if it only uses the same XML Schema. Without XML Schema, the trading partners have to create XML document by themselves. It is difficult to know the meaning of each tag, when it is exchanged. In this case, the mistakes may easily happen, and it is difficult to implement the system.

In this step, all of the business documents of the company will be compared with the structures of business documents in XML Schema form of each PIP from 3.2.3.

When useful PIPs have been identified, the structures of business documents are analyzed. The tables are created to analyze the structures of business documents. They can show the level of each element, child elements of each element, and indicative data of each element.

These tables consist of five columns: No., Element, Level, Required and Remark. The No. column presents order number of each element. The Element column presents each element in the structure of business document of each PIP. They are formed as numbers or Ch. Numbers have detail in appendix B, while Ch. is meaningless. It is used to indicate users to select only one condition that is following. The Level column presents level of each element. Next number elements are child elements of previous number elements. All elements are analyzed by using these tables. The Required columns present the desire of each element according to the business documents of the company. Finally, the Remark column presents the additional data such as example data from business document of the company.

Four symbols which were shown in Required columns have meaning as follows:

Y means that the elements have been already used in the business document of the company, and they have been used to apply.

O means that the elements have not been used in the business document of the company, but they might or might not been used to apply.

N means that the elements have not been used in the business document of the company, and they have not been used to apply.

M means that the elements have not been used in the business document of the company, but they must use to apply because they may be the parent of the required elements or they are essential of business document.

In this paragraph, the overview of appeared data in the Required column and the Remark column is described. When the data in the Required column is Y, it means that the element has been used in the business document of the company. So, the example data from the business document of the company will be shown in the Remark column. When the data in the Required column is M because it is the parent element of the element that has been used in the business document of the company, it does not have data in the Remark column. When the data in the Required column is M because it bases on the RosettaNet standard or in order to improve the effective of business operation, possible data is shown in the Remark column. Finally, when the data in the Required column is N or O, they do not have any data in the Remark column.

The analysis from these tables is more comfortable than the analysis from XML Schema of each PIP. The example result of this step is shown as Table 3.1.

Table 3.1 The examples of the structure of business document of PIP4A2 in the part of Sender

No.	Element	Level	Required	Remark
65	206	3	M	
66	18	4	M	
67	4	5	M	Notify
68	151	5	M	Notify of Forecast
69	152	5	M	PIP4A2
70	153	5	N	
71	211	5	M	Forecast
72	29	4	M	
73	28	5	Y	Prepared by
74	61	5	O	e-mail of creator
75	70	5	O	Fax. No.
76	85	5	O	creator
77	143	5	O	Tel. No.

Table 3.1 The examples of the structure of business document of PIP4A2 in the part of Sender (Continues)

No.	Element	Level	Required	Remark
78	133	4	M	
79	134	5	Y	Name of Company
80	Ch.	5	Ch.	
81	10	6	O	
82	12	7	O	
83	86	7	O	
84	57	6	O	
85	58	6	O	
86	79	6	O	

Table 3.1 presents the group of elements about sender of PIP4A2. It can be classified into three groups. First group describes about the forecast document that is M. It consists of basic elements of the RosettaNet standard that are used in this document in order to realize what PIP. Next group is data of sender that is Y. Last group indicates the sender company. Name of company is Y and other identifications are O because they depend on the company desire.

CHAPTER IV
CASE STUDY INFORMATION GATHERING

This chapter is going to explain the information that has been gathered from the company as a case study. The information consists of organization background, as-is business process and business process mapped by swimlane.

4.1 Organization Background

In the case study, the company is the first-tier supplier and also second-tier supplier. It manufactures the domestic goods more than international goods. Its products are OEM (Original Equipment Manufacturer) which is the automotive equipment manufacture for car maker directly, and REM (Replacement Equipment Manufacturer) which is the automotive equipment manufacture for break downed equipment replacement in order to support replacement shop of car parts, car service center and garage. The company has approximately one hundred and forty suppliers. It has ordered raw materials about five thousand and five hundred items.

4.2 As – Is Business Process

Sending forecast which shows about three months of overall image is the primary step the customers do. Then, PO (purchase order) will be followed. Sending forecast can be various solutions. Scanning and sending data by e-mail is the majority solution that has been taken always. Other people use paper instead which is sent once a month. Ones who use EDI have to send forecast every week because the program must be run every week. For example, if the deadline is at the third week, data must be sent at the first week. Someone manages this proceed at the first day for receiving the product at the forth date. The company has two days only of lead time because the

forecast has already been sent, so it just is confirmed. On the other hand, the condition is used before sending PO for the ones who want products urgently.

The production plan will be done after received forecast. It will be created to assume production in the next month. They will be divided to show the list of each week. In the early day of the month, the production plan of the whole month is revealed in the list of each day (only the next month) (with no final term). The evaluation will be processed according to Kanban concept and print out the production order every day. It will conform to Oracle system which manages about the WIP (work in process). The barcodes were printed out and sticked on the workpieces which is moved through production line.

As mentioned above, it is the procedure since the first step that is receiving forecast from customer until making production order.

The data from production plan will be sent to the control part. They will prepare and insert the data to MRP (material requirement planning) of Oracle system for calculating demand of raw material. In MRP system, the officer will enter the deadline. Then, date, time, and amount of raw material will be calculated by the system. Ordering the raw material from supplier leads the bargain. When both company and supplier agree, the PO must be sent out.

At the beginning of the project, PR (purchase requisition) will be sent to the purchasing department by an engineer. They will search for all raw materials in the list and decide that the company will make them themselves or buy from others. The next step is to identify them in the module PO of Oracle system. If they want to buy from supplier, the bargain of cost must be agreed at the first. After that, the list of the raw material will be taken in the form of PO and sent to suppliers. The case is that companies decide to make it themselves, they must set up the cost of production capital how much it could be.

Three months forecasts from customers will be evaluated on MRP to show the demand in the future and notify the company that should order raw material in each month from who supplier and how much. Fax and e-mail is available to send PO to them, and they will send confirmation in the form of documents or messages in e-mail.

Normally, raw materials will be sent 15 days later, after sending PO. It means that if they send PO at the middle of the month, raw materials are started to send at the beginning of the next month. If they cannot send the raw materials on time, the negotiation will happen.

When raw materials are delivered into the warehouse, the receiving recorder must get invoice number that come together with PO number. In this case, it is done in order to refer the correct relation between PO and raw materials from suppliers. Then, they will be inserted to the system. This process uses PO system that runs in parallel with the inventory. However, the amount of raw materials is possibly less but cannot be exceeded. Invoice and PO will be delivered by the driver. Lead time is about one month. Company will inform the appointment date 15 days in advance. For example, the forecast will be sent at first, and PO is followed at the date of 15th – 18th to supplier. After that, raw materials will be sent. Normally, PO will be sent in the form of total. If there is partial delivery, an appointment date will be sent separately to reduce the truck jam. Company will set the car timetable by manual. Nowadays, there are more than 10 suppliers who deliver raw materials in each day, and five of them are permanent suppliers who deliver every day. The form of supplier will be scanned followed by invoice to show the amount of raw materials in each day.

The total of raw materials and invoices must be summarized and sent to accountant every day. These tasks will be processed by officers who enter data through computer and print out the data. After that, if the list of raw material, the amount of raw materials and money is consisted with invoice, they will be sent to accountant at three o'clock in the afternoon.

When the raw materials were sent to the warehouse, job order from planning department will be sent to part control. It is going to refer to the job order in order to prepare raw materials for manufacture. All of the lists and details have to be paid according to the BOM (bill of materials) which was set in the system. BOM will be used at this time to deliver data to inventory. Officers will keep job order and prepare raw materials according to each list. They will be sent to the production department that will check and receive them. After that, officer will take the lists to adjust amount of raw material in the inventory.

Now, the state of raw materials is in production line together with job order. In WIP, production officers will perform their duties and scan barcode when finish their work. Then, data will be sent to the next unit until the last one. After that, QA (quality assurance) department will check product quality and scan barcode. Finally, the total of them will run back to the warehouse again, but now they are finished goods in inventory.

Deliver date from planning department will be organized by logistic department according to PO which gets from customer. Officers will prepare product and deliver on date. Normally, the duration of stock is about one day and a half to two days. When products will be set in the transport vehicle, all of the lists will be print out in the form of invoice and sent together with products to customer.

When customers receive products, they will sign in invoice. Deliveryman will take back the copies and give them to an accountant for collecting money later.

Customers possibly receive product themselves or by delivery service which are two kinds of the distribution process. However, there is approximately 90% of customer who use the delivery service which has set cost at the beginning. On everyday or twice a day, products will be sent to the majority of customers. Company uses their transport vehicles for distribution.

For distribution, deliveryman has to know the size of truck, pallet, the destination, and time etc. If transport vehicles are insufficient, the company will employ to solve this problem. All of these details will be changed to be pointed and evaluated. Empty pallet will be returned after the delivery is completed. There are two kinds of product composing service. The first type is that the parts are sent to the company to complete them only. For the other one, company buy required parts and compose themselves.

As all mentioned above, they are the procedures about receiving forecast, planning, distribution, inventory management and finished goods delivery.

4.3 As – Is Business Process Mapping by Swimlane

After gathering information from interview in this research, Figure 4.1 - 4.7 demonstrate overall business process of this case study.
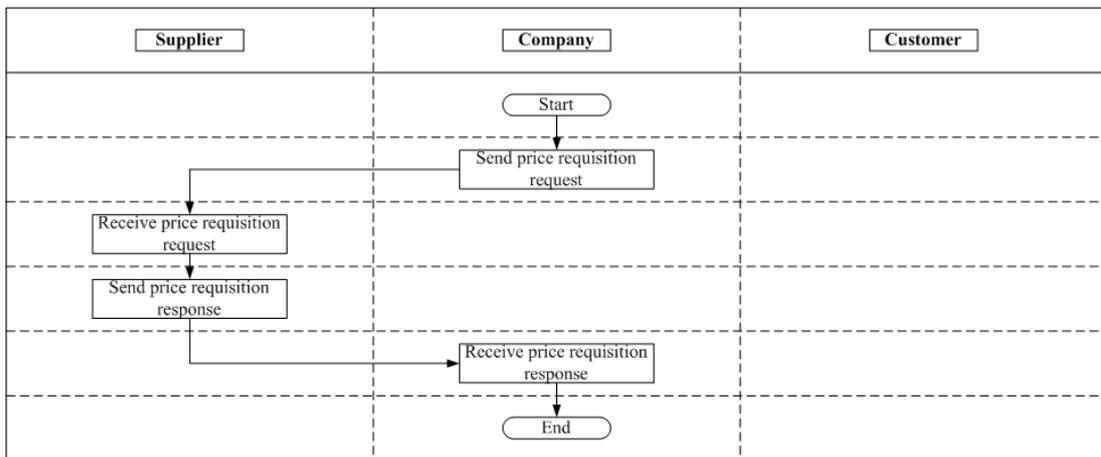
Figure 4.1 Diagram of business processes on price requisition request and response
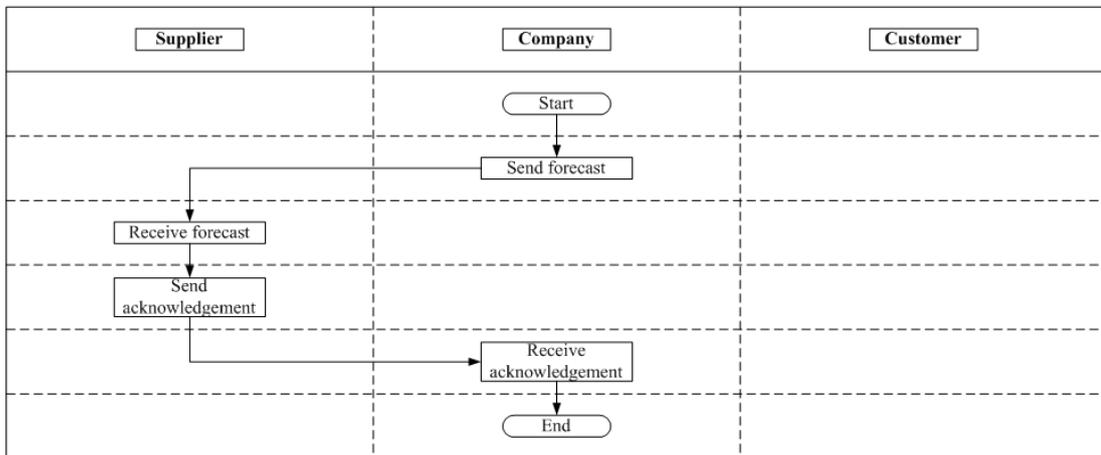
Figure 4.2 Diagram of business processes on sending forecast
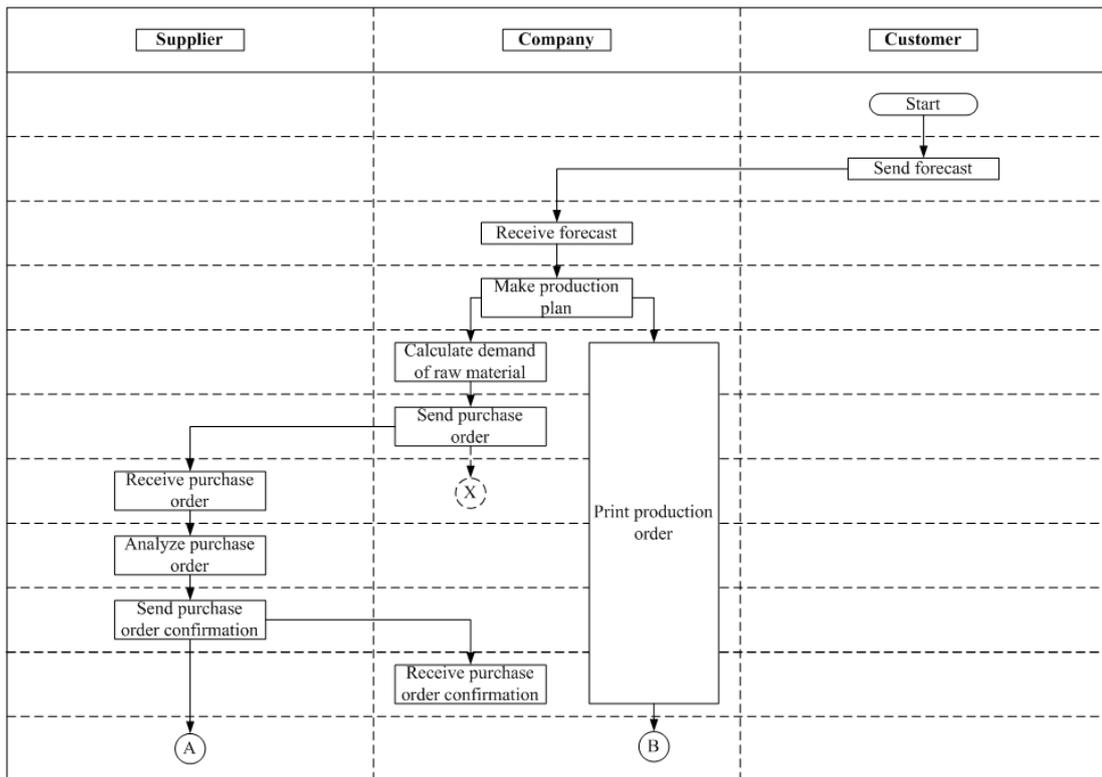
Figure 4.3 Diagram of business processes from receiving forecast to finished good delivery
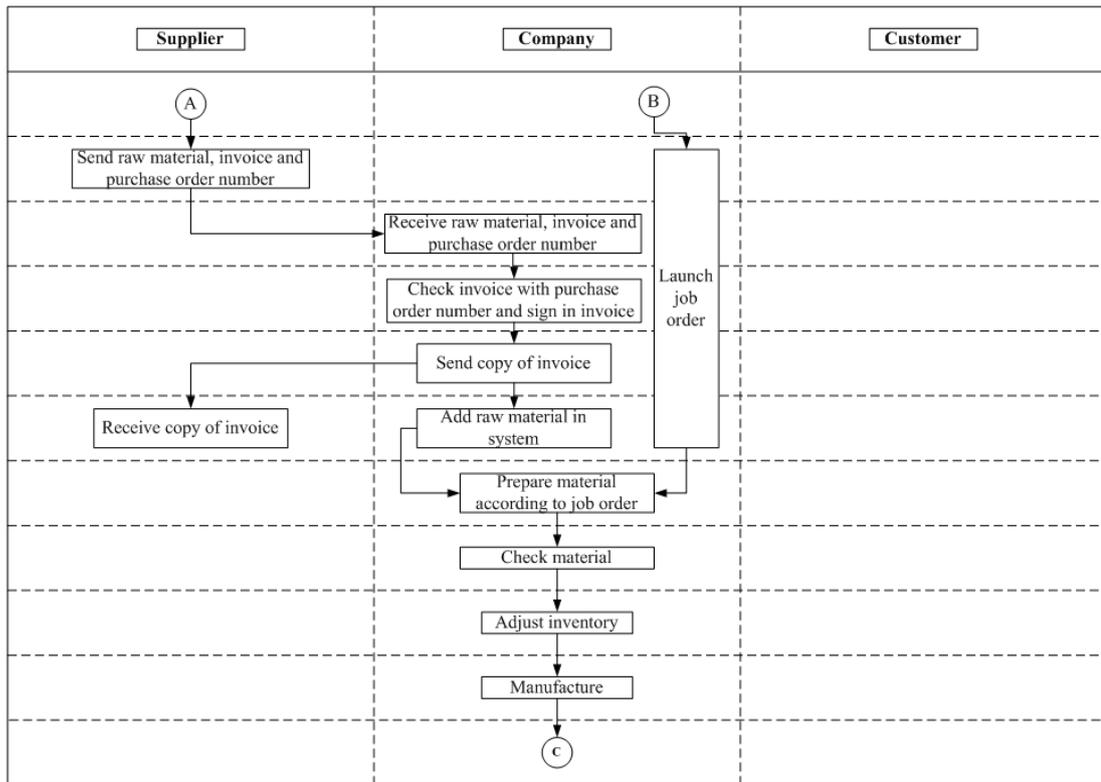
Figure 4.3 Diagram of business processes from receiving forecast to finished goods delivery (Continues)
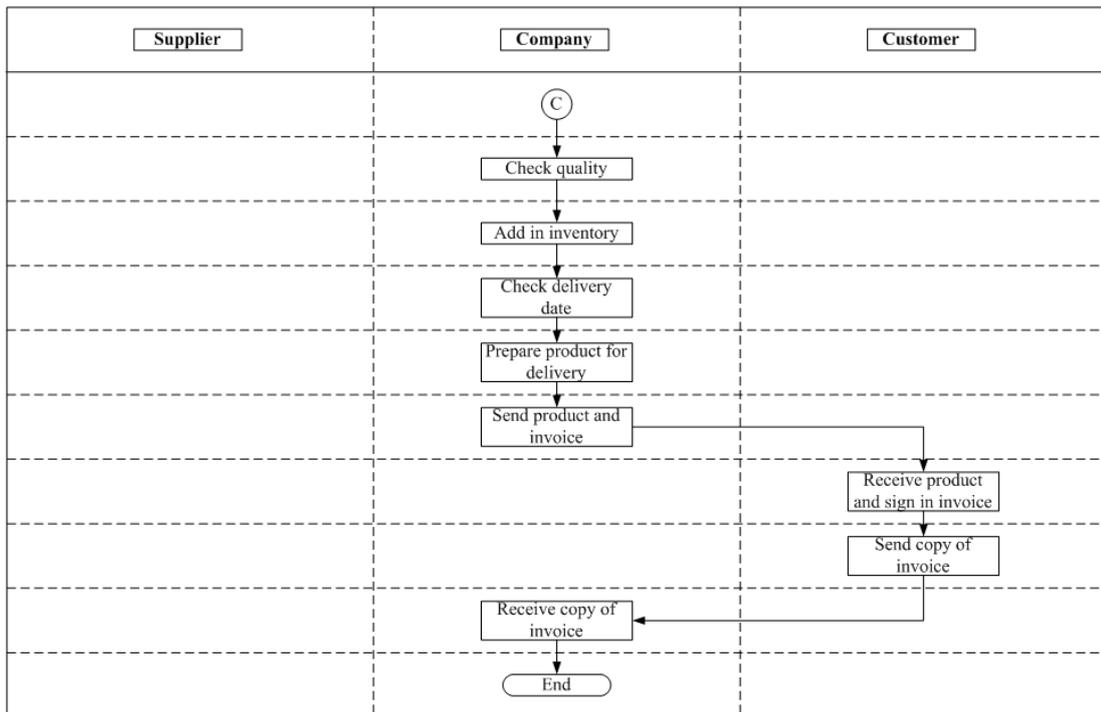
Figure 4.3 Diagram of business processes from receiving forecast to finished goods
delivery (Continues)
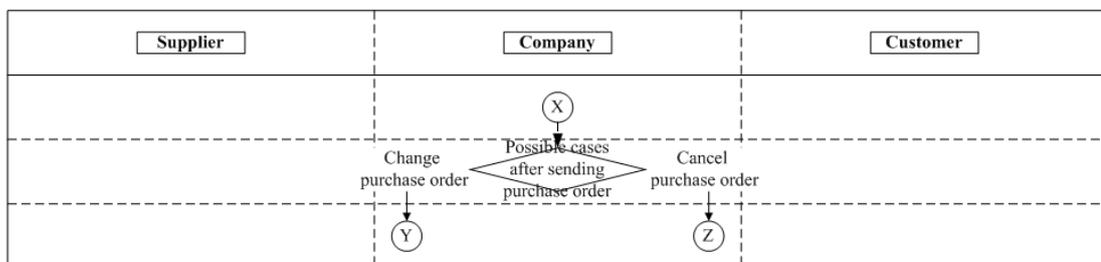
Figure 4.4 Diagram of business processes on possible cases after sending of purchase
order

Supplier	Company	Customer
	Y	
	Send new purchase order	
Receive new purchase order		
Analyze new purchase order		
Send new purchase order confirmation		
	Receive new purchase order confirmation	
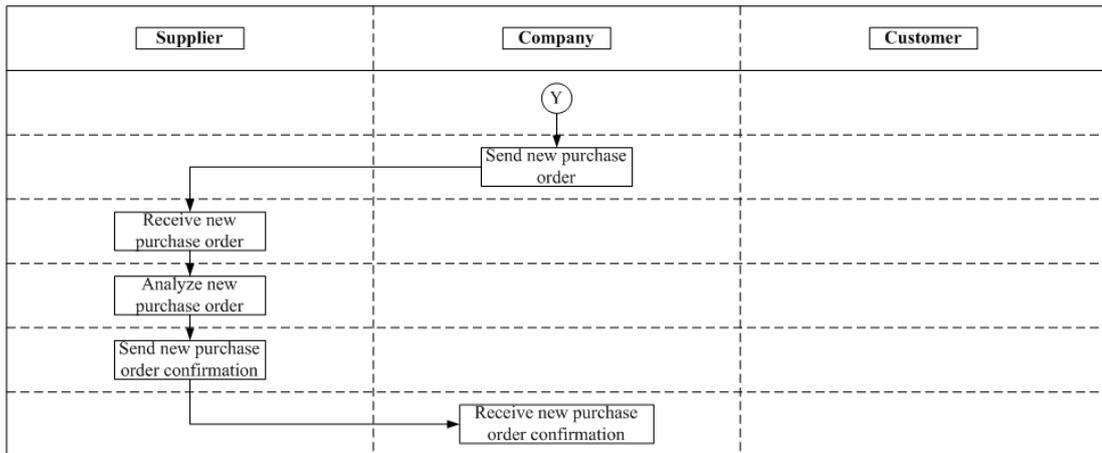
Figure 4.5 Diagram of business processes on purchase order change

Supplier	Company	Customer
	Z	
	Send purchase order cancellation	
Receive purchase order cancellation		
Analyze purchase order cancellation		
Send purchase order cancellation confirmation		
	Receive purchase order cancellation confirmation	
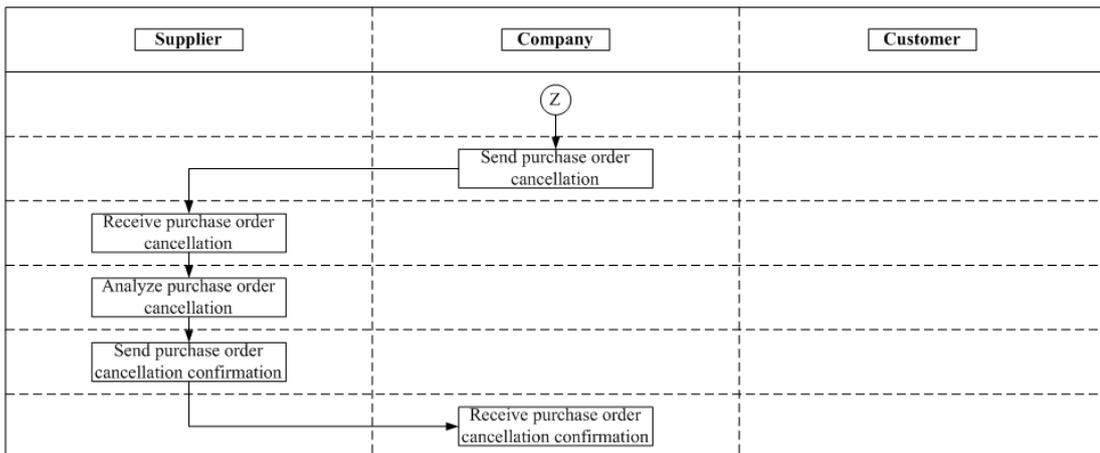
Figure 4.6 Diagram of business processes on purchase order cancellation

CHAPTER V
RESULTS AND DISCUSSION

This chapter is going to demonstrate the result from business process analysis and business document structure analysis. Moreover, the result is discussed in the last part.

5.1 The result of business process analysis

All gathered data from the company was analyzed and created business processes in the swimlane forms. Figure 5.1 – 5.7 show business processes and PIPs in each business process. This research focuses on business processes from sourcing to delivery, so PIPs which are relate to these business processes are in Order Management (cluster 3) and Inventory Management (cluster 4). For this research, segment amount and PIP amount base on XML Schema method that are less than DTD method. Cluster 3 has three segments that consist of Quote and Order Entry (3A), Transportation and Distribution (3B), and Returns and Finance (3C). Each segment has eight PIPs, six PIPs, and five PIPs respectively. The total PIPs of cluster 3 are nineteen PIPs. Cluster 4 has five segments that consist of Collaborative Forecasting (4A), Inventory Allocation (4B), Inventory Reporting (4C), Inventory Replenishment (4D), and Sales Reporting (4E). Each segment has five PIPs, two PIPs, one PIP, one PIP, and two PIPs respectively. The total PIPs of cluster 4 are eleven PIPs. So, there are thirty PIPs from cluster 3 and cluster 4. The PIPs that relate to the business processes of the case study include six PIPs from thirty PIPs that are PIP3A2: Request Price and Availability, PIP4A2: Notify of Embedded Release Forecast, PIP3A4: Request Purchase Order, PIP3A8: Request Purchase Order Change, PIP3A9: Request Purchase Order Cancellation, and PIP3C3: Notify of Invoice.
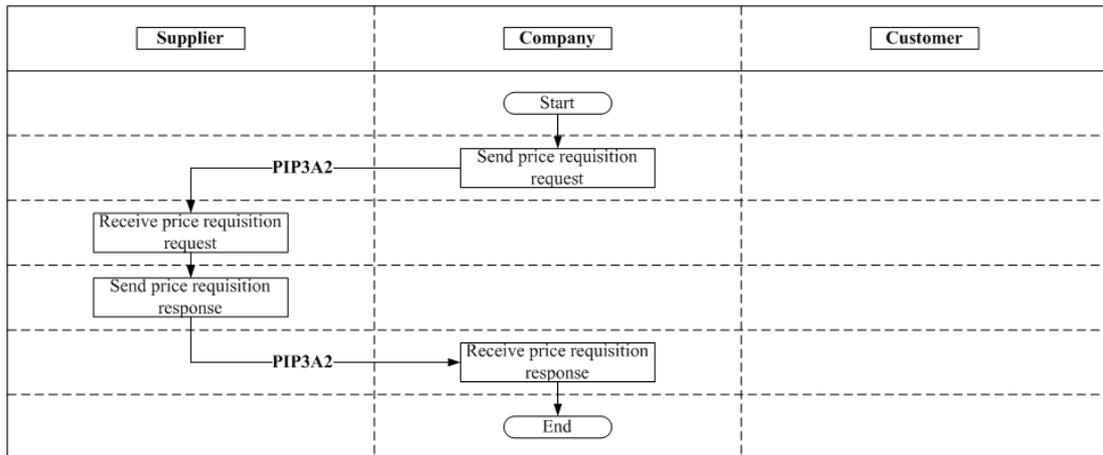
Figure 5.1 Business processes on price requisition request and response mapped with PIP 3A2
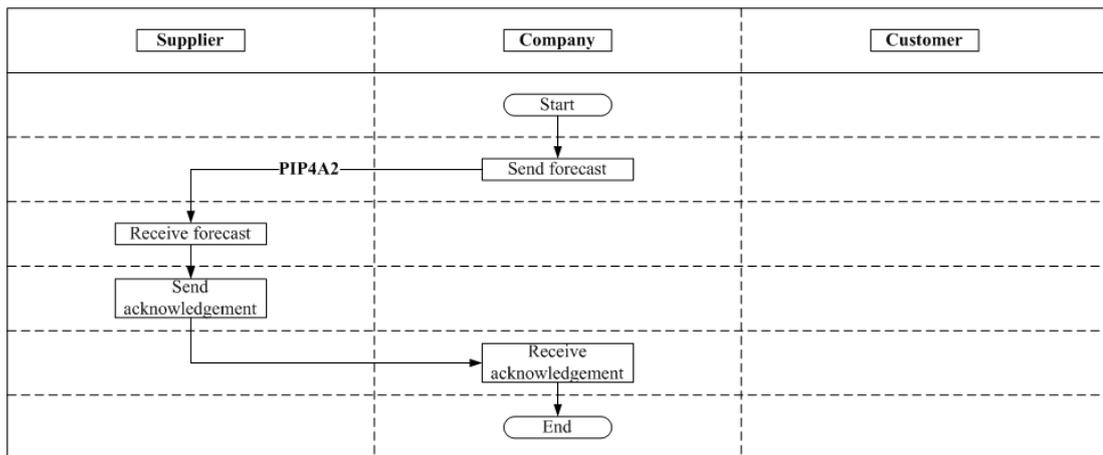
Figure 5.2 Business processes on sending forecast mapped with PIP4A2
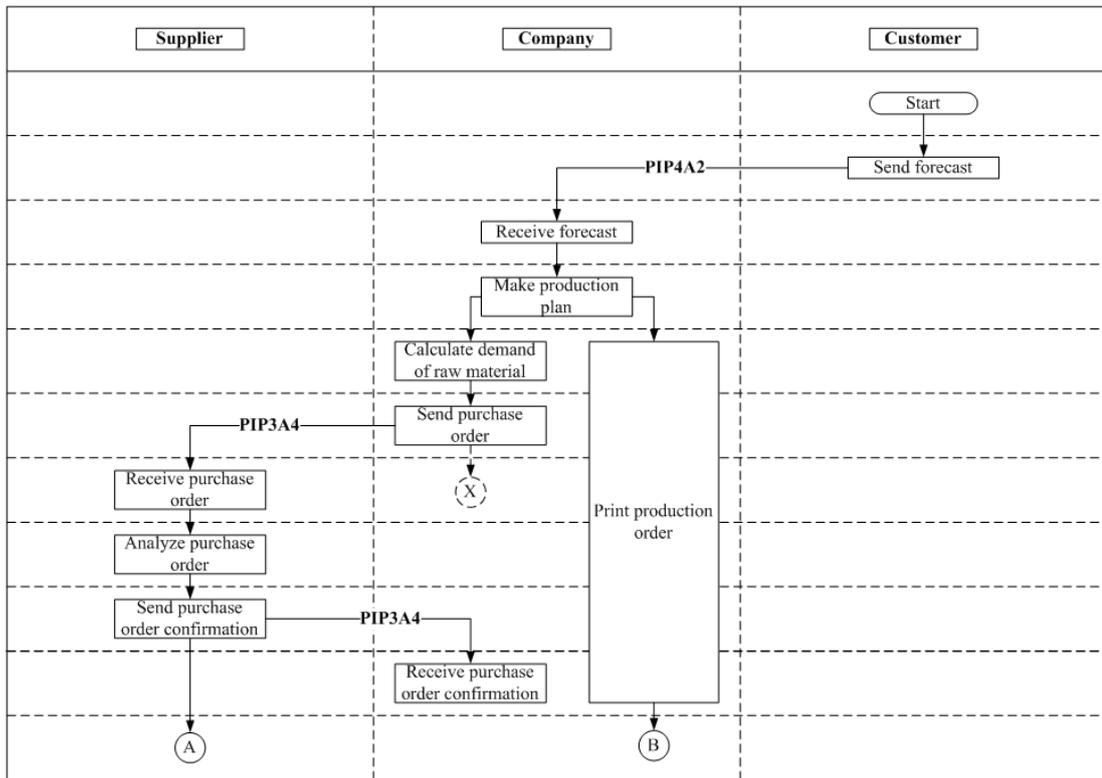
Figure 5.3 Business processes from receiving forecast to finished goods delivery mapped with PIP4A2, PIP3A4, and PIP3C3
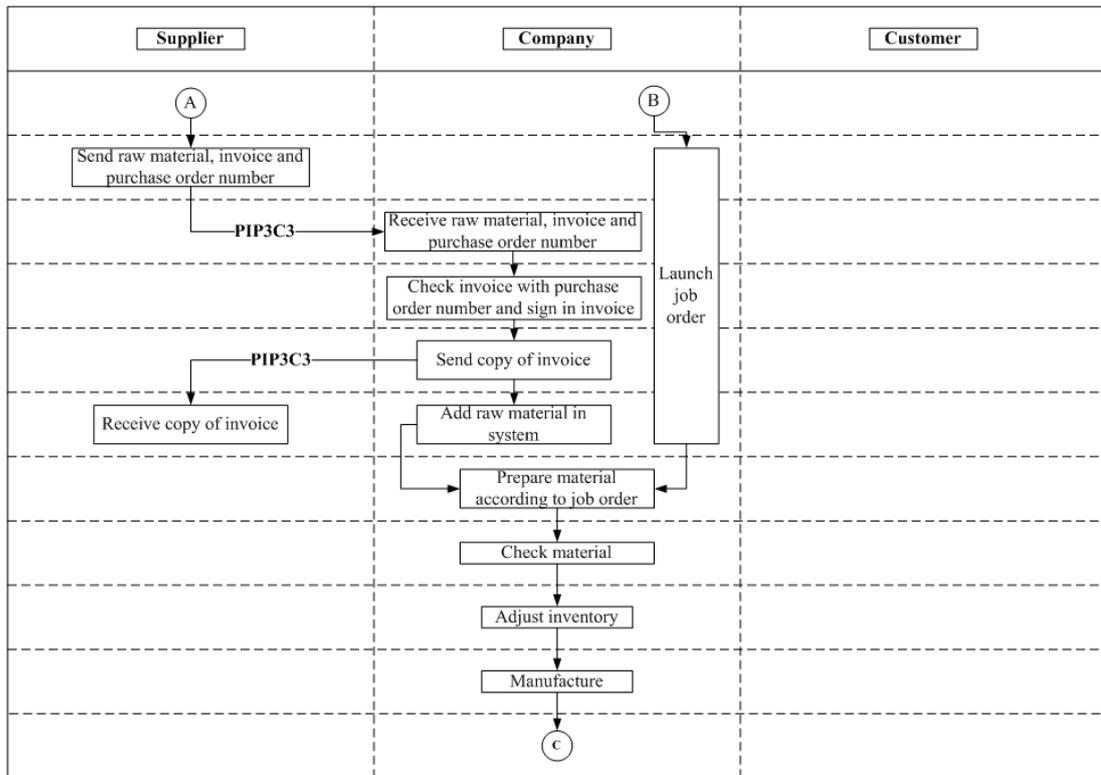
Figure 5.3 Business processes from receiving forecast to finished goods delivery
mapped with PIP4A2, PIP3A4, and PIP3C3 (Continues)
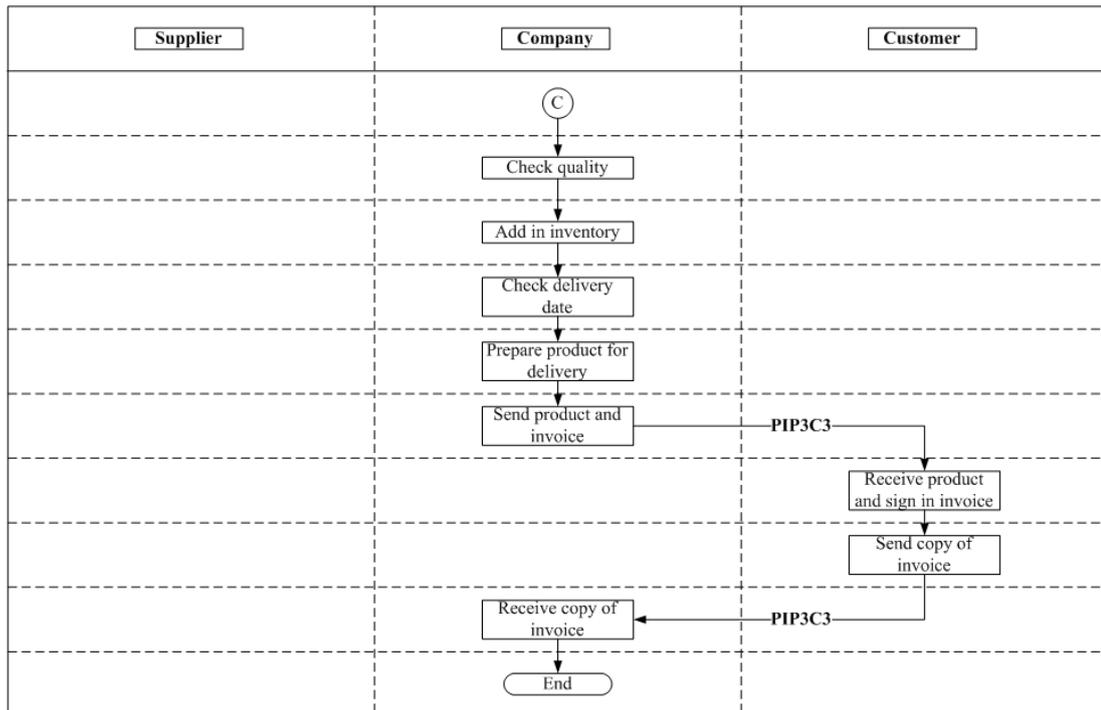
Figure 5.3 Business processes from receiving forecast to finished goods delivery

mapped with PIP4A2, PIP3A4, and PIP3C3 (Continues)
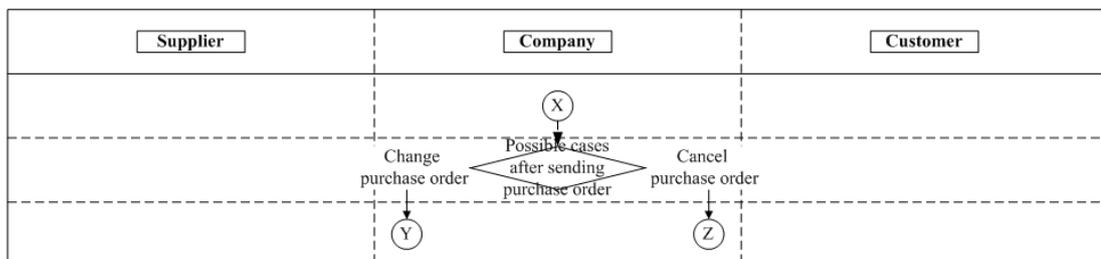
Figure 5.4 Business processes on possible cases after sending of purchase order
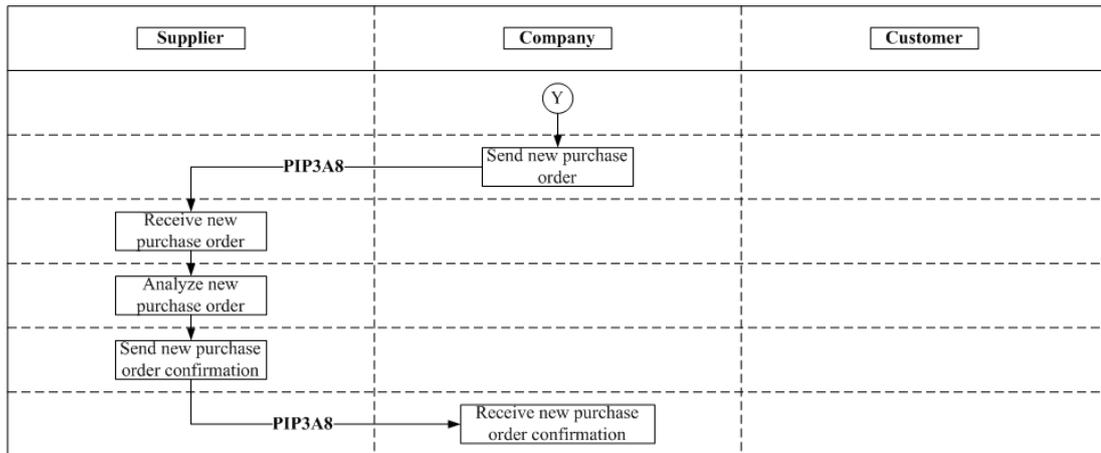
Figure 5.5 Business processes on purchase order change mapped with PIP3A8
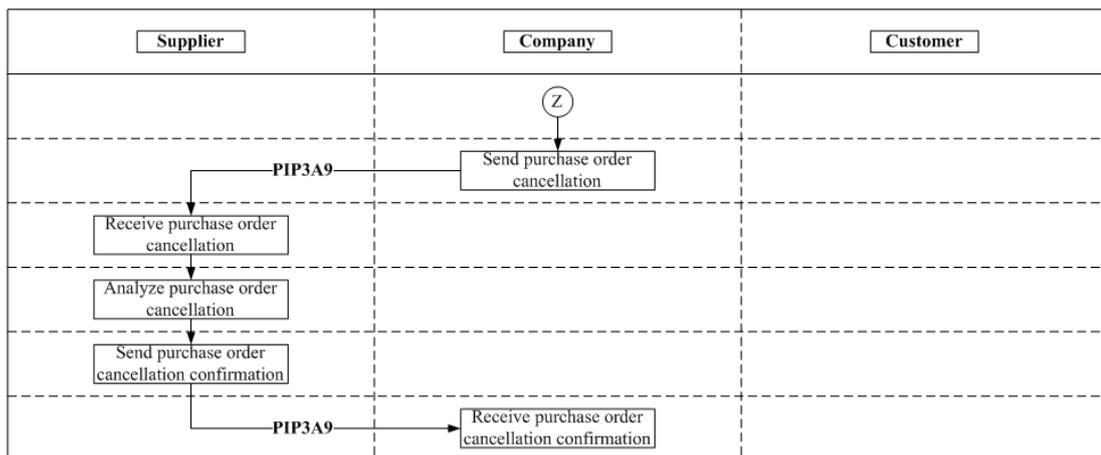
Figure 5.6 Business processes on purchase order cancellation mapped with PIP3A9

