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PRESENTATION OF STATISTICAL DATA

PART 3 MANAGEMENT INFORMATION SYSTEMS - QUALITY CONTROL

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PART 3 MANAGEMENT INFORMATION SYSTEMS — QUALITY CONTROL

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(*Continued on page* 2)

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PRESENTATION OF STATISTICAL DATA

PART 3 MANAGEMENT INFORMATION SYSTEMS — QUALITY CONTROL

0. FOREWORD

0.1 This Indian Standard (Part 3) was adopted by the Indian Standards Institution on 10 August 1982, after the draft finalized by the Quality Control and Industrial Statistics Sectional Committee had been approved by the Executive Committee.

0.2 Part 1 of this standard dealing with tabulation and summarization of data had been prepared with a view to drawing valid inferences from a large amount of data. Part 2 of the standard deals with diagrammatic presentation of the numerical data in the form of graphs and diagrams to facilitate quick understanding of the contents of the data including pattern of variation and bring out inter-relationships and other essential details. The present Part 3 contains the various charts and proformae which would be helpful to the management in organizing quality control activity and installing quality control system in their organization.

0.3 The charts and proformae, as suggested, may have to be appropriately modified to suit the needs and requirements of an individual industry and may have to be suitably authorized.

0.4 The term 'chart' is used where the information given is complete without the addition of any numerical data, otherwise the term 'proforma' is used.

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1. SCOPE

1.1 This standard (Part 3) deals with management information charts and proformae used in the organization of a quality control system in an industry. The various charts and proformae covered under this standard are grouped under the following heads:

a) Organization chart,

b) Matrix of quality,

c) Control on inspection equipments,

d) Vendor surveillance,
e) Control of incoming material,
f) Process control,
g) Customer complaint analysis,
h) Quality cost analysis,
j) Utilization of resources,
k) Inventory,
m) Suggestion schemes, and
n) Training and education.

2. CHARTS AND PROFORMAE FOR MANAGEMENT INFORMATION SYSTEMS

2.1 Organization Charts (Appendix A, Charts I, II, III and IV) — These charts describe the broad structure of organization usually found effective in an industry. It would be convenient for any industry to have an organization chart indicating the areas of responsibilities. The organization charts covered in this standard are for four types of industry, namely small (Chart I), medium (Chart II), large (Chart III) and multiplant (Chart IV).

2.2 Chart of Typical Matrix of Quality Functions and Responsibilities (Appendix B) — The matrix describes the extent and degree of involvement of various departments in different quality functions for achieving the quality objectives of the organization.

2.3 Control on Inspection Equipments (Appendix C, Proformae I, II and III) — The proformae covered under this appendix are for the registration of different measuring equipments (Proforma I), the day-to-day inspection report on the maintenance of various gauges (Proforma II) and the consolidated monthly report on maintenance (Proforma III) for reviewing the progress.

2.4 Vendor Development (Appendix D, Proformae I, II, III and IV) — Under this is given the proforma for vendor's registration application (Proforma I) giving all the necessary information on the equipment and capability of the vendor. The two supplementary proformae consist of list of items for which registration is applied for (Proforma II) and list of machines in operation (Proforma III). Proforma IV is meant for the overall assessment of the vendor capability.

2.5 Vendor History (Appendix E) — This proforma helps in maintaining complete histroy of vendor's performance item-wise.

2.6 Vendor's Performance Evaluation (Appendix F)—This proforma helps us in the evaluation of vendor's performance.

2.7 Vendor Rating (Appendix G, Proformae I and II) — In the vendor rating, the proforma is provided for quality rating of a vendor for each of items supplied (Proforma I). Proforma II provides the comparative ratings of vendors on an item on various aspects, such as quality, delivery, price, attitude and potential which help in arriving at the overall rating. The weightages for overall index depend upon the criticality of components and their urgency on production schedule to be decided by the user.

2.8 Incoming Material Inspection (Appendix H, Proformae I, II, III and IV) — Under this, the proformae for recording the inspection results of incoming material for measurable characteristics (Proforma I) as also for attributes type (checked by go and no-go gauges) characteristics (Proforma II) are given. Proforma III is intended for studying the non-conformance of various attributes type of characteristics with cause-wise details. Proforma IV is provided for recording the deviation of incoming material from the specifications.

2.9 Vendor's Corrective Action (Appendix J) — This proforma helps in getting feed back information on corrective actions taken by the vendor.

2.10 Inprocess Control — First Off Inspection (Appendix K) — This proforma is used for the purpose of first off inspection at the start of a new job on a machine with the object of prevention of defects. The first off inspection is made before the machine is ready to go for production. This ensures the right setting of the machine and/or process. Any deviation on the nominal dimension is immediately detected and rectified by proper adjustments.

2.11 Inprocess Control—Patrol Inspection (Appendix L, Proformae I, II, III, IV, V, VI, VII and VIII) — The various proformae given under this appendix relate to the data sheets and control charts mostly used in a machine shop engaged in the production of components and parts. These charts are used for control purposes at the shop floor. The control chart data sheet may be for moving range (that is, in cases where only one sample is tested from a batch/control unit) (Proforma I), variable type of characteristics (Proforma II), attributes type of characteristics (Proforma III), inspection by gauging (Proforma IV), number of defects type of characteristics (Proforma V), demerit score when the data is classified according to seriousness of defects (Proforma VI) and daily summary of inprocess inspection report (Proforma VII). The Proforma VIII on summary of machine suitability and capacity (job-wise or characteristic-wise) is meant for periodic review of the suitability of the various machines for doing different types of jobs.

2.12 Customer Complaints (Appendix M, Proformae I and II) — Proforma I is meant for collection of data on customer complaints, whereas

Proforma II is meant for summarizing these complaints for proper review and follow up action.

2.13 Quality Cost Analysis (Appendix N) — The proforma provides for quarterly comparison of quality costs in different categories, like prevention, appraisal and failure for identifying areas for priority attention.

2.14 Utilization of Resources (Appendix P, Proformae I, II, III and IV) — Quality control in its total aspect implies customer satisfaction at minimum cost. This necessitates optimal utilization of all resources. Proformae I, II and III are provided for recording and reviewing of productivity data pertaining to equipments, raw materials and manpower to enable necessary steps for effecting improvements wherever feasible. Proforma IV is meant for recording and overall summary of inputs and outputs for assessment of true growth.

