# Chapter 8 Transportation Tests (Model Project)

## 8.1 Transportation Tests, Target Products and Routes

The activities for the 3rd Site Survey of the Study basically consist of the development of the re-engineering of the packaging through the data analysis of collected information during the Transportation Environment Surveys along the 4 countries, and the establishment the "Reference Guideline for Evaluation of Packaging Tests". On this way, once implemented the improvements on the design of the packaging, a cargo having the re-designed packaging will be loaded in a truck together with cargoes packed with normal design, for the purpose of carrying out a field tests. This step will be done after completed the evaluation tests at laboratories.

For the 4th Site Survey of the Study, the JICA Study Team prepared the work plan through the coordination with the Counterpart institutes of the 4 countries, in order to define the participation of the cooperative companies, the target products, the routes to be run and the schedule of the field tests.

**Table 8.1-1 Transportation Tests: Target Products and Routes**

| Country | Sequence of Routes | Dist. (1 way) km | Dist. km | Cooperative Company | Schedule 2006 | Days |
|---|---|---|---|---|---|---|
| Argentina | Rosario－Bs Aires (route for Model Project) | 300 | 600 | FRIMETAL | 11/27 ～ 11/28 | 2 |
| | Rafaela－Neuquen (route for Model Project) | 1300 | 2600 | Williner | 11/2 ～ 11/6 | 5 |
| | Aimogasta－Bs. Aires (route for Model Project) | 1200 | 1200 | NUCETE | | 3 |
| Brazil | Joinville－Recife (route for Model Project) | 3000 | 6000 | Multibrass | 10/9 ～ 10/18 | 10 |
| | Hortolandia－Recife (route for Model Project) | 3000 | 6000 | BSH | 10/30 ～ 11/8 | 10 |
| Paraguay | Loma Plata－Asunción (route for Model Project) | 500 | 1000 | Chortitzer | 10/9 ～ 10/11 | 3 |
| Uruguay | Montevideo－Fray Bentos (route for Model Project) | 300 | 600 | Conaprole | 10/19 ～ 10/20 | 2 |

Note: "Model Project": A study process for final evaluation of new improved packaging.
Source: JICA Study Team

On Table 8.1-1 they are indicated the planned field transportation tests and those already executed.

**Table 8.1-2 Transportation Tests: Target Products and Routes (status)**

| | Company | Product | Routes of stretch | | Transp. Co. | Remark |
|---|---|---|---|---|---|---|
| | | | Origin | Destinat. | | |
| Argentina | Frimetal | Heladeras | Rosario | Bs. As. | Proper | |
| | Mastellone | Lacteo/D leche | BsAires | Santiago | — | Cancelled |
| Brazil | BHS | Heladeras | — | — | — | Cancelled |
| | Multibras | Heladeras | Joinville | Sao Paulo | Proper | |
| Paraguay | Chortitzer | Leche | Loma Plata | Asuncion | proper | |
| Uruguay | Conaprole | Yoghurt | Montevideo | Fray Bentos | — | postponed |

Note: The reasons of cancellation or postponement are described in the related chapters.
Source: JICA Study Team

## 8.2 Data Analysis of Transportation Tests and Packaging Design Improvement

Regarding the determination of the items to be examined, and the conditions for carrying out the tests (the target products are dairy products and home appliances) must be predetermined so that all possible damages during the transportation process can be covered. The same idea can be applied for the laboratory tests.

In general, the level of external forces applied during the transportation process will depend on the type of product, the actual route, the type of vehicle to be used – they can be variable – so that the variable factors are multiple. Therefore, the test items for the packaging must be selected carefully taking into account the type of product, the routes, the type of truck, analyzing all the factors as an integral system.

The packaging tests conditions, since they are variable depending on the characteristics of the product, very often they are established by the manufacturers themselves.

In the case of Japan, the standard which establishes these conditions is in accordance with the JIS (Japan Industrial Standard) standard, which specifies the tests conditions by a single standard and the related tests defined as "standardized tests".

The JIS standards establish the rules so that they are suitable for all the transportation conditions in all Japan territory, conforming to other international standards, such as ISO standards.

The JIS standard applicable for packaging tests is listed as follows.

**Table 8.2-1 JIS Standards Related to Packaging**

| No. | Standard No. | Standard Title | Remarks |
|---|---|---|---|
| 1 | Z 0108 : 2005 | Glossary of terms for packaging | Under review |
| 2 | Z 0119 : 2002 | Mechanical-shock fragility testing methods for packaging and products design | According to ISO |
| 3 | Z 0150 : 2001 | Packaging -- Pictorial marking for handling of goods | According to ISO |
| 4 | Z 0152 : 1996 | Marking for Attention in handling of packaged goods | Japan special standard |
| 5 | Z 0170 : 1998 | Unit loads -- Stability testing | Translation version according to ISO |
| 6 | Z 0200 : 1999 | Packaged freights -- General rules of testing | According to ISO |
| 7 | Z 0201 : 1989 | Methods of designating on component parts and points of containers when testing | |
| 8 | Z 0202 : 1994 | Method of drop test for packaged freights | According to ISO |
| 9 | Z 0203 : 2000 | Packaged freights -- Conditioning for testing | Translation version according to ISO |
| 10 | Z 0205 : 1998 | Packaged freights -- Method of horizontal impact tests | According to ISO |
| 11 | Z 0212 : 1998 | Packaged freights and containers -- Method of compression test | According to ISO |
| 12 | Z 0215 : 1996 | Testing method of stitch strength for sewn kraft paper | |

| No. | Standard No. | Standard Title | Remarks |
|---|---|---|---|
| | | sacks | |
| 13 | Z 0216 : 1991 | Water spray test for packages and containers | |
| 14 | Z 0217 : 1998 | Kraft paper sacks -- Method of drop test | According to ISO |
| 15 | Z 0222 : 1959 | Method of permeability test for moisture proof packing case | |
| 16 | Z 0232 : 2004 | Packaged freights -- Method of vibration test | According to ISO |

Based on these standards, the transportation field tests have been carried out with redesigned package, according to the data analysis of the Transportation Environment Surveys and the work plan as indicated in Chapter 7.

The results of field tests have been analyzed through the data analysis, according to the type of products and the surveyed routes for each member countries, as indicated in the clause 8.1 of this report.

The condition of the field survey is described for each country as follows.

## 8.2.1 Argentina

### 8.2.1.1 Household Appliances

Table 8.2.1-1 describes the specifications for the actual transportation test and the routes covered in the survey performed using refrigerators as target product (product selected for Argentina).

**Table 8.2.1-1 Actual Transportation Test and Routes Covered using the Target Product**

| | | Argentina |
|---|---|---|
| Actual transportation test of the target product | | |
| | Target product | Electric Refrigerator |
| | Type | Capacity 350 liters |
| | Qualitative weight of packaging (kg) | 56 |
| | Packaging measures L x A x H (mm) | 625×624×1,695 |
| | Sample using improved packaging | 1 Class<br>Review of the EPS |
| Route | | |
| | Stretch | Rosario - BuenosAires |
| | Distance (km) | 300 |
| | Duration of the survey (day) | 1 |
| | Units to be tested (units) | 2 |
| | Vehicle used | Semi trailer truck |

Source: JICA Study Team

### (1) Analysis of the data obtained in the actual transportation test and measures for improvement

Although some conclusions are not final so as to be considered measures for improving the quality of packaging design, the results of the actual transportation test and lab tests performed on the samples are summarized in Table 8.2.1-2.

**Table 8.2.1-2 Analysis of the Data Collected in the Actual Transportation Test and Measures for Improvement**

| | Argentina |
|---|---|
| Collected data | a. Measurements taken from the back of the trailer: data under analysis<br>b. Inside the refrigerator: data under analysis. |
| Measures for packaging improvement | The results of the actual transportation test, both in respect of the products as well as the packaging, were successful. The vibration and drop test results were also very good. |

Source: JICA Study Team

During the transportation test, impact sensors were placed in the trailer and inside the product. The sensor placed in the trailer was used to measure the vibrations during transportation and the one inside the product was used to measure impacts during the handling of the product. In order to measure the drop impact of the refrigerator, an impact sensor was placed on the compressor tray located at the bottom of the product but upon several analyses of the measured data, the handling impacts could not be accurately measured due to the propagation of the reaction to the impact inside the compressor. To avoid this, the measurements were taken from a location not closed to the compressor and accurate results were obtained. The analysis was performed by the counterparty.

### (2) Lab tests in Argentina

Table 8.2.1-3 shows the results of the lab tests performed in Argentina.

**Table 8.2.1-3 Lab Tests Results: Argentina**

| Description of the Test | | Product and Improved Packaging | Traditional Packaging |
|---|---|---|---|
| Vibration test (see Fig. 8.2.1-1) | | | |
| | Testing conditions | The PSD was calculated performing random tests based on the transportation vibrations measured along a 1300km stretch between Rosario and Bs.As. and Mendoza and Bs.As., applying vibrations with a PSD equal to 3 hours. | The reactions to the vibrations were measured. |
| | Results | Satisfactory both as to products and packaging. | (Used as background information for the improvement of the packaging). |

| Description of the Test | Product and Improved Packaging | Traditional Packaging |
|---|---|---|
| Drop test (See Fig. 8.2.2) | Msec applied speed G (duration of the impact msec) | Applied speed G (duration of the impact msec) |
| Dropping height 5cm | 6.4 (28.5) | 6.5 (23.5) |
| 10cm | 11.9 (22.0) | 13.0 (22.5) |
| 20cm | 14.3 (33.0) | 14.6 (23.5) |
| 30cm | 19.5 (29.0) | - (-) |
| Results | | |
| Inside parts loosened. | Generation (Solved by implementing the packaging of parts) | Generation |
| Door unleveled | Generation: Refrigerator side 3mm, freezer side 1mm. | Generation: Refrigerator side 3mm, freezer side 1mm. |
| Thermal plaque unleveled | Generation | Generation |
| Compressor tray | Not deformed | Deformed: 1mm longwise, 1mm widthwise. |
| Pandeo lateral | Not deformed | Not deformed |

Source JICA Study Team

Source JICA Study Team

**Fig 8.2.1-1 Vibration Tests, Improved Product**

Source JICA Study Team

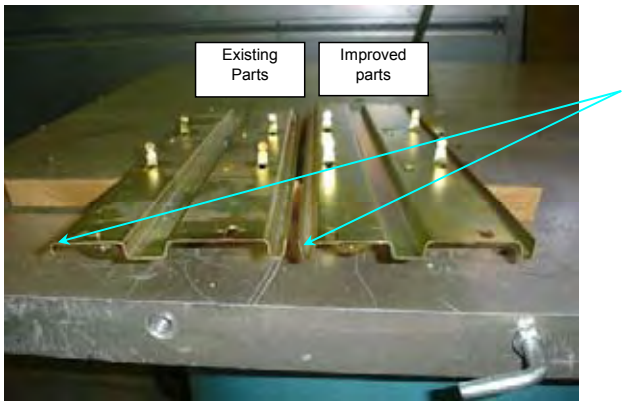
**Fig 8.2.1-2 Drop Tests, Improved Product**

The packaging improvement specifications were mainly related to the shape of the EPS that supports the bottom of the refrigerator for it to move with the refrigerator at the time of the impact. As regards the deformation of the door, some effects were seen but since the inside parts were damaged, the resistance to impact should be improved.

Now then, the following is related to the potential improvement of the product based on the test results indicated in Table 8.2.1-3.

(1) The loosening of inside parts can be solved by the implementation of the proposal for the packaging of individual parts.

(2) Based on the results of the impact tests, it was seen that the compressor tray was defective, so improvement measures were proposed to the manufacturer, that is performing the pertinent tests. See Fig. 8.2.1-3.




Source: JICA Study Team

**Fig. 8.2.1-3 Modifications to the Compressor Tray**

Although the drop test was carried out pursuant to the standard set at 10 cm, upon the evaluation of the mentioned improvement specifications, the basic resistance was tested, concluding that the volume of EPS used may be reduced by 30%.

#### 8.2.1.2 Reasons for the interruption of the export of dairy products

At the beginning of October, the Chilean government increased the customs tariffs applicable to Argentine dairy products by 21%, so that the company suspended shipments. According to the Company, there have been no difficulties related to packaging, at least up to Mendoza, a flat stretch. The problems occur when crossing the Andes. But the company cancelled the actual transportation test because if no products are going to be exported to Chile, carrying out the model project would be useless.

### 8.2.2 Brazil

#### 8.2.2.1 Household Appliances

Table 8.2.2-1 describes the actual transportation test specifications and the routes covered in the survey performed using refrigerators as target product for Brazil.

**Table 8.2.2-1 Actual Transportation Test and Routes Covered using the Target Product**

| | | Brazil |
|---|---|---|
| Actual transportation test of the target product | | |
| | Target product | Electric Refrigerator |
| | Type | Capacity 350 liters |
| | Qualitative weight of packaging (kg) | 51 |
| | Packaging measures LxAxH（mm） | 692×642×1,562 |
| | Sample using improved packaging | 2 Classes<br>Packed in cardboard boxes, with EPS |
| Route | | |
| | Stretch | Joinville - SaoPaulo |
| | Distance (km) | 500 |
| | Duration of the survey (day) | 1 |
| | Units to be tested (units) | 2 |
| | Vehicle used | Trailer truck |

Source: JICA Study Team

**(1) Analysis of the data obtained in the actual transportation test and measures for improvement**

The same process applied in Argentina was performed in Brazil. Although some conclusions are not final so as to be considered measures for improving the quality of packaging design, the results of the actual transportation test and lab tests performed on the samples are summarized in the following Table.

**Table 8.2.2-2 Analysis of the Data obtained in the Actual Transportation Test and Measures for Improvement**

| | Brazil |
|---|---|
| Collected data | a. Taken from the back of the trailer: data analysis failed<br>b. Inside the refrigerator: data analysis failed. |
| Measures for packaging improvement | The results of the actual transportation test, both in respect of the products as well as the packaging, were successful. The implementation of the improvement specifications will be verified through lab tests. |

Source: JICA Study Team

Like in Argentina, during the actual transportation test, impact sensors were placed in the trailer and inside the product. The sensor placed in the trailer was used to measure the vibrations during transportation and the one inside the product was used to measure impacts during the handling of the product. In order to measure the drop impact of the refrigerator, an impact sensor was placed on the compressor tray located at the bottom of the product but the sensor failed and no data could be obtained so the measurement was postponed.

**(2) Packaging test based on the improved design**

In Brazil, packaging tests using cardboard were performed (see Fig. 8.2.2-1) with the cooperation of a packaging company and based on the specifications set forth by the industrial design area of the counterparty. This was implemented in the production line of the cooperating company, preparing the packaging to perform the actual transportation test.

Source: JICA Study Team

**Fig. 8.2.2-1 Packaging Test Using Cardboard**

### 8.2.3 Paraguay

#### 8.2.3.1 Packaging Design and Transportation Tests

A package was created for testing (milk pouch) made of material improved by increasing the percentage of L-LDPE polyethylene by 15% as compared to the material usually used.

Based on information from the production plant, this improved packaging resulted in 50% reduction of sealing damages caused in the production line.

Besides, the JICA Study Team, visited the production plant. By taking samples of full pouches, a significant improvement was seen in the properties of the improved pouch through compression and drop tests. Although the pouch has been improved, high quality cannot be attained if the processing controls are deficient. To obtain good results, not only improved materials should be used but strict production line controls should be implemented.

The samples prepared using improved material were tested during transportation, along the Loma Plata - Asunción stretch.

#### 8.2.3.2 Testing schedule (PY)

Date: October 12, 2006 (Thursday)

| Date | Itinerary |
|---|---|
| October 12 （Thursday） | 15:20 Departure<br>16:06 Chaco route crossing<br>17:53 Pozo Colorado<br>20:46 Villa Hayes<br>21:12 Asuncion – stop at gas station to fill the truck up<br>21:45 Asuncion – arrival to Chortitzer's Distribution Center |

Note: The truck speed in this case was better than in the test performed the previous year (from September 27 to October 4, 2005).
Source: JICA Study Team

#### 8.2.3.3 Organization of the Transportation Environment Survey (PY)

JICA Study Team: Mr. Tsuyoshi Kage, Ms. Yuko Matsunaga (Interpreter)
INTN: Mr. Ovaldo Raul Barbosa
Chortitzer: Mr. Javier Romero

#### 8.2.3.4 Routes covered by the survey

The stretch from Loma Plata to Asunción was 440 km long. From Loma Plata up to the crossing of the Chaco Route, unpaved stretches or route sections under repair were found for a total of 20 km. The condition of the route was a little better – only in some parts – if compared to October, 4, 2005.

Besides, the transported cargo consisted of milk crates with 18 units (pouches) each.

#### 8.2.3.5 Vehicle and cargo

The truck and the cargo used in the survey.

| | Main Features | Photographs |
|---|---|---|
| Type of truck | Semi-Trailer<br>Closed with refrigeration |  |
| Axles and suspension | 1(S)＋2(D)＋1(D)＋1(D)<br>Spring+Air+spring+spring | |
| Maximum load | 25 ton | |
| Cargo | Milk pouches in crates | |
| Carried load | 25.3 ton | |

Source: JICA Study Team

#### 8.2.3.6 Results of the transportation test

To test the packaging made of the improved material, a visual inspection of all the transported units was made on the following day, verifying the location and the possible causes of the damages identified. Since no inspections were made at the plant before departure, it could

not be determined whether the damages were suffered during transportation or not. Therefore, it was concluded that the total damages found upon arrival include both, those suffered in the plant and during transportation.

Final damages = Plant damages + Transportation damages

Within the different kinds of damages, "damages to the material and pin holes" occur in the production line due to "hitching" and/or to the internal protuberances of the plastic crates.

On the other hand, damages to the seals were comparatively low in pouches made of the improved material, about 1.5 / 1,000 units; showing a significant improvement as compared to the current material.

**Table 8.2.3-1 Comparative Analysis of Damages to Milk Pouches**

| | Date of Transp. | Inspec. Number | Location/ Cause of the Damage | | Total | Damaged Seals (1/1000) |
|---|---|---|---|---|---|---|
| | | | Seals | Material, Pin Holes | | |
| Improved mat | Oct 12, 06 | 1,332 | 2 | 2 | 4 | 1.5 |
| Current material | Oct 18, 06 | 1,620 | 8 | 5 | 13 | 4.9 |
| Current material | Oct 19, 06 | 1,620 | 5 | 6 | 11 | 3.0 |
| Current material | Oct 20, 06 | 1,620 | 2 | 4 | 6 | 1.2 |
| Total Current material. | | 4,860 | 15 | 15 | 30 | 3.1 |
| Current material * | Oct 20, 06 | 810 | 4 | 1 | 5 | 4.9 |

*Note: Cargo carried from Plant number 2 (taking Route number 2 to Ciudad del Este, Campo 8 in Caaguazu, Asuncion. Total 300km)

Source: JICA Study Team

### 8.2.4 Uruguay

Yogurt pot lids are made of aluminum foil (AL40μ/ Laquered).

Two kinds of improved material were tested in this Survey: Aluminum foil of the current thickness but laminated with PET12μ and another one, less thick (aiming at reducing costs).

The specifications of those materials are the following:

a) Improved material: AL40μ/PET12μ/Lacquer

b) Improved material 2: AL30μ/PET12μ/Lacquer

Unfortunately, the supply of these materials by the lid supplier is delayed due to union disputes. In addition, the Company is also facing union problems. These problems are expected to be solved in the short term. Once they are solved, and once the materials are supplied, the counterparty, LATU, will perform the pertinent transportation tests.

## 8.3 Improvements to Prevent Damages to the Target Products

### 8.3.1 Analysis of the Causes of Damages

During the development of the Transportation Environment Surveys as well as the packaging design activities, the parties to the Study, the members of the Study Team and the members of the counterpart have analyzed some cases of direct damages to products. Since these cases can be used as reference to analyze damages to packaging, a summary of the conclusions is shown in the following table.

**Table 8.3.1-1 Number of Cases of Damaged Packaging**

| Case | Household appliances | Food products |
|---|---|---|
| Impact due to dropping during handling | 1 | 1 |
| Vibration during transportation | 3 | 5 |
| Compression load during storage | 2 | 4 |
| Variation of temperature, moisture, atmospheric pressure | 0 | 3 |

Source: JICA Study Team

In the case of household appliances, damages occurred during long distance transportation, storage and loading /unloading; in the case of food products, during storage, handling for arrangement on pallets for storage, vibration during long distance transportation and changes of temperature during the distribution process.

### 8.3.2 Damage Rate of Products of the Cooperating Companies

The damage rate of the different products of each cooperating companies of the four countries, mainly during transportation, was calculated based on forms completed by the cooperating companies, as described in the following table. However, since this kind of data is considered confidential in almost all companies, the names of the parties that cooperated in this survey are not mentioned, upon request of the companies and the counterparts.

**Table 8.3.2-1 Percentage of Damages to the Products of the Companies Selected for this Survey (Manufacturers of Household Appliances)**

| Company | Percentage of Damages | Comments |
|---|---|---|
| Company A | 0.03%<br>(only refrigerators) | Damages directly related to packaging |
| Company B | 0.22<br>(All the products) | Percentage of returns (85% are due to damages directly related to packaging) |
| Company C | 2.66<br>(All the products) | Percentage of returns (No specific information) |

**Table 8.3.2-2 Percentage of Damages to the Products of the Companies Selected for this Survey (Manufacturers of Food Products)**

| Company | Percentage of Damages | Comments |
|---|---|---|
| Company A | 4%<br>(All the products) | Porcentage of returns (No specific information) |
| Company B | 0.58%<br>(All the products) | Percentage of returns (20% are due to damages directly related to packaging) |
| Company C | 1.48 %( All the products)<br>2.13% (Target products for the Study) | Porcentage of returns (No specific information) |

However, companies in general do not have any policy or regulation in place to determine the rate of damages to their products and, since they do not have a system where information about the damaged parts, the possible causes of the damage, etc can be entered, such information could not be obtained in detail.

Therefore, in the case of household appliances, the damages to the products were analyzed. In the case of food products, since the percentage of returns include claims due to expiry, most companies have information related to the rate of returns and not of damages.

Specifically in the case of food, since most products are transferred to the client in the plant – under the pertinent contracts – the wholesaler or distributor is responsible for controlling and handling the delivered goods, so there is no information available about the causes of damages throughout this process, even when many claims are made.

This Study included detailed surveys performed together with the cooperating companies to verify the number of damages to products. The following form was used in respect of company "B", that operates in the food sector. Unfortunately, the design of this form does not allow us to clearly identify the cause of the damages, so the data collected may not be sufficient to perform the design improvement test.

**Table 8.3.2-3 Form used by Company "B" (Food Producer) to Control Damages during Distribution**

| Code # | Item | Amount of Damages | Number of Damages |
|---|---|---|---|
| 1* | Damages during transportation | | |
| 2* | Deficits (difference between the number of contracted units and delivered units) | | |
| 3 | Visible defects (identified by the retailer upon delivery) | | |
| 4 | Error in the Order | | |
| 5 | Change of product by request of the customer | | |
| 6* | Expired | | |
| 7 | Error in the invoice | | |
| 8 | Quality of the product | | |
| 9 | Error in the orders | | |
| 10* | Cancellation of the order due to default in payment | | |

| Code # | Item | Amount of Damages | Number of Damages |
|---|---|---|---|
| 11 | Change due to payment date problems | | |
| 12 | Unknown causes | | |
| 13 | Cancelled order | | |
| 15* | Accident during transportation | | |
| 16 | Error in the bar code | | |
| 17 | Production line problems | | |
| 18 | Excessive orders | | |
| 19* | Error in distribution | | |
| 20 | Pricing error | | |
| 21 | Unpaid distribution taxes (ICMS) | | |
| 22 | Error in the computerized registration of customers | | |
| 23 | Error in the registration of customer data | | |
| 24 | Products returned due to nonperformance of contractual obligations | | |
| 25* | Error in the counting of the pallets | | |
| 26 | Error in the calculation of distribution taxes (ICMS) | | |
| 27 | Excessive stock (Return due to lack of room in the customer's warehouses) | | |
| 28* | Problems with the Carrier | | |
| 29 | Returns due to special contracts (eg. Christmas, etc.) | | |
| 30* | Losses during transportation | | |
| 99 | Other | | |

In company "B", as regards the item marked* classified as "Distribution", the main reasons for the return of products are: distribution and quality deficiencies. For example, from 0.58% of returned products, of which 0.19% were returned due to "1. damages during transportation" and 0.24% due to quality deficiencies (First semester, 2006).

Besides, the company has informed that no food products have been returned cause by package damage in the last few years. The reason for this is that, depending on the country, the dairy industry is monopolizing the market apparently related to the agreement between suppliers and purchasers as well as due to the influence of an ordering system where damages are assumed. In addition, taking into account the fact that, consumers are much more tolerant to damages in this region than in the Japanese market, it could be concluded that the actual percentage of damages exceeds the one described above.

In the Study, the following checklists were used. They are usually used by Japanese companies to analyze product returns. They are filled in upon reception of the damaged goods. These items were analyzed together with the cooperating companies.

### Table 8.3.2-4 Damages Check List (Draft) – Appliances (mainly Refrigerators)

**a) Damages to Packaging**

| Type of Damage | Size / Number of Damage | Statistical Data (%) |
|---|---|---|
| Tearing | Cm | % |
| Holes | Cm | % |
| Holes during handling | Cm | % |
| Lost straps | # | % |
| Dented corners | Cm | % |
| Denting | Cm | % |
| Denting, scratches EPS | #, Cm | % |
| Friction | - | % |
| Swollen | - | % |
| Unbalanced base | - | % |
| (Other) | | % |

**b) Damages to the Product**

| Type of Damage | Size / Number of Damage | Statistical Data (%) |
|---|---|---|
| Deformation of the body | Cm | % |
| Loosened parts | # | % |
| Problems with doors | # | % |
| Tubing damages | # | % |
| False start / wires | # | % |
| (Other) | | % |

### Table 8.3.2-5 Damages Check List (Draft) – Food Products (Pouches, Plastic Pots, Tetrapak)

**a) Pouches**

| Type of Damage | | Statistical Data (%) |
|---|---|---|
| Primary packaging | | |
| Leaks (during transportation) | (through the seals) | % |
| | (through the body) | % |
| Leaks (at the plant) | (through the seals) | % |
| | (through the body) | % |
| Explosion | (due to impact) | % |
| | (due to compression)* | % |
| (Other) | | % |

**b) Plastic packaging (pudding and yogurt)**

| Type of Damage | | Statistical Data (%) |
|---|---|---|
| Primary packaging | | |
| Leaks (during transportation) | (through the seals) | % |
| | (through the body) | % |
| Leaks (at the plant) | (through the seals) | % |
| | (through the body) | % |
| Explosion | (due to impact) | % |
| | (due to compression)* | % |
| Deformation | (of the border of the lid) | % |
| | (of the body) | % |
| Damages due to problems with the secondary packaging | | % |
| (Other) | | % |

* Damages may be reduced improving the secondary packaging or the handling.

**a) Tetrapak**

| Type of Damage | | Statistical Data (%) |
|---|---|---|
| Primary packaging | | |
| Explosion | (due to impact) | % |
| | (due to compression)* | % |
| Deformation | (of the border of the lid) | % |
| | (of the body) | % |
| Damages due to problems with the secondary packaging | | % |
| (Other) | | % |

**Transportation of products to Chile**

The rate of damages to household refrigerators (with capacity of 310L, and a cargo consisting of 142 units per semi trailer truck) transported along the Brazil-Argentina-Chile route, i.e. 2700km per truck, was analyzed. The results of the inspections performed at the final warehouse in Chile are analyzed below. The whole cargo carried in one of the trucks was checked.

(1) Product: In respect of the dispatch of the cargo, since the packages cannot be opened, no visual inspection could be made.

(2) Packaging: since the company had no packaging damage evaluation internal policy in place, the cargo was routinely checked according to the judgment of the employees in charge of receiving the goods at the final warehouse. The results of the verification (performed by the Study Team) are shown in Table below.

**Table 8.3.2-6 Number of Rejected Units**

| Units to be Analyzed | | Accepted | Rejected |
|---|---|---|---|
| Vertical position | 94 | 90 | 4 |
| Horizontal position | 48 | 2 | 46 |
| Total | 142 | 92 | 50 |

Note: From the 50 damaged products, those occurring in the plant or when dispatching the goods in the plant are:

a) Cracks on molded EPS: 4 units

b) Damages to the shrink type film17 units

Source: JICA Study Team

Refrigerators have been placed horizontally on top of a vertical layer so as to improve loading effectiveness. However, from the table above packaging design problems can be inferred. One of these problems is that when the refrigerators are horizontally placed, the staff in charge of loading and unloading step on the lateral walls of the refrigerators, where the packaging is relatively weak and therefore prone to damages. The other problem is that when the refrigerators are in a horizontal position, the parts are affected by the vibrations during transportation, which should be taken into account when designing them.

### 8.3.3 Economic Advantages Resulting from the Improvement of Packaging

The information on the impact of packaging costs on the final price of the products and on production costs is confidential, so calculating the economic margins that would result from improving packaging is very difficult.

However, only one company that produces refrigerators – one of the target products of the Survey – has provided us with information on the packaging of their products, provided that its name is not mentioned. Under this agreement, an economic analysis shall be made based on this company.

**(1) Savings after reducing the damages ratio**

The following calculation should be made:

US$ 700 (production cost) x 220,000 (units / year) x 0.03% = US$ 46,200

→ Under the current conditions, where the rejection rate due to damages is 0.03%, the annual loss amounts to US$ 46,200. If packaging is improved, this figures could be reduced almost to zero.

**(2) Reduction of transportation and handling costs**

The cost of transportation by a truck from a home appliances manufacturing plant to a consumer center is approximately US$ 650 per one way trip. If a shipping product is a refrigerator, a standard size truck's maximum loading capacity is 80 units per truck. Therefore, this home appliances manufacturer needs 2,750 trucks per year for their shipping since they produce 220,000 units of refrigerators per year. The current damages ratio is 0.03% for refrigerators of this home appliances manufacturer on their processes of shipment, transportation, storage and handling.

If a current damages ratio of 0.03% is considered, it can be said that 66 units (220,000× 0.03%) are rejected and returned to the plant per year. If there is no merchandise returns, then the annual transportation cost of this home appliances manufacturer is calculated as:

2,750 units × US$650 = US$1,787,500 / year

If 33 units out of total 66 units of refrigerator returns per year would be returned to a manufacturing plant, the transportation cost of US$21,450 (US$650×33 units) can be increased in case of 1 unit refrigerator returns per 1 time truck transportation. This cost can be reduced by the improvement of packaging with a probability of returns to profit.

**(3) Reduction of Packaging Expenses**

In this company 3.4% of the manufacturing costs are absorbed by packaging materials and labor costs. Logistics is aware that the currently used packaging is excessive and that if the

proposed improvements are implemented, packaging costs will be reduced by 1%, representing savings for US$ 1.5 million in production costs.

Besides, this would result in a significant reduction of damages that would benefit not only manufacturers but also wholesalers, carriers, retailers and related parties.

The following table shows the results of a survey made in private companies about the increase of packaging costs and the policies in place to reduce the same.

1) Causes of the increase of packaging costs

| | Proportion of the Item |
|---|---|
| a. Increase in packaging materials | 52.9% |
| b. Increase in distribution process | 23.5% |
| c. Increase in returnable packages | 11.8% |
| d. Increase in contracts executed and outsourced services | 11.8% |
| | 100% |

2) Packaging costs reduction policy

| | Proportion of the Item |
|---|---|
| a. Recycling of the packaging material (reuse) | 16.2% |
| b. Simplification, elimination of packaging material (reduction) | 15.3% |
| c. Modification of the design of the packaging material | 15.3% |
| d. Operative/ work efficiency (Standardization) | 14.4% |
| e. Review of the pricing system applicable to contracts or outsourced services | 12.0% |
| f. Recycling of materials | 12.0% |
| g. Execution of contracts | 6.0% |
| h. Review of contracts | 4.6% |
| i. Addition of equipment for distribution | 3.7% |
| j. Elimination of equipment for distribution (humanization) | 0.5% |
| | 100% |

(Several answers were given)

In respect to the packaging costs reduction policy, if verified per type of task, the highest number of tasks are performed during manufacturing. This specifically shows the change in the design of the packaging material. The next most important one is simplification /elimination (reduction) and finally recycling of the packaging material (reuse) that shows the actions performed by companies that attain optimization through the modification of designs.

As regards wholesalers, the recycling of packaging materials is the most important one, followed by operative/work efficiency (Standardization).

As seen in this JICA Study, if the policy is implemented as a common standard and both recycling and environmental problems are considered important issues within the MERCOSUR, the four items mentioned below will certainly arise, according to a survey carried out in Japan.

1. Modification of the packaging material
2. Operative / work efficiency (Standardization)
3. Simplification /elimination (reduction)
4. Recycling of the packaging material (reuse)

Based on these principles, packaging costs should be reduced.

Besides, the following distribution weaknesses identified in the MERCOSUR should be highlighted: lack of organization to control the distribution process, lack of funds for storage security as well as long distance transportation security, high cost of installing GPS in the truck and high transportation insurance costs.

The lack of organization in the distribution management system may be due to the fact that contracts are not clear as to the distribution schedule. The distribution activities, where damages occur, are: manufacturing, entrance to the storage, storage tasks, dispatch, distribution processing, transportation, loading and unloading tasks. Within this classification, the activities where packaging are mainly damaged are loading and unloading and transportation.

This JICA Study included Transportation Environment Surveys using long distance trucks within the MERCOSUR and the provision of advice as regards the creation of adequate packaging based cargo handling surveys. However, more awareness should be risen in respect of he analysis of damages, through the consolidation of an organized distribution control to monitor the whole process, from the distribution activities up to delivery to the customers.

3) Economic evaluation of packaging

[1] Distribution costs = Selling price x 5.26% : (Average standard in force in Japan)

Structural comparison per item:

a. Transportation costs: 5.66%

b. Household appliances: 2.45%

c. Food products: 7.96%

[2] Current proportion of distribution costs

a. Transportation costs: 56.6%

(Supply, Internal: total transportation costs for sale)

b. Storage costs: 20.5%

c. Packaging costs: 6.0%

d. Loading/unloading costs 9.7%

e. Administrative costs related to distribution 7.2%

(Expenses related to security within the Mercosur; no data available)

100%

[3] Percentage of damages to products within the Mercosur (simple calculation)

Household appliances 0.97% (average)

Processed food: 2.21% (average)

[4] Household appliances (target product for the Study: refrigerators)

(Eg) Selling Price = US$ 700/Unit

Distribution costs: 700 x 2.45%= US$ 17.15

Packaging costs: 17.5 x 6.0%= US$ 1.029

Manufactured units (annual): 220,000 units

Total annual packaging costs: US$ 226,380.00

The annual losses due to damaged products suffered by this company (calculated based on an average percentage of damages to products of 3 companies) is US$/year 2,195.89-

However, the losses due to packaging damages are shown as a % of the distribution costs, so in the case of household appliances, this percentage is proportional to the 2.45% of the total price (see above)

Therefore, 220,000 units/year x US$ 17.15 (distribution costs) = US$ 3,773,000.00

Applying the product damages factor:

US$ 3,773,000.00 x 0.97% = US$ 36,598.00.-

Which represents the annual total losses.

[5] Other factors

Security issues as well as insurance are important factors that affect operative expenses in the MERCOSUR region. However, this can be solved by implementing an organized distribution management system. To such end, the methodologies to be implemented in order to reduce losses should be determined first.

## 8.4 Improvement of Transportation for Target Products

### 8.4.1 Distribution System and related Standards

The following remarks can be made regarding the goods distribution system within MERCOSUR Region:

1) Elimination (in principle) of custom duties within MERCOSUR

Custom duties have basically been eliminated within MERCOSUR since January 1st 1995. Exception was made of some items that remain regulated within MERCOSUR.

2) Application of common customs tariff outside MERCOSUR

Common customs tariff from 0 to 20% are applied to products that are imported from outside MERCOSUR since January 1st 1995 (i.e. 85% of 9000 items). These rates have been changed to 0 to 22.5% from January 2001 onwards.

The customs tariff described in above item (2) are being modified in order to fit economical changes worldwide and within MERCOSUR. According to the experience of the Study-Team when crossing the international borders during the Transport Environment Study, the "hardware" such as customs system is not well-balanced to the "software" consolidation. In addition, there is neither regulation nor rules that offer preferential treatment to export-import activities within MERCOSUR, waiting time to clear cargoes in each customs office is one of the outstanding problems in MERCOSUR distribution system. It will be necessary to develop a goods distribution system from the operative point of view.

Meanwhile, there are common standards within MERCOSUR for the regulation of packaging materials, as described below. However, common standards and reference guides regarding packaging within MERCOSUR (which are the subject of this Study) are not yet regulated. Based upon the studies developed in each of the countries, within a wide context of goods distribution, Argentina and Brazil are applying national standards, while Paraguay and Uruguay do not have such ones. Above paragraphs are summarized in the Table below:

**(1) Packaging related Standards of Brazil**

CETEA, the counterpart institute in Brazil, is applying the following national and international standards for packaging testing, as well as goods distribution standards. National Standards are primarily considered, and international standards are taken as a reference. Please refer to Brazilian Standards reference List on next pages.

## Table 8.4.1-1 (1) CETEA Standards (National Standards)

| Nº de Controle | Identificação / Ano | Nome do Documento | Documento original | Texto* | Última Consulta |
|---|---|---|---|---|---|
| | **ABIEF** | | | | |
| 1 | NT-1.00/00: 2000 | NOMENCLATURA | ADI | I | OUT./2005 |
| 2 | NT-1.01/00: 2000 | FILME DE POLIETILENO DE BAIXA DENSIDADE (PEBD) NÃO IMPRESSO - USO GERAL | ADI | I | OUT./2005 |
| 3 | NT-1.02/00: 2000 | SACOS PLÁSTICOS PARA ACONDICIONAMENTO DE LIXO | ADI | I | OUT./2005 |
| 4 | NT-1.03/00: 2000 | FILME DE POLIETILENO DE BAIXA DENSIDADE (PEBD) PARA EMBALAGEM DE LEITE PASTEURIZADO | ADI | I | OUT./2005 |
| 5 | NT-1.04/00: 2000 | FILME DE POLIETILENO DE BAIXA DENSIDADE (PEBD) IMPRESSO | ADI | I | OUT./2005 |
| 6 | NT-1.05/00: 2000 | SACOS DE POLIETILENO DE BAIXA DENSIDADE (PEBD) COM E SEM IMPRESSÃO USO GERAL | ADI | I | OUT./2005 |
| 7 | NT-1.06/00: 2000 | FILME DE POLIETILENO DE BAIXA DENSIDADE ESTICÁVEL PARA PALETIZAÇÃO (FILME STRETCH) | ADI | I | OUT./2005 |
| | **ABNT** | | | | |
| 8 | NBR 5425: 1985 | GUIA PARA INSPEÇÃO POR AMOSTRAGEM NO CONTROLE E CERTIFICAÇÃO DE QUALIDADE | ADI | I | FEV./06 |
| 9 | NBR 5426: 1985 | PLANOS DE AMOSTRAGEM E PROCEDIMENTOS NA INSPEÇÃO POR ATRIBUTOS | ADI | I | FEV./06 |
| 10 | NBR 5427: 1985 | GUIA PARA UTILIZAÇÃO DA NORMA NBR 5426 - PLANOS DE AMOSTRAGEM E PROCEDIMENTOS NA INSPEÇÃO POR ATRIBUTOS | ADI | I | FEV./06 |
| | NBR 5839: 1984 | COLETA DE AMOSTRAS DE TINTAS E VERNIZES | ADI | I | FEV./06 |
| | NBR 5840/MB-745: 1974 | EXAME PRÉVIO E PREPARAÇÃO PARA ENSAIOS DE AMOSTRAS DE TINTAS E VERNIZES | ADI | I | FEV./06 |
| 11 | NBR 5841: 1974 | DETERMINAÇÃO DO GRAU DE EMPOLAMENTO DE SUPERFÍCIES PINTADAS | ADI | I | FEV./06 |
| 12 | NBR 5842: 1978 | DETERMINAÇÃO DO PONTO DE FULGOR (MÉTODO DO VASO FECHADO) EM TINTAS, VERNIZES E RESINAS | ADI | I | FEV./06 |
| 13 | NBR 5849: 1986 | TINTAS DETERMINAÇÃO DE VISCOSIDADE PELO COPO FORD | ADI | I | FEV./06 |
| 14 | NBR 5902: 1980 | DETERMINAÇÃO DO ÍNDICE DE EMBUTIMENTO EM CHAPAS DE AÇO PELO MÉTODO ERICHSEN MODIFICADO | ADI | I | FEV./06 |
| 15 | NBR 5915: 1984 **(NBR5915: 2003)** | CHAPAS FINAS A FRIO DE AÇO-CARBONO PARA ESTAMPAGEM | ADI | I | FEV./06 |
| 16 | NBR 5980: 2004 | EMBALAGEM DE PAPELÃO ONDULADO - CLASSIFICAÇÃO | ADI | I | FEV./06 |
| 17 | NBR 5985: 1988 | PAPELÃO ONDULADO E CAIXAS DE PAPELÃO ONDULADO | ADI | I | FEV./06 |
| 18 | NBR 5991: 1997 | EMBALAGENS PLÁSTICAS PARA ÁLCOOL - REQUISITOS E MÉTODOS DE ENSAIO | ADI | I | FEV./06 |
| 19 | NBR 6023: 2002 | INFORMAÇÃO E DOCUMENTAÇÃO - REFERÊNCIAS - ELABORAÇÃO | ADI | I / D | FEV./06 |
| 20 | NBR 6146: 1980 (válida até 29.04.2005) CANCELADA E SUBSTITUÍDA POR NBRIEC60529 | INVÓLUCROS DE EQUIPAMENTOS ELÉTRICOS - PROTEÇÃO | ADI | I | FEV./06 |
| 21 | NBR 6156: 1983 (CANCELADA E SUBSTITUÍDA - NBR NM-ISO 7500-1: 2004) | MÁQUINA DE ENSAIO DE TRAÇÃO E COMPRESSÃO VERIFICAÇÃO | ADI | I | FEV./06 |
| 22 | NBR 6403: 1992 | SÉRIES DE NÚMEROS NORMALIZADOS | ADI | I | FEV./06 |
| | NBR 6405: 1988 (CANCELADA E SUBSTITUÍDA POR NBR ISO 4287: 2002) | RUGOSIDADE DAS SUPERFÍCIES | ADI | I | MAIO/06 |
| 23 | NBR 6565: 1982 | ELASTÔMERO VULCANIZADO - DETERMINAÇÃO DO ENVELHECIMENTO ACELERADO EM ESTUFA | ADI | I | FEV./06 |
| 24 | NBR 6599: 2000 | ALUMÍNIO E SUAS LIGAS - PROCESSOS E PRODUTOS - TERMINOLOGIA | ADI | I | FEV./06 |
| 25 | NBR 6658: 1994 | BOBINAS E CHAPAS FINAS DE AÇO-CARBONO PARA USO GERAL | ADI | I | FEV./06 |
| 26 | NBR 6659: 1983 | FOLHAS NÃO REVESTIDAS, SIMPLESMENTE REDUZIDAS | ADI | I | FEV./06 |
| 27 | NBR 6665: 2006 | FOLHAS LAMINADAS DE AÇO-CARBONO REVESTIDAS ELETROLITICAMENTE COM ESTANHO OU CROMO OU NÃO REVESTIDAS - ESPECIFICAÇÃO | ADI | I | FEV./06 |
| 28 | NBR 6673: 1981 | PRODUTOS PLANOS DE AÇO - DETERMINAÇÃO DAS PROPRIEDADES MECÂNICAS À TRAÇÃO | ADI | I | FEV./06 |
| 29 | NBR 6736: 2001 | PAPELÃO ONDULADO DE FACE SIMPLES E DE PAREDE SIMPLES - DETERMINAÇÃO DA RESISTÊNCIA AO ESMAGAMENTO | ADI | I | FEV./06 |
| 30 | NBR 6737: 2002 | PAPELÃO ONDULADO - DETERMINAÇÃO DA RESISTÊNCIA À COMPRESSÃO DE COLUNA | ADI | I | FEV./06 |
| 31 | NBR 6738: 2001 | PAPELÃO ONDULADO - DETERMINAÇÃO DA ESPESSURA | ADI | I | FEV./06 |
| 32 | NBR 6739: 2003 | EMBALAGEM DE PAPELÃO ONDULADO - EMBALAGEM DE TRANSPORTE VAZIA OU COM O SEU CONTEÚDO - ENSAIO DE COMPRESSÃO USANDO APARELHO DE COMPRESSÃO | ADI | I | FEV./06 |
| 33 | NBR 6834: 2000 | ALUMÍNIO E SUAS LIGAS - CLASSIFICAÇÃO | ADI | I | FEV./06 |
| 34 | NBR 6835: 2000 | ALUMÍNIO E SUAS LIGAS - CLASSIFICAÇÃO DAS TÊMPERAS | ADI | I | FEV./06 |
| 35 | NBR 7155: 2003 | PAPEL - DETERMINAÇÃO DO TEMPO DE ABSORÇÃO DE ÁGUA (ENSAIO DA GOTA) | ADI | I | FEV./06 |
| 36 | NBR 7244: 1982 | FOLHA-DE-FLANDRES - DETERMINAÇÃO DE DESCOLORAÇÃO | ADI | I | FEV./06 |
| 37 | NBR 7318: 1982 | ELASTÔMERO VULCANIZADO PARA USO EM VEÍCULOS AUTOMOTORES - DETERMINAÇÃO DA DUREZA | ADI | I | FEV./06 |
| | NBR 7340: 1982 | TINTAS E VERNIZES - DETERMINAÇÃO DO TEOR DE SUBSTÂNCIAS VOLÁTEIS E NÃO VOLÁTEIS | ADI | I | MAIO/06 |
| 38 | NBR 7401: 1985 | FOLHAS-DE-FLANDRES - DETERMINAÇÃO DO TAMANHO DE GRÃO DE ESTANHO | ADI | I | FEV./06 |
| 39 | NBR 7406: 1985 | FOLHAS-DE-FLANDRES - DETERMINAÇÃO DO VALOR DE FERRO EM SOLUÇÃO - VFS | ADI | I | FEV./06 |
| 40 | NBR 7407: 1982 | FOLHAS-DE-FLANDRES - DETERMINAÇÃO DA DUREZA ROCKWELL | ADI | I | FEV./06 |
| | NBR 7408: 1982 | AÇO INOXIDÁVEL - DETERMINAÇÃO DA SUSTENTABILIDADE AO ATAQUE INTERGRANULAR COM ÁCIDO OXÁLICO | ADI | I | FEV./06 |
| 41 | NBR 7452: 1982 | PLÁSTICOS - ATMOSFERAS PADRÃO PARA CONDICIONAMENTO E ENSAIO | ADI | I | FEV./06 |
| 42 | NBR 7462: 1992 | ELASTÔMERO VULCANIZADO - DETERMINAÇÃO DA RESISTÊNCIA À TRAÇÃO | ADI | I | FEV./06 |

