

Table 2-11 Gross Regional Product (GRP) by Region (1986)

Unit: Million US dollars (1977 prices)

Region	GRP (%)	GRP per head of population
1st Region	12,257	37
2nd Region	20,331	57
3rd Region	8,046	36
4th Region	8,083	17
5th Region	38,457	28
6th Region	22,110	33
7th Region	15,188	19
8th Region	36,394	21
9th Region	11,977	15
10th Region	17,777	18
11th Region	1,725	25
12th Region	10,429	75
Metropolitan Region	156,291	31
Total Country	376,627	29

(Source: INE)

Table 2-12 Gross Regional Product in Each Region by Industry (1986)

(Unit: %)

Region	Agriculture and fishery	Mining	Manufacturing	Construction	Service	Total
1st Region	13.1	1.5	35.6	3.7	46.2	100.0
2nd Region	2.2	51.4	7.3	6.9	32.2	100.0
3rd Region	2.5	46.2	2.8	3.6	41.0	100.0
4th Region	17.1	8.6	14.2	6.2	53.9	100.0
5th Region	7.3	8.5	26.6	4.6	53.0	100.0
6th Region	23.4	32.5	10.1	8.1	25.9	100.0
7th Region	31.3	0.1	13.8	7.4	47.4	100.0
8th Region	16.3	2.3	32.8	4.4	44.3	100.0
9th Region	29.7	0.1	16.1	5.5	48.5	100.0
10th Region	22.8	0.5	17.7	8.0	51.1	100.0
11th Region	20.8	2.0	3.9	10.1	63.2	100.0
12th Region	5.9	38.2	8.9	6.5	40.6	100.0
Metropolitan Region	3.8	0.7	24.8	5.7	65.1	100.0
Total Country	9.8	8.4	20.8	5.5	50.7	100.0

(Source: Central Bank)

## 2.2.6 Financial Policy

Chile's financial situation substantially deteriorated during the Allende administration, with the fiscal deficit/GDP ratio reaching 24.3% in 1973. In the subsequent period under President Pinochet,

efforts were made to raise the tax revenue as a source of state income other than from copper while expenditures were curtailed mainly in the public investment sector. As a result, the scale of fiscal expenditures was reduced and progress was made to achieve a balance. These efforts produced an improvement in the fiscal balance which recorded a credit position in the period from 1979 through 1981. From 1982, however, Chile struggled with the increased burden of debt repayments and the lack of growth in revenue so that the fiscal account returned to a deficit position. In 1985, the fiscal deficit/GDP ratio worsened to 6.3%. After 1985, however, this ratio was practically stabilized at a reduced level of 0.1% in 1987, 0.3% in 1988, and 0.5% in 1989.

The budget announced by the Treasury for the fiscal year 1990 (January - December) is presented in Table 2-13. The scale of the budget for the part drawn up on a peso basis is 28% up on the previous year and 100% up for the part drawn up on a dollar basis. In the fiscal year 1991, the scale of the budget for the part drawn up on a peso basis is 46% up on the previous year and 23% down for the part drawn up on a dollar basis. In the fiscal year 1991, the scale of the budget for the part drawn up on a peso basis is 46% up from the previous year and 23% down for the part drawn up on a dollar basis. (The Chilean budget is drawn up partly on a peso and partly on a US dollar basis. Those budgetary items that will naturally be covered in foreign currency is established on a dollar basis from the beginning so as to avoid the adjustments associated with fluctuations in the exchange rate.)

Table 2-13 National Budget in the Fiscal Years 1990, 1991

	FY 1990		FY 1991	
	Peso Budget (Million Pesos)	Dollar Budget (Million Dollars)	Peso Budget (Million Pesos)	Dollar Budget (Million Dollars)
<Revenue>	1,259,469	1,226.3	1,844,997	949.7
Sales receipts	81,322	387.6	37,930	227.0
Tax revenue	1,284,577	299.5	1,825,257	241.1
Sale of assets	779	-	1,013	-
Loan recovery	69	-	268	-
Transfer	31	-	4,748	-
Other receipts	-142,029	512.8	-95,233	329.6
Borrowings	34,459	126.0	46,014	150.0
Revenue brought forward from previous FY	261	0.4	25,000	2.0
<Expenditures>	1,259,469	1,226.3	1,844,997	949.7
Ministry of the Interior	24,458	-	31,142	-
Ministry of Finance	11,010	3.5	14,176	3.5
Ministry of Foreign Affairs	2,296	35.9	2,999	79.8
Ministry of Public Works	55,181	-	70,585	-
Ministry of Labor	417,567	-	527,207	-
Ministry for Housing	38,298	-	74,432	-
Ministry and Health and Welfare	59,489	-	86,232	-
Ministry of Education	200,943	-	255,549	-
Ministry of Defense	162,780	97.9	202,628	93.6
Ministry of Mining	2,395	1.5	3,506	1.7
Special Accounts (Including debt repayment)	234,371	1,052.0	586,309	766.6
Miscellaneous	50,681	5.5	78,502	4.4

(Source: MDH)

### 2.2.7 Economic Development Plan

The Chilean government leaves economic development of the country upon market principles, and basically does not intervene in activities in the private sector, and for this reason they do not have any economic development plan clearly described in a specific document. However, MINECOM regards expansion of export of industrial products as the most important economic measure for the development, and is wrestling with the following tasks.

- (1) Production of higher value - added manufactured goods

- (2) Realization of more sophisticated and more diversified industrial structure
- (3) Technological development
- (4) Promotion of small and medium scale industries
- (5) Diffusion of technological education and development of human resources

MINECOM is not going to directly lead private industries, but is going to provide environment necessary for achieving the objectives. Note that the concrete policies of MINECOM will be described in 2.3 "Current Situation of the Industrial Sector".

#### 2.2.8 Acceptance of Economic Cooperation

In recent years, the amount of official development aid received by Chile on a bilateral basis from member nations of the OECD Official Development Aid Committee (on a net value basis) has tended to increase significantly. Thus in 1984, ODA amounted to 9.7 million US dollars and rose to 45.80 million US dollars in 1985. Though 1986 marked a swing to a 4.0 million US dollar excess of debt repayments over ODA receipts, the following year (1987) recorded ODA receipts of 23.40 million US dollars and 1988 receipts of 46.30 million US dollars. The main aid-providing nations in 1988 were the Federal Republic of Germany (39.3% of the total bilateral aid), Japan (32.4%), and Italy (23.1%).

Multilateral ODA aid from international organizations showed that Chile's repayment exceeded ODA receipts each year from 1985 through 1988. The actual figures for 1988 (20.8 million US dollar excess of repayments) show that the funds provided from the UNDP accounted for the largest part at 32.2 million US dollars.

The total inflow of capital into Chile (that is, the total of ODA plus non-ODA funds) shows that the capital influx on multilateral basis

exceeds that made on a bilateral basis. The organizations primarily responsible for the supply of capital to Chile are the World Bank and the Inter-American Development Bank (IDB).

In 1988, the inflow of funds based on multilateral arrangements totaled 409.20 million US dollars, including 211.00 million US dollars from the World Bank and 188.70 million US dollars from IDB.

## 2.3 Current Situation of the Industrial Sector

### 2.3.1 Changes in Economic and Industrial Policies

Of all the Central and South American nations, Chile took a lead in taking policies to foster industries by the first-phase import substitution (import substitution of consumer goods). Under President Frei, the Chilean government increased its capital share in the production of copper in 1964 and proceeded with the policies of the second-phase import substitution, concentrating on the chemical and heavy industries. CORFO founded in 1939 had been aimed in particular to carry out effective funding operations for the industrial sector concentrating on the basic industries such as iron/steel, automobiles, and petroleum. Through these activities, a number of national enterprises were founded.

The Allende administration coming into power later in 1970, proceeded with the nationalization of companies and introduced a variety of economic control measures. For Chile with its small market size, however, these economic measures were counter-productive. Instead of raising management efficiency, they led to a drop in efficiency standards, with production output falling at the same time. The economy went into a recession and Chilean society was thrown into confusion, thus creating the conditions that were conducive to the coup d'etat which occurred in 1973.

The military regime under Pinochet pushed ahead with major liberalization programs. While economic controls on the domestic market were removed and efforts made to privatize state enterprises,

the administration was committed to improving the nation's industrial structure by exposing Chilean companies to direct international competition through a reduction in duty tariffs for foreign goods and the removal of non-tariff barriers. As a result, ineffective domestic enterprises were unable to survive in this process of "natural selection". The administration's export promoting policies included a number of preferential measures, with determined attempts made to attract foreign capital through an amendment of the laws on foreign investment and foreign exchange.

The Chilean government tried to push through economic measures to liberalize the market and put it under the lead of the private sector. Thus it aimed at a "small government" and did not specifically lay down any positive industrialization measures or programs for the promotion of industry under state guidance. The result was the development of a light industry processing primary products for export, including mainly agricultural, forestry, and fishery products as those have comparative advantages, with abundance and low-price. This light industry made a contribution to the earning of foreign currency. This policy is responsible for the success Chile is showing at present, though partly this success was also due to the favorable climate of the world economy since the latter part of the 1980s.

Thus, the economic policies of the Pinochet administration do not include any development plans or industrialization programs in which the state plays a leading role. Nor did the Pinochet administration pass any substantial industrial promotion policies or lay down preferential measures to create strategic industries, with the exception of only some such measures as export promotion measures to be described later. There is the criticism, however, that letting the market find its short-term equilibrium may not have consequences on the long-term economic development and the manufacturing sector, which, as a leading sector, has drastic spinoff effects on the economy, should be fostered with a priority.

Yet, the present administration under President Aylwin does follow in the footsteps of the economic policies of the previous administration and does not envisage any changes from the liberal and

private sector-led, open-market policy, judging from the generally stable economic situation at present. This view was fully confirmed in the hearings the Survey Team conducted with the government officials in the ministries concerned.

### 2.3.2 Structure of the Manufacturing Sector

Under the economic liberalization policies adopted after 1973, the Chilean industry assumed a structure reflecting its comparative advantage. As shown in Table 2-3, the mining sector and agriculture, fisheries and forestry account for a relatively major position in the national economy, whereas the manufacturing industry commands a relatively low position. Within the types of industry classed as part of the manufacturing industries, it can be seen that the types of industries related to agriculture, fisheries and forestry have a very high share. The data below are the results of a state-of-the-industry survey conducted in 1985 (aimed at companies employing a minimum of 10 persons). The results of this survey showed that the percentage of small scale enterprises with less than 50 employees was 77% of all enterprises.

Table 2-14 State of the Manufacturing Industry  
(As of 1985, companies employing a minimum  
of 10 persons)

	No. of companies	No. of employees	Total value of production (100 million pesos)	Value-added worth (100 million pesos)
Manufacturing industry as a whole	4,333	256,305	19,237	8,441
Food - beverages - tobacco	1,528	78,011	5,374	2,211
Textile - apparel - leather	790	48,414	1,308	614
Timber - wood products	457	22,811	620	305
Paper - printing - publishing	222	15,611	1,268	655
Chemical industry	443	28,859	4,492	1,504
Non-metal mineral products	149	9,339	478	274
Primary metals	56	16,329	4,345	2,264
Metal processing - machinery and equipment	636	35,324	1,313	591
Other manufacturing industries	52	1,604	35	20

Note: Chemical industry includes rubber, plastics, petroleum and coal derivatives.  
(Source: Foreign Investment Commission, INN)

The industrial production indices since 1980 show that the growth of general index during the past 10 years is rather low at 39%, and this is because influence by recessions in 1982 and 1983 was very serious. Growth rates in the sectors of intermediate goods related to the construction, mining and agriculture/forestry are remarkable, while those in production of durable goods, equipment for transportation and office furniture are flat or rather minus.

Table 2-15 Industrial Production Indices

	1985	1988	1989	1990
General indice	98.8	121.1	137.3	139.2
Non-durable consumer goods	98.3	121.6	134.3	136.7
Durable consumer goods	48.7	103.5	123.7	108.5
Equipment for transportation	53.3	77.7	98.4	87.6
Capital goods	84.1	113.7	113.1	139.0
Intermediate goods	116.0	128.2	137.3	132.8
(for manufacturing)				
Intermediate goods	92.8	137.0	148.7	152.1
(for construction)				
Intermediate goods (for mining)	100.8	132.7	153.4	168.4
Intermediate goods	182.1	194.1	216.1	171.8
(for agriculture)				
Packing, accessories	106.4	127.8	128.4	136.7
Fuel, lubricant	84.5	105.8	128.5	130.8
Office furniture	93.0	103.4	102.5	100.9

(Source: SOFOFA)

In recent years, export of industrial products has been rapidly increasing, and the growth rate from 1985 to 1989 was 156%, or about 2.5 times (See Table 2-16). When viewed by product type, the growth rate in "other industrial products (textile, leather, glass and other products)" was 10 times or more, the highest in the period from 1985 to 1989. Also the growth rates in wood products and chemical products are remarkable. When viewed from share of each product type in the total amount of exported industrial products, the share of foods products has always been around 50%, followed by paper and pulp (20%) and wood products (10%), and the combined percentage of these 3 product types is around 80% of all. In food products having the largest share, percentage of fish meal is more than 50%, which is in a range from 20 to 30% of the total of export of industrial products.



Thus, fish meal, paper and pulp, and wood products share a major portion of industrial exports, and all of these are processed goods based on the primary industry centering on abundant and cheap marine products and forest resources in Chile. The Chilean government itself prefers export of manufactured and high value-added products to exporting raw materials. The government also hopes to heighten the extent of processing of exported products by exporting high value-added products rather than labour-intensive products. Concretely, copper products such as electric wires, paper products such as paper for printing, canned agricultural and marine products, and wine seem to be promising.

Furthermore, it is recommended that Chile shift from export of industrial products produced by processing primary resources to export of machines, parts and chemical products. However, in the current situation where the government is following the policy of free and open trade, it will be difficult for manufacturers in Chile to cope with imported products, because their competitiveness is rather low in price and product quality.