2.15 Inventory (Appendix Q) — Optimal utilization of capital resources is also a very important aspect. Major part of capital resources is blocked in inventory of raw materials, semi-finished and finished goods. This proforma provides for comparison of actual inventory with minimum achievable for corrective action whenever necessary.

2.16 Suggestion Schemes (Appendix R) — This proforma provides for recording the information on number of suggestions made, their review as also the ultimate impact.

2.17 Training Programmes (Appendix S) — This proforma is meant for recording the information regarding the various training programmes conducted for personnel of different levels, such as executives, supervisors, operators and other personnel from various departments. The proforma would be helpful in reviewing the training activities from time to time.

3. INFORMATION TO TOP MANAGEMENT

3.1 All the proformae given in the standard need not go to the top management. It is desirable that the top management may be kept informed about the organization charts (*see* **2.1**), matrix of quality functions and responsibilities (*see* **2.2**), consolidated monthly report on maintenance of inspection equipments (Proforma III of **2.3**), comparative overall rating of vendors (Proforma II of **2.7**), summary of customer complaints (Proforma II of **2.12**), quality cost analysis (*see* **2.13**) and training programmes (*see* **2.17**). The remaining proformae may be dealt with at the appropriate levels.

APPENDIX A

(*Clause* 2.1)

ORGANIZATION CHART

CHART I SMALL SIZE COMPANY

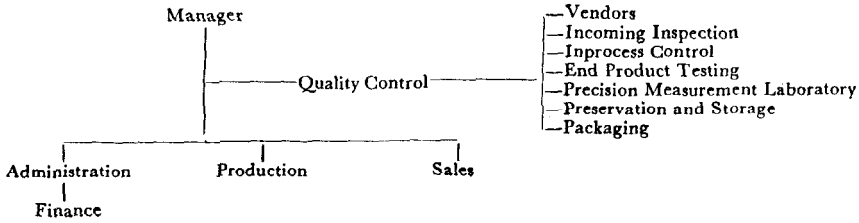


CHART II MEDIUM SIZE COMPANY

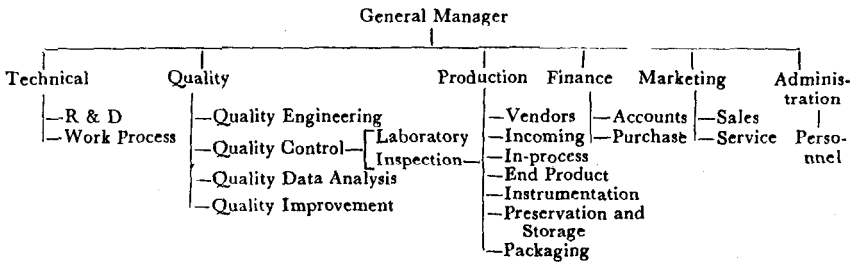


CHART III LARGE SIZE COMPANY

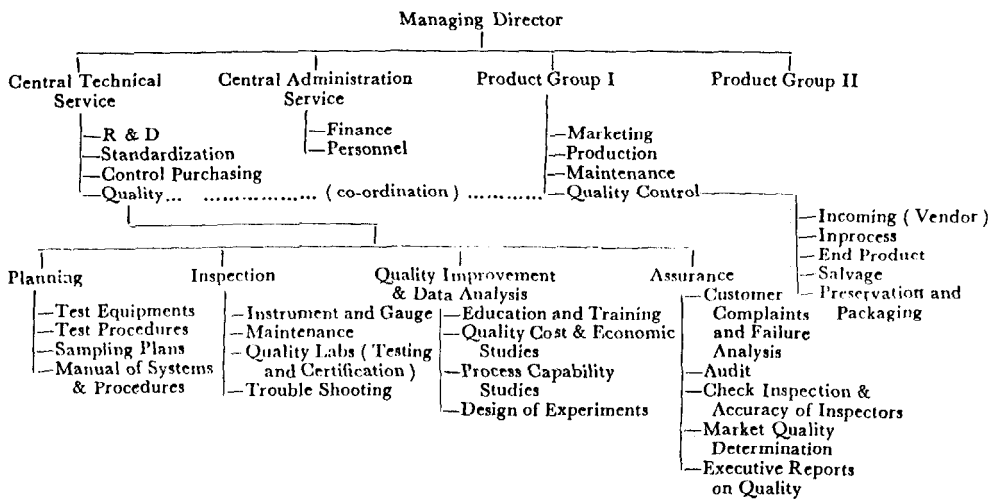
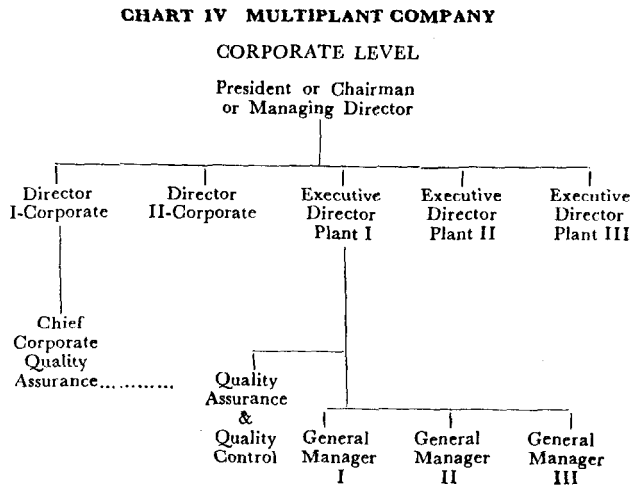


CHART IV MULTIPLANT COMPANY



APPENDIX B

(*Clause* 2.2)

