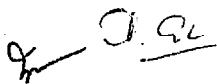
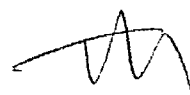


List of Annexes

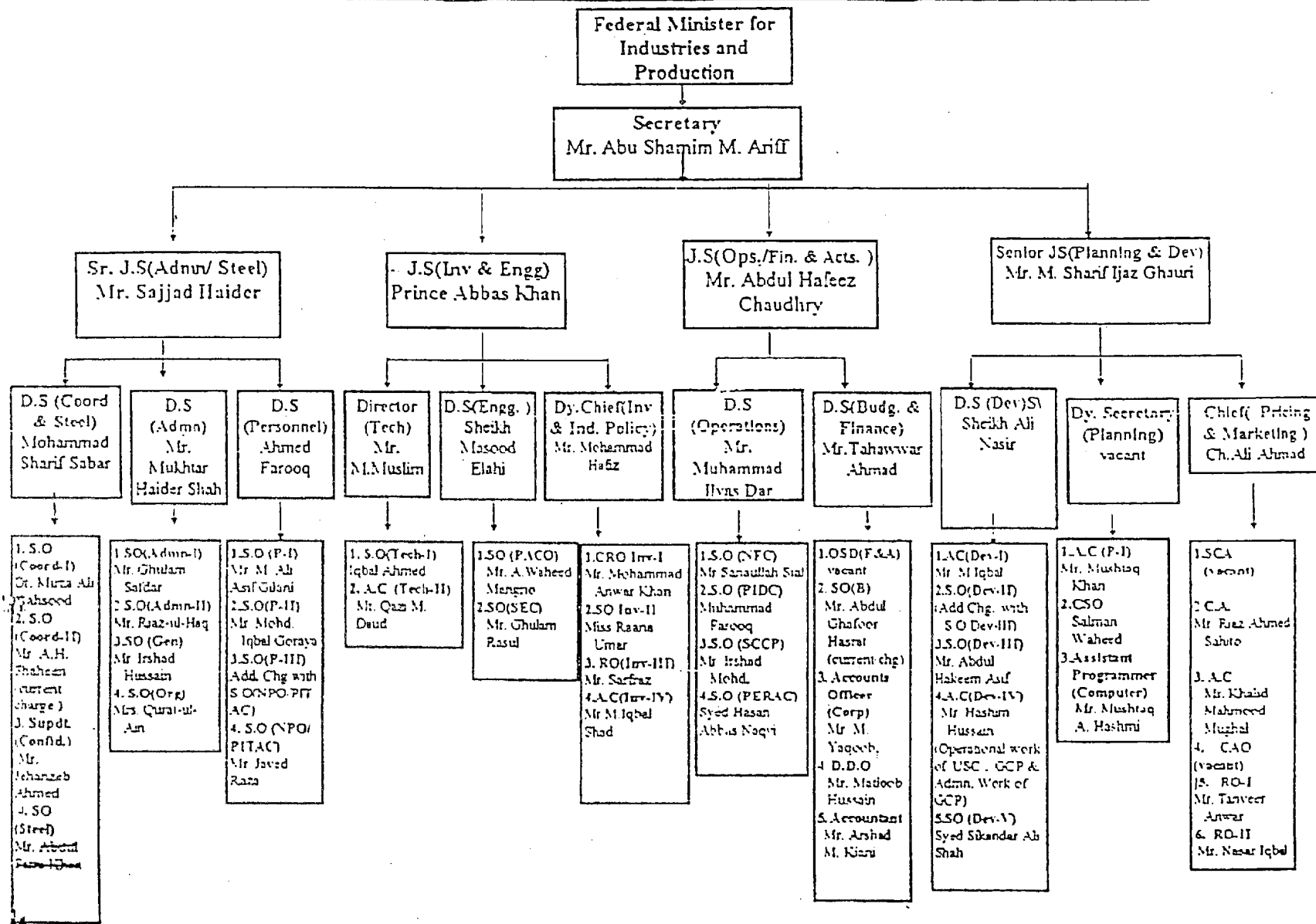
- 1 Organization Chart of Ministry of Industries and Production
- 2 Organization Chart of PITAC
- 3 Budget, Settlement Account, Generated Income of PITAC
- 4 Summary of PITAC's Performance
- 5-1a Training Courses of PITAC (Technical Courses)
- 5-1b Training Courses of PITAC (Human Resource Development Courses)
- 5-2 Course Contents of Technical Training Courses of PITAC
- 6 Machinery and Equipment at Machine and Tool Shop of PITAC
- 7 Impact of JICA Phase 1 Project
- 8 Assistance to PITAC from Donor Agencies
- 9 Target Products for Plastic Moulding Die
- 10 List of Charts for Project Planning and Management
- 11 Project Design Matrix (PDM)
- 12 Plan of Operations (PO)
- 13 Annual Plan of Operations (APO) (Draft)
- 14 Technical Cooperation Program (TCP)
- 15 Annual Technical Cooperation Program (ATCP) (Draft)
- 16 Tentative Schedule of Implementation (TSI)
- 17 Annual Tentative Schedule of Implementation (ATSI) (Draft)
- 18-1 List of Machinery and Equipment for the Project
- 18-2 Size and Capacity of Machinery and Equipment
- 19 Location of Project Building in PITAC
- 20 Construction Schedule of Project Building
- 21 Requirements for Project Building and Equipment Installation Environment
- 22 Tentative Plan of the Project Site
- 23 Allocation Plan of Counterpart Personnel
- 24 List of the PITAC Personnel to be deployed to the JICA Phase-II Project
- 25 The Budget Allocated for the Project
- 26 Five Basic Evaluation Components
- 27 Monitoring and Evaluation Plan
- 28 Common Formats for Monitoring and Evaluation (Draft)
- 29 The Function and Composition of Joint Coordinating Committee
- 30 Items to be Follow-up by Both Sides until the Commencement of the Project
- 31 List of Attendees of the Meeting







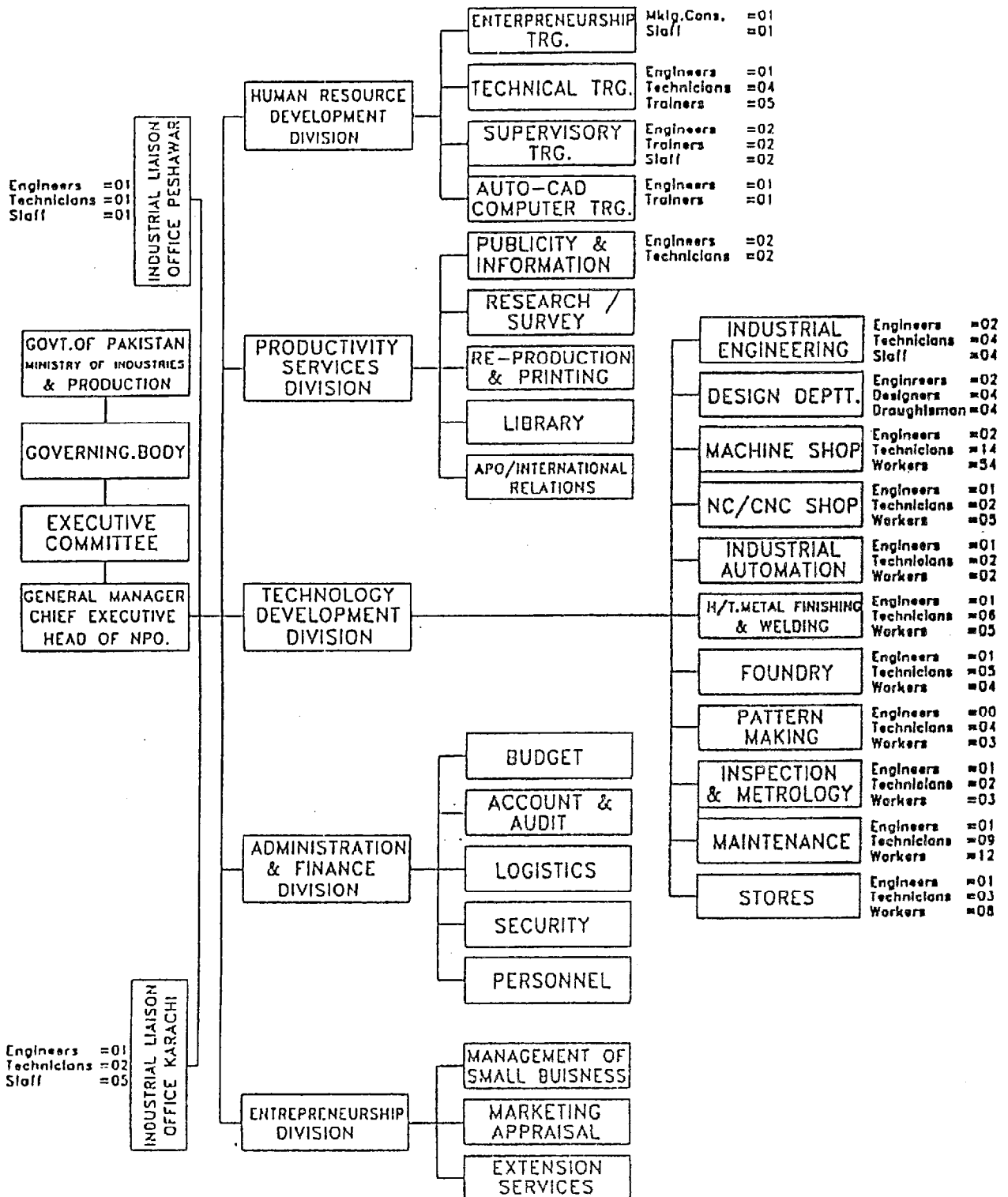
ORGANIZATIONAL CHART OF M/O INDUSTRIES AND PRODUCTION



- 67 -

COMPUTER CELL
M/o Ind. & Prod.
dated: 10-3-2000.

PITAC: ORGANISATION CHART



LEGEND:

- ENGINEERS: University Graduate in Engineering.
- TECHNICIANS: 3 Years Diploma Course from Polytechnic.
- WORKERS: Matriculate with 2 years Certificate from Vocational Training Institute.
- STAFF: Superintendent, Clerk, Typist, Office Boys, etc.

Rev: 8th April, 2000

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Annex 3

Budget, Settlement Account, Generated Income of PITAC, 1995-96

Expenditure	Estimated (A)	Actual (B)	(B)/(A)	Income	Estimated (A)	Actual (B)	(B)/(A)
Personnel Expense	31,320,000/-	31,319,722/-	100.00%	Training	1,300,000/-	1,280,255/-	98.48%
Utilities	2,364,500/-	2,364,598/-	100.00%	Advisory and Consultancy Service	100,000/-	60,027/-	60.27%
Office Consumable	477,000/-	477,176/-	100.03%	Seminars and Conference	200,000/-	190,563/-	95.28%
Furniture Fixture & Tools Equipment	483,500/-	483,574/-	100.00%	Production (Die Moulds & Services)	2,700,000/-	2,808,169/-	104%
Repair & Maint	256,000/-	255,827/-	99.93%	Misc.	50,000/-	8,180/-	16.36%
				Total Receipt	4,350,000/-	4347194/-	99.94%
Others (APO Contribution Conference, Seminar & Symposia.	3,836,000/-	3,836,297/-	100.00%	Govt. grant-in-Aid	34,390,000/-	34,390,000/-	100%
Total	38,737,000/-	38,737,194/-	100.00%	Total	38,740,000/-	38,737,194/-	99.99%
Income/Expenditure (Actual)							100%

Budget Settlement Account, Generated Income of PITAC, 1996-97

Expenditure	Estimated (A)	Actual (B)	(B)/(A)	Income	Estimated (A)	Actual (B)	(B)/(A)
Personnel Expense	33,574,324/-	33,572,426/-		Training	1,800,000/-	1,793,457/-	99.64%
Utilities	2,518,500/-	2,518,297/-		Advisory and Consultancy Service	100,000/-	88,117/-	88.12%
Office Consumable	720,000/-	719,617/-		Seminars and Conference	200,000/-	205,148/-	102.57%
Furniture & Office	652,500/-	652,623/-		Production (Die Moulds & Services)	2,400,000/-	2,355,826/-	98.16%
Maintenance	781,000/-	781,485/-		Others	50,000/-	47,776/-	95.55%
				Total Receipt	4,550,000/-	4,490,324/-	98.69%
Others (APO Contribution Conference, Seminar & Symposia.	4,782,000/-	4,781,722/-		Govt. Grant-in-Aid	38,538,000/-	38,538,000/-	100.00%
Total	43,028,324/-	43,026,170/-		Total	43,088,000/-	43,028,324/-	99.88%
Income/Expenditure (Actual)							100%