Table 2-16 Export Trends for Industrial Products

Unit: Million US dollars, FOB, %

Item	Rate	85		86		87		88		89		85-89 Growth rate
		Amount	i.c.w. prev.yr.	Amount	i.c.w. prev.yr.	Amount	i.c.w. prev.yr.	Amount	i.c.w. prev.yr.	Amount	i.c.w. prev.yr.	
Food		488.5	23.3	602.7	22.8	739.9	26.9	953.4	15.3	1,099.3	125.0	
Beverage		20.4	5.3	21.5	55.8	33.6	14.8	38.3	37.9	52.8	158.8	
Timber products		73.4	34.0	98.4	54.0	151.5	38.6	210.3	31.6	276.7	277.0	
Paper/Pulp		210.4	29.4	272.4	33.9	364.6	14.3	417.1	1.2	422.3	100.7	
Chemical products		79.9	5.5	84.3	22.4	103.3	69.2	174.8	70.8	298.5	273.6	
Iron/steel non-ferrous metals		60.4	27.6	77.2	13.0	87.3	34.9	117.8	1.5	119.6	98.0	
Machinery, metal products		13.3	73.7	23.1	16.4	26.9	2.6	27.6	23.2	34.0	155.6	
Transport/material handling equipment		17.2	212.8	58.8	-40.1	32.1	8.4	34.8	4.9	36.5	112.2	
Other industrial products		12.4	116.1	26.5	176.3	73.8	52.9	112.9	40.0	158.1	1,175.0	
Total industrial products		975.6	29.1	1,260.0	28.0	1,618.1	29.3	2,067.0	19.7	2,497.8	156.0	

(Source: Central Bank)

### 2.3.3 Promotion of Export of Industrial Products

#### (1) Export/import control system

As the Chilean government has been following the policy of free trade depending on the market principle, there are very few restrictions on export and import. Although exports of more than 1,000 US dollars require authorization by Central Bank, exports of any item are allowable, and embargo is not applied to any goods with few exceptions. Also in import, there is no restriction in item and in quantity, regardless of whether the importer is a corporation or an individual, save that on import of second-hand cars (Note that import of specific types of cars is allowable), and any goods can be imported so long as the prescribed procedure for import is followed.

Note that the custom rule in Chile is very simple, and although an additional tax is imposed to some specific items, basically the same custom rate is applied to all goods. The custom rate is very low, being 11% as of July, 1991.

#### (2) Policy for promotion of export

In order to restore the Chilean economy seriously influenced by the world-wide recession in the first half of 1980s, the Chilean government started a series of export promotion measures to diversify the country's export structure now depending on the traditional primary industry products such as copper, iron ore, nitrate of soda and fish meal.

Of these, the repayment system called "Reintegro" has been the most effective for promotion of export of non-traditional products. In this system, when exporting any item other than those annually announced by MINECOM (mainly traditionally exported products), 5 to 10% of F.O.B. value of the exported products is repaid. This system is applied not only to particular industrial sectors or fields, but to all items which are not listed in the negative list mentioned above (Note that the products must not

always be industrial products), and also this system is applied to domestic and foreign capital companies quite equally, so that the procedure required is very simple and practically very effective.

Also there is a guarantee fund system for export of non-traditional products especially for small and medium scale companies. In this system, a company lacking physical mortgage (such as real estate) required for borrowing money from a bank can receive a guarantee based on the fund if the company can satisfy certain conditions.

Other export promotion systems include an import tax exemption system for export products, a bonded warehouse system for export products, and return of value-added tax. All systems are applicable for any types of export items.

(3) Institutions and organizations for promotion of export

1) PROCHILE

This is an institution under MRE with more than 30 overseas offices, and are carrying out the following activities.

- Organizes industries in Chile to participate in trade fairs in foreign countries (especially for process foods and light industry products). Participates in 30 to 40 trade fairs held mainly in Central and South America.
- Dispatches missions for market research of foreign countries (mainly in North America and Central and South America).
- Holds various types of seminars and organizes events for export promotion.
- Invites missions from foreign countries for export promotion.

- Prepares catalogs and video tapes for promotion of Chilean products to foreign countries.
- Setting up committees consisting of Chilean companies by industry and planning for promotion of export of Chilean products.

2) ASEXMA

This body was organized by about 200 private enterprises exporting products (mainly medium scale industries). The amount of export by the member companies in 1989 amounted to about 170 million dollars, which correspond to about 7% of the total amount of industrial products exported from Chile. This organization is now making serious efforts to promote exports by participating in trade fairs in overseas countries, dispatching missions for promotion of export, and organizing events. Also sub-committees representing 12 manufacturing sectors have been set up.

3) Exhibition of export products

In Chile, Bank of Chile and O'Higgins Bank, which are major private banks in the country, have a permanent site for exhibition of export products respectively, where products of their customer manufacturers are exhibited.

4) FONTEC

CORFO was established in 1939, and has made a great contribution to growth of industry in Chile by means of investing in basic industries. The current purposes of CORFO include (1) management of state-run companies, (2) distribution of IDB fund among private companies, (3) promotion of foreign investment in Chile, and (4) improvement of technology in private companies. Of these, FONTEC, one of institutions under CORFO, is responsible for (4) improvement of technology in private companies, and is making efforts for

promotion and diversification of export. FONTEC gives financial cooperation (grant and financing) to private companies in relation to projects for technological improvement and setting up of laboratories in the companies. This organization gives assistance and services to all qualified companies equally, and does not discriminate any industrial sectors nor fields. In 1992, the organization will appropriate 100 million dollars including IDB fund and fund of CORFO itself in the budget for the fiscal year 1992 (Note that this amount is a total of budgets for FONTEC, FONDEF and FONDECYT).

5) SERCOTEC

This organization is under control by CORFO, and aims at promotion of industrial technologies for small and medium scale industries. In recent years, this organization has been making active efforts for promotion of export of products produced by small and medium scale industries in cooperation with PROCHILE. This organization organizes various types of seminar, provides consulting services, conducts surveys, and supplies information. Other activities include participation in trade fairs in overseas countries, dispatching missions for export promotion, and invitation of missions from foreign countries.

Results of a questionnaire survey conducted by SERCOTEC especially for small and medium scale companies indicate that people in small and medium scale companies seem to consider they have serious problems in the field of sales and marketing, and that they are little aware of the necessity to improve their technologies and product design. In rural areas, SERCOTEC has established a network of industries making use of their 20 branch offices, provides the industries with various types of information (on technologies, education, financing, markets and export), and also has been providing educational and training services for marketing and technologies especially for small and medium scale industries

through various types of educational organizations.

6) Others

There are FONDEF (Scientific and technological research promotion fund) and FONDECYT (Scientific and technological development national fund). Although both funds do not directly aim at promotion of export, they have made large contributions to promotion of technological development and research which in turn contributes to promotion of export. FONDEF grants fund for R & D in private research institutes and universities, and has specified mining, fishery, forestry, agriculture, and information industry as their preferential industrial fields for the grant. On the other hand, FONDECYT does not specify any preferential field, and gives financial assistance for academic research and education activities.

#### 2.4 Problems Concerning Industrial Development

(1) Targets for the industrial sector in the economic development plans

At present, Chile has no national development plan so that there are no specific targets for the industrial sector clearly defined in specific documents. The policy of the present administration carried on with the policies of its predecessor by trying to stimulate exports of non-traditional products. For that purpose, the various policies for promotion of industries as described above have been introduced.

(2) Problems concerning the industrial sector and types of industry for which the propagation of TQC offers favorable prospects

As repeatedly stated above, the particular feature of Chile's industrial policy is that it has no active policy emphasizing the development of any specific industries in particular.

The prospective types of industry in this context are, therefore, those that have a comparative advantage, such as the mining industry and the agricultural, fishery and forestry sector. In these segments of industry, Chile has the natural advantage of abundant and relatively low-price resources and raw materials. It can also resort to a high-level labor force. The introduction of TQC in the types of industry and sectors to upgrade quality would result in the achievement of international competitiveness for Chile's products and would create industries capable of earning the nation strong foreign currency reserves. With the gradual upgrading of the level of processing, industry would then be in a position to produce and export products with a high value-added worth. This, in turn, would stimulate employment on the domestic market, increase the national income, reduce Chile's foreign indebtedness and thus contribute to the nation's economic growth.

If the level of processing were to be raised even further to achieve an even higher value-added content, it would be essential to upgrade and introduce technology. This might create the need for some preferential or incentive measures for the various types of industry.





**CHAPTER 3 CURRENT SITUATION OF AND PROBLEMS  
IN INDUSTRIAL STANDARDIZATION**



### 3.1 Present Situation

#### 3.1.1 Government Policy

The government's industrial standardization policies and programs are within the jurisdiction of the MINECOM, while CORFO assumes responsibility as an executive organ, handling the implementation of government policies in domains such as the provision of finance, the development of technology and manpower.

CORFO has under its umbrella six technical organizations, including INTEC, IFOP, CIREN, and INFOR. One of the organization is INN.

INN plays an important role as Chile's core organization for industrial standardization. Placed under the jurisdiction of the MINECOM and CORFO in all matters concerning economic planning, plant and equipment investment, technical development and the training of manpower resources so that its position allows it to promote industrial standardization in accordance with national policies directives. In other words, INN as an organization is capable of advancing industrial standardization in a manner aligned with government policies, including, for example, the nationwide quality campaigns launched by SERNAC, an organization of MINECOM, and the moves by SERCOPEC, a suborganization of CORFO, to assist and support industry.

The ministerial offices related to the government or CORFO have strong views about the need for industrial standardization and quality control and the necessity of ensuring the further development of these activities in the future. It is, however, not necessarily true to say that this recognition is supported by appropriate budgetary means, nor are there any policies or programs for standardization and quality control on a national level. While policies should be established by the relevant government authorities and through the united strength of specialists such as the groups and organizations concerned, private-sector companies, the universities, and research institutes, the fact at present is that there are no suitable organizations acting as the nucleus for the advancement of such policy programs.

INN for its part, has obtained the cooperation of a large circle of specialists from entities such as the universities, MDS, MDA, and the private sector as a qualification committee responsible for the accreditation of certification bodies. Similarly, the Standards Technical Committee, the examining committee for Chilean Standards (NCh), holds its sessions with the invitation of specialists from the various spheres. It may therefore be argued that INN does possess the potential capability for formulating policy measures concerning industrial standardization and quality management. Thus, it is practical that INN is responsible for drafting and submitting concrete policy proposals for the government.

### 3.1.2 Outline of INN

INN was created by CORFO and received corporate status pursuant to the 1973 Decree of MDJ No. 678.

In Chile, it is the only body entitled to establish national standards. In its intermediate position between the government and the private sector, its main activity at present is to develop standards. In addition, its jurisdiction includes the certification system and quality management.

Since it also participates to ISO, COPANT, PASC, and ILAC, it is also active in the international field. Its affiliation with IEC is that of a subscribing member.

The purpose of INN is defined in its statutes as follows:

- (1) Establishment of national technical standards (NCh)
- (2) Development of, and control over, the Chilean Certification System
- (3) Participation in the planning for the development of a national weights and measures system

- (4) Participation in the planning for the international standardization activities as Chile's representative organization

In Chile, standardization activities were started in 1944, following the establishment of INDITECNOR, the forerunner of INN. Since the establishment of INN in 1973, a total of 839 standards have already been established. At present, there are 1,763 standards drawn up as NCh standards.

The INN Council consists of Chairman, Vice-chairman and five other members. All Council members are appointed by the Vice-President of CORFO.

There are 24 ordinary (regular) INN staff members. Fig. 3.1-1 shows the organization of INN.

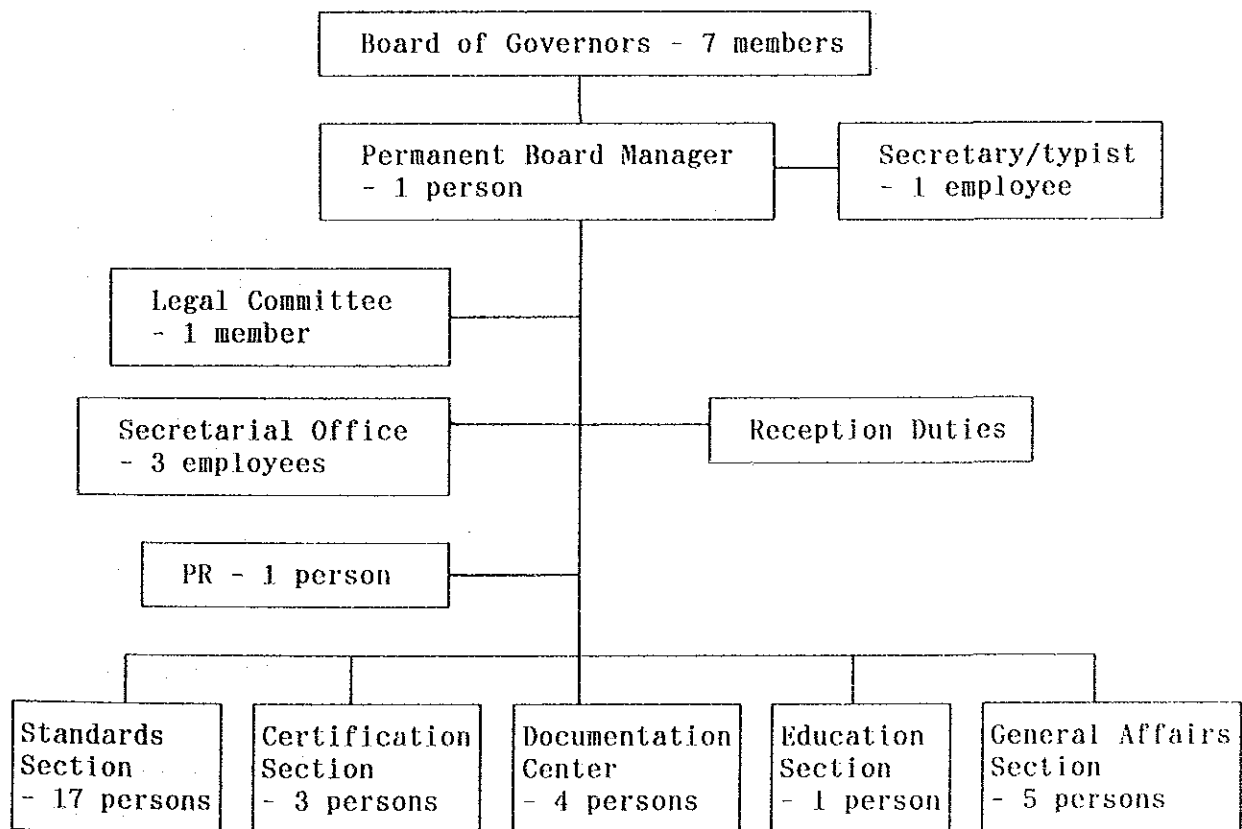


Fig. 3.1-1 INN Organization

Note: There are 37 employees including and below the rank of Managing Director. INN has 24 regular staff members. Extraordinary staff members are the specialists of the Standards Section, legal advisers, PR officers and some secretaries.