However, the company cannot apply all of them for electronic data exchange because the business process of the company is different from the RosettaNet standard. About price requisition, it is about supplier selection that the company must consider individually. So, PIP3A2 cannot be applied in this case study. Moreover, the company policy still needs signatures on paper documents such as invoices, so they have been made by manual processes. In this case study, PIP 3C3 cannot be used to apply. So, they remain four PIPs from six PIPs. Each PIP has different business processes that are shown the detail as Figure 5.7 – 5.10.
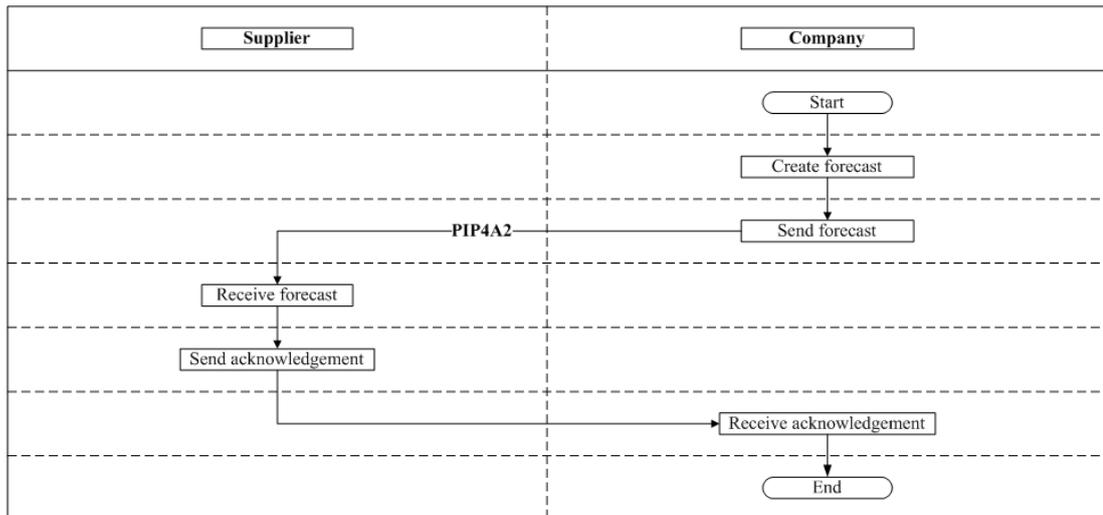
Figure 5.7 The detail of business process of PIP4A2
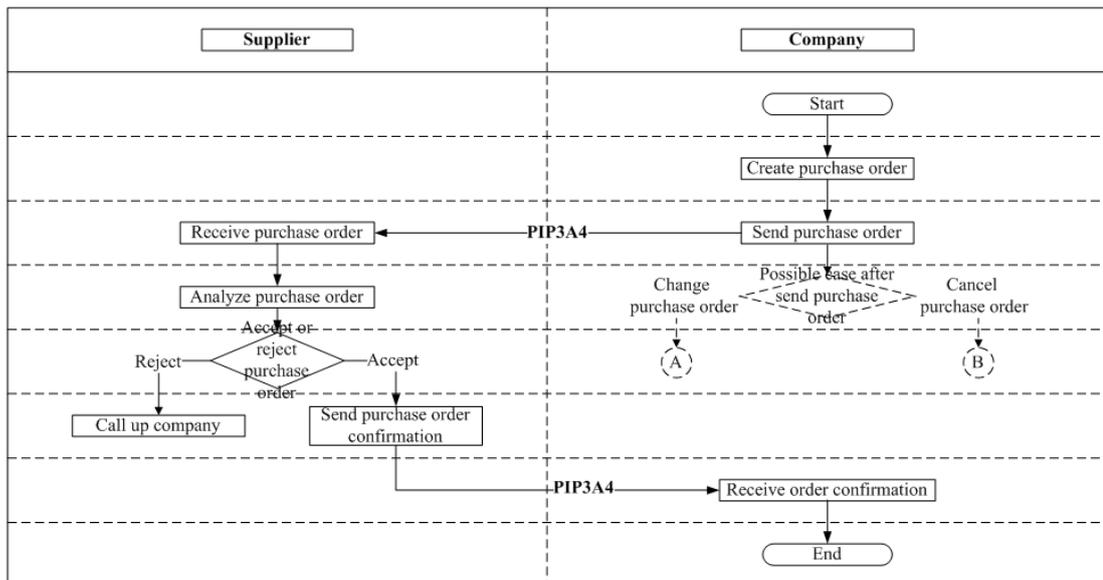
Figure 5.8 The detail of business process of PIP3A4
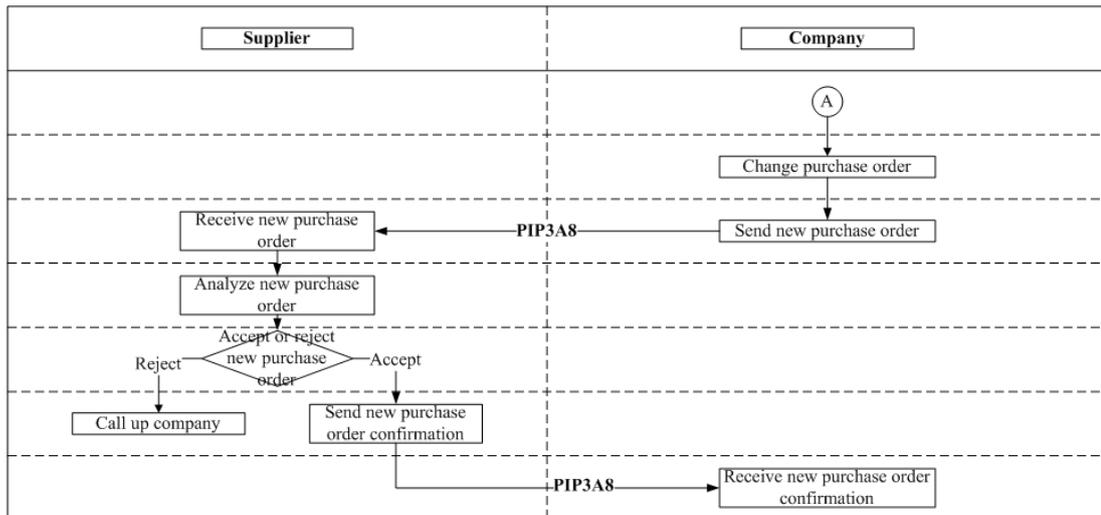
Figure 5.9 The detail of business process of PIP3A8
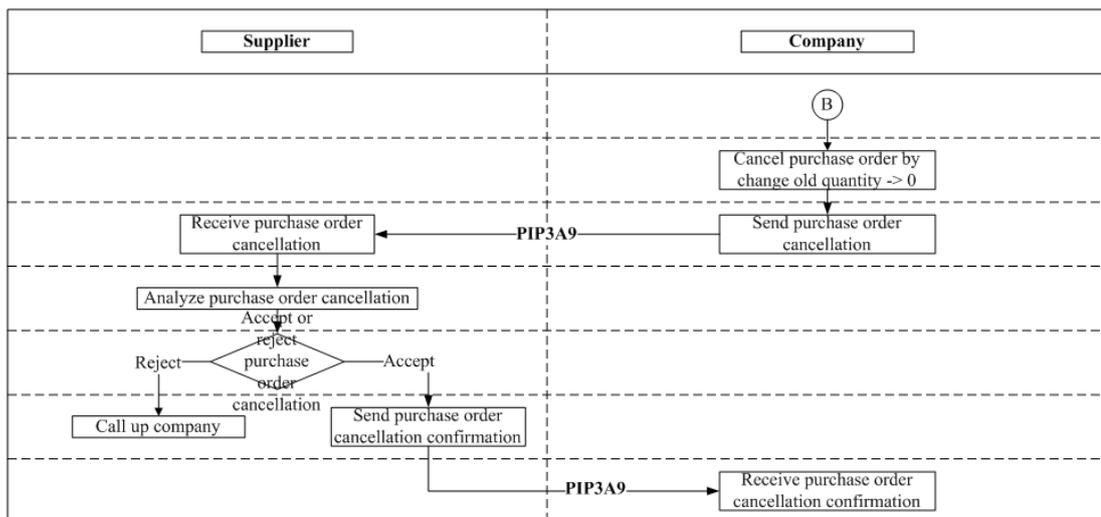
Figure 5.10 The detail of business process of PIP3A9

5.2 The PIP structure analysis

First, this part is going to describe the compositions of useful PIPs that remain four PIPs from six PIPs because the case study cannot apply PIP3A2 and PIP3C3. They are PIP4A2, PIP3A4, PIP3A8, and PIP3A9. The numbers that appear in the parentheses are the line number (No. column in appendix C) in the XML Schema

guideline of each PIP. The element dictionary that describes the detail of all elements and the XML Schema of each PIP are collected in the appendix B and appendix C respectively.

Every PIP has main element that covers all elements called root element (No.1). In this part, elements at level 3 are selected as the main elements to classify elements, because they consist of the related child elements in each business activity.

5.2.1   PIP4A2: EmbeddedReleaseForecastNotification

This PIP supports a business process which a forecast sender sends a forecast to a forecast receiver. It contains product demand information (planning demand) and/or product release information (demand confirmation). This PIP consists of the elements as follows:

EmbeddedReleaseForecastNotification is the root element of PIP4A2 (No.1-377). All elements can be divided into two main sections. There are twenty three percent of DocumentHeader that identifies general document information, sender information and receiver information of the business document (No.2-86) and seventy-seven percent of EmbeddedReleaseForecast that describes the future demand forecast of product for the specific time periods (No.87-377).

DocumentHeader consisits of five main sections as follows:

5.2.1.1   CorrelationInformation is the group of elements that correlates with a request document to a response document and to the contract in an executing choreography (No.3-11).

5.2.1.2   DocumentInformation is the group of elements that identifies the business document, the summary of attachments, and the information about the security of the business document (No.12-41).

5.2.1.3   HeaderVersion is the UN/CEFACT of document header (No.42).

5.2.1.4   Receiver is the group of elements that identifies the receiver of the business docmunet (No.43-64).

5.2.1.5   Sender is the group of elements that identifies the initiate trading partner of the business document (No.65-86).

EmbeddedReleaseForecast consists of five main sections as follows:

5.2.1.6 EmbeddedReleaseForecastTransportEvent is the element that identifies an event during the transportation of a shipment (No.88).

5.2.1.7 ForecastEvent is the element that identifies the event to initiate a forecast (No.89).

5.2.1.8 ForecastIdentifierReference is the group of elements that describes the various types of proprietary reference identifiers for forecast information (No.90-97).

5.2.1.9 IsFinalForecast is the element that indicates whether the business document is final. When the forecast is final it is considered "constrained" (No.98).

5.2.1.10 PartnerProductForecast is the group of elements that describes forecast and customer information of a product. They can be classified into three parts as follows (99-377):

- PartnerDescription is the group of elements that describes an identity of a trading partner, contact information and function in a supply chain (No.100-210).

- ProductForecastInformation is the group of elements that describes forecast information of a product (No.211-270).

- SoldTo is the group of elements that describes the buyer (No.271-377).

5.2.2   PIP3A4: PurchaseOrderRequest

This PIP supports a buyer to issue a purchase order, and acknowledge supplier when the order is accepted, rejected, or pending. The supplier acknowledgment may also include related information about delivery expectation. The request of this PIP consists of the elements as follows:

PurchaseOrderRequest is the root element of PIP3A4 (No.1-1887). All elements can be divided into two main sections. There are five percent of DocumentHeader that identifies general document information, sender information and receiver information of the business document (No.2-86) and ninety-five percent of PurchaseOrder that describes quantity of purchase products at an agree price and schedule (No.87-1887).

DocumentHeader consisits of five main sections as follows:

5.2.2.1 CorrelationInformation is the group of elements that correlates with a request document to a response document and to the contract in an executing choreography (No.3-11).

5.2.2.2 DocumentInformation is the group of elements that identifies the business document, the summary of attachments, and the information about the security of the business document (No.12-41).

5.2.2.3 HeaderVersion is the UN/CEFACT of document header (No.42).

5.2.2.4 Receiver is the group of elements that identifies the trading partner of the business document (No.43-64).

5.2.2.5 Sender is the group of elements that identifies the initiate trading partner of the business document (No.65-86).

PurchaseOrder consists of twenty-six main sections as follows:

5.2.2.6 AccountDescription is the group of elements that describes a customer or supplier account (No.88-211).

5.2.2.7 BillTo is the group of elements that describes the payer (No.212-318).

5.2.2.8 BusinessDocumentReference is the group of elements that refers indirectly to other related business documents (No.319-325).

5.2.2.9 Comments is the element that describes a general information (No.326).

5.2.2.10 ContractInformation is the group of elements that represents a business arrangement for the supply of goods or services at an agreed price (No.327-329).

5.2.2.11 ContractOwner is the group of elements that describes the trading partner and/or location which the product must be set up to use or service (No.330-436).

5.2.2.12 FinancingTerms is the group of elements that describes finance terms (No.437-448).

5.2.2.13 GovernmentContractIdentifier is the group of elements that refers indirectly to other business related documents (No.449-455).

5.2.2.14 GovernmentPriorityRating is the element that is a priority rating code. It will be used when a contract number exists and PO type is Government (No.456).

5.2.2.15 Information is the element that describes information about a product (No.457).

5.2.2.16 InstallAt is the group of elements that describes the trading partner and/or location which the product must be set up to use or service (No.458-564).

5.2.2.17 IsDropShip is the element that indicates whether the order is a drop shipment (No.565).

5.2.2.18 IsRequiredToRespondAtDetailLevel is the element that represents the option to respond. If the value equals to true, the receiver is required to response to detail level. If the value equals to false, the receiver is only required to reply at summary level (No.566).

5.2.2.19 ListPrice is the group of elements that represents the pre-discounted price (No.567-575).

5.2.2.20 Location is the group of elements that describes the location of business document (No.576-583).

5.2.2.21 OrderLineItem is the group of elements that describes an entry in a purchase order document (No.584-1516).

5.2.2.22 OrderShippingInformation is the group of elements that describes information of product shipping (No.1517-1528).

5.2.2.23 PurchaseOrderFillPriority is the element that identifies fill priority to manufacture in a constraint condition. Values are determined by Trading Partner Agreement as 1 = highest priority, 5 = medium priority and 9 = lowest priority (No.1529).

5.2.2.24 PurchaseOrderType is the element that identifies category specification for a purchase order (No.1530).

5.2.2.25 RequestedEvent is the element that is a date of requested transport event (No.1531-1535).

5.2.2.26 ResponseTo is the group of elements that describes the trading partner whom a response business document must be sent when it is not equal to receiver (No.1536-1642).

5.2.2.27 SecondaryBuyer is the group of elements that describes an alternate buyer (No.1643-1755).

5.2.2.28 ShipTo is the group of elements that describes the trading partner and/or location that the product must be delivered to (No.1756-1862).

5.2.2.29 SpecialDiscount is the group of elements that represents a special discount based on the special discount identifier (No.1863-1874).

5.2.2.30 TaxExempStatus is the group of elements that describes tax exemption conditions (No.1875-1880).

5.2.2.31 TotalAmount is the group of elements that represents the total price of an entire business document (No.1881-1887).

5.2.3   PIP3A4: PurchaseOrderConfirmation

This PIP supports a buyer to issue a purchase order, and acknowledge supplier when the order is accepted, rejected, or pending. The supplier acknowledgment may also include related information about delivery expectation. The confirmation of this PIP consists of the elements as follows:

PurchaseOrderConfirmation is the root element of PIP3A4 (No.1-2226). All elements can be divided into two main sections. There are five percent of DocumentHeader that identifies general document information, sender information and receiver information of the business document (No.2-86) and ninety-five percent of PurchaseOrder that describes quantity of purchase products at an agree price and schedule (No.87-2226).

DocumentHeader consists of five main sections like PIP3A4: PurchaseOrderRequest.

PurchaseOrder consists of thirty-two main sections as follows:

5.2.3.1 AccountDescription is the group of elements that describes a customer or supplier account (No.88-211).

5.2.3.2 BillTo is the group of elements that describes the payer (No.212-318).

5.2.3.3   BusinessDocumentReference is the group of elements that refers indirectly to other related business documents (No.319-325).

5.2.3.4   Comments is the element that describes a general information (No.326).

5.2.3.5   ConfirmationType is the element that identifies type of exception process (No.327).

5.2.3.6   ContractInformation is the group of elements that represents a business arrangement for the supply of goods or services at an agreed price (No.328-330).

5.2.3.7   ContractOwner is the group of elements that describes the trading partner and/or location which the product must be set up to use or service (No.331-437).

5.2.3.8   FinancingTerms is the group of elements that describes finance terms (No.438-449).

5.2.3.9   GovernmentContractIdentifier is the group of elements that refers indirectly to other business related documents (No.450-456).

5.2.3.10 GovernmentPriorityRating is the element that is a priority rating code. It will be used when a contract number exists and PO type is Government (No.457).

5.2.3.11 Information is the element that describes information about a product (No.458).

5.2.3.12 InstallAt is the group of elements that describes the trading partner and/or location which the product must be set up to use or service (No.459-565).

5.2.3.13 IsDropShip is the element that indicates whether the order is a drop shipment (No.566).

5.2.3.14 ListPrice is the group of elements that represents the pre-discounted price (No.567-575).

5.2.3.15 Location is the group of elements that describes the location of business document (No.576-583).

5.2.3.16 OrderLineItem is the group of elements that describes an entry in a purchase order document (No.584-1722).

5.2.3.17 OrderShippingInformation is the group of elements that describes information of product shipping (No.1723-1734).

5.2.3.18 PurchaseOrderAcknowledgmentReason is the element that is a reason to acknowledge a purchase order (No.1735).

5.2.3.19 PuchaseOrderFillPriority is the element that identifies fill priority to manufacture in a constraint condition. Values are determined by Trading Partner Agreement as 1 = highest priority, 5 = medium priority and 9 = lowest priority (No.1736).

5.2.3.20 PurchaseOrderStatus is the element that identifies the status of a purchase order (No.1737).

5.2.3.21 PurchaseOrderType is the element that identifies category specification for a purchase order (No.1738).

5.2.3.22 RequestedEvent is the element that is a date of requested transport event (No.1739-1743).

5.2.3.23 ResponseTo is the group of elements that describes the trading partner whom a response business document must be sent when it is not equal to receiver (No.1744-1850).

5.2.3.24 ResponseDescription is the element that represents the description of response (No.1851).

5.2.3.25 ScheduledEvent is the element that is a date of requested transport event (No.1852-1856).

5.2.3.26 SecondaryBuyer is the group of elements that describes an alternate buyer (No.1857-1969).

5.2.3.27 ShipFrom is the group of elements that describes the location where the product is shipped from (No.1970-2076).

5.2.3.28 ShipTo is the group of elements that describes the trading partner and/or location that the product must be delivered to (No.2077-2183).

5.2.3.29 SpecialDiscount is the group of elements that represents a special discount based on the special discount identifier (No.2184-2195).

5.2.3.30 TaxExempStatus is the group of elements that describes tax exemption conditions (No.2196-2201).

5.2.3.31 TaxSummary is the group of elements that describes the total tax information of a local, regional or national taxing authority (No.2202-2219).

5.2.3.32 TotalAmount is the group of elements that represents the total price of an entire business document (No.2220-2226).

5.2.4 PIP3A8: PurchaseOrderChangeRequest

This PIP supports a buyer to change purchase order and obtain a quick response from the supplier. The acknowledgements can be accepted, rejected, or pending. The request of this PIP consists of the elements as follows:

PurchaseOrderChangeRequest is the root element of PIP3A8 (No.1-1436). All elements can be divided into two main sections. There are six percent of DocumentHeader that identifies general document information, sender information and receiver information of the business document (No.2-86) and ninety-four percent of PurchaseOrder that describes quantity of purchase products at an agree price and schedule (No.87-1436).

DocumentHeader consists of five main sections like PIP3A4: PurchaseOrderRequest.

PurchaseOrder consists of twenty-eight main sections as follows:

5.2.4.1 AccountDescription is the group of elements that describes a customer or supplier account (No.88-211).

5.2.4.2 BusinessDocumentReference is the group of elements that refers indirectly to other related business documents (No.212-218).

5.2.4.3 Comments is the element that describes a general information (No.219).

5.2.4.4 ContractInformation is the group of elements that represents a business arrangement for the supply of goods or services at an agreed price (No.220-222).

5.2.4.5 Date is the element that is the date stamp of a purchase order document (No.223).

5.2.4.6 FinancingTerms is the group of elements that describes finance terms (No.224-235).

5.2.4.7 GeneralServiceAdministrationNumber is the group of elements that identifies the number. It relates to a pre-established of end-user price agreement (No.236-242).

5.2.4.8 GovernmentContractIdentifier is the element that identifies the unique number as a government contract (No.243-249).

5.2.4.9 GovernmentPriorityRating is the element that is a priority rating code. It will be used when a contract number exists and PO type is Government (No.250).

5.2.4.10 InstallAt is the group of elements that describe the trading partner and/or location which the product must be set up to use or service (No.251-357).

5.2.4.11 IsDropShip is the element that indicates whether the order is a drop shipment (No.358).

5.2.4.12 OderShippingInformation is the group of elements that describe information of product shipping (No.359-370).

5.2.4.13 OriginalScheduledEvent is the group of elements that is scheduled the date of transportation event to occur (No.371-375).

5.2.4.14 ProductInformation is the element that describes the information of a product (No.376).

5.2.4.15 OrderLineItem is the group of elements that describes a business document entry of a product (No.377-1168).

5.2.4.16 PurchaseOrderChangeType is the element that identifies the type of purchase order change request (No.1169).

5.2.4.17 PurchaseOrderFillPriority is the element that identifies fill priority to manufacture in a constraint condition. Values are determined by Trading Partner Agreement as 1 = highest priority, 5 = medium priority and 9 = lowest priority (No.1170).

5.2.4.18 PurchaseOrderIdentifier is the group of elements that identifies a purchase order (No.1171-1177).

5.2.4.19 PurchaseOrderType is the element that identifies the category specification of a purchase order (No.1178).

5.2.4.20 ReceivedQuantityInformation is the group of elements that describes information regarding the quantity of the received product (No.1179-1188).

5.2.4.21 RequestEvent is the element that is a date of requested transport event (No.1189-1193).

5.2.4.22 RequestedShipFrom is the group of elements that describes the location where the product is requested to ship from (No.1194-1201).

5.2.4.23 RevisionNumber is the element that defines an incremental change number (No.1202).

5.2.4.24 ScheduleEvent is the group of elements that describes date of scheduled transport event (No.1203-1207).

5.2.4.25 SecondaryBuyer is the group of elements that describes an alternate buyer (No.1208-1320).

5.2.4.26 ShipTo is the group of elements that describes the trading partner and/or location that the product must be delivered to (No.1321-1427).

5.2.4.27 TaxExempStatus is the group of elements that describes tax exemption conditions (No.1428-1433).

5.2.4.28 TotalAmount is the group of elements that represents the total price of an entire business document (No.1434-1436).

5.2.5   PIP3A8: PurchaseOrderChangeConfirmation

This PIP supports a buyer to change purchase order and obtain a quick response from the supplier. The acknowledgements can be accepted, rejected, or pending. The confirmation of this PIP consists of the elements as follows:

PurchaseOrderChangeConfirmation is the root element of PIP3A8 (No.1-1904). All elements can be divided into two main sections. There are five percent of DocumentHeader that identifies general document information, sender information and receiver information of the business document (No.2-86) and ninety-five percent of PurchaseOrder that describes quantity of purchase products at an agree price and schedule (No.87-1904).

DocumentHeader consists of five main sections like PIP3A4: PurchaseOrderRequest.

PurchaseOrder consists of thirty-two main sections as follows:

5.2.5.1   AccountDescription is the group of elements that describes a customer or supplier account (No.88-211).

5.2.5.2   BusinessDocumentReference is the group of elements that refers indirectly to other related business documents (No.212-218).

5.2.5.3   Comments is the element that describes a general information (No.219).

5.2.5.4   ConfirmationType is the element that identifies the type of exception process (No.220).

5.2.5.5   ContractInformation is the group of elements that represents a business arrangement for the supply of goods or services at an agreed price (No.221-223).

5.2.5.6   Date is the element that is the date stamp of a purchase order document (No.224).

5.2.5.7   FinancingTerms is the group of elements that describes financing terms (No.225-236).

5.2.5.8   GeneralServiceAdministrationNumber is the group of elements that identifies the number. It relates to a pre-established of end-user price agreement (No.237-243).

5.2.5.9   GovernmentContractIdentifier is the element that identifies the unique number as a government contract (No.244-250).

5.2.5.10 GovernmentPriorityRating is the element that is a priority rating code. It will be used when a contract number exists and PO type is Government (No.251).

5.2.5.11 InstallAt is the group of elements that describe the trading partner and/or location which the product must be set up to use or service (No.252-358).

5.2.5.12 IsDropShip is the element that indicates whether the order is a drop shipment (No.359).

5.2.5.13 OderShippingInformation is the group of elements that describe information of product shipping (No.360-371).

5.2.5.14 OriginalScheduledEvent is the group of elements that is scheduled the date of transportation event to occur (No.372-376).

5.2.5.15 ProductInformation is the element that describes the information of a product (No.377).

5.2.5.16 ProductLineItem is the group of elements that describes a business document entry of a product (No.378-1475).

5.2.5.17 PurchaseOrderAcknowledgmentReason is the element that represents the reason of a purchase order acknowledgement (No.1476).

5.2.5.18 PurchaseOrderChangeType is the element that identifies the type of purchase order change request (No.1477).

5.2.5.19 PurchaseOrderFillPriority is the element that identifies fill priority to manufacture in a constraint condition. Values are determined by Trading Partner Agreement as 1 = highest priority, 5 = medium priority and 9 = lowest priority (No.1478).

5.2.5.20 PurchaseOrderIdentifier is the group of elements that identifies a purchase order (No.1479-1485).

5.2.5.21 PurchaseOrderStatus is the element that identifies the status of a purchase order (No.1486).

5.2.5.22 PurchaseOrderType is the element that identifies the category specification of a purchase order (No.1487).

5.2.5.23 RequestEvent is the element that is a date of requested transport event (No.1488-1492).

5.2.5.24 RequestedShipFrom is the group of elements that describes the location where the product is requested to ship from (No.1493-1500).

5.2.5.25 RevisionNumber is the element that defines an incremental change number (No.1501).

5.2.5.26 ScheduleEvent is the group of elements that describes date of scheduled transport event (No.1502-1506).

5.2.5.27 SecondaryBuyer is the group of elements that describes an alternate buyer (No.1507-1619).

5.2.5.28 ShipForm is the group of elements that describes the location where the product is shipped from (No.1620-1726).

5.2.5.29 ShipTo is the group of elements that describes the trading partner and/or location that the product must be delivered to (No.1727-1833).

5.2.5.30 TaxExempStatus is the group of elements that describes tax exemption conditions (No.1834-1839).

5.2.5.31 TaxSummary is the group of elements that describes the total tax information of a local, regional or national taxing authority (No.1840-1901).

5.2.5.32 TotalAmount is the group of elements that represents the total price of an entire business document (No.1902-1904).

5.2.6   PIP3A9: PurchaseOrderCancellationRequest

This PIP supports a buyer to cancel a purchase order. The confirmation can be accepted or rejected. The request of this PIP consists of the elements as follows:

PurchaseOrderCancellationRequest is the root element of PIP3A9 (No.1-96). All elements can be divided into two main sections. There are ninety percent of DocumentHeader that identifies general document information, sender information and receiver information of the business document (No.2-86) and ten percent of PurchaseOrder that describes quantity of products at an agree price and schedule (No.87-96).

DocumentHeader consists of five main sections like PIP3A4: PurchaseOrderRequest.

PurchaseOrderCancellation consists of three main sections as follows:

5.2.6.1   PurchaseOrderCancellationReason is the element that identifies the cancellation reason of the purchase order (No.88).

5.2.6.2   PurchaseOrderIdentifier is the group of elements that identifies a purchase order (No.89-95).

5.2.6.3   RevisionNumber is the element that is an incremental change number (No.96).

5.2.7   PIP3A9: PurchaseOrderCancellationConfirmation

This PIP supports a buyer to cancel a purchase order. The confirmation can be accepted or rejected. The confirmation of this PIP consists of the elements as follows:

PurchaseOrderCancellationConfirmation is the root element of PIP3A9 (No.1-104). All elements can be divided into two main sections. There are eighty-three percent of DocumentHeader that identifies general document information, sender information and receiver information of the business document (No.2-86) and seventeen percent of PurchaseOrder that describes quantity of products at an agree price and schedule (No.87-104).

DocumentHeader consists of five main sections like PIP3A4: PurchaseOrderRequest.

PurchaseOrderCancellation consists of four main sections as follows:

5.2.7.1   PurchaseOrderCancellationReason is the element that identifies the cancellation reason of the purchase order (No.88).

5.2.7.2   PurchaseOrderIdentifier is the group of elements that identifies a purchase order (No.89-95).

5.2.7.3   RequestingDocument is the group of elements that identifies the request document of purchase order cancellation to track purpose (No.97-103).

5.2.7.4   RevisionNumber is the element that is an incremental change number (No.104).

From all PIPs in this section, they are compared by the group of elements as shown Table 5.1.

Table 5.1 The comparison of element groups among PIPs

Level	Element	PIP4A2	PIP3A4		PIP3A8		PIP3A9	
			R.	C.	R.	C.	R.	C.
1	EmbeddedReleaseForecastNotification	/						
1	PurchaseOrderRequest		/					
1	PurchaseOrderConfirmation			/				
1	PurchaseOrderChangeRequest				/			
1	PurchaseOrderChangeConfirmation					/		
1	PurchaseOrderCancellationRequest						/	
1	PurchaseOrderCancellationConfirmation							/
2	DocumentHeader	/	/	/	/	/	/	/
3	CorrelationInformation	/	/	/	/	/	/	/
3	DocumentInformation	/	/	/	/	/	/	/
3	HeaderVersion	/	/	/	/	/	/	/
3	Receiver	/	/	/	/	/	/	/
3	Sender	/	/	/	/	/	/	/
2	EmbeddedReleaseForecast	/						
2	PurchaseOrder		/	/	/	/		
2	PurchaseOrderCancellation						/	/
3	EmbeddedReleaseForecastTransportEvent	/						
3	ForecastEvent	/						
3	ForecastIdentifierReference	/						
3	IsFinalForecast	/						
3	PartnerProductForecast	/						
3	AccountDescription		/	/	/	/		
3	BillTo		/	/				
3	BusinessDocumentReference		/	/	/	/		
3	Comments		/	/	/	/		
3	ConfirmationType			/		/		
3	ContractInformation		/	/	/	/		
3	ContractOwner		/	/				
3	Date				/	/		
3	FinancingTerms		/	/	/	/		
3	GeneralServiceAdministrationNumber				/	/		
3	GovernmentContractIdentifier		/	/	/	/		
3	GovernmentPriorityRating		/	/	/	/		

Table 5.1 The comparison of element groups among PIPs (Continues)

Level	Element	PIP4A2	PIP3A4 R.	PIP3A4 C.	PIP3A8 R.	PIP3A8 C.	PIP3A9 R.	PIP3A9 C.
3	Information		/	/				
3	InstallAt		/	/	/	/		
3	IsDropShip		/	/	/	/		
3	IsRequiredToRespondAtDetailLevel		/					
3	ListPrice		/	/				
3	Location		/	/				
3	OrderLineItem		/	/	/			
3	OrderShippingInformation		/	/	/	/		
3	OriginalScheduledEvent				/	/		
3	ProductInformation				/	/		
3	ProductLineItem					/		
3	PurchaseOrderAcknowledgmentReason			/		/		
3	PurchaseOrderCancellationReason						/	/
3	PurchaseOrderChangeType				/	/		
3	PurchaseOrderFillPriority		/	/	/	/		
3	PurchaseOrderIdentifier				/	/	/	/
3	PurchaseOrderStatus			/		/		
3	PurchaseOrderType		/	/	/	/		
3	ReceivedQuantityInformation				/			
3	RequestedShipFrom				/	/		
3	RequestedEvent		/	/	/	/		
3	RequestingDocument							/
3	ResponseTo		/	/				
3	ResponseDescription			/				
3	RevisionNumber				/	/	/	/
3	ScheduledEvent			/	/	/		
3	SecondaryBuyer		/	/	/	/		
3	ShipFrom			/		/		
3	ShipTo		/	/	/	/		
3	SpecialDiscount		/	/				
3	TaxExempStatus		/	/	/	/		
3	TaxSummary			/		/		
3	TotalAmount		/	/	/	/		

Remark

R.   stands for   Request

C.   stands for   Confirmation

From Table 5.1, the main elements in XML Schema of each PIP are both similar and different. The first element in level 1 has different name that depends on the business process of each PIP. The second part is document header that every PIPs has. The third part is element name that defines the responsibility of each PIP. They are different but PIP3A4 is similar to PIP3A8. The forth part is the detail of each document. PIP4A2 is absolutely different from other PIPs because PIP4A2 is forecast while PIP3A4, PIP3A8, and PIP3A9 are purchase order.

PIP3A9 has few main element groups because it is cancellation, so detail is not necessary. It only has the number of purchase order, reason of cancellation, and minor data. PIP3A4 and PIP3A8 consist of many element groups. Almost of them are alike. Request is a little different from confirmation. The difference of PIP3A4 and PIP3A8 is a contract section, the detail of the company that the product will be send to, the price before discount of the raw material, discount, and the detail of each raw material order.

Request of PIP3A4 has additional data about the response requirement. Confirmation of PIP3A4 has confirmation type, reason of response, status of purchase order, transportation date and location of raw material, and total tax.

PIP3A8 is different from PIP3A4. It consists of expectation date of raw material receiving, agreed price, change type, DUNS number for sending raw material, time of change because it is purchase order change. Request of PIP3A8 has the detail of each raw material order and amount of receiving raw material because they can change. Confirmation of PIP3A8 is similar to confirmation of PIP3A4. It consists of confirmation type, related document about raw material in purchase order, reason of response, status of purchase order, location for transportation, and total tax.

From above mention, it shows that each PIP has some same element groups. Every PIPs has DocumentHeader. PIP3A4 and PIP3A8 have many same element groups, because both of them are related to purchase order. For this reason, if we apply the standard of electronic data exchange, data usage is easier than manual

operation. From only once data insertion, it can be used in many transactions, so the operation time and errors have decreased.

5.3   The result of business document structure analysis

The tables which were described in the chapter III can help to analyze the structures of business documents of the RosettaNet standard in XML Schema form. The business documents of the company that use to compare with the business document structures of the RosettaNet standard are shown in appendix A. PIP4A2 is compared with forecast document that is FC01 in appendix A. PIP3A4, PIP3A8, and PIP3A9 are compared with purchase order that is PO01 in appendix A. The analysis from these tables is more comfortable than the analysis from XML Schema of each PIP. The result of business document structure analysis of each PIP is shown in appendix C.

This part shows the summary result that consists of PIP4A2, PIP3A4, PIP3A8, and PIP3A9. The element groups of each PIP are classified as Table 5.1. And, the accordance of each element group with the business document of the company is explained as follows:

5.3.1   PIP4A2: EmbeddedReleaseForecastNotification

DocumentHeader consists of five main sections as follows:

5.3.1.1   CorrelationInformation: this group of elements is O because the company does not make any contracts with suppliers before starting business operation together. There are not any documents that refer to forecast document request. However, it is possible to make the contracts or the forecast document request before starting business operation in the future.

5.3.1.2   DocumentInformation: this group of elements is divided into five parts. The first part is Y because it explains about forecast document. It consists of date of business document creation which conforms to date in the forecast report document of the company. The second part is O because it indicates the forecast document either document code or type of the document. The forecast document of the company does not have it, but it is probably added in the future for

the convenience to search the forecast document in the company. The third part is M because it indicates the standard of each document standard. It is essential to show that the document is made by the RosettaNet standard. The fourth part is O because it is the summary data about file attachment of forecast document. It depends on the company that wants to attach files or not. The last part is M because it is the security data of the forecast document to check safety according to the RosettaNet standard.

5.3.1.3   HeaderVersion: this element is N because the forecast document of the company does not have this data, and it is unnecessary because it is UN/CEFACT standard.

5.3.1.4   Receiver: this group of elements is divided into three parts. The first part is M because it explains about the receiver of the forecast document. It consists of basic data of the RosettaNet standard. It is used to indicate the type of PIP of each business document. The second part is the data of supplier which is both Y and O. It depends on the forecast report document of the company that has these elements or not. And, some elements probably require that depend on the company. The last part indicates the detail of the company. The name of the company is Y. Other identifications are O that depend on the company.

5.3.1.5   Sender: this group of elements explains about the sender of the forecast document. It consists of the same elements as Receiver. Almost of element requirements are similar, but there are different in the part of supplier. It is Y because it is already in the forecast report document of the company.

EmbeddedReleaseForecast consists of five main sections as follows:

5.3.1.6   EmbeddedReleaseForecastTransportEvent: this element is N because the forecast report document of the company does not have the transport part, and it is unnecessary for forecast document.

5.3.1.7 ForecastEvent: this element is O because it is informed about the cause that leads to send the forecast document. It depends on the company.

5.3.1.8   ForecastIdentifierReference: this group of elements is N because there is not any reference document for forecast document.

5.3.1.9   IsFinalForecast: this element is M because it is informed that this forecast document is the exact one.

5.3.1.10 PartnerProductForecast: this group of elements consists of Y, N, O, and M. It depends on each element. It can be divided into three groups as follows:

- PartnerDescription: this group of elements focuses on the part of FullPartner because it is the most complete and flexible class. The group of elements in the part of PhysicalAddress is O because it depends on the company. The other data can bring from the DocumentHeader to use, so it is N.

- ProductForecastInformation: this group of elements explains about the detail of forecasted material. It consists of the detail of material and the quantity of requested material in each month. It has the quantity of next month that will exactly be ordered including next three months forecast. Moreover, there is measure unit that is Y because it is corresponded with the forecast report document of the company. The other data is N because it is the addition part about the detail of receiving to sending material, and the reference documents that relate to the material. The forecast report document of the company does not have these data.

- SoldTo: this group of elements is N because it identifies that all of materials will be produced to sell to which company. The forecast report document of the company does not have these data, and they are unnecessary to identify.

5.3.2   PIP3A4: PurchaseOrderRequest

DocumentHeader consists of five main sections as follows:

5.3.2.1 CorrelationInformation: this group of elements is O because the company does not make any contracts with suppliers before starting business operation together. There are not any documents that refer to purchase order request. However, it is possible to make the contracts or the purchase order request before starting business operation in the future.

5.3.2.2 DocumentInformation: this group of elements is divided into five parts. The first is Y because it explains about purchase order. It consists of date of business document creation which conforms to date in the purchase order of the company. The second part is O because it indicates the purchase order

either document code or type of the document. The purchase order of the company does not have it, but it is probably added in the future for the convenience to search the purchase order in the company. The third part is M because it indicates the standard of each document standard. It is essential to show that the document is made by the RosettaNet standard. The fourth part is O because it is the summary data about file attachment of purchase order. It depends on the company that wants to attach files or not. The last part is M because it is the security data of the forecast document to check safety according to the RosettaNet standard.

5.3.2.3 HeaderVersion: this element is N because the purchase order of the company does not have this data, and it is unnecessary because it is UN/CEFACT standard.

5.3.2.4 Receiver: this group of element is divided into three parts. The first part is M because it explains about the receiver of the purchase order. It consists of the basic data of the RosettaNet standard. It is used to indicate the type of PIP of each business document. The second part is the data of supplier which is both Y and O. It depends on the purchase order of the company that has these elements or not. Some elements probably require that depend on the company. The last part indicates the detail of the company. The name of the company is Y. Other identifications are O that depend on the company.

5.3.2.5 Sender: this group of elements explains about the sender of the purchase order. It consists of the same elements as Receiver. Almost of element requirements are similar, but there are different in the part of supplier. It is Y because it is already in the purchase order of the company.

PurchaseOrderRequest consists of twenty-six main sections as follows:

5.3.2.6 AccountDescription: the first group of elements explains about financial account and credit card information of a customer or a supplier which is O. It depends on the company that wants to fill these data or not. The second part explains general data of trading partner. In the part of physical address elements are both Y and O because some elements relate to the purchase order of the company. Some elements depend on the company that needs them or not. The remainder elements are N because they are already in the DocumentHeader. The last

part is O because it is payment. The purchase order of the company does not have these data, but it can be added to show how to pay.

5.3.2.7 BillTo: this group of elements is N because it describes about payer which has already identified in the part of DocumentHeader.

5.3.2.8 BusinessDocumentReference: this group of elements is N because it describes about reference documents of the purchase order. The company does not have these documents.

5.3.2.9 Comments: this element is Y because the purchase order of the company has data about condition and sender which can be filled in this part.

5.3.2.10 ContractInformation: this group of elements is O because the company may make the contract document about raw material order in the future.

5.3.2.11 ContractOwner: this group of elements is N because it explains about person who make contract with the company. It is the same data as DocumentHeader because the company has general connection with trading partner. So, if contract is made, it will be the same data as DocumentHeader.

5.3.2.12 FinancingTerms: this group of elements is N because it explains about each payment. The company does not define payment in the purchase order.

5.3.2.13 GovernmentContractIdentifier: this group of elements is N because it describes the contract of the company with the government. In this case, the company only orders raw material with private companies.

5.3.2.14 GovernmentPriorityRating: this element is N because it is rating code of purchase order that is made with the government. In this case, the company only orders raw material with private companies.

5.3.2.15 Information: this element is N because it explains about general data of raw material. The purchase order of the company does not have this part. There are only raw material code and name of raw material.

5.3.2.16 InstallAt: this group of elements is N because it explains about the customer company that raw material will be sent to. It has already been in the DocumentHeader.

5.3.2.17 IsDropShip: this element is N because the purchase order of the company does not identify the shipment.

5.3.2.18 IsRequiredToRespondAtDetailLevel: this group is N because company does not want to send back in this part.

5.3.2.19 ListPrice: this group of elements is N because the purchase order of the company does not have this part. It is not necessary because the agreed price of raw material has already committed before making purchase order.

5.3.2.20 Location: this group of elements is N because document location is not necessary for the company.

5.3.2.21 OrderLineItem: this group of elements is the most important of purchase order because it describes the detail of purchasing raw material. The main information consists of price, quantity, raw material list, and total cost of each raw material. The elements will be Y, if the purchase order of the company already has these data. The elements will be O, if some data are not in the purchase order of the company. If the elements are beneficial and available to add, they will be O. Other elements which are the detail of service will be N because the company does not use them.

5.3.2.22 OrderShippingInformation: this group of elements is N because the purchase order of the company does not have data about product transportation.

5.3.2.23 PurchaseOrderFillPriority: this element is O because it depends on the company that needs this part to identify the importance of each purchase order.

5.3.2.24 PurchaseOrderType: this element is M because it informs the type of purchase order.

5.3.2.25 RequestedEvent: this group of elements is M because it informs the date of raw material transportation.

5.3.2.26 ResponseTo: this group of elements is N because it explains the detail of the person that must send data back. It is unnecessary for the company.

5.3.2.27 SecondaryBuyer: this group of elements is N because it describes the detail about other trading partners. It is not necessary for the company.

5.3.2.28 ShipTo: this group of elements is O because it describes the detail of the company that will be received product. It depends on the company because it may be different place from the company that defined in the DocumentHeader.

5.3.2.29 SpecialDiscount: this group of elements is O because the company may add data about raw material discount.

5.3.2.30 TaxExempStatus: this group of elements is O because the company may add data about tax exception.

5.3.2.31 TotalAmount: this group of elements can be both Y and O because some elements correspond with data in the purchase order of the company. Some elements may be added in order to show more important detail about total cost.

5.3.3   PIP3A4: PurchaseOrderConfirmation

DocumentHeader is similar to PIP3A4: PurchaseOrderRequest.

PurchaseOrderConfirmation consists of thirty-two main sections. Most of them is similar to PurchaseOrderRequest and can apply like PurchaseOrderRequest except IsRequiredToRespondAtDetailLevel. However, there are some additional elements as follows:

5.3.3.1 ConfirmationType: this element is M because it shows the confirmation type.

5.3.3.2 PurchaseOrderAcknowledgmentReason: this element is M because it shows the response data.

5.3.3.3 PurchaseOrderStatus: this element is M because it shows status of each purchase order.

5.3.3.4 ResponseDescription: the group of elements is O because it depends on the company that needs to add the description of the purchase order or not.

5.3.3.5 ScheduleEvent: the group of elements is N because it defines the date of raw material transportation. It has already had in the RequestedEvent.

5.3.3.6   ShipFrom: the group of elements is O because it describes the detail of the supplier that send raw material to the company. It depends on the company because it may be different place from the company that defined in the DocumentHeader.

5.3.3.7   TaxSummary: the group of elements is O because the company probably adds these data in TotalAmount.

5.3.4   PIP3A8: PurchaseOrderChangeRequest

DocumentHeader is similar to PIP3A4: PurchaseOrderRequest.

PurchaseOrderChangeRequest consists of twenty-eight main sections. Most of them are similar to PurchaseOrderRequest. They can apply like PurchaseOrderRequest but except eight groups that are BillTo, ContractOwner, Information, IsRequiredToRespondAtDetailLevel, ListPrice, Location, ResponseTo, and SpecialDiscount. However, there are some additional elements as follows:

5.3.4.1   Date: this element is O because it is the date stamp of the purchase order. It depends on the company.

5.3.4.2   GeneralServiceAdministrationNumber: the group of elements is N because the purchase order of the company does not have it.

5.3.4.3   OriginalScheduleEvent: the group of elements is N because the purchase order of the company does not have information of transportation.

5.3.4.4   ProductInformation: this element is N because the purchase order of the company does not have data of raw material that except identification and name.

5.3.4.5   PurchaseOrderChangeType: this element is M because it describes type of purchase order change.

5.3.4.6   PurchaseOrderIdentifier: the group of elements is N because reference of purchase order uses only P/O number that has already had in DocumentHeader.

5.3.4.7   ReceivedQuantityInformation: the group of elements is N because raw material receiving of the company has another system to manage. It is not in the purchase order.

5.3.4.8 RequestedShipFrom: the group of elements is N because the company does not request raw material manufacturer.

5.3.4.9 RevisionNumber: this element is M because it defines time of change.

5.3.4.10 ScheduleEvent: the group of elements is N because raw material receiving of the company has another system to manage. It is not in the purchase order.

