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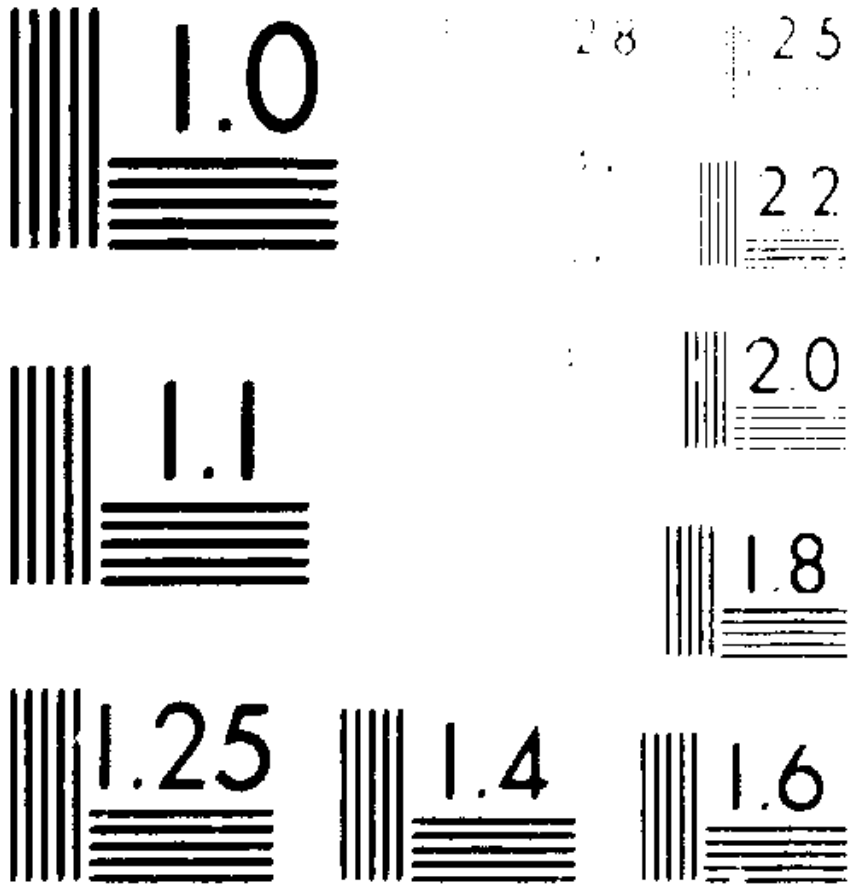
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DEVELOPMENT OF CAPITAL GOODS INDUSTRIES

DP/TUR/76/034

Turkey.

Technical Report No. XII:
Demand for Capital Goods
for Fertilizer Industry

Vol : I

1982

UNITED NATIONS DEVELOPMENT PROGRAMMES IN TURKEY

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANISATION

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English

DEVELOPMENT OF CAPITAL GOODS INDUSTRIES

DP/TUR/76/034

Technical Report No. XII - Vol.I

Prepared for the Government of Turkey

by the United Nations Industrial Development Organization

acting as executing agency for the United Nations Development Programme

Based on the work of

Capital Goods Development Project Team in Turkey

United Nations Industrial Development Organization

Vienna

Birlesmiş Milletler Kalkınma Programı

UNITED NATIONS NATIONS UNIES

DEVELOPMENT PROGRAMME IN TURKEY

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U.N. BUILDING, 197 ATATÜRK BULVARI P.K. BOX 407 ANKARA [illegible]

CHAPTER I

INTRODUCTION

1.1. The State Planning Organisation in Turkey, in close cooperation with the United Nations Industrial Development Organisation (UNIDO) undertook a detailed study to develop and expand the capital goods manufacturing industries.

1.2. AZOT SANAYİİ T.A.Ş. (AZOT), as the largest fertilizer producing company in Turkey, was asked by SPO to be involved in this project. This report deals with the anticipated demand of capital goods for the fertilizer sector.

1.3. The project has been conducted under the direction of Mr. M.M.Luther, Chief Technical Adviser and Mr. Vedat Mihladız Project Manager in AZOT. AZOT SANAYİİ T.A.Ş. supported the project in February 1981 with two engineers named Mrs. Emine Abdelal and Mr. Oğuz Kadıoğlu. After September 1981 Mrs. Emine Abdelal continued alone.

./..

1.4. Mr. A.D.Surie, Mechanical Engineer, joined the project as an expert on March 1981 and was assigned to work with AZOT engineers on demand projections for capital goods in Fertilizer Industry, besides some other sectors.

1.5. This report has been discussed with the management of AZOT who are in agreement with it.

1.6. Mrs. Güler İzmirlioğlu and Mr. Ziya Sıddıki, National Project Coordinators have been continuously associated with the work at all stages.

1.7. All the detailed data including modular production charts, activity charts, flow diagrams and yearwise details of demand for capital goods for AZOT are in the additional volumes as under:

Vol.II - Ammonia from Coal
Vol.III- Ammonia from Naptha
Vol.IV - Sulphuric Acid(İskenderun Plant)
Vol.V - Urea (Soma Plant)
Vol.VI - DAP
Vol.VII- Phosphoric Acid
Vol.VIII-Urea(İskenderun Plant)
Vol.IX - Sulphuric Acid (Mazıdağı)

CHAPTER II

OBJECTIVES AND METHODOLOGY

2.1. OBJECTIVES OF THE PROJECT

2.1.1. The main objective of the Capital Goods Development Project is to plan the long range development of capital goods industry in Turkey through identification of machinery and equipment requirements of industrial plants planned to be constructed up to 2000 and prepare plans for manufacture of as many of these capital goods as possible to reduce the level of their imports.

2.1.2. The demand for capital goods for process industries has been determined by following the methodology presented in Technical Report No. 1- Methodology for Planning of Capital Goods Industries by CTA, UNIDO. It deals with the details of equipment and machinery in terms of their specifications as well as manufacturing characteristics.

2.1.3. By means of a computer programme, the expected requirement for groups of equipment for the plants were determined and sorted in ascending numerical order according to their codes and classified into groups of equipment.

The computer programme also lists for each equipment the quantity required, unit weight and unit cost in US dollars (1980 base) and furthermore, gives weight and cost distributions, yearwise on the basis of anticipated year of commissioning. These lists have been compiled as a result of examination of the modular production charts, modular flow diagrams and plant survey forms which are explained in the following sections.

2.2. METHODOLOGY FOR PROCESS INDUSTRIES

2.2.1. Different concept have been used by the Capital Goods Development Project teams for working out future demands of capital goods in different types of industries. This section briefly outlines the methodology as developed for process industries.

The technology and plant size for each plant have been considered and a mathematical model developed. The data has been codified under 15 digit codes and information transferred on to a computer programme. Using a computer system, it will be possible to identify common items and to readily establish requirements first for each plant, then for the particular industry and finally for all industries.

Estimated cost data for each item has also been included in the programme.

Instruments and electrical requirements are not included in this study.

2.3. CLASSIFICATION OF INDUSTRY

2.3.1. COMMODITY CLASSIFICATION

The 4 digit Industrial Standard Industrial Classification of all Economic Activities of United Nations (ISIC) has been used as the basis for classification of different parameters of industry to suit the Turkish conditions.

A fifth digit has been added to identify the specific commodity under consideration. considered were classified as shown on Page 7.

2.3.2. MODULAR PRODUCTION CHART

This chart shows the use of raw materials, the resultant intermediate products, by-products, waste products and of xourse the final products.

It does not take into account the process used nor the type of machinery or plant capacities. The main products and by-products are indicated in a square and the waste products in an ellipse. Full lines joining any two represent a production module in which the machine pool exists. In case of more than one entry to the same production module, these multiple production lines converging for production modules are represented by a full production line. Each product (Main, by-, intermediate or waste) has been given a two digit number. A sample is on page 39.

CLASSIFICATION OF FERTILIZERS

ISIC CODE

3512	-	Manufacture of fertilizers and pesticides. The manufacture of straight, mixed, compound and complex nitrogenous, phosphate and potash fertilizers, the formulation and preparation of ready-to-use pesticides, insecticides, fungicides and herbicides and of concentrates for this purpose. Included are sulphuric, phosphoric and nitric acid plants operated in conjunction with fertilizer plants which can not be separately reported, establishments primarily engaged in manufacturing urea are classified in group 3511. The manufacturing of basic or technical chemicals used in preparing pesticides, such as lead and calcium arsenates, copper sulfate, DDT, BHC, is classified in group 3511.
3512 - 1	-	Ammonia from coal.
3512 - 2	-	Ammonia from Naptha.
3512 - 3	-	Sulphuric Acid.
3512 - 4	-	DAP.
3512 - 5	-	Urea.
3512 - 6	-	Phosphoric Acid.

2.3.3. INDUSTRY ACTIVITIES CHART

To classify and codify the process industries and production activities an industry activities chart showing the stages of production has been prepared for each main product. A cumulative 9 digit coding system consisting of SITC code for industry sector(4), main product(1), intermediate product or production stage (2), technology (1), capacity(1) has been used. As explained in Para 2.3.1., the 5th digit identifies the main product, a specific item in the sector covered by the relevant ISIC code. Out of the remaining 4 digits on the industry activity chart, the first 2 for intermediate products which are processed in a production module. The 8th and 9th digits are for the alternative technologies and capacities of a particular production module respectively. In addition the name of the critical equipment and its capacity(defined as the 8th digit of SITC Codification system which will be described later) are also shown on the chart. In case of more than one critical equipment determining the capacity the item with the highest value is considered as critical. A sample is on page 40.

2.3.4. MODULAR PROCESS FLOW DIAGRAM AND PLANT SURVEY FORM

To identify each production module one modular process flow diagram showing the process flow and one plant survey for recording the required information have been prepared.

2.3.4.1. The modular process flow diagram shows the process flow between equipment and machines in the order they are required. The left hand side of the diagram is the flow diagram and the right hand side is the list of equipment which are used in the process together with their 15 digit codes quantitative and machine function codes. Different symbols and codes numbers are given to the equipment according to their functions. The circle symbol(0) and numbers between 0-29 are used for process equipment while the square symbol (□) and numbers 30-39 for inspection, the triangle symbol (△) and numbers 40-59 for storage, the arrow symbol (⇧) and numbers 60-79 for transport equipment. Full lines (——) represent

work flow. A sample is on page 41 . ~~A sample chart~~ ~~indicating the relationship between flow diagram and~~ activities is on Page .

2.3.4.2. Plant survey form shows besides actual costs and 1980 basis costs, all the actual data of specifications and manufacturing characteristics and identifies specifically the 15 digit code for each. A sample is on Page 42.

2.3.4.3. The purchase year, the cost at the time of purchasing and the cost in 1980 US dollars of the equipment are also given in these forms.

2.4. CLASSIFICATION AND CODIFICATION OF CAPITAL GOODS

2.4.1. A 15 digit system based on the 5 digit SITC code has been evolved to cover all capital goods expected to be used in sectors considered by the Capital Goods Development Project in Turkey. The first 5 digits are the SITC codes and classify machines and equipment according to their functions. The next 9 digits have been allocated for definition of nomenclature, specifications and manufcaturing characteristics, and the last digit is used for information on whether it is imported or manufcatured in Turkey. This system is schematically shown on Page 11 .

LAYOUT OF 15 DIGIT CODES FOR CAPITAL GOODS

1 2 3 4 5	SITC Group name
6 7	Machine name
8	Major specification(Capacity)
9	Major specification(Optional)1
10	Major specification(Optional)2
11	Type
12	Manufacturing Characteristics 1(Weight)
13	Manufacturing Characteristics 2(x)
14	Manufactur Charact 3(x)
15	Origin

(x) Type of material in the case of fabricated equipment(eg. type of steel) and that of principal parts in the case of machines (eg. type of casting).

(xx) Plate thickness is the case of fabricated equipment and maximum weight of a component in the case of machinery.

2.4.2. EXAMPLE OF CAPITAL GOODS CODES BASED ON SITC

The 15 digit codes developed on the basis of SITC code Number 64241 is on page ~~27~~ 43

If, for example, a particular drum has to be codified, the 15 digit code for it 692410510322111 would be evolved as under:

The particulars of a drom to be codified are given below:

SITC CODE	69241
Nomenclature	Drum(Digits 6 and 7, Code 05)
Capacity	7.5 m^3 (Digit 8 - Code 1)
Major specification 1	Nil(Digit 9 - Code 0)
Major Specification 2	Temp.70°C(Digit 10-Code 3)
Type	Cylindrical(Digit 11-Code 2)
Weight	6T(Digit 12-Code 2)
Material	Stainless steel plate(Digit 13-Code 6)
Plate thickness	12 mm (Digit 14-Code 1)
Origin	Turkey(Digit 15 - Code 1)

CHAPTER III

DEMAND PROJECTIONS

3.1. CAPACITY AND DEMAND FOR FERTILIZER

The capacity and the expected production figures for all fertilizer plants in public and private sectors in 1988 and 1993 as well as production in 1980 are shown on Table 20 (page 36).

3.2. The future plants of AZOT which have been analyzed for this project are:

(i) IVth Fertilizer Complex consisting of

-Ammonia (from Napthta)	2 x 1000 t/d
-Urea	1100 t/d
-Sulphuric Acid	2 x 1050 t/d
-DAP(including phosphoric acid production)	1400 t/d

(ii) SOMA Fertilizer Complex Consisting of

-Ammonia (from coal)	1000 t/d
-Urea	1550 t/d
-Sulfur	166 t/d
-Methanol	80 t/d

(iii)MAZIDAĞI Fertilizer Plant Consisting of

- Sulphuric Acid	1283 t/d
- Phosphoric Acid	427 t/d
- TSP(%45)	585 t/d

Anticipated dates of commissioning for IVth Fertilizer Complex and SOMA Fertilizer Complex are taken as 1987 while for MAZIDAĞI Fertilizer Plant as 1988.

3.3. The triple superphosphate plant with a capacity of 393.000 Tpa which was originally to be carried out by Gübre Fabrikaları T.A.Ş. has not been included. Details of this unit will be added as they become available.

3.4. During the study it is assumed that the equipment requirement for the new Urea Plant-İSKENDERUN will be the same as the Urea Plant-SOMA since the data available is only from Urea Plant-SOMA.

The same assumption is made also for Sulphuric Acid and Phosphoric Acid Plants at Mazıdağı. The equipment requirement for Sulphuric Acid and Phosphoric Acid Plants has been taken as of the Sulphuric Acid and Phosphoric Acid Plants at İSKENDERUN.

3.5. The summary of demand according to the 5 digit SITC Code both weight-wise and value-wise for each plant are in Annexures.

3.6. The grand total of capital goods demand for all future fertilizer plants according to the 5 digit SITC code are in pages

CHAPTER IV

CONCLUSIONS AND RECOMMENDATIONS

4.1. CONCLUSIONS

4.1.1. The demand for capital goods for AZOT in the period 1981-1990 is as under:

	Weight(Tons)	Value(1000 $)
Fabricated equipment	17,087.35	49,967.77
Machinery	13,413.61	57,884.51

4.1.2. Details of demand for items of different specifications and manufacturing characteristics are given in Volume II.

The total equipment required for plants other than AZOT (excluding Ammonium Sulphate Plant by private sector Akdeniz Gübre Fab.) is expected to be as shown on Table No.19.

CAPITAL GOODS
DEVELOPMENT PROJECT
UNIDO/SPO (AZOT)

TABLE 1

TOTAL SUMMARY OF CAPITAL GOODS DEMAND IN 1981-1990
FOR AZOT SANAYİİ T.A.Ş.

Weight(tons)/Value (1000 $)

SITC CODE	BASIC MACHINE NAME	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	TOTAL
69211	Reservoirs, tanks, bins etc					2662.8	466.2					3129.0
69243	Containers (pressurized)					2667.4	11.9					2679.3
71261	Turbines					98.77	10.0					108.77
72831	Screen, separator, sifter					46.00	8.0					54.00
72832	Crushers, mills					238.50	50.0					288.50
72834	Agglomerators					10396.0	-					10396.0
74131	Electric furnaces					6.0	6.0					12.0
74132	Non-electric furnaces					1029.5	66.0					1095.5
74161	Heat exchangers					3481.8	260.0					3741.8
74162	Evaporators					99.4	-					99.4
74164	Dryers					49.0						49.0
74165	Reaction vessels					2367.1	430.0					2797.1
74166	Columns					1620.4	331.7					1952.1
74210	Reciprocating pumps					95.26	0.6					95.86
74220	Centrifufal pump					141.8	26.4					168.2
74230	Rotary pump					0.3	-					0.3
74240	Jet pumps					3.68	-					3.68
74312	Vacuum pump					22.0	11.0					.0
74313	Compressor					319.89	-					319.89
74341	Fans					148.8	6.0					154.8
74342	Blowers					113.80	14.5					128.3
74361	Purifying machinery for gas.					1395.80	29.5					1425.3
74362	Purifying machinery for liq.					43.0	43.0					86.0
74423	Pneumatic conveyors					42.4	4.0					46.4
74426	Conveyors, mechanical					868.14	191.5					1059.64
74428	Handling machinery					485.0	130.0					615.0
74535	Packing machine					13.77	4.0					17.77
						28300.16	2120.3					30500.96
						15443.52	1643.8					17087.35
						1236.54	107.0					1343.61

CAPITAL GOODS
DEVELOPMENT PROJECT
UNIDO/IPO (A20?)

TABLE [illegible]

TOTAL [illegible] OF CAPITAL GOODS [illegible] IN 1981-1990
FOR [illegible]

Weight (tons) / Value (000 $)

SITC CODE	BASIC MACHINE NAME	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	TOTAL
69211	Reservoirs, tanks, vats etc					[illegible]	[illegible]					[illegible]2.5
69243	Containers (pressurized)					[illegible]	[illegible]					[illegible]
71262	Turbines					21[illegible]	[illegible]					[illegible].6
72831	Screens, separator, sifter					[illegible]	[illegible]					[illegible].2
72832	Crushers, mills					[illegible].7	[illegible]					[illegible]
72834	Agglomerators					[illegible].5	-					[illegible].5
74131	Electric furnaces					[illegible]	6.0					[illegible]
74132	Non-electric furnaces					[illegible].11	[illegible]					[illegible].11
741[illegible]	Heat exchangers					[illegible]	[illegible]					[illegible]
74162	Evaporators					11[illegible].2	-					1120.2
74164	Dryers					[illegible]	-					62.0
74165	Reaction vessels					[illegible]	172.0					9[illegible]2.31
74166	Columns					[illegible]	766.0					[illegible].05
74213	Reciprocating pumps					[illegible]	2.0					20761.5
74220	Centrifugal pump					[illegible]	[illegible]					1934.38
74230	Rotary pump					[illegible]	-					3.2
74240	Jet pumps					[illegible]	-					8.4
74312	Vacuum pump					[illegible]	1[illegible].4					18.8
74313	Compressor					1[illegible].76	-					15849.76
74341	Fans					[illegible]	7.6					994.72
74342	Blowers					[illegible]	13.64					468.06
74361	Purifying machinery for gas					17[illegible]	167.4					1819.4
74362	Purifying machinery for liq.					[illegible].4	531.4					1241.4
74423	Pneumatic conveyors					[illegible].7	32.0					100.7
74426	Conveyors, mechanical					[illegible].98	1227.4					6215.43
74428	Handling machinery					1929.7	509.7					2429.7
74525	Weighing machinery					104.7	4.4					109.10
	TOTAL					100[illegible]1.03	7508.18					107559.21
	Plant Fabricated Equipment					[illegible]23.9	4663.8					49967.77
	Machinery					55037.18	2844.38					57881.51

~~CENTRAL GOODS~~

DEVELOPMENT PROJECT
UNIDO/SPO (AZOT)

TABLE 3

SUMMARY OF CAPITAL GOODS DEMAND IN 1981-1990
FOR NEW AMMONIA PLANT (based on coal) CONS.YEAR 1987
LOCATION: SONA CAPACITY 300,000 t/y

Weight (tons)/~~Value (1000 $)~~

~~ISIC CODE~~	BASIC MACHINE NAME	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	TOTAL
69211	Reservoirs, tanks, bins etc.					848.8						848.8
69243	Containers (pressurized)					1541.8						1541.8
71251	Turbines					82.0						82.0
72811	Separators sifter					21.0						21.0
72832	Crusher, grinding mills					116.0						116.0
74132	Non-electric furnaces					280.0						280.0
74161	Heat exchangers					990.43						990.43
74165	Reaction vessels					695.4						695.4
74166	Columns					667.0						667.0
74230	Reciprocating pumps					0.06						0.06
74220	Centrifugal pumps					62.77						62.77
74230	Rotary pumps					0.3						0.3
7431	Compressors					129.45						129.45
7434	Fans					28.4						28.4
74342	Blowers					89.8						89.8
74361	Purifying machinery					1301.0						1301.0
74423	Pneumatic conveyors					18.4						18.4
74426	Conveyors					397.84						397.84
74428	Handling machinery					300.0						300.0
74525	Weighing machinery					0.7						0.7
	GRAND TOTAL					7571.0						7571.0
	Out of which											
	Plate Fabricated equipment					6324.38						6324.38
	Machines					1246.62						1246.62

CAPITAL GOODS

DEVELOPMENT PROJECT
UNIDO/SPO (AZOT)

TABLE 4

SUMMARY OF CAPITAL GOODS DEMAND IN 1981-1990
FOR NEW AMMONIA PLANT (based on coal) COMM.YEAR 1987
LOCATION: SOMA CAPACITY 300,000 t/y Weight (tons)/ Value (1000 $)

SITC CODE	BASIC MACHINE NAME	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	TOTAL
69211	Reservoirs, tanks, bins etc.					581.7						581.7
69243	Containers (pressurized)					2044.0						2044.0
71261	Turbines					1936.0						1936.0
72831	Separators, sifter					89.8						89.8
72832	Crushers, grinding mills					1079.0						1079.0
74132	Non-electric furnaces					1921.0						1921.0
74161	Heat exchangers					7316.36						7316.36
74165	Reaction vessels					3837.6						3837.6
74166	Columns					1462.5						1462.5
74210	Reciprocating pumps					1.3						1.3
74220	Centrifugal pumps					862.1						862.1
74230	Rotary pumps					3.2						3.2
74313	Compressors					7807.0						7807.0
74341	Fans					278.0						278.0
74342	Blowers					36.36						36.36
74361	Purifying machinery					1417.2						1417.2
74423	Pneumatic conveyors					26.0						26.0
74426	Conveyors					2492.8						2492.8
74428	Handling machinery					1120.0						1120.0
74525	Weighing machinery					0.61						0.61
	GRAND TOTAL					34312.53						34312.53
	Out of which											
	Plate Fabricated equipment					18580.36						18580.36
	Machines					15732.17						15732.17

CAPITAL GOODS
DEVELOPMENT PROJECT
UNIDO/SPO (AZOT)

TABLE 5

SUMMARY OF CAPITAL GOODS DEMAND IN 1981-1990
FOR THE NEW AMMONIA PLANT (based on suppliers) COMM.YEAR 1987
LOCATION: İSKENDERUN CAPACITY 300,000 t/y

Weight (tons)/~~value (1000 $)~~

SITC CODE	BASIC MACHINE NAME	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	TOTAL
69211	Reservoris, tanks etc.					959.70						959.70
69243	Containers (pressurized)					1021.10						1021.10
71261	Turbines					6.77						6.77
74132	Non-electric furnaces					676.50						676.50
74161	Heat exchangers					1267.97						1267.97
74165	Reaction vessels					598.70						598.70
74166	Columns					468.90						468.90
74220	Centrifugal pumps					21.05						21.05
74313	Compressor					100.44						100.44
74341	Fans					53.00						53.00
74361	Purifying machinery for gases					11.80						11.80
	GRAND TOTAL					5185.93						5185.93
	Out of which											
	Plate fabricated equipment					5004.67						5004.67
	Machinery					181.26						181.26

CAPITAL GOODS
DEVELOPMENT PROJECT

UNIDO/SPG (AZOT)

TABLE 6

SUMMARY OF CAPITAL GOODS DEMAND IN 1981-1990
FOR THE NEW AMMONIA PLANT (based on naphtha) CONST.YEAR 1987
LOCATION [illegible] CAPACITY 300,000 t/y ~~Weight (tons)~~ Value (1000 $)

SITC CODE	BASIC MACHINE MAKE	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	TOTAL
69211	Reservoris, tanks etc.					1255.03						1255.03
69243	Containers(pressurised)					2355.90						2355.90
71261	Turbines					212.96						212.96
74132	Non-electric furnaces					2627.11						2627.11
74161	Heat exchangers					4591.93						4591.93
74165	Reaction vessels					3327.61						3327.61
74166	Columns					1142.36						1142.36
74220	Centrifugal pumps					462.63						463.63
74313	Compressor					6538.76						6538.76
74341	Fans					566.83						566.83
74361	Purifying machinery for gases					77.2						77.2
	GRAND TOTAL					23158.32						23158.32
	Out of which											
	Plate fabricated equipment					15377.14						15377.14
	Machinery					7781.18						7781.18

CAPITAL GOODS
DEVELOPMENT PROJECT
UNIDO/SPO (AZOT)

TABLE 7

SUMMARY OF CAPITAL GOODS DEMAND IN 1981-1990
FOR THE NEW SULFURIC ACID PLANT COMM. YEAR 1987
LOCATION: İSKENDERUN CAPACITY: 315.000t/year

Weight (tons)/~~Value (1000 $)~~

SITC CODE	BASIC MACHINE NAME	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	TOTAL
69211	Reservoirs, tank, bins etc.					380.0						380.0
69243	Containers (pressurized)					10.0						10.0
71261	Turbines					10.0						10.0
74132	Non-electric furnaces					60.0						60.0
74161	Heat exchangers					260.0						260.0
74165	Reaction vessels					180.0						180.0
74166	Columns					251.0						251.0
74220	Centrifugal pumps					14.2						14.2
74342	Blowers					6.0						6.0
74361	Purifying machinery for gas					10.0						10.0
74362	Purifying machinery for liq.					3.0						3.0
74426	Conveyors, mechanical					53.5						53.5
74428	Handling machinery					15.0						15.0
	GRAND TOTAL					1249.7						1249.7
	Out of which											
	Plate fabricated equipment					1154.0						1154.0
	Machinery					95.7						95.7

CAPITAL GOODS
DEVELOPMENT PROJECT
UNIDO/SPO (AZOT)

TABLE 8

SUMMARY OF CAPITAL GOODS DEMAND IN 1981-1990
FOR THE NEW SULFURIC ACID PLANT COMM. YEAR 1987
LOCATION: İSKENDERUN CAPACITY: 315,000 t/year

weight (tons)/value (1000 $)

SITC CODE	BASIC MACHINE NAME	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	TOTAL
69211	Reserveirs, tank,hims etc.					439.6						439.6
69243	Containers (pressurised)					70.0						70.0
71261	Turbines					20.0						20.0
74132	Non-electric furnaces					60.0						60.0
74161	Heat exchangers					2020.0						2020.0
74165	Reaction vessels					322.0						322.0
74166	Columns					562.0						562.0
74220	Centrifugal pumps					41.28						41.28
74342	Blowers					367.0						367.0
74361	Purifying machinery for gas					96.0						96.0
74362	Purifying machinery for liq.					21.4						21.4
74426	Conveyors, mechanical					439.7						439.7
74428	Handling machinery					9.7						9.7
	GRAND TOTAL					4468.68						4468.68
	Out of which											
	Plate fabricated equipment					3591.00						3591.00
	Machinery					877.68						877.68

CAPITAL GOODS
DEVELOPMENT PROJECT
UNIDO/SPO (AZOT)

TABLE 9

SUMMARY OF CAPITAL GOODS DEMAND IN 1981-1990
FOR THE NEW UREA PLANT COMM.YEAR 1987
LOCATION: SONA CAPACITY: 465,000 t/year

Weight (tons)/~~Value (1000 $)~~

SITC CODE	BASIC MACHINE NAME	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	TOTAL
69211	Reservoirs, tanks, etc.					47.5						47.5
69243	Containers (pressurised)					44.7						44.7
72834	Agglomerators					5100.0						5100.0
74161	Heat exchangers					455.7						455.7
74162	Evaporators					21.4						21.4
74165	Reaction vessels					312.5						312.5
74166	Columns					33.9						33.9
74210	Reciprocating pumps					47.0						47.0
74220	Centrifugal pumps					4.49						4.49
74240	Jet pumps					1.84						1.84
74313	Compressors					30.0						30.0
74341	Fans					17.2						17.2
74426	Conveyors, mechanical					10.00						10.00
74525	Weighing machinery					0.36						0.36
	GRAND TOTAL					6126.59						6126.59
	Out of which											
	Plate fabricated equipment					915.7						915.7
	Machines					5210.89						5210.89

CAPITAL GOODS
DEVELOPMENT PROJECT
UNIDO/SPO (AZOT)

TABLE 10

SUMMARY OF CAPITAL GOODS DEMAND IN 1981-1990
FOR THE NEW UREA PLANT COMM. DATE 1987
LOCATION: SOMA CAPACITY: 465.000 t/year

~~Weight (tons)~~/volume (1000 $)

SITC CODE	BASIC MACHINE NAME	1981	1982	1983	1984	1985	1986	1987	1588	1989	1990	TOTAL
69211	Reserveirs, tanks etc.					92.7						92.7
69243	Containers (pressurized)					283.5						283.5
72834	Agglomerators					195.0						195.0
74161	Heat exchangers					2183.0						2183.0
74162	Evaporators					534.0						534.0
74165	Reaction vessels					914.8						914.8
74166	Columns					276.9						276.9
74210	Reciprocating pumps					10478.0						10478.0
74220	Centrifugal pumps					106.4						106.4
74240	Jet pumps					4.2						4.2
74313	Compressors					752.0						752.0
74341	Fans					38.4						38.4
74426	Conveyors, mechanical					23.6						23.6
74525	Weighing machinery					0.31						0.31
	GRAND TOTAL					15882.81						15882.81
	Out of which											
	Plate fabricated equipment					4284.9						4284.9
	Machines					11597.91						11597.91

CAPITAL GOODS
DEVELOPMENT PROJECT
UNIDO/SPO (ALGO?)

TABLE 11

SUMMARY OF CAPITAL GOODS DEMAND IN 1981-1990
FOR THE NEW DAP PLANT (including PHOSPHORIC ACID PRODUCTION)
LOCATION: ISKENDERUN CAPACITY: 420,000 t/year CONST. YEAR 1987 Weight (tons)/~~Value (1000 $)~~

SITC CODE	BASIC MACHINE NAME	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	TOTAL
69211	Reservoirs, tanks, bins etc.					379.3						379.3
69243	Containers (pressurised)					5.1						5.1
72831	Screens, classifiers					25.0						25.0
72832	Crushers					68.5						68.5
72834	Agglomerators					196.6						196.6
74131	Electric furnaces					6.0						6.0
74132	Non-electric furnaces					13.0						13.0
74161	Heat exchangers					52.0						52.0
74162	Evaporators					78.0						78.0
74164	Dryers					49.0						49.0
74165	Reaction vessels					268.0						268.0
74166	[illegible]					165.7						167.7
74210	Reciprocating pumps					1.2						1.2
74220	Centrifugal pumps					34.8						34.8
74312	Vacuum pumps					11.0						11.0
74341	Fans					33.0						33.0
74342	Blower					18.0						18.0
74361	Purifying machinery for gas.					73.0						73.0
74362	Purifying machinery for liq.					40.0						40.0
74423	Pneumatic conveyors					24.0						24.0
74426	Conveyors, mechanical					396.8						396.8
74428	Handling machinery					170.0						170.0
74525	Weighing machinery					12.35						12.35
	GRAND TOTAL					2120.35						2120.35
	Out of which											
	Plate fabricated equipment					1129.1						1129.1
	Machines					991.25						991.25

CAPITAL GOODS
DEVELOPMENT PROJECT
UNIDO/SPO (AZOT)

TABLE 12

SUMMARY OF CAPITAL GOODS DEMAND IN 1981-1990
FOR THE NEW DAP PLANT (including PHOSPHORIC ACID PRODUCTION)
LOCATION: İSKENDERUN CAPACITY: 420,000 t/year COMM. YEAR 1987 ~~Weight (tons)~~/Value (1000 $)

SITC CODE	BASIC MACHINE NAME	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	TOTAL
69211	Reservoirs, tanks, bins etc.					347.7						347.7
69243	Containers (pressurized)					19.1						19.1
72831	Screens, classifiers					176.5						176.5
72832	Crushers					537.2						537.2
72834	Agglomerators					374.5						374.5
74131	Electric furnaces					6.0						6.0
74132	Non-electric furnaces					13.0						13.0
74161	Heat exchangers					164.6						164.6
74162	Evaporators					52.2						52.2
74164	Dryers					62.0						62.0
74165	Reaction vessels					117.0						117.0
74166	Columns					346.4						346.4
74210	Reciprocating pump					4.2						4.2
74220	Centrifugal pumps					273.14						273.14
74312	Vacuum pumps					19.4						19.4
74341	Fans					65.49						65.49
74342	Blower					45.3						45.3
74361	Purifying machinery for gas					157.6						157.6
74362	Purifying machinery for liq					610.0						610.0
74423	Pneumatic conveyors					42.7						42.7
74426	Conveyors, mechanical					2008.38						2008.38
74428	Handling machinery					800.0						800.0
74525	Weighing machinery					103.47						103.47
	GRAND TOTAL					~~6343.88~~						6343.88
	Out of which											
	Plate fabricated equipment					1893.6						~~1893.6~~
	Machines					4450.28						4450.28

CAPITAL GOODS
DEVELOPMENT PROJECT

UNIDO/SPO (AZOT)

TABLE 13

SUMMARY OF CAPITAL GOODS DEMAND IN 1981-1990
FOR NEW PHOSPHORIC ACID PLANT COMM.YEAR 1988
LOCATION MAZIDAĞI CAPACITY: 126,118 t/y

weight (tons)/~~value (1000 $)~~

SITC CODE	BASIC MACHINE NAME	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	TOTAL
69211	Reservoirs, tanks, bins etc.						86.2					86.2
69243	Containers (pressurised)						1.9					1.9
831	Classifier						8.0					8.0
72832	Grinding mills						50.0					50.0
74131	Electrical furnaces						6.0					6.0
74132	Non-electric furnaces						6.0					6.0
74165	Reaction vessels						250.0					250.0
74156	Columns						80.7					80.7
74210	Reciprocating pumps						0.6					0.6
74220	Centrifugal pumps						12.2					12.2
74312	Vacuum pumps						11.0					11.0
74341	Fans						6.0					6.0
74342	Blowers						8.5					8.5
74361	Purifying machinery for gas.						19.5					19.5
74362	Purifying machinery for liq.						40.0					40.0
74423	Pneumatic conveyors						4.0					4.0
74426	Conveyors, mechanical						138.0					138.0
74428	Handling machinery						115.0					115.0
74525	Weighing machinery						4.0					4.0
	GRAND TOTAL						871.1					871.1
	Out of which											
	Plate fabricated equipment						489.8					489.8
	Machinery						357.3					357.3

CAPITAL GOODS

TABLE 14

DEVELOPMENT PROJECT
UNIDO/SPO (AZOT)

SUMMARY OF CAPITAL GOODS DEMAND IN 1981-1990
FOR NEW PHOSPHORIC ACID PLANT CONSL.YEAR 1988
LOCATION MAZIDAĞI CAPACITY: 126,118 t/y

weight(tons)/value (1000 $)

SITC CODE	BASIC MACHINE NAME	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	TOTAL
69211	Reservoirs, tanks, bink etc.						93.5					93.5
69243	Containers (pressurized)						10.9					10.9
72831	Classifier						122.0					122.0
72832	Grinding mills						431.0					431.0
74131	Electrical furnaces						6.0					6.0
74132	Non-electric furnaces						6.0					6.0
74165	Reaction vessels						57.0					57.0
74166	Columns						218.0					218.0
74210	Reciprocating pump						2.0					2.0
74220	Centrifugal pump						41.2					41.2
74312	Vacuum pumps						19.4					19.4
74341	Fans						7.6					7.6
74342	Blowers						19.4					19.4
74361	Purifying machinery for gas.						71.4					71.4
74362	Purifying machinery for liq.						610.0					610.0
74423	Pneumatic conveyors						32.0					32.0
74426	Conveyors, mechanical						787.7					787.7
74428	Handling machinery						500.0					500.0
74525	Weighing machinery						4.4					4.4
	GRAND TOTAL						3039.5					3039.5
	Out of which											
	Plate fabricated equipment						1072.8					1072.8
	Machinery						1966.7					1966.7

CAPITAL GOODS
DEVELOPMENT PROJECT
UNIDO/SPO (AZOT)

TABLE 15

SUMMARY OF CAPITAL GOODS DEMAND IN 1981-1990
FOR THE NEW UREA PLANT COMM. YEAR 1987
LOCATION: İSKENDERUN CAPACITY: 330,000 t/y Weight (tons)/~~Value (1000 $)~~

SITC CODE	BASIC MACHINE NAME	1981	1982	1983	1984	1985	1986	1986	1988	1989	1990	TOTAL
69211	Reservoirs, tanks, etc					47.5						47.5
69243	Containers (pressurized)					44.7						44.7
72834	Agglomerators					5100.0						5100.0
74161	Heat exchangers					455.7						455.7
74162	Evaporators					21.4						21.4
74165	Reaction vessels					312.5						312.5
74166	Columns					33.9						33.9
74210	Reciprocating pumps					47.0						47.0
74220	Centrifugal pumps					4.49						4.49
74240	Jet pumps					1.84						1.84
74313	Compressors					30.0						30.0
74341	Fans					17.2						17.2
74426	Conveyors, mechanical					10.00						10.00
74525	Weighing machinery					0.36						0.36
	GRAND TOTAL					6126.59						6126.59
	Plate fabricated equipment					915.7						915.7
	Machines					5210.89						5210.89

CAPITAL GOODS
DEVELOPMENT PROJECT
UNIDO/SPO (AZOT)

TABLE 16

SUMMARY OF CAPITAL GOODS DEMAND IN 1981-1990
FOR THE NEW UREA PLANT COMM. DATE 1987
LOCATION: İSKENDERUN CAPACITY: 330.000 t/year

~~Weight (tons)~~/Value (1000 $)

SITC CODE	BASIC MACHINE NAME	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	TOTAL
69211	Reservoirs, tanks etc.					92.7						92.7
69243	Containers (pressurized)					283.5						283.5
72834	Agglomerators					195.0						195.0
74161	Heat exchangers					2183.0						2183.0
74162	Evaporators					534.0						534.0
74165	Reaction vessels					914.8						914.8
74166	Columns					276.9						276.9
74210	Reciprocating pumps					10478.0						10478.0
74220	Centrifugal pumps					106.4						106.4
74240	Jet pumps					4.2						4.2
74313	Compressors					752.0						752.0
74341	Fans					38.4						38.4
74426	Conveyors, mechanical					23.6						23.6
74525	Weighing machinery					0.31						0.31
	GRAND TOTAL					15882.81						15882.81
	Out of which											
	Plate fabricated equipment					4284.9						4284.9
	Machines					11597.91						11597.91

CAPITAL GOODS
DEVELOPMENT PROJECT
UNIDO/SPO (ALGT)

TABLE 17

SUMMARY OF CAPITAL GOODS DEMAND IN 1981-1990
FOR THE NEW SULFURIC ACID PLANT COMM YEAR 1988
LOCATION: MAZIDAGI CAPACITY: 385,000 t/y

Weight (tons)/Value (1000 $)

SITC CODE	BASIC MACHINE NAME	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	TOTAL
69211	Reservoirs, tank bins etc.						380.0					380.0
69243	Containers (pressurized)						10.0					10.0
71261	Turbines						10.0					10.0
74132	Non-electric furnaces						60.0					60.0
74161	Heat exchangers						260.0					260.0
74165	Reaction vessels						180.0					180.0
74166	Columns						251.0					251.0
74220	Centrifugal pumps						14.2					14.2
74342	Blowers						6.0					6.0
74351	Purifying machinery for gas						10.0					10.0
74352	Purifying machinery for liq						3.0					3.0
74426	Conveyors, mechanical						53.5					53.5
74428	Handling machinery						15.0					15.0
	GRAND TOTAL						1249.7					1249.7
	Out of which											
	Plate fabricated equipment						1154.0					1154.0
	Machinery						95.7					95.7

CAPITAL GOODS
DEVELOPMENT PROJECT
UNIDO/SPO (AZOT)

TABLE 18

SUMMARY OF CAPITAL GOODS DEMAND IN 1981-1990
FOR THE NEW SULFURIC ACID PLANT COMM YEAR 1988
LOCATION: MAZIDAGI CAPACITY 385,000 t/y

weight (tons)/value (1000 $)

SITC CODE	BASIC MACHINE NAME	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	TOTAL
69211	Reservoirs, tank, bins etc					-	439.6					439.6
69243	Containers (pressurized)					-	70.0					70.0
71261	Turbines					-	20.0					20.0
74132	Non-electric furnaces					-	60.0					60.0
74161	Heat exchangers					-	2020.0					2020.0
74165	Reaction vessels					-	322.0					322.0
74166	Columns					-	562.0					562.0
74220	Centrifugal pumps					-	41.28					41.28
74342	Blowers					-	367.0					367.0
74361	Purifying machinery for gas					-	96.0					96.0
74362	Purifying machinery for liq					-	21.4					21.4
74425	Conveyors, mechanical					-	439.7					439.7
74428	Handling machinery					-	9.7					9.7
	GRAND TOTAL					- -	4468.68					4468.68
	Out of Which											
	Plate fabricated equipment					-	3591.00					3591.00
	Machinery					-	877.68					877.68

TABLE 19

TOTAL EQUIPMENT DEMAND FOR PLANTS OTHER THAN AZOT
(Excluding Ammonium Sulphate Plant by Private
Sector Akdeniz Gübre Fabrikası)

COMPANY	PRODUCT (Cap.t/y)	YEAR OF COMMISSIONING	Steel Fabrication		Machinery		TOTAL	
			Weight (Tons)	Value (1000$)	Weight (Tons)	Value (1000$)	Weight (Tons)	Value (1000$)
Gübre Fab.	H_2SO_4 (230.000)	1985	1154.0	3591.0	95.7	877.68	1249.7	4468.68
	DAP(210.000)	1987	639.3	822.8	609.95	2483.58	1249.25	3306.38
İGSAŞ	NH_3 (330.000)	1988	5004.67	15377.14	181.26	7781.18	5185.93	23158.32
	Urea(577.500)	1988	915.7	4284.9	5210.89	11597.91	6126.59	15882.81
	NH_3 (290.000)	1988	5004.67	15377.14	181.26	7781.18	5185.93	23158.32
	Urea(506.100)	1988	915.7	4284.9	5210.89	11597.91	6126.59	15882.81

TABLE 20

CAPITAL GOODS DEVELOPMENT PROJECT IN TURKEY

FERTILIZER PRODUCTION IN 1980 AND PRODUCTION ESTIMATES FOR 1988-1993

(TON)

COMPANIES	KIND OF FERTILIZER	CAPACITY	1980 PRODUCTION	PRODUCTION ESTIMATE	
				1988	1993
I- AZOT SANAYİİ TAŞ.					
I-Installed plants					
-KÜTAHYA	ANC (%21N)	50 000	55 040	50 000	50 000
-	ASC (%21N)	60 000	36 310	60 000	60 000
	ANC (%26N)	338 500	84 150	288 000	288 000
-SAMSUN	TSP (%45P_2O_5)	220 000	114 248	198 000	198 000
	DAP (18-46-0)	227 200	105 100	204 000	204 000
-ELAZIĞ	NSP (%17P_2O_5)	220 000	15 822	180 000	180 000
-GEMLİK	ANC (%26N)	594 000	170 415	535 000	535 000
II-PLANTS WHICH ARE PLANNED TO BE INSTALLED					
-SOMA GÜBRE	UREA(%46N)	459 000	-	390 000	413 000
-IV.FERTI-LIZER COMPLEX	UREA(%46N)	330 000	-	280 000	297 000
	DAP (18-46-0)	420 000	-	357 000	378 000
-MAZIDAĞI	TSP(%45P_2O_5)	393 000	-	351 000	351 000
2. GÜBRE FAB.AŞ.					
-YARIMCA	TSP(%45P_2O_5)	185 000	123 150	180 000	180 000
	NPK(20-20-0)	200 000	180 210	180 000	180 000
-İSKENDERUN	TSP(%45P_2O_5)	185 000	131 656	-	-
	DAP (18-46-0)	210 000	-	210 000	210 000
3. İGSAŞ					
I.INSTALLED PLANTS					
-YARIMCA	UREA(%46 N)	511 500	429 739	511 500	511 500

TABLE 20

CAPITAL GOODS DEVELOPMENT PROJECT IN TURKEY

FERTILIZER PRODUCTION IN 1980 AND PRODUCTION ESTIMATES FOR 1988-1993 (Continued)

(TON)

COMPANIES	KIND OF FERTILIZER	CAPACITY	1980 PRODUCTION	PRODUCTION ESTIMATE 1988	1993
II-PLANTS WHICH ARE PLANNED TO BE INSTALLED					
-ANADOLU GÜBRE	UREA(%46N)	506 100		421 750	506 100
-TRAKYA GÜBRE	UREA(%46N)	577 500	-	519 750	548 625
4. PETKİM					
-YARIMCA	AS (%21N)	108 000	67 767	109 000	109 000
-ALİAĞA	AS (%21N)	4 500	*	4 500	4 500
5. AKDENİZ GÜBRE GÜBRE AŞ./ - MERSİN	AN (%26N)	594 000	261 880	408 000	480 000
	DAP(18-46-0)	148 500	17 970	102 000	120 000
			-		
	AS (%21N)	200 000	-	140 000	200 000
6. BAGFAS-İSKUR I-INSTALLED PLANT -BANDIRMA	TSP(%45P_2O_5)	160 000	100 496	160 000	160 000
	DAP(18-46-0)	165 000	60 288	165 000	165 000
	AS (%21 N)	220.000	60 165	214 500	214 500
	NPK (20-20-0)	165 000	*	165 000	165 000

TABLE 20

CAPITAL GOODS DEVELOPMENT PROJECT IN TURKEY

FERTILIZER PRODUCTION IN 1980 AND PRODUCTION ESTIMATES FOR 1988-1993(Continued)

(TON)

COMPANIES	KIND OF FERTILIZER	CAPACITY	1980 Production	PRODUCTION ESTIMATE 1988	1993
7. EGE GÜBRE AŞ.					
-FOÇA	NPK (20-20-0)	300 000	132 346	250 000	250 000
8. TOROS GÜBRE AŞ.					
-CEYHAN	NPK (20-20-0)	330 000	*	250 000	250 000
9. T.DEMİR ÇELİK İŞL.					
-KARABÜK	AS (%21N)	8 500	4 698	6 000	6 000
	NSP(%17P_2O_5)	22 000	9 794	14 000	14 000
-İSKENDERUN	AS (%21N)	12 100	5 109	12 000	12 000
TOTAL AS PHYSICAL FERTILIZER			2 116 323	7,413,475	7,677,410

TABLE 21

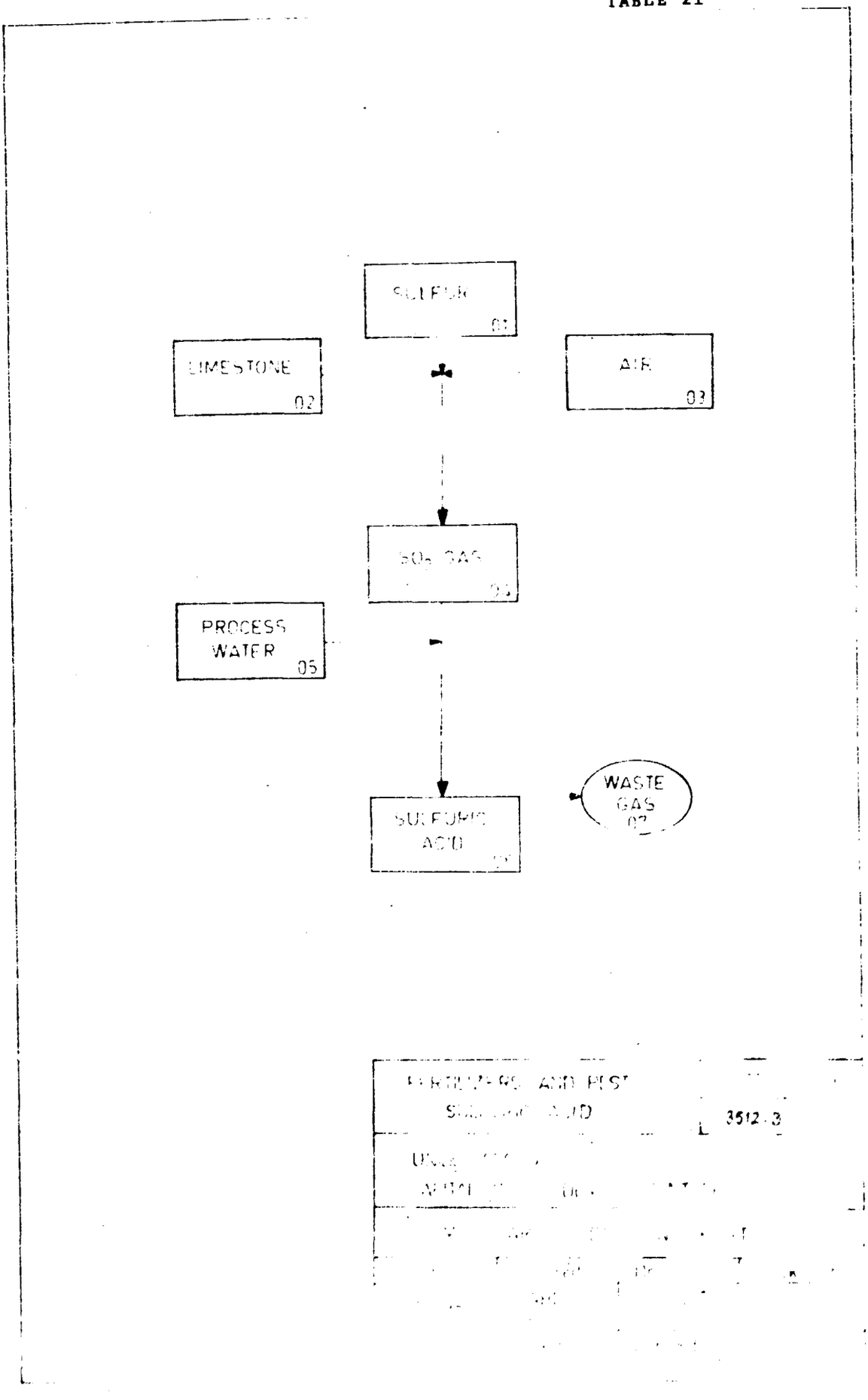

SULFUR
01
LIMESTONE
02
AIR
03
SO2 GAS
04
PROCESS
WATER
05
WASTE
GAS
07
SULFURIC
ACID
06
3512-3

Table 22

UNIDO/SPO (AZOT)

CAPITAL GOODS DEVELOPMENT PROJECT

INDUSTRY ACTIVITIES CHART

Ind.Code : 3512-3

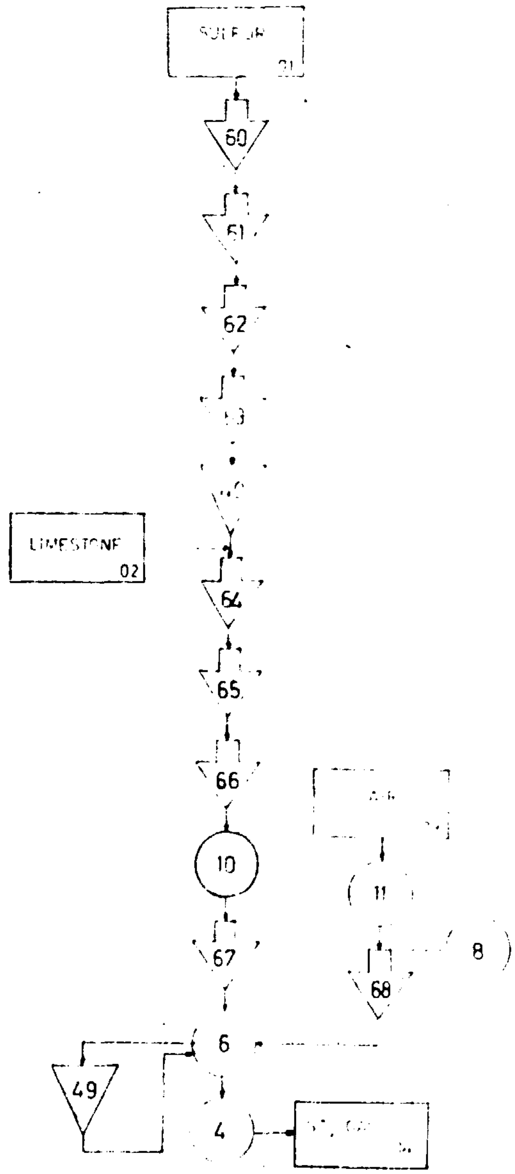
Ind.Name : Fertilizer and Pesticides

SULFURIC ACID

Prepared by	Checkedby	Approved by
Chem.Eng.MSc F. ABDELAL	UNIDO/Expert	UNIDO/CTA

PRODUCTION STAGE		TECHNOLOGY		CRITICAL EQUIPMENT		DESIGN LINE CAPACITY	
CODE	NAME	CODE	NAME	NAME	CAPACITY RANGE	CODE	CAPACITY
01	Sulfur	-	-	-	-	1	2X15 t/h
						2	18 t/h
04	SO_2 gas	1	Sulfur burning	S Combustion chamber	125 m^3	1	2x95.460 m^3/h
						2	113.700 m^3/h
06	Sulfuric acid	1	Conversion and double absorption	Converter	737 m^3	1	2x43.75 t/h
						2	54.4 t/h

TABLE 23



CAPACITY CALCULATIONS

Name of the critical equipment: S Combustion [illegible]

Design capacity of the critical equipment per [illegible]

No. of critical equipment : 2

Designed line capacity per hour : [illegible]

Designed line capacity per shift : [illegible]

Designed line capacity per day : [illegible]

Designed line capacity per year : [illegible]

ACTIVITY CODE		INDUSTRY [illegible]	[illegible]	[illegible]	
		3512	[illegible]	1	
NO	MACHINE CODE	MACHINE NAME			[illegible]
60	744260272013651	Felt conveyor			1
61	7442602720146 71	Belt conveyor			1
62	74426072013[illegible]41	Belt conveyor			1
63	744280060023[illegible]51	Tripper			1
40	692110111322211	[illegible]ulfur feed hopper			1
64	7442602120115 11	Belt conveyor			1
65	742200732[illegible]	Filtration pump			[illegible]
66	74[illegible]0031621[illegible]12	[illegible]			[illegible]
10	743623[illegible]001 12	Sulfur filters			[illegible]
67	742[illegible]00236[illegible]1[illegible]13	Sulfur burner feed pump			[illegible]
6	7[illegible]13224[illegible]4 11	S combustion chamber			
4	7[illegible]1[illegible]10660014233	Waste heat boiler			
49	692110[illegible]2[illegible]2	[illegible]			[illegible]
68	7434[illegible]0061101 11	Air blower			
11	74[illegible]1[illegible] 2122	Air filter			
8	712[illegible]10[illegible]00[illegible]32[illegible]22	Turbine for blower			

UNIDO / SPO (AZOT)

CAPITAL GOODS DEVELOPMENT PROJECT

MODULAR PROCESS FLOW DIAGRAM

TABLE 24

	[illegible]	[illegible]	[illegible] 1	[illegible] SPEC 2	[illegible]	[illegible] 1	[illegible] 2	[illegible] 3	[illegible]	Q.	[illegible] UNIT	TOTAL	CONSTANT 19[illegible] UNIT	TOTAL	YEAR OF PURCHASE	SITE CODE 1 2 3 4 5	6 7	8	9	10	11	12	13	14	
[illegible]	belt conveyor	[illegible] 600 t/h	: 800mm	[illegible] 58m	bulk	13.[illegible] tons	C-Steel	[illegible]	1	1	[illegible]	[illegible]	[illegible]	[illegible]	1979	74426	02	[illegible]	2	0	1	3	6	5	[illegible]
[illegible]	belt conveyor	[illegible] 600 t/h	: 800mm	L= 211m	bulk	[illegible] tons	C-Steel	27 tons	1	1	2[illegible]0	2[illegible]0	[illegible]	268	1979	74426	02	7	2	0	1	4	6	7	[illegible]
[illegible]	belt conveyor	[illegible] t/h	: 800mm	L= 74m	bulk	1[illegible].0 tons	C-Steel	[illegible] tons	1	1	70	70	7	75	1979	74426	02	7	2	0	1	3	6	4	[illegible]
[illegible]	[illegible]ipper	[illegible] t/h	: 300mm	L= 90 m	travelling	1[illegible].0 tons	[illegible] 24-1	13 tons	1	1	91	91	97	97	1979	74428	00	8	0	0	2	3	9	5	1
[illegible]	[illegible] feed hopper	$5m^3$	∅ 1 m.	[illegible]5°C	cyl.	[illegible].0 tons	C-Steel	6 mm	1	1	5.6	5.6	5.6	5.6	1980	69211	01	1	0	3	[illegible]	2	2	1	[illegible]
[illegible]	[illegible]lt conveyor	40 t/h	: 500mm	L= 10 m	bulk	[illegible] tons	C-Steel	1.35 tons	1	1	10	10	10.7	10.7	1979	74426	02	1	2	0	1	1	[illegible]	1	[illegible]
[illegible]	[illegible]ltration pump	$12m^3/h$	: 30m	viscous	vertical	[illegible] tons	Cast iron	[illegible] ton	2	2	1.0	2	1.[illegible]7	[illegible],14	1979	74220	[illegible]	3	2	6	2	1	[illegible]	1	[illegible]
	[illegible] pump	[illegible]m^3/h	: 15m	viscous	vertical	0.[illegible] tons	Cast iron	0.5 ton	2	2	1.2	[illegible].4	1.28	2.[illegible]6	1979	74220	02	3	1	6	[illegible]	1	[illegible]	1	
[illegible]	[illegible] filters	1 t/[illegible]				1.5 tons	C-Steel	[illegible].7 tons	2	2	10	20	1[illegible].7	21,5	1979	74362	31	2	0	[illegible]	0	1		1	
[illegible]	[illegible]	[illegible]m^3/h	: [illegible]0m	viscous	vertical	1.[illegible] tons	Cast iron	0.6 ton	2	3	1.1	3.3	1.17	3.51	197[illegible]	74220	02	2	3	6	[illegible]	1		1	
[illegible]	[illegible] chamber	[illegible] m^2	[illegible]0°C	1 t/h S		30.[illegible] tons	C-Steel	[illegible]	1	2	30	60	30	60	19[illegible]	74132	24	[illegible]	[illegible]			4		[illegible]	
	[illegible] boiler	[illegible]	-	-	[illegible] tube	40. tons	C-Steel	40 mm	2	2	[illegible]	[illegible]	[illegible]	40[illegible]	1[illegible]	74161	06	6	0	0	1	[illegible]			
	[illegible]					5.[illegible] tons	C-Steel	20 mm	[illegible]	2	35	70	35	70	1[illegible]0	69243	02	1	4	[illegible]	[illegible]	2		[illegible]	
	[illegible]	[illegible]m^3/min	[illegible]	air		3.0 tons	Cast iron	[illegible] tons	[illegible]	2	170	340	[illegible]	3[illegible]	[illegible]	74342	00	[illegible]	1	1		[illegible]			
[illegible]	[illegible]					[illegible] tons	[illegible] steel	-	2	2	[illegible]	96	[illegible]	96	19[illegible]0	74361	[illegible]0	8	[illegible]	[illegible]	[illegible]	2	1	2	
[illegible]	[illegible]			[illegible]kg/cm^2	back pressure	[illegible].0 tons	Alloy iron	[illegible]	2	2	10	2[illegible]	1[illegible]	20	[illegible]	71261	02	0	0	2	[illegible]	2	[illegible]	[illegible]	

Fabricated equipment

SITC Code 69211 - Reservoirs, tanks, vats and similar containers for any material (other than compressed or liquified gas) of iron or steel of a capacity exceeding 300 lt., whether or not lined or heat-insulated but, not fitted with mechanical or thermal equipments.