The Education Section is responsible for training activities on quality control on the basis of close cooperation with other related organizations.

The Certification Section assesses and accredits the certification bodies for agricultural and pasture farming and fisheries. So far, 46 certification bodies have been accredited as of March 1991. This includes government bodies, universities, cooperatives/foundations, private-sector inspection organizations, and consultants. The main organizations in this context are, however, the private-sector inspection organizations, and the universities.

In the construction sector, six certification bodies were accredited in 1986 through INN's independent accreditation procedures. The activities of the INN Accreditation Committee are currently dormant as follow-up activities are not carried out to the required extent.

The Standards Section is the most active of all of INN's sections. Details hereof will be presented later.

The Documentation Center has 180,000 documents under its care. These include NCh, ISO, IEC, ASTM, DIN, JIS and other national and international standards. It also controls technical documentation relating to exports and the Codex Alimentarius. INN has a separate reading room in its offices which is open to the general public.

INN also belongs to ISONET (ISO Information Network) and accepts responsibilities for reporting under Agreement of Technical Barriers to Trade of the GATT. INN also acts as Chile's liaison center with the international community in all matters concerning standardization.

Although the system of Weights and Measures are essential elements in the certification and standards system, INN has no specialist for Weights and Measures. The Laws on Weights and Measures laid down by Chile's parliament in 1848 are still in force. In 1978, INN drafted an amendment proposal for the Weights and Measures laws under the instructions of MINECOM.

## 3.2 Establishment of National Standards

### 3.2.1 Executive Organization

INN is authorized under Chilean law to establish national Chilean standards (NCh). These tasks are handled by the Standards Section.

### 3.2.2 Procedures for the Drafting of Standards and Results Achieved in the Establishment of Standards

Fig. 3.2-1 shows the flowchart for the procedures leading to the establishment of NCh standards.

When a proposal for the establishment of standard has been prepared, the original draft drawn up by INN's Secretariat and the relevant informations are submitted to the Standards Technical Committee which will assume the main responsibility for deliberating on this standard. At every stage, the conclusions are drawn by giving the greatest importance to a consensus. The Committee's proposal will be made public and disclosed to the general public to invite comments and opinions. When a consensus has been reached, the draft will be forwarded to the relevant ministerial offices for authorization after the INN Council has given its approval. The standard emerging from this process will then be promulgated by affixing the Of mark (meaning "OFFICIAL") to the Number of the Standard.



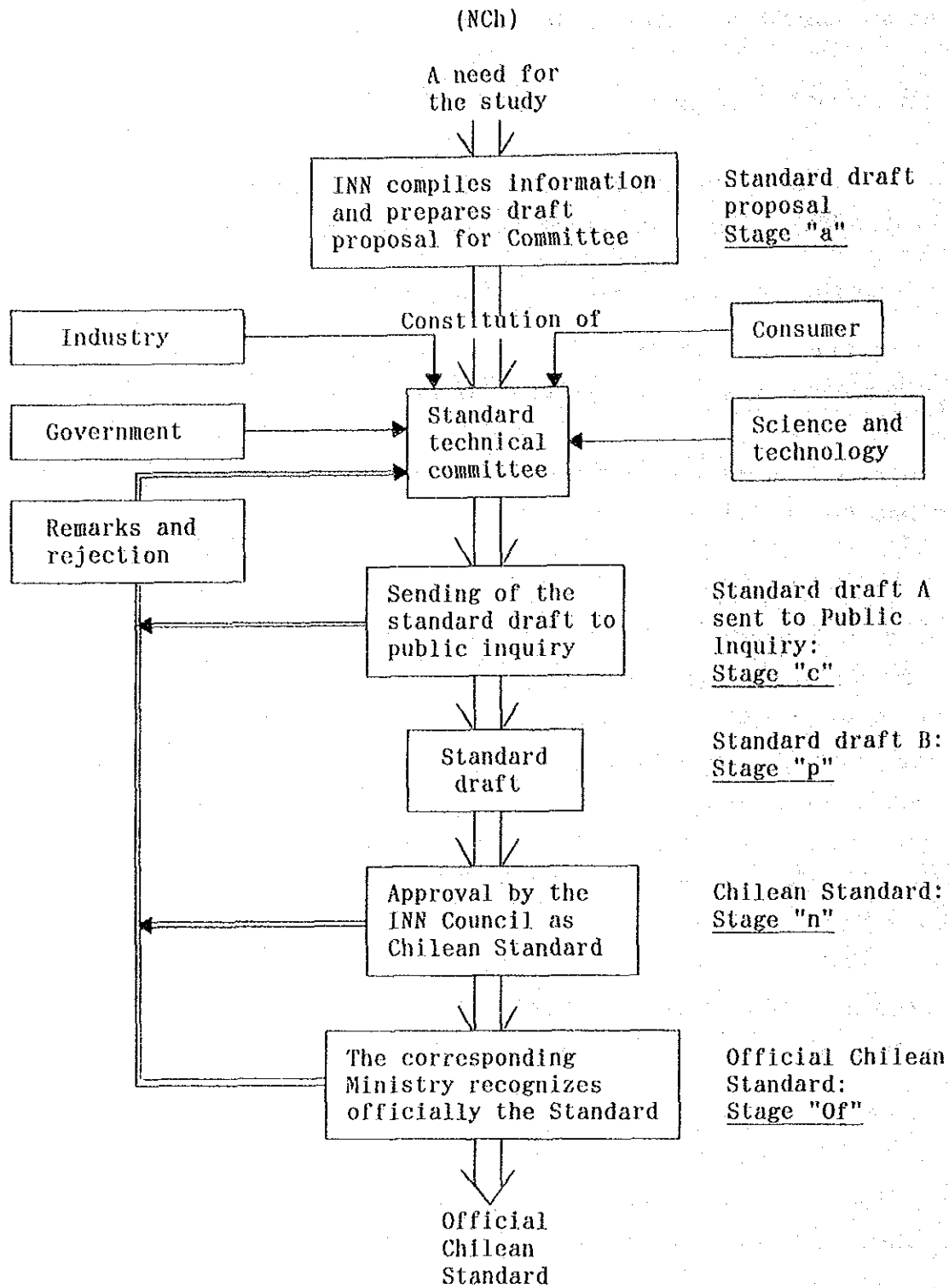


Fig. 3.2-1 NCh Standard Drafting Process Flowchart

The need for establishing standards arises by virtue of government instructions (relevant ministries and public corporations) as well as by the expressed wishes of the private sector. INN for its part does not actively search and probe for the need for the establishment of standard. Standards may be drafted under government instructions in cases in which the relevant ministries demand their establishment as compulsory standards.

In the preparation process for the original standard draft, the specialists concerned at the INN Standards Section will examine the need for the standard. In this connection, the group will first examine the existing international or regional standards (ISO, IEC, CODEX, COPANT, etc.) and then the foreign (national) standards and organization standards (UL, ASTM, etc.) in an effort to achieve conformity and alignment. Independent Chilean standards will be established only if no corresponding standard is found to exist in any of the above standard categories. As an example, there are standards on environmental conditions.

INN has appointed Standards Technical Committees for deliberating on standards. At present, INN has standing committees of 22. All preparations for the activities of the Committees are made by INN. The normal practice is to elect 50 - 100 persons from the relevant ministerial offices, industry, private-sector organizations as users of standards, and neutral academic entities. The Standards Technical Committee proceeds with its work without appointing a Committee Chairman, solely by coordinating with INN as the executive body (secretariat). Nor is the deliberation process confined to the committee members, but rather procedures are open to invite the opinions of a wider circle of the public in an endeavor to obtain a consensus. The costs for conducting the Committee's business are not totally met by the INN budget but are strongly supported by the members of the Technical Committees.

Prior to deliberation, draft standards (proposals) are classed as "stage a", and those under deliberation as "class c" to make a distinction. The number of members on committee work in 1990 totaled 500, and the "hearings" conducted to invite opinions involved 2,000

persons.

The following committees have been appointed at present by request to sit on specific issues.

- (1) Living standards, danger prevention, and health/protection - human protection - safety footwear
- (2) Living standards, danger prevention, and health/protection - hazardous substances
- (3) Living standards, danger prevention, and health/protection - vehicles - Sulfuric acid
- (4) Living standards, danger prevention, and health/protection - Fire protection - Fire extinguishers
- (5) Packaging, packages, handling, transport - vehicular conditions - Inspection stations
- (6) Packaging and packages - Compressed (pressurized) gas containers
- (7) Packaging and packages - Flexible packages
- (8) Energy - Machines - Combustion equipment
- (9) Energy - Machines - Packaging
- (10) Energy - Petroleum products - Liquid petroleum
- (11) Construction - Design, planning and assembly of structures - Freight
- (12) Construction - Temperature adjustment - Thermal insulation equipment
- (13) Construction - Anti-fire/fire-fighting equipment

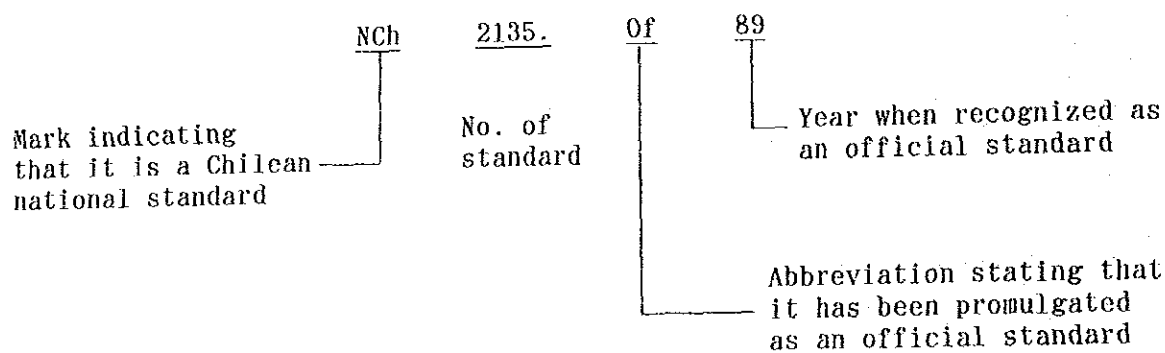
- (14) Construction - Design, planning and assembly of structures -  
Wooden framework
- (15) Construction - Materials and parts - Iron nails
- (16) Food products and agricultural/pasture farming products - Seeds -  
Beans (Legumes)
- (17) Food products and agricultural/pasture farming products - Grain -  
wheat
- (18) Food products and agricultural/pasture farming products - General  
conditions - Labeling
- (19) Chemistry - Paints, Lacquers, Varnishes, signboard paints, and  
paints for traffic panels
- (20) Chemistry - Plastics, Polyurethane, Sponge Mats
- (21) Metals and Ores - Metals in General - Welding
- (22) Forestry - Wood/timber

The final stages of a draft standard is denoted as "stage p". In this stage, examination is conducted by the INN Council which examines the deliberation procedures up to the "p" stage and verifies that the committee members have been appropriate. It does not examine any technical aspects. On completion of these "stage p" procedures, the draft standard reached the "n" stage in which it is submitted to the Minister concerned for official recognition. After ministerial official recognition, it is promulgated in the Official Gazette. The time required for the establishment of an ordinary standard is from six months to two years up to stage "c" and another two months may be required for the standard to reach stage "n".

There are no regulations specifying regular review procedures for standards after they have been established. Reviews will be made, however, when a request has been made. If international or similar

standards have been amended, it will be necessary to review the corresponding NCh so as to ensure alignment. In practice, however, such reviews are not conducted. Opinions on standards are invited mainly for compulsory standards. Such opinions must be submitted in writing to the ministry concerned or to INN. The opinions thus expressed will be examined by the Standards Technical Committee.

NCh/Of standards are identified as follows.