CHART OF TYPICAL MATRIX OF QUALITY FUNCTIONS AND RESPONSIBILITIES

Sl No.	Quality Functions	Disciplines Involved																	
		Management	Sales	Finance	R & D	Standards	Design	Planning	Purchase	Production	Quality Engineering	Quality Control/ Laboratory	Metrology/Calibration Lab	Quality Assurance	Tool Room	Maintenance	Personnel & Admn	Customers	Suppliers
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
1.	Policy on quality	R	I	I	I	I	I	I	I	I	I	I	I	C	I	I	I	I	I
2.	Customer's requirement	—	R	—	C	—	C	I	—	I	I	I	—	I	—	—	—	C	—
3.	Specifications	—	I	—	C	C	R	I	I	I	I	I	—	—	I	—	—	—	—
4.	Preparation of inspection plan/checklist	—	—	—	—	—	—	—	—	I	R	C	—	I	—	—	—	—	I
5.	Selection of instruments and gauges	—	—	—	—	—	—	C	—	I	R	C	C	I	C	—	—	—	—
6.	Quality survey of suppliers	—	—	—	—	—	—	C	C	—	R	I	—	I	—	—	—	—	C
7.	Receive inspection	—	—	—	—	—	C	C	C	C	C	R	C	I	—	—	—	—	I
8.	Testing (materials)	—	—	—	C	C	C	C	C	C	C	R	—	I	—	—	—	—	I
9.	Feed back to vendor	—	—	—	—	—	—	—	R	—	I	C	—	—	—	—	—	—	C
10.	Vendor evaluation and rating	—	—	—	—	—	—	—	C	—	R	C	—	I	—	—	—	—	I
11.	Handling, storage, issue in stores	—	—	—	—	—	—	C	R	—	—	—	—	—	—	—	—	—	—
12.	Process capability studies	—	—	—	—	—	—	C	—	C	R	C	—	I	—	I	—	—	—
13.	First off inspection	—	—	—	—	—	C	C	—	R	—	C	C	—	—	—	—	—	—
14.	Inprocess control	—	—	—	—	—	C	C	—	R	C	C	C	I	—	—	—	—	—
15.	End product testing	—	C	—	I	—	C	—	—	C	I	R	—	I	—	—	—	I	—
16.	Shipping/packing	—	C	—	—	—	C	—	—	R	—	C	—	—	—	—	—	—	—
17.	Tool control at manufacturing stage	—	—	—	—	—	—	C	—	—	—	C	C	—	R	—	—	—	—
18.	Calibration of measuring instruments/gauges	—	—	—	—	—	—	—	—	C	—	R	C	I	C	—	—	—	—
19.	Tool control at production stage	—	—	—	—	—	—	C	—	R	—	C	C	—	C	—	—	—	—
20.	Quality of machine tools ordered	—	—	—	—	—	—	R	—	C	—	—	—	C	—	C	—	—	—
21.	Periodical testing of accuracy of machine	—	—	—	—	—	—	I	—	R	—	C	C	I	—	C	—	—	—
22.	Life, reliability studies and other special studies	I	I	—	C	—	C	I	—	C	R	C	—	I	—	—	—	—	—
23.	Handling, storage, issue in shop	—	—	—	—	—	—	C	—	R	—	C	—	—	—	—	—	—	—
24.	Feed back of customer's complaints	—	R	—	I	—	I	—	—	I	I	I	—	I	—	—	—	C	—
25.	Analysis of customer's complaints	I	I	—	C	—	C	I	—	C	C	C	—	R	—	—	—	I	—
26.	Company standards	—	—	—	—	R	C	—	—	—	—	I	—	—	—	—	—	—	—
27.	Quality costs	I	I	R	—	—	I	I	I	I	C	I	I	I	I	I	—	—	—
28.	Fixing targets on quality costs	R	I	C	—	—	I	I	I	I	C	I	I	C	I	I	—	—	—
29.	Quality reports	I	I	—	I	—	I	I	I	I	C	C	—	R	—	—	—	—	—
30.	Quality audit	—	—	—	—	—	—	—	—	—	I	C	—	R	—	—	—	—	—
31.	Quality control in ancillary units	—	—	—	—	—	C	C	—	—	C	C	C	I	—	—	—	—	R
32.	Training of personnel on quality	C	—	—	—	—	C	C	C	C	C	C	C	R	—	—	C	—	—

R = Responsible C = Co-operate I = Informed

APPENDIX C

(*Clause* 2.3)

CONTROL ON INSPECTION EQUIPMENTS

PROFORMA I REGISTRATION OF MEASURING EQUIPMENTS

Name of Company: Department:

Sl No.	Date of Registration	Date of Receipt	Description	Size	Range	Checked by	Registration*/ Cardex No.	Date of Issue	Issued to	Signature	Remarks

*Give code number depending upon its description, size, range, number available, location, etc.

(*Continued*)

APPENDIX C — *Contd*

CONTROL ON INSPECTION EQUIPMENTS

PROFORMA II—INSPECTION REPORT ON MAINTENANCE OF GAUGES

Name of Company: Department:

Gauge Number: Location:

Description: Section: Shelf:

Type: Date of Issue:

Date Received: Approved:

Date	Dimensions				Inspected by	Remarks	Next Due Date for Inspection*
	1. Nominal..... Tolerance	2. Nominal..... Tolerance	3. Nominal..... Tolerance	4. Nominal..... Tolerance			
	Actual	Actual	Actual	Actual			

*Maintain cardex and file in the order of due date.

(*Continued*)

APPENDIX C — *Contd*

CONTROL ON INSPECTION EQUIPMENTS

PROFORMA III MONTHLY REPORT ON GAUGE MAINTENANCE

Name of Company:

Month: Date:

a) Total number of measuring instruments/gauges	a1) Available						
	a2) In use						
b) Total number of measuring instruments/gauges covered in the calibration programme							
c) Percentage covered (% of b/a2)							
		Tool Cribs					
		1	2	3	4	5	6
d) Expected							
e) Controlled							
f) Percentage controlled (% of e/d)							
g) Within tolerance	Number						
	Percentage						
h) Rework	Number						
	Percentage						
j) Scrapped	Number						
	Percentage						
k) Received earlier to schedule	Number						
	Percentage						
m) Total available	Number						

APPENDIX D

(*Clause* 2.4)

VENDOR DEVELOPMENT

PROFORMA I VENDOR'S REGISTRATION APPLICATION

Name of Company:

Name of vendor:		
Date:	Trade Name:	
Address—Workshop/Godown	Address—Head Office	
Telephone number: Telex number Grams :		
Persons to contact on matters concerning bids, contracts (if agents, so specify)		
Name	Official capacity	Telephone number
Type of organization a) Individual b) Partnership c) Joint stock company d) Co-operative	Particulars of registration such as Indian company/Indian partnership act/Indian factory act/any other	
Indicate classes of equipment, supplies, material and/or services in which you are interested to register with us in Proforma II.		
Are you on the list of approved vendors/contractors on DGS & D, Railways or Government undertakings ? If so, give registration number, date & items for which registered (copy of registration/rate contract may be furnished)		
Have you ever been banned or removed from any list of approved government contractors/vendors ? If so, give details		

