

# Wood Packaging Study

**Quantification of the Manufacture, Recycling  
and Re-use of Wood Packaging in the UK, 2009**

**A Study**

**for**

**Timcon and the Forestry Commission**



**Forestry Commission**



**by**

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**July, 2010**

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## Background to the Research:

It is likely that further regulatory changes governing the flow of wood packaging materials within Europe will be introduced over time, which will affect every company producing and handling wooden packaging in Europe.

A key element of any change, in order to safeguard indigenous forests and woodlands, would be to guard against the proliferation of pests in wood packaging. Consequently, the Forestry Commission of Great Britain and Timcon, the Timber Packaging and Pallet Confederation wished to examine market volumes and the extent to which ISPM15 treatment activities were carried out in the UK.

This information is likely to help formulate packaging, plant health and forest industry policy in the UK, ensuring that the best interests of the pallets and packaging industry are represented both in the UK and in Europe.

In addition, the pallets and packaging industry is an important consumer of timber products and the Forestry Commission, Timcon and other interested parties wished to estimate the volumes of wood packaging produced in the UK. Results of this work would inform the task of measuring the usage of sawn softwood in this industry, as quantified in the Forestry Commission's timber utilisation studies.

In order to determine these information needs, Timcon and the Forestry Commission commissioned *timbertrends*, an independent analyst, to carry out a survey among members of the Wood Packaging Material Marking Programme (WMS) and members of Timcon at the beginning of 2010, for the year 2009.

## Objectives of the Research:

To estimate the volume and value of new pallets and packaging materials manufactured and recycled (repaired and re-manufactured) in the UK, leading to an estimate of softwood and hardwood usage. This would involve providing:

1. Estimates of turnover by value of new pallet manufacture and recycling in the UK
2. Estimates of the volume of pallets by:
  - size of pallet
  - type (2-way/4-way)
  - treated (ISPM15)
  - reusable
3. Estimates of timber consumption by pallet and packaging manufacturers in the UK, including estimates of timber supply by country
4. Estimates of the productive capacity of ISPM15 heat treated and kiln dried pallet manufacture.

## **Scope of the Research:**

The scope of the research covered manufacturers of pallets and packaging in the UK within the Timcon membership and members of the Wood Packaging Material Marking Scheme (WMS), less those already in Timcon membership.

## **Methodology:**

In order to gain the maximum possible market coverage, as defined above in Scope of the Research, at the minimum cost, the survey was conducted by e-mail with selected use of the telephone for response chasing.

A short questionnaire was devised, into which respondents to the survey entered data, and returned by e-mail. A copy of the questionnaire can be found in Annex I of this report.

Measuring the supply of manufactured, recycled and re-used pallets and packaging in the UK required a careful and deliberate approach, because of the structure of the industry.

The market comprises many small firms, a good number of middle-sized firms, larger firms and a number of very large firms operating within the industry. The activities of these companies are not homogenous, with differing emphases on manufacturing and recycling and also different ways of getting to market. This is exemplified by the difference between manufacturers and pallet pool operators with manufacturers mostly selling their output while pallet pool operators only rent pallets for use by customers.

Consequently, the methodology adopted for this work required a different approach from the 'normal' stratified research sample used in markets where there is less differentiation between companies.

A more detailed explanation of the methodology used can be found in Annex II to this report.

## **Programme of Work:**

The programme of work included the following processes:

1. Formulating and seeking approval for the survey questionnaire
2. Production of the questionnaire
3. Compiling the survey sample
4. Writing and seeking approval for the covering letter to accompany the survey questionnaire
5. Building the survey and analysis database to be used in the despatch and receipt of questionnaires
6. Despatch of the questionnaires to the survey sample
7. Receipt, checking and input of data to the analysis database
8. Chasing selected companies for response
9. Analysis and interpretation
10. Presentation of initial findings at the Timcon Annual General Meeting
11. Writing of draft report
12. Production of final report

## Executive Summary

### **Turnover**

From the work of this wood packaging study it is estimated that the turnover of the pallets and packaging industry in 2009 was approximately £406 million. Within this total, pallet turnover was estimated to be £285 million. The estimated turnover of newly manufactured pallets was £168 million, for recycled pallets the turnover estimate was £110 million and £7 million for re-used pallets.

### **Employment**

This study of firms within the Timcon membership and Wood Packaging Material Marking Programme estimated that the number of employees in 2009 involved in pallet and packaging production in the UK was in the region 5,500.

### **Quantity of Pallets Manufactured, Recycled and Re-used**

Based on reliable evidence, it is estimated that the total number of pallets placed onto the market in 2009 by UK producers and recyclers amounted to approximately 91 million. Newly manufactured pallets were estimated to account for 32 million with 53 million recycled pallets and around 6 million re-used pallets.

### **Pallet Sizes**

Of newly manufactured pallets in 2009, estimates indicate that 34% were of dimension 1,000mm x 1,200mm, 27% were 800mm x 1,200mm and approximately 39% were of other sizes. For estimates of recycled pallets, 89% were 1,000mm x 1,200mm, 8% were 800mm x 1,200mm with 4% for the remainder.

### **Pallet Types**

Of newly manufactured pallets in 2009, estimates indicate that 26% were 2-way pallets and 74% were 4-way pallets. The 4-way type was the most commonly recycled, accounting for 96% of all recycled pallets and 92% of re-used pallets were also of the 4-way type.

### **Timber Usage**

In 2009, it is estimated that 1.46 million cubic metres of timber products were consumed by the UK pallets and packaging industry. New pallet production consumed the greater part of these materials, at just under 1 million cubic metres.

Estimates of material usage indicate that softwood accounts for 82% of the total, followed by hardwood at 10.5% and panel products at 7.5%.

### **Heat Treatment and Kiln Drying**

The estimated number of heat treated pallets produced and recycled in 2009 specifically by Timcon manufacturing members is 8 million, from a total of around 80 million. Of this 8 million, it is estimated that 2 million were produced from bought-in heat treated timber while the remaining 6 million pallets were heat treated in-house.

Any future legislation requiring the industry to produce only heat treated pallets would need to carefully take account of the capability of the industry to meet this requirement. The gap between this requirement and the ability of the industry to deliver against it - is considerable. If the UK was required make **all** production ISPM15 compliant, to meet **all** current demand levels, it is likely that higher utilisation of existing capacity would be required and between a doubling and trebling of the existing installed base of kilns would need to take place.

## Key Findings:

### Industry Turnover

#### Estimates of turnover by value of new pallet manufacture and recycling in the UK.

Prior to the work for this report, the only measure of industry activity was provided by ProdCom. ProdCom stands for PROducts of the European COMmunity and is a European Union (EU) wide survey of production mainly for the manufacturing industries and covers around 3,866 products classified to around 234 industries. Companies involved in the annual ProdCom Inquiry supply sales data for the products they manufacture, as well as non-manufacturing income.

According to ProdCom, the total turnover of the combined activities of pallet manufacturing and recycling in the UK in 2008 was £325 million (£324,527,000).

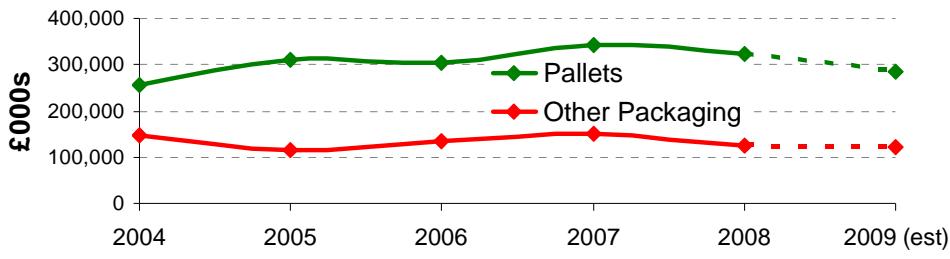
In 2009, based upon the survey conducted among Timcon and WMS members, it is estimated that turnover was £285 million (£285,199,000). This estimate is 12.1% lower than the 2008 Prodcom total.