| Nº de Controle | Identificação / Ano | Nome do Documento | Documento original | Texto* | Última Consulta |
|---|---|---|---|---|---|
| | **ABIEF** | | | | |
| 43 | NBR 7549: 2001 | ALUMÍNIO E SUAS LIGAS - ENSAIO DE TRAÇÃO DOS PRODUTOS DÚCTEIS E FUNDIDOS | ADI | I | FEV./06 |
| 44 | NBR 7500: 2005 | IDENTIFICAÇÃO PARA O TRANSPORTE TERRESTRE, MANUSEIO, MOVIMENTAÇÃO E ARMAZENAMENTO DE PRODUTOS | ADI | I | FEV./06 |
| 45 | NBR 7501: 2005 | TRANSPORTE TERRESTRE DE PRODUTOS PERIGOSOS - TERMINOLOGIA | ADI | I | FEV./06 |
| 46 | NBR 7840: 1983 | GARRAFAS RETORNÁVEIS DE USO COMUM PARA CERVEJAS, REFRIGERANTES, AGUARDENTES, SODAS E ÁGUAS GASEIFICADAS | ADI | I | FEV./06 |
| 47 | NBR 7841: 1983 | GARRAFAS RETORNÁVEIS DE USO COMUM PARA CERVEJAS, REFRIGERANTES, AGUARDENTES, SODAS E ÁGUAS GASEIFICADAS - VERIFICAÇÃO DAS CARACTERÍSTICAS | ADI | I | FEV./06 |
| 48 | NBR 7842: 1983 | GARRAFAS RETORNÁVEIS DE USO COMUM PARA CERVEJAS, REFRIGERANTES, AGUARDENTES, SODAS E ÁGUAS GASEIFICADAS FORMATOS, DIMENSÕES E CORES | ADI | I | FEV./06 |
| | NBR 7882: 1989 | RECIPIENTE METÁLICO - ENSAIO DE ESTANQUEIDADE | ADI | I | MAIO/06 |
| 49 | NBR 8094: 1983 | MATERIAL METÁLICO REVESTIDO E NÃO REVESTIDO CORROSÃO POR EXPOSIÇÃO À NÉVOA SALINA | ADI | I | FEV./06 |
| 50 | NBR 8095: 1983 | MATERIAL METÁLICO REVESTIDO E NÃO REVESTIDO CORROSÃO POR EXPOSIÇÃO À ATMOSFERA ÚMIDA SATURADA | ADI | I | FEV./06 |
| 51 | NBR 8113: 1983 | FOLHAS METÁLICAS - DETERMINAÇÃO DO ÓLEO DE CAROÇO DE ALGODÃO OU SEBACATO DE DIOCTILA PELA BALANÇA DE SUPERFÍCIE | ADI | I | FEV./06 |
| 52 | NBR 8164: 1983 | FOLHAS E CHAPAS DE AÇO DE BAIXO CARBONO - DETERMINAÇÃO DA ANISOTROPIA PLÁSTICA E DO EXPOENTE DE ENCRUAMENTO | ADI | I | FEV./06 |
| 53 | NBR 8219: 1999 | TUBOS E CONEXÕES DE PVC - VERIFICAÇÃO DO EFEITO SOBRE ÁGUA | ADI | I | FEV./06 |
| 54 | NBR 8252: 1983 | PALETES - DIMENSÕES BÁSICAS | ADI | I | FEV./06 |
| 55 | NBR 8254: 1983 | PALETES | ADI | I | FEV./06 |
| 56 | NBR 8255: 1983 | PALETES DE MADEIRA - RESISTÊNCIA DA FIXAÇÃO AO ARRANCAMENTO | ADI | I | FEV./06 |
| 58 | NBR 8308: 2000 | FOLHAS DE ALUMÍNIO E SUAS LIGAS - ENSAIO DE TRAÇÃO | ADI | I | FEV./06 |
| 59 | NBR 8334: 1983 | PALETES | ADI | I | FEV./06 |
| 60 | NBR 8335: 1983 | PALETES - FLEXÃO DA FACE SUPERIOR | ADI | I | FEV./06 |
| 61 | NBR 8336: 1983 | PALETES - DETERMINAÇÃO DA RESISTÊNCIA À FLEXÃO DA FACE INTERIOR | ADI | I | FEV./06 |
| 62 | NBR 8337: 1983 | PALETES - DETERMINAÇÃO DA RESISTÊNCIA À FLEXÃO DO PALETE APOIADO NA FACE SUPERIOR | ADI | I | FEV./06 |
| 63 | NBR 8338: 1983 | PALETES - DETERMINAÇÃO DA RESISTÊNCIA À FLEXÃO DO PALETE APOIADO NA FACE INFERIOR | ADI | I | FEV./06 |
| 64 | NBR 8339: 1983 | PALETES - DEFORMAÇÃO EM DIAGONAL | ADI | I | FEV./06 |
| 65 | NBR 8341: 1983 | PALETES - DETERMINAÇÃO DA RESISTÊNCIA À QUEDA LIVRE SOBRE QUINA | ADI | I | FEV./06 |
| 66 | NBR 8481: 1984 | FOLHAS-DE-FLANDRES - DETERMINAÇÃO DO REVESTIMENTO DE ESTANHO PELO MÉTODO COULOMÉTRICO (ELETROLÍTICO) | ADI | I | FEV./06 |
| 67 | NBR 8749: 1985 | FOLHAS-DE-FLANDRES - DETERMINAÇÃO DA DENSIDADE DE CORRENTE ELÉTRICA (DCE) DA CAMADA DE LIGA FERRO ESTANHO | ADI | I | FEV./06 |
| 68 | NBR 8750: 1985 | FOLHAS DE AÇO CROMADAS - DETERMINAÇÃO DO ÓXIDO DE CROMO PELO MÉTODO COLORIMÉTRICO | ADI | I | FEV./06 |
| 69 | NBR 8823: 1985 | MATERIAIS METÁLICOS REVESTIDOS E NÃO REVESTIDOS - CORROSÃO POR EXPOSIÇÃO À NÉVOA SALINA ACÉTICA | ADI | I | FEV./06 |
| 70 | NBR 8824: 1985 | MATERIAIS METÁLICOS REVESTIDOS E NÃO REVESTIDOS - CORROSÃO POR EXPOSIÇÃO À NÉVOA SALINA CUPROACÉTICA | ADI | I | FEV./06 |
| 71 | NBR 8962: 1985 | FOLHAS DE AÇO CROMADAS - DETERMINAÇÃO DE CROMO TOTAL PELO MÉTODO COLORIMÉTRICO | ADI | I | FEV./06 |
| 72 | NBR 9159: 2005 | PAPEL PARA MIOLO - DETERMINAÇÃO DA RESISTÊNCIA À COMPRESSÃO QUANDO ONDULADO EM LABORATÓRIO (CMT) | ADI | I | ABR./06 |
| 73 | NBR 9191: 2002 | SACOS PLÁSTICOS PARA ACONDICIONAMENTO DE LIXO - REQUISITOS E MÉTODOS DE ENSAIO | ADI | I | FEV./06 |
| 74 | NBR 9192: 1985 | PALETES DE MADEIRA - MATERIAIS | ADI | I | FEV./06 |
| 75 | NBR 9193: 1985 | PALETES DE MADEIRA SERRADA | ADI | I | FEV./06 |
| 76 | NBR 9198: 1985 | EMBALAGEM E ACONDICIONAMENTO - TERMINOLOGIA | ADI | I | FEV./06 |
| 77 | NBR 9397: 1986 | MATERIAIS TÊXTEIS - TIPOS DE COSTURA | ADI | I | FEV./06 |
| 78 | NBR 9460: 1986 | EMBALAGEM - DESEMPENHO | ADI | I | FEV./06 |
| 79 | NBR 9461: 1986 | EMBALAGEM E ACONDICIONAMENTO DETEMINAÇÃO DO DESEMPENHO EM VIBRAÇÃO VERTICAL | ADI | I | FEV./06 |
| 80 | NBR 9464: 1986 | EMBALAGEM - DETERMINAÇÃO DO DESEMPENHO EM PERFURAÇÃO | ADI | I | FEV./06 |
| 81 | NBR 9465: 1986 | EMBALAGEM - DETERMINAÇÃO DO DESEMPENHO EM COMPRESSÃO LOCALIZADA | ADI | I | FEV./06 |
| 82 | NBR 9466: 1986 | EMBALAGEM - DETERMINAÇÃO DO DESEMPENHO EM BAIXA PRESSÃO | ADI | I | FEV./06 |
| 83 | NBR 9467: 1986 | EMBALAGEM E ACONDICIONAMENTO - DETERMINAÇÃO DO DESEMPENHO EM EXPOSIÇÃO À CHUVA | ADI | I | FEV./06 |
| 84 | NBR 9468: 1986 | EMBALAGEM - DETERMINAÇÃO DO DESEMPENHO EM EXPOSIÇÃO À UMIDADE | ADI | I | FEV./06 |
| 85 | NBR 9469: 1986 | EMBALAGEM - DETERMINAÇÃO DO DESEMPENHO COM CONTEÚDO AGRESSIVO | ADI | I | FEV./06 |
| 86 | NBR 9470: 1986 | EMBALAGEM - DETERMINAÇÃO DA ESTANQUEIDADE | ADI | I | FEV./06 |
| 87 | NBR 9471: 1986 | EMBALAGEM - DETERMINAÇÃO DA RESISTÊNCIA À PRESSÃO INTERNA | ADI | I | FEV./06 |
| 88 | NBR 9472: 1986 | EMBALAGEM - DETERMINAÇÃO DA RESISTÊNCIA AO FOGO | ADI | I | FEV./06 |
| 89 | NBR 9473: 1986 | EMBALAGEM PARA ISOLAMENTO TÉRMICO - DETERMINAÇÃO DO DESEMPENHO | ADI | I | FEV./06 |
| 90 | NBR 9474: 1986 | EMBALAGEM E ACONDICIONAMENTO - DETERMINAÇÃO DO DESEMPENHO EM QUEDA | ADI | I | FEV./06 |
| 91 | NBR 9475: 1986 | EMBALAGEM E ACONDICIONAMENTO - DETERMINAÇÃO DA RESISTÊNCIA À COMPRESSÃO POR CARGA CONSTANTE | ADI | I | FEV./06 |
| 92 | NBR 9476: 1986 | EMBALAGEM - DETERMINAÇÃO DO DESEMPENHO EM LEVANTAMENTO | ADI | I | FEV./06 |
| 93 | NBR 9477: 1986 | CONDICIONAMENTO CLIMÁTICO DE EMBALAGEM E ACONDICIONAMENTO - PROCEDIMENTO | ADI | I | FEV./06 |

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|---|---|---|---|---|---|
| | **ABIEF** | | | | |
| 94 | NBR 9478: 1986 | IDENTIFICAÇÃO DAS FACES DE EMBALAGEM PARA ENSAIO | ADI | I | FEV./06 |
| 95 | NBR 9479: 1994 | CÂMARAS ÚMIDAS E TANQUES PARA CURA DE CORPOS-DE-PROVA DE ARGAMASSA E CONCRETO | ADI | I | FEV./06 |
| 96 | NBR 9633: 1986 | PLÁSTICOS - TERMINOLOGIA | ADI | I | FEV./06 |
| 97 | NBR 9735: 2005 | CONJUNTO DE EQUIPAMENTOS PARA EMERGÊNCIAS NO TRANSPORTE TERRESTRE DE PRODUTOS PERIGOSOS | ADI | I | FEV./06 |
| 98 | NBR 9801: 1987 | PREPARAÇÃO DA PLACA DE BORRACHA VULCANIZADA PARA ENSAIOS FÍSICOS E QUÍMICOS | ADI | I | FEV./06 |
| 99 | NBR 9875: 1987 | PLÁSTICOS - DETERMINAÇÃO DA MASSA ESPECÍFICA DO MATERIAL MOLDADO E DO FATOR DE COMPRESSÃO | ADI | I | FEV./06 |
| 100 | NBR 10004/10005/10006/10007: 2004 | RESÍDUOS SÓLIDOS - COLETÂNEA DE NORMAS (NBR 10004:2004 - RESÍDUOS SÓLIDOS - CLASSIFICAÇÃO; NBR 10005:2004 - PROCEDIMENTO PARA OBTENÇÃO DE EXTRATO LIXIVIADO DE RESÍDUOS SÓLIDOS; NBR 10006:2004 - PROCEDIMENTO PARA OBTENÇÃO DE EXTRATO SOLUBILIZADO DE RESÍDUOS SÓLIDOS; NBR 10007:2004 - AMOSTRAGEM DE RESÍDUOS SÓLIDOS). | ADI | I | FEV./06 |
| 101 | NBR 10025: 1987 | ELASTÔMERO VULCANIZADO- ENSAIO DE DEFORMAÇÃO PERMANENTE À COMPRESSÃO | ADI | I | FEV./06 |
| 102 | NBR 10234: 1988 | FOLHAS-DE-FLANDRES - AVALIAÇÃO DA SOLDABILIDADE COM SOLDA 30 A | ADI | I | FEV./06 |
| 103 | NBR 10249: 1988 | FOLHAS-DE-FLANDRES - DETERMINAÇÃO DA CAMADA DE ESTANHO PELO MÉTODO GRAVIMÉTRICO | ADI | I | FEV./06 |
| 104 | NBR 10250: 1988 | FOLHAS-DE-FLANDRES - ADERÊNCIA DE VERNIZ EPÓXI FENÓLICO | ADI | I | FEV./06 |
| 105 | NBR 10334: 1999 **(NBR 10334:2003)** | SEGURANÇA DE CHUPETAS | ADI | I | FEV./06 |
| 106 | NBR 10356: 1988 | SÍMBOLOS PARA FOLHAS DE AÇO DE BAIXO TEOR DE CARBONO | ADI | I | FEV./06 |
| 107 | NBR 10456: 2004 | ADESIVOS - DETERMINAÇÃO DA RESISTÊNCIA DA COLAGEM | ADI | I | FEV./06 |
| 108 | NBR 10530: 2002 | PAPELÃO ONDULADO - DETERMINAÇÃO DA RESISTÊNCIA À DESCOLAGEM DOS COMPONENTES PELO MÉTODO DE IMERSÃO | ADI | I | FEV./06 |
| 109 | NBR 10531: 1988 | EMBALAGENS METÁLICAS - LATAS | ADI | I | FEV./06 |
| 110 | NBR 10532: 1988 | LATAS - DETERMINAÇÃO DA CAPACIDADE TOTAL | ADI | I | FEV./06 |
| 111 | NBR 10608: 1989 | FOLHAS-DE-FLANDRES - DETERMINAÇÃO DE CROMO TOTAL NA SUPERFÍCIE, PELO MÉTODO COLORIMÉTRICO | ADI | I | FEV./06 |
| 112 | NBR 10854: 1989 | TRANSPORTE AÉREO DE ARTIGOS PERIGOSOS - EMBALAGEM | ADI | I | FEV./06 |
| 113 | NBR 11003: 1990 | TINTAS - DETERMINAÇÃO DA ADERÊNCIA | ADI | I | FEV./06 |
| | NBR 11134 / PB-1004: 1983 | ROLHAS METÁLICAS TIPO COROA PARA FECHAMENTO DE GARRAFAS - CARACTERÍSTICAS DIMENSIONAIS | ADI | I | FEV./06 |
| 114 | NBR 11135: 1990 | EMPREGO DE ROLHAS METÁLICAS TIPO COROA PARA FECHAMENTO DE GARRAFAS | ADI | I | FEV./06 |
| 115 | NBR 11136: 1990 | EMBALAGENS PLÁSTICAS - TERMINOLOGIA | ADI | I | FEV./06 |
| 116 | NBR 11273: 1990 | EMBALAGEM - CLASSIFICAÇÃO | ADI | I | FEV./06 |
| 117 | NBR 11274: 1990 | TAMBORES | ADI | I | FEV./06 |
| 118 | NBR 11276: 1990 | LATAS - CLASSIFICAÇÃO | ADI | I | FEV./06 |
| 119 | NBR 11280: 1990 | AMPOLAS - CONTROLE DA QUALIDADE | ADI | I | FEV./06 |
| 120 | NBR 11281: 1990 | AMPOLAS - CAPACIDADE VOLUMÉTRICA | ADI | I | FEV./06 |
| 121 | NBR 11282: 1993 | AMPOLAS - VERIFICAÇÃO DE SIMETRIA | ADI | I | FEV./06 |
| 122 | NBR 11283: 1990 | AMPOLAS - VERIFICAÇÃO DE TENSÕES EXCESSIVAS | ADI | I | FEV./06 |
| 123 | NBR 11284: 1993 | AMPOLAS - RESISTÊNCIA DO ANEL À RUPTURA | ADI | I | FEV./06 |
| 124 | NBR 11285: 1990 | AMPOLAS - RESISTÊNCIA HIDROLÍTICA - ENSAIO EM VIDRO PULVERIZADO | ADI | I | FEV./06 |
| 125 | NBR 11286: 1990 | AMPOLAS - RESISTÊNCIA HIDROLÍTICA - ENSAIO POR FOTOMETRIA DE CHAMA | ADI | I | FEV./06 |
| 126 | MB 3092/NBR 11287: 1989 | ARTIGOS POLIMÉRICOS EM CONTATO COM ALIMENTOS - PROVA DE CESSÃO | ADI | I | FEV./06 |
| 127 | NBR 11290: 1989 | ARTIGOS POLIMÉRICOS EM CONTATO COM ALIMENTOS - PROVA DE CESSÃO - MIGRAÇÃO ESPECÍFICA DE DITIOCARBAMATOS, TIOURAMAS E XANTOGENATOS | ADI | I | FEV./06 |
| 128 | NBR 11291: 1989 | ARTIGOS POLIMÉRICOS EM CONTATO COM ALIMENTOS - PROVA DE CESSÃO - MIGRAÇÃO DE FORMALDEÍDO | ADI | I | FEV./06 |
| 129 | NBR 11292: 1989 | ARTIGOS POLIMÉRICOS EM CONTATO COM ALIMENTOS - PROVA DE CESSÃO - MIGRAÇÃO ESPECÍFICA DE FENÓIS E CRESÓIS | ADI | I | FEV./06 |
| 130 | NBR 11293: 1989 | ARTIGOS POLIMÉRICOS EM CONTATO COM ALIMENTOS - PROVA DE CESSÃO - MIGRAÇÃO ESPECÍFICA DE PERÓXIDO | ADI | I | FEV./06 |
| 131 | NBR 11407: 1990 | ELASTÔMERO VULCANIZADO- DETERMINAÇÃO DAS ALTERAÇÕES DAS PROPRIEDADES FÍSICAS, POR EFEITO DE IMERSÃO EM LÍQUIDOS | ADI | I | FEV./06 |
| 132 | NBR 11564: 2002 | EMBALAGEM DE PRODUTOS PERIGOSOS - CLASSES 1, 3,4,5,6,8 E 9 - REQUISITOS E MÉTODOS DE ENSAIO | ADI | I | FEV./06 |
| 133 | NBR 11599: 1989 | COMPOSTOS DE PVC PARA USO EM ARTIGOS MÉDICOS, ODONTOLÓGICOS E HOSPITALARES DE USO ÚNICO | ADI | I | FEV./06 |
| 135 | NBR 11819: 2004 | FRASCOS DE VIDRO PARA PRODUTOS FARMACÊUTICOS - REQUISITOS E MÉTODOS DE ENSAIO | ADI | I | FEV./06 |
| 136 | NBR 11823: 2005 | UTENSÍLIOS DOMÉSTICOS DE ALUMÍNIO E SUAS LIGAS - PANELA DE PRESSÃO DE USO DOMÉSTICO | ADI | I | FEV./06 |
| 137 | NBR 11888: 1992 | BOBINAS FINAS E CHAPAS FINAS DE AÇO-CARBONO E DE AÇO BAIXA LIGA E ALTA RESISTÊNCIA - REQUISITOS GERAIS | ADI | I | FEV./06 |
| 138 | NBR 11912: 2001 | MATERIAIS TÊXTEIS - DETERMINAÇÃO DA RESISTENCIA À TRAÇÃO E ALONGAMENTO DE TECIDOS PLANOS(TIRA) | ADI | I | FEV./06 |
| 139 | NBR 11931: 1977 | MÉTODO PADRÃO DE TESTE PARA DENSIDADE DE PLÁSTICOS PELA TECNICA DE GRADIENTE DE DENSIDADE | ADI | I | FEV./06 |
| 140 | NBR 11936: 1977 | DETERMINAÇÃO DO PESO ESPECÍFICO DE PLÁSTICOS COM O USO DE PICNÔMETRO | ADI | I | FEV./06 |
| 141 | NBR 12106 / MB-3447: 1991 | FOLHA DE FLANDRES - DETERMINAÇÃO DO ÓXIDO DE ESTANHO | ADI | I | FEV./06 |
| 142 | NBR 12806: 1993 | ANÁLISE SENSORIAL DOS ALIMENTOS E BEBIDAS | ADI | I | FEV./06 |

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| | ABIEF | | | | |
| 143 | NBR 12995: 1993 | TESTE TRIANGULAR EM ANÁLISE SENSORIAL DOS ALIMENTOS E BEBIDAS | ADI | I | FEV./06 |
| 144 | NBR 13056: 2000 | FILMES PLÁSTICOS - VERIFICAÇÃO DA TRASPARÊNCIA MÉTODO DE ENSAIO | ADI | I | FEV./06 |
| 145 | NBR 13058: 2003 | EMBALAGENS FLEXÍVEIS - ANÁLISE DE SOLVENTES RESIDUAIS | ADI | I | FEV./06 |
| 146 | NBR 13096: 1994 | MATERIAIS TEXTEIS - PONTOS DE COSTURA | ADI | I | FEV./06 |
| 147 | NBR 13177: 1994 | EMBALAGENS FLEXÍVEIS - AVALIAÇÃO DO POTENCIAL DE CONTAMINAÇÃO ORGANOLÉPTICA DE ALIMENTOS | ADI | I | FEV./06 |
| 148 | NBR 13221: 2005 | TRANSPORTE TERRESTRE DE RESÍDUOS | ADI | I | FEV./06 |
| 149 | NBR 13230: 1994 | SIMBOLOGIA INDICATIVA DE RECICLABILIDADE E IDENTIFICAÇÃO DE MATERIAIS PLÁSTICOS | ADI | I | FEV./06 |
| | NBR 13289: 1995 | AÇO E FERRO - DETERMINAÇÃO DO MOLIBDÊNIO POR ESPECTROMETRIA DE ABSORÇÃO ATÔMICA | ADI | I | MAIO/06 |
| | NBR 13290: 1995 | AÇO E FERRO - DETERMINAÇÃO DO COBRE POR ESPECTROMETRIA DE ABSORÇÃO ATÔMICA | ADI | I | MAIO/06 |
| 150 | NBR 13375: 1995 | LINHA DE COSTURA DETERMINAÇÃO DA RESISTÊNCIA RUPTURA E DO ALONGAMENTO A RUPTURA | ADI | I | FEV./06 |
| 151 | NBR 13376: 1995 | LINHA DE COSTURA - DETERMINAÇÃO DA RESISTÊNCIA DA LAÇADA Á RUPTURA E DO ALONGAMENTO DA LAÇADA À RUPTURA | ADI | I | FEV./06 |
| 152 | NBR 13388: 1995 | CORTA-FLUXO "CONTA GOTAS" - ESPECIFICAÇÃO | ADI | I | FEV./06 |
| 153 | NBR 13389: 1995 | CORTA-FLUXO "CONTA GOTAS" - TERMINOLOGIA | ADI | I | FEV./06 |
| 154 | NBR 13526: 1995 | TESTE DE COMPARAÇÃO MULTIPLA EM ANÁLISE SENSORIAL DOS ALIMENTOS E BEBIDAS | ADI | I | FEV./06 |
| 155 | NBR 13793: 2005 | SEGURANÇA DE MAMADEIRAS E DE BICOS DE MAMADEIRAS | ADI | I | MAR./06 |
| | NBR 14070: 2005 | ALUMÍNIO E SUAS LIGAS - MÉTODOS DE ANÁLISES QUÍMICAS | ADI | I | MAIO/06 |
| 156 | NBR 14101: 1998 | PAPEL E CARTÃO - TUBETES - AMOSTRAGEM PARA ENSAIOS | ADI | I | FEV./06 |
| 157 | NBR 14102: 2002 | PAPEL E CARTÃO - TUBETES - CONDICIONAMENTO DAS AMOSTRAS | ADI | I | FEV./06 |
| 158 | NBR 14105: 1998 | MANÔMETROS COM SENSOR DE ELEMENTO ELÁSTICO - RECOMENDAÇÕES DE FABRICAÇÃO E USO | ADI | I | FEV./06 |
| 159 | NBR 14257: 1998 | PAPEL E CARTÃO - TUBETES - DETERMINAÇÃO DA UMIDADE. MÉTODO POR SECAGEM EM ESTUFA | ADI | I | FEV./06 |
| 160 | NBR 14259: 1998 **(CANCELADA E SUBSTITUÍDA POR NBR 14260:2005)** | PAPEL - DETERMINAÇÃO DA RESISTÊNCIA AO ESMAGAMENTO DO ANEL (COM PRENSA DO TIPO BARRA DE FLEXÃO) | ADI | I | FEV./06 |
| 161 | NBR 14260: 2005 | PAPEL - DETERMINAÇÃO DA RESITÊNCIA AO ESMAGAMENTO DO ANEL (COM PRENSA DO TIPO PRATOS RÍGIDOS) | ADI | I | FEV./06 |
| 162 | NBR 14283: 1999 | RESÍDUOS EM SOLOS - DETERMINAÇÃO DA BIODEGRADAÇÃO PELO MÉTODO RESPIROMÉTRICO | ADI | I | FEV./06 |
| 163 | NBR 14319: 2003 | PAPEL, CARTÃO E PASTA CELULÓSICA - DETERMINAÇÃO DE CLORETOS SOLÚVEIS EM ÁGUA - MÉTODO GERAL POR POTENCIOMETRIA | ADI | I | FEV./06 |
| 164 | NBR 14320: 2003 | PAPEL, CARTÃO E PASTA CELULÓSICA - DETERMINAÇÃO DE CLORETOS SOLÚVEIS EM ÁGUA - MÉTODO PARA PRODUTOS DE ALTA PUREZA POR POTENCIOMETRIA | ADI | I | FEV./06 |
| 165 | NBR 14328: 1999 | EMBALAGEM PLÁSTICA PARA ÁGUA MINERAL E DE MESA - TAMPA PARA GARRAFÃO RETORNÁVEL - REQUISITOS E MÉTODOS DE ENSAIO | ADI | I | FEV./06 |
| 166 | NBR 14351: 1999 | PAPEL E CARTÃO -TUBETES - DETERMINAÇÃO DA RESISTÊNCIA À COMPRESSÃO PLANA | ADI | I | FEV./06 |
| | NBR 14466: 2000 | TUBOS DE POLIETILENO PE 80 E PE 100 - VERIFICAÇÃO DA RESISTÊNCIA APÓS ENVELHECIMENTO | ADI | I | MAR./06 |
| 167 | NBR 14474: 2000 | FILMES PLÁSTICOS - VERIFICAÇÃO DA RESISTÊNCIA Á PERFURAÇÃO ESTÁTICA - MÉTODO DE ENSAIO | ADI | I | FEV./06 |
| 168 | NBR 14484: 2000 | PAPEL E CARTÃO - TUBETES - MEDIÇÃO DAS DIMENSÕES | ADI | I | FEV./06 |
| 169 | NBR 14485: 2000 **(NBR 14485: 2002)** | PAPEL E CARTÃO - DETERMINAÇÃO DA HIGROEXPANSIVIDADE ATÉ UMIDADE RELATIVA MÁXIMA DE 86% | ADI | I | FEV./06 |
| 170 | NBR 14523: 2000 | PAPEL E CARTÃO - TUBETES - ESPECIFICAÇÃO DO DIÂMETRO INTERNO | ADI | I | FEV./06 |
| 171 | NBR 14535: 2000 | MÓVEIS DE MADEIRA - TRATAMENTO DE SUPERFÍCIES - REQUISITOS DE PROTEÇÃO E ACABAMENTO | ADI | I | FEV./06 |
| 172 | NBR 14575: 2000 | PAPEL E CARTÃO - DESCRIÇÃO E CALIBRAÇÃO PARA O APARELHO DE COMPRESSÃO | ADI | I | FEV./06 |
| 173 | NBR 14619: 2005 | TRANSPORTE TERRESTRE DE PRODUTOS PERIGOSOS - INCOMPATIBILIDADE QUÍMICA | ADI | I | FEV./06 |
| 174 | NBR 14720: 2001 | EMBALAGEM METÁLICA PARA AEROSSOL - REQUISITOS E VERIFICAÇÃO DA RESISTÊNCIA À PRESSÃO INTERNA PARA EMBALAGENS VAZIAS SEM VÁLVULA | ADI | I | FEV./06 |
| 175 | NBR 14776: 2001 | CADEIRA PLÁSTICA MONOBLOCO - REQUISITOS E MÉTODOS DE ENSAIO | ADI | I | FEV./06 |
| 176 | NBR 14799: 2002 | RESERVATÓRIO POLIOLEFÍNICO PARA ÁGUA POTÁVEL - REQUISITOS | ADI | I | FEV./06 |
| 177 | NBR 14865: 2002 | COPOS PLÁSTICOS DESCARTÁVEIS | ADI | I | FEV./06 |
| 178 | NBR 14876: 2002 | UTENSÍLIOS DOMÉSTICOS DE ALUMÍNIO E SUAS LIGAS - ALÇAS, CABOS, POMÉIS E SISTEMAS DE FIXAÇÃO - REQUISITOS | ADI | I | FEV./06 |
| 179 | NBR 14910: 2002 | EMBALAGENS DE VIDRO PARA PRODUTOS ALIMENTÍCIOS - REQUISITOS E MÉTODOS DE ENSAIO | ADI | I | FEV./06 |
| 180 | NBR 14911: 2002 | PAPELÃO ONDULADO - DETERMINAÇÃO DA GRAMATURA DOS PAPÉIS-COMPONENTES APÓS A SEPARAÇÃO+B20 | ADI | I | FEV./06 |
| | NBR 140914: 2002 | PAPEL E CARTÃO - DETERMINAÇÃO DA RESISTÊNCIA Á PERMEAÇÃO DE LIQUIDOS - MÉTODO HÉRCULES | ADI | I | FEV./06 |
| 181 | NBR 14915: 2002 | PAPEL E CARTÃO - ENVELHECIMENTO ACELERADO - TRATAMENTO COM CALOR SECO A 105ºC | ADI | I | FEV./06 |
| 182 | NBR 14916: 2002 | PAPEL E CARTÃO - ENVELHECIMENTO ACELERADO - TRATAMENTO COM CALOR SECO A 120ºC OU 150ºC | ADI | I | FEV./06 |
| 183 | NBR 14926: 2003 | PAPEL E CARTÃO - ENVELHECIMENTO ACELERADO - TRATAMENTO COM CALOR ÚMIDO A 80ºC E UMIDADE RELATIVA DE 65% | ADI | I | FEV./06 |
| 184 | NBR 14937: 2005 | SACOLAS PLÁSTICAS TIPO CAMISETA - REQUISITOS E MÉTODOS DE ENSAIO | ADI | I | FEV./06 |
| 185 | NBR 14952: 2003 | BALDES PLÁSTICOS INJETADOS PARA USO INDUSTRIAL | ADI | I | FEV./06 |
| | NBR 14972: 2003 | PAPELÃO ONDULADO - DETERMINAÇÃO DA RESISTÊNCIA DA COLAGEM POR SEPARAÇÃO SELETIVA USANDO DISPOSITIVO COM PINOS | ADI | I | MAR./06 |
| | NBR 14979: 2003 | EMBALAGEM DE PAPELÃO ONDULADO - DETERMINAÇÃO DAS DIMENSÕES INTERNAS DA CAIXA | ADI | I | MAR./06 |

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| | ABIEF | | | | |
| 186 | NBR 14990-1: 2004 | SISTEMAS E MATERIAIS DE EMBALAGEM PARA ESTERILIZAÇÃO DE PRODUTOS PARA SAÚDE | ADI | I | FEV./06 |
| 187 | NBR 14990-2: 2003 | SISTEMAS E MATERIAIS DE EMBALAGEM PARA ESTERILIZAÇÃO DE PRODUTOS PARA SAÚDE - PARTE 2: PAPEL GRAU CIRÚRGICO PARA FABRICAÇÃO DE EMBALAGENS PARA ESTERILIZAÇÃO A VAPOR SATURADO SOB PRESSÃO | ADI | I | FEV./06 |
| 188 | NBR 14990-3: 2003 | SISTEMAS E MATERIAIS DE EMBALAGEM PARA ESTERILIZAÇÃO DE PRODUTOS PARA SAÚDE - PARTE 3: PAPEL GRAU CIRÚRGICO PARA FABRICAÇÃO DE EMBALAGENS PARA ESTERILIZAÇÃO POR ÓXIDO DE ETILENO | ADI | I | FEV./06 |
| 189 | NBR 14990-4: 2003 | SISTEMAS E MATERIAIS DE EMBALAGEM PARA ESTERILIZAÇÃO DE PRODUTOS PARA SAÚDE - PARTE 4: PAPEL GRAU CIRÚRGICO REVESTIDO COM LACA, PARA FABRICAÇÃO DE EMBALAGENS TERMOSSELÁVEIS PARA ESTERILIZAÇÃO POR ÓXIDO DE ETILENO OU POR RADIAÇÃO | ADI | I | FEV./06 |
| 190 | NBR 14990-7: 2004 | SISTEMAS E MATERIAIS DE EMBALAGEM PARA ESTERILIZAÇÃO DE PRODUTOS PARA SAÚDE - PARTE 7: ENVELOPE E TUBULAR PARA ESTERILIZAÇÃO POR ÓXIDO DE ETILENO | ADI | I | FEV./06 |
| 191 | NBR 14990-8: 2004 | SISTEMAS E MATERIAIS DE EMBALAGEM PARA ESTERILIZAÇÃO DE PRODUTOS PARA SAÚDE - PARTE 8: ENVELOPE E TUBULAR PARA ESTERILIZAÇÃO POR RADIAÇÃO | ADI | I | FEV./06 |
| 192 | NBR 148990-11: 2003 | SISTEMAS E MATERIAIS DE EMBALAGEM PARA ESTERILIZAÇÃO DE PRODUTOS PARA SAÚDE - PARTE 11: PAPEL GRAU CIRÚRGICO PARA FABRICAÇÃO DE EMBALAGENS PARA ESTERILIZAÇÃO POR RADIAÇÃO | ADI | I | FEV./06 |
| 193 | NBR 15004: 2003 | PAPEL E PRODUTO PARA FINS SANITARIOS - DETERMINAÇÃO DA CAPACIDADE E TEMPO DE ABSORÇÃO DE ÁGUA | ADI | I | FEV./06 |
| 194 | NBR 15008: 2003 | CAIXA PLÁSTICA RETORNÁVEL PARA HORTIFRUTÍCOLAS - REQUISITOS E MÉTODOS DE ENSAIO | ADI | I | FEV./06 |
| 195 | NBR 15009: 2003 | CONTENTOR FLEXÍVEL - RQUISITOS E MÉTODOS DE ENSAIO | ADI | I | FEV./06 |
| 196 | NBR 15010: 2003 | PAPEL PARA FINS SANITÁRIOS - DETERMINAÇÃO DA RESISTÊNCIA À TRAÇÃO A ÚMIDO | ADI | I | FEV./06 |
| 197 | NBR 15068: 2004 | PAPELÃO ONDULADO - DETERMINAÇÃO DO COEFICIENTE DE FRICÇÃO ESTÁTICA (MÉTODO DO PLANO HORIZONTAL) | ADI | I | FEV./06 |
| 198 | NBR 15134: 2004 | PAPEL E PRODUTO DE PAPEL PARA FINS SANITÁRIOS - MÉTODOS DE ENSAIO | ADI | I | FEV./06 |
| 199 | NBR 15135: 2004 | PAPEL, CARTÃO E PASTA CELULÓSICA - DETERMINAÇÃO DE SULFATOS SOLÚVEIS EM ÁGUA | ADI | I | FEV./06 |
| | NBR 15321: 2006 | UTENSÍLIOS DOMÉSTICOS DE ALUMÍNIO E SUAS LIGAS - REVESTIMENTO ANTIADERENTE - AVALIAÇÃO DO DESEMPENHO | ADI | I | MAIO/06 |
| 200 | NBR ISO 4287: 2002 (Esta norma cancela e substitui a NBR 6405) | ESPECIFICAÇÕES GEOMÉTRICAS DO PRODUTO (GPS) - RUGOSIDADE: MÉTODO DO PERFIL - TERMOS, DEFINIÇÕES E PARÂMETROS DA RUGOSIDADE | ADI | I | FEV./06 |
| 201 | NBR ISO 6892: 2002 | MATERIAIS METÁLICOS - ENSAIO DE TRAÇÃO À TEMPERATURA AMBIENTE | ADI | I | FEV./06 |
| 202 | NBR ISO 9000: 2000 | SISTEMAS DE GESTÃO DA QUALIDADE - FUNDAMENTOS E VOCABULÁRIO | ADI | I | FEV./06 |
| 203 | NBR ISO 9001: 2000 | SISTEMAS DE GESTÃO DA QUALIDADE - REQUISITOS | ADI | I | FEV./06 |
| 204 | NBR ISO 9004: 2000 | SISTEMAS DE GESTÃO DA QUALIDADE - DIRETRIZES PARA MELHORIA DE DESEMPENHO | ADI | I | FEV./06 |
| 205 | NBR ISO 10012: 2004 | SISTEMAS DE GESTÃO DE MEDIÇÃO - REQUISITOS PARA OS PROCESSOS DE MEDIÇÃO E EQUIPAMENTO DE MEDIÇÃO | ADI | I | FEV./06 |
| 206 | NBR ISO 10012-1: 1993 **CANCELADA E SUBSTITUÍDA POR NBR 10012: 2004** | REQUISITOS DE GARANTIA DA QUALIDADE PARA EQUIPAMENTOS DE MEDIÇÃO. PARTE 1: SISTEMA DE COMPROVAÇÃO METROLÓGICA PARA EQUIPAMENTO DE MEDIÇÃO | ADI | I | FEV./06 |
| | NBR ISO 11535: 2004 | MINÉRIOS DE FERRO - DETERMINAÇÃO DE VÁRIOS ELEMENTOS - MÉTODO DE ESPECTROMETRIA DE EMISSÃO ATÔMICA EM PLASMA DE ECOPLAMENTO INDUTIVO | ADI | I | MAIO/06 |
| 207 | NBR ISO 14001: 1996 **(NBR 14001: 2004)** | SISTEMAS DE GESTÃO AMBIENTAL - ESPECIFICAÇÃO E DIRETRIZES PARA USO (Sistemas da gestão ambiental - Requisitos com orientações para uso) | ADI | I | FEV./06 |
| 208 | NBR ISO 14004: 1996 **(NBR 14004: 2005)** | SISTEMAS DE GESTÃO AMBIENTAL - DIRETRIZES GERAIS SOBRE PRINCÍPIOS, SISTEMAS E TÉCNICAS DE APOIO (Sistemas de gestão ambiental - Diretrizes gerais sobre princípios, sistemas e técnicas de apoio) | ADI | I | FEV./06 |
| 209 | NBR ISO 14010: 1996 (CANCELADA E SUBSTITUÍDA - NBR ISO 19011: 2002) | DIRETRIZES PARA AUDITORIA AMBIENTAL - PRINCÍPIOS GERAIS (Diretrizes para auditorias de sistema de gestão da qualidade e/ou ambiental ) | ADI | I | FEV./06 |
| 210 | NBR ISO 14011: 1996 (CANCELADA E SUBSTITUÍDA - NBR ISO 19011: 2002) | DIRETRIZES PARA AUDITORIA AMBIENTAL - PROCEDIMENTOS DE AUDITORIA - AUDITORIA DE SISTEMAS DE GESTÃO AMBIENTAL (Diretrizes para auditorias de sistema de gestão da qualidade e/ou ambiental ) | ADI | I | FEV./06 |
| 211 | NBR ISO 14012: 1996 (CANCELADA E SUBSTITUÍDA - NBR ISO 19011: 2002) | DIRETRIZES PARA AUDITORIA AMBIENTAL - CRITÉRIOS DE QUALIFICAÇÃO PARA AUDITORES AMBIENTAIS (Diretrizes para auditorias de sistema de gestão da qualidade e/ou ambiental ) | ADI | I | FEV./06 |
| 212 | NBR ISO 14020: 2002 | RÓTULOS E DECLARAÇÕES AMBIENTAIS - PRINCÍPIOS GERAIS | ADI | I | FEV./06 |
| 213 | NBR ISO 14021: 2004 | RÓTULOS E DECLARAÇÕES AMBIENTAIS - AUTODECLARAÇÕES AMBIENTAIS - (ROTULAGEM DO TIPO II) | ADI | I | FEV./06 |
| 214 | NBR ISO 14024: 2004 | RÓTULOS E DECLARAÇÕES AMBIENTAIS - ROTULAGEM AMBIENTAL DO TIPO I - PRINCÍPIOS E PROCEDIMENTOS | ADI | I | FEV./06 |
| 215 | NBR ISO 14040: 2001 | GESTÃO AMBIENTAL - AVALIAÇÃO DO CICLO DE VIDA - PRINCÍPIOS E ESTRUTURA | ADI | I | FEV./06 |
| 216 | NBR ISO 14041: 2004 | GESTÃO AMBIENTAL - AVALIAÇÃO DO CICLO DE VIDA - DEFINIÇÃO DE OBJETIVO E ESCOPO E ANÁLISE DE INVENTÁRIO | ADI | I | FEV./06 |
| 217 | NBR ISO 14042: 2004 | GESTÃO AMBIENTAL - AVALIAÇÃO DO CICLO DE VIDA - AVALIAÇÃO DO IMPACTO DO CICLO DE VIDA | ADI | I | FEV./06 |
| 218 | NBR ISO/IEC 17025: 2005 | REQUISITOS GERAIS PARA COMPETÊNCIA DE LABORATÓRIOS DE ENSAIO E CALIBRAÇÃO | ADI | I / D | MAR./06 |
| 219 | NBR ISO/TR 10232: 2000 | PALETES PLANOS PARA TRANSPORTE DE CARGA GERAL - CAPACIDADE DE PROJETO E CARGA MÁXIMA DE TRABALHO | ADI | I | FEV./06 |
| 220 | NBR ISO/TR 10233: 2001 | PALETES PLANOS PARA TRANSPORTE DE CARGA GERAL - REQUISITOS DE DESEMPENHO | ADI | I | FEV./06 |
| 221 | NBR ISO/TR 10234:2001 10/2005 (Norma cancelada sem substituição) | PALETES PLANOS PARA TRANSPORTE DE CARGA GERAL - REQUISITOS FITOSSANITÁRIOS (SAÚDE VEGETAL) PARA PALETES DE MADEIRA | ADI | I | FEV./06 |

