UNIVERSITI TEKNOLOGI MARA

INDUSTRIAL TRAINING FIELD REPORT

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PROGRAMME	DIPLOMA OF CHEMICAL ENGINEERING
STUDENT ID	2018233368
LI DURATION	17 WEEKS (23 MARCH 2021 – 15 JULY 2021)
SUPERVISOR	MR MOHD AZRIN BIN SA'ARI
COMPANY	MYAMAX PRECISION ENGINEERING (M) SDN BHD
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1. INTRODUCTION

1.1. Introduction to Industrial Training

To complete the final semester of the Diploma in Chemical Engineering (EH110) at Universiti Teknologi MARA (UiTM) Pasir Gudang, I need to register the subject of Industrial Training (CHE353). The industrial training is an integral platform for anyone to gain experience in an actual workplace. Students must seek out and apply for an internship at any company that is involved in the subject of chemical engineering before entering the real world. Important documents must also be included with their application.

Aside from that, the objective of the training is to provide students with exposure and opportunities to participate in real-world job experiences. They will benefit from this course because they will be able to broaden their knowledge, learn more about modern chemical businesses, and apply the theories they acquired throughout their diploma to real-world settings.

Students must complete a minimum of 17 weeks of industrial training to earn a total of 7 credit hours. This 16-week industrial training is required by the Board of Engineers Malaysia (BEM) for undergraduate students to meet the criteria of the Engineering Technology Accreditation Council (ETAC).

1.2. Job Scope of Industrial Training

During my internship, I was assigned to the First Article Division in the Quality Assurance Department in Myamax Precision Engineering (M) Sdn Bhd. My job scope during the internship was manufacturing project, documentation, and part inspection. Despite the pandemic COVID-19, I successfully finished 17 weeks of industrial training under the supervision and guidance of Mr. Mohd Azrin bin Sa'ari, assistant engineer Mr. Hafis bin Sulaiman, and quality control technician Mr. Mohd Shamir bin Abdul Razak. I considered myself fortunate to have had the opportunity to work with excellent mentors and helpful co-workers. I have learned many new knowledges that are not really related to chemical engineering, but I can gain experience from the activities that I do every day during my internship period.

2. CONTENTS

2.1. Organizational Chart and History of the Company

2.1.1. Organizational Chart

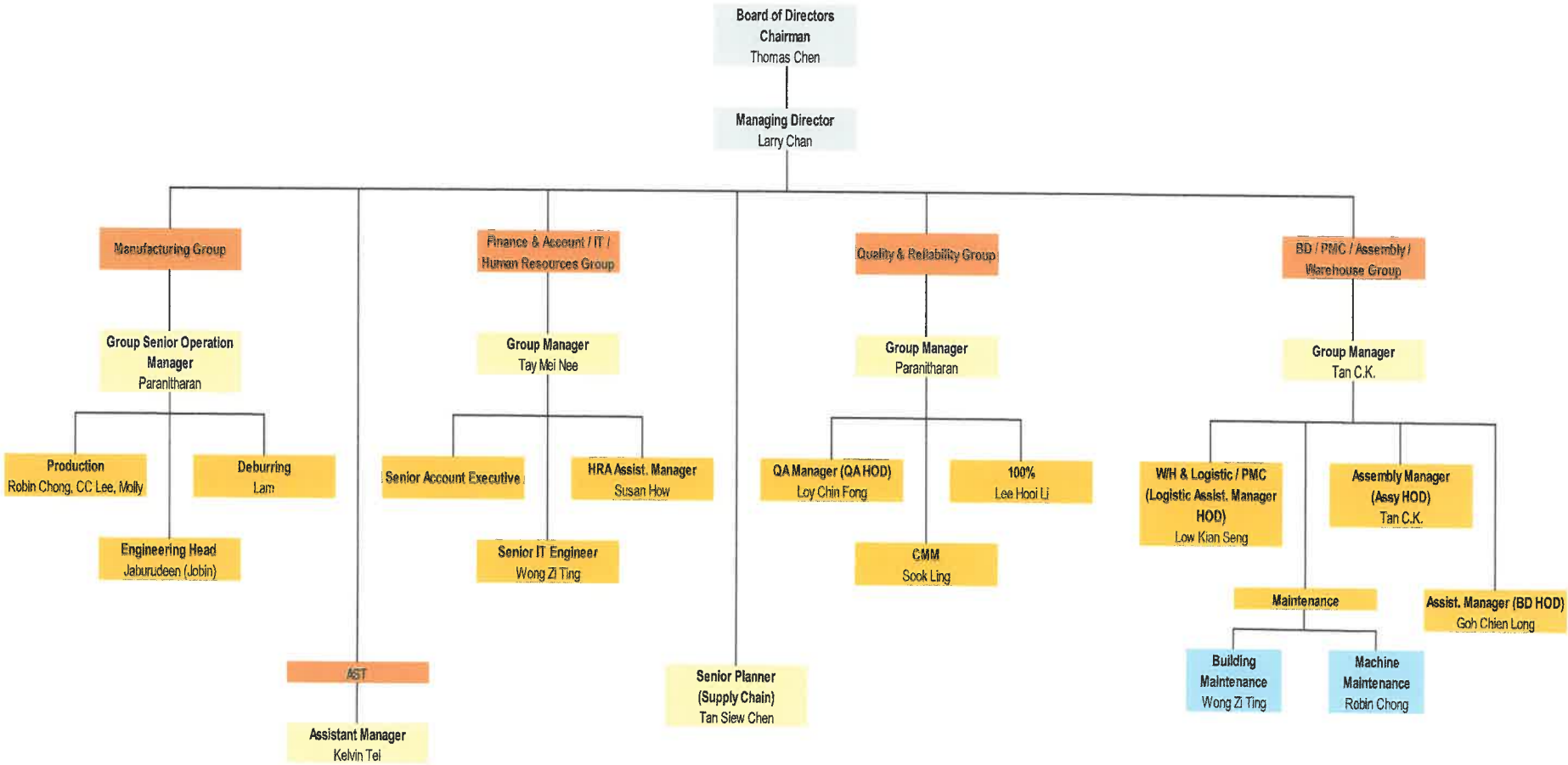


Figure 1: *Organizational Chart of Myamax Precision Engineering*

2.1.2. History of Company

Myamax Precision Engineering (M) Sdn Bhd, established in 1995, is a high-tech firm with comprehensive experience in precision machining and subassembly. Myamax is well-equipped with a variety of cutting-edge technological devices. The company are firmly committed to providing the consumers with an efficient one-stop solution in terms of timely distribution, high quality, and cost-effective goods and services.

Myamax is the partnering manufacturing hub with Amax Precision Singapore and Iamax Precision India that is focusing on manufacturing and assembly which is equipped with complete machining, assembly, and treatment services, as well as a remarkable talent pool the clients can leverage on.

The initial activity in Myamax was focus on supplying machined die-cast components for disk drive industry. For example, diversification into communication, audio, printers, instrumentation, and medical industries include diecast, extrusion, investment casting, sand casting, steel casting, special material machining and sub-assembly process.

2.1.3. Vision, Mission, and Value of the Company

Our Vision

To be the preferred partner of world-class manufacturers – to make remarkable successes out of world-class products.

Our Mission

To delight our customers through consistent delivery of high-quality components – by applying sound engineering practices, continuous improvement initiatives and commitment to optimized use of our resources.

Our Values

Professionalism | Commitment | Teamwork | Integrity | Excellence.