Expanding the analysis to include non-pallet packaging, (cases, boxes, crates and cable drums, in addition to pallets, but not casks, tubs etc) the 2008 Prodcom total was £448 million (£448,192,000).

Using data from the survey conducted among Timcon and WMS members, it is estimated that turnover of pallets and packaging production was £406 million (£406,414,844) in 2009. This estimate is 9.3% lower than the 2008 Prodcom total.

The trend in the value of pallet production in the UK, alongside estimates of pallet turnover for 2009 from the wood packaging study is shown graphically in chart 1 below.

**Chart 1: Turnover of UK Pallets & Packaging  
Manufacturing & Recycling 2004-2008  
& 2009 Estimated**



It should be noted that in chart 1, the turnover data to 2008 is extracted from the Prodcom series and the estimate for 2009 is derived entirely from the survey conducted among

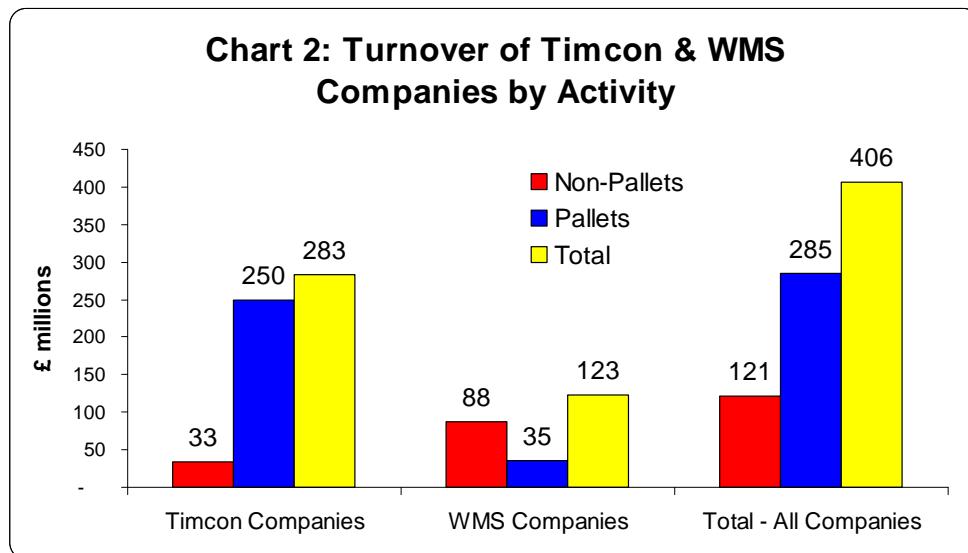
Timcon and WMS members. The comparison of these two sources of information can be found in Annex III of this report.

Estimates were also made for the division of turnover between Timcon member companies and those belonging to the Wood Packaging Marking Scheme. It should be noted that those companies within Timcon membership that are also WMS members were not included in the estimate for WMS companies' turnover.

Of the estimated industry turnover of £406 million, Timcon companies' turnover was £283 million and the turnover of WMS companies was estimated to be around £123 million.

By virtue of requesting information from both memberships on manufacturing activity, it was possible to identify the turnover within each membership of non-pallet and pallet manufacturing activity.

Chart 2 below presents this breakdown.

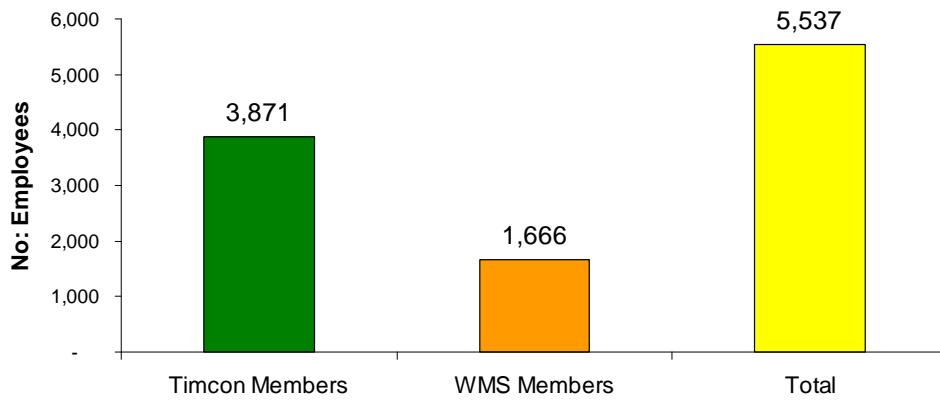


At £250 million, Timcon companies account for the majority of pallet turnover, which represents 88% of the total pallet turnover of £285 million. Conversely, WMS companies account for the majority of non-pallet turnover, totalling £88 million in 2009, or 73% of non-pallet manufacturing turnover.

## Industry Employment

Provision of employment numbers by respondents to the wood packaging study, coupled with estimates of turnover by Timcon and WMS companies permitted estimates to be made of the number of people employed in the industry.

**Chart 3: Total Number of Employees in the UK Wood Packaging Industry**



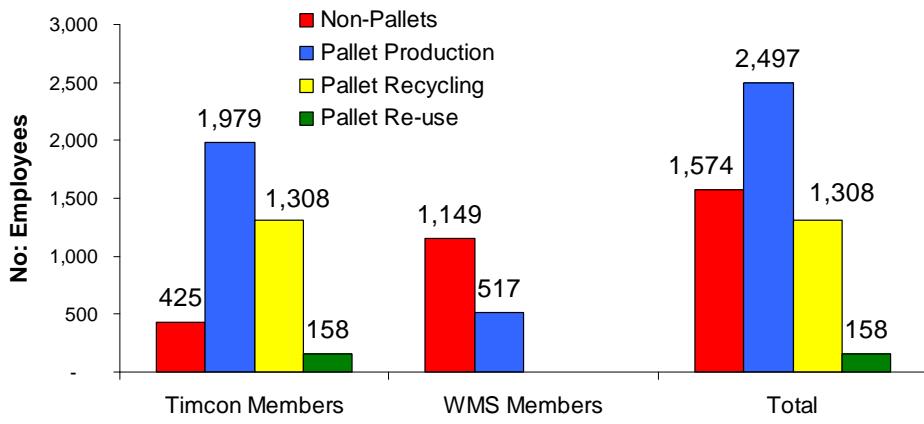
Measuring employment is an ever changing activity, particularly during times of economic recession, however, by taking the average number of employees engaged in each type of activity from the survey results of both the Timcon and WMS memberships, it was possible to estimate the total number of employees engaged in wood packaging production in 2009.

As shown in chart 3, from a total of just over 5,500 people, almost 3,900 were employed by Timcon manufacturers (or 70%) and approximately 1,700 were employed by WMS manufacturers.

A further breakdown of employment by activity within each group was requested by the survey, allowing an estimate to be made of employment in non-pallet packaging and the various categories of pallet manufacture and re-use.

Chart 4 below identifies this breakdown of employment.

**Chart 4: Employees Engaged in Wood Packaging by Activity**



Unsurprisingly, the great majority of employees within the group of Timcon manufacturing companies are engaged in pallet production, recycling or re-use. The term pallet production

refers to newly manufactured pallets; recycled pallets are repaired pallets (or re-manufactured pallets where additional material is used to repair more than 25% -30% of the original pallet) and re-used pallets are simply those which are retrieved and placed back onto the market without any need for further processing.

The proportion of those employed in non-pallet manufacture within Timcon companies was 11%; the remaining 89% were involved in pallet manufacturing and re-use.

The reverse applies to employment in WMS companies with 69% employed in non-pallet manufacture and the remaining 31% in pallet making.