Budget, Settlement Account, Generated Income of PITAC, 1997-98

Expenditure	Estimated (A)	Actual (B)	(B)/(A)	Income	Estimated (A)	Actual (B)	(B)/(A)
Personnel Expense	33,115,000/-	33,114,661/-		Training	1,600,000/-	1,518,935/-	94.93%
Utilities	2,848,000/-	2,847,842/-		Advisory and Consultancy Service	100,000/-	110,171/-	110.17%
Office Consumable	820,500/-	820,624/-		Seminars and Conference	250,000/-	241,563/-	96.63%
Furniture & Office	333,000/-	333,008/-		Production (Die Moulds & Services)	2,300,000/-	2,297,209/-	99.87%
Maintenance	586,000/-	586,231/-		Others	50,000/-	36,122/-	74.24%
				Total Receipt	4,300,000/-	4,204,000/-	97.70%
Others (APO Contribution Conference, Seminar & Symposia.	5,501,500/-	5,500,697/-		Govt. grant-in Aid	39,000,000/-	39,000,000/-	100.00%
Total	43,204,000/-	43,203,063/-		Total	43,300,000/-	43,204,000/-	99.78%
Income/Expenditure (Actual)							100%

Budget, Settlement Account, Generated Income of PITAC, 1998-99

Expenditure	Estimated (A)	Actual (B)	(B)/(A)	Income	Estimated (A)	Actual (B)	(B)/(A)
Personnel Expense	26,751,270/-	26,749,813/-	100%	Training	1,200,000/-	1,073,939/-	89.49%
Utilities	3,031,000/-	3,031,047/-	100%	Advisory and Consultancy Service	100,000/-	78,421/-	78.42%
Office Consumable	880,500/-	881,031/-	100%	Seminars and Conference	150,000/-	140,094/-	93.40%
Furniture & Office	--	--	--	Production (Die Moulds & Services)	3,100,000/-	2,721,316/-	87.78%
Maintenance	421,800/-	422,142/-	100%	Others	50,000/-	50,000/-	100%
				Total Receipt	4,600,000/-	4,063,770/-	88.34%
Others (APO Contribution Conference, Seminar & Symposia.	5,371,000/-	5,371,537/-	100%	Govt. grant-in Aid	32,391,800/-	32,391,800/-	100.00%
Total	36,455,570/-	36,455,570/-	100%	Total	36,991,800/-	36,455,570/-	98.55%
Income/Expenditure (Actual)							100%

Budget Statement Account, Generated Income of PITAC, 1999-2000 (JUL 1999-JUNE 2000)

Expenditure	Estimated (A)	Actual (B)	(B)/(A)	Income	Estimated (A)	Actual (B)	(B)/(A)
Personnel Expense	30,229,035/-	30,227,808/-	100%	Training	1,000,000/-	561,305/-	56.13%
Utilities	2,935,000/-	2,934,996/-	100%	Advisory and Consultancy Service	100,000/-	63,592/-	63.59%
Office Consumable	1,246,600/-	1,246,733/-	100%	Seminars and Conference	300,000/-	145,500/-	48.50%
Furniture & Office	--	--	--	Production (Die Moulds & Services)	3,550,000/-	2,395,738/-	67.48%
Maintenance	445,000/-	446,367/-	100%	Others	50,000/-	19,500/-	39.00%
				Total Receipt	5,000,000/-	3,185,635/-	63.71%
Others (APO Contribution Conference, Seminar & Symposia.	6,330,000/-	6,329,731/-	100%	Govt. grant-in Aid	38,000,000/-	38,000,000/-	54.97%
Total	41,185,635/-	41,185,635/-	100%	Total	43,000,000/-	41,185,635/-	95.78%
				Income/Expenditure (Actual)		100.00%	

Budget Statement Account, Generated Income of PITAC, 2000-2001 (JULY 2000-February 2001)

Expenditure	Estimated (A)	Actual (B)	(B)/(A)	Income	Estimated (A)	Actual (B)	(B)/(A)
Personnel Expense	34,250,000/-	21,269,092/-	62%	Training	1,000,000/-	326,825 /-	33%
Utilities	3,647,000/-	1,971,669/-	54%	Advisory and Consultancy Service	100,000/-	66,750/-	67%
Office Consumable	1,243,000/-	722,231/-	58%	Seminars and Conference	300,000/-	60,052/-	20%
Furniture & Office	--	--	--	Production (Die Moulds & Services)	3,550,000/-	6,69,566/-	19%
Maintenance	510,000/-	241,864/-	47%	Others	50,000/-	5100/-	10%
				Total Receipt	5,000,000/-	11,28,293/-	23%
Others (APO Contribution Conference, Seminar & Symposia.	6,150,675/-	6,439,819 /-	105%	Govt. grant-in Aid	40,800,000/-	30,497,000/-	75%
Total	45,800,000/-	30,644,675/-	67%	Total	45,800,000/-	31,625,293/-	69%
				Income/Expenditure (Actual)		103%	

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Annex 4

Summary of PITAC's Performance

1	Activities	Type	94		95		96		97		98		99		2000	
			I.C	I.P	I.C	I.P	I.C	I.P	I.C	I.P	I.C	I.P	I.C	I.P	I.C	I.P
	(1) Technical Training	course	-	17	-	19	-	15	-	19	-	23	-	25	-	24
		attendees	-	248	-	138	-	234	-	168	-	94	-	103	-	98
	(2) HRD Training	course	9	28	7	9	7	7	6	5	4	7	6	9	5	9
		attendees	118	354	290	328	150	115	130	106	70	108	100	120	98	120
	Total	course	9	45	7	28	7	22	6	24	4	30	6	34	5	33
		attendees	118	602	290	466	150	349	130	274	70	202	100	223	95	218
2	Advisory and Consultancy Services		Quantity		Quantity		Quantity		Quantity		Quantity		Quantity			
	(1) Technical Expert Services (APO)	- Mould Making - ISO 9000 - QC Techniques - Moulding	5		6		8		8		10		11		8	
	(2) Local Expertise and Technological Backup Support (PITAC)	- Moulds - Dies/Tools - Technical advices - In-plant Improvement - Others	295 90 200 100 110		379 117 225 97 126		407 134 230 105 106		429 103 201 92 57		453 91 193 83 95		467 95 225 97 103		457 93 215 91 99	
	Total		800		950		990		890		925		987		955	
3	Seminars and Conferences		Number	Attendees	Number	Attendees	Number	Attendees	Number	Attendees	Number	Attendees	Number	Attendees	Number	Attendees
	(a) Quality		6	60	1	435	2	493	3	547	3	473	3	535	3	487
	(b) Productivity		2	18	1	64	2	63	2	85	3	107	4	127	4	120
	(c) Technology		4	22	-	-	1	32	1	27	2	43	3	68	3	72
	(d) Others		1	19	-	-	1	9	1	13	1	29	1	37	1	35
	Total		13	119	2	499	6	597	7	672	9	652	11	767	11	714

I.C In Company

I.P In PITAC

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Training Courses of PITAC (1996)

(Technical Courses)

Training Course	Course Title	Type of Training	Duration	Attendees	Remarks	
Regular Training Course	1. Machine Shop Practices	OJT	10 weeks	40		
	-do-	2. Jig & Fixture Design	-do-	-do-	15	
	-do-	3. Precision Die and Mould Making	-do-	-do-	35	
	-do-	4. Press Tool & Mould Design	-do-	-do-	40	
	-do-	5. Cutting Tool & Gauge Design	-do-	-do-	30	
	-do-	6. Basic Drafting	-do-	6 weeks	10	
	-do-	7. Advance Drafting	-do-	-do-	15	
	-do-	8. Inspection & Quality Control	-do-	-do-	9	
	-do-	9. Heat Treatment	-do-	-do-	2	
	-do-	10. Basic Pneumatics	-do-	-do-	12	
Special Training Course	11. CNC Machine Tool	-do-	2 weeks	6		
	-do-	12. Tool Design	-do-	6 weeks	4	
	-do-	13. Tool and Cutter Grinding	-do-	4 weeks	6	
	-do-	14. Induction Hardening Techniques	-do-	1 weeks	5	
	-do-	15. Gear Cutting	-do-	2 weeks	5	
				234		

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Training Courses of PITAC (1997)

(Technical Courses)

Training Course	Course Title	Type of Training	Duration	Attendees	Remarks
Regular Training Course	1. Machine Shop Practice.	OJT	10 weeks	8	
-do-	2. Jigs and Fixtures Design.	-do-	-do-	5	
-do-	3. Precision Die and Mould Making.	-do-	-do-	28	
-do-	4. Press Tool and Mould Design.	-do-	-do-	22	
-do-	5. Cutting Tool and Gauge Design	-do-	-do-	20	
-do-	6. Basic Drafting .	-do-	6 weeks	15	
-do-	7. Advance Drafting.	-do-	-do-	6	
-do-	8. Inspection and Quality Control	-do-	-do-	7	
-do-	9. Heat Treatment.	-do-	-do-	4	
-do-	10. Basic Pneumatics.	-do-	-do-	12	
Special Training Course	11. CNC Machine Tool	-do-	2 weeks	2	
-do-	12. Tool Design.	-do-	6 weeks	2	
-do-	13. Tool and Cutter Grinding.	-do-	4 weeks	2	
-do-	14. Induction Hardening Techniques	-do-	1 weeks	5	
-do-	15. Gear Cutting.	-do-	2 weeks	8	
-do-	16. Sheet Metal	-do-	1 weeks	-	
-do-	17. EDM; Wirecut	-do-	-do-	10	
-do-	18. Spark Erosion	-do-	-do-	10	
-do-	19. CNC Milling	-do-	2 weeks	4	
				168	

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Training Courses of PITAC (1998)

(Technical Courses)

Training Course	Course Title	Type of Training	Duration	Attendees	Remarks
Regular Training Course	1. Machine Shop Practice.	OJT	10 weeks	6	
-do-	2. Jigs and Fixture Design.	-do-	-do-	8	
-do-	3. Precision Die and Mould Making.	-do-	-do-	10	
-do-	4. Press Tool and Mould Design.	-do-	-do-	6	
-do-	5. Cutting Tool and Gauge Design	-do-	-do-	15	
-do-	6. Basic Drafting.	-do-	6 weeks	6	
-do-	7. Advance Drafting	-do-	-do-	4	
-do-	8. Inspection and Quality Control.	-do-	-do-	5	
-do-	9. Heat Treatment.	-do-	-do-	2	
-do-	10. Basic Pneumatics.	-do-	-do-	4	
Special Training Course	11. CNC Machine Tool.	-do-	2 weeks	2	
-do-	12. Tool Design.	-do-	6 weeks	2	
-do-	13. Tool and Cutter Grinding.	-do-	4 weeks	2	
-do-	14. Induction Hardening.	-do-	1 weeks	4	
-do-	15. Gear Cutting.	-do-	-do-	1	
-do-	16. CNC Milling.	-do-	2 weeks	6	
-do-	17. Spark Erosion	-do-	1 weeks	2	
-do-	18. EDM Wirecut	-do-	-do-	2	
-do-	19. Profile Grinder	-do-	-do-	1	
-do-	20. Jig Grinding.	-do-	-do-	2	
-do-	21. Ultrasound Flaw Detector	-do-	-do-	2	
-do-	22. Universal Measuring Machine	-do-	-do-	2	
-do-	23. Roundness Measuring Machine	-do-	-do-	2	
				94	

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Training Courses of PITAC (1999)

(Technical Courses)

Training Courses	Course Title	Type of Training	Duration	Attendees	Remarks
Regular Training Courses	1. Machine Shop Practice	OJT	10 Weeks	10	
-do-	2. Jig & Fixture Design	-do-	-do-	10	
-do-	3. Precision Die and Mould Making	-do-	-do-	21	
-do-	4. Press Tool & Mould Design	-do-	-do-	10	
-do-	5. Cutting Tool & Gauge Design	-do-	-do-	15	
-do-	6. Basic Drafting	-do-	6 Weeks	5	
-do-	7. Advanced Drafting	-do-	-do-	4	
-do-	8. Inspection & Quality Control	-do-	-do-	5	
-do-	10. Basic Pneumatics	-do-	2 Weeks	4	
Special Training Courses	11. CNC Machine Tools	-do-	6 Weeks	6	
-do-	12. Tool Design	-do-	1 Week	4	
-do-	14. Induction Hardening Technique	-do-	2 Weeks	5	
-do-	15. Gear Cutting	-do-		4	
				103	

