SURVEY OF OPPORTUNITIES FOR BOLIVIAN INDUSTRY

Volume IV

Metalworking Industry

report to

THE MINISTRY OF PLANNING

Arthur D. Little, Inc.

MINISTRY OF PLANNING

GOVERNMENT OF BOLIVIA

SURVEY OF OPPORTUNITIES FOR BOLIVIAN INDUSTRY

VOLUME IV

METALWORKING INDUSTRY

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ARTHUR D. LITTLE, INC.

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I. SUMMARY

I. SUMMARY

A. OBJECTIVES

The objective of this study is to identify industrial development opportunities for Bolivia in the metalworking industrial sector of the economy and classify them according to their promise. For those opportunities having the most promise feasibility or pre-feasibility studies are recommended.

B. SCOPE

The metalworking sector was defined to include the products listed in Appendix A. The industry comprises primarily products manufactured from iron and steel sheet, bar, plate, rod, castings and forgings, and secondarily aluminium and cuprous based metals and alloys in similar form.

A number of products were initially eliminated from consideration since they are part of the ferrous metals sector which is outside our scope of work. Other products were excluded because they were analyzed under our study of the electrical-electronic sector or the non-ferrous metals sector.

Opportunities were examined within the geographic context of the five-nation Andean subregion (Ancom). We also considered the possibility of the exporting certain metal working products to the Cuenca del Plata area, LAFTA, and world markets.

C. APPROACH

The approach towards screening opportunities placed major emphasis on markets and minimum economic scale of plant. Consideration was also given to the availability of resources.

The analysis was conducted by specialists with broad knowledge of the metal working industry, its products and methods of manufacture. We reviewed published trade and production data for each of the five Andean countries. Particular attention was paid to the LAFTA computer print-out presenting import statistics for LAFTA member countries. United States Department of Commerce trade data were also used for reference purposes.

A large number of interviews were conducted in Bolivia and the other Andean countries with industrialists, government officials and, where appropiate, with personnel from international organizations. Throughout the analysis we worked closely with counterparts from the Ministry of Planning and the Technical Integration Secretariat, Ministry of External Affairs.

A number of taks were conducted during the course of the study. First, an almost infinite list of possibilities was

consolidated to more manageable proportions by considering only NABALALC four-digit categories.[a] Very little accuracy has been forfeited by taking this step because to treat individual product manufacture (e.g. drill bits or guillotine paper cutters) would be reaching greater precision than other factors such as the accuracy of available market data would justify. Moreover, to study products individually would depart from reality, since manufacturing economics dictates that products utilizing the same technology and equipment should be included under one manufacturing roof.

The second step involved the screening of product categories on the basis of market criteria. Generally, a product category was rejected if the Andean market, measured by imports, was found to be less than US$ 1.0 million per year. However, if the equipment investment required for a minimum-sized plant is less than US$ 300,000 the market size cut-off point was dropped to US$ 500,000. Product categories whose market in the Andean subregion was near the cut-off point were given very little consideration if the Bolivian market was less than US$ 50,000 and exhibited little or no growth.

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[a] NABALALC is a product classification which has been adopted by the Andean Pact countries. Its categories, like those of the Standard International Trade Classification (SITC), are product oriented in contrast with such codifications as the Standard Industrial Classification (SIC) which are industry oriented.

If we judged that a product category was likely to have rapid growth in the future we retained it even if current market size was found to be somewhat below the cut-off point.

Because of special circumstances, usually the possibility either of small economic plants or of producing several products in a single plant, a number of categories that would have been discarded by the market test were retained.

It would be unrealistic to conclude that because we had rigorously screened all categories that no potential opportunities remained in those that had been rejected. In some cases it is possible that the market will grow at a rate substantially faster than that which we have anticipated; in other cases imaginative entrepreneus may discover opportunities in specific product areas which we had rejected. We believe, however, that most significant industrialization opportunities in the metal working sector have been identified.

Sixty-two NABALALC four digit categories remained for further consideration after the market screening. The next analytical step was to further reduce this number on the basis of manufacturing economics. For each category a typical manufacturing product mix was visualized, a processed flow developed, equipment and space requirements identified, and investment for a minimum viable plant estimated along with break-even level sales for such a plant. These annual sales were compared to the market

for the same product in Bolivia, the Andean Subregion and LAFTA by dividing the market in each of these areas by the sales of a minimum viable plant to yield a market multiplier. In cases where market multipliers were less than two for a product category oriented towards the Bolivian market and less than five for one oriented to the Andean market, the categories were discarded. In this way the list of 62 categories was reduced to 38.

In order to crosscheck these results against data for companies producing similar products in the United States, we obtained Dun and Bradstreet financial reports on some fifty companies selected on the basis that the major part of their business was in products similar to the 38 which were under consideration for Bolivia. From these reports we developed reference parameters, such as sales per dollar of fixed assets, sales per employee, and fixed assets per employee. These checkpoints were used to measure our judgments on plant and investment.

The 38 tentative opportunities were then classified according to criteria such as market size, labor intensivity, backward and forward linkage, and value to weight ratio. A ranking was conducted for the 10 or 15 opportunities which according to each criteria were most promising. This arrangement of potential opportunities enabled us to determine which made the most frequent appearance near the top of each criterion list.

Finally products employing common manufacturing methods were grouped into projects, and projects were collected into complexes - when such collection made sense -.

D. CONCLUSIONS

A significant number of opportunities exist for the establishment of metalworking manufacturing facilities in Bolivia. Tables 1, 2 and 3 present the opportunities identified by our study classified according to whether they show high promise (Table 1), medium promise (Table 2), and low promise (Table 3). The tables also indicate whether the opportunities focus on the Bolivian or Andean markets.

The markets for metalworking products will probably be limited to Bolivia, the Andean subregion, and the Cuenca del Plata area. A number of opportunities we have identified will be solely for the Bolivian market by virtue of counter competitive transportation economics (low value per weight) or a well established industry in the other countries. Others can supply the Andean or possibly the Cuenca del Plata countries. It is doubtful that there will be attractive markets for wrought metal products beyond these two geographical areas.

In the long-run the prosperity of these projects will depend on establishing a steel sheet mill and facilities for the rolling of shapes such as angle, channel, and wide flangebeams. While it

TAFLE 1

HIGH PROMISE METAL WORKING OPPORTUNITIES

NABALALC Code	Abbreviated Product Description
84.06	Engines[b]
84.22	Hoists[b]
90.14	Geodesic Instruments[b]
84.56	Mineral Crushing[b]
84.11	Fans and Blowers[a]
87.01	Tractors[b]
82.05	Interchangeable Tools[b]
82.11	Piston Compressors[a]
84.62	Bearings[b]
84.10	Pumps[a]
84.45	Machine Tools[b]
84.63	Power Transmission[b]

a. Bolivian Market Oriented; Andean Subregion Supplementary Market.

b. Andean Market Oriented; Perhaps Supplemented by other Markets.

TABLE 2

MEDIUM PROMISE METAL WORKING OPPORTUNITIES

NABALALC Code	Abbreviated Product Description
84.41	Sewing Machines[b]
84.23	Leveling & Excavating[b]
84.30	Food Machinery[b]
82.03	Pliers[b]
84.47	Wood Plastic Machinery[b]
85.05	Hand Tools/ Electric Motor[b]
84.49	Motorized Hand Tools[b]
73.32	Nuts and Bolts[a]
84.51	Typewriters[a]
73.25	Wire Rope and Cable[a]
82.02	Hand Saws and Blades[b]
88.15	Domestic Refrigerators[a]
84.14) 85.11)	Industrial Ovens and Furnaces[b]
73.18	Tubes and Pipes[a]

a. Bolivian Market Oriented; Andean Subregion Supplementary Market.

b. Andean Market Oriented; Perhaps supplemented by other Markets.

TABLE 3

LOW PROMISE METAL WORKING OPPORTUNITIES

NABALALC Code	Abbreviated Product Description
84.37	Weaving and Knitting Machinery[b]
83.15	Welding Rod[b]
82.04	Hand Tools Nes[b]
83.02	Door Hardware[a]
83.01	Locks and Padlocks[a]
73.21	Iron and Steel Structures[a]
82.11	Razors and Blades[b]
73.14	Iron Wire[a]
73.10	Ferrous Bars[a]
84.24	Agricultural Equipment[a]
73.36	Stoves Ovens[a]
82.01	Hand Tools for agriculture and Forestry[a]

a. Bolivian Market Oriented; Andean Subregion Supplementary Market.

b. Andean Market Oriented; Perhaps Supplemented by other Markets.

is possible to supply the Bolivian market with products using imported shapes and sheet, the export of products, where sheet and shapes represent a significant portion of total value, would be difficult.

A number of the opportunities identified in the metalworking sector are small. Typically a project at full production will have sales of about US$ 2.0 million and will require an investment of US$ 0.3 million; it will have a labor force of about 300.

As contrasted with petroleum, chemical, and similar process flow industries few economies of scale exist in the metalworking industry. Exceptions may be products whose manufacture uses a tunnel or continuous porcelain enamelling line such as refrigerators, stoves, washing machines and bathtubs. Also, if an internal combustion engine plant is installed in Bolivia, the application of an automatic machining line may result in some economies of scale. In general, however, the economies gained through larger volume will be limited to the distribution of fixed costs such as management, land, building, maintenance and resources over a larger production base.

In order to gain some of these economies as well as the external economies possible through the use of common services purchased from outside along with economies in the use of infrastructure, it can be desirable to combine small projects into larger ones or even into metalworking complexes. The following

indicate some possible complexes for Bolivia:

COMPLEX I - Tractors and Power Transmission Equipment

a. Engines and Compressors

b. Tractors and Forklift Trucks

c. Agricultural Implements

d. Trucks and Trailers

e. Power Transmission and Material Handling Equipment

COMPLEX II - Mining and Related Equipment

a. Mineral Crushing and Screening Equipment

b. Pneumatic Mining Equipment

c. Grain Crushing and Sorting Equipment

d. Wood Treatment Equipment

e. Pressure Vessels

COMPLEX III - Machine Tools

a. Steel Working Tools

b. Stone Working Tools

c. Wood and Plastic Tools

d. Accessories

E. RECOMMENDATIONS

Our general recommendation is that, insofar as projects found feasible are likely to be implemented, each of the high promise opportunities be subjected to feasibility or prefeasibility study. Moreover, we recommend that each of the medium promise

opportunities be subjected to prefeasibility study which can later be carried forward to full feasibility study if the prefeasibility findings are strongly affirmative. Low promise opportunities may be saved for later consideration if the number of high and medium promise opportunities in this and other sectors found to be feasible is inadequate.

We further recommend that the Government immediately commission a study which will determine the feasibility of manufacturing in Bolivia the iron and steel products that are needed as raw materials for the industries of the metalworking sector. The viability of many metalworking projects can well depend upon the availability of locally-manufactured raw materials.

II. CRITERIA FOR SELECTION AND RANKING

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In this chapter we describe the methodology by which we identified opportunities and then evaluated them in terms of the degree of their promise for Bolivia. In Chapter III we provide detail on market dimensions for the metalworking categories we have surveyed; some of these quantities are presented more fully in Appendixes A, B, and D. Chapter III also indicates the kinds of data on existing production that we have examined.

Chapter IV then indicates our evaluation of each one of the metalworking opportunities we have identified and proceeds to describe rather fully each of the twelve opportunities we have evaluated as carrying high promise for Bolivia. These twelve opportunity profiles cover product description, manufacturing equipment and process, skills required, and the investment and sales levels of minimum viable and minimum economic plants.

Chapter V indicates the patterns of complexes into which some of these projects can be grouped, while Chapter VI discusses generally the infrastructural needs of the opportunities as a group and Chapter VII considers briefly the role that Bolivia might play in an integrated Ancom automotive industry.

Our analysis and screening of potential opportunities in the Bolivian metalworking sector employed eight criteria.

They are:

- Market size: Bolivia, Andean and other ALALC
- Use of Bolivian resources (backward linkage)
- Labor intensivity
- Market trend
- Value to weight
- Time to implement
- Forward linkage
- Ancom production

In using criteria such as these for the identification and ranking of Bolivian industrial opportunities, some criteria obviously deserve more weight than others. Which ones are more important and how much more important and how much more they should count is a matter of judgment. Different analysts looking at the same criteria would probably tend to weight them differently.

A. MARKET SIZE

Since an opportunity can exist only as there is a sufficiently large market, we gave the greatest and first attention to this criterion. Because of the necessity of an adequate market, only as a potential opportunity was found to be worthy by the market criterion, were the other criteria applied. Thus those possible industries that did not pass the market size criterion were discarded - no further attention was given them.

The sufficiency of market volume can be determined only in the light of the volume of production of the plant that deserves consideration for the particular industry; sales need to be large enough to enable a plant to operate at a level that is viable or profitable from a national point of view. In order to apply the market criterion we have found it worthwhile to conceptualize for each industry a "minimum viable plant" and a variant thereof called "minimum economic plant".

A minimum viable plant (MVP) is defined to be the smallest facility - smallness in terms of normal operating capacity - which in the light of expected costs and sales prices is capable of operating on a break-even basis, i.e., a scale at which revenues will just equal all costs other than interest costs or profits.

If the anticipated market is sufficiently large to provide sales permitting a minimum viable plant to operate at its break-even level, we have deemed that market to be adequate in size; thus the industry will have passed the test posed by the market criterion and the other criteria may then be applied to it.

In the course of our screening by the criterion of market size we evaluated each industry in terms of the ratio of market magnitude to break-even sales for a MVP. The higher the ratio, the more attractive the potential opportunity. In preparing these ratios we gave more weight to Bolivian and other Ancom

markets than to those elsewhere because the Andean Group provides a far more reliable outlet for products of the Bolivian metal-working industry.

Our selection of the concept of minimum viable plant for this purpose of gauging market size does not mean, of course, that we could ever be recommending the erection of an MVP which would do no better than break-even. Rather, this concept is appropriate only as a screening device for the elimination of those possible industries which in terms of the economics of production require a plant larger than can be supported by the available market. We chose to make use of the break-even measure in order to avoid the knotty problem of specifying a minimum acceptable level of profitability.

It may be useful, however, at this point in our presentation to introduce the concept of a minimum economical plant (MEP) which is the smallest facility which is capable of producing at profitable levels, and thus is the smallest plant that would be of interest to an investor, public or private, concerned to receive a return on the invested funds.

The meaning of MEP can be most readily understood by observing the respects in which such a plant differs from an MVP. Generally, an MVP operating at break-even will be fully utilizing one or more pieces of equipment. Thus an MEP will be larger than an MVP in the sense of having higher capacity made possible

by some additional investment in equipment and by additional working capital as well. On the other hand, presuming that an MVP is efficiently run at the break-even level, certain pieces of equipment will have a low degree of utilization and can support a higher level of activity. Also certain fixed overhead functions such as plant management, maintenance, shipping receiving and the like could support a higher level of activity. Theoretically, at a sales volume one dollar greater than minimum viable, minimum economic status will have been achieved. As a practical matter, a level of operation which can reasonably be considered to be "minimum economic", in metal products manufacture, is likely to be at least twice as great (in sales proceeds) as minimum viable. Some minor additional investment (perhaps 10-15%) will generally be needed to take full advantage of the increased utilization of dominant equipment since the investor will not buy all of the assembly and minor operations equipment (to utilize fully the dominant machinery) at the outset.

Our procedure was to discontinue consideration of any category which commands an Ancom import market of less than US$ 1.0 million unless the investment cost of an MVP is less than US$ 300,000 in which case the market cut-off was reduced to US$ 500,000. Then the ratio of market size to MVP break-even sales in each of the three geographic market areas was used in evaluating the opportunity relative to other opportunities in the sector.

B. USE OF BOLIVIAN RAW MATERIALS (BACKWARD LINKAGE)

Any prospective industry that is expected to use raw materials that might economically be produced within the nation carries the virtue of "backward linkage". Since Bolivia is understandably and correctly concerned to find outlets for locally-produced raw materials, the probable demand for such materials by any considered industry is an appropriate criterion. We did not reject any potential opportunity which showed no backward linkage but the criterion was given substantial weight in the ranking of projects.

Since Bolivia does not have a steel industry the major part of the raw materials utilized by the metalworking industry would have to be imported. It is possible that Bolivia's metalworking industry which is based on the domestic market could be developed utilizing raw material imports. It is highly unlikely, however, that an export oriented metalworking industry would be viable over the long term without the establishment of at least a steel sheet mill and facilities for rolling shapes such as angle, channel, and wide flange beams.

The degree of backward linkage enters quantitatively in our Chapter IV discussions of high promise opportunities where percentage of integration is estimated, that percentage being the fraction of sales value of product that is represented by value added (produced) in Bolivia. Whatever portion of that added value is not produced within the plant shows, of course, backward linkage.

C. LABOR INTENSIVITY

Because of substantial unemployment. or underemployment, of labor in Bolivia, when alternative projects or processes are under consideration the one that provides more jobs is considered to be better, other things being equal. Thus we regard labor intensivity as a virtue, and it is used as a criterion in ranking projects.

In order to judge labor intensivity we assessed each opportunity from the standpoint of people employed, sales value per person and investment per person. Generally speaking, those industries with intensive assembly operations such as typewriters (84.51) and geodesic instruments (94.14) ranked highest. On the other hand, metalworking industries with highly automated processes do not require intensive labor per pound, per dollar of sales, or per dollar of investment. Examples of this type are welding and soldering wire (83.15) and iron wire (73.14).

D. MARKET TREND

An important factor determining the extent of an opportunity is market trend; the greater, the growth exhibited by a product or group of products the more promising the opportunity. Our evaluation assigned greater weight to products with sharply rising demand than to those whose demand was projected to be static or to increase slowly. Examples of products with a sharply increasing

market are pumps (84.10), fans and blowers and other like equipment (84.11) and power transmission equipment (84.63). Products with decreasing or static markets are agricultural equipment (84.24) and tube and pipe (73.18).

E. VALVE TO WEIGHT

Bolivia because of its location and its topography is at a transport disadvantage, for most manufactured products, when competing in export markets or when using imported raw materials. To take this factor into account we computed the value to weight relationship for the products and raw materials involved in each opportunity. Higher ranking was given opportunities the materials and products of which carried higher value to weight ratios and would be, therefore, capable of absorbing relatively high transport costs.

F. TIME TO IMPLEMENT

As a measure of attractiveness of an opportunity, we have determined the time required to implement a project. We have given higher rank to projects which can be implemented very quickly (within a year or so), than those requiring a longer period of time. The definition of "implementation" is quite flexible since projects operating on a garage-scale with three or four employees can be put into operation virtually overnight. Our definition of "time to implement" is the time required to make plans, order

equipment, build buildings, receive equipment, find and train people, and manufacture the first batch of products. The operation may or may not reach break-even within the time indicated. On the other hand, an entrepreneur with hard work and good luck might achieve a profitable status very quickly.

To give an idea of the range of implementation times, facilities for the manufacture of hoists and winches (84.22) could put into operation within a very short time period. The manufacture of weaving and knitting machinery (84.37), on the other hand would probably require three to four years to implement: a licensing agreement would have to be negotiated and personnel would have to be trained in some special skills. Of the opportunities we have identified, none in our opinion would need more than four years to implement.

G. FORWARD LINKAGE

Toward linkage is the effect of new industry output on other Bolivian industry. This is an important factor that needs to be considered in ranking opportunities since for example, an industry with a large degree of forward linkage will have a much greater effect on the economy one with smaller forward linkage. Each opportunity was evaluated according to the following:

1. Products essential to many other industries; true industrial growth will not be complete without this industry.

2. Feeds naturally into several other industries or one significant industry.

3. Moderate effect on other industries as product input or manufacturing equipment.

4. Little effect on other industries.

5. No perceptible effect on other Bolivian manufacturing industries because, e.g., the prospective industry produces consumer products.

H. PRODUCTION IN OTHER ANDEAN COUNTRIES

In evaluating opportunities to manufacture for export we paid attention not only to the size of market as measured by current imports but also to the relative size of existing production of that good in that market. The greater the penetration of any market by local manufacturers, the less promising that market appears to a Bolivian export manufacturer. For this reason we up graded in the rankings these opportunities to export which would not face formidable local competition.

III. MARKETS AND PRODUCTION

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A. MARKETS

Market data were obtained by our team from several published sources. The primary source was statistical publications issued on imports by the various countries. We concentrated on imports because they are the best indicator of demand in excess of local supply and thus probably of a potential opportunity.

The import data which we have selected as the most useful are presented in total in Appendix B. Three types of data are included. The primary type is the CUCI Computer Printout of LAFTA imports available from Montevideo, Uruguay. While these data do not cover Bolivia, Ecuador, Uruguay and Venezuela, they provide the best available documentation of imports to Colombia, Chile, Peru and the remainder of LAFTA.

We have supplemented these data with Bolivian figures from two sources; one official Bolivian Government statistics and two, United States Department of Commerce statistics on shipments into Bolivia. We also attempted to use Official Ecuadorian Government Statistics but found the numbers published not sufficiently credible or correlatable for our use. Thus Ecuador figures listed in Appendix B are solely from U.S. Dept. of Commerce compilation of shipments into Ecuador.

Appendix C, Market Data - Cuenca del Plata, summarizes for three of the four Cuenca del Plata countries the most recent import data for the principal categories. As might be expected, the markets in Argentina and Brazil, for all except items like domestic refrigerators, add to the Andean and Bolivian attractiveness of these opportunities. To the extent that these markets can be tapped, an increase in profitability can be realized by a well-run manufacturing enterprise.

An early and essential step in the subsequent feasibility or prefeasibility studies of the opportunities here identified will be a detailed investigation of past, present, and prospective national production in each of the markets that now appear promising. Such an investigation is needed before markets for Bolivian exports can be predicted with confidence. Future Bolivian markets will need to be forecast in more detail, also.

We recognize that for specific feasibility studies, firmer, more refined market data, referring to five and six and perhaps even seven digit NABALALC categories must be obtained and forecast.

B. EXISTING PRODUCTION CAPABILITIES

In Table 4 we have assembled, from several sources, published data on the production of metal working products in the Andean countries other than Bolivia. Much of the information is inadequate for a definitive base: some of it is conflicting. In addition to being subject to the ordinary problems of recording and transcription this information is greatly affected by slight differences in the definitions of the NABALALC code. For purposes of indicating growth of and/or substantial production the data is adequate.

For example, refrigerators before looking at production in the other Andean countries represented one of the better opportunities for export. But it would certainly appear that the possibility to sell refrigerators (even if they were readily exportable items) in the other Andean Countries are greatly reduced by entrenched production capacity in each country and such an opportunity would have to be justified on the Bolivian market alone. Reference to Appendix B under category 84.15, Domestic Refrigerators, reveals a very low level of imports for the Andean countries and other LAFTA and, although we believe that a minimum viable plant can be supported by the Bolivian market we urge caution and point out that there should be considerable growth of the Bolivian market before domestic refrigerators can be a truly viable venture within Bolivia.

TABLE 4

PRODUCTION OF SELECTED METAL WORKING PRODUCTS OTHER ANDEAN COUNTRIES

(Thousand of U.S. Dollars)

NABALALC	Description	Chile[a] 1965	Chile[a] 1966	Chile[a] 1967	Chile[b] 1967	Colombia[b] 1966	Colombia[c] 1966	Peru[b] 1967	Peru[d] 1967	Ecuador[b] 1966	Ecuador[e] 1967
73.14	Iron and Steel Wire	—	—	—	—	—	—	—	897	—	91
73.18	Tubes and Pipes of Iron and Steel	—	—	—	—	—	2102	—	3903	—	—
73.21	Steel Structures	NA	NA	10000	17020	6435	—	3068	1323	549	271
73.25	Stranded Iron and Steel Wire, Cables, Rope	250	250	500	—	—	895	—	—	—	—
73.29	Chain and Parts of Iron and Steel	200	180	200	200	145	144	29	23	—	—
73.32	Nuts and Bolts	5040	6600	7200	7220	2463	69	1376	105	80	66
73.36	Stoves	31447	19479	16861	—	—	5027	—	2423	—	16
73.40	Castings and Forgings Iron and Steel	14206	14366	14025	22120	2726	1140	4637	—	—	100
82.01	Hand, Tools, Shovels, etc.	567	494	506	667	2589	—	168	40	—	162
82.02	Saws and Blades Hand/Machine	203	NA	100	150	140	—	—	—	—	—
82.03	Hand Tools, Pliers, Snips, etc.	—	—	—	25	352	—	—	—	—	—
82.04	Hand Tools Diamond Mfg.	491	526	519	663	55	—	2	—	—	—

SOURCE:
[a] Chile - Antecedentes Sobre el Sector Metal-Mecánica
[b] Comercio Exterior de Bolivia
[c] Publicación del Departamento Nacional de Planeación Unidad de Integración Económica
[d] Estadística Industrial 1967
[e] Encuesta de Manufactura y Minera 1967
NA - Not Available

TABLE 4 (Cont.)

PRODUCTION OF SELECTED METAL WORKING PRODUCTS OTHER ANDEAN COUNTRIES

(Thousand of U.S. Dollars)

NABALALC	Description	Chile[a] 1965	Chile[a] 1966	Chile[a] 1967	Chile[b] 1967	Colombia[b] 1966	Colombia[c] 1966	Peru[b] 1967	Peru[d] 1967	Ecuador[b] 1966	Ecuador[e] 1967
82.05	Interchanging Tools, Machine, ect.	NA	NA	1700	—	103	—	—	393	—	—
82.11	Razors and Blades	—	—	—	—	2885	2884	—	—	—	—
83.01	Locks and Padlocks	12513	NA	13000	13080	1650	1536	233	25	—	—
83.02	Base Metal Fittings	NA	NA	NA	350	1884	944	139	—	—	—
83.15	Wire Rods and Electrodes, etc.	2325	1953	2139	2309	98	—	—	55	—	—
84.06	Internal Combustion Engines	NA	430	430	430	110	—	1161	—	—	—
84.10	Pumps for Liquids	789	1151	1175	1205	617	—	678	500	—	—
84.11	Airpumps Fans and Blowers	400	480	1080	1135	23	43	9	13	—	—
84.14	Industrial and Laboratory Furnaces	40	27	183	193	86	—	—	64	—	—
84.15	Refrigerators	30886	34330	33983	32933	14152	14195	6624	4923	—	1021
84.17	Heating, Distilling, Sterilizing	2190	2637	3178	3178	201	46	154	102	—	—
84.22	Hoists and Winches	15	150	610	1060	231	231	585	188	—	—
84.23	Excavating, Boring Equipment	315	365	480	480	9	—	—	—	—	—
84.24	Tillage Equipment, Plows, etc.	57	59	51	834	1235	1235	9	156	—	—
84.29	Dairy Machinery	NA	NA	NA	200	46	46	9	—	—	—
84.30	Mach., Bakery, Confectionery	114	93	60	110	942	719	132	68	—	—

TABLE 4 (Cont.)

PRODUCTION OF SELECTED METAL WORKING PRODUCTS OTHER ANDEAN COUNTRIES

(Thousand of U.S. Dollars)

NABALALC	Description	Chile[a] 1965	Chile[a] 1966	Chile[a] 1967	Chile[b] 1967	Colombia[b] 1966	Colombia[c] 1966	Peru[b] 1967	Peru[d] 1967	Ecuador[b] 1966	Ecuador[d] 1967
84.37	Weaving and Knitting Machines	NA	NA	NA	400	—	—	—	—	—	—
84.40	Mach. for finishing Textiles	8315	9701	10992	10992	3551	3517	1	—	—	—
84.41	Sewing Machines	1062	1257	NA	2164	4819	4819	1195	945	—	—
84.45	Mach. Tools - Metal	295	377	639	—	—	60	—	—	—	—
84.46	Mach. Tools - Stone Ceramics	—	—	—	—	32	32	7	—	—	—
84.47	Mach. Tools - Wood, Cork, Bone	260	284	392	142	12	12	—	—	—	—
84.48	Mach. Tool Accessories	NA	NA	NA	—	138	138	—	—	—	—
84.49	Portable Hand Tools, Air or Electric	—	—	—	—	—	—	1	—	—	—
84.51	Typewriters	—	—	3000	3000	2722	2722	—	—	—	—
84.53	Statistical Machines	—	—	—	—	—	—	—	—	—	—
84.55	Parts and Accessories for 84.51, 84.53	—	—	—	—	20	20	—	—	—	—
84.56	Mineral Sorting, Crushing Machinery	5400	6000	6330	7770	206	184	811	248	—	—
84.61	Taps, Cocks, Valves	2571	2887	4639	—	—	822	—	121	—	—
84.62	Ball, Roller, Needle Bearings	—	—	—	—	—		—	—	—	—

TABLE 4 (Cont.)

PRODUCTION OF SELECTED METAL WORKING PRODUCTS OTHER ANDEAN COUNTRIES

(Thousand of U.S. Dollars)

NABALALC	Description	Chile[a] 1965	Chile[a] 1966	Chile[a] 1967	Chile[b] 1967	Colombia[b] 1966	Colombia[c] 1966	Peru[b] 1967	Peru[d] 1967	Ecuador[b] 1966	Ecuador[d] 1967
84.63	Trans Shafts, Cranks, Housings	913	961	1014	1014	314	312	322	68	—	—
87.01	Tractors	—	—	—	—	—	—	—	—	—	—
87.07	Fork Lift Trucks, and Platform	—	—	—	—	—	—	—	129	—	—
87.14	Other Vehicles	NA	NA	NA	1000	383	353	648	—	—	—
90.05	Refract. Telescopes	—	—	—	—	—	—	—	—	—	—
90.10	Photo Copying Machines	—	—	—	—	—	—	—	—	—	—
90.12	Compound Optical Microscopes	—	—	—	—	—	—	—	—	—	—
90.13	Optical Appliances	—	—	—	—	—	—	—	—	—	—
90.14	Surveying Instruments	—	—	—	—	—	—	—	—	—	—
90.15	Balances-Sensitive	—	—	—	—	—	—	—	—	—	—
90.16	Drawing Instruments	—	—	—	—	—	—	—	—	—	—
90.25	Instruments Chem. Analysis	—	—	—	—	—	—	—	—	—	—
90.26	Gas Liquid Meters	NA	NA	NA	5400	—	—	—	—	—	—
91.05	Clocks	—	—	—	—	68	—	—	—	—	—

On the other hand, although there appears to be a moderate amount of pump manufacture (84.10) in Peru, Colombia, and Chile as indicated from the several sources of Table 4 reference to Appendix B indicates high level of imports to all those countries in relation to manufacture. In addition, as contrasted with domestic refrigerators, there is a multitude of different types of pumps and there may well be an opportunity consequent to an Andean Pact decision allocating various types of pump manufacture among four or five of the Ancom countries. If a feasibility of prefeasibility study is conducted on the possibility of manufacturing pumps in Bolivia the market for specific types of pumps would have to be determined. Fans and blowers and piston compressors (84.11) would seem to have only a moderate competition from production activity in Chile, and this reinforces our opinion of this category as a promising opportunity.

As might be expected, Nuts and Bolts (73.32), and iron and steel structures (73.21) are manufactured in each country, primarily for domestic use. We believe that these commodity groups are typical of those which should be made by each country for itself. Within these sectors, however, certain specific products could be programmed.

There is a scarcity of data on Bolivian production in the metal working area. The majority of operations employ under 25 people. Our existing industry survey was limited to establish-

ments employing more than 25. Appendix E - Bolivian Establishments Visited, indicates the firms visited by the combined Metal working/electrical and electronics goods team. Production and other pertinent statistics are included in the Survey of Existing Industry in Bolivia.

IV. DISCUSSION OF OPPORTUNITIES

IV. DISCUSSION OF OPPORTUNITIES

The possible opportunity identified after the screening conducted on the basis of markets are presented in Table 5. This list was reduced to 38 opportunities using manufacturing economics as the screening criteria (Table 6); the 38 opportunities were then classified as high, medium, and low promise according to the criteria discussed in Chapter II.

Opportunities in each of the three groups are listed in rough order of their promise. The borderlines between groups are somewhat arbitrary, with the opportunities at the bottom of one group being similar in promise to those at the top of the following group. We should emphasize that all 38 are promising opportunities and that any two opportunities may be regarded as significantly different in level of promise only when several other opportunities are ranked between them.

In the following pages each of the opportunities falling in the high promise category is discussed in some detail.