2.1.4. Products of Business

1. Medical Component

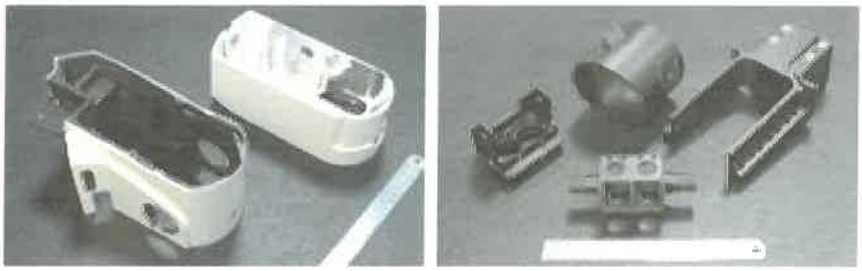


Figure 2: *Example of Medical Component*

2. Industrial Component

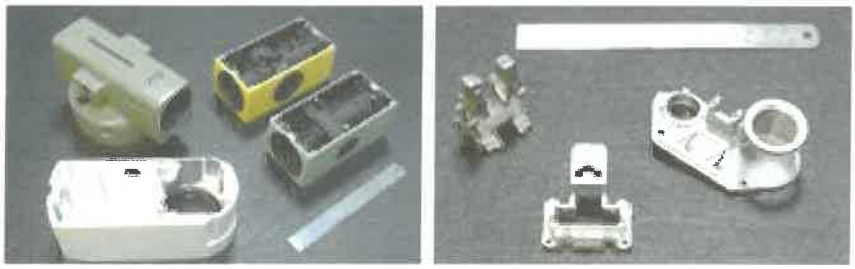


Figure 3: *Example of Industrial Component*

3. Specific Component

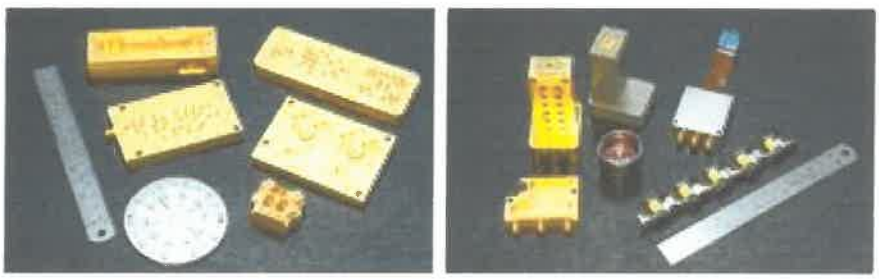


Figure 4: *Example of Specific Component*

2.2. Process Flow (First Article Division)

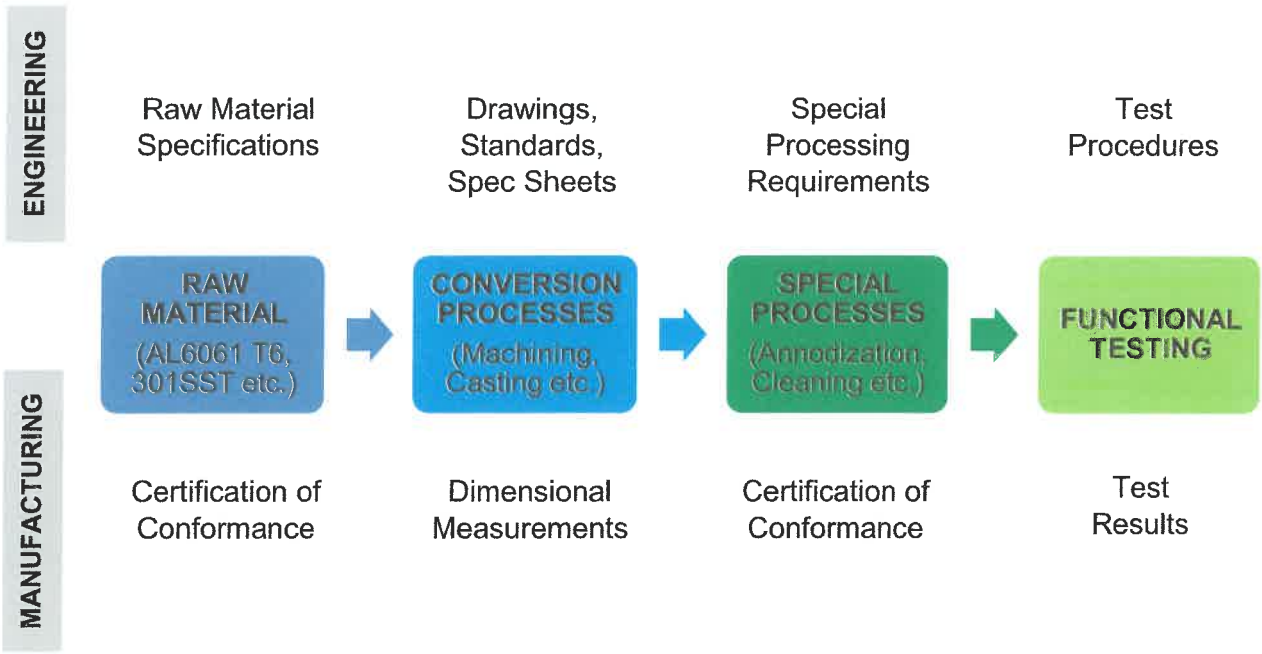


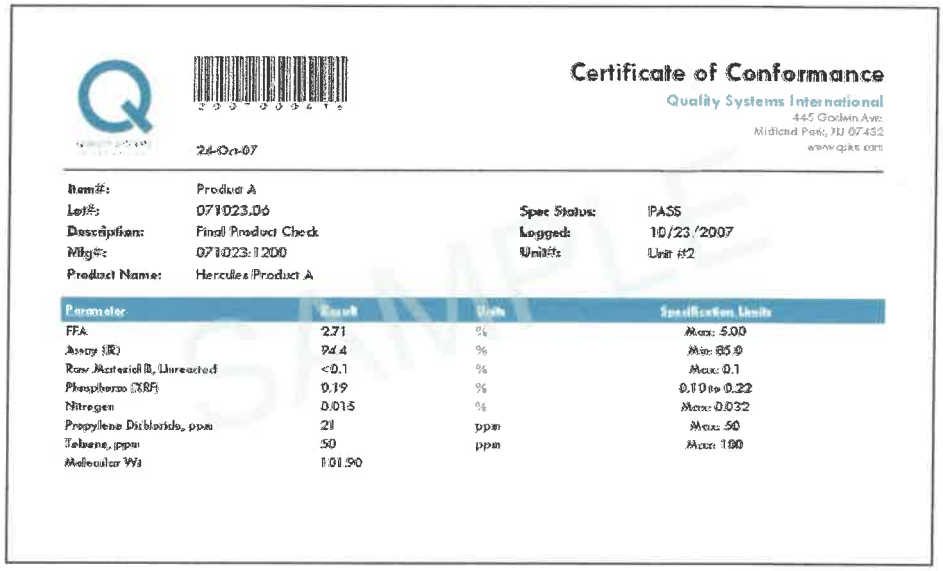
Figure 5: *Process Flowchart of First Article Division*

2.2.1. Raw Material

The costumer will provide a raw material specification (e.g. AL6061 T6, 301SST etc.) and a reference standard. The supplier, in turn, must provide proof that the raw material used for the first article meets this specification. This proof is provided in terms of a Certificate of Conformance (CoC) provided by the mill along with traceability information such as a Heat Lot number. The CoC will typically contain:

- The Mill Name
- Material Form and Dimensions
- Heat Lot Number
- Material Grade
- Actual Chemical Composition
- Mechanical Test Results
- ASTM Standard Number
- Quantity Covered by the Report
- Country of Origin

