

TABLE 3B-1

EFFICIENCY

POSITIVE RESPONSE ON INPUT OF PROJECT

Input	Yes (%)
Japanese side	
equipment	73.7
training	47.4
experts despatched	52.6
Malaysian side	
budget/funding	36.8
staffing	26.3
facilities	52.6
Overall efficiency of the Project	100.0

(Source: Counterparts)

TABLE 3B-2

EFFICIENCY

ACHIEVEMENT OF PROJECT IN 1986 (MEAN SCORE)

Parameter	Measurement Standards	C/V Services
Mass	3.83	4.20
Length	3.57	3.71
Volume	3.44	3.78
Electricity	4.00	4.14
Temperature	3.75	3.75

(Source: Counterparts)

TABLE 3B-3

EFFECTIVENESS

PROJECT'S CONTRIBUTION TO MALAYSIAN METROLOGY REQUIREMENTS

	Overall	Mass	Length	Volume	Elect	Temperature
attainment of Malaysian metrology requirements in 1986	3.82	4.14	4.00	3.78	4.25	3.89
attainment of Malaysia's metrication in 1986	4.18	4.17	4.29	4.00	4.13	4.22
improvement in accuracy since 1986	100.0	100.0	100.0	100.0	100.0	89.0

(Source: Counterparts)

TABLE 3B-4

EFFECTIVENESS

PROJECT'S CONTRIBUTION TO CURRENT MALAYSIA'S METROLOGY REQUIREMENTS AND MEASUREMENT STANDARDS

Parameter	Current metrology requirement (mean scope)		Current measurement Standards (Yes %)		
	Counterpart	Professional	AV	Counterpart	Professional
Overall	3.73	3.33	3.64	30.0 (N=10)	33.3 (N=3)
Mass	4.17	2.67	3.67	(N=5)	66.7 (N=3)
Length	3.86	3.67	3.80	(N=7)	100.0 (N=3)
Volume	3.60	3.25	3.50		75.0 (N=4)
Electricity	3.75	4.00	3.80		50.0 (N=2)
Temperature	3.78	3.00	3.58	25.0 (N=3)	66.7 (N=3)

(Source: Counterparts & Professionals)

TABLE 3B-5

EFFECTIVENESS

POSITIVE RESPONSES ON UTILISATION OF CALIBRATION SERVICES

Parameter.	Ever used	Currently used	Stopped	SIRIM's standards meet Beneficiaries needs (%)
Mass	28	28	4	40
Length	36	36	0	60
Volume	16	16	4	28
Electricity	28	28	0	40
Temperature	44	44	0	68
Others			0	28

(Source: Beneficiaries)

TABLE 3B-6

EFFECTIVENESS

USEFULNESS OF SIRIM'S CALIBRATION AND TRAINING/CONSULTING SERVICES

Parameter	Calibration	Training/Consulting
Mass	4.10	3.00
Length	3.90	2.00
Volume	3.60	2.33
Electricity	3.20	2.00
Temperature	3.63	2.00

(Source: Beneficiaries)

TABLE 3B-7

EFFECTIVENESS

CONTRIBUTION OF SIRIM'S MEASUREMENT CENTRE TO MALAYSIA'S METROLOGY REQUIREMENTS

	Overall	Mass	Length	Volume	Elect	Temperature
attainment of M'sia's metrology requirement in 1986	3.00	2.67	3.33	3.40	4.00	3.00
metrology skill upgraded in last 5 years in SIRIM	2.33	2.33	2.33	2.40	3.00	2.33
metrology skill upgraded in last 5 years in M'sia	2.00	2.00	2.33	2.20	2.50	2.00
Performance MC meeting the current needs of M'sia metrology system	2.00	2.00	2.33	2.60	3.50	2.33
SIRIM'S services in meeting the current need of industries in M'sia	1.67	1.67	2.33	2.40	3.50	1.67

(Source: Professionals)

TABLE 3B-8

EFFECTIVENESS

PROFESSIONAL'S RATE SIRIM'S ACTIVITIES

	Mean score
establishment & maintenance of standards/traceability	3.00
monitoring local metrology labs	2.00
dissemination of new measurement techniques	2.00
measurement/calibration services	2.80
consultancy services	2.40
training on metrology	2.40

(Source: Professionals)

TABLE 3B-9

IMPACT

IMPORTANCE OF THE IMPACT OF THE MEASUREMENT CENTRE
ON UPGRADING METROLOGY SKILLS IN MALAYSIA

Parameter	Counterpart	Professional	Average
Overall	3.75	2.66	3.53
Mass	3.33	2.33	3.00
Length	3.63	3.00	3.45
Volume	3.78	3.40	3.64
Electricity	4.00	3.00	3.80
Temperature	3.67	2.33	3.33
Others		2.00	2.00

(Source: Counterparts & Professionals)

TABLE 3B-10

IMPACT

POSITIVE RESPONSES TO IMPACT OF THE PROJECT

	N=18 Counterparts	N=4 Professio
contribution to industrialisation process	100.00	100.00
importance of contribution to industrialisation process (mean score)	4.11	3.40
increase of intercomparison of standard	94.40	66.70

TABLE 3B-11

IMPACT
IMPACT OF METROLOGY PROJECT

	Yes (%)	Meanscore
Contribution to the industrialisation process		3.32
Importance of MC activities on up grading Malaysia's metrology skill		3.15
Impact of MC activities on upgrading Beneficiary 's metrology skill	64.0	3.31
Negative impacts on the improvement of metrology of Beneficiaries	8.0	5.00
Increase in cost of production	32.0	-
Increase in product's quality	56.0	-
Product became more competitive		
- domestic	56.0	-
- foreign	40.0	-

(Source: Beneficiaries)

TABLE 3B-12

IMPACT

PROPORTION \$ SPENDING ON CALIBRATION, 1991

Laboratory	Amount spent			
SIRIM	\$ 6739.40			
Other labs	\$ 11993.20			
% of \$ Spent on SIRIM	$\frac{6739.40}{18732.60}$	x 100%	=	36%

(Source: Beneficiaries)

TABLE 3B-13

RELEVANCE

PERFORMANCE & SERVICE PROFICIENCY OF VARIOUS METROLOGY LABS

	Beneficiary	Professional
SIRIM	3.72	2.60
SISIR	4.20	4.50
SEEL	4.00	4.00
Other foreign labs	-	3.50
Local labs	-	4.00

(Source: Beneficiaries)

TABLE 3B-14

RELEVANCE
RELEVANCE OF THE PROJECT

	Counterpart (Yes) %	Professional (Yes) %
Goal & purpose still valid	94.7	60.0
SIRIM'S seVICES & standard meet the current metrology needs	21.1	40.0
Changes needed	72.2	66.7
adaptation made (Yes)	88.2	0.0
(mean score)	3.4	-

(Source: Counterparts & Professionals)

Table 3B-15

RELEVANCE
BENEFICIARIES USING LABS OTHER THAN SIRIM (%)

	Use other labs in Malaysia	Use other labs outside Malaysia
Mass	24	16
Length	20	8
Volume	20	8
Electricity	12	16
Temperature	20	12
Others	8	8

(Source: Beneficiaries)

TABLE 3B-16

RELEVANCE

AVERAGE ADDITIONAL COST INCURRED IN CALIBRATION DONE OVERSEAS

Country	%
Singapore	40
US	100
UK	200
Australia	
Japan	400

(Source: Beneficiaries)

TABLE 3B-17

SUSTAINABILITY

SUSTAINABILITY OF THE PROJECT

	Overall	Mass	Length	Volume	Elect	Temperature
SIRIM'S standard meet most of the needs of industry today		3.50	3.50	3.00	3.43	3.00
SIRIM'S services today	3.67	3.60	3.57	3.13	3.57	3.50
Resources - equipment	2.83	3.20	2.86	2.78	3.00	2.88
- HR	2.36	2.40	2.57	2.22	2.43	2.63
- facilities	2.40	2.40	2.29	2.56	2.86	2.50
maintenance of equipment	3.11	3.40	3.14	3.00	4.00	3.50

(Source: Counterparts)

Appendix 3.1

METROLOGY PROJECT QUESTIONNAIRE RESULTS TABLE (COUNTERPART 1/2)
(A:No of responses, B:Rating)

		MASS		LENGTH		VOLUME	
		A	B	A	B	A	B
0_C	Pj. succeed in 1986	3	100.0%	3	100.0%	7	100.0%
	Input from Japan						
1_1A	Equipment	3	100.0%	3	66.7%	7	57.1%
1_1A1	Not enough	0		1		3	
1_1A2	Obsolete	0		0		0	
1_1A3	Low accuracy	0		0		0	
1_1A4	Others	0		0		0	
1_1B	Training in Japan	3	66.7%	3	66.7%	7	42.9%
1_1B1	Not enough	0		1		3	
1_1B2	Not appropriate	0		0		0	
1_1B3	Others	1		0		1	
1_1C	Technology transfer	3	33.3%	3	33.3%	7	42.9%
1_1C1	N-enough J.experts	0		0		0	
1_1C2	Period too short	1		1		3	
1_1C3	Others	1		1		1	
	Malaysian input						
1_2A	Funding	2	100.0%	3	66.7%	5	60.0%
1_2B	Staffing	3	0.0%	3	33.3%	6	0.0%
1_2C	Facilities	3	100.0%	3	66.7%	7	42.9%
	Achievement estab. of measure. standard in SIRIM in 1986						
1_4A	Mass	3	4.3	1	4.0	2	4.5
1_4B	Length	2	4.5	3	3.0	2	4.5
1_4C	Volume	2	3.5	1	3.0	7	3.3
1_4D	Electricity	2	4.0	1	4.0	2	4.0
1_4E	Temperature	2	4.0	1	4.0	2	4.0
	Achievement estb. Cal./Verif. service in SIRIM in 1986						
1_5A	Mass	3	4.3	1	4.0	2	4.5
1_5B	Length	2	4.5	3	3.3	2	4.5
1_5C	Volume	2	4.0	1	4.0	7	3.7
1_5D	Electricity	2	4.5	1	4.0	2	4.5
1_5E	Temperature	2	3.5	1	4.0	2	3.5
1_6A	Achi.in Tech.consul.	2	3.5	2	3.5	5	3.4
1_6B	Achi.in Train.serv.	2	2.5	2	3.0	6	2.3
1_7	Output justify Input	3	100.0%	3	100.0%	7	100.0%
	Contribution on attain. Metrology requirement in 1986						
2_1A	Overall	2	4.0	2	4.5	5	3.8
2_1B	Mass	3	4.0	2	4.5	3	3.7
2_1C	Length	2	3.5	3	4.3	2	3.5
2_1D	Volume	2	3.5	2	4.5	6	3.3
2_1E	Electricity	2	4.0	2	4.5	2	4.0
2_1F	Temperature	2	3.5	2	4.5	2	3.5

Appendix 3.1

Contribution on Metrication in 1986							
2_2A	Overall	2	4.5	2	4.5	4	4.3
2_2B	Mass	3	4.0	2	4.5	2	4.5
2_2C	Length	2	4.5	3	4.3	2	4.5
2_2D	Volume	2	4.0	2	4.5	7	3.9
2_2E	Electricity	2	3.5	2	4.5	2	3.5
2_2F	Temperature	2	4.0	2	4.5	2	4.0
Extension of Metrology requirement achieved today							
2_3A	Overall	2	3.5	2	4.0	4	3.5
2_3B	Mass	3	4.3	2	4.0	2	4.0
2_3C	Length	2	3.5	3	4.0	2	3.5
2_3D	Volume	2	3.5	2	4.0	7	3.4
2_3E	Electricity	2	3.5	2	4.0	2	3.5
2_3F	Temperature	2	3.0	2	4.0	2	3.0
Measurement standard meet to metrology needs in 1992							
2_4A	Overall	2	0.0%	1	0.0%	5	40.0%
2_4B	Mass	3	0.0%	1	0.0%	2	0.0%
2_4C	Length	2	50.0%	3	33.3%	2	50.0%
4_2D	Volume	2	50.0%	1	0.0%	7	57.1%
4_2E	Electricity	2	0.0%	1	0.0%	2	0.0%
2_4F	Temperature	2	0.0%	1	0.0%	2	0.0%
Improvement accuracy since 1986							
2_5A	Overall	2	100.0%	3	100.0%	5	100.0%
2_5B	Mass	3	100.0%	2	100.0%	2	100.0%
2_5C	Length	2	100.0%	3	100.0%	2	100.0%
2_5D	Volume	2	100.0%	2	100.0%	7	100.0%
2_5E	Electricity	2	100.0%	2	100.0%	2	100.0%
2_5F	Temperature	2	100.0%	2	100.0%	2	100.0%
Calib./Verif. service meet needs today							
2_6A	Metrology	3	66.7%	3	66.7%	7	71.4%
2_6B	Industrialization	3	66.7%	1	0.0%	6	66.7%
3_1A	Contri. since 1986	3	100.0%	3	100.0%	7	100.0%
3_1B	Importance of it	3	4.0	3	3.3	6	3.7
3_2	Impact on PV-labs	2	100.0%	3	66.7%	7	71.4%
3_3A	Overall	2	3.5	3	3.7	5	3.4
3_3B	Mass	3	3.0	2	4.0	2	3.0
3_3C	Length	2	3.5	3	3.7	3	3.7
3_3D	Volume	2	4.0	2	4.0	6	3.8
3_3E	Electricity	2	3.0	2	4.0	2	3.0
3_3F	Temperature	2	3.0	2	4.0	2	3.0
3_4	Inter comparison	3	100.0%	3	100.0%	6	83.3%
3_5	Unexpected outcome	3	0.0%	3	0.0%	7	14.3%
3_6	N-impact on Metro.	2	0.0%	2	0.0%	6	0.0%
3_6A	Importance of it	0		0		0	
3_7	N-impact on Metric.	3	0.0%	3	0.0%	7	0.0%