## Pallet Values & Volumes

### **Estimates of the volume of newly manufactured and recycled pallets by: size of pallet; type (2-way/4-way); treated (ISPM15); reusable.**

For reference, when viewing quantity data, the turnover data previously reported is reproduced here.

As reported above, the estimated turnover of all wood packaging manufacturing in 2009 derived from this wood packaging study was £406 million, down from the £448 million total in 2008 which was report in the Prodcom series, which in turn was lower than the £492 million Prodcom total in 2007.

As shown above, within these totals, the turnover of pallet making, recycling and re-use was estimated to be around £285 million in 2009, down from the £325 million Prodcom totals in 2008 and £342 million in 2007.

The quantity of pallets manufactured, recycled and re-used in 2009 was estimated to be around 91 million.

According to ProdCom, the quantity in 2008 was approximately 63 million and in 2007, ProdCom reported a total of nearly 78 million.

Whilst there is consistency between the Prodcom turnover and the 2009 turnover estimate from the wood packaging study, described above, there is an inconsistency between the survey estimate of 91 million pallets manufactured, recycled and re-used as estimated from the survey in 2009 and the 63 million figure provided by Prodcom for 2008.

It is perhaps worthwhile revisiting the composition of the Prodcom sample and also the estimated standard errors present in the Prodcom sample for wooden packaging.

The sample of companies selected to provide data for Prodcom is stratified by number of employees, as follows:

No: of Employees	Total of All Businesses Total Sampled
1-9	333
10-19	88
20-49	58
50-99	21
>100	6

Encouragingly, ONS reported that all wooden container manufacturers employing 20 or more people formed part of the PRODCOM Inquiry.

This, apparently, guarantees that 85 of the largest companies in the industry contribute data to the Prodcom series. However, only 40% of companies employing between 10 and 19 employees were included in the PRODCOM inquiry and only 5 companies employing less than 10 employees contribute data to the PRODCOM inquiry. The low number of sampled companies in the smallest employee band is because of the requirement within the PRODCOM Inquiry to limit the burden on small businesses.

ONS claim that allowance is made for the smaller companies, with estimates for that sector of the market included in the totals published.

However, the statistical analysis conducted for an earlier report, "To improve the accuracy of measuring the packaging and pallets market in the UK; for use in the programme of Improving Timber Utilisation Statistics" revealed that the standard errors present in the Prodcom report for wood packaging were substantially higher than those for the whole of the Prodcom series of reports.

Further discussion of this is contained in Annex III of this report, but from the Prodcom analysis for 2006, the total of pallets manufactured in the UK was 74.7 million. Using the standard error (in value) declared by ONS, this would, if converted to provide a possible range of volumes produced, result in a range in 2006 of between 67 and 83 million pallets.

This confirms that the Prodcom estimates are not precise. It also suggests – assuming the findings of this wood packaging study are relatively representative – that the Prodcom Inquiry is not taking into account the entire market, when providing estimates.

As part of this study, ONS were re-contacted to ascertain whether the explanation provided in the earlier Forestry Commission report<sup>1</sup> that repairing and re-manufacturing activities were included in the Prodcom Inquiry - as manufacturing activity - was correct. Confirmation was provided. The response from ONS read, "*I think we could broadly say that for PRODCOM, all pallets, whether from virgin wood, or recycled, are still within the 1624 class, and split out as per our previous correspondence*".

It is believed that the discrepancies between the Prodcom data and that provided by this study have their root in the interpretation of what constitutes production.

This issue is returned to, as stated, in Annex III of this report.

Returning to the findings of the wood packaging study, as shown in chart 2 earlier in this report, the turnover of pallet production in the UK in 2009 was £285 million. Of this total, it is estimated that £168 million was accounted for by newly manufactured pallets, £110 million by recycled pallets and around £7 million by re-used pallets.

In percentage terms, newly manufactured pallets comprised 59% of the total, recycled 38% and re-used pallets 3% of turnover.

The estimate of 91 million pallets placed onto the market in 2009 also included manufactured, recycled and re-used pallets and the breakdown of these activities by quantity is,

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<sup>1</sup> A 2008 report entitled, "To Improve the Accuracy of Measuring the Pallets and Packaging Market in the UK; for use in the Programme of Improving Timber Utilisation Statistics".

approximately: 32 million newly manufactured, 53 million recycled and 6 million re-used. Proportionately, newly manufactured pallets accounted for 35% of total production, recycled accounted for 58% and re-used 7% of total quantity produced.

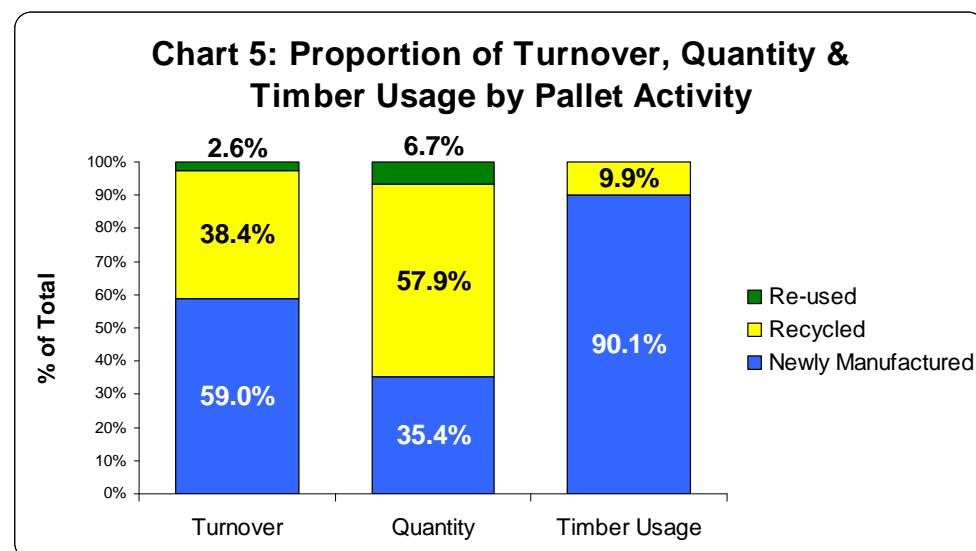
The wood packaging study also requested information on timber products usage and it was therefore possible to determine the volumes, in cubic metres, of these products purchased.

For newly manufactured pallets, timber usage was – as will be seen later in this report under the section on timber usage – 977,000m<sup>3</sup> and for recycled pallets, timber usage was 107,000m<sup>3</sup>.

The proportion of timber usage in pallet production is therefore heavily orientated towards new manufactures, which account for 90% of all timber products used with the remaining 10% used in recycling. It is assumed that no timber is used in the re-use of pallets.

Therefore, industry turnover, quantities and timber usage for each of the activities of manufacturing, recycling and re-use are proportionately, substantially different.

This breakdown is shown in chart 5 below.



In order to gauge an indication of the changes that had taken place from 2008 to 2009, a small number of Timcon members provided data for 2008. From these changes in activity, it is believed that a small shift in the emphasis away from new manufacturing to recycling between 2008 and 2009 appears to have taken place.

This is considered to be due to two main factors.

The first was the state of the market in 2009 where a weaker economy resulted in the overall demand for pallets continuing to decline. Within a lower volume market, a shift in emphasis from newly manufactured to recycled pallets may have been a reflection of pallet buyers looking to reduce pallet purchase costs during recessionary times.

The second was the difficulty with which some timber supplies could be obtained. Overseas softwood suppliers as a group, reduced production capacity further in 2009, with Finnish and Latvian mills especially, experiencing difficulty in securing adequate log supplies and this,

coupled with significantly lower demand in many markets and construction in particular, resulted in line suspensions and even mill closures.

The impact on the pallets market meant that greater quantities of recycled pallets were placed onto the market.

Consequently, it is believed that the proportion of recycled pallets was somewhat lower in 2008 than the 58% of total supply in 2009.