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Training Courses of PITAC (2000)

(Technical Courses)

Training Courses	Course Title	Type of Training	Duration	Attendees	Remarks
Regular Training Courses	1. Machine Shop Practice	OJT	10 Weeks	10	
-do-	2. Jig & Fixture Design	-do-	-do-	10	
-do-	3. Precision Die and Mould Making	-do-	-do-	18	
-do-	4. Press Tool & Mould Design	-do-	-do-	10	
-do-	5. Cutting Tool & Gauge Design	-do-	-do-	13	
-do-	6. Basic Drafting	-do-	6 Weeks	5	
-do-	7. Advanced Drafting	-do-	-do-	4	
-do-	8. Inspection & Quality Control	-do-	-do-	5	
-do-	10. Basic Pneumatics	-do-	2 Weeks	4	
Special Training Courses	11. CNC Machine Tools	-do-	6 Weeks	6	
-do-	12. Tool Design	-do-	1 Week	4	
-do-	14. Induction Hardening Technique	-do-	2 Weeks	5	
-do-	15. Gear Cutting	-do-	-do-	4	
				98	

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Training Courses of PITAC (1996)

(HRD Courses)

Training Course	Course Title	Type of Training	Duration	Attendees	Remarks
HRD Programmes	1. Supervisory Development	Seminar	1 weeks	40	
	2. Tool Engineering Techniques	-do-	10 weeks	32	
	3. Market Appraisal Techniques	-do-	10 days	30	
	4. ISO 9000	-do-	1 weeks	10	
	5. Post Harvest Technology for Vegetables	-do-	-do-	14	
	6. 7-Quality Tools for Continuous Improvement	-do-	3 days	21	
	7. Energy Management	-do-	2 weeks	20	
	8. Hand Knotted Carpet Industry	Study Mission	1 weeks	11	
	9. Quality Control Circles	Seminar	3 days	12	
	10. Tool Engineering Techniques	-do-	1 week	15	
	11. Total Quality Management	-do-	-do-	20	
	12. Problem Solving Techniques	-do-	2 days	12	
	13. How to Start Export Business	-do-	4 days	20	
	14. Energy Audit	-do-	1 day	08	
				265	

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Training Courses of PITAC (1997)

(HRD Courses)

Training Course	Course Title	Type of Training	Duration	Attendees	Remarks
HRD Programmes	1. Improving Productivity, Quality, Human Resources and Entrepreneurship Development	Seminar	01 days	11	
	2. Financial Analysis				
	3. Qualified Metals Castings	-do-	10 days	18	
	4. Irrigation Associations	-do-	05 days	12	
	5. Energy Audit	-do-	06 days	32	
	6. Quality Control Circles	-do-	01 days	10	
	7. ISO 9000	-do-	05 days	12	
	8. Supervisor Development	-do-	-do-	102	
	9. Quality Tools for Continuous Improvement	-do-	-do-	12	
	10. Total Quality Management	-do-	-do-	10	
	11. Problem Solving Techniques	-do-	-do-	12	
		-do-	2 days	05	
				236	

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Training Courses of PITAC (1998)

(HRD Courses)

Training Course	Course Title	Type of Training	Duration	Attendees	Remarks
HRD Programmes	1. Tool Engineering Techniques	Seminar	10 weeks	12	
	2. Total Quality Management	-do-	3 days	9	
	3. Export Capabilities of SME's	-do-	10 days	12	
	4. Problem Solving Techniques	-do-	2 days	9	
	5. How to Start Export Business	-do-	4 days	94	
	6. Degraded Soils	-do-	5 days	11	
	7. Quality Tools for Continuous Improvement	-do-	3 days	5	
	8. ISO 9000				
	9. Supervisory Development	-do-	3 days	8	
	10. Quality Control Circles	-do-	1 weeks	6	
	11. Energy Audit	-do-	3 days	6	
		-do-	1 day	6	
				178	

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Training Courses of PITAC (1999)
 ((HRD Courses))

Training Course	Course Title	Type of Training	Duration	Attendees	Remarks
HRD Programmes	1. Tool Engineering Techniques	Seminar	10 weeks	12	
	2. Total Quality Management	-do-	3 days	9	
	3. Export Capabilities of SME's	-do-	10 days	12	
	4. Problem Solving Techniques	-do-	2 days	29	
	5. How to Start Export Business	-do-	4 days	94	
	6. Degraded Soils	-do-	5 days	11	
	7. Quality Tools for Continuous Improvement	-do-	3 days	27	
	8. ISO 9000	-do-	3 days	8	
	9. Supervisory Development	-do-	1 weeks	6	
	10. Quality Control Circles	-do-	3 days	6	
	11. Energy Audit	-do-	1 day	6	
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Training Courses of PITAC (2000)
(HRD Courses)

Training Courses	Course Title	Type of Training	Duration	Attendees	Remarks
HRD Programmes	1. Improving Productivity , Quality, Human Resource and Enterpreneurship Development	Seminar	01 days	11	
	2. Financial analysis	-do-	10 days	18	
	3. Quality Metals Castings	-do-	03 days	12	
	4. Irrigation Association	-do-	06 days	32	
	5. Energy Audit	-do-	01 days	10	
	6. Quality Control Cicles	-do-	-do-	96	
	8. Supervisory Development	-do-	-do-	12	
	9. Quality Tools for Continuous	-do-	-do-	10	
	10. Total Quality Management improvement	-do-	-od-	12	
	11. Problem Solving Techniques	-do-	2 days	05	
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Course Contents of Technical Training Courses of PITAC

1. *Machine Shop Practice*

Workshop Safety Precautions, Introduction to machine & machine Tools, Types of tools, Introduction to basic workshop materials, Different types of lathe, Parts of lathe & their functions, Size of lathe, Lathe operations, Cutting different kinds of threads, Tapers & kind of tapers, Cutting speed & feed on lathe, Shaper and its parts & their functions, Operations on shaper, Cutting V-Block, Key ways & Dove Tail joint on shaper, Introduction to milling machines and different cutters used, Milling operations, Cutting of Spur, Helical & Bevel gears & Drill, Reamer and cam etc, Introduction to bench fitting, Different kinds of files & their functions, Making centre gauge, ACME gauge & Inside/Outside callipers, Introduction to various grinding machines & their operations.

2. *Precision Die and Tool Making*

Introduction, Safety, Use of Precision Tools, Study and practice of various types of Lathe, Cutting various types of Threads, Study and Practice of different types of Milling machines, Cutting Spur, Bevel, Helical and Worm Gears. Precision Surface and Cylindrical Grinding Machines, Profile and Thread Grinding Machines. Profile and Thread Grinding Machines Grinding Wheels and types. Use of Sine bar, Gear Shaping and Hobbing, Lapping, Honing and use of oil stones, Jig boring and Jig Grinding.

3. *Jig and Fixture Design*

Introduction, Economic approach to the provision of special equipment. Basic Design principles, General principles of location, Drill Bushes and Plates, Locating and Clamping Devices. Classification of Jigs for Drilling operations. Analysis and synthesis. Exercises for Designing Jigs, Fixtures, Fixtures for Milling operations. Fixture and Machine relationship, Designing of plain Milling Fixtures, String Milling Fixtures, Gauge Mill Fixtures etc. Limits, Fits and Tolerance, types of screw thread and their applications, types of Gears, Gear Material, application and calculations for Spur Gear. Heat Treatment Processes i.e. Annealing, Normalizing, Hardening, Tempering etc.

4. *Press Tools and Mould Design*

Introduction to Die Design, Blank and Blanking Die, Steps to Design a Die. Layout a scrap strip. Design of the parts as follow Die Block, Punches, Punch Plate, Finger Stoppers, Automatic Stopper, Stripper, Selection of Die set, how to apply fasteners. Types of Dies. Piercing, Blanking, Multi Station Progressive Die, Bending, Notching, Drawing, Forging, Compound, Combination Curling, Trimming. Introduction of Moulds. Steps to Design a Mould. Design principles in part design. General construction and type of Moulds. Runner and Spur Design. Cooling System. Ejection System, Shrinkage, Feed System, Venting.

5. *Cutting Tool and Gauge Design*

Introduction, Basic Trigonometry and Exercises, Study of Flat Form and Circular Form Tools. Tool signatures, recommended angles for High Speed Steel (HSS) for cutting different materials. Designing Flat Form Tool and Circular Form Tool for 3-different shapes, graphically and analytically. Introduction of Gearing. Calculations and Designing 6 DP and 8 DP Milling Cutters. Study of Broaching and Broach Designing. Designing of standard cutting tools as twist drills, Milling cutters, Reamers etc. Study of Fits and Tolerances and Conventional Inspection Gauges. Designing of Plug, Snap,

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Depth and Taper Gauges and special Gauges as per requirement. Study of Threads and Designing Thread, Plug and Thread Ring Gauges. Material Specification. Heat Treatment Process and Surface Finish required for Gauges.

6. *Basic Drafting*

Introduction, Basic Drafting Principles, Type of lines and their application, Orthographic Projection System. Isometric and oblique views. Auxiliary views, Sectional Views, Drawing Practice of 2/3 views, Limits, Fits and Tolerance, types of screw threads and their applications. Types of gears, Gear Material. Engineering Materials (Steel - Plain Carbon Steel and alloy Steels). Brass, Bronze, Plastics, Definition of Heat Treatment. Heat Treatment Processes i.e. Annealing, Normalizing, Hardening and Tempering.

7. *Advanced Drafting*

Introduction, Orthographic Projection system. 1st, 2nd, 3rd and 4th angle projection system. Rejection of 2nd and 4th. 1st and 3rd angles as Industrial standards. Review of Isometric, Obliquish, Sectional and Auxiliary views. Limit, Fits and Tolerance and its application. Types of view threads and their use. Gears, Gear Material and calculations for Spur Gear. Practice of making Orthographic views from Isometric views and from machine components. Practice of making Isometric views from Orthographic views. Heat Treatment processes i.e. Annealing, Normalizing, Hardening, Case Hardening processes. Introduction of Hardening, Tempering etc.

8. *Inspection and Quality Control*

Introduction of measuring instruments and equipment, use of Vernier Calliper, Micrometer, Protector, Dial Indicators and Gauge Block, Sinebar, Wire System of Checking threads different ways of measurement, Tapers, Use of comparators, Visual Gauges, Super Micrometer, Use of Magnaflux, for crack detector and metal monitor. Gear Checking operation of universal length measuring and Ultrasonic flaw detector and Roundness measuring Machine. Proper use of Electronic Comparator and Production Gauges.

9. *Heat Treatment Techniques*

Introduction, Safety, Various types of Heat Treatment, Hardening, Tempering, Quenching, Case Hardening, Cyaniding, Annealing and Normalizing different Steel. Alloy Steel, Identifying Steels, Spark Testing Practice, Carburizing, Heat Treatment of Tool Steels, High Speed Steels.

10. *Basic Pneumatic Course*

Introduction, Compressed Air Production and Distribution. Symbols of Pneumatic components and operational principle. Construction of Pneumatic Valves and Cylinders etc. Exercises on Pneumatic Circuits using Valves and Cylinders. Practical application of Pneumatic to different manufacturing problems and Laboratory Practice. Electro Pneumatics. Introduction and conversion of Pneumatic circuits to Electro Pneumatics.

11. *Pattern Making*

Introduction and proper use and care of bench and hand tools, demonstration of Pattern shop Machinery. Machinery Used, Blue Print Reading exercises in Pattern Making. Layout of Pattern, Methods of making. Split and Match Plate Gated Pattern. Basic Discussion and Demonstration in Foundry work as related to Pattern Making.

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12. *Basic Foundry Practice*

Introduction to Foundry Work, Moulding Sand and its classification practice in Sand Moulding and Core making exercise and testing, Melting practice. Basic Foundry Metallurgy, Machine Moulding, Cleaning and Finishing of Castings. Casting defects and their remedies.