Appendix 3.1

3_7A	Importance of it	0		0		0	
4_1	Purpose & goal valid	3	100.0%	3	100.0%	7	100.0%
4_2	Output still suffic.	3	0.0%	3	33.3%	7	28.6%
4_3	Major changes	3	100.0%	3	33.3%	6	50.0%
4_4	Adapt.to changes	3	100.0%	2	100.0%	6	66.7%
4_4B	Adaptation rate	3	3.3	2	3.0	4	3.5
5_1	Meet current needs	3	4.0	3	2.7	7	3.1
5_2	Metric. diffusion	3	4.3	3	4.0	7	4.1
5_3A	Mass	3	4.0	1	3.0	2	3.5
5_3B	Length	2	3.5	3	3.3	3	3.7
5_3C	Volume	2	3.0	1	3.0	6	3.0
5_3D	Electricity	2	3.0	1	3.0	2	3.0
5_3E	Temperature	2	3.0	1	3.0	2	3.0
5_3F	Other parameter	1	4.0	0		1	4.0
Service meet the needs of industry							
5_4A	Overall	1	4.0	1	4.0	3	4.0
5_4B	Mass	3	4.0	1	4.0	2	4.5
5_4C	Length	2	4.0	3	3.7	2	4.0
5_4D	Volume	2	3.5	1	3.0	6	3.2
5_4E	Electricity	2	4.0	1	4.0	2	4.0
5_4F	Temperature	2	3.5	1	4.0	2	3.5
5_4G	Other parameter	2	3.5	2	3.5	3	3.3
Resources							
Equipment							
5_5A1	Overall	2	3.0	3	3.0	5	3.0
5_5A2	Mass	3	3.3	1	3.0	2	3.5
5_5A3	Length	2	3.0	3	3.0	2	3.0
5_5A4	Volume	2	3.0	1	3.0	7	2.7
5_5A5	Electricity	2	4.0	1	4.0	2	4.0
5_5A6	Temperature	2	3.5	1	4.0	2	3.5
5_5A7	Other parameter	2	3.0	2	3.5	2	3.0
Human resource							
5_5B1	Overall	2	2.5	3	2.3	5	2.2
5_5B2	Mass	3	2.0	1	2.0	2	2.5
5_5B3	Length	2	2.5	3	2.3	2	2.5
5_5B4	Volume	2	2.0	1	2.0	7	2.0
5_5B5	Electricity	2	2.0	1	2.0	2	2.0
5_5B6	Temperature	2	2.0	1	2.0	2	2.0
5_5B7	Other parameter	2	1.5	2	2.0	2	1.5
Funding							
5_5C1	Operational	2	3.5	3	3.3	4	3.5
5_5C2	Development	2	3.0	3	3.3	3	2.7
5_5C3	R&D	2	4.0	2	3.5	3	3.7
Facilities							
5_5D1	Overall	2	3.5	2	2.5	5	3.0
5_5D2	Mass	3	2.3	1	3.0	2	3.0
5_5D3	Length	2	2.5	3	2.3	2	2.5

Appendix 3.1

5_5D4	Volume	2	2.5	1	3.0	7	2.6
5_5D5	Electricity	2	3.0	1	3.0	2	3.0
5_5D6	Temperature	2	2.5	1	3.0	2	2.5
5_5D7	Other parameter	1	4.0	1	2.0	1	4.0
5_6	Service procedure	3	100.0%	3	100.0%	6	100.0%
5_7A	Equip. maint. system	3	100.0%	3	100.0%	6	83.3%
	Equipment condition						
5_8A	Overall	2	4.0	2	3.5	4	3.3
5_8B	Mass	3	3.7	1	4.0	2	4.5
5_8C	Length	2	4.0	3	2.7	2	4.0
5_8D	Volume	2	4.0	1	4.0	7	3.0
5_8E	Electricity	2	4.5	1	4.0	2	4.5
5_8F	Temperature	2	4.0	1	4.0	2	4.0
5_8G	Other parameter	1	3.0	1	3.0	1	3.0

Appendix 3.1

METROLOGY PROJECT QUESTIONNAIRE RESULT TABLE (COUNTERPARTS 2/2)
(A:No of responses, B:Rating)

		ELECTRICITY		TEMPERATURE	
		A	B	A	B
0_C	Pj. succeed in 1986	5	100.0%	4	100.0%
	Input from Japan				
1_1A	Equipment	5	100.0%	5	80.0%
1_1A1	Not enough	0		1	
1_1A2	Obsolete	0		0	
1_1A3	Low accuracy	0		1	
1_1A4	Others	0		0	
1_1B	Training in Japan	5	80.0%	4	25.0%
1_1B1	Not enough	1		3	
1_1B2	Not appropriate	0		0	
1_1B3	Others	0		1	
1_1C	Technology transfer	5	100.0%	5	40.0%
1_1C1	N-enough J.experts	0		0	
1_1C2	Period too short	0		3	
1_1C3	Others	0		0	
	Malaysian input				
1_2A	Funding	3	33.3%	2	100.0%
1_2B	Staffing	5	60.0%	5	0.0%
1_2C	Facilities	5	60.0%	4	25.0%
	Achievement estab. of measurement STD in SIRIM in 1986				
1_4A	Mass	1	5.0	1	2.0
1_4B	Length	1	4.0	1	4.0
1_4C	Volume	1	5.0	1	4.0
1_4D	Electricity	4	4.5	0	
1_4E	Temperature	2	4.5	4	3.5
	Achievement estb. Cal/Verf.service in SIRIM in 1986				
1_5A	Mass	1	5.0	0	
1_5B	Length	1	4.0	1	4.0
1_5C	Volume	1	5.0	1	4.0
1_5D	Electricity	4	4.5	0	
1_5E	Temperature	2	4.5	4	3.8
1_6A	Achi.in Tech.consul.	3	4.7	3	3.3
1_6B	Achi.in Train.serv.	4	3.5	3	2.3
1_7	Output justify Input	5	100.0%	5	100.0%
	Contribution on attain metrology requirements in 1986				
2_1A	Overall	2	3.5	4	3.8
2_1B	Mass	1	5.0	1	3.0
2_1C	Length	1	4.0	1	4.0
2_1D	Volume	1	5.0	0	
2_1E	Electricity	4	4.5	0	
2_1F	Temperature	2	4.5	4	3.5

Contribution on Metrication in 1986

Appendix 3.1

3_7A	Importance of it	0		0	
4_1	Purpose & goal valid	5	100.0%	5	80.0%
4_2	Output still suffic.	5	20.0%	5	0.0%
4_3	Major changes	5	100.0%	5	100.0%
4_4	Adapt. to changes	5	100.0%	5	80.0%
4_4B	Adaptation rate	5	4.0	4	3.5
5_1	Meet current needs	5	3.8	5	3.4
5_2	Metric. diffusion	5	4.6	5	4.2

Metrology standards meet to industry needs today

5_3A	Mass	1	4.0	1	3.0
5_3B	Length	1	4.0	1	4.0
5_3C	Volume	1	4.0	1	3.0
5_3D	Electricity	4	3.8	0	
5_3E	Temperature	2	3.5	4	3.0
5_3F	Other parameter	2	1.5	0	

Service meet the needs of industry

5_4A	Overall	3	3.7	2	3.5
5_4B	Mass	1	4.0	0	
5_4C	Length	1	4.0	1	4.0
5_4D	Volume	1	4.0	1	1.0
5_4E	Electricity	4	3.8	0	
5_4F	Temperature	2	3.5	4	3.8
5_4G	Other parameter	1	3.0	0	

Resources

Equipment					
5_5A1	Overall	2	3.0	4	2.5
5_5A2	Mass	1	4.0	0	
5_5A3	Length	1	4.0	1	2.0
5_5A4	Volume	1	4.0	1	3.0
5_5A5	Electricity	4	2.8	0	
5_5A6	Temperature	2	3.0	4	2.5
5_5A7	Other parameter	1	3.0	0	
Human resource					
5_5B1	Overall	2	2.5	2	1.5
5_5B2	Mass	1	3.0	0	
5_5B3	Length	1	3.0	1	2.0
5_5B4	Volume	1	3.0	1	1.0
5_5B5	Electricity	4	2.5	0	
5_5B6	Temperature	2	2.5	4	2.8
5_5B7	Other parameter	1	3.0	0	
Funding					
5_5C1	Operational	5	2.8	5	3.0
5_5C2	Development	5	3.0	5	2.8
5_5C3	R&D	4	2.8	3	2.7
Facilities					
5_5D1	Overall	2	2.0	3	1.3

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5_5D2	Mass	1	3.0	0	
5_5D3	Length	1	3.0	1	1.0
5_5D4	Volume	1	3.0	1	2.0
5_5D5	Electricity	4	3.0	0	
5_5D6	Temperature	2	2.0	4	2.5
5_5D7	Other parameter	0		0	
5_6	Service procedure	5	100.0%	5	100.0%
5_7A	Equip. maint. system		100.0%	5	100.0%
	Equipment condition				
5_8A	Overall		2.5	3	3.0
5_8B	Mass		3.0	0	
5_8C	Length		3.0	1	4.0
5_8D	Volume		3.0	1	3.0
5_8E	Electricity		4.0	0	
5_8F	Temperature		3.0	4	3.5
5_8G	Other parameter			0	

Appendix 3.1

METROLOGY PROJECT QUESTIONNAIRE RESULT TABLE (BENEFICIARIES 1/2)
(A: No of responses, B: Rating)

		MASS		LENGTH		VOLUME	
		A	B	A	B	A	B
1_1	Utilize Metrology Unit	7	100.0%	11	100.0%	5	100.0%
Usefulness to company/organization							
Calibration/Measurement services							
1_2A1	Mass	7	3.7	7	4.0	4	3.3
1_2A2	Length	5	3.8	8	3.9	2	3.0
1_2A3	Volume	4	3.3	3	3.7	4	3.3
1_2A4	Electricity	2	3.0	5	2.8	1	1.0
1_2A5	Temperature	6	3.7	9	3.4	3	3.0
1_2A6	Other major parameter	2	4.5	3	4.0	1	4.0
Training/Consulting services							
1_2B1	Mass	3	3.0	2	2.5	3	3.0
1_2B2	Length	2	2.0	2	2.0	2	2.0
1_2B3	Volume	3	2.3	2	2.0	3	2.3
1_2B4	Electricity	1	0.0	1	0.0	1	0.0
1_2B5	Temperature	2	2.0	2	2.0	2	2.0
1_2B6	Other major parameter	1	4.0	0		1	4.0
1_4	Tech. personnel in Company	7	100.0%	11	100.0%	5	80.0%
Area need improvement							
1_6A	Fee rate	1	14.3%	1	9.1%	1	20.0%
1_6B	Turnaround time	6	85.7%	9	81.8%	3	60.0%
1_6C	Accurate/timely info.	3	42.9%	4	36.4%	2	40.0%
1_6D	User info.	3	42.9%	4	36.4%	3	60.0%
1_6E	Service proficiency	3	42.9%	4	36.4%	2	40.0%
1_6F	Others	1	14.3%	2	18.2%	1	20.0%
2_1	Contri. to Indust. process	6	3.5	10	3.5	5	3.6
2_2	Importance impact	6	3.2	9	3.1	4	2.8
2_3	Impact on upgrading	6	83.3%	10	80.0%	5	60.0%
2_3A	Impact rate	5	3.6	8	3.9	3	3.3
2_4	Negative impact	6	0.0%	10	20.0%	5	0.0%
2_4A	Importance			1	5.0		
2_5	Cost increase	6	33.3%	11	63.6%	4	25.0%
2_6	Quality up	6	100.0%	10	70.0%	4	75.0%
More competitive							
2_7A	Domestic companies	7	85.7%	9	77.8%	5	60.0%
2_7B	Foreign countries	5	60.0%	8	75.0%	4	25.0%
Meet company needs							
2_8A	Mass	7	100.0%	7	85.7%	4	100.0%
2_8B	Length	5	100.0%	11	100.0%	2	100.0%
2_8C	Volume	5	80.0%	4	75.0%	4	100.0%
2_8D	Electricity	2	100.0%	6	83.3%	1	100.0%

