final report

Project Code: M.461

Prepared by: Webb technical Group

Date published: August 1994

ISBN: 0 642 36003 0

PUBLISHED BY
Meat and Livestock Australia Limited
Locked Bag 991
NORTH SYDNEY NSW 2059

Retail Ready Packaging for Lamb exported by Air Freight

Meat & Livestock Australia acknowledges the matching funds provided by the Australian Government and contributions from the Australian Meat Processor Corporation to support the research and development detailed in this publication.

Table of Contents

		Page
Executive Summary		1
Introduction		3
Objectives		4
I.	Findings From Work Activities in Australia	5
A.	Discussion with Hills of Darling	5
B.	Issues Relating to Transport of Retail-Ready Lamb Cuts From Australia to Canada	7
C.	Review of Work at Food Research Institute on Project M.461	9
D.	Review of Another Possible Packaging Technology (CS.171)	10
II.	Findings From Work Activities in Canada	11
A.	Present Situation	11
B.	Everfresh Capabilities	12
C.	Desires for Future	13
D.	Distribution	14
E.	Consumer Preference	15
III.	Case-Ready Packaging Technology Review	16
A.	Vacuum Package	16
B.	Vacuum Skin Package (Single Stage)	17
C.	Modified Atmosphere Package	17
D.	Masterbag	18
E.	Vacuum Skin Package Two Stage	19
F.	Australian Modified Atmosphere (CS.171)	19
G.	Modified Atmosphere-Bubble Packaging	20
H.	Case-Ready Packaging Technology Comparisons	21
IV.	Description of Total Retail-Ready Lamb Process	22
V.	Critical Process Changes	23
VI.	Recommendations	24
Appendix	Supplemental Information on Various Packaging Technologies	

Table of Contents - Page 2

List of Tables

Table 1 Case-Ready Packaging Technology Comparisons (Follows Page 21)

List of Figures

Figure 1 The Predicted Effect on Product Temperature When Transfer of Product Occurs Without Continuous Refrigeration (Follows Page 8)

Figure 2 Lamb Process and Product Flow Chart - Shipping to Retail (Follows Page 22)

EXECUTIVE SUMMARY

The Meat Research Corporation contracted with Webb Technical Group, Inc. (Raleigh, North Carolina, USA) to conduct a technical review of MRC Project M.461 and to recommend appropriate retail-ready packaging technologies for the future direction of the project. Meat scientists from Webb Technical Group visited with project participants in Australia and Canada. The project has been reviewed, and findings are summarized. The current packaging technology, which was under investigation, has been determined to be inadequate for the current system of sea transport. Several major changes are recommended in the processing and distribution chain that are considered critical to the future success of the project.

The major recommendations are summarized below:

- There needs to be tighter control on all aspects of the process and distribution system from slaughter through retail display. No matter how perfect the packaging system selected, the lamb cuts will not withstand the current system in order to meet the Canadian market requirements. For example, the system of storage and distribution in Canada is insufficiently controlled to assure adequate quality of Australian lamb products. Improvements in control will reduce the length of shelf-life required.
- The marketing requirements for consumer demands in Canada need to be defined. It is evident that insufficient information has been obtained or transmitted to Australia to adequately assure a successful venture by the Australian lamb industry. However, it should be stated that there does appear to be a desire for retail-ready lamb on the

part of retail store management and meat cutters in the Edmonton, Alberta, market area.

- The capacity to produce the types of retail-ready, packaged lamb cuts in Australia is insufficient; thereby increasing the shelf-life requirements. Technically, this causes the residual color (oxymyoglobin) to be exhausted before the product has an opportunity to "bloom" out in the retail market.
- The total shelf-life for case-ready product meeting the requirements of project M.461 is at least 10 weeks when product is to be shipped in a full size sea container to the western Canada market area.
- The best available packaging system for fresh, small lamb cuts (e.g., chops, steaks) that will approach meeting the requirements for sea shipment of retail-ready lamb cuts is that described as MAP with two stage "bubble" cap (*i.e.*, MAP-Bubble). This system can meet a shelf-life timeframe of approximately 8-10 weeks with three days retail display time. This system will only work if adequate controls are maintained.
- A superior control system throughout the processing and distribution chain must be initiated. This needs to be operated by the same type of approach as a well-defined and implemented Hazard Analysis Critical Control Point (HACCP) program.

INTRODUCTION

In April of 1994, Webb Technical Group, Inc. (WTG) was given the responsibility of evaluating MRC project M461. WTG meat scientists were sent to Australia and Canada to determine why difficulties were encountered when Australian processors attempted to prepare and export retail-ready lamb products to Canadian markets. The meat scientist in Australia interviewed key personnel associated with the project. In addition, this scientist visited the processing/packaging facility, as well as the overseas shipping company that would be used to handle retail-ready lamb products. Another meat scientist was sent to Alberta, Canada to determine the requirements of the Canadian retail market. This scientist obtained information about retail package types currently existing in Canadian retail markets. The system that would be employed for retail-ready lamb distribution was investigated. Also, the Canadian criteria for retail-ready lamb color, purge, and shelf-life were determined.

Other WTG personnel met with the meat scientists who traveled to Australia and Canada to evaluate and discuss the information gathered from the international studies. From these meetings and other packaging research, WTG has generated a report that discusses the findings from the Australian and Canadian investigations, the available packaging technologies, and the best recommendations for producing satisfactory Australian retail-ready lamb items that can be exported and sold in Canadian markets.

OBJECTIVES

The original objectives of this study were to:

1) conduct a technical review of MRC Project M-461.

2) recommend the retail-ready packaging technologies for lamb products being exported from Australia to Canada.

I. FINDINGS FROM WORK ACTIVITIES IN AUSTRALIA

The technical review of MRC project M.461, by the meat scientist from Webb Technical Group, involved discussions with the lead scientist on the project, as well as with the lamb processing plant management. In addition, meetings were held with the overseas shipping company, the CSIRO Meat Laboratory and with a packaging equipment company.

A. Discussion with Hills of Darling Lamb Processing Plant

The Webb Technical Group meat scientist met with Mr. Bill Hill of the Hills of Darling lamb processing plant to discuss various aspects of the MRC project M.461.

1. Description of Plant Capabilities

The Hills of Darling plant is a plant with fewer than 20 employees. The plant purchases live lamb (less than 12 months of age), has animals contract slaughtered at a nearly plant, and the chilled carcasses (typically 3-5°C; occasionally 9-10°C) are shipped to the Hills of Darling plant the day after slaughter to be broken down into various cuts. The carcasses are stored for less than 24 hours in a cooler prior to cutting in a cutting room maintained at about 10°C (50°F). The labor contract calls for the cutting room to be not less than 10°C for worker comfort. The cutting room is staffed by 6 to 8 people. One person operates a small carcass breaking saw, and the remaining people supply carcasses to the breaking saw, cut and trim primal cuts (large cuts), and package the cuts. All of this takes place in a medium sized cutting/packaging room.

Packaged product is stored in a 0°-2°C cooler. It was estimated that approximately four weeks are required to pack a sufficient quantity of lamb for a sea container load.

The plant construction and current sanitation level appeared to be above average but, some changes would be desirable to produce the retail-ready lamb products. Examples of the types of changes which might be needed are included in the Recommendations section of this report.

2. Description of Cuts Desired (B. Hill Perspective)

An integral part of a technical review of this project includes obtaining information on which cuts would be supplied to Canada. During our meetings with Bill Hill, we discussed this aspect of the project from his perspective. Mr. Hill believes that nearly all of the typical retail cuts would need to be supplied. This includes a wide range of package sizes and weights when one considers cuts ranging in size from whole leg of lamb to loin chops.

With respect to package weights and piece count/package, Mr. Hill was not able to supply specific cut-by-cut guidelines, but mentioned that the weight per package should be towards the smaller size. He further mentioned that four retail packages per "mother pack" would be appropriate. He also volunteered that one retail package per "mother pack" would be ideal. A solid polystyrene tray would be acceptable as the "tray" part of the package. As far as colors are concerned, Mr. Hill felt that white or black would be acceptable.

B. Issues Relating to Transport of Retail-Ready Lamb Cuts From Australia to Canada

Our meat scientist also met with Mr. Charles Masters, of the Columbus Line, to obtain further information relative to shipping retail-ready lamb cuts to Canada. The Hills of Darling plant routinely uses Columbus Line to ship product to Canada.

Retail-ready cuts are extremely perishable, and therefore, temperature control at approximately 0° to 1°C (minus 1° to 2°C would be better) is of utmost importance. At any point where a container may be off refrigeration, as when transfers occur, it is important to understand the degree to which the product inside the container may be subjected to higher than desirable temperatures. Because tight temperature standards are extremely important, we highlight the following points where the container is off refrigeration:

1. At the processing plant - The empty container arrives at the plant, and since it has no on-board refrigeration, the internal temperature may be several degrees above whatever the outside air temperature is. Ambient air temperatures of 40°C (104°F) are possible during the warm season.

2. During loading of the container and transporting back to the shipping dock, as described above, the product will not have active refrigeration. If the mass of the product is chilled before loading, some resistance to increases in temperature

during the trip to the shipping dock will help. However, this increase in product temperature only adds to the total burden of decreasing product shelf-life.

3. Transfers occurring while the sea container is in transit allows for sea containers to be held for up to 2 hours without refrigeration. This has been standard for shipping line contracts to allow for loading, unloading and transfer operations. Nevertheless, depending upon ambient air temperature and solar conditions, this will cause a problem with product shelf-life

.

See Figure 1 for an illustration as to how product temperature might be affected when transfers occur with containers off refrigeration.

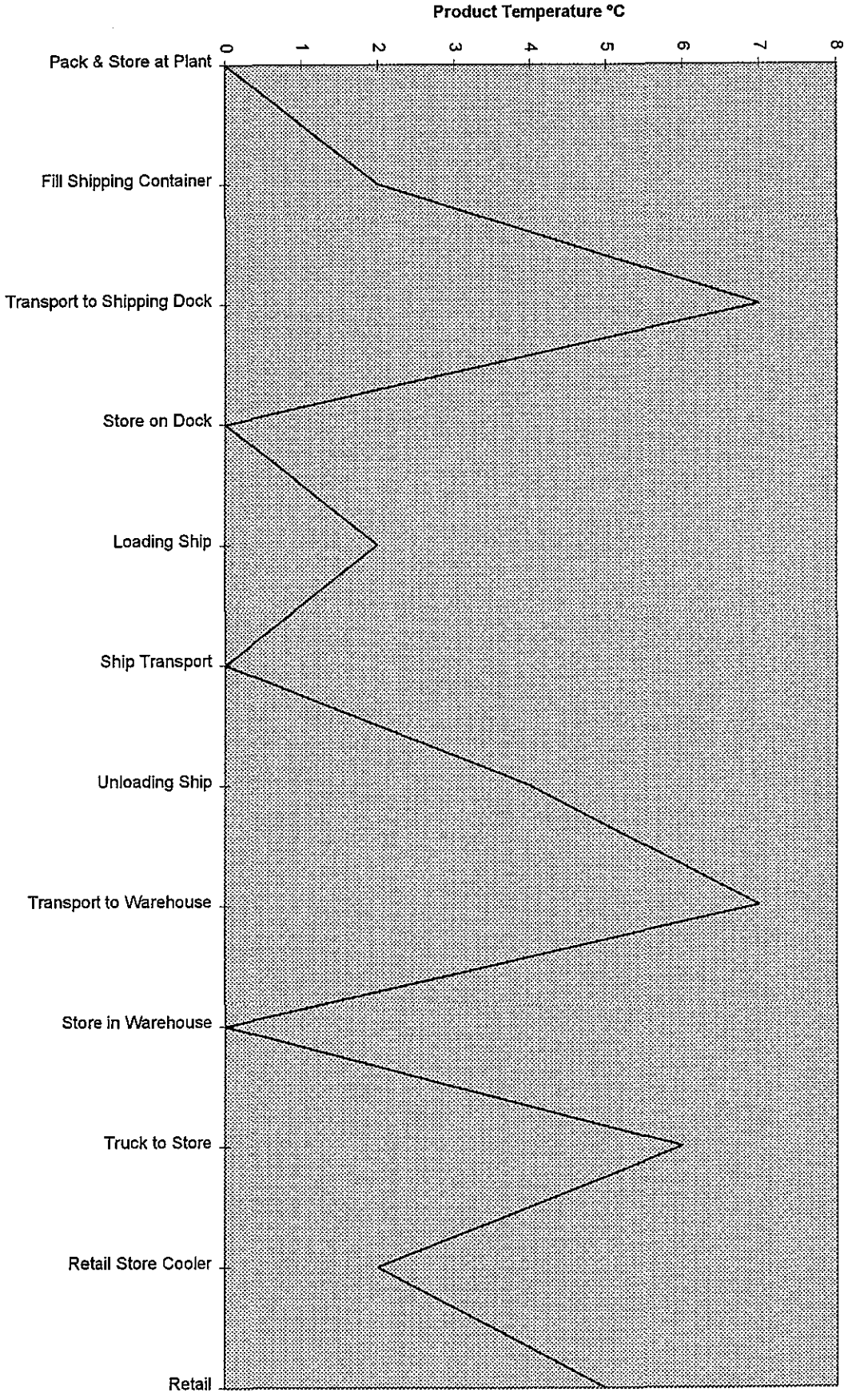


Figure 1. The predicted effect on product temperature when transfer of product occurs without continuous refrigeration. (Using Sea Transport)

C. Review of Work at Food Research Institute (FRI) on Project M.461

Our meat scientist reviewed the work performed under project M.461 at the Food research Institute. The project leader for this project is Dr. Ray Mawson. Due to illness, Dr. Mawson was not available the day of our visit, but we were able to interview him by phone during our visit to FRI.

Originally the project team had wanted to try the Ossid 500 machine with CO_2 flushing for the retail pack and a Multivac with CO_2 flushing for the "mother pack". The Ossid machine was never made available by Cryovac because of their concern that it would not achieve a low enough oxygen level in the retail pack. Due to the lack of availability of the Ossid machine, the research team proceeded to try other packaging methods for the primary retail package. They decided to simulate a vacuum skin package (VSP) by using small bags made with O_2 permeable film as the outer skin pack. Meat samples were placed on either expanded polystyrene (EPS) or solid plastic trays, and the packages were vacuumed and back-flushed on a chamber-type vacuum machine. These retail packages were then placed in a "mother pack" formed on a Multivac 7000. The Multivac had been modified to increase vacuum and to increase CO_2 back-flush pressure within normal machine cycle times. An oxygen level of 180 to 200 ppm in the atmosphere of the "mother pack" was achieved during the initial trials. The packages were held at 1° to 2°C for shelf-life testing.