13. *Basic Welding Processes*

Introduction, Safety precautions, Material and equipment used and its characters, practice in Gas and Electric Welding on square Butt Welding Corner Weld, Fillet Weld, Pipe Butt Weld, Branch Pipe Weld, Single V Butt Weld and Cast Iron Weld. Gas Cutting, Brazing practice selection of current and Electrode for Electric Welding.

14. *Basic Course on Mould Making*

The Course is designed, particularly for Workers in the field of Mould Making. The participants of the course are equipped with fundamental techniques involved in this field. Various Machining, Finishing and Assembling Operations are learnt and practiced by the participants

15. *Mould Making for Technicians and Supervisors.*

The course contents include reading and understanding of assembly/part drawings for mould making. Selection of processes/operations for making precision cores and cavities. Assembling Operation and Tools equipment required by a die fitter are learnt and used. Basic introduction to moulding process and clamping of mould on the moulding machine is taught. Inspection of the moulded plastic parts, various defects of plastic parts and their remedies are also learnt.

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Annex 6

Machinery and Equipment at Machine & Tool Shop, PITAC

(As on 8th November, 2000)

S. No.	Field	Name	Specifications & Size	Provided By	Date of Installation	Operation	Maintenance
01	Machine Shop	Shapper	Cincinnati 20" U.S.A.	USA	1956	A	A
02	-do-	DoAll Bend Saw Machine	Sr. No.5821-338	USA	1956	A	A
03	-do-	Power Press 90 tons.	Sr. No.8102	USA	1956	B	A
04	-do-	Power Press 35 tons.	Sr. No.II-46292	USA	1956	B	A
05	-do-	Power Press 27 tons.	Sr. No. 35143	USA	1956	B	A
06	-do-	Planner 36"x10'	Open End' Chipmaster S.No.600-14-56	USA	1957	B	A
07	-do-	Horizontal Boring & Milling Machine	Type CNC-80 400/440 V, 3 Phase,. 50	Polish	10-08-68	B	A
08	-so-	Radial Drilling Machine	Gilbert. Lot-12 Sr. No.4A1010	USA	1957	A	A
09	-do-	Lathe Machine (Prima made)	Model PL-165 (4 1/2 FI) W/accessories	PAK	1.09.91	A	A
10	-do-	Heavy Duty Precision Engine Lathe	Model TAL600	Japan	-do-	A	A
11	-do-	Lathe Machine	Leblond	USA	1956	B	A
12	-do-	Turret Lathe machine	Gisholt Sr. No.2050-14	USA	1957	B.	B
13	-do-	Lathe Machine	PECO Model CL-160 Sr.No.7142	PAK	15.09.81	B	A
14	-do-	Lathe Machine	PECO Brand CL-200	Pak	1986	A	A
15	-do-	Lathe, PECO Made	Model BL-115 SR No.5815	PAK	28.04.77	A	A
16	-do-	Lathe	South Bend	USA	1960	B	B
17	-do-	Capstan lathe	400/440 V, 3 Phase 50 Cycle.	Polish	30-2068	B	A
18	-do-	Drill & Tap Grinder	400/440 V, 3 Phase 50 Cycle.	USA	1960	B	A
19	-do-	Pedastal Grinder	3 Phase 440 V. 50 cycle	China	1983	A	A
20	-do-	Pedastal Grinder	220V, Single Phase			A	A
21	-do-	Power Hacksaw				B	B
22	-do-	Elektron Drill				B	B
23	-do-	Turner Radial Drill M/c.		USA	1957	B	B
24	-do-	Hand Mould Machine	220 V.Single Phase	Pakistan		B	B
25	-do-	Carbide Pedastal Tool Grinder		USA			
26	-do-	Hand Tap Machine				A	A
27	-do-	Bridge Port Milling Machine	3 Phase, 440 V.	USA	1957	A	A
28	-do-	Bridge Port Milling Machine	3 Phase, 440 V.	USA	1957		B
29	-do-	Bridgeport Milling Machine	Sr. No.J-22789	USA	1957	B	A

31	-do-	Universal Milling Machine	Model 63 - W	China	-do-	A	A
32	-do-	Universal Milling Machine	KEARNEY & TRECKER	USA	1957	B	A
33	-do-	Internal/External Cylindrical Grinder	Brown & Sharp	USA	1957	A	B
34	-do-	Plain Surface Grinder	Brown & Sharp Sl. No.5	USA	1957	A	A
35	-do-	Plain Surface Grinder	Gallmeyer & Livingston No.45	USA	1957	B	A
36	-do-	Cylindrical Grinding Machine	Sl.No.1229	China	1966	B	B
37	-do-	Universal Tool & Cutter Grinding Machine	Model-6025 W/Special equipment	China	28-03-68	B	B
38	-do-	Universal Tool & Cutter Grinder	Type NUA 25 400/440 V, 3 Phase 50 Cycle	Polish	16.06.69	B	A
39	-do-	Norton Cylindrical Grinder 6'x3'	Norton	USA	1957	A	A
40	-do-	Universal ToolCutter Grinding M/c.	Gallmeyer & Livingston S.No.119	USA	1957	A	A
41	-do-	Hamilton Universal Gear hobbing Machine No.1	Hamilton	USA	1961	A	A
42	-do-	Gear Hobbing Machine.	Babar & Colman Sr. No. 3398	USA	1961	A	B
43	-do-	Gear Shaper	Fellows No.32187	USA	1957	B	B
44	-do-	Spark Erosion Machine		Russia	1957	B	B
45	-do-	Horizontal Surface Grinding M/c.	Model Ph-3000/1000/440 V. 50Cycle	CZECH	09.06.1969	A	A
46	-do-	Horizontal Surface Grinding M/c.	Model Ph-3000/1000/440 V, 50 Cycle	CZECH	09.,06.69	A	A
47	-do-	Carbide ToolGrinder	Waida Mfg. Co.	Japan	1984	A	A
48	-do-	Internal Grinding	Arter	USA		A	A
49	-do-	Profile Projector (Micrometer)	Model P-600A W/600 mm dia vertical Screen 270 V. Single Phase 50 Cycle	Italian	30.06.70	A	A
50	-do-	Tool Room, Lathe Machine	Model 11462 N400 400/440, 50 Cycle Phase	Russian	20-06-68	B	A
51	-do-	Lathe Machine	Model 1811 W/std accessories	Russian	19-10-68	A	A
52	-do-	Heavy Duty Jig Borer	Milwaki	USA	1957	A	A
53	-do-	Thread Grinder	Sheffielod	USA	1957	A	A
54	-do-	Drill Machine		Pak		A	A
55	-do-	Centreless Grinding Machine	Type SBA, 75 400/440 V, 3 Phase 50 Cycle	-do-	1958	A	A
56	-do-	Heavy Duty Hydraulic Copying Shapper	Type GH 560 380/660 V	Hungry	1957	A	A
57	do	Hydraulic Copy Milling Machine	Bridgeport	USA	-do-	A	A
58	-do-	Lapping Machine	S.No..6101	USA	1957	A	A

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59	-do-	Universal Lapping Machine, Micro Lap	Model UL-1 W/std Accessories 380/400V.3 phaswe 50 cycle.	Germany	1957	A	A
60	-do-	Pantograph Engraving Machine		USA	1957	B	A
61	-do-	Surface Grinding Machine.	John & Shipman. Model 540 England	England	-do-	A	A
62	-do-	Surface Grinding Machine	Brown & Sharp	USA	-do-	A	A
63	-do-	Surface Grinding Machine	Brown & Sharp	USA	-do-	A	A
64	-do-	Horizontal Spindle Tool Room Surface Grinding Machine	Brown & Sharp	USA	1957	A	A
65	-do-	Optical Profile Grinding Machine	400-V Phase, 50 Cycle Complete Wath 5011 & 2001 Pamographs	England	1957	B	A
66	-do-	Jig Grinder	Moore	USA	15.01.92	A	A
67	-do-	Jig Grinder	Moore	USA	15.01.92	A	A
68	-do-	Jig Boring Machine	Moore	USA	1957	A	A
69	-do-	Jig Boring Machine	Moore	USA	1957	A	A
70	-do-	Grind All Fixture No.1		USA	15.1.1992	A	A
71	-do-	Air Compressor, Heavy Duty	2 Stage, Motor 10 HP 1050 RPM Displacement 40 CFM/Max Pressure 150 PSI. Tank Size 250 LTR.	USA		A	A
72	-do-	Air Compressor, Heavy Duty	2 Stage, Motor 10 HP 1050 RPM Displacement 40 CFM/Max Pressure 150 PSI. Tank Size 250 LTR.	Taiwan	1997	A	A
73	-do-	Precision Honning M/c.	Model 5K42JG41 S.No.149405	USA	1957	A	A
74	NC Shop	CNC Milling Machine	Model Makino XE 55	Japan	29.06.95	A	A
75	-do-	EDM Wire Cut Machine	Model Japax LU3B	Japan	1984	A	B
76	-do-	EDM Spark Erosion Machine	Model Japax DP20	-do-	-do-	A	A
77	-do-	NC Copy Milling Machine	Model Makino AGH-UX85	-do-	-do-	A	B
78	-do-	Optical Profile Grinder	Model Wastno GI.S-130	-do-	1983	A	A
79	-do-	Electro Forming Machine	Model HEF50	-do-	1984	B	A

Operations

A = Operated many times
 B = Operated a few time
 C = Almost not operated

Maintenance

A = Good
 B = Necessary to repair (operated now)
 C = Necessary to repair (not operated now)

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Annex 7 Impact of JICA Phase-I Project

1. Technological Back up Support Services: Some Typical Examples

S No	Job No.	Description	Date	Customer
1	24106	Spark Erosion of Mould Insert for I.V drip Mould	4-1-95	M/s. Medi Pak (Pvt) Ltd, Lahore
2	24135	Wire Cutting of Purches, Electrodes and dies for automatic parts	6-2-95	M/s. Tele Tronic Industry Lahore
3	24169	Spark Erosion of Plungers lock set	20-2-95	M/s. Regal Ceramics Gujranwala.
4	24195	Wire Cutting of Punch	7-3-95	M/s. Pakistan Card Clothing Co. Muslim Town Lahore
5	24225	Wire Cutting of die for medicinal tablet making machine	21-3-95	M/s Stand Pharm Pakistan (Pvt) Ltd, Lahore.
6	24226	Spark Erosion of Mould Insert for Auto Cable Clips.	21-3-1995	M/s. Haji Rehman Lahore
7	24227	Spark Erosion of Mould Insert for I.V. drip mould	20-3-1995	M/s. Medi Pak (Pvt) Ltd Lahore.
8	24231	Spark erosion of mould plates	26-3-95	M/s. Thermosole Industry, Lahore
9	24234	Wire Cutting of Punch for shaving blade die	26-3-95	M/s Treect Corporation Lahore.
10	24236	Wire Cutting of Punches.	26-3-95	M/s Pakistan Card Clothing Co. Lahore.
11	24331	Form Grinding of Special form tool for lathe on Optical profile Grinding M/C.	27-4-95	M/s Thermosole Indury Lahore
12	24336	Wire cutting of Dies for Tablets Making Machine.	30-4-95	M/s. Wil Shire Labs (Pvt.) Lahore CNC.
13	24369	Wire Cutting of cavities in die plate	21-5-1995	M/s. H.M. Engg. Lahore.
14	24385	Form Grinding of Shoe Lace Cutter ends	24-5-95	M/s. Globe Lace Mills Lahore.
15	22419	Wire Cutting of die Part	18-6-95	Mr. Nacem Khan Lahore.
16	24429	Wire Cutting of die plate	14-6-95	M/s. Farm Equipment(pvt)Ltd Lahore.
17	24435	Form Grinding of Cane	15-6-95	M/s. Thermosole Ind. Lahore
18	24458	Form Grinding of Snap Gauges	21-6-95	M/s. M.M. Engg. Lahore
19	24474	Spark Erosion of Cavity of Mould	26-6-95	M/s. Thermosole Ind. Lahore.
20	24480	Spark Errosion of Cavity of Mould	28-6-95	M/s. M.M. Engg. Lahore.
21	24525	Form Grinding of Tool bits for glass bottle neck	12-7-95	M/s. Mecas Engg (Pvt) Ltd. Lahore
22	24531	Boring of holes in Jig plate by maintaining Co-ordinates on copy Milling.	13-7-95	M/s. Iqbal Brothers Engg. Faisal Abad.
23	24551	Form Grinding of Tool bit for Lathe M/C	20-7-95	-do-
24	24558	Wire cutting of Cavity of die Plate	24-7-95	Mohammad Riaz, Okara
25	24591	Forming of threads by Profile Grinder on Crusher of thread Grinding Machine	6-8-95	M/s. Spining Machinery Co Lahore.
26	24605	Boring of special holes by maintaining Co-ordinates on N/C Copy milling for	16-8-95	M/s Iqbal Brothers Faisalabad.