5.3.5 PIP3A8: PurchaseOrderChangeConfirmation

DocumentHeader is similar to PIP3A8: PurchaseOrderChangeRequest.

PurchaseOrderChangeConfirmation consists of thirty-two main sections. Most of them is similar to PurchaseOrderChangeRequest. They can apply like PurchaseOrderChangeRequest but except two groups that are OrderLineItem and ReceivedQuantityInformation. However, there are some additional elements as follows:

5.3.5.1 ConfirmationType: this element is M because it shows the confirmation type.

5.3.5.2 ProductLineItem: the group of elements consists of M, Y, O, and N because some elements correspond with the purchase order of the company. Some elements can be added to complete the purchase order in the future such GTIN (Global Trade Item Number) that is number of the raw material. However, most of elements are N because they are the detail that are unnecessary for the company.

5.3.5.3 PurchaseOrderAcknowledgmentReason: this element is M because it shows the response data.

5.3.5.4 PurchaseOrderStatus: this element is M because it shows status of each purchase order.

5.3.5.5 ShipFrom: the group of elements is O because it describes the detail of the supplier that send raw material to the company. It depends on the company because it may be different place from the company that defined in the DocumentHeader.

5.3.5.6   TaxSummary: the group of elements is O because the company probably adds these data in TotalAmount.

5.3.6   PIP3A9: PurchaseOrderCancellationRequest

DocumentHeader is similar to PIP3A4: PurchaseOrderRequest.

PurchaseOrderCancellationRequest consists of three main sections as follows:

5.3.6.1   PurchaseOrderCancellationReason: this element is M because it explains the reason of purchase order cancellation.

5.3.6.2   PurchaseOrderIdentifier: the group of elements consists of both Y and O because it depends on the purchase order of the company.

5.3.6.3   RevisionNumber: this element is M because it defines time of change before cancellation.

5.3.7   PIP3A9: PurchaseOrderCancellationConfirmation

DocumentHeader is similar to PIP3A9: PurchaseOrderCancellation-Request.

PurchaseOrderCancellationConfirmation consists of four main sections. Most of them is similar to PurchaseOrderCancellationRequest and can apply like PurchaseOrderCancellationRequest. However, there are some additional elements as follows:

5.3.7.1 RequestingDocument: the group of elements is N because the purchase order of the company does not have reference document to cancel the purchase order.

5.4   Discussion

From the result of the business document structure analysis, all of elements in each PIP can be classified into three groups according to the requirement of the company.

First, it is called "essential elements" that conform to the business document of the company. When the business document only has this group of

elements, it can operate the business transactions. Second, it is called "additional elements". They can be added into the business document of the company in order to enhance efficiency of business operation. Finally, it is called "unnecessary elements" that are unnecessary for the company to operate the business transactions.

In each PIP discussion, the required elements of each group are calculated as percent. The solutions show as follows:

PGP = (SEG x 100) / (TEP - SCP)

PGP   stands for   Percent of each group of each PIP.

SEG   stands for   Sum of elements (of each group).

TEP   stands for   Total of elements (of each PIP).

SCP   stands for   Sum of Ch. elements (of each PIP)

The percent of each group of each PIP will be shown in Table 5.2. It shows percent of Y and M elements (essential element), percent of O elements (additional element), and percent of N elements (unnecessary element). It consists of PIP4A2, PIP3A4, PIP3A8, and PIP3A9.

Table 5.2 The required percent of each element group of PIP4A2, PIP3A4, PIP3A8, and PIP3A9

Group of required elements	PIP 4A2	PIP3A4		PIP3A8		PIP3A9	
		R.	C.	R.	C.	R.	C.
Essential element (Y and M)	59 / 16	68 / 4	76 / 3	60 / 4	65 / 4	39 / 42	40 / 40
Additional element (O)	56 / 16	148 / 8	210 / 10	105 / 8	265 / 14	43 / 46	43 / 42
Unnecessary element (N)	246 / 68	1581 / 88	1847 / 87	1205 / 88	1488 / 82	11 / 12	18 / 18
Total element	361	1797	2133	1370	1818	93	101
%	100	100	100	100	100	100	100

Remark

R.   stands for   Request

C.   stands for   Confirmation

Table 5.2 shows that each PIP has different element amount. PIP3A9 has the least elements, while PIP3A4 is nearby PIP3A8 that have the most elements. However, total elements of each PIP are calculated as one hundred percent. Every PIPs that except PIP3A9 has maximum unnecessary element (N). For PIP3A4 and PIP3A8, many unnecessary elements are about trading partner information in the content (not include document header). It has four choices for the company to exactly use. This group of elements repeatedly appears in the structure of business document, because there are various business activities that related to trading partner such as contract information, location of product delivery and so on. For this company, it has already defined trading partner information in receiver section of document header.

Another group of unnecessary elements is about product transportation. The company has another document to mange this section, so these elements are unnecessary. For PIP4A2, unnecessary elements come from transportation. The company does not have these data in the forecast report document. PIP3A9 has minimal unnecessary elements because it does not have group of elements as mentioned previously. It has very slight elements in the content.

For additional element (O), PIP3A4 is similar to PIP3A8, because both of them are about purchase order. Most of additional elements of them are in the content, while most of additional elements of PIP4A2 and PIP3A9 are in document header.

For essential element (Y and M), overall image of every PIPs is like additional elements. But, essential elements of all PIPs are in document header.

Next part, the percent of each element group of each PIP is demonstrated including the different requirement of each element group.

5.4.1   PIP4A2: EmbeddedReleaseForecastNotification

First, sixteen percent of all elements are essential element. They consist of forecasted product information.

Second, sixteen percent of all elements are additional element. They consist of code that initials the forecast and detail of forecasted product information.

Finally, sixty-eight percent of all elements are unnecessary element. They consist of details about various reference documents and information about transportation.

5.4.2   PIP3A4: PurchaseOrderRequest

First, four percent of all elements are essential element. They consist of comment for purchase order, raw material information in purchase order, purchase order type, transportation date, and total price of purchase order.

Second, eight percent of all elements are additional element. They consist of supplier account, business arrangement of raw material at agreed price, additional data of raw material, importance of purchase order, detail of shipped from place, special discount, condition of tax exemption, and detail of total price of purchase order.

Finally, eighty-eight percent of all elements are unnecessary element. They consist of detail of supplier account, data of payer, referenced documents, data of contract owner, detail of financing term, purchase data with government, list price, detail of shipping, and detail of alternate buyer.

5.4.3   PIP3A4: PurchaseOrderConfirmation

First, three percent of all elements are essential element. They consist of comment for purchase order, confirmation type, raw material information in purchase order, acknowledgment reason, purchase order status, purchase order type, transportation date, and total price of purchase order.

Second, ten percent of all elements are additional element. They consist of supplier account, business arrangement of raw material at agreed price, additional data of raw material, importance of purchase order, description of response, detail of shipped to place, detail of shipped from place, special discount, condition of tax exemption, total tax, and detail of total price of each purchase order.

Finally, eighty-seven percent of all elements are unnecessary element. They consist of detail of supplier account, data of payer, referenced documents, data of contract owner, detail of financing term, purchase data with government, list price, detail of shipping, and detail of alternate buyer.

5.4.4   PIP3A8: PurchaseOrderChangeRequest

First, four percent of all elements are essential element. They consist of comment of purchase order, raw material information in purchase order, type of purchase order change, transportation date, revision number, and total price of each purchase order.

Second, eight percent of all elements are additional element. They consist of supplier account, business arrangement of raw material at agreed price, stamped date of purchase order, additional data of raw material, importance of purchase order, detail of shipped to place, conditions of tax exemption, and detail of total price of purchase order.

Finally, eighty-eight percent of all elements are unnecessary element. They consist of detail of supplier account, referenced documents, detail of financing term, purchase data with government, detail of shipping, and detail of alternate buyer.

5.4.5   PIP3A8: PurchaseOrderChangeConfirmation

First, four percent of all elements are essential element. They consist of comment of purchase order, confirmation type, acknowledgment reason, type of purchase order change, purchase order status, purchase order type, transportation date, revision number, and total price of each purchase order.

Second, fourteen percent of all elements are additional element. They consist of supplier account, business arrangement of raw material at agreed price, stamped date of purchase order, detail of shipped to place, detail of shipped from place, conditions of tax exemption, total tax, and detail of total price of each purchase order.

Finally, eighty-two percent of all elements are unnecessary element. They consist of detail of supplier account, referenced documents, detail of financing term, purchase data with government, detail of shipping, and detail of alternate buyer.

5.4.6   PIP3A9: PurchaseOrderCancellationRequest

First, forty-two percent of all elements are essential element. They consist of reason of cancellation, and revision number.

Second, forty-six percent of all elements are additional element. They only consist of part from document header.

Finally, twelve percent of all elements are unnecessary element. They consist of code of purchase order.

5.4.7   PIP3A9: PurchaseOrderCancellationConfirmation

First, forty percent of all elements are essential element. They consist of reason of cancellation, and revision number.

Second, forty-two percent of all elements are additional element. They only consist of part from document header.

Finally, eighteen percent of all elements are unnecessary element. They consist of code of purchase order, and requested document.

From every PIPs, the percent of essential element is the least from all PIPs. Most of them are from document header part. There is a little in the main content of each PIP. Examples are product information and total price. The maximal element is unnecessary element. Examples are location of the trading partners, the transportation, and detail of product information. For this case study, the location of trading partner has only one location in the document header part, so other locations in each PIP is not be used. Transportation data is not in the purchase order of the company, so it is not be used for this case study.

CHAPTER VI
CONCLUSION

This research proposes the methodology to apply the RosettaNet standard in the case study of the Thai automotive industry. Data gathering is the first step to understand feature of business operation of the company. And then, the business processes of the company are analyzed to map with PIPs of the RosettaNet standard. Finally, the business documents of the company are analyzed to check that each element of each PIP can be applied or not.

From the first and the second step, the business processes between the company and trading partners from sourcing to delivery are collected and created the swimlane diagrams in order to map with PIPs in next step.

According to the third step about business process analysis, there are two clusters that correspond to the business processes of the case study. They   are   Order Management (cluster 3) and Inventory management (cluster 4). There are six PIPs namely PIP3A2, PIP4A2, PIP3C3, PIP3A4, PIP3A8, and PIP3A9 that can be applied. However, there are some constraints because the business processes of the company are different from the RosettaNet standard. When exchanging legal documents, the policy of the company still requires signatures on legal documents. In this case study, the company was unable to use PIP 3C3 for receiving invoices and sending back copies of invoices. However, it can be possible if the policy of signature requirement is removed or use some element of each PIP instead to prove that the invoice is already signed such element "Comments". The company can set the private number of the authority that only knows between two trading partners. Some business processes depend on some conditions of the company, so it cannot apply in the form of PIP. In this case study, PIP3A2 cannot be applied because it depends on the condition of the company about supplier selection. As a result, they remain four PIPs from six PIPs to continually analyze the structures of business documents.

In the last step about analysis of the business document structure, the RosettaNet standard changed method from DTD to XML Schema few years ago. There are three main differences between two methods that are structure, element amount, and element name. First aspect that is explained is the structure. XML Schema organizes the structure of elements better than DTD. For example, the basic elements that appear in all of business documents consist of sender, receiver, document identifier, date and time of document creation. XML Schema arranges these elements in the part of document header. They are fixed in the same structure of every PIPs, while these elements are scattered in DTD, do not have specific structure. XML schema has root element to identify the responsibility of each PIP such EmbeddedReleaseForecastIdentification, PurchaseOrderRequest, but DTD does not have it. In DTD, some PIPs begin with fromRole (as Sender in XML Schema), while some PIPs begin with name of responsibility. As DTD has different structure from XML Schema, level of each element is absolutely different. In the aspect of structure, XML Schema is more standard than DTD. Second, it is about element amount. XML Schema has elements more than DTD, because it provides additional elements, and choice to precisely use. In document header, XML Schema has additional elements from DTD that consist of contract information, request document, attachment documents, and security specification. Moreover, PartnerDescription of XML Schema has four choices that include FullPartner, IntermittentPartner, KnownPartnerContact, and NewPartner, while DTD has only one choice that likes FullPartner of XML Schema. In the aspect of element amount, XML Schema provides the basic elements more than DTD. It is useful for users to apply, because users can choose the most suitable group of elements. Finally, some element names of XML Schema are different from DTD. In the case of different name of elements, element names of XML Schema are clearer than DTD. Example is a comparison between GlobalBusinessIdentifier of DTD and DUNS of XML Schema. The users may not understand GlobalBusinessIdentifier, while DUNS is a direct word. It is a number that is assigned by Dun and Bradstreet to identify a business location. From all of reasons, XML Schema is more standard and suitable to apply more than DTD, so the structure of business document in the form of XML Schema is studied.

From mention above, this part will compare the result when the same PIP is applied in different methods. In this part, PIP4A2 is selected to be the example PIP, and the result of comparison is shown as Table 6.1.

Table 6.1   The comparison of required percent of each element group of PIP4A2 between DTD and XML Schema

Group of required elements	DTD		XML Schema	
Essential element (Y and M)	36	33	59	16
Additional element (O)	35	32	56	16
Unnecessary element (N)	39	35	246	68
Total elements / %	110	100	361	100

Table 6.1 shows that DTD and XML Schema have different element amount. DTD has elements less than XML Schema. However, total elements of two methods are calculated as one hundred percent. DTD has percent of essential element (Y and M) and additional element (O) more than XML Schema. From all elements, DTD has basic elements more than XML Schema, while almost elements in XML Schema are additional and unnecessary elements. So, the component manufacturer can use DTD to exchange data between suppliers, because it provides all basic elements of forecast content such as part number, quantity, frozen zone, and forecast interval. However, XML Schema provides document header better than DTD. It has more detail than DTD such as document attachment, document security, and standard of data exchange. They are important issues that the company should consider. Moreover, XML Schema provides additional elements for future. For example, the head office makes a purchase order, but the raw material must send to the factory that locates in another place. The RosettaNet standard has already provided these elements.

From the analysis of the business document structure, we found that there were few basic data elements for each business activity in the business document, while the structure of business document of each PIP consists of many data elements. An example is a forecast report document. It consists of supplier name, contact name, date, product model, product number, product name, quantity of product in the present month, and quantity of product forecasted over the next three months, while the structure of business document of PIP 4A2 consists of many data elements. Examples are DUNS which is a number to identify a business location and GLN (Global Location Numbers) which is a number to identify legal entities, trading parties and location.

Currently, some data elements are not necessary for the company, so many additional data elements in the structures of business documents (XML Schemas of PIPs) may be obstacles to apply this standard. However, if the company needs to add these data elements in the future, the RosettaNet standard can be used to create competitive advantages. Examples include using DUNS element for checking reliability of other companies, using GLN element for checking the origin of the component, or using GTIN (Global Trade Item Number) element for defining each raw material. Moreover, there are many elements that can add in the future when the company expands the business. The structures of business documents of the RosettaNet standard provide the elements that the company can define different location of each factory. For example, the head office makes a purchase order, but the raw material must send to the factory that locates in another place. The RosettaNet standard already provided these elements.

When the companies apply the RosettaNet standard, there are two main benefits. First, it is efficiency about data accuracy because business documents of the company have duplicate data. Especially, almost data elements of purchase order request, purchase order change, purchase order cancellation are the same data. Forecast report document and purchase order have data redundancy in the part of document header. So, the standard of data exchange can decrease data redundancy and data error. In this part, the examples of PIPs that relate to the business transactions of the company are exemplified in order to demonstrate the data redundancy quantity of different business transactions. Each PIP has some same groups of elements. In this

research, it is inexactly calculation. All elements are not used to calculate because each PIP has many elements and it waste time. Groups of elements that were shown in Table 5.1are used to calculate. The duplicate element groups of each PIP can be calculated as percent to clearly demonstrate the number of element redundancy of each PIP.

The percent of redundant element groups of each PIP is calculated by the solution as follows:

$$PRP = (SRG \times 100) / TGP$$

PRP	stands for	Percent of redundant element groups of each PIP.
SRG	stands for	Sum of redundant element groups between two PIPs that are needed to compare.
TGP	stands for	Total element groups of each PIP.

In the part of document header, one-hundred percent of all PIP elements are same. In the part of content, elements of PIP3A4 and PIP3A8 are very redundant. Element groups of PIP3A4 duplicate with PIP3A8 approximately seventy-three percent, while element groups of PIP3A8 duplicate with PIP3A4 approximately seventy-one percent. Element group of PIP3A9 duplicate with PIP3A8 around fifty percent, while element group of PIP3A8 duplicate with PIP3A9 around six percent.

It shows that there are many redundant data in different business transactions that are forecast report document, purchase order request, purchase order change, and purchase order cancellation. So, when the companies adopt the data standard, data error can be decreased. Because the companies insert data only once time, the data can be used in all business transactions that have the same data as insertion such as the supplier name, item of material, material number, material quantity, and material cost.

Second, it is traceability. The automotive industry is about assembly industry, so it has many parts from various locations. Currently, Thailand already has product liability law (PL law) that is about the safety of each product. From this reason, traceability has become the important factor in automotive industry. It can backward check the location of raw material production in each step. The RosettaNet standard has the elements that can use for traceability. It has GTIN to define each raw material, and GLN to identify the origin of the component. The organization can use

GTIN and GLN for traceability. The first-tier supplier can trace the location of each raw material from the second-tier supplier. Moreover, if the RosettaNet standard can be applied in the third-tier supplier, the traceability will be more efficient because it can trace since the original location of each raw material.

In the part of security, the RosettaNet standard provides main security services for message-level security. They consist of authentication, authorization, confidentiality, integrity, and non-repudiation. Other security services are depended on the company to enhance security of message exchange. For example, available that is the property of a system can be access any time upon demand by authorized users.

Since most of elements are unnecessary elements, it may be constraint to adopt for the Thai automotive company in small or medium size. Nevertheless, the company can utilize the essential elements and additional elements of the RosettaNet standard as prototype to develop electronic data exchange system, because the RosettaNet standard standardize the common business data that are product description, pricing information, sender information, receiver information, and document information. These elements are basic data for almost companies. Moreover, the RosettaNet standard also provides the basic security to exchange electronic data. So, if the company adhere the standard of data exchange, it and its trading partners can develop the data exchange system in the same direction.

Currently, a component manufacturer in the Thai automotive industry has started to implement the data exchange system that is inspired by the RosettaNet standard. It has developed the prototype system to exchange data that consist of forecast, purchase order, purchase order cancellation, advance shipping notification between suppliers. At the beginning, it has used the system to exchange data between five suppliers. In the future, it intends to use this system between fifty suppliers which are often communicated.

Finally, the application of the RosettaNet standard for the Thai automotive industry is interested to study. Nowadays, the RosettaNet standard has been extensively applied in the computer and electronic industry. This industry has the same criteria with automotive industry. Both of them have to communicate with several suppliers because of many components for production. So, it can be possible

that the Thai automotive industry use the RosettaNet standard as the main standard to exchange data between suppliers.

For future researches, the study should gather business processes and business documents from several component manufacturers of the Thai automotive industry. Moreover, the future researches should study from first-tier suppliers to third-tier suppliers of the component manufacturers in order to enhance business transactions of production and traceability. Furthermore, when the research can comprehensively study core business processes and basic data elements in the business documents, it may specially create the RosettaNet standard template for component manufacturers of the Thai automotive industry.

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APPENDICES

APPENDIX A
THE BUSINESS DOCUMENTS OF THE COMPANY

Form: FC01

ชื่อบริษัท **FORECAST REPORT**

Supplier Name :   Date :

Attention :   Revision :

Model :   Page :

Item	Part Number	Part Name	Lot Size	Std / Unit	Fix	Year 2009		
					มิ.ย.-09	ก.ค.-09	ส.ค.-09	ก.ย.-09
1	LC03E01020P1	BRACKET	20	1	62	64	84	108
2	LQ13E01109P1	BRACKET	20	1	62	64	84	108
3	YN11P01136P1	PLATE	20	1	62	64	84	108
4	YN21C02410P1	BRACKET	20	1	62	64	84	108
5	YN21C02423P1	PLATE	20	1	62	64	84	108
6	YN21C02961P1	COVER	20	1	62	64	84	108
7	YN21C03039P2	GUARD	20	1	62	64	84	108
8	YN21C03332P1	GUARD	20	1	62	64	84	108
9	YN21C03343P3	GUARD	20	1	62	64	84	108
10	YN21C03352P1	GUARD	20	1	62	64	84	108

Remark

1. ปริมาณการสั่งซื้อจริง อาจคลาดเคลื่อนจากข้อมูลประมาณการฉบับนี้
ประมาณ 15 % จากยอดประมาณการ

2. กรณีที่มีการเปลี่ยนแปลงการผลิต หรือ การใช้งาน อันเป็นเหตุให้
เกิดความคลาดเคลื่อนใด ๆ ทางบริษัทจะรับผิดชอบยอด Stock ใน
เดือนที่สั่งซื้อตาม PO และ ยอดประมาณการล่วงหน้า 1 เดือน

3. กรณีได้รับข้อมูลแล้วกรุณา Fax เอกสารกลับมาที่เบอร์ XX-XXXXXXX
หรือ ส่งมาทาง E-Mail Addr XXX@XXX.XXX
ติดต่อ ผู้จัดทำ หมายเลข. xx-xxxxxxx

(..........)   (..........)
ผู้จัดทำ   ผู้ตรวจสอบ
.... / .... / .... / .... / ....

สำหรับ Supplier บันทึก และ ตอบกลับ	
☐ ได้รับเอกสารแล้	☐ อ่านข้อมูลได้ชัดเจน
	☐ อ่านข้อมูลได้ไม่ชัดเจน
	☐ จำนวนเอกสารครบถ้วน
	☐ จำนวนเอกสารไม่ครบถ้วน
ลงชื่อผู้รับเอกสาร	

(..........)   (..........)
ผู้ช่วยผู้จัดการฝ่าย PLD   ผู้จัดการทั่วไปด้านโรงงาน
.... / .... / .... / .... / ....

(..........)
วันที่ .... / .... / ....

จำนวนเอกสารรวม : .... หน้า

Form: PO01

ใบสั่งซื้อ

1.

บริษัท
ที่อยู่บริษัท

IND0135

P/O: 408744

ชื่อบริษัท Supplier
ที่อยู่บริษัท Supplier บรรทัดที่ 1
ที่อยู่บริษัท Supplier บรรทัดที่ 2
หมายเลขโทรศัพท์

STORE-S2

TRTHQ   Net 30 (CTB   THB   02-JUN-09

Quantity

1	FU-03-073	น้ำยาเคมี Hydor Pac 10%		10-JUN-2009	1,000.00 KILO	7.30	7,300.00

7,300.00

Prepared by: Check by: Approved by:

Date: Date: Date:

เงื่อนไขและการส่งมอบ

1. สินค้าที่ส่งมอบต้องมีคุณภาพ ขนาด ปริมาณและจัดส่งตามกำหนด ถ้าไม่เป็นไปตามเงื่อนไขข้างต้นผู้ซื้อมีสิทธิ์ยกเลิกใบสั่งซื้อนี้
   และไม่ต้องรับผิดชอบใด ๆ ทั้งสิ้น

2. ใบส่งมอบสินค้า (Invoice) ต้องระบุเลขที่ใบสั่งซื้อ, รายละเอียดสินค้า, จำนวน, ราคา ตามใบสั่งซื้อเท่านั้นและมีสำเนาอย่างน้อย 4 ฉบับ

3. กรณีที่มีการทยอยส่งสินค้า จะใช้สำเนาใบสั่งซื้อแนบมาด้วยทุกครั้ง จนกว่าจะส่งสินค้าครบจำนวนจานในใบสั่งซื้อ

4. บริษัทจะไม่รับผิดชอบในการชำระเงินใด ๆ ทั้งสิ้น สำหรับรับสินค้าที่ผู้ขายส่งมอบเกินกว่าจำนวน และ/หรือราคาที่ส่งกว่าที่ได้ระบุ
   ไว้ในใบสั่งซื้อนี้

5. กรรมสิทธิ์และความรับผิดชอบของสินค้าจะเปลี่ยนจากของท่านเป็นของบริษัท ณ สถานที่และเวลาที่มีการส่งมอบสินค้านั้น

PC-FM-002/1

APPENDIX B

TERMINOLOGY OF PIP4A2, PIP3A4, PIP3A8, AND PIP3A9

No.	Element	PIP 4A2	PIP 3A4 r.	PIP 3A4 c.	PIP 3A8 r.	PIP 3A8 c.	PIP 3A9 r.	PIP 3A9 c.	Type	Description
1	AccountDescription		/	/	/	/			cl.	The collection of business properties that describe a customer or supplier account.
2	AccountName		/	/	/	/			at.	The name of a bank account.
3	AccountNumber		/	/	/	/			at.	Identification number of an account.
4	ActionName	/	/	/	/	/	/	/	at.	The name of Action. For RosettaNet usually any of Request/Confirm/Notify/Query/Response.
5	AddressLine1	/	/	/	/	/			at.	The first line of a physical address.
6	AddressLine2	/	/	/	/	/			at.	The second line of a physical address.
7	AddressLine3	/	/	/	/	/			at.	The third line of a physical address.
8	AddressLine4	/	/	/	/	/			at.	The fourth line of a physical address.
9	AddressLine5	/	/	/	/	/			at.	The fifth line of a physical address.
10	AlternativeIdentifier	/	/	/	/	/	/	/	cl.	Identifies the specified code and the name of the organization that a code is utilized from.
11	Amount	/	/	/	/	/			at.	Specifies the monetary amount.
12	Authority	/	/	/	/	/	/	/	at.	The name of the organization that a code is utilized from.

No.	Element	PIP 4A2	PIP 3A4 r.	PIP 3A4 c.	PIP 3A8 r.	PIP 3A8 c.	PIP 3A9 r.	PIP 3A9 c.	Type	Description
13	Begin		/	/	/	/			at.	The date and time indicating the beginning of the date time period.
14	Begin	/	/	/					at.	The date indicating the beginning of the date period.
15	BillTo		/	/					cl.	The party that will pay the invoice.
16	BusinessDocumentReference		/	/	/	/			cl.	The business document reference object allows for the indirect referencing of a relationship to other business related documents.
17	BusinessProcessInstance-Identifier	/	/	/	/	/	/	/	at.	The identifier for the public business process instance being sent that both the sender and receiver can identify.
18	BusinessServiceInformation	/	/	/	/	/	/	/	cl.	The object allows the specification of the business service utilized within the partner company. This may or may not be the same as the information sent by the RNIF.
19	BuyerLineItem			/	/	/			at.	Line number assigned to an item by the product buyer.
20	BuyerSubLineItem			/	/	/			at.	The information related to the original buyer submitted document and contained within the subline level.
21	CardHolderName		/	/	/	/			at.	The name of the owner of a credit card.

No.	Element	PIP 4A2	PIP 3A4 r.	PIP 3A4 c.	PIP 3A8 r.	PIP 3A8 c.	PIP 3A9 r.	PIP 3A9 c.	Type	Description
22	CarrierInformation		/	/	/	/			cl.	The collection of business properties that describe a carrier's identification.
23	CertificationIdentifier		/	/	/	/			at.	The unique identifier that represents the authorization for a product or service's tax exempt status.
24	CidIdentifier		/	/	/	/			at.	Unique identifier for credit card purchase activity utilized by American Express.
25	CityName	/	/	/					at.	The name of a city.
26	CityTax					/			cl.	The collection of business properties that describe tax information for the city levying the tax.
27	Comments		/	/	/	/			at.	Free form textual description of a general nature.
28	Contact	/	/	/	/	/	/	/	at.	The name of the department, service or individual to be contacted within the organization.
29	ContactInformation	/	/	/	/	/	/	/	cl.	The business document must allow for the identification of the name of the department, service or individual to be contacted regarding the context of the business document.
30	ContractIdentifier	/	/	/	/	/	/	/	at.	Unique identification of a contract between the Sender and the Receiver

No.	Element	PIP 4A2	PIP 3A4 r.	PIP 3A4 c.	PIP 3A8 r.	PIP 3A8 c.	PIP 3A9 r.	PIP 3A9 c.	Type	Description
31	ContractInformation		/	/					cl.	The collection of business properties that represent a business arrangement for the supply of goods or services at an agreed price.
32	ContractInformation	/	/	/	/	/	/	/	cl.	A block of information used to correlate a contract in an executing choreography.
33	ContractOwner		/	/					cl.	The party who is the owner of the contract. For example, In the direct business, the buyer is the contract owner. In the distribution business, the buyer is the distributor and the contract owner is the reseller.
34	ContractType	/	/	/	/	/	/	/	at.	The type of the contract: an attribute describing the type of the ContractIndentification. Valid values are URI, URN,ebXMLCPA, or other values defined by partners.
35	CorrelationInformation	/	/	/	/	/	/	/	cl.	A block of information used to correlate a requesting document to a responding document and to the contract in an executing choreography.

No.	Element	PIP 4A2	PIP 3A4 r.	PIP 3A4 c.	PIP 3A8 r.	PIP 3A8 c.	PIP 3A9 r.	PIP 3A9 c.	Type	Description
36	Creation	/	/	/	/	/	/	/	at.	The creation date and time of the specified Business Document (i.e. the Purchase Order date).
37	CreditCard		/	/	/				cl.	A collection of business properties that describe information about a credit card.
38	CurrencyConversion				/				cl.	The collection of business properties that describe the exchange of money in circulation.
39	CustomerInformation		/	/	/	/			cl.	The collection of business properties that describe an end user.
40	Date	/			/	/			at.	The date a product or service is received.
41	DatePeriod	/	/	/					cl.	The business document must allow for the computation or statement of a duration based upon a beginning and an ending date.
42	DateTime			/					at.	The Date that the specified quantity was shipped
43	DateTime	/	/	/	/	/	/	/	at.	The date-time stamp indicating on the referenced business document.
44	DateTimePeriod		/	/	/	/			cl.	The business document must allow for the computation or statement of a period of time based upon date and time.

No.	Element	PIP 4A2	PIP 3A4 r.	PIP 3A4 c.	PIP 3A8 r.	PIP 3A8 c.	PIP 3A9 r.	PIP 3A9 c.	Type	Description
45	Day		/	/	/	/			at.	The specific day of the month a payment is required in order to receive a discount.
46	Day		/	/	/	/			at.	The specific day of the month a payment is due without incurring late charges.
47	Days		/	/	/	/			at.	The number of days within which a payment is required in order to receive a discount.
48	Days		/	/	/	/			at.	The number of days within which a payment is due without incurring late charges.
49	Description	/	/	/	/	/	/	/	at.	A description of the attachment.
50	DiscountedPrice		/	/					cl.	This object represents a special discount price.
51	Discounts		/	/	/	/			cl.	The collection of business properties that describe payment discounts.
52	DocumentHeader	/	/	/	/	/	/	/	cl.	The object allows for the identification of the sender and receiver of the business document.
53	DocumentIdentification	/	/	/	/	/	/	/	cl.	The object specifies all information necessary to identify the business document.

No.	Element	PIP 4A2	PIP 3A4 r.	PIP 3A4 c.	PIP 3A8 r.	PIP 3A8 c.	PIP 3A9 r.	PIP 3A9 c.	Type	Description
54	DocumentInformation	/	/	/	/	/	/	/	cl.	The object specifies information to identify the business document, a summary of attachments, and information about the business document security.
55	DocumentManifest	/	/	/	/	/	/	/	cl.	The block provides a brief summary of attachments and Service Content.
56	DocumentSecurity	/	/	/	/	/	/	/	cl.	The object provides additional granularity in specifying business document security (this is in addition to the specified PIP security).
57	DUNS	/	/	/	/	/	/	/	at.	A number assigned by Dun and Bradstreet to identify a business location.
58	DUNSPlus4	/	/	/	/	/	/	/	at.	An identifier to specify a specific location within a business location.
59	Duration		/	/					cl.	This object allows representation of a duration of time.
60	EffectiveDate				/				at.	The date tax become effective or applicable.
61	Email	/	/	/	/	/	/	/	at.	The electronic mail for the specified contact.
62	EmbeddedReleaseFore-castNotification	/							cl.	A Message wrapper or root element for PIP4A2.

No.	Element	PIP 4A2	PIP 3A4 r.	PIP 3A4 c.	PIP 3A8 r.	PIP 3A8 c.	PIP 3A9 r.	PIP 3A9 c.	Type	Description
63	EmbeddedReleaseForecast	/							cl.	The collection of business properties that describe future demand requirements information by product, for specific time periods, that can be used for build purposes with ship authorization trigger information.
64	End		/	/	/	/			at.	The date and time indicating the ending of the date time period.
65	End	/	/	/					at.	The date indicating the ending of the date period.
66	ExpediteReferenceIdenti-fier		/	/	/	/			at.	The unique identification number for the expediting of a product.
67	ExpiringBy		/	/					cl.	Renew all products expiring in this specific period.
68	ExpiryDate		/	/	/	/			at.	The date that a contractual agreement expires.
69	Factor					/			at.	The conversion factor to apply to convert from the currency of the freight charges to the currency used for payment.
70	Fax	/	/	/	/	/	/	/	at.	The fax number for the specified contact.
71	FinancialAmount		/	/		/			cl.	The business document must express financial amounts.

No.	Element	PIP 4A2	PIP 3A4 r.	PIP 3A4 c.	PIP 3A8 r.	PIP 3A8 c.	PIP 3A9 r.	PIP 3A9 c.	Type	Description
72	FinancingTerms		/	/	/	/			cl.	The collection of business properties that describe financing terms.
73	ForecastIdentifierRefe-rence	/							cl.	The collection of business properties that describe the various types of proprietary reference identifiers for forecast information.
74	ForecastPeriod	/							cl.	The collection of business properties that describe periodicity as determined by the forecasting partner agreement.
75	ForecastProductSchedule	/							cl.	The collection of business properties that describe quantity during a specific period for a particular product.
76	FrozenZone	/							cl.	The date period for a forecast that is no longer open to change and within which all requirements are committed for release.
77	FullPartner	/	/	/	/	/			cl.	The business document must describe the trading partners in the business transaction. This data structure provides the flexibility to describe a partner in all possible methods as for new, existing or known partner.

No.	Element	PIP 4A2	PIP 3A4 r.	PIP 3A4 c.	PIP 3A8 r.	PIP 3A8 c.	PIP 3A9 r.	PIP 3A9 c.	Type	Description
78	GeneralServicesAdministrationNumber				/	/			cl.	Identifying number relating to a pre-established end-user pricing agreement.
79	GLN	/	/	/	/	/	/	/	at.	Global Location Number (GLN) – An identifier to identify legal entities, trading parties and location.
80	GovernmentContractIdentifier		/	/	/	/			cl.	The unique number that identifies a government contract.
81	GTIN	/	/	/					at.	Global Trade Identification Number (GTIN).
82	HandlingInstruction		/	/					at.	Free form textual description of instructions.
83	HeaderVersion	/	/	/	/	/	/	/	at.	The UN/CEFACT version of the document header.
84	Identifier			/					at.	A unique serial identifier assigned to a product.
85	Identifier	/	/	/	/	/	/	/	at.	Identifies the role of the contact (i.e. Service Technician, Account Manager) in the Business Process.
86	Identifier	/	/	/	/	/	/	/	at.	The specified code to represent an entity (e.g. product, location, partner, etc.)
87	Identifier	/	/	/	/	/	/	/	at.	The unique identifier for the document being sent.
88	Identifier		/	/					at.	The unique identifier that identifies an account.
89	Identifier		/	/	/	/			at.	The unique number than identifies a contract.

No.	Element	PIP 4A2	PIP 3A4 r.	PIP 3A4 c.	PIP 3A8 r.	PIP 3A8 c.	PIP 3A9 r.	PIP 3A9 c.	Type	Description
90	Identifier		/	/	/	/			at.	The unique number that identifies a credit card.
91	Identifier		/	/					at.	This object representing the special discount identifier.
92	Identifier			/			/		at.	Unique identification for a taxing authority.
93	Identifier	/	/	/	/	/	/	/	at.	Unique identification of the referenced business document.
94	Identifier		/	/					at.	Unique number that identifies a purchase order issued by the secondary buyer.
95	Information		/	/					at.	A free form textual description of information, relating to a product.
96	InstallAt		/	/	/	/			cl.	The partner and/or location to which the product must be set up for use or service.
97	InstallAtPartnerLine		/	/					cl.	The partner and/or location to which the product must be set up for use or service.
98	InstallAtSubLine		/	/					cl.	The partner and/or location to which the product must be set up for use or service.
99	IntermittentPartner	/	/	/	/	/			cl.	The business document must describe a physical address for a delivery.
100	IsDropShip		/	/	/	/			at.	Indicates whether the order is a drop shipment.

No.	Element	PIP 4A2	PIP 3A4 r.	PIP 3A4 c.	PIP 3A8 r.	PIP 3A8 c.	PIP 3A9 r.	PIP 3A9 c.	Type	Description
101	IsFinalForecast	/							at.	Indicates whether the business document is final. When a forecast is final it is considered "constrained" forecast data that is "actionable" by the forecast recipient.
102	IsProductFamily	/							at.	Indicates whether the reporting is intended to report a product family or a product.
103	IsRequiredToRespondAt-DetailLevel		/						at.	This object representing the option for the response. If the value equals to true, the receiver is required to response to detail level. If the value equals to false, the receiver is only required to reply at summary level.
104	IsShipmentAuthorization-Exists	/							at.	Indicates the product is authorized for release.
105	IsTaxExempt		/	/	/	/			at.	Indicates whether a product is exempt from taxation.

No.	Element	PIP 4A2	PIP 3A4 r.	PIP 3A4 c.	PIP 3A8 r.	PIP 3A8 c.	PIP 3A9 r.	PIP 3A9 c.	Type	Description
106	IsTaxTriangulationAppli-cable					/			at.	Indicates whether intermediate suppliers in a triangulation chain may be able to use a simplified procedure available throughout the EC. Triangulation is a name for a type of transaction that can apply only to EU VAT registered companies dispatching goods to countries within the EU.
107	KnownPartner	/	/	/	/	/			cl.	The business document must describe the trading partners in the business transaction.
108	KnownPartnerContact	/	/	/	/	/			cl.	The business document must describe the trading partners in the business transaction.
109	Length	/	/	/	/	/	/	/	at.	The size of the attachment in bytes (i.e. 1 000 000 bytes)
110	Line	/	/	/	/	/	/	/	at.	References the specific line number of the specified business document.
111	LineNumber		/	/					at.	Number of the line in the document.
112	ListPrice		/	/					cl.	This object represents the pre-discounted price.
113	Location	/	/	/	/	/			cl.	The business document must specify a location.
114	Location			/					at.	Identification of the tax collection authority location.

No.	Element	PIP 4A2	PIP 3A4 r.	PIP 3A4 c.	PIP 3A8 r.	PIP 3A8 c.	PIP 3A9 r.	PIP 3A9 c.	Type	Description
115	ManifestItem	/	/	/	/	/	/	/	cl.	The object provides details about the specific attachment(s).
116	Mode		/	/	/	/			at.	This object refer to the tax exemption mode by Customs against goods declared eg. duty free, partial tax exemption or full tax exemption.
117	MonetaryAmount		/	/		/			cl.	The collection of business properties that describe the monetary amount defined by a specified currency.
118	MultipleType	/	/	/	/	/	/	/	at.	Indicates whether the manifest contains documents of multiple types. True if yes, and False if no.
119	NationalTax					/			cl.	The collection of business properties that describe tax information for the country levying the tax.
120	NetTerms		/	/	/	/			cl.	The collection of business properties that describe net payment due terms.
121	NewPartner	/	/	/	/	/			cl.	The business document must describe a new, existing (but known to only one of the parties to the transaction) or an unknown party to the business transaction.

No.	Element	PIP 4A2	PIP 3A4 r.	PIP 3A4 c.	PIP 3A8 r.	PIP 3A8 c.	PIP 3A9 r.	PIP 3A9 c.	Type	Description
122	NonRepudiableReceipt	/	/	/	/	/	/	/	at.	The value "true" will indicate that a signed acknowledgement for the business document is necessary.
123	Notes		/	/	/	/			at.	A textual description about contract.
124	NumberOfItems	/	/	/	/	/	/	/	at.	Total number of documents in the message. The physical count of the attachments in the payload plus the RosettaNet Business Message (for Service Content). The value of this field will be at least 1.
125	OrderLineItem		/	/					cl.	The collection of business properties that describe an entry in a purchase order business document.
126	OrderPricing		/	/					cl.	The collection of business properties that describe the type of pricing and financial amount for a purchase order.
127	OrderQuantity		/	/	/	/			cl.	The collection of business properties that describe various types of product quantity used in an ordering process.
128	OrderShippingInformation		/	/	/	/			cl.	The collection of business properties that describe information relating to shipping a product.
129	OriginalScheduledEvent				/	/			cl.	The initial date a transportation event is scheduled to occur.

No.	Element	PIP 4A2	PIP 3A4 r.	PIP 3A4 c.	PIP 3A8 r.	PIP 3A8 c.	PIP 3A9 r.	PIP 3A9 c.	Type	Description
130	PackList		/	/	/	/			cl.	Free form textual description, on the pack list, of requirements relating to the packing of the product.
131	PartnerDescription	/	/	/	/	/			cl.	The collection of business properties that describe a business partners' identity, their contact information, where they are physically located and their function in a supply chain.
132	PartnerId	/	/	/	/	/	/	/	at.	The Trading Partner Identification of MNC that is creating this TPIR PIP.
133	PartnerIdentification	/	/	/	/	/	/	/	cl.	The business document must allow for the identity of one or more parties to the transaction.
134	PartnerName	/	/	/	/	/	/	/	at.	The name of the partner's company/business.
135	PartnerProductForecast	/							cl.	The collection of business properties that describe forecast and customer information for a product.
136	PaymentTerms		/	/	/	/			cl.	The collection of business properties that describe payment terms.
137	Percent		/	/	/	/			at.	The financial percent representing a reduction to the total amount due.

No.	Element	PIP 4A2	PIP 3A4 r.	PIP 3A4 c.	PIP 3A8 r.	PIP 3A8 c.	PIP 3A9 r.	PIP 3A9 c.	Type	Description
138	PercentDue		/	/	/	/			at.	The amount owed expressed as a percentage.
139	Percentage		/	/					at.	This object represents a special discount percentage.
140	Period		/	/					at.	Represents a duration of time.
141	PersistentEncryption	/	/	/	/	/	/	/	at.	The value "true" will indicate that the Business Document (including the header) needs to be encrypted when stored or transported.
142	PersistentSignature	/	/	/	/	/	/	/	at.	The value "true" will indicate that a signature is required to be stored with the document while stored or transported.
143	Phone	/	/	/	/	/	/	/	at.	The telephone number for the specified contact.
144	Phrase					/			at.	Country or territory specific tax qualifier verbiage as and when required for tax audit purposes. Such verbiage should be transmitted and stored with the invoice, and may be required to be in local language. Trading Partners are responsible for ensuring that appropriate verbiage is included as per individual tax authority requirements.

No.	Element	PIP 4A2	PIP 3A4 r.	PIP 3A4 c.	PIP 3A8 r.	PIP 3A8 c.	PIP 3A9 r.	PIP 3A9 c.	Type	Description
145	PhysicalAddress	/	/	/	/	/			cl.	The business document must provide a physical address for a party to the business transaction.
146	PipIdentifier	/	/	/	/	/	/	/	at.	PIP Identification.[i.e. PIP3A4]
147	PipVersion	/	/	/	/	/	/	/	at.	PIP version number (i.e. 02.02.00).
148	PostOfficeBox	/	/	/	/	/			at.	The Post Office Box identifier used to identify a party's post office box.
149	PostalCode	/	/	/	/	/			at.	Identifying geographic location as specified by a national postal code.
150	PrePaymentCheckNumber		/	/	/	/			at.	The check number issued to prepay a monetary amount for an account.
151	ProcessIdentifier	/	/	/	/	/	/	/	at.	The name of the PIP e.g. Notify of Forecast Reply.
152	ProcessReference	/	/	/	/	/	/	/	at.	The URN for the PIP that includes Cluster/Segment/Process pattern used to identify the interface process (such as PIP3A4)
153	ProcessState	/	/	/	/	/	/	/	at.	The business process (or service) state of the sender of a document. When a service receives this document, the receiver may use the state as a precondition.