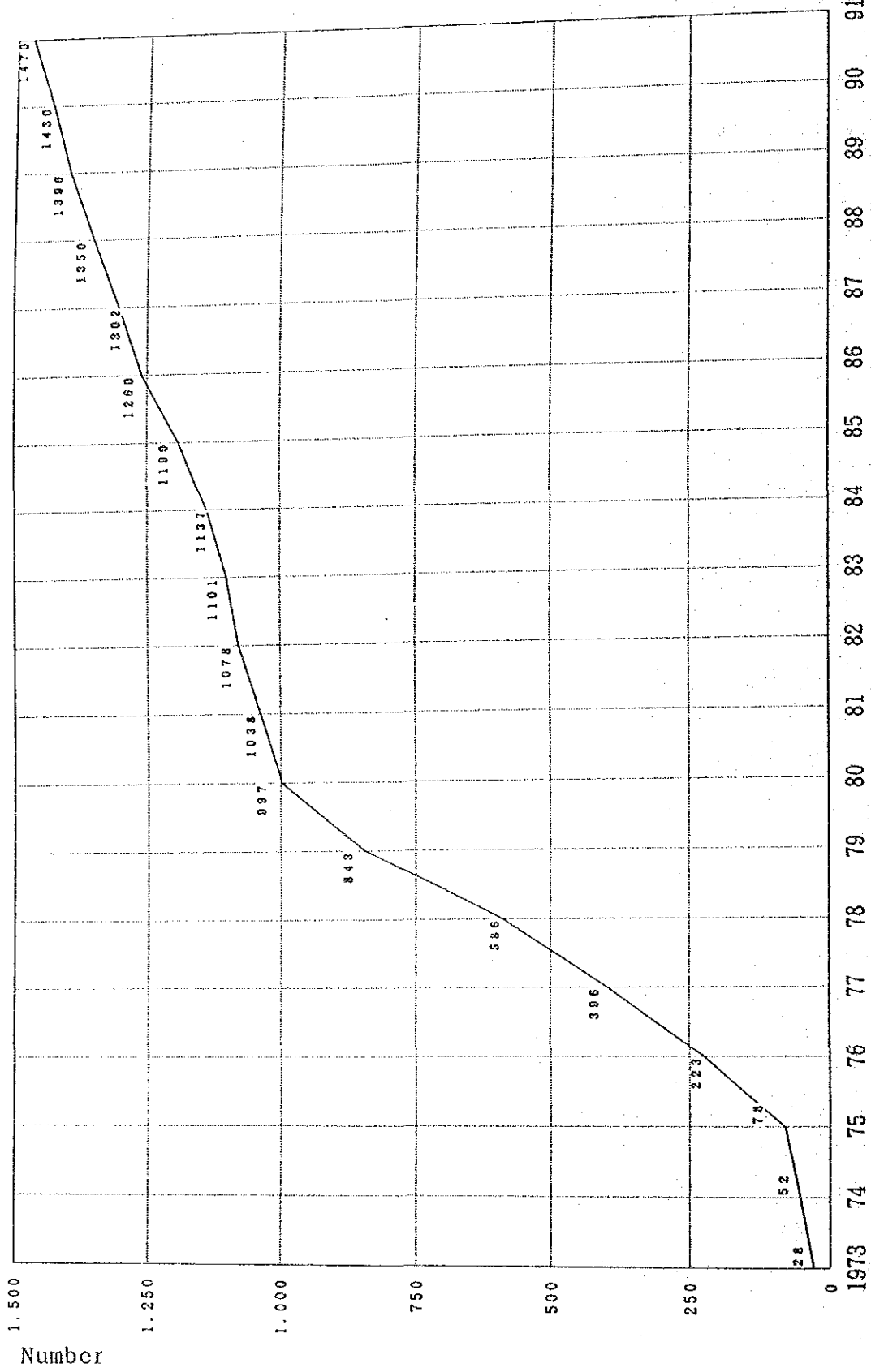


Until the end of 1991, a total of 1,763 NCh - Of standards had been established, and roughly 15% of these are compulsory standards. Fig. 3.2-2 shows the numbers of standards having reached the "n" stage since the establishment of INN in 1973. It can be seen that the time of rapid expansion in the number of standards laid down has come to an end. Instead, a steady-state position has been reached in which the main concern is to amend and maintain the standards that have already been passed. This involves the supplementation and updating of the contents of standards, their adaptation to the state of the art in the ongoing process of technical innovation, propagation activities and efforts to ensure the certification system a firm place. A similar pattern was also observed for the JIS standards. Thus, the 1950s were marked by a dramatic expansion in the number of JIS standards passed (at a rate of 300 - 800 a year). Since the 1970s, however, this rate has steadied to a level of 100 - 200 standards a year. Table 3.2-1 breaks down the number of Chilean standards passed into a classification based on the ministries concerned.

Table 3.2-1 Classification by Ministry in Charge for Official Recognition of Standards

(Source: INN)

Ministry Concerned	Number of Standards Passed
MDA	207
MINECOM	920
MEP	19
MDI	2
MOP	342
MDS	72
MINTRATEL	60
MDM	1
MINVU	140
Total	1,763



(Source: INN)

Fig. 3.2-2 Number of Standards Authorized by the Council of INN from 1973 until 1991

Table 3.2-2 gives the number of standards by area.

Table 3.2-2. Classification of NCh Standards by Area

Letter	Area	No. of Standards
A	Basic standards	70
B	Document - Information	23
C	Life - Safety - Health	148
D	Packaging - Handling - Transport	110
E	Energy	112
F	Building/Construction	229
G	Food - Agricultural/Pasture Farming	296
H	Chemicals	146
J	Metals and Ores	281
K	Machinery	67
L	Electricity	106
M	Fabric and Leather	99
N	Wood/timber and wood products	75
O	Miscellaneous	1
	Total	1,763

(Source: INN)

### 3.2.3 General Penetration of Standards

To ensure the propagation and penetration of standards, the practice of all countries is to publish an official bulletin or journal of the standards organization. INN, too, has its own publication. This is the INN-Formativo which went into print in July 1986. Unfortunately, however, the bulletin has been discontinued after April 1988 and only seven numbers have appeared. As a result, "Of" standards are made public in the Official Gazette. When important standards or standards difficult to understand are issued, explanatory meetings are held at and by INN. Standards are sold from the INN offices and cannot be purchased in non-INN organizations or in bookshops. For provincial towns, INN therefore runs a mail-order service.



Despite these facts, NCh standards are well known by Chile's industry and companies. Participation in INN's Standards Technical Committee is also very actively sought-after by the government and public organizations as well as the private sector. This interest is the result of the long history Chile has in its standardization activities.

From these observations it is clear that despite the problems Chile has in connection with its dissemination activities, the nation does already have a solid foundation for the establishment and propagation of standards. With the introduction of the Unified Certification System it will become easier to adopt suitable measures to meet the need to propagate the system in the provinces and provincial towns and to provide a service for those wishing to obtain international and foreign standards.

### 3.2.4 Supervision of Standards

#### (1) Standards kept by INN

At present, INN keeps 180,000 standards as said before. These can broadly be divided into standards, regulations, and certification system. Table 3.2-3 gives the details of the standards kept by INN.

Table 3.2-3 Classification of Standards kept at INN

1. Standards	1.1 NCh 1.2 Catalogo de NCh 1.3 Normas Internacional: ISO, IEC, CODEX 1.4 Catalogo de Normas Internacionales 1.5 Normas Regionales: CEN/CENELEC, COPANT 1.6 Normas Extranjeros: ANSI, NF, DIN, UNE, JIS, UNI, etc. 1.7 Normas de Asociación: ASTM, API, NFPA, AWWA, etc.
2. Regulations	2.1 Reglamentos Nacionales: Por Ministerio, Por Ares Tecnologia 2.2 Reglamentos Extranjeros
3. Certification System	3.1 Systemas Nacionales: Obligatorio, Voluntario 3.2 Certificacion de Producto 3.3 Directorio de los Organismos de Certificacion

(Source: INN)

(2) INN database

INN registers NCh, related regulations and some specifications for export destinations on its computer and keeps them on its database to provide an information service concerning their amendments and abolitions. The classification breakdown and the entries kept on record are as followed.

1) NORDAT (NCh)

Number of standard, title, relevant ministry, data of regulations, data of establishment, industrial sector, history of amendment/modification, corresponding foreign standard

2) REGDAT (Regulations on quality)

History of amendment/modification

3) EXPODAT (Export)

Standard of export destination, regulations of export destination concerning the particular product, title, language

(3) Terminology

NCh are published in Spanish only. Catalogs are published in Spanish and English.

3.2.5 Preparation of Standards other than NCh

The process of establishing NCh standards has already been discussed in detail. For those areas in which no NCh standards have been drawn up, the ministerial authorities will, in certain cases, prepare their own standards. This is the case, for example, with Department of National Road of MOP which drafts its own standards citing NCh, ASTM, and AASHTO to lay down its LNV standards for gravel, sand, soil quality, and construction methods. To a very small extent, MINVU has its own standards, citing international and foreign standards.

The government offices and private-sector organizations take an active part in the drafting of NCh standards, but Chile has no Association Standards or Industry Standards of the type seen in some of the industrialized nations. This direction of development in standardization which has given priority to the establishment of a complete body of national standards may produce favorable results in the future.

### 3.2.6 Problem Areas in the Establishment of Standards

Within INN's activities, the drafting of standards is the most active areas. As stated above NCh standards are also penetrating into Chile's industry.

In view of the budgetary constraints and the skeleton staff, INN leaves much room for doubt as to the completeness of its standards which should form the basis for the future Unified Certification System and the Propagation of Quality Control. This will therefore necessitate urgent measures to improve the situation.

#### (1) Establishing a policy on the drafting of standards

The need for drawing up standards was fully echoed in the hearings conducted by decision of INN at the Standards Technical Committee appointed by INN, based on the request from the government and the private sector.

There have been some astounding changes in the recent trends for drawing up of standards. The international standardization organizations such as ISO/IEC have made major efforts in their activities to reduce the time required deliberating on draft standards. At the same time, the rate of development is accelerating with regard to the GATT's countermeasures against trade obstacles, the integration of the EC, the alignment of EN standards with international standards, and the certification system.

This makes it clear that INN's current policy with its passive approach to searching for the needs of standardization calls for revision. INN should make a thorough assessment of international trends and national economic policies as well as the developments which are taking place in the industrial domain. It must then build on this understanding to draw up its own policies and make proposals to the government, accordingly.

Fortunately, INN falls under the competence of CORFO so that it should find it easy to make this assessment of economic and technical trends. At the same time, INN has also close contacts with the bodies in charge of quality control training and education and the technical sectors of companies so that it should not be too difficult for INN to draw up long-term and short-term development plans for standards. INN needs to provide a system capable of producing maintenance plans after the issue of standards, such as the establishment of plans for the development of new industrial standards in areas in which there are no NCh standards as yet, the propagation and modification of existing standards and the recommendation of the necessary equipment for the recognition under the applicable standards. The working expenses and staff or personnel costs required for this will be an important issue. In detail, the following five fundamental areas will be essential for drawing up policies relating to the establishment of standards.

- 1) Clarification of the purpose(s) of standards
- 2) Assuring international alignment and compatibility
- 3) Appropriate Standardization to suit the needs of the time  
(Timely standardization)
- 4) Standardization from the viewpoint of the user and consumer
- 5) Proper maintenance

In the past, the general tendency was that standards were drawn up after a technology had been established. In those areas, however, in which the pace of progress is very fast as is the case in the information, factory automation, new technology, and new materials areas, there is the danger that standards will be impracticable or give rise to problems over interchangeability and compatibility unless urgent steps are taken to standardize so as to avoid a standardization lag with respect to technological innovation. This explains the importance of item 3) of the above.

In addition to the above items, it is also essential to pay attention to the participation of specialists from a wide range of fields in the drawing up of standards, the collection and submission of relevant product information and the dealing with patent rights.

(2) NCh maintenance and updating programs

Measures to maintain and update the standards to state of the art in the technical domain are of the greatest importance to assure the reliability of the standards. In this context, however, INN has many shortcomings. It lacks the capability to conduct regular reviews of standards. As a result, there have been and are many cases in which although international or foreign standards were revised, the corresponding NCh standards still remain unchanged in their old version. This calls for urgent efforts to aim for a facility ensuring the regular revision and updating of standards.

- 1) Checking for changes of cited standards such as amendments, abolitions, unification, etc.
- 2) Checking relevant standards against modified standards (For example, testing and sampling methods, etc.)
- 3) Checking the overseas standards, including international standards, and investigating newly issued standards.

At present, the ISO practice is to review its standards every five years. There are also Association Standards whose review editions are published every year. As stated above, INN has completed its standards database, and if this database were actively used it would be relatively easy to overcome these problems.

(3) Establishment of explanatory statement on standards

Standards are made much easier to understand, if their background and purpose is explained in a "Statement Explaining the Standard".

This explanatory statement should be prepared, when standards are drawn up or amended. NCh standards do not have such an explanatory statement. Its use is most desirable, however, as it would be a very effective means of popularizing the standards. The explanatory statement should or may contain the following details.

- 1) Summary of the background leading to the drafting or amendment of the standard and comparison chart showing the amendments.
  - 2) Name list of the Standards Technical Committee members
  - 3) Clear identification of cited standards and reference standards
  - 4) Main arguments and their voting results
  - 5) Cautions with respect to related laws and regulations and the use of standards
- (4) Measures to diffuse standards

Practically all international standardization bodies and national standardization organizations publish their own bulletins or journals to diffuse and popularize their standards. In addition to national and world information on standards, these bulletins normally present a wide range of other useful information, including plans and schedule of international conferences to be held, decisions of conferences, introduction of newly developed technology, world-wide trends on standardization and quality control and the views and opinion of experts. Through the presentation of news and standardization in conjunction with the broader ambit of relevant development, the bulletins are effective in promoting the dissemination and penetration of such standards and also in generating a deeper understanding of standardization and quality control.

The publication of the INN bulletin has been suspended, and in view of its importance in the diffusion of standardization and quality control, it is most strongly hoped that its publication will be revived. It is also worthwhile to examine propagation methods using the bulletins and journals published by other organizations.

(5) International standardization activities

At present, INN represents Chile at four of ISO's Technical Committees (TCs) in which it has P membership status. Under present conditions, however, there is no national committee and deliberations are conducted by consultation with those experts concerned or by taking INN's judgment into consideration even at the time of casting the vote for a draft international standard. It therefore appears most essential to set up a national committee. Allowing for the aspect of Chile's alignment with international standards, it seems appropriate that the corresponding standards technical committees should be appointed as the acting national committees for ISO/TC. Participation in the process leading to the eventual enactment of an international standards will not only ensure that Chile's opinions are reflected in international standards but also much affect the activities of drafting NCh standards.

3.2.7 International Nature of the Technical Level of NCh

NCh makes frequent reference to international and foreign standards and often quotes them. It is difficult to infer the level of technology Chile's industry may possess merely by judging from these standards. To make the point clear, let us here compare two standards selected from NCh with an equivalent international standard and an equivalent foreign standard, in this case, JIS.