| Nº de Controle | Identificação / Ano | Nome do Documento | Documento original | Texto* | Última Consulta |
|---|---|---|---|---|---|
| | | **ABIEF** | | | |
| 222 | NBR ISO/TR 14062: 2004 | GESTÃO AMBIENTAL - INTEGRAÇÃO DE ASPECTOS AMBIENTAIS NO PROJETO E DESENVOLVIMENTO DO PRODUTO | ADI | I | FEV./06 |
| | NBR NM COPANT 1579: 2000 | AÇO E FERRO FUNDIDO - DETERMINAÇÃO DO TEOR DE MANGANÊS - MÉTODO ESPECTROFOTÔMETRICO | ADI | I | MAIO/06 |
| 223 | NBR NM 105: 1999 | PAPEL E CARTÃO - DETERMINAÇÃO DA UMIDADE - MÉTODO POR SECAGEM EM ESTUFA | ADI | I | FEV./06 |
| 224 | NBR NM 146-1:1998 | MATERIALES METÁLICOS - DUREZA ROCKWELL - PARTE 1: MEDICIÓN DE DUREZA ROCKWELL (ESCALAS A, B, C, D, E, F, G, H y K) Y ROCKWELL SUPERFICIAL (ESCALAS 15N, | ADI | I | FEV./06 |
| 225 | NBR NM 146-2: 1998 (contém errata) | MATERIALES METÁLICOS - DUREZA ROCKWELL - PARTE 2: CALIBRACIÓN DE MÁQUINAS DE ENSAYO DE DUREZA ROCKWELL (ESCALAS A, B, C, D, E, F, G, H, K, N, y T) | ADI | I | FEV./06 |
| 226 | NBR NM 146-3: 1998 | MATERIAIS METÁLICOS - DUREZA ROCKWELL. PARTE 3: CALIBRAÇÃO DE BLOCOS PADRÃO A SEREM USADOS NA CALIBRAÇÃO DE MÁQUINA DE MEDIR DUREZA ROCKWELL (ESCALAS A, B, C, D, E, F, G, H, K, e T) | ADI | I | FEV./06 |
| 227 | NBR NM 187-1: 1999 | MATERIAIS METÁLICOS - DUREZA BRINELL. PARTE 1: MEDIÇÃO DA DUREZA BRINELL | ADI | I | FEV./06 |
| 228 | NBR NM 264-1: 2001 | CHAPAS E TIRAS DE AÇO - MÉTODO PARA DETERMINAÇÃO DOS COEFICIENTES DE ANISOTROPIA PLÁSTICA NORMAL "R" E DE ANISOTROPIA PLANAR "DELTA R" ATRAVÉS DE ENSAIOS DE TRAÇÃO AXIAL | ADI | I | FEV./06 |
| 229 | NBR NM 264-2: 2001 | CHAPAS E TIRAS DE AÇO-CARBONO, LIGADOS E INOXIDÁVEIS FERRÍTICOS DE BAIXO CARBONO - MÉTODO PARA DETERMINAR O COEFICIENTE DE ENCRUAMENTO "N" MEDIANTE ENSAIOS DE TRAÇÃO AXIAL | ADI | I | FEV./06 |
| | NBR NM 300-1: 2004 | SEGURANÇA DE BRINQUEDOS. PARTE 1: PROPRIEDADES GERAIS, MECÂNICAS E FÍSICAS | ADI | I | MAR./06 |
| | NBR NM 300-3: 2004 | SEGURANÇA DE BRINQUEDOS. PARTE 3: MIGRAÇÃO DE CERTOS ELEMENTOS | ADI | I | MAR./06 |
| 230 | NBR NM-ISO 186: 1998 | PAPEL E CARTÃO - AMOSTRAGEM PARA DETERMINAÇÃO DA QUALIDADE MÉDIA | ADI | I | FEV./06 |
| 231 | NBR NM-ISO 187: 1996 | PAPEL, CARTÃO E PASTAS CELULÓSICAS - ATMOSFERA NORMALIZADA PARA CONDICIONAMENTO E ENSAIO E PROCEDIMENTO DE CONTROLE DA ATMOSFERA E CONDICIONAMENTO DAS AMOSTRAS | ADI | I | FEV./06 |
| 232 | NBR NM-ISO 534: 2000 | PAPEL E CARTÃO - DETERMINAÇÃO DA ESPESSURA E DA DENSIDADE APARENTE DE UMA ÚNICA FOLHA OU DE UM MAÇO | ADI | I | FEV./06 |
| 233 | NBR NM-ISO 535: 1999 | PAPEL E CARTÃO - DETERMINÇÃO DA CAPACIDADE DE ABSORÇÃO DE ÁGUA - MÉTODO COBB | ADI | I | FEV./06 |
| 234 | NBR NM-ISO 536: 2000 | PAPEL E CARTÃO - DETERMINAÇÃO DA GRAMATURA | ADI | I | FEV./06 |
| 235 | NBR NM-ISO 1924-1: 2001 | PAPEL E CARTÃO - DETERMINAÇÃO DAS PROPRIEDADES DE TRAÇÃO. PARTE 1: MÉTODO DA VELOCIDADE CONSTANTE DE ALONGAMENTO | ADI | I | FEV./06 |
| 236 | NBR NM-ISO 1924-2: 2001 | PAPEL E CARTÃO - DETERMINAÇÃO DAS PROPRIEDADES DE TRAÇÃO. PARTE 2: MÉTODO DA VELOCIDADE CONSTANTE DE CARGA | ADI | I | FEV./06 |
| 237 | NBR NM-ISO 1974: 2001 | PAPEL - DETERMINAÇÃO DA RESISTÊNCIA AO RASGO - MÉTODO ELMENDORF | ADI | I | FEV./06 |
| 238 | NBR NM ISO 2144: 2001 | PAPEL, CARTÃO E PASTAS CELULÓSICAS - DETERMINAÇÃO DO RESÍDUO (CINZA) DA INCINERAÇÃO A 900°C. | ADI | I | FEV./06 |
| 239 | NBR NM-ISO 2493: 2001 | PAPEL E CARTÃO - DETERMINAÇÃO DA RESISTÊNCIA À FLEXÃO | ADI | I | FEV./06 |
| 240 | NBR NM-ISO 2758: 2001 | PAPEL - DETERMINAÇÃO DA RESISTÊNCIA AO ARREBENTAMENTO | ADI | I | FEV./06 |
| 241 | NBR NM-ISO 2759: 2001 | CARTÃO - DETERMINAÇÃO DA RESISTÊNCIA AO ARREBENTAMENTO | ADI | I | FEV./06 |
| 242 | NBR NM-ISO 3611: 1997 | MICRÔMEROS PARA MEDIÇÕES EXTERNAS | ADI | I | FEV./06 |
| 243 | NBR NM-ISO 5636-5: 2001 | PAPEL E CARTÃO - DETERMINAÇÃO DA PERMEÂNCIA AO AR (FAIXA MÉDIA) - PARTE 5: MÉTODO GURLEY | ADI | I | FEV./06 |
| 244 | NBR NM-ISO 6588: 2001 | PAPEL, CARTÃO E PASTA CELULÓSICA - DETERMINAÇÃO DO PH DE EXTRATOS AQUOSOS | ADI | I | FEV./06 |
| 245 | NBR NM-ISO 8791-2: 2001 | PAPEL E CARTÃO - DETERMINAÇÃO DA ASPEREZA OU LISURA (MÉTODO DE FUGA DE AR) PARTE 2: MÉTODO BENDTSEN | ADI | I | FEV./06 |
| 246 | NM-ISO 536: 2000 | PAPEL Y CARTÓN - DETERMINACIÓN DEL GRAMAJE | ADI | I | FEV./06 |
| 247 | PROJETO 11:02.03-019: 1983 (NÃO CONSTA NO CENWIN) | PAPELÃO ONDULADO - DETERMINAÇÃO DA RESISTÊNCIA À ADESIVIDADE ENTRE AS ONDAS E AS CAPAS | ADI | I | FEV./06 |
| 248 | PROJETO 23:04.02-001 - ATUAL NBR-14910:2002 | EMBALAGENS DE VIDRO | ADI | I | FEV./06 |
| 249 | PROJETO 23:04.02-002 - ATUAL NBR-14910:2002 | EMBALAGENS DE VIDRO PARA ALIMENTOS | ADI | I | FEV./06 |
| 250 | PROJETO 23:004.02-003: 1996 | GARRAFA DE VIDRO RETORNÁVEL DE USO EXCLUSIVO PARA CERVEJA (NÃO CONSTA NO CENWIN) | ADI | I | FEV./06 |
| 251 | PROJETO 23:005.08-003 (ATUAL NBR 14637:2001) | EMBALAGEM PLÁSTICA PARA ÁGUA MINERAL E DE MESA - GARRAFÃO RETORNÁVEL - REQUISITOS PARA LAVAGEM, ENCHIMENTO E FECHAMENTO | ADI | I | FEV./06 |
| 252 | PROJETO 23:05.09-001: 1988 (ATUAL NBR-11136:1990) | EMBALAGENS PLÁSTICAS | ADI | I | FEV./06 |
| 253 | PROJETO 23:06.02-001: 1990 (ATUAL NBR-13177:1994) | EMBALAGENS FLEXÍVEIS - ANÁLISE DE SOLVENTES RESIDUAIS - MÉTODO DE ENSAIO | ADI | I | FEV./06 |
| 254 | PROJETO 23:06.02-002 (ATUAL NBR-13177:1994) | EMBALAGENS FLEXÍVEIS - AVALIAÇÃO DO POTENCIAL DE CONTAMINAÇÃO ORGANOLÉPTICA DE ALIMENTOS - MÉTODO DE ENSAIO | ADI | I | FEV./06 |
| 255 | PROJETO 51:002.01-00 (ATUAL NBR-14937:2003) | SACOLAS PLÁSTICAS TIPO CAMISETA REQUISITOS E MÉTODOS DE ENSAIO | ADI | I | FEV./06 |
| | | | | | |
| | | **CETESB** | | | |
| | L5.125: 1995 | ÁGUA - DETERMINAÇÃO DE FENÓIS MÉTODO COLORIMÉTRICO DA 4-AMINO-ANTIPIRINA | ADI | I | MAIO/06 |
| | | | | | |
| | | **IPT-NEA** | | | |
| 255 | IPT-NEA 01: 1991 | EMBALAGEM - DESEMPENHO E DISTRIBUIÇÃO FÍSICA | ADI | I | JUNHO/04 |
| 256 | IPT-NEA 02: 1991 | EMBALAGEM E ACONDICIONAMENTO - VERIFICAÇÃO DO DESEMPENHO EM QUEDA | ADI | I | JUNHO/04 |

| Nº de Controle | Identificação / Ano | Nome do Documento | Documento original | Texto* | Última Consulta |
|---|---|---|---|---|---|
| | **ABIEF** | | | | |
| 222 | NBR ISO/TR 14062: 2004 | GESTÃO AMBIENTAL - INTEGRAÇÃO DE ASPECTOS AMBIENTAIS NO PROJETO E DESENVOLVIMENTO DO PRODUTO | ADI | I | FEV./06 |
| | NBR NM COPANT 1579: 2000 | AÇO E FERRO FUNDIDO - DETERMINAÇÃO DO TEOR DE MANGANÊS - MÉTODO ESPECTROFOTÔMETRICO | ADI | I | MAIO/06 |
| 223 | NBR NM 105: 1999 | PAPEL E CARTÃO - DETERMINAÇÃO DA UMIDADE - MÉTODO POR SECAGEM EM ESTUFA | ADI | I | FEV./06 |
| 224 | NBR NM 146-1:1998 | MATERIALES METÁLICOS - DUREZA ROCKWELL - PARTE 1: MEDICIÓN DE DUREZA ROCKWELL (ESCALAS A, B, C, D, E, F, G, H y K) Y ROCKWELL SUPERFICIAL (ESCALAS 15N, | ADI | I | FEV./06 |
| 225 | NBR NM 146-2: 1998 (contém errata) | MATERIALES METÁLICOS - DUREZA ROCKWELL - PARTE 2: CALIBRACIÓN DE MÁQUINAS DE ENSAYO DE DUREZA ROCKWELL (ESCALAS A, B, C, D, E, F, G, H, K, N, y T) | ADI | I | FEV./06 |
| 226 | NBR NM 146-3: 1998 | MATERIAIS METÁLICOS - DUREZA ROCKWELL. PARTE 3: CALIBRAÇÃO DE BLOCOS PADRÃO A SEREM USADOS NA CALIBRAÇÃO DE MÁQUINA DE MEDIR DUREZA ROCKWELL (ESCALAS A, B, C, D, E, F, G, H, K, e T) | ADI | I | FEV./06 |
| 227 | NBR NM 187-1: 1999 | MATERIAIS METÁLICOS - DUREZA BRINELL. PARTE 1: MEDIÇÃO DA DUREZA BRINELL | ADI | I | FEV./06 |
| 228 | NBR NM 264-1: 2001 | CHAPAS E TIRAS DE AÇO - MÉTODO PARA DETERMINAÇÃO DOS COEFICIENTES DE ANISOTROPIA PLÁSTICA NORMAL "R" E DE ANISOTROPIA PLANAR "DELTA R" ATRAVÉS DE ENSAIOS DE TRAÇÃO AXIAL | ADI | I | FEV./06 |
| 229 | NBR NM 264-2: 2001 | CHAPAS E TIRAS DE AÇO-CARBONO, LIGADOS E INOXIDÁVEIS FERRÍTICOS DE BAIXO CARBONO - MÉTODO PARA DETERMINAR O COEFICIENTE DE ENCRUAMENTO "N" MEDIANTE ENSAIOS DE TRAÇÃO AXIAL | ADI | I | FEV./06 |
| | NBR NM 300-1: 2004 | SEGURANÇA DE BRINQUEDOS. PARTE 1: PROPRIEDADES GERAIS, MECÂNICAS E FÍSICAS | ADI | I | MAR./06 |
| | NBR NM 300-3: 2004 | SEGURANÇA DE BRINQUEDOS. PARTE 3: MIGRAÇÃO DE CERTOS ELEMENTOS | ADI | I | MAR./06 |
| 230 | NBR NM-ISO 186: 1998 | PAPEL E CARTÃO - AMOSTRAGEM PARA DETERMINAÇÃO DA QUALIDADE MÉDIA | ADI | I | FEV./06 |
| 231 | NBR NM-ISO 187: 1996 | PAPEL, CARTÃO E PASTAS CELULÓSICAS - ATMOSFERA NORMALIZADA PARA CONDICIONAMENTO E ENSAIO E PROCEDIMENTO DE CONTROLE DA ATMOSFERA E CONDICIONAMENTO DAS AMOSTRAS | ADI | I | FEV./06 |
| 232 | NBR NM-ISO 534: 2000 | PAPEL E CARTÃO - DETERMINAÇÃO DA ESPESSURA E DA DENSIDADE APARENTE DE UMA ÚNICA FOLHA OU DE UM MAÇO | ADI | I | FEV./06 |
| 233 | NBR NM-ISO 535: 1999 | PAPEL E CARTÃO - DETERMINÇÃO DA CAPACIDADE DE ABSORÇÃO DE ÁGUA - MÉTODO COBB | ADI | I | FEV./06 |
| 234 | NBR NM-ISO 536: 2000 | PAPEL E CARTÃO - DETERMINAÇÃO DA GRAMATURA | ADI | I | FEV./06 |
| 235 | NBR NM-ISO 1924-1: 2001 | PAPEL E CARTÃO - DETERMINAÇÃO DAS PROPRIEDADES DE TRAÇÃO. PARTE 1: MÉTODO DA VELOCIDADE CONSTANTE DE ALONGAMENTO | ADI | I | FEV./06 |
| 236 | NBR NM-ISO 1924-2: 2001 | PAPEL E CARTÃO - DETERMINAÇÃO DAS PROPRIEDADES DE TRAÇÃO. PARTE 2: MÉTODO DA VELOCIDADE CONSTANTE DE CARGA | ADI | I | FEV./06 |
| 237 | NBR NM-ISO 1974: 2001 | PAPEL - DETERMINAÇÃO DA RESISTÊNCIA AO RASGO - MÉTODO ELMENDORF | ADI | I | FEV./06 |
| 238 | NBR NM ISO 2144: 2001 | PAPEL, CARTÃO E PASTAS CELULÓSICAS - DETERMINAÇÃO DO RESÍDUO (CINZA) DA INCINERAÇÃO A 900ºC. | ADI | I | FEV./06 |
| 239 | NBR NM-ISO 2493: 2001 | PAPEL E CARTÃO - DETERMINAÇÃO DA RESISTÊNCIA À FLEXÃO | ADI | I | FEV./06 |
| 240 | NBR NM-ISO 2758: 2001 | PAPEL - DETERMINAÇÃO DA RESISTÊNCIA AO ARREBENTAMENTO | ADI | I | FEV./06 |
| 241 | NBR NM-ISO 2759: 2001 | CARTÃO - DETERMINAÇÃO DA RESISTÊNCIA AO ARREBENTAMENTO | ADI | I | FEV./06 |
| 242 | NBR NM-ISO 3611: 1997 | MICRÔMEROS PARA MEDIÇÕES EXTERNAS | ADI | I | FEV./06 |
| 243 | NBR NM-ISO 5636-5: 2001 | PAPEL E CARTÃO - DETERMINAÇÃO DA PERMEÂNCIA AO AR (FAIXA MÉDIA) - PARTE 5: MÉTODO GURLEY | ADI | I | FEV./06 |
| 244 | NBR NM-ISO 6588: 2001 | PAPEL, CARTÃO E PASTA CELULÓSICA - DETERMINAÇÃO DO PH DE EXTRATOS AQUOSOS | ADI | I | FEV./06 |
| 245 | NBR NM-ISO 8791-2: 2001 | PAPEL E CARTÃO - DETERMINAÇÃO DA ASPEREZA OU LISURA (MÉTODO DE FUGA DE AR) PARTE 2: MÉTODO BENDTSEN | ADI | I | FEV./06 |
| 246 | NM-ISO 536: 2000 | PAPEL Y CARTÓN - DETERMINACIÓN DEL GRAMAJE | ADI | I | FEV./06 |
| 247 | PROJETO 11:02.03-019: 1983 (NÃO CONSTA NO CENWIN) | PAPELÃO ONDULADO - DETERMINAÇÃO DA RESISTÊNCIA À ADESIVIDADE ENTRE AS ONDAS E AS CAPAS | ADI | I | FEV./06 |
| 248 | PROJETO 23:04.02-001 - ATUAL NBR-14910:2002 | EMBALAGENS DE VIDRO | ADI | I | FEV./06 |
| 249 | PROJETO 23:04.02-002 - ATUAL NBR-14910:2002 | EMBALAGENS DE VIDRO PARA ALIMENTOS | ADI | I | FEV./06 |
| 250 | PROJETO 23:004.02-003: 1996 | GARRAFA DE VIDRO RETORNÁVEL DE USO EXCLUSIVO PARA CERVEJA (NÃO CONSTA NO CENWIN) | ADI | I | FEV./06 |
| 251 | PROJETO 23:005.08-003 (ATUAL NBR 14637:2001) | EMBALAGEM PLÁSTICA PARA ÁGUA MINERAL E DE MESA - GARRAFÃO RETORNÁVEL - REQUISITOS PARA LAVAGEM, ENCHIMENTO E FECHAMENTO | ADI | I | FEV./06 |
| 252 | PROJETO 23:05.09-001: 1988 (ATUAL NBR-11136:1990) | EMBALAGENS PLÁSTICAS | ADI | I | FEV./06 |
| 253 | PROJETO 23:06.02-001: 1990 (ATUAL NBR-13177:1994) | EMBALAGENS FLEXÍVEIS - ANÁLISE DE SOLVENTES RESIDUAIS - MÉTODO DE ENSAIO | ADI | I | FEV./06 |
| 254 | PROJETO 23:06.02-002 (ATUAL NBR-13177:1994) | EMBALAGENS FLEXÍVEIS - AVALIAÇÃO DO POTENCIAL DE CONTAMINAÇÃO ORGANOLÉPTICA DE ALIMENTOS - MÉTODO DE ENSAIO | ADI | I | FEV./06 |
| 255 | PROJETO 51:002.01-00 (ATUAL NBR-14937:2003) | SACOLAS PLÁSTICAS TIPO CAMISETA REQUISITOS E MÉTODOS DE ENSAIO | ADI | I | FEV./06 |
| | | | | | |
| | **CETESB** | | | | |
| | L5.125: 1995 | ÁGUA - DETERMINAÇÃO DE FENÓIS MÉTODO COLORIMÉTRICO DA 4-AMINO-ANTIPIRINA | ADI | I | MAIO/06 |
| | | | | | |
| | **IPT-NEA** | | | | |
| 255 | IPT-NEA 01: 1991 | EMBALAGEM - DESEMPENHO E DISTRIBUIÇÃO FÍSICA | ADI | I | JUNHO/04 |
| 256 | IPT-NEA 02: 1991 | EMBALAGEM E ACONDICIONAMENTO - VERIFICAÇÃO DO DESEMPENHO EM QUEDA | ADI | I | JUNHO/04 |
| 257 | IPT-NEA 03: 1991 | EMBALAGEM E ACONDICIONAMENTO - VERIFICAÇÃO DA RESISTÊNCIA À COMPRESSÃO POR CARGA CONSTANTE | ADI | I | JUNHO/04 |
| 258 | IPT-NEA 06: 1991 | EMBALAGEM E ACONDICIONAMENTO - VERIFICAÇÃO DO DESEMPENHO EM VIBRAÇÃO VERTICAL | ADI | I | JUNHO/04 |
| 259 | IPT-NEA 08: 1991 | EMBALAGEM E ACONDICIONAMENTO - VERIFICAÇÃO DO DESEMPENHO EM OSCILAÇÕES HORIZONTAIS | ADI | I | JUNHO/04 |
| 260 | IPT-NEA 09: 1991 | EMBALAGEM - VERIFICAÇÃO DO DESEMPENHO EM IMPACTO LOCALIZADO | ADI | I | JUNHO/04 |

## Table 8.4.1-1 (2) CETEA standards (International standards)

| Nº de Controle | Identificação / Ano | Nome do Documento | Doc. original | Texto* | Última Consulta |
|---|---|---|---|---|---|
| | **ANSI** | | | | |
| 1 | ANSI Z 245-30: 1999 | WASTE CONTAINERS - SAFETY REQUIREMENTS | ADI | I | FEV./2006 |
| 2 | ANSI Z 245-60: 1999 | WASTE CONTAINERS - COMPATIBILITY DIMENSIONS | ADI | I | FEV./2006 |
| | **ASME** | | | | |
| 3 | ASME BPE-2002 (010-A537b-1815/04) | BIOPROCESSING EQUIPMENT + ADDENDA BPE-a-2004 | ADI | I | FEV./2006 |
| | **ASTM** | | | | |
| | Vol. 08.01 - 2001 | PLASTICS (I): D 256 - D2343 | ADI | CD-ROM | 2001 |
| | Vol. 08.02 - 2001 | PLASTICS (II): D 2383 - D 4322 | ADI | CD-ROM | 2001 |
| | Vol. 08.03 - 2001 | PLASTICS (III) : D 4329 - D 6585 | ADI | CD-ROM | 2001 |
| | Vol 15.09 - 2001 | PAPER; PACKAGING; FLEXIBLE BARRIER MATERIALS; BUSINESS IMAGING PRODUCTS | ADI | CD-ROM | 2001 |
| 4 | A 240/ A240M-05 **(A 240/A240M-06)** | STANDARD SPECIFICATION FOR CHROMIUM AND CHROMIUM-NICKEL STAINLESS STEEL PLATE, SHEET, AND STRIP FOR PRESSURE VESSELS AND FOR GENERAL APPLICATIONS | ADI | I / D | MAIO/2006 |
| 5 | A 623-05 **(A 623-06)** | STANDARD SPECIFICATION FOR TIN MILL PRODUCTS, GENERAL REQUIREMENTS | ADI | I / D | MAIO/2006 |
| 7 | A 623M-06 | STANDARD SPECIFICATION FOR TIN MILL PRODUCTS, GENERAL REQUIREMENTS (METRIC)1 | ADI | I / D | MAIO/2006 |
| 8 | A 630-03 | STANDARD TEST METHOD FOR DETERMINATION OF TIN COATING WEIGHTS FOR ELECTROLYTIC TIN PLATE | ADI | I / D | FEV./2006 |
| | B 117-03 | STANDARD PRACTICE FOR OPERATING SALT SPRAY (FOG) APPARATUS | ADI | I / D | MAIO/2006 |
| 9 | B 339-00 | STANDARD SPECIFICATION FOR PIG TIN | ADI | I / D | FEV./2006 |
| 10 | B 487-85 (1990) (2002) | STANDARD TEST METHOD FOR MEASUREMENT OF METAL AND OXIDE COATING THICKNESS BY MICROSCOPICAL EXAMINATION OF A CROSS SECTION | ADI | I | FEV./2006 |
| 11 | B 499 - 96 (2002) | STANDARD TEST METHOD FOR MEASUREMENT OF COATINGS ON MAGNETIC BASIS METALS1 | ADI | I | FEV./2006 |
| 12 | C 147-86 (2000) (2005) | STANDARD TEST METHODS FOR INTERNAL PRESSURE STRENGTH OF GLASS CONTAINERS | ADI | I / D | FEV./2006 |
| 13 | C 148-00 | STANDARD TEST METHODS FOR POLARISCOPIC EXAMINATION OF GLASS CONTAINERS | ADI | I / D | FEV./2006 |
| 14 | C 149-86 (1995) (2005) | STANDARD TEST METHOD FOR THERMAL SHOCK RESISTANCE OF GLASS CONTAINERS | ADI | I | FEV./2006 |
| 15 | C 162-05 | STANDARD TERMINOLOGY OF GLASS AND GLASS PRODUCTS | ADI | I / D | FEV./2006 |
| 16 | C 224-78 (1994) (2004) | STANDARD PRACTICE FOR SAMPLING GLASS CONTAINERS | ADI | | FEV./2006 |
| 17 | C 225-85 (1994) (2004) | STANDARD TEST METHODS FOR RESISTANCE OF GLASS CONTAINERS TO CHEMICAL ATTACK | ADI | | FEV./2006 |
| 18 | C 633-01 | STANDARD TEST METHOD FOR ADHESION OR COHESION STENGTH OF THERMAL SPRAY COATINGS | ADI | I / D | FEV./2006 |
| 19 | C 675 - 91 (2001) | STANDARD TEST METHOD FOR ALKALI RESISTANCE OF CERAMIC DECORATIONS ON RETURNABLE BEVERAGE GLASS CONTAINERS | ADI | I / D | FEV./2006 |
| 20 | C 676-04 | STANDARD TEST METGHOD FOR DETERGENT RESISTANCE OF CERAMIC DECORATIONS ON GLASS TABLEWARE | ADI | I / D | FEV./2006 |
| 21 | C 735 - 93 (1999) **(C735-04)** | STANDARD TEST METHOD FOR ACID RESISTANCE OF CERAMIC DECORATIONS ON RETURNABLE BEER AND BEVERAGE GLASS CONTAINERS | ADI | | FEV./2006 |
| 22 | C 738-94 (1999) | STANDARD TEST METHOD FOR LEAD AND CADMIUM EXTRACTED FROM GLAZED CERAMIC SURFACES | ADI | I / D | FEV./2006 |
| 23 | C 927-80 (2004) | STANDARD TEST METHOD FOR LEAD AND CADMIUM EXTRACTED FROM THE LIP AND RIM AREA OF GLASS TUMBLERS EXTERNALLY DECORATED WITH CERAMIC GLASS ENAMELS | ADI | I / D | FEV./2006 |
| 24 | C 978-02 **(C 978-04)** | STANDARD TEST METHOD FOR PHOTOELASTIC DETERMINATION OF RESIDUAL STRESS IN A TRANSPARENT GLASS MATRIX USING A POLARIZING MICROSCOPE AND OPTICAL RETARDATION COMPENSATION PROCEDURES | ADI | | FEV./2006 |
| 25 | C 1256-93 (2003) | STANDARD PRACTICE FOR INTERPRETING GLASS FRACTURE SURFACE FEATURES | ADI | I / D | FEV./2006 |
| 26 | D 256-00 **(D 256-06) - NORMA ON-LINE- ARQ. PASTA ASTM PDF** | STANDARD TEST METHODS FOR DETERMINING THE IZOD PENDULUM IMPACT RESISTANCE OF PLASTICS | ADI | I / D | FEV./2006 |
| 27 | D 374-99 (2004) | STANDARD TEST METHODS FOR THICKNESS OF SOLID ELECTRICAL INSULATION | ADI | | FEV./2006 |
| 28 | D 610-01 | STANDARD TEST METHOD FOR EVALUATING DEGREE OF RUSTING ON PAINTED STEEL SURFACES | ADI | I / D | FEV./2006 |
| 29 | D 618-05 | STANDARD PRACTICE FOR CONDITIONING PLASTICS FOR TESTING | ADI | I / D | FEV./2006 |
| 30 | D 646-96(2001) | STANDARD TEST METHOD FOR GRAMMAGE OF PAPER AND PAPERBOARD (MASS PER UNIT AREA) | ADI | I / D | FEV./2006 |
| | D 721-05 | STANDARD TEST METHOD FOR OIL CONTENT OF PETROLEUM WAXES | ADI | I / D | MAIO/2006 |
| 31 | D 792-00 | STANDARD TEST METHODS FOR DENSITY AND SPECIFIC GRAVITY (RELATIVE DENSITY) OF PLASTICS BY DISPLACEMENT | ADI | I / D | FEV./2006 |
| 32 | D 882-02 | STANDARD TEST METHOD FOR TENSILE PROPERTIES OF THIN PLASTIC SHEETING | ADI | I / D | FEV./2006 |

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|---|---|---|---|---|---|
| 33 | D 895-79 (D895-94) **WITHDRAWN, NO REPLACEMENT** | STANDARD TEST METHOD WATER VAPOR PERMEABILITY OF PACKAGES | ADI | | FEV./2006 |
| | D 938-05 | STANDARD TEST METHOD FOR CONGEALING POINT OF PETROLEUM WAXES, INCLUDING PETROLATUM | ADI | I / D | MAIO/2006 |
| 34 | D 999-01 | STANDARD METHOD FOR VIBRATION TESTING OF SHIPPING CONTAINERS | ADI | I / D | FEV./2006 |
| 35 | D 1005-95(2001) | STANDARD TEST METHOD FOR MEASUREMENT OF DRY-FILM THICKNESS OF ORGANIC COATINGS USING MICROMETERS | ADI | I / D | FEV./2006 |
| | D 1186-01 | STANDARD TEST METHODS FOR NONDESTRUCTIVE MEASUREMENT OF DRY FILM THICKNESS OF NONMAGNETIC COATINGS APPLIED TO A FERROUS BASE | ADI | I / D | JUN./2006 |
| 36 | D 1193-99 | STANDARD SPECIFICATION FOR REAGENTE WATER | ADI | I / D | FEV./2006 |
| 37 | D 1200-94 (2005) | STANDARD TEST METHOD FOR VISCOSITY BY FORD VISCOSITY CUP | ADI | | FEV./2006 |
| 38 | D 1239-98 | STANDARD TEST METHOD FOR RESISTANCE OF PLASTIC FILMS TO EXTRACTION BY CHEMICALS | ADI | I / D | FEV./2006 |
| | D 1248-05 | STANDARD SPECIFICATION FOR POLYETHYLENE PLASTICS EXTRUSION MATERIALS FOR WIRE AND CABLE | ADI | I / D | FEV./2006 |
| 39 | D 1259-85(2001) | STANDARD TEST METHODS FOR NONVOLATILE CONTENT OF RESIN SOLUTIONS | ADI | I / D | FEV./2006 |
| 40 | D 1292-05 | STANDARD TEST METHOD FOR ODOR IN WATER | ADI | I / D | FEV./2006 |
| 41 | D 1400 - 00 | STANDARD TEST METHOD FOR NONDESTRUCTIVE MEASUREMENT OF DRY FILM THICKNESS OF NONCONDUCTIVE COATINGS APPLIED TO A NONFERROUS METAL BASE 1 | ADI | I | FEV./2006 |
| 42 | D 1415-88(2004) **(1415-05)** | STANDARD TEST METHODS FOR RUBBER PROPERTY - INTERNATIONAL HARDNESS | ADI | | FEV./2006 |
| 43 | D 1434-82 (1998) (2003) | STANDARD TEST METHOD FOR DETERMINING GAS PERMEABILITY CHARACTERISTICS OF PLASTIC FILM AND SHEETING | ADI | | FEV./2006 |
| 44 | D 1505-03 | STANDARD TEST METHOD FOR DENSITY OF PLASTICS BY THE DENSTY-GRADIENT TECHNIQUE | ADI | I / D | FEV./2006 |
| 45 | D 1644-01 | STANDARD TEST METHODS FOR NONVOLATILE CONTENT OF VARNISHES | ADI | I / D | FEV./2006 |
| 46 | D 1653-93(1999) **(D 1653-03)** | STANDARD TEST METHODS FOR WATER VAPOR TRANSMISSION OF ORGANIC COATING FILMS | ADI | | FEV./2006 |
| 47 | D 1693-05 | STANDARD TEST METHOD FOR ENVIRONMENTAL STRESS-CRACKING OF ETHYLENE PLASTICS | ADI | I / D | FEV./2006 |
| 48 | D 1746-03 | STANDARD TEST METHOD FOR TRANSPARENCY OF PLASTIC SHEETING | ADI | I / D | FEV./2006 |
| 49 | D 1876-01 | STANDARD TEST METHOD FOR PEEL RESISTANCE OF ADHESIVES (T-PEEL TEST) | ADI | I / D | FEV./2006 |
| 50 | D 1922-00a **(D 1922-05)** | STANDARD TEST METHOD FOR PROPAGATION TEAR RESISTANCE OF PLASTIC FILM AND THIN SHEETING BY PENDULUM METHOD | ADI | | FEV./2006 |
| 51 | D 1938-02 | STANDARD TEST METHOD FOR TEAR-PROPAGATION RESISTANCE (TROUSER TEAR) OF PLASTIC FILM AND THIN SHEETING BY A SINGLE-TEAR METHOD | ADI | I / D | FEV./2006 |
| | D 2008-91 (2001) | STANDARD TEST METHOD FOR ULTRAVIOLET ABSORBANCE AND ABSORPTIVITY OF PETROLEUM PRODUCTS | ADI | I / D | MAIO/2006 |
| 52 | D 2121-00 | STANDARD TEST METHODS FOR POLYMER CONTENT OF STYRENE MONOMER AND AMS (@-METHYLSTYRENE) | ADI | I / D | FEV./2006 |
| 53 | D 2369-04 | STANDARD TEST METHOD FOR VOLATILE CONTENT OF COATINGS | ADI | I / D | FEV./2006 |
| | D 2370-98 (2002) | STANDARD TEST METHOD FOR TENSILE PROPERTIES OF ORGANIC COATINGS | ADI | I / D | JUN./2006 |
| 54 | D 2457-03 | STANDARD TEST METHOD FOR SPECULAR GLOSS OF PLASTIC FILMS AND SOLID PLASTICS | ADI | I / D | FEV./2006 |
| 55 | D 2463-95 (2001) (2005) | STANDARD TEST METHOD FOR DROP IMPACT RESISTANCE OF BLOW-MOLDED THERMOPLASTIC CONTAINERS | ADI | | FEV./2006 |
| 56 | D 2563-94 (2002) | STANDARD PRACTICE FOR CLASSIFYING VISUAL DEFECTS IN GLASS-REINFORCED PLASTIC LAMINATE PARTS | ADI | | FEV./2006 |
| 57 | D 2582-00 **(D 2583-03)** | STANDARD TEST METHOD FOR PUNCTURE-PROPAGATION TEAR RESISTANCE OF PLASTIC FILM AND THIN SHEETING | ADI | | FEV./2006 |
| 58 | D 2659-95 (2005) | STANDARD TEST METHOD FOR COLMN CRUSH PROPERTIES OF BLOWN THERMOPLASTIC CONTAINERS | ADI | | FEV./2006 |
| 59 | D 2803-03 | STANDARD GUIDE FOR TESTING FILLIFORM CORROSION RESISTANCE OF ORGANIC COATINGS ON METAL | ADI | I / D | FEV./2006 |
| 60 | D 2832-92 (2005) | STANDARD GUIDE FOR DETERMINING VOLATILE AND NONVOLATILE CONTENT OF PAINT AND RELATED COATINGS | ADI | I / D | FEV./2006 |
| | D 2911-94 (2001) | STANDARD SPECIFICATION FOR DIMENSIONS AND TOLERANCES FOR PLASTIC BOTTLES | ADI | I / D | JUN./2006 |
| 61 | D 3074-94 **WITHDRAWN, NO REPLACEMENT** | STANDARD TEST METHODS FOR PRESSURE IN METAL AEROSOL CONTAINERS | ADI | | FEV./2006 |
| 62 | D 3078-02 | STANDARD TEST METHOD FOR DETERMINATION OF LEAKS IN FLEXIBLE PACKAGING BY BUBBLE EMISSION | ADI | I / D | FEV./2006 |
| 63 | D 3079-94 (2003) | STANDARD TEST METHOD FOR WATER VAPOR TRANSMITION OF FLEXIBLE HEAT-SEALED PACKAGES FOR DRY PRODUCTS | ADI | | FEV./2006 |
| | D 3198-97 (2002) | STANDARD TEST METHOD FOR APPLICATION AND REMOVAL TORQUE OF THREADED OR LUG-STYLE CLOSURES | ADI | | FEV./2006 |
| | D 3330/D 3330M-04 | STANDARD TEST METHOD FOR PEEL ADHESION OF PRESSURE-SENSITIVE TAPE | ADI | I / D | JUN./2006 |
| 64 | D 3335-85a(2005) | STANDARD TEST METHOD FOR LOW CONCENTRATIONS OF LEAD, CADMIUM, AND COBALT IN PAINT BY ATOMIC ABSORPTION SPECTROSCOPY | ADI | I / D | FEV./2006 |

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|---|---|---|---|---|---|
| 65 | D 3354-96 | STANDARD TEST METHOD FOR BLOCKING LOAD OF PLASTIC FILM BY THE PARALLEL PLATE METHOD | ADI | | FEV./2006 |
| 66 | D 3359-02 | STANDARD TEST METHODS FOR MEASURING ADHESION BY TAPE TEST | ADI | I / D | FEV./2006 |
| 67 | D 3418-03 | STANDARD TEST METHOD FOR TRANSITION TEMPERATURES OF POLYMERS BY DIFFERENTIAL SCANNING CALORIMETRY | ADI | I / D | FEV./2006 |
| 68 | D 3451-01 | STANDARD GUIDE FOR TESTING COATING POWDERS AND POWDER COATINGS | ADI | I / D | FEV./2006 |
| 69 | D 3475-05 | STANDARD CLASSIFICATION OF CHILD-RESISTANT PACKAGES | ADI | I / D | FEV./2006 |
| | D 3618-05 | STANDARD TEST METHOD FOR DETECTION OF LEAD IN PAINT AND DRIED PAINT AND DRIED PAINT FILMS | ADI | I / D | MAIO/2006 |
| 70 | D 3624-85a(2005) | STANDARD TEST METHOD FOR LOW CONCENTRATIONS OF MERCURY IN PAINT BY ATOMIC ABSORPTION SPECTROSCOPY | ADI | I / D | FEV./2006 |
| | D 3654/D 3654M-02 | STANDARD TEST METHODS FOR SHEAR ADHESION OF PRESSURE-SENSITIVE TAPES | ADI | I / D | FEV./2006 |
| 71 | D 3895-03 **(D 3895-04)** | STANDARD TEST METHOD FOR OXIDATIVE-INDUCTION TIME OF POLYOLEFINS BY DIFFERENTIAL SCANNING CALORIMETRY | ADI | | FEV./2006 |
| | D 3924-80 (2005) | STANDARD SPECIFICATION FOR STANDARD ENVIRONMENT FOR CONDITIONING AND TESTING PAINT, VARNISH, LACQUER, AND RELATED MATERIALS | ADI | I / D | JUN./2006 |
| 72 | D 3925-02 | STANDARD PRACTICE FOR SAMPLING LIQUID PAINTS AND RELATED PIGMENTED COATINGS | ADI | I / D | FEV./2006 |
| 73 | D 3985-05 | STANDARD TEST METHOD FOR OXYGEN GAS TRANSMITION RATE THROUGH PLASTIC FILM AND SHEETNG USING A COULOMETRIC SENSOR | ADI | I / D | FEV./2006 |
| | D 4145-83 (2002) | STANDARD TEST METHOD FOR COATING FLEXIBILITY OF PREPAINTED SHEET | ADI | I / D | MAIO/2006 |
| 74 | D 4166-99 (2004)e1 | STANDARD TEST METHOD FOR MEASUREMENT OF THICKNESS OF NONMAGNETIC MATERIALS BY MEANS OF A DIGITAL MAGNETIC INTENSITY INSTRUMENT | ADI | I / D | FEV./2006 |
| 75 | D 4169-05 | STANDARD PRACTICE FOR PERFORMANCE TESTING OF SHIPPING CONTAINERS AND SYSTEMS | ADI | I / D | FEV./2006 |
| 76 | D 4275-02 | STANDARD TEST METHOD FOR DETERMINATION OF BUTYLATED HYDROXY TOLUENE (BHT) IN POLYMERS OF ETHYLENE AND ETHYLENE-VINYL ACETATE (EVA) COPOLYMERS BY GAS CHROMATOGRAPHY | ADI | I / D | FEV./2006 |
| | D 4279-95 (2003) | STANDARD TEST METHODS FOR WATER VAPOR TRANSMISSION OF SHIPPING CONTAINERS-CONSTANT AND CYCLE METHODS | ADI | D | JUN./2006 |
| 77 | D 4577-05 | STANDARD TEST METHOD FOR COMPRESSION RESISTANCE OF A CONTAINER UNDER CONSTANT LOAD | ADI | I / D | FEV./2006 |
| 78 | D 4635-95 **(4635-01) - NORMA ON-LINE- ARQ. PASTA ASTM PDF** | STANDARD SPECIFICATION FOR POLYETHYLENE FILMS MADE FROM LOW-DENSITY POLYETHYLENE FOR GENERAL USE AND PACKAGING APPLICATIONS | ADI | I / D | FEV./2006 |
| 79 | D 4728-01 | STANDARD TEST MEHTOD FOR RANDOM VIBRATION TESTING OF SHIPPING CONTAINERS | ADI | I / D | FEV./2006 |
| 80 | D 4919-03 | STANDARD GUIDE FOR TESTING OF HAZARDOUS MATERIALS PACKAGINGS | ADI | I / D | FEV./2006 |
| 81 | D 4991-94 (1999) | STANDARD TEST METHOD FOR LEAKAGE TESTING OF EMPTY RIGID CONTAINERS BY VACUUM METHOD | ADI | | FEV./2006 |
| 82 | D 5032-97 (2003) | STANDARD PRACTICE FOR MAINTAINING CONSTANT RELATIVE HUMIDITY BY MEANS OF AQUEOUS GLYCERIN SOTULIONS | ADI | I / D | FEV./2006 |
| 83 | D 5094-04 | STANDARD TEST METHODS FOR GLOSS LEAKAGE OF LIQUIDS FROM CONTAINERS WITH THREADED OR LUG-STYLE CLOSURES | ADI | I / D | FEV./2006 |
| 84 | D 5210-92(2000) | STANDARD TEST METHOD FOR DETERMINING THE ANAEROBIC BIODEGRADATION OF PLASTIC MATERIALS IN THE PRESENCE OF MUNICIPAL SEWAGE SLUDGE | ADI | I / D | FEV./2006 |
| 85 | D 5271-02 | STANDARD TEST METHOD FOR DETERMINING THE AEROBIC BIODEGRADATION OF PLASTIC MATERIALS IN NA ACTIVATED-SLUDGE-WASTEWATER-TREATMENT SYSTEM | ADI | I / D | FEV./2006 |
| 86 | D 5276-98 (2004) - VOL.15.09-2001 (CD-ROM) | STANDARD TEST METHOD FOR DROP TEST OF LOADED CONTAINERS BY FREE FALL | ADI | | FEV./2006 |
| 87 | D 5391-99 (2005) | STANDARD TEST METHOD FOR ELECTRICAL CONDUCTIVITY AND RESISTIVITY OF A FLOWING HIGH PURITY WATER SAMPLE | ADI | I / D | FEV./2006 |
| 88 | D 5419-95 (2003) | STANDRD TEST METHOD FOR ENVIRONMENTAL STRESS CRACK RESISTANCE (ESCR) OF THREADED PLASTIC CLOSURES | ADI | | FEV./2006 |
| 89 | D 5477-02 | STANDARD PRACTICE FOR IDENTIFICATION OF POLYMER LAYERS OR INCLUSIONS BY FOURIER TRANSFORM INFRARED MICROSPECTROSCOPY | ADI | I / D | FEV./2006 |
| 90 | D 5511-02 | STANDARD TEST METHOD FOR DETERMINING ANAEROBIC BIOEGRADATION OF PLASTIC MATERIALS UNDER HIGH-SOLIDS ANAEROBIC-DIGESTION CONDITIONS | ADI | I / D | FEV./2006 |
| 91 | D 5524-94 (2001) | STANDARD TEST METHOD FOR DETERMINATION OF PENOLIC ANTIOXIDANTS IN HIGH DENSITY POLYETHYLENE SING LIQUID CHROMATOGRAPHY | ADI | | FEV./2006 |
| 92 | D 5525-94a **WITHDRAWN 2002, NO REPLACEMENT** | STANDARD PRACTICE FOR EXPOSING PLATICS TO A SIMULATED ACTIVE LANDFILL ENVIRONMENT | ADI | | FEV./2006 |
| 93 | D 5576-00 | STANDARD PRACTICE FOR DETERMINATION OF STRUCTURAL FEATURES IN POLYOLEFINS AND POLYOLEFIN COPOLYMERS BY INFRARED SPECTROPHOTOMETRY (FT-IR) | ADI | I / D | FEV./2006 |
| 94 | D 5577-94 (2003) | STANDARD GUIDE FOR TECHNIQUES TO SEPARATE AND IDENTIFY CONTAMINANTS IN RECYCLED PLASTICS | ADI | | FEV./2006 |
| 95 | D 5594-98 (2004) | STANDARD TEST METHOD FOR DETERMINATION OF THE VINYL ACETATE CONTENT OF ETHYLENE-VINYL ACETATE (EVA) COPOLYMERS BY FOURIER TRANSFORM INFRARED SPECTROSCOPY (FT-IR) | ADI | | FEV./2006 |