The table below provides a quantitative breakdown of pallet activity turnover, quantities and timber usage for 2009.

**Table 1: Pallet Turnover, Quantity and Timber Usage**

	Pallet Turnover - £000s	000s Pallets	000s m3
WMS Pallet Production	29,090	5,521	163
Timcon Pallet Production	139,167	26,622	813
Total Pallet Production	168,257	32,144	977
Timcon & WMS Pallet Recycling	109,631	52,590	107
All Pallets Manufactured & Recycled	277,888	84,734	1,084
Re-used Pallets	7,312	6,085	-
Total	285,199	90,819	1,084

From this data table, it is possible to derive average values and usages per activity.

Table 2 below describes these.

**Table 2: Pallet Values and Material Usage**

	£/Pallet	m3/Pallet
WMS Pallet Production	5.27	0.0296
Timcon Pallet Production	5.23	0.0306
Total Pallet Production	5.23	0.0304
Timcon & WMS Pallet Recycling	2.08	0.0020
All Pallets Manufactured & Recycled	3.28	-
Re-used Pallets	1.20	-
Total	3.14	-

As would be expected, higher values appertain with newly manufactured pallets and the average prices per pallet for Timcon and WMS produced pallets derived from the results of the survey are very similar with the combined average of £5.23 reflecting the greater weight of Timcon companies in the manufacturing mix.

The average usage of timber products for newly manufactured pallets is also similar between Timcon and WMS companies and at an average level of 0.0304m<sup>3</sup> per pallet, this is virtually identical to the average usage that has been used for many years by Timcon in the reporting of packaging waste statistics.

The average price of recycled pallets, derived from the survey, is £2.08 which is a reflection of the combined rental income from the large volumes placed onto the market by pallet pool operators and sales values obtained by Timcon manufacturers.

With material usage of recycled pallets quantified at 0.002m<sup>3</sup> per pallet, this suggests that the 'average' repair constitutes around 7% of a pallet, or the odd deckboard or stringer replacement.

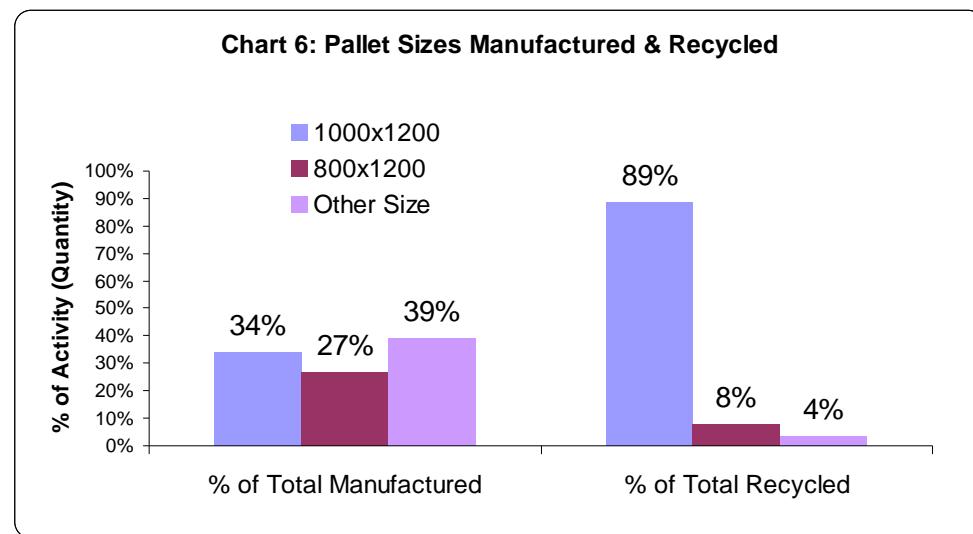
## Pallet Sizes

Information was sought on the quantity manufactured or recycled of the two most common pallet sizes, 1000 x 1200 or 1200 x 100 and 800 x 1200. The responses to this request revealed that other sizes too, were produced and recycled.

Not all respondents to this survey question were able to identify quantities by size of pallet, therefore care should be exercised in drawing firm conclusions from the data supplied. With this weakness in the data noted, estimates of the size profile for the total market were nevertheless made.

In 2009, it was estimated that 68% of all pallets newly manufactured and recycled were of the 1000 x 1200 size; around 15% were 800 x 1200 and the remaining 17% were of a variety of different sizes. Based on the estimate of 91 million pallets manufactured and recycled in 2009, this indicates that just over 57 million pallets were of the largest size, nearly 13 million were of the 800 x 1200 size and around 15 million of other sizes.

Within these totals, differences in the size of pallets by the type of activity were noted and are presented in chart 6 below.



Perhaps a less even spread of sizes might have been expected in the manufacture of pallets and a more even spread of sizes in the recycling of pallets.

As stated, the small sample sizes, when interrogating data to this level of detail, can provide misleading results. It is possible also that the high proportion of other sizes claimed to be manufactured was a misunderstanding of the survey question. On the questionnaire, no provision was made for quantifying sizes other than the two above, therefore, where the proportions allocated to these two sizes did not reach 100%, it was assumed that the remainder was for other sizes.

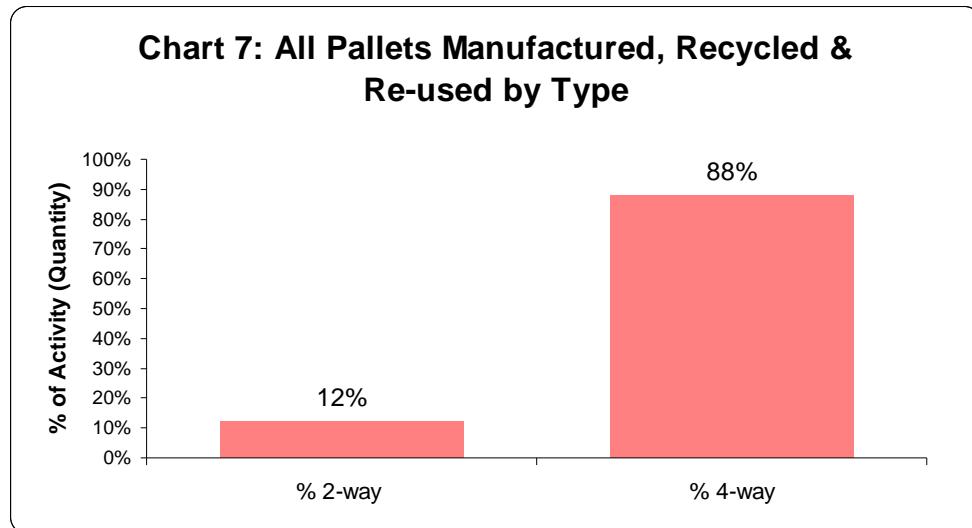
This interpretation may not have been universally applied by survey respondents.

## Pallet Types

Information was also sought on the type of pallet manufactured and recycled – either 2-way or 4-way entry.