No.	Element	PIP 4A2	PIP 3A4 r.	PIP 3A4 c.	PIP 3A8 r.	PIP 3A8 c.	PIP 3A9 r.	PIP 3A9 c.	Type	Description
154	ProductFamilyReporting	/							cl.	The collection of business properties that describe proprietary part information.
155	ProductForecastIdentifier	/							cl.	The unique identifier that represents a forecast for a product.
156	ProductForecastInformation	/							cl.	The collection of business properties that describe forecast information for a product.
157	ProductForecastRevision	/							cl.	To use the identifier as an incremental number used to identify changes to ProductForecast.
158	ProductIdentification	/	/	/					cl.	The object provides the identifier(s) of a product.
159	ProductInformation				/	/			at.	A textual description of information, relating to a product.
160	ProductLineItem		/	/	/	/			cl.	The collection of business properties that describe a business document entry for a product in a purchase order business documents.
161	ProductLineNumber		/	/					at.	The object that representing the line number of the referenced product line item.
162	ProductName	/	/	/					at.	The name of the product.
163	ProductOrderQuantity		/	/					cl.	The collection of business properties that describe product quantity.

No.	Element	PIP 4A2	PIP 3A4 r.	PIP 3A4 c.	PIP 3A8 r.	PIP 3A8 c.	PIP 3A9 r.	PIP 3A9 c.	Type	Description
164	ProductReceiptReference	/							cl.	The collection of business properties that describe shipment, date and quantity information for a received product.
165	ProductQuantity	/							at.	A quantity specifying the number of product units.
166	ProductSchedule	/							cl.	The collection of business properties that describe forecast type, forecast date period and forecast quantity information.
167	ProductSerialIdentifier		/	/					at.	A unique serial identifier assigned to a product.
168	ProductSubLineItem		/	/	/	/			cl.	The collection of business properties that describe a part of a product line item.
169	ProjectIdentifier		/	/	/	/			at.	The unique identification number that identifies a project for a given customer.
170	PurchaseOrder		/	/	/	/			cl.	The collection of business properties that describe a buyer's offer to purchase a quantity of products at an agreed price and schedule.
171	PurchaseOrderCancella-tion						/	/	cl.	The collection of business properties that describe the cancellation of a purchase order.
172	PurchaseOrderCancella-tionConfirmation							/	cl.	A message wrapper or root element for PIP3A9.

No.	Element	PIP 4A2	PIP 3A4 r.	PIP 3A4 c.	PIP 3A8 r.	PIP 3A8 c.	PIP 3A9 r.	PIP 3A9 c.	Type	Description
173	PurchaseOrderCancellationRequest						/		cl.	A message wrapper or root element for PIP3A9.
174	PurchaseOrderCancellationResponse							/	at.	Code identifying the response to a request for a purchase order cancellation.
175	PurchaseOrderChangeConfirmation					/			cl.	Top level object for a Purchase Order Change business document.
176	PurchaseOrderChangeRequest				/				cl.	Top level object for a Purchase Order Change business document.
177	PurchaseOrderConfirmation		/						cl.	Top level object for a Purchase Order business document.
178	PurchaseOrderRequest		/						cl.	Top level object for a Purchase Order business document.
179	PurchaseOrderIdentifier				/	/	/	/	cl.	A code identifying a purchase order.
180	PurchaseOrderReference			/					cl.	The purchase order reference object allows for the indirect referencing of a relationship to other purchase order documents.
181	Quantity	/			/	/			at.	The product quantity received.
182	Rate			/		/			at.	A number representing a percentage value, e.g. 75.125 represents 75 1/8 percent.
183	ReceivedQuantityInformation				/				cl.	The collection of business properties that describe information regarding the quantity of the product received.

No.	Element	PIP 4A2	PIP 3A4 r.	PIP 3A4 c.	PIP 3A8 r.	PIP 3A8 c.	PIP 3A9 r.	PIP 3A9 c.	Type	Description
184	Receiver	/	/	/	/	/	/	/	cl.	The object allows the identification of the receiving party of the business message.
185	RegionalTax					/			cl.	The collection of business properties that describe tax information for the region levying the tax.
186	RequestedEvent		/	/	/	/			cl.	The date a transportation event is requested to occur.
187	RequestedQuantity		/	/	/	/			at.	The quantity of product requested.
188	RequestedShipFrom		/	/	/	/			cl.	The DUNS or DUNS + 4 number of the location where the product is requested to be shipped from.
189	RequestedUnitPrice		/	/	/	/			cl.	The price requested for a unit of product.
190	RequestingDocument							/	cl.	Identifies the purchase order cancellation request document for tracking purpose.
191	RequestingDocument-CreationDateTime	/	/	/	/	/	/	/	at.	The date-time of the requesting business document.
192	RequestingDocument-Information	/	/	/	/	/	/	/	cl.	A block of information used to correlate a requesting document to a responding document in an executing choreography.
193	RequestingDocument-InstanceIdentifier	/	/	/	/	/	/	/	at.	The Business Document identification number that identifies the requesting Business Document.

No.	Element	PIP 4A2	PIP 3A4 r.	PIP 3A4 c.	PIP 3A8 r.	PIP 3A8 c.	PIP 3A9 r.	PIP 3A9 c.	Type	Description
194	RespondTo		/	/					cl.	The party to whom a responding business document must be sent when it is not equal to receiver.
195	ResponseDateTime	/	/	/	/	/	/	/	at.	The expected time to receive the response. This can not be greater than the PIP TimeToPerform.
196	ResponseDescription			/					at.	This object representing the description of response.
197	ResponseDescription			/					at.	This object representing the description of response.
198	Revision	/	/	/	/	/	/	/	at.	Referenced the revision of the specified business document.
199	Revision	/	/	/					at.	Referenced the specified product revision.
200	RevisionNumber				/	/	/	/	at.	Referenced the specified product revision.
201	SCAC		/	/	/	/			at.	-
202	ScheduledEvent			/	/	/			cl.	The date a transportation event is scheduled to occur.
203	ScheduledShipQuantity		/	/	/	/			at.	Quantity of product shipped currently scheduled for shipment.
204	ScheduleProductForecast-Identifier	/							cl.	The unique identifiers that reference documents in a Forecast.

No.	Element	PIP 4A2	PIP 3A4 r.	PIP 3A4 c.	PIP 3A8 r.	PIP 3A8 c.	PIP 3A9 r.	PIP 3A9 c.	Type	Description
205	SecondaryBuyer		/	/	/	/			cl.	The collection of business properties that describe an alternate buyer.
206	Sender	/	/	/	/	/	/	/	cl.	The object allows the identification of the initiating party of the business message.
207	ServiceIdentification		/	/					at.	A unique serial identifier assigned to a service.
208	ServiceLevel		/	/					at.	The object that representing the type of service or service name.
209	ServiceLineItem		/	/					cl.	The collection of business properties that describe a service entry in a purchase order business documents.
210	ServiceLineItemByOption		/	/					cl.	The collection of business properties that describe a service entry by option (eg. by Contract, by Product or by Site) in a purchase order business documents.
211	ServiceName	/	/	/	/	/	/	/	at.	The name of the Business Activity with the "Request/Confirm" part removed. E.g., for the Activity "Request Purchase Order"==> "Purchase Order".
212	ServiceOrderQuantity		/	/					cl.	The collection of business properties that describe service quantity.

No.	Element	PIP 4A2	PIP 3A4 r.	PIP 3A4 c.	PIP 3A8 r.	PIP 3A8 c.	PIP 3A9 r.	PIP 3A9 c.	Type	Description
213	ServicePeriod		/	/					cl.	This object allows representation of a date period by a duration or begin and an end dates for a service period.
214	ShipFrom			/		/			cl.	The location from where the product is to be shipped.
215	ShipmentIdentifier	/							at.	Reference identifier assigned by the partner originating a shipment to uniquely identify the shipment.
216	ShippedQuantity			/					at.	Quantity of product shipped.
217	ShippingCointainerIdentifier	/							at.	Unique identifier that represents a shipping container. Normally a UCC structured identifier. Also known as a "license plate".
218	ShipTo		/	/	/	/			cl.	The partner and/or location to which the product must be delivered.
219	ShipToPartnerSubLine		/	/					cl.	The partner and/or location to which the product must be delivered.
220	ShippedQuantityInformation			/		/			cl.	The collection of business properties that describe information regarding the quantity of the product shipped.
221	SoldTo	/							cl.	The party to whom a product has been sold.
222	Source					/			at.	The source of the exchange rate used to convert between currencies.

No.	Element	PIP 4A2	PIP 3A4 r.	PIP 3A4 c.	PIP 3A8 r.	PIP 3A8 c.	PIP 3A9 r.	PIP 3A9 c.	Type	Description
223	SpecialDiscount		/	/					cl.	This object represents a special discount based on the special discount identifier.
224	SpecialHandlingInstruction		/	/	/	/			cl.	The collection of business properties that describe product packaging or shipping handling instructions.
225	SpecifiedFullPartner	/	/	/	/	/			cl.	The business document must describe the trading partners in the business transaction. This data structure provides the flexibility to describe a partner in all possible methods as for new, existing or known partner. This is specifically for partner who role has been specified.
226	SpecifiedIntermittent-Partner	/	/	/	/	/			cl.	The business document must describe a physical address for a delivery.
227	SpecifiedKnownPartner	/	/	/	/	/			cl.	The business document must describe the trading partners in the business transaction.
228	SpecifiedKnownPartner-Contact	/	/	/	/	/			cl.	The business document must describe the trading partners in the business transaction and allow for an identification of an individual of the trading partner.

No.	Element	PIP 4A2	PIP 3A4 r.	PIP 3A4 c.	PIP 3A8 r.	PIP 3A8 c.	PIP 3A9 r.	PIP 3A9 c.	Type	Description
229	SpecifiedNewPartner	/	/	/	/	/			cl.	The business document must describe a new, existing (but known to only one of the parties to the transaction) or an unknown party to the business transaction.
230	Standard	/	/	/	/	/	/	/	at.	Identifies the standard used to submit the business document. (e.g. RosettaNet).
231	StandardDocumentIdentification	/	/	/	/	/	/	/	cl.	The object specifies additional information necessary to identify the standard business document.
232	StartDate		/	/					at.	The date indicating the beginning of the duration.
233	SubLine	/	/	/	/	/	/	/	at.	References the specific subline number of the specified business document.
234	SubLineItem		/	/	/	/			at.	Information contained within a subline.
235	SubstituteProductReference			/		/			cl.	The collection of business properties describing a product that is being substituted for a requested product.
236	TaxAmount			/					cl.	The business document must include a tax amount(s).
237	TaxExemptStatus		/	/	/	/			cl.	The collection of business properties that describe tax exemption conditions.

No.	Element	PIP 4A2	PIP 3A4 r.	PIP 3A4 c.	PIP 3A8 r.	PIP 3A8 c.	PIP 3A9 r.	PIP 3A9 c.	Type	Description
238	TaxExemption		/	/	/	/			cl.	The collection of business properties that describe tax exemption type and identification information.
239	TaxJurisdiction			/		/			cl.	The business document must identify the specific tax collection authority.
240	TaxPhrase					/			cl.	The collection of business properties that describe VAT specific information.
241	TaxSummary			/		/			cl.	The collection of business properties that describe the total tax information for a local, regional or national taxing authority.
242	Text		/	/	/	/			at.	Free form textual description for how specified goods, packages or containers should be handled.
243	TotalAmount		/	/	/	/			cl.	Total price for an entire business document.
244	TotalLineItemAmount		/	/	/	/			cl.	The monetary total associated with a line item.

No.	Element	PIP 4A2	PIP 3A4 r.	PIP 3A4 c.	PIP 3A8 r.	PIP 3A8 c.	PIP 3A9 r.	PIP 3A9 c.	Type	Description
245	TpirBusinessProcessIdentifier	/	/	/	/	/	/	/	at.	A Business Process Identifier to uniquely define the TPIR-PIP 'role' within a Business Scenario at a company or MNC level. The identifier MUST be composed of alphanumeric characters only and its length MUST be between one and twelve characters.
246	TpirPipIdentification	/	/	/	/	/	/	/	cl.	The object specifies all information necessary to uniquely identify a TPIR-PIP within a Registry or trading partner repository.
247	TpirPipVersion	/	/	/	/	/	/	/	at.	A TPIR-PIP Version Number (i.e., major and minor version number as XX.XX).
248	TradeOffZone	/							cl.	The date period for a forecast in which there is a partial financial liability for product based on the TPA. Also known as the liability horizon.
249	Type	/	/	/	/	/	/	/	at.	Name of the Action Message
250	UnitPrice	/		/		/			cl.	Agreed upon sale price for each unit ordered.
251	UniversalResourceIdentifier	/	/	/	/	/	/	/	at.	The generic set of all names/addresses that are short strings that refer to resources.
252	Uri	/	/	/	/	/	/	/	at.	Describes the destination uri for the TPIR form.

No.	Element	PIP 4A2	PIP 3A4 r.	PIP 3A4 c.	PIP 3A8 r.	PIP 3A8 c.	PIP 3A9 r.	PIP 3A9 c.	Type	Description
253	Version	/	/	/	/	/	/	/	at.	i.e. PIP3A4v01.00
254	WireTransferIdentifier		/	/	/	/			at.	A unique identity of a wire transfer used for reference.

Remark:

cl. means class.

at. means attribute.

No.	Element	PIP 4A2	PIP 3A4 r.	PIP 3A4 c.	PIP 3A8 r.	PIP 3A8 c.	PIP 3A9 r.	PIP 3A9 c.	Type	Description
dp1	Procurement	/							xsd	XML/Domain/Pro-curement
dpc1	RN_AccountClassification		/	/	/	/			xsd	XML/Domain/Pro-curement/CodeList
dpc2	RN_ConfirmationType			/		/			xsd	XML/Domain/Pro-curement/CodeList
dpc3	RN_CreditCardClassifica-tion		/	/	/	/			xsd	XML/Domain/Pro-curement/CodeList
dpc4	RN_CustomerType		/	/	/	/			xsd	XML/Domain/Pro-curement/CodeList
dpc5	RN_FinanceTerms		/	/	/	/			xsd	XML/Domain/Pro-curement/CodeList
dpc6	RN_ForecastEvent	/							xsd	XML/Domain/Pro-curement/CodeList
dpc7	RN_ForecastQuantityType	/							xsd	XML/Domain/Pro-curement/CodeList
dpc8	RN_ForecastReference-Type	/							xsd	XML/Domain/Pro-curement/CodeList
dpc9	RN_GovernmentPriority-Rating		/	/	/	/			xsd	XML/Domain/Pro-curement/CodeList
dpc10	RN_PaymentCondition		/	/	/	/			xsd	XML/Domain/Pro-curement/CodeList
dpc11	RN_ProductSubstitution-Reason			/		/			xsd	XML/Domain/Pro-curement/CodeList

No.	Element	PIP 4A2	PIP 3A4 r.	PIP 3A4 c.	PIP 3A8 r.	PIP 3A8 c.	PIP 3A9 r.	PIP 3A9 c.	Type	Description
dpc 12	RN_PurchaseOrder-AcknowledgementReason			/		/			xsd	XML/Domain/Pro-curement/CodeList
dpc 13	RN_PurchaseOrderCancel-lationReason						/	/	xsd	XML/Domain/Pro-curement/CodeList
dpc 14	RN_PurchaseOrderChange Type				/	/			xsd	XML/Domain/Pro-curement/CodeList
dpc 15	RN_PurchaseOrderFillPri-ority		/	/	/	/			xsd	XML/Domain/Pro-curement/CodeList
dpc 16	RN_PurchaseOrderStatus			/		/			xsd	XML/Domain/Pro-curement/CodeList
dpc 17	RN_PurchaseOrderType		/	/	/	/			xsd	XML/Domain/Pro-curement/CodeList
dpc 18	RN_RequestOption		/						xsd	XML/Domain/Pro-curement/CodeList
dpc 19	RN_ShipmentTerms		/	/	/	/			xsd	XML/Domain/Pro-curement/CodeList
dpc 20	RN_SpecialFulfillment-Request		/	/	/	/			xsd	XML/Domain/Pro-curement/CodeList
dpc 21	RN_SpecialHandling		/	/	/	/			xsd	XML/Domain/Pro-curement/CodeList
dpc 22	RN_TaxExemptionCode		/	/	/	/			xsd	XML/Domain/Pro-curement/CodeList
dpc 23	RN_TransportEvent	/	/	/	/	/			xsd	XML/Domain/Pro-curement/CodeList
dsc 1	RN_AmountType		/	/	/	/			xsd	XML/Domain/Shared/CodeList
dsc 2	RN_FreeOnBoard		/	/		/			xsd	XML/Domain/Shared/CodeList
dsc 3	RN_Interval	/							xsd	XML/Domain/Shared/CodeList
dsc 4	RN_InvoiceChargeType		/	/		/			xsd	XML/Domain/Shared/CodeList
dsc 5	RN_MonetaryAmount-Type		/	/		/			xsd	XML/Domain/Shared/CodeList
dsc 6	RN_PaymentMethod		/	/	/	/			xsd	XML/Domain/Shared/CodeList
dsc 7	RN_PricingTypeCode		/	/					xsd	XML/Domain/Shared/CodeList
dsc 8	RN_ShippingServiceLevel		/	/	/	/			xsd	XML/Domain/Shared/CodeList
sc1	RN_TPIRFileType	/	/	/	/	/	/	/	xsd	XML/System/Code-List

No.	Element	PIP 4A2	PIP 3A4 r.	PIP 3A4 c.	PIP 3A8 r.	PIP 3A8 c.	PIP 3A9 r.	PIP 3A9 c.	Type	Description
uc1	ISO_Country	/	/	/	/	/			xsd	XML/Universal/Code-List
uc2	ISO_CountrySubdivision	/	/	/	/	/			xsd	XML/Universal/Code-List
uc3	ISO_Currency	/	/	/	/	/			xsd	XML/Universal/Code-List
uc4	ISO_Language								xsd	XML/Universal/Code-List
uc5	RN_DocumentType	/	/	/	/	/	/	/	xsd	XML/Universal/Code-List
uc6	RN_MimeTypeQuailifier	/	/		/				xsd	XML/Universal/Code-List
uc7	RN_ProcessRoleIdentifier	/	/	/	/	/			xsd	XML/Universal/Code-List
uc8	RN_TaxType				/				xsd	XML/Universal/Code-List
uc9	RN_UnitOfMeasure	/	/		/				xsd	XML/Universal/Code-List
ic1	RN_Response							/	xsd	Interchange/CodeList (PIP3A9)

Remark:

xsd   stands for   XML Schema

Description   stands for   The path of XML Schema location of the RosettaNet standard

APPENDIX C
THE RESULT OF BUSINESS DOCUMENT STRUCTURE ANALYSIS

PIP4A2: EmbeddedReleaseForecastNotification

No.	Element	Level	Required	Remark
1	62	1	M	
2	52	2	M	
3	35	3	O	
4	32	4	O	
5	30	5	O	
6	34	5	O	
7	192	4	O	
8	17	5	O	
9	191	5	O	
10	193	5	O	
11	195	5	O	
12	54	3	M	
13	36	4	Y	Date
14	53	4	M	
15	87	5	O	
16	249	5	O	
17	Ch.	5	Ch.	
18	231	6	M	
19	230	7	M	RosettaNet
20	253	7	M	PIP4A2V11.00A
21	246	6	N	
22	sc1	7	N	
23	132	7	N	
24	146	7	N	
25	147	7	N	
26	245	7	N	
27	247	7	N	
28	252	7	N	
29	55	4	O	
30	115	5	O	
31	49	6	O	

No.	Element	Level	Required	Remark
32	uc4	6	O	
33	109	6	O	
34	uc6	6	O	
35	251	6	O	
36	118	5	O	
37	124	5	O	
38	56	4	M	
39	122	5	M	true
40	141	5	M	true
41	142	5	M	true
42	83	3	N	
43	184	3	M	
44	18	4	M	
45	4	5	M	Notify
46	151	5	M	Notify of Forecast
47	152	5	M	PIP4A2
48	153	5	N	
49	211	5	M	Forecast
50	29	4	M	
51	28	5	Y	Attention
52	61	5	O	
53	70	5	O	
54	85	5	O	
55	143	5	O	
56	133	4	M	
57	134	5	Y	Supplier Name
58	Ch.	5	Ch.	
59	10	6	O	
60	12	7	O	
61	86	7	O	
62	57	6	O	
63	58	6	O	
64	79	6	O	
65	206	3	M	
66	18	4	M	
67	4	5	M	Notify
68	151	5	M	Notify of Forecast
69	152	5	M	PIP4A2
70	153	5	N	

No.	Element	Level	Required	Remark
71	211	5	M	Forecast
72	29	4	M	
73	28	5	Y	ชื่อผู้ติดต่อ
74	61	5	Y	e-mail ผู้ติดต่อ
75	70	5	Y	หมายเลขโทรศัพท์
76	85	5	Y	ผู้ติดต่อ
77	143	5	Y	หมายเลขโทรสัพท์
78	133	4	M	
79	134	5	Y	ชื่อบริษัท
80	Ch.	5	Ch.	
81	10	6	O	
82	12	7	O	
83	86	7	O	
84	57	6	O	
85	58	6	O	
86	79	6	O	
87	63	2	M	
88	dpc23	3	N	
89	dpc6	3	O	
90	73	3	N	
91	43	4	N	
92	uc5	4	N	
93	93	4	N	
94	110	4	N	
95	198	4	N	
96	233	4	N	
97	dpc8	4	N	
98	101	3	M	true
99	135	3	M	
100	131	4	O	
101	Ch.	5	Ch.	
102	77	6	O	
103	29	7	N	
104	28	8	N	
105	61	8	N	
106	70	8	N	
107	85	8	N	
108	143	8	N	
109	113	7	N	

No.	Element	Level	Required	Remark
110	Ch.	8	Ch.	
111	10	9	N	
112	12	10	N	
113	86	10	N	
114	57	9	N	
115	58	9	N	
116	79	9	N	
117	133	7	N	
118	134	8	N	
119	Ch.	8	Ch.	
120	10	9	N	
121	12	10	N	
122	86	10	N	
123	57	9	N	
124	58	9	N	
125	79	9	N	
126	145	7	O	
127	5	8	O	
128	6	8	O	
129	7	8	O	
130	8	8	O	
131	9	8	O	
132	25	8	O	
133	uc1	8	O	
134	uc2	8	O	
135	149	8	O	
136	148	8	O	
137	uc7	7	O	
138	99	6	N	
139	29	7	N	
140	28	8	N	
141	61	8	N	
142	70	8	N	
143	85	8	N	
144	143	8	N	
145	145	7	N	
146	5	8	N	
147	6	8	N	
148	7	8	N	

No.	Element	Level	Required	Remark
149	8	8	N	
150	9	8	N	
151	25	8	N	
152	uc1	8	N	
153	uc2	8	N	
154	149	8	N	
155	148	8	N	
156	uc7	7	N	
157	108	6	N	
158	29	7	N	
159	28	8	N	
160	61	8	N	
161	70	8	N	
162	85	8	N	
163	143	8	N	
164	107	7	N	
165	133	8	N	
166	134	9	N	
167	Ch.	9	Ch.	
168	10	10	N	
169	12	11	N	
170	86	11	N	
171	57	10	N	
172	58	10	N	
173	79	10	N	
174	uc7	8	N	
175	121	6	N	
176	29	7	N	
177	28	8	N	
178	61	8	N	
179	70	8	N	
180	85	8	N	
181	143	8	N	
182	113	7	N	
183	Ch.	8	Ch.	
184	10	9	N	
185	12	10	N	
186	86	10	N	
187	57	9	N	

No.	Element	Level	Required	Remark
188	58	9	N	
189	79	9	N	
190	133	7	N	
191	134	8	N	
192	Ch.	8	Ch.	
193	10	9	N	
194	12	10	N	
195	86	10	N	
196	57	9	N	
197	58	9	N	
198	79	9	N	
199	145	7	N	
200	5	8	N	
201	6	8	N	
202	7	8	N	
203	8	8	N	
204	9	8	N	
205	25	8	N	
206	uc1	8	N	
207	uc2	8	N	
208	149	8	N	
209	148	8	N	
210	uc7	7	N	
211	156	4	M	
212	dpc6	5	O	
213	76	5	M	
214	14	6	Y	Fix (1 มิ.ย.09)
215	65	6	Y	Fix (30 มิ.ย.09)
216	154	5	M	
217	102	6	N	
218	158	6	M	
219	162	7	Y	Part Name
220	199	7	Y	Revision
221	Ch.	7	Ch.	
222	10	8	M	
223	12	9	Y	Item
224	86	9	Y	Part Number
225	81	8	N	
226	155	5	N	

No.	Element	Level	Required	Remark
227	43	6	N	
228	uc5	6	N	
229	93	6	N	
230	110	6	N	
231	198	6	N	
232	233	6	N	
233	dpc8	6	N	
234	157	5	N	
235	43	6	N	
236	uc5	6	N	
237	93	6	N	
238	110	6	N	
239	198	6	N	
240	233	6	N	
241	164	5	N	
242	40	6	N	
243	181	6	N	
244	215	6	N	
245	217	6	N	
246	248	5	N	
247	14	6	N	
248	65	6	N	
249	uc9	5	Y	Std / Unit
250	250	5	O	
251	11	6	O	
252	uc3	6	O	
253	166	5	M	
254	75	6	M	
255	74	7	M	
256	41	8	M	
257	14	9	Y	loop 1-ม.ค.-09 - 1-ก.ย.-09
258	65	9	Y	loop 30-ม.ค.-09 - 30-ก.ย.-09
259	dsc3	8	M	MON (Month)
260	104	8	O	
261	165	7	Y	loop จำนวนแต่ละเดือน
262	204	7	N	
263	43	8	N	
264	uc5	8	N	
265	93	8	N	

No.	Element	Level	Required	Remark
266	110	8	N	
267	198	8	N	
268	233	8	N	
269	dpc8	8	N	
270	dpc7	6	N	
271	221	4	N	
272	Ch.	5	Ch.	
273	225	6	N	
274	29	7	N	
275	28	8	N	
276	61	8	N	
277	70	8	N	
278	85	8	N	
279	143	8	N	
280	113	7	N	
281	Ch.	8	N	
282	10	9	N	
283	12	10	Ch.	
284	86	10	N	
285	57	9	N	
286	58	9	N	
287	79	9	N	
288	133	7	N	
289	134	8	N	
290	Ch.	8	Ch.	
291	10	9	N	
292	12	10	N	
293	86	10	N	
294	57	9	N	
295	58	9	N	
296	79	9	N	
297	145	7	N	
298	5	8	N	
299	6	8	N	
300	7	8	N	
301	8	8	N	
302	9	8	N	
303	25	8	N	
304	uc1	8	N	

No.	Element	Level	Required	Remark
305	uc2	8	N	
306	149	8	N	
307	148	8	N	
308	226	6	N	
309	29	7	N	
310	28	8	N	
311	61	8	N	
312	70	8	N	
313	85	8	N	
314	143	8	N	
315	145	7	N	
316	5	8	N	
317	6	8	N	
318	7	8	N	
319	8	8	N	
320	9	8	N	
321	25	8	N	
322	uc1	8	N	
323	uc2	8	N	
324	149	8	N	
325	148	8	N	
326	228	6	N	
327	29	7	N	
328	28	8	N	
329	61	8	N	
330	70	8	N	
331	85	8	N	
332	143	8	N	
333	227	7	N	
334	133	8	N	
335	134	9	N	
336	Ch.	9	Ch.	
337	10	10	N	
338	12	11	N	
339	86	11	N	
340	57	10	N	
341	58	10	N	
342	79	10	N	
343	229	6	N	

No.	Element	Level	Required	Remark
344	29	7	N	
345	28	8	N	
346	61	8	N	
347	70	8	N	
348	85	8	N	
349	143	8	N	
350	113	7	N	
351	Ch.	8	Ch.	
352	10	9	N	
353	12	10	N	
354	86	10	N	
355	57	9	N	
356	58	9	N	
357	79	9	N	
358	133	7	N	
359	134	8	N	
360	Ch.	8	Ch.	
361	10	9	N	
362	12	10	N	
363	86	10	N	
364	57	9	N	
365	58	9	N	
366	79	9	N	
367	145	7	N	
368	5	8	N	
369	6	8	N	
370	7	8	N	
371	8	8	N	
372	9	8	N	
373	25	8	N	
374	uc1	8	N	
375	uc2	8	N	
376	149	8	N	
377	148	8	N	

PIP3A4: PurchaseOrderRequest

No.	Element	Level	Required	Remark
1	178	1	M	
2	52	2	M	
3	35	3	O	
4	32	4	O	
5	30	5	O	
6	34	5	O	
7	192	4	O	
8	17	5	O	
9	191	5	O	
10	193	5	O	
11	195	5	O	
12	54	3	M	
13	36	4	Y	02-JUN-09
14	53	4	M	
15	87	5	Y	P/O (408744)
16	249	5	O	
17	Ch.	5	Ch.	
18	231	6	M	
19	230	7	M	RosettaNet
20	253	7	M	PIP3A4V11.12
21	246	6	N	
22	sc1	7	N	
23	132	7	N	
24	146	7	N	
25	147	7	N	
26	245	7	N	
27	247	7	N	
28	252	7	N	
29	55	4	O	
30	115	5	O	
31	49	6	O	
32	uc4	6	O	
33	109	6	O	
34	uc6	6	O	
35	251	6	O	
36	118	5	O	
37	124	5	O	
38	56	4	M	

No.	Element	Level	Required	Remark
39	122	5	M	true
40	141	5	M	true
41	142	5	M	true
42	83	3	N	
43	184	3	M	
44	18	4	M	
45	4	5	M	Request
46	151	5	M	Request Purchase Order
47	152	5	M	PIP3A4
48	153	5	N	
49	211	5	M	PurchaseOrder
50	29	4	M	
51	28	5	O	
52	61	5	O	
53	70	5	Y	Fax. No.
54	85	5	O	
55	143	5	Y	Tel. No.
56	133	4	M	
57	134	5	Y	Supplier Name
58	Ch.	5	Ch.	
59	10	6	O	
60	12	7	O	
61	86	7	O	
62	57	6	O	
63	58	6	O	
64	79	6	O	
65	206	3	M	
66	18	4	M	
67	4	5	M	Request
68	151	5	M	Request Purchase Order
69	152	5	M	PIP3A4
70	153	5	N	
71	211	5	M	PurchaseOrder
72	29	4	M	
73	28	5	Y	Prepared by
74	61	5	O	e-mail ผู้สั่ง
75	70	5	O	หมายเลขโทรสาร
76	85	5	O	ผู้สั่ง
77	143	5	O	หมายเลขโทรศัพท์

No.	Element	Level	Required	Remark
78	133	4	M	
79	134	5	Y	ชื่อบริษัท
80	Ch.	5	Ch.	
81	10	6	O	
82	12	7	O	
83	86	7	O	
84	57	6	O	
85	58	6	O	
86	79	6	O	
87	170	2	M	
88	1	3	M	
89	dpc1	4	O	
90	2	4	O	
91	3	4	O	
92	37	4	O	
93	21	5	O	
94	24	5	O	
95	dpc3	5	O	
96	68	5	O	
97	90	5	O	
98	131	4	M	
99	Ch.	5	Ch.	
100	77	6	M	
101	29	7	N	
102	28	8	N	
103	61	8	N	
104	70	8	N	
105	85	8	N	
106	143	8	N	
107	113	7	N	
108	Ch.	8	Ch.	
109	10	9	N	
110	12	10	N	
111	86	10	N	
112	57	9	N	
113	58	9	N	
114	79	9	N	
115	133	7	N	
116	134	8	N	

No.	Element	Level	Required	Remark
117	Ch.	8	Ch.	
118	10	9	N	
119	12	10	N	
120	86	10	N	
121	57	9	N	
122	58	9	N	
123	79	9	N	
124	145	7	M	
125	5	8	Y	ชื่อบริษัท Supplier
126	6	8	Y	ที่อยู่ Supplier บรรทัดที่ 1
127	7	8	Y	ที่อยู่ Supplier บรรทัดที่ 2
128	8	8	O	
129	9	8	O	
130	25	8	O	
131	uc1	8	O	
132	uc2	8	O	
133	149	8	O	
134	148	8	O	
135	uc7	7	O	
136	99	6	N	
137	29	7	N	
138	28	8	N	
139	61	8	N	
140	70	8	N	
141	85	8	N	
142	143	8	N	
143	145	7	N	
144	5	8	N	
145	6	8	N	
146	7	8	N	
147	8	8	N	
148	9	8	N	
149	25	8	N	
150	uc1	8	N	
151	uc2	8	N	
152	149	8	N	
153	148	8	N	
154	uc7	7	N	
155	108	6	N	

No.	Element	Level	Required	Remark
156	29	7	N	
157	28	8	N	
158	61	8	N	
159	70	8	N	
160	85	8	N	
161	143	8	N	
162	107	7	N	
163	133	8	N	
164	134	9	N	
165	Ch.	9	Ch.	
166	10	10	N	
167	12	11	N	
168	26	11	N	
169	57	10	N	
170	58	10	N	
171	79	10	N	
172	uc7	8	N	
173	121	6	N	
174	29	7	N	
175	28	8	N	
176	61	8	N	
177	70	8	N	
178	85	8	N	
179	143	8	N	
180	113	7	N	
181	Ch.	8	Ch.	
182	10	9	N	
183	12	10	N	
184	86	10	N	
185	57	9	N	
186	58	9	N	
187	79	9	N	
188	133	7	N	
189	134	8	N	
190	Ch.	8	Ch.	
191	10	9	N	
192	12	10	N	
193	86	10	N	
194	57	9	N	

No.	Element	Level	Required	Remark
195	58	9	N	
196	79	9	N	
197	145	7	N	
198	5	8	N	
199	6	8	N	
200	7	8	N	
201	8	8	N	
202	9	8	N	
203	25	8	N	
204	uc1	8	N	
205	uc2	8	N	
206	149	8	N	
207	148	8	N	
208	uc7	7	N	
209	dsc6	4	O	
210	150	4	O	
211	253	4	O	
212	15	3	N	
213	Ch.	4	Ch.	
214	225	5	N	
215	29	6	N	
216	28	7	N	
217	61	7	N	
218	70	7	N	
219	85	7	N	
220	143	7	N	
221	113	6	N	
222	Ch.	7	Ch.	
223	10	8	N	
224	12	9	N	
225	86	9	N	
226	57	8	N	
227	58	8	N	
228	79	8	N	
229	133	6	N	
230	134	7	N	
231	Ch.	7	Ch.	
232	10	8	N	
233	12	9	N	

No.	Element	Level	Required	Remark
234	86	9	N	
235	57	8	N	
236	58	8	N	
237	79	8	N	
238	145	6	N	
239	5	7	N	
240	6	7	N	
241	7	7	N	
242	8	7	N	
243	9	7	N	
244	25	7	N	
245	uc1	7	N	
246	uc2	7	N	
247	149	7	N	
248	148	7	N	
249	226	5	N	
250	29	6	N	
251	28	7	N	
252	61	7	N	
253	70	7	N	
254	85	7	N	
255	143	7	N	
256	145	6	N	
257	5	7	N	
258	6	7	N	
259	7	7	N	
260	8	7	N	
261	9	7	N	
262	25	7	N	
263	uc1	7	N	
264	uc2	7	N	
265	149	7	N	
266	148	7	N	
267	228	5	N	
268	29	6	N	
269	28	7	N	
270	61	7	N	
271	70	7	N	
272	85	7	N	

No.	Element	Level	Required	Remark
273	143	7	N	
274	227	6	N	
275	133	7	N	
276	134	8	N	
277	Ch.	8	Ch.	
278	10	9	N	
279	12	10	N	
280	86	10	N	
281	57	9	N	
282	58	9	N	
283	79	9	N	
284	229	5	N	
285	29	6	N	
286	28	7	N	
287	61	7	N	
288	70	7	N	
289	85	7	N	
290	143	7	N	
291	113	6	N	
292	Ch.	7	Ch.	
293	10	8	N	
294	12	9	N	
295	86	9	N	
296	57	8	N	
297	58	8	N	
298	79	8	N	
299	133	6	N	
300	134	7	N	
301	Ch.	7	Ch.	
302	10	8	N	
303	12	9	N	
304	86	9	N	
305	57	8	N	
306	58	8	N	
307	79	8	N	
308	145	6	N	
309	5	7	N	
310	6	7	N	
311	7	7	N	

No.	Element	Level	Required	Remark
312	8	7	N	
313	9	7	N	
314	25	7	N	
315	uc1	7	N	
316	uc2	7	N	
317	149	7	N	
318	148	7	N	
319	16	3	N	
320	43	4	N	
321	uc5	4	N	
322	93	4	N	
323	110	4	N	
324	198	4	N	
325	233	4	N	
326	27	3	Y	เงื่อนไขและการอ่อนขอบ
327	31	3	O	
328	89	4	O	
329	123	4	O	
330	33	3	N	
331	Ch.	4	Ch.	
332	225	5	N	
333	29	6	N	
334	28	7	N	
335	61	7	N	
336	70	7	N	
337	85	7	N	
338	143	7	N	
339	113	6	N	
340	Ch.	7	Ch.	
341	10	8	N	
342	12	9	N	
343	86	9	N	
344	57	8	N	
345	58	8	N	
346	79	8	N	
347	133	6	N	
348	134	7	N	
349	Ch.	7	Ch.	
350	10	8	N	

No.	Element	Level	Required	Remark
351	12	9	N	
352	86	9	N	
353	57	8	N	
354	58	8	N	
355	79	8	N	
356	145	6	N	
357	5	7	N	
358	6	7	N	
359	7	7	N	
360	8	7	N	
361	9	7	N	
362	25	7	N	
363	uc1	7	N	
364	uc2	7	N	
365	149	7	N	
366	148	7	N	
367	226	5	N	
368	29	6	N	
369	28	7	N	
370	61	7	N	
371	70	7	N	
372	85	7	N	
373	143	7	N	
374	145	6	N	
375	5	7	N	
376	6	7	N	
377	7	7	N	
378	8	7	N	
379	9	7	N	
380	25	7	N	
381	uc1	7	N	
382	uc2	7	N	
383	149	7	N	
384	148	7	N	
385	228	5	N	
386	29	6	N	
387	28	7	N	
388	61	7	N	
389	70	7	N	

No.	Element	Level	Required	Remark
390	85	7	N	
391	143	7	N	
392	227	6	N	
393	133	7	N	
394	134	8	N	
395	Ch.	8	Ch.	
396	10	9	N	
397	12	10	N	
398	86	10	N	
399	57	9	N	
400	58	9	N	
401	79	9	N	
402	229	5	N	
403	29	6	N	
404	28	7	N	
405	61	7	N	
406	70	7	N	
407	85	7	N	
408	143	7	N	
409	113	6	N	
410	Ch.	7	Ch.	
411	10	8	N	
412	12	9	N	
413	86	9	N	
414	57	8	N	
415	58	8	N	
416	79	8	N	
417	133	6	N	
418	134	7	N	
419	Ch.	7	Ch.	
420	10	8	N	
421	12	9	N	
422	86	9	N	
423	57	8	N	
424	58	8	N	
425	79	8	N	
426	145	6	N	
427	5	7	N	
428	6	7	N	

No.	Element	Level	Required	Remark
429	7	7	N	
430	8	7	N	
431	9	7	N	
432	25	7	N	
433	uc1	7	N	
434	uc2	7	N	
435	149	7	N	
436	148	7	N	
437	72	3	N	
438	dpc5	4	N	
439	136	4	N	
440	51	5	N	
441	45	6	N	
442	47	6	N	
443	137	6	N	
444	120	5	N	
445	46	6	N	
446	48	6	N	
447	dpc10	5	N	
448	138	5	N	
449	80	3	N	
450	43	4	N	
451	uc5	4	N	
452	93	4	N	
453	110	4	N	
454	198	4	N	
455	233	4	N	
456	dpc9	3	N	
457	95	3	N	
458	96	3	N	
459	Ch.	4	Ch.	
460	225	5	N	
461	29	6	N	
462	28	7	N	
463	61	7	N	
464	70	7	N	
465	85	7	N	
466	143	7	N	
467	113	6	N	

No.	Element	Level	Required	Remark
468	Ch.	7	Ch.	
469	10	8	N	
470	12	9	N	
471	86	9	N	
472	57	8	N	
473	58	8	N	
474	79	8	N	
475	133	6	N	
476	134	7	N	
477	Ch.	7	Ch.	
478	10	8	N	
479	12	9	N	
480	86	9	N	
481	57	8	N	
482	58	8	N	
483	79	8	N	
484	145	6	N	
485	5	7	N	
486	6	7	N	
487	7	7	N	
488	8	7	N	
489	9	7	N	
490	25	7	N	
491	uc1	7	N	
492	uc2	7	N	
493	149	7	N	
494	148	7	N	
495	226	5	N	
496	29	6	N	
497	28	7	N	
498	61	7	N	
499	70	7	N	
500	85	7	N	
501	143	7	N	
502	145	6	N	
503	5	7	N	
504	6	7	N	
505	7	7	N	
506	8	7	N	

No.	Element	Level	Required	Remark
507	9	7	N	
508	25	7	N	
509	uc1	7	N	
510	uc2	7	N	
511	149	7	N	
512	148	7	N	
513	228	5	N	
514	29	6	N	
515	28	7	N	
516	61	7	N	
517	70	7	N	
518	85	7	N	
519	143	7	N	
520	227	6	N	
521	133	7	N	
522	134	8	N	
523	Ch.	8	Ch.	
524	10	9	N	
525	12	10	N	
526	86	10	N	
527	57	9	N	
528	58	9	N	
529	79	9	N	
530	229	5	N	
531	29	6	N	
532	28	7	N	
533	61	7	N	
534	70	7	N	
535	85	7	N	
536	143	7	N	
537	113	6	N	
538	Ch.	7	Ch.	
539	10	8	N	
540	12	9	N	
541	86	9	N	
542	57	8	N	
543	58	8	N	
544	79	8	N	
545	133	6	N	

No.	Element	Level	Required	Remark
546	134	7	N	
547	Ch.	7	Ch.	
548	10	8	N	
549	12	9	N	
550	86	9	N	
551	57	8	N	
552	58	8	N	
553	79	8	N	
554	145	6	N	
555	5	7	N	
556	6	7	N	
557	7	7	N	
558	8	7	N	
559	9	7	N	
560	25	7	N	
561	uc1	7	N	
562	uc2	7	N	
563	149	7	N	
564	148	7	N	
565	100	3	N	
566	103	3	N	
567	112	3	N	
568	117	4	N	
569	dsc1	5	N	
570	71	5	N	
571	11	6	N	
572	uc3	6	N	
573	dsc4	5	N	
574	dsc5	5	N	
575	dsc7	4	N	
576	113	3	N	
577	Ch.	4	Ch.	
578	10	5	N	
579	12	6	N	
580	86	6	N	
581	57	5	N	
582	58	5	N	
583	79	5	N	
584	125	3	M	

No.	Element	Level	Required	Remark
585	Ch.	4	Ch.	
586	160	5	M	
587	16	6	N	
588	43	7	N	
589	uc5	7	N	
590	93	7	N	
591	110	7	N	
592	198	7	N	
593	233	7	N	
594	27	6	N	
595	31	6	N	
596	89	7	N	
597	123	7	N	
598	uc1	6	O	
599	39	6	N	
600	dpc4	7	O	
601	131	7	N	
602	Ch.	8	Ch.	
603	77	9	N	
604	29	10	N	
605	28	11	N	
606	61	11	N	
607	70	11	N	
608	85	11	N	
609	143	11	N	
610	113	10	N	
611	Ch.	11	Ch.	
612	10	12	N	
613	12	13	N	
614	86	13	N	
615	57	12	N	
616	58	12	N	
617	79	12	N	
618	133	10	N	
619	134	11	N	
620	Ch.	11	Ch.	
621	10	12	N	
622	12	13	N	
623	86	13	N	

No.	Element	Level	Required	Remark
624	57	12	N	
625	58	12	N	
626	79	12	N	
627	145	10	N	
628	5	11	N	
629	6	11	N	
630	7	11	N	
631	8	11	N	
632	9	11	N	
633	25	11	N	
634	uc1	11	N	
635	uc2	11	N	
636	149	11	N	
637	148	11	N	
638	uc7	10	N	
639	99	9	N	
640	29	10	N	
641	28	11	N	
642	61	11	N	
643	70	11	N	
644	85	11	N	
645	143	11	N	
646	145	10	N	
647	5	11	N	
648	6	11	N	
649	7	11	N	
650	8	11	N	
651	9	11	N	
652	25	11	N	
653	uc1	11	N	
654	uc2	11	N	
655	149	11	N	
656	148	11	N	
657	uc7	10	N	
658	108	9	N	
659	29	10	N	
660	28	11	N	
661	61	11	N	
662	70	11	N	

No.	Element	Level	Required	Remark
663	85	11	N	
664	143	11	N	
665	107	10	N	
666	133	11	N	
667	134	12	N	
668	Ch.	12	Ch.	
669	10	13	N	
670	12	14	N	
671	86	14	N	
672	57	13	N	
673	58	13	N	
674	79	13	N	
675	uc7	11	N	
676	121	9	N	
677	29	10	N	
678	28	11	N	
679	61	11	N	
680	70	11	N	
681	85	11	N	
682	143	11	N	
683	113	10	N	
684	Ch.	11	Ch.	
685	10	12	N	
686	12	13	N	
687	86	13	N	
688	57	12	N	
689	58	12	N	
690	79	12	N	
691	133	10	N	
692	134	11	N	
693	Ch.	11	Ch.	
694	10	12	N	
695	12	13	N	
696	86	13	N	
697	57	12	N	
698	58	12	N	
699	79	12	N	
700	145	10	N	
701	5	11	N	