(*Continued*)

APPENDIX D — *Contd*

VENDOR DEVELOPMENT

PROFORMA I VENDOR'S REGISTRATION APPLICATION — *Contd*

Category of vendors: Manufacturer/Agent (authorized)/Trader

If Manufacturer, give following particulars:

a) Duration for which factory in production:

b) Production capacity per annum:

c) Percentage capacity available for our organization:

d) Facilities for testing and inspection:

Description of instruments and gauges available	Range	Least count

e) Details of machines in operation (in Proforma III)

f) Number of employees

Status / Division	Graduate		Diploma	Skilled	Non-skilled
	Technical	Non-technical			
Production					
Quality control					

g) Source of raw materials

Type	Source

h) Do you inspect the bought out materials ? Yes/No

j) Do you have testing facilities for bought out materials, if not, what is done for testing ? Yes/No

k) Is process inspection done during manufacture ? Yes/No

m) Do you have finished product inspection set up ? Yes/No

(*Continued*)

APPENDIX D — *Contd*

VENDOR DEVELOPMENT

PROFORMA I VENDOR'S REGISTRATION APPLICATION—*Contd*

n) Can you comply with the quality certificate wherever called for ? Yes/No

p) Are gauges/instruments in use periodically checked ? Yes/No

If Agents, give particulars of agencies with true copy of authorization. Also give the following information:

Are you already doing business with us or our sister units ? If so, give following details for the last 12 months:

a) Registration number, if registered with us

b) Total value of materials tendered

c) Total value of purchase orders tendered

d) Total value of material supplied

Financial Status:

a) Value of current assets as on date:

b) Value of current liabilities as on date:
(Attach balance sheets for last 3 years)

c) Value of total sales during the previous year:

d) Value of orders in hand:

e) Value of total capital employed:

f) Banker's name and address:

g) Sales tax registration number:
Excise registration number:

h) Amount up to which supply can be made at one time:

j) Have you obtained income tax clearance certificate ? If so, state number & date, and enclose a copy of the same showing details of income assessed, tax demanded and paid for the last 3 years:

List of enclosures: (Catalogues, technical literature, price list, etc)	Any special information:
Evaluation of vendor	I certify that the information supplied herein (including all pages attached) is correct Signature Name Designation Place Date

APPENDIX D — *Contd*

VENDOR DEVELOPMENT

PROFORMA II ITEMS FOR WHICH REGISTRATION IS APPLIED

Name of Company:

Sl No.	Description	IS/Other Specification Number	Size (Range)	Trade Mark/ Brand	Average Stock Maintained	
					Quantity	Value

(*Continued*)

APPENDIX D — *Contd*

VENDOR DEVELOPMENT

PROFORMA III LIST OF MACHINES IN OPERATION

Name of Company:

Sl No.	Description and Specifications of Machine with Make	Number of Machines	Grade of Accuracy Attainable	Spare Capacity Available	Remarks

(*Continued*)

APPENDIX D — *Contd*

VENDOR DEVELOPMENT

PROFORMA IV VENDOR CAPABILITY SURVEY

Name of Company:

Name of vendor:	Telephone number:
Address:	Whom to contact for clarification:
	Year business started:
Date of visit:	
Persons contacted 1. 2. 3. 4.	

Item required	Total capacity	Spare capacity available

INCOMING MATERIAL QUALITY CONTROL	Rating			
	No	Poor	Satisfactory	Good
a) Is the set up existing ?				
b) Is material testing facility available for:				
Chemical				
Mechanical				
Electrical				
Others				
If not, what is done for material test ?				

(*Continued*)

APPENDIX D — *Contd*

VENDOR DEVELOPMENT

PROFORMA IV VENDOR CAPABILITY SURVEY — *Contd*

	Rating			
	No	Poor	Satisfactory	Good
c) Is incoming inspection well equipped with instruments ?				
d) How much of acceptance sampling is followed ?				
e) Is there a defect feed back system to vendors ?				
f) Is inspection planning done ?				
g) Is there a procedure for disposal of non-conforming items ?				

h) Who decides on non-conforming items ?

NOTE — Attach a list of documents, if any in use.

IN-PROCESS & FINISHED PRODUCT QUALITY CONTROL

(Strike whichever is not applicable)

a) Process inspection done	No inspection/Set up/Patrol/Last Off
b) Is inspection planning done ?	No/Poor/Satisfactory/Good
c) Who decides on disposal of rejection ?	.....
d) Who inspects and certifies the first off ?	No body/Shop/Inspector
e) Is there a system to use quality control charts ($\bar{X}$ and R, p, c-chart) for control during production ?	No/Poor/Satisfactory/Good
f) Is there a defect analysis and feed back system ?	No/Poor/Satisfactory/Good
g) How outgoing products are inspected ?	Sampling/100 percent
h) Is there facilities for i) Type tests ?	No/Poor/Satisfactory/Good
ii) Routine tests ?	No/Poor/Satisfactory/Good
j) Can inspection stop machine or process if defectives are made ?	Yes/No
k) Aro check lists available for finished goeds ? (If so, enclose a specimen)	Yes/No
m) Can the firm comply with all the requirements of quality certificates ?	Yes/No

NOTE — Attach a list of documents, if any, in use.