A. INTERNAL COMBUSTION ENGINES

1. Product Description - NABALALC 84.66 ... internal combustion piston engines, aircraft engines, other.

In view of the possible varieties of internal combustion engines which could range from small to massive sizes for both

TABLE 5

POSSIBLE METAL WORKING OPPORTUNITIES

NABALALC Code	Product Description	Bolivian MKT. Sufficient?	Andean MKT. Sufficient?	Estimated MKT. Bolivia M$	Estimated MKT. Andean M$	Estimated MKT. Other ALALC M$	Bolivian MKT./ MVP	Andean MKT./ MVP	Other ALALC MKT./ MVP	Market Comment[a]	Labor Intensivity 1,2,3 4,5	Speed Implementation Yrs.	Value/ Weight
73.14	Iron Wire	No	Yes	400	3,000	4,200	1	8	10	Low B Excellent A Excellent O	1	1-2	Low
73.17	Cast Iron Tubes and Pipes			ELIMINATED									
73.18	Tubes/Pipes	Yes	Yes	2,000	26,500	17,000	1.25	16.5	10.5	Border. B Excellent A Excellent O	1	1	Low +
73.20	Tube/Pipe Fittings			ELIMINATED									
73.25	Wire Rope/Cables	No	Yes	200	4,500	2,000	0.7	16	7	Low B Excellent A Excellent O	3	1	Med. -
73.21	Iron Steel Structures	Yes	Yes+	900	7,100	6,000	9	80	10	Excellent B Excellent A Excellent O	3	1	Low
73.32	Nuts/Bolts	No	Yes	125	5,500	7,000	3/4-1	34.4	44	Low B Excellent A Excellent O	2	1	Med. -
73.36	Stoves, Ovens	Yes	Yes	500	3,300	300	2	6.6	0.6	Border B Excellent A Low O	3	1-2	Low +
73.38	Iron/Steel Domestic Articles			ELIMINATED									

[a] See End of Table

TABLE 5 (Cont.)

POSSIBLE METAL WORKING OPPORTUNITIES

NABALALC Code	Product Description	Bolivian MKT. Sufficient?	Andean MKT. Sufficient?	Estimated MKT. Bolivia M$	Estimated MKT. Andean M$	Estimated MKT. Other ALALC M$	Bolivian MKT./ MVP	Andean MKT./ MVP	Other ALALC MKT./ MVP	Market Comment[a]	Labor Intensivity 1,2,3 4,5	Speed Implementation Yrs.	Value/ Weight
82.01	Hand Tools/Agri., Forestry	No	Yes	125	1,500	-	0.4	5	0	Low B Good A Low 0	3	1	Med. -
82.02	Hand Saws and Blades	No	Yes	90	1,460	1,600	0.5	7.5	7.5	Low B Excellent A Excellent 0	4	1	Med. -
82.03	Pliers/Wrenches/Files Hand Shears	No	Yes	175	3,500	3,000	1.1	22	18.7	Border B Excellent A Excellent 0	3	1-2	Low
82.05	Interchangeable Hand Tools	No	Yes	700	9,200	29,000	1.4	18.4	58	Border B Excellent A Excellent 0	2	1	High
82.06	Knives/Cutting Blades			ELIMINATED									
82.09	Serrated Cutting Blades			ELIMINATED									
82.10	Knife Blades			ELIMINATED									
82.11	Razors/Razor Blades	No	Yes	75	2,525	800	0.3	8.4	2.7	Low B Excellent A Good 0	3	2	High
82.12	Scissors/Blades			ELIMINATED									
82.13	Cutlery (Misc.)			ELIMINATED									
82.14	Kitchen/Tableware			ELIMINATED									

TABLE 5 (Cont.)

POSSIBLE METAL WORKING OPPORTUNITIES

NABALALC Code	Product Description	Bolivian MKT. Sufficient?	Andean MKT. Sufficient?	Estimated MKT. Bolivia M$	Estimated MKT. Andean M$	Estimated MKT. Other ALALC M$	Bolivian MKT./ MVP	Andean MKT./ MVP	Other ALALC MKT./ MVP	Market Comment[a]	Labor Intensivity 1,2,3 4,5	Speed Implementation Yrs.	Value/ Weight
83.01	Locks/Padlocks	No	Yes -	200 300	2,500	0	1	10	--	Border B Excellent A Low 0	4	1-2	High -
83.02	Door Hardware	No	Yes -	250	3,100	900	0.8	11	3	Low B Excellent A Good 0	3	1	Med. -
83.07	Metal Lighting Fixtures		ELIMINATED										
83.09	Metal Clasps, Buckles, Etc.		ELIMINATED										
83.15	Weld Rod	No	Yes -	200	1,200	2,600	1	6	13	Border B	1	1-2	High
84.06	Engines	Yes	Yes	2,600	47,100	70,000	2.6	47	70	Good A Excellent 0	4	2-3	Med.
84.10	Pumps	Yes	Yes -	1,000	16,400	2,600	2 1/2	4	65	Good B Excellent A	3	2	Med. +
84.11-101	Piston Compressors	No	Yes	1,000	8,000	26,000	1-2	13	43	Excellent 0	4	2-3	Med.
84.11-201	Fans/Blowers	Yes	Yes +	1,000	7,000	12,000	3	19	19	Excellent B, A, 0	4	2	Med. +
85.11	Industrial Ovens			360	7,500	18,800	1	19	52			2	Low +
84.15	Domestic Refrigerators	Yes	Yes	950	8,200	2,850	2.5	.22	7.6	Good B Excellent A Excellent 0	4	1-2	Med. -

TABLE 5 (Cont.)

POSSIBLE METAL WORKING OPPORTUNITIES

NABALALC Code	Product Description	Bolivian MKT. Sufficient?	Andean MKT. Sufficient?	Estimated MKT. Bolivia M$	Estimated MKT. Andean M$	Estimated MKT. Other ALALC M$	Bolivian MKT./ MVP	Andean MKT./ MVP	Other ALALC MKT./ MVP	Market Comment[a]	Labor Intensivity 1,2,3 4,5	Speed Implementation Yrs.	Value/ Weight
84.22	Hoists/Winches	Yes -	Yes	2,000	24,000	23,000	2-4	48	46	Good B Excellent A Excellent 0	4	2	Med.
84.23	Scrapers/Bulldozers/ Etc.	No	Yes	2,500	46,000	55,000	1.6	30	38	Fair B Good A Good 0	3	3	Low +
84.24	Agricultural Equipment	No	Yes	250	4,450	5,000	0.3	4.5	5	Low B Good A, 0	3	1-2	Low +
84.30	Food Machinery	No	Yes	200	8,000	6,000	0.5	20	15	Low B Excellent A, 0	3	2-3	High -
84.41	Sewing Machines	No +	Yes	350	12,000	7,000	1	36	20	Low B	4	2	Med. +
84.45	Machine Tools			1,300	14,000	57,000	1-2	18	71			3-4	Med. +
84.47	Wood Plastic Machinery	No	Yes	300 200	3,500	4,000	0.5	7	8	Fair B, A, 0	3	2-3	Med. +
84.49	Motorized Hand Tools	No	Yes	400	3,200	3,600	0.5	5+	16	Low B Good A Excellent 0	4	2	High +
84.56	Mineral Crushing/ Grading	Yes +	Yes +	3,700	20,400	10,000	12	68	33	Excellent B, A, 0	3	2	Low +
84.37	Weaving and Knitting Machine	No	Yes	1,200	13,250	21,000	0.34	3.8	6	Low B Good A Good 0	4	3-4	Med. +

TABLE 5 (Cont.)

POSSIBLE METAL WORKING OPPORTUNITIES

NABALALC Code	Product Description	Bolivian MKT. Sufficient?	Andean MKT. Sufficient?	Estimated MKT. Bolivia M$	Estimated MKT. Andean M$	Estimated MKT. Other ALALC M$	Bolivian MKT./ MVP	Andean MKT./ MVP	Other ALALC MKT./ MVP	Market Comment[a]	Labor Intensivity 1,2,3 4,5	Speed Implementation Yrs.	Value/ Weight
84.51	Typewriters, Etc.	?	Yes	500 700	5,900	21,000	0.34	3.8	6	Good B Excellent A Excellent O	5	2	High -
84.52	Calculating Machines		ELIMINATED										
84.53	Statistical Machines		ELIMINATED										
84.54	Other Office Machines		ELIMINATED										
84.61	Valves, Cocks, Etc.	Yes	Yes	700	12,000	17,000	2	35	48	Low B	3	2	Med.
84.62	Bearings	No	Yes +	400	8,000	34,000	0.7	30	300	Low B Excellent A, O	4	2-3	High
84.63	Power Transmission Equipment	No	Yes	400	13,000	34,000	1	30	85	Low B Excellent A, O	3	1-2	Med.
85.05	Hand Tool w/Motor	No	Yes	125	1,675	2,300	0.3	4.2	5.8	Low B Good A, O	5	1-2	High
87.01	Tractors	Yes	Yes	4,000	36,000	34,000	3.2	29	27	Good B Excellent A, O	4	2-3	Med.
90.14	Surveying Instruments	No	Yes	200+	2,000	4,300	1	9.5	17	Border B Excellent A	5	2-3	High
90.16	Math. Calculating Instruments		ELIMINATED	BUT TIES IN WITH 90.14									

TABLE 5 (Cont.)

POSSIBLE METAL WORKING OPPORTUNITIES

NABALALC Code	Product Description	Bolivian MKT. Sufficient?	Andean MKT. Sufficient?	Estimated MKT. Bolivia M$	Estimated MKT. Andean M$	Estimated MKT. Other ALALC M$	Bolivian MKT./ MVP	Andean MKT./ MVP	Other ALALC MKT./ MVP	Market Comment[a]	Labor Intensivity 1,2,3 4,5	Speed Implementation Yrs.	Value/ Weight
90.27	Counters		ELIMINATED										
91.02	Clocks		ELIMINATED										
91.03	Instru. Panel Clocks		ELIMINATED										
91.04	Other Clocks		ELIMINATED										
91.05	Time of Day Recording Apparatus		ELIMINATED										
91.06	Time Switches		ELIMINATED										
91.08	Clock Movements		ELIMINATED										
91.10	Clock Cases		ELIMINATED										
91.11	Other Clock and Watch Parts		ELIMINATED										
97.06	Gym or Sports Apparatus		ELIMINATED										

[a]Market Comment Key: A = Ancom
B = Bolivia
O = Other LAFTA

Excellent = MKT/MVP > 5
Good = MKT/MVP 2-5
Border = MKT/MVP 1-2
Low = MKT/MVP < 1

TABLE 6

METAL WORKING OPPORTUNITIES

CLASSIFIED ACCORDING TO PROMISE

NABALALC	Abbreviated Product Description	Market Orientation
High Promise		
84.06	Engines	Andean
84.22	Hoists	Andean
90.14	Geodesic Instruments	Andean
84.56	Mineral Crushing	Andean
84.11	Fans and Blowers	Bolivian
87.01	Tractors	Andean
82.05	Interchangeable Tools	Andean
82.11	Piston Compressors	Bolivian
84.62	Bearings	Andean
84.10	Pumps	Bolivian
84.45	Machine Tools	Andean
84.63	Power Transmission	Andean

NABALALC	Abbreviated Product Description	Market Orientation
Medium Promise		
84.41	Sewing Machines	Andean
84.30	Food Machinery	Andean
84.23	Leveling and Excavating equipment	Andean
82.03	Pliers	Andean
84.47	Wood and Plastic Machinery	Andean
85.05	Hand Tools without Electric Motor	Andean
84.49	Motorized Hand Tools	Andean
73.32	Nuts and Bolts	Bolivian
84.51	Typewriters	Bolivian
73.25	Wire Rope and Cable	Bolivian
82.62	Hand Saws and Blades	Andean
84.15	Domestic Refrigerators	Bolivian
84.14 85.11	Industrial Ovens and Furnaces	Andean
73.18	Tubes and Pipes	Bolivian

NABALALC	Abbreviated Product Description	Market Orientation
Low Promise		
84.37	Weaving and Knitting Machinery	Andean
83.15	Welding Rod	Andean
82.04	Hand Tools	Andean
83.02	Door Hardware	Bolivian
83.01	Locks and Padlocks	Bolivian
73.21	Iron and Steel Structures	Bolivian
82.11	Razors and Blades	Andean
73.14	Iron Wire	Bolivian
84.24	Agricultural Equipment	Bolivian
73.36	Stoves, Ovens	Bolivian
82.01	Hand Tools-Agricultural and Forestry.	Bolivian

gasoline and diesel-powered, we think it practical to consider that this industrial opportunity initially be limited to the manufacture of liquid cooled engines in the 30 to 200 horsepower range. These engines could be models of 2, 3, 4, 6, and 8 cylinders depending upon the size and application. We do not contemplate manufacturing aircraft piston engines. This manufacturing enterprise could supply engines to the mining sector, tractors, mobile agricultural implements, materials handling equipment, and motor-generator sets, to name a few.

The engines should be selected for maximum interchangeability in parts such as 4, 6, and 8 cylinder blocks to utilize common bore and stroke. Similarly, common blocks could have different bores and strokes to vary the horsepower range in order to minimize manufacturing costs. By minimizing the variety of castings and forgings required by the different models and by the use of common parts, longer production runs and better economy would result from less frequent set-ups and less inventory of in-process and finished parts. It would also greatly simplify the problems associated with production control, planning and scheduling.

2. The Process

It would be expected that ultimately this manufacturing operation would have its own foundry and forge shop; therefore, the raw materials for these departments would be purchased to-

gether with the various types of machining alloys needed for the fabrication of engine components. Initially, however, raw castings will be purchased. Items to be purchased in finished form would be starters, generators, fuel pumps, fuel injection pumps, carburetors, pistons, valves, radiators, filters, etc. As this industry develops and when volume justifies, it could eventually undertake the manufacture of fuel injection pumps. This process requires a high degree of technical sophistication; therefore, a careful make-or-buy decision is required. Even though most of the material mentioned above will have to be imported, the engine plant should be able to reach between 65% and 70% local integration.

If maximum interchangeability of parts is realized some 450 to 600 different castings and forgings would have to be machined. This number could easily double if close attention is not paid to interchangeability.

The engine manufacturing plant will have four major departments: foundry, forge, machine shop (which will be divided into engine block machining, crankshaft machining and the other machine parts) and assembly. Peripheral functions such as degreasing, deburring, painting, etc. will be needed.

Foundry equipment will include mold sand systems, core sand systems, core blowers, core drying ovens, melting furnaces, molding machines and shakeout and snagging equipment.

The forge shop will consist of basic mechanical forging presses, such as eccentric, mechanical drop hammers, board drop hammers, rolling machines, straightening presses, shot blast equipment, holding furnaces, heat treatment furnaces and miscellaneous grinders for rough grinding.

The machine shop, the largest manufacturing operation within the plant, will consist of standard type machine tools for turning, milling, boring, drilling, tapping, broaching, except for crankshaft and cylinder block production where transfer equipment will be required. Some small stampings will be produced.

3. Minimum Viable Plant

The minimum viable plant investment for the manufacture of engines in Bolivia is estimated at US$ 1,000,000 investment requiring US$ 1,250,000 sales to break-even. This estimate does not include a captive foundry, the manufacture of crankshafts, fuel injection systems, or major automatic transfer equipment for block machining. Some 2,000 engines, or one per hour, would be produced. Overall average equipment usage would be 40-50% and integration perhaps 40% at this level of manufacture. As a comparison, an economically viable plant which manufactures 20,000 engines per year and manufacture engines to a level of 90% integration would require an investment of approximately US$ 7,000,000. Such an installation would include foundry and

large forging presses. Sales would need to approach US$ 10,000,000 and utilization of equipment would be in the order of 75%.

4. Skills

The manufacture of internal combustion engines require basic foundry, forging, machining and mechanical assembly capabilities, as well as peripheral skills, such as trouble shooting, testing, and equipment maintenance. A licensor for the operation will be required and it is expected that the licensor would provide training program, as well as technical assistance, during start-up and early operation. It will also be necessary for the licensor to provide resident engineers and skilled technicians for a sufficient period of time to bring the work force up to operating standards of training. Personnel must be trained in managerial, direct production jobs, and supporting functions both in office and plant.

5. Summary

Internal combustion engines represent a very important opportunity for Bolivia. The Andean Market at present is US $ 47.0 million and will grow steadily, since only minor production exists in Peru, Chile and Colombia, Bolivia may wish to pursue energetically the assignment under the Pact of this opportunity, in whole or in part.

B. HOISTS AND WINCHES, ETC.

1. Product Description NABALALC 84.22

This category includes hoists manually and electrically operated, electric winches, stationary cranes of several types, such as davit with winch, mobile gantry crane with rotating boom, and mobile floor crane and manual and electrical capstans. A typical product mix for a plant producing these products, even with many simplifying arrangements, calls for a rather complex product line. But even when all the products mentioned above are included, many common manufacturing elements are to be found throughout the product line. Typically materials handling equipment of this type is in the one-half ton to five ton range. Thus, for example, where units are electrical, there is a rather narrow range of electrical motors to install. Gear reductions will be approximately the same for the hand-operated equipment of a three-ton hoist, a three-ton winch, and a three-ton mobile gantry. A simple davit and winch, given the ability to rotate and given proper structural footing to support such rotation, becomes a rotating boom with winch. The same unit given four casters and some additional framework can be pushed around as a floor crane; or with the addition of two A-frames and a top cross member this same unit can become a mobile gantry crane. "Mobile" in the sense used in this category means that it can be pushed or

pulled around a floor; it does not mean self propelled. A winch and a capstan of the same capacity have a number of common elements. They merely operate in planes 90° apart from each other.

The products in this group are needed in every manufacturing plant, on farms, in truck terminals, warehouses and machinery repair shops.

2. Process

In the manufacture of this product mix there are some five lines of flow which converge at the final steps of welding, degreasing, painting and assembly and test. The five lines are as follows:

a. Plate is sheared and holes are drilled and punched.

b. Shapes, such as channel, angle and wide flange beams are sawed, and then holes are drilled or punched.

c. Sheet metal is sheared, blanked and stamped.

d. Castings are cut in the form of gears, key ways and splines are broached in these and the resulting product heat treated.

e. Alloy steel shafting is turned, key ways are milled, and sometimes heat treated.

These constitute the manufacturing activities of the basic plant. Necessarily a great deal of the items are to be purchased

at first and to be made only when their quantity justifies it.

Purchased elements of hoists, winches and cranes comprise the following: electrical motors, gear motors, bushings, bearings, wire rope, forged hooks and iron castings. Iron castings will be needed for gear blanks, drums, trolley wheels, handles, caster bodies, reels, gear reduction housings, capstan heads and the like. There is sufficient iron foundry content in this product mix to encourage expansion of existing nearby foundries, but for quite sometime in the economic progress of this plant a foundry solely for these purposes will not be economically justifiable. Forging needs will also be met through purchases. Primary uses will be hooks, swivels and chairs.

3. Minimum Viable Plant

Investment for the minimum plant would be approximately US$ 400,000 not including working capital. Of this amount, the process machinery and equipment would be in the order of US $ 200,000. Such equipment would be typically one each of the following: metal worker, saw, shear, brake, blinking press (75 ton), stamping press (50 ton), stamping press (25 ton), gear cutter, lathe, universal milling machine, MIG welder, heat treating equipment, and rolls for sheet metal. Building (2000 square meters) and land (8000 square meters) would add another US$ 120,000 to this investment, and about US$ 80,000 additional will be needed for general equipment such as air compressor,

materials handling equipment, broler, maintenance shop, tool and die shop, and the like.

Estimating on the basis of an average mix within the product grouping, we would expect the minimum viable plant to produce some 300,000 pounds annually of finished product with a sales value of nearly US$ 550,000 per year.

This plant would require some 32 direct hourly employees. supervision, management, and indirect people such as maintenance, shipping and janitorial would add perhaps 10 people to this total. Approximately US$ 90,000 would be required for working capital. At this level of operation, equipment utilization would approximate 55% and integration about 50%. The minimum economic plant would need sales of approximately US$ 1,000,000 with 80-85% equipment utilization. Integration would approach 85 per cent.

4. Skills

Within the plant several skills will be essential. A tool and die making capability for the simple shapes which have to be stamped and drawn will be most desirable. A set-up man for the machine shop operations is essential. Welding skills can be readily taught, but someone has to teach them. The remaining people need only one week to one month of training to operate the specific machines.

A practical knowledge of machining operations and how and when to use them should reside in the single production mechanical engineer who should be in full time residence on this job.

Although no specific technology or licensing arrangement is required, it would be desirable to be linked with a technical partner who can save time by producing drawings of the products to be made.

5. Summary

This product group is used by all manufacturing industries. In addition, warehouses, truck terminals, garages and even large stores will benefit from use of these products. We note some production in Chile, Peru and Colombia but this production is under 10% of the Andean Market and in a very diffuse product line. By group technology, 84.22 can economically be combined with 84.63 power transmission equipment and, as we recommend later in this report, into Complex I.

C. GEODESIC INSTRUMENTS

1. Product Description - NABALALC 90.14...

This category includes surveying (including photogrammetrical surveying) hydrographic, navigational, meteorological, hydrological and geophysical instruments; and compasses, and range finders.

The various products which would make up a typical product mix for this industrial opportunity are: directional and repeating theodolites, different models of transits, self-leveling levels, self-indexing alidades and builders levels and transits with tripods.

This product line requires sophisticated manufacturing techniques in precision machining, die casting, precision casting and optics. Initially this industry will begin operations as an assembly operation and will gradually phase toward the fabrication of components. The optical parts would probably be the last components to be fabricated.

2. Process Description

The raw material which would be imported would be the various die casting alloys, high quality machine alloys, plastic components, and miscellaneous hardware.

The prime manufacturing operation will be precision machining and will require precision turret lathes, screw machines, milling machines, grinding equipment, drilling, tapping and boring equipment and other equipment of tool room quality. Many of the machine operations will be performed in an environmental controlled area particularly for those parts which require close tolerance. The optics must be assembled in a "clean room" atmosphere to ensure that dust particles are not trapped in the internal areas of the optics.

Finishing capability will be needed as anodizing, plating, and prime paint.

3. Minimum Viable Plant

The minimum viable plant which would include only some machining, finishing, and assembly operations, is estimated as requiring a sales volume of US$ 250,000 a year and, an investment of US$ 225,000 with an additional working capital of US $ 40,000. A substantially larger investment (perhaps US$400,000) and sales volume (approximately US$ 800,000) would be required for a minimum economic plant. Utilization of equipment at these two levels will be in the order of 40% and 80%, respectively. Integration at the two levels would be approximately 40% and 75% respectively.

4. Skills

Precision metal fabrication, optical fabrication, precision assembly and alignment are mandatory skills needed for this operation. It is expected that resident expatriate technicians supplied by the company which is offering technical assistance will be in residence a considerable length of time, possibly two or three years to provide the proper training for the skilled job functions where they are necessary.

We believe that this opportunity could well be seized by Bolivia and, once operating, could establish Bolivia as a prime South American source of precision instruments.

5. Summary

This is an opportunity to obtain for Bolivia a "non-produced" (in the Ancom subregion) product group and to build precision manufacturing capability starting from a small base. Manufacture of these products will make use of the latent (in the metal products industry sense) ability of Bolivians to produce fine quality work. Standards of precision will have to be defined and enforced by the technical partner, e.g., Keuffel and Esser. Once geodesic instruments have been established, it is reasonable to phase into laboratory optical equipment, starting with comparators and photo enlargers, and then branching out into physical measurement equipment, balances, and, ultimately, binoculars, microscopes, and watt-hour meters.

The Bolivian market alone is essentially equal to the minimum viable sales volume but this would offer a borderline opportunity; the Andean and other ALALC markets offer an excellent opportunity, namely, approximately US$ 2 million for the Andean market and US$ 4 million for the market in the other ALALC countries.

Presently, all of the LAFTA countries are importing these instruments, primarily from the United States, Germany and Japan. This industry probably has not developed in the Andean countries due to the high skills required in manufacturing these instruments; therefore, if Bolivia can develop this cap-

ability, it has available to it an immediate captured market with minimum chance of competition from within the Andean countries.

D. MINERAL CRUSHING AND AGGREGATE SORTING EQUIPMENT

1. Product Description - NABALALC 84.56

This product category includes machinery for sorting, screening, separating, washing, crushing, grinding or mixing earth, stone, ores or other mineral substances, in solid form; machinery for agglommerating, molding or shearing solid mineral fuels, ceramic paste, unhardened cement, blasting materials, or other mineral products in powder or paste form; machines for forming foundry molds of sand.

The initial product mix for which we have estimated the minimum viable plant is based on two families of product-ore crushing equipment and screening machinery of the multiple tray type.

2. The Process

The raw material required for this line of equipment is basically heavy sheet steel and plate, heavy castings, forging stock, heavy steel wire and rod, heavy machine stock, and steel structural shapes, etc. The components which would be purchased are motors of various sizes, sprockets, miscellaneous hardware, bearings, pumps, belting and roller chain.

The manufacturing departments needed are a machine shop, forge shop, sheet metal shop, welding, assembly, and paint shops. Due to the heavy bulky size of the product, a fairly large plant area would be required.

The machine shop functions would not demand great precision but would involve heavy lathe work, and would require large boring mills, milling, drilling, tapping, and other standard machine tools. Similarly, the sheet metal shop and forge shop would also require large heavy sheet metal equipment and forging equipment for shearing, bending, notching, and forming operations.

Most of the welding would be done manually and the major portion of the capital investment for the welding department would be for the purchase of large welding fixtures. The large items of the product mix, e.g., crushing mills, would be assembled in one location rather than on a production line basis. Smaller items, if the volume is sufficiently large could be assembled on a drag-line and be fabricated in sequence.

It would probably be advisable to have a shot blasting operation for cleaning prior to priming and painting. In this case, the items could either be fed through blast by a monorail or drag-line system.

3. Minimum Viable Plant

The minimum viable plant is estimated on the basis that castings, forgings and heavy shafts and cams would be purchased

(hopefully from Bolivian industry). This minimum viable plant would require an investment of US$ 300,000 plus working capital of some US$ 50,000. Sales at break-even level would approximate US$ 300,000. A profitable plant would develop sales of some US$ 900,000 with well under US$ 100,000 added to the fixed investment.

Integration can be moderately high (approaching 75%) in this industry. Motors and heavy plate would be imported, but all else should come from Bolivia in the near term.

Utilization of equipment at break even will be highly variable (100% for welding equipment, but perhaps 30% for lathes and boring mills). At a profitable level, more welding equipment will have been added (and will continue at 100%) whereas some machine shop tools will be 50-60% loaded at best.

4. Skills

Generally, the skills required for the manufacture of this equipment are not too high. Therefore, the Bolivian labor force can be trained in fairly rapid fashion. In fact, many of the existing industries in Bolivia are operating with personnel who have skills which could easily be adapted to the tasks which would be required for this manufacturing operation.

5. Summary

Mineral crushing equipment is essential to the Ancom econ-

omy. We note moderate production in Chile of US$ 6.0 million and minor production in Colombia and Peru. But in this rapidly growing market there is ample room for profitable manufacture in Bolivia.

E. FANS AND BLOWERS

1. Product Description - NABALALC 84.11

This category includes air pumps, vacuum pumps, air or gas compressors (including motor and turbo pumps and compressors, and free piston generators for gas turbines); fans, blowers and the like.

At the outset, the product mix for this opportunity is likely to include only fans and blowers and related equipment indicated in the NABALALC category. Reciprocating compressors, on the other hand, would be a logical addition to an internal combustion engine plant because of the similarity of equipment required to manufacture this equipment. These are discussed under Section H of this chapter.

A typically-needed size range of blowers which could be produced in a minimum plant would range from 1/4 horsepower with a 9 1/2 inch wheel diameter and approximate output of 1,000 cubic feet per minute to 10 horsepower with 36 1/2 inch wheel diameter and an output of 20,000 cubic feet per minute. These fans could be designed to operate at these outputs within a static pressure

range of 1/8 to 1 inch of water, which would depend on the characteristics desired. Blowers, on the other hand, although they may be similar in construction, are designed to move these volumes of air at higher velocities and pressures.

2. Process Description

The primary raw material required for this operation will be sheet metal of various standard sizes of mild steel, stainless steel, and aluminum. Other items that would be purchased would be castings, electric motors, pillow blocks, sheaves, bearings and miscellaneous hardware.

The operations involved in the manufacture of fans and blowers are fairly straightforward. These products primarily require the basic sheet metal operations. Sheet metal is sheared, blanked, rolled, punched, notched, and formed (e.g. squirrel cage blades), as needed.

The machine operations are again basic, such as lathe work for the turning of shafts, milling, boring, drilling, and tapping. The assembly operations will require both seam and spot welding as well as some silver soldering and brazing. This facility will also be provided with equipment for deburring, degreasing, priming and painting operations.

It is conceivable that fans and blowers could be assembled sequentially on assembly lines. The only real critical area in the

assembly function is the balancing operation of both fans and blowers which must be done in conjunction with final test.

3. Minimum Viable Plant

The minimum viable plant is estimated as requiring a sales volume of approximately US$ 360,000 a year. This minimum plant could be started up with investment of some US$ 180,000 for land, building and equipment and an additional sum of US$ 60,000 for working capital. Integration will be about 60% and equipment utilization will be approximately 45%.

The present Bolivian market provides a sales volume which is six times the minimum viable plant annual sales, which indicates that a good relative rate of return is possible with the Bolivian market alone. The Andean and other LAFTA markets are exceptionally good. All factors indicate that the manufacture of fans and blowers in Bolivia offers an excellent opportunity, not only for the Bolivian market, but for even a percentage of Andean or other LAFTA markets.

This plant should show profit at US$ 1,000,000 annual sales; investment in fixed assets would be approximately US$ 275,000. At this level, equipment utilization would approach 80% and integration 85%.

4. Skills

The skills involved in the manufacture of fans and blowers are sheet metal fabrication, some basic machine operations and of course assembly operations. Tool and die skills are needed in this plant.

5. Summary

This is a promising opportunity directed toward the Bolivian market initially, inasmuch as there is significant Andean production. However, we would expect a prefeasibility study to uncover certain special items which are "non-produced" within Ancom. We would expect that some of these would logically be made in Bolivia.

F. TRACTORS

1. Product Description - NABALALC 87.01

This category includes tractors, whether or not fitted with power take-offs, winches or pulleys:

a. Tractors, wheel type

b. Tractors, caterpillar or crawler type

c. Roadtractors for semi-trailers

In the view of the complexity of tractor manufacture, we would propose that this industrial opportunity be limited at first to the manufacture of wheel type and crawler tractors. We would expect that this facility would produce two sizes of the

wheel tractor, the small size between 35 and 40 horsepower and the large between 50 and 60 horsepower. Only one model of the crawler tractor would be produced and could range between 55 to 75 horsepower.

It is not economical for engines to be made in the tractor plant during the first stages of the manufacturing program. An engine plant is discussed elsewhere in this report to supply not only the tractor plant needs but other industrial and mining applications. In more industrialized nations, the common practice is for engines to be produced in separate facilities.

It would be expected that a tractor plant would also manufacture or import optional equipment such as power steering, power brakes, fourwheel drives, and the like, particularly if it is to supply the Andean market.

2. Process Description

The major items that would be purchased finished are engines, batteries, wheels, tires, generators, starters, filters, instruments and radiators and some optional equipment. Raw materials would include hot rolled sheet metal of various standard sizes, metal shapes, machine stock, forging stock, wire (electrical and mechanical) and castings. (The castings would be of gray and alloy iron, steel, malleable iron, bronze and aluminum).

There would be four major manufacturing departments in the

tractor manufacturing plant: the machine shop, the sheet metal and welding shop, the forge shop and the assembly department, which would include painting and testing.

A typical tractor consists of approximately 130 forgings and 180 various castings which have to be machined. The machine shop would require complete machining capabilities, such as turning, milling, drilling, tapping, grinding, broaching, etc. Initially, standard equipment could be utilized; however, as production increases, numerical control machine tools might be added for complex parts.

The sheet metal shop would comprise most of the typical sheet metal operations, such as shearing, notching, bending, punching, forming, drawing, and rolling. The welding department would be located in close proximity to both the machine shop and the sheet metal shop and would perform various electric arc and spot welding operations needed for fabrication of subassemblies.

The forge department would be equipped with basic mechanical forging equipment such as board drop hammers, other mechanical forge presses, trimming presses, gas-fired forging furnaces, and blase cleaning and pickling equipment. The bulk of the parts coming out of the forge department will have to be machined; therefore, these departments should be in close proximity to one another.

It is expected that the necessary initial tooling required for forging dies, stamping and sheet metal dies, machine shop, welding and assembly fixturing would be purchased from those companies providing technical assistance.

