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SPECIAL REPORT

COATING & LAMINATING

COATING & LAMINATING

The Future

by **Corey M. Reardon** AWA Alexander Watson Assoc.



The first of five related articles examining today's coating/laminating industry peers into the future of this key industry niche.

The coating and laminating industry serves three major market sectors: packaging, decorative products, and technical products. Most coated and laminated materials can be grouped under these headings (see figure below).

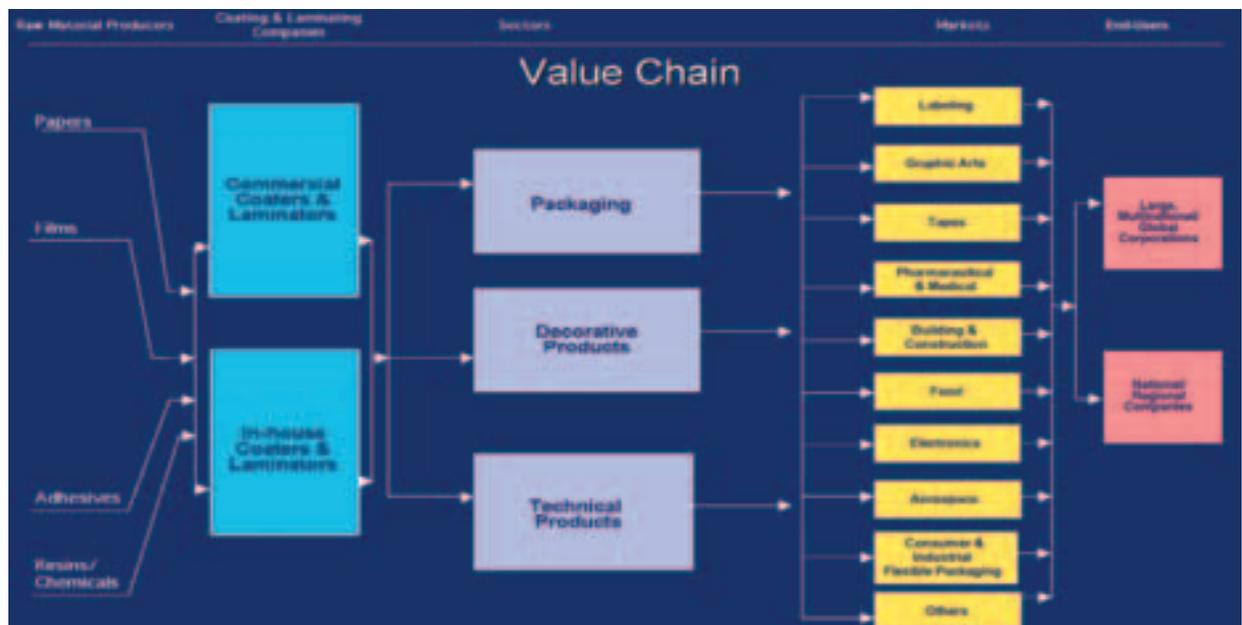
The packaging market accounts for the bulk of coated and laminated products. Drivers in this sector include:

- cost-effectiveness
- “added value” functionality
- esthetics
- quality improvements
- product protection and security

Decorative products may be defined as those destined for labeling, marking, wrapping, and nonfunctional esthetic applications. The main drivers in this sector are cost-effectiveness, quality, and brand differentiation.

The third sector, technical products produced within the coating and laminating industry, require adherence to stringent quality and manufacturing standards, traceability, tight

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COATING & LAMINATING

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material and performance tolerances, cost-competitiveness, and often, proprietary or confidentiality agreements between suppliers and customers.

The Factors Influencing Demand

Many factors influence the demand for coated and laminated products, including demographics, the overall economy, industrial growth, globalization, and environmental concerns.

In terms of demographics, the causal link between people and products can be extrapolated to compare population figures and the amount of coated and laminated products consumed. Population projections worldwide are for growth, with Asia, Africa, and Latin America experiencing the largest increase. Collectively, these areas eventually will represent the greatest concentrations of people with a new, direct need for packaging and other products made from coated and laminated materials.