OTHER FACILITIES

a) Are the gauges in use periodically controlled ? (If so, please enclose a copy of procedure)	No/Poor/Satisfactory/Good
b) Is there a tool inspection and maintenance system ?	Yes/No

(*Continued*)

APPENDIX D — *Contd*

VENDOR DEVELOPMENT

PROFORMA IV VENDOR CAPABILITY SURVEY — *Contd*

c) Are machine and process capability studies conducted periodically ?	Yes/No
d) Is regular maintenance of machines done ?	Yes/No
e) Is there a procedure regarding effecting changes in drawings ?	Yes/No
f) Is there a procedure regarding handling of complaints ?	Yes/No

PERFORMANCE

a) How is the performance of :

i) Product (in finished store)	Poor/Satisfactory/Good
ii) Tools in use	Poor/Satisfactory/Good
iii) Instruments (calibration)	Poor/Satisfactory/Good

b) If unsatisfactory, give areas for improvement:

OVERALL RATING ON THE TECHNICAL CAPABILITY OF THE FIRM

REMARKS AND RECOMMENDATIONS:

APPENDIX E

(*Clause* 2.5)

VENDOR HISTORY — ITEM WISE

Name of Company: Vendor: Price: Vendor's Quotation:

Item: Minimum Quotation:

Drawing Number:

Specification:

Sl No.	Order No.	Scheduled Date of Delivery	Date Received	Date of Inspection	Quantity Ordered	Quantity Received	Quantity Inspected	Quantity Conforming to Specifications	Quantity Non-conforming to Specifications				Lot Decision	Remarks (Such as Letter Writing, Visits Paid, Response from Vendor)
									Accepted on Deviation	Rework	Scrap	Total		

APPENDIX F

(*Clause* 2.6)

PERFORMANCE EVALUATION REPORT

Name of Company:

Supplier:

Item:

Drawing Number:

Date:

Period:

Total Number of Lots Submitted :

Number of Lots Accepted:

Sl No.	Characteristic/ Defect	Tolerance	Maximum Observed Variation	Category of Characte-ristic/ Defect	No. of Lots in which the Defective Pieces Lie	Percentage Sample Pieces Having Defects	Remarks

APPENDIX G

(*Clause* 2.7)

VENDOR RATING — ITEM WISE

Name of the Company:

Item : Category Code*

Sl No.	Vendor	Rating					Rank	Remarks
		Quality	Delivery	Price	Attitude & Potential	Overall Rating		
	Weightage							

*Code

Delivery	Quality		
	Class I	Class II	Class III
Critical Path of Project	11	21	31
Sub-critical Path of Project	12	22	32
Others	13	23	33

APPENDIX H

(*Clause* 2.8)

INCOMING MATERIAL INSPECTION

PROFORMA I FOR MEASURABLE CHARACTERISTICS

Name of Company:

Component: Drawing Number: Supplier: Date Indented: Date Received:

Inspected by: Order Number: Lot Number: Lot Size: Date:

Sl No.	Characteristic ..... Nominal ..... Tolerence						Characteristic .....
	Category: Critical/Major/Minor						
	AQL: Sample Size:						
	Item Number					Mean ($\bar{X}$)	Range (R)
	1	2	3	4	5		
					Total		
					Mean ($\bar{X}$) =		$\bar{R}$ =

$\bar{X} + k\bar{R} =$

$\bar{X} - k\bar{R} =$

For value of 'k' refer to IS : 2500 (Part II)-1965.

Lot Accepted/Rejected

Lot Disposal:

	Code
Material to be returned to vendor	1
Material to be reworked	2
Material to be sent to production on deviation	3

(*Continued*)

APPENDIX H — *Contd*

INCOMING MATERIAL INSPECTION

PROFORMA II FOR ATTRIBUTE CHARACTERISTICS CHECKED BY GO NO-GO GAUGES

Name of Company:

Component: Supplier: Drawing Number: Date Indented: Date Received:

Inspected by: Order Number: Lot Number: Lot Size: Date:

Sl No.	Characteristic	AQL	Sample Size	Acceptance Number*	No. of Items Conforming	No. of Items Non-conforming Due to			$(c-a)$	Lot Accepted/ Rejected	Lot Disposal Code†
						Over Size (c)	Under Size (a)	Total $(c+a)$			

*Refer to IS : 2500 (Part I)-1973.

†Lot Disposal Code:

	Code
Material to be returned to the vendor	1
Material to be reworked	2
Material sent to production on deviation	3

(*Continued*)

APPENDIX H — *Contd*

INCOMING MATERIAL INSPECTION

PROFORMA III FOR OTHER ATTRIBUTE CHARACTERISTICS

Name of Company:

Component: Supplier: Drawing Number: Date Indented: Date Received:

Inspected By: Order Number: Lot Number: Lot Size: Date:

Sl No.	Characteristic	AQL	Sample Size	Acceptance Number*	Number of Items Conforming	Number of Items Non-conforming			Cause-wise Details† of Non-conformities					Lot Accepted/ Rejected	Lot Disposal ‡ Code	Remarks
						Reworkable	Scrap	Total	*A*	*B*	*C*	*D*	...			

*Refer to IS : 2500(Part I)-1973.

†Causes codes are listed below (to be listed by the company):

Code	*Causes*	*Code*	*Causes*
A		*C*	
B		*D*	

‡Lot disposal Code

	Code		*Code*		*Code*
Material to be returned to vendor	1	Material to be reworked	2	Material sent to production on deviation	3

(*Continued*)

APPENDIX H — *Contd*

INCOMING MATERIAL INSPECTION

PROFORMA IV DEVIATION OF INCOMING MATERIAL

Name of Company:

Reference Number: Date:

Item: Quantity:

Specification: Challan Number:

Drawing Number: Particulars of Vendor:

Supplier:

Sl No.	Characteristic	Nature and Extent of Deviation

Deviation quantity requested:

Details of rework:

Effect on final product:

Corrective action with the supplier:

Existing stock:

Remarks of assembly/production:
(using department)

APPENDIX J

(*Clause* 2.9)

VENDOR'S CORRECTIVE ACTION

Name of Company:

Vendor: Reference Number:

Purchase Order Number: Date:

The material referred in above purchase order has been found substandard item:

The inspection results are given below:

DATE	QUANTITY RECEIVED	QUANTITY INSPECTED	QUANTITY REJECTED	DETAILS OF REJECTION (MEASUREMENT-WISE FOR MEASURABLE AND CAUSE-WISE FOR ATTRIBUTES CHARACTERISTICS)	INSPECTOR

VENDOR'S REPORT

a) I agree and accept the defects. I am taking following steps to avoid recurrence of such incidence in future.

b) I do not agree with defects pointed for the following reasons:

i)

ii)

iii)

c) If (b) is true, the vendor may suggest measures that will avoid such differences on quality between vendor and vendee.