The results of the testing revealed that the packages which used EPS trays spoiled in less than 28 days, whereas the meat in packages which used solid plastic trays were still not spoiled; and color remained very good when the test was terminated at 28 days. The reason given for testing only to 28 days was that the original plans called for air freight as the means of shipping product, and under this scenario, a 28 day shelf-life would have been sufficient. The most likely reason for the EPS tray product spoiling was the presence of air within the cells of the EPS tray which resulted in an oxygen level within the "mother pack" which allowed for the rapid growth of spoilage bacteria. The project was terminated at this point, and no shipping trials have been completed.

One technical problem, which Dr. Mawson felt was in need of resolution, was the flexibility of the film he used in the VSP package. The particular Cryovac film he used in his tests was reportedly not flexible enough to provide a true vacuum skin. A follow-up phone call between our meat scientist and Cryovac revealed that this film was Cryovac RD106.

D. Review of Another Possible Packaging Technology (CS.171)

The MRC had also asked our meat scientist to review another project, CS.171, which had been conducted by the CSIRO Meat Laboratory, under the direction of Mr. Barry Shay. This project had proceeded to completion and utilized some similar technology to that used in project M.461.

The main relevant differences between the two projects were that the researchers in the CS.171 had access to a true VSP machine and that they ran the lamb product tests out to 6 weeks storage at 0°C. The researchers in this project found that in order to maximize shelf-life, it was necessary to achieve an oxygen level in the "mother pack" of less than 0.3%, with 0.03% being both achievable and more desirable. The film oxygen transmission rates used in this study were: mother pack film <10 mL/m^2/24 hr.; VSP (Cryovac) 2100 mL/m^2/24 hr.

The results of this research indicated that retail-ready lamb, packaged as described above, was capable of achieving a six week shelf-life at 0°C, including a 2 day retail display shelf-life. Mr. Shay predicted that it may be possible to achieve 8 to 10 weeks if the product were stored at -1°C throughout the storage period.

II. FINDINGS FROM WORK ACTIVITIES IN CANADA

A. Present Situation

Lamb sales make up a rather small portion of the total retail meat business in Canada, approximately one to three percent of sales. This averages three to four boxes of lamb per store per week, with some stores selling almost none to others moving upwards of eight boxes on an average annual basis. Many stores appear to either sell lamb predominately fresh or frozen, normally not both ways in the same store. Much of the lamb is imported from either New Zealand or Australia. The Safeway retail chain, for example, is now selling frozen New Zealand lamb in a vacuum skin, printed retail

package. However, they are in the process of switching to Australian lamb from Everfresh for the fresh meat case. Our meat scientist viewed various stores in Edmonton and the surrounding area. All stores displayed at least some lamb. The small stores had shoulder chops only and the larger establishments displayed more variety. Package sizes were small with weights of about 0.75 lb. (0.35 kg) in rib or loin chops. Some packages of shoulder chops were less than 0.5 lb. (0.2 kg).

The government inspectors rigidly enforce clean up between species at the retail level. The average union wages in the stores in the Edmonton area are just above the twenty dollar per hour level, and fringe benefits are rather high. In addition, labor laws are quite strict. Therefore, the cost of labor alone is quite high and is one of the primary driving forces behind the desire to have a fresh case-ready program in lamb. Gross profit in lamb is normally figured at about 40% (compared to beef and pork's gross rate of 25% to 28%).

B. Capabilities of Everfresh

Everfresh is a meat brokerage-type business. One of the things which sets them apart from other brokers is that they assume ownership of the meat. They do business internationally, dealing with such countries as Australia, Canada, Mexico and the United States. The volume of business approximates over 100,000,000 pounds of meat annually.

One retail store, which is an upscale butcher shop, is operated by Everfresh. Since they do not sell meat retail-wrapped, this store should not be considered part of this project.

At the time of our visit, the Everfresh people did not provide us with names of retail chain store contacts from whom we could ascertain lamb cut specifications and volumes of lamb cuts required. While this put us at a disadvantage in determining marketplace needs, we visited several retail stores to determine the types of cuts, package sizes, package types and display temperatures.

C. Desires for Future

Based upon discussions with the Everfresh people, several important factors came to light. The desire to go to case-ready is shared by both management and the work force. Management's desire is to have lamb in the counters without the current high shrink and labor costs now seen in the fresh case and to have consistent quality levels in *all* stores. It must be understood that stores in Canada can be at great distances apart, and monitoring activities in some stores is difficult at best. Management also wants a product that can be controlled with respect to the price charged to the consumer. Subsequently, they would desire to have the product weighed and bar coded coming into their stores.

The cutters are unconcerned about the loss of work represented by a retail-ready lamb program since most do not do the volume of lamb to justify the time. Many view lamb as an extra aggravation. Stores would likely have to get combo boxes of packages of middle meat chops and/or shoulder chops and other cheaper cuts. Stores catering to the carriage trade (upper class clientele) would order more of the middle meats while others could

order more of the lower priced cuts. Legs and other roasts could be unitized together in a box.

D. Distribution

Perhaps, the most difficult challenge in this project is overcoming the complex distribution system that case-ready lamb from Australia to Canada must traverse. Product must come either via air or sea. Obviously, air is more expensive, yet many times quicker. Another pitfall of air transport is the fact that most, if not all, product shipped by air is transferred in Hawaii and, as a consequence, is exposed to high temperatures on the airport tarmac. According to the Everfresh people, it is not uncommon to have product shipped by air that approaches 50°F on top of the stacks. For a case-ready package, this temperature level would prove devastating.

Sea transport presents its unique temperature hazards as well. Although the time of travel is normally stated at 22 days from Australia to Vancouver, BC, the actual time is normally longer by a minimum of several days. Add to this, production time necessary to accumulate sufficient product, more time to get the product to the docks for loading, plus the time to get the product off loaded, transferred into a secure warehouse, inspected, transported to yet another warehouse, and then shipped to the stores (some at great distances). With all these steps, the minimum age upon arrival to the retail stores may be 6 to 7 weeks from the time of packaging. Assuming the stores will not be able to order with exact accuracy, the product will need two to four weeks shelf-life remaining. Under the present plant capacity and distribution scheme, the successful case-ready lamb program will need product with approximately ten weeks or greater total shelf-life.

Fortunately, the temperatures of sea transported product can be much better controlled than product shipped by air.

Temperatures at the retail level are somewhat typical. We observed instances where freezing was occurring in the rear of the case and other situations where product was 55°F in the retail case. Although truck receiving at stores was not observed, it would be safe to assume that the same problems (*i.e.*, occasional elevated product temperatures) found in the US stores would be found in Canada. Ambient temperature will be a positive factor during much of the year, however, since the market is in a cooler geographic area. Figure 1, discussed previously, illustrates the realistic temperature of the product under current loosely controlled conditions at various points in the distribution system.

E. Consumer Preferences

The consumers in Canada are not unlike those in the US. Fresh meat is preferred over frozen meat, even though the consumer will then freeze the product at home. Store-packaged product is preferred over prepackaged, although this is gradually changing. Purge (free meat juice in the package) is a major detriment to sales. For example, vacuum packed boneless pork loins, sold widely in the US, will not sell in Canada due to purge. Proper trim and product presentation are critical issues to a successful meat merchandising program.

III. CASE-READY PACKAGING TECHNOLOGY REVIEW

In a careful review of current case-ready technology, there are numerous companies from a film and from an equipment manufacturer's perspective. There are an endless variety of combinations, further complicated by the fact that in different countries, technology will oftentimes be associated with different companies. Although we are aware of much of the propriety work that is being conducted, we will only discuss what is publicly available information.

In an effort to simplify an explanation of what is on the market, we have categorized case-ready packaging into seven separate technologies. There are, of course, variations of each, but basically, these seven are inclusive of all available technologies. This report will list each category, describe the process and technology and then explain how each technology applies to this project. In addition, Table 1, which summarizes each category relative to several package attribute requirements, is included at the end of Section III.

A. Vacuum Package

This type of package is one of the first types of case-ready packaging that has been used in the retail trade. Basically, this process involves placing meat into a pouch or barrier bag, evacuating the air, and heat-sealing the bag. Shelf-life of the product in this package is 30 days or longer.

Although this type of technology is time proven, there are some rather serious drawbacks, the first of which is that the meat is in the reduced myoglobin (purple) stage. Bone-in product is possible, but the use of thicker bags is required, creating less acceptability by the consumer. Purge can be a serious drawback; even a small amount is very visual to the consumer.

B. Vacuum Skin Package (VSP) Single Stage

This package is similar to vacuum, has a long shelf-life, and is a sound, time-tested system. It is perhaps the most widely used retail packaging technology in existence in the meat industry. It is distinguished from a vacuum in the fact that two films are used: a lower forming film which molds itself to the meat and a second sealing film which is flat. This is the technology that Excel is currently testing in some stores in the United States (see new brochure in Appendix). The package that Excel used 6-8 years ago was a vacuum package.

The drawback to this system is the same as for vacuum packaged product. Color of the meat is not the desired bright, oxymyglobin. This is a problem for the consumers, as evidenced by the lack of success by Excel. Again, purge can be a very serious problem.

C. Modified Atmosphere Package (MAP)

This type of package is a deep dish of semi-rigid barrier film or tray into which the product is placed and a flat lid stock of flexible barrier film. Another version of this packaging technology is seen when product is placed in a high walled tray and then completely sealed with a barrier film. This type of packaging is used to a large

extent in Europe. ConAgra is now selling its Healthy Choice Ground Beef in this type of package, as are most of the ground poultry items. This technology uses a highly oxygenated atmosphere which surrounds the meat. The headspace is required to be of a height to allow for a sufficient ratio of atmosphere to meat.

This package has a pleasing color to the meat due to the high oxygen content of the atmosphere. However, the shelf-life is limited to about two weeks. That coupled with the high headspace, causing low shipping cube utilization, are both serious problems based upon the objectives of this project.

D. Masterbag

This type of system, along with all further ones discussed, are of a two stage nature. This is defined by the meat in the retail package being initially subjected to a shipping atmosphere and then at time of display being exposed to normal atmosphere. The masterbag approach is one in which meat is retail-packed into a traditional foam tray with PVC overwrap. Several of these packages are then placed in a barrier bag in which a highly oxygenated atmosphere is flushed. This type of system is very consumer-friendly with the retail packages being indistinguishable from store-wrapped product.

The primary problem with this system is that the shelf-life is only about two weeks, as is the situation with all highly oxygenated atmospheres. This system also requires significant headspace in the primary stage.

E. VSP Two Stage

This system is a two stage process. The difference between it and the masterbag is that this system uses an inert (vacuum) shipping atmosphere in order to obtain longer shelf-life. The package resembles a typical VSP package except that the forming film is laminated with a permeable portion closest to the meat and a barrier portion on the upper side. Upon display, the nonpermeable film is peeled off, leaving the thin oxygen permeable film over the meat which allows the meat to bloom. Safeway is currently testing this type of package in some stores in Canada.

Shelf-life of this product is about four weeks (Safeway stated that they were allowing six days in stage one and another three or four in stage two). Like vacuum packed or traditional VSP, purge can be a problem. The use of bone-in product is problematic.

F. Australian Modified Atmosphere (CS.171 Project)

This system can really be considered a version of the VSP Two Stage Process. It is mentioned as a separate system because of the involvement that it has played in the CS.171 Project. The experience in this project has shown that the presence of even comparably small amounts of O_2 causes problems with blooming. This is a rather significant problem with this type of technology. Low levels of O_2 cause a permanent discoloration. With a VSP package, it is difficult to reduce oxygen to levels low enough to prevent formation of metmyoglobin. If the vacuum is increased to very high levels to reduce the oxygen levels, then purge can become a problem. In addition,

the oxygen that adheres to the meat under the film can be sufficient to cause problems. These problems are applicable to VSP Two Stage, as well.

G. MAP - Bubble Packaging

This modified atmosphere packaging (MAP) process also uses a two stage process with an inert shipping atmosphere, and at the time of display, normal atmosphere comes into contact with the meat. The major difference between this system and the VSP Two Stage or the Australian modified system is the fact that meat is not in direct contact with the film. In fact, one of the advantages of this system is that the film is in about the same contact with the meat as traditional store-wrapped product. This allows for less chance of residual oxygen to adversely affect the color. A higher vacuum can thus be utilized. Because the atmosphere immediately around the meat is flushed with nitrogen and carbon dioxide, any residual oxygen is diluted. This process has several other advantages. The retail packages are very similar to the traditional packages. Also, the package is made of PET materials, so recycling is made quite feasible. Purge does not seem to be a problem since the meat is under no pressure, and the film is not tightly adhered to the meat. Another factor that can be significant, especially in low volume products such as lamb, is the fact that each pack is self-contained. Therefore, single packages can be opened up without exposing additional packs to the second stage (an aerobic atmosphere). Headspace is needed with this system, but in less volume due to the configuration of the package.

H. Case-Ready Packaging Technology Comparisons

Table 1 summarizes several key package attribute requirements and whether or not a given packaging technology is able to meet the specified requirement. This information is useful in selecting the best technology for use in this project.

Table 1. Case-Ready Packaging Technology Comparisons

	Packaging Technology						
Package Attribute Requirement	A	B	C	D	E	F	G
Over 30 day shelf-life	Y	Y	N	N	N	Y	Y
Efficient cube utilization	Y	Y	N	N	Y	?	?
Acceptable purge (Canada)	N	N	Y	Y	?	Y	Y
Acceptable bloom	N	N	Y	Y	Y	Y	Y
Prepricing Capability	Y	Y	Y	Y	N	Y	Y
Familiar package	N	N	N	Y	N	N	Y

Identification of Packaging Technologies and Table Notations

A Vacuum Package

B VSP Single State

C MAP Package

D Masterbag

E VSP Two Stage

F CS.171 Project

G. MAP Bubble Package

Y = Meets package attribute requirement

N = Does not meet package attribute requirement

? = Insufficient information ot make determination

IV. DESCRIPTION OF TOTAL RETAIL-READY LAMB PROCESS

The product targeted for display in Canada is produced by a process, and it should not be viewed as just a packaging technology. The process used to produce this product begins at the time of acquiring the live lamb and ends when the consumer eats the product. The process is described in Figure 2. Information on product temperature, refrigeration conditions, and "processing times" are also shown. "Processing times" is a term used for the elapsed time for a step in the process to be completed.