No.	Element	Level	Required	Remark
702	6	11	N	
703	7	11	N	
704	8	11	N	
705	9	11	N	
706	25	11	N	
707	uc1	11	N	
708	uc2	11	N	
709	149	11	N	
710	148	11	N	
711	uc7	10	N	
712	169	7	N	
713	66	6	N	
714	95	6	N	
715	97	6	N	
716	29	7	N	
717	28	8	N	
718	61	8	N	
719	70	8	N	
720	85	8	N	
721	143	8	N	
722	113	7	N	
723	Ch.	8	Ch.	
724	10	9	N	
725	12	10	N	
726	86	10	N	
727	57	9	N	
728	58	9	N	
729	79	9	N	
730	133	7	N	
731	134	8	N	
732	Ch.	8	Ch.	
733	10	9	N	
734	12	10	N	
735	86	10	N	
736	57	9	N	
737	58	9	N	
738	79	9	N	
739	145	7	N	
740	5	8	N	

No.	Element	Level	Required	Remark
741	6	8	N	
742	7	8	N	
743	8	8	N	
744	9	8	N	
745	25	8	N	
746	uc1	8	N	
747	uc2	8	N	
748	149	8	N	
749	148	8	N	
750	100	6	N	
751	103	6	N	
752	111	6	Y	1
753	112	6	M	
754	117	7	M	
755	dsc1	8	O	
756	71	8	M	
757	11	9	Y	7.30
758	uc3	9	Y	THB
759	dsc4	8	O	
760	dsc5	8	O	
761	dsc7	7	O	
762	127	6	M	
763	187	7	Y	1,000
764	203	7	N	
765	128	6	N	
766	22	7	N	
767	88	8	N	
768	201	8	N	
769	dsc2	7	N	
770	130	7	N	
771	dpc19	7	N	
772	dsc8	7	N	
773	dpc20	7	N	
774	224	7	N	
775	dpc21	8	N	
776	242	8	N	
777	158	6	M	
778	162	7	Y	ฉบับแนบ Hydor Pac 10%
779	199	7	N	

No.	Element	Level	Required	Remark
780	Ch.	7	Ch.	
781	10	8	O	
782	12	9	O	
783	86	9	O	
784	81	8	O	
785	168	6	N	
786	27	7	N	
787	31	7	N	
788	89	8	N	
789	123	8	N	
790	uc1	7	N	
791	39	7	N	
792	dpc4	8	N	
793	131	8	N	
794	Ch.	9	Ch.	
795	77	10	N	
796	29	11	N	
797	28	12	N	
798	61	12	N	
799	70	12	N	
800	85	12	N	
801	143	12	N	
802	113	11	N	
803	Ch.	12	Ch.	
804	10	13	N	
805	12	14	N	
806	86	14	N	
807	57	13	N	
808	58	13	N	
809	79	13	N	
810	133	11	N	
811	134	12	N	
812	Ch.	12	Ch.	
813	10	13	N	
814	12	14	N	
815	86	14	N	
816	57	13	N	
817	58	13	N	
818	79	13	N	

No.	Element	Level	Required	Remark
819	145	11	N	
820	5	12	N	
821	6	12	N	
822	7	12	N	
823	8	12	N	
824	9	12	N	
825	25	12	N	
826	uc1	12	N	
827	uc2	12	N	
828	149	12	N	
829	148	12	N	
830	uc7	11	N	
831	99	10	N	
832	29	11	N	
833	28	12	N	
834	61	12	N	
835	70	12	N	
836	85	12	N	
837	143	12	N	
838	145	11	N	
839	5	12	N	
840	6	12	N	
841	7	12	N	
842	8	12	N	
843	9	12	N	
844	25	12	N	
845	uc1	12	N	
846	uc2	12	N	
847	149	12	N	
848	148	12	N	
849	uc7	11	N	
850	108	10	N	
851	29	11	N	
852	28	12	N	
853	61	12	N	
854	70	12	N	
855	85	12	N	
856	143	12	N	
857	107	11	N	

No.	Element	Level	Required	Remark
858	133	12	N	
859	134	13	N	
860	Ch.	13	Ch.	
861	10	14	N	
862	12	15	N	
863	86	15	N	
864	57	14	N	
865	58	14	N	
866	79	14	N	
867	uc7	12	N	
868	121	10	N	
869	29	11	N	
870	28	12	N	
871	61	12	N	
872	70	12	N	
873	85	12	N	
874	143	12	N	
875	113	11	N	
876	Ch.	12	Ch.	
877	10	13	N	
878	12	14	N	
879	86	14	N	
880	57	13	N	
881	58	13	N	
882	79	13	N	
883	133	11	N	
884	134	12	N	
885	Ch.	12	Ch.	
886	10	13	N	
887	12	14	N	
888	86	14	N	
889	57	13	N	
890	58	13	N	
891	79	13	N	
892	145	11	N	
893	5	12	N	
894	6	12	N	
895	7	12	N	
896	8	12	N	

No.	Element	Level	Required	Remark
897	9	12	N	
898	25	12	N	
899	uc1	12	N	
900	uc2	12	N	
901	149	12	N	
902	148	12	N	
903	uc7	11	N	
904	169	8	N	
905	66	7	N	
906	95	7	N	
907	98	7	N	
908	29	8	N	
909	28	9	N	
910	61	9	N	
911	70	9	N	
912	85	9	N	
913	143	9	N	
914	227	8	N	
915	133	9	N	
916	134	10	N	
917	Ch.	10	Ch.	
918	10	11	N	
919	12	12	N	
920	86	12	N	
921	57	11	N	
922	58	11	N	
923	79	11	N	
924	100	7	N	
925	127	7	N	
926	187	8	N	
927	203	8	N	
928	128	7	N	
929	22	8	N	
930	88	9	N	
931	201	9	N	
932	dsc2	8	N	
933	130	8	N	
934	dpc19	8	N	
935	dsc8	8	N	

No.	Element	Level	Required	Remark
936	dpc20	8	N	
937	224	8	N	
938	dpc21	9	N	
939	242	9	N	
940	dpc15	7	N	
941	186	7	N	
942	44	8	N	
943	13	9	N	
944	64	9	N	
945	dpc23	8	N	
946	188	7	N	
947	Ch.	8	Ch.	
948	10	9	N	
949	12	10	N	
950	86	10	N	
951	57	9	N	
952	58	9	N	
953	79	9	N	
954	189	7	N	
955	dsc1	8	N	
956	71	8	N	
957	11	9	N	
958	uc3	9	N	
959	dsc4	8	N	
960	dsc5	8	N	
961	219	7	N	
962	29	8	N	
963	28	9	N	
964	61	9	N	
965	70	9	N	
966	85	9	N	
967	143	9	N	
968	113	8	N	
969	Ch.	9	Ch.	
970	10	10	N	
971	12	11	N	
972	86	11	N	
973	57	10	N	
974	58	10	N	

No.	Element	Level	Required	Remark
975	79	10	N	
976	133	8	N	
977	134	9	N	
978	Ch.	9	Ch.	
979	10	10	N	
980	12	11	N	
981	86	11	N	
982	57	10	N	
983	58	10	N	
984	79	10	N	
985	145	8	N	
986	5	9	N	
987	6	9	N	
988	7	9	N	
989	8	9	N	
990	9	9	N	
991	25	9	N	
992	uc1	9	N	
993	uc2	9	N	
994	149	9	N	
995	148	9	N	
996	234	7	N	
997	uc9	7	N	
998	dpc15	6	N	
999	186	6	N	
1000	44	7	N	
1001	13	8	N	
1002	64	8	N	
1003	dpc23	7	N	
1004	188	6	N	
1005	Ch.	7	Ch.	
1006	10	8	N	
1007	12	9	N	
1008	86	9	N	
1009	57	8	N	
1010	58	8	N	
1011	79	8	N	
1012	189	6	N	
1013	dsc1	7	N	

No.	Element	Level	Required	Remark
1014	71	7	N	
1015	11	8	N	
1016	uc3	8	N	
1017	dsc4	7	N	
1018	dsc5	7	N	
1019	218	6	N	
1020	Ch.	7	Ch.	
1021	225	8	N	
1022	29	9	N	
1023	28	10	N	
1024	61	10	N	
1025	70	10	N	
1026	85	10	N	
1027	143	10	N	
1028	113	9	N	
1029	Ch.	10	Ch.	
1030	10	11	N	
1031	12	12	N	
1032	86	12	N	
1033	57	11	N	
1034	58	11	N	
1035	79	11	N	
1036	133	9	N	
1037	134	10	N	
1038	Ch.	10	Ch.	
1039	10	11	N	
1040	12	12	N	
1041	86	12	N	
1042	57	11	N	
1043	58	11	N	
1044	79	11	N	
1045	145	9	N	
1046	5	10	N	
1047	6	10	N	
1048	7	10	N	
1049	8	10	N	
1050	9	10	N	
1051	25	10	N	
1052	uc1	10	N	

No.	Element	Level	Required	Remark
1053	uc2	10	N	
1054	149	10	N	
1055	148	10	N	
1056	226	8	N	
1057	29	9	N	
1058	28	10	N	
1059	61	10	N	
1060	70	10	N	
1061	85	10	N	
1062	143	10	N	
1063	145	9	N	
1064	5	10	N	
1065	6	10	N	
1066	7	10	N	
1067	8	10	N	
1068	9	10	N	
1069	25	10	N	
1070	uc1	10	N	
1071	uc2	10	N	
1072	149	10	N	
1073	148	10	N	
1074	228	8	N	
1075	29	9	N	
1076	28	10	N	
1077	61	10	N	
1078	70	10	N	
1079	85	10	N	
1080	143	10	N	
1081	227	9	N	
1082	133	10	N	
1083	134	11	N	
1084	Ch.	11	Ch.	
1085	10	12	N	
1086	12	13	N	
1087	86	13	N	
1088	57	12	N	
1089	58	12	N	
1090	79	12	N	
1091	229	8	N	

No.	Element	Level	Required	Remark
1092	29	9	N	
1093	28	10	N	
1094	61	10	N	
1095	70	10	N	
1096	85	10	N	
1097	143	10	N	
1098	113	9	N	
1099	Ch.	10	Ch.	
1100	10	11	N	
1101	12	12	N	
1102	86	12	N	
1103	57	11	N	
1104	58	11	N	
1105	79	11	N	
1106	133	9	N	
1107	134	10	N	
1108	Ch.	10	Ch.	
1109	10	11	N	
1110	12	12	N	
1111	86	12	N	
1112	57	11	N	
1113	58	11	N	
1114	79	11	N	
1115	145	9	N	
1116	5	10	N	
1117	6	10	N	
1118	7	10	N	
1119	8	10	N	
1120	9	10	N	
1121	25	10	N	
1122	uc1	10	N	
1123	uc2	10	N	
1124	149	10	N	
1125	148	10	N	
1126	223	6	O	
1127	50	7	O	
1128	117	8	O	
1129	dsc1	9	O	
1130	71	9	O	

No.	Element	Level	Required	Remark
1131	11	10	O	
1132	uc3	10	O	
1133	dsc4	9	O	
1134	dsc5	9	O	
1135	dsc7	8	O	
1136	91	7	O	
1137	139	7	O	
1138	237	6	O	
1139	105	7	O	
1140	238	7	O	
1141	23	8	O	
1142	116	8	O	
1143	dpc2	8	O	
1144	244	6	M	
1145	dsc1	7	O	
1146	71	7	M	
1147	11	8	Y	7,300
1148	uc3	8	Y	THB
1149	dsc4	7	O	
1150	dsc5	7	O	
1151	uc9	6	Y	KILO
1152	209	5	N	
1153	16	6	N	
1154	43	7	N	
1155	uc5	7	N	
1156	93	7	N	
1157	110	7	N	
1158	198	7	N	
1159	233	7	N	
1160	31	6	N	
1161	89	7	N	
1162	123	7	N	
1163	82	6	N	
1164	96	6	N	
1165	Ch.	7	Ch.	
1166	225	8	N	
1167	29	9	N	
1168	28	10	N	
1169	61	10	N	

No.	Element	Level	Required	Remark
1170	70	10	N	
1171	85	10	N	
1172	143	10	N	
1173	113	9	N	
1174	Ch.	10	Ch.	
1175	10	11	N	
1176	12	12	N	
1177	86	12	N	
1178	57	11	N	
1179	58	11	N	
1180	79	11	N	
1181	133	9	N	
1182	134	10	N	
1183	Ch.	10	Ch.	
1184	10	11	N	
1185	12	12	N	
1186	86	12	N	
1187	57	11	N	
1188	58	11	N	
1189	79	11	N	
1190	145	9	N	
1191	5	10	N	
1192	6	10	N	
1193	7	10	N	
1194	8	10	N	
1195	9	10	N	
1196	25	10	N	
1197	uc1	10	N	
1198	uc2	10	N	
1199	149	10	N	
1200	148	10	N	
1201	226	8	N	
1202	29	9	N	
1203	28	10	N	
1204	61	10	N	
1205	70	10	N	
1206	85	10	N	
1207	143	10	N	
1208	145	9	N	

No.	Element	Level	Required	Remark
1209	5	10	N	
1210	6	10	N	
1211	7	10	N	
1212	8	10	N	
1213	9	10	N	
1214	25	10	N	
1215	uc1	10	N	
1216	uc2	10	N	
1217	149	10	N	
1218	148	10	N	
1219	228	8	N	
1220	29	9	N	
1221	28	10	N	
1222	61	10	N	
1223	70	10	N	
1224	85	10	N	
1225	143	10	N	
1226	227	9	N	
1227	133	10	N	
1228	134	11	N	
1229	Ch.	11	Ch.	
1230	10	12	N	
1231	12	13	N	
1232	86	13	N	
1233	57	12	N	
1234	58	12	N	
1235	79	12	N	
1236	229	8	N	
1237	29	9	N	
1238	28	10	N	
1239	61	10	N	
1240	70	10	N	
1241	85	10	N	
1242	143	10	N	
1243	113	9	N	
1244	Ch.	10	Ch.	
1245	10	11	N	
1246	12	12	N	
1247	86	12	N	

No.	Element	Level	Required	Remark
1248	57	11	N	
1249	58	11	N	
1250	79	11	N	
1251	133	9	N	
1252	134	10	N	
1253	Ch.	10	Ch.	
1254	10	11	N	
1255	12	12	N	
1256	86	12	N	
1257	57	11	N	
1258	58	11	N	
1259	79	11	N	
1260	145	9	N	
1261	5	10	N	
1262	6	10	N	
1263	7	10	N	
1264	8	10	N	
1265	9	10	N	
1266	25	10	N	
1267	uc1	10	N	
1268	uc2	10	N	
1269	149	10	N	
1270	148	10	N	
1271	103	6	N	
1272	111	6	N	
1273	112	6	N	
1274	117	7	N	
1275	dsc1	8	N	
1276	71	8	N	
1277	11	9	N	
1278	uc3	9	N	
1279	dsc4	8	N	
1280	dsc5	8	N	
1281	dsc7	7	N	
1282	126	6	N	
1283	117	7	N	
1284	dsc1	8	N	
1285	71	8	N	
1286	11	9	N	

No.	Element	Level	Required	Remark
1287	uc3	9	N	
1288	dsc4	8	N	
1289	dsc5	8	N	
1290	dsc7	7	N	
1291	158	6	N	
1292	162	7	N	
1293	199	7	N	
1294	Ch.	7	Ch.	
1295	10	8	N	
1296	12	9	N	
1297	86	9	N	
1298	81	8	N	
1299	161	6	N	
1300	163	6	N	
1301	187	7	N	
1302	203	7	N	
1303	167	6	N	
1304	dpc17	6	N	
1305	207	6	N	
1306	208	6	N	
1307	212	6	N	
1308	187	7	N	
1309	203	7	N	
1310	213	6	N	
1311	Ch.	7	Ch.	
1312	41	8	N	
1313	14	9	N	
1314	65	9	N	
1315	59	8	N	
1316	140	9	N	
1317	232	9	N	
1318	223	6	N	
1319	50	7	N	
1320	117	8	N	
1321	dsc1	9	N	
1322	71	9	N	
1323	11	10	N	
1324	uc3	10	N	
1325	dsc4	9	N	

No.	Element	Level	Required	Remark
1326	dsc5	9	N	
1327	dsc7	8	N	
1328	91	7	N	
1329	139	7	N	
1330	210	5	N	
1331	16	6	N	
1332	43	7	N	
1333	uc5	7	N	
1334	93	7	N	
1335	110	7	N	
1336	198	7	N	
1337	233	7	N	
1338	31	6	N	
1339	89	7	N	
1340	123	7	N	
1341	67	6	N	
1342	Ch.	7	Ch.	
1343	41	8	N	
1344	14	9	N	
1345	65	9	N	
1346	59	8	N	
1347	140	9	N	
1348	232	9	N	
1349	82	6	N	
1350	96	6	N	
1351	Ch.	7	Ch.	
1352	225	8	N	
1353	29	9	N	
1354	28	10	N	
1355	61	10	N	
1356	70	10	N	
1357	85	10	N	
1358	143	10	N	
1359	113	9	N	
1360	Ch.	10	Ch.	
1361	10	11	N	
1362	12	12	N	
1363	86	12	N	
1364	57	11	N	

No.	Element	Level	Required	Remark
1365	58	11	N	
1366	79	11	N	
1367	133	9	N	
1368	134	10	N	
1369	Ch.	10	Ch.	
1370	10	11	N	
1371	12	12	N	
1372	86	12	N	
1373	57	11	N	
1374	58	11	N	
1375	79	11	N	
1376	145	9	N	
1377	5	10	N	
1378	6	10	N	
1379	7	10	N	
1380	8	10	N	
1381	9	10	N	
1382	25	10	N	
1383	uc1	10	N	
1384	uc2	10	N	
1385	149	10	N	
1386	148	10	N	
1387	226	8	N	
1388	29	9	N	
1389	28	10	N	
1390	61	10	N	
1391	70	10	N	
1392	85	10	N	
1393	143	10	N	
1394	145	9	N	
1395	5	10	N	
1396	6	10	N	
1397	7	10	N	
1398	8	10	N	
1399	9	10	N	
1400	25	10	N	
1401	uc1	10	N	
1402	uc2	10	N	
1403	149	10	N	

No.	Element	Level	Required	Remark
1404	148	10	N	
1405	228	8	N	
1406	29	9	N	
1407	28	10	N	
1408	61	10	N	
1409	70	10	N	
1410	85	10	N	
1411	143	10	N	
1412	227	9	N	
1413	133	10	N	
1414	134	11	N	
1415	Ch.	11	Ch.	
1416	10	12	N	
1417	12	13	N	
1418	86	13	N	
1419	57	12	N	
1420	58	12	N	
1421	79	12	N	
1422	229	8	N	
1423	29	9	N	
1424	28	10	N	
1425	61	10	N	
1426	70	10	N	
1427	85	10	N	
1428	143	10	N	
1429	113	9	N	
1430	Ch.	10	Ch.	
1431	10	11	N	
1432	12	12	N	
1433	86	12	N	
1434	57	11	N	
1435	58	11	N	
1436	79	11	N	
1437	133	9	N	
1438	134	10	N	
1439	Ch.	10	Ch.	
1440	10	11	N	
1441	12	12	N	
1442	86	12	N	

No.	Element	Level	Required	Remark
1443	57	11	N	
1444	58	11	N	
1445	79	11	N	
1446	145	9	N	
1447	5	10	N	
1448	6	10	N	
1449	7	10	N	
1450	8	10	N	
1451	9	10	N	
1452	25	10	N	
1453	uc1	10	N	
1454	uc2	10	N	
1455	149	10	N	
1456	148	10	N	
1457	103	6	N	
1458	111	6	N	
1459	112	6	N	
1460	117	7	N	
1461	dsc1	8	N	
1462	71	8	N	
1463	11	9	N	
1464	uc3	9	N	
1465	dsc4	8	N	
1466	dsc5	8	N	
1467	dsc7	7	N	
1468	126	6	N	
1469	117	7	N	
1470	dsc1	8	N	
1471	71	8	N	
1472	11	9	N	
1473	uc3	9	N	
1474	dsc4	8	N	
1475	dsc5	8	N	
1476	dsc7	7	N	
1477	158	6	N	
1478	162	7	N	
1479	199	7	N	
1480	Ch.	7	Ch.	
1481	10	8	N	

No.	Element	Level	Required	Remark
1482	12	9	N	
1483	86	9	N	
1484	81	8	N	
1485	161	6	N	
1486	163	6	N	
1487	187	7	N	
1488	203	7	N	
1489	167	6	N	
1490	dpc17	6	N	
1491	dpc18	6	N	
1492	207	6	N	
1493	208	6	N	
1494	212	6	N	
1495	187	7	N	
1496	203	7	N	
1497	213	6	N	
1498	Ch.	7	Ch.	
1499	41	8	N	
1500	14	9	N	
1501	65	9	N	
1502	59	8	N	
1503	140	9	N	
1504	232	9	N	
1505	223	6	N	
1506	50	7	N	
1507	117	8	N	
1508	dsc1	9	N	
1509	71	9	N	
1510	11	10	N	
1511	uc3	10	N	
1512	dsc4	9	N	
1513	dsc5	9	N	
1514	dsc7	8	N	
1515	91	7	N	
1516	139	7	N	
1517	128	3	N	
1518	22	4	N	
1519	88	5	N	
1520	201	5	N	

No.	Element	Level	Required	Remark
1521	dsc2	4	N	
1522	130	4	N	
1523	dpc19	4	N	
1524	dsc8	4	N	
1525	dpc20	4	N	
1526	224	4	N	
1527	dpc21	5	N	
1528	242	5	N	
1529	dpc15	3	O	
1530	dpc17	3	M	Code list
1531	186	3	M	
1532	44	4	M	
1533	13	5	Y	10-JUN-2009
1534	64	5	Y	10-JUN-2009
1535	dpc23	4	N	
1536	194	3	N	
1537	Ch.	4	Ch.	
1538	225	5	N	
1539	29	6	N	
1540	28	7	N	
1541	61	7	N	
1542	70	7	N	
1543	85	7	N	
1544	143	7	N	
1545	113	6	N	
1546	Ch.	7	Ch.	
1547	10	8	N	
1548	12	9	N	
1549	86	9	N	
1550	57	8	N	
1551	58	8	N	
1552	79	8	N	
1553	133	6	N	
1554	134	7	N	
1555	Ch.	7	Ch.	
1556	10	8	N	
1557	12	9	N	
1558	86	9	N	
1559	57	8	N	

No.	Element	Level	Required	Remark
1560	58	8	N	
1561	79	8	N	
1562	145	6	N	
1563	5	7	N	
1564	6	7	N	
1565	7	7	N	
1566	8	7	N	
1567	9	7	N	
1568	25	7	N	
1569	uc1	7	N	
1570	uc2	7	N	
1571	149	7	N	
1572	148	7	N	
1573	226	5	N	
1574	29	6	N	
1575	28	7	N	
1576	61	7	N	
1577	70	7	N	
1578	85	7	N	
1579	143	7	N	
1580	145	6	N	
1581	5	7	N	
1582	6	7	N	
1583	7	7	N	
1584	8	7	N	
1585	9	7	N	
1586	25	7	N	
1587	uc1	7	N	
1588	uc2	7	N	
1589	149	7	N	
1590	148	7	N	
1591	228	5	N	
1592	29	6	N	
1593	28	7	N	
1594	61	7	N	
1595	70	7	N	
1596	85	7	N	
1597	143	7	N	
1598	227	6	N	

No.	Element	Level	Required	Remark
1599	133	7	N	
1600	134	8	N	
1601	Ch.	8	Ch.	
1602	10	9	N	
1603	12	10	N	
1604	86	10	N	
1605	57	9	N	
1606	58	9	N	
1607	79	9	N	
1608	229	5	N	
1609	29	6	N	
1610	28	7	N	
1611	61	7	N	
1612	70	7	N	
1613	85	7	N	
1614	143	7	N	
1615	113	6	N	
1616	Ch.	7	Ch.	
1617	10	8	N	
1618	12	9	N	
1619	86	9	N	
1620	57	8	N	
1621	58	8	N	
1622	79	8	N	
1623	133	6	N	
1624	134	7	N	
1625	Ch.	7	Ch.	
1626	10	8	N	
1627	12	9	N	
1628	86	9	N	
1629	57	8	N	
1630	58	8	N	
1631	79	8	N	
1632	145	6	N	
1633	5	7	N	
1634	6	7	N	
1635	7	7	N	
1636	8	7	N	
1637	9	7	N	

No.	Element	Level	Required	Remark
1638	25	7	N	
1639	uc1	7	N	
1640	uc2	7	N	
1641	149	7	N	
1642	148	7	N	
1643	205	3	N	
1644	94	4	N	
1645	131	4	N	
1646	Ch.	5	Ch.	
1647	77	6	N	
1648	29	7	N	
1649	28	8	N	
1650	61	8	N	
1651	70	8	N	
1652	85	8	N	
1653	143	8	N	
1654	113	7	N	
1655	Ch.	8	Ch.	
1656	10	9	N	
1657	12	10	N	
1658	86	10	N	
1659	57	9	N	
1660	58	9	N	
1661	79	9	N	
1662	133	7	N	
1663	134	8	N	
1664	Ch.	8	Ch.	
1665	10	9	N	
1666	12	10	N	
1667	86	10	N	
1668	57	9	N	
1669	58	9	N	
1670	79	9	N	
1671	145	7	N	
1672	5	8	N	
1673	6	8	N	
1674	7	8	N	
1675	8	8	N	
1676	9	8	N	

No.	Element	Level	Required	Remark
1677	25	8	N	
1678	uc1	8	N	
1679	uc2	8	N	
1680	149	8	N	
1681	148	8	N	
1682	uc7	7	N	
1683	99	6	N	
1684	29	7	N	
1685	28	8	N	
1686	61	8	N	
1687	70	8	N	
1688	85	8	N	
1689	143	8	N	
1690	145	7	N	
1691	5	8	N	
1692	6	8	N	
1693	7	8	N	
1694	8	8	N	
1695	9	8	N	
1696	25	8	N	
1697	uc1	8	N	
1698	uc2	8	N	
1699	149	8	N	
1700	148	8	N	
1701	uc7	7	N	
1702	108	6	N	
1703	29	7	N	
1704	28	8	N	
1705	61	8	N	
1706	70	8	N	
1707	85	8	N	
1708	143	8	N	
1709	107	7	N	
1710	133	8	N	
1711	134	9	N	
1712	Ch.	9	Ch.	
1713	10	10	N	
1714	12	11	N	
1715	26	11	N	

No.	Element	Level	Required	Remark
1716	57	10	N	
1717	58	10	N	
1718	79	10	N	
1719	uc7	8	N	
1720	121	6	N	
1721	29	7	N	
1722	28	8	N	
1723	61	8	N	
1724	70	8	N	
1725	85	8	N	
1726	143	8	N	
1727	113	7	N	
1728	Ch.	8	Ch.	
1729	10	9	N	
1730	12	10	N	
1731	86	10	N	
1732	57	9	N	
1733	58	9	N	
1734	79	9	N	
1735	133	7	N	
1736	134	8	N	
1737	Ch.	8	Ch.	
1738	10	9	N	
1739	12	10	N	
1740	86	10	N	
1741	57	9	N	
1742	58	9	N	
1743	79	9	N	
1744	145	7	N	
1745	5	8	N	
1746	6	8	N	
1747	7	8	N	
1748	8	8	N	
1749	9	8	N	
1750	25	8	N	
1751	uc1	8	N	
1752	uc2	8	N	
1753	149	8	N	
1754	148	8	N	

No.	Element	Level	Required	Remark
1755	uc7	7	N	
1756	218	3	O	
1757	Ch.	4	Ch.	
1758	225	5	O	
1759	29	6	O	
1760	28	7	O	
1761	61	7	O	
1762	70	7	O	
1763	85	7	O	
1764	143	7	O	
1765	113	6	N	
1766	Ch.	7	Ch.	
1767	10	8	N	
1768	12	9	N	
1769	86	9	N	
1770	57	8	N	
1771	58	8	N	
1772	79	8	N	
1773	133	6	O	
1774	134	7	N	
1775	Ch.	7	Ch.	
1776	10	8	O	
1777	12	9	O	
1778	86	9	O	
1779	57	8	O	
1780	58	8	O	
1781	79	8	O	
1782	145	6	O	
1783	5	7	O	
1784	6	7	O	
1785	7	7	O	
1786	8	7	O	
1787	9	7	O	
1788	25	7	O	
1789	uc1	7	O	
1790	uc2	7	O	
1791	149	7	O	
1792	148	7	O	
1793	226	5	N	

No.	Element	Level	Required	Remark
1794	29	6	N	
1795	28	7	N	
1796	61	7	N	
1797	70	7	N	
1798	85	7	N	
1799	143	7	N	
1800	145	6	N	
1801	5	7	N	
1802	6	7	N	
1803	7	7	N	
1804	8	7	N	
1805	9	7	N	
1806	25	7	N	
1807	uc1	7	N	
1808	uc2	7	N	
1809	149	7	N	
1810	148	7	N	
1811	228	5	N	
1812	29	6	N	
1813	28	7	N	
1814	61	7	N	
1815	70	7	N	
1816	85	7	N	
1817	143	7	N	
1818	227	6	N	
1819	133	7	N	
1820	134	8	N	
1821	Ch.	8	Ch.	
1822	10	9	N	
1823	12	10	N	
1824	86	10	N	
1825	57	9	N	
1826	58	9	N	
1827	79	9	N	
1828	229	5	N	
1829	29	6	N	
1830	28	7	N	
1831	61	7	N	
1832	70	7	N	

No.	Element	Level	Required	Remark
1833	85	7	N	
1834	143	7	N	
1835	113	6	N	
1836	Ch.	7	Ch.	
1837	10	8	N	
1838	12	9	N	
1839	86	9	N	
1840	57	8	N	
1841	58	8	N	
1842	79	8	N	
1843	133	6	N	
1844	134	7	N	
1845	Ch.	7	Ch.	
1846	10	8	N	
1847	12	9	N	
1848	86	9	N	
1849	57	8	N	
1850	58	8	N	
1851	79	8	N	
1852	145	6	N	
1853	5	7	N	
1854	6	7	N	
1855	7	7	N	
1856	8	7	N	
1857	9	7	N	
1858	25	7	N	
1859	uc1	7	N	
1860	uc2	7	N	
1861	149	7	N	
1862	148	7	N	
1863	223	3	O	
1864	50	4	O	
1865	117	5	O	
1866	dsc1	6	O	
1867	71	6	O	
1868	11	7	O	
1869	uc3	7	O	
1870	dsc4	6	O	
1871	dsc5	6	O	

No.	Element	Level	Required	Remark
1872	dsc7	5	O	
1873	91	4	O	
1874	139	4	O	
1875	237	3	O	
1876	105	4	O	
1877	238	4	O	
1878	23	5	O	
1879	116	5	O	
1880	dpc22	5	O	
1881	243	3	M	
1882	dsc1	4	M	
1883	71	4	M	
1884	11	5	Y	7,300
1885	uc3	5	Y	THB
1886	dsc4	4	O	
1887	dsc5	4	O	

PIP3A4: PurchaseOrderConfirmation

No.	Element	Level	Required	Remark
1	177	1	M	
2	52	2	M	
3	35	3	O	
4	32	4	O	
5	30	5	O	
6	34	5	O	
7	192	4	O	
8	17	5	O	
9	191	5	O	
10	193	5	O	
11	195	5	O	
12	54	3	M	
13	36	4	Y	02-JUN-09
14	53	4	M	
15	87	5	Y	P/O (408744)
16	249	5	O	
17	Ch.	5	Ch.	
18	231	6	M	
19	230	7	M	RosettaNet

No.	Element	Level	Required	Remark
20	253	7	M	PIP3A4V11.12
21	246	6	N	
22	scl	7	N	
23	132	7	N	
24	146	7	N	
25	147	7	N	
26	245	7	N	
27	247	7	N	
28	252	7	N	
29	55	4	O	
30	115	5	O	
31	49	6	O	
32	uc4	6	O	
33	109	6	O	
34	uc6	6	O	
35	251	6	O	
36	118	5	O	
37	124	5	O	
38	56	4	M	
39	122	5	M	
40	141	5	M	
41	142	5	M	
42	83	3	N	
43	184	3	M	
44	18	4	M	
45	4	5	M	Confirm
46	151	5	M	Confirmatiom Purchase Order
47	152	5	M	PIP3A4
48	153	5	N	
49	211	5	M	PurchaseOrder
50	29	4	M	
51	28	5	O	
52	61	5	O	
53	70	5	Y	Fax. No.
54	85	5	O	
55	143	5	Y	Tel. No.
56	133	4	M	
57	134	5	Y	Supplier Name
58	Ch.	5	Ch.	

No.	Element	Level	Required	Remark
59	10	6	O	
60	12	7	O	
61	86	7	O	
62	57	6	O	
63	58	6	O	
64	79	6	O	
65	206	3	M	
66	18	4	M	
67	4	5	M	Confirm
68	151	5	M	Confirmation Purchase Order
69	152	5	M	PIP3A4
70	153	5	N	
71	211	5	M	PurchaseOrder
72	29	4	M	
73	28	5	Y	Prepared by
74	61	5	O	e-mail ผู้ซื้อห้า
75	70	5	O	หมายเลขโท รสาร
76	85	5	O	ผู้ซื้อห้า
77	143	5	O	หมายเลขโท รสัพท์
78	133	4	M	
79	134	5	Y	ชื่อบริษัท
80	Ch.	5	Ch.	
81	10	6	O	
82	12	7	O	
83	86	7	O	
84	57	6	O	
85	58	6	O	
86	79	6	O	
87	170	2	M	
88	1	3	M	
89	dpc1	4	O	
90	2	4	O	
91	3	4	O	
92	37	4	O	
93	21	5	O	
94	24	5	O	
95	dpc3	5	O	
96	68	5	O	
97	90	5	O	

No.	Element	Level	Required	Remark
98	131	4	M	
99	Ch.	5	Ch.	
100	77	6	M	
101	29	7	N	
102	28	8	N	
103	61	8	N	
104	70	8	N	
105	85	8	N	
106	143	8	N	
107	113	7	N	
108	Ch.	8	Ch.	
109	10	9	N	
110	12	10	N	
111	86	10	N	
112	57	9	N	
113	58	9	N	
114	79	9	N	
115	133	7	N	
116	134	8	N	
117	Ch.	8	Ch.	
118	10	9	N	
119	12	10	N	
120	86	10	N	
121	57	9	N	
122	58	9	N	
123	79	9	N	
124	145	7	M	
125	5	8	Y	ชื่อบริษัท Supplier
126	6	8	Y	ที่อยู่ Supplier บรรทัดที่ 1
127	7	8	Y	ที่อยู่ Supplier บรรทัดที่ 2
128	8	8	O	
129	9	8	O	
130	25	8	O	
131	uc1	8	O	
132	uc2	8	O	
133	149	8	O	
134	148	8	O	
135	uc7	7	O	
136	99	6	N	

No.	Element	Level	Required	Remark
137	29	7	N	
138	28	8	N	
139	61	8	N	
140	70	8	N	
141	85	8	N	
142	143	8	N	
143	145	7	N	
144	5	8	N	
145	6	8	N	
146	7	8	N	
147	8	8	N	
148	9	8	N	
149	25	8	N	
150	uc1	8	N	
151	uc2	8	N	
152	149	8	N	
153	148	8	N	
154	uc7	7	N	
155	108	6	N	
156	29	7	N	
157	28	8	N	
158	61	8	N	
159	70	8	N	
160	85	8	N	
161	143	8	N	
162	107	7	N	
163	133	8	N	
164	134	9	N	
165	Ch.	9	Ch.	
166	10	10	N	
167	12	11	N	
168	26	11	N	
169	57	10	N	
170	58	10	N	
171	79	10	N	
172	uc7	8	N	
173	121	6	N	
174	29	7	N	
175	28	8	N	

No.	Element	Level	Required	Remark
176	61	8	N	
177	70	8	N	
178	85	8	N	
179	143	8	N	
180	113	7	N	
181	Ch.	8	Ch.	
182	10	9	N	
183	12	10	N	
184	86	10	N	
185	57	9	N	
186	58	9	N	
187	79	9	N	
188	133	7	N	
189	134	8	N	
190	Ch.	8	Ch.	
191	10	9	N	
192	12	10	N	
193	86	10	N	
194	57	9	N	
195	58	9	N	
196	79	9	N	
197	145	7	N	
198	5	8	N	
199	6	8	N	
200	7	8	N	
201	8	8	N	
202	9	8	N	
203	25	8	N	
204	uc1	8	N	
205	uc2	8	N	
206	149	8	N	
207	148	8	N	
208	uc7	7	N	
209	dsc6	4	O	
210	150	4	O	
211	253	4	O	
212	15	3	N	
213	Ch.	4	Ch.	
214	225	5	N	

No.	Element	Level	Required	Remark
215	29	6	N	
216	28	7	N	
217	61	7	N	
218	70	7	N	
219	85	7	N	
220	143	7	N	
221	113	6	N	
222	Ch.	7	Ch.	
223	10	8	N	
224	12	9	N	
225	86	9	N	
226	57	8	N	
227	58	8	N	
228	79	8	N	
229	133	6	N	
230	134	7	N	
231	Ch.	7	Ch.	
232	10	8	N	
233	12	9	N	
234	86	9	N	
235	57	8	N	
236	58	8	N	
237	79	8	N	
238	145	6	N	
239	5	7	N	
240	6	7	N	
241	7	7	N	
242	8	7	N	
243	9	7	N	
244	25	7	N	
245	uc1	7	N	
246	uc2	7	N	
247	149	7	N	
248	148	7	N	
249	226	5	N	
250	29	6	N	
251	28	7	N	
252	61	7	N	
253	70	7	N	

No.	Element	Level	Required	Remark
254	85	7	N	
255	143	7	N	
256	145	6	N	
257	5	7	N	
258	6	7	N	
259	7	7	N	
260	8	7	N	
261	9	7	N	
262	25	7	N	
263	uc1	7	N	
264	uc2	7	N	
265	149	7	N	
266	148	7	N	
267	228	5	N	
268	29	6	N	
269	28	7	N	
270	61	7	N	
271	70	7	N	
272	85	7	N	
273	143	7	N	
274	227	6	N	
275	133	7	N	
276	134	8	N	
277	Ch.	8	Ch.	
278	10	9	N	
279	12	10	N	
280	86	10	N	
281	57	9	N	
282	58	9	N	
283	79	9	N	
284	229	5	N	
285	29	6	N	
286	28	7	N	
287	61	7	N	
288	70	7	N	
289	85	7	N	
290	143	7	N	
291	113	6	N	
292	Ch.	7	Ch.	