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		drilling Jig Plates		
27	24605	do	do	do
28	24606	do	do	do
29	24207	do	do	do
30	24608	do	do	do
31	24609	do	do	do
32	24510	do	do	do
33	24615	Spark Erosion of Die Part of drip Chamber die	20-8-95	M/s. Medi pak Ltd Lahore.
34	24636	Spark Erosion of die Plate	28-8-95	M/s PECS Ind Lahore
35	24660	Spark Erosion of Cavity in mould Plate	7-9-95	do
36	24687	Special Form Grinding of tool bit on Optical Profile Grinding	18-9-95	M/s. Iqbal Brothers Faisalabad.
37	24693	do	21-9-95	M/s. Mccas Enggs Lahore
38	24700	do	25-9-95	M/s. Iqbal Brothers Faisalabad
39	24705	Spark erosion of Cavity in Mould Plate	26-9-95	M/s. PECS Ind Lahore.
40	24768	do	17-10-95	do
41	24770	Wire Cutting of Carbide dies for extrusion of Aluminium Channel	18-10-95	Mr. Ashique Hussain Yousafi Lahore.
42	24784	do	23-10-95	do
43	24793	do	25-10-95	Mr. Ashique Hussain Yousafi Lahore
44	24796	Spark Erosion of punches for making special form	26-1-95	M/s. PECS Ind Lahore.
45	24811	Spark Erosion of Cavity in Die Plate	30-10-95	do
46	24820	do	6-11-95	do
47	24831	Form Grinding of Tool bit for making thread on mould of glass bottle neck	8-11-95	M/s Mccas Engg. lahore.
48	24874	Forming of teeth on H.S.S. blade by Optical Profile Grinder	28-11-95	M/s. Al-Shaukat Engg Lahore
49	24920	Form Grinding of Tool Bit for making special form on mould	19-12-95	M/s. Long Ford Engg. Lahore
50	24926	Special Forming of roller for making cup of shock absorber of Motor cycle	20-12-95	M/s. Atlas Honda Ltd Sheikhpura
51	24934	Wire Cutting of Carbide dies for extrusion of bend of optical Frame	28-12-99	M/s. Ashique Hussain Lahore.
52	24983	Form Grinding of Tool bit	21-1-95	M/s. Long Ford Engg. Lahore.
53	24298	Spark erosion of Cavity on cores of Plastic Injection Moulds	30-1-96	M/s. Plastic Packaging Industries Ltd. HUB Baluchistan.
54	25014	Spark erosion of plate of mould Auto parts	7-2-96	M/s. PECS, Industries Lahore
55	25016	Spark erosion of Cavity and core of Mould of drip chamber	8-2-96	M/s. Medi Pak Ltd Lahore
56	25042	Form Grinding of Tool bit for making thread on bottle neck mould	29-2-96	M/s. Mccas Engg (pvt) Ltd. Lahore.
57	25050	Wire Cutting of Cavity of extrusion die	3-3-96	M/s. Rehman Industry Gujranwala
58	25133	Spark Erosion of Cavity of mould plate for Auto parts	31-3-96	M/s. PECS. Inds Lahore.
59	25147	Spark Erosion of Core pin of injection mould of Auto parts	7-4-96	do

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60	25153	Wire Cutting of notch punches	9-4-96	M/s. Pakistan Card Clothing Lahore
61	25184	Forming of end of punches for shoe lace cutting	14-4-96	Pak Tape textile factory, Lahore
62	25171	Form grinding of tool bit for making threads on bottle neck mould	16-4-96	M/s. Meccas Engg. Lahore
63	25172	Wire cutting of polar cup base die	16-4-96	M/s. Packages Ltd. Lahore
64	25181	Form Grinding of roller on Opitcal Profile Grinder	18-4-96	M/s. Spindle Craft Ltd. Lahore
65	25189	Spark Erosion of Die Plate for auto part mould	21-4-96	M/s. PECS Ind. Lahore.
66	25209	do	16-5-96	do
67	25249	do	16-5-95	do
68	25289	do	5-6-96	do
69	25305	Spark Erosion of Cavities of Mould for auto part	12-6-96	M/s. S.A. Engg Lahore.
70	25313	Spark erosion of die Plate for auto part mould	17-6-96	M/s PECS Ind. Lahore.
71	25314	Wire Cutting of male die for base of paper cup	17-6-96	M/s. Packaged Ltd. lahore.
72	25349	Wire Cutting of Embroidry M/C Part	2-7-96	M/s Bashir Ahmad Lahore.
73	25353	Spark erosion of Dies for Plastic parts	2-7-96	M/s.Scroz Ltd Gujranwala
74	25355	Form Grinding of tool bit for making serration of ratchet cutter of Surgical Sessiors	2-7-96	M/s. Allam Surgical Sialkot
75	25393	Spark Erosion and wire cutting of Cavities of Mould for auto part	8-7-96	M/s. PECS Ind Lahore.
76	25409	Wire Cutting and Spark erosion of punches of electric circuit looard	28-7-96	do
77	25410	do	do	do
78	25411	do	do	do
79	25412	do	do	do
80	25413	do	do	do
81	25414	do	do	do
82	25415	do	do	do
83	25423	Wire Cutting and Spark erosion of male and Female Punches	31-7-96	M/s. Pakistan Card Clothing Co. Lahore.
84	25435	Spark erosion of Cavity of Mould Plate for auto part	5-8-96	M/s. PECS Industries Lahore
85	25443	Wire Cutting of die and Punches for Textile Machine	6-8-96	M/s. Pakistan Card Clothing Co. Lahore.
86	25444	Spark erosion of die for disco chain making Machine	6-8-96	M/s. Shalimar Chains International Lahore.
87	25476	Wire Cutting of die and Punch	20-8-96	M/s. Farm Equipment (Pvt) Ltd. Lahore.
88	25535	Spark erosion of Cavity of injection mould for handle of spry Gun	18-9-96	M/s. National Trading Co. Karachi.
89	25536	Spark erosion of Cavity of injection mould for body of spry Gun	23-9-96	do
90	25552	Spark erosion of upper part of I.V drip mould	30-9-96	M/s. Meddi Pak Ltd Lahore

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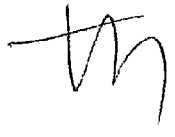
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91	25587	Wire Cutting of Cavity of Medicine / tablet die	14-10-96	M/s. Stand Pharm Pakistan (Pvt) Ltd. Lahore.
92	25588	Copy Milling of die Plate	14-10-1996	M/s. Plasti Craft Lahore.
93	25590	Wire Cutting of Extrusion die	14-10-96	M/s. Shama Wire Cables Lahore
94	25591	Making special holes in Jig Plate for Tractor Part by maintaining Co-ordinates	14-10-96	M/s. Iqbal Brothers Faisalabad
95	25592	do	do	do
96	25593	do	do	do
97	25594	do	do	do
98	25595	do	do	do
99	25596	do	do	do
100	25599	Spark erosion of part of mould for reflector	15-1-96	M/s. Mechano Engg. Lahore
101	25657	Wire Cutting and Spark Erosion of Carbide tip	11-11-96	M/s Breeze Ind Lahore
102	25679	Wire Cutting and Spark Erosion of Punches for auto part mould	20-11-96	M/s. PECS Ind Lahore
103	25680	do	do	do
104	25680	do	do	do
105	25682	do	do	do
106	25683	Form Grinding of Tool bit for making threads on bottle and mould	20-11-96	M/s.Mecas Engg. Lahore.
107	25755	Wire Cutting of Punches	11-12-96	M/s. PECS Ind Lahore.
108	25834	Form Grinding of Tool bit for mould of bottle neck	30-1-97	M/s. Ravi Glass Ltd Lahore
109	25851	Spark erosion of injection mould core	15-2-98	M/s. Medi Pak Ltd
110	25881	Form Grinding on roller	26-2-97	M/s. Spindle Craft Lahore
111	2586	Wire Cutting of die Plate and Punches for auto part mould	28-2-97	M/s. PECS Ind Lahore
112	25889	do	1-3-97	do
113	25919	Making Slot by grinding of mould core pin	15-3-97	M/s. Medi Pak Lahore
114	25939	Spark Erosion of injection point in mould insert	21-3-97	do
115	25951	Form Grinding of tool bit for making threads on bottle neck mould	28-3-97	M/s Ravi Glass Ltd Lahore.
116	25955	do	1-4-97	M/s. Mecas Engg. Lahore
117	25977	Wire Cutting of slot in jewellery tools	9-4-97	M/s. Pak Chains Lahore
118	26000	Wire cutting of punch for vehicle door part	23-4-97	M/s. H.M. Engg. Lahore
119	26025	Profile Grinding of roller for making cup of shock absorber	30-4-97	M/s. Atlas Honda Ltd. Sheikhpura
120	26034	Form grinding of tool bit for making threads on bottle neck mould		M/s Ravi Glass Ltd. Lahore
121	26045	For Grinding of tool bit for thread of bottle neck mould	13-5-97	M/s. Ahmad Mould & Engg. Lahore
122	26058	Making slot by profile grinding	16-5-97	M/s. Medi Pak Ltd Lahore.
123	26068	Wire Cutting of profile on tool for making ratched cutter of Surgical sceriors	2-6-97	M/s. Shaheen Cutter Industries Sialkot.

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124	26104	Spark erosion of Mould Plate for auto parts	7/6/97	M/s. PECS Ind Lahore.
125	26105	Wire Cutting of die and Punches for auto parts	17-6-97	do
126	226168	Milling of ratchet part of milk plant	7-7-97	M/s. Faizen Technical Association
127	26171	Wire Cutting of dies for plastics parts	8-7-97	M/s. PECS Ind Lahore.
128	26189	Wire Cutting of Carbide dies	22-7-97	M/s. Thermosole Ind. Lahore.
129	26192	Spark Erosion of Cavity in Die Plate	24-7-97	M/s. Aafaq Corp Lahore.
130	26220	Wire Cutting of Die	5-8-97	M/s. Thermosole Ind. Lahore.
131	26228	Spark Erosion of Cavity in mould Plate	7-8-97	M/s. Plastic Craft Lahore.
132	26239	Copy milling of outer contour of Cam	15-8-97	M/s. Mcpro Engg Lahore.
133	26256	Spark erosion of Cavities of injection mould for auto parts	21-8-97	M/s. PECS Ind.
134	26256	Wire Cutting of dies & Punches	do	do
135	2268	Spark Erosion of Cavities in mould plate	28-8-97	M/s. Plasti Craft Lahore
136	26306	Spark erosion of Cavity in die plate	8-9-97	M/s. Best Techniques Lahore.
137	26322	Copy milling of cam	27-9-97	M/s. Packages Ltd.
138	26326	Spark erosion of die plate	30-9-97	M/s. PECS Ind Lahore

II. Training & Human Resource Development: Some Typical Examples

- Mr. Ali Haider Shah & Bahre Karam Asstt Technical Manager of M/s Omer Glass Industries Peshawar were trained in NC Machining Operations from 10-1-1987 to 12-2-1987.
- Mr. Shakeel Akhtar App. Engr. of PITAC trained in NC Programming Operator in 1987
- Mr. Mohammad Shuib, Mr. Rafiq, Mr. Inayat (Apprentice Supervisor) were trained in 1987.
- Apprentice Engineers of PITAC were Trained in NC Operations in 1988-1989.. (Mr. Muhammad Ishtiaq, Mr. Muhammad Ashraf, Mr. Irfan Zaheer, Mr. Khalid Mehmood, Mr. Ifikhar Ahmed, Mr. Amir Mirza & Mr. Adnan Gul.)
- Training extended to 20 Engineers and Technicians of H.M.C. Taxila from 17-2-1990 to 31-3-1990.
- Training imparted to the 5 Engineers from HMC Taxila from 3-11-90 to 29-11-90 in EDM Spak Erosion and Wire Cut.
- Training Extended to 10 technicians of Atlas Honda (Punjdarya Ltd.) from 3-2-1991 to 14-3-1991 on EDM Wire cut and CNC Lathe Machine.
- One day Seminar Conducted on 2-3-1991 for the final year students of University of Engineering & Technology Lahore on Operation of NC/CNC Machine Tools. 60 Students attended.
-
- Training on EDM Machining of 20 Technicians of Nowshera Sheet Glass Ltd. NWFP Nowshera
- Zafar Abbas Hashim J/E of MIRDC Trained in NC Machining Operations for a period of 6 weeks from 21-10-1992 to 6-12-1992
- Ten Instructors of Govt. Apparentice Training Centre Ferozewala Distt. Kala Shahkaku Sheikhupura were trained on NC Machining Operation from 24-3-1994 to 23-4-1994.
- Mr. Tariq Hussain, Technical Officer of Plastic Technology Centre Karachi was trained in NC Machining Operations from 17-2-1990 to 31-9-1990.
- Three Supervisors pf Machine Shop of M/s Panjdarya Ltd Honda were trained on NC CNC Machining Operation from 17-2-1990-to 31-3-1990.

