



# Sustaining Value for Rosin Esters in Hot Melt Adhesives

Jonathan Lowe  
JEL Consulting  
September 2019



# Agenda

- Introduction- Hot Melt Adhesive market and trends
- How are market trends impacting Rosin Ester usage?
- Rosin Ester market size by segment and 10-year forecast
- Major issues to address to sustain Rosin Ester usage and value
- Regional variations
- Why is Rosin Ester usage not falling faster?
- Conclusions



# Introduction

## Hot Melt Adhesives European Market

- European market size estimated at 670kT
- Growing at around 3.5% per year over all market segments
- Tackifier market is ca. 255kT (38% of total adhesive)
- Rosin Ester market is ca. 88kT
  - 13% of total adhesive
  - 35% of tackifier quantity
  - Rosin Ester market has declined by ca. 1% per year over last 10 years, despite overall adhesive market growth
- Rosin Ester usage varies by Adhesive market segment and geography



# Hot Melt Adhesives

## Key Market Trends and Developments



Trends & Demands	Adhesive Developments
Higher speed application equipment with reduced downtime due to breakages and cleaning	Clear, clean-running, highly thermally stable products that do not char or break down
Material cost savings- smaller packs and reserves, less adhesive	Next generation products with excellent specific adhesion to low energy substrates at low usage rates, controlled with in-line equipment
“Bio-based”, renewable, recyclable	No price premium for renewable (yet); recyclable still the ultimate aim, but seems a long way off
Lower application temperatures to save energy and improve handling safety	Lower softening point adhesives with equivalent or better properties



# General Trends Affecting Rosin Ester Usage

## Positives

- Superior adhesion in some applications
- Good hedge against hydrocarbon price and availability swings (but not currently!)
- Seen as “renewable” alternative to hydrocarbon tackifiers (but still need hydrocarbon for the polymer, so not a “green” adhesive)
- Odour of RE is sometimes favoured over hydrocarbons
- Reluctance of users to move away from rosin esters (industry inertia)

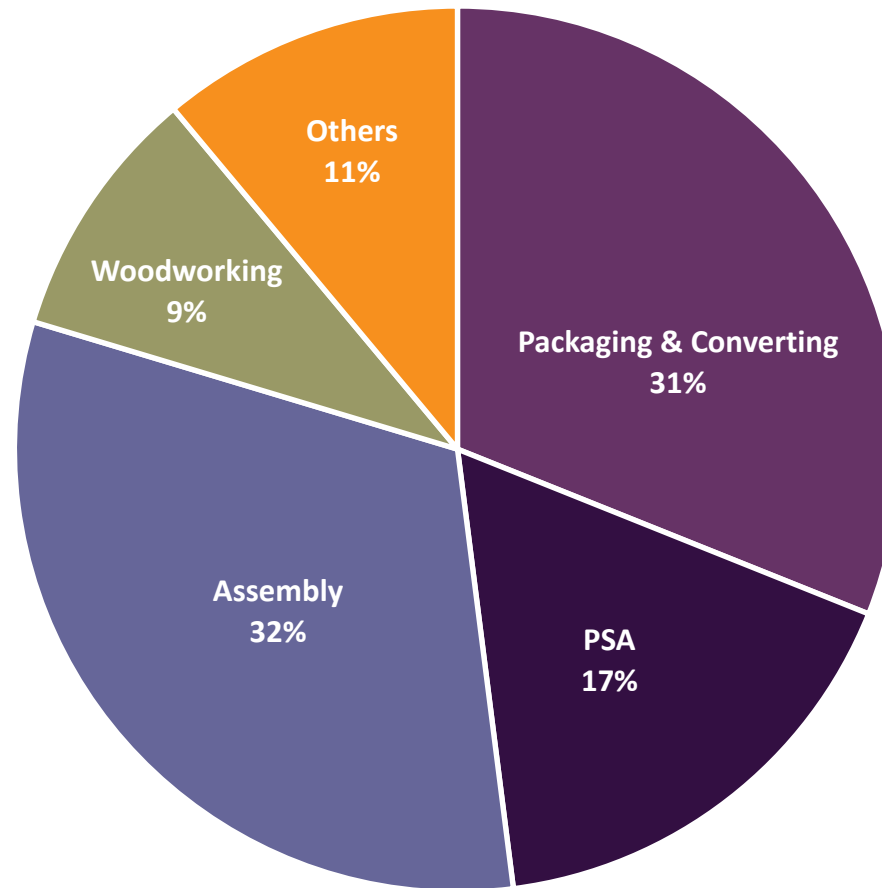
## Negatives

- Growth in metallocene catalysed PP and PE polymers which are generally incompatible with rosin ester tackifiers
  - Metallocene catalysed polymers enable more stable, cleaner running and lower usage adhesives to be formulated
  - Generally need hydrogenated hydrocarbons to tackify them
- Rosin esters sometimes associated with “old technology”- yellowish, with poor thermal stability
- “Standard” hydrocarbon tackifiers have also improved