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| 97 | D 5814-02 | STANDARD PRACTICES FOR DETERMINATION OF CONTAMINATION IN RECYCLED POLY(ETHYLENE TEREPHTHALATE) (PET) FLAKES AND CHIPS USING A PLAQUE TEST | ADI | I / D | FEV./2006 |
| 98 | D 5815-95 (2001) | STANDARD TEST METHOD FOR DETERMINATION OF PHENOLIC ANTIOXIDANTS AND ERUCAMIDE SLIP ADDITIVES IN LINEAR LOW-DENSITY POLYETHYLENE USING LIQUID CHROMATOGRAPH (LC) | ADI | | FEV./2006 |
| 99 | D 5947-02 **(D 5947-03)** | STANDARD TEST METHODS FOR PHYSICAL DIMENSIONS OF SOLID PLASTICS SPECIMENS | ADI | | FEV./2006 |
| 100 | D 5988-03 | STANDARD TEST METHOD FOR DETERMINING AEROBIC BIODEGRADATION IN SOIL OF PLASTIC MATERIALS OR RESIDUAL PLASTIC MATERIALS AFTER COMPOSTING | ADI | I / D | FEV./2006 |
| | D 5991-96 (2002) | STANDARD PRACTICE FOR SEPARATION AND IDENTIFICATION OF POLY(VINYL CHLORIDE) (PVC) CONTAMINATION IN POLY(ELTHYLENE TEREPHTALATE) (PET) FLAKE | ADI | | MAR./2006 |
| 101 | D 6042-04 | STANDARD TEST METHOD FOR DETERMINATION OF PHENOLIC ANTIOXIDANTS AND ERUCAMIDE SLIP ADDITIVES IN POLYPROPYLENE HOMOPOLYMER FORMULATIONS USING LIQUID CHROMATOGRAPHY (LC) | ADI | I / D | FEV./2006 |
| 102 | D 6688-01 | STANDARD TEST METHOD FOR RELATIVE RESISTANCE OF PRINTED MATTER TO LIQUID CHEMICALS BY A SANDWICH METHOD | ADI | I / D | FEV./2006 |
| 103 | D 6691-01 | STANDARD TEST METHOD FOR DETERMINING AEROBIC BIODEGRADATION OF PLASTIC MATERIALS IN THE MARINE ENVIRONMENT BY A DEFINED MICROBIAL CONSORTIUM | ADI | I / D | FEV./2006 |
| | D 6701-01 | STANDARD TEST METHOD FOR DETERMINING WATER VAPOR TRANSMISSION RATES THROUGH NONWOVEN AND PLASTIC BARRIERS | ADI | I / D | ABR./2006 |
| 104 | D 6954-04 | STANDARD GUIDE FOR EXPOSING AND TESTING PLASTICS THAT DEGRADE IN THE ENVIRONMENT BY A COMBINATION OF OXIDATION AND BIODEGRADATION | ADI | I / D | FEV./2006 |
| 105 | D 7075-04 | STANDARD PRACTICE FOR EVALUATING AND REPORTING ENVIRONMENTAL PERFORMANCE OF BIOBASED PRODUCTS | ADI | I / D | FEV./2006 |
| 106 | E 3-01 | STANDARD PRACTICE FOR PREPARATION OF METALLOGRAPHIC SPECIMENS | ADI | I / D | FEV./2006 |
| 107 | E 8-04 | STANDARD TEST METHODS FOR TENSION TESTING OF METALLIC MATERIAL | ADI | I / D | FEV./2006 |
| 109 | E 18-05 | STANDARD TEST METHODS FOR ROCKWELL HARDNESS AND ROCKWELL SUPERFICIAL HARDNESS OF METALLIC MATERIALS | ADI | I / D | FEV./2006 |
| | E 45-97(2002) **(E45-05)** | STANDARD TEST METHODS FOR DETERMINING THE INCLUSION CONTENT OF STEEL | ADI | I / D | EV./2006 |
| 110 | E 82-91 (2001) | STANDARD TEST METHOD FOR DETERMINING THE ORIENTATION OF A METAL CRYSTAL | ADI | | FEV./2006 |
| 111 | E 96/E 96M-05 | STANDARD TEST METHODS FOR WATER VAPOR TRANSMITION OF MATERIALS | ADI | I / D | FEV./2006 |
| 112 | E 104-02 | STANDARD PRACTICE FOR MAINTAINING CONSTANT RELATIVE HUMIDITY BY MEANS OF AQUEOUS SOLUTIONS | ADI | I / D | FEV./2006 |
| 113 | E 112-96 (2004) | STANDARD TEST METHODS FOR DETERMINING AVERAGE GRAIN SIZE | ADI | I / D | FEV./2006 |
| 114 | E 122-00 | STANDARD PRACTICE FOR CALCULATING SAMPLE SIZE TO ESTIMULATE, WITH A SPECIFIED TOLERABLE ERROR, THE AVERAGE FOR A CHARACTERISTIC OF A LOT OR PROCESS | ADI | I / D | FEV./2006 |
| 115 | E 131-05 | STANDARD TERMINOLOGY RELATING TO MOLECULAR SPECTROSCOPY | ADI | I / D | ABR./2006 |
| 116 | E 167-96 **WITHDRAWN 2005, NO REPLACEMENT** | STANDARD PRACTICE FOR GONIOPHOTOMETRY OF OBJECTS AND MATERIALS | ADI | | FEV./2006 |
| 117 | E 168-06 | STANDARD PRACTICES FOR GENERAL TECHNIQUES OF INFRARED QUANTITATIVE ANALYSIS | ADI | I / D | MAIO/2006 |
| 118 | E 171-94 (2002) | STANDARD SPECIFICATION FOR STANDARD ATMOSPHERES FOR CONDITIONING AND TESTING FLEXIBLE BARRIER METHODS | ADI | | FEV./2006 |
| | E 179-96 (2003) | STANDARD GUIDE FOR SELECTION OF GEOMETRIC CONDITIONS FOR MEASUREMENT OF REFLECTION AND TRANSMISSION PROPERTIES OF MATERIALS | ADI | I / D | ABR./2006 |
| 119 | E 252-84 **(E252-05)** | STANDARD TEST METHOD THICKNESS OF THIN FOIL AND FILM BY WEIGHING | ADI | | FEV./2006 |
| 120 | E 398-03 | STANDARD TEST METHOD FOR WATER VAPOR TRANSMISSION RATE OF SHEET MATERIALS USING DYNAMIC RELATIVE HUMIDITY MEASUREMENT | ADI | I / D | FEV./2006 |
| 121 | E 460-04 | STANDARD PRACTICE FOR DETERMINING EFFECT OF PACKAGING ON FOOD AND BEVERAGE PRODUCTS DURING STORAGE | ADI | I / D | FEV./2006 |
| 122 | E 493-97 | STANDARD TEST METHODS FOR LEAKS USING THE MASS SPECTROMETER LEAK DETECTOR IN THE INSIDE-OUT TESTING MODE | ADI | | FEV./2006 |
| 123 | E 498-95 (2000) | STANDARD TEST METHODS FOR LEAKS SING THE MASSS SPECTROMETER LEAK DETECTOR OR RESIDUAL GAS ANALYSER IN THE TRACER PROBE MODE | ADI | | FEV./2006 |
| 124 | E 499-95 (2000) | STANDARD TEST METHODS FOR LEAKS USING THE MASS SPECTROMETER LEAK DETECTOR IN THE DETECTOR PROBE MODE | ADI | | FEV./2006 |
| 125 | E 515-05 | STANDARD TEST METHOD FOR LEAS USING BUBBLE EMISSION TECHNIQUES | ADI | I / D | ABR./2006 |
| 126 | E 517-00 | STANDARD TEST METHOD FOR PLASTIC STRAIN RATIO R FOR SHEET METAL | ADI | I / D | FEV./2006 |
| | E 542-01 | STANDARD PRACTICE FOR CALIBRATION OF LABORATORY VOLUMETRIC APPARATUS | ADI | I / D | ABR./2006 |
| | E 573-01 | STANDARD PRACTICES FOR INTERNAL REFLECTION SPECTROSCOPY | ADI | I / D | MAIO/2006 |
| 127 | E 646-00 | STANDARD TEST METHOD FOR TENSILE STRAIN-HARDENING EXPONENTS (N-VALUES) OF METALLIC SHEET MATERIAL | ADI | I / D | FEV./2006 |

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| 129 | E 928-03 | STANDARD TEST METHOD FOR PURITY BY DIFFERENTIAL SCANNING CALORIMETRY | ADI | I / D | FEV./2006 |
| 130 | E 1148-87(1993) **(E 1148-02)** | STANDARD TEST METHOD FOR MEASUREMENTS OF AQUEOUS SOLUBILITY | ADI | | FEV./2006 |
| | E 1251-04 | STANDARD TEST METHOD FOR ANALYSIS OF ALUMINUM AND ALUMINUM ALLOYS BY ATOMIC EMISSION SPECTROMETRY | ADI | I / D | MAIO/2006 |
| | E 1252-98(2002) | STANDARD PRACTICE FOR GENERAL TECHNIQUES FOR OBTAINING INFRARED SPECTRA FOR QUALITATIVE ANALYSIS | ADI | I / D | ABR./2006 |
| 131 | E 1269-04 **(E 1269-05)** | STANDARD TEST METHOD FOR DETERMINING SPECIFIC HEAT CAPACITY BY DIFFERENTIAL SCANNING CALORIMETRY | ADI | I / D | FEV./2006 |
| | E 1348-02 | STANDARD TEST METHOD FOR TRANSMITTANCE AND COLOR BY SPECTROPHOTOMETRY USING HEMISPHERICAL GEOMETRY | ADI | I / D | ABR./2006 |
| 132 | E 1356-03 | STANDARD TEST METHOD FOR ASSIGNMENT OF THE GLASS TRANSITION TEMPERATURES BY DIFFERENTIAL SCANNING CALORIMETRY | ADI | I / D | FEV./2006 |
| 133 | E 1421-99 (2004) | STANDARD PRACTICE FOR DESCRIBING AND MEASURING PERFORMANCE OF FOURIER TRANSFORM MID-INFRARED (FT-MIR) SPECTROMETERS: LEVEL ZERO AND LEVEL ONE TESTS | ADI | I / D | FEV./2006 |
| 134 | E 1448-92 (2004) | STANDARD PRACTICE FOR CALIBRATION OF SYSTEMS USED FOR MEASURING VEHICULAR RESPONCE TO PAVEMENT ROUGHNESS | ADI | I / D | FEV./2006 |
| 135 | E 1870-04 | STANDARD TEST METHOD FOR ODOR AND TASTE TRANSFER FROM POLYMERIC PACKAGING FILM | ADI | I / D | FEV./2006 |
| | E 1951-02 | STANDARD GUIDE FOR CALIBRATING RETICLES AND LIGHT MICROSCOPE MAGNIFICATIONS | ADI | I / D | ABR./2006 |
| 136 | F 88-05 | STANDARD TEST METHOD FOR SEAL STRENGTH OF FLEXIBLE BARRIER MATERIALS | ADI | I / D | FEV./2006 |
| 137 | F 97-72 (1997) (2002) | STANDARD PRACTICES FOR DETERMINING HERMETICITY OF ELECTRON DEVICES BY DYE PENETRATION | ADI | I / D | FEV./2006 |
| 138 | F 119-82 (1992) (2002) | STANDARD TEST METHOD FOR RATE OF GREASE PENETRATION OF FLEXIBLE BARIER MATERIALS (RAPID METHOD) | ADI | | FEV./2006 |
| 139 | F 151-86 (1997) - **WITHDRAWN 2004, NO REPLACEMENT** | STANDARD TEST METHOD FOR RESIDUAL SOLVENTS IN FLEXIBLE BARRIER MATERIALS | ADI | | FEV./2006 |
| 140 | F218-95 (2000) **(F218-05)** | STANDARD TEST METHOD FOR ANALYZING STRESS IN GLASS | ADI | | FEV./2006 |
| 141 | F 904-98 (2003) | STANDARD TEST METHOD FOR COMPARISON OF BOND STRENGTH OR PLY ADHESION OF SIMILAR LAMINATES MADE FROM FLEXIBLE MATERIALS | ADI | I / D | FEV./2006 |
| 142 | F 1004-00 **(F 1004-04)** | STANDARD CONSUMER SAFETY SPECIFICATION FOR EXPANSION GATES AND EXPANDABLE ENCLOSURES | ADI | | FEV./2006 |
| 143 | F 1249-01 **(F 1249-05) - TEMOS AS DUAS - ROSA** | STANDARD TEST METHOD FOR WATER VAPOR TRANSMITION RATE THROUGH PLASTIC FILM AND SHEETING USING A MODULATED INFRARED SENSOR | ADI | I / D | FEV./2006 |
| 144 | F1307-02 | STANDARD TEST METHOD FOR OXYGEN TRANMISSION RATE THROUG DRY PACKAGES USING A COULOMETRIC SENSOR | ADI | | FEV./2006 |
| 145 | F 1769-97 - **WITHDRAWN 2004, NO REPLACEMENT** | STANDARD TEST METHOD FOR MEASUREMENT OF DIFFUSIVITY, SOLUBILITY, AND PERMEABILITY OF ORGANIC VAPOR BARRIERS USING A FLAME IONIZATION DETECTOR | ADI | | FEV./2006 |
| 146 | F 1927-98 (2004) | STANDARD TEST METHOD FOR DETERMINATION OF OXYGEN GAS TRANSMITION RATE, PERMEABILITY AND PERFORMANCE AT CONTROLLED RELATIVE HUMIDITY THROUGH BARRIER MATERIALS USING A COULOMETRIC DETECTOR | ADI | I / D | FEV./2006 |
| 147 | F 2013-05 | STANDARD TEST METHOD FOR DETERMIANTION OF RESIDUAL ACETALDEHYDE IN POLYETHYLENE TEREPHTHALATE BOTTLE POLYMER USING AN AUTOMATED STATIC HEAD-SPACE SAMPLING DEVICE AND A CAPILLARY GC WITH A FLAME IONIZATION DETECTOR | ADI | I / D | MAR./2006 |
| 148 | F 2097-05 | STANDARD GUIDE FOR DESIGN AND EVALUATION OF PRIMARY PACKAGING FOR MEDICAL PRODUCTS | ADI | I / D | FEV./2006 |
| | **BSI** | | | | |
| 149 | BS EN 645:1994 | PAPER AND BOARD INTENDED TO COME INTO CONTACT WITH FOODSTUFFS - PREPARATION OF A COLD WATER EXTRACT | ADI | I | FEV./2006 |
| 150 | BS EN 647:1994 | PAPER AND BOARD INTENDED TO COME INTO CONTACT WITH FOODSTUFFS - PREPARATION OF A COLD WATER EXTRACT | ADI | I | FEV./2006 |
| 151 | BS EN 13206:2001 | COVERING THERMOPLASTIC FILMS FOR USE IN AGRICULTURE AND HORTICULTURE | ADI | I | FEV./2006 |
| 152 | BS 1133: SUBSECTION 7.5:1990 | PACKAGING CODE. SECTION 7. PAPER AND BOARD WRAPPERS, BAGS AND CONTAINERS. SUBSECTION 7.5. FIBREBOARD CASES AND FITMENTS | ADI | I | FEV./2006 |
| 153 | BS 2782: PART 0 : 1982 **(BS 2782-0:2004)** | METHODS OF TESTING PLASTICS PART 0. INTRODUCTION | ADI | I | FEV./2006 |
| 154 | BS 3755:1964 | THE ASSESSMENT OF ODOUR FROM PACKAGING MATERIALS USED FOR FOODSTUFFS | ADI | I | FEV./2006 |
| 155 | BS 3900-F18:1998 **(BS 3900-F18:2005)** | METHODS OF TEST FOR PAINTS - PART F18: DETERMINATION OF RESISTANCE TO CORROSION UNDER A WET (SALT FOG)/DRY/HUMIDITY CYCLE (Paints and varnishes. Determination of resistance to cyclic corrosion conditions. Wet (salt fog)/dry/humidity ) | ADI | I | FEV./2006 |
| 156 | BS 6001: SUPPLEMENT 1984 **(BS 6001-2:1993)** | BRITISH STANDARD SPECIFICATION FOR SAMPLING PROCEDURES AND TABLES FOR INSPECTION BY ATTRIBUTES. SUPPLEMENT 1. SAMPLING PLANS INDEXED BY LIMITING QUALITY (LQ) | ADI | I | FEV./2006 |
| 157 | BS AMENDMENT Nº 1 | AMENDMENT Nº1 PUBLISHED AND EFFECTIVE FROM 30 APRIL 1986 TO BS 6001: SUPPLEMENT 1: 1984 | ADI | I | JAN./2005 |
| 158 | BS 6455: 1984 | BRITISH STANDARD METHOD FOR MONITORING THE LEVELS OF RESIDUAL SOLVENTS IN FLEXIBLE PACKAGING MATERIALS | ADI | I | FEV./2006 |
| | **NORMAS EUROPEIAS** | | | | |

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|---|---|---|---|---|---|
| 160 | CEN/TR 13695-2: 2004 | PACKAGING. REQUIREMENTS FOR MEASURING AND VERIFYIN THE FOUR HEAVY METALS AND OTHER DANGEROUS SUBSTANCES PRESENT IN PACKAGING, AND THEIR RELEASE INTO THE ENVIRONMENT. PART 2: REQUIREMENTS FOR MEASURING AND VERIFYING DANGEROUS SUBSTANCES PRESENT IN PACKAGING, AND THEIR RELEASE INTO THE ENVIRONMENT. | ADI | I / D | FEV./2006 |
| 161 | CEN/TS 13130-9: 2005 | MATERIALS AND ARTICLES IN CONTACT WITH FOODSTUFFS - PLASTICS SUBSTANCES SUBJECT TO LIMITATION - PART 9: DETERMINATION OF ACETIC ACID, VINYL ESTER IN FOOD SIMULANTS | ADI | I / D | FEV./2006 |
| 162 | CEN/TS 13130-15: 2005 | MATERIALS AND ARTICLES IN CONTACT WITH FOODSTUFFS - PLASTICS SUBSTANCES SUBJECT TO LIMITATION - PART 15: DETERMINATION OF 1, 3-BUTADIENE IN FOOD SIMULANTS | ADI | I / D | FEV./2006 |
| 163 | CEN/TS 13130-16: 2005 | MATERIALS AND ARTICLES IN CONTACT WITH FOODSTUFFS - PLASTICS SUBSTANCES SUBJECT TO LIMITATION - PART 16: DETERMINATION OF CAPROLACTAM AND CAPROLACTAM SALT IN FOOD SIMULANTS | ADI | I / D | FEV./2006 |
| 164 | CEN/TS 13130-24: 2005 | MATERIALS AND ARTICLES IN CONTACT WITH FOODSTUFFS - PLASTICS SUBSTANCES SUBJECT TO LIMITATION - PART 24: DETERMINATION OF MALEIC ACID AND MALEIC ANHYDRIDE IN FOOD SIMULANTS | ADI | I / D | FEV./2006 |
| 165 | CEN/TS 13130-25: 2005 | MATERIALS AND ARTICLES IN CONTACT WITH FOODSTUFFS - PLASTICS SUBSTANCES SUBJECT TO LIMITATION - PART 25: DETERMINATION OF 4-METHYL-1-PENTENE IN FOOD SIMULANTS | ADI | I / D | FEV./2006 |
| 166 | CEN/TS 13130-26: 2005 | MATERIALS AND ARTICLES IN CONTACT WITH FOODSTUFFS - PLASTICS SUBSTANCES SUBJECT TO LIMITATION - PART 26: DETERMINATION OF 1-OCTENE AND TETRAHYDROFURAN IN FOOD SIMULANTS | ADI | I / D | FEV./2006 |
| 167 | CR 13695-1: 2000 | PACKAGING - REQUIREMENTS FOR MEASURING AND VERIFYING THE FOUR HEAVY METALS AND OTHER DANGEROUS SUBSTANCES PRESENT IN PACKAGING AND THEIR RELEASE INTO THE ENVIRONMENT - PART 1: REQUIREMENTS FOR MEASURING AND VERIFYING THE FOUR HEAVY METALS PRESENT IN PACKAGING | ADI | I / D | FEV./2006 |
| 168 | 82/711/EEC | PLASTICS BASIC FOR MIGRATION TESTS | ADI | I | FEV./2006 |
| 169 | 84/500/EEC | CERAMICS | ADI | I | FEV./2006 |
| 170 | 85/572/EEC | PLASTICS LIST OF SIMULANTS | ADI | I | FEV./2006 |
| 171 | 90/128/EEC | PLASTICS MONOMERS | ADI | I | FEV./2006 |
| 172 | 92/39/EEC | PLASTICS 1ST AMENDMENT 90/128/EEC | ADI | I | FEV./2006 |
| 173 | 93/9/EEC | PLASTICS 2 ND AMENDMENT TO 90/128/EEC | ADI | I | FEV./2006 |
| 174 | 95/3/EEC | PLASTICS 3ND AMENDMENT TO 90/128/EEC | ADI | I | FEV./2006 |
| 175 | 96/11/EEC | APPENDIX 11 - COMMISSION DIRECTIVE AMENDING DIRECTIVE 90/128/EEC RELATING TO PLASTICS MATERIALS AND ARTICLES INTENDED TO COME INTO CONTACT WITH FOODSTUFFS. | ADI | I | FEV./2006 |
| 176 | 97/48/EEC | APPENDIX 5 - COMMISSION DIRECTIVE AMENDING FOR THE SECOND TIME COUCIL DIRECTIVE 82/711/EEC LAYING DOWN THE BASIC RULES NECESSARY FOR TESTING MIGRATION OF THE CONSTITUENTS OF PLASTIC MATERIALS AND ARTICLES INTENDED TO COME INTO CONTACT WITH FOODSTUFFS | ADI | I | FEV./2006 |
| 178 | ENV 1186-13 | MATERIALS AND ARTICLES IN CONTACT WITH FOODSTUFFS - PLASTICS. PART 13: TEST METHOD FOR OVERALL MIGRATION AT HIGH TEMPERATURES | ADI | I | FEV./2006 |
| 179 | ENV 1186-15 | MATERIALS AND ARTICLES IN CONTACT WITH FOODSTUFFS - PLASTICS. PART 15: ALTERNATIVE TEST METHODS TO MIGRATION INTO FATTY FOOD SIMULANTS BY RAPID EXTRACTION INTO ISO-OCTANE AND/OR 95% ETHANOL | ADI | I | FEV./2006 |
| | prEN 13206:1998 (Norma adquirida pelo cliente / cópia autorizada para uso interno) | COVERING THERMOPLASTIC FILMS FOR USE IN AGRICULTURE AND HORTICULTURE | ADI | I | ---------- |
| | prEN 13655:1999 (Norma adquirida pelo cliente / cópia autorizada para uso interno) | PLASTICS - MULCHING THERMOPLASTIC FILMS FOR USE IN AGRICULTURE AND HORTICULTURE | ADI | I | ---------- |
| 180 | SFS-EN 13130-1: 2004 | MATERIALS AND ARTICLES IN CONTACT WITH FOODSTUFFS. PLASTICS SUBSTANCES SUBJECT TO LIMITATION. PART 1: GUIDETO THE TEST METHODS FOR THE SPECIFIC MIGRATION OF SUBSTANCES FROM PLASTICS TO FOODS AND FOOD SIMULANTS AND THE DETERMINATION OF SUBSTANCES IN PLASTICS AND THE SELECTION OF CONDITIONS OF EXPOSURE TO FOOD SIMULANTS | ADI | I / D | FEV./2006 |
| 181 | SFS-EN 13130-2: 2004 | MATERIALS AND ARTICLES IN CONTACT WITH FOODSTUFFS. PLASTICS SUBSTANCES SUBJECT TO LIMITATION. PART 2: DETERMINATION OF TEREPHTHALIC ACID IN FOOD SIMULANTS | ADI | I / D | FEV./2006 |
| 182 | SFS-EN 13130-5: 2004 | MATERIALS AND ARTICLES IN CONTACT WITH FOODSTUFFS. PLASTICS SUBSTANCES SUBJECT TO LIMITATION. PART 5: DETERMINATION OF VINYLIDENE CHLORIDE IN FOOD SIMULANTS | ADI | I / D | FEV./2006 |
| 183 | SFS-EN 13130-7: 2004 | MATERIALS AND ARTICLES IN CONTACT WITH FOODSTUFFS. PLASTICS SUBSTANCES SUBJECT TO LIMITATION. PART 7: DETRMINATION OF MONOETHYLENE GLYCOL AND DIETHYLENE GLYCOL IN FOOD SIMULANTS | ADI | I / D | FEV./2006 |
| 184 | SFS-EN 13428: 2005 | PACKAGING. REQUIREMENTS SPECIFIC TO MANUFACTURING AND COMPOSITION. PREVENTION BY SOURCE REDUCTION | ADI | I / D | FEV./2006 |
| 185 | SFS-EN 13429: 2005 | PACKAGING. REUSE | ADI | I / D | FEV./2006 |
| 186 | SFS-EN 13430: 2005 | PACKAGING. REQUIREMENTS FOR PACKAGING RECOVERABLE BY MATERIAL RECYCLING | ADI | I / D | FEV./2006 |

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|---|---|---|---|---|---|
| 187 | SFS-EN 13431: 2005 | PACKAGING. REQUIREMENTS FOR PACKAGING RECOVERABLE IN THE FORM OF ENERGY RECOVERY, INCLUDING SPECIFICATION OF MINIMUM INFERIOR CALORIFIC VALUE. | ADI | I / D | FEV./2006 |
| 188 | SFS-EN 13432: 2001 | PACKAGING. REQUIREMENTS FOR PACKAGING RECOVERABLE THROUGH COMPOSTING AND BIODEGRADATION. TEST SCHEME AND EVALUATION CRITERIA FOR THE FINAL ACCEPTANCE OF PACKAGING | ADI | I / D | FEV./2006 |
| | **DIN** | | | | |
| | | DIN CATALOGUE OF TECHNICAL RULES´89 | ADI | I | |
| | DIN EN 10202: 2001 | COLD REDUCED TINMILL PRODUCTS - ELETROLYTIC TINPLATE AND ELECTROLYTIC CHROMIUM/CHROMIUM OXIDE COATED STEEL | ADI | I | MAR./2006 |
| 189 | DIN 10951: 1978 **(DIN ISO 4120: 2005)** | SENSORY TESTING METHODS: TRIANGULAR TEST - **NÃO CONSTA NO SITE DA DIN** | ADI | I | FEV./2006 |
| 190 | DIN 10952 TEIL 1: | SENSORY TESTING METHODS; EVALUATION TEST WITH SCALE; TESTING METHOD | ADI | I | FEV./2006 |
| 191 | DIN 10953 - NÃO CONSTA NO SITE DA DIN | APPLICATION OF SENSORY TESTING METHODS - **NÃO CONSTA NO SITE DA DIN** | ADI | I | FEV./2006 |
| 192 | DIN 10955: 1983, **Publication date:2004-06** | SENSORY ANALYSIS - TESTING OF PACKAGING MATERIALS AND PACKAGES FOR FOODSTUFFS | ADI | I | FEV./2006 |
| 193 | DIN 10961 TEIL 1: 1996 | ASSESSORS FOR SENSORY ANALYSIS; PRESELECTION, TRAINING, SELECTION, CHECK TEST | ADI | I | FEV./2006 |
| 194 | DIN 10961 TEIL 2: 1996 | ASSESSORS FOR SENSORY ANALYSIS; TEST TASKS AND TEST METHODS | ADI | I | FEV./2006 |
| 195 | DIN 50014: 1985 | CLIMATES AND THEIR TECHNICAL APPLICATION | ADI | I | FEV./2006 |
| 196 | DIN 50017: 1982 - **WITHDRAWN** | ATMOSPHERES AND THEIR TECHNICAL APPLICATION; CONDENSATION WATER TEST ATMOSPHERES | ADI | I | FEV./2006 |
| 197 | DIN 52295: 1993 | TESTING OF GLASS:PENDULUM IMPACT TEST ON CONTAINERS; TESTING BY ATTRIBUTES AND BY VARIABLES | ADI | I | FEV./2006 |
| | DIN 53122-1: 2001 | DETERMINATION OF THE WATER VAPOUR TRANSMISSION RATE OF PLASTIC FILM, RUBBER SHEETING, PAPER, BOARD AND OTHER SHEET MATERIALS BY GRAVIMETRY | ADI | I | FEV./2006 |
| 198 | DIN 53373: 1970 | TESTING OF PLASTIC FILMS IMPACT PENETRATION TEST WITH ELECTRONIC DATA RECORDING | ADI | I | FEV./2006 |
| 199 | DIN 53380-3: 1998 | DETERMINING THE GAS TRANSMISSION RATE OF PLASTIC FILM, SHEETING AND MOULDINGS BY THE CARRIER GAS METHOD | ADI | I | FEV./2006 |
| 200 | DIN 53455 - NÃO CONSTA | TESTING OF PLASTICS | ADI | I | FEV./2006 |
| 201 | DIN 53539: 1979 - **WITHDRAWN** | TESTING OF ELASTOMERS : TENSILE TEST - **NÃO CONSTA NO SITE DA DIN** | ADI | I | FEV./2006 |
| 202 | DIN 55471 TEIL 1: 1983 | CELLULAR POLYSTYRENE FOR PACKAGING; REQUIREMENTS, TESTING - TEMOS A NORMA EM ALEMÃO - JÁ EXISTE EM INGLÊS | ADI | I | FEV./2006 |
| 203 | DIN 55471 TEIL 2: 1987 | CELLULAR POLYSTYRENE FOR PACKAGING; CALCULATION AND FORMING OF PACKAGING MOULDINGS - TEMOS A NORMA EM ALEMÃO - JÁ EXISTE EM INGLÊS | ADI | I | FEV./2006 |
| 204 | DIN ISO 8362 TEIL 1: 1990 **(DIN EN ISO 8362-1:2004)** | INJECTION CONTAINERS FOR INJECTABLES AND ACCESSORIES; INJECTION VIALS MADE OF GLASS TUBING, IDENTICAL WITH ISO 8362-1: 1989 (Injection containers and accessories - Part 1: Injection vials made of glass tubing (ISO 8362-1:2003); German version EN ISO 8362-4:2004, text in German and English) | ADI | I | FEV./2006 |
| | **IRAM** | | | | |
| 205 | IRAM 9034-1:1996 | AMPOLLAS DE VIDRIO CON ESTRANGULACIÓN, PARA USO MEDICINAL | ADI | I / D | MAR./2006 |
| 206 | IRAM 9034-2:1997 | AMPOLLAS DE VIDRIO PARA INYETABLES DE USO MEDICO. PARTE 2: CON UN SOLO PUNTO DE CORTE (OPC) | ADI | I / D | MAR./2006 |
| 207 | IRAM 9071-1:1996 | FRASCOS AMPOLLAS DE VIDRIO PARA PREPARACIONES MEDICINALES INYETABLES - ELABORADA A PARTIR DE TUBOS | ADI | I / D | MAR./2006 |
| | | | | | |
| | **ISO** | | | | |
| 208 | ISO 14: 1982 | STRAIGHT-SIDED SPLINES FOR CYCLINDRICAL SHAFTS WITH INTERNAL CENTERING - DIMENSIONS, TOLERANCES AND VERIFICATION | ADI | I | FEV./2006 |
| 209 | ISO 90-2: 1986 (ISO 90-2:1997) | LIGHT GAUGE METAL CONTAINERS - DEFINITIONS AND DETERMINATION OF DIMENSIONS AND CAPACITIES - PART 2: GENERAL USE CONTAINERS | ADI | I | FEV./2006 |
| 210 | ISO 291: 2005 | PLASTICS - STANDARD ATMOSPHERES FOR CONDITIONING AND TESTING | ADI | I / D | MAIO/2006 |
| | ISO 527-1: 1993 (Norma adquirida pelo cliente / cópia autorizada para uso interno) | PLASTICS - DETERMINATION OF TENSILE PROPERTIES - PART 1: GENERAL PRINCIPLES | ADI | I / D | JAN./2006 |
| | ISO 527-3: 1995 (Norma adquirida pelo cliente / cópia autorizada para uso interno) | PLASTICS - DETERMINATION OF TENSILE PROPERTIES - PART 3: TEST CONDITIONS FOR FILMS AND SHEETS | ADI | I / D | JAN./2006 |
| 211 | ISO 535: 1991 | PAPER AND BOARD - DETERMINATION OF WATER ABSORPTIVENESS - COBB METHOD | ADI | I / D | FEV./2006 |
| 212 | ISO 554: 1976 | STANDARDS ATMOSPHERES FOR CONDITIONING AND/OR TESTING - SPECIFICATIONS | ADI | | FEV./2006 |
| 213 | ISO 720: 1985 | GLASS - HYDROLYTIC RESISTANCE OF GLASS GRAINS AT 121ºC - METHOD OF TEST AND CLASSIFICATION | ADI | I / D | FEV./2006 |
| 214 | ISO 960:1988 - **CANCELADA E SUBSTITUÍDA POR**: ISO 15512:1999 | PLASTICS - DETERMINATION OF WATER CONTENT | ADI | I | FEV./2006 |

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|---|---|---|---|---|---|
| 215 | ISO 1099: 1975 (ISO 1099:2006) | METALS - AXIAL LOAD FATIQUE TESTING | ADI | I | FEV./2006 |
| | ISO 1520: 1999 | PAINTS AND VARNISHES - CUPPING TEST | ADI | I / D | JUN. 2006 |
| 216 | ISO 2295:1974 | AVOCADOS - GUIDE FOR STORAGE AND TRANSPORT | ADI | I | FEV./2006 |
| 217 | ISO 2528: 1995 | SHEET MATERIALS - DETERMINATION OF WATER VAPOUR TRANSMITION RATE GRAVIOMETRIC (DISH) METHOD | ADI | I | FEV./2006 |
| 218 | ISO 2854:1976 | SATATISTICAL INTERPRETATION OF DATA - TECHNIQUES OF ESTIMATION ANS TESTS RELATING TO MEANS AND VARIANCES | ADI | I | FEV./2006 |
| 219 | ISO 2859-1: 1999 | SAMPLING PROCEDURES FOR INSPECTION BY ATTRIBUTES - PART 1: SAMPLING SCHEMES INDEXED BY ACCEPTANCE QUALITY LIMIT (AQL) FOR LOT-BY-LOT INSPECTION | ADI | I | FEV./2006 |
| 220 | ISO 2906:1984 (IS0 2906:2002) | CINEMATOGRAPHY - IMAGE AREA PRODUCED BY CAMARA APERTURE ON 35 MM MOTION PICTURE FILM - POSITIONS AND DIMENSIONS | ADI | I | FEV./2006 |
| 221 | ISO 3004-1: 1979 / 3004-3: 1981 / 3004-4: 1980 - **CANCELADAS E SUBSTITUÍDAS POR**: ISO 10653:1993 / ISO 10654:1993 / ISO/TR 11761:1992 / ISO/TR 11762:1992 / ISO/TR 11776:1992 | **ISO 3004-1** - HERMETICALLY SEALED METAL CONTAINERS FOR FOOD AND DRINK - PART 1: ROUND OPEN TOP GENERAL PURPOSE FOOD CANS. / **ISO 3004-3** - HERMETICALLY SEALED METAL CONTAINERS FOR FOOD AND DRINKS - PART 3: CANS FOR DRINK / **ISO 3004-4** - HERMETICALLY SEALED METAL CONTAINERS FOR FOOD AND DRINKS - PART 4: CANS FOR EDIBLE OIL | ADI | I | FEV./2006 |
| 222 | ISO 3036: 1975 | BOARD - DETERMINATION OF PUNCTURE RESISTANCE | ADI | I | FEV./2006 |
| 223 | ISO 3037:1994 | CORRUGATED FIBREBOARD - DETERMINATION OF EDGEWISE CRUSH RESISTANCE (UNWAXEDMEDGE METHOD) | ADI | I | FEV./2006 |
| 224 | ISO 3038: 1975 | CORRUGATED FIBREBOARD - DETERMINATION OF THE WATER RESISTANCE OF THE GLUE BOND BY IMMERSION | ADI | I | FEV./2006 |
| 225 | ISO 3039: 1975 | CORRUGATED FIBREBOARD - DETERMINATION OF THE GRAMMAGE OF THE COMPONENT PAPERS AFTER SEPARATION | ADI | I | FEV./2006 |
| 226 | ISO 3596-2: 1988 ( ISO 3596: 2000) | ANIMAL AND VEGETABLE FATS AND OILS - DETERMINATION OF UNSAPONIFIABLE MATTER - PART 2: RAPID METHOD USING HEXANE EXTRACTION | ADI | I | FEV./2006 |
| 227 | ISO 4120: 2004 | SENSORY ANALYSIS - METHODOLOGY - TRIANGLE TEST | ADI | I / D | FEV./2006 |
| 228 | ISO 4180-1: 1980 | COMPLETE, FILLED TRANSPORT PACKAGES - GENERAL RULES FOR THE COMPILATION OF PERFORMANCE TEST SCHEDULES - PART 1: GENERAL PRINCIPLES | ADI | I | FEV./2006 |
| 229 | ISO 4180-2: 1980 | COMPLETE, FILLED TRANSPORT PACKAGES - GENERAL RULES FOR THE COMPILATION OF PERFORMANCE TEST SCHEDULES - PART 2: QUANTITATIVE DATA | ADI | I | FEV./2006 |
| 230 | ISO 4186: 1980 | ASPARAGUS - GUIDE TO STORAGE | ADI | I | FEV./2006 |
| 231 | ISO 4581:1994 | PLASTICS - STYRENE/ACRYLONITRILE COPOLYMERS - DETERMINATION OF RESIDUAL ACRYLONITRILE MONOMER CONTENT - GAS CHROMATOGRAPHY METHOD | ADI | I / D | FEV./2006 |
| | ISO 4591: 1992 (Norma adquirida pelo cliente / cópia autorizada para uso interno) | PLASTICS - FILM AND SHEETING - DETERMINATION OF AVERAGE THICKNESS OF A SAMPLE, AND AVERAGE THICKNESS AND YIELD OF A ROLL, BY GRAVIMETRIC TECHNIQUES (GRAVIMETRIC THICKNESS) | ADI | I | JAN./2006 |
| | ISO 4592: 1992 (Norma adquirida pelo cliente / cópia autorizada para uso interno) | PLASTICS - FILM AND SHEETING - DETERMINATION OF LENGHT AND WIDTH | ADI | I | JAN./2006 |
| | ISO 4593: 1993 (Norma adquirida pelo cliente / cópia autorizada para uso interno) | PLASTICS - FILM AND SHEETING - DETERMINATION OF THICKNESS BY MECHANICAL SCANNING | ADI | I | JAN./2006 |
| 232 | ISO 4599: 1986 | PLASTICS - DETERMINATION OF RESISTANCE TO ENVIRONMENTAL STRESS CRACKING (ESC) - BENT STRIP METHOD | ADI | I | FEV./2006 |
| 233 | ISO 4600: 1992 | PLASTICS - DETERMINATION OF ENVIRONMENTAL STRESS CRACKING (ESC) - BALL OR PIN IMPRESSION METHOD | ADI | I | FEV./2006 |
| 234 | ISO 4624:2002 | PAINTS AND VARNISHES - PULL-OFF TEST FOR ADHESION | ADI | I / D | FEV./2006 |
| 235 | ISO 4710:1988 (ISO 4710:2000) | CORK STOPPERS FOR SPARKLING WINES AND GASIFIED WINES - SPECIFICATION (Cork -- Cylindrical stoppers for sparkling wines and gasified wines -- Characteristics) | ADI | I | FEV./2006 |
| 236 | ISO 4802-1:1988 | GLASSWARE - HYDROLYTIC RESISTANCE OF THE INTERIOR SURFACES OF GLASS CONTAINERS - PART 1: DETERMINATION BY TITRATION METHOD AND CLASSIFICATION | ADI | I | FEV./2006 |
| 237 | ISO 4802-2:1988 | GLASSWARE - HYDROLYTIC RESISTANCE OF THE INTERIOR SURFACES OF GLASS CONTAINERS - PART 2: DETERMINATION BT FLAME SPECTROMETRY AND CLASSIFICATION | ADI | I / D | FEV./2006 |
| 238 | ISO 4892-1:1994 (ISO 4892-1:1999) | PLASTICS - METHODS OF EXPOSURE TO LABORATORY LIGHT SOURCES - PART 1: GENERAL GUIDANCE | ADI | I | FEV./2006 |
| 239 | ISO 4892-2:1994 (ISO 4892-2: 2006) | PLASTICS - METHODS OF EXPOSURE TO LABORATORY LIGHT SOURCES - PART 2: XENON-ARC SOURCES | ADI | I | FEV./2006 |
| 240 | ISO 4892-3:1994 | PLASTICS - METHODS OF EXPOSURE TO LABORATORY LIGHT SOURCES - PART 3: FLUORESCENT UV LAMPS | ADI | I | FEV./2006 |
| 241 | ISO 4892-4:1994 (ISO 4892-4:2004) | PLASTICS - METHODS OF EXPOSURE TO LABORATORY LIGHT SOURCES - PART 4: OPEN-FLAME CARBON-ARC LAMPS | ADI | I | FEV./2006 |