For example:



Certificate of Conformance

Quality Systems International
445 Godwin Ave.
Midland Park, NJ 07432
www.qsi.com

24-Oct-07

Item#:	Product A		
Lot#:	071023.06	Spec Status:	PASS
Description:	Final Product Check	Logged:	10/23/2007
Mfg#:	071023:1200	Unit#:	Unit #2
Product Name:	Hercules/Product A		

Parameter	Result	Units	Specification Limits
FFA	2.71	%	Max: 5.00
Assay (R)	94.4	%	Min: 85.0
Raw Material B, Unreacted	<0.1	%	Max: 0.1
Phosphorus (XRF)	0.19	%	0.10 to 0.22
Nitrogen	0.015	%	Max: 0.032
Propylene Dichloride, ppm	21	ppm	Max: 50
Toluene, ppm	50	ppm	Max: 100
Molecular Wt	101.90		

Figure 6: *Certificate of Conformance (CoC)*

2.2.2. Conversion Processes

The conversion processes are the second process in First Article Division which including machining, casting, and so on. This process is important before the production team proceed for the mass production of the product. This is because the engineer has to determine whether the first piece dimension of the product produce by the machine is accurate according to the specification and drawing given by the costumer.

2.2.2.1. Itemizing Drawing

An itemized drawing or ballooned drawing has numbered "balloons" that indicate the part's unique measurements and needs. The figures on the inflated graphic match the figures on the Dimensional Data Sheet or Report. When person in charge itemizing a drawing, it is simple to compare the measurements on a data sheet to the dimensions of the drawing.

For example:

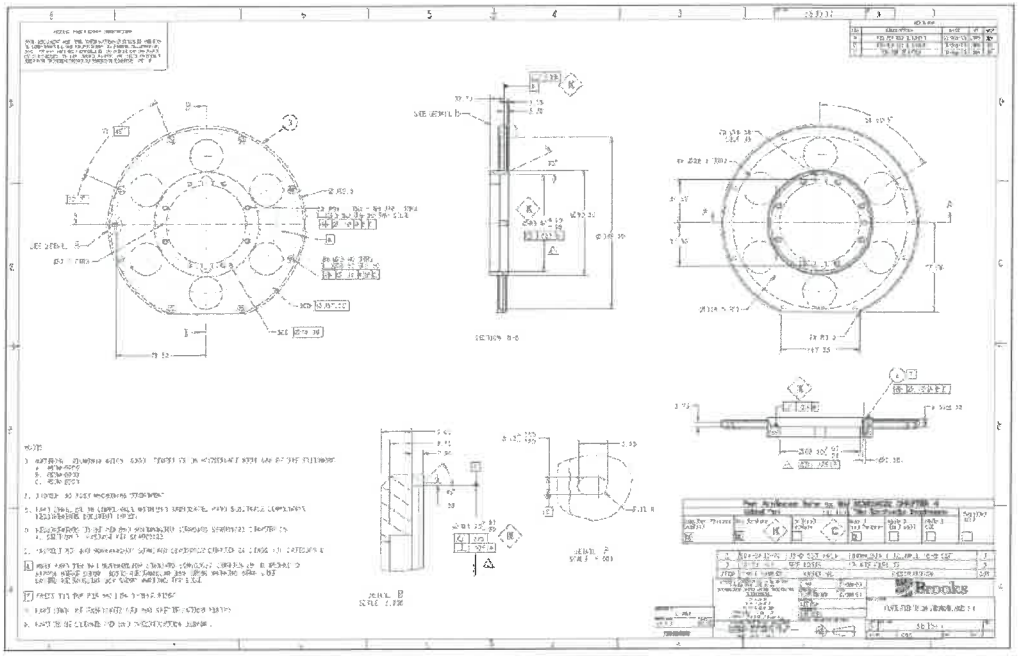


Figure 7: *2D Drawing*

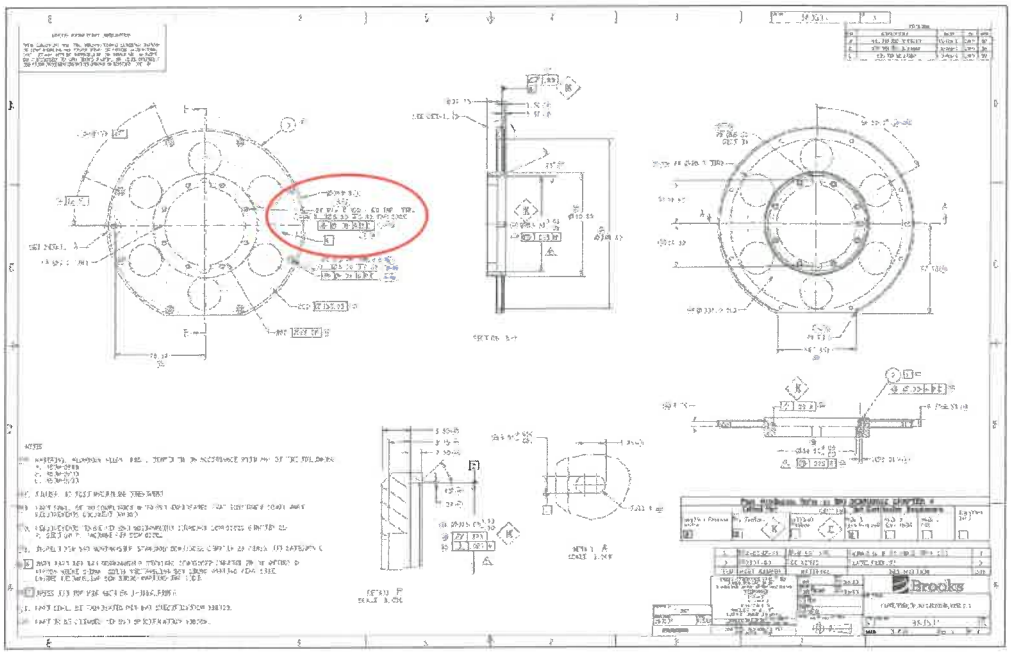


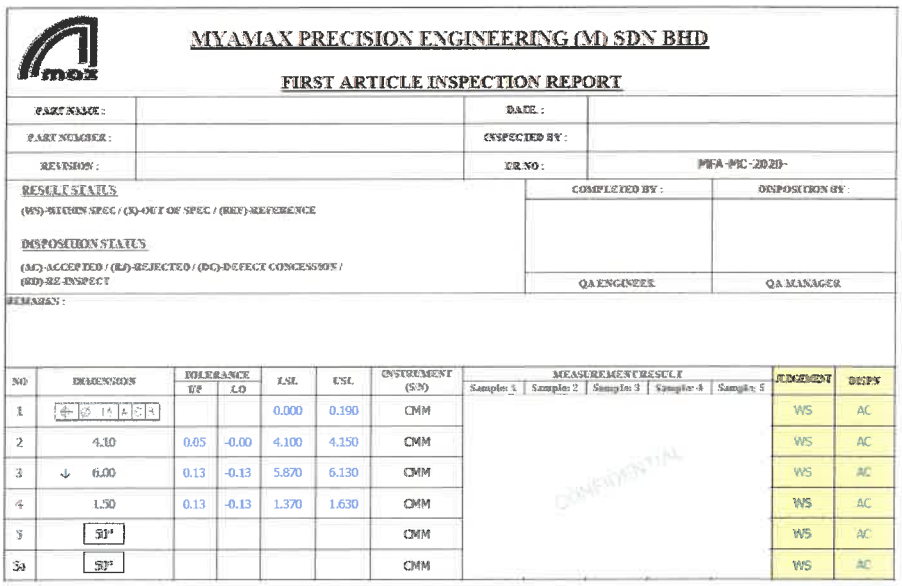
Figure 8: *Itemized 2D Drawing*

2.2.2.2. Dimensional Measurements / Record

FA Inspection Report is a design verification and design history file and a formal method of providing a reported measurement for each manufactured feature of a part or assembly. The evaluation report consists of assuring all the properties and features are

compliant to its specifications. Attribute Specifications (Accept/Reject) such as Part Engraving Checks will be included in the dimensional record, as will Variable Specifications (Numeric or Measured Value) such as linear dimensions, diameters, and locations. A first article inspection may be performed by an approved 2nd party supplier that is a dimensional metrology laboratory using a variety of calibrated tools such as coordinate-measuring machines (CMM), cmm/vision systems, and programmable 3-axis measurement systems, depending on the inspection capability, the type of product, and the governing specification.