The standards being compared are as follows, and Tables 3.2-4 and 3.2-5 present the comparisons.



(1) Steel bar for steel-reinforced concrete

NCh 204 Of 78  
ISO/DIS 6935/1.2  
JIS G3112

For Chile, a country located in an earthquake zone, this standard is of the greatest relevance. IDIEM certifies this steel bar as a compulsory standard.

ISO is currently in the drafting stage for the relevant standard which is to be enacted very soon. JIS amended its standard in 1987. By contrast, NCh has not amended or reviewed the standard although 13 years have elapsed since it was first established.

The particular features and problems associated with the three standards can be summed up as follows.

- 1) The nomenclature for the steel grades in NCh should be based on the internationally used MPa.
- 2) NCh does not take weldability and workability into consideration as important factors in the standards on chemical analysis/composition.
- 3) While ISO mentions certification procedures, NCh and JIS do not specify these. Consideration should be given to examining the laying down of specifications for certification procedures in the product standards. It also appears important to compare the third-party certification carried out at present under NCh with that implemented under ISO.

(2) Tooth brushes

NCh 2113 Of 90  
JIS S 3016

ISO has no relevant standard. The NCh standard was established in 1990, the corresponding JIS standard in 1985.

- 1) Each standard determines the categories of tooth brushes, their testing methods and tolerances on an independent basis, and there is no similarity and overlap between them, JIS makes provisions for compatibility with Food Hygiene Legislation.
- 2) JIS has not sampling stipulations, while NCh uses the NCh sampling methods.
- 3) For the hardness tests of the bristles of the brush, NCh uses ISO 8627 while JIS prescribed its own original testing method.

The above shows very clearly that NCh attaches great importance to international standards. It has also been seen that with the passage of time from the establishment of a standard there comes the need for review. Moreover, NCh uses units not conforming to current international practice. Thus, while the international unit of force is the Newton (N), NCh admits of the use of  $\text{kg/cm}^2$  in the certificates based on NCh standards. It will therefore be necessary to ensure the rigorous use of these units in connection with reviews of standards.

Table 3.2-4 Standard Requirements for Steel Bar for Concrete Reinforcement

1. Title	ISO/DIS/6935/1 & 2 --90 Steel for the reinforcement of concrete Part 1 & 2	NCh 204 Of 78 Steel-Hot rolled bars for reinforced concrete	JIS G3112-1987 Steel bars for concrete reinforcement																																																												
2. Scope	Hot-rolled without heat treatment concrete bars (Round or Ribbed)	Rolled bar made from ingot (Round or Ribbed)	Hot-rolled bar																																																												
3. Grade of steel	Numerals in the tables show yield stress in ISO/715, tensile strength and yield stress in NCh.	<table border="1" data-bbox="391 548 550 772"> <thead> <tr> <th>Round</th> <th>Ribbed</th> </tr> </thead> <tbody> <tr> <td>PB 240</td> <td>—</td> </tr> <tr> <td>PB 300</td> <td>RB 300</td> </tr> <tr> <td>—</td> <td>RB400/RB400W</td> </tr> <tr> <td>—</td> <td>RB500/RB500W</td> </tr> </tbody> </table>	Round	Ribbed	PB 240	—	PB 300	RB 300	—	RB400/RB400W	—	RB500/RB500W	<table border="1" data-bbox="391 548 550 772"> <thead> <tr> <th>Round</th> <th>Ribbed</th> </tr> </thead> <tbody> <tr> <td>SR235</td> <td>—</td> </tr> <tr> <td>SR295</td> <td>SD295A/B</td> </tr> <tr> <td>—</td> <td>SD345</td> </tr> <tr> <td>—</td> <td>SD390</td> </tr> <tr> <td>—</td> <td>SD490</td> </tr> </tbody> </table>	Round	Ribbed	SR235	—	SR295	SD295A/B	—	SD345	—	SD390	—	SD490																																						
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5. Chemical analysis	<p>Round : P.S. <math>\leq</math> 0.060%</p> <p>Ribbed : P.S. <math>\leq</math> 0.060%</p> <p>RBW specify C, Si, Mn P.S. N and Ceq which formula is :</p> $Ceq = \frac{C + Mn}{6} + \frac{(Cr + V + Mo)}{5} + \frac{(Cu + Ni)}{15}$	<p>No composition specified, Use Siemens-Martin, electric furnace, or oxygen process</p>	<p>Round ; SR and SD295A P.S. <math>\leq</math> 0.050</p> <p>Ribbed ; SD295B specified on C, Si, Mn, P, S,</p> <p>Other SDs specified on C, Si, Mn, P, S, and Ceq.</p> $Ceq = \frac{C + Mn}{6}$																
6. Mechanical property test	<p>1) Tensile strength, Yield strength, Elongation and Yield Ratio</p> <p>Round ; 160° ~ 180° bending over a mandrel specified.</p> <p>Ribbed ; 160° ~ 180° bending over a mandrel specified.</p> <p>By arrangement, Re-bending test can be specified. On request, Fatigue test will be carried out.</p>	<p>Tensile strength, Yield strength, Elongation, A63-42H requires Yield Ratio</p> <p>Round ; 180° bending over a mandrel specified</p> <p>Ribbed ; 90° bending over a mandrel specified.</p>	<p>Tensile strength, Yield strength, Elongation</p> <p>Round &amp; Ribbed ; 180° bending over a mandrel specified, except SD490 which requires 90° bending.</p>																
7. Tolerance of dimensions	<p>Round ; diameter</p> <p>in accord with the agreement of mass tolerance of unit-length instead.</p> <p>Ribbed ; diameter to be based on mass tolerance of unit-length</p>	<p>Round ; diameter</p> <table border="1" data-bbox="975 757 1110 1205"> <tr> <th>Nominal Size</th> <th>Diameter tolerance</th> </tr> <tr> <td>5 ~ 20</td> <td><math>\pm 0.3mm</math></td> </tr> <tr> <td>22 ~ 32</td> <td><math>\pm 1.0mm</math></td> </tr> <tr> <td>36 ~ 50</td> <td><math>\pm 1.5mm</math></td> </tr> </table>	Nominal Size	Diameter tolerance	5 ~ 20	$\pm 0.3mm$	22 ~ 32	$\pm 1.0mm$	36 ~ 50	$\pm 1.5mm$	<p>Round ; diameter</p> <table border="1" data-bbox="975 237 1110 685"> <tr> <th>Nominal Size</th> <th>Diameter Tolerance</th> </tr> <tr> <td>&lt; 16</td> <td><math>\pm 0.4mm</math></td> </tr> <tr> <td>16 <math>\leq</math> <math>\leq</math> 28</td> <td><math>\pm 0.5mm</math></td> </tr> <tr> <td>&gt; 28</td> <td><math>\pm 1.8%</math></td> </tr> </table> <p>Ovality shall be within 70% of total range of Diam. tolerance.</p>	Nominal Size	Diameter Tolerance	< 16	$\pm 0.4mm$	16 $\leq$ $\leq$ 28	$\pm 0.5mm$	> 28	$\pm 1.8%$
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<p>8. Marking</p>	<p>For Ribbed, maker's name and kind of steel shall be pressed on each product.</p> <p>For Bundle (over 50kg), shall be labeled with items below ;</p> <ul style="list-style-type: none"> <li>- Name of maker</li> <li>- Name of specification (Standards)</li> <li>- Kind of steel</li> <li>- Nominal Size</li> <li>- Melt number or inspection number</li> <li>- Country name</li> </ul>	<p>Name of maker and Kind of steel shall be pressed at interval of 2m on each product.</p>	<p>For Round &amp; Ribbed, labels include following items</p> <ul style="list-style-type: none"> <li>- Kind of steel</li> <li>- Melt number or inspection number</li> <li>- Diameter or Nominal Size</li> <li>- Maker's name or its abbreviation</li> </ul> <p>For Ribbed, Each product shall be press marked.</p>																																						
<p>9. Certification &amp; inspection</p>	<p>The products shall be subjected to one of the following two certifications.</p> <ul style="list-style-type: none"> <li>- in accordance with a certification scheme monitored by an external body</li> <li>- according to testing of specific delivery which is stipulated in the standards.</li> </ul>	<p>Not specified</p>	<p>Not specified</p>																																						

Table 3.2-5 Standard Requirements for Toothbrushes

	JIS S 3016-85 Toothbrushes	NCh 2113 of 90 Capillos Dentales - Requisitos - Generales y de Rotulacion
1. Scope	1. Fiber planted toothbrushes, except the motor driven and the temporary use.	2.1 Synthetic fiber planted tooth-brushes, except the special purpose, the dental use and the power driven.
2. Type	3. For adults and children	3.1 For adults, youth and infants 3.2 Soft, medium and hard depending on the fibers.
3. Quality (Material)	<p>4.</p> <p>(1) No burrs, cracks, stains and scratches on the surface of hafts.</p> <p>(2) Indications on the hafts shall clearly be identified and no discoloration and exfoliation shown.</p> <p>(3) Harmless for sanitation and for gums</p> <p>(4) The tension test results for depilation (7.1) shall show more than 7.85 N.</p> <p>(5) Amount of planted fibers shall be suitable against its diameter of the planting hole and their finishing shall be excellent.</p> <p>(6) No contamination of dirty fibers and foreign substances.</p> <p>(7) Fibers shall be heat resistant (Test shall follow 7.2)</p> <p>6.</p> <p>(1.2) The quality of synthetic fiber shall be satisfied with the following conditions :</p> <p>(a) No deterioration against the one-minute dipping test in water keeping <math>80^{\circ} \pm 2^{\circ}C</math>.</p> <p>(b) Under the control of the food sanitation law.</p> <p>(c) Recuperative power from bending shall be 45% and more. (Test shall follow 7.3)</p>	<p>6</p> <p>6.1 Material shall be colourless, tasteless and odorless.</p> <p>6.3 Haft shall have suitable flexibility to use.</p> <p>6.2 No poisonous contamination during usage.</p> <p>6.4 No parts have deterioration during usage.</p> <p>6.5 Fiber fixing materials shall be anti-corrosive (Test shall follow 10.1)</p> <p>7.1 Thickness of the hafts shall allow as deep as 3mm stabbing of fibers.</p> <p>7.2 The margin of fiber planted parts of hafts shall have 3.5mm length wise and 2.5mm width wise for the circumferences.</p> <p>7.3 Only Medium and Soft grades shall be used for youth and infants.</p> <p>7.8 The tips of fibers shall have round shape and no projections</p> <p>7.9 Whole surfaces have no harmful projections and corners during usage.</p>

- (2) Requirement of plastic made parts shall be under the control of the food sanitation law. (Test shall follow 7.3)
- (3) In the case of using metals for fiber fixing, their natures shall be harmless, (eg brass, aluminum, etc.).

4. Sampling

No specification made.

5. Dimensions

5. Dimensions

	length of fibers
For adults	more than 8.0mm
For children	more than 7.0mm

- 8.3 Resistance value of tension of each fiber-bundle shall be 15 N or more. (The test shall follow 10.2)
- 8.4 Hardness of planted fibers shall be tested in accordance with NCh NCh 2119 Of 90. (ISO 8627-87)
- 8.5 Finishing test of the fiber bundles shall show that 60% of the total number of fibers be round shape.

(The test shall follow 10.3)

9. Shall follow NCh 43 and 44.

5.1 Classified by dimension

	Total length(min.)	Width of brushing part(max.)
For adult	150mm	15.0mm
For youth	120mm	13.0mm
For infant	90mm	11.0mm

5.2 Classified by hardness

Type	Symbol	Diameter of the fiber(mm)
Soft	S	0.175 ~ 0.224
Medium	M	0.225 ~ 0.249
Hard	H	0.250 ~ 0.330

8. Dimensions of Tooth-brush

	For adult	For Youth	For infant
Length mm	20min.	17-30	15-28
Width mm	12min.	7-10	5-8
Number of fiber bundles(min.)	20	20	20
Length of fibers mm	10-14	9-12	8-11
Tolerance of profile	2	1.5	1
Dimensions mm			

<p>6. Test methods</p>	<p>7.1 Fiber fixing strength test. Randomly sampled 2 fiber bundles shall be tested individually by tension tester with 20mm/min. pulling speed. Values shall be more than 7.85 N respectively. Keeping for 15 minutes or more under a load of 15 N shall be acceptable.</p> <p>7.2 Heat resistance test No abnormal phenomena shall be found by the water dipping test for 3 minutes with <math>\pm 2^\circ\text{C}</math> of designated temp. More than 60% of round fiber tips shall be acceptable.</p> <p>7.3 Recuperative power ratio test After specified hot water dipping, the specimen is subjected to bending. Adequately dried specimen shall be measured for its recuperative power ratio. Result shall show 45% or more.</p>	<p>10.2 Repeating the procedure twice with 2 minutes in 60°C water dipping followed by 2 minutes in 40, then one of the fiber-bundles of the specimen is subjected to tension test by a haft fixing.</p> <p>10.3 The roundness of fiber tips shall be examined by microscope of X 200.</p> <p>10.4 Hardness of planted fibers shall be conducted in accordance with NCh 2119/ISO 8627.)</p>
<p>7. Marking</p>	<p>9. Marking (1) Kind (2) Name of manufacturer or its abbreviation (3) Markings conforming to the home appliances quality indication law. ① Haft's material ② Fiber's material ③ Hardness of fiber ④ Heat resistance Temperature ⑤ Trademark of the maker</p>	<p>11.1 On each product (a) Name of manufacturer or its trademark (b) Hardness grade (S/M/H) 11.2 On package (a) Manufacturer's nation (b) Name of manufacturer or its trademark (c) Hardness grade (S/M/H) (d) Information for consumers</p>
<p>8. Reference</p>	<p>ISO 8627-87 Dentistry-Stiffness of the tufted area of tooth-brushes. (TC106)</p> <p>The equipment standards in Chile is NCh 2119 - Of 90.</p>	



### 3.3 Certification System

#### 3.3.1 Outline of the Certification System as it Exists in the Republic of Chile

The national certification system in force is reported to include some 30 types of certification, including compulsory and voluntary certification. Compared with other countries, however, these figures are not particularly large. Rather the opposite is true. In various other countries, it can be seen that there are by far more certification systems in use, especially for compulsory certification. In Japan, there are some 60 certification systems which are deemed to be major.