The completed parts in the operations described above would be processed through finishing operations, such as paint, prime, black oxide, anodizing, plating etc., as required, then would be assembled into subassemblies. These subassemblies would be delivered to various stages of two separate assembly lines, one for the wheel-type tractor and the other for the crawler tractor. The assembly lines would probably be spaced either by a drag line system or by special dollies which would be manually pushed from station to station as the assembly sequence progressed. The completed tractors would then be tested, given a final painting (a common painting operation for both lines would be advisable) and moved to the finished goods storage area for shipment.

3. Minimum Viable Plant

Based on the assumption that the tractor engines would not be manufactured in this plant, the minimum viable plant would require sales of US$ 1,250,000, which represents a production output of approximately 500 tractors per year. The estimates investment for such a plant would be US$ 1.0 million plus a minimum working capital requirement of some US$ 200,000. Employment for the minimum viable plant should approximate 75 people. Utilization

of equipment would approximate 40% and integration would be under 50% at this level of manufacture.

As a comparison, a minimum economic plant would require an investment of approximately US$ 1.5 million and would generate sales revenue of approximately US$ 5.0 million. At this level, equipment utilization would approach 80% and integration 75%.

4. Skills

The skills needed in manufacturing tractors are of the basic metalworking type; therefore, the work force from the Bolivian labor market could be trained in a period of 1-2 months time. It would be expected that tractors would be manufactured under license and that the licensor would provide the necessary technical assistance which would include resident engineers and technicians to provide the necessary training and expertise.

5. Summary

Tractor manufacturing could be an important industry for the economic development of Bolivia. There is no published production in the Andean Subregion, however, our field work indicate the existence of a proposal for production in Colombia of tracked and wheeled tractors in two facilities. Those tractors would be marketed in Bolivia and Ecuador. Both plants would be built to serve the entire Andean market or at least a major part of it and would exchange parts and pieces as the basis of a sectional program for

agricultural machinery. We urge the backing of a Bolivian facility and think it should be encouraged unless plant construction has already begun in Colombia.

Tractor manufacture can form the nucleus of Complex I (described in Chapter V) and readily lends itself to expansion into mobile materials handling equipment such as fork lift trucks and towing vehicles.

G. INTERCHANGEABLE HAND TOOLS

1. Product Description - NABALALC 82.05

This category includes interchangeable tooling for hand tools, machine tools or for power-operated hand tools. Examples of operations in which these tools are used are: stamping, drilling, tapping, threading, boring, broaching, milling, cutting, turning, and the like. The category includes wire drawing, extrusion dies, metal and rock drilling bits.

From the total product universe within this sector we have selected the following items for which a market typically exists; in our judgement they represent the core manufacture in this product category. These products are drills, reamers, taps, dies, milling heads, cutting tools and, although perhaps not in the initial stages of manufacture, rock drilling bits and tungsten carbide inserts for cutting tools.

2. Process Description

Generally speaking the process would be as follows:

a. Wire would be cold formed, cut off, ground, heat treated, final ground, marked and packaged, for the family of drilling tools.
b. Bar stock would be sawn, bored, ground for teeth, heat treated, final ground, marked and packaged, for dies.
c. Plate would be sheared, rough ground, finish ground, key ways would be broached, deburred, heat treated, marked and packaged, for milling side cutters.
d. The sheet would be stamped, ground for sharpening, broached for key ways, followed by bright nickel dip and packaging for arbor spacers and shims.

For preservation against corrosion most of the products would be dipped in a preservative and some may be dipped in a thermo-setting clear plastic.

Purchased elements for this process would be almost exclusively raw material, that is to say, wire, bar stock, plate and sheet. In addition, grinding wheels would also be required.

3. Minimum Viable Plant

The investment for the minimum viable plant would be in the order of US$ 280,000 consisting of the following (in addi-

tion to land, building and general manufacturing service equipment): a saw, shear, blanking press, cold former, four cylindrical grinders, one surface grinder, one internal gear cutter, one external gear cutter, stamping press, mill, drill presses, deburring equipment, heat treat equipment, electrolysis dip tank and packaging dip tank. Additional equipment will be required for the rock drilling bit manufacture and tungsten carbide inserts.

This plant should be producing some 10 units per hour of approximately 20 products and on a one shift basis should generate in the order US$ 550,000 annual revenues. Integration would be approximately 70%. Machine utilization would approximate 60% at this level of production and would approach a maximum of 80% at a profitable sales level of US$ 0.9 - US$ 1.0 million.

4. Skills

Tool and die making and maintenance skills are required in addition to machine tool set-up capabilities. Remaining skills or ordinary machine operator capabilities with perhaps more training required for final grind operators. It would be advisable to have a metallurgist as a member of the supervisory staff or management. A mechanical engineer with good knowledge of machine tools and the operation of scheduling thereof would also be desirable.

5. Summary

This is an excellent opportunity to accomplish two things at one time: to manufacture a product which is essentially non-produced in the Andean Subregion (minor production is reported in Colombia and Peru) and to supply an essential commodity to the Bolivian metal working industry. With a Bolivian market of some US$ 0.7 million and Andean market of over US$ 9.0 million, this enterprise should be a successful contributor to the Bolivian economy.

H. PISTON COMPRESSORS

1. Product Description - NABALALC 84.11.102

We describe the manufacture of piston compressors as an opportunity for both the Bolivian and Andean market with the stipulation that is only be undertaken alone if the engine plant is not implemented. Because all the equipmend needed to make piston compressors is included within the engine plant, it is desirable to include piston compressors in this plant. Should, however, the engine plant not become a reality, then the following remarks apply.

We expect this plant to make air compressors to serve the decentralized field operations of mining and construction, as well as in plant and automotive garage needs. They will fall in the 2 to 50 horsepower range initially.

2. Process

Inputs to this plant would be raw castings from the Bolivian foundry industry; forgings will at first be imported and then obtained from local industry. Pistons and rings will be imported for a long time in all likelihood. These components must be cut, machined, assembled and tested. Equipment is needed to mill the blocks, bore and hone the cylinders and to perform a host of similar operations on both the block and the head. A stamping press will be needed for crank cases and such components as air filters and silencers. This manufacturing plant could also make the reciprocating compressors for refrigeration purposes in the 20 to 100 ton range.

3. Minimum Viable Plant

Investment for a minimum viable plant would be in the order of US$ 0.4 million for equipment, building and land. We would expect that this investment would support not only a breakeven level of some US$ 0.5 - US$ 0.6 million of sales but would also be adequate and fully used at sales of US$ 0.8 - US$ 0.9 million per year. Equipment utilization at these levels would be 55% and 60% respectively. Even with the most adroit scheduling and fortuitous market situation it is difficult to achieve more than 80% average equipment utilization across the shop; to do this, extra hours, or more than 100% must be achieved on some central pieces of equipment. 100% is generally taken as 2 shifts 5 day

operation. Integration should be at 40% and 90% at the two levels, respectively.

4. Skills

Machine set-up, tool, die maintenance and possibly making, metallurgy and quality control are the primary skills needed for this plant.

5. Summary

Piston compressors are important in the economic growth of the country, not only because every metal working manufacturing plant and many non-metal plants must have compressed air but also because construction and mining cannot develop without such equipment. In addition, chemical process industries require air for pneumatic control of instruments. Even if Bolivia does not implement the far-more-important engine plant, piston compressors represent an opportunity.

I. BEARINGS

1. Product Description - NABALALC 84.62

This category includes ball, roller, and needle bearings. As a typical product mix, we would suggest the manufacture of some 65% ball bearings single and double row 25% roller bearings and 10% needle bearings. We would expect the plant to concentrate on the most popular sizes for general industry. This would

exclude miniature precision bearings and bearings for shafts of over two inches. By concentrating in this range there is reasonable assurance that the total market figures which we have obtained would apply in relation to the plant which we described below. Shaft seals would also be included in this manufacturing plant.

2. Process Description

In the manufacture of this product group there are some five lines of manufacturing flow prior to assembly.

a. Alloy bar would be turned, sawn, rough ground, finish ground, heat treated and final ground to make the inner and outer races of ball and roller bearings.
b. Sheet would be blanked, punched and formed twice.
c. Strip would be formed and cut off and final formed to make the ball retainer.
d. Strip would also be stripped, blanked, punched and stamped to make a retainer shield for enclosure against dust and abrasives.
e. Wire would be wound to form a garter spring for seals.

Parts made by the above lines of flow would be assembled and tested on a statistical basis.

Purchased material would be ball bearing balls (probably from Japan), alloy bar, light gauge strip, neoprene moldings and

spring wire. None of these items to our knowledge is now manufactured in Bolivia.

3. Minimum Viable Plant

To operate the minimum viable plant an investment in equipment, land, and buildings of some US$ 0.4 million will be required. Important equipment foreseen will include saw, shear, blanking press, three punch presses, lathes, two cylindrical grinders, one surface grinder, heat treatment and assembly equipment, and metallurgical quality control apparatus.

On the basis of an average mix we would expect the minimum viable plant to produce some 250,000 units per year at an average market value of about US$ 2.40 each or some US$ 0.6 million of sales revenue annually. Equipment utilization would be about 55% at this level and integration would also be high because the high value added counteracts the high content of materials imports - approximately 60%.

To operate at a minimum economic basis, approximately US$ 0.1 million would have to be added, primarily for grinding capacity, and sales between US$ 1.2 and US$ 1.5 million would be required. Equipment utilization would approach 70%, but integration would remain at 60%.

4. Skills

In the hourly workers rank, a tool and die maker and set-up man would be required. Remaining skills are those of machine operator with training times of up to a month except possibly longer for the critical grinding operations.

In the direction of the plant two technical skills are essential metallurgy and quality control. Quality control and test are quite sophisticated for this group of products and the results depend heavily on the metallurgical knowledge required to determine accurately what materials are being received and to what degree they need heat treatment. Both of these operations will require some investment in equipment to support them.

5. Summary

Bearings, like power transmission equipment, are essential to the growth of the metal working industries, not only for new products but also to keep existing wheels turning. With an Andean market of some US$ 9.0 million and growing rapidly we believe this is an excellent opportunity especially in view of minor production in the Subregion.

J. PUMPS

1. Product Description - NABALALC 84.10

This category covers pumps (including motor pumps and turbo-pumps) for liquids, whether or not fitted with measuring devices;

liquid elevators of bucket, chain, screw, band and similar kinds.

The products which we considered as being appropiate for the nucleus of this manufacturing opportunity are centrifugal pumps with open or closed impellers which could range in capability between 10 to 100 gallons per minute at a head of up to 200 feet to be used for small or medium pumping applications. Large mining pumps are a logical addition, but we do not contemplate their manufacture at the outset. The other line of equipment listed in this CAMALAC category, conveyortype equipment, requires a completely different manufacturing capability and we have not included them as part of the project.

2. Process Description

The inputs which would be required for this manufacturing operation would include castings for casings and impellers of iron, bronze, and steel. In addition, machining alloys, forging stock, motors of various horsepower, internal combustion engines, bearings, pillow blocks, and miscellaneous hardware would be needed. Some sheet metal would be used for guards.

The operations required for the manufacture of centrifugal and conveyor type pumps are fairly straightforward and can be divided into functional departments, namely, machine shop, sheet metal shop, welding, forge shop, assembly, paint and testing. In reviewing the component make-up of the products being considered

in this opportunity, the number of forgings needed would probably not justify own manufacture.

The machine shop would have capability for medium lathe work, boring, milling, drilling, tapping, grinding and the like.

The sheet metal shop and the welding department would be comprised of standard basic equipment such as shear, brake, rolls, notcher and spot welding. Assembly operations would be divided by product line and size. At first the division should be between small and large pumps. It would be advisable that these assembly lines utilize a common painting operation which would include degreasing and priming.

3. Minimum Viable Plant

The minimum viable plant is estimated at a sales level of approximately US$ 0.4 million per year and would need an investment of US$ 0.24 million with an additional US$ 65,000 working capital. Equipment utilization would approximate 40% and integration 50% at this level of operation. A minimum economic level of operation can be achieved when sales reach US$ 0.7 - US$ 0.8 million. The basic equipment and building investment will support this sales level. However, working capital needs will increase to approximately US$ 130,000. Employment at this level would approach fifty people. Equipment utilization would be near 80% and integration should be in the neighborhood of 70%.

4. Skills

The manufacture of pumps requires basic sheet metal, machine, welding and assembly skills. It is expected that some technical assistance would be required initially; however, training for this operation will not be exceptionally difficult.

5. Summary

Because of significant production in the Andean Subregion, this is primarily an opportunity to produce for the Bolivian market. However, once manufacture is established, certain products, not now manufactured in the Andean countries should be selected and produced.

K. MACHINE TOOLS INDUSTRY

1. Product description - NABALALC 84.45

This category covers all the ordinary types of machine tools for milling, drilling, shaping, stamping, turning, sawing, drilling and grinding. From such a comprehensive product list it is difficult to predict accurately what the primary items of manufacture should be. These, of course, must be determined in a feasibility study. However, we would expect that the standard models of each should be in the initial manufacture and their production should be phased in the order of expected usage. Drills and saws are the most used, the simplest to make and would likely be beginning products. Lathes would be next in both complication and in

usage. Milling machines and mills are the most complicated and must be made to provide a complete product line. It would be advisable to seek out a licensor who could also provide the rudiments of numerical control to apply to these machines and to manufacture the machines with future numerical control in mind.

This industry is basic to the development of the metal working industry in Bolivia and the Andean countries. The Bolivian market is currently about US$ 1.0 million and the Andean market about US$ 14.0 million. The market in other LAFTA countries about US$ 57.0 million. However, it would be difficult to compete in this market against Brazil and Mexico, both of which manufacture these products.

2. Process

The manufacture of machine tools will require the use of wrought stock (imported) and raw castings made in Bolivia. This material will be sawn, welded, milled, drilled, bored, tapped, turned, ground and assembled. Electric motors may or may not be provided and these will have to be imported. We anticipate a modified assembly line for the small equipment such as saws and drills and assembly bays for ad hoc assembly of the larger equipment. A portion of the investment and floor space for this plant would be devoted to measuring, gauging and quality control.

3. Minimum Viable Plant

We estimate that the minimum viable plant should have a sales level of US$ 0.8 million per year. This minimum plant could be started with an investment of some US$ 0.6 million for land, building and equipment. The Bolivian market at present cannot support this project and part of the output would need to be sold on the Andean market. If the Bolivian market grows at the same rate as during the 1964-1968 for period demand for machine tools should be about US$ 1.0 million by 1975, which is sufficient to support a minimum viable plant. Integration on a minimum viable plant basis in the order of 60-70%. Ultimate integration should approach 90%. Utilization of equipment at the minimum viable level would be in the order of 50%.

Very little equipment would need to be added to reach an economic level of some US$ 1.2 million in sales unless the product line mix is extended unwisely to the extremes of size or complexity. We would expect that not more than US$ 0.1 million for equipment would be needed to be added to support the sales level of US$ 1.2 - US$ 1.5 million per year. Utilization of equipment should be 75% - 80%.

4. Skills

Probably the most important plant skills required for this project are measuring, gauging, inspecting and quality control.

Plant operations involve machine operation and setup skills and, therefore, metallurgical knowledge will be needed to guide heat treatment to adjust incoming batches of raw materials.

5. Summary

Since machine tool manufacturing capacity is lacking in the Andean Subregion and since Andean imports are nearly US$ 14.0 million per year and production in the area is less than US$ 1.0 million, this can be an excellent opportunity for Bolivia.

A licensor or investor presently manufacturing a comprehensive product line is an essential ingredient for the success of this venture. Prefeasibility work must define the specific products for each phase of manufacture.

L. POWER TRANSMISSION EQUIPMENT

1. Product Description - NABALALC 84.63

The products in this category are reasonably well related for good manufacturing practice. Pillow blocks, cranks, gears, wheels, sprockets, gear reducers, couplings and sheaves need not all be made together at once but can be added as production builds up in the existing lines. We have selected as the typical product mix pillow blocks, sprockets, gear reducers, sheaves, and shafting up to twenty horsepower.

2. Process Description

In the manufacture of these particular products there are several distinct and separate lines of manufacture. Generally speaking, assembly is minor; gear reducers, however, require some assembly. The various processes are as follows:

a. Small sheaves and pulleys are die cast of zinc, trimmed and minor final operations such as drilling and tapping for set screws and boring and broaching a key way in the center hole are completed.

b. Cast iron gear blanks are hobbed and the center hole bored and the keyway broached.

c. Cast iron gear cases are milled, bored and bushings are pressed in.

d. Shafts are sawn, turned and sometimes threaded, key ways are milled and then bearing surfaces are cylindrically ground.

e. Sheet metal sheaves are blanked from sheet, stamped, and spot welded. When volume justifies tooling for folding, a single or double sheave pulley out of one piece can be employed.

f. Sprockets are blanked from plate then stamped, bored, broached, sometimes ground and heat treated.

Inputs for this set of products will be hot rolled plate, cast iron gear blanks and cases, cold rolled shafting, bronze bushings, ball bearings, molded reinforced rubber vee and cog belts and single and double roller chain.

3. Minimum Viable Plant

Investment for the minimum plant will be approximately US$ 325,000 not including working capital. Of this the process machinery and equipment would be in the order of US$ 225,000. Such equipment would typically be a zinc die caster, turret lathe, universal milling machine, saw, grinder, stamping press, hobbing machine, broach, heat treat equipment, drilling, reaming, and tapping machines plus a welder. A building of 2,000 square meters and land (6000 square meters) together with some US$ 40,000 of general equipment such as air compressor, materials handling apparatus, boiler, maintenance, tool and die shop and the like are indicated.

Output of this plant would be limited by the gear hobbing and sprocket grinding operations. There is no need, however, in the early stages of manufacture to have more than one of these machines because they can be operated at two shifts to match a one shift output of the other products. The minimum viable plant would need annual revenue in the order of US$ 350,000. Some 25 direct hourly people would be employed.

Integration would approach 65% and machine utilization 50% of this level of production.

A practical minimum economic plant would require less than US$ 50,000 additional investment and equipment utilization can approach 70% (a practical maximum in this type of manufacture) in supporting a sales level of US$ 0.9 - US$ 1.0 million. Integration would peak out at 75-80% if sheet steel, zinc and shafting continue to be imported.

4. Skills

The operation skills in this type of manufacture are largely those of machine operators. One skilled man to handle set ups and tool and die work is essential. Metallurgical aspects are simple and perhaps technical training could be combined with supervision of the shop. A member of supervision should understand machining operations and how best to use the machine tools.

5. Summary

The manufacture of power transmission equipment is important. This is an essential industry in the development of Bolivia's metalworking industry. With an Andean market of about US$ 15.0 million (although spread over a diffuse product mix) and Andean production about 10% of the market, there is ample room for the location of an economically viable enterprise in Bolivia.

V. GROUPINGS OF PROJECTS INTO MANUFACTURING COMPLEXES

V. GROUPINGS OF PROJECTS INTO MANUFACTURING COMPLEXES

Previous chapters in this report have dealt with projects consisting of single products or groupings of a few products. The consolidation of projects into manufacturing complexes can (1) produce additional manufacturing economies and (2) support product manufacture which would not be economic as a lone project.

The grouping of projects into manufacturing complexes results in savings through the non-investment of redundant equipment, provided the complex is under one management. In addition, whether or not there is one management, savings in overhead items such as land, buildings, and overall administration of services and infrastructure and in transportation of work-in-process or parts feeding from one industry to another can be achieved.

A. COMPLEXES INDICATING GREATEST PROMISE

Our analysis has indicated three complexes which appear promising for Bolivia in the near term. These are presented schematically in Tables 7,8 and 9; they are: (1) tractor and power transmission, (2) mining and related equipment, and (3) machine tools.

1. Tractor And Power Transmission

The most important complex would have as its nucleus the manufacture of tractors and power transmission equipment. We

TABLE 7

COMPLEX I

ENGINES, POWER TRANSMISSION, VEHICLES

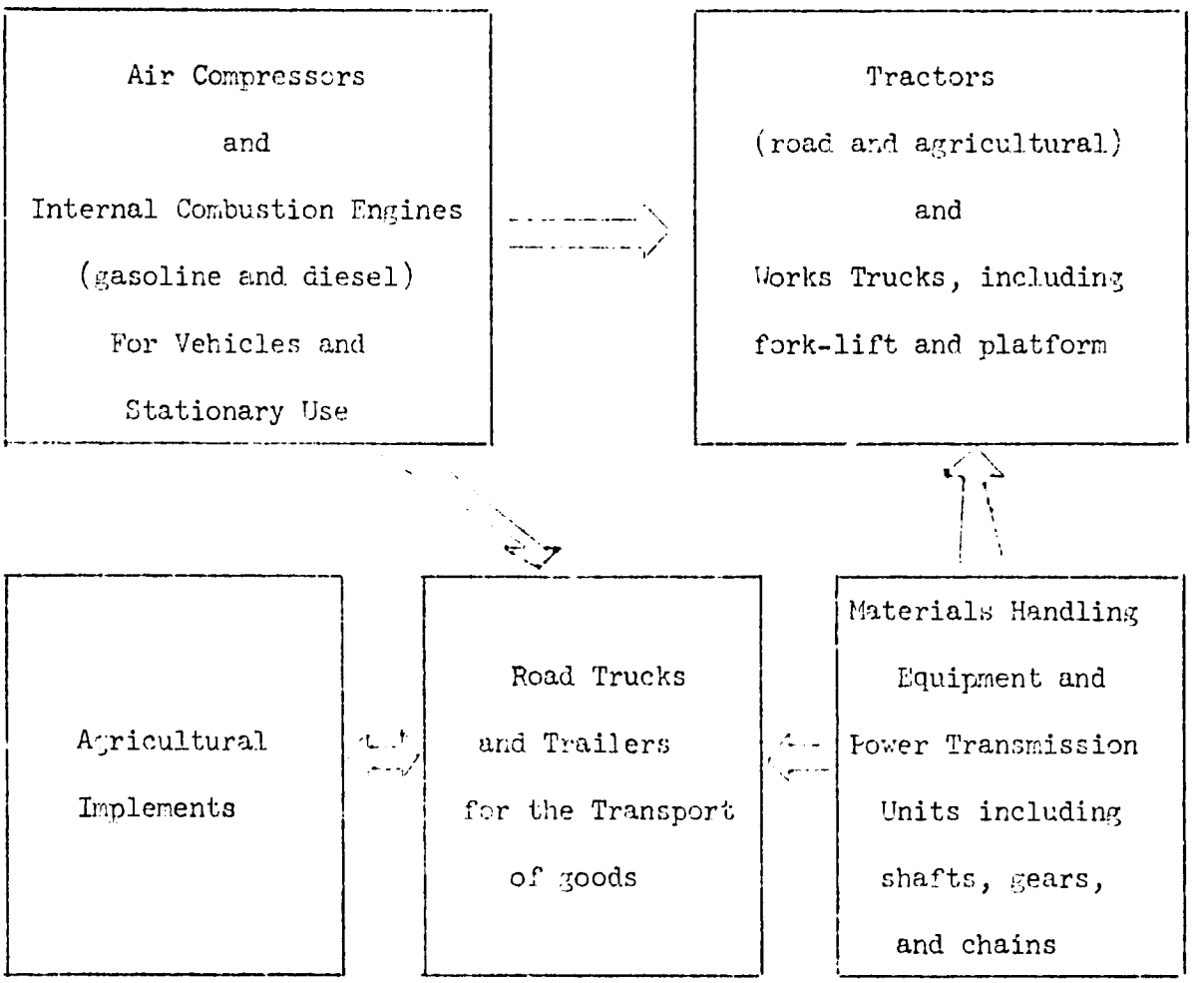

TABLE 8

COMPLEX II

MINING & RELATED EQUIPMENT

	NABALAIC	Description
	84.56.101 84.56.199 84.56.801 84.56.802 84.56.899	Mineral Crushing & Screwing Equipment -- Ball Mills
	84.49-199 73.40.301 74.40.901	Pneumatic Mining Equipment
	84.24	Grain Crushing & Sorting Equipment.
	84.59.401	Wood Treatment Equipment.
(Fired) (Unfired)	84.01.101 84.17.199	Pressure Vessels.

TABLE 9

COMPLEX III

MACHINE TOOLS

NABALALC	Description
84.45	For Steel working
84.46	For Stone Working
84.47	For Wood and Plastic
84.48	Accessories

would expect that tractor assembly would be the first phase of construction and operation. Next facilities of the manufacture of power transmission and materials handling equipment would be installed to supply the tractor plant and the Bolivian and Andean markets. At the same time perhaps forklift trucks could be added to the tractor plant.

The third phase of construction would be the engine and piston compressor plant. Its implementation would require about four years. It would supply engines to the tractor plant and other mobile equipment such as trucks and bulldozers and the stationary and other engine needs of Bolivia and the Andean Subregion.

Part four of this complex would include the truck plant whose operation and facilities are significantly different than the other parts of the complex. Once the truck plant is established trailers and agricultural implements would be added. The final phase of implementing this complex would consist of the installation of a plant to manufacture excavation and leveling equipment such as bulldozers.

If the Bolivian foundry is not capable of providing the cast iron needs of this complex, a borderline justification for a foundry can probably be made for installation between the fifth and tenth year of operation. The same applies to the forging needs of the complex except that some forging presses can be installed in the tractor and bulldozer plants to supply the complex.

There would be heat-treating equipment in the power transmission and materials handling plant and it is possible that this could be used or expanded to treat the small forgings required for the manufacture of tractors, trucks and engines.

It is more difficult to define for a complex of this nature the levels of minimum viable plant and minimum economic plant than it is for individual products because of the need to make, in addition to all the judgments for the single products plant, an estimate of how the various components of the complex will interact and grow. We would estimate that this complex could reach a break-even status in four to six years, exclusive of the lead time required to find technical partners and start serious planning. At this stage investment should be in the order of US$ 2.5 million and sales approximately US$ 3.0 million. Current market which this complex would be supplying is approximately US$ 32.0 million in Bolivia and US$ 270.0 million in the Andean Subregion. Integration at break-even should be approximately 50%. At the minimum economic stage, somewhere between six and ten years from the beginning of construction, investment should be perhaps 15% more or US$ 3.0 million in total. Sales should be approximately US$ 7.0 million and integration should reach 90%. We would estimate that utilization of equipment at break-even would be 40% and at minimum economic level 70%.

We hasten to indicate that, desirable as is the grouping of these industries into a complex, it is not essential, and the Boli-

vian Government or private investor should not be deterred by the magnitude of a complex such as the one described above. Each of the major elements of this complex can stand by itself and can operate without the synergism of its neighbors. We suggest this complex only to indicate a further refinement of economics and to initiate thinking in this direction. This complex would be key for the development of Bolivia's metalworking industry.

2. Mineral Crushing and Sorting Equipment

This complex is centered on mineral crushing and sorting equipment (NABALALC 84.56). It should begin with crushing mills and heavy duty screens and then expand into the manufacture of other equipment such as ball mills, cement grinding equipment and the like. A logical extension, though on a lighter scale, is machinery for cereal and grain milling and classifying. This machinery is distinct from food finishing equipment such as that for meat grinding and slicing or for the manufacture of chocolate, bread, and pastry in that the sanitary standards are lower and thus some of the same iron and steel can be used for interior materials and trim. In the event that rotary kilns are justified economically and become part of the base equipment for this plant the equipment will be available for other cylindrical vessels, primarily fired and unfired vessels. If the latter are manufactured, then autoclaves for wood treatment (84.59.401) should also be considered for inclusion in this project. This plant would

have the capability of milling, drilling and turning castings and it should manufacture pneumatic mining equipment, e.g. pneumatic drills (NABALALC 84.49.199).

The objective of this complex is to provide machinery for the mining industry of Bolivia and the Andean countries. The current market for all these products is US$ 4.8 million in Bolivia and US$ 52.0 million in the Andean Subregion, with good growth indicated. The complex could achieve break-even in three to five years and minimum economic viability in four to eight years. Investment at break-even would be approximately US$ 0.4 million and at minimum economic size, US$ 0.5 million. Utilization of equipment at these two levels would be respectively 40% and 65%. Percent integration at break-even we estimate at 75% and 80% at minimum economic plant levels and ultimately between 95% and 100%.

3. Machine Tools

A combination of machine tools for wood and plastic (NABALALC 84.47), stone (NABALALC 84.46), and parts and pieces for machine tools (NABALALC 84.48) with the basic machine tool industry (NABALALC 84.45) represents a logical grouping for the third suggested complex. Very little if any additional manufacturing machinery would be required once this complex is implemented.

For this complex the Bolivian market is approximately US$ 0.9 million and the Andean market US$ 20.0 million.

The machine tool industry can have a vital impact upon the manufacture of other metalworking products in Bolivia. In addition to metal turning, grinding and milling equipment it will include the manufacture of sheet metal working machinery. The easier or more economical it is for a Bolivian manufacturer to obtain basic metalworking tools the more likely early accomplishment of economic growth in the metalworking industry will occur. Our estimate of vital statistics for this complex is as follows:

	Investment (Thou. US$)	Sales (Thou. US$)	Integration	Timing	Equipment Utilization
Minimum Viable Plant	600-700	950	60-70%	3-5 yrs	60-65%
Minimum Economic Plant	800-900	1,800	80-90%	5-8 yrs	75-89%

4. Problem of Obtaining Technical Know-how

One word of caution should be noted in planning for complexes of this nature. As a complex becomes more comprehensive in manufacture, it is more difficult to find a single technical licensor or investor in the private sector whose competence lies in all of the manufacturing portions of the complex. In the case of the tractor and power transmission complex whereas it is true

that International Harvester, Fiat, and Deutz presently manufacture all of the items anticipated, it is difficult to name any others. In the case of the mineral crushing and sorting equipment complex, we do not know of one licensor that has the technical expertise to produce all the products included. The technical requirements of the machine tool complex can for the most part probably be fulfilled by a company such as Cincinnati Inc.

In the instance of smaller installations, such as the geodesic instrument plant, although several companies like Keufel and Esser can provide the technical input for the geodesic and drafting instruments as many as five other licensors may be required to provide technical input for the manufacture of laboratory optical and comparison equipment.

B. POTENTIAL GROUPING OF NADALALC CATEGORIES - GROUP TECHNOLOGY

Beyond the complexes discussed above, there are countless other product opportunities the manufacture of which can by group technology logically be placed under a common plant roof.

Of the most limitless combinations which could be considered, the possibilities which we judge to be practical are grouped in Table 10.

TABLE 10

ADDITIONAL POSSIBLE GROUPINGS OF METAL WORKING

PROJECTS INTO MANUFACTURING COMPLEXES

	NABALALC Description	Rational for Complex
1.	73.14 Iron or steel wire wheather or nor coated but not insulated 73.25 Stranded wire cables, cordage ropes, planted bands, slings and the like or iron and steel wire but excluding insulated electric cables. 74.10 Stranded wire cables, cordage, ropes, plated bands, slings and the like of copper wire but excluding insulated electric cables. 73.15 Wire rods, tubes, plates, electrodes and similar products of base metal or of metal carbides, coated or corded with flex material of a kind used for soldering, brasing, welding or disposition of metal carbides; wire and roads of agglomerated base metal power, metal spring.	= The wire products included in the three categories could be combined in a common wire drawing operation.
2.	73.18 Tubes and pipes and blanks thereof of iron, (other than the cast iron) or steel excluding high pressure hydraulic conduits. a. Blanks for tubes and pipes b. Seamless tubes and pipes c. Other	The manufacturing process for producing tubes and pipes as compared to tubes and pipe fittings is completely different; however these operations should be under the same roof or an adequate inventory of fittings should be available in a tube and pipe manufacturing plant.