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|---|---|---|---|---|---|
| 242 | ISO TC 6 N 786 (ISO 5263-1:2004; ISO 5263-2:2004; ISO 5263-3:2004) | PULPS - LABORATORY WET DISINTEGRATION = Pulps -- Laboratory wet disintegration -- Part 1: Disintegration of chemical pulps; Pulps -- Laboratory wet disintegration -- Part 2: Disintegration of mechanical pulps at 20 degrees C; Pulps -- Laboratory wet disintegration -- Part 3: Disintegration of mechanical pulps at > 85 degrees C | ADI | I | FEV./2006 |
| 243 | ISO 5636-5:2003 | PAPER AND BOARD - DETERMINATION OFAIR PERMEANCE AND AIR RESISTANCE (MEDIUM RANGE) - PART 5: GURLEY METHOD | ADI | I / D | FEV./2006 |
| 244 | ISO 6252:1992 | PLASTICS - DETERMINATION OF ENVIRONMENTAL STRESS CRACKING (ESC) - CONSTANT-TENSILE-STRESS METHOD | ADI | I | FEV./2006 |
| 245 | ISO 6383-1:1983 | PLASTICS - FILM AND SHEETING - DETERMINATION OF TEAR RESISTANCE - PART 1: TROUSER TEAR METHOD | ADI | I | FEV./2006 |
| 246 | ISO 6383-2:1983 | PLASTICS - FILM AND SHEETING - DETERMINATION OF TEAR RESISTANCE - PART 2: ELMENDORF METHOD | ADI | I | FEV./2006 |
| 247 | ISO 6508-1:1999 (ISO 6508-1:2005) | METALLIC MATERIAL - ROCKWELL HARDNESS TEST - PART 1: TEST METHOD (SCALES A, B, C, D, E, F, G, H, K, N, T) | ADI | I / D | FEV./2006 |
| | ISO 6658: 2005 | SENSORY ANALYSIS - METHODOLOGY - GENERAL GUIDANCE | ADI | I / D | MAR./2006 |
| 248 | ISO 6661: 1983 | FRESH FRUIT AND VEGETABLES - ARRANGEMENT OF PARALLELEPIPEDIC PACKAGES IN LAND TRANSPORT VEHICLES | ADI | I | FEV./2006 |
| 249 | ISO 6882:1981 | ASPARAGUS - GUIDE TO REFRIGERATED TRANSPORT | ADI | I | FEV./2006 |
| 250 | ISO 6885:1988 (ISO 6885:1998) | ANIMAL AND VEGETABLE FATS AND OILS - DETERMINATION OF ANISIDINE VALUE | ADI | I | FEV./2006 |
| 251 | ISO 6892:1998 | METALLIC MATERIAL - TENSILE TESTING AT AMBIENT TEMPERATURE | ADI | I / D | FEV./2006 |
| 252 | ISO/DIS 7263:1993-DRAFT (7263:1994) | CORRUGATING MEDIUM - DETERMINATION OF THE FLAT CRUSH RESISTANCE AFTER LABORATORY FLUTING | ADI | I | FEV./2006 |
| 253 | ISO 7348:1992 | GLASS CONTAINERS - MANUFACTURE - VOCABULARY | ADI | I / D | FEV./2006 |
| 254 | ISO 7458:2004 | GLASS CONTAINERS - INTERNAL PRESSURE RESISTANCE - TEST METHODS | ADI | I / D | FEV./2006 |
| 255 | ISO 7459:2004 | GLASS CONTAINERS - THERMAL SHOCK RESISTANCE AND THERMAL SHOCK ENDURANCE - TEST METHODS | ADI | I / D | FEV./2006 |
| 256 | ISO 7765-1:1988 | PLASTICS FILM AND SHEETING - DETERMINATION IMPACT RESISTANCE BY THE FREE-FALLING DART METHOD - PART 1: STAIRCASE METHODS | ADI | I | FEV./2006 |
| 257 | ISO 7765-2:1994 | PLASTICS FILM AND SHEETING - DETERMINATION OF IMPACT RESISTANCE BY THE FREE - FALLING DART METHOD - PART 2: INSTRUMENTED PUNCTURE TEST | ADI | I | FEV./2006 |
| 258 | ISO 7965-1:1984 | PACKAGING - SACKS - DROP TEST - PART 1: PAPER SACKS | ADI | I | FEV./2006 |
| 259 | ISO 7965-2:1993 | SACKS - DROP TEST - PART 2: SACKS MADE FROM THERMOPLASTIC FLEXIBLE FILM | ADI | I | FEV./2006 |
| 260 | ISO 8106:2004 | GLASS CONTAINERS - DETERMINATION OF CAPACITY BY GRAVIMETRIC METHOD -TEST METHOD | ADI | I / D | FEV./2006 |
| 261 | ISO 8113:2004 | GLASS CONTAINERS - RESISTANCE TO VERTICAL LOAD TEST METHOD | ADI | I / D | FEV./2006 |
| 262 | ISO 8162:1985 - **CANCELADA** | GLASS CONTAINERS -TALL CROWN FINISHES DIMENSIONS | ADI | I | FEV./2006 |
| 263 | ISO 8163:1985 - **CANCELADA** | GLASS CONTAINERS - SHALLOW CROWN FINISHES DIMENSIONS | ADI | I | FEV./2006 |
| 264 | ISO 8164:1990 - **CANCELADA** | GLASS CONTAINERS - 520 ML EURO-FORM BOTTLES - DIMENSIONS | ADI | I | FEV./2006 |
| 265 | ISO 8317:2003 | CHILD-RESISTANCE PACKAGING - REQUIREMENT AND TESTING PRECEDURES FOR RECLOSABLE PACKAGES | ADI | I | FEV./2006 |
| 266 | ISO 8362-1:1989 (ISO 8362-1:2003) | INJECTION CONTAINERS FOR INJECTABLES AND ACCESSORIES - PART 1: INJECTION VIALS MADE OF GLASS TUBING | ADI | I | FEV./2006 |
| 267 | ISO 8362-2:1988 | INJECTION CONTAINERS FOR INJECTABLES AND ACCESSORIES - PART 2: CLOSURES FOR INJECTION VIALS | ADI | I | FEV./2006 |
| 268 | ISO 8611-1:2004 | PALLETS FOR MATERIALS HANDLING- FLAT PALLETS - PART 1: TEST METHODS | ADI | I / D | ABR./2006 |
| | ISO/TS 8611-2:2005 | PALLETS FOR MATERIALS HANDLING- FLAT PALLETS - PART 2: PERFORMANCE REQUIREMENTS AND SELECTION OF TESTS | ADI | I / D | ABR./2006 |
| | ISO/TS 8611-3:2005 | PALLETS FOR MATERIALS HANDLING- FLAT PALLETS - PART 3: MAXIMUM WORKING LOADS | ADI | I / D | ABR./2006 |
| 269 | ISO 8683:1988 | LETTUCE - GUIDE TO PRECOOLING AND REFRIGERATED TRANSPORT | ADI | I | FEV./2006 |
| 270 | ISO 9008:1991 | GLASS BOOTLES - VERTICALY - TEST METHOD | ADI | I | FEV./2006 |
| 271 | ISO 9009:1991 | GLASS CONTAINERS - HEIGHT AND NON-PARALLELISM OF FINISH WITH REFERENCE TO CONTAINER BASE TEST METHODS | ADI | I | FEV./2006 |
| 272 | ISO 9056:1990 | GLASS CONTAINERS - SERIES OF PILFERPROOF FINISH - DIMENSIONS | ADI | I | FEV./2006 |
| 273 | ISO 9057:1991 | GLASS CONTAINERS - 28 MM TAMPER-EVIDENT FINISH FOR PRESSURIZED LIQUIDS - DIMENSIONS | ADI | I / D | FEV./2006 |
| 274 | ISO 9058:1992 | GLASS CONTAINERS - TOLERANCES | ADI | I | FEV./2006 |
| 275 | ISO 9160:1992 - **CANCELADA E** | WIDE-MOUTH GLASS CONTAINERS - VACUUM LUG FINISHES - DIMENSIONS | ADI | I | FEV./2006 |
| 276 | ISO 9885:1991 | WIDE -MOUTH GLASS CONTAINERS - DEVIATION FROM FLATANESS OF TOP SEALING SURFACE | ADI | I | FEV./2006 |
| 277 | ISO 10012-1:1992 (ISO 10012:2003) | QUALITY ASSURANCE REQUIREMENTS FOR MEASURING EQUIPMENT - PART 1: METROLOGICAL CONFIRMATION SYSTEM FOR MEASURING EQUIPMENT (Measurement management systems -- Requirements for measurement processes and measuring equipment) | ADI | I | FEV./2006 |
| 278 | ISO 10653:1993 | LIGHT GAUGE METAL CONTAINERS - ROUND OPEN-TOP CANS - CANS DEFINED BY NOMINAL GROSS LIDDED CAPACITIES | ADI | I | FEV./2006 |
| 279 | ISO 10654:1993 | LIGHT-GAUGE METAL CONTAINERS - ROUND OPEN-TOP CANS - CANS FOR LIQUID PRODUCTS WITH ADDED GAS, DEFINED BY THEIR NOMINAL FILLING VOLUMES | ADI | I | FEV./2006 |

| Nº de Controle | Identificação / Ano | Nome do Documento | Doc. original | Texto* | Última Consulta |
|---|---|---|---|---|---|
| 280 | ISO 10985:1999 | CAPS MADE OF ALUMINIUM-PLASTICS COMBINATIONS FOR INFUSION BOTTLES AND INJECTION VIALS - REQUIREMENTS AND TEST METHODS | ADI | I | FEV./2006 |
| 281 | ISO 11134:1994 | STERILIZATION OF HEALTH CARE PRODUCTS - REQUIREMENTS FOR VALIDATION AND ROUTINE CONTROL - INDUSTRIAL MOIST HEAT STERILIZATION | ADI | I / D | FEV./2006 |
| 282 | ISO 11135:1994 | MEDICAL DEVICES - VALIDATION AND ROUTINE CONTROL OF ETHYLENE OXIDE STERILIZATION | ADI | I / D | FEV./2006 |
| 283 | ISO 11137:1995 | STERILIZATION OF HEALTH CARE PRODUCTS - REQUIREMENTS FOR VALIDATION AND ROUTINE CONTROL - RADIATION STERILIZATION | ADI | I / D | FEV./2006 |
| 284 | ISO 11137 - AMD 1:2001 | STERILIZATION OF HEALTH CARE PRODUCTS - REQUIREMENTS FOR VALIDATION AND ROUTINE CONTROL - RADIATION STERILIZATION - AMD1: SELECTION OF ITEMS FOR DOSE SETTING | ADI | I | FEV./2006 |
| 285 | ISO 11418-7:1998 | CONTAINERS AND ACCESSORIES FOR PHARMACEUTICAL PREPARATIONS: PART 7: SCREW-NECK VIALS MADE OF GLASS TUBING FOR LIQUID DOSAGE FORMS | ADI | I | FEV./2006 |
| 286 | ISO 11469:1993 (ISO 11469:2000) | PLASTICS - GENERIC IDENTIFICATION AND MARKING OF PLASTIC PRODUCTS | ADI | I | FEV./2006 |
| 287 | ISO 11607:2003 (FOTOCÓPIA CEDIDA POR LÉA M. OLIVEIRA) | PACKAGING FOR TERMINALLY STERILIZED MEDICAL DEVICES | ADI | I | FEV./2006 |
| 288 | ISO 11949:1995 | COLD - REDUCED ELETROLYTIC TINPLATE | ADI | I | FEV./2006 |
| 289 | ISO 11950:1995 | COLD - REDUCED ELETROLYTIC CHROMIUM/CHROMIUM OXIDE-COATED STEEL | ADI | I | FEV./2006 |
| 290 | ISO 14020:2000 | ENVIRONMENTAL LABELS AND DECLARATIONS - GENERAL PRINCIPLES | ADI | I | FEV./2006 |
| 291 | ISO 14024:1999 | ENVIRONMENTAL LABELS AND DECLARATIONS - TYPE I - ENVIRONMENTAL LABELLING - PRINCIPLES AND PROCEDURES | ADI | I | FEV./2006 |
| 292 | ISO 14040:1997 | ENVIRONMENTAL MANAGEMENT - LIFE CYCLE ASSESSMENT - PRINCIPLES AND FRAMEWORK | ADI | I / D | FEV./2006 |
| 293 | ISO 14041:1998 | ENVIRONMENTAL MANAGEMENT- LIFE CYCLE ASSESSMENT - GOAL AND SCOPE DEFINITION AND INVENTORY ANALYSIS | ADI | I / D | FEV./2006 |
| 294 | ISO 14042:2000 | ENVIRONMENTAL MANAGEMENT - LIFE CYCLE ASSESSMENT - LIFE CYCLE IMPACT ASSESSMENT | ADI | I / D | FEV./2006 |
| 295 | ISO 14043:2000 | ENVIRONMENTAL MANAGEMENT - LIFE CYCLE ASSESSMENT - LIFE CYCLE INTERPRETATION | ADI | I / D | FEV./2006 |
| 296 | ISO 15985:2004 | PLASTICS - DETERMINATION OF THE ULTIMATE ANAEROBIC BIODEGRADATION AND DISINTEGRATION UNDER HIGH-SOLIDS ANAEROBIC-DIGESTION CONDITIONS - METHOD BY ANALYSIS OF RELEASED BIOGAS | ADI | I / D | FEV./2006 |
| 297 | ISO/TR 14025:2000 | ENVIRONMENTAL LABELS AND DECLARATIONS - TYPE III - ENVIRONMENTAL DECLARATIONS | ADI | I | FEV./2006 |
| 298 | ISO/TR 14047:2003 | ENVIRONMENTAL MANAGEMENT - LIFE CYCLE IMPACT ASSESSMENT - EXAMPLES OF APPLICATION OF ISO 14042 | ADI | I / D | FEV./2006 |
| 299 | ISO/TR 14049:2000 | ENVIRONMENTAL MANAGEMENT - LIFE CYCLE ASSESSMENT - EXAMPLES OF APPLICATION OF ISO 14041 TO GOAL AND SCOPE DEFINITION AND INVENTORY ANALYSIS | ADI | I / D | FEV./2006 |
| 300 | ISO/TR 14062:2002 | ENVIRONMENTAL MANAGEMENT - INTEGRATING ENVIRONMENTAL ASPECTS INTO PRODUCT DESIGN AND DEVELOPMENT | ADI | I / D | FEV./2006 |
| 301 | ISO TS 14048:2002 | ENVIRONMENTAL MANAGEMENT - LIFE CYCLE ASSESSMENT - DATA DOCUMENTATION FORMAT | ADI | I / D | FEV./2006 |
| 302 | | | | | |
| | **NORMAS EM VERMELHO ESTÃO DESATUALIZADAS, AGUARDANDO AQUISIÇÃO** | | | | |
| | **JIZ** | | | | |
| 303 | JIS Z 0200:1987 **(ISO JIS Z 0200:1999)** | GENERAL RULES OF PERFORMANCE TESTING FOR PACKAGE FREIGHTS (Packaged freights -- General rules of testing) | ADI | I | FEV./2006 |
| | **NORMAS PORTUGUESAS** | | | | |
| 304 | NP 3313: 1988 | VIDRO DE EMBALAGEM: COLHEITA DE AMOSTRAS | ADI | I | FEV./2006 |
| 305 | NP 3314: 1988 | VIDRO DE EMBALAGEM: ENSAIO DE CHOQUE TÉRMICO | ADI | I | FEV./2006 |
| 306 | NP 3315: 1988 | VIDRO DE EMBALAGEM: GARRAFAS DE VIDRO DE FABRICAÇÃO NORMAL. RELACIONAMENTO DIMENSIONAL E TOLERÂNCIAS | ADI | I | FEV./2006 |
| 307 | NP 3548: 1988 | VIDRO DE EMBALAGEM: VOCABULÁRIO | ADI | I | FEV./2006 |
| 308 | NP 3549: 1988 | VIDRO DE EMBALAGEM: BOIÕES DE VIDRO DE FABRICAÇÃO NORMAL - RELACIONAMENTO DIMENSIONAL E TOLERÂNCIAS | ADI | I | FEV./2006 |
| 309 | NP 3550: 1988 | VIDRO DE EMBALAGEM: ENSAIO DE PRESSÃO INTERIOR | ADI | I | FEV./2006 |
| 310 | NP 3551: 1988 | VIDRO DE EMBALAGEM: ENSAIO DE CARGA AXIAL | ADI | I | FEV./2006 |
| 311 | NP 3552: 1988 | VIDRO DE EMBALAGEM: CARACTERÍSTICAS DE RESISTÊNCIA DAS GARRAFAS | ADI | I | FEV./2006 |
| 312 | NP EM 868-1: 2000 | MATERIAIS E SISTEMAS DE EMBALAGENS PARA DISPOSITIVOS MÉDICOS A SEREM ESTERILIZADOS - PARTE 1: REQUISITOS GERAIS E MÉTODOS DE ENSAIO | ADI | I | FEV./2006 |
| | **TAPPI** | | | | |
| 313 | T 460:2002 | AIR RESISTANCE OF PAGER(GURLEY METHOD) 05 PÁGINAS | ADI | I | LIVRO TAPPI - FEV./2006 |
| 314 | T 464:2001 | WATER VAPOR TRASMISSION RATE OF PAPER AND PAPER BOARD AT HIGH TEMPERATURE AND HUMIDITY - 04 PÁGINAS | ADI | I | LIVRO TAPPI - FEV./2006 |
| 315 | T 503 om-94 - **WITHDRAWN 1995** | COEFFICIENT OF STATIC FRICTION AND SHIPPING SACK PAPER (INCLINED PLANE METHOD) 03 PÁGINAS | ADI | I | LIVRO TAPPI - FEV./2006 |
| 316 | T 811:2002 | EDGEWISE COMPRESSIVE STRENGTH OF CORRUGATED FIBER BOARD (SHORT COLUMN TEST) - 05 PÁGINAS | ADI | I | LIVRO TAPPI - FEV./2006 |
| 317 | T 821 pm-81**(T 821 om-06)** | PIN ADHESION OF CORRUGATED BOARD BY SELECTIVE SEPARATION - 02 PÁGINAS | ADI | I | FEV./2006 |
| 318 | T 826 om-04 | SHORT SPAN COMPRESSIVE STRENGTH OF CONTAINERBOARD | ADI | I | FEV./2006 |
| 319 | TAPPI 507 cm-85 **(T507 cm-99)** | GREASE RESISTANCE OF FLEXIBLE PACKAGING MATERIALS | ADI | I | FEV./2006 |
| 320 | TAPPI UM 526 | ADHESIVE BOND STRENGTH, LAMINATED PRODUCTS (ELMONDORF PEEL METHOD) - 02 PÁGINAS | ADI | I | ?????? |
| 321 | TAPPI UM 537 | FILM AND CONSTRUCTION IDENTIFY TESTS | ADI | I | ?????? |

**(2) Packaging related Standards in Argentina**

There are packaging standards for food products in Argentina as shown below. There are, however, neither standards for goods distribution nor standards for packaging design, yet.

(There are some other packaging related standards for Dangerous Goods by ocean shipping, but this information shall be omitted due to irrelevance between the articles and target products.) Packaging Standards for Food Products in Argentina are shown in next pages.

| Subject | Regulation | Description | Effect | File Name |
|---|---|---|---|---|
| Packaging | ResGMC 3/92 | General criteria of food related packaging and equipment to be on direct contact with food substance | Incorporated into FNC by Res. MSyAS 3/95 | GMC3_92 |
| Packaging | ResGMC 30/92 | Plastic packaging and equipment to be on direct contact with foods: food classification and simulation substances | Annex updated later by Res. 32/97 & 33/97<br>Incorporated into FNC by ResMSyAS 3/95 | GMC30_92 |
| Packaging | ResGMC 36/92 | Total Migration Tests of plastic packaging and equipment, to be on direct contact with foods | Incorporated into FNC by ResMSyAS 3/95 | GMC36_92 |
| Packaging | ResGMC 55/92 | Glass and ceramic packaging and equipment to be on direct contact with foods | Incorporated into FNC by ResMSyAS 3/95 | GMC55_92 |
| Packaging | ResGMC 56/92 | General rules for Plastic packaging and equipment to be on direct contact with foods | Incorporated into FNC by ResMSyAS 3/95 | GMC56_92 |
| Packaging | ResGMC 16/93 | Rules for returnable plastic packaging to be used to be on direct contact with non-alcohol carbonated beverages | Incorporado al C.A.A. por ResMSyAS 3/95 | GMC16_93 |
| Packaging | ResGMC 27/93 | Rules for metal packaging and equipment to be on direct contact with foods | Modified later by Res. GMC N° 48/93<br>Supplemented by Res GMC 30/99<br>Incorporated into FNC by ResMSyAS 3/95 | GMC27_93 |
| Packaging | ResGMC 28/93 | Rules for Plastic packaging and equipment to be on direct contact with foods (pigments & colorants) | Incorporated into FNC by ResMSyAS 3/95 | GMC28_93 |
| Packaging | ResGMC 47/93 | Residual vinyl chloride monomer content on packaging and equipment made by PVC and their copolymers | Incorporated into FNC by ResMSyAS 3/95 | GMC47_93 |
| Packaging | ResGMC 48/93 | Modification of rules for metal packaging and equipment to be on direct contact with foods | This regulation modifies the Res GMC Nº 27/93<br>Incorporated into FNC by ResMSyAS 3/95 | GMC48_93 |
| Packaging | ResGMC 86/93 | Determination of Residual Styrene Monomer | Modified by Res 14/97<br>Incorporated into FNC by ResMSyAS 3/95 | GMC86_93 |
| Packaging | ResGMC 87/93 | Polymer and Resin positive list for plastic packaging and equipment to be on direct contact with foods | Modified and completed by Res GMC N° 5/95 | GMC87_93 |

| Subject | Regulation | Description | Effect | File Name |
|---|---|---|---|---|
| | | | Modified by Res GMC N° 34/97<br>Modified by Res GMC N° 52/97<br>Modified and completed by Res GMC N° 11/99 (annulment later by Res GMC 52/00)<br>Modified and completed by Res GMC N° 13/99<br>Modified and completed by Res GMC N° 29/99<br>Completed by Res GMC N° 52/2000<br>Incorporated into FNC by ResMSyAS 3/95 | |
| Packaging | ResGMC 19/94 | Cellulose packaging and equipment to be on direct contact with foods | Supplemented by Res. GMC Nº 35/97<br>Modified by Res GMC Nº 20/2000<br>Incorporated into FNC by ResMSyAS 3/95 | GMC19_94 |
| Packaging | ResGMC 95/94 | Additives Positive List for plastic materials | Modified and completed by Res GMC Nº 36/97<br>Modified and completed by Res GMC Nº 53/97<br>Incorporated into FNC by ResMSyAS 184/95 | GMC95_94 |
| Packaging | ResGMC 5/95 | Polymer and Resin positive list for plastic packaging and equipment to be on direct contact with foods | This regulation modifies the Res GMC Nº 87/93 -<br>Incorporated into FNC by ResMSyAS 357/97 | GMC5_95 |
| Packaging | ResGMC 10/95 | Determination of Total Migration of plastics into olive oil, as grease simulation | Incorporated into FNC by ResMSyAS 357/97 | GMC10_95 |
| Packaging | ResGMC 11/95 | Determination of Specific Migration of Ethylene Glycol and Di-Ethylene Glycol | Modified by Res GMC Nº 15/97<br>Incorporated into FNC by ResMSyAS 357/97 | GMC11_95 |
| Packaging | ResGMC 12/95 | Total Migration Test of Cellulose packaging and equipment | Incorporated into FNC by ResMSyAS 357/97 | GMC12_95 |
| Packaging | ResGMC 14/97 | Modification of Resolution No. 86/93 " Determination of Residual Styrene Monomer " | Modified by Res GMC N° 86/93<br>Incorporated into FNC by ResSAGPyA- SPyRS 725-175/2000 | GMC14_97 |
| Packaging | ResGMC 15/97 | Modification of Resolution GMC No. 11/95 " Determination of Specific Migration of Ethylene Glycol and | This regulation modifies the Res GMC N° 11/95 | GMC15_97 |

| Subject | Regulation | Description | Effect | File Name |
|---|---|---|---|---|
| | | Di-Ethylene Glycol " | | |
| Packaging | ResGMC 32/97 | MERCOSUR Technical Regulation about the application of Table 1 (Classification of Simulation Foods) as Annex of Resolution No GMC No. 30/92 “Plastic packaging and equipment to be on direct contact with foods: food classification and simulation substances” | This regulation modifies the Res GMC N° 30/92 | GMC32_97 |
| Packaging | ResGMC 33/97 | Extension of the use of n-heptane as simulation of grease foods in the Migration Tests of plastic packaging and equipment | Supplementing Res GMC N° 30/92 | GMC33_97 |
| Packaging | ResGMC 34/97 | Extension of Part-b of Positive List of Polymers and Resins for plastic packaging and equipment to be on direct contact with foods (Resolution GMC No 87/93) | Extension of Part-B Res GMC N° 87/93) | GMC34_97 |
| Packaging | ResGMC 35/97 | General rules for cellulose packaging and equipment to be on direct contact with foods | This regulation modifies the GMC Nº 19/94 | GMC35_97 |
| Packaging | ResGMC 36/97 | New additives included in the Positive List for plastic materials | This regulation modifies Res Nº 95/94 GMC | GMC36_97 |
| Packaging | ResGMC 52/97 | MERCOSUR Technical Regulation about the updating of Positive List of resins and polymers for plastic packaging and equipment to be on direct contact with foods | Updating of Res GMC Nº 87/93 | GMC52_97 |
| Packaging | ResGMC 53/97 | MERCOSUR Technical Regulation about the incorporation of new additives into the Positive List of additives for plastic materials to be on direct contact with foods | Modifies and supplement Res GMC NO 95/94 | GMC53_97 |
| Packaging | ResGMC 54/97 | MERCOSUR Technical Regulation about elastomer packaging and equipment to be on direct contact with foods | | GMC54_97 |
| Packaging | ResGMC 55/97 | MERCOSUR Technical Regulation about regenerated cellulose film to be on direct contact with foods | | GMC55_97 |
| Packaging | ResGMC 56/97 | MERCOSUR Technical Regulation about Positive List for cellulose packaging and equipment to be on direct contact with foods | | GMC56_97 |
| Packaging | ResGMC 56/98 | MERCOSUR Technical Regulation about chlorinated polyethylene packaging and equipment to be on direct contact | Incorporated into FNC by ResMSyAS 606/99 | GMC56_98 |

| Subject | Regulation | Description | Effect | File Name |
|---|---|---|---|---|
| | | with foods | | |
| Packaging | ResGMC 9/99 | MERCOSUR Technical Regulation about incorporation of new additives in Positive List of additives for plastic materials (Resolution GMC No. 95/94) | Completeness of Res. GMC N° 95/94 | GMC9_99 |
| Packaging | ResGMC 10/99 | MERCOSUR Technical Regulation about incorporation of new additives in Positive List of additives for plastic materials (Resolution GMC No. 95/94) | Supplement of Res. GMC N° 95/94 | GMC10_99 |
| Packaging | ResGMC 11/99 | MERCOSUR Technical Regulation about updating the Positive List of Polymer and Resins for plastic packaging and equipment to be on direct contact with foods | Supplement of Res.GMC N°87/93 | GMC11_99 |
| Packaging | ResGMC 12/99 | MERCOSUR Technical Regulation about the incorporation of new additives on the Positive List of additives for plastic materials | Supplemet of Res. GMC N° 95/94 | GMC12_99 |
| Packaging | ResGMC 14/99 | MERCOSUR Technical Regulation about updating the Positive List of additives for plastic materials | Supplement and modification of Res.GMC N° 95/94 | GMC14_99 |
| Packaging | ResGMC 25/99 | MERCOSUR Technical Regulation about PET multilayer packaging (one time use) for carbonated non-alcohol beverages | | GMC25_99 |
| Packaging | ResGMC 27/99 | MERCOSUR Technical Regulation about adhesives used on the manufacturing of packaging and equipment for direct contact with foods | | GMC27_99 |
| Packaging | ResGMC 28/99 | MERCOSUR Technical Regulation about the Positive List of elastomer packaging and equipment for direct contact with foods | | GMC28_99 |
| Packaging | ResGMC 29/99 | MERCOSUR Technical Regulation about updating of Positive List of polymers and resins for plastic packaging and equipment for direct contact with foods (Resolution GMC No. 87/93) | Supplement and modification of Res.GMC N° 87/93 | GMC29_99 |
| Packaging | ResGMC 30/99 | MERCOSUR supplementary Technical Regulation to Res. 27/93 about the migration of phenolic compounds on metallic packaging and equipment for direct contact with foods | Supplement and modification of Res. GMC N° 27/93 | GMC30_99 |

| Subject | Regulation | Description | Effect | File Name |
|---|---|---|---|---|
| Packaging | ResGMC 31/99 | MERCOSUR Technical Regulation about general criteria for updating of Positive Lists of composition of packaging and equipment for direct contact with foods | | GMC31_99 |
| Packaging | ResGMC 32/99 | MERCOSUR Technical Regulation about reference analysis methodology for control of packaging and equipment for direct contact with foods | | GMC32_99 |
| Packaging | ResGMC 52/99 | MERCOSUR Technical Regulation about recycled cellulose materials | | GMC52_99 |
| Packaging | ResGMC 20/00 | Modification del MERCOSUR Technical Regulation about "cellulose packaging and equipment for direct contact with foods" | Modification of Res.GMC 19/94 | GMC20_00 |
| Packaging | ResGMC 52/00 | MERCOSUR Technical Regulation about updating of Positive List of polymers and resins of plastic packaging and equipment for direct contact with foods | Supplement to Res GMC N° 87/93<br>Nullment of Res GMC N° 13/99 | GMC52_00 |
| Packaging | ResGMC 67/00 | MERCOSUR Technical Regulation about paraffin to be on direct contact with foods | | GMC67_00 |
| Packaging | ResGMC 68/00 | MERCOSUR Technical Regulation about synthetic viscera made by regenerated cellulose to be on direct contact with foods | | GMC68_00 |
| Packaging | ResSAGPyA 121/98 | New Regulation System for packaging to be used for commerce of bulk honey | | SAGPyA121_98 |
| Packaging | ResSAGPyA<br>ResSPyRS<br>169_27/00 | Modification of Methodology of official analysis (Clause 16.2 Vol. II) related to determination of residual Vinyl Chlorine monomer, according to Resolution GMC No. 47/93 and Resolution GMC No. 13/97 | Modification of Clause 16.2 Vol. II of FNC | SAGPyA169__27_00 |

Source: Ministry of Economy, Argentina

### 8.4.2 Transportation Infrastructure within MERCOSUR

The following table describes MERCOSUR basic infrastructure.

| | |
|---|---|
| Railways | 68,643 km |
| Automotive Roads | 2,114,923 km |
| Navigable Rivers | 65,000 km |
| Pipelines (Oil) | 12,794 km |
| Gas Pipelines (Gas) | 11,013 km |
| Airports | 6,083 |
| Telephones | 12,925,300 units |

Source: The Economic Council for Latin America (CEPAL)

Within the above, the automotive ways, which are the core of the Study, have not been maintained before the creation of MERCOSUR, due to particular problems within each of the Countries. Even though improvement works have been made through financial support from international organizations as well as the private sector, there are still many serious problems. As a reference, in the following table they are shown the total lengths of routes in the 4 member countries, and percentages of paved routes.

| | Argentina | Brazil | Paraguay | Uruguay |
|---|---|---|---|---|
| Total routes (km) | 215,471 | 1,724,929 | 29,500 | 8,983 |
| Percentage paved （%） | 29.4 | 9.2 | 9.4 | 87.0 |

Source: 2006 - World Development Indicators (World Bank)

As stated previously on the paragraph 8.4.1, the waiting time to clear cargoes at customs offices is significant. Therefore, in order to streamline the MERCOSUR distribution system within the countries, it will be necessary to promote efficiency in the custom system together with road maintenance and improvement.

The four member countries of the MERCOSUR are presently included in a general plan of energy and transportation infrastructural project which is supported by a technical cooperation plan for 12 Latin-American Countries. This plan is carried out by the Interamerican Development Bank (IDB), Corporación Andina de Fomento (CAF) and Fondo Financiero para el Desarrollo del Río de la Plata (FONPLATA) and it is called “Iniciativa para la Integración Regional de Infraestructura de Sud América (IIRSA)”.

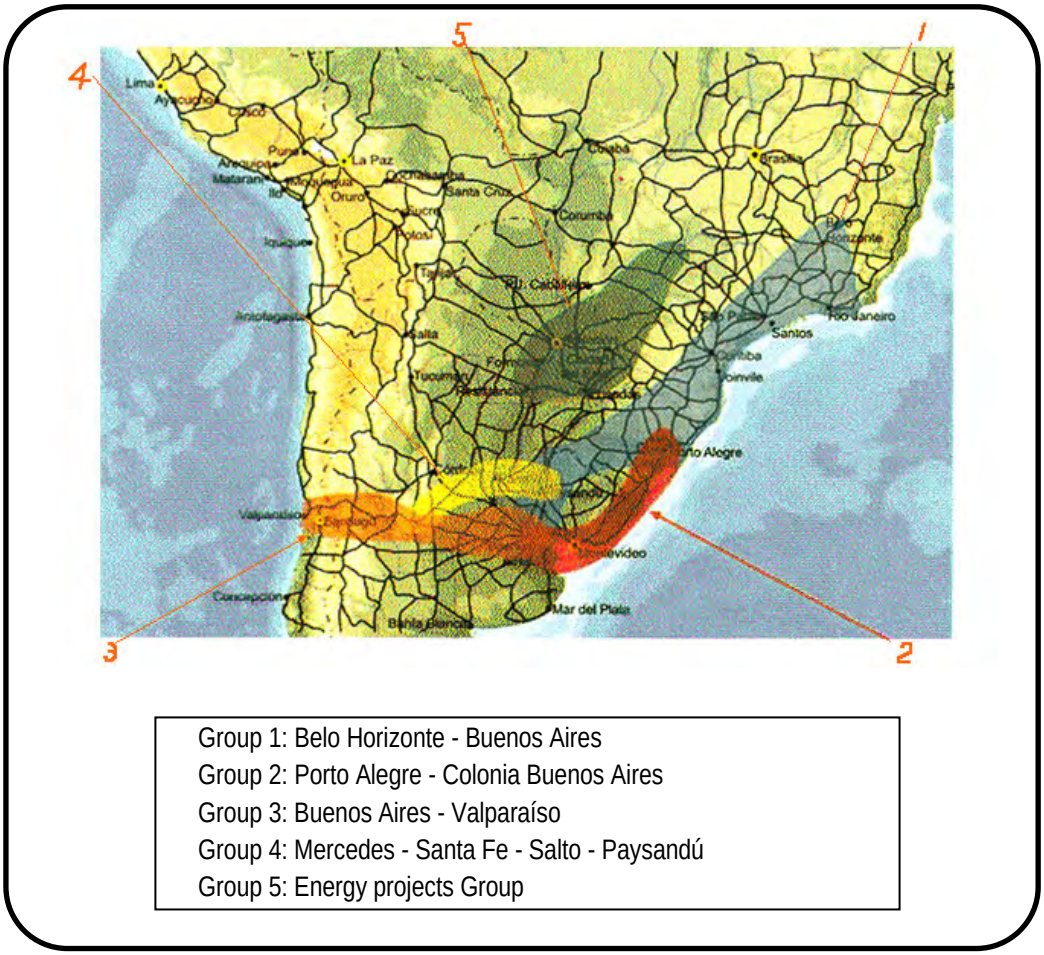
In the region, the study is centered mainly in MERCOSUR – Chile Axis (crossing Argentina, Brazil, Uruguay) and the Interocean Central Axis (Brazil, Paraguay). In these axis, they are proposed series of infrastructure related projects.

### 8.4.2.1 MERCOSUR –Chile Axis (Brazil, Argentina, Uruguay)

**IIRSA Plan –MERCOSUR Region Project Grouping**

| Group | Target Countries |
|---|---|
| Group 1: Belo Horizonte - Argentina / Brazil border - Buenos Aires | Argentina - Brazil |
| Group 2: Porto Alegre - Colonia -Buenos Aires | Argentina - Brazil - Uruguay |
| Group 3: Valparaíso - Buenos Aires | Argentina - Chile |
| Group 4: Mercedes - Santa Fe - Salto - Paysandú | Argentina - Uruguay |
| Group 5: Energy related | All countries |

**IIRSA Plan – MERCOSUR Region Grouping**

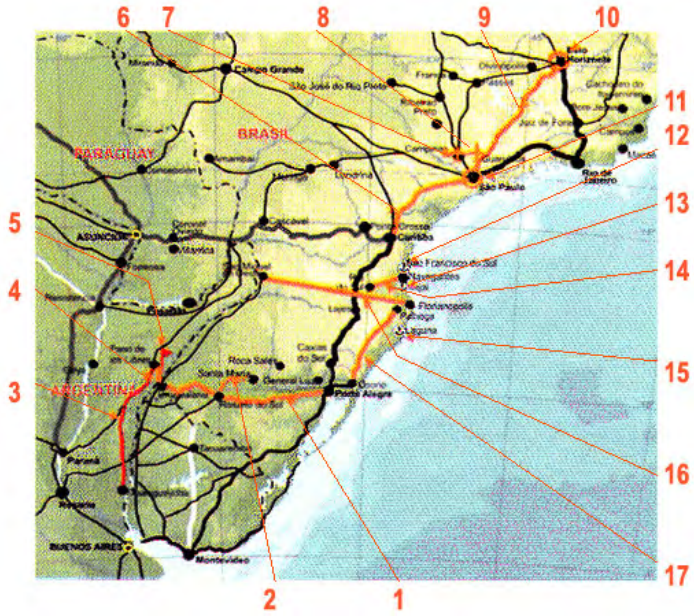



Group 1: Belo Horizonte - Buenos Aires
Group 2: Porto Alegre - Colonia Buenos Aires
Group 3: Buenos Aires - Valparaíso
Group 4: Mercedes - Santa Fe - Salto - Paysandú
Group 5: Energy projects Group

Source: IIRSA

Furthermore, the development projects for each group are described in the table. Basically, all the development plans are based on Asuncion Protocol, and promoting the integration process, aiming to increase the productivity and economic strengthening of the region.

### (1) Group 1: Belo Horizonte (BRA)- Buenos Aires (AR)




1 Porto Alegre – Uruguayana (Rehabilitation of route)

2 Santa María – Rosário do Sul (Road construction)

3 Anchor project: RN-14 between Paso de los Libres and Gualeguaychú (Road widening)

4 New bridges on river Río Uruguay on the Argentina – Brazil border

5 Construction and setting of cargo control system in Paso de los Libres

6 Sao Paulo - Curitiba (Completion of road widening construction)

7 Expansion of Campinas Airport

8 Expansion of Guarulhos Airport

9 Belo Horizonte - Sao Paulo (Completion of road widening construction)

10 Construction of ring route of Belo Horizonte

11 Construction of ring route of Sao Paulo

12 Expansion of Sao Francisco do Sul Port

13 Infrastructure improvements of Puerto Itajal Port

14 Repair works of route Navegantes – Rio do Sul

15 Rehabilitation of facility and breakwater (SC) of Laguna Port

16 Paving works of route BR-282/SC Florianópolis – Argentina border

17 Palhoça - Osorio (Road widening)

Source: IIRSA

### (2) Group 2: Porto Alegre (BRA)- Colonia (UR)-Buenos Aires (AR)


1 Repair works on Salto - Paysandú railway

2 Route 26: Repair works on route segment Rio Branco - Paysandú

3 Repair works on Montevideo - Rivera railway

4 Repair works on Río Grande – Pelotas BR 392 RS

5 Expansion of Río Grande Port / Dredging of access channel

6 Construction of International bridge Jaguarão - Rio Branco

7 Anchor Project: Adaptation works of corridor for Rio Branco - Colonia: RN 1, 11, 8, 17 & 18

8 Border crossing control point for Montevideo - Chuy

9 Repair works on Montevideo - Rivera Route

10 Expansion works on La Paloma Port

11 Combined cycle power station in San José

12 Repair works of the route Montevideo - Fray Bentos RN 1, 3, 11, 23, 12 and 2

13 International bridge for Buenos Aires - Colonia

14 Adaptation works in river port of Nueva Palmira

Source: IIRSA

### (3) Group 3: Buenos Aires (AR), Valparaiso (CHI)


1 Improvement works of San Antonio Port

2 Improvement works of Valparaíso Port

3 Repair works on RN 60 CH Sector Valparaíso – Los Andes

4 Adaptations for custom control point in Los Sauces (Los Andes)

5 Cargo control center in of boader Cristo Redentor (Argentina-Chile border)

6 Repair of route RN 7 Potrerillos- Chile border

7 Anchor project: Railway project Los Andes (Chile) – Mendoza (Argentina) (Ferrocarril Trasandino Central)

8 Construction of protection shelters in Caracoles (chilean side road in Andes)

9 RN 7 construction of deviation way Palmira – Junction with RN40 S

10 RN 7 double way on route Luján-Junction with RN188 (Junin)

11 RN 7 construction of railway deviation to La Picasa lake

12 RN7 construction of railway deviation alternative to La Picasa lake

13 Paving works for RN40 Sur: from Malargüe up to Neuquén province border

14 Paving works for RN145: Junction Nº 40 Sur- access to Pehuenche crossing point

15 Construction of cargo transference center in Pehuenche (border crossing point)

16 Paving of segment for Puente Armerillo - Paso Pehuenche on route CH115

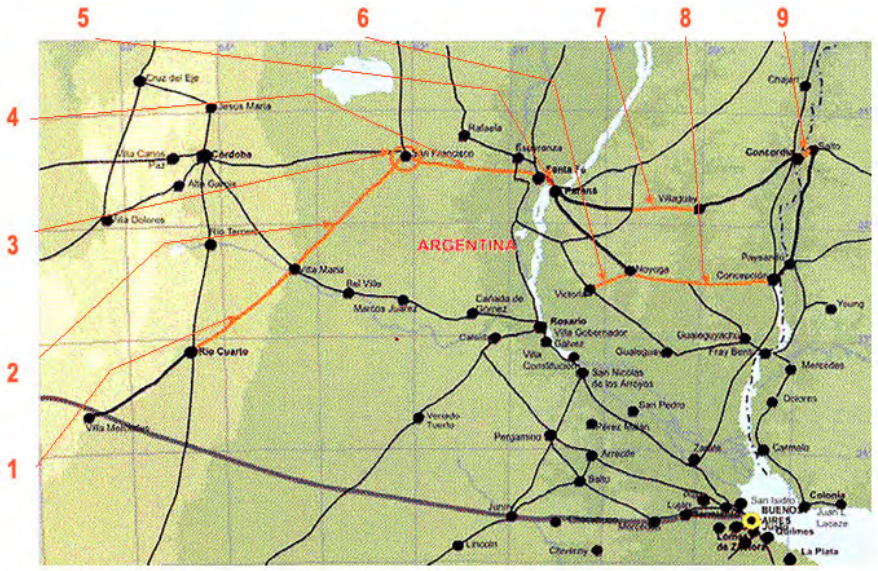
17 Road project for San Fernando – San Antonio (fruit route)

18 Construction of protection shelters on Cristo Redentor (chilean border)

19 Alternative of tunnels in Los Libertadores- Argentina border

Source: IIRSA

### (4) Group 4: Villa Mercedes, Santa Fe (AR), Salto (UR) , Paisandu




1 RN 158 –San Francisco – Río Cuarto (Road widening)

2 Pave repair works for RN 158 of San Francisco – Río Cuarto

3 Construction of alternative for RN 19 (via San Francisco option)

4 RN 19 for Junction RN 11 – San Francisco Section

5 Anchor project: Repair and expansion of RN 168 river tunnel Paraná y Santa Fe

6 Expansion of province route RP26: segment Victoria – Nogoyá Section

7 Paving repair on RN 18. of Junction RN 32 – Villaguay Section

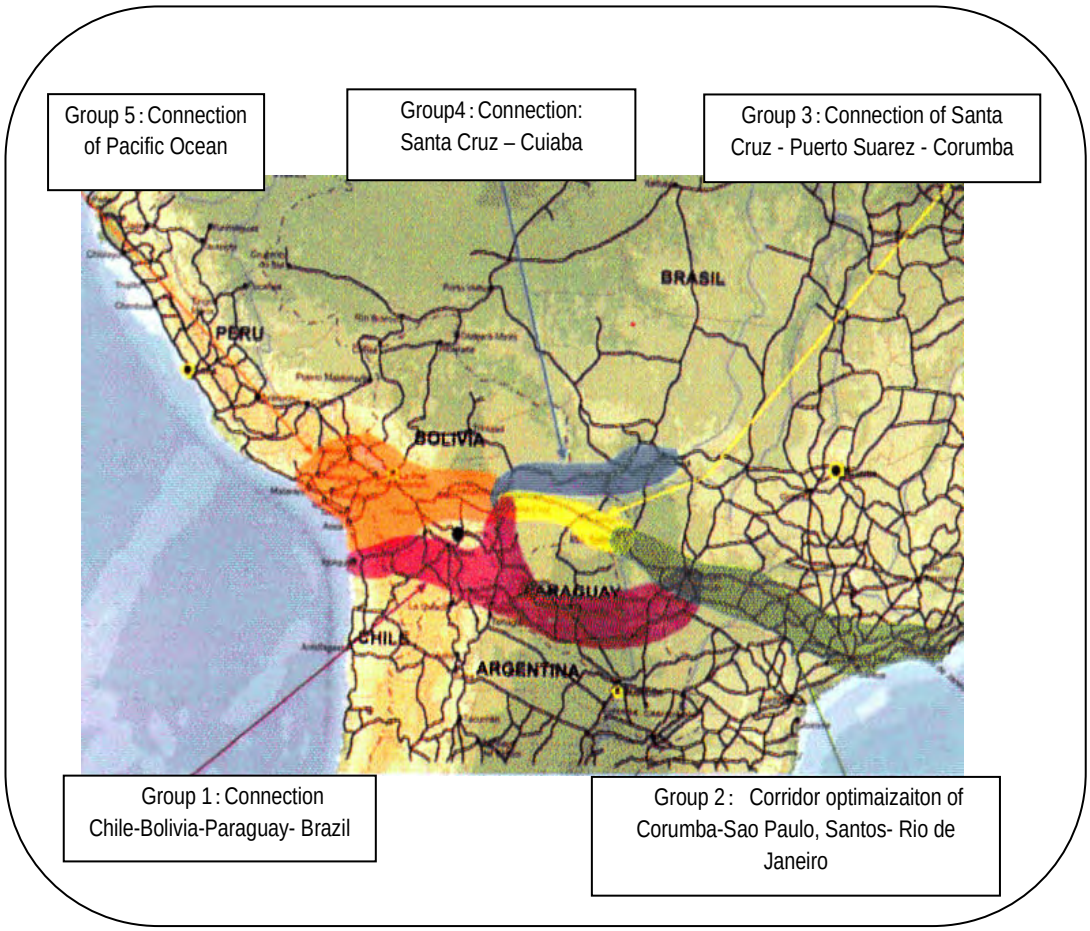
8 Construction of connection for Noyogá - Junction RN 14

9 Construction of international bridge Salto – Concordia

Source: IIRSA

### 8.4.2.2 Interocean Central Axis (Brazil, Paraguay)

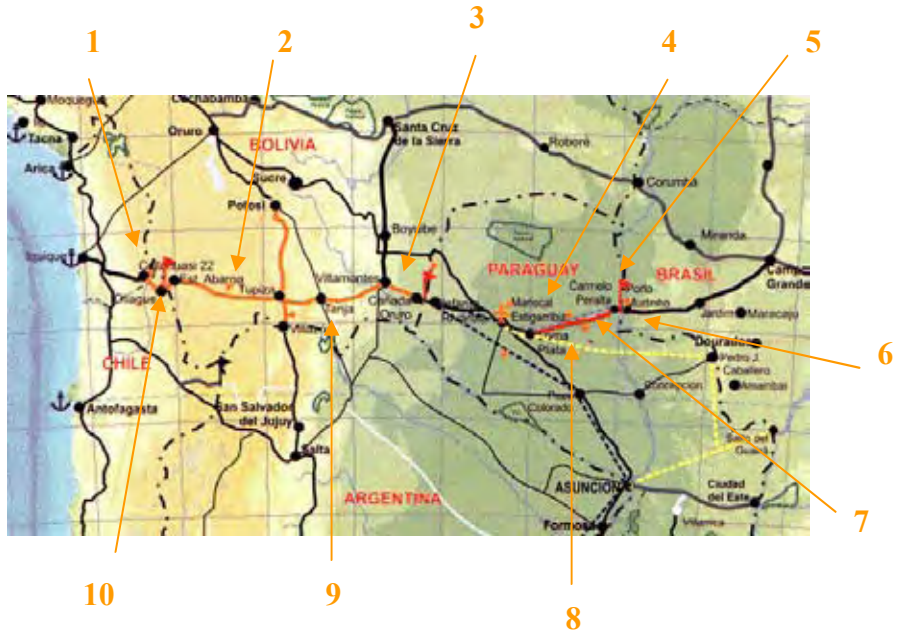
| Groups | | Countries |
|---|---|---|
| Group 1: | Conection of Chile-Bolivia-Paraguay-Brasil | Chile, Bolivia, Paraguay, Brazil |
| Group 2: | Corridor ptimization: Corumba-Sao Paulo, Santos- Rio de Janeiro | Brazil |
| Group 3: | Connection of Santa Cruz- Puerto Suarez-Corumba | Bolivia, Brazil |
| Group 4: | Conection Santa Cruz – Cuiaba | Bolivia, Brazil |
| Group 5: | Conections to Pacific Ocean: (*)<br>Illo/Matarani-Desaguadero- La Paz+Arica-La Paz+Iquique-Oruro-Cochabamba-Santa Cruz | Peru, Chile, Bolivia |




Source: IIRSA

*) The Group 5 of IIRSA is an area which is not directly related to this Study. So, it will be omitted in this Report.