The problem in Chile are that the various definitions and implementation procedures included in the various types accreditation systems and certification systems belonging to the government, public, and private are not unified or aligned.

To deal with this problem, plans have already been made to see to it that an international level certification system is attempted on the basis of the ISO 9000 Series in the whole of Chile. This attempt is a strategical move to ensure positive results on the European market and to make ready for the integration of the EC market in 1992. These efforts are also turning into some fundamental plans with respect to quality control in Chile, Chile's certification system, and the nation's weights and measures system.

Some initial efforts have already been made. At present, the establishment of the national standards (NCh) corresponding to the ISO 9000 Series and ISO 10011 Series have been completed, and campaigns with the organization of seminars are held to ensure their penetration.

Table 3.3-1 Certification Principles and Practice ISO Publication 1980

No.	Third party certification system	Continuing surveillance of product exercised by certification body	Manufacturer's quality control investigated and audited by certification body
1	Type testing	-	-
2	Type testing followed by subsequent surveillance through audit testing of samples purchased on the open market	0	-
3	Type testing followed by subsequent surveillance through audit testing of factory samples	0	-
4	Type testing followed by subsequent surveillance through audit testing of samples from both the open market and the factory	0	-
5	Type testing and assessment of factory quality control and its acceptance followed by surveillance that takes into account the audit of factory quality control and the testing of samples from the factory and the open market	0	0
6	Factory quality control assessment and its acceptance only	-	0
7	Batch testing	-	-
8	100% testing	0	-

Recognition with regard to the types of certification in Chile is based on the Certification Principles and Practice Document issued by ISO in 1980. Table 3.3-1 sums up the situation. Used are types 1, 5 and 7 of this document. (The types will therefore be referred to hereinafter as ISO/1, ISO/5 and ISO/7). Type ISO/7 is by far the most predominant system. This is the lot certification system. In this system of certification, the certification body conducts an inspection of the product lot submitted from certification on the basis of the standards laid down in the contract document relating to the product concerned. In this certification procedure, a certificate is issued which must be based on an acceptance verdict as the outcome of certification inspection. ISO/1 certification is also conducted on a small scale. This certification relates to the initial production model and does not include the certification of products in the subsequent manufacturing process. ISO/5 type certification is practiced in the INN and CESMEC systems. The INN system, however, is not implemented. The CESMEC systems only extends to 12 companies. These results are too poor to speak of dissemination. These methods include the inspection of the manufacturers' quality systems and the confirmation of product quality. This implies the module method including the introduction of the ISO 9000 Series now in progress in the EC and is a similar method to the JIS mark system. It also represents the most desirable method of quality assurance and is in line with world trends. The details of the Chilean ISO/5 system, however, can be described as being extremely unsatisfactory in terms of the level represented in the ISO 9000 Series.

In terms of the system as a compulsory and voluntary certification system, the compulsory certification concentrating on public health, hygiene, and safety is not liable to make a substantial contribution to the improvement of quality to promote exports and the use of alternatives to imports. The ISO/5 procedure, that is the method of certification based on an evaluation of quality systems and the assurance of product quality, is felt to have emerged as a major factor of the improvement of quality. In this sense, the ISO 9000 Series can be regarded as a base supporting the certification system and quality control.

The following entities may take over these functions in the certification system (Based on ISO - Guide 2).

1) Accreditation body

The accreditation body is the organization in charge of the accreditation of certification body and certification system. In the case of Chile, accreditation is primarily enforced by way of compulsory certification by the central government bodies and ministries, including MOP, MDS and MDA. On the other hand, INN is in charge of voluntary accreditation.

2) Certification body

Certification bodies are primarily responsible for the handling and issue of certification of conformity.

3) Inspection body

Inspection bodies are primarily responsible for the carrying out of inspection duties on behalf of and for the certification bodies. In the case of Chile, certification and inspection bodies are often one organization. In this report, such comprehensive certification and inspection bodies will be referred to as Laboratories.

In Chile, these organizations cannot be said to fully comply with the clear definitions given above. For this purpose, a study has been made to ascertain the real situation for each organization concerned.

(1) Accreditation body

In the case of compulsory certification, the government bodies will undertake accreditation. For this purpose, the government authorities concerned will carry out their special accreditation procedures on the basis of specified rules and regulations. As an example of this type of accreditation, we may refer to the fact

the MINVU has approved 44 certification bodies on the basis of the Urban Development Regulation to act as certification entities for building materials. The Bureau for Road Construction of MOP has accredited certification bodies on a regional basis for the certification of construction materials. Since some certification bodies do not have permanent facilities, the Bureau for Road Construction also runs an observation patrol.

However, some government ministries only register and use certification bodies accredited by INN. Registration is made upon request from accredited certification bodies. For example, MINECOM has registered 46 certification bodies accredited by INN for certification of agricultural and fishery products.

For voluntary certification, INN is currently considered as being an accreditation organization for certification bodies. INN accredits certification bodies on the basis of INN Rule 70 - 200. The types of certification to be maintained under these regulations are that Lot Certification, Permanent Production Certification and Certification Using the Mark of Conformity with NCh Standards. These are the three types of certification. Of these three types of certification, only lot certification is actually being carried out. The other two types of certification are not carried out. Fig. 3.3-1 gives the flowchart for INN's inspection procedures relating to food products.

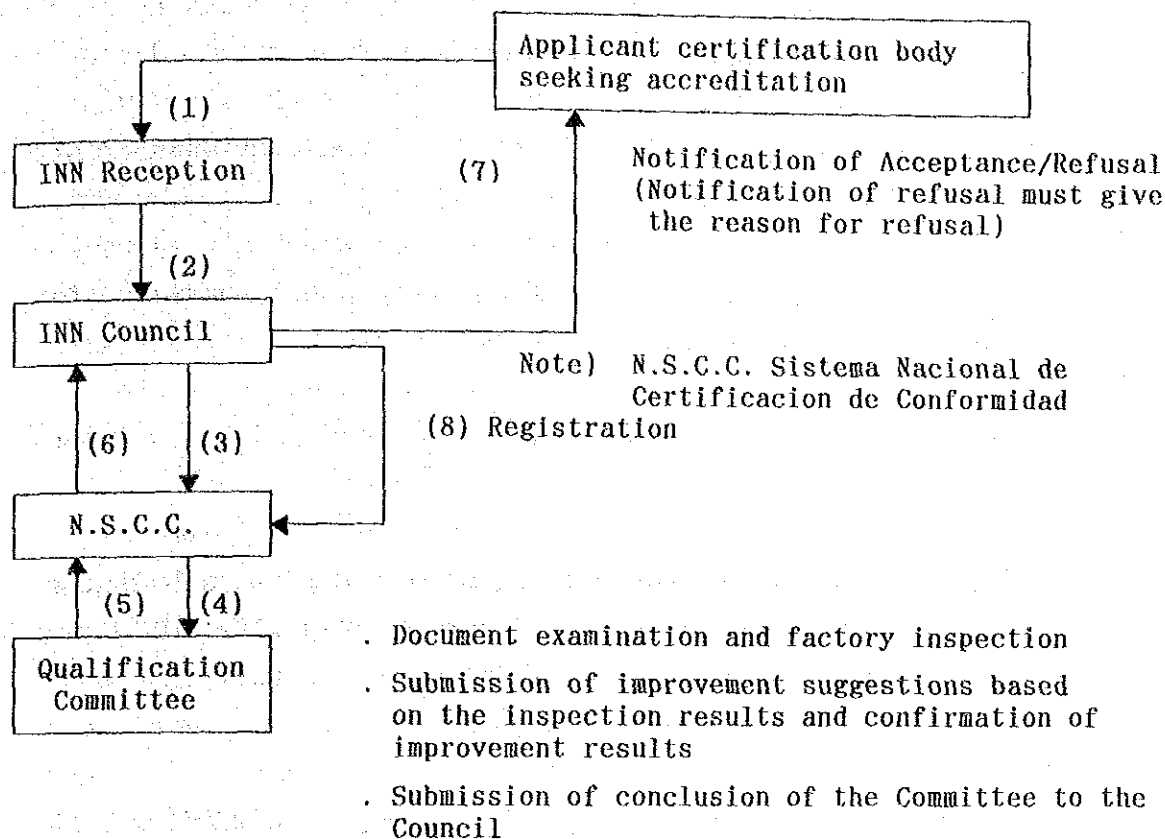


Fig. 3.3-1 INN Accreditation Flow (Source: INN)

Applicants seeking accreditation from INN will submit a written application document to INN. The qualification requirements to be met by applicants for accreditation are subject to the same conditions for all applicants, whether private companies, public bodies, or private individuals. These qualifications are checked out either by sampling or by inspection/analysis, as the case may be. Application forms are of the format prescribed by INN. The entries on application forms are as follows. (INN-Doc-70-214)

- 1) Evidence that applicant is an organization established in compliance with the laws and regulations
- 2) Explanations about the organization and its functions
- 3) For applicants in the agricultural, pasture-farming, and fisheries sector, records of past certification results and consultancy service results.

- 4) Names of fields and products concerned
- 5) Qualification of engineering/technical staff and inspectors (engineering qualifications required) \*
- 6) Details of weighing and measuring equipment, methods for performing calibration
- 7) Standards used (NCh standard numbers, international standard numbers)

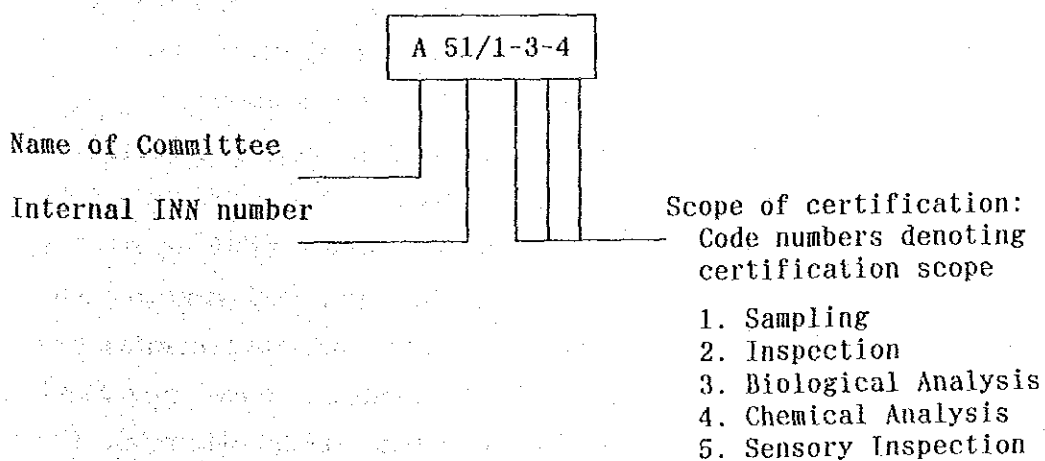
\* Note: Engineers/qualified technicians and inspectors in charge of certification must be registered with INN, and certificates can only be signed by authorized staff registered with INN.

Accreditation authority at INN is vested in the Council of INN. The organization is structured so that instruction for inspection will be given through N.S.C.C. to the Qualification Committee. N.S.C.C. is a system within INN and its responsibility is to take charge and supervise of inspection and registration procedures. In the case of agricultural, pasture-farming, and fishery products, the Qualification Committee is constituted from members representing the following organizations.

- 1) Asociacion de Exportadores de Chile A.G.
- 2) Colegio de Ingenieros Agronomos de Chile A.G.
- 3) Colegio Medico Veterinario de Chile A.G.
- 4) Colegio Quimico Farmaceutico de Chile A.G.
- 5) Consejo de Rectores
- 6) Instituto Nacional de Normalizacion, INN
- 7) Corporacion de Fomento de La Produccion, CORFO
- 8) Ministerio de Agricultura
- 9) Ministerio de Economia, Fomento y Reconstruccion
- 10) Servicio Nacional de Pesca, SERNAP
- 11) Ministerio de Salud

The Qualification Committee scrutinizes the documentation submitted and assigns the auditors representing the committee on inspection duty to the applicant certification body. The appointed auditors will evaluate the details of quality control and standardization at the applicant's body. Based on the results, the auditors will give specific advice on areas requiring improvement, and the applicant will act on this advice by making the appropriate improvements. The auditors will re-inspect the premises to confirm whether the improvements have been made as instructed.

The final report will be submitted by the Qualification Committee to the Council which will deliberate on the approval or refusal of accreditation in the final instance. If accreditation is refused, notification thereof will be sent to the applicant with a statement giving the reasons for refusal. If accreditation is granted, arrangements are made for the registration with N.S.C.C. within INN. The period of validity of accreditation is for two years reckoned from the date of accreditation. During this period of validity, INN is entitled to make inspection visits to the accredited certification body. For registration, an official registration number given by the INN Council is used. The coding is as follows:



In the above example, registration is with the A (Food Products) Committee No. 51 and the scope of certification is given as sampling, biological analysis, and chemical analysis.



Accreditation is subject to renewal every two years. For renewal, INN will evaluate the results obtained during the period of validity of the accreditation and conduct inspections, including witnessed inspection visits to the applicant's premises if and when required. The decision as to the grant of renewal is made through the same procedures as those applicable to a new application. The certificate issued by the Accreditation Body will become null and void in the following circumstances.

- 1) When no application for renewal is made.
- 2) When business activities are suspended for a period of 30 days or longer, without reason
- 3) When business operations cannot be maintained due to changes in equipment and staff
- 4) When the certification system has been abused
- 5) When there has been a gross mistake committed in the execution of the certification duties
- 6) When the activities (certification) have been left to a third-party
- 7) When any other unlawful action has been taken.