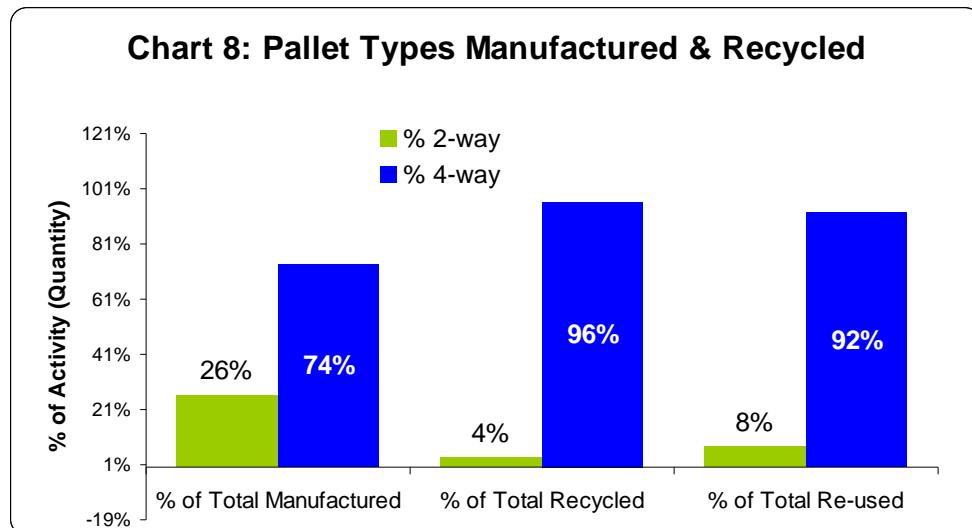
As for pallet sizes, not all respondents to this survey question were able to identify pallet types, although a higher response than the size enquiry was forthcoming. However, a similar caveat is provided when viewing the data on pallet type.

In 2009, it was estimated that 12% of all pallets newly manufactured and recycled were 2-way entry with 88% reported to be 4-way pallets and this is presented graphically below.



Based on the estimate of 91 million pallets manufactured and recycled in 2009, this indicates that just over 11 million pallets were of the 2-way type with the remaining 80 million of the 4-way type.

Within these totals, differences in pallet type by the type of activity were noted and are presented in chart 8 below.



As in the analysis of pallet sizes, the small sample may be responsible for an exaggeration in the quantity of 4-way pallets manufactured, recycled and re-used, although it would appear

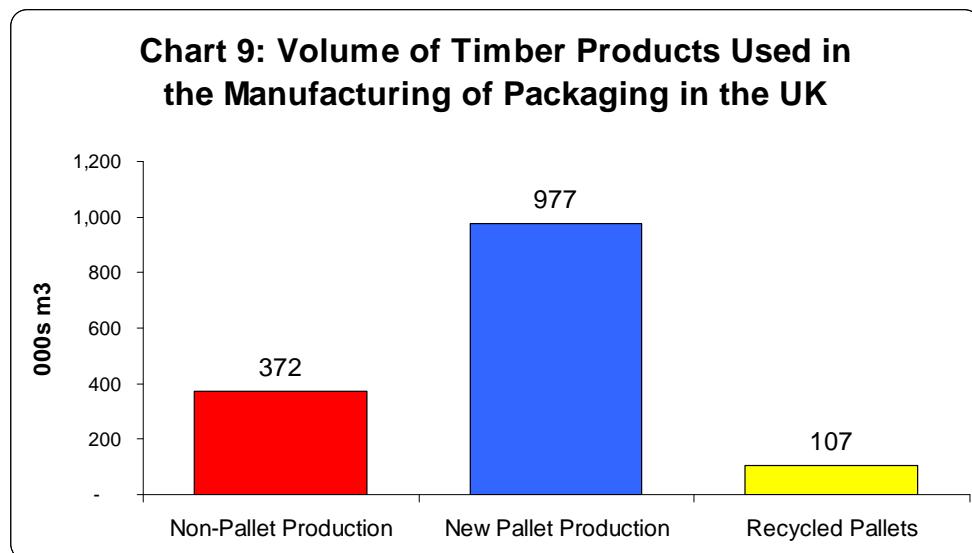
that 4-way pallets, irrespective of deficiencies in the survey sample, are by far the most common pallet type in the market.

## Estimates of Timber Consumption by UK Pallet Manufacturers

In order to satisfy the Timcon requirement of reporting to both national and international bodies and the Forestry Commission requirement to measure timber utilisation in the UK, this wood packaging study asked Timcon and WMS members companies to quantify the volume of timber products used in their various activities.

This resulted in an estimate for 2009 of nearly 1.5 million cubic metres of softwood, hardwood and panels products.

This was separately identified by activity type and is shown in chart 9 below.

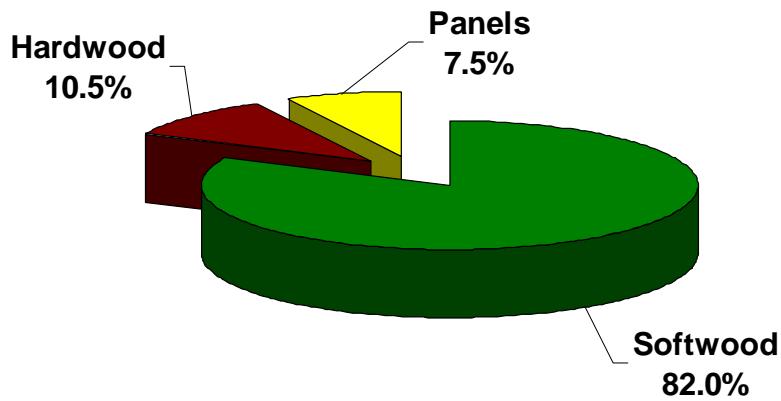


New pallet manufacture consumes the greatest volume of timber products, accounting for around two-thirds of total consumption.

Of the total of timber products consumed by manufacturers of pallets and packaging materials, softwood is the most used product type. It should be noted that the volumes of timber products used are estimated from the survey. It is likely that for some respondents to the survey, some volumes of softwood have been mistakenly counted as hardwood.

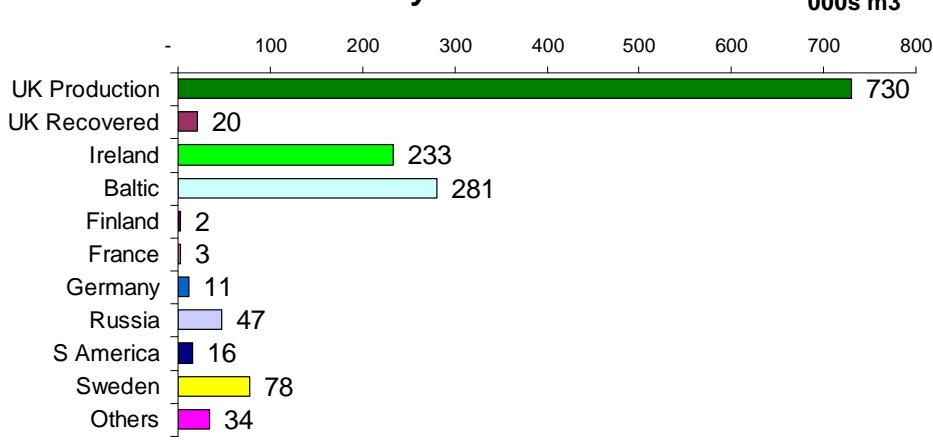
Chart 10 below describes the breakdown of the approximate 1.5 million cubic metres of timber products consumed.

**Chart 10: Volume of Wood Products Consumed by Type**



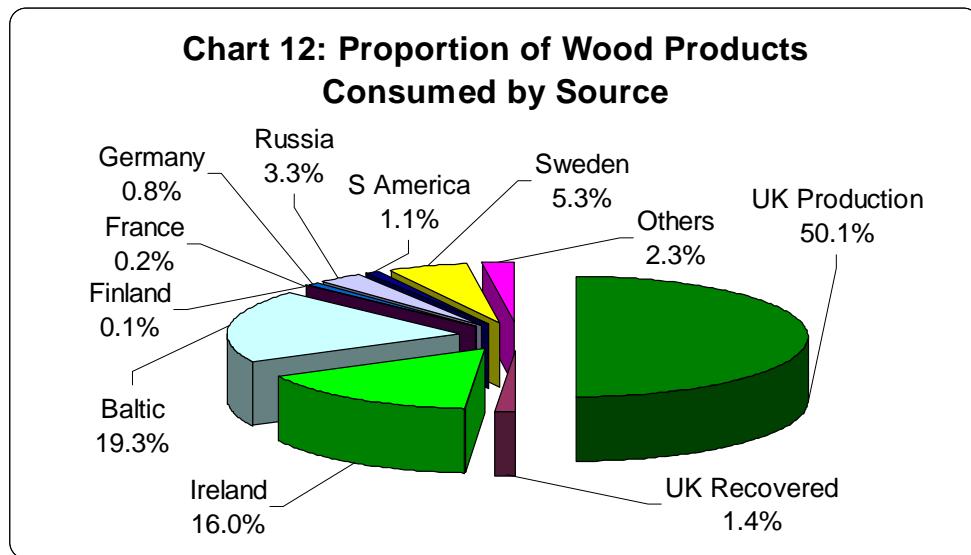
Manufacturers were also requested to identify the source of their timber products supplies and the estimate of consumption by source is shown, by volume below.