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Annex 8 Assistance to PITAC from Donor Agencies

Sr. No.	Name of Agencies	Title of the Project	Duration	Committed Amount	Abstract of the Contents
1	UNDP	Setting up of Low Cost Automation Development Cell	1 Years 1979	US\$ 50,000. Equivalent Rs. 500,000	Automation of existing facilities of production through use of Hydraulic, Pneumatic and Electrical Controls relatively Low Cost
2	JICA	Modernization & Balancing of PITAC, Lahore Phase I	3 Years 1983 - 84 to 1985 - 86	Rs. 10.016 Million	To upgrade and modernize the existing facilities of Machine Tool Shop, Heat Treatment, Inspection, A/V Aids and Transport.
3	ILO & UNDP	Establishment of National Supervisory Training Centre	3 Years 1991 - 92 to 1993 - 94	Rs. 12.550 Million	To train Shopfloor Supervisors/Foremen in Supervisory Functions and Provide Advisory Services in Productivity & Quality Improvement.
4	Commonwealth Secretariat	Establishment of Auto CAD training facilities	1996 to 1999	Rs. 1.5 Million	To equip Designing facilities with Auto CAD
5	JICA	JICA's Aftercare programme for PITAC	January 1994 to June 1995	Rs. 12.550 Million	To bear the cost of all the equipment, Spare Parts, Consumable, supplied earlier by JICA in Phase I
6	Mitsubishi Electric Corp. (Melco) Japan	PLC Training Equipment for LCA Lab	1 Year January, 1998 to October, 1998	Rs. 1.00 Million	PLC, PLC Simulation, PC, Digital and Analog Converter, PLC Extension Modules and PLC Program Software
7.	Asian Productivity Organization (APO) Japan	Workshop on Designing of Moulds for Plastic Products	2 Weeks November 29 to December 9-1999	Rs.0.5 Million	An International Training Programme for Supporting Industry & Vendors

LCA: Low Cost Automation
PLC: Programmable Logic Controller

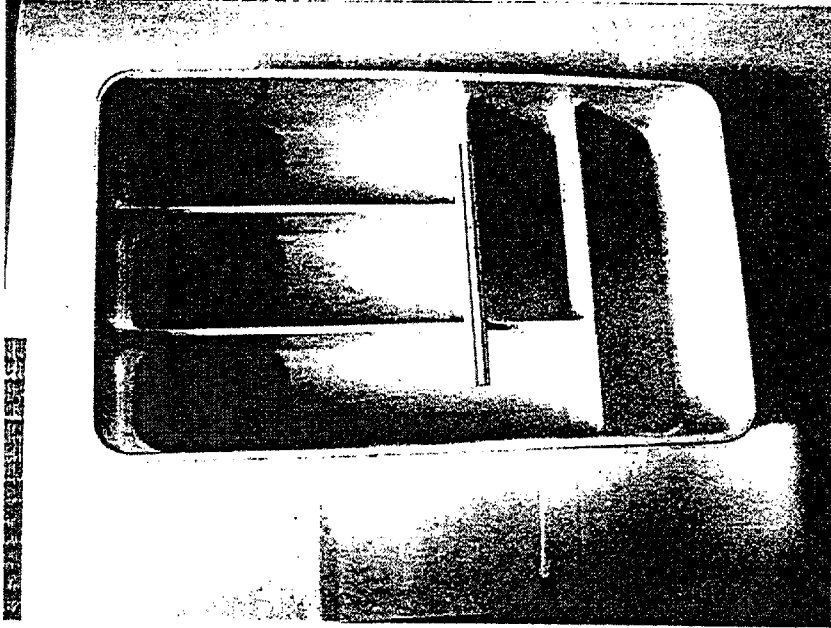
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Annex 9 Target product for plastic molding die (Level 1)

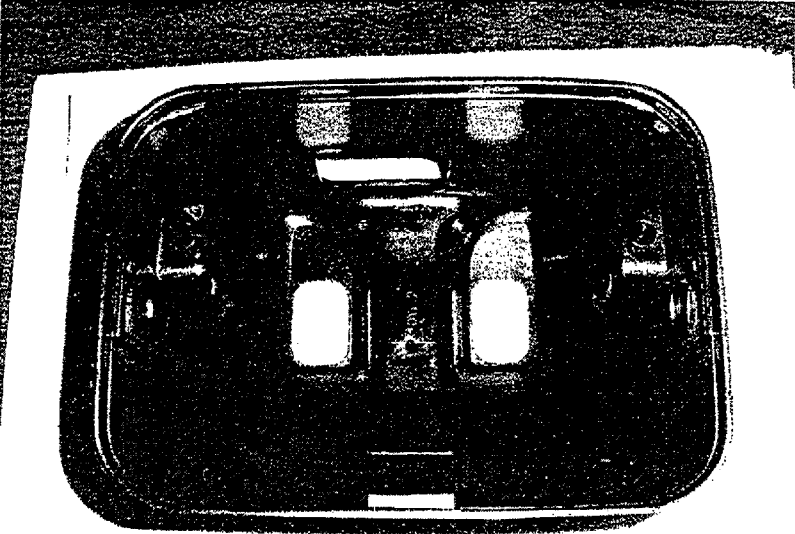
PRODUCT NAME	Plastic plate
APPEARANCE (Reference Sample)	
	
TARGET AIMS	<ul style="list-style-type: none"> * Understand fundamental 3-dimensional CAD operation using wire-frame surface modeling * For 350t injection machine's operation * Thickness homogeneity with wide shape
DIE DESIGN TECHNOLOGY	<ul style="list-style-type: none"> * Two plate upper-lower structure dies * Compact data treatment on CAD using wire-frame modeling * Treatment of plane & curved surface union
DIE MACHINING TECHNOLOGY	<ul style="list-style-type: none"> * Three dimensional CAD/CAM machining * Tool selection for curved corner machining
MATERIALS	* P S or PP
SIZE	* 350 X 270
REMARK	

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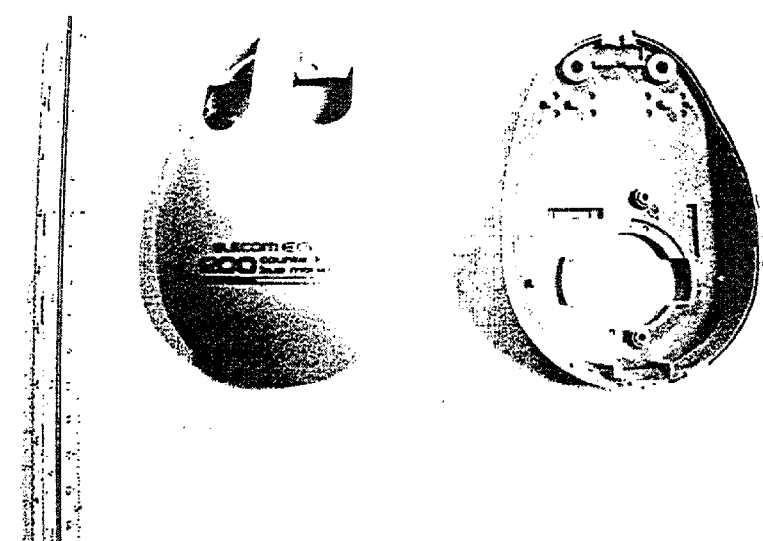
Target product for plastic molding die (Level 2)

PRODUCT NAME	Front light body for motorcycle
APPEARANCE (Reference Sample)	
	
TARGET AIMS	<ul style="list-style-type: none"> * Die machining process design & machining conditions study * Total fundamental study of CAD – CAM – 3D-measurement system
DIE DESIGN TECHNOLOGY	<ul style="list-style-type: none"> * Slider core die structure * Gate position and design
DIE MACHINING TECHNOLOGY	<ul style="list-style-type: none"> * Three dimensional CAD/CAM machining * Machining process design, optimal conditions and tool selection
MATERIALS	* PS or PP
SIZE	* 180 X 140 X 100
REMARK	

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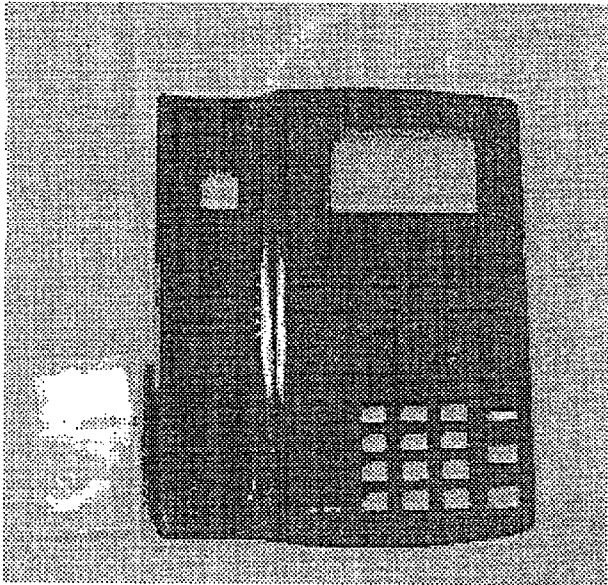
Target product for plastic molding die (Level 3)

PRODUCT NAME	Mouse covers for PC (Upper & lower)
APPEARANCE (Reference Sample) <div style="text-align: center; margin-top: 20px;">  </div>	
TARGET AIMS	<ul style="list-style-type: none"> * Three dimensional curved shape * Pin point gate molding (2 positions) * Simple under cut structure
DIE DESIGN TECHNOLOGY	<ul style="list-style-type: none"> * Three plate die structure * Single cavity molding or Two piece cavities molding * Simple under cut structure design
DIE MACHINING TECHNOLOGY	<ul style="list-style-type: none"> * Three dimensional CAD/CAM machining * Outer surface texture treatment
MATERIALS	* ABS (Natural)
SIZE	* 110 X 70
REMARK	

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Target product for plastic molding die (Level 4)

PRODUCT NAME	Desk top telephone(Upper case)
APPEARANCE (Reference Sample) <div style="text-align: center; margin: 10px 0;">  </div>	
TARGET AIMS	<ul style="list-style-type: none"> * Understand design and product for high appearance quality molding products * For 350t injection machine's operation
DIE DESIGN TECHNOLOGY	<ul style="list-style-type: none"> * Core-shape and cavity-insert design to escape bad effects on appearance * Under-cut core side structure
DIE MACHINING TECHNOLOGY	<ul style="list-style-type: none"> * Surface polish treatment for appearance * Three dimensional CAD/CAM machining
MATERIALS	* ABS
SIZE	* 250 X 200
REMARK	

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Annex 10 List of Charts for Project Planning and Management

No.	Name of Charts	Contents
1	Project Design Matrix (PDM)	A worksheet to overview the Project based on an assumption - designed to analyze a multi-level chain of cause-to-effect such as input to output, output to project purpose and project purpose to overall goal
2	Technical Cooperation Program (TCP)	A chart which indicates the items transferred by the Japanese experts to the C/P, namely, technology transfer items. The period to be covered by the said chart is the whole period of the Project. The minimum unit of the period in the chart is a quarter (three months).
3	Annual Technical Cooperation Program (ATCP)	A chart which materializes the respective technology transfer items in TCP. The period to be covered by the said chart is, in principle, one (1) year at most. The minimum unit of the period in the chart is a month.
4	Plan of Operations (PO)	A chart which indicates the schedule of respective activities in the PDM. The period to be covered by the said chart is the whole period of the Project. The minimum unit of the period in the chart is a quarter (three months).
5	Annual Plan of Operations (APO)	A chart which materializes the respective activities in PO. The period to be covered by the said chart is, in principle, one (1) year at most. The minimum unit of the period in the chart is a month.
6	Tentative Schedule of Implementation (TSI)	A chart which indicates the schedule of respective inputs by both sides. The period to be covered by the said chart is the whole period of the Project. The minimum unit of the period in the chart is a quarter (three months).
7	Annual Tentative Schedule of Implementation (ATSI)	A chart which materializes the respective inputs in TSI, if necessary. The period to be covered by the said chart is, in principle, one (1) year at most. The minimum unit of the period in the chart is a month.