	NABALALC Description	Rational for Complex
3.	82.01 Hand Tools, the following spades, shovels, picks hoes, forks, rakes, axes, bill hooks, and similar hewing tools scythes, sickles, hay knives, grass shears, timber wedges and other tools of a kind used in agricultural or forestry. 82.03 Hand tools, the following: pliers (including cutting pliers), pincers, tweezers, tinmen's snips, bolt cutters, perforating punches , pipe cutters, spanners and wrenches (but not including tap wrehches), files and rasps. 82.04 Hand tools, including mounted glaziers' diamonds, not falling within any other heading of this chapter, blow lamps, anvils, vises and clamps, other than accessories for parts of machine tools portable forges, grinding wheels mounted on frameworks (hand or pedal operated) 82.12 Scissors(including tailors' shears) and blades thereof 82.13 Other articles of cutlery (for example, secateurs, hair clippers, butchers, cleavers, paper knives), manicure and chiropody sets and appliances.	The manufacture of the products listed in group 3 require basic forging, sheet metal and machine opcreations. Standard equipment can be used for flexibility; however due to the large variety of products, cooling will be expensive

	NABALALC Description	Rational for Complex
4.	82.02 Saws (non-mechanical) and blades for hand on machine saws (including toothless saw blades)	Some specialized equipment will be needed for the manufacture of saws and razor blades, however the remaining product mix-can be produced with standard equipment and basic technology
	82.06 Knives and cutting blade for machines or for mechanical appliances.	
	82.09 Knives with cutting blades serrated or not (including pruning knives), other than knives falling within heading 82.06.	
	82.10 Knife blades	
	82.11 Razors and razor blades (including razor blade blanks, whether or not in strips)	
5.	83.01 Locks and padlocks (key combination or electrically operated). and parts thereof of base metal, frames incorporating locks, for handbags trunks or the like and parts of such frames, of base metal, keys for any of the foregoing articles, finished or not, of base metal	The use of power metallurgy die casting, standard machining and finishing operations will be used for the manufacture of this product mix.
	83.02 Base metal fittings and mountings for a kind suitable for furniture, doors, staircases, windows, blinks, coachwork, saddlery, trunks caskets and the like(including automatic door closers), base metal hat-racks, hat pegs, brackets and the like.	

	NABALALC Descriptions	Rational for complex
	83.09 Clasps, frames with clasps for handbags and the like, buckle-clasps, hooks, eyes, eyelets, and the like, of base metal, of a kind commonly used for clothing, travel goods, handbags, or other textile or leather goods, tubulars rivets of base metal.	
6.	84.15 Refrigerators and refrigerating equipment(electrical and others) a. Refrigerators and refrigerating equipment other than domestic refrigerators b. Domestic refrigerators, non- electrical. c. Domestic refrigerators, electrical 73.36 Stoves, ranges, cookers, grates, fires and other space heaters, gas rings, plate warmers with burners, wash boilers with grates or other heating elements, and similar equipment, of a kind used for domestic purposes, not electrically operated, and parts thereof, of iron or steel. 85.12 Electric instantaneous or storage water heaters and inmersion heaters. 84.40 b. Domestic washing machines	Manufacture of the so-called "with line" requires basic sheets metal operations, enameling, apinting, assembly, etc. Metal office furniture might also be added to this product mix.
7.	84.51 Typewriters, other than typewriters incorporating calculating mechanisms: check-writing machines	Although the manufacture of this product mix requires similar technology the high capital investment, particularly in tooling would have to be justified.

	NABALALC Description	Rational for Complex
7.	84.51 Typewriters, other than typewriters incorporating calculating mechanisms; check-writing machines. 84.52 Calculating machines, accounting machines, cash registers portage machines, ticket-issuing machines and similar machines incorporating a, calculating device. 84.53 Statistical machines kind operated in conjuction with punched cards (for example sorting, calculating and tabulation machines), accounting machines operated in conjuction with similar punched cards, auxiliary machines for use with such machines (i.e. punching and checking machines) 84.54 Other office machines (i.e. hectograph or stencil duplicating machines, addressing machines, coin-sorting machines, coin-counting and wrapping machines, pencil - sharpening machines, perforating and stapling machines.	Although the manufacture of this product mix requires similar technology the high capital investment, particularly in tooling would have to be justified.
8.	90.14 Surveying (including photogrammetrical surveying hydrographic, navigational meteorological, hydrological and geophysical instruments compresses rangefinders.	These categories can logically be grouped together, both requiring precision machining and assembly capabilities

NABALALC Description	Rational for complex
90.16 Drawing, marking-out and mathematical calculating instruments, drafting machines, pantographs, alide rules, disc calculators and the like, measuring or checking instruments, appliances and machines not falling within any other heading of this chapter. (i.e., micrometers, callipers, gauges, measuring rods, balancing machines), profile projectors.	
90.05 Binoculars	
90.12 Microscopes	
90.26 Watt-hour meters	
90.13 Laboratory optical equipment.	
90.27 Revolution counters, production counters, taximeters, milecmeters, pedometers and the like, speed indicators, (including, magnetic speed indicators) and tachometers (other than articles falling within the heading #90.14).	
91.02 Clocks with watch movements (excluding clocks of heading 91.03)	
91.03 Instrument panel clocks and clocks of a similar type, for vehicles, aircraft or vessels.	
91.04 Other clocks	
91.05 Time of day recording apparatus, apparatus with clock or watch movement (including secondary movement) or with synchronous motor, for measuring , recording or otherwise indicating intervals of time.	

	NABALALC Description	Rational for complex
	91.06 Time switches with clock or watch movement (including secondary movement) or with synchronous motor.	
	91.07 Watch movements (including stop watch movements) assembled	
	91.08 Clock movements, assembled	
	91.11 Other clock and watch parts.	
10	85.05 Tools for working in the hand with self-contained electric motor. 84.49 Tools for working in the hand, pneumatic or with self contained non-electric motor.	This is one of the most attractive groups and would rank high in point awards. Recommend consideration for prefeasibility.

C. NABALALC CATEGORY 84.59 B - MACHINERY N.E.C.

This category consists of a large number of products that could not easily be placed in other groups. It is best defined by its equivalent SITC heading 719.8. When a rigorous list (such as NABALALC) is prepared, in spite of all efforts to categorize everything, a category remains entitled Miscellaneous; such is 84.59 B. It came to our attention because the value of Andean imports of products in this category are about US$ 50.0 million. Closer investigation indicated, however, that this market is shared by a large number of different kinds of industrial machinery; a list follows:

84.59	201-299	Presses for plastics
	302-303	Asphalt making and depositing machinery
	401	Wood treatment machinery
	501	Cigarette filter machinery
	599	Other machinery for the fabrics industry
	601	Machinery to make wire slings and cables
	701	Oil soap and lubricant machinery
	702	Machinery for making electrical wire
	703	Large freezer paant machinery
	799	Misc. machinery not even classified in this sector
	901	Friction dampers
	902	Zipper manufacturing machines

Without conducting individual and specific market surveys for each product in the five Andean countries, it is impossible to determine with any reasonable accuracy how the US$ 50.0 million is distributed. We do note, though, in reviewing the content of this sector a number of industries which could be combined with NABALALC four-digit sectors identified as opportunities or with the complexes suggested. These are as follows:

NABALALC CODE	DESCRIPTION	REMARKS
84.59.401	Wood treatment equipment	Can logically be combined with the unfired pressure vessels (NABALALC 84.17) if they in turn are combined with the rolling and welding equipment in the mineral and related products Complex II.
84.59.703	Large freezer machinery	The compressor for this category could be made in the engine plant or centralized pump plants if they are reciprocating or rotary, respectively.
84.59.201	Plastic presses	These could possibly be made in conjunction with the machine tool Complex III.

VI. INFRASTRUCTURE

VI. INFRASTRUCTURE

In general, metal product manufacturing does not put heavy demands on the infrastructure. Each of the plants for the opportunities foreseen will employ only up to 100 people, will require perhaps 2,000 square meters of building space, and will use relatively little in terms of utilities. Insignificant quantities of cooling water and small quantities of electrical power will be required. A typical plant will use 300-500 amperes at 440-480 volts, and should have either 220-440 volt or 277/480 volt, three or four wire supply. Drainage, sewage and pollution effluent will also be minor but should be planned carefully in each instance.

Although not many people will be employed in the metal-working industries, some of the skills are vitally important to the viability of the industry. In every plant, machine operators will have to be trained. If these operators have already been trained to use lathes, milling machines, grinders and the like the job of start-up will be easier for plant management.

Two primary skills (tool and die making and machinery set-up also must be available in order for the metal product industry to flourish.

On the technical/professional level, in addition to management capability there must be plant personnel who understant the use

and optimum application of the various machine tools so that the operations are conducted in an efficient manner. In addition, several of the promising opportunities require a resident metallurgist with knowledge, both theoretical and practical, of in-coming materials and the necessary and possible corrective action through heat and surface treating which can be taken in the plant because of the long lead time in obtaining materials. In other words he must be capable of improvising.

These plants are of such a size that it would be an economic luxury to employ specialists. Combined skills, e.g. a metallurgist who knows machining, a foreman who knows metallurgy, and a metallurgist who knows quality control etc., are most desirable.

Transportation needs are probably met today. The majority of the products coming out of metal-mechanical plants will be of such a quantity and weight and cube as to be shipped by truck within Bolivia and by truck and then air to leave the country. It would be desirable to receive raw materials in railroad car lots. For both of these reasons the metalworking product opportunities will probably be located in major industrial centers. If not, transportation links will have to be provided.

VII. INFLUENCE OF AN EMERGING AUTOMOTIVE INDUSTRY ON BOLIVIAN METALWORKING INDUSTRIES

VII. INFLUENCE OF AN EMERGING AUTOMOTIVE INDUSTRY ON BOLIVIAN METALWORKING INDUSTRIES

Although the engines that were included in the tractor complex are not aimed at the automotive industry, only moderate investment and operational adaptation will be required to provide automotive engines. If Bolivia obtains a reservation for this product under the Andean pact, Bolivia would be in as good a position to provide engines as any of the other countries except the country in which vehicle assembly is to take place. Engine manufacture would be economically more competitive than, for instance, vending machines. For vending machines, sheet metal must be shipped into Bolivia, converted into a different shape and then shipped out of Bolivia, the latter in an uneconomically low weight to cube ratio. In the case of engines, however, the castings would come from existing foundry industry, the castings being machined, assembled, and tested and then shipped to the assembly country.

Engines, however, do not represent the highest value to weight of automotive components; starters, generators and ignition equipment approach the highest value to weight and, therefore, are the best items to ship across Andean physical barriers. An examination of opportunities for these products is included in the electrical and electronic goods industry survey. Should it be decided that Bolivia's contribution to the automotive industry would lie in gearing and power transmission, the market for a Bolivian plant

operating in the power transmission sector (NABALALC 84.63) would be greatly augmented and strengthened. Similarly justification for the bearing industry (NABALALC 84.62) and its profitability would also be increased greatly if Bolivia obtained a guarantee for the Andean market. If Bolivia's contribution to the Andean automotive industry were limited to gauges and instruments these could be joined with the geodesic and other laboratory instruments combined plant, and readily shipped to any of the Andean countries because of their extremely high value to weight. Such gauges would be ampere meters, pressure switches, relays and the like for indication of gas level, over-and under-charge oil pressure, position of direction signals and the like.

Thus, almost without regard to the specific task assigned, Bolivia's metal working industry will benefit from supplying virtually any part of automotive manufacturing.

A P P E N D I X A

M E T A L W O R K I N G

M E T A L W O R K I N G

NABALALC	P R O D U C T
73.19.0.01	Steel high pressure conductor, including loops of the types used in Hydroelectric installations.
73.21.0.02	Clamps and other devices specially designed to assemble construction elements.
73.24.0.01	Steel or iron containers for acetylene.
73.26.0.99	The remaining artificial splinters with wire or iron or steel straps.
73.29.0.01	Claims for transmission.
73.31.0.02	Points for file cards.
73.32.0.01	Screw studs.
73.33.0.01	Needles for hand sewing.
73.35.0.03	Plain spiral springs.
74.11	Gauze, cloth, grill netting, fencing, reinforcing fabric and similar materials (including endless bands), of copper wire.
74.11.0.01	Continuous or non-ending cloths for machinery.
74.11.0.99	The remaining.
74.12.0.01	Nettings with a single copper piece, manufactured through cuts on a sheet or plate and next spreaded ("deployee").

NABALALC	P R O D U C T
74.13.0.01	Chains, small chains and components, made of copper.
74.15	Bolts and nuts (Threaded or not), screws, eyebolts and hooks thread rivets, pins, pegs, cotters and similar parts of copper turnery; and copper gaskets (including open and pressure gaskets.)
74.15.0.01	Rivets.
74.15.0.99	The remaining.
74.16	Copper wharfs (springs of copper).
74.16.0.01	Helicoidals.
74.16.0.99	The remaining.
74.17	Non electric heating and baking copper appliances of the domestic types including their spare parts.
74.17.0.01	Appliances.
74.17.8	Spare parts and pieces.
74.17.8.01	Spare parts and pieces.
75.04	Tubes (including their hewing), hollow bars and piping accesories (joints, knees, sleeves, flanges and so on), made out of nickel.
75.04.0.02	Piping accessories.
76.09	Containers, tanks, vats and similar deposits made out of aluminum, for any product, with capacities over 300 liters without mechanic or thermic devices, including those with internal or coloring coatings.

NABALALC	P R O D U C T
76.11	Aluminum containers for compressed or liquid gases.
76.12	Wires, cordage; braids and strands, made of aluminium wire except those insulated articles for electric use.
76.12.0.01	Wires.
76.12.0.99	The remaining.
76.13	Metalic cloths and nettings of aluminum wire.
76.14	Nettings, of a single alumin um piece manufactured through on a sheet or plate and next spreaded ("deployee").
77.03	Manufactures of magnesium.
77.04	Beryllium (glusinium), plain or manufactured.
77.04.0.02	Manufactured.
78.05.0.02	Lead accessories for piping.
79.05	Gutters, roof capping, skylight frames, and other fabricated building components, of zinc.
80.05.0.02	Tin accessories for piping.
81.01.2	Wolfram (tungsten manufactured).
81.01.2.01	Bars, rods and profiles.
81.01.2.03	Small plates, sheets and strips.
81.01.2.99	The remaining.
81.02.2	Molybdenum manufactured.
81.02.2.01	Bars, rods, and profiles.
81.02.2.02	Filaments and wires.
81.01.1.03	Small plates, sheets and strips.

NABALALC	P R O D U C T
81.02.2.99	The remaining.
81.03.2	Tantalum manufactured.
81.03.2.01	Bars, rods and profiles.
81.03.2.02	Filaments and wires.
81.03.2.03	Small plates, sheets and strips.
81.03.2.99	The remaining.
81.04	Other base metals, unwrought or wrought, and articles thereof
81.04.1.03	Manufactures of Thorium and Uranium.
81.04.2.03	Manufactures of bismuth.
81.04.3.03	Manufactures of cobalt.
81.04.3.04	Manufactures of Chromium.
81.04.4.03	Manufactures of manganese.
81.04.4.04	Manufactures of antimony.
81.04.5.07	Manufactures of galium.
81.04.5.08	Manufactures of germanium.
81.04.6.03	Manufactures of hafnium.
81.04.6.04	Manufactures of indium.
81.04.7.03	Manufactures of niobium.
81.04.7.04	Manufactures of rhenium.
81.04.8.02	Gross thallium.
81.04.8.03	Manufactures of titanium.
81.04.8.04	Manufactures of thallium.
82.01.0.03	Hoes.
82.01.0.06	Pruning scissors.

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NABALALC	P R O D U C T
82.02	Handsaw, all kinds of saw blades (including bits and non-toothing blades).
82.02.1	Saw blades.
82.02.1.01	Band saws.
82.02.1.02	Bow band saws.
82.02.1.03	Bitsaws.
82.02.1.04	Buzz saw.
82.02.1.05	Chain saw.
82.02.1.06	Non-toothing saws for stones.
82.02.1.99	The remaining.
82.02.2	Mounting saws.
82.02.2.01	Hand saws.
82.02.2.99	The remaining.
82.02.8	Spare parts and pieces.
82.02.8.01	Archs, turncuckle.
82.02.8.02	Teeths.
82.02.8.99	The remaining.
82.03.0.01	Shears.
82.03.0.02	Wrench.
82.02.0.03	Pliers, tongs and pincers.
82.03.0.05	Socket punch.
82.03.0.06	Pipe cutter, bolt cutter.
82.03.0.07	Pincers for watches, clocks, stamps, collectors, depilation and other similars.
82.03.0.99	The remaining.

NABALALC	P R O D U C T
82.04.0.03	Bench screw.
82.04.0.07	Mounted diamonds for glass work
82.04.0.09.	Screwdrivers.
82.04.0.10	Special tools for watchmakers.
82.04.0.99	The remaining (hand utensils and tools).
82.05.0.02	Drills, drill bits and other similar utensils.
82.05.0.03	Diestock.
82.05.0.04	Bits.
82.05.0.05	Blades.
82.05.0.06	Sounding and drilling utensils (Push brace, drill bits and similars).
82.05.0.07	Tiers.
82.05.0.99	The remaining (Replaceable utensils for machine tools).
82.06	Cutting blades for machines and mechanic devices.
82.06.0.01	For industrial machines.
82.06.0.99	The remaining (Cutting blades for machines and mechanic devices).
82.07.0.01	Plates, rods, points and similar objects for tools, non-mounted made of out metallic carbides (wolfram, vanadium and other materials grouped by sintesing).
82.08	Coffee-mills, mincers, juice-extractors and other mechanical appliances, of a weight not exceeding ten kilogrammes and of a kind used for domestic purposes in the preparation, serving or con-

NABALALC	P R O D U C T
82.08 (Cont.)	ditioning of food or drink.
82.08.0.99	The remaining.
82.09.0.01	Pocket knives.
82.09.0.02	Trimming blades and similar.
82.09.0.03	Knives for butchery and shoemaking and others for similar professional uses.
82.11.1.01	Blades
82.12	Scissors and their blades.
82.12.0.01	Common type scissors.
82.12.0.02	Scissors for tailorshops, barbershops and similar professional uses.
82.12.0.03	Blades.
82.12.0.99	The remaining.
82.13.0.01	Trimming scissors and similars.
82.13.0.02	Shears.
82.13.0.03	Splitters, kn ves and cutters for butchers and kitchen use.
82.13.0.05	Tools for manicure, pedicure and similars.
82.13.0.99	The remaining (cutting articles).
83.01.1	Locks.
83.01.1.01	Locks for vehicles.
83.01.1.02	Locks for safe boxes.
83.02.9	Others (hinges for glasses and the remaining similar metallic articles).

NABALALC	P R O D U C T
83.02.9.01	Hinges for glasses.
83.07.1	Lighting fixtures.
83.07.1.01	Oil, kerosene or pressure flashlighters.
83.08.1.01	Flexible tubes made out of common metals.
84.02.1.01	Auxiliary equipment for steam generators.
84.02.8	Spare parts and pieces for steam generators auxiliary equipment.
84.03.1.01	Gazogenes and generators.
84.03.8	Spare parts and pieces for gazogenes and generators.
84.04	Locomobiles and semifixed steam machines.
84.04.8.01	Spare parts and pieces.
84.05.1.01	Steam piston machines.
84.05.2.01	Steam turbines.
84.05.8	Spare parts and pieces for steam machines, etc.
84.06	Explotion or internal combustion piston engines.
84.06.1.01	For aviation.
84.06.3	For boats.
84.06.3.01	For outside gunwall.
84.06.3.99	The remaining.
84.06.4	For motorcycles, bycicles and similars.
84.06.4.01	For motorcycles.
84.06.4.99	The remaining.
84.06.5	Stationary.
84.06.5.01	Diesel and semi-diesel.
84.06.5.99	The remaining.

NABALALC	P R O D U C T
84.06.8	Spare parts and pieces (except motocars).
84.06.8.01	For airplanes engines.
84.06.8.02	Cylinder liners.
84.06.8.03	Carburators.
84.06.8.04	Pistons.
84.06.8.05	Piston segments.
84.06.8.06	Valves.
84.06.8.99	The cleaning.
84.06.9	Other explotion engines.
84.07.1.01	Turbines.
84.07.8	Spare parts and pieces.
84.07.9	Other motor hydraulic machines.
84.07.9.01	Hydraulic wheels.
84.07.9.99	The remaining.
84.08	Other motor engines and machines.
84.08.2.01	Gas turbines excluding those for aviation use.
84.08.8	Spare parts and pieces.
84.08.8.01	For airplane engines.
84.08.8.02	For gas turbines.
84.08.8.99	The remaining.
84.08.9	Other engines and motion machines.
84.08.9.01	Air (or gas) pressured.
84.08.9.02	Wind driven.
84.08.9.03	Hydraulic.
84.08.9.99	The remaining.

NABALALC	P R O D U C T
84.09.0.01	Tampers with mechanic propulsion.
84.10.2	Volumetric rotary pumps.
84.10.2.01	Lobe-rotary pumps.
84.10.2.99	The remaining pumps.
84.10.4	Injection pumps.
84.10.4.01	For explotion or internal combustion engines (with water, oil, gasoline and similars).
84.10.4.99	The remaining.
84.10.5.01	Liquid elevators.
84.10.8.01	Spare parts and pieces for pumps, engine pumps and so on.
84.10.9	Other pumps and engine pumps.
84.10.9.01	For fuel injection.
84.10.9.99	The remaining.
84.11	Pumps, engine pumps and turbo pumps with air or vaccuum compressors, motor driven compressors and turbo-compressors with air or other gases; piston generators; ventilators and similars.
84.11.1	Compressor pumps.
84.11.1.01	Hand or pedal pumps.
84.11.1.02	Air compressors.
84.11.1.99	The remaining.
84.11.8.01	Spare parts and pieces for pumps, engine pumps, etc.
84.11.9	Other pumps and engine pumps, etc.

NABALALC	P R O D U C T
84.11.9.01	Free piston generators.
84.11.9.99	The remaining.
84.13.1	Burners.
84.13.1.99	The remaining.
84.14	Industrial or laboratory furnaces, except electric furnaces in the position 85.11.
84.14.1	Furnaces.
84.14.1.01	Industrial.
84.14.1.02	For laboratories.
84.14.8	Spare parts and pieces.
84.14.8.01	For industrial furnaces.
84.14.8.02	For laboratory furnaces.
84.15	Refrigerators and refrigerating equipment (electrical and other).
84.15.1	For domestic use.
84.15.1.02	Non electric.
84.15.9	Other derives and machines for cold.
84.15.9.99	The remaining.
84.16.1	Calandrias and laminators.
84.16.1.01	For paper cardboard.
84.16.1.99	The remaining.
84.16.8	Spare parts and pieces.
84.16.8.01	Cylinders.
84.16.8.99	The remaining.

NABALALC	P R O D U C T
84.17.1	Heating and cooling derives and appliances.
84.17.1.01	Plate temperature switches.
84.17.1.99	The remaining heating and cooling derives.
84.17.2.01	For destillation and rectification.
84.17.3	For evaporating and drying.
84.17.3.01	For liofilixation and criodesiccation.
84.17.4	For torrefaction.
84.17.4.01	For torrefaction.
84.17.5	For sterilization.
84.17.5.01	Medical and surgical.
84.17.5.99	The remaining.
84.17.8	Spare parts and pieces.
84.17.8.01	For non-electric domestic water heater.
84.17.8.99	The remaining.
84.17.9	Other appliances and derives for baking, pasteurization, drying, evaporization, etc.
84.17.9.91	To liquefy gases.
84.17.9.99	The remaining.
84.18.1	Centrifugal machines and derives.
84.18.1.01	Separators.
84.18.1.02	Centrifuges for laboratory.
84.18.1.03	Centrifuges for sugar factories.
84.18.1.99	The remaining (centrifuges).
84.18.8	Spare parts and pieces.

NABALALC	P R O D U C T
84.18.8.01	For centrifugal machines and derives.
84.18.8.02	For filters and purifiers.
84.18.8.99	The remaining.
84.19.1	Machines and appliances.
84.19.1.01	To wrap cigarettes in cellophane.
84.19.1.02	To fill, seal and label bottles.
84.19.1.99	The remaining.
84.19.8.01	Spare parts and pieces.
84.20	Weighing machinery (excluding balances of a sensitivity of five centigrammes or better), including weight-operated counting and checking machines; weighing machine weights of all kinds.
84.20.8	Spare parts and pieces.
84.20.8.01	Weights or counter weights.
84.20.8.99	The remaining.
84.21.1	Pulverizers and powder-sprayers.
84.21.1.02	Exciter including autopropulsor.
84.21.2	Derives to fight fires.
84.21.2.01	Fire extinguisher.
84.21.2.99	The remaining.
84.21.3	Aerographic guns and similar derives.
84.21.3.01	Guns.
84.21.3.99	The remaining.
84.21.4	Machines and derives for dandblast, steamjet and similar uses.

NABALALC	P R O D U C T
84.21.4.01	For sandblast, steam jet and similars.
84.22.1	Tackles, lathes and winches.
84.22.1.01	Tackes and hand or electric sheaves.
84.22.1.02	Winches or electric hoists.
84.22.1.99	The remaining.
84.22.2	Jacks.
84.22.2.01	Mechanic.
84.22.2.02	Hydraulic.
84.22.3	Elevators and conveyors.
84.22.3.01	Elevators and hoisting engines.
84.22.3.03	Derricks.
84.22.3.04	Auto-propulsor cranes.
84.22.3.99	The remaining.
84.22.8	Spare parts and pieces.
84.22.8.01	Rollers.
84.22.8.02	Security derives (parachutes).
84.22.8.99	The remaining.
84.22.9	Other elevating machines and derives.
84.22.9.01	Mechanic escalators.
84.22.9.99	The remaining.
84.23	Stationary movable machines and derives for extraction, stone moving, soil drilling or excavation (power shovels, coal cutters, excavators, dragshovels, bulldozers, scrapers, etc; hammers,

NABALALC	P R O D U C T
84.23 (Cont.)	trestle bents; snowplows different to the snowplows trucks described in position 87.03).
84.23.1	Machines and derives for extraction, starting and drilling.
84.23.1.01	For boring and drilling.
84.23.1.02	Coal or rock cutters.
84.23.1.99	The remaining.
84.23.2	Machines for excavation, grading, leveling and similar uses.
84.23.2.01	Graders or rollers.
84.23.2.02	Bulldozers.
84.23.2.03	Scrapers.
84.23.2.04	Graders.
84.23.2.99	The remaining.
84.23.3	Tampers.
84.23.3.01	Tamping rollers without propulsion.
84.23.3.99	The remaining.
84.23.8	Spare parts and pieces.
84.23.8.01	Rollers for graders and dragshovel ("bulldozers"), ("scrapers").
84.23.8.02	Points for power shovel.
84.23.8.99	The remaining.
84.23.9.01	Impact lammer.
84.23.9.99	The remaining.

NABALALC	P R O D U C T
84.24.1.01	Displows including shovel plows.
84.24.1.02	Point or tooth plows.
84.24.1.09	The remaining plows.
84.24.1.11	Rasonas, disk or shovel horrow.
84.24.1.19	The remaining drags.
84.24.1.21	Rooters.
84.24.1.99	The remaining machines and appliances for soil preparation and work.
84.24.2	For farming.
84.24.2.01	Fertilizer spreaders or distributors.
84.24.2.02	Seeding and combined fertilizers seeding machines.
84.24.2.03	Seeding machines and transplanter.
84.24.2.04	Cultivators.
84.24.2.99	The remaining machines and appliances for farming.
84.25.1	Machinery for forrage and strow collection and packing; gross cutters.
84.25.1.01	Cotton forrage.
84.25.1.02	Corn forrage.
84.25.1.03	Packing machines.
84.25.1.04	Grass cutters.
84.25.1.05	Brush scythes or brush cutters.
84.25.1.99	The remaining machinery for forrage and strow collection and packing.
84.25.3	Machinery and appliances for the classification of eggs, fruits and other agricultural products.

NABALALC	P R O D U C T
84.25.3.01	Machinery and derives for egg classification.
84.25.3.99	The remaining machinery for the classification of eggs, fruits, and other agricultural products.
84.25.4	Combined machinery.
84.25.4.01	For cotton.
84.25.8	Spare parts and pieces.
84.26.1	Milking machines and other machinery and derives for milk treatment.
84.26.1.01	Milking machinery.
84.26.1.02	Homogenizing machinery.
84.26.1.03	Machinery to irradiate milk.
84.26.1.99	The remaining milking machines and other machinery and derives for milk treatment.
84.26.2	Machinery and derives for milk transformation into dairy products.
84.26.2.01	Butter containers.
84.26.2.02	Kneaders.
84.26.2.03	Butter kneaders.
84.26.2.04	Molders or molding machines.
84.26.2.11	Machinery to homogenize.
84.26.2.12	Presses or vises.
84.26.2.13	Molding machines.
84.26.2.99	The remaining.
84.26.8	Spare parts and pieces.

NABALALC	P R O D U C T
84.28.1	Machinery and derives for farming and horticulture.
84.28.1.01	Fertilizer crushers and mixers.
84.28.1.02	Mechanic shears.
84.28.1.03	Cereal crushers.
84.28.1.99	The remaining machines and derives for farming and horticulture.
84.28.2.03	Automatic devices to pluck.
84.28.3.01	Presses and vises for honey.
84.28.3.99	The remaining.
84.28.8	Spare parts and pieces.
84.29	Machinery for cereal and dry vegetable milling; and treatment, except rural type machinery.
84.29.1.01	To mix, to clean, to screen and to prepare grains.
84.29.2.01	To crush or grind.
84.29.3.01	To classify and to separate from the flour the remaining products of the milling.
84.29.8	Spare parts and pieces.
84.29.9	Others.
84.29.9.01	Complete plants.
84.29.9.99	The remaining.
84.30.1.01	For the bakery and pastry, industry with nutritive and confectionery pastes.
84.30.6.01	For breweries.
84.30.2.01	For cacao and chocolate manufacturing.

NABALALC	P R O D U C T
84.30.8	Spare parts and pieces.
84.31	Machinery and appliances for cellulosic pulp manufacturing (paper pulp) and final processing of paper and cardboard.
84.31.1.01	For cellulosic pulp manufacturing.
84.31.2	For manufacturing and final processing of paper and cardboard.
84.31.2.01	For equipment.
84.31.2.99	The remaining.
84.31.8	Spare parts and pieces.
84.32	Book-binding machinery, including book-sewing machines.
84.32.1	Machinery and derives.
84.32.1.01	To clamp and to staple.
84.32.1.99	The remaining.
84.33.1	Machinery and derives.
84.33.1.01	Shears and cutters.
84.33.1.99	The remaining.
84.33.8	Spare parts and pieces.
84.34.1.01	Machinery to melt and form printing types, to prepare stereotype plates and similars.
84.34.2	Types, plates and other printing elements.
84.34.2.01	Types.
84.34.2.02	Lithographic stones.

NABALALC	P R O D U C T
84.34.2.03	Cylinders.
84.34.2.99	The remaining.
84.34.8	Spare parts and pieces.
84.35.1	Printing equipment.
84.35.1.01	Made of platinium, for ink and cylindrical.
84.35.1.99	The remaining.
84.35.1.11	Offset.
84.35.1.99	The remaining.
84.35.2	Auxiliary printing machines and derives.
84.35.2.01	Automatic marginers.
84.35.2.99	The remaining.
84.35.8	Spare parts and pieces.
84.36	Machinery and derives for spinning (extrusion of synthetic or artificial textile materials); machinery and derives for the preparation of textile materials.
84.36.1.01	For spinning through extrusion of synthetic or artificial textile materials.
84.36.2.01	Cotton desmc nters.
84.36.2.99	The remaining.
84.36.3	For spinning, twisting and winding.
84.36.3.01	Winding machines.
84.36.3.99	The remaining.
84.37	Looms and wearers to make cloth, tulle, lace,

NABALALC	P R O D U C T
84.37 (cont.)	embroidery, passementerie and mesh, preparatory machinery and derives to make cloth and weaving.
84.37.1.01	Machinery and derives for the preparation of spimmings.
84.37.2.99	The remaining.
84.37.3	Looms for cloth.
84.37.3.01	Automatic.
84.37.3.99	The remaining.
84.37.9	Others.
84.37.9.01	Machines to mend meshes.
84.37.9.99	The remaining.
84.38.1.01	Machines and devices.
84.38.8	Spare parts, pieces and accesories.
84.39	Machines and devices for filters manufacturing and finishing, by pieces or in a determined shape, including machines and models for hat shops or factories.
84.40.1.03	For dry cleaning.
84.40.1.99	The remaining.
84.40.2.01	For bleaching and staining.
84.40.3.01	For sizing and finishing.
84.40.4.01	For cloth printing.
84.40.8	Spare parts and pieces.
84.41.1.99	The remaining.
84.41.2	Machine head.

NABALALC	P R O D U C T
84.42	Machines and devices for leather and skin preparation and work, for shoe and other leather or skin manufactures excluding sewing machines described in position 84.41.
84.42.01	For shoe and other leather and skin manufactures.
84.42.8	Spare parts and pieces.
84.45.1	Sharpeners.
84.45.1.02	For tools.
84.45.1.01	For saw blades.
84.45.1.99	The remaining.
84.45.2	Planers and cleaning machines.
84.45.2.01	Planers and rolling mills.
84.45.2.02	Hydraulic and mechanic shaper.
84.45.2.99	The remaining.
84.45.3	Milling machines.
84.45.3.01	Copying machines.
84.45.3.02	Universal copying machines.
84.45.3.99	The remaining.
84.45.4	Presses and impact hammer.
84.45.4.01	Mechanic impact hammer.
84.45.4.02	Pneumatic impact hammer.
84.45.4.03	Excentric presses.
84.45.4.04	Hydraulic presses.
84.45.4.99	The remaining.