**Chart 11: Volume of Wood Products Consumed by Source**



Collectively, timber products produced in the UK and Irish and Baltic products account for the great majority of consumption in the UK packaging industry.

The proportional breakdown is shown in chart 12.



In 2009, around 87% of all timber consumed was sourced from the UK, Ireland and the Baltic States.

## Heat Treatment and Kiln Drying Capacity in the UK

With the prospect of the application by the EU of the ISPM15 standard, to all wood packaging used in intra community trade it was important for Timcon, the Forestry Commission and other bodies to know the extent to which UK manufacturers could respond to such demands.

A survey question asked, "What is the cubic capacity of the drying chambers you possess able to fulfil ISPM15 standard and what is the maximum number of charges of Heat Treated wooden packaging that you can complete in 24 hours?"

The response to this question was poor. The responses that were received indicated that there was not a universal understanding or interpretation of the question with some responses having to be discarded.

However, from the remaining responses, it has been possible to make an estimate of the current, likely 'state of readiness' within the Timcon membership to produce treated pallets to ISPM15, should there be a requirement to produce only heat treated pallets in the UK.

Further investigation revealed that the 'typical' operations within those companies responding to the survey involve 1 charge per day passing through the kiln for heat treatment (min 3 hour cycle) during a typical working day of 7/8 hours.

Based upon the existing working practices of those companies responding to the survey, it was ascertained that for pallet manufacturers with kilns, the current utilisation of kilning capacity for new heat treated pallet manufacturing is around a third, at 32.5%.

If this finding is applied to the 19 million pallets that are produced by Timcon manufacturers with kilns, the number of heat treated pallets estimated to have been produced in 2009 was 6.2 million.

As shown in table 1 earlier in this report, adding the estimated number of all new pallets produced by WMS member companies to the total output of all new pallets produced by Timcon members, the total number of all new pallets manufactured in 2009 was estimated to be around 32.1 million.

Consequently, at the 'typical' throughput per day (1 charge per day per kiln), the industry heat treatment capacity utilisation is 6.2 million pallets / 32.1 million pallets, or 19.3%. However, not all pallet manufacturers own or have access to kilns.

For those manufacturers with kilns, the current level of utilisation of these kilns is calculated to be around 33%. Consequently, it would appear that there is a potential to increase throughput, or the number of charges per day. This was confirmed by each respondent to the survey indicating that the potential for more than 1 charge per day per kiln existed.

If the requirement to produce only heat treated pallets became mandatory, the industry – on this basis – would need to increase heat treatment capacity utilisation fivefold. It should be noted that this does not include pallets made from timber heat treated by a third party. However, as shown a little later in this section, this constitutes a very small proportion of current production.

The probable practical maximum would be 2 charges per day, or a doubling of existing utilisation (of manufacturers with kilns) to around 65%.

This would increase the output of heat treated pallets to around 12.5 million and industry utilisation close to 40%. Should the need to produce only heat treated pallets become a legislative requirement, the current installed base of kilns operated by Timcon pallet manufacturers would only be able to meet 40% of the demand in the UK.

Clearly, any future legislation would need to carefully take account of the capability of the industry to meet the requirement of producing only heat treated pallets. The gap between the legislative requirement to produce only heat treated pallets and the ability of the industry to deliver against this requirement is brought sharply into focus when considering the scale of change that would be needed. If, for example, 80% of current demand in the UK was required to be ISPM15 compliant, the current installed base of kilns would need to double, assuming that each manufacturer had doubled utilisation through existing kilns and maintained this level of utilisation through new kilns.

With a probable maximum utilisation of kilns for heat treatment of 65%, if the UK was required make **all production** ISPM15 compliant, to meet **all** current demand levels, it is likely that between a doubling and trebling of the existing installed base of kilns would need to take place.

In this final part of the survey concerned with the capability of manufacturers to heat treat or kiln dry their production, a question was asked to attempt to measure the incidence of heat treatment conducted internally by Timcon companies and the extent of 'bought-in' heat treated timber.

The number of responses received for this part of the questionnaire was also poor and therefore the following information should be noted for interest only. Although estimates are given, firm conclusions about the level of bought-in and internal heat treated timber cannot be drawn from the number of survey responses.

In order to provide sufficient data the Timcon membership database was used to provide a good basis for calculation. The Timcon membership database identifies whether or not a

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manufacturer has kilning capability. From this information, when combined with sales data from the Timcon membership database and results from the survey, the activity of companies with kilns could be quantified.

Of the 63 Timcon manufacturing members, 20 have kilns.

Timcon turnover bands are identified by the gradation of smallest companies in turnover band A, to the largest in bands E, F and G. The survey results indicated that of the timber purchased by manufacturers in band A, around 15% was bought-in heat treated. This percentage decreased through the turnover bands to the largest manufacturers where less than 3% of timber purchases were heat treated.

With less investment in kilning capacity among smaller manufacturers, the survey correctly revealed that a higher proportion of bought-in heat treated timber prevailed among smaller companies. The incidence of bought-in heat treated timbers decreased through the turnover bands (from the lowest turnover levels to the highest). The highest incidence of in-house heat treatment was, unsurprisingly, in the turnover bands populated by the larger companies.

In order to make estimates of the overall supply of heat-treated packaging to the market, a number of assumptions needed to be made.

The proportion of heat treated timber purchased by those companies responding to the survey was assumed to be the same as for those companies not responding to the survey. This meant that turnover band A companies that did not respond to the survey were assumed to have bought-in around 15% of heat treated timber as a proportion of their total purchases. Similarly, non-respondents in other turnover bands were assumed to consume the same proportion of heat treated timbers as did respondents in their respective turnover bands.

Therefore, using highly representative turnover data (from the Timcon database) with less than representative usage (bought-in and own treatment) from the survey, it was revealed that around 3% of the total Timcon pallet manufacturing and recycling in 2009 used bought-in material and approximately 8% was heat treated internally. This provided a further 89% of pallet production and recycling that was not heat treated.

Should these derived proportions reflect activity in the market, this would identify just over 2 million pallets which used timber that had been heat treated by a third party; around 6 million heat treated pallets would have been produced from Timcon companies with their own heat treatment capacity and the remaining 72 million pallets placed onto the market, both newly manufactured and recycled, by Timcon manufacturers would have received no heat treatment to ISPM15.

In conclusion, the multiple demands to produce ISPM15 compliant pallets, kiln dried pallets and recycled pallets which are fit for purpose, place considerable pressure on manufacturers' current productive capability.

New demands to provide ISPM15 compliant pallets would impact manufacturers' capability to provide kiln dried pallets which in turn, as this wood packaging study has revealed, would affect manufacturers' ability to maintain or increase the number of recycled pallets placed onto the market.

It is clear that future legislation on wood packaging, if required to be effective, will need to carefully take account of industry's ability to meet the demands placed upon it.

# Annex I

## Survey Questionnaire

Forestry Commission



**timcon**  
timber packaging and pallet confederation

A confidential survey of TIMCON members on behalf of the Forestry Commission. Individual company data will not be seen by Timcon members, Executive Committee or the Forestry Commission

The availability of reliable current statistical information on the UK pallet and packaging industry is of critical importance to UK government agencies in the areas of packaging, plant health and industrial policy. In addition, the proposed extension of ISPM 15 regulations in Europe will require accurate statistical input from the UK in order best represent UK interests.