Appendix 3.1

2_8E	Temperature	6	100.0%	10	90.0%	3	100.0%
2_8F	Other major parameter	3	66.7%	6	83.3%	1	100.0%
3_1	Different from 5 years ago	6	16.7%	8	12.5%	5	20.0%
3_2	Other labs in M'sia	7	42.9%	11	54.5%	5	60.0%
3_2A	Mass	2	28.6%	5	45.5%	2	40.0%
3_2B	Length	2	28.6%	4	36.4%	2	40.0%
3_2C	Volume	2	28.6%	3	27.3%	2	40.0%
3_2D	Electricity	1	14.3%	2	18.2%	1	20.0%
3_2E	Temperature	3	42.9%	3	27.3%	3	60.0%
3_2F	Other major parameter			1	9.1%		
3_3	Other labs overseas	7	28.6%	11	36.4%	5	20.0%
3_3A	Mass	1	14.3%	2	18.2%	1	20.0%
3_3B	Length	1	14.3%	2	18.2%	1	20.0%
3_3C	Volume	1	14.3%	2	18.2%	1	20.0%
3_3D	Electricity	1	14.3%	2	18.2%	1	20.0%
3_3E	Temperature	1	14.3%	3	27.3%	1	20.0%
3_3F	Other major parameter	1	14.3%	1	9.1%		
	Proficiency of labs						
3_5A	SIRIM	4	4.3	7	3.9	3	4.3
3_5B	SISIR	1	4.0	1	5.0	1	4.0
3_5C	SEEL						
3_7	Any other parameter	6	66.7%	8	50.0%	4	50.0%

Appendix 3.1

METROLOGY PROJECT QUESTIONNAIRE RESULT TABLE (BENEFICIARIES 2/2)
(A:No of responses, B:Rating)

		ELECTRICITY		TEMPERATURE	
		A	B	A	B
1_1	Utilize Metrology Unit	7	100.0%	14	100.0%
Usefulness to company/organization					
Calibration/Measurement services					
1_2A1	Mass	3	3.7	8	4.0
1_2A2	Length	4	3.3	9	3.8
1_2A3	Volume	1	1.0	4	3.8
1_2A4	Electricity	7	3.0	7	2.9
1_2A5	Temperature	6	2.8	13	3.5
1_2A6	Other major parameter	2	3.5	3	4.0
Training/Consulting service					
1_2B1	Mass	1	1.0	2	2.5
1_2B2	Length	1	0.0	3	2.0
1_2B3	Volume	1	0.0	2	2.0
1_2B4	Electricity	2	1.5	2	1.5
1_2B5	Temperature	1	0.0	2	2.0
1_2B6	Other major parameter				
1_4	Tech. personnel in Company	7	100.0%	14	92.9%
Area need improvement					
1_6A	Fee rate	2	28.6%	1	7.1%
1_6B	Turnaround time	7	100.0%	13	92.9%
1_6C	Accurate/timely info.	4	57.1%	7	50.0%
1_6D	User info.	4	57.1%	7	50.0%
1_6E	Service proficiency	4	57.1%	6	42.9%
1_6F	Others	1	14.3%	2	14.3%
2_1	Contri. to Indust.process	7	2.9	13	3.4
2_2	Importance impact	7	3.1	13	3.1
2_3	Impact on upgrading	7	57.1%	13	76.9%
2_3A	Impact rate	4	3.8	10	3.6
2_4	Negative impact	7	0.0%	13	15.4%
2_4A	Importance			1	5.0
2_5	Cost increase	7	42.9%	14	57.1%
2_6	Quality up	6	66.7%	13	76.9%
More competitive					
2_7A	Domestic companies	6	33.3%	12	66.7%
2_7B	Foreign countries	6	33.3%	9	66.7%
Meet company needs					
2_8A	Mass	3	100.0%	8	87.5%
2_8B	Length	5	100.0%	11	100.0%
2_8C	Volume	1	100.0%	5	80.0%
2_8D	Electricity	7	100.0%	8	87.5%

Appendix 3.1

2_8E	Temperature	6	83.3%	13	92.3%
2_8F	Other major parameter	3	100.0%	5	80.0%
3_1	Different from 5 years ago	6	16.7%	12	25.0%
3_2	Other labs in M'sia	7	57.1%	14	42.9%
3_2A	Mass	2	28.6%	4	28.6%
3_2B	Length	2	28.6%	4	28.6%
3_2C	Volume	1	14.3%	3	21.4%
3_2D	Electricity	3	42.9%	2	14.3%
3_2E	Temperature	1	14.3%	4	28.6%
3_2F	Other major parameter			1	7.1%
3_3	Other labs overseas	7	57.1%	13	30.8%
3_3A	Mass	1	14.3%	3	21.4%
3_3B	Length	1	14.3%	2	14.3%
3_3C	Volume	1	14.3%	2	14.3%
3_3D	Electricity	2	28.6%	2	14.3%
3_3E	Temperature	2	28.6%	3	21.4%
3_3F	Other major parameter	1	14.3%	1	7.1%
	Proficiency of labs				
3_5A	SIRIM	6	3.5	11	3.7
3_5B	SISIR	3	4.3	3	4.7
3_5C	SEEL				
3_7	Any other parameter	6	33.3%	10	40.0%

Appendix 3.1

METROLOGY PROJECT QUESTIONNAIRE RESULT TABLE (JAPANESE EXPERT)
(A:No of responses, B:Rating)

		VOLUME		MASS		ELEC- TRICITY	
		A	B	A	B	A	B
1-0	Contribute. Metrology & Metrication in Malaysia	2	100.0%	1	100.0%	1	100.0%
	Japanese input						
1-1AA	Equipment	1	100.0%	1	100.0%	1	100.0%
1-1AA1	Not enough	0		0		0	
1-1AA2	Obsolete	0		0		0	
1-1AA3	Low accuracy	0		0		0	
1-1AA4	Others	1		0		0	
1-1AB	Training in Japan	1	100.0%	1	100.0%	1	100.0%
1-1AB1	Not enough	0		0		0	
1-1AB2	Not appropriate	0		0		0	
1-1AB3	Others	1		0		0	
1-1AC	Tech. transfer	2	50.0%	1	100.0%	1	100.0%
1-1AC1	Lack of J. Expert	1		0		0	
1-1AC2	Not appropriate	1		0		0	
1-1AC3	Others	0		0		0	
	Malaysia input						
1-1BA	Funding	2	0.0%	1	0.0%	1	100.0%
1-1BB	Facility	2	0.0%	1	0.0%	1	0.0%
1-1BC	Stuffing	2	50.0%	1	100.0%	1	100.0%
	Pj. achievement during Pj. period						
	Establishment of measurement standards						
1-2AA	Overall	1	3.0	0		0	
1-2AB	Mass	2	4.0	1	5.0	0	
1-2AC	Length	1	4.0	0		0	
1-2AD	Volume	2	3.5	1	4.0	0	
1-2AE	Electricity	1	4.0	0		1	5.0
1-2AF	Temperature	1	4.0	0		0	
	Establishment of calibration services						
1-2BA	Overall	1	4.0	0		0	
1-2BB	Mass	2	4.5	1	5.0	0	
1-2BC	Length	1	4.0	0		0	
1-2BD	Volume	2	3.5	1	4.0	0	
1-2BE	Electricity	1	4.0	0		1	5.0
1-2BF	Temperature	1	4.0	0		0	
1-2C	Esta. of tech. consultancy	2	3.5	1	4.0	1	4.0
1-2D	Esta. of training system	2	3.5	1	4.0	1	4.0
	Attainment of tech transfer during Pj. period						
1-3A	Overall	1	4.0	0		0	
1-3B	Mass	2	4.0	1	5.0	0	
1-3C	Length	1	4.0	0		0	
1-3D	Volume	2	4.0	1	5.0	0	
1-3E	Electricity	1	4.0	0		1	5.0
1-3F	Temperature	1	4.0	0		0	
1-4A	Output justify input	1	100.0%	1	100.0%	1	100.0%

Attainment of metrology needs during Pj. period

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2-1A1	Overall	1	4.0	0		1	4.0
2-1B1	Mass	2	4.0	1	5.0	0	
2-1C1	Length	1	3.0	0		0	
2-1D1	Volume	2	3.5	1	4.0	0	
2-1E1	Electricity	1	4.0	0		1	5.0
2-1F1	Temperature	1	4.0	0		0	
Attainment of metrology needs currently							
2-1A2	Overall	1	4.0	0		0	
2-1B2	Mass	2	3.5	1	4.0	0	
2-1C2	Length	1	3.0	0		0	
2-1D2	Volume	2	3.0	1	4.0	0	
2-1E2	Electricity	1	4.0	0		1	4.0
2-1F2	Temperature	1	4.0	0		0	
Diffusion of metrication during Pj. period							
2-21A	Overall	1	4.0	0		1	5.0
2-21B	Mass	2	4.5	1	4.0	0	
2-21C	Length	1	3.0	0		0	
2-21D	Volume	2	3.5	1	4.0	0	
2-21E	Electricity	1	5.0	0		1	5.0
2-21F	Temperature	1	5.0	0		0	
Diffusion of metrication currently							
2-22A	Overall	1	5.0	0		1	5.0
2-22B	Mass	2	4.5	1	4.0	0	
2-22C	Length	1	3.0	0		0	
2-22D	Volume	2	3.5	1	4.0	0	
2-22E	Electricity	1	5.0	0		1	5.0
2-22F	Temperature	1	5.0	0		0	
Esta. of metrology standards satisfy Malaysia needs during the project period							
2-31A	Overall	1	100.0%	0		1	100.0%
2-31B	Mass	2	100.0%	1	100.0%	0	
2-31C	Length	1	100.0%	0		0	
2-31D	Volume	2	100.0%	1	100.0%	0	
2-31E	Electricity	1	100.0%	0		1	100.0%
2-31F	Temperature	1	100.0%	0		0	
Esta. of metrology standards satisfy Malaysia currently							
2-32A	Overall	1	0.0%	0		1	100.0%
2-32B	Mass	2	50.0%	1	100.0%	0	
2-32C	Length	1	0.0%	0		0	
2-32D	Volume	2	50.0%	1	100.0%	0	
2-32E	Electricity	1	100.0%	0		1	100.0%
2-32F	Temperature	1	100.0%	0		0	
Services provided satisfy (during Pj. period):							
2-41A	Measure/calibration needs	2	100.0%	1	100.0%	1	100.0%
2-41B	Industrialization needs	2	100.0%	1	100.0%	1	100.0%
Service satisfy (current)							
2-42A	Measurement/calibration needs	1	100.0%	1	100.0%	1	100.0%
2-42B	Industrialization needs	2	50.0%	1	100.0%	1	100.0%
Improvement of measurement accuracy during Pj. period							
2-51A	Overall	1	100.0%	0		1	100.0%

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2-51B	Mass	2	100.0%	1	100.0%	0	
2-51C	Length	1	100.0%	0		0	
2-51D	Volume	2	100.0%	1	100.0%	0	
2-51E	Electricity	1	100.0%	0		1	100.0%
2-51F	Temperature	1	100.0%	0		0	
	Improvement of measurement accuracy currently						
2-52A	Overall	0		0		0	
2-52B	Mass	0		0		0	
2-52C	Length	0		0		0	
2-52D	Volume	0		0		0	
2-52E	Electricity	0		0		0	
2-52F	Temperature	0		0		0	
3-1	Contribut. on M' industrializati	2	100.0%	1	100.0%	1	100.0%
3-1X	Importance	2	4.0	1	4.0	1	5.0
3-2	Impacts to develop. PV labs	1	100.0%	1	100.0%	1	100.0%
3-2X	Importance	1	4.0	1	4.0	1	5.0
	Impacts on measurement/calibration tech. improvement						
3-3A	Overall	1	4.0	0		1	5.0
3-3B	Mass	2	4.0	1	4.0	0	
3-3C	Length	1	4.0	0		0	
3-3D	Volume	2	3.5	1	4.0	0	
3-3E	Electricity	1	4.0	0		1	5.0
3-3F	Temperature	1	4.0	0		0	
3-4	Contribut. on improve. of M's m/standards	2	100.0%	1	100.0%	1	100.0%
3-4X	Importance	2	3.5	1	4.0	1	5.0
3-5	Unexpected outcome	2	100.0%	1	100.0%	1	100.0%
3-5X	Importance	2	4.0	1	5.0	1	4.0
3-6A	N-impact on tech. improvement	2	0.0%	1	0.0%	1	0.0%
3-6AX	Importance	0		0		0	
3-6B	N-impact on metric. diffusion	2	0.0%	1	0.0%	1	0.0%
3-6BX	Importance	0		0		0	
4-1	Goal & purpose validation	2	0.0%	1	0.0%	1	100.0%
4-21	Output of Pj. was relevant	2	50.0%	1	100.0%	1	100.0%
4-22	Output of Pj. still relevant	2	0.0%	1	0.0%	1	100.0%
4-3	Major changes	1	100.0%	0		1	100.0%
4-4	Adaptation of SIRIM	2	100.0%	1	100.0%	0	
4-4X	Adaptation rate	1	4.0	1	4.0	0	
5-1	Contribution on M's metrology establishment since Pj end	2	3.5	1	4.0	0	
5-2	Contribution on metrication diffusion since Pj end	2	4.0	1	4.0	1	5.0