NABALALC	P R O D U C T
84.45.5	Drillers, perforators and similars.
84.45.5.01	Radial perforators.
84.45.5.02	Bench drillers.
84.45.5.03	Column drillers.
84.45.5.99	The remaining.
84.45.6	Lathes.
84.45.6.01	Turn lathes.
84.45.6.02	Universal parallels.
84.45.6.99	The remaining.
84.45.7	Saws.
84.45.7.01	Band saws.
84.45.7.02	Circulars or buzz saws.
84.45.7.99	The remaining.
84.45.9	Others.
84.45.9.01	Shears.
84.45.9.02	Electro-erosion machines.
84.45.9.03	Mechanic benders.
84.45.9.99	The remaining.
84.46ps	Machine tools for rock or stone work, ceramic products, concrete, fibrocement and other similar mineral materials; and for cold glass work different to those in position 84.49.
84.46.0.01	For ceramic industry.
84.47	Machine tools, different to those in position 84.49, for wood, bone-coak, ebonite, artificial plastic materials and other similar hard materials.

NABALALC	P R O D U C T
84.47.1	Planers and sanders.
84.47.1.01	Jack planers.
84.47.1.02	Planers or brushes with three or four sides.
84.47.1.03	Matching planers.
84.47.1.04	Sanders.
84.47.1.99	The remaining.
84.47.2	Milling machines.
84.47.2.01	Copying machines.
84.47.2.02	Automatic copying machines.
84.47.2.99	The remaining.
84.47.3	Presses or vises.
84.47.3.01	Hydraulic.
84.47.3.02	Excentric.
84.47.3.03	Plywood.
84.47.3.99	The remaining.
84.47.4	Drillers, perforators and similars.
84.47.4.01	Drillers.
84.47.4.99	The remaining.
84.47.5	Lathes or hoists.
84.47.5.01	Automatic tubulars.
84.47.5.99	The remaining.
84.47.6	Saws.
84.47.6.01	Continuous band-saws.
84.47.6.02	Circulars.
84.47.6.99	The remaining.

NABALALC	P R O D U C T
84.47.9	Others.
84.47.9.01	Assembling machines.
84.47.9.02	Vertical-shaft machine for making wood moldings or shapers.
84.47.9.99	The remaining.
84.48	Pieces and accesories identificable exclusively for the tools described in positions 84.45 through 84.47.
84.48.0.01	For machine tools in position 84.45.
84.48.0.02	For machine tools in position 84.46.
84.48.0.03	For machine tools in position 84.47.
84.48.0.99	The remaining.
84.49	Machines and tools, pneumatic tools with manual engine, non-electric.
84.49.1	Pneumatics.
84.49.1.01	To place and remove screws, bolts and nuts.
84.49.1.99	The remaining.
84.49.8	Spare parts and pieces.
84.49.9.01	With attached engine.
34.50	Gas powered machines and appliances for cutting, welding and superficial tempering.
84.50.1.01	Machines and devices.
84.50.8	Spare parts and pieces.
84.51.2.01	Machines to verify checks.
84.52.1.01	Mechanic (manual).

NABALALC	P R O D U C T
84.52.1.03	Electronic.
84.52.1.99	The remaining.
84.52.2	Accounting machines.
84.52.2.01	Mechanic (manual).
84.52.2.02	Electric.
84.52.2.03	Electronic.
84.52.3.01	Mechanic (manual).
84.52.3.02	Electric
84.52.9	Others.
84.52.9.01	For postage.
84.52.9.99	The remaining.
84.53	Statistical machines and similars for punch-cards.
84.53.0.01	Statistical machines and similars for punch-cards. (key punchers, verifiers, classifiers, tabulators and multipliers, etc.)
84.54	Other office machine and equipment, copying machines (hectographic and for plates), printing machines to address, classifiers, pencil sharpeners, punches, staplers, etc.
84.54.0.01	Hectographic copying machines.
84.54.0.02	Mimeographs
84.54.0.03	Address printing machines.
84.54.0.04	Machines to classify, count and wrap coins.
84.54.0.99	The remaining.

NABALALC	P R O D U C T
84.56.1	For extractive industries.
84.56.2.01	To group and shape.
84.56.8.99	The remaining.
84.57	Machinery and devices for heated glass manufacturing and work assembly machinery for electric and electronic lamps, tubes and valves and similars.
84.57.1.01	Machines and appliances.
84.57.8	Spare parts and pieces.
84.58	Automatic selling devices with their operation not subject to chance or skill, such as automatic dispensers of cigarettes, candies, stamps, etc.
84.59	Machines mechanic devices and appliances not mentioned or included in other positions of this chapter.
84.59.1.01	Nuclear reactors.
84.59.2	Machinery and devices for the manufacture of artificial plastic materials from rubber and similar materials.
84.59.3	Machinery and devices for public works, construction and similar works.
84.59.3.01	Power drag brooms.
84.59.3.02	Spreaders.
84.59.3.03	Asphalt plants.
84.59.4.01	Machinery and devices for lumber treatment and similar materials.

NABALALC	P R O D U C T
84.59.5	Machinery and devices for tobacco industry.
84.59.5.01	For the application of filter cigarettes.
84.59.99	The remaining.
84.59.6.01	Manufacturing machinery for cords and wires.
84.59.7.01	For oils, soaps and nutritive fats industry.
84.59.7.02	For the manufacturing of electric wires.
84.59.7.03	Complete refrigerated slaughter house.
84.59.7.99	The remaining.
84.59.8	Spare parts and pieces.
84.59.9	Other machines and devices.
84.59.9.01	Friction shock absorber.
84.59.9.02	For manufacturing zip-fasteners.
84.59.9.99	Other.
84.61.9.01	Christmas trees.
84.62	All kinds of bearings (ball, needle, or roller bearings).
84.63.1.01	Transmission shafts, crankshafts and cranks.
84.63.1.03	Variable speed gears.
84.63.1.99	Other.
84.64	Metal, plastic joints, sets or assortments of joints, dissimilar in composition, for machines vehicles and piping, packaged pouches, envelopes or analogous containers.
84.65	Spare parts and pieces for machinery, mechanic devices and fixtures not mentioned nor included

NABALALC	P R O D U C T
84.65 (cont.)	in other positions of this chapter, without electric connections, insulations or any other electrical characteristic.
85.01	Generators, engines and rotary converters, transformers and rotary converters, transformers and static converters, (rectifiers, etc.), reactance and autoinduction bobbins.
85.01.1	Generators (dynamos, alternators).
85.01.1.01	Up to 300 KVA or KW.
85.01.1.02	From more than 300 to 1000 KVA or KW.
85.01.1.03	From more than 1000 to 10.000 KVA or KW.
85.01.1.04	From more than 10.000 to 100.000 KVA or KW.
85.01.1.05	Over 100.000 KVA or KW.
85.01.1.07	Generator groups from more than 300 to 1000 KVA or KW.
85.01.1.08	Generator group from more than 1000 to 10.000 KVA or KW.
85.01.1.09	Generator groups over 10.000 KVA or KW.
85.01.2	Rotative motors and converters.
85.01.2.02	Over 1 to 10 HP.
85.01.2.03	Over 10 to 100 HP.
85.01.2.04	Over 100 HP.
85.01.2.13	Over 10 to 100 HP.
85.01.2.14	Over 100 HP.
85.01.2.21	Converters.

NABALALC	P R O D U C T
85.01.2.99	The remaining.
85.01.3	Static converters.
85.01.3.01	Mercuric steam rectifiers.
85.01.3.02	Metallic rectifiers.
85.01.3.04	Electrolytic rectifiers.
85.01.3.05	Vibrating plates rectifiers.
85.01.3.99	The remaining.
85.01.4.05	From over 10.000 to 100.000 KVA.
85.01.4.06	Over 100.000 KVA.
85.01.5.01	Autoinduction and reactance bobbins.
85.01.8	Spare parts and pieces.
85.02	Electromagnets, permanent magnets, magnetized or not, mandrel plates and other magnetic and electromagnetic devices for fastening, coupling, slinging, velocity shifts, electromagnetic brakes, electromagnetic heads for elevators.
85.05	Electromagnetic tools and machine tools (included hand operated engines).
85.05.0.01	Electromechanic tools and machine tools (including engine) for manual use.
85.06.8	Spare parts and pieces.
85.08.0.01	Magnets.
85.08.0.04	Hot spark plugs.
85.08.0.05	Distributors.

NABALALC	P R O D U C T
85.08.0.06	Starters.
85.08.0.07	Dynamos (generators).
85.08.0.99	The remaining.
85.10.1.01	Security lamps for miners.
85.10.1.99	The remaining.
85.10.8	Spare parts and pieces.
85.11.1.01	For laboratories.
85.11.2.99	The remaining.
85.11.8	Spare parts and pieces.
85.12.1.05	Showers.
85.12.8	Spare parts and pieces.
85.12.9.01	Industrial electric irons.
85.16.1.99	The remaining.
85.17	Electric appliances for acoustic and visual signaling, bells, sonories (sonerías), alarms, detecting screens, detecting devices against forage and fire, etc.)
85.17.1	Devices.
85.17.1.01	Devices.
85.17.8.01	Spare parts and pieces.
85.19.1	Relays.
85.19.1.01	Thermic.
85.19.1.02	For starting.
85.19.1.99	The remaining.

NABALALC	P R O D U C T
85.19.3	Non heating resistances, potentiometer and rheostats.
85.19.3.02	Electrolytic for engines.
85.19.3.99	The remaining.
85.19.8	Spare parts and pieces.
85.20.1	Lamps (incandescent tubes and lamps).
85.20.1.01	For Christmas trees.
85.20.1.02	For flashlighters.
85.20.3.01	Lamps and tubes for ultraviolet or infrared rays.
85.22.1	Machines and devices.
85.22.1.99	The remaining.
85.22.8	Spare parts and pieces.
85.24.0.01	Electrodes.
85.24.0.02	Brushes.
85.24.0.23	Filaments.
85.24.0.99	The remaining.
85.28	Single electric spare parts and pieces for machines and devices not listed in other positions of this chapter.
86.02	Electric locomotives (with accumulators or external power).
86.03	Other rail locomotives.
86.04	Automotors (including automotive streetcars and motor vehicles for inspection and conservation of railways).

NABALALC	P R O D U C T
86.08	Cable containers including cisterns, deposits and tanks used in any type of transportation.
86.09.0.06	Main driving rods for steam locomotives.
86.10	Fixed material for railways, not electric mechanic devices for signals, security control, and command for any type of communication, single spare parts and pieces included.
87.01	Tractors, including hoisting tractors.
87.05.0.01	For vehicles described in position 87.01.
87.06.0.01	For vehicles described in position 87.01.
87.07	Wheel barrows, maneuverable vehicles, (carriers, tractors, elevators and similars) with any type of engine, and their single spare parts and pieces.
87.09	Motorcycles and velocipedes that included auxiliar engine and with or without side-car. Sidecars for motorcycles and velocipedes presented apart.
88.02	Aerodynes (airplanes, hydroplanes, comets, auto-gyro, helycopters) rotating parachutes.
88.03	Single spare parts and pieces of the devices mentioned in positions 88.01 and 88.02.
88.05	Catapults and similar launching devices, including single spare parts and pieces.
89.03	Light vessels, pump vessels, dredges of all kinds, pontoons, cranes, and other vessels for accessory

NABALALC	P R O D U C T
89.03 (cont.)	navigation in relation to the principal function of floating dry docks.
89.05	Floating devices such as deposits, boxes, buoys, beacons and similars.
90.06	Astronomic and cosmographic instruments such as telescopes, astronomic lens, meridian and equatorial instruments and their frames excluding radioastronomic devices.
90.07.1	Photographic devices.
90.07.1.01	With fixed focus (box type).
90.07.1.02	For aerial photographs.
90.07.1.03	For medical use.
90.07.1.04	For copying documents.
90.07.1.05	For use in printing shops in the making and preparation of plates.
90.07.1.99	The remaining.
90.08	Cinematographic devices (sound and sight intaking devices such as projectors with or without sound reproduction).
90.09	Devices for fixed projection, photographic enlarging and reducing devices.
90.11	Microscopes, electronic and protonic diffractographic devices.
90.12	Optical microscopes, including devices for microphotography, microcinematography and microprojection.

NABALALC	P R O D U C T
90.12.1	Devices.
90.12.1.01	Monocular microscopes.
90.12.1.02	Devices for microphotography or microcinematography.
90.12.1.03	Devices for microprojection.
90.12.1.99	The remaining.
90.14	Surveying (including photogrammetrical surveying). hydrographic, navigational, meteorological, hydrological and geophysical instruments, compasses, rangefinders.
90.14.1	For geodesy, topography, land surveying, levelling and hydrography.
90.14.1.01	Theodolites.
90.14.1.02	Alidades.
90.14.1.99	The remaining.
90.14.2.01	For photogrametry.
90.14.3.01	For navigation.
90.14.4.01	For metereology, hydrology and geophysics.
90.14.5	Compasses and telemeters.
90.14.5.01	Navigational compasses.
90.14.5.02	Telemeters.
90.14.5.99	The remaining.
90.15	Scales sensitive to weights equal or less than five centigrams, with or without counter weights.
90.16	Devices for drawing, lay-out, and computation

NABALALC	P R O D U C T
90.16 (cont.)	(pantographs, cases for mathematicians, computational rulers and circles), machines, devices and instruments to measure, check and control, not included in other positions of this chapter (balanced planimeters, micrometers, gages, calipers,meters, etc.) profile projectors.
90.16.1.01	Instruments for drawing, lay-out and computation.
90.16.2.01	Machines devices and instruments to measure, check and control.
90.16.8	Spare parts and pieces.
90.17	Devices and instruments for medicine, surgery, odontology and veterinary, including electromedical and ophthalmologic devices.
90.17.1	Electromedical devices.
90.17.1.01	Electrocardiographs.
90.17.1.99	The remaining.
90.17.2	Instruments and devices for odontology
90.17.2.01	Dental equipment with base (stand).
90.17.2.02	Dental drillers.
90.17.2.99	The remaining.
90.17.3	Instruments and devices for veterinary.
90.17.3.01	For castration.
90.17.3.99	The remaining.
90.17.9.01	Hypodermic syringes.

NABALALC	P R O D U C T
90.17.9.02	Sounders.
90.17.9.99	The remaining.
90.18	Devices for mechanic therapy and massages, devices for psicotechnique, ozonotherapy, oxygentheraphy, revival, aerosoltherapy, and all other kinds of breathing devices (including antigas masks).
90.20	X-rays devices, including for radiophotography and devices that use radioactive materials; including X-rays lamp generators, tension generators, control benches, screens, armchairs, tables, and similar supports for treatment and tests.
90.22	Densimeters, aerometers, scales for liquids and similar devices, thermometers, pyrometers, barometers, hydrometers and recording and not recording psicometers, including combinations among them.
90.24	Devices and instruments for gases, liquids and fluids measurement, regulation and control; for automatic temperature control, such as pressure gauges, thermostats, level indicators, dampers, flow meters, heatmeters; excluding the machines and devices of position 90.14.
90.24.1	Pressure gauges.
90.24.1.01	Metallic.
90.24.1.99	The remaining.
90.24.2.01	For stores.

NABALALC	P R O D U C T
90.24.2.02	For heaters.
90.24.2.99	The remaining.
90.24.9.01	Stream gauges.
90.24.9.02	Level indicators or meters.
90.25	Instruments and devices for physic-chemical analysis (such as polarimeters, refractometers, spectrometers, gas and smoke analyzers); instruments and devices for viscosity, porosity, expansion, superficial tension and similars (such as viscosimeters, porometers, dilatometers), calorimetric, photometric and acustic measures (such as photometers including exposimeters and calorimeters) microtomes.
90.25.1	Devices and instruments.
90.25.1.01	Polarimeters.
90.25.1.02	Saccarimeters.
90.25.1.03	Refractometer.
90.25.1.04	Spectometers, spectoscopes and spectographs.
90.25.1.05	Calorimeters.
90.25.1.06	Photometers and spectophotometers.
90.25.1.07	Exposure meters.
90.25.1.99	The remaining.
90.26.3	Gas meters.
90.26.3.01	Hydraulic.
90.26.3.99	The remaining.

NABALALC	P R O D U C T
90.27	Revolution counters, production counters, taximeters, mileometers, pedometers, and the like, speed indicators (including magnetic speed indicators) and tachometers (different to those described in position 90.14) stroboscopes.
90.27.0.01	Velocimeter
90.27.0.99	The remaining.
90.27.0.02	Taximeters.
90.28	Electronic and electric instruments and devices for measuring, verification, control, regulation or analysis.
90.28.1	To measure electric magnitudes.
90.28.2	Instruments and devices described in position 90.14 but electric or electronic.
90.28.3	Machines, instruments and devices like those described in position 90.16 but electric or electronic.
90.28.4	Machines, instruments and devices like those described in position 90.22 but electric or electronic.
90.28.5	Instruments and devices like those described in position 90.23 but electric or electronic.
90.28.6	Instruments and devices like those described in position 90.24 but electric or electronic.
90.28.7	Instruments and devices like those described in position 90.25 but electric or electronic.

NABALALC	P R O D U C T
90.28.8	Instruments and devices like those described in position 90.27 but electric or electronic.
90.28.9	Others.
90.29	Single spare parts and pieces, identifiable accessories exclusively or principally designed for the instruments or devices in position 90.23, 90.24, 90.26, 90.27 or 90.28, that can be used in one or several of the instruments and devices of said positions.
91.01	Pocket watches, wrist watches and similars (including timing devices of the same type).
91.02	Other watches or clocks (including alarm clocks) with small size mechanism (excluding clocks of heading No. 91.03).
91.03	Panel clocks and similars for cars, airplanes, ships and other vehicles.
91.04	The remaining clocks (with non-small scale mechanisms and other similar watchmaking devices).
91.06	Devices with a watchmaking or synchronous layout that allows the operation of a mechanism at determined times (such as timing clocks and commutative clocks).
91.07	Small scale mechanism for clocks and watches.
91.08	Other finished watchmaking mechanisms.

NABALALC	P R O D U C T
91.09	Cases for watches described in position 91.01 and their finished or not finished parts.
91.10	Cases and similars for remaining watches, clocks and watchmaking devices including spare parts.
91.11	Other watchmaking spare parts and devices.
97.01	Children's cars and vehicles (with wheels) such as bicycles, tricycles, skaters, mechanic horses, pedal cars, doll cars and similars.
97.03	The remaining models reduced for game or play, only metallic.
97.06.0.99	The remaining.
97.07	Fish hooks and butterfly catchers, fishline goods for fishing (cinbeles) and hunting glasses.
98.07	Stamps, numerators, small printers, daters, stamp or seal presses and similar devices.

A P P E N D I X B

IMPORTS OF METAL WORKING PRODUCTS

ANDEAN SUBREGION AND ALALC

1964 - 1968

(IN THOUSAND DOLLARS)

NOTES TO APPENDIX B

° All values are in thousands of U.S. dollars.

° Left-hand column headed Bolivia shows published Bolivian import statistics.

° Columns headed Colombia, Chile, Peru, and Total ALALC (LAFTA) contain CUCI ALALC computer import data.

° Columns headed Ecuador FOB and Bolivia FOB were derived from U.S. Department of Commerce Market Share Reports in which values are published on a FOB basis. Values in these columns have been adjusted upward to achieve comparability with CIF values by adding 10% to 30%, depending upon the product.

° Blanks in columns indicate non-availability of data.

IMPORTS OF METAL WORKING PRODUCTS - ANDEAN SUBREGION AND ALALC

1964 - 1968

(In Thousand U.S. Dollars)

NABALALC No.	DESCRIPTION	YEAR	BOLIVIA	COLOMBIA	CHILE	ECUADOR F.O.B.	PERU	TOTAL ALALC WITHOUT BOL-EC	BOLIVIA F.O.B.	COMMENTS
73.10	BARS AND RODS (INCLUDING WIRE ROD) OF IRON OR STEEL HOT-ROLLED FORGED	1964		176	31	81		1481		Existing industry
		1965	653		16	146	33	146		(Ibhasa - See Memo)
		1966		13	25	239		825		Extra capacity available
		1967	1417	27		491	1660	2586		
		1968				237				
73.10	BARS AND RODS, HOLLOW MINING DRILL OF STEEL OR IRON, NOT FOR FINE STEEL	1964		558	645		2116	7997	239	Ditto with 73.01 also
		1965		542	2277		1479	7608	400	possible expansion of
		1966		1675	2043		1153	11152	501	Ibhasa capabilities
		1967		882	341		790	6589	817	
		1968							512	
73.14	IRON OR STEEL WIRE WHETHER OR NOT COATED, BUT NOT INSULATED	1964		1033	373	891	742	6503	145	
		1965	321	1134	334	833	1078	7111	206	
		1966		1321	563	1295	1175	7668	340	Possible grouping with
		1967	407	519	195	1262	863	5797	356	73.25
		1968	592						400	Andean Market possible Local raw material required
73.17	TUBES AND PIPES OF CAST IRON	1964		3	98	77	118	565	25	Although local market
		1965	58	10	52	562	320	871	15	is small, possible minimal
		1966		5	178	739	394	1217	17	2 machines operation using
		1967	383	390	28	300	310	1242	31	scrap as raw material -
		1968	137			158			114	Andean Market not good; low value/weight
73.18	TUBES AND PIPES AND BLANKS THEREOF OF IRON OR STEEL (OTHER THAN OF CAST IRON) SEAMLESS	1964		6004	6483		3398	32472	3550	Bolivian market alone can sup-
		1965		3315	3490		3938	19358	3296	port small pipe welding plant
		1966		4994	3081		3746	22084	1596	(single yoder machines) Side
		1967		12080	300		5651	32616	1753	market not good; low value/weight
		1968							2188	Would look very promising if P.H. could be supplied locally High capital low labor content

IMPORTS OF METAL WORKING PRODUCTS - ANDEAN SUBREGION AND ALALC (Cont.)

1964 - 1968

(In Thousand U.S. Dollars)

NABALALC No.	DESCRIPTION	YEAR	BOLIVIA	COLOMBIA	CHILE	ECUADOR F.O.B.	PERU	TOTAL ALALC WITHOUT BOL-EC	BOLIVIA F.O.B.	COMMENTS
73.18	TUBES AND PIPES OF SOLDERED STEEL	1964		3369	3200	1258	624	21799	3550	Bolivian market alone can support small pipe welding plant, etc.
		1965		1554	2167	1666	1756	10999	3296	
		1966		855	4949	3141	1774	12446	1596	
		1967		419	2062	2610	2549	10473	1753	
		1968			1627				2188	
73.19	HIGH PRESSURE HYDRO-ELECTRIC CONDUITS OF STEEL WHETHER OR NOT REINFORCED	1964							3550	Market too low both Bolivian and Andean. Possibly an adjunct to a tank or prime vessel plant
		1965	160	200			31		3296	
		1966		4			208		1596	
		1967	26	544			317		1753	
		1968	173						2188	
73.27	GAUGE, CLOTH, GRILL NETTING, FENCING OF IRON OR STEEL WIRE	1964		117	152	16	173	751	78	
		1965	156	115	116	74	335	1130	129	
		1966		80	176	30	620	1512	345	Insufficient market
		1967	109	93	177	45	430	1290	418	
		1968	113			41			139	
73.28	EXPANDED METAL OF IRON OR STEEL	1964		3	23	(X)	13	223		
		1965	1	1	21	(X)	102	125		
		1966			30		61	95		Insufficient market
		1967	1		8	(X)	67	65		
		1968	2			1				
73.29	CHAIN AND PARTS THEREOF OF IRON OR STEEL	1964		540	590	55	860	4271	73	
		1965	105	373	659	113	979	4451	111	
		1966		770	775	61	1265	2207	102	Insufficient market
		1967	96	463	347	89	1300	6799	46	
		1968	95			108			70	
73.30	ANCHORS AND GRAPRODS AND PARTS THEREOF OF IRON OR STEEL	1964			22	(X)	180	272		
		1965	1		63	8	16	175		
		1966		4	36	1	43	268		Insufficient market
		1967	0	23	25	6	26	101		
		1968	46			5				

IMPORTS OF METAL WORKING PRODUCTS - ANDEAN SUBREGION AND ALALC (Cont.)

1964 - 1968

(In Thousand U.S. Dollars)

NABALALC No.	DESCRIPTION	YEAR	BOLIVIA	COLOMBIA	CHILE	ECUADOR F.O.B.	PERU	TOTAL ALALC WITHOUT BOL-EC	BOLIVIA F.O.B.	COMMENTS
73.31	NAILS, TACKS, STAPLES HOOK NAILS STUDS, OF IRON OR STEEL	1964		290	180	55	310	1608	64	Existing industry Kalifra
		1965	77	64	220	116	733	1674	55	Enough capacity for
		1966		117	187	140	669	1717	91	Bolivian market
		1967	139	378	127	239	421	2423	86	
		1968	92			162			44	
73.32	BOLTS, NUTS AND RIVETS, SCREWS OF IRON OR STEEL	1964		660	1519	106	1005	5517	30	Possible opportunity for
		1965	266	360	1391	197	1544	6230	131	local and Andean market
		1966		477	1959	214	1896	10446	219	Simple auto and semi
		1967	311	557	2935	231	1602	12327	122	auto mechanism required
		1968	463			222			124	
73.33	NEEDLES FOR HAND SEWING HAND CARPET AND KNITTING NEEDLES OF IRON OR STEEL	1964		103	28	22	173	663	8	
		1965	15	12	38	7	106	654	13	
		1966		99	110	7	63	732	16	Insufficient market
		1967	23	44	49	3	96	637	22	
		1968	22			2			6	
73.20	TUBE AND PIPE FITTINGS OF IRON OR STEEL	1964		955	3467	193	631	2764	163	Possible grouping with
		1965	191	572	1688	334	1207	6448	194	73.18. Both Bolivian and
		1966		875	1765	402	1820	10300	220	Andean Market. Fittings
		1967	251	804	1194	554	1657	10933	233	could have high value to
		1968	376			579			480	weight
73.21	STRUCTURES COMPLETE OR INCOMPLETE AND PARTS OF STRUCTURES OF IRON OR STEEL	1964		2543	5539	51	1747	13738	191	Existing industry (Ibhesa)
		1965	234	788	2370	23	3742	14508	638	User "Camena" for smaller
		1966		609	4432	112	2202	13973	504	angles
		1967	376	2385	1548	606	2351	13205	207	Export not good
		1968	1058			117			993	
73.22	RESERVOIRS, TANKS, VATS AND SIMILAR CONTAINERS OF IRON OR STEEL	1964		4	806	86	150	3855	82	
		1965	171	22	299	118	273	5113	107	
		1966		8	477	77	883	3659	161	Insufficient market
		1967	137	24	969	56	450	5046	104	
		1968	178			84			173	

IMPORTS OF METAL WORKING PRODUCTS - ANDEAN SUBREGION AND ALALC (Cont.)

1964 - 1968

(In Thousand U.S. Dollars)

NABALALC No.	DESCRIPTION	YEAR	BOLIVIA	COLOMBIA	CHILE	ECUADOR F.C.B.	PERU	TOTAL ALALC WITHOUT BOL-EC	BOLIVIA F.O.B.	COMMENTS
73.23	CASKS, DRUMS,	1964		141	63	44	355	4549	5	
	CANS, BOXES OF SHEET	1965	99	22	104	41	154	6292	11	
	OR PLATE IRON OR STEEL	1966		19	124	25	190	16295	12	Insufficient market
	FOR PACKING	1967	8	22	425	44	140	8046	1	
		1968	237			45			17	
73.24	COMPRESSED GAS CYLINDERS	1964		261	230	51	309	1918	2	
	AND SIMILAR PRESSURE	1965	18	163	191	32	151	1531	6	
	CONTAINERS, OF IRON OR	1966		241	346	34	375	2348	44	Insufficient market
	STEEL	1967	108	156	384	27	418	2266	37	
		1968	271			55			24	
73.25	STRANDED WIRE, CABLES,	1964		237	1392	64	1076	3593	81	Possible grouping with
	CORDAGE, RODES OF IRON OR	1965	140	124	1347	88	1179	3147	77	73.14
	STEEL, BUT EXCLUDING	1966		572	1575	118	1330	6446	140	Andean market possible
	INSULATED ELECTRIC CABLES	1967	207	346	2838	92	1239	7077	170	Local raw material required
		1968	327			238			171	
73.26	BARBED WIRE OR STEEL	1964		878	6	102	37	14560	70	
	WIRE; OF KINDS USED FOR	1965	146		7	97	153	10379	260	
	FENCING OF IRON OR STEEL	1966		1907	26	33	104	11000	6	Insufficient market
		1967	81	52	1	66	126	12340	169	
		1968	109			41			32	
73.34	PINS, HAIRPINS AND CURL-	1964		3	1	1	149	187	11	
	ING GRIPS OF IRON OR	1965	21		2	12	194	274	24	
	STEEL	1966			1	20	155	230	22	Insufficient market
		1967	22	1	3	18	153	226	21	
		1968	20			19			17	
73.35	SPRINGS AND LEAVES FOR	1964		120	142	31	93	1247	27	
	SPRINGS OF IRON OR	1965	136	121	214	64	197	2081	78	
	STEEL	1966		116	259	39	211	2992	78	Insufficient market
		1967	141	137	2668	50	244	5502	64	
		1968	114			82			71	

IMPORTS OF METAL WORKING PRODUCTS - ANDEAN SUBREGION AND ALALC (Cont.)

1964 - 1968

(In Thousand U.S. Dollars)

NABALALC No.	DESCRIPTION	YEAR	BOLIVIA	COLOMBIA	CHILE	ECUADOR F.O.B.	PERU	TOTAL ALALC WITHOUT BOL.-EC	BOLIVIA F.O.B.	COMMENTS
73.36	STOVES, COOKERS, GRATES FRIERS AND OTHER SPACE HEATERS OF IRON OR STEEL	1964		68	254	123	1816	2628	33	Bolivian market sufficient
		1965	650	28	192	157	2302	2940	53	for small operation
		1966		15	120	181	2654	3115	78	Probably not good for export
		1967	531	14	322	321	2148	2863	40	Already being manufactured
		1968	882		532				99	Group with other unit white line products Low value/weight
73.37	CENTRAL HEATING, BOILERS AIR HEATERS, UNIT HEATERS AND RADIATORS, NOT ELECTRICALLY OPERATED, OF IRON OR STEEL	1964		3	37			41	15	
		1965	18		45		9	337	26	
		1966		20	68		15	130	19	Insufficient market
		1967	10	3	124		14	176	66	
		1968	3						96	
73.38	ARTICLES USED FOR DOMESTIC PURPOSES, SANITARY WARE FOR INDOOR USE OF IRON OR STEEL	1964		29	80	126	457	845	32	
		1965	430		96	90	271	763	48	Product mix possible
		1966			96	106	555	744	23	
		1967	471		172	92	590	1228	41	
		1968	510			169			48	
73.38	WASHSTANDS, BATHTUBS, BIDETS, AND OTHER SANITARY WARE OF IRON OR STEEL	1964			62		503	703	22	
		1965			42		725	942	59	
		1966			77		675	941	69	
		1967			29		551	775	112	
		1968							123	
73.39	IRON OR STEEL WOOL; POT SCOURERS, GLOVES AND THE LIKE	1964				9	38	49		
		1965	10			10	39	44		
		1966				3	45	71		
		1967	12	1	2	4	55	23		
		1968	7			4				

IMPORTS OF METAL WORKING PRODUCTS - ANDEAN SUBREGION AND ALALC (Cont.)