E-mail Survey Form - Please input the required information in greyed out boxes and save this form on your server/computer.  
Then click on the e-mail address [survey@timbertrends.net](mailto:survey@timbertrends.net) below, and attach the saved file to your e-mail and send.

Where the question requires a percentage answer precise calculation is not necessary; you only need to give your best estimate from your everyday knowledge of your business

Questionnaire relates to activity in		2009				
		If you are prepared to provide data for earlier years please save separate copies for each year changing the year box above.				
		Wooden Packaging Activity (carried out by yourself)				
<b>Q1 - Quantitative Data</b>		Measure	New Wooden Packaging Excluding Pallets	New Wooden Pallet Production	Recycled Wooden Pallets (Repaired, Newlife, remanufactured)	Re-used Wooden Pallets (not repaired or remanufactured)
a. Sales Turnover per activity in £	£					
b. No. Employees engaged per activity	Number					
c. Quantity of wood packaging items processed per activity	Number of units					
d. Timber consumption of all sources and types	Cubic Metres					
<b>Q2 - % Produced by Type</b>		Measure	New Wooden Packaging Excluding Pallets	New Wooden Pallet Production	Recycled Wooden Pallets (Repaired, Newlife, remanufactured)	Re-used Wooden Pallets (not repaired or remanufactured)
a. 2-way entry	% of Q1c	N/A				
a. 4-way entry	% of Q1c					
<b>Q3 - % Produced by Size</b>		Measure	New Wooden Packaging Excluding Pallets	New Wooden Pallet Production	Recycled Wooden Pallets (Repaired, Newlife, remanufactured)	Re-used Wooden Pallets (not repaired or remanufactured)
a. 1000 x 1200 or 1200 x 1000	% of Q1c	N/A				
b. 800 x 1200	% of Q1c					
<b>Q4 - Recycled Wooden Pallets by Type</b>		Measure	New Wooden Packaging Excluding Pallets	New Wooden Pallet Production	All Recycled & Reused Wooden Pallets	
a. Repaired (less than 33% of components replaced)	% of Q1c		N/A			
b. Remanufactured (Newlife or remanufactured pallets from reclaimed wood more than 33% of components replaced)	% of Q1c					
<b>Q5 - Timber Consumption by Source.</b>		Measure	All Wooden Packaging			
a. UK Production	% of Q1 d					
b. UK Recycled/Recovered	% of Q1 d					
a. Republic of Ireland	% of Q1 d					
b. Baltic States	% of Q1 d					
c. Finland	% of Q1 d					
d. France	% of Q1 d					
e. Germany	% of Q1 d					
f. Russia/Belorussia/Ukraine	% of Q1 d					
g. South America	% of Q1 d					
h. Sweden	% of Q1 d					
l. Other - specify	% of Q1 d					
<b>Q6 - Percentage of Wood consumption by type</b>		Measure	All Wooden Packaging			
a. Softwood (coniferous species, e.g. pine, spruce)	% of Q1d					
b. Hardwood (non-coniferous species, e.g. poplar (spen), birch alder)	% of Q1d					
c. Manufactured Wood (OSB, Plywood, Composite Blocks etc.)	% of Q1d					
<b>Q7 - ISPM15 Capacity</b>		Measure	All Wood Packaging			
a. What is the cubic capacity of the drying chambers you possess able to fulfil ISPM15 standard? (Note this is the usable internal volume of all of your chamber)	Cubic Metres					
b. What is the cubic capacity of drying chambers that you plan to install over the next 12 months. (Note this is the usable internal volume of all of your planned chambers)	Cubic Metres					
c. What is the maximum number of charges of Heat Treated wooden packaging that you can complete in 24 hours?	Number					
d. What is the maximum number of charges of Kiln Dried including Heat Treatment wooden packaging that you can complete in 24 hours?	Number					
<b>Q8 - ISPM15 Activity</b>		Measure	New Wooden Packaging Excluding Pallets	New Wooden Pallet Production	All Recycled & Reused Wooden Pallets	
a. What percentage of the wooden packaging activity that you carry out is carried out with bought in heat treated wood in accordance with the ISPM15 standard?	% of Q1c					
b. What percentage of all of the wooden packaging activity that you carry out is treated by you to ISPM15	% of Q1c					

When completed, please save to file and then click on the address here, attach the form from the file just saved to return your form directly to Nick Moore at the e-mail address:

[survey@timbertrends.net](mailto:survey@timbertrends.net)

Company Name:

## Annex II

### Methodology

The structure of the pallets and packaging manufacturing and recycling industry is different from many of the industries that operate in the UK economy.

The market comprises many small firms, a good number of middle-sized firms, larger firms and a small number of very large firms operating within the industry. The activities of these companies are not homogenous, with differing emphases on manufacturing and recycling and also different ways of getting to market. This is exemplified by the difference between manufacturers and pallet pool operators with manufacturers mostly selling their output while pallet pool operators only rent pallets for use by customers.

Consequently, the research methodology adopted for this work required a different approach from the 'normal' stratified research sampling used in markets where there is less differentiation between companies.

There was also the important consideration to safeguard the results of the wood packaging study from revealing – through detailed analysis – individual response provided by the very large companies.

Consequently, a 'layered' approach was developed to deliver information that was representative of the market; not skewed towards the few very large companies and at the same time protecting individual company data from view.

Data from individual respondents to the survey were aggregated to determine the scale of different layers within the overall survey sample. This provided an indication of the type of activity that was being carried out within each layer.

Typically, in any of the layers, the activity profile of new pallet manufacture, recycled and re-used pallets could be determined from the survey. The survey data was augmented by the addition of data from the Timcon database which allowed estimates of turnover (among other features) to be made for the entire Timcon membership – but specifically, for manufacturing members of Timcon, as opposed to supplier members.

The calculation of turnover of Timcon members was made by taking the mid-point of each turnover band and simply adding the number of companies in each band to arrive at a notional total of turnover for the Timcon membership.

Where companies responded to the survey, their individual actual data was then reintroduced to the analysis, with the mid-point turnover figure for these individual companies withdrawn from the notional total.

Consequently, a highly representative turnover figure could be derived, notwithstanding that some companies would fall below the mid-point turnover mark while others would be above that mark.

This process of 'adding-back' individual survey results to the mid-point aggregate turnovers for each band resulted in a good estimate from which to establish the detailed analysis that followed.

This methodology was preferred to two others that were considered.

The first involved taking the selected Timcon members' turnover change from 2008 to 2009 and applying this change to the industry turnover for 2008 for the relevant pallets and packaging categories as provided by Prodcom. This resulted in an estimated turnover total of £412 million for 2009.

Although this provided a turnover very close to the one derived from the 'layered' approach, it was felt that to simply take one change statistic and use this as the 'target' industry turnover was too simplistic and would not take into account the varying performance of many companies. Effectively, this 'top-down' approach was based on indicative evidence – not robust data. Hence, this approach was not used.

The second possible methodology involved using the detailed performance changes for each respondent to the survey and making an assessment of the representative nature of the sample before 'grossing' to arrive at industry totals. Although a legitimate approach, it was felt that insufficient weight was given to smaller companies, only a few of which responded to requests for information. This view was borne out when the aggregate turnover totals from the survey were grossed according to the number of respondents as a percentage of the total. The resulting turnover total was in the region of £600 million. Clearly, applying a uniform multiplier (grossing factor) gave too much weight to larger companies and substantially over-valued the industry.

Consequently the layered approach using data for every Timcon manufacturing member was adopted, as this provided an estimate of market value that would be the least prone to error or omission.