# Rosin Esters in HM Adhesives- ca. 88kT

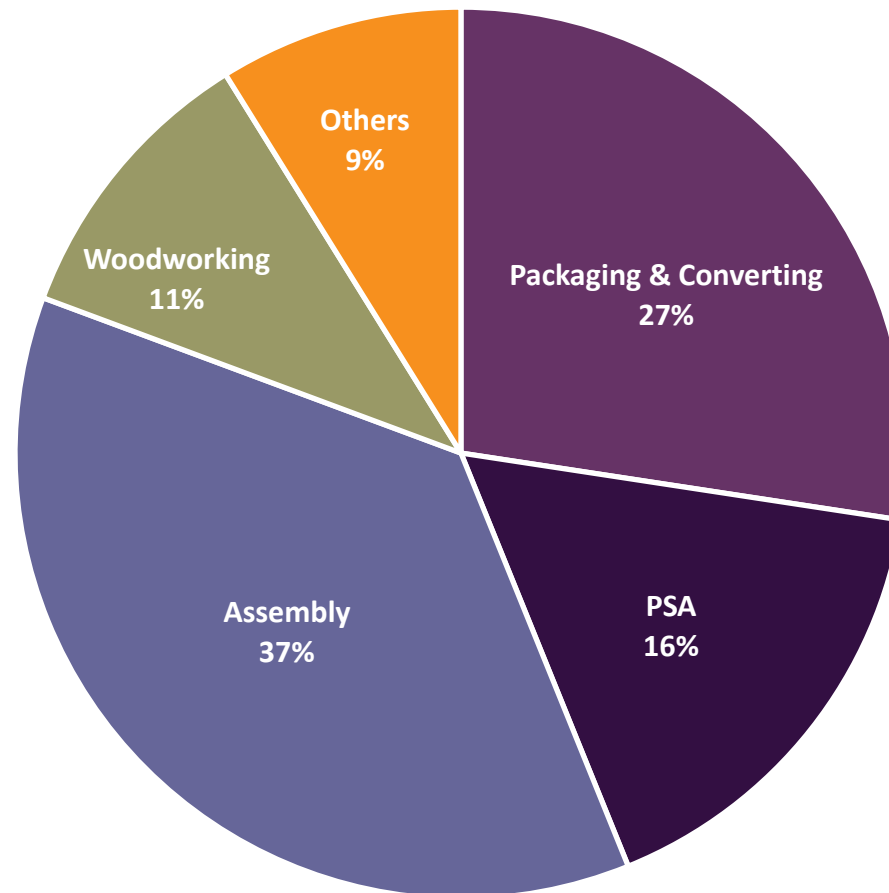
## Estimated Quantity by Market Segment- Europe 2019





# Rosin Esters in HM Adhesives- ca. 110kT

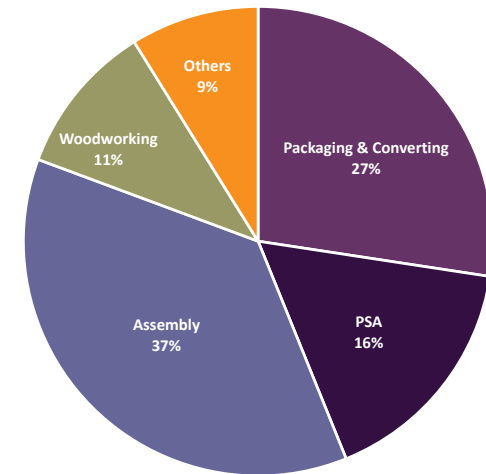
## Projected Quantity by Market Segment- Europe 2029



**CAGR = 2.3%**

# + Assumptions for RE Quantity Development 2019 - 2029 (88kT to 110kT - CAGR 2.3%)

- Annual market segment growth rates according to industry projections
  - Packaging & Converting 2.0%
  - PSA 2.5%
  - Assembly 3.8%
  - Woodworking 3.5%
  - Others 0.0%
- RE decline in Packaging and Converting 1% per year
- RE decline in PSA 0.5% per year
- RE holds share in other segments







## Major Issues to Address to Sustain Rosin Ester Usage and Value



1. Link between initial colour and thermal stability.
2. Incompatibility of RE with metallocene catalysed polymers.
3. Adhesive usage optimization.
4. Deeper understanding of applications.