APPENDIX K

(*Clause* 2.10)

IN PROCESS CONTROL — FIRST OFF INSPECTION

Name of Company:

Component: Drawing Number: Date: Operator:

Unit: Machine Number: Shift: Supervisor:

Sl No.	Characteristic	Specification		Measurement				Average	Checked by	Remarks
		Nominal	Tolerance	1	2	3	4			

APPENDIX L

(*Clause* 2.11)

PROCESS CONTROL — PATROL INSPECTION

PROFORMA I INDIVIDUAL CONTROL CHART

Name of Company:

Product:	Characteristic:	Sample Size:	Operator:
Product Order Number:	Unit of Measurement:	Frequency:	Inspector:
Stage:	Nominal Value:	Date/Period:	Supervisor:

Sl No.	Date	Shift No.	Batch No./ Control Unit No.	Individual Measurement	Moving* Range	Graphical Presentation
(1)	(2)	(3)	(4)	(5)	(6)	LCL CL UCL

*Moving range is defined as the absolute difference between two successive test results.
For computation of control limits, reference may be made to IS : 397 (Part 1)-1972.

(*Continued*)

APPENDIX L — *Contd*

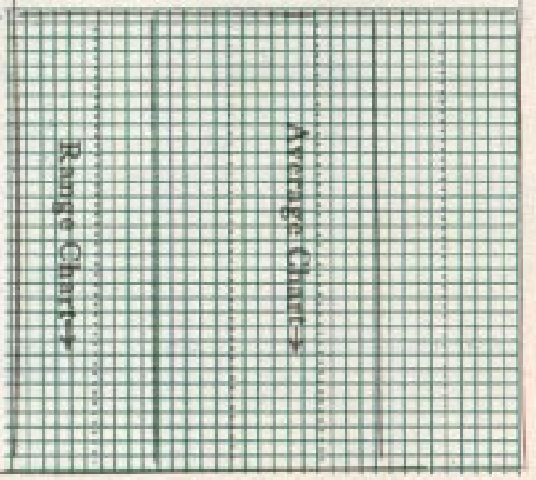
PROCESS CONTROL — PATROL INSPECTION

PROFORMA II CONTROL CHART FOR VARIABLES

Name of Company:

Product:	Characteristic:	Sample Size:	Operator:
Product Order Number:	Unit of Measurement:	Frequency:	Inspector:
Stage:	Nominal Value:	Date/Period:	Supervisor:
Machine Number:	Tolerance:		

Sl No.	Date	Time	Individual Measurement					Total	Mean / Median	Range	Graphical Presentation
			1	2	3	4	5				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	



For computation of control limits, refer to IS : 397 (Part I)-1972.

(*Continued*)

PROCESS CONTROL — PATROL INSPECTION

PROFORMA III CONTROL CHART FOR NUMBER OF DEFECTIVES

Name of Company:

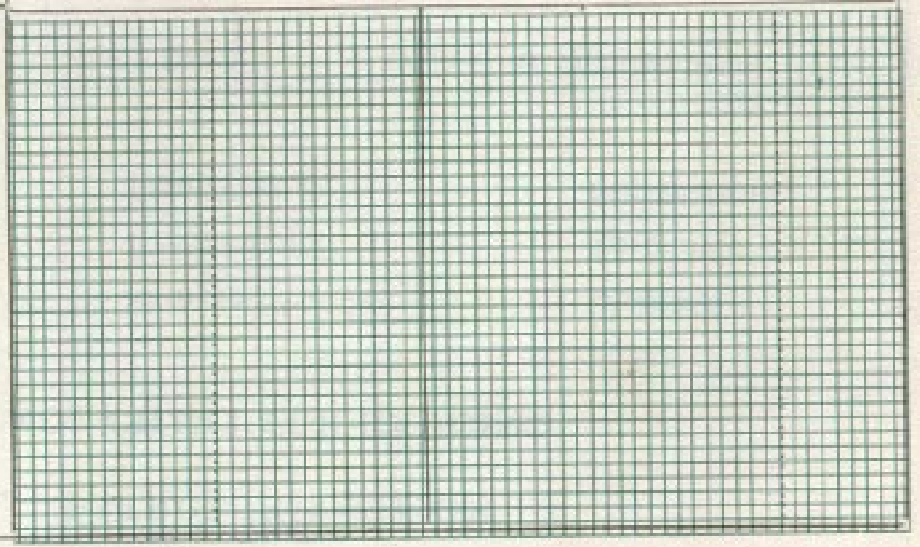
Product: Characteristic: Sample Size (n): Operator:

Product Order Number: Frequency: Supervisor:

Stage: Nominal Value: Date/Period: Inspector:

Machine Number:

Sl No.	Date	Time	Number of Defectives (d)	Graphical Presentation
(1)	(2)	(3)	(4)	



For computation of control limits, refer to IS : 397 (Part II)-1975.

(Continued)

APPENDIX L — *Contd*

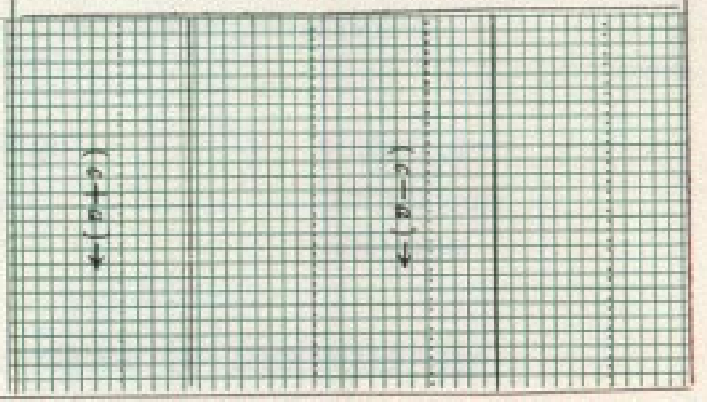
PROCESS CONTROL — PATROL INSPECTION

PROFORMA IV CONTROL CHART FOR GAUGING

Name of Company:

Product:	Characteristic:	Sample Size (n):	Operator:
Product Order Number:	Nominal Value:	Frequency:	Inspector:
Stage:	Tolerance:	Date/Period:	Supervisor:
Machine Number:			

Sl No.	Date	Time	Number of Defectives		$c+a$	$c-a$	Graphical Presentation
			Above Upper Limit (c)	Below Lower Limit (a)			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	
			$\Sigma c =$	$\Sigma a =$			
			$\bar{c} =$	$\bar{a} =$			