6-7		8		9		10		11		12		13		14		15	
Basic Machine Nomenclature		Major Specification (Capacity)		Major Spec.-1 Optional		Major Spec.-2 Optional		Type		Manufacturing characteristic -1		Manufacturing characteristic -2		Manufacturing characteristic -3		Origin	
Code	Name	Code	Cubic meters (m^3)	Code	Diameter in meters (m)	Code	Temperature °C	Code	Description	Code	Weight(tons)	Code	Main body materials	Code	Plate thickness mm.	Code	
01	Bins	1	Upto 100	1	Upto 5	1	Above 500	1	Rectangular/ cubic	1	Upto 5	1	Mild steel upto 0.20 carbon (untested quality)	1	Upto 20	1	Turkey
02	Bunkers	2	100-500	2	5-7.5	2	500-100	2	Circular/ cylindrical	2	5-10			2	20-40	2	Imported
03	Chests	3	500-1000	3	7.5-10	3	100-[illegible]			3	10-25			3	40-50		
04	Containers	4	1000-2500	4	Over 10	4	[illegible]-(-25)		semi-cylindrical	4	25-50			4	Over 50		
05	Reservoirs	5	2500-7500			5	(-25)-(-50)			5	50-100	2	Carbon steel above 0.20 C tested quality				
06	Silos	6	7500-15000			6	(-50)-(-100)		elliptical	6	100-200						
07	Tanks	7	15000-30000			7	(-100)-(-120)	3	Spherical	7	200-300						
08	Tubs	8	30000-50000			8	(-120)-(-170)			8	300-500	3	Boiler steel				
09	Vats	9	Over 50000			9	Below (-170)			9	Over 500	4	Alloy steel				
10	Vessels											5	High alloy steel				
11	Double-walled vessels											6	Stainless steel				
12	Lined vessels											7	Non-ferrous materials				
13	Storage tanks																
14	Hoppers							9	Others (nia,								
99	Others, (nia)	(nia: not indicated above)										9	Others				

12535
(2 of 9)

DEVELOPMENT OF CAPITAL GOODS INDUSTRIES

DP/TUR/76/034

Technical Report No. XII:
Demand for Capital Goods
for Fertilizer Industry

Vol : II

UNITED NATIONS DEVELOPMENT PROGRAMMES IN TURKEY

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANISATION

RESTRICTED

Sept.1982
English

DEVELOPMENT OF CAPITAL GOODS INDUSTRIES

DP/TUR/76/034
TURKEY

Technical report NoXII-Vol II
Demand for Capital Goods for Fertiliser Industry -
Ammonia(from Coal) - SOMA

Prepared for the Government of Turkey
by the United Nations Industrial Development Organization
acting as executing agency for the United Nations Development Programme

Based on the work of
Capital Goods Development Project Team in Turkey

United Nations Industrial Development Organization
Vienna

U.ITED NATIONS DEVELOPMENT PROGRAMMES IN TURKEY

CAPITAL GOODS DEVELOPMENT PROJECT IN TURKEY

Vol.II

AMMONIA FROM COAL - SOMA FERTILIZER PLANT

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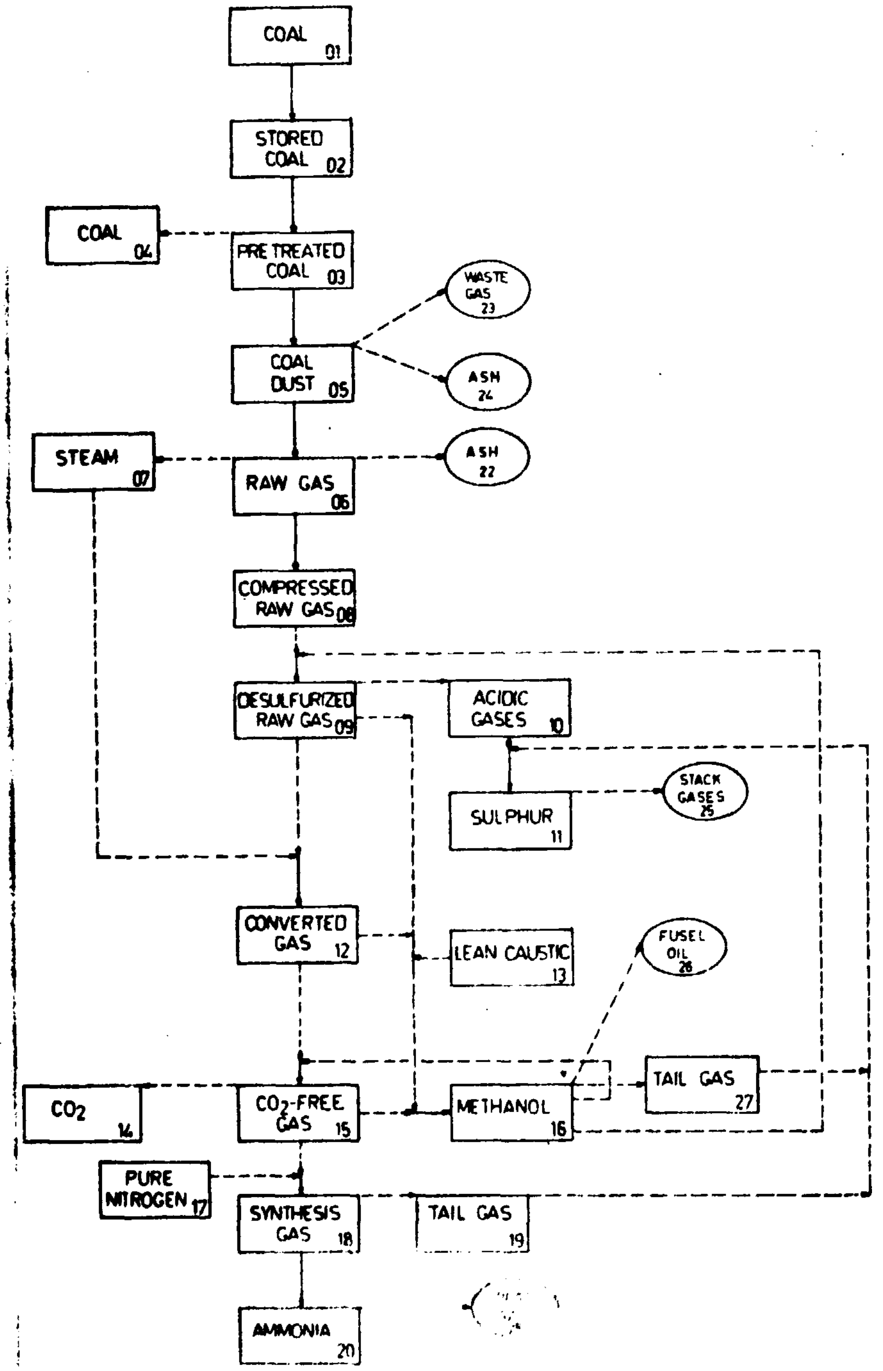


FERTILIZERS AND PESTICIDES AMMONIA (from coal)	INDUSTRY CODE 3512-1
UNIDO / SPO (AZOT) CAPITAL GOODS DEVELOPMENT PROJECT	
MODULAR PRODUCTION CHART	

DATE	PREPARED BY	DRAWN BY	CHECKED BY
23.9.1981	Emine Abdulnt Oğuz Kadıoğlu	Fatma Çelik	Vedat Mahledis
Checked by UNIDO/Expert		Approved by UNIDO/CTA	

UNIDO/RPO (ABOT)

CAPITAL GOODS DEVELOPMENT PROJECT

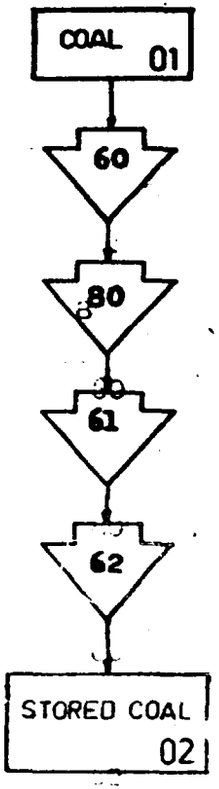
Ind. Code 3512-1

Ind. Name: Fertilizer and Pesticides

- AMMONIA -

Prepared by:	Checked by	Approved by
Chem. Eng. Mo H. ABDELAL	UNIDO/Expert [signature]	UNIDO/CTA

PRODUCTION STAGE		TECHNOLOGY		CRITICAL EQUIPMENT		DESIGN LINE CAPACITY	
CODE	NAME	CODE	NAME	NAME	CAPACITY RANGE	CODE	CAPACITY
01	COAL	-	-	-	-	-	-
02	Strored Coal	1	Stacking-reclaiming	reclaimer	370 t/h	1	108 t/h
03	Pretreated coal	1	crushing	crusher	108 t/h	1	108 t/h
05	Coal dust	1	grinding	coal mill	107 t/h	1	85 t/h
06	raw gas	1	Fluidised bed coal gasification	gasifier	28 t/h	1	115500 Nm^3/h
08	Compressed raw gas	1	Centrifugal compression	Compressor	57700 Nm^3/h	1	115500 Nm^3/h
09	desulphurised raw gas	1	Methanol wash	wash column	218 m^3	1	110945 Nm^3/h
11	Sulphur	1	Claus	kiln	600 m^3	1	6.90 t/h
12	Converted gas	1	Co. shift conversion	converter	115 m^3	1	169450 Nm^3/h
15	CO_2- free gas	1	Methanol wash	Stripping column	219 m^3	1	95.000 Nm^3/h
16	Methanol	1	Low-pressure	Converter	37.7 m^3	1	3.33 t/h
18	Synthesis gas	1	Liquid N_2 wash	N_2-wash column	150 m^3	1	110500 Nm^3/h
20	Ammonia	1	Synthesis	converter	230 m^3	1	41.67 t/h



CAPACITY CALCULATIONS

No of cr.eq.=reclaimer

D.cap of cr.eq.=370 t/h

No of. cr.eq.=2

Designed line capacity : 108 t/h
Designed line capacity :2592 t/shift
Designed line capacity :2592 t/d
Designed line capacity :854,700 t/y

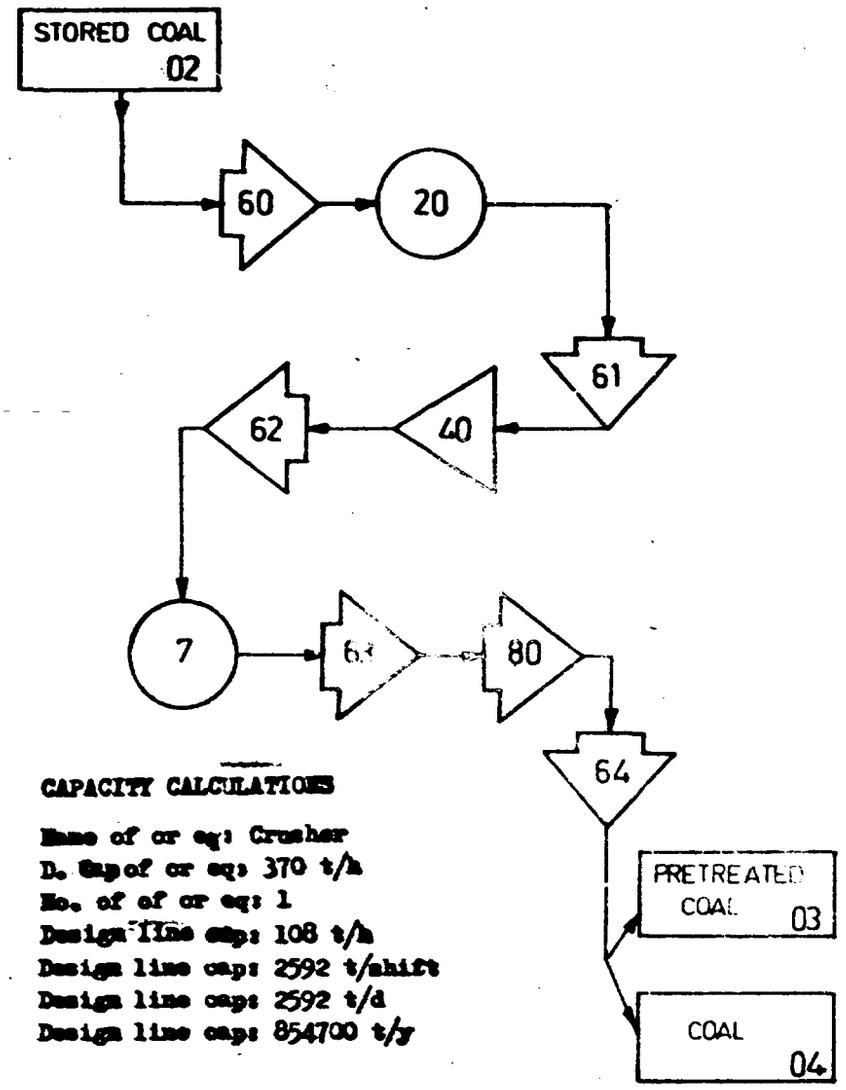
ACTIVITY CODE	INDUSTRY	PRODUCT	TECH.	CAP.
	3512-1	02	1	1

NO:	MACHINE CODE	MACHINE NAME	QUAN
60	744260273013661	Belt conveyer	1
80	745250681111111	Belt weigher	1
60	744260273016691	Belt conveyer	1
62	744280380026692	Stacker reclaimer	2

UNIDO / SPO (AZOT)
CAPITAL GOODS DEVELOPMENT PROJECT

MODULAR FLOW DIAGRAM

INDUSTRY	PRODUCT	TECHNOLOGY
FERTILIZER	STORED COAL	Stacking-Reclaiming
DATE	SAMPLE PLANT	CAPACITY
23.9.1981	-	108 t/h
PREPARED BY	DRAWN BY	CHECKED BY
EMİNE ABDELAL OĞUZ KADIOĞLU	FATMA ÇELİK	VEDAT MİHLADİZ
Checked by UNIDO/Expert		Approved by UNIDO/CTA



CAPACITY CALCULATIONS

Name of cr eq: Crusher
D. Cap of cr eq: 370 t/h
No. of of cr eq: 1
Design line cap: 108 t/h
Design line cap: 2592 t/shift
Design line cap: 2592 t/d
Design line cap: 854700 t/y

ACTIVITY CODE	INDUSTRY	PRODUCT	TECH.	CAP.
	3512-1	03	1	1

NO	MACHINE CODE	MACHINE NAME	QUAN
60	744260253015681	Belt conveyor	1
20	728313110002631	Overhead magnet sep.	1
61	744260253013641	Belt conveyor	1
40	692110110012211	Intermediate bin	1
62	744267553011631	Vibrating feeder	1
7	728320440003651	Crusher	1
63	744260253014671	Belt conveyor	1
80	745250681111611	Belt weigher	1
64	744260253013661	Belt conveyor	1

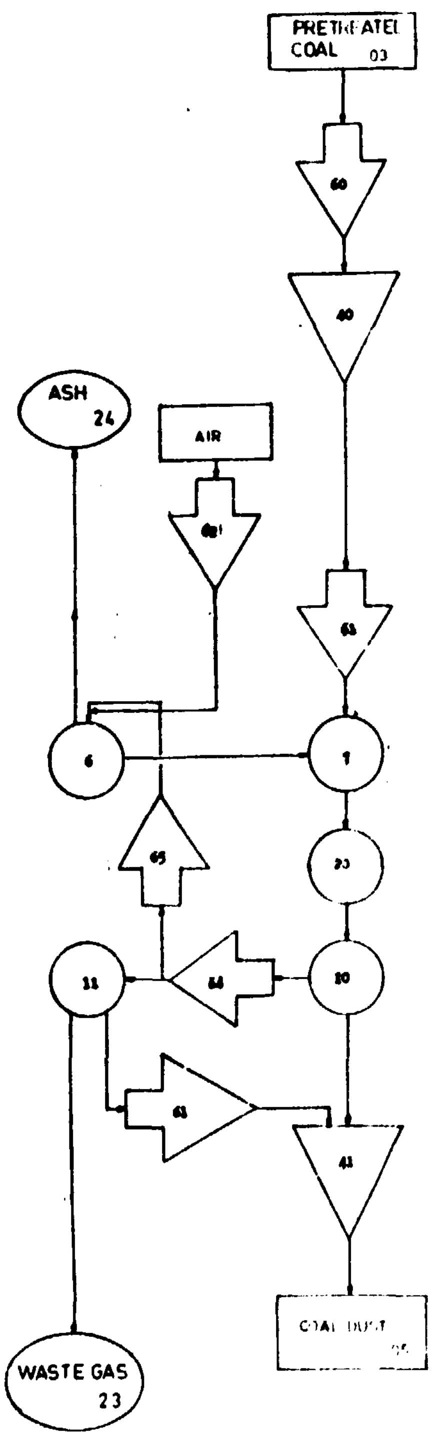
UNIDO/SPO (AZOT)
CAPITAL GOODS DEVELOPMENT PROJECT

MODULAR FLOW DIAGRAM

INDUSTRY	PRODUCT	TECHNOLOGY
FERTILIZER	PRETREATED COAL	-
DATE	SAMPLE PLANT	CAPACITY
23.9.1981	-	108 t/h
PREPARED BY	DRAWN BY	CHECKED BY
EMİNE ARDELAL OĞUZ KADIOĞLU	FATMA ÇELİK	VEDAT NİHLADİK

Checked by UNIDO/Expert

Approved by UNIDO/CTA



ACTIVITY CODE	INDUSTRY	PRODUCT	TECH	CAP
	3512-1	05	1	1

NO	MACHINE CODE	MACHINE NAME	QUAN
1	7[illegible]3211[illegible]2214671	Coal mill	2
6	7[illegible]	Hot gas producer	2
20	72[illegible]316[illegible]	Sifter(air classifier)	2
10	743[illegible]11171[illegible]21	Cyclone separator	12
11	7[illegible]101[illegible]12	Electrostatic precipitator	2
40	69211[illegible]01[illegible]	Raw coal bunker	2
41	[illegible]21102243[illegible]	coal dust bunker	2
60	7442[illegible]253013441	belt conveyor	1
60	74426102[illegible]1	chain conveyor	2
62	7434101371[illegible]	fresh air fan	2
63	74341[illegible]1222[illegible]2	Vapor fan	2
64	7442600100[illegible]201	Jet conveyor	4
65	743410[illegible]7122[illegible]1	Waste air fan	2

CAPACITY CALCULATIONS

Name of critical equipment: Coal Mill
Design Capacity of the critical equipment: 107 t/h
NO. of critical equipment : 2
Design line capacity : 85 t/h
Design line capacity : 1718 t/shift
Design line capacity : 2310 t/d
Design line capacity : 673.2[illegible] t/y

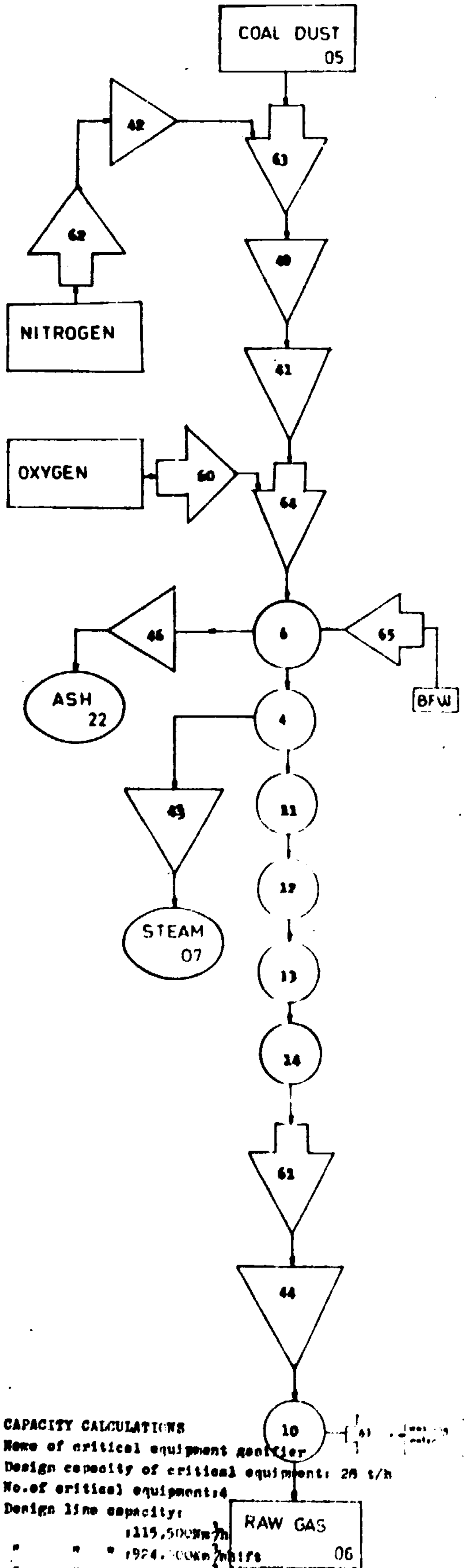
UNIDO / SPD (AZOT)
CAPITAL GOODS DEVELOPMENT PROJECT

[illegible] DIAGRAM

INDUSTRY	PRODUCT	TECHNOLOGY
[illegible]	COAL DUST	GRINDING
DATE	SAMPLE PLANT	CAPACITY
[illegible].1981	-	85 t/h
[illegible]	DRAWN BY	CHECKED BY
[illegible]	Cumhur Ilgaz	Vedat [illegible]
[illegible]	Approved by UNIDO/CIA	

ACTIVITY CODE	INDUSTRY	PRODUCT	TECH	CAP
	3512 1	06	1	1

NO	MACHINE CODE	MACHINE NAME	QUAN
10	74361011001521 2	Elect. Precipitator	2
6	74132055610430 2	Gasifier	4
4	74161060440632 1	Waste heat boiler	4
11	74361201300820 1	Cooling washer	4
12	74361401000390 2	Disintegrators	8
13	74361601200821 1	Drop separator	4
14	74361611100121 1	Water separator	4
42	69211101102120 1	Nitrogen vessel	4
40	69211011102821 1	Service bunker	16
41	69211011102127 1	Feed bunker	16
43	69281021202830 2	Steam collector	4
44	69243039004020 1	Raw gas holder	1
60	74342005920720 2	Oxygen blower	4
61	74342005820260 2	Raw gas blower	4
62	74313235120120 2	Nitrogen compressor	2
63	74426432001120 2	Fuller pump	4
64	74426431001127 2	Coal dust screw	32
62	74313235120420 2	Nitrogen compressor	2
43	69241091602830 2	Steam collector	4
65	74220023411120 2	Water pump	2
63	74220024342120 2	Pump	2
46	69211012002520 1	Bunker for slag	1



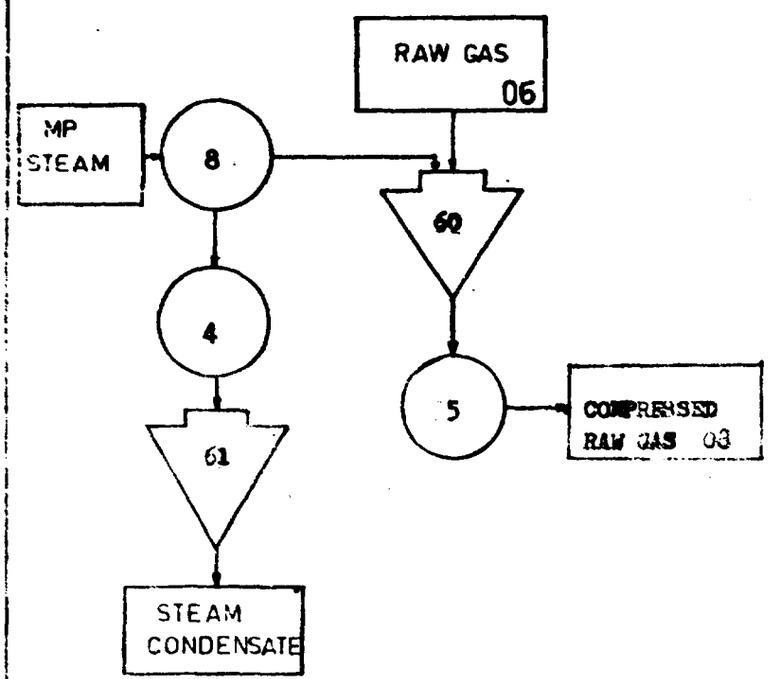
CAPACITY CALCULATIONS
Name of critical equipment gasifier
Design capacity of critical equipment: 28 t/h
No.of critical equipment:4
Design line capacity:
:115,500 Nm^3/h
" " " :924,000 Nm^3/shifts
" " 2,772,000 Nm^3/d
915×10^6 Nm^3/y

UNIDO / SPO (AZOT)
CAPITAL GOODS DEVELOPMENT PROJECT

MODULAR FLOW DIAGRAM

INDUSTRY	PRODUCT	TECHNOLOGY
FERTILIZER	RAW GAS	COAL GASIFICATION
DATE	SAMPLE PLANT	CAPACITY
23.9.1981	-	115.500 Nm^3/h
PREPARED BY	DRAWN BY	CHECKED BY
Cahit Akbaşol	Fatma Çelik	Vedat mihladiz

Checked by UNIDO ... | Approved by UNIDO/CTA



CAPACITY CALCULATIONS
Name of critical of equipment :Raw gas compressor
Design capicity of critical equipment: 57 700 Nm^3/h
No. of critical equipment : 2
Design line capacity : 115 500 Nm^3/h
Design line capacity : 9.2 10^6 Nm^3/shift
Design line capacity : 2.76 10^6 Nm^3/d
Design line capacity : [illegible] 10^8 Nm^3/year

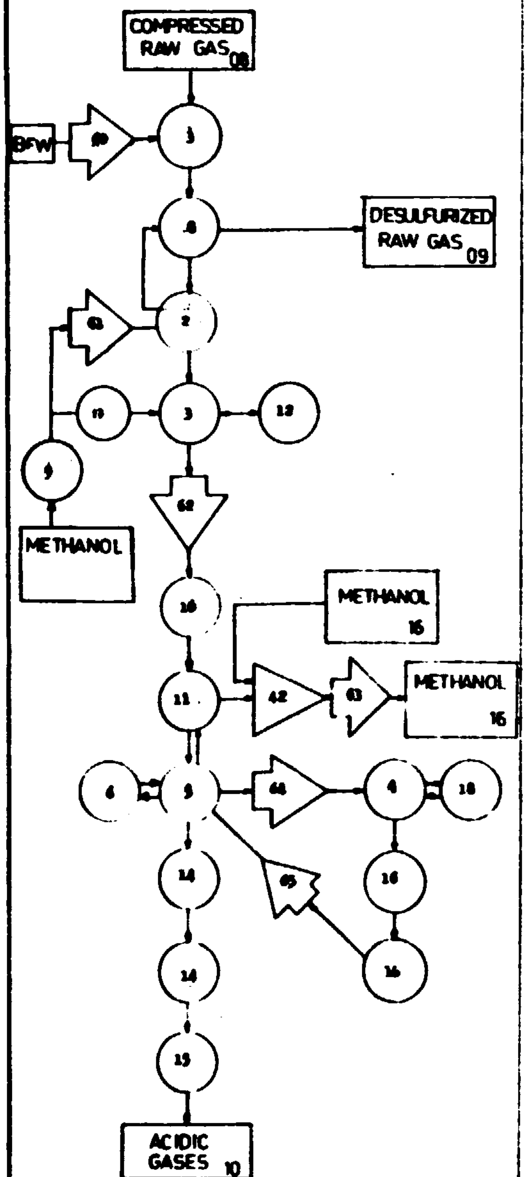
ACTIVITY CODE	INDUSTRY	PRODUCT	TECH.	CAP.
	3512-1	08	1	1

NO	MACHINE CODE	MACHINE NAME	QUAN
60	743131294215612	Raw gas compressor	2
8	712610128224342	Condensing turbine	2
61	742200242211611	Condensate pump	4
4	741610593413212	Steam condenser	2
5	692430210320212	Condensate separator	2
5	692430210820212	Condensate separator	2
5	692430210821212	Condensate separator	2
5	692430210821212	Condensate separator	2

UNIDO / SPO (AZOT)
CAPITAL GOODS DEVELOPMENT PROJECT

MODULAR FLOW DIAGRAM

INDUSTRY	PRODUCT	TECHNOLOGY
FERTILIZER	COMPRESSED RAW GAS	Centrifugal Compression
DATE	SAMPLE PLANT	CAPACITY
23.9.1931	-	115,500 Nm^3/h
PREPARED BY	DRAWN BY	CHECKED BY
EKİNE ABDELAL ÖZER KADIOĞLU	FATMA ÇELİK	VEDAT NİHLADIZ
Checked by UNIDO/Expert		Approved by UNIDO/CTA



CAPACITY CALCULATIONS

Name of the critical equipment wash column

Design capacity of the critical equipment: 210 m^3

No. of critical equipment : 1

Designed lined capacity : 110.945 Nm^3/h

Designed line capacity : 887.560 $Nm^3/shift$

Designed line capacity : 2.6 X106 Nm^3/day

Designed line capacity : 798 X106 $Nm^3/year$

ACTIVITY CODE	[illegible]	[illegible]	TECH	CAP
	[illegible]	01	1	1

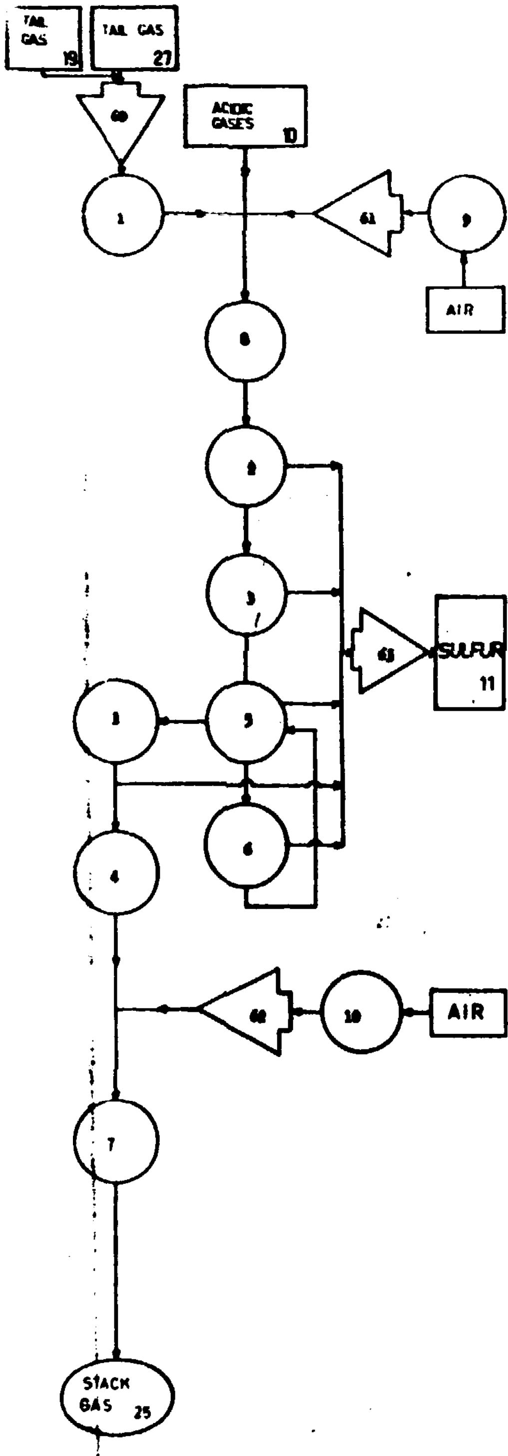
No.	MACHINE CODE	MACHINE NAME	QUAN
6	[illegible]	[illegible]	1
7	[illegible]	[illegible]	1
8	[illegible]	Heat exchanger	1
9	[illegible]	Heat exchanger	1
10	74161 15[illegible]	Heat exchanger	1
11	74161 182[illegible]	Heat exchanger	1
12	74161 162413702	Heat exchanger	1
13	74161 132413702	Heat exchanger	1
14	74161 181111202	Heat exchanger	1
15	74161 181211202	Heat exchanger	1
16	74161 183211202	Heat exchanger	1
17	74161 181311201	Heat exchanger	1
1	74166 130014202	Pre-scrubbing column	1
2	74166 1[illegible]015202	Wash column	1
3	74166 [illegible]014202	Stripping column	1
4	74166102[illegible]13202	Regeneration column	1
5	74166118[illegible]13202	Separation column	1
18	7416103[illegible]12208	Cooler	1
62	69211321102?202	Storage vessel	1
60	7422002[illegible]	Water pump	2
61	7422002[illegible]2	Methanol pump	2
62	7422002[illegible]12	Methanol pump	2
63	742200[illegible]11619	Methanol pump	2
64	7422002[illegible]	Methanol pump	2
65	7422002[illegible]	Methanol pump	2

UNIDO / SPO (A/OI)

CAPITAL GOODS DEVELOPMENT PROJECT

[illegible] DIAGRAM

INDUSTRY	PRODUCT	TECHNOLOGY
[illegible]	[illegible]	Methanol wash
DATE	SAMPLE PLANT	CAPACITY
[illegible]	-	110.945 Nm^3/h
PREPARED BY	DRAWN BY	CHECKED BY
[illegible]	Nutra Celik	Vedat Mahledis
		Approved by UNIDO/LTA



ACTIVITY CODE		INDUSTRY	PRODUCT	TECH	CAP
		3512-1	11	1	1

NO	MACHINE CODE	MACHINE NAME	QUAN
60	74342003120[illegible]	Gas blower	2
1	7416103200012 12	Cooler	2
61	74342003110 12 12	Air blower	2
2	74161060240[illegible]	waste heat boiler	[illegible]
3	74165041[illegible]	Catalyst tower	2
4	74161010000 12 12	Heat exchanger	1
5	74161050[illegible]	Condenser	1
6	74161050[illegible]	Condenser	1
62	74342003110 12 12	Air blower	2
7	741322405300[illegible]	Combustion furnace	1
8	741322405300261	Claus kiln	1
63	742200231[illegible]	pump for sulfur	2
9	74361503000[illegible]	Air filter	2
10	74361503000[illegible]	Air filter	2

CAPACITY CALCULATIONS
Name of the critical equipment: Claus kiln
Design capacity of the critical equipment: [illegible] m^3/h
No. of critical equipment : [illegible]
Design line capacity : 6.90 t/hour
Design line capacity : 55.2 t/shift
Design line capacity : 165.6 t/day
Design line capacity : [illegible] t/year

UNIDO/SPO (AZOT)
CAPITAL GOODS DEVELOPMENT PROJECT

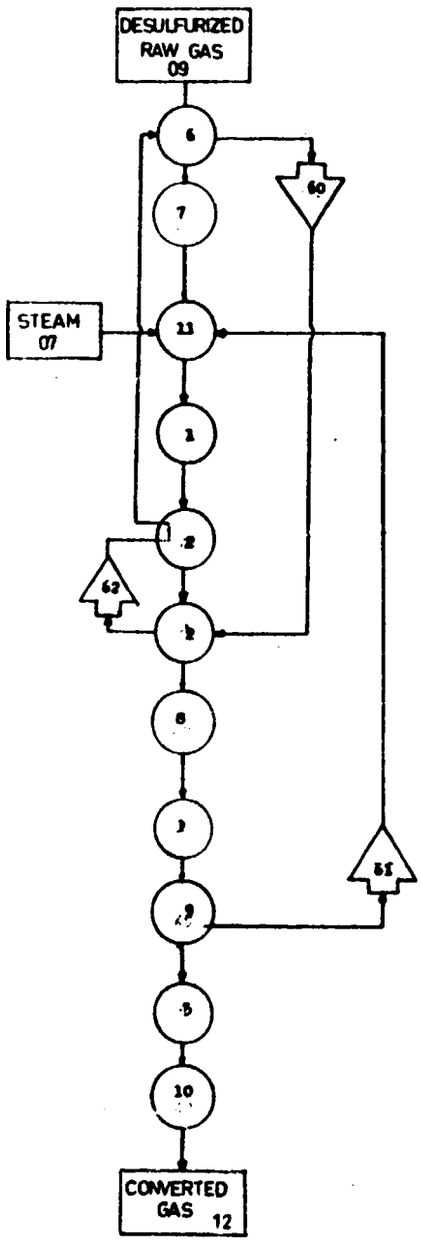
MODULAR FLOW DIAGRAM

INDUSTRY	PRODUCT	TECHNOLOGY
FERTILIZER	SULPHUR	CLAUS
DATE	SAMPLE PLANT	CAPACITY
2?.5.1981	-	6.90 t/h
PREPARED BY	DRAWN BY	CHECKED BY
[illegible]	Fatma Çelik	Vedat Mihledis

Checked by UNIDO/Expert | Approved by UNIDO/CTA

ACTIVITY CODE	INDUSTRY	PRODUCT	TECH	CAP.
	3512-1	12	1	1

NO	MACHINE CODE	MACHINE NAME	QUAN
1	74161014001 [illegible] 12	Heat exchanger	4
2	74161014001 [illegible] 2	Heat exchanger	1
3	74161014001 [illegible] 2	Heat exchanger	3
4	74166134443622	Desaturator	1
5	74161034001 [illegible] 2	Final cooler	1
6	74166125443682	Saturator	1
7	69243021402 [illegible] 2	Separator	1
8	69243021402 [illegible] 2	Separator	1
9	69243021402 [illegible] 2	Separator	1
10	69243021402 [illegible] 2	Separator	1
11	74165074 [illegible] 422	Converter	2
60	74220025101 [illegible] 2	Booster pump	2
61	74220023301 [illegible] 2	Quench pump	2
62	74220026321 [illegible]	Recycle pump	2



CAPACITY CALCULATIONS

Name of the critical equipment : converter
No. of critical equipment : 2

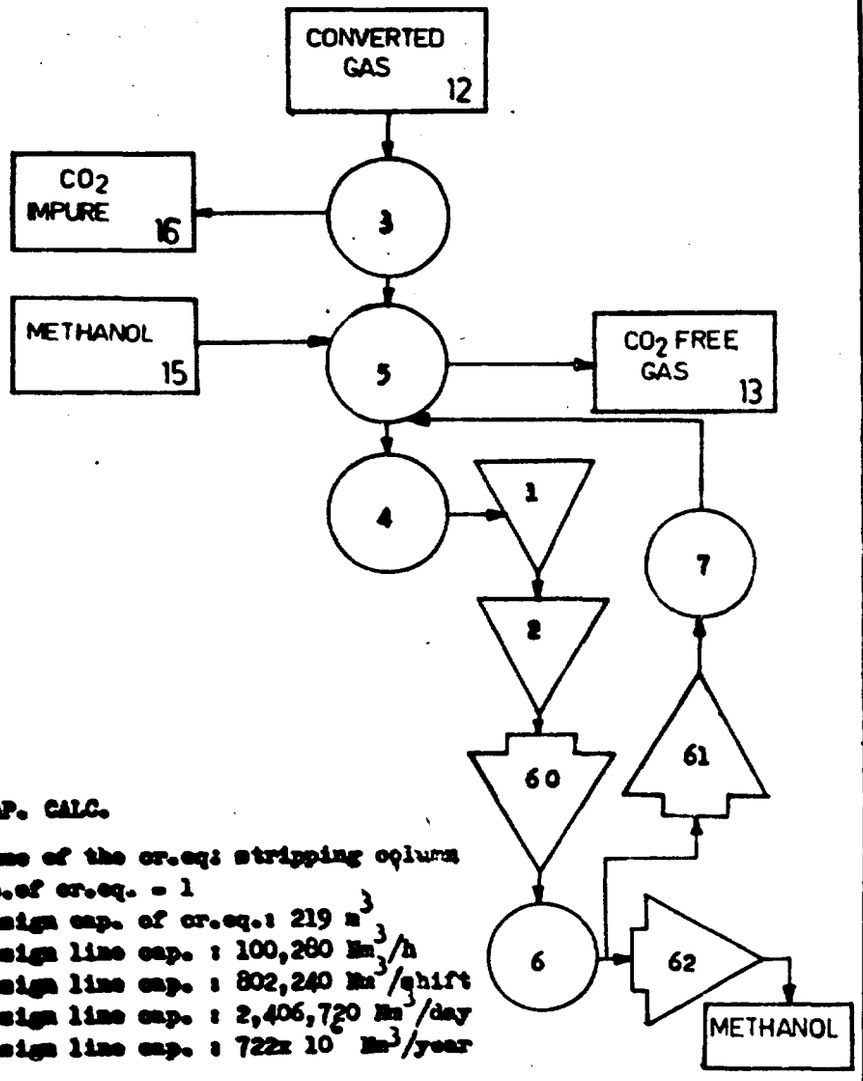
Design line capacity : 169.450 Nm^3/h
Design line capacity : 1,356,000 Nm^3/shift
Design line capacity : $4X10^6$ Nm^3/day
Design line capacity : $1,220 \times 10^6$ Nm^3/year

UNIDO SPO (AZOT)
CAPITAL GOODS DEVELOPMENT PROJECT

[illegible] DIAGRAM

INDUSTRY	PRODUCT	TECHNOLOGY
[illegible]	[illegible] GAS	SHIFT CONVERSION
DATE	SAMPLE PLANT	CAPACITY
22.9.1981	-	169.450 Nm^3/h
PREPARED BY	DRAWN BY	CHECKED BY
[illegible]	[illegible]	VEDAT MIHLADIZ

Checked by UNIDO/CTA | Approved by UNIDO/CTA



CAP. CALC.

Name of the cr.eq: stripping column
No.of cr.eq. = 1
Design cap. of cr.eq.: 219 m^3
Design line cap. : 100,280 Nm^3/h
Design line cap. : 802,240 Nm^3/shift
Design line cap. : 2,406,720 Nm^3/day
Design line cap. : 722x 10 Nm^3/year

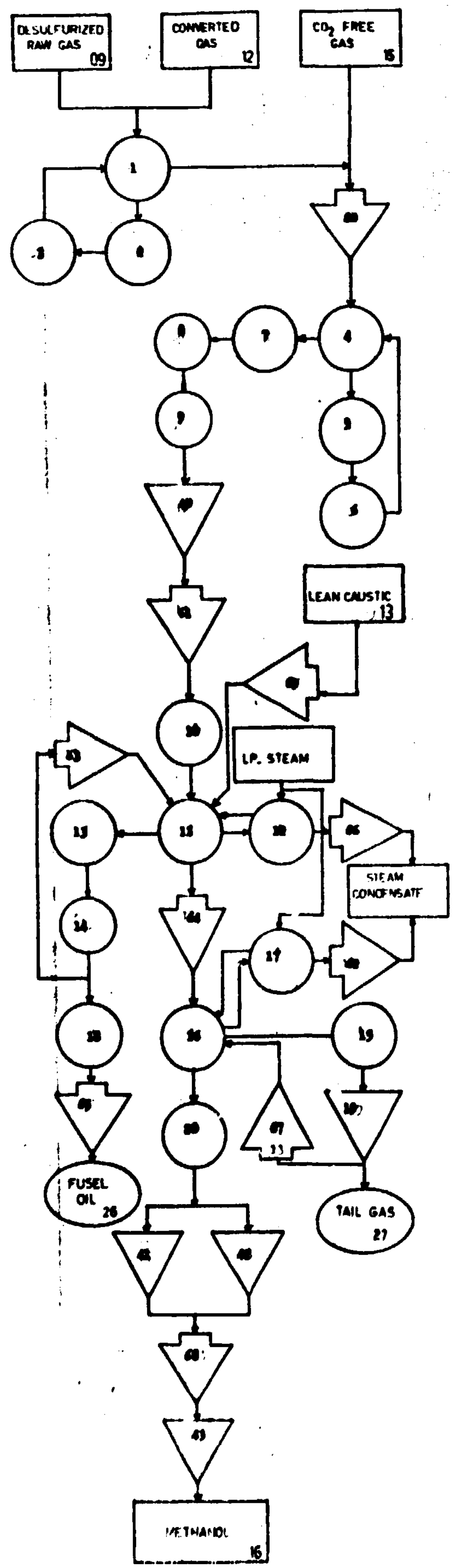
ACTIVITY CODE	INDUSTRY	PRODUCT	TECH.	CAP.
	3512-1	15	1	1

NO	MACHINE CODE	MACHINE NAME	QUAN
1	692430214523422	Separator	1
2	692430211523212	Separator	1
3	741610153413212	Heat exchanger	1
4	741610163414212	Heat exchanger	1
5	741660856216222	Wash column	1
6	741660741214212	Stripping column	1
7	741610342312212	Cooler	1
60	742200236111622	Methanol pump	2
61	742200235111612	Methanol pump	2
62	742200254111612	Methanol pump	2

UNIDO/SPO (AZOT)
CAPITAL GOODS DEVELOPMENT PROJECT

MODULAR FLOW DIAGRAM

INDUSTRY	PRODUCT	TECHNOLOGY
FERTILIZER	CO_2 FREE GAS	Methanol wash
DATE	SAMPLE PLANT	CAPACITY
23.9.1981	-	100,280 Nm^3/h
PREPARED BY	DRAWN BY	CHECKED BY
EKİNE ARDELAL OĞUZ KADIOĞLU	FATMA ÇELİK	VEDAT MİNLARİK
Checked by UNIDO/Expert		Approved by UNIDO/CTA



ACTIVITY CODE	INDUSTRY	PRODUCT	TECH	CAP
	3512-1	16	1	1

NO	MACHINE CODE	MACHINE NAME	QUAN
1	74161013001342	Interchanger	1
2	74161011001492	Gas preheater	1
3	74165951414232	Reactor (desulf'n)	1
60	74311178521263	Circulator	1
4	74161014001322	Interchanger	1
5	74161072001242	Startup heater	1
6	74165062414392	Converter	1
7	74161054001312	Condenser	1
8	69243001542318	Catchpot	1
9	69043021102138	Letdown vessel	1
40	69211132208121	Crude Methanol Tank	1
61	74220022321102	Crude Methanol pump	2
10	74161081008101	Crude Bottom exchanger	1
11	74166061100361	Topping column	1
12	74161082007106	Reboiler	1
62	74220022321102	Condensate pump	2
63	74220022820102	Topping reflux pump	2
64	74220022821102	Topping bottom pump	2
13	74161052001101	Primary Condenser	1
14	69243021102120	Reflux drum	1
15	74161052001101	Secondary Condenser	1
65	74230002821101	Fusel oil pump	2
16	74166031101301	Refining column	1
17	74161024001201	Reboiler	1
66	74220022921102	Condensate pump	2
18	74161054001001	Condenser	1
19	69243021102121	Reflux drum	1
67	74220023020102	Refining reflux pump	2
20	74161030001101	Product cooler	1
45	69211131113121	Methanol Storage tank	1
46	69211131113231	Methanol Storage tank	1
68	74220023101612	Recycle pump	2
43	69211133332121	Methanol tank	1
69	74210011501712	Caustic dosing pump	1

CAPACITY CALCULATIONS

Name of the critical equipments converter

Design capacity of critical equipments: 37.7 m^3

No. of critical equipment : 1

Design line capacity : 3.33 t/hour

Design line capacity : 26.6 t/shift

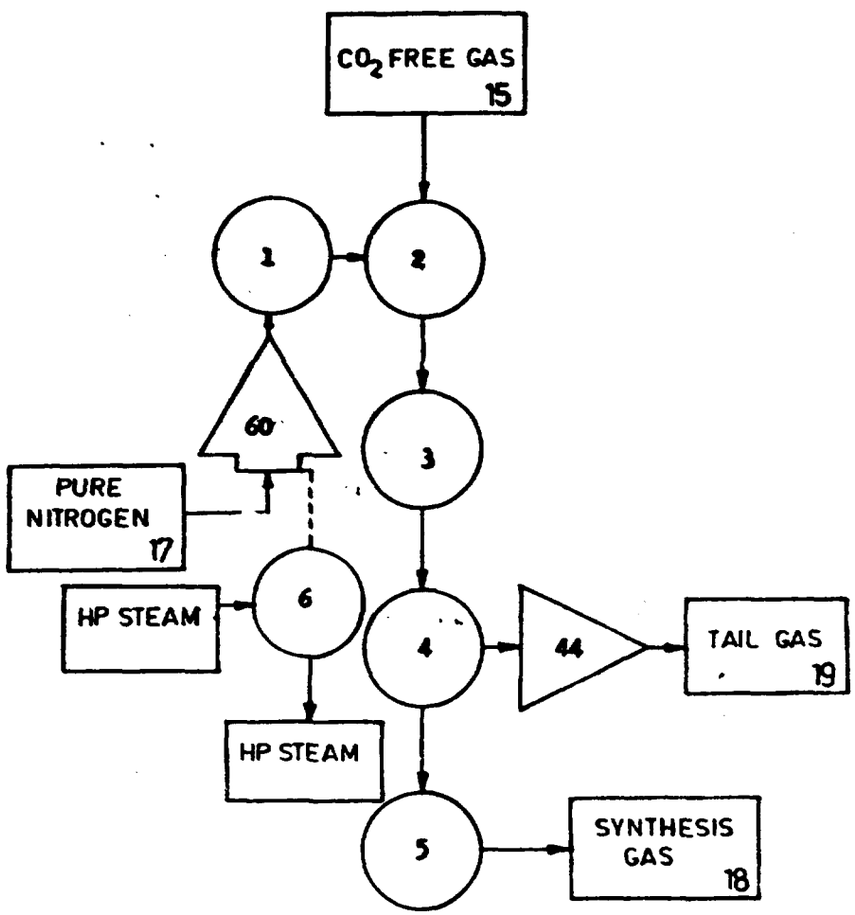
Design line capacity : 80 t/day

Design line capacity : 26.400 t/year

UNIDO / SPO (AZOT)
CAPITAL GOODS DEVELOPMENT PROJECT

MODULAR FLOW DIAGRAM

INDUSTRY	PRODUCT	TECHNOLOGY
PETROCHEMICAL	METHANOL	LOW PRESSURE
DATE	SAMPLE PLANT	CAPACITY
23.9.1981	-	3.33 t/h
PREPARED BY	DRAWN BY	CHECKED BY
[illegible]	[illegible] ILGAS	VEDAT [illegible]
Checked by UNIDO/Expert		Approved by UNIDO/CTA



ACTIVITY CODE		INDUSTRY	PRODUCT	TECH.	CAP.
		3512-1	18	1	1

NO	MACHINE CODE	MACHINE NAME	QUAN
1	7416101400126 22	Heat exchanger	1
2	7416101400126 22	Heat exchanger	1
3	7416101400126 22	Heat exchanger	1
4	7416101400126 22	Heat exchanger	1
5	7416608400136 32	N2-Wash column	1
4	6924303400462 11	Gas holder	1
60	7431312552142 52	N_2-compressor	1
6	7126101282233 2	Steam turbine	1

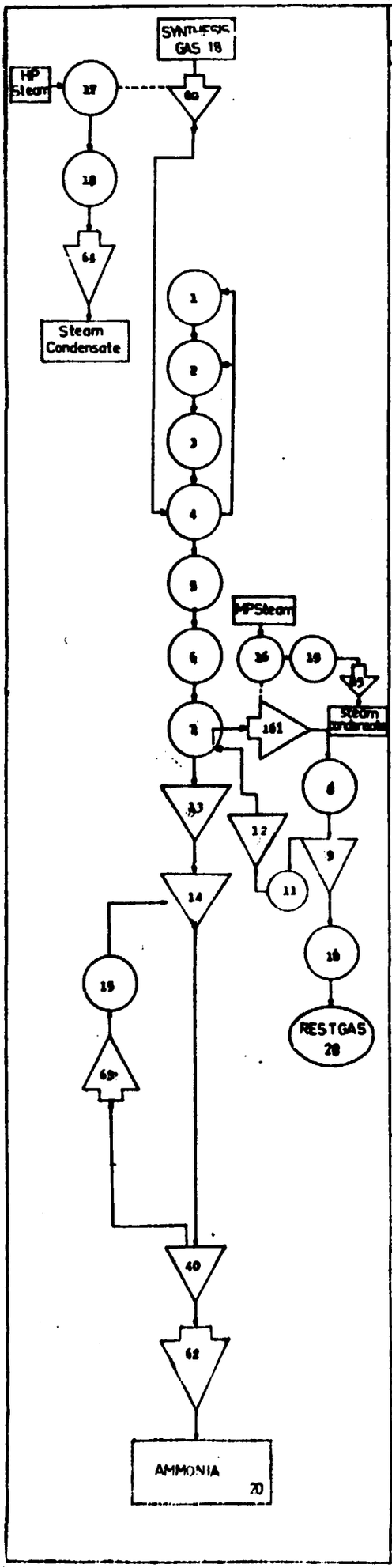
CAP. CALC. Name of the critical equipment : N_2-wash column
Design capacity of the critical equipment: 150 m^3
No.of critical equipment :1
Design line capacity : 110500 Nm^3/h
Design line capacity : 884 000 Nm^3/shift
Design line capacity : 2.6×10^6 Nm^3/day
Design line capacity : 195.6x 10[illegible] Nm3/year

UNIDO /SPO (AZOT)
CAPITAL GOODS DEVELOPMENT PROJECT

MODULAR FLOW DIAGRAM

INDUSTRY	PRODUCT	TECHNOLOGY
FERTILIZER	SYNTHESIS GAS	Liq. N_2 wash
DATE	SAMPLE PLANT	CAPACITY
23.9.1981		110.500 Nm^3/h
PREPARED BY	DRAWN BY	CHECKED BY
[illegible] ABDELAL OGUZ KADIOGLU	FATMA ÇELIK	VEDAT MIHLADIZ

Checked by UNIDO/Expert Approved by UNIDO/CTA



ACTIVITY CODE	INDUSTRY	PRODUCT	TECH	CAP.
	3512-1	20	1	1

NO	MACHINE CODE	MACHINE NAME	QUAN
60	7431312662146[illegible]	Syn. gas compressor	1
1	7413274152052[illegible]	Startup heater	1
2	7416501861472[illegible]	NH_3 Converter	1
3	7416107400[illegible]	BFw preheater	1
4	7416101500[illegible]	Heat exchanger	1
5	7416103600[illegible]	Cooler	1
6	7416101400[illegible]	Heat exchanger	1
7	7416104400[illegible]	Ammonia chiller	1
61	7431311562[illegible]	NH_3 Compressor	1
8	7416105600[illegible]	NH_3 Condenser	1
9	6924302173212[illegible]	NH_3 receiver	1
10	7416103600[illegible]	Inert gas cooler	1
11	7416101200[illegible]	Product heat hanger	1
12	6924302[illegible]	NH_3 Seperator	1
13	6924302[illegible]	Flash drum	1
40	6924304615382[illegible]	NH_3 storage tank	1
62	7422010361216[illegible]	NH_3 pump	2
14	6924302170212[illegible]	NH_3 seperator	1
63	7431301832816[illegible]	NH_3 compressor	1
15	7416105200[illegible]	NH_3 condenser	1
16	7126111100[illegible]	Condensing turbine	1
17	7126113200[illegible]	Condensing ext'n turbine	1
18	7416105400[illegible]	Steam condenser	1
63	7422002332016[illegible]	Condensate pump	2
19	7416105300[illegible]	Steam condenser	1
65	7422002332016[illegible]	Condensate pump	2

CAPACITY CALCULATIONS

Name of the critical equipment : converter
Design capacity of the critical equipment :230m³
No. of critical equipment :1
Design line capacity :41,67 t/hour
Design line capacity :333.4 t/shift
Design line capacity :1000 t/day
Design line capacity : 300,000 t/year

UNIDO / SPO (AZOT)
CAPITAL GOODS DEVELOPMENT PROJECT

[illegible] FLOW DIAGRAM

INDUSTRY	PRODUCT	TECHNOLOGY
[illegible]	AMMONIA	Synthesis
DATE	SAMPLE PLANT	CAPACITY
[illegible]	-	41,67 t/h
PREPARED BY	DRAWN BY	CHECKED BY
[illegible]	Gunter Ilgas	Vedat Mihlodis

Checked by UNIDO/Expert [illegible] | Approved by UNIDO/CTA

UNIDO/SPC (AECT) CAPITAL GOODS DEVELOPMENT PROJECT

ACTIVITY CODE 351210211													
SERIAL NO.	MARK/MODEL	BASIC MACHINE NOMENCLATURE	MAJOR SPECIFICATION	MAJOR SPECIFICATION 1	MAJOR SPECIFICATION 2	TYPE DESCRIPTION	MANUFACTURING CHARACT-1	MANUFACTURING CHARACT-2	MANUFACTURING CHARACT-3	ORIGIN	QUANTITY	PURCHASE COST 1000 $ UNIT	PURCHASE COST 1000 $ TOTAL
60		Belt conveyer	C= 500 t/h	L= 1000 m	L= 20 m	Bulk	17	C-Steel	14.0	1	1	28.4	[illegible]
80		Belt weigher	C= 500 t/h	L= 1000 mm			0.35	C-Steel	0.35	1	1	0.16	[illegible]
61		belt conveyor	C= 500 t/h	L= 1000 m	L= 557 m	bulk	125	C-Steel	112.0	1	1	731	[illegible]
62		Stacker-reclaimer	C= 500 t/h			travelling	150	C-Steel	135.0	2	2	560	[illegible]

SECTION 1

MANUFACTURING CHARACT-1	MANUFACTURING CHARACT-2	MANUFACTURING CHARACT-3	ORIGIN	QUANTITY	PURCHASE COST 1000 $ UNIT	PURCHASE COST 1000 $ TOTAL	CONSTANT 1980 YEAR COST 1000 $ UNIT	CONSTANT 1980 YEAR COST 1000 $ TOTAL	YEAR OF PURCHASE AND REMARK	SITC CODE (FOR COMPUTER) 1 2 3 4 5	6 7	8	9	10	11	12	13	14	15
17	C-Steel	14.0	1	1	28.4	[illegible]	30.5	30.5	1979	74426	02	7	3	0	1	3	6	6	1
0.35	C-Steel	0.35	1	1	0.16	[illegible]	0.3	0.3	1968	74525	04	8	1	1	1	1	6	1	1
125	C-Steel	112.0	1	1	731	[illegible]	784.4	784.4	1979	74426	02	7	1	0	1	6	6	9	1
150	C-Steel	135.0	2	2	560	[illegible]	560	560	1980	74428	03	8	0	0	2	6	6	8	2

SECTION 2

UNIDO/EPO (ARCT) CAPITAL GOODS DEVELOPMENT PROJECT

ACTIVITY CODE 351210301													
SERIAL NO	MARK/M DET	BASIC MACHINE NOMENCLATURE	MAJOR SPECIFICATION	MAJOR SPECIFICATION 1	MAJOR SPECIFICATION 2	TYPE DESCRIPTION	MANUFACTURING CHARACT-1	MANUFACTURING CHARACT-2	MANUFACTURING CHARACT-3	ORIGIN	QUANTITY	PURCHASE COST 1000 $ UNIT	PURCHASE COST 1000 $ TOTAL
60		belt conveyor	C= 370 t/h	L= 1000 m	L= 305 m	bulk	99	C-Steel	90 ton	1	1	400	400
70		Lagnet seperator					5	C-Steel	4 ton	1	1	2	2
61		belt conveyor	C= 370 t/h	L= 1000 m	L= 30 m	bulk	11	C-Steel	9.5 ton	1	1	39	39
40		Intermediate bin	V= 6 m^3			cubic	10	C-Steel	6 mt	1	1	14	14
62		Vibrating feeder	C= 370 t/h	L= 1000 m		bulk	4	C-Steel	3 ton	1	1	200	200
7		Crusher	C= 370 t/h				16	C-Steel	12 ton	1	1	200	200
63		belt conveyor	C= 370 t/h	L= 1000 m	L= 103 m	bulk	31	C-Steel	28	1	1	135	135
80		belt weigher	C= 370 t/h	L= 1000 m		bulk	0.35	C-Steel	0.35	2	1	0.16	0.16
64		belt conveyor	C= 370 t/h	L= 1000 m	L= 103 m	bulk	21	C-Steel	19 ton	1	1	135	135

SECTION 1

MANUFACTURING CHARACT-1	MANUFACTURING CHARACT-2	MANUFACTURING CHARACT-3	ORIGIN	QUANTITY	PURCHASE COST 1000 $		CONSTANT 1960 YEAR $ IN 1000$		YEAR OF PURCHASE AND REMARK	SITE CODE (FOR COMPUTER)										
					UNIT	TOTAL	UNIT	TOTAL		1 2 3 4 5	6 7	8	9	10	11	12	13	14	15	
99	C-Steel	90 ton	1	1	400	400	429.5	429.5	1979	74426	02	5	3	0	1	5	6	8	1	
5	C-Steel	4 ton	1	1	2	2	2	2	1980	72631	31	1	0	0	0	2	6	3	1	
11	C-Steel	9.5 ton	1	1	39	39	41.8	41.8	1979	74426	02	5	3	0	1	3	6	6	1	
10	C-Steel	6 mt	1	1	14	14	14	14	1980	69213	01	1	0	0	1	8	2	8	1	
4	C-Steel	3 ton	1	1	200	200	214.6	214.6	1979	74426	75	5	3	0	1	1	6	5	1	
1	C-Steel	12 ton	1	1	200	200	215.8	215.8	1979	72832	04	4	0	0	0	3	8	5	1	
31	C-Steel	28	1	1	135	135	144.9	144.9	1979	74426	02	5	3	0	1	4	6	7	1	
0.35	C-Steel	0.35	2	1	0.16	0.16	0.31	0.31	1968	74525	06	8	1	1	1	1	6	1	1	
21	C-Steel	19 ton	1	1	135	135	144.9	144.9	1979	74426	02	5	3	0	1	3	6	6	1	

SECTION 2

ACTIVITY CODE: 351210501		UNIDO/SPC (AIOC) CAPITAL GOODS DEVELOPMENT PROJECT											
SERIAL NO	MARK/MODEL	BASIC MACHINE NOMENCLATURE	MAJOR SPECIFICATION	MAJOR SPECIFICATION 1	MAJOR SPECIFICATION 2	TYPE DESCRIPTION	MANUFACTURING CHARACT-1	MANUFACTURING CHARACT-2	MANUFACTURING CHARACT-3	ORIGIN	QUANTITY	PURCHASE COST 1000$	
												UNIT	TOTAL
7		Coal mill	C= 107 t/h	20 RPM	700 kW	horizontal	50	C-Steel	40 ton	1	2	400	800
6		Hot gas producer	8.5×10^6 kcal/h				6.0	C-Steel	12 mm	2	2	5	10
20		Sifter (air classifier	107 t/h				Bab	C-Steel	6 ton	1	2	18	36
10		Cyclone separator	60.000 m^3/h	Q= 1.7 m			10.0	C-Steel	12 mm	1	12	8	96
11		electrostatic precipit	150000 m^3/h			multiple	250	C-Steel	12 mm	2	2	230	460
40		raw coal bunker	750 m^3			rectangular	168	C-Steel	8 mm	1	2	116.6	233.2
41		coal dust bunker	420 m^3	Q= 10 t		circular	100	C-Steel	8 mm	1	2	70.6	141.2
1		belt conveyor	360 t/h	b= 1.2 m	L= 12 m	bulk	6	C-Steel	5.4 ton	1	1	21.7	21.7
61		chain conveyor	53.8 t/h	b= 1.2 m	L= 4 m	bulk	4	C-Steel	3 ton	1	2	18	18
62		fresh air fan	180000 m^3/h		air	forced	4	Grey iron	3 ton	2	2	30	60
63		Vapor fan	380000 m^3/h		gas	exhaust	6.2	Grey iron	5 ton	2	2	40	80
64		Jet conveyor	9 t/h	-	-	medium pressure	0.05	C-Steel	8 mm	1	4	0.5	2
65		mesin air fan	200.000 m^3/h		air	exhaust	4	Grey iron	3 ton	2	2	34	68

SECTION 1

ITE DESCRIPTION	MANUFACTURING CHARACT-1 F	MANUFACTURING CHARACT-2	MANUFACTURING CHARACT-3	ORIGIN	QUANTITY	PURCHASE COST 1000$ UNIT	PURCHASE COST 1000$ TOTAL	CONSTANT 1980 1000 $ YEAR COST UNIT	CONSTANT 1980 1000 $ YEAR COST TOTAL	YEAR OF PURCHASE AND REMARK	SITC CODE (FOR COMPUTER) 1 2 3 4 5	6 7	8	9	10	11	12	13	14	15
izontal	50	C-Steel	40 ton	1	2	400	800	431.6	863.2	1979	72832	11	2	8	8	1	6	6	8	1
	6.0	C-Steel	12 ton	2	2	5	10	5	10	1980	74132	24	0	5	2	0	8	8	8	2
	8.0	C-Steel	6 ton	1	2	18	36	43.9	87.9	1970	72831	60	4	0	0	0	8	9	8	1
	10.0	C-Steel	12 ton	1	12	8	96	8.6	102.7	1979	74301	11	8	1	0	0	8	8	8	1
tiple	250	C-Steel	12 ton	2	2	230	460	247	494	1979	74301	01	8	0	0	8	9	2	1	2
ngular	168	C-Steel	8 ton	1	2	118.6	237.2	118.6	237.2	1980	69211	02	3	0	0	1	6	2	8	1
ller	100	C-Steel	8 ton	1	2	70.6	141.2	70.6	141.2	1980	69211	02	2	4	0	2	5	8	8	1
	6	C-Steel	5.4 ton	1	1	21.7	21.7	23.3	23.3	1979	74426	02	5	3	0	1	9	6	4	1
	4	C-Steel	3 ton	1	2	18	18	19.3	19.3	1979	74426	10	2	3	0	1	1	6	3	1
id	4	Grey iron	3 ton	2	2	30	60	40.1	80.2	1977	74341	01	3	7	1	1	5	2	8	2
st	6.2	Grey iron	5 ton	2	2	40	80	53.5	107	1977	74341	01	4	7	2	2	8	2	4	2
ium asure	0.05	C-Steel	8 ton	1	4	0.5	2	0.5	2	1980	74429	00	1	0	0	3	3	2	8	1
at	4	Grey iron	3 ton	2	2	34	68	45.4	90.8	1977	74341	01	3	7	1	2	8	2	8	2

SECTION 2

SECTION 1

UNIDO/SPO (AZOT) CAPITAL GOODS DEVELOPMENT PROJECT

ACTIVITY CODE 351210611

SERIAL NO	MARK / MODEL	BASIC MACHINE NOMENCLATURE	MAJOR SPECIFICATION	MAJOR SPECIFICATION 1	MAJOR SPECIFICATION 2	TYPE DESCRIPTION	MANUFACTURING CHARACT -1 TOTAL WT (ton)	MANUFACTURING CHARACT- 2	MANUFACTURING CHARACT- 3	ORIGIN	QUANTITY	PURCHASE COST 1000, UNIT	PURCHASE COST 1000, TOTAL
10		Elect. Precipitator	55000 m^3/h			Single zone	199	C-Steel	12 mm	2	2	130	260
6		Gasifier	28 t/h				183	R-Steel II	18 mm	2	4	400	1.600
4		Waste heat boiler	650 m^2	ID: 4 m	L: 31.3m		199	R-Steel II	35 mm	1	4	548	2.192
12		Cooling washer	73400 m^3/h	Q: 6.5 m			3.75	C-Steel	18 mm	1	4	7.2	26.[illegible]
12		Disintegrators	36700 m^3/h				1.36.9	Grey iron	10.ton	2	8	13	104
13		Drop separator	73400 m^3/h	Q:4.4m			14.1	C-Steel	12 mm	1	4	10	40
14		Water separator	73400 m^3/h	Q: 1.4m			41.05	C-Steel	12 mm	1	4	1.5	6
42		Nitrogen vessel	V: 24.3 m^3	Q: 2.2 m	T- 35°C	cylindrical	1.[illegible]8	C-Steel	12 mm	1	4	3.8	15.2
40		Service bunker	V: 70 m^3	Q: 3.2 m	T- 80°C	Semi-cylin	11[illegible]1	C-Steel	8 mm	1	16	5	80
41		Feed bunker	V: 8 m^3	Q: 1.4 m	T- 80°C	Semi-cylin	[illegible]7.0	C-Steel	10 mm	1	16	1.4	22.4
43		Steam collector	V: 31 m^3	Q: 2.5 m	12 bar	Cylindrical	276.8	[illegible]	16 mm	2	4	21	84
44		Raw gas holder	V: 50000 m^3	P:400 mm WC	T- 30°C	telescopic	850	C-Steel	18 mm	1	1	850	850
60		Oxygen blower	C: 247 m^3/min	P:0.6 kg/cm^2	gas		[illegible]6.2	Grey iron	4.0 ton	2	4	2.2	8.8
61		Raw gas blower	C: 673 m^3/min	P: 0.1 kg/cm^2	gas		[illegible]5.5	C-Steel	3.0 ton	2	4	5.0	20.0
62		Nitrogen compressor	C: 102 m^3/min	P: 0.7 kg/cm^2	gas		72.6	Grey iron	2.0 ton	2	2	400	800
60		Fuller pump	96 t/h	Q m		bulk	1.[illegible]55	Grey iron	3.0 ton	2	4	6	24
64		Coal dust screw	4.6 t/h	Q m		bulk	7[illegible]2.37	Grey iron	3.0 ton	2	32	20	640
67		Nitrogen compressor	C: 167 m^3/min	P: 2.5 kg/cm^2	gas		315	Grey iron	18.0 ton	2	2	400	800
43		Steam collector	V: 6.8 m^3	80 bar	T- 105°C	cylindrical	[illegible]6.0	R-Steel	18 mm	2	4	21	84
65		Water pump	C: 30 m^3/h	P: 120 mH_2O		Horizontal	0.2	Grey iron	0.1 ton	2	2	2.5	5
63		Pump	C: 200 m^3/h	P: 14 mH_2O		Vertical	0.9	Grey iron	0.3 ton	2	2	2.2	4.[illegible]
46		Bunker for slag	V: 350 m^3/	V: 350 m^3	T- 40°C	Semi-cylin	60 [illegible]	C-Steel	8 mm	1	1	58.8	58.[illegible]

SECTION 2

	MANUFACTURING CHARACT -1 TOTAL WT (ton)	MANUFACTURING CHARACT- 2	MANUFACTURING CHARACT- 3	ORIGIN	QUALITY	PURCHASE COST 1000$ UNIT	PURCHASE COST 1000$ TOTAL	CONSTANT 1980 YEAR COST 1000 $ UNIT	CONSTANT 1980 YEAR COST 1000 $ TOTAL	YEAR OF PURCHASE AND REMARK	SITC CODE (FOR COMPUTER) 1 2 3 4 5	6 7	8	9	10	11	12	13	14	15
one	199	C-Steel	12 mm	2	2	130	260	139.6	279.2	1979	74361	01	1	0	0	1	5	2	0	2
	183	R-Steel II	18 mm	2	4	400	1.600	400	1.600	1980	74332	05	5	6	1	0	4	1	0	2
	397	R-Steel II	35 mm	1	4	548	2.192	548	2.192	1980	74161	06	0	4	4	0	6	3	2	1
	3.75	C-Steel	18 mm	1	4	7.2	28.8	7.7	30.9	1979	74361	20	7	3	0	0	5	2	1	1
	1.36.8	Grey iron	10.ton	2	8	13	104	14	112	1979	74361	40	4	0	0	0	3	3	3	2
	1.8.1	C-Steel	12 mm	1	4	10	40	24.4	97.6	1970	74361	60	7	2	0	0	2	2	0	1
	41.05	C-Steel	12 mm	1	4	1.5	6	1.8	7.2	1978	74361	61	7	1	0	0	1	2	3	1
gal	1.8.8	CSSteel	12 mm	1	4	3.8	15.2	3.8	15.2	1980	69211	10	1	1	3	2	1	2	1	1
in	11?.1	C-Steel	8 mm	1	16	5	80	5	80	1980	69211	01	1	1	3	2	2	2	1	1
in	2.0	C-Steel	10 mm	1	16	1.4	22.4	1.4	22.4	1980	69211	08	1	1	3	2	1	2	1	1
al	276.8	R-Steel/.. II	18 mm	2	4	21	84	24.6	98.4	1978	69243	02	1	2	2	2	2	3	1	2
e	850	C-Steel	18 mm	1	1	850	850	850	850	1980	69243	03	9	03	3	4	9	2	1	1
	16.2	Grey iron	4.0 ton	2	4	2.2	8.8	2.35	9.42	1979	74342	00	5	9	2	0	2	2	3	2
	5.5	C-Steel	3.0 ton	2	4	5.0	20.0	5.35	21.4	1979	74342	00	5	8	2	0	2	6	3	2
	78.6	Grey iron	2.0 ton	2	2	400	800	400	800	1980	74313	21	5	1	2	0	2	2	3	2
	8.55	Grey iron	3.0 ton	2	4	6	24	6	24	1980	74425	30	2	0	0	1	1	2	3	2
	2.37	Grey iron	3.0 ton	2	32	20	640	20	640	1980	74426	43	2	0	0	1	1	2	3	2
	75	Grey iron	18.0 ton	2	2	400	800	400	800	1980	74313	23	5	1	2	0	1	2	4	2
ical	9.9	R-Steel7	18 mm	2	4	21	84	24.6	98.4	1978	69243	02	1	8	2	2	2	3	1	2
al	0.2	Grey iron	0.1 ton	2	2	2.5	5	2.7	5.4	1979	74220	02	3	4	1	1	1	2	1	2
	8.9	Grey iron	0.3 ton	2	2	2.2	4.4	2.4	4.8	1979	74220	02	4	3	4	2	1	2	1	2
in	08	C-Steel	8 mm	1	1	58.8	58.8	58.8	58.8	1980	69211	01	2	0	0	2	5	2	1	1

SECTION 1

ACTIVITY CODE 351210811 — UNIDO/SPO (ALGT) CAPITAL GOODS DEVELOPMENT PROJECT

SERIAL NO	MAKE/MODEL	BASIC MACHINE NOMENCLATURE	MAJOR SPECIFICATION	MAJOR SPECIFICATION 1	MAJOR SPECIFICATION 2	TYPE DESCRIPTION	MANUFACTURING CHARACT-1	MANUFACTURING CHARACT-2	MANUFACTURING CHARACT-3	ORIGIN	CONDITION	PURCHASE C... UNIT	
50		sour gas compressor	C.57.700c³/h	30 kg/cm²	BHp	horizontal	180	C-Steel	40 ton	2	2	600	1.
8		Condensing turbine	1400 kw		35 rpm		84	Alloy iron casting	12 ton	2	2	250	
53		Condensate pump	C: 100 m³/h	80 m		horizontal	0.7	C-Steel	0.5 ton	1	4	2.8	
6		Steam condenser	539 m²	ID= 2.9 m	L= 6 m	shell tube	23	C-Steel	18 mm	2	2	125.6	
45		Condensate separator	V: 4.5 m³		80°C	cyl.	8	C-Steel	18 mm	2	2	11	
45		Condensate seperator	V: 1.6 m³		80°C	cyl.	8.5	C-Steel	18 mm	2	2	9	
45		Condensate separator	V: 1.2 m³		80°C	cyl.	8.5	C-Steel	18 mm	2	2	9	
45		Condensate seperator	V: 0.37 m³		80°C	cyl.	8.5	C-Steel	18 mm	2	2	9	

SECTION 2

TYPE DESCRIPTION	MANUFACTURING CHARACT-1	MANUFACTURING CHARACT-2	MANUFACTURING CHARACT-3	ORIGIN	QUANTITY	PURCHASE COST 1000 $ UNIT	PURCHASE COST 1000 $ TOTAL	CONTRACT 1980 YEAR COST 1000 $ UNIT	CONTRACT 1980 YEAR COST 1000 $ TOTAL	YEAR OF PURCHASE AND REMARK	SITE CODE (FOR COMPUTER) 1 2 3 4 5	6 7	8	9	10	11	12	13	14	15
Horizontal	180	C-Steel	40 ton	2	2	600	1.200	642	1.284	1979	74313	12	9	4	2	1	9	6	9	2
	81	Alloy iron casting	12 ton	2	2	250	500	268	535	1979	71261	01	2	8	2	2	4	3	4	2
Horizontal	0.7	C-Steel	0.5 ton	1	4	2.6	10	6.6	26.4	1968	74220	02	4	2	2	2	2	6	8	1
shell tube	21	C-Steel	18 mm	2	2	125.6	125.6	125.6	251.2	1980	74161	05	5	3	4	1	9	2	3	2
cyl.	1	C-Steel	18 mm	2	2	11	22	12.9	25.8	1978	69243	02	1	0	3	2	1	2	1	2
cyl.	8.5	C-Steel	18 mm	2	2	9	18	10.5	21	1978	69243	02	1	0	3	2	1	2	1	2
cyl.	8.5	C-Steel	18 mm	2	2	9	18	10.5	21	1978	69243	02	1	0	3	2	1	2	1	2
cyl.	8.5	C-Steel	18 mm	2	2	9	18	10.5	21	1978	69243	02	1	0	3	2	1	2	1	2

UNIDO/SPO (ALGT) CAPITAL GOODS DEVELOPMENT PROJECT

ACTIVITY		BASIC MACHINE NOMENCLATURE	MAJOR SPECIFICATIONS	MAJOR SPECIFICATIONS	MAJOR SPECIFICATIONS	TYPE DESCRIPTION	MANUFACTURING CHARACT -1	MANUFACTURING CHARACT- 2	MANUFACTURING CHARACT - 3	ORIGIN	QUANTY	PURCHASE COST 1000	
SERIAL NO	MARK/MODEL											UNIT	TOTAL
6		Reboiler	60 m^2	ID:0.8m	L: 4.4m	U-tubes	3	C-Steel	18 mm	2	1	11	
7		Reboiler	60 m^2	ID:0.9m	L: 4.5m	U-tubes	3	C-Steel	18 mm	2	1	11	
8		Heat exchanger	871 m^2	ID:1.8m	L: 9m	Shell and tube	34	TT3S (tubes)	16 mm	2	1	500	
9		Heat exchanger	257 m^2	ID:1.1m	L:7m	"	10	TT3S (tubes)	16 mm	2	1	140	
10		Heat exchanger	745 m^2	ID: 1.3m	L: 15m	"	29	TT3S (tubes)	16 mm	2	1	385	385
11		Heat exchanger	693 m^2	ID: 1.8m	L: 9m	"	27	TT3S (tubes)	16 mm	2	1	350	350
12		Heat exchanger	282 m^2	ID: 1.0m	L: 9m	"	11	TT3S (tubes)	16 mm	2	1	140	140
13		Heat exchanger	1232 m^2	ID: 1.8m	L: 15m	"	48	C-Steel	16 mm	2	1	287	287
14		Heat exchanger	51 m^2	ID: 0.6m	L: 2m	"	2	TT3S (tubes)	16 mm	2	1	56	
15		Heat exchanger	77 m^2	ID: 0.6m	L: 3.5m	"	3	TT3S (tubes)	16 mm	2	1	60	60
16		Heat exchanger	12.8 m^2	ID: 2.7m	L: 3.6m	"	0.5	TT3S (tubes)	16 mm	2	1	32	32
17		Heat exchanger	51 m^2	ID: 0.6m	L: 5.0m	"	2	C-Steel	16 mm	2	1	10	10
1		Pressurising column	V: 33.6m^3	30 bar	35°C	plate baffles	37	C-Steel	12 mm	2	1	80	80
2		Wash column	V: 210m^3	30 bar	-30°C	plate baffles	98	TT3S	18 mm	2	1	130	130
3		Stripping column	V: 196 m^3	4 bar	-30°C	plate baffles	43	TT3S	16 mm	2	1	85	85
4		Regenerat ion column	V: 137 m^3	4 bar	30°C	plate baffles	20	C-Steel	12 mm	2	1	40	40
5		Separation column	V: 14m^3	1 atm	35°C	plate baffles	15	C-Steel	12 mm	2	1	35	35
18		Cooler	200 m^2	ID: 1.3m	L: 9m	shell tube	8	C.Steel	16 mm	1	1	40	40
42		Storage vessel	V: 51 m^3	ϕ : 3m	-	cyl.	8	TT3S	12 mm	2	1	25	25
60		Water pump	C: 55 m^3/h	45 m	cold clear	horizontal	0.7	Grey iron	0.5 ton	2	2	1.4	2.8
61		Methanol pump	C: 153 m^3/h	303 m	cold clear	horizontal	2.5	C-Steel	1.5 ton	2	2	0.9	1.8
62		Methanol pump	C: 66 m^3/h	350 m	cold clear	horizontal	2	C-Steel	1 ton	2	2	4	8
63		Methanol pump	C: 800 m^3/h	261	cold clear	horizontal	2	C-Steel	1 ton	2	2	80	160
64		Methanol pump	C: 2 m^3/h	306	cold clear	horizontal	2.7	C-Steel	1.3 ton	2	2	0.9	1.8
65		Methanol pump	C: 1 m^3/h	257	cold clear	horizontal	1.5	C-Steel	0.9 ton	2	2	0.6	1.2