Applicants having been granted INN inspection and accreditation (that is, applicants thereby enabled to act as Certification Bodies) will be entitled to issue certificates themselves as certification bodies subject to the grant of permission by the government authorities concerned. In some cases of compulsory certification, these certification bodies may conduct certification procedures and tests under the instructions of the government authorities in charge.

Let us take as an example of the execution of such certification procedures the certification by IDIEM of the steel bars used for

concrete reinforcements under the instructions of MOP. A practical example of tests being performed under ministerial guidance is the testing of fish meal for export by IFOP under instruction of SERNAP. The certificates produced in such cases are issued by SERNAP, while IFOP merely provides the test data.

Apart from the food and fishery product sector, INN also accredits six organizations in the pipe installation material sector for the building industry. Since 1986, these organizations have been very active.

Features of the INN Accreditation System are as follows.

- 1) Apart from government and private sector organization, approval can also be obtained by private individuals.
- 2) It is possible to obtain approval for sampling or inspection/analysis, or for both (that is, certification organization exclusively for sampling are also approved).

These procedures for accreditation are also applied when the supervisory government authorities in charge undertake accreditation. For this purpose, there is a tendency in Chile with its limited number of certification bodies with comprehensive certification capabilities, so that most government authorities will focus on a small number of competent certification bodies and thus concentrate the certification system. On the other hand, there is the opposite tendency of a fine breakdown of the certification fields. This implies the approval of certification capabilities only in one specific field and means that government authorities will grant accreditation to a large number of certification bodies. The 44 certification bodies of MINVU, mentioned earlier, and the 46 certification bodies operating in the agricultural, pasture-farming, and fishery products sector by accreditation of INN, are good examples of this.

This differentiation of the scope of certification gives rise to the danger of uncertainty about the responsibility status of the

issuer of the certificate. The separation between sampling and testing/analysis, in particular, is liable to lead to such risks.

Under these conditions, it is clear that some order must be created in this connection. The first problem area is the fact that the various accreditation bodies (mostly the supervisory government authorities) carry out their own accreditation. The second major problem area is that the scope of the certification service activities are not properly defined. In specific terms, this refers to the integration of sampling and testing/analysis under one category.

In connection with the first problem area, it has been pointed out that this leads to difficulties in maintaining objectivity and transparency in inspection procedures. The accreditation body assumes the function of assuring the competence and neutrality of the certification bodies. No improvements in export and industrial performance can be achieved unless the accreditation bodies are internationally recognized for the capabilities and command international reliability.

In view of the integration of the EC, in the compulsory certification system, 11 items have already been specified by the EC. These product categories are seen as potential export products from Chile, including toys, safety and protective goods, pressure containers, gas implements. The number of product categories subject to compulsory certification in the EC will grow in the future.

To achieve transparency as the pre-condition for mutual trust, it is necessary that the inspection standards and approval procedures are simple and clear. For this purpose, it is conceivable to assign the inspection to an independent or a very limited number of accreditation bodies.

The accreditation body must then maintain and handle the application and registration documents of the certification bodies and also assume responsibility for the laying down and upkeep of

the qualification criteria. Auditors need not necessarily be members of the accreditation body or bodies but it must be possible to assign specialists of the external supervisory government authorities and the universities and industry. Such accreditation bodies may either be newly created or formed on the basis of the bodies that already exist. The most realistic idea is to have INN act as this accreditation body. Yet, this would, of course, require appropriate measures to upgrade INN's capabilities.

The second problem involves the need to establish a comprehensive certification body with a great reputation for reliability. It is in the nature of a comprehensive certification body that it should be capable of certifying a whole range of operations, including sampling, inspection/analysis and ship loading. At present there are certification bodies with a capability for certification in specific areas, that is, bodies certifying either sampling or inspection/analysis. In the future it will be necessary to impart a universal or comprehensive certification capability to these currently specialized bodies. As a result, the comprehensive certification bodies will be entrusted with the responsibility for these tasks. It is easy to realize how this will lead to a much clearer identification of responsibility for certificates and to a greater competence of the accreditation bodies.

## (2) Certification bodies

According to ISO guide 2, the role and function of certification system is to handle the certification of conformity to the standards and the execution of inspection tasks required for this. For the inspection tasks, however, it may be possible to have these tasks executed by some other inspection body acting on assignment.

In Chile, many certification bodies also act as inspection bodies at the same time. According to the ISO guide, these two functions are broken down and regulated separately.

1) The following two ISO guides are typical examples for certification bodies.

- ISO guide 28: General rules for a model third-party certification system for products.
- ISO guide 40: General requirements for the acceptance of certification bodies.

2) The following two ISO guides are typical examples for inspection bodies.

- ISO guide 25: General requirements for the technical competence of testing laboratories
- ISO guide 38: General requirements for the acceptance of testing laboratories

In Chile, the term "certification" is often used even though this implies only the certification of the test results for samples that have been brought to the testing. To ensure that Chile's certification will be accepted worldwide and that Chilean certification bodies will be recognized on an international level, it will be essential to create a system that strictly conform to the definitions laid down by the international bodies (ISO/IEC). In this report, the certification bodies will be examined on the basis of this recognition.

For our survey, we visited 15 powerful certification bodies in the Republic of Chile. Table 3.3-2 sums up their certification scopes. The data in parentheses ( ) refer to indirectly obtained data as the bodies concerned were not visited by the team.

By type of organization, these bodies can be divided as follows.

- Government/public bodies

CIMM

INTEC

SERNAP

IFOP

ISP

INFOR

IDIC

- Bodies belong to universities or their branch organizations

DICTUC

IDIEM

Chile University, Department of Engineering

Concepcion University

(Austral University)

- Non-profit bodies of the private sector

Fundacion Chile

(APSTC)

- Private-sector companies

CESMEC

SGS

BV

Table 3.3-2 Overview of Scope of Certification of the Certification Bodies Visited by the Team

Industrial sector for certification Certification body	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Remarks (*)
	CESMEC	0	0	0	0	0	0	0	0	0	0	0	0	0	0*	0	
IDIC			0				0	0	0	0	0	0	0	0*	0	0	Explosives/safety
DICTUC			0				0	0		0	0	0		0*	0	0	Geology
IDIEM								0	0			0			0		
CIMM						0						0				0	
INTEC	0	0	0			0					0	0		0*	0	0	Packaging
Fundacion Chile	0	0	0	0	0							0					
BV	0	0	0									0		0*			Ship certification
SERNAP		0	0														
IFOP		0	0														
(APSTC)		0	0														
(Austral University)		0	0	0	0							0*					Wood paints
Chile University											0					0	
SGS	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	
ISP	0	0	0									0		0*	0		Medical/ pharmaceutical, Heath control
INFOR				0	0												
Concepcion University			0														

1. Agriculture - pasture-farming products
2. Fishery products
3. Agriculture - pasture-farming fishery processing-products
4. Forestry products
5. Processed wood products
6. Mining industry
7. Electricity - gas - water supply
  
- (8. through 14. - Manufacturing industry)
8. Construction and construction materials
9. Metal processing
10. Mechanical engineering
11. Electric and electronic industry
12. Chemistry
13. Textiles and leather
14. Other sectors
  
15. Environment
16. Measuring equipment calibration



Table 3.3-3 Number of Engineers at the Certification Bodies Visited by the Team

	Name of certification body	No. of Technical staff	University graduates	Non-university graduates	Remarks
1	CESMEC	450	300	150	
2	IDIC	80 - 100	40	40 - 60	
3	DICTUC	50	20	30	
4	IDIEM	130	-	-	
5	CIMM	140	-	-	
6	INTEC	140	70	70	
7	Fundacion Chile	113	-	-	
8	BV	25	-	-	No testing laboratory
9	SERNAP	40	-	-	No testing laboratory
10	IFOP	176	119	57	
11	INFOR	7	-	-	
12	SGS	40	-	-	
13	Chile University Department of Engineering	-	-	-	
14	ISP	580	-	-	Including office staff
15	Concepcion University	-	-	-	

Note 1: - symbolise not clear

Note 2: Chile University, Department of Engineering certifies only in the electrical field and space research stations

Note 3: Exclusive certification bodies are CESMEC, BV, SGS and similar private bodies.

Note 4: Including research staff of public bodies and universities

- 1) Certification is provided for a wide range of fields by certification bodies with private company status. CESMEC, in particular, has a conspicuously large number of engineers and the range it covers may be considered broad enough to cater

for all of Chile's industries. As a certification body with a powerful comprehensive capability, CESMEC has the most extensive capability. SGS has a global network, but its organization in Chile is not all that big. Both these bodies (CESMEC and SGS) have a great interest in the ISO 9000 Series.

CESMEC, in particular, conducts mainly ISO/5 type certification but has not yet reached the ISO 9000 level.

- 2) The government authorities' certification bodies play a great role in Chile and there is a large number of them. These bodies perform certification services only in specific special areas. They have a large number of engineers (researchers) so that they may be assumed to have a high level of technical competence. But rather than being or acting in the capacity of a certification body, it would appear to be more appropriate to class them as research bodies providing technical development capabilities and research services for the private sector seeing that in many cases their certification activities are only an ancillary activity.

SERNAP has a rather special status, in that it carries out compulsory certification services based on the agreements Chile has signed with its export destination countries for fish meal. It does not have a testing laboratory of its own. Instead, SERNAP has accredited a number of testing laboratories and establishes its certification report on the basis of the test report received by SERNAP from its accredited testing laboratories.

ISP is the central body in general control of all affairs subject to the compulsory regulations under MDS, and Codigo Sanitario and its regulations. Its certification activities include pharmaceutical and medical/dietary foods, etc. Apart from conducting certification activities itself, it also supervises the testing laboratories specified by MDS.

As research institutes under CORFO, there are INTEC, INFOR and IFOP. All of these three entities conduct certification activities in their particular special fields.

- 3) The universities and university organizations conduct certification activities in conjunction with the public and private bodies. This may be considered as a particular feature of Chile's certification system. Except for the Concepcion University, the Universities and the University organizations cover a very wide range of industrial products.

The Chile University, Department of Engineering, the Space Research Center, DICTUC, undertake calibration service to very high accuracy standards with the benefit of its academic knowledge.

IDIEM plays an important role as a certification body for construction materials, a critical area in country located in the world's earthquake zone such as Chile. It has been accredited by MOP as Chile's only certification body for steel bars used for reinforced concrete. It also has a research department for the seismic testing and fatigue testing of construction materials.

Austral University has started a certification service for the voluntary certification corrosion-proof wood paints and has just begun with the trial work.

It has substantial advantages to take part in the certification systems offered by such universities. However, some aspects of the service should be seriously reviewed as a nature of the universities' service is different from the services provided by the private sector. Thus, further consideration should be given to the speed of the certification services and the fees set by the universities for these services.

- 4) Fundacion Chile and APSTC are all non-profit organizations of the private sector. These have the following characteristics

Fundacion Chile covers agriculture/pasture-farming, fisheries, and forestry, providing certification and technical consultancy and advisory services for companies and services for the establishment of new companies based on technology introduced from abroad. It is a unique certification body in terms of its high level of technology and its management philosophy.

Salmon and trout export certification, developed by APSTC, is being provided as voluntary certification service by Fundacion Chile and CESMEC. This system came into being in 1987 and has taken root at a very fast rate.

As stated earlier in connection with inspection bodies, there are many cases of certification bodies doubling as inspection entities so that the latter will not be discussed here separately.

### (3) Present status of certification bodies

#### 1) Classification of certification systems in Chile

Certification systems can be divided into compulsory and voluntary certification system. Each of these two systems can be subdivided further into type certification (ISO/1 type), lot classification (ISO/7 type), and conformity mark certification (ISO/5 type). Practically all certification under the compulsory system comes under the regulations of the public or government authorities subject on legal decrees and enforcement orders. Compulsory certification is also performed on the basis of agreements signed by Chile with foreign governments. One example of this is the compulsory certification of fish meal for export to the United States of America.

On the other hand, some products such as safety boots used to be subject to compulsory certification but the rules have now changed to voluntary certification. Since the certification seal has remained without change, it is in some cases not possible to judge from the format of the seal whether the product concerned is subject to compulsory or voluntary certification. There are other products which come under the provisions of legal decrees and enforcement regulations, yet their certification is on a voluntary basis. This applies to the export of fruit, for example.

This indicates that it is not necessarily possible to draw a clear distinction between compulsory and voluntary certification. On a macro-level, however, most certification is of a compulsory nature, while voluntary certification accounts for a small minority of cases. Whether compulsory or voluntary, the main type of certification conducted in either system is that of lot certification. Conformity mark certification is not in widely spread use. Type certification is only conducted on an exceptional basis by outside (government authorities) assignment.

## 2) Lot certification

Lot certification is the most widely used form of certification. The products to be certified are submitted to the certification body in the form of a lot. The certification body will thereupon inspect the lot in accordance with the use specified in the contract, by referring to such standards as NCh. The certificate will be granted after the lot has been found to comply with the standards, and will be refused if the lot fails to conform to said standards. Since the method of certification does not take into account the level of technology of the factory having manufactured the lot, inspection procedures must be carried out on each occasion in accordance with the standards. If random sampling is used on the lot submitted for certification, it will be necessary to lay down the Acceptable

Quality Level (AQL).

With this method, it is not possible or permissible to make any "shortcuts" in the inspection work, even though it may seem reasonable to assume, for example, that quality is maintained at a stable level. This type of testing also necessitates check the contract lot submitted for certification against the certification by sorting and assessing all products, regardless of how big or how small the manufacturing lot may be. To overcome this shortcoming and achieve greater speediness in product shipment with simultaneous improvement in quality, it is more effective to conduct certification by way of a factory inspection visit to witness the quality control system in the manufacturing process. This entails the inspection of the factory's quality system with simultaneous confirmation of product quality. This form of certification is known as ISO/5 type certification.