1964 - 1968

(In Thousand U.S. Dollars)

NABALALC No.	DESCRIPTION	YEAR	BOLIVIA	COLOMBIA	CHILE	ECUADOR F.O.B.	PERU	TOTAL ALALC WITHOUT BOL-EC	BOLIVIA F.O.B.	COMMENTS
74.05	COPPER FOIL OF A THICK-	1964		104	12	1		195		
	NESS NOT EXCEEDING 0.15	1965	4	10	16	X	234	367		
	MILLIMETERS	1966		128	20	X	426	826		Market insufficient
		1967	1	100	12	X	225	567		
		1968	.035			X				
74.07	TUBES AND PIPES OF COP-	1964		397	117	42	190	1004	4	
	PER, HOLLOW BARS OF	1965	19	462	110	68	504	1456	20	
	COPPER	1966		357	219	144	364	1614	57	Market insufficient
		1967	26	743	75	57	58	1802	40	
		1968	34			88			41	
74.08	TUBES AND PIPES FITTINGS	1964		215	48	26	55	469		
	OF COPPER	1965	6	77	74	19	108	500		
		1966		160	254	35	109	799		Market insufficient
		1967	6	64	58	10	172	616		
		1968	4			41				
74.09	RESERVOIRS TANKS, VATS,	1964		0	0	51	4	4	124	
	AND SIMILAR CONTAINERS	1965	X	0	0	23	0	3	107	
	OF COPPER. CAPACITY	1966		2	0	112	7	9	179	Market insufficient
	EXCEEDING 300 LITERS	1967	X	0	0	606	1	1	104	
		1968	4			117			261	
74.10	STRANDED WIRE, CABLES,	1964		51	9	12	7	99	2	
	CORDAGE, ROPES OF COP-	1965	163	52	27	13	38	133	2	
	PER WIRE, BUT EXCLUDING	1966		6	9	3	59	155	15	Market insufficient
	INSULATED ELECTRIC	1967	18	8	15	11	35	219	9	
	CABLES	1968	35			13			4	

IMPORTS OF METAL WORKING PRODUCTS - ANDEAN SUBREGION AND ALALC (Cont.)

1964 - 1968

(In Thousand U.S. Dollars)

NABALALC No.	DESCRIPTION	YEAR	BOLIVIA	COLOMBIA	CHILE	ECUADOR F.O.B.	PERU	TOTAL ALALC WITHOUT BOL-EC	BOLIVIA F.O.B.	COMMENTS
74.11	GAUGE, CLOTH, GRILL NETTING, FENCING OF COPPER WIRE	1964		181	32		34	831		
		1965		193	50	3	22	787		
		1966		347	109	1	39	1227		Market insufficient
		1967	2	198	307	6	61	1290		
		1968	1			7				
74.12	EXPANDED METAL OF COPPER	1964		0	0		0	0		
		1965	X	2	0		0	2		
		1966		4	0		2	6		Market insufficient
		1967	X	2	0		0	2		
		1968								
74.13	CHAIN AND PARTS THEREOF OF COPPER	1964				1	6	6		
		1965				1	9	13		
		1966				X	7	9		Market insufficient
		1967	1	4		1	10	20		
		1968	1							
74.14	NAILS, TACKS, STAPLES HOOK, NAILS OF COPPER OR OF IRON OR STEEL WITH HEADS OF COPPER	1964		31	51		89	197		
		1965	4	21	71	1	12	141		
		1966		0	49	5	14	79		Market insufficient
		1967	4	4	2		13	38		
		1968	.059			1				
74.15	BOLTS AND NUTS, RIVETS COTTERS OF COPPER	1964		0	89	6	51	169	12	
		1965	18	22	47	7	78	200	7	
		1966		36	108	5	92	365	9	Market insufficient
		1967	11	28	41	13	90	276	7	
		1968	972			13			1	

IMPORTS OF METAL WORKING PRODUCTS - ANDEAN SUBREGION AND ALALC (Cont.)

1964 - 1968

(In Thousand U.S. Dollars)

NABALALC No.	DESCRIPTION	YEAR	BOLIVIA	COLOMBIA	CHILE	ECUADOR F.O.B.	PERU	TOTAL ALALC WITHOUT BOL-EC	BOLIVIA F.O.B.	COMMENTS
74.16	SPRINGS OF COPPER	1964				X				
		1965	1	1		X		10		
		1966				X	1	17		Market insufficient
		1967	2	5	1	X	1	16		
		1968	.104			5				
74.17	COOKING AND HEATING	1964		123	5	64	705	833	33	
	APPARATUS OF A KIND USED	1965	149	60	10	75	712	788	97	
	FOR DOMESTIC PURPOSES,	1966		36	9	54	699	755	78	Market insufficient
	NOT ELECTRICALLY OPERATED	1967	134	37		60	612	659	113	
	OF COPPER	1968	133			53			125	
74.18	ARTICLES OF A KIND COMMON-	1964			0	8	286	287	7	
	LY USED FOR DOMESTIC PUR-	1965	7	6	2	26	58	75	11	
	POSES, BULDERS, SANITARY	1966		16	0	30	70	93	6	Market insufficient
	WARE FOR INDOOR USED OF	1967	8	2	8	55	82	99	6	
	COPPER	1968	15			74			7	
74.19	OTHER ARTICLES OF	1964		151		11	227	2789	2	
	COPPER	1965	5	117		45	92	957	29	
		1966		129	167	23	156	1524	28	Market insufficient
		1967	12	83	32	31	180	942	15	
		1968	4			27			14	
75.04	TUBES AND PIPES AND	1964		158				651		
	FITTINGS OF NICKEL	1965		14	13		9	369		
		1966		68	4		20	414		Market insufficient
		1967	X	25	26		2	1109		
		1968								

IMPORTS OF METAL WORKING PRODUCTS - ANDEAN SUBREGION AND ALALC (Cont.)

1964 - 1968

(In Thousand U.S. Dollars)

NABALALC No.	DESCRIPTION	YEAR	BOLIVIA	COLOMBIA	CHILE	ECUADOR F.O.B.	PERU	TOTAL ALALC WITHOUT BOL-EC	BOLIVIA F.O.B.	COMMENTS
75.05	ELECTRO-PLATING ANODES OF NICKEL	1964			29			1189		
		1965		51	66	2	7	1192		
		1966		106	47	1	24	968		Market insufficient
		1967	X	77	49	3	21	1744		
		1968	.359			1				
75.06	OTHER ARTICLES OF NICKEL	1964		887	67	3	14	1000		
		1965		17	143	5	9	200		
		1966		54	116	5	11	766		Market insufficient
		1967		23	16	1	15	231		
		1968	1			5				
76.04	ALUMINUM FOIL OF A THICKNESS NOT EXCEEDING 0.15 MILLIMETERS	1964		677	155	167	189	1531	31	
		1965	29	328	104	129	509	2280	45	
		1966		448	335	253	710	3221	47	Market insufficient
		1967	77	64	293	330	966	2891	49	
		1968	66			293			77	
76.06	TUBES AND PIPES OF ALUMINUM, HOLLOW BARS OF ALUMINUM	1964		16	57	162	13	796	4	
		1965	9	18	28	32	190	423	13	
		1966		217	63	35	11	362	2	Market insufficient
		1967	9	29	27	65	12	241	12	
		1968	25			79			4	
76.07	TUBES AND PIPES FITTINGS OF ALUMINUM	1964		7		X	86	116		
		1965	X	15		1	6	141		
		1966		22		6	12	106		Market insufficient
		1967	5	19	15	26	8	104		
		1968	1			91				

IMPORTS OF METAL WORKING PRODUCTS - ANDEAN SUBREGION AND ALALC (Cont.)

1964 - 1968

(In Thousand U.S. Dollars)

NABALALC No.	DESCRIPTION	YEAR	BOLIVIA	COLOMBIA	CHILE	ECUADOR F.O.B.	PERU	TOTAL ALALC WITHOUT BOL-EC	BOLIVIA F.O.B.	COMMENTS
76.08	STRUCTURES, COMPLETE	1964				86	28	153	4	
	OR INCOMPLETE OF	1965	8			118	90	205	9	
	ALUMINUM	1966		21		77	152	331	12	Market insufficient
		1967	21	6	467	56	49	714	249	
		1968	350			84			20	
76.09	RESERVOIRS, TANKS,	1964				X		2	X	
	VATS, OF ALUMINUM	1965	X			X	1	59	X	
		1966				5	2	4	18	Market insufficient
		1967	3					20	X	
		1968	109			X			88	
76.10	CASKS, DRUMS, BOXES AND	1964		10	108	48	43	308	10	
	SIMILAR CONTAINERS OF	1965	9		140	71	57	392	12	
	ALUMINUM	1966			150	128	96	464	16	Market insufficient
		1967	19	5	242	88	104	628	16	
		1968	16			70			16	
76.11	COMPRESSED GAS CYLINDERS	1964				X				
	AND SIMILAR PRESSURE	1965	X			X		13		
	CONTAINERS, OF ALUMINUM	1966				X		290		Market insufficient
		1967	a	7	1	X		10		
		1968				1				
76.12	STRANDED WIRE, CABLES,	1964		2205		X		4899	13	
	CORDAGE, ROPES, PLATED	1965	218	105		310	449	4569	377	
	BANDS OF ALUMINUM WIRE	1966		210		134	410	7555	106	Market insufficient
	BUT EXCLUDING INSULATED	1967	270	1569	318	239	596	12244	268	
	ELECTRIC CABLES	1968	103			486			X	

IMPORTS OF METAL WORKING PRODUCTS - ANDEAN SUBREGION AND ALALC (Cont.)

1964 - 1968

(In Thousand U.S. Dollars)

NABALALC No.	DESCRIPTION	YEAR	BOLIVIA	COLOMBIA	CHILE	ECUADOR F.O.B.	PERU	TOTAL ALALC WITHOUT BOL-EC	BOLIVIA F.O.B.	COMMENTS
76.13	GAUGE, CLOTH, GRILL, NETTING, REINFORCING FABRIC AND SIMILAR MATERIALS, OF ALUMINUM WIRE	1964		1		X	1	6		
		1965	X			X	2	20		
		1966		2		1	3	27		Market insufficient
		1967	2	2		1	5	37		
		1968	40			1				
76.14	EXPANDED METAL, OF ALUMINUM	1964								
		1965	X					1		
		1966					1	1		Market insufficient
		1967	X							
		1968								
76.15	ARTICLES OF A KIND COMMONLY USED FOR DOMESTIC PURPOSES, BUILDERS SANITARY WARE FOR INDOOR USE, OF ALUMINUM	1964		16	19	49	294	398	12	
		1965	19	5	22	56	490	646	40	
		1966		3	14	37	417	550	24	Market insufficient
		1967	21	8	32	126	404	567	21	
		1968	15			34			12	
76.16	OTHER ARTICLES OF ALUMINUM	1964		320	207	7	29	1430	3	
		1965	14	50	356	34	310	1195	28	
		1966		264	186	26	487	2176	35	Market insufficient
		1967	62	237	136	41	427	2390	30	
		1968				117			129	
77.03	OTHER ARTICLES OF MAGNESIUM	1964		16	0		2	19		
		1965	X	5	0		4	11		
		1966		12	0		3	29		Market insufficient
		1967		6	1		6	18		
		1968								

IMPORTS OF METAL WORKING PRODUCTS - ANDEAN SUBREGION AND ALALC (Cont.)

1964 - 1968

(In Thousand U.S. Dollars)

NABALALC No.	DESCRIPTION	YEAR	BOLIVIA	COLOMBIA	CHILE	ECUADOR F.O.B.	PERU	TOTAL ALALC WITHOUT BOL-EC	BOLIVIA F.O.B.	COMMENTS
78.04	LEAD FOIL OF A WEIGHT	1964		1	8	1	4	150		
	PER SQUARE METER	1965	4	49	7	4	10	72		
	NOT EXCEEDING 1,700	1966		19	10	4	9	47		Market insufficient
	GRAMMES; LEAD POWDERS	1967	5	17	2	3	9	41		
	AND FLAKES	1968	.409							
78.05	TUBES AND PIPES AND	1964		6	3	34	0	30		
	BLANKS THEREFOR OF LEAD	1965	3	16	4	20	0	43		
	HOLLOW BARS, TUBE AND	1966		7	21	36	5	59		Market insufficient
	PIPE FITTINGS OF LEAD	1967	5	9	1	50	2	25		
		1968	3			34				
78.06	OTHER ARTICLES OF	1964		1	1	X	8	72		
	LEAD	1965	2	6	27		19	187		
		1965		6	51	2	8	120		Market insufficient
		1967		1	1	2	19	97		
		1968	15							
79.04	TUBES AND PIPES OF ZINC	1964		0	1		0	1		
	HOLLOW BARS AND TUBE AND	1965	X	4	0		3	11		
	PIPE FITTINGS, OF ZINC	1966		11	1		4	22		Market insufficient
		1967		2			6	23		
		1968	.006							
79.05	GUTTERS, ROOF CAPPING	1964		16	0		0	16		
	LIGHT FRAMES, OF ZINC	1965	X	0	0	X	1	4		
		1966		0	0		4	4		Market insufficient
		1967	X	0	0		0	1		
		1968								

IMPORTS OF METAL WORKING PRODUCTS - ANDEAN SUBREGION AND ALALC (Cont.)

1964 - 1968

(In Thousand U.S. Dollars)

NABALALC No.	DESCRIPTION	YEAR	BOLIVIA	COLOMBIA	CHILE	ECUADOR F.O.B.	PERU	TOTAL ALALC WITHOUT BOL-EC	BOLIVIA F.O.B.	COMMENTS
79.06	OTHER ARTICLES OF	1964		4	0	X	19	568		
	ZINC	1965	1	4	0	X	52	63		
		1966		23	0	X	39	74		Market insufficient
		1967		48	6	2	37	102		
		1968	1			4				
80.04	TIN FOIL, OF A WEIGHT	1964		0	0		0	95		
	PER SQUARE METER NOT	1965			1		0	21		
	EXCEEDING ONE KILOGRAMME	1966		2	1		1	23		Market insufficient
	TIN POWDERS AND FLAKES	1967		5	1		1	44		
		1968	.060							
80.05	TUBES AND PIPES, OF	1964		0	2		0	4		
	TIN; HOLLOW BARS AND	1965		0			4	7		
	TUBE AND PIPE FITTINGS	1966		0	0		0	5		Market insufficient
	OF TIN	1967	X	2			0	8		
		1968								
80.06	OTHER ARTICLES OF	1964		3	34	X	37	116		
	TIN	1965	1	2	0	25	35	45		
		1966		3	0	22	36	41		Market insufficient
		1967		1	0	65	36	44		
		1968	.031			35				
82.01	HAND TOOLS, SPADES	1964		156	58	431	1061	1964	82	Bolivian market alone can
	SHOVELS, PICKS, HOES,	1965	579	83	57	420	988	2042	151	support operation, can be
	KNIVES AND OTHER USED IN	1966		79	51	250	1057	2243	133	grouped with 82.01, 82.03,
	AGRICULTURE OR FORESTRY	1967	362	23	132	258	1050	2189	142	82.04, 82.05
		1968	246			206			84	High value/weight

IMPORTS OF METAL WORKING PRODUCTS - ANDEAN SUBREGION AND ALALC (Cont.)

1964 - 1968

(In Thousand U.S. Dollars)

NABALALC No.	DESCRIPTION	YEAR	BOLIVIA	COLOMBIA	CHILE	ECUADOR F.O.B.	PERU	TOTAL ALALC WITHOUT BOL-EC	BOLIVIA F.O.B.	COMMENTS
82.02	SAWS AND BLADES FOR HAND OR MACHINE SAWS	1964	51	198	449	86	348	2366	37	
		1965	89	101	612	97	497	2838	64	Should be grouped with 82.09
		1966	105	145	555	94	567	2926	61	
		1967	100	150	412	143	624	3057	75	
		1968	102			64			77	
82.03	HAND TOOLS; PLIERS, PINCERS, PIPE CUTTERS SPANNERS AND WRENCHES; FILES AND RASPS	1964	187	1608	409	173		4935	67	
		1965	205	645	565	163	1048	6244	122	Same as 82.01
		1966	210	402	693	132	1176	8535	162	
		1967	241	655	1176	242	1271	9909	154	
		1968	217			215			141	
82.04	HAND TOOLS; MOUNTED GLAZIERS DIAMONDS BLOW LAMPS, ANVILS, VICES, AND CLAMPS, GRINDING WHEELS	1964	186	2331	1505	239	2869	13866	132	
		1965	195	690	1529	231	1252	6072	222	
		1966	360	334	2775	315	1029	7555	240	Same as 82.01
		1967	230	393	634	338	1561	6568	282	
		1968	292			412			226	
82.05	INTERCHANGEABLE TOOLS FOR HAND TOOLS, FOR MACHINE TOOLS OR FOR POWER OPERATED HAND TOOLS FOR PRESSING STAMPING, DRILLING, TAPPING, THREADING, MILLING	1964	293	251	6080	291		15033	436	
		1965	515	503	6567	275	2885	23141	865	
		1966	650	1556	8674	294	3690	37521	631	Same as 82.01
		1967	763	1271	3017	269	3689	37970	672	
		1968	710			213			602	
82.06	KNIVES AND CUTTING BLADES FOR MACHINES OR FOR MECHANICAL APPLIANCES	1964	20	372	29	18		733	7	
		1965	15	232	46	27	98	1477	10	Grouped with 82.09
		1966	10	219	95	32	152	2416	9	High value/weight
		1967	47	296	306	22	158	2598	7	Look at export market
		1968	33			29			15	

IMPORTS OF METAL WORKING PRODUCTS - ANDEAN SUBREGION AND ALALC (Cont.)

1964 - 1968

(In Thousand U.S. Dollars)

NABALALC No.	DESCRIPTION	YEAR	BOLIVIA	COLOMBIA	CHILE	ECUADOR F.O.B.	PERU	TOTAL ALALC WITHOUT BOL-EC	BOLIVIA F.O.B.	COMMENTS
82.07	TOOL - TIPS AND PLATES STICKS, UNMOUNTED, OF SINTERED METAL CARBIDES (i.e. CARBIDES OF TUNGSTEN, MOLYBDENUM OR VANADIUM)	1964	1		13			461	19	
		1965	1	9	22	1	32	705	21	
		1966	34	14	7		70	966	15	Market insufficient
		1967	3	14	19		48	719	4	
		1968	19						19	
82.08	COFFEE MILLS, MINCERS JUICE EXTRACTORS AND OTHER MECHANICAL APPLIANCES SERVING OR CONDITIONING OF FOOD OR DRINKS	1964	30		36		180	246	20	
		1965	44		53		279	377	35	
		1966	43	3	92		442	641	35	Market insufficient
		1967	53		218		410	745	34	
		1968	50						29	
82.09	KNIVES WITH CUTTING BLADES, SERRATED OR NOT (OTHER THAN KNIVES FALLING ON 82.06)	1964	59	99	57	29	429	780	37	Group with 82.02, 82.06
		1965	110	28	73	106	350	736	103	High value/weight
		1966	105	21	52	83	439	777	138	Similar operation
		1967	120	62	129	114	328	994	102	
		1968	86		132				63	
82.10	KNIFE BLADES	1964								
		1965	X			X	10	23		Group with 82.02,
		1966					13	30		82.06, 82.09
		1967	24		2		12	38		
		1968								
82.11	RAZOR AND RAZOR BLADES	1964		43	596	14	848	1783		Group with 82.02, 82.06
		1965	97	43	896	11	765	2256	5	82.09, 82.10
		1966		236	1409	8	773	3452	13	
		1967	123	80	1392	18	719	3443	24	
		1968	173			46			58	

IMPORTS OF METAL WORKING PRODUCTS - ANDEAN SUBREGION AND ALALC (Cont.)

1964 - 1968

(In Thousand U.S. Dollars)

NABALALC No.	DESCRIPTION	YEAR	BOLIVIA	COLOMBIA	CHILE	ECUADOR F.O.B.	PERU	TOTAL ALALC WITHOUT BOL-EC	BOLIVIA F.O.B.	COMMENTS
82.12	SCISSORS AND BLADES THEREFOR	1964		342	53	66	167	761	52	Could be combined with 82.01 (Hand Tools)
		1965	54	117	101	67	175	694	79	
		1966	47	31	185	89	204	789	101	
		1967	59	60	194	100	210	1039	118	
		1968	30			109			79	
82.13	OTHER ARTICLES OF CUTTERY (SECATEURS, HAIR CLIPPERS, PAPER KNIVES, MANICURE SETS) NAIL FILES, ETC.	1964	44	71	37		165	535		Group with 82.01
		1965	51	49	56		188	542		
		1966	51	17	35		229	801		
		1967	71	31	136		245	1010		
		1968	63							
82.14	SPOONS, FORKS, FISH-EATERS BUTLER KNIVES, LOAVLES AND SIMILAR KITCHEN OR TABLE WEAR	1964		13	332	27	604	1140	34	Group with 82.01
		1965	134	3	345	116	508	1053	85	
		1966		7	291	122	700	1169	71	
		1967	96	5	157	109	262	639	75	
		1968	125			161			63	
82.15	HANDLES OF BASE METAL FOR ARTICLES FALLING WITHIN HEADING No. 82.09 82.13, 82.14	1964								Market insufficient
		1965		2		X		26		
		1966					2	17		
		1967					6	36		
		1968	.001							
83.01	LOCKS AND PADLOCKS OF BASE METAL, KEYS FOR ANY OF THE FOREGOING ARTICLES FINISHED OR NOT, OF BASE METAL	1964	180	77	44	278	1126	1438	119	Bolivian market can support industry 83.01, 83.02
		1965	252	39	30	304	1657	2016	161	
		1966	361	63	28	339	1775	2508	203	
		1967	353	60	77	349	1888	2815	208	
		1968	266			395			157	

IMPORTS OF METAL WORKING PRODUCTS - ANDEAN SUBREGION AND ALALC (Cont.)

1964 - 1968

(In Thousand U.S. Dollars)

NABALALC No.	DESCRIPTION	YEAR	BOLIVIA	COLOMBIA	CHILE	ECUADOR F.O.B.	PERU	TOTAL ALALC WITHOUT BOL-EC	BOLIVIA F.O.B.	COMMENTS
83.02	BASE METAL FITTINGS AND MOUNTINGS OF A KIND SUITABLE FOR FURNITURE	1964	135	69	52	782	1535	1856	57	High value/weight, good item for export to Andean market also
		1965	190	104	64	280	1366	1985	169	
		1966	166	257	75	310	1736	3905	139	
		1967	236	169	198	367	1865	4023	182	
		1968	224			471			179	
83.03	SAFES, STRONG BOXES, ARMOURED OR REINFORCED STRONG-ROOMS, AND CASH AND DEED BOXES OF BASE METAL	1964		14	5	29	68	148		
		1965	17		14	13	27	103	10	
		1966		3	6	53	49	156	3	Market insufficient
		1967	24	2	2	40	26	106	10	
		1968	21			39			11	
83.04	FILING CABINETS, RACKS SORTING BOXES, PAPER, TRAYS, OF BASE METAL	1964		27	7	11		35	8	
		1965	11	1	3	3	86	100	8	
		1966			9	8	115	127	16	Market insufficient
		1967	36	1	9	12	78	93	15	
		1968	40			9			9	
83.05	FITTINGS FOR LOOSE LEAF BINDERS FOR FILES OR FOR STATIONARY BOOKS, OF BASE METAL	1964				13	247	408	5	
		1965	25	2		20	250	448	20	
		1966		9		73	274	446	28	Market insufficient
		1967	36	7	25	25	880	263	24	
		1968	68			25			25	
83.06	STATUETTES AND OTHER ORNAMENTS OF A KIND USED INDOORS, OF BASE METAL	1964		7	1	7	8	66	2	
		1965	23	8	0	40	37	112	13	
		1966		6	1	9	45	128	47	Market insufficient
		1967	21	2	15	8	43	293	2	
		1968	118			11			5	

IMPORTS OF METAL WORKING PRODUCTS - ANDEAN SUBREGION AND ALALC (Cont.)

1964 - 1968

(In Thousand U.S. Dollars)

NABALALC No.	DESCRIPTION	YEAR	BOLIVIA	COLOMBIA	CHILE	ECUADOR F.O.B.	PERU	TOTAL ALALC WITHOUT BOL-EC	BOLIVIA F.O.B.	COMMENTS
83.07	LAMPS AND LIGHTING FITTINGS, OF BASE METAL	1964		449	140	211	794	1953	131	
		1965	63	361	76	198	754	1826	294	Market not very large
		1966		201	127	254	883	2835	213	Product mix varied
		1967	306	125	264	255	725	1950	254	Mfg operation. Simple
		1968	276			296			237	metal working might support small job shop
83.08	FLEXIBLE TUBING AND PIPING OF BASE METAL	1964	1	30		2	83	196		
		1965	3	29		8	34	255		
		1966	1	29	3	3	40	268		Market insufficient
		1967	1	42	52	7	57	407		
		1968	2			6				
83.09	CLASPS, FRAMES WITH CLASPS FOR HAND BAGS, BUCKLES, HOOKS OF BASE METAL	1964		143	5	39	709	1227	19	
		1965	55	110	5	63	769	1589	44	
		1966		55	6	68	707	1514	52	Can be grouped with 83.02
		1967	64	68	37	100	955	1811	38	
		1968	57			77			40	
83.10	BEADS AND SPANGLES, OF BASE METAL	1964					4	4		
		1965			1			4		
		1966			2		1	3		Market insufficient
		1967						2		
		1968	1							
83.11	BELLS AND GONGS, NON-ELECTRIC, OF BASE METAL	1964			4	5	13	17		
		1965			1	4	9	15		
		1966			1	1	12	21		Market insufficient
		1967	11	1	3	6	16	26		
		1968	8			4				

IMPORTS OF METAL WORKING PRODUCTS - ANDEAN SUBREGION AND ALALC (Cont.)

1964 - 1968

(In Thousand U.S. Dollars)

NADALALC No.	DESCRIPTION	YEAR	BOLIVIA	COLOMBIA	CHILE	ECUADOR F.O.B.	PERU	TOTAL ALALC WITHOUT BOL-EC	BOLIVIA F.O.B.	COMMENTS
83.12	PHOTOGRAPH, PICTURE AND SIMILAR FRAMES, OF BASE METAL, MIRRORS OF BASE METAL	1964					6	6		
		1965					4	18		
		1966					5	27		Market insufficient
		1967			3		9	40		
		1968	.005							
83.13	STOPPERS, CROWN CORKS, BOTTLE CAPS, CAPSULES, OF BASE METAL	1964		9	54	21	151	759	12	
		1965	46	20	35	41	310	851	9	
		1966		72	44	40	273	1629	24	Market insufficient
		1967	23	17	22	57	313	2307	9	
		1968	45			61			34	
83.14	SIGN-PLATES, NAME-PLATES NUMBERS, LETTERS OR OTHER SIGNS, OF BASE METAL	1964				3	8	90		
		1965	19			3	16	45		
		1966				12	39	160		Market insufficient
		1967	7	1	9	9	52	217		
		1968	8			13				
83.15	WIRE, RODS, TUBES, PLATES ELECTRODE, OF BASE METAL OR OF METAL CARBIDES	1964		586	229	29	317	3724	29	
		1965	156	190	360	106	256	3138	111	Possible grouping with
		1966		166	400	209	318	3263	127	73.14
		1967	212	152	342	231	310	4087	98	
		1968	173			243			124	
84.01	STEAM AND OTHER VAPOR GENERATING BOILERS	1964		1400	1650	273	2030	11650	84	Bolivian market insufficient
		1965	226	1072	2450	87	2580	14330	55	Require high capital
		1966		750	2490	162	1520	11590	42	investment and high degree
		1967	120	250	1250	1140	1490	6320	38	of skills
		1968	168			87			133	

IMPORTS OF METAL WORKING PRODUCTS - ANDEAN SUBREGION AND ALALC (Cont.)

1964 - 1968

(In Thousand U.S. Dollars)

NABALALC No.	DESCRIPTION	YEAR	BOLIVIA	COLOMBIA	CHILE	ECUADOR F.O.B.	PERU	TOTAL ALALC WITHOUT BOL-EC	BOLIVIA F.O.B.	COMMENTS
84.02	AUXILIARY PLANTS FOR USE	1964	9	203		13		4682	5	Bolivian market insufficient
	WITH STEAM AND OTHER	1965	18	104		15	271	3463	22	Require high capital
	VAPOR GENERATING BOILERS	1966	19	48		69	277	1106	4	Investment and high degree of
		1967	73	68	189	155	348	1680	16	skills
		1968	336			36			44	
84.03	PRODUCER GAS AND WATER	1964	7	31		12	56	174	12	
	GENERATORS, ACETILENO	1965	9	24		17	191	694	18	
	GAS GENERATORS	1966	28	13		36	59	1678	48	Same as 84.01
		1967	18	416	88	28	50	1088	40	
		1968	914			77			92	
84.04	STEAM ENGINES WITH	1964				X	2	2		
	SELF-CONTAINED BOILERS	1965		20		2	1	30		
		1966	11			X		3		Market insufficient
		1967			1	X		252		
		1968	6							
84.05	STEAM AN OTHER VAPOR	1964		1234		122	520	6454	5	
	POWER UNITS, NOT IN-	1965	34	447	1	4	203	5008	188	
	CORPORATING BOILERS	1966	7	237		2	180	7647	2	Market insufficient
		1967	11	257	143	580	1126	5910	13	
		1968	33			2			18	
84.06	INTERNAL COMBUSTION	1964	750			412	527	5835	336	Bolivian market fairly
	PISTON ENGINES FOR	1965	1900	1217		307	680	6176	499	high but considering?
	AIRCRAFT	1966	2200	3160		237	602	8536	754	Variety of engine models
		1967	2300	1445	930	424	182	6459	657	probably purchased
		1968	2600			361			559	Reduces desirability

IMPORTS OF METAL WORKING PRODUCTS - ANDEAN SUBREGION AND ALALC (Cont.)

1964 - 1968

(In Thousand U.S. Dollars)

NABALALC No.	DESCRIPTION	YEAR	BOLIVIA	COLOMBIA	CHILE	ECUADOR F.O.B.	PERU	TOTAL ALALC WITHOUT BOL-EC	BOLIVIA F.O.B.	COMMENTS
84.07	WATER WHEELS, WATER TURBINES AND OTHER WATER ENGINES, INCLUDING REGULATORS	1964	23	1328	2894	29	1544	7389	27	
		1965	237	1271	83	88	950	4800	336	
		1966	420	1150	2781	333	1176	14893	349	Market unfavorable
		1967	47	890	416	124	1685	10040	8	
		1968	32			68			259	
84.03	OTHER ENGINES AND MOTORS	1964	5	115		X		2763		
		1965	2	173		16		6600	1	
		1966	6	887		66		7180	X	
		1967	37		3	63		10987	3	
		1968	35			251			121	
84.08	GAS TURBINES OTHER THAN FOR AIRCRAFT	1964					292	316	X	
		1965		1			148	4031	X	
		1966					4	7157	X	
		1967				2	6	3996	421	
		1968				1			3	
84.08	OTHER MOTORS NOT SPECIFIED	1964		2470		19	35	4164	X	
		1965		54		5	82	3936	1	
		1966		94			76	3823	20	
		1967		71		1	120	3241	15	
		1968				7			48	
84.09	MECHANICALLY PROPELLED ROAD ROLLERS	1964	2	420		32	93	1051	46	
		1965	14	440		120	98	1783	12	
		1966	10	35		53	341	537	33	
		1967		257	77	255	56	746	79	
		1968	44			266			105	

IMPORTS OF METAL WORKING PRODUCTS - ANDEAN SUBREGION AND ALALC (Cont.)

1964 - 1968

(In Thousand U.S. Dollars)

NABALALC No.	DESCRIPTION	YEAR	BOLIVIA	COLOMBIA	CHILE	ECUADOR F.O.B.	PERU	TOTAL ALALC WITHOUT BOL-EC	BOLIVIA F.O.B.	COMMENTS
84.10	PUMPS FOR LIQUIDS	1964	605	4100	2867	727	3444	20527	354	Bolivian market inadequate
		1965	660	3815	3511	613	4652	27340	590	to support industry
		1966	2000	6507	3870	634	4731	36969	1435	Should group with 84.11
		1967	900	4332	4197	1333	5708	43905	995	
		1968	1124			1389			1132	
84.11	AIR PUMPS, VACUUM PUMPS AND AIR OR GAS COMPRESSORS	1964	490	4204	2910	116	1178	36900	63	
		1965	660	3980	2124	378	4281	38934	287	
		1966	1300	3140	2602	618	6430	46700	731	See 84.10
		1967	1180	2920	3270	786	3960	67323	1320	
		1968	2340			781			2286	
84.12	AIR CONDITIONING MACHINES	1964		363		206	300	4665	5	
		1965	16	80	3	176	687	2334	6	
		1966		81		172	613	2421	70	Market insufficient
		1967	26	124	607	246	680	3354	15	
		1968	172			259			16	
84.13	FURNACE, BURNERS FOR LIQUID FUEL (ATOMISERS)	1964	2	253		12	256	1405	4	
		1965	5	182		27	216	1432	24	
		1966	7	240		21	175	1866	4	Market insufficient
		1967	10	212	145	50	680	2489	10	
		1968	34			60			23	
84.14	INDUSTRIAL AND LABORATORY FURNACES AND OVENS, NON-ELECTRIC	1964	36	882	33	73		5688	5	
		1965	54	346	65	33	548	12656	16	Low value/weight
		1966	66	5235	34	199	950	21343	30	
		1967	100	1216	1045	787	1280	14570	159	
		1968	260			146			303	

IMPORTS OF METAL WORKING PRODUCTS - ANDEAN SUBREGION AND ALALC (Cont.)