### (1) Group 1: Connection Chile-Bolivia-Paraguay-Brazil




1) Road construction for Ollague-Collahuasi 22
2) Road construction for Cañada Oruro-Villamontes-Tarija-Estacion Abaroa
3) Border crossing way for Infante Rivarola – Cañada Oruro
4) Improvement of Mariscal Estigarribia Airport
5) Optical fiber connection, Porto Murtinho – Loma Plata
6) Border crossing for Carmelo Peralta-Porto Murtinho
7) Road paving for Carmelo Peralta – Loma Plata, y construccion puente Carmelo Peralta-Puerto Murtinho
8) Gas-electricity Project: Bolivia-Paraguay
9) Road paving for Potosi-Tupiza- Villazon
10) Border crossing way for Ollague- Estacion Abaroa

Source: IIRSA

### (2) Group 2: Corridor optimization Corumba-Sao Paulo, Santos- Rio de Janeiro


(1) Beltway of Corumba

(2) Railway surrounding infrastructure of Campo Grande

(3) Railway stretch recovery for Bauru- Santos (SP)

(4) Anchor project: Ring railway of San Pablo ( N-S)

(5) Seaport modernization: Puerto de Santos

(6) Beltway construction for Rio de Janeiro

(7) Road access way to Spetiba Port

(8) Ring road for seaport of Puerto de Santos

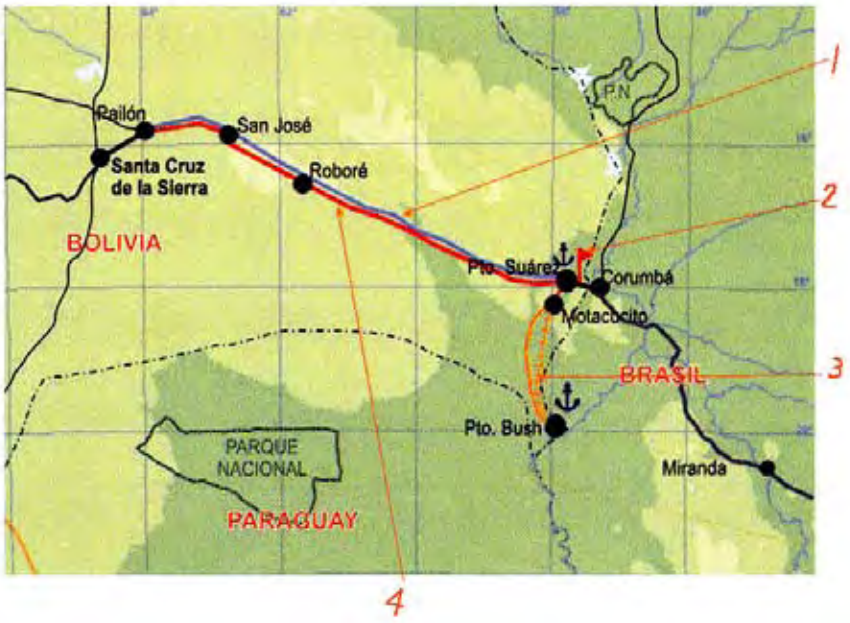
(9) Railway recovery for Corumba (MS)- Bauru (SP)

(10) Beltway for Campo Grande

(11) Railway recovery for Corumba- Campo Grande (ferrovia de Pantanal)

Source: IIRSA

### (3) Group 3: Connection of Santa Cruz- Puerto Suarez-Corumba




(1) Installation of optic fiber, along route Pailon – Puerto Suarez

(2) Border crossing way for Puerto Suarez- Corumba

(3) Concession of railway-roads Motacucito- Puerto Bush (incl.operation)

(4) Anchor Project: road construction Pailon- San Jose-Puerto Suarez

Source: IIRSA

### (4) Group 4: Connection of Santa Cruz – Cuiaba

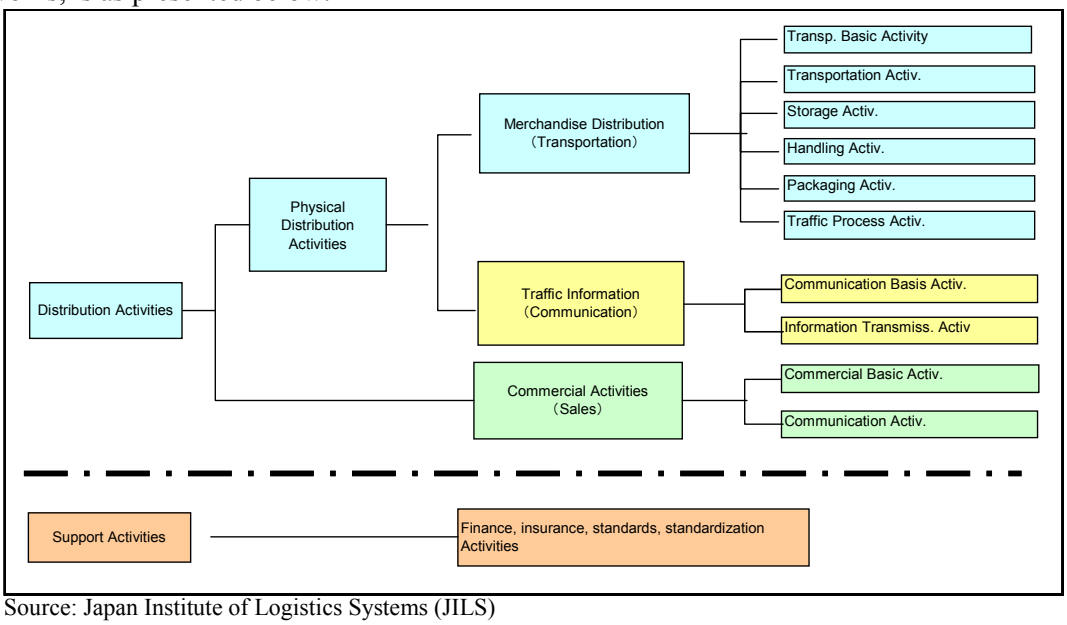

(1) Paving works between Banegs bridge - Okinawa
(2) Banegas bridge construction
(3) Anchor project: road construction San Matias - Concepcion
(4) Border crossing way for Port Limao – San Matias
(5) Road paving for Porto Limao – San Matias

Source: IIRSA

### 8.4.3 Improvement in Logistics (Physical Distribution)

#### 8.4.3.1 Logistics

In general, the logistics system or physical distribution, which includes the distribution networks, is as presented below.




Source: Japan Institute of Logistics Systems (JILS)

**Fig. 8.4.3-1 Logistics System**

It is named as physical distribution or logistics system to the series of activities performed during the transportation process of goods within a certain established time and distance, from the supplier to the demander. These activities include packaging, transportation, storage, handling, distribution, and the compilation of information that are required and generated to this purpose. When all these activities work systematically, it is possible to reduce the overall cost. Also, these can be further defined as provider, production, sales, recollection, among other types of logistics, based on the activities within a specific part of the process.

As it is shown in the Table 8.4.3-1, the activities that take place in the goods' distribution process, such as transportation, storage, handling and packaging were researched from the standpoint of the improvement of the transportation and packaging technology at hand through this JICA Study.

Regarding the reduction of costs, the following objects were performed.

**(1) Cost of the Packaging Material**

a. Shift to machines and standardized norms

b. Reuse of packaging materials

With respect to the standards, the indicated norms are those currently utilized in Argentina and Brazil. In regard to the reuse of a packaging material, the following is presented as a recommendation.

**(2) Reduction in Packaging Costs**

a. Substituting packaging materials

b. Revision of the machinery and packaging production line.

c. Revision of the packaged merchandise at the moment of delivery

Regarding the issues above, it was proposed to substitute the Styrofoam with corrugated cardboard, the improvement of the utilized surfaces of the Styrofoam and the packaging production line for electric home appliances for the study at hand for the JICA development. Similarly, for the products consisting of processed foods (dairy), improvements were performed for the lids of individual containers and the films for pouches.

**(3) Reduction in Distribution Costs**

a. Revision from the individual to the grouping packaged products

The primary focus was on the products that consisted of processed foods, to improve the loading arrangement in the corrugated cardboard boxes for those products packaged in pouches. The recommendation allows accommodating a larger number of pouches per box.

Regarding the improvement in methodology to prevent damaging of goods during handling, transport and storage, there were two aspects that were discussed, and further recommendations were developed for those managing each of the phases of distribution.

1. Signs regarding warnings during handling
2. Improvement of the stacking (load up) method

On the subject of components of distribution cost in respect to sales, the data for the case of Japan is presented below as a means of an example.

1) Based on statistics[1], the cost percentage of the distribution cost in comparison to the sales cost equals 5.26%. Further subcategorized by activity, there is a 5.26% in the manufacturing industry, 4.54% in the wholesale commerce, and 4.28% in retail commerce.

[1] Source: Japan Institute of Logistics Systems (JILS)

2) From the industries pertinent to the present study for the development of JICA

| | | |
|---|---|---|
| a. Electric artifacts for industrial and household uses: | | 2.45% |
| b. Foods: | At ambient temperature: | 7.96% |
| | Refrigerated: | 7.95% |

The break-down of the physical distribution costs by logistic arrangement is as follows:

| | |
|---|---|
| a. Transportation cost | 56.03% |
| b. Storage cost | 18.01% |
| c. Other | 25.96% |
| | 100.00% |

#### 8.4.3.2 Topics of analysis: An environment friendly logistics

Based on the project at hand for the JICA development, if a general revision is made to the "Actual Improvement and Near Future" from a logistic perspective, the obtained results would be those displayed in Table 8.4.3-1.

These are issues related to the improvement in logistics and cost reduction through the efficient flow of the physical distribution system, which includes the improvement of packaging technologies and transportation, which were mentioned in section 8.4.3.1.

## Table 8.4.3-1 Actual Improvement and Near Future for Logistics

| Classification | Aspects for Evaluation | | | Logistical Issues to be Revised with respect to the Natural Environment | Sample of Determining Data | Sample Determining Data related to the Natural Environment |
|---|---|---|---|---|---|---|
| Revision of the Packaging | 1) | Reducing the packaging materials. Thinning | Are the packaging being reduced or simplified enough to minimize the amount of wasted material? | Reduction of excessive packaging materials; are they slimming (simplification of the material)? | Volume of packaging material. | ●Product<br>The volume of emitted carbon dioxide can be calculated by multiplying the amount of energy consumed to process the wasted packaging material by their carbon monoxide emission coefficient. |
| | | | | Thinning of the packaging material, reduction in weight (use of lighter corrugated cardboard, etc.) | Reduction in the volume of packaging material. | |
| | | | | Reduction in weight of the packaging by replacing the shock-absorbent materials | Packaging material reduction index (compared to previous year) | |
| | | | | Reduction in the use of internal cardboard separators within each corrugated cardboard box | | |
| | | | | Avoid the packaging in small boxes, and prepare group packaging within large boxes. | | |
| | | | | Weight increase through the reduction of multi-layered material is avoided, utilizing part of the container itself as shock-absorbent material. | | |
| | | | | Simplification of the packaging (transport without packaging, only with label ticket), in accordance with the receiver of the merchandise (buyer) | | |
| | | | | Simplification of the packaging considering the method to discard the material by the consumer. | | |
| | | | | Transportation of merchandise without packaging, in the actual state in which these products will be used (transported in hanger hooks, and their recollection after delivery) | | |
| | | | | Reduce the use of cardboard pallets and one-time-use slide stoppers (disposable) | | |
| | 2) | Reuse and Recycling | Is the reuse and recycling of materials being implemented to reduce the amount of wasting material? | Implementation of the systematic reuse and recycling of cases and packaging for the entire transport branch (including sub-sectors) | Volume of packaging material. | |
| | | | | Introduction of two-way cases, going and returning (cases with common specifications within the company, other companies within the branches, or common for the diversity of that products) | Reduction in the volume of packaging material. | |
| | | | | Substitute the use of corrugated cardboard cases and shock-absorbing materials for one time uses, with those that are reusable; recollection of the used cases and boxes. | Packaging material reduction index (compared to previous year) | |
| | | | | Recollection and reutilization of the shock-absorbing materials. | Packaging material rotational (reuse) index. | |
| | | | | Use of materials for reusable storage. | Packaging material recycling index. | |
| | | | | Utilization of reusable pallets. | | |
| | | | | Utilization of recyclable pallets. | | |
| | | | | Utilization of recyclable packaging for storage. | | |
| | | | | Fabrication of filling material using the wasted corrugated cardboard boxes, recycling it for shock-absorbent uses and others. | | |
| | | | | Use of recyclable packaging materials. | | |
| | | | | Reduce the use of complex packaging materials (utilization of very simple elements to facilitate their recycling). | | |

| Classification | Aspects for Evaluation | | | Logistical Issues to be Revised with respect to the Natural Environment | Sample of Determining Data | Sample Determining Data related to the Natural Environment |
|---|---|---|---|---|---|---|
| | 3) | Use of Elements with Low Impacts to the Natural Environment | Is the nature of the packaging material's composition being considered to reduce their environmental impact at the time of disposal? | Reduction of the packaging through the use of corrugated cardboard boxes packaged with film. | Quantity of used and reduced packaging material (actual materials) | |
| | | | | Reduction of the use of corrugated cardboard boxes, packaging directly on the product's container with film. | Quantity of used and reduced packaging material previous materials) | |
| | | | | Change of the wooded packaging for large merchandize for polyethylene bags. | Packaging material reduction index (compared to previous year) | |
| | | | | Packaging the external box of merchandise, individually or grouped, with contractile film. | Quantity of used and reduced contaminant material | |
| | | | | Change of the shock-absorbent material, from plastic to paper, to reduce the impacts towards the natural environment. | | |
| | | | | Reduce the use of toxic materials harmful to the natural environment. | | |
| | | | | Change the packaging material from chlorine vinyl with polypropylene, polyethylene to avoid the emission of dioxides during their incineration. | | |
| | | | | Reduce the use of toxic materials harmful to the natural environment (for example, the use of paper adhesive tape to seal boxes.) | | |
| | | | | Use of plastic materials with organic decomposition properties. | | |
| | 4) | Incorporation of Machineries with Low Environmental Contamination | Are the machines being used of low contaminant emission to reduce their environmental impact during packaging? | Incorporation of packaging materials of low energy consumption. | Machinery units in use | •Entrance (gasoline, gas oil, gas, electricity, etc.) Calculate the total energy consumption for the transportation and distribution process. •Product (carbon dioxide, NOx, etc.) Calculate the total energy consumption for the transportation and distribution process. Calculate the emission of carbon dioxide, NOx, etc, by multiplying the consumption with the emission coefficient. |
| | | | | Incorporation of packaging machineries with low impacts to the natural environment (for example, incorporation of the labeler that does not produce toxic elements). | Number of reduced machineries in use | |
| | | | | Incorporation of environmentally friendly machineries such as packaging machines and fabricators of shock-absorbent materials | Machinery reduction index (compared to previous year) | |
| Revision of Routes and Delivery Dispatch | 1) | Revision of the Routes and Delivery Dispatch | Are the traveling plans and itineraries (delivery vehicle, times, routes, etc.) revised to reduce the use of fuel? | Daily revision of loading volumes and comparison with the distribution plan to select the appropriate sized vehicle. | Traveling distance | |
| | | | | Deliveries during night time and on holidays to avoid traffic congestions. | Reduced distance/ distance reduction index (compared to previous year) | |
| | | | | Selection of appropriate routes through simulations, in accordance with the delivery plan. | Number of trucks (units) | |
| | | | | Reduction of the traveling distance by dividing the delivery convoys between direct routes and intermediate locations, based on the | Reduction in truck units/ reduction index (compared to previous year) | |
| | | | | Reduction of the transport distance through the revision of the location of the recycling companies. | | |

| Classification | Aspects for Evaluation | | | Logistical Issues to be Revised with respect to the Natural Environment | Sample of Determining Data | Sample Determining Data related to the Natural Environment |
|---|---|---|---|---|---|---|
| | 2) | Increase of the Loading Coefficient | Is there sufficient effort towards increasing the loading efficiency and reduce the number of delivery vehicles? | Delivery convoys with consolidated mixed freight for low volume transactions. | Number of trucks (units) | |
| | | | | Improve the loading coefficient by rotating the delivery dispatches with mixed loadings for different commercial stores. | Reduction in truck units/ reduction index (compared to previous year) | |
| | | | | Recollection of the reusable material by the trucks returning to the distribution dispatch location. | Loading coefficient | |
| | | | | Use of two-way containers that are foldable (increases the efficiency for the recollection logistics) | Evolution of the loading coefficient (comparing to previous year) | |
| | | | | Systematic control of the vehicle delivery plan to prioritize the dispatch of larger sized vehicles. | | |
| | | | | Reduce the frequency of the delivery dispatches by increasing the size of the transport vehicles (trucks). | | |
| | 3) | Check-up and Maintenance | Are controls and maintenance regularly performed on the vehicles to improve their energy | Periodic maintenance and control prior to the dispatch of the vehicles to reduce the cost of fuel, lubricants and gas emissions. | Number of days in between control and maintenances; evolution of the fuel consumption | |
| | 4) | Driving with an Ecological Conscience | Is the way the vehicles are driven paid attention to, with the purpose of reducing the unnecessary use of fuel? | The vehicles are driven with an ecological conscience (avoiding peeling out and aggressive acceleration), with aims to rationalizing the energy and reducing the emission of toxic gases. | Ecologic driving. Number of days and peop | |
| | | | | Avoiding the unnecessary idle running of the engine (turn off the engine when it is not necessary) | Eliminate the unnecessary idling of the motor engine. Number of days and | |
| | 5) | Incorporation of Low Contaminant Emission Vehicles | Are low contaminant emission vehicles used, with the purpose of reducing the emission of gasses for loading unit? | Incorporation of vehicles with low gas emission, or those running on clean energy (ecologic) | Number of low emission vehicles; incorporated units and the corresponding incorporation index (in comparison to the previous year.) | |
| | | | | Installing devices to reduce the gases, such as DPF (diesel particles filter?) | Reduction in the number of diesel units; reduction index (compared to the previous year) | |

| Classification | Aspects for Evaluation | | | Logistical Issues to be Revised with respect to the Natural Environment | Sample of Determining Data | Sample Determining Data related to the Natural Environment |
|---|---|---|---|---|---|---|
| Revision of the Handling, Storing and Distributing Processes | 1) | Incorporation of Machineries and Tools; their Efficient Use | Are there improvements in place regarding functionality and incorporation of machinery tools, to reduce the emission of toxic gases and wastes in each logistic activity? | Reduce the units of forklift trucks. | Incorporation of low energy consumption machines. | |
| | | | | Regular maintenance of the machinery | Number of newly incorporated low energy consumption machines. | |
| | | | | Incorporation of machineries for storing, handling, processing of the distribution, all with low impacts on the natural environment. (for example, labelers that do not use toxic materials) | Number of incorporated low energy consumption machines. | |
| | | | | Incorporation of machines with low energy consumption. | | |
| | | | | Incorporation of machines with low environmental pollutant emissions. | | |
| | 2) | Maintenance of the Facilities; their Efficient Use | Are there improvements in place regarding the functionality and maintenance of the facility, to increase energy efficiency in each of the logistic activities? | There are waiting rooms available for the drivers, to avoid the idle running of the engines during waits in the summer, winter and for nighttime dispatches and deliveries. | Number of incorporated low energy consumption machines. | |
| | | | | Use of post pallets to reduce the energy consumption for the lighting (improves the storing efficiency) | Number of newly incorporated low energy consumption machines. | |
| | | | | Autoimmunization of the reception and delivery dispatch jobs. | Number of incorporated low energy consumption machines. | |
| | | | | Use of tools of low energy consumption, such as those with inverse | | |
| | | | | Defining the handling processes with human intervention and those with machinery. | | |
| | | | | Control of the placing of the merchandize to be stored, appropriate signaling for the storage. | | |
| | | | | Use of the Freon substitute for the cooled and refrigerated trucks. | | |
| | 3) | Normalizing the Volumes | Are the distribution volumes normalized to prevent the high and low extremes in the handling and storing activities? | The volume fluctuation between receptions and dispatches is avoided, | Number of days in stock | |
| | | | | Establishing the storing volume. | Reduction in the number of days in stock / Reduction coefficient (compared to the previous year) | |
| | | | | Increase the handling efficiency by leveling the volume and reducing the number of merchandise handling machineries units. | | |
| | 4) | Reduction in the Resources | Are there efforts to reduce the use of resources involved throughout the logistic process, with the purpose of reducing wastes? | The information for the transport is printed directly on the packaging. | Number of used labels<br>Reduction in labels/ reduction coefficient (compared to the previous year)<br>Use material volume<br>Reduced material volume<br>Reduction coefficient for material volumes (compared to the previous year) | •Product<br>The volume of emitted carbon dioxide can be calculated by multiplying the amount of energy consumed to process the wasted packaging material by their carbon monoxide emission coefficient. |
| | | | | Use of transport labels (STAR labels), to reduce the number of labels. | | |
| | | | | System and methods for storing to avoid the unnecessary use of materials during storage. | | |

Source: Japan Institute of Logistics Systems

# Chapter 9 Improvements Proposal to Reduce the Rate of Damages

# Chapter 9 Improvements Proposal to Reduce the Rate of Damages

## 9.1 Improvement in the Design of Primary Packaging for Food Products

As one of the purposes of food packaging is to protect its content, the product must arrive in good condition and perfectly packed to the hands of the consumer after transport / distribution. One of the purposes of this Study is to reduce the number of damages during transportation. A series of alternatives referred to handling, storage and transportation improvement are proposed. Some recommendations are also made as to design improvements of primary packaging of dairy products.

### (1) Milk Pouches

The advantages of milk pouches are: minimum quantity of material, low cost, low accumulation of waste after consumption. However, the main point is the hot sealing, through which leaks occur. Leaking is a fatal defect. In case of packaging of confectionery products commercialized in South America for example, “side joint sealing” is used, where the seal bands are broad enough to make it resistant. Instead, in the case of pouches, problems must be specifically analyzed and improvements be proposed, since there are design compromise solutions in this type of packaging.

The most common pouch sealing method is “pillow type joint” (as compared to the “side joint sealing” method). This type of sealing is made by applying heat on one side to obtain fusion with the second film, for which reason at this point the sealing can be quite weak.

The “side joint sealing” is highly resistant because the heat is applied on both sides of the joining point. If shifting from the “pillow type joint” sealing to the “side joint” sealing is considered, there would be no problems since there would be no changes in the size of the pouch.

Sealing of the upper and lower part of the pouch is made by “fusion and cut”, and since it is very narrow, it is easy to tear. Sealing design should have a minimum width of 5mm. The sum of the width of the upper and lower part of the sealing should amount to 10mm. As a result, if height of the currently used pouch is approximately 230mm, it should change to 240mm, and the material consumption will increase by almost 5%. Considering that the cost of the material is of USD 4 cents, according to the sector, costs would be increased up to USD 0.2 cents per unit. Nevertheless, since shifting to a material with a higher L-LDPE percentage brings about a higher resistance, it is possible to reduce thickness by 5%, completely offsetting the increased sealing cost.

In order to face all these changes in the sealing method, change in the existing production equipment should be considered. Besides, it is necessary to bear in mind all these considerations when equipment is replaced by new ones at the plant. Even in those cases when the machinery updating cannot be done immediately, by improving the quality control on the production line, outstanding improvements can be attained, reducing leaking defects. This has been motivated by the fact that, as a result of milk pouches resistance evaluation tests carried out in Argentina, Paraguay and Uruguay, it could be observed that some brands' pouches were of excellent quality without leaking at sealing and body, even using "pillow type" joint sealing method. On the other hand, it should be mentioned that some brands had leaks, even though "side joint sealing" was used.

**(2) Aluminum foil for packaging**

Aluminum foil has excellent gas and sunlight barrier properties, therefore, it is highly recommended to manufacturing flexible materials for packaging. However, it has certain weaknesses: it is easy to tear, and subject to pin holes by punching or by folding. As a result, it is generally laminated with a plastic film. For example, it is usually applied together with a polyethylene film, PVC, PET in laminated form, for medical or food products.

In the case of chocolate bars and cigarettes, aluminum is used in separate wraps, but at the same time they are placed in other carton or paper containers for protection.

In South America, the aluminum foil is used as a lid for yogurt and milk jam pots, and tear and leaking at arrival to the consumer are usual. From the point of view of the packaging design and product protection, this is a very serious problem. Therefore, it is very important to study the subject and redesign the pots, replacing the aluminum foil by a laminated plastic material to compensate that weakness.

## 9.2 Improvements in the Storage and Handling of Cargoes

### 9.2.1 Food Products (dairy, olives, and other products)

(1) Company A and B use PE pouches and plastic crates. As to materials, some cases of damaged crates and protuberances or sharp parts remaining from manufacturing could be observed on the internal parts of the crates. Due to such defects, tearing or pin holes could occur during transportation due to vibration.

On the other hand, in the case of the Company A, several wood pallets were damaged or had bulging nails, resulting in damages to Kraft paper bags and spillage.

To implement improvements to reduce damage in the storage and transportation of products, the quality of the elements used, such as pallets, crates, etc. should be strictly controlled.

(2) Both in Company A and B, during palletization of cargo many cases of deformation of boxes could be observed. Besides, boxes were also damaged due to their being inadequately placed in the pallet, protruding from it. A comprehensive analysis of the size of the boxes with respect to the product should be carried out as well as a verification of the resistance of boxes, the loading and palletization methods, etc. performing a comprehensive study to reduce damages.

(3) In the case of Company B, it could be observed that due to the low cost of labor, loading and unloading tasks are mostly made manually.

Should labor costs increase in the future, the loading and unloading method should be modified and fork-lift should be used, so as to have a uniform and safe working method and prevent impacts due to dropping, with the consequences they may have.

### 9.2.2 Household appliances (white goods)

To ensure the quality of a product that is commercialized through a distribution network, without a quality control is inadmissible. Besides, the manufacturer is responsible for the final quality of the product that should have security controls in place in respect of the handling and storage of products.

The following table describes the aspects related to the equipment and improvements to be implemented in the packaging design control system, in respect of the target products used in this Study.

| | |
|---|---|
| (1) Standard handling survey: | Setting of the weight of the cargo and number of employees for loading/unloading |
| (2) Packing standard for loading / unloading and product storage: | Place slots to grab the upper, lower and inferior sides of boxes |
| (3) Safety controls in loading / unloading of products from the top of the truck: | Safety is essential. Safety controls of auxiliary and packaging equipment. |
| (4) Verification of the safety level in pile up storage: | Take the necessary steps to prevent deformation of boxes in the long term, considering the location of the center of gravity (in Argentina specially, improvements were developed focused on this aspect). |

## 9.3 Transportation Improvements

### 9.3.1 Food Products (dairy, olives, and others)

(1) In the case of Company B, transportation of yogurt pots is made by piling up 2 layers inside crates, one in a normal position and the other one upside down with the lids facing each other. By applying this method, due to the friction between the aluminum lids, there appear pin holes, spilling the product in the upper layer pots, affecting the other containers around. Both lids should be placed in normal position, using a separator, to reduce damages.

(2) In the case of Company C, for the transportation of pots of dulce de leche to Chile, 2 layers of pots are placed upside down in carton boxes. When performing the lab vibration tests, the lids of upper layer of upside down pots suffer from friction, and as a result the printing on the cap loses quality. Besides, it has been observed that the aluminum lid have pin holes that cause leaks due to fatigue.

Nevertheless, the transportation survey crossing the Andes had to be temporarily suspended due to the effects of increase of customs tariffs. If exports are resumed, the same problem will be arisen.

To reduce leaks, a separator should be placed between lids. Besides, as to the pin holes in the material, it could be confirmed that by replacing the aluminum foil for a laminated plastic material, the problem can be solved, therefore this type of material should be used to manufacture the lids.

### 9.3.2 Household Appliances (white goods)

From the point of view of transportation improvement, the packaging system should be analyzed by considering that products are distributed by land or water in containers. As to the target product (white goods household appliances) used in this JICA Study, since transportation was restricted to land (for export), the required packaging quality surveys were carried out taking into account this fact, and the applicable specifications were prepared.

Clause 4.5 of this report describes the results of surveys carried out directly by this Study team on products that arrived at the final warehouse.

As a result of said surveys, the following improvements are proposed:

| | |
|---|---|
| (1) Shipment from plant: | Improvement of QC of the product to be shipped (Several defects were observed in the cover of the shrink type film) |
| (2) Problems when loading the trucks: | Verification of loading equipment used and their operation |

| | |
|---|---|
| | (Packaging defects were found, especially in the units loaded horizontally on top. Possibly due to loading procedures) |
| (3) Common subjects applicable to water transport: | Standardization of the transportation module |

## 9.4 Transportation Insurance

It could be confirmed that all nine visited cooperating companies have taken out insurance on the goods at the time of dispatch from the factory. Thus, economic losses arising from any eventual damage during transportation are avoided.

Regarding the cost of the insurance policy, it will obviously depend in each case on the terms and conditions of the agreement signed with the client. In the case of the manufacturers of white goods, since most sales are agreed to be transferred to the client "at factory", the buyer or the carrier company to which the goods are transferred shall be responsible for taking out insurance. In the case of foodstuff manufacturers, the insurance shall be the responsibility of the manufacturer, since in most cases, transportation is done by the same manufacturing company.

However, there is a case of a foodstuff manufacturer where transportation is entrusted to a third party company, but the insurance is taken out by the manufacturing company, or in other cases by the buyer, so, in any cases the carrier is not held responsible for the damages during the transportation.

As consequence of this situation, commentaries stating that the handling of goods are becoming more hard, without care.

## 9.5 Interesting Aspects in the Regional Transportation for involved Sectors

### 9.5.1 Household Appliances (white goods)

The target product in this Study carried out by JICA for cases in Argentina and Brazil are white goods home appliances. Among them, the refrigerator has been chosen as a specific product for this Study.

One company from Argentina and two companies from Brazil collaborated in this Study. The transportation environment survey in the main routes for the selected products started with the close cooperation among the members of the mission, the counterpart institutions, and the cooperating companies. As the ground transportation of the selected products uses extremely long routes in a vast territory, with great climate variations, modern sensors devices were used,

allowing the simultaneous measurement of temperature, humidity, vibrations and impacts. This Study has built up high expectations concerning the reduction of damages in the products in a short term. Data were collected and analyzed geographically on the route chosen for the Study, by means of the data-crossing of the measurement sensors with a GPS positioning system. It is pertinent to say that this achievement was possible to a great extent, not only because of the interest in the Study, but thanks to the cooperation of the household-electric appliances manufacturers and the transportation companies.

This Transportation Environment Survey carried out by JICA would not have been possible without the cooperation of the carriers with whom a fluid and close communication was established concerning the coordination with the measuring instruments, as well as the characteristics of the cargoes and the trucks. Particularly it is worth mentioning the truck-drivers, without whose inestimable cooperation the data collection would not have been possible.

The products selected for this Study were loaded on trucks in the factories, and then transported and unloaded in the distribution centers, where they were stored in the warehouses. In this integral sequence of transport-distribution of the goods, the measurement of impacts during cargo handling was of great importance. It is through this analysis of the integral process that these studies carried out by JICA arouse the interest of the involved sectors.

After analyzing the data collected in the Transportation Environment Surveys, laboratory tests were made iteratively on the basis of this information, so that a design of a packaging adapted to the studied routes could be developed. Concerning the preparation of the test samples, the cooperation offered by the suppliers of packaging material has been indispensable.

In this study of JICA, in the case of Brazil, a new packaging for a product was prepared using 100% cardboard, based on a design of an improved packaging, with the cooperation of a factory of packaging material.

In Argentina, the improved packaging for testing has been prepared practically with the intervention of the personnel of the counterpart (INTI) and the support of the members of the mission, using available materials in the local market, and modeled manually by the same personnel.

Through this JICA Study, it was possible to hold the personnel training program and carry out the technology transfer through theoretical and practical courses on topics such as measurements in the transportation environment, taking into account the relevance of the packaging technology for transportation and distribution. This Study, despite the fact that it has been carried out in a limited context of time, products, transportation routes and involved industrial sectors, it has succeeded in catching the interest of the manufacturing industry and the transportation sector, as well as the packaging material sector. The overhauling aspects are the

control of the process in: a) factory, b) exit and entrance of cargoes, c) transportation, d) storage and distribution to the consumer sector.

However, for the manufacturing sector, sudden implementation of improvements in the packaging processes would imply a great financial burden. Therefore, the implementation of improvements in the design, with the consequent modifications in the production lines, etc., shall require a certain time for fulfillment. But on the other hand, the advisory services offered to the manufacturing plants, the carriers and the suppliers of packaging material have been effective, particularly if the implementation of systematic improvements applicable in a near future is considered.

### 9.5.2 Processed Food Products (mainly dairy products)

Household electric appliances and processed food products were chosen as the target of this JICA Study. In the case of Brazil, only household electric appliances were taken as a target.

In Argentina, Paraguay and Uruguay, dairy products were chosen due to their relevance in the productive matrix in these three countries. On the other hand, in Argentina, products derived from olive and vegetable oil were added because of the great interest of the cooperating companies which supported this Study.

In the first stage of the project, with the first set of measurement devices arrived in Argentina, a first demonstration test of the Study of the Transportation Environment was carried out simultaneously with the application of the GPS. Tests with products derived from olive were carried out, in a section of 1200 km between Aimogasta (Province of La Rioja) and Buenos Aires. On the other hand, in order to carry out measurements for the handling of cargoes, a "dummy" cargo olive product box was designed and prepared. The object of this study was the improvement and technological development of secondary packaging.

Next, after holding a technical training course about the operation of the devices, the transportation environment survey with previously selected dairy products was carried out in Argentina, Uruguay and Paraguay. For the purpose of carrying out simultaneously the measurement of impacts during the handling of the cargoes, a "dummy" cargo of a dairy product for each country were designed and prepared, and placed together in the cargoes to be transported. Then, distribution studies were carried out with different types of dairy product cargoes in small trucks in cities and their surrounding areas, taking into consideration the damages during the handling of the cargo in the distribution process. Moreover, temperature control was performed on the refrigerated trucks, where the deterioration of the quality of the products due to the increase in the room temperature during the summer is unavoidable. In the light of the results of this Study, the authorities at management level of the cooperating

companies showed a high interested in promoting policies aiming at the improvement of the control of the distribution of their products.

On the other hand, as the Development Study of JICA moved forward, the interest of the manufacturers on specific damages caused a change in the approach of the studies. The focus which was first put on secondary packaging but later shifted onto primary packaging (individual packaging). More specifically, the studies aimed at improvements in the packages, the lids of packages, the filling process and the materials of the packages.

On the basis of the analysis of the packaging material available in the local market and the technology of Japan, the mission members studied the possibility of developing improvements in the design for each of the three mentioned countries separately. In the case of the individual package, a specific case of damages in packages was studied, then an analysis of the probable origin of the damages was carried out, and taking into account this hypothesis, a series of laboratory tests was planned and carried out iteratively. Once the origin of the damages was determined with precision, a series of improvements, such as modifications in the design of the package, changes in the material of the package, changes in the process of the production line were proposed. As a result of all these studies, technical recommendations regarding improvements in the packages (sachets) of milk, yoghurts, “dulce de leche (milk jam)” and some other products could be given. The accomplishment of the improvements in the design of packages drew the interest of the executives of the cooperating companies concerning the concrete possibility to reduce damages in the products.

On the other hand, we consider that we have succeeded in drawing the interest of the suppliers of packaging material regarding the contribution that could be made in technological improvements, incorporation of technology and in addition, the increase of companies’ awareness of the need to offer a better product to the final consumers.

## 9.6 Type of Transportation (shipments by ground, water, and air)

According to the information received from sources such as truck drivers data, reports from IIRSA (South America Regional Integration Initiative) Group, investigations sponsored by the BID (IDB) and the CEPAL (ECLAC), most of the goods trade within the four countries of the MERCOSUR flows by ground, using trucks.

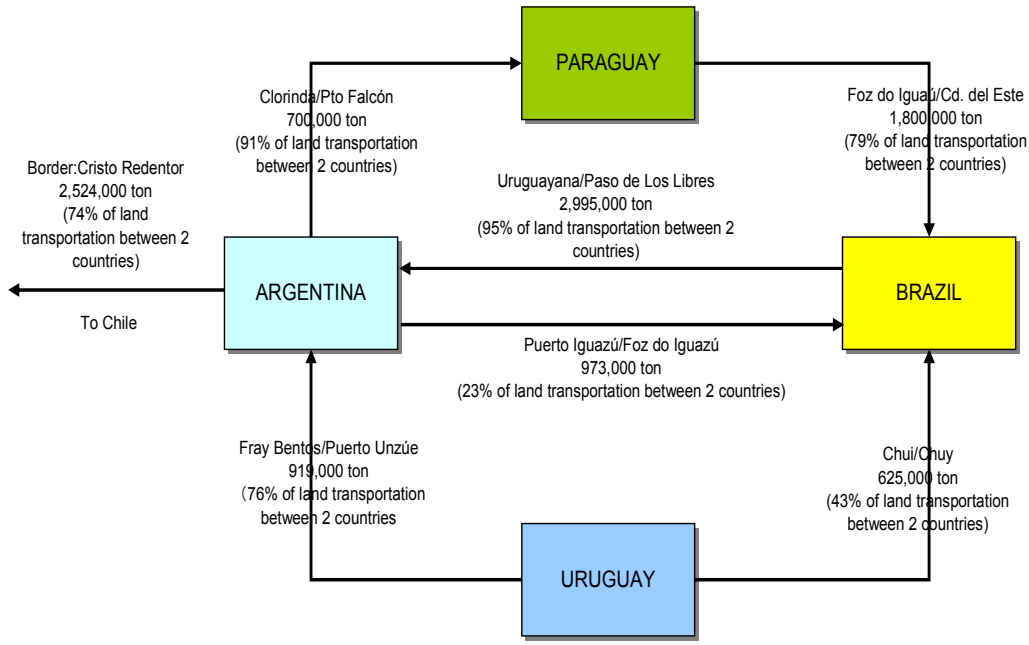
**Table 9.6-1 Distribution of Ground Transportation in the Four MERCOSUR Countries**

| Country | Transportation by land using trucks | Remarks |
|---|---|---|
| ARGENTINA | 80% | Cereals like wheat is transported through rivers |
| BRAZIL | 67% | Cereals are transported 28% by train and 5% through rivers |
| PARAGUAY | 89% | The import-export trade of goods are made 90% by ground and the remaining 10% is made through rivers |
| URUGUAY | 76% | Wood transportation from the forestall area is made by train |

Source: JICA Study Team

The present Study carried out by JICA is based on products for import-export trade that are transported by land (trucks). Currently, the transportation for shipments from the North zone (continental part) into the South zone (port coastal zone) of the MERCOSUR region is by train and through rivers. Another observation that surfaced through this Study is that the goods move from the east to the west. Also, the import-export trade from and to countries limiting with the MERCOSUR is made, in most cases by land using trucks.

This observation can be proved particularly with the transportation of products selected by this Study (electric household appliances and processed food –dairy products). Despite there is no current data available, the following graphic can show a comparison between the quantity (in tons) of goods that passed through the border of the four MERCOSUR countries by land and the ones that passed the borders between two countries.




Source: JICA Study Team

**Fig. 9.6-1 Percentage of Ground Transportation between the Four Countries of the MERCOSUR Region**

In the MERCOSUR region, the influence of transportation insurance costs has probably a relatively high impact as a component of the final price for commercialized products. With a view to a reduction of these costs, in the case of routine transportation through a same route and in identical transportation conditions, a detailed study of the routes, the distributed and handled ways of goods, the characteristics of the vehicles, the way of driving, etc., will give a "security index", that is, a quantitative parameter applicable to the transportation and distribution processes.

For that reason, it can be said that this Study of Packaging Technology for the Distribution of Merchandise Distribution in MERCOSUR has opened a field where the access to these technologies is possible, especially for the companies, so as to assure the integrity of the products of each manufacturer until their final destination, the consumer, assuring the integrity the product.

Therefore, in addition from providing for the security of the product, a reduction of insurance costs will finally represent a contribution to cost reduction and consequently. It will also result in a greater competitiveness.

# Chapter 10 Results and General Recommendation

# Chapter 10 Results and General Recommendation

## 10.1 Analysis and Detailed Review of the Work Schedule for the Study, including the Exchange of Information on the Progress of the Monitoring Survey Performed with the Counterpart Institutes

During the initial stage of this Study, the document entitled: "Inception Report" was prepared. Said report describes the activities based on the following work-meetings and consultancy methodologies:

(1) Joint Meetings of the 4 countries: every 6 months
(2) Rotary Technical Guidance (TG) Courses in the 4 countries
(3) Workshops (WS)
(4) Information Seminars of the Study results: upon completion of the project in the 4 countries

The Study has been carried out based on the work schedule prepared for each stage in respect of the mentioned basic items and agreed upon between the JICA Study Team and each of the counterpart institutes.

### 10.1.1 Results of the joint meetings of the 4 countries

The joint meetings of the 4 countries are held in each of the 4 countries every six months pursuant to the following schedule:

**(1) First Joint Meeting of the 4 Member Countries**

Date: March 10, 2005 – INTI Buenos Aires – Argentina
Main Issue: Approval of the Inception Report
Confirmation of the existing lab equipment and schedules
Workshop (WS) (Implementation of the Transportation Environment Survey Demonstration Test)
Participants: 3 member countries (the C/P from Paraguay was absent), the JICA Study Team, and other participants.