On page 2 of Figure 2, two possible modes of transportation are shown with accompanying data on "process time" and refrigeration conditions. When product is shipped by air, the elapsed time from loading the air container to retail display is 3.5 to 4 weeks; when shipped by sea, this time becomes 11-12 weeks (an absolute minimum of 10 weeks).

As shown by the charts, there are several points at which less than optimum refrigeration conditions or lengthy "process times" occur, both of which will work against maintaining optimum product quality.

Figure 2. LAMB PROCESS AND PRODUCT FLOW CHART (PAGE 1)

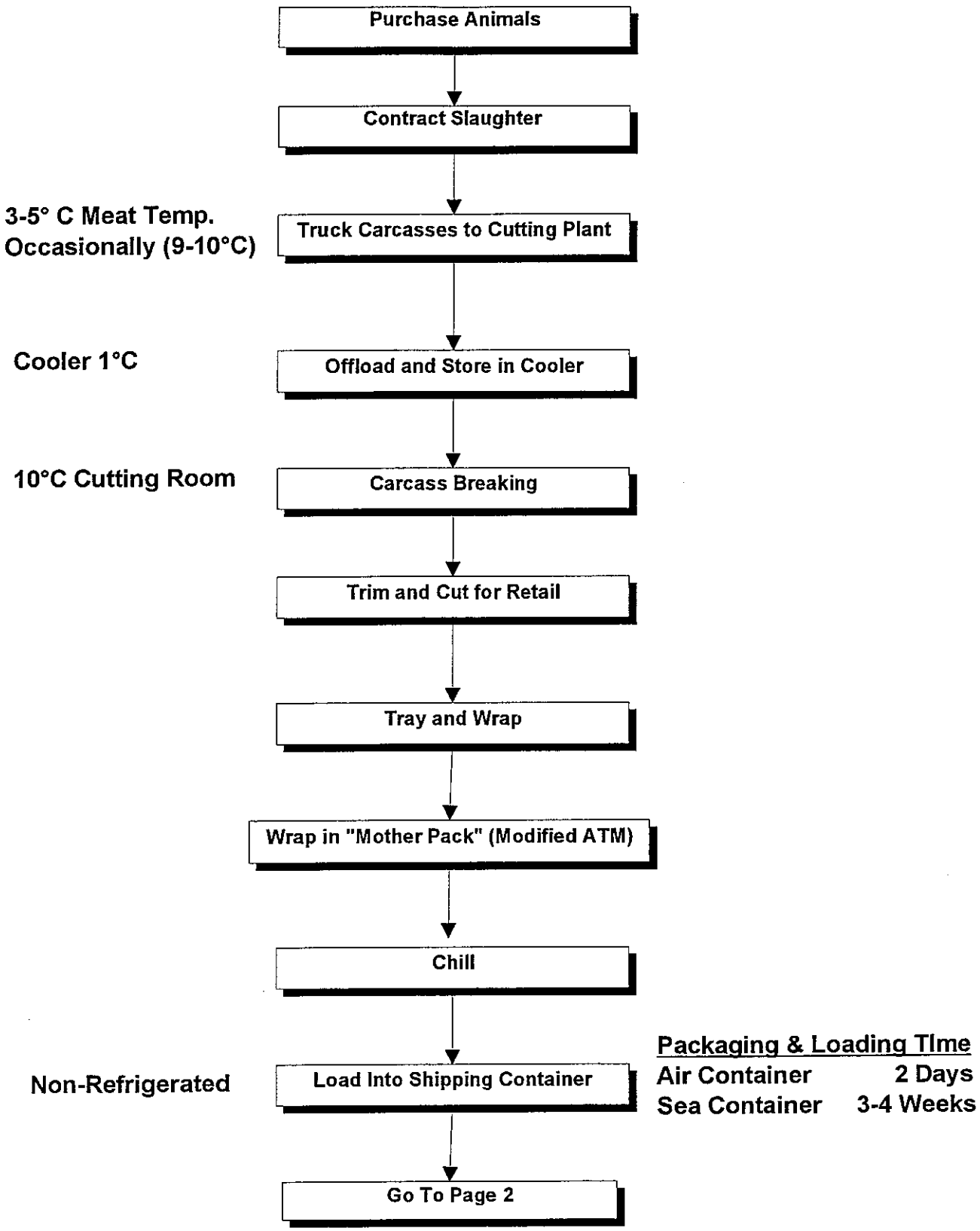
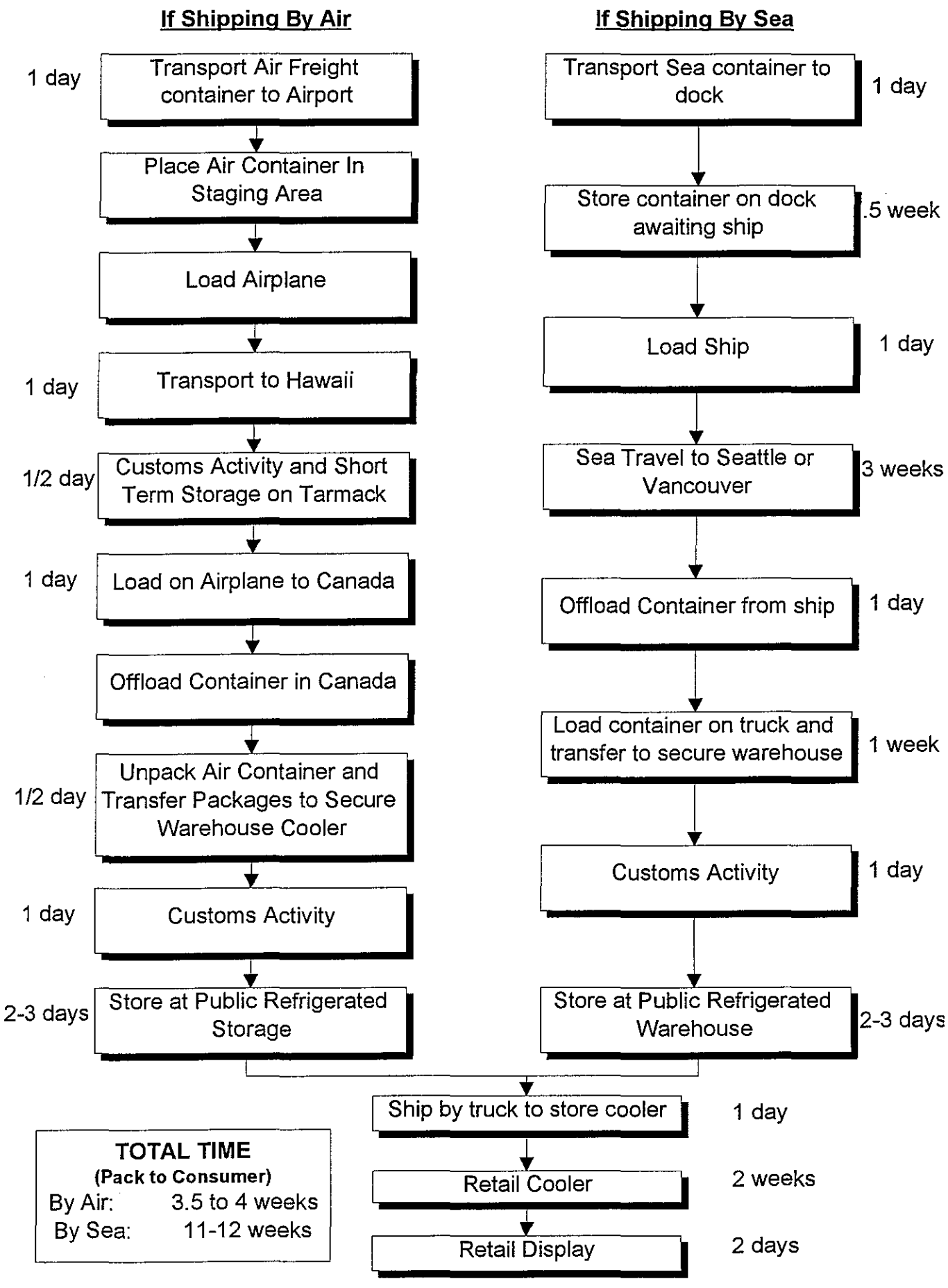


Figure 2. LAMB PROCESS AND PRODUCT FLOW CHART - SHIPPING TO RETAIL (PAGE 2)



V. CRITICAL PROCESS CHANGES

A. Plant Changes

1. Lower cutting room temperature of 4°C (40°F)
2. More rigid sanitation procedures
3. Expansion of refrigerated area where packaging would take place.
4. Higher speed cutting and packaging line to gain valuable distribution time on this highly perishable product. In other words, fill the shipping container faster.

B. Packaging

Consider using two different types of packaging technology due to different size of meat cuts (e.g., roasts versus chops).

C. Shipping Container Handling

1. Air Cargo - Better method of packing to assure proper temperature maintenance.
2. Sea Container
   a. Prechill with auxiliary refrigeration prior to loading.
   b. Assure proper product temperature maintenance during transporting container between plant and shipping docks.

D. Reduced Product Handling and Transfers

Re-examine distribution to see if fewer transfers are possible.

VI. RECOMMENDATIONS

As discussed previously in this report, there are many requirements which must be met in order for retail-ready lamb to have the required shelf-life and to have appeal to retail customers in Canada.

Until recently, the technology to produce consumer acceptable retail-ready lamb with long shelf-life has not been available without prohibitive capital investment. In addition, the high capital investment for equipment and the uncertainty over consumer acceptance of a new packaging technology have made potentially innovative meat processors uneasy with taking the risk involved with implementing a retail-ready lamb package into their product offering. In the case of lamb, the relatively low market volume makes it even more difficult to justify the high cost of entry into a retail-ready packaged lamb program. Simply stated, there have been less desirable (*i.e.*, high labor input) and somewhat inadequate (*i.e.*, high waste) means of supplying fresh lamb cuts to retail customers in Canada.

After careful consideration of the Australian lamb processor capability, the distribution system, the Canadian requirements and the currently available packaging technologies, we have come to the conclusion that in order for success to be obtained, the following steps should be taken.

This is what we recommend for the future direction of the project:

A. Outline of Recommendations

- Conduct a thorough market survey of the Canadian retail sales potential. This is always the place to start with any enterprise.
- Initiate Stage 1 Production
  - Initiate changes per Section V, "Critical Process Changes"
  - Make available MAP-Bubble Packaging for packing the products at the plant.
  - Ship narrow range of product by air freight for first 4-6 months
  - Continue to conduct shelf-life tests.
  - Monitor consumer acceptance at selected retail stores.
- Initiate Stage 2 Production
  - Begin larger shipments by sea
  - Verify continued consumer acceptance

B. Details of Recommendations

Although the importer (Everfresh) has stated that they can sell retail-ready, fresh lamb cuts in Canada, the market has not been sufficiently evaluated by them. We would recommend a brief market evaluation be performed to answer the question of whether or not the retail chains in Canada would actually buy the products and what are the specific types of requirements by both the market managers and the consumers. If so, what kind of volume would be anticipated. This market survey would involve surveying

two to three major retailers in the Edmonton area. Questions asked would be directed to meat merchandisers, and we would obtain the following types of information:

A. What types of cuts and package styles would consumers buy in retail-ready lamb? (e.g., Would consumers purchase whole leg of lamb and shoulder in a VSP non-permeable film package if attractively presented?)

B. How much would each chain anticipate buying initially and on a continuous basis?

C. Confirm what cuts are desired.

As stated above, Everfresh has only one store of their own, and it is not the type of store which would utilize retail-ready lamb since it has a service-type meat case where customers ask for and receive cuts from a meat department employee. Although Everfresh took our meat scientist to various retail operations, they were not able to put our representative in direct contact with retail store merchandisers. Therefore, we were only able to get a general impression of retail needs while our representative was in Edmonton. We attempted to directly contact various retail headquarters while we were in Edmonton but were unable to arrange meetings to discuss the market demand which they would anticipate having on retail-ready lamb. We can overcome this problem by planning and direct contact ahead of time.

Assuming a positive result from the recommended market survey, we suggest a two stage approach to addressing this market, which is similar to the approach planned for M.461.

Stage 1 Recommendation

This stage will be a rather short term approach. In this stage, we recommend both the upgrading of the lamb processing facility, as discussed under the "Critical Process Changes" section above, as well as the purchase/lease of a MAP - Bubble packaging machine. In addition, we recommend that the product be shipped by air freight initially, with a better method of packing to assure a more acceptable and reliable product temperature profile. This would most likely involve more dry ice and auxiliary insulation in the air freight container. Since this is an export project, we recommend that the Hills of Darling operation approach an appropriate agency within Australia to provide a short term subsidy to offset the cost of the air freight.

This stage would last approximately 4-6 months, and it will accomplish the following:

a. Verify the specific market requirements and to monitor consumer acceptance of product.

b. Build volume.

c. Allow for experience with the shipping of the product and for refinement in processing and packaging techniques.

d. Allow for FRI to conduct shelf-life tests to verify that 10-12 weeks of shelf-life are attainable

e. To plan for adequate facilities for packing retail shelf-ready lamb cuts in sufficient volume to reduce sea container loading time to less than 10 days.

Stage 2 Recommendation

Following successful completion of Stage 1, above, we recommend implementing Stage 2, which is a longer term program. In this stage, the processors should be prepared move to pack larger volumes for shipments by sea. In order to do this, the processor will have to enlarge his facility in order to produce enough product to fill a sea container faster or use an alternative packing system. We anticipate that retail-ready lamb product packed by the MAP - Bubble system in the present Hills of Darling plant would take about four weeks to complete. The cutting and trimming capacity should be increased to provide for a sea container loaded within 10 days, which would result in more nearly meeting the shelf-life requirements.