SECTION 1

	MANUFACTURING CHARACT -1	MANUFACTURING CHARACT- 2	MANUFACTURING CHARACT - 3	ORIGIN	QUANTY	PURCHASE COST 1000$ UNIT	PURCHASE COST 1000$ TOTAL	CONTSTANT 1980 YEAR COST 1000 $ UNIT	CONTSTANT 1980 YEAR COST 1000 $ TOTAL	YEAR OF PURCHASE AND REMARK	SITC CODE (FOR COMPUTER) 1 2 3 4 5	6 7	8	9	10	11	12	13	14	15
TYPE																				
e	3	C-Steel	18 mm	2	1	11		11	11	1980	74161	02	3	1	3	2	1	2	0	1
e	3	C-Steel	18 mm	2	1	11		11	11	1980	74161	02	3	1	3	2	1	2	0	1
tube	34	TTZE (tubes)	16 mm	2	1	500		535	535	1979	74161	01	5	2	4	1	1	2	1	2
	10	TTZE (tubes)	16 mm	2	1	160		150	150	1979	74161	01	4	2	4	1	3	2	1	2
	29	TTZE (tubes)	16 mm	2	1	385	385	412	412	1979	74161	01	5	2	4	1	4	2	1	2
	27	TTZE (tubes)	16 mm	2	1	350	350	375	375	1979	74161	01	5	2	4	1	4	2	1	2
	11	TTZE (tubes)	16 mm	2	1	140	140	150	150	1979	74161	01	4	2	4	1	1	2	1	2
	48	C-Steel	16 mm	2	1	287	287	287	287	1980	74161	01	6	2	4	1	4	2	1	2
	2	TTZE (tubes)	16 mm	2	1	56		60	60	1979	74161	01	3	1	1	1	1	2	1	2
	1	TTZE (tubes)	16 mm	2	1	60	60	64.2	64.2	1979	74161	01	3	1	2	1	1	2	1	2
	0.5	TTZE (tubes)	16 mm	2	1	32	32	34.2	34.2	1979	74161	01	2	1	2	1	1	2	1	2
	2	C-Steel	16 mm	2	1	10	10	10	10	1980	74161	01	3	1	3	1	1	2	1	1
ffles	37	C-Steel	12 mm	2	1	80	80	94.2	94.2	1978	74166	01	2	0	0	1	4	2	1	2
ffles	28	TTZE	18 mm	2	1	130	130	153	153	1978	74166	08	2	4	3	1	5	2	1	2
ffles	49	TTZE	16 mm	2	1	85	85	100	100	1978	74166	07	4	3	3	1	4	2	1	2
ffles	20	C-Steel	12 mm	2	1	40	40	47.1	47.1	1978	74166	10	3	1	4	1	3	2	1	2
ffles	15	C-Steel	12 mm	2	1	35	35	41.2	41.2	1978	74166	11	2	1	4	1	3	2	1	2
be	8	C-Steel	16 mm	1	1	40	40	107	107	1968	74161	03	4	2	4	1	2	2	1	1
	8	TTZE	12 mm	2	1	25	25	65.4	65.4	1968	69211	07	1	1	0	2	2	2	1	2
tal	0.7	Grey Iron	0.5 ton	2	2	1.4	2.8	3.7	7.4	1968	74220	02	3	2	1	1	3	2	1	2
tal	2.5	C-Steel	1.5 ton	2	2	0.9	1.8	2.4	4.8	1968	74220	02	4	6	1	1	2	6	2	2
tal	2	C-Steel	1 ton	2	2	4	8	10.5	21	1968	74220	02	3	5	1	1	1	6	1	2
tal	2	C-Steel	1 ton	2	2	80	160	210.6	421.2	1968	74220	02	5	5	5	1	1	6	1	2
tal	2.7	C-Steel	1.3 ton	2	2	0.9	1.8	2.4	4.8	1968	74220	02	1	6	5	1	1	6	2	2
tal	1.5	C-Steel	0.9 ton		2	0.6	1.2	1.6	3.2	1968	74220	02	1	5	1	1	1	6	1	2

SECTION 2

UNIDO/EPO (ALGE) CAPITAL GOODS DEVELOPMENT PROJECT

ACTIVITY CODE 351211111

SERIAL NO	MARK/MODEL	BASIC MACHINE NOMENCLATURE	MAJOR SPECIFICATION 1	MAJOR SPECIFICATION 2	MAJOR SPECIFICATION 3	TYPE DESCRIPTION	MANUFACTURING CHARACT-1	MANUFACTURING CHARACT-2	MANUFACTURING CHARACT-3	ORIGIN	QUANTITY	PURCHASE COST 1000 UNIT	PURCHASE COST 1000 TOTAL
50		Gas blower	C=10,8 m^3/min.	600 mmWC	gas	-	4.0	Grey iron	2.0 ton	2	2	1.0	2.0
1		Cooler	A.15 m^2	-	-	shell tube	0.900	C.Steel	16 mm	2	2	3.5	7.0
51		Air blower	C=33 m^3/min.	600 mmWC	air	-	4.5	Grey iron	3.0 ton	2	2	0.6	1.2
2		Waste heat boiler		ID=1,2 m	L = 7,2 m		60	C-Steel	35 mm	2	1	300	300
3		Catalyst tower	V=14,2 m^3		Catalytic	packed	15	C-Steel	18 mm	1	2	50	100
4		Heat exchanger	A=0.5 m^2			shell tube	0.83	C-Steel	12 mm	2	1	1.98	1.98
5		Condenser	A=33 m^2	-	-	shell tube	1.285	C-Steel	12 mm	2	1	7.69	7.69
6		Condenser	A=61.5 m^2	-	-	shell tube	2.4	C-Steel	12 mm	2	1	14.3	14.3
52		Air blower	C=10 m^3/min.	600 mmWC	air	-	4.0	Grey iron	2.0 ton	2	2	1.0	2.0
7		Combustion furnace		Ch.Size 6,2 m^3	gaseous	-	6.0	C-Steel	12 mm	1	1	6	6
8		Claus kiln	600 Nm^3/h	Ch.Size 16 m^3	gaseous		30.0	C-Steel	12 mm	1	1	30	30
63		Pump for sulfur	C= 12 m^3/h	20 m	viscous	vertical	0.5	Grey iron	0.3 ton	2	2	0.6	1.2
9		Air filter	33 m^3/min.	"	-	-	2	Mild steel	0.9 ton	1	2	5	10
10		Air filter	10 m^3/min.	"	-	-	2	Mild steel	0.9 ton	1	2	2	4

SECTION 1

(PILOT) CAPITAL GOODS DEVELOPMENT PROJECT

TYPE DESCRIPTION	MANUFACTURING CHARACT-1	MANUFACTURING CHARACT-2	MANUFACTURING CHARACT-3	ORIGIN	QUANTITY	PURCHASE COST 1000$ UNIT	PURCHASE COST 1000$ TOTAL	CONSTANT 1960 YEAR COST 1000 $ UNIT	CONSTANT 1960 YEAR COST 1000 $ TOTAL	YEAR OF PURCHASE AND REMARK	SITC CODE (FOR COMPUTER) 1 2 3 4 5	6 7	8	9	10	11	12	13	14	15
-	4.0	Grey iron	2.0 ton	2	2	1.0	2.0	1.07	2.14	1979	74342	00	3	1	2	0	1	2	2	2
ail tube	0.900	C.Steel	16 mm	2	2	3.5	7.0	3.5	7.0	1980	74161	03	2	0	0	0	1	2	1	2
-	4.5	Grey iron	1.0 ton	2	2	0.6	1.2	0.64	1.28	1975	74342	00	1	1	1	0	1	2	2	2
	60	C-Steel	35 mm	2	1	300	300	300	300	1980	74161	06	0	2	4	0	8	2	8	2
ked	35	C-Steel	18 mm	1	2	50	100	53.7	107.4	1979	74165	04	1	0	1	4	9	2	8	1
ail tube	0.83	C-Steel	12 mm	2	1	1.98	1.98	1.98	1.98	1980	74161	01	0	0	0	0	2	2	2	2
ail tube	1.285	C-Steel	12 mm	2	1	7.69	7.69	7.69	7.69	1980	74161	05	8	0	0	2	3	2	2	2
ail tube	2.4	C-Steel	12 mm	2	1	14.3	14.3	14.3	14.3	1980	74161	05	9	0	0	2	1	2	8	2
-	4.0	Grey iron	2.0 ton	2	2	1.0	2.0	1.07	2.14	1979	74342	00	3	8	1	0	1	2	8	2
-	6.0	C-Steel	12 mm	1	1	6	6	6	6	1980	74132	84	0	5	3	0	2	2	2	1
	30.0	C-Steel	12 mm	1	1	30	30	30	30	1980	74132	24	0	5	3	0	8	2	3	1
tical	0.5	Grey iron	0.3 ton	2	2	0.6	1.2	1.6	3.2	1968	74220	02	3	1	6	2	1	2	8	2
-	2	Mild steel	0.9 ton	1	2	5	10	12.2	24.4	1970	74361	50	3	0	0	0	2	1	1	1
-	2	Mild steel	0.9 ton	1	2	2	4	4.9	9.8	1970	74361	50	3	0	0	0	1	1	1	1

SECTION 2

UNIDO/EPO (ABOT) CAPITAL GOODS DEVELOPMENT PROJECT

ACTIVITY CODE 3512211211

SERIAL NO	NAME / MODEL	BASIC MACHINE NOMENCLATURE	MAJOR SPECIFICATION	MAJOR SPECIFICATION 1	MAJOR SPECIFICATION 2	TYPE DESCRIPTION	MANUFACTURING CHARACT -1	MANUFACTURING CHARACT - 2	MANUFACTURING CHARACT - 3	ORIGIN	QUANTITY	UNIT	TOTAL
1		Heat exchanger	A: 358 m^2			shell tube	34.5	Si-Steel	38 mm	2	4	83.4	333.7
2		Heat exchanger	A: 411 m^2			shell tube	20.5	C-Steel	18 mm	2	1	95.8	95.8
3		Heat exchanger	A: 490 m^2			shell tube	28	C-Steel	18 mm	2	3	114.2	342.5
4		Deaerateur	V: 200 m^3	P: 30 atm	T: 200°C	spray	115	C-Steel	35 mm	2	1	800	800
5		Final cooler	A: 480 m^2			shell tube	16.5	C-Steel	18 mm	2	1	111.8	111.8
6		Saturator	V: 253 m^3	P: 30 atm	T: 110°C	spray	153	C-Steel	41 mm	2	1	730	730
7		Separator	V: 55 m^3	P: 30 atm		cyl.	35.2	C-Steel	25 mm	2	1	70	70
8		Separator	V: 19 m^3	P: 30 atm		cyl.	16.6	C-Steel	18 mm	2	1	35	35
9		Separator	V: 15 m^3	P: 30 atm		cyl.	13.7	C-Steel	18 mm	2	1	25	25
10		Separator	V: 10 m^3	P: 30 atm		cyl.	11.1	C-Steel	18 mm	2	1	20	20
11		Converter	V: 115 m^3	P: 30 atm	Catalytic	packed bed	385	[illegible]	35 mm	2	2	850	1.700
60		Booster pump	C: 960 m^3/h	H: 20 m	Hot clear	horizontal	7.5	Si-Steel	1.5 kgs	2	2	8.88	17.77
61		Quench pump	C: 70 m^3/h	H: 85 m	Hot clear	horizontal	5.6	Si.Steel	0.4 kgs	2	2	4.05	8.1
62		Recycle pump	C: 1100 m^3/h	H: 55 m	Hot clear	horizontal	8.9	Si-Steel	1.5 kgs	2	2	23.2	46.4

SECTION 1

...TION	MANUFACTURING CHARACT -1	MANUFACTURING CHARACT - 2	MANUFACTURING CHARACT - 3	ORIGIN	QUANTITY	PURCHASE COST 1000 $ UNIT	PURCHASE COST 1000 $ TOTAL	CONSTRU-1980 YEAR COST 1000$ UNIT	CONSTRU-1980 YEAR COST 1000$ TOTAL	YEAR OF PURCHASE AND REMARK	MTG-CODE (FOR COMPUTER) 1 2 3 4 5	6 7	8	9	10	11	12	13	14	15
...ter	30.5	St-Steel	18 mm	2	4	83.4	333.7	83.4	333.7	1980	74161	01	4	0	0	1	9	6	3	2
...ter	20.5	C-Steel	18 mm	2	1	95.8	95.8	95.8	95.8	1980	74161	01	4	0	0	1	3	2	8	2
...ter	80	C-Steel	18 mm	2	3	114.2	342.5	114.2	342.5	1980	74161	01	4	0	0	1	9	2	3	2
...r	115	C-Steel	35 mm	2	1	200	200	235.4	235.4	1978	74166	33	8	4	4	3	6	2	0	2
...e	16.5	C-Steel	18 mm	2	1	111.8	111.8	111.8	111.8	1980	74161	03	4	0	0	1	3	2	3	2
...r	151	C-Steel	41 mm	2	1	230	230	270.7	270.7	1978	74166	12	8	4	4	3	6	2	3	2
...	34.2	C-Steel	25 mm	2	1	70	70	82	82	1978	69243	02	1	4	0	2	4	2	2	2
...	16.6	C-Steel	18 mm	2	1	35	35	41	41	1978	69243	02	1	4	0	2	3	2	3	2
...	13.7	C-Steel	18 mm	2	1	25	25	29.3	29.3	1978	69243	02	1	4	0	2	3	8	8	2
...	11.1	C-Steel	18 mm	2	1	20	20	23.4	23.4	1978	69243	02	1	4	0	2	3	2	3	2
...ed	385	13Cr Mo 44	35 mm	2	3	850	1.700	994	1.989	1978	74165	07	8	3	1	4	6	4	8	2
...tal	2.5	St-Steel	1.5 ton	2	2	8.88	17.77	23.4	46.8	1968	74220	02	5	1	2	1	3	7	0	2
...tal	3.6	St.Steel	0.4 ton	2	2	4.05	8.1	10.7	21.4	1968	74220	02	3	3	2	1	1	7	1	2
...tal	2.7	St-Steel	1.5 ton	2	2	23.2	46.4	61.1	122.2	1968	74220	02	6	3	2	1	3	7	2	2

SECTION 2

ACTIVITY UNIT DESIGNATION												
SECTION NO	EQUIPMENT NO	BASIC EQUIPMENT NOMENCLATURE	MAJOR SPECIFICATION	MAJOR SPECIFICATION 1	MAJOR SPECIFICATION 2	TYPE DESCRIPTION	MANUFACTURING CHARACT-1	MANUFACTURING CHARACT-2	MANUFACTURING CHARACT-3	ORIGIN	QUANTITY	PURCH UNIT
1	1	Separator	V: 92 m^3	ø 30 bar	-31°C	cyl.	22	TTSt	85 mm	2	1	50
2	1	Seperator	V: 71 m^3	ø 3 bar	-31°C	cyl.	10	C-Steel	16 mm	2	1	26
3	1	Heat exchanger	513 m^2	11=2r	L=8.5m	shell tube	20	TTSt	18 mm	2	1	245
4	1	Heat exchanger	1104 m^2	11=2r	L=9r	shell tube	43	TTSt	18 mm	2	1	490
5	1	Wash column	V=261 m^3	50 bar	-60°C	plate baffles	127	C-Steel	30 mm	2	1	180
6	1	Stripping column	V=219 m^3	1 atm	-64°C	plate baffles	36	C-Steel	18 mm	2	1	70
7	1	Cooler	205 m^2	11=1.3r	L=5 m	shell tube	8	TTSt	18 mm	2	1	140
60	2	Methanol pump	C=44 m^3/h	374 m	cold clear	horizontal	3.0	C-St	1.5 ton	2	2	4
61	2	Methanol pump	C=88 m^3/h	257 m	cold clear	horizontal	2.2	C-St.	1.0 ton	2	2	5
62	2	Methanol pump	C=640 m^3/h	133 m	cold clear	horizontal	1.3	C-St.	0.7 ton	2	2	16

SECTION 1

TYPE DESCRIPTION	MANUFACTURING CHARACT-1	MANUFACTURING CHARACT-2	MANUFACTURING CHARACT-3	ORIGIN	QUANTITY	PURCHASE COST 1000$ UNIT	PURCHASE COST 1000$ TOTAL	CURRENT 1980 YEAR COST UNIT	CURRENT 1980 YEAR COST 1000$ TOTAL	YEAR OF PURCHASE AND REMARK	SITC CODE (FOR COMPUTER) 1 2 3 4 5	6 7	8	9	10	11	12	13	14	15
cyl.	22	TTSt	25 mm	2	1	50	50	56.6	56.6	1978	69243	80	1	4	5	2	3	4	8	2
cyl.	10	C-Steel	16 mm	2	1	28	28	32.8	32.8	1978	69243	80	1	1	5	2	3	2	3	2
ell tube	20	TTSt	18 mm	2	1	245	245	262	262	1979	74161	01	5	3	4	8	3	2	3	2
ell tube	43	TTSt	18 mm	2	1	490	490	524	524	1979	74161	01	6	3	4	8	4	2	3	2
lete baffles	127	C-Steel	30 mm	2	1	180	180	211.8	211.8	1978	74160	06	5	6	8	1	6	2	2	2
lete baffles	36	C-Steel	18 mm	2	1	70	70	82.4	82.4	1978	74166	07	4	3	2	1	4	2	1	2
ell tube	8	TTSt	18 mm	2	1	140	140	152	152	1979	74163	03	4	2	3	3	2	2	3	2
rizontal	3.0	C-St	1.5 ton	2	2	4.1	8.2	10.8	21.6	1968	74220	02	3	6	3	3	3	6	2	2
rizontal	2.2	C-St.	1.0 ton	2	2	5.1	10.2	13.4	26.8	1968	74220	02	3	6	3	3	3	6	3	2
rizontal	1.3	C-St.	0.7 ton	2	2	16	32	42.1	84.2	1968	74220	02	5	4	3	3	3	6	3	2

SECTION 2

SECTION 1

UNIDO/EPO (ALOT) CAPITAL GOODS DEVELOPMENT PROJECT

ACTIVITY CODE 351211611

SERIAL NO	MARK/MODEL	BASIC MACHINE NOMENCLATURE	MAJOR SPECIFICATION 1	MAJOR SPECIFICATION 2	MAJOR SPECIFICATION 3	TYPE DESCRIPTION	MANUFACTURING CHARACT-1	MANUFACTURING CHARACT-2	MANUFACTURING CHARACT-3	ORIGIN	QUANTITY	PURCHASE COST 1000 UNIT	PURCHASE COST 1000 TOTAL
1		Interchanger	A=66.7 m^2			shell tube	4.0	Alloy steel	30 mm	2	1	576	576
2		Gas preheater	A=3.8 m^2			shell tube	0.4	Alloy steel	25 mm	2	1	2.6	2
3		Reactor (desulf'n)	V=4.27 m^3	P= 55 atm	Catalytic	packed	7.4	Alloy steel	32 mm	2	1	42.5	42.
3A		Circulator	C=4453m3/min	P= 50 kg/cm^2	Diverse gas	horizontal	6.0	C-Steel	3.0 ton	2	1	700	700
4		Interchanger	A=355 m^2			shell tube	16.5	Alloy steel	35 mm	2	1	300	300
5		Startup heater	A=15 m^2			shell tube	4.7	Alloy steel	25 mm	2	1	17.3	17
6		Converter	V=37.7 m^3	P= 55 atm	Catalytic	packed	19.0	B-Steel	30 mm	2	1	50	50
7		Condenser	A=378 m^2			shell tube	13.6	boiler steel	35 mm	2	1	100	100
8		Catchpot	V=8.8 m^3	P: 56 kg/cm^2		cyl.	6.8	B-Steel	25 mm	2	1	26	26
9		Letdown vessel		P:5kg/cm^2		cyl.	1.0	Boiler steel	18 mm	1	1	13	13
10		Crude Methanol tank	V=118 m^3	ϕ 5 m		cylindrical	11.0	C-Steel	16 mm	1	1	10	10
11		Crude Methanol pump	C=6 m^3/h	H:60 m	Hot clear	horizontal	0.22	C-Steel cas.	0.1 ton	2	2	0.86	1.
12		Crude Bottom exchanger	A=5 m^2			shell tube	0.65	St.Steel	18 mm	1	1	2.1	2.
13		Topping column	V=5.2 m^3	P= 4.5 atm			11.5	St.Steel	18 mm	1	1	35	35
14		Reboiler	A=15 m^2			spiral	1.1	St.Steel(tube)	18 mm	1	1	8.5	8.
15		Condensate pump	C=1.5 m^3/h	H:80 m	Hot clear	horizontal	0.15	C.St.	011 ton	2	2	0.73	1.
16		Topping reflux pump	C=3.5 m^3/h	H:45 m	Hot clear	horizontal	0.15	C.St.	0.1 ton	2	2	0.75	1.
17		Topping bottom pump	C=7 m^3/h	H:45 m	Hot clear	horizontal	0.11	C.St.	0.1 ton	2	2	0.82	1.
18		Primary condenser	A=40 m^2			shell tube	2.2	St.Steel	18 mm	1	1	21.6	21
19		Reflux drum	V: 0.6 m^3	P: 4.5 kg/cm^2		cyl.	0.6	C-Steel	16 mm	1	1	6	6
20		Secondary condenser	A=10 m^2			shell tube	0.83	St.Steel	12 mm	1	1	9	9
65		Fusel oil pump	C=1 m^3/h	H:25 m	vicious	horizontal	0.15	C-Steel	011 ton	2	2	0.59	1.
15		Refining column	V=64.7 m^3	P= 4.5 atm		plate	17.5	St.Steel	16 mm	1	1	81.6	81
14		Reboiler	A=100 m^2				4.58	C-Steel	18 mm	1	1	14	14
66		Condensate pump	C=6 m^3/h	H:80 m	Hot clear	horizontal	0.15	C-Steel	0.1 ton	1	1	0.95	
10		Condenser	A=110 m^2			shell tube	5.0	St.Steel	18 mm	1	1	37.3	
59		Reflux drum	V: 2.6 m^3	P: 4.6 kg/m^2		cyl.	1.4	C-Steel	18 mm	1	1	39	3
59		Refining reflux pump	C=16 m^3/h	H:16 m	Hot clear	horizontal	0.22	C-Steel	0.1 ton	2	2	1.12	2
20		Product cooler	A=12 m^2			shell tube	0.94	St.Steel(tube)	18 mm	1	1	9.3	
41		Methanol storage tank	V=53 m^3	ϕ 3.5 m	T= 30°C	cylindrical	0.2	C-Steel	16 mm	1	1	8	
42		Methanol storage tank	V=53 m^3	ϕ 3.5 m	T= 30°C	cylindrical	0.2	C-Steel	16 mm	1	1	8	
60		Recycle pump	C=25 m^3/h	H:50 m	Hot clear	horizontal	0.25	C-Steel	0.1 ton	2	2	0.86	1
43		Methanol tank	V=707 m^3	ϕ 10 m	T= 30°C	cylindrical	9.0	C-Steel	16 mm	1	1	21	2
69		Caustic dosing pump	C=0.05 m^3/h	H:20 m	corrosive	horizontal	0.06	St.Steel	0.03 ton	2	1	0.463	0

SECTION 2

TYPE DESCRIPTION	MANUFACTURING CHARACT-1	MANUFACTURING CHARACT-2	MANUFACTURING CHARACT-3	ORIGIN	QUANTITY	PURCHASE COST 1000 $ UNIT	PURCHASE COST 1000 $ TOTAL	CONSTANT 1960 YEAR COST UNIT	CONSTANT 1960 YEAR COST 1000$ TOTAL	YEAR OF PURCHASE AND REMARK	SIC CODE (FOR COMPUTER) 1 2 3 4 5	6 7	8	9	10	11	12	13	14	15
shell tube	4.0	Alloy steel	30 m	2	1	576	576	618.6	618.6	1979	74161	01	3	0	0	3	1	4	8	2
shell tube	0.4	Alloy steel	25 m	2	1	2.6	2.6	2.8	2.8	1979	74161	01	1	0	0	3	1	4	8	2
packed	7.4	Alloy steel	2 m	2	1	42.5	42.5	49.7	49.7	1978	74165	05	1	4	1	4	2	4	8	2
horisontal	6.0	C-Steel	3.0 ton	2	1	700	700	1,756	1,756	1969	74313	12	8	5	2	8	2	8	3	2
shell tube	16.5	Alloy steel	35 m	2	1	300	300	322,2	322,2	1979	74161	01	4	0	0	1	3	4	8	2
shell tube	4.7	Alloy steel	25 m	2	1	17.3	17.3	18.6	18.6	1979	74161	07	2	0	0	8	2	4	8	2
packed	19.0	B-Steel	30 m	2	1	50	50	58.5	58.5	1978	74165	06	2	4	1	4	3	9	8	2
shell tube	13.6	boiler steel	35 m	2	1	100	100	107.4	107.4	1979	74161	05	4	0	0	8	3	3	a	2
cyl.	6.8	B-Steel	25 m	2	1	26	26	30.4	30.4	1978	69243	02	1	5	0	2	2	3	8	1
cyl.	1.0	Boiler steel	18 m	1	1	13	13	15.2	15.2	1978	69243	02	1	1	0	2	1	3	8	1
cylindrical	11.0	C-Steel	16 m	1	1	10	10	25.1	25.1	1969	69211	13	2	2	0	2	3	2	8	1
horisontal	0.22	C-Steel cap.	0.1 ton	2	2	0.86	1.72	2.3	4.6	1968	74220	02	2	8	2	8	1	6	8	2
shell tube	0.65	St.Steel	18 m	1	1	2.1	2.1	2.3	2.3	1979	74161	01	1	0	0	8	1	6	8	1
	11.5	St.Steel	18 m	1	1	35	35	41.2	41.2	1978	74166	06	1	1	0	0	1	6	8	1
spiral	1.1	St.Steel(tube)	10 m	1	1	8.5	8.5	9.1	9.1	1979	74161	02	2	0	0	8	1	6	8	1
horisontal	0.15	C-Steel	011 ton	2	2	0.73	1.45	1.9	3.8	1968	74220	02	2	3	2	8	1	6	8	2
horisontal	0.15	C-Steel	0.1 ton	2	2	0.75	1.5	2	4	1968	74220	02	2	8	2	8	1	6	8	2
horisontal	0.11	C-Steel	0,1 ton	2	2	0.82	1.64	2.2	4.4	1968	74220	02	2	8	2	8	1	6	8	2
shell tube	2.2	St.Steel	18 m	1	1	21.6	21.6	23.2	23.2	1979	74161	05	2	0	0	8	1	6	8	1
cyl.	0.6	C-Steel	16 m	1	1	6	6	7	7	1978	69243	02	1	1	0	8	7	2	1	1
shell tube	0.83	St.Steel	12 m	1	1	9	9	9.7	9.7	1979	74161	05	2	0	0	8	1	6	8	1
horisontal	0,15	C-Steel	011 ton	2	2	0.59	1.19	1.6	3.2	1968	74230	00	2	8	6	8	1	6	8	1
plate	17.5	St.Steel	16 m	1	1	81.6	81.6	96	96	1978	74166	05	2	1	0	1	3	6	8	1
	4.58	C-Steel	18 m	1	1	14	14	15	15	1979	74161	02	4	0	0	8	1	2	8	1
horisontal	0.15	C-Steel	0.1 ton	1	1	0.95	0.95	2.5	2.5	1968	74220	02	2	8	2	8	1	6	8	2
shell tube	5.0	St.Steel	18 m	1	1	37.8	37.8	40.6	40.6	1979	74161	05	4	8	0	8	2	6	3	1
cyl.	1.4	C-Steel	18 m	1	1	39	39	45.7	45.7	1978	69243	02	1	1	0	2	1	2	3	1
horisontal	0.22	C-Steel	0.1 ton	2	2	1.12	2.24	2.9	5.8	1968	74220	02	3	8	2	8	1	6	3	2
shell tube	0.96	St.Steel(tube)	18 m	1	1	5.3	5.3	5.7	5.7	1979	74161	03	2	8	0	8	1	6	3	1
cylindrical	0.2	C-Steel	16 m	1	1	8	8	20	20	1969	69211	13	1	1	3	2	3	2	3	1
cylindrical	0.2	C-Steel	16 m	1	1	8	8	20	20	1969	69211	13	1	1	3	2	3	2	8	1
horisontal	0.75	C-Steel	0.1 ton	2	2	0.86	1.72	2.3	2.3	1968	74220	02	3	8	2	8	1	6	8	2
cylindrical	0.0	C-Steel	16 m	1	1	21	21	57.6	57.6	1969	69211	11	1	1	3	2	3	2	3	1
horisontal	0.06	St.Steel	0.05 ton	2	1	0.483	0.484	1.3	1.3	1968	74210	01	1	8	5	0	1	7	8	2

UNIDO/RPC (AZOT) CAPITAL GOODS DEVELOPMENT PROJECT

ACTIVITY 3512211011

SERIAL NO	MARK / MODEL	BASIC MACHINE NOMENCLATURE	MAJOR SPECIFICATION	MAJOR SPECIFICATION 1	MAJOR SPECIFICATION 2	TYPE DESCRIPTION	MANUFACTURING CHARACT -1	MANUFACTURING CHARACT -2	MANUFACTURING CHARACT - 3	ORIGIN	QUANTY	PURCHASE COST(1000 UNIT	PURCHASE COST(1000 TOTAL
2		Heat exchanger	231 m^2			shell tube	9	St-Steel	18 mm	2	1	20.7	20.7
3		Heat exchanger	231 m^2			shell tube	9	St-Steel	18 mm	2	1	20.7	20.7
8		Heat exchanger	231 m^2			shell tube	9	St-Steel	18 mm	2	1	20.7	20.7
4		Heat exchanger	231 m^2			shell tube	9	St-Steel	18 mm	2	1	20.7	20.7
5		N_2- wash column	150 m^3	65 bar	-160°C	plate baffles	14	St-Steel	15 mm	2	1	76	76
44		Gas holder	V: 2000 m^3			telescopic	113	C-Steel	16 mm	1	1	113	113
50		H_2 - compressor	C: 30000 m^3/h	Ps 50 kg/cm^2	gas	horizontal	28	Grey iron	14 ton	2	1	1,00	1,00
6		Steam turbine	6500 kw	2000 RPM	35 atm.	reaction	8	Alloy iron cast	4 ton	2	1	200	200

SECTION 1

...TION	MANUFACTURING CHARACT -1	MANUFACTURING CHARACT -2	MANUFACTURING CHARACT - 3	ORIGIN	QUANTITY	PURCHASE COST (1000 $) UNIT	PURCHASE COST (1000 $) TOTAL	CONSTANTS 1980 YEAR COST (1000 $) UNIT ($)	CONSTANTS 1980 YEAR COST (1000 $) TOTAL ($)	YEAR OF PURCHASE AND REMARK	SITC CODE (FOR COMPUTER) 1 2 3 4 5	6-7	8	9	10	11	12	13	14	15
...be	9	St-Steel	18 mm	2	1	20.7	20.7	22.2	22.2	1979	74161	01	4	0	0	8	8	6	8	2
...be	9	St-Steel	18 mm	2	1	20.7	20.7	22.2	22.2	1979	74161	01	4	0	0	8	8	6	8	2
...be	9	St-Steel	18 mm	2	1	20.7	20.7	22.2	22.2	1979	74161	01	4	0	0	0	8	6	8	2
...be	9	St-Steel	18 mm	2	1	20.7	20.7	22.2	22.2	1979	74161	01	4	0	0	8	8	6	8	2
...flex	14	St-Steel	18 mm	2	1	76	76	85.5	85.5	1978	74160	06	4	0	0	1	1	6	0	2
...tic	113	C-Steel	16 mm	1	1	113	113	113	113	1980	69243	03	4	0	0	4	6	2	0	2
...tal	28	Grey iron	14 ton	2	1	1,000	1,000	1,000	1,000	1980	74313	12	5	5	2	8	4	2	8	2
...r	8	Alloy iron cast	4 ton	2	1	200	200	200	200	1980	71261	01	2	8	2	2	2	3	3	2

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SECTION 2

UNIDO/SMO (A20[illegible]) CAPITAL GOODS DEVELOPMENT PROJECT

ACTIVITY CODE 35[illegible]

SERIAL NO	MAKE/MODEL	BASIC MACHINE NOMENCLATURE	MAJOR SPECIFICATION	MAJOR SPECIFICATION 1	MAJOR SPECIFICATION 2	TYPE DESCRIPTION	MANUFACTURING CHARACT-1	MANUFACTURING CHARACT-2	MANUFACTURING CHARACT-3	ORIGIN	QUANTITY	PURCHASE COST UNIT	[illegible]
60		Syn.gas compressor	$C=1842 m^3/min.$	$P=162 kg/cm^2$	gas	horizontal	35	C.Steel	37 ton	2	1	-	
1		Start up heater	Fuel used 0.5 t/h	1100°C	liquid	-	52	St.Steel (tube)	12 mm	2	1	200	
2		NH_3 converter	$230 m^3$	P= 162 atm	catalytic	packed	269	C.Steel	145 mm	2	1		
3		BFW preheater	$A=453 m^2$	-	-	shell tube	[illegible]	C.Steel	16 mm	2	1	100	
4		Heat exchanger	$A=731 m^2$	—	-	shell tube	[illegible]	C.Steel	25 mm	2	1	170	
5		Cooler	$A=1130 m^2$	-	-	shell tube	66.5	C.Steel	20 mm	2	1	250	
6		Heat exchanger	$A=248 m^2$	-	-	shell tube	22.0	C.Steel	30 mm	2	1	57.6	
7		Ammonia chiller	$A=491 m^2$	-	-	shell tube	35.0	C.Steel	42 mm	2	1	98	
61		NH_3 compressor	$C=125 m^3/min$	$P=162 kg/cm^2$	gas	horizontal	7.0	C.Steel	4 ton	2	1	[illegible]	
8		NH_3 condenser	$A=1011 m^2$	-	-	shell tube	[illegible]	C.Steel	18 mm	2	1	236	
9		NH_3 receiver	$5 m^3$	$130 kg/cm^2$	-	cyl.	2.0	C.Steel	25 mm	2	1	11	
10		Inert gas cooler	$A=23 m^2$	-	-	shell tube	1.0	C.Steel	18 mm	2	1	7.7	
11		Product heat exchanger	$A=90 m^2$	-	-	shell tube	4.1	C.Steel	25 mm	2	1	21	
12		NH_3 separator	$30 m^3$	$137 kg/cm^2$	-23°C	cyl.	34.0	C.Steel	70 mm	2	1	65	
13		Flash drum	$44 m^3$	$8.5 kg/cm^2$	-33°C	cyl.	27.0	C.Steel	10 mm	2	1	35	
40		NH_3 storage tank	$V=9936 m^3$	P= 1 atm	T= -33°C	spherical	368	C.Steel	20 mm	1	1	368	
62		NH_3 pump	$C=60 m^3/h$	$H=434.1 mH_2O$	cold clear	vertical	2.8	C.Steel	1.5 ton	2	2	12	
14		NH_3 separator	$5 m^3$	$137 kg/cm^2$	-23°C	cyl.	0.25	C.Steel	12 mm	2	1	5	
63		NH_3 compressor		$P=8.6 kg/cm^2$	gas	horizontal	0.25	C.Steel	0.1 ton	2	1	50	
15		NH_3 condenser	$A=10 m^2$	-	-	shell tube	0.5	C.Steel	12 mm	2	1	4	
16		Condensing turbine	1800 kw	-	-	reaction	5.0	Grey iron	2 ton	2	4		
17		Condensing extn turbine	13300 kw	-	-	combined	15.0	Grey iron	7 ton	2	4		
18		Steam condenser	$A=205 m^2$	-	-	shell tube	12.5	C.Steel	16 mm	2	1	41	
64		Condensate pump	$C=30 m^3/h$	$P=91 mH_2O$	Hot clear	horizontal	0.42	C.Steel	0.[illegible] ton	2	2	4.1	
19		Steam condenser	$A=85 m^2$	-	-	shell tube	9.5	C.Steel	12 mm	2	1	15	
65		Condensate pump	$C=12.3 m^3/h$	$P=91 mH_2O$	Hot clear	horizontal	0.34	C.Steel	0.2 ton	2	2	3.0	

SECTION 1

MANUFACTURING CHARACT-1	MANUFACTURING CHARACT-2	MANUFACTURING CHARACT-3	ORIGIN	QUANTITY	PURCHASE COST 1000$ UNIT	PURCHASE COST 1000$ TOTAL	CONSTANT 1980 YEAR COST 1000 $ UNIT	CONSTANT 1980 YEAR COST 1000 $ TOTAL	YEAR OF PURCHASE AND REMARK	NITC CODE (FOR COMPUTER) 1 2 3 4 5	6 7	8	9	10	11	12	13	14	15
35	C.Steel	27 ton	2	1	-	-	2,742	2,742	1980	74313	12	6	6	2	1	4	6	6	2
52	St.Steel (Tubes)	12 mm	2	1	200	200	275	275	1976	74132	24	1	5	2	0	5	8	1	2
269	C.Steel	145 mm	2	1			1,634	1,634	1980	74165	01	8	6	1	4	7	2	6	2
3.5	C.Steel	35 mm	2	1	100	100	100	100	1980	74161	07	4	0	0	8	4	2	8	2
34.0	C.Steel	85 mm	2	1	170	170	170	170	1980	74161	01	5	0	0	8	4	2	8	2
66.5	C.Steel	20 mm	2	1	250	250	250	250	1980	74161	03	6	0	0	8	5	2	8	2
22.0	C.Steel	30 mm	2	1	57.8	57.8	57.8	57.8	1980	74161	01	4	0	0	8	3	2	8	2
35.0	C.Steel	42 mm	2	1	98	98	98	98	1980	74161	04	4	0	0	8	4	2	8	2
7.0	C.Steel	4 ton	2	1	300	300	900	900	1969	74313	11	5	6	2	0	2	6	8	2
26.0	C.Steel	38 mm	2	1	236	236	236	236	1980	74161	05	6	0	0	8	4	2	8	2
2.0	C.Steel	25 mm	2	1	11	11	12.9	12.9	1978	65243	02	1	7	8	2	3	2	8	2
1.0	C.Steel	18 mm	2	1	7.7	7.7	7.7	7.7	1980	74161	03	6	0	0	8	3	2	8	2
4.1	C.Steel	25 mm	2	1	21	21	21	21	1980	74161	01	2	0	0	8	3	2	8	2
34.0	C.Steel	70 mm	2	1	65	65	76.1	76.1	1978	69243	02	1	7	4	2	4	2	4	2
17.0	C.Steel	38 mm	2	1	35	35	41	41	1978	69243	02	1	2	9	2	8	6	0	2
368	C.Steel	38 mm	1	1	368	368	368	368	1980	69243	04	6	1	5	3	8	2	0	1
2.8	C.Steel	1.5 ton	2	2	12	24	13	26	1979	74220	10	3	6	1	2	1	6	8	2
0.25	C.Steel	12 mm	2	1	5	5	5.9	5.9	1978	69243	02	1	7	8	2	1	2	2	2
0.25	C.Steel	0.1 ton	2	1	50	50	125	125	1969	74313	01	8	3	2	8	1	6	8	2
0.5	C.Steel	12 mm	2	1	4	4	4	4	1980	74161	05	2	0	0	8	1	2	0	2
5.0	Grey Iron	2 ton	2	4			200	200	1980	73261	11	1	0	0	8	2	6	2	2
35.0	Grey Iron	7 ton	2	4			2000	2000	1980	73261	13	2	0	0	3	3	6	8	2
12.5	C.Steel	16 mm	2	1	41	41	41	41	1980	74161	05	4	0	0	8	3	2	8	2
0.42	C.Steel	0.2 ton	2	2	4.1	8.2	4.4	8.8	1979	74220	02	3	3	2	0	1	6	8	2
9.5	C.Steel	12 mm	2	1	35	35	35	35	1980	74161	05	3	0	0	0	2	2	8	2
0.34	C.Steel	0.2 ton	2	2	1.0	2.0	1.6	5.2	1968	74220	02	3	3	2	0	1	6	8	2

SECTION 2

UNIDO/IPO (ABOT)

CAPITAL GOODS

DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR SOHA FERTILIZER COMPLEX, LOCATION: SOHA

ANTICIPATED DATE OF COMMISSIONING 1987 CAPACITY : 300,000 t/y

FERTILIZER INDUSTRY, AMMONIA (FROM COAL), . . . ,

BUNKERS, VESSELS TANKS, SEPARATORS DRUMS, GAS HOLDERS

Ind. Code 3513-1

Weight/Volume

1

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $ (1000)	YEARS										Total 1981-1990
					1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	
69211 0110012211	Intermediate bin	1	10.0	14.0					10.0						10.0
69211 0111321211	Feed bunker	16	2.0	1.4					32.0						32.0
69211 0111322211	Service bunker	16	7.1	5.0					113.0						113.0
69211 0120025211	Slag bunker	1	84.0	58.8					84.0						84.0
69211 0224025211	Coal dust bunker	2	100.0	70.6					200.0						200.0
69211 0230016211	Raw coal bunker	2	168.0	118.6					336.0						336.0
69211 0711022212	Storage vessel	1	3.0	65.4					8.0						8.0
69211 0111321211	Nitrogen Vessel	4	3.8	3.8					14.4						14.4
69211 1311323211	Methonol sto. tank	2	10.2	20.0					20.4						20.4
69211 1322023211	Crude methonol tank	1	11.0	25.1					11.0						11.0
69211 1333323211	Methonol tank	1	20.0	57.6					20.0						20.0
69243 0217421212	NH_3 separater	1	0.25	5.9					0.25						0.25
69243 0217321222	NH_3 receiver	1	2.0	12.9					2.0						2.0
69243 0210321212	Condensate separator	2	1.0	12.9					2.0						2.0
69243 0210321212	Condensate separator	6	0.5	10.3					3.0						3.0
69243 0211524511	Flash drum	1	17.0	41.0					17.0						17.0
69243 0217434242	NH_3 separator	1	34.0	76.1					34.0						34.0
69243 0211021211	Reflux drum	1	1.4	45.7					1.4						1.4

UNIDO/ESC (AZOT)

CAPITAL GOODS

DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT SOMA FERTILIZER COMPLEX, LOCATION: SOMA

ANTICIPATED DATE OF COMMISSIONING: 1987 CAPACITY: 300,000 t/y

FERTILIZER INDUSTRY- AMMONIA (FROM COAL)

BURNERS, VESSELS TANKS, SEPARATOR DRUMS, GAS HOLDERS

Ind. Code 3513-2

Weight/Value 2

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $ 1000)	YEARS										Total 1981-1990
					1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	
69243 0211021311	Letdown vessel	1	1.0	15.2					1.0						1.0
69243 0211523212	Separator	1	10.0	32.8					10.0						10.0
69243 0214523422	Separator	1	22.0	58.6					22.0						22.0
69243 0211027211	Reflux drum	1	0.6	7.0					0.6						0.6
69243 0212224312	Steam collector	4	6.8	24.6					27.2						27.2
69243 0214023212	Separator	1	11.1	23.4					11.1						11.1
69243 0214023212	Separator	1	16.6	41.0					16.6						16.6
69243 0214023812	Separator	1	13.7	29.3					13.7						13.7
69243 0214024222	Separator	1	35.2	82.0					35.2						35.2
69243 0215022321	Catch-pot	1	6.8	30.4					6.8						6.8
69243 0216224312	Steam collector	1	6.9	24.6					6.9						6.9
69243 0340046212	Gas holder	1	113.0	113.0					113.0						113.0
69243 0391349211	Raw gas holder	1	850.0	850.0					850.0						850.0
69243 0461538211	NH_3 sto. tank	1	368.0	368.0					368.0						368.0

UNIDO/SPO (ASOE)
CAPITAL GOODS
DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR SCHA FERTILIZER COMPLEX, LOCATION: SCHA

ANTICIPATED DATE OF COMMISSIONING 1987 CAPACITY : 300.000 t/y

Ind.Code 3512-1

FERTILIZER INDUSTRY-AMMONIA (FROM COAL)

Weight/Value

GENERAL ENGINEERING EQUIPMENT

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit weight (tons)	Unit cost in 1980 (US $ 1000)	YEARS										Total 1981-1990
					1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	
71261 0128224342	Condensing turbine	2	27.0	268.0					54.0						54.0
71261 0128222332	Steam turbine	1	8.0	200.0					8.0						8.0
71261 1110012622	Condensing turbine	1	5.0	200.0					5.0						5.0
71261 1320033622	Condensing ext^{n} tur.	1	15.0	1000.0					15.0						15.0
72831 3110002631	Magnet separator	1	5.0	2.0					5.0						5.0
72831 6040002941	Air classifier	2	8.0	43.9					16.0						16.0
72832 0440003651	Crusher	1	16.0	215.8					16.0						16.0
72832 1122214671	Coal mill	2	50.0	431.6					100.0						100.0
74132 0596106322	Gasifier	4	43.0	400.0					172.0						172.0
74132 2405202212	Hot gas producer	2	10.0	5.0					20.0						20.0
74132 2405302211	Combustion furnace	1	6.0	6.0					6.0						6.0
74132 2405302211	Claus kiln	1	30.0	30.0					30.0						30.0
74132 2415205212	Start up heater	1	52.0	275.0					52.0						52.0

UNIDO/PPD (ESST)

CAPITAL GOODS

DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR SONA FERTILIZER COMPLEX, LOCATION: SONA — Ind.Code 2818-7

ANTICIPATED DATE OF COMMISSIONING 1987 CAPACITY : 330,000 t/y — Weight/Value

FERTILIZER INDUSTRY AMMONIA (FROM COAL),

HEAT EXCHANGER, REBOILER, COOLER, CHILLER CONDENSER etc.

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 US $ 1000)	YEARS										Total 1981-1990
					1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	
74161 0100003212	Heat exchanger	1	0.83	1.98					0.83						0.83
74161 0110011422	Gas preheater	1	0.4	2.8					0.4						0.4
74161 0110011611	Crude bottom exch.	1	0.65	2.3					0.65						0.65
74161 0120001212	Product heat exch.	1	4.1	21.0					4.1						4.1
74161 0123211212	Heat exchanger	1	0.5	34.0					0.5						0.5
74161 0130011412	Inter changer	1	4.0	618.6					4.0						4.0
74161 0131111212	Heat exchanger	1	2.0	10.0					2.0						2.0
74161 0131211212	Heat exchanger	1	3.0	64.2					3.0						3.0
74161 0131311211	Heat exchanger	1	2.0	60.0					2.0						2.0
74161 0140003412	Inter changer	1	16.5	322.2					16.5						16.5
74161 0140012622	Heat exchanger	4	9.0	22.2					36.0						36.0
74161 0140013212	Heat exchanger	1	20.5	95.8					20.5						20.5
74161 0140013222	Heat exchanger	1	22.0	57.8					22.0						22.0
74161 0140013612	Heat exchanger	4	18.5	83.4					74.0						74.0
74161 0140113212	Heat exchanger	3	20.0	114.2					60.0						60.0
74161 0142413212	Heat exchanger	1	10.0	150.0					10.0						10.0
74161 0142413212	Heat exchanger	1	11.0	150.0					11.0						11.0
74161 0150014222	Heat exchanger	1	36.0	170.0					36.0						36.0

UNIDO/SPO (ABOT)

CAPITAL GOODS

DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR SOMA FERTILIZER COMPLEX, LOCATION: SOMA

ANTICIPATED DATE OF COMMISSIONING 1987 CAPACITY : 330,000 t/yr

FERTILIZER INDUSTRY AMMONIA (-HEON COAL),

HEAT EXCHANGER, REBOILER, COLER, CHILLER, CONDENSER, ETC.

Est. Code 351.2-1

Weight/Value

5

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $ 1000)	YEARS										Total 1981-1990
					1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	
74161 0152411212	Heat exchanger	1	34.0	535.0					34.0						34.0
74161 0142413212	Heat exchanger	1	27.0	375.0					27.0						27.0
74161 0152414212	Heat exchanger	1	29.0	412.0					29.0						29.0
74161 0153403212	Heat exchanger	1	20.0	262.0					20.0						20.0
74161 0162414212	Heat exchanger	1	48.0	287.0					48.0						48.0
74161 0163414212	Heat exchanger	1	43.0	524.0					43.0						43.0
74161 0220071611	Reboiler	1	1.1	9.1					1.1						1.1
74161 0231321211	Reboiler	2	3.0	11.0					6.0						6.0
74161 0240021211	Reboiler	1	4.58	15.0					4.5						4.5
74161 0320001212	Cooler	2	0.91	3.5					1.82						1.82
74161 0320011611	Product cooler	1	0.94	5.7					0.94						0.94
74161 0340013212	Final cooler	1	16.5	111.8					16.5						16.5
74161 0360011212	Inert gas cooler	1	1.0	7.7					1.0						1.0
74161 0360015222	Cooler	1	66.5	250.0					66.5						66.5
74161 0440004212	Ammonia chiller	1	35.0	98.0					35.0						35.0
74161 0500011	Condenser	2	1.28	7.69					2.46						2.46
74161 0520001211	NH_3 condenser	1	0.5	4.0					0.5						0.5
74161 0520011611	Primary condenser	1	2.2	23.2					2.2						2.2

UNIDO/IPCT (ANOT)

CAPITAL GOODS

DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR SOMA FERTILIZER COMPLEX, LOCATION: SOMA

ANTICIPATED DATE OF COMMISSIONING 1987 CAPACITY : 300,000 t/y

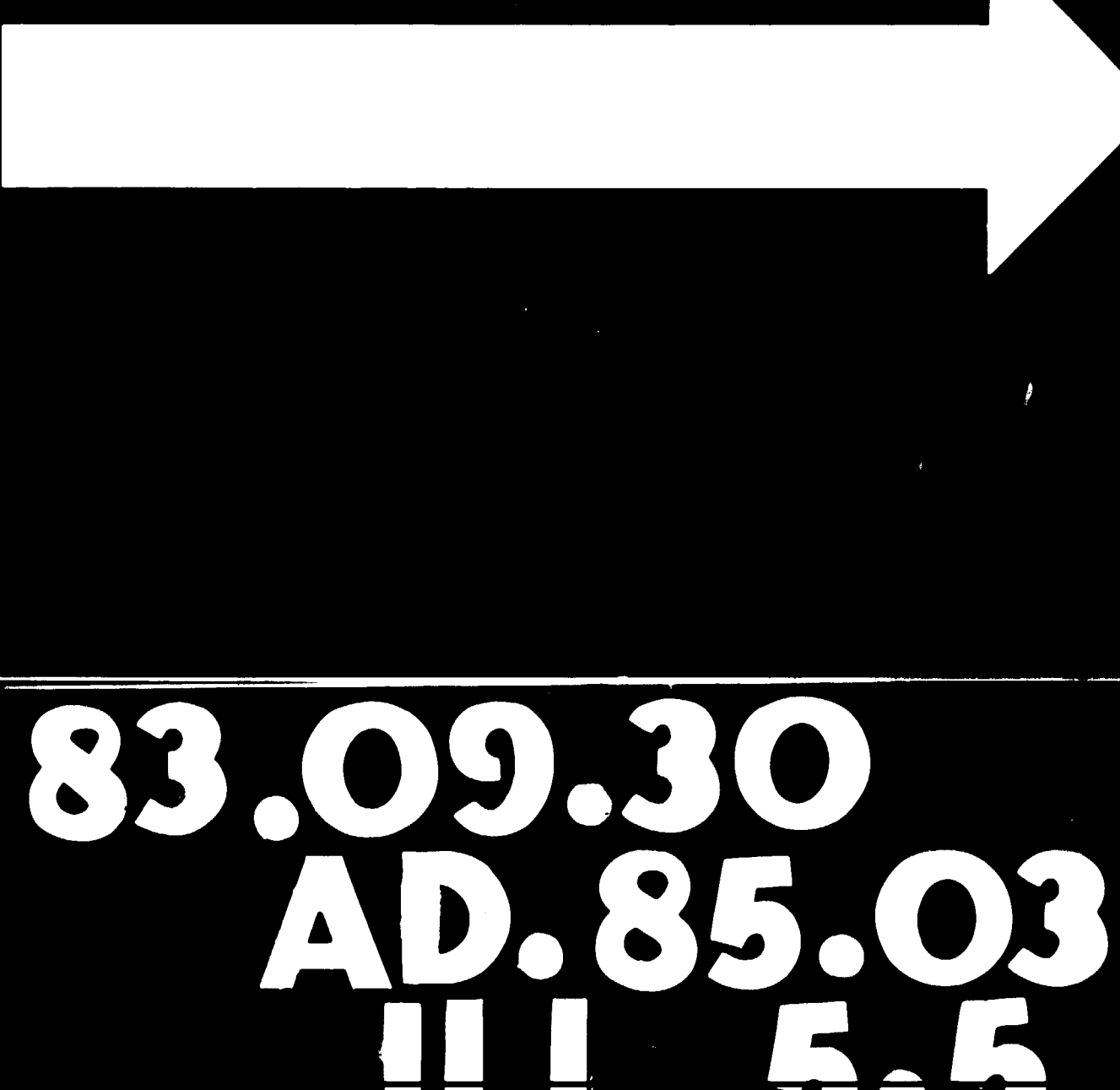
FERTILIZER INDUSTRY AMMONIA (FROM COAL),

HEAT EXCHANGER, REBOILER, COLER, CHILLER, CONDENSER, WER.

Ind. Code 3513-1

Weight/Value

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $ 1000)	YEARS										Total 1981-1990
					1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	
74161 0342312212	Cooler	1	8.0	150.0					8.0						8.0
74161 0342412212	Cooler	1	8.0	107.0					8.0						8.0
74161 0520011611	Secondary condenser	1	0.83	9.7					0.83						0.83
74161 0530012212	Steam condenser	1	9.5	15.0					9.5						9.5
74161 0530013611	Condenser	2	2.4	14.3					4.8						4.8
74161 0540012611	Condenser	1	5.0	40.6					5.0						5.0
74161 0540013212	Steam condenser	1	12.5	41.0					12.5						12.5
74161 0540013322	Condenser	1	13.6	107.4					13.6						13.6
74161 0553413212	Steam condenser	1	21.0	125.6					21.0						21.0
74161 0560004212	NH_3 condenser	1	26.0	235.0					26.0						26.0
74161 0602405222	WER	1	60.0	300.0					60.0						60.0
74161 0604406321	WER	1	137.0	548.0					137.0						137.0
74161 0720012422	Start up heater	1	4.7	18.6					4.7						4.7
74161 0740004212	BFW preheater	1	36.5	100.0					36.5						36.5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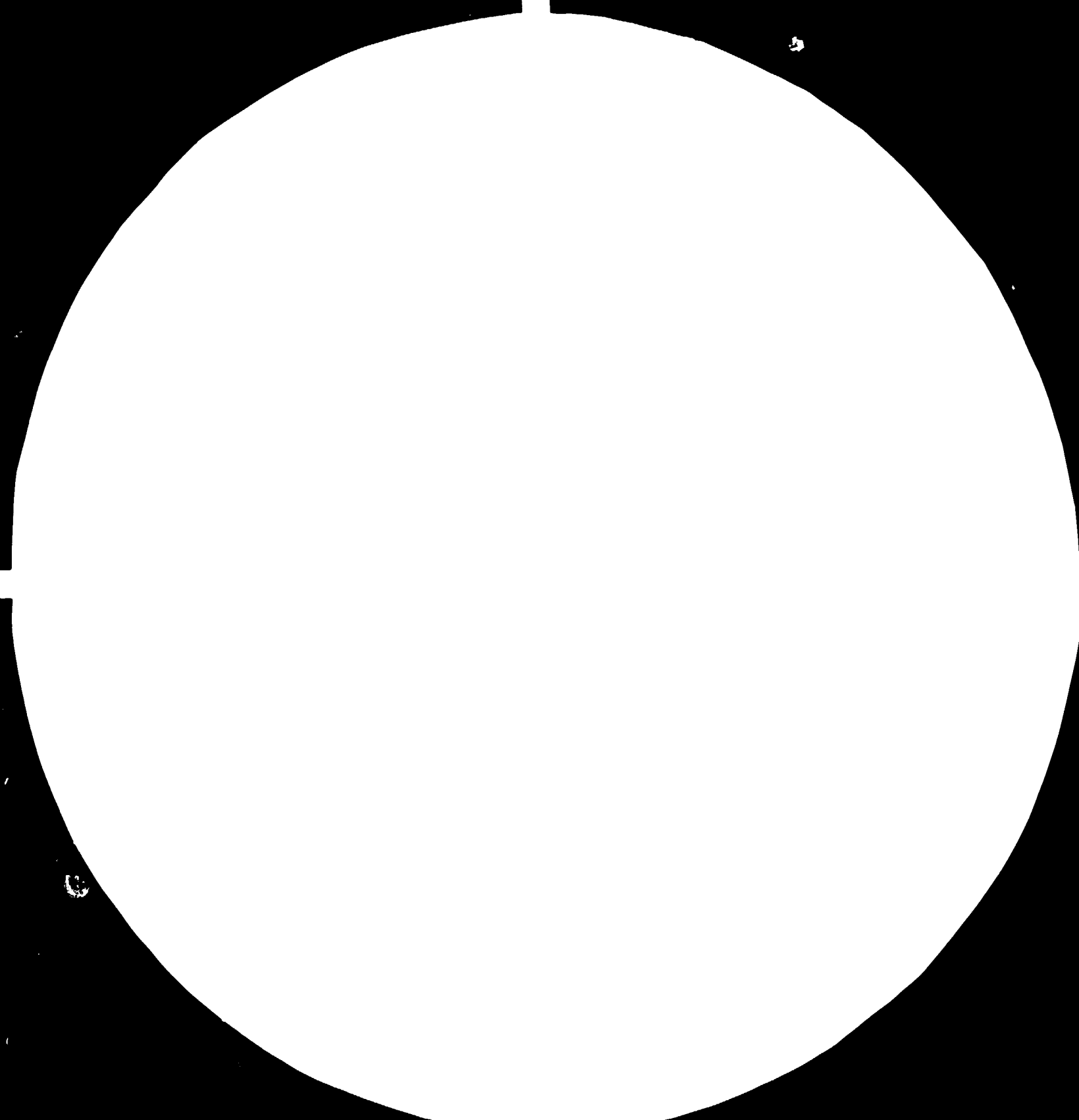

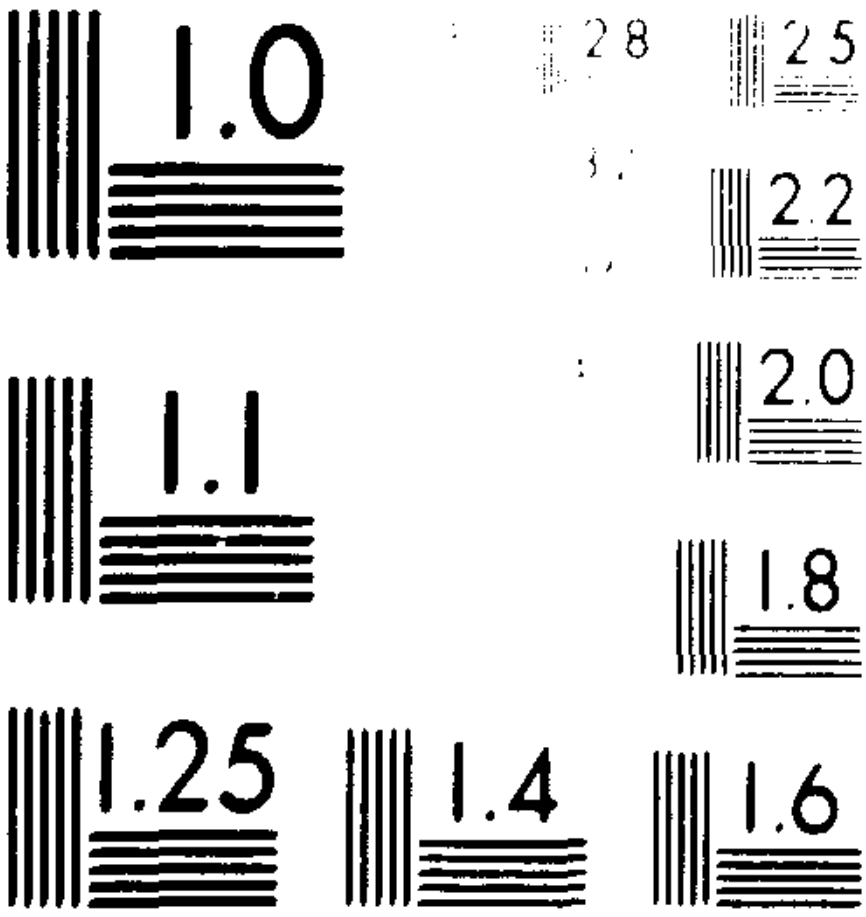

UNIDO/IPO (AZOF)
CAPITAL GOODS
DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR SOMA FERTILIZER COMPLEX, LOCATION: SOMA
ANTICIPATED DATE OF COMMISSIONING : 1987 CAPACITY : 300,000 t/y
FERTILIZER INDUSTRY- AMMONIA (FROM COAL)

Ind. Code 3512-1
Weight/Value

CHEMICAL REACTION EQUIPMENT, COLUMNS

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit costs 1980 (US $ 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	TOTAL 1981-1990
74165 0316147247	NH_3 Converter	1	269.0	1,634					269.0						269.0
74165 0410143211	Catalyst tower	2	15.0	53.7					30.0						30.0
74165 0514142432	Gas'n reactor	1	7.4	49.7					7.4						7.4
74165 0624143922	Converter	1	19.0	98.5					19.0						19.0
74165 0[illegible]146422	Converter	2	185.0	994.0					370.0						370.0
74166 0[illegible]4214212	Prescrubbing column	1	37.0	94.2					37.0						37.0
74166 0531013611	Refining column	1	17.5	96.0					17.5						17.5
74166 0611003611	Topping column	1	11.5	41.2					11.5						11.5
74166 0741214212	Stripping column	1	36.0	82.4					36.0						36.0
74166 0741314212	Stripping column	1	43.0	100.0					43.0						43.0
74166 0840013632	H_2 wash column	1	14.0	80.5					14.0						14.0
74166 0841[illegible]5212	Wash column	1	78.0	153.0					78.0						78.0
74166 0855216222	Wash column	1	127.0	211.8					127.0						127.0
74166 1041413212	Regeneration column	1	20.0	47.1					20.0						20.0
74166 1121413[illegible]	Separation column	1	15.0	41.2					15.0						15.0
74166 125443[illegible]	Saturator	1	153.0	270.7					153.0						153.0
74166 134443[illegible]	Desaturator	1	115.0	235.4					115.0						115.0

UNIDO/SPO (AECF)
CAPITAL GOODS
DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR SOMA FERTILIZER COMPLEX, LOCATION: SOMA
ANTICIPATED DATE OF COMMISSIONING : 1987 CAPACITY : 300,000 t/y
FERTILIZER INDUSTRY-AMMONIA (FROM COAL)
CHEMICAL REACTION EQUIPMENT, COLUMNS

Ind. Code 3512-1
Weight/Value

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $ 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	TOTAL 1980-1990
74210 0111501712	Caustic Dosing pump	1	0.06	1.3					0.06						0.06
74220 0215111612	Methanol pump	2.	1.5	1.6					3.0						3.0
74220 0216111612	Methanol pump	2	2.7	2.4					5.4						5.4
74220 0223211612	Condensate pump	2	0.15	2.5					0.3						0.3
74220 0222211612	Topping reflux pump	2	0.15	2.0					0.3						0.3
74220 0222211612	Topping bottom pump	2	0.11	2.2					0.22						0.22
74220 0223211612	Condensate pump	1	0.15	1.9					0.15						0.15
74220 0223211612	Crude methanol pump	2	0.22	2.3					0.44.						0.44
74220 0233211612	Refining reflux pump	2	0.22	2.9					0.44						0.44
74220 0233211612	Recycle pump	2	0.25	2.3					0.5						0.5
74220 0231621212	Sulfur pump	2	0.5	1.6					1.0						1.0
74220 0232111ulw	Water pump	2	0.7	3.7					1.4						1.4
74220 0233011712	Quench pump	2	0.6	10.7					1.2						1.2
74220 0233201612	Condensate pump	2	0.34	2.6					0.68						0.68
74220 0233201612	Condensate pump	2	0.42	4.4					0.84						0.84
74220 0234111212	Water pump	2	0.4	2.7					0.8						0.8
74220 0235111612	Methanol pump	2	2.2	13.4					4.4						4.4
74220 0235111612	Methanol pump	2	2.0	10.5					4.0						4.0

UNIDO/SPO (ABOE)
CAPITAL GOODS
DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR SOMA FERTILIZER COMPLEX, LOCATION: SOMA
ANTICIPATED DATE OF COMMISSIONING : 1987 CAPACITY : 300.000 t/y
FERTILIZER INDUSTRY - AMMONIA (FROM COAL)
CHEMICAL REACTION EQUIPMENT, OTHERS

Ind. Code 3512-1
Weight/Value

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $ 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	TOTAL 1980-1990
74220 0236111612	Methanol pump	2	3.0	10.0					6.0						6.0
74220 0242211611	Condensate pump	4	0.7	6.6					2.8						2.8
74220 0243421212	Pump	2	0.5	2.4					1.0						1.0
74220 0246111612	Methanol pump	2	2.5	2.4					5.0						5.0
74220 0251211212	Booster pump	2	2.5	23.4					5.0						5.0
74220 0254111612	Methanol pump	2	1.3	42.1					2.6						2.6
74220 0255111612	Methanol pump	2	2.0	210.6					4.0						4.0
74220 0263211271?	Recycle pump	2	2.7	51.1					5.4						5.4
74220 1036121612	NH_3 pump	2	2.8	13.0					5.6						5.6
74220 0022611611	Fusel Oil pump	2	0.15	1.6					0.3						0.3
74313 0103201612	NH_3 compressor	1	0.25	125.0					0.25						0.25
74313 1156202622	NH_3 compressor	1	7.0	300.0					7.0						7.0
74313 1255214252	H_2 compressor	1	28.0	1.000					28.0						28.0
74313 1266214662	Syn. gas compressor	1	35.0	1.742					35.0						35.0
74313 1285212632	Circulator	1	6.0	1.756					6.0						6.0
74313 12942	Raw gas compressor	2	8.0	642.0					16.0						16.0
74313 2351202	N_2 compressor	2	3.6	400.0					7.2						7.2
74313 235120..24	N_2 compressor	2	15.0	400.0					30.0						30.0

UNIDO/SPO (AZOF)
CAPITAL GOODS
DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR SCHA FERTILIZER COMPLEX, LOCATION : SCHA
ANTICIPATED DATE OF COMMISSIONING : 1987 CAPACITY: 300,000 t/y
FERTILIZER INDUSTRY - AMMONIA (FROM COAL)
CHEMICAL REACTION EQUIPMENT, COLUMN

Ind. Code 3512-1
Weight/Value
10

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $ 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	TOTAL 1980-1990
74341 0137111232	Fresh air fan	2	4.0	40.1					8.0						8.0
74341 0137121232	Waste air fan	2	4.0	45.4					8.0						8.0
74341 0147222242	Vapor fan	2	6.2	53.5					12.4						12.4
74342 0059202232	Oxygen blower	4	6.2	2.35					42.8						24.8
74342 0058202632	Raw gas blower	4	5.5	5.35					22.0						22.0
74342 0030111222	Air blower	2	4.0	1.07					8.0						8.0
74342 0030111232	Air blower	2	4.5	0.64					9.0						9.0
74342 0030211222	Gas blower	2	4.0	1.07					8.0						8.0

UNIDO/SPO (AZOT
CAPITAL GOODS

DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR SONA FERTILIZER COMPLEX, LOCATION SONA
ANTICIPATED DATE OF COMMISSIONING 198[illegible] CAPACITY : 300,000 t/y
FERTILIZER INDUSTRY-AMMONIA (FROM COAL)
GAS CLEANING EQUIPMENT

Ind. Code 3512-1
Weight/Value-

11:

sito code	home machine name	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $ 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	TOTAL 1981-1990
74361 0110015212	Elec. precipitator	2	99	139.6					198.0						198.0
74361 0190027212	Elec. precipitator	2	250	247.0					500.0						500.0
74351 1171002211	Cyclone separator	12	10	8.6					120.0						120.0
74361 2073005211	Cooling Washer	4	75.0	77.0					300.0						300.0
74361 4040003932	Disintegrator	8	16.8	14.0					134.4						134.4
74361 5010001111	Air filter	4	2.0	8.5					8.0						8.0
74361 6072002211	Drop separator	4	9.1	24.4					36.4						36.4
74361 6171001211	Water Separator	4	1.05	1.8					4.2						4.2

UNIDO/:SPO (ASOT)
CAPTTAL GOODS
DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR SODA FERTILIZER COMPLEX, LOCATION: SODA
ANTICIPATED DATE OF COMMISSIONING 1987 CAPACITY: 300,000 t/y
FERTILIZER INDUSTRY-AMMONIA (FROM COAL), UREA, METHANOL, SULFUR
CONVEYORS, TRANSPORT EQUIPMENT

Ind. Code 3513-1
Weight/Value
ER

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $ 1000)	YEARS										Total 1981-1990
					1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	
74423 0010031211	Jet conveyor	4	0.05	0.5					0.20						0.20
74426 0253013641	Belt conveyor	1	6.0	23.6					6.0						6.0
74426 0253013661	Belt conveyor	1	21.0	144.9					21.0						21.0
74426 0253013641	Belt conveyor	1	11.0	41.8					11.0						11.0
74426 0253014671	Belt conveyor	1	31.0	144.9					31.0						31.0
74426 0253015681	Belt conveyor	1	99.0	429.5					99.0						99.0
74426 0273013661	Belt conveyor	1	17.0	30.5					17.0						17.0
74426 02 3016691	Belt conveyor	1	125.0	784.4					125.0						125.0
74426 1023011631	Chain conveyor	2	4.0	19.3					8.0						8.0
74426 4310011232	Screw conveyor	32	2.37	20.0					75.84						75.84
74423 3020011232	Puller pump	4	4.55	6.0					18.20						18.20
74426 7553011631	Vibrating feeder	1	4.0	214.6					4.0						4.0
74428 0380026692	Stacker-reclaimer	2	150.0	560.0					300.0						300.0
74525 0681111611	Belt weigher	1	0.35	0.3					0.35						0.35
74525 0681111611	Belt weigher	1	0.35	0.31					0.35						0.35

EQUIPMENT REQUIREMENT FOR SOHA FERTILIZER COMPLEX, LOCATION: SOHA

UNIDO/SPO (AZOT) — ANTICIPATED DATE OF COMMISSIONING 1987 CAPACITY : 300,000 t/y — Ind. Code 3512-1

CAPITAL GOODS — FERTILIZER INDUSTRY-AMMONIA (FROM COAL) — Weight/Value

DEVELOPMENT PROJECT — BUNKERS, VESSELS TANKS, SEPARATORS DRUMS, GAS HOLDERS

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $ 1000)	YEARS										TOTAL 1981-1990
					1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	
69211 0110012211	Intermediate bin	1	10.0	14.0					14.0						14.0
69211 0111321211	Feed bunker	16	2.0	1.4					22.4						22.4
69211 0111322211	Service bunker	16	7.1	5.0					80.0						80.0
69211 0120025211	Slag bunker	1	84.0	58.8					58.8						58.8
69211 0224025211	Coal dust bunker	2	100.0	70.6					141.2						141.2
69211 0230015211	Raw coal bunker	2	158.0	118.6					237.2						237.2
69211 0711022212	Storage vessel	1	8.0	65.4					65.4						65.4
69211 1011321211	Nitrogen vessel	4	3.8	3.8					15.2						15.2
69211 1311323211	Methanol sto.tank	2	10.2	20.2					40.0						40.0
69211 1322023211	Crude methonol tank	1	11.0	25.1					25.1						25.1
69211 1333323211	Methonol tank	1	20.0	57.6					57.6						57.6
69243 0217421212	NH_3 separator	1	0.25	5.9					5.9						5.9
69243 0217321222	NH_3 receiver	1	2.0	12.9					12.9						12.9
69243 0210321212	Condensate separator	2	1.0	12.9					25.8						25.8
69243 0210321212	Condensate separator	6	0.5	10.5					63.0						63.0
69243 021152	Flash drum	1	17.0	41.0					41.0						41.0
69243 02174242	NH_3 separator	1	34.0	76.1					76.1						76.1
69243 02110212	Flux drum	1	1.4	45.7					45.7						45.7

UNIDO/SPO (AZOT)

CAPITAL GOODS

DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR SONA FERTILIZER COMPLEX, LOCATION: SONA

ANTICIPATED DATE OF COMMISSIONING 1987 CAPACITY : 330,000 t/y.