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Project Design Matrix (PDM)

Narrative Summary	Verifiable Indicators	Means of Verification	Important Assumption
(Overall Goal) Domestic plastic mould making industries are able to supply better quality moulds for plastic production in Pakistan.	1 Increase of moulds delivered to plastic parts and components industries 2 Improvement of quality of plastic products 3 Increase of plastic mould making companies which support the assembly makers	1-1 Industrial statistics 1-2 Survey report of PITAC 2 Survey report of PITAC 3 Survey report of PITAC	a. There is no drastic change in the policy of Pakistan government regarding engineering sectors. b. Demand for plastic industry from assembly industry continues to be stable. c. Linkage between assembly industry and plastic mould industry is enhanced. d. Quality requirements for plastic products becomes higher in the industries.
(Project Purpose) Technical capability of PITAC is upgraded to extend technical services in the field of plastic mould technology.	1 Level of satisfaction of recent and former service beneficiaries 2 Number of newly improved services and beneficiaries	1, 2 Questionnaire to and interview with related industries	a. Pakistani plastic mould industries utilize the technology obtained from PITAC. b. Demand for quality mould from plastic industry is increasing in trend. c. Plastic materials and mould materials are provided within Pakistan.
(Outputs of the Project) 1 The project operation unit is established for making advanced plastic moulds. 2 The necessary machinery and equipment are provided, installed, operated and maintained properly. 3 Technical capability of the counterpart personnel (hereinafter referred to as "C/P") is upgraded. 4 Technical training courses and seminars are implemented systematically. 5 Technical backup support services are implemented systematically. 6 Advisory services are implemented systematically.	1 Number and capacity of staff, budget and settlement accounts, number of committees and meetings, number of cases in publicity 2-1 Contents and condition of machinery and equipment 2-2 Route to get spare parts and situation to secure spare parts 3-1 Assessment by the Japanese experts 3-2 Number of achieved target products 3-3 Manuals, textbooks and training materials developed 4-1 Number of training courses and their participants 4-2 Number of seminars and their participants 5-1 Number of mould designs and their clients. 5-2 Number of implemented trial prototypes and their clients 6-1 Number of implemented technical advisory services and their clients	1 Organization chart, Administration record, Accounting record, Personnel record 2-1 Property record, operation & maintenance record 2-2 Spare parts list, suppliers list 3-1, 3-2, 3-3 Record of PITAC 4, 5, 6 Record of PITAC	a. Trained C/Ps remain at PITAC.

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(Activities)	Inputs		a. C/P personnel remain at PITAC.
	The Pakistani side	The Japanese side	
1-1 Allocate necessary personnel as planned.	1 Provision and Maintenance of Building and Facilities	1 Dispatch of Japanese Experts (1) Long-term Experts (2) Short-term Experts Appropriate number of short-term experts will be dispatched as necessity arises.	
1-2 Formulate plans of activities.			
1-3 Make budget plan and execute it properly.			
1-4 Establish and operate project management system.			
2-1 Provide and install necessary machinery and equipment.	2 Allocation of C/P and Administrative Personnel (1) Administrative C/P (2) Technical C/P (3) Administrative Staff (4) Supporting Staff a. Secretary b. Driver c. Other necessary staff upon request by the Japanese experts	2 C/P Training in Japan A certain number (0-3 persons) of the C/P yearly	
2-2 Operate and maintain machinery and equipment properly.			
3-1 Make Technical Cooperation Program.			
3-2 Implement technology transfer to the C/P.	3 Provision of Machinery & Equipment and their Maintenance	3 Provision of Machinery and Equipment	(Preconditions) a. Construction and refurbishment of building and facilities for the project is complete. b. Qualified new staff is recruited for PITAC.
3-3 Monitor and evaluate the result of technology transfer to the C/P.			
4-1 Identify needs through company visits.			
4-2 Make plans of technical training courses and seminars.			
4-3 Develop training curricula and teaching material.			
4-4 Implement technical training courses and seminars.	4 Local Cost Necessary budget for the implementation of the Project	4 Supporting Local Cost	
4-5 Monitor and evaluate the result of technical training courses and seminars.			
5-1 Identify needs through company visits.			
5-2 Make plans of technical backup support services.			
5-3 Implement technical backup support services.			
5-4 Monitor and evaluate the result of technical backup support services.			
6-1 Identify needs through company visits.			
6-2 Make plans of advisory services.			
6-3 Implement advisory services.			
6-4 Monitor and evaluate the result of advisory services.			

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Calendar Year		2000	2001	2002	2003	2004	2005	2006
Japanese Fiscal Year		2000	2001	2002	2003	2004	2005	2006
		I II III IV	I II III IV	I II III IV	I II III IV	I II III IV	I II III IV	I II III IV
	Term of Technical Cooperation			Signing of the R/D				
1	The Project operation unit is established for making advanced plastic moulds			▼				
1-1	Allocate necessary personnel as planned							
1-2	Formulate plans of activities							
1-3	Make budget plan and execute properly							
1-4	Establish and operate project management system							
2	The necessary machinery and equipment are provided, installed, operated and maintained properly							
2-1	Provide and install necessary machinery and equipment							
2-2	Operate and maintain machinery and equipment properly							
3	Technical capability of the counterpart personnel (hereinafter referred to as "C/P") is upgraded							
3-1	Make Technical Cooperation Program							
3-2	Implement technology transfer to the C/P							
3-3	Monitor and evaluate the result of technology transfer to the C/P							
4	Technical training courses and seminars are implemented systematically							
4-1	Identify needs through company visits							
4-2	Make plans of technical training courses and seminars							
4-3	Develop training curricula and teaching material							
4-4	Implement technical training courses and seminars							
4-5	Monitor and evaluate the result technical training courses and seminars							
5	Technical backup support services are implemented systematically							
5-1	Identify needs through company visits							
5-2	Make plans of technical backup support services							
5-3	Implement technical backup support services							
5-4	Monitor and evaluate the result of technical backup support services							
6	Advisory services are implemented systematically							
6-1	Identify needs through company visits							
6-2	Make plans of advisory services							
6-3	Implement advisory services							
6-4	Monitor and evaluate the result of advisory services							

Note 1 The Japanese fiscal year starts in April and ends in March.

Note 2 This schedule is subject to change in accordance with the progress of the project.

Calendar Year		2001			2002			2003								
Japanese Fiscal Year		2000			2001			2002								
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
		Signing of the R/D														
	Term of Technical Cooperation	[Redacted]														
1	The Project operation unit is established for making advanced plastic moulds															
1-1	Allocate necessary personnel as planned															
1-2	Formulate plans of activities															
1-3	Make budget plan and execute properly															
1-4	Establish and operate project management system															
2	The necessary machineries and equipments are provided, installed, operated and maintained properly															
2-1	Provide and install necessary machineries and equipments															
2-2	Operate and maintain the machineries and equipments properly															
3	Technical capability of the counterpart personnel (hereinafter referred to as "C/P") is upgraded															
3-1	Make Technical Cooperation Program															
3-2	Implement technology transfer to the C/P															
3-3	Monitor and evaluate the result of technology transfer to the C/P															
4	Technical training courses and seminars are implemented systematically															
4-1	Identify needs through company visits															
4-2	Make plans of technical training courses and seminars															
4-3	Develop training curricula and teaching material															
4-4	Implement technical training courses and seminars															
4-5	Monitor and evaluate the result technical training courses and seminars															
5	Technical backup support services are implemented systematically															
5-1	Identify needs through company visits															
5-2	Make plans of technical backup support services															
5-3	Implement technical backup support services															
5-4	Monitor and evaluate the result of technical backup support services															
6	Advisory services are implemented systematically															
6-1	Identify needs through company visits															
6-2	Make plans of advisory services															
6-3	Implement advisory services															
6-4	Monitor and evaluate the result of advisory services															

Note 1 The Japanese fiscal year starts in April and ends in March.

2 This schedule is subject to change in accordance with the progress of the project.

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Annex 15 Annual Technical Cooperation Program (ATCP) 1/3

OJT INNER TRAINING

Calendar Year	2000												2001												2002												2003		
Activities / Japanese Fiscal Year	2000			2001									2002									2003																	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3												
Term of Technical Cooperation	Signing of the R/D																																						
1. Fundamentals (common items)	[Grid with activity shading]																																						
1.1. General machine drawing	[Grid with activity shading]																																						
1.2. Plastic materials and moulding characteristics	[Grid with activity shading]																																						
1.3. Fundamentals of mold materials	[Grid with activity shading]																																						
1.4. Fundamentals of processing	[Grid with activity shading]																																						
1.5. Fundamentals of plastic injection moulding	[Grid with activity shading]																																						
2. Injection mould design	[Grid with activity shading]																																						
2.1. Fundamentals of mould design	[Grid with activity shading]																																						
2.1.1. Principles of injection mould	[Grid with activity shading]																																						
(1) Primary injection mold (what is mould? cutting tools, industrial standard etc.)	[Grid with activity shading]																																						
(2) Name and function of construction parts of mould (guide pin, locate ring etc.)	[Grid with activity shading]																																						
(3) Name and function of elements of mould (runner, gate etc.)	[Grid with activity shading]																																						
2.1.2. Standard of mould design	[Grid with activity shading]																																						
(1) Name and function of injection moulding products (boss, rib etc.)	[Grid with activity shading]																																						
(2) Determination of injection condition	[Grid with activity shading]																																						
(3) Procedure from product model to mould design	[Grid with activity shading]																																						
(4) Layout design of basic mould construction	[Grid with activity shading]																																						
(5) Design of injection moulding product (product design, product quality, shrinkage rates, mold flow etc.)	[Grid with activity shading]																																						
(6) design of mould standard parts	[Grid with activity shading]																																						
(7) Treatment of undercut	[Grid with activity shading]																																						
(8) Fundamental design of target product-1 (simple 3D-mould: kitchen tray)	[Grid with activity shading]																																						
2.1.3. Fundamentals of mold processing and plastic injection moulding	[Grid with activity shading]																																						
2.1.4. General operation of CAD/CAM	[Grid with activity shading]																																						
(1) Computer operation for CAD/CAM	[Grid with activity shading]																																						
(2) Operation of CAD, CAM and CAD/CAM	[Grid with activity shading]																																						
2.2. Mould design by CAD	[Grid with activity shading]																																						
2.2.1. Basic technique of mould design by CAD	[Grid with activity shading]																																						
2.2.2. Mould design by CAD	[Grid with activity shading]																																						
(1) Basic technique of CAD, CAM and CAD/CAM	[Grid with activity shading]																																						
(2) Application technique of CAD/CAM	[Grid with activity shading]																																						
(3) CAD/CAM operation and mould design (2-dimension/2.5D/3D)	[Grid with activity shading]																																						
(4) Design of target product-1 by CAD (kitchen tray)	[Grid with activity shading]																																						
(5) Design of target product-2 by CAD (motorcycle light cover)	[Grid with activity shading]																																						
(6) Design of target product-3 by CAD (medium size mould of construction importance: mouse of computer)	[Grid with activity shading]																																						
(7) Design of target product-4 by CAD (surface appearance importance mould: desk telephone case)	[Grid with activity shading]																																						
(8) How to use CAD/CAM data, exchange of CAD/CAM network data etc.	[Grid with activity shading]																																						

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Annex 15 Annual Technical Cooperation Program (ATCP) 3/3