Alternative Packing Arrangements

If the Hills of Darling cannot supply the needed volume for the Canadian market within the specified time limit (*i.e.*, <10 days) or if the funds are not available for the facility upgrade and packaging equipment, alternative arrangements which might be considered are:

1. Co-op packaging - several processors could share in the expense and benefits.
2. Co-packing arrangement by Hills of Darling.

Alternative Packaging TechnologyRecommendation

We recognize that providing only one packaging technology for the future direction of the project may be too limiting when one considers all factors, such as machine availability, lamb cutting plant requirements, shipping method limitations, and in-place barriers to change. With this in mind, we also offer an alternative packaging technology for consideration. From a technical standpoint, this alternative is not as attractive as our primary recommendation; but it may be a good alternative if the MAP bubble package is not an attractive option to the project participants.

The alternative packaging technology which could be considered is the technology utilized in the CS.171 Project. As summarized in Table 1, this technology has a shortcoming since it is not readily familiar to the retail customer since it has a much different appearance than the standard stretch wrap PVC retail package. If this alternative is pursued, consumer acceptance of this package may need to be tested prior to purchasing machines to produce product. One other shortfall of this technology is that it will only deliver a six week shelf-life at 0°C. If this technology is adopted, it will be necessary to conduct the market survey and to continue with the "Stage 1 Production" phase outlined under Section VI.A.

The capital investment for this alternative recommendation will most likely be higher than for our primary recommended packaging technology. However, the commercial partner involved in the project may find the alternative works better for them.

APPENDIX

Supplemental information on various packaging technologies.

VACUUM PACKAGING

MANUFACTURERS (EXAMPLE)

- Multivac

- Dixie Union

M.461 - Retail Ready Packaging for Lamb exported by Air Freight

MULTIVAC
PACKAGING MACHINES

Multivac, Inc.
1414 WEST 29TH, KANSAS CITY, MISSOURI 64108

1015

DIXIE VAC

M.461 - Retail Ready Packaging for Lamb exported by Air Freight

Produktschutz und Präsentation in Perfektion

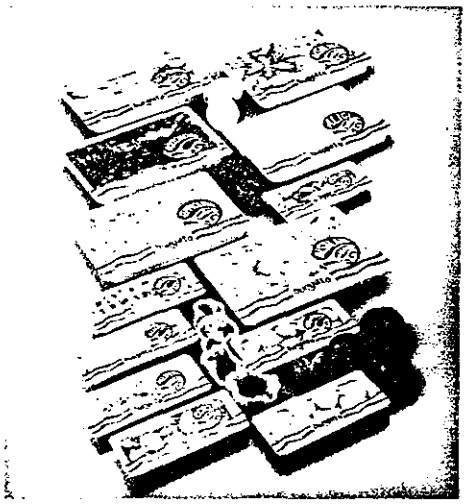
Jedem Kunden seine betriebs-, branchen- und produktspezifische Form-, Füll- und Verschließmaschine anbieten zu können — das ist das Ziel der **DIXIE** UNION. Das Angebot reicht von der einfachen Standardmaschine **DIXIE** VAC 2000 E bis hin zur technisch hochwertigen **DIXIE** VAC MODULAR in Modularbauweise. Ob Frischfleisch, Wurstwaren, Fisch, Käse oder Backwaren, flexibel oder standfest, evakuiert oder mit Atmosphärenaustausch, keine Packung ist diesem Verpackungssystem zu schwierig.

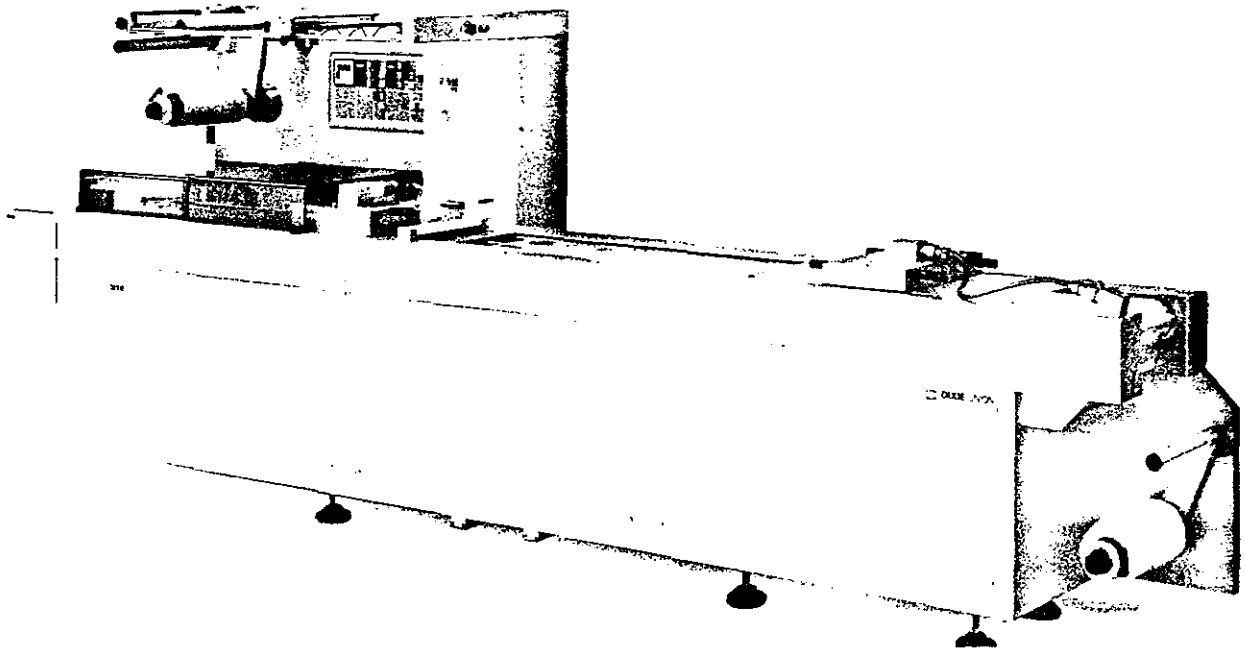
Product protection and presentation in perfection

The aim of **DIXIE** UNION is to be able to offer every customer a form, fill and seal machine suitable for his specific business and product. The offer ranges from the simple, standard machine **DIXIE** VAC 2000 E to the technical, high quality **DIXIE** VAC MODULAR in modular construction. Whether it's fresh meat, processed meat and sausages, fish, cheese, bread, cakes or pastries— flexible or rigid—evacuated or with atmosphere exchange—no package is too difficult for this machine.

Protección y perfecta presentación del producto

El objetivo de **DIXIE** UNION es ofrecer a cada cliente la máquina de envasado que se adapte a su producto y las especificaciones del mercado. La gama de modelos va desde la termoformadora standart **DIXIE** VAC 2000 E a la termoformadora de concepción modular de alta tecnología **DIXIE** VAC MODULAR.
DIXIE garantiza el acondicionado al vacío o con inyección de gas, con film flexible ó rígido en cualquier aplicación: carne fresca, salchichas, pescado, queso, pan, pastelería, etc.



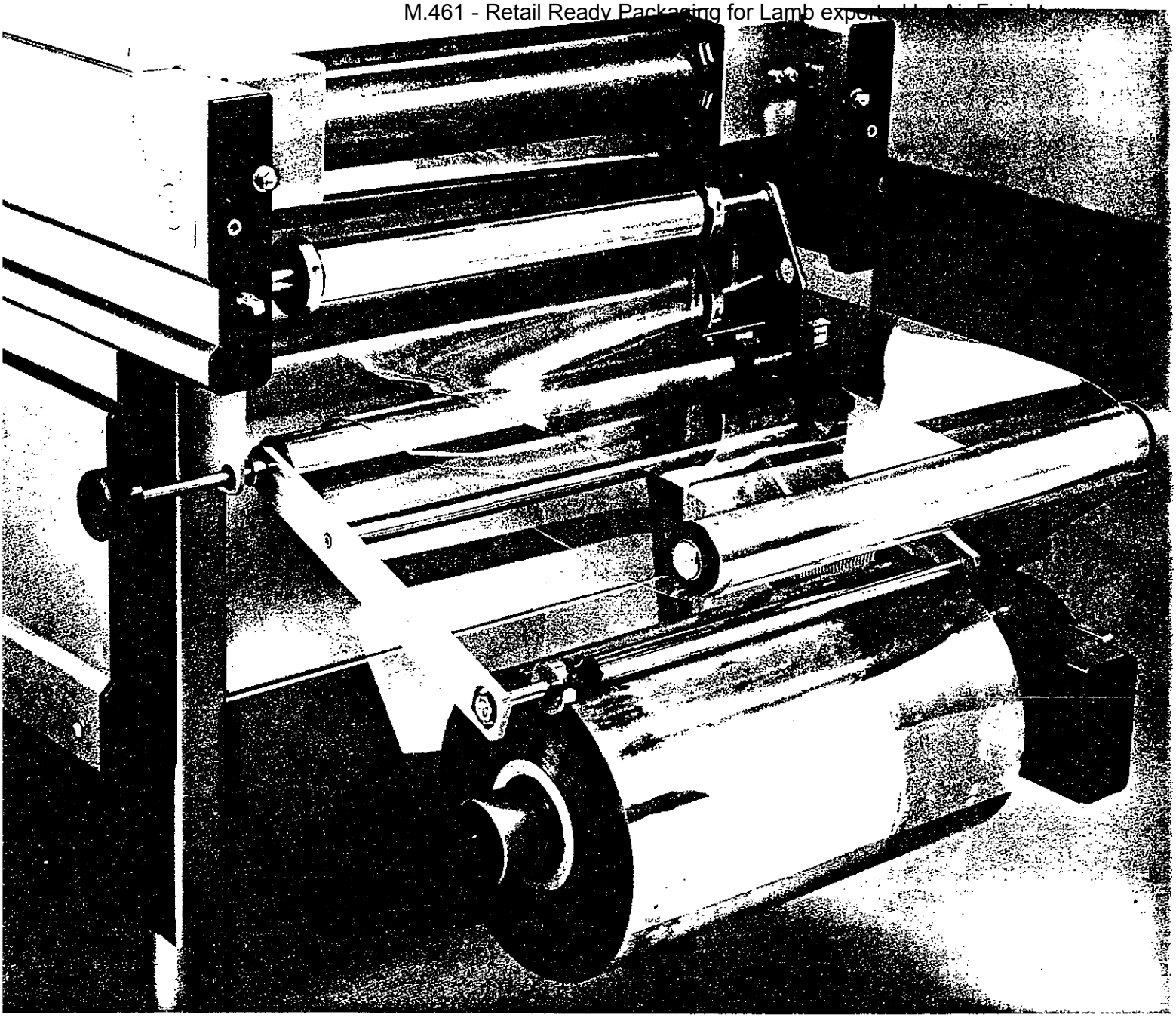


VSP SINGLE STAGE

Manufacturers:

- Multivac

- Dixie Union



The Rollstock Machine Range.

MULTIVAC

USDA CHOICE
GRAIN-FED BEEF

DOUBLE DIAMOND
BRAND
VACUUM·SEALED
FRESHNESS

EXCEL

VACUUM SEAL LOCKS
FRESHNESS IN

Beef At Its Best

EXCEL

DOUBLE DIAMOND BRAND VACUUM-SEALED FRESHNESS

Fits Today's Needs

For Consumers:

- Great Taste, Everytime
  - USDA Choice Grain-Fed Beef
- Stays Fresh Longer
  - Meal Planning Flexibility
- Easy, Customized Cooking Directions
- Freezer Ready Package
  - No Repackaging
  - No Freezer Burn
  - Beef Stays Juicy
  - Recommended Freezer Life
- Product For Today's Life Style
  - Trimmed To An Overall 1/8"
- Convenient Sizing
- Can See Product Through Package
- Tamper Evident Packaging

For You:

- Known Cost / Known Sell
  - Eliminates Variability
- Manage Your Case To Consumer Demand
- Easier To Manage Opportunities
  - Reduce Shrink Costs
  - Improve Revenue With Improved Stock Position
  - Keep Cases Filled During Peak And Slack Periods
  - In Business 24 Hours A Day
- Feature Planning Based On Product, Not Sub-Primal Volumes
- Limit In-Store Cutting Of Labor Intensive Products
- Increase Product Line By Adding Selected Case Ready Items

CD 6000

The versatile vacuum-skin machine for the production of DARFRESH* packs, skin, vacuum and gas flush packs.

Construction
Side frames, chain guides and control cabinet are all made from substantial, anodised aluminium plates and profiles. The machine main frame with its robust mechanical components guarantees a high level of stability and a long working life. On the CD 6000 the top film is held firmly in place by transport gripper chains on both sides of the film.

Die Lifting System
Opening and closing of the forming and sealing stations is carried out by two separate pneumatically operated lifting systems. The sealing station lifting system can also move the sealing die top part upwards to pack products above the pack depth. The special knee lever principle guarantees a minimum consumption of compressed air and fast lifting actions. The smooth functioning of the forming and sealing process is ensured by very high die closing pressure. The die lifting system of the forming station is positioned precisely for the advance length by means of a threaded spindle.