Appendix 3.1

Measurement standards esta'd meet						
M's industrialization needs						
5-3A	Overall	1	3.0	0	1	5.0
5-3B	Mass	2	4.5	1	5.0	0
5-3C	Length	1	4.0	0	0	0
5-3D	Volume	2	3.5	1	4.0	0
5-3E	Electricity	1	4.0	0	1	5.0
5-3F	Temperature	1	4.0	0	0	0
5-3G	Others	0		0	0	0
M/calibration services esta'd meet						
M's industrialization needs						
5-4A	Overall	1	3.0	0	0	0
5-4B	Mass	1	4.0	0	0	0
5-4C	Length	1	4.0	0	0	0
5-4D	Volume	1	3.0	0	0	0
5-4E	Electricity	1	4.0	0	1	5.0
5-4F	Temperature	1	4.0	0	0	0
5-4G	Others	0		0	0	0
Resources						
Equipment						
5-5AA	Overall	1	2.0	0	0	0
5-5AB	Mass	1	3.0	0	0	0
5-5AC	Length	1	2.0	0	0	0
5-5AD	Volume	1	2.0	0	0	0
5-5AE	Electricity	1	2.0	0	0	0
5-5AF	Temperature	1	3.0	0	0	0
5-5AG	Others	0		0	0	0
Stuffing						
5-5BA	Overall	1	3.0	0	0	0
5-5BB	Mass	1	3.0	0	0	0
5-5BC	Length	1	3.0	0	0	0
5-5BD	Volume	1	3.0	0	0	0
5-5BE	Electricity	1	3.0	0	0	0
5-5BF	Temperature	1	3.0	0	0	0
5-5BG	Others	0		0	0	0
Funding						
5-5CA	Operational	0		0	0	0
5-5CB	Development	0		0	0	0
5-5CC	R&D	0		0	0	0
Facilities						
5-5DA	Overall	1	3.0	0	0	0
5-5DB	Mass	1	4.0	0	0	0
5-5DC	Length	1	3.0	0	0	0
5-5DD	Volume	1	3.0	0	0	0
5-5DE	Electricity	1	4.0	0	0	0
5-5DF	Temperature	1	4.0	0	0	0
5-5DG	Others	0		0	0	0
5-6	Procedure manuals	2	100.0%	1	100.0%	1 0.0%
Training stuffs since Pj. end						
5-7A	Overall	1	100.0%	0	0	0
5-7B	Mass	2	100.0%	1	100.0%	0

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5-7C	Length	1	100.0%	0	0	
5-7D	Volume	1	100.0%	0	0	
5-7E	Electricity	1	100.0%	0	1	0.0%
5-7F	Temperature	1	100.0%	0	0	
5-7G	Others	0		0	0	
5-8	Equipment maintenance system	2	50.0%	1	100.0%	1 0.0%
	Condition of equipments					
5-9A	Overall	1	4.0	0	0	
5-9B	Mass	1	4.0	0	0	
5-9C	Length	1	4.0	0	0	
5-9D	Volume	1	4.0	0	0	
5-9E	Electricity	1	3.0	0	0	
5-9F	Temperature	1	4.0	0	0	
5-9G	Others	0		0	0	

METROLOGY PROJECT COUNTERPART COMMENTS (MASS)

EFFICIENCY

1-1 ENOUGH INPUT FROM JAPAN

- Communication barrier
- There was not enough input from Japan, because of limited staff (technical level)
- Special request time to time also fulfilled. (Japan input)

1-2 MALAYSIAN INPUT BETWEEN 1981-1986

- There were not enough technical personnel.
- Needed 17 ROs, but get 12 (Malaysia input)

1-6 PROJECT ACHIEVEMENT IN 1986

- Not enough staff to give training (services),

1-8 ANY OTHER COMMENTS

- Satisfactory efficiency obtained by the Project.
- The measurement center is one of the highest earning unit in SIRIM. (Combination Income/Operational Exp = 0.5/1.0)

EFFECTIVENESS

2-6 MEET THE NEEDS

- The calibration/verification services of SIRIM meets approximately 70 % of the requests of the Metrology and Industrialization in Malaysia.

2-7 ANY OTHER COMMENTS

- Very effective
- The transfer of technology/knowledge is very effective.

IMPACT

3-8 ANY OTHER COMMENTS

- The impact is that people learn to appreciate the role measurement/metrology more.

RELEVANCE

4-2 OUTPUT STILL SUFFICIENT

- We need higher level of accuracy now, better services needed now - higher technical-know-how required now. (more complicated equipment used now)
- There is a rapid investment and industrialization in Hi-tech activities in M'sia. Therefore, calibration services are always insufficient (in all fields).

4-3 MAJOR CHANGES

- Change in the equipment design which need a different of our present building structure for us to carry out proper calibration (for e.g. a room with constant temp. for calibration)
- Higher accuracy needed

Appendix 3.2

- More technical knowledge required
- There is a reorganization in the metrology unit to expand its function.

4-4 ADAPTATION OF SIRIM

- Equipment with higher level of accuracy was purchased.
- More flexible calibration services (in fees) .e.g. contract service
- Organize more exhibition and seminar
- Partially automated calibration services
- Take part in contract research

4-5 ANY OTHER COMMENTS

- Our clients would have more confidence in us if we are trained and have acquired the technical skills needed. Through which we can provide better services.

SUSTAINABILITY

5-6 SERVICE PROCEDURE

- Quality manual is available.

5-9 ANY OTHER COMMENTS

- By sending the technical professionals for short training courses.
- There should have follow-up programs to guide/assist the technical personnel in carry out their daily activities/calibrations -- by sending experts to Malaysia.
- Reorganization has made our activities better-run, it may cause inconvenience to the industry at the beginning stage of the reorganization.
- There are good supports from the management in all aspect. That's why we are still going on well.

METROLOGY PROJECT COUNTERPARTS COMMENTS (VOLUME)
EFFICIENCY

1-1 ENOUGH INPUT FROM JAPAN

- More training should be given to technicians.
- Not enough training - Mostly offered to officials only.
- Special request time to time also fulfilled. (Japan input)

1-2 MALAYSIAN INPUT BETWEEN 1981-1986

- ARO & RO were trained but technicians not trained and didn't get sufficient training from ARO & RO. (STAFFING)
- Space not enough, resources not enough. (FACILITIES)
- Not enough floor space laboratories & current supply
- # of staff is sufficient, but not given enough training - in-house.
- Needed 17 ROs, but get 12
- Building and laboratory structure not suitable for laboratory activity.
- Too few human resources

1-6 PROJECT ACHIEVEMENT IN 1986

- Not enough staff to give training

1-8 ANY OTHER COMMENTS

- More effective training in specialized subjects necessary.
- The measurement center is one of the highest earning unit in SIRIM. (Combination Income/Operational Exp = 0.5/1.0)

EFFECTIVENESS

2-6 MEET THE NEEDS

- The calibration/verification services of SIRIM meets approximately 70 % of the requests of the Metrology and Industrialization in Malaysia.

2-7 ANY OTHER COMMENTS

- It is effective to certain extent. It would be better if we could have an extension of the program, especially in terms of provisions of equip. & training-longer, training period for technical personnel is also necessary.
- Need more high-tech equipment to keep up with the standards (catch up with industries).
- The transfer of technology/knowledge is very effective.
- For volume calibration/verification services only about 50% request are met but the rest are not met due to staff and facility constraint.

IMPACT

3-8 ANY OTHER COMMENT

- Overall, it has more positive impacts for E.G. awareness of accuracy, improvement & maintenance of standards. No negative impacts.

RELEVANCE

4-2 OUTPUT STILL SUFFICIENT

- Need more equipments, more staff training and more accuracy.
- Need to improve overall capabilities & increase accuracy standards.
- But in future ,not enough high tech equipment.
- There is a rapid investment and industrialization in Hi-tech activities in M'sia. Therefore, calibration services are always insufficient (in all fields).

4-3 MAJOR CHANGES

- There is a reorganization in the metrology unit to expand its function.
- Rapid industrialization needs other facilities other than basic standards.

4-4 ADAPTATION OF SIRIM

- The equipment are lacking in high tech. (old fashioned)
- More flexible calibration services (in fees)..e.g. contract service
- Organize more exhibition and seminar
- Partially automated calibration services
- Take part in contract research
- No future planning

4-5 ANY OTHER COMMENTS

- Industry's need for accuracy much higher than SIRIM's. Because budget/funding, government relaxed than industry.
- We are to keep up-to-date to the changes of the needs of industrialization. We do not want to be behind compare to the industrialization.

SUSTAINABILITY

5-5 RESOURCES

- Lack of proper space, provide more suitable for office administration.

5-6 SERVICE PROCEDURE

- Quality manual is available.

5-7 EQUIPMENT MAINTENANCE SYSTEM

- No proper maintenance/control system. Lack of manpower & time

5-9 ANY OTHER COMMENTS

- We would like to improve in the accuracy attained by us. We would like to acquire equipment with higher accuracy because our clients' equipment is of higher accuracy level than ours'.
- More high-tech equipments needed.
- Training to be provided to technicians within locally or overseas.
- Better accuracy equipments & should be made available for fieldwork.

Appendix 3.2

- More & better training should be provided for lower level staff; training in SIRIM should be compliment by overseas training.
- Reorganization has made our activities better-run, it may cause inconvenience to the industry at the beginning stage of the reorganization.
- There are good supports from the management in all aspect. That's why we are still going on well.

METROLOGY PROJECT COUNTERPARTS COMMENTS (ELECTRICITY)

EFFICIENCY

1-1 ENOUGH INPUT FROM JAPAN

- Not enough training - Communication/language problem (TRAINING IN JAPAN)

1-2 MALAYSIAN INPUT BETWEEN 1981-1986

- Probably due to the economic reason, I felt that there was not enough funding for the project.
- Lack of staff to handle daily activities. (STAFFING)
- Central air-con for Labs was not sufficient for good environmental condition.
- Lack of funding for accessories for equipment. (MALAYSIA INPUT)
- Not enough space and equipments (MALAYSIA INPUT)
- Not enough staff (MALAYSIA INPUT)

1-8 ANY OTHER COMMENTS

- Good achievement of the project in the sense that more companies approached us for our service.
- The efficiency of the Project is high by considering the information available at that period.
- A lot of technical knowledge was transferred through discussions and work with the experts and also during training. But the only problem was in communication.

EFFECTIVENESS

2-6 MEET THE NEEDS

- The Project (SIRIM) meets 70% of the needs of Metrology in Malaysia.
- The Project (SIRIM) meets 70% of the needs of the industries.

2-7 ANY OTHER COMMENTS

- There is improvement to meet with today's needs.
- As far as the electrical section is concerned, the Project is successful & effective.
- The Project has resulted an improvement in the standards (in electrical), the techniques in maintaining, calibrating and measuring the standards.
- Improvement of measurement standards and also keeping in touch with latest development in metrology for industrialization.

IMPACT

3-5 UNEXPECTED OUTCOME

- The public are more conscious about equality and also metrology.

3-8 ANY OTHER COMMENTS

- The project has greatly contributed to the development of

metrology in Malaysia, particularly the expects of equipment, standards and expects trained.

-- Companies which are still using equipment/standards in Imperial Standards will have problems in obtaining calibration because SIRIM only calibrate in SI unit.

RELEVANCE

4-2 OUTPUT STILL SUFFICIENT

- No - Due to the development in measurement technology and accuracy of the standards increased very fast.
- Greater needs in diversity and higher accuracy.
- Accuracy of current needs has improved very much and fast calibration service. New technology need to be upgraded.
- Need to be upgraded

4-3 MAJOR CHANGES

- Higher accuracy level is expected.
- Expanding the needs in the parameters of measurement (optical, microwave, time & frequency measurement)
- Rapid industrialization.
- Accuracy of equipment from companies has greatly improved. Therefore SIRIM's standards should also increased our accuracy of equipment higher.
- More calibration services needed

4-4 ADAPTATION OF SIRIM

- Better facilities provided.
- More higher level equipment are purchased.
- More staff are trained to meet the needs.
- By increasing measurement parameters and accuracy of measurement.
- Meet the demands of the industry in terms of standards to achieve required accuracy level.
- Carried out R&D by using automated measuring set.
- Discussion with customer to know what are their needs to improvement.
- Purchasing better equipment with higher accuracy.
- Upgrading the accuracy of equipments.

4-5 ANY OTHER COMMENTS

- Fast service are required by the market, but due to lack of staff & equipment, we do not perform as well.
- We need latest equipment to have higher accuracy, at least, higher accuracy then the instruments of electronics firms in Malaysia.
- The abrupt stop in the contribution to the Project in terms human resources (tech-transfer, training Japan) & equip.by JICA has resulted a discontinuity in our further research and development of higher national standards.
- The purpose & goals of the Project would be valid for Malaysia ever in the near future.
- We would like to improve more on our measurement standards by purchasing more high accuracy equipment. We would like to have more training/workshop to educate ourselves with new

technologies on measurements.

SUSTAINABILITY

5-7

-- Provide more courses, international involvement in metrology and also provide time to time information about new technology in measurement.