1964 - 1968

(In Thousand U.S. Dollars)

NABALALC No.	DESCRIPTION	YEAR	BOLIVIA	COLOMBIA	CHILE	ECUADOR F.O.B.	PERU	TOTAL ALALC WITHOUT BOL-EC	BOLIVIA F.O.B.	COMMENTS
84.15	REFRIGERATORS AND REFRIGERATING EQUIPMENT (ELECTRICAL AND OTHER)	1964	430	409	1331	351	102	3394	55	This could be considered for domestic market only begin operations by manufacturing cabinet import compressors
		1965	540	202	1115	320	475	3911	79	
		1966	890	133	1151	365	604	4178	107	
		1967	1020	325	820	539	1094	4130	178	
		1968	991			701			97	
84.15	DOMESTIC REFRIGERATORS, NON-ELECTRICAL	1964				57	458	1215	39	Could be considered for domestic market only. Begin operations by manufacturing cabinet import compressors
		1965		31		14	623	720	36	
		1966		8		51	529	662	60	
		1967		2	9	89	422	517	61	
		1968				146			19	
84.15	DOMESTIC REFRIGERATORS, ELECTRICAL	1964		2116	175	741	1480	5936	124	Same.
		1965		1377	238	405	1383	3581	241	
		1966		53	214	472	2215	3010	321	
		1967		41	1139	597	2180	4012	422	
		1968				617		8800	319	
84.16	CALENDERING AND SIMILAR ROLLING MACHINES (OTHER THAN METAL-WORKING AND METAL-ROLLING MACHINES AND GLASS-WORKING MACHINES)	1964	43	60		34		3568		Insufficient market.
		1965	4	321		38	29	1407		
		1966	133	640		13	96	2566		
		1967	38	325	145	125	207	3285		
		1968	4			24				
84.17	MACHINERY, PLANT AND SIMILAR LABORATORY EQUIPMENT, WHETHER OR NOT ELECTRICALLY HEATED (NOT FOR DOMESTIC PURPOSE)	1964	317	11671	102	208	206	17838	88	Colombian market High compared to total ALALC Possibly use for trade
		1965	173	12763	22	665	1892	31209	469	
		1966	220	25235	41	669	2363	49728	218	
		1967	165	8400	3235	2956	2241	39452	526	
		1968	380			911			1773	

IMPORTS OF METAL WORKING PRODUCTS - ANDEAN SUBREGION AND ALALC (Cont.)

1964 - 1968

(In Thousand U.S. Dollars)

NABALALC No.	DESCRIPTION	YEAR	BOLIVIA	COLOMBIA	CHILE	ECUADOR F.O.B.	PERU	TOTAL ALALC WITHOUT BOL-EC	BOLIVIA F.O.B.	COMMENTS
84.17	DOMESTIC INSTANTANEOUS OR STORAGE WATER HEATERS, NON ELECTRICAL	1964		1247	99	5		1320		Colombia market
		1965		8	123	2	88	230		High compared to total
		1966			108	5	97	255		ALALC
		1967			62	22	119	202		Possibly use for trade
		1968				5				
84.18	CREAM SEPARATORS	1964	65	21	2	7		318		
		1965	504	11	0	7		218		
		1966	250	22	4	14		433		
		1967	188	13	25	13		503		
		1968	560			X				
84.18	CENTRIFUGES; FILTERING AND PURYFING MACHINERY AND APPARATUS, FOR LIQUIDS OR GASES	1964		479	188	63	51	5567	63	
		1965		1518	544	235	1438	11477	142	
		1966		2132	134	373	2108	14476	268	
		1967		1215	2267	582	2092	18023	244	
		1968				772			558	
84.19	MACHINERY FOR CLEANING OR DRYING BOTTLES OR OTHER CONTAINERS, DISH WASHING MACHINES, ETC	1964	226	1389	572	220	16	8723	188	Insufficient market
		1965	526	1337	360	266	2136	15717	219	Export insufficient
		1966	145	1183	468	710	2660	17242	319	Low value/weigh
		1967	325	1758	1733	991	3267	19375	304	Specialized product
		1968	270			836			167	
84.20	WEIGHING MACHINERY (EXCLUDING BALANCES OF GREAT SENSITIVITY)	1964	87	296	392	172	760	2805	40	Insufficient market
		1965	106	165	513	152	817	3336	61	Export insufficient
		1966	104	372	510	134	646	3678	100	Low value/weight
		1967	169	210	350	278	987	4342	135	Specialized product
		1968	187			186			109	
84.21	MECHANICAL APPLIANCES, FIRE EXTINGUISHERS, STEAM OR SAND BLASTING MACHINES, JET PROJECTING MACHINES	1964	40	620	41	202	583	3739	5	Insufficient market
		1965	110	435	318	386	1091	5881	65	Export insufficient
		1966	120	111	242	308	1026	6300	102	Low value/weight
		1967	95	301	1044	373	1280	7094	127	Specialized product
		1968	135			350			98	

IMPORTS OF METAL WORKING PRODUCTS - ANDEAN SUBREGION AND ALALC (Cont.)

1964 - 1968

(In Thousand U.S. Dollars)

NABALALC No.	DESCRIPTION	YEAR	BOLIVIA	COLOMBIA	CHILE	ECUADOR F.O.B.	PERU	TOTAL ALALC WITHOUT BOL-EC	BOLIVIA F.O.B.	COMMENTS
84.22	LIFTING, HANDLING, LOADING OR UNLOADING MACHINERY, TELPHERS AND CONVEYORS	1964	310	5041	9233	646	6473	38356	706	Bolivian market may be sufficient to support industry if local. Raw Material available
		1965	689	4108	7164	847	7344	36304	1025	
		1966	650	5092	7512	1115	8334	43140	960	
		1967	885	4392	8044	1984	10555	46757	1282	
		1968	1069			1379			2276	Market increase required
84.23	EXCAVATING, LEVELLING, BORING AND EXTRACTING MACHINERY, STATIONERY OR MOBILE, FOR EARTH, MINERALS OR ORES	1964	2300	15640	3641	1207	7335	70706	1750	Local market might be adequate for excavating and boring etc., for mining industry Combine with 84.56
		1965	2687	6688	1845	1731	15488	65447	1333	
		1966	2800	5620	4122	1540	16238	88411	2134	
		1967	2694	7211	19802	1052	16934	111540	4075	
		1968	2405			2049			3081	
84.24	AGRICULTURAL AND HORTICULTURAL MACHINERY FOR SOIL PREPARATION, LAWN AND SPORTS GROUND ROLLERS	1964	59	1000	2276	175	888	10666	27	Possible for local market Can ship knocked down? Low value/weight
		1965	63	577	2038	173	1139	9655	61	
		1966	90	310	3257	169	1177	9345	57	
		1967	174	251	2627	203	1749	8517	109	
		1968	321			322			206	
84.25	HARVESTING AND THRESHING MACHINERY	1964	60	1348	2761	166	3047	16663	22	Market insufficient
		1965	57	900	4094	125	736	14553	37	
		1966	27	1222	4992	122	473	15717	20	
		1967	75	1082	4792	290	782	18778	33	
		1968	67			337			68	
84.26	DAIRY MACHINERY (INCLUDING MILKING MACHINES)	1964	6	44	709	9	201	1538	X	Market insufficient
		1965	1	68	119	4	140	932	X	
		1966	6	49	148	6	157	902	1	
		1967	5	78	444		159	1319	X	
		1968	3			1			75	

IMPORTS OF METAL WORKING PRODUCTS - ANDEAN SUBREGION AND ALALC (Cont.)

1964 - 1968

(In Thousan U.S. Dollars)

NABALALC No.	DESCRIPTION	YEAR	BOLIVIA	COLOMBIA	CHILE	ECUADOR F.C.B.	PERU	TOTAL ALALC WITHOUT BOL-EC	BOLIVIA F.O.B.	COMMENTS
84.27	PRESSES, CRUSHERS, AND OTHER MACHINERY USED IN WINE - MAKING, CIDER - MAKING, FRUIT JUICE PREPARATION OR THE LIKE	1964			12	X		293		
		1965		6	6	X	50	380		
		1966		1	16	X	41	282		Market insufficient
		1967	1		5	5	56	274		
		1968				7				
84.28	OTHER AGRICULTURAL, HORTICULTURAL, POULTRY-KEEEPING AND BEE-KEEPING MACHINERY	1964	6	600		11	208	1459	9	
		1965	74	386		90	540	2503	38	
		1966	20	249		128	661	2862	38	Market insufficient
		1967	32	85	786	87	680	2974	46	
		1968	58			138			59	
84.29	MACHINERY USED IN THE BREAD GRAIN MILLING INDUSTRY (CEREAL OR DRIED LEGUMINOUS VEGETABLES)	1964	60	595		80		15714		
		1965	74	193	11	206	1481	2928		
		1966	80	322	62	198	874	2762		
		1967	255	259	113	706	971	2350		
		1968	127			421				
84.30	MACHINERY USED IN THE DRINK INDUSTRIES, BAKERY CONFECTIONARY, CHOCOLATE MANUFACTURE, SUGAR OR BREWING MANUFACTURE	1964	1115	117	26	586	137	5474	244	Good possibility for local market
		1965	3982	1548	218	910	2316	13224	352	
		1966	300	822	5	836	3550	13718	105	Competition with Ecuador in Ancom market
		1967	761	1043	1216	4045	4593	15298	129	
		1968	1272			1167			166	
84.31	MACHINERY FOR MAKING OR FINISHING CELLULOSIC PULP, PAPER OR PAPER BOARD	1964	22			1		14379		
		1965	3			123	476	13061		
		1966	59		1	84	588	9081		Market insufficient
		1967	72		488	311	11167	24165		
		1968	17			303				

IMPORTS OF METAL WORKING PRODUCTS - ANDEAN SUBREGION AND ALALC (Cont.)

1964 - 1968

(In Thousand U.S. Dollars)

NABALALC No.	DESCRIPTION	YEAR	BOLIVIA	COLOMBIA	CHILE	ECUADOR F.O.B.	PERU	TOTAL ALALC WITHOUT BOL-EC	BOLIVIA F.O.B.	COMMENTS
84.32	BOOK-BINDING MACHINERY INCLUDING BOOK-SEWING MACHINES	1964	6		2	24		602		
		1965	3	20	4	174	80	1233		Market insufficient
		1966	7	30	5	83	78	1615		
		1967	3	200	72	43	124	2276		
		1968	2			21				
84.33	PAPER OR PAPER BOARD CUTTING MACHINES OF ALL KINDS	1964	12		39	34		2746	7	
		1965	14	1171	79	540	559	5682	13	
		1966	27	784	73	244	538	6155	59	Market insufficient
		1967	9	877	456	234	956	7728	9	
		1968	79			321			120	
84.34	MACHINERY FOR TYPE FOUNDRING OR TYPE SETTING	1964	36	415	826	67	511	5404	48	
		1965	65	165	156	155	776	9387	85	
		1966	21	450	564	113	989	16312	78	Market insufficient
		1967	131	444	1528	147			59	
		1968	68			293				
84.35	OTHER PRINTING MACHINERY MACHINES FOR USES ANCILLARY TO PRINTING	1964	236	1646	4	263	755	11185	133	
		1965	183	1328	7	506	2395	14633	91	
		1966	260	1106	9	249	4753	20671	414	Market insufficient
		1967	270	1811	1246	1150	3363	22255	112	
		1968	208			654			168	
84.36	MACHINES FOR EXTRUDING MAN-MADE TEXTILES. SPINNING AND TWISTING MACHINES TEXTILE DOUBLING THROWING AND REELING MACHINES	1964	100	2785	3225	3277	2516	17736		Product too complex and specialized for local market size
		1965	332	3227	4903	3721	4144	32401	286	
		1966	44	1373	7082	4450	2945	37631	207	However Andean market sizable. However indications are that if is synthetically. Will eventually diminish as textile industry development is completed. Possible grouping with 84.36
		1967	446	2895	3344	4579	3153	47110	242	
		1968	326			2969			623	

IMPORTS OF METAL WORKING PRODUCTS - ANDEAN SUBREGION AND ALALC (Cont.)

1964 - 1968

(In Thousand U.S. Dollars)

NABALALC No.	DESCRIPTION	YEAR	BOLIVIA	COLOMBIA	CHILE	ECUADOR F.O.B.	PERU	TOTAL ALALC WITHOUT BOL-EC	BOLIVIA F.O.B.	COMMENTS
84.37	WEAVING MACHINES, KNITTING, WARPING MACHINES	1964	298	1337	128	631	3569	30481	157	
		1965	690	825	630	814	3508	25277	498	
		1966	650	1675	1538	1142	5442	27958	452	
		1967	539	2176	2701	1219	6431	34144	415	
		1968	1620			679			631	
84.38	AUXILIARY MACHINES FOR USE WITH MACHINES OF HEADING No. 84.37	1964	81	1709	115	389		8927	46	
		1965	303	1827	161	976	1876	16346	273	
		1966	172	3957	201	438	2214	23261	238	Same as 84.37
		1967	156	2614	2213	409	2185	22329	149	Group with 84.36
		1968	228			512			299	
84.39	MACHINERY FOR THE MANUFACTURE OR FINISHING OF FELT IN THE PIECE OR IN SHAPES	1964	7	6		5				
		1965	48	70		2	14	78		
		1966		7		6	10	230		Market insufficient
		1967	5	1	22	9	8	247		
		1968	4			X		385		
84.40	MACHINERY FOR WASHING, CLEANING, DRYING, BLEACHING, DYEING, DRESSING, FINISHING TEXTILE YARNS	1964	22	746	12	170	2180	5050	2	
		1965	3080	471	4	792	1309	7904	172	
		1966	120	302		979	2153	10006	213	Same as 84.36
		1967	41	1353	1571	680	2998	14974	324	
		1968	143			711			470	
84.40	DOMESTIC WASHING MACHINE (ELECTRICAL OR NOT)	1964		455	237	60	1043	2544	11	
		1965		91	290	50	345	757	10	
		1966		55	268	75	360	799	30	Same as 84.36
		1967		81	93	59	811	1097	43	Complex and specialized
		1968							40	

IMPORTS OF METAL WORKING PRODUCTS - ANDEAN SUBREGION AND ALALC (Cont.)

1964 - 1968

(In Thousand U.S. Dollars)

NABALALC No.	DESCRIPTION	YEAR	BOLIVIA	COLOMBIA	CHILE	ECUADOR F.O.B.	PERU	TOTAL ALALC WITHOUT BOL-EC	BOLIVIA F.O.B.	COMMENTS
84.41	SEWING MACHINES (FURNITURE, NEEDLES FOR SEWING MACHINES)	1964	20	2123	2752	957	3856	14903	522	
		1965	33	1262	3097	831	4599	16558	626	
		1966	18	1695	3822	736	4657	18640	974	
		1967	60	1853	3795	949	3995	17600	368	
		1968							330	
84.42	MACHINERY FOR PREPARING TANNING OR WORKING HIDES SKINS OR LEATHER (INCLUDING BOOT AND SHOE MACHINERY)	1964	76	257	81	119		2590	56	
		1965	232	200	67	62	775	3487	120	
		1966	190	393	92	27	831	3956	160	
		1967	229	355	1203	112	1089	5619	124	
		1968	100			56			86	
84.43	CONVERTERS, LADLES, INGOT MOULDS AND CASTING MACHINES USED IN METALLURGY, AND IN METAL FOUNDRIES	1964		494	33			16690		
		1965		133	135		214	2498		
		1966		161	6	1	104	2883		Market insufficient
		1967	12	139	354	10	5317	7759		
		1968	31			17				
84.44	ROLLING MILLS AND ROLLS THEREFOR	1964		217	1	3		18453		
		1965	5	1039	11	6	184	19734		
		1966		2137	16	2	658	30650		Market insufficient
		1967	6	9448	1034	6	936	26095		
		1968	6			1077				
84.45	MACHINE - TOOLS FOR WORKING METALS OR METALLIC CARBIDES (NOT INCLUDED THOSE FALLINGS IN HEADINGS 84.49 or 84.50)	1964	178	6446	1907	550	1885	87665	158	
		1965	303	10620	2447	389	2850	84757	239	
		1966	450	4206	3658	709	5188	76892	189	
		1967	313	3167	6197	632	3664	80205	307	
		1968	416			719			1297	

IMPORTS OF METAL WORKING PRODUCTS - ANDEAN SUBREGION AND ALALC (Cont.)

1964 - 1968

(In Thousand U.S. Dollars)

NABALALC No.	DESCRIPTION	YEAR	BOLIVIA	COLOMBIA	CHILE	ECUADOR F.O.B.	PERU	TOTAL ALALC WITHOUT BOL-EC	BOLIVIA F.O.B.	COMMENTS
84.46	MACHINE - TOOLS FOR WORKING MINERALS	1964	3	90		7		250	1	
		1965	17	93		23	133	2772	9	
		1966	3	100		19	179	1460	3	Market insufficient
		1967	1	102	124	34	235	2061	6	
		1968	13			222			18	
84.47	MACHINE - TOOLS FOR WORKING WOOD, CORK, BONE EBONITE HARD ARTIFICIAL PLASTIC MATERIALS AND OTHER HARD CARVING MATERIALS	1964	39	372	221	94	258	2255	39	
		1965	199	606	228	187	889	4695	54	Specialized equipment
		1966	153	293	250	256	1562	4923	72	Market marginal
		1967	216	309	1103	116	1729	7628	167	
		1968	347			276			124	
84.48	ACCESSORIES AND PARTS SUITABLE FOR USE SOLELY OR PRINCIPALLY WITH THE MACHINES FALLING WITHIN HEADINGS 84.45, 84.47	1964	27	798		46		2851	23	
		1965	28	506		46	424	7345	32	
		1966	31	827		55	472	7418	33	Market insufficient
		1967	31	525	706	60	535	9087	81	
		1968	81			85			46	
84.49	TOOLS FOR WORKING IN THE HAND, PNEUMATIC OR WITH SELF-CONTAINED NON-ELECTRIC MOTOR	1964	33	531	3	45	3717	6231	112	
		1965	204	465	1	54	2116	6230	439	
		1966	47	391	10	71	2038	6607	500	
		1967	90	349	1325	105	2192	7620	332	
		1968	228			138			375	
84.50	GAS-OPERATED WELDING, BRAZING, CUTTING AND SURFACE TEMPERING APPLIANCES	1964	35	169	23	37	122	925	57	
		1965	36	193	29	22	215	953	21	
		1966	67	129	14	49	251	927	26	Market insufficient
		1967	58	169	186	57	232	1198	60	
		1968	74			28			22	

IMPORTS OF METAL WORKING PRODUCTS - ANDEAN SUBREGION AND ALALC (Cont.)

1964 - 1968

(In Thousand U.S. Dollars)

NAB ALC No.	DESCRIPTION	YEAR	BOLIVIA	COLOMBIA	CHILE	ECUADOR F.O.B.	PERU	TOTAL ALALC WITHOUT BOL-EC	BOLIVIA F.O.B.	COMMENTS
84.51	TYPEWRITERS, CHECK WRITING MACHINES	1964		1201	666	505	2541	6858	229	Possible grouping with 84.52, 84.53
		1965	480	303	395	618	3164	7225	365	
		1966		321	953	504	3515	10591	585	Required skilled mach. and assy
		1967	680	71	1569	524	3011	12782	560	
		1968	395			489			354	High value/weight Labor intensive
84.52	CALCULATING MACHINES ACCOUNTING MACHINES, CASH REGISTERS	1964	175	2058	2068	543	1934	26518	306	
		1965	254	1920	1749	677	2336	27528	247	
		1966	280	1819	2570	493	2908	35025	325	
		1967	563	538	3803	678	3444	43666	511	
		1968	300			898			195	
84.53	STATISTICAL MACHINES OF A KIND OPERATED IN CONJUNCTION WITH PUNCHED CARDS	1964	133	612	943		1742	13199		
		1965	9	395	335		1224	11750		
		1966	328	140	1547		1114	13906		
		1967	39	487	3517		2752	27544		
		1968	23							
84.54	OTHER OFFICE MACHINES (i.e. STENCIL DUPLICATING MACHINES, PERFORATING AND STAPLING MACHINES, ETC.)	1964	61	190	130	45	358	2964	17	Some of this product can be grouped with 85.51, 85.52, 85.53
		1965	53	59	135	115	375	2746	44	
		1966	69	66	269	118	495	2998	64	
		1967	101	185	372	94	484	3455	81	
		1968	75			97			53	
84.55	PARTS AND ACCESSORIES FOR USE SOLELY OR PRINCIPALLY WITH MACHINES IN HEADINGS 84.51, 84.52, 84.53 or 84.54)	1964		231	358	11	370	8832	10	Same as 85.54
		1965	53	1209	460	26	362	8852	25	
		1966		2726	1648	33	394	13401	39	
		1967	50	2995	580	70	560	13840	33	
		1968	27			34			24	

IMPORTS OF METAL WORKING PRODUCTS - ANDEAN SUBREGION AND ALALC (Cont.)

1964 - 1968

(In Thousand U.S. Dollars)

NABALALC No.	DESCRIPTION	YEAR	BOLIVIA	COLOMBIA	CHILE	ECUADOR F.O.B.	PERU	TOTAL ALALC WITHOUT BOL-EC	BOLIVIA F.O.B.	COMMENTS
84.56	MACHINERY FOR SORTING SCREENING, SEPARATING, WASHING, CRUSHING, GRINDING OR MIXING EARTH, STONE ORES OR MINERALS, MACHINES FOR AGGLOMERATING, MOULDING SOLID MINERAL FUELS, CERAMIC PASTE, ETC.	1964	1100	3090	1406	359	6258	18634	739	Excellent choice based on
		1965	2230	2420	1018	328	8765	25218	679	Bolivian market alone
		1966	2000	2741	1305	623	6745	23126	1021	Possible for export
		1967	3400	6410	5019	1314	8156	34888	2655	Low value/weight
		1968	3700			670			3753	
84.57	GLASS WORKING MACHINES FOR ASSEMBLING ELECTRIC FILAMENT, ETC.	1964	20	309	228	4		2038	20	
		1965	25	1116	15	21	947	4490	2	
		1966	1	567	23	2	1015	5557	3	
		1967	1	398	614	105	1548	5310	18	
		1968	21			28			24	
84.58	AUTOMATIC VENDING MACHINES (i.e. STAMP, CIGARETTE CHOCOLATE AND FOOD MACHINES)	1964				1		65		
		1965		3		X	1	81		
		1966				9	2	1665		Market insufficient
		1967					8	239		
		1968	272			2				
84.59	NUCLEAR REACTORS	1964	250							
		1965	448							
		1966	1709							
		1967	1228							
		1968	952							
84.59	OTHERS NOT SPECIFIED	1964		3625	40032		23566	159792	1043	
		1965		3205	35346		16129	115128	1048	
		1966		3450	41445		24824	110130	1005	
		1967		5139	10651		24105	95044	577	
		1968							562	

IMPORTS FOR METAL WORKING PRODUCTS - ANDEAN SUBREGION AND ALALC (Cont.)

1964 - 1968

(In Thousand U.S. Dollars)

NABALALC No.	DESCRIPTION	YEAR	BOLIVIA	COLOMBIA	CHILE	ECUADOR F.O.B.	PERU	TOTAL ALALC WITHOUT BOL-EC	BOLIVIA F.O.B.	COMMENTS
84.60	MOULDING BOXES FOR METAL FOUNDRY FOR GLASS, FOR MINERAL MATERIALS, FOR RUBBER OR PLASTIC	1964		586	59	54	30	4265	13	
		1965	13	383	52	99	546	6356	21	
		1966		304	109	68	794	8668	30	
		1967	64	359	510	52	995	8226	205	
		1968	303						111	
84.61	TAPS, COCKS, VALVES FOR PIPES, BOILER SHELLS TANKS, VATS, ETC.	1964	309	3249	3667	218	2212	18292	132	
		1965	524	2444	3795	541	3074	19723	499	
		1966	605	2354	5309	575	4048	25420	440	
		1967	446	3163	3614	857	4748	30220	286	
		1968	672			616			545	
84.62	BALL, ROLLER OR NEEDLE ROLLER BEARINGS	1964	277	3577	2959	302	1643	31492	189	
		1965	311	2176	3510	237	1704	36739	183	
		1966	363	4638	4014	304	2000	50268	250	
		1967	325	2871	2915	299	2150	43593	226	
		1968	403			304			221	
84.63	TRANSMISSION SHAFTS, CRANKS, BEARING HOUSINGS, ETC.	1964	243	1173	1127	27	1615	24816	252	
		1965	248	1306	1222	128	2250	40167	123	
		1966	335	5282	1725	164	2773	46420	184	
		1967	420	3123	6595	432			260	
		1968				397				
84.64	GASKETS AND SIMILAR JOINTS OF METAL SHEETING COMBINED WITH OTHER MATERIAL	1964	46		1779	5		1813	2	
		1965	69	137	1935	42	530	3577	11	
		1966	76	622	2768	33	645	5192	16	
		1967	85	262	655	45	565	6365	12	
		1968	80			41			22	

IMPORTS OF METAL WORKING PRODUCTS - ANDEAN SUBREGION AND ALALC (Cont.)

1964 - 1968

(In Thousand U.S. Dollars)

NABALALC No.	DESCRIPTION	YEAR	BOLIVIA	COLOMBIA	CHILE	ECUADOR F.O.B.	PERU	TOTAL ALALC WITHOUT BOL-EC	BOLIVIA F.O.B.	COMMENTS
84.65	MACHINE PARTS, NOT CONTAINING ELECTRICAL CONNECTORS, INSULATORS, COILS, ETC.	1964	3	801	21794	52	3318	32053	11	
		1965	13	537	20345	73	558	26625	34	
		1966	4	1227	25732	87	518	36045	40	
		1967	5	779	3420	166	701	8757	53	
		1968	10			239			36	
86.01	STEAM RAIL LOCOMOTIVES AND TENDERS	1964			116			1157	9442	
		1965	X					50	10022	
		1966						3	15247	
		1967	X					80	15945	
		1968							24474	
86.02	ELECTRIC RAIL LOCOMOTIVES OTHER THAN SELF-GENERATING	1964	4	1251	5456		114	6833	13	
		1965	110		4635		176	7067	X	
		1966	149	96	828		328	1790	118	
		1967	61	13	893		335	2978	151	
		1968	265						860	
86.03	OTHER RAIL LOCOMOTIVES	1964	47	151	546	71	5407	54253	16	
		1965	1030	42	291	13	1810	12791	X	
		1966		91	145	7	2139	7604	16	
		1967	7		2268	X	464	35254	7	
		1968	30			17			3575	
86.04	MECHANICALLY PROPELLED RAILWAY AND TRAINWAY COACHES	1964	18		23	8	11	507	4	
		1965		214	22	1	60	898	X	
		1966	3		12	X	8	4173	X	
		1967	231	15	209	X	254	4875	238	
		1968	925			X			1223	

IMPORTS OF METAL WORKING PRODUCTS - ANDEAN SUBREGION AND ALALC (Cont.)

1964 - 1968

(In Thousand U.S. Dollars)

NABALALC No.	DESCRIPTION	YEAR	BOLIVIA	COLOMBIA	CHILE	ECUADOR F.O.B.	PERU	TOTAL ALALC WITHOUT BOL-EC	BOLIVIA F.O.B.	COMMENTS
86.05	RAILWAY AND TRAINWAY PASSENGER COACHES AND LUGGAGE VANS, TRAVELLING POSTOFFICE COACHES, ETC.	1964			182	9	5	3543	X	
		1965	5	251		X	26	4596	X	
		1966				X	204	3455	X	
		1967	X			X	53	1775	168	
		1968				X			232	
86.06	RAILWAY AND TRAINWAY ROLLING-STOCK AND OTHER SERVICE VEHICLES	1964			55	1		389		
		1965	X	26	26	X	123	512		Market insufficient
		1966		5	3	X	335	783		
		1967	27	56	289	9	59	679		
		1968	.028							
86.07	RAILWAY AND TRAINWAY GOODS VANS, GOODS WAGONS AND TRUCKS	1964		7195	518		1474		X	
		1965	83	1270	425		2287	10261	19	
		1966		138	598		421	1813	18	Market insufficient
		1967	34	62	399		890	1668	14	
		1968	103						1363	
86.08	ROAD-RAIL AND SIMILAR CONTAINERS FOR TRANSPORT BY RAIL, ROAD AND SHIP	1964	59							
		1965	5	17			14	229		
		1966	10				133	170		Market insufficient
		1967	3		2		1	39		
		1968	14							
86.09	PARTS OF RAILWAY AND TRAIN-WAY LOCOMOTIVES AND ROLLING-STOCK	1964	138	1835	2085	153	1253	40288	84	
		1965	67	623	1795	93	1397	44495	53	
		1966	160	664	2006	49	1390	22354	102	Market insufficient
		1967	253	1223	1710	40	2360	25342	126	
		1968	183			59			690	

IMPORTS FOR METAL WORKING PRODUCTS - ANDEAN SUBREGION AND ALALC (Cont.)

1964 - 1968

(In Thousand U.S. Dollars)

NABALALC No.	DESCRIPTION	YEAR	BOLIVIA	COLOMBIA	CHILE	ECUADOR F.O.B.	PERU	TOTAL ALALC WITHOUT BOL-EC	BOLIVIA F.O.B.	COMMENTS
86.10	RAILWAY AND TRAMWAY TRUCK FIXTURES AND FITTINGS	1964	10		730	2		4635		
		1965	1	75	647	X	11	4010		
		1966	1	27	886	7	44	2703		Market insufficient
		1967	2		10	7	7	310		
		1968	1			X				
87.01	TRACTORS, WHETHER OR NOT FITTED WITH POWER TAKE-OFFS, WINCHES OR PULLERS	1964	760	8853	4532	1196	4221		1333	Start by importing engine, transmission build rest
		1965	3000	9340	5218	1357	9065	37701	520	
		1966	900	8435	6476	1602	15681	60772	482	Enough local market
		1967	2152	6761	11075	1657	11021	58430	2740	possible export
		1968	4056			2880		62916	1210	
87.01	OTHER TRACTORS	1964		6330	85			46810	4042	Model variation
		1965		923	0			24263	4651	will be deciding factor
		1966		908	0			51657	7286	
		1967		2512	145		161	30635	8263	
		1968							6903	
87.02	MOTOR VEHICLES FOR THE TRANSPORT OF PERSONS, GOODS OR MATERIALS	1964		6650	7746	3724	26555	150524	702	
		1965	8546	8838	10718	2993	34267	155432	1077	
		1966		25413	10341	2322	46336	168406	2895	Assay operation
		1967	15978	22356	13604	2252	41191	166222	1319	
		1968	11223			3335			1707	
87.02	PUBLIC SERVICE TYPE PASSENGERS VEHICLES (i.e. MOTOR BUSES, COACHES)	1964		57	261	276	2535	4732	509	
		1965		126	294	326	7439	11407	140	
		1966		154	462	492	3593	10909	448	Existing industry
		1967		5	7739	416	14414	22454	371	Bus bodies
		1968				235			283	

IMPORTS OF METAL WORKING PRODUCTS - ANDEAN SUBREGION AND ALALC (Cont.)