No.	Element	Level	Required	Remark
293	10	8	N	
294	12	9	N	
295	86	9	N	
296	57	8	N	
297	58	8	N	
298	79	8	N	
299	133	6	N	
300	134	7	N	
301	Ch.	7	Ch.	
302	10	8	N	
303	12	9	N	
304	86	9	N	
305	57	8	N	
306	58	8	N	
307	79	8	N	
308	145	6	N	
309	5	7	N	
310	6	7	N	
311	7	7	N	
312	8	7	N	
313	9	7	N	
314	25	7	N	
315	uc1	7	N	
316	uc2	7	N	
317	149	7	N	
318	148	7	N	
319	16	3	N	
320	43	4	N	
321	uc5	4	N	
322	93	4	N	
323	110	4	N	
324	198	4	N	
325	233	4	N	
326	27	3	Y	เงื่อนไขและการอนุมอน
327	dpc2	3	M	
328	31	3	O	
329	89	4	O	
330	123	4	O	
331	33	3	N	

No.	Element	Level	Required	Remark
332	Ch.	4	Ch.	
333	225	5	N	
334	29	6	N	
335	28	7	N	
336	61	7	N	
337	70	7	N	
338	85	7	N	
339	143	7	N	
340	113	6	N	
341	Ch.	7	Ch.	
342	10	8	N	
343	12	9	N	
344	86	9	N	
345	57	8	N	
346	58	8	N	
347	79	8	N	
348	133	6	N	
349	134	7	N	
350	Ch.	7	Ch.	
351	10	8	N	
352	12	9	N	
353	86	9	N	
354	57	8	N	
355	58	8	N	
356	79	8	N	
357	145	6	N	
358	5	7	N	
359	6	7	N	
360	7	7	N	
361	8	7	N	
362	9	7	N	
363	25	7	N	
364	uc1	7	N	
365	uc2	7	N	
366	149	7	N	
367	148	7	N	
368	226	5	N	
369	29	6	N	
370	28	7	N	

No.	Element	Level	Required	Remark
371	61	7	N	
372	70	7	N	
373	85	7	N	
374	143	7	N	
375	145	6	N	
376	5	7	N	
377	6	7	N	
378	7	7	N	
379	8	7	N	
380	9	7	N	
381	25	7	N	
382	uc1	7	N	
383	uc2	7	N	
384	149	7	N	
385	148	7	N	
386	228	5	N	
387	29	6	N	
388	28	7	N	
389	61	7	N	
390	70	7	N	
391	85	7	N	
392	143	7	N	
393	227	6	N	
394	133	7	N	
395	134	8	N	
396	Ch.	8	Ch.	
397	10	9	N	
398	12	10	N	
399	86	10	N	
400	57	9	N	
401	58	9	N	
402	79	9	N	
403	229	5	N	
404	29	6	N	
405	28	7	N	
406	61	7	N	
407	70	7	N	
408	85	7	N	
409	143	7	N	

No.	Element	Level	Required	Remark
410	113	6	N	
411	Ch.	7	Ch.	
412	10	8	N	
413	12	9	N	
414	86	9	N	
415	57	8	N	
416	58	8	N	
417	79	8	N	
418	133	6	N	
419	134	7	N	
420	Ch.	7	Ch.	
421	10	8	N	
422	12	9	N	
423	86	9	N	
424	57	8	N	
425	58	8	N	
426	79	8	N	
427	145	6	N	
428	5	7	N	
429	6	7	N	
430	7	7	N	
431	8	7	N	
432	9	7	N	
433	25	7	N	
434	uc1	7	N	
435	uc2	7	N	
436	149	7	N	
437	148	7	N	
438	72	3	N	
439	dpc5	4	N	
440	136	4	N	
441	51	5	N	
442	45	6	N	
443	47	6	N	
444	137	6	N	
445	120	5	N	
446	46	6	N	
447	48	6	N	
448	dpc10	5	N	

No.	Element	Level	Required	Remark
449	138	5	N	
450	80	3	N	
451	43	4	N	
452	uc5	4	N	
453	93	4	N	
454	110	4	N	
455	198	4	N	
456	233	4	N	
457	dpc9	3	N	
458	95	3	N	
459	96	3	N	
460	Ch.	4	Ch.	
461	225	5	N	
462	29	6	N	
463	28	7	N	
464	61	7	N	
465	70	7	N	
466	85	7	N	
467	143	7	N	
468	113	6	N	
469	Ch.	7	Ch.	
470	10	8	N	
471	12	9	N	
472	86	9	N	
473	57	8	N	
474	58	8	N	
475	79	8	N	
476	133	6	N	
477	134	7	N	
478	Ch.	7	Ch.	
479	10	8	N	
480	12	9	N	
481	86	9	N	
482	57	8	N	
483	58	8	N	
484	79	8	N	
485	145	6	N	
486	5	7	N	
487	6	7	N	

No.	Element	Level	Required	Remark
488	7	7	N	
489	8	7	N	
490	9	7	N	
491	25	7	N	
492	uc1	7	N	
493	uc2	7	N	
494	149	7	N	
495	148	7	N	
496	226	5	N	
497	29	6	N	
498	28	7	N	
499	61	7	N	
500	70	7	N	
501	85	7	N	
502	143	7	N	
503	145	6	N	
504	5	7	N	
505	6	7	N	
506	7	7	N	
507	8	7	N	
508	9	7	N	
509	25	7	N	
510	ucl	7	N	
511	uc2	7	N	
512	149	7	N	
513	148	7	N	
514	228	5	N	
515	29	6	N	
516	28	7	N	
517	61	7	N	
518	70	7	N	
519	85	7	N	
520	143	7	N	
521	227	6	N	
522	133	7	N	
523	134	8	N	
524	Ch.	8	Ch.	
525	10	9	N	
526	12	10	N	

No.	Element	Level	Required	Remark
527	86	10	N	
528	57	9	N	
529	58	9	N	
530	79	9	N	
531	229	5	N	
532	29	6	N	
533	28	7	N	
534	61	7	N	
535	70	7	N	
536	85	7	N	
537	143	7	N	
538	113	6	N	
539	Ch.	7	Ch.	
540	10	8	N	
541	12	9	N	
542	86	9	N	
543	57	8	N	
544	58	8	N	
545	79	8	N	
546	133	6	N	
547	134	7	N	
548	Ch.	7	Ch.	
549	10	8	N	
550	12	9	N	
551	86	9	N	
552	57	8	N	
553	58	8	N	
554	79	8	N	
555	145	6	N	
556	5	7	N	
557	6	7	N	
558	7	7	N	
559	8	7	N	
560	9	7	N	
561	25	7	N	
562	ucl	7	N	
563	uc2	7	N	
564	149	7	N	
565	148	7	N	

No.	Element	Level	Required	Remark
566	100	3	N	
567	112	3	N	
568	117	4	N	
569	dsc1	5	N	
570	71	5	N	
571	11	6	N	
572	uc3	6	N	
573	dsc4	5	N	
574	dsc5	5	N	
575	dsc7	4	N	
576	113	3	N	
577	Ch.	4	Ch.	
578	10	5	N	
579	12	6	N	
580	86	6	N	
581	57	5	N	
582	58	5	N	
583	79	5	N	
584	125	3	M	
585	Ch.	4	Ch.	
586	160	5	M	
587	16	6	N	
588	43	7	N	
589	uc5	7	N	
590	93	7	N	
591	110	7	N	
592	198	7	N	
593	233	7	N	
594	19	6	N	
595	27	6	N	
596	31	6	N	
597	89	7	N	
598	123	7	N	
599	ucl	6	O	
600	39	6	N	
601	dpc4	7	O	
602	131	7	N	
603	Ch.	8	Ch.	
604	77	9	N	

No.	Element	Level	Required	Remark
605	29	10	N	
606	28	11	N	
607	61	11	N	
608	70	11	N	
609	85	11	N	
610	143	11	N	
611	113	10	N	
612	Ch.	11	Ch.	
613	10	12	N	
614	12	13	N	
615	86	13	N	
616	57	12	N	
617	58	12	N	
618	79	12	N	
619	133	10	N	
620	134	11	N	
621	Ch.	11	Ch.	
622	10	12	N	
623	12	13	N	
624	86	13	N	
625	57	12	N	
626	58	12	N	
627	79	12	N	
628	145	10	N	
629	5	11	N	
630	6	11	N	
631	7	11	N	
632	8	11	N	
633	9	11	N	
634	25	11	N	
635	uc1	11	N	
636	uc2	11	N	
637	149	11	N	
638	148	11	N	
639	uc7	10	N	
640	99	9	N	
641	29	10	N	
642	28	11	N	
643	61	11	N	

No.	Element	Level	Required	Remark
644	70	11	N	
645	85	11	N	
646	143	11	N	
647	145	10	N	
648	5	11	N	
649	6	11	N	
650	7	11	N	
651	8	11	N	
652	9	11	N	
653	25	11	N	
654	uc1	11	N	
655	uc2	11	N	
656	149	11	N	
657	148	11	N	
658	uc7	10	N	
659	108	9	N	
660	29	10	N	
661	28	11	N	
662	61	11	N	
663	70	11	N	
664	85	11	N	
665	143	11	N	
666	107	10	N	
667	133	11	N	
668	134	12	N	
669	Ch.	12	Ch.	
670	10	13	N	
671	12	14	N	
672	86	14	N	
673	57	13	N	
674	58	13	N	
675	79	13	N	
676	uc7	11	N	
677	121	9	N	
678	29	10	N	
679	28	11	N	
680	61	11	N	
681	70	11	N	
682	85	11	N	

No.	Element	Level	Required	Remark
683	143	11	N	
684	113	10	N	
685	Ch.	11	Ch.	
686	10	12	N	
687	12	13	N	
688	86	13	N	
689	57	12	N	
690	58	12	N	
691	79	12	N	
692	133	10	N	
693	134	11	N	
694	Ch.	11	Ch.	
695	10	12	N	
696	12	13	N	
697	86	13	N	
698	57	12	N	
699	58	12	N	
700	79	12	N	
701	145	10	N	
702	5	11	N	
703	6	11	N	
704	7	11	N	
705	8	11	N	
706	9	11	N	
707	25	11	N	
708	uc1	11	N	
709	uc2	11	N	
710	149	11	N	
711	148	11	N	
712	uc7	10	N	
713	169	7	N	
714	66	6	N	
715	84	6	N	
716	95	6	N	
717	97	6	N	
718	29	7	N	
719	28	8	N	
720	61	8	N	
721	70	8	N	

No.	Element	Level	Required	Remark
722	85	8	N	
723	143	8	N	
724	113	7	N	
725	Ch.	8	Ch.	
726	10	9	N	
727	12	10	N	
728	86	10	N	
729	57	9	N	
730	58	9	N	
731	79	9	N	
732	133	7	N	
733	134	8	N	
734	Ch.	8	Ch.	
735	10	9	N	
736	12	10	N	
737	86	10	N	
738	57	9	N	
739	58	9	N	
740	79	9	N	
741	145	7	N	
742	5	8	N	
743	6	8	N	
744	7	8	N	
745	8	8	N	
746	9	8	N	
747	25	8	N	
748	uc1	8	N	
749	uc2	8	N	
750	149	8	N	
751	148	8	N	
752	100	6	N	
753	111	6	Y	1
754	112	6	M	
755	117	7	M	
756	dsc1	8	O	
757	71	8	M	
758	11	9	Y	7.30
759	uc3	9	Y	THB
760	dsc4	8	O	

No.	Element	Level	Required	Remark
761	dsc5	8	O	
762	dsc7	7	O	
763	127	6	M	
764	187	7	Y	1,000
765	203	7	N	
766	128	6	N	
767	22	7	N	
768	88	8	N	
769	201	8	N	
770	dsc2	7	N	
771	130	7	N	
772	dpc19	7	N	
773	dsc8	7	N	
774	dpc20	7	N	
775	224	7	N	
776	dpc21	8	N	
777	242	8	N	
778	158	6	M	
779	162	7	Y	ปริมาณ Hydor Pac 10%
780	199	7	N	
781	Ch.	7	Ch.	
782	10	8	O	
783	12	9	O	
784	86	9	O	
785	81	8	O	
786	168	6	N	
787	20	7	N	
788	27	7	N	
789	31	7	N	
790	89	8	N	
791	123	8	N	
792	uc1	7	N	
793	39	7	N	
794	dpc4	8	N	
795	131	8	N	
796	Ch.	9	Ch.	
797	77	10	N	
798	29	11	N	
799	28	12	N	

No.	Element	Level	Required	Remark
800	61	12	N	
801	70	12	N	
802	85	12	N	
803	143	12	N	
804	113	11	N	
805	Ch.	12	Ch.	
806	10	13	N	
807	12	14	N	
808	86	14	N	
809	57	13	N	
810	58	13	N	
811	79	13	N	
812	133	11	N	
813	134	12	N	
814	Ch.	12	Ch.	
815	10	13	N	
816	12	14	N	
817	86	14	N	
818	57	13	N	
819	58	13	N	
820	79	13	N	
821	145	11	N	
822	5	12	N	
823	6	12	N	
824	7	12	N	
825	8	12	N	
826	9	12	N	
827	25	12	N	
828	uc1	12	N	
829	uc2	12	N	
830	149	12	N	
831	148	12	N	
832	uc7	11	N	
833	99	10	N	
834	29	11	N	
835	28	12	N	
836	61	12	N	
837	70	12	N	
838	85	12	N	

No.	Element	Level	Required	Remark
839	143	12	N	
840	145	11	N	
841	5	12	N	
842	6	12	N	
843	7	12	N	
844	8	12	N	
845	9	12	N	
846	25	12	N	
847	uc1	12	N	
848	uc2	12	N	
849	149	12	N	
850	148	12	N	
851	uc7	11	N	
852	108	10	N	
853	29	11	N	
854	28	12	N	
855	61	12	N	
856	70	12	N	
857	85	12	N	
858	143	12	N	
859	107	11	N	
860	133	12	N	
861	134	13	N	
862	Ch.	13	Ch.	
863	10	14	N	
864	12	15	N	
865	86	15	N	
866	57	14	N	
867	58	14	N	
868	79	14	N	
869	uc7	12	N	
870	121	10	N	
871	29	11	N	
872	28	12	N	
873	61	12	N	
874	70	12	N	
875	85	12	N	
876	143	12	N	
877	113	11	N	

No.	Element	Level	Required	Remark
878	Ch.	12	Ch.	
879	10	13	N	
880	12	14	N	
881	86	14	N	
882	57	13	N	
883	58	13	N	
884	79	13	N	
885	133	11	N	
886	134	12	N	
887	Ch.	12	Ch.	
888	10	13	N	
889	12	14	N	
890	86	14	N	
891	57	13	N	
892	58	13	N	
893	79	13	N	
894	145	11	N	
895	5	12	N	
896	6	12	N	
897	7	12	N	
898	8	12	N	
899	9	12	N	
900	25	12	N	
901	uc1	12	N	
902	uc2	12	N	
903	149	12	N	
904	148	12	N	
905	uc7	11	N	
906	169	8	N	
907	66	7	N	
908	84	7	N	
909	95	7	N	
910	98	7	N	
911	29	8	N	
912	28	9	N	
913	61	9	N	
914	70	9	N	
915	85	9	N	
916	143	9	N	

No.	Element	Level	Required	Remark
917	227	8	N	
918	133	9	N	
919	134	10	N	
920	Ch.	10	Ch.	
921	10	11	N	
922	12	12	N	
923	86	12	N	
924	57	11	N	
925	58	11	N	
926	79	11	N	
927	100	7	N	
928	127	7	N	
929	187	8	N	
930	203	8	N	
931	128	7	N	
932	22	8	N	
933	88	9	N	
934	201	9	N	
935	dsc2	8	N	
936	130	8	N	
937	dpc19	8	N	
938	dsc8	8	N	
939	dpc20	8	N	
940	224	8	N	
941	dpc21	9	N	
942	242	9	N	
943	dpc12	7	N	
944	dpc15	7	N	
945	dpc16	7	N	
946	186	7	N	
947	44	8	N	
948	13	9	N	
949	64	9	N	
950	dpc23	8	N	
951	188	7	N	
952	Ch.	8	Ch.	
953	10	9	N	
954	12	10	N	
955	86	10	N	

No.	Element	Level	Required	Remark
956	57	9	N	
957	58	9	N	
958	79	9	N	
959	196	7	N	
960	220	7	N	
961	16	8	N	
962	43	9	N	
963	uc5	9	N	
964	93	9	N	
965	110	9	N	
966	198	9	N	
967	233	9	N	
968	42	8	N	
969	216	8	N	
970	219	7	N	
971	29	8	N	
972	28	9	N	
973	61	9	N	
974	70	9	N	
975	85	9	N	
976	143	9	N	
977	113	8	N	
978	Ch.	9	Ch.	
979	10	10	N	
980	12	11	N	
981	86	11	N	
982	57	10	N	
983	58	10	N	
984	79	10	N	
985	133	8	N	
986	134	9	N	
987	Ch.	9	Ch.	
988	10	10	N	
989	12	11	N	
990	86	11	N	
991	57	10	N	
992	58	10	N	
993	79	10	N	
994	145	8	N	

No.	Element	Level	Required	Remark
995	5	9	N	
996	6	9	N	
997	7	9	N	
998	8	9	N	
999	9	9	N	
1000	25	9	N	
1001	uc1	9	N	
1002	uc2	9	N	
1003	149	9	N	
1004	148	9	N	
1005	223	7	N	
1006	50	8	N	
1007	117	9	N	
1008	dsc1	10	N	
1009	71	10	N	
1010	11	11	N	
1011	uc3	11	N	
1012	dsc4	10	N	
1013	dsc5	10	N	
1014	dsc7	9	N	
1015	91	8	N	
1016	139	8	N	
1017	234	7	N	
1018	uc9	7	N	
1019	250	7	N	
1020	dsc1	8	N	
1021	71	8	N	
1022	11	9	N	
1023	uc3	9	N	
1024	dsc4	8	N	
1025	dsc5	8	N	
1026	dpc12	6	M	
1027	dpc15	6	N	
1028	dpc16	6	M	
1029	186	6	N	
1030	44	7	N	
1031	13	8	N	
1032	64	8	N	
1033	dpc23	7	N	

No.	Element	Level	Required	Remark
1034	188	6	N	
1035	Ch.	7	Ch.	
1036	10	8	N	
1037	12	9	N	
1038	86	9	N	
1039	57	8	N	
1040	58	8	N	
1041	79	8	N	
1042	189	6	N	
1043	dsc1	7	N	
1044	71	7	N	
1045	11	8	N	
1046	uc3	8	N	
1047	dsc4	7	N	
1048	dsc5	7	N	
1049	196	6	N	
1050	202	6	N	
1051	44	7	N	
1052	13	8	N	
1053	64	8	N	
1054	dpc23	7	N	
1055	214	6	N	
1056	Ch.	7	Ch.	
1057	225	8	N	
1058	29	9	N	
1059	28	10	N	
1060	61	10	N	
1061	70	10	N	
1062	85	10	N	
1063	143	10	N	
1064	113	9	N	
1065	Ch.	10	Ch.	
1066	10	11	N	
1067	12	12	N	
1068	86	12	N	
1069	57	11	N	
1070	58	11	N	
1071	79	11	N	
1072	133	9	N	

No.	Element	Level	Required	Remark
1073	134	10	N	
1074	Ch.	10	Ch.	
1075	10	11	N	
1076	12	12	N	
1077	86	12	N	
1078	57	11	N	
1079	58	11	N	
1080	79	11	N	
1081	145	9	N	
1082	5	10	N	
1083	6	10	N	
1084	7	10	N	
1085	8	10	N	
1086	9	10	N	
1087	25	10	N	
1088	uc1	10	N	
1089	uc2	10	N	
1090	149	10	N	
1091	148	10	N	
1092	226	8	N	
1093	29	9	N	
1094	28	10	N	
1095	61	10	N	
1096	70	10	N	
1097	85	10	N	
1098	143	10	N	
1099	145	9	N	
1100	5	10	N	
1101	6	10	N	
1102	7	10	N	
1103	8	10	N	
1104	9	10	N	
1105	25	10	N	
1106	uc1	10	N	
1107	uc2	10	N	
1108	149	10	N	
1109	148	10	N	
1110	228	8	N	
1111	29	9	N	

No.	Element	Level	Required	Remark
1112	28	10	N	
1113	61	10	N	
1114	70	10	N	
1115	85	10	N	
1116	143	10	N	
1117	227	9	N	
1118	133	10	N	
1119	134	11	N	
1120	Ch.	11	Ch.	
1121	10	12	N	
1122	12	13	N	
1123	86	13	N	
1124	57	12	N	
1125	58	12	N	
1126	79	12	N	
1127	229	8	N	
1128	29	9	N	
1129	28	10	N	
1130	61	10	N	
1131	70	10	N	
1132	85	10	N	
1133	143	10	N	
1134	113	9	N	
1135	Ch.	10	Ch.	
1136	10	11	N	
1137	12	12	N	
1138	86	12	N	
1139	57	11	N	
1140	58	11	N	
1141	79	11	N	
1142	133	9	N	
1143	134	10	N	
1144	Ch.	10	Ch.	
1145	10	11	N	
1146	12	12	N	
1147	86	12	N	
1148	57	11	N	
1149	58	11	N	
1150	79	11	N	

No.	Element	Level	Required	Remark
1151	145	9	N	
1152	5	10	N	
1153	6	10	N	
1154	7	10	N	
1155	8	10	N	
1156	9	10	N	
1157	25	10	N	
1158	uc1	10	N	
1159	uc2	10	N	
1160	149	10	N	
1161	148	10	N	
1162	220	6	O	
1163	16	7	N	
1164	43	8	N	
1165	uc5	8	N	
1166	93	8	N	
1167	110	8	N	
1168	198	8	N	
1169	233	8	N	
1170	42	7	O	
1171	216	7	O	
1172	218	6	N	
1173	Ch.	7	Ch.	
1174	225	8	N	
1175	29	9	N	
1176	28	10	N	
1177	61	10	N	
1178	70	10	N	
1179	85	10	N	
1180	143	10	N	
1181	113	9	N	
1182	Ch.	10	Ch.	
1183	10	11	N	
1184	12	12	N	
1185	86	12	N	
1186	57	11	N	
1187	58	11	N	
1188	79	11	N	
1189	133	9	N	

No.	Element	Level	Required	Remark
1190	134	10	N	
1191	Ch.	10	Ch.	
1192	10	11	N	
1193	12	12	N	
1194	86	12	N	
1195	57	11	N	
1196	58	11	N	
1197	79	11	N	
1198	145	9	N	
1199	5	10	N	
1200	6	10	N	
1201	7	10	N	
1202	8	10	N	
1203	9	10	N	
1204	25	10	N	
1205	uc1	10	N	
1206	uc2	10	N	
1207	149	10	N	
1208	148	10	N	
1209	226	8	N	
1210	29	9	N	
1211	28	10	N	
1212	61	10	N	
1213	70	10	N	
1214	85	10	N	
1215	143	10	N	
1216	145	9	N	
1217	5	10	N	
1218	6	10	N	
1219	7	10	N	
1220	8	10	N	
1221	9	10	N	
1222	25	10	N	
1223	uc1	10	N	
1224	uc2	10	N	
1225	149	10	N	
1226	148	10	N	
1227	228	8	N	
1228	29	9	N	

No.	Element	Level	Required	Remark
1229	28	10	N	
1230	61	10	N	
1231	70	10	N	
1232	85	10	N	
1233	143	10	N	
1234	227	9	N	
1235	133	10	N	
1236	134	11	N	
1237	Ch.	11	Ch.	
1238	10	12	N	
1239	12	13	N	
1240	86	13	N	
1241	57	12	N	
1242	58	12	N	
1243	79	12	N	
1244	229	8	N	
1245	29	9	N	
1246	28	10	N	
1247	61	10	N	
1248	70	10	N	
1249	85	10	N	
1250	143	10	N	
1251	113	9	N	
1252	Ch.	10	Ch.	
1253	10	11	N	
1254	12	12	N	
1255	86	12	N	
1256	57	11	N	
1257	58	11	N	
1258	79	11	N	
1259	133	9	N	
1260	134	10	N	
1261	Ch.	10	Ch.	
1262	10	11	N	
1263	12	12	N	
1264	86	12	N	
1265	57	11	N	
1266	58	11	N	
1267	79	11	N	

No.	Element	Level	Required	Remark
1268	145	9	N	
1269	5	10	N	
1270	6	10	N	
1271	7	10	N	
1272	8	10	N	
1273	9	10	N	
1274	25	10	N	
1275	uc1	10	N	
1276	uc2	10	N	
1277	149	10	N	
1278	148	10	N	
1279	223	6	O	
1280	50	7	O	
1281	117	8	O	
1282	dsc1	9	O	
1283	71	9	O	
1284	11	10	O	
1285	uc3	10	O	
1286	dsc4	9	O	
1287	dsc5	9	O	
1288	dsc7	8	O	
1289	91	7	O	
1290	139	7	O	
1291	235	6	N	
1292	158	7	N	
1293	162	8	N	
1294	199	8	N	
1295	Ch.	8	Ch.	
1296	10	9	N	
1297	12	10	N	
1298	86	10	N	
1299	81	9	N	
1300	dpc11	7	N	
1301	237	6	O	
1302	105	7	O	
1303	238	7	O	
1304	23	8	O	
1305	116	8	O	
1306	dpc22	8	O	

No.	Element	Level	Required	Remark
1307	241	6	O	
1308	236	7	O	
1309	71	8	O	
1310	11	9	O	
1311	uc3	9	O	
1312	239	8	O	
1313	uc1	9	O	
1314	92	9	O	
1315	114	9	O	
1316	182	9	O	
1317	uc8	8	O	
1318	243	7	O	
1319	dsc1	8	O	
1320	71	8	O	
1321	11	9	O	
1322	uc3	9	O	
1323	dsc4	8	O	
1324	dsc5	8	O	
1325	244	6	M	
1326	dsc1	7	O	
1327	71	7	M	
1328	11	8	Y	7,300
1329	uc3	8	Y	THB
1330	dsc4	7	O	
1331	dsc5	7	O	
1332	uc9	6	Y	KILO
1333	250	6	M	
1334	dsc1	7	O	
1335	71	7	M	
1336	11	8	Y	7.3
1337	uc3	8	Y	THB
1338	dsc4	7	O	
1339	dsc5	7	O	
1340	209	5	N	
1341	16	6	N	
1342	43	7	N	
1343	uc5	7	N	
1344	93	7	N	
1345	110	7	N	

No.	Element	Level	Required	Remark
1346	198	7	N	
1347	233	7	N	
1348	31	6	N	
1349	89	7	N	
1350	123	7	N	
1351	82	6	N	
1352	96	6	N	
1353	Ch.	7	Ch.	
1354	225	8	N	
1355	29	9	N	
1356	28	10	N	
1357	61	10	N	
1358	70	10	N	
1359	85	10	N	
1360	143	10	N	
1361	113	9	N	
1362	Ch.	10	Ch.	
1363	10	11	N	
1364	12	12	N	
1365	86	12	N	
1366	57	11	N	
1367	58	11	N	
1368	79	11	N	
1369	133	9	N	
1370	134	10	N	
1371	Ch.	10	Ch.	
1372	10	11	N	
1373	12	12	N	
1374	86	12	N	
1375	57	11	N	
1376	58	11	N	
1377	79	11	N	
1378	145	9	N	
1379	5	10	N	
1380	6	10	N	
1381	7	10	N	
1382	8	10	N	
1383	9	10	N	
1384	25	10	N	

No.	Element	Level	Required	Remark
1385	uc1	10	N	
1386	uc2	10	N	
1387	149	10	N	
1388	148	10	N	
1389	226	8	N	
1390	29	9	N	
1391	28	10	N	
1392	61	10	N	
1393	70	10	N	
1394	85	10	N	
1395	143	10	N	
1396	145	9	N	
1397	5	10	N	
1398	6	10	N	
1399	7	10	N	
1400	8	10	N	
1401	9	10	N	
1402	25	10	N	
1403	uc1	10	N	
1404	uc2	10	N	
1405	149	10	N	
1406	148	10	N	
1407	228	8	N	
1408	29	9	N	
1409	28	10	N	
1410	61	10	N	
1411	70	10	N	
1412	85	10	N	
1413	143	10	N	
1414	227	9	N	
1415	133	10	N	
1416	134	11	N	
1417	Ch.	11	Ch.	
1418	10	12	N	
1419	12	13	N	
1420	86	13	N	
1421	57	12	N	
1422	58	12	N	
1423	79	12	N	

No.	Element	Level	Required	Remark
1424	229	8	N	
1425	29	9	N	
1426	28	10	N	
1427	61	10	N	
1428	70	10	N	
1429	85	10	N	
1430	143	10	N	
1431	113	9	N	
1432	Ch.	10	Ch.	
1433	10	11	N	
1434	12	12	N	
1435	86	12	N	
1436	57	11	N	
1437	58	11	N	
1438	79	11	N	
1439	133	9	N	
1440	134	10	N	
1441	Ch.	10	Ch.	
1442	10	11	N	
1443	12	12	N	
1444	86	12	N	
1445	57	11	N	
1446	58	11	N	
1447	79	11	N	
1448	145	9	N	
1449	5	10	N	
1450	6	10	N	
1451	7	10	N	
1452	8	10	N	
1453	9	10	N	
1454	25	10	N	
1455	uc1	10	N	
1456	uc2	10	N	
1457	149	10	N	
1458	148	10	N	
1459	111	6	N	
1460	112	6	N	
1461	117	7	N	
1462	dsc1	8	N	

No.	Element	Level	Required	Remark
1463	71	8	N	
1464	11	9	N	
1465	uc3	9	N	
1466	dsc4	8	N	
1467	dsc5	8	N	
1468	dsc7	7	N	
1469	126	6	N	
1470	117	7	N	
1471	dsc1	8	N	
1472	71	8	N	
1473	11	9	N	
1474	uc3	9	N	
1475	dsc4	8	N	
1476	dsc5	8	N	
1477	dsc7	7	N	
1478	158	6	N	
1479	162	7	N	
1480	199	7	N	
1481	Ch.	7	Ch.	
1482	10	8	N	
1483	12	9	N	
1484	86	9	N	
1485	81	8	N	
1486	161	6	N	
1487	163	6	N	
1488	187	7	N	
1489	203	7	N	
1490	167	6	N	
1491	dpc12	6	N	
1492	180	6	N	
1493	43	7	N	
1494	uc5	7	N	
1495	93	7	N	
1496	110	7	N	
1497	198	7	N	
1498	233	7	N	
1499	dpc16	6	N	
1500	dpc17	6	N	
1501	196	6	N	

No.	Element	Level	Required	Remark
1502	207	6	N	
1503	208	6	N	
1504	212	6	N	
1505	187	7	N	
1506	203	7	N	
1507	213	6	N	
1508	Ch.	7	Ch.	
1509	41	8	N	
1510	14	9	N	
1511	65	9	N	
1512	59	8	N	
1513	140	9	N	
1514	232	9	N	
1515	223	6	N	
1516	50	7	N	
1517	117	8	N	
1518	dsc1	9	N	
1519	71	9	N	
1520	11	10	N	
1521	uc3	10	N	
1522	dsc4	9	N	
1523	dsc5	9	N	
1524	dsc7	8	N	
1525	91	7	N	
1526	139	7	N	
1527	210	5	N	
1528	16	6	N	
1529	43	7	N	
1530	uc5	7	N	
1531	93	7	N	
1532	110	7	N	
1533	198	7	N	
1534	233	7	N	
1535	31	6	N	
1536	89	7	N	
1537	123	7	N	
1538	67	6	N	
1539	Ch.	7	Ch.	
1540	41	8	N	

No.	Element	Level	Required	Remark
1541	14	9	N	
1542	65	9	N	
1543	59	8	N	
1544	140	9	N	
1545	232	9	N	
1546	82	6	N	
1547	96	6	N	
1548	Ch.	7	Ch.	
1549	225	8	N	
1550	29	9	N	
1551	28	10	N	
1552	61	10	N	
1553	70	10	N	
1554	85	10	N	
1555	143	10	N	
1556	113	9	N	
1557	Ch.	10	Ch.	
1558	10	11	N	
1559	12	12	N	
1560	86	12	N	
1561	57	11	N	
1562	58	11	N	
1563	79	11	N	
1564	133	9	N	
1565	134	10	N	
1566	Ch.	10	Ch.	
1567	10	11	N	
1568	12	12	N	
1569	86	12	N	
1570	57	11	N	
1571	58	11	N	
1572	79	11	N	
1573	145	9	N	
1574	5	10	N	
1575	6	10	N	
1576	7	10	N	
1577	8	10	N	
1578	9	10	N	
1579	25	10	N	

No.	Element	Level	Required	Remark
1580	uc1	10	N	
1581	uc2	10	N	
1582	149	10	N	
1583	148	10	N	
1584	226	8	N	
1585	29	9	N	
1586	28	10	N	
1587	61	10	N	
1588	70	10	N	
1589	85	10	N	
1590	143	10	N	
1591	145	9	N	
1592	5	10	N	
1593	6	10	N	
1594	7	10	N	
1595	8	10	N	
1596	9	10	N	
1597	25	10	N	
1598	uc1	10	N	
1599	uc2	10	N	
1600	149	10	N	
1601	148	10	N	
1602	228	8	N	
1603	29	9	N	
1604	28	10	N	
1605	61	10	N	
1606	70	10	N	
1607	85	10	N	
1608	143	10	N	
1609	227	9	N	
1610	133	10	N	
1611	134	11	N	
1612	Ch.	11	Ch.	
1613	10	12	N	
1614	12	13	N	
1615	86	13	N	
1616	57	12	N	
1617	58	12	N	
1618	79	12	N	

No.	Element	Level	Required	Remark
1619	229	8	N	
1620	29	9	N	
1621	28	10	N	
1622	61	10	N	
1623	70	10	N	
1624	85	10	N	
1625	143	10	N	
1626	113	9	N	
1627	Ch.	10	Ch.	
1628	10	11	N	
1629	12	12	N	
1630	86	12	N	
1631	57	11	N	
1632	58	11	N	
1633	79	11	N	
1634	133	9	N	
1635	134	10	N	
1636	Ch.	10	Ch.	
1637	10	11	N	
1638	12	12	N	
1639	86	12	N	
1640	57	11	N	
1641	58	11	N	
1642	79	11	N	
1643	145	9	N	
1644	5	10	N	
1645	6	10	N	
1646	7	10	N	
1647	8	10	N	
1648	9	10	N	
1649	25	10	N	
1650	uc1	10	N	
1651	uc2	10	N	
1652	149	10	N	
1653	148	10	N	
1654	111	6	N	
1655	112	6	N	
1656	117	7	N	
1657	dsc1	8	N	

No.	Element	Level	Required	Remark
1658	71	8	N	
1659	11	9	N	
1660	uc3	9	N	
1661	dsc4	8	N	
1662	dsc5	8	N	
1663	dsc7	7	N	
1664	126	6	N	
1665	117	7	N	
1666	dsc1	8	N	
1667	71	8	N	
1668	11	9	N	
1669	uc3	9	N	
1670	dsc4	8	N	
1671	dsc5	8	N	
1672	dsc7	7	N	
1673	158	6	N	
1674	162	7	N	
1675	199	7	N	
1676	Ch.	7	Ch.	
1677	10	8	N	
1678	12	9	N	
1679	86	9	N	
1680	81	8	N	
1681	161	6	N	
1682	163	6	N	
1683	187	7	N	
1684	203	7	N	
1685	167	6	N	
1686	dpc12	6	N	
1687	180	6	N	
1688	43	7	N	
1689	uc5	7	N	
1690	93	7	N	
1691	110	7	N	
1692	198	7	N	
1693	233	7	N	
1694	dpc16	6	N	
1695	dpc17	6	N	
1696	dpc18	6	N	

No.	Element	Level	Required	Remark
1697	196	6	N	
1698	207	6	N	
1699	208	6	N	
1700	212	6	N	
1701	187	7	N	
1702	203	7	N	
1703	213	6	N	
1704	Ch.	7	Ch.	
1705	41	8	N	
1706	14	9	N	
1707	65	9	N	
1708	59	8	N	
1709	140	9	N	
1710	232	9	N	
1711	223	6	N	
1712	50	7	N	
1713	117	8	N	
1714	dsc1	9	N	
1715	71	9	N	
1716	11	10	N	
1717	uc3	10	N	
1718	dsc4	9	N	
1719	dsc5	9	N	
1720	dsc7	8	N	
1721	91	7	N	
1722	139	7	N	
1723	128	3	N	
1724	22	4	N	
1725	88	5	N	
1726	201	5	N	
1727	dsc2	4	N	
1728	130	4	N	
1729	dpc19	4	N	
1730	dsc8	4	N	
1731	dpc20	4	N	
1732	224	4	N	
1733	dpc21	5	N	
1734	242	5	N	
1735	dpc12	3	M	

No.	Element	Level	Required	Remark
1736	dpc15	3	O	
1737	dpc16	3	M	
1738	dpc17	3	M	
1739	186	3	M	
1740	44	4	M	
1741	13	5	Y	10-JUN-2009
1742	64	5	Y	10-JUN-2009
1743	dpc23	4	N	
1744	194	3	N	
1745	Ch.	4	Ch.	
1746	225	5	N	
1747	29	6	N	
1748	28	7	N	
1749	61	7	N	
1750	70	7	N	
1751	85	7	N	
1752	143	7	N	
1753	113	6	N	
1754	Ch.	7	N	
1755	10	8	N	
1756	12	9	N	
1757	86	9	N	
1758	57	8	N	
1759	58	8	N	
1760	79	8	N	
1761	133	6	N	
1762	134	7	N	
1763	Ch.	7	Ch.	
1764	10	8	N	
1765	12	9	N	
1766	86	9	N	
1767	57	8	N	
1768	58	8	N	
1769	79	8	N	
1770	145	6	N	
1771	5	7	N	
1772	6	7	N	
1773	7	7	N	
1774	8	7	N	

No.	Element	Level	Required	Remark
1775	9	7	N	
1776	25	7	N	
1777	uc1	7	N	
1778	uc2	7	N	
1779	149	7	N	
1780	148	7	N	
1781	226	5	N	
1782	29	6	N	
1783	28	7	N	
1784	61	7	N	
1785	70	7	N	
1786	85	7	N	
1787	143	7	N	
1788	145	6	N	
1789	5	7	N	
1790	6	7	N	
1791	7	7	N	
1792	8	7	N	
1793	9	7	N	
1794	25	7	N	
1795	uc1	7	N	
1796	uc2	7	N	
1797	149	7	N	
1798	148	7	N	
1799	228	5	N	
1800	29	6	N	
1801	28	7	N	
1802	61	7	N	
1803	70	7	N	
1804	85	7	N	
1805	143	7	N	
1806	227	6	N	
1807	133	7	N	
1808	134	8	N	
1809	Ch.	8	Ch.	
1810	10	9	N	
1811	12	10	N	
1812	86	10	N	
1813	57	9	N	

No.	Element	Level	Required	Remark
1814	58	9	N	
1815	79	9	N	
1816	229	5	N	
1817	29	6	N	
1818	28	7	N	
1819	61	7	N	
1820	70	7	N	
1821	85	7	N	
1822	143	7	N	
1823	113	6	N	
1824	Ch.	7	Ch.	
1825	10	8	N	
1826	12	9	N	
1827	86	9	N	
1828	57	8	N	
1829	58	8	N	
1830	79	8	N	
1831	133	6	N	
1832	134	7	N	
1833	Ch.	7	Ch.	
1834	10	8	N	
1835	12	9	N	
1836	86	9	N	
1837	57	8	N	
1838	58	8	N	
1839	79	8	N	
1840	145	6	N	
1841	5	7	N	
1842	6	7	N	
1843	7	7	N	
1844	8	7	N	
1845	9	7	N	
1846	25	7	N	
1847	uc1	7	N	
1848	uc2	7	N	
1849	149	7	N	
1850	148	7	N	
1851	197	3	O	
1852	202	3	N	

No.	Element	Level	Required	Remark
1853	44	4	N	
1854	13	5	N	
1855	64	5	N	
1856	dpc23	4	N	
1857	205	3	N	
1858	94	4	N	
1859	131	4	N	
1860	Ch.	5	Ch.	
1861	77	6	N	
1862	29	7	N	
1863	28	8	N	
1864	61	8	N	
1865	70	8	N	
1866	85	8	N	
1867	143	8	N	
1868	113	7	N	
1869	Ch.	8	Ch.	
1870	10	9	N	
1871	12	10	N	
1872	86	10	N	
1873	57	9	N	
1874	58	9	N	
1875	79	9	N	
1876	133	7	N	
1877	134	8	N	
1878	Ch.	8	Ch.	
1879	10	9	N	
1880	12	10	N	
1881	86	10	N	
1882	57	9	N	
1883	58	9	N	
1884	79	9	N	
1885	145	7	N	
1886	5	8	N	
1887	6	8	N	
1888	7	8	N	
1889	8	8	N	
1890	9	8	N	
1891	25	8	N	

No.	Element	Level	Required	Remark
1892	uc1	8	N	
1893	uc2	8	N	
1894	149	8	N	
1895	148	8	N	
1896	uc7	7	N	
1897	99	6	N	
1898	29	7	N	
1899	28	8	N	
1900	61	8	N	
1901	70	8	N	
1902	85	8	N	
1903	143	8	N	
1904	145	7	N	
1905	5	8	N	
1906	6	8	N	
1907	7	8	N	
1908	8	8	N	
1909	9	8	N	
1910	25	8	N	
1911	uc1	8	N	
1912	uc2	8	N	
1913	149	8	N	
1914	148	8	N	
1915	uc7	7	N	
1916	108	6	N	
1917	29	7	N	
1918	28	8	N	
1919	61	8	N	
1920	70	8	N	
1921	85	8	N	
1922	143	8	N	
1923	107	7	N	
1924	133	8	N	
1925	134	9	N	
1926	Ch.	9	Ch.	
1927	10	10	N	
1928	12	11	N	
1929	26	11	N	
1930	57	10	N	

No.	Element	Level	Required	Remark
1931	58	10	N	
1932	79	10	N	
1933	uc7	8	N	
1934	121	6	N	
1935	29	7	N	
1936	28	8	N	
1937	61	8	N	
1938	70	8	N	
1939	85	8	N	
1940	143	8	N	
1941	113	7	N	
1942	Ch.	8	Ch.	
1943	10	9	N	
1944	12	10	N	
1945	86	10	N	
1946	57	9	N	
1947	58	9	N	
1948	79	9	N	
1949	133	7	N	
1950	134	8	N	
1951	Ch.	8	Ch.	
1952	10	9	N	
1953	12	10	N	
1954	86	10	N	
1955	57	9	N	
1956	58	9	N	
1957	79	9	N	
1958	145	7	N	
1959	5	8	N	
1960	6	8	N	
1961	7	8	N	
1962	8	8	N	
1963	9	8	N	
1964	25	8	N	
1965	uc1	8	N	
1966	uc2	8	N	
1967	149	8	N	
1968	148	8	N	
1969	uc7	7	N	

No.	Element	Level	Required	Remark
1970	214	3	O	
1971	Ch.	4	Ch.	
1972	225	5	O	
1973	29	6	O	
1974	28	7	O	
1975	61	7	O	
1976	70	7	O	
1977	85	7	O	
1978	143	7	O	
1979	113	6	N	
1980	Ch.	7	Ch.	
1981	10	8	N	
1982	12	9	N	
1983	86	9	N	
1984	57	8	N	
1985	58	8	N	
1986	79	8	N	
1987	133	6	O	
1988	134	7	O	
1989	Ch.	7	Ch.	
1990	10	8	O	
1991	12	9	O	
1992	86	9	O	
1993	57	8	O	
1994	58	8	O	
1995	79	8	O	
1996	145	6	O	
1997	5	7	O	
1998	6	7	O	
1999	7	7	O	
2000	8	7	O	
2001	9	7	O	
2002	25	7	O	
2003	uc1	7	O	
2004	uc2	7	O	
2005	149	7	O	
2006	148	7	O	
2007	226	5	N	
2008	29	6	N	

No.	Element	Level	Required	Remark
2009	28	7	N	
2010	61	7	N	
2011	70	7	N	
2012	85	7	N	
2013	143	7	N	
2014	145	6	N	
2015	5	7	N	
2016	6	7	N	
2017	7	7	N	
2018	8	7	N	
2019	9	7	N	
2020	25	7	N	
2021	uc1	7	N	
2022	uc2	7	N	
2023	149	7	N	
2024	148	7	N	
2025	228	5	N	
2026	29	6	N	
2027	28	7	N	
2028	61	7	N	
2029	70	7	N	
2030	85	7	N	
2031	143	7	N	
2032	227	6	N	
2033	133	7	N	
2034	134	8	N	
2035	Ch.	8	Ch.	
2036	10	9	N	
2037	12	10	N	
2038	86	10	N	
2039	57	9	N	
2040	58	9	N	
2041	79	9	N	
2042	229	5	N	
2043	29	6	N	
2044	28	7	N	
2045	61	7	N	
2046	70	7	N	
2047	85	7	N	

No.	Element	Level	Required	Remark
2048	143	7	N	
2049	113	6	N	
2050	Ch.	7	Ch.	
2051	10	8	N	
2052	12	9	N	
2053	86	9	N	
2054	57	8	N	
2055	58	8	N	
2056	79	8	N	
2057	133	6	N	
2058	134	7	N	
2059	Ch.	7	Ch.	
2060	10	8	N	
2061	12	9	N	
2062	86	9	N	
2063	57	8	N	
2064	58	8	N	
2065	79	8	N	
2066	145	6	N	
2067	5	7	N	
2068	6	7	N	
2069	7	7	N	
2070	8	7	N	
2071	9	7	N	
2072	25	7	N	
2073	uc1	7	N	
2074	uc2	7	N	
2075	149	7	N	
2076	148	7	N	
2077	218	3	O	
2078	Ch.	4	Ch.	
2079	225	5	O	
2080	29	6	O	
2081	28	7	O	
2082	61	7	O	
2083	70	7	O	
2084	85	7	O	
2085	143	7	O	
2086	113	6	N	

No.	Element	Level	Required	Remark
2087	Ch.	7	Ch.	
2088	10	8	N	
2089	12	9	N	
2090	86	9	N	
2091	57	8	N	
2092	58	8	N	
2093	79	8	N	
2094	133	6	O	
2095	134	7	O	
2096	Ch.	7	Ch.	
2097	10	8	O	
2098	12	9	O	
2099	86	9	O	
2100	57	8	O	
2101	58	8	O	
2102	79	8	O	
2103	145	6	O	
2104	5	7	O	
2105	6	7	O	
2106	7	7	O	
2107	8	7	O	
2108	9	7	O	
2109	25	7	O	
2110	uc1	7	O	
2111	uc2	7	O	
2112	149	7	O	
2113	148	7	O	
2114	226	5	N	
2115	29	6	N	
2116	28	7	N	
2117	61	7	N	
2118	70	7	N	
2119	85	7	N	
2120	143	7	N	
2121	145	6	N	
2122	5	7	N	
2123	6	7	N	
2124	7	7	N	
2125	8	7	N	

No.	Element	Level	Required	Remark
2126	9	7	N	
2127	25	7	N	
2128	uc1	7	N	
2129	uc2	7	N	
2130	149	7	N	
2131	148	7	N	
2132	228	5	N	
2133	29	6	N	
2134	28	7	N	
2135	61	7	N	
2136	70	7	N	
2137	85	7	N	
2138	143	7	N	
2139	227	6	N	
2140	133	7	N	
2141	134	8	N	
2142	Ch.	8	Ch.	
2143	10	9	N	
2144	12	10	N	
2145	86	10	N	
2146	57	9	N	
2147	58	9	N	
2148	79	9	N	
2149	229	5	N	
2150	29	6	N	
2151	28	7	N	
2152	61	7	N	
2153	70	7	N	
2154	85	7	N	
2155	143	7	N	
2156	113	6	N	
2157	Ch.	7	Ch.	
2158	10	8	N	
2159	12	9	N	
2160	86	9	N	
2161	57	8	N	
2162	58	8	N	
2163	79	8	N	
2164	133	6	N	

No.	Element	Level	Required	Remark
2165	134	7	N	
2166	Ch.	7	Ch.	
2167	10	8	N	
2168	12	9	N	
2169	86	9	N	
2170	57	8	N	
2171	58	8	N	
2172	79	8	N	
2173	145	6	N	
2174	5	7	N	
2175	6	7	N	
2176	7	7	N	
2177	8	7	N	
2178	9	7	N	
2179	25	7	N	
2180	uc1	7	N	
2181	uc2	7	N	
2182	149	7	N	
2183	148	7	N	
2184	223	3	O	
2185	50	4	O	
2186	117	5	O	
2187	dsc1	6	O	
2188	71	6	O	
2189	11	7	O	
2190	uc3	7	O	
2191	dsc4	6	O	
2192	dsc5	6	O	
2193	dsc7	5	O	
2194	91	4	O	
2195	139	4	O	
2196	237	4	O	
2197	105	4	O	
2198	238	4	O	
2199	23	5	O	
2200	116	5	O	
2201	dpc22	5	O	
2202	241	3	O	
2203	236	4	O	

No.	Element	Level	Required	Remark
2204	71	5	O	
2205	11	6	O	
2206	uc3	6	O	
2207	239	5	O	
2208	uc1	6	O	
2209	92	6	O	
2210	114	6	O	
2211	182	6	O	
2212	uc8	5	O	
2213	243	4	O	
2214	dsc1	5	O	
2215	71	5	O	
2216	11	6	O	
2217	uc3	6	O	
2218	dsc4	5	O	
2219	dsc5	5	O	
2220	243	3	M	
2221	dsc1	4	O	
2222	71	4	M	
2223	11	5	Y	7,300
2224	uc3	5	Y	THB
2225	dsc4	4	O	
2226	dsc5	4	O	

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No.	Element	Level	Required	Remark
1	176	1	M	
2	52	2	M	
3	35	3	O	
4	32	4	O	
5	30	5	O	
6	34	5	O	
7	192	4	O	
8	17	5	O	
9	191	5	O	
10	193	5	O	
11	195	5	O	
12	54	3	M	

No.	Element	Level	Required	Remark
13	36	4	Y	02-JUN-09
14	53	4	M	
15	87	5	Y	P/O (408744)
16	249	5	O	
17	Ch.	5	Ch.	
18	231	6	M	
19	230	7	M	RosettaNet
20	253	7	M	PIP3A8V11.00
21	246	6	N	
22	sc1	7	N	
23	132	7	N	
24	146	7	N	
25	147	7	N	
26	245	7	N	
27	247	7	N	
28	252	7	N	
29	55	4	O	
30	115	5	O	
31	49	6	O	
32	uc4	6	O	
33	109	6	O	
34	uc6	6	O	
35	251	6	O	
36	118	5	O	
37	124	5	O	
38	56	4	M	
39	122	5	M	
40	141	5	M	
41	142	5	M	
42	83	3	N	
43	184	3	M	
44	18	4	M	
45	4	5	M	Request
46	151	5	M	Request Purchase Order Change
47	152	5	M	PIP3A8
48	153	5	N	
49	211	5	M	PurchaseOrderChange
50	29	4	M	
51	28	5	O	