(*Continued*)

Computation: Let $\bar{c} = \frac{\Sigma c}{k}$, $\bar{a} = \frac{\Sigma a}{k}$ and $\bar{d} = \bar{c} + \bar{a}$

where k is the number of samples and $d = c + a$

1. The control limits for $(c + a)$ is same as for the number of defectives (*see* Proforma III).

2. The control limits for $(c - a)$ are as follows:

$$CL = \bar{c} - \bar{a}$$

$$LCL = (\bar{c} - \bar{a}) - 3\sqrt{(\bar{c} + \bar{a}) - \frac{(\bar{c} - \bar{a})^2}{n}}$$

$$UCL = (\bar{c} - \bar{a}) + 3\sqrt{(\bar{c} + \bar{a}) - \frac{(\bar{c} - \bar{a})^2}{n}}$$

NOTE — Gauging is not limited to the engineering industry. It is a general concept when the data is classified as within two limits or beyond that. It may be applied to weight, resistance value, percent residue, etc.

(*Continued*)

APPENDIX L — *Contd*

PROCESS CONTROL — PATROL INSPECTION

PROFORMA V CONTROL CHART FOR NUMBER OF DEFECTS

Name of Company:

Product: Characteristic: Sample Size: Operator:

Product Order Number: Nominal Value: Frequency: Inspector:

Stage: Date/Period: Supervisor:

Machine Number:

Sl No.	Date	Time	Number of Defects	Graphical Presentation
(1)	(2)	(3)	(4)	LCL CL UCL

For computation of control limits, refer to IS : 397 (Part II)-1975.

(*Continued*)

APPENDIX L — *Contd*

PROCESS CONTROL — PATROL INSPECTION

PROFORMA VI CONTROL CHART FOR DEMERIT SCORE

Name of Company:

Product: Characteristic: Operator:

Product Order Number: Specification: Inspector:

Stage: Sample Size: Supervisor:

Machine Number:

Sample No.	Total Number of Defects	Number of Defects for Category			Demerit Score *D*	Graphical Presentation
		A	*B*	*C*		
		Weights				
		w_1	w_2	w_3		LCL CL UCL
(1)	(2)	(3)	(4)	(5)	(6)	

(Continued)

Computation: Let a_1, b_1, c_1 be the number of defects of category A, B and C respectively in the i-th sample, and

w_1, w_2, w_3 be the weights of category of A, B and C respectively so that $w_1 + w_2 + w_3 = 1$

Then D_1, the demerit score for the i-th sample is $= w_1a_1 + w_2b_1 + w_3c_1$ and $\bar{D}$, the average demerits score

$$= \frac{\Sigma D_1}{k} = w_1 \bar{a} + w_2 \bar{b} + w_3 \bar{c}$$

where $\bar{a}$, $\bar{b}$ and $\bar{c}$ are the average number of defects of category A, B and C respectively and k is the number of samples.

$$\sigma_D = \sqrt{w_1^2 \bar{a} + w_2^2 \bar{b} + w_3^2 \bar{c}}$$

The control limits are as follows:

$$CL = \bar{D}$$

$$LCL = \bar{D} - 3\sigma_D$$

$$UCL = \bar{D} + 3\sigma_D$$

(*Continued*)

APPENDIX L — *Contd*

INPROCESS CONTROL — PATROL INSPECTION

PROFORMA VII DAILY SUMMARY OF IN-PROCESS INSPECTION REPORT

Name of Company: Date: Shop/Department:

Machine Number	Shift	Operator	Job No.	Item	Stage	Number				Source-wise Details of not OK					Remarks
						Produced	Inspected	OK	Not OK	Operator	Machine	Tool	Materials	Others	

Note — Make a monthly summary for review for improvements.

(*Continued*)

APPENDIX L — *Contd*

PROCESS CONTROL — PATROL INSPECTION

PROFORMA VIII SUMMARY OF MACHINE SUITABILITY AND CAPACITY (JOB-WISE)

(PERIODIC REVIEW — QUARTERLY/HALF YEARLY/ANNUAL)

Name of Company:

MACHINE NUMBER	CHARACTERISTIC JOB					
	A	*B*	*C*	*D*	*E*	
1						
2						
3						
4						
5						
6						
7						
8						
9						
...						

NOTE — Leave the cell blank if a machine is not suitable for a job and enter the capacity otherwise.

APPENDIX M

(*Clause* 2.12)

CUSTOMER COMPLAINTS

PROFORMA I STATEMENT OF CUSTOMER COMPLAINTS

Name of Company:

Product:

Sl No.	Customer	Identification of Product						Date Sold	Date of Commissioning or Usage	Details of Customer Complaint	Type of Complaint (Serious/ Major/ Minor)	Report of Factory Representative on Complaint			Action Taken on Item Under Reference	Result of Action Taken	Actions Proposed for Future
		Batch No.	Date of Manufacture	Type	Size	Capacity	Item No.					Detail	Source*	Suggestions			

*Under this column, it may be mentioned whether the item has failed due to customer's fault/manufacturing fault/transport damages, etc.

(*Continued*)

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APPENDIX M — *Contd*

CUSTOMER COMPLAINTS

PROFORMA II SUMMARY OF CUSTOMER COMPLAINTS

Name of Company: Product (Item):

Size: Period:

Brand:

Extent of Seriousness / Source of Defects	Serious		Major		Minor		Total		Percent Previous Year
	Total No. of Defects	Percent*	Total No. of Defects	Percent*	Total No. of Defects	Percent*	Total No. of Defects	Percent*	
Customer's fault									
Manufacturing fault									
Transport damages & pilferage									
Others									
Overall									

*It is the percentage of defectives or defects per 100 items of the total items supplied during the period under reference.