This 'layered' approach was used for the calculation of other industry totals, namely employment, quantity of pallets produced, quantity of pallet types and sizes, timber usage and measurement of heat treatment and kiln drying activity among Timcon members.

Response to each of these other information requirements was not uniform however, with some companies either unable or unwilling to provide answers to all questions on the questionnaire.

## Annex III

### Prodcom 2009 – Forecast & Provisional Results

The work of this wood packaging study provides estimates of pallet and packaging activity for 2009.

With survey work carried out in the early months of 2010 for the year 2009 and analysis for this study completed by April 2010, the results effectively provided an estimate or ‘forecast’ of the data that would be included in the 2009 Prodcom, the final version of which is due for publication in November 2010. However, provisional results are published by ONS in July each year and at time of completing this wood packaging study, the provisional Prodcom for 2009 has been made available by ONS.

Consequently, the work of this study for 2009 can be compared against the provisional Prodcom for 2009. The study indicated that when the 2009 Prodcom was available, it would almost certainly show a fall in values and quantities over 2008.

The measure of the change in activity between 2008 and 2009 from the small-scale selective exercise conducted among a few Timcon members, as part of the wood packaging study, indicated that a fall in turnover in the region of 10% took place from 2008 to 2009.

If this was repeated across the industry and applied to the 2008 Prodcom, the 2009 Prodcom would probably show pallet industry turnover falling from £324,527,000 to £295,024,000 and pallet volumes falling from 62,802,165 to around 57,000,000.

This outcome from the study reveals a fairly close comparison of turnover, with pallet turnover in 2009 from the wood packaging study estimated to be £285,199,000.

With the 2009 Prodcom becoming available, comparisons can be made with the wood packaging study estimates. The 2009 Prodcom pallet turnover was £276 million, a difference of around 3% to the study estimates. The 2009 Prodcom quantity of pallets produced was 56 million, a difference of less than 2% to the study estimates – applying the study’s predicted percentage change between 2008 and 2009 to the 2008 Prodcom totals.

As noted in the body of the report, the quantities placed onto the market, as measured by Prodcom, differ considerably from the study, with the 56 million pallets quoted in the 2009 Prodcom and the 91 million from the wood packaging study.

If, as it is believed, the wood packaging study totals are highly representative, it would appear that the Prodcom quantity totals are failing to identify a substantial part of the market.

The average pallet value within 2008 Prodcom was £5.17 and in the 2009 Prodcom, this fell to £4.95. The average pallet value from the study for 2009 was £3.28. However, average pallet value for just newly manufactured pallets from the study was £5.23 in 2009.

This suggests that within the 2008 and the 2009 Prodcom, measurement of the proportion of recycled pallets was insufficient. Should this be the case, the cause could be due to one or a number of factors.

These are:

- that the Prodcom Inquiry has failed to gather data from companies or operating units of companies that are engaged in pallet recycling (through a weakness in sample selection) or
- Prodcom has identified activity for which an incorrect interpretation has been made (possibly repair activity that was not classified as production) or
- that some companies completing the Prodcom Inquiry have (incorrectly) omitted or mis-interpreted the requirement to report recycling activity.

Another possibility is that the wood packaging study has correctly estimated turnover totals but not quantities placed in the market in 2009?

This latter possibility would seem unlikely however.

The survey estimate of 91 million pallets was derived from the measurement of respondents' actual quantities of 63 million pallets, with the remainder derived from conversion of survey non-respondents' turnover data split into newly manufactured, recycled and re-used (according to the proportions from 'non' top layers of the survey sample) and converted into quantities, again based on the average usage data derived from survey respondents.

The 28 million pallets that formed the addition to the known totals from the survey (91 million less 63 million) was based on survey activity rates, mid-point turnover estimates from the Timcon Database and 'grossing' of WMS pallet production based on the proportion of those responding to the survey as a percentage of the total estimated productive numbers within WMS membership.

Effectively, the margin for error, provided through the 'layered' approach to the wood packaging study was substantially reduced.

If the mid-point turnover estimates for Timcon manufacturers and the 'grossed' totals for WMS members were in error by, for example, as much as 30%, this would mean the estimates of the total number of pallets placed onto the market would range from around 85 million to 99 million. Therefore, even with latitude of 30% for non-respondents to the survey, the differences from the estimate 91 million pallets from the study would only be between 7% lower or 9% higher.

The margin for error could be estimated for the larger part of the 28 million, as represented by Timcon manufacturers, but it is doubtful if this would be as high as 30%; therefore it can be stated that there is a high degree of confidence with the estimated figure of 91 million pallets in 2009.

Information held by the author on imports and exports of wood-based products has enabled estimates to be made of trade in pallets.

Consequently, merging the results of the wood packaging study with trade data allowed an estimate of the pallet Prodcom for 2009.

As stated above, the pallet Prodcom 2009 was likely to show a drop in turnover and quantity of pallets produced in the UK, but as proposed above, the pallet Prodcom 2009 was also likely to show a significantly different quantity of pallets produced.

The intermediate Prodcom for flat pallets and collars of wood for 2008, the results of the wood packaging study cast in the format of Prodcom for 2009 and the provisional 2009 Prodcom is shown in the table below.

For 2009, the imports and exports totals have been derived from HM Revenue and Customs data which have been analysed and 'cleaned' to provide more accurate information.

#### Flat Pallets and Collars of Wood

Value £000s	2008 Prodcom Intermediate	2009 Wood Packaging Study	2009 Prodcom Provisional
UK Manufacturer Sales	324,527,000	285,199,456	276,322,000
Intra EU Exports	10,126,000	9,746,707	9,469,000
Intra EU Imports	14,535,000	12,677,410	12,678,000
Net Balance	4,409,000	2,930,703	3,209,000
Extra EU Exports	836,000	368,796	369,000
Extra EU Imports	652,000	122,042	123,000
Net Balance	- 184,000	- 246,754	- 246,000
Total Exports	10,962,000	10,115,503	9,838,000
Total Imports	15,187,000	12,799,452	12,801,000
Net Balance	4,225,000	2,683,949	2,963,000
UK Net Supply	328,752,000	287,883,405	279,285,000

#### Volume (Number of Items)

UK Manufacturer Sales	62,802,165	90,819,423	55,850,208
Intra EU Exports	3,572,462	1,930,169	1,842,051
Intra EU Imports	3,291,562	2,036,146	2,291,463
Net Balance	- 280,900	- 105,977	- 449,412
Extra EU Exports	408,579	49,646	40,176
Extra EU Imports	67,406	17,080	28,802
Net Balance	- 341,173	- 32,566	- 11,374
Total Exports	3,981,041	1,979,815	1,882,227
Total Imports	3,358,968	2,053,226	2,320,265
Net Balance	- 622,073	- 73,411	- 438,038
UK Net Supply	62,180,092	90,892,834	56,288,246

#### £ per Item

UK Manufacturer Sales	5.17	3.14	4.95
Intra EU Exports	2.83	5.05	5.14
Intra EU Imports	4.42	6.23	5.53
Extra EU Exports	2.05	7.43	9.18
Extra EU Imports	9.67	7.15	4.27
Total Exports	2.75	5.11	5.23
Total Imports	4.52	6.23	5.52
UK Net Supply	5.29	3.17	4.96

As originally stated earlier in this report, on release of the 2009 Prodcom, it would probably be seen that industry turnover for all pallets and packaging falls below £400 million (the wood packaging study estimated £406 million) and specifically for pallets the number manufactured would be below 60 million. This has been borne out by the release of the 2009 Prodcom where UK manufacturer's sales of all packaging was £400 million and specifically for pallets, the number produced in the 2009 Prodcom was almost 56 million.

This confirms the probable under-estimation by Prodcom of the volumes and values present in the pallets and packaging industry over the last few years.

If this supposition is correct, it should be possible to estimate and revise (upwards) the various industry measures of value and volume over the last few years.