No.	Element	Level	Required	Remark
52	61	5	O	
53	70	5	Y	Fax. No.
54	85	5	O	
55	143	5	Y	Tel. No.
56	133	4	M	
57	134	5	Y	Supplier Name
58	Ch.	5	Ch.	
59	10	6	O	
60	12	7	O	
61	86	7	O	
62	57	6	O	
63	58	6	O	
64	79	6	O	
65	206	3	M	
66	18	4	M	
67	4	5	M	
68	151	5	M	
69	152	5	M	
70	153	5	N	
71	211	5	M	
72	29	4	M	
73	28	5	Y	Prepared by
74	61	5	O	e-mail ผู้จัดทำ
75	70	5	O	หมายเลขโทรสาร
76	85	5	O	ผู้จัดทำ
77	143	5	O	หมายเลขโทรศัพท์
78	133	4	M	
79	134	5	Y	ชื่อบริษัท
80	Ch.	5	Ch.	
81	10	6	O	
82	12	7	O	
83	86	7	O	
84	57	6	O	
85	58	6	O	
86	79	6	O	
87	170	2	M	
88	1	3	M	
89	dpc1	4	O	
90	2	4	O	

No.	Element	Level	Required	Remark
91	3	4	O	
92	37	4	O	
93	21	5	O	
94	24	5	O	
95	dpc3	5	O	
96	68	5	O	
97	90	5	O	
98	131	4	M	
99	Ch.	5	Ch.	
100	77	6	M	
101	29	7	N	
102	28	8	N	
103	61	8	N	
104	70	8	N	
105	85	8	N	
106	143	8	N	
107	113	7	N	
108	Ch.	8	Ch.	
109	10	9	N	
110	12	10	N	
111	86	10	N	
112	57	9	N	
113	58	9	N	
114	79	9	N	
115	133	7	N	
116	134	8	N	
117	Ch.	8	Ch.	
118	10	9	N	
119	12	10	N	
120	86	10	N	
121	57	9	N	
122	58	9	N	
123	79	9	N	
124	145	7	M	
125	5	8	Y	ชื่อบริษัท Supplier
126	6	8	Y	ที่อยู่ Supplier บรรทัดที่ 1
127	7	8	Y	ที่อยู่ Supplier บรรทัดที่ 2
128	8	8	O	
129	9	8	O	

No.	Element	Level	Required	Remark
130	25	8	O	
131	uc1	8	O	
132	uc2	8	O	
133	149	8	O	
134	148	8	O	
135	uc7	7	O	
136	99	6	N	
137	29	7	N	
138	28	8	N	
139	61	8	N	
140	70	8	N	
141	85	8	N	
142	143	8	N	
143	145	7	N	
144	5	8	N	
145	6	8	N	
146	7	8	N	
147	8	8	N	
148	9	8	N	
149	25	8	N	
150	uc1	8	N	
151	uc2	8	N	
152	149	8	N	
153	148	8	N	
154	uc7	7	N	
155	108	6	N	
156	29	7	N	
157	28	8	N	
158	61	8	N	
159	70	8	N	
160	85	8	N	
161	143	8	N	
162	107	7	N	
163	133	8	N	
164	134	9	N	
165	Ch.	9	Ch.	
166	10	10	N	
167	12	11	N	
168	26	11	N	

No.	Element	Level	Required	Remark
169	57	10	N	
170	58	10	N	
171	79	10	N	
172	uc7	8	N	
173	121	6	N	
174	29	7	N	
175	28	8	N	
176	61	8	N	
177	70	8	N	
178	85	8	N	
179	143	8	N	
180	113	7	N	
181	Ch.	8	Ch.	
182	10	9	N	
183	12	10	N	
184	86	10	N	
185	57	9	N	
186	58	9	N	
187	79	9	N	
188	133	7	N	
189	134	8	N	
190	Ch.	8	Ch.	
191	10	9	N	
192	12	10	N	
193	86	10	N	
194	57	9	N	
195	58	9	N	
196	79	9	N	
197	145	7	N	
198	5	8	N	
199	6	8	N	
200	7	8	N	
201	8	8	N	
202	9	8	N	
203	25	8	N	
204	uc1	8	N	
205	uc2	8	N	
206	149	8	N	
207	148	8	N	

No.	Element	Level	Required	Remark
208	uc7	7	N	
209	dsc6	4	O	
210	150	4	O	
211	253	4	O	
212	16	3	N	
213	43	4	N	
214	uc5	4	N	
215	93	4	N	
216	110	4	N	
217	198	4	N	
218	233	4	N	
219	27	3	Y	โรงงานใหม่แต่การทำงานเงิน
220	31	3	O	
221	89	4	O	
222	123	4	O	
223	40	3	M	
224	72	3	N	
225	dpc5	4	N	
226	136	4	N	
227	51	5	N	
228	45	6	N	
229	47	6	N	
230	137	6	N	
231	120	5	N	
232	46	6	N	
233	48	6	N	
234	dpc10	5	N	
235	138	5	N	
236	78	3	N	
237	43	4	N	
238	uc5	4	N	
239	93	4	N	
240	110	4	N	
241	198	4	N	
242	233	4	N	
243	80	3	N	
244	43	4	N	
245	uc5	4	N	
246	93	4	N	

No.	Element	Level	Required	Remark
247	110	4	N	
248	198	4	N	
249	233	4	N	
250	dpc9	3	N	
251	96	3	N	
252	Ch.	4	Ch.	
253	225	5	N	
254	29	6	N	
255	28	7	N	
256	61	7	N	
257	70	7	N	
258	85	7	N	
259	143	7	N	
260	113	6	N	
261	Ch.	7	Ch.	
262	10	8	N	
263	12	9	N	
264	86	9	N	
265	57	8	N	
266	58	8	N	
267	79	8	N	
268	133	6	N	
269	134	7	N	
270	Ch.	7	Ch.	
271	10	8	N	
272	12	9	N	
273	86	9	N	
274	57	8	N	
275	58	8	N	
276	79	8	N	
277	145	6	N	
278	5	7	N	
279	6	7	N	
280	7	7	N	
281	8	7	N	
282	9	7	N	
283	25	7	N	
284	uc1	7	N	
285	uc2	7	N	

No.	Element	Level	Required	Remark
286	149	7	N	
287	148	7	N	
288	226	5	N	
289	29	6	N	
290	28	7	N	
291	61	7	N	
292	70	7	N	
293	85	7	N	
294	143	7	N	
295	145	6	N	
296	5	7	N	
297	6	7	N	
298	7	7	N	
299	8	7	N	
300	9	7	N	
301	25	7	N	
302	uc1	7	N	
303	uc2	7	N	
304	149	7	N	
305	148	7	N	
306	228	5	N	
307	29	6	N	
308	28	7	N	
309	61	7	N	
310	70	7	N	
311	85	7	N	
312	143	7	N	
313	227	6	N	
314	133	7	N	
315	134	8	N	
316	Ch.	8	Ch.	
317	10	9	N	
318	12	10	N	
319	86	10	N	
320	57	9	N	
321	58	9	N	
322	79	9	N	
323	229	5	N	
324	29	6	N	

No.	Element	Level	Required	Remark
325	28	7	N	
326	61	7	N	
327	70	7	N	
328	85	7	N	
329	143	7	N	
330	113	6	N	
331	Ch.	7	Ch.	
332	10	8	N	
333	12	9	N	
334	86	9	N	
335	57	8	N	
336	58	8	N	
337	79	8	N	
338	133	6	N	
339	134	7	N	
340	Ch.	7	Ch.	
341	10	8	N	
342	12	9	N	
343	86	9	N	
344	57	8	N	
345	58	8	N	
346	79	8	N	
347	145	6	N	
348	5	7	N	
349	6	7	N	
350	7	7	N	
351	8	7	N	
352	9	7	N	
353	25	7	N	
354	uc1	7	N	
355	uc2	7	N	
356	149	7	N	
357	148	7	N	
358	100	3	N	
359	128	3	N	
360	22	4	N	
361	88	5	N	
362	201	5	N	
363	dsc2	4	N	

No.	Element	Level	Required	Remark
364	130	4	N	
365	dpc19	4	N	
366	dsc8	4	N	
367	dpc20	4	N	
368	224	4	N	
369	dpc21	5	N	
370	242	5	N	
371	129	3	N	
372	44	4	N	
373	13	5	N	
374	64	5	N	
375	dpc23	4	N	
376	159	3	N	
377	160	3	N	
378	ddc1	4	N	
379	16	4	N	
380	43	5	N	
381	uc5	5	N	
382	93	5	N	
383	110	5	N	
384	198	5	N	
385	233	5	N	
386	19	4	N	
387	27	4	N	
388	31	4	N	
389	89	5	N	
390	123	5	N	
391	uc1	4	O	
392	39	4	N	
393	dpc4	5	N	
394	131	5	N	
395	Ch.	6	Ch.	
396	77	7	N	
397	29	8	N	
398	28	9	N	
399	61	9	N	
400	70	9	N	
401	85	9	N	
402	143	9	N	

No.	Element	Level	Required	Remark
403	113	8	N	
404	Ch.	9	Ch.	
405	10	10	N	
406	12	11	N	
407	86	11	N	
408	57	10	N	
409	58	10	N	
410	79	10	N	
411	133	8	N	
412	134	9	N	
413	Ch.	9	Ch.	
414	10	10	N	
415	12	11	N	
416	86	11	N	
417	57	10	N	
418	58	10	N	
419	79	10	N	
420	145	8	N	
421	5	9	N	
422	6	9	N	
423	7	9	N	
424	8	9	N	
425	9	9	N	
426	25	9	N	
427	uc1	9	N	
428	uc2	9	N	
429	149	9	N	
430	148	9	N	
431	uc7	8	N	
432	99	7	N	
433	29	8	N	
434	28	9	N	
435	61	9	N	
436	70	9	N	
437	85	9	N	
438	143	9	N	
439	145	8	N	
440	5	9	N	
441	6	9	N	

No.	Element	Level	Required	Remark
442	7	9	N	
443	8	9	N	
444	9	9	N	
445	25	9	N	
446	uc1	9	N	
447	uc2	9	N	
448	149	9	N	
449	148	9	N	
450	uc7	8	N	
451	108	7	N	
452	29	8	N	
453	28	9	N	
454	61	9	N	
455	70	9	N	
456	85	9	N	
457	143	9	N	
458	107	8	N	
459	133	9	N	
460	134	10	N	
461	Ch.	10	Ch.	
462	10	11	N	
463	12	12	N	
464	86	12	N	
465	57	11	N	
466	58	11	N	
467	79	11	N	
468	uc7	9	N	
469	121	7	N	
470	29	8	N	
471	28	9	N	
472	61	9	N	
473	70	9	N	
474	85	9	N	
475	143	9	N	
476	113	8	N	
477	Ch.	9	Ch.	
478	10	10	N	
479	12	11	N	
480	86	11	N	

No.	Element	Level	Required	Remark
481	57	10	N	
482	58	10	N	
483	79	10	N	
484	133	8	N	
485	134	9	N	
486	Ch.	9	Ch.	
487	10	10	N	
488	12	11	N	
489	86	11	N	
490	57	10	N	
491	58	10	N	
492	79	10	N	
493	145	8	N	
494	5	9	N	
495	6	9	N	
496	7	9	N	
497	8	9	N	
498	9	9	N	
499	25	9	N	
500	uc1	9	N	
501	uc2	9	N	
502	149	9	N	
503	148	9	N	
504	uc7	8	N	
505	169	5	N	
506	66	4	N	
507	96	4	N	
508	Ch.	5	Ch.	
509	225	6	N	
510	29	7	N	
511	28	8	N	
512	61	8	N	
513	70	8	N	
514	85	8	N	
515	143	8	N	
516	113	7	N	
517	Ch.	8	Ch.	
518	10	9	N	
519	12	10	N	

No.	Element	Level	Required	Remark
520	86	10	N	
521	57	9	N	
522	58	9	N	
523	79	9	N	
524	133	7	N	
525	134	8	N	
526	Ch.	8	Ch.	
527	10	9	N	
528	12	10	N	
529	86	10	N	
530	57	9	N	
531	58	9	N	
532	79	9	N	
533	145	7	N	
534	5	8	N	
535	6	8	N	
536	7	8	N	
537	8	8	N	
538	9	8	N	
539	25	8	N	
540	uc1	8	N	
541	uc2	8	N	
542	149	8	N	
543	148	8	N	
544	226	6	N	
545	29	7	N	
546	28	8	N	
547	61	8	N	
548	70	8	N	
549	85	8	N	
550	143	8	N	
551	145	7	N	
552	5	8	N	
553	6	8	N	
554	7	8	N	
555	8	8	N	
556	9	8	N	
557	25	8	N	
558	uc1	8	N	

No.	Element	Level	Required	Remark
559	uc2	8	N	
560	149	8	N	
561	148	8	N	
562	228	6	N	
563	29	7	N	
564	28	8	N	
565	61	8	N	
566	70	8	N	
567	85	8	N	
568	143	8	N	
569	227	7	N	
570	133	8	N	
571	134	9	N	
572	Ch.	9	Ch.	
573	10	10	N	
574	12	11	N	
575	86	11	N	
576	57	10	N	
577	58	10	N	
578	79	10	N	
579	229	6	N	
580	29	7	N	
581	28	8	N	
582	61	8	N	
583	70	8	N	
584	85	8	N	
585	143	8	N	
586	113	7	N	
587	Ch.	8	Ch.	
588	10	9	N	
589	12	10	N	
590	86	10	N	
591	57	9	N	
592	58	9	N	
593	79	9	N	
594	133	7	N	
595	134	8	N	
596	Ch.	8	Ch.	
597	10	9	N	

No.	Element	Level	Required	Remark
598	12	10	N	
599	86	10	N	
600	57	9	N	
601	58	9	N	
602	79	9	N	
603	145	7	N	
604	5	8	N	
605	6	8	N	
606	7	8	N	
607	8	8	N	
608	9	8	N	
609	25	8	N	
610	uc1	8	N	
611	uc2	8	N	
612	149	8	N	
613	148	8	N	
614	100	4	N	
615	111	4	N	
616	127	4	N	
617	187	5	N	
618	203	5	N	
619	128	4	N	
620	22	5	N	
621	88	6	N	
622	201	6	N	
623	dsc2	5	N	
624	130	5	N	
625	dpc19	5	N	
626	dsc8	5	N	
627	dpc20	5	N	
628	224	5	N	
629	dpc21	6	N	
630	242	6	N	
631	129	4	N	
632	44	5	N	
633	13	6	N	
634	64	6	N	
635	dpc23	5	N	
636	158	4	M	

No.	Element	Level	Required	Remark
637	162	5	Y	ผงสารส้ม Hydor Pac 10%
638	199	5	N	
639	Ch.	5	Ch.	
640	10	6	O	
641	12	7	O	
642	86	7	O	
643	81	6	O	
644	159	4	O	
645	168	4	N	
646	dcc1	5	N	
647	20	5	N	
648	27	5	N	
649	31	5	N	
650	89	6	N	
651	123	6	N	
652	uc1	5	N	
653	39	5	N	
654	dpc4	6	N	
655	131	6	N	
656	Ch.	7	Ch.	
657	77	8	N	
658	29	9	N	
659	28	10	N	
660	61	10	N	
661	70	10	N	
662	85	10	N	
663	143	10	N	
664	113	9	N	
665	Ch.	10	Ch.	
666	10	11	N	
667	12	12	N	
668	86	12	N	
669	57	11	N	
670	58	11	N	
671	79	11	N	
672	133	9	N	
673	134	10	N	
674	Ch.	10	Ch.	
675	10	11	N	

No.	Element	Level	Required	Remark
676	12	12	N	
677	86	12	N	
678	57	11	N	
679	58	11	N	
680	79	11	N	
681	145	9	N	
682	5	10	N	
683	6	10	N	
684	7	10	N	
685	8	10	N	
686	9	10	N	
687	25	10	N	
688	uc1	10	N	
689	uc2	10	N	
690	149	10	N	
691	148	10	N	
692	uc7	9	N	
693	99	8	N	
694	29	9	N	
695	28	10	N	
696	61	10	N	
697	70	10	N	
698	85	10	N	
699	143	10	N	
700	145	9	N	
701	5	10	N	
702	6	10	N	
703	7	10	N	
704	8	10	N	
705	9	10	N	
706	25	10	N	
707	uc1	10	N	
708	uc2	10	N	
709	149	10	N	
710	148	10	N	
711	uc7	9	N	
712	108	8	N	
713	29	9	N	
714	28	9	N	

No.	Element	Level	Required	Remark
715	61	10	N	
716	70	10	N	
717	85	10	N	
718	143	10	N	
719	107	9	N	
720	133	10	N	
721	134	11	N	
722	Ch.	11	Ch.	
723	10	12	N	
724	12	13	N	
725	26	13	N	
726	57	12	N	
727	58	12	N	
728	79	12	N	
729	uc7	10	N	
730	121	8	N	
731	29	9	N	
732	28	10	N	
733	61	10	N	
734	70	10	N	
735	85	10	N	
736	143	10	N	
737	113	9	N	
738	Ch.	10	Ch.	
739	10	11	N	
740	12	12	N	
741	86	12	N	
742	57	11	N	
743	58	11	N	
744	79	11	N	
745	133	9	N	
746	134	10	N	
747	Ch.	10	Ch.	
748	10	11	N	
749	12	12	N	
750	86	12	N	
751	57	11	N	
752	58	11	N	
753	79	11	N	

No.	Element	Level	Required	Remark
754	145	9	N	
755	5	10	N	
756	6	10	N	
757	7	10	N	
758	8	10	N	
759	9	10	N	
760	25	10	N	
761	uc1	10	N	
762	uc2	10	N	
763	149	10	N	
764	148	10	N	
765	uc7	9	N	
766	169	6	N	
767	66	5	N	
768	96	5	N	
769	Ch.	6	Ch.	
770	225	7	N	
771	29	8	N	
772	28	9	N	
773	61	9	N	
774	70	9	N	
775	85	9	N	
776	143	9	N	
777	113	8	N	
778	Ch.	9	Ch.	
779	10	10	N	
780	12	11	N	
781	86	11	N	
782	57	10	N	
783	58	10	N	
784	79	10	N	
785	133	8	N	
786	134	9	N	
787	Ch.	9	Ch.	
788	10	10	N	
789	12	11	N	
790	86	11	N	
791	57	10	N	
792	58	10	N	

No.	Element	Level	Required	Remark
793	79	10	N	
794	145	8	N	
795	5	9	N	
796	6	9	N	
797	7	9	N	
798	8	9	N	
799	9	9	N	
800	25	9	N	
801	uc1	9	N	
802	uc2	9	N	
803	149	9	N	
804	148	9	N	
805	226	7	N	
806	29	8	N	
807	28	9	N	
808	61	9	N	
809	70	9	N	
810	85	9	N	
811	143	9	N	
812	145	8	N	
813	5	9	N	
814	6	9	N	
815	7	9	N	
816	8	9	N	
817	9	9	N	
818	25	9	N	
819	uc1	9	N	
820	uc2	9	N	
821	149	9	N	
822	148	9	N	
823	228	7	N	
824	29	8	N	
825	28	9	N	
826	61	9	N	
827	70	9	N	
828	85	9	N	
829	143	9	N	
830	227	8	N	
831	133	9	N	

No.	Element	Level	Required	Remark
832	134	10	N	
833	Ch.	10	Ch.	
834	10	11	N	
835	12	12	N	
836	86	12	N	
837	57	11	N	
838	58	11	N	
839	79	11	N	
840	229	7	N	
841	29	8	N	
842	28	9	N	
843	61	9	N	
844	70	9	N	
845	85	9	N	
846	143	9	N	
847	113	8	N	
848	Ch.	9	Ch.	
849	10	10	N	
850	12	11	N	
851	86	11	N	
852	57	10	N	
853	58	10	N	
854	79	10	N	
855	133	8	N	
856	134	9	N	
857	Ch.	9	Ch.	
858	10	10	N	
859	12	11	N	
860	86	11	N	
861	57	10	N	
862	58	10	N	
863	79	10	N	
864	145	8	N	
865	5	9	N	
866	6	9	N	
867	7	9	N	
868	8	9	N	
869	9	9	N	
870	25	9	N	

No.	Element	Level	Required	Remark
871	uc1	9	N	
872	uc2	9	N	
873	149	9	N	
874	148	9	N	
875	100	5	N	
876	127	5	N	
877	187	6	N	
878	203	6	N	
879	128	5	N	
880	22	6	N	
881	88	7	N	
882	201	7	N	
883	dsc2	6	N	
884	130	6	N	
885	dpc19	6	N	
886	dsc8	6	N	
887	dpc20	6	N	
888	224	6	N	
889	dpc21	7	N	
890	242	7	N	
891	129	5	N	
892	44	6	N	
893	13	7	N	
894	64	7	N	
895	dpc13	6	N	
896	159	5	N	
897	dpc15	5	N	
898	186	5	N	
899	44	6	N	
900	13	7	N	
901	64	7	N	
902	dpc23	6	N	
903	188	5	N	
904	Ch.	6	Ch.	
905	10	7	N	
906	12	8	N	
907	86	8	N	
908	57	7	N	
909	58	7	N	

No.	Element	Level	Required	Remark
910	79	7	N	
911	189	5	N	
912	11	6	N	
913	uc3	6	N	
914	200	5	N	
915	202	5	N	
916	44	6	N	
917	13	7	N	
918	64	7	N	
919	dpc23	6	N	
920	218	5	N	
921	Ch.	6	Ch.	
922	225	7	N	
923	29	8	N	
924	28	9	N	
925	61	9	N	
926	70	9	N	
927	85	9	N	
928	143	9	N	
929	113	8	N	
930	Ch.	9	Ch.	
931	10	10	N	
932	12	11	N	
933	86	11	N	
934	57	10	N	
935	58	10	N	
936	79	10	N	
937	133	8	N	
938	134	9	N	
939	Ch.	9	Ch.	
940	10	10	N	
941	12	11	N	
942	86	11	N	
943	57	10	N	
944	58	10	N	
945	79	10	N	
946	145	8	N	
947	5	9	N	
948	6	9	N	

No.	Element	Level	Required	Remark
949	7	9	N	
950	8	9	N	
951	9	9	N	
952	25	9	N	
953	uc1	9	N	
954	uc2	9	N	
955	149	9	N	
956	148	9	N	
957	226	7	N	
958	29	8	N	
959	28	9	N	
960	61	9	N	
961	70	9	N	
962	85	9	N	
963	143	9	N	
964	145	8	N	
965	5	9	N	
966	6	9	N	
967	7	9	N	
968	8	9	N	
969	9	9	N	
970	25	9	N	
971	uc1	9	N	
972	uc2	9	N	
973	149	9	N	
974	148	9	N	
975	228	7	N	
976	29	8	N	
977	28	9	N	
978	61	9	N	
979	70	9	N	
980	85	9	N	
981	143	9	N	
982	227	8	N	
983	133	9	N	
984	134	10	N	
985	Ch.	10	Ch.	
986	10	11	N	
987	12	12	N	

No.	Element	Level	Required	Remark
988	86	12	N	
989	57	11	N	
990	58	11	N	
991	79	11	N	
992	229	7	N	
993	29	8	N	
994	28	9	N	
995	61	9	N	
996	70	9	N	
997	85	9	N	
998	143	9	N	
999	113	8	N	
1000	Ch.	9	Ch.	
1001	10	10	N	
1002	12	11	N	
1003	86	11	N	
1004	57	10	N	
1005	58	10	N	
1006	79	10	N	
1007	133	8	N	
1008	134	9	N	
1009	Ch.	9	Ch.	
1010	10	10	N	
1011	12	11	N	
1012	86	11	N	
1013	57	10	N	
1014	58	10	N	
1015	79	10	N	
1016	145	8	N	
1017	5	9	N	
1018	6	9	N	
1019	7	9	N	
1020	8	9	N	
1021	9	9	N	
1022	25	9	N	
1023	uc1	9	N	
1024	uc2	9	N	
1025	149	9	N	
1026	148	9	N	

No.	Element	Level	Required	Remark
1027	234	5	N	
1028	uc9	5	N	
1029	dpc15	4	N	
1030	186	4	N	
1031	44	5	N	
1032	13	6	N	
1033	64	6	N	
1034	dpc23	5	N	
1035	188	4	N	
1036	Ch.	5	Ch.	
1037	10	6	N	
1038	12	7	N	
1039	86	7	N	
1040	57	6	N	
1041	58	6	N	
1042	79	6	N	
1043	189	4	N	
1044	11	5	N	
1045	uc3	5	N	
1046	200	4	N	
1047	202	4	N	
1048	44	5	N	
1049	13	6	N	
1050	64	6	N	
1051	dpc23	5	N	
1052	218	4	N	
1053	Ch.	5	Ch.	
1054	225	6	N	
1055	29	7	N	
1056	28	8	N	
1057	61	8	N	
1058	70	8	N	
1059	85	8	N	
1060	143	8	N	
1061	113	7	N	
1062	Ch.	8	Ch.	
1063	10	9	N	
1064	12	10	N	
1065	86	10	N	

No.	Element	Level	Required	Remark
1066	57	9	N	
1067	58	9	N	
1068	79	9	N	
1069	133	7	N	
1070	134	8	N	
1071	Ch.	8	Ch.	
1072	10	9	N	
1073	12	10	N	
1074	86	10	N	
1075	57	9	N	
1076	58	9	N	
1077	79	9	N	
1078	145	7	N	
1079	5	8	N	
1080	6	8	N	
1081	7	8	N	
1082	8	8	N	
1083	9	8	N	
1084	25	8	N	
1085	uc1	8	N	
1086	uc2	8	N	
1087	149	8	N	
1088	148	8	N	
1089	226	6	N	
1090	29	7	N	
1091	28	8	N	
1092	61	8	N	
1093	70	8	N	
1094	85	8	N	
1095	143	8	N	
1096	145	7	N	
1097	5	8	N	
1098	6	8	N	
1099	7	8	N	
1100	8	8	N	
1101	9	8	N	
1102	25	8	N	
1103	uc1	8	N	
1104	uc2	8	N	

No.	Element	Level	Required	Remark
1105	149	8	N	
1106	148	8	N	
1107	228	6	N	
1108	29	7	N	
1109	28	8	N	
1110	61	8	N	
1111	70	8	N	
1112	85	8	N	
1113	143	8	N	
1114	227	7	N	
1115	133	8	N	
1116	134	9	N	
1117	Ch.	9	Ch.	
1118	10	10	N	
1119	12	11	N	
1120	86	11	N	
1121	57	10	N	
1122	58	10	N	
1123	79	10	N	
1124	229	6	N	
1125	29	7	N	
1126	28	8	N	
1127	61	8	N	
1128	70	8	N	
1129	85	8	N	
1130	143	8	N	
1131	113	7	N	
1132	Ch.	8	Ch.	
1133	10	9	N	
1134	12	10	N	
1135	86	10	N	
1136	57	9	N	
1137	58	9	N	
1138	79	9	N	
1139	133	7	N	
1140	134	8	N	
1141	Ch.	8	Ch.	
1142	10	9	N	
1143	12	10	N	

No.	Element	Level	Required	Remark
1144	86	10	N	
1145	57	9	N	
1146	58	9	N	
1147	79	9	N	
1148	145	7	N	
1149	5	8	N	
1150	6	8	N	
1151	7	8	N	
1152	8	8	N	
1153	9	8	N	
1154	25	8	N	
1155	uc1	8	N	
1156	uc2	8	N	
1157	149	8	N	
1158	148	8	N	
1159	237	4	O	
1160	105	5	O	
1161	238	5	O	
1162	23	6	O	
1163	116	6	O	
1164	dpc22	6	O	
1165	244	4	M	
1166	11	5	Y	7,300
1167	uc3	5	Y	THB
1168	uc9	4	Y	KILO
1169	dpc14	3	M	Code list
1170	dpc15	3	O	
1171	179	3	N	
1172	43	4	N	
1173	uc5	4	N	
1174	93	4	N	
1175	110	4	N	
1176	198	4	N	
1177	233	4	N	
1178	dpc17	3	M	Code list
1179	183	3	N	
1180	16	4	N	
1181	43	5	N	
1182	uc5	5	N	

No.	Element	Level	Required	Remark
1183	93	5	N	
1184	110	5	N	
1185	198	5	N	
1186	233	5	N	
1187	43	4	N	
1188	181	4	N	
1189	186	3	M	
1190	44	4	M	
1191	13	5	Y	10-JUN-2009
1192	64	5	Y	10-JUN-2009
1193	dpc23	4	N	
1194	188	3	N	
1195	Ch.	4	Ch.	
1196	10	5	N	
1197	12	6	N	
1198	86	6	N	
1199	57	5	N	
1200	58	5	N	
1201	79	5	N	
1202	200	3	M	Number
1203	202	3	N	
1204	44	4	N	
1205	13	5	N	
1206	64	5	N	
1207	dpc23	4	N	
1208	205	3	N	
1209	94	4	N	
1210	131	4	N	
1211	Ch.	5	Ch.	
1212	77	6	N	
1213	29	7	N	
1214	28	8	N	
1215	61	8	N	
1216	70	8	N	
1217	85	8	N	
1218	143	8	N	
1219	113	7	N	
1220	Ch.	8	Ch.	
1221	10	9	N	

No.	Element	Level	Required	Remark
1222	12	10	N	
1223	86	10	N	
1224	57	9	N	
1225	58	9	N	
1226	79	9	N	
1227	133	7	N	
1228	134	8	N	
1229	Ch.	8	Ch.	
1230	10	9	N	
1231	12	10	N	
1232	86	10	N	
1233	57	9	N	
1234	58	9	N	
1235	79	9	N	
1236	145	7	N	
1237	5	8	N	
1238	6	8	N	
1239	7	8	N	
1240	8	8	N	
1241	9	8	N	
1242	25	8	N	
1243	uc1	8	N	
1244	uc2	8	N	
1245	149	8	N	
1246	148	8	N	
1247	uc7	7	N	
1248	99	6	N	
1249	29	7	N	
1250	28	8	N	
1251	61	8	N	
1252	70	8	N	
1253	85	8	N	
1254	143	8	N	
1255	145	7	N	
1256	5	8	N	
1257	6	8	N	
1258	7	8	N	
1259	8	8	N	
1260	9	8	N	

No.	Element	Level	Required	Remark
1261	25	8	N	
1262	uc1	8	N	
1263	uc2	8	N	
1264	149	8	N	
1265	148	8	N	
1266	uc7	7	N	
1267	108	6	N	
1268	29	7	N	
1269	28	8	N	
1270	61	8	N	
1271	70	8	N	
1272	85	8	N	
1273	143	8	N	
1274	107	7	N	
1275	133	8	N	
1276	134	9	N	
1277	Ch.	9	Ch.	
1278	10	10	N	
1279	12	11	N	
1280	26	11	N	
1281	57	10	N	
1282	58	10	N	
1283	79	10	N	
1284	uc7	8	N	
1285	121	6	N	
1286	29	7	N	
1287	28	8	N	
1288	61	8	N	
1289	70	8	N	
1290	85	8	N	
1291	143	8	N	
1292	113	7	N	
1293	Ch.	8	Ch.	
1294	10	9	N	
1295	12	10	N	
1296	86	10	N	
1297	57	9	N	
1298	58	9	N	
1299	79	9	N	

No.	Element	Level	Required	Remark
1300	133	7	N	
1301	134	8	N	
1302	Ch.	8	Ch.	
1303	10	9	N	
1304	12	10	N	
1305	86	10	N	
1306	57	9	N	
1307	58	9	N	
1308	79	9	N	
1309	145	7	N	
1310	5	8	N	
1311	6	8	N	
1312	7	8	N	
1313	8	8	N	
1314	9	8	N	
1315	25	8	N	
1316	uc1	8	N	
1317	uc2	8	N	
1318	149	8	N	
1319	148	8	N	
1320	uc7	7	N	
1321	218	3	O	
1322	Ch.	4	Ch.	
1323	225	5	O	
1324	29	6	O	
1325	28	7	O	
1326	61	7	O	
1327	70	7	O	
1328	85	7	O	
1329	143	7	O	
1330	113	6	N	
1331	Ch.	7	Ch.	
1332	10	8	N	
1333	12	9	N	
1334	86	9	N	
1335	57	8	N	
1336	58	8	N	
1337	79	8	N	
1338	133	6	O	

No.	Element	Level	Required	Remark
1339	134	7	N	
1340	Ch.	7	Ch.	
1341	10	8	O	
1342	12	9	O	
1343	86	9	O	
1344	57	8	O	
1345	58	8	O	
1346	79	8	O	
1347	145	6	O	
1348	5	7	O	
1349	6	7	O	
1350	7	7	O	
1351	8	7	O	
1352	9	7	O	
1353	25	7	O	
1354	uc1	7	O	
1355	uc2	7	O	
1356	149	7	O	
1357	148	7	O	
1358	226	5	N	
1359	29	6	N	
1360	28	7	N	
1361	61	7	N	
1362	70	7	N	
1363	85	7	N	
1364	143	7	N	
1365	145	6	N	
1366	5	7	N	
1367	6	7	N	
1368	7	7	N	
1369	8	7	N	
1370	9	7	N	
1371	25	7	N	
1372	uc1	7	N	
1373	uc2	7	N	
1374	149	7	N	
1375	148	7	N	
1376	228	5	N	
1377	29	6	N	

No.	Element	Level	Required	Remark
1378	28	7	N	
1379	61	7	N	
1380	70	7	N	
1381	85	7	N	
1382	143	7	N	
1383	227	6	N	
1384	133	7	N	
1385	134	8	N	
1386	Ch.	8	Ch.	
1387	10	9	N	
1388	12	10	N	
1389	86	10	N	
1390	57	9	N	
1391	58	9	N	
1392	79	9	N	
1393	229	5	N	
1394	29	6	N	
1395	28	7	N	
1396	61	7	N	
1397	70	7	N	
1398	85	7	N	
1399	143	7	N	
1400	113	6	N	
1401	Ch.	7	Ch.	
1402	10	8	N	
1403	12	9	N	
1404	86	9	N	
1405	57	8	N	
1406	58	8	N	
1407	79	8	N	
1408	133	6	N	
1409	134	7	N	
1410	Ch.	7	Ch.	
1411	10	8	N	
1412	12	9	N	
1413	86	9	N	
1414	57	8	N	
1415	58	8	N	
1416	79	8	N	

No.	Element	Level	Required	Remark
1417	145	6	N	
1418	5	7	N	
1419	6	7	N	
1420	7	7	N	
1421	8	7	N	
1422	9	7	N	
1423	25	7	N	
1424	uc1	7	N	
1425	uc2	7	N	
1426	149	7	N	
1427	148	7	N	
1428	237	3	O	
1429	105	4	O	
1430	238	4	O	
1431	23	5	O	
1432	116	5	O	
1433	dpc22	5	O	
1434	243	3	M	
1435	11	4	Y	7,300
1436	uc3	4	Y	THB

PIP3A8: PurchaseOrderChangeConfirmation

No.	Element	Level	Required	Remark
1	175	1	M	
2	52	2	M	
3	35	3	O	
4	32	4	O	
5	30	5	O	
6	34	5	O	
7	192	4	O	
8	17	5	O	
9	191	5	O	
10	193	5	O	
11	195	5	O	
12	54	3	M	
13	36	4	Y	02-JUN-09
14	53	4	M	
15	87	5	Y	P/O (408744)

No.	Element	Level	Required	Remark
16	249	5	O	
17	Ch.	5	Ch.	
18	231	6	M	
19	230	7	M	RosettaNet
20	253	7	M	PIP3A8V11.00
21	246	6	N	
22	scl	7	N	
23	132	7	N	
24	146	7	N	
25	147	7	N	
26	245	7	N	
27	247	7	N	
28	252	7	N	
29	55	4	O	
30	115	5	O	
31	49	6	O	
32	uc4	6	O	
33	109	6	O	
34	uc6	6	O	
35	251	6	O	
36	118	5	O	
37	124	5	O	
38	56	4	M	
39	122	5	M	
40	141	5	M	
41	142	5	M	
42	83	3	N	
43	184	3	M	
44	18	4	M	
45	4	5	M	Confirm
46	151	5	M	Confirmation Purchase Order Change
47	152	5	M	PIP3A8
48	153	5	N	
49	211	5	M	PurchaseOrderChange
50	29	4	M	
51	28	5	O	
52	61	5	O	
53	70	5	Y	Fax. No.
54	85	5	O	

No.	Element	Level	Required	Remark
55	143	5	Y	Tel. No.
56	133	4	M	
57	134	5	Y	Supplier Name
58	Ch.	5	Ch.	
59	10	6	O	
60	12	7	O	
61	86	7	O	
62	57	6	O	
63	58	6	O	
64	79	6	O	
65	206	3	M	
66	18	4	M	
67	4	5	M	Confirm
68	151	5	M	Confirmation Purchase Order Change
69	152	5	M	PIP3A8
70	153	5	N	
71	211	5	M	PurchaseOrderChange
72	29	4	M	
73	28	5	Y	Prepared by
74	61	5	O	e-mail ผู้จัดทำ
75	70	5	O	หมายเลขโทรสาร
76	85	5	O	ผู้จัดทำ
77	143	5	O	หมายเลขโทรศัพท์
78	133	4	M	
79	134	5	Y	ชื่อบริษัท
80	Ch.	5	Ch.	
81	10	6	O	
82	12	7	O	
83	86	7	O	
84	57	6	O	
85	58	6	O	
86	79	6	O	
87	170	2	M	
88	1	3	M	
89	dpc1	4	O	
90	2	4	O	
91	3	4	O	
92	37	4	O	
93	21	5	O	

No.	Element	Level	Required	Remark
94	24	5	O	
95	dpc3	5	O	
96	68	5	O	
97	90	5	O	
98	131	4	M	
99	Ch.	5	Ch.	
100	77	6	M	
101	29	7	N	
102	28	8	N	
103	61	8	N	
104	70	8	N	
105	85	8	N	
106	143	8	N	
107	113	7	N	
108	Ch.	8	Ch.	
109	10	9	N	
110	12	10	N	
111	86	10	N	
112	57	9	N	
113	58	9	N	
114	79	9	N	
115	133	7	N	
116	134	8	N	
117	Ch.	8	Ch.	
118	10	9	N	
119	12	10	N	
120	86	10	N	
121	57	9	N	
122	58	9	N	
123	79	9	N	
124	145	7	M	
125	5	8	Y	ชื่อบริษัท Supplier
126	6	8	Y	ที่อยู่ Supplier บรรทัดที่ 1
127	7	8	Y	ที่อยู่ Supplier บรรทัดที่ 2
128	8	8	O	
129	9	8	O	
130	25	8	O	
131	uc1	8	O	
132	uc2	8	O	

No.	Element	Level	Required	Remark
133	149	8	O	
134	148	8	O	
135	uc7	7	O	
136	99	6	N	
137	29	7	N	
138	28	8	N	
139	61	8	N	
140	70	8	N	
141	85	8	N	
142	143	8	N	
143	145	7	N	
144	5	8	N	
145	6	8	N	
146	7	8	N	
147	8	8	N	
148	9	8	N	
149	25	8	N	
150	uc1	8	N	
151	uc2	8	N	
152	149	8	N	
153	148	8	N	
154	uc7	7	N	
155	108	6	N	
156	29	7	N	
157	28	8	N	
158	61	8	N	
159	70	8	N	
160	85	8	N	
161	143	8	N	
162	107	7	N	
163	133	8	N	
164	134	9	N	
165	Ch.	9	Ch.	
166	10	10	N	
167	12	11	N	
168	26	11	N	
169	57	10	N	
170	58	10	N	
171	79	10	N	

No.	Element	Level	Required	Remark
172	uc7	8	N	
173	121	6	N	
174	29	7	N	
175	28	8	N	
176	61	8	N	
177	70	8	N	
178	85	8	N	
179	143	8	N	
180	113	7	N	
181	Ch.	8	Ch.	
182	10	9	N	
183	12	10	N	
184	86	10	N	
185	57	9	N	
186	58	9	N	
187	79	9	N	
188	133	7	N	
189	134	8	N	
190	Ch.	8	Ch.	
191	10	9	N	
192	12	10	N	
193	86	10	N	
194	57	9	N	
195	58	9	N	
196	79	9	N	
197	145	7	N	
198	5	8	N	
199	6	8	N	
200	7	8	N	
201	8	8	N	
202	9	8	N	
203	25	8	N	
204	uc1	8	N	
205	uc2	8	N	
206	149	8	N	
207	148	8	N	
208	uc7	7	N	
209	dsc6	4	O	
210	150	4	O	

No.	Element	Level	Required	Remark
211	253	4	O	
212	16	3	N	
213	43	4	N	
214	uc5	4	N	
215	93	4	N	
216	110	4	N	
217	198	4	N	
218	233	4	N	
219	27	3	Y	เรียบเรียบแล้ว การท่องจบ
220	dpc2	3	M	Code list
221	31	3	O	
222	89	4	O	
223	123	4	O	
224	40	3	M	
225	72	3	N	
226	dpc5	4	N	
227	136	4	N	
228	51	5	N	
229	45	6	N	
230	47	6	N	
231	137	6	N	
232	120	5	N	
233	46	6	N	
234	48	6	N	
235	dpc10	5	N	
236	138	5	N	
237	78	3	N	
238	43	4	N	
239	uc5	4	N	
240	93	4	N	
241	110	4	N	
242	198	4	N	
243	233	4	N	
244	80	3	N	
245	43	4	N	
246	uc5	4	N	
247	93	4	N	
248	110	4	N	
249	198	4	N	

No.	Element	Level	Required	Remark
250	233	4	N	
251	dpc9	3	N	
252	96	3	N	
253	Ch.	4	Ch.	
254	225	5	N	
255	29	6	N	
256	28	7	N	
257	61	7	N	
258	70	7	N	
259	85	7	N	
260	143	7	N	
261	113	6	N	
262	Ch.	7	Ch.	
263	10	8	N	
264	12	9	N	
265	86	9	N	
266	57	8	N	
267	58	8	N	
268	79	8	N	
269	133	6	N	
270	134	7	N	
271	Ch.	7	Ch.	
272	10	8	N	
273	12	9	N	
274	86	9	N	
275	57	8	N	
276	58	8	N	
277	79	8	N	
278	145	6	N	
279	5	7	N	
280	6	7	N	
281	7	7	N	
282	8	7	N	
283	9	7	N	
284	25	7	N	
285	uc1	7	N	
286	uc2	7	N	
287	149	7	N	
288	148	7	N	

No.	Element	Level	Required	Remark
289	226	5	N	
290	29	6	N	
291	28	7	N	
292	61	7	N	
293	70	7	N	
294	85	7	N	
295	143	7	N	
296	145	6	N	
297	5	7	N	
298	6	7	N	
299	7	7	N	
300	8	7	N	
301	9	7	N	
302	25	7	N	
303	uc1	7	N	
304	uc2	7	N	
305	149	7	N	
306	148	7	N	
307	228	5	N	
308	29	6	N	
309	28	7	N	
310	61	7	N	
311	70	7	N	
312	85	7	N	
313	143	7	N	
314	227	6	N	
315	133	7	N	
316	134	8	N	
317	Ch.	8	Ch.	
318	10	9	N	
319	12	10	N	
320	86	10	N	
321	57	9	N	
322	58	9	N	
323	79	9	N	
324	229	5	N	
325	29	6	N	
326	28	7	N	
327	61	7	N	

No.	Element	Level	Required	Remark
328	70	7	N	
329	85	7	N	
330	143	7	N	
331	113	6	N	
332	Ch.	7	Ch.	
333	10	8	N	
334	12	9	N	
335	86	9	N	
336	57	8	N	
337	58	8	N	
338	79	8	N	
339	133	6	N	
340	134	7	N	
341	Ch.	7	Ch.	
342	10	8	N	
343	12	9	N	
344	86	9	N	
345	57	8	N	
346	58	8	N	
347	79	8	N	
348	145	6	N	
349	5	7	N	
350	6	7	N	
351	7	7	N	
352	8	7	N	
353	9	7	N	
354	25	7	N	
355	uc1	7	N	
356	uc2	7	N	
357	149	7	N	
358	148	7	N	
359	100	3	N	
360	128	3	N	
361	22	4	N	
362	88	5	N	
363	201	5	N	
364	dsc2	4	N	
365	130	4	N	
366	dpc19	4	N	

No.	Element	Level	Required	Remark
367	dsc8	4	N	
368	dpc20	4	N	
369	224	4	N	
370	dpc21	5	N	
371	242	5	N	
372	129	3	N	
373	44	4	N	
374	13	5	N	
375	64	5	N	
376	dpc23	4	N	
377	159	3	N	
378	160	3	N	
379	ddc1	4	N	
380	16	4	N	
381	43	5	N	
382	uc5	5	N	
383	93	5	N	
384	110	5	N	
385	198	5	N	
386	233	5	N	
387	19	4	N	
388	27	4	N	
389	31	4	N	
390	89	5	N	
391	123	5	N	
392	uc1	4	O	
393	39	4	N	
394	dpc4	5	N	
395	131	5	N	
396	Ch.	6	Ch.	
397	77	7	N	
398	29	8	N	
399	28	9	N	
400	61	9	N	
401	70	9	N	
402	85	9	N	
403	143	9	N	
404	113	8	N	
405	Ch.	9	Ch.	