Industrial growth is a key driver of demand for coated and laminated materials. Today, these materials can contribute to innovation and end-use developments that can enhance the performance of products, their ease of use, their safety, and the diversity of applications. This is particularly true of laminated and coated materials in the decorative and technical sectors, which are closely aligned to product manufacture and distribution.

Market Expectations

Although the future prospects for coating and laminating continue to be encouraging, in recent years the market has experienced a gradual contraction in terms of both materials and application segments, as well as a dramatic increase in margin pressures across the board. This will continue, with growth rates generally under 5%/annum.

Throughout the coating and laminating value chain, consolidation is occurring—though often to the detriment of the supply side, due to the increasingly dominant end-users, who are leveraging their purchasing power. Material suppliers and coating and laminating companies are redefining their value propositions as a consequence of additional pressure on mar-

gins and the reluctance of their customers—particularly the end-users—to accept price increases.

Industry Profitability

Overall, economic growth worldwide currently is not good. Demand for coating and laminating—as for other products—has been adversely affected by the recession of the US economy and the resultant slowdown in other economies across the globe.

Longer-term economic projections are more optimistic, however, with economic recovery in place, backed by low interest rates, low inflation, and buoyant world trade. The coating and laminating industry's growth expectations will improve.

In the current trading environment, however, there are real concerns about long-term profitability, due to the increasing competition in almost every sector. Price fluctuations in raw materials exacerbate the situation and make a stable pricing structure impossible to maintain (see figure above).

Globalization

Globalization, which is a reality today, is having a profound impact on the profile of the major players in the industry, as well as that of their suppliers. It is expanding opportunities for many companies. Opening up new growth are trade agreements such as GATT (General Agreements on Tariffs and Trade); EU (European Union); North American Free Trade Agreement (NAFTA); Mercosur (trade agreement among Brazil, Argentina, Uruguay, and Paraguay); and ASEAN (association of Southeast Asian nations). However, globalization also is increasing competition significantly across the whole value chain as end-users leverage their central purchasing power.

Raw Material Price Trends – North America

Year	Quarters	NBSK \$/metric ton	LDPE Cents/pound	PP Cents/pound
1994	Q1	465		
	Q2	520		
	Q3	595		
	Q4	700		
1995	Q1	780		
	Q2	855		
	Q3	905		
	Q4	930		
1996	Q1	723		
	Q2	515	52.0	44.5
	Q3	565	52.0	47.5
	Q4	580	50.0	45.5
1997	Q1	570	53.0	45.5
	Q2	575	52.0	41.5
	Q3	610	51.0	38.5
	Q4	610	48.0	36.0
1998	Q1	565	46.0	35.5
	Q2	560	43.0	33.5
	Q3	550	40.0	30.5
	Q4	500	37.0	29.5
1999	Q1	495	39.0	28.5
	Q2	520	49.0	29.5
	Q3	550	54.0	32.5
	Q4	600	52.0	36.5
2000	Q1	640	55.0	38.5
	Q2	680	58.0	43.5
	Q3	710	54.0	40.5
	Q4	710	52.0	39.5
2001	Q1	677	59.0	38.5
	Q2	568	56.0	34.5

Developments in purchasing strategies—including international and global procurement, e-commerce, and the influence of global consumer goods branding—are just some examples of the way in which globalization is impacting the coating and laminating industry.

The Environment

Environmental issues are becoming increasingly important, particularly at governmental levels. Emission and waste management controls already largely have been implemented by the coating and laminating and consumer ends of the industry value chain, but in Europe the EU is moving into a new phase of environmental legislation. The packaging industry is significantly impacted by the requirements for reduced packaging waste and ever-tightening recycling and reuse targets.

Looking Ahead

Current research at AWA indicates demand for coating and laminating will rise. This growth, however, will be in terms of

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the area of materials sold as opposed to tonnage, due to the demand for decreased basis weights.

Outside North America, demand will grow faster—particularly as the economies of Asia and Latin America continue to strengthen. Japan's economic crisis has affected confidence there, and now the challenge lies in the country's ability to reform itself. China is enjoying relatively strong growth and continues to attract foreign investment, which will certainly fuel demand for coating and laminating. While the Western European economies do not offer dramatic growth prospects, Eastern Europe—particularly Russia, Poland, and Turkey—are promising in the short- to medium-term as their capitalist economies mature.