For example:



MYAMAX PRECISION ENGINEERING (M) SDN BHD

FIRST ARTICLE INSPECTION REPORT

PART NAME :		DATE :	
PART NUMBER :		INSPECTED BY :	
REVISION :		ER NO :	PIFA-PIC-2020-

RESULT STATUS

(WS)-WITHIN SPEC / (X)-OUT OF SPEC / (REF)-REFERENCE

DISPOSITION STATUS

(AC)-ACCEPTED / (RJ)-REJECTED / (DC)-DEFECT CONCESSION / (RD)-RE-INSPECT

COMPLETED BY :	DISPOSITION BY :
QA ENGINEER	QA MANAGER

REMARKS :

NO	DIMENSION	TOLERANCE U/S	TOLERANCE L/O	LSL	USL	INSTRUMENT (S/N)	MEASUREMENT RESULT Sample: 1	Sample: 2	Sample: 3	Sample: 4	Sample: 5	JUDGEMENT	DISPS
1	⌖ Ø 0.15 A B C			0.000	0.190	CMM						WS	AC
2	4.10	0.05	-0.00	4.100	4.150	CMM						WS	AC
3	↓ 6.00	0.13	-0.13	5.870	6.130	CMM						WS	AC
4	1.50	0.13	-0.13	1.370	1.630	CMM						WS	AC
5	SR*					CMM						WS	AC
5a	SR*					CMM						WS	AC

Figure 9: *FA Inspection Report Template*

2.2.3. Special Processes

In this process, the product that have been produce will undergo the special process such as anodization, plating, or cleaning process according to the costumer demand. The specification of the special process is required to be followed by the team in charge to make sure there is no rejected part for the shipment to the costumer.

2.2.3.1. Restriction of Certain Hazardous Substances (RoHS)

In the "Hazardous Substances Directive," RoHS stands for "Restriction of Certain Hazardous Substances" in electrical and electronic equipment. EU Directive 2011/65 / EU establishes this limitation. When a product is RoHS-certified, it means that the amount of dangerous or difficult-to-remove chemicals is kept to a minimum. Lead, mercury, hexavalent

chromium, and cadmium are examples of such chemicals. Electronic device manufacturers must utilize more ecologically friendly alternatives, such as unleaded soldering. The EU Declaration of Conformity must demonstrate compliance with the RoHS Directive. This is accomplished using technical documentation compliant with the DIN EN 50581 guideline.

Since 2011, only CE-certified goods have been authorized to be used by manufacturers. CE is also mentioned above. It certifies that the product complies with EU Regulation 765/2008 and that it fulfils the appropriate installation criteria set forth in Community harmonization law.

For example:

Shenzhen RCT Testing Technology Co., Ltd.
Floor 14, Block A, Caifugang Building, Baoyuan Road, Xixiang,
Baoan District, Shenzhen, Guangdong, China (518101)
Tel: +86-755-[illegible] Fax: +86-755-[illegible] http://www.rct-test.com

Certificate of Conformity

Certificate No: RCT1510[illegible]

Applicant	:	Shenzhen E-Lover Technology Co., Ltd
		Sunwoda Industrial Park, Chuangye Road, Shiyan Street, Bao'an District, Shenzhen City, Guangdong Province, China
Product	:	LED High Bay Light
Trade Name	:	E-LOVER
Model	:	EL-HB1BM, EL-HB2EN, EL-HB3EN, EL-HB3CM, EL-HB4CN,EL-HB4CM, EL-HB5EN,EL-HB1EN
Report No.	:	RCT1510000067
Test Standards	:	EN 60598-2-1:1989 EN 60598-1:2008+A11:2009 EN 62493: 2015 EN 62471: 2008 EN 61347-1:2015 EN 61347-2-13:2014 EN 62031:2008+A1:2013

The EUT described above has been tested by us with the listed standards and found in compliance with the council LVD directive 2006/95/EC. It is possible to use CE marking to demonstrate the compliance with this LVD directive.

CE

Lab Director / Edmins
Date:Oct.13, 2015

The results in this report are applicable only to the equipment tested. This report shall not be reproduced except in full without the written approval of Shenzhen RCT Testing Technology Co., Ltd.

Figure 10: *RoHS Compliant*

2.2.4. Functional Testing

If just a certain number of tests have been conducted on an item, it must be regarded "incomplete." These minimal testing must be agreed upon with LH and may include dimensions inspections, weight checks, and functioning tests, among others. If all of the tests

linked to the manufacturing process have been completed, and all of the relevant papers (related to article conformance) specified in the First Article Inspection Planning documents are accessible and conform, an article inspection must be declared "complete."