No.	Element	Level	Required	Remark
406	10	10	N	
407	12	11	N	
408	86	11	N	
409	57	10	N	
410	58	10	N	
411	79	10	N	
412	133	8	N	
413	134	9	N	
414	Ch.	9	Ch.	
415	10	10	N	
416	12	11	N	
417	86	11	N	
418	57	10	N	
419	58	10	N	
420	79	10	N	
421	145	8	N	
422	5	9	N	
423	6	9	N	
424	7	9	N	
425	8	9	N	
426	9	9	N	
427	25	9	N	
428	uc1	9	N	
429	uc2	9	N	
430	149	9	N	
431	148	9	N	
432	uc7	8	N	
433	99	7	N	
434	29	8	N	
435	28	9	N	
436	61	9	N	
437	70	9	N	
438	85	9	N	
439	143	9	N	
440	145	8	N	
441	5	9	N	
442	6	9	N	
443	7	9	N	
444	8	9	N	

No.	Element	Level	Required	Remark
445	9	9	N	
446	25	9	N	
447	uc1	9	N	
448	uc2	9	N	
449	149	9	N	
450	148	9	N	
451	uc7	8	N	
452	108	7	N	
453	29	8	N	
454	28	9	N	
455	61	9	N	
456	70	9	N	
457	85	9	N	
458	143	9	N	
459	107	8	N	
460	133	9	N	
461	134	10	N	
462	Ch.	10	Ch.	
463	10	11	N	
464	12	12	N	
465	86	12	N	
466	57	11	N	
467	58	11	N	
468	79	11	N	
469	uc7	9	N	
470	121	7	N	
471	29	8	N	
472	28	9	N	
473	61	9	N	
474	70	9	N	
475	85	9	N	
476	143	9	N	
477	113	8	N	
478	Ch.	9	Ch.	
479	10	10	N	
480	12	11	N	
481	86	11	N	
482	57	10	N	
483	58	10	N	

No.	Element	Level	Required	Remark
484	79	10	N	
485	133	8	N	
486	134	9	N	
487	Ch.	9	Ch.	
488	10	10	N	
489	12	11	N	
490	86	11	N	
491	57	10	N	
492	58	10	N	
493	79	10	N	
494	145	8	N	
495	5	9	N	
496	6	9	N	
497	7	9	N	
498	8	9	N	
499	9	9	N	
500	25	9	N	
501	uc1	9	N	
502	uc2	9	N	
503	149	9	N	
504	148	9	N	
505	uc7	8	N	
506	169	5	N	
507	66	4	N	
508	96	4	N	
509	Ch.	5	Ch.	
510	225	6	N	
511	29	7	N	
512	28	8	N	
513	61	8	N	
514	70	8	N	
515	85	8	N	
516	143	8	N	
517	113	7	N	
518	Ch.	8	Ch.	
519	10	9	N	
520	12	10	N	
521	86	10	N	
522	57	9	N	

No.	Element	Level	Required	Remark
523	58	9	N	
524	79	9	N	
525	133	7	N	
526	134	8	N	
527	Ch.	8	Ch.	
528	10	9	N	
529	12	10	N	
530	86	10	N	
531	57	9	N	
532	58	9	N	
533	79	9	N	
534	145	7	N	
535	5	8	N	
536	6	8	N	
537	7	8	N	
538	8	8	N	
539	9	8	N	
540	25	8	N	
541	uc1	8	N	
542	uc2	8	N	
543	149	8	N	
544	148	8	N	
545	226	6	N	
546	29	7	N	
547	28	8	N	
548	61	8	N	
549	70	8	N	
550	85	8	N	
551	143	8	N	
552	145	7	N	
553	5	8	N	
554	6	8	N	
555	7	8	N	
556	8	8	N	
557	9	8	N	
558	25	8	N	
559	uc1	8	N	
560	uc2	8	N	
561	149	8	N	

No.	Element	Level	Required	Remark
562	148	8	N	
563	228	6	N	
564	29	7	N	
565	28	8	N	
566	61	8	N	
567	70	8	N	
568	85	8	N	
569	143	8	N	
570	227	7	N	
571	133	8	N	
572	134	9	N	
573	Ch.	9	Ch.	
574	10	10	N	
575	12	11	N	
576	86	11	N	
577	57	10	N	
578	58	10	N	
579	79	10	N	
580	229	6	N	
581	29	7	N	
582	28	8	N	
583	61	8	N	
584	70	8	N	
585	85	8	N	
586	143	8	N	
587	113	7	N	
588	Ch.	8	Ch.	
589	10	9	N	
590	12	10	N	
591	86	10	N	
592	57	9	N	
593	58	9	N	
594	79	9	N	
595	133	7	N	
596	134	8	N	
597	Ch.	8	Ch.	
598	10	9	N	
599	12	10	N	
600	86	10	N	

No.	Element	Level	Required	Remark
601	57	9	N	
602	58	9	N	
603	79	9	N	
604	145	7	N	
605	5	8	N	
606	6	8	N	
607	7	8	N	
608	8	8	N	
609	9	8	N	
610	25	8	N	
611	uc1	8	N	
612	uc2	8	N	
613	149	8	N	
614	148	8	N	
615	100	4	N	
616	111	4	N	
617	127	4	N	
618	187	5	N	
619	203	5	N	
620	128	4	N	
621	22	5	N	
622	88	6	N	
623	201	6	N	
624	dsc2	5	N	
625	130	5	N	
626	dpc19	5	N	
627	dsc8	5	N	
628	dpc20	5	N	
629	224	5	N	
630	dpc21	6	N	
631	242	6	N	
632	129	4	N	
633	44	5	N	
634	13	6	N	
635	64	6	N	
636	dpc23	5	N	
637	158	4	M	
638	162	5	Y	ผสมกับ Hydor Pac 10%
639	199	5	N	

No.	Element	Level	Required	Remark
640	Ch.	5	Ch.	
641	10	6	O	
642	12	7	O	
643	86	7	O	
644	81	6	O	
645	159	4	O	
646	168	4	N	
647	dcc1	5	N	
648	20	5	N	
649	27	5	N	
650	31	5	N	
651	89	6	N	
652	123	6	N	
653	uc1	5	N	
654	39	5	N	
655	dpc4	6	N	
656	131	6	N	
657	Ch.	7	Ch.	
658	77	8	N	
659	29	9	N	
660	28	10	N	
661	61	10	N	
662	70	10	N	
663	85	10	N	
664	143	10	N	
665	113	9	N	
666	Ch.	10	Ch.	
667	10	11	N	
668	12	12	N	
669	86	12	N	
670	57	11	N	
671	58	11	N	
672	79	11	N	
673	133	9	N	
674	134	10	N	
675	Ch.	10	Ch.	
676	10	11	N	
677	12	12	N	
678	86	12	N	

No.	Element	Level	Required	Remark
679	57	11	N	
680	58	11	N	
681	79	11	N	
682	145	9	N	
683	5	10	N	
684	6	10	N	
685	7	10	N	
686	8	10	N	
687	9	10	N	
688	25	10	N	
689	uc1	10	N	
690	uc2	10	N	
691	149	10	N	
692	148	10	N	
693	uc7	9	N	
694	99	8	N	
695	29	9	N	
696	28	10	N	
697	61	10	N	
698	70	10	N	
699	85	10	N	
700	143	10	N	
701	145	9	N	
702	5	10	N	
703	6	10	N	
704	7	10	N	
705	8	10	N	
706	9	10	N	
707	25	10	N	
708	uc1	10	N	
709	uc2	10	N	
710	149	10	N	
711	148	10	N	
712	uc7	9	N	
713	108	8	N	
714	29	9	N	
715	28	9	N	
716	61	10	N	
717	70	10	N	

No.	Element	Level	Required	Remark
718	85	10	N	
719	143	10	N	
720	107	9	N	
721	133	10	N	
722	134	11	N	
723	Ch.	11	Ch.	
724	10	12	N	
725	12	13	N	
726	26	13	N	
727	57	12	N	
728	58	12	N	
729	79	12	N	
730	uc7	10	N	
731	121	8	N	
732	29	9	N	
733	28	10	N	
734	61	10	N	
735	70	10	N	
736	85	10	N	
737	143	10	N	
738	113	9	N	
739	Ch.	10	Ch.	
740	10	11	N	
741	12	12	N	
742	86	12	N	
743	57	11	N	
744	58	11	N	
745	79	11	N	
746	133	9	N	
747	134	10	N	
748	Ch.	10	Ch.	
749	10	11	N	
750	12	12	N	
751	86	12	N	
752	57	11	N	
753	58	11	N	
754	79	11	N	
755	145	9	N	
756	5	10	N	

No.	Element	Level	Required	Remark
757	6	10	N	
758	7	10	N	
759	8	10	N	
760	9	10	N	
761	25	10	N	
762	uc1	10	N	
763	uc2	10	N	
764	149	10	N	
765	148	10	N	
766	uc7	9	N	
767	169	6	N	
768	66	5	N	
769	96	5	N	
770	Ch.	6	Ch.	
771	225	7	N	
772	29	8	N	
773	28	9	N	
774	61	9	N	
775	70	9	N	
776	85	9	N	
777	143	9	N	
778	113	8	N	
779	Ch.	9	Ch.	
780	10	10	N	
781	12	11	N	
782	86	11	N	
783	57	10	N	
784	58	10	N	
785	79	10	N	
786	133	8	N	
787	134	9	N	
788	Ch.	9	Ch.	
789	10	10	N	
790	12	11	N	
791	86	11	N	
792	57	10	N	
793	58	10	N	
794	79	10	N	
795	145	8	N	

No.	Element	Level	Required	Remark
796	5	9	N	
797	6	9	N	
798	7	9	N	
799	8	9	N	
800	9	9	N	
801	25	9	N	
802	uc1	9	N	
803	uc2	9	N	
804	149	9	N	
805	148	9	N	
806	226	7	N	
807	29	8	N	
808	28	9	N	
809	61	9	N	
810	70	9	N	
811	85	9	N	
812	143	9	N	
813	145	8	N	
814	5	9	N	
815	6	9	N	
816	7	9	N	
817	8	9	N	
818	9	9	N	
819	25	9	N	
820	uc1	9	N	
821	uc2	9	N	
822	149	9	N	
823	148	9	N	
824	228	7	N	
825	29	8	N	
826	28	9	N	
827	61	9	N	
828	70	9	N	
829	85	9	N	
830	143	9	N	
831	227	8	N	
832	133	9	N	
833	134	10	N	
834	Ch.	10	Ch.	

No.	Element	Level	Required	Remark
835	10	11	N	
836	12	12	N	
837	86	12	N	
838	57	11	N	
839	58	11	N	
840	79	11	N	
841	229	7	N	
842	29	8	N	
843	28	9	N	
844	61	9	N	
845	70	9	N	
846	85	9	N	
847	143	9	N	
848	113	8	N	
849	Ch.	9	Ch.	
850	10	10	N	
851	12	11	N	
852	86	11	N	
853	57	10	N	
854	58	10	N	
855	79	10	N	
856	133	8	N	
857	134	9	N	
858	Ch.	9	Ch.	
859	10	10	N	
860	12	11	N	
861	86	11	N	
862	57	10	N	
863	58	10	N	
864	79	10	N	
865	145	8	N	
866	5	9	N	
867	6	9	N	
868	7	9	N	
869	8	9	N	
870	9	9	N	
871	25	9	N	
872	uc1	9	N	
873	uc2	9	N	

No.	Element	Level	Required	Remark
874	149	9	N	
875	148	9	N	
876	100	5	N	
877	127	5	N	
878	187	6	N	
879	203	6	N	
880	128	5	N	
881	22	6	N	
882	88	7	N	
883	201	7	N	
884	dsc2	6	N	
885	130	6	N	
886	dpc19	6	N	
887	dsc8	6	N	
888	dpc20	6	N	
889	224	6	N	
890	dpc21	7	N	
891	242	7	N	
892	129	5	N	
893	44	6	N	
894	13	7	N	
895	64	7	N	
896	dpc23	6	N	
897	159	5	N	
898	dpc12	5	N	
899	dpc15	5	N	
900	dpc16	5	N	
901	186	5	N	
902	44	6	N	
903	13	7	N	
904	64	7	N	
905	dpc23	6	N	
906	188	5	N	
907	Ch.	6	Ch.	
908	10	7	N	
909	12	8	N	
910	86	8	N	
911	57	7	N	
912	58	7	N	

No.	Element	Level	Required	Remark
913	79	7	N	
914	189	5	N	
915	11	6	N	
916	uc3	6	N	
917	200	5	N	
918	202	5	N	
919	44	6	N	
920	13	7	N	
921	64	7	N	
922	dpc23	6	N	
923	214	5	N	
924	Ch.	6	Ch.	
925	225	7	N	
926	29	8	N	
927	28	9	N	
928	61	9	N	
929	70	9	N	
930	85	9	N	
931	143	9	N	
932	113	8	N	
933	Ch.	9	Ch.	
934	10	10	N	
935	12	11	N	
936	86	11	N	
937	57	10	N	
938	58	10	N	
939	79	10	N	
940	133	8	N	
941	134	9	N	
942	Ch.	9	Ch.	
943	10	10	N	
944	12	11	N	
945	86	11	N	
946	57	10	N	
947	58	10	N	
948	79	10	N	
949	145	8	N	
950	5	9	N	
951	6	9	N	

No.	Element	Level	Required	Remark
952	7	9	N	
953	8	9	N	
954	9	9	N	
955	25	9	N	
956	ucl	9	N	
957	uc2	9	N	
958	149	9	N	
959	148	9	N	
960	226	7	N	
961	29	8	N	
962	28	9	N	
963	61	9	N	
964	70	9	N	
965	85	9	N	
966	143	9	N	
967	145	8	N	
968	5	9	N	
969	6	9	N	
970	7	9	N	
971	8	9	N	
972	9	9	N	
973	25	9	N	
974	ucl	9	N	
975	uc2	9	N	
976	149	9	N	
977	148	9	N	
978	228	7	N	
979	29	8	N	
980	28	9	N	
981	61	9	N	
982	70	9	N	
983	85	9	N	
984	143	9	N	
985	227	8	N	
986	133	9	N	
987	134	10	N	
988	Ch.	10	Ch.	
989	10	11	N	
990	12	12	N	

No.	Element	Level	Required	Remark
991	86	12	N	
992	57	11	N	
993	58	11	N	
994	79	11	N	
995	229	7	N	
996	29	8	N	
997	28	9	N	
998	61	9	N	
999	70	9	N	
1000	85	9	N	
1001	143	9	N	
1002	113	8	N	
1003	Ch.	9	Ch.	
1004	10	10	N	
1005	12	11	N	
1006	86	11	N	
1007	57	10	N	
1008	58	10	N	
1009	79	10	N	
1010	133	8	N	
1011	134	9	N	
1012	Ch.	9	Ch.	
1013	10	10	N	
1014	12	11	N	
1015	86	11	N	
1016	57	10	N	
1017	58	10	N	
1018	79	10	N	
1019	145	8	N	
1020	5	9	N	
1021	6	9	N	
1022	7	9	N	
1023	8	9	N	
1024	9	9	N	
1025	25	9	N	
1026	ucl	9	N	
1027	uc2	9	N	
1028	149	9	N	
1029	148	9	N	

No.	Element	Level	Required	Remark
1030	218	5	N	
1031	Ch.	6	Ch.	
1032	225	7	N	
1033	29	8	N	
1034	28	9	N	
1035	61	9	N	
1036	70	9	N	
1037	85	9	N	
1038	143	9	N	
1039	113	8	N	
1040	Ch.	9	Ch.	
1041	10	10	N	
1042	12	11	N	
1043	86	11	N	
1044	57	10	N	
1045	58	10	N	
1046	79	10	N	
1047	133	8	N	
1048	134	9	N	
1049	Ch.	9	Ch.	
1050	10	10	N	
1051	12	11	N	
1052	86	11	N	
1053	57	10	N	
1054	58	10	N	
1055	79	10	N	
1056	145	8	N	
1057	5	9	N	
1058	6	9	N	
1059	7	9	N	
1060	8	9	N	
1061	9	9	N	
1062	25	9	N	
1063	ucl	9	N	
1064	uc2	9	N	
1065	149	9	N	
1066	148	9	N	
1067	226	7	N	
1068	29	8	N	

No.	Element	Level	Required	Remark
1069	28	9	N	
1070	61	9	N	
1071	70	9	N	
1072	85	9	N	
1073	143	9	N	
1074	145	8	N	
1075	5	9	N	
1076	6	9	N	
1077	7	9	N	
1078	8	9	N	
1079	9	9	N	
1080	25	9	N	
1081	uc1	9	N	
1082	uc2	9	N	
1083	149	9	N	
1084	148	9	N	
1085	228	7	N	
1086	29	8	N	
1087	28	9	N	
1088	61	9	N	
1089	70	9	N	
1090	85	9	N	
1091	143	9	N	
1092	227	8	N	
1093	133	9	N	
1094	134	10	N	
1095	Ch.	10	Ch.	
1096	10	11	N	
1097	12	12	N	
1098	86	12	N	
1099	57	11	N	
1100	58	11	N	
1101	79	11	N	
1102	229	7	N	
1103	29	8	N	
1104	28	9	N	
1105	61	9	N	
1106	70	9	N	
1107	85	9	N	

No.	Element	Level	Required	Remark
1108	143	9	N	
1109	113	8	N	
1110	Ch.	9	Ch.	
1111	10	10	N	
1112	12	11	N	
1113	86	11	N	
1114	57	10	N	
1115	58	10	N	
1116	79	10	N	
1117	133	8	N	
1118	134	9	N	
1119	Ch.	9	Ch.	
1120	10	10	N	
1121	12	11	N	
1122	86	11	N	
1123	57	10	N	
1124	58	10	N	
1125	79	10	N	
1126	145	8	N	
1127	5	9	N	
1128	6	9	N	
1129	7	9	N	
1130	8	9	N	
1131	9	9	N	
1132	25	9	N	
1133	uc1	9	N	
1134	uc2	9	N	
1135	149	9	N	
1136	148	9	N	
1137	223	5	N	
1138	uc9	5	N	
1139	250	5	N	
1140	11	6	N	
1141	uc3	6	N	
1142	dpc12	4	M	
1143	dpc15	4	N	
1144	dpc16	4	M	
1145	186	4	N	
1146	44	5	N	

No.	Element	Level	Required	Remark
1147	13	6	N	
1148	64	6	N	
1149	dpc23	5	N	
1150	188	4	N	
1151	Ch.	5	Ch.	
1152	10	6	N	
1153	12	7	N	
1154	86	7	N	
1155	57	6	N	
1156	58	6	N	
1157	79	6	N	
1158	189	4	N	
1159	11	5	N	
1160	uc3	5	N	
1161	200	4	N	
1162	202	4	N	
1163	44	5	N	
1164	13	6	N	
1165	64	6	N	
1166	dpc23	5	N	
1167	214	4	N	
1168	Ch.	5	Ch.	
1169	225	6	N	
1170	29	7	N	
1171	28	8	N	
1172	61	8	N	
1173	70	8	N	
1174	85	8	N	
1175	143	8	N	
1176	113	7	N	
1177	Ch.	8	Ch.	
1178	10	9	N	
1179	12	10	N	
1180	86	10	N	
1181	57	9	N	
1182	58	9	N	
1183	79	9	N	
1184	133	7	N	
1185	134	8	N	

No.	Element	Level	Required	Remark
1186	Ch.	8	Ch.	
1187	10	9	N	
1188	12	10	N	
1189	86	10	N	
1190	57	9	N	
1191	58	9	N	
1192	79	9	N	
1193	145	7	N	
1194	5	8	N	
1195	6	8	N	
1196	7	8	N	
1197	8	8	N	
1198	9	8	N	
1199	25	8	N	
1200	uc1	8	N	
1201	uc2	8	N	
1202	149	8	N	
1203	148	8	N	
1204	226	6	N	
1205	29	7	N	
1206	28	8	N	
1207	61	8	N	
1208	70	8	N	
1209	85	8	N	
1210	143	8	N	
1211	145	7	N	
1212	5	8	N	
1213	6	8	N	
1214	7	8	N	
1215	8	8	N	
1216	9	8	N	
1217	25	8	N	
1218	uc1	8	N	
1219	uc2	8	N	
1220	149	8	N	
1221	148	8	N	
1222	228	6	N	
1223	29	7	N	
1224	28	8	N	

No.	Element	Level	Required	Remark
1225	61	8	N	
1226	70	8	N	
1227	85	8	N	
1228	143	8	N	
1229	227	7	N	
1230	133	8	N	
1231	134	9	N	
1232	Ch.	9	Ch.	
1233	10	10	N	
1234	12	11	N	
1235	86	11	N	
1236	57	10	N	
1237	58	10	N	
1238	79	10	N	
1239	229	6	N	
1240	29	7	N	
1241	28	8	N	
1242	61	8	N	
1243	70	8	N	
1244	85	8	N	
1245	143	8	N	
1246	113	7	N	
1247	Ch.	8	Ch.	
1248	10	9	N	
1249	12	10	N	
1250	86	10	N	
1251	57	9	N	
1252	58	9	N	
1253	79	9	N	
1254	133	7	N	
1255	134	8	N	
1256	Ch.	8	Ch.	
1257	10	9	N	
1258	12	10	N	
1259	86	10	N	
1260	57	9	N	
1261	58	9	N	
1262	79	9	N	
1263	145	7	N	

No.	Element	Level	Required	Remark
1264	5	8	N	
1265	6	8	N	
1266	7	8	N	
1267	8	8	N	
1268	9	8	N	
1269	25	8	N	
1270	uc1	8	N	
1271	uc2	8	N	
1272	149	8	N	
1273	148	8	N	
1274	220	4	N	
1275	16	5	N	
1276	43	6	N	
1277	uc5	6	N	
1278	93	6	N	
1279	110	6	N	
1280	198	6	N	
1281	233	6	N	
1282	42	5	N	
1283	181	5	N	
1284	218	4	N	
1285	Ch.	5	Ch.	
1286	225	6	N	
1287	29	7	N	
1288	28	8	N	
1289	61	8	N	
1290	70	8	N	
1291	85	8	N	
1292	143	8	N	
1293	113	7	N	
1294	Ch.	8	Ch.	
1295	10	9	N	
1296	12	10	N	
1297	86	10	N	
1298	57	9	N	
1299	58	9	N	
1300	79	9	N	
1301	133	7	N	
1302	134	8	N	

No.	Element	Level	Required	Remark
1303	Ch.	8	Ch.	
1304	10	9	N	
1305	12	10	N	
1306	86	10	N	
1307	57	9	N	
1308	58	9	N	
1309	79	9	N	
1310	145	7	N	
1311	5	8	N	
1312	6	8	N	
1313	7	8	N	
1314	8	8	N	
1315	9	8	N	
1316	25	8	N	
1317	uc1	8	N	
1318	uc2	8	N	
1319	149	8	N	
1320	148	8	N	
1321	226	6	N	
1322	29	7	N	
1323	28	8	N	
1324	61	8	N	
1325	70	8	N	
1326	85	8	N	
1327	143	8	N	
1328	145	7	N	
1329	5	8	N	
1330	6	8	N	
1331	7	8	N	
1332	8	8	N	
1333	9	8	N	
1334	25	8	N	
1335	uc1	8	N	
1336	uc2	8	N	
1337	149	8	N	
1338	148	8	N	
1339	228	6	N	
1340	29	7	N	
1341	28	8	N	

No.	Element	Level	Required	Remark
1342	61	8	N	
1343	70	8	N	
1344	85	8	N	
1345	143	8	N	
1346	227	7	N	
1347	133	8	N	
1348	134	9	N	
1349	Ch.	9	Ch.	
1350	10	10	N	
1351	12	11	N	
1352	86	11	N	
1353	57	10	N	
1354	58	10	N	
1355	79	10	N	
1356	229	6	N	
1357	29	7	N	
1358	28	8	N	
1359	61	8	N	
1360	70	8	N	
1361	85	8	N	
1362	143	8	N	
1363	113	7	N	
1364	Ch.	8	Ch.	
1365	10	9	N	
1366	12	10	N	
1367	86	10	N	
1368	57	9	N	
1369	58	9	N	
1370	79	9	N	
1371	133	7	N	
1372	134	8	N	
1373	Ch.	8	Ch.	
1374	10	9	N	
1375	12	10	N	
1376	86	10	N	
1377	57	9	N	
1378	58	9	N	
1379	79	9	N	
1380	145	7	N	

No.	Element	Level	Required	Remark
1381	5	8	N	
1382	6	8	N	
1383	7	8	N	
1384	8	8	N	
1385	9	8	N	
1386	25	8	N	
1387	uc1	8	N	
1388	uc2	8	N	
1389	149	8	N	
1390	148	8	N	
1391	235	4	N	
1392	158	5	N	
1393	162	6	N	
1394	199	6	N	
1395	Ch.	6	N	
1396	10	7	N	
1397	12	8	N	
1398	86	8	N	
1399	81	7	N	
1400	dpc11	5	N	
1401	237	4	O	
1402	105	5	O	
1403	238	5	O	
1404	23	6	O	
1405	116	6	O	
1406	dpc22	6	O	
1407	241	4	O	
1408	26	5	O	
1409	60	6	O	
1410	117	6	O	
1411	dsc1	7	O	
1412	71	7	O	
1413	11	8	O	
1414	uc3	8	O	
1415	dsc4	7	O	
1416	dsc5	7	O	
1417	182	6	O	
1418	239	6	O	
1419	uc1	7	O	

No.	Element	Level	Required	Remark
1420	92	7	O	
1421	114	7	O	
1422	182	7	O	
1423	38	5	O	
1424	40	6	O	
1425	69	6	O	
1426	uc3	6	O	
1427	222	6	O	
1428	uc3	6	O	
1429	117	5	O	
1430	dsc1	6	O	
1431	71	6	O	
1432	11	7	O	
1433	uc3	7	O	
1434	dsc4	6	O	
1435	dsc5	6	O	
1436	119	5	O	
1437	60	6	O	
1438	117	6	O	
1439	dsc1	7	O	
1440	71	7	O	
1441	11	8	O	
1442	uc3	8	O	
1443	dsc4	7	O	
1444	dsc5	7	O	
1445	182	6	O	
1446	239	6	O	
1447	uc1	7	O	
1448	92	7	O	
1449	114	7	O	
1450	182	7	O	
1451	185	5	O	
1452	60	6	O	
1453	117	6	O	
1454	dsc1	7	O	
1455	71	7	O	
1456	11	8	O	
1457	uc3	8	O	
1458	dsc4	7	O	

No.	Element	Level	Required	Remark
1459	dsc5	7	O	
1460	182	6	O	
1461	239	6	O	
1462	uc1	7	O	
1463	92	7	O	
1464	114	7	O	
1465	182	7	O	
1466	240	5	O	
1467	106	6	O	
1468	144	6	O	
1469	244	4	M	
1470	11	5	Y	7,300
1471	uc3	5	Y	THB
1472	uc9	4	Y	KILO
1473	250	4	M	
1474	11	5	Y	7.3
1475	uc3	5	Y	THB
1476	dpc12	3	M	
1477	dpc14	3	M	Code list
1478	dpc15	3	O	
1479	179	3	N	
1480	43	4	N	
1481	uc5	4	N	
1482	93	4	N	
1483	110	4	N	
1484	198	4	N	
1485	233	4	N	
1486	dpc16	3	M	Code list
1487	dpc17	3	M	Code list
1488	186	3	M	
1489	44	4	M	
1490	13	5	Y	10-JUN-2009
1491	64	5	Y	10-JUN-2009
1492	dpc23	4	N	
1493	188	3	N	
1494	Ch.	4	Ch.	
1495	10	5	N	
1496	12	6	N	
1497	86	6	N	

No.	Element	Level	Required	Remark
1498	57	5	N	
1499	58	5	N	
1500	79	5	N	
1501	200	3	M	
1502	202	3	N	
1503	44	4	N	
1504	13	5	N	
1505	64	5	N	
1506	dpc23	4	N	
1507	205	3	N	
1508	94	4	N	
1509	131	4	N	
1510	Ch.	5	Ch.	
1511	77	6	N	
1512	29	7	N	
1513	28	8	N	
1514	61	8	N	
1515	70	8	N	
1516	85	8	N	
1517	143	8	N	
1518	113	7	N	
1519	Ch.	8	Ch.	
1520	10	9	N	
1521	12	10	N	
1522	86	10	N	
1523	57	9	N	
1524	58	9	N	
1525	79	9	N	
1526	133	7	N	
1527	134	8	N	
1528	Ch.	8	Ch.	
1529	10	9	N	
1530	12	10	N	
1531	86	10	N	
1532	57	9	N	
1533	58	9	N	
1534	79	9	N	
1535	145	7	N	
1536	5	8	N	

No.	Element	Level	Required	Remark
1537	6	8	N	
1538	7	8	N	
1539	8	8	N	
1540	9	8	N	
1541	25	8	N	
1542	uc1	8	N	
1543	uc2	8	N	
1544	149	8	N	
1545	148	8	N	
1546	uc7	7	N	
1547	99	6	N	
1548	29	7	N	
1549	28	8	N	
1550	61	8	N	
1551	70	8	N	
1552	85	8	N	
1553	143	8	N	
1554	145	7	N	
1555	5	8	N	
1556	6	8	N	
1557	7	8	N	
1558	8	8	N	
1559	9	8	N	
1560	25	8	N	
1561	uc1	8	N	
1562	uc2	8	N	
1563	149	8	N	
1564	148	8	N	
1565	uc7	7	N	
1566	108	6	N	
1567	29	7	N	
1568	28	8	N	
1569	61	8	N	
1570	70	8	N	
1571	85	8	N	
1572	143	8	N	
1573	107	7	N	
1574	133	8	N	
1575	134	9	N	

No.	Element	Level	Required	Remark
1576	Ch.	9	Ch.	
1577	10	10	N	
1578	12	11	N	
1579	26	11	N	
1580	57	10	N	
1581	58	10	N	
1582	79	10	N	
1583	uc7	8	N	
1584	121	6	N	
1585	29	7	N	
1586	28	8	N	
1587	61	8	N	
1588	70	8	N	
1589	85	8	N	
1590	143	8	N	
1591	113	7	N	
1592	Ch.	8	Ch.	
1593	10	9	N	
1594	12	10	N	
1595	86	10	N	
1596	57	9	N	
1597	58	9	N	
1598	79	9	N	
1599	133	7	N	
1600	134	8	N	
1601	Ch.	8	Ch.	
1602	10	9	N	
1603	12	10	N	
1604	86	10	N	
1605	57	9	N	
1606	58	9	N	
1607	79	9	N	
1608	145	7	N	
1609	5	8	N	
1610	6	8	N	
1611	7	8	N	
1612	8	8	N	
1613	9	8	N	
1614	25	8	N	

No.	Element	Level	Required	Remark
1615	uc1	8	N	
1616	uc2	8	N	
1617	149	8	N	
1618	148	8	N	
1619	uc7	7	N	
1620	214	3	O	
1621	Ch.	4	Ch.	
1622	225	5	O	
1623	29	6	O	
1624	28	7	O	
1625	61	7	O	
1626	70	7	O	
1627	85	7	O	
1628	143	7	O	
1629	113	6	N	
1630	Ch.	7	Ch.	
1631	10	8	N	
1632	12	9	N	
1633	86	9	N	
1634	57	8	N	
1635	58	8	N	
1636	79	8	N	
1637	133	6	O	
1638	134	7	N	
1639	Ch.	7	Ch.	
1640	10	8	O	
1641	12	9	O	
1642	86	9	O	
1643	57	8	O	
1644	58	8	O	
1645	79	8	O	
1646	145	6	O	
1647	5	7	O	
1648	6	7	O	
1649	7	7	O	
1650	8	7	O	
1651	9	7	O	
1652	25	7	O	
1653	uc1	7	O	

No.	Element	Level	Required	Remark
1654	uc2	7	O	
1655	149	7	O	
1656	148	7	O	
1657	226	5	N	
1658	29	6	N	
1659	28	7	N	
1660	61	7	N	
1661	70	7	N	
1662	85	7	N	
1663	143	7	N	
1664	145	6	N	
1665	5	7	N	
1666	6	7	N	
1667	7	7	N	
1668	8	7	N	
1669	9	7	N	
1670	25	7	N	
1671	uc1	7	N	
1672	uc2	7	N	
1673	149	7	N	
1674	148	7	N	
1675	228	5	N	
1676	29	6	N	
1677	28	7	N	
1678	61	7	N	
1679	70	7	N	
1680	85	7	N	
1681	143	7	N	
1682	227	6	N	
1683	133	7	N	
1684	134	8	N	
1685	Ch.	8	Ch.	
1686	10	9	N	
1687	12	10	N	
1688	86	10	N	
1689	57	9	N	
1690	58	9	N	
1691	79	9	N	
1692	229	5	N	

No.	Element	Level	Required	Remark
1693	29	6	N	
1694	28	7	N	
1695	61	7	N	
1696	70	7	N	
1697	85	7	N	
1698	143	7	N	
1699	113	6	N	
1700	Ch.	7	Ch.	
1701	10	8	N	
1702	12	9	N	
1703	86	9	N	
1704	57	8	N	
1705	58	8	N	
1706	79	8	N	
1707	133	6	N	
1708	134	7	N	
1709	Ch.	7	Ch.	
1710	10	8	N	
1711	12	9	N	
1712	86	9	N	
1713	57	8	N	
1714	58	8	N	
1715	79	8	N	
1716	145	6	N	
1717	5	7	N	
1718	6	7	N	
1719	7	7	N	
1720	8	7	N	
1721	9	7	N	
1722	25	7	N	
1723	uc1	7	N	
1724	uc2	7	N	
1725	149	7	N	
1726	148	7	N	
1727	218	3	O	
1728	Ch.	4	Ch.	
1729	225	5	O	
1730	29	6	O	
1731	28	7	O	

No.	Element	Level	Required	Remark
1732	61	7	O	
1733	70	7	O	
1734	85	7	O	
1735	143	7	O	
1736	113	6	N	
1737	Ch.	7	Ch.	
1738	10	8	N	
1739	12	9	N	
1740	86	9	N	
1741	57	8	N	
1742	58	8	N	
1743	79	8	N	
1744	133	6	O	
1745	134	7	N	
1746	Ch.	7	Ch.	
1747	10	8	O	
1748	12	9	O	
1749	86	9	O	
1750	57	8	O	
1751	58	8	O	
1752	79	8	O	
1753	145	6	O	
1754	5	7	O	
1755	6	7	O	
1756	7	7	O	
1757	8	7	O	
1758	9	7	O	
1759	25	7	O	
1760	uc1	7	O	
1761	uc2	7	O	
1762	149	7	O	
1763	148	7	O	
1764	226	5	N	
1765	29	6	N	
1766	28	7	N	
1767	61	7	N	
1768	70	7	N	
1769	85	7	N	
1770	143	7	N	

No.	Element	Level	Required	Remark
1771	145	6	N	
1772	5	7	N	
1773	6	7	N	
1774	7	7	N	
1775	8	7	N	
1776	9	7	N	
1777	25	7	N	
1778	uc1	7	N	
1779	uc2	7	N	
1780	149	7	N	
1781	148	7	N	
1782	228	5	N	
1783	29	6	N	
1784	28	7	N	
1785	61	7	N	
1786	70	7	N	
1787	85	7	N	
1788	143	7	N	
1789	227	6	N	
1790	133	7	N	
1791	134	8	N	
1792	Ch.	8	Ch.	
1793	10	9	N	
1794	12	10	N	
1795	86	10	N	
1796	57	9	N	
1797	58	9	N	
1798	79	9	N	
1799	229	5	N	
1800	29	6	N	
1801	28	7	N	
1802	61	7	N	
1803	70	7	N	
1804	85	7	N	
1805	143	7	N	
1806	113	6	N	
1807	Ch.	7	Ch.	
1808	10	8	N	
1809	12	9	N	

No.	Element	Level	Required	Remark
1810	86	9	N	
1811	57	8	N	
1812	58	8	N	
1813	79	8	N	
1814	133	6	N	
1815	134	7	N	
1816	Ch.	7	Ch.	
1817	10	8	N	
1818	12	9	N	
1819	86	9	N	
1820	57	8	N	
1821	58	8	N	
1822	79	8	N	
1823	145	6	N	
1824	5	7	N	
1825	6	7	N	
1826	7	7	N	
1827	8	7	N	
1828	9	7	N	
1829	25	7	N	
1830	uc1	7	N	
1831	uc2	7	N	
1832	149	7	N	
1833	148	7	N	
1834	237	3	O	
1835	105	4	O	
1836	238	4	O	
1837	23	5	O	
1838	116	5	O	
1839	dpc22	5	O	
1840	241	3	O	
1841	26	4	O	
1842	60	5	O	
1843	117	5	O	
1844	dsc1	6	O	
1845	71	6	O	
1846	11	7	O	
1847	uc3	7	O	
1848	dsc4	6	O	

No.	Element	Level	Required	Remark
1849	dsc5	6	O	
1850	182	5	O	
1851	239	5	O	
1852	uc1	6	O	
1853	92	6	O	
1854	114	6	O	
1855	182	6	O	
1856	38	4	O	
1857	40	5	O	
1858	69	5	O	
1859	uc3	5	O	
1860	222	5	O	
1861	uc3	5	O	
1862	117	4	O	
1863	dsc1	5	O	
1864	71	5	O	
1865	11	6	O	
1866	uc3	6	O	
1867	dsc4	5	O	
1868	dsc5	5	O	
1869	119	4	O	
1870	60	5	O	
1871	117	5	O	
1872	dsc1	6	O	
1873	71	6	O	
1874	11	7	O	
1875	uc3	7	O	
1876	dsc4	6	O	
1877	dsc5	6	O	
1878	182	5	O	
1879	239	5	O	
1880	uc1	6	O	
1881	92	6	O	
1882	114	6	O	
1883	182	6	O	
1884	185	4	O	
1885	60	5	O	
1886	117	5	O	
1887	dsc1	6	O	

No.	Element	Level	Required	Remark
1888	71	6	O	
1889	11	7	O	
1890	uc3	7	O	
1891	dsc4	6	O	
1892	dsc5	6	O	
1893	182	5	O	
1894	239	5	O	
1895	uc1	6	O	
1896	92	6	O	
1897	114	6	O	
1898	182	6	O	
1899	240	4	O	
1900	106	5	O	
1901	144	5	O	
1902	243	3	M	
1903	11	4	Y	7,300
1904	uc3	4	Y	THB

PIP3A9: PurchaseOrderCancellationRequest

No.	Element	Level	Required	Remark
1	173	1	M	
2	52	2	M	
3	35	3	O	
4	32	4	O	
5	30	5	O	
6	34	5	O	
7	192	4	O	
8	17	5	O	
9	191	5	O	
10	193	5	O	
11	195	5	O	
12	54	3	M	
13	36	4	Y	02-JUN-09
14	53	4	M	
15	87	5	Y	P/O (408744)
16	249	5	O	
17	Ch.	5	Ch.	
18	231	6	M	

No.	Element	Level	Required	Remark
19	230	7	M	RosettaNet
20	253	7	M	PIP3A9V11.10B
21	246	6	N	
22	scl	7	N	
23	132	7	N	
24	146	7	N	
25	147	7	N	
26	245	7	N	
27	247	7	N	
28	252	7	N	
29	55	4	O	
30	115	5	O	
31	49	6	O	
32	uc4	6	O	
33	109	6	O	
34	uc6	6	O	
35	251	6	O	
36	118	5	O	
37	124	5	O	
38	56	4	M	
39	122	5	M	
40	141	5	M	
41	142	5	M	
42	83	3	N	
43	184	3	M	
44	18	4	M	
45	4	5	M	Request
46	151	5	M	Request Purchase Order Cancellation
47	152	5	M	PIP3A9
48	153	5	N	
49	211	5	M	PurchaseOrderCancellation
50	29	4	M	
51	28	5	O	
52	61	5	O	
53	70	5	Y	Fax. No.
54	85	5	O	
55	143	5	Y	Tel. No.
56	133	4	M	
57	134	5	Y	Supplier Name

No.	Element	Level	Required	Remark
58	Ch.	5	Ch.	
59	10	6	O	
60	12	7	O	
61	86	7	O	
62	57	6	O	
63	58	6	O	
64	79	6	O	
65	206	3	M	
66	18	4	M	
67	4	5	M	
68	151	5	M	
69	152	5	M	
70	153	5	N	
71	211	5	M	
72	29	4	M	
73	28	5	Y	Prepared by
74	61	5	O	e-mail ผู้สั่งซื้อ
75	70	5	O	หมายเลขโทรสาร
76	85	5	O	ผู้สั่งซื้อ
77	143	5	O	หมายเลขโทรศัพท์
78	133	4	M	
79	134	5	Y	ชื่อบริษัท
80	Ch.	5	Ch.	
81	10	6	O	
82	12	7	O	
83	86	7	O	
84	57	6	O	
85	58	6	O	
86	79	6	O	
87	171	2	M	
88	dpc13	3	M	
89	179	3	M	
90	43	4	O	
91	uc5	4	O	
92	93	4	Y	P/O (408744)
93	110	4	O	
94	198	4	O	
95	233	4	O	
96	200	3	M	

PIP3A9: PurchaseOrderCancellationConfirmation

No.	Element	Level	Required	Remark
1	172	1	M	
2	52	2	M	
3	35	3	O	
4	32	4	O	
5	30	5	O	
6	34	5	O	
7	192	4	O	
8	17	5	O	
9	191	5	O	
10	193	5	O	
11	195	5	O	
12	54	3	M	
13	36	4	Y	02-JUN-09
14	53	4	M	
15	87	5	Y	P/O (408744)
16	249	5	O	
17	Ch.	5	Ch.	
18	231	6	M	
19	230	7	M	RosettaNet
20	253	7	M	PIP3A9V11.10B
21	246	6	N	
22	sc1	7	N	
23	132	7	N	
24	146	7	N	
25	147	7	N	
26	245	7	N	
27	247	7	N	
28	252	7	N	
29	55	4	O	
30	115	5	O	
31	49	6	O	
32	uc4	6	O	
33	109	6	O	
34	uc6	6	O	
35	251	6	O	
36	118	5	O	
37	124	5	O	
38	56	4	M	

No.	Element	Level	Required	Remark
39	122	5	M	
40	141	5	M	
41	142	5	M	
42	83	3	N	
43	184	3	M	
44	18	4	M	
45	4	5	M	Confirm
46	151	5	M	Confirmation Purchase Order Cancellation
47	152	5	M	PIP3A9
48	153	5	N	
49	211	5	M	PurchaseOrderCancellation
50	29	4	M	
51	28	5	O	
52	61	5	O	
53	70	5	Y	Fax. No.
54	85	5	O	
55	143	5	Y	Tel. No.
56	133	4	M	
57	134	5	Y	Supplier Name
58	Ch.	5	Ch.	
59	10	6	O	
60	12	7	O	
61	86	7	O	
62	57	6	O	
63	58	6	O	
64	79	6	O	
65	206	3	M	
66	18	4	M	
67	4	5	M	
68	151	5	M	
69	152	5	M	
70	153	5	N	
71	211	5	M	
72	29	4	M	
73	28	5	Y	Prepared by
74	61	5	O	e-mail ผู้สั่งซื้อ
75	70	5	O	หมายเลขโทรสาร
76	85	5	O	ผู้สั่งซื้อ

No.	Element	Level	Required	Remark
77	143	5	O	หมายเลขโทรศัพท์
78	133	4	M	
79	134	5	Y	ชื่อบริษัท
80	Ch.	5	Ch.	
81	10	6	O	
82	12	7	O	
83	86	7	O	
84	57	6	O	
85	58	6	O	
86	79	6	O	
87	171	2	M	
88	dpc13	3	M	
89	(icl)	3	M	
90	179	3	M	
91	43	4	O	
92	uc5	4	O	
93	93	4	Y	P/O (408744)
94	110	4	O	
95	198	4	O	
96	233	4	O	
97	190	3	N	
98	43	4	N	
99	uc5	4	N	
100	93	4	N	
101	110	4	N	
102	198	4	N	
103	233	4	N	
104	200	3	M	

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