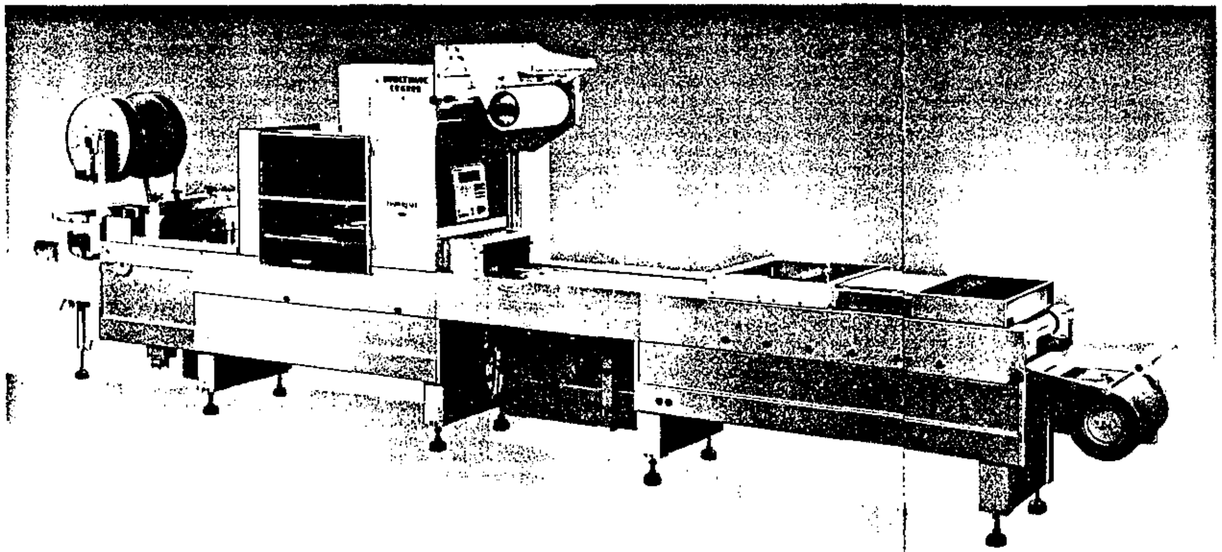
Drive
The choice of drive system depends upon the required output and the product to be packed. There is a choice of two systems:
1) 3-phase AC motor with brake and digital pre-selection of advance
2) MC Drive, with a powerful 3-phase AC motor with servo amplifier offering variable speed, acceleration and deceleration for optimum capacity.

Control System
The CD 6000 is equipped with a modular microprocessor control for industrial applications. The choice of machine control functions is decided by activating different programmes in the memory. Communication is carried out through a terminal displaying full text available in different languages on a vacuum fluorescent display screen. Time and temperature parameters are input digitally and times are quartz based. Up to 32 different machine settings can be stored in the memory and can be recalled at the touch of a button.

Automatic filling or loading systems as well as printing and on-line labelling systems are synchronised through the MC control.

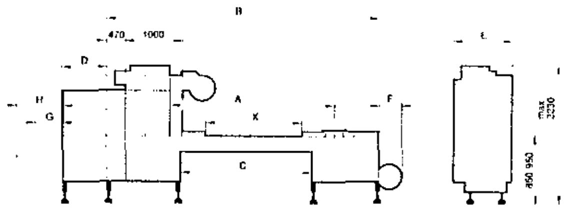
DARFRESH* Vacuum-Skin-Packaging
The Darfresh* top film from Cryovac is heated and after closing of the sealing station it is drawn by vacuum into the sealing dome and heated to the required drape temperature. A gentle ventilation process allows the top film to mould itself, without pressure, around every contour of the product. At the same time, the top film seals itself to the tray, close to the edge of the product.

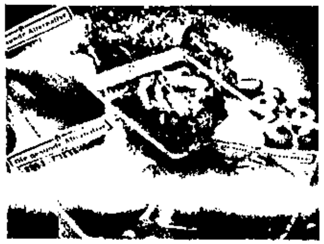
* Cryovac and Darfresh are registered trademarks of W.R. Grace & Co.



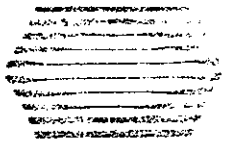
		CD 6000			
A	Distance between die centres	2130–2830	2650–3350	3240–3940	4040–4540
B	Length of machine w/o discharge extension	4530	5080	5640	6260
C	Length of loading area	1150	1620	2220	2880
D	Length of discharge area	2000/2210/2600/2790			
E	Width of machine	895–1095			
F	Film rewind	600			
G	Transit guard depending on the individual safety regulations	400			
H	Discharge conveyor	1000/1200			
K	Loading area	depending on cut-off length and machine model			
Film width		320–620			
Maximum cut-off length		600			
Maximum forming depth		die lifting system A: 40	die lifting system B: 100		
Product height above film level		die lifting system A: 90	die lifting system B: 50		

All dimensions in mm. The required amounts of electrical power, compressed air and cooling water, as well as the weight of the machine, are dependent upon the machine specification.





*DARFRESH**
vakuum skin packages



DIXIE UNION

Verpackungssysteme
Packaging Systems
Sistemas de envasado

Hauptsitz
Headquarter
Central

DIXIE UNION
Verpackungen GmbH
Roemerstrasse 12
Postfach 1410
D-8960 Kempten
Germany
Tel. 08 31-56 16-0
Telex 548 15
Fax 08 31-56 16 325 (Vertrieb/Sales/Ventes)
-56 16 298 (Kundendienst/Service)
-56 16 333 (Verwaltung/Administration)

Niederlassungen
Branches
Filiales

DIXIE UNION S.A.R.L.
Zone Industrielle Portuaire
Boîte Postale 181
F-35606 Redon Cédex
France
Tel. 99 71 21 88
Telex 042-740 448
Fax 99 71 41 81

DIXIE UNION (UK) Ltd.
34 Tanners Drive
Blakelands
GB-Milton Keynes
MK 14 5 BW
Great Britain
Tel. 09 08-614 567
Fax 09 08-616 011

DIXIE UNION
Verpackungen GmbH
Freiburgstrasse 177 A
CH-3008 Bern
Switzerland
Tel. 031-25 56 56
Fax 031-25 54 12

U.S.A.
Reiser Packaging, Inc.
725 Dedham Street
Canton, MA 02021
U.S.A.
Tel. 617-821-1290
Fax 617-821-1316

Agenturen
Representatives
Representantes

Albania (Agent in Austria)
Argentina, Buenos Aires
Australia, Brisbane
Austria, Gumpoldskirchen, Linz
Belgium, Bornem, Waver
Brazil (Agent in Germany)
Bulgaria (Agent in Austria)
Canada, Oakville, Ontario
Chile, Santiago de Chile
VR China (Agent in Switzerland)
Colombia, Santiago de Cali
Costa Rica, Costa Rica
CSFR, Prag
Cyprus, Nicosia
Denmark, Broendby
Egypt, Alexandria
Ecuador, Quito
Finland, Östersundom
Greece, Moschato, Athens
Guatemala, Guatemala City
G.U.S., Moskau, Kiew
Hong Kong
Hungaria (Agent in Austria)
Iceland, Reykjavik
India, New Dehli
Indonesia, Singapore
Irak, Shiraz, Teheran
Ireland, Dublin
Israel, Tel Aviv
Italy, Cesano Boscone (Mi)
Japan, Tokyo
Korea, Seoul
Kuwait, (Agent in Germany)
Malaysia, Singapore
Mexico, Mexico City
Netherlands, Zwolle, ZH 't Harde
New Zealand, Penrose, Auckland
Norway, Oslo, s Arpsborg
Paraguay, Asunción
Peru (Agent in Germany)
Poland, Warsaw
Portugal, Ermesinde, Lisboa, Visen
Saudi-Arabia (Agent in Germany)
Singapore
South Africa, Noordhoek, Johannesburg, Cape Town
Spain, Madrid, Barcelona
Sweden, Göteborg
Syria, Damaskus
Taiwan, Taipei
Thailand, Bangkok
Turkey, Istanbul
USA, Canton, Boston
Uruguay, Montevideo

DIXIE SKIN

Erstklassig
Die zweite Haut

Das original **DIXIE** SKIN Verpackungssystem besteht aus der **DIXIE** PAK Verpackungsmaschine und der speziellen **DIXIE** SKIN Folie. Einmal mehr beweist **DIXIE** UNION hiermit seine Kompetenz als Anbieter von kompletten Verpackungslösungen. Das **DIXIE** SKIN Verpackungssystem garantiert erstklassigen Produktschutz und verkaufsfördernde Produktpräsentation. Ausgezeichnet mit dem „Internationalen Verpackungspreis 1984" auf der Interpack in Düsseldorf und dem „Worldstar for Packaging 1985" auf dem 7. World Packaging Congress in Toronto.

Die spezielle SKIN-Folie schmiegt sich vollkommen an das Produkt an — wie eine zweite Haut — und sichert die perfekte Produktpräsentation.

First Class
The second skin

The unique **DIXIE** SKIN packaging system combines **DIXIE** PAK packaging machines and special **DIXIE** SKIN film. Once again proving **DIXIE** UNION's ability to supply complete packaging solutions. The **DIXIE** SKIN packaging system guarantees first class product protection and promotional product presentation. It was awarded the "1984 International Prize" at Interpack in Düsseldorf and the "1985 World Star for Packaging" at the 7th World Packaging Congress in Toronto.

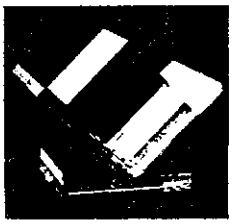
The special SKIN Film drapes itself around the product—like a second skin—and provides the perfect product presentation.

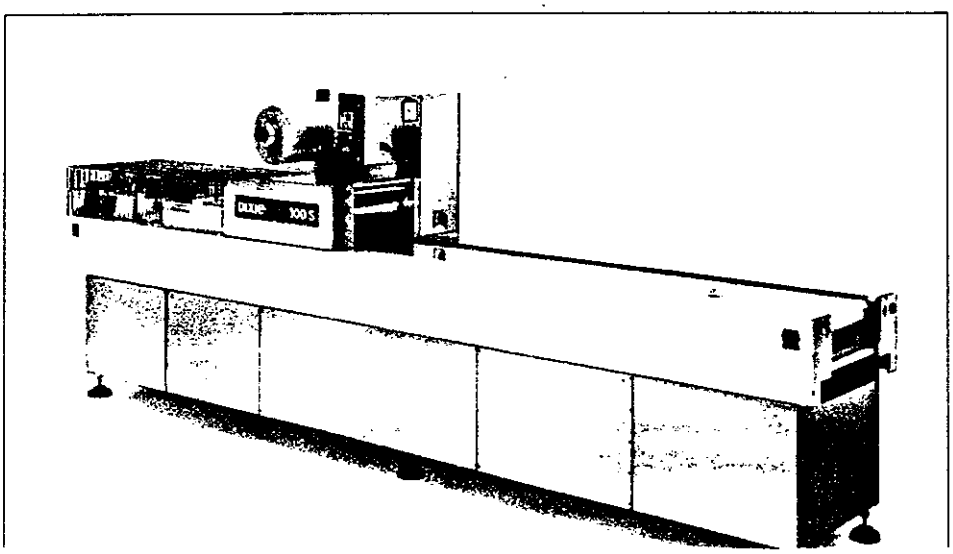
Primera clase
Segunda piel

La originalidad del sistema de embalaje **DIXIE** SKIN reside en las especificaciones de la máquina **DIXIE** PAK asociadas al film especial **DIXIE** SKIN. De nuevo, **DIXIE** UNION evidencia su capacidad por encontrar soluciones correctas en el envasado. El sistema **DIXIE** SKIN ofrece al producto una excepcional protección con una atrayente presentación.

DIXIE UNION se ha hecho merecedor del premio "INTERNACIONAL DEL EMBALAJE 1984" en Interpack, Dusseldorf y el "WORLD STAR FOR PACKAGING 1985" en el 7° Congreso Mundial del Embalaje en Toronto.

El film especial SKIN se adhiere perfectamente al producto como una segunda piel, ofreciendo una perfecta presentación.





MODIFIED ATMOSPHERE PACKAGE (MAP)

DIXIE UNION

Verpackungssysteme
Packaging Systems
Sistemas de envasado

Hauptsitz
Headquarter
Central

DIXIE UNION
Verpackungen GmbH
Roemerstrasse 12
Postfach 1410
D-8960 Kempten
Germany
Tel. 08 31-56 16-0
Telex 548 15
Fax 08 31-56 16 325 (Vertrieb/Sales/Ventes)
-56 16 298 (Kundendienst/Service)
-56 16 333 (Verwaltung/Administration)

Niederlassungen
Branches
Filiales

DIXIE UNION S.A.R.L.
Zone Industrielle Portuaire
Boîte Postale 181
F-35606 Redon Cédex
France
Tel. 99 71 21 88
Telex 042-740 448
Fax 99 71 41 81

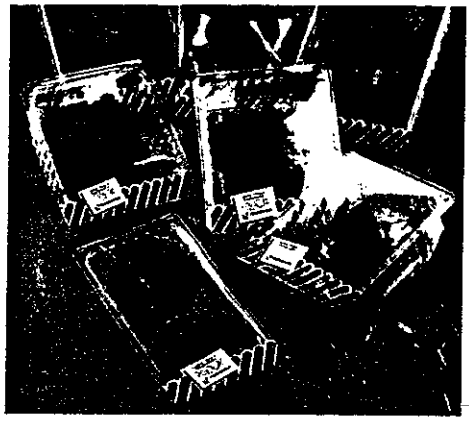
DIXIE UNION (UK) Ltd.
34 Tanners Drive
Blakelands
GB-Milton Keynes
MK 14 5 BW
Great Britain
Tel. 09 08-614 567
Fax 09 08-616 011

DIXIE UNION
Verpackungen GmbH
Freiburgstrasse 177 A
CH-3008 Bern
Switzerland
Tel. 031-25 56 56
Fax 031-25 54 12

U.S.A.
Reiser Packaging, Inc.
725 Dedham Street
Canton, MA 02021
U.S.A.
Tel. 617-821-1290
Fax 617-821-1316

Agenturen
Representatives
Representantes

Albania (Agent in Austria)
Argentina, Buenos Aires
Australia, Brisbane
Austria, Gumpoldskirchen, Linz
Belgium, Bornem, Waver
Brazil (Agent in Germany)
Bulgaria (Agent in Austria)
Canada, Oakville, Ontario
Chile, Santiago de Chile
VR China (Agent in Switzerland)
Colombia, Santiago de Cali
Costa Rica, Costa Rica
CSFR, Prag
Cyprus, Nicosia
Denmark, Broendby
Egypt, Alexandria
Ecuador, Quito
Finland, Östersundom
Greece, Moschato, Athens
Guatemala, Guatemala City
G.U.S., Moskau, Kiew
Hong Kong
Hungaria (Agent in Austria)
Iceland, Reykjavik
India, New Dehli
Indonesia, Singapore
Irak, Shiraz, Teheran
Ireland, Dublin
Israel, Tel Aviv
Italy, Cesano Boscone (Mi)
Japan, Tokyo
Korea, Seoul
Kuwait, (Agent in Germany)
Malaysia, Singapore
Mexico, Mexico City
Netherlands, Zwolle, ZH 't Harde
New Zealand, Penrose, Auckland
Norway, Oslo, s Arpsborg
Paraguay, Asunción
Peru (Agent in Germany)
Poland, Warsaw
Portugal, Ermesinde, Lisboa, Visen
Saudi-Arabia (Agent in Germany)
Singapore
South Africa, Noordhoek, Johannesburg, Cape Town
Spain, Madrid, Barcelona
Sweden, Göteborg
Syria, Damaskus
Taiwan, Taipei
Thailand, Bangkok
Turkey, Istanbul
USA, Canton, Boston
Uruguay, Montevideo

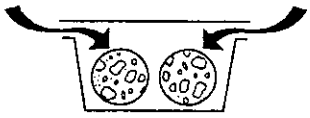


Atmosphere Exchange (M.A.P./C.A.P.)