The certification body proceeds with its certification tasks by supervising the quality system and regularly checking and confirming product quality. With this system, the certification body can communicate to the buyer or consumer that the product meets the certification requirements. This is achieved by conferring upon the manufacturer the right to display the Conformity mark. The ISO/9000 Series is being recognized and gradually implemented worldwide as the quality system model. In the EC, it has been implemented as a compulsory certification system styled "model system". Preparation are also under way for its implementation in the voluntary certification system. To engage in international trade, the use of the ISO 9000 Series as the basis for the certification system is now becoming a practically inescapable necessity.

On this recognition, plans will be required to ensure a gradual changeover from the ISO/7 type which has now an overwhelming majority share, to ISO/5 type.

In 1988, exports from Chile consisted to an overwhelming degree of 67.7% of primary products, while manufacturing products accounted only for a minor share of 32.3%.

Primary products include in the main ores, fruit and fishery products. The certification bodies visited by the study team were found to conduct a high-level certification service for these products. Manufacturing products, however, still leave much to be desired in terms of improvements in quality and quantity. One of the major problems is the lack of a weights and measures system for industrial products.

The first problem a typical certification body has in connection with lot certification is the lack of standards or specifications. Before starting the certification work, the manufacturer and buyer will frequently agree on the specifications to be used. This can be interpreted as the main reason for the lack of standards or specifications. The questionnaire inquiry has also shown that there is a widely shared recognition for the need to have standards. Certification is normally carried out in such a way that the certificate is issued after the standards have been confirmed, samples taken, tests completed, and the test results assessed. In some cases, however, there may be some doubt left as to whether the product lots corresponding to the certificate have been properly and clearly identified. This occurs when the lots have not been clearly sorted or separated. This may also happen, when the period for display of the CONFORMITY mark (or seal) and the method of verification of the display of the mark (seal) is not properly supervised by the certification body.

This is regulated under the provisions for "product sorting" in ISO 9003. At present, lot certification can be seen as part of a process directed at Conformity mark certification in the future, and if lot certification is seen in those terms, it will become clear how important it may be to establish the

ISO 9003 "Quality System - Model for quality assurance in final inspection and test" as a paradigm.

3) CONFORMITY mark certification

Certification under this system is administered by way of INN's ongoing production certification and by way of the certification procedure using a mark of conformity with NCh. At present, however, this system is not applied in practice.

APSTC operates an export certification system for fresh and frozen salmon. Though this system is not for industrial products, it is a good example of a Conformity mark certification system in which a certification body accredited by APSTC. The factory is entitled to affix the CONFORMITY mark to the inspected products (salmon). Fig. 3.3-2 shows a sample of a CONFORMITY seal.



Fig. 3.3-2 CONFORMITY seal by APSTC

The certification procedures are devised so that all standards and regulations in force in the U.S., Canada, New Zealand, Norway, and the United Kingdom are met. Since the start of this certification system in 1986, it has marked a rapid growth, and the volume of products (salmon) handled by the system has reached 27,000 - 30,000 tons. This is on a world-leading scale, with the value of (salmon) exports amounting to 200 million US dollars. The success of the system is due to the need for it on the part of the user and the merits perceived by the producer. It demonstrates how fast a growth can be achieved, provided that a suitable level of quality is maintained.



CESMEC has developed a CONFORMITY mark certification procedure. This is the only system carried out for industrial products. The problem, however, is that a mere 12 firms have come to accept this system during the 15 years since it was started. This includes cases of voluntary application, and only a mere two companies have used the system permanently. One of these two companies is a paint and the other an interior decor manufacturer. The other ten companies use this system for items (products) subject to compulsory certification. This includes three safety boot manufacturers who have recently been released from compulsory certification. In view of these rather poor results with the CESMEC CONFORMITY mark certification system, it is clear that the system has remained at a very low profile due to the following reasons.

- (a) There are no applications for certification of products not subject to compulsory certification.
- (b) Factories making application as a sales promotion exercise cannot be granted certification with the CONFORMITY mark because of their low level of technology.

The CESMEC CONFORMITY mark certification system operates as follows.

- Applicants seeking CONFORMITY mark certification will be subject to examination of their product quality and their quality control in the form of a document scrutiny and a factory inspection. If they pass the inspection, they will be granted permission to display the CONFORMITY mark. Under this system, CESMEC will examine the application documents received and arranged for a factory inspection to be carried out by two auditors. The purpose of this inspection is to verify and confirm quality by checking the quality control status at the factory and taking samples from the process. This is not included in the quality system, it is not based

on the ISO/9000 Series.

- For two or more months after the factory inspection, continuous checks are performed on the products leaving the factory. These checks are performed both in CESMEC's testing laboratory and in the factory's test room. CESMEC also inspects measuring equipment. Within three months after receipt of permission, intermittent follow-up inspections are performed.
- The mark (seal) is made and monitored at the responsibility of the factory. No permit is issued. Validity is conferred by written notification. At the request of the user, a permit/certificate may be issued. There are no inspection criteria or specifications except for safety boots. For other products, specifications are established by specialists.

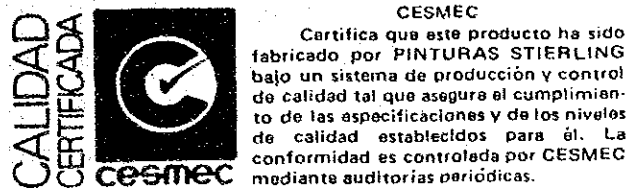


Fig. 3.3-3 CONFORMITY Mark for Voluntary Certification (Paints)

The major differences of this system as compared with the JIS mark certification system are as follows.

- (a) It does not include factory quality system inspection.
- (b) Importance is attached to checking product quality. Long-term round robin tests are performed and lot control is applied by certification body when non-conformity has been detected.
- (c) No permits are issued.

- (d) The design of the mark (seal) is left to the approved factory which may make marks other than the CESMEC mark (Fig. 3.3-3). (Design differs for each factory and for each approved product item.)
- (e) There are no written inspection criteria or specifications, nor are such criteria or specifications made public.

The objectives of this CESMEC system are as follows:

(a) For the manufacturer

- a) Conformity with standards is certified by a third party.
- b) Gaining greater competitiveness against other manufacturers
- c) Ability to eliminate excessive purchaser demands
- d) Compared with lot certification, this is less costly and requires less time to complete.
- e) Conveying an image of progressive control to outsiders

(b) For the purchaser

- a) Certification by a third party offers confidence and reassurance (a feeling of being "safe")
- b) For the purchaser (individual, small/medium company) without any means of checking the quality of the product it is a warranty service by the manufacturer.
- c) Allows the purchases to cut acceptance inspection costs.

(c) For the domestic economy

a) It is a means of removing unnecessary reduplication of effort by double control by the manufacturer and purchaser, thereby offering greater efficiency.

b) It means that the basic conditions for entering the international market are met.

Yet, despite these objectives, the question remains as to why the system has not grown in the voluntary certification area. If the system is compared with that of APSTC, the following answers may be given to this question.

(a) The international certification level is not reached. APSTC commands a level fulfilling the standards of its competitors (USA, New Zealand, Norway and Canada). In contrast, the CESMEC system is not up to the international level on a number of counts, as has been seen earlier in the comparison with the JIS mark system.

(b) Attention in quality control is shifted to inspection, notably product inspection

In the case of fresh fish as handled by APSTC, attention is primarily concentrated in the prevention of quality deterioration. On the contrary, the most important aspect is to improve quality in the case of industrial products, and although inspection plays a great role, the approach of being exclusively concerned with inspection is not relevant. On the other hand, however, the costs of certification for the manufacturer will significantly increase.

(c) Low level of shipment quality

In the case of fresh fish, the high level of quality of Chilean products is known throughout the world. In contrast, applicants for industrial product approval have a low level of quality, and are not up to the approval level.

(d) The general climate of Chile's industry does not meet the conditions required for certification to become established.

A certification system is not simply a matter of technological power. It is also much determined by national policies, financial conditions, the types of industry showing an interest, the size of the market and other extraneous factors. From the viewpoint of creating an industry capable of producing industrial products with a high added value, the fact about the Chilean system is that the general climate does not offer the necessary conditions for the growth of the certification system.

As seen above, the CONFORMITY mark certification system has only a very poor record to show in the voluntary certification area. This contrast markedly with INN's NCh Conformity Mark System. These two mark systems, that is the INN NCh Conformity system and the CESMEC Conformity system pursue purposes which lie in different directions. A new idea is called for that will marry the two systems on which it should be based.

The essential formula to be taken into consideration when proceeding with these plans is that: Establishment of lot certification which has a proven record (ISO/7) and Achieving a Conformity Mark Certification System based on Lot Certification (ISO/5).

#### 4) Summary of the Chilean certification system

Based on the findings of the study team, Table 3.3-4 gives an overview of the certification system as it stands in Chile.

The compulsory certification system is regulated by laws or decrees. Its scope covers product, human safety, health and environmental conditions. In Chile, the system is aimed at electric appliances, equipment using liquid and gaseous fuels, human protective implements, construction materials, pressure containers, etc.

The government authorities in charge accredit the certification bodies in pursuance to a ministerial decree and prescribe the specifications for the execution of certification. The certification body carries out the certification activities in accordance with the specification and it is the general practice for the certification bodies to issue certificate under their name.

- (a) MOP has approved and accredited IDIEM for the certification of structural concrete materials and steel bars for concrete reinforcement.
- (b) MOP, Bureau of Road Construction approves and accredits testing institutes charged with the checking of sections of roadworks at the time of carrying out road surfacing work. Accreditation is defined by the conditions of the contract concerned. A number of testing institutes have been accredited.

Table 3.3-4 Overview of the Certification System

	Compulsory voluntary	Products concerned	Accreditation bodies	Applicable law/ regulation	Applicable standard	Certification body	Certification method	Mark used/ not used
1	Compulsory	Steel bar, concrete	MOP	Decree	NCh	IDIEM	Lot	Not used
2		Road construction materials	MOP	Decree	LNv	Different for each construction section	Lot	Not used
3		Construction materials	MINVU	Urban Development Law	NCh and others	CESMEC, DICTUC, IDIEM and 44 other bodies	Lot	Not used
4		Construction materials	MOP	Decree		CESMEC	Conformity mark	Used
5		Waste gases  Vehicle inspection	MINTRATEL	Decree	Technical specifi- cations	Waste gases: 176 companies  Vehicle inspection: 62 companies	Single unit	Used
6		Electric appliances and fuel containers	MINECOM	Decree	IEC/NCh	CESMEC, DICTUC, total of 6 companies	Lot	Used
7		Pipe installation materials	MOP & MINVU	Decree	NCh  SENBOB	CESMEC, DICTUC, IDIC, IDIEM, UFTSM, Norte University	Lot	Used
8		Pharmaceutical  Hygien	MDS	Decree		ISP (Certification and accreditation of testing laboratory)	Lot	Used
9		Fishery products for export	MINECOM	Inter- Government Agreement	Contract specifica- tion	Various companies, including Fundacion Chile & IFOP	Lot	Used
10		Explosive	MON	Decree	Technical specifica- tion	IDIC	Lot	Used
11	Voluntary	Fresh and frozen salmon	APSTC		APSTC certifica- tion rules	Fundacion Chile, CESMEC and others	Lot	Used
12		Shoes, paint, furniture			NCh	CESMEC	Conformity mark	Used
13		Export timber			NCh, JAS,	INFOR	Lot	Used
14		Wood protection paints			NCh, JAS, etc.	Austral University	Lot	Used
15		Fruit, Marine products	INN		Contract specifica- tion	46 companies with INN	Lot	Used

- (c) MINVU has approved and accredited 44 certification bodies for certification in the construction field.

This right was conferred by No. 254, General Ordinance of Construction and Urbanization, Construction Law of MINVU. These bodies perform certification of the wood, cement, and metal materials accredited under Ministerial Resolution 420 and certification and road surfacing. The main certification bodies are CESMEC, DICTUC, IDIEM, UTFSM and Norte University. These are also approved by MOP. The compulsory certification system by way of Conformity Mark Certification includes a system operated by MOP aimed at construction materials. The condition is that it should be accredited by INN. Certification is executed by CESMEC. At present, there are seven companies coming under the system.

- (d) MINTRATEL has instituted regulations for car exhaust gases and a bus inspection system for security. For the former, a total of 176 companies, for the latter, a total of 62 companies have been approved. Certification is executed on the basis of technical standards, but NCh standards are not used.

- (e) SEC of MINECOM carries out certification of electric appliances and town gas equipments for safety control of electricity and fuel. The items registered under Decree (washing machines, irons, mixers, vacuum cleaners, etc.) are certified under NCh (or IEC) standards. At present, the six certification bodies including CESMEC, DICTUC, IDIEM and UTFSM are accredited by the ministry. For export items, too, the decree is being applied, but in this case, UL and other powerful certification bodies are accepted as the most important approved certification bodies.

- (f) SSSA of MOP has accredited six certification bodies (i.e., CESMEC, IDIC, IDIEM, DICTUC, UTFSM and Norte University)



for certification of construction materials and sanitary installations (piping) in conjunction with MINVU on the basis of INN inspection.

(g) ISP is responsible for products requiring compulsory hygiene inspection as well as pharmaceutical, health products, and the environment on the basis of Reglamento of MDS. It has approved the certification bodies in this field and placed them under its supervision, and also conducts approval and certification of new drugs in its own testing and inspection laboratory. For import products, too, it assumes responsibility. There are 180 certification bodies accredited so far, including government, public and private bodies.

(h) SERNAP is part of MINECOM and conducts certification for marine products for export. It is the certification body responsible for Chile's marine product exports (cans, fish meal, fish oil, etc.). It provides compulsory certification services, including certification based on an intergovernment agreement with the U.S. (FDA) and certification based on the demands of the governments of Europe, Central and South America.

While being a certification body, it has no testing laboratory of its own. It therefore accredits some testing laboratories all of which have passed INN accreditation.

(i) IDIC is the body supervising explosives, and 60% of the explosives handled by IDIC are used by companies in the private sector.

Some areas of the voluntary certification sector are outside government control. The voluntary system will be covered in this report only to the extent the study team was able to investigate during its mission.