5-9 ANY OTHER COMMENTS

-- In order to up-grade the system set, we need more higher level equipment & more short training particularly for technical persons. (specializing in only one but not all equipment)

-- The Project is as successful as planned, in terms of equipments, training & standards. However, due to the lack of staff supplied (employed), we did not achieve as targeted in terms of RO/AROs & technicians train

-- We are below the level of accuracy obtained by some of the companies, which we hope we can up-date/up-grade ourselves in order to cope with the market needs.

-- We should be specialized in only one aspect but not many aspects

METROLOGY PROJECT COUNTERPARTS COMMENTS (TEMPERATURE)
EFFICIENCY

1-1 ENOUGH INPUT FROM JAPAN

- Lower staff, period too short: practice period not enough. (JAPAN INPUT)
- Not enough training in Japan; Temperature- 2 of 4 staffs trained in Japan, only 1 trained staff, 1 trained staff transferred.
- Period too short. 2 came for 1 month each; equipment not fully arrived, train by theory but not practical, too much to learn.
- Not enough training - Communication/language problem

1-2 MALAYSIAN INPUT BETWEEN 1981-1986

- Not enough staff in the temperature section.
- Not enough space.
- Not enough technical personnel. (MALAYSIA INPUT - STAFFING)
- Building and laboratory structure not suitable for laboratory activity.
- Too few human resources
- Not enough space and equipments
- Not enough staff
- Not enough research officers at that moment.

1-8 ANY OTHER COMMENTS

- Training is not enough (both training in Japan & training given by Japanese experts in Malaysia)

EFFECTIVENESS

2-7 ANY OTHER COMMENTS

- Accuracy of equipments do not meet needs of industry. Their demand is very advanced in comparison with SIRIUS' capability.
- There is effectiveness in the Project but very slow in the achievement due to lack of man power and equipment.
- For volume calibration/verification services only about 50% request are met but the rest are not met due to staff and facility constraint.

IMPACT

3-2 IMPACT TO PRIVATE LAB. DEVELOP.

- SIRIM provides information to private sector & to develop private calibration systems. SIRIM is referred to for latest information.

3-5 UNEXPECTED OUTCOME

- SIRIM standards are "said" to be better than that of other countries.
- A great difference in the realization of the importance of measurement in the industries.
- Good timing for industrial development growth.

RELEVANCE

4-1 GOAL & PURPOSE STILL VALID

-- Calibration standards have been established but there is room for greater improvements toward higher accuracies:

4-2 OUTPUT STILL SUFFICIENT

-- Not accurate enough for standards. Lack of technical personnel in providing services because too many instruments coming in, secondly, lack of higher accuracy equipment for providing services needed.

-- Metrology is a wide field which needs to continuously updated.

-- Need to be upgraded

4-3 MAJOR CHANGES

-- Higher accuracy equipment needed for calibration of instruments sent to us.

-- Rapid industrialization needs other facilities other than basic standards.

-- New parameters needed: Viscosity, Light luminescence, Sound, engineering parameters.

-- Wide scope of measuring parameters that need to be established and maintain.

-- More calibration services needed

4-4 ADAPTATION OF SIRIM

-- We bought new equipment with higher accuracy to meet the needs.

-- We upgraded our accuracy/standards to meet the standards of ISO 9000.

-- By collaborating with international metrology Labs.

-- Upgrading the accuracy of equipments.

4-5 ANY OTHER COMMENTS

-- More higher accuracy instruments and technical staff needed for a better service by SIRIM to meet the needs of the industries.

SUSTAINABILITY

5-5 RESOURCES

-- Electricity.....Electricity is suitable.

-- LengthCrowded length Lab. Air-con in Length Lab is sufficient because separate from central air-con.

-- Not enough space; forecast is too conservative.

-- TemperatureDeveloped biggest lounge of temperature, planned 1 room but should have more than 1.

5-9 ANY OTHER COMMENTS

-- Japan cooperation is needed for this phase.

-- Need another more-advanced phase of this Project.

-- Need more technology transfer.

-- New industries move very fast.

-- Metrology field needs to be continuously developed and upgraded to achieve the highest measurement accuracy. But new

Appendix 3.2

equipments are very expensive thus giving the drawback to the metrology center of SIRIM.

- Need to shorten turnaround time.
- Technical training are also very important so as to continuously upgrade the expertise of the staff.

METROLOGY PROJECT BENEFICIARIES COMMENTS

EFFECTIVENESS

1-5

-- Train staffs in Japan, S'gapore.

1-6 SERVICE IMPROVEMENT

-- Higher accuracy should be achieved

1-7 ANY OTHER COMMENTS

-- Generally not favorable forwards SIRIM. Go there just to get approval.

-- Information for standard charge. Higher accuracy equipment like thermometer +/- 0.1C.

-- SIRIM does not inform on the organizational change in SIRIM. Official in charge of different department always changed. This created problems in their services.

IMPACT

2-10 ANY OTHER COMMENTS

-- If SIRIM improved the quality of their equipment and services, we will use more.

RELEVANCE

3-1 CHANGES

-- In view of SIRIM's status as the establishment of national standard of industries in Malaysia

3-2 UTILIZATION OF OTHER'S LAB

-- Monthly contract services at our premises

-- Faster services

-- Utilizing in-house and suppliers. More relevant to Co.'s needs.

-- Calibration is carried out at company's premises and don't have to send to SIRIM.

3-3 UTILIZATION OF OVERSEAS

-- Relevant equipment and support is provided.

3-6 OVERSEAS EQUIPMENT CALIBRATION

-- Experts from sister corp. come here to do it.

3-7 OTHER PARAMETERS

-- Viscosity - essential parameter in paint industry

3-8 ANY OTHER COMMENT

-- More experienced and trained personnel is needed to provide a better and efficient service

-- Hopefully there will be improvement.

-- SIRIM should provide faster service.

-- Other labs would come to collect the equipment from us and provide good follow-up (monthly or bimonthly) whereas SIRIM

- does not provide these services at all.
- SIRIM should achieve higher accuracy standard.
 - Quite a lot of SIRIM's equipment are out-dated.
 - SIRIM's services is not organized; they only know about their own department.
 - SIRIM lack a centralized system where department/unit can coordinate all the calibration services available in SIRIM.
 - SIRIM should provide brochures/booklets to guide the consumer on the application of equipment to educate the end-users on the general maintenance of the equipment.
 - SIRIM should provide information on ISO.
 - Privatisation may help to improve the services in SIRIM.
 - During emergency cases, we hope they can get things done in a shorter time.
 - Generally, I think they should provide a shorter turnaround time.
 - SIRIM's calibration services are too costly; that's the reason why we set up our own calibration lab.
 - SIRIM should educate the factories on how to set up their calibration lab. ie SIRIM should be organized in providing consultation to factories in this aspect.
 - SIRIM is not responsive enough to the market needs.
 - Generally, I find the staff are knowledgeable and professional enough to handle the needs in the market.
 - In the Electricity parameter, SIRIM's equipment still meet the needs of the industry.
 - At the present moment, I still think SIRIM's services meet most of my needs.
 - In my perception, SIRIM's level of accuracy are better accepted.
 - SIRIM charge rate (M\$500/2hour/man) is high.
 - SIRIM's technology, profession is OK.
 - Calibration time too long.
 - By ISO9000 application and/or increase number of factory, SIRIM's calibration capacity will not be enough to serve to the beneficiaries.
 - Privatization will make SIRIM's service better.
 - SIRIM should monitor the expire date of standards and perform the recalibration timely. My experience with many of our suppliers in that they do not perform calibration of their measuring instruments. It would be beneficial if SIRIM can develop some method to calibrate their instruments at less cost (consideration of small company with few instruments).

METROLOGY PROJECT QUESTIONNAIRE JAPANESE EXPERTS COMMENTS
(MASS)

EFFICIENCY

1-1Ba BUDGET/FUNDING OF MALAYSIA

-- Short of operational budget for building/facilities(air-cond)

IMPACT

3-5 UNEXPECTED OUTCOME

-- Calibration/measurement for certification to gas-meters were started immediately with provided equipment.

RELEVANCE

4-2 OUTPUT RELEVANCE TODAY

-- More parameters are needed than five parameters in the Project. (e.g. density, concentration, pressure)

4-3 MAJOR CHANGES IN MALAYSIAN INDUSTRIALIZATION PROCESS

-- Accompanied with Proton-Saga's debut in 1985, SIRIM turned to have to certificate several new parameters (e.g. transmission of light through glass, speed meter).

4-4 SIRIM'S ADAPTATION TO CHANGES

-- Around 1990, reorganizing and expanding calibration/measurement division in order to cope with increasing application of calibration/measurement from private companies for industrial standard and R & D.

SUSTAINABILITY

5-6 MANUALS

-- "Manuals for standard balance weight" completed

METROLOGY PROJECT QUESTIONNAIRE JAPANESE EXPERTS COMMENTS
(VOLUME)

EFFICIENCY

1-1Aa EQUIPMENT FROM JAPAN

-- Equipment provided from Japan cannot be repaired by Malaysian side due to lack of spare parts.

1-1Ab TRAINING IN JAPAN

-- Several months training period too short because we consider the individual research field of metrology (e.g. mass, length, etc) as our 'life work'.

1-1Ac TECHNOLOGY TRANSFER FROM JAPAN

-- Lack of Japanese experts
-- Consultancy period too short

1-1Ad OTHERS

-- Continuous cooperation (e.g. exchange personnel, recalibration standards) is necessary. For instance, dispatching Japanese experts as consultants/supervisors is effective enough.

1-1Ba BUDGET/FUNDING OF MALAYSIA

-- Short of operational budget
-- Short of operational budget for building/facilities(air-cond)

1-1Bc FACILITY

-- The building constructed by Malaysian side was not suitable for accurate calibration/measurement. It is impossible for Malaysian side to design and construct the facilities suitable for accurate calibration/measurement (e.g. thermos regulator, vibration proof, dust proof etc).

1-1Bb STAFFING

-- Counterparts including administrators and technicians participated earnestly and with all their might.
-- Generally the technical level of counterparts was low. I think it resulted from education in universities. Upgrading in instrumentation engineering, precision machine engineering, applied physics and etc is necessary.

1-4 PROJECT OUTPUT JUSTIFY INPUT OR NOT

-- Both counterparts and experts were busy in latter half of the Project period due to delay in dispatching the experts and providing the equipment. (i.e. since R/D, dispatching the experts: 6 months later and providing the equipment: 1 year later, so starting of technology transfer was delayed.)

EFFECTIVENESS

2-4A SERVICES MEET METROLOGY NEEDS

-- The services were effective for consumers protection, but

insufficient to meet the industrial needs.

2-4B SERVICES MEET INDUSTRIAL NEEDS

-- The services should be upgraded, otherwise it cannot catch up the industrial needs.

2-6 OTHER COMMENTS ON EFFECTIVENESS

-- The standards of each parameter provided in Malaysia should be periodically calibrated by more primary standards (e.g. standards in developed countries)

IMPACT

3-2 IMPACT ON PRIVATE METROLOGY LABS

-- I don't know whether private labs exists in Malaysia.

3-5 UNEXPECTED OUTCOME

-- In refining industry, they are using calibrated thermometers instead of 'know-how' of a past master.

-- Calibration/measurement for certification to gas-meters were started immediately with provided equipment.

3-7 OTHER COMMENTS ON IMPACT

-- Fixing of metrication in measure and square measure of building/land will take long time.

RELEVANCE

4-1 GOAL & PURPOSE VALIDATION

-- SIRIM applied recalibration of standards to Japan, and SIRIM's officials came to Japan in many times.

4-2 OUTPUT RELEVANCE THEN

-- High-tech industries in Malaysia are almost j/v with developed countries, so high-accurate standards are provided from the countries.

4-2 OUTPUT RELEVANCE TODAY

-- Some standards need higher accuracy and other parameters (e.g. force, pressure) are needed.

-- More parameters are needed than five parameters in the Project. (e.g. density, concentration, pressure)

4-3 MAJOR CHANGES IN MALAYSIAN INDUSTRIALIZATION PROCESS

-- Need of establishment of metrology in legally regulated parameters (e.g. vibration, noise)

-- Accompanied with Proton-Saga's debut in 1985, SIRIM turned to have to certificate several new parameters (e.g. transmission of light through glass, speed meter).

4-4 SIRIM'S ADAPTATION TO CHANGES

-- Reorganization and expansion

-- Around 1990, reorganizing and expanding calibration/measurement division in order to cope with increasing application of calibration/measurement from private companies for industrial

standard and R & D.

SUSTAINABILITY

5-6 MANUALS

- Almost good
- "Manuals for standard balance weight" completed

5-8 MAINTENANCE SYSTEM

- Many troubles in electric machine/components, but no repairer.
- Hard to obtain spare parts and consumables
- Recalibration to standards is impossible, so that its accuracy is unclear.

5-9 MAINTENANCE CONDITION

- Overall:--generally good
- Mass :--existing new equipment for precise measurement
 - National standard needs recalibration
- Length :--generally good
 - straight measure calibrator & 10m tape measure calibration need readjustment.
- Volume :--Highly motivated
 - (e.g. developing automatic calibrator to gas-meter)
 - Need improved facilities (e.g. fixed temperature room)
- Electricity:--Need improved facilities (e.g. fixed temperature/dry room)
- Temperature:--Comparative calibration is available, but calibration of standards on fixed point is not.