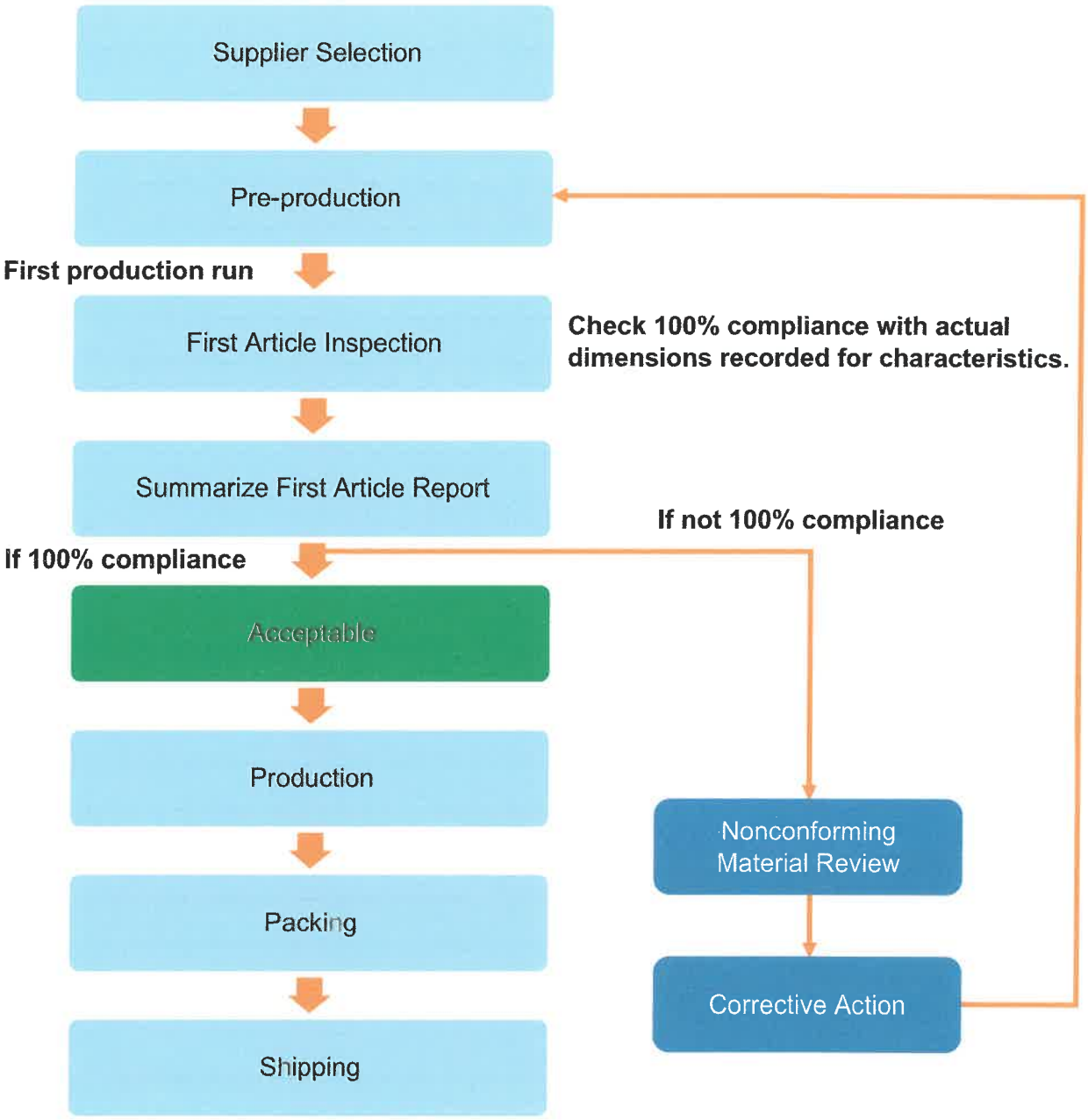


Figure 11: *Flowchart of First Article Inspection*

2.3. Brief Daily / Weekly Activity

Day	Date	Description of practical training experie4nce / Details of the project	Type of skills obtained
		WEEK 1	
1	**23.03.2021** Tuesday	- Registration as Trainee and Company Introduction by Miss Esther (HR Officer). - Briefing on the Quality Assurance Department, First Article Flow and Job Function by Mr Azrin bin Sa'ari (Supervisor). - Understand the Specification of Fabrication Tolerances Section 608 by Keysight Company. **Summary:** - Get to know the company's background in depth and understand the flow and job function of First Article Division under Quality Assurance Department in a systematic manner.	1. Able to know the scope of Quality Assurance (QA) and First Article (FA) job. 2. Able to learn and gain new basic knowledge in FA team.
2	**24.03.2021** Wednesday	- Learned about itemizing drawing which is numbering all the dimension in the drawing by manual / software (Inspection Manager Software). - Prepared FA Inspection Report based on the drawing that have been ballooning by manual / software. **Summary:** - Get to do new activities in FA team by numbering the dimension of the part number drawing given.	
3	**25.03.2021** Thursday	- Doing cosmetic inspection and gauge inspection on the part. - Understand the specification of cosmetics on coated parts and metal finishes. - Learned how to check the roughness of the parts.	

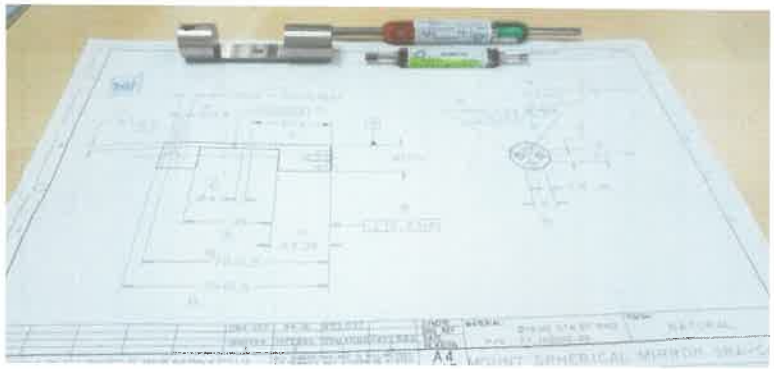
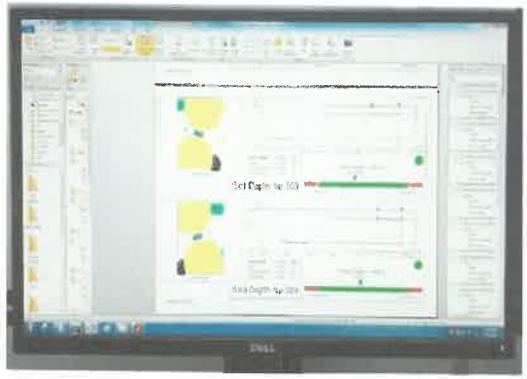
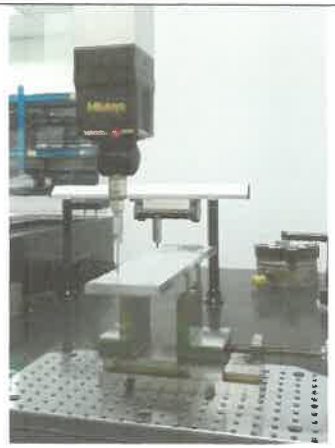
		Summary: - Gain knowledge about the size of the pin and thread gauge for the inspection based on the drawing of the PN. - Understand the specification that accepted or rejected for the cosmetics inspection of the PN.  ***Figure 12:*** *Gauge Inspection*	
4	**26.03.2021** Friday	- Doing FA Inspection Report of the PN 5023-1342. - Learned how to use Trimos and check the diameter of the part. **Summary:** - Get to know how Trimos function and how to handle it to check the dimension of the parts.	

		 ***Figure 13:*** *Trimos handling by Operator*	
5	**27.03.2021** Saturday	- Continue checking the diameter of the part using Trimos based on the drawing. - Collect data from CCI. **Summary:** - Get to explore the CCI software and know how the CCI checking the dimension of the small piece part.	

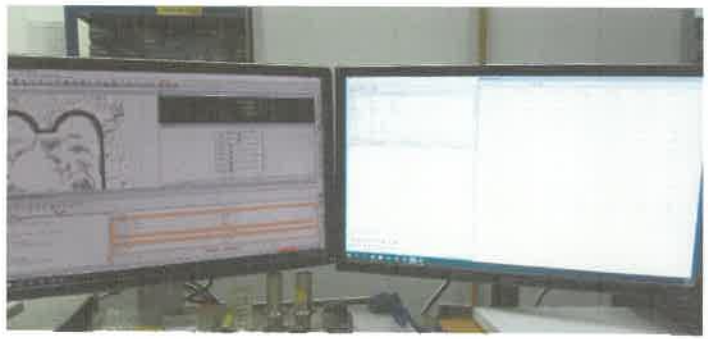
		 ***Figure 14:*** *CCI Machine*  ***Figure 15:*** *CCI Dimension Result*	
		WEEK 2	
6	**29.03.2021** Monday	- Understand the Cosmetics Specification by Brooks Company for checking the parts. - Packaging and cosmetics inspection of Brooks Company part number 200-5600-02 Revision A and Revision B. **Summary:** - Learned how to do cosmetics inspection for the part numbers to determine whether the part is accepted or rejected before the shipment. - Gain knowledge on how to determine the type of the cosmetics on the part.	1. Able to use Inspection Manager Software for itemize drawing by ballooning.