FERTILIZER INDUSTRY-AMMONIA (FROM COAL)

Ind.Code 3512-1

Weight/Value

BUNKERS, VESSELS TANKS, SEPARATORS DRUMS, GAS HOLDERS

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $ 1000)	YEARS										Total 1981-1990
					1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	
69243 0211021311	Letdown vessel	1	1.0	15.2					15.2						15.2
69243 0211523212	Separator	1	10.0	32.8					32.8						32.8
69243 0214523422	Separator	1	22.0	58.6					58.6						58.6
69243 0211027211	Reflux drum	1	0.6	7.0					7.0						7.0
69243 0212224312	Steam collector	4	[illegible]	24.6					98.4						98.4
69243 0214023212	Separator	1	11.1	23.4					23.4						23.4
69243 0214023212	Separator	1	16.6	41.0					41.0						41.0
69243 0214023812	Separator	1	13.7	29.3					29.3						29.3
69243 0214024222	Separator	1	35.2	82.0					82.0						82.0
69243 0215022321	Catch-pot	1	6.8	30.4					30.4						30.4
69243 0216224312	Steam collector	1	6.9	24.6					24.6						24.6
69243 0240046212	Gas holder	1	113.0	113.0					113.0						113.0
69243 0391349211	Raw gas holder	1	850.0	850.0					850.0						850.0
69243 0461538211	NH_3 sto.tank	1	368.0	368.0					368.0						368.0

UNIDO/SPO (AZOT)
CAPITAL GOODS
DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR SOMA FERTILIZER COMPLEX, LOCATION: SOMA

ANTICIPATED DATE OF-COMMISSIONING 1987 CAPACITY : 300.000 t/y

FERTILIZER INDUSTRY-AMMONIA (FROM COAL)

Ind.Code 3512-1

[illegible]/Value

GENERAL ENGINEERING EQUIPMENT

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $ 1000)	YEARS 1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
71261 0128224342	Condensing turbine	2	27.0	268.0					536.0						536.0
71261 0128222332	Steam turbine	1	8.0	200.0					200.0						200.0
71261 1110012622	Condensing turbine	1	5.0	200.0					200.0						200.0
71261 1320033622	Condensing ext^{n} tur.	1	15.0	1000.0					1000.0						1000.0
72831 3110002631	Magnet separator	1	5.0	2.0					2.0						2.0
72831 6040002941	Air classifier	2	8.0	43.9					87.8						87.8
72832 0440003651	Crusher	1	16.0	215.8					215.8						215.8
72832 1122214671	Coal mill	2	50.0	431.6					863.2						863.2
74132 0556106322	Gasifier	4	43.	400.0					1600.0						1600.0
74132 2405202212	Hot gas producer	2	10.0	5.0					10.0						10.0
74132 2405302211	Combustion furnace	1	6.0	6.0					6.0						6.0
74132 2405302211	Claus kiln	1	30.0	30.0					30.0						30.0
74132 2415205212	Start up heater	1	52.0	275.0					275.0						275.0

UNIDO/SPO (AZOT)
CAPITAL GOODS
DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR SONA FERTILIZER COMPLEX, LOCATION : SONA
ANTICIPATED DATE OF COMMISIONING 1987 CAPACITY : 300.000. t/y
FERTILIZER INDUSTRY AMMONIA (FROM COAL),
HEAT EXCHANGER, REBOLIER, COOLER , CHILLER, CONDENSER, WHB.

Ind. Code 3512-1
Weight/Value

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $ 1000)	YEARS										TOTAL 1981-1990
					1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	
74161 0100001212	Heat exchanger	1	0.83	1.98					1.98						1.98
74161 0110011422	Gas preheater	1	0.4	2.8					2.8						2.8
74161 0110011611	Crude bottom exch.	1	0.65	2.3					2.3						2.3
74161 0120001212	Product heat exch	1	4.1	21.0					21.0						21.0
74161 0130211212	Heat exchanger	1	0.5	34.0					34.0						34.0
74161 0130011412	Inter changer	1	4.0	618.6					618.6						618.6
74161 0131111212	Heat exchanger	1	1.0	10.0					10.0						10.0
74161 0131211212	Heat exchanger	1	3.0	64.2					64.2						64.2
74161 0131311211	Heat exchanger	1	2.0	60.0					60.0						60.0
74161 0140003412	Inter changer	1	16.5	322.2					322.2						322.2
74161 0140012622	Heat exchanger	4	9.0	22.2					88.8						88.8
74161 0140013212	Heat exchanger	1	20.5	95.8					95.8						95.8
74161 0140013222	Heat exchanger	1	22.0	57.8					57.8						57.8
74161 0140013612	Heat exchanger	4	18.5	83.4					333.6						333.6
74161 0140113212	Heat exchanger	3	20.0	114.2					342.6						342.6
74161 0142413212	Heat exchanger	1	10.0	150.0					150.0						150.0
74161 0142413212	Heat exchanger	1	11.0	150.0					150.0						150.0
74161 0150014222	Heat exchanger	1	36.0	170.0					170.0						170.0

UNIDO/SPO (AZOT)
CAPITAL GOODS
DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR SONA FERTILIZER COMPLEX, LOCATION: SONA

ANTICIPATED DATE OF COMMISSIONING 1987 CAPACITY: 300,000 t/y
FERTILIZER INDUSTRY AMMONIA (FROM COAL),
HEAT EXCHANGER, REBOILER, COOLER, CHILLER, CONDENSER, ETC.

Ind. Code 3512-1
Weight/Value

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	UNIT Weight (tons)	Unit costin 1980 (US $ 1000)	YEARS										TOTAL 1981-1990
					1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	
74161 0152411212	Heat exchanger	1	34.0	535.0					535.0						535.0
74161 0152414212	Heat exchanger	1	27.0	375.0					375.0						375.0
74161 0152414212	Heat exchanger	1	29.0	412.0					412.0						412.0
74161 0153483212	Heat exchanger	1	20.0	262.0					262.0						262.0
74161 0152414212	Heat exchanger	1	48.0	287.0					287.0						287.0
74161 0153414212	Heat exchanger	1	43.0	524.0					524.0						524.0
74161 0220071611	Reboiler	1	1.1	9.1					9.1						9.1
74161 0231321211	Reboiler	2	3.0	11.0					22.0						22.0
74161 0240021211	Reboiler	1	4.58	15.0					15.0						15.0
74161 0320001212	Cooler	2	0.91	3.5					7.0						7.0
74161 0320011611	Product cooler	1	0.94	5.7					5.7						5.7
74161 0342312212	Cooler	1	8.0	150.0					150.0						150.0
74161 0342412212	Cooler	1	8.0	107.0					107.0						107.0
74161 0340013212	Final cooler	1	16.5	111.8					111.8						111.8
74161 0360011212	Inert gas cooler	1	1.0	7.7					7.7						7.7
74161 03600152	Cooler	1	66.5	250.0					250.0						250.0
74161 0440004212	Ammonia chiller	1	35.0	98.0					98.0						98.0
74161 0500013611	Condenser	2	1.28	7.69					15.38						15.38

UNIDO/SPO (AZOF)
CAPITAL GOODS
DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR SONA FERTILIZER COMPLEX, LOCATION: SONA
ANTICIPATED DATE OF COMMISSIONING 1987 CAPACITY : 300,000 t/y
FERTILIZER INDUSTRY AMMONIA (FROM COAL),
HEAT EXCHANGER, REBOILER, COOLER, CHILLER, CONDENSER, WHB.

Ind. Code 3512-1
Weight/Value

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $ 1000)	YEARS										TOTAL 1981-1990
					1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	
74161 0520011212	NH_3 condenser	1	0.5	4.0					4.0						4.0
74161 0520011611	Primary condenser	1	2.2	23.2					23.2						23.2
74161 0520011611	Secondary condenser	1	0.83	9.7					9.7						9.7
74161 0530012212	Steam condenser	1	0.5	15.0					15.0						15.0
74161 0530013611	Condenser	2	2.4	14.3					28.6						28.6
74161 0540012611	Condenser	1	5.0	40.6					40.6						40.6
74161 0540013212	Steam condenser	1	12.5	41.0					41.0						41.0
74161 0540013322	Condenser	1	13.6	107.4					107.4						107.4
74161 0553413212	Steam condenser	1	21.0	125.6					125.6						125.6
74161 0560004212	NH_3 condenser	1	26.0	236.0					236.0						236.0
74161 0602405222	WHB	1	60.0	300.0					300.0						300.0
74161 0604406321	WHB	1	137.0	548.0					548.0						548.0
74161 0720012422	Start up heat	1	4.7	18.6					18.6						18.6
74161 0740004212	Raw preheater	1	36.5	100.0					100.0						100.0

UNIDO/SPO (AZOT)
CAPITAL GOODS
DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR SONA FERTILIZER COMPLEX, LOCATION: SONA
ANTICIPATED DATE OF COMMISSIONING: 1987 CAPACITY : 300.000 t/y
FERTILIZER INDUSTRY - AMMONIA (FROM COAL)

Ind. Code 3512-1
Weight/Value

7

CHEMICAL REACTION EQUIPMENT, COLUMNS

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $ 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	TOTAL 1981-1990
74165 0136147247	NH_3 Converter	1	269.0	1,634					1634.0						1634.0
74165 0410143211	Catalyst tower	2	15.0	53.7					107.4						107.4
74165 0514142432	Des'n reactor	1	7.4	49.7					49.7						49.7
74165 0624143922	Converter	1	19.0	58.5					58.5						58.5
74165 0743145 422	Converter	2	185.0	994.0					1988.0						1988.0
74166 0324414212	Prescrubbing columa	1	37.0	94.2					94.2						94.2
74166 0531013611	Refining column	1	17.5	96.0					96.0						96.0
74166 0611003611	Topping column	1	11.5	41.2					41.2						41.2
74166 0741214212	Stripping column	1	36.0	82.4					82.4						82.4
74166 0741314212	Stripping column	1	43.0	100.0					100.0						100.0
74166 0849013632	N_2 - Wash column	1	14.0	89.5					89.5						89.5
74166 0844315212	Wash column	1	78.0	153.0					153.0						153.0
74166 0856216222	Wash column	1	127.0	211.8					211.8						211.0
74166 1041413212	Regeneration	1	20.0	47.1					47.1						47.1
74166 1121413212	Separation column	1	15.0	41.2					41.2						41.2
74166 1254436[illegible]	Saturator	1	153.0	270.7					270.7						270.7
74166 1344436[illegible]	Desaturator	1	115.0	235.5					235.4						235.4

UNIDO/SPO (AZOT)

CAPITAL GOODS
DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR SOMA FERTILIZER COMPLEX, LOCATION : SOMA
ANTICIPATED DATE OF COMMISSIONING 1987 CAPACITY : 300,000 t/y
FERTILIZER INDUSTRY-AMMONIA (FROM COAL)
PUMPS, COMPRESSORS, FANS, BLOWERS, EJECTORS

Ind. Code 3512-1
Weight/Value

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $ 1000)	YEARS										TOTAL 1981-1990
					1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	
74210 0111501712	Caustic Dosing pump	1	0.06	1.3					1.3						1.3
74220 0215111612	Methanol pump	2	1.5	1.6					3.2						3.2
74220 0216111612	Methanol pump	2	2.7	2.4					4.8						4.8
74220 0223211612	Condensate pump	2	0.15	2.5					5.0						5.0
74220 0222211612	Topping reflux pump	2	0.13	2.0					4.0						4.0
74220 0222211612	Topping bottom pump	2	0.11	2.2					4.4						4.4
74220 0223211612	Condensate pump	1	0.15	1.9					1.9						1.9
74220 0223211612	Crude methanol pump	2	0.22	2.3					4.6						4.6
74220 0233211612	Refining pump	2	0.22	2.9					5.8						5.8
74220 0233211612	Recycle pump	2	0.25	2.3					4.6						4.6
74220 0231621212	Sulfur pump	2	0.5	1.6					3.2						3.2
74220 0232111212	Water pump	2	0.7	3.7					7.4						7.4
74220 0233011712	Quench pump	2	0.6	10.7					21.4						21.4
74220 0233201512	Condensate pump	2	0.34	2.6					5.2						5.2
74220 0233201612	Condensate pump	2	0.42	4.4					8.8						8.8
74220 0235111612	Methanol pump	2	2.2	13.4					26.8						26.8
74220 0235111612	Methanol pump	2	2.9	10.5					21.0						21.0
74220 0236111612	Methanol pump	2	3.0	10.0					20.0						20.0

UNIDO/SPO (AZOT)

CAPITAL GOODS

DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR SOBA FERTILIZER COMPLEX, LOCATION: SOBA

ANTICIPATED DATE OF COMMISSIONING 1987 CAPACITY : 330,000 t/y

FERTILIZER INDUSTRY-AMMONIA (FROM COAL)

PUMPS, COMPRESSORS, FANS, BLOWERS, EJECTORS

Ind. Code 3512-1

Weight/Value

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $ 1000)	YEARS										TOTAL 1981-1990
					1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	
74220 0243421212	Pump	2	0.5	2.4					4.8						4.8
74220 0246111612	Methanol pump	2	2.5	2.4					4.8						4.8
74220 0251211212	Booster pump	2	2.5	23.4					46.8						46.8
74220 0254111612	Methanol pump	2	1.3	42.1					84.2						84.2
74220 0255111612	Methanol pump	2	2.0	210.6					421.2						421.2
74220 026321127?2	Recycle pump	2	2.7	61.1					122.2						122.2
74220 1036121612	NH_3 pump	2	2.8	13.0					26.0						26.0
74230 0022611611	Fuel oil pump	2	0.15	1.6					3.2						3.2
74313 0103201612	NH_3 compressor	1	0.25	125.0					125.0						125.0
74313 1156202622	NH_3 compressor	1	7.0	300.0					300.0						300.0
74313 1255214252	H_2 compressor	1	28.0	1,000					1,000						1,000
74313 1266214662	Syn. gas compressor	1	35.0	1,742					1,742						1,742
74313 1285212632	Circulator	1	6.0	1,756					1,756						1,756
74313 1294215672	Raw gas compressor	2	8.0	642.0					1284.0						1284.0
74313 2351202222	H_2 compressor	2	3.6	400.0					800.0						800.0
74313 235120[illegible]	H_2 compressor	2	15.0	400.0					800.0						800.0
74341 0137111[illegible]	Fresh air fan	2	4.0	40.1					80.2						80.2
74341 0137121232	Waste air fan	2	4.0	45.4					90.8						90.8

UNIDO/SPO (ASOT)
CAPITAL GOODS
DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR SOMA FERTILIZER COMPLEX, LOCATION: SOMA
ANTICIPATED DATE OF COMMISSIONING 1987 - [illegible]
FERTILIZER INDUSTRY-AMMONIA (FROM COAL)
PUMPS, COMPRESSORS, FANS, BLOWERS, EJECTORS

Ind. Code 3513-1
Weight/Value
1)

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $ 1000)	YEARS										Total 1981-1990
					1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	
74341 0147222242	Vapor fan	2	6.2	53.5					107.0						107.0
74342 0059202232	Oxygen blower	4	6.2	2.35					9.4						9.4
74342 0058202632	Raw gas blower	4	5.5	5.35					21.4						21.4
74342 0030111222	Air blower	2	4.0	1.07					2.14						2.14
74342 0030111232	Air blower	2	4.5	0.64					1.28						1.28
74342 0030211222	Gas blower	2	4.0	1.07					2.14						2.14

UNIDO/SPO (ARG82)
CAPITAL GOODS
DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR SODA FERTILIZER COMPLEX, LOCATION SODA
ANTICIPATED DATE OF COMMISSIONING 1987 CAPACITY : 300.000 t/y
FERTILIZER INDUSTRY-AMMONIA (FROM COAL), UREA, METHANOL, SULFUR
GAS CLEANING EQUIPMENT

Ind. Code 3513-1
Weight/Value
II

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $ 1000)	YEARS										Total 1981-1990
					1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	
74361 0110015212	Elec. precipitator	2	99	139.6					279.2						279.2
74351 0190027212	Elec. precipitator	2	250	247.0					494.0						494.0
74361 1171002211	Cyclone separator	12	10	8.6					103.2						103.2
74361 2073005211	Cooling Washer	4	75.0	77.0					308.0						308.0
74361 3040003932	Disintegrator	8	16.8	14.0					112.0						112.0
74361 5010001111	Air filter	4	2.0	8.5					34.0						34.0
74361 6072002211	Drop separator	4	9.1	24.4					79.6						79.6
74361 6171001211	Water Separator	4	1.05	1.8					7.2						7.2

UNIDO/SPC (AZOT)
CAPITAL GOODS
DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR SONA FERTILIZER COMPLEX, LOCATION, SONA
ANTICIPATED DATE OF COMMISSIONING 1987 CAPACITY : 500,000.t/y
FERTILIZER INDUSTRY-AMMONIA (FROM COAL), UREA, METHANOL, SULFUR
CONVEYORS, TRANSPORT EQUIPMENT

Ind. Codes 3513-1
Weight/Value
32

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $ 1000)	YEARS										Total 1981-1990
					1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	
74423 00100312l1	Jet conveyor	4	0.05	0.5					2.0						2.0
74426 0253013641	Belt conveyor	1	6.0	23.6					23.6						23.6
74426 0253013661	Belt conveyor	1	21.0	144.9					144.9						144.9
74426 0253013641	Belt conveyor	1	11.0	41.8					41.8						41.8
74426 0253014671	Belt conveyor	1	31.0	144.9					144.9						144.9
74426 0253015651	Belt conveyor	1	99.0	429.5					429.5						429.5
74426 0273013661	Belt conveyor	1	17.0	30.5					30.5						30.5
74426 02 3015691	Belt conveyor	1	125.0	784.4					784.4						784.4
74426 1023011631	Chain conveyor	2	4.0	19.3					38.6						38.6
74426 4313011232	Screw conveyor	32	2.37	20.0					640.0						640.0
74423 3020011232	Puller pump	4	4.55	6.0					24.0						24.0
74426 7553011631	Vibrating feeder	1	4.0	214.6					214.6						214.6
74428 0380026692	Stacker-reclaimer	2	150.0	560.0					1120.0						1120.0
74525 0681111611	Belt weigher	1	0.35	0.3					0.3						0.3
74525 0681111611	Belt weigher	1	0.35	0.31					0.31						0.31

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DEVELOPMENT OF CAPITAL GOODS INDUSTRIES

DP/TUR/76/034

Technical Report No. XII:
Demand for Capital Goods
for Fertilizer Industry

Vol : III

UNITED NATIONS DEVELOPMENT PROGRAMMES IN TURKEY

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANISATION

RESTRICTED

Sept 1982
English

DEVELOPMENT OF CAPITAL GOODS INDUSTRIES

DP/TUR/76/034

Technical report NoXII-Vol. III
Demand for Capital Goods for Fertiliser Industry-
Ammonia (based on napthta) -ISKENDERUN

Prepared for the Government of Turkey
by the United Nations Industrial Development Organization
acting as executing agency for the United Nations Development Programme

Based on the work of
Capital Goods Development Project Team in Turkey

United Nations Industrial Development Organization
Vienna

UNITED NATIONS DEVELOPMENT PROGRAMMES IN TURKEY

CAPITAL GOODS DEVELOPMENT PROJECT IN TURKEY

Vol.III

Ammonia (based on napthta) - ISKENDERUN

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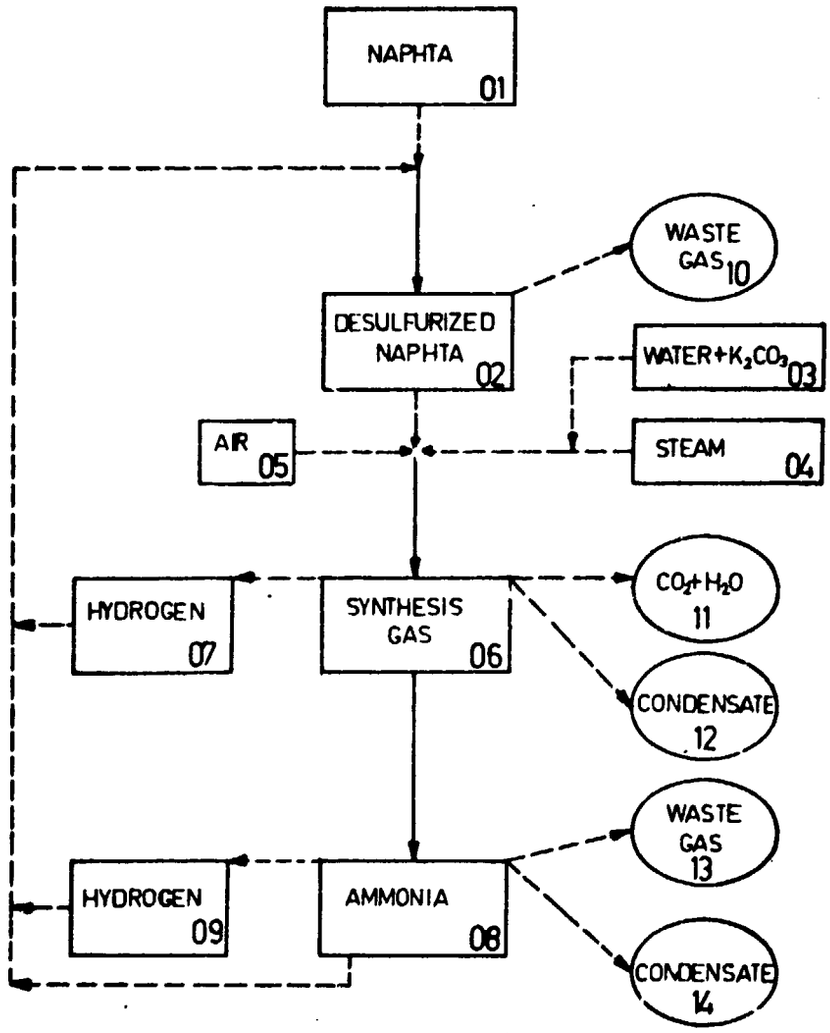


FERTILIZERS AND PESTICIDES AMMONIA			INDUSTRY CODE 3512-2
UNIDO SPO (AZOT) CAPITAL GOODS DEVELOPMENT PROJECT			
MODULAR PRODUCTION CHART			
DATE	Prepared by	Drawn by	Checked by
11.11.1981	E. ABDELAL	F. ÇELİK	V. MIHLADIZ
Checked by UNIDO/Expert		Approved by UNIDO/CTA	

UNIDO/SPO (AZOT)

CAPITAL GOODS DEVELOPMENT PROJECT

INDUSTRY ACTIVITIES CHART

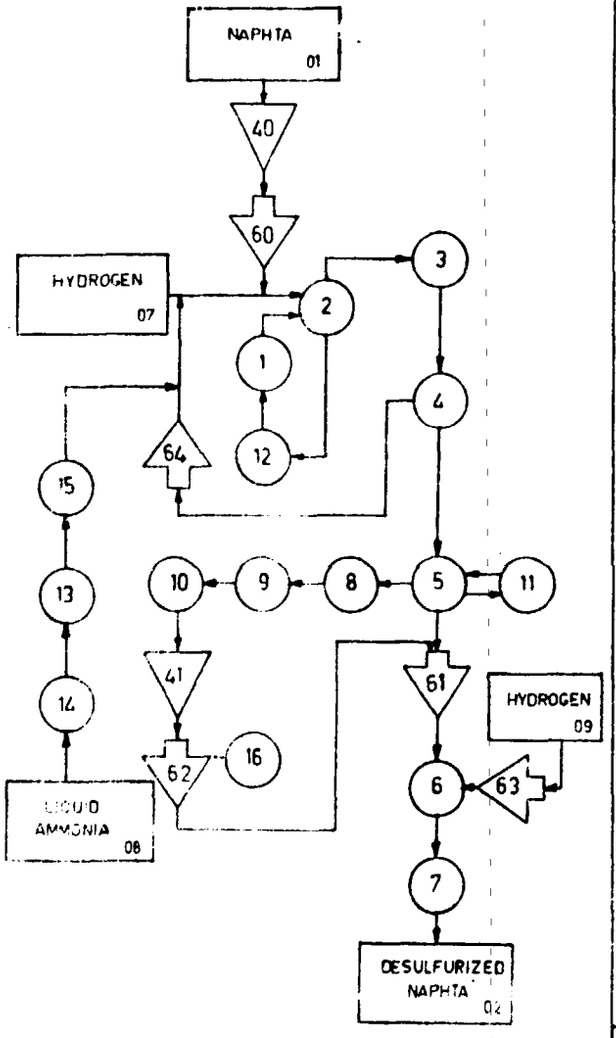
Ind.Code : 3512-2

Ind.Name : Fertiliser and Pesticides

AMMONIA

Prepared by	Checkedby	Approved by
Chem.Eng.DSc R.ARDELAL	UNIDO/Expert	UNIDO, CTA

PRODUCTION RANGE		TECHNOLOGY		EQUIPMENT UNIT		DESIGN CAPACITY	
CODE	NAME	CODE	NAME	NAME	CAPACITY RANGE	CODE	CAPACITY
01	Naphta	-	-	-	-	-	31.04 t/h
02	Desulphurized Naphta	1	Hydrogen Treating	Hydrotreater Reactor	44 m^3	1	22.65 t/h
06	Synthesis gas	2	Naphta Reforming and gas treatment	Primary Reformer	22.65 t/h	1	117000 m^3/h
08	Ammonia	2	Compression and synthesis	Compressor	117,000 m^3/h	1	41.66 t/h



CAPACITY CALCULATIONS

Name of the critical equipment: Hydrotreater reactor

Design capacity of the critical equipment : 44 m^3

No of critical equipment : 1

Design line capacity : 22.05 t/hour

Design line capacity : 101.2 t/shift

Design line capacity : 543.6 t/day

Design line capacity : 1 ,.. t/year

ACTIVITY CODE	INDUSTRY	PRODUCT	TECH	CAP
	3512-2	02	1	1

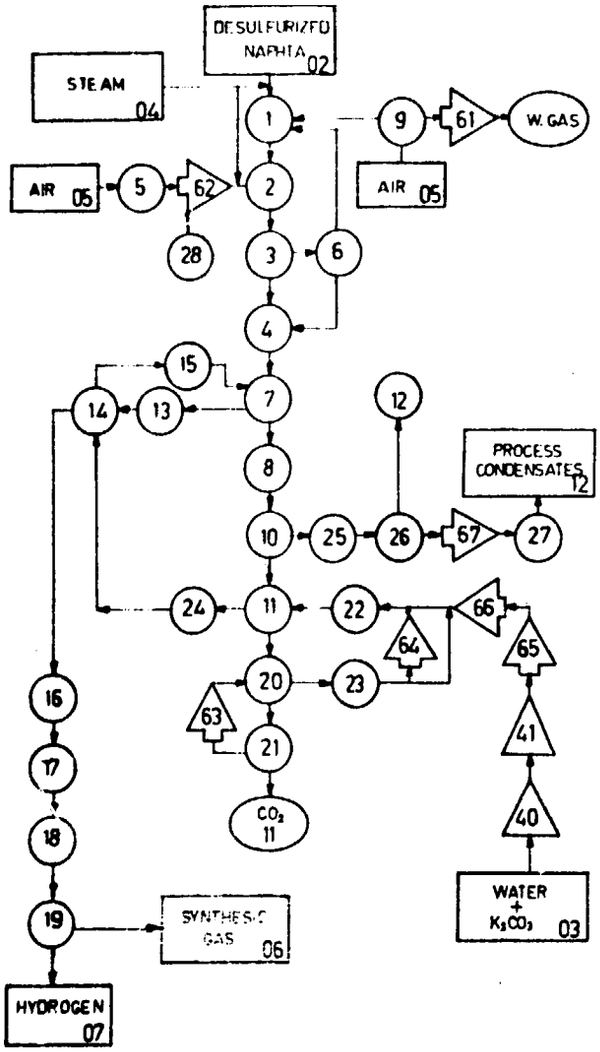
NO	MACHINE CODE	MACHINE NAME	QUAN
40	69211 1374327211	Raw naptha storage tank	3
60	74220 0236211912	Naptha pump	2
1	74165 2122143422	Hydrotreater reactor	1
2	74161 0141411311	Feed/effluent exch.	2
3	74161 0541312311	effluent condenser	1
4	69243 0212323121	effluent separator	1
5	74166 0734413311	Hydrotreater product str.	1
61	74220 0337211612	Stripper pump	2
41	69211 1354326211	Desulfd napthta sto tank	1
6	74132 243[illegible]204212	Start up heater	1
7	74165 0533144432	Desulfuriser	1
8	74161 0321311211	Napthta cooler	1
9	74161 0321311281	Napthta cooler	1
10	69243 0211321311	Napthta flash drum	1
62	74220 0234211212	Des. napth pump	1
11	74161 0241311311	Reboiler	1
63	74313 0133211622	Gas compressor	2
12	74132 2435205612	Hydrotreater furnace	1
13	74132 2435204212	Ammonia dissociator	1
14	74161 0321041212	Ammonia vaporizer	1
15	74161 0321211211	Recycle comp cooler	1
64	74313 0244213652	Hydrogen recycle comp.	1
16	71261 0218211612	Turbine	1

UNIDO SPO (AZOT)
CAPITAL GOODS DEVELOPMENT PROJECT

MODULAR FLOW DIAGRAM

INDUSTRY	PRODUCT	TECHNOLOGY
FERTILIZER	DESULFURIZED NAPHTA	HYDROGEN TREATING
DATE	SAMPLE PLANT	CAPACITY
11 11 1981	ÇEMLIK AMMONIA PLANT	22.05 t/h
Prepared by	Drawn by	Checked by
E. ABDELAL	F.ÇELİK	V.MIHLADIZ

Checked by UNIDO/Expert | Approved by UNIDO/CTA



CAPACITY CALCULATIONS

Name of the critical equipment: primary reformer

Design capacity of the critical equipment: 22.63 t/h

No of critical equipment: 1

Design line capacity: 117000 m^3/hour

Design line capacity: 936000 m^3/shift

Design line capacity: 2,808,000 m^3/day

Design line capacity: 842,420,000 m^3/year

ACTIVITY CODE	INDUSTRY	PRODUCT	TECH	CAP
	3512-2	06	2	1

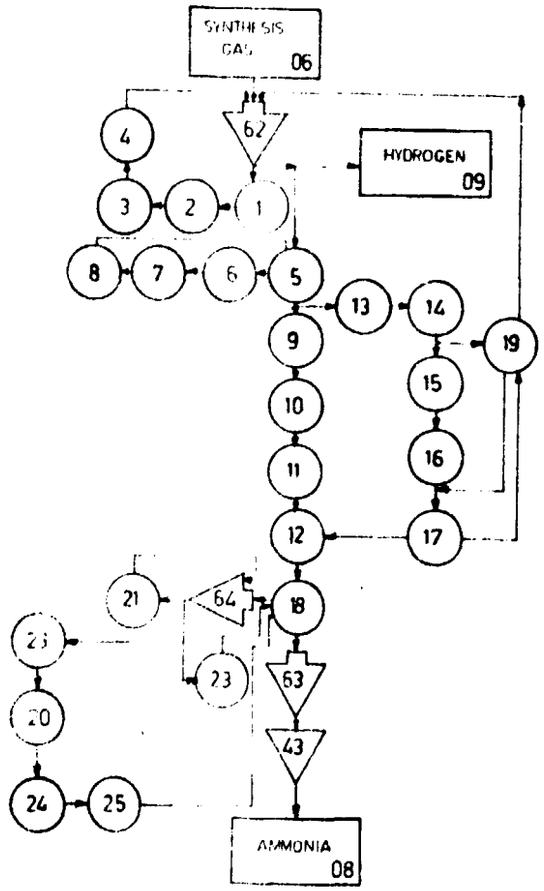
NO	MACHINE CODE	MACHINE NAME	QUAN
1	74132 4035208212	Primary reformer	1
2	74165 22431452232	Secondary reformer	1
3	74161 06424652232	Primary [illegible]	1
4	74161 0642364242	Secondary [illegible]	1
5	74361 5040002192	Air Filters	2
6	69243 0217225242	Steam drum	1
6A	74341 0240224672	Fan for reformer	1
7	74165 0753146242	Shift converter	1
8	74161 0152413[illegible]1	BFW exchanger	1
9	74161 1060090282	Air preheater	1
10	69243 0213323222	Raw gas separator	1
62	74313 1254113742	Air compressor	1
11	74166 0353426222	CO_2 absorber	1
12	69243 0213323222	Overhead drum	1
13	74161 0642364342	Primary shifter [illegible]	1
14	74161 1042313422	Preheater	1
15	74161 0342214342	Shift inlet cooler	1
16	74165 2333144432	Methanator	1
17	74161 0762415242	BFW heater	1
18	74161 0341413341	Cooler	2
19	69243 0214325222	Suction drum	1
20	74166 0761417221	CO_2 stripper	1
2	74161 0562414311	Stripper condenser	1
63	74220 0233211612	Pump	2
22	74161 [illegible]141411581	BFW exchanger	1
64	74220 0245211712	Lean solution pump	2
23	74161 0341412311	Cooler	1
65	74220 0231211712	Pump	1
66	74220 0232211612	Pump	1
40	69211 0711321212	Make-up tank	1
41	69211 1333323211	Storage tank	1
24	69243 0211321611	Stripper drum	1
25	74161 0341412311	Cooler	1
67	74220 0232211612	Condensate pump	2
26	74166 0731423211	Process stripper	1
27	74161 01414122[illegible]1	Heat exchanger	1
28	71261 0126222332	Steam turbine	1
61	74241 0130213662	Fan for reformer	1

UNIDO / SPO (AZOT)
CAPITAL GOODS DEVELOPMENT PROJECT

MODULAR FLOW DIAGRAM

INDUSTRY	PRODUCT	TECHNOLOGY
FERTILIZER	SYNTHESIS GAS	NAPHTA REFORMING GAS and TREATMENT
DATE	SAMPLE PLANT	CAPACITY
11 11 1981	GEMLİK AMMONIA PLANT	117000 m³/h
Prepared by	Drawn by	Checked by
E. ABDELAL	F. ÇELİK	V. MIHLADIZ

Checked by UNIDO/Expert [signature] | Approved by UNIDO/CTA



CAPACITY CALCULATIONS

Name of the critical equipment: Syn. gas compressor

Design capacity of the critical equipment: 117,000 Nm^3/h

No of critical equipment: 1

Design line capacity : 41.66 t/hour

Design line capacity : 333.28 t/shift

Design line capacity : 1000 t/day

Design line capacity : 330000 t/year

ACTIVITY CODE	INDUSTRY	PRODUCT	TECH	CAP
	3512-2	08	2	1

NO	MACHINE CODE	MACHINE NAME	QUAN
62	74313 1256213692	Syn gas compresser	1
1	74161 0142413281	Heat exchanger	1
2	74161 0341412281	Cooler	1
3	74161 0431111281	NH_3 Chiller	1
4	69243 0216323242	1st stage separator	1
5	74161 0162415242	Heat exchanger	1
6	74132 2445206222	Startup heater	1
7	74165 0146147242	Ammonia converter	1
8	74161 0162415242	BFW heat exchanger	1
9	74161 0121041212	Purge gas exchanger	1
10	74161 0421041212	Purge gas chiller	1
11	69243 0210521222	Purge separator	1
12	69243 0212521212	Let down drum	1
63	74220 0233111712	NH_3 pump	2
13	74161 0352314212	feed recycle gas cooler	1
14	74161 0442313222	1st chiller	1
15	74161 0442413242	2nd chiller	1
16	74161 0452413232	3rd chiller	1
17	74161 0442313242	4th chiller	1
18	69243 0217424242	Ammonia separator	1
19	74161 0152415242	Feed/ eff. exchanger	1
64	74313 1253214672	Refrigerant comp.	1
80	69243 0212322222	Refrigerant receiver	1
81	74167 0341312311	Intercstge cooler	1
82	74161 0341311311	Ref. comp cooler	1
83	74161 0562414282	Refrigerant condenser	2
84	74167 0421114211	Flash gas chiller	1
85	69243 0213524611	Flash drum	1
43	69243 0214529213	Ammonia storage tank	1

UNIDO / SPO (AZOT)
CAPITAL GOODS DEVELOPMENT PROJECT

MODULAR FLOW DIAGRAM

INDUSTRY	PRODUCT	TECHNOLOGY
FERTILIZER	AMMONIA	COMPRESSION AND SYNTHESIS
DATE	**SAMPLE PLANT**	**CAPACITY**
11 11 1981	GEMLİK AMMONIA PLANT	1000 t/d
Prepared by	**Drawn by**	**Checked by**
E. ABDELAL	F. ÇELİK	V. MIHLADIZ

Checked by UNIDO/Expert | Approved by UNIDO/CTA

ACTIVITY CODE 351220211																												
No.	BASIC MACHINE NAME	MAJOR SPECIFICA.	MAJOR SPEC-1	MAJOR SPEC-2	TYPE DESCRIPTION	MANUFAC. CHARACT-1	MANUFAC. CHARACT-2	MANUFAC. CHARACT-3	CR.	Q.	PURCHASE COST UNIT	PURCHASE COST TOTAL	CONSTANT 1980 YEAR COST (1000 $) UNIT ($)	CONSTANT 1980 YEAR COST (1000 $) TOTAL ($)	YEAR OF PURCHASE AND REMARK	SITC CODE (FOR COMPUTER) 1 2 3 4 5	6 7	8	9	10	11	12	13	14	15
40	Raw naptha storege tank	18 000 m^3	Ø: 36m	H: 17.5m	open top	268 tons	C-Steel	16 mm	1	3	45 M TL	135 M L.	591.80	1115.40	1980	69211	13	7	4	3	2	7	2	1	1
60	Naptha pump	$38m^3/h$	470m	raw naphta	horizontal	1.7 "	Forged steel	0.5 ton	2	2	FF335,240	FF670,480	88,95	177.90	1977	74220	02	3	6	2	1	1	9	1	2
61	Hydrotreater reactor	$44m^3$	23 atm	catalytic	packed	17.5 ton	LA Steel	23 mm	2	1	£ 86,027	£ 86,027	194.86	194.86	1978	74165	01	2	2	1	4	3	4	2	2
62	Feed/effluent exch.	$194m^2$	ID: 0.5m	L= 7.3m	Shell& tube	4.5 ton	B-Steel	20 mm	1	2	467,928	467,928	22.68	45.37	1978	74161	01	4	1	4	1	1	3	1	1
63	Effluent condenser	$180m^2$	ID= 750mm	L= 6m	Shell&tube	7 ton	B-Steel	18mm	1	1	438,984	438,984	21.28	21.28	1976	74161	05	4	1	3	1	2	3	1	1
64	Reboiler reactor	$16.6m^3$	P=19kg/cm^2	68°C	Cyl	11.5 ton	F-Steel	26mm	1	1		-	101.68	101.68	1980	69243	01	1	6	3	8	3	3	6	1
65	Separation product sep.	$15 m^3$	40 atm	240°C	plate	25	B-Steel	18mm	1	1	£ 17,341	£ 17,341	45.45	45.45	1976	74161	07	3	2	3	1	1	3	1	1
66	Stripper pump	$45.4m^3/h$	732 m	naphtha	horizontal	2.8	C-Steel	0.4 ton	2	2	FF 27,110	FF 54,230	7,19	14,38	1977	74220	03	3	7	2	1	1	6	1	2
67	Desulfd naphtha stc. tank	$6000m^3$	Ø: 24m	H: 18m	Cyl	130	C-Steel	8mm	1	1	2 M TL	2 M TL	96.42	96.42	1978	69211	13	5	4	3	2	6	2	1	1
68	Start up heater	$97m^3$	1200°C	Liquid	-	39	C-Steel	20 mm	2	1	£ 93,179	£ 93,179	210,64	210,64	1978	74132	24	3	5	2	0	4	2	1	2
69	Gas Liquifier	$81m^3$	45 atm	catalytic	packed	46	LA Steel	44mm	2	1	£195,000	£195,000	441.70	441.7	1978	74165	05	3	3	1	4	4	4	3	2
70	Naphtha cooler	$31m^2$	ID= 387mm	L=5m	Shell&tube	1.5	C-Steel	20mm	1	1	74,772	74,772	3,62	3,62	1978	74161	03	2	1	3	1	1	2	1	1
71	Naphtha cooler	$31m^2$	ID= 38.7cm	L=5m	Shell&tube	1.5	C-Steel	20mm	1	1	74,772	74,772	3,62	3,62	1978	74161	03	2	1	3	1	1	2	1	1
72	Naphtha flash drum	$11m^3$	4.6kg/cm^2	68°C	Cyl -	3.7	B-Steel	11mm	1	1			32,71	32.71	1980	69243	02	1	1	3	2	1	1	1	1
73	Dies. Naptha pump	$38m^3/h$	190m	naphtha	horizontal	1.025	Grey iron	0,222ton	2	1	£ 3,500	£ 3,500	7,85	7,85	1977	74220	02	3	4	2	1	1	2	1	2
74	Condenser	$140m^2$	ID= 700mm	L= 5.7m	Shell&tube	5	B-Steel	20mm	1	1	337,680	337,680	16.37	16.37	1978	74161	02	4	1	3	1	1	3	1	1
75	Gas compression	$14,428m^3/h$	25kg/cm^2	gas	horizontal	2.72	C-Steel	1.4 ton	2	2	£ 40,130	£ 80,260	89,98	179,96	1977	74313	01	3	3	2	1	1	6	2	2
76	Hydrotreater furnace	$71m^3$	1200°C	liquid	-	65	St-Steel	6mm	2	1	£ 374,195	£ 374,195	845.90	845.90	1978	74132	24	3	5	2	0	4	2	1	2
77	Ammonia stripper	$56m^3$	1150°C	liquid	-	29.5	C-Steel	8mm	2	1	£ 114,640	£ 114,640	259.67	259.67	1978	74132	24	3	5	2	0	4	2	1	2
78	Ammonia vaporizer	$13.10m^2$	ID= 102mm	-	double pipe	0.210	C-Steel	6mm	2	1	FF 14,930	FF 14,930	3,90	3,90	1978	74161	09	2	1	0	4	1	2	1	2
79	Recycle comp cooler	$34m^2$	ID= 381mm	L= 4m	Shell&tube	1.4		18mm	1	1	0.33 M TL	0.33 M TL	24.25	24.25	1977	74161	03	2	1	2	1	1	2	1	1
80	Hydrogen recycle comp.	775kg/hr	45.5kg/cm^2	gas		18	Cast steel	12 ton	2	1	£ 91,819	£ 91,819	208.30	208.30	1978	74313	02	4	4	2	1	3	6	5	2
81	Turbine	37 Kw	2950 RPM	46kg/cm^2	impulse	0.270	C-Steel	0.22 ton	2	1	FF 43,360	FF 43,360	12,96	12,96	1977	71261	02	1	8	2	1	1	6	1	3

UNIDO / SPO (AZOT) CAPITAL GOODS DEVELOPMENT PROJECT

ACTIVITY CODE 351220621

NO	BASIC MACHINE NAME	MAJOR SPECIFICA.	MAJOR SPEC-1	MAJOR SPEC-2	TYPE DESCRIPTION	MANUFACTURING CHARACT-1	MANUFAC. CHARACT-2	MANUFAC. CHARACT-3	GR	Q	PURCHASE COST UNIT	PURCHASE COST TOTAL	CONSTANT 1980 YEAR COST (1000$) UNIT ($)	CONSTANT 1980 YEAR COST (1000$) TOTAL ($)	YEAR OF PURCHASE AND REPAIR	SITC CODE (FOR COMPUTER) 1 2 3 4 5	6 7	8	9	10	11	12	13	14	15
1	Primary reformer	[illegible].55 t/h	1000°C	Liquid	-	427 ton	C-Steel	7mm	2	1	L 471,850	L 471,850	1068.60	1068.60	1976	74132	40	3	5	2	0	8	2	1	2
2	Secondary reformer	[illegible]70 m³	35 atm	catalytic	packed	78.2 ton	C-Steel	45mm	2	1	L 127,557	L127,557	288.93	288,93	1978	74165	22	4	3	1	4	5	2	3	2
3	Primary [illegible]	[illegible] m²	ID= 1.48m	over 6 m	bayonet	89 ton	C-Steel	40mm	2	1	L 181,265	L181,265	410.59	410.59	1978	74161	[illegible]	[illegible]	2	4	6	5	2	3	2
4	Secondary [illegible]	[illegible] m²	ID= 1.4m	L= 4.6m	bayonet	4[illegible] ton	C-Steel	100mm	2	1	L 87,105	L 87,105	197.30	197.30	1976	74161	06	4	2	3	6	4	2	4	2
5	[illegible]	[illegible]/h	-	-	-	5.[illegible] ton	Mild Steel	12mm	2	2	L 17,041	L 34,082	38.60	77.20	1976	74361	40	4	0	0	0	2	1	1	2
[illegible]	[illegible]	[illegible] m³	128kg/cm²	3[illegible]0°C	cyl.	9[illegible] ton	C-Steel	82mm	2	1	L 226,150	L 226,150	516.76	516.76	1976	69243	01	1	7	2	2	5	2	4	2
[illegible]	[illegible]	1.1m³/sec				36 ton	C-Steel	34 ton	2	1	L 104,108	L 104,108	238.29	238.29	1978	74341	0[illegible]	[illegible]	[illegible]	2	2	4	6	7	2
[illegible]	[illegible]	[illegible] m³	34 kg/cm²	Catalytic	Packed	173 ton	C-Steel	70mm	2	1	L [illegible]	L 28[illegible],101	645.79	645.79	1978	7416[illegible]	07	[illegible]	3	1	4	6	2	4	[illegible]
[illegible]	[illegible]		[illegible] = 1175 mm	L= [illegible].5m	Shell&tube	[illegible] ton	LA Steel	[illegible]mm	1	1	2.[illegible]	2.2 [illegible]	106.63	106.63	1978	741[illegible]	01	[illegible]	[illegible]	4	1	3	5	[illegible]	[illegible]
9	[illegible]	1[illegible]			recuperative	[illegible]20 ton	C-Steel	20mm	2	1	L 393,741	L 393,741	891.67	891.67	1978	741[illegible]	10	[illegible]	[illegible]	0	9	8	2	2	2
10	[illegible] generator	25m³	30kg/cm²	112°C	cylindrical	20 ton	C-Steel	33mm	2	1	L 46,195	L 46,195	104.64	104.64	1978	69243	02	1	3	3	2	3	2	2	2
[illegible]	[illegible] compressor	49 t/h	35kg/cm²	air	horizontal	17 ton	cast steel	7 ton	2	1	6,591,310	6,591,310	1728.18	1728.18	1978	74313	12	5	4	1	1	3	7	4	2
[illegible]	[illegible]	50 m³	30 atm	114°C	Packed	200 ton	C-Steel	42mm	2	1	2,603,277	2,603,277	679.89	679.89	1978	74166	03	5	3	4	2	6	2	2	2
[illegible]	[illegible] drum	16 m³	30kg/cm²		cyl.	10 ton	C-Steel	28mm	2	1	L 12,100	L 12,100	27.41	27.41	1978	69243	02	1	1	1	2	1	2	2	[illegible]
[illegible]	[illegible]	4[illegible]3 m²	ID= 1.3 m	L= 4.[illegible] m	bayonet	38 ton	Boiler Steel	86mm	2	1	L 64,067	L 64,067	145.12	145.12	1978	74161	06	4	2	3	6	4	1	4	[illegible]
[illegible]	[illegible]	1[illegible] m²	ID= 1200mm	L= 4.3m	Shell&tube	15 ton	LA Steel	25mm	1	1	997,740	997,740	48.36	48.36	1978	74161	10	4	2	3	1	3	4	2	[illegible]
[illegible]	[illegible] inlet cooler	[illegible] m²	ID= 1.2m	L= [illegible]	Shell tube	25 ton	B Steel	64 mm	2	1	L 45,704	L 45,704	103.53	103.53	1978	74161	03	4	2	2	1	4	3	4	[illegible]
[illegible]	[illegible]	[illegible] m³	30 atm	Catalytic	packed	36 ton	LA Steel	45mm	2	1	L 53,919	L 53,919	122.13	122.13	1978	74165	23	3	3	1	4	[illegible]	[illegible]	[illegible]	[illegible]
17	[illegible]	112[illegible]	[illegible] 1.3m	L= 12.5m	Shell tube	61 ton	C-Steel	76 mm	2	1	L 97.461	L 97.461	220.76	220.76	1978	74161	07	[illegible]	2	4	1	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	29[illegible] m²	[illegible] = 87 mm	L= 7.0m	shell&tube	13 ton	B Steel	53mm	1	2	1.04 [illegible]	1.04 [illegible]	50.41	50.41	1978	74161	03	4	1	4	1	[illegible]	[illegible]	[illegible]	[illegible]
19	[illegible] drum	12.4 m³	31 atm		cyl.	87 ton	C-Steel	28mm	2	1	L 9,201	L 9,201	20.84	20.84	1978	[illegible]43	02	1	4	3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	CO₂ stripper	1100 m³	3kg/cm²	115°C	trays	225 ton	C-Steel	25mm	1	1	26 M [illegible]	26 M [illegible]	341.93	341.93	1980	74166	07	6	1	4	[illegible]	7	2	[illegible]	[illegible]
[illegible]	Stripper condenser	1437 m²	ID=1525mm	L= 7.3m	Shell & tube	35 ton	B Steel	15mm	1	1	3.5 M [illegible]	3.5 M [illegible]	169.65	169.65	1978	74161	05	6	2	4	1	[illegible]	3	[illegible]	[illegible]
23	Pump	[illegible]m³/h	89 m		Horizontal	0.909 ton	C-Steel	0.5 ton	2	2	L 4,304	L 8.608	9.85	18.30	1977	78220	02	3	3	2	1	1	6	1	[illegible]
[illegible]	[illegible] exchanger	171 m²	ID= 600mm	L= 7m	Shell&tube	4 ton	HA Steel	25mm	1	1	412,110	412,110	19.98	19.98	1978	74161	01	4	1	4	1	1	5	2	[illegible]
34	[illegible] solution pump	256m³/h	287m		Horizontal	2750 ton	St-Steel	1 ton	2	2	L 41,000	L 82,000	91.93	183.86	1977	74220	02	4	5	2	1	1	7	1	[illegible]
43	Cooler	160m²	ID= 675mm	L= 6.5m	Shell & tube	6 ton	B Steel	20mm	1	1	1.28 M [illegible]	1.28 M [illegible]	62.04	62.04	1978	74161	03	4	1	4	1	2	3	1	[illegible]
65	Pump	57m³/h	21 m		Horizontal	0.600 ton	St-Steel	0.4 ton	2	1	L 4,425	L 4,425	19.92	9.92	1977	74220	02	3	1	2	1	1	7	1	2
55	Pump	34m³/h	26 m		Horizontal	0.536 ton	C-Steel	0.35 ton	2	1	L 3,900	L 3,900	8.74	8.74	1977	74220	02	3	2	2	1	1	[illegible]	1	2
40	Make-up tank	16m³	Ø= 2.6m	112°C	cyl.	3.7 ton	C-Steel	8mm	2	1	L 4,660	L 4,660	10.56	10.56	1978	69211	07	1	1	3	2	1	2	1	2
41	Storage tank	570 m³	Ø= 8m		cyl.	22 ton	C-Steel	7mm	1	1	0.45 M [illegible]	0.45 M [illegible]	32.65	32.65	1977	69211	13	3	3	3	2	3	2	1	1
24	Stripper drum	2.5 m³	2.5kg/cm²	-	cyl.	1.6 ton	St-steel	10mm	1	1	-		14.15	14.15	1980	69243	02	1	1	3	2	1	6	1	1
25	Cooler	193m²	ID= 650mm	L= 7.5m	Shell&tube	6 ton	B Steel	20mm	1	1	465,130	465,130	22.55	22.55	1978	74161	03	4	1	4	1	2	3	1	1
57	Condensate pump	70 m³/h	37.3m		Horizontal	0.371 ton	C-Steel	0.25 ton	2	2	L 2,921	L 5,842	6.55	13.10	1977	74220	08	3	2	2	1	1	6	1	2
26	Process stripper	6[illegible] m³	2.8kg/cm²	121°C	packed	18.9 ton	C-Steel	10mm	1	1	1,022,000	1,022,000	75.09	75.09	1977	74166	07	3	1	4	2	3	2	1	1
27	Heat exchanger	243 m²	ID=700mm	L= 8m	Shell&tube	6 ton	C-Steel	20mm	1	1	586.000	586.000	28.40	28.40	1976	74161	01	4	1	4	1	2	2	1	1
28	Steam turbine	6600 kw	3500 RPM	39kg/cm²	reaction	6.5 ton	Alloy iron	5 ton	2.	1	-	-	200.00	200.00	1980	71261	01	2	8	2	2	2	3	3	2
61	Fan for reformer	55.3m³/sec			forced-dr.	17 ton	C-Steel	15 ton	2	1	L 104,180	L 104,180	238.53	238.53	1979	74341	01	3	0	2	1	3	6	6	2

UNIDO / SPC (AZCT) CAPITAL GOODS DEVELOPMENT PROJECT

ACTIVITY CODE 35122CB21

NO	BASIC MACHINE NAME	MAJOR SPECIFICA.	MAJOR SPEC-1	MAJOR SPEC-2	TYPE DESCRIPTION	MANUFAC. CHARACT-1	MANUFACT. CHARACT-2	MANUFAC. CHARACT-3	QR.	Q.	PURCHASE COST UNIT	PURCHASE COST TOTAL	CONSTANT 1980 YEAR COST (1000$) UNIT ($)	CONSTANT 1980 YEAR COST (1000$) TOTAL ($)	YEAR OF PURCHASE	SITC CODE (FOR COMPUTER) 1 2 3 4 5	6 7	8	9	10	11	12	13	14	15
62	Syn gas compressor	1950m³/min	150kg/cm²	gas	horizontal	25 ton	Cast-Steel	18 ton	2	1	1,045,914	1,045,914	2,742	2,742	1978	74313	12	6	6	7	1	3	6	6	2
1	Heat exchanger	403m²	ID=1050mm	L= 12m	Shell & tube	19 ton	C-Steel	25mm	1	1	3.5 M.M.	3.5 M.M.	169.65	169.65	1978	74161	01	4	2	4	1	3	2	2	1
2	Cooler	162m²	ID=725mm	L= 6.5m	Shell & tube	7.4ton	C-Steel	20mm	1	1	3.0 M.M.	3.0 M.M.	145.42	145.42	1978	74161	03	4	1	4	1	2	2	1	1
3	NH3 chiller	82m²	ID= 725mm	L= 2.3m	Shell & tube	3.5ton	C-Steel	20mm	1	1	1.1 M.M.	1.1 M.M.	53,32	53,32	1978	74161	04	3	1	1	1	1	2	1	1
4	Wet steam seperator	8.5m³	80 kg/cm²	40°C	cyl.	11 ton	C-Steel	53mm	2	1	$ 19,227	$ 19,227	43,55	43,55	1978	69243	02	1	6	3	2	1	2	4	2
5	Heat exchanger	230m²	ID= 1.35m	L= 12.5m	Shell tube	81 ton	C-Steel	105mm	2	1	$ 127,734	$ 127,734	289,33	289,33	1978	74161	01	6	2	4	1	5	2	4	2
6	Starter heater	265m³	1200°C	Liquid		116 ton	C-Steel	23mm	2	1	FF 927,000	FF 927,000	242,10	242,10	1978	74132	24	4	5	2	0	6	2	2	2
7	Ammonia converter	230m³	[illegible] kg/cm²	catalytic	Packed	248 ton	C-Steel	148mm	2	1	6,468,079	6,468,079	1634,23	1634,23	1979	74165	01	4	6	1	4	7	2	4	2
8	[illegible] heat exchanger	1227.6m²	[illegible]	L=11.6m	Shell tube	72.5ton	C-Steel	90mm	2	1	$ 108,851	$ 108,851	246,56	246,56	1978	74161	01	6	2	4	1	5	2	4	2
9	Purge gas exchanger	21m²	ID= [illegible]		double pipe	1.232 ton	C-Steel	8mm	2	1	FF 55,100	FF 55,100	14,39	14,39	1978	74161	01	2	1	0	4	1	2	1	2
10	Purge gas chiller	21m²	ID= 203mm		double pipe	1.232 ton	C-Steel	8mm	2	1	FF 55,100	FF 55,100	14,39	14,39	1978	74161	04	2	1	0	4	1	2	1	2
11	Purge seperator	6201	[illegible]	- 30°C	cyl.	2.5 ton	C-Steel	35mm	2	1	$ 9,513	$ 9,513	21,55	21,55	1978	69243	02	1	8	5	2	1	2	2	2
12	Hot dest drum	11m³	[illegible]	- 30°C	cyl.	4.6 ton	C-Steel	19mm	2	1	$ 7,730	$ 7,730	17,51	17,51	1978	69243	02	1	2	5	2	1	2	1	2
13	[illegible] pump	67m³/h	93m	NH_3	horizontal	0.909 ton	LA-Steel	0.136 ton	2	2	$ 6,143	$ 12,296	13,79	27,58	1977	74220	02	3	3	1	1	1	7	1	2
14	Feed & recycle gas cooler	819m²	ID= 1.7m	L= 6m	Shell tube	27 ton	C-Steel	15mm	2	1	$ 57,136	$ 57,136	129,42	129,42	1978	74161	03	5	2	2	1	4	2	1	2
15	Hot chiller	415m²	ID= 1.1m	L= 5.5m	Shell tube	15 ton	C-Steel	40mm	2	1	$ 28,797	$ 28,797	65,23	65,23	1978	74161	04	4	2	3	1	3	2	2	2
16	2nd chiller	464m²	ID=1.1m	L= 6.2m	Shell tube	17 ton	C-Steel	53mm	2	1	$ 33,187	$ 33,187	85,23	25,23	1978	74161	04	4	2	4	1	3	2	4	2
17	1st chiller	306m²	ID= 1.15m	L= 6.2m	Shell tube	16 ton	C-Steel	43mm	2	1	$ 32,549	$ 32,549	73,73	73,73	1978	74161	04	5	2	4	1	3	2	3	2
18	Ammonia chiller	477m²	ID= 1.9m	L= 5.5m	Shell tube	21 ton	C-Steel	-85mm	2	1	$ 36,645	$ 38,645	87,54	87,54	1978	74161	04	4	2	3	1	3	2	4	2
19	Ammonia seperator	30m³	137.[illegible] kg/cm²	- 23.3°C	cyl.	36 ton	C-Steel	71mm	2	1	FF 701,080	FF 701,080	183,10	183,10	1978	69243	02	1	7	4	2	4	2	4	2
20	Feed/eff. exchanger	1,155m²	ID= 1.2m	L= 11.5m	Shell tube	65 ton	C-Steel	80mm	2	1	$ 84,884	$ 8..884	192.27	192.27	1978	74161	01	6	2	4	1	5	2	4	2
64	Refrigerant comp.	23830m³/hr	17kg/cm²	gas	horizontal	35 ton	Cast-Steel	28 ton	2	1	6,408,500	6,408,500	1680.25	1680.25	1978	74313	12	5	3	2	1	4	6	7	2
20	Refrigerant receiver	17m³	13kg/cm²	34°C	cyl.	9 ton	C-Steel	24mm	2	1	$ 9,020	$ 9,020	20,43	20.43	1978	69243	02	1	2	3	2	2	2	2	2
21	Interstage cooler	318m²	ID= 850mm	L= 6m	Shell&tube	7.7 ton	B-Steel	20mm	1	1	1.2 M.M.	1.2 M.M.	88.17	88.17	1977	74161	03	4	1	3	1	2	3	1	1
22	Ref. comp. cooler	423m²	ID= 975mm	L= 6m	Shell&tube	10 ton	B-Steel	20mm	1	1	1.6 M.M.	1.6 M.M.	117.56	117.56	1977	74161	03	4	1	3	1	1	3	1	1
23	Refrigerant condenser	1409m²	ID= 1,425mm	L= 8.3m	Shell tube	35 ton	B-Steel	30mm	2	2	$ 49,664	$ 99,328	112,50	225.0	1978	74161	05	6	2	4	1	4	3	8	2
24	Flash gas chiller	14.3m²	ID= 30[illegible]	L= 2.5m	Shell&tube	0.811 ton	C-Steel	10mm	1	1	0.18 M.M.	0.18 M.M.	8,73	8,73	1978	74161	04	2	1	1	1	4	2	1	1
25	Flash drum	44m³	8.5kg/cm²	-33°C	cyl.	30 ton	St-Steel	13mm	1	1			265.25	265.25	1978	69243	02	1	1	5	2	4	6	1	1
43	Ammonia storage tank	11,000m³	1 kg/cm²	- 33°C	Dome roof	700 ton	C-Steel	20mm	1	1	75 M.M.	75 M.M.	986,32	986,32	1980	69243	84	8	1	5	2	8	2	1	1

Ind. Code [illegible]

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UNIDO/SPO (AZOT)
CAPITAL GOODS DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR THE NEW AMMONIA PLANT
CAPACITY: 330,000 t/y LOCATION: ISKENDERUN
ANTICIPATED DATE OF COMMISSIONING: 1987
FERTILIZER INDUSTRY-AMMONIA Tanks, drums, separators

Weight/~~Value~~

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit Cost in 1980 (US $ 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
69211 0711321212	Make-up tank	1	3.7	10.56					3.7						3.7
69211 1333323211	Storage tank	1	22.0	32.65					22.0						22.0
69211 1354326211	Des'd naptha sto. tank	1	130.0	96.42					130.0						130.0
69211 1374327211	Raw naptha sto. tank	3	268.0	591.80					804.0						804.0
69243 0434529211	Ammonia sto. tank	1	700.0	986.12					700.0						700.0
69243 0211321311	Naptha flash drum	1	3.7	32.71					3.7						3.7
69243 0211321611	Stripper drum	1	1.6	14.15					1.6						1.6
69243 0211424611	Flash drum	1	30.0	265.25					30.0						30.0
69243 0212322222	Refrigerant receiver	1	9.0	20.43					9.0						9.0
69243 0212323321	Effluent separator	1	11.5	101.68					11.5						11.5
69243 0212521212	Let down drum	1	4.8	17.31					4.8						4.8
69243 0213323222	Raw gas separator	1	20.0	104.64					20.0						20.0
69243 0213323222	Overhead drum	1	10.0	27.41					10.0						10.0
69243 0214325222	Suction drum	1	87.0	20.84					87.0						87.0
69243 0216323242	I st stage separator	1	11.0	41.55					11.0						11.0
69243 0217225242	Steam drum	1	92.0	516.76					92.0						92.0
69243 0217424242	Ammonia separator	1	38.0	183.10					38.0						38.0
69243 0218521222	Purge separator	1	2.5	21.55					2.5						2.5

EQUIPMENT REQUIREMENT FOR THE NEW AMMONIA PLANT

Ind. Code 3512-2

CAPACITY: 330,000 t/y LOCATION: İSKENDERUN

ANTICIPATED DATE OF COMMISSIONING: 1987

FERTILIZER INDUSTRY-AMMONIA Turbines

METEC/SPO (ANOK)
CAPITAL GOODS DEVELOPMENT PROJECT

2

Weight/Value

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $. 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981 1990
71251 0123222332	Steam turbine	1	6.5	200.0					6.5						6.5
71251 0213211612	Turbine	1	0.27	12.96					0.27						0.27

UNIDO/SPO (AZOT)
CAPITAL GOODS DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR THE NEW AMMONIA PLANT
CAPACITY: 300,000 t/y LOCATION: ISKENDERUN
ANTICIPATED DATE OF COMMISSIONING: 1987
FERTILIZER INDUSTRY- AMMONIA Furnaces

Ind. Code 3512.2

Weight/Value

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $ 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
74132 2435204212	Startup heater	1	39.0	210.64					39.0						39.0
74132 2435204212	Ammonia dissociator	1	29.5	259.67					29.5						29.5
74132 2435205612	Hydrotreater furnace	1	65.0	845.90					65.0						65.0
74132 2445206222	Start up heater	1	116.0	242.10					116.0						116.0
74132 4085208212	Primary reformer	1	427.0	1068.8					427.0						427.0

Ind. Code 3513-2

UNIDO/SPO (AZOT)
CAPITAL GOODS DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR THE NEW AMMONIA PLANT

CAPACITY: 300,000 t/y LOCATION: [illegible]

ANTICIPATED DATE OF COMMISSIONING: 1987

FERTILIZER INDUSTRY- AMMONIA Heat exchangers, reboilers, coolers, chillers, condensers, WHB, heaters and vaporizers

Weight/Value

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit weight (tons)	Unit cost in 1980 (US $. 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
74161 0121041212	Purge gas exchanger	1	1.23	14.39					1.23						1.23
74161 0141411311	Feed/eff. exchanger	2	4.5	22.68					9.0						9.0
74161 0141411521	[illegible] exchanger	1	4.0	19.98					4.0						4.0
74161 0141 12211	Heat exchanger	1	6.0	28.40					6.0						6.0
74151 0142413211	Heat exchanger	1	19.0	169.65					19.0						19.0
74161 0152413521	[illegible] exchanger	1	25.0	106.63					25.0						25.0
74161 0162415242	[illegible] heat exchanger	1	72.5	246.56					72.5						72.5
74161 0162415242	Heat exchanger	1	81.0	289.33					81.0						81.0
74161 0162415242	Feed/eff. exchanger	1	65.0	192.27					65.0						65.0
74151 0241311311	Reboiler	1	5.0	16.37					5.0						5.0
74151 0321211211	Recycle comp. cooler	1	1.4	24.25					1.4						1.4
74161 0321311211	Naptha cooler	1	1.5	3.62					1.5						1.5
74161 0321311211	Naptha cooler	1	1.5	3.62					1.5						1.5
74161 0341311311	Ref comp. cooler	1	10.0	117.56					10.0						10.0
74161 0341312311	Interstage cooler	1	7.7	38.17					7.7						7.7
74161 0341412211	Cooler	1	7.4	145.42					7.4						7.4