However, the industry as a whole still has to face a considerable amount of internal reform, reorganization, and consolidation. There is no prospect of a let-up in the buying power of the end-users. While margin pressure is a major characteristic of this buying pattern, there is also a trend to smaller orders, required more frequently and more quickly—often “just in time.” Cost reductions are essential for suppliers of coated and laminated materials if they are to remain profitable and competitive with the alternative materials and production methods emerging today.

In an uncertain economic environment, these are tough challenges, but this is an industry that has continued to evolve and re-invent itself over a considerable time span. I remain confident of its future.

Corey M. Reardon has more than 15 years of management experience in the converting and laminating industry with leading companies such as Rexam and Avery Dennison. Today, he is a principal of international market research and consulting firm AWA Alexander Watson Assoc., a company that specializes in supporting the coating, laminating, and converting industries with multiclient and private market studies and industry-specific supply-chain conferences. For more information contact AWA at +31 20 676 20 69; info@awa-bv.com; awa-bv.com.

Film Liners

by Lee Keiser AWA Alexander Watson Assoc.



Film liners—the fastest-growing technology—account for about 10% of the total global release liner volume, about 2,300 million sq m.

This is a reflection of the undoubted benefits they bring to self-adhesive labeling: facilitating crisp die-cutting; enabling high-speed automatic label application; and aiding adhesive wetout on the pack for the best possible “no-label look.”

Following are the major types of film release liners:

- polyester
- polystyrene
- high-density polyethylene
- low-density polyethylene
- polypropylene

In addition, multilayer films based on the preceding polymers and various copolymers are employed. Other films that have found their way into the release liner market at one time or another are polyamide, polysulfone, polyvinyl chloride, and polyvinylidene difluoride, some in niche applications that may not exist any longer.

However, the five major types of films represent significant volumes and will be discussed in more detail.

Polyester Film

Polyester film (PET) is the largest volume film in the release liner market, and it has found considerable use in the label and medical markets. Given the size of the label market for release liners, even a minor market penetration will result in significant volume.

In the label market, polyester is used in relatively thin gauges such as 23 or 36 micron. The major benefits offered to the label market are high-speed dispensing with a minimum of web breaks, excellent die-cutting surface, excellent profile control, and minimal moisture sensitivity.

Equally important, the surface smoothness of the polyester film makes it an ideal candidate for use in no-label-look applications. Additionally, because of the film's low caliper, more labels can be incorporated into a given roll diameter to improve the efficiency and cost-effectiveness of a labeling operation.

Heavier gauges of polyester, e.g., 127 micron, are used in medical and graphic arts applications. The stiffness of the polyester film is a benefit in both end-use segments, and the dimensional stability, even in the face of changes in ambient moisture, is of significant value in graphic arts applications where multicolor print registration can be critical.

While the majority of polyester is more or less transparent, white polyester and matte-surfaced polyester also are used in specialized applications. Polyester is relatively expensive, and it is the choice when the benefits overcome the cost or when specific properties are required that only polyester can deliver.

High-Density Polyethylene

HDPE film finds use in calipers ranging from 25–750 micron, though the majority is in the range of 50–125 micron. A significant market for HDPE film is the self-adhesive tape market, in which both single- and two-sided-coated HDPE film is used.

HDPE film can be pigmented readily, and blue and white commonly are used in addition to the unpigmented film. HDPE film has a maximum recommended use temperature of about 85 deg C under tension. Higher temperatures under normal web processing tensions can cause excessive elongation, as can excessive tension at lower temperatures. Also, HDPE film does not have the level of thickness uniformity required for precise coating applications.

Thicker films—in the range of 500–750 micron—are used in thermoformed trays for the processing and distribution of hot melt adhesive billets. Very thick film (more accurately, sheet) can be thermoformed with comparatively deep draws, and the silicone release coating still retains its functionality in releasing the billets.

Low-Density Polyethylene

LDPE is a fairly soft, extensible, and conformable film. For applications such as a foamed tape that might require some exten-

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sibility of the liner as it is being wound into a roll, LDPE film is a good choice. Unlike HDPE film, LDPE film is not available in as wide a range of calipers. It is commonly found in the range of 50–250 micron. It cannot be readily thermoformed, so thicker films do not have the same functionality as their high-density sister products.