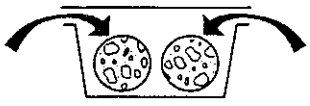
The shelf-life of different fresh products can be considerably extended by the use of modified (M.A.P.) and controlled atmosphere packaging (C.A.P.) (i.e. fresh red meat, cheese, fish, fruit, vegetables, bakery products etc.).

Here the air in the package is replaced by a protective atmosphere. In this way the product remains fresh longer and retains its original nutritional value. This system can also be used for products which are sensitive to pressure.

Atmosphere exchange "top-downwards"



Atmosphere exchange "bottom-upwards"



Both procedures may be time and/or pressure controlled and with the help of mixers when using 2 or 3 components. The machine is immediately stopped if there is a deviation from the mixture recipe. A statement of the atmosphere mixture is possible.

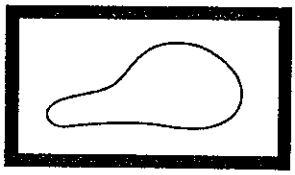
Additional Equipment

- pressure balance tank for quick and even atmosphere exchange

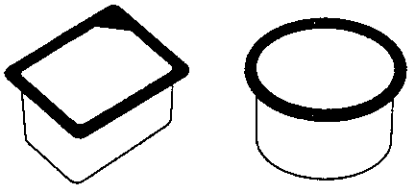
Sealing Systems

Depending on the application, different sealing systems may be used.

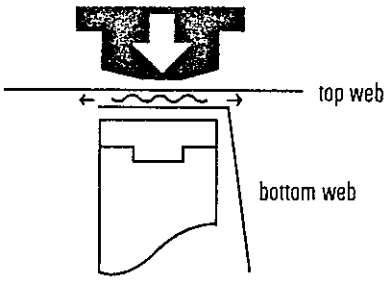
Area fusion sealing with **DIXIE** SKIN **sealing plate.** The universal use with different package sizes guarantees minimum re-set times. The product does not purge.



Perimeter sealing
for exactly defined sealing of the package borders. Used for rectangular or circular packages, contour sealing to strengthen hole punches (euro-hole) and easy-peel, easy-opening corners.



Rounded-off sealing-frames
In order to clear product residues of ready-made meals from the sealing area.



Sealing tools with isolation support for the protection of heat sensitive products

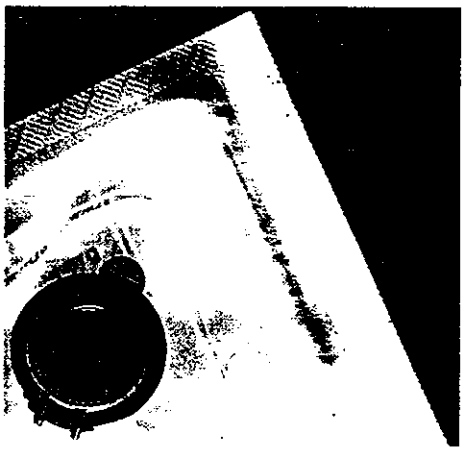
Patented DIXIE PEEL **sealing system** for applications in the medical and non-food sector and for easy, safe, fibre-free opening of the package if sealing with paper. The sealing plates can be universally used with different dies. This reduces machinery costs as well as re-set times.

Impulse sealing system
for the technical use of very demanding mono-films. The particular application has to be specified by the **DIXIE** UNION application department.

Additional Equipment

- indicating instruments to report a failore of the sealing plate elements

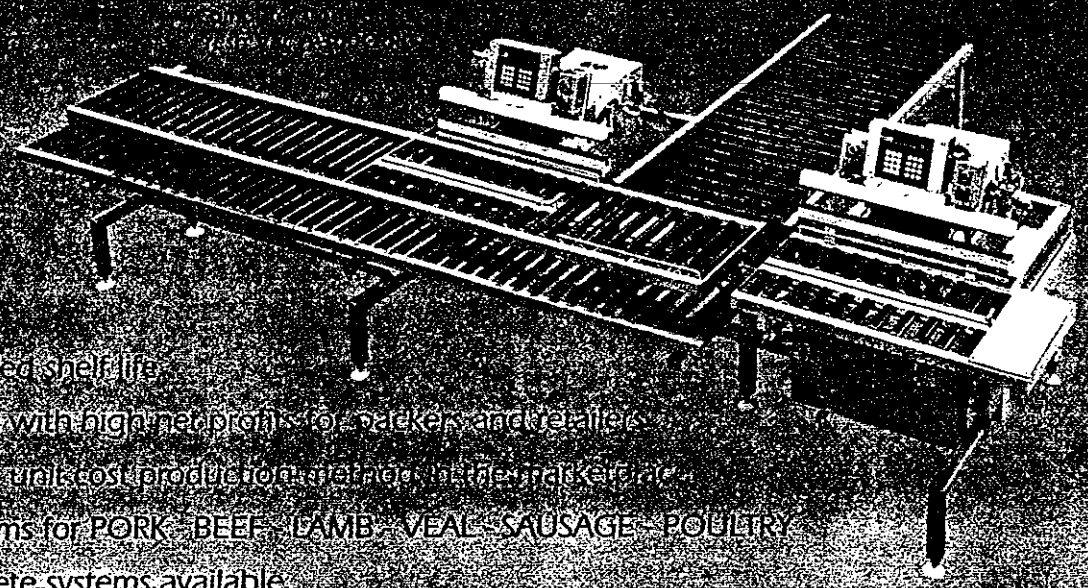
Pic. : medical package sealed with the **DIXIE** PEEL sealing system



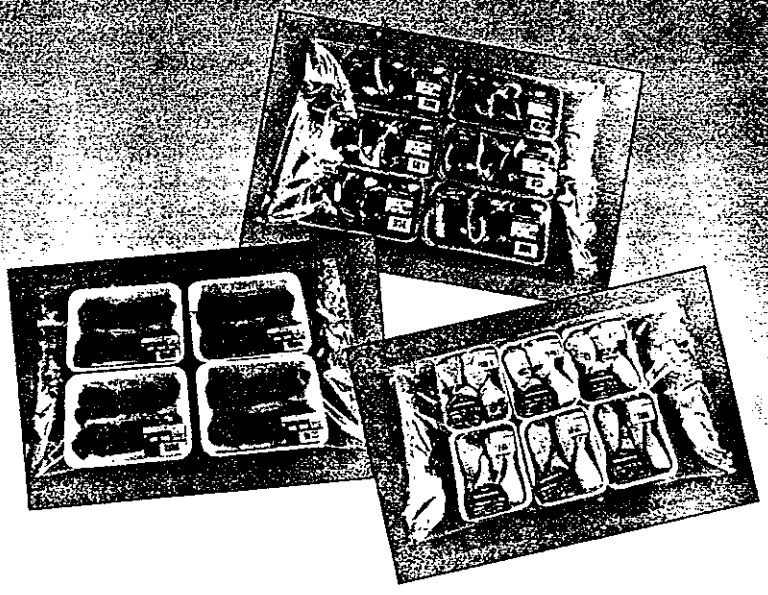
MASTERBAG

LET'S TALK COUNTER READY!

A practical, no risk system for increased profitability for meat processors and retailers



- Extended shelf life
- Packed with high net profits for packers and retailers
- Lowest unit cost production method in the marketplace
- Programs for PORK - BEEF - LAMB - VEAL - SAUSAGE - POULTRY
- Complete systems available
  - FTC slicing equipment
  - Cutting room design
  - Cutting tables and conveyors
  - Automatic overwrap feed systems
  - Modified atmosphere packaging
- Computer analysis of financial implication of case ready meat
  - Full cost analysis
  - Net profit forecast
  - Cash flow analysis
  - Pricing to retailers
  - Personnel and equipment forecast for every sales level
  - Retail profitability and much more
- Sales assistance for packers selling to retailers



Packer and retailers need improved net profits and **we can help!**
Let's talk at the Southeastern Poultry Show
Booth #5304

CVP SYSTEMS

2518 Wisconsin Ave., Downers Grove, IL 60515
Tel: (708) 852-1190 • Fax: (708) 852-1386

CIRCLE REPLY NO. 043

VSP TWO STAGE

(No manufacturer's literature)

- Most likely using a Multivac 6000 vacuum skin machine with new co-laminated barrier/ non-barrier film.

CD 6000

The versatile vacuum-skin machine for the production of DARFRESH* packs, skin, vacuum and gas flush packs.

Construction
Side frames, chain guides and control cabinet are all made from substantial, anodised aluminium plates and profiles. The machine main frame with its robust mechanical components guarantees a high level of stability and a long working life. On the CD 6000 the top film is held firmly in place by transport gripper chains on both sides of the film.

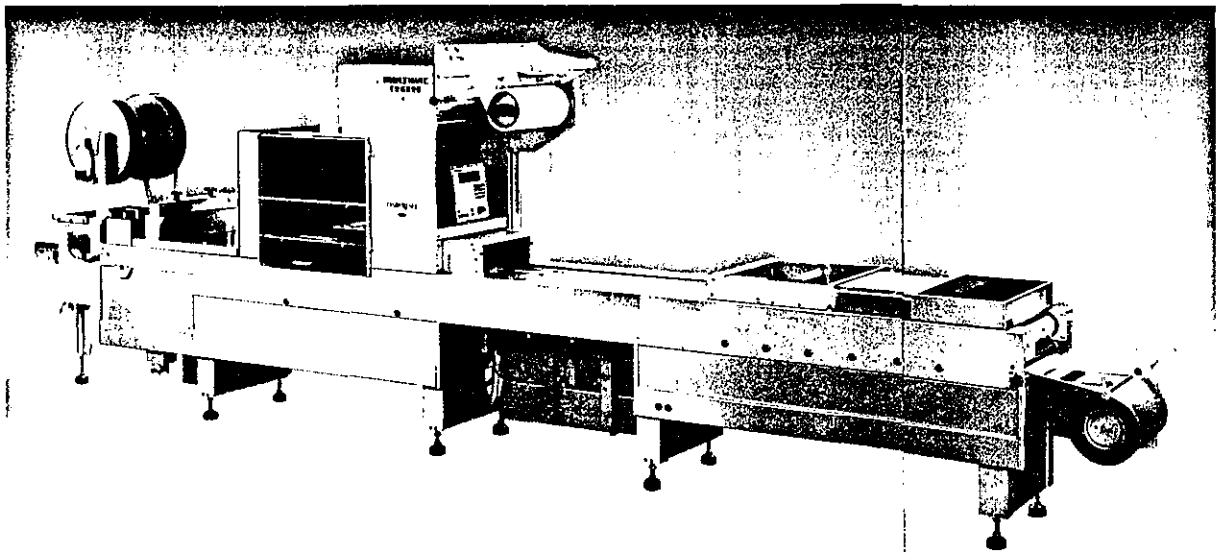
Die Lifting System
Opening and closing of the forming and sealing stations is carried out by two separate pneumatically operated lifting systems. The sealing station lifting system can also move the sealing die top part upwards to pack products above the pack depth. The special knee lever principle guarantees a minimum consumption of compressed air and fast lifting actions. The smooth functioning of the forming and sealing process is ensured by very high die closing pressure. The die lifting system of the forming station is positioned precisely for the advance length by means of a threaded spindle.

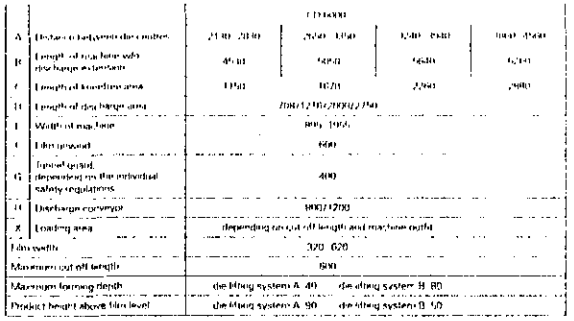
Drive
The choice of drive system depends upon the required output and the product to be packed. There is a choice of two systems:
1) 3-phase AC motor with brake and digital pre-selection of advance
2) MC-Drive, with a powerful 3-phase AC motor with servo amplifier offering variable speed, acceleration and deceleration for optimum capacity.

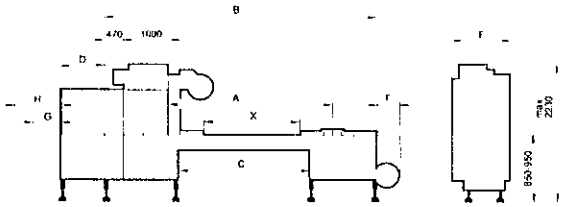
Control System
The CD 6000 is equipped with a modular microprocessor control for industrial applications. The choice of machine control functions is decided by activating different programmes in the memory. Communication is carried out through a terminal displaying full text available in different languages on a vacuum fluorescent display screen. Time and temperature parameters are input digitally and times are quartz based. Up to 32 different machine settings can be stored in the memory and can be recalled at the touch of a button.

Automatic filling or loading systems as well as printing and on-line labelling systems are synchronised through the MC control.

DARFRESH* Vacuum-Skin-Packaging
The Darfresh* top film from Cryovac is heated and after closing of the sealing station it is drawn by vacuum into the sealing dome and heated to the required drape temperature. A gentle ventilation process allows the top film to mould itself, without pressure, around every contour of the product. At the same time, the top film seals itself to the tray, close to the edge of the product.