# Link Between Initial Colour & Thermal Stability

- Research indicates that initial colour is a the biggest factor in the perceived thermal stability of an adhesive
  - Customers often insist on a white / clear adhesive even if they know that a yellowish one has the same (or even better) thermal stability
  - Mostly relevant for Packaging & Converting

## *Addressing the Issue:*

- Very low initial colour rosin esters
- Continuing proof of high thermal stability / resistance to char
  - Work with co-suppliers (e.g. EVA producers)
- Understand the sub-segments where colour is less important, e.g. fruit box erection
- "Melt-on-demand" application equipment is not a panacea, but close links with equipment manufacturers are essential





# Adhesive Usage Optimization

- Optimizing (minimising) adhesive usage is a very hot topic now
  - Metallocene-based adhesives can give usage savings due to their lower density, but their higher cost means that usage measurement is more critical than before
  - Potential cost-savings for users, also enhancing their “green” credentials
  - Equipment manufacturers are offering accurate in-line dosage meters that can also be retro-fitted to existing lines (e.g. Nordson ATS Retrofit Kit)

## ***Addressing the Issue:***

- Engage with the equipment manufacturers to optimise adhesive performance benchmarks for RE-based adhesives
- May be possible to reduce adhesive quantities due to RE conferring superior adhesion in some applications
- Cannot rely on the adhesive companies to work on this without significant support!





# Deeper Understanding of Applications

- Metallocene products have made significant inroads into Packaging
- Benefits of metallocene are lower (or less obvious) in other segments
  - In these segments, the adhesive is usually a high proportion of the part cost
  - Specific adhesive performance tends to outweigh speed, colour and thermal stability

## ***Addressing the Issue:***

- Explore the sub-segments of Assembly- Transportation, Construction, Filter, Mattress & Spring, Textiles, Appliances, etc.
  - Design and optimise tackifiers that can address specific unmet needs
- Hot Melt PSAs still use RE widely
  - Understand better the specific reasons and benefits
  - Can be even harder to understand due to longer value chain





# Regional Variations in Rosin Ester Usage

## Europe

- Erosion of rosin ester greatest here
- Market uptake of metallocene higher in West and North than South and East
  - Focus on technology advancement and “total cost of ownership” of adhesive
  - Partnerships with equipment companies (Nordson, Robatech, etc.) to sell solutions to customers rather than just products
  - Many small to medium hot melt producers in Italy, Spain and Portugal with long-standing customer and supplier relationships and more market inertia

## North America

- Rosin ester share has held up more, less market penetration of metallocene adhesives
  - Customers are more adhesive price-driven
  - Users have more “hands on the machine”- focus on equipment maintenance
  - Trade war has impacted imports of hydrocarbons (polymers and tackifiers) from China



# Rosin Esters in Hot Melt Adhesives

## Regional Variations

### South America

- Market uptake of metallocene adhesives is low
  - Traditional high usage of gum rosin esters from Brazil, etc.

### Asia

- Appreciable adoption of metallocene adhesives for new applications and with global users
- EVA / Rosin Esters still maintain a healthy share due to local manufacture
- Operator education is not always sufficient to benefit from material savings
- Equipment maintenance is low cost, and/ or comes included as part of a service package with the equipment



# Why is Rosin Ester Usage Not Falling Faster? Industry Inertia

- Larger adhesive users (especially FMCG companies) typically use RFQ processes to select adhesives
  - Usually part of MRO spend, adhesives often assigned to an intern/ junior purchasing staff member
  - Often results in no/ few changes to products
- Many smaller, independent adhesive users do not consider changing product unless they are forced to (e.g. by product deletion)
  - Especially true of products sold through distributors and agents which can be 40 - 50% of the market
- Adhesives that require a formal re-approval process will need to offer significant benefits to justify the time / cost of re-approval



# Conclusions

- Despite reduced usage in some segments, Rosin Ester usage is expected to grow over the next 10 years, albeit at a lower rate than adhesive market growth
- To address the challenge of sustaining usage and value for Rosin Esters, manufacturers are encouraged to:
  - Develop lower colour / more stable products
  - Work intensively with co-suppliers (e.g. EVA producers and equipment manufacturers)
  - Gain a deeper understanding of adhesive sub-segments so that new, tailored products can be developed
  - Further explore how rosin esters can play a greater role in tackifying metallocene polymers







**Thank You!**

**Jonathan Lowe**  
**JEL Consulting**  
**[jonathan@jelconsulting.eu](mailto:jonathan@jelconsulting.eu)**  
**+31 65 433 7249**