In addition, the temperature and solvent resistance of LDPE film limit the applications. Under normal web processing conditions, LDPE film has a temperature limit of about 70 deg C. Solvent-based adhesives can adversely impact the integrity of LDPE film by swelling the film and causing distortion—much as water will affect paper.

LDPE film is available in virtually any desired color; white, blue, yellow, green, and red are common colors. In addition, it is available in a variety of embossed patterns. LDPE film finds use in building and construction applications, where it serves as a release liner for pipeline wrapping systems. Like HDPE film, LDPE film does not generally have the degree of profile control required for highly precise coating applications. Both LDPE film and HDPE film have the advantage of being relatively low-cost substrates for release applications.

Polypropylene

PP film is supplied in several different versions. Biaxially oriented PP (BOPP) is manufactured by three different processes, and the resulting films have different properties. It can be produced by the bubble process, the sequential machine-direction (MD) orienting/trans-direction (TD) stentering process, or the simultaneous MD/TD orienting/stentering process. Cast PP film (CPP) is produced by casting the extrudate onto a chill roll. In this case, orientation of the film is zero in the TD and minimal in the MD.

BOPP films are used in labeling applications, where they compete with PET films for high-speed application and high clarity in end use. Such unpigmented BOPP films are supplied in the range of about 25–50 micron. BOPP films are thermally sensitive, and converters must pay attention to controlling the tension and temperature to avoid film elongation during processing. BOPP films are also notch-sensitive and can, therefore, tear easi-

ly if an edge is damaged.

CPP film is very different from BOPP film. It is not notch-sensitive and can be supplied in various colors, although white is the most common choice. It has been used in diaper closure applications and other tape applications. Temperature sensitivity is comparable to BOPP film.

Polystyrene

PS films, or more correctly, high-impact PS films (HIPS), predominantly are used in medical applications.

The commonly used thickness of these films is 50–250 micron. Stiffness and thermoformability are two of the main attributes of HIPS films. Relatively thin films, e.g., 125 micron, are stiff and can be thermoformed with small wells to accommodate electrode contacts for EKG electrodes or similar applications.

HIPS films generally are supplied as unpigmented or white substrates. Other colors could be readily supplied. This film is very temperature- and solvent-sensitive: Aromatic solvents such as toluene or xylene will rapidly degrade a HIPS release liner. For self-adhesive applications, attention must, therefore, be paid to the solvent composition of solvent-based adhesives.

Looking Ahead

It is not likely filmic release liners will fulfill the promise that was predicted about 25 years ago by a company that would rather remain anonymous, wherein paper-based liners would be almost nonexistent and film release liners would be the dominant release liner substrate.

However, it is clear filmic release liners have a place in the market that cannot be matched by paper or paper-based release liners, and the market probably will continue to grow at a more rapid pace than that of paper-based release liners—not only because the size of the market itself is fairly small, but also because new applications for film liners will continue to be developed at a more rapid pace than for the more mature paper-based release liner products.

Lee Keiser is an associate of AWA Alexander Watson Assoc. and principal of his own US-based consultancy.

Release Liners

by **Corey M. Reardon** AWA Alexander Watson Assoc.

Release liners, both paper and film, remain a key product of the coating and laminating industry; world demand in 2000 was 22,810 million sq m, of which most went to the self-adhesives market. Demand from the self-adhesive laminators—particularly for label stock—remains buoyant, but the materials and market emphasis are changing, and the profile of the release liner manufacturers also is changing in response to increasing globalization of the market, raw material price rises, and margin pressures.

Release liners are used in a variety of applications, primarily self-adhesive laminates; film casting; bakery and foods; and industrial.

Self-adhesives are by far the largest application area. While the growth rates of the different sectors vary, the market still is growing overall, particularly in relation to film liners. In the label stock segment, film liners offer packaging line managers the highest possible label application speeds, without any of the web breaks associated in “stop/start” situations with paper liners. In tape and other industrial segments, film liners also offer the strength and durability needed for uninterrupted application.

North America

North America is the largest consumer of release liners, and 50% of the usage is currently calendered krafts (SCK), although high-performance glassines and films are taking market share in label stock.