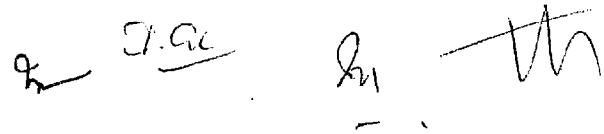
OJT INNER TRAINING

Calendar Year	2001						2002						2003															
Activities / Japanese Fiscal Year	2000			2001						2002																		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
5. Mould assembling & maintenance and trial shot of injection moulding																												
5.1 Fundamentals of finishing and polishing																												
(1) Procedure of polishing																												
(2) Polishing standard of important structure part																												
(3) Polishing (finishing) standard of surface appearance importance parts																												
5.2. Fundamentals of mould assembling and modification or repairing																												
(1) procedure of disassembling and assembling of standard parts																												
(2) Gathering parts and pre-assembling																												
(3) Final assembling and preparation																												
(4) Work procedure of trial shot injection moulding																												
5.3. Assembling and trial shot of target products (model moulds) prepared for the project																												
(1) Procedure of preparation and check of mould specification																												
(2) Trial shot examples and procedure of injection condition setting																												
(3) Procedure of moving check of mould attached to injection machine																												
(4) Check procedure of poor injection products																												
(5) Evaluation procedure of injection products																												
(6) Trial shot and assembling of target product-1 (supplied mould)																												
(7) Trial shot and assembling of target product-2 (supplied mould)																												
(8) Trial shot and assembling of target product-3 (supplied mould)																												
(9) Trial shot and assembling of target product-4 (supplied mould)																												
5.4. Assembling and trial shot of target product (model moulds) produced in the project																												
(1) Target product-1 assembling and trial shot																												
(2) Target product-2 assembling and trial shot																												
(3) Target product-3 assembling and trial shot																												
(4) Target product-4 assembling and trial shot																												
5.5. Assembling and trial shot injection moulding of prototyping moulds																												
5.6. Solve problems on injection moulding																												
5.7. Regular check and maintenance of injection moulding machines and injection moulds																												
6. Monitoring and necessary feedback																												

Annex 16

Tentative Schedule of Implementation (TSI)

Calendar Year	2000				2001				2002				2003				2004				2005					
Japanese Fiscal Year	2000				2001				2002				2003				2004				2005					
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV		
	Signing of the R/D																									
	▼																									
Term of Technical Cooperation																										
The Japanese side																										
I Dispatch of Mission																										
(1) Preliminary Study Team																										
(2) Preparatory Study Team																										
(3) Project Design Team																										
(4) Mid-term Evaluation Team																										
(5) Project Evaluation Team																										
II Dispatch of Japanese Experts																										
(1) Chief Advisor																										
(2) Coordinator																										
(3) Mould Design																										
(4) CAD/CAM Network System																										
(5) Mould Processing (with CAM-CNC or DNC)																										
(6) Mould Assembling and Trial Shot																										
III Dispatch of Short Term Experts	Appropriate number of short-term experts will be dispatched as necessity arises.																									
IV Training of the C/P in Japan	0~3 C/Ps will be accepted in Japan annually.																									
V Provision of Machinery and Equipment																										
The Pakistan side																										
I Building and Facilities																										
II Machinery and Equipment																										
III Allocation of C/Ps and Necessary Staff																										
IV Allocation of Budget																										



Annex 17 Annual Tentative Schedule of Implementation (ATSI) (Draft)

Calendar Year Japanese Fiscal Year	2001												2002												2003								
	2000			2001									2002									2003											
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3						
Term of Technical Cooperation	Signing of the R/D																																
The Japanese side																																	
I Dispatch of Mission																																	
(1) Project Design Team	█																																
II Dispatch of Long-term Experts																																	
(1) Chief Advisor																																	
(2) Coordinator																																	
(3) Mold Design																																	
(4) CAD/CAM System																																	
(5) Mould Processing																																	
(6) Mould Assembling and Trial Shot																																	
III Dispatch of Short-term Experts																																	
(1) Installation and Operation of Machinery and Equipment																																	
a. CAD/CAM System																																	
b. Machining Center																																	
c. Electric Discharge Machine																																	
d. Wire-cut EDM																																	
e. Injection Machine																																	
f. Coordinate Measuring Machine																																	
(2) Technical Support for Target Product (If necessary)																																	
(3) Seminar, Maintenance etc. (If necessary)																																	
(4) Others (If necessary)																																	
IV Training of the C/P in Japan																																	
	0~3 C/Ps will be accepted in Japan annually																																
V Provision of Machineries and Equipments																																	
The Pakistan side																																	
I Building and Facilities																																	
II Machinery and Equipment																																	
III Allocation of the C/P and necessary staff																																	
IV Allocation of Budget																																	

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Field	NO (*1)	Equipment/Machinery	Q'ty	Availability (Refer to Footnote)	If to be procured, by Japan or Pakistan
Mold Design	1-1	CAD/CAM SYSTEM NET-WORK STATION	1set	P	Japan
	1-2	AVR UNIT (Server & Client)	1set	P	Pakistan
	1-3	UPS UNIT (Server & Client)	1set	P	Pakistan
	1-4	Working Desk and Chair	10set	P	Pakistan
	1-5	Desk for LBP	1	P	Pakistan
	1-6	Desk for Server	1	P	Pakistan
Mold Processing	2	CNC Vertical Milling Machine	1	U	Phase 1
		CNC Vertical Milling Machine	4	+	Japan
	3	CNC Vertical Machining Center	1	P	Japan
	4	Electric Discharge Machine	1	U	Phase 1
	5	Electric Discharge Machine	1	+	Japan
	6	Wire-cut EDM	1	U	Phase 1
	7	Wire-cut EDM	1	+	Japan
	8	Small Hole Drilling Machine *	1	P	Japan
	9	Vertical Milling Machine	3	U	Pakistan
	10	Tool Presetter	1	P	Japan
	11	Tools & Jigs	1set	P	Japan
	12	Tools & Holders	1set	P	Japan
		Profile Grinder	4	+	Japan
	13	Surface Grinder	1	+	Japan
	14	Lathe	2	U	Pakistan
	15	Polishing Equipment	1	P	Japan
	16	Drill Grinder	1	P	Japan
	17	Endmill Grinder	1	P	Japan
	18	Cabide Turning Tool Grinder	1	P	Japan
	19	Tool Grinder	1	U	Pakistan
	20	Bench Grinder	1	U	Pakistan
	21	Band Saw	1	R	Pakistan
	22	Working Desk	4	P	Pakistan
	23	Tool Locker	1	P	Pakistan
	24	Rack	2	P	Pakistan
25	Stocker	2	P	Pakistan	
Mold Assembly & Injection Try-out	26	Large Size Injection Machine (350ton)	1	P	Japan
	27	Middle Size Injection Machine (150ton)	1	P	Japan
	28	Flexible Mould Temperature Control	2	P	Japan
	29	Temperature Control	2	P	Japan
	30	Waterless cooling system for molding machin	1	P	Japan
	31	Plastic Material Drier	1	P	Japan
	32	Model Mold for Plastic Injection	4	P	Japan
	33	Welding Machine for Mold Repairing	1	P	Japan
	34	Assembly Tool Unit	3set	P	Japan
	35	Polishing and Finishing Unit	3set	P	Japan

	36	Working Desk	4	P	Pakistan
	37	Mold Assembly Bench (1200mm x 2400mm)	1	P	Pakistan
	38	Mold Rack	2	P	Pakistan
	39	Tool Locker	1	P	Pakistan
Inspection	40	Coordinate Measuring Machine **	1	P	Japan
	41	Projection Machine	1	U	Phase I
	42	Clearance Gauge	10	P	Japan
		Tool Makers' Microscope	4	P	Japan
	43	Pin Gauge	1set	U	Phase I
	44	Block Gauge	1set	U	Pakistan
	45	Gauge Unit	1set	U	Pakistan
Others	46	Visual Education Set etc.	1set	P	Japan
	47	Text Books	1set	P	Japan
	48	Fork-Lift	1	P	Pakistan
	49	Trolley	5	P	Pakistan
	50	Crane (3 ton)	1	P	Pakistan
	51	Compressor	1set	I	Pakistan
		Generator	4	P	Pakistan
	52	Stabilizer	1	P	Pakistan
		Water Treatment Plant	4	P	Pakistan

NOTE:

- 1 U:Existing and to be used.R:Existing but to be replaced.I:Existing but to be Increased in no.P:To be procured
 2 *:Small Hole Drilling Machine might be provided by the Japanese side if its budget allows.

3 **:Coordinate Measuring Machine will be provided if its export is allowed by the Government of Japan in accordance with Japanese laws and regulations.

J. Ac *Li* *M*

Annex 18-2

Size and Capacity of Machinery and Equipment

No.	Equipment and Machinery	Qty	Model/Manufacturer (reference)	Machine Dimension unit (mm)			Floor Size unit (mm)		Weight (kg)	Power source (*1)		Water MPa (l/min)	Air MPa (l/min)	Tank l	Remark
				L	W	H	L	W		E-Power (kVA)	Drive Motor (kW)				
3	CNC Vertical Machining Center	1	Model V55 MAKINO	2,400	3,110	3,133	2,995	4,005	9,300	55	Spindle D.M 22 18.5		0.5~0.8 (600)	550l	
5	Electric Discharge Machine	1	EDGE 2 MAKINO	1,600	1,800	2,290	1,925	1,770	3,000	(11.5)	(M-Current 30A)		(200)	200	
7	Wire-cut EDM	1	Model EU61 MAKINO	2,150	2,500	2,200	2,500	2,500	5,200	(9)	(M-Current 30A)		0.6MPa	1,030	
8	Small Hole Drilling Machine	1	ST300 ELENICS	600	960	2,150	1,500	1,600	100	3.5				150	
10	Tool Presetter	1	VDM3040-3 MST	755	1,238	1,627	1,000	1,700	250	2.5					
11	Tools & Jigs	1	Hi speed Tool & Jigs (for Machining Center)												
12	Tools & Holders	1	Tool & Holders (for Machining Center)												
13	Surface Grinder	1	Surface Grinder Model GS-63Zb KURODA	2,520	1,750	2,490	3,240	2,630	2,500	11	Spindle D.M 3.7	(10)			
13-1	Dust collector/coolant device	1	Optional Equipment (GS-63Zb)	540	1,300	1,300					0			100	
15	Polishing Equipment	1	Polishing Equipment Model CM3021 Minitor Co., LTD JAPAN												
16	Drill Grinder	1													
17	Endmill Grinder	1													
18	Cabide Turning Tool Grinder	1													
26	Large Size Injection Machine (350ton)	1	Model SH350C Sumitomo Heavy Industries	7,510	1,910	2,280	7,510	1,911	11,500		45			500	
27	Middle Size Injection Machine (150ton)	1	Model SH160C Sumitomo Heavy Industries	5,170	1,460	2,030	5,170	1,460	5,400		37			240	
28	Flexible Mold Temperature Control	2	Model MCN-150H MATSUI	350	912	730	350	912	115		Pump 2.2	0.24MPa (20)			
29	Temperature Control	2	Model MCN-30H MATSUI	271	530	627	271	685	60		Pump	0.08MPa			

No.	Equipment and Machinery	Q'ty	Model/Manufacturer (reference)	Machine Dimension/unit (mm)			Floor Size unit (mm)		Weight (kg)	Power source (*1)		Water MPa (l./min)	Air MPa (l./min)	Tank C l.	Remark
				L	W	H	L	W		E-Power (kVA)	Drive Motor (kW)				
30	Waterless cooling system for molding machines	1	Water Less System Model WL-15 KANYETSU	1,650	1,100	1,380	2,000	2,000	900	20					
31	Plastic Material Drier	1	Model DMZ-120-100V MATSUI	110	702	1,330	110	702	180		Heater 6				
31-1	Hopper drier with a stand	1	Optional Equipment (DMZ-120-100V)	1,100	856	2,112	1,100	856	180						
32	Model Mold for Plastic Injection	4													
33	Welding Machine for Mold Repairing	1	Mold Welding machine YOZO SYSTEM1 NIRON TECHNO	300	180	430	300	480	12		Voltage 0~50V E-Current 0~1850A				
34	Assembly Tool unit	3													
35	Polishing & Finishing Unit	3													
40	Coordinate Measuring Machine	1	Model BEYOND APex710 Mitutoyo	(1657)	(1,916)	(2,698)	(3,360)	(1,000)	(1,810)	(1.2)			(0.4) (50)		
42	Clearance Gauge	10													
46	Visual Education Set etc.	1													
47	Text Books	1													

Notes: (*1) Power Source 200V 50Hz

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