5-10 OTHER COMMENTS ON SUSTAINABILITY

- The task of National Metrology should be usually engaged by experts of each parameters for their life work. So, continuous/free interchange of personnel between SIRIM and NRLM/ETL is desirable. Malaysian standards should be brought to Japan and adjusted, and Japanese experts should go to instruct the calibration on fixed temperature point. And dispatching the experts as advisors to repairing/adjustment of equipment will promote the effect.

METROLOGY PROJECT QUESTIONNAIRE JAPANESE EXPERTS COMMENTS
(ELECTRICITY)

EFFICIENCY

1-1A EQUIPMENT FROM JAPAN

-- Instruction schedule/plan was substantially changed due to turnovers of two counterparts (i.e. one trained in Japan and another in Malaysia).

1-1Ba BUDGET/FUNDING OF MALAYSIA

-- Short of operational budget.

1-1Bc FACILITY

-- New building was constructed by Malaysian side and calibration/measurement lab. for certification were placed there, but lab. for establishment/maintenance of National Standards were left in old building. So that this lab's condition was so bad -- especially thermos/humidity regulator need to be improved and I suggested improvement, but not yet.

1-1Bb STAFFING

-- There was problem of staff turnover (refer to 'OTHERS' above) but after that Malaysian side recruited two graduates.

1-5 OTHER COMMENTS ON EFFICIENCY

-- Technology in establishment/maintenance/procurement of National Standards was transferred sufficiently. A problem awaiting solution is keeping the condition of labs suitable for accurate calibration/measurement (e.g. fixed temperature/humidity). Otherwise, provided equipment would deteriorate as like former Malaysian equipment.

IMPACT

3-2 IMPACT ON PRIVATE METROLOGY LABS

-- I don't know whether private labs exists in Malaysia.

3-5 UNEXPECTED OUTCOME

-- Application of calibration/measurement and certification were increased.

THE JOINT EVALUATION STUDY ON
THE JAPANESE TECHNICAL COOPERATION PROJECTS
IN MALAYSIA

QUESTIONNAIRE

NATIONAL METROLOGY LABORATORY PROJECT

ECONOMIC PLANNING UNIT, PRIME MINISTERS' DEPARTMENT

JAPAN INTERNATIONAL COOPERATION AGENCY

OCTOBER 1992

BACKGROUND OF RESPONDENT

Name :

Designation :

Division :

Organisation/Firm :

(For SIRIM employee)

Year joined SIRIM :

If Metrology Division, indicate specialty :

- Mass
- Length
- Volume
- Electricity
- Temperature

If Fine Ceramics Division, indicate specialty :

- Oxide
- Non-Oxide
- Glass and Rare Earth Oxide

If MDEC, indicate specialty :

- Electroplating
- Presswork
- Die Making
- Welding

Which JICA activities did you participate in ?

.....
.....

0. Do you think the National Metrology Laboratory Project has succeeded in meeting the needs of metrication and requirements of metrology in Malaysia in 1986 ?

Yes No

Efficiency

This section is concerned with the efficiency of the project, i.e. how economically the project inputs are translated into outputs. Kindly tick (✓) the most appropriate answer or write down your comments.

1-1. Were there enough Project inputs from Japan between 1981-1986 to meet the needs for establishing a metrology system in SIRIM in 1986 ?

a. Equipment Yes No

If "No", Please choose appropriate reasons.

a-1. Not enough equipment

a-2. Obsolete Technology

a-3. Low accuracy

a-4. Others (Please specify: _____)

b. Training in Japan Yes No

If "No", Please choose appropriate reasons.

b-1. Not enough training

b-2. Training not appropriate for Malaysia's metrology programme

b-3. Others (Please specify: _____)

c. Technology transfer from Japan Yes No
(e.g. Japanese expertise)

If "No", Please choose appropriate reasons.

c-1. Not enough Japanese experts

c-2. Consultancy period too short

c-3. Others (Please specify: _____)

d. Others (Please specify: _____)

1-2. Do you think the Malaysian inputs between 1981-1986 to the Metrology Project was adequate?

a. Budget/Funding Yes No

If "No", Please explain: _____

b. Staffing Yes No
 (e.g. sufficient professional and technical personnel)

If "No", Please explain : _____

c. Facilities Yes No
 (e.g. space, utilities, air-cond)

If "No", Please explain : _____

d. Others (Please specify: _____)

1-4. How do you rate the Project's achievement in the establishment of measurement standards in SIRIH in 1986 ?

	No comment					
a. Mass	<input type="checkbox"/>	Low 1	2	3	4	5 High
b. Length	<input type="checkbox"/>	Low 1	2	3	4	5 High
c. Volume	<input type="checkbox"/>	Low 1	2	3	4	5 High
d. Electricity	<input type="checkbox"/>	Low 1	2	3	4	5 High
e. Temperature	<input type="checkbox"/>	Low 1	2	3	4	5 High

1-5. How do you rate the Project's achievement in the establishment of calibration/verification services in SIRIH in 1986 ?

	No comment					
a. Mass	<input type="checkbox"/>	Low 1	2	3	4	5 High
b. Length	<input type="checkbox"/>	Low 1	2	3	4	5 High
c. Volume	<input type="checkbox"/>	Low 1	2	3	4	5 High
d. Electricity	<input type="checkbox"/>	Low 1	2	3	4	5 High
e. Temperature	<input type="checkbox"/>	Low 1	2	3	4	5 High

1-6. How do you rate the Project's achievement in 1986 in the establishment of:

	No comment					
a. Technical consultancy (e.g. advice on metrication programme)	<input type="checkbox"/>	Low 1	2	3	4	5 High
b. Training service	<input type="checkbox"/>	Low 1	2	3	4	5 High

1-7. Do you think the Project "Outputs" justify the "Inputs" by both the Japanese and Malaysian Governments between 1981-1986 ?

Yes No

1-8. Any other comments _____

_____**Effectiveness**

This section is concerned with the effectiveness of the Project, i.e. the extent whereby the objectives of the Project are successful. Kindly tick (✓) the most appropriate answer or write down your comments.

2-1. What level of attainment of Malaysian metrology requirements in 1986 was contributed by the Metrology Project ?

	No comment	Low					High
		1	2	3	4	5	
a. Overall							
b. Mass	<input type="checkbox"/>	1	2	3	4	5	
c. Length	<input type="checkbox"/>	1	2	3	4	5	
d. Volume	<input type="checkbox"/>	1	2	3	4	5	
e. Electricity	<input type="checkbox"/>	1	2	3	4	5	
f. Temperature	<input type="checkbox"/>	1	2	3	4	5	

2-2. What level of attainment of Malaysia's metrication programme in 1986 was contributed by the Metrology Project ?

	No comment	Low					High
		1	2	3	4	5	
a. Overall							
b. Mass	<input type="checkbox"/>	1	2	3	4	5	
c. Length	<input type="checkbox"/>	1	2	3	4	5	
d. Volume	<input type="checkbox"/>	1	2	3	4	5	
e. Electricity	<input type="checkbox"/>	1	2	3	4	5	
f. Temperature	<input type="checkbox"/>	1	2	3	4	5	

2-3. To what extent are Malaysia's metrology requirements today achieved by outputs of the Metrology Project ?

	No comment	Low					High
		1	2	3	4	5	
a. Overall							
b. Mass	<input type="checkbox"/>	1	2	3	4	5	
c. Length	<input type="checkbox"/>	1	2	3	4	5	
d. Volume	<input type="checkbox"/>	1	2	3	4	5	
e. Electricity	<input type="checkbox"/>	1	2	3	4	5	
f. Temperature	<input type="checkbox"/>	1	2	3	4	5	

2-4 Do the measurement standards provided in the Metrology Project meet to the needs of metrology in Malaysia in 1982 ?

- | | Yes | No | Don't know |
|----------------|--------------------------|--------------------------|--------------------------|
| a. Overall | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| b. Mass | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| c. Length | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| d. Volume | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| e. Electricity | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| f. Temperature | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

2-5. Have there been any improvement in the measurement/calibration accuracy since 1986 ?

- | | Yes | No | Don't know |
|----------------|--------------------------|--------------------------|--------------------------|
| a. Overall | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| b. Mass | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| c. Length | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| d. Volume | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| e. Electricity | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| f. Temperature | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

2-6. Do the calibration/verification services established in the Metrology Project meet the needs of Metrology and Industrialization in Malaysia today ?

- a. Metrology Yes No Don't know
 If "No", When is it likely to be attained ? _____
- b. Industrialization Yes No Don't know
 If "No", When is it likely to be attained ? _____

2-7. Any other comments _____

Impact

This section is concerned with the impact of the Project, i.e. the effects of the Project; direct or indirect, positive or negative. Kindly tick (✓) the most appropriate answer or write down your comments.

3-1. Do you think the Metrology Project has contributed to the industrialisation process since 1986 ?

- Yes No
- If yes, how important was it ? Low 1 2 3 4 5 High

3-2. Do you think the Metrology Project has any impact on the development of private metrology laboratories in Malaysia ?

Yes No Don't know

3-3. How important have been the impact of the Metrology Project on upgrading metrology skills in Malaysia ?

	None	Low				High
a. Overall	0	1	2	3	4	5
b. Mass	0	1	2	3	4	5
c. Length	0	1	2	3	4	5
d. Volume	0	1	2	3	4	5
e. Electricity	0	1	2	3	4	5
f. Temperature	0	1	2	3	4	5

3-4. Do you think the Metrology Project has resulted in an increase of international inter-comparison of standards maintained in SIRIM ?

Yes No

3-5. Were there any unexpected outcome of the Metrology Project ?

Yes No

If "Yes", please comment : _____

3-6. Have there been any "Negative Impacts" from the Metrology Project on the the improvement of metrology in Malaysia ?

Yes No

If "Yes", Please rate the importance Low 1 2 3 4 5 High

If "Yes", Please explain : _____

3-7. Have there been any "Negative Impacts" from the Metrology Project on the the Malaysia's metrication programme ?

Yes No

If "Yes", Please rate the importance Low 1 2 3 4 5 High

If "Yes", Please explain : _____

3-8. Any other comments _____

Relevanco

This section is concerned with the relevance of the Project, i.e. whether the objectives of the Project are pertinent and worthwhile.
Kindly tick (✓) the most appropriate answer or write down your comments.

4-1. Is the purpose and goal of the Metrology Project still valid ?

Yes No

If "No", Please explain : _____

Purpose: a. Establishment of a calibration/measurement standard
b. Establishment of a high level calibration/measurement service system

Goal : Improvement of Malaysian calibration and measurement technology

4-2. Are the output (measurement standards and calibration/verification services, etc) of the Metrology Project still sufficient to meet the current needs of metrology in Malaysia ?

Yes No

If "No", Please explain : _____

4-3. Have there been major changes in Malaysia's industrialization process to warrant a change in the Metrology Project design ? (If "No", skip Q 4-4)

Yes No

If "Yes", What are the changes : _____

4-4. Has the Metrology Unit/Center adapted to the changing needs of industrialisation of Malaysia ?

Yes No

If "No", Please comment : _____

If "Yes", Please rate the adaptation of the Metrology Unit/Center.

Adaptation	Low	1	2	3	4	5	High
------------	-----	---	---	---	---	---	------

If "Yes", Please elaborate how the Metrology Unit/Center has followed these changes.

4-5. Any other comments _____

Sustainability

This section is concerned with the sustainability of the Project, i.e. the extent the Project is continued after the assistance is completed. Kindly tick (✓) the most appropriate answer or write down your comments.

5-1. Please assess the performance of the Metrology Centre in meeting the current needs of Malaysia's Metrology System .

Low 1 2 3 4 5 High

5-2. Please assess the contribution of the Metrology Centre in the diffusion of metrication in Malaysia today.

Low 1 2 3 4 5 High

5-3. Do you think the metrology standards maintained by the Metrology Center meet most of the needs of industry today ?

	No comment	Inadequate	Satisfactory	Excellent
a. Mass	<input type="checkbox"/>	1 2	3 4	5
b. Length	<input type="checkbox"/>	1 2	3 4	5
c. Volume	<input type="checkbox"/>	1 2	3 4	5
d. Electricity	<input type="checkbox"/>	1 2	3 4	5
e. Temperature	<input type="checkbox"/>	1 2	3 4	5
f. Other major parameter	<input type="checkbox"/>	1 2	3 4	5

5-3. How would you rate the services of the Metrology Center in meeting the needs of industries in Malaysia today ?