Although film liners presently account for only 12% of the total release liner market, their usage is spread across a broad range of applications. For example, film accounts for more than half the release liners used in the building and insulation market, which is currently enjoying a relatively high growth rate of 9%/annum.

In North America 80% of release liners used in label stock applications are produced

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by in-house silicone coating, by major self-adhesive concerns such as Avery Dennison and MACtac. Consumer products manufacturers' desire to differentiate their products through the packaging is fueling growth for self-adhesive labels, as they remain the most flexible option for "added value" product identification.

There is still plenty of capacity in the industry, but its changing profile will lead to higher-capacity usage as consolidation, acquisitions, rationalization, and liquidations continue. Fewer companies will account for a larger share of the business, but there is also room for some small specialist suppliers for niche products.

Overall, the North American market outlook is optimistic, but the smaller supplier base will lead to more intense competition.

Europe

Europe—7,160 million sq m, the second-largest market for release liners—also is dominated by the self-adhesive label stock segment and by calendered krafts, glassine in particular. The figure for self-adhesive usage that is in-house silicone coated is 90%. Film liners also are enjoying dynamic growth in the European label stock sector.

The label stock market for release liners in Europe had about 4%–5% growth in 2001, roughly the average growth rate for the overall market. Hygiene applications—baby diapers and sanpro—are growing at 6%, due to the developing economies of Eastern Europe.

The release liner manufacturers in Europe have not achieved the same levels of consolidation and rationalization that are evident in North America. The acquisition by UPM-Kymmene of Rexam Release's Netherlands operation, along with its North American business, to create Loparex worldwide, is expected to be the forerunner of changed

ownership for a number of commercial release liner companies.

The Environmental Factor

Recycling and re-use of release liners is a global issue today; only casting papers enjoy more than one use in commercial terms.

Uniquely, the US-based Channeled Resources/MaraTech worldwide family of companies offers a complete solution to the problem of gaining commercial benefit from waste materials: It purchases, processes, and sells nonrecyclables, with silicone-coated release liners and self-adhesive laminates. However, there currently is no governmental pressure in North America to move industry toward environmentally responsible disposal.

Conversely, in Europe the EU Packaging Waste Directive has led to an increasing focus on driving down the overall weight of all primary packaging, as well as supply chain responsibility for collection and disposal of what is defined as packaging waste, which includes release liners.

Opportunities Ahead

Certainly, there is a continuing future for release liners; the broad range of their applications makes them a relatively secure niche in the converting industry.

However, demand is softening—particularly in Europe and North America—and the "traditional" markets no longer can be relied upon to drive real growth. Today's prime opportunity area is Asia Pacific—currently 22% of the global market, most of it in calendered krafts, but with films perhaps the best future option for the region's environmental conditions.

The rest of the world, including Latin America, which today represents just 4% of the market, is another potential development region, but unstable economies make it a longer-term target.

Metallized Materials

by Dr. William Llewellyn
AWA Alexander
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Metallized materials—both films and papers—are much in demand across the globe, and their prospects continue to look positive, according to our current research.

However, the market segments into which the materials are sold are not universally healthy. Perhaps the best growth prospects are offered in technical applications, particularly for holographic security print and brand authentication.

Additionally, low-volume speciality applications for metallized films still offer niche market development opportunities in, for example, reflective traffic safety sign face materials, engineered films, medical disposables, and balloons.

Packaging, the volume market for metallized films and papers, is slowing as a result of competition among material suppliers and metallizers, industry rationalization, cost pressures, and the development of alternative material solutions.

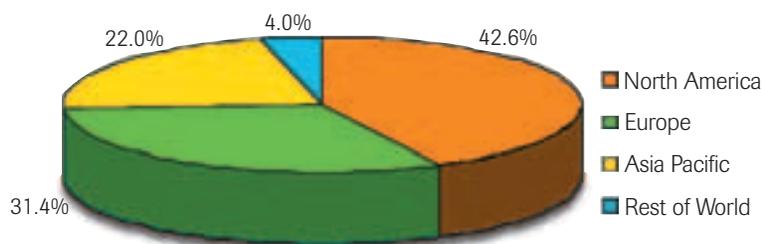
Labels in their broadest sense, however, continue to be the leading light in the decorative market segment, driven by the needs of retail brand differentiation, particularly on premium beers and FABs. All the label technologies can, and do, use metallized materials (including holographic "specials" and "wallpaper patterns," both paper and film, self-adhesive and glue-applied, or even wraparounds and shrink sleeves.