9	**01.04.2021** Thursday	- Did the itemized drawing and FA Inspection Report of Leica Project. - Transfer the NOEM tracker into KPI Monitoring 2021. **Summary:** - Ease the engineer work to checking the data of the costumer and keep the part production due in track.	
10	**02.04.2021** Friday	- Did the itemized drawing and FA Inspection Report of Leica Project for Module 1 and Module 2. **Summary:**	
11	**03.04.2021** Saturday	- Did the itemized drawing and FA Inspection Report of Leica Project. **Summary:** - Completed all the itemized drawing and FA Inspection Report for Leica Project.	
WEEK 3			
12	**05.04.2021** Monday	- Compiling data from Mitutoyo CMM to FA Inspection Report for PN 5023-1342. - Handling Mitutoyo CMM to determine the dimension of PN 127552 from Brooks Company. **Summary:** - Get to learned new knowledge which is handling equipment for the part dimension measurement. - Learned new equipment for the inspection the parts.	1. Get to know to handle and use CMM for determine the dimension of the part.

		  ***Figure 17:*** *CMM Dimensional Checking* ***Figure 18:*** *Measurement Reading*	
13	**06.04.2021** Tuesday	- Transfer info of PN in FA Report 2021 to Google Drive and copy the link of the file into Program Masterlist 2021. **Summary:** - Ease the engineer to find the program of the products for the dimensional measurements.	
14	**07.04.2021** Wednesday	- Transfer info of PN in FA Report 2021 to Google Drive and copy the link of the file into Program Masterlist 2021. **Summary:** - Ease the engineer to find the created program of the same products for the dimensional measurements in the mass production process of the product that have been produced by production team.	
15	**08.04.2021** Thursday	- Doing FA Inspection Report which is key-in CMM data into the report of PN 10733741. - Updated Program Masterlist 2021.	

		Summary: - Ease the engineer to find the program of the products for the dimensional measurements.	
16	**09.04.2021** Friday	- Did Myamax 4000-0447 Quality Procedure, Cosmetic Parts Inspection Spec. - Completed the SAXEN-L Project Module 1. **Summary:** - Prepared the specification procedure for the team reference during the inspection.	
		WEEK 4	
18	**12.04.2021** Monday	- Cosmetics and gauge inspection for PN 200-0748. - Compile CMM data in FA Inspection Report. **Summary:** - Compile the completed data from the equipment that have been used to do inspection in the FA Inspection Report for the submission to the costumer. - Get to do the inspection of the part number to determine the dimension is followed the specification from the costumer.	1. Learned easier way to key-in CMM data into FA Inspection Report for with VLOOKUP.
19	**13.04.2021** Tuesday	- Collect CCI data for PN 5023-2806 REDLINE after plat. - Completed the FA Inspection Report of PN 5023-2806 for Sample 1, 4 and 5 after plating. **Summary:** - Completed the FA Inspection Report after the dimensional measurements.	
20	**14.04.2021** Wednesday	- Compile the material certificate, RoHS, and plating report into the submission report folder for PN 01.103654.00, 01.103657.00, 01.103656.00, M9830-20012, M9830-20013, U9420-20002 and U9420-20001.	

		Summary: - Compile the completed data from the equipment that have been used to do inspection in the FA Inspection Report for the submission to the costumer. - Get to do the inspection of the part number to determine the dimension is followed the specification from the costumer.	
25	**20.04.2021** Tuesday	- Doing itemize drawing of Legacy Project PN 361517, 361527, 361724, 361745, 362004, 362518 and 362562. - FA Inspection Report preparation for Legacy Project PN 61517, 361527, 361724, 361745, 362004, 362518 and 362562. **Summary:** - Completed the itemizing drawing and FA Inspection Report given. - Preparing the FA Inspection Report before the production run.	
26	**21.04.2021** Wednesday	- Completed the FA Inspection Report of Legacy Project for PN 61517, 361527, 361724, 361745, 362004, 362518 and 362562. - Updated Program Masterlist 2021. **Summary:** - Compile the completed data from the equipment that have been used to do inspection in the FA Inspection Report for the submission to the costumer.	
27	**22.04.2021** Thursday	- Key-in CMM data and QV data in FA Inspection Report for PN 127522. - Prepared the equipment for packaging PN 127522 for the shipment. **Summary:** - Compile the completed data from the equipment that have been used to do inspection in the FA Inspection Report for the submission to the costumer.	

32	**28.04.2021** Wednesday	- Learned how to use and handling Mitutoyo QV Scope for part numbers dimension inspection. - Compiling detail of Goods Received Notes (GRN) in FA Incoming Inspection. **Summary:** - Learned part checking by using Mitutoyo QV Scope and able to complete the dimension measurement.	adapted in daily activities.
33	**29.04.2021** Thursday	- Learned how to create program using Mitutoyo QV Scope for dimension inspection of the parts. - Created program using Mitutoyo QV Scope for part numbers U9422-20021. **Summary:** - Learned part checking by using Mitutoyo QV Scope and able to complete the dimension measurement. - Get opportunity to create the program in QV Scope for the mass production dimensional measurements.  ***Figure 19:*** *QV Scope Program*	

		Summary: - Completed the itemizing drawing and FA Inspection Report given.	
50	**19.05.2021** Wednesday	- Checking cosmetics for the PN 362518 and 361724 after cleaning process by AST. - Packing PN 362518 and 361724 for a shipment. **Summary:** - Get opportunity to checking the cosmetics of the parts after the special process for the packaging.	
51	**20.05.2021** Thursday	- Dimension checking for PN 10743113, 10743511, 10710871, 10710871, 10715314 and 10746365 using QV Scope and Trimos. **Summary:** - Get to do the inspection of the part number to determine the dimension is followed the specification from the costumer.	
52	**21.05.2021** Friday	- Key-in CMM data in FA Inspection Report for PN 362518 and 361724. - Dimensions checking for PN 362516. **Summary:** - Compile the completed data from the equipment that have been used to do inspection in the FA Inspection Report for the submission to the costumer. - Get to do the inspection of the part number to determine the dimension is followed the specification from the costumer.	
53	**22.05.2021** Saturday	- Did itemize drawing and FA Inspection Repot for PN 361023, 361024, 361027, 361029 and 361030. - Doing FA Inspection Report for PN 362563. **Summary:**	

		- Completed the itemizing drawing and FA Inspection Report given for the submission to the costumer. - Preparing the FA Inspection Report before the production run to ease the team after the production done.	
WEEK 10			
54	**24.05.2021** Monday	**WORK FROM HOME**	1. More proficient to key-in data in FA Inspection Report using VLOOKUP technic.
55	**25.05.2021** Tuesday	- Key-in complete data of CMM and other equipment in FA Inspection Report for PN U9422-20019, U9422-20021, U9424-20010, U9424-20012, 362004, 361527, 361745 and 362562. **Summary:** - Compile the completed data from the equipment that have been used to do inspection in the FA Inspection Report for the submission to the costumer.	
56	**26.05.2021** Wednesday	- Did FA Inspection Report for PN 362563. - Key-in CMM data for PN 33325-20001 and 33326-20044. **Summary:** - Preparing the FA Inspection Report before the production run. - Compile the completed data from the equipment that have been used to do inspection in the FA Inspection Report for the submission to the costumer.	
57	**27.05.2021** Thursday	**WORK FROM HOME**	
58	**28.05.2021** Friday		