Ind. Coef. 5312-2

UNIDO/SPO (AZOT)
CAPITAL GOODS DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR THE NEW AMMONIA PLANT
CAPACITY: 300,000 t/y LOCATION: ISKENDERUN
ANTICIPATED DATE OF COMMISSIONING: 1987
FERTILIZER INDUSTRY- AMMONIA Heat exchangers, reboilers, coolers, chillers, condenser, WHB, heaters, and vaporizers

Weight/Value

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $. 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
74161 0341412311	Cooler	1	6.0	22.55					6.0						6.0
74161 0341412311	Cooler	1	6.0	62.04					6.0						6.0
74161 0341413341	Cooler	2	13.0	50.41					26.0						26.0
74161 0342214342	Shift inlet cooler	1	25.0	103.53					25.0						25.0
74161 0352314212	Feed & recycle gas cooler	1	27.0	129.42					27.0						27.0
74161 0421041212	Purgegas chiller	1	1.23	14.39					1.23						1.23
74161 0421114211	Flash gas chiller	1	0.81	8.73					0.81						0.81
74161 0431111211	NH_3 chiller	1	3.5	53.32					3.5						3.5
74161 0442313222	1st chiller	1	15.0	65.21					15.0						15.0
74161 0442313242	4th chiller	1	21.0	87.54					21.0						21.0
74161 0442413242	2nd chiller	1	17.0	25.23					17.0						17.0
74161 0452413232	3rd chiller	1	18.0	73.73					18.0						18.0
74161 0541312311	Effluent condenser	1	7.0	21.28					7.0						7.0
74161 0562414311	Stripper condenser	1	35.0	169.65					35.0						35.0
74161 0562414322	Ref condenser	2	35.0	112.50					70.0						70.0
74161 0642364242	Secondary WHB	1	49.0	197.30					49.0						49.0

Ind. Code 3512-2

EQUIPMENT REQUIREMENT FOR THE NEW AMMONIA PLANT

CAPACITY: 300,000 t/y LOCATION: ISKENDERUN

ANTICIPATED DATE OF COMMISSIONING: 1987

UNIDO/SPO (ASOT)
CAPITAL GOODS DEVELOPMENT PROJECT

FERTILIZER INDUSTRY-AMMONIA Heat exchangers, reboilers, coolers, chillers, condensers, WHB, heaters and vaporizers

Weight/Value-

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit Cost in 1980 (US $ 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
74161 064236 4342	Primary eff WHB	1	38.0	145.12					38.0						38.0
74161 0642465232	Primary WHB	1	89.0	410.59					89.0						89.0
74161 0762415242	BFW heater	1	61.0	220.76					61.0						61.0
74161 0921041212	Ammonia vaporizer	1	0.2	3.90					0.2						0,2
74161 1042313432	Preheater	1	15.0	48.36					15.0						15.0
74161 1060098212	Air preheater	1	420.0	1 891.87					420.0						420.0

Ind. Code 3512-2

UNIDO/SPO (AZOT)
CAPITAL GOODS DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR THE NEW AMMONIA PLANT
CAPACITY: 1000,000 t/y LOCATION: ISKENDERUN
ANTICIPATED DATE OF COMMISSIONING: 1987
FERTILIZER INDUSTRY-AMMONIA Reactors, Columns

Weight/Value-

SITC CODE	BASIC MACHINE NAME	Qty.	Unit Wt. (tons)	Unit Cost in 1980 (US $ 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981 - 1990
74165 0146147242	Ammonia Converter	1	248.0	1634.2					248.0						248.0
74165 0533144432	Desulfurizer	1	46.0	441.7					46.0						46.0
74165 0753146242	Shift Converter	1	173.0	645.79					173.0						173.0
74165 2122143422	Hydrotreater reactor	1	17.5	194.86					17.5						17.5
74165 2243145232	Secondary reformer	1	78.2	238.93					78.2						78.2
74165 2333144432	Methanator	1	36.0	122.13					36.0						36.0
74166 0353426222	CO_2 absorber	1	200.0	679.89					200.0						200.0
74166 0731423211	Process stripper	1	18.9	75.09					18.9						18.9
74166 0734413311	Hydrotreater stripper	1	25.0	45.45					25.0						25.0
74166 0761417221	CO_2 Stripper	1	225.0	341.93					225.0						225.0

Ind. Code 3513-2

UNIDO/SPO (AZOT)
CAPITAL GOODS DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR THE NEW AMMONIA PLANT
CAPACITY: 300,000 t/y LOCATION: ISKENDERUN
ANTICIPATED DATE OF COMMISSIONING: 1987

FERTILIZER INDUSTRY-AMMONIA Pumps, Compressors and Fans Filters

Weight/Value

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit Cost in 1980 (US $ 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
74220 0231211712	Pump	1	0.6	9.92					0.6						0.6
74220 0232211612	Pump	1	0.54	8.74					0,54						0.54
74220 0232211612	Condensate pump	2	0.37	6.55					0.74						0.74
74220 0233111712	Ammonia pump	2	0.91	13.79					1.82						1.82
74220 0233211612	Pump	2	0.91	9.65					1.82						1.82
74220 0234211212	Des'd naptha pump	1	1.03	7.85					1.03						1.03
74220 0236211912	Naptha pump	2	1.7	88.95					3.4						3.4
74220 0245211712	Lean sol'n pump	2	2.75	191.93					5.5						5.5
74220 0337211612	Stripper pump	2	2.8	7.19					5.6						5.6
74313 0133211622	Gas compressor	2	2.72	189.98					5.44						5.44
74313 0244213652	H_2-recycle comp.	1	18.0	208.3					18.0						18.0
74313 1253214672	Ref.compressor	1	35.0	1680.3					35.0						35.0
74313 1254113742	Air compressor	1	17.0	1728.2					17.0						17.0
74313 1256213652	Syn. gas compressor	1	25.0	2,742					25.0						25.0
74341 0130213652	Fan for reformer	1	17.0	230.53					17.0						17.0
74341 0240224672	Fan for reformer	1	36.0	238.3					36.0						36.0
74361 5040002112	Air filters	2	5.9	38.6					11.8						11.8

EQUIPMENT REQUIREMENT FOR THE NEW AMMONIA PLANT

Ind. Code 3512-2

CAPACITY: 300,000 t/y LOCATION: ISKENDERUN

UNIDO/SPO (AZOT)

ANTICIPATED DATE OF COMMISSIONING: 1987

CAPITAL GOODS DEVELOPMENT PROJECT

FERTILIZER INDUSTRY-AMMONIA Tanks, drums, separators

Weight/Value

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit Cost in 1980 (US $ 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
69211 0711321212	Make-up tank	1	3.7	10.56					10.56						10.56
69211 1333323211	Storage tank	1	22.0	32.65					32.65						32.65
69211 1354326211	Dea'd sto. tank	1	130.0	96.42					96.42						96.42
69211 1374327211	Raw naptha sto. tank	3	268.0	591.30					1115.4						1115.4
69243 0434529211	Ammonia sto. tank	1	700.0	986.32					986.32						986.32
69243 0211321211	Naptha flash drum	1	3.7	32.71					32.71						32.71
69243 0211321611	Stripper drum	1	1.6	14.15					14.15						14.15
69243 0211424611	Flash drum	1	30.0	265.25					265.25						265.25
69243 0212322222	Refrigerant receiver	1	9.0	20.43					20.43						20.43
69243 0212323321	Effluent separator	1	11.5	101.68					101.68						101.68
69243 0212521212	Let down drum	1	4.8	17.51					17.51						17.51
69243 0213323222	Raw gas separator	1	20.0	104.64					104.64						104.64
69243 0213323222	Overhead drum	1	10.0	27.41					27.41						27.41
69243 0214325222	Suction drum	1	87.0	20.84					20.84						20.84
69243 0216323242	1st stage separator	1	11.0	43.55					43.55						43.55
69243 0217225242	Steam drum	1	92.0	516.76					516.76						516.76
69243 0217424242	Ammonia separator	1	38.0	183.10					183.10						183.10
69243 0218521222	Purge separator	1	2.5	21.55					21.55						21.55

Ind. Code 3512-2

EQUIPMENT REQUIREMENT FOR THE NEW AMMONIA PLANT

CAPACITY: 300,000 t/y LOCATION: İSKENDERUN

UNIDO/SPO (ALOT) ANTICIPATED DATE OF COMMISSIONING: 1987

CAPITAL GOODS DEVELOPMENT PROJECT FERTILIZER INDUSTRY-AMMONIA Turbines

Weight/Value

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $. 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
71261 0120222332	Steam turbine	1	6.5	200.0					200.0						200.0
71261 0216211612	Turbine	1	0.27	12.96					12.96						12.96

UNIDO/SPO (ANOT)

CAPITAL GOODS DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR THE NEW AMMONIA PLANT

CAPACITY: 300,000 t/y LOCATION: İSKENDERUN

ANTICIPATED DATE OF COMMISSIONING: 1987

FERTILIZER INDUSTRY- AMMONIA Furnaces

Ind. Code 3512-2

Weight/Value

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $ 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
74132 2435208212	Startup heater	1	39.0	210.64					210.64						210.64
74132 2435204212	Ammonia dissociater	1	29.5	259.67					259.67						259.67
74132 2435205612	Hydrotreater furnace	1	65.0	845.90					845.90						845.90
74132 2445206222	Start up heater	1	116.0	242.10					242.10						242.10
74132 40;5208212	Primary reformer	1	427.0	1068.8					1068.8						1068.8

UNIDO/SPO (AZOT)

CAPITAL GOODS DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR THE NEW AMMONIA PLANT — Ind. Code 3512-2

CAPACITY: 300,000 t/y LOCATION: ISKENDERUN

ANTICIPATED DATE OF COMMISSIONING: 1987

FERTILIZER INDUSTRY- AMMONIA Heat exchangers, reboilers, coolers, chillers, condenser, WHB, heaters, and vaporizers. — Weight/Value

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 US $. 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
74161 0121041212	Purge gas exchanger	1	1.23	14.39					14.39						14.39
74161 0141411111	Feed/eff exchanger	2	4.5	22.68					45.37						45.37
74161 0141411521	BFW exchanger	1	4.0	19.98					19.98						19.98
74161 0141412211	Heat exchanger	1	6.0	28.40					28.40						28.40
74161 0142413221	Heat exchanger	1	19.0	169.65					169.65						169.65
74161 0152413521	BFW exchanger	1	25.0	106.63					106.63						106.63
74161 0162415242	BFW heat exchanger	1	72.5	246.56					246.56						246.56
74161 0162415242	Heat exchanger	1	81.0	289.33					289.33						289.33
74161 0162415242	Feed/eff exchanger	1	65.0	192.27					192.27						192.27
74161 0241311311	Reboiler	1	5.0	16.37					16.37						16.37
74161 0321211211	Recycle comp. cooler	1	1.4	24.25					24.25						24.25
74161 0321311211	Naptha cooler	1	1.5	3.62					3.62						3.62
74161 0321311211	Naptha cooler	1	1.5	3.62					3.62						3.62
74161 0341311311	Ref comp. cooler	1	10.0	117.56					117.56						117.56
74161 0341312341	Interstage cooler	1	7.7	88.17					88.17						88.17
74161 0341412211	Cooler	1	7.4	145.42					145.42						145.42
74161 0341413511	Cooler	1	6.0	22.55					22.55						22.55
74161 0341412311	Cooler	1	6.0	62.04					62.04						62.04

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UNIDO/SPO (AZOT)
CAPITAL GOODS DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR THE NEW AMMONIA PLANT

Ind.Code 1512-2

CAPACITY: 300,000 t/y LOCATION: ISKENDERUN

ANTICIPATED DATE OF COMMISSIONING: 1987

FERTILIZER INDUSTRY-AMMONIA Heat exchangers, reboilers, coolers, chillers, condenser, WHB, heaters, and vaporisers,

Weight/Value

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $ 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
74161 0341413341	Cooler	2	13.0	50.41					100.82						100.82
74161 0342214342	Shift inlet cooler	1	25.0	103.53					103.53						103.53
74161 0352314212	Feed recycle gas cooler	1	27.0	129.42					129.42						129.42
74161 0421041212	Purge gas chiller	1	1.23	14.39					14.39						14.39
74161 0421114211	Flash gas chiller	1	0.81	8.73					8.73						8.73
74161 0431111211	NH_3 chiller	1	3.5	53.32					53.32						53.32
74161 0442313222	1st chiller	1	15.0	65.21					65.21						65.21
74161 0442313242	4th chiller	1	21.0	87.54					87.54						87.54
74161 0442413242	2nd chiller	1	17.0	25.23					25.23						25.23
74161 0452413232	3rd chiller	1	18.0	73.73					73.73						73.73
74161 0541312311	Effluent condenser	1	7.0	21.28					21.28						21.28
74161 0562414311	Stripper condenser	1	35.0	169.65					169.65						169.65
74161 0562414322	Ref condenser	2	35.0	112.50					225.0						225.0
74161 0642364242	Secondary WHB	1	49.0	197.30					197.30						197.30
74161 0642364342	Primary eff WHB	1	38.0	145.12					145.12						145.12
74161 0642465232	Primary WHB	1	89.0	410.59					410.59						410.59
74161 0762415242	BFW heater	1	61.0	220.76					220.76						220.76
74161 0921041212	Ammonia vaporiser	1	0.2	3.99					3.99						3.99

EQUIPMENT REQUIREMENT FOR THE NEW AMMONIA PLANT — Ind.Code 3512-2

CAPACITY: 300,000 t/y LOCATION: ISTHENDERUN

UNIDO/SPO (AZOT)

ANTICIPATED DATE OF COMMISSIONING: 1987

CAPITAL GOODS DEVELOPMENT PROJECT

FERTILIZER INDUSTRY-AMMONIA Heat exchangers, reboilers, coolers, chillers, HER, heaters and vaporizers

Weight/Value

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $ 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
74161 1042313422	Preheater	1	15.0	48.36					48.36						48.36
74161 1060098212	Air preheater	1	420.0	891.87					891.87						891.87

UNIDO/SPO (AZOT)

CAPITAL GOODS DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR THE NEW AMMONIA PLANT

CAPACITY: 300.000 t/y LOCATION: ISKENDERUN

ANTICIPATED DATE OF COMMISSIONING: 1987

FERTILIZER INDUSTRY-AMMONIA Reactors, Columns

Ind. Code 3518-2

Weight/Value

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost 1980 (US $ 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
74165 0146147242	Ammonia Converter	1	248.0	1634.2					1634.2						1634.2
74165 0533144432	Desulfuriser	1	46.0	441.7					441.7						441.7
74165 0753146242	Shift Converter	1	173.0	645.79					645.79						645.79
74165 2122143422	Hydrotreater reactor	1	17.5	194.86					194.86						194.86
74165 2243145232	Secondary reformer	1	78.2	288.93					288.93						288.93
74155 2333144432	Methanator	1	36.0	122.13					122.13						122.13
74166 0353426222	CO_2 absorber	1	200.0	679.89					679.89						679.89
74166 0731423211	Process stripper	1	18.9	75.09					75.09						75.09
74166 0734413311	Hydrotreater stripper	1	25.0	45.45					45.45						45.45
74166 0761417221	CO_2 Stripper	1	225.0	341.93					341.93						341.93

UNIDO/SPO (AZOT)
CAPITAL GOODS DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR THE NEW AMMONIA PLANT
CAPACITY: 300,000 t/y LOCATION: İSKENDERUN
ANTICIPATED DATE OF COMMISSIONING: 1987
FERTILIZER INDUSTRY-AMMONIA Pumps, Compressors and fans filters

Ind. Code 3512-2

Weight/Value

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit Cost 1980 (US $. 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
74220 0231211712	Pump	1	0.6	9.92					9.92						9.92
74220 0232211612	Pump	1	0.54	8.74					8.74						8.74
74220 0232211612	Condvnsate pump	2	0.37	6.55					13.10						13.10
74220 0233111712	Ammonia pump	2	0.91	13.79					27.58						27.58
74220 0233211612	Pump	2	0.91	9.65					19.30						19.30
74220 0234211212	Des'd naptha pump	1	1.03	7.85					7.85						7.85
74220 0236211912	Naptha pump	2	1.7	88.95					177.90						177.90
74220 0245211712	Lean sol'n pump	2	2.75	91.93					183.86						183.86
74220 0337211612	Stripper pump	2	2.8	7.19					14.38						14.38
74313 0133211622	Gas compressor	2	2.72	89.98					179.96						179.96
74313 0244213652	H_2-recycle comp.	1	18.0	208.3					208.3						208.3
74313 1253214692	Ref. compressor	1	35.0	1680.3					1680.3						1680.3
74313 1254113742	Air compressor	1	17.0	1728.2					1728.2						1728.2
74313 1266213662	Syn. gas compressor	1	25.0	2,742					2,742						2,742
74341 0130213562	Fan for reformer	1	17.0	238.53					238.53						238.53
74341 0240224672	Fan for reformer	1	36.0	238.3					238.3						238.3
74361 5040002112	Air filters	2	5.9	38.6					77.2						77.2

12535
(4 of 9)

DEVELOPMENT OF CAPITAL GOODS INDUSTRIES

DP/TUR/76/034

Technical Report No. XII:
Demand for Capital Goods
for Fertilizer Industry

Vol : IV

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANISATION

RESTRICTED

Sept. 1982
English

DEVELOPMENT OF CAPITAL GOODS INDUSTRIES

DP/TUR/76/034

Technical report NoXII-Vol. IV
Demand for Capital Goods for Fertiliser Industry-Sulfuric Acid - ISKENDERUN

Prepared for the Government of Turkey
by the United Nations Industrial Development Organization
acting as executing agency for the United Nations Development Programme

Based on the work of
Capital Goods Development Project Team in Turkey

United Nations Industrial Development Organization
Vienna

UNITED NATIONS DEVELOPMENT PROGRAMMES IN TURKEY

CAPITAL GOODS DEVELOPMENT PROJECT IN TURKEY

Vol IV

Sulfuric Acid - ISKENDERUN

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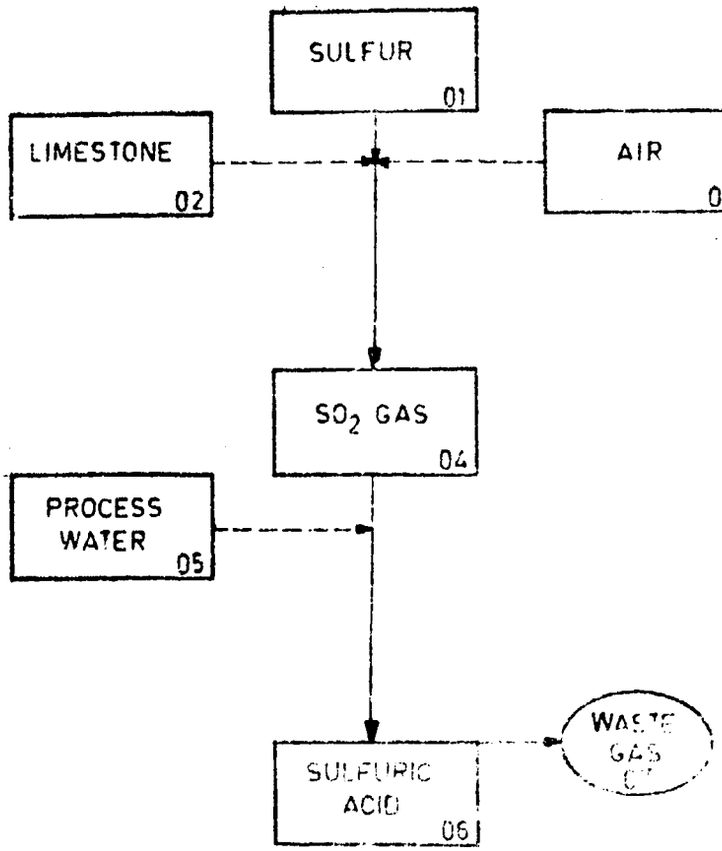


FERTILIZERS AND PESTICIDES SULFURIC ACID			INDUSTRY CODE 3512-3
UNIDO /SPO (AZOT) CAPITAL GOODS DEVELOPMENT PROJECT			
MODULAR PRODUCTION CHART			
Date	Prepared by	Drawn by	Checked by
12.10.1981	E. ABDELAL O. KADIOGLU	F. ALICIOGLU	V. MIHLADIZ
Checked by UNIDO/Expert		Approved by UNIDO/CTA	

Ind.Code : 3512-3

Ind.Name : Fertilizer and Pesticides

SULFURIC ACID

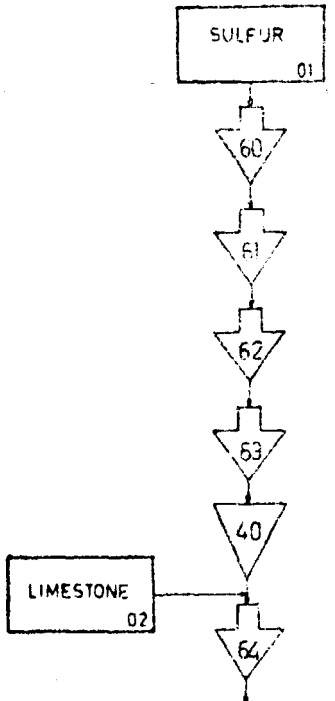
UNIDO/SPC (ALGT)

CAPITAL GOODS DEVELOPMENT PROJECT

INDUSTRY ACTIVITIES CHART

Prepared by	Checked by	Approved by
Chem.Eng.Dic R. ABDELAL	UNIDO/Expert	UNIDO/CTA

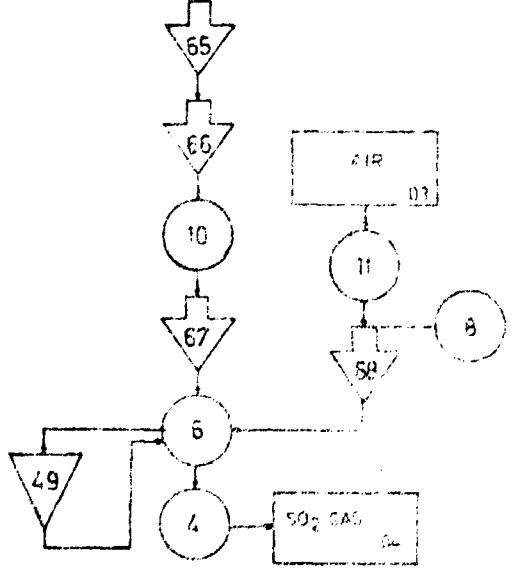
PRODUCTION STAGE		TECHNOLOGY		CRITICAL EQUIPMENT		DESIGN LINE CAPACITY	
CODE	NAME	CODE	NAME	NAME	CAPACITY RANGE	CODE	CAPACITY
01	Sulfur	-	-	-	-	1	2x15 t/h
						2	18 t/h
04	SO_2 gas	1	Sulfur burning	S Combustion chamber	125 m^3	1	2x95.460 m^3/h
						2	118.700 m^3/h
06	Sulfuric acid	1	Conversion and double absorption	Converter	737 m^3	1	2x43.75 t/h
						2	54.4 t/h



ACTIVITY CODE

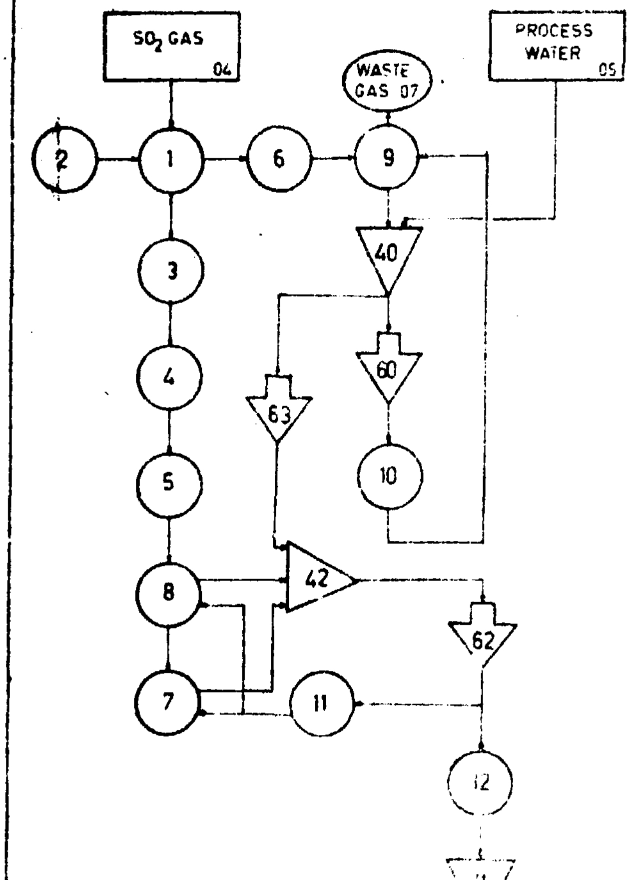
INDUSTRY	PRODUCT	CODE	
3512	304	1	

NO	MACHINE CODE	MACHINE NAME	QUAN
60	7442602720136511	Belt conveyor	1
61	7442602720146711	Belt conveyor	1
62	7442602720136411	Belt conveyor	1
63	7442800800239911	Tripper	1
40	6921101113282111	Sulfur feed hopper	1
64	7442602120136311	Belt conveyor	1
65	7422002376017132	Filtration pump	2
66	7422002376217132	Transfer pump	1
10	7436235200082132	Sulfur filter	1
67	7422002236282132	Sulfur burner feed pump	1
4	7413224450042112	S combustion chamber	1
4	7416106600142132	Waste heat boiler	1
45	6921102142022122	Steam drum	1
68	7434200611012132	Air Blower	1
19	7436150800021322	Air filter	1
8	7126102000132132	Turbine for blower	1



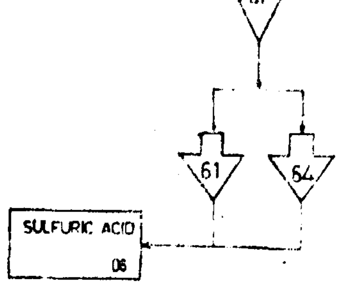
CAPACITY CALCULATIONS

Name of the critical equipment: 6 Combustion Chamber
Design capacity of the critical equipment per hour 15 %
No. of critical equipment : 2
Designed line capacity per hour : 2X95,460 m^3
Designed line capacity per shift: 2X763,680 m^3
Designed line capacity per day : 2X2,291,040 m^3
Designed line capacity per year : 2X687X10 m^3



ACTIVITY CODE		INDUSTRY	PRODUCT	TECH	CAP
		3512	306	1	1

NO	MACHINE CODE	MACHINE NAME	QUAN
1	741650931149221	Converter	2
2	741610850023412	Superheater	2
3	741610740021212	Final economiser	2
4	741610143318212	Hot gas H.E.	2
5	741610144418212	Cold gas H.E.	2
6	74161074002[illegible]212	Interpass economiser	2
7	741660321424231	Absorption tower	2
8	741660321424211	Drying tower	2
9	741660321424211	Final absorbing tower	[illegible]
40	69211071232[illegible]	Acid tank	[illegible]
60	74220025157[illegible]	Acid pumps	2
10	7416103400[illegible]	Acid cooler	2
41	69211136430211	Acid storage tank	[illegible]
61	742200231512[illegible]	Acid transfer pump	2
11	7416103[illegible]	Acid cooler	2
42	6921107113[illegible]	Acid tank	[illegible]
62	742200[illegible]157[illegible]	Acid pump	[illegible]
12	74161[illegible]	Acid cooler	[illegible]
43?	742200[illegible]	Acid [illegible]	2
64?	7422[illegible]	Acid transfer pump	2



CAPACITY CALCULATIONS

Name of the critical equipment: Converter

Design capacity of the critical equipment per hour 95,460 m³

No of critical equipment : 2

Designed line capacity per hour : 2X43.75 t

Designed line capacity per shift: 2X350 t

Designed line capacity per day : 2X1050 t

Designed line capacity per year : 2X345,000 t

PREPARED BY

EMINE ARDELAL

OĞUZ KADIOĞLU

ACTIVITY CODE 351230411 UNIDO/SPO (AZOT) CAPITAL GOODS DEVELOPMENT PROJECT

NO	BASIC MACHINE NOMENCLATURE	MAJOR SPEC.	MAJOR SPEC 1	MAJOR SPEC 2	TYPE DESCRIPTION	MANUFAC. CHARACT.1	MANUFAC. CHARACT.2	MANUFAC. CHARACT.3	OR.	Q.	PURCHASE COST (1000 £) UNIT	PURCHASE COST (1000 £) TOTAL	CONSTANT 1980 YEAR COST (1000 £) UNIT	CONSTANT 1980 YEAR COST (1000 £) TOTAL	YEAR OF PURCHASE AND REMARK	SITC CODE (FOR COMPUTER) 1 2 3 4 5	6 7	8	9	10	11	12	13	14	15
60	Belt conveyor	C: 600 t/h	W: 800mm	L= 88m	bulk	13.0 tons	C-Steel	17 tons	1	1	80	80	86	86	1979	74426	02	7	2	0	1	8	6	5	1
61	Belt conveyor	C: 600 t/h	W: 800mm	L= 211m	bulk	30.0 tons	C-Steel	27 tons	1	1	250	250	268	268	1975	74426	02	7	2	0	1	4	6	7	1
62	Belt conveyor	C:600 t/h	W: 800mm	L= 74m	bulk	10.0 tons	C-Steel	9 tons	1	1	70	70	75	75	1979	74426	02	7	2	0	1	3	6	4	1
63	Tripper	C:600 t/h	W: 800mm	L= 90 &	travelling	[illegible].0 tons	E 24-1	13 tons	1	1	91	91	97	97	1979	74428	00	8	0	9	2	3	9	5	1
[illegible]	Sulfur feed hopper	$5m^3$	W: 1 w.	25°C	cyl.	8.0 tons	C-Steel	6 mm	1	1	5.6	5.6	5.6	5.6	1980	69211	01	1	0	3	2	8	2	4	1
64	Belt conveyor	40 t/h	W: 500mm	L= 10 m	bulk	0.6 tons	C-Steel	2.35 tons	1	1	10	10	10.7	10.7	1979	74426	02	1	2	0	1	3	6	1	1
65	Filtration pump	$12m^3/h$	H: 30m	viscous	vertical	0.7 tons	Cast iron	0.5 ton	2	2	1.0	2	1.07	2.14	1979	74220	02	3	2	6	2	1	2	0	2
66	Precoat pump	$50m^3/h$	H: 15m	viscous	vertical	0.7 tons	Cast iron	0.5 ton	2	2	1.2	2.4	1.28	2.56	1979	74220	02	3	1	6	2	1	2	0	2
[illegible]	Sulfur filters	1[illegible] t/h				1.5 tons	C-Steel	2.7 tons	2	2	10	20	10.7	21,5	1979	74362	31	2	0	0	0	1	2	1	2
[illegible]	Sulfur burner feed pmp	$8m^3/h$	H: 60m	viscous	vertical	1.0 tons	Cast iron	0.6 ton	2	3	1.1	3.3	1.17	3.51	1979	74220	02	2	3	6	2	1	2	0	2
[illegible]	[illegible] combustion chamber	[illegible]	10[illegible]°C	1 [illegible]		30.[illegible] tons	C-Steel	[illegible] mm	1	2	30	60	30	60	19[illegible]	74132	24	4	5	0	0	4	2	1	2
	Waste heat boiler	[illegible]		-	small tube	40.[illegible] tons	C-Steel	[illegible] mm	2	2	2[illegible]	40[illegible]	200	40[illegible]	19[illegible]	74161	06	6	0	0	1	4	2	3	2
[illegible]	Steam drum	[illegible] m^3				5.0 [illegible]	[illegible]	00 mm	2	2	35	70	35	70	19[illegible]	69243	02	1	4	2	2	8	2	2	2
	Air blower	$1500m^3/min$	H: 4[illegible]	air		3.0	Cast iron	[illegible] tons	2	2	170	340	183	367	19[illegible]	74342	00	6	1	1	0	1	2	3	2
[illegible]	Air filter	[illegible] m^3/min				5 [illegible]	[illegible]	-	2	2	48	96	48	96	19[illegible]	74361	50	8	0	0	0	8	0	0	2
[illegible]	Turbine for blower			40kg/cm²	back pressure	[illegible]	[illegible]	1.7 tons	2	2	10	20	10	20	19[illegible]	71261	02	0	0	2	8	8	3	2	2

ACTIVITY CODE 3512390611 UNIDO/SPO (AZOT) CAPITAL GOODS DEVELOPMENT PROJECT

	BASIC MACHINE NOMENCLATURE	MAJOR SPEC.	MAJOR SPEC. 1	MAJOR SPEC. 2	TYPE DESCRIPTION	MANUFAC. CHARACT.1	MANUFAC. CHARACT.2	MANUFAC. CHARACT.3	OR.	Q.	PURCHASE COST(1000$) UNIT	PURCHASE COST(1000$) TOTAL	CONSTANT 1980 YEAR COST(1000 $) UNIT	CONSTANT 1980 YEAR COST(1000 $) TOTAL	YEAR OF ERECTION A-D REMARK	SITC CODE (FOR COMPUTER) 1 2 3 4 5	6 7	8	9	10	11	12	13	14	15
1	Converter	V: 737 m^3	1 Atm.	Catalytic	Packed	90 tons	C-Steel	30 mm	2	2	150	300	161	321	1978	74165	09	3	1	1	4	5	2	2	1
2	Super heater	513 m^2			U-tube	20 tons	Alloy Steel	5 mm	2	2	150	300	150	300	1980	74161	08	5	0	0	2	0	4	1	2
3	Final economiser	350 m^2			U-tube	14 tons	C-Steel	5 mm	2	2	100	200	100	200	1980	74161	07	4	0	0	2	0	2	1	2
4	Hot gas H.E	180 m^2	ϕ 2.8m	L 5.5m	Shell&tube	7 tons	C-Steel	20 mm	2	2	30	60	30	60	1980	74161	01	4	3	3	1	2	2	1	2
5	Cold gas H.E	230 m^2	ϕ 3.4m	L 7.9m	Shell&tube	9 tons	C-Steel	20 mm	2	2	45	90	45	90	1980	74161	01	4	4	4	1	2	2	1	2
6	Interpass economizer	128 m^2			U-tube	5 tons	C-Steel	5 mm	2	2	25	50	25	50	1980	74161	07	4	0	0	2	0	2	1	2
7	Absorption tower	V: 213m^3	1 kg/cm^2	200°C	Packed	40 tons	C-Steel	20 mm	1	2	100	200	107	214	1979	74166	03	2	0	4	2	4	2	0	1
8	Drying tower	V: 167m^3	1 kg/cm^2	60°C	Packed	33 tons	C-Steel	20 mm	1	2	73	145	78	156	1979	74166	03	2	0	4	2	4	2	0	1
9	Final absorbing tower	V: 182m^3	1 kg/cm^2	200°C	Packed	36 tons	C-Steel	20 mm	1	2	90	180	96	192	1979	74166	03	2	0	4	2	4	2	0	1
40	Acid tank	V: 54 m^3	ϕ : 5m	H: 2.7-0m	cyl.	7 tons	C-Steel	12 mm	1	2	15	30	15	30	1980	69211	07	1	2	3	2	0	2	1	1
60	Acid pump	C: 885m^3/h	H : 23m	corrosive	Vertical	2.0 tons	Cast iron	1,5 ton	2	2	9	18	9.9	19.8	1979	74220	02	5	1	5	2	0	2	2	2
10	Acid cooler	1.123x10^6 Kcal/h			shell tube	5 tons	St. Steel	12 mm	2	2	110	220	110	220	1980	74161	03	4	0	0	1	2	6	1	2
41	Acid storage tank	V: 8200m^3	ϕ : 25.5m	H: 12 m	cyl.	175.0 tons	C-Steel	20 mm	1	2	190	380	190	380	1980	69211	13	6	4	3	2	6	2	3	1
61	Acid transfer pump	C: 48m^3/h	H : 15m	corrosive	Horizontal	0.7 tons	Cast iron	1,5 ton	2	2	1.2	2.4	1.32	2.64	1979	74220	02	3	1	5	1	3	2	3	2
11	Acid cooler	18.750x10^6 Kcal/h			shell tube	15 tons	St. Steel	12 mm	2	2	200	400	200	400	1980	74161	03	4	0	0	1	3	6	1	2
42	Acid tank	V: 20m^3	ϕ : 3m	H: 2.8 m	cyl.	4.0 tons	C-Steel	12 mm	1	2	12	24	12	24	1980	69211	07	1	1	3	2	0	2	1	1
62	Acid pump	C: 265m^3/h	H: 20m	corrosive	Vertical	0.6 tons	Cast iron	0.6	2	2	3.3	6.6	3.5	7	1979	74220	02	3	1	5	2	1	2	1	2
12	Acid cooler	3.5x10^6 Kcal/h			shell tube	11 tons	St. steel	12	2	2	150	300	150	300	1980	74161	03	4	0	0	1	3	6	1	2
63	Acid drain pump	C: 40m^3/h	H: 15m	corrosive	Horizontal	0.4 tons	Cast iron	0.4 ton	2	2	1.1	2.2	1.2	2.4	1979	74220	02	3	1	5	1	1	2	1	2
64	Acid transfer pump	C: 3m^3/h	H: 25m	corrosive	Horizontal	0.5 tons	Cast iron	0.4 ton	2	2	0.92	1.84	1.2	2.3	1969	74220	02	2	2	5	1	1	2	1	2

UNIDO/ SPO (AZOT)

CAPITAL GOODS DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENTS FOR THE NEW SULFURIC ACID PLANT

CAPACITY: 1050 t/d LOCATION: İSKENDERUN

ANTICIPATED DATE OF COMMISSIONING: 1987

FERTILIZER INDUSTRY-SULFURIC ACID

Ind. Code 3512-3

Weight/Value

Hopper, tank drum

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $ 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
69211 0111322211	Sulfur feed hopper	1	8.0	5.6					8.0						8.0
69211 0711321211	Acid tank	2	4.0	12.0					8.0						8.0
69211 0712322211	Acid tank	2	7.0	24.0					14.0						14.0
69211 1364320211	Acid storage tank	2	175.0	190.0					350.0						350.0
69243 0204222212	Steam drum	2	5.0	35.0					10.0						10.0

UNIDO/SPO (AZOT)

CAPITAL GOODS

DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR THE NEW SULFURIC ACID PLANT,
CAPACITY : t/d LOCATION:
ANTICIPATED DATE OF COMMISSIONING: 1987
FERTILIZER INDUSTRY- SULFURIC ACID

Turbine, Combustion Chamber

Weight/~~Value~~

SITC CODE	BASIC MACHINE UNIT	Q'ty Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $ 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
71261 0200212322	Turbine for blower	2	5.0	10.0					10.0						10.0
74132 2449004212	S Combustion cham	2	30.0	30.0					60.0						60.0

UNIDO/SPO ([illegible])
CAPITAL GOODS
DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR THE NEW SULFURIC ACID PLANT,
CAPACITY: t/d LOCATION:
ANTICIPATED DATE OF COMMISSIONING:1987
FERTILIZER INDUSTRY-SULFURIC ACID
Heat exchanger

Ind. Code 3512-3

Weight/Value

SITC CODE	BASIC MACHINE NAME	Qty (No.)	Unit weight (ton)	Unit cost in 1980 (US $ 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
74161 014 312212	Hot gas H.E.	2	7.0	30.0					14.0						14.0
74161 014 412212	Cold gas H.E.	[illegible]	8.0	45.0					16.0						16.0
74161 014 [illegible]	Acid cooler	2	9.0	110.0					18.0						18.0
74161 014 [illegible]	Acid cooler	2	11.0	150.0					28.0						22.[illegible]
74161 [illegible]	Acid cooler	2	15.0	200.0					30.0						30.0
74161 014 [illegible]	Waste heat boiler		[illegible]	200.0					50.0						50.0
74161 014 [illegible]22212	Interpass economizer	[illegible]	[illegible]	25.0					10.0						10.0
74161 014 [illegible]23212	Final economizer	2	14.0	100.0					20.0						20.0
74161 [illegible]	Super heater		[illegible]	150.0					40.0						40.0

UNIDO/SPO (AZOT)

CAPITAL GOODS

DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR THE NEW SULFURIC ACID PLANT,
CAPACITY : 1[illegible] t/d LOCATION : [illegible]
ANTICIPATED DATE OF COMMISSIONING : 1987
FERTILIZER INDUSTRY- SULFURIC ACID
Converter, Tower

In.Code 3512-3

Weight/Value

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $ 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
74165 0931145211	Converter	2	90.0	161.0					180.0						180.0
74166 0321424211	Drying Tower	2	33.0	78.0					99.0						99.0
74[illegible] 0321424211	Re-absorption tower	2	36.0	96.1					72.0						72.0
74[illegible] 0321424211	Absorption tower	2	40.0	107.0					80.0						80.0

UNIDO/SPO (AZOT)

CAPITAL GOODS

DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR THE NEW SULFURIC ACID PLANT,
CAPACITY : [illegible] t/d LOCATION: [illegible]
ANTICIPATED DATE OF COMMISSIONING : 1987
FERTILIZER INDUSTRY-SULFURIC ACID

Ind. Code 3512-3

Pump, blower

Weight/Value

SITC CODE [illegible]	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $. 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
74220 0222511212	Acid transfer pump	2	0.6	1.2					1.0						1.0
74220 0223521212	3 burner feed pump	2	1.0	1.17					2.0						2.0
74220 0231511212	Acid transfer pump	2	0.7	1.32					1.4						1.4
74220 0231511212	Acid drain pump	2	0.7	1.2					1.4						1.4
74220 0231521212	[illegible]at pump	2	0.7	1.28					1.4						1.4
74220 0232521212	Filtration pump	2	0.7	1.07					1.4						1.4
74220 0241521212	Acid pump	2	1.3	1.5					1.6						1.6
74220 0251521222	Acid pump	2	2.0	9.9					4.0						4.0
7-24[illegible]	Air blower	2	3.0	183.0					3.0						3.0

UNIDO/SPO (AZOT)

CAPITAL GOODS

DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR THE NEW SULFURIC ACID PLANT, CAPACITY [illegible] t/d LOCATION: [illegible]
ANTICIPATED DATE OF COMMISSIONING : 1987
FERTILIZER INDUSTRY- SULFURIC ACID

Ind. Code 3512-3

Weight/Value

Filters, and belt conveyors

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $. 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Totol 1981-1990
74361 5080002122	Air filter	2	5.0	48.0					10.0						10.0
74362 3120001212	Sulfur filter	2	1.5	10.7					3.0						3.0
74426 0212011611	Belt conveyor	1	0.5	10.7					0.5						0.5
74426 0272013[illegible]	Belt conveyor	1	10.0	75.0					10.0						10.0
74426 [illegible]	Belt conveyor	1	13.0	86.0					13.0						13.0
74426 0272016671	Belt conveyor	1	30.0	263.0					30.0						30.0
74428 0081001951	Tripper	1	15.0	9.7					15.0						15.0

EQUIPMENT REQUIREMENTS FOR THE NEW SULFURIC ACID PLANT

CAPACITY: 1000 t/d LOCATION: [illegible]

ANTICIPATED DATE OF COMMISSIONING: 1987

FERTILIZER INDUSTRY-SULFURIC ACID

Ind. Code 3512-3

~~Weight/Value~~

UNIDO/SPO (AZOT)

CAPITAL GOODS DEVELOPMENT PROJECT

Hopper, tank drum

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $. 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
69211 0111322211	Sulfur feedhopper	1	8.0	5.6					5.6						5.6
69211 0711321211	Acid tank	2	4.0	12.0					24.0						24.0
69211 0712322211	Acid tank	2	7.0	15.0					30.0						30.0
69211 1364326211	Acid storage tank	[illegible]	175.0	190.0					380.0						380.0
69245 0304244[illegible]	Steam drum	[illegible]	5.0	35.0					70.0						70.0

UNIDO/SPO (AZOT)

CAPITAL GOODS

DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR THE NEW SULFURIC ACID PLANT,
CAPACITY : 1050 t/d LOCATION : [illegible]
ANTICIPATED DATE OF COMMISSIONING: 1987
FERTILIZER INDUSTRY-SULFURIC ACID

Ind. Code 3512-3

PAGE 2

Weight/Value

Turbine, Combustion Chamber

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $. 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
71261 0200212322	Turbine for blower	2	5.0	10.0					20.0						20.0
74132 2445004212	S Combustion cham	2	30.0	30.0					60.0						60.0

UNIDO/SPO (AZOT)

CAPITAL GOODS

DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR THE NEW SULFURIC ACID PLANT,
CAPACITY 1050 t/d LOCATION: [illegible]
ANTICIPATED DATE OF COMMISSIONING: 1987
FERTILIZER INDUSTRY-SULFURIC ACID

Ind.Code 3512-3

Heat exchanger

~~Weight~~/Value

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $. 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
74161 0143312212	Hotgas H.E.	2	7.0	30.0					60.0						60.0
74161 0144412212	Cold gas H.E.	2	9.0	45.0					90.0						90.0
74161 0340012612	Acid cooler	2	9.0	110.0					220.0						220.0
74161 0340013612	Acid cooler	2	11.0	150.0					300.0						300.0
74161 0340013612	Acid cooler	2	15.0	200.0					400.0						400.0
74161 0660012232	Waste heat boiler	2	40.0	200.0					400.0						400.0
74161 0740022212	Interpass economizer	2	5.0	25.0					50.0						50.0
74161 0740023212	Final economizer	2	14.0	100.0					200.0						200.0
74161 0350023412	Super heater	2	20.0	150.0					300.0						300.0

UNIDO/SPO (ALGOT)

CAPITAL GOODS

DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR THE NEW SULFURIC ACID PLANT,
CAPACITY : 1000 t/d LOCATION : [illegible]
ANTICIPATED DATE OF COMMISSIONING : 1987
FERTILIZER INDUSTRY-SULFURIC ACID

Converter, Tower

Ind. Code 3512-3

BASE 4

Weight/Value

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $. 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
74165 0931145211	Converter	2	90.0	161.0					322.0						322.0
74166 0321a24211	Drying Tower	2	33.0	78.0					156.0						156.0
74166 0321f24211	F.Absorption tower	2	36.0	96.0					192.0						192.0
74166 0321s24211	Absorption tower	2	40.0	107.0					214.0						214.0

UNIDO/GPO (AZOT)

CAPITAL GOODS

DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR THE NEW SULFURIC ACID PLANT,
CAPACITY : [illegible] t/d LOCATION: [illegible]
ANTICIPATED DATE OF COMMISSIONING : 1987
FERTILIZER INDUSTRY-SULFURIC ACID

Ind.Code 3512-3

Weight/Value

Pump- blower

SITC CODE	BASIC MACHINE NAME	[illegible]	[illegible]	Unit cost in 1980 (US $ 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
74220 [illegible]	Acid [illegible] pump	2	0.5	1.2					2.4						2.4
74290 [illegible]	S burner/[illegible]	2	1.0	1.17					2.34						2.34
74290 [illegible]	[illegible] transfer pump	2	0.7	1.32					2.64						2.64
74290 [illegible]	[illegible] pump	2	0.5	1.2					2.4						2.4
74290 [illegible]	[illegible]	2	[illegible]	1.28					2.56						2.56
74290 [illegible]	Filtration pump	2	[illegible]	1.07					2.14						2.14
74290 [illegible]	[illegible]	2	0.8	3.5					7.0						7.0
74290 [illegible]	[illegible]	2	[illegible]	9.9					19.8						19.8
74342 [illegible]	[illegible]	2	3.0	183.0					366.0						366.0

UNIDO/SPO (ALGOT)

CAPITAL GOODS

DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR THE NEW SULFURIC ACID PLANT,
CAPACITY : [illegible] t/d LOCATION : [illegible]
ANTICIPATED DATE OF COMMISSIONING : 1967
FERTILIZER INDUSTRY-SULFURIC ACID

Filters, and belt conveyors

Ind.Code 3512-3

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Weight/Value

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1960 (US $. 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
74361 5080002122	Air filter	2	5.0	48.0					96.0						96.0
74362 3120001212	Sulfur filter	2	1.5	10.7					21.4						21.4
74426 0212041611	Belt conveyor	[illegible]	4.5	19.7					19.7						19.7
74425 0272013[illegible]1	Belt conveyor	1	18.0	73.0					73.0						73.0
74426 0272021[illegible]1	Belt conveyor	1	23.0	86.0					86.0						86.0
74425 0272021[illegible]1	Belt conveyor	1	30.0	268.0					268.0						268.0
74428 0050021[illegible]1	Tractor	1	15.0	9.7					9.7						9.7

1/80

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DEVELOPMENT OF CAPITAL GOODS INDUSTRIES

DP/TUR/76/034

Technical Report No. XII:
Demand for Capital Goods
for Fertilizer Industry

Vol. V

UNITED NATIONS DEVELOPMENT PROGRAMME

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANISATION

RESTRICTED

Sept.1982
English

DEVELOPMENT OF CAPITAL GOODS INDUSTRIES

DP/TUR/76/034

Technical report No.XII-Vol. V

Demand for Capital Goods for Fertiliser Industry-Urea-SOMA

Prepared for the Government of Turkey
by the United Nations Industrial Development Organization
acting as executing agency for the United Nations Development Programme

Based on the work of
Capital Goods Development Project Team in Turkey

United Nations Industrial Development Organization
Vienna

UNITED NATIONS DEVELOPMENT PROGRAMMES IN TURKEY

CAPITAL GOODS DEVELOPMENT PROJECT IN TURKEY

Vol.V

Urea-SOMA

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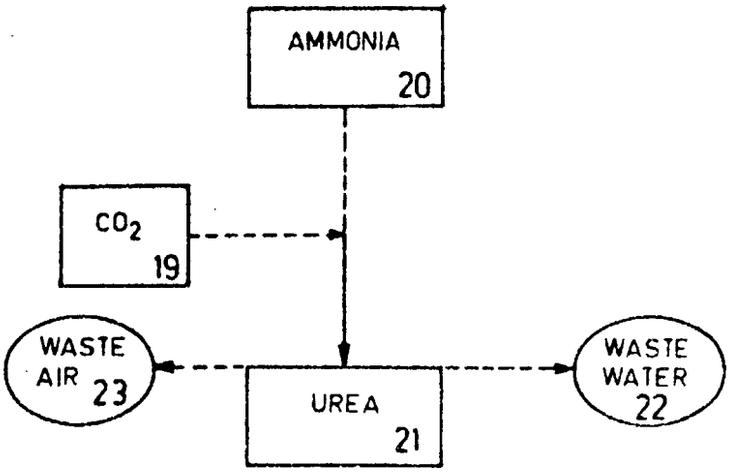


FERTILIZERS AND PESTICIDES UREA			INDUSTRY CODE 3512 . 5
UNIDO/SPO (AZOT) CAPITAL GOODS DEVELOPMENT PROJECT			
MODULAR PRODUCTION CHART			
DATE	Prepared by	Drawn by	Checked by
23.9.1981	E. ABDELAL	F. ÇELİK	V. MIHLADIZ
Checked by UNIDO/Expert		Approved by UNIDO/CTA	

UNIDO/SPO (AZOT)

CAPITAL GOODS DEVELOPMENT PROJECT

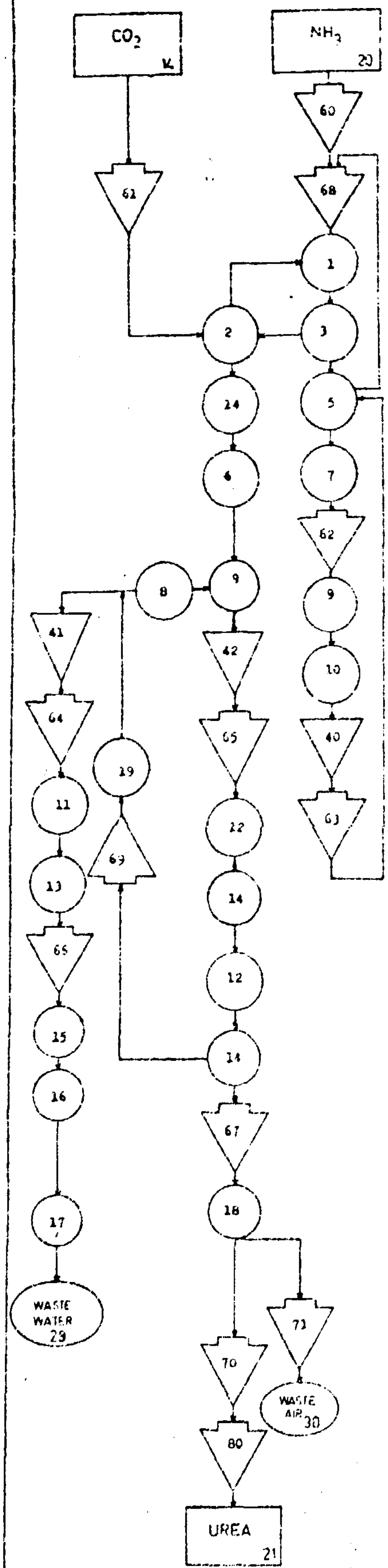
Prepared by	Checked by	Approved by
Chem. Eng. MSc E. ABDELAL	UNIDO/Expert	UNIDO/CTA

Ind. Code: 3512-5

Ind. Name Fertilizer and Pesticides

UREA

PRODUCTION STAGE		TECHNOLOGY		CRITICAL EQUIPMENT		DESIGN LINE CAPACITY	
CODE	NAME	CODE	NAME	NAME	CAPACITY RANGE	CODE	CAPACITY
20	Ammonia	-	-	-	-	-	-
						-	-
21	Urea	1	Stripping	reactor	205 m^3	1	64.58 t/h
						2	45.83 t/h



ACTIVITY CODE		INDUSTRY	PRODUCT	TECH	CAP
		392 5	2	.	:

NO	MACHINE CODE	MACHINE NAME	QUAN
60	742100230133642	HP-NH_3 pump	2
61	743131056204162	CO_2 compressor	1
1	741610540016122	HP condenser	1
2	741610140016222	HP heat exchanger	1
3	741550246357642	Reactor	1
4	741660421422613	Rectif ying column	1
5	741560206403132	LP scrubber	1
6	741610100013112	Heater recirculation	1
7	741660311411612	Absorber	1
62	74220023201171[illegible]	Absorber circ. pump	2
8	741610320011622	Absorber circ.cooler	1
9	692430211321[illegible]	Flash tank	1
10	741660210021612	Scrubber	1
40	692430212321612	Level tank	1
63	742100136[illegible]3742	Carbonate pump	2
41	692111320023619	NH_3 water tank	1
42	69211132002361[illegible]	Urea storage tank	1
64	742200234011711	Desorber feed pump	2
65	742200243011713	Urea sol'n pump	2
11	741530120011[illegible]	Desorber heat exchan	1
12	741[illegible]20100013[illegible]	Evaporator	2
13	741660920011614	Desorption column	2
14	692430211321111	Separator	2
66	742200235011711	Hydrolyzer feed pump	2
15	741310140012610	Hydrolyzer heat exchanger	1
16	741650310054[illegible]	Hydrolizer	1
17	741610250011[illegible]	Waste water cooler	1
67	742200234011714	Urea melt pump	1
18	7[illegible]340510009341	Prilling tower	1
70	744[illegible]60[illegible]20012[illegible]14	Belt conveyor	1
80	7[illegible]066111[illegible]004	Belt scale	1
71	743410132121[illegible]02	Fan	4
68	742400130001[illegible]1	HP ejector	
19	741610540013[illegible]1	Condenser	
69	74[illegible]4001100317[illegible]2	Ejector	

CAPACITY CALCULATIONS

Name of the critical equipment : reactor
Design capacity of the Cr. eq : 225 m^3
No. of critical equipment :1
Design line capacity : 71 t/hour
Design line capacity : 568 t/shift
Design line capacity : 17[illegible] t/day
Design line capacity : 511200 t/year

UNIDO /SEGE TAVOR[illegible]

CAPITAL GOODS DEVELOPMENT PROJEC[illegible]

[illegible] FLOW DIAGRAM

INDUSTRY	PRODUCT	TECHNOLOGY
[illegible]	UREA	[illegible]
DATE	SAMPLE PLANT	CAPACITY
[illegible].9.1981	-	71 t/h
ENGINEERED BY	DRAWN BY	CHECKED BY
Fatma Abdelal [illegible]	Cumhur Ilgaz	Vedat Lahleda[illegible]

[illegible] by UNIDO Expert [illegible] | Approved by UNIDO/CTA

[illegible] CAPITAL GOODS DEVELOPMENT PROJECT

ACTIVITY CODE 351PM111

SERIAL No.	[illegible]	BASIC MACHINE DESCRIPTION	MACH. SPECIFICATION	MACH. SPECIFICATION 1	MACH. SPECIFICATION 2	TYPE DESCRIPTION	MANUFACTURING CHARACT-1	MANUFACTURING CHARACT-2	MANUFACTURING CHARACT-3	ORIGIN	CLASS	PURCHASE COST 1000 $ UNIT	PURCHASE COST 1000 $ TOTAL	CONSTANT 1980 [illegible] UNIT	CONSTANT 1980 [illegible] TOTAL	YEAR OF PURCHASE	SITE CODE 1 2 3 4 5	6 7	8	9	10	11	12	13	14	15
[illegible]		[illegible] pump	Q= [illegible] m³/h	1234 [illegible]	Cold clear	Horizontal	21	C-steel	6 ton	2	2	310	620	816	1632,4	[illegible]	74210	02	3	[illegible]	1	1	1	[illegible]	6	2
[illegible]		[illegible] compressor	Q= 4[illegible]3.3 m³/h	145 kg/cm²	[illegible]	Horizontal	[illegible]	[illegible]	15 ton	2	1	[illegible]	[illegible]	[illegible]	[illegible]	1965	74313	10	5	6	2	0	4	2	6	2
[illegible]		[illegible]	3000 m³	-	-	Steel tube	115.0	C-steel	30 m	2	1	600	600	600	600	1960	74103	05	4	0	0	1	[illegible]	2	2	2
[illegible]		[illegible]	4100 m³	-	-	Steel tube	[illegible]	C-steel	30 m	2	1	600	600	600	600	[illegible]	74161	03	6	0	0	1	6	[illegible]	2	2
[illegible]		Reactor	V= [illegible] m³	[illegible] kg/cm²	non-catalytic	Sieve plate	[illegible]	St-steel	60 m	2	1	[illegible]	[illegible]	700	700	1978	74165	07	4	6	2	6	[illegible]	6	3	2
[illegible]		[illegible]	[illegible] m³	[illegible] kg/cm²	T= 115	Packed	5	St-steel	16 m	2	1	50	50	67,3	67,3	1975	74166	04	8	1	4	2	2	6	1	7
[illegible]		[illegible]		[illegible] kg/cm²	T= [illegible] °C	Shell tube	15.0	C-steel	45 m	2	1	40	40	47,1	47,1	1976	74166	07	0	6	4	0	3	2	3	7
[illegible]		Water [illegible]	3300 m²			Shell tube	[illegible]	C-steel	16 m	2	1	600	600	600	600	1980	74163	01	0	0	0	1	3	2	3	2
[illegible]		[illegible]	V= 4.7[illegible] m³	[illegible] kg/cm²	T= 120°C	Packed	2.0	St-steel	16 m	2	1	30	30	38,7	38,7	1979	74166	03	1	1	4	1	1	6	1	2
[illegible]		Absorp[illegible]	Q= 45 m³/h	1461.8 [illegible]		[illegible]	0.75	St-steel	0.1 ton	1	2	2.5	5	6.6	13.2	1976	74220	02	1	2	0	1	1	7	3	1
[illegible]		[illegible]	33 m²			Plates	1.1	St-steel	15 m	1	1	17	17	17	17	[illegible]	74103	03	7	0	0	1	1	6	1	1
[illegible]		[illegible]	V= 0.3 m³	P=1 atm	T= 90°C	Cylindrical	3.2	St-steel	12 m	1	1	5	5	5.4	5.4	1975	69243	02	1	1	3	2	1	6	3	1
[illegible]		[illegible]	V= 2 m³			[illegible]	1.2	St-steel	12 m	1	1	22	22	23.6	23.6	1979	74166	02	1	0	0	1	1	6	3	1
[illegible]		[illegible]	V= 6.[illegible] m³	P=2 atm		Cylindrical	[illegible]	St-steel	16 m	1	1	[illegible]	[illegible]	[illegible]	[illegible]	1975	69243	02	1	1	3	2	1	6	1	1
[illegible]		[illegible] pump	Q= 45 m³/h	[illegible]		Horizontal	12.5	St-steel	6 ton	2	[illegible]	[illegible]	[illegible]	4423	[illegible]	1960	74210	01	3	6	0	1	3	7	4	2
42		[illegible] tank	V= 450 m³			Cyl.	24.5	St-steel	16 m	1	1	[illegible]	[illegible]	50.1	50.1	[illegible]	69211	11	2	0	0	2	3	6	1	1
[illegible]		[illegible]	V= [illegible] m³			Cyl.	[illegible]	St-steel	16 m	1	1	17	17	42.6	[illegible]	[illegible]	69211	11	2	0	0	[illegible]	1	6	1	1
[illegible]		[illegible]	Q= 15 m³/h	112.14 [illegible]		Horizontal	[illegible]	St-steel	0.7 ton	1	[illegible]	4.44	[illegible]	11.7	23.4	[illegible]	74220	02	1	4	0	1	1	7	2	1
[illegible]		[illegible]	[illegible]	52 [illegible]		Horizontal	[illegible]	St-steel	0.3 ton	2	2	4.1	[illegible]	[illegible]	[illegible]	[illegible]	74220	02	4	3	[illegible]	1	1	[illegible]	3	2
[illegible]		[illegible] exchanger	21.2 m²			Plate	[illegible]	St-steel	0.3 t	2	1	11	11	11	11	[illegible]	74103	01	8	0	0	1	1	[illegible]	3	2
[illegible]		[illegible]	[illegible] m²			Shell tube	[illegible]	C-steel	18 m	2	2	[illegible]	[illegible]	267	535	1975	74167	01	6	0	0	1	1	6	1	1
[illegible]		[illegible] column	V= 1.6 m³			[illegible]	[illegible]	St-steel	16 m	2	[illegible]	49	[illegible]	52.6	[illegible]	1975	74166	09	2	0	0	1	1	6	3	[illegible]
[illegible]		[illegible]	V= 90 m³	P= 1 atm	T= 110°C	Cyl.	[illegible]	St-steel	16 m	1	2	[illegible]	210	123	246	1978	69243	02	1	1	3	2	3	6	1	1
[illegible]		[illegible]	Q= 15 m³/h	[illegible]		Horizontal	[illegible]	St-steel	0.5 ton	1	[illegible]	7.9	15.8	20.8	[illegible]	[illegible]	74270	02	1	[illegible]	0	1	1	7	1	1
[illegible]		[illegible] heat exchanger	251 m²			Shell tube	[illegible]	St-steel	16 m	1	1	[illegible]	[illegible]	[illegible]	80	1960	74103	01	4	[illegible]	0	1	1	6	1	2
[illegible]		[illegible]	V= [illegible] m³			[illegible]	[illegible]	St-steel	16 m	2	1	[illegible]	[illegible]	214.1	214.1	1979	74165	02	3	0	0	[illegible]	4	6	1	2
[illegible]		[illegible]	52 m²			Plates	[illegible]	St-steel	12 m	1	1	[illegible]	[illegible]	[illegible]	23	[illegible]	74103	03	3	0	0	1	1	6	1	1
[illegible]		[illegible] heat [illegible]	[illegible] m³/h	102 m [illegible]		Horizontal	[illegible]	St-steel	0.5 ton	2	1	[illegible]	[illegible]	6.6	[illegible]	1968	74220	02	[illegible]	4	0	1	1	7	3	1
[illegible]		[illegible] tower	50 t/h	[illegible]	[illegible]		5100 ton	Concrete	50 c.	[illegible]	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	72834	06	1	6	0	0	9	5	4	[illegible]
										1	1															
[illegible]		Belt conveyor	[illegible]	[illegible]	[illegible]	[illegible]	10.0	[illegible] steel	9 ton	1	[illegible]	[illegible]	[illegible]	21,6	[illegible]	1979	[illegible]	[illegible]	2	0	0	1	2	[illegible]	6	[illegible]
[illegible]		[illegible]	[illegible]			[illegible]	[illegible]	[illegible]	0.2 ton	[illegible]	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	74525	[illegible]	6	1	1	1	1	6	1	[illegible]
[illegible]		[illegible]	[illegible]	[illegible]	[illegible]		4.3	[illegible] steel	5.5 ton	1	4	[illegible]	[illegible]	[illegible]	[illegible]	1976	[illegible]	01	[illegible]	7	1	1	1	6	1	[illegible]
[illegible]		[illegible]	[illegible]			[illegible] driven	[illegible]	St-steel	0.2 ton	[illegible]	1	1	1	1.4	1.4	[illegible]	[illegible]	01	3	0	0	0	1	7	[illegible]	[illegible]
[illegible]		[illegible]	[illegible]			Shell tube	[illegible]	St-steel	16 m	1	2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	74103	05	4	0	0	1	1	6	1	[illegible]
[illegible]		[illegible]	[illegible]	[illegible] kg [illegible]		Steam driven	[illegible]	St-steel	0.5 ton	2	2	1	2	1.4	2.6	1976	74240	01	1	0	0	0	8	8	1	[illegible]

UNIDO/SPO (AZOT)
CAPITAL GOODS
DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR UREA PLANT
LOCATION: [illegible] CAPACITY : 1550 t/d
ANTICIPATED DATE OF COMMISSIONING: 1987
FERTILIZER INDUSTRY: Urea

Ind. Code: 3512-5
Weight/~~Value~~

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $ 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
69211 1320023611	NH_3 water tank	1	24.5	50.1					24.5						24.5
69211 1320023611	Urea storage tank	1	23.0	42.6					23.0						23.0
69243 0211321611	Flash tank	1	3.2	5.4					3.2						3.2
69243 0211321611	Level tank	1	1.9	32.1					1.9						1.9
69243 0211323611	Separator	2	19.8	123.0					39.6						39.6
[illegible]	Prilling tower	1	510.0	[illegible]					510.0						[illegible]
74161 0100013212	Heater recirculation	1	130	[illegible]					130.0						[illegible]
74161 0120011612	[illegible] heat exch.	1	[illegible]	[illegible]					[illegible]						[illegible]
74161 0140016222	Hp heat exchanger	[illegible]	[illegible]	[illegible]					162.0						[illegible]
74162 0330011611	Absorber circ. cooler	1	1.3	17.0					1.3						[illegible]
74161 0330011611	Waste water cooler	1	2.0	23.0					2.0						2.0
74161 0540013611	Condenser	2	15.5	[illegible]					31.0						31.0
74161 0540016222	Hp Condenser	1	119.0	600.0					119.0						119.0
74162 0100013612	Evaporator	2	10.7	237.0					21.4						21.4
74165 0246257642	Reactor	1	280.0	700.0					280.0						480.0
74165 0330054612	Hydrolyzer	1	32.5	214.8					32.5						32.0
74166 0206403232	Hp Scrubber	1	18.0	47.1					18.0						18.0
74161 0140012611	Hydrolyzer heat exch.	1	9.8	30.0					9.8						9.8

UNIDO/SPO (AZOT)
CAPITAL GOODS
DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR UREA PLANT
LOCATION: [illegible] CAPACITY : 1350 t/d
ANTICIPATED DATE OF COMMISSIONING: 1987
FERTILIZER INDUSTRY: Urea

Ind. Code: 3512-5
Weight/Value

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost'in 1980 (US $ 1000)	1981	192	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
74166 0210021611	Scrubber	1	1.1	23.6					1.1						1.1
74166 0311411612	Absorber	1	2.0	38.7					2.0						2.0
74166 0421422612	Rectifying column	1	5.0	62.3					5.0						5.0
74166 0920011612	Desorption column	2	3.9	52.6					7.8						7.8
74210 0136013742	Carbamate pump	2	12.5	442.3					25.0						25.0
74210 0238113642	Hp-NH_3 pump	2	11.0	816.2					22.0						22.0
74220 0232011711	Absorber circ. pump	2	0.25	6.6					0.5						0.5
74220 0234011711	Desorber feed pump	2	0.3	11.7					0.6						0.6
74220 0234011712	Urea melt pump	1	0.69	6.6					0.69						0.69
74220 0235011711	Hydrolyzer feed pump	2	0.71	20.8					1.42						1.42
74220 0243011712	Urea sol'n pump	2	0.64	10.8					1.28						1.28
74240 0110001712	Booster	2	0.78	1.4					1.56						1.56
74240 0130001712	Hp Ejector	1	0.28	1.4					0.28						0.28
74313 1056204262	CO_2 compressor	1	30.0	752.0					30.0						30.0
74341 0132131631	Fan	4	4.3	9.6					17.2						17.2
74426 0220012641	Belt conveyor	1	10.0	23.6					10.0						10.0
74525 0661111611	Belt scale	1	0.36	0.31					0.36						0.36

UNIDO/SPO (AZOT)
CAPITAL GOODS
DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR UREA PLANT
LOCATION: SOMA. CAPACITY : 1000 t/d
ANTICIPATED DATE OF COMMISSIONING: 1987
FERTILIZER INDUSTRY : Urea

Ind. Code 3512-5
~~Weight/Value~~

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost'in 1980 (US $ 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
69211 1320023611	NH_3 water tank	1	24.5	50.1					50.1						50.1
69211 1320023611	Urea storage tank	1	23.0	42.6					42.6						42.6
69243 0211321611	Flash tank	1	3.2	5.4					5.4						5.4
69243 0211321611	Level tank	1	1.9	32.1					32.1						32.1
69243 0211323611	Separator	2	19.8	123.0					246.0						246.0
72834 0516009941	Prilling tower	1	5100	195.0					195.0						195.0
74161 0100013212	Heater recirculation	1	130	600.0					600.0						600.0
74161 0120011612	Desorber heat exch.	1	0.6	11.0					11.0						11.0
74161 0140012611	Hydrolyzer heat exch.	1	9.8	80.0					80.0						80.0
74161 0140016222	Hp heat exchanger	1	162.0	600.0					600.0						600.0
74161 0320011611	Absorber circ. cooler	1	1.3	17.0					17.0						17.0
74161 0330011611	Waste water cooler	1	2.0	23.0					23.0						23.0
74161 0540013611	Condenser	2	15.5	126.0					252.0						252.0
74161 0540016222	Hp Condenser	1	119.0	600.0					600.0						600.0
74162 0100013612	Evaporator	2	10.7	267.0					534.0						534.0
74165 0246267642	Reactor	1	280.0	700.0					700.0						700.0
74165 0330054612	Hydrolyzer	1	32.5	214.8					214.8						214.8
74166 0206403232	HP Scrubber	1	18.0	47.1					47.1						47.1