Regional Markets Around the Globe

Europe (the biggest market with 39% of demand) and North America represent relatively mature markets today, and growth will continue at a slow 3%/annum—even taking into account major consumer brand applications such as Budweiser labels and the continued expansion of metallized paper in Europe for inner liner applica-

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Worldwide Market for Release Liners by Region (%) – 2000



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tions. Competition is intense, and fashions are ever-changing.

In addition to intra-market pressures, metallizers are experiencing competitive pressure from low-cost imports. Purchasing metallized materials outside the traditional markets can reduce costs—a priority in most converting supply chains today—and has led to dilution of sales for home-produced North American and European materials. India and the Middle East, particularly Israel, are the biggest sources of lower-cost imports, and their installed capacity continues to increase each year.

The real opportunities are the world's developing marketplaces. Today, the Far East represents the main manufacturing base for Christmas decorations and gift wrap, undercutting European converted goods sup-

pliers, and there is a robustly developing manufacturing base for metallized materials there. In terms of regional development around the globe, China already has invested heavily in film and paper capacity.

Opportunities in Mature Markets

Capacity replacement is a genuine opportunity area in North America and Europe, helping reduce costs through greater efficiency and speed and realizing the stringent specification levels for barrier or metal adhesion that older machines cannot consistently achieve.

Technology advances also are driving machine replacement: Recent advances in plasma and gas wedge technologies for films and the demands for clear coatings for both barrier and security require upgrading at least, and possibly full replacement.

Key to Success: Adding Value

Security applications using metallized materials have been exploited partially through holography, but there is good potential for a range of vacuum-deposited coatings suited to lower-level security applications such as document protection, driver licenses, ID cards, etc., where transparent coatings and OVDs (optically variable devices) can offer opportunities for thermal as well as sputtered evaporation.

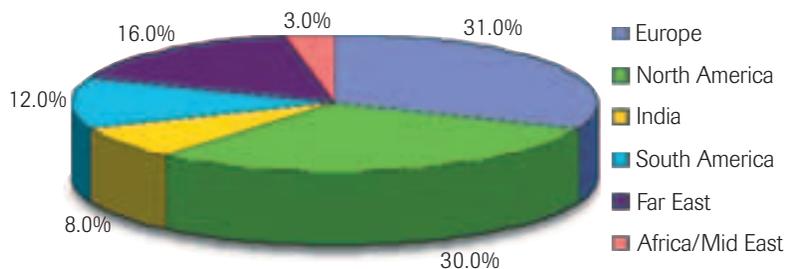
Looking at the market overall, it is evident there is limited profitability in general trade metallizing: Operating margins, particularly in Europe, are severely depressed and facing further erosion. There is, however, a need for higher-added-value products created through further downstream converting, such as improved holographic imaging for functional and decorative applications and patterned metallizing for "in-register" converting.

Also, there is a need for alternative high-performance specialty coatings—clear films for microwavable retort pouches, higher-barrier films and paper, and functional metallized papers; for cost-reduction breakthroughs; and for the development of new applications both inside and outside aluminum foil replacement.

Metallized materials still have much to offer their main markets in terms of excellent barrier properties and esthetics. And, the environmental/recycling properties of metallized papers are of increasing importance.

The Assn. of Industrial Metallizers, Coaters and Laminators (AIMCAL) is sole sponsor of the first edition of an annual research report "Metallized Papers and Films—World Sourcebook 2002: Markets, Materials and Technologies," currently being researched by AWA Alexander Watson Assoc. for publication in spring 2002. See p. CL6 for information on contacting AWA.

World Demand for Metallized Products - SQ M



pliers, and there is a robustly developing manufacturing base for metallized materials there.

In India there are already 28 major metallizing companies with 40 metallizing machines among them. Compare this to the U.K.'s manufacturing capacity—which represents 40% of Europe's total—of eight general trade metallizing companies with a total of 26 machines.