APPENDIX N

(*Clause* 2.13)

QUALITY COST ANALYSIS

Name of Company: Year:

Cost Categories	Quarterly Quality Cost in Rs				Total
	I	II	III	IV	
1. PREVENTION COSTS					
1.1 Quality Engineering					
1.2 Maintenance and Calibration of Equipments					
1.3 Development of Acceptance of Standards					
1.4 Vendor Development					
1.5 Obtaining a Third Party Guarantee of Quality					
1.6 Quality Training					
TOTAL					
2. APPRAISAL COSTS					
2.1 Inspection/Testing of the Incoming Materials					
2.2 In-Process Evaluation of Quality of Product					
2.3 Quality Audit on In-Process Products					
2.4 Quality Audit on Finished Products					
2.5 Materials/Services Consumed in Inspection					
2.6 Calibration and Maintenance of Inspection Equipments					
2.7 Evaluation of Inspection Data					
TOTAL					

(*Continued*)

APPENDIX N — *Contd*

QUALITY COST ANALYSIS

Cost Categories	Quarterly Quality Cost in Rs				Total
	I	II	III	IV	
3. FAILURE COSTS					
3.1 Internal Failure Costs					
3.1.1 Scrap Incurred in Course of Meeting Quality Requirements					
3.1.2 Re-work and Repair					
3.1.3 Analysis of Non-conforming Materials					
3.1.4 Re-inspection and Re-testing					
3.1.5 Loss Due to Down Grading of the Materials as " Seconds "					
TOTAL					
3.2 External Failure Costs					
3.2.1 Dealing with Complaints of Failures					
3.2.2 Handling and Accounting for Rejected Products					
3.2.3 Analysing and Repairing of Rejected Products					
3.2.4 Replacement of Failures Within the Warrantee Period					
3.2.5 Replacement of Products Due to Marketing Error					
TOTAL					
Grand Total of Quality Costs					
%Over Sales Turn Over or Total Expenditure of Company					

APPENDIX P

(*Clause* 2.14)

UTILIZATION OF RESOURCES

PROFORMA I EQUIPMENTS

Name of Company: Year:

Sl No.	Equipment	Operation	Number Produced	Production per Hour		Remarks
				Current	Past Best	

(*Continued*)

APPENDIX P — *Contd*

UTILIZATION OF RESOURCES

PROFORMA II RAW MATERIALS

Name of Company: Year:

Sl No.	Item	Quantity Consumed	Value in Rupees	Ratio to Total Output (%)			Remarks
				Quantity	Value	Best Year	

(Continued)

APPENDIX P — *Contd*

UTILIZATION OF RESOURCES

PROFORMA III MAN POWER

Name of Company: Year:

Sl No.	Total Number of Working Days	Man Days		Percentage Worked		Ratio to Output			Remarks
		Maximum Available	Actual Worked	Last Year	Current Year	Last Year	Current Year	Best Year	

(Continued)

APPENDIX P — *Contd*

UTILIZATION OF RESOURCES

PROFORMA IV SUMMARY OF INPUT AND OUTPUT

Name of Company:

1. INPUT

Sl No.	Growth	Year			
		Last Year	Current Year	Percentage Increase	Best Year
1	Man Power				
2	Equipments (Rs)				
3	Tools (Rs)				
4	Laboratories (Rs)				

NOTE — The details of equipment, tools and laboratories should be provided separately.

2. OUTPUT

Sl No.	Growth	Items*	Year		Percentage Increase/ Decrease	Best Year
			Last	Current		
1	Quantity Produced	a				
		b				
		c				
		d				
2	Turn-Over (Total)					
3	Inflation Correction					
4	Profits					

*Major items only.

APPENDIX Q

(*Clause* 2.15)

INVENTORY

Name of Company: Year:

Sl No.	Items	Quantity	Value in Rupees	Ratio to Total Value of Output (%)				Remarks
				Last Year	Current Year	Best Year	Minimum Possible	

APPENDIX R

(*Clause* 2.16)

SUGGESTION SCHEMES

Name of Company: Year:

Sl No.	Suggestion	Area of Improvement	Estimated Investment, if Any	Estimated Savings per Year	Recommendations of Evaluating Committee	Award	Remarks

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APPENDIX S

(*Clause* 2.17)

TRAINING PROGRAMMES (EXECUTIVES/SUPERVISORS/OPERATORS)

Name of Company:

Sl No.	Date	Training Programme (Description)	Total Number of Days of Programme	Number of Participants from the Department									
				Design		Purchase		Production		Quality Control		Others	
				Planned	Achieved	Planned	Achieved	Planned	Achieved	Planned	Achieved	Planned	Achieved

BUREAU OF INDIAN STANDARDS

Headquarters :

Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002

Telephones : 331 01 31 Telegrams : Manaksanstha

331 13 75 (Common to all Offices)

Regional Offices :		*Telephone*
Central	: Manak Bhavan, 9, Bahadur Shah Zafar Marg, NEW DELHI 110002	331 01 31 331 13 75
* Eastern	: 1/14 C.I.T. Scheme VII M, V.I.P. Road, Maniktola, CALCUTTA 700054	37 86 62
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Southern	: C.I.T. Campus, IV Cross Road, MADRAS 600113	41 29 16
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‡ Peenya Industrial Area, 1st Stage, Bangalore-Tumkur Road, BANGALORE 560058	39 49 55
Gangotri Complex, 5th Floor, Bhadbhada Road, T.T. Nagar, BHOPAL 462003	55 40 21
Plot No. 82/83, Lewis Road, BHUBANESHWAR 751002	5 36 27
Kalai Kathir Building, 6/48-A Avanasi Road, COIMBATORE 641037	2 67 05
Quality Marking Centre, N.H. IV, N.I.T., FARIDABAD 121001	—
Savitri Complex, 116 G. T. Road, GHAZIABAD 201001	8-71 19 96
53/5 Ward No. 29, R.G. Barua Road, 5th By-lane, GUWAHATI 781003	3 31 77
5-8-56C L. N. Gupta Marg, (Nampally Station Road) HYDERABAD 500001	23 10 83
R14 Yudhister Marg, C Scheme, JAIPUR 302005	6 34 71
117/418 B Sarvodaya Nagar, KANPUR 208005	21 68 76
Plot No. A-9, House No. 561/63, Sindhu Nagar, Kanpur Road, LUCKNOW 226005	5 55 07
Patliputra Industrial Estate, PATNA 800013	6 23 05
District Industries Centre Complex, Bagh-e-Ali Maidan, SRINAGAR 190011	—
T. C. No. 14/1421, University P. O., Palayam, THIRUVANANTHAPURAM 695034	6 21 04

Inspection Offices (With Sale Point) :

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