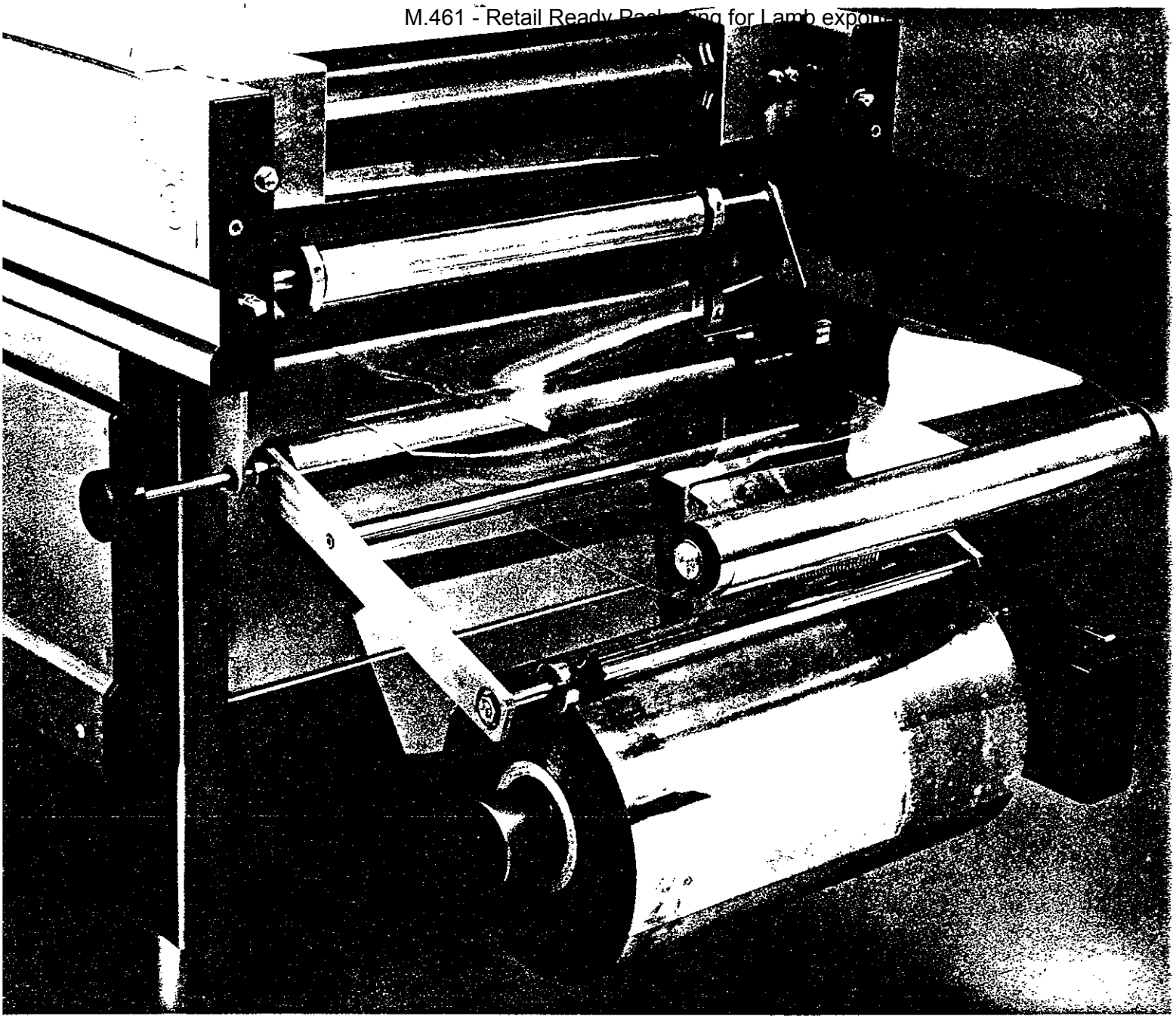
DARFRESH vakuum skin packages*

CS.171

Manufacturers of this type of equipment:

- Multivac - supplied by Cryovac in Australia

- (Alternative: Dixie Union - supplied by Trigon)



The Rollstock Machine Range.

MULTIVAC

M.461 - Retail Ready Packaging for Lamb exported by Air Freight

CD 6000

The versatile vacuum-skin machine for the production of DARFRESH* packs, skin, vacuum and gas flush packs.

Construction
Side frames, chain guides and control cabinet are all made from substantial, anodised aluminium plates and profiles. The machine main frame with its robust mechanical components guarantees a high level of stability and a long working life. On the CD 6000 the top film is held firmly in place by transport gripper chains on both sides of the film.

Die Lifting System
Opening and closing of the forming and sealing stations is carried out by two separate pneumatically operated lifting systems. The sealing station lifting system can also move the sealing die top part upwards to pack products above the pack depth. The special knee lever principle guarantees a minimum consumption of compressed air and fast lifting actions. The smooth functioning of the forming and sealing process is ensured by very high die closing pressure. The die lifting system of the forming station is positioned precisely for the advance length by means of a threaded spindle

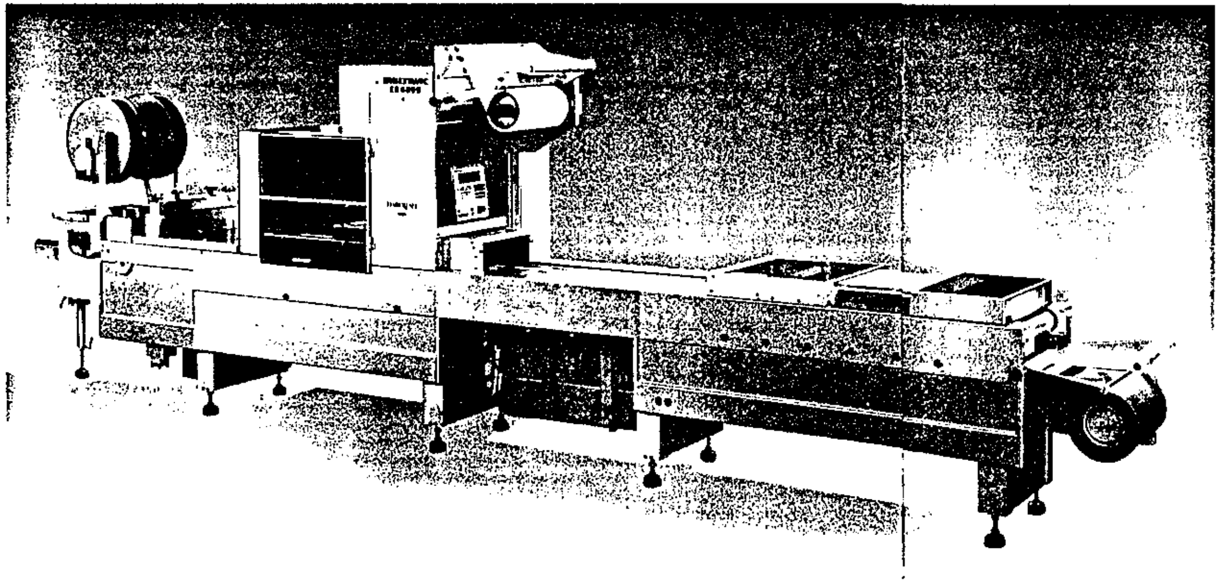
Drive
The choice of drive system depends upon the required output and the product to be packed. There is a choice of two systems:
1) 3-phase AC motor with brake and digital pre-selection of advance
2) MC-Drive, with a powerful 3-phase AC motor with servo amplifier offering variable speed, acceleration and deceleration for optimum capacity.

Control System
The CD 6000 is equipped with a modular microprocessor control for industrial applications. The choice of machine control functions is decided by activating different programmes in the memory. Communication is carried out through a terminal displaying full text available in different languages on a vacuum fluorescent display screen. Time and temperature parameters are input digitally and times are quartz based. Up to 32 different machine settings can be stored in the memory and can be recalled at the touch of a button.

Automatic filling or loading systems as well as printing and on-line labelling systems are synchronised through the MC control.

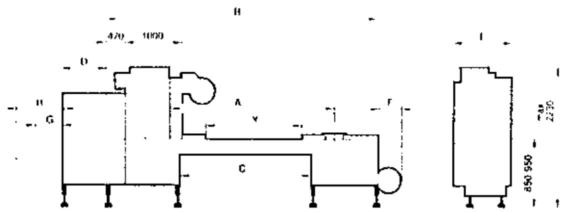
DARFRESH*
Vacuum-Skin-Packaging
The Darfresh* top film from Cryovac is heated and after closing of the sealing station it is drawn by vacuum into the sealing dome and heated to the required drape temperature. A gentle ventilation process allows the top film to mould itself, without pressure, around every contour of the product. At the same time, the top film seals itself to the tray, close to the edge of the product.

* Cryovac and Darfresh are registered trademarks of W.R. Grace & Co.



		CD 6000			
A	Distance between die centres	2130–2830	[illegible]	3240–3940	[illegible]
B	Length of machine w/o discharge extension	4530	[illegible]	5640	6260
C	Length of feed-in area	[illegible]	1670	2200	[illegible]
D	Length of discharge area	700/1210/2000/2750			
E	Width of machine	895–1095			
F	Film rewind	600			
G	Tunnel guard depending on the individual safety regulations	400			
H	Discharge conveyor	800/1200			
*	Loading area	depending on cut-off length and machine width			
Film width		320–520			
Maximum cut-off length		600			
Maximum forming depth		die lifting system A: [illegible]	die lifting system B: [illegible]		
Product height above film lead		die lifting system A: [illegible]	die lifting system B: [illegible]		

All dimensions in mm. [illegible]



*DARFRESH**
vakuum skin packages

R5200

The versatile machine for medium to large packaging requirements.

Construction
The side frames, chain guides and control cabinet are constructed from substantial anodised aluminium plates and profiles. The machine frame in conjunction with the robust components, guarantees high stress tolerances and a long working life.

Die Lifting System
Opening and closing of the forming and sealing dies is effected by an electromechanical die lifting system. This ensures quiet running of the machine and low compressed air consumption. Strong knee levers and lifting rails offer a high level of die closing pressures and smooth functioning of the machine even with large forming and sealing dies.

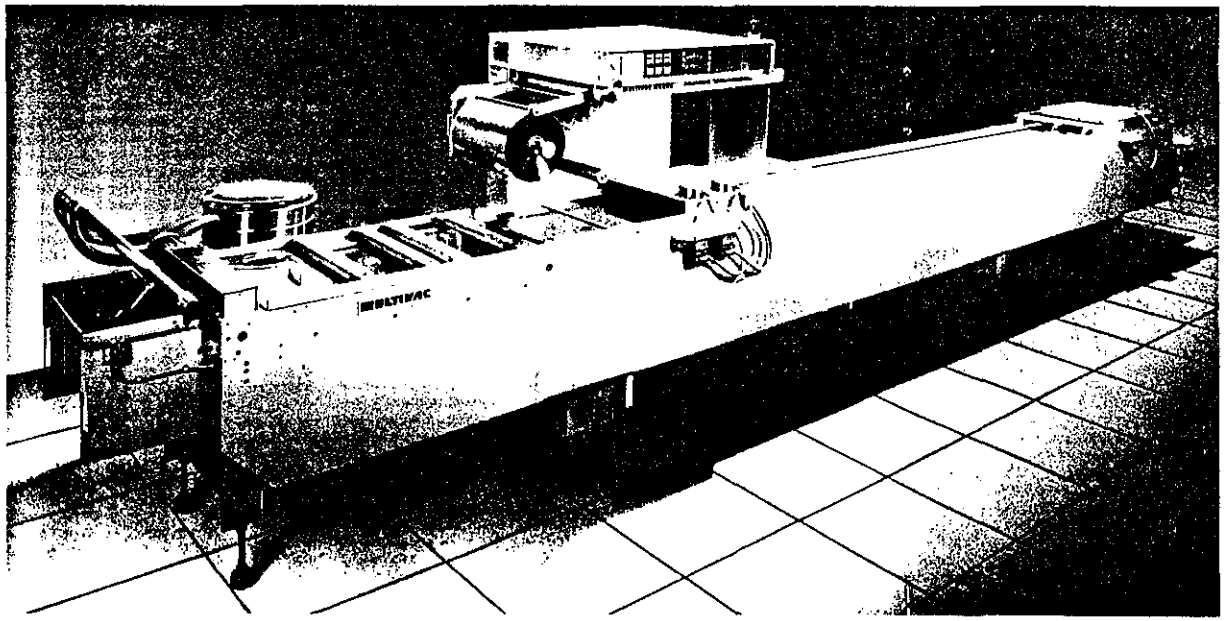
Drive
The choice of drive system depends upon the required output and the product to be packed. There is a choice of two systems:
1) 3-phase AC motor with brake and digital pre-selection of advance
2) MC-Drive, with a powerful 3-phase AC motor with servo amplifier offering variable speed, acceleration and deceleration for optimum capacity.

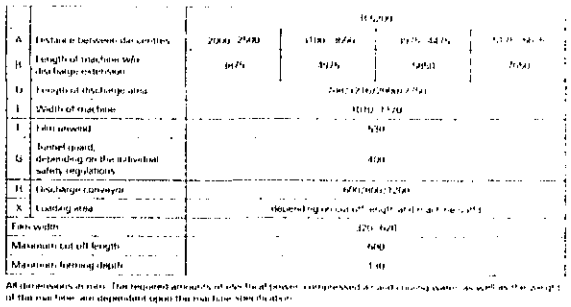
Control Systems
Two different types of control systems are available:

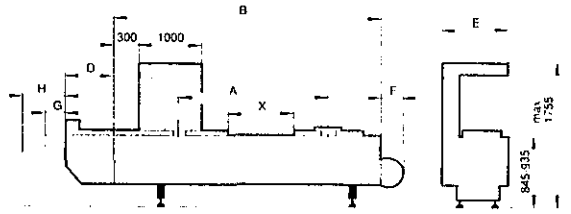
PC Control
A programmable controller ensures a high degree of reliability. The choice of machine functions is pre-set on control buttons and timed functions are set by potentiometers. A two-digit fault display helps with resetting the control and reduces down time to a minimum.

MC Control
The microprocessor control is designed to meet more exacting demands. The choice of machine control functions is decided by activating different programmes in the memory. Communication is carried out through a terminal displaying full text available in different languages on a vacuum fluorescent tube. Time and temperature parameters are input digitally and times are quartz based. Up to 32 different machine settings can be stored in the memory and can be recalled at the touch of a button.