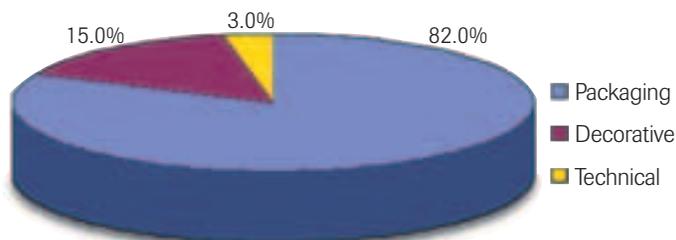
Net importing companies in recent years have been the countries of Eastern Europe (including Russia), but there is now the inevitable tendency for them to look at local manufacture and converting, further eroding

Films Versus Papers

The developing markets still favor metallized papers, particularly where there are opportunities to replicate global brand packaging styles. However, metallized films are growing faster in all regions. Oriented polypropylene is the fastest-growing film type, but in some markets—notably India—PET is preferred. Metallized OPP production is very much an "in-house" activity, with either film manufacturers or packaging converters playing an active role in the metallizing process.

Main Markets for Metallized Materials

(Total 2000: 5,201.2 min sq m)



Dr. William Llewellyn is an associate of AWA Alexander Watson Assoc. and an independent international business and technical consultant. Llewellyn has more than ten years in senior management positions with Van Leer Metallized Products Ltd., U.K., and a doctorate in chemical engineering.

One Answer to 'Linerless' Label Production



Edited by **Deborah Donberg** Managing Editor

A flexible, comparatively fast, linerless self-adhesive sleeving system for tray packs and bunched foods has been launched by U.K.-based SE Dynarap.

A company within the SE Labels Group (recently sold to Swedish industrial group Skanem Industries), SE Dynarap pioneered and has specialized for several years in the production of pack sleeving systems. The company has established an enviable reputation with the meat packing industry on both sides of the Atlantic, and the latest addition to its product portfolio offers what it says is its most versatile labeling solution yet.

Winning Combination

The SE Sleeve system combines applicator machine and high quality labels/sleeve consumables, which are printed on a quality thin sleeving board by any of the standard roll-to-roll printing processes, and in-line overlaminated or ultraviolet-varnished to give a high-gloss, matte, textured, or even embossed surface.

In a second pass on a coating machine, the adhesive strip and silicone layer are applied to the front and back of the printed label roll, which is then ready for application to the chosen packs. The coater/laminator was built by SE Dynarap, and the sleeves are printed on either a Nilpeter offset combination press or an Arpeco Impressionist.

The applicator is a compact, specially engineered, computer-controlled ma-

chine that offers a wide choice of label positioning options and high quality label graphics. Guillotining and forming around the pack are achieved in-line, at speeds to 100 packs/min. At present, only butt-cut labels are commercially possible, but SE Dynarap's research team is working on developing a die-cutting capability.

is formulated to give optimal initial adhesion with a low coat weight. Sleeves or labels can be fed in any width from 65 to 300 mm to meet the needs of a variety of different packs."

The SE Sleeve can be programmed to operate fully automatically, but for very short runs and product trials, labels also can be

hand-applied. The addition of weigh scales can give fixed weight/catch-weight options as part of the labeling operation, used in conjunction with a Markem Smart Date II coder—also optional—for the addition of variable information.

Bradley adds, "SE Sleeve is the logical extension to our existing systems, Dynarap bands and Dynasleeve carton sleeve. We have six years behind us in meeting this market's highly specific requirements, both in terms of machinery and consumables, and our

systems are already in use in leading food packaging halls throughout Europe and North America." **PFFC**



The SE Sleeve labeling/sleeving system from SE Dynarap combines applicator machine and high quality labels/sleeve consumables, which are printed on a quality thin sleeving board.



Tesco "Ready to Roast" meat joints are labeled using Dynarap's new linerless SE Sleeve system.

Says Les Bradley, SE Dynarap's managing director, "SE Sleeve is undoubtedly the most sophisticated and flexible sleeving system available today. With just one machine, a manufacturer can achieve any one of four different labeling/sleeving formats—top presentation, top and side presentation, C sleeve, or

a full wraparound sleeve."

Bradley continues, "The sleeves are presented to the machine in the roll self-wound. The absence of a backing paper means less roll changes, more labels per roll, and increased economy. The adhesive

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