	No comment	Inadequate	Satisfactory	Excellent
a. Overall	<input type="checkbox"/>	1 2	3 4	5
b. Mass	<input type="checkbox"/>	1 2	3 4	5
c. Length	<input type="checkbox"/>	1 2	3 4	5
d. Volume	<input type="checkbox"/>	1 2	3 4	5
e. Electricity	<input type="checkbox"/>	1 2	3 4	5
f. Temperature	<input type="checkbox"/>	1 2	3 4	5
g. Other major parameter	<input type="checkbox"/>	1 2	3 4	5

5-5. Does the Metrology Center have enough resources for its activities ?

a. Equipment		No comment						
a-1. Overall	<input type="checkbox"/>	Low	1	2	3	4	5 High	
a-2. Mass	<input type="checkbox"/>	Low	1	2	3	4	5 High	
a-3. Length	<input type="checkbox"/>	Low	1	2	3	4	5 High	
a-4. Volume	<input type="checkbox"/>	Low	1	2	3	4	5 High	
a-5. Electricity	<input type="checkbox"/>	Low	1	2	3	4	5 High	
a-6. Temperature	<input type="checkbox"/>	Low	1	2	3	4	5 High	
a-7. Other major parameter	<input type="checkbox"/>							
()	<input type="checkbox"/>	Low	1	2	3	4	5 High
b. Human resources (e.g. sufficient professional and technical personnel)								
		No comment						
b-1. Overall	<input type="checkbox"/>	Low	1	2	3	4	5 High	
b-2. Mass	<input type="checkbox"/>	Low	1	2	3	4	5 High	
b-3. Length	<input type="checkbox"/>	Low	1	2	3	4	5 High	
b-4. Volume	<input type="checkbox"/>	Low	1	2	3	4	5 High	
b-5. Electricity	<input type="checkbox"/>	Low	1	2	3	4	5 High	
b-6. Temperature	<input type="checkbox"/>	Low	1	2	3	4	5 High	
b-7. Other major parameter	<input type="checkbox"/>							
()	<input type="checkbox"/>	Low	1	2	3	4	5 High
c. Funding								
		No comment						
c-1. Operational Funding	<input type="checkbox"/>	Low	1	2	3	4	5 High	
c-2. Development Funding	<input type="checkbox"/>	Low	1	2	3	4	5 High	
c-3. Research & Development Funding	<input type="checkbox"/>	Low	1	2	3	4	5 High	
d. Facilities (space, air-cond., power supply, etc)								
		No comment						
d-1. Overall	<input type="checkbox"/>	Low	1	2	3	4	5 High	
d-2. Mass	<input type="checkbox"/>	Low	1	2	3	4	5 High	
d-3. Length	<input type="checkbox"/>	Low	1	2	3	4	5 High	
d-4. Volume	<input type="checkbox"/>	Low	1	2	3	4	5 High	
d-5. Electricity	<input type="checkbox"/>	Low	1	2	3	4	5 High	
d-6. Temperature	<input type="checkbox"/>	Low	1	2	3	4	5 High	
e. Others (Please specify : _____)								

5-6. Has a service procedure (e.g. instruction manuals, job description, operational procedures, etc) been established in the Metrology Centre ?

Yes No

5-7. Is there the equipment maintenance/procurement/control system. And are the Metrology Centre people following this ?

Yes No

If "No", Please comment : _____

5-8. Please assess the maintenance condition of the Metrology Center equipment.

	No comment	Low					High	reasons
	<input type="checkbox"/>	1	2	3	4	5		
a. Over all	<input type="checkbox"/>	1	2	3	4	5		
b. Mass	<input type="checkbox"/>	1	2	3	4	5	_____	
c. Length	<input type="checkbox"/>	1	2	3	4	5	_____	
d. Volume	<input type="checkbox"/>	1	2	3	4	5	_____	
e. Electricity	<input type="checkbox"/>	1	2	3	4	5	_____	
f. Temperature	<input type="checkbox"/>	1	2	3	4	5	_____	
g. Others (Please specify : _____)								

* Reasons:

A : lack of spare parts/no supplier

B : lack of expertise in maintaining/repairing

C : too costly to repair equipment

D : obsolete model

E : others (Please specify : _____)

5-9. Any other comments _____

Thank you for your cooperation !

THE JOINT EVALUATION STUDY ON
THE JAPANESE TECHNICAL COOPERATION PROJECTS
IN MALAYSIA

QUESTIONNAIRE

NATIONAL METROLOGY LABORATORY PROJECT

ECONOMIC PLANNING UNIT, PRIME MINISTERS' DEPARTMENT

JAPAN INTERNATIONAL COOPERATION AGENCY

OCTOBER 1992

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- Efficiency:** examines how economically inputs are converted into outputs
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We seek your fullest cooperation in providing frank and honest opinions, and we assure you that opinions expressed herein will not be attributed to individual persons, and that full confidentiality can be expected. All published results of this survey will only be in aggregated statistics.

Definitions

In order to standardise the understanding of terms used in this survey, several commonly used terms are defined below:-

Calibration The set of operations which establish, under specified conditions, the relationship between values indicated by a measuring instrument or measuring system, or values represented by a material measure, and the corresponding known values of a measurand

Standard A standard, generally of the highest metrological quality available at a given location, from which measurements made at that location are derived.

Services Calibration/measurement/verification and/or consultancy available for own use and/or for clients.

SIRIM's Metrology System

Consists of two components, standards and services:

- (a) the calibration/measurement/verification standard set by SIRIM;
- (b) the calibration/measurement/verification service available at SIRIM.

Malaysia's Metrology System

Consists of two components:

- (a) SIRIM's Metrology System;
- (b) Private Sector's Metrology System (Private metrology labs and private industry labs).

Guidelines for Completing this Questionnaire

- 1 Most of the answers require you to make an assessment or evaluation, i.e. just to tick the appropriate response. However where appropriate, please feel free to write to comment, especially where you think the project can benefit from your experience or knowledge of the industry, project management, etc. Written comments will be highly valued. We assure you that the information that you provide will not be identified to you without your written permission.
- 2 Please comment on all the sections of the questionnaire in which you are knowledgeable or indicate your answers in the appropriate places.
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 Economic Planning Unit
 Prime Minister's Department
 Jalan Dato Onn
 50502 Kuala Lumpur

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 Fax: 03- 291 4268

In case of uncertainty on any aspect of the questionnaire, please contact:

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 Taman Megah
 47301 Petaling Jaya
 Selangor

Tel: 03- 777 2189
 Fax: 03- 777 2087

This particular questionnaire is concerned with National Metrology Laboratory Project.

The Metrology Project

The Metrology Project was a technical cooperation programme between the Japanese and Malaysian governments to set up a National Metrology Laboratory at SIRIM.

On the Japanese side, the project was implemented through the JICA. And in this project, the Japanese side provided equipment, training for Malaysian (mainly SIRIM officers) and despatched Japanese experts to Malaysia. In addition, the Malaysian government provided complementary assistance in budgets, personnel and buildings, etc.

The parameters which were established by the Metrology Project were as follows:-

Mass
Length
Volume
Temperature
Electricity

The project was implemented between 1981 and 1986.

JOINT EVALUATION STUDY

Date :.....

Background Information

Respondent's name :

Current Designation :

Firm or Organisation :

Address :

No of Workers/Employees : _____

Industrial Sector : _____

(Main business activity): _____

Year Firm/Institution established : _____

Interviewer:

Project : MIDEC
Metrology
Fine Ceramics

Effectiveness

This section is concerned with the effectiveness of the Project, i.e. the extent whereby the objectives of the Project are successful. Kindly tick (/) the most appropriate answer or write down your comments.

1-1. Have your company/organisation ever utilised the Calibration/Measurement and Consultation (C/M/C) services of SIRIM's Metrology Unit/Measurement Center ?

Yes No

If "Yes", Please state when you first used these services and whether your company/organisation is currently using the C/M/C services according to the following parameters : (If "No", Please skip to No 1-4)

a. Calibration/Measurement services

	Ever used	Year	Currently used
a-1. Mass	<input type="checkbox"/>	()	<input type="checkbox"/>
a-2. Length	<input type="checkbox"/>	()	<input type="checkbox"/>
a-3. Volume	<input type="checkbox"/>	()	<input type="checkbox"/>
a-4. Electricity	<input type="checkbox"/>	()	<input type="checkbox"/>
a-5. Temperature	<input type="checkbox"/>	()	<input type="checkbox"/>
a-6. Other major parameter ()	<input type="checkbox"/>	()	<input type="checkbox"/>

b. Training/Consulting services

	Ever used	Year	Currently used
b-1. Mass	<input type="checkbox"/>	()	<input type="checkbox"/>
b-2. Length	<input type="checkbox"/>	()	<input type="checkbox"/>
b-3. Volume	<input type="checkbox"/>	()	<input type="checkbox"/>
b-4. Electricity	<input type="checkbox"/>	()	<input type="checkbox"/>
b-5. Temperature	<input type="checkbox"/>	()	<input type="checkbox"/>
b-6. Other major parameter ()	<input type="checkbox"/>	()	<input type="checkbox"/>

1-2. To what extent have the various services of the Metrology Unit's been useful to your company/organisation ?

a. Calibration/Measurement services

	No comment	Low				High
a-1. Mass	<input type="checkbox"/>	1	2	3	4	5
a-2. Length	<input type="checkbox"/>	1	2	3	4	5
a-3. Volume	<input type="checkbox"/>	1	2	3	4	5

- a-4. Electricity 1 2 3 4 5
- a-5. Temperature 1 2 3 4 5
- a-6. Other major parameter
() 1 2 3 4 5

b. Training/Consulting services

- | | No comment | Low | | | High |
|-----------------------------------|--------------------------|-----|---|---|------|
| b-1. Mass | <input type="checkbox"/> | 1 | 2 | 3 | 4 5 |
| b-2. Length | <input type="checkbox"/> | 1 | 2 | 3 | 4 5 |
| b-3. Volume | <input type="checkbox"/> | 1 | 2 | 3 | 4 5 |
| b-4. Electricity | <input type="checkbox"/> | 1 | 2 | 3 | 4 5 |
| b-5. Temperature | <input type="checkbox"/> | 1 | 2 | 3 | 4 5 |
| b-6. Other major parameter
() | <input type="checkbox"/> | 1 | 2 | 3 | 4 5 |

1-3. Which of the services of the Metrology Unit have your company/organisation stopped using ? If stopped please state the reason.

a. Calibration/Measurement services

- | | Stopped | Reason |
|-----------------------------------|--------------------------|--------|
| a-1. Mass | <input type="checkbox"/> | () |
| a-2. Length | <input type="checkbox"/> | () |
| a-3. Volume | <input type="checkbox"/> | () |
| a-4. Electricity | <input type="checkbox"/> | () |
| a-5. Temperature | <input type="checkbox"/> | () |
| a-6. Other major parameter
() | <input type="checkbox"/> | () |

b. Training/Consulting services

- | | Stopped | Reason |
|-----------------------------------|--------------------------|--------|
| b-1. Mass | <input type="checkbox"/> | () |
| b-2. Length | <input type="checkbox"/> | () |
| b-3. Volume | <input type="checkbox"/> | () |
| b-4. Electricity | <input type="checkbox"/> | () |
| b-5. Temperature | <input type="checkbox"/> | () |
| b-6. Other major parameter
() | <input type="checkbox"/> | () |

1-4. Do your company/organisation have technical personnel in charge of your company/organisation's calibration/measurement instruments ?

Yes No

If "Yes", how many ? ()

1-5. How many have your company/organisation's metrology staff been trained in the past years by :

	before 1989	1989	1990	1991
a. SIRIM	()	()	()	()
b. in-house	()	()	()	()
c. other institute/labs in Malaysia	()	()	()	()
d. overseas	()	()	()	()

1-6. In what area do you think SIRIM's measurement services need improvement ?

- a. Fee rate/structure
- b. Turnaround time
- c. Provide accurate/timely information
- d. Adequacy of user information on calibrations
- e. Service proficiency
- f. Others (_____)

1-7. Any other comments _____

Impact

This section is concerned with the impact of the Project, i.e. the effects of the Project; direct or indirect, positive or negative. Kindly tick (✓) the most appropriate answer or write down your comments.

2-1. To what extent has SIRIM's Metrology Unit/Measurement Center contributed to the industrialisation process ?

Low 1 2 3 4 5 High

2-2. How important have been the impact of the Metrology Unit/Measurement Center activities on upgrading metrology technology/skills in Malaysia ?

0 None Low 1 2 3 4 5 High

2-3. Is there any impacts of the Metrology Unit/Measurement Center activities on upgrading metrology technology/skills of your company ?

Yes No

If "Yes", Please rate the impacts 0 None Low 1 2 3 4 5 High

2-4. Have there been any "Negative Impacts" from the Metrology Unit/Measurement Center on the improvement of metrology of your company ?

Yes No

If "Yes", Please rate the importance Low 1 2 3 4 5 High

If "Yes", Please explain : _____

2-5. After your company/organisation started using calibration/measurement services, did your cost of production increase ?

Yes No

If "Yes", % increase in cost due to using cal./meas. services

(.....%)

2-6. Was there an increase in your product's quality after using cal./meas. services ?

Yes No

2-7. With the application of calibrated measurement instruments in the production, have your products become more competitive compared with products from :

a. Other domestic companies' Yes No

b. Foreign countries' Yes No

2-8. Do the measurement standards provided in the Metrology Unit/Measurement Center Project meet your metrology needs ?

	Yes	No	Don't know
a. Mass	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Length	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Volume	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Electricity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Temperature	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Other major parameter (_____)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2-9. On average (say 1991) how much does your company/organisation spend annually on calibration services offered by :

- 1991
- a. SIRIM \$ _____
- b. Other Malaysian labs \$ _____
- c. Foreign Metrology Center \$ _____

2-10. Any other comments _____

Relevance

This section is concerned with the relevance of the Project, i.e. whether the objectives of the Project are pertinent and worthwhile. Kindly tick (✓) the most appropriate answer or write down your comments.