UNIDO/SPC (AZCT)

CAPITAL GOODS

DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR UREA PLANT

LOCATION: [illegible] CAPACITY : 1550 t/d

ANTICIPATED DATE OF COMMISSIONING: 1987

FERTILIZER INDUSTRY: Urea

Ind. Code: 3512-5

~~Weight~~/Value

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $ 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
74166 0210021611	Scrubber	1	1.1	23.6					23.6						23.6
74166 0311411612	Absorber	1	2.0	38.7					38.7						38.7
74166 0421422612	Rectifying column	1	5.0	62.3					62.3						62.3
74166 0920011612	Desorption column	2	3.9	52.6					105.2						105.2
74210 0138013742	Carbamate pump	2	12.5	442.3					8846.0						8846.0
74210 0238113642	HP-NH_3 pump	2	11.0	816.2					1632.0						1632.4
74220 0232011711	Absorber circ. pump	2	0.25	6.6					13.2						13.2
74220 0234011711	Desarber feed pump	2	0.3	11.7					23.4						23.4
74220 0234011712	Urea melt pump	1	0.69	6.6					6.6						6.6
74220 0235011711	Hydrolyzer feed pump	2	0.71	20.8					41.6						41.6
74220 0243011712	Urea sol'n pump	2	0.64	10.8					21.6						21.6
74240 0110001712	Booster	2	0.78	1.4					2.8						2.8
74400 0130001712	Hp Ejector	1	0.28	1.4					1.4						1.4
74313 1036214262	CO_2 Compressor	1	30.0	752.0					752.0						752.0
74341 0132131631	Fan	4	4.3	9.6					38.4						38.4
74426 0220012641	Belt conveyor	1	10.0	23.6					23.6						23.6
74525 0661111611	Belt scale	1	0.35	0.31					0.31						0.31

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DEVELOPMENT OF CAPITAL GOODS INDUSTRIES

DP/TUR/76/034

Technical Report No. XII:
Demand for Capital Goods
for Fertilizer Industry

Vol : VI

UNITED NATIONS DEVELOPMENT PROGRAMMES IN TURKEY

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANISATION

RESTRICTED

Sept, 1982
English

DEVELOPMENT OF CAPITAL GOODS INDUSTRIES

DP/TUR/76/034

Technical report No.XII-Vol VI

Demand for Capital Goods for Fertiliser Industry-
DAP-ISKENDERUN

Prepared for the Government of Turkey
by the United Nations Industrial Development Organization
acting as executing agency for the United Nations Development Programme

Based on the work of
Capital Goods Development Project Team in Turkey

United Nations Industrial Development Organization
Vienna

UNITED NATIONS DEVELOPMENT PROGRAMMES IN TURKEY

CAPITAL GOODS DEVELOPMENT PROJECT IN TURKEY

Vol. VI

DAP-ISKENDERUN

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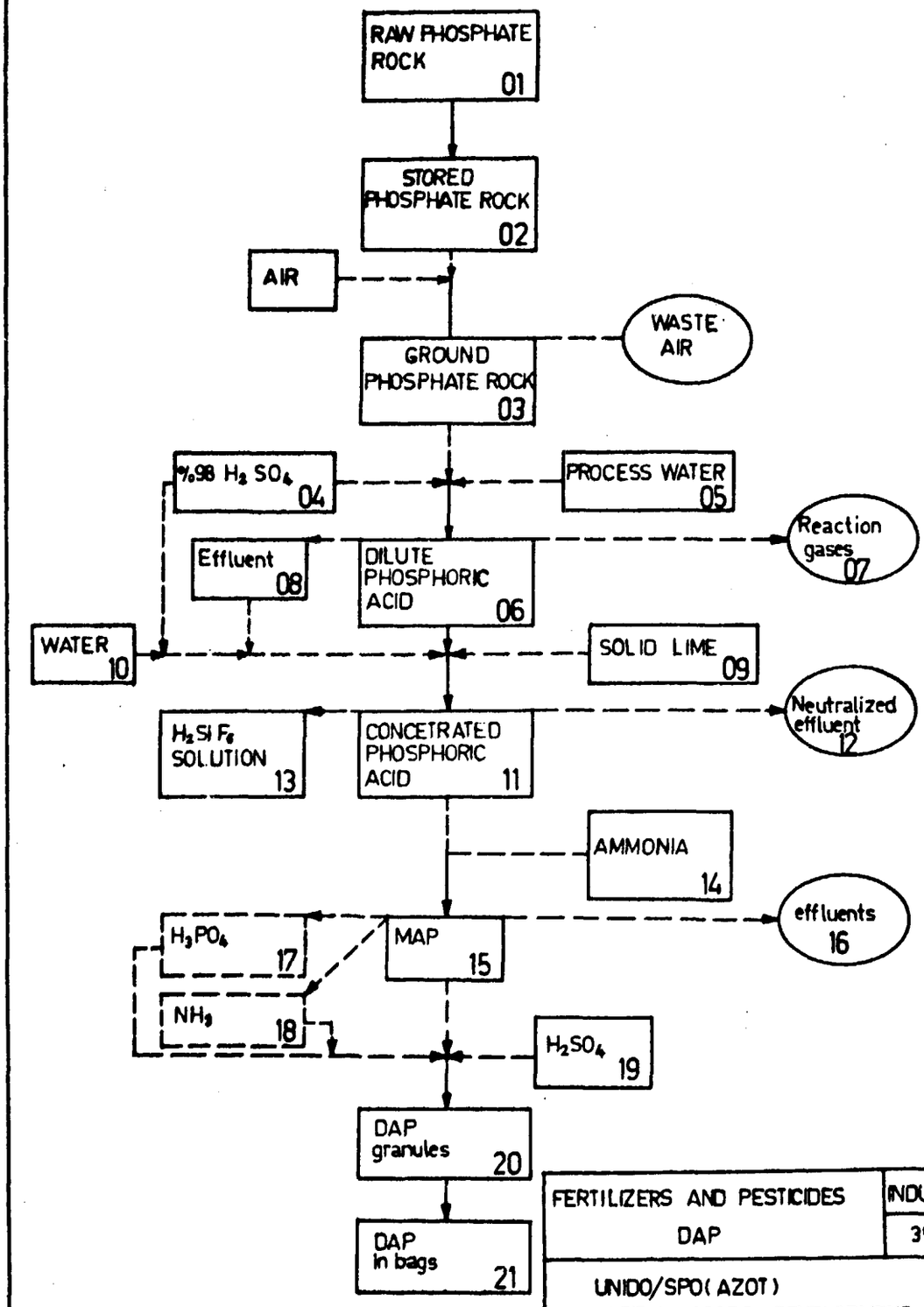


FERTILIZERS AND PESTICIDES DAP	INDUSTRY CODE 3512 - 4
UNIDO/SPO(AZOT) CAPITAL GOODS DEVELOPMENT PROJECT	
MODULAR PRODUCTION CHART	

DATE	Prepared by	Drawn by	Checked by
7. 9 . 1981	F. ABDELAL	F. ÇELİK	V. MIHLADIZ
Checked by UNIDO/Expert		Approved by UNIDO/CTA	

UNIDO/SPO (AZOT)

CAPITAL GOODS DEVELOPMENT PROJECT

Ind.Code : 3512-4

Ind.Name : Fertilizer and Pe. Acids

Prepared by	Checked by	Approved by
Chem.Eng.BSc R. ABDSLAL	UNIDO/Expert	UNIDO/CTA

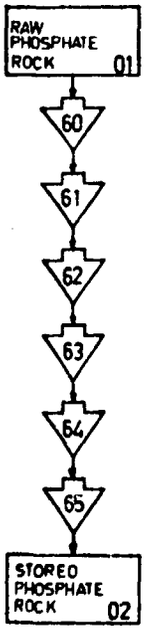
INDUSTRY ACTIVITIES CHART

DAP

PRODUCTION STAGE		TECHNOLOGY		CRITICAL EQUIPMENT		DESIGN LINE CAPACITY	
CODE	NAME	CODE	NAME	NAME	CAPACITY RANGE	CODE	CAPACITY
01	Raw phosphate rock	-	-	-	-	-	-
02	Stored phosphate rock	1	tripping	tripper	750 t/h	1	750 t/h
03	Ground phosphate	1	grinding	ball mill	110 t/h	1	110 t/h
06	$\leq 28\ H_3PO_4$	1	wet process	reaction tank	1250 m^3	1	110 t/h
11	$\leq 52\ H_3PO_4$	1	evaporation	evaporation drum	207 m^3	1	62 t/h
15	MAP	1	slurry process	MAP Tower	1964 m^3	1	51 t/h
20	DAP granules	1	granulation	granulator	341 t/h	1	64 t/h
21	DAP in bags	1	bagging	bagging machines	1050 bag/h	1	210 t/h

ACTIVITY CODE	INDUSTRY	PRODUCT	TECH.	CAP.
	3512-4	02	1	1

NO	MACHINE CODE	MACHINE NAME	QUAN
60	74426 0273012641	Belt conveyor	1
61	74426 0272011611	Belt conveyor	1
62	74426 0272013651	Belt conveyor	1
63	74426 0272013651	Belt conveyor	1
64	74426 0272013651	Belt conveyor	1
65	74428 0400321672	Tripper	1



CAPACITY CALCULATIONS

Name of the critical equipment Tripper

Design Capacity of the critical equipment: 750 t/h

No. of critical equipment : 1

Design line capacity : 750 t/hour

Design line capacity : 6000 t/shift

Design line capacity : 18.000 t/day

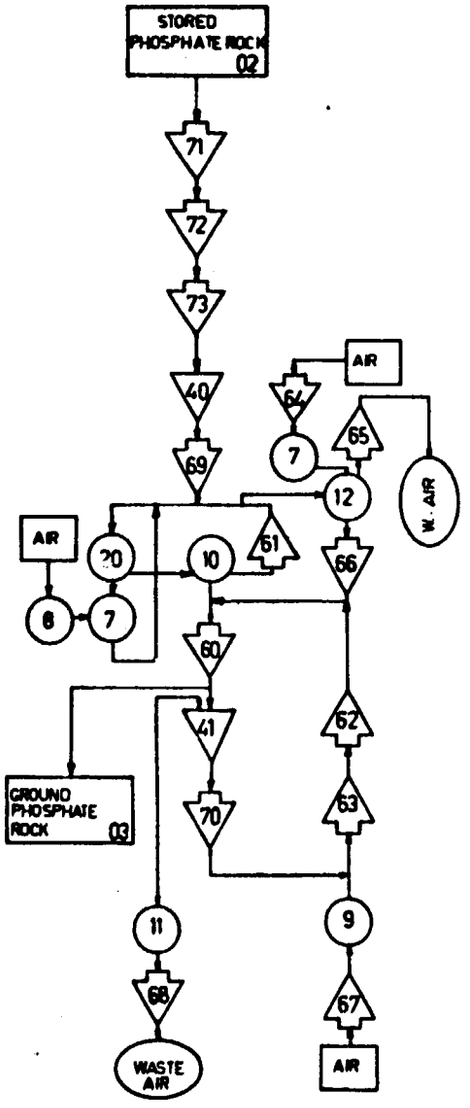
Design line capacity : 792.000 t/year

UNIDO/SPO (AZOT)
CAPITAL GOODS DEVELOPMENT P[illegible]

MODULAR FLOW DIAGRAM

INDUSTRY	PRODUCT	TECHNOLOGY
FERTILIZER	DRIED PHOSPHATE ROCK	TRIPPING AND SCRAPING
DATE	SAMPLE PLANT	CAPACITY
2 [illegible] 1981		750 t/h
Prepared by	Drawn by	Checked by
E. ARDELEAN	F. CELIK	V. MIHLADIZ

Checked by UNIDO/[illegible] Approved by UNIDO/PTA



CAPACITY CALCULATIONS

Name of the critical equipment: Ball Mill
Design capacity of the critical equipment : 110 t/h
No. of critical equipment : 1
Design line capacity : 880 t/shift
Design line capacity : 2640 t/day
Design line capacity : 792,000 t/year

ACTIVITY CODE	INDUSTRY	PRODUCT	TECH.	CAP.
	3512-4	03	1	1

NO	MACHINE CODE	MACHINE NAME	QUAN
40	69211 0120325211	Hopper	1
20	72831 6040022632	Classifier	1
7	72832 1128615271	Ball mill	1
61	74342 0171101232	Main blower	1
10	74361 1130011211	Cyclone	6
60	74426 1642013651	Conveyer	1
41	69211 0120325211	Hopper	1
62	74426 5130013251	Elevator	1
63	74423 0050031211	Air flied conveyer	1
64	74341 0138101632	Air fan	1
65	74341 0128131612	Exhaust fan	1
66	74426 4330011632	Screw conveyor	1
11	74361 5010001211	Exhaust filter	1
6	74132 2425202211	Combustion chamber	1
67	74341 0128101612	Conditioning fan	1
8	74131 4011001611	Air heater	1
68	74341 0127131612	Exhaust fan	1
9	74131 4011001611	Air heater	1
12	74361 5090001211	Filter	1
69	74426 7630011621	Peripheric extractor	1
70	74426 7630011621	Cellular extractor	1
72	74426 0232013651	Belt. Conveyer	1
73	74426 0232013651	Belt Conveyer	1
171	74428 0450025672	Reclaiming scraper	1

UNIDO/SPO(AZOT)
CAPITAL GOODS DEVELOPMENT PROJECT

MODULAR FLOW DIAGRAM

INDUSTRY	PRODUCT	TECHNOLOGY
FERTILIZER	GROUND PHOSPHATE ROCK	grinding
DATE	SAMPLE PLANT	CAPACITY
7. 9. 1981	—	110 t/h
Prepared by	Drawn by	Checked by
E. ABDELAL	F. ÇELİK	A

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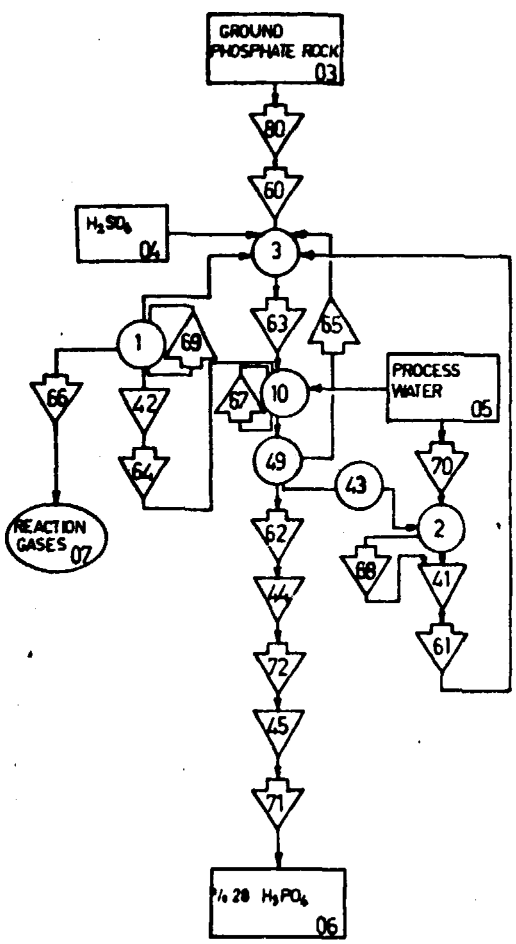
ACTIVITY CODE	INDUSTRY	PRODUCT	TECH.	CAP.
	3512-4	06	1	1

NO	MACHINE CODE	MACHINE NAME	QUAN
80	74525 0680111681	Dosimeter	1
60	74426 1630011621	Conveyer	1
63	74220 0241811712	Slurry pump	1
10	74362 4371004472	Ucego Filter	1
49	69243 0211321912	Separator	1
61	74220 0242511712	Acid pump	1
62	74220 0242511712	Strong acid pump	1
64	74220 0241221712	Process water pump	1
41	69211 0754328211	Dilute H_3PO_4 DEC.Tank	1
65	74210 2032811212	Sludge pumps	2
1	74166 0821434212	Washing towers	2
66	74342 0071111212	Blower	1
42	69211 0711321912	Tank for towers	1
67	74220 0243511712	Cloth washing pump	1
43	69243 0211321912	Vacuum separator	1
2	74166 0211431912	Scrubber	1
44	69211 0711321912	Barometric seal tank	1
68	74312 2353112222	Vacuum pump	2
69	74220 0242511712	Circulation pump	2
70	74220 0241511712	Process water pump	2
45	69211 0754324211	Dilute H_3PO_4 tank	1
71	74220 0231511712	Clarified H_3PO_4 pump	3
72	74220 0241511712	Dilute H_3PO_4 pump	1
3	74165 086121941	Reaction tank	1



CAPACITY CALCULATIONS

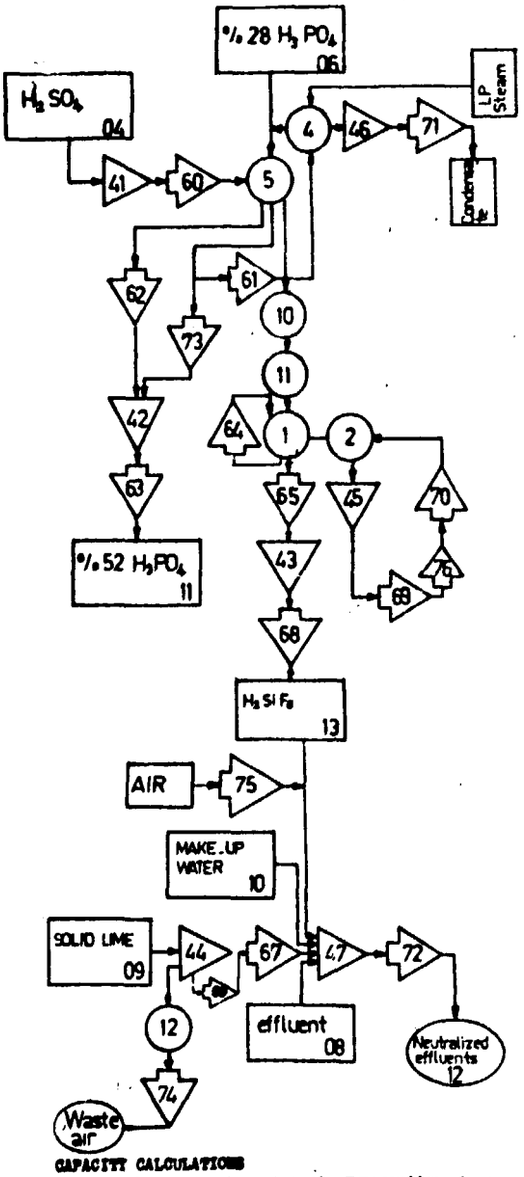
Name of the critical equipment:	**Reaction tank**
Design capacity of the critical equipment:	
No.of critical equipment	**:**
Design line capacity	**: 110 t/hour**
Design line capacity	**: 880 t/shift**
Design line capacity	**: 2640 t/day**
Design line capacity	**: 792,000 t/year**

UNIDO/SPO (AZOT)
CAPITAL GOODS DEVELOPMENT PROJECT

MODULAR FLOW DIAGRAM

INDUSTRY	PRODUCT	TECHNOLOGY
FERTILIZER	% 28 H_3PO_4	wet process
DATE	SAMPLE PLANT	CAPACITY
7 9 1981	—	110 t/h
Prepared by	Drawn by	Checked by
E. ABDELAL	F. ÇELİK	V. MIHLADIZ

Checked by UNIDO/Expert - A. A. L.	Approved by UNIDO/CTA



CAPACITY CALCULATIONS

Name of the critical equipment: Evaporation drum
Design capacity of the critical equipment: 207 m^3
No. of critical equipment : 2
Design line capacity : 62 t/h
Design line capacity : 496 t/shift
Design line capacity : 1488 t/day
Design line capacity : 446.400 t/year

ACTIVITY CODE	INDUSTRY	PRODUCT	TECH.	CAP.
	3512-4	11	1	1

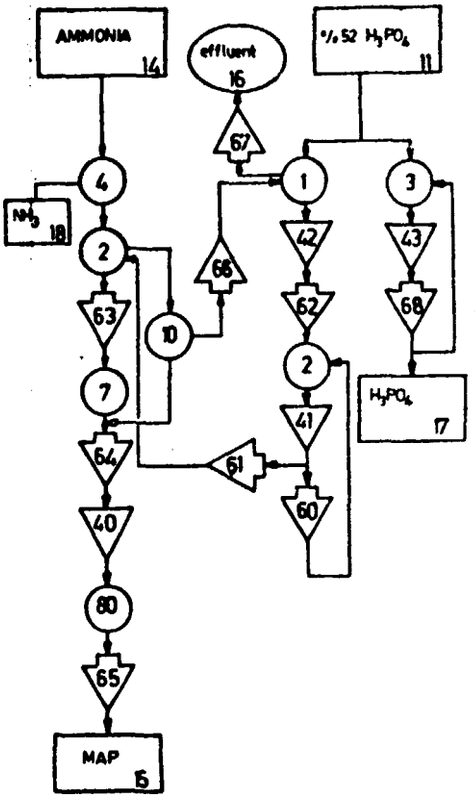
NO	MACHINE CODE	MACHINE NAME	QUAN
5	74162 1003514221	Evaporation drum	2
4	74161 01[illegible]12212	Graphite block exch.	2
60	74220 0222511212	H_2SO_4 pump	1
41	69211 0711321211	H_2SO_4 drum	1
61	74220 0261511722	Circulation pump	2
62	74220 0231511712	Conc. H_3PO_4 pump	2
63	74220 0232511712	H_3PO_4 pump	2
41	69211 1344325211	Conc. H_3PO_4 tank	1
10	74361 1102002211	Cyclone separator	2
11	74361 6101002211	Mist eliminator	2
1	74166 0321433212	Fluorine absorber	4
43	69211 1344325211	$H_2Si\ F_6$ storage tank	1
64	74220 0221511712	$H_2Si\ F_6$ pump	2
65	74220 022[illegible]511712	$H_2\ Si\ F_6$ pump	2
44	69211 0120325211	Hopper	1
66	74426 7610011611	Cellular extractor	1
67	74220 0231011712	Lime-water pump	1
68	74220 0241521712	Pump	1
2	74161 0563313212	Vacuum condenser	1
45	69211 0711321211	Tank	
69	74220 0261111712	CW pump	
70	74220 026211[illegible]722	CW pump (out)	1
46	69243 0211321211	Condensate drum	2
71	74220 0231211212	Condensate pump	2
72	74220 0241511212	Circ. pump	4
73	74220 0241511712	Draining pump	1
12	74361 50[illegible]0001112	Conditioning filter	1
74	74341 0114111212	Exhaust fan	1
47	69211 0711321912	Prep. tank	1
75	74342 0068101222	Air blower	
76	74341 0177121232	Cooling tower fans	

UNIDO/SPO(AZOT)
CAPITAL GOODS DEVELOPMENT PRO

MODULAR FLOW DIAGRAM

INDUSTRY	PRODUCT	TECHNOLOGY
FERTILIZER	% 52 H_3PO_4	EVAPORATION
DATE	SAMPLE PLANT	CAPACITY
7.9.1981		62 t/h
Prepared by	Drawn by	Checked by
E.ABDELAL	E.CLUK	V.MIHLADIZ

Checked by UNIDO/Expert [illegible] Approved by UNIDO/CTA



CAPACITY CALCULATIONS

Name of the critical equipment: MAP Tower

Design capacity of the critical equipment: 1964 m^3

No. of critical equipment : 1

Design line capacity : 51 t/hour

Design line capacity : 408 t/shift

Design line capacity : 1224 t/day

Design line capacity : 367.200 t/year

ACTIVITY CODE	INDUSTRY	PRODUCT	TECH.	CAP.
	3512-4	05	1	1

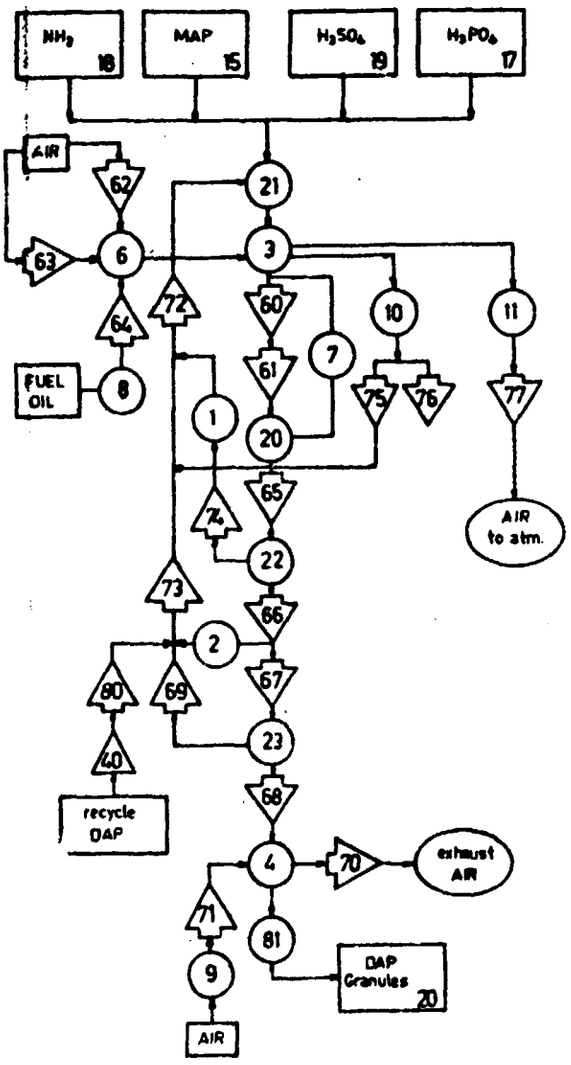
NO	MACHINE CODE	MACHINE NAME	QUAN
4	74161 0934111212	Ammonia vaporiser	1
2	74165 0811262512	Reactor	3
1	74166 0241434212	MAP tower scrubber	1
1	74166 0231431912	Granulator scrubber	1
41	69211 0711323212	Acid tank	1
66	74220 0252511712	Pump for scrubber	1
61	74220 0233511712	Transf pump	1
62	74220 0242511712	pump for scrubber	1
63	74426 0222011611	Belt conveyer	1
7	72832 0710111612	Lump crusher	1
64	72426 0222011611	Belt conveyer	1
80	69211 0110323211	Surge bin	1
80	74525 0670111611	MAP doseiser	1
65	74423 5140013651	Recycle elevator	1
10	74361 1291022211	Multicyclone	2
66	74341 0135131 6 32	Exhaust air fan	1
67	74341 0146131 6 32	Exhaust air fan	1
3	74166 0231431912	Dryer scrubber	1
42	69211 0711323212	Recin acid tank	1
68	74220 0242511712	Pump for scrubber	1
43	69211 0711323212	Acid tank	1
5	72634 0516006991	MAP Tower	1

UNIDO/SPO(AZOT)
CAPITAL GOODS DEVELOPMENT PROJECT

MODULAR FLOW DIAGRAM

INDUSTRY	PRODUCT	TECHNOLOGY
FERTILIZER	MAP	Slurry process
DATE	SAMPLE PLANT	CAPACITY
7 9 1981	—	51 t/h
Prepared by	Drawn by	Checked by
F. ABDELAL	F. CELIK	V. MIHLADIZ

Checked by UNIDO/Expert [signature] Approved by UNIDO/CTA



CAPACITY CALCULATIONS

Name of the critical equipment Granulator drum

Design capacity of the critical equipment: 340 t/h

No. of critical equipment : 1

Design line capacity : 64 t/hour

Design line capacity : 512 t/shift

Design line capacity : 1536 t/day

Design line capacity : 460,800 t/year

ACTIVITY CODE		INDUSTRY	PROD.	TECH.	CAP.
		3512-4	20	1	1

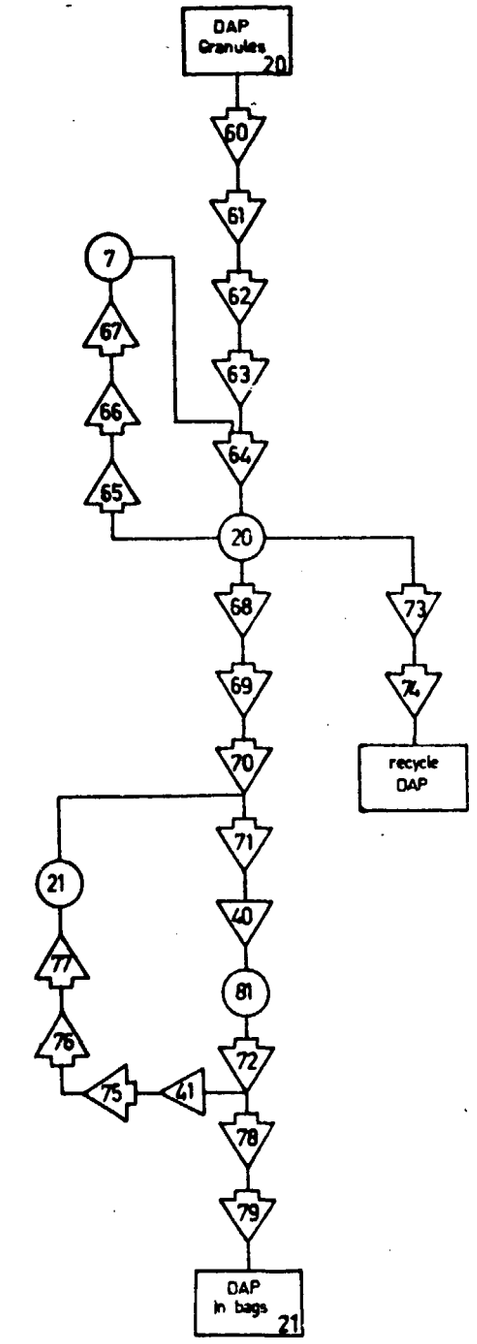
NO	MACHINE CODE	MACHINE NAME	QUAN
21	72834 0855008[illegible]	Granulator drum	1
3	74164 4085264212	Dryer drum	1
60	74426 0243011611	Belt conveyor	1
61	74426 3140013661	Main elevator	1
20	72831 0657011612	Oversize screen	1
7	72832 0710211681	Lump crusher	1
6	74132 8424202212	Combustion chamber	1
63	74342 0051101612	Air blower	1
64	74342 0051101622	Dilution air blower	1
8	74161 0710071212	Fuel oil heater	1
64	74210 1026611612	HP fuel oil pump	1
65	74426 0243013641	Belt conveyor	1
22	72831 0644011632	Main screen	1
66	74426 0232011631	Belt conveyor	1
67	74426 0222011641	Belt conveyor	1
23	72831 0634011632	Final screen	1
68	74425 0222011611	Belt conveyor	1
69	74426 0222011611	Belt conveyor	1
4	74164 9060061612	Fluidised bed cooler	1
70	74341 0134131632	Exhaust air fan	1
71	74342 0061101632	Air blower to cooler	1
9	74161 0710071212	Air heater	1
72	74426 0222012641	Belt conveyor	1
80	74525 0670111612	Weight scale	1
73	74426 0243013631	Belt conveyor	1
1	72832 0710412631	Oversize crusher	1
2	72832 0710412631	Product crusher	1
74	74426 0212011611	Belt conveyor	1
10	74361 1271022211	Multicyclone	1
11	74361 1281021211	Multicyclone	1
40	69211 0110323211	Bin	1
81	74525 0660111621	Product decimator	1
75	74426 4310011611	Screw conveyor	1
76	74341 0136111632	Ded. air fan	1
77	74341 0136131632	Exhaust fan	1

UNIDO / SPO (AZOT)
CAPITAL GOODS DEVELOPMENT PROJECT

MODULAR FLOW DIAGRAM

INDUSTRY	PRODUCT	TECHNOLOGY
FERTILIZER	DAP Granules	Granulation
DATE	SAMPLE PLANT	CAPACITY
7 9 1981	—	64 t/h
Prepared by	Drawn by	Checked by
E ABDELAL	F.ÇELİK	V MIHLADIZ

Checked by UNIDO/Expert A. Ilic | Approved by UNIDO/CTA



ACTIVITY CODE	INDUSTRY	PRODUCT	TECH.	CAP.
	3512-4	21	1	1

NO	MACHINE CODE	MACHINE NAME	QUAN
60	74426 0222013631	Belt conveyor	2
61	74426 0460029582	Reclaiming scraper	1
62	74426 0242012641	Belt conveyor	1
63	74426 0242014671	Belt conveyor	1
64	74426 7532011611	Vibrating conveyor	2
20	72831 0624011631	Vibrating screens	2
65	74426 0212011611	Belt conveyor	1
66	74426 3112013651	Belt elevator	1
67	74426 0212011611	Belt conveyor	1
7/	72832 0710111611	Crusher	1
68	74426 0242011631	Belt conveyor	1
69	74426 0242012641	Belt conveyor	1
70	74426 0242012641	Belt conveyor	1
71	74426 0242011631	Belt conveyor	1
40	69211 0110312611	Hopper	4
81	74525 0570211712	Bagging machines	4
72	74426 0122011611	Belt conveyor	4
73	74426 0212013661	Belt conveyor	1
74	74426 0212011631	Belt conveyor	1
41	69211 0110311611	Hopper	4
75	74426 0212011631	Belt conveyor	1
76	74426 0212011611	Belt conveyor	1
77	74426 3112013661	Belt conveyor	1
21	72831 0624011631	Vibrating sieve	1
78	74426 0122011611	Belt conveyor	4
79	74426 0122011631	Telescopic loader	4

CAPACITY CALCULATIONS

Name of the critical equipment: Bagging machines
Design capacity of the critical equipment :1050 bag/hour
No of the critical equipments: 4
Design line capacity : 210 t/hour
Design line capacity : 1536 t/shift
Design line capacity : 1536 t/day
Design line capacity : 460,800 t/year

UNIDO / SPO (AZOT)
CAPITAL GOODS DEVELOPMENT PROJECT

MODULAR FLOW DIAGRAM

INDUSTRY	PRODUCT	TECHNOLOGY
FERTILIZER	DAP in bags	BAGGING
DATE	SAMPLE PLANT	CAPACITY
7.9.1981	—	210 t/h
Prepared by	Drawn by	Checked by
E ABDELLAL	F CELİK	V MIHLADZ

Checked by UNIDO/Expert | Approved by UNIDO/CTA

UNIDO/SPO (AICT) CAPITAL GOODS DEVELOPMENT PROJECT

ACTIVITY CODE 3512403211																														
NO	EXISTING EQUIPMENT	MAJOR SPEC.	MAJOR SPEC. 1	MAJOR SPEC. 2	TYPE DESCRIPTION	MANUFAC. CHARACT.1	MANUFAC. CHARACT.2	MANUFAC. CHARACT.3	QTY.	Q.	PURCHASE COST(1000$) UNIT	PURCHASE COST(1000$) TOTAL	CONSTANT 1980 YEAR COST(1000$) UNIT	CONSTANT 1980 YEAR COST(1000$) TOTAL	YEAR OF PURCHASE AND RELEASE	SIC CODE (ISIC CODE REF) 1 2 3 4 5	6	7	8	9	10	11	12	13	14	15
60	Belt conveyor	750 t/h	L:1400 m	L:12 m	bulk	7.0 tons	C-Steel	6.3 tons	1	1	80	80	85	85	1979	74426	02	7	3	0	1	2	6	4	1
61	Belt conveyor	750 t/h	L: 800 m	L: 6 m	bulk	1.5 tons	C-Steel	1.35 tons	1	1	9	9	9.6	9.6	1979	74420	02	7	2	0	1	1	6	1	1
62	Belt conveyor	750 t/h	L: 800 m	L:190 m	bulk	13.0 tons	C-Steel	11.7 tons	1	1	99	99	96	96	1979	74420	02	7	2	0	1	1	6	5	1
63	Belt conveyor	750 t/h	L: 800 m	L:150 m	bulk	21.0 tons	C-Steel	19 tons	1	1	140	140	150	150	1979	74426	02	7	2	0	1	1	6	5	1
64	Belt conveyor	750 t/h	L: 600 m	L:162 m	bulk	22.0 tons	C-Steel	19.6 tons	1	1	170	170	182	182	1979	74426	02	7	2	0	1	1	6	5	1
65	Stripper	750 t/h	-	L: 50 m	travelling	15 tons	C-Steel	11.5 tons	2	1	100	100	100	100	1980	74428	02	8	0	0	2	4	6	7	2

UNIDO/SPC (ASCE) CAPITAL GOODS DEVELOPMENT PROJECT

ACTIVITY CODE 351240311

NO	BASIC MACHINE NOMENCLATURE	MAJOR SPEC.	MAJOR SPEC. 1	MAJOR SPEC. 2	TYPE DESCRIPTION	MANUFAC. CHARACT.1	MANUFAC. CHARACT.2	MANUFAC. CHARACT.3	OR.	Q.	IN PLACE COST (1000$) UNIT	IN PLACE COST (1000$) TOTAL	CONSTANT 1980 YEAR COST (1000$) UNIT	CONSTANT 1980 YEAR COST (1000$) TOTAL	YEAR OF PURCHASE AND IN AGE	SITC CODE (FOR COMPUTER) 1 2 3 4 5	6 7	8	9	10	11	12	13	14	15
40	Hopper	V: 100 m^3	-	25°C	Cylindrical	10.0 ton	C-Steel	6 mm	1	1	.10	10	.10	10	1980	69311	01	2	0	3	2	5	2	1	1
20	Classifier	C: 110t/h	-	-	Closed	6.0 ton	C-Steel	4 ton	2	1	50	50	122	122	1970	72831	60	4	0	0	2	2	6	3	2
7	Ball mill	C: 110t/h	20 RPM	700 kW	horizontal	50.0 ton	C-Steel	40 ton	1	1	400	400	431	431	1979	72432	11	2	2	6	1	5	2	7	1
61	Main Blower	C:150.000 m^3	P=1 kg/cm^2	air	-	4.5 ton	Grey iron	4 ton	2	1	9	9	9.7	9.7	1979	74342	01	7	1	1	0	1	2	3	2
20	Cyclone	C.25000 m^3/h	-	-	single zone	2.5 ton	C-Steel	12 mm	1	6	7.5	45	7.5	45	1980	74363	11	3	6	0	1	1	2	1	1
60	Conveyor	C: 220 t/h	800 mm	L= 60 m	bulk	15 ton	C-Steel	13 ton	1	1	50	50	54	54	1975	74426	16	4	2	6	1	3	6	5	1
41	Hopper	V: 100 m^3	-	25°C	Cylindrical	10.0 ton	C-Steel	6 mm	1	1	10	10	10	10	1980	69311	01	2	0	3	2	5	2	1	1
62	Elevator	C: 110 t/h	-	-	bulk	12.0 ton	weld steel	11 ton	2	1	8	8	6.6	6.6	1979	74426	51	3	0	6	1	3	2	5	1
63	Air filled conveyor	C: 110 t/h	800 mm	L= 29 m	TP(1-2kg/cm^2)	4 ton	C-Steel	6 mm	1	1	30	30	32	32	1979	74423	00	5	6	6	3	1	[illegible]	1	1
64	Air fan	C:40.000 m^3/h	H:800 mm C	air	-	3.0 ton	C-Steel	2.5 ton	2	1	3.8	3.8	4.1	4.1	1979	74341	01	3	6	1	0	1	6	3	[illegible]
65	Exhaust fan	C:6000 m^3/h	H:800 mm C	air	exhaust	1.0 ton	C-Steel	0.8 ton	2	1	0.9	0.9	1	1	1979	74341	01	2	5	1	3	1	6	1	2
66	Screw conveyor	C: 110 t/h	D: 0,5 m	-	bulk	4 ton	C-Steel	3.0 ton	2	1	9	9	9.7	9.7	1975	74426	43	3	0	0	1	1	6	3	2
11	[illegible] filter	60.0 m^3/h	-	-	socks filter	2 ton	C-Steel	-	1	1	7.5	7.5	8.1	8.1	1970	74361	50	1	0	6	0	1	2	1	1
6	Combustion chamber	V: 45 m^3	1200°C	liquid	-	6 ton	C-Steel	8 mm	1	1	6	6	6	6	1980	74232	24	2	5	2	6	2	2	1	1
67	Conditioning fan	C:10.000 m^3/h	H: 800 mm	air	-	1.0 ton	C-Steel	0.8 ton	2	1	1.4	1.4	1.5	1.5	1979	74341	01	2	5	1	0	1	6	1	[illegible]
8	Air heater	V: 2 m^3	T: 200°C	-	-	3 ton	C-Steel	6 mm	1	1	3	3	3	3	1980	74131	40	1	1	0	0	1	6	1	1
68	Exhaust fan	C:6000 m^3/h	H: 600 mm	air	exhaust	1.0 ton	C-Steel	0.8 ton	2	1	0.9	0.9	1	1	1979	74341	01	2	7	1	3	1	6	1	2
9	Air heater	V: 2 m^3	T: 200°C	--	-	3 ton	C-Steel	6 mm	1	1	3	3	3	3	1980	74131	40	1	1	0	6	1	6	1	1
12	Filter	6000 m^3/h	-	-	bag filter	2 ton	C-Steel	-	1	1	7.5	7.5	15.3	15.3	1970	74361	50	1	0	0	0	1	2	1	1
69	[illegible] extractor	C: 110 t/h	-	-	-	2 ton	C-Steel	1.0 ton	1	1	5	5	5.4	5.4	1979	74426	70	3	0	6	1	1	6	2	1
70	Cellular extractor	C: 110 t/h	-	-	-	2 ton	C-Steel	1.0 ton	1	1	5	5	5.4	5.4	1979	74426	70	3	[illegible]	[illegible]	1	1	6	[illegible]	1
71	Reclaiming scraper	120 t/h	-	-	travelling	50 ton	C-Steel	46 ton	2	1	200	200	200	200	1980	74425	54	5	0	0	2	5	[illegible]	[illegible]	2
72	Belt conveyor	110 t/h	= 500 mm	L= 168 m	bulk	22 ton	C-Steel	25.8 ton	1	1	90	90	96	96	1979	74426	02	3	2	0	1	3	6	5	1
73	Belt conveyor	110 t/h	= 500 mm	L= 110 m	bulk	15 ton	C-Steel	13.5 ton	1	1	70	70	75	75	1979	74426	02	3	2	0	1	3	6	5	1

UNIDO/[illegible] (AZOT) CAPITAL GOODS DEVELOPMENT PROJECT

ACTIVITY CODE [illegible]42011

No.	Basic machine nomenclature	Major spec.	Major spec. 1	Major spec. 2	Type description	Manufac. char. fact. 1 (tons)	Manufac. char. fact. 2	Manufac. char. fact. 3	[illegible]	Q.	Purchase cost (1000$) Unit	Purchase cost (1000$) Total	Constant 1980 year cost (1000$) Unit	Constant 1980 year cost (1000$) Total	Year of purchase and release	SITC code (for computer) 1 2 3 4 5	6 7	8	9	10	11	12	13	14	15
60	[illegible]ometer	C:110 t/h	-	mechanical	fixed	4	C-Steel	3.5 ton	1	1	4.2	4.2	4.4	4.4	1979	74525	06	8	0	1	1	1	6	1	1
[illegible]	Conveyor	C:110 t/h	V:800 m[illegible]	L=11 m	bulk	1.5	C-Steel	1.2 ton	1	1	10	10	11	11	1979	7442[illegible]	16	1	2	0	1	1	6	2	1
[illegible]3	Slurry pump	C:3[illegible]0 m^3/h	H: 10 m	slurry	horizontal	0.5	Alloy steel	0.5 ton	2	1	2.4	2.4	2.6	2.6	1979	74220	02	4	1	8	1	1	7	1	2
10	[illegible] filter	C:600 t/h	Area 250 m^2	-	-	40	Alloy steel	32 ton	2	1	250	250	610	610	1970	74302	43	7	1	0	0	4	4	7	2
4	[illegible]	V:16.4 m^3	Q:1.9 m	T=30°C	cyl.	1.4	plastic	20 mm	2	1	6.9	6.9	6.9	6.9	1980	69243	02	1	1	3	2	1	5	1	2
61	Acid pump	C:200 m^3/h	H:25 m	corrosive	horizontal	1.0	Alloy steel	0.8 ton	2	1	2.5	2.5	3.1	3.1	1979	74220	02	4	2	5	1	1	7	1	2
62	Strong acid pump	C:105 m^3/h	H:25 m	corrosive	horizontal	0.5	Alloy steel	0.4 ton	2	1	1.7	1.7	1.8	1.8	1979	74220	02	4	2	5	1	1	7	1	2
64	[illegible] water pump	C:200 m^3/h	H:15 m	hot clear	vertical	1.0	Alloy steel	0.6 ton	2	2	2.1	2.1	2.3	2.3	1979	74220	02	4	1	[illegible]	2	[illegible]	7	1	2
42	Dilute H_3PO_4 [illegible] tank	V:3060 m^3	[illegible]:20,6 m	30°C	cyl.	32.0	C-Steel	18 mm	1	1	30	30	32	32	1975	69211	13	5	4	3	2	4	2	1	1
65	Sludge pumps	C:10 m^3/h	H:30 m	sludge	horizontal	0.3	cast iron	0.2 ton	2	2	0.9	1.8	1	2	1979	74210	20	3	[illegible]	6	1	1	[illegible]	1	2
1	Cooling towers	V:203 m^3	2 atm	35°C	spray	40	C-Steel	16 mm	2	2	100	200	107	214	1979	741[illegible]	05	2	1	4	3	4	[illegible]	1	2
66	[illegible]	C:14,[illegible] m^3/h	P:2 kg/cm^2	air	-	4.0	C-Steel	3.5 ton	2	1	9	9	9.7	9.7	1979	74342	00	7	1	1	1	1	[illegible]	1	2
43	[illegible] for towers	V:10 m^3	Q:2,5 m	35°C	cyl.	1.0	plastic	20 mm	2	1	4.5	4.5	4.5	4.5	1980	69211	07	1	1	3	2	1	5	1	2
67	[illegible] pump	[illegible] m^3/h	H:85 m	corrosive	horizontal	1.3	Alloy steel	1.2 ton	2	1	10	10	11	11	1979	74220	02	4	3	5	1	1	7	1	2
5	[illegible]	[illegible]4 m^3	[illegible]:1.2 m	T=40°C	cyl.	0.[illegible]	plastic	20 mm	2	1	4	4	4	4	1980	69243	02	1	1	3	2	1	5	1	2
2	[illegible]	V:6.2 m^3	P=2 atm	T=40°C	spray	0.7	plastic	20 mm	2	1	4	4	4	4	1980	74166	02	1	1	4	3	1	[illegible]	1	2
44	[illegible] seal tank	V:10.3 m^3	[illegible]:2.5 m	40°C	cyl.	1.2	plastic	20 mm	2	1	5	5	5	5	1980	69211	07	1	1	3	2	2	[illegible]	1	2
68	Vacuum pump	C:7500 m^3/h	210 mm [illegible]	air	horizontal	5.5	cast iron	5.0 ton	2	[illegible]	9	[illegible]	9.7	19.4	1979	743[illegible]	[illegible]3	[illegible]	3	[illegible]	1	2	2	2	2
69	Circulation pump	C:200 m^3/h	H:25 m	corrosive	horizontal	1.0	Alloy steel	0.8 ton	2	2	3.7	7.4	4	[illegible]	1979	74220	02	4	[illegible]	5	1	1	7	1	2
70	[illegible] water pump	C:200 m^3/h	H:15 m	corrosive	horizontal	1.0	Alloy steel	0.8 ton	2	2	2.1	4.2	2.3	4.5	1979	74220	02	4	1	5	1	1	7	1	2
45	[illegible] H_3PO_4 tank	C:3060 m^3	[illegible]:20,6 m	40°C	cyl.	32.0	C-Steel	18 mm	1	1	30	30	32	32	1975	69211	13	5	4	3	2	4	2	1	1
71	Clarified H_3PO_4 pump	C:46 m^3/h	H:15 m	corrosive	horizontal	0.6	Alloy steel	0.5 ton	2	3	1.2	3.6	1.3	3.9	1975	74220	02	3	1	5	1	1	7	1	2
72	Dilute H_3PO_4 pump	C:105 m^3/h	H:15m	corrosive	horizontal	0.7	Alloy steel	0.5 ton	2	1	1.5	1.5	1.6	1.6	1979	74220	02	4	1	5	1	1	7	1	2
3	Reaction tank	1250 m^3	atmospheric	non-[illegible]	stirred	250 ton	concrete	30 cm	1	1	53.7	53.7	57	57	1979	74165	05	6	1	2	1	7	9	4	1

UNIDO/SPO (AZOT) CAPITAL GOODS DEVELOPMENT PROJECT

ACTIVITY CODE 351241111											PURCHASE COST 1000$		CONSTANT 1980 YEAR COST 1000 $		YEAR OF PURCHASE AND REMARK	SITC CODE (FOR COMPUTER)													
	SPECIFIC MACHINE NOMENCLATURE	MAJOR SPEC.	MAJOR SPEC. 1	MAJOR SPEC. 2	TYPE DESCRIPTION	MANUFAC. CHARACT.1	MANUFAC. CHARACT.2	MANUFAC. CHARACT.3	OR.	Q.	UNIT	TOTAL	UNIT	TOTAL		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
5	Evaporation drum	V:207 m^3	Ø: 5.6 m	H=5.4 m	cyl.	39.0 tons	C-Steel	25 mm	1	2	24.4	48.8	26.1	52.2	1979	74162		10	0	3	5	1	4	2	2	1
6	Graphite block exch.	A:317.5 m^2	Ø: 2 m	L=5 m	shell tube	9.5	C-Steel	20 mm	2	2	50.0	100	53.5	107	1979	74161		01	4	3	3	1	2	2	1	2
60	H_2SO_4 pump	C:3 m^3/h	H: 25 m	corrosive	horizontal	0.3	Cast iron	0.2 ton	2	1	1.06	1.06	1.13	1.13	1979	74220		02	2	2	5	1	1	2	1	2
61	H_2SO_4 drum	V:1.5 m^3	Ø: 1 m	T=40°C	cyl.	1.4	C-Steel	16 mm	1	1	3.8	3.8	4.1	4.1	1979	69211		07	1	1	3	2	1	2	1	1
61	Circulation pump	C:2200 m^3/h	H: 16 m	corrosive	horizontal	1.5	Alloy steel	1.2 ton	2	2	20	40	21.4	42.8	1979	74220		02	6	1	5	1	1	7	2	2
62	Conc.H_2SO_4 pump	C:20 m^3/h	H: 15 m	corrosive	horizontal	0.5	Alloy steel	0.4 ton	2	2	1.3	2.6	1.4	2.8	1979	74240		02	3	1	5	1	1	7	1	2
63	H_2SO_4 pump	C:35 m^3/h	H: 45 m	corrosive	horizontal	0.7	Alloy steel	0.5 ton	2	2	1.5	3	1.6	3.2	1979	74220		02	3	2	5	1	1	7	1	2
64	Conc.H_2SO_4 tank	V:1995 m^3	Ø: 15.2 m	H=11 m	cyl.	90	C-Steel	16 mm	1	1	72	72	77	77	1979	69211		13	4	4	3	2	5	2	1	1
65	Cyclone seperator	V:116 m^3	Ø: 4.3 m	-	inverted cyclone	9	C-Steel	12 mm	1	2	9	18	9	18	1980	74361		11	0	2	0	0	2	2	1	1
66	Mist eliminator	V:24 m^3	Ø: 2.6 m	-	-	9	C-Steel	16 mm	1	2	2	4	2.1	4.2	1979	74361		61	0	1	0	0	2	2	1	1
67	Ammonia absorber	V:121 m^3	P: 4 atm	T=40°C	spray	10	C-Steel	18 mm	2	4	3	12	3.2	12.8	1979	74166		03	2	1	4	3	3	2	1	2
68	H_2SO_4 storage tank	V:1574 m^3	Ø: 13.5 m	T=25°C	cyl.	65	C-Steel	18 mm	1	1	63	63	67	67	1979	69211		13	4	4	3	2	5	2	1	1
69	H_2SO_4 pump	C:2.5 m^3/h	H: 20 m	corrosive	horizontal	0.3	Alloy steel	0.2 ton	2	2	1	2	1.07	2.14	1979	74220		02	2	1	5	1	1	7	1	2
70	H_2SO_4 pump	C:5 m^3/h	H: 20 m	corrosive	horizontal	0.3	Alloy steel	0.2 ton	2	2	1	2	1.07	2.14	1979	74220		02	2	1	5	1	1	7	1	2
71	Hopper	V:400 m^3	-	T=25°C	cyl.	50	C-Steel	8 mm	1	1	50	50	50	50	1980	69211		01	2	0	3	2	5	2	1	1
72	Cellulose tractor	C:5 t/h	-	-	-	1	C-Steel	0.7 ton	1	1	3	3	3	3	1980	74400		76	1	0	0	1	1	6	1	1
73	Press tank	V: 5.5 m^3	Ø: 2.1 m	T=25°C	cyl.	0.6	Plastic	20 mm	1	1	4.5	4.5	4.8	4.8	1979	69211		07	1	1	3	2	1	5	1	2
74	Circulation pump	C:35 m^3/h	H: 10 m	-	horizontal	0.4	Alloy steel	0.3 ton	2	1	1	1	1.1	1.1	1979	74220		02	3	1	0	1	1	7	1	2
75	Pump	C:300 m^3/h	H: 20 m	corrosive	vertical	1.0	Alloy steel	0.8 ton	2	1	4	4	4.3	4.3	1979	74220		02	4	1	5	2	1	7	1	2
76	Vacuum condenser	A:300 m^2	Ø: 2.6 m	L: 6 m	shell tube	14	C-Steel	12 mm	2	2	10.2	20.4	26.3	52.7	1969	74161		05	6	3	3	1	3	2	1	2
77	Tank	V:8 m^3	Ø: 2.2 m	T=25°C	cyl.	2.5	C-Steel	12 mm	1	2	9	18	9.6	19.3	1979	69211		07	1	1	3	2	1	2	1	1
78	C pump	C:2425 m^3/h	H: 20 m	cold clear	horizontal	1.5	Alloy steel	1.0 ton	2	1	27	27	29	29	1979	74220		02	6	1	1	1	1	7	1	2
79	C pump (cut)	C:2400 m^3/h	H: 38 m	cold clear	horizontal	2.2	Alloy steel	1.5 ton	2	1	70	70	76	76	1979	74220		02	6	2	1	1	1	7	2	2
80	Condensate drum	V:1.7 m^3	P: 1 atm	T=60°C	cyl.	1.6	C-Steel	18 mm	1	2	3.8	7.6	4.1	8.1	1979	69243		02	1	1	3	2	1	2	1	1
81	Concentrate pump	C:31 m^3/h	H: 20 m	hot clear	horizontal	0.4	Cast iron	0.3 ton	2	2	2.3	4.6	2.5	5.0	1979	74220		02	3	1	2	1	1	2	1	2
82	Circ. pump	C:190 m^3/h	H: 23 m	corrosive	horizontal	1.0	C-Steel	0.6 ton	2	2	2.9	11.4	3.1	12.4	1979	74220		02	4	1	5	1	1	2	1	2
83	Draining pump	C:140 m^3/h	H: 20 m	corrosive	horizontal	1.0	Alloy steel	0.6 ton	2	1	1.8	1.8	1.9	1.9	1979	74220		02	4	1	5	1	1	7	1	2
84	Conditioning filter	1200 m^3/h	-	-	bag.filter	3	Mild steel	-	1	1	3.5	3.5	8.5	8.5	1979	74351		50	1	0	0	0	1	1	1	2
85	Exhaust fan	C:12000 m^3/h	P: 50 mm	air	exhaust	1.0	Cast iron	0.8 ton	1	1	0.55	0.55	0.59	0.59	1979	74341		01	1	4	1	3	1	2	1	2
86	Air blower	100000 m^3/h	H:860 mm	air	-	2.5 tons	Cast iron	1.5 ton	2	1	7	7	7.5	7.5	1979	74342		00	6	8	1	0	1	2	2	1
87	Cooling tower fans	150000 m^3/h	H:600 mm	air	ind.draught	3.5 tons	Cast iron	2.7 ton	2	2	9	18	9.7	19.4	1979	74341		01	7	7	1	2	1	2	3	2

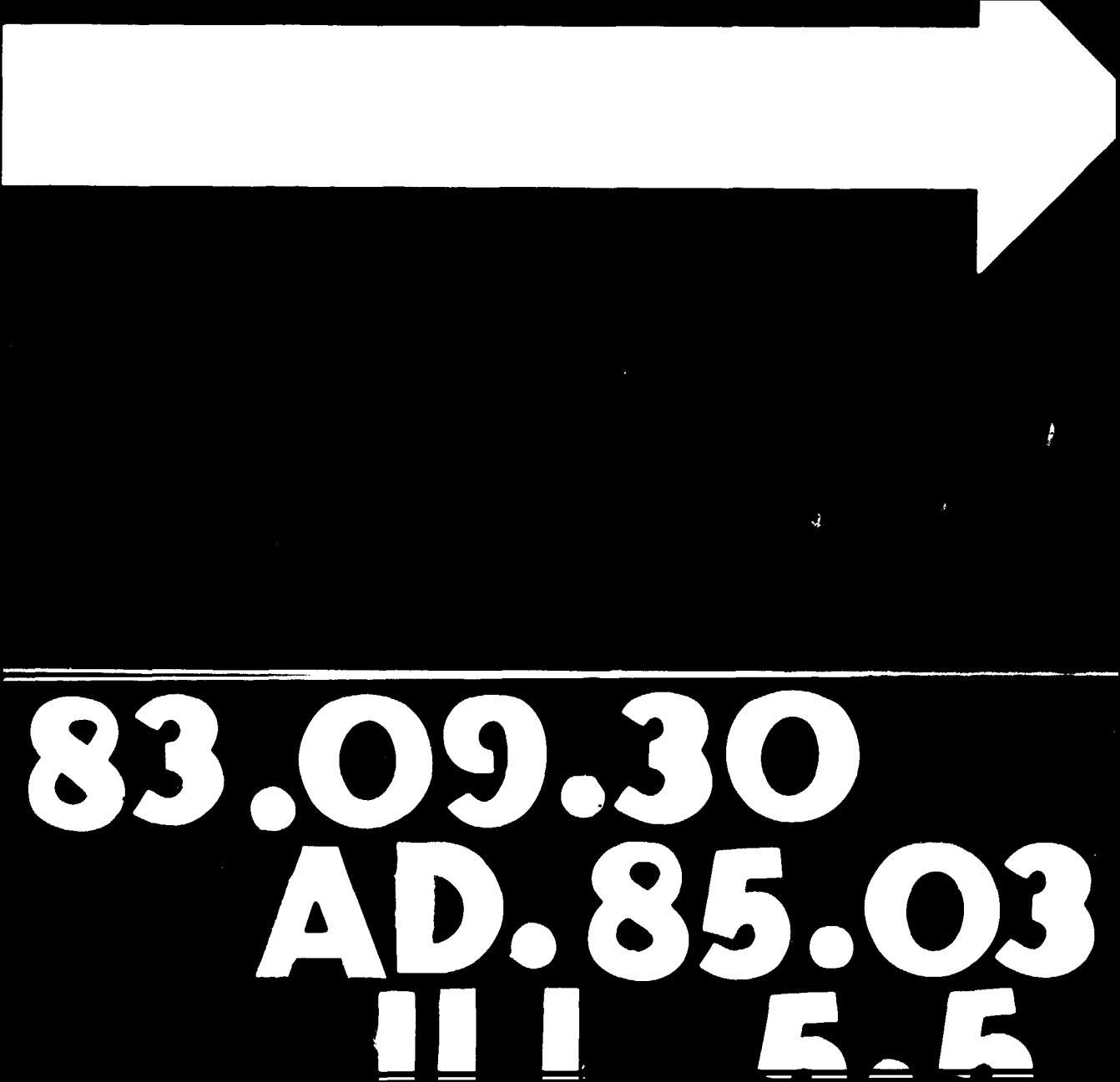
[illegible] (ASCT) CAPITAL GOODS DEVELOPMENT PROJECT

[illegible] 1241511

[illegible]	[illegible]	[illegible] 1	MISC. SPEC. 2	T.[illegible] DESCRIPTION	[illegible] CHARACT.1	[illegible] CHARACT.2	[illegible] CHARACT.3	Q.	Q.	PURCHASE COST (1000$) UNIT	PURCHASE COST (1000$) TOTAL	CONSTANT 1980 YEAR COST (1000$) UNIT	CONSTANT 1980 YEAR COST (1000$) TOTAL	YEAR OF PURCHASE AND [illegible]	SITE CODE (FOR COUNTRIES) 1 2 3 4 5	6 7	8	9	10	11	12	13	14	15
[illegible]	[illegible]	∅: 3 m	L= 5 m	[illegible]	3 ton	C-Steel	12 mm	2	[illegible]	3	3	3	3	19[illegible]	741[illegible]	0[illegible]	3	4	3	[illegible]	1	2	1	2
[illegible]	[illegible]	[illegible]spheric	nonstandard	[illegible]	9.0	[illegible]-Steel	10 mm	2	1	20	20	2[illegible]	[illegible]	19[illegible]	74[illegible]	06	1	1	2	[illegible]	[illegible]	5	1	2
[illegible] tower scrubber	V: [illegible] m³	atmospheric	-	cylindrical	40	[illegible]	[illegible] mm	2	1	100	100	107	107	1979	74166	02	4	1	4	3	4	2	1	2
[illegible] scrubber	V: [illegible] m³	atmospheric	-	cylindrical	4.5	plastic	[illegible] mm	2	1	4	4	4.3	4.3	1979	7416[illegible]	02	3	1	4	3	1	9	1	2
[illegible] Acid tank	V: 9 m³	∅: 3 m	-	cylindrical	11	C-Steel	16 mm	2	1	9.4	[illegible]	10.[illegible]	10.1	1979	69211	07	1	1	3	2	3	2	1	2
[illegible] Pump for scrubber	C: 50[illegible] m³/h	H: 40 m	corrosive	horizontal	1.0	St.Steel	0.8 ton	2	1	10	10	10.7	1[illegible].7	197[illegible]	74220	01	5	[illegible]	5	1	1	7	1	[illegible]
[illegible] Transfer pump	C: 35 m³/h	40 m [illegible]	corrosive	horizontal	0.9	St.Steel	0.6 ton	2	1	5	5	5.4	5.4	1979	74220	02	3	3	5	1	1	[illegible]	1	2
[illegible] Pump for scrubber	C: 3[illegible] m³/h	H: 35 m	corrosive	horizontal	0.9	St.Steel	0.6 ton	2	1	9	9	9.6	9.6	1979	74220	02	4	2	5	1	1	7	1	2
[illegible] Belt conveyor	C: 50 t/h	L: 650 m	L= 11 m	bulk	1.5	C-Steel	1.3 ton	1	1	11	11	12	12	1979	74426	02	2	2	0	1	1	6	1	1
[illegible] crusher	C: 10 t/h	-	11 kw	desintegrator	1.0	C-Steel	0.8 ton	1	1	13	13	14	14	1979	72832	07	1	0	1	1	1	6	1	1
[illegible] Belt conveyor	C: 50 t/h	L: 650 m	L=7.5 m	bulk	1.5	C-Steel	1.3 ton	1	1	6	8	6.5	6.5	1979	74426	02	2	2	0	1	1	6	1	1
[illegible]	[illegible] 25 m³	-	T= 30°C	cyl.	5	C-Steel	8 mm	1	1	5	5	5	5	1980	69211	01	1	0	3	2	3	2	1	1
[illegible]	C: [illegible] t/h	-	mechanical	fixed	1.5	C-Steel	1.0 ton	1	1	3.5	3.5	3.7	3.7	1979	74525	06	7	0	1	1	1	6	1	1
[illegible] Bucket elevator	[illegible] t/h	-	-	bucket	20	C-Steel	14 ton	1	1	10	10	10.7	10.7	1979	74423	51	4	0	0	1	3	6	5	1
[illegible] Multicyclone	C: 175000 m³/h	[illegible]: 1.5 [illegible]	-	4 cyclone	6	C-Steel	12 mm	1	2	17.5	35	18.7	37.4	1979	74361	12	9	1	0	2	2	2	1	1
[illegible] Exhaust air fan	[illegible] m³/h	[illegible]: 220 mm [illegible]	-	exhaust	4.0	C-Steel	3.5 ton	2	1	6	8	8.6	8.6	1979	74341	01	3	5	1	3	1	6	3	2
[illegible] Exhaust air fan	C: 215000 m³/h	[illegible]: 400 mm [illegible]	-	exhaust	4.0	C-Steel	3.5 ton	2	1	10	10	11	11	1979	74341	01	4	6	1	3	1	6	3	2
[illegible] Tower scrubber	V: 9[illegible] m³	atmospheric	-	cylindrical	4.5	plastic	20 mm	2	1	4	4	4.3	4.3	1979	74166	02	3	1	4	3	1	9	1	[illegible]
[illegible] [illegible]ic acid tank	V: 5 m³	∅: 3 m	-	cylindrical	11	C-Steel	16 mm	2	1	9.4	9.4	10.1	10.1	1979	69211	07	1	1	3	2	3	2	1	[illegible]
[illegible] Pump for scrubber	C: 25[illegible] m³/h	H: 35 m	corrosive	horizontal	0.8	St.Steel	0.6 ton	2	1	7.8	7.8	8.3	8.3	1979	74220	02	4	2	5	1	1	7	1	2
[illegible] tower	V: 15[illegible] m³	60 t/h	-	cylindrical	172.6	C-Steel	172.6 ton	1	1	300	300	321	321	1979	72834	05	1	6	0	0	6	9	[illegible]	1
[illegible] Acid tank	V: 9 m³	∅: 3 m	T= 30°C	cylindrical	11	C-Steel	16 mm	2	1	9.4	9.4	10.1	10.1	1979	69211	07	1	1	3	2	3	2	1	[illegible]