59	**29.05.2021** Saturday		
		WEEK 11	
60	**31.05.2021** Monday	- Did WI Packaging for PN 362004, 361745, 361527, 362562 and 366525. **Summary:** - Get to prepare the WI Packaging instruction to ease the person in charge to do the packaging for the shipment during mass production process.	1. More proficient to key-in data in FA Inspection Report using VLOOKUP technic. 2. Improving in itemizing drawing.
61	**01.06.2021** Tuesday	**WORK FROM HOME**	
62	**02.06.2021** Wednesday	- Did itemize drawing and FA Inspection Report for PN G1988-20000, LE-847-10718531 (Page 1) and LE-847-10718531 (Page 2). **Summary:** - Completed the itemizing drawing and FA Inspection Report given for the submission to the costumer.	
63	**03.06.2021** Thursday	- Key-in complete data in FA Inspection Report for PN 362516 and 366528. - Did reitemized drawing for PN U9422-20022 and U9422-20020. **Summary:** - Completed the reitemizing drawing and FA Inspection Report given. - Compile the completed data from the equipment that have been used to do inspection in the FA Inspection Report for the submission to the costumer.	
64	**04.06.2021** Friday	**WORK FROM HOME**	
65	**05.06.2021**		

	Saturday		
WEEK 12			
66	**07.06.2021** Monday	**YANG DI-PERTUAN AGONG'S BIRTHDAY**	1. More proficient to key-in data in FA Inspection Report using VLOOKUP technic. 2. Improving in reitemizing drawing.
67	**08.06.2021** Tuesday	**WORK FROM HOME**	
68	**09.06.2021** Wednesday	- Did reitemized drawing and FA Inspection Report for PN X3835-20082 and X3835-20087. **Summary:** - Completed the reitemizing drawing and FA Inspection Report given.	
69	**10.06.2021** Thursday	- Did reitemized drawing and FA Inspection Report for PN X3845-20016 and X3845-20017. **Summary:** - Completed the reitemizing drawing and FA Inspection Report given for the submission to the customer.	
70	**11.06.2021** Friday	- Did reitemized drawing and FA Inspection Report for PN X3835-20078 and X3845-20018. **Summary:** - Completed the reitemizing drawing and FA Inspection Report given.	
71	**12.06.2021** Saturday	- Key-in data of CMM and QV Scope in FA Inspection Report for PN N7730-22311, N7764-22301, N7764-22302, N7765-22301 and N7768-22301. **Summary:**	

		- Compile the completed data from the equipment that have been used to do inspection in the FA Inspection Report for the submission to the costumer.	
WEEK 13			
72	**14.05.2021** Monday	**WORK FROM HOME**	
73	**15.06.2021** Tuesday		
74	**16.06.2021** Wednesday		
75	**17.06.2021** Thursday	- Key-in CMM data in FA Inspection Report for PN 364487, W1312-20546 and W1312-20603. - Did FA Inspection Report for PN 364060 and 365310. **Summary:** - Compile the completed data from the equipment that have been used to do inspection toward the sample of the product in the FA Inspection Report for the submission to the costumer.	
76	**18.06.2021** Friday	**WORK FROM HOME**	
77	**19.06.2021** Saturday		
WEEK 14			
78	**21.05.2021** Monday	**WORK FROM HOME**	**NA**

79	**22.06.2021** Tuesday		
80	**23.06.2021** Wednesday		
81	**24.06.2021** Thursday		
82	**25.06.2021** Friday		
83	**26.06.2021** Saturday		
WEEK 15			
84	**28.06.2021** Monday	- Compare and did itemize drawing for PN 353531 vs 361027, 348716 vs 361023 and 348726 vs 361030. **Summary:** - Completed the itemizing drawing and FA Inspection Report given.	1. More proficient to key-in data in FA Inspection Report using VLOOKUP technic. 2. Improving in reitemizing drawing.
85	**29.06.2021** Tuesday	- Key-in CMM data in FA Inspection Report for PN U9422-20020 and U9422-20022. **Summary:** - Compile the completed data from the equipment that have been used to do inspection in the FA Inspection Report for the submission to the costumer.	
86	**30.06.2021** Wednesday	- Compare and did itemized drawing for PN 361024 vs 354467 and 361029 vs 348728. - Did reitemized drawing for PN U9422-20020 and U9422-20022. **Summary:** - Completed the itemizing and reitemizing drawing and FA Inspection Report given.	

		- Focusing on comparing the drawing that have been given by the costumer to proceed with the dimensional measurements.	
87	**01.07.2021** Thursday	WORK FROM HOME	
88	**02.07.2021** Friday		
89	**03.07.2021** Saturday		
WEEK 16			
90	**05.07.2021** Monday	WORK FROM HOME	1. Improving in itemizing drawing.
91	**06.07.2021** Tuesday	- Compare and reitemized drawing for PN U9422-20003, U9422-20004, U9422-20006, U9422-20013 and U9422- 20014. **Summary:** - Completed the reitemizing drawing and FA Inspection Report given by supervisor for the team reference.	
92	**07.07.2021** Wednesday	WORK FROM HOME	
93	**08.07.2021** Thursday		
94	**09.07.2021** Friday		
95	**10.07.2021**		

	Saturday		
WEEK 17			
96	**12.07.2021** Monday	**WORK FROM HOME**	**NA**
97	**13.07.2021** Tuesday		
98	**14.07.2021** Wednesday		
99	**15.07.2021** Thursday		

2.4. Description of Task Assigned

2.4.1. Introduction

During the 17 weeks industrial training session, I was assigned a variety of assignments by my supervisor that were both pertinent to my studies and provided exposure to other semi-related subjects. Aside from that, I have learnt to strengthen my soft skills as well as my management method while working with managers, engineers, operators, and members of the public.

2.4.2. Tasks and Assignments

2.4.2.1. Leica Project

Starting from Week 7 of industrial training, I was assigned to handling the machining part of the Leica Company new project under Department of Assembly. I was responsible to measure the dimensions of each part numbers that involve in the project.

Introduction to Leica Project

Figure 21: *Leica Surgical Microscope*

Leica operating microscopes are designed to meet the needs of microsurgery. The optics carrier is a small optical equipment that transmits a magnified and precisely focused picture from the surgical operative field or portion of the body that is being inspected for diagnosis. One of the most significant components of a functioning microscope is the microscope stand.

The red circle in *Figure 21* is the project that under Department of Assembly that they must handle. There are about 45-part numbers that have been machining and need to measure the dimension of the part. I was responsible to measure the dimensions of the part numbers whether it is followed the specification that required by the costumer (Leica). The accurate measurement is requiring following the specification given by the customer because to determine whether the parts is accepted or rejected to continue the next process in the project.

Component of Leica Surgical Microscope

There are about 45 components (part number, PN) that undergoes machining process for the project. For examples:

1. Screwbacke (PN: 10715314)

Figure 22: *Screwbacke*

2. Klemmbacke (PN: 10710871)

Figure 23: *Klemmbacke*

Measurement Equipment

Choosing the right equipment is the basis for producing accurate results for the dimension of the parts. There is several equipment that I use to measure the dimension of the part. For examples:

1. **Mitutoyo Quick Vision Apex (QV Scope)**

Figure 24: *Mitutoyo QV APEX QVTI-X40P1L-D*

The Mitutoyo Quick Vision Apex is a dimension measuring technology that does not require any interaction (non-contact dimension measurement system) with accuracy of 2 micron (µm). It takes photos enlarged by its optical lens with its camera and then utilizes image processing technologies to locate the edges of the workpiece. The equipment measures the size of microscopic characteristics found in electronics, semiconductor components, precision machinery, and medical equipment components using its optical technology to substantially enlarge pictures.

Since the equipment measures without touching the workpiece, there is no danger of the workpiece being damaged, being broken, misshapen, or stained. In addition to electrical and semiconductor measurements, the QV Scope is very ideally suited to measuring soft resin-moulded items and thin press-moulded workpieces that must be kept clean. The QV Scope can measure many points in a recorded picture at rapid speeds. The QV Scope image processing technology and high-speed stage control enable high-throughput measurements, making it the ideal choice for workpieces with numerous characteristics to be measured as well as manufacturing process management of mass-produced items. The equipment uses its

image auto focus function and non-contact displacement sensor to perform highly accurate height measurements.