3-1. Is your company's current needs for SIRIM's Metrology Unit/Measurement Center services different from your needs 5 years ago ?

Yes No

If "Yes", Please explain the changes : _____

3-2. Do you utilise the Calibration/Measurement/Consultation services of other institute(s) and/or labs in Malaysia ?

Yes No

If "Yes", Please state the reason :

- | | Yes | Reason |
|--------------------------|--------------------------|---------|
| a. Mass | <input type="checkbox"/> | (_____) |
| b. Length | <input type="checkbox"/> | (_____) |
| c. Volume | <input type="checkbox"/> | (_____) |
| d. Electricity | <input type="checkbox"/> | (_____) |
| e. Temperature | <input type="checkbox"/> | (_____) |
| f. Other major parameter | | |
| (_____) | <input type="checkbox"/> | (_____) |

3-3. Do you utilise the metrology service of institute(s) and/or labs outside of Malaysia ?

Yes No

If "Yes", Please state the reason :

- | | Yes | Reason |
|--------------------------|--------------------------|---------|
| a. Mass | <input type="checkbox"/> | (_____) |
| b. Length | <input type="checkbox"/> | (_____) |
| c. Volume | <input type="checkbox"/> | (_____) |
| d. Electricity | <input type="checkbox"/> | (_____) |
| e. Temperature | <input type="checkbox"/> | (_____) |
| f. Other major parameter | | |
| (_____) | <input type="checkbox"/> | (_____) |

3-4. How much did the calibration/measurement unit in your firm cost last year in terms of :

- a. \$ _____
- b. % total annual production _____ %

3-5. Can you please rate the reliability and service proficiency of various metrology labs ?

	Highly unpredictable				Service assured
a. SIRIM	1	2	3	4	5
b. SISIR	1	2	3	4	5
c. SEEL	1	2	3	4	5

3-6. If your company/organisation has sent equipment to be calibrated outside of Malaysia, can you estimate the additional cost (i.e. fees, freight, transport, documentation, etc) to send it overseas than to SIRIM (for a similar equipment):

- a. Singapore (SISIR/SEEL) _____ % (more than to SIRIM)
- b. US _____ % (more than to SIRIM)
- c. UK _____ % (more than to SIRIM)
- d. Australia _____ % (more than to SIRIM)
- e. Japan _____ % (more than to SIRIM)

3-7. Is there any other parameters which you would like to see SIRIM offers ?

Yes No

If "Yes", please comment : _____

3-8. Any other comments _____

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Definitions

In order to standardise the understanding of terms used in this survey, several commonly used terms are defined below:-

- Calibration** The set of operations which establish, under specified conditions, the relationship between values indicated by a measuring instrument or measuring system, or values represented by a material measure, and the corresponding known values of a measurand
- Standard** A standard, generally of the highest metrological quality available at a given location, from which measurements made at that location are derived.
- Services** Calibration/measurement/verification and/or consultancy available for own use and/or for clients.

SIRIM's Metrology System

Consists of two components, standards and services:

- (a) the calibration/measurement/verification standard set by SIRIM;
- (b) the calibration/measurement/verification service available at SIRIM.

Malaysia's Metrology System

Consists of two components:

- (a) SIRIM's Metrology System;
- (b) Private Sector's Metrology System (Private metrology labs and private industry labs).

JOINT EVALUATION STUDY

Date :.....

Background Information

Respondent's name :

Current Designation :

Firm or Organisation :

Address :

No of Workers/Employees : _____

Industrial Sector : _____

(Main business activity): _____

Year Firm/Institution established : _____

Interviewer:

Project : MIDEC
Metrology
Fine Ceramics

0. Have you heard of the Metrology Project (1981-1984) in SIRIM which was sponsored by the Japan International Cooperation Agency (JICA) ?

Yes No

Effectiveness

This section is concerned with the effectiveness of the Project, i.e. the extent whereby the objectives of the Project are successful. Kindly tick (✓) the most appropriate answer or write down your comments.

1-1. Please rate the level of attainment of Malaysia's metrology requirements which have been contributed by the Metrology Unit/Measurement Center since 1986 ?

	No comment	Low	1	2	3	4	High	5
a. Overall	<input type="checkbox"/>	1	2	3	4	5		
b. Mass	<input type="checkbox"/>	1	2	3	4	5		
c. Length	<input type="checkbox"/>	1	2	3	4	5		
d. Volume	<input type="checkbox"/>	1	2	3	4	5		
e. Electricity	<input type="checkbox"/>	1	2	3	4	5		
f. Temperature	<input type="checkbox"/>	1	2	3	4	5		
g. Other parameters	<input type="checkbox"/>	1	2	3	4	5		

1-2. Please rate the level of attainment of Malaysia's metrication programme which have been contributed by the Metrology Unit/Measurement Center since 1986 ?

Low	High
1	5
2	
3	
4	

1-3. To what extent are Malaysia's metrology requirements today achieved by outputs of the Metrology Unit/Measurement Center ?

	No comment	Low	1	2	3	4	High	5
a. Overall	<input type="checkbox"/>	1	2	3	4	5		
b. Mass	<input type="checkbox"/>	1	2	3	4	5		
c. Length	<input type="checkbox"/>	1	2	3	4	5		
d. Volume	<input type="checkbox"/>	1	2	3	4	5		
e. Electricity	<input type="checkbox"/>	1	2	3	4	5		
f. Temperature	<input type="checkbox"/>	1	2	3	4	5		
g. Other parameters	<input type="checkbox"/>	1	2	3	4	5		

1-4. To what extent has the metrology technology/skill been upgraded in the Metrology Unit/Measurement Center today compared to 5 years ago ?

	No comment	None	Low					High
a. Overall		0	1	2	3	4	5	
b. Mass	<input type="checkbox"/>	0	1	2	3	4	5	
c. Length	<input type="checkbox"/>	0	1	2	3	4	5	
d. Volume	<input type="checkbox"/>	0	1	2	3	4	5	
e. Electricity	<input type="checkbox"/>	0	1	2	3	4	5	
f. Temperature	<input type="checkbox"/>	0	1	2	3	4	5	
g. Other parameters	<input type="checkbox"/>	0	1	2	3	4	5	

1-5. Given that SIRIM is the National Metrology Center, how would you rate their activities ?

	Low				High
a. Establishment and maintenance of standards/traceability	1	2	3	4	5
b. Monitoring local metrology labs	1	2	3	4	5
c. Dissemination of new measurement techniques	1	2	3	4	5
d. Measurement/calibration services	1	2	3	4	5
e. Consultancy services	1	2	3	4	5
f. Training on Metrology	1	2	3	4	5

1-6. Do the measurement standards provided in the Metrology Unit/Measurement Center meet the needs of metrology in Malaysia today ?

	Yes	No	Don't know
a. Overall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Mass	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Length	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Volume	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Electricity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Temperature	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. Other parameters	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

1-7. Do the calibration/verification services established in the Metrology Unit/Measurement Center meet the needs of Metrology and Industrialization in Malaysia today ?

a. Metrology Yes No Don't know
 If "No", please comment : _____

b. Industrialization Yes No Don't know

If "No", please comment : _____

1-8. Any other comments _____

Impact

This section is concerned with the impact of the Project, i.e. the effects of the Project; direct or indirect, positive or negative. Kindly tick (✓) the most appropriate answer or write down your comments.

2-1. Do you think the Metrology Unit/Measurement Center has contributed to the industrialisation process in Malaysia ?

Yes No

If yes, how important was it ? Low 1 2 3 4 5 High

2-2. How important have been the impact of the Metrology Unit/Measurement Center on upgrading metrology skills in Malaysia ?

	No comment	None	Low					High
a. Overall		0	1	2	3	4	5	
b. Mass	<input type="checkbox"/>	0	1	2	3	4	5	
c. Length	<input type="checkbox"/>	0	1	2	3	4	5	
d. Volume	<input type="checkbox"/>	0	1	2	3	4	5	
e. Electricity	<input type="checkbox"/>	0	1	2	3	4	5	
f. Temperature	<input type="checkbox"/>	0	1	2	3	4	5	
g. Other parameters	<input type="checkbox"/>	0	1	2	3	4	5	

2-3. To what extent has the metrology technology/skill been upgraded in Malaysia today compared to 5 years ago ?

	No comment	None	Low					High
a. Overall		0	1	2	3	4	5	
b. Mass	<input type="checkbox"/>	0	1	2	3	4	5	
c. Length	<input type="checkbox"/>	0	1	2	3	4	5	
d. Volume	<input type="checkbox"/>	0	1	2	3	4	5	
e. Electricity	<input type="checkbox"/>	0	1	2	3	4	5	
f. Temperature	<input type="checkbox"/>	0	1	2	3	4	5	
g. Other parameters	<input type="checkbox"/>	0	1	2	3	4	5	

2-4. Can you please rate the performance and service proficiency of various metrology labs ?

	Low				High
a. SIRIM	1	2	3	4	5
b. SISIR	1	2	3	4	5
c. SEEL	1	2	3	4	5
d. Other foreign labs	1	2	3	4	5
e. Local labs	1	2	3	4	5

2-5. Do you think the Metrology Unit/Measurement Center has resulted in an increase of international inter-comparison of standards maintained in SIRIM ?

Yes No

2-6. Were there any unexpected outcomes of the Metrology Unit/Measurement Center ?

Yes No

If "Yes", please comment : _____

2-7. Have there been any "Negative Impacts" from the Metrology Unit/Measurement Center on the the improvement of metrology in Malaysia ?

Yes No

If "Yes", Please rate the importance Low 1 2 3 4 5 High

If "Yes", please explain : _____

2-8. Have there been any "Negative Impacts" from the Metrology Unit/Measurement Center on Malaysia's metrication programme ?

Yes No

If "Yes", Please rate the importance Low 1 2 3 4 5 High

If "Yes", Please explain : _____

2-9. Any other comments _____

Relevance

This section is concerned with the relevance of the Project, i.e. whether the objectives of the Project are pertinent and worthwhile. Kindly tick(✓) the most appropriate answer or write down your comments.

3-1: Is the purpose and goal of the Metrology Unit/Measurement Center still valid ?

Yes No

If "No", Please explain : _____

Purpose: a. Establishment of a calibration/measurement standard
b. Establishment of a high level calibration/measurement service system

Goal : Improvement of Malaysian calibration and measurement technology

3-2. Are the measurement standards and calibration/verification services, etc of the Metrology Unit/Measurement Center sufficient to meet the current needs of metrology in Malaysia ?

Yes No

If "No", Please explain : _____

3-3. Have there been major changes in Malaysia's industrialization process to warrant a change in the Metrology Unit/Measurement Center design ?
(If "No", skip Q 3-4)

Yes No

If "Yes", What are the changes : _____

3-4. Has the Metrology Unit/Measurement Center adapted to the changing needs ?

Yes No Don't know

If "No", Please comment : _____

3-5. Any other comments _____

This section is concerned with the sustainability of the Project, i.e. the extent the Project is continued after the assistance is completed. Kindly tick(✓) the most appropriate answer or write down your comments.

4-1. Please assess the performance of the Metrology Unit/Measurement Centre in meeting the current needs of Malaysia's Metrology System.

	No comment	Low				High
a. Overall	<input type="checkbox"/>	1	2	3	4	5
b. Mass	<input type="checkbox"/>	1	2	3	4	5
c. Length	<input type="checkbox"/>	1	2	3	4	5
d. Volume	<input type="checkbox"/>	1	2	3	4	5
e. Electricity	<input type="checkbox"/>	1	2	3	4	5
f. Temperature	<input type="checkbox"/>	1	2	3	4	5
g. Other parameters	<input type="checkbox"/>	1	2	3	4	5

4-2. Please assess the contribution of the Metrology Centre in the diffusion of metrication in Malaysia today.

Low 1 2 3 4 5 High

4-3. Do you think the metrology standards maintained by the Metrology Center meet most of the needs of industry today?

No comment	Inadequate	Satisfactory	Excellent
<input type="checkbox"/>	1	2 3 4	5

4-4. How would you rate the services of the Metrology Unit/Measurement Center in meeting the needs of industries in Malaysia today?

	No comment	Inadequate	Satisfactory	Excellent
a. Overall	<input type="checkbox"/>	1	2 3 4	5
b. Mass	<input type="checkbox"/>	1	2 3 4	5
c. Length	<input type="checkbox"/>	1	2 3 4	5
d. Volume	<input type="checkbox"/>	1	2 3 4	5
e. Electricity	<input type="checkbox"/>	1	2 3 4	5
f. Temperature	<input type="checkbox"/>	1	2 3 4	5
g. Other major parameters	<input type="checkbox"/>	1	2 3 4	5

4-5. Does the Metrology Unit/Measurement Center have enough resources for its activities ?

	Yes	No	Don't Know
a. Overall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Human resources (e.g. sufficient professional and technical personnel)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Facilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4-6. What other calibration/measurement services should be offered by SIRIN's Metrology Unit/Measurement Center ?

Please state : _____

4-7. Any other comments _____

Thank you for your cooperation !