UNIDO/SPO (ARGT) CAPITAL GOODS EQUIPMENT PROJECT

ACTIVITY CODE 351242011																														
NO.	BASIC MACHINE POINT CAPACITY	MAJOR SPEC.	MAJOR SPEC. 1	MAJOR SPEC. 2	TYPE DESCRIPTION	MANUFAC. CHARACT.1	MANUFAC. CHARACT.2	MANUFAC. CHARACT.3	QU.	Q.	PURCHASE COST 1000$ UNIT	PURCHASE COST 1000$ TOTAL	CONSTANT 1980 YEAR COST 1000 $ UNIT	CONSTANT 1980 YEAR COST 1000 $ TOTAL	YEAR OF PURCHASE AND REMARK	ITIC CODE (FOR COMPUTER) 1 2 3 4 5	6 7	8	9	10	11	12	13	14	15
21	Granulator drum	C:341 t/h	C:3,9 m	265 kW	rotating	24 tons	C-Steel	20 ton	2	1	50	50	53.5	53.5	1979	72834	02	5	5	0	0	3	6	6	2
3	Dryer drum	C:341 t/h	L:20 m	Q:4 m	rotating	47 tons	C-Steel	16 m	2	1	55	55	59	59	1979	74164	40	8	5	2	6	4	2	1	2
60	Belt conveyor	C:260 t/h	L:1000 m	L=5 m	bulk	1.5 tons	C-Steel	1 ton	1	1	10	10	11	11	1979	74426	02	4	3	0	1	1	6	1	1
61	Dryer elevator	C:200 t/h	-	-	bucket	20 tons	C-Steel	15 ton	1	1	10	10	11	11	1979	74426	51	4	0	0	1	1	6	1	1
20	Oversize screen	C:200 t/h	20 mm	-	single deck	2.5 tons	C-Steel	2 ton	2	1	10	10	10.7	10.7	1979	72831	06	5	7	0	1	1	6	3	2
7	Lump crusher	C:25 t/h	-	74 KW	double roller	1 tons	C-Steel	0.8 ton	1	1	18	18	19.4	19.4	1979	72832	07	1	0	2	1	1	6	2	1
6	Combustion chamber	V:40 m^3	900°C	liquid		7.0 tons	C-Steel	12 m	1	1	7	7	7	7	1980	74332	24	2	4	2	0	2	2	1	2
62	Air blower	C:73500 m^3/h	H:200 mm	air	-	1 tons	C-Steel	0.8 ton	2	1	2	2	2.2	2.2	1979	74342	00	5	1	1	0	1	6	1	2
63	Dilution air blower	C:58000 m^3/h	H:80 mm	air	-	2 tons	C-Steel	1.5 ton	2	1	4	4	4.3	4.3	1979	74342	00	5	1	1	0	1	6	2	2
[illegible]	Fuel oil heater	C:100 t/h	-	-	steam coil	0.5 tons	C-Steel	16 m	2	1	1	1	1	1	1980	74161	07	1	0	0	7	1	2	1	2
65	Fuel oil pump	C:1 m^3/h	H:300 m	viscous	plunger	0.3 tons	C-Steel	0.2 tons	2	1	1	1	1.1	1.1	1979	74210	10	2	6	6	1	1	6	1	2
6	Belt conveyor	C:260 t/h	L:1000 m	L=30 m	bulk	11 tons	C-Steel	9 tons	1	1	15	15	16.1	16.1	1979	74426	02	4	3	0	1	3	6	4	1
8	Dryer grate	C:130 t/h	L:1.5-3.5 m	-	double deck	2.0 tons	C-Steel	2 tons	2	2	7	14	7.5	15	1979	72831	06	4	4	0	1	1	6	3	2
10	Belt conveyor	C:150 t/h	L:800 m	L=10 m	bulk	4 tons	C-Steel	1.5 ton	1	1	13	13	14	14	1979	74426	02	3	2	0	1	1	6	3	1
67	Belt conveyor	C:65 t/h	L:650 m	L=5 m	bulk	1.5 tons	C-Steel	0.6 ton	1	1	7	7	7.5	7.5	1979	74426	02	2	2	0	1	1	6	1	1
2	Dryer screen	C:65 t/h	1.5 m	-	single deck	2.0 tons	C-Steel	1.5 ton	2	2	6	12	6.4	12.8	1979	72831	06	3	4	0	1	1	6	3	2
6	Belt conveyor	C:65 t/h	L:500 m	L=4 m	bulk	1.0 tons	C-Steel	0.6 ton	1	1	6	6	6.4	6.4	1979	74426	02	2	2	0	1	1	6	1	1
69	Belt conveyor	C:50 t/h	L:500 m	L=5 m	bulk	1.5 tons	C-Steel	0.5 ton	1	1	6.6	6.6	7.1	7.1	1979	74426	02	2	2	0	1	1	6	1	1
6	Fluid bed cooler	C:65 t/h	-	-	direct heat	3 tons	C-Steel	16 m	2	1	3	3	3	3	1980	74164	90	6	0	0	6	1	6	1	2
70	Cooler air fan	C:110000 m^3/h	H:50 mm	air	exhaust	4 tons	C-Steel	3.5 tons	2	1	7	7	7.5	7.5	1979	74341	01	3	4	1	3	1	6	3	2
71	Air blower to cyclon	C:103500 m^3/h	H:16 mm	air	-	4 tons	C-Steel	3.5 tons	2	1	6	6	6.5	6.5	1979	74342	00	6	1	1	0	1	6	3	2
9	Air heater	C:100 t/h	-	-	steam coil	1.5 tons	C-Steel	12 m	1	1	1	1	1	1	1980	74161	07	1	0	0	7	1	2	1	2
72	Belt conveyor	C:65 t/h	L:500 mm	L=10 m	bulk	3 tons	C-Steel	1.6 tons	1	1	10	10	11	11	1979	74426	02	2	2	0	1	1	6	2	1
[illegible]	Weight scale	C:65 t/h	-	mechanical	fixed	0.35 tons	C-Steel	0.35 tons	1	1	0.37	0.37	0.37	0.37	1980	74525	06	7	0	1	1	1	6	1	1
73	Belt conveyor	C:250 t/h	L:1200 m	L=10 m	bulk	4.5 tons	C-Steel	2.7 tons	1	1	20	20	21	21	1979	74426	02	4	3	0	1	1	6	3	1
1	Oversize crusher	C:35 t/h	-	235 kW	percussion	6 tons	C-Steel	4 tons	1	2	24	48	25.9	51.7	1979	72832	07	1	0	4	1	2	6	3	1
2	Product crusher	C:35 t/h	-	120 kW	percussion	6 tons	C-Steel	4 tons	1	1	24	24	25.9	25.9	1979	72832	07	1	0	4	1	2	6	3	1
74	Belt conveyor	C:35 t/h	L:15 m	L=6 m	bulk	1.5 tons	C-Steel	1 tons	1	1	7.5	7.5	8	8	1979	74426	02	1	2	0	1	1	6	1	1
10	Multicyclone	60000 m^3/h	D: 1.4 m	-	8 cyclone	6 tons	C-Steel	15 m	1	1	10	10	10.7	10.7	1979	74361	15	7	1	0	2	2	2	1	1
11	Multicyclone	93000 m^3/h	D: 1.55 m	-	8 cyclone	3 tons	C-Steel	12 m	1	1	15	15	16.1	16.1	1979	74361	12	7	1	0	2	1	2	1	1
42	Bin	V: 30 m^3	-	T=30°C	cylindrical	5 tons	C-Steel	8 m	1	1	5	5	[illegible]	5	1980	69211	01	1	0	3	2	3	2	1	1
61	Product doseter	C:25 t/h	-	mechanical	fixed	2 tons	C-Steel	1.5 tons	2	1	14.3	14.5	15.0	15	1979	74525	06	6	0	1	1	1	6	2	1
75	Scre. conveyor	C:? t/h	-	L=3 m	bulk	0.7 tons	C-Steel	0.5 tons	1	1	10	10	11	11	1979	7442[illegible]	02	1	0	0	1	1	6	1	1
76	Ind.air fan	C:60000 m^3/h	H:300 m	-	forced-dr.	3 tons	C-Steel	2.5 ton	2	1	4	4	4.3	4.3	1979	74341	01	3	6	1	1	1	6	3	2
77	Exhaust fan	C:93000 m^3/h	H:420 m	-	exhaust	4 tons	C-Steel	3.5 tons	2	1	6	6	6.5	6.5	1979	74341	01	3	6	1	3	1	6	3	2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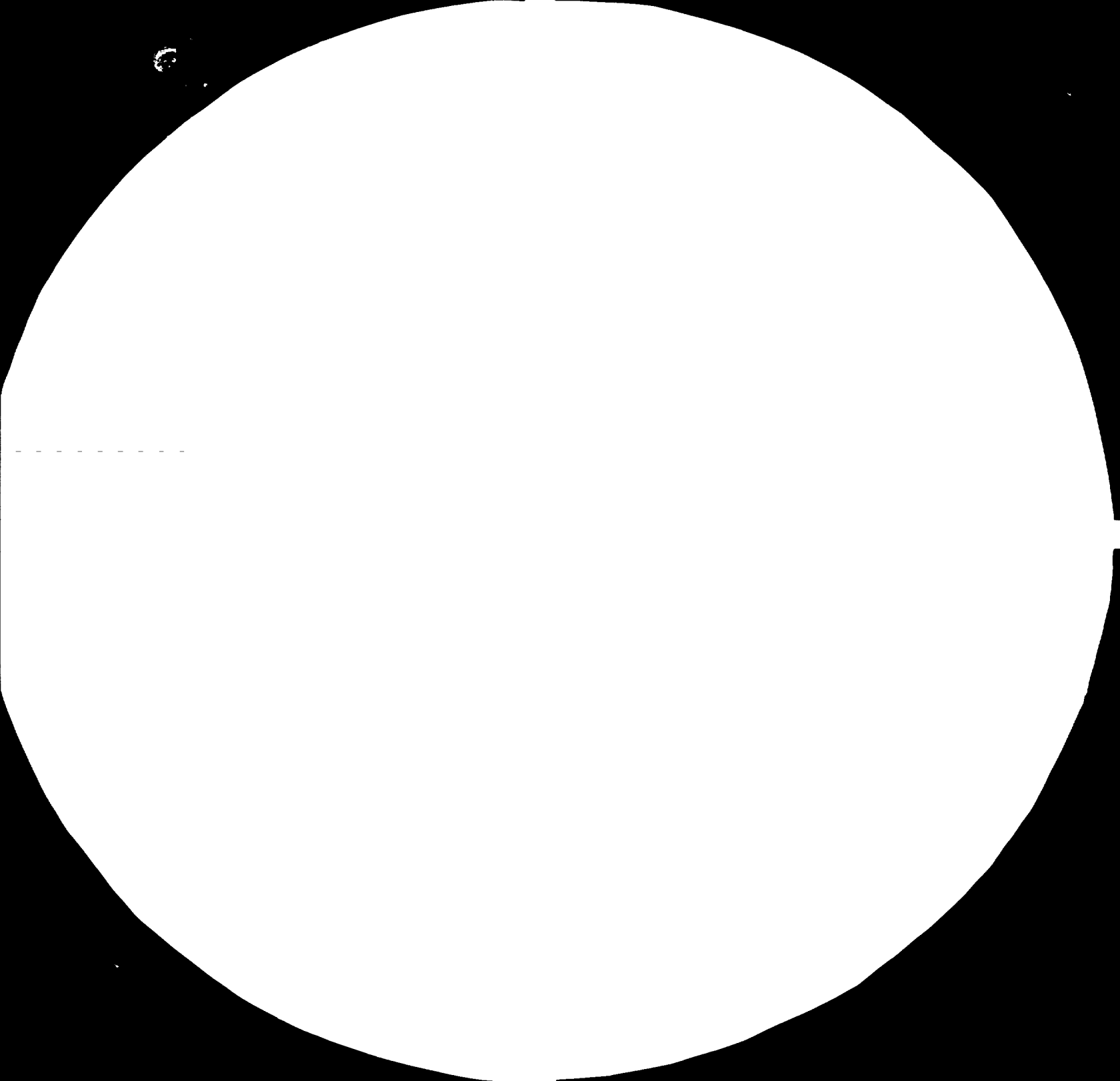

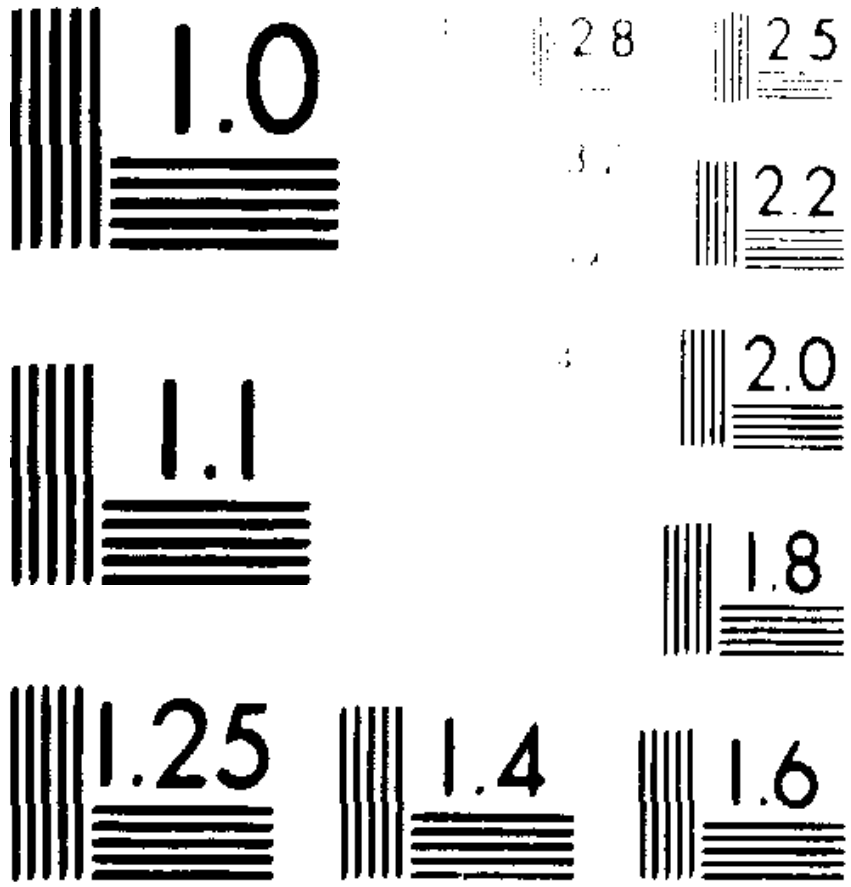

UNIDC/SPC (ACCT) CAPITAL GOODS DEVELOPMENT PROJECT

NO	[illegible] CODE 351242111 / [illegible] FOR [illegible]	MAJOR SPEC	MAJOR SPEC. 1	MAJOR SPEC. 2	TYPE [illegible]	MATL/SPEC. [illegible]	MATL/SPEC. [illegible]	CAPAC. [illegible]	1	2	[illegible]	[illegible]	CONSTANT 1980 YEAR COST (1000$) UNIT	CONSTANT 1980 YEAR COST (1000$) TOTAL	YEAR OF PURCHASE AND [illegible]	SITC CODE (FOR COMPUTER) 1 2 3 4 5	6 7	8	9	10	11	12	13	14	15
60	Belt conveyor	60 t/h	650 mm	L=160 m	bulk	21 ton	C-Steel	18 ton	1	2	10[illegible]	[illegible]	107	214	1979	74426	0[illegible]	[illegible]	2	0	1	3	6	6	1
[illegible]	Reclaiming scraper	240 t/h	-	-	travelling	15[illegible] ton	C-Steel	50 ton	2	1	30[illegible]	300	300	300	19[illegible]	74428	04	6	0	0	2	5	6	8	2
62	Belt conveyor	240 t/h	[illegible]	L=[illegible] m	bulk	[illegible] ton	C-Steel	7 ton	1	1	50	50	54	54	1979	744[illegible]	[illegible]	4	2	0	1	7	6	4	1
63	Belt conveyor	240 t/h	[illegible]	L=315 m	bulk	4[illegible] ton	C-Steel	42 ton	1	1	300	300	321	321	1979	74426	0[illegible]	4	2	0	1	4	6	7	1
64	[illegible] conveyor	125 t/h	1600 [illegible]	L=3 m	horizontal	[illegible]	C-Steel	6.4 ton	1	2	6	12	6.42	12.8	1979	74426	75	3	2	0	1	1	6	1	1
[illegible]	[illegible]	125 t/h	[illegible]	[illegible]	open	3.0 ton	St.Steel	2.5 ton	1	[illegible]	6	12	6	12	1980	72[illegible]	06	2	4	0	1	1	6	3	1
[illegible]	Belt conveyor	3[illegible] t/h	[illegible]	[illegible]	bulk	1.2 ton	C-Steel	1 ton	1	1	9	9	9.6	9.6	1979	74426	02	1	2	0	1	1	6	1	1
66	Belt elevator	3[illegible] t/h	[illegible]	L=19 m	bulk	15 ton	C-Steel	13 ton	1	1	20	20	21	21	1979	74426	51	1	2	0	1	3	6	5	1
67	Belt conveyor	30 t/h	500 mm	L=7 m	bulk	1.0 ton	C-Steel	0.9 ton	1	1	8	8	8.6	8.6	1979	74426	0[illegible]	1	2	0	1	1	6	1	1
[illegible]	Crusher	3[illegible] t/h		4 k	[illegible] type	4.0 ton	C-Steel	3.[illegible] ton	1	1	20	20	21	21	1979	72832	07	1	0	1	1	1	6	1	1
68	Belt conveyor	230 t/h	1600 mm	L=[illegible] m	bulk	4.5 ton	C-Steel	4 ton	1	1	20	20	21	21	1979	74426	02	4	2	0	1	1	6	3	1
69	Belt conveyor	230 t/h	1600 mm	L=4[illegible] m	bulk	7.0 ton	C-Steel	6 ton	1	1	47	47	50	50	1979	74426	02	4	2	0	1	2	6	4	1
70	Belt conveyor	230 t/h	1600 mm	L=4[illegible] m	bulk	7.[illegible] ton	C-Steel	6 ton	1	1	45	45	48	45	1979	74426	02	4	2	0	1	2	6	4	1
71	Belt conveyor	230 t/h	1600 mm	L=25 m	bulk	3.[illegible] ton	C-Steel	3.3 ton	1	1	27	27	29	29	1979	74426	02	4	2	0	1	1	[illegible]	3	1
[illegible]	Hopper	60 m^3	-	t=20°C	rectangular	[illegible].7 ton	St.Steel	8 m[illegible]	1	4	6.7	35	6.7	35	1980	69211	01	1	0	3	1	2	6	1	1
01	[illegible] machines	1050 b[illegible]/h		electrical	double weigher	[illegible].5 ton	St.Steel	1,600 ton	2	4	20	60	20	80	1980	74525	05	7	0	2	1	1	7	1	2
72	Belt conveyor	1050 b[illegible]/h	650 mm	L=3 m	packaged	[illegible].5 ton	C-Steel	0.4 ton	1	4	5	20	5.4	10.8	1979	74426	01	2	2	0	1	1	6	1	1
73	Belt conveyor	20 t/h	[illegible] mm	L=151 m	bulk	2[illegible] ton	C-Steel	19 ton	1	1	90	90	96.3	96.3	1979	74426	0[illegible]	1	2	0	1	1	[illegible]	6	1
74	Belt conveyor	20 t/h	500 mm	L=2[illegible] m	bulk	[illegible] ton	C-Steel	3.[illegible] ton	1	1	22	22	23.5	23.5	1979	74426	02	1	2	0	1	1	6	3	1
41	Hopper	20 m^3	-	t=25°C	rectangular	[illegible].3 ton	St.Steel	1 m[illegible]	1	4	[illegible].3	9.2	2.3	[illegible].2	1980	69211	01	1	0	3	1	1	6	1	1
75	Belt conveyor	25 t/h	500 mm	L=27 m	bulk	[illegible].5 ton	C-Steel	3.2 ton	1	1	21	21	22.5	22.5	1979	74426	02	1	2	0	1	1	6	3	1
76	Belt conveyor	25 t/h	500 mm	L=7 m	bulk	0.9 ton	C-Steel	0.8 ton	1	1	8	8	8.56	8.56	1979	74426	02	1	2	0	1	1	6	1	1
77	Belt conveyor	25 t/h	500 mm	L=2[illegible] m	bulk	2[illegible] ton	C-Steel	18 ton	1	1	30	30	32	32	1979	74426	51	1	2	0	1	1	6	[illegible]	1
21	[illegible]	25 t/h	3.5 m	1.5 k[illegible]	open	[illegible].5 ton	St.Steel	1.3 ton	1	1	6	6	6	6	1980	72031	06	2	4	0	1	1	6	2	1
78	Belt conveyor	1050 b[illegible]/h	650 mm	L=[illegible] m	packaged	1.0 ton	C-Steel	0.9 ton	1	4	9	36	9.6	3[illegible].5	1979	74426	01	2	2	0	1	1	[illegible]	1	1
79	Telescopic loader	1050 bag/h	650 mm	L=10 m	packaged	3.[illegible] ton	C-Steel	2.7 ton	1	4	11	44	11.9	47.4	1979	74426	01	2	2	0	1	1	6	[illegible]	1

UNIDO/ICIS (AZOT)

CAPITAL GOODS

DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENTS FOR THE NEW PHOSPHORIC ACID AND DAP PLANT — Ref. Code 1312-4

CAPACITY: 1400 t/d LOCATION : İSKENDERUN

ANTICIPATED DATE OF COMMISSIONING:1987

FERTILIZER INDUSTRY – DAP Bins, tanks, separators

PAGE –

Weight/Value

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 US $. 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981–1990
69211 0110311611	Hopper	4	2.3	2.3					9.2						9.2
69211 0110312511	Hopper	1	8.7	8.7					8.7						8.7
69211 0110323211	Bin	1	5.0	5.0					5.0						5.0
69211 0110323211	Surge bin	1	5.0	5.0					5.0						5.0
69211 0120325211	Hopper	1	10.0	10.0					10.0						10.0
69211 0120325211	Hopper	1	10.0	10.0					10.0						10.0
69211 0120325211	Hopper	1	50.0	50.0					50.0						50.0
69211 0711321211	H_2SO_4 drum	1	1.4	4.1					1.4						1.4
69211 0711321211	Tank	2	2.5	9.6					5.0						5.0
69211 0711321212	Tank for towers	1	1.0	4.0					1.0						1.0
69211 0711321212	Barometal tank	1	1.2	4.8					1.2						1.2
69211 0711321212	Preparation tank	1	0.6	4.8					0.6						0.6
69211 0711323212	Acid tank	1	11.0	10.1					11.0						11.0
69211 0711323212	Recirc. acid tank	1	11.0	11					11.0						11.0
69211 0711323212	Acid tank	1	11.0	10.1					11.0						11.0
69211 1344325211	Conc.H_3PO_4 tank	1	90.0	77.0					90.0						90.0
69211 1344325211	H_2SiF_6 sto.tank	1	85.0	67.0					85.0						85.0
69211 1354324211	Dil H_3PO_4 Dec.tank	1	32.0	32.0					32.0						32.0

UNIDO/IFC (AEOT)
CAPITAL GOODS
DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENTS FOR THE NEW PHOSPHORIC ACID NEW DAP PLANT
CAPACITY: 1400 t/d LOCATION: ISKENDERUN
ANTICIPATED DATE OF COMMISSIONING: 1987
FERTILIZER INDUSTRY - DAP Rims, tanks, separators

Ind. Code 3511-3

Weight/ Value

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 US $. 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
69211 1354328211	Dil H_3PO_4 tank	1	132.0	132.0					132.0						132.0
69243 0211321211	Condensate drum	2	1.6	4.1					3.2						3.2
69243 0211321912	Separator	1	1.4	6.9					1.4						1.4
69243 0211321912	Vacuum separator	1	0.5	4.0					0.5						0.5

UNIDO/SPO (AZOT)
CAPITAL GOODS
DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENTS FOR THE NEW PHOSPHORIC ACID AND DAP PLANT
CAPACITY: 1400 t/d LOCATION: İSKENDERUN
ANTICIPATED DATE OF COMMISSIONING: 1987
FERTILIZER INDUSTRY- Screens, Crushers, granulator

Ref. Code

Weight/Value

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $ 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
72831 0624011611	Vibrating screen	2	1.5	6.0					3.0						3.0
72831 0624011611	Vibrating sieve	1	1.5	4.0					1.5						1.5
72831 0634011612	Final screens	2	2.5	6.4					5.0						5.0
72831 0644011612	Main screens	2	2.5	7.5					5.0						15.0
72831 0657011612	Oversize Screen	1	2.5	10.7					2.5						2.5
72831 6040022212	Classifier	1	8.0	122.0					8.0						8.0
72832 0710111611	Lump crusher	1	1.5	19.4					1.5						1.5
72832 0710111611	Crusher	1	4.0	21.0					4.0						4.0
72832 0710211611	Lump crusher	1	1.0	14.0					1.0						1.0
72832 0710412631	Oversize crusher	1	6.0	25.9					6.0						6.0
72832 0710412631	Product crusher	1	6.0	25.9					6.0						6.0
72832 1120005261	Ball mill	1	50.0	400.0					50.0						50.0
72834 0255003662	Granulator drum	1	24.0	53.5					24.0						24.0
72834 0516006991	MAP tower	1	172.6	321.0					172.6						172.6

UNIDO/SPO (AEOT)

CAPITAL GOODS

DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENTS FOR THE NEW PHOSP...

CAPACITY: 1400 t/d LOCATION: İSKENDERUN

ANTICIPATED DATE OF COMMISSIONING: 1987

FERTILIZER INDUSTR... DAP Furnaces, exchangers and columns

Unit: ... 1513-4

PAGE 4

Weight/Value

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $ 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
74131 4010001611	Air heater	2	3.0	3.0					6.0						6.0
74132 2424202211	Combustion chamber	1	7.0	7.0					7.0						7.0
74132 2425202211	Combustion chamber	1	6.0	6.0					6.0						6.0
74151 0130012212	Drop.block exch.	2	9.5	53.5					19.0						19.0
74161 0563113212	Vacuum condenser	2	14.0	26.3					28.0						28.0
74161 0710071212	Fuel oil heater	1	0.5	1.0					0.5						0.5
74161 0710071212	Air heater	1	1.5	1.0					1.5						1.5
74161 0934311212	NH_3 vaporizer	1	3.0	3.0					3.0						3.0
74162 1003514211	Evaporation drum	2	39.0	26.1					78.0						78.0
74164 4065264212	Dryer drum	1	47.0	59.0					47.0						47.0
74164 9060064612	Flu.bed cooler	1	3.0	3.0					3.0						3.0
74165 0811262512	Reactor	3	9.0	20.0					18.0						18.0
74166 0211431912	Scrubber	1	0.7	4.0					0.7						0.7
74166 0231431912	Dryer scrubber	1	4.5	4.3					4.5						4.5
74166 0231431912	Granulator scrubber	1	4.5	4.3					4.5						4.5
74166 0241434212	MAP tower scrubber	1	40.0	107.0					40.0						40.0
74166 0321433212	Fluorine absorber	4	10.0	3.2					40.0						40.0
74166 0821434212	Washing tower	2	40.0	107.0					80.0						80.0
74165 0861217941	Reaction tank	1	250.0	57.0					250.0						250.0

UNIDO/IPO (AZOT)

CAPITAL GOODS

DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENTS FOR THE NEW PHOSPHORIC ACID AND DAP-GRANT

CAPACITY: 1400 t/d LOCATION: İSKENDERUN

ANTICIPATED DATE OF COMMISSIONING: 1987

FERTILIZER INDUSTRY- DAP Pumps

Ref. Code: 3519-4

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Weight/Engine

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $. 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
74210 1026611612	HP Fuel Oil pumps	2	0.3	1.1					0.6						0.6
74210 2032811212	Sludge pumps	2	0.3	1.0					0.6						0.6
74220 0221511712	H_2SiF_6 pump	2	0.3	1.07					0.6						0.6
74220 0231511712	H_2SiF_6 pump	2	0.3	1.07					0.6						0.6
74220 0231511212	H_2SO_4 pump	2	0.3	1.13					0.6						0.6
74220 0231011712	Lime-water pump	1	0.4	1.1					0.4						0.4
74220 0231 1212	Condensate pump	2	0.4	2.5					0.8						0.8
74220 0231511712	Conc. H_3PO_4 pump	2	0.5	1.4					1.0						1.0
74220 0231511712	Clar. H_3PO_4 pump	3	0.6	1.3					1.8						1.8
74220 0232511712	H_3PO_4 pump	2	0.7	1.6					1.4						1.4
74220 0233911712	Transfer pump	1	0.9	5.4					1.8						1.8
74220 0241511212	Circ. pump	4	1.0	3.1					4.0						4.0
74220 0241511712	Process water pump	2	1.0	2.3					2.0						2.0
74220 0241511712	Draining pump	1	1.0	1.9					1.0						1.0
74220 0241521712	Process water pump	2	1.0	2.3					2.0						2.0

UNIDO/SPG (AZOT)
CAPITAL GOODS
DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENTS FOR THE NEW PHOSPHORIC ACID AND DAP PLANT
CAPACITY: 1400 t/d LOCATION: İSKENDERUN
ANTICIPATED DATE OF COMMISSIONING: 1987
FERTILIZER INDUSTRY- DAP Pumps

Ind.Code 3518-4
PAGE 6
Weight/Value

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $. 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
74220 0241511712	Dil.H_3PO_4 pump	1	0.7	1.6					0.7						0.7
74220 0241521712	Pump	1	1.0	4.3					1.0						1.0
74220 0241611712	Slurry pump	1	0.9	2.6					0.9						0.9
74220 0242011712	Circ. pump	2	1.0	4.0					2.0						2.0
74220 0242011712	Pump for scrubber	1	0.9	9.6					0.9						0.9
74220 0242011712	Pump for scrubber	1	0.8	[illegible]					0.8						0.8
74220 0242511712	Acid pump	1	1.0	3.2					1.0						1.0
74220 0242511712	Strong acid pump.	1	0.5	1.8					0.5						0.5
74220 0243011712	Cloth washing pump.	1	1.3	11.0					1.3						1.3
74220 0252011712	Pump for scrubber	1	1.0	10.7					1.0						1.0
74220 0261011712	Circ. pump	2	1.5	29.0					3.0						3.0
74220 0261111712	CW pump	1	1.5	76.0					1.5						1.5
74220 0262101712	CW pump	1	2.2	9.7					2.2						2.2
74312 2353112222	Vacuum pumps	2	5.5	9.7					11.0						11.0

UNIDO/SPO (AZOT)

CAPITAL GOODS

DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENTS FOR THE NEW PHOSPHORIC ACID AND DAP PLANT

CAPACITY: 1400 t/d LOCATION: ISKENDERUN

ANTICIPATED DATE OF COMMISSIONING: 1987

FERTILIZER INDUSTRY- DAP Fans, blowers

Ind.Code 3513-6

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Weight/Value-

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $. 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
74341 0114141212	Exhaust fan	1	1.0	0.59					1.0						1.0
74341 0120101612	Conditioning fan	1.	1.0	1.5					1.0						1.0
74341 0120131612	Exhaust fan	1	1.0	1.0					1.0						1.0
74341 0120131612	Exhaust fan	1	1.0	1.0					1.0						1.0
7434[illegible] 0130101612	Air fan	1	3.0	4.1					3.0						3.0
7434[illegible] 0134131612	Exhaust air fan	1	4.0	7.5					4.0						4.0
74341 0135[illegible]1612	Exhaust air fan	1	4.0	8.6					4.0						4.0
74341 0135[illegible]1612	Cod. air fan	1	3.0	4.3					3.0						3.0
74341 0135131612	Exhaust air fan	1	4.0	11.0					4.0						4.0
74341 0140131612	Exhaust air fan	1	4.0	6.5					4.0						4.0
74342 0051101612	Air blower	1	1.0	2.2					1.0						1.0
74342 0051101622	Dilution air blower	1	2.0	9.7					2.0						2.0
74342 0061101612	Air blower	1	4.0	6.5					4.0						4.0
74342 0071101212	Blower	1	4.0	9.7					4.0						4.0
74342 0070101212	Main blower	1	4.5	9.7					4.5						4.5
74342 0068101222	Air blower	1	2.5	7.5					2.5						2.5
74341 01771212	[illegible]oling tower fans	2	3.5	9.7					7.0						7.0

UNIDO/SPO (AZOT)
CAPITAL GOODS
DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENTS FOR THE NEW PHOSPHORIC ACID AND DAP PLANT
CAPACITY: 1400 t/d LOCATION: İSKENDERUN
ANTICIPATED DATE OF COMMISSIONING: 1987
FERTILIZER INDUSTRY- DAP Cyclones, filters

Ind.Code 3512-4
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Weight/~~Value~~

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $. 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
74361 1100001211	Cyclone	6	2.5	7.5					15.0						15.0
74361 1102002211	Cyclone separator	2	9.0	9.0					18.0						18.0
74361 1271021211	Multicyclone	1	6.0	10.7					6.0						6.0
74361 1281022211	Multicyclone	1	3.0	16.1					3.0						3.0
74361 1291022211	Multicyclone	1	6.0	18.7					6.0						6.0
74361 5010001211	Filter	1	2.0	13.3					2.0						2.0
74361 5010001211	Exhaust filter	1	2.0	13.1					2.0						2.0
74361 5010001111	Conditioning filter	1	3.0	8.5					3.0						3.0
74361 6101002211	Mist eliminator	2	9.0	2.1					18.0						18.0
74362 4371000002	Ucego filter	1	40.0	610					40.0						40.0

UNIDO/SPO (AZOT)

CAPITAL GOODS DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENTS FOR THE NEW PHOSPHORIC ACID AND DAP PLANT

CAPACITY: 1400 t/d LOCATION: İSKENDERUN

ANTICIPATED DATE OF COMMISSIONING: 1987

FERTILIZER INDUSTRY- DAP Conveyors, elevators

Ind. Code 3512-4

Weight/Value

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $ 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
74423 0050031211	Air flied conveyor	1	4.0	32.6					4.0						4.0
74423 5140013651	Recycle elevator	1	20.0	10.7					20.0						20.0
74426 0122011611	Belt elevator	4	0.5	5.4					2.0						2.0
74426 0122011611	Belt conveyor	4	1.0	9.6					4.0						4.0
74426 0122011611	Telescopic loader	4	3.0	11.9					12.0						12.0
74426 0212011611	Belt conveyor	1	1.2	9.6					1.2						1.2
74426 0212011611	Belt conveyor	1	1.0	8.6					1.0						1.0
74426 0212011611	Belt conveyor	1	0.9	8.56					0.9						0.9
74426 0212011631	Belt conveyor	1	4.3	23.5					4.3						4.3
74426 0212011631	Belt conveyor	1	3.5	22.5					3.5						3.5
74426 0212011611	Belt conveyor	1	1.5	8.0					1.5						1.5
74426 0212013661	Belt conveyor	1	22.0	96.3					22.0						22.0
74426 0222011611	Belt conveyor	2	1.5	10.25					3.0						10.25
74426 0222011621	Belt conveyor	1	3.0	11.0					3.0						3.0
74426 0222011611	Belt conveyor	1	1.5	7.1					1.5						1.5
74426 0222011[illegible]	Belt conveyor	1	1.0	6.4					1.0						1.0
74426 0222011631	Belt conveyor	1	1.5	7.5					1.5						1.5
74426 0222013661	Belt conveyor	2	21.0	107.0					42.0						42.0

UNIDO/SPO (AZOT)

CAPITAL GOODS

DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENTS FOR THE NEW PHOSPHORIC ACID AND DAP PLANT

CAPACITY: 1400 t/d LOCATION: ISKENDERUN

ANTICIPATED DATE OF COMMISSIONING: 1987

FERTILIZER INDUSTRY- DAP Conveyors, elevators

Ind. Code 3512-

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Weight/Value-

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $. 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
74426 0232013651	Belt conveyor	1	22.0	96.0					22.0						22.0
74426 0232013651	Belt conveyor	1	15.0	75.0					15.0						15.0
74426 0232011631	Belt conveyor	1	4.0	14.0					4.0						4.0
74426 0242011631	Belt conveyor	1	4.5	21.0					4.5						4.5
74426 0242012641	Belt conveyor	1	7.0	48.0					7.0						7.0
74426 0242011631	Belt conveyor	1	3.7	29.0					3.7						3.7
74426 0242012641	Belt conveyor	1	7.0	50.0					7.0						7.0
74426 0242012641	Belt conveyor	1	8.0	54.0					8.0						8.0
74426 0242014671	Belt conveyor	1	46.0	321.0					46.0						46.0
74426 0243011611	Belt conveyor	1	4.5	21.0					4.5						4.5
74426 0243011631	Belt conveyor	1	11.0	16.1					11.0						11.0
74426 0243013651	Belt conveyor	1	1.5	11.0					1.5						1.5
74426 0272013651	Belt conveyor	1	22.0	182.0					22.0						22.0
74426 0272013651	Belt conveyor	1	21.0	150.0					21.0						21.0
74426 0272013651	Belt conveyor	1	13.0	96.0					13.0						13.0
74426 0272011611	Belt conveyor	1	1.5	9.6					1.5						1.5
74426 0273012641	Belt conveyor	1	7.0	85.0					7.0						7.0
74426 1632011621	Belt conveyor	1	1.5	11.0					1.5						1.5

UNIDO/SPO(AZ02)
CAPITAL GOODS
DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENTS FOR THE NEW PHOSPHORIC ACID AND DAP PLANT
CAPACITY: 1400 t/d LOCATION: ISKENDERUN
ANTICIPATED DATE OF COMMISSIONING: 1987
FERTILIZER INDUSTRY- DAP Conveyors, elevators

Indu. Code 3512-4
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Weight Value

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $. 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
74426 1642013651	Conveyor	1	15.0	54.0					15.0						15.0
74426 4310011611	Screw conveyor	1	0.7	11.0					0.7						0.7
74426 4330011312	Screw conveyor	1	4.0	9.7					4.0						4.0
74426 5112013611	Belt elevator	1	20.0	32.0					20.0						20.0
74426 5112013651	Belt elevator	1	15.0	21.0					15.0						15.0
74426 5130013251	Elevator	1	12.0	8.6					12.0						12.0
74426 5130013651	Main elevator	1	20.0	11.0					20.0						20.0
74426 7532011611	Belt conveyor	1	0.5	6.42					0.5						0.5
74426 7610011621	Cellular extractor	1	1.0	3.0					1.0						1.0
74426 7630011621	Peripheric extractor	1	2.0	5.4					2.0						2.0
74426 7630011521	Cellular extractor	1	2.0	5.4					2.0						2.0
74428 0280024672	Tripper	1	15.0	100.0					15.0						15.0
74423 0 0025682	Reclaiming scraper	1	55.0	300.0					55.0						55.0
74385 0570211712	Bagging machine	4	0.5	20.0					2.0						2.0
74525 0660111621	Product dosimeter	1	2.0	15.0					2.0						2.0
74525 0670111611	Weight scale	1	0.35	0.37					0.35						0.35
74525 0670111611	MAP Dosimeter	1	4.0	3.7					4.0						4.0
74525 0680111631	Dosimeter	1	4.0	4.4					4.0						4.0
74428 0450025672	Reclaiming scraper	2	50.0	300.0					100.0						100.0

UNIDO/SPO (AEOT)
CAPITAL GOODS
DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENTS FOR THE NEW PHOSPHORIC ACID AND DAP PLANT
CAPACITY: 1400 t/d LOCATION: İSKENDERUN
ANTICIPATED DATE OF COMMISSIONING: 1987
FERTILIZER INDUSTRY-DAP Bins, tanks, separators

Ind. Code 3513-4
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-Weight/Value

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 US $ 1000)	1981	1982	1983	1984	1985	1986	1987	1989	1989	1990	Total 1981-1990
69211 0110311611	Hopper	4	2.3	2.3					9.2						9.2
69211 0110312611	Hopper	1	8.7	8.7					8.7						8.7
69211 0110323211	Bin	1	5.0	5.0					5.0						5.0
69211 0110323211	Surgi bin	1	5.0	5.0					5.0						5.0
69211 0120325211	Hopper	1	10.0	10.0					10.0						10.0
69211 0120325211	Hopper	1	10.0	10.0					10.0						10.0
69211 0120325211	Hopper	1	50.0	50.0					50.0						50.0
69211 0711321211	H_2SO_4 drum	1	1.4	4.1					4.1						4.1
69211 0711321211	Tank	2	2.5	9.6					19.2						19.2
69211 0711321912	Tank for towers	1	1.0	4.5					4.5						4.5
69211 0711321912	Bar. seal tank	1	1.2	5.0					5.0						5.0
69211 0711321912	Preparation tank	1	0.8	4.8					4.8						4.8
69211 0711323212	Acid tank	1	11.0	10.1					10.1						10.1
69211 0711323212	Recirc. acid tank	1	11.0	11					11.0						11.0
69211 0711323212	Acid tank	1	11.0	10.1					10.1						10.1
69211 1344325211	Conc. H_3PO_4 tank	1	90.0	77.0					77.0						77.0
69211 1344325211	H_2SiF_6 etc. tank	1	85.0	67.0					67.0						67.0
69211 1354326211	Dil H_3PO_4 Dec. tank	1	32.0	32.0					32.0						32.0

UNIDO/SPO (AZOT)

CAPITAL GOODS

DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENTS FOR THE NEW PHOSPHORIC ACID AND DAP PLANT

CAPACITY: 1400 t/d LOCATION: ISKENDERUN

ANTICIPATED DATE OF COMMISSIONING: 1987

FERTILIZER INDUSTRY-DAP Bins, tanks, separators

Ind. Code 3513-4

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-Weight/Value

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 US $ 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
69211 1254326211	Dil H_3PO_4 tank	1	32.0	32.0					32.0						32.0
69243 0211321211	Condensate drum	2	1.6	4.1					8.2						8.2
69243 0211321912	Separator	1	1.4	6.9					6.9						6.9
69243 0211321912	Vacuum separator	1	0.5	4.0					4.0						4.0

UNIDO/SPO (AZOT)
CAPITAL GOODS
DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENTS FOR THE NEW PHOSPHORIC ACID AND DAP PLANT
CAPACITY: 1400 t/d LOCATION: ISKENDERUN
ANTICIPATED DATE OF COMMISSIONING: 1987
FERTILIZER INDUSTRY- Sceens, Crushers, granulator

Ind. Code 3512-

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Weight/Value

SITC CODE	BASIC MACHINE NAME	Qty. Re'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $. 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
72831 0624011611	Vibrating screen	2	1.5	6.0					12.0						12.0
72831 0624011611	Vibrating sieve	1	1.5	4.0					4.0						4.0
72831 0634011612	Final screens	2	2.5	6.4					12.8						12.8
72831 0644011612	Main screens	2	2.5	7.5					15.0						15.0
72831 0657011612	Oversize Screen	1	3.5	10.7					10.7						10.7
72831 0660022212	Classifier	1	6.0	122.0					122.0						122.0
72832 0710111611	Lump crusher	1	2.5	19.4					19.4						19.4
72832 0710111611	Crusher	1	4.0	21.0					21.0						21.0
72832 0710211611	Lump crusher	1	1.0	14.0					14.0						14.0
72832 0710412631	Oversize crusher	1	6.0	25.9					25.9						25.9
72832 0710412631	Product crusher	1	6.0	25.9					25.9						25.9
72832 1120005261	Ball mill	1	50.0	431.0					431.0						431.0
72834 0255003662	Granulator drum	1	24.0	53.5					53.5						53.5
72834 0516006991	MAP tower	1	172.6	321.0					321.0						321.0

UNIDO/SPO (AZOT)

CAPITAL GOODS

DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENTS FOR THE NEW PHOSPHORIC ACID AND DAP PLANT

CAPACITY: 1400 t/d LOCATION: İSKENDERUN

ANTICIPATED DATE OF COMMISSIONING: 1987

FERTILIZER INDUSTRY- DAP Furnaces, exchangers and columns

Ind. Code 3512-4

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Weight/Value

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $ 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
74131 4010001611	Air heater	2	3.0	3.0					6.0						6.0
74132 2424202211	Combustion chamber	1	7.0	7.0					7.0						7.0
74132 2425202211	Combustion chamber	1	6.0	6.0					6.0						6.0
74161 0130012212	Grap. block exch.	2	9.5	53.5					107.0						107.0
74161 0963313212	Vacuum condenser	2	14.0	26.3					52.6						52.6
74161 0710071212	Fuel oil heater	1	0.5	1.0					1.0						1.0
74161 0710071212	Air heater	1	1.5	1.0					1.0						1.0
74161 0934311212	NH_3 vaporizer	1	3.0	3.0					3.0						3.0
74162 1003514211	Evaporation drum	2	39.0	26.1					52.2						52.2
74164 4085264212	Dryer drum	1	47.0	59.0					59.0						59.0
74164 9060061612	Flu.bed cooler	1	3.0	3.0					3.0						3.0
74165 0811262512	Reactor	3	9.0	20.0					60.0						60.0
74166 0211431912	Scrubber	1	0.7	0					4.0						4.0
74166 0231431912	Dryer scrubber	1	4.5						4.3						4.3
74166 0231431912	Granulator scrubber	1	4.5						4.3						4.3
74166 0241434212	MAP tower scrubber	1	40.0	107.0					107.0						107.0
74166 0321433212	Fluorine absorber	4	10.0	3.2					12.8						12.8
74166 0821434212	Washing tower	2	40.0	107.0					214.0						214.0
74165 0861217941	Reaction tank	1	250.0	57.0					57.0						57.0

UNIDO/SPO (AEOT)

CAPITAL GOODS

DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENTS FOR NEW PHOSPHORIC ACID AND DAP PLANT

CAPACITY: 1400 t/d LOCATION: İSKENDERUN

ANTICIPATED DATE OF COMMISSIONING: 1987

FERTILIZER INDUSTRY-DAP Pumps

Ind. Code:

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Weight/Value

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $. 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total
74210 1026611612	HP Fuel Oil pumps	2	0.3	1.1					2.2						2.2
74210 2032811212	Sludge pumps	2	0.3	1.0					2.0						2.0
74220 0221511712	H_2SiF_6 pump	2	0.3	1.07					2.14						2.14
74220 0221511712	H_2SiF_6 pump	2	0.3	1.07					2.14						2.14
74220 0222511212	H_2SO_4 pump	[illegible]	0.3	1.13					2.26						2.26
74220 0231611712	Lime-water pump	1	0.4	1.1					1.1						1.1
74220 0231211212	Condensate pump	2	0.4	2.5					5.0						5.0
74220 0231511712	Conc. H_3PO_4 pump	2	0.5	1.4					2.8						2.8
74220 0231511712	Clar. H_3PO_4 pump	3	0.6	1.3					3.9						3.9
74220 0232511712	H_3PO_4 pump	2	0.7	1.6					3.2						3.2
74220 0233511712	Transfer pump	1	0.9	5.4					10.8						10.8
74220 0241511212	Circ. pump	4	1.0	3.1					12.4						12.4
74220 0241511712	Process water pump	2	1.0	2.3					4.6						4.6
74220 0241511712	Draining pump	1	1.0	1.9					3.8						3.8
74220 0241521712	Process water pump	2	1.0	2.3					4.6						4.6

FERTILIZER (AIDA)
CAPITAL GOODS
DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENTS FOR THE NEW PHOSPHORIC ACID AND DAP PLANT
CAPACITY: 1400 t/d LOCATION: ISHWERDERUN
ANTICIPATED DATE OF COMMISSIONING: 1987
FERTILIZER INDUSTRY-DAP Pmups

Ind.Code 3512-4

~~Weight~~/Value

SITC CODS	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $. 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
74220 0241511712	Dil.H_3PO_4 pump	1	0.7	1.6					1.6						1.6
74220 0241521712	Pump	1	1.9	4.3					4.3						4.3
74220 0241811712	Slurry pump	1	0.9	2.6					2.6						2.6
74220 0242011712	Slurry pump	2	1.9	4.0					8.0						8.0
74220 0243011712	Pump for scrubber	1	3.9	9.6					9.6						9.6
74220 0242021712	Pump for scrubber	1	3.3	8.3					8.3						8.3
74220 0242511712	Acid pump	1	1.4	3.1					3.1						3.1
74220 0242521712	Strong acid pump.	1	1.4	3.5					3.5						3.5
74220 0243011712	Cloth washing pump.	1	1.3	11.0					11.0						11.0
74220 0252011712	Pump for scrubber	1	1.9	10.7					10.7						10.7
74220 0261011712	Circ.pump	2	1.5	29.0					58.0						58.0
74220 0251111712	CW pump	1	1.5	76.0					76.0						76.0
74220 0262101712	CW pump	1	2.2	9.7					19.4						19.4
74312 2353112222	Vacuum pumps	2	5.5	9.7					19.4						19.4

UNIDO [illegible]
CAPITAL GOODS
DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENTS FOR THE NEW PHOSPHORIC ACID AND DAP PLANT
CAPACITY: 1400 t/d LOCATION: İSKENDERUN
ANTICIPATED DATE OF COMMISSIONING: 1987
FERTILIZER INDUSTRY-DAP Fans, blowers

Ind. Code 3512
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~~Weight~~/Value

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $. 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
74341 0124141212	Exhaust fan	1	1.0	0.59					0.59						0.59
74341 012[illegible]12	Conditioning fan	1	1.0	1.5					1.5						1.5
74341 012[illegible]31612	Exhaust fan	1	1.0	1.0					1.0						1.0
74341 [illegible]	Exhaust fan	1	1.0	1.0					1.0						1.0
74341 0130101[illegible]12	Air fan	1	3.0	4.1					4.1						4.1
[illegible] 013[illegible]1612	Exhaust air fan	1	4.0	7.5					7.5						7.5
[illegible] 013[illegible]1612	Exhaust air fan	1	4.0	8.6					8.6						8.6
74341 013[illegible]1612	[illegible]d. air fan	1	3.0	4.3					4.3						4.3
74341 013[illegible]131612	Exhaust air fan	1	4.0	11.0					11.0						11.0
74341 0146131612	Exhaust air fan	1	4.0	6.5					6.5						6.5
74342 0051101612	Air blower	1	1.0	2 2					2.2						2.2
74342 0051101[illegible]12	Dilution air blower	1	2.0	9.7					9.7						9.7
7[illegible] 0061101612	Air blower	1	4.0	6.5					6.5						6.5
74342 0071111212	Blower	1	4.0	9.7					9.7						9.7
74342 0070101212	Mai[illegible]ver	1	4.5	9.7					9.2						9.7
74342 0068101222	Air bl[illegible]	1	2.5	7.5					7.5						7.5
74341.0177121232	Cooli[illegible]r fans	2	3.5	9.7					19.4						19.4

UNIDO/SPO (AZOT)

CAPITAL GOODS

DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENTS FOR THE NEW PHOSPHORIC ACID AND DAP PLANT

CAPACITY: 1400 t/d LOCATION: ISKENDERUN

ANTICIPATED DATE OF COMMISSIONING: 1987

FERTILIZER INDUSTRY-DAP Cyclones, filters

Weight/Value

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $. 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
74361 1100001211	Cyclone	6	2.5	7.5					45.0						45.0
74361 1102002211	Cyclone separator	2	9.0	9.0					18.0						18.0
74361 [illegible]	Multicyclone	1	6.0	10.7					10.7						10.7
74361 [illegible]	Multicyclone	1	3.0	16.1					16.1						16.1
74361 [illegible]	Multicyclone	1	6.0	18.7					18.7						18.7
74361 5010001211	Filter	1	2.0	18.3					18.3						18.3
74361 5010001211	Exhaust filter	1	2.0	16.1					16.1						16.1
74361 5010001111	Conditioning filter	1	3.0	8.5					8.5						8.5
74361 6101002211	Mist eliminator	2	9.0	2.1					4.2						4.2
74362 4371000002	Ucego filter	1	40.0	610					610						610

UNIDO/SPO (AZOT)

CAPITAL GOODS DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENTS FOR THE NEW PHOSPHORIC ACID AND DAP PLANT

CAPACITY: 1400 t/d LOCATION: İSKENDERUN

ANTICIPATED DATE OF COMMISSIONING: 1987

FERTILIZER INDUSTRY-DAP Conveyors, elevators

Ind. Code 3513-4

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Weight/Value

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $. 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
74423 00500311211	Air flied conveyor	1	4.0	32.0					32.0						32.0
74423 5140013651	Recycle elevator	1	20.0	10.7					10.7						10.7
74426 0122011611	Belt elevator	4	0.5	5.4					21.6						21.6
74426 0122011511	Belt conveyor	4	1.0	9.6					38.4						38.4
74426 0122011631	Telescopic loader	4	3.0	11.9					47.6						47.6
74426 0212011611	Belt conveyor	1	1.2	9.6					9.6						9.6
74426 0212011511	Belt conveyor	1	1.0	8.6					8.6						8.6
74426 0212011511	Belt conveyor	1	0.8	8.56					8.56						8.56
74426 0212011631	Belt conveyor	1	4.3	23.5					23.5						23.5
74426 0212011631	Belt conveyor	1	3.5	22.5					22.5						22.5
74426 0212011611	Belt conveyor	1	1.5	6.0					6.0						6.0
74426 0212013661	Belt conveyor	1	22.0	96.3					96.3						96.3
74426 0222011611	Belt conveyor	2	1.5	10.25					20.5						20.5
74426 0222011621	Belt conveyor	1	3.0	11.0					11.0						11.0
74426 0222011611	Belt conveyor	1	1.5	7.1					7.1						7.1
74426 0222011611	Belt conveyor	1	1.0	6.4					6.4						6.4
74426 0222011631	Belt conveyor	1	1.5	7.5					7.5						7.5
74426 0222011361	Belt conveyor	2	21.0	107.0					214.0						214.0

UNIDO/CPO (AZOT)

CAPITAL GOODS

DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENTS FOR THE NEW PHOSPHORIC ACID AND DAP PLANT

CAPACITY: 1400 t/d LOCATION: ISKENDERUN

ANTICIPATED DATE OF COMMISSIONING: 1987

FERTILIZER INDUSTRY-DAP Conveyors, elevators

Ind Code 3512-4

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Weight/Value

SITC CODE	BASIC MACHINE NAME	Qty. Re'd (no)	Unit Weight (tons)	Unit cost in 1980 US $ 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
74426 0232013651	Belt conveyor	1	22.0	96.0					96.0						96.0
74426 0232013651	Belt conveyor	1	15.0	75.0					75.0						75.0
74426 0232011631	Belt conveyor	1	4.0	14.0					14.0						14.0
74426 0232011631	Belt conveyor	1	4.5	21.0					21.0						21.0
74426 0242012631	Belt conveyor	1	7.0	48.0					48.0						48.0
74426 0242011631	Belt conveyor	1	3.7	29.0					29.0						29.0
74426 0242012641	Belt conveyor	1	7.0	50.0					50.0						50.0
74426 0242012641	Belt conveyor	1	8.0	54.0					54.0						54.0
74426 0212014671	Belt conveyor	1	46.0	321.0					321.0						321.0
74426 0243011611	Belt conveyor	1	4.5	21.0					21.0						21.0
74426 0243011631	Belt conveyor	1	11.0	16.1					16.1						16.1
74426 0243013631	Belt conveyor	1	1.5	11.0					11.0						11.0
74426 0272013651	Belt conveyor	1	22.0	182.0					182.0						182.0
74426 0272013651	Belt conveyor	1	21.0	150.0					150.0						150.0
74426 0272013651	conveyor	1	13.0	96.0					96.0						96.0
74426 0272011611	conveyor	1	1.5	9.6					9.6						9.6
74426 0273012641	veyor	1	7.0	85.0					85.0						85.0
74426 1632011621	Belt conveyor	1	1.5	11.0					11.0						11.0

UNIDO/SPO (AZOT)
CAPITAL GOODS
DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENTS FOR THE NEW PHOSPHORIC ACID AND DAP PLANT
CAPACITY:1400 t/d LOCATION: ISKENDERUN
ANTICIPATED DATE OF COMMISSIONING: 1987
FERTILIZER INDUSTRY-DAP Conveyors, elevators

Ind. Code 3512-4
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Weight/Value

SITC CODE	BASIC MACHINE NAME	Qty. Re'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $. 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
74426 1642013651	Conveyor	1	15.0	54.0					54.0						54.0
74426 4310011611	Screw conveyor	1	0.7	11.0					11.0						11.0
74426 4330011312	Screw conveyor	1	4.0	9.7					9.7						9.7
74426 5112013611	Belt elevator	1	20.0	32.0					32.0						32.0
74426 5112013651	Belt elevator	1	15.0	21.0					21.0						21.0
74426 5130013651	Elevator	1	12.0	8.6					8.6						8.6
74426 5140013661	Chain elevator	1	[illegible]	11.0					11.0						11.0
74426 7532011611	Belt conveyor	1	[illegible]	6.42					6.42						6.42
74426 7610011621	Cellular extractor	1	1.0	3.0					3.0						3.0
74426 7630011621	Peripheric extractor	1	2.0	5.4					5.4						5.4
74426 7630011621	Cellular extractor	1	[illegible]	5.4					5.4						5.4
74428 0280024672	Tripper	1	15.0	100.0					100.0						100.0
74428 0460025682	Reclaming scraper	1	50.0	300.0					300.0						300.0
74525 0570211712	Bagging machine	4	0.5	20.0					80.0						80.0
74525 0660111621	Product dosimeter	1	2.0	15.0					15.0						15.0
74525 0660111611	Weight scale	1	0.35	0.37					0.37						0.37
74525 0670111611	MAP Dosimeter	1	4.0	3.7					3.7						3.7
74525 0680111631	Dosimeter	1	4.0	4.4					4.4						4.4
74428 0450025672	Reclaiming scraper	2	50.0	200.0					400.0						400.0

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DEVELOPMENT OF CAPITAL GOODS INDUSTRIES

DP/TUR/76/034

Technical Report No. XII:
Demand for Capital Goods
for Fertilizer Industry

Vol : VII

UNITED NATIONS DEVELOPMENT PROGRAMMES IN TURKEY

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANISATION

RESTRICTED

Sept 1982
English

DEVELOPMENT OF CAPITAL GOODS INDUSTRIES

DP/TUR/76/034

Technical report No XII-Vol VII
Demand for Capital Goods for Fertiliser Industry-
Phosphoric Acid - MAZIDAGI

Prepared for the Government of Turkey
by the United Nations Industrial Development Organization
acting as executing agency for the United Nations Development Programme

Based on the work of
Capital Goods Development Project Team in Turkey

United Nations Industrial Development Organization
Vienna

UNITED NATIONS DEVELOPMENT PROGRAMMES IN TURKEY

CAPITAL GOODS DEVELOPMENT PROJECT IN TURKEY

Vol. VII

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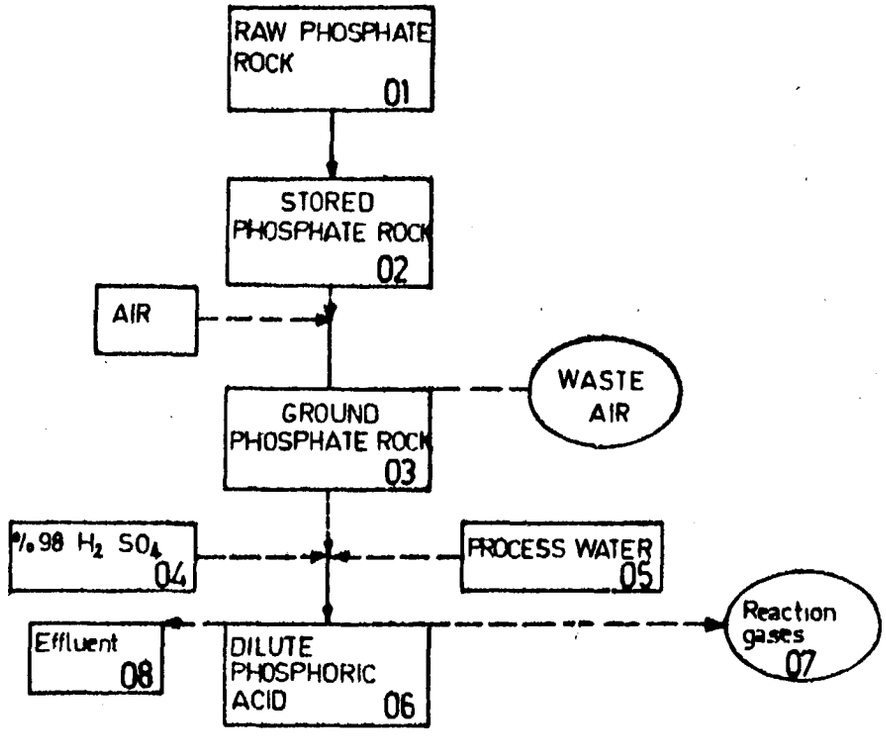


FERTILIZERS AND PESTICIDES PHOSPHORIC ACID	INDUSTRY CODE 3512 - 6
UNIDO / SPO (AZOT) CAPITAL GOODS DEVELOPMENT PROJECT	
MODULAR PRODUCTION CHART	

DATE	Prepared by	Drawn by	Checked by
7.9.1981	E.ABDELAL	F. ÇELİK	V.MIHLADİZ
Checked by UNIDO/Expert		Approved by UNIDO/CTA	

UNIDO/SFC (AZOT)

CAPITAL GOODS DEVELOPMENT PROJECT

Prepared by	Checked by	Approved by
Chem.Eng.BS L. ABDELAL	UNIDO/Expert	UNIDO/CTA

INDUSTRY ACTIVITIES CHART

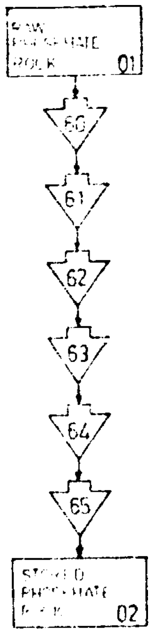
Ind. Code : 3512-6

Ind.Name : Fertilizer and Pesticides
PHOSPHORIC ACID

PRODUCTION STAGE		TECHNOLOGY		CRITICAL EQUIPMENT		DESIGN LINE CAPACITY	
CODE	NAME	CODE	NAME	NAME	CAPACITY RANGE	CODE	CAPACITY
01	Raw phosphate rock	-	-	-	-	-	-
02	Stored phosphate rock	1	tripping	tripper	750 t/h	1	750 t/h
03	Ground phosphate	1	grinding	ball mill	110 t/h	1	110 t/h
05	% 28 H_3PO_4	1	wet process	reaction tank	1250 m^3	1	110 t/h

ACTIVITY CODE 3512-6

60	[illegible]	[illegible]	1
61	74[illegible]	[illegible]	[illegible]
62	74[illegible]	[illegible]or	[illegible]
63	74?26 0272[illegible]	[illegible]or	1
64	74?26 02[illegible]	[illegible]or	[illegible]
65	74[illegible]	[illegible]	[illegible]



CAPACITY CALCULATIONS

Name of the critical equipment Tripper

Design Capacity of the critical equipment: 750 t/h

No. of critical equipment : 1

Design line capacity : 750 t/hour

Design line capacity : 6000 t/shift

Design line capacity : 18,000 t/day

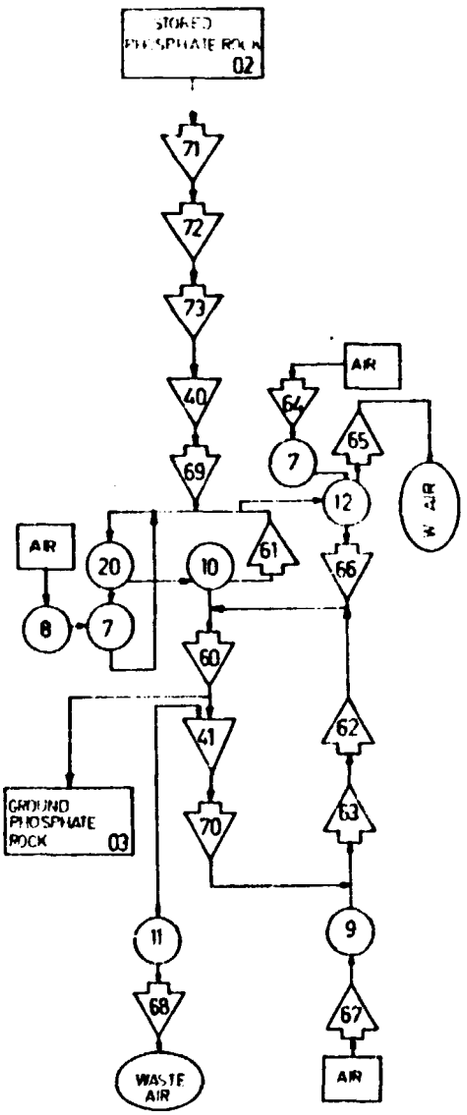
Design line capacity : 792,000 t/year

UNIDO / SPO (AZOT)
CAPITAL GOODS DEVELOPMENT PROJECT

MODULAR FLOW DIAGRAM

INDUSTRY	PRODUCT	TECHNOLOGY
FERTILIZER	STORED PHOSPHATE ROCK	[illegible]
DATE	SAMPLE PLANT	[illegible]
[illegible]		[illegible]
Prepared by	Drawn by	Checked by
E. ARDELAL	F. CELIK	[illegible]

Checked by UNIDO/Expert A-[illegible] Approved by UNIDO/[illegible]



CAPACITY CALCULATIONS

Name of the critical equipment: Ball Mill
Design capacity of the critical equipment : 110 t/h
No. of critical equipment : 1
Design line capacity : 880 t/shift
Design line capacity : 2640 t/day
Design line capacity : 792,000 t/year

ACTIVITY CODE	INDUSTRY	PRODUCT	TECH.	PAR.
	FE2-6	01	-	1

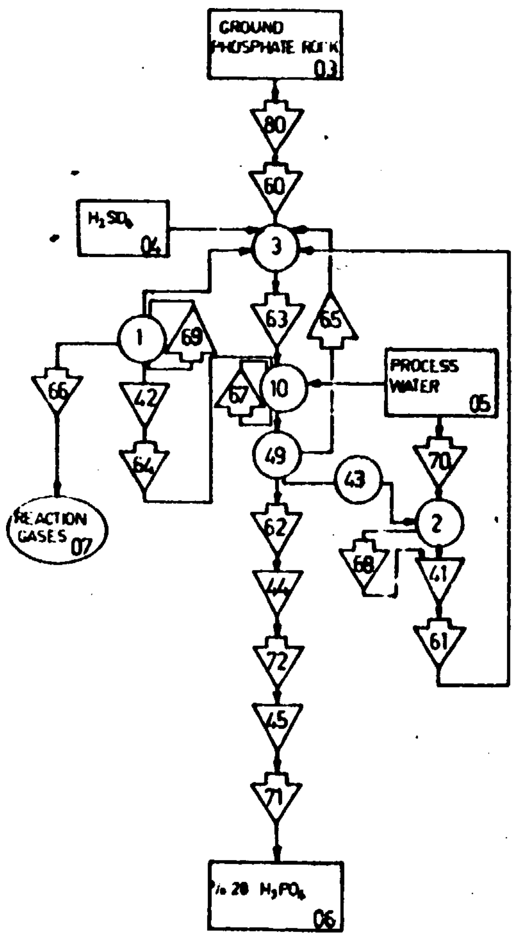
NO.	MACHINE CODE	MACHINE NAME	QUANT.
40	69211 0120325211	Hopper	1
20	72031 6040322632	Classifier	1
7	72032 1128615271	Ball mill	1
61	74342 0171101232	Main blower	1
10	74361 1130011211	Cyclone	6
60	74426 1648013631	Conveyor	1
41	69211 0120325211	Hopper	1
62	74426 5130013251	Elevator	1
63	74423 0050011211	Air flied conveyor	1
64	74341 0138101632	Air fan	1
65	74341 0128131612	Exhaust fan	1
66	74426 4330011632	Screw conveyor	1
11	74361 5010001211	Exhaust filter	1
6	74132 2425202211	Combustion chamber	1
67	74341 0128101612	Conditioning fan	1
8	74131 4011001611	Air heater	1
68	74341 0127131612	Exhaust fan	1
9	74131 4011001611	Air heater	1
12	74361 5090001211	Filter	1
69	74426 7630011621	Peripheric extractor	1
70	74426 7630011621	Cellular extractor	1
72	74426 0232013651	Belt. Conveyor	1
73	74426 0232013651	Belt Conveyor	1
71	74426 0450025672	Reclaiming scraper	1

UNIDO/SPO(AZOT)
CAPITAL GOODS DEVELOPMENT PROJECT

MODULAR FLOW DIAGRAM

INDUSTRY	PRODUCT	TECHNOLOGY
FERTILIZER	GROUND PHOSPHATE ROCK	grinding
DATE	SAMPLE PLANT	CAPACITY
7 9 1981	—	110 t/h
Prepared by	Drawn by	Checked by
F. ABDELAL	F. ÇELİK	V MIHLADIZ

Checked by UNIDO/Expert — Approved by UNIDO/CTA



CAPACITY CALCULATIONS
Name of the critical equipment: Reaction tank
Design capacity of the critical equipment:
No.of critical equipment :
Design line capacity : 110 t/hour
Design line capacity : 880 t/shift
Design line capacity : 2640 t/day
Design line capacity : 792,000 t/year

ACTIVITY CODE		INDUSTRY	PRODUCT	TECH	
		3512 – 6	08	1	1

NO	MACHINE CODE	MACHINE NAME	
80	74525 0604811581	Dusinator	1
60	74426 1530821681	Conveyor	1
63	74220 0241511712	Slurry pump	1
10	74362 4371504412	Uwego Filter	1
49	69243 0211321912	Separator	1
61	74220 0242511712	Acid pump	1
62	74220 0242511712	Strong acid pump	1
64	74220 0241221712	Process water pump	1
41	69211 0754320211	Dilute H_3PO_4 DBL.Tank	1
65	74210 2032311212	Sludge pump	2
1	74166 0821434212	Washing towers	1
66	74342 0071111212	Blower	1
42	69211 0711321912	Tank for towers	1
67	74220 0243511712	Cloth washing pump	1
43	69243 0211321912	Vacuum separator	1
2	74166 0211431912	Scrubber	1
44	69211 0711321912	Barometric seal tank	1
68	74312 2351112222	Vacuum pump	2
69	74220 0242511712	Circulation pump	2
70	74220 0241511712	Process water pump	2
45	69211 0754320211	Dilute H_3PO_4 tank	1
71	74220 0231511712	Clarified H_3PO_4 pump	3
72	74220 0241511712	Dilute H_3PO_4 pump	1
3	74165 086121941	Reaction tank	1

UNIDO/SPO (AZOT)
CAPITAL GOODS DEVELOPMENT PROJECT

MODULAR FLOW DIAGRAM

INDUSTRY	PRODUCT	TECHNOLOGY
FERTILIZER	% 28 H_3PO_4	wet process
DATE	**SAMPLE PLANT**	**CAPACITY**
7 9 1981	—	110 t/h
Prepared by	**Drawn by**	**Checked by**
E ABDELAL	F CELIK	V MIHLAVIZ

Checked by UNIDO/Expert | Approved by UNIDO/CTA

UNIDO/SPO (AGOT) CAPITAL GOODS DEVELOPMENT PROJECT

ACTIVITY CODE 351260211	MAJOR SPEC	MAJOR SPEC. 1	MAJOR SPEC. 2	TYPE DESCRIPTION	MANUFAC. CHARACT.1	MANUFAC. CHARACT.2	MANUFAC. CHARACT.3	Q.ty	Q	PURCHASE COST(1000$) UNIT	PURCHASE COST(1000$) TOTAL	CONSTANT 1980 YEAR COST(1000$) UNIT	CONSTANT 1980 YEAR COST(1000$) TOTAL	YEAR OF PURCHASE AND REMARK	SITC CODE (MAIN COMMODITY) 1 2 3 4 5	6	7	8	9	10	11	12	13	14	15
[illegible]	750 t/h	L:1400 mm	L:12 m	bulk	7.0 tons	C-Steel	6.3 tons	1	1	80	80	85	85	1979	74426	02	7	1	0	1	2	6	4	2
[illegible]	750 t/h	W: 800 mm	L: 6 m	bulk	3.5 tons	C-Steel	3.35 tons	1	1	9	9	9.6	9.6	1979	74426	02	7	2	1	1	1	1	1	1
[illegible]	750 t/h	W: 800 mm	L:90 m	bulk	13.0 tons	C-Steel	11.7 tons	1	1	90	90	96	96	1979	74426	02	7	2	0	1	1	6	5	2
[illegible]	750 t/h	W: 800 mm	L:150 m	bulk	21.0 tons	C-Steel	19 tons	1	1	140	140	150	150	1979	74426	02	7	2	0	1	1	6	5	2
[illegible]	750 t/h	W: 800 mm	L:162 m	bulk	22.0 tons	C-Steel	11.8 tons	1	1	179	179	182	182	1979	74426	02	7	2	0	1	1	6	5	2
[illegible]	750 t/h	-	L: 90 m	travelling	15 tons	C-Steel	11.5 tons	2	1	100	100	100	100	1980	74426	02	8	0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

(UNIDO/SPO (ACCT)   CAPITAL GOODS [illegible]