2. TRIMOS

Figure 25: *TRIMOS V300+/302+/604+*

Trimos is a measuring instrument that is used to determine the height of things and to label work-in-progress items with the accuracy of 2µm. By utilizing the bottom of the scriber as the datum, Trimos may also be used to measure the height of an item. The datum may be permanently fixed, or the height gauge may have the ability to adjust the scale. This is accomplished by sliding the scale vertically along the body of the Trimos by turning a fine feed screw at the top of the gauge; the scale can then be matched to it with the scriber set to the same level as the base. This setting allows to utilize various scribers or probes, as well as compensate for any mistakes in a broken or resharpened probe.

3. Mitutoyo Digital Micrometre

Figure 26*: Mitutoyo Digital Micrometre*

A micrometre is a precision measuring device that is available in both metric and imperial variants and is used to acquire extremely precise measurements. Metric micrometres measure in 0.01 mm increments, while imperial micrometres measure in 0.001 inches. The measures they offer can be more precise than those provided by other measuring instruments like dial callipers or vernier callipers, but they are highly dependent on the user's attention to detail.

A micrometre measures with a calibrated screw or thread (located internally on the spindle). The distance between the measuring faces of the instrument (the spindle and the anvil) is changed by 0.5mm for metric versions and by 0.025 inches for imperial micrometres every time the spindle completes a full revolution. These are the lowest values that the main sleeve scale may represent. Micrometres are very accurate measurement instruments, although their range is restricted. Micrometres generally measure between 25mm to 1 inch in length. For example, imperial versions measure 0–1 inch, 1–2 inch, 2–3 inch, while metric one's measure 0–25mm, 25–50mm, 50–75mm, and so on.

4. Pin and Thread Gauge

Figure 27: *Pin Gauge*

Pin gauge is divided into 2 which is 'Go' and 'No-Go' gauge. A 'Go' or 'No–Go' gauge is an inspection instrument used to compare a workpiece to its permissible tolerances using a 'Go' or 'No–Go' test. A 'Go' or 'No–Go' gauge is an essential component of the quality process used in the manufacturing business to assure part interchangeability across processes or even between different manufacturers. It does not return a traditional size or measurement, but rather a condition that is either acceptable (the part is within tolerance and may be utilized) or unacceptable (the part must be rejected). The 'Go' pin gauge is the size of the low limit of the

hole while the 'No–Go' pin gauge corresponds to the high of the limit of the hole. Its term is derived from two tests: the workpiece must pass one test (Go) and fail the other (No–Go).

For example:

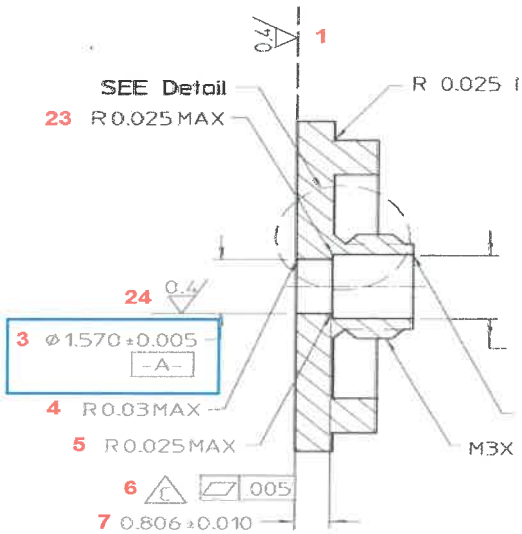


Figure 28: *Drawing with Tolerances*

In *Figure 28*, the dimension of the hole diameter is 1.570 millimetre (mm), and the tolerance of the dimension is ±0.005mm.

- **'Go' pin gauge:** 1.570mm – 0.005mm = 1.565mm
  The 'Go' end should fully enter the hole part because the diameter of the pin gauge is smaller than the nominal diameter of the hole.
- **'No–Go' pin gauge:** 1.570mm + 0.005mm = 1.575mm
  The 'No–Go' end should not enter the hole part because the diameter of the pin gauge is larger than the nominal diameter of the hole.

When using the pin gauge, appropriately apply 2 fingers hold force during the inspection to prevent the pin gauge or the workpiece from being damage or being broken.

Figure 29: *Thread Gauge*

A thread gauge also known as a screw gauge or pitch gauge, is used to measure the pitch or lead of a screw thread. Thread pitch gauges are used to determine the pitch of a thread on a screw or in a tapped hole as a reference tool. This tool is not intended to be a precision measuring device; rather, it allows the user to assess the profile of a particular thread and rapidly categorize it by form and pitch. This thread gauge also saves time by eliminating the requirement for the user to measure and determine the threaded item's pitch. The main purpose of the use of the thread gauge is to determine the number of turns for the thread hole.

- Thread per inch vs Thread Pitch

1/4"-20 x 2"			M2 x .4 x 5M		
Dia	TPI	Length	Dia	Pitch	Length

- Count of number of turns for internal diameter (ID) thread for 'Go'
  Number of turns = Thread Depth x Threads per Inch **(measurement in inch)**
  Number of turns = Thread Depth / Pitch **(measurement in mm)**

For example:

Number of Turns = Thread Depth X Threads per Inch				Number of Turns = Thread Depth / Pitch			
Thread Depth	=	1	Inch	Thread Depth	=	10	mm
Threads per Inch	=	20		Pitch	=	0.4	
Number of Turns	=	20.0		Number of Turns	=	25.0	
Minimum Number of Turns	=	19.5		Minimum Number of Turns	=	24.5	

Note: Minimum number of turns is acceptable limit after minus the chamfer.

3. CONCLUSION

Universiti Teknologi MARA (UiTM) has always strived to develop well-rounded students with strong academic accomplishments, improved communication skills, and leadership abilities that would help them succeed in their future endeavours. Students enrolled in this industrial training program have had the chance to obtain real-world job experience and gain a better understanding of the contemporary chemical industry.

This industrial training has been one of the kind experiences for me as I learned a lot through the tunnels of the inspection of the parts for the production. Being the trainee in the Quality Assurance Department has given me a golden opportunity to do the inspection on the parts, handling machine for the inspection and the understand the specification that required in the manufacturing process. Nonetheless, I am truly grateful to be surrounded by the great people in the company and the guidance that they had given to me despite their busy working schedule. I am also humbly honoured for the opportunity given to me to take part in the company client's project as my mini project. Even though, I was assigned in the department that are not really related to my diploma studies, but the worker is trying their best to related some of my knowledge in chemical engineering in my daily activities as the trainee.

In a nutshell, I am truly grateful that I have successfully completed my industrial training in the span of 17 weeks despite the pandemic COVID-19. I would like to express my deepest gratitude to Mr Mohd Azrin bin Sa'ari, Mr Hafis bin Sulaiman and Mr Mohd Shamir bin Abdul Razak of the First Article Team for giving me guidance and support along my industrial training period.

4. RECCOMMENDATIONS

In my opinion, industrial training should last at least 4 months and no more than 6 months. This will allow students to take advantage of additional time during their internship to explore and learn more while also boosting the likelihood of their internship application being accepted by the company. Other than that, students should be required to attend site visits in order to get more experience in the chemical engineering sector or to meet clients for business engagements in order to improve their communication skills and confidence. Last but not least, students should be encouraged to participate in company projects, according to companies. The student does not need to be directly involved in the project; instead, have them participate in group discussions, brainstorming sessions, or problem-solving sessions.