*Results*

The main purpose of this first joint meeting of the 4 countries was the approval of the Inception Report (IC/R), which is essential for the progress of the survey to be carried out with the INTI – Argentina as counterpart coordinator of this Study. Besides, since the Study had begun in November 2004, discussions about the tasks carried out at the beginning were intensified. Before the meeting, the main dispute between the parties was the significantly

different opinions of the Study Team and the Counterpart, which were discussed throughout the meeting. In fact, the problem was that the counterpart considered that the Study Team's "ample" scope survey to be carried out under the leadership of the C/P Counterpart was going to be carried out under the leadership of the Study-Team as regards costs. In such regard, several measures were taken, especially in respect of the "Transportation Environment Survey" scheduled for the second operational year.

**(2) Second Joint Meeting of the 4 Countries**

Date: February 16, 2006. Place: CETEA – Campinas, Brazil

Main Issue: Approval of the Progress Report (PR/R)
WS (3 Day long) - Presentation of the Results of the Transportation Environment Survey in each country and performance of vibration tests on targeted products at CETEA's Laboratory

Participants: C/P from 4 countries, JICA Study Team, Cooperating companies, and other participants

Note: The 2nd joint Meeting was carried out 1 year after the first one because the 28-day joint technical training course for the 4 countries was carried out in Asuncion – Paraguay as from August 22, 2005 with the participation of two counterparts from in each country. This training course was considered urgent, and referred to the technical operation of the 2 measuring devices supplied to perform the transportation environment survey.

*Results*

By the end of the second year of activity, especially related to the Transportation Environment Survey being analyzed, and with 2 to 3 participants from each country, presentations were made by each country. Vibration tests evidencing the effective progress of the project were carried out three days before in the WS. In addition, CETEA –Brazil worked together with the cooperating countries, leading to better results. In this 2nd Joint Meeting of the 4 countries, basic guidelines for the evaluation of packaging tests were agreed upon with a view the 3rd year of "Packaging Design" activities. Issues related to the classification of the database (DB) were also discussed.

**(3) Third Joint Meeting of the 4 Countries**

Date: June 20, 2006. Place: LATU- Montevideo, Uruguay

Main Issue: Approval of the Interim Report (IT/R)

- Checking of the "Reference Guidelines for Packaging Tests"
- Cargo preparation based on the new packaging design (improved design)
- Lab tests
- Checking of the Model Project plan

*Results:*

The order of business discussed in this 3rd Joint Meeting of the 4 countries included the analysis of the data collected in the Transport Environment Survey, the setting of packaging tests evaluation parameters and the beginning of the packaging design stage of the survey, ending with an interesting unification of criteria between the C/Ps and the JICA Study Team. In addition, the IT/R, which sets the basis for the Final Report, was approved.

Regarding the setting of packaging tests evaluation parameters, there was confusion among the C/Ps of the 4 countries due to unclear technical instructions in respect of the processing of the results obtained from the analysis of the data collected in the Transportation Environment Survey; particularly during the computerized processing of the data obtained from the SAVER sensors.

**(4) Fourth Joint Meeting of the 4 Countries**

January 18, 2007 – Place: INTI – Buenos Aires, Argentina

*Main topics:*

- General briefing and final comments about this JICA Study
- Discussions about the Draft Final Report of the Study (DF/R) – Approval and comments
- Final confirmation on Program of the Public Seminar of the Results of the Study, explanation about panels to be shown

Attendance: The Counterpart institutes of the 4 countries, members of JICA Study Team, JICA Argentina representatives, and other representatives.

*Results:*

1) The position of each of the 4 member countries of MERCOSUR, related to the supports given to this Study during a period of 2 years and 5 months, items of concern and awareness about the sensitive items.
2) Details and comments about the Draft Final Report (DF/R). Confirmation of comments to be stated and future prospective of the results obtained in the Study.
3) Details to be considered for the preparation of the Public Seminar of Results of the Study, by the counterpart institutes and by the JICA Study Team.
4) Awareness of importance of data collection and continuous maintenance for improvement of packaging technology in each country was obtained.

### 10.1.2 Results of the rotary technical guidance courses in the 4 countries

The following stages were defined within the general scope of the study aiming at improving the technical level and the development of skills of the staff from the four countries:

(1) First year: First field survey carried out as follows: (Part 1), and then (Part 2).

(2) Second year: Second field survey performed as follows: (Part 1), then (Part 2) and then Third field survey.
(3) Third year: Fourth field survey, Fifth field survey, Sixth field survey planning, completion of the 4th field survey.

In the meantime, expert groups of the Study Team visited the 4 countries in a "Rotary cooperation program at regional level" to provide technical guidance (TG) and training courses. These activities were focused on the relevant tasks scheduled in the Work Flow Diagram and carried out at the JICA headquarters separately from the Study. All this aiming at improving the staff's technical skills through workshops (WS) related to the 3 Technical Guidance courses (TG) delivered in Japan. However, there were some difficulties with the Transportation Environment Survey due to the significant differences in the size of the 4 countries that generated further differences between the cargo supplied by the cooperating companies, the selected route and the schedule of the survey. Further, there were also problems in the selection of the products for export because of customs delays at the border that prevented the expeditious completion of the survey. Ten Technical Guidance Rotary Courses (TG) were scheduled to be delivered in the first 3 years, but only nine had been completed by the fourth operative year.

The mentioned courses were delivered as described below:

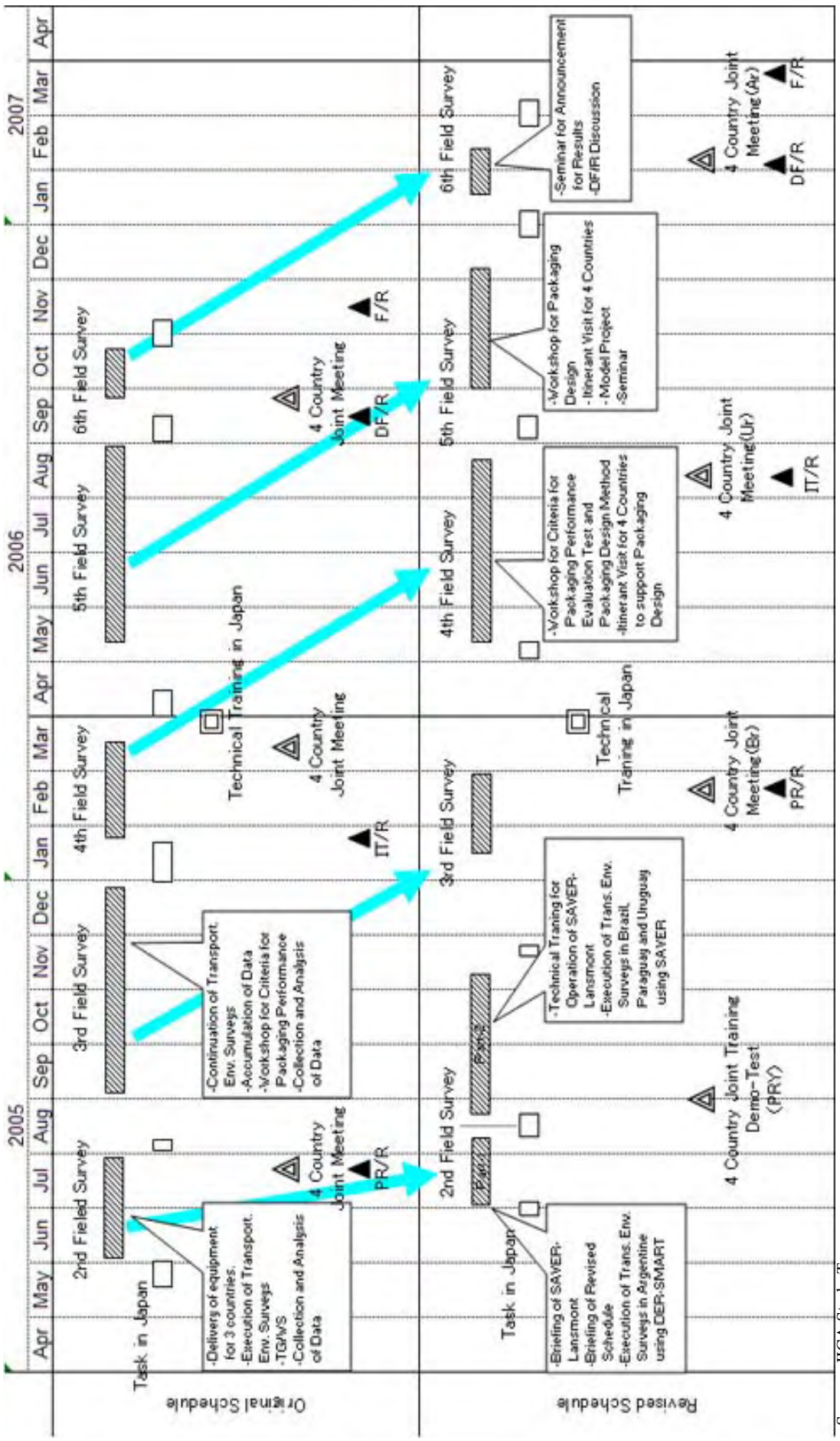
**(1) TG (1): First field survey in the first year (Part 1), November to December 2004.**

For this TG, the members of the JICA Study Team were divided into two Groups, I and II. Group I mainly held meetings with the C/Ps in each country where the most difficult issues and the Inception Report (IC/R) were considered, whereas Group II verified the basic features of the cooperating companies, and the equipment available in each country. The obtained results were analyzed in detail. As regards the First field survey (Part 2, from February to March 2005), the Transportation Environment Survey was carried out as a demonstration test. To such end, DER-SMART measuring equipment was used together with a GPS within the dummy cargo along the selected route in Argentina, (a 2,400 km round trip between Buenos Aires – Aimogasta, transporting olive by-products (packed olives) supplied by NUCETE, one of the cooperating companies). The obtained data was analyzed together with the C/P and the results were discussed in the 4 countries. Then, the C/P received technical training. It should be mentioned that the INTI played a key role in the analysis of the data as Argentine coordinator.

**Changes in the Work schedule after the Second field survey**

At the beginning of the second year of the Study, the sensors supplied to perform the transportation environment survey were different from those previously sent to Argentina, so important changes had to be made in the Work Schedule.

Said changes are described in the following Figure 10.1.2-1.




Source: JICA Study Team

**Fig. 10.1.2-1 Work Schedule, Original and Amended for the 2nd and 3rd year of the Study**

These changes in the schedule generated the need to coordinate the operation and technical adjustment of the different sensors.

**(2) TG (0): Second field survey (Part 1), Second Year, July –August 2005**

In order to modify the Work Schedule, a technical description of the SAVER 3X90 sensors and of the calibration of the DER-SMART/SAVER3X90 equipment was planned so as to adjust the transportation environment survey using different sensors and carry it out using DER-SMART sensors along selected routes in Argentina pursuant to the amended schedule. To this end, the members of the JICA Study Team were divided into two groups, in order to deliver a theoretical course on the SAVER 3X90 sensors and the adjustment of the Transportation Environment Survey using different sensors. Said course was delivered in the 4 countries as an additional Rotary Technical Guidance Course TG (0).

**(3) TG (1): Brazil, September - October 2005**

**Joint Technical Guidance Course of the 4 Countries in Paraguay (August 22 – 29, 2005)**

This course dealt with the theory, operation and demonstration of the application of the SAVER 3X90 sensors in the Transportation Environment Survey, and provided training on the analysis of the collected data.

After the completion of this course in Paraguay, the equipment was distributed to the respective C/P. Brazil, as well as the members of the Study Team and the C/P, received DER-SMART and SAVER 3X90 sensors. Then, the Transportation Environment Survey was performed in Brazil with the participation of MULTIBRAS and BSH. The survey covered a one-way distance of 3000 km and the knowledge acquired in the technical guidance courses on the analysis of vibration and impact data using the OJT method were applied, supervised by the JICA Study Team.

**(4) TG (2): Paraguay, end of September to Beginning of October, 2006**

The first Transportation Environment Survey was performed along the 3 selected routes using SAVER 3X90 sensors. A survey on the handling of cargo (dairy products) during transportation in Asuncion and the Greater Asuncion area was also performed using a dummy cargo specifically designed and assembled to such end. The trucks used in this Transportation Environment Survey were owned by the cooperating company, CHORTITZER; besides, 4 ton hired trucks were also used along the stretch from the Loma Plata factory, north of Paraguay, to the supermarkets and shops. Along this stretch, and mainly where the roads were in bad conditions, the temperature control of the truck refrigerator was checked.

**(5) TG (3): Uruguay, Beginning to mid-September 2005**

The First Transportation Environment Survey was carried out along the three selected routes using SAVER 3X90 sensors. First, a dummy cargo of butter (the product selected for this survey) was designed and assembled. The survey started at the low temperature storage chamber of CONAPROLE's Florida factory along the selected routes using a hired truck covering the Montevideo – Rivera stretch, about 500 km north, at the border with Brazil. Then, a mixed cargo was carried from Montevideo to Fray Bentos (at the border with Argentina) about 300 km to the west.

The issues discussed in this TG were the improvement of the computer data matching process (that was too slow) and the process of delivery (factory/ carrier/ supermarket) of the dummy cargo for the transportation environment survey.

At the beginning of November, the JICA Study Team temporarily returned to Japan to prepare the draft of the Progress Report (PR/R) while the cooperating companies performed their independent Transportation Environment Surveys, analyzing the work already completed on the selected routes. Meanwhile, simultaneously with the preparation of the Progress Report draft, the JICA Study Team analyzed the significant amount of data collected upon request.

**Coordination Meeting: INTI – Argentina, November 1, 2005**

During the Second field survey (Part 2) of the export of products from Chile, across the Andes, to be performed in Argentina with the collaboration of Frimetal (that supplied refrigerators) using SAVER 3X90 sensors was cancelled due to a strong snow storm. It was finally carried out in July 2005, as well as the analysis of the data (corresponding to the three routes) collected during the Transportation Environment Survey performed using DER-SMART sensors, supervised by the C/P INTI. Finally, upon completion of the Second field survey, the JICA Study Team held a coordination meeting in Buenos Aires with the MERCOSUR coordinators (INTI) in order to discuss the development of the Transportation Environment Survey performed in the 4 countries.

**(6) TG (4): Argentina, Mid – January, 2006**

After the return of the JICA Study Team to Japan in November 2005, the data obtained in the Transportation Environment Surveys independently performed by the C/P was compiled and analyzed. Special attention was given to the processing and control of the data obtained in the second survey of the Aimogasta-Iguazú stretch that had to be repeated due to GPS failure. In addition, the methodologies and techniques applied in the data analysis were also discussed based on the results of the Transportation Environment Surveys performed along the routes selected in each country by the MERCOSUR coordinator, the INTI. The draft of the Progress Report prepared by the JICA Study Team in line with the basic rules for the evaluation of

packaging tests was also considered. As a result, both parties agreed to proceed based on the methodology described in the Progress Report.

**(7) TG (5): Paraguay, End of January to Beginning of February, 2006**

Simultaneously with the technical training on the processing methodology and analysis of the data collected in the Transportation Environment Survey, the discussions were held about the technical aspects of the analysis of the data collected in the transportation survey performed between the Greater Asuncion and Asuncion.

**(8) TG (6): Uruguay, End of January, 2006**

The results of the analysis of the data obtained in the independent Transportation Environment Surveys performed by the C/P along the Montevideo – Rocha and Montevideo – Rivera stretches were discussed.

**(9) TG (7): Brazil, Beginning of January – End of February, 2006**

Simultaneously with the discussion on the methodologies and techniques applied to process the data obtained in the Transportation Environment Survey, and the presentation of the draft of the Progress Report (PR/R), the basic project related to the construction of the database (DB) and the establishment of basic guidelines for the Evaluation of Packaging Tests were considered. This TG (7) delivered in Brazil is related to the WS held from February 13th to 16th and the Second Joint Meeting of the 4 countries, where an agreement was reached on the methodologies and techniques applicable in the Joint Workshop of the 4 C/P countries.

**(10) TG (8): Fourth field survey, May to July, 2006**

Through a TG delivered as the first activity of the third operational year, the rotary approach was established for the WS (11) between C/P countries and cooperating companies to establish the basic parameters of packaging design based on the results of determination of the basic guidelines for the evaluation of packaging tests, in accordance with the results of the Transportation Environment Survey. In the first meeting with the counterpart of Argentina, the JICA Study Team's explanation of the third year operational plan on the process and technique to develop the "Reference Guideline for Packaging Tests, for Evaluation" was insufficient. The JICA Study Team had to move to other country, so that both parties did not reach to the agreement. By the following meetings with other counterparts of three countries, the discussion on development of the "Reference Guideline for Packaging Tests, for Evaluation" was revised and established the basis of packaging design by continuing "PSD" and "Grms vs Speed" scatter diagrams for the road condition evaluation.

**(11) TG (9): Fifth field Study, October 23 to November 01, 2006**

October 24, 2006 – Argentina

A meeting was held between the JICA Study Team and the INTI, in order to confirm the final details of "Reference Guideline for Packaging Tests, for Evaluation", which have been done intensively on the same month. The INTI promised to make the diffusion of the results of the studies to others 3 countries. Also, they were discussed the following topics:

[1] Work Plan for the Model Project by using the improved packaging

[2] Details about the preparation of the 4th Joint Meeting and the Public Seminar of Results of the Study, to be held on January 2007

October 26 2006 – Uruguay

The meeting was held between the related parties, in order to confirm the final details of "Reference Guideline for Packaging Tests, for Evaluation", based on the draft summary document.

Also, it was reported that the Model Project is slightly delayed due to specific problems on the cooperating company. Therefore, the execution of the surveys for the model project was done by the counterpart exclusively.

It was reported about the Schedule of the 4th Joint Meeting of 4 countries, and the Public Seminar of Results of the Study, to be done on January 2007.

October 27, 2006 – Paraguay

The meeting was held between the related parties, in order to confirm final details of the "Reference Guideline for Packaging Tests, for Evaluation".

Since the model project, in this case, has been completed by the counterpart and the JICA Study Team, the meeting was continued with topics related to improved packaging (primary packaging) and their evaluation.

It was reported about the Schedule of the 4th Joint Meeting of 4 countries, and the Public Seminar of Results of the Study, to be done on January 2007.

November 01, 2006 – Brazil

In the case of Brazil, after completed two meetings with counterparts of Brasilia and Rio de Janeiro, a final meeting was held with CETEA (Campinas) for explaining the process and final details of the "Reference Guideline for Packaging Tests, for Evaluation".

After that, it was discussed the details of the model project. It was reported that some cooperating companies were facing difficulties for the execution of the model project, so that it is decided to reschedule completely the work plan, including the provision of materials, preparation of test package, transportation surveys, monitoring of cargo handling and lab tests.

Also, they were discussed the details of the program of the Public Seminar of Results of the Study (Jan. 2007), specially the aspects how to show the development of the studies in the so wide environment such as of Brazil.

### 10.1.3 Results of the Workshops (WS)

Workshops were carried out as secondary TG activities. There were great expectations but the participation was not as planned. The fact that the follow-up distances in each country exceeded 30,000km, the separation between the working groups and the countries due to the delay in the analysis of the data because of geographical distances and the time required by the field surveys, the sudden increase of the work load in Japan led to the reduction of the WS and the TG. However, due to the cooperation of the C/P of each country, the WS were successful. Besides, it should be noted that the WS have had a positive effect on the awareness of the counterparts as to the application of the obtained knowledge to identify those issues that require improvement in respect of their own products as well as on obtaining the cooperating companies' management interest in this Study. A total of 12 WS were performed from the 1st year to the 4th field survey in the 3rd year. The topics discussed in such WS are described below.

**(1) WS (1): Asunción, Paraguay (Westfalenhaus Hotel), August 29, 2005**

This first technological training WS was carried out in Paraguay, from August 22 to 28, 2005, with the participation of the 4 countries according to the following agenda: a) review of the SAVER3X90 sensors operation techniques seen in the previous training course, b) exchange of ideas on the planning of the Transportation Environment Surveys that would begin in September 2005 in each country.

The WS also included technical advice on the analysis and compilation of data obtained during the Transportation Environment Survey performed between Asuncion and Encarnacion (PY). Afterwards, the C/Ps from each country made their technical presentations.

Then, discussion meetings were held to define the procedures applicable to the Transportation Environment Surveys to be carried out as from September 2005 and finally, the last important issue was the provision of advice on the preparation of special data processing forms and the creation of databases (DB) for each survey.

Besides, each Transportation Environment Survey in the 4 countries is jointly executed by the Study Team and the C/P Institutes. To such end, the JICA Study Team supplied sensors to each C/P.

**(2) WS (2): Campinas, Brazil October 26 2005（CETEA）**

In Brazil, prior to this Workshop (WS2), the technical meeting was held on October 4, at MULTIBRAS (cooperating company) to analyze the results of transportation survey along the Joinville-San Pablo stretch (3,000km) performed from September 9 to 12, 2005.

In the Workshop (WS1) held at CETEA, Campinas, the following issues were discussed:

- Transportation survey along the Manaus-Belem-San Pablo route (4,700km) carried out from September 14 to 23, 2005. The target products for this survey were MULTIBRAS household appliances (external air conditioners).
- Transportation survey along the Joinville-Argentina- Santiago de Chile route (2,700km) carried out from October 11 to 18, 2005. The target products for this survey were MULTIBRAS household appliances (refrigerators).
- Technical discussion meeting about the results of the analysis of the data collected along the Hortlandia – Recife route (3,000km) transporting BSH household appliances (refrigerators).

In addition, the JICA Study Team delivered the technical course where the specific characteristics of the data analysis and the results of the survey carried out along the Manaus-Belem-San Pablo route were discussed as well as the aspects to be taken into account considering a long distance road trip.

The C/P Institutes made presentations on the analysis of the data collected along the Joinville-Salvador route.

As regards the pending issues, the problem of the excessive time taken to match the GPS Data Logger data and the SAVER3X90 sensor data were highlighted. Regarding this problem, the JICA Study Team would contact the manufacturers in order to find a solution.

**(3) WS (3): Asunción del Paraguay (Westfalenhaus Hotel), October 21, 2005 WS**

The Transportation Environmental Survey in Uruguay began on September 23, 2005. It started in Montevideo and covered three selected routes. This survey was jointly performed by the JICA Study Team together with the members of C/P Institute (LATU) using SAVER 3X90 sensors.

Almost at the same time, the technical training course was delivered in respect of the preparation of the dummy cargo to be used in the impact test to be performed during the handling of the cargo in the Greater Asunción.

At the same time, the Transportation Environment Surveys were carried out in Paraguay, except on the Campo Grande-Brazil route (due to the lack of milk products because of the reduction of export caused by the bad weather conditions).

The C/P from Paraguay made its presentation on the results on the surveyed roads.

During the presentation, the managers of the cooperating company identified the problems caused by inadequate distribution conditions and (low) temperatures during the distribution of their products, based on analysis of the data obtained from said surveys. These discussions raised awareness of the need to maintain strict temperature controls during the distribution process.

**(4) WS (4): September 9, 2005. Montevideo, Uruguay (CONAPROLE )**

Before performing the Transportation Environment Survey using SAVER3X90 sensors, the survey on butter, as target product, was carried out as requested by CONAPROLE – one of the cooperating companies. To such end "Dummy" loads were designed and manufactured for the Study, and they were placed together with the normal load in the refrigerated warehouses of said company in Florida.

On September 8, 2005, the dairy products supplied by CONAPROLE were carried from Montevideo to Rivera (at the border with Brazil). On September 15th, the dairy products supplied by CONAPROLE were carried from Montevideo to Fray Bentos. Sensors were placed to study both the handling of the cargo and the transportation environment.

Based on the results of the data analysis, the WS was held with the attendance of 2 officers of the company. The members of the counterpart institutes made presentations about two the surveyed routes.

During the WS, the company required advice in order to improve its secondary packaging as well as primary packaging. In such respect, the JICA Study Team made a technical explanation through a PowerPoint presentation based on Japanese technology and experiences.

After the presentation, the officers of the company said that they found the information provided very useful to solve some production line problems facing the company.

**(5) WS (5) January 19, 2006. Buenos Aires – Argentina (INTI)**

This Workshop (5) consisted of a series of technical meetings to analyze the applied methods and the results of the analysis of the data collected in the transportation environment survey from Aimogasta to Iguazu, carrying olive by-products (olives) supplied by NUCETE, one of the cooperating companies.

There were some difficulties during the survey carried out on October 2005, since some GPS data were missing. To solve this problem, the C/P organized another survey along the same route that was performed in December. The details of the PSD diagrams corresponding to this route were discussed in the WS.

During this WS, the JICA Study Team explained the characteristics arising from the analysis of the data collected from all the routes surveyed (almost simultaneously) by the C/Ps in each country.

Issues related to reference parameters validation process described in the draft "Reference Guidelines for the Evaluation of Packaging Tests" included in thee P/R, were discussed.

Finally, an agreement on this process was reached between the parties (the JICA Study Team and the MERCOSUR- INTI - Coordinator).

**(6) WS (6) February 2, 2006 – Asunción, Paraguay (Westfalenhaus hotel)**

The JICA Study Team provided advice on the data collected in the transportation environment surveys performed in Paraguay up to such date:

1) Loma Plata-Coronel Oviedo- Ciudad del Este

2) Loma Plata－Asunción－Encarnación

3) Greater Asunción & Asunción

4) Loma Plata－Asunción

5) Asunción－P.J. Caballero (PA)－Ponta Pora (BR)－Campo Grande.

It should be noted that most of the routes were surveyed by the C/P themselves, with no support by the staff of the JICA Study Team but for technical support on the process of result analysis.

The president and 7 officers of CHORTIZER (the cooperating company from Paraguay) and two representatives of the suppliers of packaging materials attended the Workshop.

The members of the C/P from Paraguay made presentations about the 5 routes mentioned above, explaining the characteristics of the transportation survey and the analysis of the data.

During the WS, certain inquiries were made about the results of the analysis, especially as regards the Greater Asunción, Asunción and the Asunción -Campo Grande (BR) routes.

Then, the JICA Study Team made the technical presentation about packaging resistance tests for liquid food products, and transportation environment tests using impact sensors. Then, demonstration seal tests of the cooperating company products were performed using the Seal Tester.

**(7) WS (7) January 26, 2006 – Montevideo, Uruguay (LATU)**

As from November 2005, the C/P institute has independently carried out the Transportation Environment Survey of these 2 routes: Montevideo-Rocha, Montevideo-Rivera (2nd survey).

Based on the analysis of the data, the JICA Study Team provided some technical advice. During the WS, the C/P made the presentation about the surveys on the 2 routes addressed to the cooperating companies and other participants.

Subsequently, the JICA Study Team delivered a course on packaging resistance testing for liquid food products and a demonstration test on dairy products using the Seal Tester.

The staff of CONAPROLE, the cooperating company, made several questions about the material used to manufacture the lids and the containers, as well as about the Japanese sealing technology.

**(8) WS (8) & WS (9) February 13 - 15 - 2006 – Campinas, Brazil (CETEA-ITAL)**

Workshop (8) performed at CETEA in Campinas, Brazil, was focused on the progress made in the analysis of the data collected during the Transportation Environment Survey, and on the consistency of the results of such analysis. The counterpart institutes of the 4 countries and the JICA Study Team made presentations.

The main subject of WS (9) was the collection of data from each country and the performance of lab tests of "target" products, such as household appliances (refrigerators) and food products (long-life milk and olives).

The presentations made by each country using PowerPoint included explanations of the analysis of the data gathered during the Transportation Environment Survey and the conditions of the routes.

The JICA Study Team delivered the course focused on the importance of the Transportation Environment Surveys in each country, using measuring sensors, and their impact on packaging redesign. Interesting technical discussions were held based on the questions made.

From another point of view, lab vibration and drop tests were carried out using refrigerators and dairy products. The counterpart institutes made presentations on the conditions of the routes based on the collected data.

One of the cooperating companies, MULTIBRAS a Brazilian producer of household appliances, made a presentation about its own laboratory in Joinville. One of the packaging experts of BSH's headquarters in Germany was present. The JICA Study Team discussed technical aspects with this person.

Regarding food products, CHORTIZER from Paraguay supplied samples of long life milk (UHT) and "Valle Fértil" (a subsidiary of the NUCETE group in Brazil) supplied olives. Lab tests were performed using both products.

A representative of "Valle Fértil" attended the workshop and the JICA experts provided technical advise about its product.

**(9) WS (10)**

**May18, 2006 Buenos Aires – Argentina (Conference Room – Argentine Ministry of Foreign Affairs)**

**May 23, 2006 – Rafaela, Province of Santa Fe, Argentina (Campo Alegre Hotel)**

At the beginning of the 3rd and 4th field survey, the WS (10) was organized as an Information Seminar in Buenos Aires City, sponsored by the INTI, the Argentine Ministry of Foreign Affairs and the JICA Argentine Office.

The next WS (10) was held in Rafaela City, one of the main milk and dairy producing regions of Argentina. Besides, an important research center of the INTI and the WILLINER's (one of the cooperating companies from Argentina) production plant are located in that area.

The Seminar held on May 18, in Buenos Aires, attended by many participants, included presentations about the Transportation Environment Survey, its background information and analysis, the improved accuracy of the surveys by using sensors, and the design of packages for household appliances.

After the presentations, questions were made about the transportation of vegetables, packaging design security ratios, etc.

In the second Seminar held on May 23 in Rafaela, the background information on the Transportation Environment Survey and the technology for food/dairy products in place in Japan were discussed. Special attention was given to packaging materials and the aspects to be taken into account from the consumer's point of view. The attendants showed much interest in these matters.

**(10) WS (11)** **May 25, 2006 – Montevideo, Uruguay (LATU)**

**May 30, 2006 – Asunción, Paraguay (INTN)**

**June 1, 2006 – Campinas, Brazil (CETEA)**

WS (11) was mainly focused on the guidelines and activities necessary to define the "Reference Guidelines for the Evaluation of Packaging Tests". In addition, presentations were made on resistance tests carried out on food packaging using a Vacuum Desiccators. All these presentations were held in each of the 4 member countries.

In the Workshop (11) carried out on May 25, 2006 in LATU (Uruguay), tests were performed on dairy products using the Vacuum Desiccators, which was implemented at that time, in the 3rd operational year.

Then, technical meetings were held to discuss the steps to be taken to define the "Reference Guidelines for the Evaluation of Packaging Tests", the main topic of this 4th stage of the Study. The methodology and basic procedures had already been agreed upon at the 2nd Joint Meeting held in February, 2006.

The tasks defined in the plan for the 3rd year of the Study began to be performed. Routes were classified into 3 main categories, based on PSD diagrams and Grms/Speed graphics for each one. Based on the analysis of these data, and upon a graphic analysis of photographs, the routes were classified into the following categories: A (good), B (medium), and C (bad).

Then, the Grms/Speed scatter diagrams were plotted based on the data obtained in the Transportation Environment Survey, and the A, B, and C curves were defined. The percentage of each A, B and C category for each route was calculated. As a result of this analysis, the following conclusions were made:

1) Montevideo-Rivera route: no differences between the 1st and the 2nd survey.
2) Montevideo-Rocha route: significant differences between the 1st and the 2nd survey, so the studies should be repeated.
3) Montevideo-Fray Bentos route: many impacts were recorded so it is classified as a “bad route”.

The WS carried out on May 30, in Asuncion, Paraguay (Conference Room of the Westfalenhaus Hotel) included demonstration tests using the Vacuum Desiccator, presentations on packaging technology for dairy products and technical discussions to define the "Reference Guidelines for Evaluation of Packaging Tests”.

Representatives of the cooperating company attended the WS. They showed special interest in improving the quality of packaging and the methods for packaging/handling of cardboard boxes.

A Workshop focused on the determination of basic rules for the evaluation of packaging tests was carried out on June 1, at the CETEA- Campinas, Brazil. The PSD Curves made based on the analysis of the Transportation Environment Survey performed in Brazil were analyzed as well as the scatter curve of Gms/Speed. Based on that, a new category, “D” was added to the existing ones, A, B and C. This new category was considered necessary due to the size of the country. Finally, the experts of the JICA Study Team explained the MERCOSUR standards (draft) related to vibration tests on packed cargoes. Besides, the PSD scatter graphs and the Gms/Speed scatter graphs were unified to be used as reference data in respect of the routes surveyed in the 4 countries. Said unified graphs were used as guidelines to discuss the location of the routes to be used in the Study. The JICA Study Team agreed to verify such graphs to prepare a final version.

### 10.1.4 Results of the public seminar of result

The Public Seminar of Results of the Study was held by a tour event along the 4 member countries, as a part of the 6th field study, starting from middle of January 2007, and according to following schedule.

Argentina: January19, 2007 (Fri) Place: Buenos Aires, Hotel Panamericano
Uruguay: January 23, 2007 (Tue) Place: Montevideo, Salon Conf. LATU
Paraguay: January 26, 2007 (Fri) Place: Asunción , Hotel Sheraton
Brazil: January 30, 2007 (Tue) Place: San Pablo, APAS
The program of each event was as follows:

**Public Seminar of Results of the Study:**

- Presentation
- JICA Study Team: 3 specialists

(1) Improvement of Packaging Technology for household appliances (white goods) results and future projection
(2) Improvement of Packaging Technology for food products (specially dairy products) results and future projection
(3) Determination of the "Reference Guideline for Packaging Tests, for Evaluation for MERCOSUR", general guidelines and proposal

- Counterpart institutes of the 4 countries: 1 specialist for each event in each country
  - Introduction of the Transportation Environment Surveys, future prospective about development plan of packaging improvement in their countries

Please refer to Annex 1 for the detailed program on the Public Seminar of Results of the Study held in each country.

During the Public Seminar of Results, they would be shown panels including photographs and text related to the Study. At the same time, this information was distributed to the participants by a CD-ROM (Refer to Annex 2).

## 10.2 Technology Transfer to Counterpart Institutes and the Private Sector

The main purpose of this Study is to establish basic standards for the evaluation of packaging tests for the MERCOSUR as a whole. To attain such purpose, the most important matters to be considered are: improving the technical level of the four member countries of the MERCOSUR and obtaining the cooperating companies' support. To such end, the following guidelines were established:

(1) Rotary Technical Guidance Courses (TG)
(2) Workshops (WS)
(3) Additional matters related to technical training in Japan

Based on these basic items, in the field survey performed during the first year, the methodology applicable to the selection of routes (specially international routes) for the Transportation Environment Survey as well as to the selection of the target products was discussed with the C/P from the four countries and the cooperating companies. In February 2005, a demonstration of the Transportation Environment Survey was performed using DER SMART sensors, along 1,200 km, between Buenos Aires and Aimogasta, with the cooperation of the Argentine company NUCETE. In order to perform vibration tests and impact tests during the handling of the cargo within the scope of this survey, "dummy" cargoes were prepared and placed on the pallets together with the usual cargo in order to collect data. The survey was carried out repeating the technical guidance course with the Study Team, the C/P and the cooperating companies.

### 10.2.1 Results of the technology transfer

Besides, 3 technical guidance courses (including the one in March, 2004) were delivered in Japan as an additional activity of this Study. The first course took place in March 2004, and was focused on basic packaging techniques. Eight persons attended (2 from each country). The other courses were organized based on the scheduled activities of the Study. Topics such as theory on and preparation of dummy loads, transportation, data collection and analysis were discussed in the second course held in March, 2005 with 8 attendants (2 from each country). All these contents were applied in the field survey performed in February, 2005. During the second year, the distribution of sensors to the 4 countries was arranged. Due to delays in the supply of the equipment and the fact that a different sensor was supplied to Argentina by mistake, significant changes had to be made in the schedule. This led to the following situations:

(1) The Transportation Environment Survey was performed along the route selected in Argentina using the equipment provided (Transportation of dairy products from the

cooperating company Williner along the Rafaela – Asunción del Paraguay and Rafaela – Neuquén routes used by said company).

(2) The Joint Technical Guidance course for the 4 countries and demonstration test along the Asunción – Encarnación stretch, using a different equipment (subsequently replaced) in Paraguay. This Joint Technical Guidance course delivered between August 22 and 28, 2005, included: basic knowledge and operation of the sensors and demonstration tests using said sensors. Two specialists from each country attended with a total of 8 participants, mainly young people. This was positive due to their capacity to understand the technical information that led to the execution of the plan by applying the OJT approach, intensively and quickly. It should be highlighted that the supply of staff and the cooperation in the installation of the equipment by Paraguay led to the improved effectiveness of the course.

After this course, the main Transportation Environment Surveys were carried out, upon the distribution of the new equipment (SAVER 3X90) to the C/P from the four countries and the delivery of the equipment supplied during the First Stage to Argentina and Brazil. To such end, the Study Team was divided into groups that were sent to each country. The surveys were consecutively performed in each country on the selected routes and with the target products. However, the First Survey (in all the countries) was carried out under the supervision of the JICA Study Team, using the equipment (continuous vibrations, impacts, temperature and moisture measurements, and using GPS) installed in the trucks. The follow-up was made using a vehicle where 1 or 2 members of the JICA Study Team and 1 or 2 members of the C/P trained in Paraguay traveled. During the follow-up the forms described in the demonstration course delivered in Paraguay applying the OJT method were used. It should be noted that the Brazilian team recorded data up to the analysis stage. The following table shows the results for each country.

## Table 10.2.1-1 Original and Actual Schedules for the Transportation Environment Surveys

| County | Original Plan | | | | Actual Plan | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Route | Target Product | Distance One way | Company | Route | Target Product | Distance | Company | Date |
| Argentina | Bs.As. - Aimogasuta | Processed Olive | 1,200km | NUCETE | Bs.As. - Aimogasta | Processed Olive | 2,500km (Round trip) | NUCETE | 2/9 - 2/12 '05 |
| | Rafaela - Asunción | Powdered Milk | 800km | Willner | Rafaela - Asunción | Powdered Milk | 1,600km (Round trip) | Willner | 7/3 - 7/7 '05 |
| | Aimogasta - Curitiba | Olive Product | 2,500km | NUCETE | Aimogasta - Curitiba | Olive Product | 2,500km | NUCETE | 7/19 - 7/23 '05 |
| | Rafaela - Neuquen | Dairy Product | 1,300km | Willner | Rafaela - Neuquen | Dairy Product | 1,800km | Willner | 7/8 - 7/12 '05 |
| | — | — | — | — | Neuquen-Santa Rosa | Only measurement | 500km | Williner | 7/11 '05 |
| | Neuquen - Bariloche | Dummy Cargo Handling Survey | — | Willner | Neuquen - Bariloche | Dummy Cargo Handling Survey | — | Willner | Dummy was improved for impact test after 3 months past |
| | — | — | — | — | Aimogasta-Iguazú | Olive Product | 1,600km | NUCETE | 11/20-21 '05 |
| | Rosario - Mendoza - Santiago | Refrigerator, Showcase | 1,500km | FRIMETAL | Cancelled because of Chile boarder closing due to heavy snow ('05) | | | | |
| | Uruguaiana - Medoza - Los Andes | Refrigerator | 1,700km | Multibras | Uruguaiana - Mendoza - Los Andes | Refrigerator | 1,700km | Multibras | 10/11-20 '05 |
| | Rosario - Mendoza - Santiago | Refrigerator, Showcase | 1,500km | FRIMETAL | Cancelled because of Chile boarder closing due to heavy snow ('06) | | | | |
| | Bs.As. - Mendoza | Vegetable Oil | 1,000km | MOLINOS | Bs.As. - Mendoza | Vegetable Oil | 1,000km | MOLINOS | 5/26 '06 |
| | Bs.As. - Rosario | Refrigerator | 300km | FRIMETAL | Bs.As. - Rosario | Refrigerator | 300km | FRIMETAL | Several times including model projects in 2006 |
| Brazil | São Paulo - Recife | Refrigerator | 3,000km | Multibras | Joinville - Salvador | Refrigerator | 2,500km | Multibras | 9/8 - 9/12 '05 |
| | Sã Paulo - Recife | Refrigerator | 3,000km | BSH | Campinas - Recife | Refrigerator | 2,650km | BSH | 10/21 - 26 '05 |
| | Manaus - Belem - São Paulo | Refrigerator, Other Home Appliances | 4,700km | Multibras | Manaus - Belem - São Paulo | Air Conditioner | 4,700km | Multibras | 9/14 - 9/23 |
| | São Paulo - Uruguaiana - BsAs | Refrigerator | 2,500km | Multibras | Joinville - Uruguaiana - Santiago | Refrigerator | 2,700km | Multibras | 10/11 - 20 '05 |

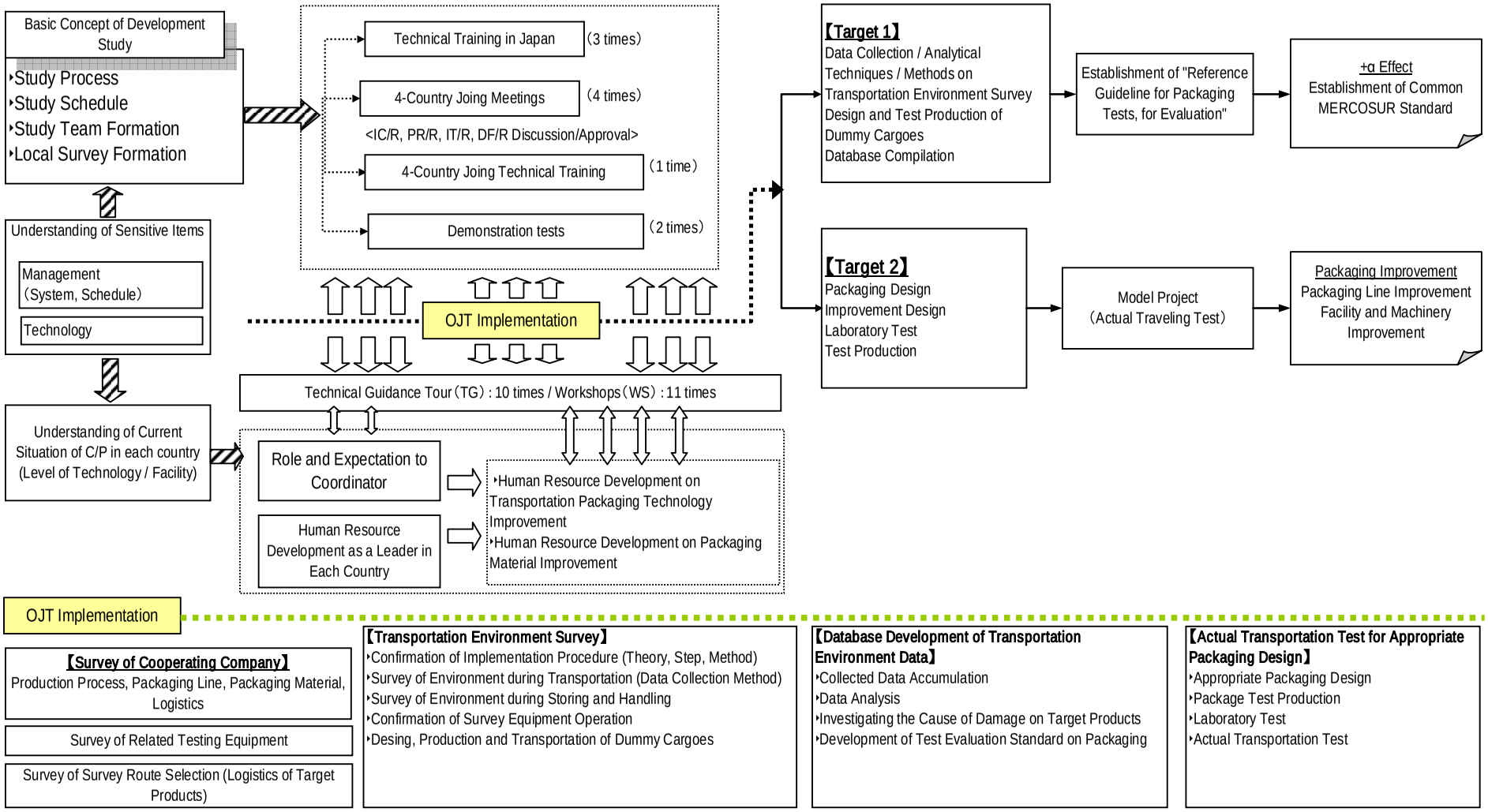
| County | Original Plan | | | | Actual Plan | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Route | Target Product | Distance One way | Company | Route | Target Product | Distance | Company | Date |
| Paraguay | Loma Plata - P.J. Caballero | Dairy Product | 800km | Choritizer | Asunción - PJ Caballero - Campo Grande | Dairy Product | 1,000km | Chortizer | 12-'06 |
| | Asunción - Cd. del Este | Dairy Product | 340km | Choritizer | Loma Plata - Asunción - Cd. del Este | Dairy Product | 860km | Choritizer | 9/27 - 28 '05 |
| | Asunción - Encarnación | Dairy Product | 400km | Choritizer | Loma Plata - Asunción Encarnación | Dairy Product | 900km | Choritizer | 10/4 - 10/5 |
| | — | — | — | — | Gran Asunción Delivery | Dairy Product | — | Choritizer | 9/30 '05 |
| | — | — | — | — | Asunción City Delivery | Dairy Product | — | Choritizer | 10/14 '05 |
| Uruguay | Florida - Montevideo | Butter, Powered Milk | 100km | Conaprole | Rivera - Florida - Montevideo | Long Life Milk | 4,800km | Conaprole | 9/8 - 9 '05 |
| | Montevideo - Chuy | Butter, Powered Milk | 250km | Conaprole | Montevideo - Rocha | Long Life Milk | 200km | Conaprole | Several times in LATU |
| | Montevideo - Fray Bentos | Butter, Powered Milk | 300km | Conaprole | Montevideo - Fray Bentos | Long Life Milk, Yoghurt, Cheese | 400km | Conaprole | 9/5 '05 |

Source: JICA Study Team

Note): In Paraguay, the transportation environment surveys were implemented by INTN and Chortitzer during the absence of the Study Team.