[illegible] 351260311 Basic machine description	Major spec	Major spec 1	Major spec 2	Type description	Manufac. charact. 1	Manufac. charact. 2	Manufac. charact. 3	Or.	Q.	Purchase cost (10 $) Unit	Purchase cost (10 $) Total	[illegible] 1980 [illegible] (1000$) Unit	[illegible] 1980 [illegible] (1000$) Total	Year of purchase and remark	Code 1 2 3 4 5	6 7	[illegible]
[illegible]	V: 100m³	-	25°C	Cylindrical	10.0 ton	C-Steel	6 mm	1	1	.10	10	.10	.10	1980	69211	21	[illegible]
[illegible]	C: 110t/h	-	-	Closed	8.0 ton	C-Steel	4 ton	2	1	50	50	122	122	1970	72[illegible]1	[illegible]	4
[illegible]	C: 110t/h	20 RPM	700 kW	horizontal	50.0 ton	[illegible]-Steel	40 ton	1	1	400	400	431	431	1979	[illegible]	11	[illegible]
[illegible] blower	C:150.000m³/h	P=1 kg/cm²	air	-	4.5 ton	Grey iron	4 ton	2	1	9	9	3.7	9.7	1979	74[illegible]	[illegible]	[illegible]
[illegible]	C:25000m³/h	-	-	single zone	2.5 ton	C-Steel	12 mm	1	6	7.5	45	7.5	45	1980	74[illegible]	[illegible]	[illegible]
[illegible]	C: 220 t/h	800 mm	L= 60 m	bulk	15 ton	C-Steel	11 ton	1	1	50	50	54	54	1979	[illegible]	[illegible]	4
[illegible]	V: [illegible] m³	-	25°C	Cylindrical	10.0 ton	C-Steel	6 mm	1	1	10	10	10	10	1980	69211	21	3
[illegible]	C: 110 t/h	-	-	bulk	12.0 ton	weld steel	11 ton	2	1	8	8	8.6	8.6	1979	74[illegible]	21	3
[illegible] conveyor	C: 110 t/h	800 mm	L= 29 m	EP(1-2kg/cm²)	4 ton	C-Steel	6 mm	1	1	30	30	32	32	1979	74[illegible]	[illegible]	5
[illegible]	C:40.000m³/h	H:800 mm.C	air	-	3.0 ton	C-Steel	2.5 ton	2	1	3.8	3.8	4.1	4.1	1979	74341	21	3
[illegible]	C:6000 m³/h	H:800 mm-C	air	exhaust	1.0 ton	C-Steel	0.8 ton	2	1	0.9	0.9	1	1	1979	74341	21	2
[illegible]	C: 110 t/h	[illegible]: 0,5 m	-	bulk	4 ton	C-Steel	3.8 ton	2	1	9	9	9.7	9.7	1979	74426	43	3
[illegible]	[illegible] m³/h	-	-	socks filter	2 ton	C,Steel	-	1	1	7.5	7.5	8.1	8.1	1970	74361	50	1
[illegible]	V: 45 m³	1200°C	liquid	-	6 ton	C-Steel	8 mm	1	1	6	6	6	6	1980	74332	24	2
[illegible]	C:[illegible]m³/h	[illegible] 800 mm	air	-	1.0 ton	C-Steel	0.8 ton	2	1	1.4	1.4	1.5	1.5	1979	74341	21	2
[illegible]	[illegible]	T: 200°C	-	-	3 ton	C-Steel	8 mm	1	1	3	3	3	3	1980	74132	40	1
[illegible]	[illegible] m³/h	[illegible] 600 mm	air	exhaust	1.0 ton	C-Steel	0.8 ton	2	1	0.9	0.9	1	1	1979	74341	01	[illegible]
[illegible]	[illegible] m³	T: 200°C	-	-	3 ton	C-Steel	8 cm	1	1	3	3	3	3	1980	74131	40	1
[illegible]	[illegible] m³/h	-	-	bag filter	2 ton	C-Steel	-	1	1	7.5	7.5	18.3	18.3	1970	74361	50	1
[illegible]	C: 110 t/h	-	-	-	2 ton	[illegible]-Steel	1.6 ton	1	1	5	5	5.4	5.4	1979	74426	[illegible]	3
[illegible]	C: 110 t/h	-	-	-	2 ton	[illegible]-Steel	[illegible] ton	1	1	5	5	5.4	5.4	1979	7442[illegible]	[illegible]	3
[illegible]	[illegible]	-	-	travelling	50 ton	C-[illegible]	46 ton	2	1	200	200	200	200	1980	7442[illegible]	[illegible]	[illegible]
[illegible]	[illegible] t/h	= 500 mm	L= 168 m	bulk	22 [illegible]	[illegible]-Steel	19.8 ton	1	1	90	90	96	96	1979	74426	32	3
[illegible]	110 t/h	= 500 mm	L= 110 m	bulk	1[illegible] ton	C-Steel	13.5 ton	1	1	70	70	75	85	1979	74426	32	3

UNIDO/SPO (AZOT) CAPITAL GOODS DEVELOPMENT PROJECT

ACTIVITY CODE 391260611	MAJOR SPEC.	MAJOR SPEC. 1	MAJOR SPEC. 2	TYPE DESCRIPTION	MANUFAC. CHARACT.1 (tons)	MANUFAC. CHARACT.2	MANUFAC. CHARACT.3	OR.	Q.	PURCHASE COST (1000$) UNIT	PURCHASE COST (1000$) TOTAL	CONSTANT 1980 YEAR COST (1000$) UNIT	CONSTANT 1980 YEAR COST (1000$) TOTAL	YEAR OF PURCHASE AND REMARK	SITC CODE (FOR COMPUTER) 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
[illegible]	C:110 t/h	-	mechanical	fixed	4	C-Steel	3.5 ton	1	1	4.2	4.2	4.4	4.4	1979	74525 06 8 0 1 1 1 6
[illegible]	C:110 t/h	Z:800 mm	L=11 m	bulk	1.5	C-Steel	1.2 ton	1	1	10	10	11	11	1979	74426 16 1 2 0 1 1 6
[illegible]	C:120 m³/h	H: 16 m	slurry	horizontal	0.9	Alloy steel	0.5 ton	2	1	2.4	2.4	2.6	2.6	1979	74220 02 4 1 8 1 5
[illegible]	C:150 t/h	Area 250 m²	-	-	40	Alloy steel	32 ton	2	1	250	250	610	610	1970	74362 43 7 1 0 0 4 4
[illegible]	V:16.4 m³	Q:1.9 m	T=30°C	cyl.	1.4	plastic	20 mm	2	1	6.9	6.9	6.9	6.9	1980	69243 02 1 1 3 1 9
[illegible]	C:230m³/h	H:25 m	corrosive	horizontal	1.0	Alloy steel	0.8 ton	2	1	2.9	2.9	3.1	3.1	1979	74220 02 4 2 5 1 1 7
[illegible]	C:105m³/h	H:25 m	corrosive	horizontal	0.5	Alloy steel	0.4 ton	2	1	1.7	1.7	1.8	1.8	1979	74220 02 4 2 5 1 1 7
[illegible]	C:200m³/h	H:15 m	hot clear	vertical	1.0	Alloy steel	0.8 ton	2	2	2.1	2.1	2.3	2.3	1979	74220 02 4 1 2 2 1 7
[illegible]	V:3660 m³	Q:20,6 m	30°C	cyl.	38.8	C-Steel	18 mm	1	1	30	30	32	32	1979	69211 13 5 4 3 2 4 2
[illegible]	C:10 m³/h	H:30 m	sludge	horizontal	0.3	cast iron	0.2 ton	2	2	0.9	1.8	1	2	1979	74210 20 3 2 0 1 1
[illegible]	7:203 m³	2 atm	35°C	spray	40	C-Steel	16 mm	2	2	100	200	107	214	1979	74166 08 2 1 4 3 4 2
[illegible]	2:145000m³/h	P:2 kg/cm²	air	-	4.6	C-Steel	3.5 ton	2	1	9	9	9.7	9.7	1979	74342 00 7 1 1 1 1 9
[illegible]	V:10 m³	Q:2,5 m	35°C	cyl.	1.0	plastic	20 mm	2	1	4.5	4.5	4.5	4.5	1980	69211 07 1 1 3 2 1 9
[illegible]	1300 m³/h	H:45 m	corrosive	horizontal	1.3	Alloy steel	1.2 ton	2	1	10	10	11	11	1979	74220 02 4 1 5 1 1 7
[illegible]	V:4 m³	Q:1.2 m	T=40°C	cyl.	0.5	plastic	20 mm	2	1	4	4	4	4	1980	69243 32 1 1 3 2 1 9
[illegible]	1:2 m³	P=2 atm	T=40°C	spray	0.7	plastic	20 mm	2	1	4	4	4	4	1980	74166 02 1 1 4 3 1 9
[illegible]	V:1.3 m³	Q:2.5 m	40°C	cyl.	1.2	plastic	20 mm	2	1	5	5	5	5	1980	69211 07 1 1 3 2 1 9
[illegible]	C:750m³/h	210 mm Hg	air	horizontal	5.5	cast iron	5.0 ton	2	2	9	18	9.7	19.4	1979	74312 23 9 3 1 1 3 9
[illegible]	C:200m³/h	H:25 m	corrosive	horizontal	1.0	Alloy steel	0.8 ton	2	2	3.7	7.4	4	8	1979	74220 02 4 2 5 1 1 7
[illegible]	C:200 m³/h	H:15 m	corrosive	horizontal	1.0	Alloy steel	0.8 ton	2	2	2.1	4.2	2.3	4.5	1979	74220 02 4 1 2 1 1 7
[illegible]	V:60 m³	Q:20,6 m	40°C	cyl.	32.0	C-Steel	18 mm	1	1	30	30	32	32	1979	69211 13 5 4 3 2 4 2
[illegible]	C: 5 m³/h	H:15 m	corrosive	horizontal	0.6	Alloy steel	0.5 ton	2	3	1.2	3.6	1.3	3.9	1979	74220 02 3 1 5 1 1 7
[illegible]	C:105 m³/h	H:15m	corrosive	horizontal	0.7	Alloy steel	0.5 ton	2	1	1.5	1.5	1.6	1.6	1979	74220 02 4 1 5 3 1 7
[illegible]	1250 m³	atmosferic	non-aera	stirred	250 ton	concrete	30 cm	1	1	53.7	53.7	57	57	1979	74145 08 6 1 2 1 7 9

UNIDO/SPO (AZOT)

CAPITAL GOODS

DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENTS FOR THE NEW PHOSPHORIC ACID PLANT

CAPACITY: 126,118 t/y LOCATION: MAZIDAĞI **Ind. Code 3512-6**

ANTICIPATED DATE OF COMMISSIONING: 1988

FERTILIZER INDUSTRY-Phosphoric Acid **Weight/Value**

BIST CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $ 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
[illegible]	Hopper	1	10.0	10.0						10.0					10.0
[illegible]	Hopper	1	10.0	10.0						10.0					10.0
[illegible]	[illegible] for towers	1	1.0	4.3						1.0					1.0
[illegible]	Horizontal tank	1	1.2	5.						1.2					1.2
[illegible]	[illegible] Dec.tank	1	32.	32.0						32.0					32.0
[illegible]	[illegible]	1	32.	32.0						32.0					32.0
[illegible]	Separator	1	1.	6.9						1.4					1.4
[illegible]	Vacuum separator	1	0.	4.3						0.5					0.5
[illegible]	Classifier	1	8.	122.3						8.0					8.0
[illegible]	Ball mill	1	50.	331.						50.0					50.0
[illegible]	Air heater	2	3.0	3.0						6.0					6.0
[illegible]	Combustion chamber	1	6.0	6.0						6.0					6.0
[illegible]	Scrubber	1	0.7	4.0						0.7					0.7
74166	Washing tower	2	40.0	107.0						80.0					80.0
74165	Reaction tank	1	250.0	57.0						250.0					250.0
74210	Sludge pumps	2	0.3	1.0						0.6					0.6
74220	Clar. H_3PO_4 pump	3	0.6	1.3						1.8					1.8
74220	Process water pump	2	1.0	2.3						2.0					2.0

EQUIPMENT REQUIREMENTS FOR THE NEW PHOSPHORIC ACID PLANT

UNIDO/SPO (AZOT) CAPACITY: 126,118 t/y LOCATION: MAZIDAĞI Ind.Code 3512-6

CAPITAL GOODS ANTICIPATED DATE OF COMMISSIONING: 1986

DEVELOPMENT PROJECT FERTILIZER INDUSTRY-Phosphoric Acid Weight/Value

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $ 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
74220 0241521712	Process water pump	2	1.0	2.3				.		2.0					2.0
74220 0241511712	Dil.H_3PO_4 pump	1	0.7	1.6				.		0.7					0.7
74220 0241811712	Slurry pump	1	0.9	2.6				.		0.9					0.9
74220 0242011712	Circ.pump	2	1.0	4.0				.		2.0					2.0
74220 0242511712	Acid pump	1	1.0	3.1				.		1.0					1.0
74220 0242511712	Strong acid pump.	1	0.5	1.8				.		0.5					0.5
74220 0243011712	Cloth washing pump.	1	1.3	11.0				.		1.3					1.3
74312 2353112222	Vacuum pumps	2	5.5	9.7				.		11.0					11.0
74341 0120101612	Conditioning fan	1	1.0	1.5				.		1.0					1.0
74341 0120131612	Exhaust fan	1	1.0	1.0				.		1.0					1.0
74341 0120131612	Exhaust fan	1	1.0	1.0				.		1.0					1.0
74341 0130101612	Air fan	1	3.0	4.1				.		3.0					3.0
74342 0071111212	Blower	1	4.0	9.7				.		4.0					4.0
74342 0070101212	Main blower	1	4.5	9.7				.		4.5					4.5
74361 1100001211	Cyclone	6	2.5	7.5				.		15.0					15.0
74361 5010001211	Filter	1	2.0	18.3				.		2.0					2.0
74361 5010001211	Exhaust filter	1	2.0	8.1				.		2.0					2.0
74362 4371000002	Ucego filter	1	40.0	610				.		40.0					40.0

EQUIPMENT REQUIREMENTS FOR THE NEW PHOSPHORIC ACID PLANT

UNIDO/SPO (AZOT) — CAPACITY: 126,118 t/y LOCATION: MAZIDAĞI — Ind. Code 3512-6

CAPITAL GOODS — ANTICIPATED DATE OF COMMISSIONING: 1985

DEVELOPMENT PROJECT — FERTILIZER INDUSTRY-Phosphoric Acid — Weight/Value

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $ 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
74423 0050031211	Air flied conveyor	1	4.0	32.0				.		4.0					4.0
74426 0232013651	Belt conveyor	1	22.0	96.0				.		22.0					22.0
74426 0232013651	Belt conveyor	1	15.0	75.0				.		15.0					15.0
74426 0243013651	Belt conveyor	1	1.5	11.0				.		1.5					1.5
74426 0272013651	Belt conveyor	1	22.0	182.0				.		22.0					22.0
74426 0272013651	Belt conveyor	1	21.0	150.0				.		21.0					21.0
74426 0272013651	Belt conveyor	1	13.0	96.0				.		13.0					13.0
74426 0272011611	Belt conveyor	1	1.5	9.6				.		1.5					1.5
74426 0273012641	Belt conveyor	1	7.0	85.0				.		7.0					7.0
74426 1642013651	Conveyor	1	15.0	54.0				.		15.0					15.0
74426 4330011312	Screw conveyor	1	4.0	9.7				.		4.0					4.0
74426 5130013251	Elevator	1	12.0	8.6				.		12.0					12.0
74426 7630011621	Peripheric extractor	1	2.0	5.4				.		2.0					2.0
74426 7630011621	Cellular extractor	1	2.0	5.4				.		2.0					2.0
74428 0280024672	Dripper	1	19.0	100.0				.		15.0					15.0
74525 0680111631	Dosimeter	1	4.0	4.4				.		4.0					4.0
74428 0450025672	Reclaiming scraper	2	50.0	200.0				.		100.0					100.0

UNIDO/SPC (AZOT)

CAPITAL GOODS

DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENTS FOR THE NEW PHOSPHORIC ACID PLANT

CAPACITY: 126,118 t/y LOCATION: MAZIDAĞI

ANTICIPATED DATE OF COMMISSIONING: 1988

FERTILIZER INDUSTRY-Phosphoric Acid

Ind.Code 3512-6

Weight/Value

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $ 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
69211 0120325211	Hopper	1	10.0	10.0				.		10.0					10.0
69211 0120325211	Hopper	1	10.0	10.0				.		10.0					10.0
69211 0211321912	Tank for towers	1	1.0	4.5				.		4.5					4.5
69211 0211321912	Bar.seal tank	1	1.2	5.0				.		5.0					5.0
69211 1321321912	Dil H_3PO_4 Dec.tank	1	32.0	32.0				.		32.0					32.0
69211 1074326211	Dil H_3PO_4 tank	1	32.0	32.0				.		32.0					32.0
69243 0211321912	Separator	1	1.4	6.9				.		6.9					6.9
69243 0211321912	Vacuum separator	1	0.5	4.0				.		4.0					4.0
72831 6043022212	Classifier	1	8.0	122.0				.		122.0					122.0
72832 1123005261	Ball mill	1	50.0	431.0				.		431.0					431.0
74131 4010001611	Air heater	2	3.0	3.0				.		6.0					6.0
74132 2425202211	Combustion chamber	1	6.0	6.0				.		6.0					6.0
74166 0211431912	Scrubber	1	0.7	4.0				.		4.0					4.0
74166 0821434212	Washing tower	2	40.0	107.0				.		214.0					214.0
74165 0861217941	Reaction tank	1	250.0	57.0				.		57.0					57.0
74210 2032811212	Sludge pumps	2	0.3	1.0				.		2.0					2.0
74220 0231511712	Clar.H_3PO_4 pump	3	0.6	1.3				.		3.9					3.9
74220 0241511712	Process water pump	2	1.0	2.3				.		4.6					4.6

UNIDO/SPO (AZOT)

CAPITAL GOODS

DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENTS FOR THE NEW PHOSPHORIC ACID PLANT

CAPACITY: 126,118 t/y LOCATION: NAZIDAŽI

ANTICIPATED DATE OF COMMISSIONING: 1988

FERTILIZER INDUSTRY-Phosphoric Acid

Ind.Code 3512-6

?

Weight/Value

SITC CODE	BASIC MACHINE NAME	Qty Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $ 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
74220 0241521712	Process water pump	2	1.0	2.3				.		4.6					4.6
74220 0241511712	Dil.H_3PO_4 pump	1	0.7	1.6				.		1.6					1.6
74220 0241811712	Slurry pump	1	0.9	2.6				.		2.6					2.6
74220 0242011712	Circ.pump	2	1.0	4.0				.		8.0					8.0
74220 0242511712	Acid pump	1	1.0	3.1				.		3.1					3.1
74220 0242511712	Strong acid pump.	1	0.5	1.8				.		1.8					1.8
74220 0243011712	Cloth washing pump.	1	1.3	11.0				.		11.0					11.0
74312 2353112222	Vacuum pumps	2	5.5	9.7				.		19.4					19.4
74341 0120101612	Conditioning fan	1	1.0	1.5				.		1.5					1.5
74341 0120131612	Exhaust fan	1	1.0	1.0				.		1.0					1.0
74341 0120131612	Exhaust fan	1	1.0	1.0				.		1.0					1.0
74341 0130101612	Air fan	1	3.0	4.1				.1		4.1					4.1
74342 0071111212	Blower	1	4.0	9.7				./		9.7					9.7
74342 0070101212	Main blower	1	4.5	9.7				.		9.7					9.7
74361 1100001211	Cyclone	6	2.5	7.5				.		45.0					45.0
74361 5010001211	Filter	1	2.0	18.3				1 .		18.3					118.3
74361 5010001211	Exhaust filter	1	2.0	8.1				.1		8.1					8.1
74362 4371000002	Uoego filter	1	40.0	610				.		610					610

UNIDO/SPO (AZOT)
CAPITAL GOODS
DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENTS FOR THE NEW PHOSPHORIC ACID PLANT
CAPACITY: 126,118 t/y LOCATION: MAZIDAĞI
ANTICIPATED DATE OF COMMISSIONING: 1988
FERTILIZER INDUSTRY-Phosphoric Acid

Ind.Code 3512-6
Weight/Value

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $ 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
[illegible] 0520031211	Air flied conveyor	1	4.0	32.0				.		32.0					32.0
74426 0232013651	Belt conveyor	1	22.0	96.0				.		96.0					96.0
[illegible] 0232013651	Belt conveyor	1	15.0	75.0				.		75.0					75.0
[illegible] 0232013651	Belt conveyor	1	1.5	11.0				.		11.0					11.0
[illegible] 0232013651	Belt conveyor	1	22.0	182.0				.		182.0					182.0
[illegible] 0232013651	Belt conveyor	1	21.0	[illegible]				.		150.0					150.0
[illegible] 0232013651	Belt conveyor	1	13.[illegible]	[illegible]				.		96.0					96.0
[illegible] 1272011611	Belt conveyor	1	1.5	9.6				.		9.6					9.6
[illegible] 0273012641	Belt conveyor	1	7.0	85.0				.		85.0					85.0
74426 1642013651	Conveyor	1	15.0	54.0				.		54.0					54.0
74426 4330011312	Screw conveyor	1	4.0	9.7				.		9.7					9.7
74426 5130013251	Elevator	1	12.0	8.6				.		8.6					8.6
74426 7630011621	Peripheric extractor	1	2.0	5.4				.		5.4					5.4
74426 7630011621	Cellular extractor	1	2.0	5.4				.		5.4					5.4
74423 0280024672	Gripper	1	15.0	100.0				.		100.0					100.0
74525 0680111631	Dosimeter	1	4.0	4.4				.		4.4					4.4
74428 0450025672	Reclaiming scraper	2	50.0	200.0				.		400.0					400.0

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DEVELOPMENT OF CAPITAL GOODS INDUSTRIES

DP/TUR/76/034

Technical Report No. XII:
Demand for Capital Goods
for Fertilizer Industry

Vol.: VIII

Birleşmiş Milletler Kalkınma Programı

UNITED NATIONS NATIONS UNIES

DEVELOPMENT PROGRAMME IN TURKEY

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANISATION

RESTRICTED Sept.1982

English

DEVELOPMENT OF CAPITAL GOODS INDUSTRIES

DP/TUR/76/034

Technical report No.XII-Vol.VIII

Demand for Capital Goods for Fertiliser Industry- Urea-İskenderun

Prepared for the Goverment of Turkey

by the United Nations Industrial Development Organization

acting as executing agency for the United Nations Development Programme

Based on the work of

Capital Goods Development Project Team in Turkey

United Nations Industrial Development Organization

Vienna

This report has not been cleared with the United Nations Industrial Development Organization which does not, therefore, necessarily share the views presented.

U.N. BUILDING, 197 ATATÜRK BULVARI P.O. BOX 407 ANKARA CABLES : UNDEVPRO TEL : 26 54 80 TELEX : 42684

CAPITAL GOODS DEVELOPMENT PROJECT IN TURKEY

Vol.VIII

Urea-İSKENDERUN

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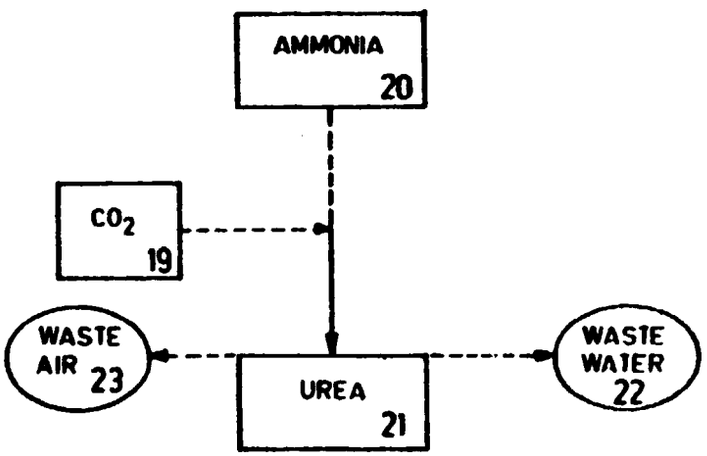


FERTILIZERS AND PESTICIDES UREA			INDUSTRY CODE [illegible]
UNIDO/SPO (AZOT) CAPITAL GOODS DEVELOPMENT PROJECT			
MODULAR PRODUCTION CHART			
DATE	Prepared by	Drawn by	Checked by
23.9.1981	E. ABDELAL	F. ÇELIK	V MIHLADIZ
Checked by UNIDO/Expert		Approved by UNIDO/CTA	

UNIDO/SPO (ASOT)

CAPITAL GOODS DEVELOPMENT PROJECT

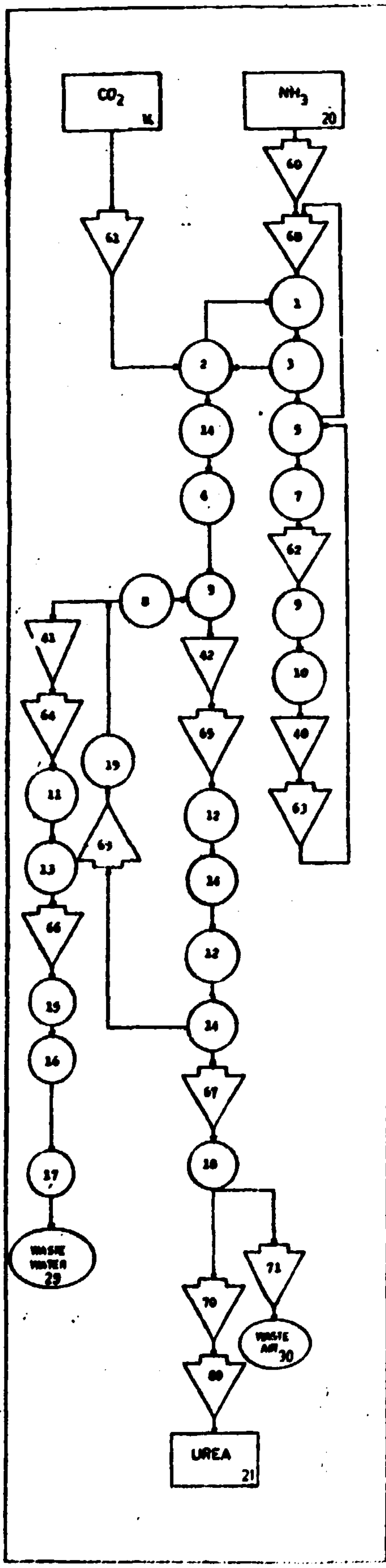
Ind. Code: 3512-5

Ind. Name Fertiliser and Pesticides

UREA

Prepared by	Checked by	Approved by
Chem. Eng. ESc E. ABDELAL	UNIDO/Expert	UNIDO/CTA

PRODUCTION STAGE		TECHNOLOGY		CRITICAL EQUIPMENT		DESIGN LINE CAPACITY	
CODE	NAME	CODE	NAME	NAME	CAPACITY RANGE	CODE	CAPACITY
20	Ammonia	-	-	-	-	-	-
						-	-
21	Urea	1	Stripping	reactor	205 m^3	1	64.58 t/h
						2	45.83 t/h



INDUSTRY	PRODUCT	TECH	CAP
3512.5	21	1	1

ACTIVITY CODE

NO	MACHINE CODE	MACHINE NAME	QUAN
60	742100230113642	HP-NH_3 pump	2
61	743131056204162	CO_2 compressor	1
1	741610540016222	HP condenser	1
2	741610240016222	HP heat exchanger	1
3	741650246257642	Reactor	1
4	741660421422612	Rectifying column	1
5	741660206403532	HP scrubber	1
6	741610100013212	Heater recirculation	1
7	741660311411612	Absorber	1
62	7422002[illegible]1712	Absorber circ. pump	2
8	741610320011612	Absorber [illegible] cooler	1
9	692430211321612	Flash tank	1
10	741660210021612	Scrubber	1
40	692430211321612	Level tank	1
63	742100130023742	Carbamate pump	2
41	692111320023612	NH_3 water tank	1
42	692111320023612	Urea storage tank	1
64	742200234031712	Desorber feed pump	2
65	742200243011712	Urea sol'n pump	2
11	741610120011612	Desorber heat exchan	1
12	741620100013412	Evaporator	2
13	741660920011612	Desorption column	2
14	692430211323[illegible]	Separator	2
66	742200235011712	Hydrolyser feed pump	2
15	741610140012612	Hydrolyser heat exchanger	1
16	741650330054612	Hydrolyser	1
17	741610310011612	Waste water cooler	1
67	742200234011712	Urea melt pump	1
18	720340516009941	Prilling tower	1
70	744260220012641	Belt conveyor	1
80	745250641111602	Belt scale	1
71	743410332133412	Fan	4
68	742400130001712	HP ejector	
19	741610540013411	Condenser	
69	742400110001712	Booster	

CAPACITY CALCULATIONS

Name of the critical equipment : reactor
Design capacity of the Cr. eq. : 205 m^3
No. of critical equipment :1
Design line capacity : 71 t/hour
Design line capacity : 568 t/shift
Design line capacity : 1704 t/day
Design line capacity : 511200 t/year

UNIDO / SPD (AZOT)
CAPITAL GOODS DEVELOPMENT PROJECT

[illegible] FLOW DIAGRAM

INDUSTRY	PRODUCT	TECHNOLOGY
FERTILIZER	UREA	STRIPPING
DATE	SAMPLE PLANT	CAPACITY
[illegible].9.1981	-	71 t/h
PREPARED BY	DRAWN BY	CHECKED BY
[illegible] Abdelal [illegible]	Cumhur Ilgaz	Vedat [illegible]

Checked by UNIDO/Expert [illegible]	Approved by UNIDO/CTA

UNIDO/PPD (AZOT)

CAPITAL GOODS

DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR UREA PLANT

LOCATION: ~~BASE CAPACITY~~ : 1300 t/d

ANTICIPATED DATE OF COMMISSIONING: 1987

FERTILIZER INDUSTRY: Urea

Ind. Coast 3512-5

Weight/~~Value~~

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost'in 1980 (US $ 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
69211 1320023611	NH_3 water tank	1	24.5	50.1					24.5						24.5
69211 1320023611	Urea storage tank	1	23.0	42.6					23.0						23.0
69213 0211321611	Flash tank	1	3.2	5.4					3.2						3.2
69213 0211321611	Level tank	1	1.9	32.1					1.9						1.9
69219 0211323611	Separator	2	19.8	123.0					39.6						39.6
74814 0316000941	Prilling tower	1	510.0	195.0					510.0						510.0
74162 0130013212	Heater recirculation	1	130	600.0					130.0						130.0
74161 0130011612	Desorber heat exch.	1	0.6	11.0					0.6						0.6
74161 0140016222	Hp heat exchanger	1	162.0	600.0					162.0						162.0
74161 0320011511	Absorber circ. cooler	1	1.3	17.0					1.3						1.3
74161 0330011511	Waste water cooler	1	2.0	23.0					2.0						2.0
74161 0540013611	Condenser	2	15.5	126.0					31.0						31.0
74161 0540016222	Hp Condenser	1	119.0	600.0					119.0						119.0
74162 0130013612	Evaporator	2	10.7	267.0					21.4						21.4
74165 0140267642	Reactor	1	200.0	700.0					200.0						200.0
74165 0330054612	Hydrolyzer	1	32.5	214.3					32.5						32.5
74165 0206403232	Scrubber	1	15.0	47.1					15.0						15.0
74161 0140012611	Hydrolyzer heat exch.	1	9.8	80.0					9.8						9.8

UNIDO/SPO (AZOT)

CAPITAL GOODS

DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR UREA PLANT

LOCATION: [illegible] CAPACITY : 1300 t/d

ANTICIPATED DATE OF COMMISSIONING: 1987

FERTILIZER INDUSTRY: Urea

Ind. Cost [illegible]

Weight/~~Value~~

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost'in 1980 (US $ 1000)	1981	192	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
[illegible] 0210011611	Scrubber	1	1.1	23.6					1.1						1.1
74166 0311011612	Absorber	1	2.0	38.7					2.0						2.0
74166 0321022612	Rectifying column	1	5.0	62.3					5.0						5.0
[illegible] 0210011612	Desorption column	2	3.9	52.6					7.8						7.8
[illegible] 0130013742	Carbamate pump	2	12.5	442.3					25.0						25.0
[illegible]	H_2O-NH_3 pump	2	11.0	816.2					22.0						22.0
[illegible]	Absorber circ. pump	2	0.25	6.6					0.5						0.5
74220 [illegible] 11711	Desorber feed pump	2	0.3	11.7					0.6						0.6
74220 0234011712	Urea melt pump	1	0.69	6.6					0.69						0.69
74220 0230011711	Hydrolyzer feed pump	2	0.71	20.8					1.42						1.42
74220 0243011712	Urea sol'n pump	2	0.64	10.8					1.28						1.28
74240 0110001712	Booster	2	0.78	1.4					1.56						1.56
74240 0130001712	Hp Ejector	1	0.28	1.4					0.28						0.28
74313 1056204262	CO_2 compressor	1	30.0	752.0					30.0						30.0
74341 0152131631	Fan	4	4.3	9.6					17.2						17.2
74426 0220012641	Belt conveyor	1	10.0	23.6					10.0						10.0
74525 0661111611	Belt scale	1	0.36	0.31					0.36						0.36

UNIDO/SPO (AZOT)

CAPITAL GOODS

DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR UREA PLANT

LOCATION: ~~INC. CAPACITY~~ : 1100 t/d

ANTICIPATED DATE OF COMMISSIONING: 1987

FERTILIZER INDUSTRY : Urea

Ind. Code 3512-5

~~Weight~~/Value

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $ 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
69911 1320023611	NH_3 water tank	1	24.5	50.1					50.1						50.1
69911 1320023611	Urea storage tank	1	23.0	42.6					42.6						42.6
69243 0211321611	Flash tank	1	3.2	5.4					5.4						5.4
69243 0211321611	Level tank	1	1.9	32.1					32.1						32.1
69343 0211323611	Separator	2	19.8	123.0					246.0						246.0
72834 0516000941	Prilling tower	1	5100	195.0					195.0						195.0
74161 0130013212	Heater recirculation	1	1300	600.0					600.0						600.0
74161 0120011612	Desorber heat exch.	1	0.6	11.0					11.0						11.0
74161 0140012611	Hydrolyzer heat exch.	1	9.8	80.0					80.0						80.0
74161 0140015222	Hp heat exchanger	1	162.0	600.0					600.0						600.0
74161 0320011611	Absorber circ. cooler	1	1.3	17.0					17.0						17.0
74161 0330011611	Waste water cooler	1	2.0	23.0					23.0						23.0
74161 0340013611	Condenser	2	15.5	126.0					252.0						252.0
74161 0340015222	Hp Condenser	1	119.0	600.0					600.0						600.0
74162 0130013612	Evaporator	2	13.7	267.0					534.0						534.0
74165 02450.7642	[illegible]stor	1	250.0	700.0					700.0						700.0
74165 0330054612	[illegible]lyzer	1	32.5	214.8					214.8						214.8
74166 0206403232	HP Scrubber	1	18.0	47.1					47.1						47.1

UNIDO/SPO (AZOT)

CAPITAL GOODS

DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR UREA PLANT

LOCATION: [illegible] CAPACITY : 1190 t/d

ANTICIPATED DATE OF COMMISSIONING: 1987

FERTILIZER INDUSTRY: Urea

Ind. Code: 3512-5

~~Weight~~/Value

CCCC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $ 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
[illegible] 3210021611	Scrubber	1	1.1	23.6					23.6						23.6
74[illegible] 0311411612	Absorber	1	2.0	38.7					38.7						38.7
[illegible] 0311422612	Rectifying column	1	5.0	62.3					62.3						62.3
[illegible] 0311011612	Desorption column	2	3.9	52.6					105.2						105.2
[illegible] 0211011742	Carbamate pump	2	12.5	442.3					3846.0						[illegible]
[illegible]	HP-NH_3 pump	2	11.0	816.2					1632.0						[illegible]
[illegible]	Absorber circ. pump	2	0.25	6.6					13.2						[illegible]
[illegible] 0334011711	Desorber feed pump	2	0.3	11.7					23.4						[illegible]
[illegible] 0234011712	Urea melt pump	1	0.69	6.6					6.6						[illegible]
[illegible] 0235011711	Hydrolyzer feed pump	2	0.71	20.8					41.6						[illegible]
74220 0243011712	Urea sol'n pump	2	0.64	10.8					21.6						21.6
74240 0113001712	Booster	2	0.78	1.4					2.8						2.8
74400 0130001712	Hp Ejector	1	0.28	1.4					1.4						1.4
74313 1056304262	CO_2 Compressor	1	30.0	752.0					752.0						752.0
74341 0132131631	Fan	4	4.3	9.6					38.4						38.4
74426 0220012641	Belt conveyor	1	10.0	23.6					23.6						23.6
74525 0661111611	Belt scale	1	0.36	0.31					0.31						0.31

12535
(9 of 9)

DEVELOPMENT OF CAPITAL GOODS INDUSTRIES

DP/TUR/76/034

Technical Report No. XII:
Demand for Capital Goods
for Fertilizer Industry

Vol.: IX

Birleşmiş Milletler Kalkınma Programı

UNITED NATIONS NATIONS UNIES

DEVELOPMENT PROGRAMME IN TURKEY

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

RESTRICTED

Sept.1982

English

DEVELOPMENT OF CAPITAL GOODS INDUSTRIES

DP/TUR/76/034

Technical report No.XII-Vol.IX

Demand for Capital Goods for Fertiliser Industry-

Sulfuric Acid-MAZIDAĞI

Prepared for the Goverment of Turkey

by the United Nations Industrial Development Organization

acting as executing agency for the United Nations Development Programme

Based on the work of

Capital Goods Development Project Team in Turkey

United Nations Industrial Development Organization

Vienna

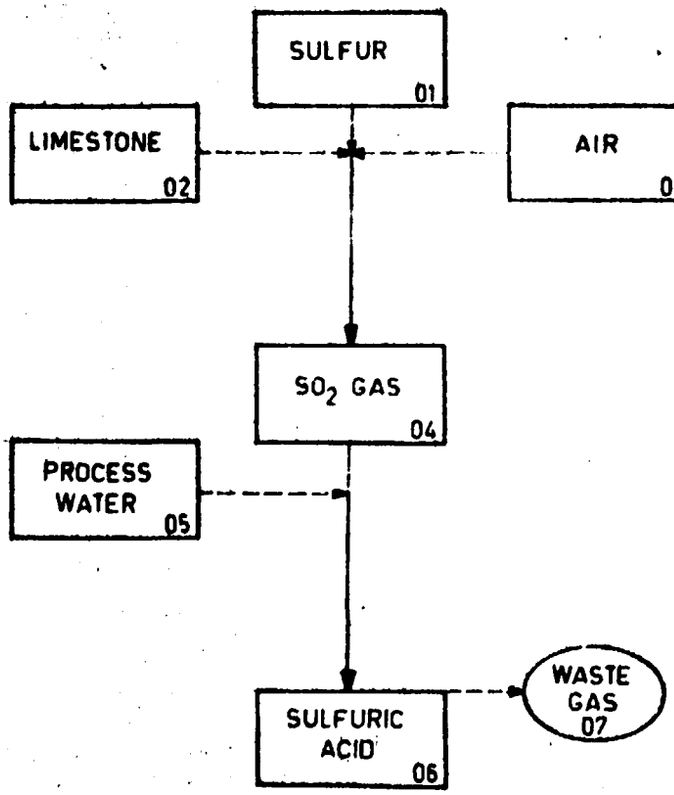
U.N. BUILDING, 197 ATATÜRK BULVARI P.O. BOX 407, ANKARA CABLES : UNDEVPRO TEL : 26 54 68 TELEX : 42804

CAPITAL GOODS DEVELOPMENT PROJECT IN TURKEY

Vol.IX

Sulfuric Acid-MAZIDAĞI

TABLE OF CONTENTS



FERTILIZERS AND PESTICIDES SULFURIC ACID			INDUSTRY CODE 3512-3
UNIDO /SPO (AZOT) CAPITAL GOODS DEVELOPMENT PROJECT			
MODULAR PRODUCTION CHART			
Date	Prepared by	Drawn by	Checked by
12.10.1981	E. ABDELAL O. KADIOĞLU	F. ARICIOĞLU	V. MIHLADIZ
Checked by UNIDO/Expert		Approved by UNIDO/CTA	

Ind.Code : 3512-3

Ind.Name : Fertilizer and Pesticides

SULFURIC ACID

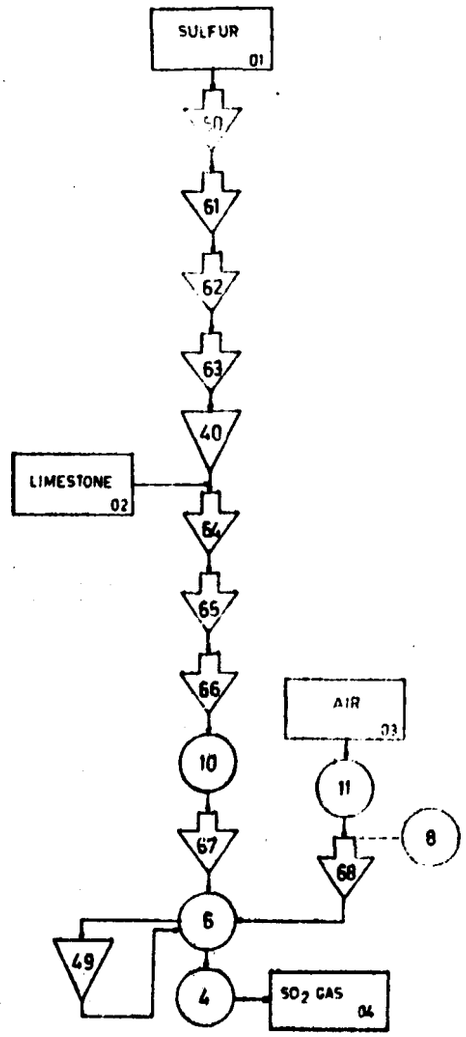
UNIDO/UPC (AZOT)

CAPITAL GOODS DEVELOPMENT PROJECT

INDUSTRY ACTIVITIES CHART

Prepared by	Checked by	Approved by
Chem.Eng.Mo. R. ABDELAL	UNIDO/Expert	UNIDO/CHB

PRODUCTION STAGE		TECHNOLOGY		CRITICAL EQUIPMENT		DESIGN LINE CAPACITY	
CODE	NAME	CODE	NAME	NAME	CAPACITY RANGE	CODE	CAPACITY
C1	Sulfur	–	–	–	–	1	2115 t/h
						2	18 t/h
04	SO_2 gas	1	Sulfur burning	2 Combustion chamber	125 m^3	~~1~~	2x95.460 m^3/h
						2	118.700 m^3/h
06	Sulfuric acid	1	Conversion and double absorption	Converter	737 m^3	1	2x43.75 t/h
						2	56.6 t/h



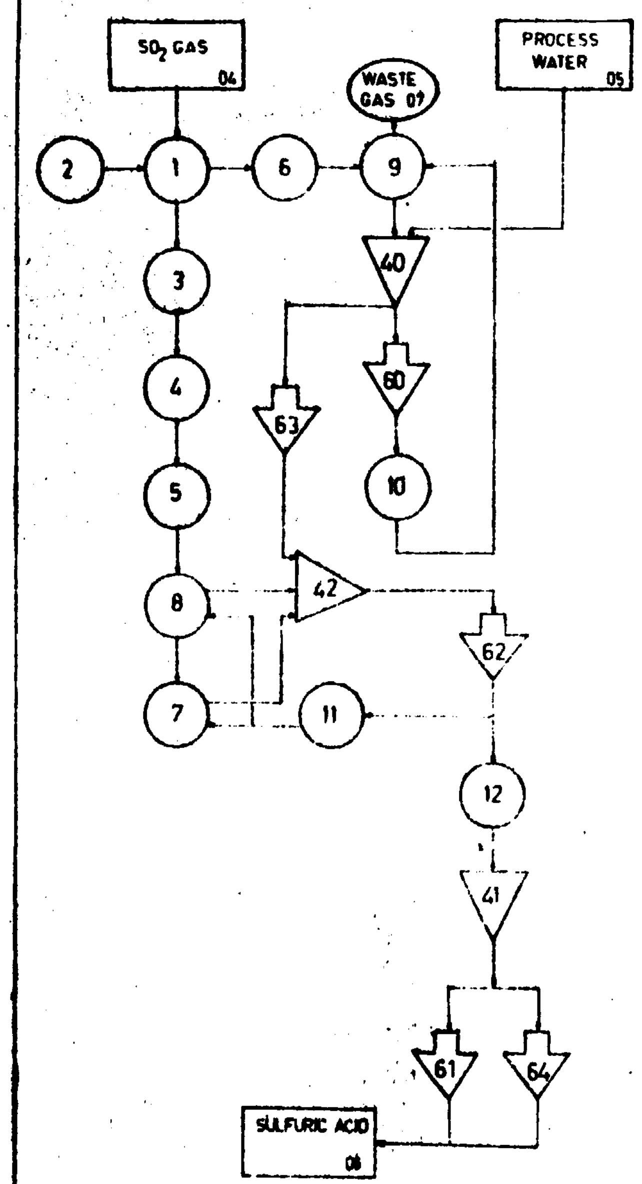
CAPACITY CALCULATION
Name of the critical equipment: 8 Combustion Chamber
Design capacity of the critical equipment per hour 15 t
No. of critical equipment : 2
Designed line capacity per hour : 27[illegible],460 m^3
Designed line capacity per shift: 27763,680 m^3
Designed line capacity per day : 832,271,040 m^3
Designed line capacity per year : [illegible] m^3

ACTIVITY CODE	INDUSTRY	PRODUCT	TECH	CAP
	3512	304	1	1

NO	MACHINE CODE	MACHINE NAME	QUAN
60	7449602720136[illegible]	Belt conveyor	1
61	7449602720146[illegible]	Belt conveyor	1
62	7449602720136[illegible]	Belt conveyor	1
63	7442800800239[illegible]	Tripper	1
40	6921101113[illegible]	Sulfur feed hopper	1
64	7449602120186[illegible]	Belt conveyor	1
65	7422002326[illegible]	Filtration pump	2
66	7422002316[illegible]	Precoat pump	2
10	7436235200[illegible]	Sulfur filters	2
67	7422002235[illegible]	Sulfur burner feed [illegible]	
6	7411[illegible]	S [illegible]	
4	7410[illegible]	Waste heat [illegible]	
49	6921107[illegible]	Steam drum	
68	7434[illegible]	Air Blower	
12	7436[illegible]	Air filter	
8	7126102000[illegible]	Turbine for blower	

UNIDO /SPO (AZOT)
CAPITAL GOODS DEVELOPMENT PROJECT
MODULAR PROCESS FLOW DIAGRAM

INDUSTRY	PRODUCT	TECHNOLOGY
FERTILIZER	SO_2 GAS	SULFUR BURNING
DATE	SAMPLE PLANT	CAPACITY
12 10 1981	--	2 x 95 480 m^3/h
PREPARED BY	DRAWN BY	CHECKED BY
EMINE ABDELAL OGUZ KADIOGLU	F ARICIOGLU	MIHLADIZ
Checked by UNIDO/Expert	Approved	DATA



CAPACITY CALCULATIONS

Name of the critical equipment: Converter

Design capacity of the critical equipment per hour 95,460

No of critical equipment : 2

Designed line capacity per hour : 2X43.75 t

Designed line capacity per shift: 2X350 t

Designed line capacity per day : 2X1050 t

Designed line capacity per year : 2X345,000 t

ACTIVITY CODE	INDUSTRY	PRODUCT	TECH	CAP
	3512	306	1	1

NO	MACHINE CODE	MACHINE NAME	QUAN
1	7416509311149221	Converter	2
2	7416108900234212	Superheater	2
3	7416107400229212	Final economiser	2
4	7416101433187212	Hot gas H.E.	2
5	7416101444182212	Cold gas H.E.	2
6	7416107400229212	Interpass economiser	2
7	7416603214242211	Absorption tower	2
8	7416603214242211	Drying tower	2
9	7416603214242211	Final absorbing tower	2
40	6921107123292211	Acid tank	2
60	7422002515212212	Acid pumps	2
10	7416103400186122	Acid cooler	2
41	6921113643262211	Acid storage tank	2
61	7422002315112212	Acid transfer pump	2
11	7416103400186122	Acid cooler	2
42	6921107113212211	Acid tank	2
62	7422002415212212	Acid pump	2
12	7416103400186122	Acid cooler	2
63	7422002315112212	Acid drain pump	2
64	7422002225112212	Acid transfer pump	2

UNIDO /SPO (AZOT)

CAPITAL GOODS DEVELOPMENT PROJECT

MODULAR PROCESS FLOW DIAGRAM

INDUSTRY	PRODUCT	TECHNOLOGY
FERTILIZER	SULFURIC ACID	CONVERS[illegible] AND [illegible]
DATE	SAMPLE PLANT	CAPACITY
12.10.1981	—	2x43.75 t/h
PREPARED BY	DRAWN BY	CHECKED BY
EMINE ABDELAL OGUZ KADIOĞLU	F. ARICIOĞLU	V. MIHLADIZ

Checked by UNIDO/Expert | Approved by UNIDO/CTA

ACTIVITY CODE 351230411 UNIDO/SPO (A2OT) CAPITAL GOODS DEVELOPMENT PROJECT

NO	BASIC MACHINE NOMENCLATURE	MAJOR SPEC.	MAJOR SPEC 1	MAJOR SPEC 2	TYPE DESCRIPTION	MANUFAC. CHARACT.1	MANUFAC. CHARACT.2	MANUFAC. CHARACT.3	Ok.	Q.	PURCHASE COST (1000 £) UNIT	TOTAL	CONSTANT 1980 YEAR COST (1000 £) UNIT	TOTAL	YEAR OF PURCHASE AND REMARK	SITC CODE (FOR COMPUTER) 1 2 3 4 5	6 7	8	9	10	11	12	13	14	15
60	belt conveyor	C: 600 t/h	W: 800mm	L= 88m	bulk	13.0 tons	C-Steel	12 tons	1	1	80	80	86	86	1979	74426	02	7	2	0	1	3	6	4	1
61	Belt conveyor	C: 600 t/h	W: 800mm	L= 211m	bulk	30.0 tons	C-Steel	27 tons	1	1	250	250	268	268	1979	74426	02	7	2	0	1	4	6	7	1
62	Belt conveyor	C:600 t/h	W: 800mm	L= 74m	bulk	10.0 tons	C-Steel	9 tons	1	1	70	70	75	75	1979	74426	02	7	2	0	1	3	6	4	1
63	Tripper	C:600 t/h	W: 800mm	L= 50 m	travelling	1[illegible].0 tons	F 24-1	13 tons	1	1	91	91	97	97	1979	74428	02	8	0	5	2		[illegible]	5	1
[illegible]	Sulfur feed hopper	$5m^3$	[illegible]: 1 m.	25°C	cyl.	8.0 tons	C-Steel	6 mm	1	1	5.[illegible]	[illegible]	5.6	5.6	1980	69211	01	1	0		2	2		[illegible]	1
6[illegible]	belt conveyor	40 t/h	W: 500mm	L= 10 m	bulk	0.5 tons	C-Steel	1.35 tons	1	1	10	10	10.7	10.7	1979	74[illegible]6	02	1	2	0	1	3	[illegible]	1	1
65	Filtration pump	$12m^3/h$	H: 30m	viscous	vertical	0.7 tons	Cast iron	0.5 ton	2	2	1.0	2	1.07	2.14	1979	74220	02	3	2	5	2	3		1	2
[illegible]	[illegible] pump	$50m^3/h$	H: 15m	viscous	vertical	0.7 tons	Cast iron	0.5 ton	2	2	1.2	2.4	1.26	2.56	1979	74[illegible]	02	3	2	[illegible]	2	1		[illegible]	2
[illegible]	Sulfur filters	1[illegible] t/h				1.5 tons	C-Steel	2.7 tons	2	2	10	20	10.7	21.5	1979	74362	3[illegible]	2	9	0	0	1	[illegible]	1	2
[illegible]	Sulfur burner feed pump	$8m^3/h$	H: 60m	viscous	vertical	1.0 tons	Cast iron	0.6 ton	2	3	1.1	3.3	1.17	3.51	1979	74220	02	[illegible]	3	[illegible]	[illegible]	1	[illegible]	0	2
[illegible]	combustion chamber	[illegible] 12 m^3	1000°C	1 [illegible]		[illegible] tons	C-Steel	[illegible] mm	1	2	30	60	30	60	198[illegible]	74132	24	4	[illegible]	0	[illegible]	4			[illegible]
[illegible]	Waste heat boiler	1[illegible] m^2	-	-	small tube	40.0 tons	C-Steel	10 mm	2	2	200	400	200	400	1980	74161	0[illegible]	6	0	0	1	4			[illegible]
[illegible]	[illegible]	10 m^3				5.0 tons	C-Steel	10 mm	2	2	35	70	35	70	19[illegible]	69243	02	1	4	2	[illegible]	8	[illegible]	2	[illegible]
[illegible]	[illegible] blower	$1600m^3/min$	H: 49m	air		3.0 tons	Cast iron	[illegible] tons	2	2	170	340	183	366	197[illegible]	74342	0[illegible]	[illegible]	3	[illegible]	0	1	[illegible]	3	[illegible]
[illegible]	Air filter	[illegible] m^3/min				5.0 tons	Mild steel	-	2	2	48	96	48	96	1980	74361	50	8	[illegible]	[illegible]	0	2	3	6	[illegible]
[illegible]	Turbine for blower			40kg/cm²	back pressure	5.0 tons	Alloy iron	4.7 tons	2	2	10	20	10	20	1980	71161	0[illegible]	0	[illegible]	2	8	2	[illegible]	[illegible]	2

ACTIVITY CODE 3512306.11 UNIDO/SPO (AZOT) CAPITAL GOODS DEVELOPMENT PROJECT

	BASIC MACHINE NOMENCLATURE	MAJOR SPEC.	MAJOR SPEC. 1	MAJOR SPEC. 2	TYPE DESCRIPTION	MANUFAC. CHARACT.1	MANUFAC. CHARACT.2	MANUFAC. CHARACT.3	OR.	Q.	PURCHASE COST(1000$) UNIT	PURCHASE COST(1000$) TOTAL	CONSTANT 1980 YEAR COST(1000 $) UNIT	CONSTANT 1980 YEAR COST(1000 $) TOTAL	YEAR OF PURCHASE REMARK	SITC CODE (FOR COMPUTER) 1 2 3 4 5	6 7	8	9	10	11	12	13	14	15
1	Converter	V: 737 m^3	1 Atm.	Catalytic	Packed	90 tons	C-Steel	30 mm	2	2	150	300	161	321	1978	74165	09	9	1	1	4	5	2	2	1
2	Super heater	513 m^2			U-tube	20 tons	Alloy Steel	5 mm	2	2	150	300	150	300	1980	74161	09	5	0	0	2	0	4	1	2
3	Final economiser	350 m^2			U-tube	14 tons	C-Steel	5 mm	2	2	100	200	100	200	1980	74161	07	4	0	0	2	0	2	1	2
4	Hot gas H.E	180 m^2	D: 2.8m	L: 5.5m	Shell&tube	7 tons	C-Steel	20 mm	2	2	30	60	30	60	1980	74161	01	4	1	1	1	0	2	1	2
5	Cold gas H.E	231 m^2	D: 3.4m	L: 7.9m	Shell&tube	9 tons	C-Steel	20 mm	2	2	45	90	45	90	1980	74161	01	4	4	4	1	2	2	1	2
6	Interpass economiser	128 m^2			U-tube	5 tons	C-Steel	5 mm	2	2	25	50	25	50	1980	74161	07	4	0	0	2	0	2	1	2
7	Absorption tower	V: 213m^3	1 kg/cm^2	200°C	Packed	40 tons	C-Steel	20 mm	1	2	100	200	107	214	1978	74166	03	2	1	4	2	4	2	1	1
8	Bleacher tower	V: 169m^3	1 kg/cm^2	60°C	Packed	33 tons	C-Steel	20 mm	1	2	73	145	78	156	1978	74166	03	2	1	4	2	8	2	1	1
9	Final absorbing tower	V: 180m^3	1 kg/cm^2	200°C	Packed	36 tons	C-Steel	20 mm	1	2	90	180	96	192	1979	74166	03	2	1	4	2	4	2	1	1
40	Acid tank	V: 54 m^3	D: 5m	H: 2.700m	cyl.	7 tons	C-Steel	12 mm	1	2	15	30	15	30	1988	69211	07	1	2	3	2	8	2	1	1
41	Acid pump	Q: 80m^3/h	H: 23m	corrosive	Vertical	2.0 tons	Cast iron	1,5 ton	2	2	9	18	9.9	19.8	1975	74220	02	5	1	5	2	3	2	2	2
42	Acid cooler	1.123x10^6 Kcal/h			shell tube	9 tons	St. Steel	12 mm	2	2	110	220	110	220	1980	74161	03	4	0	0	1	2	16	1	1
43	Acid storage tank	V: 800m^3	D: 29.5m	H: 15 m	cyl.	17[illegible] tons	C-Steel	20 mm	1	2	190	380	190	380	1980	69211	13	6	4	3	2	6	2	3	1
61	Acid transfer pump	Q: 48m^3/h	H: 15m	corrosive	Horizontal	0.7 tons	Cast iron	1,5 ton	2	2	1.2	2.4	1.32	2.64	1979	74220	02	3	1	5	1	1	2	2	2
62	Acid cooler	18.750x10^6 Kcal/h			shell tube	15 tons	St. Steel	12 mm	2	2	200	400	200	400	1980	74161	03	4	0	0	1	3	16	1	2
42	Acid tank	V: 20m^3	D: 3m	H: 2.8 m	cyl.	4.0 tons	C-Steel	12 mm	1	2	12	24	12	24	1988	69211	07	1	1	3	2	3	2	2	1
63	Acid pump	Q: 26m^3/h	H: 20m	corrosive	Vertical	0.6 tons	Cast iron	0.6 ton	2	2	3.3	6.6	3.5	7	1975	74220	02	4	1	5	2	1	2	2	2
12	Acid cooler	3.5x10^6 Kcal/h			shell tube	11 tons	St.Steel	12 mm	2	2	150	300	150	300	1980	74161	03	4	0	0	1	3	16	1	2
63	Acid drain pump	Q: 40m^3/h	H: 15m	corrosive	Horizontal	0.7 tons	Cast iron	0.4 ton	2	2	1.1	2.2	1.2	2.4	1975	74220	02	3	1	5	1	1	2	1	2
64	Acid transfer pump	Q: 3m^3/h	H: 35m	corrosive	Horizontal	0.4 tons	Cast iron	0.4 ton	2	2	0.[illegible]	1.04	1.2	2.3	1969	74220	01	2	2	5	1	1	2	1	2

UNIDO/ SPO (ACSP)

CAPITAL GOODS DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENTS FOR THE NEW SULFURIC ACID PLANT

CAPACITY: 1200 t/d LOCATION: [illegible]

ANTICIPATED DATE OF COMMISSIONING: 1985

FERTILIZER INDUSTRY-SULFURIC ACID

Hopper, tank drum

Ind. Code [illegible]

Weight/Value

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $ 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
[illegible]	Sulfur feed hopper	1	8.0	5.6					8.0						8.0
[illegible]	Acid tank	2	4.0	12.0					8.0						8.0
[illegible]	Acid tank	2	7.0	24.0					14.0						14.0
[illegible]	Acid storage tank	2	175.0	100.0					350.0						350.0
[illegible]	Steam drum	2	5.0	35.0					10.0						10.0

[illegible]/SPO (AZOT)

[illegible] GOODS

[illegible] PROJECT

[illegible] ACID PLANT,
CAPACITY : 1283 [illegible] LOCATION: MAZICAĞ
ANTICIPATED [illegible] OF COMMISSIONING: 19[illegible]
[illegible] SULFURIC ACID

[illegible], Combustion Chamber

Weight/~~Value~~

[illegible] CODE	BASIC MACHINE NAME	Qty. Req'd [illegible]	[illegible]	[illegible]	[illegible]	1962	[illegible]	[illegible]	1965	1966	1967	1968	1969	[illegible]	Total [illegible]
[illegible] 322	[illegible] for blower	2	[illegible]	10.0					10.0						[illegible]
[illegible]	[illegible] Combustion cham	2	[illegible]	[illegible]					[illegible]						[illegible]

UNIDO/SPO (AZOT)

CAPITAL GOODS

DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR THE NEW SULFURIC ACID PLANT,
CAPACITY 1283 t/d LOCATION: MAZIDAĞI
ANTICIPATED DATE OF COMMISSIONING: 1985
FERTILIZER INDUSTRY-SULFURIC ACID
Heat exchanger

Ind. Code 3512-3

Weight [illegible]

SITC Code	Basic Machine Name	Qty. Req'd (no.)	Unit weight (tons)	Unit cost in 1980 (1000 $)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
[illegible]	Hot gas H.E.	2	7.0	30.0					14.0						14.0
[illegible]	Cold gas H.E.	2	[illegible]	45.0					[illegible]						[illegible]
[illegible]	[illegible] cooler	2	[illegible]	[illegible]					[illegible]						[illegible]
[illegible]	[illegible] cooler	[illegible]	[illegible]	[illegible]					[illegible]						[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]					[illegible]						[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]					[illegible]						[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	25.0					[illegible]						[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]					[illegible]						[illegible]
[illegible]	[illegible] heater	[illegible]	[illegible]	[illegible]					[illegible]						40.0

UNIDO/SPO (ARGE)

CAPITAL GOODS

DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR THE NEW SULFURIC ACID PLANT,
CAPACITY : 1200 t/d LOCATION : MACHIDAGI
ANTICIPATED DATE OF COMMISSIONING : 1988
FERTILIZER INDUSTRY- SULFURIC ACID
Converter, Tower

In.Code 3512-3

Weight/Value

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $. 000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
74165 0938145211	Converter	2	90.0	151.8					180.0						180.0
74166 0314424211	Drying Tower	2	33.0	78.0					99.0						99.0
74166 0321424211	F.Absorption tower	2	36.0	96.0					72.0						72.0
74166 0314424211	Absorption tower	2	40.0	147.0					80.0						80.0

UNIDO/SPG (AZOF)

CAPITAL GOODS

DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR THE NEW SULFURIC ACID PLANT, CAPACITY :1263 t/d LOCATION: WARIDAM ANTICIPATED DATE OF COMMISSIONING : 1988 FERTILIZER INDUSTRY-SULFURIC ACID

Ind. Code 3512-3

Pump, blower

Weight/Value

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $. 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
[illegible]	Acid transfer pump	2	0.5	1.2					1.0						1.0
[illegible]	3 burner feed pump	2	1.0	1.17					2.0						2.0
[illegible]	[illegible] transfer pump	2	0.7	1.32					1.4						1.4
[illegible]	[illegible] pump	2	0.7	1.2					1.4						1.4
[illegible]	[illegible] pump	2	0.7	1.28					1.4						1.4
[illegible]	[illegible] pump	2	0.7	1.07					1.4						1.4
[illegible]	[illegible]	2	0.8	3.5					1.6						1.6
[illegible]	[illegible]	2	2.0	4.9					4.0						4.0
[illegible]	Air [illegible]	2	3.0	103.0					3.0						3.0

UNIDO/IPG (ADOT)
CAPITAL GOODS
DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR THE NEW SULFURIC ACID PLANT,
CAPACITY :1283 t/d LOCATION: MAZIDAGI
ANTICIPATED DATE OF COMMISSIONING : 198[illegible]
FERTILIZER INDUSTRY- SULFURIC ACID

Ind. Code 3512-3

Weight/~~Value~~

Filters, and belt conveyors

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $. 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
74351 5080002122	Air filter	2	5.0	45.0					10.0						10.0
74352 3120001812	Sulfur filter	2	1.5	10.7					3.0						3.0
74426 0212011611	Belt conveyor	1	0.5	14.7					0.5						[illegible]
74426 0272013641	Belt conveyor	1	10.0	75.0					10.0						[illegible]
74426 0272013651	Belt conveyor	1	13.0	86.0					13.0						[illegible]
74426 0272014671	Belt conveyor	1	30.0	253.0					30.0						[illegible]
74428 0080023951	Tripper	1	15.0	9.7					15.0						15.0

UNIDO/SPO (AZOT)

CAPITAL GOODS DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENTS FOR THE NEW SULFURIC ACID PLANT

CAPACITY: 1233 t/d LOCATION: [illegible]

ANTICIPATED DATE OF COMMISSIONING: 198[illegible]

FERTILIZER INDUSTRY-SULFURIC ACID

Ind. Code 3512-2

TABLE [illegible]

Weight/Value

Hopper, tank drum

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $. 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
69211 0111322211	Sulfur feedhopper	1	8.0	5.6					5.6						5.6
[illegible] 3712321211	Acid tank	2	4.0	12.0					24.0						24.0
[illegible] 0712322211	Acid tank	2	7.0	15.0					30.0						30.0
[illegible]	Acid storage tank	2	175.0	190.0					380.0						380.0
[illegible]	Steam drum	2	5.0	35.0					70.0						70.0

UNIDO/SPO (ACUT)

CAPITAL GOODS

DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR THE NEW SULFURIC ACID PLANT,
CAPACITY : 1285 t/d LOCATION : FARIDABAD
ANTICIPATED DATE OF COMMISSIONING: 1988
FERTILIZER INDUSTRY-SULFURIC ACID

Ind. Code 3512-3

PAGE 2

Weight/Value

Turbine, Combustion Chamber

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $, 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
71961 0200742322	Turbine for blower	2	5.0	10.0					20.0						20.0
74132 2445004212	S Combustion cham	2	30.0	30.0					60.0						60.0

[illegible] (ASCP)

CAPITAL GOODS

DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR THE NEW SULFURIC ACID PLANT,
CAPACITY 1200 t/d LOCATION: [illegible]
ANTICIPATED DATE OF COMMISSIONING: [illegible]
FERTILIZER INDUSTRY - SULPHURIC ACID

Ind. Code 3512-3

PART 3

Heat exchanger

Weight/Value

ITEM CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit weight (tons)	Unit cost in 1980 (US $. 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
74161 0[illegible]2212	Retgas H.E.	2	7.0	30.0					60.0						60.0
74161 0[illegible]2212	Cold gas H.E.	2	9.0	45.0					90.0						90.0
74161 0[illegible]2612	Acid cooler	2	9.0	110.0					220.0						220.0
74161 0[illegible]3612	Acid cooler	2	11.0	150.0					300.0						300.0
74161 0[illegible]3612	Acid cooler	2	15.0	200.0					400.0						400.0
74161 0660054232	Waste heat boiler	2	40.0	200.0					400.0						400.0
74161 0740022212	Interpass economiser	2	5.0	25.0					50.0						50.0
74161 0740023212	Final economiser	2	14.0	100.0					200.0						200.0
74161 0[illegible]3412	Super heater	2	20.0	150.0					300.0						300.0

UNIDO/SPO (AZOT)

CAPITAL GOODS

DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR THE NEW SULFURIC ACID PLANT,
CAPACITY : 1280 t/d LOCATION : MAZIRAQ
ANTICIPATED DATE OF COMMISSIONING : 1988
FERTILIZER INDUSTRY-SULFURIC ACID

Converter, Tower

Ind.Code 3512-3

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Weight/Value

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $. 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
74165 09[illegible]145211	Converter	2	90.0	161.0					322.0						322.0
74106 0321424211	Drying Tower	2	33.0	78.0					156.0						156.0
[illegible] 0321424211	F.Absorption tower	2	36.0	96.0					192.0						192.0
[illegible] 0321424211	Absorption tower	2	40.0	107.0					214.0						214.0

UNIDO/SPO (AZOT)

CAPITAL GOODS

DEVELOPMENT PROJECT

EQUIPMENT REQUIREMENT FOR THE NEW SULPHURIC ACID PLANT,
CAPACITY : 1253 t/d LOCATION: MAZIDAGH
ANTICIPATED DATE OF COMMISSIONING : 1988
FERTILIZER INDUSTRY-SULFURIC ACID

Ind. Code 3512-3

Flow 3

Weight/Value

Pump- blower

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit Weight (tons)	Unit cost in 1980 (US $ 1000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
74229 0222511212	Acid transfer pump	2	0.5	1.2					2.4						2.4
74229 0223621212	S burner fed pump	2	1.0	1.17					2.34						2.34
74229 0231511212	Acid transfer pump	2	0.7	1.32					2.64						2.64
74229 0181511212	Acid drain pump	2	0.7	1.2					2.4						2.4
74229 0241521212	Precoat pump	2	0.7	1.28					2.56						2.56
74229 0221521212	Filtration pump	2	0.7	1.07					2.14						2.11
74229 0201521212	Acid pump	2	0.8	3.5					7.0						7.0
74229 0251521222	Acid pump	2	2.0	9.9					19.8						19.8
74229 0061101212	Air blower	2	3.0	183.0					367.0						367.0

UNIDO/SPO (AZOT)

CAPITAL GOODS

DEVELOPMENT PROJECT

EQUIPMENT FOR ERECTION OF [illegible] SULFURIC ACID PLANT,
CAPACITY : 1293 t/d LOCATION : MAZIDAGH
ANTICIPATED DATE OF COMMISSIONING : 1988
FERTILIZER INDUSTRY-SULFURIC ACID

Ind.Code 3512-3

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Weight/Value

Filters, and belt conveyors

SITC CODE	BASIC MACHINE NAME	Qty. Req'd (no)	Unit weight (tons)	Unit cost in 1980 (US $ '000)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total 1981-1990
74351 [illegible]	Air filter	2	5.0	48.0					96.0						96.0
[illegible]	Sulfur filter	2	1.5	10.7					21.4						21.4
	[illegible] conveyor	1	0.5	10.7					10.7						10.7
	[illegible] conveyor	1	10.0	75.0					75.0						75.0
	[illegible] conveyor	1	13.0	36.0					36.0						36.0
	[illegible] conveyor	1	30.0	203.0					203.0						203.0
[illegible]	Dropper	1	15.0	9.7					9.7						9.7