1964 - 1968

(In Thousand U.S. Dollars)

NABALALC No.	DESCRIPTION	YEAR	BOLIVIA	COLOMBIA	CHILE	ECUADOR F.O.B.	PERU	TOTAL ALALC WITHOUT BOL-EC	BOLIVIA F.O.B.	COMMENTS
87.02	OTHERS (i.e. TRUCKS, STATION WAGONS, AMBULANCES, ETC.)	1964		16927	10512	9617	16176	63694		Existing industry
		1965		12146	10060	7639	24074	93483		Bus bodies
		1966		16541	14697	8133	21270	98677		
		1967		11142	29014	9908	21820	122939		
		1968				12845				
87.03	SPECIAL PURPOSES MOTOR LORRIERS AND VANS (i.e. FIRE ENGINES, ETC.)	1964		1553	799	404	26	6521	157	
		1965	281	258	398	464	1388	4768	224	
		1966		559	415	198	614	6455	445	Market insufficient
		1967	146	2570	1848	312	2306	16382	815	
		1968	546			454			1076	
87.04	CHASSIS FITTED, WITH ENGINES, FOR THE MOTOR VEHICLES, FALLING WITHIN HEADINGS 87.01, 87.02 or 87.03	1964						46940		
		1965	33	8282			451	8733		
		1966			1		3702	9703		Market insufficient
		1967	314		2486		15767	18253		
		1968	375							
87.04	THE REMAINING CHASSISES WITH MOTOR	1964		838	3237	496	1720	23375	4	
		1965			3801	173	692	11082	X	
		1966		2428	16004	206	1024	26988	X	Market insufficient
		1967		6087	1899	257	341	17510	17	
		1968				526			67	
87.05	BODIES INCLUDING CABS FOR THE MOTOR VEHICLES FALLING IN 87.01, 87.02, 87.03	1964	49	12	206	X	148	386	X	
		1965	108	25	240	83	45	338	49	
		1966	14	9	344	150	127	515	103	Market insufficient
		1967	10	14	74	108	340	482	14	
		1968	24			64			29	

IMPORTS OF METAL WORKING PRODUCTS - NADEAN SUBREGION AND ALALC (Cont.)

1964 - 1968

(In Thousand U.S. Dollars)

NABALALC No.	DESCRIPTION	YEAR	BOLIVIA	COLOMBIA	CHILE	ECUADOR F.O.B.	PERU	TOTAL ALALC WITHOUT BOL-EC	BOLIVIA F.O.B.	COMMENTS
87.06	PARTS AND ACCESSORIES OF THOSE MOTOR VEHICLES (EXCEPT MOTORCYCLES)	1964		18114	5254	900	17111	178190	157	Product line too varied
		1965	1652	9655	7050	3207	15908	161440	2012	
		1966		18758	11186	3380	18939	149713	2056	
		1967	1720	9248	13874	4132	19100	132017	2597	
		1968	2356			4478			2626	
87.07	WORKS TRUCKS, OF THE TYPES USED IN FACTORIES OR WAREHOUSES	1964	7	62	25	155	510	3255	21	
		1965	20	430	4	151	624	5311	45	
		1966	45	1015	110	227	714	7495	105	Market insufficient
		1967	39	1452	959	226	716	8739	14	
		1968	69			233			131	
87.08	TANKS AND OTHER ARMOURED FIGHTING VEHICLES, MOTORISED	1964			4			4		
		1965	X	3	21			27		
		1966			1			679		
		1967	4		329			2321		
		1968								
87.11	INVALID CARRIAGES FITTED WITH MEANS OF MECHANICAL PROPULSION	1964		0	7	164		7	265	
		1965		3	7	150	15	29	126	
		1966		8	1	137	19	42	141	Market insufficient
		1967		3	1	189	17	35	211	
		1968	133			240			86	
87.12	PARTS AND ACCESSORIES OF ARTICLES FALLING WITHIN HEADINGS 87.09, 87.10 or 87.11	1964	157	24	101	13	221	1140	-	
		1965	169		152	20	13	1029	38	
		1966	130		179	22	20	937	19	Market insufficient
		1967	166		75	18	18	882	13	
		1968	108			17			8	

IMPORTS OF METAL WORKING PRODUCTS - ANDEAN SUBREGION AND ALALC (Cont.)

1964 - 1968

(In Thousand U.S. Dollers)

NABALALC No.	DESCRIPTION	YEAR	BOLIVIA	COLOMBIA	CHILE	ECUADOR F.O.B.	PERU	TOTAL ALALC WITHOUT BOL-EC	BOLIVIA F.O.B.	COMMENTS
87.13	BABY CARRIAGES AND INVALID CARRIAGES (OTHER THAN MOTORISED OR MECHANICALLY PROPELLED)	1964		6	8	14	55	181		
		1965	6		7	13	82	188		
		1966		15	9	12	133	263		Market insufficient
		1967	8	29	25	13	129	331		
		1968	16			17				
87.14	OTHER VEHICLES (INCLUDING TRAILERS) NOT MECHANICALLY PROPELLED, AND PARTS THEREOF	1964		108	474		446	2451		
		1965	183	660	523		560	3061		
		1966		92	781		977	3460		Market insufficient
		1967	195	95	937		1033	4164		
		1968	119							
88.01	BALLONS AND AIR SHIPS	1964				X	86	86		
		1965	9			X		21		
		1966				3		3		Market insufficient
		1967	X			X		177		
		1968				2				
88.02	FLYING MACHINES, GLIDERS AND KITES, ROTOCHUTES	1964	873	3493	13966	1233	158	37834	367	Market not large enough
		1965	575	2109	2717	727	894	21433	378	for complex technology
		1966	440	7531	4675	516	1694	57912	522	required for manufacturing
		1967	558	7682	2770	795	67	76516	252	
		1968	964			1459			1568	
88.03	PARTS OF GOODS FALLING IN HEADINGS 88.01 or 88.02	1964	433	2452	1232	301	1202	28838	325	
		1965	363	1936	649	411	518	13322	367	Same as 88.02
		1966	534	4898	766	364	342	16986	328	
		1967	446	3181	2716	439	115	15623	265	
		1968	555			998		442	442	

IMPORTS OF METAL WORKING PRODUCTS - ANDEAN SUBREGION AND ALALC (Cont.)

1964 - 1968

(In Thousand U.S. Dollars)

NABALALC No.	DESCRIPTION	YEAR	BOLIVIA	COLOMBIA	CHILE	ECUADOR F.O.B.	PERU	TOTAL ALALC WITHOUT BOL-EC	BOLIVIA F.O.B.	COMMENTS
89.01	WAR SHIPS OF ALL KINDS	1964								
		1965								
		1966								
		1967	7	2	24			26		Market insufficient
		1968	78							
89.01	SHIPS AND BOATS (EXCEPT WAR SHIPS)	1964		660	5952	442	91	12405	5	
		1965		660	8202	10	151	23400	2	
		1966		223	302	6	236	3970	108	Market insufficient
		1967		6925	1444	94	166	39752	3	
		1968				10231			66	
82.02	TUGS	1964		146		277		569		
		1965	X	54		X		81		
		1966		123		9		123		Market insufficient
		1967	1			X		1915		
		1968				X				
89.03	LIGHT-VESSELS, FIRE FLOATS, DREDGERS OF ALL KINDS, FLOATING CRANES, ETC.	1964	18	469	405	93	95	1242		
		1965	1	400		20	119	960		
		1966	815	811	15	X	59	6782		Market insufficient
		1967	349	2246		597	42	3901		
		1968	124			X				
89.04	SHIPS, BOATS AND OTHER VESSELS FOR BREAKING UP	1964						635		
		1965	X					436		
		1966						106		Market insufficient
		1967	X							
		1968								

IMPORTS OF METAL WORKING PRODUCTS - ANDEAN SUBREGION AND ALALC (Cont.)

1964 - 1968

(In Thousand U.S. Dollars)

NABALAC No.	DESCRIPTION	YEAR	BOLIVIA	COLOMBIA	CHILE	ECUADOR F.O.B.	PERU	TOTAL ALALC WITHOUT BOL-EC	BOLIVIA F.O.B.	COMMENTS
89.05	FLOATING STRUCTURES OTHER THAN VESSELS (i.e. COFFER DAMS, LANDING STAGES, BUOYS, ETC.)	1964			336	136		337		
		1965		38	336	9	1	382		
		1966		18	119	X	40	404		Market insufficient
		1967		46	29	71	11	145		
		1968	.118			X				
90.03	FRAMES AND MOUNTINGS, AND PARTS THEREOF, FOR SPECTUDES, PRINCO-NEZ, ETC.	1964		5		24	72		23	
		1965	29	2		25	178		21	
		1966			105	19	281		27	Market insufficient
		1967	41		4	24	215		24	
		1968	33			35			23	
90.05	REFRACTING TELESCOPES PRISMATIC OR NOT	1964		16	57	1	3	188	2	
		1965	5	4	30		9	177	2	Market insufficient
		1966		13	27	2	16	506	8	
		1967	5	10	29	1	28	595	10	
		1968	6			3			8	
90.06	ASTRONOMICAL INSTRUMENTS	1964	66	3	0		70	93		
		1965	4	1.1	0		6	21		
		1966	6	2.7	0		7	114		Market insufficient
		1967	11	14	1206		13	1280		
		1968	2							
90.09	IMAGE PROJECTORS	1964	17	1396	288	56	382	3393	2	
		1965	34	244	306	188	852	2856	4	
		1966	41	93	396	22	1077	3651	7	Market insufficient
		1967	41	163	283	39	817	3876	15	
		1968	20			94			30	

IMPORTS OF METAL WORKING PRODUCTS - ANDEAN SUBREGION AND ALALC (Cont.)

1964 - 1968

(In Thousand U.S. Dollars)

NAB'LALC No.	DESCRIPTION	YEAR	BOLIVIA	COLOMBIA	CHILE	ECUADOR F.O.B.	PERU	TOTAL ALALC WITHOUT BOL.-EC	BOLIVIA F.O.B.	COMMENTS
90.10	APPARATUS AND EQUIPMENT OF A KIND USED IN PHOTOGRAPHIC OR CINEMATOGRAPHIC LABORATORIES	1964		2	0	42	140	1190	49	
		1965	29	3	0	46	281	3100	27	
		1966		17	4	39	277	5169	29	Market insufficient
		1967	61	25	278	280	225	7773	60	
		1968	53			331			69	
90.11	MICROSCOPES AND DIFFRACTION APPARATUS, ELECTRON AND PISTON	1964	8	0	0	2	0	0		
		1965	19	16	0	X	31	643		
		1966	7	16	0	X	4	300		Market insufficient
		1967	13	14	32	1	3	498		
		1968	9			X				
90.12	COMPOUND OPTICAL MICROSCOPES	1964	10	133	0	12	263	2053	10	
		1965	23	86	0	53	273	2088	29	
		1966	20	154	0	27	204	2554	44	Market insufficient
		1967	41	194	736	42	279	3503	34	
		1968	19			37			45	
90.13	OPTICAL APPLIANCES AND INSTRUMENTS	1964		112	54	2	22	205	1	
		1965	10	36	21	8	43	246	10	
		1966		39	93	5	97	515	5	
		1967	7	29	14	7	73	544	3	
		1968	7			12			5	
90.14	SURVEYING HIDROGRAPHIC NAVIGATIONAL, METEOROLOGICAL, GEOPHISICAL INSTRUMENTS	1964	288	707	459	86	738	395	117	High specialized skills required
		1965	203	379	450	182	592	3503	70	Training period long
		1966	260	371	671	142	871	5428	85	High capital investment
		1967	523	452	561	199	753	6051	100	High value/weight
		1968	248			96			109	Possible export

IMPORTS OF METAL WORKING PRODUCTS - ANDEAN SUBREGION AND ALALC (Cont.)

1964 - 1968

(In Thousand U.S. Dollars)

NABALALC No.	DESCRIPTION	YEAR	BOLIVIA	COLOMBIA	CHILE	ECUADOR F.O.B.	PERU	TOTAL ALALC WITHOUT BOL-EC	BOLIVIA F.O.B.	COMMENTS
90.15	BALANCES OF A SENSITIVITY OF FIVE CENTIGRAMMES OR BETTER	1964		83	46	6	59	532	3	
		1965	6	22	41	9	68	559	13	
		1966		20	78	13	86	739	12	Market insufficient
		1967	15	34	92	10	75	677	40	
		1968	14			10			80	
90.16	DRAWING, MARKING OUT AND MATHEMATICAL, CALCULATING INSTRUMENTS	1964	118	349	165	94	395	3228	66	
		1965	126	440	201	136	133	5507	99	
		1966	165	324	338	118	798	7467	125	Possible group with
		1967	195	382	2495	107	952	10214	149	90.16
		1968	187			164			153	
90.17	MEDICAL, DENTAL, SURGICAN AND VETERINARY INSTRUMENTS AND APPLIANCES (ELECTRO-MEDICAL)	1964	250	1114	29	23	78	1669	6	
		1965	341	223	23	79	1156	2234	18	
		1966	262	343	67	91	4154	6915	20	Market insufficient
		1967	354	307	629	470	1732	5037	17	
		1968	281			43			28	
90.17	OTHER (NOT ELECTROMEDICAL INSTRUMENTS)	1964		1850	392	372	1129	7906	124	
		1965		761	745	396	1005	6215	150	
		1966		1422	855	319	989	9020	165	Market insufficient
		1967		1261	1681	1767	1248	10359	180	
		1968				723			296	
90.18	MECHANO-THERAPY APPLIANCES	1964	64	10	97	4	221	1124	3	
		1965	35	52	83	27	312	1589	26	
		1966	43	59	145	29	345	1501	12	Market insufficient
		1967	37	116	281	117	377	1808	25	
		1968	63			42			42	

IMPORTS OF METAL WORKING PRODUCTS - NADEAN SUBREGION AND ALALC (Cont.)

1964 - 1968

(In Thousand U.S. Dollars)

NABALALC No.	DESCRIPTION	YEAR	BOLIVIA	COLOMBIA	CHILE	ECUADOR F.O.B.	PERU	TOTAL ALALC WITHOUT BOL-EC	BOLIVIA F.O.B.	COMMENTS
90.20	APPARATUS BASED ON THE USE OF X-RAYS	1964	122	410	706	117	747	6336	101	
		1965	212	264	502	72	767	6665	126	
		1966	82	724	265	45	838	7785	41	Market insufficient
		1967	71	380	890	247	648	8906	77	
		1968	112			206			134	
90.21	INSTRUMENTS, APPARATUS OR MODELS DESIGNED SOLELY FOR DEMONSTRATION PURPOSES	1964		994	85	53	64	7626	21	
		1965	33	564	102	60	139	1567	18	
		1966		960	234	42	245	3126	31	Market insufficient
		1967	112	603	288	62	305	3254	48	
		1968	256			54			198	
90.22	MACHINES AND APPLIANCES FOR TESTING MECHANICALLY THE HARDNESS, STRENGHT, ELASTICITY AND THE LIKE OF INDUSTRIAL MATERIALS	1964	5	200	77	6	0	2731		
		1965	10	127	3	14	104	1931		
		1966	22	129	25	24	196	3263		Market insufficient
		1967	12	114	234	6	643	3745		
		1968	67			14				
90.23	HYDROMETERS AND SIMILAR INSTRUMENTS	1964		438	255	10	313	1528	6	
		1965	25	122	215	15	231	2303	12	
		1966		123	283	16	181	2619	15	Market insufficient
		1967	20	107	295	29	261		11	
		1968	27			29			15	
90.24	INSTRUMENTS AND APPARATUS FOR MEASURING, CHECKING OR AUTOMATICALLY CONTROLLING THE FLOW, DEPLOT OF LIQUIDS OR GASES	1964	40	697	229	16	178	4969	4	
		1965	73	600	211	71	695	7338	74	
		1966	110	673	266	52	1107	11255	44	Market insufficient
		1967	98	978	1798	120	1322	14202	53	
		1968	69			68			91	

IMPORTS OF METAL WORKING PRODUCTS - ANDEAN SUBREGION AND ALALC (Cont.)

1964 - 1968

(In Thousand U.S. Dollars)

NABALALC No.	DESCRIPTION	YEAR	BOLIVIA	COLOMBIA	CHILE	ECUADOR F.O.B.	PERU	TOTAL ALALC WITHOUT BOL-EC	BOLIVIA F.O.B.	COMENTS
90.25	INSTRUMENTS FOR PHYSICAL OR CHEMICAL ANALYSIS	1964	56	644	896	14	699	11492	9	
		1965	96	228	998	93	615	4014	54	
		1966	57	407	1240	115	508	5620	57	Market insufficient
		1967	78	276	862	178	1080	5342	206	
		1968	107			117			92	
90.27	REVOLUTION COUNTERS, PRODUCTION COUNTERS, TAXIMETERS, ETC.	1964	4	123	17	1	109	979		Group with 91.01
		1965	7	80	19	2	72	1193		
		1966	5	66	159	3	129	1791		
		1967	7	126	296	4	132	2044		
		1968	10			4				
90.28	ELECTRICAL MEASURING, CHECKING OR AUTOMATICALLY CONTROLLING	1964	99	565		301	353	8242	166	
		1965	115	496	2	478	1135	13731	228	
		1966	226	627		399	1660	18320	192	
		1967	122	1021	2428	514	1626	25119	493	
		1968	249			596			371	
90.29	PARTS OR ACCESSORIES SUITABLE FOR USE SOLELY WITH ONE OR MORE OF THE ARTICLES FALLING WITHIN HEADING 90.23, 90.24, 90.26, 90.27 or 90.28	1964	29	190	113	9	0	1062	4	
		1965	17	344	90	76	154	4035	84	
		1966	15	461	187	45	366	5130	116	
		1967	39	680	450	73	532	7751	86	
		1968	59			82			91	
91.02	CLOCKS WITH WATCH MOVEMENTS (EXCLUDING THOSE ON 91.03)	1964		1	83	1	0	694		
		1965	24	70	127	1	10	669		
		1966		35	263		14	686		Group with 91.01
		1967	46	43	81		25	457		
		1968	28							

IMPORTS OF METAL WORKING PRODUCTS - SUBREGION ANDEAN AND ALALC (Cont.)

1964 - 1968

(In Thousand U.S. Dollars)

NABALALC No.	DESCRIPTION	YEAR	BOLIVIA	COLOMBIA	CHILE	ECUADOR F.O.B.	PERU	TOTAL ALALC WITHOUT BOL-EC	BOLIVIA F.O.B.	COMMENTS
91.03	INSTRUMENT PANEL CLOCKS OF SIMILAR TYPE, FOR VEHICLES, AIRCRAFTS OR VESSELS	1964		1	6	X	0	7		Group with 91.01
		1965		2	3		4	32		
		1966		7	3	1	4	155		
		1967	1	1	3	X	0	118		
		1968	1			X				
91.04	OTHER CLOCKS	1964		261	20	60	322	853	26	Group with 91.01
		1965	42	13	31	29	292	613	51	
		1966		7	16	27	432	1032	74	
		1967	41	11	240	38	417	1274	63	
		1968	53			29			51	
91.05	TIME OF DAY RECORDING APPARATUS; WITH CLOCK OR WATCH MOVEMENTS	1964		31	5	5	64	309	3	
		1965	9	22	6	22	98	563	8	Group with 91.01
		1966		5	13	9	125	895	4	
		1967	18	12	105	10	160	1140	16	
		1968	27			14			16	
91.06	TIME SWITCHES WITH CLOCK OR WATCH MOVEMENT OR WITH SYNCHRONOUS MOTOR	1964		22	6	1	0	48		
		1965	1	4	6	5	29	349		Group with 91.01
		1966		53	6	1	43	520		
		1967	9	60	207		37	1020		
		1968	6							
91.07	WATCH MOVEMENTS ASSEMBLED	1964		1	37	9	599	1227		
		1965		0	39	0	43	355		Technology complex would need to import
		1966		5	75	12	47	761		
		1967		1	13	5	62	587		
		1968	.019			6				

IMPORTS OF METAL WORKING PRODUCTS - ANDEAN SUBREGION AND ALALC (Cont.)

1964 - 1968

(In Thousand U.S. Dollars)

NABALALC No.	DESCRIPTION	YEAR	BOLIVIA	COLOMBIA	CHILE	ECUADOR F.O.B.	PERU	TOTAL ALALC WITHOUT BOL-EC	BOLIVIA F.O.B.	COMMENTS
91.08	CLOCK MOVEMENT ASSEMBLED	1964	0	0	4	X	0	16		
		1965		11	6	X	11	48		Group with 91.01
		1966		24	7	1	10	120		
		1967		25	2	X	2	124		
		1968	.117			1				
91.09	WATCH CASES AND PARTS OF WATCH CASES, INCLUDING BLANKS THEREOF	1964		1	1		0	378		Group with 91.01
		1965	2	0	2	3	20	122		
		1966		2	7	1	12	185		
		1967		0	2	3	23	147		
		1968	2			1				
91.10	CLOCK CASES AND CASES OF A SIMILAR TYPE FOR OTHER GOODS OF THIS CHAPTER, AND PARTS THEREOF	1964		0	0		0	86		Group with 91.01
		1965		0	0		1	32		
		1966		0	0		5	43		
		1967		1	0		1	29		
		1968								
91.11	OTHER CLOCKS AND WATCH PARTS	1964		28	0	19	16	623	4	Group with 91.01
		1965	3	11	0	13	42	529	5	
		1966		52	0	16	60	719	13	
		1967	2	56	58	17	58	875	6	
		1968	3			19			13	
93.01	SIDE-ARMS (i.e. SWORDS BAYONETS AND PARTS THEREOF)	1964		9	6		3	30		
		1965	2	0	19		3	31		
		1966		5	16		2	32		
		1967	2	10	14		1	32		
		1968	.490							

IMPORTS OF METAL WORKING PRODUCTS - ANDEAN SUBREGION AND ALALC (Cont.)

1964 - 1968

(In Thousand U.S. Dollars)

NABALALC No.	DESCRIPTION	YEAR	BOLIVIA	COLOMBIA	CHILE	ECUADOR F.O.B.	PERU	TOTAL ALALC WITHOUT BOL-EC	BOLIVIA F.O.B.	COMMENTS
93.02	REVOLVER AND PISTOLS	1964		726	11		172	958		
	FIRE ARMS	1965	50	944	50		87	1155		
		1966		278	73		80	587		
		1967	67	382	13		65	735		
		1968	17							
93.03	ARTILLERY WEAPONS	1964		1	16		0	2870		
	MACHINE-GUNS AND OTHER	1965	10	0	0		2	7		
	MILLITARY FIRE ARMS	1966		34	72		0	324		
		1967	35	158	639		0	866		
		1968	11							
93.04	OTHER FIRE ARMS, IN-	1964		318	305	4	177	882	29	
	CLUDING VERY LIGHT PISTOLS	1965	63	729	80	3	235	1275	19	
		1966		238	72	11	165	1082	47	
		1967	67	362	35	5	294	1166	17	
		1968	42			12			14	
93.05	ARMS OF OTHER DESCRIPTIONS	1964	6	22	4	35		76		
	INCLUDING AIR, SPRING AND	1965		32	5	1	49	98		
	SIMILAR PISTOLS, RIFLES	1966		19	15	5	29	100		
	AND GUNS	1967	4	31	21	4	47	150		
		1968	5			5				
93.06	PARTS OF ARMS BUT NOT	1964		0	0		3	140		
	INCLUDING PARTS OF SIDE-	1965	1	99	15		1	365		Market insufficient
	ARMS	1966		16	50		1	199		
		1967	2	35	126		1	327		
		1968	8							
93.06	PARTS OF ARMS FALLING	1964		36	0		0	70		
	WITHIN HEADING 93.04	1965		34	0		0	34		Market insufficient
	or 93.05	1966		57	0		0	325		
		1967		363	41		0	493		
		1968								

IMPORTS OF METAL WORKING PRODUCTS - ANDEAN SUBREGION AND ALALC (Cont.)

1964 - 1968

(In Thousand U.S. Dollars)

NABALALC No.	DESCRIPTION	YEAR	BOLIVIA	COLOMBIA	CHILE	ECUADOR F.O.B.	PERU	TOTAL ALALC WITHOUT BOL-EC	BOLIVIA F.O.B.	COMMENTS
93.07	BOMBS, GRANADES, TORPEDOES, MINES GUIDED WEAPONS AND MISSILES, ETC.	1964		1	164	33	374	673	31	
		1965	94	1175	334	51	376	1937	97	
		1966		269	911	46	303	1570	114	Market insufficient
		1967	244	289	1383	90	362	2130	76	
		1968	201			56			136	
93.07	GUIDED WEAPONS AND MUNITIONS NOT SPECIFIED	1964		243	1		0	1385		
		1965		177	4		7	735		
		1966		615	1		24	1336		
		1967		812	423		10	1793		
		1968								
97.06	APPLIANCES, APPARATUS ACCESSORIES AND REQUISITES	1964		117	90	30	150	1675	24	Group with 97.02
		1965	52	43	134	87	241	1361	30	
		1966		42	143	36	307	1426	29	
		1967	47	31	203	45	294	1892	33	
		1968	46			34			15	
97.07	FISH HOOKS, LINE FISHING RODS AND TACKLES ETC.	1964		69	2479	28	62	2888		
		1965	4	35	2282	3	42	2714		
		1966		16	1469	10	61	2097		Market insufficient
		1967	5	34	110	6	39	116		
		1968	3			4				
98.07	DATE, SEALING AND SIMILAR STAMPS, HAND-OPERATED	1964		36	41	10	34	145		
		1965		11	41	37	58	173		
		1966		20	56	28	52	228		Market insufficient
		1967	5	39	25	31	64	250		
		1968	2			19				

A P P E N D I X C

C U E N C A D E L P L A T A I M P O R T S

1 9 6 7

CUENCA DEL PLATA IMPORTS
1967

(Thousand US dollars)

NABALALC Code	Description	Argentina	Brazil	Paraguay
73.02	Ferromanganese	1539	1529	-
73.10	Bars & rods of iron & steel	796	1584	537
73.14	Iron and steel wire	111	1640	649
73.18	Tubes & pipes of iron & steel	5338	3513	123
73.21	Steel Structures	982	505	297
73.25	Stranded iron & steel wire, cables and rope	162	1436	78
73.29	Chain & parts of iron & steel	1087	1585	20
73.32	Nuts and bolts	3223	1658	87
73.36	Stores	14	20	160
73.40	Castings & forgings iron and steel	1184	419	157
82.01	Hand tools shovels etc.	274	134	181
82.02	Saws & blades hand/machine	261	887	25
82.03	Hand tools, pliers, snips etc.	1048	2461	99
82.04	Hand tools diamond manufacture	260	1649	100
82.05	Interchange tools, machine etc.	7960	12323	25
82.11	Razors and blades	601	121	138
83.01	Locks and padlocks	281	-	43
83.02	Base and metal fittings	1100	45	46
83.15	Wire rods & electrodes etc.	270	1785	40
84.06	I. C. Engines	12250	18368	570

CUENCA DEL PLATA IMPORTS
1967

NABALALC Code	Description	Argentina	Brazil	Paraguay
84.10	Pumps for liquids	11375	5003	109
84.11	Airpumps tons & blowers	10903	8332	42
84.14	Industry & laboratory furnaces	2474	2306	-
84.15	Refrigerators	556	121	555
84.17	Heating, distilling, sterilizing	415	6244	-
84.22	Hoists and winches	5226	5901	115
84.23	Excavating, boring equipment	22192	16735	2111
84.24	Tillage equipment, plows, etc.	223	408	70
84.29	Dairy machinery	135	214	251
84.30	Machinery, bakery confect.	1230	1219	330
84.37	Weaving knitting machinery	2988	5842	198
84.40	Machinery for finishing textiles	1209	746	105
84.41	Sewing machinery	1182	2760	240
84.45	Machinery tools - metal	11301	25116	128
84.46	Machinery tools - stone ceramics	166	601	2
84.47	Machinery tools - wood, cork, bone	329	1212	35
84.48	Machinery tool accessories	3516	28	6
84.49	Portable hand tools air or electric	719	1053	2
84.51	Typewriters	3100	3057	152
84.53	Statistical machinery	7979	1451	11
84.55	Parts & Accessories for 84.51, 84.53	1940	3908	13

CUENCA DEL PLATA IMPORTS
1967

NABALALC Code	Description	Argentina	Brazil	Paraguay
84.56	Mineral sorting, crushing	1982	4761	159
84.61	Taps, cocks, valves	5147	2908	-
84.62	Bulls, roller, needle bearing	10388	13986	-
84.63	Trans. shafts, cranks, housings	10755	9855	129
85.05	Hand tools w/electric motor	300	732	68
85.11	Industrials, lab furnaces	831	2442	20
87.01	Tractors	6342	24381	883
87.07	Fork trucks, sm. trucks etc.	1087	914	-
87.09	Motorcycles	89	8	209
87.10	Bicycles	1	2	53
87.12	Parts & Acc. 87.09, 87.10, 87.11	46	460	196
87.14	Other vehicles	64	51	118
90.05	Refract telescopes	36	41	1
90.10	Photo copying	1722	925	-
90.12	Compound optical microscope	567	1035	21
90.13	Optical appliances	92	195	1
90.14	Surveying	1217	1743	6
90.15	Balances-sensitive	102	158	1
90.16	Drawing instruments	982	2544	146
90.25	Instruments chem.analysis	668	1734	-
90.26	Gas, liquid meters	1071	1682	36
91.05	Clocks	61	44	1

A P P E N D I X D

LIST OF COMPANIES INTERVIEWED

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Fundición Hormet Achachicala La Paz, Bolivia	Foundry for Tin and Lead
Fundición Oruro Oruro, Bolivia	Foundry for Tin
Fundición de Estaño-Metal Oruro, Bolivia	Foundry for Tin
Empresa Nacional de Fundiciones "ENAF" Oruro, Bolivia	Foundry for Tin
Kalifra Ltda. Teniente Oquendo 224 La Paz, Bolivia	Works in Aluminum and Iron
Sociedad Anónima Volcán Av. Pando 101 La Paz, Bolivia	Machinery, parts of machinery repairments Iron Foundry, and rebuilding
La Precisa Av. Simón Bolivar 1527 La Paz, Bolivia	Metalic structures: Doors, Windows, Curtains, Furniture
RAVI Industrias Hispano-Bolivianas Av. Siles esq. Camacho Cochabamba, Bolivia	Crowncorks Containers (Hojalata) Toys, Domestic Utensiles
FANAAL Mercado 1078 La Paz, Bolivia	Domestic Utensiles
Industrias MACA Junín 5323 Cochabamba, Bolivia	Metallic furniture, Cabinets, Desks
Industrias OSO Av. Camacho esq.Siles	Barbed wire and Nails
SIMSA	Project of Steel Industry, At. present Refractory bricks

COMETAL Km. 2 Carretera Norte Santa Cruz, Bolivia	Metallic furniture
Kery Nava, Ltda. Buenos Aires 154 Santa Cruz, Bolivia	Barbed wire and Nails
Corporación de Fomento a la Producción Comisión Metal-Mecánica Moneda 921 Santiago, Chile	Central Information on all Metal-Mecánica imports, Exports Production of Chile
Asociación de la Industria Metalúrgica (ASIMET) Agustinas 785 Santiago, Chile	Central information on all Mecánica industries of Chile
MADEMSA Ureta Cox 952 Santiago, Chile	Domestic appliances (white goods)
FENSA Manuel Rodriguez 40 Santiago, Chile	White goods
SINDELEN Estado 359 Santiago, Chile	White goods
Compañía INDUSTRIAS CHILENAS CIC Maipu, Santiago	Bicycles, Tricycles, White goods, Metallic furniture
Junta Nacional Planificación 10 Agosto 608 Quito, Ecuador	Planning of Industries in Ecuador and Center of Inf. on Exports Imports and production
CENDES Caracas 172 Quito, Ecuador	Center for Development of Industries
Sociedad Nacional Industrias Las Flores 346 Lima , Perú	Central Information on all Industries in Perú
Monark, Perú Coilloma 112 Lima, Perú	Bicycles, Tricycles, White goods

Santa Cruz Ltd. La Paz, Bolivia	Drill bits for mining industry
IBHASA Industria Boliviana de Hierro y Acero Camino Panamericano El Alto La Paz, Bolivia	Iron Particularly Bars for Construction
ACRILUX Calle Potosí 1345 La Paz, Bolivia	Metal Furniture
FENPO Av. Blanco Galindo Km. 5 Cochabamba, Bolivia	Household Utilities Cabinets, Stores, Refrigerators
FEMCO Gral. Achá 4448 Cochabamba, Bolivia	Lighting Fixtures Mate rials for electric Installations. Electric energy distribution panels, metal works
FANET Calle Figueroa 630 La Paz, Bolivia	Crowncorks Containers (Hojalata)
CAMENA El Alto La Paz, Bolivia	Bus, truck bodies
Corporación Boliviana de Fomento Av. Camacho 1485 La Paz, Bolivia	Central Information on Development of Industries
INPIBOL Av. Camacho 1488 La Paz, Bolivia	Central Information on New Industries
Dirección Nacional de Industrias Av. Camacho esq. Bueno La Paz, Bolivia	Center of Information of Existing Industries
Hidrostal Av. Argentina 2842 Lima, Perú	Pumps for Solids, Grains, and Deep Wells
Philips Peruana Alfonso Ugarte 1268 Lima, Perú	White Goods