1. Loma Plata – Asunción; 550km (one-way)×6 times=3,300km
2. Loma Plata – Encarnación; 1,100km (one-way)×1 time
3. Asunción - Campo Grande (BRA); 1,000km(one-way)×1 time
4. Loma - Plata Ciudad del Este; 800km(one-way)×1 time

Due to the significant volume of data and the numerous hours dedicated to analyze it in Japan, the evaluation and verification tasks were made during the training course in Japan (March 2006) together with the C/P.




Source: JICA Study Team

**Fig. 10.2.1-1 Correspondence and Effect to Technology Transfer on Development Study of Packaging Technology Improvement**

#### 10.2.1.1 Objectives attained by the counterpart institutes

This JICA Study focused on the joint performance of the following activities: attainment of technological targets in three stages, site surveys in 8 stages, 3 Technical Guidance Courses in Japan, rotary local Technical Guidance Courses (TG), Work shops (WS) and 2 annual Joint Meetings of the representatives of the four countries (every 6 months). Besides, the following activities were scheduled: demonstration field tests using measuring equipment (place: selected Argentine routes), operation of equipment, demonstration measurements using the equipment (during the Joint Training Guidance Course for the four countries in Paraguay) and joint Workshops for the 4 countries to carry out Lab Tests in Brazil.

Successful results were obtained in the three stages (see the table below) and the institutes of the four countries obtained technological knowledge on packaging due to the joint activities performed at the beginning of stage II. Besides, as regards the training of the staff, technicians have progressed successfully throughout the stages of the Study, in special young ones.

| Stage | Objective | Results |
|---|---|---|
| I | (1) Creation of a framework for the Study and basic Study | Explanation and understanding of sensitive information, Inception Report (IC/R) |
| II | (2) Collection and analysis of basic packaging data for transportation.<br>(3) Creation of a database of the packaging evaluation tests. | Successful analysis performed with the counterparts based on the transportation environment survey supervised by the Study Team<br>Meeting to present the Progress Report and the Interim Report and to discuss the definition of Packaging Standards for the MERCOSUR in detail |
| III | (4) Packaging design test, execution of the Model Project | Preparation of samples to test the improvement of individual packaging for processed food (dairy products) improved packaging for household appliances (white line appliances) |

| C/P Institute | Staff | | | Cooperating Companies (Number) | Training Course in Japan (Number of trainees) |
|---|---|---|---|---|---|
| | I | II | III | | |
| INTI - Argentina | 2 | 2 | 4～5 | 5 | 7 |
| INT<br>INMETRO<br>CETEA- Brazil | 2<br>1<br>2 | 2<br>1<br>4 | 3<br>1<br>4 | | |
| INTN - Paraguay | 2 | 4 | 5 | 2 | 7 |
| LATU - Uruguay | 2 | 5 | 5 | 2 | 7 |

Source: JICA Study Team

The counterpart institutes contributed as follows, especially to the training of young technicians: 1 member of the INTI of the General Packaging Technical Area, in Brazil (CETEA, INT, INMETRO) 2 to 3 persons of the General Packaging Area together with the Packaging Materials Area; as regards the Packaging Design Area, training courses were addressed to management, from the INTN , of Paraguay and the LATU, of Uruguay, 2 to 3 technicians

attended the Joint Technical Guidance Course for the four countries delivered in Paraguay in August 2005.

Besides, from the analysis stage of the Transportation Environment Survey to the Packaging Design stage, objectives were attained such as the creation of contacts with the packaging materials sector due to the participation of specialized technicians from the counterpart institutes of the four countries. Based on these results, it can be said that the technical training of the counterparts' staff has been successful, mainly considering the accomplishments of the first stage such as: the operation of the sensors, the collection and analysis of data, the evaluation of packaging tests (lab and field transportation tests), the provision of advice to final users. All this applies specifically to individual packaging for dairy products and packaging for household appliances such as refrigerators, i.e. the target products of the Study that were selected in advance.

#### 10.2.1.2 Levels attained by the counterpart institutes in packaging design

As explained in item 10.2.1(1) in respect of the activities performed in the first stage, the counterpart institutes were able to implement technology related to the collection of field data and the analysis of data. However, during the packaging design stage, since the target products for the Study selected in each of the four countries were different, i.e. processed food and white goods appliances (refrigerators) the testing conditions of each counterpart were also different.

**(1) Processed food (dairy products)**

During the packaging design stage in respect of dairy products, the activities focused on individual packages. The damages to the products of the cooperating companies were considered and a technical solution was sought. To such end, several technical analysis meetings were held among the Study Team, the counterparts and the cooperating companies (including packaging materials suppliers) and the following activities were carried out in order to improve packaging design.

[1] Survey to identify the possible origin of the damages (leaks)

[2] Tests to investigate the causes of the damages and verify the results

Based on the results of these activities, materials were selected and new packaging shapes were defined (designs). The final design was made after performing several resistance tests. In Argentina, Paraguay and Uruguay, the tests performed on materials involved specialized staff of the counterpart institutes. As a result of the analyses and tests, the numerous lab tests aiming at improving lid design and material, the counterpart staff obtained important OJT knowledge.

**(2) Household appliances (white goods: refrigerators)**

The Transportation Environment Survey included several successful tests in the four countries, not only in respect of the target products but others too. As regards household appliances, the counterparts from Argentina and Brazil obtained practical knowledge. The counterpart institute's labs had the facilities and equipment necessary to carry out their own tests even before the Study was performed. In the case of the Argentine INTI, several lab tests were performed before focusing on packaging design. The results were used to prepare a packaging prototype for the model project. The target product of this model project were refrigerators and the route surveyed was Buenos Aires-Rosario. The efforts of the INTI to perform the design tasks as well as to supply material and prepare the prototype should be noted, since they contributed to the success of the experience and stimulated the self confidence of the staff.

Besides, in Brazil, criteria were unified between the CETEA, in charge of the lab tests, the INT, that has an industrial design sector, the supplier of materials that cooperated in the manufacturing of the prototypes and the cooperating companies, aiming at improving packaging.

### 10.2.2 Recommended strategies for the technological development of the MERCOSUR counterpart institutes

During this JICA Study, the standards were established as regards storage and the analysis of the data obtained in the Transportation Environment Survey along the main routes (especially those used to export products by land and distribute goods to the main local distribution centers) using the target products (dairy products, and white goods appliances) for the four MERCOSUR member countries. Besides, technology was transferred in stages during the packaging design process, through several lab tests, the preparation of packaging for testing based on improved designs and the subsequent execution of the model project, including an actual transportation test with the participation of the Study Team, the members of the counterparts and the cooperating companies. The contribution of the MERCOSUR coordinator, the Argentine INTI, in the organization of the joint meetings of the four countries in each stage of the transportation environment survey should be specially noted.

Fig. 10.2.2-1 shows the results obtained up to date and the future development in connection with these results and the technological training.

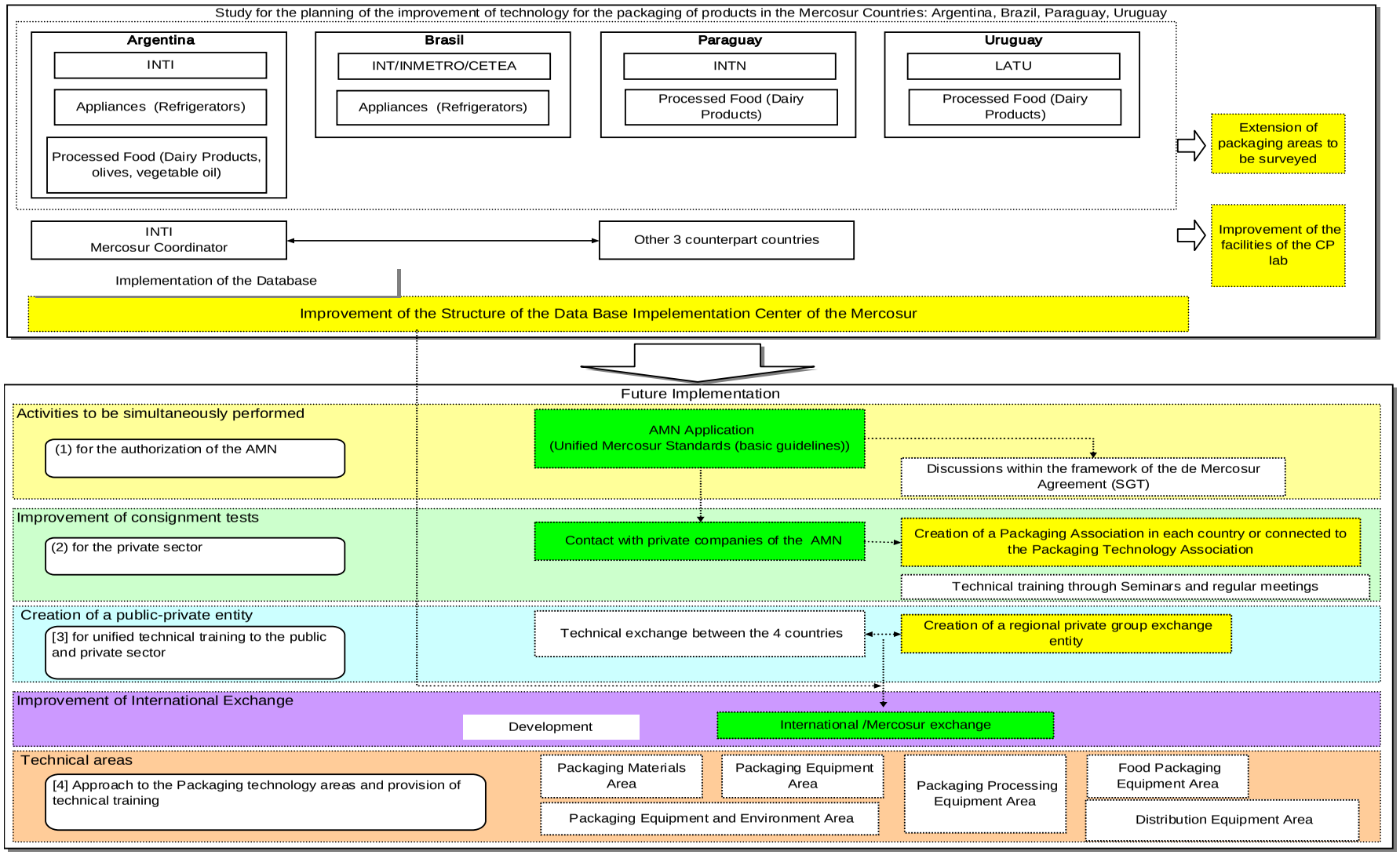
(1) The upper part of Fig. 10.2.2-1 describes the implementation and the guidelines for the creation of the database. It indicates the way the collected data should be shared. Figure 10.3.2-2 in item 10.3.2 of this chapter indicates the progress of the suggested measures.

(2) Then, the tasks necessary to obtain the official approval of the Unified Standards (basic guidelines) by the AMN mentioned in item (1) at the bottom of the graph were performed. Specifically, by the end of July, 2006 a meeting was held between the JICA Study Team, the counterparts and the AMN at the AMN headquarters in Sao Paulo. At that time, it was concluded that the Commission should be created to perform all the tasks necessary to obtain such authorization, based on the explanation of the AMN application procedures.

(3) The efforts to create an AMN Commission would involve the Packaging private sector of the four countries in order to gradually improve technology through the exchange of information on how to solve the problems facing the private sector.

(4) The previous item (3) mentions the collaboration between official entities (the public sector) and the private sector, including the cooperating companies from the four countries. Although the "packaging area" is specifically mentioned, all the other related areas that require technical improvement should be considered and included.

(5) The areas related to this study are included in the figure. Their internal functions should be strengthened by establishing a specialized association. Besides, the regional MERCOSUR / international exchange should be encouraged in furtherance of an appropriate technological exchange.




Source: JICA Study Team

**Fig. 10.2.2-1 Results and Future Development of the Survey for the Improvement of Packaging Technology in the MERCOSUR**

### 10.2.3 Recommendations related to promoting the importance of technological improvement in the distribution process in respect of the private sector

The packaging area is closely related to other areas of the different industries. As regards the Transportation Environment Survey, from departure of the truck carrying the cargo packed in the plant to the arrival of the products to the retailers, the cargo is handled several times, beginning with the dispatch of the goods, then in the truck up to the warehouses and then during distribution to the retailers. Therefore, technical training is very important, including institutional relations within the distribution process. There are 6 different areas related to packaging.

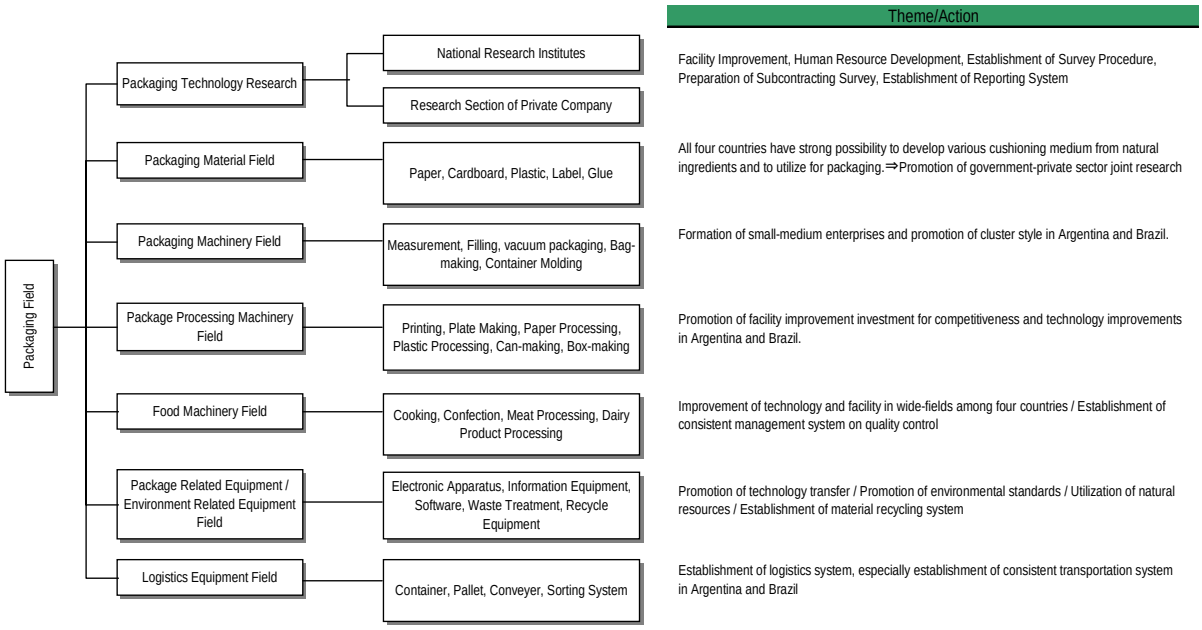
**Table 10.2.3-1 Industrial Areas related to Packaging**

| Areas | Description |
|---|---|
| Packaging materials | Paper, Bristol board, paper items, cardboard, plastic, metal, glass, tying and gluing material, isolating material, artificial fabrics, labels, and glue |
| Packaging equipment | Scales, filling equipment, vacuum packaging equipment, bag packager, molder, external packager, label machine, box packager, sealing machine, strapping equipment, and washing machines |
| Packaging materials processing equipment | Printer, photo recorder, paper processor, plastic processor, bag processor, box processor, can processor, stapler, Guillotine, Cutter, and isolating materials processor |
| Food packaging equipment | Kitchen ware, bread and pastry processors, meat processors, dairy processors, rice-based food processor, spinner, water pump, sanitary equipment, and HACCP products |
| Packaging equipment – equipment for the environmental survey | Testing devices, testing devices equipment, inspection equipment, classification equipment, analysis equipment, washing machines, electronic equipment, IT equipment - software, waste processor, recycling equipment, and environmental protection equipment |
| Distribution equipment | Containers, Pallets, Shelves, conveyor belts, transportation systems, compacting machines, shredders , classification systems, pallet wrapping machine, and transportation equipment |

Source: JICA Study Team

The area related to the packaging of food is one of the most important ones and its contribution to the industry of packaging technology is very significant.

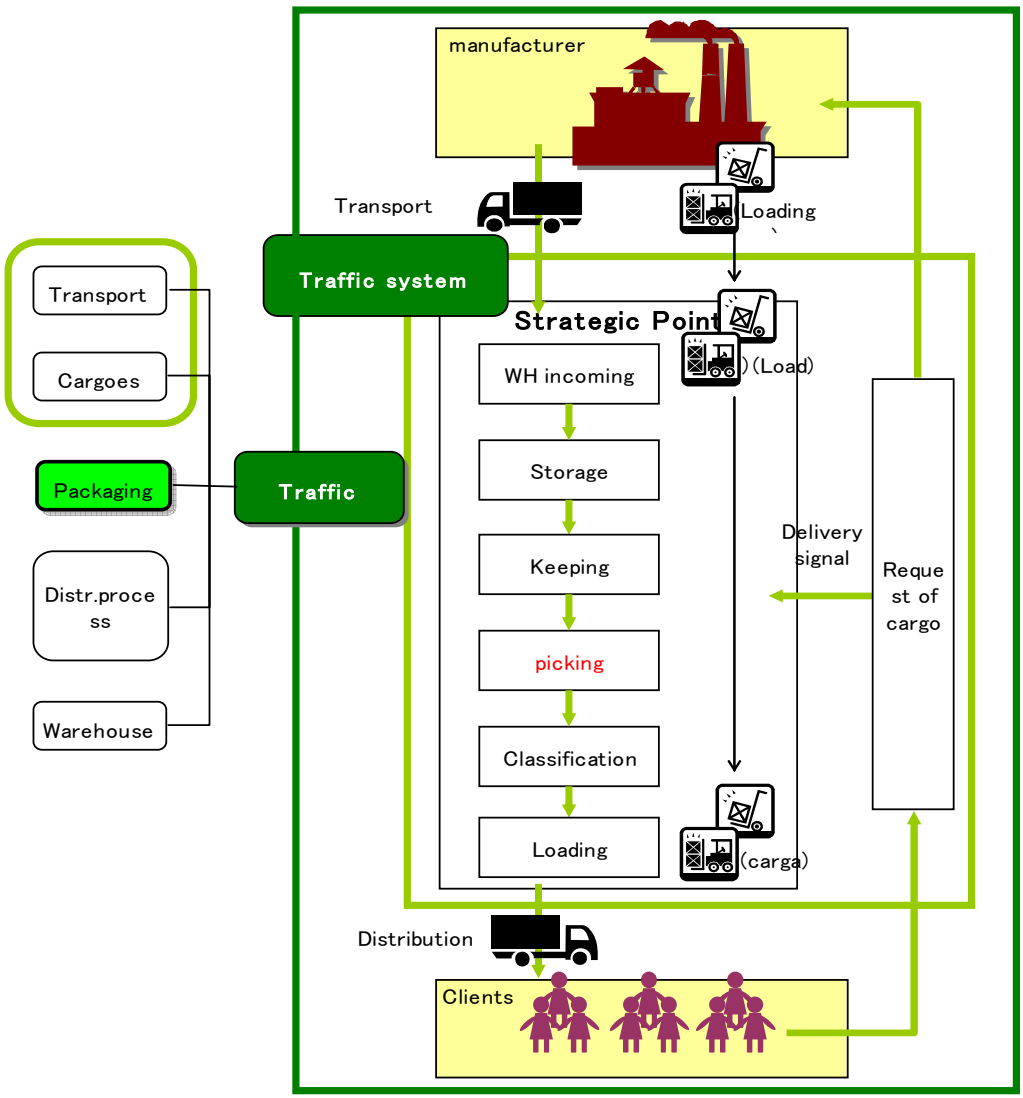
Packaging is very important in the distribution process due to its effects on the product during transportation and distribution. This JICA Study focused on the transportation environment survey and aimed at obtaining data from drop tests and other tests performed on the cargo. During this important process, packaging is the main factor in respect of safety, for the product to be delivered to consumers in good conditions. Therefore, it can be inferred that improving packaging technology implies reducing damages and costs while encouraging competition, as shown in Fig. 10.2.3-2, that explains the importance of packaging during loading, unloading and transportation. Thus, a detailed manual on cargo safety and security should be prepared taking into account the controlled packaging and handling technological aspects.




Source: JICA Study Team

**Fig. 10.2.3-1 Improvement of Packaging Related Industry Field**

Traffic and the role of packaging in the traffic system




Source: Prepared by the JICA Study Team, Distribution Structure, published by Editorial KANKI, Author: Kazuo YUSAWA

**Fig. 10.2.3-2 Distribution and Importance of Packaging for Transportation within the Distribution System**

## 10.3 Outline for the Achievement of Overall Goal of the Study

### 10.3.1 Sustainability of the "Reference Guideline for Packaging Tests, for Evaluation"

The establishment of the "Reference Guideline for Packaging Tests, for Evaluation", the objective of the Study for development of JICA, has defined as final objective to lower product damages during its distribution within MERCOSUR countries, by means of strengthening the technology for transportation-suitable containers and packaging design. Once the product transportation damage records are lowered, exportation competitiveness will be improved.

The first step aiming to this goal started by the preparation of the Reference Guideline for the four MERCOSUR countries (see Chapter 6, Interim Report by JICA Study Group), through the data gathering and analysis during the transportation environment survey on selected target products and transportation routes.

However, as the process of data analysis is going on, big differences aroused between the results of the data between the four MERCOSUR countries, which surpassed the initial estimation of making analysis considering only the road status factor. This led to the first conclusion: many factors have to be taken into account for the preparation of a complete reference guide.

Therefore, additional factors have been included in the analysis, such as: road type, truck structure, truck driving method, etc. Taking the hardest route (among field itineraries) as a reference, and studying the Grms vs Speed scatter diagram, the study range was split into three wide portions:

a) the range from Grms= 0.00 to 0.33, as the pure vibrations zone

b) the range from Grms= 0.33 a 0.70, as the bouncing vibration zone

c) the range above Grms= 0.70, as the shock/drop zone

Based upon the above, the MERCOSUR Transportation Environment Surveys' results were classified into three levels (see Fig. 10.3.1-1 and Table 10.3.1-1):

Level 1 (Bad Condition)

Level 2 (Normal Condition)

Level 3 (Good Condition)

After that, the data of all surveyed routes were verified and making route combinations by pairs, from two different countries, they were obtained 52 combinations for the total of four MERCOSUR countries. As result of the calculations, the reference guide was prepared based on the type of routes taken from the most representatives ones from each country and combined by pairs. The reference guide specifies all the parameters (test duration, frequencies, drop heights,

etc.) for each of the tests described therein: vibration tests, bouncing tests, and free drop tests (drop height= 10cm, counting the number of drops).

The Transportation Environment Surveys performed under the scope of the present JICA Study were developed under predetermined conditions such as selected itineraries and products (dairy products and home appliances (refrigerators)). In the future, the updating of above mentioned data will be of the utmost importance. Therefore, further data gathering shall be performed under comparable measurement conditions using a reliable study method, in order to fulfill the end users of the "Reference Guideline for Packaging Tests, for Evaluation". In addition, it will also have a direct relationship with the activities of maintenance and integration process of the database (DB) and also the IIRSA plan, which includes the MERCOSUR region, under development.

The MERCOSUR infrastructure has been improving year by year, regarding the transportation routes and physical distribution as well. Due to a structural change of the industries, the production focuses have changed also, affecting subsequently the related distribution networks. These changes led to a further improvement on packaging test standards for evaluation, to a higher level (as shown in its classification included in this Chapter) and the routes reference data have also changed, provided that new data have been gathered along the new distribution routes to be used in the future.

On the other hand, this "Reference Guideline for Packaging Tests, for Evaluation" can also be kept as an indicative reference for packaging cost reduction, aiming to improve transportation competitiveness. High expectancies are being held regarding the potential of packaging technologies and the counterpart's laboratory equipment, which can becoming the attraction poles for further studies for private sector. For this reason, it is highly recommended to continue the transportation environment surveys in order to update the database.

### 10.3.2 Management of the common regional database (DB)

The construction of the MERCOSUR Common Database has been described in above Chapter 5. By compiling all the available data as per today (gathered during the transportation environment survey along more than 20,000km across the four countries), the whole data can be grouped as follows:

[1] "Raw" data, gathered along transportation routes
[2] Data analysis results
[3] Reference values recorded for packaging evaluation tests

The next step was the starting of transportation-suitable packaging re-design, in accordance to the data analysis of information from the transportation environment survey and the preparation of improved packaging by using local materials. For primary packaging improvements, they have been introduced new piling up methods on storage, for dairy products and other manufactured products (i.e., milk, yogurts, milk caramel, olive-derived products, and vegetable oil).

Cooperating companies faced the problem of product damage, and now the technical capacity for improvement has been strengthened, as response of their request. Laboratory tests and real transportation tests have been performed on selected products from each of the four MERCOSUR countries, and the model project that summarizes those tests was implemented. These data have been added to the compiled database.

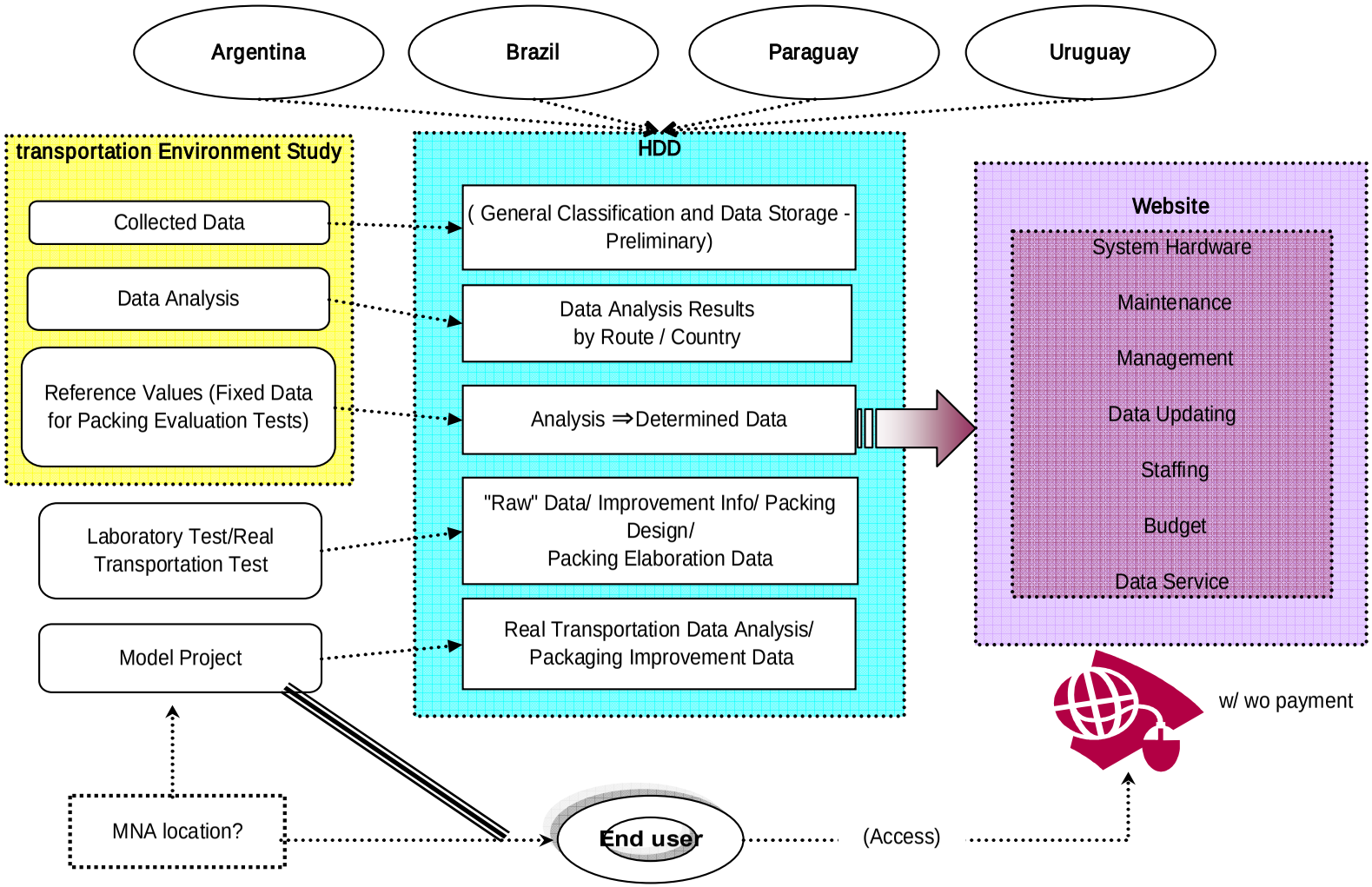
All the above data and related information were described in the General Summary (preliminary) (See Chapter 5), and were stored in a hard disk drive (HDD) [1], taking into account that the project activities go on in each of the MERCOSUR countries. The stored information includes: "raw" data from real transportation surveys and laboratory tests; data analysis output for each of the routes and countries; reference values' determination supporting data (for packaging re-design) and its fabrication; data analysis output for real transportation survey during the model project and improved packaging data.

Considering that above data will be shared all over MERCOSUR region and opened to the public, data management for DB and the methodology of services to be provided are top relevant.

In order to allow the start up of the website (to access the information), and to determine the required database format for this purpose, the entity to be responsible for the system and hardware management (including renewal of equipment), staffs, data service and budget administration has to be assigned. This is the utmost importance as the first step that will allow MERCOSUR private end users accessing the DB, and it will also be a challenge for the transportation packaging and container improvement.

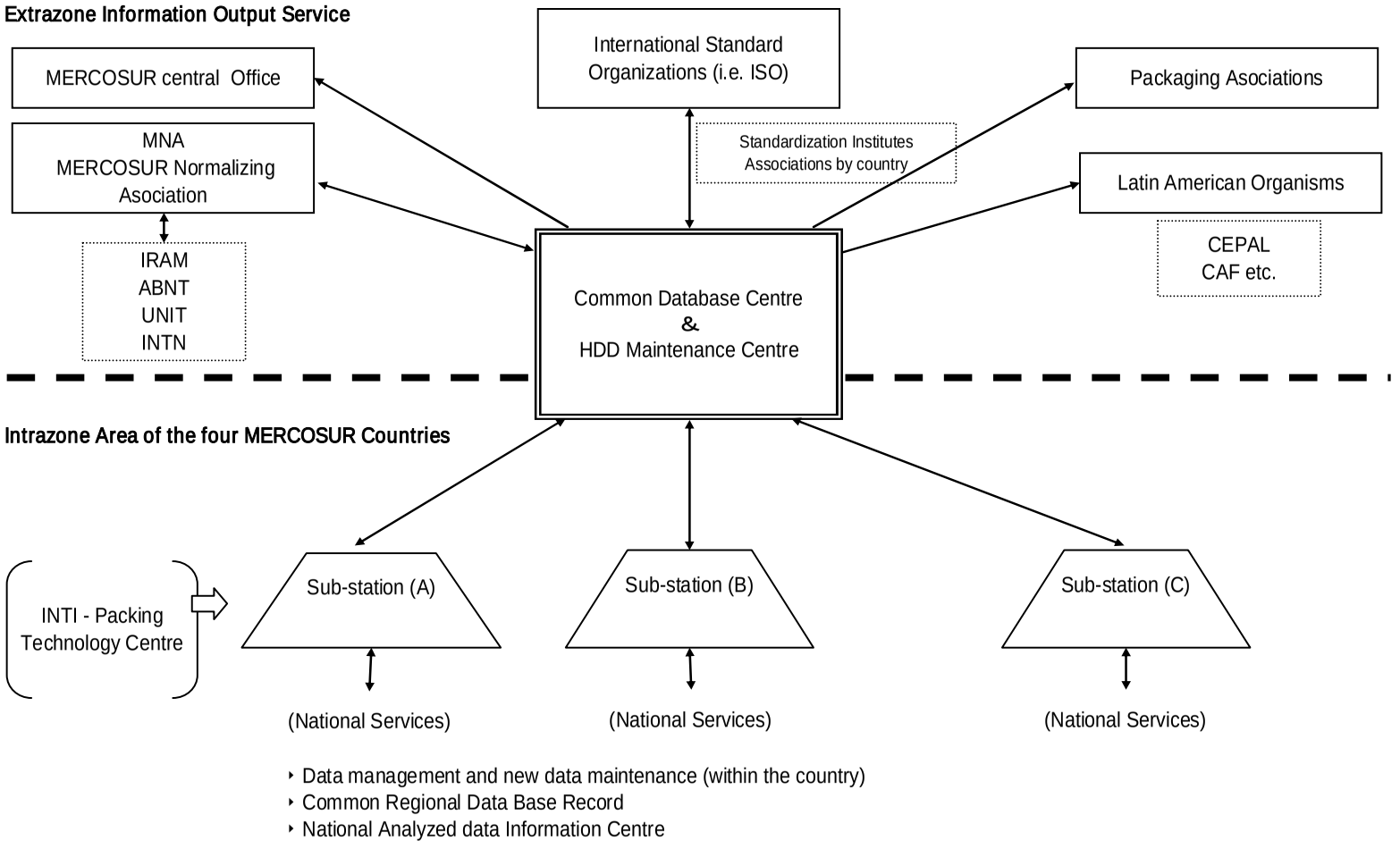
Fig.10.3.2-1 depicts the above schematically: "Common Database Centre Organization structure, HDD Maintenance Centre" including MERCOSUR DB Information Service and its extension to extra-block regions. A sub-station will be installed in each of the countries, and data emission will be performed by means of a satellite system. In the future, this Centre will be interconnected to other related organizations worldwide as shown Fig. 10.3.2-2.

[1] Note: There are four HDDs, one for each of the MERCOSUR countries.




Source: JICA Study Team

**Fig. 10.3.2-1 HDD: Regional Structure and Integration**




Source: JICA Study Team

**Fig. 10.3.2-2 Organization Chart for the MERCOSUR Database Regional Centre**

### 10.3.3 Proposal to the MERCOSUR Standard Association (AMN) and Promotion of the establishment of MERCOSUR Common Standards (guideline)

During the development of this Study, the counterpart institutes of the four countries and the cooperating companies collaborated in the preparation of the proposal of MERCOSUR Common Standards (Guideline).

In the occasion of the Third Joint Meeting of the four MERCOSUR countries on July 2006 in Montevideo (Uruguay), the meeting was held among members of the JICA Mission, the four countries' counterparts and the person in charge of the AMN Central Office to interchange ideas about the ways of developing the establishment of the proposed Standard.

As result of that meeting, the JICA Study Team made the following statements about future implementation of the standards:

(1) To reconfirm that the institutes from each of the four countries' counterpart institutes will undertake the administration / management of the MERCOSUR Common Standards (Guideline) related to packaging technologies.

(2) As some of the counterpart institutes and local AMN representatives have different policies, it is recommended to implement country-level coordinations.

(3) The request of application to the AMN, for the approval of establishment of Standards in the MERCOSUR, shall be submitted as per the Procedure described in paragraph 6.3.2 herein. However, the participation of private companies association by sectors will be top relevant.

(4) Above request shall be submitted in accordance with the AMN request forms. Notwithstanding it is very important to declare in the form the necessity of organizing the "Packaging Sector Committee (CSM)" within the AMN structure.

(5) Once the request has been submitted, the AMN will answer within a time stated on the regulations. During this waiting time, and in order to reinforce the action of the CSM, a presentation shall be prepared to support the hypothesis under which the approval of the submitted standards will lead to the improvement of transportation and exportation competitiveness to a top worldwide benchmark level.

(6) The official approval of the submitted standards by the AMN is the first step in the enforcement in each country member, based upon the priorities of common regional standards. Furthermore, this will allow enlarging the number of standards to be applied to other products besides dairy products and home appliances.

(7) The AMN Secretariat and the Sector Committee are holding periodical meetings, as per MERCOSUR agreement. They can hand over the proposals (particularly the ones related

to packaging technologies) to a higher level, because they are related to the MERCOSUR Work Sub-group (SGT).

(8) This Study on packaging technology improvement for product distribution within MERCOSUR is relevant not only regarding the information gathered therein, but also because of its technical aspects. Therefore, we recommend the consideration of a systemizing process and its legal application, in the near future.

(9) The AMN will hand over the submitted standards to the MERCOSUR SGT, to receive the final approval and proceed to their enforcement at a regional level. At this point, the standards will be evaluated at an international level, and will become an alternative for the international discussion about regional data.

(10) Finally, there are some projects for improving transportation competitiveness in progress in South America region: IIRSA plan (South American Regional Integration Initiative) through the IDB (Inter-American Development Bank); also through the EPA (Economic Partnership Agreement) / FTA and Market Approach APEC, etc.

All these projects point out the importance of the packaging technology regulations for transportation.

### 10.3.4 Recommended actions to be taken by the counterparts and the private sector

For the performance of this JICA Study, the support of the cooperating companies was essential, mainly in the product-related areas. Figure 10.3.4-1 shows the conclusions regarding the coordinated work performance between counterpart's institutes and private ones. There are some differences among the four MERCOSUR countries, considering international trading aspects and industrial infrastructure, so that we recommend basically a planning of development process focused on these differences in order to achieve future progress.

The JICA mission recommends the construction of a real link between counterpart's and private institutions in order to allow the official establishment of the MERCOSUR Packaging Standards, as well as the formation of a new Containers and Packaging Sector Committee.

The JICA Study's development verification in each of the four countries will be considered as follows:

**(1) ARGENTINA**

The Packaging Association of the private sector and the INTI of the government sector coexist and have interrelationship in this country. The organizational structure of INTI's executive board committee is established and functioned with emphasis on cooperation between the government and private sectors. The technological improvement of the transportation

packaging field, which was implemented with participation of manufacturing sector as a priority area for the JICA Development Study, was informed to the INTI's executive board committee beforehand as well as the progress reports. Therefore, it is expected to establish further active cooperative relationship for the continuous technological development of packaging with a very broad base.

Land transportation media is very important in such an extended territory, and have to be considered in the future. A growth in transportation activities will stimulate exportation competitiveness as well as South American unification, and an approach to the Pacific Ocean will widen the range of exported products by means of export packaging technologies improvement.

**(2) BRAZIL**

The Packaging Association represents the private sector, like in Argentina. Brazil is one of the few world most extended continental countries, and they have historically supported the maintenance of the terrestrial infrastructure. Product transportation damage reduction is a matter to be solved urgently, because Brazilian production is highly diversified and it is scattered all over the country.

INT, INMETRO and CETEA, which are the counterpart's institutions for this JICA Development Study, agreed with the country higher organisms to promote future development on the basis of mutual and periodical cooperation.

Despite the manufacturing facilities, distribution centres and transportation routes are widely spread due to the country's dimensions, material manufacturers agreed to apply the recommended improvement into their plants, independently from their investment plans. The land transportation packaging technology improvements still outstanding in Brazil are countless, considering either the study target products (home appliances) or other market products. It is urgent to create a system based upon sharing this Study process, and to use the databases as an instrument to handle the technologies of the Packaging Association (that unifies counterpart's and private institutions).

**(3) PARAGUAY**

Dairy products are one of the most relevant products of the Paraguayan manufacturing industry, and they have been chosen as target products for this JICA Development Study. Human resources have been developed along this Study, thanks to the close cooperation of counterpart's institutions and cooperating companies.

There is no Packaging Association-alike entity because of local industrial Regulations. Therefore, a unified system shall be organized among the Commerce Chambers, the Export Promotion Sector (Ministry for Commerce and Industry) and Private Institutions in order to

develop transportation packaging technologies. The reason for this is that Paraguay is already exporting its products to Brazil, Bolivia and Peru, and this system will be very supportive for land and river transportation activities.

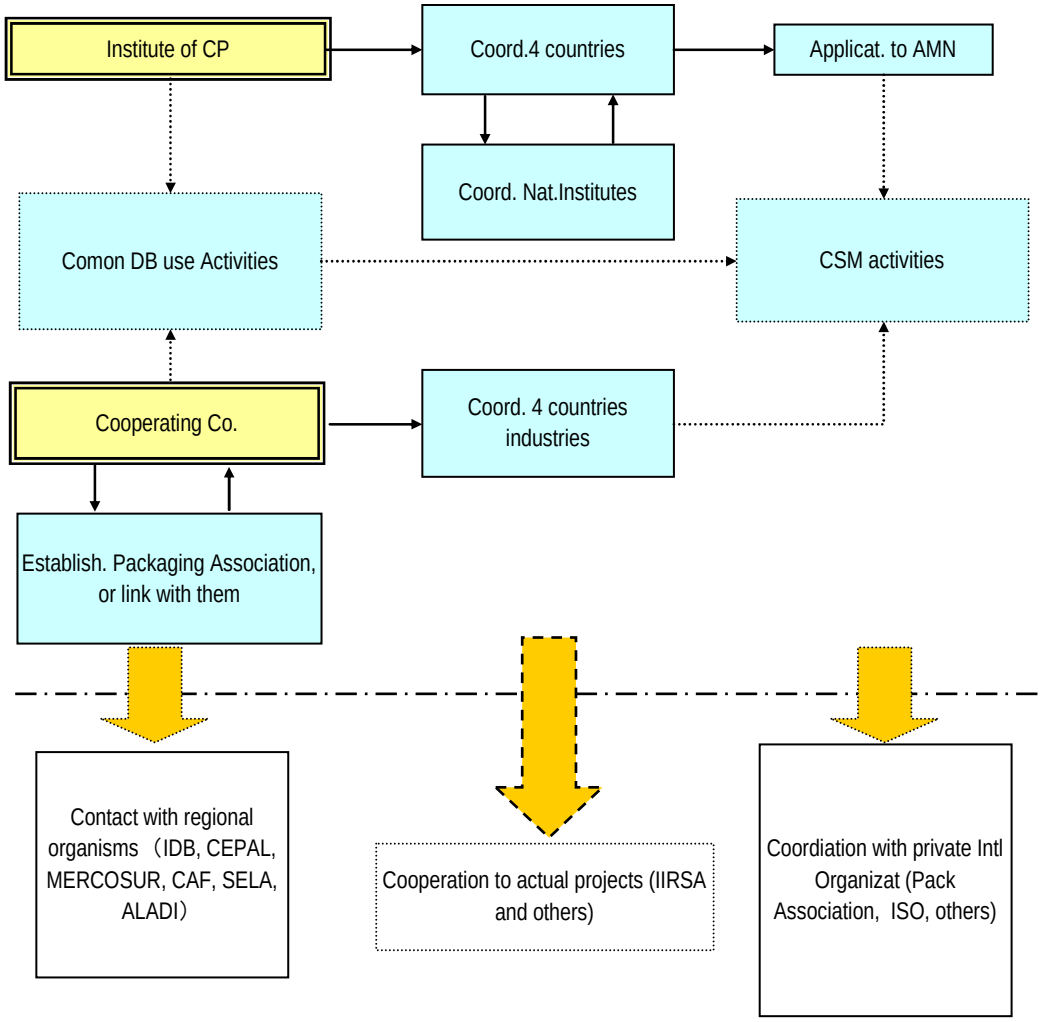
Temperature, humidity and pressure have to be considered as product conservation variables when manufactured food products are transported well above sea level in summer, and particularly to the country's northwest zone. Therefore, the development of a system where the counterpart institute (INTN) undertakes the management of standards involving above variables is of great importance.

**(4) URUGUAY**

The core of the Uruguayan industrial structure is cattle breeding, and consequently dairy products are of main productive relevance, like in Paraguay. The forest sector is now growing in importance as a productive industry, thanks to the subsidies given to the sector since long time ago. The JICA Development Study showed the results of improvements made on primary packaging of dairy product.

Further development will be performed through the common database of counterpart's and private institutions, based on the Chamber of Commerce, because there is no Packaging Association-alike entity in Uruguay. Notwithstanding this we recommend that the new group unifying the packaging technology section and the plastics section should be placed inside the counterpart's institution. We have to pint out that the counterpart's packaging technology section does not have enough equipment, and they are receiving test samples from the private sector. This situation is being handled in equipment shortage for packaging material testing. Therefore, these facilities need to be refurbished.

Below we detail the forest sector development process as a subject of national industry expansion. The counterpart's institution is expectant to develop national cardboard as packaging material. Therefore, forest products would be used as packaging material in the future, and ecological consequences have to be considered.




Source: JICA Study Team

**Fig. 10.3.4-1 Counterpart's Institutions and Private Sector Actions**