Automatic filling or loading systems as well as printing and on-line labelling systems are synchronised through the MC control.







DIXIE UNION

Verpackungssysteme
Packaging Systems
Sistemas de envasado

Hauptsitz
Headquarter
Central

DIXIE UNION
Verpackungen GmbH
Roemerstrasse 12
Postfach 1410
D-8960 Kempten
Germany
Tel. 08 31-56 16-0
Telex 548 15
Fax 08 31-56 16 325 (Vertrieb/Sales/Ventes)
-56 16 298 (Kundendienst/Service)
-56 16 333 (Verwaltung/Administration)

Niederlassungen
Branches
Filiales

DIXIE UNION S.A.R.L.
Zone Industrielle Portuaire
Boîte Postale 181
F-35606 Redon Cédex
France
Tel. 99 71 21 88
Telex 042-740 448
Fax 99 71 41 81

DIXIE UNION (UK) Ltd.
34 Tanners Drive
Blakelands
GB-Milton Keynes
MK 14 5 BW
Great Britain
Tel. 09 08-614 567
Fax 09 08-616 011

DIXIE UNION
Verpackungen GmbH
Freiburgstrasse 177 A
CH-3008 Bern
Switzerland
Tel. 031-25 56 56
Fax 031-25 54 12

U.S.A.
Reiser Packaging, Inc.
725 Dedham Street
Canton, MA 02021
U.S.A.
Tel. 617-821-1290
Fax 617-821-1316

Agenturen
Representatives
Representantes

Albania (Agent in Austria)
Argentina, Buenos Aires
Australia, Brisbane
Austria, Gumpoldskirchen, Linz
Belgium, Bornem, Waver
Brazil (Agent in Germany)
Bulgaria (Agent in Austria)
Canada, Oakville, Ontario
Chile, Santiago de Chile
VR China (Agent in Switzerland)
Colombia, Santiago de Cali
Costa Rica, Costa Rica
CSFR, Prag
Cyprus, Nicosia
Denmark, Broendby
Egypt, Alexandria
Ecuador, Quito
Finland, Östersundom
Greece, Moschato, Athens
Guatemala, Guatemala City
G.U.S., Moskau, Kiew
Hong Kong
Hungaria (Agent in Austria)
Iceland, Reykjavik
India, New Dehli
Indonesia, Singapore
Irak, Shiraz, Teheran
Ireland, Dublin
Israel, Tel Aviv
Italy, Cesano Boscone (Mi)
Japan, Tokyo
Korea, Seoul
Kuwait, (Agent in Germany)
Malaysia, Singapore
Mexico, Mexico City
Netherlands, Zwolle, ZH 't Harde
New Zealand, Penrose, Auckland
Norway, Oslo, s Arpsborg
Paraguay, Asunción
Peru (Agent in Germany)
Poland, Warsaw
Portugal, Ermesinde, Lisboa, Visen
Saudi-Arabia (Agent in Germany)
Singapore
South Africa, Noordhoek, Johannesburg, Cape Town
Spain, Madrid, Barcelona
Sweden, Göteborg
Syria, Damaskus
Taiwan, Taipei
Thailand, Bangkok
Turkey, Istanbul

rstklassig
ie zweite Haut

as original **DIXIE** SKIN Verpackungs-ystem besteht aus der **DIXIE** PAK erpackungsmaschine und der peziellen **DIXIE** SKIN Folie. Einmal ehr beweist **DIXIE** UNION hiermit eine Kompetenz als Anbieter von ompletten Verpackungslösungen. Das IXIE SKIN Verpackungssystem arantiert erstklassigen Produktschutz nd verkaufsfördernde Produkt-räsentation. Ausgezeichnet mit dem Internationalen Verpackungspreis 984" auf der Interpack in Düsseldorf nd dem „Worldstar for Packaging 985" auf dem 7. World Packaging ongress in Toronto.

ie spezielle SKIN-Folie schmiegt sich ollkommen an das Produkt an — wie ine zweite Haut — und sichert die erfekte Produktpräsentation.

First Class
The second skin

The unique **DIXIE** SKIN packaging system combines **DIXIE** PAK packaging machines and special **DIXIE** SKIN film. Once again proving **DIXIE** UNION's ability to supply complete packaging solutions. The **DIXIE** SKIN packaging system guarantees first class product protection and promotional product presentation. It was awarded the "1984 International Prize" at Interpack in Düsseldorf and the "1985 World Star for Packaging" at the 7th World Packaging Congress in Toronto.

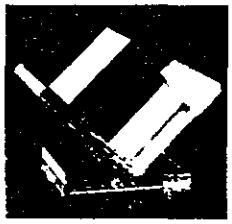
The special SKIN Film drapes itself around the product—like a second skin—and provides the perfect product presentation.

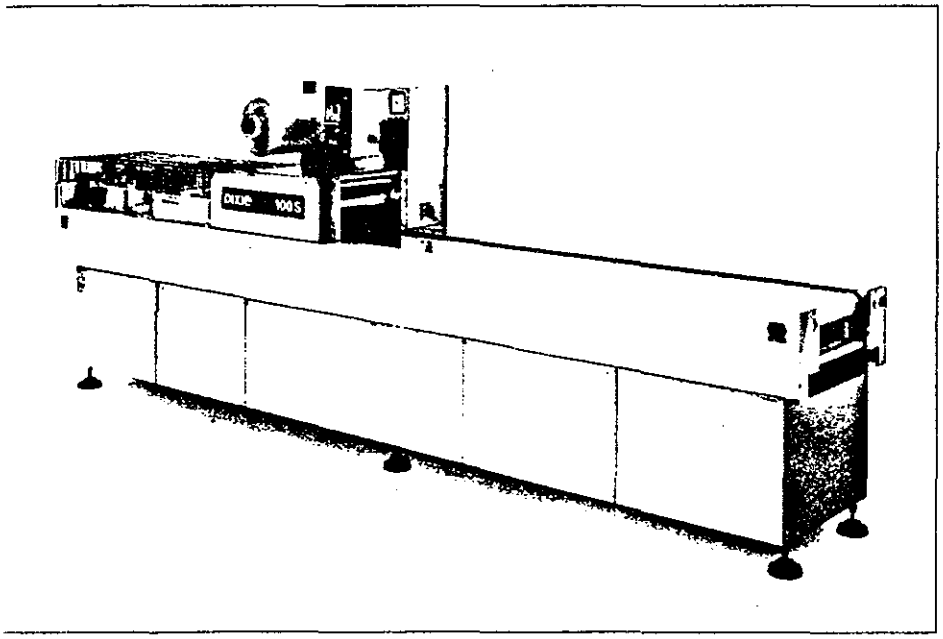
Primera clase
Segunda piel

La originalidad del sistema de embalaje **DIXIE** SKIN reside en las especificaciones de la máquina **DIXIE** PAK asociadas al film especial **DIXIE** SKIN. De nuevo, **DIXIE** UNION evidencia su capacidad por encontrar soluciones correctas en el envasado. El sistema **DIXIE** SKIN ofrece al producto una excepcional protección con una atrayente presentación.

DIXIE UNION se ha hecho merecedor del premio "INTERNACIONAL DEL EMBALAJE 1984" en Interpack, Dusseldorf y el "WORLD STAR FOR PACKAGING 1985" en el 7° Congreso Mundial del Embalaje en Toronto.

El film especial SKIN se adhiere perfectamente al producto como una segunda piel, ofreciendo una perfecta presentación.





DIXIE VAC

Produktschutz und Präsentation in Perfektion

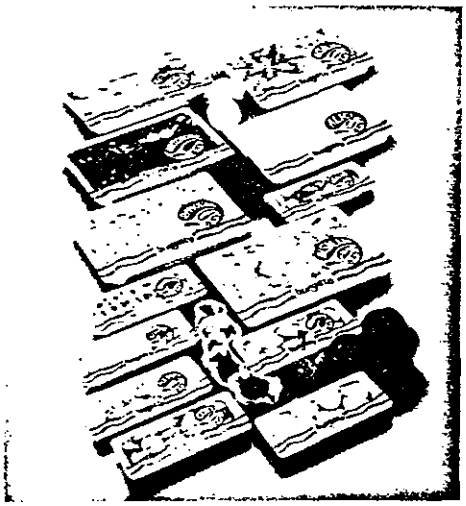
Jedem Kunden seine betriebs-, branchen- und produktspezifische Form-, Füll- und Verschließmaschine anbieten zu können — das ist das Ziel der **DIXIE** UNION. Das Angebot reicht von der einfachen Standardmaschine **DIXIE** VAC 2000 E bis hin zur technisch hochwertigen **DIXIE** VAC MODULAR in Modularbauweise. Ob Frischfleisch, Wurstwaren, Fisch, Käse oder Backwaren, flexibel oder standfest, evakuiert oder mit Atmosphärenaustausch, keine Packung ist diesem Verpackungssystem zu schwierig.

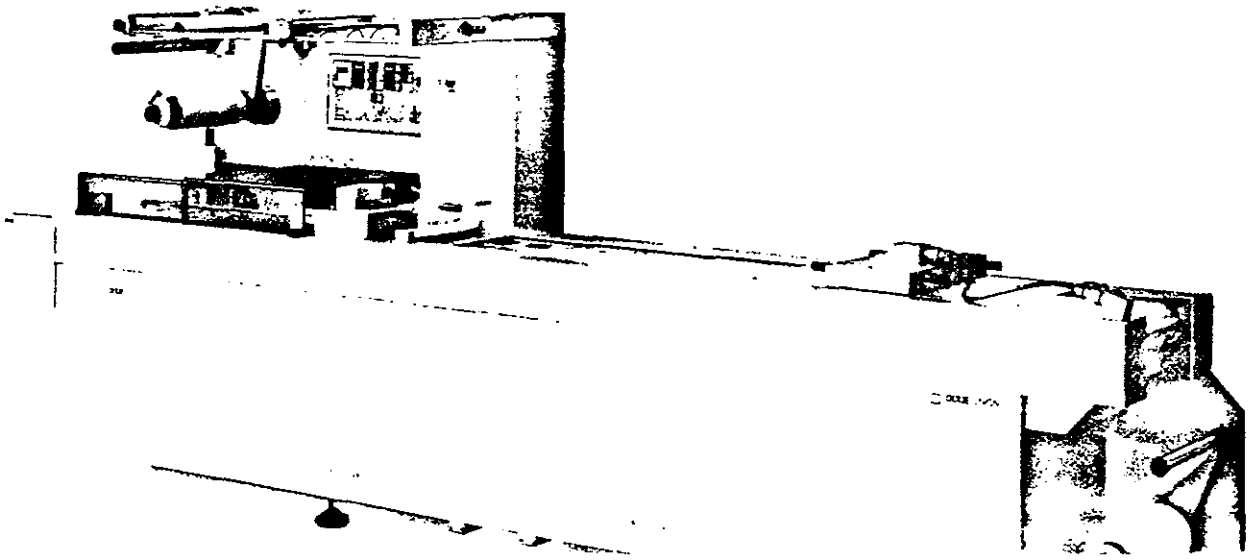
Product protection and presentation in perfection

The aim of **DIXIE** UNION is to be able to offer every customer a form, fill and seal machine suitable for his specific business and product. The offer ranges from the simple, standard machine **DIXIE** VAC 2000 E to the technical, high quality **DIXIE** VAC MODULAR in modular construction. Whether it's fresh meat, processed meat and sausages, fish, cheese, bread, cakes or pastries—flexible or rigid—evacuated or with atmosphere exchange—no package is too difficult for this machine.

Protección y perfecta presentación del producto

El objetivo de **DIXIE** UNION es ofrecer a cada cliente la máquina de envasado que se adapte a su producto y las especificaciones del mercado. La gama de modelos va desde la termoformadora standart **DIXIE** VAC 2000 E a la termoformadora de concepción modular de alta tecnologia **DIXIE** VAC MODULAR.
DIXIE garantiza el acondicionado al vacío o con inyección de gas, con film flexible ó rígido en cualquier aplicación: carne fresca, salchichas, pescado, queso, pan, pastelería, etc.





MAP BUBBLE PACKAGE

TEEGARWOOD SYSTEM

Extended Shelf-life Packaging For Fresh Meats

G A R

Now There's A Packaging System That Keeps Your Profit Picture From Spoiling

Imagine a packaging system for case-ready fresh red meats that would allow you 25 days or more to get your product from packer to the consumer; a system that would effectively lower your total cost per package, eliminate out-of-stock problems on the retail level and reduce shrinkage for both packers and stores to a negligible amount. A system so advanced that it is destined to revolutionize the meat packing industry, yet our toughest critic, the consumer, will think that each cut of meat came freshly packaged from the back of the store.

Sound like an idea for the future? No. It's a system already being utilized today. Introducing the Garwood™ System from Garwood Packaging Inc.

The Garwood™ Controlled Atmosphere Packaging System. All Wrapped Up In Freshness.

Garwood™ technology is a revolutionary new Controlled Atmosphere Packaging System that is specifically engineered for fresh meat packaging. The Garwood™ package consists of a white tray, a thin, gas permeable membrane stretched across the meat and a clear dome, all of which are recyclable materials.

When the meat is packed into the tray, the air is completely evacuated and a mixture of carbon dioxide and nitrogen is then back-flushed into the chamber at atmospheric pressure. Patented, single-chamber technology then seals the package with a plastic dome. The result is a very consumer-appealing package containing meat in an additive-free environment which inhibits spoiling, rancidity and discoloration for over 21 days, with a further 4 plus days following dome removal at the point of sale.

Making A Case For Case-Ready Meats

All this state-of-the-art technology, the cost-per-package savings, distribution and storage advantages and all the other benefits realized from the Garwood™ System doesn't mean anything if the consumer won't buy it out of the case.

At Garwood™, we haven't overlooked this fact and, quite frankly, have spent millions of dollars in research and extensive trials to design a system that successfully clears this critical hurdle.

The Two-Stage System

Our unique two-stage system takes into account the storage, shipping and product protection needs the packer and retailer plus the consumers' perception of what fresh re meat should look like. While the n trogen and carbon dioxide mixture greatly enhances the "life" of fresh packed red meats, the lack of oxy causes red meat to turn to a deox myoglobin purple or gray. And w some suggest that consumers will eventually buy purple beef and g pork, Garwood™ instead develop